



# SmartPAC<sup>®</sup>2

# Press Automation Control with WPC 2000 Clutch/Brake Control

*includes optional DiPro<sup>®</sup>PAC and ProCam<sup>®</sup>PAC* 1128600 *Rev. P January* 2018

Tech Support Hotline 800-586-8324 8-5 EST



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Thank you for purchasing a Wintriss Product. We appreciate your business and want to do whatever we can to ensure your satisfaction. Wintriss products are built to stay on the job day after day, and are backed by an ironclad guarantee, international standards approvals, and unbeatable support. Whenever you need assistance or service, we back all our products with excellent spare parts inventories, training programs, and prompt repair service. We would like to share with you a list of service options–probably the largest number of service options offered in the industry.

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Whatever the product, we are committed to satisfying you with innovative engineering, quality construction, reliable performance, and ongoing, helpful support. Call us whenever you need assistance.

# Changes for Revision P of the SmartPAC 2 with WPC 2000 User Manual (1128600)

This revision of the SmartPAC 2 user manual covers SmartPAC 2 software version 13.81 and higher and WPC 2000 software version 6.00 and higher. The changes include:

- In How to Use This Manual, added link to downloadable product documentation.
- Throughout manual, updated with Shadow 9 light curtain information, including addition of wiring diagrams Figures 26, 27, and 28 at the end of the manual.
- In Chapter 7, Fault Messages, added notes about finding error numbers 120 or higher in WPC 2000 Option 2 User Manual (1130700) and WPC 2000 Option 2 Additional Inputs Only Instruction Sheet (1141900).
- In Appendix A, revised Extracts from ANSI B11.19-2003 8.3 to 2010 edition (ANSI B11.19-2010 8.3).

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# How To Use This Manual

This manual shows you how to install, set up, program, operate, and troubleshoot SmartPAC 2 with WPC 2000 including the optional DiProPAC and ProCamPAC modules.

Chapter 1 provides an overview of the operation and features of SmartPAC 2 and WPC 2000.

Chapter 2 shows you how to install SmartPAC 2 with WPC 2000.

Chapter 3 shows you how to use the SmartPAC 2 with WPC 2000 displays and keyboard.

Chapter 4 shows you how to use SmartPAC 2 in Initialization mode, which is the mode you select to make settings that apply to SmartPAC 2/WPC 2000 operation for all tools.

Chapter 5 shows you how to use SmartPAC 2 in Program mode, which is the mode you select to program settings that apply to SmartPAC 2/WPC 2000 operation for individual tools.

Chapters 6 shows you how to use SmartPAC 2 in Run mode, which is the mode you select to run the press and make minor adjustments to programmed settings.

Chapter 7 provides explanations of the messages that display on the SmartPAC 2 front panel when a fault condition occurs or a counter preset is reached, and shows you how to correct SmartPAC 2 and WPC 2000 faults.

Appendix A provides OSHA regulations and ANSI standards pertaining to the use of presence-sensing devices for point-of-operation guarding on mechanical power presses.

Appendix B provides the safety standards you must meet when building your own Operator Station.

Appendix C shows you how to use the optional PM (Preventative Maintenance) Monitor available with SmartPAC 2.

Appendix D shows you how to upgrade SmartPAC 2 firmware.

Appendix E shows you how to install and use the SmartView remote viewing utility.

Appendix F provides instructions in upgrading from an original SmartPAC to a SmartPAC 2.

Appendix G shows you how to install a replacement SmartPAC 2 board.

Appendix H shows you how to report downtime and scrap to Wintriss's ShopFloorConnect Asset Utilization Software (SFC).

Appendix I shows you how to report downtime and scrap to Wintriss's Line Efficiency Tracking Software (LETS).

Appendix J shows you how to install, wire, and troubleshoot WPC 2000 Option 1 user inputs.

The Glossary provides definitions of some of the terms used in the manual that may be unfamiliar to you.

Setup sheets at the back of the manual provide forms on which you can maintain a record of Initialization and Program settings for your SmartPAC 2 with WPC 2000.

Figures following the Setup sheets provide wiring diagrams that you can use in conjunction with the instructions in Chapter 2 to wire SmartPAC 2 with WPC 2000 and its components.

Download documents for other Wintriss product at <u>http://www.wintriss.com/wcg/general/</u> <u>downloads.html</u>

# **Important Highlighted Information**

Important danger, warning, caution and notice information is highlighted throughout the manual as follows:

# A DANGER

A DANGER symbol indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

# A WARNING

A WARNING symbol indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

# CAUTION

A CAUTION symbol indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

### NOTICE

A NOTICE symbol indicates important information that you should remember, including tips to aid you in performance of your job.

#### WARRANTY

Wintriss Controls warrants that Wintriss electronic controls are free from defects in material and workmanship under normal use and service for a period of one year (two years for Shadow light curtains) from date of shipment. All software products (LETS/ SFC and SBR), electromechanical assemblies, and sensors are warranted to be free from defects in material and workmanship under normal use and service for a period of 90 days from date of shipment. Wintriss's obligations under this warranty are limited to repairing or replacing, at its discretion and at its factory or facility, any products which shall, within the applicable period after shipment, be returned to Wintriss Controls freight prepaid and which are, after examination, disclosed to the satisfaction of Wintriss to be defective. This warranty shall not apply to any equipment which has been subjected to improper installation, misuse, misapplication, negligence, accident, or unauthorized modification. The provisions of this warranty do not extend the original warranty of any product which has either been repaired or replaced by Wintriss Controls. No other warranty is expressed or implied. Wintriss accepts no liability for damages, including any anticipated or lost profits, incidental damages, consequential damages, costs, time charges, or other losses incurred in connection with the purchase, installation, repair or operation of our products, or any part thereof.

Please note:

It is solely the user's responsibility to properly install and maintain Wintriss controls and equipment. Wintriss Controls manufactures its products to meet stringent specifications and cannot assume responsibility for consequences arising from their misuse.

This product is covered by US patent #5455848.

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# **Chapter 1. Introduction**

SmartPAC 2 is a smart modular interface for multiple press automation functions including die protection and programmable cam switch. Every SmartPAC 2 provides a control-reliable, resolver-based brake monitor and extensive counter capabilities. Because SmartPAC 2 is microprocessor-based, it can monitor or control a variety of functions on every stroke even for very high-speed presses. SmartPAC 2 features a large, bright color display, a numeric keypad, and easy-to-use keys to program and run your press. SmartPAC 2 can be connected to a computer network, enabling press operation to be monitored remotely and e-mail messages to be sent from the SmartPAC 2 control.

SmartPAC 2 can be configured with the following options:

- Up to 32-sensor die protection system
- Up to 16-channel programmable cam switch
- Up to 16-sensor in-die measurement system
- Solid-state dual-microprocessor-based clutch/brake control (WPC 2000)
- Two- or four-input load monitoring
- · Automated shut-height and counterbalance control
- Automated press speed and lubrication control
- Servofeed interface

In addition, SmartPAC 2 can be linked to Wintriss's ShopFloorConnect Asset Utilization Software (SFC) or Line Efficiency Tracking Software (LETS) for data collection, analysis and reporting.

# WPC 2000 and Control Reliability

WPC 2000 Wintriss Clutch/Brake Control is an easy-to-use, dual-microprocessor-based system that controls part-revolution mechanical power presses. Housed in a single modular enclosure, both microprocessors function independently, have different power supplies, and provide separate information to the operator. As a result of its "dual diverse redundancy," WPC 2000 is able to provide optimum clutch/brake control and improved operator safety while increasing productivity.

WPC 2000 meets or exceeds all ANSI B11.1-2009, OSHA 1910.217, and Canadian Z142-02 standards for Control Reliability, the benchmarks that govern the operation of mechanical power presses. Control Reliability demands that a single component failure in a clutch/brake control circuit *not* prevent the normal stopping action of the press, *not* create an unintended stroke, and *not* allow initiation of a subsequent stroke until the failure has been corrected.

# SmartPAC 2 with WPC 2000

SmartPAC 2 integrated with WPC 2000 provides a comprehensive user interface for the Wintriss Clutch/Brake control, bringing a multitude of press automation functions to one central location.

### SmartPAC 2 Standard Features

The following capabilities are standard features on SmartPAC 2:

- All settings are made at the operator console, using SmartPAC 2's keyboard and large, bright color display
- All tool programming is automatically saved in SmartPAC 2's non-volatile memory. To use the same settings when you run the job again, simply re-load your stored tool number. SmartPAC 2 can save settings for up to 200 tools.
- SmartPAC 2's built-in brake monitor constantly checks brake wear by measuring stop time whenever the press stops and displaying that value in milliseconds. SmartPAC 2 also displays the number of degrees that it took the press to stop.
- Fault messages appear on the SmartPAC 2 display whenever the press malfunctions, counter presets are reached, or stopping/starting times exceed set limits. An error/event log maintains a record of the last 100 errors and events.
- Screen capture capability enables users to easily send the contents of the screen to a PC.
- SmartPAC 2 is Ethernet-ready, allowing the control to be connected to any computer network. Network connectivity allows press operations to be viewed remotely via the SmartView utility, and e-mail messages, containing diagnostics and error log information, to be sent from the SmartPAC 2.
- SmartPAC 2 upgrades and enhancements can be installed quickly and easily. Upgrades can be either downloaded directly to SmartPAC 2 via the local network or mailed to you on a USB disk.

### WPC 2000 Standard Features

WPC 2000 provides the following capabilities as standard features:

- Interrupted Stroke provision. When the press is the Emergency-stopped before the completion of a stroke by either the operator or an automatic device for personnel or equipment protection, the message "Interrupted Stroke" flashes on the SmartPAC 2 display, and WPC 2000 switches to "Two-hand Maintained Single-stroke" mode. To clear the Interrupted Stroke, the operator pushes both Run/Inch buttons simultaneously and holds them until the press reaches the top of the stroke. At this point, the "Interrupted Stroke" message disappears, and WPC 2000 automatically reverts to the original operating mode.
- Customized status codes. Nine user inputs are provided, allowing you to monitor auxiliary press functions, such as lubrication systems. When one of these functions issues a Stop command, a unique status code is displayed on the SmartPAC 2 LCD to identify why the press stopped. Two of the inputs are cross-checked pairs, which you can use for safety interlocks. If you install the optional Option 1 board, you can connect up to 20 additional non-control-reliable inputs and up to 4 additional control-reliable, cross-checked input pairs (see Appendix J).
- 90° stop-time test. This standard feature is required in order to set the correct safety distance for personnel-guarding devices including light curtains, two-hand controls, and type-B movable barriers. The test is performed at 90°, the press's most critical stopping point, with the press running in Continuous and the heaviest die installed. The results of

the test provide the stopping time (Ts) value specified in both OSHA 1910.217 and ANSI B11.1-2009 (see Appendix A).

- Inputs for multiple Shadow light curtains. WPC 2000 tests up to two Shadow light curtain inputs every time that the press is started and stopped.
- Micro-inch, a feature that allows you to set the amount of time that the Dual Safety Valve is open in Inch mode when you push the Run/Inch palm buttons. Normally, in Inch the DSV is open for only as long as the Run/Inch buttons are depressed. The Micro-inch setting specifies the length of time the DSV is open regardless of how long the Run/Inch buttons are held. Allowing finer adjustments than are possible in Inch, Micro-inch is designed to facilitate setup on high-speed or short-stroke presses.
- Connection of two Operator Stations directly to the WPC 2000. Additional Operator Stations may be connected. Contact Wintriss Tech. Support for information.
- WPC 2000 Main Processor board with diagnostic LEDs for troubleshooting.

### SmartPAC 2 Options

SmartPAC 2 can be configured with the following options:

- DiProPAC. When configured with the DiProPAC option, SmartPAC 2 can monitor up to 32 sensors, allowing detection of malfunctions such as stock buckling, misfeeds, and improper part ejection.
- ProCamPAC. The ProCamPAC option provides up to 16 programmable cam channels, enabling SmartPAC 2 to control cam timing for feed, pilot release, air blow-off, lubricator, and other press equipment. ProCamPAC also includes global cams for press operation functions, DSV ON channel delay timing, and multiple on/off cycles for a single cam.
- AutoSetPAC or WaveFormPAC. Provides two- or four-channel load monitoring, protecting your press and dies from overloads and underloads. You can store high, low, and repeatability setpoints with tool number, display, adjust, and recalculate setpoints, and compare setpoints to the actual load. With WaveFormPAC, you can also display and save load signatures and create up to four windows to monitor tonnage at points other than peak.
- RamPAC. Provides automatic control of shut height and counterbalance and cushion pressures by tool number.
- ProPAC. Provides up to 16 analog, NPN, or PNP inputs that enable you to monitor in-die dimensions and other process parameters.
- Info Center. Enables die setup sheets and other plant-specific press information to be displayed on the SmartPAC 2 screen. This option allows you to store information needed throughout the plant on a central server, where it is available to operators via SmartPAC 2's Ethernet connectivity. In order to make use of Info Center functionality, SmartView (see Appendix E) must be installed. Documentation of the Info Center option is available at www.smartpac2.com/SmartView/InfoCenterSetupHelp.htm
- SBR (SmartPAC Backup and Restore). Allows you to back up programmed tool settings to a Windows laptop PC.
- USB Disk Backup. Allows you to back up tool settings to a USB disk.

- High Speed (HSP). Required for presses that run faster than 800 SPM, this option handles speeds from 14-1600 SPM.
- Bilingual. Provides Run mode screens in both English and a second language which you select.
- Preventive Maintenance (PM) Monitor. Allows you to track selected press functions requiring scheduled maintenance and alerts you when maintenance is due.
- PLC Interface. Enables SmartPAC 2 to transmit tool settings to a Programmable Logic Controller for press automation and auxiliary functions.
- SFC (ShopFloorConnect Asset Utilization Software) or LETS (Line Efficiency Tracking Software). Data collection software that processes downloaded production information from SmartPAC 2, generating OEE and other reports.
- Third Party Communications. Allows SmartPAC 2 to transmit real-time and status information to external software for reporting and other tasks.

### WPC 2000 Options

The following options can be added to your WPC 2000:

- Operator Station. The Operator Station is normally the device used to run the press in all Stroke Select positions. Wintriss provides operator stations with Run/Inch palm switches mounted on either the top or sides (see *Installing Operator Station(s)*, page 2-16 for available configurations).
- Dual-monitored Safety Valve (DSV). The DSV controls the flow of air to the press clutch and brake. Wintriss provides 3/4 in. and 1 in. Ross DM2 DSVs. See *Installing a Dual Safety Valve*, page 2-12 for further details.
- System Air Pressure Sensor or Switch. This sensor or switch monitors the system air pressure. See *Installing Air Pressure Sensors or Switches*, page 2-13 for additional information.
- Shadow Light Curtain. The Shadow light curtain is a presence-sensing device that places an infrared light field between the point-of-operation and the operator. When an object, like the operator's hand, enters the sensing field and blocks a light beam, the light curtain detects the object and issues an Emergency-stop command to the press.

The Shadow light curtain is required for point-of-operation guarding if WPC 2000 is used with a Foot Switch or in One-hand operating mode. Multiple light curtains can be wired to a WPC 2000. WPC 2000 tests up to two pairs of Shadow inputs every time that the press is started and stopped. See *Installing a Light Curtain*, page 2-22 for more information.

WPC 2000 is designed to be used with a Shadow light curtain. If you order WPC 2000 without a light curtain, the control enclosure does not have a Mode Select switch, and the unit operates only in Two-hand mode.

The light curtain is placed between the Operator Station and the die space. Shadow's mounting-bracket design allows plenty of room for adjustment.

• Counterbalance Air Pressure Switch. Operating identically to the clutch air pressure switch, this switch is used with the counterbalance air supply on presses equipped with counterbalances, as required by OSHA regulations.

- One-hand Control. A low-force switch that can be used with WPC 2000 running One-hand/Two-hand/Foot firmware and equipped with a Shadow light curtain guarding the point of operation. The One-hand Control switch can be mounted on or near the press, allowing the operator to press the switch as part of his normal hand motion after loading a part.
- Foot Switch. A device that frees the operator's hands for increased, fully-guarded protection and productivity. One-hand/Two-hand/Foot firmware is required, and a Shadow light curtain must be installed.
- Bar Mode Control. Allows operators and setup personnel to bar the press by hand for die setting and adjustment. Recommended for smaller-capacity presses of 65 tons or less.
- Automatic Single-stroke (External Trip). Allows feed equipment to signal WPC 2000 to initiate a stroke upon completion of a feed. This option is useful in applications where the feed must be completed before the press can be stroked.
- Automatic Continuous On-demand. Allows an external device to signal WPC 2000 to start the press in Continuous mode and maintain operation in Continuous.
- Auto Compensated Top Stop (ACTS). A feature that automatically adjusts the Top-stop "On" Angle to an earlier point in the stroke to compensate for increases in press speed. ACTS is designed specifically for variable-speed presses. See *Switch 4 Enabling Auto Compensated Top Stop (ACTS)*, page 4-37 for additional information about this feature.
- Multiple Operator Stations. Two Operator Stations can be connected directly to WPC 2000. If you wish to install more than two Op. Stations, contact Wintriss Tech. Support (see *Installing Multiple Operator Stations*, page 2-21).

### A DANGER

#### HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

- Safeguard the point of operation exposed by the non-working Operator Station when using multiple Operator Stations. The exposed area near a disabled Operator Station must be properly guarded.
- Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

### NOTICE

Use light curtains in addition to multiple operator stations for best personnel safeguarding.

- Display Configuration Options. WPC 2000 is available without an enclosure. See page 2-11 for installation instructions.
- Auxiliary E-Stop Output Relay Board. Allows up to three auxiliary devices such as a feed or transfer to be stopped or prevented from starting when an E-stop button is pressed, a light curtain is interrupted, or a cross-checked input is open.

If your WPC 2000 has Shadow light curtain muting firmware, you can prevent the auxiliary E-stop relays from issuing a Stop command if the light curtain is interrupted during the muted portion of the stroke by setting option switch 2 on switch block S102 on the WPC

2000 Main Processor board (see page 4-42). The auxiliary E-stop muting function is necessary in applications where parts must be ejected through a light curtain. Auxiliary relay muting does not prevent the auxiliary relays from issuing a Stop command when an E-stop button is pressed or a cross-checked input is open.

Layout of the Auxiliary E-Stop Output Relay board is shown in Figure 2-14, page 2-28. Wiring connections are shown in Table 2-29, page 2-115.

# **Resolver-based Operation**

SmartPAC 2 is connected to a resolver mounted on the press that turns one to one (1:1) with the crankshaft. Like an electrical generator, the resolver has internal windings and works on the principle of inductance. As the resolver turns, the amplitude and phase of its two outputs vary. SmartPAC 2 converts this analog signal to a number that specifies the position of the press crankshaft in degrees.

# **SmartPAC 2 Front Panel**

Programming and operation of SmartPAC 2 is accomplished via the SmartPAC 2 front panel, which is shown in Figure 1-1, page 1-7. A brief description of each panel component is provided below.

```
Display
                             Used with the keyboard to make and adjust settings, load tool
                             numbers, and view diagnostic messages. The display, which
                             measures 10.4 in. (264 mm) diagonally, is a color liquid crystal
                             display (LCD).
Program/Run key switch
                             Allows Program mode to be locked so settings cannot be
                             changed by the press operator. Key must be set to "Run" to
                             operate the press. Minor adjustments, including loading an
                             existing tool, can be made in Run mode.
Stroke Select key switch
                             Allows you to select the operating mode of the press. There are
                             four settings: Off, Inch, Single-stroke, and Continuous.
                             Consists of cursor keys and a numeric keypad (described
Keyboard
                             below) that are used with the display to make settings.
Cursor keys
                             Enable you to select a display item with the highlight bar. Also
                             allow you to select alphabetic characters and special symbols
                             when naming the press, tools, cam channels, and sensors.
Number keys
                             Enable you to input numeric values such as counter presets or
                             tool numbers
Function keys
                             Eight keys labelled "F1" to "F8" that perform specific tasks.
                             Functions performed by pressing the key are displayed to the
                             left of the key label. Function keys can also be programmed as
                             "Hot keys" that take the user directly to desired screens.
HELP key
                             Enables you to access a help screen that provides information
                             about the display you are looking at.
```



Figure 1-1. SmartPAC 2 Front Panel

ENTER key	When you press this key, SmartPAC 2 accepts the menu item you have selected or the number you have keyed in.
RESET key	You press this key when you are done with a programming or other procedure. Also resets SmartPAC 2 after fault or event messages appear on the display.
Brake Warning LED	An amber LED that flashes when the stopping time of the press increases to within 10 milliseconds of the preset Stop-time Limit, alerting the operator that it is time to schedule maintenance on the brake.

Detailed instructions on how to use the keyboard and display are provided in Chapter 3.

# WPC 2000 Operator Station

Figure 1-2 identifies the switches and indicator lamps on a Wintriss Operator Station. (The configuration with side-mounted Run/Inch palm switches is shown.) Functions of Operator Station components are provided following the figure.



Figure 1-2. Operator Station Components (Side-mounted Run/Inch Palm Buttons)

**Run/Inch Palm Switches (2)**–Initiate press action when both switches are pressed at the same time (Two-hand mode) or when only the left switch is pressed (One-hand mode).

**Prior Act Lamp and Switch**–An arming device that must be pressed in Continuous Twohand and Continuous Foot operating modes before a stroke can be initiated. When the switch is pressed, the lamp illuminates for 8 seconds, indicating the interval within which the operator must press the Run/Inch buttons or Foot Switch in order to stroke the press. Also used in Automatic Single-stroke operation (see page 6-49).

**Emergency Stop Switch**–Stops the press immediately when you push it. The switch is not spring-loaded, so you must pull it back to its original position to clear the emergency stop (F13) fault (see page 7-8).

**Top Stop Switch**–Stops the press at the top of its stroke when pressed during Continuous operation.

**Palm Time Lamp**–Illuminates when one Run/Inch palm button is depressed, turning off after the 1/2-second palm time ("synchronous" time in ANSI terminology) on a standalone Operator Station or the 5-second concurrent time on multiple Operator Stations. The other palm button on a standalone Op. Station or all pairs of buttons on multiple Operator Stations must be pressed before the lamp turns off in order to initiate a stroke.

**Mute Lamp**–Illuminates during muting of the light curtain on the upstroke. Requires installation of a Shadow light curtain and optional light curtain muting firmware.
# **SmartPAC 2 Settings**

You can make the following settings, using the keys on the SmartPAC 2 keyboard:

- **Assign tool numbers**. Settings for each tool are stored by tool number, which you assign to identify and access the tool when you want to program or load it. You specify in Initialization mode whether to use numeric or alphanumeric tool numbers in programming.
- Load settings by tool number. SmartPAC 2 saves all counter, sensor (if DiProPAC is installed), cam switch (if ProCamPAC is installed), and other press settings in its electronic memory. To use tool settings again, you recall them by selecting the tool number from the Tool Manager display. SmartPAC 2 retains tool settings even when the power is off.
- **Record tool information for each tool number.** With this option you can record up to 30 characters of information for each tool, such as installation notes.
- **Protect settings with lockout and optional password security.** Using SmartPAC 2's Security Access Menu in Initialization mode, you can lock many of the settings in Run mode, preventing anyone without access to the Program/Run key from altering Run settings. You can also require that the user enter a password in order to change settings. To prevent unauthorized changes to SmartPAC 2 setup, you can require a special password for access to the Main Initialization Menu.
- Set Brake Monitor. You set the brake monitor stop time limit to compensate for normal brake wear and to provide a warning when the brake needs service. When you make a time setting that is longer than the actual stopping time and the press reaches that stop time limit, the brake monitor disables the press, alerting you that your brake requires service. In addition, the Brake Warning LED on the SmartPAC 2 front panel (see Figure 1-1, page 1-7 for location) flashes when press stopping time approaches within 10 milliseconds of the stop time limit, allowing you to schedule brake maintenance before the press has to be disabled.
- Set counters. SmartPAC 2 provides counters to keep track of the number of strokes made by the press during each job, the number of good parts produced, and other desired statistical information. The stroke counter increments at each press cycle. The good parts counter increments only when the die protection or tonnage monitoring option does not generate a fault. Three batch counters can be set to either top-stop the press or signal programmable limit switch (PLS) outputs when their presets are reached. The total hits counter counts all hits on a tool, and keeps track of the last recorded number for the previous job. With the optional Advanced counter mode, you can set the good parts counter to give an accurate parts count when multiple parts are produced at each stroke or when multiple strokes are required to produce one part.
- **Reset SmartPAC 2**. You reset SmartPAC 2 whenever the press is stopped because of a malfunction. The malfunction is described in a fault message, which displays on the SmartPAC 2 front panel when the fault occurs, making it easy to troubleshoot the problem. See Chapter 7 for documentation of fault messages.
- **Review recent errors.** SmartPAC 2's Error/Event Log feature displays the 100 most recent errors and events that have occurred at the press. Errors (i.e., incidents that cause the press to stop) are shown along with the stroke count and crankshaft angle at which the error

occurred. Events such as tool changes are displayed with the date, time, and stroke count. The Error Log is accessible from the Main Run Menu.

- Set timing for sensor inputs (DiProPAC Only). You can specify the portion of the stroke during which you want installed sensors to monitor press operation. Up to 32 sensors can be programmed, allowing detection of malfunctions such as stock buckling, misfeeds, die overload, and improper part ejection.
- Set timing for cam channels (ProCamPAC Only). You can specify the crankshaft angle at which to activate your feed pilot release, assembly operations, air cylinders, transfer devices, lubricators, air blow-off, cut off, loader/unloader controls, and other equipment that requires precise synchronization with the press. You can also assign a name to each cam channel.

# Sensors Available for DiProPAC

DiProPAC, the SmartPAC 2 die protection option, checks output from sensors monitoring the die and sends a stop signal to the press when it detects a malfunction. Sensors can be mounted on the press or die.

Any electromechanical sensor can be used with SmartPAC 2 as long as it can switch between an open state (i.e., sensor circuit to SmartPAC 2 open) and a closed state (i.e., sensor circuit closed to ground or "grounded"). All types of NPN electronic sensors (e.g., proximity, photoelectric, and fiberoptic sensors) can be used as can simple contact sensors and probes. If you have questions about whether a certain sensor will work with SmartPAC 2, contact Wintriss Controls.

Wintriss makes or sells a wide range of sensors. Those that can be used with SmartPAC 2 with DiProPAC are shown below. Detailed application information is available. Many sensors made by other manufacturers can also be used.

- **Miniature fiberoptic photoelectric sensors**—Through-beam and reflective types are available with adjustable sensitivity and the capability to detect objects as small as .0006 in. (.015 mm). Require 12 to 24 Vdc power source.
- **Proximity sensors**—Miniature electronic sensors that detect metal objects passing in front of the sensor barrel. These sensors have no moving parts and are not affected by water or oil. Require 12 to 24 Vdc power source.
- **Misfeed detectors**—Designed to monitor non-working, spring-loaded pilot punch position, stripper position, or other material location applications.
- Short feed sensors—Used to ensure that material is contacted at the fully advanced position.
- **Overload sensors**—Used to prevent expensive die damage due to overload from slugging, material thickness variations, broken tooling, etc.
- Die overload sensors—Designed to detect minor changes in shut height.
- Buckling sensor—Used to detect material buckle.
- End of material sensor—Signals when material has run out.
- **Probes**—Three types are available for diverse applications.

# ProCamPAC Programmable Cams

# A DANGER

#### PROGRAMMABLE CAM SWITCH NOT FOR SAFETY USE

Use SmartPAC 2's programmable cam switch to control auxiliary functions only. The SmartPAC 2 programmable cam capability should never be used to provide timing signals for any safety use including clutch/brake control or muting of light curtains.

Failure to comply with these instructions will result in death or serious injury.

The optional ProCamPAC module enables you to connect up to eight or sixteen cam channels to your equipment. ProCamPAC consists of a PC board that you install in your SmartPAC 2 and a separate assembly that contains the relays that open and close on signals from SmartPAC 2. Different types of relays can be used depending upon the voltages of your equipment and your special needs. Refer to Chapter 2 for details on wiring the cam channels.

# **SmartPAC 2's Three Modes of Operation**

SmartPAC 2 has three operating modes, each of which allows you to perform specific tasks.

- Initialization Mode. Used to create settings that control operation of SmartPAC 2 when any tool is loaded (e.g., the zero position of the resolver, global cams, auto advance constants, etc.). Initialization settings generally only need to be made once. Initialization mode is discussed in detail in Chapter 4.
- **Program Mode.** Used to create, modify, and load settings that control SmartPAC 2 operation for a specific tool (e.g., sensor and cam timing, counter presets, etc.). You cannot use this mode while the press is running. Instructions for using Program Mode are provided in Chapter 5.
- **Run Mode.** Used to operate the press and make adjustments to programmed settings such as sensor and cam timing. You can also load tool settings in Run mode. Run mode is discussed in Chapter 6.

# SmartPAC 2 with WPC 2000 Specifications

SmartPAC 2 with WPC 2000 specifications are shown in Table 1-1.

Table 1-1. SmartPAC 2 with WPC 2000 Specifications

Enclosures	SmartPAC 2 Enclosure		
	12.76 x 11.53 x 5.28 in. (324 x 293 x 134 mm), NEMA 12, shock-mounted. Weight: 17.4 lbs.		
	SmartPAC 2 Panel mount		
	12.3 x 11.3 in. (312 x 287 mm)		
	WPC 2000 Enclosure		
	14.00 x 19.62 x 7.00 in. (355.6 x 498.3 x 177.8 mm), NEMA 12, shock-mounted.		
	WPC 2000 without Enclosure		
	Allow 15.5 x 15.5 x 5.5 in. (394 x 394 x 140 mm) for installation.		
Equipment (Available from Wintriss Controls)	<b>Resolver</b> 0.75 in. (19 mm) keyed shaft. Rated shaft loading: 200 lb. axial, 200 lb. radial. <b>Operator Station</b> NEMA 12. Includes two palm buttons, Top-stop, Emergency-stop, and Prior		
	Act buttons, and palm time and mute lamps. Pre-wired; unwired version also available.		
	<b>Dual Safety Valve (DSV)</b> Available in 0.75 in. (19 mm) or 1 in. (25 mm) Ross DM2 models.		
	Air Pressure Switch or Sensor		
	Switch: 12-150 PSI. Sensor: 0-200 PSI, 1-6 Vdc, excitation 24 Vdc. Monitors clutch air supply pressure.		
Electrical	SmartPAC 2 Input		
	115/230 ± 10% Vac 50/60 Hz, 50 VA		
	Input Check Circuit		
	12-250 Vac or Vdc		
	WPC 2000 Input		
	100-240 ± 10% Vac (universal switching), 50/60 Hz., 75 VA		
	WPC 2000 Output		
	24 ± 1% Vdc, 200 mA maximum for customer use including auxiliary outputs.		
	Power Requirements If Not Using Wintriss AC Power Supply		
	24 ± 5% Vdc, 2 A. Must be certified to CSA C22.2 No. 234 Standard.		
Oper. Temp.	32° to 122° F (0° to 50° C)		
Speed	7-800 SPM; 14-1600 SPM optional at reduced accuracy (see <i>SmartPAC 2 Options</i> , below)		

Accuracy	$\pm 2/3^{\circ}$ ( $\pm 1.33^{\circ}$ for high speed version–see <i>SmartPAC 2 Options</i> , below)	
Counters	Good parts, strokes, 3 batch with presets (7 digits) Number-of-hits-on-tool counter: counts all hits on tool; resettable to 0 after maintenance	
Display	10.4 in. (264 mm) color active matrix TFT liquid crystal display (LCD) Brake Warning LED, Power LED	
Memory	Allows storage of settings for 200 tools	
SmartPAC 2 Inputs/Outputs	Inputs for resolver, input check circuit, remote reset USB, PS/2 and Ethernet RJ-45 connectors	
	Outputs for top stop, emergency stop: ratings 0-4 A resistive @ 120V max (AC or DC); Normally open–Held closed. Fault condition or power off opens relay(s)	
WPC 2000 Inputs	Resolver Overrun limit switch Two operator stations DSV monitor Air pressure switch or sensor (???) Two pressure sensors: range, 0-200 psi; output, 1-6 Vdc; excitation, 12 Vdc.	
Additional WPC 2000 Inputs	Motor         Forward and reverse contacts         Shadow Light Curtains (2)         Checks proper functioning at every stroke initiation and stop.         Customized Status Codes         Seven for E-stop, Top-stop, or E-stop/Lockout         Two cross-checked pairs, one for E-stop or E-stop/Lockout, the other for E-stop/Lockout only	
WPC 2000 Outputs	<ul> <li>DSV         Two monitored relays, rated 4 A @ 120 Vac, for E-stopping and Top-stopping press.     </li> <li>Lockout         One monitored relay, rated 4 A @ 120 Vac, for de-energizing motor and other devices under critical conditions.     </li> <li>Auxiliary Stop Output         Provides a signal to stop auxiliary equipment during an interrupted stroke.     </li> </ul>	
Communications	Connects via Ethernet to local area network; data viewed via the Internet using SmartView remote viewing utility; allows backup of programmed tool settings to a network drive.	
SmartPAC 2 Options	<b>DiProPAC</b> provides up to 32 die protection sensor inputs Power for electronic sensors (NPN only): 15 Vdc min., 100 mA total DiPro Sensor Interface, DSI 2*: 5.88 x 5.41 x 3.42 in. (149 x 137 x 87 mm) DiProPAC sensor-disabled output: open collector, 8 mA max.	

Table 1-1.	SmartPAC 2 with	WPC 2000 S	Specifications (	(Cont.)	)
				/	

SmartPAC 2	ProCamPAC provides up to 16 programmable cam switch output channels
Options (continued)	Programmable cam output assembly (NEMA 12; holds up to 8 outputs) Enclosure: 9 x 11 x 3.5 in. (229 x 279 x 89 mm), shock-mounted Relay SPDT 0-3 A resistive @ 240V DC solid state SPST 2A @ 5-60 Vdc AC solid state SPST 1A @ 70-250 Vac
	AutoSetPAC* or WaveFormPAC* 10.25 x 12 x 4 in. (260 x 305 x 102 mm)
	2 or 4 strain link inputs Ability to store high, low, and repeatability setpoints with tool number Display, adjust, recalculate "auto" setpoints and display actual load Display and save load signatures Up to 4 windows to monitor tonnage at points other than the peak (WaveFormPAC only)
	SFI ServoFeed Interface integrates servofeed
	<b>RamPAC*</b> 10.25 x 12 x 4 in. (260 x 305 x 102 mm)
	Automatically sets shut height and counterbalance and cushion pressures
	<b>ProPAC*</b> 12.3 x 14 x 4.3 in. (312 x 356 x 109 mm)
	Provides up to 16 analog, NPN or PNP inputs Ability to store high, low, and repeatability setpoints with tool number Display and adjust manual or auto setpoints and display actual values Monitor in-die dimensions and other process parameters
	SBR
	Provides capability to back up tool settings to a Windows laptop PC. Requires purchase of SBR software.
	USB Disk Backup
	Enables backup of programmed tool settings to USB disk
	Info Center
	With this option Setup sheets and other press information stored on a central server can be displayed on networked SmartPAC 2s
	High Speed (HSP)
	Required for presses with speeds higher than 800 SPM; handles speeds from 14-1600 SPM (see <i>Speed</i> and <i>Accuracy</i> , above)
	Bilingual*
	(English/Spanish) status/adjust menus
	Preventive Maintenance (PM) Monitor
	Tracks selected press functions requiring scheduled maintenance and alerts the user when maintenance is due
	PLC Interface
	Enables SmartPAC 2 to transmit additional tool settings to a Programmable Logic Controller for press automation and auxiliary functions

Table 1-1. SmartPAC 2 with WPC 2000 Specifications (Cont.)

SmartPAC 2 Options	ShopFloorConnect Asset Utilization Software (SFC) or Line Efficiency Tracking Software (LETS)
(continued)	Provides capability for production information from SmartPAC 2 to be downloaded to SFC or LETS data collection software for generation of OEE and other reports. Requires purchase of SFC or LETS software.
	3rd Party Comms
	This option allows SmartPAC 2 to transmit real-time and status information to external software for reporting and other tasks
WPC 2000 Options	Shadow V, Shadow VI, Shadow VII, Shadow 8, or Shadow 9 Light Curtains
-	Heights from 6 to 60 in. (138 to 1524 mm), scanning ranges from 23' to 65' (7 to 20 m). Refer to Shadow literature for more information.
	Firmware
	Muting for Shadow light curtain on the upstroke. Two-hand only. One-hand, two-hand or foot operation**. Automatic Single-stroke (External Trip). Continuous On-demand. Auto compensated top-stop (ACTS). High Speed (>500 SPM).
	Selector Switches
	Mode (One-hand, two-hand, or foot operation**). Micro-inch on/off. Automatic (single-stroke or continuous on-demand) on/off to slave the press to an external device. Operator station select for either of two operator stations or both operator stations.
	Auxiliary E-Stop Output Relays Two monitored relays, rated 4 A @ 120 Vac, for up to three auxiliary devices (e.g., feed, transfer, etc.), which can be stopped or prevented from starting if any E-stop button is depressed, any light curtain is interrupted, or any cross- checked inputs are open.
	Foot Switch
	Safety switch for foot actuation** (1-hand/2-hand/foot firmware required).
	One-hand Control
	Control for one-hand actuation** (1-hand/2-hand/foot firmware required).
	<b>Counterbalance Air Pressure Switch or Sensor</b> Switch: 12-150 PSI. Sensor: 0-200 PSI, 1-6 Vdc, excitation 24 Vdc. Monitors counterbalance air supply (uses one custom input).
	Bar Mode Control Allows manual turning of crankshaft.
	Remote Crank-angle Clock Display
	Second display can be installed up to 100 ft. away.
	Motor Control and Custom Packages
	Refer to Press Control/Motor Starter literature, and/or contact your Wintriss representative or factory for more details.
	<ul> <li>Consult product user manual. DSI 2: #1121900; AutoSetPAC: #1101600; WaveFormPAC: #1109100; RamPAC: #1115200; ProPAC: #1117500; Bilingual (English/Spanish): #1130600.</li> </ul>

	Table 1-1.	SmartPAC 2 with WPC 2000 Specifications	(Cont.)
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\*\* Shadow light curtains required

# A DANGER

#### IMPROPER INSTALLATION, USE OR MAINTENANCE

- Follow all procedures in this manual. Perform only the tests and repairs listed in this manual. Use only factory-supplied replacement parts.
- Ensure that WPC 2000 clutch/brake control is installed, tested and repaired by qualified personnel.
- Wire, install and maintain WPC 2000 clutch/brake control in accordance with the applicable safety standards. Carry out all inspection procedures in OSHA 1910.217.
- Wire and install all equipment in accordance with the requirements of OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
- Install and maintain your machine guarding system according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.
- Perform the checkout sequence after installation and after any modification or repair of the WPC 2000 clutch/brake control.
- Lockout/Tagout the press during all installation, modification, repair or maintenance procedures.
- Ensure that supervisors, die-setters, maintenance persons, machine operators, foremen, and any others responsible for operation of the machinery have read and understood all instructions for use of the WPC 2000 clutch/brake control.
- Disconnect the "Continuous" mode position of your Stroke Select switch and cover the "CONT" label on your control if the press is not properly guarded for use in Continuous mode.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### FAULTY INSTALLATION

- Ensure that wiring is correct.
- Use only safety-certified components for safety functions, including interlock switches used in safety applications.
- Install guarding to prevent access to hazardous areas. Prevent access to hazardous areas over, under, or around any guarding devices.
- Ensure that there is one active Operator Station for each operator if you are using Two-hand mode.

Failure to comply with these instructions will result in death or serious injury.

## A DANGER

#### ELECTRIC SHOCK OR HAZARDOUS ENERGY

- Disconnect main power before installation.
- Remove all power to the press, press control, and other equipment used with the press.
- Remove all fuses and "tag out" per OSHA 1910.147 Control of Hazardous Energy (Lockout/ Tagout).
- Ensure that installation is performed by qualified personnel.
- Complete all wiring procedures before connecting to the AC power source.

Failure to comply with these instructions will result in death or serious injury.

## A DANGER

#### PROGRAMMABLE CAM SWITCH NOT FOR SAFETY USE

Use SmartPAC 2's programmable cam switch to control auxiliary functions only. The SmartPAC 2 programmable cam capability should never be used to provide timing signals for any safety use including clutch/brake control or muting of light curtains.

Failure to comply with these instructions will result in death or serious injury.

## NOTICE

#### OPTIONAL MODULES PROCAMPAC AND DIPROPAC INCLUDED IN MANUAL

When you order your SmartPAC 2 with WPC 2000 system, you may include the DiProPAC die protection and/or ProCamPAC programmable cam switch option. This manual includes instructions for installing and using both modules. Remember that they are options and might not be included in your system.

If you ordered SmartPAC with other optional modules such as AutoSetPAC load monitor or ProPAC process monitor, refer to the user manual for that option for complete details on its installation and use.

## NOTICE

#### **UPGRADING FROM ORIGINAL SMARTPAC**

See Appendix F for instructions on upgrading from original SmartPAC to SmartPAC 2.

## NOTICE

#### READ INSTALLATION INSTRUCTIONS BEFORE STARTING INSTALLATION

If you install WPC 2000 and SmartPAC 2 yourself, read this installation chapter carefully, plan your installation, and figure out what steps you will follow before you start drilling holes, running conduit, or cutting wires.

# NOTICE

When you have completed installation procedures, perform the tests in the *Performing Checkout Tests* section, page 2-87 to ensure that WPC 2000 and SmartPAC 2 are installed correctly and working properly before proceeding to the Initialization (Chapter 4), Program (Chapter 5), and Run (Chapter 6) chapters.

## NOTICE

#### LEARN TO USE SMARTPAC 2 BEFORE INSTALLING ON A PRESS

If you have not used SmartPAC 2 before, learn how to initialize and program it before installing it on a press. On the bench, connect your unit to a resolver (see page 2-24) and to AC power (see page 2-9) so that you can access all the menus and make settings. See Chapter 3 for instructions on using the keyboard and displays, Chapter 4 for using Initialization mode, Chapter 5 for using Program mode, and Chapter 6 for using Run mode.

# NOTICE

### PRESS MUST BE AT TDC

Before starting installation, make sure that the die has been removed from the press and the press ram has been moved to top dead center (TDC). The press must be at TDC when you make final adjustments for the resolver. The TDC setting should be  $0^{\circ} \pm 2^{\circ}$ . Use a dial indicator on the face of the ram, if necessary, to ensure that the ram is positioned correctly.

# **Installation Guidelines**

Observe the following guidelines when installing WPC 2000 and SmartPAC 2, referring to Figure 2-1, page 2-4 when necessary.

• Provide clean input power

Provide a dedicated 120V power circuit from the press control transformer to the WPC 2000 input power connection. Do not power any relays or solenoids from this circuit or from the auxiliary power terminals on WPC 2000. Doing so may cause erratic press shutdowns due to electrical noise.

• Separate high- and low-voltage wires

Never run wires for 120V and for lower voltages (e.g., 24V, 60V) inside the same conduit. For example, the Operator Station cables should not share the same conduit with 120 Vac wiring. However, power and logic wiring for the light curtain or Dual Safety Valve (DSV) can be run in the same conduit.

Run flexible, liquid-tight conduit for high-voltage lines (120V power) to a knockout on the top left of the WPC 2000 enclosure. Run another high-voltage conduit (120 V power, relay circuits, input check circuit) from a knockout on the top left of WPC 2000 to a knockout on the top right of the SmartPAC 2 enclosure. If you have Top-stop and Emergency-stop circuits that are 24V or a voltage other than 120V, you must run them separately from the high-voltage wiring.

Run a high-voltage conduit for DSV wiring and a a low-voltage conduit for the resolver to knockouts on the bottom left of WPC 2000. Run a low-voltage conduit for resolver and communications wires from the lower right of WPC 2000 to the lower left of SmartPAC 2.

The AC power supply wires to SmartPAC 2 should be run separately from the DC control wires going to the ProCamPAC Output Assembly. Never use the SmartPAC 2 power terminals as a junction point to provide power for external devices. Do not use the ProCam output enclosure as a junction box for the AC control wires. Provide a separate junction box for this purpose.



Figure 2-1. Installation Overview

• Provide NEMA 12 conduit and connections

Because SmartPAC 2 and WPC 2000 are rated NEMA 12 (i.e., protected against dust and oil), you must use conduit of the same rating and make proper connections to ensure that the enclosure is NEMA-12-protected.

• Properly ground SmartPAC 2 and WPC 2000

The ground wire from SmartPAC 2 should be connected to the main ground point of the WPC 2000. This ground point may be in the area where the control transformer is grounded. Finding a good place for a ground is sometimes difficult, but the location should be close to where the press receives its ground.

• Correctly terminate all cable shields

Terminate all cable shields to the studs provided in the enclosure or to a good grounding location (see *Terminating Cable Shields*, page 2-6).

• Install suppressors across inductive loads

All relays, solenoids, or other inductive loads that are controlled by SmartPAC 2 or WPC 2000 must be suppressed. Suppressors should be installed across the load and as close to the load as possible. See Figure 2-34, page 2-69. Never install a suppressor across relay contacts. If you do, the suppressor may fail shorted and the equipment controlled by that relay remain energized. In some cases, suppressors are required in the Top-stop and Emergency-stop circuits. Additional suppressors (part number 2238801) can be obtained from Wintriss.

# **Connecting Wires to Terminal Block Connectors**

# NOTICE

## CONNECTOR WIRING

The connector can plug into the receptacle on the PC board in only one direction. Before wiring the connector, mark its left and right ends when it is plugged in to make sure you wire the correct pin numbers.

Connect wires to terminal block connectors as follows:

- 1. Find the correct terminal and loosen the screw over it by turning it counterclockwise (see Figure 2-2, page 2-6).
- 2. Strip the correct wire for this terminal 1/4 in. (6.4 mm) from end.
- 3. Insert bare wire into the terminal 90% of the way. Tighten the screw. The metal tooth inside will clamp down on the bare wire for a tight connection. Make sure that the metal tooth is clamped down on the bare part of the wire, not on the insulation.
- 4. Connect all wires. Double-check connections when done.
- 5. Plug the connector firmly into the receptacle on the PC board. The connector can fit into the receptacle in only one direction.



Figure 2-2. Correct Way to Attach Wires to Terminal Block Connectors

# **Terminating Cable Shields**

## NOTICE

### TERMINATE BOTH ENDS OF SHIELD

Be sure to terminate cable shields at both ends (for example, at SmartPAC 2 and DSI 2).

Your SmartPAC 2 and WPC 2000 have ground studs on the inside of the enclosure for terminating cable shields at their point of entry. For each shielded cable, perform the following steps, referring to Figure 2-3.



Figure 2-3. Connecting Shield Drain Wire to Ground Stud

- 1. Strip the cable jacket as far as the end of the conduit fitting.
- 2. Cut the drain wire to a length that allows it to wrap at least once around the nearest grounding stud. Loosen the nut on the stud, wrap the drain wire clockwise around the stud, and tighten down the nut.
- 3. Connect the rest of the wires in the cable to the terminal block.

# **Checking the Press**

Before starting the installation, remove the die from the press and check all modes of press operation. Run the press in Inch, Single-stroke, and Continuous. Make sure the press has working Top-stop and Emergency-stop circuits. Verification that the press operates and stops properly is extremely important because WPC 2000 and SmartPAC 2 will be connected to the press stop circuits. Do not forget to indicate in your electrical prints where WPC 2000 and SmartPAC 2 are wired in. Set the press ram to top dead center (TDC).

# NOTICE

## MOVE RAM TO TDC BEFORE INSTALLING WPC 2000 AND SMARTPAC 2

Move the ram to top dead center (TDC) before installing WPC 2000 and SmartPAC 2. Be accurate when setting the press to TDC. Set to  $0^{\circ} \pm 2^{\circ}$ . Use a dial indicator on the face of the ram if necessary.

# Installing WPC 2000

The following sections show you how to mount and wire the WPC 2000 control enclosure.

## Mounting the Control Enclosure

Mount the control enclosure (see Figure 2-4, page 2-8 for mounting dimensions) so that it can be easily reached to make wiring connections and perform necessary maintenance.

The enclosure does not have to be mounted to the press but can be installed on a free-standing pedestal, pendant, or column.

For easy access to the interior of the enclosure, make sure that there is enough room to open the control enclosure door at least  $120^{\circ}$ .

# NOTICE

## NON-ENCLOSURE INSTALLATION

See *Installing WPC 2000 without Enclosure*, page 2-11 for installation instructions if you are installing WPC 2000 in your own enclosure or console.

Plastic cable ties and self-sticking cable clamps are provided in the accessory parts bag. Use them to organize the cables and wiring inside the control enclosure.



Figure 2-4. WPC 2000 Enclosure: Mounting Dimensions

# Wiring the Control Enclosure

WPC 2000 requires the following electrical components:

- Motor forward auxiliary contact (24V)
- Slide adjust monitor circuit (24V)
- Motor stop circuit (110V), if applicable
- Motor reverse auxiliary contact (24V), if applicable

Power to WPC 2000 should be provided by a step-down control transformer capable of handling 75 VA at 115 Vac  $\pm$  10%.

Most of the original controls on the press will be replaced during rewiring except the disconnect, motor starter, and control transformer. Make sure to rewire so that the motor starter operates properly.

## Slide Adjust Considerations

If your press has a motorized slide adjustment for the ram, you must prevent slide adjustment while the press is running. Connect spare contacts on the slide adjustment switches (i.e., Slide Adjustment "On" or Slide Adjustment "Up"/"Down" switch) to the WPC 2000 Emergency-stop circuit or a user interlock to stop the press as soon as the ram adjust switches on. For help in determining how to connect this wiring, call Wintriss Tech. Support.

## **Connecting AC Wiring**

## A DANGER

#### ELECTRIC SHOCK OR HAZARDOUS ENERGY

- Disconnect main power before installation.
- Remove all power to the press, press control, and other equipment used with the press.
- Remove all fuses and "tag out" per OSHA 1910.147 Control of Hazardous Energy (Lockout/ Tagout).
- Ensure that installation is performed by qualified personnel.
- Complete all installation procedures before connecting to the AC power source.

Failure to comply with these instructions will result in death or serious injury.

## NOTICE

#### FOR 24 VDC VERSIONS OF WPC 2000:

- Refer to Table 1-1, page 1-12 for DC power requirements
- Wire 24 Vdc directly to connector TB105 on the WPC 2000 Main Processor board (see Figure 2-14, page 2-28 for location and Figure 16 (Herion DSV), Figure 17 (Ross Serpar DSV), or Figure 22 (Ross DM2 DSV) at the back of the manual for wiring.) Connect "+ volts" to pin #90 on TB105 Connect "ground" to pin #89

All wires can be run through flexible, liquid-tight conduit to the control as long as all circuits are 115V. If your Top-stop circuits and Emergency-stop circuits are low voltage (for example, 24V), run two conduits—one for 115V wires and one for 24V wires. Be sure to number all wires so they are consistent with the electrical prints for your press.

Bring the wiring connections for AC power to a convenient point so that you can connect them to the power terminal block at the top left of the enclosure (see Figure 2-5, page 2-10). No. 16 wire (No. 14, if local codes require it) is recommended for these circuits with a minimum 75° C temperature rating.

## NOTICE

#### WPC 2000 AUTOMATICALLY ADJUSTS TO 115 OR 230 VOLT INPUT POWER

You do not need to use a switch or other device to set the level of input power.

To make AC power wiring connections, perform the following steps:

1. Locate the power supply input terminal block on the back wall at the top left of the enclosure, as shown in Figure 2-5.



Figure 2-5. AC Input Wiring Connections

- 2. Determine how you will bring wiring from your 115 or 230 Vac power source to the enclosure. For 115 Vac, you need three wires—high (black), neutral (white) and ground (green). For 230 Vac, wires are black and red, with green or green-yellow for ground.
- 3. Run the power wires to the enclosure through flexible, liquid-tight conduit. Because WPC 2000 is rated NEMA 12 (protected against dust and oil), you must use conduit of the same rating and make proper connections to ensure NEMA 12 protection.
- Connect the ground wire to the set screw terminal on the roof of the enclosure, referring to Figure 2-5 and to Figure 16 (Herion DSV), Figure 17 (Ross Serpar DSV), or Figure 22 (Ross DM2 DSV) at the back of the manual.
- 5. Connect the power wires.

For 115 Vac power, connect the black wire to the LINE terminal and the white wire to NEUT.

For 230 Vac, connect the black wire to the LINE terminal and the red wire to NEUT.

Strip the wire 1/4 in. from the end. Loosen the screw in the input power terminal block, insert the stripped portion of the wire, and tighten the screw.

- 6. Double-check connections.
- 7. Make all necessary conduit connections to ensure NEMA 12 protection.

## Installing WPC 2000 without Enclosure

When you order WPC 2000 without enclosure, you receive a Main Processor board, power supply, and input power terminal block mounted on an aluminum plate (see Figure 2-6 for mounting dimensions).



Figure 2-6. WPC 2000 Mounting Plate: Mounting Dimensions

The plate has a hole in each corner to facilitate installation of the WPC 2000 board and related components in your enclosure or console. When installing the mounting plate, be sure to allow at least 1 in. clearance on top, bottom, and both sides of the plate and above the power supply and Main Processor board. Allow at least 2 1/2 in. clearance on the right side of the plate for making wiring connections to terminal blocks TB101-TB104.

The power supply on the mounting plate is pre-wired to the power terminal, TB105, on the Main Processor board and to the input power terminal block on the plate. To connect AC wiring to the input power terminal block, follow the instructions in *Connecting AC Wiring*, page 2-9.

# Installing a Dual Safety Valve

# A DANGER

### USER-SUPPLIED DUAL SAFETY VALVE NOT SUITABLE FOR SAFETY USE

Ensure that your dual safety valve meets the applicable safety standards. Contact the valve manufacturer for information.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### INSTALL DSV CLOSE TO CLUTCH/BRAKE ASSEMBLY TO REDUCE STOPPING TIME

Install the dual safety valve as close as possible to the clutch/brake assembly. Any excess piping between the valve and the clutch/brake assembly increases the Stopping Time of the press.

Failure to comply with these instructions will result in death or serious injury.

# WARNING

### DSV MUFFLER CLOGGING OR LOOSENING

- Clean the DSV muffler periodically. A clogged muffler can degrade Stopping Time.
- Tighten the muffler securely to the valve body. Periodically check to make sure the muffler is securely installed. Vibration may cause it to loosen and fall. To tighten the muffler, secure the valve body, hold the muffler with both hands and turn clockwise as tightly as possible without stripping the threads.

Failure to comply with these instructions could result in death or serious injury.

If you have ordered a Ross or Herion DSV with your WPC 2000, refer to the appropriate wiring diagram at the end of this manual and to the documentation that came with your valve to install the DSV. Note the following requirements:

#### • Ross DM2

To wire the Ross DM2 DSV, refer to figures 18 and 22 at the back of the manual.

The Reset circuit requires that a diode be installed across the coil in the solenoid to provide noise suppression (see Figure 22). This wiring has already been done for you in the Hirschmann connector for the 24 Vdc Reset solenoid, which is provided along with two Hirschmann connectors for the 120 Vac valve solenoids in the Ross DM2 kit.

The Reset solenoid connector comes in two styles. One has a black shell with an electrical circuit including a diode symbol (-k-) printed on it, the other a transparent shell with a red LED indicator visible inside. You install this connector on the Reset solenoid at one end of the DSV. The Reset solenoid connector is the only connector at this end of the DSV. The other two connectors are installed on the two valve solenoids at the other end of the DSV,

which has three connectors altogether, including one for the DSV monitor that is already installed. You wire the Reset solenoid and valve solenoid connectors to WPC 2000 as shown in Figure 22.

## CAUTION

#### DO NOT WIRE RESET CIRCUIT TO 110 VAC

The Reset circuit works only on 24 Vdc. Do not wire the Reset circuit to 110 Vac. Failure to comply with these instructions could result in property damage.

Note that the DM2 Reset circuit is wired to the OFF position on the WPC 2000 Stroke Select switch (see Figure 18). To reset the Ross DM2 DSV after an F47 error (see page 7-14), press Reset/Select, and turn the Stroke Select switch to OFF, then back to one of the other operating modes (i.e., Inch, Single-stroke, or Continuous).

Make sure to install air supply lines that match the inlet port size of the DM2 DSV to provide sufficient air to reset the unit in case of a fault (see page 7-31).

### Ross Serpar with EP Monitor

This Ross DSV requires a separate user-supplied reset switch. See Figure 17 at the end of this manual. Also, all jumpers except those shown in the wiring diagram must be removed; otherwise, the WPC 2000 Main Processor board may be damaged.

#### Herion XSZ

Make sure that you wire the Herion DSV monitor between pin #20 and a +24 Vdc output. See Figure 16 at the end of the manual.

## **Installing Air Pressure Sensors or Switches**

Your SmartPAC 2 with WPC 2000 requires either sensors or switches to monitor clutch air pressure and counterbalance air pressure if there is a counterbalance. Wintriss offers two pressure sensors with the unit, one for clutch air pressure, the other for counterbalance air pressure (see Figure 2-7).



Figure 2-7. Air Pressure Sensor

The following sections show you how to install air pressure sensors and switches.

## Installing a Clutch Air Pressure Sensor

Install and wire a clutch air pressure sensor as follows:

- 1. Install a filter regulator and lubricator in-line before the clutch air pressure sensor if they are not already present.
- 2. Connect shop air to the clutch air pressure sensor input port.
- 3. Run the cable through flexible, liquid-tight conduit, observing NEMA 12 requirements.
- 4. Wire the clutch air pressure sensor as shown in Table 2-1 and in Figure 1 at the end of the manual.

WPC 2000 Main Processor Bd. Pin #	Signal	Wire Color
32	+24 Vdc	Red
33	Main System Air	White
34	Analog Ground	Black

Table 2-1. Clutch Air Pressure Sensor Wiring Connections

- 5. On the WPC 2000 Main Processor board, connect a jumper between pin #8, the Clutch Air Pressure Switch input, and ground (e.g., pin #54) to ground the input.
- 6. Set the clutch air pressure sensor to 35 PSI, or the pressure recommended by the press manufacturer.

## Installing a Counterbalance Air Pressure Sensor

Install and wire a counterbalance air pressure sensor as follows if there is a counterbalance:

- 1. Install a filter regulator and lubricator in-line before the counterbalance air pressure sensor if they are not already present.
- 2. Connect shop air to the counterbalance air pressure sensor input port.
- 3. Run the cable through flexible, liquid-tight conduit, observing NEMA 12 requirements.
- 4. Wire the counterbalance air pressure sensor as shown in Table 2-2 and in Figure 1 at the end of the manual.

Table 2-2. Counterbalance Air Pressure Sensor Wiring Connections

WPC 2000 Main Processor Bd. Pin #	Signal	Wire Color
42	+24 Vdc	Red
43	Counter Balance	White
44	Analog Ground	Black

5. Set the counterbalance air pressure sensor to the pressure recommended by the press manufacturer, typically the pressure required for the smallest upper die you plan to use in this press

## NOTICE

#### USING RAMPAC (SMARTPAC 1 OR 2) TO CONTROL COUNTERBALANCE PRESSURE

If you use RamPAC to control the counterbalance pressure, install a pressure switch and connect it to WPC 2000 as described in *Installing a Counterbalance Air Pressure Switch*, page 2-15.

## Installing a Clutch Air Pressure Switch

## NOTICE

The clutch air pressure switch is held closed when pressure is applied above the setpoint limit.

Install and wire the clutch air pressure switch as follows:

- 1. Install a filter regulator and lubricator in-line before the clutch air pressure switch if they are not already present.
- 2. Connect shop air to the clutch air pressure switch input port.
- 3. Run the cable through flexible, liquid-tight conduit, observing NEMA 12 requirements.
- 4. Wire the normally open terminals of the switch between pin #8 and ground (e.g., pin #54) on the WPC 2000 Main Processor board, referring to Figure 1 at the end of the manual.
- 5. Set the clutch air pressure switch to 35 PSI, or the pressure recommended by the press manufacturer.

## Installing a Counterbalance Air Pressure Switch

Install and wire a counterbalance air pressure switch as follows if there is a counterbalance:

- 1. Install a filter regulator and lubricator in-line before the counterbalance air pressure switch if they are not already present.
- 2. Connect shop air to the counterbalance air pressure switch input port.
- 3. Run the cable through flexible, liquid-tight conduit, observing NEMA 12 requirements.
- 4. Wire the normally open terminals of the switch to pin # 83 (User Input 4) and ground (e.g., pin # 54), referring to Figure 1 at the end of the manual.

## NOTICE

If pin #83 has already been assigned to other user-selected auxiliary equipment, then wire the counterbalance switch contacts across a terminal on the WPC 2000 Main Processor board that generates an E-stop when the connection to ground is broken. See *Wiring WPC 2000 User Inputs*, page 2-31 for more information.

5. Set the counterbalance air pressure switch to the pressure recommended by the press manufacturer, typically the pressure required for the smallest upper die you plan to use in this press.

## NOTICE

#### USING RAMPAC (SMARTPAC 1 OR 2) TO CONTROL COUNTERBALANCE PRESSURE

If you use RamPAC to control the counterbalance pressure, set the WPC 2000 counterbalance pressure switch to the pressure required to balance the empty ram.

# Installing Operator Station(s)

# A DANGER

#### NON-WINTRISS OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

- Ensure that the Operator Station is wired correctly.
- Ensure that on any non-Wintriss Operator Station the Run buttons are placed so that two hands are required to push them at the same time and that buttons cannot be pushed simultaneously with one hand or with one hand and one elbow.
- Ensure that on any non-Wintriss Operator Station the Run buttons have ring guards or other means in place to prevent unintentional operation.
- Run all necessary tests to verify that each Operator Station is wired correctly and provides proper anti-tie-down and anti-repeat protection. Test procedures are provided at the end of this chapter (see page 2-87).

Failure to comply with these instructions will result in death or serious injury.

The Operator Station should be installed in a location from which the operator can conveniently run the press. On most gap-frame (OBI or OBG) presses, this will be on the front of the bolster. For straight-side presses, the Operator Station may be installed on the press or on a pedestal.

The Operator Station should not be permanently mounted until you have calculated the correct safety distance (see page 6-23) and performed the applicable checkout (see page 2-87) tests. When you have finished wiring, you can place the Operator Station temporarily on the floor or on a cart.

If you are not installing a light curtain, and if you are planning to use the Operator Station as a two-hand safety device, the Operator Station must be mounted at the correct safety distance from the nearest pinch point on the press. This distance must be calculated based on the Stopping Time of your press. See page 6-21 for details. Mounting the Operator Station at the correct safety distance prevents an operator from leaving the station and reaching the pinch point before the press stops.

If you are installing a light curtain, the Operator Station must be placed outside the area guarded by the light curtain. You do not need to calculate a specific safety distance for your Operator Station since the light curtain now prevents access to the pinch point. You must not, however, mount the Operator Station between the light curtain and the pinch point.

## Wiring a Pre-wired Operator Station

## Checking Pre-wired Operator Station Wiring

Before connecting your pre-wired Operator Station to WPC 2000, check the wiring to the mute lamp inside the Operator Station and modify, if necessary, according to the instructions below. Operator stations shipped as part of WPC 2000 systems should not need modification.

1. Find the mute lamp on the Operator Station, as shown in Figure 2-8.



Figure 2-8. Pre-wired Operator Stations Showing Mute Lamp Connections

- 2. Open the Operator Station, and locate the mute lamp connections on the underside of the cover.
- 3. Determine whether you need to modify the mute lamp wiring:
  - If your mute lamp wiring looks like panel "E" in Figure 2-9, page 2-18 (i.e., the black wire is connected, the red-and-white wire not connected), the wiring is correct.
  - If your mute lamp wiring looks like panel "A", follow steps A through E in Figure 2-9 to disconnect the white-and-red wires and connect the black wire.
- 4. When the mute lamp wiring is correct, connect the Operator Station to WPC 2000.



Figure 2-9. Wiring Steps to Modify Operator Station for WPC 2000

## Making Wiring Connections

To wire a pre-wired Operator Station, perform the following steps:

- 1. Punch a hole in the Operator Station enclosure for conduit or sealtight.
- 2. Connect the conduit or sealtight to the hole; then open the Operator Station box.
- 3. Run the Operator Station cable in the sealtight.
- 4. Plug the connector end of the cable into the Operator Station.

- 5. At the other end of the cable, connect the wires to the Main Processor board connector terminals, as shown in Table 2-27, page 2-114 and Figure 2 at the end of the manual.
- 6. Mount the Operator Station in a permanent location after performing the applicable verification and checkout tests and calculating the correct safety distance. Refer to Figure 2-10 and Figure 2-11 for mounting dimensions.



Figure 2-10. Pre-wired Operator Station with Side Run Buttons: Mounting Dimensions



Figure 2-11. Pre-wired Operator Station with Top Run Buttons: Mounting Dimensions

## Wiring an Unwired Operator Station

## A DANGER

### OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

- Ensure that the Operator Station is wired correctly.
- Run all necessary tests to verify that each Operator Station is wired correctly and provides proper anti-tie-down and anti-repeat protection. Test procedures are provided at the end of this chapter (see page 2-87).

Failure to comply with these instructions will result in death or serious injury.

To wire the unwired Wintriss Operator Station, follow the wiring diagram in Figure 7 at the end of this manual. Before using your press, be sure to check the wiring carefully, run all the applicable verification and checkout tests, and calculate the safety distance. You can then mount the Operator Station in a permanent location, referring to Figure 2-12 for mounting dimensions.



Figure 2-12. Unwired Operator Station: Mounting Dimensions

## Wiring a User-built Operator Station

## A DANGER

#### NON-WINTRISS OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

- Ensure that the Operator Station is wired correctly.
- Ensure that on any non-Wintriss Operator Station the Run buttons are placed so that two hands are required to push them at the same time and that buttons cannot be pushed simultaneously with one hand or with one hand and one elbow.
- Ensure that on any non-Wintriss Operator Station the Run buttons comply with the requirements specified in Table B-2, page B-2.
- Ensure that on any non-Wintriss Operator Station the Run buttons have ring guards or other means in place to prevent unintentional operation.
- Run all necessary tests to verify that each Operator Station is wired correctly and provides proper anti-tie-down and anti-repeat protection. Test procedures are provided at the end of this chapter and at the end of Chapter 3.

Failure to comply with these instructions will result in death or serious injury.

If you build your own Operator Station, refer to Appendix B for applicable safety requirements. To wire your user-built Operator Station, refer to Figure 7 at the end of the manual. Before using your press, be sure to check the wiring carefully and run all the applicable verification and checkout tests. After calculating the correct safety distance, you can mount the user-built Operator Station in a permanent location.

## Installing Multiple Operator Stations

## A DANGER

#### HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

- Safeguard the point of operation exposed by the non-working Operator Station when using multiple Operator Stations. The exposed area near a disabled Operator Station must be properly guarded.
- Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

## NOTICE

Use light curtains in addition to multiple Operator Stations for best personnel safeguarding.

You can wire up to two Operator Stations to the WPC 2000 (see Figure 5 at the back of the manual for dual Op. Station wiring). Make sure that switch 6 on S102 on the WPC 2000 Main Processor board is set to OFF if you connect dual Operator Stations (see page 4-43).

If you wish to install more than two Operator Stations, contact Wintriss Tech. Support. Do not order standard Wintriss "Multiple Operator Stations" when installing more than two Op. Stations. All Operator Stations in a multi-Op.-Station configuration except the Op. Station

connected to the "A" inputs must contain a Two-hand Control module. When you install more than two Operator Stations, set switch 6 on S102 to ON.

When wiring dual operator stations, make sure to label each Operator Station correctly. Install the label "A" prominently on the Operator Station wired into inputs for Operator Station "A" or "1." Install the label "B" prominently on the Operator Station wired into inputs for Operator Station "B" or "2." Test each Operator Station individually. Confirm that selector switch position "A" controls Operator Station "A" and selector switch position "B" controls Operator Station "B." Also test switch position "Both" to confirm that it controls both Operator Station "A" and Operator Station "B."

# Installing a Light Curtain

# A DANGER

#### PREVENT OPERATOR FROM STANDING BETWEEN LIGHT CURTAIN AND HAZARDOUS AREA

Ensure that the operator cannot position himself between the light curtain and the hazardous area. Use another pair of light curtains or a mechanical barrier at knee to waist height to prevent the operator or a passerby from being "trapped" between the light curtain and the hazard.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### INCORRECT LIGHT CURTAIN INSTALLATION

- Mount the light curtains at the correct safety distance as instructed in *Calculating the Safety Distance*, page 6-23. The light curtain will only provide full protection for operators when mounted at the correct safety distance.
- Install and wire your light curtains correctly, following the instructions in your Shadow manual and referring to Figures 4, 14, 15, 20, 21, 23, and 24 at the end of this manual.

Failure to comply with these instructions will result in death or serious injury.

The light curtain is normally mounted in front of the die space and must be located at least the safety distance from the pinch point. This location ensures that the light curtain can send a Stop command to the press in time for the press to stop before anyone can reach the pinch point. Any opening or access to the die space that is not guarded by the light curtain must be guarded by mechanical barriers.

To determine the Stopping Time of the press, refer to page 6-21. To calculate the correct safety distance, see page 6-23.

## NOTICE

You cannot permanently mount the light curtain until the WPC 2000 is working properly and you have measured the Stopping Time, set the brake monitor, and calculated the correct safety distance. However, you will be able to wire the light curtain.

WPC 2000 provides wiring connections for up to two pairs of light curtains (see Table 2-27, page 2-114). If you wire two sets of light curtains, you must enable them on S101 option switch 6 (see Table 4-10, page 4-38).

## Installing Shadow Light Curtains

Wiring connections for Shadow light curtains are provided in the following wiring diagrams at the back of the manual:

- Shadow V–Figure 4
- Shadow VI-Figure 14
- Shadow VI Integrated–Figure 15
- Shadow VII-Figures 20 and 21
- Shadow 8–Figures 23 and 24
- Shadow 9–Figures 25, 26, and 27

For Shadow I or Shadow II wiring, contact Wintriss Tech. Support. For complete Shadow light curtain mounting instructions, see your Shadow user manual.

### Setting Jumpers for Shadow VII, Shadow 8, and Shadow 9 Light Curtains

When you install Shadow VII, Shadow 8, or Shadow 9 light curtains on your press, you must set jumpers JP121-JP124 on the WPC 2000 Main Processor board (see Figure 2-14, page 2-28) to the positions shown in Table 2-3. Wiring diagrams are provided in figures 20 (Shadow VII control box), 21 (Shadow VII DIN controller), 23 (Shadow 8 optional control), 24 (Shadow 8 wired directly to WPC 2000), 26 (WPC 2000 and Shadow 9 Control Box Wiring Diagram), 27 (WPC 2000 and Shadow 9 Wiring Diagram), and 28 (Dual Shadow 9 WPC 2000 Wiring Diagram) at the end of the manual.

	Jumper on Main Processor Board	Settings
Light Curtain #1	JP123	PNP
Light Curtain #1	JP124	INT
Light Curtain #2	JP121	PNP
	JP122	INT

Table 2-3. Shadow VII, Shadow 8, and Shadow 9 Light Curtain Jumper Settings

## Installing Non-Shadow Light Curtains

## A WARNING

It is your responsibility to ensure that your light curtains are control reliable and intended for use on a mechanical power press as a primary point-of-operation guard. The manufacturer of your light curtain should be able to provide the necessary information.

Failure to comply with these instructions could result in death or serious injury.

If you plan to interface a light curtain system other than Shadow with your WPC 2000, please call Wintriss Tech. Support for instructions. Be ready to provide the following information:

- Light curtain manufacturer
- Light curtain model number
- WPC model (i.e., WPC 2000)
- WPC 2000 firmware version number (located on A or B microprocessor chip label)
- Wiring diagram from the light curtain manufacturer's manual

If your WPC 2000 does not have the firmware that allows Foot or One-Hand control and/or muting of a light curtain on the upstroke, you can connect the light curtain's dry contact outputs directly in series with WPC 2000's E-stop string.

# Installing the Resolver

# A DANGER

## **RESOLVER OUT OF SYNCH WITH CRANKSHAFT**

Retain the sprockets on the crankshaft and resolver shaft mechanically so they cannot shift or move out of radial alignment. Be sure that the key on the resolver shaft retains the resolver sprocket. Use a pin or other method to fix the position of the sprocket on the crankshaft.

Failure to comply with these instructions will result in death or serious injury.

# CAUTION

## DAMAGE TO RESOLVER

Be sure that the sprocket or gear driving the resolver chain or timing belt is mounted so it is centered on the crankshaft. If the gear or sprocket is mounted off-center, the resulting loads on the resolver shaft may cause the unit to fail.

Failure to comply with these instructions could result in property damage.

# NOTICE

## RAM MUST BE AT TDC BEFORE INSTALLING RESOLVER

The ram must be at top dead center (TDC) before you install the resolver. Use a dial indicator on the face of the ram if necessary. Set the ram to  $0^{\circ} \pm 2^{\circ}$ .

Because the resolver must provide WPC 2000 with the exact position of the crankshaft at every degree of the stroke (see *Resolver-based Operation*, page 1-6), the device must be driven smoothly at a 1:1 ratio with the crankshaft. Design a method of driving the resolver directly from the crankshaft, using a chain or timing belt (not a V belt) and sprockets. Use either an idler sprocket or a spring-loaded resolver base to compensate for slack or stretch.

The drive method you choose must also allow for adjustment of the resolver to its zero position at top dead center. All sprockets must be keyed or pinned. The resolver shaft has a standard key. Wintriss stocks a spring-loaded base with a hole pattern to match the resolver.

When designing the drive for the resolver, observe the following precautions:

- Do not use a chain more than three feet in length
- Do not use gears, right-angle joints, or shafts with universal joints, which will develop either too much backlash or too much play

- Do not try to couple the resolver directly to the crankshaft. Such a placement requires extreme precision. If the resolver is only slightly off-center, its bearing will be subjected to side loads well in excess of its rated capacity and will ultimately fail.
- Do not use flexible couplings, which can be inaccurate, or V belts, which can also be inaccurate and will slip
- Do not use a flexible shaft like a speedometer cable. The resolver will lag the crankshaft because of the twisting of the shaft on start-up. When the crankshaft stops, the resolver will turn past the true stopping point and snap backward.

## Mounting the Resolver

To mount the resolver, perform the following steps:

# NOTICE

It does not matter which direction the resolver turns when the press runs. You adjust for the direction of rotation when you wire the unit (see *Wiring the Resolver*, next section).

- 1. Mount the resolver by bolting it to the press or other platform at the desired location.
- 2. Make sure the press is at TDC.
- 3. Rotate the resolver shaft so the keyway is aligned with the arrow on the housing (see Figure 2-13, page 2-26).
- 4. Keeping the keyway aligned with the arrow, attach the chain or drive mechanism.

## Wiring the Resolver

To wire the resolver, perform the following steps:

- 1. If the resolver cable is not already connected, locate the cable, plug the molded connector into the resolver (it only goes one way), and twist the locknut so the connection is tight.
- 2. Run the resolver cable through conduit from the resolver to one of the knockouts at the bottom left of the WPC 2000 enclosure.

# NOTICE

You can run the resolver and overrun limit switch cables through the same conduit (see Figure 2-1, page 2-4 for an example). If you do so, make sure not to cut the cable and wires until both the resolver and the overrun limit switch are installed.

- 3. Find the resolver terminal block, TB 106, on the WPC 2000 Main Processor board (see Figure 2-14, page 2-28), and remove the L-shaped connector.
- 4. Viewing the resolver from the shaft end, determine whether the shaft will turn clockwise or counterclockwise when the press runs.



Figure 2-13. Resolver: Mounting Dimensions

5. Measure and cut the resolver wires so they reach TB 106, then wire them to the L-shaped connector, referring to Table 2-4, page 2-27, and Figure 1 at the end of the manual. Make sure you connect the black and yellow wires correctly, based on the direction in which your resolver will rotate–clockwise or counterclockwise. Refer to *Installation Overview*, page 2-4 if you need help wiring the TB 106 connector.

Pin #	Signal	Wire Color	
104	S4 Return	Brown	
105	R2 Ground	Orange	
106	S3 Return	Yellow*	
107 R1 Drive Red		Red	
108	S2 Cosine	Green	
109	S1 Sine	Black*	
110	Shield		
* Shown for clockwise rotation, facing shaft For counterclockwise, swap black and yellow wires			

## NOTICE

#### **CONNECTOR WIRING**

Before wiring, place the connector over its base the way it will plug in (it can plug in only one way) and double-check pin assignments to make sure you wire correctly.

- 6. Double-check connections when you are finished wiring.
- 7. Plug the L-shaped connector firmly into its base. It can plug in only one way.
- 8. To connect resolver wiring between WPC 2000 and SmartPAC 2, refer to page 2-50.

## Replacing the Resolver

## NOTICE

If the resolver you are replacing is defective, you may not be able to move the ram to TDC. If you are unable to move the ram, make a note of the angular position of the keyway on the old resolver. When you install the new resolver, make sure its keyway is in the same position. See step 1, below.

If you need to replace your resolver, do the following:

1. Perform the *Mounting the Resolver* and *Wiring the Resolver* procedures, above.

If you are replacing a defective resolver and were unable to move the ram to TDC, make sure the keyway on the new resolver is in the same angular position as the keyway on the resolver being replaced.

- 2. Check the resolver's direction of rotation (see procedure above).
- 3. Rezero the resolver, following the instructions in Zeroing the Resolver, page 2-78.



Figure 2-14. WPC 2000 Main Processor Board: Location of Important Components
# Installing the Overrun Limit Switch

## **A** DANGER

### MOUNT OVERRUN LIMIT SWITCH SO IT PROVIDES CORRECT TIMING

- Install the overrun limit sensor magnet on a component, such as the crankshaft, that moves independent of the resolver and whose motion is not affected by the condition of the resolver or the resolver's drive mechanism. Safe operation of the press depends on the overrun limit sensor working correctly when the resolver or its drive mechanism fails.
- Install the overrun limit sensor magnet in the correct angular location according to the instructions starting on page 2-82.

### Failure to comply with these instructions will result in death or serious injury.

The overrun limit sensor, also called the "overrun sensor," enables WPC 2000 to monitor operation of the resolver and to stop the press whenever the resolver fails to work properly, as can happen when the resolver drive chain breaks or slips or when the resolver is broken. The overrun sensor provides a signal to WPC 2000 at the same resolver angle on every stroke. Whenever this angle changes, WPC 2000 detects that the resolver is no longer rotating at a 1:1 ratio with the crankshaft and sends an Emergency-stop command to the press, simultaneously displaying an error code.

## Planning Your Overrun Sensor Installation

The overrun sensor consists of a magnetic switch and a magnet. Select a mounting location for both components that ensures that the magnet moves past the switch once on every stroke and within 1/8 in. to 3/16 in. (3 mm to 5 mm) of the switch, close enough for the switch to sense the magnet's presence. The magnet is mounted to the crankshaft or another component that rotates identically on every stroke. The switch is hard-mounted to the press or other surface and remains stationary.

## NOTICE

Make sure to position the overrun sensor 1/8 in. to 3/16 in. from the magnet. This gap specification is different from that of the flywheel speed sensor (see page 2-43).

There must be no connection between the overrun limit sensor and the resolver to ensure that the overrun sensor continues to operate if the resolver or its drive mechanism fails.

To obtain an adequate overrun signal at high speeds, the magnet should be mounted so that it can be sensed by the switch for 15° to 25° of the stroke. The interval during which the magnet is sensed, called the "dwell," decreases as the diameter of the rotating shaft increases (see Figure 2-15, page 2-30). Select a shaft whose diameter will allow the sensor to detect the magnet for the required dwell. A shaft diameter of 4 in. to 6 in. (100 mm to 150 mm) is optimum.



Figure 2-15. Overrun Sensor Magnet Placement: Dwell as a Function of Shaft Diameter

## Mounting the Overrun Sensor Switch

## NOTICE

## INSTALL MAGNET AFTER MOUNTING SWITCH

Install the overrun magnetic switch as instructed in this section. Refer to page 2-82 for instructions on installing the overrun magnet.

The overrun sensor magnetic switch comes already installed in a bracket. Mount the bracket and switch at a location past which the magnet will pass on every stroke and within 1/8 in. to 3/16 in. (3 mm to 5 mm) of the magnet, referring to Figure 2-16.



Figure 2-16. Overrun Sensor Magnetic Switch: Installation Example

Place the magnet temporarily on the crankshaft or other mounting surface while you set the gap between the switch face and the magnet. After tightening down the bracket's mounting screws, remove the magnet and put it in a safe place until you mount it permanently.

## Wiring the Overrun Sensor Switch

## NOTICE

You can run both the resolver wires and the overrun limit sensor cable through the same conduit. If you do so, wait to cut the cable and wires until both the resolver and the overrun limit sensor are installed.

Run the cable for the magnetic switch through conduit to the WPC 2000. Connect the wires to terminal blocks on the WPC 2000 Main Processor board, as shown in Table 2-5 and Figure 1 at the end of the manual.

WPC 2000 Main Processor Bd. Pin #	Signal	Wire Color
23	+24 Vdc	Red
24	Overrun input to WPC 2000	White
25	Ground	Black

Table 2-5. Overrun Sensor Switch Wiring Connections

## Wiring WPC 2000 User Inputs

## A DANGER

### USER INPUTS 1 THROUGH 7 NOT SUITABLE FOR SAFETY USE

DO NOT use inputs 1 through 7 as part of any personnel-protection system. These inputs are not control reliable.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

### USER INPUTS ADD DELAY TO STOPPING TIME

DO NOT connect light curtains or other presence-sensing devices to any user inputs. The crosschecked input pairs (8/9 and 10/11), though control reliable, are suitable only for applications such as connecting to safety switches used with interlocking barrier guards.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

### MAKE SURE TO WIRE CROSS-CHECKED INPUT PAIR CORRECTLY

Input pairs 8/9 and 10/11 are control reliable only if wired correctly in a pair according to the instructions in this section.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

### CHECK PRESS TO MAKE SURE IT STOPS WHEN USER INPUT ACTUATES

- WPC 2000 comes from the factory with the inputs bypassed by jumpers. Make sure to remove the appropriate jumper from the Main Processor board connector when you wire a user input. Otherwise, WPC 2000 will not receive the signal from the input. Leave all unused inputs jumpered/bypassed.
- Perform checkout procedures to ensure that the user inputs are wired correctly and that WPC 2000 responds correctly when the user input faults (see page 2-113).

Failure to comply with these instructions will result in death or serious injury.

WPC 2000 user inputs allow you to connect signals from other equipment in order to monitor auxiliary press functions such as lubrication systems. WPC 2000 provides connections for two pairs of control-reliable, cross-checked inputs and seven independent inputs that are not control reliable.

When an input issues a Stop command by opening a normally closed (N/C) relay, a fault code for the input(s) appears on the SmartPAC 2 display. Stop types for all inputs except cross-checked user input pair 10/11 are set to E-Stop by default; input pair 10/11 is set to E-Stop/Lockout. All inputs except input pair 10/11 can be reconfigured by the user on the Press Control User Interlock Menu in SmartPAC 2 Initialization (see *User Interlocks*, page 4-24). Inputs 1-7 can be changed to Top-Stop or E-Stop/Lockout. Cross-checked input pair 8/9 can be changed to E-stop/Lockout. If you have SmartPAC 2 firmware version 3.32 or higher and WPC 2000 firmware version 1.70 or higher, an additional stop type, Top-stop/Lockout, is available for inputs 1-7. Wiring connection and fault code for each input are shown in Table 2-6, page 2-33.

The cross-checked input pairs generate a fault either when one or both inputs in the pair are open or when the inputs "disagree" (i.e., one input is open, the other closed) for longer than 100 msec. Cross-checked input pair 10/11 can be used to detect critical safety problems such as the removal of die receptacle blocks.

E-Stop/Lockout and Top-Stop/Lockout stop types not only issue a Stop command and display the appropriate fault code but also simultaneously open the Lockout relay and display the Lockout message on the SmartPAC 2 display. To clear the Lockout message, turn the Stroke Select switch to OFF and then back to INCH (see *Wiring the Lockout Relay*, page 2-34 and *Lockout Message*, page 7-3).

You can wire the Lockout relay to your motor starter so that ungrounding of a user input or of either input in an input pair will shut off the motor.

To wire the user inputs, run conductors from the appropriate terminal number on the Main Processor board to your equipment and then back to either +24 Vdc or ground, as shown in Table 2-6 and Figure 3 at the end of the manual. (There are several available "Ground" and "+24 Vdc" terminals on the Main Processor board from which to choose.) Figure 13 at the back of the manual provides an example of how to wire safety devices to the cross-checked

inputs. After you have wired the inputs you will use, be sure to bypass all the unused inputs by connecting them to +24 Vdc or ground.

User Input (Interlock)	Stop Type *	Pin #	Jumper Connection (Bypass)	Fault Code	Name of Auxiliary Equipment
User 1		21	+24 Vdc	51	
User 2		82	+24 Vdc	52	
User 3		71	+24 Vdc	53	
User 4		83	Ground	54	
User 5		72	Ground	55	
User 6		84	Ground	56	
User 7		73	Ground	57	
User 8 paired with 9		85	Ground	58 17	
User 9 paired with 8		74	Ground	50, 17	
User 10 paired with 11	E-stop/	86	Ground	50 18	
User 11 paired with 10	Lockout	18	Ground	50, 10	

Table 2-6. WPC 2000 User Inputs: Stop Types, Fault Codes, and Wiring Connections

Stop types for all inputs except input pair 10/11 are set to E-Stop by default; input pair 10/11 is set to E-Stop/Lockout. All inputs except input pair 10/11 can be reconfigured by the user. If you have SmartPAC 2 firmware version 3.32 or higher and WPC 2000 firmware version 1.70 or higher, an additional stop type option, Top-stop/Lockout, is available for user inputs 1-7. To set these inputs to Top-stop/Lockout or to change the stop type setting for any user input, see page 4-24.

# NOTICE

If you do not bypass the unused inputs, WPC 2000 will not work properly.

You can add up to 20 more non-control-reliable user inputs and up to 4 more control-reliable, cross-checked user inputs to your WPC 2000 by purchasing the Option 1 "daughter" board, which you install on the WPC 2000 Main Processor board. If you are interested in this product, contact your local Wintriss representative or call Wintriss Tech. Support. To install, wire, program, monitor, and troubleshoot the Option 1 board, refer to Appendix J.

You can display the status of all user inputs in SmartPAC Initialization mode. See *Input Status*, page 4-44.

# **Connecting Other Wintriss Products to WPC 2000**

You can connect the stop circuits of other Wintriss products to WPC 2000. Before you wire, complete all WPC 2000 installation, initialization and checkout procedures. Then run the press in all modes of operation–Inch, Single-stroke, and Continuous (if applicable). Also make sure that the press has working Top-stop and Emergency-stop circuits. Since WPC 2000 is connected to the press stop circuits, it is extremely important to verify that the press operates and stops properly before connecting WPC 2000 to other units. Do not forget to mark on your electrical prints where you wire in WPC 2000.

When the Stopping Time is critical to your operation, as it is with die protection, be sure to wire as follows. Whenever you have Emergency-stop circuits, wire them between terminals #67 and #68 or terminals #68 and #69 on the Main Processor board. For Top-stop circuits, wire them between terminals #79 and #80 or terminals #80 and #81. Refer to Figure 1 at the end of the manual for specific wiring schematics.

Use customized status code wiring (see *Wiring WPC 2000 User Inputs*, page 2-31) when the auxiliary equipment that you are connecting does not have its own self-explanatory displays, as are available in DiPro 1500 or AutoSet load analyzers.

# **Installing WPC 2000 Options**

# Wiring the Lockout Relay

The Lockout relay, which is designed to be wired to critical press functions such as the motor starter (see Figure 6 at the back of the manual for an example), provides an added safety feature to WPC 2000. Whenever a serious error condition occurs, the Lockout message will appear in the SmartPAC 2 display. To clear the Lockout message, turn the Stroke Select switch to OFF, then back to INCH or one of the other operating modes.

Wire the function you want to be controlled by the Lockout relay to TB 301 on the DSV/ Lockout relay board, which is located in the upper left corner of the WPC 2000 Main Processor board (see Figure 2-14, page 2-28). Wiring connections are shown in Table 2-7 and in Figures 16 (Herion DSV), 17 (Ross Serpar DSV), and 22 (Ross DM2 DSV) at the end of the manual.

DSV/Lockout Relay Bd. TB301 Pin #	Signal
97	Lockout relay input
98	Lockout relay output
99	Lockout relay output

	14/2 /	<b>^</b>		<b>D</b> ()
l able 2-7. Lockout Rela	v Wirina	Connections	(DSV/Lockout Rela	v Board)
	,	•••••••		,

# Wiring Auxiliary Outputs

## **A** DANGER

### NON-SAFETY OUTPUT USED FOR SAFETY FUNCTIONS

Use Auxiliary outputs 1, 2, and 3 for non-safety functions only, such as convenience in automation. They cannot protect personnel from a moving hazard.

Failure to comply with these instructions will result in death or serious injury.

WPC 2000 provides three optional Auxiliary outputs that you can use to automate equipment connected to your clutch/brake control. A summary of wiring connections and change conditions for these three outputs is provided in Table 2-8. Details about each output are given following the table. Additional wiring details are provided in Table 2-27, page 2-114 and in Figure 3 at the back of the manual.

Output	Pin # (WPC 2000 Proc. Bd.)	Normal State	Change State	Change Conditions
Aux. 1	28	On (N/C)	Off (or Open)	<ul> <li>WPC 2000 fault</li> <li>E-stop string open</li> <li>Light curtain interruption</li> <li>Interrupted Stroke (controlled by option switch 8–see Table 2-9)</li> </ul>
Aux. 2	36	Off (N/O)	On (or Closed)	<ul><li>WPC 2000 fault</li><li>Interrupted stroke</li><li>Key switch in Inch and DSV energized</li></ul>
Aux. 3	29	Off (N/O)	On (or Closed)	DSV energized

Table 2-8. Auxiliary Output Wiring Connections and Change Conditions

## Auxiliary Output 1

Auxiliary 1 is normally closed (N/C), or On. The output opens, or turns Off, when a fault condition occurs, an E-stop string opens, or a light curtain is interrupted while the press is running. The output can also be programmed to turn Off during an Interrupted Stroke (see page 6-39 for an explanation of Interrupted Stroke).

Aux. Output 1 response to an Interrupted Stroke is controlled by option switch 8 on the WPC 2000 Main Processor board. Switch settings are shown in Table 2-9.

Option Switch 8	Auxiliary Output 1 State Change during Interrupted Stroke
OFF	Output turns OFF when an Interrupted Stroke occurs
ON	Output remains ON during an Interrupted Stroke unless the Interrupted Stroke is preceded by a WPC 2000 fault or an Emergency Stop, in which case the output turns OFF

When switch 8 is set to OFF, Auxiliary Output 1 opens, or turns Off, at the occurrence of an Interrupted Stroke. When switch 8 is set to ON, the output turns Off during an Interrupted Stroke only when there is also a fault or Emergency-stop condition; otherwise, the output remains On during an Interrupted Stroke. See *Auxiliary Output 1 Response to Interrupted Stroke*, page 4-40 for additional details.

The switch 8 ON setting allows the press to be "inched" during an Interrupted Stroke, when the WPC 2000 is in Two-hand Maintained Single-stroke mode. Normally, in Two-hand Maintained Single-stroke, the operator must hold down the Run/Inch palm buttons until the press reaches its Top-stop position in order to avoid another Interrupted Stroke. With switch 8 set to ON, the operator may release the Run/Inch buttons while inching the press to Top-stop without initiating an Interrupted Stroke.

Auxiliary Output 1 can be wired to a customer-supplied control relay and used to stop auxiliary equipment such as scrap choppers, conveyors, etc. when one of the conditions described above causes the press to stop. When a warning beacon is connected to the control relay, the beacon illuminates when a fault occurs and Aux. Output 1 opens.

## Auxiliary Output 2

Auxiliary Output 2 is normally open (N/O), or Off. The output closes to ground, or turns on, whenever there is an interrupted stroke or fault condition or the press is placed in Inch mode.

Auxiliary Output 2 can be connected to the Setup Mode inputs of DiPro 1500 and AutoSet 1500/1504 Plus. The output is used to disable green sensors in DiPro 1500 or repeatability setpoints in AutoSet 1500/1504 Plus whenever the press is switched to Inch mode or an interrupted stroke or fault condition occurs. A customer-supplied output relay can be wired into this circuit. Refer to the applicable manuals for wiring details.

## **Auxiliary Output 3**

Auxiliary Output 3 is normally open (N/O), or Off. The output closes, or turns On, when the DSV is energized. When Bar Control is in use (see *Operating the Press in Bar Mode*, page 6-53), Aux. Output 3 remains open, or Off, when the DSV is energized.

Auxiliary Output 3 can be wired to the input check circuit of DiPro 1500 or ProCam 1500 and is used to prevent Loss of Rotation faults on these units when Bar Control is activated.

When WPC 2000 is in Bar Control mode, the DSV is energized to enable the crankshaft to be turned by hand. Under normal conditions, whenever the DSV is energized, Aux. Output 3 turns On, sending a low-voltage (i.e., 24 Vdc) input check signal to the DiPro 1500 or ProCam 1500.

DiPro/ProCam 1500 uses the input check signal to initiate monitoring of the programmed start time limit, the interval within which the crankshaft must begin rotating in order to avoid a Loss of Rotation fault. In Bar Control mode, Aux. Output 3 disables the input check signal, preventing the 1500 unit from monitoring the start time limit.

Wire Auxiliary Output 3 to the "A" connection of the input check circuit of DiPro 1500 or ProCam 1500. Wire one of the +24 Vdc outputs on the WPC 2000 Main Processor board (pins #37 through #42) to the "B" connection of DiPro 1500 or ProCam 1500. If your DiPro

1500 or ProCam 1500 is equipped with a voltage selector switch for the input check circuit, set it to the 12-60 volt position. Refer to the DiPro 1500 or ProCam 1500 manual for details.

## Wiring Operator Mode Outputs

Terminal block TB109 on the WPC 2000 Main Processor board provides outputs to customer-supplied solid-state relays to allow monitoring of the WPC 2000 operator mode. Figure 2-17 shows an example of how to wire a relay so that it turns on when WPC 2000 is in Automatic Single-stroke. Wiring schematics for all operator mode outputs is provided in Figure 18 at the end of the manual.

### WARNING

These operator mode outputs are NOT control reliable. They can, however, be used as a convenience to interface automation.



Figure 2-17. WPC 2000 Operator Mode Outputs: Wiring Example

# Wiring a Foot Switch

## **A** DANGER

## UNGUARDED HAZARDS

When using a foot switch, ensure that light curtains and other safeguards are properly installed and operating to protect operators.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

### IMPROPER FOOT SWITCH

Ensure that any foot control switch complies with OSHA 1910.217 (b) (7) (x), including protection from accidental actuation by falling or moving objects or unintentional stepping on the control. **Failure to comply with these instructions will result in death or serious injury.** 

Foot Switch, an option available from Wintriss, enables the operator to use both hands during operation of the press as, for example, when manually feeding parts. If you choose to order a foot switch, you must obtain optional One-hand/Two-hand/Foot firmware from Wintriss and install a Shadow safety light curtain.

Wire the Foot Switch's normally closed contact to pin #4 on the WPC 2000 Main Processor board and the normally open contact to pin #14, then wire both contacts to +24 Vdc, as shown in Table 2-10 and Figure 3 at the end of the manual.

WPC 2000 Main Processor Bd. Pin #	Foot Switch Contacts
4	N/C input
14	N/O input
+24 Vdc (e.g., #37)	Common

Table 2-10. Foot Switch Wiring Connections

Refer to page 4-37 for Foot Switch settings.

# Installing a One-hand Control

## **A** DANGER

### INSTALL SAFEGUARDS TO PREVENT ACCESS TO HAZARDOUS AREA

- Follow all applicable OSHA and ANSI regulations for safeguarding your press system. Point-ofoperation safeguarding is the single most important factor in the prevention of injuries.
- Follow all applicable OSHA and ANSI regulations when installing a one-hand control.
- Ensure that proper safeguarding devices are installed and working properly. Wintriss takes no responsibility if safeguarding devices are not installed or working correctly.
- DO NOT use WPC 2000 or a one-hand control as a safeguarding device.
- Install and operate WPC 2000 and a one-hand control in accordance with OSHA and ANSI regulations.

Failure to comply with these instructions will result in death or serious injury.

## A DANGER

### PREVENT OPERATOR FROM STANDING BETWEEN LIGHT CURTAIN AND HAZARD

Ensure that the operator cannot position himself between the light curtain and the hazardous area. Use another pair of light curtains or a mechanical barrier at knee to waist height to prevent the operator or a passerby from being "trapped" between the light curtain and the hazard.

### Failure to comply with these instructions will result in death or serious injury.

One-hand Control is a switch available from Wintriss that allows operators to use their free hand to feed a part while their other hand operates the switch. This option can only be used with WPC 2000 systems equipped with One-hand and Single-stroke modes, employing a Shadow light curtain to guard the point of operation, and running One-hand/Two-hand/Foot firmware.

The One-hand Control is mounted on or near the press and allows the operator to cycle the press without using the Operator Station. To stroke the press, the operator simply pushes the button as part of his normal hand motion after loading a part.

The One-hand Control can be used in two different modes. In Normal mode, the press cycles in Single-stroke whenever you push the One-hand Control button. In "Light Curtain Break" mode, the press cycles only when you push the One-hand Control button within eight seconds after removing your hand(s) from the light curtain. If the button is pushed after this interval expires, the press does not cycle.

Light Curtain Break mode prevents inadvertent operation of the press when an operator is loading or unloading parts.

The mode used for One-hand Control is determined by the setting on option switch 3 (see page 4-36). When switch 3 is set to OPEN, One-hand Control operates in Normal mode. When switch 3 is set to CLOSED, One-hand Control operates in Light Curtain Break mode.

## Mounting a One-hand Control

## **A** DANGER

### DO NOT MOUNT OPERATOR CONTROL TOO CLOSE TO HAZARD

Mount the One-hand Control outside the area protected by the light curtain. DO NOT mount the One-hand Control between the light curtain and the point of operation.

Failure to comply with these instructions will result in death or serious injury.

To mount the One-hand Control, perform the following steps, referring to Figure 2-18 and Figure 2-19, page 2-41 for mounting dimensions:



Figure 2-18. One-hand Control Switch: Mounting Dimensions





- 1. Shut off power to the press and to WPC 2000.
- 2. Choose a mounting location on or near the press convenient to the operator. The One-hand Control should be mounted so the operator can reach it as part of normal hand movement after loading a part. An adjustable bracket may be necessary.
- 3. Mount the One-hand Control, using the tapped holes on the bottom of its metal enclosure.

## Wiring a One-hand Control to WPC 2000

## A DANGER

### ELECTRIC SHOCK OR HAZARDOUS ENERGY

- Disconnect main power before installation.
- Remove all power to the press, press control, and other equipment used with the press.
- Remove all fuses and "tag out" per OSHA 1910.147 Control of Hazardous Energy (Lockout/ Tagout).
- Ensure that installation is performed by qualified personnel.
- Complete all installation procedures before connecting to the AC power source.

Failure to comply with these instructions will result in death or serious injury.

To wire One-hand Control, you need to make connections to both the Operator Station and to the WPC 2000 Main Processor board. To do so, perform the following steps:

1. Turn off power to the press and to the WPC 2000.

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- 2. Loosen the clips at the bottom of the front panel of the Operator Station. Swing the front panel up and support it so you can work inside the box. (The cover will stay up if you slide it slightly to the left or right.)
- 3. Knock out a hole in the bottom of the Operator Station near the existing conduit from the WPC 2000 control enclosure.
- 4. Using the conduit hole provided in the base of the One-hand Control, run conduit and wiring to the Operator Station, referring to Figure 2-20 for terminal locations on the bottom of the One-hand Control.



Figure 2-20. Wiring Connections in One-hand Control Switch (Switch Cover, Bottom View)

5. Measure wires to fit before cutting, then make the appropriate wiring connections, referring to Table 2-11, below, and Figure 8 at the end of the manual.

One-hand Control Terminal # *	WPC 2000 Main Processor Bd. and Operation Station Connections Pin# Signal	
11	1 Palm switch A N/C input +	
12	Blue wire in Operator Station cable	
13	3 One-hand A input +	
14	Blue wire in Operator Station cable	

Table 2-11. One-hand Control Wiring Connections

\* Refer to Figure 2-20, above

- 6. Fasten the switch cover onto the base with the screws provided.
- 7. Tighten all conduit connections that may have been loosened during installation.
- 8. Close and latch the cover of the Operator Station and WPC 2000.
- 9. Make sure that you have run all your ground wires. Do not use conduit as ground.

## Wiring a Keylock Switch to Prevent Changes to WPC 2000 Settings

You can use a keylock switch (not supplied by Wintriss) to provide additional security that supersedes the Run mode lockout provided in SmartPAC 2. Refer to *Additional Security*, page 4-52 for more information.

Wire your keylock switch between ground and SmartPAC 2 terminal #251 on TB107.

- Switch CLOSED (grounded): prevents changes to any WPC 2000 settings in Program and Run modes
- Switch OPEN (not grounded): Normal operation of Program and Run modes.

# Installing Flywheel Speed Sensor

# A WARNING

## INJURY FROM MAGNETS THAT DETACH

Mount the magnets with the brass screws provided. If you mount them with plastic screws or adhesive, the attachment could fail and the magnets become dangerous projectiles, especially on high-speed presses.

Failure to comply with these instructions could result in death or serious injury.

You can monitor the speed of the press's flywheel by installing a Latching Magnetic Cam Switch (LMCS), an option available from Wintriss. The LMCS consists of the following parts:

- A sensor mounted on a bracket with wiring for connection to the WPC 2000 Main Processor board
- Two magnets, one red, the other blue, for attachment to the flywheel
- Two brass screws, one for mounting each magnet

To install the LMCS, do the following:

- 1. Select a mounting location that allows the sensor to detect the magnets as they rotate on the flywheel. The magnets should be mounted approximately 180° apart to ensure that the LMCS transitions from Off to On once per revolution.
- 2. Fabricate a bracket to position the LMCS 3/8 in. to 1/2 in. from the face of the magnets. If possible, make the bracket adjustable.

# NOTICE

Make sure to position the LMCS sensor 3/8 in. to 1/2 in. from the magnets. This gap specification is different from that of the overrun limit switch (see page 2-29).

3. Install the LMCS as shown in Figure 2-21, page 2-44.

Position the magnets so they are approximately 180° apart. Magnets should be installed plastic side up with a non-ferrous metal screw. A ferrous screw may cause false signals. A brass screw (6-32) is supplied with each magnet. Use a No. 36 drill and a 6-32 tap.

#### NOTICE Be sure to position the red and blue magnets on the flywheel approximately 180° apart. LMCS sensor Red magnet 3/8" to rigid bracket to 1/2" gap press frame between mounted magnet and dead center sensor Red magnet Blue magnet ±180° dwell flywheel Blue **Side View** magnet

Figure 2-21. Installing the LMCS and Magnets

- 4. Run the cable from the LMCS sensor through flexible, liquid-tight conduit to the WPC 2000 enclosure. The enclosure is rated NEMA 12 (protected against dust and oil). You must use conduit rated NEMA 12 and make proper conduit connections to ensure NEMA 12 protection.
- 5. Wire the LMCS to the WPC 2000 Main Processor board as shown in Table 2-12.

WPC 2000 Main Processor Bd. Pin #	LMCS Wire Color
22	White
23	Red
25	Black

Table 2-12. Flywheel Speed Sensor Wiring Connections

6. Double-check wiring connections.

**Front View** 

# Mounting and Wiring the Bar Control Enclosure

Mount the Bar Control enclosure in a location that is convenient to the operator while he is releasing the machine's brake and barring the press. Make sure that the operator will not block a light curtain while pressing the Bar control Operate button. Refer to Figure 2-22, page 2-45 for mounting dimensions.

To wire the Bar Control, connect the Bar selector switch input to pin #6 on the WPC 2000 Main Processor board and the Bar actuator input to pin #16, as shown in Table 2-13, page 2-45 and Figure 3 at the end of the manual.





WPC 2000 Main Processor Bd. Pin #	Bar Control Contacts
16	Bar actuator input
6	Bar selector switch input
+24 Vdc (e.g., #37)	Common

# Wiring Automatic Single-stroke

## A DANGER

### PRESS STARTING UNEXPECTEDLY

- Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using Automatic Single-stroke. Since the external trigger starts the stroke, a stroke can occur unexpectedly.
- Ensure that guarding is properly installed to prevent access to the machine over, under, or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

Automatic Single-stroke is an operating mode that enables the operator to automate a manual press using a feeding device or robot. To wire the Automatic Single-stroke actuating mechanism, refer to Table 2-14 and Figure 3 at the back of the manual.

WPC 2000 Main Processor Bd. Pin #	Foot Switch Contacts
15	N/C input
5	N/O input
+24 Vdc (e.g., #37)	Common

Table 2-14. Automatic Single-stroke Wiring Connections

Though an SPDT contact is shown in Figure 3, you can also use solid state switches (proximity switches, for example) or outputs from a programmable logic controller (PLC). To make sure that the contacts are clear and reliable, the switch or relay should be new and unused.

You set the Prior Act time for Automatic Single-stroke with option switch 5 (see page 4-38). To operate the press in this operating mode, refer to page 6-49.

## Wiring Automatic Continuous On-demand

## A DANGER

### PRESS STARTING UNEXPECTEDLY

- Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using Automatic Continuous On-demand mode, in which a stroke can occur unexpectedly.
- Ensure that guarding is properly installed to prevent access to the machine over, under, or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

Contact Wintriss Tech. Support for information on using this operating mode.

# Installing SmartPAC 2

# Mounting the SmartPAC 2 Control Enclosure

# NOTICE

If your SmartPAC 2 is a panel mount version, go to the next section, page 2-48, for mounting instructions.

# NOTICE

## PLACE SMARTPAC 2 AT A CONVENIENT HEIGHT

SmartPAC 2 should be installed at a convenient height for all users. Ideally, the top edge of the unit should be approximately at chin level. Experiment to determine a good height for all users before mounting.

To mount the SmartPAC 2 enclosure, follow the steps below, referring to Figure 2-23.



Figure 2-23. SmartPAC 2 Mounting Dimensions: Enclosure

- 1128600
- 1. Determine a convenient location for the enclosure. Ideally, the enclosure should be mounted where operators and setup personnel can easily see the readouts and reach the keyboard. Make sure that all cables can reach the enclosure. Leave enough room to open the door at least 120°. The enclosure can be mounted on a pedestal, pendant, or the press itself.
- 2. Drill and tap (if necessary) mounting holes, using a No. 7 drill and 1/4–20 tap, then mount the enclosure, using the enclosed shock mounts. Shock mount studs are 1/4–20.
- 3. Go to *Wiring between WPC 2000 and SmartPAC 2*, page 2-50 to start wiring your SmartPAC 2.

# Installing SmartPAC 2 as a Panel Mount

If you have received the panel-mount configuration of SmartPAC 2, follow the steps below to install the panel mount in your enclosure. The panel mount is usually installed from the outside of the enclosure. Be sure to allow at least 6 in. (152 mm) of clearance behind the panel mounting plane to leave enough room for the electronics.

- 1. Determine a convenient location within your enclosure for mounting SmartPAC 2. Ideally, SmartPAC 2 should be mounted where operators and setup personnel can easily see the readouts and reach the keyboard.
- 2. Cut out a hole in your enclosure, and drill and tap twelve holes for #10-32 screws, referring to Figure 2-24, page 2-49 for mounting and "cutout" dimensions.
- 3. Mount SmartPAC 2 in your enclosure, accessing wiring connections from the back.
- 4. Go to *Wiring between WPC 2000 and SmartPAC 2*, page 2-50 to start wiring your SmartPAC 2.



Figure 2-24. SmartPAC 2 Mounting and Cutout Dimensions: Panel Mount

# Wiring between WPC 2000 and SmartPAC 2

This section shows you how to make the following wiring connections between WPC 2000 and SmartPAC 2:

- WPC 2000 resolver wiring
- Communications wiring
- AC wiring
- Stop circuit and input check circuit wiring

As shown in Figure 2-1, page 2-4, you run the resolver and communications wiring through one conduit (for low-voltage connections), AC, stop circuit, and input check circuit wiring through another conduit (for high-voltage connections). Refer to Figure 2-25, page 2-51 and Figure 1 at the end of the manual when making wiring connections.

## **Connecting the Resolver Wiring**

## NOTICE

Make sure you have already wired the resolver directly to the WPC 2000 (see page 2-25). In the following procedure, you will wire in parallel between the "resolver" terminals on TB106 on the WPC 2000 Main Processor board and the "resolver" terminals on TB101 on the SmartPAC 2 board. This wiring scheme makes WPC 2000 the "master," SmartPAC 2 the "slave."

To wire the resolver from WPC 2000 to SmartPAC 2, perform the following steps, referring to Table 2-15, page 2-51, Figure 2-25, page 2-51, and Figure 1 at the end of the manual.

- 1. Make sure that the resolver is connected directly to WPC 2000.
- 2. Find one of the two 6-conductor shielded cables without connector, and run it through 1/2 in. flexible, liquid-tight conduit from the bottom right of the WPC 2000 enclosure to the bottom left of the SmartPAC 2 enclosure (see Figure 2-1, page 2-4). Both WPC 2000 and SmartPAC 2 are rated NEMA 12 (protected against dust and oil). You must use conduit of the same rating and make proper connections to ensure NEMA 12 protection.
- 3. Remove the resolver connector, TB106, from the WPC 2000 Main Processor board (it is already wired to the resolver), and connect wiring from the 6-conductor cable to terminals 104 through 110, matching brown wire to brown wire, orange to orange, yellow to yellow, and so forth (see Table 2-4, page 2-27). Then plug the connector back into TB106.

## NOTICE

## WIRE AND PLUG IN CONNECTOR CORRECTLY

The connector can plug into the receptacle on the PC board in only one direction. Before wiring the connector, mark its left and right ends when it is plugged in to make sure you wire the correct pin numbers.

4. Remove the resolver connector, TB101, from the SmartPAC 2 board (see Figure 2-25) and connect wiring from the 6-conductor cable to terminals 212 through 218, as shown in Table 2-15. Plug the connector back into TB101 when you are done.

- 5. Double-check connections when you are finished wiring.
- 6. Locate jumper JP101 on the SmartPAC 2 board (see Figure 2-25), and move it to the "Slave" position.

Pin #	Signal	Wire Color		
212	Shield	Shield		
213	S1	Black*		
214	S2	Green		
215	R1	Red		
216	S3	Yellow*		
217	R2	Orange		
218	S4	Brown		
* Shown for clockwise rotation, facing shaft.				

Table 2-15. SmartPAC 2 Resolver (TB101) Wiring

For counterclockwise, swap black and yellow wires.



Figure 2-25. SmartPAC 2 Board: Location of Components

# **Connecting Communications Wiring**

To connect communications wiring between SmartPAC 2 and WPC 2000, perform the following steps, referring to Table 2-16, below, and to Figure 1 at the end of the manual:

- 1. Find the other 6-conductor shielded cable, and run it through the same conduit as you ran the resolver wiring in the previous procedure (see step 2, page 2-50).
- 2. Remove the TB105 connector from the SmartPAC 2 board (see Figure 2-25, page 2-51 for location), and connect wiring from the 6-conductor cable as shown in Table 2-16. Plug the connector back into TB105 when you are done.
- 3. Remove the TB107 connector from the WPC 2000 Main Processor board (see Figure 2-14, page 2-28 for location), and connect wiring from the 6-conductor cable as shown in Table 2-16. Plug the connector back into TB107 when you are done.
- 4. Double-check connections when you are finished wiring.

Pin # on TB105 SmartPAC 2	Wire Color *	Pin # on TB107 WPC 2000
Shield **	Shield	Shield **
326 (Ground)	Black	111 (Ground)
327 (+RxD6)	Red	115 (+TxD)
328 (-RxD6)	Green	114 (-TxD)
329 (+TxD6)	Orange	113 (+RxD)
330 (-TxD6)	Yellow	112 (-RxD)

Table 2-16. Communications Wiring: SmartPAC 2 to WPC 2000

\* Cut off unused brown wire.

\*\* Terminate to ground stud nearest entry to enclosure

## Connecting AC Wiring

# A WARNING

## ELECTRIC SHOCK HAZARD

- Do not connect the AC power source until you are done with all other installation procedures.
- Turn off and disconnect power from the machinery SmartPAC 2 is connected to before making any wiring connections. This includes power to the machine control and motor.

Failure to comply with these instructions could result in death or serious injury.

Run the AC power wires through a "high-voltage" conduit (see *Installation Guidelines*, page 2-3) along with the wiring for Emergency-stop, Top-stop, and Input Check circuits. No. 16 wire (No. 14, if local codes require it) with a minimum 75° C temperature rating is recommended for these circuits. Bring the conduit from the top left of WPC 2000 to the top right of SmartPAC 2. Then, to wire the AC input terminal block, follow these steps:



1. Find the AC terminal block at the top right corner of the back wall of the enclosure (see Figure 2-26).

Figure 2-26. Wiring AC to Terminal Block, Inside Enclosure, Top Right

For a panel mount unit, the terminal block is mounted to the back of the faceplate near the top right corner of the SmartPAC 2 PC board.

2. Determine how you will bring wiring for your 115 Vac power source (or 230V source, if applicable) from WPC 2000 to the SmartPAC 2. Run a 3-conductor shielded cable (you must supply your own cable) through flexible, liquid-tight conduit from the top left of the WPC 2000 enclosure to the top right of the SmartPAC 2 enclosure.

AC wiring should be connected directly to the press control transformer at the press control. For 115 Vac, you need three wires-high (black), neutral (white) and ground (green). For 230 Vac, wires are black and red with green or green/yellow for ground.

- 3. Connect the AC input wires and ground wire as shown in Figure 2-26. Make your ground connection as follows:
  - SmartPAC 2 Enclosure: Connect your ground (green or green/yellow) wire to the set screw terminal on the inside of the enclosure. To connect to the set screw terminal, strip the ground wire about 1/4 in. (6.4 mm) from end, loosen the screw on the terminal, slide the wire in the hole, and tighten the screw to secure the wire in place.
  - SmartPAC 2 Panel Mount: Connect the ground wire to the ground stud on the face plate below the AC input terminal block.

## **Connecting Stop Circuits and Input Check Circuit**

To connect stop circuit and input check circuit wiring between WPC 2000 and SmartPAC 2, perform the following steps:

1. Supplying your own multi-conductor cable (six wires minimum–two for the Emergency-stop circuit, two for the Top-stop circuit, and two for the Input Check circuit), run the cable through the same flexible, liquid-tight conduit as you ran AC wiring (see step 2, page 2-53) from the bottom right of the WPC 2000 enclosure to the bottom left of the SmartPAC 2 enclosure.

Because SmartPAC 2 is rated NEMA 12 (protected against dust and oil), you must use conduit of the same rating and make proper connections to ensure NEMA 12 protection.

2. Locate connector TB102 on the SmartPAC 2 board (see Figure 2-25, page 2-51), and unplug it from its socket. Connect the wires for stop and input check circuits to TB102 pin locations, as shown in Table 2-17, below, and Figure 1 at the end of the manual. Plug the connector back into TB102 when you are done.

SmartPAC 2 TB102 Pin #	Circuit	WPC 2000 Pin #
205	Input check A	41 (TB104)
206	Input check B	29 (TB103)
207	E-stop	68 (TB103)
208	E-stop	67 (TB103)
209	Top-stop	80 (TB104)
210	Top-stop	79 (TB104)

Table 2-17. Stop and Input Check Circuit Wiring Connections

- Locate connectors TB103 and TB104 on the WPC 2000 Main Processor board (see Figure 2-14, page 2-28), and unplug them from their sockets. Connect the wires for stop and input check circuits to the appropriate pin numbers on TB103 and TB104, as shown in Table 2-17 and Figure 1. Plug the connectors back into TB103 and TB104 when you are done.
- 4. Double-check connections to make sure that you did not wire the connectors backwards (see *Connecting Wires to Terminal Block Connectors*, page 2-5).
- 5. Make all the necessary conduit connections to ensure NEMA 12 protection.

# NOTICE

Be sure to number all wires in a way consistent with your press's electrical prints.

## Setting the Input Check Voltage Switch

When the input check circuit is wired as shown in Table 2-17, page 2-54, do the following:

- 1. Find the input check voltage switch, S101, on the SmartPAC 2 board (see Figure 2-25, page 2-51). It is located on the right side of the board just beneath the E-stop relays.
- 2. Place S101 in the Down position.

When the input check circuit is wired directly in parallel with the coil of the dual safety valve, do the following:

1. For a coil voltage of 60-250V, the switch should be placed in the Up position, the factory setting; for 12-60V coil voltage, place the switch in the Down position.



Figure 2-27. Input Check Switch (S101)

# NOTICE

## HOW THE INPUT CHECK CIRCUIT DETECTS RESOLVER CHAIN BREAKAGE

When the dual safety valve relay is energized by the press control to start the press, voltage is produced in the input check circuit. This signals SmartPAC 2 to initiate a stroke at the press. If SmartPAC 2 gets no signal from the resolver within the specified start time limit (resolver not turning), SmartPAC 2 opens the Emergency-stop circuit and a "loss of rotation" fault message is displayed on the LCD. The fault indicates that the resolver belt or chain is broken or so loose that the resolver shaft cannot move. Other possible reasons for the fault are low air pressure to the clutch or a bad clutch.

# Connecting SmartPAC 2 to a Network

Before you can connect SmartPAC 2 to a computer network, your network administrator must make the necessary connections and settings.

The Ethernet cable is plugged into the Ethernet connector on the SmartPAC 2 board (see Figure 2-25, page 2-51).

# NOTICE

## SETTING STATIC IP ADDRESS

SmartPAC 2 comes from the factory set up for a Dynamic Host Configuration Protocol (DHCP) network, which automatically assigns IP addresses. If your network requires static IP addresses, have your network administrator call Wintriss Tech. Support for assistance in setting up SmartPAC 2 with a static IP address. See CHANGE NETWORK SETTINGS, page 4-60.

# **Installing SmartPAC 2 Options**

# Adding or Upgrading DiProPAC or ProCamPAC

# A WARNING

## ELECTRIC SHOCK HAZARD

Turn off and disconnect power from SmartPAC 2 and from the machinery it is connected to before making any wiring connections. This includes power to the machine control and motor. Do not connect the AC power source until you are done with all other installation procedures.

Failure to comply with these instructions could result in death or serious injury.

# CAUTION

## DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components. Failure to comply with these instructions could result in property damage.

# NOTICE

## INSTALL DIPROPAC AND/OR PROCAMPAC BOARDS IN CORRECT LOCATIONS

Install these boards in the locations shown in Figure 2-28, page 2-57. If you install a board in the wrong location, SmartPAC 2 will not recognize that the option is installed.

Eight-, 16-, and 32-channel configurations of the same option are interchangeable. When a board is installed in the correct location, SmartPAC 2 recognizes whether it is an 8-, 16-, or 32-channel version of DiProPAC or an 8- or 16-channel version of ProCamPAC.

# NOTICE

### DIPROPAC 32 MAY REQUIRE FIRMWARE UPGRADE

The DiProPAC 32 module requires that you be running SmartPAC 2 firmware version 4.42 or higher. If your current SmartPAC 2 firmware version is lower than 4.42, you must upgrade your firmware before installing the DiProPAC 32 board.

## NOTICE

### MAKE SURE TO CLEAR TABLES AFTER INSTALLING DIPROPAC 32

If you are installing a DiProPAC 32 board, you must clear some of the SmartPAC 2 memory tables; otherwise, your SmartPAC 2 will not operate properly. After installing the board, clear the tables by accessing the Diagnostics Menu from the SmartPAC 2 Main Initialization Menu (see page 4-1), and selecting the CLEAR TABLES item (see page 4-61). On the Clear Tables Utility screen, select DIPRO 32, and when the red warning window displays, press the CLEAR key to confirm that you want to continue with the Clear Tables process.

The following instructions describe how to add die protection and/or programmable limit switch capabilities to a basic SmartPAC 2 or upgrade your existing die protection and

programmable limit switch capabilities. DiProPAC is available as an 8-sensor, 16-sensor, or 32-sensor board. You can obtain the ProCamPAC board in 8-cam or 16-cam versions. Wiring instructions for the DiProPAC board are provided starting on page 2-61. Wiring for the ProCamPAC board is documented starting on page 2-63.

## Replacing an Existing Board

To replace an existing DiProPAC or ProCamPAC board, do the following:

- 1. Turn off power to the SmartPAC 2.
- 2. On the SmartPAC 2 board, locate the board that you wish to replace (see Figure 2-28).



Figure 2-28. DiProPAC and ProCamPAC Boards Installed on SmartPAC 2 Board

# CAUTION

### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

3. Making sure you are grounded, remove the connector(s) attached to the board, one connector for an 8-sensor or 8-cam unit, two connectors for a 16-sensor or 16-cam unit (see Figure 2-29 and Figure 2-30).



DiProPAC 8

DiProPAC 16

DiProPAC 32

Figure 2-29. DiProPAC Boards (8-, 16-, and 32-Sensor): Location of Components



Figure 2-30. ProCamPAC Boards (8- and 16-Channel): Location of Components

If you are replacing a DiProPAC board, the connector(s) go to the DiPro Sensor Interface. If you are replacing a ProCamPAC board, the connector(s) go to the ProCam Output assembly.

- 4. Remove the four screws that hold the board to the standoffs, and put them aside.
- 5. Mark the board to identify it so you don't re-install it by mistake.
- 6. Remove the board by pulling it straight up from the SmartPAC 2 board and out of its connector.
- 7. Making sure that you are still grounded, install the new board by plugging it into the appropriate connector, J111 or J112 (see Figure 2-25, page 2-51). Connectors are keyed, so you can only plug in the boards in one direction.
- 8. When the board is properly seated, screw it down to the four standoffs, using the screws you removed in step 4.
- 9. Reinstall the connector(s) you removed in step 3.

If you are upgrading from an 8- to a 16-sensor DiProPAC, from a 16- to a 32-sensor DiProPAC, or from an 8- to a 16-channel ProCamPAC, make sure you plug the connector(s) into the correct terminal block(s). Terminal block assignments for the different boards are as follows (see Figure 2-29 and Figure 2-30):

- DiProPAC 8: Sensors 1-8 to TB554 upper
- DiProPAC 16: Sensors 1-8 to TB554 upper, sensors 9-16 to TB554 lower
- DiProPAC 32: Sensors 1-8 to TB554 upper, sensors 9-16 to TB554 lower
- ProCamPAC 8: Cam channels 1-8 to TB401
- ProCamPAC 16: Cam channels 1-8 to TB451, channels 9-16 to TB452
- 10. If you have installed a board with an additional connector (i.e., a 16-sensor or 16-channel board in place of an 8-sensor or 8-channel board, or a 32-sensor board in place of a 16-sensor board), wire that connector or those connectors to the appropriate component. For the DiProPAC board, wire the connector to the DiPro Sensor Interface, following the instructions starting on page 2-61. For the ProCamPAC board, wire the connector to the ProCam Output assembly, following the procedure starting on page 2-63.
- 11. Verify that you have installed the board(s) properly by performing the *Verifying Installation of DiProPAC and ProCamPAC* procedure, page 2-74. You need to complete this procedure before you can use SmartPAC 2.

## Installing a New Board

To install a new DiProPAC or ProCamPAC board, do the following:

1. On the SmartPAC 2 board, locate the connector in which the new board should be installed (see Figure 2-28).

## CAUTION

### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

- 2. Making sure that you are grounded, install the new board by plugging it into the appropriate connector, J111 or J112 (see Figure 2-25, page 2-51). Connectors are keyed, so you can only plug in the boards in one direction.
- 3. When the board is properly seated, screw it down to the four standoffs, using the screws that came with the kit.
- 4. Remove the connector(s) from the board, one connector for an 8-sensor or 8-cam unit, two connectors for a 16-sensor or 16-cam unit, four connectors for a 32-sensor unit. Terminal block assignments for the different boards are as follows (see Figure 2-29 and Figure 2-30):
  - DiProPAC 8: Sensors 1-8 to TB554 upper
  - DiProPAC 16: Sensors 1-8 to TB554 upper, sensors 9-16 to TB554 lower
  - DiProPAC 32: Sensors 1-8 to TB554 upper, sensors 9-16 to TB554 lower, sensors 17-24 to TB555 upper, and sensors 25-32 to TB555 lower
  - ProCamPAC 8: Cam channels 1-8 to TB401
  - ProCamPAC 16: Cam channels 1-8 to TB451, channels 9-16 to TB452
- 5. Wire the connector(s) to the appropriate component(s). For the DiProPAC board, wire the connector(s) to the DiPro Sensor Interface, following the instructions starting on page 2-61. For the ProCamPAC board, wire the connector(s) to the ProCam Output assembly, following the procedure starting on page 2-63.
- 6. Plug the connector(s) back into their sockets on the board.
- 7. Verify that you have installed the board(s) properly by performing the *Verifying Installation of DiProPAC and ProCamPAC* procedure, page 2-74. You need to complete this procedure before you can use SmartPAC 2.

# **Connecting DiPro Sensor Interface to SmartPAC 2**

To connect your DiPro die protection sensors through the DiPro Sensor Interface (DSI) 2, refer to Table 2-18 (below) to wire sensors 1-8, Table 2-19, page 2-62 to wire sensors 9-16, Table 2-20, page 2-62 to wire sensors 17-24, and Table 2-21, page 2-63 to wire sensors 25-32. Wiring diagrams (Figure 9 for sensors 1-16, Figure 10 for sensors 17-32) are provided at the back of the manual. Terminate cable shields to ground studs close to the point of entry into the enclosure. Refer to the DSI 2 manual for more information.

# NOTICE

## DSI 2 NOT COMPATIBLE WITH LOW-IMPEDANCE SENSORS

If any of your sensors are low-impedance types, they must be wired directly to DiProPAC. Low-impedance sensors cannot be wired to DSI 2.

Wire color*	1st DSI 2 (TB2)		DiP	roPAC (TB554)
	Pin #	Pin Designation	Pin #	Pin Designation
Brown	1	SENSOR 1	282	SENSOR 1
Red	2	SENSOR 2	283	SENSOR 2
Orange	3	SENSOR 3	284	SENSOR 3
Yellow	4	SENSOR 4	285	SENSOR 4
Green	5	SENSOR 5	286	SENSOR 5
Blue	6	SENSOR 6	287	SENSOR 6
Violet	7	SENSOR 7	288	SENSOR 7
Gray	8	SENSOR 8	289	SENSOR 8
		No connection	290	Sensor power
Black	9	GND	291	GND
	10	GND		No connection
	11	+5 VDC		No connection
Shield	Terminate stud	drain wire to ground	Terminate stud	drain wire to ground

Table 2-18. DiPro	Sensor Interface	(DSI) 2 to	SmartPAC 2	Wiring,	Sensors	1-8
				3,		

\* Your colors may be different

Wire color*	2nd DSI 2 (TB2)		DiProPAC (TB554)	
	Pin #	in # Pin Designation Pi		Pin Designation
Brown	1	SENSOR 1	292	SENSOR 9
Red	2	SENSOR 2	293	SENSOR 10
Orange	3	SENSOR 3	294	SENSOR 11
Yellow	4	SENSOR 4	295	SENSOR 12
Green	5	SENSOR 5	296	SENSOR 13
Blue	6	SENSOR 6	297	SENSOR 14
Violet	7	SENSOR 7	298	SENSOR 15
Gray	8	SENSOR 8	299	SENSOR 16
		No connection	300	Sensor power
Black	9	GND	301	GND
	10	GND		No connection
	11	+5 VDC		No connection
Shield	Terminate drain wire to ground stud		Terminate drain wire to ground stud	

Table 2-19. DiPro Sensor Interface (DSI) 2 to SmartPAC 2 Wiring, Sensors 9-16

\* Your colors may be different.

Wire color*	3rd DSI 2 (TB2)		DiProPAC (TB555)	
	Pin #	Pin Designation	Pin #	Pin Designation
Brown	1	SENSOR 1	180	SENSOR 17
Red	2	SENSOR 2	181	SENSOR 18
Orange	3	SENSOR 3	182	SENSOR 19
Yellow	4	SENSOR 4	183	SENSOR 20
Green	5	SENSOR 5	184	SENSOR 21
Blue	6	SENSOR 6	185	SENSOR 22
Violet	7	SENSOR 7	186	SENSOR 23
Gray	8	SENSOR 8	187	SENSOR 24
		No connection	188	Sensor power
Black	9	GND	189	GND
	10	GND		No connection
	11	+5 VDC		No connection
Shield	Terminate drain wire to ground stud		Terminate drain wire to ground stud	

\* Your colors may be different

Wire color*	4th DSI 2 (TB2)		DiProPAC (TB555)		
	Pin #	Pin Designation	Pin #	Pin Designation	
Brown	1	SENSOR 1	190	SENSOR 25	
Red	2	SENSOR 2	191	SENSOR 26	
Orange	3	SENSOR 3	192	SENSOR 27	
Yellow	4	SENSOR 4	193	SENSOR 28	
Green	5	SENSOR 5	194	SENSOR 29	
Blue	6	SENSOR 6	195	SENSOR 30	
Violet	7	SENSOR 7	196	SENSOR 31	
Gray	8	SENSOR 8	197	SENSOR 32	
		No connection	198	Sensor power	
Black	9	GND	199	GND	
	10	GND		No connection	
	11	+5 VDC		No connection	
Shield	Terminate drain wire to ground stud		Terminate drain wire to ground stud		

Table 2-21. DiPro Sensor Interface (DSI) 2 to SmartPAC 2 Wiring, Sensors 25-32

\* Your colors may be different.

## NOTICE

If there are extra wires in the cable, cut them off close to the end of the cable jacket.

## **Connecting Programmable Cam Channels**

## A DANGER

#### PROGRAMMABLE CAM SWITCH NOT FOR SAFETY USE

Use SmartPAC 2's programmable cam switch to control auxiliary functions only. The SmartPAC 2 programmable cam capability should never be used to provide timing signals for any safety use including clutch/brake control or muting of light curtains. Failure to comply with these instructions will result in death or serious injury.

## CAUTION

### BOARD DAMAGE OR SHORT CIRCUIT WHEN MOUNTED WITHOUT ENCLOSURE

- Mount the cam output assembly in a clean area where it will be safe from damage.
- Provide at least 0.5 in. (12.7 mm) clearance between the back of the Cam Outputs board and any metal surface.

Failure to comply with these instructions could result in property damage.

If you have purchased the ProCamPAC option with SmartPAC 2, you have received a separate output assembly for wiring up to sixteen cam channels to your equipment. The assembly contains the relays that open and close at the angles you set in SmartPAC 2, turning

your equipment on and off. Different types of relays can be used, depending on the voltages of your equipment and your special needs.

To mount the ProCamPAC Output Assembly and wire it to the ProCamPAC board inside the SmartPAC 2 control, follow the instructions below. These instructions may be used with either the 8- or 16-channel ProCamPAC board. Refer to Table 2-22 and Table 2-23, page 2-67 for wiring connections. A wiring diagram is provided in Figure 11 at the end of the manual.

- 1. Select a convenient location for running conduit from the ProCamPAC Output Assembly to the equipment that it will control.
- 2. Mount the output enclosure, using the mounting holes on the flanges as shown in Figure 2-31, page 2-65.
- 3. Select the relays to be used with each channel. Relays should already be plugged into the Cam Outputs board (see Figure 2-32, page 2-66), each relay labelled with its type (i.e., standard or solid state).

Standard relays can only be plugged into the slots labeled K301 through K305, K307, K309, and K311, which are channels 1-8. Optional solid state relays can only be plugged into slots labeled K306, K308, K310, and K312, which are channels 5-8.

Do not mix standard and solid state relays in channel locations 5-8. For example, if you plug a solid state relay into channel 5 (location K306), you cannot plug a standard relay into location K305. See Figure 2-32.

### Example

Say you wish to use three standard relays and one solid state relay. You would install the three standard relays in channels 1 through 3, and the solid state relay in channel 5, skipping the channel 4 output for all wiring and programming.

- 4. To remove a relay, pull the plastic retention clip away from the relay and pull the relay straight out of its socket. When re-inserting the relay, make sure that the pins line up with the socket holes, then press in firmly.
- 5. Locate the 12-conductor cable(s) for wiring the ProCamPAC board (see Figure 2-30, page 2-58 for layouts of 8- and 16-channel boards) to terminal block TB301 inside the ProCamPAC Output enclosure. If you are wiring an 8-channel ProCamPAC, one cable is supplied (for channels 1-8). If you are wiring a 16-channel board, two cables are supplied, one for channels 1 through 8, the other for channels 9 through 16.
- 6. Remove the appropriate connector(s) from its socket on the ProCamPAC board (TB401 for an 8-channel ProCamPAC, TB451 and TB452 for a 16-channel ProCamPAC). Connect wires from the 12-conductor cable(s) to the pin locations on the appropriate terminal blocks, as shown in Table 2-22, page 2-67 (for the 8-channel option) or Table 2-22 and Table 2-23 (for the 16-channel option). See also Figure 11 at the end of the manual.


Figure 2-31. ProCamPAC Output Assembly



Figure 2-32. Cam Outputs Board

Wire	8-cam: ProCamPAC TB401 (cams 1-8) 16-cam: ProCamPAC TB451 (cams 1-8) (Pin #)	1st Cam Output Board TB301 (Pin #)
		CHAS (1)
White	Relay Pwr (270)	A (3)*
Black	GND (269)	B (2)*
Red	+5 (268)	+5 Vdc (4)
Tan	Ch 8 (267)	Ch 8 (5)
Pink	Ch 7 (266)	Ch 7 (6)
Gray	Ch 6 (265)	Ch 6 (7)
Blue	Ch 5 (264)	Ch 5 (8)
Yellow	Ch 4 (263)	Ch 4 (9)
Orange	Ch 3 (262)	Ch 3 (10)
Purple	Ch 2 (261)	Ch 2 (11)
Brown	Ch 1 (260)	Ch 1 (12)

\* Note that the pin numbers for A and B are out of order

Wire	16-cam: ProCamPAC TB452 (9-16) (Pin #)	2nd Cam Output Board TB301 (Pin #)
		CHAS (1)
White	Relay Pwr (281)	A (3)*
Black	GND (280)	B (2)*
Red	+5 (279)	+5 Vdc (4)
Tan	Ch 16 (278)	Ch 8 (5)
Pink	Ch 15 (277)	Ch 7 (6)
Gray	Ch 14 (276)	Ch 6 (7)
Blue	Ch 13 (275)	Ch 5 (8)
Yellow	Ch 12 (274)	Ch 4 (9)
Orange	Ch 11 (273)	Ch 3 (10)
Purple	Ch 10 (272)	Ch 2 (11)
Brown	Ch 9 (271)	Ch 1 (12)

## Table 2-23. ProCamPAC to Cam Output Assembly TB301 Wiring, Cams 9-16

\* Note that the pin numbers for A and B are out of order

- 7. Plug the connector(s) back into its socket.
- 8. Run the cable(s) through conduit to TB301 in the ProCamPAC Output enclosure, using the knockouts directly above the connector.

- Remove the TB301 connector from its socket, and connect wires from the 12-conductor cable(s) as shown in Table 2-22 (for 8-channel ProCamPAC) or Table 2-22 and Table 2-23 (for 16-channel ProCamPAC). A wire from CHAS to a lug on the ProCamPAC Output enclosure should already be connected (unless you bought the board assembly only).
- 10. Plug the connector(s) back into its socket.
- 11. To connect the relays to your equipment, use connectors TB302 and TB303 (see Figure 2-33).

TB303				<u>TB302</u>			
000	000	$\bigcirc \bigcirc \bigcirc$	000	$\bigcirc \bigcirc \bigcirc \bigcirc$	$\bigcirc \bigcirc \bigcirc \bigcirc$	$\bigcirc \bigcirc \bigcirc$	000
CHAN 8 N/C C N/O	CHAN 7 N/C C N/O	CHAN 6 N/C C N/O	CHAN 5 N/C C N/O	CHAN 4 N/C C N/O	CHAN 3 N/C C N/O	CHAN 2 N/C C N/O	CHAN 1 N/C C N/O

Figure 2-33. Connector TB302 and TB303 for Wiring Relays to Equipment

Specific connections depend on the type of relay you use. For 120 Vac relays, you can connect wires from your equipment to "C" and either the "N/O" or "N/C" side of the relay. If you connect to "N/O," the equipment will be on for the number of degrees set in SmartPAC 2. If you connect to "N/C," the equipment will be on except for the number degrees set. Generally, you should use the "N/O" terminal so that equipment is off except when you use SmartPAC 2 to turn it on. Use the "N/C" terminal only if it is more practical to do the reverse.

All solid state relays work only when the "C" and the "N/O" terminals are connected. Polarity must be correct for DC solid state relays (refer to Table 2-24.)

Module	How To Connect	Туре
Relay	One wire to C, one wire to N/O or N/C, polarity does not matter	SPDT
DC Solid State	- to C, + to N/O	SPST
AC Solid State	One wire to C, one wire to N/O, polarity does not matter	SPST

Table 2-24. Connections to Relays

# A WARNING

## INCORRECT SUPPRESSOR INSTALLATION MAY CAUSE RELAYS TO REMAIN ENERGIZED

Ensure that suppressors are correctly installed. They must not be installed across the relay contacts inside the ProCamPAC Output enclosure. If a suppressor is installed across the relay contacts and it fails shorted, the equipment controlled by that relay will remain energized.

Failure to comply with these instructions could result in death or serious injury.

- 12. To reduce electrical noise and to extend the life of the relays, do the following:
  - a. *AC loads*: Install arc suppressors across each inductive load (motors, coils, etc.) that is connected to a cam relay (see Figure 2-34). Suppressors are supplied with each relay. Install the suppressors across the load or as close to the load as possible. Attach suppressors by connecting leads across existing terminals or junction points.
  - b. *DC loads*: Install a diode across each DC load, such as relays, solenoids and PLC inputs (see Figure 2-35).



Figure 2-34. Installing Suppressors Across an AC Load





# Setting Up High-speed Version of SmartPAC 2 with WPC 2000

If you have a standard SmartPAC 2 and wish to change the system to a high-speed version (1600 SPM maximum), you will need to order SmartPAC 2 firmware with the high-speed option. Contact Wintriss Tech. Support for details. When you receive the new firmware, perform the following steps:

- 1. Install SmartPAC 2 firmware with the high-speed option according to the instructions in Appendix D.
- 2. Locate jumper J102 on the SmartPAC 2 board (see Figure 2-25, page 2-51), and move the jumper from the pins at the LOW setting to the pins at the HIGH setting.
- 3. Locate jumpers J125 and J126 on the WPC 2000 Main Processor board (see Figure 2-14, page 2-28), and move the jumpers from the pins at the LO setting to the pins at the HI setting.

# Wiring a Remote Reset Switch

# NOTICE

Wintriss recommends that you wire the Remote Reset switch to SmartPAC 2 rather than to WPC 2000. A Reset switch wired to WPC 2000 can reset only WPC 2000 faults. The same switch wired to SmartPAC 2 can reset faults for both controls.

If you would like to be able to reset the SmartPAC 2 and WPC 2000 from a location remote from their enclosures, the SmartPAC 2 board provides a terminal (i.e., pin #249 on TB107) for wiring a remote Reset switch.

Connect a wire from terminal #249 on TB107 on the SmartPAC 2 board to a normally open switch (see Figure 2-25, page 2-51, Table 2-25, below, and Figure 1 at the end of the manual). Connect another wire from the switch to terminal #250 on TB107. SmartPAC 2 and WPC 2000 are reset with a momentary connection to ground.

SmartPAC 2 Board, TB107 Pin #	Signal
249	Remote Reset input
250	Ground

Table 2-25. Remote Reset Switch Wiring Connections

# Wiring a Sensor-Disabled Output (Optional)

You can wire a Sensor-disabled Output such as a warning light to a customer-supplied solidstate relay to warn personnel that the die protection capability, if installed, is disabled. Connect the positive input wire from your 12Vdc solid-state relay to terminal #302 (Relay Power) on TB553 on the DiProPAC board (see Figure 2-29, page 2-58 and Figure 9 at the back of the manual). Connect the negative input wire from the relay to terminal #306 (Auxiliary 1) on TB553. You cannot use more than 8 mA for your relay.

# Setting Up SmartPAC 2 with WPC 2000

## A DANGER

## PREVENT INJURY DURING SETUP

- Keep all personnel away from the press during setup.
- Be sure there is no die or other tooling in the press during setup.

Failure to comply with these instructions will result in death or serious injury.

## CAUTION

## PREVENT DAMAGE TO PRESS AND/OR DIE

Ensure that no die is mounted in the press during setup procedures.

Failure to comply with these instructions could result in property damage.

## Turning on Power to SmartPAC 2 and WPC 2000

## NOTICE

For help in using the SmartPAC 2 keyboard and display, see Chapter 3.

To turn on power to SmartPAC 2 and WPC 2000, do the following:

1. Make sure there is no die in the press.

## NOTICE

If you turn the Program/Run key and nothing happens, press RESET repeatedly until SmartPAC 2 changes modes. Before turning the Program/Run key, make sure SmartPAC 2 is in the Main menu for the mode it is in. If it is not, press RESET repeatedly until the Main menu appears. Then turn the Program/Run key.

- 2. Turn the Program/Run key switch to the PROG position.
- 3. Power up the SmartPAC 2 and WPC 2000.

The green Power light on the SmartPAC 2 front panel illuminates, and a red SmartPAC 2 screen (see Figure 2-36, page 2-72) appears for a few seconds.



Figure 2-36. SmartPAC 2 Startup Screen

When the startup screen disappears, the Brake Warning light begins to flash at approximately two-second intervals as SmartPAC 2 completes its startup routine. This can take up to one minute. Eventually, the Main Program Menu appears (see Figure 2-37).

THE CURRENTLY LOADED TOOL IS #6160 DEMO TOOL SENSORS DISABLED	
GO TO THE TOOL MANAGER SENSOR ENABLE/DISABLE & STATUS RECALCULATE SETPOINTS	
USE THE CURSOR KEYS TO CHANGE SELECTIONS PRESS ENTER TO ACCESS TOOL NUMBERS.	

Figure 2-37. SmartPAC 2 Main Program Menu

# NOTICE

- If the Program/Run key switch is set to RUN when you power up, the message "PRESS CONTROL IS IN LOCKOUT MODE" is displayed on the screen. To clear the message, turn the Stroke Select key switch to OFF, then to one of the other operating modes.
- If another error message displays when SmartPAC 2 starts up, press RESET.
- If the error message continues to appear after you press RESET, find the message in Chapter 7 and follow the instructions for correcting the problem. If you cannot find the message or cannot fix the problem, contact Wintriss Tech. Support.

4. Press the "1" and "CLEAR" keys simultaneously and hold them down for a few seconds until the Main Initialization Menu (see Figure 2-38) appears.

MAIN INITI	ALIZATION MENU	
USE THE CURSOR KEYS TO CHOOSE MENU ITEMS. PRESS THE ENTER KEY TO SELECT. SWITCH TO RUN WHEN DONE.	RESOLVER ZERO POSITION SENSOR INSTALLED OPTIONS PRESS NAME SELECT CAM NAMES AUTO ADVANCE SET GLOBAL CAMS CUSTOM SENSOR NAMES SENSOR ENABLE MODE FEED CONTROL PM MONITOR TOOL INFORMATION PRESS CONTROL SECURITY ACCESS BACKUP/RESTORE SETUP DATA COMMS SETUP NETWORK LUBE/SPEED/FLYWBRAKE DIAGNOSTICS	

Figure 2-38. Main Initialization Menu

- 5. Verify that the "PRESS CONTROL" item appears in the menu, indicating that SmartPAC 2 is communicating with WPC 2000.
  - If "PRESS CONTROL" does not appear in the menu, go to Problems at Startup (next).
  - If "PRESS CONTROL" appears in the menu and you have the DiProPAC and/or ProCamPAC option(s), go to *Verifying Installation of DiProPAC and ProCamPAC*, page 2-74. If you don't have one of these options, go to *Creating and Loading a Test Tool*, page 2-76.

# **Problems at Startup**

If one of the following problems occurs at startup, perform the accompanying instructions to solve it.

## SmartPAC 2 Display Remains Off

• If the green Power LED on the SmartPAC 2 front panel does not illuminate:

Turn off power to SmartPAC 2 and WPC 2000, and recheck all power connections. Check to make sure that the connectors at both ends of the cables between the SmartPAC 2 board and the display are correctly seated. Power up SmartPAC 2 and WPC 2000 again. If the display remains off, contact Wintriss Tech. Support.

• If the green Power LED illuminates but the display remains off:

Power down SmartPAC 2 and WPC 2000, and check to make sure that the connectors at both ends of the cables between the SmartPAC 2 board and the display are correctly seated. Power up SmartPAC 2 and WPC 2000 again. If the display remains off, contact Wintriss Tech. Support.

## "PRESS CONTROL" Does Not Appear in SmartPAC 2 Initialization Menu

- 1. Leaving power on, open the door of the WPC 2000 enclosure, and check the state of the LEDs on the Main Processor board.
  - If any of the LEDs are illuminated, the WPC 2000 has power. Go to step 2.
  - If none of the LEDs are illuminated, power down the SmartPAC 2 and WPC 2000, and check the AC wiring to the WPC 2000 (see page 2-9).

If the AC wiring checks out, power up both units. If no LEDs are illuminated, contact Wintriss Tech. Support. If any LEDs are illuminated, go to the SmartPAC 2 Main Initialization Menu and check for the presence of the "PRESS CONTROL" item.

If "PRESS CONTROL" is displayed in the menu, go to the next applicable section to continue setting up your system.

If "PRESS CONTROL" is not displayed, go to step 2.

- 2. Leaving power on, open the door of the SmartPAC 2 enclosure, and check the state of the LEDs labelled "Tx6" and "Rx6" on the SmartPAC 2 board (see Figure 2-25, page 2-51). These two LEDs are located just to the left of TB105 on the right side of the board.
  - If both LEDs are blinking, SmartPAC 2 and WPC 2000 are communicating. Check the Main Initialization Menu again for the presence of the "PRESS CONTROL" item.

If "PRESS CONTROL" is displayed in the menu, go to the next applicable section to continue setting up your system.

If "PRESS CONTROL" is not displayed, contact Wintriss Tech. Support.

• If the green "Rx6" LED is not blinking, power down SmartPAC 2 and WPC 2000, and check the communications wiring (see page 2-52). If communications wiring checks out, power up both units, access the Main Initialization Menu, and check for the presence of the "PRESS CONTROL" item.

If the "PRESS CONTROL" item is displayed, go to the next applicable section to continue setting up your system.

If "PRESS CONTROL" is not displayed, contact Wintriss Tech. Support.

# Verifying Installation of DiProPAC and ProCamPAC

If you installed DiProPAC and/or ProCamPAC as part of your SmartPAC 2 system (see page 2-56), you need to verify that the installation was done correctly and that these options are available. To do so, perform the following steps:

- 1. Access the Main Initialization Menu (see Figure 2-38, page 2-73).
- 2. Move the highlight bar to INSTALLED OPTIONS, and press ENTER. The Installed Options screen displays (see Figure 2-39, page 2-75 for an example).

INSTALLED OPTIONS: SmartPAC DEMO SmartPAC 2 Software V 7.77 12/08T1.28 Serial number 00001918 Copyright 1994-2009 Program loader Software V1.06 XPe V, Shell V0.0.0, Main V7.3.0 Board revision number 0	SELECT LANGUAGE	F1 F2 F3
ProCamPAC 8 channels installed DiProPAC 32 sensors installed WPC 2000 Control installed V1.00 WPC 2000 Option 2 installed V1.00 PM Monitor option installed Alternate language option installed DEMO option installed USB disk backup option installed Tool information center installed Wintriss/LETS option installed INDRAMAT CLM IDS SFI installed		F4 F5 F6 F7 F8

Figure 2-39. Installed Options Screen

- 3. Verify that "DiProPAC" and/or "ProCamPAC" are displayed in the installed options list.
  - If the correct option(s) is displayed, go to the next section.
  - If the correct option(s) is not displayed, go to page 2-56 and verify that you performed the DiProPAC and/or ProCamPAC installation properly. Verify that the DiProPAC and/ or ProCamPAC board(s) is plugged into the correct connector(s). If the installation checks out and the correct option(s) does not display, contact Wintriss Tech. Support.

## Initializing WPC 2000 Parameters

## NOTICE

#### INITIALIZE WPC 2000 PARAMETERS BEFORE PROGRAMMING SMARTPAC 2/WPC 2000

When you set up a new SmartPAC 2 with WPC 2000, initialize the WPC 2000 press parameters before you start programming your unit.

## NOTICE

#### **RECORD WPC 2000 SETTINGS BEFORE INITIALIZING PARAMETERS**

Use the Press Parameters Setup Sheet at the end of the manual to record your WPC 2000 settings before installing new firmware or initializing parameters.

## NOTICE

Initializing press parameters resets them to their default values. Initialize press parameters only when you set up a new SmartPAC 2 with WPC 2000 or install new WPC 2000 firmware.

When you first set up your SmartPAC 2 with WPC 2000 or when you install new WPC 2000 firmware, initialize press parameters on the Press Control Parameter Menu (see page 4-34 for instructions).

# NOTICE

To access the Press Control Parameter Menu:

- 1. Turn the Program/Run key on the SmartPAC 2 front panel to PROG.
- 2. Press the "1" and "CLEAR" keys simultaneously and hold down a few seconds until the Main Initialization Menu displays.
- 3. Move the highlight bar to the PRESS PARAMETERS item, using the Up (▲) or Down (▼) cursor key, and press ENTER.

If you install new WPC 2000 firmware in an existing system, record the WPC 2000 parameters before you install the new firmware. Re-enter the parameters after you re-initialize the WPC 2000. See Chapter 3 for help using the SmartPAC 2 keyboard and displays.

# **Creating and Loading a Test Tool**

In order to set the direction of rotation of the resolver, zero the resolver, set the Top-stop angle, install the overrun magnet, and perform other procedures covered in the remainder of this chapter, you must be able to run the press. In order to run the press, you must create and load a "test" tool, as instructed in the following steps.

# NOTICE

- If you turn the Program/Run key switch and nothing happens, press RESET repeatedly until the screen changes color, indicating that the SmartPAC 2 has changed to the mode you selected.
- If the message "PRESS CONTROL IS IN LOCKOUT MODE" is displayed on the screen, turn the Stroke Select key switch to OFF, then to one of the other operating modes to clear it.
- 1. Create a tool number and program counter settings (see *Creating a New Tool*, page 5-3, *TOOL NAME or TOOL ID*, page 5-8, and *COUNTERS*, page 5-9). If you are not familiar with how to use the SmartPAC 2 keyboard and displays, see Chapter 3.
- 2. Load the tool number (see *Loading a Tool*, page 5-5), and enter Run mode (see *Entering and Exiting Run Mode*, page 6-2).

# Checking and Setting the Direction of Resolver Rotation

## **DANGER**

## PREVENT INJURY DURING SETUP

- Keep all personnel away from the press during setup.
- Be sure there is no die or other tooling in the press during setup.

Failure to comply with these instructions will result in death or serious injury.

# NOTICE

- If you turn the Program/Run key switch and nothing happens, press RESET repeatedly until the screen changes color, indicating that the SmartPAC 2 has changed to the mode you selected.
- If the message "PRESS CONTROL IS IN LOCKOUT MODE" is displayed on the screen, turn the Stroke Select key switch to OFF, then to one of the other operating modes to clear it.

To verify that the resolver rotates in the right direction, perform the following steps:

- 1. With a "test" tool loaded (see previous section), turn the Program/Run key switch to RUN.
- 2. Turn the Stroke Select key switch to INCH.
- 3. Inch the press by holding down, then releasing the Run/Inch palm switches on the Operator Station. Observe the crankshaft angle displayed on the SmartPAC 2 screen.
  - If the crankshaft angle increases as you inch the press (i.e., moves from 0° toward 359°), the resolver is rotating in the right direction and wiring is correct. Go to the next section.
  - If the crankshaft angle decreases as you inch the press (i.e., moves from 359° toward 0°), the resolver is rotating in the wrong direction and wiring is incorrect.

Correct resolver wiring by swapping the black and yellow wires at both the WPC 2000 resolver connector, TB106, and the SmartPAC 2 resolver connector, TB101, referring to *Wiring the Resolver*, page 2-25.

- 4. Inch the press again, and observe the crankshaft angle display.
  - If the crankshaft angle increases, go to the next section.
  - If the crankshaft angle decreases, contact Wintriss Tech. Support.

# Zeroing the Resolver

## **A** DANGER

## PREVENT INJURY DURING SETUP

- · Keep all personnel away from the press during setup.
- Be sure there is no die or other tooling in the press during setup.

Failure to comply with these instructions will result in death or serious injury.

## NOTICE

## PRESS MUST BE AT TDC WHEN ZEROING RESOLVER

Verify that the press is at top dead center (i.e.,  $0^{\circ} \pm 2^{\circ}$ ) before you zero the resolver. If the press is not at TDC, your timing settings may be wrong.

You must perform this procedure the first time you power up SmartPAC 2 and whenever you install a new resolver. Zeroing the resolver ensures that SmartPAC 2 maintains an accurate "zero" resolver position (i.e., as close to TDC as possible) by which it can time all its operations. To zero the resolver, access the SmartPAC 2 Main Initialization Menu (see Figure 2-37, page 2-72) and follow the instructions in the *RESOLVER ZERO* section, page 4-3.

# Setting the Top-stop "On" Angle and Installing the Overrun Magnet

## A DANGER

## PREVENT INJURY DURING SETUP

- Keep all personnel away from the press during setup.
- Be sure there is no die or other tooling in the press during setup.

Failure to comply with these instructions will result in death or serious injury.

# A WARNING

## INCORRECT INSTALLATION OF OVERRUN LIMIT SWITCH

Ensure that the overrun sensor magnet is installed at a proper location if you have Two-hand Control without light curtains, or light curtains with muting. Proper installation of the magnet ensures that if the Top-stop output relay fails, a hazardous situation will not occur on the downstroke. The magnet must be mounted as close as possible to the Top-stop "On" Angle (see page 2-82).

Failure to comply with these instructions could result in death or serious injury.

This section shows you how to install the magnet that, with the overrun sensor, makes up the overrun limit switch. You should already have installed the overrun sensor (see page 2-29). The overrun limit switch enables WPC 2000 to monitor operation of the resolver and to stop the press whenever the resolver fails to work properly.

The press cannot be run in Continuous or Single-stroke unless the overrun sensor and magnet are installed and working correctly. Without the overrun limit switch, you can only operate the press in Inch.

The angle at which you mount the magnet depends on the Top-stop "On" Angle, the angle at which the Top-stop cam turns on, initiating a Top-stop. You must first determine and set the Top-stop "On" Angle before installing the magnet.

## Setting the Top-stop "On" Angle

In the following procedure, you

- Set the Top-stop "On" Angle to 270°
- Top-stop the press three times to determine an average angle at which the press stops
- Use the average angle value to calculate the actual Top-stop "On" angle
- Set the calculated Top-stop "On" Angle

To calculate and set the Top-stop "On" Angle, perform the following steps:

# NOTICE

For a variable-speed press, you need to determine the latest Top-stop "On" Angle, which is the angle at which the press top-stops at its slowest speed and with the shortest stopping angle/time.

# NOTICE

## BEFORE YOU SET THE TOP-STOP ANGLE, MAKE SURE THAT

- The press ram has been mechanically set to top dead center (TDC) (see NOTICE on page 2-3)
- The resolver has been aligned as close as possible to TDC (i.e., 0° ±2°) (see Mounting the Resolver, page 2-25)
- The resolver has been zeroed (see page 2-78)
- 1. Make sure the following WPC 2000 features are set correctly:
  - Option switches 1, 2, and 4 on switch block S101 on the WPC 2000 Main Processor board should be set to OPEN (see page 4-35 for instructions).

When switches 1 and 2 are "open," you can set any Top-stop Angle between 211° and 355°.

When switch 4 is "open," the Auto Compensated Top Stop (ACTS) feature is disabled. ACTS compensates for increases in press speed by adjusting the Top-stop Angle backward (i.e., decreasing the angle).

- Pin #13 on the WPC 2000 Main Processor board should not be connected. When pin #13 is unwired, Top-stop in Inch is enabled (see page 6-42).
- Micro-inch should be disabled (see page 4-29 for instructions).
- 2. Power down, then power up the SmartPAC 2 to enable the new settings.

- 3. Clear the "PRESS CONTROL IS IN LOCKOUT MODE" message on the SmartPAC 2 display by turning the Stroke Select switch to OFF, then to INCH.
- 4. If you have a variable-speed press, set the press to the slowest production speed, but not slower than 6 SPM.
- 5. Turn the Stroke Select key switch to RUN.
- 6. On the Main Run Menu, move the highlight bar to PRESS CONTROL, using the Up or Down cursor key, and press ENTER. The Press Control Parameters screen displays (see Figure 6-24, page 6-31) with the highlight bar resting on the TOP STOP ANGLE value.
- 7. Press ENTER to select the current Top-stop Angle setting, and when the Numeric Entry window displays (see Figure 3-6, page 3-4), key in a value of 270°, or use the Up or Down cursor key to adjust the current value to 270°, and press ENTER.
- 8. Press RESET to return to the Main Run Menu.
- 9. Press and hold the Run/Inch palm switches on the Operator Station so the press makes a complete stroke and top-stops.
- 10. Observe the value displayed in the Crank Angle/SPM readout. The is the angle at which the press top-stopped. Record this angle in the "Trial 1" box under step 1 in the Overrun Sensor Magnet Installation Worksheet (see Figure 2-40, page 2-81).
- 11. Repeat step 9 at least two more times, and record the angle at which the press top-stops in the "Trial 2" and "Trial 3" boxes in the Overrun Sensor Magnet Installation Worksheet.
- 12. Calculate the average angle at which the press top-stops from the three trials, and record this value in the box in step 2 in the Overrun Sensor Magnet Installation Worksheet.
- 13. If the average angle reading is between 358° and 2°, the Top-stop "On" Angle is correct and does not need to be adjusted. Go to *Installing the Overrun Sensor Magnet*, page 2-82.

If the average angle reading is greater than  $180^{\circ}$  but less than  $358^{\circ}$ , go to step 14.

If the average angle reading is greater than 2° but less than or equal to 180°, go to step 15.

If the some of the angle readings in steps 9 through 11 fall between  $181^{\circ}$  and  $357^{\circ}$  and others between  $3^{\circ}$  and  $180^{\circ}$ , contact Wintriss Tech. Support.

- 14. When the average angle at which the press top-stops falls between 181° and 357°, perform the following calculations, using the boxes in step 3a in the Overrun Sensor Magnet Installation Worksheet:
  - Subtract the Top-stop Angle setting you made on the Press Control Parameters screen in step 7 (i.e., 270°) from the average angle reading. The difference is the number of degrees it took the press to stop, or the press's stopping angle.
  - Subtract the stopping angle from 360°. The difference is the angle at which the Top-stop cam turned on, or the Top-stop "On" Angle. Go to step 16.

# **Overrun Sensor Magnet Installation Worksheet**

To determine your press's Top-stop "On" Angle, overrun magnet installation angle, and option switch 1 and 2 settings, do the following:

1. With the Top Stop Angle set to 270°, cycle the press three times in Inch mode. Record the **angle at which the press top-stops** each time.



2. Calculate the average of the three trials, and record.



### Avergage angle at which press top-stops

- 3. Does the average angle at which the press top-stops occur before or after TDC? Calculate the Top-stop "On" Angle as follows (a or b):
  - a. Angle at which press top-stops occurs before TDC (181° through 357°)



4. Determine the angle at which to install the overrun magnet (refer to Table 2-27).



5. Determine option switch 1 and 2 settings (refer to Table 2-27).



Figure 2-40. Overrun Sensor Magnet Installation Worksheet

- 15. When the average angle at which the press top-stops falls between 3° and 180°, subtract the average angle reading from 270°, the Top-stop Angle setting you made on the Press Control Parameters screen in step 7. The difference is the angle at which the Top-stop cam turned on, or the Top-stop "On" Angle. Use the boxes in step 3b in the Overrun Sensor Magnet Installation Worksheet for this calculation.
- 16. Turn the Program/Run key switch to PROG, access the Main Initialization Menu (see Figure 2-38, page 2-73) by pressing the 1 and CLEAR keys at the same time for a second or two, and select PRESS CONTROL to display the WPC Initialization Menu.
- 17. Select PRESS PARAMETERS on the WPC Initialization Menu to display the Press Control Parameter Menu.
- 18. Enter the Top-stop "On" Angle value you calculated in step 14 or 15 in the TOP STOP DEFAULT field on the Press Control Parameter Menu (see page 4-27 for instructions).

## Installing the Overrun Sensor Magnet

The following procedure shows you how to

- Determine the correct angle at which to mount the overrun magnet, based on your Top-stop "On" Angle calculations in the previous section
- Determine the setting for option switches 1 and 2, based on your Top-stop "On" Angle calculations
- Install the magnet

Since the Top-stop cam stays on for  $20^{\circ}$ , the magnet must be mounted at an angle at least  $20^{\circ}$  greater than the Top-stop "On" Angle you calculated and set in the previous procedure, allowing the Top-stop cam to turn off before the overrun limit sensor turns on. Otherwise, an "80" series fault will display on the SmartPAC 2 LCD (see *Top-stop and Overrun Setting Faults*, page 7-21.)

Perform the following steps:

1. Determine the angle at which to install the overrun sensor magnet by consulting Table 2-26. The first row of the table, labelled "Top-stop "On" Angle," shows Top-stop "On" Angle ranges (i.e., less than 240°, 241° to 270°, etc.). The second row shows the angle at which the overrun sensor magnet should be mounted for each range (i.e., at 270° if the Top-stop "On" Angle is less than 240°, at 300° if the Top-stop "On" Angle is between 241° and 270°, etc.).

Table 2-26.	Overrun	Sensor	Magnet	Mounting	Angle and	Option S	Switch	Settings

Top-stop "On" Angle	< 240°	241° to 270°	271° to 300°	> 301°
Magnet Mounting Angle	270°	300°	330°	359°
Switch 1 Setting	ON	ON	OFF	OFF
Switch 2 Setting	ON	OFF	ON	OFF

Record in the box in step 4 of the Overrun Sensor Magnet Installation Worksheet (see Figure 2-40, page 2-81) the correct mounting angle for the range within which your calculated Top-stop "On" Angle falls (see step 18 of the previous procedure).

### Example

You calculated in step 18 that your Top-stop "On" Angle is 284°, which falls in the 271° to 300° column in Table 2-26. The correct mounting angle for the overrun sensor magnet would be 330°.

2. Determine the option switch 1 and 2 settings required for your calculated Top-stop "On" Angle, referring to Table 2-26. Row 3 of the table shows option switch 1 settings for each Top-stop "On" Angle range; row 4 shows option switch 2 settings. WPC 2000 uses these settings to determine the angle at which to begin the overrun sensor closure test, which is used to make sure that the overrun limit switch closes at the same angle on every stroke.

Record in the box in step 5 of the Overrun Sensor Magnet Installation Worksheet the option switch 1 and 2 settings for the range within which your calculated Top-stop "On" Angle falls.

### Example

You calculated in step 18 that your Top-stop "On" Angle is 284°, which falls in the 271° to 300° column in Table 2-26. The correct switch settings would be OPEN for switch 1 and CLOSED for switch 2.

- 3. Set option switches 1 and 2 to the positions you determined in step 2, referring to page 4-35 for instructions.
- 4. If you are using the Auto Compensated Top Stop feature, return option switch 4 to its CLOSED setting to enable it (see step 1 of the *Setting the Top-stop "On" Angle* procedure).
- 5. Power down, then power back up SmartPAC 2 to enable the new option switch settings.
- 6. With the press in Inch mode, press the Run/Inch palm buttons until you have inched the press to the angle you determined in step 1 (i.e., 270°, 300°, 330°, or 359°).
- 7. Using double-sided foam tape or other means, temporarily install the magnet directly beneath the overrun sensor, referring to *Mounting the Overrun Sensor Switch*, page 2-30.
- 8. Check to make sure that the "Overrun limit Switch" LED in LED Group 6 on the WPC 2000 Main Processor board is lit, referring to the LED map in Figure 2-41, page 2-89 for location. This LED illuminates when the overrun magnetic switch senses the magnet.

## NOTICE

Make sure that the overrun limit switch has enough dwell to provide an adequate signal at high speeds. Optimally, the magnet should actuate the switch for 15° to 25°. The larger the diameter of the shaft on which the magnet is mounted, the shorter the dwell (see Figure 2-16, page 2-30. The ideal shaft diameter is 4-6 in.

9. Run the press in Inch mode for about 4 strokes, viewing the overrun sensor's On/Off angles on each stroke. To display On/Off angles, select PRESS CONTROL on the Main

Run Menu, then press **F3** (Show Overrun Angles) on the Press Control Parameters screen (see Figure 6-24, page 6-31).

## Example

If you mounted the magnet at an angle of  $330^\circ$ , the magnetic switch might come "on" at, say,  $321^\circ$ , and go "off" at  $337^\circ$ .

10. Run the press in Inch, Single-stroke, and Continuous modes for about 4 strokes each.

If the press cycles in every mode without a fault, go to step 11.

If a fault occurs while you are cycling the press in one or more modes, do the following:

- If a fault occurs on the first stroke after you install the magnet, press RESET and execute another stroke.
- If the fault code is between F80 and F89 (or H80 through H89), there a problem with the overrun sensor. Re-check your installation of the magnetic switch (see page 2-29) and the magnet (see step 7) and your settings for option switches 1 and 2 (see steps 2 and 3), then press RESET and run the press again for a few strokes. If the press stops and the same error code displays, call Wintriss Tech. Support.
- If another fault code displays, look up the fault in Chapter 7 and follow the suggested remedy. After correcting the problem, press RESET and run the press again for a few strokes, checking for faults. If you need assistance, contact Wintriss Tech. Support.

# A WARNING

## INJURY FROM MAGNETS THAT DETACH

Mount the magnet with the brass screws provided. Plastic screws or adhesive could fail, causing the magnet to become a dangerous projectile, especially on high-speed presses. **Failure to comply with these instructions could result in death or serious injury.** 

# NOTICE

Use a brass or other non-ferrous screw to mount the magnet. Steel or ferrous screws can cause false signals.

- Permanently install the magnet in the position in which you temporarily mounted it in step
   Drill and tap a hole, using a No. 36 drill and 6-32 tap. Mount the magnet, plastic side
   up, with the 6-32 brass screw provided.
- 12. Cycle the press a few times in Single-stroke and Continuous modes to make sure it operates without error.

# **Installing Revised Firmware in WPC 2000**

## A DANGER

### MACHINE MALFUNCTION AFTER INSTALLING REVISED SOFTWARE

Perform the final checkout (see page 2-87) tests after performing the firmware installation. Failure to comply with these instructions could result in death or serious injury.

# A DANGER

### ELECTRIC SHOCK OR HAZARDOUS ENERGY

- Disconnect main power before installation.
- Remove all power to the press, press control, and other equipment used with the press.
- Remove all fuses and "tag out" per OSHA 1910.147 Control of Hazardous Energy (Lockout/ Tagout).
- Ensure that installation is performed by qualified personnel.
- Complete all installation procedures before connecting to the AC power source.

Failure to comply with these instructions will result in death or serious injury.

To install revised firmware in WPC 2000, follow these steps:

- 1. Record the following WPC 2000 settings, using the Press Parameters Setup Sheet at the back of the manual:
  - Stop-time Limit (see page 4-30)
  - Auto Carry-up Angle (see page 4-28)
  - Top-stop Angle (see page 4-28)
  - Micro-inch Time (see page 4-29)
  - Cam On/Off settings (see page 6-19)
  - Counter Preset (page 6-8)
  - Counter (if necessary–see page 6-8)
- 2. Turn off power to WPC 2000.

## CAUTION

### STATIC DISCHARGE DAMAGE TO CHIP

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

3. Making sure that you are grounded, open the WPC 2000 enclosure and locate firmware chips A (labelled "U111") and B (labelled "U134") on the Main Processor board (see Figure 2-14, page 2-28). Note that each chip has a white label and a semi-circular notch at one end. The notch on the chip faces in the same direction as the notch on its socket.

# NOTICE

Each new WPC 2000 firmware chip must be installed with the notch facing in the same direction as the chip it is replacing.

# CAUTION

If you use a screwdriver, be careful not to insert the screwdriver under the socket or you may damage the board.

Failure to comply with these instructions could result in property damage.

- 4. Use a chip puller to remove the old chips, or insert a small screwdriver between the bottom of the chips and their sockets and carefully pry the chips from the board. Put the chips aside.
- 5. Making sure you are grounded, open the package containing the new firmware chips, and, one at a time, remove the chips from their holders.

# CAUTION

## CHIP INSTALLED INCORRECTLY

- Install each chip with the notch facing in the same direction as the notch on the old firmware chip; otherwise, when you power up the control, the chips will be destroyed.
- Align pins correctly with the socket before plugging chips in.

Failure to comply with these instructions could result in property damage.

6. Plug each chip into its socket, inserting the left row of pins first, then aligning the right row of pins over the socket and pushing them in. Make sure that the notch in the chip faces in the same direction as the notch in the old chip and that all of the pins are in the socket.

# NOTICE

If the two rows of pins are spread too far apart to plug easily into the socket, hold the chip on its side on a flat surface with the pins pointing toward you. Being careful not to overbend the pins, gently draw the top of the chip toward you until the pins bend a little. Turn the chip over so that the other row of pins is now flat and pointing toward you. Draw the top of the chip toward you again until the pins bend. When the rows of pins look parallel, plug the chip into its socket again. If the chip still doesn't fit, repeat this procedure.

- 7. To verify that both chips are installed correctly, power up the WPC 2000 and SmartPAC 2.
  - If the units power up normally, go to step 8.
  - If the SmartPAC 2 LCD displays the message "A WPC 2000 WAS INSTALLED THE LAST TIME THE UNIT WAS POWERED UP AND WAS NOT SEEN THIS TIME," one or more pins may be bent or not plugged in properly. Turn power off, and repeat the procedure in the Notice for step 6 for each chip. Power the units up again. If WPC 2000 continues to malfunction, call Wintriss Tech. Support.

8. Re-initialize the system, following the instructions starting on page page 4-34.

## **A** DANGER

### MAKE SURE THAT STOP-TIME LIMIT IS CORRECT AFTER INITIALIZATION

Whenever you initialize WPC 2000, the Stop-time Limit is reset to its factory value of 500 mS. Make sure to set the Stop-time Limit to a value based on the actual stopping time of your press. Use the stopping time measured in the 90° stop-time test to calculate the safety distance.

Failure to comply with these instructions will result in death or serious injury.

9. Re-program the settings you recorded in step 1.

Perform final checkout tests (next section).

# **Performing Checkout Tests**

## A DANGER

### PREVENT INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

## A DANGER

### **INCORRECT INSTALLATION**

- Perform the necessary checkout procedures according to the instructions in this manual.
- · Correct any malfunctions before running the press.
- · Ensure that all procedures are performed by qualified personnel.

Failure to comply with these instructions will result in death or serious injury.

# **WARNING**

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

- DO NOT touch electrical connections or circuit boards.
- Use test equipment only on the terminals specified in the instructions.
- Ensure that the tests are performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

# **WARNING**

### TOOLS OR OTHER MATERIAL IN THE DIE

Ensure that there are no tools or other material in or near the die before running the press. Failure to comply with these instructions could result in death or serious injury.

## NOTICE

### PRESS MUST BE IN "TOP-STOP IN INCH" MODE WHEN PERFORMING CHECKOUT TESTS

Make sure that there is no connection to pin #13 on the WPC 2000 Main Processor board before running checkout tests. Top-stop in Inch must be enabled when performing these tests. See page 6-42 for further details.

This section provides the tests you need to perform to verify that your WPC 2000 is installed and set up correctly. These tests must be performed before you proceed to Chapter 4. Perform the tests in order, skipping tests for optional components that do not apply to your WPC 2000 setup. Use the "test" tool you created for setup procedures (see page 2-76).

If your WPC 2000 fails a test, you will be directed to follow step-by-step procedures to isolate and correct the problem. If you are unable to correct a problem, contact Wintriss Tech. Support for assistance.

Do not run the press until the problem has been corrected. Do not attempt to replace any components in your new WPC 2000 unless instructed to by Wintriss Tech. Support.

In order to run the tests, you need to know how to operate the press in Inch, Single-stroke, and Continuous modes using Two-hand, One-hand, or Foot control. Refer to the instructions starting on page 6-39 if you need help running the press using these settings.

Many of the tests ask you to check the state of LEDs on the WPC 2000 Main Processor board and status indicators on the screens available from the Display WPC Input Status screen (see *Input Status*, page 4-44). An LED map of the Main Processor board, showing the locations of all LEDs, is provided in Figure 2-41, page 2-89. You access the Display WPC Input Status screen by selecting PRESS CONTROL on the SmartPAC 2 Main Initialization Menu (see Figure 2-38, page 2-73), then INPUT STATUS on the WPC Initialization Menu (see Figure 4-18, page 4-23).

+ 5 Logi All LEDs are red except ones that shaded, which are green. Pin nun associated with LEDs are shown i <b>bold</b> . LEDs without pin numbers a for internal connections. LED posi on board are represented schema	t are hbers in are itions atically.	GROUP 7	<ul> <li>86 - User input 10</li> <li>85 - User input 8</li> <li>84 - User input 6</li> <li>83 - User input 4</li> <li>82 - User input 2</li> <li>87 - Light curtain A 2 input</li> <li>77 - Light curtain A 1 input</li> <li>76 - Mute lamp 2 output</li> </ul>
G R O U P 5	<ul> <li>66 - Mute lamp 1 output</li> <li>DSV B contact check</li> <li>88 - Light curtain B 2 input</li> <li>DSV A contact check</li> <li>DSV B drive check</li> <li>Lockout drive check</li> <li>Lockout contact check</li> <li>DSV A drive check</li> </ul>	GROUP 6	<ul> <li>75 - Unused input</li> <li>74 - User input 9</li> <li>73 - User input 7</li> <li>72 - User input 5</li> <li>71 - User input 3</li> <li>70 - Remote reset</li> <li>26 - Unused input</li> <li>24 - Overrun limit switch</li> </ul>
G R O U P 3	<ul> <li>21 - User input 1</li> <li>Aux B drive check</li> <li>Aux A drive check</li> <li>Aux A contact check</li> <li>Aux B contact check</li> <li>Aux B contact check</li> <li>15 - Automatic actuator N/C</li> <li>14 - Foot switch N/O</li> <li>12 - Palm switch B N/O</li> <li>11 - Palm switch A N/O</li> </ul>	GROUP 4	<ul> <li>22 - Top stop limit switch</li> <li>20 - DSV monitor input</li> <li>63 - Prior act B input</li> <li>19 - Unused input</li> <li>18 - User input 11</li> <li>17 - Motor reverse input</li> <li>16 - Bar actuator input</li> <li>60 - Top stop B2 input</li> <li>57 - E-stop B2 input</li> <li>13 - Top stop inch disable</li> </ul>
G R O U P Transmit () Receive () Receive () Transmit ()	<ul> <li>8 - Clutch air pressure sw.</li> <li>78 - Light curtain B 1 input</li> <li>7 - Motor forward</li> <li>4 - Foot switch N/C</li> <li>1 - Palm switch A N/C</li> <li>+ 5 Logic A</li> </ul>	GROUP 2	<ul> <li>52 - Top stop B1 input</li> <li>6 - Bar selector switch</li> <li>5 - Automatic actuator N/O</li> <li>48 - E-stop B1 input</li> <li>3 - One hand A</li> <li>2 - Palm switch B N/C</li> </ul>

Figure 2-41. WPC 2000 LED Indicator Map (Center- or Right-mounted Board)

# WPC 2000 Power Supply Test

# A WARNING

### ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

- DO NOT touch electrical connections or circuit boards.
- Use test equipment only on the terminals specified in the instructions.
- Ensure that this test is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

To run the WPC 2000 power supply test, do the following, referring to Figure 2-41 for LED locations on the WPC 2000 Main Processor board:

- 1. Set the Stroke Select key switch to OFF.
- 2. Open the front cover of the control enclosure or the door of your console.
- 3. Turn on power to WPC 2000.
- 4. On the WPC 2000 Main Processor board, check to see whether the +24 VDC, +5 Logic A, and +5 Logic B LED indicators are illuminated.
  - If all three LEDs are lit, go to the next applicable test.
  - If all three LEDs are unlit, check to make sure that line voltage is being applied to the system (see step 3), and correct any problems. If the LEDs are still unlit, call Wintriss Tech. Support.
  - If one or both of the +5 Logic LEDs are unlit, call Wintriss Tech. Support.

# **Checking Safeguarding Devices**

## **A** DANGER

### DO NOT USE NON-SAFETY INTERLOCK SWITCHES IN SAFETY APPLICATIONS

- Ensure that all interlock switches used on safeguards are designed and rated for safety applications. Check with the manufacturer to verify the rating of each interlock switch.
- Ensure that safety interlock switches are connected to control-reliable inputs if they are used for safeguarding applications.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

### PREVENT INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.
- Use extreme caution when testing moveable guards. Keep hands and other body parts outside the guarded area.

#### Failure to comply with these instructions will result in death or serious injury.

Before turning on the press, check to verify the following conditions:

- All fixed safeguards prevent entry of a hand or other body part into the hazardous area.
- All moveable safeguards are correctly installed and wired to prevent operation of the press when they are open and prevent entry of a hand or other body part into the hazardous area.
- All interlock switches used with safeguards are designed and rated for use in safety applications. Check with the switch manufacturer to confirm their suitability for safety use.
- Interlock switches used for safeguarding are connected to control-reliable inputs.
- Any light curtains are installed at least the safety distance from the hazardous area and are working properly.
- Any Two-hand controls used as safeguarding devices are mounted at least the safety distance from the hazardous area.
- Safeguards are in place to prevent entry to the hazardous area under, over or around light curtains or other safeguarding devices.

Test safeguarding devices as follows:

- 1. Run the press in Inch mode. Have someone else block the light curtain, if one is installed, with an opaque object. The press should stop immediately.
  - If the press stops, go to the next step.
  - If the press does not stop, check the wiring of the light curtain and correct any problems. Repeat the test. If the press still doesn't stop, call Wintriss Tech. Support.
- 2. Run the press in Inch mode. Keeping hands outside the guarded area, have someone else open one of the moveable guards just enough to open the interlock switch. The press should stop immediately.
  - If the press stops immediately when you open the guard, go to the next step.
  - If the press does not stop, check the wiring of the moveable guard and correct any problems. Repeat the test. If the press still doesn't stop, call Wintriss Tech. Support.
- 3. Close the guard you just tested, reset the press control, and repeat step 2 for each moveable guard. When you have tested all moveable guards, go to the next section.

# **Checking Dual Safety Valve (DSV) Wiring**

## A WARNING

### PREVENT ELECTRIC SHOCK WHEN WORKING INSIDE THE ENCLOSURE

Turn off and disconnect power from the WPC 2000, the press and any other machinery it is connected to before working inside the enclosure. This includes power to the press motor.

Failure to comply with these instructions could result in death or serious injury.

Follow the checkout procedure below to ensure that the dual safety valve is wired correctly. Proper installation and operation of the DSV is crucial to personnel safety.

1. Power down the press and press control.

- 2. On the DSV/Lockout Relay board (see Figure 2-14, page 2-28 for location), remove fuse F302 or F303. F302 and F303 are the DSV fuses.
- 3. Power up the press and SmartPAC 2 with WPC 2000, select INCH with the Stroke Select switch, and push both Run/Inch buttons. Observe what happens.
  - If the ram does not move and the SmartPAC 2 display shows F79 or one of the DSV faults (see page 7-19), the DSV is operating properly. Go to the next step.
  - If the ram moves and/or the SmartPAC 2 display shows a fault other than F79 or one of the DSV faults, check the wiring of the DSV and correct any problems, then repeat step 3. If the ram still moves and/or the display still shows a fault other than F79 or one of the DSV faults, power down the press immediately, and call Wintriss Tech. Support.
- 4. Power down the press and SmartPAC 2 with WPC 2000.
- 5. On the DSV/Lockout Relay board, replace the DSV fuse (i.e., F302 or F303) you removed in step 2, and remove the other DSV fuse.
- 6. Power up the press and SmartPAC 2 with WPC 2000, make sure the press is in Inch mode, and push both Run/Inch buttons. Observe what happens.
  - If the ram does not move and the SmartPAC 2 display shows F79 or one of the DSV faults, the DSV is operating properly. Go to the next step.
  - If the ram moves and/or the SmartPAC 2 display shows a fault other than F79 or one of the DSV faults, check the wiring of the DSV and correct any problems, then repeat step 6. If the ram still moves and/or the display still shows a fault other than F79 or one of the DSV faults, power down the press immediately and call Wintriss Tech. Support.
- 7. Power down the press and SmartPAC 2 with WPC 2000, and replace the fuse you removed in step 5.
- 8. Power up the press and SmartPAC 2 with WPC 2000, make sure the press is still in Inch mode, and push both Run/Inch buttons briefly. The ram should move.
  - If the ram moves, go to the next section.
  - If the ram does not move, check the wiring of the DSV and correct any problems. Power up the press and SmartPAC 2 with WPC 2000. Push the Run/Inch buttons again. If the ram still does not move, call Wintriss Tech. Support.

# **Checking the Emergency-stop Circuit**

## NOTICE

## CHECKING THE EMERGENCY-STOP CIRCUIT IN SINGLE STROKE MODE

If your press does not run in Continuous mode, run this test while the press is making a stroke in Single-stroke mode.

To check the Emergency-stop circuit, do the following:

- 1. Run the press in Continuous mode, and press the Emergency Stop button on the Operator Station. The press should Emergency-stop immediately.
  - If the press Emergency-stops, repeat this test for every Emergency Stop button on the press. If the press Emergency-stops every time, go to the next applicable test.
  - If the press does not Emergency-stop, check the wiring of your E-stop circuit, correcting any problems, and run the test again. If the press still does not Emergency-stop, call Wintriss Tech. Support. Do not continue with this checkout procedure until the press E-stops correctly.

# NOTICE

## RESET EMERGENCY-STOP BUTTON AFTER USE

The Emergency-stop button is not spring-loaded. You must pull it up to its original position to reset the Emergency-stop (F13) fault.

# **Checking the Top-stop Circuit**

## NOTICE

### CHECKING THE TOP-STOP CIRCUIT IN SINGLE-STROKE MODE

If your press does not run in Continuous mode, run this test while holding down the Run/Inch palm buttons in Single-stroke mode.

To check the Top-stop circuit, do the following:

- 1. Run the press in Continuous mode, and press the Top Stop button on the Operator Station. The press should stop at top dead center.
  - If the press top-stops, repeat this test for every Top Stop button on the press. If the press top-stops every time, go to the next applicable test.
  - If the press does not top-stop, check the wiring of your Top-stop circuit, correcting any problems, and run the test again. If the press still does not top-stop, call Wintriss Tech. Support. Do not continue with this checkout procedure until the press top-stops correctly.

# System Static Test

## **WARNING**

## ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

- DO NOT touch electrical connections or circuit boards.
- Use test equipment only on the terminals specified in the instructions.
- Ensure that this test is performed by qualified personnel.

## Failure to comply with these instructions could result in death or serious injury.

To perform the system static test, do the following, referring to Figure 2-41 for LED locations and *Input Status*, page 4-44 for instructions in how to access the Input Status screens:

- 1. Turn off the system air and bleed down the system air pressure to less than 35 PSI.
- 2. On the SmartPAC 2 front panel:
  - Turn the Program/Run key switch to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to INCH.
- 3. Check to see whether the Interrupted Stroke message flashes on the SmartPAC 2 display.
  - If the Interrupted Stroke message displays, go to the next step.
  - If the Interrupted Stroke message does not display, check to see whether the "INCH SEL" item on the WPC Buttons and Switches Input Status screen is ON (see Figure 4-26, page 4-45). If "INCH SEL" shows an OFF status, check the wiring of the Stroke Select switch and correct any problems. If "INCH SEL" is still OFF, call Wintriss Tech. Support.
- 4. Press the Emergency Stop button on the Operator Station.
- 5. Check to see whether fault code F13 appears on the SmartPAC 2 display.
  - If F13 displays, go to the next step.
  - If F13 does not display, check to see whether the "E-stop A input" and "E-stop B input" LEDs on the WPC 2000 Main Processor board turn off when the Emergency Stop button is pressed. If the two LEDs do not turn off, check the wiring of the E-stop A and E-stop B input connections, and correct any problems. If the two LEDs still do not turn off, call Wintriss Tech. Support.

# NOTICE

## **RESET EMERGENCY-STOP BUTTON AFTER USE**

The Emergency-stop button is not spring-loaded. You must pull it up to its original position to reset the Emergency-stop (F13) fault.

- 6. Turn on the press motor in forward rotation (if applicable).
- 7. Check to see whether the "Motor forward" LED on the WPC 2000 Main Processor board is lit.
  - If the "Motor forward" LED is lit, go to the next step.
  - If the "Motor forward" LED is unlit, check the wiring of the Motor Forward input connection, and correct any problems. If the LED is still unlit, call Wintriss Tech. Support.
- 8. Press both Run/Inch palm buttons on the Operator Station at the same time.

9. Check to see whether fault code F48 appears on the LED display.

## NOTICE

If the E-stop and Top-stop circuits are not connected according to the wiring shown in Figure 2 at the end of the manual, the fault code that displays may be different. Call Wintriss Tech. Support for assistance.

- If F48 displays, go to the next step.
- If F48 does not display, check to see whether the "System air pressure" LED on the WPC 2000 Main Processor board is unlit. If the LED is unlit, check the wiring of the system air pressure switch input and correct any problems. Press both Run/Inch palm buttons again. If F48 still does not display, call Wintriss Tech. Support.
- 10. Apply system air pressure to the press.
- 11. Check to see whether the "System air pressure" LED on the WPC 2000 Main Processor board is lit. Clear the error code on the display by pressing RESET.
- 12. Turn off the counterbalance air and bleed down the counterbalance air pressure.
- 13. Press both Run/Inch palm buttons on the Operator Station at the same time. The ram should not move, and the fault code associated with the input the counterbalance pressure switch is connected to (normally, F54 for User 4 Input) should display.
  - If the ram does not move and the appropriate fault code appears, restore the counterbalance air, press RESET, and go to the next step.
  - If the ram moves and/or the appropriate fault code does not display, check the wiring of the counterbalance air pressure switch input, and correct any problems. Push both Run/ Inch palm buttons again. If the ram still moves and/or the appropriate fault code still does not display, call Wintriss Tech. Support.

## NOTICE

If the E-stop and Top-stop circuits are not connected according to the wiring shown in Figure 2 at the end of the manual, the fault code that displays may be different. Call Wintriss Tech. Support for assistance.

- 14. Press the Emergency Stop button on the Operator Station.
  - If fault code F13 displays, go to the next applicable test.
  - If F13 does not display, contact Wintriss Tech. Support.

# Anti-tiedown Test

## A DANGER

### INJURY DURING TESTING

- · Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

### **OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS**

- Ensure that the Operator Station is wired correctly.
- Ensure that on any non-Wintriss Operator Station the Run buttons are placed so that two hands are required to push both buttons at the same time and no one can press both buttons with one hand or with one hand and one elbow.
- Ensure that on any non-Wintriss Operator Station the Run buttons have ring guards or other means in place to prevent unintentional operation.

### Failure to comply with these instructions will result in death or serious injury.

The anti-tiedown test verifies that the Operator Station is installed correctly and is wired so that both hands are needed to press the Run/Inch buttons simultaneously. To perform the test, do the following:

- 1. On the SmartPAC 2 front panel:
  - Turn the Program/Run key switch to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to SINGLE STROKE.
- 2. Press and hold down both Run/Inch palm buttons to cycle the press through one stroke. When the press top-stops, continue to hold down the left button, and remove your hand from the right button; then, after a moment, replace your hand on the right button and continue to hold down both buttons.
  - If the press does not initiate the stroke, go to the next step.
  - If the press does initiate the stroke, check the wiring of the palm buttons. When the problem has been corrected, repeat step 2. If the press still initiates the stroke, call Wintriss Tech. Support.
- 3. Remove both hands from the Run/Inch buttons.
- 4. Press and hold down both Run/Inch buttons to cycle the press through one stroke. When the press top-stops, continue to hold down the right button, and remove your hand from the left button; then, after a moment, replace your hand on the left button and continue to hold down both buttons.
  - If the press does not initiate the stroke, the test has been completed successfully. Go to the next applicable test.

• If the press does initiate the stroke, check the wiring of the palm buttons, correcting any problems, then repeat step 4. If the press still initiates the stroke, call Wintriss Tech. Support.

## Anti-repeat Test

## A DANGER

### INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

### OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

- Ensure that the Operator Station is wired correctly.
- Ensure that on any non-Wintriss Operator Station the Run buttons are placed so that two hands are required to push both buttons at the same time and no one can press both buttons with one hand or with one hand and one elbow.
- Ensure that on any non-Wintriss Operator Station the Run buttons have ring guards or other means in place to prevent unintentional operation.

Failure to comply with these instructions will result in death or serious injury.

The anti-repeat test verifies that the press cycles only once when WPC 2000 is in Single-stroke mode and both Run/Inch buttons are pressed simultaneously. To perform the test, do the following:

- 1. On the SmartPAC 2 front panel:
  - Turn the Program/Run key switch to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to SINGLE STROKE.
- 2. Press and hold down both Run/Inch palm buttons until the press completes a stroke and for ten seconds after the press stops.
  - If the press makes one stroke and then top-stops, WPC 2000 is operating correctly. Go to the next applicable test.
  - If the press cycles again after making one stroke, check the wiring of the Operator Station and correct any problems; then, repeat the test. If the press still cycles after it makes one stroke, call Wintriss Tech. Support.

# Shadow Light Curtain Test

# A WARNING

### ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

- DO NOT touch electrical connections or circuit boards.
- Use test equipment only on the terminals specified in the instructions.
- Ensure that this test is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

WPC 2000 tests whether its light curtain inputs are working properly whenever the press is started and stopped.

Perform the following test to verify that your Shadow light curtain is installed and wired correctly and operating properly, referring also to the troubleshooting information in your light curtain user manual if necessary. If you have more than one light curtain on your press, perform this test on each light curtain.

- 1. Power up the light curtain.
- 2. Check to see whether there is power to the Shadow. On Shadow V and Shadow VI units, the amber (Power On) LED on the transmitter indicates that the light curtain has power. On Shadow VII units, the presence of power is indicated by an illuminated diagnostic code LED display. The green Power LED on the optional Shadow 8 control or the LEDs on Shadow 8 Main Receiver and Transmitter indicate the presence of power. On Shadow 9, the green power LED on the optional control, the green POWER LED on the transmitter, and the ON/OFF LED illuminated red or green on the receiver indicate the presence of power.
  - If the Shadow has power, go to the next step.
  - If the Shadow does not have power, turn off the light curtain, and check the input power wiring and the power fuse. (The fuse is located in the Shadow V receiver or in the Shadow VI, Shadow VII, Shadow 8, or Shadow 9 (optional) control box. The Shadow VII DIN controller has no fuse.) Rewire power connections and/or replace the fuse if necessary. Power up again. (On Shadow V and Shadow VI units, if there is still no power, turn off the transmitter and try replacing the amber indicator. Power up again.) If there is still no power to the unit, call Wintriss Tech. Support.
- 3. At the Shadow receiver, check to see whether the green (Curtain Unobstructed) indicator is lit.
  - If the green indicator is lit, go to the next step.
  - If the receiver's red (Curtain Obstructed) indicator is lit, realign the light curtain heads. If the red indicator is still lit, check the interrupt circuit (Shadow V and Shadow VI) or the Light Curtain Test mode jumper (Shadow VII, Shadow 8, or Shadow 9). To check the interrupt circuit, make sure that the following terminal reads 0 V relative to ground:

Shadow V: INT terminal in the transmitter (see Figure 4 at end of manual) Shadow VI: pin #19 on auxiliary TB4 in the control (see Figure 14 at end of manual) Shadow VI/WPC Interface Board: pin #5 on TB4 (see Figure 15 at end of manual) If the applicable terminal does not read 0 V relative to ground, check and correct the ground wiring for the unit.

The Light Curtain Test Mode jumper (JP124 for Light Curtain 1, JP122 for Light Curtain 2–see Figure 2-14, page 2-28 for location on the WPC 2000 Main Processor board), should be positioned at the "INT" setting when Shadow VII, Shadow 8, or Shadow 9 light curtains are installed. Reposition the jumper to the correct setting if necessary. The Light Curtain Output Type jumper (JP123 for Light Curtain 1, JP121 for Light Curtain 2) should be set to "PNP."

If the red indicator is still illuminated, call Wintriss Tech. Support.

- If both the receiver's green and red indicators are unlit, power down the unit and check the wiring to the receiver. Also check the power fuse (located in the Shadow V receiver, in the Shadow VI, Shadow VII, Shadow 8, or Shadow 9 (optional) control box, not present in the Shadow VII DIN control), and replace if necessary. Power up again. If the receiver's green and red indicators are still off, replace them. If none of these remedies corrects the problem, call Wintriss Tech. Support.
- 4. Block the light curtain. On the receiver, the green indicator should turn off and the red indicator should illuminate.
  - If the receiver's green indicator goes off and the red indicator comes on, go to the next step.
  - If the receiver's green indicator stays on when the curtain is blocked, check receiver wiring, and repeat step 4. If the green indicator is still lit, call Wintriss Tech. Support.
- 5. Remove the obstruction from the light curtain. At the receiver, verify that the red indicator goes off and the green indicator comes on.
- 6. Go to the next applicable test.

# Single-stroke Mode Test with Light Curtain(s)

# A DANGER

## INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

## CONTINUOUS MODE USED ON PRESS NOT GUARDED PROPERLY FOR CONTINUOUS

Disconnect the "Continuous" position on the Stroke Select switch to prevent your press from being run in Continuous mode if it is not guarded correctly for use in Continuous mode. Also cover the "CONT" label on your control's Stroke Select switch.

Failure to comply with these instructions will result in death or serious injury.

# A WARNING

### ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

- DO NOT touch electrical connections or circuit boards.
- Ensure that this test is performed by qualified personnel.
- Failure to comply with these instructions could result in death or serious injury.

To test Single-stroke mode when light curtains are installed, perform the following steps, referring to Figure 2-41 for LED locations and *Input Status*, page 4-44 for instructions in how to access the Input Status screens. To verify Single-stroke operation on a press without light curtains, go to the next test (page 2-102).

- 1. On the SmartPAC 2 front panel:
  - Turn the Program/Run key switch to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to SINGLE STROKE.

Verify that the "S.S. SEL" item on the WPC Buttons and Switches Input Status screen is ON (see Figure 4-26, page 4-45).

- 2. Verify that the light curtain is unobstructed and that the "Light curtain A1 input" and "Light curtain A2 input" LEDs on the WPC 2000 Main Processor board are lit. (If you are testing a second pair of light curtains, verify that "Light curtain B1 input" and "Light curtain B2 input" LEDs are lit.) These LEDs turn off when the light curtain is obstructed.
- 3. Press and hold both Run/Inch palm buttons on the Operator Station, observing the ram's motion.
  - If the ram makes a complete stroke, stopping at top dead center, go to the next step.
  - If the ram moves but does not make a complete stroke or does not stop at top dead center and a fault code between F80 and F89 (or between H80 and H89) displays, there is a problem with the overrun limit switch. Try the remedies suggested for overrun limit switch faults, starting on page 7-21; then, inch the ram to the top of the stroke and repeat this test. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
  - If the ram moves but does not make a complete stroke or does not stop at top dead center and an overrun limit switch fault does not display, check the wiring of the palm buttons and light curtains, correcting any problems; then, inch the ram to the top of the stroke, and repeat the test. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
  - If the ram does not move at all, check to make sure that the correct version of WPC 2000 firmware is installed, and check the wiring of the palm buttons, correcting any problems. Re-run the test, starting with step 1. If the ram still does not move when you press the Run/Inch palm buttons, call Wintriss Tech. Support.
- 4. Interrupt the light curtain by placing a piece of cardboard or other object between the light curtain heads to block at least two inches of the light field. Leave the object in place while you perform step 5.
- 5. Press and hold both Run/Inch palm buttons, observing the behavior of the ram.
  - If the ram does not move and you have only one light curtain, go to the next step.
  - If the ram does not move and you have two light curtains, repeat the test, starting with step 4, removing the obstruction from the first light curtain and blocking the second light curtain. Once the test on the second light curtain is successful, go to the next step.
  - If the ram does move, check to make sure the correct version of WPC 2000 firmware is installed, and check the wiring of the palm buttons and light curtains, correcting any problems. Re-run the test, starting with step 4. If the ram still moves with the light curtain blocked, call Wintriss Tech. Support.
- 6. Remove the object you used to interrupt the light curtain field in step 4. Prepare to insert it into the field while the ram is on the downstroke. Be sure to keep hands and other objects away from the press.
- 7. While one person presses and holds both Run/Inch palm buttons, have another person move the cardboard or other object into the light field while the ram is on the downstroke. Observe the action of the ram.
  - If you are using one light curtain, and the ram stops immediately and the Interrupted Stroke message flashes on the SmartPAC 2 display, go to the next step.
  - If you are using two light curtains, and the ram stops immediately and the Interrupted Stroke messages displays, inch the ram to the top of the stroke and repeat the test by interrupting the second light curtain, starting with step 6. When you have successfully completed the test with the second light curtain, go to the next step.
  - If the ram does not stop immediately, check the wiring of the light curtains, correcting any problems; then, inch the ram to the top of the stroke and re-run the test, starting with step 6. If the ram again moves when the light curtain is interrupted, call Wintriss Tech. Support.
- 8. Clear the Interrupted Stroke by holding the Run/Inch palm buttons until the ram stops at top dead center.
- 9. Press and immediately release the Run/Inch palm buttons, observing the behavior of the ram.
  - If the ram moves when you press the Run/Inch palm buttons, then stops when you release them, and the Interrupted Stroke message displays, go to the next step.
  - If the ram does not move, or if it moves but does not stop immediately when you release the Run/Inch palm buttons, or if the Interrupted Stroke message does not display, check the wiring of the palm buttons and light curtains, correcting any problems, and run this test again, repeating step 9. If the ram still does not move or moves but does not stop immediately, or if the ram stops but the Interrupted Stroke message does not display, call Wintriss Tech. Support.
- 10. Complete the stroke by pressing and holding the Run/Inch palm buttons.

#### 11. Go to the next applicable test.

### Single Stroke Mode Test without Light Curtain(s)

#### **DANGER**

#### INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

### A DANGER

#### CONTINUOUS MODE USED ON PRESS NOT GUARDED PROPERLY FOR CONTINUOUS

Disconnect the "Continuous" position on the Stroke Select switch to prevent your press from being run in Continuous mode if it is not guarded correctly for use in Continuous mode. Also cover the "CONT" label on your control's Stroke Select switch.

Failure to comply with these instructions will result in death or serious injury.

To test Single-stroke mode when light curtains are not installed, perform the following steps, referring to Figure 2-41 for LED locations and *Input Status*, page 4-44 for instructions in how to access the Input Status screens:

- 1. On the SmartPAC 2 front panel:
  - Turn the Program/Run key switch to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to SINGLE STROKE.

Verify that the "S.S. SEL" item on the WPC Buttons and Switches Input Status screen is ON (see Figure 4-26, page 4-45).

- 2. Press and hold both Run/Inch palm buttons, observing the motion of the ram.
  - If the ram makes a complete stroke and stops at or near top dead center, go to step 6.
  - If the ram does not make a full stroke or does not stop at top dead center, go to the next step.
- 3. Check for fault codes on the SmartPAC 2 display.
  - If a fault code between F80 and F89 (or between H80 and H89) displays, there is a problem with the overrun limit switch. Try the remedies suggested for overrun limit switch faults, starting on page 7-21; then, inch the ram to the top of the stroke and run the test again, starting with step 2. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
  - If the SmartPAC 2 display shows no error or an error other than an overrun limit switch fault, check and correct the wiring of the palm buttons and light curtains, correcting any problems; then, run the test again, starting with step 2. If the ram still does not complete a stroke or stop at top dead center, call Wintriss Tech. Support.

- 4. Turn the Stroke Select switch to INCH, and bring the ram to top dead center. Verify that the "INCH SEL" item on the WPC Buttons and Switches Input Status screen is ON (see Figure 4-26, page 4-45).
- 5. Press and then immediately release the Run/Inch palm buttons, observing the behavior of the ram.
  - If the ram moves when you press the Run/Inch buttons, then stops when you release them, and the Interrupted Stroke message flashes on the SmartPAC 2 display, go to the next step.
  - If the ram does not move, or if it moves but does not stop immediately when you release the Run/Inch buttons, or if the Interrupted Stroke message does not display, check the wiring of the palm buttons and light curtains, correcting any problems, and run the test again, repeating step 5. If the ram still does not move or moves but does not stop immediately, or if the ram stops but the Interrupted Stroke message does not display, call Wintriss Tech. Support.
- 6. Complete the stroke by pressing and holding the Run/Inch palm buttons.
- 7. Go to the next applicable test.

### Continuous Mode Test with Light Curtain(s)

### A DANGER

#### IMPROPER SAFEGUARDING

- Install safeguarding devices as needed to ensure operator safety. Follow the machine guarding requirements of OSHA regulation 1910.217 and any other regulations and standards that apply.
- Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

### **A** DANGER

#### INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

### **WARNING**

#### ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

- DO NOT touch electrical connections or circuit boards.
- Ensure that this test is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

This test verifies that your press and the light curtains connected to it operate correctly in Continuous mode. To verify Continuous mode operation on a press without light curtains, go to the next test (page 2-106). If your press does not run in Continuous mode, go to the next applicable test. To run the Continuous mode test with light curtains, do the following, referring to Figure 2-41 for LED locations and *Input Status*, page 4-44 for instructions in how to access the Input Status screens:

- 1. On the SmartPAC 2 front panel:
  - Turn the Program/Run key switch to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to CONT.

Verify that the "CONT SEL" item on the WPC Buttons and Switches Input Status screen is ON (see Figure 4-26, page 4-45).

- Verify that the light curtain is unobstructed and that the "Light curtain A1 input" and "Light curtain A2 input" LEDs on the WPC 2000 Main Processor board are lit. (If you are testing a second pair of light curtains, verify that "Light curtain B1 input" and "Light curtain B2 input" LEDs are lit.) These LEDs turn off when the light curtain is obstructed.
- 3. Press the Prior Act button on the Operator Station. The Prior Act lamp should illuminate, then turn off after eight seconds.
  - If the Prior Act lamp turns off after eight seconds, go to step 4.
  - If the Prior Act lamp does not turn off after eight seconds, stop! Do not go any further! Call Wintriss Tech. Support.
- 4. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.
  - If the press continues to run, go to the next step.
  - If the press stops, check the wiring of the palm buttons, correct any problems, press and hold both Run/Inch buttons to return the ram to top dead center, and run the test again. If the press still stops, call Wintriss Tech. Support.
- 5. Press the Emergency Stop button on the Operator Station. The ram should stop immediately, the F13 fault code should appear on the SmartPAC 2 LCD, and the Interrupted Stroke message should display. If these conditions are not present, check the wiring of the Operator Station, particularly the E-stop wiring, and correct any problems. Rerun this test from step 4. If the conditions are still not present, call Wintriss Tech. Support.

### NOTICE

#### RESET EMERGENCY-STOP BUTTON AFTER USE

The Emergency-stop button is not spring-loaded. You must pull it up to its original position to reset the Emergency-stop (F13) fault.

### NOTICE

When a stroke is interrupted, WPC 2000 automatically switches to Two-hand Maintained Single-stroke mode for the remainder of the stroke.

- 6. Press and hold the Run/Inch palm buttons until the press returns to top dead center.
- 7. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.
- 8. Press the Top Stop button on the Operator Station. The ram should stop near top dead center. If the ram does not stop at TDC, check the wiring of the Operator Station, particularly the top-stop wiring, and correct any problems. Rerun this test from step 7. If the ram still does not top-stop, call Wintriss Tech. Support.
- 9. Restart the press in Continuous mode.
- 10. Block the light curtain. The press should come to an immediate stop, and the Interrupted Stroke message should display.
  - If the press comes to an immediate stop and the Interrupted Stroke message displays, go to the next step.
  - If your WPC 2000 has the muting option, and the ram stops as soon as it reaches the non-muted (i.e., downward) portion of the stroke, go to the next step.
  - If your WPC 2000 has the muting option, and the ram does not stop in the non-muted portion of the stroke, check the wiring of the light curtain, correcting any problems, and run the test again, starting with step 9. If the ram still does not stop in the non-muted part of the stroke, call Wintriss Tech. Support.
  - If your WPC 2000 does not have the muting option and the press does not come to an immediate stop when you interrupt the light curtain, check the wiring of the light curtain, correcting any problems, and run the test again, starting with step 9. If the press still does not stop immediately, call Wintriss Tech. Support.
- 11. Press and hold both Run/Inch palm buttons to return the ram to top dead center.
- 12. Go to the next applicable test.

### Continuous Mode Test without Light Curtain(s)

### A DANGER

#### IMPROPER SAFEGUARDING

- Install safeguarding devices as needed to ensure operator safety. Follow the machine guarding requirements of OSHA regulation 1910.217 and any other regulations and standards that apply.
- Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

### A DANGER

#### INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

This test verifies that your press operates correctly in Continuous mode. To verify Continuous mode operation on a press with light curtains, return to the previous test (see page 2-103). If your press does not run in Continuous mode, go to the next applicable test. To run the Continuous mode test without light curtain, do the following, referring to Figure 2-41 for LED locations and *Input Status*, page 4-44 for instructions in how to access the Input Status screens:

- 1. On the SmartPAC 2 front panel:
  - Make sure the Program/Run key switch is set to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to CONT.

Verify that the "CONT SEL" item on the WPC Buttons and Switches Input Status screen is ON (see Figure 4-26, page 4-45).

- 2. Press the Prior Act button on the Operator Station. The Prior Act lamp should illuminate, then turn off after eight seconds.
  - If the Prior Act lamp turns off after eight seconds, go to the next step.
  - If the Prior Act lamp does not turn off after eight seconds, stop! Do not go any further! Call Wintriss Tech. Support.
- 3. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.
  - If the press continues to run, go to the next step.
  - If the press stops, check the wiring of the palm buttons, and correct any problems. Run the test again. If the press still stops, call Wintriss Tech. Support.

4. Press the Emergency Stop button on the Operator Station. The ram should stop immediately, the F13 fault code should appear in the LED display, and the Interrupted Stroke message should display. If these conditions are not present, check the wiring of the Operator Station, particularly the E-stop wiring, and rerun this test from step 3. If the conditions are still not present, call Wintriss Tech. Support.

### NOTICE

#### **RESET EMERGENCY-STOP BUTTON AFTER USE**

The Emergency-stop button is not spring-loaded. You must pull it up to its original position to reset the Emergency-stop (F13) fault.

### NOTICE

When a stroke is interrupted, WPC 2000 automatically switches to Two-hand Maintained Single-stroke mode for the remainder of the stroke.

- 5. Press and hold the Run/Inch palm buttons until the press returns to top dead center.
- 6. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.
- 7. Press the Top Stop button on the Operator Station. The ram should stop near top dead center. If the ram does not stop at TDC, check the wiring of the Operator Station, particularly the top-stop wiring, and correct any problems. Rerun this test from step 6. If the ram still does not top-stop, call Wintriss Tech. Support.
- 8. If the die space is safeguarded with doors or gates with interlocking circuits, open a door/ gate and try starting the press. The press should not start and an F13 (see page 7-8), or F17 or F18 (see page 7-9) error should display. Close the door/gate, reset the error, and start the press. While the press is running, open the door/gate. The press should stop immediately and display F13, F17, or F18. If the press does not stop, check the wiring of the interlock switch and the switch itself for proper functioning.
- 9. Go to the next applicable test.

### Foot Switch Test

#### A DANGER

#### INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

### A DANGER

#### MISSING SAFEGUARDS

Install a light curtain for use with the Foot Switch option. A light curtain is required for using the Foot Switch.

Failure to comply with these instructions will result in death or serious injury.

This test, which should be run only if you have an optional Foot Switch, verifies that your Foot Switch is operating properly. To perform the test, do the following, referring to Figure 2-41 for LED locations and *Input Status*, page 4-44 for instructions in how to access the Input Status screens:

### NOTICE

These instructions refer to the Auto Carry-up Angle, which is factory set to one of the following values:

- 170° if the press does not have a light curtain
- 149° if the press does have a light curtain

Refer to Setting the Auto Carry-up Angle, page 4-28 for information about the Auto Carry-up feature.

- 1. On the SmartPAC 2 front panel:
  - Make sure the Program/Run key switch is set to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select FOOT on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to SINGLE STROKE.

Verify that the "S.S. SEL" and "FOOT N/C" items on the WPC Buttons and Switches Input Status screen are ON (see Figure 4-26, page 4-45).

- 2. Make sure that option switch 3 on the WPC 2000 Main Processor board is set to OPEN, its default setting (see *Enabling Foot Control in a Foot Switch*, page 4-37).
- 3. Power down, then power back up the WPC 2000, if necessary, to enable the settings change. The WPC 2000 is now in Foot Trip mode, the press stroking each time the Foot Switch is depressed.

### NOTICE

Depress the Foot Switch quickly and fully to initiate a stroke. If you depress the Foot Switch slowly or partially, the press will not stroke.

4. Depress the Foot Switch and immediately release it. The press should make a single stroke and stop at top dead center.

### NOTICE

If the Interrupted Stroke message displays, you must depress and hold the Run/Inch buttons on the Operator Station to bring the press back to top dead center and clear the Interrupted Stroke before you can operate the Foot Switch.

Verify that the "FOOT N/O" item on the WPC Buttons and Switches Input Status screen (see Figure 4-26, page 4-45) changes from an OFF to an ON status and that the "FOOT N/C" item changes from ON to OFF.

- If the press strokes and the status of the inputs is correct, go to the next step.
- If the press does not stroke or the inputs are not in the correct state, check the wiring of the Foot Switch, the setting of switch 3 (it should be OPEN), and the selection on the Mode Select Menu (FOOT should be selected). Make any necessary corrections, and repeat step 4. If the press still does not stroke, call Wintriss Tech. Support.
- 5. Set option switch 3 to CLOSED.
- 6. Power down, then power back up WPC 2000 to enable the settings change. You are now in Foot Control mode. The press should cycle to Top-stop only if the Foot Switch is held down past the Auto Carry-up Angle.
- 7. Press and hold the Foot Switch through the Auto Carry-up Angle, then release the Foot Switch. The press should complete the stroke, stopping at Top-stop.
  - If the press completes the stroke, go to the next step.
  - If the press does not complete the stroke, check the wiring of the Foot Switch and the setting of switch 3 (it should be CLOSED). Make any necessary corrections, and repeat step 7. If the press still does not stroke, call Wintriss Tech. Support.
- 8. Press and hold the Foot Switch again, but release it before the Auto Carry-up Angle. The press should begin to cycle but stop immediately when the Foot Switch is released.
  - If the press stops, go to the next step.
  - If the press does not stop, check the wiring of the Foot Switch, making any necessary corrections, and repeat step 8. If the press still does not stop, call Wintriss Tech. Support.
- 9. Press and hold both Run/Inch buttons to return the press to TDC.
- 10. Set the Stroke Select switch to "CONT." Verify that the "CONT SEL" item on the WPC Buttons and Switches Input Status screen shows an ON status (see Figure 4-26, page 4-45).

- 11. Press the Prior Act button on the Operator Station, and, before the indicator lamp goes out, depress and hold down the Foot Switch. The press should run as long as the Foot Switch is depressed, stopping at Top-stop after completion of the stroke when the Foot Switch is released.
  - If the press behaves correctly, go to the next step.
  - If the press behaves otherwise, check the wiring of the Foot Switch and Operator Station, correcting any problems, and repeat step 11. If the press still fails to run and/or stop correctly, call Wintriss Tech. Support.
- 12. Press the Prior Act button and, before the indicator lamp goes out, depress the Foot Switch, immediately releasing it. The press should stop after a single stroke.
  - If the press stops correctly, go to the next step.
  - If the press does not stop correctly, check the wiring of the Foot Switch and Operator Station, correcting any problems, and repeat step 12. If the press still fails to stop correctly, call Wintriss Tech. Support.
- 13. If you want to repeat testing of the Foot Switch in Continuous mode, make sure to press the Prior Act button before attempting to initiate another stroke.
- 14. Go to the next applicable test.

### **One-hand Control Test**

### A DANGER

#### INJURY DURING TESTING

- Keep all personnel away from the press during testing.
- Be sure there is no die or other tooling in the press during testing.

Failure to comply with these instructions will result in death or serious injury.

### A DANGER

#### MISSING SAFEGUARDS

Install a light curtain for use with the One-hand Control option. A light curtain is required for using the One-hand Control.

Failure to comply with these instructions will result in death or serious injury.

This test, which should be run only if you have an optional One-hand Control, verifies that your One-hand Control is operating properly. To perform the test, do the following, referring to Figure 2-41 for LED locations and *Input Status*, page 4-44 for instructions in how to access the Input Status screens:

- 1. On the SmartPAC 2 front panel:
  - Make sure the Program/Run key switch is set to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select ONE HAND on the Mode Select Menu (see page 6-40)
  - Turn the Stroke Select key switch to SINGLE STROKE.

Verify that the "S.S. SEL" and "PALM A N/C" items on the WPC Buttons and Switches Input Status screen are ON (see Figure 4-26, page 4-45).

- 2. Make sure that option switch 3 on the WPC 2000 Main Processor board is set to OPEN, its default setting (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 4-36).
- 3. Power down, then power back up the WPC 2000, if necessary, to enable the settings change. The WPC 2000 is now in normal One-hand Control operation, the press stroking each time the One-hand Control switch is depressed.

### NOTICE

Depress the One-hand Control switch quickly and fully to initiate a stroke. If you depress the One-hand Control switch slowly or partially, the press will not stroke.

4. Press the One-hand Control switch and release it immediately. The press should make a single stroke and stop at top dead center.

### NOTICE

If the Interrupted Stroke message displays, you must press and hold the Run/Inch buttons on the Operator Station to bring the press back to top dead center and clear the Interrupted Stroke before you can operate the One-hand Control.

Verify that the "ONE HAND N/O" item on the WPC Buttons and Switches Input Status screen (see Figure 4-26, page 4-45) changes from an OFF to an ON status when the One-hand Control is depressed and that the "PALM A N/C" item changes from ON to OFF.

- If the press makes a complete stroke and the status of the "ONE HAND N/O" and "PALM A N/C" inputs is correct, go to the next step.
- If the press does not make a complete stroke or the status of the inputs is not correct, check the wiring of the One-hand Control, the setting of switch 3 (it should be OPEN), and the selection on the Mode Select Menu (ONE HAND should be selected). Make any necessary corrections, and repeat step 4. If the press still fails to make a complete stroke or input status is still incorrect, contact Wintriss Tech. Support.
- 5. Set option switch 3 to CLOSED.
- 6. Power down, then power back up WPC 2000 to enable the settings change. You are now in Light Curtain Break mode. The press should cycle to Top-stop only if the One-hand Control is pressed within eight seconds of the operator's hand clearing the light curtain.
- 7. Without breaking the light curtain, press the One-hand Control. The press should not cycle.
  - If the press does not cycle, go to the next step.
  - If the press cycles, check the wiring of the One-hand Control and the setting of switch 3 (it should be CLOSED). Make any necessary corrections, and repeat step 7. If the press still cycles, call Wintriss Tech. Support.

- 8. Now break the light curtain to activate the One-hand Control, then remove your hand and press the One-hand Control within eight seconds. The press should make a complete stroke, stopping at Top-stop.
  - If the press cycles, go to the next step.
  - If the press does not cycle, check the wiring of the One-hand Control, correcting any problems, and repeat step 8. If the press still cycles, call Wintriss Tech. Support.
- 9. Break the light curtain again, but this time wait ten seconds or longer before pressing the One-hand Control. Use a watch or timer to verify the delay interval. The press should not make a stroke.
  - If the press does not make a stroke, go to the next step.
  - If the press strokes, check the wiring of the One-hand Control, correcting any problems, and repeat step 9. If the press still makes a stroke, call Wintriss Tech. Support.

10. Go to the next applicable test.

### **Bar Mode Control Test**

### **A** DANGER

#### INJURY DURING BAR MODE TESTING

- Be sure there is no die or other tooling in the press during testing.
- Keep all personnel away from the press during testing.
- Use a spring-loaded turnover bar when you bar the press.

#### Failure to comply with these instructions will result in death or serious injury.

This test, which should be run only if you have an optional Bar Mode Control, verifies that your Bar Mode Control is operating properly. To perform the test, do the following, referring to *Input Status*, page 4-44 for instructions in how to access the Input Status screens:

- 1. On the SmartPAC 2 front panel:
  - Make sure the Program/Run key switch is set to RUN.
  - Turn the Stroke Select key switch of OFF.
  - Select TWO HAND on the Mode Select Menu (see page 6-40).
  - Turn the Stroke Select key switch to INCH.
- 2. Set the Select switch on the Bar Control to "ON." Verify that the "BAR MODE" item on the WPC Buttons and Switches Input Status screen is ON (see Figure 4-26, page 4-45).
- 3. Turn the press motor off.
- 4. While the press's flywheel is still turning, press and release the Operate button on the Bar Mode Control. Verify that the following events occur:
  - The Dual Safety Valve should energize while the Operate button is depressed and de-energize when the button is released
  - The "BAR ACT" item on the WPC Buttons and Switches Input Status screen should change from OFF to ON and remain ON while the Operate button is depressed

- The F26 fault code should appear on the SmartPAC 2 display
- 5. Press RESET to clear the fault.
- 6. When the flywheel has stopped turning, press and hold the Operate button on the Bar Mode Control. The Dual Safety Valve should energize and stay energized.
- 7. You can now bar the press, using a spring-loaded turnover bar.

### NOTICE

As you bar the press, WPC 2000 monitors the speed of the crank. If you bar the press too quickly, the DSV de-energizes and an F26 fault code displays, stopping the press.

8. Go to the next applicable test.

### **Checking Operation of the User Inputs**

This test verifies that any user inputs you have connected to auxiliary press functions are wired and operating correctly. If you have not wired any user inputs, go to the next section. To perform this test, do the following:

- 1. Run the press. Actuate one of the user inputs.
  - If the press stops and the appropriate fault code displays, the input is wired and operating properly. Repeat the test for the other user inputs. When you have checked all of the inputs, go to the next test.
  - If the press does not stop and/or the appropriate fault code does not display, check the wiring of that input, referring to *Wiring WPC 2000 User Inputs*, page 2-31, and rerun the test. If the press still does not stop and/or the correct fault code does not display, call Wintriss Tech. Support.

### Checking Cam Channels (ProCamPAC Only)

Create some test settings for your cam channels in Program mode (see *CAM SWITCH* (*Optional*), page 5-38), load the tool settings, and switch to Run mode to run the press. Ensure that the equipment (feed, blow off, lube, etc.) controlled by each channel is operating appropriately according to the settings you made.

# What Next?

To program and use your SmartPAC 2, follow the instructions in the remaining chapters of this manual. Go to Chapter 4 to make Initialization settings for your SmartPAC 2.

# Wiring Tables

Tables showing WPC 2000 and SmartPAC 2 wiring connections are provided on the following pages.

Pin	Signal	Pin	Signal
	TB104 Top		TB104 Bottom
44	Analog ground	88	Light curtain B2 input **
43	Counterbalance air (Analog 2) input	87	Light curtain A2 input **
42	+24 Vdc output	86	User input 10 – (paired w/ User Input 11*)
41	+24 Vdc output	85	User input 8 – (paired w/ User Input 9*)
40	+24 Vdc output	84	User input 6 –
39	+24 Vdc output	83	User input 4 –
38	+24 Vdc output	82	User input 2 +
37	+24 Vdc output	81	Top-stop string input (connects internally to 49)
36	Aux. 2 output	80	Top-stop string center loop connection
35	Light curtain 2 enable	79	Top-stop string drive output
	ТВ103 Тор		TB103 Bottom
34	Analog ground	78	Light curtain B1 input **
33	Main system air (Analog 1) input	77	Light curtain A1 input **
32	+24 Vdc output	76	Mute lamp 2 output +
31	Ground	75	Unused input –
30	Ground	74	User input 9 – (paired w/ User Input 8*)
29	Aux. 3 output	73	User input 7 –
28	Aux. 1 output	72	User input 5 –
27	Light curtain 1 enable	71	User input 3 +
26	Unused input +	70	Remote reset input –
25	Ground	69	E-stop string input (connects internally to 45)
24	Overrun limit switch input -	68	E-stop string center loop connection
23	+24 Vdc output	67	E-stop string drive output
	ТВ102 Тор		TB102 Bottom
22	Top stop limit switch input –	66	Mute lamp 1 output +
21	User input 1 +	65	Palm time lamp output –
20	DSV monitor input +	64	Prior act lamp output –
19	Unused input –	63	Prior act B input +
18	User input 11 – (paired w/ User Input 10*)	62	Prior act B output
17	Motor reverse input +	61	Prior act A input (connects internally to 62)
16	Bar actuator input +	60	Top-stop B2 input + pulse
15	Auto. Single-stroke (Ext. Trip) actuator N/C +	59	Top-stop B2 output
14	Foot switch N/O input +	58	Top-stop A2 input (connects internally to 59)
13	Top Stop in Inch Disable input +	57	E-stop B2 input + pulse
12	Palm switch B N/O input +	56	E-stop B2 output
11	Palm switch A N/O input +	55	E-stop A2 input (connects internally to 56)
	ТВ101 Тор		TB101 Bottom
10	Ground	54	Ground
9	+24 Vdc output	53	+24 Vdc output
8	Clutch air pressure switch input –	52	Top-stop B1 input + pulse
7	Motor forward input +	51	Top-stop B1 output
6	Bar selector switch input +	50	Top-stop A1 input (connects internally to 51)
5	Auto. Single-stroke (Ext. Trip) actuator N/O +	49	Top-stop A output
4	Foot switch N/C input +	48	E-stop B1 input + pulse
3	One hand A input +	47	E-stop B1 output
2	Palm switch B N/C input +	46	E-stop A1 input (connects internally to 47)
1	Palm switch A N/C input +	45	E-stop A output

\* See Wiring WPC 2000 User Inputs, page 2-31.

\*\* Input polarity depends on setting (NPN or PNP) of Light Curtain Output Type jumpers (JP121 and JP123) on WPC 2000 Main Processor board (see Figure 2-14, page 2-28).

#### Table 2-28. WPC 2000 Power Supply (TB105) Wiring Connections

Pin #	Signal
90	+24 Vdc input
89	СОМ

Table 2-29. WPC 2000 Aux. E-stop Relay Board Wiring Connections

Pin #	Signal
96	Circuit 3 output
95	Circuit 3 input
94	Circuit 2 output
93	Circuit 2 input
92	Circuit 1 output
91	Circuit 1 input

#### Table 2-30. WPC 2000 DSV/Lockout Relay Board Wiring Connections

Pin #	Signal
103	DSV B relay output
102	DSV B relay input
101	DSV A relay output
100	DSV A relay input
99	Lockout relay output
98	Lockout relay output
97	Lockout relay input

#### Table 2-31. WPC 2000 AC Power Wiring Connections

Pin #	Signal
	L1 (Hi)
	L2 (Neutral)
	Ground

#### Table 2-32. SmartPAC 2 SFI Port (1) and Module Port (2) (TB103) Wiring Connections

Pin #	Signal	Port
235	+RXD1	SFI PORT (1)
236	-RXD1	"
237	TXD1	"
238	+TXD1	"
239	–TXD1	"
240	GND	"
241	+RXD2	MODULE PORT (2)
242	-RXD2	"
243	+TXD2	"
244	–TXD2	"

#### Table 2-33. SmartPAC 2 Special Port (3) and PACNet Port (4) (TB104) Wiring Connections

Pin #	Signal	Port
224	+RXD3	SPECIAL PORT (3)
225	-RXD3	"
226	TXD3	"
227	+TXD3	"
228	-TXD3	"
229	GND	"
230	+RXD4	PACNET PORT (4)
231	-RXD4	"
232	TXD4	"
233	+TXD4	"
234	-TXD4	"

#### Table 2-34. SmartPAC 2 Spare 1 Port (5) and WPC Port (6) (TB105) Wiring Connections

Pin #	Signal	Port
330	-TXD6	WPC PORT (6)
329	+TXD6	"
328	–RXD6	"
327	+RXD6	"
326	GND	"
325	-TXD5	SPARE 1 PORT (5)
324	+TXD5	"
323	TXD5	"
322	–RXD5	"
321	+RXD5	"

#### Table 2-35. SmartPAC 2 Spare 3 Port (7) and Spare 4 Port (8) (TB106) Wiring Connections

Pin #	Signal	Port
320	-TXD8	SPARE 2 PORT (8)
319	+TXD8	"
318	TXD8	"
317	-RXD8	"
316	+RXD8	"
315	GND	"
314	-TXD7	SPARE 3 PORT (7)
313	+TXD7	"
312	TXD7	"
311	-RXD7	"
310	+RXD7	"

#### Table 2-36. SmartPAC 2 Aux I/O (TB107) Wiring Connections

Pin #	Signal
245	+15 V
246	POSITION SENSOR
247	GND
248	ZERO
249	REMOTE RESET
250	GND
251	LOCKOUT
252	INCH/SETUP
253	OP STA 2
254	OP STA 1

# Chapter 3. SmartPAC 2 Keyboard, Displays and Operating Modes

This chapter shows you how to use the SmartPAC 2 keyboard and displays and introduces you to SmartPAC 2's three operating modes. The keyboard and the screen on which the displays appear are located on the SmartPAC 2 front panel, which is shown in Figure 3-1.

It is a good idea to learn how to use SmartPAC 2 before you install it. Set up the unit on a bench and wire a power cord and a resolver to it, then try making settings on the displays. SmartPAC 2 is easy to use. The instructions on each display tell you which key to press in order to proceed to the next step.



Figure 3-1. SmartPAC 2 with WPC 2000 Front Panel

This chapter covers the following topics:

- Comparing SmartPAC 2 with Original SmartPAC, next section
- SmartPAC 2 Keyboard, page 3-3
- SmartPAC 2 Display Layout in Run Mode, page 3-13
- SmartPAC 2 Operating Modes, page 3-15
- Screen Capture, page 3-23

# **Comparing SmartPAC 2 with Original SmartPAC**

If you are familiar with the original SmartPAC, you will find using the SmartPAC 2 very similar. Figure 3-2 shows the differences between SmartPAC 1 and SmartPAC 2 front panels. Some of the instructions in this manual are based on those for the original SmartPAC.



Figure 3-2. Differences Between SmartPAC 2 and Original SmartPAC

SmartPAC 2 and the original SmartPAC are very similar in appearance, and many of the procedures for using them are the same. The differences between their front-panel controls are:

Item	SmartPAC 2	Original SmartPAC
Crank Angle/SPM display	In the center of the Crank Angle clock on the display and in the status box at the top of the display.	Separate red 3-digit LED display
Function Keys	8 function keys	6 function keys
Неlр Кеу	At center of cursor keys; press to access information about the current screen.	None
Contrast keys	None-display is self-adjusting	2 to left of display screen
Interrupted Stroke indication	Message flashes in status box at top of display	Indicator light on front panel

# SmartPAC 2 Keyboard

The SmartPAC 2 keyboard, as shown in Figure 3-3, is composed of number keys, cursor keys, function keys, and HELP, CLEAR, ENTER, and RESET keys. There are also two key switches: Stroke Select and Program/Run. Use of the keys and key switches is explained in the following sections.



Figure 3-3. SmartPAC 2 Keyboard

### Stroke Select Key Switch

The Stroke Select key switch, shown in Figure 3-4, is used to select the operating mode of the press: Off, Inch, Single-stroke, or Continuous (see page 6-39). This key switch is also used to clear the Lockout message when it appears on the SmartPAC 2 display (see page 7-3). To do so, turn the key to the "OFF" position, then back to the operating mode you want.

Users can be prevented from changing the operating mode by removing the key.



Figure 3-4. Stroke Select Key Switch

### A DANGER

#### CONTINUOUS MODE USED ON PRESS NOT GUARDED PROPERLY FOR CONTINUOUS

Disconnect the "Continuous" position on the Stroke Select switch to prevent your press from being run in Continuous mode if it is not guarded correctly for use in Continuous mode. Also cover the "CONT" label on your control's Stroke Select switch.

Failure to comply with these instructions will result in death or serious injury.

### Number Keys

The number keys, shown in Figure 3-5, are used to input numeric values, such as counter presets or tool numbers. They are used in conjunction with entry windows–numeric, alphabetic, and alphanumeric–which display when you select items on SmartPAC 2 screens (see Figure 3-6, below, and Figure 3-7, page 3-5).



Figure 3-5. Number Keys

To enter a number in an entry window, simply key in the individual digits of the number, using the number keys, and press ENTER. The window closes when you are finished, and the number you entered appears on the SmartPAC 2 screen next to the item you selected.

You can also use the cursor keys to enter information on these entry screens (see *Cursor Keys*, page 3-6). The CLEAR key is used to delete entered information (see *CLEAR Key*, next). To cancel a numeric entry operation, press RESET (see *RESET Key*, page 3-11).



Figure 3-6. Numeric Entry Window (Left); Alphabetic Entry Window (Right)

	Max Chars = $20$
ABCDE FGHIJK LMNOPQ RSTUVW XYZ,-# .()*@&	Press the CLEAR to clear text. Use the Keypad to input numbers. Use the CURSORS to select the letters. Press ENTER to input the letters. Press F6 when done. Press RESET to cancel. Press F2 to Toggle Case

Figure 3-7. Alphanumeric Entry Window

The number keys are also used to execute several functions. Pressing the 8 and 0 keys at the same time saves a screen capture of the current display (see page 3-23). Pressing 2 and 0 simultaneously on a selected Run mode screen programs the next function key you press as a Hot key for that screen (see page 6-3). Pressing the decimal point (.) key on the Main Run Menu opens a window in the upper right corner of the screen displaying the crankshaft angle in large characters (see page 6-6). This window carries over to other Run mode screens on which a prominent crankshaft angle display is useful such as angle adjustment screens for cams and die protection sensors. These keys and their functions are summarized in Table 3-1.

Table 3-1. Number Key Functions

Key/Key Combination	Function
8 and 0	Capture screen
2 and 0	Program Hot key
Decimal point (.)	Display crankshaft angle on Main Run Menu and selected Run mode screens

### **CLEAR Key**

The CLEAR key, shown in Figure 3-8, is used to delete digits or characters in a SmartPAC 2 entry window (see Figure 3-6 and Figure 3-7). You also use the CLEAR key as directed in other procedures, such as deleting a tool.



Figure 3-8. Clear Key

### **Cursor Keys**

The cursor, or arrow, keys, shown in Figure 3-9, are used to

- Move the highlight bar over an item you want to select on a SmartPAC 2 display
- Increase or decrease numeric values in SmartPAC 2 entry windows and screens
- Move the highlight box over a letter you want to enter in a SmartPAC 2 entry window
- Set the Ready signal for sensors and timing for cams (see page 3-23)



Figure 3-9. Cursor Keys

### Using Cursor Keys to Move the Highlight Bar

The cursor keys control the movement of the highlight bar that you use to select items on a SmartPAC 2 screen, such as the CAM SWITCH item on the SmartPAC 2 Run Menu shown in Figure 3-10.

ENABLE SENSORS
COUNTERS
DIE PROTECTION
CAM SWITCH
BRAKE MONITOR
TONNAGE/WAVEFORM
PRESS CONTROL
FEED CONTROL
TOOL INFORMATION
SHUTHGT/CNTRBAL
ERROR LOG
LOAD NEW TOOL
DIALOG MENU
TOGGLE HOT KEYS 2

Figure 3-10. Highlighted Item on Run Menu

Pressing the Up ( $\checkmark$ ) or Down ( $\checkmark$ ) cursor key moves the highlight bar up or down the list of items. When the highlight bar rests on the item you want to select, press ENTER.

The highlight bar moves one item up or down for each depression of the appropriate key. If you hold the key down, the highlight bar moves until you release it.

If there is only one column of items displayed, the highlight bar wraps to the top of the list when you press the Down ( $\checkmark$ ) cursor key with the bar on the last item. The highlight bar moves to the bottom of the list when you press the Up ( $\checkmark$ ) cursor key with the bar on the first item.

If there is more than one column of items, the highlight bar will move from the bottom of one column to the top of the column to the right of it when you press the Down ( $\checkmark$ ) cursor key with the bar on the last item in the first column. You can also use the Left ( $\checkmark$ ) and Right ( $\triangleright$ ) cursor keys to move between columns on the same level.

When there are more columns than can be displayed on the screen (the tool list in Tool Manager, for example, can have up to nine columns), pressing the Left ( $\triangleleft$ ) and Right ( $\triangleright$ ) cursor keys will move you to the hidden columns. The highlight bar wraps to an item in the leftmost column when the Right ( $\triangleright$ ) cursor key is pressed with the bar in the rightmost column. Likewise, the bar wraps to the rightmost column when the Left ( $\triangleleft$ ) cursor key is pressed with the highlight bar in the leftmost column.

### Using Cursor Keys to Increase or Decrease Numeric Values

The Up ( $\bigstar$ ) and Down ( $\checkmark$ ) cursor keys can be used to increase and decrease numeric values displayed in SmartPAC 2 entry windows (see Figure 3-6 and Figure 3-7, page 3-5) and on some SmartPAC 2 screens. To increase the value, press the Up ( $\bigstar$ ) cursor; to decrease the value, press the Down ( $\checkmark$ ) cursor. The displayed value increases or decreases one unit for each depression of the appropriate key. If you hold the key down, the value continues to increase or decrease until you release it.

#### Using Cursor Keys to Highlight Letters in Entry Windows

You can use Up ( $\checkmark$ ), Down ( $\checkmark$ ), Left ( $\checkmark$ ), and Right ( $\triangleright$ ) cursor keys to move the highlight box from one letter (including symbols and the space character) to another in alphabetic and alphanumeric entry windows (see Figure 3-6 and Figure 3-7). When the letter you want is highlighted, you press ENTER to accept that letter. To accept an entire alphabetic or alphanumeric entry, press function key F6.

In the alphanumeric entry window (see Figure 3-7), you can press the **F2** key to change between upper- and lower-case letters. For more information about alphanumeric mode, see *Tool Number Mode*, page 4-6.

### Using Cursor Keys to Set Timing

You can use the cursor keys to set timing for your optional programmable cam switch and sensors, setting the crankshaft angles at which you want a Ready signal or cam channel to turn on and off. For detailed instructions on using die protection sensors and cams, see *DIE PROTECTION (Optional)*, page 5-16 and *CAM SWITCH (Optional)*, page 5-38.

Timing settings are made on a crank angle clock that appears on Die Protection and Cam Switch screens in Program and Run modes. When these screens are displayed, the cursor keys move two cursors around this diagram, one cursor controlling the angle at which the sensor or cam turns on, the other controlling the angle at which the sensor or cam turns off. The two cursors define the endpoints of a highlighted arc that indicates graphically the duration of the On signal. The four cursor keys function in the following manner:

- Right ( ▶ ) cursor key increases the On setting, moving the On cursor clockwise.
- Left ( ◀ ) cursor key decreases the On setting, moving the On cursor counterclockwise.
- Up ( $\checkmark$ ) cursor key increases the Off setting, moving the Off cursor clockwise.
- Down ( ) cursor key decreases the Off setting, moving the Off cursor counterclockwise.

The following steps illustrate how the cursor keys are used to set timing for a cam channel in Program mode.

1. Before On/Off settings have been made for a cam channel, On and Off crankshaft angles are both 0°, as shown in Figure 3-11. The "dwell" (i.e., the number of degrees during which the channel is On) is 0°.



Figure 3-11. Cam Channel Timing: On=0°, Off=0°

To set the On angle, you use the Left ( 

 and Right ( ) cursor keys. Press and hold down the Right ( ) cursor key to move the On cursor clockwise around the crank angle diagram until you reach 239°. The On angle is shown in the window in the center of the crank angle clock. Your display should look like the one shown in Figure 3-12, page 3-9. If you overshoot the On angle you want, simply press the Left ( ) cursor key to move the On cursor counterclockwise. Notice that the dwell has changed to 121° (i.e., 360°-239°), indicating that the cam channel is on for 121°. The dwell angle is shown graphically by the highlighted arc on the crank angle clock.

### NOTICE

Zero degrees (0°) and 360° are located at the same point in the crankshaft rotation.



Figure 3-12. Cam Channel Timing: On=239°, Off=0°

To set the Off angle, you use the Up (▲) and Down (▼) cursor keys. With the cam channel timing set as in Figure 3-12, press the Down (▼) cursor key and hold it down until the Off cursor, moving counterclockwise, reaches 270° as shown in the window inside the crank angle diagram. The channel timing display should look like the one shown in Figure 3-13. If you overshoot the desired Off angle, press the Up (▲) cursor key to move the Off cursor clockwise.



Figure 3-13. Cam Channel Timing: On=239°, Off=270°

### **HELP Key**

The HELP key, shown in Figure 3-14, provides information about the current SmartPAC 2 display. Pressing HELP takes you to a Help screen that instructs you how to use the display and explains key terms you need to know.



Figure 3-14. HELP Key

### ENTER Key

The ENTER key, shown in Figure 3-15, is used to complete selection of an item or value on a SmartPAC 2 display. After you have highlighted the item with the cursor keys (see *Cursor Keys*, page 3-6), pressing the ENTER key displays the SmartPAC 2 screen for that item. You also use the ENTER key for other functions, such as to accept a number you have keyed in, to start loading settings for a tool, etc.



Figure 3-15. ENTER Key

### NOTICE

### SELECT = HIGHLIGHT + ENTER

When this manual instructs you to *select* an item, you should highlight the item and press ENTER.

### **RESET Key**

The RESET key, shown in Figure 3-16, has two functions: to exit from the current display and return to the previous display and to reset SmartPAC 2 when an error is generated or a counter preset is reached.

When RESET is used to exit from a display, a screen message indicates the conditions under which RESET should be pressed (e.g., *PRESS RESET WHEN DONE* or *PRESS RESET TO CANCEL*).

When RESET is used to reset SmartPAC 2, the fault message documenting the error disappears, and you can once again run the press.



Figure 3-16. RESET Key

### Program/Run Key Switch

The Program/Run key switch, shown in Figure 3-17, is used to move between Program and Run modes (see *SmartPAC 2 Operating Modes*, page 3-15).

- When you turn the key switch to PROG, SmartPAC 2 enters Program mode
- When you turn the key switch to RUN, SmartPAC 2 enters Run mode



Figure 3-17. Program/Run Key Switch

The switch has a removable key so that access to Run mode can be controlled.

### NOTICE

SmartPAC 2 changes from Run to Program mode or from Program to Run when the display shows the Main menu in the mode you are leaving. If you turn the key and nothing happens, press RESET repeatedly until you see the new mode appear on the display.

### **Function Keys**

The function keys, shown in Figure 3-18, are used to perform specific tasks on SmartPAC 2 screens. Located on the SmartPAC 2 panel along the right edge of the LCD, these eight keys, **F1** through **F8**, are assigned different functions on each SmartPAC 2 display. Specific functions are shown in a rectangular label on the LCD just to the left of the function key number label. When a function key has no label, no function has been assigned to that key on that screen. Screen messages may instruct you to press specific function keys to perform certain tasks. In most of the screens in Run mode, the **F8** key has been assigned the function of returning you to the Main Run Menu.



Figure 3-18. Function Keys

In Run mode, you can program function keys as "Hot" keys to give you quick access to frequently-used screens. See *Hot Keys*, next, for more information.

### **Hot Keys**

Hot keys, shown in Figure 3-19, page 3-13, are function keys you program to take you directly to screens you use frequently in Run mode. When a function key is programmed as a Hot key, a description of the screen to which the key is linked appears in the label to the left of the function key number on the Main Run Menu. When you press that function key, SmartPAC 2 goes to that screen. For detailed instructions on how to use Hot keys, see page 6-3.



Figure 3-19. Hot Keys Programmed on Main Run Menu

#### Example

You frequently need to adjust the timing for the cam channel that controls part blowoff. For convenience, you set up a Hot key to take you directly from the Main Run Menu to the adjust screen for that cam channel.

You can use all the function keys, F1 through F8, as Hot keys.

### NOTICE

If you have the alternate language option, **F1** is reserved for switching between languages in Run mode and cannot be used as a Hot key.

Hot keys are identified by the red frame around their descriptive labels. If your SmartPAC 2 does not have the alternate language option installed, you can have two sets of Hot keys, making a total of sixteen. To switch from one set to the other, highlight "TOGGLE HOT KEYS 1," and press ENTER. "TOGGLE HOT KEYS 2" replaces "TOGGLE HOT KEYS 1" on the menu, and the other set of Hot key labels appears.

## SmartPAC 2 Display Layout in Run Mode

The layout of the SmartPAC 2 display in Run mode is shown in Figure 3-20, page 3-14. At the top of the display is a status box that contains information such as the press name and the press speed or angle. Below the status box is the Run window, which contains menu items, instructions, graphics, and other elements. Along the right edge of the display are the eight function keys with descriptive labels shown for active keys. If any function keys have been programmed as Hot keys (see page 3-12), their labels have a red border.

You progress from menu to menu in Run mode by use of the ENTER and RESET keys, as instructed on the display. You navigate in the same way in Initialization and Program modes.



Figure 3-20. SmartPAC 2 Display, Run Mode

### Selecting an Item on a Display

To select an item on a SmartPAC 2 display, highlight the item you want, using the cursor keys (see page 3-6), and press ENTER. Figure 3-21 shows the Main Run Menu with the "CAM SWITCH" item highlighted. SmartPAC 2 goes to the display you have selected, on which you can select another item or make a setting. Screen messages tell you how to proceed on each display.



Figure 3-21. Main Run Menu with "CAM SWITCH" Highlighted

## **SmartPAC 2 Operating Modes**

SmartPAC 2 has three modes of operation: Initialization mode, Program mode, and Run mode. The Main, or top, menu for each mode is shown in Figure 3-22 along with a physical description of the display, a summary of what you can do in that mode, and a reference to the chapter in which that mode is documented. Table 3-2, page 3-16 provides more detail about what you can do in each mode, instructs you in how to enter and exit the mode, and refers you to other sections of the manual.

### NOTICE

To exit any mode, be sure you are in the Main menu, as shown in Figure 3-22. If you are not in the Main menu, press RESET repeatedly until the Main menu appears.



Figure 3-22. SmartPAC 2 Operating Modes, Showing Main Menus

Mode	How to Enter This Mode	How to Exit This Mode	
Initialization	Turn Program/Run key to PROG.* Then press the "1" and "CLEAR" keys simultaneously and hold down a few seconds until the Main Initialization Menu appears.	To switch to Program mode:	
Make settings that control operation of SmartPAC 2 with all tools.		Press RESET.	
You use Initialization mode extensively when you install a new SmartPAC 2. You will use this mode only occasionally after you set up SmartPAC 2 and the press is running. See page 3-17 and Chapter 4. White text on dark blue display.		<i>To switch to Run mode:</i> Turn the Program/Run key to RUN.*	
Program	From Run mode:	To switch to Run mode:	
Create, modify and load settings for individual tools that control SmartPAC 2 operation when that tool is loaded	Turn the Program/Run key to PROG.*	Turn the Program/Run key to RUN.*	
See page 3-19 and Chapter 5	From Initialization mode	To switch to Initialization mode:	
Black text on light green display.	Go to the Main Initialization Menu, and Press RESET. —or— Turn the Program/Run key to	Press the "1" and "CLEAR" keys simultaneously and hold down a few seconds until the Main Initialization Menu appears.	
	RUN and then back to PROG.*		
Run	Turn the Program/Run key to RUN.*	To switch to Program mode:	
Run the press. In this mode you can adjust counters, cams, sensors and other functions while the press is running.		Turn the Program/Run key to PROG.*	
See page 3-21 and Chapter 6.			
Black text on light blue display.			
* If you turn the key and nothing happens, press RESET repeatedly until SmartPAC 2 changes modes. Before you turn the Program/Run key, make sure SmartPAC 2 is in the Main (or top) menu for the mode it is in. If it is not, press RESET repeatedly until the Main menu appears.			

Table 3-2. Initialization, Program and Run Modes: Entry and Exit Procedures

If the message "PRESS CONTROL IS IN LOCKOUT MODE" appears on the SmartPAC 2 display, turn the Stroke Select key switch to "OFF," then back to the desired operating mode to clear the message.

### **Initialization Mode**

Initialization mode allows you make settings that control the operation of SmartPAC 2 with any tool. (Settings for individual tools are made in Program mode–see page 3-19.) Initialization mode is used extensively when you install a new SmartPAC 2, but you will likely use it only occasionally after SmartPAC 2 is set up and the press is running.

The Main Initialization Menu is shown in Figure 3-23. Figure 3-24, page 3-18 shows you how to navigate through the SmartPAC 2 menus in Initialization mode.



Figure 3-23. Initialization Mode Main Menu

See Chapter 4 for detailed instructions on how to use SmartPAC 2 in Initialization mode.

### NOTICE

For help with an item on the Main Initialization Menu, press the HELP key when that screen is displayed.



#### Figure 3-24. Navigation Example: Initialization Mode

Press ENTER to go in direction of arrow. Press RESET to return to previous menu. This illustration includes some optional features. Your menus may be different.

### **Program Mode**

Program mode allows you to create, copy, modify and delete tools as well as enable or disable sensors. The Main Program Menu is shown in Figure 3-25. Figure 3-26, page 3-20 shows you how to navigate through the SmartPAC 2 menus in Program mode.



Figure 3-25. Program Mode Main Menu

See Chapter 5 for detailed instructions on how to use SmartPAC 2 in Program mode.

# **NOTICE** For help with an item on the Main Program Menu, press the HELP key when that screen is displayed.



Figure 3-26. Navigation Example: Program Mode

Press ENTER to go in direction of arrow. Press RESET to return to previous menu. This illustration includes some optional features. Your menus may be different.
## Run Mode

Run mode is the mode you use to run the press. The Main Run Menu, shown in Figure 3-27, displays the rotation of the crankshaft on a crank angle clock diagram in the lower left corner of the display. When the press is running in Continuous mode, the press speed in strokes per minute is displayed in the center of the clock diagram. When the press is stopped or running in Inch or Single-stroke, the crankshaft angle is displayed inside the clock.

If security access settings in Program mode permit, you may be able to adjust cam timing and perform other operations in Run mode (see *CAM SWITCH (Optional*), page 6-18).

Figure 3-28, page 3-22 shows you how to navigate through the SmartPAC 2 menus in Run mode.



Figure 3-27. Run Mode Main Menu

See Chapter 6 for detailed instructions on how to use SmartPAC 2 in Run mode.

## NOTICE

For help with an item on the Main Run Menu, press the HELP key when that screen is displayed.



Figure 3-28. Navigation Example: Run Mode

Press ENTER to go in direction of arrow. Press RESET to return to previous menu. This illustration includes some optional features; your menus may be different.

# Screen Capture

SmartPAC 2 allows you to save a copy of one or more SmartPAC 2 screens to aid in troubleshooting or maintain records of tool settings such as cam on/off angles. Your screen capture options depend on your SmartPAC 2 Main firmware version, which you can easily determine by accessing the Installed Options screen (see page 4-9.)

If the SmartPAC 2 Main version is earlier than V 5.3.1, refer to *Screen Capture in SmartPAC 2 Main Versions Earlier than V 5.3.1*, below. If your version of SmartPAC 2 Main is V 5.3.1 or later, refer to *Screen Capture in SmartPAC 2 Main Versions V 5.3.1 and Later*, page 3-25.

# Screen Capture in SmartPAC 2 Main Versions Earlier than V 5.3.1

If the SmartPAC 2 Main version is earlier than Version 5.3.1, all screen captures are saved to SmartPAC 2 memory, each new screen capture overwriting the previous one. You can e-mail the current screen capture in memory to a selected recipient if the SmartPAC 2 is connected to a computer network and recipient e-mail addresses have been set up in SmartView. You can also save the screen capture to a USB disk inserted in the SmartPAC 2 USB connector.

### Saving a Screen Capture to SmartPAC 2 Memory

To save a copy of a SmartPAC 2 screen to SmartPAC 2 memory, do the following:

- 1. On the SmartPAC 2 front panel, access the screen you want to capture.
- 2. Press the 8 and 0 (zero) keys simultaneously for a second or two until the message "Capturing Screen..." in very small letters appears at the top right of the display.

The captured screen remains in SmartPAC 2 memory until the next screen capture is performed, the new screen capture overwriting the old one.

### E-Mailing a Screen Capture

E-mail provides a convenient way of sharing screen captures with individuals responsible for troubleshooting your SmartPAC 2 (e.g., Wintriss Tech. Support) or maintaining a record of tool settings. In order to use e-mail, your SmartPAC 2 must be connected to a computer network and e-mail addresses of recipients configured in SmartView (see page E-2). To e-mail a copy of the screen currently residing in SmartPAC 2 memory (see *Saving a Screen Capture to SmartPAC 2 Memory*, above), do the following:

- 1. Access the Run mode Main Menu (see Figure 6-1, page 6-1), and select MESSAGING. A screen displays with the headings "From:," "To:," and "Message:" at the top and a window with a list of e-mail recipients beneath. The "From:" slot is filled with the e-mail address that has been configured for your SmartPAC 2 (see page E-14).
- Highlight the recipient you want, using the Up (▲) or Down (▼) cursor key, then press
  F3 (Select Recipient). The recipient you selected appears in the "To:" slot.
- 3. Press F4 (Select Message) to display a list of available messages, highlight the "Screen Capture" item, and press F4 again. "Screen Capture" appears in the "Message:" slot.

4. Press F5 (Send Message and Exit). The message "Sending Message" appears beneath the message window, and you are returned to the Main Run Menu.

Refer to MESSAGING, page 6-37 for additional information about sending e-mail messages.

### Saving a Screen Capture to a USB Disk

You can save a copy of the current screen residing in SmartPAC 2 memory to a USB disk inserted in the USB connector on the SmartPAC 2 processor board. A USB disk allows you to transfer the screen capture to another computer when your SmartPAC 2 is not networked. The error/event log (see page 6-34) and other information maintained in a special SmartPAC 2 buffer are saved along with the screen capture. To save this information, do the following:

## CAUTION

#### POWER DOWN SMARTPAC 2 BEFORE INSERTING USB DISK

Do not insert a USB disk into the USB connector while SmartPAC 2 is running. The USB disk could touch a component on the SmartPAC 2 board, resulting in a short circuit and damage to the board. Always power down SmartPAC 2 before inserting a USB disk.

Failure to comply with these instructions could result in property damage.

- 1. Power down the SmartPAC 2.
- 2. Open the SmartPAC 2 enclosure or console.
- 3. Locate the USB connector, J121, on the SmartPAC 2 board (see Figure 2-25, page 2-51), then carefully insert the USB disk into the USB connector.

## NOTICE

The USB disk can be inserted into the USB connector only one way. Do not attempt to force the USB disk into the connector.

- 4. Shut the enclosure or console door, and power up the SmartPAC 2.
- 5. Access the Main Initialization Menu (see Figure 4-1, page 4-1), select DIAGNOSTICS, and when the Diagnostics Menu (see Figure 4-40, page 4-61) displays, select SAVE TO USB DISK. The following messages appear in succession:

PLEASE WAIT WHILE THE DATA IS BEING TRANSFERRED TO THE USB DISK. THIS MAY TAKE UP TO ONE MINUTE TO COMPLETE . . .

THE USB DISK TRANSFER HAS FINISHED AND WAS SUCCESSFUL. PRESS THE RESET KEY AND THEN REMOVE THE USB DISK DEVICE.

- 6. When the second message appears, press RESET to return to the Diagnostics Menu.
- 7. Power down the SmartPAC 2, and remove the USB disk.

The screen capture is saved to a folder on the USB disk named UpLoadnnnnnnn, where *nnnnnn* is the serial number of the SmartPAC 2. The screen capture itself is named ScreenCapturennnnnn.gif. There are additional files in the UpLoad folder.

## Screen Capture in SmartPAC 2 Main Versions V 5.3.1 and Later

If you are running SmartPAC 2 Main Version 5.3.1 or later, screen captures can be saved to SmartPAC 2 memory as in earlier versions or, if a properly configured USB disk is inserted in the SmartPAC 2 USB connector when the capture is made, you can save one or more screen captures directly to the USB disk. If you choose to continue saving screen captures to SmartPAC 2 memory, you can still copy the screen capture to an e-mail message or to a USB disk as described in *Screen Capture in SmartPAC 2 Main Versions Earlier than V 5.3.1*, above.

#### Saving Multiple Screen Captures to a USB Disk

To save one or more screen captures to a USB disk, do the following:

## CAUTION

#### POWER DOWN SMARTPAC 2 BEFORE INSERTING USB DISK

Do not insert a USB disk into the USB connector while SmartPAC 2 is running. The USB disk could touch a component on the SmartPAC 2 board, resulting in a short circuit and damage to the board. Always power down SmartPAC 2 before inserting a USB disk.

Failure to comply with these instructions could result in property damage.

- 1. At your PC, create a folder named "Capture" in the root directory of the USB disk.
- 2. Power down the SmartPAC 2, and open the SmartPAC 2 enclosure or console.
- 3. Locate the USB connector, J121, on the SmartPAC 2 board (see Figure 2-25, page 2-51), then carefully insert the USB disk into the USB connector.

## NOTICE

The USB disk can be inserted into the USB connector only one way. Do not attempt to force the USB disk into the connector.

- 4. Shut the enclosure or console door, and power up the SmartPAC 2.
- 5. On the SmartPAC 2 front panel, access one of the screens you want to capture.
- 6. Press the 8 and 0 (zero) keys simultaneously for a second or two until the message "USB Capturing Screen..." in very small letters appears at the top right of the display.
- 7. Repeat steps 5 and 6 for additional screens. The number of screens you can capture is limited only by the capacity of your disk.
- 8. When you are finished, open the enclosure or console, and remove the USB disk.

Captured screens are saved to a folder in the Capture folder named "Capturennnnnn," where *nnnnnnn* is the SmartPAC 2 serial number. Screen capture files are named using a prefix that stands for the operating mode in which the screen functions (i.e., INIT, PROG, and RUN) followed by the date and time of the capture (e.g., INIT-02212007102234). The date is expressed in *mmddyyyy* (month/day/year) format, the time in *hhmmss* (hours/ minutes/seconds) military format. All screen captures are saved as .gif files.

# Chapter 4. SmartPAC 2 Initialization Mode

## NOTICE

#### INITIALIZE WPC 2000 PARAMETERS BEFORE PROGRAMMING SMARTPAC 2/WPC 2000

You should already have initialized press parameters when you set up your new SmartPAC 2 with WPC 2000 (see page 2-75). If you haven't, do so now, following the instructions starting on page 4-34. You must also initialize parameters when you install new WPC 2000 firmware.

This chapter shows you how to make settings in SmartPAC 2 Initialization mode. Initialization settings, which are entered via the Main Initialization Menu (see Figure 4-1), control operation of SmartPAC 2 for all tools. (You make settings for individual tools in Program mode–see Chapter 5).

MAIN INITI	ALIZATION MENU	(
USE THE CURSOR KEYS TO CHOOSE MENU ITEMS. PRESS THE ENTER KEY TO SELECT. SWITCH TO RUN WHEN DONE.	RESOLVER ZERO POSITION SENSOR INSTALLED OPTIONS PRESS NAME SELECT CAM NAMES AUTO ADVANCE SET GLOBAL CAMS CUSTOM SENSOR NAMES SENSOR ENABLE MODE FEED CONTROL PM MONITOR TOOL INFORMATION PRESS CONTROL SECURITY ACCESS BACKUP/RESTORE SETUP DATA COMMS SETUP DATA COMMS SETUP DATA COMMS SETUP DATA COMMS SETUP DATA COMMS SETUP NETWORK LUBE/SPEED/FLYWBRAKE DIAGNOSTICS	

*Figure 4-1. Main Initialization Menu* (Includes some options. Your display may look different.)

The following sections cover zeroing the resolver, disabling the position sensor, making auto advance settings, documenting selected information for each tool, setting up the press control, controlling security access, backing up and restoring tool setups, setting communications parameters, and other operations. The chapter also covers programmable cam and die protection functions such as entering custom cam channel and sensor names and setting global cams.

If you have SmartPAC 2 options installed, you will also make Initialization settings for them. Refer to the user manuals for the options you have purchased for instructions.

# **Entering and Exiting Initialization Mode**

### NOTICE

#### SELECT = HIGHLIGHT + ENTER

When this manual instructs you to select an item, you should highlight the item, and press ENTER.

Follow the instructions shown in Table 4-1 to enter and exit Initialization mode. See Figure 3-24, page 3-18 for help in navigating in Initialization mode.

To Enter Initialization Mode		To Exit Initialization Mode
1. 2.	Turn Program/Run key to PROG.* Press the "1" and "CLEAR" keys simultaneously and hold down a few seconds until the Main Initialization Menu appears.	<i>To switch to Program mode:</i> Press RESET. <i>To switch to Run mode:</i> Turn the Program/Run key to RUN.*

Table 4-1. Instructions for Entering and Exiting Initialization Mode

\* If you turn the key and nothing happens, press RESET repeatedly until SmartPAC 2 changes modes. Make sure SmartPAC 2 is in the Main (or top) menu for the mode it is in before you turn the Program/Run key. If SmartPAC 2 is not in a top-level menu, press RESET repeatedly until the Main menu appears.

If the message "PRESS CONTROL IS IN LOCKOUT MODE" displays on the SmartPAC 2 front panel, turn the Stroke Select key switch to OFF, then back to the desired operating mode to clear the message.

The first display you see in Initialization mode is the Main Initialization Menu (see Figure 4-1). From this menu, you can access all the Initialization mode displays.

The following sections show you how to use the selections available on the Main Initialization Menu to set initialization parameters for SmartPAC 2 with ProCamPAC and DiProPAC.

## NOTICE

#### SET THE INTERNAL CLOCK IN SMARTPAC 2

When you initialize your SmartPAC 2, be sure to set the clock to the correct date and to your local time according to the instructions in *SET CLOCK*, page 4-64.

# Initializing WPC 2000 Parameters

## NOTICE

Initializing press control parameters resets them to their default values. Initialize press parameters only when you set up a new SmartPAC 2 with WPC 2000 or install new WPC 2000 firmware.

## NOTICE

#### RECORD WPC 2000 SETTINGS BEFORE INITIALIZING PARAMETERS

Use the Press Parameters Setup Sheet at the end of the manual to record your WPC 2000 settings before installing new firmware or initializing parameters.

When you first set up your SmartPAC 2 with WPC 2000 or install new WPC 2000 firmware, initialize press parameters, following the instructions provided starting on page 4-34.

# **RESOLVER ZERO**

#### (INITIALIZATION - RESOLVER ZERO)

This item enables you to zero the resolver. You must zero the resolver when you first install SmartPAC 2 (see page 2-78) and whenever you replace the resolver. Zeroing the resolver ensures that SmartPAC 2 maintains an accurate "zero" resolver position (i.e., as close to TDC as possible) by which it can time all its operations.

The ram must be at top dead center (TDC) when zeroing the resolver. If the ram is already at TDC, perform the *Setting the Resolver Zero Position* procedure, page 4-4. Otherwise, first inch the ram to TDC, following the *Moving the Ram to Top Dead Center (TDC)* procedure, next. Then perform the *Setting the Resolver Zero Position* procedure.

## Moving the Ram to Top Dead Center (TDC)

If the ram is not at TDC, you must first inch the press to  $0^{\circ} \pm 2^{\circ}$  before you can zero the resolver. You must load a tool in order to inch the press. To move the ram to TDC, do the following:

## NOTICE

- If you turn the Program/Run key switch and nothing happens, press RESET repeatedly until the screen changes color, indicating that the SmartPAC 2 has changed to the mode you selected.
- If the message "PRESS CONTROL IS IN LOCKOUT MODE" is displayed on the screen, turn the Stroke Select key switch to OFF, then to one of the other operating modes to clear it.
- 1. With a "test" tool loaded (see *Creating and Loading a Test Tool* procedure, page 2-76), turn the Program/Run key to RUN, and inch the press to  $0^{\circ} \pm 2^{\circ}$ .

## NOTICE

#### USE A DIAL INDICATOR TO DETERMINE TDC

Do not rely on the SmartPAC 2 display to indicate when the press has reached TDC. Until the resolver is zeroed, displayed values are inaccurate. Use a dial indicator or some other means to determine 0°.

2. When the press is at TDC, perform the next procedure.

## **Setting the Resolver Zero Position**

To zero the resolver with the press at TDC, perform the following steps:

1. Select RESOLVER ZERO on the Main Initialization Menu. The screen shown in Figure 4-2 displays.

The value shown in the CURRENT RESOLVER ANGLE field, which is the actual angular position of the resolver shaft, should be as close as possible to  $0^{\circ}$ . Ideally, the reading should be between 355° and 5°, but anywhere between 330° and 30° is acceptable.

CURRENT RESOLVER ANGLE = 344 DEGREES CURRENT ZERO CORRECTION = 344 DEGREES	SET RESOLVER ZERO POSITION	F1 F2
Before zeroing the resolver make sure that the press is at TDC. Try to get the current resolver angle as close to zero as possible but the unit will compensate from 330 to 30 deg. When you press the F1 key the system will then always		F3 F4
recognize this as the zero position.		F5 F6
PRESS THE F1 FUNCTION KEY TO SET THE RESOLVER ZERO POSITION. PRESS THE RESET KEY WHEN YOU ARE DONE.		F7 F8

Figure 4-2. "Resolver Zero" Screen

- 2. If the current resolver angle is outside the range of 330° to 30°, loosen the tension on your drive mechanism and turn the resolver shaft by hand (either direction is acceptable) until the arrow on the shaft is aligned with the keyway (see Figure 2-13, page 2-26), indicating a resolver position of 0°. Continue to adjust the position of the resolver shaft until the reading in the CURRENT RESOLVER ANGLE field is as close to 0° as you can get it. Then tighten the drive mechanism, making sure not to change the resolver angle reading.
- 3. Press the F1 (Set Resolver Zero Position) key on the Resolver Zero screen.

SmartPAC 2 electronically adds or subtracts the offset (i.e., the difference between the CURRENT RESOLVER ANGLE reading and 0°), and the CURRENT ZERO

CORRECTION reading should change to match the value shown in the CURRENT RESOLVER ANGLE field.

4. Press RESET when you are finished. You are returned to the Main Initialization Menu.

# **POSITION SENSOR**

(INITIALIZATION - POSITION SENSOR)

### NOTICE

#### DISABLE POSITION SENSOR ON SMARPAC 2 WITH WPC 2000 INTEGRATION

An overrun limit sensor is required for SmartPAC 2 with WPC 2000 Integration (see page 2-29). You cannot use a position sensor. Make sure to disable the POSITION SENSOR MODE setting as instructed below.

This item allows you to disable the position sensor, select the format (i.e., numeric or alphanumeric) to be used in entering tool numbers, specify whether counters are to be incremented in Inch mode during setup, and make other settings. Parameters are set on the screen shown in Figure 4-3. The following sections show you how to set each parameter

POSITION SENSOR MODE = DISABLED RESOLVER MOTION MODE = NORMAL MOTION ANGLE WHEEL ROTATION = CW DIRECTION TOOL NUMBER MODE = NUMERIC ONLY COUNTER SETUP MODE = NOT INCREMENTED IN INCH MODE	
COUNTER INCREMENT MODE = NO INC FAULT	
CURRENT RESOLVER ANGLE = 128	
POSITION SENSOR INPUT - OFF	
USE THE CURSOR KEYS TO SELECT THE MODE YOU WANT TO CHANGE. PRESS THE ENTER KEY TO CHANGE IT. PRESS THE RESET KEY WHEN YOU ARE DONE.	
CHANGEOVER/SETUP	

Figure 4-3. Position Sensor Screen

### **Position Sensor Mode**

(INITIALIZATION - POSITION SENSOR)

To operate SmartPAC 2 with WPC 2000, you must disable the POSITION SENSOR MODE setting. To do so, follow these instructions:

- 1. With the cursor resting on the POSITION SENSOR MODE field, press ENTER until the "DISABLED" entry displays.
- 2. Press RESET to save your setting and return to the Main Initialization Menu.

## **Resolver Motion Mode (Normal Motion – Link Motion)**

(INITIALIZATION - POSITION SENSOR)

This item controls whether SmartPAC 2 adapts to the action of a link-motion press. The default setting is "NORMAL MOTION." If your SmartPAC 2 is installed on a link-motion press, go to *Using SmartPAC 2 with a Link-motion Press*, page 4-65 for instructions.

## Angle Wheel Rotation (Clockwise – Counterclockwise)

(INITIALIZATION - POSITION SENSOR)

This setting controls the rotational direction of the crank angle clock on the SmartPAC 2 display. The default setting is "CW DIRECTION" (Clockwise). If you want the crank angle clock to rotate in a counterclockwise direction, press ENTER with the ANGLE WHEEL ROTATION item selected and "CW DIRECTION" displayed. The setting changes to "CCW DIRECTION."

## **Tool Number Mode**

(INITIALIZATION – POSITION SENSOR)

## NOTICE

Before you set up your SmartPAC 2, decide which tool number mode you will use, Numeric or Alphanumeric. Set up your SmartPAC 2 in that mode, and do not change tool number modes afterward.

## NOTICE

#### UPGRADING FROM ORIGINAL SMARTPAC

See *When You Upgrade from an Original SmartPAC*, page 4-7 and Appendix F for more information about managing tool number mode when upgrading from original SmartPAC to SmartPAC 2.

This item enables you to select which format–Numeric or Alphanumeric–is used to enter tool numbers in SmartPAC 2. In Numeric mode, tool numbers are limited to 7 digits and contain only numbers. Alphanumeric tool "numbers" can contain 20 characters, including both letters and numbers. Other differences between the two tool number modes are shown in Table 4-2, page 4-7.

Numeric Tool Number Mode	Alphanumeric Tool Number Mode
Tool Number: numbers only	Tool Number: letters, numbers, symbols
7 digits, max.	20 characters, max.
Tool Manager: Sorts tool numbers numerically	Tool Manager: Sorts tool numbers alphanumerically
Tool Name:	Tool ID:
Optional, entered by user Alphanumeric (letters, numbers and symbols)	Automatically assigned by SmartPAC 2; assigned consecutively, starting with "1"
20 characters, max.	Numeric Editable by user (must be unique)
	7 digits, max.

Table 4-2. Numeric and Alphanumeric Tool Number Modes

To set tool number mode, do the following:

- 1. Press ENTER to toggle between NUMERIC and ALPHANUMERIC.
- 2. When the setting you want is displayed, press RESET.

Once you select a mode and program a tool, do not change tool number mode.

### When You Upgrade from an Original SmartPAC

### NOTICE

#### UPGRADING FROM ORIGINAL SMARTPAC

See Appendix F for more information about upgrading from original SmartPAC to SmartPAC 2.

When you replace an original SmartPAC with SmartPAC 2 and transfer tool setup information, the existing tools will default to Numeric mode. If you want to switch to Alphanumeric mode, you must perform the following procedure before you change the tool number mode:

- 1. In SmartPAC 1, check to make sure that each tool has a valid, unique tool name. This will become its alphanumeric tool number after you change tool number mode to Alphanumeric.
- 2. If a tool does not have a tool name, go to Program mode and enter a unique name for it.
- 3. If more than one tool has the same name, change the duplicate name or names to unique ones.

When you have completed these changes, you can set tool number mode to Alphanumeric.

# **Counter Setup Mode**

(INITIALIZATION - POSITION SENSOR)

This item allows you to enable or disable counter setup mode. To set this parameter, do the following:

- 1. Press ENTER to toggle between three settings:
  - "IS INCREMENTED IN ALL MODES"-Parts and batch counters will increment on every stroke no matter what mode (i.e., Inch, Single-stroke, or Continuous) you are in.
  - "NOT INCREMENTED IN INCH MODE"-The Parts counter and batch counters whose increment mode is programmed as GOOD PARTS will not increment when you are in Inch mode.
  - "NOT INCREMENTED IN INCH MODE OR INT. STROKE MODE"-The Parts counter and batch counters whose increment mode is programmed as GOOD PARTS will not increment when you are in Inch mode or when there is an Interrupted Stroke.

# NOTICE

The Strokes counter will increment regardless of the mode you are in.

2. When the setting you want is displayed, press RESET.

# **Counter Increment Mode**

(INITIALIZATION - POSITION SENSOR)

This item, which is provided for SFC (see Appendix H) and LETS (see Appendix I) customers, allows you to specify whether the Good Parts counter increments during a fault condition. The default setting, NO INC FAULT, prevents the counter from incrementing when there is a fault. To set this parameter, do the following:

- 1. Press ENTER to toggle between two settings:
  - "NO INC FAULT"—The Parts counter and batch counters whose increment mode is programmed as GOOD PARTS will increment on every stroke except when there is a fault condition. This is the default setting.
  - "INC ALWAYS"-The Parts counter and batch counters whose increment mode is programmed as GOOD PARTS will increment on every stroke even if a fault condition is present.
- 2. When the setting you want is displayed, press RESET.

# **INSTALLED OPTIONS**

#### (INITIALIZATION - INSTALLED OPTIONS)

This item enables you to view the options that are installed on your SmartPAC 2 (see Figure 4-4), including the number of cam channels and sensors.



*Figure 4-4. Installed Options Screen* Your screen will look different.

If you have ordered the alternate language option, this screen provides a function key, F3 (Select Language), that allows you to select the language in which SmartPAC 2 screens are displayed. When you press F3, the screen shown in Figure 4-5 displays.

_	
SELECT LANGUAGE SPANISH PORTUGUESE GERMAN	
USE CURSOR KEYS TO CHOOSE THE ALTERNATE LANGUAGE THAT YOU WANT. PRESS THE RESET WHEN DONE.	

Figure 4-5. Select Language Screen

To select a language, highlight one of the three items, and press RESET. You are returned to the Installed Options screen.

# PRESS NAME

(INITIALIZATION - PRESS NAME)

## NOTICE

You can use a separate computer keyboard to enter the press name. See page 4-68.

This item enables you to name the press on which SmartPAC 2 is installed. When you select PRESS NAME, the Alphabetic Entry window opens (see Figure 4-6), allowing you to enter the characters composing the press name you want, using any combination of alphabetic characters, numbers and symbols.

F	А G M	B H N	Сно	а С Д	EKO	PRESS CLEAR TO CLEAR TEXT. USE THE KEYPAD TO ENTER NUMBERS USE
R	S	T	υ	v	w #	CURSORS TO SELECT THE LETTERS DRESS ENTER
•	Ì	<b>,</b>	*	/	" &	TO ENTER THE LETTERS. PRESS F6 WHEN DONE. PRESS RESET TO CANCEL.

Figure 4-6. Alphabetic Entry Window

To enter a press name in the Alphabetic Entry window, do the following:

To key in letters and symbols, highlight each character, using the Up (▲), Down (▼), Left (◀), and Right (▶) cursor keys, then press ENTER. Pressing the CLEAR key clears the text.

To key in numbers, use the numeric keypad, then press ENTER.

2. To accept your entry, press F6. To cancel your selection, press RESET.

# **SELECT CAM NAMES (Optional)**

(INITIALIZATION - SET CAM NAMES)

### NOTICE

#### CAM NAMES ENTERED IN INITIALIZATION APPLY TO ALL TOOLS

The names you assign to cam channels in Initialization apply to all tools. If, for example, you "custom-name" Channel 1 as "Bypass 3," then Channel 1 is "Bypass 3" for every tool loaded.

This item, which appears on the Main Initialization Menu only if your SmartPAC 2 is equipped with ProCamPAC, allows you to assign descriptive names to each of your cam channels. You can name up to 16 channels, depending on your SmartPAC 2 configuration (i.e., 8-channel or 16-channel ProCamPAC). Do the following to assign cam channel names:

1. Select SELECT CAM NAMES on the Main Initialization Menu. The Cam Channel Name Menu, shown in Figure 4-7, displays. The first time you access this screen, all channels have the entry "UNNAMED."

	CHANNEL 1	FEED ADVANCE	(
CAM CHANNEL	CHANNEL 2	PILOT RELEASE	
NAME MENU	CHANNEL 3	TOP STOP	
	CHANNEL 4	HYD OVR RESET	
	CHANNEL 5	CUTOFF	
	CHANNEL 6	SPRAY LUBE	
	CHANNEL 7	SCRAP CHOPPER	
	CHANNEL 8	CONVEYOR	
	CHANNEL 9	UNNAMED	
	CHANNEL 10	) UNNAMED	
	CHANNEL 11	UNNAMED	
	CHANNEL 12	UNNAMED	
	CHANNEL 13	UNNAMED	
	CHANNEL 14	UNNAMED	
	CHANNEL 15	5 UNNAMED	
	CHANNEL 16	5 UNNAMED	
USE CURSOR I	KEYS TO SEI	LECT THE CHANNEL.	
PRESS ENTER	TO CHANGE	THE NAME.	
PRESS RESET	WHEN DONE.		

*Figure 4-7. Cam Channel Name Menu (16-Channel ProCamPAC)* Your display may look different.

2. Select a channel. The screen shown in Figure 4-8 displays.

SELECT NAME FOR		
CAM CHANNEL 1	UNNAMED	
	"CUSTOM" NAME	
	ACTIVATE GAG	
USE THE CURSOR KEYS	ADVANCE SLIDE	
TO CHOOSE A NAME.	ANTI-BACK REL.	
PRESS THE ENTER	BYPASS 1	
KEY TO SELECT THE	BYPASS 2	
NAME.	CONVEYOR	
PRESS THE RESET	CUTOFF	
KEY WHEN DONE.	FEED ADVANCE	
	FEED COMPLETE	
	FEED ENABLE	
	INSPECT DEV 1	
	INSPECT DEV 2	
	LUBE	
	OUTLET 1	
	OUTLET 2	
MORE NAMEST	PART BLOW OFF	

Figure 4-8. Cam Channel Name Selection Screen

3. Select from the list of names the name that best describes the function of the selected cam channel. You are returned to the Cam Channel Name Menu with the name you selected displayed to the right of the selected channel.

To view names that appear below the MORE NAMES line, press the Down ( $\checkmark$ ) cursor key. A new name appears each time you press the Down ( $\checkmark$ ) cursor. When you have cycled through the complete list, the highlight bar returns to "UNNAMED," the first item.

4. If none of the names in the list seems suitable but you still want to name the cam channel, you can select "CUSTOM NAME." If you do so, the Alphabetic Entry window (see Figure 4-6, page 4-10) displays.

## NOTICE

You can use a separate computer keyboard to enter cam channel names. See page 4-68.

- 5. Key in a "custom" cam channel name, following the directions in the Alphabetic Entry window, then press **F6** to accept your entry. You are returned to the Cam Channel Name Menu with the "custom" name you selected displayed to the right of the selected channel. To cancel your selection, press RESET.
- 6. When you are finished naming channels, press RESET to return to the Main Initialization Menu.

## NOTICE

Cam channel names do not replace channel numbers. They simply provide a way to identify channel numbers by their function.

# **AUTO ADVANCE and Slow RPM (Optional)**

#### (INITIALIZATION - AUTO ADVANCE)

This item, which appears on the Main Initialization Menu only when ProCamPAC is installed, enables you to set parameters that control the timing for up to two cam channels that are programmed as Auto Advance. You make these settings on the Auto Advance Menu (see Figure 4-9), which displays when you select the AUTO ADVANCE item.

PRESS ANGLE	
auto advance menu 🛛 🚺	
ADVANCE CONST. $1 = \frac{35}{40}$ DEG/100 SPM ADVANCE CONST. $2 = 40$ DEG/100 SPM	
SLOW RPM = 30 SPM	
YOU CAN OPERATE THE PRESS WHILE IN THIS SCREEN TO HELP YOU ADJUST THE SETTINGS. USE THE CURSOR KEYS TO SELECT A VALUE. PRESS THE ENTER KEY TO CHANGE IT. PRESS THE RESET KEY WHEN DONE.	

Figure 4-9. Auto Advance Menu

Auto Advance is a ProCamPAC feature that allows you to provide accurate timing for speed-sensitive functions on variable speed presses, such as feed advance, pilot release, advance slide, part lube, and conveyors. Auto Advance works best on presses with speed ranges from several hundred to over a thousand Strokes-per-Minute (SPM).

A channel programmed as Auto Advance automatically advances cam timing as the speed of the press increases and delays the timing as speed decreases. The rate of advance or delay is controlled by an advance constant, a specified number of degrees of advance for each 100 SPM increase in press speed.

You can set two advance constants on the Auto Advance Menu. Advance Constant 1 is applied to the lowest numbered cam channel programmed as Auto Advance. Advance Constant 2 is applied to the next lowest numbered Auto Advance channel.

### NOTICE

#### LIMIT ON CAM CHANNEL AUTO OUTPUT SETTINGS

You cannot program more than two cam channels as Auto Advance. See *Making an Auto Advance Setting*, page 5-44.

You must also specify the minimum press speed at which auto advance will be applied. This value is entered in the SLOW RPM field on the Auto Advance Menu.

## NOTICE

#### IMPORTANT TO SET SLOW RPM

SmartPAC 2 uses the Slow RPM value as a starting point in the auto advance process. If the value you enter for Slow RPM is inaccurate, SmartPAC 2 will not auto advance programmed cam channels at the right time.

The Auto Advance Menu allows you to adjust your Auto Advance and Slow RPM settings while the press is running. When the press is stroking, the press speed in SPM is displayed in the upper right corner of the screen under the caption PRESS SPEED. When an Auto Advance cam is turned on, the press angle is displayed in the same location under the caption PRESS ANGLE (see Figure 4-9). The PRESS ANGLE display enables you to see the effect of different Advance Constant and Slow RPM settings.

## Calculating the Auto Advance Constant

To calculate the auto advance constant for a specified cam channel, follow these steps:

- 1. Determine the fastest speed (RPMa) of your press and the angle at which the cam should turn on at this speed (Aa).
- 2. Determine the slowest speed (RPMb) of your press and the angle at which the cam should turn on at this speed (Ab).

## NOTICE

If either stopping angle occurs after  $0^{\circ}$  (or  $360^{\circ}$ ), then add  $360^{\circ}$  to the angle. For instance, if the press stops at  $12^{\circ}$ , the stopping angle is actually  $12^{\circ}+360^{\circ}$  or  $372^{\circ}$ .

3. Subtract the two angle values. We will call this result "Ac."

Aa - Ab = Ac

4. Subtract the two press speeds. We will call this result "RPMc."

RPMa – RPMb = RPMc

5. Divide *Ac* (the difference between the angles) by *RPMc* (the difference between the press speeds), and multiply that value by 100. This is the number of degrees per 100 RPM.

Ac / RPMc x 100 =  $\#^{\circ}$  / 100 RPM

#### Example: Calculating the Auto Advance Constant for a Pilot Release Cam

Your slowest speed is 50 RPM and the pilot release angle at that speed is 100°.

Your fastest speed is 100 RPM and the pilot release angle at that speed is  $75^{\circ}$ .

Subtract 50 RPM from 100 RPM: 100 - 50 = 50

Subtract 75° from 100°: 100 - 75 = 25

Divide the difference in angles by the difference in RPM, and multiply this by 100:

 $25/50 \times 100 = 50$ 

Your advance constant is  $50^{\circ}$  / 100 RPM.

## Setting Auto Advance Constants and Slow RPM

To set the auto advance constants and slow RPM value, do the following:

- 1. Select AUTO ADVANCE on the Main Initialization Menu to access the Auto Advance Menu (see Figure 4-9).
- 2. With the highlight bar on ADVANCE CONST. 1, press ENTER. The Numeric Entry window (see Figure 3-6, page 3-4) displays.
- 3. Key in a value (maximum is 500) in the Numeric Entry window, using the numeric keypad or the Up (▲) and Down (▼) cursor keys, then press ENTER.
- 4. Repeat steps 2 and 3 for ADVANCE CONST. 2 (maximum value is 500) and SLOW RPM (maximum value is 2000).
- 5. When you are done, press RESET to return to the Main Initialization Menu.

## NOTICE

#### AUTO ADVANCE IS ADJUSTABLE

SmartPAC 2 allows you to adjust Auto Advance and Slow RPM settings in Initialization mode while the press is running. The angle at which an Auto Advance cam turns on is shown in the upper right corner of the screen under the caption PRESS ANGLE, enabling you to see the effect of different settings.

# SET GLOBAL CAMS (Optional)

(INITIALIZATION – SET GLOBAL CAMS)

## A DANGER

#### PROGRAMMABLE CAM SWITCH NOT FOR SAFETY USE

Use SmartPAC 2's programmable cam switch to control auxiliary functions only. The SmartPAC 2 programmable cam capability should never be used to provide timing signals for any safety use including clutch/brake control or muting of light curtains.

Failure to comply with these instructions will result in death or serious injury.

## NOTICE

Set as global cams only cam channels that perform identically regardless of the tool installed.

## NOTICE

You can use a "global" cam with the mechanical cam switch for Top Stop, if one has been installed, to assist in adjusting top-stop and to use the Auto Advance feature to mimic Auto-compensated Top Stop (ACTS). See Setting the ACTS Angle (Optional), page 4-33 and Switch 4 – Enabling Auto Compensated Top Stop (ACTS), page 4-37.

## NOTICE

#### CHANNELS 6, 7 AND 8 CANNOT BE USED FOR GLOBAL CAMS

You can set any channel as a global cam except channels 6, 7 and 8.

This item, which appears on the Main Initialization Menu only when ProCamPAC is installed, allows you to make settings for selected cam channels that apply to all tools programmed on your SmartPAC 2. These cam channels are called "global" cams, and they are used to program events that remain the same on all tools. Setting global cams saves programming the same cam information for each tool and ensures that the cam always operates in the same way.

To program a global cam, do the following:

## NOTICE

If you want to name the cam channel, do so before you program it as a global cam. Enter the cam name as instructed in *SELECT CAM NAMES (Optional)*, page 4-10.

1. Select SET GLOBAL CAMS on the Main Initialization Menu. The Global Cams menu, shown in Figure 4-10, page 4-16, displays. An asterisk (\*) indicates the channels that are already programmed as global cams.

3 TOP STOP 4 PART BLOW OFF USE THE CURSOR KEYS 5 CUTOFF TO CHOOSE A CAM 9 CHANNEL 9 CHANNEL. PRESS THE 10 CHANNEL 10 ENTER KEY TO PROGRAM. 11 CHANNEL 11 PRESS THE RESET KEY 12 CHANNEL 12 WHEN DONE. 13 CHANNEL 13 14 CHANNEL 14 15 CHANNEL 15 THE * MEANS THAT THE 16 CHANNEL 16 CAM IS PROGRAMMED GLOBALLY. F5

*Figure 4-10. Global Cams Menu* Asterisk (\*) Indicates Global Cams

2. Select the cam you want to program. The Global Cam Timing Type screen, shown in Figure 4-11 displays.



Figure 4-11. Global Cam Timing Type Screen

- 3. Select the type of cam timing you want to program for this channel, referring to *CAM SWITCH* (*Optional*), page 5-38 for instructions.
- 4. When you have finished programming the global cam, press RESET.

### NOTICE

If you set or change global cams while a tool is loaded, you must reload the tool to make the global cams take effect.

# **CUSTOM SENSOR NAMES (Optional)**

#### (INITIALIZATION - CUSTOM SENSOR NAMES)

This item, which appears on the Main Initialization Menu only when DiProPAC is installed, allows you to create "custom" names for up to 32 die protection sensors. The custom names you create in Initialization provide the options available to you in Program mode when you select names for your sensors. You create custom names on the Custom Sensor Names screen, which is shown in Figure 4-12.

## NOTICE

You can use a separate computer keyboard to enter custom sensor names. See page 4-68.

## NOTICE

Custom Name entries 17-32 display sequentially, one at a time as you move the highlight bar down past the CUSTOM 16 item.

Custom names do not have to be entered in the sequence that you use to name sensors. Sensor 1 can be assigned Custom Name 32, Sensor 2 Custom Name 15, Sensor 3 Custom Name 5, etc. See page 5-22 for instructions in assigning custom names to sensors.

	CUSTOM 1	CYLINDER RETURN	
CUSTOM	CUSTOM 2	NEW ENTRY	
SENSOR	CUSTOM 3		
NAMES	CUSTOM 4		
	CUSTOM 5		
	CUSTOM 6		
	CUSTOM 7		
	CUSTOM 8		
	CUSTOM 9		
	CUSTOM 10		
	CUSTOM 11		
	CUSTOM 12		
	CUSTOM 13		
	CUSTOM 14		
	CUSTOM 15		
MORE	CUSTOM 16		
USE CURS	OR KEYS TO	SELECT A CUSTOM	
NAME. PR	ESS ENTER T	O SET/CHANGE A NAME.	
PRESS RE	SET WHEN DO		

Figure 4-12. Custom Sensor Names Screen

To create a custom name, do the following:

- 1. Select CUSTOM SENSOR NAMES on the Main Initialization Menu. The Custom Sensor Names screen displays.
- Select the item for which you want to create a custom name (e.g., CUSTOM 1, CUSTOM 2, etc.). The Alphabetic Entry window (see Figure 4-6, page 4-10) displays.
- 3. Key in the custom name, following the directions in the Alphabetic Entry window, then press **F6** to accept your entry. You are returned to the Custom Sensor Names screen with

the custom name you created displayed to the right of the selected item number. To cancel your selection, press RESET.

- 4. Repeat steps 2 and 3 for each item you want to name. To access CUSTOM 17 through CUSTOM 32 items, move the highlight bar down past "CUSTOM 16." Additional Custom Name entries display sequentially, one at a time.
- 5. Press RESET when you are done to return to the Main Initialization Menu.

# **SENSOR ENABLE MODE (Optional)**

#### (INITIALIZATION – SENSOR ENABLE MODE)

The SENSOR ENABLE MODE item, which appears on the Main Initialization Menu only when DiProPAC is installed, allows you to select the way in which your die protection sensors are enabled. This item also allows you to enable Setup mode. You make these settings on the Die Protection Mode Selection Menu (see Figure 4-13).



Figure 4-13. Die Protection Mode Selection Menu

## Selecting Sensor Enable Mode

You can select one of three modes for enabling die protection sensors:

- MANUAL ENABLE. When this option is selected, sensors are not automatically re-enabled after the press is restarted following a setup or other procedure in which the sensors have been temporarily disabled. You must enable or disable sensors manually in Program and Run modes (see *SENSOR ENABLE/DISABLE & STATUS (Optional)*, page 5-52 and *DISABLE (ENABLE) SENSORS*, page 6-6).
- AUTO BY TOOL. When this option is selected, DiProPAC automatically re-enables all sensors programmed for a specific tool whenever the press is restarted. You specify in Program mode the number of strokes to allow after the press starts before DiProPAC re-enables all sensors for the tool (see *Setting the "Auto Enable by Tool" Counter Value*, page 5-21).

• AUTO BY SENSOR. When this option is selected, DiProPAC automatically re-enables each sensor programmed for a specific tool, sensor by sensor. You specify in Program mode for each sensor the number of strokes to allow after the press is restarted before DiProPAC re-enables that sensor (see *Setting the "Auto Enable by Sensor" Counter Value*, page 5-23).

To select a Sensor Enable mode, do the following:

- 1. Select SENSOR ENABLE MODE on the Main Initialization Menu. The Die Protection Mode Selection Menu displays (see Figure 4-13).
- 2. With the highlight bar on the SENSOR ENABLE MODE item, press ENTER until the setting you want is displayed.
- 3. Press RESET to return to the Main Initialization Menu.

# Enabling Setup Mode

Setup mode allows you to run the press in Inch without incrementing the good parts and batch counters or triggering a fault condition in the green sensors. This mode, as its name indicates, is used during setup. You enable Setup mode by selecting one of two settings:

- IN INCH. Press operates in Setup mode whenever the Stroke Select switch is set to INCH
- IN INCH/INT.STRK. Press operates in Setup mode whenever the Stroke Select switch is set to INCH or an Interrupt Stroke occurs

To enable Setup mode, do the following:

- 1. Select SENSOR ENABLE MODE on the Main Initialization Menu. The Die Protection Mode Selection Menu displays.
- 2. Move the highlight bar to the SETUP MODE item.
- 3. Press ENTER to toggle the setting from DISABLED to one of the other settings (i.e., IN INCH or IN INCH/INT.STRK).
- 4. Press RESET to return to the Main Initialization Menu.

# **TOOL INFORMATION**

#### (INITIALIZATION - TOOL INFORMATION)

The TOOL INFORMATION item on the Main Initialization Menu allows you to set up a name, unit of measurement, and number of decimal places for up to six items you wish to document for each tool. You enter specific values and up to thirty characters of special information for each tool in Program and Run modes (see *TOOL INFORMATION*, page 5-50 and *TOOL INFORMATION*, page 6-33)

# NOTICE

Tool Information screens only maintain information about the tool. They do not control any aspect of press operation.

## NOTICE

This feature is not available if you have the optional PLC interface installed.

To set up items you wish to document for each tool, do the following:

1. Select TOOL INFORMATION on the Main Initialization Menu. The Tool Information Setup screen, shown in Figure 4-14, displays.

		NAI	Æ	UNITS	5	PLACES
TOOL INFO. NAMES	1 2 3 4 5 6	NAME NAME NAME NAME NAME	1 2 3 4 5 6	UNS UNS UNS UNS UNS	1 2 3 4 5 6	000000
USE CUR: ENTER TO	SOR D CI	KEYS HANGE	TO SELECT , PRESS RE	CAN2 Set V	vme . Vhen	PRESS DONE.

Figure 4-14. Tool Information Setup Screen

2. Highlight the NAME 1 item, and press ENTER. The Tool Information Name screen, shown in Figure 4-15, displays.

USE THE CURSOR KEYS TO CHOOSE A NAME. PRESS THE ENTER KEY TO SELECT THE NAME. PRESS THE RESET KEY WHEN DONE. MORE NAMES*	"CUSTOM" FEED LENGTH FEED RATE FEED ACCEL FEED SPEED SHUT HEIGHT PASS LINE HT LUBE TEMP. MATERIAL # CUSHION PRES INSPECTION LUBE PRESS. LUBE TYPE PILOT ANGLE PRESS SPEED CONVEYOR	

Figure 4-15. Tool Information Name Screen

3. Move the highlight bar to the name you want, using the cursor keys, and press ENTER. You are returned to the Tool Information Setup screen with the name you selected displayed.

- 4. If you want to use a name that is not in the list, select the "CUSTOM" item.
- 5. When the Alphabetic Entry window (see Figure 4-6, page 4-10) displays, key in a custom name of up to 12 characters, following the directions on the screen, then press **F6** to accept your entry. You are returned to the Tool Information Setup screen with your custom name displayed. To cancel your selection, press RESET.

## NOTICE

You can use a separate computer keyboard to enter tool information names. See page 4-68.

6. Highlight the UNS 1 item, and press ENTER. The Tool Information Units Selection screen, shown in Figure 4-16, displays.

	CUSTOM	
	IN	
USE THE CURSOR KEYS	TT	
TO CHOOSE & NAME	MM	
DDFCC THE ENTED	CM .	
VEV TO CELEON THE	DGI	
KEI IO SELECI INE	P31	
NAME.	BAR	
PRESS THE RESET	LBS	
KEY WHEN DONE.	TONS	
	OUNCES	
	DEG. F	
	DEG. C	
	METERS	
	FT/MIN	
	FT/SEC	
	MM/SEC	
MORE NAMES	MM/MIN	

Figure 4-16. Tool Information Units Selection Screen

- 7. Move the highlight bar to the abbreviation for the unit you want, using the cursor keys, and press ENTER. (See Table 4-3, page 4-22 for an explanation of abbreviations.) You are returned to the Tool Information Setup screen with your Units selection displayed.
- 8. If you want to specify a unit that is not in the list, select the "CUSTOM" item. When the Alphabetic Entry window displays, key in a unit of up to 6 characters. To accept your entry, press **F6**. You are returned to the Tool Information Setup screen with the unit you created displayed.

On-screen Abbreviation	Units	On-screen Abbreviation	Units
IN	Inches	METERS	Meters
FT	Feet	FT/MIN	Feet per minute
MM	Millimeters	FT/SEC	Feet per second
СМ	Centimeters	MM/SEC	Millimeters per second
PSI	Pounds per square inch	MM/MIN	Millimeters per minute
BAR	Bars	GALS	Gallons
LBS	Pounds	QTS	Quarts
TONS	Tons	GRAMS	Grams
OUNCES	Ounces	SPM	Strokes per minute
DEG. F	Degrees Fahrenheit	FPM	Feet per minute
DEG. C	Degrees Celsius	MPM	Meters per minute

Table 4-3. Abbreviations for Units on Tool Information Setup Screen

Highlight the zero (0) on the first line in the PLACES column, and press ENTER. When the Numeric Entry window displays (see Figure 3-6, page 3-4), key in a value, using the numeric keypad or the Up (▲) and Down (▼) cursor keys, then press ENTER.

For numeric values, you can select up to four decimal places. For YES/NO items, enter eight (8) for the number of places. Table 4-4 provides additional information about decimal place formats.

No. of Places	Example	Digits to Left of Decimal Point	Digits to Right of Decimal Point	Range
0	Whole numbers: press speed (SPM)	Up to seven (7)	None (0)	0 to 9,999,999
1		Up to five (5)	One (1)	0.0 to 99,999.9
2	Die location (mm)	Up to four (4)	Two (2)	0.00 to 9,999.99
3	Pass line height (inches)	Up to three (3)	Three (3)	0.000 to 999.999
4	Precise values: material thickness	Up to two (2)	Four (4)	0.0000 to 99.9999
8	Yes or No designation	Not applicable	Not applicable	NO (0) YES (1)

Table 4-4. Decimal Places and Formats

## NOTICE

Do not change the number of decimal places on the Tool Information Setup screen after you have entered values for specific tools in Program or Run mode. If you change the number of decimal places, entered values will be changed by a factor of ten for each decimal place added or removed.

10. Repeat steps 2-9 for other Tool Information items you want to set up. A Tool Information Setup screen with sample entries filled in is shown in Figure 4-17.

		NAME	UNITS	PLACES	
TOOL INFO. NAMES	123456	PASS LINE HT STRAIGHTENER HYD. OVLD. PRESS SPEED CONVEYOR PART LUBE	IN IN TONS SPM	2 2 0 8 8	
USE CUR: ENTER TO	SOR CI	KEYS TO SELEC HANGE, PRESS F	CT A NAME. RESET WHEN	PRESS DONE.	

Figure 4-17. Tool Information Setup Screen with Sample Entries

11. When you are finished, press RESET to return to the Main Initialization Menu.

# PRESS CONTROL

(INITIALIZATION - PRESS CONTROL)

The PRESS CONTROL item on the Main Initialization Menu gives you access to the WPC Initialization Menu (see Figure 4-18), which allows you to make settings specific to the WPC 2000 clutch/brake control.

WPC INITIALIZATIO	n menu
USE THE CURSOR KEYS US TO SELECT THE ITEM PR YOU WISH TO SEE. PR PRESS ENTER TO IN ACCESS IT. PRESS RESET WHEN DONE.	ER INTERLOCKS ESS PARAMETERS ESS OPTIONS PUT STATUS

Figure 4-18. WPC Initialization Menu

## **User Interlocks**

(INITIALIZATION - PRESS CONTROL - USER INTERLOCKS)

### **A** DANGER

#### USER INPUTS 1 THROUGH 7 NOT SUITABLE FOR SAFETY USE

DO NOT use inputs 1 through 7 as part of any personnel-protection system. These inputs are not control reliable.

Failure to comply with these instructions will result in death or serious injury.

### A DANGER

#### INPUT PAIRS 8 & 9 AND 10 & 11 ARE CONTROL RELIABLE ONLY IF WIRED CORRECTLY

User input pairs 8/9 and 10/11 are control reliable only if wired correctly in a pair according to the instructions in this section.

Failure to comply with these instructions will result in death or serious injury.

## A DANGER

#### USER INPUTS ADD DELAY TO STOPPING TIME

DO NOT connect light curtains or other presence-sensing devices to any user inputs. The cross-checked input pairs (8/9 and 10/11), though control reliable, are suitable only for applications such as connecting to safety switches used with interlocking barrier guards.

Failure to comply with these instructions will result in death or serious injury.

The USER INTERLOCKS item on the WPC Initialization Menu gives you access to the Press Control User Interlock Menu (see Figure 4-19), on which you can set the stop type and input name for WPC 2000's eleven user inputs.

I TAVE NAME	
PRESS CONTROL USER INTERLOCK MENU	
USER 1 = T STOP LOW OIL LEVEL	
USER $2 = E$ STOP LOW OIL PRESS.	
USER $3 = E$ STOP DIE NITROGEN	
USER $4 = E$ LOC MOTOR OVLD.	
USER 5 = UNUSED UNNAMED	
USER 6 = UNUSED UNNAMED	
USER 7 = UNUSED UNNAMED	
USER 8 = UNUSED UNNAMED	
USER 9 = UNUSED UNNAMED	
USER 10 = UNUSED UNNAMED	
USER II = UNUSED UNNAMED	
USE THE CURSOR KEYS TO CHOOSE THE USER	
STOP TYPE YOU WISH TO CHANGE. PRESS THE	
ENTER KEY TO CHANGE THE USER STOP TYPE.	
PRESS THE RESET KEY WHEN YOU ARE DONE.	

Figure 4-19. Press Control User Interlock Menu

These eleven inputs are used to connect signals from other equipment in order to monitor auxiliary press functions such as lubrication systems. Two input pairs are cross-checked so they are control reliable when wired correctly to safety devices and can be used to connect equipment such as interlocked barrier guards.

When one of these inputs issues a Stop command by opening a normally closed (N/C) relay, a fault code for the input appears on the SmartPAC 2 display. The type of stop is determined by the setting you make on this screen. For inputs 1 through 7, you can set the stop type to E-stop, Top-stop, or E-stop/Lockout. If you have SmartPAC 2 firmware version 3.32 or higher and WPC 2000 firmware version 1.70 or higher, an additional stop type option, Top-stop/Lockout, is available for these inputs. If you do not want to use one of these inputs, select "UNUSED."

Cross-checked input pair 8/9 is programmable for E-stop or E-stop/Lockout. Cross-checked pair 10/11 is set to E-stop/Lockout and cannot be changed. These input pairs cause WPC 2000 to E-stop the press and generate errors when one or both inputs in a pair are open or the inputs in a pair "disagree" for longer than 100 msec. (i.e., one input is open and the other is closed).

Input pairs 8/9 and 10/11 are always activated and cannot be turned off. If you do not want to use one or both pairs of inputs, leave them wired to ground, as indicated in Table 2-6.

As a help to troubleshooting and installation, you can also display the status of the interlocks by selecting the INPUT STATUS item on the WPC Initialization menu (see page 4-44).

You can connect additional equipment to your WPC 2000 by purchasing the WPC 2000 Option 1 "daughter" board, which you install on the WPC 2000 Main Processor board. The Option 1 board provides up to 20 additional non-control-reliable user inputs and up to 4 additional control-reliable, cross-checked user inputs. See Appendix J for details. If you are interested in this product, contact your local Wintriss representative or call Wintriss Tech. Support.

To set the stop type and input name for each of the user inputs, do the following:

### NOTICE

Input pair 8 & 9 operates as only as E STOP or E LOC. Input pair 10 & 11 operates only as E LOC. If you set the stop type for one of these inputs to UNUSED or T STOP, SmartPAC sets it back to E STOP or E LOC when you exit the User Interlock menu.

1. On the WPC Initialization Menu, select USER INTERLOCKS. The Press Control User Interlock Menu displays.

2. Highlight the stop type for the input you want to program. Press ENTER to change the stop type. User Inputs 1 – 7 can be set to UNUSED, T STOP, E STOP or E LOC. Cross-checked pair 8/9 can be set to E STOP or E LOC, cross-checked pair 10/11 to E LOC only.

## NOTICE

If you have SmartPAC 2 firmware version 3.32 or higher and WPC 2000 firmware version 1.70 or higher, an additional stop type option, T LOC (Top-stop/Lockout), is available for inputs 1-7.

 Use the Right ( ▶ ) cursor key to move the highlight bar to the input's name ("UNNAMED" until you select another name). Press ENTER. The Select Stop Name screen (see Figure 4-20) displays.

		N
SELECT STOP NAME		
	UNNAMED	
	"CUSTOM" NAME	
	BEARING TEMP.	
USE CURSOR KEYS	CHAIN BREAK	
TO MAKE SELECTION	CONVEYOR	
PRESS ENTER TO SET	COUNTER BAL.	
RESET WHEN DONE	DIE NITROGEN	
	DIE PROTECTION	
	DIIAT. VALVE	
	END OF STOCK	
	FFEDER	
	UTCU ATD DDFC	
	NICH LOOD	
	NICH OIL TEMP	
	NIGH OIL IMP.	
	HIGH OIL PRES.	
	HYDRAULIC OVLD	
	LOAD MONITOR	
MORE NAMES▼	LOW AIR PRESS.	

Figure 4-20. Select Stop Name Screen

4. Highlight the name you want, using the cursor keys, and press ENTER. You are returned to the Press Control User Interlock Menu with the name you selected displayed in the right-hand column next to the appropriate user input.

## NOTICE

The name you enter for input 8 is applied to both inputs 8 and 9 in the cross-checked pair. The name you enter for input 10 is applied to both cross-checked inputs 10 and 11. Once you have established names for inputs 8 and 10, any name you attempt to enter for input 9 or 11 will be disregarded.

If you want to enter a name that does not appear in the list, select "CUSTOM" NAME, and when the Alphabetic Entry window displays (see Figure 4-6, page 4-10), key in the name, following the directions in the window, then press **F6** to accept your entry. You are returned to the Select Stop Name screen.

If you are not using the input, select UNUSED.

To access a name beneath the MORE NAMES indicator, move the highlight bar down past the last item in the list. Additional Custom Name entries display sequentially, one at a time.

- 5. Repeat steps 2 through 4 for the other user inputs.
- 6. When you are finished, press RESET twice to return to the Main Initialization Menu.

## **Press Parameters**

#### (INITIALIZATION – PRESS CONTROL – PRESS PARAMETERS)

The Press Parameters item on the WPC Initialization Menu gives you access to the Press Control Parameter Menu (see Figure 4-21), on which you can make the following WPC 2000 settings:

- Top-stop Angle
- Auto Carry-up Angle
- Micro-inch Time and Angle
- Main Air Pressure Limit and Counterbalance Air Pressure Offset
- Stop-time Limit
- Start-time Limit
- Shutdown Time
- Flywheel Timer
- ACTS Angle

You can also select the units that are used to display pressure on this and other Press Control screens and instruct WPC 2000 to perform an Initialize Parameters operation.

PRESS CONTROL PARAMETER MENU	
TOP STOP DEFLT = 220 DEG CARRYUP ANGLE = 149 DEG MICRO TIME = 75 MSEC MICRO ANGLE = 95 DEG MAIN AIR LIMIT = 482 Kp CNTR BAL +/- = 68 Kp STOP LIMIT = 165 MSEC START LIMIT = 100 MSEC SHUT DOWN TIME = 3 MIN FLYWHEEL TIMER = 15 SEC ACTS ANGLE = 0 DEG PRESSURE UNITS = Kp	
INITIALIZE PARAMETERS	
USE THE CURSOR KEYS TO CHOOSE THE VALUE YOU WANT TO CHANGE. PRESS THE ENTER KEY TO CHANGE THE VALUE. PRESS THE RESET KEY WHEN DONE.	

Figure 4-21. Press Control Parameter Menu

To set any of the bulleted items shown above, perform the following steps:

1. On the Press Control Parameter Menu, move the highlight bar to the item you want, using the cursor keys, and press ENTER.

- Key in a new value in the Numeric Entry window (see Figure 3-6, page 3-4), using the numeric keypad or the Up (▲) and Down (▼) cursor keys, then press ENTER.
- 3. Press RESET to save your change and return the WPC Initialization Menu.

To initialize press parameters, perform the procedure shown in the *Initializing WPC 2000 Parameters* section, page 4-34.

#### Setting the Top-stop Angle

## NOTICE

For a variable-speed press, you need to determine the latest Top-stop Angle, which is the angle at which the press top-stops at its slowest speed and with the shortest stopping angle/time.

### NOTICE

#### BEFORE YOU SET THE TOP-STOP ANGLE, MAKE SURE THAT

- The press ram has been mechanically set to top dead center (TDC) (see NOTICE on page 2-3)
- The resolver has been aligned as close as possible to TDC (i.e., 0° ±2°) (see Mounting the Resolver, page 2-25)
- The resolver has been zeroed (see page 2-78)

The value you enter in this field is the Top-stop "On" angle you determined in the *Setting the Top-stop* "On" Angle procedure in Chapter 2 (see step 18, page 2-82).

#### Setting the Auto Carry-up Angle

### **A** DANGER

#### INCORRECT AUTO CARRY-UP ANGLE

- Ensure that the Auto Carry-up Angle is correct. If the operator can reach the pinch point, the Auto Carry-up Angle must be set so that any hazardous openings are smaller than 1/4 in. by the time the crankshaft reaches the Auto Carry-up Angle.
- Determine the Auto Carry-up Angle for each tool, based on the crank angle at which the tool's hazardous openings are smaller than 1/4 in.
- Change the Auto Carry-up Angle to the correct value when you change tools.

Failure to comply with these instructions will result in death or serious injury.

### NOTICE

The following Auto Carry-up function also applies to Foot Control. For more information about using Foot Control for Single Stroke mode, see *Single-stroke, Foot Operation*, page 6-48 and *Enabling Foot Control in a Foot Switch*, page 4-37.

WPC 2000's Auto Carry-up feature (also called Operator Station Mute) enables the press to complete a stroke whenever the operator releases the Run/Inch palm buttons after the ram has passed the Auto Carry-up Angle.

The Auto Carry-up Angle is factory-set to 149° if your WPC 2000 has light curtain firmware and to 170° if you have non-light curtain firmware. If you change the auto carry-up default setting, you must use an angle value that is at or past the crankshaft angle at which the pinch point openings on the press have closed to less than 1/4 in. (6 mm). Pinch points that are less than 1/4 in. (6 mm) are considered non-hazardous to the operator.

With large presses where the stroke is long and press speed is slow, you must ensure that the operator cannot release the buttons and reach the pinch point before it closes. This applies only when Two-hand Control is used to safeguard the point of operation (without light curtain) and only if any opening allowing access to the pinch point is 1/4 in. (6 mm) or larger.

Set the Auto Carry-up Angle at the correct value to protect the operator.

#### Setting Micro-inch Time and Angle

Micro-inch Time is the length of time in milliseconds that the Dual Safety Valve is open when the operator presses the Run/Inch buttons on the Operator Station while the press is in Inch mode.

Normally, when the press is running in Inch (see *Top-stop in Inch*, page 6-42), the DSV is open and the clutch engaged as long as the Run/Inch palm buttons are depressed. When Micro-inch is enabled, the clutch remains engaged only for the length of time specified in the MICRO TIME setting on the Press Control Parameter Menu unless the operator releases the Run/Inch palm buttons before the period has expired.

You enable Micro-inch via the MICRO ANGLE setting on the Press Parameter Control Menu. The Micro Angle default setting is 185°, which disables Micro-inch. To enable this feature, change the Micro Angle to another setting between 186° and 184°. The angle you specify enables Micro-inch for the range of angles between that value and 185°.

#### EXAMPLE

If you set the Micro-inch Angle to 186°, the press will automatically Micro-inch throughout the stroke from 186° to 185°.

If you set the Micro-inch Angle to 300°, the press will Micro-inch from 300° to 185°. Normal inching resumes from 185° to 300°.

You can enter Micro-inch values from 6 to 600 milliseconds. The default value, set at the factory, is 100 mS.

#### Setting Clutch and Counterbalance Air Pressure Limits

The MAIN AIR LIMIT and CNTRBAL +/- items allow you to establish a low setpoint for Clutch Air Pressure and a setpoint range for Counterbalance Air Pressure. Instructions for installing sensors or switches to monitor Clutch and Counterbalance Air pressures are provided starting on page 2-13.

The value you enter in the MAIN AIR LIMIT field sets the low limit for Clutch Air Pressure. If clutch pressure drops below the limit, an F45 fault displays on the SmartPAC 2 LCD (see page 7-14).

You can view the current Clutch Air Pressure and the Main Air Limit on the Press Control Parameters screen in Run mode (see page 6-30). To disable clutch pressure monitoring, enter zero (0) in this field. When you do so, clutch pressure readings and the Low Limit setting are not displayed in Run mode.

The value you enter in the CNTR BAL +/- field sets the tolerance for the Counterbalance Setpoint you establish in Program mode (see page 5-48). For example, if you program a Counterbalance Setpoint of 40 psi and a Counterbalance Tolerance of +/- 5 psi, Counterbalance Air pressures must remain within a range of 35 to 45 psi whenever the press is at or passing through Top Dead Center (TDC). (Counterbalance pressure can vary outside this range at Bottom Dead Center (BDC)). If the counterbalance pressure falls outside the tolerance you set, an F46 fault displays on the SmartPAC 2 LCD (see page 7-14).

You can view the current Counterbalance Air Pressure and Counterbalance Setpoint on the Press Control Parameters screen in Run mode (see page 6-30). To disable pressure monitoring, enter zero (0) in this field. When you do so, the CNTR BAL SETPOINT field will not display on the Press Control Parameters screen in Program mode, and counterbalance pressure readings and the Counterbalance Setpoint will not display in Run mode.

### Setting the Stop-time Limit

### DANGER

#### RECALCULATE SAFETY DISTANCE WHEN STOP TIME CHANGES

- Perform a 90° Stop Test any time you change the Stop-time Limit (see page 6-22).
- Recalculate the safety distance based on the new Stop-time Limit and adjust or reinstall safeguarding devices according to the new safety distance.

#### Failure to comply with these instructions will result in death or serious injury.

This item enables you to set the limit for your press's stopping time. The stopping time is the time that it takes the crankshaft to stop once the dual safety valve (DSV) has been de-energized. The Brake Monitor checks the stopping time of the press on every top-stop, and whenever the stopping time increases to within 10 milliseconds of the Stop-time Limit you set on this screen, the Brake Warning LED on the SmartPAC 2 front panel flashes. This warning alerts maintenance personnel to perform the necessary repairs on the press.

Whenever the press's stopping time exceeds the Stop-time Limit, SmartPAC 2 displays the "STOP TIME EXCEEDED" message (see page 7-26) and prevents the press from operating until the problem has been corrected.

The Stop-time Limit default is 500 mS, which is set when WPC 2000 is initialized (see *Initializing WPC 2000 Parameters*, page 4-34). The Stop-time Limit you specify is displayed on the Stop Time Status screen in Run mode (see *BRAKE MONITOR*, page 6-20).
#### Calculating the Stop-time Limit

The value you set as the Stop-time Limit on the Press Control Parameter Menu must factor in the normal wear on your brake to prevent SmartPAC 2 from generating stop-time faults when the stopping time increases only a little. The Stop-time Limit can be easily calculated based on the actual stopping time of your press. To perform this calculation, do the following:

- 1. Press RESET repeatedly until the Main Program Menu displays.
- 2. Perform the *Determining the Stopping Time of Your Press* procedure in Run mode (see page 6-21).

### NOTICE

#### ADD 10% FOR OLD BRAKES, 20% FOR NEW BRAKES

The rule of thumb for calculating the Stop-time Limit is to add 20% of the stopping time to your press's stopping time if your brakes are new, 10% if your brakes are old. Since stopping time increases as the brake wears, the calculated Stop-time Limit should be roughly the same for both new and old brakes.

3. Multiply the stopping time value you determined in step 2 by 0.20 (i.e., 20%) for a new brake or 0.10 (i.e., 10%) for an old brake, and add the result to the stopping-time value. This is your Stop-time Limit.

### NOTICE

The Stop-time Limit must be at least 10 mS greater than the stopping time. Otherwise, normal operation of press will cause the Brake Warning LED to flash.

#### Example 1

Your recorded stopping time is 207 mS and your brake is old. Take 10% of 207 (i.e., 0.10 x 207 = 20.7, rounded to 21) and add the result to 207 (i.e., 21 + 207 = 228). Your calculated Stop-time Limit is 228 mS.

#### Example 2

Your recorded stopping time is 175 mS and your brake is new. Take 20% of 175 (i.e., 0.20 x 175 = 35) and add the result to 175 (i.e., 35 + 175 = 210). Your calculated Stop-time Limit is 210 mS.

#### Setting the Start-time Limit

The starting time of your press is the time it takes for the crankshaft to start turning after the DSV has been energized. More specifically, it is the interval between the closing (turning on) of the output relays on the DSV/Lockout Relay board, which provides the signal for the Dual Safety Valve (DSV) to energize, and the resolver signal, which indicates that the crankshaft has begun to turn. The greater part of this interval is the time it takes for the clutch mechanism to activate and engage.

Whenever the start time exceeds the Start-time Limit you set on the Press Control Parameter Menu, SmartPAC 2 displays an F79 (Loss of Rotation) fault on the SmartPAC 2 LCD (see

page 7-20) and prevents the press from starting. The Start-time Limit setting enables WPC 2000 to monitor operation of the resolver and detect resolver drive failure.

The Start-time Limit default is 1998 mS, which is set when WPC 2000 is initialized (see *Initializing WPC 2000 Parameters*, page 4-34). The setting is automatically changed to twice the starting time measured by WPC 2000 on the first stroke after initialization.

Wintriss recommends that you use this automatic setting as your Start-time Limit. If you decide to change the setting, you should enter a value at least 40% greater than the measured start time of your press. You can view the most recent starting time on the Stop Time Status screen in Run mode (see page 6-21).

#### Example

Your measured start time is 250 mS. Take 40% of 250 (i.e.,  $0.40 \times 250 = 100$ ) and add the result to 250 (i.e., 100 + 250 = 350). Your calculated Start-time Limit is 350 mS.

#### Setting the Shutdown Time (Optional)

### NOTICE

Auto-compensated Top Stop (ACTS) firmware is required in order for WPC 2000 to implement the Shutdown Time setting.

### NOTICE

Since WPC 2000 uses the lockout relay to shut off the press motor when the Shutdown Time has expired, the lockout relay must be wired to the motor starter in order for the Shutdown Time setting to function (see page 2-34).

The Shutdown Time setting is the length of time WPC 2000 waits after the DSV de-energizes before shutting off the press motor. When the DSV is de-energized, the motor may still be on even though the press is not actually running. WPC 2000 uses the Shutdown Time value to turn off the press motor if the DSV is not re-energized after the specified length of time. An F10 fault code (see page 7-7) is displayed on the SmartPAC 2 LCD when the press has been stopped. You can set the Shutdown Time to any value between 0 and 100 minutes.

#### Setting Flywheel Timer (Optional Hardware Required)

### NOTICE

A flywheel speed sensor must be installed in order for the Flywheel Timer to function. See page 2-43.

The Flywheel Timer setting allows WPC 2000 to prevent the press motor from being reversed or Bar mode from being activated whenever the flywheel is turning at a speed greater than the specified number of seconds per revolution.

A flywheel speed sensor must be installed in order for WPC 2000 to implement the Flywheel Timer setting. The flywheel sensor monitors the length of time it takes the flywheel to turn one revolution. As the flywheel slows down, the time for one revolution increases. The

Flywheel Timer should be set to the cycle time below which it is safe to reverse or bar the press. This setting affects both Forward-to-Reverse and Reverse-to-Forward changes in press motor operation.

#### EXAMPLE

When the press is running at 60 strokes per minute (SPM), the length of time for one revolution is 1 second (i.e., 60/60 = 1). As the press slows down to 3 SPM, the time increases to 20 seconds per revolution (i.e., 60/3 = 20). If you set the Flywheel Timer to 20 seconds, WPC 2000 will not allow reversal of the motor or barring of the press until the flywheel has slowed down to less than 3 SPM.

#### Setting the ACTS Angle (Optional)

Auto-compensated Top Stop (ACTS) is an optional WPC 2000 feature that automatically adjusts the Top-stop "On" Angle to an earlier point in the stroke to compensate for increases in press speed. You enable ACTS via switch 4 on the Press Control Option Switch Menu (see page 4-37 for instructions and for additional details about the ACTS feature).

The ACTS Angle setting allows you to specify the angle at which you want the press to stop. In most variable speed applications, the ACTS angle should be set to 0°, the default value. However, in top knock-out applications, the angle might be set after 0°, while in some high-speed applications, it might be set before 0°. SmartPAC 2 will only accept ACTS Angle entries between 330° and 30°. If you have questions about where to set the ACTS Angle, contact Wintriss Tech. Support.

#### **Selecting Pressure Units**

The Pressure Units setting allows you to select the units in which pressure is displayed on Press Control screens in Initialization, Program, and Run modes. Three Pressure Unit options are available: PSI (Pounds per Square Inch), Kp (Kilopascals), and BAR (Bars). To select a Pressure Unit, do the following:

1. With the highlight bar on the current PRESSURE UNIT setting, press ENTER until the option you want is displayed.

Note that the units in which the MAIN AIR LIMIT and CNTRBAL +/- settings are displayed change to the units you selected.

#### Initializing WPC 2000 Parameters

### NOTICE

#### INITIALIZE WPC 2000 PARAMETERS BEFORE PROGRAMMING SMARTPAC 2/WPC 2000

When you set up a new SmartPAC 2 with WPC 2000, initialize WPC 2000 press parameters before you start programming your unit. See page 2-75.

### NOTICE

#### **RECORD WPC 2000 SETTINGS BEFORE INITIALIZING PARAMETERS**

Use the Press Parameters Setup Sheet at the end of the manual to record your WPC 2000 settings before installing new firmware or initializing parameters.

### NOTICE

Initializing press parameters resets WPC 2000 to its default settings. Initialize WPC 2000 parameters only when you set up a new SmartPAC 2 with WPC 2000 or install new WPC 2000 firmware.

When you first set up your SmartPAC 2 with WPC 2000 or when you install new WPC 2000 firmware, initialize WPC 2000 parameters by following the steps below. If you install new WPC 2000 firmware in an existing system, first record press parameters so you can re-enter them after initializing the system.

1. On the Press Control Parameter Menu, move the highlight bar to the INITIALIZE PARAMETERS item, and press ENTER. The message shown in Figure 4-22 displays.

```
IF YOU CONTINUE THIS WILL INITIALZE
ALL OF THE PRESS CONTROL PARAMTERS.
THESE INCLUDE THE BRAKE MONITOR
SETTINGS AND TOP STOP ANGLE.
PRESS THE ENTER KEY TO CONTINUE.
PRESS THE RESET KEY TO CANCEL.
```

Figure 4-22. Initialize Parameters Warning Message

2. Press ENTER to continue the Initialize Parameters process

or

Press RESET to cancel the Initialize Parameters process.

The warning message disappears, and you are returned to the Press Control Parameter Menu.

### **Press Options**

(INITIALIZATION - PRESS CONTROL - PRESS OPTIONS)

The Press Options item on the WPC Initialization Menu gives you access to the Press Control Option Switch Menu, on which you can set the positions of eight switches on switch block S101 on the WPC 2000 Main Processor board and make three operator mode settings. You can set two additional switches on S102, but this must be done on the Main Processor board itself.

PRESS CONTROL OPTIO	N SWITCH	I MENU
	SW 1	= OPEN
SE CURSOR KEYS TO	SW 2	= OPEN
ELECT THE SWITCH.	SW 3	= OPEN
RESS ENTER TO CHANGE.	SW 4	= OPEN
RESS RESET WHEN DONE.	SW 5	= OPEN
	SW 6	= OPEN
	SW 7	= OPEN
	5W 8	= OPEN
DIIAL OPERATORS =	NOT USE	CD
AUTOMATIC MODE =	DISABLE	ED
TWO HAND ONLY =	DISABLE	ED
DTE: You must power do	wn and u	ıp the
ress control to make t	he swite	ch changes
acome effective.		

Figure 4-23. Press Control Option Switch Menu

### **Setting Option Switches on S101**

### NOTICE

#### CYCLE POWER AFTER CHANGING OPTION SWITCH SETTINGS

Whenever you change an option switch setting, you must power down the WPC 2000 and power it back up again in order to enable the new setting. If you do not cycle power, the previous switch setting will remain in effect.

The SW1 through SW8 items control the position of switches on switch block S101 on the WPC 2000 Main Processor board. Switches can be set to OPEN or CLOSED. To set one of these items, do the following:

- 1. On the Press Control Option Switch Menu, move the highlight bar to the setting for the switch you want.
- 2. Press ENTER until the setting you want is displayed.
- 3. Repeat steps 1 and 2 for each switch you want to set.
- 4. Press RESET when you are finished to save your settings and return to the WPC Initialization Menu.

Settings for each switch are documented in the following sections.

### Switches 1 and 2 – Top-stop Angle Range

Options switches 1 and 2 control the range of angles within which the Top-stop "On" Angle falls (see *Installing the Overrun Sensor Magnet*, page 2-82). WPC 2000 uses these switch settings to determine at what angle to begin the overrun sensor closure test, which is used to make sure that the overrun limit switch closes at the same angle on every stroke. Settings for option switches 1 and 2 are shown in Table 4-5.

Top-stop Angle Range	< 240°	241° to 270°	271° to 300°	> 301°
Switch 1 Setting	CLOSED	CLOSED	OPEN	OPEN
Switch 2 Setting	CLOSED	OPEN	CLOSED	OPEN

#### Switch 3 – One-hand Control and Foot Switch Settings

When you have optional One-hand/Two-hand/Foot firmware, option switch 3 provides settings for a One-hand Control or Foot Switch. Switch 3 enables Light Curtain Break mode in a One-hand Control when "ONE HAND" is highlighted on the Mode Select Menu (see page 6-40). Switch 3 enables either Foot Trip or Foot Control in a Foot Switch when "FOOT" is the selected mode.

ENABLING LIGHT CURTAIN BREAK MODE IN A ONE-HAND CONTROL

When "ONE HAND" is highlighted on the Mode Select Menu, switch 3 controls the conditions under which a One-hand Control (see *Installing a One-hand Control*, page 2-39) is active, as shown in Table 4-6.

When switch 3 is set to OPEN, the One-hand Control is continuously active, allowing you to initiate a stroke any time you push the One-hand Control switch.

When switch 3 is set to CLOSED, the One-hand Control is active only during the window within which the operator breaks the light curtain to feed a part and for eight seconds after his hand has cleared the light curtain. This condition is called Light Curtain Break mode. If the operator presses the switch after this window has expired, the press will not start. The light curtain must be broken again before the next stroke can be initiated.

Setting	One-hand Control Functionality
OPEN	Normal operation (Default). One-hand Control is always active. Stroke can be initiated at any time by pressing switch.
CLOSED	Light Curtain Break mode. One-hand Control is active only during window between initial breaking of light curtain and 8 seconds after light curtain is cleared.

Table 4-6. Switch 3 Settings (S101): Enabling Light Curtain Break Mode

#### ENABLING FOOT CONTROL IN A FOOT SWITCH

When "FOOT" is highlighted on the Mode Select Menu, switch 3 controls how the Foot Switch must be activated in order to initiate and complete a stroke, as shown in Table 4-7. Switch 3 Foot Switch settings apply only to Single-stroke operation.

When switch 3 is set to OPEN, the Foot Switch is in Foot Trip mode, which requires only that the operator depress the Foot Switch, without holding it down, to initiate and complete a stroke.

When switch 3 is set to CLOSED, the Foot Switch is in Foot Control mode, which requires that the operator depress and hold down the Foot Switch through the Auto Carry-up Angle in order to complete a stroke. If the Foot Switch is released before the Auto Carry-up Angle, WPC 2000 issues an Emergency-stop command to the press.

Setting	Foot Switch Functionality
OPEN	Normal operation–Foot Trip (Default). When operator depresses Foot Switch, press makes a complete stroke.
CLOSED	Foot Control enabled. Operator must depress and hold down Foot Switch until the press has passed the Auto Carry-up Angle in order to complete a stroke.

Table 4-7. Switch 3 Settings (S101): Enabling Foot Control

#### Switch 4 – Enabling Auto Compensated Top Stop (ACTS)

When you have Auto Compensated Top Stop (ACTS) firmware, switch 4 controls enabling of the ACTS feature (see Table 4-8). ACTS is a WPC 2000 option that adjusts the Top-stop "On" Angle to an earlier point in the stroke to compensate for increases in press speed.

ACTS is designed specifically for variable-speed presses. As the speed of the press increases, the stopping angle increases, pushing the point at which the press actually top-stops past 360°, or TDC. ACTS senses when the press has not stopped at TDC and compensates for this lengthening of the stopping angle by moving the Top-stop Angle back an equivalent number of degrees. The Top-stop Angle cannot be adjusted backward beyond 211°, the factory setting.

Adjustment of the Top-stop Angle always lags behind press speed changes because ACTS requires several Top-stops to fine tune its settings.

When switch 4 is set to OPEN, ACTS is disabled and the press operates normally. When switch 4 is set to CLOSED, the ACTS feature is enabled, allowing the Top-stop Angle to be adjusted as press speed increases.

Setting	ACTS Functionality
OPEN	Normal operation (Default). ACTS disabled.
CLOSED	ACTS enabled. Top-stop Angle is retarded as speed of the press increases.

Table 4-8. Switch 4 Settings (S101): Enabling ACTS

If you use the ACTS feature, it is critical that you set the Stop-time Limit on your Brake Monitor correctly so that you have advance warning of the need for brake maintenance (see *Setting the Stop-time Limit*, page 4-30). Since increases in stopping angle may be due to brake wear rather than to speed changes, ACTS may increase the difficulty of detecting brake problems unless back-up systems are in place.

#### Switch 5 – Prior Act Time for Automatic Stroke Modes

Switch 5 controls the Prior Act time for Automatic Single-stroke and Automatic Continuous On-demand operating modes if one or both of these options have been installed on your press (see Table 4-9). The Prior Act time is the interval within which the activating signal from the feed device or robot must be received in order to initiate a stroke.

When switch 5 is set to OPEN, its default setting, the activating signal must be received within a 30-second window for Automatic Single-stroke and a 1-minute window for Automatic Continuous On-demand. When switch 5 is set to CLOSED, the window increases to 5 minutes for Automatic Single-stroke and 10 minutes for Automatic Continuous On-demand.

Wiring instructions for Automatic Single-stroke are provided on page 2-46, operating procedures on page 6-49. For information on wiring and operating Automatic Continuous On-demand, call Wintriss Tech. Support.

Setting	Prior Act Time Automatic Single-stroke	Prior Act Time Automatic Continuous On-demand
OPEN	30 seconds (Default)	1 minute (Default)
CLOSED	5 minute	10 minutes

Table 4-9. Switch 5 Settings (S101): Prior Act Times for Automatic Modes

#### Switch 6 - Enabling Dual Light Curtains

Switch 6 controls whether WPC 2000 recognizes dual light curtains when two light curtains are wired to the system, as shown in Table 4-10. Refer to page 2-22 for general light curtain installation instructions.

When switch 6 is set to OPEN, its default position, dual light curtains are disabled, and WPC 2000 recognizes only a single light curtain. When switch 6 is set to CLOSED, dual light curtains are enabled, and both light curtains, if two light curtains are wired, are recognized.

Table 4-10. Switch 6 Settings (S101): Enabling Dual Light Curtains

Setting	Dual Light Curtains
OPEN	Normal operation (Default). Dual light curtains disabled. WPC 2000 recognizes only one light curtain.
CLOSED	Dual light curtains enabled. WPC 2000 recognizes two light curtains.

#### Switch 7 – Not Used

# Switch 8 – Top-stop Mode for F and H Errors and Auxiliary Output 1 Response to Interrupted Stroke

Switch 8 has two different functions. It controls how quickly the press top-stops when an F or an H fault occurs, and if Auxiliary Output 1 on the WPC 2000 Main Processor board has been wired, it also specifies how that output responds to an Interrupted Stroke condition.

#### NOTICE

#### CHANGES TO SWITCH 8 SETTING AFFECT BOTH SWITCH FUNCTIONS

When you change the option switch 8 setting for either the Top-stop or Auxiliary Output 1 function, the new setting will affect operation of the other function.

SELECTING TOP-STOP MODE FOR F AND H ERRORS

#### A DANGER

#### PRESS MAKES ANOTHER STROKE AFTER BEING TOP-STOPPED ON F OR H ERROR

Use extreme caution if you set Switch 8 to OFF, which allows the press to complete another stroke if an error occurs after  $210^{\circ}$ .

Failure to comply with these instructions will result in death or serious injury.

One switch 8 function specifies whether the press takes an additional stroke before it top-stops when an F or an H fault occurs after 210° (see Table 4-11).

When switch 8 is set to OPEN, its default setting, the press top-stops on the current stroke when an F or H fault occurs before 210°, or takes an additional stroke before it top-stops if the error occurs after 210°. When switch 8 is set to CLOSED, the press top-stops on the current stroke if an F or H fault occurs at any angle.

Setting	Top-stop Behavior for F and H Errors
OPEN	Normal operation (Default). Press top-stops on current stroke when F or H fault occurs before 210°, on next stroke if error occurs after 210°.
CLOSED	Press top-stops on current stroke at whatever angle an F or H error occurs.

Table 4-11. Switch 8 Settings (S101): Top-stop Mode for F and H Errors

#### AUXILIARY OUTPUT 1 RESPONSE TO INTERRUPTED STROKE

#### A DANGER

#### NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use auxiliary outputs 1, 2, and 3 for non-safety functions only, such as convenience in automation. They cannot protect personnel from a moving hazard.

Failure to comply with these instructions will result in death or serious injury.

If you have wired Auxiliary Output 1 (see page 2-35), switch 8 also controls how this output responds to an Interrupted Stroke condition, as shown in Table 4-12.

When switch 8 is set to OPEN, its default setting, Aux. Output 1 turns "off" during an Interrupted Stroke and whenever a fault occurs, an E-stop string opens, or a light curtain is broken with the press running. When switch 8 is set to CLOSED, the Auxiliary Output stays "on" during an Interrupted Stroke when no fault condition or E-stop occurs but turns "off" whenever there is a fault, an open E-stop string, or a light curtain interruption.

Table 4-12. Switch 8 Settings (S101): Auxiliary Output 1 Response to Interrupted Stroke

Settings	Auxiliary Output 1 State Change
OPEN	Normal operation (Default). Aux. Output 1 turns "off" when one of the following occurs:
	a fault condition (error code displays)
	an open E-stop string
	a light curtain interruption while press is running
CLOSED	Aux. Output 1 stays "on" during Interrupted Stroke if no fault condition or E-stop occurs, turns "off" when one of the following occurs:
	a fault condition (error code displays)
	an open E-stop string
	a light curtain interruption while press is running

\* An Interrupted Stroke does not occur in Inch mode if the operator holds the palm switches throughout the stroke. An Interrupted Stroke occurs in Inch only when the operator releases his hands from the palm switches before the stroke is completed.

#### **Making Operator Mode Settings**

The DUAL OPERATORS, AUTOMATIC MODE, and TWO HAND ONLY items allow you to make settings that control operator interaction with the WPC 2000. To set one of these items, do the following:

- 1. On the Press Control Option Switch Menu, move the highlight bar to the operator mode item you want.
- 2. Press ENTER until the setting you want is displayed.
- 3. Repeat steps 1 and 2 for each operator mode you want to set.

4. Press RESET when you are finished to save your settings and return to the WPC Initialization Menu.

Settings for each operator mode are documented in the following sections.

#### **Dual Operators**

The item allows you to enable Dual Operator Stations when two or more Operator Stations are wired to WPC 2000 (see page 2-21) and to specify how the active Operator Station(s) is selected. There are three options:

- NOT USED (Default). The Dual Operator Station feature is disabled. WPC 2000 recognizes only one Operator Station.
- SCREEN MODE. The Dual Operator Station feature is enabled, and the Active Op. Station is selected on the SmartPAC 2 Run mode display.
- REMOTE SWITCH. The Dual Operator Station feature is enabled, and the Active Op. Station is selected via a remote three-position switch. If you use this setting, you must wire a remote selector switch. You can order such a switch from Wintriss (part no. 4256601).

#### Automatic Mode

This item allows you to enable Automatic Single-stroke or Automatic Continuous On-demand operating mode if you have installed one of these options. Refer to page 2-46 for wiring instructions and pages 6-49 and 6-52 for operating procedures. There are two options:

- DISABLED (Default). Automatic modes are disabled.
- ENABLED. Automatic modes are enabled.

#### Two Hand Only

### NOTICE

One-hand/Two-hand/Foot firmware must be installed in order for this setting to be functional. Do not set this item if you are running standard firmware.

This item allows you to make One-hand and Foot operating modes unavailable if you are running One-hand/Two-hand/Foot firmware. If you are running standard firmware, this setting is not functional. There are two options:

- DISABLED (Default). Two-hand Only operating mode is disabled, allowing the user to select Two-hand, One-hand, or Foot mode to run the press.
- ENABLED. Two-hand Only operating mode is enabled, making One-hand and Foot modes unavailable.

#### **Setting Option Switches on S102**

### NOTICE

Switches 1, 3 through 5, 7, and 8 on switch block S102 are not used.

This section shows you how to make settings on option switches 2 and 6 on switch block S102 on the WPC 2000 Main Processor board (see Figure 2-14, page 2-28 for location). All eight S102 switches are factory-set to the OFF position. Only switches 2 and 6 are active. To set a switch to ON (see Figure 4-24), push up on the switch with a small screwdriver or your fingernail.



Figure 4-24. S102 Option Switch OFF and ON Settings

### Switch 2 – Auxiliary E-Stop Relay Muting Function

The Auxiliary E-Stop Output Relay board is an optional "daughter" board that enables up to three auxiliary devices (e.g., feeds, transfers, etc.) to be stopped, or prevented from starting, when one of three conditions exist: activation of an E-stop button, penetration of a light curtain, and an "open" state in a cross-checked input.

Option switch 2 allows the Auxiliary E-Stop Output Relay board to be muted when a light curtain is penetrated during the muted portion of the stroke (see Table 4-13). The switch is functional only when your WPC 2000 has optional Shadow muting firmware, which disables the light curtain during the portion of the stroke after the Auto Carry-up Angle has been reached (see *Setting the Auto Carry-up Angle*, page 4-28).

Setting	Auxiliary E-Stop Output Muting Function
OFF	Normal Operation (Default). Disables the muting function. When the light curtain is obstructed during any portion of the stroke, a stop command is issued to auxiliary devices.
ON	Enables the muting function, allowing objects to penetrate the light curtain during the muted portion of the stroke without triggering a stop command for auxiliary devices.

Table 4-13. Switch 2 Settings (S102): Enabling E-Stop Muting Function

When switch 2 is set to OFF, its default setting, muting of the Auxiliary E-Stop Output Relay board is disabled, and penetration of the light curtain at any point in the stroke causes a stop command to be sent to auxiliary devices. When switch 2 is set to ON, the Auxiliary E-Stop Output Relay board is muted during the portion of the stroke when the light curtain is muted.

If the light curtain is interrupted during this muting window, a stop command is *not* sent to auxiliary devices.

Switch 2 enables muting of the Auxiliary E-Stop Output Relay board only during a light curtain interruption. With switch 2 set to ON, the board functions normally (i.e., issues a stop command) when an E-stop button is activated or a cross-checked input is open.

Switch 6 – Selecting Concurrent Time for More Than Two Operator Stations

### NOTICE

You should only change this switch from its default setting if you have installed more than two Operator Stations on your WPC 2000. Contact Wintriss Tech. Support for further information.

Option switch 6 on S102 allows you to select a 5-second concurrent time for WPC 2000 configurations with more than two Operator Stations installed, as shown in Table 4-14.

### NOTICE

Do not attempt to install more than two Operator Stations until you have contacted Wintriss Tech. Support. All Operator Stations in a multi-Op.-Station configuration except the Op. Station wired to the "A" inputs must contain a Two-hand Control module. Do not order standard Wintriss "Multiple Operator Stations."

Concurrent time is the 5-second interval within which each pair of palm switches on all connected Operator Stations must be activated in order to start the press. If the concurrent time is exceeded, the press will not start.

When switch 6 is set to OFF, its default position, and two Operator Stations are connected to WPC 2000, the palm switches on each Operator Station must be pressed within a 1/2-second window (called the "palm" or "synchronous" time) and both pairs of palm switches must be pressed within a 5-second concurrent time window in order to stroke the press.

When switch 6 is set to ON and more than two Operator Stations are connected to WPC 2000, palm switches on all connected Operator Stations must be pressed within a 5-second concurrent time window to start the press. All Op. Stations connected to the "B" inputs must contain a Two-hand Control module to provide the required 1/2-second palm (or synchronous) time.

Setting	Concurrent Time for Multiple Op. Stations
OFF	Normal Operation (Default). Establishes a 1/2-second palm (or synchronous) time and a 5-second concurrent time for two Operator Stations.
ON	Establishes a concurrent time of 5 seconds when more than two Operator Stations are connected to WPC 2000. Also keeps a 1/2-second palm (or synchronous) time for the Op. Station connected to the "A" inputs. Each Operator Station connected to the "B" inputs must contain a Two-hand Control module to provide the required 1/2-second palm (or synchronous) time.

Table 4-14. Switch 6 Settings (S102): Selecting Concurrent Time for Multiple Op. Stations

### **Input Status**

(INITIALIZATION - PRESS CONTROL - PRESS OPTIONS)

The Input Status item on the WPC Initialization Menu gives you access to the Display WPC Input Status screen (see Figure 4-25), from which you can view the status of WPC inputs, including buttons, switches, E-stops, Top-stops, interlocks, and transducers.



Figure 4-25. Display WPC Input Status Screen

Input status screens for these items, which are displayed when you press the appropriate function key, are provided as an aid to installation and troubleshooting.

### NOTICE

The LEDs on the WPC 2000 Main Processor board also show the status of these inputs. See Figure 2-41, page 2-89 for a map of LED locations.

When you press **F2** (Buttons/Switches), the WPC Buttons and Switches Input Status screen displays (see Figure 4-26, page 4-45).

NAME TERM#	STATUS	
PALM A N/C 1	ON	
PALM A N/O 11	ON	
ONE HAND N/O 3	ON WPC BUTTONS	
PALM B N/C 2	ON AND SWITCHES	
PALM B N/O 12	ON INPUT STATUS	
FOOT N/C 4	ON	
FOOT N/O 14	ON	
EXT ACT N/C 15	ON	
EXT ACT N/O 5	ON	
BAR MODE 6	ON	
BAR ACT 16	ON	
OFF SEL S248	OFF	
INCH SEL S249	OFF	
S.S. SEL S250	ИО	
CONT SEL S251	OFF	
OP. STA. 1 S253	OFF	
OP. STA. 2 S254	OFF	
WPC LOCK S255	OFF	
REM RESET S257	OFF	
PRESS THE RESET	KEY WHEN DONE.	

Figure 4-26. WPC Buttons and Switches Input Status Screen

When you press **F3** (Estops/Top Stops), the WPC Estop and Top Stop Input Status screen displays (see Figure 4-27).

NAME TERM#	STATUS	
ESTOP 1 48	OFF	
ESTOP 2 57	ON	
TOP STOP 1 52	ON WPC ESTOP	
TOP STOP 2 60	ON AND TOP STOP	
PRIOR ACT 63	ON INPUT STATUS	
LIGHT CUR A1 77	ON	
LIGHT CUR A2 87	OFF	
LIGHT CUR B1 78	ON	
LIGHT CUR B2 88	OFF	
MOTOR FOR 7	ON	
MOTOR REV 17	ON	
OVERRUN SW 24	ON	
AUX TOP/FLY 22	ON	
DSV CHECK A	ON	
DSV CHECK B	ON	
LOCKOUT CHECK	ON	
PRESS THE RESET	KEY WHEN DONE.	

Figure 4-27. WPC Estop and Top Stop Input Status Screen

When you press **F4** (Interlocks), the WPC Interlock Group 1 Input Status screen displays (see Figure 4-28, page 4-46). Input Status screens for additional user inputs are available if you have installed the Option 1 daughter board (see Appendix J).

NAME TERM#	STATUS		
LOW OIL LEVEL 21	ON		
LOW OIL PRESS. 82	ON		
DIE NITROGEN 71	ON	WPC INTER-	
MOTOR OVLD. 83	ON	LOCK GROUP 1	
USER 5 72	ON	INPUT STATUS	
USER 6 84	ON		
USER 7 73	ON		
USER 8 85	ON		
USER 9 74	ON		
USER 10 86	ON		
USER 11 18	ON		
DSV MONITOR 20	ON		
MAIN AIR 8	ON		
SPEC. 1 26	ON		
SPEC. 2 13	ON		
SPEC. 3 75	ON		
SPEC. 4 19	ON		
SPEC. 5 70	ON		
PRESS THE RESET	KEY WHI	EN DONE.	

Figure 4-28. WPC Interlock Group 1 Input Status Screen

When you press **F5** (Transducers), the WPC Transducer Input Status screen displays (see Figure 4-29).

WPC TRANSDUCER INPUT STATUS	
COUNTER BALANCE PRESSURE = 56 PSI MAIN AIR PRESSURE = 88 PSI	
PRESS THE RESET KEY WHEN DONE.	

Figure 4-29. WPC Transducer Input Status Screen

## SECURITY ACCESS

#### (INITIALIZATION - TOOL INFORMATION)

The SECURITY ACCESS item on the Main Initialization Menu allows you to control user access to SmartPAC 2 operating modes and settings. You set user access on the Security Access Menu, which is shown in Figure 4-30.

	SECURITY	ACCESS MENU	CHANGE PASSWORDS
	LOAD TOOL #:	PROGRAM AND RUN MODES	
DE	LETE TOOL #:	PROGRAM MODE	$\square$
SET	CNTR PRESET:	PROGRAM AND RUN MODES	E2
CH	LANGE COUNTS:	NO CHANGES ALLOWED	
CHG GO	OD PRTS CNT:	NO CHANGES ALLOWED	
	RESET MODE:	PROGRAM AND RUN MODES	E3
CHG TO	OL TEMPLATE:	PASSWORD NOT REQUIRED	
ADJ.	PROPAC SENS:	PROGRAM AND RUN MODES	
ADJ.	DIPRO SENS:	PROGRAM AND RUN MODES	IF4
DISA	BLE SENSORS:	PROGRAM AND RUN MODES	
TURN	OFF SENSORS:	PASSWORD REQUIRED	
	ADJUST CAMS:	PROGRAM AND RUN MODES	IF5
ADJUST	PRESS CNTL:	PROGRAM AND RUN MODES	
L	OAD MONITOR:	ALLOW RECALC/ADJUST	
AD	JUST RAMPAC:	PROGRAM AND RUN MODES	IF6
	MORE		
			IF7
USE TH	E CURSOR KEY:	S TO MAKE CHOICES.	
PRESS	THE ENTER KEY	Y TO CHANGE THE MODES.	
PRESS	THE RESET KE	Y WHEN DONE.	8-11
CHANGE	OVER/SETUP		

Figure 4-30. Security Access Menu

For most items on the Security Access Menu, you can specify three types of access:

- PROGRAM AND RUN MODES. Allows users to change settings in both Program and Run modes. This access type is the least secure.
- PROGRAM MODE ONLY. Allows users to change settings only in Program mode (i.e., when the Program/Run key is in the PROG position). To prevent users from entering Program mode, you should remove the Program/Run key with the switch set to RUN.
- PASSWORD REQUIRED. Allows users to change settings only after they have entered a password. This access type is the most secure.

The following items on the Security Access Menu allow you to select other access options (see Table 4-15, page 4-48 for a complete list of security access settings):

- CHANGE COUNT and CHG GOOD PRTS CNT. These items allow you to specify NO CHANGES ALLOWED, which prevents changes to actual counter values for strokes, good parts, total hits, and batch counters (CHG COUNT) or for good parts only (CHG GOOD PRTS CNT). This setting is applicable in either Program or Run mode.
- INIT. PASSWORD. This item allows you to require a password for user access to the Main Initialization Menu. To require a password, highlight the MUST BE USED selection. Otherwise, select NOT REQUIRED.
- LOAD MONITOR. This item has four options: ALLOW RECALC/ADJUST, ALLOW RECALC ONLY, NO RECALC/ADJUST, and PASSWORD REQUIRED.
- CHG TOOL TEMPLATE. This item has two options: PASSWORD REQUIRED and PASSWORD NOT REQUIRED.

Security Access Menu Item	Security Access Settings
LOAD TOOL #	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
DELETE TOOL #	PROGRAM MODE NOT ALLOWED PASSWORD REQUIRED
SET CNTR PRESET	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
CHANGE COUNTS	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED NO CHANGES ALLOWED
CHG GOOD PRTS CNT	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED NO CHANGES ALLOWED
RESET MODE	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
CHG TOOL TEMPLATE	PASSWORD REQUIRED PASSWORD NOT REQUIRED
ADJ. PROPAC SENS	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
ADJ. DIPRO SENS	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
DISABLE SENSORS	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
TURN OFF SENSORS	ALLOWED NOT ALLOWED PASSWORD REQUIRED
ADJUST CAMS	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
ADJUST PRESS CNTL	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
ADJUST FEED	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
LOAD MONITOR	ALLOW RECALC/ADJUST ALLOW RECALC ONLY NO RECALC/ADJUST PASSWORD REQUIRED

Table 4-15. Security Access SettingsOptional modules included; your menu may be different

ADJUST RAMPAC	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
ADJUST TOOL INFO	PROGRAM AND RUN MODES PROGRAM MODE ONLY PASSWORD REQUIRED
INIT. PASSWORD	NOT REQUIRED MUST BE USED

Table 4-15. Security Access Settings (Cont.)
Optional modules included; your menu may be different

When you attempt to access a menu that is password-protected, SmartPAC 2 displays a window (see Figure 4-31) that asks you to enter your password.



Figure 4-31. "Enter Your Password" Screen

### NOTICE

#### IF YOU FORGET OR DO NOT KNOW YOUR PASSWORD(S)

Call Wintriss Tech. Support at the telephone number on the cover of this manual. Give the Tech. Support person the 5-digit number from the bottom of the "Enter your password" display.

Instructions for accessing menus in Program and Run modes are provided in chapters 5 and 6.

### **Setting Security Access**

### NOTICE

#### CHECK YOUR PASSWORDS

Make sure to check your passwords before changing any security access settings. Record the passwords in a safe place. Refer to *Changing Passwords*, page 4-50.

### NOTICE

#### DO NOT ENABLE INIT. PASSWORD UNTIL YOU HAVE CHECKED YOUR PASSWORDS

Field-upgraded SmartPAC 2s may have different passwords than those listed in this manual. If you do not know the Initialization password and change the INIT. PASSWORD item to MUST BE USED, you will not be able to access the Main Initialization Menu.

### NOTICE

#### BE CAREFUL WHEN SETTING RESET MODE SECURITY ACCESS

If you select the PROGRAM MODE ONLY or PASSWORD REQUIRED setting for the RESET MODE item, the operator will not be able to reset SmartPAC 2 in Run mode when the press stops as the result of a malfunction.

If you want the operator to be able to reset the machine in Run mode following errors, select PROGRAM AND RUN MODES as the Reset Mode setting.

If you want one person to be responsible for tracking faults, give that individual the Program/Run key, and set Reset Mode access to PROGRAM MODE ONLY. When a fault occurs, that individual can reset the press by turning the key switch to PROG and pressing the RESET key, then resume press operation by turning the key back to RUN.

To make security access settings, do the following:

- 1. Select SECURITY ACCESS on the Main Initialization Menu to display the Security Access Menu (see Figure 4-30, page 4-47). Note that the factory settings allow all actions to be performed in both Program and Run modes for those items for which the PROGRAM AND RUN MODES setting is available.
- To change the security access of an item, highlight the item, using the Up (▲) and Down (▼) cursor keys, then press ENTER one or more times until the type of access you want displays. Refer to Table 4-15, page 4-48 for help with selecting access options.
- 3. Press RESET to save your settings and return to the Main Initialization Menu.

#### Examples

You want to prevent the operator from loading a tool number in Run mode. To accomplish this, set the security access for LOAD TOOL # to PROGRAM MODE ONLY. With this setting, a tool can be loaded only when the Program/Run key is switched to PROG.

You want to give only certain individuals the ability to adjust cams. To accomplish this, set ADJUST CAMS to PASSWORD REQUIRED, and give these individuals the password. With security access set in this way, the cams cannot be adjusted without the user entering the correct password.

### **Changing Passwords**

SmartPAC 2 allows you to set up to four different passwords:

- General Password–Provides access to all SmartPAC 2 menus and settings unless one or more of the following specific passwords is also required
- Init. Password–Provides access to the Main Initialization Menu
- PM Password–Provides access to the PM (Preventive Maintenance) Monitor option (see Appendix C)
- Tool Template Password–Provides access to the Tool Template (see page 5-5)

Passwords must be numeric and can be from one to four digits in length.

### NOTICE

#### DEFAULT PASSWORDS

Your SmartPAC 2 comes from the factory with all passwords set to the default password "1234." If you have upgraded your SmartPAC 2 in the field, your passwords may be different.

To change passwords, perform the following steps:

1. On the Security Access Menu (see Figure 4-30, page 4-47), press **F1** (Change Passwords) to display the Set Passwords Menu (see Figure 4-32).



Figure 4-32. Set Passwords Menu

2. Select the password you want to change. The screen shown in Figure 4-33 displays.



Figure 4-33. "Enter a New Password" Screen

3. Key in the new password, following the instructions in the window, and press ENTER. You are returned to the Set Passwords Menu.

### Additional Security

You can secure your WPC 2000 adjustments by installing a user-supplied keylock switch as described in *Wiring a Keylock Switch to Prevent Changes to WPC 2000 Settings*, page 2-43." The switch works as follows:

- Switch ON (grounded): prevents changes to any WPC 2000 settings in Program and Run modes
- Switch OFF (not grounded): Normal operation of Program and Run modes.

By using this keylock switch, you can prevent anyone from making changes to WPC 2000 settings in Program and Run modes. The keylock switch overrides the Security Access settings discussed in the previous sections.

The following message displays at the bottom of the Press Control screen in Program and Run modes when the keylock switch is closed at input 1:

```
THE PRESS CONTROL EDIT MODE IS LOCKED.
```

## **BACKUP/RESTORE**

This item, which displays on the Main Initialization Menu only when you have SmartPAC 2 version V5.32 or higher, enables you to back up and restore tools programmed on your SmartPAC 2. Tools may be backed up to a network drive, or, if you have ordered the USB Backup/Restore option (part no. 9679619), to a USB disk inserted in the SmartPAC 2 board.

You can back up as many as 200 tools per SmartPAC 2 as well as SmartPAC 2 Initialization parameters.

Instructions for backing up tools to a network drive are provided on the <u>SmartPAC2.com</u> Web site. Click on See a Demo, then on Backup Setup Online Manual. Instructions for backing up tools to a USB disk are provided below.

### Backing Up Tools to a USB Disk

The USB disk you use for backup must have at least 600 KB of free space in order to store all tools and Initialization parameters on a SmartPAC 2. USB disks are available in a wide range of capacities, and you should choose a device that will allow you to store backup information for all your SmartPAC 2s. A USB disk that should meet most needs is available from Wintriss (part no. 9679401).

Backup files are written to folders named "Backupnnnnnn," where *nnnnnnn* is the serial number of the SmartPAC 2. Use of the serial number in the folder name allows SmartPAC 2– and you–to identify the backup information pertaining to a particular control. Within folders, there are at least two files, one for tool backups, named "nnnnnnn-Tool," the other for Initialization backups, named "nnnnnnn-Init." Again, *nnnnnnn* is the SmartPAC 2 serial number.

When two or more backups have been performed on the same SmartPAC 2, two additional files are maintained in the backup folder, named "nnnnnnn-Tool.old" and

"nnnnnn-Init.old." These files contain the next-most-recent tool and Initialization backups of the SmartPAC 2 with the specified serial number.

To back up tools on a SmartPAC 2, do the following:

- 1. Make sure a USB disk with the necessary free space is installed in the USB connector in the lower left corner of the SmartPAC 2 board (component J121 in Figure 2-25, page 2-51).
- 2. Select the BACKUP/RESTORE item on the Main Initialization Menu. The Backup/ Restore Control Menu displays with the message

```
Please wait
Checking SmartPAC 2 tools...
```

appearing briefly at the top of the screen, followed by a message displaying the number of tools that have been programmed on that SmartPAC 2 (see Figure 4-34).

### NOTICE

You can view the date and time of the last backup by pressing the **F4** (*Date Last Backup*) function key. The date and time display at the bottom of the screen.



Figure 4-34. Backup/Restore Control Menu

3. To begin the backup process, press the F6 (Backup) function key.

The message

Please wait...

appears briefly at the top of the screen, and the following message displays near the bottom

USB Disk Detected (nnn Meg free)

where *nnn* is the amount of disk space in megabytes available for storing backup information.

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### NOTICE

If the SmartPAC 2 detects that the USB disk does not have enough free space to store the tool and initialization backup information, a message like the following displays

```
There is NOT enough space available
on USB Disk!
Please remove and free up approx
nnn.nK then try again
Press RESET to clear this message
```

The variable *nnn.n* is the number of kilobytes (KB) of free space required for the backup. Press RESET to clear the message, then remove the USB disk, install another USB disk with the required amount of free space, and press **F6** (Backup) again.

If you want to re-use the original USB disk, you can insert it into a USB connector on your computer, delete the files necessary to free up the required amount of space, re-install it in the SmartPAC 2, and reinitiate the backup.

As the backup proceeds, messages like the following display at the top of the screen

Backing up SmartPAC2 data for Tool nnnnnn

where nnnnnn is the tool number, followed by messages like

Backing up SmartPAC2 data for Init Group nn

where nn is the Initialization group number. Then the message

Transferring files...

displays briefly as backup files are written to the USB disk. When the backup is complete, the following message displays:

Backup Finished!

4. Press RESET to return to the Main Initialization Menu.

### **Restoring Tools from a USB Disk**

### NOTICE

You should only need to perform a restore if the SmartPAC tool and Initialization programming has been corrupted or if the SmartPAC board has been replaced. The restore process overwrites programming for all your tools and Initialization setups with the tool and Initialization settings saved during the most recent backup. In performing a restore, you may lose information that has taken you considerable time to input.

To restore backed-up tools to a SmartPAC 2, do the following:

 With the USB disk onto which tools have been backed up inserted in the USB connector (see step 1 of the *Backing Up Tools to a USB Disk* procedure, page 4-52) and the Backup/ Restore Control Menu (see Figure 4-34) displayed, press the F5 (Restore) function key. A window opens, asking you to confirm that you really want to restore tools to the SmartPAC 2, as shown in Figure 4-35, page 4-55.



Figure 4-35. Backup/Restore Control Menu with Restore Confirmation Window Displayed

### NOTICE

Make sure that you really want to restore the tool settings contained on the USB disk. During the restore process, current tool programming will be overwritten by the backed-up settings.

2. Press ENTER to continue with the restore.

The same sorts of messages display during the restore process as occurred during backup (see step 3 of the *Backing Up Tools to a USB Disk* procedure, page 4-53). When the restore is complete, the following message displays:

Finished Restore!

Press RESET to return to the Main Initialization Menu.

## **SETUP DATA COMMS (Optional)**

#### (INITIALIZATION - SETUP DATA COMMS)

The SETUP DATA COMMS item, which appears on the Main Initialization Menu only when firmware for Wintriss data collection software is installed, allows you to set communications parameters for a Wintriss data collection software product. Communications settings are made on the Set Communications Menu, which is shown in Figure 4-36. This screen is fully documented starting on page H-7 for SmartPAC 2 users with the SFC firmware option. If you have the LETS firmware option, refer to page I-7 for Set Communications Menu documentation.

SET COMMUNICATIONS MENU	
RSR/SBR CPU NUMBER = 1	
FORCED IDLE DIALOG = ENABLED	
IDLE DIALOG TIME $=$ 5 MINS.	
FORCED ERROR DIALOG = ENABLED	
ERROR DIALOG TIME = 5 MINS.	
PERSIST DIALOG = ENABLED	
AUTO BACKFILL = DISABLED DIMOG CODEEN NODE = $16 / 16$	
DIALOG SCREEN MODE - 10 / 10	
INPLANNED RESET STROKES = 15	
PLANNED RESET STROKES = 5	
CHANGEOVER RESET STROKES = 50	
SINGLE STROKE MODE = DISABLED	
IDLE TIMER $=$ 5 SEC.	
SET SPECIAL NAMES	
SET CANNED NAMES	
USE THE CURSOR KEYS TO CHOOSE THE ITEM	
YOU WISH TO CHANGE, PRESS THE ENTER KEY	
DOWNTIME RESET WHEN DONE.	

Figure 4-36. Set Communications Menu

## SETUP NETWORK

(INITIALIZATION - SETUP NETWORK)

### NOTICE

- Your network administrator must connect SmartPAC 2 to your computer network before you can use e-mail messaging or the SmartView remote viewing utility. For e-mail, your network must have a valid SMTP mail server.
- If your network requires static IP addresses, your network administrator should call Wintriss Tech. Support. See CHANGE NETWORK SETTINGS, page 4-60.

The SETUP NETWORK item on the Main Initialization Menu allows you to set up SmartPAC 2's E-mail and SmartView functions and make other settings necessary to configure a SmartPAC 2 network. You make these settings on the Network Setup Utility screen, which is shown in Figure 4-37, page 4-57.

NETWORK SETUP UTILITY	
E-MAIL FUNCTION - ENABLED SMARTVIEW FUNCTION - ENABLED SETUP E-MAIL	
CHANGE NETWORK SETTINGS PRESS TYPE - STRAIGHT SIDE	
USE THE CURSOR KEYS TO SELECT THE ITEM YOU WISH CHANGE. PRESS ENTER TO CHANGE IT. PRESS THE RESET KEY WHEN DONE.	
CURRENT NETWORK VALUES: NETWORK NAME – DI9876 TCP/IP ADDRESS – 123.45.67.89	

Figure 4-37. Network Setup Utility Screen

### E-MAIL FUNCTION

(INITIALIZATION – SETUP NETWORK – E-MAIL FUNCTION)

### NOTICE

- · Consult with your network administrator when setting up e-mail.
- Use the SmartView remote viewing utility (see next item) to set up e-mail messages and recipients.

SmartPAC 2's E-mail function allows you to send e-mails to individuals in your SmartPAC 2 network and to other recipients, such as Wintriss Tech. Support, via the Internet. If you plan to use E-mail, do the following to enable this function:

- 1. Select SETUP NETWORK on the Main Initialization Menu to display the Network Setup Utility screen.
- 2. With the highlight bar on E-MAIL FUNCTION, press ENTER to toggle the setting to ENABLED.
- 3. Press RESET to return to the Main Initialization Menu.

If you don't plan to use E-mail, set the E-MAIL FUNCTION item to DISABLED.

### **SMARTVIEW FUNCTION**

(INITIALIZATION - SETUP NETWORK - SMARTVIEW FUNCTION)

### NOTICE

Consult your network administrator when setting up SmartView.

SmartPAC 2's SmartView function enables individuals in your SmartPAC 2 network to view the operation of each press in your pressroom from a remote location. (See Appendix E for more information.) If you plan to use SmartView, do the following to enable this function:

- 1. With the highlight bar on the SMARTVIEW FUNCTION item on the Network Setup Utility screen, press ENTER to toggle the setting to ENABLED.
- 2. Press RESET to return to the Main Initialization Menu.

If you don't plan to use SmartView, set the SMARTVIEW FUNCTION item to DISABLED.

### **SETUP E-MAIL**

(INITIALIZATION - SETUP NETWORK - SETUP E-MAIL)

### NOTICE

- · Consult your network administrator when setting up e-mail.
- Use the SmartView remote viewing utility (see previous item) to set up e-mail messages and recipients.

If you have enabled the SmartPAC 2 E-mail function, you should use the SETUP E-MAIL item on the Network Setup Utility screen to enter E-mail settings. Settings are made on the Setup E-mail screen, which is shown in Figure 4-38.



Figure 4-38. Setup E-mail Screen

To setup up E-mail, do the following:

- 1. Select SETUP E-MAIL on the Main Initialization Menu. The Setup E-Mail screen displays.
- 2. With the highlight bar in the **Mail Server:** field, press ENTER. The Alphanumeric Entry window, shown in Figure 4-39, displays with the default mail server shown at the top of the window.

MySMTP.MailServer.	Com
ABCDE	text. Use the Keypad to
FGHIJK	input numbers. Use the
LMNOPQ	letters. Press ENTER to
RSTUVW	input the letters. Press F6 when done. Press RESET
XYZ,-#	to cancel. Press F2 to
. () *@_	Toggle Case Max Chars = 45

Figure 4-39. Alphanumeric Entry Window with Default Mail Server Displayed

3. Key in the name or IP address of your mail server, following the directions in the window, then press **F6** to save your entry and return to the Setup E-mail screen. Your entry is now displayed in the **Mail Server:** field.

For help in filling in this and other items, refer to Table 4-16. You can also consult your plant network administrator.

ltem	Description	Examples
Mail Server	The name or IP address of the SMTP mail server on your network	server.yourcompany.com 124.15.62.53
Mail Port	The port on the server used for mail. Usually 25.	25
Use Secure	Indicates whether a username and	FALSE
Login	network	TRUE
	TRUE = Password required	
	FALSE = No password required	
	If the setting is "FALSE," you don't need to enter a username or password.	
Username	The username (if necessary) for logging in to the network	username joe_user
Password	The password (if necessary) for logging in to the network	password secret452
Email Error Recipient	The e-mail address to which messages issued when an e-mail fails to be delivered are sent. SmartPAC 2 cannot receive e-mail.	ErrorRecipient @yourcompany.com joe.user@yourcompany.com

Table 4-16. Setup E-mail Items

E-mail From Name	Name to be shown in the "From" field in the e-mail header. Some networks require a particular format of "From" name.	FromRecipient @yourcompany.com Press_14@yourcompany.com
Wintriss E-mail Addr	The e-mail address of Wintriss Tech. Support. Use the default unless instructed otherwise.	info@wintriss.com

Table 4-16. Setup E-mail Items (Cont.)

- 4. Select the next item (e.g., **Mail Port:**, **Use Secure Login:**, etc.), and repeat steps 2 and 3, referring to Table 4-16 for help.
- 5. When you are done, press **F2** (Apply Changes) to apply the changes you have made, then press RESET to return to the Network Setup Utility screen.

### NOTICE

You can use a separate computer keyboard to enter information. See page 4-68.

After you enter settings on the Network Utility Setup screen, you use SmartView to complete setting up the e-mail messages and recipients for your SmartPAC 2 (see Appendix E).

### CHANGE NETWORK SETTINGS

(INITIALIZATION - SETUP NETWORK - CHANGE NETWORK SETTINGS)

This item is to be used only by your Information Technology or Information Systems person. Call Wintriss Tech. Support for assistance in making advanced network settings.

### NOTICE

#### SETTING STATIC IP ADDRESS

SmartPAC 2 comes from the factory set up for a Dynamic Host Configuration Protocol (DHCP) network, which automatically assigns IP addresses. If your network requires static IP addresses, have the person who supports your network call Wintriss Tech. Support for assistance in setting up SmartPAC 2 with a static IP address.

### PRESS TYPE

(INITIALIZATION – SETUP NETWORK – PRESS TYPE)

Your entry for the PRESS TYPE item is used by the SmartView remote viewing utility (see *SMARTVIEW FUNCTION*, page 4-58) to select the graphic it uses to illustrate the type of press (i.e., straight side or gap frame) on which SmartPAC 2 is installed. This graphic appears in the press information summary on the SmartView Main Page.

To set the press type, do the following:

- 1. With the highlight bar in the PRESS TYPE field, press ENTER to toggle between GAP FRAME and STRAIGHT SIDE until the option you want is displayed.
- 2. Press RESET to return to the Main Initialization Menu.

## DIAGNOSTICS

#### (INITIALIZATION - DIAGNOSTICS)

The DIAGNOSTICS item on the Main Initialization Menu gives you access to the Diagnostics Menu (see Figure 4-40), which you use primarily when you are working with Wintriss Tech. Support for initial setup or troubleshooting. This section documents only the following items:

- · COMMUNICATIONS, which allows you to run a communications loopback test
- SET CLOCK, which allows you to set SmartPAC 2's internal clock to local time
- SAVE TO USB DISK, which allows you to save screen captures and other items to a USB disk
- UPDATE FIRMWARE, which allows you to upload updated firmware to SmartPAC 2



Figure 4-40. Diagnostics Menu

### COMMUNICATIONS

(INITIALIZATION - DIAGNOSTICS - COMMUNICATIONS)

When you select the COMMUNICATIONS item on the Diagnostics Menu, the Communications Data Viewer screen, shown in Figure 4-41, displays.

COMMUNICAT USE THE CURSOR KEYS TO CHOOSE THE PORT YOU WISH TO VIEW. PRESS THE ENTER KEY TO VIEW IT. PRESS THE RESET KEY WHEN DONE.	ION DATA VIEWER PORT 1 (SFI) 0 PORT 2 (Modules) 0 PORT 3 (Special) 0 PORT 4 (PacNet) 0 PORT 5 (Spare 1) 0 PORT 6 (WPC) 0 PORT 6 (WPC) 0 PORT 7 (Spare 3) 0 PORT 8 (Spare 2) 0 PORT USB (SBC)	COMBINED TX AND RX MIXED MODE	F1 F2 F3 F4 F5
NOTE: When viewin perform a loop ba the TXD and RXD 1 pressing the F1 k	g the port data you car ck test by jumpering ines together and then ey.		F6 F7 F8

Figure 4-41. Communications Data Viewer Screen

This screen allows you to verify communications between SmartPAC 2 and its installed modules, including SFI and WPC. When you press ENTER with the highlight bar resting on one of the communications ports (e.g., PORT 1 (SFI)), the Transmit and Receive Data screen for that communications port displays (see Figure 4-42).



Figure 4-42. Transmit and Receive Data Screen: Combined View (Left), Split View (Right)

You can view communications data in two screen formats: combined and split. Press ENTER with the **F1** key label showing "COMBINED TX AND RX" to view the combined format. Press ENTER with **F1** showing "SPLIT TX AND RX" to view the split format. To toggle between the two **F1** key labels, press **F1**.

In the "combined" view, Transmit and Receive data are shown together (see the left panel in Figure 4-42), Transmit data being displayed as blue on a white background, Receive data displayed as white on blue. This view shows the data as it is transmitted and received in real time. Press **F3** (Reset Buffer) to view the data starting at the beginning of the buffer.

In the "split" view, Transmit data is shown in the upper half of the screen, Receive data in the lower half (see right panel in Figure 4-42). In this view, the data is always shown starting at the beginning of the buffer.

Normal communications between SmartPAC 2 and the selected module (e.g., SFI) is indicated by both Transmit and Receive data being displayed on the screen. If you want to examine transmitted or received data, press F2 (Stop/Start Buffer). If no data or only partial data is displayed, SmartPAC 2 and the other module are not communicating properly.

If the Transmit and Receive Data screen indicates a communications problem, you can perform a "loopback test." To do so, you connect (or jumper) the TXD (transmit) and RXD (receive) lines, and then press F1 (Send Loopback Message) to check communications. In effect, you are "receiving" the communications data that you are transmitting. This test is useful when verifying the accuracy of Transmit and Receive hardware and wiring.

To perform a loopback test, follow these steps:

- 1. Wire loopback jumpers for the port or ports you want to check, following the wiring diagram in Figure 12 at the end of the manual. Figure 12 shows loopback test wiring for both RS232 and RS485 communications. Be sure to follow the correct diagram for your system.
- 2. Select the port/module you want to test, such as "PORT 1 (SFI)." The Transmit and Receive Data screen for that port displays.
- 3. Press **F1** (Send Loopback Message) to start the test. The message "LOOP BACK MESSAGE PORT X" displays, where "x" is the number of the port you selected.

If you need help performing the loopback test, contact Wintriss Tech. Support. Be prepared to provide the following information: **product name** (e.g., SmartPAC 2 standard); **installed options** (e.g., DiProPAC, ProCamPAC, etc.); and **firmware version number** (e.g., Vs. 2.00). You can determine the last two items by accessing the Installed Options screen (see Figure 4-4, page 4-9).

### SET CLOCK

(INITIALIZATION – DIAGNOSTICS – SET CLOCK)

When you select the SET CLOCK item on the Diagnostics Menu, the Set the Clock screen, shown in Figure 4-43, displays.

_			
	SET THE CLOCK	STOP THE CLOCK	<b>F1</b>
	DATE/TIME = 03/04/03 16:02:05		<b>F2</b>
	JSE THE CURSOR KEYS TO CHOOSE THE VALUE YOU WANT TO CHANGE. PRESS THE ENTER KEY TO CHANGE IT. PRESS THE RESET KEY WHEN		F3
1	YOU ARE DONE. NOTE: The time is enterd in 24 hour		<b>F4</b>
i a	format. As an example 3 PM is hour 15 and 11 PM is hour 23.		F5
			F6
			<b>F7</b>
			F8

Figure 4-43. Set the Clock Screen

On this screen you can set the date in month/day/year (mm/dd/yy) format and the time in military hours/minutes (hh:mm) format (i.e., 1:30 p.m. = 13:30, 11:00 p.m. = 23:00). To do so, perform these steps:

- Highlight the segment of the date or time that you want to change, using the Left ( ◀ ) and Right ( ▶ ) cursor keys, then press ENTER. The Numeric Entry window (see Figure 3-6, page 3-4) displays.
- Key in a value, using the numeric keypad or the Up (▲) and Down (▼) cursor keys, and press ENTER. You are returned to the Set the Clock screen with your entry displayed in the date or time segment you selected in step 1.
- 3. Repeat steps 1 and 2 for other date/time segments.

### NOTICE

To stop the clock, press **F1** (Stop the Clock). The **F1** label changes to START THE CLOCK. To restart the clock, press **F1** (Start the Clock).

4. Press RESET when you are done to return to the Diagnostics Menu.

### NOTICE

You will have to change the clock setting in the spring and fall when your local time changes from Standard to Daylight Savings and from Daylight Savings to Standard.

### SAVE TO USB DISK

(INITIALIZATION - DIAGNOSTICS - SAVE TO USB DISK)

This item enables you to save the error/event log (see page 6-34), screen captures (see page 3-23), and other data maintained in a special SmartPAC 2 buffer to a USB disk. Once the data has been saved, you can remove the USB disk, transfer the information to a computer, and e-mail it to Wintriss Tech. Support or to another recipient (see *MESSAGING*, page 6-37). This function is useful if your SmartPAC 2 is not networked. To save information to a USB disk, do the following:

- 1. Make sure a USB disk is installed in the USB connector on the SmartPAC 2 board (see steps 1 through 4 of the *Saving a Screen Capture to a USB Disk*, page 3-24).
- 2. Access the Main Initialization Menu, select DIAGNOSTICS, and when the Diagnostics Menu (see Figure 4-40) displays, select SAVE TO USB DISK. The following messages appear in succession:

PLEASE WAIT WHILE THE DATA IS BEING TRANSFERRED TO THE USB DISK. THIS MAY TAKE UP TO ONE MINUTE TO COMPLETE . . .

THE USB DISK TRANSFER HAS FINISHED AND WAS SUCCESSFUL. PRESS THE RESET KEY AND THEN REMOVE THE USB DISK DEVICE.

- 3. When the second message appears, press RESET to return to the Diagnostics Menu.
- 4. Power down your SmartPAC 2, and remove the USB disk.

### UPDATE FIRMWARE

(INITIALIZATION - DIAGNOSTICS - UPDATE FIRMWARE)

To update the firmware in your SmartPAC 2, refer to Appendix D.

## **Using SmartPAC 2 with a Link-motion Press**

### (INITIALIZATION - POSITION SENSOR)

If your SmartPAC 2 is installed on a link-motion press, you need to determine whether to use NORMAL MOTION or LINK MOTION for your RESOLVER MOTION MODE setting (see page 4-6) and, if you are using a servofeed with a Wintriss ServoFeed Interface (SFI), how you will compensate for the different upstroke and downstroke speeds on your link-motion press.

To determine the proper RESOLVER MOTION MODE setting to use, run the press in Continuous mode (if applicable) and observe the press speed in the lower right corner of the Status box on the SmartPAC 2 display (see Figure 3-20, page 3-14).

- If press speed varies between the upstroke and downstroke, set RESOLVER MOTION MODE to LINK MOTION (refer to *Setting Link Motion*, below)
- If press speed does not vary during the stroke, leave RESOLVER MOTION MODE set to NORMAL MOTION and install and zero the resolver so that bottom dead center equals 180°. This setting will likely result in a top-dead-center reading of less than 360°, but this value is acceptable in these circumstances. Refer to Chapter 2 for instructions on installing (page 2-24) and zeroing (page 2-78) the resolver.

### **Setting Link Motion**

(INITIALIZATION - POSITION SENSOR)

If press speed in Continuous mode varies during the stroke, set RESOLVER MOTION MODE to LINK MOTION as follows:

- 1. Access the Main Initialization Menu, then select POSITION SENSOR.
- 2. Move the highlight bar to the RESOLVER MOTION MODE item, and press ENTER to display the LINK MOTION setting.
- 3. Press RESET to return to the Main Initialization menu. Turn the Program/Run key to RUN, and run the press to observe the behavior of the Press Speed value.

### NOTICE

If WaveFormPAC is installed on your press and RESOLVER MOTION MODE is set to LINK MOTION, WaveFormPAC comparison screens will not display the Ram Velocity.

### Using a ServoFeed Interface with Link Motion

If you have a link-motion press and are using a servofeed with a Wintriss Servofeed Interface (SFI), you can compensate for the change in speed between the upstroke and downstroke. In a link-motion press, the upstroke is substantially faster than the downstroke, the downstroke being slowed to improve forming operations. There are two methods you can use to compensate for the variation in speed. Perform the following procedure to find out which method to use, then refer to the appropriate section.

- 1. Access the Main Initialization Menu, and select FEED CONTROL.
- 2. On the Feed Control screen that displays, check to see if SETTLING TIME is one of the parameters shown.
  - If SETTLING TIME appears on the screen, go to *Settling Time Compensation for Link Motion* (next)
  - If SETTLING TIME does not appear, go to *Setting the Shutdown Time (Optional)* (see page 4-67)
#### **Settling Time Compensation for Link Motion**

If SETTLING TIME is a Feed Control Initialization parameter, follow the instructions below to compensate for speed variation. Once you have set the Settling Time to the appropriate value for one tool, you can use the Feed Advisor for all other tools on this press.

- 1. Access the Main Initialization Menu, and select FEED CONTROL.
- 2. On the Feed Control screen that displays, select SETTLING TIME and set it to 30 mS.
- 3. Switch to Program Mode (see Table 4-1, page 4-2), select the tool that is currently loaded, then, on the Tool Program Menu, select FEED CONTROL (see *Changing Settings for a Loaded Tool*, page 5-6.)
- 4. On the Servo-Feed Parameters screen, select FEED ADVISOR, then on the Servo-Feed Advisor screen, select CALCULATE.
- 5. Press RESET to return to the Tool Program Menu, then press F5 (Load This Tool) to load the tool. Cycle the press and notice whether feeding is complete at the correct time.
  - If feeding is complete at the correct time, you are finished with settling time compensation for link motion.
  - If feeding is completed too late, access the Main Initialization Menu, select FEED CONTROL, and increase the SETTLING TIME value by 3 mS. Then return to Program mode, and use Feed Advisor to calculate a new value with this setting (see steps 3 and 4). Load the tool number, and run the press to observe the feeding again. Continue to increase the settling time by 3-mS increments until feeding is complete at the correct time.
  - If feeding is completed too soon, access the Main Initialization Menu, select FEED CONTROL, and decrease the SETTLING TIME value by 3 mS. Then return to Program mode, and use Feed Advisor to calculate a new value with this setting (see steps 3 and 4). Load the tool number, and run the press to observe the feeding again. Continue to decrease the settling time by 3-mS increments until feeding is complete at the correct time.

#### Press Speed Compensation for Link Motion

# NOTICE

Perform the press speed compensation procedure for each tool if Settling Time is not an initialization parameter for this SFI.

If SETTLING TIME is not a Feed Control Initialization parameter, follow the instructions below to compensate for speed variation. You must perform this procedure for every tool the first time you program it.

1. Access Program mode (see Table 4-1, page 4-2), select the tool that is currently loaded, then, on the Tool Program Menu, select FEED CONTROL (see *Changing Settings for a Loaded Tool*, page 5-6.).

- 2. On the Servo-Feed Parameters screen, select FEED ADVISOR, then on the Servo-Feed Advisor screen, select PRESS SPEED, and enter a value 10% greater than the actual press speed.
- 3. When you have changed the PRESS SPEED value, select CALCULATE.
- 4. Press RESET to return to the Tool Program Menu, then press F5 (Load This Tool) to load the tool. Cycle the press and notice whether feeding is complete at the correct time.
  - If feeding is complete at the correct time, you are finished with press speed compensation for link motion.
  - If feeding is completed too late, switch to Program Mode, increase Press Speed in the Feed Advisor by 3%, and calculate a new value with this setting (see steps 2 and 3). Load the tool number, and run the press to observe the feeding again. Continue to increase Press Speed in the Feed Advisor by 3% increments until feeding is complete at the correct time.
  - If feeding is completed too soon, switch to Program Mode, decrease Press Speed in the Feed Advisor by 3%, and calculate a new value with this setting (see steps 2 and 3). Load the tool number, and run the press to observe the feeding again. Continue to decrease Press Speed in the Feed Advisor by 3% increments until feeding is complete at the correct time.

# Using a Computer Keyboard to Enter Names

When entering the name for your press and custom names for cams and sensors, you can use a computer keyboard connected to SmartPAC 2. To connect the keyboard and use it to key in names, proceed as follows:

- 1. Power down SmartPAC 2.
- 2. Plug the keyboard into the appropriate connector on the SmartPAC 2 board (see Figure 2-25, page 2-51).
  - Keyboard with a USB connector: Plug into the USB connector (J121).
  - Keyboard with a PS/2 connector: Plug into the PS/2 connector (J120).
- 3. Power up SmartPAC 2.
- 4. Select the name you want to enter (e.g., PRESS NAME), and when the Alphabetic Entry window displays (see Figure 4-6, page 4-10), type your entry on the keyboard.

You can type any alphabetic or symbol character shown in the Alphabetic Entry window. You can also enter numbers and use the backspace key and the space bar. As you type, the characters appear at the top of the Alphabetic Entry window.

5. When you have finished typing, press F6 on the SmartPAC 2 panel to accept your entry.

# Chapter 5. SmartPAC 2 Program Mode

This chapter shows you how to make settings in SmartPAC 2 Program mode. Program settings, which are entered via the Main Program Menu (see Figure 5-1), control SmartPAC 2 operation for an individual tool. (You make settings that control operation of all tools in Initialization mode–see Chapter 4).



*Figure 5-1. Main Program Menu* (Includes some options. Your display may look different.)

The following sections show you how to create, program, modify, delete, and load individual tools. You are instructed how to enter tool names, set counters, and make settings for programmable cams, die protection sensors, press control parameters, and other SmartPAC 2 options.

Once you have programmed and loaded a tool, you can switch to Run mode to run that tool on your press (refer to Chapter 6). In Run mode, you can also make some adjustments to tool settings.

If you need help using the SmartPAC 2 keyboard to input information on Program mode displays, refer to Chapter 3.

# **Entering and Exiting Program Mode**

#### NOTICE

#### SELECT = HIGHLIGHT + ENTER

When this manual instructs you to select an item, you should highlight the item, and press ENTER.

Follow the instructions shown in Table 5-1, page 5-2 to enter and exit Program mode. See Figure 3-26, page 3-20 for help in navigating in Program mode

To Enter Program Mode	To Exit Program Mode			
<i>From Run mode:</i> Turn the Program/Run key to PROG.*	<i>To switch to Run mode:</i> Turn the Program/Run key to RUN.*			
From Initialization mode:	To switch to Initialization mode:			
Go to the Main Initialization Menu. Press RESET.	Press the "1" and "CLEAR" keys simultaneously and hold down a few seconds until the Main Initialization Menu appears.			
—or—				
Turn the Program/Run key to RUN and then back to PROG.*				
* If you turn the key and nothing happens, press RESET repeatedly until SmartPAC 2 changes modes. Make sure SmartPAC 2 is in the Main (or top) menu for the mode it is in before you turn the Program/Run key. If SmartPAC 2 is not in a top-level menu, press RESET repeatedly until the Main menu appears. If the message "PRESS CONTROL IS IN LOCKOUT MODE" dicalays on the SmartPAC 2 front panel turn				
the Stroke Select key switch to OFF, then back to th	e desired operating mode to clear the message.			

Table 5-1. Instructions for Entering and Exiting Program Mode

The first display you see in Program mode is the Main Program Menu (see Figure 5-1). From this menu, you can access the Tool Manager screen (see next section) and the Sensor Enable/ Disable and Status screen (see page 5-52)

# NOTICE

For help with a Program mode screen, press the HELP key when that screen is displayed.

# **TOOL MANAGER**

(PROGRAM - GO TO THE TOOL MANAGER)

The GO TO TOOL MANAGER item on the Main Program Menu enables you to create, copy, delete and load tools. You perform these functions on the Tool Manager screen (see Figure 5-2, page 5-3), which displays when you select GO TO TOOL MANAGER.

Once you have created a tool, you must program it before the tool can be loaded. You program tools on the Tool Program Menu (see Figure 5-9, page 5-8), which you access from the Tool Manager screen by pressing the **F4** (Edit Tool) key.

The Tool Manager screen displays a list of the tools that have already been created. (SmartPAC 2 has the capability to store settings for up to 200 tools.) The currently loaded tool is highlighted. To copy, delete, program, or load a tool, select that tool and press the appropriate function key (i.e., F8 (Copy Tool), F6 (Delete Tool), F4 (Edit Tool), or F5 (Load Tool)). To create a new tool, press F7 (New Tool).

TOOL M TOOL #'s 4 USED 196 AVAILAN	ANAGER			F1
TOOL # TOOL NAME	TOOL #	TOOL NAME		ĽIJ
6160 DEMO TOOL				
6161 BRACKET 1	I			
6162 BRACKET 2	I			
9999999 TOOL TEMPLATE	I			J
	I			
	I			<b>  F3  </b>
	I			Ľ
	I			
	I		EDIT TOOL	
	I			►4
	I			j
	I			
	I		LOAD TOOL	<b>  F5  </b>
	I			ĽIJ
	I			Ĩ
	I		DELETE TOOL	
	I			<b>  F6 </b>
	I			J
	I			
	I		NEW TOOL	
	I			
USE THE CURSOR KEYS TO CH	NGE SEL	ECTION.	COPY TOOL	
PRESS ENTER TO PROGRAM, RE	SET WHEN	N DONE.		<b>⊪⊢8</b> ∥
				لت

Figure 5-2. Tool Manager Screen

# NOTICE

The Tool Manager screen sorts the tool list based on the setting for TOOL NUMBER MODE in Initialization (see page 4-6).

- If the setting is NUMERIC, tools are sorted by tool number
- If the setting is ALPHA-NUMERIC, tools are sorted alphabetically by tool name

In the example shown in Figure 5-2, tools are sorted by tool number.

# Creating a New Tool

#### (PROGRAM – GO TO THE TOOL MANAGER – F7-NEW TOOL)

To create a new tool, do the following:

1. On the Tool Manager screen, press F7 (New Tool). The Numeric Entry or Alphanumeric Entry window (see Figure 5-3) displays, depending on whether you selected Numeric or Alphanumeric tool number mode in Initialization.



Figure 5-3. Numeric Entry Window (Left); Alphanumeric Entry Window (Right)

- 2. Key in the desired tool number, following the directions displayed in the applicable window.
- 3. Press ENTER after keying in a numeric tool number, or **F6** after keying in an alphanumeric tool number. The window shown in Figure 5-4, page 5-4 displays.

DO YOU WANT TO COPY THE TOOL TEMPLATE PROGRAMMING INTO THIS NEW TOOL NUMBER? PRESS THE ENTER KEY TO COPY THE TOOL TEMPLATE. PRESS THE RESET KEY TO START WITH A BLANK TOOL.

Figure 5-4. Copy Tool Template Window

4. If you want to copy the settings you have programmed for the Tool Template (see *Copying Tool Template to a New Tool*, page 5-5), press ENTER. If you don't want to copy the Tool Template, press RESET. The Tool Program Menu displays (see Figure 5-9, page 5-8) with the highlight bar on the TOOL NAME or TOOL ID item.

# NOTICE

The first item on the Tool Program Menu is TOOL NAME if Numeric mode has been specified for tool numbers in Initialization. The first item is TOOL ID if Alphanumeric mode has been selected.

- 5. Create a name for the new tool if tool number mode is Numeric. Refer to *TOOL NAME or TOOL ID*, page 5-8 for instructions.
- 6. Continue programming settings for the new tool, following the directions in *Tool Program Menu*, page 5-8. Then load the tool, referring to *Loading a Tool*, page 5-5 for instructions.

# **Copying an Existing Tool**

(PROGRAM – GO TO THE TOOL MANAGER – select tool – F8-COPY TOOL)

If you want to copy the settings programmed for an existing tool to a new tool, perform the following steps:

 On the Tool Manager screen, highlight the tool whose settings you want to copy to the new tool, and press F8 (Copy Tool). The Numeric Entry or Alphanumeric Entry window (see Figure 5-3, page 5-3) displays, depending on whether you selected Numeric or Alphanumeric tool number mode in Initialization.

# NOTICE

If there are more tools in SmartPAC 2's memory than can be displayed in two columns, press the Left ( ◀ ) or Right ( ▶ ) cursor key to display the additional hidden column(s).

- 2. Key in the desired tool number, following the directions displayed in the applicable window.
- 3. Press ENTER after keying in a numeric tool number, or **F6** after keying in an alphanumeric tool number. The Tool Program Menu displays (see Figure 5-9, page 5-8) with the highlight bar on the TOOL NAME or TOOL ID item.

### NOTICE

The first item on the Tool Program Menu is TOOL NAME if Numeric mode has been specified for tool numbers in Initialization. The first item is TOOL ID if Alphanumeric mode has been selected.

- 4. Create a name for the new tool if tool number mode is Numeric. Refer to *TOOL NAME or TOOL ID*, page 5-8 for instructions.
- 5. Change any settings for the new tool, as necessary, following the directions in *Tool Program Menu*, page 5-8. Then load the tool, referring to *Loading a Tool*, page 5-5 for instructions.

# Copying Tool Template to a New Tool

(PROGRAM – GO TO THE TOOL MANAGER – select Tool Template, # 9999999 – **F8**-COPY TOOL)

Tool Template, which is assigned tool number 99999999, is a tool you can program with settings common to two or more tools (see *Tool Program Menu*, page 5-8). When used with the COPY TOOL (**F8**) function, Tool Template allows you to duplicate the same constellation of settings across multiple tools. Tool template is not used to run the press.

### NOTICE

#### PASSWORD PROTECTION FOR TOOL TEMPLATE

To prevent unauthorized changes, you can set Security Access (page 4-47) so that a password is required to change the Tool Template.

To copy Tool Template to a new tool, do the following:

- 1. On the Tool Manager screen, highlight TOOL # 9999999, TOOL TEMPLATE, and press **F8** (Copy Tool).
- 2. Perform steps 2 through 5 of the Copying an Existing Tool procedure, starting on page 5-4.

# Loading a Tool

(PROGRAM – GO TO THE TOOL MANAGER – select tool – **F5-**LOAD TOOL)

#### A DANGER

#### ANCILLARY EQUIPMENT MAY OPERATE WHEN TOOL IS LOADED

Ensure that all personnel stand clear when you load a tool.

Failure to comply with these instructions will result in death or serious injury.

To load a tool, perform the following steps:

1. On the Tool Manager screen, highlight the tool you want to load, and press **F5** (Load Tool). The window shown in Figure 5-6 displays,



Figure 5-5. "Enter Your Password" Screen

# NOTICE

You can also load tool numbers in Run mode, if allowed by security access, as long as the press is stopped.



Figure 5-6. Load Tool Warning Window

2. Press ENTER to load the tool. A message should appear indicating that the tool is being loaded.

# NOTICE

If an error message displays, go to Chapter 7 and follow the instructions for correcting the problem. If the error is not covered in Chapter 7, or you cannot fix the problem, call Wintriss Tech. Support.

# **Changing Settings for a Loaded Tool**

(PROGRAM - GO TO THE TOOL MANAGER - select tool - F4-EDIT TOOL)

#### A DANGER

#### ANCILLARY EQUIPMENT MAY OPERATE WHEN TOOL IS LOADED

Ensure that all personnel stand clear when you load a tool.

Failure to comply with these instructions will result in death or serious injury.

To change settings for a loaded tool, do the following:

1. With the currently loaded tool highlighted on the Tool Manager screen, press F4 (Edit Tool).

	ENTER YOUR PASSWORD	]			
	USE THE KEYPAD TO ENTER NUMBERS. USE THE UP/DOWN CURSOR KEYS TO INCREASE/DECREASE. PRESS ENTER WHEN DONE. PRESS RESET TO CANCEL.				
	60599				
If this display appears, you need to enter the general password to program the tool. Security access is set in Initialization mode (see SECURITY ACCESS, page 4-47).					

Figure 5-7. "Enter Your Password" Screen

2. Change settings for the tool, following the instructions in Tool Program Menu, page 5-8.

#### NOTICE

#### **RELOAD CURRENTLY LOADED TOOL IF YOU CHANGE IT**

If you change settings for a tool that is currently loaded, you should load the tool again after you make the changes. If you do not re-load the tool, the old settings will be used until you load the tool again.

3. When you have made your changes and "reset" out of the Tool Program Menu, the Load Tool Warning window (see Figure 5-6, page 5-6) displays. Press ENTER to load the tool.

# **Deleting a Tool**

(PROGRAM – GO TO THE TOOL MANAGER – select tool – F6-DELETE TOOL)

To delete a tool, perform the following steps:

1. On the Tool Manager screen, highlight the tool you want to delete, and press **F6** (Delete Tool). The window shown in Figure 5-8 appears, asking you to confirm that you want to delete the tool.



Figure 5-8. Delete Tool Confirmation Message

2. Press the CLEAR key to continue the deletion process. A message displays indicating that the tool has been deleted, and you are returned to the Tool Manager screen with the deleted tool removed from the tool list.

# **Tool Program Menu**

The Tool Program Menu, which is shown in Figure 5-9, displays whenever you

- Create a new tool
- Copy settings from an existing tool (e.g., Tool Template) to a new tool
- Press the F4 (Edit Tool) function key on the Tool Manager screen with a tool selected.



*Figure 5-9. Tool Program Menu* (Includes some options. Your display may look different.)

The following sections show you how to make settings for each of the items on the menu.

# NOTICE

For help with screens accessible from the Tool Program Menu, press the HELP key with that screen displayed.

# NOTICE

#### RELOAD CURRENTLY LOADED TOOL IF YOU CHANGE IT

If you change settings for a tool that is currently loaded, you should load the tool again after you make the settings. If you do not re-load the tool, the old settings will be used.

# TOOL NAME or TOOL ID

(PROGRAM - GO TO THE TOOL MANAGER - select tool - F4-EDIT TOOL - TOOL NAME/ID)

# NOTICE

If tool number mode has been set to Numeric in Initialization, this menu item is captioned TOOL NAME. If tool number mode has been set to Alphanumeric, this item is captioned TOOL ID. See *Tool Number Mode*, page 4-6.

This item on the Tool Program Menu allows you to assign a name to a tool created with a numeric tool number. To do so, perform the following steps:

### NOTICE

If you have selected alphanumeric tool number mode in Initialization (see *Tool Number Mode*, page 4-6), a tool ID is automatically generated by the system. You can view this number by selecting the TOOL ID item on the Tool Program Menu. There is no reason to change the tool ID.

1. On the Tool Program Menu, select TOOL NAME. The Alphabetic Entry window displays (see Figure 5-10).

_						
	А	в	С	D	Е	PRESS CLEAR TO CLEAR
F	G	н	Ι	J	к	TEXT. USE THE KEYPAD
г	М	N	0	Ρ	Q	TO ENTER NUMBERS. USE
R	s	т	U	v	W	CURSORS TO SELECT THE
х	Y	z	,	_	#	LETTERS. PRESS ENTER
	(	)	*	1	&	TO ENTER THE LETTERS.
						PRESS F6 WHEN DONE.
						PRESS RESET TO CANCEL.

Figure 5-10. Alphabetic Entry Window

- 2. Key in a tool name, following the instructions in the Alphabetic Entry window, then press **F6.**
- 3. When you are finished, press RESET to return to the Tool Program Menu.

# COUNTERS

(PROGRAM – GO TO THE TOOL MANAGER – select tool – **F4-**EDIT TOOL – COUNTERS)

# NOTICE

For help with the Counters screen and screens accessible from it, press the HELP key when the applicable screen is displayed.

This item on the Tool Program Menu allows you to set the counters that maintain counts of press strokes and good parts and initiate various actions when a preset number of strokes has been reached. Settings are made via the Counters screen (see Figure 5-11, page 5-10).

TOOL# 6160		SET COUNTER	F1
DEMO TOOL 2		MODES	F2
COUNT STROKES GOOD PARTS BATCH 1 (TOP STOP) BATCH 2 (TOGGLE) CHANNEL 7 BATCH 3 (PULSE) CHANNEL 8 TOTAL HITS USE CURSOR KEYS TO PRESS THE RESET KU PRESS ENTER TO SET	T PRESET VALUE 0		F3 F4 F5 F6 F7 F8

Figure 5-11. Counters Screen

SmartPAC 2 uses the following counters:

- **Strokes counter**: Counts the number of strokes made by the press during a job. When a user-programmed preset value has been reached, SmartPAC 2 top-stops the press and displays a message. The counter resets to zero (0) when the message has been cleared.
- Good Parts counter: Counts the number of strokes made by the press during a job unless a tonnage monitor, die protection, or process monitor (i.e., ProPAC) fault occurs during a stroke. SmartPAC 2 top-stops the press and displays a message when the programmed preset value has been reached. When the message has been cleared, the counter resets to zero (0).
- Total Hits counter: Counts the number of hits on the programmed tool during all jobs. The Total Hits count is incremented by the Strokes counter whenever the tool is loaded. When the programmed preset has been reached, a flashing message displays in the Status Box in Run mode. This counter can be used to indicate when die maintenance is required.
- **Batch counters (3)**: Incremented by the Strokes or Good Parts counter, depending on the user-programmed setting. Each batch counter can be set to initiate one of three actions when the programmed preset is reached: Top Stop, Toggle, and Pulse.

When a Batch counter is set to TOP STOP, SmartPAC 2 top-stops the press and displays a message, as it does for Strokes and Good Parts counters. This setting is useful when stopping the press to change bins or chutes before resuming production.

When a Batch counter is set to TOGGLE, SmartPAC 2 switches the state of a ProCamPAC output from Open to Closed or from Closed to Open. This option is useful for activating a parts diverter.

When a Batch counter is set to PULSE, SmartPAC 2 actuates a ProCamPAC output for a specified length of time. The output On time must be specified when making a Pulse setting. You can connect this output to any device that needs to be turned on once every fixed number of strokes (i.e., the Batch counter setting).

Each batch counter is assigned to a specific ProCamPAC channel: Batch 1 to Channel 6, Batch 2 to Channel 7, and Batch 3 to Channel 8. If you set a Batch counter to either TOGGLE or PULSE, the ProCamPAC channel controlled by that counter is displayed on the Counters screen (see Figure 5-11).

The crankshaft angle at which Strokes, Good Parts, Total Hits, and Batch counters is incremented can also be programmed.

# **Setting Preset Values**

Counter presets specify the count at which SmartPAC 2 initiates one of three programmed actions (i.e., Top-stop, Toggle, or Pulse). To enter counter presets, do the following:

1. On the Tool Program Menu, select COUNTERS to display the Counters screen.



Figure 5-12. "Enter Your Password" Screen

- 2. Select the setting displayed in the PRESET VALUE column of the counter you want to program. The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 3. Key in a preset value, following the directions in the window, and press ENTER. The value you entered displays in the PRESET VALUE field for the counter you selected in step 2.



You can disable a counter by setting its preset value to zero.

4. Repeat steps 2 and 3 for each counter preset you want to program.

# **Changing Count Values**

Under some circumstances, you may need to adjust the count upward or downward, or you may want to start the count at some value other than zero. To change count settings, do the following:

# NOTICE

#### ARE YOU "LOCKED OUT"?

If you cannot change count values, security access for the CHANGE COUNT function may be set to NO CHANGES ALLOWED. See *SECURITY ACCESS*, page 4-47.

1. On the Counters screen, select the setting displayed in the COUNT column of the counter you want to adjust. The Numeric Entry window (see Figure 5-3, page 5-3) displays.

# NOTICE

You can return a count to zero by simply moving the highlight bar to the appropriate COUNT field and pressing the CLEAR key.

2. Key in a new value, following the directions in the window, and press ENTER. The window shown in Figure 5-13 displays, asking you to confirm that you want to change the COUNT value.



Figure 5-13. Change Count Confirmation Window

- 3. Press the Up (▲) cursor key to proceed with the Change Count process. The value you entered in step 2 displays in the COUNT field for the counter you selected in step 1.
- 4. Repeat steps 1 through 3 for each count you want to change.

# **Clearing the Total Hits Counter**

Since the Total Hits counter does not reset to zero (0) when its preset has been reached, you must reset the counter manually. To do so, perform the following steps:

- 1. On the Counters screen, select the setting displayed in the COUNT column for TOTAL HITS.
- 2. Press the CLEAR key. The Change Count Confirmation window (see Figure 5-13) displays, asking you to confirm that you want to change the COUNT value.
- 3. Press the Up (▲) cursor key to proceed with the Change Count process and clear the Total Hits count. The value in the COUNT column for TOTAL HITS is reset to zero (0).

# **Setting Batch Counter Output and Increment Modes**

If you set a Batch counter preset value on the Counters screen, you must also specify the output and increment modes for that counter if they differ from the factory settings. By default, output mode is set to TOP STOP, increment mode to STROKE. To change these settings, perform the following steps:

# NOTICE

PULSE and TOGGLE settings are available only when ProCamPAC is an installed option. If you attempt to make these settings when your system does not have a programmable cam, SmartPAC 2 will display a message indicating that the settings are not available.

1. On the Counters screen, press F2 (Set Counter Modes). The Counter Mode Selections screen, shown in Figure 5-14, displays.



Figure 5-14. Counter Mode Selections Screen

2. Move the highlight bar to the setting in the OUTPUT MODE column for the Batch counter you want to program, then press ENTER to scroll through the three options (i.e., TOP STOP, TOGGLE, and PULSE) until the setting you want is displayed.

# NOTICE

When you select TOGGLE or PULSE, the ProCamPAC channel associated with output from that batch counter displays on the Counters screen (see Figure 5-11, page 5-10).

3. If you selected PULSE as the output mode in step 2, move the highlight bar to the PULSE TIME (MSEC) column, and press ENTER. The Numeric Entry window (see Figure 5-3, page 5-3) displays.

- 4. Key in a value for the cam channel On time in milliseconds (maximum value, 9,999 mS, or about 10 seconds), following the instructions in the window, then press ENTER. The value you keyed in displays in the PULSE TIME (MSEC) column for the specified Batch counter.
- 5. Move the highlight bar to the INCREMENT MODE column, then press ENTER to toggle between the STROKE and GOOD PARTS options until the setting you want is displayed.
- 6. Repeat steps 2 through 5 for other Batch counters, as necessary.
- 7. Press RESET to return to the Counters screen.

# **Setting Counter Increment Angle**

The crankshaft angle at which counters are incremented is set at the factory to a default value of 270°. This value is satisfactory for counting parts, but if you have programmed Batch counter outputs to control automation, increment angles for those counters should be set to the angle at which you want the automation to activate. The Counter Mode Selections screen allows you to set a common increment angle for Strokes, Good Parts, and Batch 1 counters and separate increment angles for Batch 2 and Batch 3 counters. To change default increment angles, do the following:

- 1. On the Counter Mode Selections screen, move the highlight bar to the increment angle value for the counter you want to adjust (e.g., Batch 2), then press ENTER. The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 2. Key in a new increment angle value, following the directions in the window, then press ENTER. The value you entered is displayed on the Counter Mode Selections screen.
- 3. Repeat steps 1 and 2 for other counters, as necessary.

# Setting Parts per Stroke or Strokes per Part

SmartPAC 2 allows you to control how the Strokes and Good Parts counters increment in relation to each other. You can specify the number of parts made during each stroke, in which case the Good Parts counter will increment in multiple units (e.g., 2, 3, etc.) for each increment of the Strokes counter. This setting is useful in multiple-up die applications. Conversely, you can specify the number of strokes required to make each part, causing the Good Parts counter to increment only once for multiple increments (e.g., 2, 3, etc.) of the Strokes counter. This setting is useful in die applications with a gagged cutoff.

To set the number of parts made per stroke or number of strokes required to make a part, do the following:

1. On the Counter Mode Selections screen, press **F2** (Advanced Modes). The Advanced Counter Mode Selections screen, shown in Figure 5-15, page 5-15, displays.

ADVANCED COUNTER MODE S	ELECTIONS	
PARTS MADE PER EACH STROKE	= 1	
STROKES TO MARE EACH PART	- 1	
BATCH 1 PRE-LOAD COUNT	= 0	
BATCH 2 PRE-LOAD COUNT	= 0	
BATCH 3 PRE-LOAD COUNT	= 0	
AUTO BATCH PRE-LOAD	- OFF	
AUTO BATCH FRE-LOAD	- 022	

Figure 5-15. Advanced Counter Mode Selections Screen

- 2. Select the value displayed for the item you want to program (i.e., PARTS MADE PER EACH STROKE or STROKES TO MAKE EACH PART). The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 3. Key in the value you want, following the directions in the window, and press ENTER. The value you keyed in displays in the field you selected in step 2.
- 4. Press RESET to return to the Counter Mode Selections screen.

# **Setting Batch Pre-Load Counts**

If you are setting up a tool for gagging operations, you can specify a pre-load count for each Batch counter on the Advanced Counter Mode Selections screen. This pre-load value displays in the COUNT field for each Batch counter you specify, decreasing by that value the number of strokes (or good parts) required to reach the preset value. You can reset these pre-load values in Run mode when the Batch preset is reached (see *COUNTERS*, page 6-8) as long as you set the CHANGE COUNT parameter on the Security Access Menu in Initialization to PROGRAM AND RUN MODES (see *SECURITY ACCESS*, page 4-47).

To set batch pre-load counts, do the following:

- 1. Select the pre-load count value for the batch you want (e.g., Batch 1, Batch 2, etc.). The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 2. Key in a pre-load count value, following the directions in the window, and press ENTER. The value you keyed in displays on the Advanced Counter Mode Selections screen.
- 3. Make sure that the AUTO BATCH PRE-LOAD field is set to OFF.
- 4. Press RESET to return to the Counter Mode Selections screen.

# **DIE PROTECTION (Optional)**

(PROGRAM – GO TO THE TOOL MANAGER – select tool – **F4-**EDIT TOOL – DIE PROTECTION)

### NOTICE

For help with the Die Protection Sensor Menu and screens accessible from it, press the HELP key when the applicable screen is displayed.

This item, which appears on the Tool Program Menu only when DiProPAC 8 or DiProPAC 16 is installed, enables you to program up to 8 or 16 die protection sensors. (When DiProPAC 32 is an installed option, this menu item is subdivided into DIPROPAC 1-16 and DIPROPAC 17-32 entries—see *Programming DiProPAC 32 Sensors*, page 5-32.) Settings are made via the Die Protection Sensor Menu, which is shown in Figure 5-16.

TOOL# 6160	SENSOR	1		
DEMO TOOL 2	SENSOR	2	home	
	SENSOR	3		
	SENSOR	4		
	SENSOR	5	have a second sec	
	SENSOR	6		
	SENSOR	7		IF 3
USE THE CURSOR KEYS	SENSOR	8	Second second second second	
TO CHOOSE A SENSOR.	SENSOR	9		
PRESS THE ENTER KEY	SENSOR	10		
TO PROGRAM. PRESS THE	SENSOR	11		
RESET KEY WHEN DONE.	SENSOR	12		
	SENSOR	13		
	SENSOR	14		
	SENSOR	15		
	SENSOR	16	SUMMARY	IF.
				JE7
				Ľ
				IF 8
				Ľ

*Figure 5-16. Die Protection Sensor Menu* (DiPro 16-sensor option shown. Your display may look different.)

# **Understanding Sensor Terminology**

In order to make proper sensor settings on the SmartPAC 2 display, you need to be familiar with basic sensor terminology. Terms that appear on sensor displays are explained below.

#### Normally Open, Normally Closed

A normally open (N/O) sensor actuates (signals SmartPAC 2) when the sensor circuit to SmartPAC 2 switches from open to closed-to-ground. N/O sensors are either "yellow" or "green" (see page 5-18).

In a normally closed (N/C) sensor, the sensor circuit to SmartPAC 2 is closed to ground in its normal state. The sensor actuates when the circuit opens. Normally closed sensors are "red" (see page 5-18).

Most contact sensors can be used as either normally open or normally closed, depending on how they are connected. Some electronic sensors can be switched to work either as normally open or normally closed. Most sensors are used as normally open because no current is flowing in the normal state.

#### **Ready Signal**

For many sensors, like those that monitor part ejection, blow-off, or feed advance, the event being monitored must occur during a specific portion of the stroke. If the event doesn't occur during this period, the die may be damaged. The portion of the stroke during which a sensor must actuate is called the Ready signal. You set a Ready signal only for green sensors, which monitor events that must occur on every stroke.

The term "Ready signal" derives from older die protection systems on which a mechanical cam switch on the press sent a signal to the die protection unit during the range of angles within which the sensor must actuate.

The Ready signal is set by keying in the beginning (called "ready on") and ending (called "ready off") angles of the range of angles during which the sensor must actuate. If the sensor does not actuate (i.e., closure to ground does not occur) during this window, SmartPAC 2 sends a stop command to the press. The type of stop (i.e., top stop, emergency stop, or smart stop) is programmable. See *Setting Sensor Stop Type*, page 5-25.

#### Impedance

Impedance is a measure of the resistance to the flow of electric current. Some die protection controls have inputs for electromechanical sensors that provide different impedances. As a rule of thumb, use a high-impedance input if the part is dirty or covered with a non-conductive lubricant. Use a low-impedance input if the part is covered with a water-based or conductive lubricant.

DiProPAC boards shipped since August, 2007 are compatible with all impedance levels. However, DiPro Sensor Interface (DSI) 2 cannot be used with low-impedance sensors. If you have a low-impedance application (e.g., a wire probe application in which a part/strip covered with a water-based, conductive lubricant completes the circuit), the sensor must be wired directly to the DiProPAC board.

#### Sensor Types

Sensors used with die protection systems are classified as red, yellow, or green. For SmartPAC 2 with DiProPAC, there are four types of green sensors—green, green quick check, green constant, and green special—all of which require an event to occur on every stroke or at least once during a set number of strokes.

When you make settings for a tool, you select the sensor type for each sensor connected to SmartPAC 2. You can program any combination of reds, yellows, or greens. Instructions for programming sensor types is provided starting on page 5-24.

#### Yellow Sensors

Yellow sensors, which are normally open to ground, are ideally suited to monitor events like stock buckling, end of stock, or die overload. When a yellow sensor closes, SmartPAC 2 sends a Stop command to the press. Because yellow sensors work independently of the crankshaft angle and do not actuate on every stroke, you do not set a Ready signal for them.

#### **Red Sensors**

Red sensors, which are normally closed to ground, are used to monitor the same events as yellow sensors: die overloads, end of stock, and buckling. A Stop command is sent to the press when the red sensor opens. No Ready signal is set for red sensors.

#### Green Sensors

Green sensors, which are normally open, are used to monitor events that must occur during a certain portion of each stroke or intermittently every designated number of strokes. Examples are part ejection, stock feed, and part transfer. SmartPAC 2 stops the press when the green sensor closes to ground.

Any sensor set to green, green quick check, or green constant must actuate during the Ready signal.

Depending on the type of green sensor, the Ready signal is set either a little longer or a little shorter than the actuation time.

The four types of green sensors are described below.

#### **Green Sensors**

A sensor input set to "green" must turn on during the Ready signal and turn off before the next Ready signal (see Figure 5-17).

KEY	ок	ОК	not allowed (press stops)	not allowed (press stops)
= Ready Signal = Sensor ON	TDC BDC	TDC BDC	TDC BDC	TDC BDC
Green Sensor	Sensor ON only inside ready signal.	Sensor is ON inside ready signal and stays on for a time after the end of ready signal, but turns OFF before next ready signal.	Sensor never goes OFF. Stop signal sent at beginning of ready signal.	Sensor never goes ON. Stop signal sent at end of ready signal.

Figure 5-17. Ready Signal Programming for a "Green" Sensor

#### Green Quick Check Sensors

A sensor input set to "green quick check" must turn on, at least momentarily, within the Ready signal and may not turn on outside the Ready signal (see Figure 5-18). In other words, the sensor must turn on and turn off within the Ready signal.



Figure 5-18. Ready Signal Programming for a "Green Quick Check" Sensor

#### Green Constant Sensors

When you set a sensor input to "green constant," the sensor must turn on before the Ready signal begins and turn off after the Ready signal ends, remaining actuated continuously during the entire Ready signal (see Figure 5-19).

KEY	ОК	not allowed (press stops)	not allowed (press stops)	not allowed (press stops)
= Ready Signal = Sensor ON	TDC BDC	TDC BDC	TDC BDC	TDC BDC
Green Constant Sensor	Sensor staysON during entire ready signal and goes OFF at least momentarily outside the ready signal.	Sensor goes OFF before ready signal ends. Stop signal sent immediately.	Sensor never goes OFF outside ready signal. Stop signal sent at beginning of ready signal.	Sensor never goes ON. Stop Signal sent at end of ready signal.

Figure 5-19. Ready Signal Programming for a "Green Constant" Sensor

#### Green Special Sensors

# CAUTION

#### GREEN SPECIAL SENSOR MAY NOT PREVENT DAMAGE

Use the green special sensor with caution. An undesirable number of slugs can stack up in an ejection hole while still satisfying a green special sensor's requirements. See the example below. **Failure to comply with these instructions could result in property damage.** 

Green special sensors are designed to monitor slug ejection, signalling when slugs have stacked up excessively in a slug ejection hole. Slugs are not necessarily ejected on every stroke. Several strokes may be required before they finally break free and fall out of the bottom of the die. If the slugs jam and too many stack up in the hole, the die can be damaged.

Slug stacking is virtually impossible to monitor with a standard green sensor. A red or yellow sensor is equally ineffective because the sensor changes state whenever a slug is ejected.

Instead of actuating once per stroke like a typical green sensor, the green special sensor must actuate at least once during a preset number of strokes. Rather than setting a Ready signal, you set the maximum number of strokes that the press can make without the sensor actuating.

For example, if your die clears all the slugs from a particular ejection hole approximately once every four strokes, you would set a Green Special sensor input for a six-stroke window. If no slugs are ejected after six strokes, SmartPAC 2 sends a Stop command to the press.

#### Example: How a Green Special Sensor May Not Detect a Problem

Referring to the case cited above, assume that the press makes five strokes without ejecting a slug. On the sixth stroke, one slug ejects and actuates the sensor. The green special sensor is satisfied and the press continues to run. However, there are still five slugs in the ejection hole. If the press makes five more strokes without ejecting a slug, ten slugs are now stuck in the hole. If this process were to continue, it is conceivable that an infinite number of slugs could stack up in the hole without the press stopping. Luckily, the laws of physics make this scenario unlikely. When slugs jam, it is usually because the bottom one is stuck. If the bottom slug ejects, it is very likely that the rest will soon follow.

# **Programming Sensor Settings**

On the Die Protection Sensor Menu, you select a sensor to program, then enter settings for the sensor on a series of screens that display sequentially. The settings you enter determine which screens display, and programming for each sensor is likely to use a slightly different series of screens. The following sections show you how to make these sensor program settings:

- Set the Auto Enable by Tool (see page 5-21) or Auto Enable by Sensor (see page 5-23) stroke counter
- Assign a name to each sensor (see page 5-22)
- Set the sensor type (i.e., red, yellow, green, etc.) (see page 5-24)
- Set stop type (i.e., Emergency Stop, Top Stop, and Smart Stop) (see page 5-25)
- Set the critical angle for a sensor programmed as Smart Stop (see page 5-26)
- Set the Ready signal for a green sensor (see page 5-28)
- Set the stroke count for a green special sensor (see page 5-29)

You are also shown how to change sensor settings (see page 5-30), view the sensor summary (see page 5-31), and delete sensors (see page 5-31).

#### Setting the "Auto Enable by Tool" Counter Value

If you have set Sensor Enable Mode in Initialization to AUTO BY TOOL (see page 4-18), you must set the Auto Enable by Tool counter when you first access the Die Protection Sensor Menu. The Auto Enable by Tool counter specifies the number of strokes the press must make before all sensors in the tool are re-enabled following a DISABLE SENSORS command (see *SENSOR ENABLE/DISABLE & STATUS (Optional)*, page 5-52 and *DISABLE (ENABLE) SENSORS*, page 6-6).

To set the Auto Enable by Tool counter, do the following:

1. Select DIE PROTECTION on the Tool Program Menu. The Die Protection Sensor Menu displays (see Figure 5-21) with the AUTO ENABLE COUNTER field shown to the left of the list of sensors.





Number of strokes after which DiProPAC auto enables all sensors in the tool	TOOL# 6160 DEMO TOOL 2 AUTO ENABLE COUNTER 0 STROKES USE THE CURSOR KEYS TO CHOOSE A SENSOR. PRESS THE ENTER KEY TO PROGRAM. PRESS THE RESET KEY WHEN DONE.	SENSOR 1 SENSOR 2 SENSOR 3 SENSOR 4 SENSOR 5 SENSOR 6 SENSOR 7 SENSOR 7 SENSOR 8 SENSOR 9 SENSOR 10 SENSOR 10 SENSOR 11 SENSOR 12 SENSOR 13 SENSOR 14 SENSOR 15 SENSOR 16	VIEW SENSOR SUMMARY	F1 F2 F3 F4 F5 F6 F7 F8
		SENSOR 16	SUMMARY	F6 F7 F8

Figure 5-21. Die Protection Sensor Menu with Auto Enable by Tool Counter

- 2. Select the AUTO ENABLE COUNTER field. The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 3. Key in the value you want (maximum is 99), following the directions in the window, and press ENTER. The value you keyed in displays in the AUTO ENABLE COUNTER field.
- 4. Select a sensor to program by moving the highlight bar to that sensor and pressing ENTER.

#### Naming the Sensor

When you select a sensor to program on the Die Protection Sensor Menu, the Sensor Names screen, shown in Figure 5-22, displays.

TOOL# 6160 DEMO TOOL 2	SENSOR 1 UNNAMED NOT USED	
	UNNAMED	
	"CUSTOM" NAME	
SELECT NAME FOR	AIR PRESSURE	
DIPRO SENSOR 1	BLANK FEED	
	CAM DRIVE 1	
USE CURSOR KEYS TO	CAM DRIVE 2	
CHANGE SELECTION	CLAMP PRESSURE	
PRESS ENTER TO SELECT.	DIE OVERLOAD	
RESET WHEN DONE.	END OF STOCK	
	HIGH LOOP	
	MATERIAL BUCKLE	
	MISFEED	
	MISFEED PILOT	
	OIL LEVEL	
MORE NAMES	OIL PRESSURE	

Figure 5-22. Sensor Names Screen

On this screen you can select one of the names displayed, or you can select one of the "custom" names set in Initialization (see *CUSTOM SENSOR NAMES (Optional)*, page 4-17).

To name a sensor, do the following:

- 1. Select a sensor (e.g., Sensor 1) on the Die Protection Sensor Menu. The Sensor Names screen displays.
- 2. Select from the list of names the name that best describes the function of the selected sensor.

To view names that appear below the MORE NAMES line, press the Down ( $\checkmark$ ) cursor key. A new name appears each time you press the Down ( $\checkmark$ ) cursor. When you have cycled through the complete list, the highlight bar returns to UNNAMED, the first item.

3. If none of the names in the list seem suitable but you still want to name the sensor, select "CUSTOM" NAME. The Custom Sensor Names screen, shown in Figure 5-23, page 5-23, displays.

	CUSTOM	1	CYLINDER RETURN	
CUSTOM	CUSTOM	2		
SENSOR	CUSTOM	3		
NAMES	CUSTOM	4		
	CUSTOM	5		
	CUSTOM	6		
	CUSTOM	7		
	CUSTOM	8		
	CUSTOM	9		
	CUSTOM	10		
	CUSTOM	11		
	CUSTOM	12		
	CUSTOM	13		
	CUSTOM	14		
	CUSTOM	15		
	CUSTOM	16		
USE CURS	OR KEYS	TO	SELECT A CUSTOM	
NAME. PR	ESS ENTE	R	TO PICK A NAME,	
PRESS RE	SET WHEN	I D	one.	
				- Andrewson and a second

Figure 5-23. Custom Sensor Names Screen

4. Select a "custom" name from the list. (The number of the custom name–e.g., CUSTOM 1–does not have to match the number of the sensor being programmed–e.g., SENSOR 1.)

If Sensor Enable Mode is set to AUTO BY SENSOR (see page 4-18), you are taken to the Auto Enable by Sensor Counter screen (see next section). Otherwise, the Sensor Type screen displays (see *Setting Sensor Type*, page 5-24).

#### Setting the "Auto Enable by Sensor" Counter Value

If Sensor Enable Mode is set to AUTO BY SENSOR in Initialization (see page 4-18), a screen like the one shown in Figure 5-24 displays after you enter a sensor name.



Figure 5-24. Auto Enable by Sensor Counter Screen

This screen allows you to set the Auto Enable by Sensor counter, which specifies the number of press strokes necessary to re-enable the sensor following a DISABLE SENSORS command (see *SENSOR ENABLE/DISABLE & STATUS (Optional)*, page 5-52 and *DISABLE (ENABLE) SENSORS*, page 6-6).

To set the Auto Enable by Sensor counter, do the following:

- 1. On the Auto Enable by Sensor Counter screen, select the value in the AUTO ENABLE COUNTER field. The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 2. Key in the value you want (maximum is 99), following the directions in the window, and press ENTER. The value you keyed in displays in the AUTO ENABLE COUNTER field.
- 3. Press ENTER to display the Sensor Type screen (see next section).

#### Setting Sensor Type

After you select a sensor name and, if AUTO ENABLE BY SENSOR is the Initialization setting, specify the Auto Enable stroke count, the Sensor Type screen, shown in Figure 5-25, displays. The name you selected for the sensor is shown at the right of the Status Box beneath the sensor number.



Figure 5-25. Sensor Type Screen

You can select one of six types of sensor (see *Sensor Types*, page 5-17 for details), or you can select NOT USED, in which case that sensor is not programmed for the tool.

To set the sensor type, do the following:

1. Select the sensor type you want. For all selections except UNUSED, the Sensor Stop Type screen (see next section) displays with the sensor type you selected displayed at the right of the Status Box beneath the sensor name.

If you selected UNUSED, you are returned to the Die Protection Sensor Menu. The name of the sensor you started to program is reset to SENSOR 1, SENSOR 2, etc.

#### Setting Sensor Stop Type

When you select a sensor type, the Sensor Stop Type screen, shown in Figure 5-26, displays. The Sensor Stop Type screen allows you to specify how the press is to be stopped when the die protection sensor detects a fault.



Figure 5-26. Sensor Stop Type Screen

You can select one of three Stop Type settings for the sensor: emergency stop, top stop, or smart stop. The three Stop Type options are described below.

- Emergency Stop (E-Stop). SmartPAC 2 stops the press as soon as a sensor fault is detected. You should use this setting for any die-threatening event that occurs before the critical angle, the point in the crankshaft rotation after which a stop signal to the press cannot prevent the die from closing. A typical Emergency Stop application is a sensor that monitors part ejection on the upstroke. Setting this sensor to an Emergency Stop ensures that the ram will stop on the next stroke before the die closes.
- **Top Stop.** SmartPAC 2 stops the press at the top of its stroke after a sensor fault is detected. You should use this setting for events that do not threaten the die or that occur between the critical angle and bottom dead center (BDC). A typical Top Stop application is a sensor that monitors a feed like a roll feed that takes place well into the downstroke. Setting this sensor to a Top Stop ensures that the press does not stick on the bottom as a result of a stop signal being sent just as the ram is about to contact the material.
- Smart Stop. SmartPAC 2 performs either a Top Stop or Emergency Stop depending on the angle at which the sensor fault is detected. SmartPAC 2 top-stops the press if the fault is detected after the critical angle but before bottom dead center (BDC). If the fault is detected after BDC but before the critical angle, SmartPAC 2 performs an emergency stop. A typical Smart Stop application is a sensor that monitors short feeds, which can occur either before or after the critical angle. When you select SMART STOP as the stop type, you must specify the critical angle.

To set the stop type for a sensor, do the following:

1. On the Sensor Stop Type screen, select the stop type you want (i.e., EMERGENCY STOP, TOP STOP, or SMART STOP).

If you selected SMART STOP and the critical angle has not yet been set, you are taken to the Critical Angle Programming screen (see next section).

If you selected EMERGENCY STOP or TOP STOP and the sensor you are programming is a Green, Green Quick Check, or Green Constant sensor, you are taken to the Ready Signal Programming screen (see *Setting the Ready Signal for a Green Sensor*, page 5-28).

If you selected EMERGENCY STOP or TOP STOP and the sensor you are programming is a Green Special sensor, you are taken to the Green Special Sensor Stroke Count screen (see *Setting the Counter Value for a Green Special Sensor*, page 5-29).

If you selected EMERGENCY STOP or TOP STOP and the sensor you are programming is a red or yellow sensor, you are finished, and the Sensor Settings screen displays, on which all your programmed sensor settings are shown (see *Viewing and Changing Sensor Settings*, page 5-30).

### Setting the Critical Angle for a Sensor Set to SMART STOP

When you program a sensor for a Smart Stop, you must also set the critical angle SmartPAC 2 uses to determine whether an Emergency Stop or Top Stop command is sent to the press. The critical angle you program for the first sensor set to Smart Stop is used as the critical angle for all sensors set to Smart Stop for that tool. If you change the Critical Angle setting for one Smart Stop sensor, the new critical angle is applied to all Smart Stop sensors for that tool.

To set the critical angle for the first sensor set to SMART STOP for a tool, do the following:

1. On the Sensor Stop Type screen, select SMART STOP. The Critical Angle Programming screen, shown in Figure 5-27, page 5-27, displays.

TOOL# 6160 DEMO TOOL 2	SENSOR 2 SHORT FEED	
	GREEN CONS S-S	TOP
THE CRITICAL ANGLE IS 185 D	FOR THIS TOOL EGREES.	
THIS CRITICAL ANGLE A SENSORS SET TO SMART TOOL.	PPLIES TO ALL STOP FOR THIS	
USE THE CURSOR KEYS T PRESS THE ENTER KEY W PRESS THE RESET KEY T	O CHANGE THE AN HEN DONE. O CANCEL.	GLE.

Figure 5-27. Critical Angle Programming Screen

 Decrement the CRITICAL ANGLE default value of 185°, using the Down (▼) cursor key, until the value you want is displayed. SmartPAC 2 accepts Critical Angle values between 0° and 184°.

#### NOTICE

The Critical Angle default of  $185^{\circ}$  cannot be used as your Smart Stop critical angle setting. If you attempt to enter  $185^{\circ}$  as the critical angle, a window will open, asking you to enter a different value.

3. Press ENTER when you are done.

If the sensor you are programming is a Green, Green Quick Check, or Green Constant sensor, the Ready Signal Programming screen displays (see next section).

If the sensor you are programming is a red or yellow sensor, you are finished, and you are taken to the Sensor Settings screen (see *Viewing and Changing Sensor Settings*, page 5-30).

After you have programmed one or more Smart Stop sensors, you can change the critical angle by performing these steps:

- 1. On the Die Protection Sensor Menu, select a sensor programmed as Smart Stop. The Sensor Settings screen (see Figure 5-30, page 5-30) displays.
- 2. Select SMART STOP. The Sensor Stop Type screen displays with SMART STOP highlighted.
- 3. Press F5 (Set Critical Angle) to display the Critical Angle Programming screen.
- 4. Change the Critical Angle setting, using the Up ( $\checkmark$ ) and Down ( $\checkmark$ ) cursor keys.

# NOTICE

The critical angle can only be set for values between  $0^{\circ}$  and  $184^{\circ}$ . If you attempt to enter  $185^{\circ}$  as the critical angle, a window will open, asking you to enter a different value.

#### Setting the Ready Signal for a Green Sensor

After you select the stop type for a Green, Green Quick Check, or Green Constant sensor, the Ready Signal Programming screen, shown in Figure 5-28, displays.



Figure 5-28. Ready Signal Programming Screen

On this screen, you set the Ready signal for Green, Green Quick Check, and Green Constant sensor types. The Ready signal is the timing window during which the sensor must actuate to prevent SmartPAC 2 from sending a stop signal to the press. In the example shown in Figure 5-28, the Ready On signal is set to 180°, the Ready Off signal to 265°.

For Green and Green Quick Check sensors, you set the Ready signal so that it is a little longer than the sensor's actuation time. You set the Ready signal for Green Constant sensors so that it is a little shorter than the sensor's actuation time. See *Understanding Sensor Terminology*, page 5-16 for more information.

# NOTICE

The Ready signal you set in Program mode can be fine-tuned in Run mode after you have run the press. See *Adjusting the Ready Signal for Green Sensors*, page 6-11 for details.

To set the Ready signal, do the following:

# NOTICE

If you do not know how to use the cursor keys to set sensor Ready signal timing, see page 3-7.

1. On the Ready Signal Programming screen, set the Ready On angle on the crank angle clock, using the Left ( ◀ ) and Right ( ▶ ) cursor keys.

As you press the Left ( $\triangleleft$ ) cursor key, the On cursor moves counterclockwise around the display, and the On angle value decreases. When you press the Right ( $\triangleright$ ) cursor key, the On cursor moves clockwise around the display, and the On angle value increases.

The precise On angle value is displayed in the window inside the clock display.

Set the Ready Off angle on the crank angle clock, using the Up (▲) and Down (▼) cursor keys.

As you press the Up ( $\checkmark$ ) cursor key, the Off cursor moves clockwise around the display, and the Off angle increases. As you press the Down ( $\checkmark$ ) cursor key, the Off cursor moves counterclockwise around the display, and the Off angle decreases.

The precise Off angle value is displayed in the window inside the clock display.

- 3. When you have finished setting the Ready On and Ready Off angles, press RESET. The Sensor Settings screen (see Figure 5-30, page 5-30) displays with all your sensor settings shown.
- 4. If you want to change any settings, refer to *Viewing and Changing Sensor Settings*, page 5-30).

Otherwise, press RESET to return to the Die Protection Sensor Menu. The highlight bar automatically scrolls down to the next sensor displayed on the menu.

#### Setting the Counter Value for a Green Special Sensor

After you select the stop type for a Green Special sensor, the Green Special Sensor Stroke Count screen, shown in Figure 5-29, displays. On this screen, you set the number of strokes in the interval between required Green Special sensor actuations.



Figure 5-29. Green Special Sensor Stroke Count Screen

# NOTICE

For more information about Green Special sensors, refer to *Understanding Sensor Terminology*, page 5-16.

To set the Green Special sensor stroke count, do the following:

- On the Green Special Sensor Stroke Count screen, increment or decrement the stroke counter (maximum value is 99), using the Up (▲) or Down (▼) cursor key, until the value you want is displayed.
- 2. Press RESET. The Sensor Settings screen (see Figure 5-30) displays with all your sensor settings shown.
- 3. If you want to change any settings, refer to *Viewing and Changing Sensor Settings* (next section).

Otherwise, press RESET again to return to the Die Protection Sensor Menu. The highlight bar automatically scrolls down to the next sensor displayed on the menu.

#### Viewing and Changing Sensor Settings

When you finish making settings for a sensor, you are taken to a screen like the one shown in Figure 5-30, which displays all your sensor settings.

TOOL# 6160 DEMO TOOL 2	DIPRO SENSOR 1
SENSOR NAME	PART EJECTION
SENSOR TYPE	GREEN
STOP TYPE	E-STOP
READY WINDOW	180 TO 265
SE THE CURSOR	KEYS TO SELECT AN ITEM.
RESS THE ENTER	R KEY TO CHANGE IT. PRESS
HE RESET KEY V	WHEN DONE.

Figure 5-30. Sensor Settings Screen

This screen also displays whenever you select a programmed sensor on the Die Protection Sensor Menu.

To change sensor settings, do the following:

1. On the Sensor Settings screen, select the setting you want to change. The screen on which that setting is programmed displays. For example, if you select the SENSOR NAME setting, the Sensor Names screen (Figure 5-22, page 5-22) displays.

- 2. Change the setting on the displayed screen.
- 3. Press RESET when you are finished to return to the Sensor Settings screen.
- 4. Repeat steps 1 through 3 for each setting you want to change.
- 5. Press RESET when you have finished changing settings on the Sensor Settings screen. You are returned to the Die Protection Sensor Menu.

#### Viewing the Sensor Summary

You can view a summary of the settings that have been made for all programmed sensors shown on the Die Protection Sensor Menu, including the critical angle that has been set for the tool. To view the summary, do the following:

1. On the Die Protection Sensor Menu, press **F6** (View Sensor Summary). The Sensor Summary screen, shown in Figure 5-31, displays. This screen shows the sensor name, sensor type, stop type, and the Ready signal On and Off angles for Green, Green Quick Check, and Green Constant sensors or the stroke count for Green Special sensors.

TOOL# 6160 DEMO TOOL 2 CRITICAL ANGLE = 150	
1 PART EJECTIONGRNES 180/2652 SHORT FEEDGRN CONSS 100/1653 SLUG DETECTIONGRN SPEC ES6	
PRESS THE RESET KEY WHEN DONE.	

Figure 5-31. Sensor Summary Screen

#### **Deleting a Sensor**

To delete a Die Protection sensor, do the following:

- 1. On the Die Protection Sensor Menu, select the sensor you want to delete. The Sensor Settings screen displays.
- 2. Select the Sensor Type. The Sensor Type screen appears.
- 3. Select NOT USED. You are returned to the Die Protection Sensor Menu with the name of the sensor you selected in step 1 removed and a caption specifying the sensor number (e.g., SENSOR 1, SENSOR 2, etc.) displayed.

# Programming DiProPAC 32 Sensors

When DiProPAC 32 is an installed option, two menu choices appear on the Tool Program Menu in place of the DIE PROTECTION item: DIPROPAC 1-16 and DIPROPAC 17-32 (see Figure 5-32). You program the first sixteen DiProPAC 32 sensors, using the DIPROPAC 1-16 menu item. You select the DIPROPAC 17-32 item to program sensors 17-32.



Figure 5-32. Tool Program Menu with DIPROPAC 1-16 and DIPROPAC 17-32 Items

The first sixteen DiProPAC 32 sensors are programmed in exactly the same way you program DiProPAC 8 and DiProPAC 16 sensors. If you are programming sensors 17-32 as red or yellow sensors, procedures are also the same as for DiProPAC 8 and DiProPAC 16.

When you program sensors 17-32 as green sensors, you must handle them differently. When programmed as green, green quick check, and green constant sensors, sensors 17-32 must use the same Ready signal as an already programmed green, green quick check, or green constant sensor among sensors 1-16. When programmed as green special sensors, sensors 17-32 must use the same stroke count as an already programmed green special sensor among sensors 1-16.

When planning the sensors to be assigned to each DiProPAC 32 input, make sure to reserve sensor positions 1-16 for green sensors only. Also, if you are using multiple green sensors for the same function (e.g., transfer, stripper, slug detection, etc.), program only one of the sensor positions 1-16 for this application, leaving sensor positions 17-32 for programming the remaining sensors in the group.

#### Programming Sensors 17-32 as Green, Green Quick Check, or Green Constant

To program a sensor in the group of sensors 17-32 as a green, green quick check, or green constant sensor, do the following, referring to the appropriate sections of *Programming Sensor Settings* (see page 5-20) if necessary:

1. On the Tool Program Menu (see Figure 5-32) select the DIPROPAC 17-32 item. The Die Protection Sensor 17-32 Menu (see Figure 5-33, page 5-33) displays.

TOOL# 6160 DEMO TOOL 2 USE THE CURSOR KEYS TO CHOOSE A SENSOR. PRESS THE ENTER KEY TO PROGRAM. PRESS THE RESET KEY WHEN DONE.	SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR SENSOR	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	F1 F2 F3 F4 F5 VIEW SENSOR SIDMARY F6 F7
			F8

Figure 5-33. Die Protection Sensor 17-32 Menu

2. Select the sensor number that you want to program. The Sensor Names screen (see Figure 5-34) displays.

TOOL# 6160	SENSOR 17
DEMO TOOL 2	UNNAMED
CRITICAL ANGLE 100	NOT USED
	OIL PRESSURE
	OVER FEED
SELECT NAME FOR	OVERLOAD
DIPRO SENSOR 1	PART EJECTION
	PUNCH KNOCKOUT
USE CURSOR KEYS TO	SHORT FEED
CHANGE SELECTION	SLUG DETECTION
PRESS ENTER TO SELECT.	STOCK LUBE
RESET WHEN DONE.	STOCK THICKNESS
	STOCK WIDTH
	STRIPPER
	TRANSFER
	DIE AIR PRESSURE
MODE NAMES	DIE LOBE LEVEL
MORE NAMES*	SLOG AIR PRESSORE

Figure 5-34. Sensor Names Screen with Stripper Function Highlighted

3. Select a function for the sensor. ("Stripper" is used as an example in Figure 5-34.) The Sensor Type screen (see Figure 5-35, page 5-34) displays.

TOOL# 6160 DEMO TOOL 2 CRITICAL ANGLE 100	SENSOR 17 STRIPPER NOT USED	
NOT USED RED (NC) YELLOW (NO)	GREEN QUICK CHECK GREEN CONSTANT GREEN SPECIAL	
USE THE CURSOR KEYS TYPE. PRESS ENTER TO RESET WHEN DONE.		
USE THE CURSOR KEYS TYPE. PRESS ENTER TO RESET WHEN DONE.		

Figure 5-35. Sensor Type Screen with "GREEN" Highlighted

4. Select the sensor type (i.e., GREEN, GREEN QUICK CHECK, or GREEN CONSTANT). The Sensor Stop Type screen (see Figure 5-36) displays.

TOOL# 6160 DEMO TOOL 2 CRITICAL ANGLE 100	SENSOR 17 STRIPPER GREEN	E-STOP		F1 F2
EMERGENCY S TOP STOP SMART STOP	TOP			<b>F</b> 3 <b>F</b> 4
USE THE CURSOR KEYS TO	CHANGE		SET CRITICAL ANGLE	F5 F6
TO SELECT. PRESS RESET	S ENTER			F7 F8

Figure 5-36. Sensor Stop Type Screen

5. Select the stop type you want. The Sensor Summary screen displays (see Figure 5-37, page 5-35) with the Ready signal On and Off angles shown for each green sensor programmed in the group of sensors 1-16. Sensors are displayed in ascending On angle order.
| TOOL# 6160<br>DEMO TOOL 2 |            |            |  |
|---------------------------|------------|------------|--|
| 2 SHORT FEED              | GRN CON    | SS 4/160   |  |
| 7 STRIPPER                | GRN        | TS 166/194 |  |
| 1 PART EJECTION           | GRN        | ES 240/ 0  |  |
| 5 CYLINDER RETURN         | GRN QC     | ES 275/ 23 |  |
| USE THE CURSOR KEYS       | 5 TO SELEC | T A SENSOR |  |
| TO LINK TO. PRESS T       | THE ENTER  | KEY TO     |  |
| STIECT IT DEFS D          | TSET WHEN  | DONE       |  |

Figure 5-37. Sensor Summary Screen Showing Ready Signals for Green Sensors

6. Select the Ready signal you want. The Sensor Settings screen displays (see Figure 5-38), showing the sensor name, sensor type, stop type, and Ready signal On and Off angles you have selected. The screen also shows the number of the sensor in the group of sensors 1-16 whose Ready signal is being used as the Ready signal for the sensor you are programming.

TOOL# 6160 DEMO TOOL 2	DIPRO SENSOR 17	
SENSOR NAME SENSOR TYPE STOP TYPE	STRIPPER GREEN T-STOP	
READI WINDOW	100 TO 194 LINKED - 7	
USE THE CURSOR PRESS THE ENTER THE RESET KEY V	KEYS TO SELECT AN ITEM. R KEY TO CHANGE IT. PRESS WHEN DONE.	

Figure 5-38. Sensor Settings Screen

7. Press RESET to return to the Die Protection Sensor 17-32 Menu.

#### Programming a Sensor as Green Special

To program one of the sensors in the group of sensors 17-32 as a green special sensor, perform the following steps, referring to the appropriate sections of *Programming Sensor Settings* (see page 5-20) if necessary:

1. Perform steps 1 and 2 of the *Programming Sensors 17-32 as Green, Green Quick Check, or Green Constant* procedure, page 5-32. The Sensor Names screen (see Figure 5-39) displays.



Figure 5-39. Sensor Names Screen with Slug Detection Function Highlighted

2. Select a function for the sensor. ("Slug Detection" is used as an example in Figure 5-39.) The Sensor Type screen (see Figure 5-40) displays.

TOOL# 6160 DEMO TOOL 2 CRITICAL ANGLE 100	SENSOR 18 SLUG DETECTION NOT USED	
NOT USED RED (NC) YELLOW (NO)	GREEN GREEN QUICK CHECK GREEN CONSTANT GREEN SPECIAL	
USE THE CURSOR KEYS I TYPE. PRESS ENTER TO RESET WHEN DONE.	O CHANGE SENSOR SELECT. PRESS	
2-1		

Figure 5-40. Sensor Type Screen with "GREEN SPECIAL" Highlighted

3. Select GREEN SPECIAL from the Sensor Type items.

4. When the Sensor Stop Type screen displays, select a stop type. The Sensor Summary screen (see Figure 5-41) displays with the stroke count shown for each green special sensor programmed in the group of sensors 1-16.

			_	
4 SLUG DETECTIO	on gri	N SPEC E	S 5	

Figure 5-41. Sensor Summary Screen Showing Stroke Counts for Green Special Sensors

5. Select the green special stroke count you want. The Sensor Settings screen (see Figure 5-42) displays, showing the name of the sensor, sensor type, stop type, and stroke count you have selected. The screen also shows the number of the sensor in the group of sensors 1-16 whose stroke count is being used as the stroke count for the sensor you are programming.

TOOL# 6160 DEMO TOOL 2	DIPRO SENSOR 18	
SENSOR NAME SENSOR TYPE STOP TYPE SPECIAL COUNT	SLUG DETECTION GREEN SPEC E-STOP 5 LINKED - 4	
USE THE CURSOR D PRESS THE ENTER THE RESET KEY W	KEYS TO SELECT AN ITEM. KEY TO CHANGE IT. PRESS HEN DONE.	

Figure 5-42. Sensor Settings Screen

6. Press RESET to return to the Die Protection Sensor 17-32 Menu.

## CAM SWITCH (Optional)

(PROGRAM – GO TO THE TOOL MANAGER – select tool – F4-EDIT TOOL – CAM SWITCH)

#### **A** DANGER

#### PROGRAMMABLE CAM SWITCH NOT FOR SAFETY USE

Use SmartPAC 2's programmable cam switch to control auxiliary functions only. The SmartPAC 2 programmable cam capability should never be used to provide timing signals for any safety use including clutch/brake control or muting of light curtains.

Failure to comply with these instructions will result in death or serious injury.

#### NOTICE

#### MAXIMUM NUMBER OF TIMED AND AUTO ADVANCE CHANNELS PER TOOL

Each tool can have up to four Timed Output cam channels and up to two Auto Advance channels.

#### NOTICE

For help with the Cam Channel Menu and screens accessible from it, press the HELP key when the applicable screen is displayed.

This item, which appears on the Tool Program Menu only when ProCamPAC is installed, enables you to program up to 8 (for 8-channel ProCamPAC) or 16 (for 16-channel ProCamPAC) cam channels. Cam channel settings are made via the Cam Channel Menu, which is shown in Figure 5-43.

TOOL# 6160 DEMO TOOL 2	3 TOP STOP 4 PART BLOW 5 CUTOFF	OFF	<b>F1</b>
USE THE CURSOR KEYS TO CHOOSE A CAM CHANNEL. PRESS THE ENTER KEY TO PROGRAM. PRESS THE RESET KEY WHEN DONE.	6 SPRAY LUBE 7 SCRAP CHOP: 8 CONVEYOR 9 CHANNEL 9 10 CHANNEL 10 11 CHANNEL 11 12 CHANNEL 12 13 CHANNEL 13 14 CHANNEL 15 16 CHANNEL 16	PER VIEW GLOBAL CAM SUMMARY VIEW CAM SUMMARY	F2 F3 F4 F5 F6 F7 F8

#### Figure 5-43. Cam Channel Menu

(ProCam 16-sensor option shown. Your display may look different.)

Names you have assigned to cam channels in Initialization are displayed on the Cam Channel Menu in place of the default channel numbers (see *SELECT CAM NAMES (Optional)*, page 4-10).

Channel numbers that are missing from the menu have been programmed as "global" cams in Initialization (see *SET GLOBAL CAMS (Optional)*, page 4-15). To view global cam channels, press **F5** (View Global Cam Summary) (see page 5-47).

#### Selecting a Cam Channel

To make cam settings, you must first select a channel. To do so, perform the following steps:

#### NOTICE

DO NOT USE CHANNEL 6, 7, OR 8 WHEN USING THE ASSOCIATED BATCH COUNTERS.

Cam channels 6, 7, and 8 are also used for batch counters 1, 2, and 3.

1. Select CAM SWITCH on the Tool Program Menu. The Cam Channel Menu displays.



Figure 5-44. "Enter Your Password" Screen

2. Select a cam channel to program. The Cam Channel Program Type Menu, shown in Figure 5-45, displays.



Figure 5-45. Cam Channel Program Type Menu

Instructions for programming cam channels, using each of the program types shown on the Cam Channel Program Type Menu, are provided in the following sections.

## Making an ON/OFF Setting

The PROGRAM ON/OFF ANGLES item on the Cam Channel Program Type Menu enables you to program the crankshaft angles at which a selected cam channel turns on and off. You can program up to four on/off sequences per stroke. To make a single on/off setting for a selected cam channel, perform the following steps (to make multiple on/off settings, see *Setting Multiple ON/OFF Cycles*, page 5-41):

1. Select PROGRAM ON/OFF ANGLES on the Cam Channel Program Type Menu. The Cam Channel On/Off Program screen, shown in Figure 5-46, displays.



Figure 5-46. Cam Channel On/Off Program Screen

 Set the On angle on the crank angle clock, using the Left ( ↓ ) and Right ( ▶ ) cursor keys. Refer to Using Cursor Keys to Set Timing, page 3-7 if you need help.

As you press the Left (  $\triangleleft$  ) cursor key, the On cursor moves counterclockwise around the display, and the On angle value decreases. When you press the Right (  $\triangleright$  ) cursor key, the On cursor moves clockwise around the display, and the On angle value increases.

The precise On angle value is displayed in the window inside the clock display.

3. Set the Off angle on the crank angle clock, using the Up ( $\checkmark$ ) and Down ( $\checkmark$ ) cursor keys.

As you press the Up ( $\checkmark$ ) cursor key, the Off cursor moves clockwise around the display, and the Off angle increases. As you press the Down ( $\checkmark$ ) cursor key, the Off cursor moves counterclockwise around the display, and the Off angle decreases.

The precise Off angle value is displayed in the window inside the clock display.

4. Press RESET when you are finished to return to the Cam Channel Program Type Menu.

## Setting Multiple ON/OFF Cycles

SmartPAC 2 with ProCamPAC enables you to set more than one On/Off event (or cycle) for selected cam channels. You can program up to four On/Off events for a single channel and up to six additional On/Offs for all channels. The six-cycle maximum applies to both 8-channel and 16-channel ProCamPAC. Additional On/Offs you set for global cam channels (see *SET GLOBAL CAMS (Optional)*, page 4-15) count toward the six-cycle maximum.

Table 5-2 gives examples of how you might use the extra ON/OFFs on an 8-channel ProCamPAC.

Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8	Total ON/ OFFs	Total Extra ON/ OFFs
1	1	1	1	1	1	1	1	8	0
1	2	2	1	1	1	2	1	11	3
1	2	2	2	2	2	2	1	14	6
4	4	1	1	1	1	1	1	14	6

Table 5-2. Additional On/Off Settings, 8-channel Unit: Examples

To set more than one on/off cycle for a cam channel, do the following:

 Make the first On/Off setting as instructed in *Making an ON/OFF Setting*, page 5-40. Figure 5-47 shows the Cam Channel On/Off Program screen set for an On angle of 228° and an Off angle of 259°. Note the caption at the upper left of the screen indicating that Arc 1 is selected.



Figure 5-47. Cam Channel On/Off Program Screen: One On/Off Arc

2. Press **F6** (Add a New Arc) on the Cam Channel On/Off Program screen to program a second On/Off cycle. The arc you set in step 1 (i.e., Arc 1) turns dark gray. A new arc appears as a green line at the zero (0) position on the crank-angle clock, and the caption at the left of the screen changes to SELECTED ARC–2.

## NOTICE

A new arc always starts at  $0^{\circ}$ . If one of the arcs you want to program is located near  $0^{\circ}$ , program it last. If you find that you have too many arcs at  $0^{\circ}$ , delete channel settings (see page 5-46) and start over again.

3. Program the second arc. Figure 5-48 shows the Cam Channel On/Off Program screen with Arc 2 programmed for an On Angle of 299° and an Off angle of 318°.



Figure 5-48. Cam Channel On/Off Program Screen: Two On/Off Arcs

- 4. Repeat steps 2 and 3 to add additional arcs. Figure 5-49, page 5-43 shows the Cam Channel On/Off Program screen with a third arc programmed for an On angle of 14° and an Off angle of 44°.
- 5. If you want to adjust On/Off settings for a previously programmed arc, press F7 (Select Arc) one or more times until the highlighting for that arc turns green, then use the cursor keys to change the On and/or Off angles.

## NOTICE

To delete an On/Off arc for a multi-arc cam channel, you must delete all settings for the channel (see page 5-46) and program the On/Off outputs again.

6. Press RESET when you have finished to return to the Cam Channel Program Type Menu.



Figure 5-49. Cam Channel On/Off Program Screen: Three On/Off Arcs

#### Making a Timed Output Setting

#### NOTICE

#### MAXIMUM NUMBER OF TIMED CHANNELS PER TOOL

Each tool can have up to four Timed Output cam channels.

The PROGRAM TIMED OUTPUT item on the Cam Channel Program Type Menu enables you to program the crankshaft angles at which a selected cam channel turns On and the time, or dwell, in milliseconds that the channel stays On.

A Timed Output setting is independent of press speed—with On/Off cam outputs, the time that the cam is On during the On-Off cycle decreases with press speed—and is recommended for functions such as controlling air and lubrication. This type of cam output also ensures that the channel will turn off after the programmed time. With On/Off cam settings, the channel stays on if the press stops within the On/Off window, potentially wasting air or lube.

To set a Timed Output for a cam, do the following:

- 1. Select PROGRAM TIMED OUTPUT on the Cam Channel Program Type Menu. The Cam Channel Timed Output Program screen, shown in Figure 5-50, page 5-44, displays.
- 2. Set the On angle on the crank angle clock, using the Left ( ◀ ) and Right ( ▶ ) cursor keys, referring to *Using Cursor Keys to Set Timing*, page 3-7 if you need help.

As you press the Left ( $\triangleleft$ ) cursor key, the On cursor moves counterclockwise around the display, and the On angle value decreases. When you press the Right ( $\triangleright$ ) cursor key, the On cursor moves clockwise around the display, and the On angle value increases.

The precise On angle value is displayed next to the Angle caption in the window inside the clock display. In Figure 5-50 the On angle is set to 223°.



Figure 5-50. Cam Channel Timed Output Program Screen

- Set the On time in milliseconds (maximum is 500 mS, or 0.5 seconds), using the Up (▲) cursor key to increment the Time value displayed in the window and the Down (▼) cursor key to decrement the Time value. The Time value changes in increments of 10 mS. In Figure 5-50, the On time is set to 350 mS.
- 4. Press RESET when you are finished to return to the Cam Channel Program Type Menu.

### NOTICE

#### FOR APPLICATIONS REQUIRING MORE THAN 500 MILLISECONDS

If you have an application where an On time of more than 500 milliseconds is required, do the following. Program one of the batch counters to a preset of "1," set the Counter Increment Angle to the desired On angle and the Output Mode to PULSE. Then program the Pulse Time to the cam On time you want (e.g., 600 mS). See *Setting Batch Counter Output and Increment Modes*, page 5-13.

#### Making an Auto Advance Setting

### NOTICE

You can program up to two Auto Advance output settings in Program mode. The first advance constant set in Initialization mode controls the lowest-numbered Auto Advance channel in Program mode. Likewise, the second advance constant controls the next numerically higher Auto Advance channel. If channels 3 and 5, for example, are programmed as Auto Advance, channel 3 will use the first advance constant, channel 5 the second advance constant. See *AUTO ADVANCE and Slow RPM (Optional)*, page 4-12 for more information.

The PROGRAM AUTO ADVANCE item on the Cam Channel Program Type Menu enables you to program up to two cam channels as Auto Advance and to set On and Off angles for those channels. Auto Advance cam settings automatically compensate for changes in press speed, advancing cam timing as the speed of the press increases, delaying timing as speed decreases. An Auto Advance cam channel is often used for Top Stop because it ensures that the press will top-stop at the same angle regardless of varying press speeds. Auto Advance settings are also used for feed, pilot release, lube, or other speed-sensitive application.

To program an Auto Advance cam channel, do the following:

1. Select PROGRAM AUTO ADVANCE on the Cam Channel Program Type Menu. The Cam Channel Auto Advance Program screen, shown in Figure 5-51, displays.



Figure 5-51. Cam Channel Auto Advance Program Screen

2. Set the AutoOn angle on the crank angle clock, using the Left ( ◀ ) and Right ( ▶ ) cursor keys, referring to *Using Cursor Keys to Set Timing*, page 3-7 if you need help.

As you press the Left ( $\triangleleft$ ) cursor key, the On cursor moves counterclockwise around the display, and the AutoOn angle value decreases. When you press the Right ( $\blacklozenge$ ) cursor key, the On cursor moves clockwise around the display, and the AutoOn angle value increases.

The precise AutoOn angle value is displayed in the window inside the clock display. In Figure 5-51, the AutoOn angle is set to 288°.

3. Set the Off angle on the crank angle clock, using the Up ( $\checkmark$ ) and Down ( $\checkmark$ ) cursor keys.

As you press the Up ( $\checkmark$ ) cursor key, the Off cursor moves clockwise around the display, and the Off angle value increases. As you press the Down ( $\checkmark$ ) cursor key, the Off cursor moves counterclockwise around the display, and the Off angle value decreases.

The precise Off angle value is displayed in the window inside the clock display. In Figure 5-51, the Off angle is set to 311°.

4. Press RESET when you are finished to return to the Cam Channel Program Type Menu.

#### Setting DSV ON Channel Timing

The PROGRAM DSV ON item on the Cam Channel Program Type Menu enables you to set the amount of time (in seconds) after the press stops that a DSV On cam channel remains on. A DSV On cam channel turns on when the Dual Safety Valve is energized and the press starts and turns off when the DSV is de-energized and the press stops. You set the DSV delay time on the Cam Channel DSV On Program Screen, which is shown in Figure 5-52.



Figure 5-52. Cam Channel DSV On Program Screen

DSV On cam channel programming is useful for controlling conveyors and other accessories that must operate for a short time after the press stops. Instead of setting a specific time for the Off delay, you can select the OUTPUT FOLLOWS RESOLVER MOTION setting, which keeps the cam channel on until resolver rotation falls to 6 SPM.

To set the DSV delay time, do the following:

- 1. Select PROGRAM DSV ON on the Cam Channel Program Type Menu. The Cam Channel DSV On Program screen displays.
- Increment or decrement the OFF DELAY TIME value (maximum is 254 seconds), using the Up (▲) or Down (▼) cursor key

or

Select the OUTPUT FOLLOWS RESOLVER MOTION setting by pressing the Down ( $\checkmark$ ) cursor key with "0" (zero) displayed in the OFF DELAY TIME field or the Up ( $\checkmark$ ) cursor key with "254" displayed in the OFF DELAY TIME field.

3. Press RESET when you are done to return to the Cam Channel Program Type Menu.

#### **Deleting Channel Settings**

The DELETE CHANNEL SETTINGS item on the Cam Channel Program Type Menu enables you to delete programmed settings for a selected cam channel. When you delete cam channel settings, all programmed angles and times return to 0 (zero). To delete settings for a selected cam channel, do the following:

1. Select DELETE CHANNEL SETTINGS on the Cam Channel Program Type Menu. The following window displays, asking you to confirm that you want to delete cam settings.

PRESS THE CLEAR KEY IF YOU REALLY
WANT TO DELETE THIS CHANNEL. PRESS
THE RESET KEY IF YOU DO NOT.

Figure 5-53. Cam Channel Deletion Confirmation Window

2. Press CLEAR to delete the channel. You are returned to the Cam Channel Menu.

#### Viewing the Cam Summary

Once cam channels have been programmed, you can view their settings on a summary screen accessible from the Cam Channel Menu.

To view this screen, do the following:

1. Press **F6** (View Cam Summary) on the Cam Channel Menu. The Cam Summary screen, shown in Figure 5-54, displays with the name, program type, and programmed settings shown for each programmed cam channel. Global cams are not displayed on this screen (see *Viewing Global Cams*, below).

TOOL# 6160 DEMO TOOL 2		
3 TOP STOP 4 PART BLOW OFF 5 CUTOFF 6 SPRAY LUBE 14/44 0/0	AUTO 288/311 TIMED 223-350 ON/OFF 160/180 ON/OFF 228/259 299/3	LB
DDFCC THE DFC	FT KEY WHEN DONE	

Figure 5-54. Cam Summary Screen

#### Viewing Global Cams

Global cams, which are programmed in Initialization mode (see *SET GLOBAL CAMS* (*Optional*), page 4-15), are cam channels that can be used with any tool set up on your SmartPAC 2. Global cams can be programmed for any channel except channels 6, 7 and 8 and, once set, cannot be programmed for individual tools. You cannot change global cam settings in Program mode, but you can view them as you are programming other cams.

To view global cams, do the following:

1. Press **F5** (View Global Cam Summary) on the Cam Channel Menu. The Global Cam Summary screen (see Figure 5-55) displays with the name, program type, and programmed settings shown for each channel set as a global cam.

GLOBA	L CAMS		
1 HYD	OVR RESET	ON/OFF 350/10	
2 LUE	E POLSE	ON/OFF 280/300	
PR	ESS THE RES	SET KEY WHEN DONE	

Figure 5-55. Global Cam Summary Screen

## PRESS CONTROL

(PROGRAM – GO TO THE TOOL MANAGER – select tool – F4-EDIT TOOL – PRESS CONTROL)

### NOTICE

For help with the Press Control screen, press the HELP key when the screen is displayed.

This item on the Tool Program Menu enables you to program the following press control parameters for each tool:

- Top-stop angle
- Maximum and minimum press speed limits
- Counterbalance setpoint

Settings are made on the Press Control Parameters screen, which is shown in Figure 5-56, page 5-49.

The top-stop angle is the crankshaft angle at which the Top-stop command is given on your press. This value is set by default to the Initialization Top Stop Default setting (see *Setting the Top-stop Angle*, page 4-28). You can change the default setting for each tool to account for differences in die weight, press speed, etc.

PRESS CONTROL PARAMETERS TOP STOP ANGLE 211 DEGREES MAX. PRESS SPEED 200 SPM MIN. PRESS SPEED 8 SPM	
TOP STOP ANGLE     211 DEGREES       MAX. PRESS SPEED     200 SPM       MIN. PRESS SPEED     8 SPM	
MAX. PRESS SPEED 200 SPM MIN. PRESS SPEED 8 SPM	
MIN. PRESS SPEED 8 SPM	
CHER BAL SEEDOTHE O DOT	
CNIR BAL SEIPOINI O PSI	
USE CURSOR KEYS TO CHOOSE THE VALUE YOU WANT TO CHANGE. PRESS THE ENTER KEY TO CHANGE IT. PRESS RESET WHEN DONE.	

Figure 5-56. Press Control Parameters Screen

The maximum and minimum speed limit settings are provided to allow programming of tools run on a variable-speed press. They apply to all Run operating modes—Continuous, Single-stroke, and Inch. When the speed of the press exceeds the maximum limit, SmartPAC 2 stops the press and displays the fault message "Maximum press speed exceeded." When press speed drops below the minimum limit, SmartPAC 2 stops the press and displays the fault message "Minimum press and displays the fault message are documented in Chapter 7 (see page 7-30).

The counterbalance setpoint is used together with the counterbalance tolerance you set in Initialization (see *Setting Clutch and Counterbalance Air Pressure Limits*, page 4-29) to specify the pressure range outside of which an F46 (Counterbalance Air Outside Sensor Limits) error displays on the SmartPAC 2 LCD. This field will not display if the Initialization tolerance value is set to zero (0).

To make settings on this screen, do the following:

1. Select PRESS CONTROL on the Tool Program Menu. The Press Control Parameters screen displays.



Figure 5-57. "Enter Your Password" Screen

## NOTICE

If you have installed a keylock switch to prevent changes to WPC 2000 settings, the following message is displayed at the bottom of the screen:

THE PRESS CONTROL EDIT MODE IS LOCKED See Additional Security, page 4-52.

- 2. Select the item you want to program. The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 3. Use the number keys to replace the default value with the setting you want, following the directions in the window, and press ENTER. The window closes, and your entry appears in the field you selected in step 2.
- 4. Repeat steps 2 and 3 for each item you want to program.

## NOTICE

- The value you enter in the MAXIMUM PRESS SPEED field must be greater than the Minimum Press Speed value. If the Maximum Speed setting is less than or equal to the Minimum Speed value, SmartPAC 2 changes the Maximum Speed to one Stroke per Minute greater than the Minimum Speed.
- To disable speed control, set both Maximum and Minimum Speed values to zero (0).
- 5. When you are finished, press RESET to return to the Tool Program Menu.

## TOOL INFORMATION

(PROGRAM – GO TO THE TOOL MANAGER – select tool – F4-EDIT TOOL – TOOL INFORMATION)

## NOTICE

- The Tool Information screen provides a convenient place to record information about the tool. It does not control any aspect of press operation.
- This feature is not available if you have the optional PLC interface installed.

This item on the Tool Program Menu enables you to record information about the tool you are programming that may be helpful to operators and setup personnel. You enter information on the Tool Information screen, which is shown in Figure 5-58, page 5-51.

The Tool Information screen allows you to enter up to six parameters and up to two lines of memo text. The names, units of measurement, and number of decimal places for the parameters are set in Initialization mode (see *TOOL INFORMATION*, page 4-19).

TOOL# 6160 PASS LINE HT STRAIGHTENER HYD. OVLD. PRESS SPEED CONVEYOR PART LUBE	INFORMATI 4.50 4.25 100 65 NO YES	IN IN TONS SPM	CAMB IE AL ESPANOL	F1 F2 F3
MEMO BOX CAREFULLY DIE PLACEM	CHECK ENT		LINE 1 OF THE MEMO LINE 2 OF THE MEMO	F4 F5 F6
USE CURSOR KEYS WANT TO CHANGE. CHANGE IT. PRES	TO CHOOSE PRESS THE S RESET KE	THE VALUE YOU ENTER KEY TO Y WHEN DONE.		F7 F8

Figure 5-58. Tool Information Screen

To enter tool information, do the following:

1. Select TOOL INFORMATION on the Tool Program Menu. The Tool Information screen displays.



Figure 5-59. "Enter Your Password" Screen

- 2. Select a desired parameter. The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 3. Key in the value you want, following the directions in the Numeric Entry window. For Yes/No items, key in "0" for NO, "1" for YES. Press ENTER when you are finished. You are returned to the Tool Information screen with your entry displayed in the field you selected in step 2.
- 4. Repeat steps 2 and 3 to enter other parameters, as necessary.
- 5. To enter text into the memo box, press **F5** for the first line, **F6** for the second line. When the Alphabetic Entry window (Figure 5-10, page 5-9) displays, key in your entry, following the directions in the window, and press **F6**. The window closes, and your entry appears on the first or second line of the memo box.

6. When you have finished entering tool information, press RESET to return to the Tool Program Menu.

## **SENSOR ENABLE/DISABLE & STATUS (Optional)**

[PROGRAM - SENSOR ENABLE/DISABLE & STATUS]

### NOTICE

For help with this menu item, press the HELP key.

This item, which appears on the Main Program Menu only when DiProPAC is installed, enables you to view the status of your die protection sensors, enable or disable all the sensors shown on the screen, and turn a selected sensor On or Off. You perform these tasks on the Sensor On/Off Status screen, which is shown in Figure 5-60.

SENSOR	R ON/OFF STATUS		ī
ENABLE MODE = A	AUTO BY TOOL		Ľ
SENSORS ENABLED	,	E2	2
DIE PROTECTION	PROCESS MONITOR		2
SENSOR 1 = OFF	INPUT 1 = ON	E3	3
SENSOR $2 = ON$	INPUT $2 = ON$		2
SENSOR $3 = ON$	INPUT $3 = N/U$	NEVT 8	Ē
SENSOR $4 = ON$	INPUT $4 = N/U$	SENSORS	ł
SENSOR $5 = 0N$	INPUT $5 = N/U$		4
SENSOR $6 = ON$	INPUT $6 = N/U$	DISABLE ALL	ī
SENSOR $7 = ON$	INPUT $7 = N/U$	SENSORS	כ
SENSOR $8 = 0N$	INPUT $8 = N/U$		=
			7
USE THE CORSOR	KEYS TO SELECT	FC	כ
A SENSOR. PRESS	THE ENTER KEY		Ξ
TO CHANGE THE S	KEY WHEN DONE	HELP	7
FRESS INE RESEI	KEI WHEN DONE.		
			=
		F	ł
			1

Figure 5-60. Sensor On/Off Status

## **Viewing Sensor Status**

To view the status of your sensors, do the following:

- 1. Select SENSOR ENABLE/DISABLE & STATUS on the Main Program Menu. The Sensor On/Off Status screen displays with status settings for sensors 1 through 8 displayed. Sensors may have one of three status settings: OFF, ON or N/U (Not Used).
- To view sensors 9 through 16 (if a 16-sensor DiProPAC is installed), press F4 (Next 8 Sensors). The F4 label changes to "Previous 8 Sensors." To return to the display for sensors 1 through 8, press F4 again.

3. Press RESET to return to the Main Program Menu.

#### NOTICE

When a tool is loaded, or when SmartPAC 2 is powered up, all sensors are turned on and enabled.

### **Enabling or Disabling All Sensors**

When you access the Sensor On/Off Status screen, a message is displayed on the second line of the screen beneath the screen title indicating whether sensors are enabled or disabled. If the message is SENSORS ENABLED, the **F5** function key is labelled "Disable All Sensors." If the message is SENSORS DISABLED, **F5** is labelled "Enable All Sensors."

When the message is SENSORS ENABLED, SmartPAC 2 is communicating with all the sensors that are programmed and turned on. When the message is SENSORS DISABLED, SmartPAC 2 is not communicating with the sensors.

To enable or disable all sensors, do the following:

1. On the Sensor On/Off Status screen, press F5.

If the SENSORS DISABLED message is displayed, **F5** is labelled "Enable All Sensors," and pressing **F5** enables all the sensors.

If the SENSORS ENABLED message is displayed, **F5** is labelled "Disable All Sensors," and pressing **F5** disables all the sensors.

2. Press RESET to return to the Main Program Menu.

#### NOTICE

You can also enable or disable all sensors in Run mode. See *DISABLE (ENABLE) SENSORS*, page 6-6.

## Turning a Sensor Off or On

To turn a selected sensor Off or On, do the following:

- 1. On the Sensor On/Off Status screen, highlight the sensor you want.
- 2. Press ENTER to toggle between the OFF and ON settings until the setting you want is displayed.
- 3. Press RESET to return to the Main Program Menu.

### NOTICE

- Sensors that show an N/U status have not been programmed. You cannot change their status.
- If you turn a sensor Off on the Sensor On/Off Status screen, the sensor will turn on when you reload the tool.

If you select a sensor with an "Off" status in Run mode, SmartPAC notifies you with the following message:

THAT SENSOR IS TURNED OFF.				
PRESS ENTER TO CONTINUE,				
PRESS RESET TO GO BACK.				
TO TURN ON THE INPUT TURN				
KEY TO PROGRAM AND SELECT				
"SENSOR ENABLE/DISABLE STATUS"				
FROM THE MENU.				

Figure 5-61. "Sensor Turned Off" Message

# Chapter 6. SmartPAC 2 Run Mode

This chapter shows you how to use the displays in SmartPAC 2 Run mode, which is the mode you select to run the press. You learn how to adjust programmed settings (see Chapter 5 for programming instructions) for individual tools and monitor press parameters such as speed and sensor status. The chapter also shows you how to run the press. Run mode displays are accessible via the Main Run Menu, which is shown in Figure 6-1.



*Figure 6-1. Main Run Menu* (Includes some options. Your display may look different.)

In Run mode, you can view and adjust settings only for the currently loaded tool. You cannot create new tool numbers or modify settings for an unloaded tool as you can in Program mode.

Some functions that you can perform in Run mode, such as loading a tool and adjusting sensor and cam timing, are also provided in Program mode. Duplicating these functions allows operators to perform essential tasks in Run mode without giving them access to Program mode. Operators can be locked out of Program mode by turning the Program/Run key to RUN and, then, removing the key.

To prevent unauthorized personnel from changing settings or loading tool numbers, you can lock out choices on the Run menu or require a password for access. See *SECURITY ACCESS*, page 4-47 for instructions.

The following sections show you how to load a tool, adjust the tool's counter, die protection, cam, and speed limit settings, perform the 90° stop-time test, view tool information and the error log, and toggle between the two sets of Hot keys. Instructions in how to run the press in all its operating modes are also provided.

If you need help using the SmartPAC 2 keyboard to input information on Run mode displays, refer to Chapter 3.

## **Entering and Exiting Run Mode**

#### NOTICE

#### SELECT = HIGHLIGHT + ENTER

When this manual instructs you to select an item, you should highlight the item and press ENTER.

## NOTICE

Load a tool number before entering Run mode (see next section).

Follow the instructions shown in Table 6-1 to enter and exit Run mode. See Figure 3-28, page 3-22 for help in navigating in Run mode.

To Exit Run Mode			
<i>To switch to Program mode:</i> Turn the Program/Run key to PROG.*			
<ul> <li>* If you turn the key and nothing happens, press RESET repeatedly until SmartPAC 2 changes modes. Make sure SmartPAC 2 is in the Main (or top) menu for the mode it is in before you turn the Program/Run key. If SmartPAC 2 is not in a top-level menu, press RESET repeatedly until the Main menu appears.</li> <li>If the message "PRESS CONTROL IS IN LOCKOUT MODE" displays on the SmartPAC 2 front panel, turn the Stroke Select key switch to OFF, then back to the desired operating mode to clear the message.</li> </ul>			

Table 6-1.	Instructions	for	Entering and	Exiting	Run	Mode

## NOTICE

For help with a Run mode screen, press the HELP key when that screen is displayed.

## Loading a Tool

A tool must be loaded before SmartPAC 2 will allow the press to run. If you attempt to switch from Initialization or Program mode to Run mode with no tool loaded, the error message shown in Figure 6-2 displays.



Figure 6-2. No Tool Loaded Warning Window

To respond to this error, do the following:

1. Turn the Program/Run key to PROG.

- 2. On the Main Program Menu, press RESET to clear the message.
- 3. Load a tool (see *Loading a Tool*, page 5-5).
- 4. Turn the Program/Run key to RUN. SmartPAC 2 switches to Run mode.

## **Programming Hot Keys**

Hot keys are function keys that you can program to take you directly from the Main Run Menu to screens you use frequently. Once a Hot key is programmed, pressing that function key displays the desired screen.

#### Example

You frequently need to adjust the timing for the cam channel that controls part blowoff. For convenience, you set up a Hot key to take you directly from the Main Run Menu to the adjustment screen for that cam channel.

All the function keys, **F1** through **F8**, can be used as Hot keys, unless you have the alternate language option, which uses **F1** to change languages. Each function key can be programmed with two Hot key assignments, providing a total of up to sixteen Hot keys. Hot keys can be identified by the red frame around the label describing the key's function (see Figure 6-3).



Figure 6-3. Main Run Menu, Showing Hot Keys Programmed

If you program one or more function keys with dual Hot key assignments, you move between the two sets of assignments by selecting the TOGGLE HOT KEYS item on the Main Run Menu (see *TOGGLE HOT KEYS*, page 6-39). When the first set of Hot keys is displayed, the menu item caption is "TOGGLE HOT KEYS 1." Selecting this item displays the second set of Hot keys and changes the item caption to "TOGGLE HOT KEYS 2."

### NOTICE

If you add or remove a SmartPAC 2 option (e.g., DiProPAC, ProCamPAC, etc.), the Hot keys you have programmed previously may not navigate correctly. If one or more Hot keys no longer take you to desired screens, delete and re-program those Hot keys.

To program a Hot key, do the following:

1. Access the screen you want.

## NOTICE

For best results, start from the Main Run Menu and go as directly as possible to the desired screen.

2. On the numeric keypad, press "2" and "0" simultaneously for a few seconds until the window shown in Figure 6-4 displays. Labels for the currently selected set of programmed Hot keys display to the left of the applicable function keys.

TO CREATE A HOT KEY, JUST PRESS THE FUNCTION KEY YOU WISH TO USE. TO DELETE A HOT KEY, PRESS THE CLEAR KEY AND THEN PRESS THE HOT KEY YOU WISH TO DELETE. TO TOGGLE THE HOT KEYS, USE THE CURSOR KEYS. PRESS THE RESET KEY TO CANCEL.

Figure 6-4. Hot Keys Instruction Window

- 3. To display the other set of Hot keys, press the Up ( $\checkmark$ ) or Down ( $\checkmark$ ) cursor.
- 4. To program a Hot key, press the desired function key. The instruction window closes and SmartPAC 2 returns to the previous screen in the screen hierarchy.

If you select a function key that has already been programmed, that key will be linked to the new screen.

To delete a Hot key, do the following:

1. With the Hot Keys Instruction window (see Figure 6-4) displayed, press CLEAR, then the function key associated with the Hot key you wish to delete.

## Settings Locked, or Password Required

When a Run mode setting is locked, the screen shown in Figure 6-5, page 6-5 displays if the PASSWORD REQUIRED access type has been set for that item on the Security Access Menu in Initialization (see *SECURITY ACCESS*, page 4-47).

When you enter the password, you are given access to the item.



Figure 6-5. "Enter Your Password" Screen

When a Run mode item is set to PROGRAM MODE ONLY, NO CHANGES ALLOWED, ALLOW RECALC ONLY, or NO RECALC/ADJUST, you are prevented from gaining access to that item. In most cases, no message displays to indicate that the setting is locked, but when you press ENTER to access the item or press the cursor keys to make an adjustment, nothing happens. If sensor or cam adjustments have been locked out, the message "ADJUST MODE LOCKED" appears on the Die Protection or Cam Switch menu. When the LOAD NEW TOOL item is locked out, that entry does not appear on the Main Run Menu.

## **Displaying Multiple Faults**

Whenever more than one fault occurs in response to a press condition, the message for the first fault displays in a window on the Main Run Menu and the label "Display All Errors" appears to the left of function key **F8**. To view the multiple errors, press **F8**. A large red message window opens, as shown in Figure 6-6, with each fault listed in sequence beneath the caption "ALL PENDING ERRORS." To close the window, press RESET.



Figure 6-6. Display All Errors Message Window

## **Opening the Crankshaft Angle Window**

You can open a window displaying the crankshaft angle at a magnification comparable to that on the crank angle clock on the Main Run Menu for use on Run mode screens where a prominent crankshaft angle display is useful such as angle adjustment screens for cams and die protection sensors. Simply press the decimal point (.) key when you are on the Main Run Menu. The crankshaft angle window opens in the upper right corner of the screen, as shown in Figure 6-7. To close the window, press the decimal point key again.



Figure 6-7. Crankshaft Angle Window Displayed on Main Run Menu

The crankshaft angle window can only be opened on the Main Run Menu. Once the window is displayed, it carries over to other selected Run mode screens.

# DISABLE (ENABLE) SENSORS

(RUN – DISABLE [ENABLE] SENSORS)

## NOTICE

DiProPAC has an optional "sensors disabled" output that turns on when the sensors are disabled. See page 2-70 for details.

This item allows you to manually enable your sensors when they are disabled or disable your sensors when they are enabled. When sensors are enabled, the message SENSORS ENABLED is displayed at the left of the Status Box on the Main Run Menu, as shown in Figure 6-8, page 6-7, and this item is captioned DISABLE SENSORS. When sensors are disabled, the message SENSORS DISABLED flashes in red at the left of the Status Box, and the item is captioned ENABLE SENSORS.

III I WOUC		
SmartPA	CAMBIE	
TOOL NUMBER 6160	PART CNTR 0	AL ESPANOL
DEMO TOOL 2	TWO HAND S.S.	
SENSORS ENABLED	67 FSPM / 325 DEG	
USE THE CURSOR KEYS	DISABLE SENSORS	
TO MAKE SELECTIONS.	COUNTERS	
PRESS ENTER TO	DIPROPAC 1-16	
ACCESS SELECTION.	DIPROPAC 17-32	
	CAM SWITCH	
1	BRAKE MONITOR	
	PRESS CONTROL	
	FEED CONTROL	
	PM MONITOR	
	INFO CENTER	
205	TREO CENTER	
1 323	ERROR/EVENT LOG	
	LOAD NEW TOOL	
	MESSAGING	
	DIALOG MENU	
	TOGGLE HOT KEYS 2	

Figure 6-8. Main Run Menu with SENSORS ENABLED Display

To disable or enable sensors, do the following:

1. Press ENTER with the highlight bar on the DISABLE/ENABLE SENSORS item.

If you are enabling sensors, the message at the left of the Status Box changes from SENSORS DISABLED to SENSORS ENABLED.

If you are disabling sensors, the window shown in Figure 6-9 displays.

PRESS THE FIVE KEY TO DISABLE THE SENSORS.

Figure 6-9. Disable Sensors Confirmation Message

2. Press the 5 key to confirm that you want to disable the sensors. The message at the left of the Status Box changes from SENSORS ENABLED to SENSORS DISABLED, and the message flashes in red.

You can manually enable or disable sensors no matter which setting (i.e., Manual, Auto by Tool, or Auto by Sensor) is selected for Sensor Enable Mode in Initialization (see page 4-18). If either of the Auto Enable options is selected, you should refer to *Setting the "Auto Enable by Tool" Counter Value*, page 5-21 or *Setting the "Auto Enable by Sensor" Counter Value*, page 5-23 to make the appropriate setting for the tool.

In order to protect the tool, sensors should always be enabled except during setup and troubleshooting when they can be temporarily disabled. If you have enabled Setup Mode (see page 4-19), you can run the press in Inch during setup with green sensors disabled. When Setup Mode is active, the message SENSORS IN SETUP MODE is displayed in the Status Box in place of the SENSORS ENABLED message.

## NOTICE

If you temporarily disable sensors, be sure to re-enable them before you resume making parts.

## COUNTERS

(RUN – COUNTERS)

#### NOTICE

For help with the Counters screen and screens accessible from it, press the HELP key when the applicable screen is displayed.

This item allows you to make adjustments to counter settings made in Program mode. Adjustments are entered on the Counters screen (see Figure 6-10), which displays when you select the COUNTERS item on the Main Run Menu.

## NOTICE

#### ARE YOU LOCKED OUT?

Access to items on the Counters screen may be limited to Program mode or may require a password. The security access settings in Initialization mode determine when changes can be made. See Table 4-15, page 4-48.

On this screen, you can change or reset the programmed strokes, good parts, batch and total hits counters and presets if you have the appropriate security access (see Table 4-15, page 4-48). For instructions on entering counter and preset values, see page 5-9.

TOOL NUMBER 6160 DEMO TOOL 2 SENSORS ENABLED	PART CNTR 0 CONTINUOUS MODE 1200 SPM / 359 DEG	CAMBIE AL ESPANOL F1
COUN STROKES	0 5,000	F3
BATCH 1 (TOP STOP)	0 0	F4
BATCH 2 (TOGGLE) CHANNEL 7	0 0	E5
BATCH 3 (PULSE) CHANNEL 8	0 0	
TOTAL HITS	0 10,000	F6
PRESS THE RESET K PRESS ENTER TO SE	D MAKE SELECTION. EY WHEN DONE. I THE COUNTERS.	F7
		RETURN TO MAIN MENU

Figure 6-10. Counters Screen

If you have set the CHANGE COUNT parameter on the Security Access Menu in Initialization to PROGRAM AND RUN MODES (see page 4-48), you can reset batch counts to the values you have programmed for batch pre-loads (see *Setting Batch Pre-Load Counts*, page 5-15). When the CHANGE COUNT feature is enabled for Run mode, the label RELOAD BATCH COUNTERS displays to the left of the **F2** function key (see Figure 6-11, page 6-9), and **F2** becomes active. To reset batch counts to their pre-load values, simply press **F2**. Pre-load values display in the Count field for the batches you have programmed with those values.

-		
TOOL NUMBER 6160     PART CNTR       DEMO TOOL 2     CONTINUOUS MO       SENSORS ENABLED     1200 SPM / 35	29 DE 59 DEG RELOAD BATCH COUNTERS	F1 F2
COUNT PRESET VALU	Æ	<b>F</b> 3
STROKES 30 200		ت
GOOD PARTS 29 150		
BATCH 1 0 3		<b>  F4 </b>
(TOP STOP)		ت
BATCH 2 1 3		
(TOGGLE) CHANNEL 7		<b>F</b> 5
BATCH 3 2 3		٣
(PULSE) CHANNEL 8		
TOTAL HITS 240 500		<b>F6</b>
		ت
USE CURSOR KEYS TO MAKE SELECTIC	DN.	
PRESS THE RESET KEY WHEN DONE.		<b>IF7</b>
PRESS ENTER TO SET THE COUNTERS.		ك
	RETURN TO	
	MAIN MENU	<b>IF8</b>
		لتت

Figure 6-11. Counters Screen with "Reload Batch Counters" Function

When messages display indicating that counter presets have been reached, press RESET to clear the message (see *Counter Preset Reached Messages*, page 7-23).

## NOTICE

When the Total Hits counter reaches its preset value, a flashing message, "Total Hits Preset," appears in the Status Box at the top of the screen. To clear this message, set the Total Hits preset to zero (0), then reset this value to the desired quantity. See *COUNTERS*, page 5-9.

## **DIE PROTECTION (Optional)**

(RUN – DIE PROTECTION)

## NOTICE

For help with the Die Protection Menu and the screens accessible from it, press the HELP key when the applicable screen is displayed.

This item, which appears on the Main Run Menu only when DiProPAC 8 or DiProPAC 16 is installed, allows you to adjust the Ready signal for green sensors and the stroke preset for green special sensors. Adjustments are made via the Die Protection Menu (see Figure 6-12, page 6-10), which displays when you select DIE PROTECTION. You can also view a summary of information for all your sensors and a graphical display of sensor status from this menu.



Figure 6-12. Die Protection Menu (Run Mode)

The DIE PROTECTION item is split into DIPROPAC 1-16 and DIPROPAC 17-32 entries when DiProPAC 32 is an installed option (see *Adjusting DiProPAC 32 Sensors*, page 6-15).

#### NOTICE

#### ARE YOU LOCKED OUT?

Access to items on the Die Protection Menu may be limited to Program mode or may require a password. The security access settings in Initialization mode determine when changes can be made. See Table 4-15, page 4-48.

To change programmed settings on the Die Protection Menu, you first select a sensor from the list of sensors displayed. Sensors set to UNUSED in Program mode are not shown. If you select a sensor that has been turned off (see page 5-53), the following message displays.

Figure 6-13. "Sensor Turned Off" Message

#### NOTICE

#### FOR MORE INFORMATION

For a detailed description of the different types of sensors available in SmartPAC 2 with die protection, refer to *Understanding Sensor Terminology*, page 5-16. Refer to *Programming Sensor Settings*, page 5-20 for detailed instructions on programming sensors.

## Adjusting the Ready Signal for Green Sensors

When you select a green, green quick check, or green constant sensor on the Die Protection Menu, the Ready Signal Programming screen, shown in Figure 6-14, displays.



Figure 6-14. Ready Signal Programming Screen

The functionality of this screen differs slightly from that of the Ready Signal Programming screen in Program mode. When you run the press, the angles at which the selected sensor turns on and off on each stroke are shown in the window labelled SENSOR at the right of the screen, and the number of degrees that the sensor is on is represented graphically by a green arc on the crank angle clock. These displays allow you to fine-tune the Ready signal settings made in Program mode.

Another difference is that the On and Off cursors move around the crank angle clock more slowly when you press the cursor keys, enabling you to set Ready On and Ready Off angles more precisely.

The On/Off actuation angles displayed in the Sensor window are not updated on every stroke. For green and green quick check sensors, SmartPAC 2 displays the earliest On and latest Off angles for the current sequence of press strokes (until the **F5** (Update the Sensor Arc) function key is pressed), updating the display only when the sensor turns on before the previous earliest On signal or turns off after the previous latest Off signal.

For green constant sensors, SmartPAC 2 displays the latest On and earliest Off angles, updating the display only when the sensor turns on after the previous latest On angle and turns off before the previous earliest Off angle.

#### EXAMPLE

If the On angle for a green quick check sensor fluctuates between 190° and 195° from stroke to stroke, SmartPAC 2 continuously displays 190° as the sensor's On value. However, if the On angle changes to 189°, SmartPAC 2 displays the On angle as 189° on the next stroke.

To clear the actuation angles displayed for a sensor, press the **F5** (Update the Sensor Arc) function key. If the press is stopped, the Sensor window displays zeros. If the press is running, SmartPAC 2 displays the actuation angles for the next stroke.

#### NOTICE

Pressing **F5** will not properly update sensor actuations when you are using a mechanical sensor, which vibrates constantly during the stroke. It is better to use an electronic sensor, which is not prone to constant contact bounce.

Pressing F4 (Change Reference Angle) changes the reference angle used to determine earliest/latest On and Off signals from  $0^{\circ}$ , the default, to  $180^{\circ}$ . Executing this function may be necessary to correct On readings for green and green quick check sensors that actuate before and stay actuated after TDC. When  $0^{\circ}$  is the reference angle, there can be no earliest On angle for a sensor that turns on before and off after  $0^{\circ}$  since angles just before TDC (e.g.,  $330^{\circ}$ ) are numerically greater than those just after TDC (e.g.,  $30^{\circ}$ ). You should press F4 whenever the On/Off settings in the Sensor window do not match the start and end points of the green actuation arc on the clock diagram.

To adjust the Ready signal for green sensors, do the following:

#### NOTICE

#### IF YOU DO NOT KNOW READY SIGNAL TIMING FOR GREEN SENSORS

If you are unsure of when the sensor turns on and off, program estimated settings in Program mode, load the tool, and turn off the sensor, using the SENSOR ENABLE/DISABLE & STATUS item on the Main Program Menu (see page 5-53). Turning the sensor off prevents nuisance stops when you switch to Run mode.

Then, *without reloading the tool,* turn the Program/Run switch to RUN and perform the procedure shown below. When you are finished adjusting settings in Run mode, go back to Program mode and turn the sensor back on.

1. On the Die Protection Menu, select the desired sensor. The Ready Signal Programming screen displays.

#### NOTICE

If you have turned off the sensor in Program mode (see page 5-53), a message displays indicating that the sensor is turned off (see Figure 6-13, page 6-10). Press ENTER to clear the message.

- 2. Run the press.
- 3. Observe the On and Off angles displayed in the Sensor window and the green actuation arc shown on the crank angle clock.

### NOTICE

To update the sensor's On/Off readings, press **F5** (Update the Sensor Arc). To change the reference angle from  $0^{\circ}$  to  $180^{\circ}$ , press **F4**. The reference angle is used to determine earliest and latest On/Off readings.

## NOTICE

When you press F5, dashes ( -- ) will display in the ON and OFF fields in the Sensor window just before the information updates.

- Adjust the sensor's Ready On and Ready Off angles based on the actual On and Off angle readings, using the Left ( 
   ) and Right ( 
   ) cursor keys to move the On cursor and the Up ( 
   ) and Down ( 
   ) cursor keys to move the Off cursor. See *Setting the Ready Signal for a Green Sensor*, page 5-28 if you need help manipulating the On and Off cursors.
- 5. Press RESET to return to the Die Protection Menu.

## Adjusting the Stroke Preset for Green Special Sensors

To adjust the green special sensor preset value for press strokes, do the following:

1. On the Die Protection Menu, select the desired sensor. The Green Special Sensor Stroke Count screen displays. This screen is identical to the Green Special Sensor Stroke Count screen in Program mode (see Figure 5-29, page 5-29) except that it displays additional information in the Status box.

### NOTICE

If you have turned off the sensor (page 5-53), a message displays indicating that the sensor is turned off (see Figure 6-13). Press ENTER to clear the message.

- Increment or decrement the displayed stroke count value, using the Up (▲) or Down (▼) cursor key, until the value you want is shown.
- 3. Press RESET when you are finished to return to the Die Protection Menu.

### Viewing the Sensor Summary

#### (RUN – DIE PROTECTION – F6-VIEW SENSOR SUMMARY)

You can view a summary of your die protection sensors by pressing **F6** (View Sensor Summary). The screen that displays is identical to the Sensor Summary screen accessible in Program mode (see *Viewing the Sensor Summary*, page 5-31) except that it displays additional information in the Status box.

## Show Sensor Status

(RUN – DIE PROTECTION – F7-SHOW SENSOR STATUS)

You can view the status of your sensors by pressing **F7** (Show Sensor Status). When you do so, the Sensor Status screen, shown in Figure 6-15, displays.



Figure 6-15. Sensor Status Screen

The Sensor Status screen shows the status of every sensor for a loaded tool. Sensor inputs are identified by the numbers 1 through 8 (for 8-sensor DiProPAC) or 1 through 16 (for 16-sensor DiProPAC). The type of sensor connected to each input is indicated by the following abbreviations, which appear beneath the blocks representing the sensors.

- G = Green
- GQC = Green Quick Check
- GCONS = Green Constant
- GS = Green Special (Number of required strokes is shown to the right of "GS")
- RED = Red
- YEL = Yellow
- N/U = Not Used

If the sensor block is dark, the sensor is actuated. If it is white, the sensor is not actuated.

The Sensor Status screen is designed so that you can quickly check the status of all your sensors and correct programming or wiring mistakes. When a sensor signals a fault, you can use the display to see the status of all your sensors at the stroke angle at which the press stopped.

When you select the screen with the press running, the actuation blocks for green sensors will flash as they actuate once every stroke. (Due to the slow refresh rate of this screen, some sensor actuations may be missed.) An actuation block for a green special sensor will flash every preset number of strokes.

A red sensor actuation block is always actuated except when there is a sensor fault since it is normally grounded. Actuation blocks for yellow sensors are only actuated during a fault condition.

When the press is stopped, the actuation block shows the state of the sensor at that point in the stroke. The actuation block for an unused sensor may display if a sensor has been connected to that input by mistake. The Sensor Status screen shows any change in the state of an input whether the input is being used or not.

## Adjusting DiProPAC 32 Sensors

You access DiProPAC 32 sensors on the SmartPAC 2 Main Run Menu via the DIPROPAC 1-16 and DIPROPAC 17-32 items, as shown in Figure 6-16.

eni Rui i Mude			
SmartPA	C DEMO	CAMBIE	
TOOL NUMBER 6160 DEMO TOOL 2	PART CNTR 0	AL ESPANOL	<b>F1</b>
	67 FSPM / 0 DEG		<b>F2</b>
USE THE CURSOR KEYS	ENABLE SENSORS		FS
TO MAKE SELECTIONS.	COUNTERS		Ľ
PRESS ENTER TO	DIPROPAC 1-16		
ACCESS SELECTION.	DIPROPAC 17-32		<b>  ⊢</b> 4
	CAM SWITCH BRAKE MONITOR		
	PRESS SPEED		E5
	FEED CONTROL		Ľ
	PM MONITOR		
	ERROR/EVENT LOC		ГО
	LOAD NEW TOOL		
	MESSAGING		<b>F7</b>
	DIALOG MENU		
	TOGGLE HOT KEYS 2		EO
+-			

Figure 6-16. Main Run Menu with DIPROPAC 1-16 and DIPROPAC 17-32 Items Shown

When you select the DIPROPAC 1-16 item, the Die Protection Sensor menu for sensors 1-16 displays. On this menu, you can adjust settings for green and green special sensors as described in *Adjusting the Ready Signal for Green Sensors*, page 6-11 and *Adjusting the Stroke Preset for Green Special Sensors*, page 6-13.

When you select DIPROPAC 17-32, the Die Protection Sensor menu for sensors 17-32 displays (see Figure 6-17, page 6-16, which shows the sensors that are used as examples in Chapter 5).

TOOL# 6160 STRIPPER DEMO TOOL 2 SLUG DETECTION	F1
	F2
USE THE CURSOR KEYS	F3
PRESS THE ENTER KEY TO PROGRAM. PRESS THE RESET KEY WHEN DONE	F4
KESEI KEI WIEK DONE.	F5
	VIEW SENSOR SUMMARY
	SHOW SENSOR STATUS
	RETURN TO MAIN MENU

Figure 6-17. Die Protection Sensor Menu for Sensors 17-32

When programmed as green sensors, sensors 17-32 cannot be adjusted in Run mode since they share their Ready signals or stroke counts with one of the first sixteen sensors. You can, however, adjust the Ready signal or stroke count for the sensor on which settings are based. Adjustments are automatically duplicated in all linked sensors 17-32.

When you select a sensor programmed as green, green quick check, or green constant on the Die Protection Menu for Sensors 17-32, the Run mode Ready Signal Programming screen displays with a message, located underneath the status box, indicating that you cannot change Ready signal timing for this sensor (see Figure 6-18). If you want to change timing, you must change the timing for the sensor in the group of sensors 1-16 whose Ready signal is being used for the sensor you are programming.



Figure 6-18. Ready Signal Programming Screen, Run Mode
When you select a sensor programmed as green special on the Die Protection Sensor Menu for Sensors 17-32, the Green Special Sensor Stroke Count screen displays with a message, located at the bottom of the screen, indicating that you cannot change the green special stroke count for this sensor (see Figure 6-19). If you want to adjust the stroke count, you must make this change for the green special sensor in the group of sensors 1-16 whose stroke count is being used for the sensor you are programming.



Figure 6-19. Green Special Sensor Stroke Count Screen, Run Mode

# CAM SWITCH (Optional)

(RUN – CAM SWITCH)

### A DANGER

#### PROGRAMMABLE CAM SWITCH NOT FOR SAFETY USE

Use SmartPAC 2's programmable cam switch to control auxiliary functions only. The SmartPAC 2 programmable cam capability should never be used to provide timing signals for any safety use including clutch/brake control or muting of light curtains.

Failure to comply with these instructions will result in death or serious injury.

### NOTICE

For help with the Cam Switch Menu and the screens accessible from it, press the HELP key when the applicable screen is displayed.

This item, which appears on the Main Run Menu only when ProCamPAC is installed, enables you to adjust timing for each programmed cam channel. Adjustments are made via the Cam Switch Menu (see Figure 6-20), which displays when you select CAM SWITCH.

TOOL# 6160 DEMO TOOL	PILOT RELEASE FEED ADVANCE PART BLOW OFF		F1
USE THE CURSOR KEYS TO CHOOSE A CAM CHANNEL. PRESS THE ENTER KEY TO PROGRAM.	CUTOFF SPRAY LUBE		F2 F3
PRESS THE RESET KEY WHEN DONE.		VIEW GLOBAL CAM SUMMARY	F4 F5
		VIEW CAM SUMMARY	F6
		SHOW CAM TIMING RETURN TO MAIN MENU	F7

Figure 6-20. Cam Switch Menu

The Cam Switch Menu displays a list of the cam channels that have been set up in Program mode. If you have assigned names to your cam channels in Initialization mode, those names will be displayed. Channels programmed as Global cams are not shown (see *SET GLOBAL CAMS (Optional)*, page 4-15).

To adjust cam timings for the loaded tool, do the following:

1. On the Cam Switch Menu, select the channel you want to adjust. The Cam Channel Program screen appropriate to the program type of the selected cam channel displays.

# NOTICE

#### ARE YOU LOCKED OUT?

Access to items on this screen may be limited to Program mode or may require a password. The security access settings in Initialization mode determine when changes can be made. See Table 4-15, page 4-48.

- 2. Adjust cam timings for the selected channel, following the instructions in the following sections in Chapter 5:
  - *Making an ON/OFF Setting*, page 5-40
  - Setting Multiple ON/OFF Cycles, page 5-41
  - Making a Timed Output Setting, page 5-43
  - Making an Auto Advance Setting, page 5-44
  - Setting DSV ON Channel Timing, page 5-46
- 3. When you are finished, press RESET to return to the Cam Switch Menu.

# Viewing Cam Timing

(RUN – CAM SWITCH – **F7**-SHOW CAM TIMING)

You can view a real-time graphic display of the timing settings for your cams by pressing the F7 (Show Cam Timing) function key. The screen that displays when you press F7 is shown in Figure 6-21.



Figure 6-21. Cam Timing Screen

Cam channels are displayed by number on the Y-axis. Only eight channels can be displayed at a time, so if a 16-channel ProCamPAC is installed, you must press ENTER to display channels 9 through 16. The X-axis displays the number of degrees of crankshaft rotation (from 0° to 360°) at which channels turn on and off. The timing for each channel is shown as a colored horizontal bar, the end points of which, when read against the crank angle "ruler" on the X-axis, specify on and off settings for that channel. Bars are distinguished as follows:

- On/Off Channel: Dark blue bar whose end points are the channel's On and Off settings
- Auto Advance Channel: Green bar with the letter "A" at each end. The bar's end points are the channel's On and Off settings. As press speed increases, the bar will move to the left.
- Timed Channel: Pink bar with the letter "T" at the left end, indicating the On angle, followed by a number (e.g., 350), which indicates the channel's On time in milliseconds.

The Cam Timing screen is updated once every second.

# Viewing the Global Cam Summary

(RUN – CAM SWITCH – F5-VIEW GLOBAL CAM SUMMARY)

You can view a summary of the Global cams by pressing **F5** (View Global Cam Summary). The screen that displays is identical to the Global Cam Summary screen accessible in Program mode (see *Viewing Global Cams*, page 5-47).

# Viewing the Cam Summary

#### (RUN – CAM SWITCH – F6-VIEW CAM SUMMARY)

You can view a summary of the other cams by pressing F6 (View Cam Summary). The screen that displays is identical to the Cam Summary screen accessible in Program mode (see *Viewing the Cam Summary*, page 5-47).

# **BRAKE MONITOR**

(RUN – BRAKE MONITOR)

### DANGER

#### RECALCULATE SAFETY DISTANCE WHEN STOP TIME CHANGES

- Perform a 90° Stop Test any time you change the Stop-time Limit (see page 6-22).
- Recalculate the safety distance based on the new Stop-time Limit and adjust or reinstall safeguarding devices according to the new safety distance.

Failure to comply with these instructions will result in death or serious injury.

This item enables you to view your press's starting and stopping times and stopping angle and perform the 90° stop-time test to determine the longest stopping time of the press. You can also view the Start-time and Stop-time Limits set in Initialization (see *Press Parameters*, page 4-27). You view this information and perform this procedure on the Press Control Stop Time Status screen, which is shown in Figure 6-22.

### NOTICE

For help with the Stop Time Status screen, press the HELP key when the screen is displayed.

Smar	tPAC DEMO		
TOOL NUMBER 6160	PART C	NTR 0	AL ESPANOL
DEMO TOOL 2	TWO HA	ND S.S.	
	67 F	SPM / 325 DEC	3
(1			
PRESS CONTRO	L STOP TIM	E STATUS	
			-
. V	ALUE (MSEC)	LIMIT (MSEC)	
STOP TIME	155	165	
START TIME	87	100	
STOP ANGLE	96		
90 STOP TIME	0		_
THE LIMITS MAY BE	SET IN IN	ITIALIZATION.	·
PRESS CURSOR UP K	EY TO STAR	T 90 DEGREE	
BRAKE TEST. PRESS	RESET WHE	N DONE.	
			RETURN TO
			MAIN MENU

Figure 6-22. Stop Time Status Screen

Stopping time is the time that it takes the crankshaft to stop once the dual safety valve (DSV) has been de-energized. Starting time is the time it takes for the crankshaft to start turning after the DSV has been energized. Instructions for setting Start-time and Stop-time Limits and documentation of SmartPAC 2's responses to start-time and stop-time faults are provided in *Press Parameters*, page 4-27.

Stopping angle is the number of degrees that it takes the press to stop. It is equal to the ram's stopping position in degrees minus the crankshaft position when the DSV is de-energized. (Stopping angle does *not* compensate for the complete rotation of the press when it takes more than 360° to stop.) The stopping angle value helps you when you set up the top-stop cam. For example, if the stopping angle is 100°, you would set the top-stop cam to turn on at 260°.

# **Determining the Stopping Time of Your Press**

You need to determine the stopping time of your press at Top Stop in order to calculate the Stop-time Limit to set in Initialization. To do so, perform the following steps:

1. Install the heaviest upper die you use on your press. Adjust the counterbalance for ram weight, if your press has a counterbalance.

### NOTICE

Before you can switch to Run mode, a tool must be programmed and loaded in Program mode (see *TOOL MANAGER*, page 5-2).

- 2. Turn the Program/Run key to RUN to access Run mode, then select BRAKE MONITOR on the Main Run Menu. The Press Control Stop Time Status screen displays.
- 3. Start the press in Continuous mode, and run the press until it reaches normal operating speed.

- 4. Top-stop the press and record the value (in milliseconds) displayed in the STOP TIME VALUE (MSEC) field.
- 5. Repeat steps 3 and 4 five more times. Use the highest stop-time reading from your runs as the value to use in calculating the Stop-time Limit (see *Calculating the Stop-time Limit*, page 4-31).

# Performing the 90° Stop-time Test

The 90° stop-time test is required by OSHA regulation 1910.217 and ANSI standard B11.1-2009 to set the proper safety distance for personnel-guarding devices including light curtains, two-hand controls, and type-B movable barriers. This test is performed at the press's most critical stopping point–90°. Follow these steps to perform the 90° stop-time test:

- 1. Install the heaviest upper die you use on your press. Adjust the counterbalance for ram weight, if your press has a counterbalance.
- 2. With the Program/Run key set to RUN, select BRAKE MONITOR on the Main Run Menu. The Stop Time Status screen displays.
- 3. Run the press in Continuous mode. If the press has a variable speed drive, set press speed to the highest value you will normally use.
- 4. Press the Up (▲) cursor key to start the 90° stop-time test. The following message displays at the bottom of the screen:

90 DEGREE BRAKE TEST ARMED PRESS RESET TO CANCEL TEST

- 5. When SmartPAC 2 emergency-stops the press, which occurs the next time the press reaches 90°, record the STOP TIME value displayed on the Stop Time Status screen.
- 6. Repeat the test at least 5 more times.
- 7. Record the highest reading from all your tests. This is the value you should use in calculating the safety distance.
- 8. Press RESET when you are finished to return to the Main Run Menu.

# **Calculating the Safety Distance**

### **DANGER**

#### PRESS MAY NOT STOP BEFORE OPERATOR REACHES PINCH POINT

- Calculate the safety distance according to the applicable safety regulations, the instructions in this chapter and in your light curtain user manual.
- Mount the Shadow light curtain heads at least the safety distance from the nearest pinch point or hazardous area of your press (see Figure 6-23).
- Mount your Two-hand Control at least the safety distance from the nearest pinch point or hazardous area of your press if you are using the Two-hand Control as a safety device.
- Mount your light curtain heads at least 7.5 in. (191 mm) from the nearest pinch point hazard, even if that is greater than the safety distance you calculate.

Failure to comply with these instructions will result in death or serious injury.

Once you know your press's stopping time, you can calculate the safety distance at which to mount your Shadow light curtains (see the applicable Shadow user manual for more information). The safety distance is the minimum distance from the pinch point (or hazardous area) of the press at which light curtains can be installed and still be able to stop the press before the operator can penetrate the light beam and reach the hazard (see Figure 6-23). The "pinch point" is the area of the press where moving parts can cause injury.

If you have not installed light curtains and are using a Two-hand Control as a safety device, you must mount the Two-hand Control at least the safety distance from the pinch point.



Figure 6-23. View of Light Curtains and Press Showing Safety Distance

### **ANSI and OSHA Safety Distance Formulas**

### A DANGER

#### PRESS MAY NOT STOP BEFORE OPERATOR REACHES PINCH POINT

- Calculate the safety distance carefully according to the instructions below.
- Mount your light curtain heads at least the safety distance from the hazardous area. If a light curtain is too close to the hazard, there may not be enough time for the press to stop before the operator's hand (or another object) reaches the hazard.
- Mount your Two-hand Control, if you are using it as a safety device, at least the safety distance from the hazardous area. If the Two-hand Control is too close to the hazard, there may not be enough time for the press to stop before the operator's hand (or another object) reaches the hazard.
- Call Wintriss Tech. Support if you are not sure how to calculate the safety distance.
- Failure to comply with these instructions will result in death or serious injury.

Occupational Safety and Health Administration (OSHA) regulations and American National Standards Institute (ANSI) standards mandate that all machine safeguarding devices, including Shadow light curtains, be located at the correct safety distance from the pinch point.

OSHA regulation 1910.217 governs the mounting of infrared light curtains to protect mechanical power presses. Wintriss recommends, however, that you use the formula in ANSI standard B11.1-2009 when calculating safety distance. The ANSI formula has been developed specifically for guarding of mechanical power presses and includes more factors, such as brake monitor setting, object sensitivity, and depth penetration factor, than the OSHA formula. The B11.1-2009 formula represents a new consensus among manufacturers on the proper installation of light curtains.

ANSI and OSHA formulas are documented in the following sections. For complete information on OSHA regulation 1910.217 and ANSI standards B11.1-2009 and B11.19-2003, see Appendix A.

The ANSI Safety Distance Formula

### A DANGER

#### **OBSERVE THE CORRECT SAFETY DISTANCE**

- Calculate the safety distance carefully according to the instructions below, and mount your light curtain heads at least the calculated distance from the hazardous area.
- Mount your light curtain heads at least 7.5 in. (191 mm) from the hazardous area, regardless of the calculated safety distance.
- Be sure your value for Ts (i.e., stopping time) includes the response times of all devices that react to stop the press. If your measurement for stopping time does not include the response times of the press control, light curtain, and any other devices that react to stop the press, the safety distance will be too short.

Failure to comply with these instructions will result in death or serious injury.

### A DANGER

#### USE BRAKE MONITOR TO CHECK STOPPING TIME

Use a brake monitor in light curtain applications to protect operators whose hands are routinely exposed to a hazardous area, as required by OSHA 1910.217 (c) (3) (5). A brake monitor continually checks that the machine's stopping time does not exceed a predetermined limit.

Failure to comply with these instructions will result in death or serious injury.

The ANSI B11.1 safety distance formula, which is recommended by Wintriss, is

Ds = K x (Ts + Tc + Tr + Tbm) + Dpf

where

Ds is the ANSI safety distance in inches
K is the OSHA-recommended hand-speed constant of 63 inches-per-second
Ts is the stopping time of the press in seconds
Tc is the response time of the press control
Tr is the response time of the light curtain
Tbm is additional stopping time to compensate for brake wear
Dpf is the depth penetration factor

The hand-speed constant  $\mathbf{K}$  indicates how far an individual could theoretically move his/her hand and arm in one second.

**Ts**, **Tc**, and **Tr** are the worst-case response times of the press, of the control, and of the light curtain. The response time of the press, **Ts**, is measured at approximately 90° of crankshaft rotation or at maximum closing velocity. The response time of the control, **Tc**, is the time it takes for the control to activate the machine's brake. In the 90° stop-time test used by SmartPAC 2 (see page 6-22), the calculated stop time includes both **Ts** and **Tc** values.

Response time, **Tr**, for Shadow light curtains is shown in Table 6-2.

Shadow Model	Head Length *	Response Time	Object Sensitivity
Shadow V	12 in. to 24 in.	30 mS	1.25 in
	36 in. and 48 in.	50 mS	1.25 III.
Shadow VI	6 in. to 24 in.	30 mS	
	30 in. to 48 in.	35 mS	1.25 in.
	60 in.	40 mS	
Shadow VII	6 in. to 30 in.	20 mS	
	36 in. to 59 in.	23 mS	1 19 in
	Up to 96 in.	28 mS	1.10 11.
	Up to 135 in.	32 mS	

Table 6-2. Shadow Light Curtain Response Time and Object Sensitivity

Shadow Model	Head Length *	Response Time	Object Sensitivity
Shadow 8	Up to 42 in.	23 mS	
	Up to 85 in.	32 mS	
	Up to 128 in.	41 mS	1.18 in.
	Up to 171 in.	50 mS	
	Up to 202 in.	59 mS	
Shadow 9	Standalone up to 31.5 in. (800 mm)	8 mS	
	Standalone greater than 31.5 in. (800 mm)	13 mS	
	Cascaded up to 110 in. (2800 mm) combined	13 mS	1.18 in.
	Cascaded greater than 110 in. (2800 mm) combined	18 mS	

Table 6-2.	Shadow Light	Curtain Response	Time and Object	Sensitivity (Cont.)
------------	--------------	------------------	-----------------	---------------------

\* Includes extensions/cascaded heads for Shadow VII, Shadow 8, and Shadow 9 models

**Tbm** is time added to the other response times in the ANSI formula to reflect brake wear. It is calculated as follows:

Tbm = stop-time limit – stopping time at top stop

The Stop-time Limit is calculated in Initialization (see page 4-31). You can determine the stopping time at top stop by performing the stop-time test procedure shown on page 6-21.

The depth penetration factor **Dpf** is a measure of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts. **Dpf** is related to the light curtain's object sensitivity, the smallest diameter object the light curtain can detect anywhere in its field.

Object sensitivity (S) for Shadow 8 is 1.18 in. (30 mm) with beam centers of 0.79 in. (20 mm). (See Table 6-2 for the object sensitivity of other Shadow models.) Based on S and ANSI B11.1-2009, Dpf = 3.07 in. (78 mm).

### NOTICE

#### ANSI SAFETY DISTANCE FORMULA FOR USE WITH TWO-HAND CONTROL

The formula for safety distance when using a Two-hand Control as a safeguarding device is similar to the formula above, but does not include the response time of the light curtain nor the depth penetration factor. The following is the ANSI formula for calculating the safety distance for use with Two-hand controls:

Ds = K x (Ts + Tc + Tbm)

If you use a Two-hand Control as a safeguarding device, use this formula and perform the calculation in a fashion similar to that described for the light curtain formula.

#### Example: Calculating the Safety Distance for a Light Curtain Using the ANSI Formula

The ANSI formula is

Ds = K x (Ts + Tc + Tr + Tbm) + Dpf

The following value is a constant:

**K** = 63 inches per second

We will use the following values for the variables in the formula:

**Ts** + **Tc** = 0.190 sec. (result of the 90° stop-time test)

**Tr** = 0.018 sec. (response time of Shadow 9 with greater than 110 in. (2800 mm) combined length including cascaded heads (see Table 6-2, page 6-25.)

**Tbm** = 0.035 sec. (see Example 2 in *Calculating the Stop-time Limit*, page 4-31)

**Dpf** = 3.07

Putting these values into the formula, we get:

 $\mathbf{Ds} = 63 \times (0.190 + 0.018 + 0.035) + 3.07$ 

**Ds** = (63 x 0.284) + 3.07

**Ds** = 15.309 + 3.07

**Ds** = 18.379 in.

The light curtain must be mounted 18.379 in. away from the pinch point.

When using the ANSI formula, be sure to perform the calculations in this order:

- (1) Add  $\mathbf{Ts} + \mathbf{Tc} + \mathbf{Tr} + \mathbf{Tbm}$  first.
- (2) Multiply the result by 63.
- (3) Add this result to **Dpf**. This is **Ds**.

If you do no follow this order, your safety distance calculation will be incorrect.

The OSHA Safety Distance Formula

### A DANGER

#### **OBSERVE THE CORRECT SAFETY DISTANCE**

- Calculate the safety distance carefully according to the instructions below, and mount your light curtain heads at least the calculated distance from the hazardous area.
- Mount your light curtain heads at least 7.5 in. (191 mm) from the hazardous area, regardless of the calculated safety distance.
- Be sure your value for Ts (i.e., stopping time) includes the response times of all devices that react to stop the press. If your measurement of stop time does not include the response times of the press control, light curtain, and any other devices that react to stop the press, the safety distance will be too short.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### USE BRAKE MONITOR TO CHECK STOPPING TIME

Use a brake monitor in light curtain applications to protect operators whose hands are routinely exposed to a hazardous area, as required by OSHA 1910.217 (c) (3) (5). A brake monitor continually checks to make sure that the machine's stopping time does not exceed a predetermined limit.

Failure to comply with these instructions will result in death or serious injury.

# NOTICE

Wintriss recommends that you use the American National Standards Institute (ANSI) formula for calculating safety distance because it contains more factors, allowing you to calculate the safety distance more precisely. The ANSI formula is explained in the previous section (see page 6-24).

The OSHA safety distance formula as specified in OSHA regulation 1910.217 is

Ds = K x Ts

where

Ds is the OSHA safety distance in inches

K is the OSHA-recommended hand-speed constant of 63 inches-per-second

Ts is the stopping time of the press in seconds

The stopping time, **Ts**, must be measured at approximately  $90^{\circ}$  of crankshaft rotation or at maximum closing velocity and include all components involved in stopping the press, including the response time of the press control that activates the brake and the response time of the light curtain (see Table 6-2, page 6-25).

The value calculated by SmartPAC 2 at the end of the  $90^{\circ}$  stop time test includes the stop time of the press and response time of the press control (see page 6-22).

The **Ts** value should also include a percentage factor added for brake wear. A factor of 20 percent is recommended for presses with new brakes or brakes in good condition. A factor of 10 percent is recommended for presses with older brakes. See *Calculating the Stop-time Limit*, page 4-31 for further details.

### NOTICE

### OSHA SAFETY DISTANCE FORMULA FOR USE WITH TWO-HAND CONTROL

The formula for safety distance when using a Two-hand Control as a safeguarding device is similar to the formula above, but does not include the response time of the light curtain. Use the following OSHA formula for calculating the safety distance for a Two-hand Control:

Ds = K x Ts

As indicated above, Ts must include all factors that are involved in stopping the press, including the response time of the press control but excluding the response time of the light curtain.

#### Example: Calculating the Safety Distance for a Light Curtain Using the OSHA Formula

The OSHA formula is

Ds = K x Ts

The following value is a constant:

**K** = 63 inches per second

We will use the following values for the variables in the formula:

- Stopping time of press + response time of press control = 0.190 sec. (result of the 90° stop-time test)
- Response time of light curtains =0.018 sec. (response time of Shadow 9 with greater than 110 in. (2800 mm) combined length including cascaded heads (see Table 6-2, page 6-25.)
- Additional time for brake wear = 0.035 sec. (see Example 2 in *Calculating the Stop-time Limit*, page 4-31)

Putting these values into the formula, we get:

 $\mathbf{Ds} = 63 \text{ x} (0.190 + 0.018 + 0.035)$ 

**Ds** = 63 x 0.243

**Ds** = 15.309 in.

The light curtain must be mounted 15.309 in. away from the pinch point.

When using the OSHA formula, be sure to do the calculations in this order:

(1) Add the factors involved in the stopping time **Ts** first.

(2) Multiply the result by 63. This is **Ds**.

If you do no follow this order, your safety distance calculation will be incorrect.

### Adding to Safety Distance for Blanking Windows

When using fixed or floating blanking windows with your Shadow 9 light curtain, you must add a factor to the calculated safety distance for each beam that is blanked. This applies whether you use the ANSI or the OSHA formula. For a one-beam fixed blanking window, you must add 5.38 in. (136.6 mm) to the calculated safety distance (ANSI formula). You must add 5.76 in. (146.3 mm) to the calculated safety distance for a one-beam floating blanking window (ANSI formula). See your Shadow 9 user manual for further details about fixed and floating blanking.

If you are using another Shadow light curtain, refer the appropriate Shadow user manual for the additional distance factor to add to the safety distance formula for each blanking window.

# **PRESS CONTROL**

(RUN – PRESS CONTROL)

### NOTICE

For help with the Press Control Parameters screen, press the HELP key when the screen is displayed.

This item enables you to adjust the top-stop angle, maximum and minimum press speed limits, and counterbalance setpoint established for the selected tool in Program mode (see page 5-48). (The Counterbalance Setpoint field does not display if the Counterbalance Tolerance has been set to zero (0) in Initialization mode.) You make these adjustments on the Press Control Parameters screen, which is shown in Figure 6-24, page 6-31.

You can also view (but not adjust) the angles at which the overrun sensor turns on and off (see Figure 6-25, page 6-32).

In addition, the current Counterbalance air pressure may be displayed if the Counterbalance Tolerance is set to a value other than zero (0) in Initialization, and the Main Air pressure setpoint and current Main Air pressure are shown if the Main Air Limit has been set to a non-zero value in Initialization (see Figure 6-24).

# **Adjusting Program Settings**

The top-stop angle is the crankshaft angle at which the Top-stop command is given on your press. The top-stop angle default value is set in Initialization (see *Setting the Top-stop Angle*, page 4-28) and adjusted in Program mode to account for differences in die weight, press speed, etc. for each tool.

SmartH TOOL NUMBER 6163 KEY BLANK	AC DEMO PART CN TWO HAN	IR 0 D S.S		F1
SENSORS ENABLED	07 15	PM / II DEG		F2
TOP STOP ANGLE	270 DEG		SHOW OVERRUN ANGLES	F3
MAX. PRESS SPEED	200 SPM 8 SPM			F4
SETPO	INT PRE	SSURE (PSI)		F5
MAIN AIR	70	88		<b>F6</b>
USE THE CURSOR KEYS TO CHANGE. PRESS TH	TO SELEC	I THE VALUE EY TO CHANGE DONE		<b>F7</b>
	THE WILLIA	201121	RETURN TO MAIN MENU	<b>F8</b>

Figure 6-24. Press Control Parameters Screen

The maximum and minimum speed limit settings are used to monitor press speed for tools run on a variable-speed press. They apply to all Run operating modes—Continuous, Single-stroke, and Inch. When the speed of the press exceeds the maximum limit, SmartPAC 2 stops the press and displays the fault message "Maximum press speed exceeded." When press speed drops below the minimum limit, SmartPAC 2 stops the press and displays the fault message "Minimum press and displays the fault message "Minimum press and displays the fault message are documented in Chapter 7 (see page 7-30).

The counterbalance setpoint is used together with the counterbalance tolerance you set in Initialization (see *Setting Clutch and Counterbalance Air Pressure Limits*, page 4-29) to specify the pressure range outside of which an F46 (Counterbalance Air Outside Sensor Limits) error displays on the SmartPAC 2 LCD. This field does not display if the Initialization tolerance value is set to zero (0), disabling the Counterbalance Setpoint feature.

To adjust one or more of these settings, do the following:

1. Select PRESS CONTROL on the Main Run Menu. The Press Control Parameters screen displays.

# NOTICE

#### ARE YOU LOCKED OUT?

Access to items on this screen may be limited to Program mode or may require a password. The security access settings in Initialization mode determine when changes can be made. See Table 4-15, page 4-48.

2. Move the highlight bar to the desired item, and press ENTER. The Numeric Entry window (see Figure 5-3, page 5-3) displays.

# NOTICE

- The value you enter in the MAXIMUM PRESS SPEED field must be greater than the Minimum Press Speed value. If the Maximum Speed setting is less than or equal to the Minimum Speed value, SmartPAC 2 changes the Maximum Speed to one Stroke per Minute greater than the Minimum Speed.
- To disable speed control, set both Maximum and Minimum Speed values to zero (0).
- 3. Key in a new value, or use the Up or Down cursor key to increment or decrement the existing value, and press ENTER. The window closes, and your change appears in the field you selected in step 2.
- 4. Repeat steps 2 and 3 for each item you want to adjust.
- 5. When you are finished, press RESET to return to the Main Run Menu.

# **Displaying Overrun Sensor On/Off Angles**

You can display the angles at which the overrun sensor turns on and off in order to verify that you have installed the overrun sensor magnet correctly (see step 9 of the *Installing the Overrun Sensor Magnet* procedure, page 2-82). To do so, perform the following steps:

1. On the Press Control Parameters screen, press F3 (Show Overrun Angles). A window like the one shown in Figure 6-25 displays.



Figure 6-25. Press Control Parameters Screen with Shown Overrun Angles Window

In addition to the Overrun Sensor On and Off angles, the window displays the angle at which the Top-stop cam turns off. The value displayed in the Zeroed Top Stop Off field allows you to verify that the Top-stop cam, which normally stays on for 20°, turns off before the overrun sensor turns on.

# **TOOL INFORMATION**

(RUN - TOOL INFORMATION)

# NOTICE

#### IF INFO IS CENTER INSTALLED

If you have ordered Info Center as an installed option, the TOOL INFORMATION item will not appear on the Main Run Menu. Instead, INFO CENTER will be displayed. Documentation of the Info Center option is available at

www.smartpac2.com/SmartView/InfoCenterSetupHelp.htm

# NOTICE

- The Tool Information screen provides a convenient place to record information about the tool. It does not control any aspect of press operation.
- This feature is not available if you have the optional PLC interface installed.

# NOTICE

For help with the Tool Information screen, press the HELP key when the screen is displayed.

This item enables you to change information about the loaded tool that was entered in Program mode (see *TOOL INFORMATION*, page 5-50). Adjustments are made on the Tool Number Information screen, which is shown in Figure 6-26.

TOOL NUMBER	1237654 INF	ORMATION		F1
PASS LINE HT	5.94	IN		تت
STRAIGHTENER	4.25	IN		
HYD. OVLD.	200	TONS		F2
PRESS SPEED	65	SPM		ت
CONVEYOR	YES			
PART LUBE	NO			F3
MEMO BOX				<b>F</b> 4
	arman			
DIE PLACE	MENT		LINE 1 OF THE MEMO	F5
			LINE 2 OF	
			THE MEMO	<b>F</b> 6
USE CURSOR KEY WANT TO CHANGE	S TO CHOOSE . PRESS THE	THE VALUE YOU ENTER KEY TO		<b>F7</b>
CHANGE IT. PRE	SS RESET KE	Y WHEN DONE.		
			MAIN MENU	<b>F</b> 8
2042				Ĵ

Figure 6-26. Tool Number Information Screen

To change tool information, do the following:

1. Select TOOL INFORMATION on the Main Run Menu. The Tool Number Information screen displays.

# NOTICE

### ARE YOU LOCKED OUT?

Access to items on this screen may be limited to Program mode or may require a password. The security access settings in Initialization mode determine when changes can be made. See Table 4-15, page 4-48.

- 2. Select a parameter you want to change. The Numeric Entry window (see Figure 5-3, page 5-3) displays.
- 3. Key in a new value, following the directions in the Numeric Entry window. For Yes/No items, key in "0" for No, "1" for Yes. Press ENTER when you are finished. You are returned to the Tool Number Information screen with your change displayed in the field you selected in step 2.
- 4. Repeat steps 2 and 3 to change other parameters, as necessary.
- 5. To edit text in the memo box, press **F5** for the first line, **F6** for the second line. When the Alphabetic Entry window (Figure 5-10, page 5-9) displays, key in your edits, following the directions in the window, and press **F6**. The window closes, and your changes appear on the memo box line you selected.
- 6. When you have finished changing tool information, press RESET to return to the Main Run Menu.

# ERROR/EVENT LOG

(RUN – ERROR/EVENT LOG)

# NOTICE

For HELP with the Error/Event Log, press the HELP key when the screen is displayed.

This item enables you to view a list, called the Error/Event Log (see Figure 6-27, page 6-35), that displays in reverse chronological order the 100 most recent errors or events that have occurred at the press or within SmartPAC 2.

The Error/Event Log is useful as a troubleshooting aid. Each time the press is stopped due to a fault, the log records the error message, which gives the reason for the stop, and the stroke count and crankshaft angle at which the stop occurred. When a new tool is loaded, the log displays the tool number. If SmartPAC 2 is connected to a computer network and e-mail is enabled, the log also shows messages sent by SmartPAC 2. When SmartPAC 2 is networked, you can send the Error/Event Log to Wintriss Tech. Support (see *MESSAGING*, page 6-37). Error messages displayed on the Error/Event Log are documented in Chapter 7.

To view the Error/Event Log, do the following:

- 1. Select ERROR/EVENT LOG on the Main Run Menu to display the Error/Event Log.
- 2. Use the cursor keys to scroll through the errors and events. When an error is selected, the full text of the error message is displayed in the blue window at the bottom of the screen.

DATE	TIME	ANGLE	COUNT	ERROR/EVENT TEXT		
03-07-2003	10:52:4	1 344	0 🗆	H66 ESTOP CIRCUIT FAILED THED PU		
03-07-2003	10:52:4	1 344	0 0	High setpoint exceeded on□		111
03-07-2003	10:52:4	1 344	0 🗆	F28 FLYWHEEL STILL TURNINGCO The 1		
03-07-2003	13:42:3	3 349	7323	F46 COUNTER BALANCE PRESSURE ISD		
03-07-2003	13:12:2	9 212	6145 🗆	F53 USER INPUT 3: DIE NITROGEN		
03-07-2003	12:49:4	1 4	4430	SENSOR 6 MATERIAL BUCKLE YELLOW FAUL		
03-07-2003	12:02:2	9 99	3019	F64 SHADOW B INPUTS OPENEDC D		
03-07-2003	11:32:0	11 357	1623 🗆	SENSOR 8 END OF STOCK RED FAUL1		
03-07-2003	11:08:4	1 44	489 0	SENSOR 2 SHORT FEED RED FAUL1		
03-07-2003	10:59:1	1 344	9 0	ONE OF THE SENSOR AUTO ENABLED COUNTE		
03-07-2003	10:52:4	1 342	0.0	THE RESULVER PUSITION IS DIFFERENTUTHA		
03-07-2003	10:52:4	1 43	30	FIS EMERGENCI STOP OPENLLIRE EMERG		
03-07-2003	10:29:2	0 339		You heal leaded # 140		
03-07-2003	10:29:1	10		Trifialization mode entered []		
03-07-2003	07-17-5	7 312	12595 0	F16 TOP STOP CIPCUIT OPENDThe Tor		<b>              </b>
03-07-2003	07.17.5	3 312	12595 0	Nigh setnoint exceeded on		
03-07-2003	07:13:1	9 332	12594	F56 USER INPUT 6: LOW OIL PRESS.		
03-07-2003	07:12:3	7 332	12594 0	SENSOR 1 MATERIAL BUCKLE YELLOW FAUL		
03-07-2003	06:59:5	3 332	12594 □	PRESS CONTROL IS IN LOCKOUT MODED THE		
03-06-2003	15:35:5	9 332	12594 🗆	F10 PRESS MOTOR IS OFFOUThe main		
03-06-2003	14:51:4	2 3	12594 0	THE RESOLVER POSITION IS DIFFERENTUTHA		
03-06-2003	14:51:1	9 332	12594 🗆	F56 USER INPUT 6: LOW OIL PRESS.□		
03-06-2003	14:50:3	7 332	12594 🗆	SENSOR 1 MATERIAL BUCKLE YELLOW FAUL		
03-06-2003	14:49:5	3 332	12594 🗆	PRESS CONTROL IS IN LOCKOUT MODED The		
03-06-2003	14:48:5	i9 332	12594 🗆	F10 PRESS MOTOR IS OFFOOThe main		<u> </u>
03-06-2003	14:48:4	2 3	12594 🗆	THE RESOLVER POSITION IS DIFFERENTOTHA		
High a	etnoint	exceed	ed on			
TNPL	IT 2 RIG	HT REAL	1			
Setpoint o	of 30.1	Tonnage	of 32.6			
					Return To	
					Main Menu	III N

Figure 6-27. Error/Event Log

# LOAD NEW TOOL

(RUN – LOAD NEW TOOL)

# A DANGER

#### ANCILLARY EQUIPMENT MAY OPERATE WHEN TOOL IS LOADED

Ensure that all personnel stand clear when you load a tool.

Failure to comply with these instructions will result in death or serious injury.

# NOTICE

"LOAD NEW TOOL" does not appear on the Main Run Menu if LOAD TOOL # has been set to PROGRAM MODE ONLY on the Security Access Menu in Initialization mode. See SECURITY ACCESS, page 4-47.

# NOTICE

For help with the Tool Manager screen, which displays which you select the LOAD NEW TOOL item, press the HELP key when the screen appears.

This item enables you to load a new tool when the press is stopped. (You cannot load a new tool when the press is running. If you attempt to do so, SmartPAC 2 will display an error message, indicating that the press must be stopped before a tool can be loaded.) When you select LOAD NEW TOOL, the Tool Manager screen, shown in Figure 6-28, page 6-36, displays.

TOOL #	's 4 U	3 SED 196	OOL MA	ANAGER LE			CAMB IE AL ESPANOL	F1
TOOL #	т	OOL NAME		TOOL #	TOOL NAME			لنت
6160	DEMO T	OOL						
6161	BRACKE	т 1						
6162	BRACKE	т 2						
99999999	TOOL T	EMPLATE						J
								<b>   </b> 2
								<b>Г</b>
								J
								<b>                                    </b>
								Ĵ
							LOAD TOOL	
								Ĵ
					L			Ĵ
USE TH	E CURS	SOR KEYS	TO SEL	ECT A T	OOL TO LOAD.		RETURN TO	
PRESS	THE FS	5 KEY TO	LOAD I	T. PRES	S RESET WHEN I	DONE.	MATN MENII	IFS
FRESS	THE FI	5 KEY TU	LOAD T	T. PRES	S RESET WHEN	DONE.	MAIN MENU	ГО

Figure 6-28. Tool Manager Screen

Follow these steps to load a new tool:

1. Select LOAD NEW TOOL from the Main Run Menu. The Tool Manager screen displays.

# NOTICE

#### ARE YOU LOCKED OUT?

Loading a new tool number may be limited to Program mode or may require a password. The security access settings in Initialization mode determine when changes can be made. See Table 4-15, page 4-48.

2. Highlight the tool you want and press **F5** (Load Tool). The warning window shown in Figure 6-29 displays.



Figure 6-29. Load Tool Warning Window

3. Press ENTER. A message displays, indicating that the tool you selected is being loaded, then you are returned to the Main Run Menu with the tool you loaded shown in the Status Box.

### NOTICE

If an error message displays, go to Chapter 7 and follow the instructions for correcting the problem. If the error is not covered in Chapter 7, or you cannot fix the problem, call Wintriss Tech. Support.

# MESSAGING

(RUN – MESSAGING)

### NOTICE

For help with the MESSAGING item, press the HELP key when the Messaging screen is displayed.

This item, which appears on the Main Run Menu only when e-mail has been enabled in Initialization (see *E-MAIL FUNCTION*, page 4-57), allows you to send e-mail messages to recipients accessible via your SmartPAC 2 computer network. Before you can use the e-mail messaging function, you must set up the e-mail recipients and messages using the SmartView remote viewing utility (see Appendix E).

To send an e-mail message, using the Messaging function, do the following:

1. Select MESSAGING on the Main Run Menu. A screen displays similar to the one shown in Figure 6-30, which lists the recipients you have set up using SmartView.

From: SmartPAC2-10030001 To: John Smith (pager), Toolroom, Maintenance Supv (mobile) Message:		F1 F2
Wintriss Technical Support John Smith (pager) Jack Robinson (mobile) Toolroom	Select Recipient	F3
Pressroom Foreman Quality Control Dept Jane Doe (pager) Maintenance Supv (mobile)	Select Message	<b>F4</b>
	Send Message and Exit	F5
	Clear	F6
	Recipients	F7 F8

Figure 6-30. Messaging Screen: List of Recipients

- 2. Highlight the message recipient, using the cursor keys, then press **F3** (Select Recipient). The recipient's name displays in the "To:" field at the top of the screen.
- 3. To add other recipients, repeat step 2.
- 4. Press **F4** (Select Message) to display a list of messages, as shown in Figure 6-31, page 6-38.
- 5. Highlight the message you want, using the cursor keys, then press F4 (Select Message) again to select the message. The message name displays in the "Message:" field at the top of the screen.
- 6. Press F5 (Send Message and Exit) to send the message. You are returned to the Main Run Menu.

From: SmartPAC2-10030001 To: Quality Control Dept, John Smith (pager) Message: Need QC Approval (1st part verification) Last Error Message Error Log File Waiting for Material Need QC Approval (1st part verification) Material Problem (Camber) Tooling Problem - Die No. 1234567 Press lube needs to be refilled Maintenance attention needed - Brake Warning! Waiting for Forklift (full bin) Job Stopped!! - Excessive burr Job Finished - Tool Change started Broken punch - Die No. 101793 Blank feeder jammed	Select Recipient Select Message Send Message and Exit Exit Without	F1 F2 F3 F4 F5
Broken punoh - Die No. 101793 Blank feeder jammed	Exit Without Sending	F6
	Recipients	<b>F</b> 7

Figure 6-31. Messaging Screen: List of Messages

# Sending E-mail to Wintriss Technical Support

If you select "Wintriss Technical Support" as your recipient, and "Error Log Files" as your message, you can send an e-mail to Wintriss Tech. Support that includes error logs, a list of installed options, and other useful information. An example is shown in Figure 6-32.

🖉 00001599 Windows Internet Explorer	- • ×
https://mail.wintriss.com/ows/Pac=TremBa=OpenBit=TPM.NoteBid=RgAAAABwqipYB1K4TpuvQvEu0dl.YBwDBitC5JP9562bQ1nUE%2bi7562f3462fAAAAA	
2 Reply 2 Reply All 2 Forward ♥ ▼ 1 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	۲
Wintriss Support	
Sent: Tuesday, April 19, 2011 12:14 PM	
To: Wintriss Support	
Attachments: B AppErrLog00001599.bt (17 KB); B RtsErrLog00001599.bt (4 KB)	
<pre>Installed options =&gt; ,PM MONITOR,SPANISH LANGUAGE,INFO CENTER,LETS,USB BACKUP RTS Version: V10.69 04/11 T1.46 RTS Serial Number: 00001599 RTS Loader: 1.07 RTS Board Rev: 0 Procam Total Channels: 8 Dipro Total Channels: 32 Emulator Version: 7.6.6 Shell Version: 3.01 Network Name: SPAC2-00001599 IF Address: 192.168.100.233 Time of Startup: 02-13-2003 01:21:44 WaveformPac Version: 2.00 WaveformPac Total Inputs: 4</pre>	
🚱 Internet 🍕	€ 125% ×

Figure 6-32. Sample E-mail to Wintriss Tech. Support

# **TOGGLE HOT KEYS**

### (RUN – TOGGLE HOT KEYS)

This item enables you to switch between the two sets of Hot keys available in SmartPAC 2. When you select this item with the TOGGLE HOT KEYS 1 caption displayed, the second set of Hot Keys is shown; when you select TOGGLE HOT KEYS 2, the first set of Hot Keys appears (see Figure 6-33). For more information about programming and using Hot keys, see *Programming Hot Keys*, page 6-3.



Figure 6-33. Toggle Hot Keys 1 and 2 Menu Items

# **Operating the Press**

# Responding to an Interrupted Stroke

# A DANGER

### INTERRUPTED STROKE DUE TO MACHINE MALFUNCTION

Investigate and correct the cause of the Interrupted Stroke before resuming operation of the press.

Failure to comply with these instructions will result in death or serious injury.

An Interrupted Stroke is a condition that occurs whenever the press is stopped before a stroke can be completed, forcing the operator to return the press to its Top-stop position. The command that stops the press may be issued by the operator or a safety device or be the result of a fault condition.

When an Interrupted Stroke occurs, the message "Interrupted Stroke" flashes in the status box at the top of the SmartPAC 2 screen (see Figure 3-2, page 3-2), and WPC 2000 automatically switches to Two-hand Maintained Single-stroke mode. To clear the Interrupted Stroke, press both Run/Inch palm buttons on the Operator Station until the press returns to top dead center. When the press has returned to Top-stop, the "Interrupted Stroke" message is cleared, and WPC 2000 switches back to the stroke and mode selected when the Emergency-stop occurred.

When the Emergency-stop is caused by a system fault, you must first clear the error by pressing the RESET key on the SmartPAC 2 front panel; then you can return the press to top dead center.

# **Selecting Operating Mode**

You select Inch, Single-stroke, or Continuous operation with the Stroke Select key switch on the SmartPAC 2 front panel. To choose an operating mode for one of these stroke selections, you must display the Mode Select Menu (see Figure 6-34), which you access by turning the Stroke Select switch of OFF with SmartPAC 2 in Run mode.



Figure 6-34. Mode Select Menu

The Mode Select Menu may display up to five operating mode selections, depending on the firmware and hardware options you have installed:

- Two-hand
- One-hand (Requires Two-hand/One-hand/Foot firmware and a Shadow light curtain)
- Foot (Requires Two-hand/One-hand/Foot firmware and a Shadow light curtain)
- Micro-inch Enabled (Must also be enabled in SmartPAC 2 Initialization-see page 4-29)
- Automatic (Must be enabled in SmartPAC 2 Initialization-see page 4-41)

To select an operating mode on the Mode Select Menu, do the following:

1. With the Program/Run key switch on the SmartPAC 2 front panel set to RUN, turn the Stroke Select key switch to OFF to display the Mode Select Menu.

- 2. Select the desired operating mode by pressing the appropriate function key:
  - Press F4 to enable Micro-inch
  - Press F5 to select One-hand mode
  - Press F6 to select Two-hand mode
  - Press F7 to select Foot mode
  - Press F8 to select Automatic mode
- 3. Turn the Stroke Select switch the desired setting (i.e., Inch, Single-stroke, or Continuous).

# **Operating the Press in Inch Mode**

# A DANGER

#### IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA regulation 1910.217, ANSI standards B11.1 and B11.19, and any other regulations or standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### INCH MODE NOT SUITABLE FOR PRODUCTION

DO NOT use INCH mode as a production mode, per ANSI B11.1-2009.

Failure to comply with these instructions will result in death or serious injury.

To operate the press in Inch mode, do the following:

- 1. Make sure the Program/Run key switch is set to RUN.
- 2. Turn the Stroke Select key switch of OFF.
- 3. Select one of the following options on the Mode Select Menu (see page 6-40):
  - If a light curtain is installed on the press, select "TWO HAND" or "ONE HAND." The light curtain will be muted on the upstroke if WPC 2000 has the muting option.
  - If no light curtain is installed, select "TWO HAND." If you set the switch to "ONE HAND," WPC 2000 defaults to Two-hand mode.
- 4. Turn the Stroke Select key switch to INCH.

There are four different ways to operate the press in Inch mode:

- Top-stop in Inch
- Top-stop Bypass
- Micro-inch
- Dead Motor Inch

### Top-stop in Inch

### NOTICE

Top-stop in Inch is enabled when there is no connection to pin #13 on the WPC 2000 Main Processor board. This is the factory setting.

Top-stop in Inch is the default Inch mode. To run the press in Top-stop in Inch, do the following:

1. To move the ram a short distance, press and hold both Run/Inch palm buttons on the Operator Station at the same time, releasing them when the ram has reached the desired point in the stroke.

# NOTICE

If you are running the press in One-hand mode, you need to depress the left Run/Inch button only.

The ram moves only as long as both Run/Inch buttons are depressed. Releasing one of the buttons stops the ram immediately.

# NOTICE

The ram will also stop if the light curtain is blocked during the non-muted portion of the stroke, or if a system fault is detected.

- 2. Repeat the previous step to continue "inching" the ram.
- 3. To move the ram to Top-stop, press and hold both Run/Inch palm buttons until the ram comes to a stop at the top of the stroke.
- 4. To initiate another stroke, release the Run/Inch buttons, then press and hold them until the ram again comes to rest at the Top-stop position.

# NOTICE

When "inching" the press, you may not notice when the ram top-stops.

### Top-stop Bypass (Top-stop in Inch Disabled)

### NOTICE

To disable Top-stop in Inch, connect pin #13 on the WPC 2000 Main Processor board to +24 Vdc.

Top-stop in Inch can be disabled so that the ram continues to cycle, without coming to a Top-stop, as long as the Run/Inch buttons on the Operator Station are depressed. In this alternative Inch mode, called Top-stop Bypass, the ram stops only when one or both buttons are released.

### Micro-inch

Micro-inch allows finer adjustments than are possible in Top-stop in Inch or Top-stop Bypass and is designed to facilitate setup on high-speed or short-stroke presses. In Micro-inch, the distance the ram moves is controlled by the time setting you make on the Press Control Parameter Menu in Initialization mode (see *Setting Micro-inch Time and Angle*, page 4-29). When that time has elapsed, the ram comes to a stop even though the Run/Inch palm buttons are still depressed.

The ram can be stopped before the end of the Micro-inch time by releasing one or both Run/ Inch buttons. To move the ram through a complete stroke in Micro-inch, you must "inch" the press to Top-stop. Micro-inch has no Top-stop feature.

Micro-inch is enabled via the MICRO ANGLE setting on the Press Control Parameter Menu (see page 4-29) and function key **F4** (Change Micro Inch Mode) on the Mode Select Menu (see page 6-40).

### Dead Motor Inch

Dead Motor Inch is a feature that allows you to operate the press in Inch mode for a short time after the main motor is turned off, using the energy stored in the flywheel. Dead Motor Inch allows the press to be inched in smaller increments than is possible when the press is running, and is useful during setup. To activate Dead Motor Inch, do the following:

- 1. Turn off the press motor.
- 2. Turn the Stroke Select switch to "INCH."
- 3. Press both Run/Inch buttons to initiate a stroke, releasing them when the ram has moved the desired distance. Repeat this process until the flywheel has stopped turning.

# **Operating the Press in Single-stroke Mode**

# A DANGER

#### IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA regulation 1910.217, ANSI standards B11.1 and B11.19, and any other regulations or standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

To operate the press in Single-stroke mode, do the following:

- 1. Make sure the Program/Run key switch is set to RUN.
- 2. Turn the Stroke Select key switch of OFF.

- 3. Select one of the following options on the Mode Select Menu (see page 6-40):
  - Choose "TWO HAND" if you want to run the press in Two-hand mode
  - Choose "ONE HAND" if you want to run the press in One-hand mode
  - Choose "FOOT" if you want to run the press in Foot mode.

### NOTICE

If you are running Two-hand Only firmware, One-hand and Foot modes are not available.

4. Turn the Stroke Select switch to "SINGLE STROKE."

Instructions for operating the press in each Single-stroke mode are provided below.

### Single-stroke, Two-hand Operation

### A DANGER

#### **OPERATOR STATION WIRED INCORRECTLY**

Run all necessary tests to verify that each Operator Station is wired correctly and provides proper anti-tie-down (see page 2-96) and anti-repeat (see page 2-97) protection.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### MORE OPERATORS THAN OPERATOR STATIONS

- Ensure that there are the same number of active operator stations as there are operators if the press is not equipped with properly installed and operating light curtains.
- During setup, lockout/tagout the press if there are more operators than operator stations.
- Verify at every shift change that there are the same number of active operator stations as there are operators if the press is not equipped with properly installed and operating light curtains.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### TWO-HAND CONTROL TOO CLOSE TO HAZARDOUS AREA

Verify at each shift change that any moveable Two-hand controls are located at least the safety distance from the pinch point or hazardous area.

Failure to comply with these instructions will result in death or serious injury.

When performing the following procedure, make sure to press both Run/Inch buttons on each installed Operator Station within the 1/2-second palm time ("synchronous" time in ANSI terminology) and all pairs of Run/Inch buttons on all installed Operator Stations within the 5-second concurrent time. Also, confirm that the setting on S102 switch 6 is correct for your Operator Station setup (see page 4-43).

To run the press, using Single-stroke, Two-hand operation, do the following:

1. With "TWO HAND" highlighted on the Mode Select Menu, initiate a stroke by pressing both Run/Inch buttons, holding them until the ram reaches the Auto Carry-up Angle, then releasing them (see *Setting the Auto Carry-up Angle*, page 4-28). The ram completes its stroke automatically, stopping at Top-stop.

### NOTICE

Both Run/Inch palm buttons on each Operator Station must be pressed within 1/2 second. Each pair of Run/Inch buttons on all Operator Stations must be pressed within 5 seconds. Make sure that the setting on S102 switch 6 is correct for your setup (see page 4-43).

If one or both Run/Inch buttons are released before the ram reaches the Auto Carry-up Angle, the press stops. The press will also be stopped on the downstroke if a system fault is detected or a light curtain is blocked.

### Single-stroke, One-hand Operation

### A DANGER

#### INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 2000 properly in order to run the press in Single-stroke, One-hand mode.

Failure to comply with these instructions will result in death or serious injury.

Single-stroke, One-hand operation can only be used with WPC 2000 systems running Two-hand/One-hand/Foot firmware and employing a Shadow light curtain to guard the point of operation. To run the press in this mode, do the following:

1. With "ONE HAND" highlighted on the Mode Select Menu, initiate a stroke by pressing the left Run/Inch palm button, then releasing it. The ram completes its stroke automatically, stopping at Top-stop.

The press is stopped if a system fault is detected or if a light curtain is blocked during the downstroke.

### Single-stroke, One-hand Control Operation

### A DANGER

#### INSUFFICIENT SAFEGUARDS ALLOWING ACCESS TO HAZARD

- Follow all applicable OSHA and ANSI regulations for safeguarding your press system. Point-of-operation safeguarding is the single most important factor in the prevention of injuries.
- Follow all applicable OSHA and ANSI regulations when installing a One-hand Control.
- Ensure that proper safeguarding devices are installed and working properly. Wintriss takes no responsibility if safeguarding devices are not installed or working correctly.
- DO NOT use WPC 2000 or a One-hand Control as a safeguarding device.
- Install and operate WPC 2000 and a One-hand Control in accordance with OSHA and ANSI regulations.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### PREVENT OPERATOR FROM STANDING BETWEEN LIGHT CURTAIN AND HAZARDOUS AREA

Ensure that the operator cannot position himself between the light curtain and the hazardous area. Use another pair of light curtains or a mechanical barrier at knee to waist height to prevent the operator or a passerby from being "trapped" between the light curtain and the hazard.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 2000 properly in order to run the press in Single-stroke, One-hand Control mode.

Failure to comply with these instructions will result in death or serious injury.

# NOTICE

When a One-hand Control is installed, you cannot use the Run/Inch palm buttons on the Operator Station while the press is in One-hand mode. All other modes work normally as described in this manual.

One-hand Control is a switch available from Wintriss that allows operators to use their free hand to feed a part while their other hand operates the switch. This option can only be used with WPC 2000 systems running Two-hand/One-hand/Foot firmware and employing a Shadow light curtain to guard the point of operation.

One-hand Control can be used in two different modes. In Normal mode, the press cycles in Single-stroke whenever you push the One-hand Control button. In "Light Curtain Break" mode, the press cycles only when you push the One-hand Control button within 8 seconds of removing your hand(s) from the light curtain. If the button is pushed after this interval expires, the press does not cycle.

Light Curtain Break mode prevents inadvertent operation of the press when an operator is loading or unloading parts.

You select the mode by setting option switch 3 on the Press Control Option Switch Menu (see step 1, below).

To run the press in Single-stroke, One-hand Control mode, do the following:

1. Set option switch 3 on the Press Control Option Switch Menu to OPEN to operate the press in Normal One-hand Control mode (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 4-36). Set switch 3 to CLOSED to operate in Light Curtain Break mode.

# NOTICE

If the "Interrupted Stroke" message flashes on the SmartPAC 2 display, press and hold the Run/Inch palm buttons on the Operator Station to return the press to Top-stop. The "Interrupted Stroke" message should disappear.

- 2. With "ONE HAND" highlighted on the Mode Select Menu, use the One-hand Control to operate the press as follows:
  - Press and release the One-hand Control button if option switch 3 is set for Normal operation.
  - Break the light curtain, then remove your hand and press the One-hand Control button within 8 seconds if option switch 3 is set for Light Curtain Break mode.

The press will make a complete stroke, coming to rest at Top-stop.

### NOTICE

The Prior Act lamp illuminates after the light curtain has been broken, and stays on for 8 seconds. If the One-hand Control button is not pushed within that time, the Prior Act lamp will turn off. The press will not start until you break the light curtain again and push the One-hand Control button within 8 seconds of removing your hand.

# NOTICE

If the press does not run, turn off power to the press and WPC 2000. Recheck all wiring connections. Try One-hand Control again. If the press still does not run, call Wintriss Tech. Support.

### Single-stroke, Foot Operation

### A DANGER

### INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 2000 properly in order to run the press in Single-stroke, Foot mode.

Failure to comply with these instructions will result in death or serious injury.

Single-stroke, Foot operation can only be used with WPC 2000 systems running Two-hand/ One-hand/Foot firmware and employing a Shadow light curtain to guard the point of operation.

Two modes are available when you run the press in Single-stroke Foot. In Foot Trip mode, you can initiate a complete stroke by simply pressing and releasing the Foot Switch. In Foot Control mode, you must press and hold the Foot Switch through the Auto Carry-up Angle to complete a stroke. You select the mode by setting option switch 3 on the Press Control Option Switch Menu (see step 1, below).

To run the press in Single-stroke, Foot mode, do the following:

- 1. Set option switch 3 on the Press Control Option Switch Menu to OPEN to operate the press in Foot Trip mode (see *Enabling Foot Control in a Foot Switch*, page 4-37). Set switch 3 to CLOSED to operate in Foot Control mode.
- 2. With "FOOT" highlighted on the Mode Select Menu, depress the Foot Switch to initiate a stroke, releasing or holding the pedal depending on the option switch 3 setting.
  - Release the Foot Switch if option switch 3 is set for Foot Trip
  - Hold the Foot Switch through the Auto Carry-up Angle if option switch 3 is set for Foot Control

The ram completes the stroke, coming to rest at Top-stop.

# NOTICE

### INTERRUPTED STROKE

In Foot Control mode, if you remove your foot from the Foot Switch before the ram reaches the Auto Carry-up Angle, the press will stop, the "Interrupted Stroke" message will flash on the SmartPAC 2 display, and WPC 2000 will switch to Two-hand Maintained Single-stroke mode for the remainder of the stroke. To clear the "Interrupted Stroke" message and return to Single-stroke, Foot operation, press both Run/Inch palm buttons on the Operator Station and hold them until the press returns to Top-stop.

# **Operating the Press in Automatic Single-stroke Mode**

### **DANGER**

#### IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA regulation 1910.217, ANSI standards B11.1 and B11.19, and any other regulations or standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

# **DANGER**

#### PRESS STARTING UNEXPECTEDLY

Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using Automatic Single-stroke. Since an external trigger initiates press operation, a stroke can occur unexpectedly.

Failure to comply with these instructions will result in death or serious injury.

The Automatic Single-stroke function allows an external event to automatically initiate a single stroke within a 30-second or 5-minute window, depending on the setting of option switch 5 on the Press Control Option Switch Menu (see step 1, below). Generally, material feed is used as the signaling event. However, other events such as part ejection or positive part transfer can be used.

There are three requirements for Automatic Single-stroke:

- Automatic Single-stroke must be enabled in Initialization (see page 4-41)
- There must be a trigger mechanism.
- Proper guarding equipment, such as a Shadow light curtain and fixed guards, must be installed to protect personnel.

As a triggering mechanism, you can use a single-pole, double-throw (SPDT) contact (switch or relay) or two solid-state switches (NPN, open collector). See Figure 3 at the end of the manual.

If you intend to use Automatic Single-stroke, contact Wintriss Tech. Support.

To run the press in Automatic Single-stroke, first install the sensors and other components required for this function, then do the following:

- Set option switch 5 on the Press Control Option Switch Menu to OPEN to select 30 seconds as the prior act timing or to CLOSED to select 5 minutes (see Switch 5 – Prior Act Time for Automatic Stroke Modes, page 4-38).
- 2. Select "AUTOMATIC" on the Mode Select Menu (see page 6-40)
- 3. Set the Stroke Select key switch to "SINGLE STROKE."

4. To initiate the first stroke, depress the Prior Act button-the Prior Act lamp will blink when Prior Act is armed-then press and hold the Run/Inch palm buttons until the ram passes bottom dead center.

The up stroke and all other strokes will be automatic.

It is not unusual for the press to pause at Top Stop. It is waiting for the "go" signal from the external switch.

The external signal must occur after Top Stop within the time selected on switch 5 (30 seconds or 5 minutes). If WPC 2000 does not receive the signal within this period, it assumes a problem has occurred and will not start the next stroke. If this happens, repeat step 4.

# **Operating the Press in Continuous Mode**

# A DANGER

#### IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA regulation 1910.217, ANSI standards B11.1 and B11.19, and any other regulations or standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

To operate the press in Continuous mode, do the following:

- 1. Make sure the Program/Run key switch is set to RUN.
- 2. Turn the Stroke Select key switch of OFF.
- 3. Select "TWO HAND" on the Mode Select Menu if you want to run the press in Two-hand mode; select "FOOT" if you want to run the press in Foot mode (see page 6-40).
- 4. Turn the Stroke Select switch to "CONT."

Instructions for operating the press in each Continuous mode are provided below.

### Continuous, Two-hand Operation

To run the press in Continuous, Two-hand mode, do the following:

### NOTICE

You must press both Run/Inch palm buttons on the Operator Station within 8 seconds after you press the Prior Act button in order to initiate Continuous mode operation. Otherwise, the press will not start. The Prior Act lamp illuminates when you press the Prior Act button and turns off after 8 seconds.

- 1. With "TWO HAND" highlighted on the Mode Select Menu, press the Prior Act button on the Operator Station, then, within 8 seconds, press both Run/Inch palm buttons and hold them through the Auto Carry-up Angle. The ram will complete the stroke and continue stroking until one of the following events occurs:
  - You press the Top Stop button
  - You press the Emergency Stop button
  - A system fault is detected
  - The light curtain is blocked during the non-muted portion of the stroke

The ram will stop in mid-stroke if you do not hold the Run/Inch palm buttons through the Auto Carry-up Angle.

### NOTICE

If the press is Emergency-stopped, WPC 2000 automatically changes to Two-hand Maintained Single-stroke mode and the "Interrupted Stroke" message flashes on the SmartPAC 2 display. To clear the "Interrupted Stroke" message, press and hold both Run/ Inch buttons to complete the stroke and return the ram to Top-stop.

### **Continuous, Foot Operation**

### A DANGER

#### INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 2000 properly in order to run the press in Continuous, Foot mode.

Failure to comply with these instructions will result in death or serious injury.

Continuous, Foot operation can only be used with WPC 2000 systems running Two-hand/ One-hand/Foot firmware and employing a Shadow light curtain to guard the point of operation.

Option switch 3 settings, which govern Foot operation in Single-stroke (see page 6-48), do not apply to Continuous, Foot operation.

To run the press in Continuous, Foot mode, do the following:

# NOTICE

You must depress the Foot Switch within 8 seconds after you press the Prior Act button in order to initiate Continuous mode operation. Otherwise, the press will not start. The Prior Act lamp illuminates when you press the Prior Act button and turns off after 8 seconds.

1. With "FOOT" highlighted on the Mode Select Menu," press the Prior Act button on the Operator Station, then, within 8 seconds, depress and hold the Foot Switch pedal. The ram will complete the stroke and continue stroking until you release the Foot Switch, at which point the press will return to Top-stop.

As long as the Foot Switch is depressed, the press will continue to stroke but will stop if one of the following events occurs:

- You press the Top Stop button
- You press the Emergency Stop button
- A system fault is detected
- The light curtain is blocked during the non-muted portion of the stroke

# NOTICE

If the press is Emergency-stopped, WPC 2000 automatically changes to Two-hand Maintained Single-stroke mode and the "Interrupted Stroke" message flashes on the SmartPAC 2 display. To clear the "Interrupted Stroke" message, press and hold both Run/ Inch buttons on the Operator Station to complete the stroke and return the ram to Top Stop.

# **Operating the Press in Automatic Continuous On-demand Mode**

# A DANGER

#### IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

# A DANGER

#### PRESS STARTING UNEXPECTEDLY

• Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using Automatic Continuous On-demand mode, in which a stroke can occur unexpectedly.

Failure to comply with these instructions will result in death or serious injury.

For information on using Automatic Continuous On-demand mode, call Wintriss Tech. Support.
## **Operating the Press in Bar Mode**

#### **DANGER**

#### INJURY WHEN USING BAR MODE

- Keep all personnel away from the press while it is being barred
- Use a spring-loaded turnover bar when you bar the press.
- Failure to comply with these instructions will result in death or serious injury.

To operate the press in Bar mode, you must have the Bar Mode Control option. To activate Bar mode and bar the press, do the following:

- 1. Make sure the Program/Run key switch is set to RUN.
- 2. Turn the Stroke Select key switch to OFF.
- 3. Select "TWO HAND" on the Mode Select Menu (see page 6-40).
- 4. Turn the Stroke Select switch to "INCH."
- 5. Turn off the press motor.
- 6. On the Bar Control enclosure (see Figure 2-22, page 2-45), turn the Select switch to "ON."
- 7. When the flywheel stops turning, press the Operate button on the Bar Control enclosure.
- 8. Bar the press using a spring-loaded bar.

#### NOTICE

When barring the press, do not rotate the flywheel too quickly. If the crankshaft moves faster than 6 SPM, WPC 2000 will stop the ram and fault code F26 will appear on the SmartPAC 2 display. Press the RESET key to continue barring the press.

9. If an F26 error appears in the display, press the Reset/Select button to clear it, and continue with the barring operation.

## **Multiple Operator Stations**

### **A** DANGER

#### HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

- Safeguard the point of operation exposed by the non-working Operator Station when using multiple operator stations. The exposed area near a disabled Operator Station must be properly guarded.
- Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

Failure to comply with these instructions will result in death or serious injury.

If you have wired two Operator Stations to your WPC 2000 (see *Installing Multiple Operator Stations*, page 2-21) and option switch 6 on S102 is set to OFF (see page 4-43), the Run/Inch palm switches on each Operator Station must be pressed within a 1/2-second "palm time" ("synchronous time" in ANSI terminology), and both pairs of palm switches must be pressed within a 5-second "concurrent time" window.

## NOTICE

Do not attempt to install more than two Operator Stations until you have contacted Wintriss Tech. Support. All Operator Stations in a mutli-Op.-Station configuration except the Op. Station wired to the "A" inputs must contain a Two-hand Control module.

If you have installed more than two Operator Stations, you must set option switch 6 on S102 to ON to establish a 5-second concurrent time for all Op. Stations. In addition, all Operator Stations except the Op. Station connected to the "A" inputs must contains a Two-hand Control module to provide the required 1/2-second palm time ("synchronous" time in ANSI terminology).

If you have dual Operator Stations, make sure to set the Operator Station Select Switch on the front panel of your WPC 2000 to enable either the first station, the second station, or both stations.

# Chapter 7. Fault Messages

## A DANGER

#### PRESS MALFUNCTION

Correct or repair any fault before running the press again.

Failure to comply with these instructions will result in death or serious injury.

## A DANGER

#### IMPROPER REPAIR PROCEDURES

- Follow all procedures in this manual.
- Perform only the tests and repairs listed in this manual.
- · Lockout/Tagout the press during all installation, modification, repair, or maintenance procedures.
- Use only factory-supplied replacement parts.
- Ensure that all safety procedures are followed during installation, operation, and repair of SmartPAC 2 and WPC 2000.
- Ensure that SmartPAC 2 and WPC 2000 are installed, tested, and repaired by qualified personnel.
- Perform the final checkout tests (see page 2-87) after every modification, repair, or change to the press, press control or other equipment.

Failure to comply with these instructions will result in death or serious injury.

### A DANGER

#### IMPROPER SAFETY SWITCHING RELAY REPAIR

Replace the DSV/Lockout Relay board or Auxiliary E-stop Relay board (see Figure 2-14, page 2-28) before placing the WPC 2000 back into operation after the first occurrence of a fused relay.

If a relay fuses

- DO NOT reset the WPC 2000 to restart the machine.
- Remove the WPC 2000 from operation immediately and replace the defective relay board before operating the press again.

Failure to comply with these instructions will result in death or serious injury.

## NOTICE

#### IMPORTANT INFORMATION TO PROVIDE WHEN CALLING WINTRISS TECH. SUPPORT

When you contact Wintriss Controls for technical assistance, be ready to provide the following information to expedite a resolution to the problem: product name (e.g. SmartPAC 2 with WPC 2000 Integration); installed options (e.g. DiProPAC, ProCamPAC, etc.); and firmware version number (e.g., Vs. 7.77). You can determine the last two items by accessing the Installed Options screen in Initialization mode (see page 4-9).

## NOTICE

#### E-MAIL TROUBLESHOOTING INFORMATION TO WINTRISS TECH. SUPPORT

You can send an e-mail containing the error log and other information to Wintriss Tech. Support.

- If your SmartPAC 2 is networked, you can e-mail files directly from the control. See page 6-38.
- If your SmartPAC 2 is not networked, you can load the files onto a USB disk (see page 4-65), take them to a networked computer, and e-mail them.

This chapter documents the fault messages that display on the SmartPAC 2 LCD or in the Error/Event Log, providing a brief explanation of each message and a remedy for correcting the problem.

## **Responding to Fault Messages**

### NOTICE

#### INFORMATION ON ERROR NUMBERS EQUAL TO OR GREATER THAN 120

Error numbers equal to or greater than 120 are covered in the WPC 2000 Option 2 Manual (1130700) and the WPC 2000 Option 2 Additional Inputs Only Instruction Sheet (1141900).

When an error occurs, a red message window like the one shown in Figure 7-1 displays, indicating the type of error and providing a brief explanation.



Figure 7-1. Error Code Window

If the press stops because one of the counter presets has been reached, a yellow message window like the one shown in Figure 7-2 displays.

STROKE COUNTER PRESET REACHED

#### Figure 7-2. Counter Preset Message Window

When an error message displays, correct the malfunction or other problem, consulting the Problem and Remedy descriptions for the appropriate error message in the sections that follow. When the problem has been corrected, press the RESET key (or Remote Reset Button, if installed) to clear the message. If the problem has been solved, you will be able to run the press. Otherwise, you will get the fault message again.

If the problem persists, contact Wintriss Tech. Support. Do not attempt to run the press before correcting the problem.

## Lockout Message

Certain press control faults, called Lockout faults, generate the message "PRESS CONTROL IS IN LOCKOUT MODE" on the SmartPAC 2 display after the fault is cleared. These are serious error conditions and require an additional step. When the problem has been corrected and the fault cleared, perform the following steps to clear the Lockout condition, following the instructions in the message.

- 1. Turn the Stroke Select switch to "OFF."
- 2. Turn the Stroke Select switch to "INCH" or one of the other stroke selections.

The Lockout message is cleared.

Press control fault codes that generate the lockout message are identified by an asterisk (\*) in documentation of the faults (see *Messages for Press Control Problems*, page 7-5).

## **Brake Monitor Faults**

## **Brake Warning LED**

When the Stopping Time of the press increases to within 10 mS of the Stop-time Limit set in SmartPAC 2 Initialization (see *Setting the Stop-time Limit*, page 4-30), the amber Brake Warning LED will flash. Illumination of this LED often means that the brake is wearing and/ or defective. To respond to this error, do the following:

- 1. Contact your maintenance crew immediately and have them investigate the condition of the brake.
- 2. If the brake checks out, your Stop-time Limit is too tight, not allowing for normal wear. Set a new Stop-time Limit, following the instructions starting on page 4-30.
- 3. Power down the WPC 2000, then power the unit back up to turn off the Brake Warning LED.

## Stop Time Exceeded

### A DANGER

#### INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the Stop-time Limit. See page 6-22 for instructions.
- Recalculate the safety distance based on the new Stop-time Limit and adjust or reinstall safeguarding devices according to the new safety distance. See *Calculating the Safety Distance*, page 6-23.

#### Failure to comply with these instructions will result in death or serious injury.

## A DANGER

#### PRESS MALFUNCTION

Correct or repair any press malfunction or wiring error before restarting the press.

Failure to comply with these instructions will result in death or serious injury.

When the Stopping Time of the press exceeds the Stop-time Limit, the following message displays on the SmartPAC 2 LCD

The Stopping Time of the press has exceeded the Stop Time Limit. Check the brakes and make sure that the press is safe to operate.

and WPC 2000 prevents the press from being operated until the brake has been completely repaired.

### NOTICE

#### **BRAKE WARNING**

The Brake Warning LED alerts you when the Stopping Time of the press is within 10 mS of the Stop-time Limit.

To respond to this fault, do the following:

### NOTICE

If you try to run the press without first repairing the brake, WPC 2000 will stop the press on the next stroke and again display the Stop Time Exceeded fault on the SmartPAC 2 display. The fault will continue to appear until the brake has been repaired.

- 1. Contact your maintenance crew and have them repair the brake immediately.
- 2. When the brake has been repaired, press the RESET key to clear the Stopping Time fault.
- 3. When the Lockout message displays (see page 7-3), turn the Stroke Select switch to "OFF," then to "INCH" to clear the message.
- 4. Run the press several times to determine its Stopping Time, and compare this value to the result of your last Stop-time tests, referring to the procedure starting on page 6-22.
- 5. Determine whether you need to adjust the previous Stop-time Limit, and make adjustments if necessary.

## **Messages for Press Control Problems**

## **A** DANGER

#### PRESS MALFUNCTION

Correct or repair any press malfunction or wiring error before restarting the press. Failure to comply with these instructions will result in death or serious injury.

Whenever WPC 2000 detects a problem with the clutch/brake control, the press, or peripheral equipment, it sends a Stop command to the press and generates a fault on the SmartPAC 2 display. Most of these faults include a three-character alphanumeric code (see Figure 7-3 for an example). The initial letter, E, F, or H, indicates how to clear the fault after it has been corrected and, in the case of F and H faults, specifies the processor (WPC 2000 has two processors) that reported the problem, as shown in Table 7-1.



Initial Letter	Significance
E	To clear the fault, you must power down the WPC 2000, then power the unit back up. The fault cannot be cleared by pressing the RESET key.
F	Generated by the main processor. To clear the fault, press the RESET key.
Н	Generated by the second processor. To clear the fault, press the RESET key.

Table 7-1. Fault Codes: Significance of Initial Letter

The two-digit number following the initial letter identifies the specific WPC 2000 fault. For example, fault code F53, which is shown in Figure 7-3, indicates a problem with the equipment connected to User Input 3, the name of which (i.e., "Die Nitrogen") has been programmed by the user in SmartPAC 2 Initialization (see *User Interlocks*, page 4-24). Each of the 7 non-control-reliable user inputs and each pair of the 2 cross-checked control-reliable inputs is provided with a unique status code. Fault codes also document problems with the resolver, Dual Safety Valve (DSV), Operator Station, and other WPC 2000 components.

To respond to a fault, do the following:

- 1. Correct the problem that caused the fault.
- 2. Clear the fault code or message on the SmartPAC 2 display by doing one of the following:
  - To clear F and H faults, press the RESET key on the display or a Remote Reset switch if one is installed.
  - To clear E faults, power down SmartPAC 2 and WPC 2000, then power the units back up.

All E, F, and H faults are documented in numerical order in the following sections.

## **Resolver Faults**

### NOTICE

#### **CLEARING "E" FAULT CODES**

To clear E fault codes, do the following:

- 1. Power down SmartPAC 2 and WPC 2000.
- 2. Power up SmartPAC 2 and WPC 2000.



- *Problem*: The press is running faster than 1000 SPM, the resolver has failed, or the wiring in the resolver circuit to WPC 2000 is loose or bad.
- *Remedy*: If WPC 2000's rated press speed is exceeded, reduce the speed. If press speed is not the problem, check the resolver wiring for shorts, breaks, or loose connections (see *Wiring the Resolver*, page 2-25). If wiring is not the problem, the resolver is probably bad and will have to be replaced. If necessary, contact Wintriss Tech. Support for assistance or replacement of the resolver.

## F04 or F05

Problem: Resolver wiring is faulty, or the resolver itself is bad.

*Remedy:* Check resolver wiring, making sure that the screws on the terminals are tightened on bare wire and not on insulation (see *Wiring the Resolver*, page 2-25). Also check the resolver. If necessary, contact Wintriss Tech. Support for assistance or replacement of the resolver.



*Problem*: During zeroing, the resolver has been set outside the range of  $330^{\circ}$  to  $30^{\circ}$ .

Remedy: Re-zero the resolver at top dead center (see Zeroing the Resolver, page 2-78).

## **Operational Faults**

### NOTICE

#### **CLEARING LOCKOUT MESSAGE**

To clear the Lockout message, do the following:

- 1. Turn the Stroke Select switch to "OFF"
- 2. Turn the Stroke Select switch to "INCH".

## F10\*

## NOTICE

This code is not displayed when Two-hand Inch operating mode is selected to enable Dead Motor Inch.

- Problem 1: If the message accompanying the fault code is "PRESS MOTOR IS OFF," the main motor has been turned off by the operator or as the result of Lockout (see page 7-3). This message displays following Lockout only when you have wired the lockout relay to the motor starter as instructed on page 2-34.
- Remedy 1: Turn the motor back on to reset the fault, clearing the Lockout message first (see NOTICE, below) if necessary. If the motor won't turn on, you may need to replace the Forward contact blocks on the starter with new ones. To access Run menus without starting the motor, set the press to Two-hand Inch operating mode (see page 6-40).

- Problem 2: If the message accompanying the fault code is "ENERGY SAVER SHUT DOWN," the main motor has been turned off by WPC 2000 to save energy. You will only get this message if you have wired the lockout relay to the motor starter (see page 2-34) and specified a shutdown time on the Press Control Parameter Menu in SmartPAC 2 Initialization (see page 4-32).
- *Remedy 2*: Clear the Lockout message, then turn the motor back on to reset the fault. Set the press to Two-hand Inch operating mode to access Run mode without restarting the motor. If you continue to get this message, you may need to increase the Shutdown Time setting.



- *Problem*: The resolver moved when the output relays to the Dual Safety Valve (DSV) were off (i.e., open) and the DSV was de-energized.
- *Remedy:* Check clutch, brake and DSV components for correct operation. Correct or repair any malfunction.



- *Problem*: The Emergency Stop button on the WPC 2000 Operator Station has been depressed, the E-Stop circuit was open after initiation of the stroke, or the E-Stop relay circuits are not working properly.
- *Remedy*: If another control is connected to the WPC 2000 E-stop circuit, refer to the user manual for that control to check for a specific error condition, and correct the error. If the error persists, contact Wintriss Tech. Support.



- *Problem*: The Prior Act button on the Operator Station was depressed (i.e., switch was open) after initiation of the stroke.
- *Remedy:* Press RESET. If the problem persists, check the wiring from the Operator Station to WPC 2000. If necessary, Contact Wintriss Tech. Support.



- *Problem*: The Top Stop button on the Operator Station was depressed or the Top-stop circuit was open after initiation of the stroke.
- *Remedy*: Check other equipment (e.g. DiPro 1500, AutoSet, etc.) wired into the Top-stop string. Correct the problem. Reset the other equipment first; then reset SmartPAC 2 with WPC 2000, and restart the press.



- *Problem*: Cross-checked inputs 8 & 9 were in different states (i.e., open or closed) for longer than 100 mS.
- *Remedy*: Diagnose and correct the condition that the inputs are monitoring (see Table 7-2, page 7-15) and reset the connected equipment; then press RESET.



- *Problem*: Cross-checked inputs 10 & 11 were in different states (i.e., open or closed) for longer than 100 mS.
- *Remedy*: Diagnose and correct the condition that the inputs are monitoring (see Table 7-2, page 7-15) and reset the connected equipment; then press RESET.



Problem: Auxiliary E-stop relay did not open properly.

## A DANGER

#### IMPROPER SAFETY SWITCHING RELAY REPAIR

• Replace the Auxiliary E-stop Relay board (see Figure 2-14, page 2-28) before placing the WPC 2000 back into operation after the first occurrence of a fused relay.

If a relay fuses

- DO NOT reset the WPC 2000 to restart the machine.
- Remove the WPC 2000 from operation immediately and replace the Auxiliary E-stop Relay board before operating the press again.

Failure to comply with these instructions will result in death or serious injury.

*Remedy:* Press RESET. If the problem persists, contact Wintriss Tech. Support for assistance or replacement of the relay board,



- *Problem*: You are attempting to run the main motor in reverse without selecting Two-hand Inch mode.
- *Remedy*: Select TWO HAND on the Mode Select Menu (see page 6-40), set the Stroke Select switch to "INCH," then run the motor in reverse.



- *Problem*: The N/O inputs from the Run/Inch palm buttons on the Operator Station do not turn off (i.e., open) when they should.
- *Remedy:* Check to make sure that the palm buttons are the correct switch type. Check and correct the palm switch wiring. If the error persists, call Wintriss Tech. Support.



- Problem: The operating mode was changed while the press was running.
- *Remedy:* Make your operating mode selection before running the press.



- *Problem*: The operating mode you selected (i.e., One-hand, Two-hand, or Foot) is not valid for your stroke selection (i.e., Inch, Single-stroke, or Continuous).
- *Remedy:* Refer to the discussion of operating modes starting on page 6-39 to determine the correct operating mode for your stroke selection.



*Problem*: Both Run/Inch palm buttons on the Operator Station were pressed in One-hand mode

or

Run/Inch buttons on an unselected Operator Station were pressed in a dual-Operator-Station setup.

*Remedy:* Press only one Run/Inch palm button when running the press in One-hand mode

or

Select both Operator Stations in a dual-Operator-Station setup, then initiate a stroke.



- *Problem*: The flywheel speed sensor is not turning off and on properly while the flywheel is turning.
- *Remedy*: Check the installation and wiring of the flywheel sensor (see page 2-43), and make corrections. You can disable flywheel speed sensing by setting the Flywheel Timer to 0 (zero). See page 4-32 for instructions.



- *Problem*: The flywheel turned faster than 6 SPM while the press was in Bar mode, creating a potentially unsafe barring condition.
- *Remedy:* After clearing the error, bar the press more slowly. Refer to *Operating the Press in Bar Mode*, page 6-53.



Problem: E-stops inputs were in different states (i.e., open or closed) for longer than 100 mS.

*Remedy:* Check the E-stop circuit wiring and the E-stop buttons.



- *Problem*: The flywheel was still in motion when the motor was started in the opposite direction or Bar mode was selected.
- *Remedy*: Press RESET, wait for the flywheel to stop turning, then try again to perform the desired operation. You may need to set the Flywheel Timer to a lower value (see page 4-32 for instructions).



- *Problem*: A flywheel sensor is installed, but the Flywheel Timer has been set to 0 (zero), disabling the sensor.
- *Remedy:* Disconnect the flywheel sensor (see page 2-43), or set the Flywheel Timer to a value greater than 0 (zero) (see page 4-32).

### Inter-processor Failures



*Problem*: One of the following processor errors has occurred:

- **F30** Resolver angles for A and B processors disagree by more than 2°
- F31 No reply to Check Start request received from second processor
- F33 Incorrect reply to Mode Change message received from second processor
- F34 No reply to Mode Change message received from second processor
- F35 Incorrect reply to Power-up message received from second processor
- F36 No reply to Reset Error message received from second processor
- **F37** No reply to Compare Input Buffers message received from second processor
- H38 Second processor did not receive Power-up information correctly
- H39 Second processor did not receive Mode information correctly

Remedy: Try pressing RESET. If error persists, contact Wintriss Tech. Support.

### **Input Buffer Test Failures**



- *Problem*: The following errors may occur when WPC 2000 performs input buffer tests, which compare the input data provided by processor A with the data provided by processor B. When the input data doesn't match, an error is generated.
  - **F41** Input buffer 1 check incorrect. This test checks system air pressure and motor forward inputs and user inputs 1 and 8.
  - **F42** Input buffer 2 check incorrect. This test checks remote reset, motor reverse, and bar mode selector inputs.
  - **F43** Input buffer 3 check incorrect. This test checks the DSV monitor input and user inputs 2 and 9.
  - **F44** Input buffer 4 check incorrect. This test checks the motor forward input and user inputs 2, 5, 7, 8, and 10.
- Remedy: Try pressing RESET. If error persists, contact Wintriss Tech. Support.

## Air Pressure Limits Exceeded

## F45 or H45

Problem: Clutch Air Pressure is below the setpoint established in SmartPAC 2 Initialization.

*Remedy*: Check your Clutch Air Pressure level. You may need to adjust the Main Air Limit setting (see page 4-29 for instructions).

F46 or H46

- *Problem*: Counterbalance Air Pressure is outside the Counterbalance Setpoint tolerance established in SmartPAC 2 Initialization.
- *Remedy:* Check your Counterbalance Air Pressure level. You may need to adjust the Counterbalance +/- setting (see page 4-29 for instructions).

## NOTICE

#### RAMPAC USERS

This error should not occur if you use RamPAC to monitor Counterbalance Air Pressure.

If you do get this error, make sure that RamPAC is wired correctly to its pressure sensor and that WPC 2000 is wired correctly to its pressure switch. For pressure switch wiring instructions, refer to page 2-15. Contact Wintriss Tech. Support if you need further assistance.

## **Component Failures**



Problem: Failures have occurred to standard equipment connected to WPC 2000.

- F47 Dual Safety Valve (DSV) monitor switch input open
- F48 Clutch air pressure switch input open
- *Remedy:* Correct the problem, then press RESET. If the error persists, contact Wintriss Tech. Support.

For F47 errors, try resetting the unit by pressing RESET and turning the Stroke Select key switch to OFF, then back to one of the other operating modes. If the DSV continues to fault, check to make sure that the air pressure is not set too low, and correct if necessary. Also, check to make sure that there are no restrictions in the air supply line (e.g., restrictive fittings, quick-disconnect fittings, low flow filters or regulators, or clogged filter elements) and that the supply line is sized to match the DSV inlet port. If the air pressure and air supply are sufficient, check for dirt or water in the DSV, and rebuild the valve if necessary.

For F48 errors, check to see whether the air pressure is turned off or set too low, and correct if necessary. If you are using a pressure sensor instead of a pressure switch to monitor Clutch Air Pressure, this fault will occur when pin #8 has not been wired to ground (see step 5 of the *Installing a Clutch Air Pressure Sensor* procedure, page 2-14).

## **Customized Status Codes**

### NOTICE

You can display the status of user inputs via the **F4** (Interlocks) function key on the Display WPC Input Status screen (see *User Interlocks*, page 4-24).

## F50 through F58

- Problem: A failure has occurred in an auxiliary press function (e.g., lubrication system) wired to a WPC 2000 user input. Refer to Table 7-2, page 7-15 for specific faults. See also the separate remedies for faults F17, F18, F50, and F58, which apply to the cross-checked input pairs 8/9 and 10/11.
- *Remedy*: Diagnose and correct the condition that the input is monitoring (see *Wiring WPC* 2000 User Inputs, page 2-31). If the error persists after you reset the unit, contact Wintriss Tech. Support.

Fault Code	User Input (Interlock)	Stop Type *	Pin #	Jumper Connection (Bypass)		
51	User 1		21	+24 Vdc		
52	User 2		82	+24 Vdc		
53	User 3		71	+24 Vdc		
54	User 4		83	Ground		
55	User 5		72	Ground		
56	User 6		84	Ground		
57	User 7		73	Ground		
59 17	User 8 paired with 9		85	Ground		
58, 17	User 9 paired with 8		74	Ground		
50, 18	User 10 paired with 11	E-stop/	86	Ground		
	User 11 paired with 10	Lockout	18	Ground		

Table 7	7-2. Fault	Codes	for	User	Innuts
rubic i	z. ruun	00000	101	0001	inputo

\* Stop types for all inputs except input pair 10/11 are set to E-Stop by default; input pair 10/11 is set to E-Stop/Lockout. All inputs except input pair 10/11 can be reconfigured by the user. If you have SmartPAC 2 firmware version 3.32 or higher and WPC 2000 firmware version 1.70 or higher, an additional stop type option, Top-stop/Lockout, is available for user inputs 1-7. To set these inputs to Top-stop/Lockout or to change the stop type setting for any user input, see page 4-24.



- *Problem*: A failure has occurred in an auxiliary press function wired to WPC 2000 cross-checked input pair 10 and 11 (see Table 7-2). One or both inputs are open.
- *Remedy*: Diagnose and correct the condition that the inputs are monitoring. If the error persists after you reset the unit, contact Wintriss Tech. Support.



- *Problem*: A failure has occurred in an auxiliary press function wired to WPC 2000 cross-checked input pair 8 and 9 (see Table 7-2). One or both inputs are open.
- *Remedy*: Diagnose and correct the condition that the inputs are monitoring. If the error persists after you reset the unit, contact Wintriss Tech. Support.

## **Light Curtain Faults**



- Problem: Light curtain A (fault #60) or light curtain B (fault #61) failed the WPC 2000 internal test.
- Remedy: Check to make sure that the light curtain is wired correctly, referring to figures 4, 14, 15, 20, 21, 23, and 24 at the back of the manual if you have Shadow light curtains, referring to the appropriate user manual if you have another product. If you need additional assistance, contact Wintriss Tech. Support.



- Problem: Two pairs of light curtains are wired to WPC 2000, but only one pair has been enabled on option switch 6 on the Press Control Option Switch Menu.
- Remedy: Set option switch 6 for dual light curtains (see page 4-38).



- Problem: Light curtain A is obstructed during the stroke.
- Remedy: Remove the obstruction.



- Problem: Light curtain B is obstructed during the stroke.
- Remedy: Remove the obstruction.



Problem: A light curtain is connected with Two-hand Only firmware installed in WPC 2000.

Remedy: Remove the Two-hand Only firmware, and install a firmware version intended for use with a light curtain, referring to *Installing Revised Firmware in WPC 2000*, page 2-85. Contact Wintriss Tech. Support for help in selecting the right firmware for your application.

### **Emergency-stop Circuit Driver Failure**



- Problem: The Emergency-stop input circuit driver has failed or is about to fail.
- Remedy: Check E-stop circuit wiring, and correct any problems. If the error persists after you reset the unit, contact Wintriss Tech. Support for assistance or replacement of the driver.

## **Top-stop Circuit Driver Failure**



- Problem: The Top-stop input circuit driver has failed or is about to fail.
- Remedy: Check Top-stop circuit wiring, and correct any problems. If the error persists after you reset the unit, contact Wintriss Tech. Support for assistance or replacement of the driver.

## **Shadow Light Curtain Input Faults**



- Problem: Shadow light curtain A (fault #68) or B (fault #69) inputs to WPC 2000 are not in the same state (i.e., one input is "on," the other is "off").
- Remedy: Check "Light curtain A1 input" and "Light curtain A2 input" LEDS on the WPC 2000 Main Processor board if light curtain A is generating the fault, or check "Light curtain B1 input" or "Light curtain B2 input" LEDs if light curtain B is generating the fault (see Figure 2-41, page 2-89).

If one of the two LEDs is unlit, receiver wiring is bad or one of the receiver outputs may be shorted. Check the wiring at the receiver and correct if necessary.

If the wiring is good, either the receiver needs to be replaced, or there is a problem with WPC 2000. Contact Wintriss Tech. Support for assistance.

## **DSV Interface and Lockout Relay Failures**

## F70\* through F78\*

### - or -

## H72\* through H76\*

## A DANGER

#### IMPROPER SAFETY SWITCHING RELAY REPAIR

• Replace the DSV/Lockout Relay board (see Figure 2-14, page 2-28) before placing the WPC 2000 back into operation after the first occurrence of a fused relay.

If a relay fuses

- DO NOT reset the WPC 2000 to restart the machine.
- Remove the WPC 2000 from operation immediately and replace the DSV/Lockout relay board before operating the press again.

Failure to comply with these instructions will result in death or serious injury.

Problem: The following errors indicate failures on the WPC 2000 Main Processor board or the DSV/Lockout Relay board. Error codes F70, F71, F72/H72, F73/H73, and F76/H76 indicate failures with the DSV driver logic on the Main Processor board. Codes F74/H74, F75/H75, and F77 indicate failures with the relays on the DSV/ Lockout Relay board. F78 indicates an issue with the poppet position sensors in the DSV valve itself.

- F70 DSV relay driver A was not off at start of stroke
- F71 DSV relay drivers A and B did not turn on properly or have shorted
- F72 or H72 DSV Control Flip-flop is not functioning properly
- F73 or H73 DSV Missing Pulse Detector window is not functioning properly
- F74 or H74 DSV relay A or B did not close properly at start of stroke
- F75 or H75 DSV relay A or B did not open properly at end of stroke
- F76 or H76 Lockout relay driver did not turn on properly during testing
- F77 Lockout relay check contacts were not closed before lockout relay was turned on
- **F78** The position of the DSV poppets is incorrect (Minster version only).
- *Remedy:* Press RESET. If the error persists, contact Wintriss Tech. Support for assistance or replacement of either board.

## Loss of Rotation



*Problem*: The Dual Safety Valve (DSV) has been activated, but the resolver did not start rotating within the Start-time Limit set on the Press Control Parameter Menu (see page 4-31).

The Start-time Limit setting may be too short. Alternatively, the drive belt on the resolver may be loose or broken, and the resolver may not be turning continuously with the press crankshaft, or have stopped turning altogether. Also, the resolver may be defective.

Air pressure to the clutch may be low, or the clutch may be bad, resulting in no movement of the crankshaft (and resolver) even though the DSV is energized. In addition, an internal WPC 2000 problem could have occurred.

*Remedy*: Check the Start-time Limit setting, and increase if necessary. Check the resolver and resolver drive, and replace the resolver if necessary. Check the clutch and repair if necessary. If these solutions do not work, contact Wintriss Tech. Support.

## **Internal Timing Input Failures**



- Problem: There is an internal problem with the WPC 2000 timing inputs.
- *Remedy:* Press RESET. If the error persists, contact Wintriss Tech. Support for assistance or replacement of the timing inputs.

## **Top-stop and Overrun Setting Faults**



## - and -

## H81, H83, H84, H86 and H87

- *Problem*: The overrun limit switch has turned on before the Top-stop "On" Angle timing has turned off. The Top-stop Angle internal dwell is 20°.
- *Remedy:* Check to make sure that the Top-stop "On" Angle has been set correctly (see page 2-79) and that the overrun sensor magnet has been installed at the correct angle (see page 2-82). If settings are correct and the error persists, contact Wintriss Tech. Support.

### **Overrun Limit Switch Fault**

*Problem*: The overrun limit switch has provided more than one signal to WPC 2000 during a

stroke. The switch should open and close only once per stroke.

using a brass or other non-ferrous screw.

**F85** 

*Remedy*: Check the overrun limit switch installation to make sure that the switch opens and closes only once per stroke, referring to *Installing the Overrun Sensor Magnet*, page 2-82 and the LED map on page 2-89. Check to make sure that the switch is installed correctly, referring to page 2-29, and that the magnet is installed at the correct angle (see page 2-82). Also, check to make sure that the magnet is attached

Check the diameter of the shaft on which the magnet is mounted to make sure there is enough dwell for the overrun limit switch to provide an adequate signal (see *Planning Your Overrun Sensor Installation*, page 2-29). An ideal diameter is 4 in. to 6 in. If the shaft is larger than this, mount the magnet on a shaft with a smaller diameter.

Check to make sure that the press is not encountering excessive shock and vibration due to operations such as blanking. If you cannot resolve the problem, contact Wintriss Tech. Support.

## **Overrun Limit Switch Test Angle Fault**

## F88 or H88

- *Problem*: The overrun limit switch was not closed during the overrun sensor closure test window (see step 2, page 2-83) or open at 180°.
- *Remedy*: The resolver drive may have slipped or broken. If this is the case, the resolver needs to be repaired or replaced. If the resolver drive checks out, also check the wiring and installation of the resolver (see *Installing the Resolver*, page 2-24).

Check the diameter of the shaft on which the magnet is mounted to make sure there is enough dwell for the switch to provide an adequate signal (see *Planning Your Overrun Sensor Installation*, page 2-29). An ideal diameter is 4 in. to 6 in. If the shaft is larger than this, mount the magnet on a shaft with a smaller diameter.

Check installation of the overrun sensor and magnet and wiring of the overrun sensor, referring to *Installing the Overrun Limit Switch*, page 2-29 and *Installing the Overrun Sensor Magnet*, page 2-82.

## **Overrun Limit Switch Setting Fault**



- *Problem*: The angle range (e.g., 271° to 300°) within which the Top-stop "On" Angle must fall has not been set correctly on option switches 1 and 2 on the Press Control Option Switch Menu.
- *Remedy:* Set switches 1 and 2 for the correct Top-stop "On" Angle window, referring to Table 2-26, page 2-82. If the error persists, contact Wintriss Tech. Support.

### **Internal Memory Failures**



*Problem*: There is a problem with the main or second processor on the WPC 2000 Main Processor board. The board may need to be serviced or replaced. Errors are as follows:

F90 or H90 Program memory checksum 1 is incorrect

F91 or H91 Program memory checksum 2 is incorrect

F95 or H95 Angle table memory checksum is incorrect

F96 or H96 RAM memory failed memory test

F97 or H97 No angle setup is loaded

F98 or H98 The option switch image changed during operation

F99 or H99 +24 Vdc failed, or the fuse blew

*Remedy*: Press RESET. If the error persists, contact Wintriss Tech. Support for assistance or replacement of the Main Processor board or firmware chip.

### NOTICE

#### INFORMATION ON ERROR NUMBERS EQUAL TO OR GREATER THAN 120

Error numbers equal to or greater than 120 are covered in the WPC 2000 Option 2 Manual (1130700) and the WPC 2000 Option 2 Additional Inputs Only Instruction Sheet (1141900).

## **Counter Preset Reached Messages**

#### "Good parts counter preset reached"

- *Problem:* The value set for the parts counter has been reached. The press should stop at top dead center.
- *Remedy:* Press RESET to clear the message. If your part run is complete, you need to change tooling, material, etc. before you re-start the press.

### NOTICE

When this message appears, the good parts count is automatically reset to 0.

#### "Strokes counter preset reached"

- *Problem:* The value set for the strokes counter has been reached. The press should stop at top dead center.
- *Remedy:* Press RESET to clear the message. If your part run is complete, you need to change tooling, material, etc. before you re-start the press.

### NOTICE

When this message appears, the strokes count is automatically reset to 0.

#### "Batch # counter preset reached"

- *Problem:* The value set for one of the three batch counters when the output type is set to TOP STOP has been reached. The press should stop at top dead center. See *Setting Batch Counter Output and Increment Modes*, page 5-13.
- *Remedy:* Press RESET to clear the message.

## NOTICE

When this message appears, the corresponding batch count is automatically reset to 0.

## **Messages for Equipment or Brake Monitor Problems**

The following messages cover resolver and input circuit faults, problems with the way the press is running, brake monitor faults, and internal problems with SmartPAC 2.

#### "Loss of rotation detected"

*Problem:* The resolver did not start rotating within the start time limit set in Initialization (see page 4-31) or stopped rotating while the press was running.

SmartPAC 2 knows when the Dual Safety Valve (DSV) is energized. If it sees that the DSV is energized but the resolver is not turning, this message appears.

One possible cause is that the resolver's drive belt is loose or broken. Another is that you may have low air pressure to the clutch or a bad clutch. An internal SmartPAC 2 problem could also have occurred, or the resolver could be defective.

*Remedy:* Check the resolver, the resolver drive, and the clutch. Repair if necessary. If these solutions do not work, an internal problem may have occurred. Call Wintriss Tech. Support.

#### "Angle Resolver Failure"

- *Problem:* The wiring in the resolver circuit to SmartPAC 2 may be loose or bad, or the resolver may have failed. Another possible cause is that the press may be going faster than 800 SPM (or 1600 SPM, depending on the speed setting in SmartPAC 2).
- Remedy: Check the resolver wiring and connections for shorts, breaks, or loose connections (see *Wiring the Resolver*, page 2-25). If SmartPAC 2's rated press speed has been exceeded, reduce the speed. If the speed hasn't been exceeded, make sure that the speed has been set correctly (see *Setting Up High-speed Version of SmartPAC 2 with WPC 2000*, page 2-70). If these remedies do not correct the problem, the resolver may need to be replaced. Contact the factory for assistance.

### NOTICE

To clear this fault, you must power down SmartPAC 2, then power the unit back up. Pressing RESET does not work.

#### "Input check circuit failure"

- *Problem:* The resolver turned five times, indicating that the press was running, but SmartPAC 2 received no signal from the input check circuit. The input check circuit may not have been connected or wired properly. If this message occurs when the press stops, the brake may be worn.
- *Remedy:* Check the wiring of the input check circuit and rewire, if necessary, following the instructions in *Connecting Stop Circuits and Input Check Circuit*, page 2-54. Make sure the input check voltage switch (S101) is set correctly, as shown in Figure 2-27, page 2-55. If the input check circuit is not the problem, check your brake for wear.

#### E-Stop errors

- *Problem:* If the word "ESTOP" appears in a message, one or both of the emergency stop relay circuits is not working satisfactorily and may be defective.
- *Remedy:* Check both stop relay circuits. To reset SmartPAC 2, turn the unit off, then on again. (You cannot use the RESET key to reset this error.) If the error recurs, contact Wintriss Tech. Support.

#### "Inboard ram test failure"

- *Problem:* Something is wrong with the SmartPAC 2 main processor board. The board may need to be serviced or replaced.
- *Remedy:* Try turning the power off, then on again. (You cannot use the RESET key to reset this error.) If the message continues to appear, contact Wintriss Tech. Support for assistance or replacement of the board.

#### "Resolver signals incorrect" or "Resolver drive signal incorrect"

- *Problem:* There is a problem with the resolver assembly.
- *Remedy:* Check to make sure that the Master/Slave jumper, JP101, on the SmartPAC 2 board (see Figure 2-25, page 2-51) is set to the following position:
  - MASTER for a SmartPAC 2 *without* WPC Clutch/Brake control integration
  - SLAVE for a SmartPAC 2 with WPC Clutch/Brake control integration

Check the resolver and wiring. Make sure that the terminals are tightened on bare wire and not on insulation (see *Connecting the Resolver Wiring*, page 2-50). If necessary, contact Wintriss Tech. Support for assistance or replacement of the resolver.

#### "Stop time exceeded"

Problem: The stopping time of the press has exceeded the limit set in SmartPAC 2 Initialization. You should have been pre-warned of this condition by the brake warning LED, which flashes whenever the stopping time is within 10 milliseconds of the stop-time limit.

> This message displays when the stop-time limit is not sufficient to allow for normal brake wear, or the brake is excessively worn and needs servicing. If the brake is worn, a dangerous safety problem may exist and should be corrected immediately.

*Remedy:* First, perform several 90° stop-time test runs to get an actual reading for your press's stop time. Compare these results with the results you got the last time you performed the test. Decide if the current stop-time limit is realistic or needs to be changed slightly. See page 4-31 to calculate the correct stop-time limit and page 6-22 to perform the 90° stop-time test. If you change the limit, you may have to relocate your light curtains and/or two-hand controls. Refer to the appropriate manual for assistance.

If the brake is worn, you should have your maintenance personnel service the brake immediately.

## **Messages for Programming Problems**

These messages indicate that there is a problem with the tool, the tool is not properly loaded, or there is an internal problem with SmartPAC 2.

#### "No tool number has been loaded"

- *Problem:* You are attempting to access Run mode without a tool being loaded. A tool must be loaded before you can enter Run mode.
- *Remedy:* Turn the Program/Run key to PROG to access Program mode, then load the appropriate tool, and turn the Program/Run key back to RUN.

#### "Tool number table checksum error"

Problem: The programming for the loaded tool has become corrupted.

This error can occur when SmartPAC 2 has been turned off while you are in the middle of programming a setup, or when you have not properly exited (i.e., by pressing RESET) from a Program or Run menu.

The error can also occur when you upgrade SmartPAC 2. Sometimes the information in the older firmware does not synchronize properly with the information in the new firmware. Settings can also be damaged due to an internal SmartPAC 2 malfunction.

SmartPAC 2 creates a "checksum" for every tool to check that the tool settings stored in memory are the same as the settings that are loaded with the tool. The checksum value calculated when tool settings are stored in memory must be the same as the value calculated when the settings are loaded.

*Remedy:* Access Program mode, and double-check the tool settings. If settings are correct, reload the tool.

If the error was caused because the system was turned off while in Program or Run modes, perform these steps:

- 1. Press the RESET key to clear the fault message.
- 2. Access Program mode, and select GO TO THE TOOL MANAGER.
- 3. On the Tool Manager screen, highlight the tool, and press F4 (Edit Tool).
- 4. On the Tool Program Menu, select CAM SWITCH.
- 5. Press RESET. SmartPAC 2 will create a new checksum for the tool.
- 6. Select the tool again, access the Tool Program Menu, and select CAM SWITCH. Verify that all settings are correct.
- 7. Reload the tool. You should no longer get this fault message.

If the problem is due to a system malfunction, the tool settings will have to be created again from scratch. If this happens more than once, contact Wintriss Tech. Support for assistance.

## **Messages for Sensor Faults**

#### "Green sensor missed"

- *Problem:* A green or green quick check sensor did not turn on during the Ready signal nor within 50 milliseconds after the Ready signal. No stroke angle is displayed for this error since the sensor never turned on.
- *Remedy:* Check for the malfunction that the sensor was supposed to detect (part ejection problem, misfeed, transfer problem, etc.). If a malfunction is not the cause, check to be sure that the Ready signal is set properly for this sensor. Check that a sensor is actually plugged into this input on the DSI 2. If no sensor is connected to a sensor input, that input must be set to UNUSED. Check connections between sensors and the controller.

#### "Green sensor actuated late"

*Problem:* A green or green quick check sensor turned on late, that is, within 50 milliseconds after the end of the Ready signal.

If a green or green quick check sensor does not come on during its Ready signal, SmartPAC 2 continues to look for the sensor signal. If it sees the sensor come on within 50 milliseconds after the Ready signal, this message displays. The angle at which the sensor turned on is shown in the message.

*Remedy:* Check for the malfunction the sensor was supposed to detect (like a part ejection problem or misfeed, etc.). Check that the Ready signal is set properly, and adjust if necessary.

#### "Green sensor failure"

- *Problem:* A green or green constant sensor has stayed on from the end of one Ready signal to the beginning of the Ready signal for the next stroke. No stroke angle is shown with this fault.
- *Remedy:* Check for a shorted sensor. Make sure the Ready signal has been set correctly. Check to see if a press or equipment malfunction is causing the sensor to stay on– for instance, a part wedged against a sensor or a pinched wire.

#### "Green constant fault"

- *Problem:* A green constant sensor was not on at the beginning of its Ready signal or turned off during the Ready signal. Green constant sensors must stay on throughout the Ready signal. The angle at which the sensor turned off is displayed.
- *Remedy:* Check for the malfunction that the sensor was supposed to detect.

If no malfunction has occurred, check to make sure that the Ready signal is set properly. Remember, for green constant sensors, the Ready signal must be a little shorter than the sensor's actuation angle. Check that a sensor is actually plugged into this input. Check connections between the DSI 2 and the controller.

#### "Green quick check sensor actuated outside ready"

- *Problem:* A green quick check sensor actuated or stayed on outside the Ready signal. The stroke angle at which the sensor was first detected on outside the Ready signal is shown.
- *Remedy:* Check for the malfunction the sensor was supposed to detect (part ejection problem, misfeed, etc.). Check for a part wedged against the sensor, a shorted sensor, a pinched wire, or other cause that would keep the sensor on or cause it to go on outside its Ready signal. Make sure the Ready signal is set correctly.

#### "Green special fault"

- *Problem:* A green special sensor did not actuate (i.e., there was no contact closure to ground) within the maximum number of strokes set in Program mode.
- *Remedy:* Check for the press or equipment malfunction that the sensor was supposed to detect. Check for any cause that would keep the sensor from going on. Make sure the maximum stroke count is set correctly, especially that it is not set too low. See *Setting the Counter Value for a Green Special Sensor*, page 5-29.

#### Fault message for yellow sensors: "This N/O sensor is grounded"

- *Problem:* A yellow sensor turned on (i.e., there was a contact closure to ground). When this message is displayed, the angle at which the condition was detected is shown.
- *Remedy:* Check for the press or equipment malfunction that the sensor was supposed to detect. If no malfunction has occurred, check for a shorted sensor or pinched wire.

#### Fault message for red sensors: "This N/C sensor is open"

- *Problem:* A red sensor has actuated (i.e., is open to ground). When this message is displayed, the angle at which the condition was detected is shown.
- *Remedy:* Check for the press or equipment malfunction that the sensor was supposed to detect. If no malfunction has occurred, check for a problem with the sensor. Check for loose or detached wiring at the DSI 2 or controller. Check for a severed wire from the sensor to the DSI 2 or controller.

## **Miscellaneous Fault Messages**

#### "Maximum press speed exceeded"

- *Problem:* The press is running at a speed greater than the maximum limit programmed for this tool.
- *Remedy:* After clearing the error, either run the press at a slower speed, or adjust the limit set in Program mode (see *PRESS CONTROL*, page 5-48).

#### "Minimum press speed exceeded"

- *Problem:* The press is running at a speed less than the minimum limit programmed for this tool.
- *Remedy:* After clearing the error, either run the press at a higher speed, or adjust the limit set in Program mode (see *PRESS CONTROL*, page 5-48).

#### "The resolver position is different from when the unit was turned off"

- *Problem:* This message will only appear if SmartPAC 2 detects that the resolver angle when the press is turned on is different from the angle when the press was turned off. This can happen when you move the press or upgrade SmartPAC 2 firmware.
- Remedy: Press RESET to clear. If the message reappears, call Wintriss Tech. Support.

#### "One of the sensor auto enable counters is greater than 99"

- *Problem:* Normally, this fault will never occur since SmartPAC 2 does not let you enter a value greater than 99. However, this message could display if there is an internal problem with SmartPAC 2.
- Remedy: First press RESET. If the message reappears, contact Wintriss Tech. Support.

#### "Loss of Communication at Address X"

- *Problem:* SmartPAC 2 is unable to communicate with the optional module identified by "X" in the message (see Table 7-3).
- *Remedy:* Check the wiring of the specified module. If you continue to get this error message, call Wintriss Tech. Support.

Message	Option Identified by Address
Loss of Communication at Address 1	AutoSetPAC or WaveFormPAC Channels 1 - 4
Loss of Communication at Address 2	AutoSetPAC or WaveFormPAC Channels 5 - 8
Loss of Communication at Address 4	RamPAC
Loss of Communication at Address 5	ProPAC

Table 7-3. Communication Errors: Option at Fault

#### "File Not Found"

- *Problem:* You cannot access the Dialog Menu when the DIALOG SCREEN MODE setting on the Set Communications Menu in SmartPAC 2 Initialization is "32 CUSTOM." This message displays only when you have the LETS firmware option.
- *Remedy:* Press RESET, then change the DIALOG SCREEN MODE setting to "16/16" (see page I-7).

## **Troubleshooting Using the Error/Event Log**

The Error/Event Log, which you can view in Run mode, is a useful troubleshooting aid. You can use the Error/Event log to help you diagnose the cause of a problem, or you can send the log to Wintriss Tech. Support to help them narrow down probable causes. See *ERROR*/*EVENT LOG*, page 6-34 and *Sending E-mail to Wintriss Technical Support*, page 6-38 for more information.

## **Resetting Ross DM2 DSV Faults**

If your Ross DM2 DSV faults when air is first applied to the unit, one or both poppets may have been jarred into a faulted position during shipment. When the poppets are faulted, input air can escape through the muffler port. To reset the fault, air must be applied to DSV to return the poppets to their unfaulted position.

If the fault occurs before the unit has been wired, the problem will be signalled by air escaping from the muffler port when input air is applied to the DSV. To reset the unit, press the brass button on the bottom of the Reset solenoid while air is being applied to the DSV (see Figure 7-4, page 7-32).



Figure 7-4. Ross DM2 DSV Showing Reset Button

If the fault occurs after the unit has been wired, an F47 error will appear on the SmartPAC 2 display. To clear the fault and reset the DSV, press RESET and turn the Stroke Select key switch to OFF, then to one of the other operating modes (see page 7-14).

If you have trouble resetting the DSV, the problem may be that both poppets are faulted, requiring more air for a reset than can be supplied by the system. In this case, try resetting the unit with the muffler port obstructed. Place your hands or a rag or plastic packaging material over the muffler to restrict the escape of air, then actuate the Reset solenoid.

If the DSV still will not reset, check to see if there are restrictions in the air supply line (e.g., restrictive fittings, quick-disconnect fittings, low flow filters or regulators, or clogged filter elements) and correct if necessary. Also, check to make sure that the air supply line matches the inlet port size of the DSV, and replace with a properly-sized supply line if it doesn't.

# Appendix A. Extracts from OSHA Regulations and ANSI Standards

## A WARNING

#### **REFER TO CURRENT REVISIONS OF OSHA/ANSI DOCUMENTS**

The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.

Failure to comply with these instructions could result in death or serious injury.

This appendix provides extracts from the Occupational Safety and Health Administration (OSHA) regulations and the American National Standards Institute (ANSI) standards covering presence-sensing devices.

## Extracts from OSHA Regulation 1910.217

## A WARNING

#### **REFER TO CURRENT REVISIONS OF OSHA/ANSI DOCUMENTS**

The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.

Failure to comply with these instructions could result in death or serious injury.

Reprinted below are extracts from OSHA regulation 1910.217 pertaining to the use of presence-sensing devices for point-of-operation guarding on mechanical power presses. Also reprinted here are interpretations of selected regulations provided by the Precision Metalforming Association (PMA). Extracts from the OSHA regulation are printed in the left-hand column; interpretations by PMA are shown in the right-hand column.

Wintriss makes no claim for the accuracy or effectiveness of the PMA interpretations, and persons making use of this material do so at their own risk. PMA interpretations should not be relied upon for use in any specific application. The material is provided, with PMA's permission, for informational purposes only.

Refer to the most recent versions of OSHA documents. To obtain copies of OSHA regulations, write to: OSHA's Office of Information and Consumer Affairs, 200 Constitution Avenue NW, Room N3647, Washington, DC 20210. Tel (202) 219-8151; fax (202) 219-5986.

## **Extracts from OSHA Regulation 1910.217**

#### **OSHA Regulations**

OSHA 1910.217 (c).

(c) SAFEGUARDING THE POINT OF OPERATION. –

(1) General requirements.

(i) It shall be the responsibility of the employer to provide and insure the usage of "point of operation guards" or properly applied and adjusted point of operation devices on every operation performed on a mechanical power press. See Table 0-10.

#### OSHA 1910.217 (c) (3) (i) (a)

(3) Point of operation devices.

(i) Point of operation devices shall protect the operator by:

(a) Preventing and/or stopping normal stroking of the press if the operator's hands are inadvertently placed in the point of operation.

OSHA 1910.217 (c) (3) (iii)

(iii) A presence-sensing point of operation device shall protect the operator as provided in paragraph (c) (3) (i) (a) of this section, and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other part of his body is within the sensing field of the device during the downstroke of the press slide.

(a) The device may not be used on machines using full revolution clutches.

(b) The device may not be used as a tripping means to initiate slide motion.

(c) The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent the initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system.

#### **PMA Interpretation**

TABLE 0-10

Distance of opening from point of operation hazard (inches)								N	1a 0	ax p	cir De	n n	ir	n ng	n 7	и (i	n	dt cl	h of hes)	
1/2	to	1	1/2																	1/4
1 1/2	to	2	1/2																	3/8
2 1/2	to	3	1/2																	1/2
3 1/2	to	5	1/2																	5/8
5 1/2	to	6	1/2																	3/4
6 1/2	to	7	1/2																	7/8
7 1/2	to	12	1/2																1	1/4
12 1/2	to	15	1/2																1	1/2
15 1/2	to	17	1/2																1	7/8
17 1/2	to	31	1/2																2	1/8

Presence-sensing device

(c) (3) (i) (a) Refers to the functional requirement of a presence-sensing device which prevents and/or stops normal stroking of the press.

European method (curtain of light) uses self trip safety system effectively. Variance applied for 11/17/73 by Interlake Stamping Company to use this fail safe system.

When failure occurs, the best indication is the press won't run.
### Extracts from OSHA Regulation 1910.217

#### **OSHA Regulations**

(d) Muting (bypassing of the protective function) of such device, during the upstroke of the press slide, is permitted for the purpose of parts ejection, circuit checking and feeding.

(e) The safety distance (Ds) from the sensing field to the point of operation shall be greater than the distance determined by the following formula:

Ds = 63 inches/second x Ts, where

Ds = minimum safety distance (inches);

63 inches/second = hand speed constant;

and

Ts = stopping time of the press measured at approximately  $90^{\circ}$  position of crankshaft rotation (seconds).

(f) Guards shall be used to protect all areas of entry to the point of operation not protected by the presence-sensing device.

OSHA 1910.217 (c) (3) (5)

(5) Additional requirements for safe-guarding. Where the operator feeds or removes parts by placing one or both hands in the point of operation, and a two hand control, presencesensing device, Type B gate or movable barrier (on a part revolving clutch) is used for safeguarding:

(i) The employer shall use a control system and brake monitor which comply with paragraphs (b) (13) and (14) of this section. This requirement should be complied with by November 1, 1975.

#### **PMA** Interpretation

Top of stroke is the point at which muting shall cease as it is not possible to set a point on the downstroke as the exact position where the hazard of die closing starts.

Safety distance represents the distance an operator can move his hand during the time it takes a press to stop. The internationally recognized hand reach speed is 63 inches/ second.

To determine this safety distance, the stopping time of the press is measured with some appropriate measuring device. The measurement is taken such that the stop signal is given to the press at the 90 degree point of the crank position.

Since some stopping time increase must be accommodated due to braking system deterioration, a percentage factor must be added to the measured time to obtain the factor for use in the equation for determining safety distance. A percentage factor of 20% is recommended for presses with new brakes or brakes of good condition. For older brakes, a 10% factor is recommended.

Example:

Measured stopping time = 0.190 seconds Time factor =  $1.2 \times 0.19 = 0.228$  seconds Calculation =  $63 \times 0.228$ Safety distance = 14.4 inches

(3) (iii) (f) Great care must be taken to assure that no access to the die area exists unguarded.

This paragraph tells the condition under which a brake monitoring system is required after November 1, 1975.

(b) (13) Control reliability

(b) (14) Construction requirements.

**PMA Interpretation** 

### Extracts from OSHA Regulation 1910.217

#### **OSHA Regulations**

### OSHA 1910.217 (c) (3) (vii) (c)

(c) The safety distance (Ds) between each two hand control device and the point of

two hand control device and the point of operation shall be greater than the distance determined by the following formula:

Ds = 63 inches/second x Ts, where

Ds = minimum safety distance (inches);

63 inches/second = hand speed constant;

and

Ts = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).

OSHA 1910.217 (e) (1)

(e) INSPECTION, MAINTENANCE, AND MODIFICATION OF PRESSES

(i) It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all their parts, auxiliary equipment, and safeguards are in safe operating condition and adjustment. The employer shall maintain records of these inspections and the maintenance work performed.

(ii) Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism, antirepeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. The employer shall maintain records of these inspections and the maintenance work performed. These requirements do not apply to those presses which comply with paragraphs (b) (13) and (14) of this section.

#### Example:

Measured stopping time = 0.190 seconds Time factor =  $1.2 \times 0.19 = 0.228$  seconds Calculation =  $63 \times 0.228$ Safety distance = 14.4 inches

Records of clutch and brake will be weekly. Other inspections are periodic subject to time factor determined by employer.

If brake monitoring system is installed, weekly inspection and records are not required for clutch/brake mechanism. Other parts of the press will require periodic inspections and records.

### Extracts from ANSI Standards for Presence-sensing Devices and Two-hand Controls

### A WARNING

#### REFER TO CURRENT REVISIONS OF OSHA/ANSI DOCUMENTS

The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.

Failure to comply with these instructions could result in death or serious injury.

Reprinted below are the American National Standards Institute (ANSI) standards for presence-sensing devices (light curtains) and Two-hand controls. ANSI, a national federation of trade associations, technical societies, professional groups, and consumer organizations, is the United States clearinghouse and coordinating body for voluntary standards activity. Approximately 1000 companies are affiliated with the Institute as company members.

ANSI creates voluntary standards to eliminate duplication and to weld conflicting standards into single, nationally accepted standards under the designation "American National Standards." The standards reflect a national consensus of manufacturers, consumers, scientific, technical, and professional organizations, and governmental agencies.

Shown below are extracts of standards requirements and explanatory information from ANSI B11.1-2009 and B11.19-2003 for presence-sensing devices (light curtains) and Two-hand controls. Complete versions of these documents can be obtained by writing to: ANSI, 1430 Broadway, New York, NY 10018.

#### **Standards Requirements**

**8.6.2.1.7** Each operator's hand controls shall be located at a distance from the point-of-operation so that the operator(s) cannot release either hand actuating control and reach into the point-of-operation during the hazardous portion of the cycle.

#### **Explanatory Information**

**E8.6.2.1.7** The total stopping time of the press should include the total response time of the control system and the time it takes hazardous motion to stop. The following formula should be used when calculating the safety distance (*Ds*):

Ds = K (Ts + Tc + Tbm)

Where:

K = 63 inches/second (hand speed constant).

 $T_{\rm S}$  = the stop time of the press measured from the final de-energized control element, usually the air valve.

 $T_c$  = the response time of the control.

*Tbm* = the additional time allowed by the stopping-performance monitor (brake monitor) before it detects stop time deterioration.

NOTE –  $T_s$  +  $T_c$  are usually measured by a stop time measuring device.

When the press stopping-performance monitor setting is changed, the safety distance should be recalculated. See also Annex C.

#### **Standards Requirements**

#### **Explanatory Information**

#### 8.6.3 Presence-sensing safeguarding device

**8.6.3.1** A presence-sensing device, when used for safeguarding, shall protect the operator as specified in E8.6.1 (a).

**E8.6.3.1** Various presence-sensing devices employ different sensing and adjustment techniques. The point at which a device responds to an intrusion can vary.

Safety mats and area scanners may not be suitable (effective) safeguards when utilized as primary point-of-operation safeguarding. Factors which can affect this suitability include but are not limited to:

- a) response time;
- b) minimum object sensitivity;
- c) measurement accuracy;
- d) breach ability;
- e) penetration before detection;
- f) single point of failure;
- g) large safety distances.

These devices may be utilized as supplemental safeguarding.

**E8.6.3.2** The device should be located or adjusted so that the device always responds to the intrusion at or prior to the safety distance *Ds*.

Also, care should be taken when installing the device so that it does not detect false signals from other devices or equipment in the area.

The presence-sensing device cannot protect against a catastrophic failure of the press, which causes unintended cycling action. See Annex A, Figure A.3.

**8.6.3.3** The device shall not be used for safeguarding the point-of-operation on presses using full-revolution clutches.

8.6.3.2 The device shall be interfaced with the

control circuit to prevent or stop slide motion if

any object is within the sensing field of the

device during the hazardous portion of the

cycle.

**8.6.3.4** When the sensing field has been interrupted, use of the normal press cycle-actuating means shall be required after clearing the sensing field to resume press operation.

**8.6.3.5** When the device is used in the PSDI mode, re-initiation of the press motion shall be in accordance with 6.4.3.8.1.

**8.6.3.6** Muting of the device shall be permitted only during the non-hazardous portion of the press cycle.

*E8.6.3.6* Muting is typically accomplished by interface circuits or auxiliary controls.

The die closing portion of the cycle is always considered hazardous. In some cases, feeding and transfer automation or die features can cause additional hazardous conditions even during the opening portion of the cycle (upstroke). See also ANSI B11.19 for additional information.

#### **Standards Requirements**

**8.6.3.7** Muting of the device shall be accomplished in a manner that conforms to the requirements of 6.11 and 8.8.

**8.6.3.8** The device shall have an identifiable minimum object sensitivity so that an obstruction of an equal or greater size will be detected anywhere within the sensing field regardless of the plane of intrusion.

**8.6.3.9** The device shall have a maximum response time, which shall not be affected by object sensitivity adjustments or environmental changes.

**8.6.3.10** Devices which require adjustments to accommodate variations in operating conditions, or which incorporate fixed blanking or floating blanking features, shall be designed so that the adjustments or features are capable of supervisory control by the user.

**8.6.3.11** The device shall be provided with a means that visibly indicates when it is functioning properly.

Indication that the sensing field is being blanked shall be provided. For fixed blanking, the blanked area shall be identified. Supplemental safeguarding shall be provided to prevent access to the hazard through the fixed blanked area.

#### **Explanatory Information**

**E8.6.3.7** Muting is typically accomplished by interface circuits or auxiliary controls. The muting element should incorporate a similar level of control reliability as the presence-sensing device itself. A simple cam-operated limit switch wired in parallel with the device's output is inadequate, as its failure can remain undetected.

**E8.6.3.8** The device should have a minimum object sensitivity stated by the device supplier. For example, an electro-optical device may detect a 32 mm ( $1\frac{1}{4}$  inch) diameter opaque object anywhere in its sensing field but allow 25 mm (1 inch) obstructions to pass undetected at certain points in the field.

**E8.6.3.9** The device supplier should state the maximum total response time, including output devices, of the presence-sensing device.

*E8.6.3.10* Typically, these adjustments or controls are key-operated or located under lockable covers.

**E8.6.3.11** Red and green indicators or other means that can be easily seen by the operator and others should be provided to indicate that the device is functioning.

The blanking function of a presence-sensing safeguarding device desensitizes a portion of the sensing field by disabling one or more channels such that a specific interruption is ignored. Presence-sensing devices can be provided with either fixed or floating blanking. For fixed blanking, the desensitized area does not move or change once configured. Floating blanking allows the blanked area to move within the sensing field.

Means to identify the desensitized area may include but are not limited to:

- a) Indicators within the device;
- b) Signage or marking of the fixed blanked area;
- c) The physical location of the object in the blanked area if movement or removal of the object can be detected and it results in a stop command.

#### **Standards Requirements**

#### **Explanatory Information**

8.6.3.11 (cont)

If means are provided to bypass the device, visible indication that the device is bypassed shall be provided.

**8.6.3.12** The device shall not fail to respond to the presence of the individual's hand or other body part due to the presence of a reflective object or workpiece.

**8.6.3.13** The device shall conform to the requirements of 6.11 and 8.8. In the event of a power failure to the device, the device shall initiate a stop command to the press control system.

**8.6.3.14** The interface of the presence-sensing device to the press control shall conform to the requirements of 6.11 and 8.8.

**8.6.3.15** The sensitivity of the device to intrusion shall not be adversely affected by changing conditions around the press.

**8.6.3.16** The effective sensing field of the device shall be located at distance from the nearest point-of-operation hazard so that individuals cannot reach into the point-of-operation with a hand or other body part before cessation of motion during the hazardous portion of the cycle.

Means of supplemental safeguarding can include completely filling the fixed blanked area to restrict access to the hazard, installing the device at a distance that accounts for the worse case object sensitivity (see 8.6.3.16), or alternate safeguarding may be provided to prevent access to the hazard.

Means to provide visible indication may include but are not limited to:

a) colored indicator lights;

- b) signage;
- c) physical position;
- d) awareness barrier (i.e., safety tape);
- e) other means.

**E8.6.3.16** The total stopping time of the press should include the total response time of the presence-sensing device, as stated by the supplier, the response time of the interface, the response time of the control system, and the time it takes the press to cease slide motion.

The following formula should be used when calculating the safety distance:

Ds = K (Ts + Tc + Tr + Tbm) + Dpf

where

K = 63 inches/second (hand speed constant)

 $T_{\rm S}$  = the stop time of the press measured from the final de-energized control element, usually the air valve

*Tc* = the response time of the press control

Tr = the response time of the presence-sensing device and its interface, if any, as stated by the supplier or measured by the user.

Extracts from ANS	SI B11.1-2009 8.6.3
Standards Requirements	Explanatory Information
8.6.3.16 (cont)	<i>Tbm</i> = the additional stopping time allowed by the stopping-performance monitor before it detects stop time deterioration.
	<i>Dpf</i> = the added distance due to the penetration factor as recommended in ANSI B11.19, Annex D, Figure D.2. The minimum object sensitivity is stated by the supplier. If beam blankouts or floating window features are used, these figures should be added to the object sensitivity figure before using the chart.
	NOTE - <i>T</i> s + <i>Tc</i> is usually measured by a stop time measuring device. See also ANSI B11.19, Annex C and D.
	Whenever the press-cycle STOP command or stopping-performance monitor time or angle setting is changed, the safety distance should be recalculated. See also "stopping- performance monitor" (6.12).
	NOTE – No increase in safety distance is required for fixed blanking applications if the blanked area is entirely occupied by the material or fixtures.
	In some instances, the use of blanking does not allow efficient production of certain piece parts. Horizontal placement of the sensing field, so that it detects that operator's waist area, may present a solution. In this application, the operator may freely manipulate the workpiece and operate the press as long as the operator stands outside of the horizontal sensing field.
	The sensing field should be located so that the operator cannot reach the point-of-operation prior to interrupting the sensing field and completion of the stopping action. Where possible, the sensing field should be of sufficient depth to prevent the operator from standing between the field and the point-of-operation. See also ANSI B11.19, Annex C and D.

#### Standards Requirements

**8.6.3.17** If the position of the device will allow the operator or others to place themselves between the sensing field and the point-of-operation, additional means shall be provided in conjunction with the device to prevent the operator or others from exposure to the point-of-operation hazard.

#### **Explanatory Information**

*E8.6.3.17* Additional means may include manual reset outside of the sensing field of the device or additional barrier guards, safety mats, light curtains, or other devices.

Operator controls for each operator located outside of the sensing field of the presencesensing device may be used.

As an alternative to the reset control and to prevent an individual from stepping behind the sensing field of a PSD, the maximum distance between the light curtain and the machine structure should not exceed 75mm (3 inches). Supplemental safeguarding may be utilized to eliminate a space greater than 75mm.

E8.6.3.18 Examples of ambient light are

associated with windows, light fixtures,

skylights, bay doors, or die lights.

**8.6.3.18** The device shall not be affected by ambient light or by light-source decay so that the increase in response time or object sensitivity is greater than the value used to calculate the safety distance.

**8.6.3.19** All areas of entry to the point-ofoperation not protected by the presencesensing device shall be otherwise safeguarded.

**8.6.3.20** Press production systems with a **E** configuration that would allow an individual to enter, pass through, and become clear of the presence-sensing device sensing field shall not be operated in the PSDI mode of operation.

**8.6.3.21** When a device is used on a press production system and the protection of the operator is dependent upon the stopping action of the press, a stopping-performance monitor shall be required in conformance with 6.12. See section 8.3.9 for exceptions.

**E8.6.3.19** Usually the electro-optical presencesensing devise is used in a manner that provides a protected zone in front of the primary work area with auxiliary devices or guards used to protect secondary access areas.

In some cases, mirrors may be used in conjunction with the device to provide two-, three- or four-sided protection.

E8.6.3.20 For PSDI applications see Clause 10.

#### **Standards Requirements**

#### **Explanatory Information**

8.3 Electro-optical, RF, and area scanning presence-sensing safeguarding devices

#### 8.3.1 Design and construction

**8.3.1.1** The presence-sensing device shall be designed and constructed to create a field that detects the presence of an individual(s).

The presence-sensing device shall not create a hazard in and of itself.

**8.3.1.2** The presence-sensing device shall have a minimum object sensitivity such that an obstruction of a same or greater size will always be detected anywhere within its sensing field, regardless of the plane of intrusion.

The RF (radio frequency) presence-sensing device shall provide means to adjust the sensitivity of the field. The field, once adjusted, shall not decrease in sensitivity below this established level.

**8.3.1.3** The presence-sensing device shall not fail to change its output state, if not bypassed or muted, when it detects the presence of an individual.

**8.3.1.4** Adjustment or configuration of presencesensing devices shall be capable of being supervised. **E8.3.1.1** The presence-sensing device should be designed and constructed such that it does not present hazards to individuals from:

- sharp edge or pinch point hazards;
- · radiated light or energy hazards;
- · electromagnetic interference hazards;
- electrical shock hazards.

**E8.3.1.2** The presence-sensing device should have a minimum object sensitivity stated by the supplier. For example, an electro-optical device may detect an opaque object with a diameter of 32 mm (1.25") anywhere in its sensing field, but allow an obstruction with a diameter of 25 mm (1") to pass undetected at certain points in the field.

**E8.3.1.4** Methods of meeting this requirement include, but are not limited to, the use of key operated controls, controls located under lockable covers, or controls that require a tool or password to access. Adjustment or configuration should only be performed by authorized individuals.

Adjustments or configuration can include, but are not limited to:

- muting;
- blanking;
- · power adjustments;
- · sensing field configuration;
- reset functions.

#### **Standards Requirements**

**8.3.1.5** The presence-sensing device shall incorporate visual means to indicate that the device is detecting an individual within the effective sensing field of the device.

**8.3.1.6** The presence-sensing device shall have a maximum response time that shall not be affected by object sensitivity or environmental changes.

The safeguarding supplier shall provide the maximum response time of the presencesensing device.

**8.3.1.7** The electro-optical and area scanner presence-sensing devices shall not be affected by ambient light conditions or by changes in the device light source characteristics, such that an increase in response time or object sensitivity occurs.

**8.3.1.8** Components, subassemblies or modules of electro-optical, RF, and area scanning presence-sensing devices shall conform to the requirements of 6.1, or shall be designed and constructed to meet the safety performance level (risk reduction) as determined by a risk assessment.

**8.3.1.9** The area scanning presence-sensing device shall provide a means or operating mode to verify the size, shape, and detection capabilities of the detection area or zone.

Information shall be provided by the area scanning device supplier to identify the:

- maximum safeguarding range;
- minimum object sensitivity within the stated safeguarding range;
- maximum field of view in degrees;
- tolerance in the range measurement; and
- detection capabilities with respect to the reflectivity of an object versus the distance to the object.

#### **Explanatory Information**

**E8.3.1.5** Indicators, (usually red and green), displays or meters should be provided to indicate the status of the presence-sensing device. The visual means may be integral to the presence-sensing device or part of the interface or machine control system. Due to the prevalence of color blindness (10% in males for red/green), methods such as unambiguous positioning, patterning, labeling or flashing of the indicators may be effective in providing the indication required.

**E8.3.1.7** When the electro-optical and area scanner presence-sensing devices are exposed to signals from other electro-optical presence-sensing devices or to changes in ambient light commonly associated with windows, light fixtures, skylights, bay doors or work area lights, the response time or object sensitivity should not be adversely affected.

**E8.3.1.8** See also, clause 5 and ANSI B11.0 (B11.TR3).

**E8.3.1.9** These presence-sensing devices typically operate on the principle of "diffuse reflectance," which is a principle of transmitting beam(s) of light to form a detection area or zone. When an object enters the detection area, it reflects the transmitted light back to the device, which then evaluates the object's position. The amount of reflected light (degree of reflectance in percent) that can be reliably detected typically ranges from 1.8% to over 90% and can be represented graphically by reflectivity versus distance. For more information see IEC 61496 parts 1 and 3.

#### **Standards Requirements**

#### **Explanatory Information**

#### 8.3.2 Installation, operation and maintenance

**8.3.2.1** Exposure to the hazard(s) shall not be possible by reaching over, under or around the sensing field of the presence-sensing device. Additional guards or safeguarding devices shall be provided to protect those areas.

The effective sensing field shall be of adequate height, width, and depth so that entry of the individual into the hazard zone is detected.

**E8.3.2.1** The user should select a presencesensing device adequate to prevent individuals from reaching over, under or around the sensing field during the hazardous portion of the machine cycle.

Additional safeguarding may be required in conjunction with the device to meet this requirement.

If individuals can place themselves between the sensing field and the hazard zone, additional safeguarding should be used in conjunction with the device to prevent the individual from exposure to the hazard. It has been found by practical application that this situation can occur with as little as 75 mm (3") depending on the positioning (e.g., height) and the minimum object sensitivity of the sensing field, and the ability of the individual to lean against the machine frame or guarding.

It should not be possible to climb on or walk on the machine support structure to avoid detection by the presence-sensing device when the sensing field is orientated horizontally.

When an individual can pass through the sensing field, it is considered perimeter guarding (see also, the requirements of 6.5 and 8.3.2.4).

The electro-optical and area scanning presence-sensing devices may fail to detect an individual's presence due to reflective workpieces or objects in the vicinity of the device. Care should be used to ensure that these reflections do not render the device ineffective.

Some examples of reflective objects include, but are not limited to:

- · machine surfaces;
- tooling;
- · work pieces;
- hand tools;
- auxiliary equipment;
- workholding tables and fixtures.

Testing each set-up for minimum object sensitivity should be done with an appropriate test rod, following the supplier's recommendation.

#### **Standards Requirements**

#### **Explanatory Information**

Where objects are placed within the defined sensing field of an area scanner presencesensing device, care should be taken to ensure that:

- no shadows exist behind the objects such that the device is rendered ineffective;
- removal of the object will not allow undetected access to a hazard zone.

**E8.3.2.2** Some installation hazards include, but are not limited to:

- pinch point hazards created by interference between the presence-sensing device and moving members of the machine;
- · tripping hazards;
- · electrical shock hazards;
- overhead or other "strike against" hazards;
- thermal hazards.

Where such conditions can exist, additional safeguarding may be required.

**E8.3.2.3** The safety distance calculation is dependent upon the:

- · speed of approach of the individual;
- total response time of the safeguarding device as stated by the supplier;
- response time of the interface;
- · response time of the control system;
- time it takes the machine to stop hazardous motion; and
- depth penetration factor of the safeguarding device.

See Annex D for further explanation and an example method to calculate the safety distance. Additional methods might be used as determined by the supporting risk assessment documentation.

For installations in which the direction of approach is perpendicular to the sensing field (i.e., normal approach), the minimum distance between the sensing field and the closest hazard should be no less than 100mm (4") regardless of the outcome of a safety distance calculation. Practical application has shown that less than 100 mm (4") of safety distance can result in increased risk of harm. See also, ISO 13855.

**8.3.2.2** The presence-sensing device shall be installed such that it does not create additional hazards.

**8.3.2.3** The presence-sensing device shall be installed at a location so that the effective sensing field prevents individuals from reaching the hazard(s) during the hazardous portion of the machine cycle.

#### **Standards Requirements**

#### Explanatory Information

RF presence-sensing devices have sensing fields that can vary due to:

- antenna(e) design;
- · effects of adjacent machinery and equipment;
- · field sensitivity adjustments; and
- environmental factors (such as humidity or temperature).

Before the machine is used for production purposes, the RF presence-sensing device should be checked to ensure that the effective field protects individuals at the safety distance.

#### E8.3.2.4

**8.3.2.4** The presence-sensing device shall protect individuals from hazards by initiating an immediate stop command to the machine control system when the sensing field of the device is interrupted during the hazardous portion of the machine cycle. It shall require re-initiation of the normal actuating means prior to the start or continuation of motion of the machine.

When an individual can pass through the sensing field of the presence-sensing device, the device shall initiate an immediate stop command to the machine control system and shall require that the device or machine control be manually reset before hazardous situation can occur.

The reset function and devices shall comply with 6.5.

**8.3.2.5** Indication that the sensing field is being blanked shall be provided. For fixed blanking, the blanked area shall be identified.

Supplemental safeguarding shall be provided to prevent access to the hazard through the fixed blanked area.

The operator should ensure that no individual is in the safeguarded area before re-setting the presence-sensing device or machine control and initiating a hazardous situation

**E8.3.2.5** The blanking function of an electrooptical presence-sensing device desensitizes a portion of the sensing field by disabling one or more channels such that a specific interruption is ignored. Electro-optical presence- sensing devices can be provided with fixed or floating blanking.

Floating blanking allows the blanked area to move within the sensing field. When floating blanking is enabled and the object sensitivity increases, the sensing field must be placed at a greater distance from the hazard, see 8.3.2.2 and Annex D and Figure D.1.

#### **Standards Requirements**

#### **Explanatory Information**

For fixed blanking, the desensitized area does not move or change once configured. Means to identify the desensitized area may include but are not limited to:

- indicators within the electro-optical presencesensing device;
- signage or marking of the fixed blanked area;
- the physical location of the object in the blanked area if movement or removal of the object can be detected and results in a stop command.

Means of supplemental safeguarding can include:

- completely filling the fixed blanked area to restrict access to the hazard;
- the electro-optical presence-sensing device installed at a distance that accounts for the worst case object sensitivity; (see 8.3.2.2) or
- alternate safeguarding may be provided to prevent access to the hazard.

**E8.3.2.6** See also, clause 5 and ANSI B11.0 (B11.TR3).

**8.3.2.6** Components, subassemblies or modules of the interface or machine control system shall conform to the requirements of 6.1, or shall be designed and constructed to meet the safety performance level (risk reduction) as determined by a risk assessment.

**8.3.2.7** Bypassing of the presence-sensing device shall comply with 6.6.

**8.3.2.8** Muting of the presence-sensing device shall comply with 6.7.

**8.3.2.9** The RF presence-sensing device shall not be adversely affected by changes around the machine that may alter the sensitivity of the device such that individuals are no longer detected in the sensing field at the proper safety distance.

**E8.3.2.9** The RF presence-sensing device may be affected by changes in the conditions around the machine such as ambient conditions, the placement of parts and tote boxes, grounding conditions of the operator, or the movement of industrial trucks. These changes should not adversely affect the performance of the device.

#### **Standards Requirements**

**8.3.2.10** The total tolerance in the range measurement of an area scanning presence-sensing device shall be included in determining the distance from the nearest recognized hazard to the detection area or zone. This detection area shall be identified and tested to ensure that the device is able to detect individuals entering the detection area. The effective sensing field shall be verified for proper size and coverage upon installation, replacement, or changes of the detection area.

#### **Explanatory Information**

**E8.3.2.10** When the area scanning presencesensing device is horizontally mounted, the detection area or zone should be visibly marked on the floor. This verification can be accomplished by using a programming device or by physically identifying the perimeter of the detection area with an appropriate test rod, following the supplier's recommendation. This verification is to ensure that a pre-programmed area scanning presence-sensing device with a small or improper detection area is not used by mistake in an installation requiring a larger field.

Area scanning presence-sensing device may not be suitable (effective) safeguards when used to protect an individual's hands or fingers from hazards.

Items which can affect this suitability are:

- response time;
- minimum object sensitivity;
- measurement accuracy.

# Appendix B. Specifications for User-built Operator Stations

### A DANGER

#### NON-WINTRISS OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

- Ensure that the Operator Station meets the requirements of all applicable safety regulations.
- Ensure that the Operator Station is wired correctly.
- Ensure that on any non-Wintriss Operator Station the Run buttons are placed so that two hands are required to push them at the same time and that buttons cannot be pushed simultaneously with one hand or with one hand and one elbow.
- Ensure that on any non-Wintriss Operator Station the Run buttons comply with the requirements specified in Table B-2, page B-2.
- Ensure that on any non-Wintriss Operator Station the Run buttons have ring guards or other means in place to prevent unintentional operation.
- Run all necessary tests to verify that each Operator Station is wired correctly and provides proper anti-tie-down and anti-repeat protection. Test procedures are provided at the end of chapters 2 and 3.

#### Failure to comply with these instructions will result in death or serious injury.

If you build your own Operator Station, be sure that it meets all the safety requirements in this manual and in the applicable safety regulations. Minimum requirements are shown in Table B-1.

Minimum Configuration Single-Stroke Operation Only	Minimum Configuration Single-Stroke and Continuous Operation
2 Palm buttons	2 Palm buttons
1 Emergency-stop button	1 Emergency-stop button
	1 Prior Act button

Table B-1. Operator Station Requirements

## **Run Button Installation**

Install the Run buttons on the Operator Station according to the following requirements:

- The Run buttons must be protected against unintended operation and placed so that the concurrent use of both hands is required.
- A ring guard must be installed for each run button.
- If the buttons are in the same plane, they must be separated by a distance of at least 24 in. (610 mm). If the Run buttons are not in the same plane, they may be placed closer together. For examples of correctly designed operator stations, see the illustrations of Wintriss operator stations, starting on page 2-19.

### NOTICE

A Run-button timer is built into the WPC 2000. If the Run buttons on a standalone Operator Station are not pressed within the 1/2-second "palm time" ("synchronous time" in ANSI terminology) or the Run buttons on multiple Op. Stations are not pressed within the 5-second "concurrent time," the press will not cycle. See the description of the "Palm Time Lamp" on page 1-8 and *Switch 6 – Selecting Concurrent Time for More Than Two Operator Stations*, page 4-43.

## **Switch Requirements**

Switches used for the Run, Emergency-stop, Top-stop and Prior Act buttons must meet the specifications shown in Table B-2:

Switch	Specifications
Run	NEMA 12 or 13, UL rated
	1-NC/1-N0 single contact block with transfer-style contacts. One contact bar moves from N/C contacts to the N/O contacts to ensure that the N/C and N/O contacts cannot be closed simultaneously. (Allen Bradley AB-S 800T-D1JA, Square D 9001KR25GH13, or equivalent)
	Must be guarded against accidental operation per ANSI and OSHA requirements.
E Stop	NEMA 12 or 13, UL rated
	2-NC contacts, positive opening operation, "self-latching"
Top Stop	NEMA 12 or 13, UL rated
	2-NC contacts, positive opening operation
Prior Act	NEMA 12 or 13, UL rated
	1-NC with integral green pilot lamp for 24 Vdc operation. This lamp indicates when the Prior Act timer is armed.
	Must be guarded against accidental operation per ANSI and OSHA requirements.

Table B-2. Specifications for Operator Station Switches

# Appendix C. SmartPAC Preventive Maintenance (PM) Monitor (Optional)

This appendix explains how to initialize, set up, and use the features of the SmartPAC Preventive Maintenance (PM) Monitor. This appendix serves as an add-on to the chapters in this manual. References will be made to certain sections. Complete all the steps in each of those sections unless otherwise noted.

### NOTICE

#### UPGRADING FIRMWARE

If you have a SmartPAC 2 system with AutoSetPAC, you must upgrade the firmware to accept PM Monitor functionality. Check the version of your AutoSetPAC firmware at "Installed Options" in Initialization mode. If the firmware version number is less than 1.26 for a 2-channel AutoSetPAC or less than 1.22 for a 4-channel AutoSetPAC, contact Wintriss Tech. Support immediately to obtain the correct AutoSetPAC firmware.

## About SmartPAC PM Monitor

The SmartPAC PM Monitor is an option which allows the maintenance department to manage its time more effectively. The PM Monitor tracks up to 64 items on the press based on specific usage, rather than merely signaling when a period of time has passed. Consequently, the entire stamping process is monitored automatically, and maintenance is alerted only when equipment requires attention.

### **Comparison with Traditional Preventive Maintenance**

Equipment used on or around the press needs to be checked at regular intervals, such as daily, weekly, or every specified number of strokes. Traditional preventive maintenance programs are based upon elapsed time and would be adequate if your presses were used in the same way all the time. However, with just-in-time manufacturing, shorter job runs, and more tool changes, presses and auxiliary equipment must frequently change the way that they operate. Each change results in varying degrees of wear and tear on the machinery. As a result, traditional PM programs are not the most effective way to handle these kinds of variations.

Here is an example. A traditional PM program may alert maintenance to inspect a press's braking system every three months. During that time, the press is idle or running a continuous coil-fed job, and the brake experiences minimal wear. As a result, any time spent checking the brake would be wasted. On the other hand, if the press were running a hand-fed job in Single-stroke mode, the many starts and stops of the machine would cause greater-than-normal brake wear, and three months would be too long to wait between inspections.

### How the PM Monitor Works

In the previous example, the SmartPAC 2 PM monitor would keep track of machine stops and could be set to signal a PM alert for the braking system after 50,000 machine stops, for example. If the press is idle or running coil fed jobs, the time between alerts will be long. If the press is used for hand-fed jobs, the time between alerts will be shorter.

Up to 64 items can be set up in the PM Monitor's schedule. **Tracking units** such as machine starts or stops, strokes, motor-on hours, cam channel actuations, die changes, tonnage overloads, etc. (depending on how SmartPAC is configured), can be assigned to each item in the schedule. The PM Monitor can also track hours, days, weeks and months for items that need to be maintained according to a specific time schedule. A **tracking frequency** is assigned to each item to tell the PM Monitor when to signal an alert. At that time, an alert message appears in SmartPAC's status bar in Run mode.

The entire PM **schedule** can be viewed in Run mode. The schedule shows each item, its units, frequency, and current value. Any items in **alert status** are highlighted. Items with alert status will be highlighted until the alert is cleared and the item is reset. The PM monitor continues to track alerted items until they are reset. Please note that SmartPAC does not stop the press when an item is in alert status. SmartPAC's PM schedule is password-protected to keep unauthorized personnel from clearing an alert.

### Examples of How to Use the PM Monitor

Some examples to help you properly set up your PM monitor are provided in Table C-1 and Figure C-2, page C-3, which show "PM items" and "PM tracking units." If you do not find a suitable PM item name, you can program in a "custom" name to match your application. Examples below provide such "custom" suggestions. To obtain further assistance in using the PM Monitor, contact Wintriss Tech. Support.

The tracking unit "**Ch. cycles**" (for cam channels 1 through 8 or 162), can be used to track the usage of various ancillary devices controlled by SmartPAC. Some PM items might include: feeder, pilot release solenoid, and ejection cylinders.

The tracking unit "**Die changes**" can be used to track the usage of components that are directly related to changing tools at SmartPAC. Some PM item examples might include: hydraulic clamping mechanism and the ram adjust motor.

"F##" WPC press control faults can be used to monitor items connected to the user-definable inputs set when SmartPAC is integrated with the Wintriss Clutch/Brake Control (WPC). Here are some examples: lube pressure, lube level, Nitrogen pressure (related to Nitrogen die spring systems).

air rotary seals	back shaft bearing (1 through 4)
brake	bull gear
clutch valve	conveyor (1 through 6)
counterbalance system	drive belts
DSV	feeder
flywheel bearing	gibs
lube filter	lube motor
lube system	main bearing (1 through 4)
main motor	oil level
pilot solenoid	pinion key
pitman bearing (1 through 4)	"Custom" name

	Table C-1.	Preventive	Maintenance	Items
--	------------	------------	-------------	-------

Table C-	2. PM	Tracking	Units
----------	-------	----------	-------

run hours <sup>1</sup>	days
weeks	months
die changes	ch. cycles (1 through 16) <sup>2</sup>
F## WPC press control faults (#: 45 - 59) <sup>3</sup>	press overloads <sup>4</sup>

- 1 For SmartPAC (without WPC), "run hours" refers to the length of time that SmartPAC is "on". For SmartPAC with WPC, it means how long the motor is "on". (The version of SmartPAC that you currently have is without WPC. Contact DI if you require WPC.)
- 2 Ch. cycles 1 through 16 can be used only if you have a 16-channel ProCamPAC. Only ch. cycles 1 through 8 can be used for an 8-channel configuration.
- 3 These are only available if you have SmartPAC with WPC and if you have wired and assigned press functions to the user-definable inputs. (The version of SmartPAC that you currently have is without WPC. Contact DI if you require WPC.)
- 4 "Press overload" is only available with AutoSetPAC option.

## Installing the PM Monitor

### For New Systems from the Factory

If you purchased a SmartPAC 2 system with the PM Monitor *pre-installed* at the factory, you can proceed directly to the section, "Using the PM Monitor in Initialization mode."

### For Existing Systems

If you ordered the PM Monitor options separately (in other words, if you already had a SmartPAC 2, and you were just adding the PM option), you must first physically upgrade your SmartPAC 2 system for compatibility. To upgrade your SmartPAC 2 firmware, refer to Appendix D.

Once firmware has been upgraded, proceed to the section, "Using the PM Monitor in Initialization mode."

#### NOTICE

PM Monitor must be initialized before you can use it (see page C-6).

## Using the PM Monitor in Initialization Mode

### How to Get into SmartPAC Initialization and PM Monitor

### NOTICE

#### SELECT = HIGHLIGHT + ENTER

When this manual says SELECT, it means highlight the item and press ENTER.

### NOTICE

Before changing modes, make sure your screen shows the first display in the mode you are in. If that display is not shown, nothing will happen when you turn the Program /Run key. In that case, keep pressing the RESET key. When the first display in the mode is reached, SmartPAC will instantly switch to the new mode.

1. To get into Initialization mode, turn the Program/Run key to "Program" and then press <u>both</u> the "1" and "CLEAR" keys <u>simultaneously</u> for one second.

MAIN INITIALIZATION MENU		
USE CURSOR KEYS TO CHOOSE MENU ITEMS. PRESS THE ENTER KEY TO SELECT. SWITCH TO RUN WHEN DONE.	RESOLVER ZERO POSITION SENSOR PRESS NAME SELECT CAM NAMES AUTO ADVANCE CUSTOM SENSOR NAMES SENSOR ENABLE MODE <u>PM MONITOR</u> SECURITY ACCESS	

Figure C-1. "PM Monitor" Highlighted on SmartPAC 2 Initialization Menu

2. Select "PM Monitor" from the main Initialization menu (see Figure C-1). A screen will appear asking for your password.

#### NOTICE

The password prompt will appear EVERY time that you select "PM Monitor" from the Initialization mode.



Figure C-2. PM Password Screen

3. At this point, consider the applicable alternatives below, depending on whether you have a *new system* (which includes the PM option already installed at the factory), or an *existing* SmartPAC (where you have to install and initialize this option yourself). Proceed with the one that corresponds with your system.

#### For New Systems from the Factory

If you purchased a SmartPAC system with the PM Monitor pre-installed at the factory, it is not necessary for you to clear/initialize the PM Monitor. However, you do need to complete the steps below as directed.

- 1. Enter the password "1234" at the "PM password" screen. This will take you immediately to the "PM Entry" screen.
- 2. As we mentioned above, you do not need to initialize your PM Monitor option, as it has already been done at the factory. However, it is advisable for you to change your password from the default "1234" to a different number, for security reasons.
- 3. To do this, press **F6** which is labeled "Init". It is at this screen ("Initialize PM" see Figure C-5) where you can also change your password. Proceed to the section "Assigning a new PM password number" to change your password (skip "Initializing the PM Monitor" altogether). Once you have done that, you can use the PM Monitor.

### For Existing Systems

If you ordered the PM Monitor options separately, you *must* initialize this option before you can actually use it. Complete <u>all</u> the steps in this section to initialize the PM Monitor.

### NOTICE

You should already have installed the firmware upgrade. If not, go back to the section, "Installing the PM Monitor" before proceeding further.

### Initializing the PM Monitor

1. Select "PM Monitor" from the main Initialization menu (see Figure C-1). A screen will appear asking for your password.

### NOTICE

The password prompt will appear EVERY time that you select "PM Monitor" from the Initialization mode.

2. To determine the password for your system, note the number at the bottom-right corner of the password screen, and call the factory at the telephone number on the cover of this manual. (*Because you have an upgraded system, the password may not be "1234"*.)



provide this 5-digit number to a DI tech person to obtain your PM password... (Note: Your number may vary!)

Figure C-3. PM Password Screen Showing Password Retrieval Number

3. Enter the password that you obtained from Wintriss Controls, using the numeric keypad. This will take you to the PM Entry Screen (see below). Don't worry if erroneous information appears on the screen, as it will disappear once you have completed step 5.

YOUR PRESS NAME	PM MONITOR	
ITEM NEW ITEM	ALERT EVERY	
USE THE CURSOR KEYS TO MAKE SELECTION. PRESS ENTER TO SELECT, RESET WHEN DONE.		
		F6

Figure C-4. PM Entry Screen

- 4. Press function key **F6**, which is labeled "Init".
- 5. From this screen you can initialize the PM Monitor. To initialize, select "Clear PM Info". (Notice that you can also change your password at this screen. To change your password, refer to the next section, "Assigning a New PM Password Number".)



Figure C-5. Initialize PM Screen

6. Notice the "Warning" message and accompanying instructions appearing on the screen (see below). Press the "Clear" key to initialize. (If you decide not to, then press Reset.)

```
IIII WARNING IIII
THIS WILL CLEAR OUT ALL THE PM
MONITOR INFORMATION . IF YOU
WANT TO DO THIS THEN PRESS
THE CLEAR KEY. IF YOU DO NOT
THEN PRESS THE RESET KEY.
```

Figure C-6. Initialize Warning Screen

- 7. Once you press "Clear", you will briefly see the confirming message "INITIALIZING PM MONITOR".
- 8. Next, press RESET to exit from the "Initialize PM" screen. You will be returned to the PM entry screen. Proceed to the next section to assign a new password number.

### Assigning a New PM Password Number

Before you can actually set up and use the PM Monitor, you may want to assign a new password number. (The default password is "1234".) For security reasons, it is advisable to change the default password. Follow the steps below to change the password. You can also change the password under the Security Access item on the Main Initialization menu (see Chapter 4).

- 1. Go to the "PM Entry" screen (Figure C-4). Press F6 (Init).
- 2. You will see the "Initialize PM" screen (Figure C-5). Select "Change Password".
- 3. As the screen indicates, enter a new password, up to 4 digits (numeric only). Use the numeric keypad or the up/down cursor keys. Then press Enter.
- 4. Make sure that you record this number and keep it in a place where you can find it. Without it, you cannot change settings in the PM Monitor. You are now ready to use the PM Monitor. Go to the next section.

### Select PM Item Names

You are now ready to set up PM parameters in Initialization. You can select a name for each preventative maintenance item that adequately describes its function. SmartPAC provides about 35 names. If there is a function for which you cannot find a suitable name, you can create a new name using the "Custom" feature (This procedure is explained in step 5 below.)

1. Select "New item" from this display. (You may be asked for a password before getting to this screen. If so, enter it.)



Figure C-7. PM Monitor Screen

2. Next, you will see the following display. You should give the item a name that best describes its function, so first check the list for a suitable name.

	PM MONITOR
TOUR PRESS NAME	"CUSTOM NAME"
	AIR ROTARY SEALS
	BCKSHFT BEARING 1
	BCKSHFT BEARING 2
	BCKSHFT BEARING 3
MARE SELECTION. PRESS	BCKSHFT BEARING 4
ENTER TO SELECT, RESET	BRAKE
WHEN DONE.	BULL GEAR
	CLUTCH VALVE
	CONVEYOR 1
	CONVEYOR 2
	CONVEYOR 3
	CONVEYOR 4
	CONVEYOR 5
MORE 🔻	CONVEYOR 6

Figure C-8. List of Available PM Names Screen

- 3. To see the complete list of names, press the "down" cursor key until the bottom name on the list is highlighted, then keep pressing it. A new name will appear each time you press the key. You can use the "up" cursor key to reverse direction.
- 4. If you do not find a suitable name but you still want to name the item, you can select "Custom Name" by highlighting it and pressing Enter.
- 5. As the screen suggests (see the next illustration), certain keys enable you to custom name the item. The name you select can be any combination of alphanumeric characters,

symbols, etc. Pressing the CLEAR key clears the text. To create a custom name, do the following:

- a. To select <u>letters or symbols</u>: Use the up, down, left, and/or right cursor keys to highlight the desired letter; then press ENTER.
- b. To select <u>numbers</u>: Use the numeric keypad.
- c. When finished, press function key F6 (to the right of the LCD display). To cancel you selection, press Reset. (For assistance in using the various keys, refer to Chapter 3 of this manual.)



Figure C-9. Alphanumeric Display Superimposed over PM Names Screen

6. After you have named the item, you are prompted to set the PM monitor tracking units. You can select a time-based measure, such as: run hours, days, weeks, months; or you can select measures linked to the process, such as: strokes, die changes, or programmable cam channel cycles. Select the most applicable tracking unit of measure.

YOUR PRESS NAME	PM MONITOR	
SLIDE ADJ. MOTOR USE THE CURSOR KEYS TO MAKE SELECTION. PRESS ENTER TO SELECT, RESET WHEN DONE.	RUN HOURS DAYS WEEKS MONTHS STARTS/STOPS STROKES DIE CHANGES CH1 CYCLES CH 2 CYCLES CH 3 CYCLES CH 4 CYCLES CH 5 CYCLES CH 6 CYCLES CH 7 CYCLES	select the tracking unit for the monitored item
MORE 🔻	CH 8 CYCLES	)

Figure C-10. Tracking Units Selection Screen

7. Next, the number display appears superimposed over the previous display (see the next illustration). Use the number keys or cursor keys to set the tracking frequency for the PM item.



Figure C-11. Superimposed Number Display

8. In the following illustration, we entered the slide adjust motor as our first PM item, set the tracking unit of measure to be "die changes", and the frequency at "100". Notice that item is listed just below "new item".:



Figure C-12. Programmed PM Item: Example

- 9. To set more PM items, repeat steps 1 through 8. When you are completely done initializing the PM items, press RESET to return to the main Initialization mode.
- 10. You can now go to the Run mode to view the PM Monitor status conditions. There is no PM information to set in SmartPAC's Program mode. You made all the required settings in the Initialization mode.

## Using the PM Monitor in Run mode

### How to Get into SmartPAC Run mode

To get into Run mode, set the Program/Run key to Run.

### NOTICE

Before changing modes, make sure your screen shows the first display in the mode you are in. If that display is not shown, nothing will happen when you turn the Program /Run key. In that case, keep pressing the RESET key. When the first display in the mode is reached, you will instantly switch to the new mode.

### A Tool Number Must Be Loaded Before Switching to Run Mode

If no tool number has been loaded, you cannot switch from Initialization mode or Program mode to Run mode. A tool number must be loaded before SmartPAC will allow the press to run.

If you try to switch to Run mode without a tool number loaded, you will get this error message on your screen:

NO TOOL NUMBER HAS BEEN LOADED

If so, turn the Program/Run key to "Program". Press RESET to clear the error message. Then load a tool number. Now set the Program/Run key to "Run". The Run menu, shown below, is the first display you see in Run mode. From this display you can access the PM Monitor selection.





### Viewing and Modifying PM Alerts

- 1. Select "PM Monitor" from the first display in Run mode.
- 2. You will see the list of PM items that you previously assigned in Initialization. The first item is highlighted in the next example. Use the cursor keys to view the other items on the schedule. Currently the PM status for all items is "normal" (see display). This means that none of the items has reached the limits set in Initialization.



Figure C-14. Run Mode Screen Showing PM Monitor in "Normal" Status Mode

### NOTICE

You may notice that some of the current values do not update on every stroke while the press is running. SmartPAC is keeping track of these items, but does not refresh the display until the press actually stops.

3. The next display shows that one of the items, "Slide Adjust Motor," is now in "alert" status mode. It flashes on the screen. Also, the number of items in alert status mode appears at the top of the screen.



Figure C-15. Run Mode Screen Showing "Slide Adjust Motor" in "Alert" Mode

- 4. To view other items in the schedule that may or may not be in "alert" status, use the cursor keys. If more than three PM items were set in Initialization, they will not all appear on the screen. To view them, simply use the cursor keys to scroll down the list.
- 5. To clear the alert, first highlight that item, press the appropriate function key (designated on your screen), and enter the PM password.

### NOTICE

When you clear the alert condition for a certain item, you automatically reset its current value to zero. You cannot recall the previous value.

- 6. If you want to change the frequency value on a given PM item, first highlight that item, press the designated function key, and enter the PM password. The number display will be superimposed over the screen (similar to Figure C-9). Use the number keys or cursor keys to modify the tracking frequency for that PM item.
- 7. Once you are done viewing or modifying this screen, press RESET to return to the main Run menu.

# Appendix D. Updating SmartPAC 2 Firmware

This appendix shows you how to update SmartPAC 2 firmware, using a USB disk, and load SmartPAC 2 firmware installed on a Compact Flash (CF) card. The appendix is organized in the following sections:

- Updating Firmware Using a USB Disk (next)
- Installing Firmware from a Replacement Compact Flash (CF) Card, page D-9

## Updating Firmware Using a USB Disk

### NOTICE

#### FIRMWARE ORDER MUST INCLUDE SMARTPAC 2 SERIAL NUMBER

When you order new firmware, make sure to include the serial number of your SmartPAC 2 unit. Wintriss needs the serial number to create the correct firmware for your SmartPAC 2.

The serial number is located on the top-mounting flange of the SmartPAC 2 enclosure and on the Boot Loader chip (U124) on the SmartPAC 2 board (see Figure 2-25, page 2-51). If you have a panel mount unit, the serial number can be found on the other side of the plate on which the AC input terminal block is mounted.

To order new SmartPAC 2 firmware, you must fill out a "SmartPAC 2 Firmware Upgrade" form, available from your Wintriss representative or Wintriss Tech. Support. Make sure to specify on the form the serial number on your SmartPAC 2. The firmware upgrade file you receive from Wintriss includes this serial number in its file name (i.e., SP2nnnnnn, where *SP2* stands for SmartPAC 2 and *nnnnnnn* is the eight-digit SmartPAC 2 serial number).

You can obtain SmartPAC 2 firmware in several ways. This appendix describes two methods, in which the firmware is loaded on a USB disk and installed via the USB connector on your SmartPAC 2 PC board. The two methods are as follows:

- Firmware is loaded on a USB disk and sent to you by United Parcel Service (UPS) or other shipping method. If you select this option, you pay for shipping and the cost of the USB disk. You also have to wait for delivery of the order. Follow the instructions in *Installing Updated Firmware from USB Disk to SmartPAC 2* on the next page if you choose this method.
- Firmware is available via an e-mail with a link to the Wintriss download site. You download a compressed file containing the firmware, then copy the firmware to your own USB disk and install it on the SmartPAC 2. To transfer the firmware to the USB disk, follow the instructions in *Downloading Updated Firmware from the Wintriss Server*, page D-7. Then load the firmware into SmartPAC 2, using the *Installing Updated Firmware from USB Disk to SmartPAC 2* procedure on the next page.

**Other options are available if your SmartPAC 2 unit is networked**. Call Wintriss Tech. Support for more information.

### NOTICE

If you elect to download SmartPAC 2 firmware from Wintriss, you must have

- A PC with a USB port and one of the following Windows operating systems: Windows 2000, Windows XP, and Windows 7
- A USB disk with at least 4 MB of available space

### Installing Updated Firmware from USB Disk to SmartPAC 2

Follow these steps to load new firmware from a USB disk to your SmartPAC 2.

### NOTICE

If you downloaded your firmware from Wintriss, go to page D-7 and follow the instructions in *Downloading Updated Firmware from the Wintriss Server* to load the firmware onto a USB disk. Then return to this page and install the firmware on your SmartPAC 2.

1. If a tool is loaded and you are currently running a job, you must record the current tool number, tool name or tool ID, and counter values before installing the new firmware. In Run mode, select COUNTERS, then enter the displayed counter values in the "COUNT" column in Table D-1, below.

Tool Number		
Tool Name or Tool I	D	
COUNTER	COUNT	PRESET VALUE
Strokes		You do not have to
Good Parts		They are saved with the
Batch 1		tool settings.
Batch 2		
Batch 3		
Total Hits		

Table D-1. Record of Current Counts

2. Check the serial number of the new firmware to make sure it matches the serial number of your SmartPAC 2. The firmware serial number begins with the prefix "SP2" (for SmartPAC 2) followed by a numeric code (i.e., SP2nnnnnn). The numeric code is the serial number of your SmartPAC 2 unit.

### NOTICE

- If you received your firmware on a USB disk, the serial number is the name of the folder stored on the disk. To verify the serial number, insert the disk into your computer's USB port, double-click on *My Computer*, and open the USB disk (usually identified by the label "Removable Disk" with a drive letter next to it.)
- If you downloaded your firmware from Wintriss, the serial number is the name of the compressed file you downloaded.
- 3. Power down your SmartPAC 2.
- 4. Press and hold down the F1 function key while powering up the SmartPAC 2, releasing F1 when the red Wintriss SmartPAC 2 screen displays. After about a minute the FIRMWARE LOAD MENU will appear (see Figure D-1).

(	
FIRMWARE LOAD MENU	
LOAD NEW FIRMWARE LOAD PREVIOUS FIRMWARE RELOAD CURRENT FIRMWARE XFER FROM USB DISK VIEW LOAD INFORMATION	
USE THE CURSOR KEYS TO SELECT THE ACTION YOU WISH TO PERFORM. PRESS ENTER TO PERFORM IT. PRESS RESET WHEN DONE.	
LOADER FIRMWARE V1.06	

Figure D-1. Firmware Load Menu with "XFER FROM USB DISK" Highlighted

### WARNING

#### ELECTRIC SHOCK HAZARD

- Ensure that the power source is off before you replace electronic components in a control.
- Disconnect power from the machinery it is connected to before replacing electronic components. This includes disconnecting power to the machine control and motor.
- Ensure that servicing is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

5. Open the SmartPAC 2 enclosure or console.

#### CAUTION

#### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

6. Locate the USB connector, J121, on the SmartPAC 2 board (refer to Figure 2-25, page 2-51).

### NOTICE

The USB disk can fit into the USB connector in only one orientation. DO NOT try to force the USB disk into the connector when it is in the wrong orientation.

- 7. Making sure that the USB disk is oriented correctly, carefully insert the USB disk into the USB connector. Wait about a minute for the SmartPAC 2 to recognize the USB disk.
- 8. Close the door of the enclosure or console.
- 9. Using the cursor keys, highlight "XFER FROM USB DISK," as shown in Figure D-1, and press ENTER. After a few seconds, the message "USB DISK TRANSFER COMPLETE" displays briefly, then the Firmware Load Menu appears again, as shown in Figure D-2.



Figure D-2. Firmware Load Menu with "LOAD NEW FIRMWARE" Highlighted
If the USB disk does not contain the correct folder for this SmartPAC 2 serial number, you will first see a message at the bottom of the screen that says "SP2nnnnnnn DIRECTORY NOT FOUND" and then a red window with the message "THERE WAS NO RESPONSE TO THE USB DISK FILE TRANSFER REQUEST." If these messages display, re-check the serial numbers of the SmartPAC 2 and the SmartPAC 2 firmware you are trying to load. If the two serial numbers match, try loading the firmware again. If this still does not work, contact Wintriss Tech. Support.

10. With "LOAD NEW FIRMWARE" selected, as shown in Figure D-2, press ENTER. A yellow status window appears with the message "YOU ARE ABOUT TO REPROGRAM THE SMARTPAC 2 RTS UNIT. . ." (see Figure D-3).



Figure D-3. Firmware Load Menu with Yellow Status Window

11. Press ENTER to continue. A display like that shown in Figure D-4, page D-6 appears, indicating that the firmware is being loaded. It takes about five minutes for the firmware to load.



Figure D-4. SmartPAC 2 Display with "Loading Firmware" Message

If power is lost to SmartPAC 2 during installation of the firmware, SmartPAC 2 will default to the Firmware Load Menu display when the unit is powered back up. Repeat steps 9-11 to install the firmware again.

- 12. When the firmware is completely loaded, the Load Time counter stops incrementing, a yellow status window appears briefly saying "THE DOWNLOAD SEQUENCE IS COMPLETE," and the SmartPAC 2 will restart (reboot) itself. Once the reboot is complete, another yellow status window appears saying, "YOU HAVE NOW UPDATED THE SMARTPAC SOFTWARE. SHUT THE POWER OFF AND THEN TURN IT BACK ON TO RESTART THE SMARTPAC 2."
- 13. Power down the SmartPAC 2. Remove the USB disk from the USB connector.
- 14. Power up the SmartPAC 2. Access the Main Initialization Menu and select "INSTALLED OPTIONS" to check for new installed options or enhancements, if any.

#### NOTICE

If you have a MultiPAC module connected to SmartPAC 2, the following message may appear when you power up the unit: "A MULTIPAC MODULE WAS INSTALLED THE LAST TIME THE UNIT WAS POWERED-UP AND WAS NOT SEEN THIS TIME." If you receive this message, power down SmartPAC 2 again, then power the unit back up. If the message still appears, contact Wintriss Tech. Support.

- 15. If you suspended a job in order to load SmartPAC 2 firmware, reload the tool and enter the counts for your job-in-progress from Table D-1, page D2 as follows:
  - a. Enter Run mode and select COUNTERS.
  - b. Enter the count values from Table D-1 for each line in the display.
  - c. When you are finished, you can continue running the job that was in progress.

Your Security Access settings may be set to prevent changing the count values in Run mode. If this is the case, go to the Main Initialization Menu, select "SECURITY ACCESS", and set "CHANGE COUNT" to "PROGRAM AND RUN MODES." After you change the count values, you can reset the Security Access if desired.

#### **Downloading Updated Firmware from the Wintriss Server**

#### NOTICE

To copy firmware downloaded from Wintriss to a USB disk, you must have:

- A PC with a USB port and one of the following Windows operating systems: Windows 2000, Windows XP, or Windows 7
- A USB disk with at least 4 MB of available space

To download firmware from the Wintriss server, perform the following steps:

- 1. Click on the link provided in the e-mail you received from Wintriss in response to your firmware order. If the link has been disabled by your security settings, copy the link, paste it into a Browser window, and press ENTER.
- 2. When a window displays asking if you want to open the file or save the file to your computer, select the Save option.
- 3. When the Save As window displays, click on Save with the following settings selected:

Save in:	Desktop
File name:	SP2nnnnnnn (where <i>nnnnnnn</i> is your SmartPAC 2 serial number)
Save as type:	Application

- 4. Click on Save to save the file to your desktop. This may take a few minutes.
- 5. When the Download Complete window displays, click on *Close* to end the download. (On some systems, the window may close automatically.)
- 6. Locate the downloaded, compressed file on your desktop (the icon displays the WinZip logo and the file name SP2nnnnnn), and double-click on it to launch the WinZip Self-Extractor utility.
- 7. When the WinZip Self-Extractor window displays, select the folder to which you want the contents of the unzipped file saved (the default is C:\WintrissUpdates), and click on *Unzip*.

#### NOTICE

You can change the drive and/or folder to which you save the file by clicking on the *Browse* button and navigating to the desired location. You can create a new folder by typing the folder name in the **Unzip to folder:** field.

8. Click on *OK* in the window displaying the message that the file has been unzipped successfully, then click on *Close* in the WinZip Self-Extractor window.

- 9. Double-click on the *My Computer* icon on your desktop, and when the "My Computer" window opens, navigate to the folder in which you placed the unzipped SmartPAC 2 firmware file. (The contents of the unzipped file are in a folder named SP2nnnnnn, where nnnnnnn is the serial number of your SmartPAC 2.)
- 10. Insert a USB disk into your computer's USB port. Wait a few moments for it to be recognized.
  - If your computer is already set up to use a USB disk, the USB drive (usually named "Removable Disk" with a drive letter next it) will appear in the "My Computer" window.
  - If you have never used a USB disk on your computer, you will be prompted with a message saying, "New hardware has been found." Follow the on-screen instructions to find and install the proper drivers for your USB disk. For assistance, contact your information technology staff.
- 11. With both the SP2nnnnnnn folder and the USB "Removable Disk" icon visible in "My Computer" windows, copy the SP2nnnnnn folder to the USB disk.
- 12. Stop the USB disk, using the "Unplug or Eject Hardware" utility on your computer. (The "Unplug or Eject Hardware" icon is often displayed on the far right side of the Task Bar.)

Be sure to stop the USB disk before removing it from the computer. If you don't, valuable data on your computer may be corrupted or lost.

If you are using Windows XP, you do not need to "unplug" or "eject" the USB disk.

13. Remove the USB disk from the USB drive.

To install downloaded firmware from the USB disk to SmartPAC 2, follow the instructions in *Installing Updated Firmware from USB Disk to SmartPAC 2*, page D-2.

## Installing Firmware from a Replacement Compact Flash (CF) Card

#### NOTICE

#### MAKE SURE TO SPECIFY YOUR SMARTPAC 2 SERIAL NUMBER

When you order a replacement Compact Flash (CF) card, make sure to include the serial number of your SmartPAC 2. Wintriss needs the serial number to create the correct firmware for your SmartPAC 2.

The serial number is located on the top-mounting flange of the SmartPAC 2 enclosure and on the Boot Loader chip (U124) on the SmartPAC 2 board (see Figure 2-25, page 2-51). If you have a panel mount unit, the serial number can be found on the other side of the plate on which the AC input terminal block is mounted.

If you are replacing a Compact Flash (CF) card, perform the following steps to reload the SmartPAC 2 firmware resident on it:

### WARNING

#### ELECTRIC SHOCK HAZARD

- Ensure that the power source is off before you replace electronic components in a control.
- Disconnect power from the machinery it is connected to before replacing electronic components. This includes disconnecting power to the machine control and motor.
- Ensure that servicing is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

- 1. With power to the SmartPAC 2 turned off, insert the replacement Compact Flash card in the receptacle on the SmartPAC 2 board (see Figure 2-25, page 2-51). If a ProCamPAC board is installed, you will have to remove it to access the Compact Flash slot.
- 2. Close the door of the enclosure or console.
- 3. Press and hold down the F1 function key while powering up the SmartPAC 2, releasing F1 when the red Wintriss SmartPAC 2 screen displays. After about a minute the FIRMWARE LOAD MENU will appear (see Figure D-5, page D-10).



Figure D-5. Firmware Load Menu with "RELOAD CURRENT FIRMWARE" Highlighted

4. Using the cursor keys, highlight "RELOAD CURRENT FIRMWARE," as shown in Figure D-5, and press ENTER. A yellow status window appears with the message "YOU ARE ABOUT TO REPROGRAM THE SMARTPAC 2 RTS UNIT . . ." (see Figure D-6).



Figure D-6. Firmware Load Menu with Yellow Status Window

5. Press ENTER to continue. The message "PLEASE WAIT WHILE THE FIRMWARE MEMORY IS BEING ERASED" displays briefly, followed by a display like the one shown in Figure D-7, page D-11, indicating that the firmware is being loaded. It takes about five minutes for the firmware to load.



Figure D-7. SmartPAC 2 Display with "Loading Firmware" Message

If power is lost to SmartPAC 2 during installation of the firmware, SmartPAC 2 will default to the Firmware Load Menu display when the unit is powered back up. Repeat steps 4 and 5 to install the firmware again.

- 6. When the firmware is completely loaded, the Load Time counter stops incrementing, a yellow status window appears briefly saying "THE DOWNLOAD SEQUENCE IS COMPLETE," and the SmartPAC 2 will restart (reboot) itself. Once the reboot is complete, another yellow status window appears saying, "YOU HAVE NOW UPDATED THE SMARTPAC SOFTWARE. SHUT THE POWER OFF AND THEN TURN IT BACK ON TO RESTART THE SMARTPAC 2."
- 7. Power down the SmartPAC 2, then power the unit back up.
- 8. Access the Main Initialization Menu, and select "INSTALLED OPTIONS" to verify that all the options in your SmartPAC 2 configuration have been installed.

#### NOTICE

If you have a MultiPAC module connected to SmartPAC 2, the following message may appear when you power up the unit: "A MULTIPAC MODULE WAS INSTALLED THE LAST TIME THE UNIT WAS POWERED-UP AND WAS NOT SEEN THIS TIME." If you receive this message, power down SmartPAC 2 again, then power the unit back up. If the message still appears, contact Wintriss Tech. Support.

## Appendix E. SmartView Remote Viewing and E-mail Setup

SmartView is a web-based application that allows you to remotely view the status of your SmartPAC-2-equipped presses over your network. There is no software to install. You simply go to the SmartPAC 2 web site, <u>www.smartpac2.com</u>, using Microsoft Internet Explorer version 5.5 or higher, and enter the network names of the SmartPAC 2s that you want to view.

You are taken to the SmartView Main Page screen (see Figure E-7, page E-10), which displays the status—i.e., running, stopped, or offline—of all of your presses as well as selected details about each press. From the Main Page you can access a Detail display for a selected press, which provides additional press details. If you have dial-up or VPN (Virtual Private Network) access to your company's network, you can view the status of your presses from anywhere in the world over the World Wide Web.

SmartView also provides a remote messaging feature that allows you to send text messages from your PC to any SmartPAC 2 on your network.

SmartView's email facility enables press operators to send diagnostic information, screen captures or custom text messages to Wintriss Technical Support or to any device capable of receiving an email-based text message, including computers, cell phones, pagers, and PDAs. The SmartPAC 2 Error/Event Log can be sent to Wintriss Tech. Support or any other recipient, aiding in troubleshooting application and programming problems.

## **Network Requirements**

In order to use SmartView or send emails from your SmartPAC 2, your network must meet the following requirements:

• Hardware

LAN (Local Area Network) (SmartPAC 2 listens on Port 1007 (Default)) SMTP Mail Server (Only if using E-mail feature) CAT5 cable with RJ45 connector

• Browser Internet Explorer (5.5 or higher)

## **Network Setup**

You should consult with your company's IT department before setting up your network. They will be able to answer key questions such as how your company's LAN (Local Area Network) is set up, whether the SmartPAC 2 will have a fixed IP (Internet Protocol) address or use DHCP (Dynamic Host Configuration Protocol), and how email will be sent. They will also be able to offer advice regarding network hardware issues such as cabling, hubs and mail servers.

#### Plugging in the Network Cable

#### NOTICE

Do not run Cat5 cable inside conduits containing AC high voltage wires. Ideally, run Cat5 cable in a separate conduit away from sources of electrical noise.

- 1. With SmartPAC 2 turned off, open the enclosure and plug your network (CAT5) cable with the RJ45 connector into the Ethernet connector (J122) on the SmartPAC 2 board (refer to Figure 2-25, page 2-51 for location).
- 2. Power up the SmartPAC 2.

The green LED labeled LINK on the RJ45 connector should illuminate, indicating that the network connection is active. If the LINK LED does not illuminate, unplug the connector and try plugging it in again. If the LED still fails to illuminate, ask your IT department to PING (Packet InterNet Groper) it. PING is a DOS utility used to test for network connectivity. See *SmartView Ping Utility*, page E-15.

3. When you are satisfied that the network connection is active, close the SmartPAC 2 enclosure.

#### **Programming Network Settings**

#### Enabling E-mail and SmartView and Selecting Press Type

- 1. On the Main Program Menu, press the 1 and CLEAR keys simultaneously for a few seconds until the Main Initialization Menu displays (see Figure 4-1, page 4-1).
- 2. Select SETUP NETWORK to access the Network Setup Utility screen (see Figure 4-37, page 4-57).
- 3. Make sure that the E-mail and SmartView functions are both enabled. If they aren't, press ENTER to toggle the appropriate entry from DISABLED to ENABLED.
- 4. Make sure that the Press Type is set correctly.

#### Setting Up E-mail

#### NOTICE

You must have an SMTP (Simple Mail Transfer Protocol) mail server for the E-mail feature to function properly. Contact your IT department for information about SMTP server settings and account information. It is a good idea to have the information ready ahead of time before trying to enter program fields.

1. Select **SETUP E-MAIL** on the Network Setup Utility screen. The screen that displays (see Figure 4-38, page 4-58) provides fields in which you can enter your SMTP mail server settings. Follow on-screen instructions to enter or edit entries.

- 2. **Mail Server**: Enter Mail Server address first. Be sure to pay careful attention to casesensitive text (e.g., MySMTP.MailServer.Com). Use the **F2** function key to toggle letter case.
- 3. Mail Port: Leave mail port set to 25.
- 4. Use Secure Login: Press the ENTER key to toggle between FALSE and TRUE. Some SMTP accounts require a Username and Password. If so, set Secure Login to TRUE.

Most IT departments do not use secure login. If so, leave this entry set to FALSE.

- 5. Username: If you selected TRUE in step 4, you must enter a Username. This entry is case sensitive. Use the F2 function key to toggle letter case. Leave the field blank if you set Secure Login to FALSE.
- 6. **Password**: If you selected TRUE in step 4, you must also enter a Password. This entry is case sensitive. Use the **F2** function key to toggle letter case. Leave the field blank if you set Secure Login to FALSE.
- 7. **Email Error Recipient**: Enter the E-mail address of the person to whom you want undeliverable messages sent (e.g., the individual responsible for SmartPAC2). Leave the field blank if you do not need to track or be notified of undeliverable e-mails. If you are unsure of what to enter, contact your IT department.
- 8. Email From Name: You will probably want to enter the name of the press in this field (e.g., <u>Press#@yourcompany.com</u>), although you can enter any name. Depending on how your company's SMTP server software is configured and what rules are in place, you may have to experiment with different name formats. Contact your IT department for help.
- 9. Wintriss Email Addr: Leave this field unchanged. You can use this E-mail address to send error logs and screen captures to Wintriss Tech. Support for help in troubleshooting your SmartPAC 2.

#### NOTICE

If the Wintriss E-mail Address ever changes, Wintriss will notify you. If this occurs, change this entry to the new Wintriss Technical Support E-mail Address.

#### **Changing Network Settings**

#### NOTICE

Perform this procedure only if you want to change your SmartPAC 2 from the default DHCP setting (Dynamic Host Configuration Protocol) to a Static or Fixed IP address or if you want to change your SmartPAC 2's default network computer name (i.e., SPAC2-nnnnnnn, where *nnnnnnn* is the serial number of your SmartPAC 2).

In order to make changes to network settings, you will need to connect either a USB or PS 2 mouse to the appropriate connector. For a PS 2 mouse, use connector J120 on the SmartPAC 2 board. For a USB mouse, use connector J117.

The USB mouse is probably the more convenient choice for SmartPAC 2 board versions Rev. 5 and lower since plugging it in requires only one operation. If you use a PS 2 type mouse with Rev. 5 and lower boards, you will need to plug a Y-cable into J120 and then plug the mouse into the connector on the arm of the Y labeled MOUSE. SmartPAC 2 Rev. 3 boards require that you reverse the connection and plug the mouse into the Y-cable connector labeled KEYBOARD. For versions of SmartPAC 2 boards Rev. 6 or higher, the PS 2 mouse plugs directly into connector J120. Differences in PS 2 mouse connections for different versions of SmartPAC 2 boards are summarized in Table E-1.

Board Rev. #	Identifier	PS 2 Default Configuration	Y–Cable Connection
Rev. 2	Green TB102 Connector	Keyboard Default	Do not reverse
Rev. 3	Orange TB102 Connector	Mouse Default	Reverse
Rev. 5	Yellow band on PS2 Connector	Mouse Default	Do not reverse
Rev. 6 & Higher	Mouse = MS J120 Keyboard = KB J125	N.A.	N.A.

Table E-1. SmartPAC 2 Board: PS 2 and Y-Cable Configuration

#### Changing from System Default DHCP to Static or Fixed IP Address

- 1. Power down the SmartPAC 2.
- 2. Open the enclosure. Access the PS 2 (J120) or USB (J117) connector on the SmartPAC 2 board (see Figure 2-25, page 2-51 for location), and plug in your mouse.
- 3. Power up the SmartPAC 2. Once the unit has finished booting up, you should see a mouse pointer on your display and be able to move it around.
- 4. Turn the PROG/RUN key switch to PROG.
- 5. Access the Main Initialization Menu, and select SETUP NETWORK.
- 6. On the Network Setup Utility screen, select CHANGE NETWORK SETTINGS.
- 7. When the red warning window displays, indicating that you are about to be taken to the Control Panel and that you need to connect a mouse (which you have done in step 2), press the 5 key.
- 8. When the Control Panel displays, double-left-click with your mouse on the Network Connections folder.
- 9. Single-right-click on the Local Area Connection icon.
- 10. Single-left-click on Properties in the drop-down box that displays. A Window should appear labelled Local Area Connection Properties.

- 11. In the Local Area Connection Properties window, select Internet Protocol (TCP/IP) and single-left-click on the Properties button. The Internet Protocol (TCP/IP) Properties window displays with two radio buttons already selected: "Obtain an IP address automatically" and "Obtain DNS server address automatically." These are the default settings to make your SmartPAC 2 DHCP-enabled.
- 12. Single-left-click once to select "Use the following IP address." (If you wish, you can single-left click again to select "Use the following DNS server address.")
- 13. Using the on-screen keyboard, enter the appropriate IP addresses. Consult your IT department if you need help.
- 14. Single-left-click on the OK button.
- 15. Close the On-Screen Keyboard, Local Area Connection Properties, and Network Connections windows. You should see a blank blue screen with a small window labeled Control Panel Entered with the words Re-Start System and Save Changes. Single-leftclick on the *OK* button to restart the SmartPAC 2 and save your new network settings.
- 16. To test these changes, try launching SmartView and viewing the press. Also, go to the Setup Page in SmartView (see page E-10) and see if the IP address you entered is displayed.

If you do not have network connectivity, you may need to repeat the preceding steps to make changes and/or have your settings saved.

#### **Changing Computer Name and Member Settings (System Properties)**

- 1. Repeat steps 1 through 7 above.
- 2. Double-left-click on the System icon.
- 3. Single-left-click on the Computer Name tab in the System Properties window.

#### NOTICE

It is not necessary to enter a Computer description. Leave this window blank.

- 4. Single-left-click on the *Change* button.
- 5. In the Computer Name Changes window, move the mouse pointer over the Del (Delete) key on the on-screen keyboard-the pointer becomes a hand-and single-left-click with the mouse. The computer name SPAC2-nnnnnnn (where *nnnnnnn* is the serial number of your SmartPAC 2) is deleted.
- 6. Enter the new computer name on the on-screen keyboard, single-left-clicking with the mouse on the desired characters.
- 7. If you want to change from the factory default Workgroup to Domain, unselect the Workgroup radio button, and select the Domain radio button.

SmartPAC 2 is configured at the factory to be part of a Workgroup. If your IT department requires that SmartPAC 2 be part of a Domain, you must change this setting. Contact your IT department for help.

- 8. Close the on-screen keyboard.
- 9. Single-left-click on the OK button.
- 10. When you are prompted to restart the computer, click on the OK button.
- 11. In the System Properties window, click on OK, then click on Yes to restart the computer and save changes.
- 12. After SmartPAC 2 reboots, the Main Initialization Menu should display.

## Installing SmartView

SmartView can be installed on any desktop or laptop PC that is networked to your company's LAN. If you will use SmartView on multiple computers, you must install the software on each one. In order to install SmartView, your PC must meet the following requirements:

- Microsoft Internet Explorer (version 5.5 or higher)
- Client must have administrative privileges
- If a firewall is used, SmartPAC 2 must be a trusted site

#### NOTICE

SmartView performance and speed may be affected by older and slower equipment. For optimal performance it is recommended that the computer used to run SmartView be reasonably up-to-date.

#### **Checking Explorer Settings**

- 1. Open Microsoft Internet Explorer.
- 2. At the top of the Explorer window, click on the Tools drop-down menu and select Internet Options (see Figure E-1).

🗿 Google - Microsoft Interr	🗿 Google - Microsoft Internet Explorer							
File Edit View Favorites	Tools Help		A					
Address 🔊 http://www.google.	Mail and News		👻 🄁 Ga					
Web Images Videos Ma	Manage Add-ons	i <u>mail</u> more <b>V</b>	iGoogle   Search settings   Sign in					
	Synchronize Windows Update							
	Windows Messenger Sun Java Console	Google						
	Internet Options	200210						
Enables you to change settings.								

Figure E-1. Internet Explorer Window with "Internet Options" Selected

3. On the Internet Options screen (see Figure E-2), click on the Security tab.



Figure E-2. Internet Options Screen

4. On the Security tab (see Figure E-3), click on the Custom Level button.



Figure E-3. Security Tab with "Custom Level" Button

- 5. Ensure that the following security browser settings are configured:
  - Download signed ActiveX controls: Prompt
  - Run ActiveX controls and plug-ins: Enable
  - Script ActiveX controls marked safe for scripting: Enable
  - Active scripting: Enable
- 6. When all settings are verified, click on the *OK* button on the Security Settings screen, then click on *OK* on the Internet Options screen.

#### Installing SmartView on your Computer

1. Enter http://www.smartpac2.com in the Internet Explorer address window, and click on the Go button to launch SmartView. If you are installing SmartView for the first time, the SmartView introductory page (see Figure E-4) will display. Otherwise, you will be taken directly to the SmartView Setup Page (see Figure E-5.

DemoChoice - Microsoft Internet Explorer Ele Ede Yew Favortes Loois Help Address @ http://www.smartpact.com/SmartNew/DemoChoice.htm?12 SmartPicture/DemoChoice.htm?12	79130003355	WINTRISS"
What woul	ld you l	like to do?
See a Demo	Or	Go to the SmartView Setup Page SmartView Setup Network Name. SPAC2-12345678
a Done		

Figure E-4. SmartView Introductory Page

2. Click on the *Go to the SmartView Setup Page* on the SmartView introductory page, if necessary, to access the SmartView Setup Page (see Figure E-5).

Sm	artV	liew	10100111010	TOOTOGE	energierener en	y or V	VINTRISS	5°
<u>Setup Help</u>	Ping Utility							
		Sma	rtView	Setup				
	Network Name: Demo1		Press Nar Demo Pr	ne: iess 1		Add	đ	
							-	
	31					(2)	~	
	To del	ete an entry, hi	ghlight it a	nd press th	e Delete key	<i>.</i>		
		User Name	Your Name	Here				
		Submit Change	HS	Exit without Cl	hanges			
	<u>Note:</u> prompte	f you are submitting d to download an Ac	this informatictiveX control.	ion for the first I If so, select "Y	time, you may t es" to download	be d.		

Figure E-5. SmartView Setup Page

3. Click in the Network Name window, and type "Demo1" as shown in Figure E-5.

- 4. Click in the Press Name window, and type "Demo Press 1" as shown in Figure E-5.
- 5. Click on the *Add* button. Your entries are displayed in the large window beneath the Network Name and Press Name windows.

You can also type network and press names directly into the large window.

#### NOTICE

Additional Demo Press simulations are available. To add these simulations, repeat steps 3 through 5, but instead of using "Demo1," type "Demo2," etc. in the Network Name field. You can enter names with up to two digits (e.g., Demo Press 35) in the Press Name window. These Demos are for testing and demonstration purposes.

- 6. Click in the User Name window, and type your name.
- 7. Click on the Submit Changes button.
- 8. When the window shown in Figure E-6 displays, asking if you want to download the Mabry WinSock ActiveX control, click on the *Install* button.



Figure E-6. Mabry Winsock ActiveX Control Window

#### NOTICE

The Mabry WinSock ActiveX control enables you to run SmartView on your browser. This software must be installed on your computer in order for SmartView to function properly. You may be prompted to install the software prior to this step. If you are not prompted to install this control, check to make sure your browser security settings are correct (see step 5, page E-7), or contact your IT department for more information.

9. The SmartView Main Page (see Figure E-7, page E-10) should now appear. Click on the *Add to Favorites* button to save this web site for future use.

🗿 SmartView Main - Microsoft Internet Explorer	-DX
Ele Edt Yew Favorites Tools Help	AU.
Address 🕘 http://www.smartpac2.com/SmartView/SmartView/Main.htm?1279131653580	✓ ⇒ 60
SmartView Setup Info Center Online Manual Backup Setup Online Manual Suggestions	~
SmartPAC 2 SmartView Main Page Monuol Refresh Last Update: 7/142010 at 223:44 PM	
DemoPress1 (Mesi)	
Good Parts Preset - 40000           Running @ 78 SPM           Good Parts Count - 22303	
Est Complete in 11.3 hours Percent Complete = 55.8%	
Add to Fevoriles	
I	

Figure E-7. SmartView Main Page

## **SmartView Operation**

#### Setup Page

Follow these steps to fill in the information on the SmartView Setup Page (see Figure E-5, page E-8):

- 1. On the SmartView Main Page, click on Setup to display the SmartView Setup Page.
- 2. Enter in the Network Name window "SPAC2-nnnnnnn," where *nnnnnnn* is the SmartPAC 2 8-digit serial number, if you have assigned your SmartPAC 2 a DHCP address

or

Enter in the Network Name window the SmartPAC 2 IP address if you have assigned your SmartPAC 2 a fixed or static IP address.

- 3. Enter in Press Name window a name for your press, using up to 25 characters (e.g., Press 8, Press 9, etc.).
- 4. Click on the *Add* button. Your entries are displayed in the large window beneath the Network Name and Press Name windows.

#### NOTICE

You can also type network and press names directly into the large window.

- 5. Enter a user name if you have not already done so.
- 6. Click on the *Submit Changes* button. SmartView will check for networked units and indicate if a connection is made.
- 7. To add more networked SmartPAC 2s, click on Setup on the Main Page to go back to the Setup Page, and repeat steps 2 through 6. You do not have to enter your user name each time. It is a good idea to record your settings on paper.

- 8. To make changes, select the line you want in the large window, edit the selection, and click on the *Submit Changes* button.
- 9. To delete an item, select that line in the large window, press the Delete key, and click on the *Submit Changes* button.

You can prevent a press from displaying on the Main Page without deleting its entry on the Setup Page by placing a single quotation mark in front of the entry (e.g., 'SPAC2-12345678, Press 7.)

10. If you get a "No Connection" message after clicking on *Submit Changes*, check to make sure that you have entered the correct SmartPAC2 serial number or IP address.

#### NOTICE

If the "No Connection" message persists, you may need to Ping your SmartPAC 2. See page E-15 for instructions.

#### Main Page

The SmartView Main Page, shown in Figure E-8, page E-12, lets you view a summary of information about the presses you have networked.

The Main Page displays the following press information:

- Press running speed (SPM) (if press is running)
- Press angle (if press is stopped or in a fault condition)
- Estimated hours to completion of job
- Number of parts required
- Number of parts made
- Percent of job complete

The color of the press graphic at the right of each press summary indicates the press's current state:

- Green Press is running
- Red Press is stopped
- Grey Press is offline (i.e., power is off or there is no network connection)

When a press is offline, the message "Off Line" displays next to the press graphic.

The *Refresh* button at the top of the page allows you to update the Main Page display with the latest press status information (e.g., current parts count).

The <u>Detail</u> link at the top of each press summary takes you to the Press Status Information Page (see next section), on which you can view detail press information.



Figure E-8. SmartView Main Page with Status of Multiple Presses Shown

#### **Press Status Information Page**

The Press Status Information Page (see Figure E-9, page E-13), which displays when you click on the <u>Detail</u> link in a summary panel on the Main Page, provides an expanded view of your press.

It displays the following detail information about the selected press:

- Faults (if press is in a fault condition)
- Sensor status
- Current tool number and name
- Job number
- Press capacity
- Number of parts required
- Number of parts made
- Percent of job complete
- Current job running time
- Estimated hours to job completion
- Current press tonnage
- Tonnage as a percent of press capacity

The *Update* button at the top of the page allows you to view the most current detail information. You can view the Error/Event Log or Installed Options screen by clicking on the Error Log or Installed Options link at the top of the page.

To return to the Main Page, click on the <u>Main</u> link. To go to the Wintriss.com web site, click on the <u>Wintriss.com</u> link.

The Remote Message window at the bottom of the page allows you to send a text message from your computer to SmartPAC2 (see next section).

					Lindolo		
	Last Opd	ate: 7/14/2010 at 15:	20:57 Net Name	: = 3pacz 12343	oro [opume]		
Press Status:	Running @ 78 S	SPM					
Sensor State	us:	Enabled	Good Pa	rts Preset:	40000	)	
Current Too	l:	6160	Good Pa	rts Count:	2230	3	
Tool Name:		DEMO TOOL1	Job Com	plete:	50.31	<b>%</b>	
"Job Numbe	er:	4521	Running	Time:	14.2	Hours	
Press Capacity: 200		200	Estimate	Estimated Complete in:		11.3 Hours	
*Available only w	rent Press To	nnage	Ton	nage as a %	of Press Cap	pacity	
"Available only w Curr 25	ith LETS firmware o	nnage 26	Ton	nage as a %	of Press Cap	pacity	
*Available only w Curr 25 Left Rear	ith LETS firmware o	nnage 26 Right Rear	Ton	nage as a %	of Press Cap	pacity	
*Available only w Curr 25 Left Rear	ith LETS firmware of rent Press To	nnage 26 Right Rear	Ton 50%	nage as a %	of Press Cap 44%	52%	
*Available only w Curr 25 Left Rear	vith LET3 firmware o rent Press To 96 Total Tons	nnage 26 Right Rear	50%	nage as a %	of Press Cap	52%	
*Available only w Curr 25 Left Rear	nent Press To 96 Total Tons	nnage 26 Right Rear	50%	nage as a %	of Press Cap	52%	
*Available only w Curr 25 Left Rear	rent Press To 96 Total Tons	nnage 26 Right Rear	50%	nage as a %	of Press Cap	52%	

Figure E-9. Press Status Information Page

## **Remote Messaging**

You can send a remote message from your computer to other press operators by typing the message (95 characters maximum, including spaces) in the Remote Message window on the Press Status Information Page, and clicking on the *Send* Button. A Status box displays on your computer to let you know if the transmission was successful. Your message will display as a post-it note on the SmartPAC 2 to which you have directed it (see Figure E-10, page E-14).

Once the message is read, it can be cleared by going to the Error/Event Log (click on the <u>Error</u> Log link) and pressing the **F4** key. The Error/Event log maintains the status of all messages (i.e., Sent or Cleared) by date and time.

#### NOTICE

SmartPAC 2 only displays the most recent message. When another message is sent, SmartPAC 2 automatically clears the previous message and displays the new one.



Figure E-10. SmartPAC 2 Remote Message

## E-mail Setup

You can enter new or edit existing recipient email addresses and messages on the E-mail Setup Page (see Figure E-11, page E-15), which you access from the SmartView Setup Page by clicking on the Email Setup link.

To add, change, or delete email information, do the following:

1. Click on the Down Arrow ( ) in the Select a Press window, then select the press for which you want to enter or edit email information.

Existing names/email addresses and messages for that press display in the two large windows on the screen. A status box displays to inform you that the data has been received and is ready to change.

2. To add an email name/address entry, click in the Name window, and type the person's name, then click in the Email Address window, and type his or her E-mail address. Click on the *Add* button. Your entries are displayed in the large window beneath the Name and E-mail Address windows.

#### NOTICE

You can also type the name and email address entries, separated by a comma, on a line in the large window.

3. To add an email message entry, click in the Messages window, type the text of the message, and click on the *Add* button. Your entry is displayed in the large window beneath the Messages window.

000000000000000000000000000000000000000	ab - munaana musunsi iskhansi		لكالكالك
00-	http://www.smartpac2.com/SmartViev	r/EmailSetup.htm?12791391 🛩 🔛 😽 🗙 🎦 Google	P-
Se Favorites	Hemail Setup		
Sn	nartVie	w //Wi	NTRISS <sup>®</sup>
Setup Se	tup Help Main		
	Select a Press: Press 9 (Spa	c2-12345678) CEmail Settings	
	Status: Data received for SPAC	2-00001599, make desired changes.	
	Name:	Email Address:	
		Add	
	LABOULE (BUE, LABOULEVE		
	To delete an entry, highlight it and	d press hankshane	
		a prese caeropase.	
	Message:		
		Add	
	Tool Change	~	
	End OF Stock Part Out of Spec		
	Filter needs service		
	Belt needs adjusting		
	Lube failure		
	Coffee Break		
	Call me		
	200	<u>w</u>	
	To delate an anter hight to the	A server hasternare	
	ro delete an entry, highlight it and	з ргоза раскерасе.	
		Save	8

Figure E-11. Email Setup Page



- 4. Click on the Save button to save your entries.
- 5. To change an email name, email address, or email message entry, select the appropriate line in one of the large windows, edit the selection, and click on the *Save* button.
- 6. To delete an entry, select the appropriate line in a large window, press the Delete key or backspace over the item, and click on the Save button.

Your clipboard functions are a convenient way to speed up entry. For example, to copy the same email list to multiple email-enabled SmartPAC2s, just left-click and drag your mouse over the entire email recipient list on one SmartPAC2, and paste (Control-V) it into the Email Setup Page on another SmartPAC2.

## **SmartView Ping Utility**

The Ping utility is an administrator's tool that is used to check whether a SmartPAC 2 is connected to the network and communicating properly. This utility is a good resource if you get a "No Connection" message after clicking on the *Submit Changes* button on the SmartView Setup Page (see *Setup Page*, step 10, page E-11).

To access the Ping Utility, click on the <u>Ping Utility</u> link on the Setup Page. The first time you access the Ping utility, you will be prompted to download the Mabry Internet Ping ActiveX Control and COM Object, as shown in Figure E-12. Click on the *Install* button in the Security Warning window to begin the download.

SmartVie Setup Help Ping Utility Email Setup In	to Center Setup Backup Restore Setup
	SmartView Setup
Network Name:	Press Name: Add
Denor, Deno Tress	*
	Internet Explorer - Security Warning
	Do you want to install this software?           Name: Eddary Internet Prior Active? Control and COM Object.           Publisher: Malary Softwares, Inc.           Where gations         Install
<u>«</u>	While files from the Internet can be useful, this file type can potentially harm your computer. Only install software from publishers you trust. <u>What's the inst?</u>
To delete an	entry, highlight it and press the Delete key.

Figure E-12. Mabry Internet Ping Window

To Ping your SmartPAC2 from SmartView, follow these steps:

- 1. Make sure your SmartPAC 2 is turned on and the network cable is plugged into the Ethernet connector (J122).
- 2. On the SmartView Setup Page, click on the <u>Ping Utility</u> link. The Ping Utility window, shown in Figure E-13, displays.

🗿 http://w	www.smartpac2.com - Ping Utility - Microso	ft Internet Explorer	. DX
Sr	nartViev	V	
	Ping U	tility	
	Local Name: wcg-pc-S		
	Net Name or IP Addr: Spac2-1234	15678 Ping	
		*	
	Clear	Jiet	
ම Doore		nter	net .

Figure E-13. Ping Utility Window

3. Click on the Net Name or IP Addr(ess) window, and enter the SmartPAC 2 serial number (i.e., SPAC2-nnnnnnn, where *nnnnnnn* is the serial number) if configured for DHCP or the IP address if configured for a Static IP address.

4. Click on the *Ping* button. A message indicating the success of the Ping is displayed in the large window below Net Name or IP Addr(ess) as shown in Figure E-14 and Figure E-15. Figure E-14 provides an example of a message indicating a successful Ping. Figure E-15 shows messages indicating two unsuccessful Ping attempts.



Figure E-14. Ping Utility Window with Example of a Successful Ping

) http://www	w.smartpac2.com - Ping Utility - Microsoft Internet Explore	r	- X
Sn	hartView		
	Ping Utility		
	Local Name: wcg-pc-8		
	Net Name or IP Addr: Spac2-12345678	Ping	
	Spac2-12345678 Host not found Spac2-12345678 The current connection has timed out		
		~	
	Clear List		
a Done		Internet	

Figure E-15. Ping Utility Window with Examples of Two Unsuccessful Pings

The "Host not found" message shown in Figure E-15 is typical of what you might see if the name or IP address entered on the target device is not present on the network. The message "The current connection has timed out" is typical of what you might find if the SmartPAC 2 is turned off or the physical network connection is faulty (e.g., the RJ45 connector is not plugged in or seated correctly or the Cat 5 cable between the SmartPAC 2 and the Hub is cut or defective).

You can determine the source of the problem more precisely by pinging the PC closest to the SmartPAC 2 on your LAN. If the Ping is successful, the problem is with the SmartPAC 2 rather than with the network.

If you continue to get results like those shown in Figure E-15, you may want to contact your IT department.

5. To clear the message(s) from the Ping Utility Window, click on the *Clear List* button.

# Appendix F. Upgrading from Original SmartPAC to SmartPAC 2

#### NOTICE

#### ADDING PM MONITOR

If you had an AutoSetPAC module on your original SmartPAC, and the new SmartPAC 2 includes Preventive Maintenance Monitor, you may need to upgrade your AutoSetPAC firmware. See notice on page C-1.

#### NOTICE

#### USING ALPHANUMERIC TOOL NUMBERS IN SMARTPAC 2

If you convert from an original SmartPAC, the tool number mode in your SmartPAC 2 will default to the Numeric mode. If you want to be able to use Alphanumeric mode in SmartPAC 2, you must first do the following in SmartPAC 1:

- 1. Check to see that each tool has a valid, unique name. This name will become the tool number if you switch to Alphanumeric mode.
- 2. If tools do not have names, enter Program mode and assign a unique name to each tool.
- 3. If two or more tools have been given the same name, reassign names so they are unique.

This appendix provides instructions in how to install a SmartPAC 2 in place of an original SmartPAC. It shows you how to

- Back up tools on the original SmartPAC (next section)
- Mount the new SmartPAC 2 (page F-3)
- Swap wiring from the original SmartPAC to the SmartPAC 2 (page F-4)
- Restore tool settings to the SmartPAC 2 (page F-12)
- Enter initialization settings into SmartPAC 2 and perform system checkout (page F-14)

## **Backing Up Tools on Original SmartPAC**

This section shows you how to back up tools on an original SmartPAC, using SBR (SmartPAC Backup and Restore), which you can order from Wintriss.

SBR enables you to transfer backed-up tool settings from your original SmartPAC to your new SmartPAC 2, using the hard drive of a connected computer or over a network. (For instructions in how to restore settings, see *Restoring Tools to SmartPAC 2*, page F-12.)

SmartPAC Initialization settings cannot be restored to SmartPAC 2. Initialization settings should be copied to a paper form (see the SmartPAC Initialization Setup Sheet at the back of the manual), then, after tool settings have been restored, entered manually one-by-one into SmartPAC 2, referring to the settings on the form.

If your tool database is small and programming isn't complicated, you may opt not to use a backup utility. It may be simpler to record SmartPAC 1 tool settings on a setup sheet, then enter the recorded settings into the SmartPAC 2.

#### Backing Up Tools to a Laptop

To use the SBR program to back up tools on your SmartPAC 1 to a connected laptop, refer to the "Using SBR to Upgrade from SmartPAC 1 to SmartPAC 2" section of the *SmartPAC Backup and Restore Instruction Sheet*, which is provided with the SBR software.

#### NOTICE

When setting up SmartPACs in SBR, make sure to identify the control you are backing up as a "SmartPAC 1" and the control you are restoring to as a "SmartPAC 2." With these settings, SBR will back up all tools and Initialization settings from the SmartPAC 1, then, when it detects that a SmartPAC 2 is connected, restore only the tool settings, ignoring the Initialization parameters.

#### Backing Up Tools to a Network Server

To back up tools on your SmartPAC 1 to a network server, perform the following steps:

- 1. With the Main Program Menu displayed on the SmartPAC 1 front panel, press the 1 and *CLEAR* keys at the same time and hold them down for a few seconds until the Main Initialization Menu displays.
- 2. Select the BACKUP/RESTORE menu item to display the Backup/Restore Control Menu (see Figure F-1).



Figure F-1. Backup/Restore Control Menu

3. Press the **F6** (Backup) function key to begin the backup process. While the backup is proceeding, the **Status** field on the SBR screen displays the message

Backing up...

When the backup is complete, the message in the Status field changes to

Connected

and the time at which the backup was completed displays in the Time of Last Backup field.

## **Removing SmartPAC 1 and Mounting SmartPAC 2**

- 1. Make sure that SmartPAC 1 is powered down.
- 2. Label all wires connected to the SmartPAC 1 board, noting their pin locations, to facilitate reconnecting them to SmartPAC 2. Also, make note of any ancillary wiring such as warning beacons, relays, etc.

#### NOTICE

One convenient way to easily remember pinouts and wire colors is to snip wires about 1/2 in. from their connectors, leaving a colored wire stub in each pin location. You should make sure you have enough wire before doing this.

#### CAUTION

#### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

- 3. Make a sketch showing how your wires and seal-tight cables enter your SmartPAC 1 enclosure.
- 4. Remove all wires and seal-tight from your SmartPAC 1.
- 5. Remove the DiProPAC and ProCamPAC boards from the SmartPAC 1 board if they are installed and are to be reused.
- 6. Remove the SmartPAC 1 from your press and place it in a safe location.
- 7. Determine how you will mount your new SmartPAC 2.

#### NOTICE

The SmartPAC 2 enclosure is 1 in. taller than SmartPAC 1. For a panel mount, the SmartPAC 2 cutout is the same size as for SmartPAC 1, but there must be at least a 1 in. clearance from the bottom of the panel to the nearest switch plate. See see Table 1-1. SmartPAC 2 with WPC 2000 Specifications, page 1-12.

If the SmartPAC 1 you are replacing is integrated with a WPC II and you are using a remote stroke select switch, you need a special 10-ft. wiring harness (P/N 4322701) to connect the Stroke Select switch on the WPC to your SmartPAC 2.

8. Mount your new SmartPAC 2.

If you are installing a SmartPAC 2 enclosure, the two upper or two lower shock mounts will have to be moved to accommodate the 1 in. increase in size. It may be a good idea to replace all four shock mounts if they look worn. Some customization may be required if a mounting bracket or pendant is used. In most cases, modifications are simple.

#### NOTICE

Be careful when mounting the SmartPAC 2 enclosure that the front door does not become dislodged from its hinges.

## Wiring the SmartPAC 2

#### NOTICE

If the SmartPAC 1 you are replacing is integrated with a WPC II and you are using a remote stroke select switch, you need a special 10-ft. wiring harness (P/N 4322701) to connect the Stroke Select switch on the WPC to your SmartPAC 2.

The wiring connections you need to make when you replace a SmartPAC with a SmartPAC 2 are shown in the tables starting on page F-6. These wiring tables cover the following SmartPAC components:

- Main power
- Zero cam
- Input check, emergency stop, and top stop
- Resolver port
- Position sensor (if used)
- DiProPAC
- ProCamPAC
- WPC port (integration only)
- Remote dual op. station select (optional remote switch)
- WPC adjustment lockout switch (optional)
- Remote reset (optional)
- AutoSetPAC/WaveFormPAC 2- or 4-channel (optional)
- SFI (optional)
- MultiPAC (special port optional)

Follow the instructions below to transfer the wiring from your old SmartPAC to SmartPAC 2.

- 1. Referring to the sketch you made in step 3 of the *Removing SmartPAC 1 and Mounting SmartPAC 2* procedure (page F-3), feed all wires into SmartPAC 2 knockout holes and secure all seal-tight connectors. See *AC Wiring on SmartPAC 2*, page F-12 for details on wiring the AC input and ground connections.
- 2. Check to make sure that the positions of jumpers JP101 (Master or Slave) and JP102 (high or low speed) and input check switch (S101) are the same as they were in SmartPAC 1. Refer to Figure 2-25, page 2-51 for jumper and switch locations.

#### CAUTION

#### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

- 3. Paying careful attention to orientation, reinstall and rewire the DiProPAC (connector J112 in Figure 2-25) and ProCamPAC (connector J111) boards you removed in step 5 of the *Removing SmartPAC 1 and Mounting SmartPAC 2* procedure (page F-3). Skip this step if you purchased SmartPAC 2 with ProCamPAC and DiProPAC already installed.
- 4. Referring to the appropriate wiring table (Table F-1 through Table F-16) and to the wiring diagram in Figure 1 at the back of the manual, terminate all wires at their appropriate pin locations. Re-cut and strip wires where necessary.
- 5. Make the appropriate wiring connections between DiProPAC and ProCamPAC boards, if installed (see step 3), and DSI 2 and the Cam Output assembly. See Figures 9, 10, and 11 at the back of the manual.
- 6. If you plan to network your SmartPAC 2, run Cat 5 cable with an RJ-45 connector into the enclosure.

#### NOTICE

The Cat 5 cable can share seal-tight conduit with a low-voltage line or it can be run separately. Do not run the Cat 5 cable with high-voltage wiring.

#### CAUTION

#### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

- 7. Check your work, making sure that all wiring is correct, terminal screws are tight and making an electrical connection, and all connectors and socketed ICs are seated.
- 8. Connect AC input wires and ground wire to SmartPAC 2 as shown in AC Wiring on SmartPAC 2, page F-12.

9. When you are confident that all wiring is correct, apply power and wait about a minute for SmartPAC 2 to boot up. Then Turn the Prog/Run key to PROG.

#### NOTICE

After SmartPAC 2 has booted up, you may see a message about the resolver position being different. Press RESET to clear the message.

	Original	SmartPAC	$\rightarrow$	Smar		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
L1	TB101	201	$\rightarrow$	AC Input L1 - High	201	
L2	TB101	202	$\rightarrow$	AC Input L2 - Neutral	202	
GND	TB101	203	$\rightarrow$	GND	Setscrew terminal or ground stud	

Table F-1.	SmartPAC 1	to SmartPAC 2	Wiring Changes.	Main Power
------------	------------	---------------	-----------------	------------

Table F-2. SmartPAC 1 to SmartPAC 2 Wiring Changes: Zero Cam

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
ZERO CAM	TB101	211	$\rightarrow$	TB107	248	

Table F-3. SmartPAC 1 to SmartPAC 2 Wiring Changes: Input Check, E-Stop, and Top Stop

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
A (Input Chk.)	TB101	205	$\rightarrow$	TB102	205	
B (Input Chk.)	TB101	206	$\rightarrow$	TB102	206	
E-STOP	TB101	207	$\rightarrow$	TB102	207	
E-STOP	TB101	208	$\rightarrow$	TB102	208	
T-STOP	TB101	209	$\rightarrow$	TB102	209	
T-STOP	TB101	210	$\rightarrow$	TB102	210	

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
SHIELD	TB106	212	$\rightarrow$	TB101	212	
S1	TB106	213	$\rightarrow$	TB101	213	
S2	TB106	214	$\rightarrow$	TB101	214	
R1	TB106	215	$\rightarrow$	TB101	215	
S3	TB106	216	$\rightarrow$	TB101	216	
R2	TB106	217	$\rightarrow$	TB101	217	
S4	TB106	218	$\rightarrow$	TB101	218	

Table F-5. SmartPAC 1 to SmartPAC 2 Wiring Changes: Position Sensor (If Used)

Original SmartPAC		$\rightarrow$	SmartPAC 2			
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
+V	TB107	245	$\rightarrow$	TB107	245	
POS	TB107	246	$\rightarrow$	TB107	246	
GND	TB107	247	$\rightarrow$	TB107	247	

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
SENSOR 1	TB501	282	$\rightarrow$	TB554	282	
SENSOR 2	TB501	283	$\rightarrow$	TB554	283	
SENSOR 3	TB501	284	$\rightarrow$	TB554	284	
SENSOR 4	TB501	285		TB554	285	
SENSOR 5	TB501	286		TB554	286	
SENSOR 6	TB501	287		TB554	287	
SENSOR 7	TB501	288		TB554	288	
SENSOR 8	TB501	289		TB554	289	
SEN. POWER	TB501	290		TB554	290	
GND	TB501	291		TB554	291	

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
SENSOR 1	TB551	282	$\rightarrow$	TB554	282	
SENSOR 2	TB551	283	$\rightarrow$	TB554	283	
SENSOR 3	TB551	284	$\rightarrow$	TB554	284	
SENSOR 4	TB551	285		TB554	285	
SENSOR 5	TB551	286		TB554	286	
SENSOR 6	TB551	287		TB554	287	
SENSOR 7	TB551	288		TB554	288	
SENSOR 8	TB551	289		TB554	289	
SENS. PWR.	TB551	290		TB554	290	
GND	TB551	291		TB554	291	
SENSOR 9	TB552	292		TB554	292	
SENSOR 10	TB552	293		TB554	293	
SENSOR 11	TB552	294		TB554	294	
SENSOR 12	TB552	295		TB554	295	
SENSOR 13	TB552	296		TB554	296	
SENSOR 14	TB552	297		TB554	297	
SENSOR 15	TB552	298		TB554	298	
SENSOR 16	TB552	299		TB554	299	
SENS. PWR.	TB552	300		TB554	300	
GND	TB552	301		TB554	301	

Table F-7. SmartPAC 1 to SmartP	C 2 Wiring Changes.	: DiProPAC, 16-Chann	el
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Table F-8. SmartPAC 1 to SmartPAC 2 Wiring Changes: ProCamPAC, 8-Channel

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
CHANNEL 1	TB401	260	$\rightarrow$	TB401	260	
CHANNEL 2	TB401	261	$\rightarrow$	TB401	261	
CHANNEL 3	TB401	262	$\rightarrow$	TB401	262	
CHANNEL 4	TB401	263		TB401	263	
CHANNEL 5	TB401	264		TB401	264	
CHANNEL 6	TB401	265		TB401	265	
CHANNEL 7	TB401	266		TB401	266	
CHANNEL 8	TB401	267		TB401	267	
+ 5 VDC	TB401	268		TB401	268	
GND	TB401	269		TB401	269	
RELAY PWR.	TB401	270		TB401	270	

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
CHANNEL 1	TB451	260	$\rightarrow$	TB451	260	
CHANNEL 2	TB451	261	$\rightarrow$	TB451	261	
CHANNEL 3	TB451	262	$\rightarrow$	TB451	262	
CHANNEL 4	TB451	263		TB451	263	
CHANNEL 5	TB451	264		TB451	264	
CHANNEL 6	TB451	265		TB451	265	
CHANNEL 7	TB451	266		TB451	266	
CHANNEL 8	TB451	267		TB451	267	
+ 5 VDC	TB451	268		TB451	268	
GND	TB451	269		TB451	269	
RELAY PWR.	TB451	270		TB451	270	
CHANNEL 9	TB452	271		TB452	271	
CHANNEL 10	TB452	272		TB452	272	
CHANNEL 11	TB452	273		TB452	273	
CHANNEL 12	TB452	274		TB452	274	
CHANNEL 13	TB452	275		TB452	275	
CHANNEL 14	TB452	276		TB452	276	
CHANNEL 15	TB452	277		TB452	277	
CHANNEL 16	TB452	278		TB452	278	
+ 5 VDC	TB452	279		TB452	279	
GND	TB452	280		TB452	280	
RELAY PWR.	TB452	281		TB452	281	

Table F-10. SmartPAC 1 to SmartPAC 2 Wiring Changes: WPC Port (Integration Only)

	Original SmartPAC			SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
	TR104	210		TR105	307	
	10104	219	$\rightarrow$	10105	521	
-RXD6	TB104	220	$\rightarrow$	TB105	328	
+TXD6	TB104	221	$\rightarrow$	TB105	329	
-TXD6	TB104	222	$\rightarrow$	TB105	330	
GND	TB104	223	$\rightarrow$	TB105	326	

Table F-11. SmartPAC 1 to SmartPAC 2 Wiring Changes: Remote Dual Op. Station Select(Optional Remote Switch)

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
OP STA 1	TB202	253	$\rightarrow$	TB107	254	
OP STA 2	TB202	254	$\rightarrow$	TB107	253	
GND	TB202	256	$\rightarrow$	TB107	250	

Table F-12. SmartPAC 1 to SmartPAC 2 Wiring Changes: WPC Adjustment Lockout Switch

(Optional)

	Original SmartPAC			SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
LOCKOUT	TB202	255	$\rightarrow$	TB107	251	
GND	TB202	256	$\rightarrow$	TB107	250	

Table F-13. SmartPAC 1 to SmartPAC 2 Wiring Changes: Remote Reset (Optional)

	Original SmartPAC			SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
REMOTE RES	TB203	257	$\rightarrow$	TB107	249	
GND	TB203	258	$\rightarrow$	TB107	250	

Table F-14. SmartPAC 1 to SmartPAC 2 Wiring Changes: AutoSetPAC/WaveFormPAC,

2 or 4 Channel (Integration Only)

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
GND	TB102	240	$\rightarrow$	TB103	240	
+RXD2	TB102	241	$\rightarrow$	TB103	241	
-RXD2	TB102	242	$\rightarrow$	TB103	242	
+TXD2	TB102	243	$\rightarrow$	TB103	243	
-TXD2	TB102	244	$\rightarrow$	TB103	244	
	Original SmartPAC		$\rightarrow$	Smar	SmartPAC 2	
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Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
+RXD1	TB102	235	$\rightarrow$	TB103	235	
-RXD1	TB102	236	$\rightarrow$	TB103	236	
TXD1	TB102	237	$\rightarrow$	TB103	237	
+TXD1	TB102	238	$\rightarrow$	TB103	238	
-TXD1	TB102	239	$\rightarrow$	TB103	239	
GND	TB102	240	$\rightarrow$	TB103	240	

Table F-15. SmartPAC 1 to SmartPAC 2 Wiring Changes: SFI (Optional)

Table F-16. SmartPAC 1 to SmartPAC 2 Wiring Changes: MultiPAC (Special Port - Optional)

	Original SmartPAC		$\rightarrow$	SmartPAC 2		
Signal Type	Connector	Pin Number		Connector	Pin Number	Done (√)
+RXD3	TB103	224	$\rightarrow$	TB104	224	
-RXD3	TB103	225	$\rightarrow$	TB104	225	
TXD3	TB103	226	$\rightarrow$	TB104	226	
+TXD3	TB103	227	$\rightarrow$	TB104	227	
-TXD3	TB103	228	$\rightarrow$	TB104	228	
GND	TB103	229	$\rightarrow$	TB104	229	

# AC Wiring on SmartPAC 2

Connect the AC input wires and ground wire as shown in Figure F-2.



Figure F-2. SmartPAC 2 AC Wiring (Inside Enclosure, Top Right)

Make your ground connection as follows:

- <u>For SmartPAC 2 enclosure</u>: Connect your ground (green or green/yellow) wire to the set screw terminal on the inside of the enclosure, as shown in Figure F-2. Strip the ground wire about 1/4 in. (6.4 mm) from the end, loosen the screw on the terminal, slide the wire in the hole, and tighten the screw to secure the wire in place.
- <u>For SmartPAC 2 panel mount:</u> Connect the ground wire to the ground stud located on the face plate below the AC input terminal block.

# **Restoring Tools to SmartPAC 2**

You can use SBR to restore backed-up tools from a SmartPAC 1 to a SmartPAC 2 via a connected laptop, or, if the SmartPAC 2 is on a network, you can restore tool settings from a network server. However, you cannot restore SmartPAC 1 Initialization settings to SmartPAC 2. To transfer this information to SmartPAC 2, you should copy Initialization settings to a paper form before performing the back-up, then, after restoring the other setup information, enter the Initialization settings from the form manually into SmartPAC 2 (see *System Checkout*, page F-14).

### Restoring Tools from a Laptop

To use the SBR program to restore backed-up tools via a connected laptop, refer to the "Using SBR to Upgrade from SmartPAC 1 to SmartPAC 2" section of the *SmartPAC Backup and Restore Instruction Sheet*, which is provided with the SBR software.

## NOTICE

Make sure to identify the control you are restoring to as a "SmartPAC 2." When SBR detects that a SmartPAC 2 is connected, it will restore only the backed-up tool settings, ignoring the Initialization parameters.

#### **Restoring Tools from a Network Server**

To restore backed-up tools from a network server, perform the following steps:

1. On the Backup/Restore Control Menu in Initialization mode on the SmartPAC 2, press the **F5** (Restore) function key. The message shown in Figure F-3 displays.



Figure F-3. Backup/Restore Control Menu with Restore Confirmation Message Displayed

 Press ENTER to continue with the restore. When the restore has been completed, the following message displays on the Backup/Restore Control Menu: *Restore complete!*

# System Checkout

To enter SmartPAC 1 initialization settings into SmartPAC 2 and test SmartPAC 2 operation, do the following:

- 1. In SmartPAC 2, access the Main Initialization Menu.
- 2. Referring to the initialization information you recorded for the SmartPAC 1 control (see *Backing Up Tools on Original SmartPAC*, page F-1), enter these initialization settings into SmartPAC 2.
- 3. When you have finished entering initialization information, check to make sure that the following parameters are set correctly, making changes if necessary:
  - Position Sensor: Resolver Motion Mode should be set to Normal Motion unless you are using a link motion press
  - Position Sensor: Tool Number Mode should be set to Numeric Only
  - Setup Network: If SmartPAC 2 is going to be networked, see page E-1 for detailed instructions on how to enter network settings.
  - Diagnostics: Set Clock is set to Clock at the factory. Make sure that the date and time are correct. If they aren't, make corrections.
- 4. Access the Main Program Menu, and select GO TO THE TOOL MANAGER.
- 5. When the Tool Manager screen displays, make sure that all tools that were programmed in SmartPAC 1 are shown.

# NOTICE

Tool Manager is a new screen that allows you to edit, load, delete, create, and copy tools. See page 5-2 in this manual for instructions on how to program the Tool Manager.

# NOTICE

Before loading a tool and setting up a new job, it is a good idea to create a test tool with a tool number that is not currently being used. The test tool can be deleted when checkout is complete.

- 6. Load a test tool, following the instructions in *Creating a New Tool*, page 5-3.
- 7. Turn the Program/Run key to RUN.
- 8. Go through the menu choices to make sure your new SmartPAC 2 is functioning properly. Consult you manual for information on how to use new features that you are not familiar with. You should also run the press without the tool in place. Make sure that all ancillary equipment such as conveyors, feeds and cams are functioning properly.
- 9. Once you are satisfied that your SmartPAC 2 is operating identically to your SmartPAC 1, you can load the tool for the next job, set up the die, and run the press.

# Appendix G. Replacing SmartPAC 2 PC Board

The following procedures show you how to unpack and install a replacement SmartPAC 2 PC board that you have received through the Wintriss Board Exchange (EX) program.

## NOTICE

Under the board exchange program, a replacement board can usually be shipped to you overnight if you contact Wintriss Tech. Support the previous business day. Full details about the program are available by calling Wintriss Tech. Support.

# **Unpacking the Replacement Board**

Perform the following steps as soon as you receive your replacement SmartPAC 2 PC board:

## CAUTION

#### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

1. Making sure you are grounded, carefully unpack the replacement PC board and remove it from its anti-static bag.

## NOTICE

Be sure to save the shipping box in case you need to return the replacement board.

- 2. Verify that the board has not been damaged during shipment. If damage has occurred, contact Wintriss Tech. Support immediately.
- 3. If your replacement board was shipped with a Boot Loader chip (component U124 in Figure G-1, page G-3), verify that the serial number located on its label matches the serial number on the Boot Loader chip on the board being replaced.

## NOTICE

The label on the top-mounting flange of the SmartPAC 2 enclosure also shows the serial number.

4. Put the PC board back in its anti-static bag until you are ready to install it.

# Installing the Replacement Board

To remove the old SmartPAC 2 PC board and install the new replacement board, perform the following steps:

# A WARNING

#### ELECTRIC SHOCK HAZARD

- Ensure that the power source is off before you replace electronic components in a control.
- Disconnect power from the machinery it is connected to before replacing electronic components. This includes disconnecting power to the machine control and motor.
- Ensure that servicing is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

- 1. Shut off power to the SmartPAC 2.
- 2. Open the SmartPAC 2 enclosure or console.

## CAUTION

### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

3. Making sure you are grounded, unplug all wired connectors from the SmartPAC 2 PC board (see Figure G-1, page G-3), including connectors on the ProCamPAC and DiProPAC boards (if installed).

# NOTICE

Connectors are labeled "TBnnn" or "Jnnn" in Figure G-1, where *nnn* is a three-digit numeric identifier.

To remove the small display connector J115, grasp the connector firmly between your index finger and thumb and wiggle it gently back and forth in an upward direction. Do not pull on the wires attached to the connector.

4. Remove the DiProPAC and ProCamPAC PC boards, if installed, and set them aside in a safe location.

# NOTICE

Do not remove the SOM (Industrial Computer) circuit board (see Figure G-1).

5. With a <sup>1</sup>/<sub>4</sub>-in. nut driver, remove all six <sup>1</sup>/<sub>4</sub>-in. nuts and six of the eight <sup>1</sup>/<sub>4</sub>-in. standoffs (see Figure G-1). **Do not** remove the upper right standoff for the ProCamPAC PC board or the lower left standoff for the DiProPAC PC board.



Figure G-1. SmartPAC 2 PC Board

- 6. Using both hands, carefully lift the PC board out of the enclosure, or from the mounting plate if your unit is a panel mount.
- 7. Tag or label the board in a conspicuous place to identify it.
- 8. Place the old board you have just removed and the new replacement board side by side on a clean, flat, dry surface.
- 9. Carefully eject and remove the compact flash card from the old board and insert it into the replacement board in the same location (see Figure G-1).

## NOTICE

To eject the compact flash card, push the lever on the bottom of the compact flash receptacle all the way to the left.

To reinstall the compact flash card, insert the card into the flash receptacle with the INSERT arrow on the label pointing toward the receptacle, and carefully push the card into the receptacle until you hear it click into place.

10. Remove the Battery Backed Up Ram chip (U105 in Figure G-1) from the original board and install it in the replacement board. This chip holds all your tool data.

## NOTICE

To remove the Battery Backed Up Ram chip:

- 1. Place a small, flat-blade screwdriver between the Boot Loader Chip (U124 in Figure G-1) and the bottom of the Battery Backed Up Ram chip. *Make sure the screwdriver is in contact with the chip itself and not with the chip socket.*
- 2. Using the Boot Loader Chip as a fulcrum, gently pry up the Battery Backed Up Ram chip with the screwdriver until the chip begins to move. Then, grasping the chip firmly at both ends, pull it upward until it comes free. Be careful not to bend the legs of the chip.

## NOTICE

Before replacing the Battery Backed Up Ram chip:

- 1. Make sure to inspect the legs of the chip. If any are bent, carefully straighten them, using small needle nose pliers.
- 2. Line up the chip with the socket, making sure the notch or identification dot on the top of the chip is aligned with the notch or identification dot on the socket. Then push the chip in evenly until it is fully seated.
- 11. If your replacement board was shipped without a Boot Loader chip (U124 in Figure G-1), you must remove the Boot Loader chip from your old board and insert it into the replacement board.

## NOTICE

Use a flat blade screwdriver or an IC puller to remove the Boot Loader chip. Make sure that the notch on the chip lines up with the notch on the socket.

- 12. Make sure that the Input Check switch (S101 in Figure G-1) and the Master/Slave and High/Low speed jumpers (J101 and J102 in Figure G-1) are in the same position on the replacement board as they are on the old board.
- 13. Install the replacement board in the enclosure, or on the mounting plate if your unit is a panel mount, reusing the nuts and standoffs you removed in step 5 and tightening them down with the <sup>1</sup>/<sub>4</sub>-in. nut driver. Refer to Figure G-1 for correct placement of nuts and standoffs.
- 14. Reinstall the ProCamPAC and DiProPAC PC boards, if necessary, in their proper locations on the SmartPAC 2 board.
- 15. Plug all the connectors you removed in step 3 back into the SmartPAC 2 board, including connectors on the ProCamPAC and DiProPAC boards (if installed). Make sure to insert the display connector (J115 in Figure G-1) into the SmartPAC 2 board with the correct orientation.
- 16. Double-check to make that sure all connectors are plugged into the correct slots.

- 17. Close the door of the SmartPAC 2 enclosure or console.
- 18. On the SmartPAC 2 display, press and hold down the **F1** function key while powering up the SmartPAC 2, releasing **F1** when the red Wintriss SmartPAC 2 screen displays. After about a minute the FIRMWARE LOAD MENU (see Figure G-2) will appear.



Figure G-2. Firmware Load Menu with "RELOAD CURRENT FIRMWARE" Highlighted

- 19. Select "RELOAD CURRENT FIRMWARE" (if this menu choice does not appear, call Wintriss Tech. Support), and press ENTER.
- 20. Follow the on-screen instructions for loading new firmware. This process will take approximately 4 to 5 minutes.
- 21. When the reload process has been completed, you are ready to resume normal operation.

## NOTICE

Before setting up and running a job, it is a good idea to test a few SmartPAC 2 modes and menus to make sure the unit is operating normally. If you have swapped the Battery Backed Up Ram chip in step 10, go into the Tool Manager (enter from the Main Program Menu) and verify that all your tools have been restored. If you experience any problems, call Wintriss Tech. Support.

22. Place the malfunctioning board in the anti-static bag in which you received the replacement board.

Place the anti-static bag with the old board in the box in which you received the replacement board, and ship it back to Wintriss, using the shipping label with the Return Authorization (RA) number. Contact Wintriss Tech. Support if you have additional questions.

# Appendix H. Reporting Downtime and Scrap to SFC

This appendix shows you how to report press downtime from your SmartPAC 2 control to Wintriss's ShopFloorConnect Asset Utilization Software (SFC). The appendix discusses the six machine states to which SFC logs press time, explains the downtime reporting features of SmartPAC 2, shows you how to set up SmartPAC 2 to report downtime to SFC, and provides instructions for reporting downtime.

The appendix also shows you how to use the scrap counter on the SmartPAC 2 Counters screen in Run mode to report scrap to SFC and how to adjust the Good Parts count that is reported to SFC.

SmartPAC's downtime- and scrap-reporting features are available only on SmartPAC 2 versions 4.59 or higher; in addition, the SFC firmware option must be installed.

# **Machine States to Which SFC Logs Press Time**

SFC logs all elapsed time at each press to one of six categories called machine states. The sum of all the times assigned to these machine states for an individual press is the number of hours in a production day (e.g., 12 hours, 24 hours, etc.). SFC selects the machine state to which to log press time on the basis of downtime reporting and other information it receives from SmartPAC 2. Machine states are differentiated as follows:

- Running Time-Press is running and making parts
- Idle Time–Press is stopped, no SmartPAC error has occurred, and the reason the press is stopped has not been documented in SmartPAC 2
- Unplanned Downtime–Press is stopped due to a SmartPAC 2 error, or if the press is stopped for another reason, that reason has been assigned to the Unplanned Downtime state in SFC
- Planned Downtime–Press is stopped, and the reason has been assigned to the Planned Downtime state in SFC
- Changeover Time–Press is stopped, and the reason has been assigned to the Changeover state in SFC
- Offline Time–Press is stopped because there is no power to the press or the network is down

All time during which the press is stopped for any reason other than a power interruption or network failure is logged by SFC to Idle Time unless a downtime reason is reported from the SmartPAC 2. Idle Time is treated in ShopFloorConnect as downtime with no documented reason. Since corrective action cannot be taken until a cause is identified, SmartPAC 2 has been designed to allow very precise reporting of downtime to SFC and may be programmed to require the operator to select a specific downtime reason each time the press enters an Idle state. When operator intervention is required, periods of press inactivity are more likely to be assigned to a specific downtime reason than to be logged as Idle Time.

# **SmartPAC 2 Downtime Reporting Features**

Downtime reasons in SmartPAC 2 may be reported to SFC either automatically by the system or manually by the operator. When the press is stopped because of an error generated by SmartPAC 2 or an installed SmartPAC 2 module, the specific fault (e.g., "Sensor 1 Part Ejection Missed") is reported automatically as a downtime reason to SFC.

When the press is stopped by the operator or by a piece of auxiliary equipment not connected to the SmartPAC 2, a downtime reason must be reported manually by the operator since SmartPAC 2 is unable to detect the reason for the interruption (see *Forced Idle Dialog Mode*, below). Downtime reasons may also be assigned manually to provide additional detail for periods documented automatically with specific error conditions (see *Forced Error Dialog Mode*, page H-4).

## Forced Idle Dialog Mode

If the SmartPAC 2 is set to Forced Idle Dialog mode (see *Making Downtime Reporting Settings*, page H-7), a downtime reason must be entered whenever the press is stopped by the operator or by auxiliary equipment. When the press stops (see Figure H-1, page H-3 for a schematic time line), a message displays at the SmartPAC 2 stating that the operator must enter a downtime reason before the press can be restarted. When the operator closes the message window, the Dialog Menu automatically displays. The Dialog Menu, a selection on the SmartPAC 2 Main Run Menu, displays a list of downtime reasons from which the operator must select to report downtime to SFC. Refer to *Programming Downtime Reasons*, page H-12 for instructions on how to set up the Dialog Menu.

The Forced Dialog message can be programmed to display a specified number of minutes after the press stops (see Figure H-1). This Idle Dialog Time setting enables the press to be stopped briefly without requiring entry of a downtime reason.

# Backfilling vs. Forward Filling

SFC initially logs the time after the press is stopped by the operator or by auxiliary equipment to Idle Time. When the operator selects an item on the Dialog Menu, the period of time previously documented as Idle is assigned that downtime reason. Downtime can be assigned manually or automatically, depending on how your SmartPAC 2 is programmed (see *Making Downtime Reporting Settings*, page H-7).

If SmartPAC 2 is set up for manual downtime reporting, the operator selects how the downtime is to be assigned in an option window that displays following selection of the downtime reason (see Figure H-11, page H-18). One option, which is called "backfilling," is to assign the downtime reason to all time that has elapsed since the press was stopped (see Figure H-1). The other option is to "forward fill" the downtime reason, assigning it to the period from reporting of the downtime reason until the press is restarted (see Figure H-2, page H-4). When this option is selected, all elapsed time before entry of the downtime reason is assigned to the previous downtime reason, if one was reported, or to Idle Time.

If SmartPAC 2 is set up for automatic downtime reporting, the option window does not display following selection of the downtime reason, and downtime is automatically backfilled.

## Putting the Press "Back on Line"

A period of Idle Time or Planned or Unplanned downtime comes to an end either a programmed number of strokes after the operator restarts the press (see *Reset Strokes Counters*, page H-6) or when he selects "Back on Line" from the Dialog Menu. If the press is restarted at the same time as "Back on Line" is selected, SFC begins documenting the machine state as "Running time" (see Figure H-1). When the operator selects "Back on Line" without restarting the press, the subsequent period until the press is restarted is logged to Idle Time (see Figure H-2).



Figure H-1. Forced Idle Dialog Mode Time Line (Downtime Reason Backfilled)



Figure H-2. Forced Idle Dialog Mode Time Line (Downtime Reason Forward Filled)

## Forced Error Dialog Mode

The Dialog Menu can also be programmed to display whenever the press is stopped due to a SmartPAC 2-generated fault. This feature, called Forced Error Dialog mode (see *Making Downtime Reporting Settings*, page H-7), allows the operator to add detail to a period of downtime that is initially logged to a specific SmartPAC 2 error but may actually have a different cause.

For example, SmartPAC 2 may be set up to generate an "End of Stock" error whenever the press runs out of material. This downtime reason is applied to the period of time during which a new coil is located and brought to the press unless the operator selects a more appropriate downtime reason, such as "Waiting for Coil," and, using the backfill option (see *Backfilling vs. Forward Filling*, page H-2), applies it to the incompletely documented period. When the

downtime reason is backfilled (see Figure H-3 for a schematic time line), SmartPAC logs one second to the initial error (e.g., "Sensor 5–End of Stock"), assuring that the fault is documented, and the remaining time to the new downtime reason (e.g., "Waiting for Coil").



Figure H-3. Forced Error Dialog Mode Time Line

Downtime reasons can also be "forward filled" in Forced Error Dialog mode.

As in Forced Idle Dialog mode, the Forced Dialog message can be programmed to display a specified number of minutes after the press stops (see Figure H-3). This Error Dialog Time setting prevents nuisance faults such as "Counter preset reached" from being reported as downtime.

# Persist Dialog Mode

Periods during which the press is powered down are normally documented as Offline Time and the period following the next power-up assigned to Idle Time. Periods subsequent to machine power-ups are documented as Idle Time even when the period immediately preceding the shutdown has been assigned to an Unplanned Downtime reason. The only machine states that carry over from the period immediately preceding a shutdown to the period immediately succeeding a power-up are Changeover Time and Planned Downtime. In these cases, the period during which the press is offline and the time immediately following press power-up are assigned to the machine state in effect when the press was powered down.

SmartPAC 2 can be programmed so that Unplanned Downtime reasons selected from the Dialog Menu also "persist" through press shutdowns (see *Making Downtime Reporting Settings*, page H-7). When this setting is enabled, both the interval during which the press was powered down and the time following resumption of power to the press are assigned to the downtime reason in effect when the press was shut down. One second of the period during which the press was offline is assigned to Offline Time to document this event.

# Single-stroke Mode

For hand-fed applications, a special setting can be programmed at the SmartPAC 2 (see *Making Downtime Reporting Settings*, page H-7) that allows the state of the press to be continuously reported as "Running" as long as the operator maintains a pre-determined cycle time. Normally, Single-stroke operation produces an alternating series of "Running" and "Idle" events as the press cycles and then stops to allow the operator to remove one part and load another. Since the state of the press is reported as "Running" only a fraction of the time even when the operator is maintaining an acceptable production rate, this data stream does not accurately reflect press productivity, skewing OEE ratings unfairly downward.

When you make this cycle time setting, SmartPAC 2 no longer looks for a change of state to determine whether the press is running but rather expects to see the press stroke at least once during the pre-programmed interval. If a stroke is detected, the press is reported as "Running"; if not, the press is considered to be stopped and reported as "Idle."

# **Reset Strokes Counters**

Normally, a period of Idle Time, Planned or Unplanned Downtime, or Changeover Time is ended when the operator selects "Back on Line" from the Dialog Menu and restarts the press (see *Putting the Press "Back on Line*," page H-3). However, since the operator may forget to select the "Back on Line" item, an alternative way of terminating a period of downtime is available.

SmartPAC 2 can be programmed to begin logging time following a downtime period to Running Time after a specified number of press strokes. A Reset Strokes counter (see *Making Downtime Reporting Settings*, page H-7) begins incrementing when the press is restarted, and after the counter reaches its preset, SFC changes the machine state to which it logs press time from the downtime reason to Running Time. Three different Reset Strokes counters can be programmed, allowing you to set different restart intervals following periods of Planned Downtime, Unplanned Downtime, and Changeover time.

# Setting up SmartPAC 2 to Report Downtime

To set up SmartPAC 2 to report downtime to SFC, you make downtime reporting settings on the Set Communications Menu. You program downtime reasons in one of two ways, depending on the setting you select in the DIALOG SCREEN MODE field on the Set Communications Menu (see Table H-1, page H-10).

When the default setting "16 / 16" is selected, you create downtime reasons on the Dialog Special Choice Name and Dialog Fixed Name Choice menus, which you access via the SET SPECIAL NAMES and SET CANNED NAMES items on the Set Communications Menu.

When you select the DIALOG SCREEN MODE setting of "32 CUSTOM," you create downtime reasons in SFC and download them to the SmartPAC 2. The SET SPECIAL NAMES and SET CANNED NAMES items do not display when the "32 CUSTOM" option is selected.

## NOTICE

Wintriss recommends that you select the "32 CUSTOM" setting if your shop floor uses only SmartPAC 2 controls. The "16 / 16" setting should be selected only if you have a mix of SmartPAC 2s and SmartPAC 1s and want to maintain consistency in your downtime reporting method.

The "32 CUSTOM" setting provides two advantages. All downtime reasons can be customized to meet the specific needs of your shop floor setup (up to 32 custom names can be created in SFC Administrator), and you can include all reasons in the Downtime by Reason report, which allows you to track occurrences of a specific downtime reason across multiple machines.

With the "16 / 16" setting you can create only 16 custom reasons (the other 16 are "canned"), and only the custom reasons can be included in the Downtime by Reason report. The report cannot be generated for "canned" reasons.

## Making Downtime Reporting Settings

To enable and configure the SmartPAC 2 downtime reporting features described in the previous section, perform the following steps:

1. At the SmartPAC 2, turn the Program/Run key to "PROG," then press the "1" and "CLEAR" keys simultaneously for a second or two until the Main Initialization Menu (see Figure H-4, page H-8) displays.

MAIN INITI	ALIZATION MENU	
USE THE CURSOR KEYS TO CHOOSE MENU ITEMS. PRESS THE ENTER KEY TO SELECT. SWITCH TO RUN WHEN DONE.	RESOLVER ZERO POSITION SENSOR INSTALLED OPTIONS PRESS NAME SELECT CAM NAMES AUTO ADVANCE SET GLOBAL CAMS CUSTOM SENSOR NAMES SENSOR ENABLE MODE FEED CONTROL PM MONITOR TOOL INFORMATION PRESS CONTROL SECURITY ACCESS BACKUP/RESTORE SETUP DATA COMMS SETUP NETWORK LUBE/SPEED/FLYWBRAKE DIAGNOSTICS	

Figure H-4. SmartPAC 2 Main Initialization Menu

2. Highlight the "SETUP DATA COMMS" menu item, using the Up (▲) or Down (▼) cursor key, and press ENTER. The Set Communications Menu (see Figure H-5) displays:

gen ingen state	
SET COMMUNICATIONS MENU	
RSR/SBR CPU NUMBER = 1	
IDLE DIALOG = ENABLED IDLE DIALOG TIME = 5 MINS.	
FORCED ERROR DIALOG = ENABLED	
ERROR DIALOG TIME = 5 MINS. DEPSIST DIALOG - ENABLED	
AUTO BACKFILL = DISABLED	
DIALOG SCREEN MODE = 16 / 16	
UNPLANNED RESET STROKES = 15	
PLANNED RESET STROKES = 5	
CHANGEOVER RESET STROKES = 50	
SINGLE STROKE MODE = DISABLED	
IDLE TIMER $=$ 5 SEC.	
SET SPECIAL NAMES	
SET CANNED NAMES	
USE THE CURSOR KEYS TO CHOOSE THE ITEM	
YOU WISH TO CHANGE. PRESS THE ENTER KEY	
DOWNTIME RESET WHEN DONE.	

Figure H-5. Set Communications Menu

## NOTICE

Wintriss recommends that you take advantage of the additional features provided by the "32 Custom" dialog screen mode setting. The "16 / 16" setting should be selected only when you have both SmartPAC 1s and SmartPAC 2s and, even then, only if complete consistency is required.

- 3. Highlight each menu item you want to set, using the Up (▲) or Down (▼) cursor key, then do the following:
  - To enable or disable a feature, press ENTER until the desired setting is displayed.
  - To specify a value for an item (with the exception of IDLE TIMER), press ENTER to display the Numeric Entry window, key in your entry with the SmartPAC 2 keypad, and press ENTER again.
  - To select an option for DIALOG SCREEN MODE, press ENTER until the desired setting is displayed. When DIALOG SCREEN MODE is set to "16 / 16," the SET SPECIAL NAMES and SET CANNED NAMES items display at the bottom of the menu. When the setting is "32 CUSTOM," these items do not appear.
  - To select a value for IDLE TIMER, press ENTER until the desired value is displayed.
  - To display screens on which you can program Dialog Menu entries (the DIALOG SCREEN MODE setting must be "16 / 16"), press ENTER with the cursor resting in the SET SPECIAL NAMES or SET CANNED NAMES field.

To program downtime reasons when DIALOG SCREEN MODE is set to "32 CUSTOM," you use ShopFloorConnect Administrator.

Table H-1 explains each field on the Set Communications Menu and provides instructions on how to make settings.

Field	Settings		
RSR/SBR CPU NUMBER	When SmartPAC 2 is connected to SFC, this field must be set to "1." Other CPU Number values may be used when SmartPAC 2 is connected to certain legacy software products that require each SmartPAC 2 to be assigned a unique identifier.		
FORCED IDLE DIALOG	Indicates whether SmartPAC 2 displays the Forced Dialog message and Dialog Menu after the press has been stopped by the operator or by auxiliary equipment not connected to SmartPAC 2. The number of minutes after the press has stopped before the Forced Dialog message appears is specified in the IDLE DIALOG TIME field (see next entry). At the appearance of the Forced Dialog message, the operator must select a downtime reason on the Dialog Menu in order to restart the press. This setting allows time that elapses after the press is stopped by the operator or by equipment not connected to SmartPAC 2 to be documented with a downtime reason rather than as Idle Time. There are two settings:		
	ENABLED Forced Idle Dialog mode enabled DISABLED Forced Idle Dialog mode disabled		
IDLE DIALOG TIME	Specifies the number of minutes (1-60) after the press has stopped in Forced Idle Dialog mode before the Forced Dialog message displays. This setting allows you to prevent Forced Idle Dialog from being triggered by brief stops. Suggested initial value: 5 minutes.		

Table H-1. Set Communications Menu Settings

Field	Settings
FORCED ERROR DIALOG	Indicates whether SmartPAC 2 displays the Forced Dialog message and Dialog Menu after the press has been stopped by a SmartPAC 2 fault. The number of minutes after the press has stopped before the Forced Dialog message appears is specified in the ERROR DIALOG TIME field (see next entry). At the appearance of the Forced Dialog message, the operator must select a downtime reason on the Dialog Menu in order to restart the press. This setting allows time that elapses after the press is stopped due to a SmartPAC 2 fault to be assigned a different downtime reason. There are two settings:
	ENABLEDForced Error Dialog mode enabledDISABLEDForced Error Dialog mode disabled
ERROR DIALOG TIME	Specifies the number of minutes (1-60) after the press has stopped in Forced Error Dialog mode before the Forced Dialog message displays. This setting allows you to prevent reporting of SmartPAC 2 nuisance faults such as "Counter preset reached." Suggested initial value: 5 minutes.
PERSIST DIALOG	Indicates whether an Unplanned Downtime reason from the Dialog Menu that is assigned before a press shutdown continues to be applied to the period during which the press is down and to the time after the press is powered up again. Normally, the interval during a press shutdown is assigned to "Offline Time" and the period after the press is powered up to "Idle Time." There are two settings:
	ENABLED Persist Dialog mode enabled DISABLED Persist Dialog mode disabled
AUTO BACKFILL	Indicates whether time occurring after the press has been stopped up to the point when the operator selects a downtime reason is automatically documented with that reason. When this item is disabled, the operator is given the option of backfilling or forward filling downtime following selection of a downtime reason. When this item is enabled, the downtime reason selected by the operator is automatically backfilled. There are two settings:
	ENABLED Auto Backfill enabled DISABLED Auto Backfill disabled
DIALOG SCREEN MODE	Indicates whether downtime reasons are created on the screens accessible from the SET SPECIAL NAMES and SET CANNED NAMES menu items (see below) or in ShopFloorConnect Administrator. There are two settings:
	16 / 16Downtime reasons are created in SmartPAC32 CUSTOMDowntime reasons are created in SFC
	When the "16 / 16" setting is selected, you can create only 16 custom downtime reasons, and only those reasons can be included in the Downtime by Reason Report. The "32 CUSTOM" setting enables you to create up to 32 custom reasons, all of which can appear in the Downtime by Reason Report. When the "32 CUSTOM" setting is selected, the SET SPECIAL NAMES and SET CANNED NAMES items do not display.

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Field	Settings		
UNPLANNED RESET STROKES	Specifies the number of strokes that must occur after the press is restarted following a period of Unplanned Downtime,		
PLANNED RESET STROKES	Planned Downtime, or Changeover Time before SFC begins documenting the machine state as "Running Time." This setting prevents additional press time from being attributed to		
CHANGEOVER RESET STROKES	a downtime reason when the operator forgets to select the "BACK ON LINE" item from the Dialog Menu. The number of strokes you specify should be the maximum number of press cycles that are likely to be needed to return the press to production. Valid entries: 1-9999. Suggested settings:		
	Set the Unplanned Reset Strokes counter to two strokes more than the maximum number of strokes required to fill an empty die. This setting should give the operator sufficient time to complete a response to the downtime cause (such as Coil Change) that requires the longest time to address. Set the Planned Reset Strokes counter to the lowest number of strokes required to return the press to production following a lunch or other break.		
	number of strokes required to complete a die setup.		
SINGLE STROKE MODE	This setting, which is used for hand-fed applications when the press is being run in Single-stroke mode, indicates whether SFC counts press cycles (or parts made) within the period specified in the IDLE TIMER field (see next entry) to determine whether the press is "running." When this field is set to "ENABLED," SFC only documents the press as "Idle" when no cycles occur (i.e., no parts are made) during an Idle Timer period. There are two settings:		
	ENABLED Single-stroke Mode enabled DISABLED Single-stroke Mode disabled		
IDLE TIMER	Specifies the number of seconds during which SmartPAC 2 counts the number of press strokes in Single-stroke mode to determine a production rate for hand-fed applications. This value should be twice the cycle time for the slowest hand-fed job run on a press. For example, if the slowest job produces an average of 6 parts per minute, the Idle Timer should be set to 20 seconds (6 parts per minute = 10-second cycle time; $2 \times 10$ seconds = 20 seconds). Available selections: 5, 10, 15, 20, 30, and 60.		

Table H-1. Set Communications Menu Settings (Cont.)

Field	Settings
SET SPECIAL NAMES	Displays the Dialog Special Choice Name Menu, on which you can create up to 16 custom downtime reasons for display on the Dialog Menu and specify the order in which they will appear (see <i>Creating Special Names on the Dialog Special Choice Name Menu</i> , page H-14). This item does not display when the setting for DIALOG SCREEN MODE is "32 CUSTOM."
SET CANNED NAMES	Displays the Dialog Fixed Name Choice Menu, on which you can select up to 14 pre-programmed, or "canned," downtime reasons for display on the Dialog Menu and specify the order in which they will appear (see <i>Selecting Canned Names on the Dialog Fixed Name Choice Menu</i> , page H-13). This item does not display when the setting for DIALOG SCREEN MODE is "32 CUSTOM."

Table H-1. Set 0	Communications	Menu	Settings	(Cont.)
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## **Programming Downtime Reasons**

If the DIALOG SCREEN MODE item on the Set Communications Menu has been set to "16 / 16," the default, the SET SPECIAL NAMES and SET CANNED NAMES items are displayed on the menu, allowing you to specify the downtime reasons that appear on the Dialog Menu and the order in which they are presented. The items you program on these two menus will be the menu selections available to the operator when the Dialog Menu displays in Forced Idle Dialog or Forced Error Dialog mode, or when the operator accesses the menu at other times.

If the DIALOG SCREEN MODE setting is "32 CUSTOM," the SET SPECIAL NAMES and SET CANNED NAMES items do not display, and you create downtime reasons in SFC.

"Canned" names are downtime reasons whose text has been pre-programmed into the SmartPAC 2. "Special" names are downtime reasons whose text you assign. You can select up to 14 "canned" names and create up to 16 "special" names. The Dialog Menu can include both "canned" and "special" entries, displaying up to 30 items.

## NOTICE

It is recommended that you create a standardized list of downtime reasons for all your presses. Having the Dialog Menu display the same downtime reasons in the same order on all SmartPAC 2s will help to minimize reporting errors.

When planning the order in which you want Dialog Menu items to display, you should attempt to predetermine the downtime causes that are likely to occur most frequently and place these at the beginning of the downtime reason sequence.

### Selecting Canned Names on the Dialog Fixed Name Choice Menu

When you select the SET CANNED NAMES item on the Set Communications Menu, the Dialog Fixed Name Choice Menu (see Figure H-6) displays. This menu allows you to select the "Canned" names that will appear on the Dialog Menu. "Canned" names are downtime reasons whose text has already been programmed into the SmartPAC 2. You can select up to 14 of these pre-programmed entries for inclusion in the Dialog Menu.

		0	
NAME CHOICE	BACK ON LINE	1	
MENU	PRESS IDLE	ō	
	COIL CHANGE		
USE THE CURSOR	TOOL CHANGE		
KEYS TO CHOOSE	FORKLIFT		
A SEQUENCE	QUAL CONTROL		
VALUE. PRESS	LUBE PROBLEM	6	
ENTER TO CHANGE	AIR PROBLEM	14	
VALUE. PRESS	ELEC PROBLEM	10	
THE RESET KEY	MECH PROBLEM	11	
WHEN ALL DONE.	BIN FULL	15	
PRESS THE F1	PART OUALITY	12	
KEY TO INITIAL-	PLANNED DOWN	0	
IZE ALL THE			
VALUES.			

Figure H-6. Dialog Fixed Name Choice Menu

You select a "canned" name by entering a sequence number to the right of the name's text entry. The sequence number specifies the position in which that item will appear on the Dialog Menu. For example, in the screen shown in Figure H-6, the item LUBE PROBLEM has a sequence number of 6 and, so, will appear sixth on the Dialog Menu. Since "special" downtime reasons may also appear on the Dialog Menu, be sure to maintain the necessary intervals in your "canned" name numbering scheme to accommodate these items.

To prevent a "canned" name from appearing on the Dialog Menu, set its sequence number to 0.

It is recommended that you include the following "canned" items in the Dialog Menu:

- TOOL CHANGE-This downtime reason is logged to the Changeover Time machine state, enabling SFC to track time for tool changes separately from other unplanned downtime and create special Changeover reports. "Tool Change" is the only Unplanned Downtime reason that is assigned to time when power to the press is off. Powering down the press is often necessary during tool changeover.
- BACK ON LINE-This selection enables the operator to end a downtime event. When BACK ON LINE is selected, the machine state will change from "Unplanned Downtime," "Planned Downtime," or "Changeover Time" to "Running Time" if the press is running or from one of these "downtime" states to "Idle Time" if the press is stopped.
- OPER. NUMBER–This "canned" name allows the operator to enter an operator number, enabling SFC to assign a period of press time such as a shift to a particular operator.

To select the pre-programmed downtime reasons that will appear on the Dialog Menu and the order in which they will appear, do the following:

- On the Set Communications Menu, highlight the SET CANNED NAMES item, using the Up (▲) or Down (▼) cursor key, and press ENTER. The Dialog Fixed Name Choice Menu (see Figure H-6) displays with the cursor resting in the OPER. NUMBER field.
- 2. Press ENTER, and when the Numeric Entry window appears, type the numeric position in which you want that item to appear on the Dialog Menu, or type "0" if you want to prevent the item from displaying on the Dialog Menu. Press ENTER to save your entry and return to the Dialog Fixed Name Choice Menu.
- 3. Move the cursor to the BACK ON LINE field, using the Down ( ) cursor key, and repeat step 2. Do the same for the remaining menu items.

# NOTICE

Remember to leave intervals between sequence numbers to allow room for "special" downtime reasons. See *Creating Special Names on the Dialog Special Choice Name Menu*, page H-14.

If the same sequence number is assigned to both a "canned" and a "special" name, both entries will display in that position on the Dialog Menu with the "special" name shown first.

4. When you are finished setting the sequence of "canned" names, press RESET to save your entries and return to the Set Communications Menu.

## Creating Special Names on the Dialog Special Choice Name Menu

When you select the SET SPECIAL NAMES item on the Set Communications Menu, the Dialog Special Choice Name Menu (see Figure H-7, page H-15) displays. This menu allows you to select the "special" names that will appear on the Dialog Menu. "Special" names are downtime reasons created by the user. Each name can be up to 12 characters in length, and you can include up to 16 of them in the Dialog Menu.

You specify the order in which "special" names appear on the Dialog Menu by entering a sequence number to the right of each text entry. The sequence number specifies the position in which that item will appear on the Dialog Menu. Since "canned" downtime reasons may also appear on the Dialog Menu, be sure to maintain the necessary intervals in your "special" name numbering scheme to accommodate these items.

To prevent a "special" name from appearing on the Dialog Menu, set its sequence number to 0.

To program "special" downtime reasons for inclusion in the Dialog Menu, perform the following steps:

 On the Set Communications Menu, highlight the SET SPECIAL NAMES item, using the Up (▲) or Down (▼) cursor key, and press ENTER. The Dialog Special Choice Name Menu displays with the cursor resting in the SPEC. 1 field.

DIALOG SPECIAL	SPEC.	1	QC APPROVAL		
NAME CHOICE	SPEC.	2	NO OPERATOR		
MENU	SPEC.		MACH. MAINT.	9	
	SPEC.	4	FEED PROBLEM	13	
USE THE CURSOR	SPEC.			0	
KEYS TO CHOOSE	SPEC.			0	
A NAME OR SE-	SPEC.			0	
QUENCE VALUE.	SPEC.			0	
PRESS ENTER TO	SPEC.			0	
CHANGE. PRESS	SPEC.	10		0	
THE RESET KEY	SPEC.	11		0	
WHEN ALL DONE.	SPEC.	12		0	
	SPEC.	13		0	
PRESS THE F1	SPEC.	14		0	
KEY TO CLEAR	SPEC.	15		0	
ALL THE NAMES	SPEC.	16		0	
AND VALUES.					
DOWNTIME					

Figure H-7. Dialog Special Choice Name Menu

- 2. Press ENTER, and when the Alphabetic Entry window displays, type the text (12 characters maximum, including spaces) of the downtime reason that you want to appear on the Dialog Menu; then, press F6 to save your entry and return to the Dialog Special Choice Name Menu.
- 3. Press the Right ( ▶ ) cursor key to move the cursor to the column for the SPEC. 1 sequence number.
- 4. Press ENTER, and when the Numeric Entry window displays, type the numeric position in which you want that downtime reason to appear on the Dialog Menu; then, press ENTER to save your entry and return to the Dialog Special Choice Name Menu.

## NOTICE

Remember to leave intervals between sequence numbers to allow room for "canned" downtime reasons. See *Selecting Canned Names on the Dialog Fixed Name Choice Menu*, page H-13.

If the same sequence number is assigned to both a "canned" and a "special" name, both entries will display in that position on the Dialog Menu with the "special" name shown first.

- Move the cursor to the SPEC. 2 field, using the Down (▼) cursor key, and repeat steps 2 through 4. Do the same for the remaining menu items.
- 6. When you have finished programming "special" downtime reasons, press RESET to save your entries and return to the Set Communications Menu.

# **Documenting Downtime on the Dialog Menu**

A downtime reason can be selected on the Dialog Menu either in response to the Forced Dialog message or when the operator wants to change a previous downtime entry or add detail to reported downtime.

## Documenting Downtime in Response to the Forced Dialog Message

With Forced Idle Dialog mode or Forced Error Dialog mode enabled (see *Making Downtime Reporting Settings*, page H-7), the operator is prompted to enter a downtime reason on the Dialog Menu whenever SmartPAC 2 detects that the press has stopped under the appropriate circumstances. This message is shown in Figure H-8.



Figure H-8. SmartPAC 2 Run Mode Main Menu with Forced Dialog Message Displayed

To respond to this prompt, perform the following steps:

Press RESET to clear the message. The Dialog Menu displays. If dialog screen mode is set to "16/16" (see *Setting up SmartPAC 2 to Report Downtime*, page H-7), the Dialog Menu looks like the example shown in Figure H-9, page H-17. If "32 CUSTOM" is the dialog screen mode setting, the Dialog Menu looks like the example shown in Figure H-10. Note that the "32 CUSTOM" Dialog Menu has assigned the Operator Number, Back on Line, and Changeover downtime reasons to function keys F4, F5, and F6; also, the F7 key has been assigned to the End Job function (see *Ending a Job*, page H-20).



Figure H-9. Dialog Menu ("16/16" Dialog Screen Mode)



Figure H-10. Dialog Menu ("32 CUSTOM" Dialog Screen Mode)

2. Highlight the downtime reason you want (in Figure H-9, MECH PROBLEM is selected as an example), using the Up (▲) or Down (▼) cursor key, and press ENTER.

or

Press the function key for Operator Number, Back on Line, or Changeover ("32 CUSTOM" dialog screen mode only; see Figure H-10).

- 3. If Auto Backfill has been enabled on the Set Communications Menu (see Table H-1, page H-10), the downtime reason you selected is automatically "backfilled" (i.e., assigned to the period from the time that the press was stopped up to entry of the next downtime reason or the BACK ON LINE selection). If a SmartPAC 2 fault has already been assigned to this period of press inactivity, that fault will be documented as having consumed 1 second and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will replace that entry. The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.
- 4. If Auto Backfill has been disabled, the window shown in Figure H-11 displays.

SELECT THE BACK ON LINE DOWNTIME REASON TOOL CHANGE		F1
PRESS F2 TO CHANGE THE PREVIOUS DOWNTIME REASON - MECH PROBLEM PRESS F3 TO KEEP THE PREVIOUS DOWNTIME REASON AND BEGIN LOGGING DOWNTIME TO THE NEW DOWNTIME REASON - MECH PROBLEM	CHANGE PREV. REASON KEEP PREV. REASON	F2 F3
SELECT THE REASON. PRESS THE RESET REY WHEN DONE. AIR PROBLEM PART EJECTION BIN FULL		F4 F5 F6
	RETURN TO MAIN MENU	F7 F8

Figure H-11. Dialog Menu with F2/F3 Option Window Displayed

Press the **F2** (Change Prev. Reason) function key to "backfill" the selected downtime reason, in other words, to assign it to the period from the time that the press was stopped up to entry of the next downtime reason or the BACK ON LINE selection. If a SmartPAC 2 fault has already been assigned to this period of press inactivity, that fault will be documented as having consumed 1 second and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will replace that entry.

or

Press F3 (Keep Prev. Reason) to leave documentation of the period up to the present unchanged and "forward fill" the selected downtime reason, in other words, assign it to the period from the present up to entry of the next downtime reason or the BACK ON LINE selection.

The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.

## **Documenting Downtime in Other Situations**

You can report downtime reasons to SFC at any time without being prompted by the Forced Dialog message.

#### **EXAMPLE: UPDATING A DOWNTIME REASON**

The operator stops the press for what he assumes is a feed problem and selects the downtime reason "FEED PROBLEM" from the Dialog Menu. After further investigation, he finds that the feed is working properly but the air supply to the feed is intermittent. The operator accesses the Dialog Menu, selects "AIR PROBLEM" from the list of downtime reasons, and chooses the **F2** (Change Prev. Reason) option. SFC changes the reason for the downtime period from "FEED PROBLEM" to "AIR PROBLEM."

To report downtime without being prompted, perform the following steps:

1. On the Main Run Menu (see Figure H-12), select the DIALOG MENU item.



Figure H-12. SmartPAC 2 Run Mode Main Menu with DIALOG MENU Item Selected

 On the Dialog Menu, highlight the downtime reason you want, using the Up (▲) or Down (▼) cursor key, and press ENTER.

or

Press the function key for Operator Number, Back on Line, or Changeover ("32 CUSTOM" dialog screen mode only).

3. If Auto Backfill has been enabled on the Set Communications Menu (see Table H-1, page H-10), the downtime reason you selected is automatically "backfilled" (i.e., assigned to the period from the time that the press was stopped up to entry of the next downtime reason or the BACK ON LINE selection). If a SmartPAC 2 fault has already been assigned to this period of press inactivity, that fault will be documented as having consumed 1 second and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will replace that entry. The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.

4. If Auto Backfill has been disabled, the window shown in Figure H-11 displays.

Press the **F2** (Change Prev. Reason) function key to "backfill" the selected downtime reason, in other words, to assign it to the period of Idle Time or downtime up to entry of the next downtime reason or the BACK ON LINE selection. If a downtime reason other than a SmartPAC 2 fault has been assigned to this period, the downtime reason you selected will replace it. If a SmartPAC 2 fault has been assigned to this period, the period the period filled will be documented as having consumed 1 second and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will replace that entry.

or

Press F3 (Keep Prev. Reason) to leave documentation of the period up to the present unchanged and "forward fill" the selected downtime reason, in other words, assign it to the period from the present up to entry of the next downtime reason or the BACK ON LINE selection.

The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.

## Ending a Job

If you are using the "32 CUSTOM" dialog screen mode setting, the Dialog Menu allows you to "close out" the previous job when no subsequent job is immediately available, thereby preventing any non-job-related downtime to be charged against it. You close out the previous job by pressing the **F7** (End Job) function key (see Figure H-10, page H-17).

Normally, in ShopFloorConnect one job ends and a new one begins when a new tool number is loaded, at which point all data stops accruing for the previous tool and begins accruing for the new tool.

When an End Job function is executed, the SmartPAC 2 will report the tool number to SFC as Tool Number "0" to indicate that the machine is in a "No Job" condition. All time logged during the No Job condition can be assigned machine states (Planned Downtime, Unplanned Downtime, or Changeover) and downtime reasons just as if a tool were actually loaded.

Please note that if the End Job button is used, the current job will end, but the machine can still be run. Any production run after the job has ended will be attributed to a new job.

# NOTICE

DO NOT use the End Job function key unless you are absolutely certain that you want to close out the previous job. A job cannot be "reopened" once it has ended. If you attempt to reopen a job, any production that is run after the end of the job will be attributed to a new job using the same tool number.

## **Creating Hot Keys for Dialog Menu Functions**

You can create Hot Keys on the Main Run Menu (see page 3-12 for an overview) for menu selections and function key assignments on the Dialog Menu, enabling you to perform Dialog Menu tasks from the Run Menu. When Dialogue Screen Mode is set to "32 CUSTOM" (see Table H-1. page H-10), you can create Hot Keys for both selected menu items and for function keys F4 through F7, which are pre-programmed. If Dialogue Screen Mode is set to "16/16," you can create Hot Keys only for menu items.

To program Hot Keys for selections on the Dialog Menu, perform the following steps:

1. On the Main Run Menu, select the DIALOG MENU item.

## NOTICE

The SmartPAC 2 must be in an Idle state when you program Hot Keys. Make sure to select BACK ON LINE before attempting to make Hot Key assignments.

- 2. On the Dialog Menu, highlight the BACK ON LINE item and press ENTER to place the SmartPAC 2 in an Idle state. You are returned to the Main Run Menu.
- 3. Repeat step 1 to access the Dialog Menu again.

## NOTICE

The keystrokes you use to select a downtime reason for a Hot Key are recorded. Make sure to scroll to the desired selection using the fewest number of keystrokes.

- 4. Highlight the Dialog Menu selection for which you want to create a Hot Key, using the Up (▲) or Down (▼) cursor key. Use the fewest number of keystrokes possible in scrolling to the item.
- 5. Press the "2" and "0" keys simultaneously for a few seconds until the Hot Keys Instruction Window displays (see Figure 6-4, page 6-4), then press the function key you want to make the Hot Key for the selected menu item.

To program Hot Keys for function keys **F4** through **F7** on the Dialog Menu when Dialog Screen Mode is set to "32 CUSTOM," perform the following steps:

- 1. Repeat steps 1 through 3 of the previous procedure.
- 2. Select the number on the SmartPAC 2 keypad corresponding to the function key for which you want to create a Hot Key (e.g., press "5" for function key **F5** (Back on Line)).
- 3. Press the "2" and "0" keys simultaneously for a few seconds until the Hot Keys Instruction Window displays, then press the function key you want to make the Hot Key for the selected Dialog Menu function.

# **Reporting Scrap and Good Parts to SFC**

If you are running SFC-compatible firmware, SmartPAC 2 enables you to document scrap so that scrap counts can be reported to SFC. The scrap counter, which appears on the Counters screen in Run mode, maintains a cumulative total of all user scrap entries for the currently running job, resetting to zero when the job is complete.

The cumulative scrap count reduces by that amount the number of good parts reported to SFC. The good parts count is maintained in the Good Parts Count field on the Counters screen (see Figure H-14, page H-23). If you wish to adjust the Good Parts counter upward, you can do so in up to 1,000-part increments in Run mode and in larger increments in Program mode.

To enable scrap entries and Good Parts counter adjustments to be made in Run mode, you must set the CHANGE COUNT and CHG GOOD PRTS CNT items on the Security Access Menu in Initialization mode to "PROGRAM AND RUN MODES," as shown in Figure H-13. (To display the Security Access Menu, select SECURITY ACCESS from the Main Initialization Menu–see Figure H-4, page H-8.)

If you want to allow scrap entries to be made in Run mode but prevent Good Parts counter adjustments, you must set the CHG GOOD PRTS CNT item on the Security Access Menu to "NO CHANGES ALLOWED" while leaving the CHANGE COUNT item set to "PROGRAM AND RUN MODES."

SECURITY ACCESS MENU	CHANGE PASSWORDS	F1
LOAD TOOL #: PROGRAM AND RUN MODES		ت
DELETE TOOL #: PROGRAM MODE		
SET CNTR PRESET: PROGRAM AND RUN MODES		<b>F2</b>
CHANGE COUNTS: PROGRAM AND RUN MODES		ت
CHG GOOD PRTS CNT: PROGRAM AND RUN MODES		
RESET MODE: PROGRAM AND RUN MODES		<b>IF3</b>
CHG TOOL TEMPLATE: PASSWORD NOT REQUIRED		ت
ADJ. PROPAC SENS: PROGRAM AND RUN MODES		
ADJ. DIPRO SENS: PROGRAM AND RUN MODES		<b>  F4  </b>
DISABLE SENSORS: PROGRAM AND RUN MODES		ت
TURN OFF SENSORS: PASSWORD REQUIRED		
ADJUST CAMS: PROGRAM AND RUN MODES		<b>F5</b>
ADJUST PRESS CNTL: PROGRAM AND RUN MODES		ت
LOAD MONITOR: ALLOW RECALC/ADJUST		
ADJUST RAMPAC: PROGRAM AND RUN MODES		<b>IF6</b>
MORET		ت
		<b>  F7  </b>
USE THE CURSOR KEYS TO MAKE CHOICES.		ت
PRESS THE ENTER KEY TO CHANGE THE MODES.		
PRESS THE RESET KEY WHEN DONE.		<b>  F8  </b>
CHANGEOVER/SETUP		لک

Figure H-13. Security Access Menu with CHANGE COUNT and CHG GOOD PRTS CNT Items Set to "PROGRAM AND RUN MODES"

By default, the Good Parts counter does not increment during a fault condition. If you wish the counter to increment even when there is a fault, set the COUNTER INCREMENT MODE item on the Position Sensor screen to "INC ALWAYS" (see page 4-8).

# **Making Scrap Entries**

To document scrap for a currently running job, do the following:

1. With the tool loaded and running, select "COUNTERS" on the Main Run Menu (see Figure H-12, page H-19) to display the Counters screen (see Figure H-14).

DEMO TOOL 2 TOOL ID 6160	SmartPAC DE PAR	MO T CNTR	900	CAMBIE AL ESPANOL	<b>F1</b>
SENSORS ENAE	LED PRE	SS ANGLE	0	RELOAD BATCH COUNTERS	<b>F2</b>
	COUNT F	RESET VALU	JE	SCRAP VALUE	F3
STROKES	900	0			لت
GOOD PARTS	900	10,000			
BATCH 1	0	0			<b>  F4  </b>
(TOP STOP)					ت
BATCH 2	0	0			
(TOP STOP)					<b>F</b> 5
BATCH 3	0	0			Ľ
(TOP STOP)					
TOTAL HITS	0	0			<b>F6</b>
					Ľ
USE CURSOR	KEYS TO MAK	E SELECTIO	DN.		
PRESS THE	RESET KEY WH	EN DONE.			<b>F7</b>
PRESS CLEA	R KEY TO CLE	AR THE COU	JNT.		ك
PRESS ENTE	R TO CHANGE	THE COUNT			
				RETURN TO MAIN MENU	F8

Figure H-14. Counters Screen with "Scrap Value" Function (F3) Shown

2. Press F3 (Scrap Value). The Scrap Value Entry window displays (see Figure H-15).



Figure H-15. Counters Screen with Scrap Value Entry Window Displayed (30 Items Shown)

Key in the amount of scrap you wish to document, following the directions in the window, and press ENTER. (Figure H-15 shows a scrap entry of "30" as an example.)

When you press ENTER, the Scrap Value Entry window disappears. The value you keyed in is added to the current scrap value, and the result is displayed beneath the "Scrap Value" caption to the left of the **F3** function key, as shown in Figure H-16, page H-24, where a scrap value of "30" is used as an example. The Good Parts counter is reduced by the amount of your scrap entry (e.g., 900-30=870 in Figure H-16).

DEMO TOOL 2 TOOL ID 6160 SENSORS ENABL	SmartPAC DEM PART ED PRES	O CNTR S ANGLE	870 0	CAME IE AL ESPANOL RELOAD BATCH COUNTERS	F1 F2
STROKES	COUNT PR 900	ESET VALUE 0		SCRAP VALUE 30	F3
GOOD PARTS BATCH 1	870 0	10,000 0			<b>F4</b>
(TOP STOP) BATCH 2 (TOP STOP)	0	0			F5
BATCH 3 (TOP STOP)	0	0			
TOTAL HITS	0	0			F6
PRESS THE R	LEIS TO MAKE ESET KEY WHE KEY TO CLEA	N DONE. R THE COUN	т.		<b>F7</b>
PRESS ENTER	TO CHANGE T	HE COUNT.		RETURN TO MAIN MENU	<b>F8</b>

Figure H-16. Counters Screen with Scrap Value Updated to 30 Items

## NOTICE

#### INDIVIDUAL SCRAP ENTRIES ARE ADDED TO THE CURRENT SCRAP TOTAL

The Scrap Value counter maintains a cumulative total of the scrap items documented for each job. The value you enter in the Scrap Value Entry window (see Figure H-15, page H-23) is automatically added to the total.

For example, if the count in the Scrap Value field is "30," and you want to include an additional 10 parts in the count, you would enter "10" in the Scrap Value Entry window (see Figure H-17). When you are returned to the Counters screen, the Scrap Value counter would display 40 parts (the 30 parts in the current total plus the 10 parts you entered; the Good Parts counter would be reduced by 10 parts (see Figure H-18, page H-25).



Figure H-17. Counters Screen with Scrap Value Entry Window Displayed (10 Items Shown)

DEMO TOOL 2	SmartPAC P	DEMO ART CNTR	1710	CAMB IE AL ESPANOL	F1
SENSORS ENAB	, BLED P	RESS ANGLE	0	RELOAD BATCH COUNTERS	F2
	COINT	DDESET VAL	IF	SCRAP VALUE	
STROKES GOOD PARTS	1,750	10.000	011	40	
BATCH 1 (TOP STOP)	0	0			F4
BATCH 2 (TOP STOP)	0	0			F5
BATCH 3 (TOP STOP)	0	0			
TOTAL HITS	0	0			F6
USE CURSOF PRESS THE	RESET KEY	AKE SELECTIONE.	ON.		F7
PRESS CLEA PRESS ENTE	R KEY TO C R TO CHANG	E THE COUNT	UNT.	RETURN TO	
621				MAIN MENU	

Figure H-18. Counters Screen with Scrap Value Updated to 40 Items

3. Repeat step 2 for the remaining scrap entries associated with the current job until the job is completed.

## Adjusting the Good Parts Counter

## NOTICE

You can only increase the value maintained by the Good Parts counter. You cannot decrease the Good Parts counter except by entering scrap values.

## NOTICE

You cannot adjust the Good Parts counter if the CHG GOOD PRTS CNT item on the Security Access Menu has been set to "NO CHANGES ALLOWED."

The Run mode Counters screen enables you to increase the Good Parts count to adjust for count inaccuracies, such as when good parts may be produced but not counted in Setup mode or during Fault conditions. The count can be increased by up to 1,000 parts at a time.

The Counters screen in Program mode allows you to increase Good Parts by larger amounts (see *Adjusting the Good Parts Counter in Program Mode*, next page). This capability is useful if new firmware is installed in the middle of a job, causing the Good Parts counter to reset to zero.

#### Adjusting the Good Parts Counter in Run Mode

To increase the Good Parts count in Run mode, do the following:

1. Select the GOOD PARTS COUNT field on the Counters screen.

2. When the Good Parts Entry window (like the window shown in Figure H-15) displays, key in the number of good parts you want to add (1,000 parts maximum), and press ENTER. A Confirmation window like the one shown in Figure H-19 displays.



#### Figure H-19. Good Parts Counter Adjustment Confirmation Window

Press the Up (▲) cursor key to confirm that you want to change the Good Parts counter value. You are returned to the Counters screen with your adjustment reflected in the GOOD PARTS COUNT field.

## NOTICE

If you attempt to enter a value greater than 1,000 or one that reduces (rather than increases) the Good Parts count, an error message will display briefly.

#### Adjusting the Good Parts Counter in Program Mode

## NOTICE

In Program mode, you can increase the Good Parts count in increments greater than 1,000.

To increase the Good Parts count in Program mode, do the following:

- 1. On the Counters screen in Run mode, press RESET to return to the Main Run Menu.
- 2. Turn the Program/Run key to "PROG" to display the Main Program Menu.
- 3. Select "GO TO THE TOOL MANAGER" to display the Tool Manager screen.
- 4. Press F4 (Edit Tool) with the loaded tool selected to display the Tool Program Menu.
- 5. Select COUNTERS to display the Counters screen.
- 6. Perform steps 1 through 3 of the procedure for adjusting the Good Parts counter in Run mode, above.
# Appendix I. Reporting Downtime and Scrap to LETS

This appendix shows you how to report press downtime from your SmartPAC 2 control to Wintriss's Line Efficiency Tracking Software (LETS). The appendix discusses the six machine states to which LETS logs press time, explains the downtime reporting features of SmartPAC 2, shows you how to set up SmartPAC 2 to report downtime to LETS, and provides instructions for reporting downtime.

The appendix also shows you how to use the scrap counter on the SmartPAC 2 Counters screen in Run mode to report scrap to LETS and how to adjust the Good Parts count that is reported to LETS.

SmartPAC's downtime- and scrap-reporting features are available only on SmartPAC 2 versions 4.59 or higher; in addition, the LETS firmware option must be installed.

## Machine States to Which LETS Logs Press Time

LETS logs all elapsed time at each press to one of six categories called machine states. The sum of all the times assigned to these machine states for an individual press is the number of hours in a production day (e.g., 12 hours, 24 hours, etc.). LETS selects the machine state to which to log press time on the basis of downtime reporting and other information it receives from SmartPAC 2. Machine states are differentiated as follows:

- Running Time-Press is running and making parts
- Idle Time–Press is stopped, no SmartPAC error has occurred, and the reason the press is stopped has not been documented in SmartPAC 2
- Unplanned Downtime–Press is stopped due to a SmartPAC 2 error, or if the press is stopped for another reason, that reason has been documented in SmartPAC 2 as a downtime reason other than Planned Downtime or Tool Change
- Planned Downtime–Press is stopped, and the reason has been documented in SmartPAC 2 as Planned Downtime

#### NOTICE

The Planned Downtime machine state should only be assigned for lunch and coffee breaks, meetings, training, etc. Planned Downtime is not used in calculating Overall Equipment Effectiveness (OEE) and, therefore, does not reduce the OEE value.

- Changeover Time–Press is stopped, and the reason has been documented in SmartPAC 2 as Tool Change
- Offline Time–Press is stopped because there is no power to the press or the network is down

All time during which the press is stopped for any reason other than a power interruption or network failure is logged by LETS to Idle Time unless a downtime reason is reported from the SmartPAC 2. Since Overall Equipment Effectiveness (OEE) and other efficiency metrics assign high ratings to machines with low Idle Time values, SmartPAC 2 has been designed to allow very precise reporting of downtime to LETS and may be programmed to require the operator to select a specific downtime reason each time the press enters an Idle state. When operator intervention is required, periods of press inactivity are more likely to be assigned to a specific downtime reason than to be logged as Idle Time.

# **SmartPAC 2 Downtime Reporting Features**

Downtime reasons in SmartPAC 2 may be reported to LETS either automatically by the system or manually by the operator. When the press is stopped because of an error generated by SmartPAC 2 or an installed SmartPAC 2 module, the specific fault (e.g., "Sensor 1 Part Ejection Missed") is reported automatically as a downtime reason to LETS.

When the press is stopped by the operator or by a piece of auxiliary equipment not connected to the SmartPAC 2, a downtime reason must be reported manually by the operator since SmartPAC 2 is unable to detect the reason for the interruption (see *Forced Idle Dialog Mode*, below). Downtime reasons may also be assigned manually to provide additional detail for periods documented automatically with specific error conditions (see *Forced Error Dialog Mode*, page I-4).

#### Forced Idle Dialog Mode

If the SmartPAC 2 is set to Forced Idle Dialog mode (see *Making Downtime Reporting Settings*, page I-7), a downtime reason must be entered whenever the press is stopped by the operator or by auxiliary equipment. When the press stops (see Figure I-1, page I-3 for a schematic time line), a message displays at the SmartPAC 2 stating that the operator must enter a downtime reason before the press can be restarted. When the operator closes the message window, the Dialog Menu automatically displays. The Dialog Menu, a selection on the SmartPAC 2 Main Run Menu, displays a list of downtime reasons from which the operator must select to report downtime to LETS. Refer to *Programming Downtime Reasons*, page I-11 for instructions on how to set up the Dialog Menu.

The Forced Dialog message can be programmed to display a specified number of minutes after the press stops (see Figure I-1). This Idle Dialog Time setting enables the press to be stopped briefly without requiring entry of a downtime reason.

#### Backfilling vs. Forward Filling

LETS initially logs the time after the press is stopped by the operator or by auxiliary equipment to Idle Time. When the operator selects an item on the Dialog Menu, the period of time previously documented as Idle is assigned that downtime reason. Downtime can be assigned manually or automatically, depending on how your SmartPAC 2 is programmed (see *Making Downtime Reporting Settings*, page I-7).

If SmartPAC 2 is set up for manual downtime reporting, the operator selects how the downtime is to be assigned in an option window that displays following selection of the downtime reason (see Figure I-10, page I-16). One option, which is called "backfilling," is to assign the downtime reason to all time that has elapsed since the press was stopped (see Figure I-1). The other option is to "forward fill" the downtime reason, assigning it to the period from reporting of the downtime reason until the press is restarted (see Figure I-2, page I-4). When this option is selected, all elapsed time before entry of the downtime reason is assigned to the previous downtime reason, if one was reported, or to Idle Time.

If SmartPAC 2 is set up for automatic downtime reporting, the option window does not display following selection of the downtime reason and downtime is automatically backfilled.

#### Putting the Press "Back on Line"

A period of Idle Time or downtime (either "Planned" or "Unplanned") comes to an end when the operator selects "Back on Line" from the Dialog Menu. If the press is restarted at the same time, LETS begins documenting the machine state as "Running time" (see Figure I-1). When the operator selects "Back on Line" without restarting the press, the subsequent period until the press is restarted is logged to Idle Time (see Figure I-2).



Figure I-1. Forced Idle Dialog Mode Time Line (Downtime Reason Backfilled)



Figure I-2. Forced Idle Dialog Mode Time Line (Downtime Reason Forward Filled)

#### Forced Error Dialog Mode

The Dialog Menu can also be programmed to display whenever the press is stopped due to a SmartPAC 2 fault. This feature, called Forced Error Dialog mode (see *Making Downtime Reporting Settings*, page I-7), allows the operator to add detail to a period of downtime that is initially logged to a specific SmartPAC 2 error but may actually have a different cause.

For example, SmartPAC 2 may be set up to generate an "End of Stock" error whenever the press runs out of material. This downtime reason is applied to the period of time during which a new coil is located and brought to the press unless the operator selects a more appropriate downtime reason, such as "Waiting for Coil," and, using the backfill option (see *Backfilling vs. Forward Filling*, page I-2), applies it to the incompletely documented period. When the downtime reason is backfilled (see Figure I-3, page I-5 for a schematic time line), SmartPAC



logs one second to the initial error (e.g., "Sensor 5–End of Stock"), assuring that the fault is documented, and the remaining time to the new downtime reason (e.g., "Waiting for Coil").

Figure I-3. Forced Error Dialog Mode Time Line

Downtime reasons can also be "forward filled" in Forced Error Dialog mode.

As in Forced Idle Dialog mode, the Forced Dialog message can be programmed to display a specified number of minutes after the press stops (see Figure I-3). This Error Dialog Time setting prevents nuisance faults such as "Counter preset reached" from being reported as downtime.

#### **Persist Dialog Mode**

Periods during which the press is powered down are normally documented as Offline Time and the period following the next power-up assigned to Idle Time. Periods subsequent to machine power-ups are documented as Idle Time even when the period immediately preceding the shutdown has been assigned to an Unplanned Downtime reason. The only machine states that carry over from the period immediately preceding a shutdown to the period immediately succeeding a power-up are Changeover Time and Planned Downtime. In these cases, the period during which the press is offline and the time immediately following press power-up are assigned to the machine state in effect when the press was powered down.

SmartPAC 2 can be programmed so that Unplanned Downtime reasons selected from the Dialog Menu also "persist" through press shutdowns (see *Making Downtime Reporting Settings*, page I-7). When this setting is enabled, both the interval during which the press was powered down and the time following resumption of power to the press are assigned to the downtime reason in effect when the press was shut down. One second of the period during which the press was offline is assigned to Offline Time to document this event.

#### Single-stroke Mode

For hand-fed applications, a special setting can be programmed at the SmartPAC 2 (see *Setting up SmartPAC 2 to Report Downtime*, page I-6) that allows the press to operate continuously in Single-stroke mode without the operator having to enter a downtime reason at the end of each stroke, when the SmartPAC 2 considers the press to be stopped. Instead of looking for a change of state (i.e., from Running to Stopped), SmartPAC 2 looks for at least one press cycle during a pre-programmed interval and, if it detects no stroke, considers that the press is stopped, reporting subsequent time as Idle Time.

#### **Reset Strokes Counters**

Normally, a period of Idle Time, Planned or Unplanned Downtime, or Changeover Time is ended when the operator selects "Back on Line" from the Dialog Menu and restarts the press (see *Putting the Press "Back on Line,"* page I-3). However, since the operator may forget to select the "Back on Line" item, an alternative way of terminating a period of downtime is available.

SmartPAC 2 can be programmed to begin logging time following a downtime period to Running Time after a specified number of press strokes. A Reset Strokes counter (see *Making Downtime Reporting Settings*, page I-7) begins incrementing when the press is restarted, and after the counter reaches its preset, LETS changes the machine state to which it logs press time from the downtime reason to Running Time. Three different Reset Strokes counters can be programmed, allowing you to set different restart intervals following periods of Planned Downtime, Unplanned Downtime, and Changeover time.

# Setting up SmartPAC 2 to Report Downtime

To set up SmartPAC 2 to report downtime to LETS, you make downtime reporting settings on the Set Communications Menu and program downtime reasons on the Dialog Fixed Name Choice Menu and the Dialog Special Choice Name Menu.

#### **Making Downtime Reporting Settings**

To enable and configure the SmartPAC 2 downtime reporting features described in the previous section, perform the following steps:

1. At the SmartPAC 2, turn the Program/Run key to "PROG," then press the "1" and "CLEAR" keys simultaneously for a second or two until the Main Initialization Menu (see Figure I-4) displays.



Figure I-4. SmartPAC 2 Main Initialization Menu

2. Highlight the "SETUP DATA COMMS" menu item, using the Up (▲) or Down (▼) cursor key, and press ENTER. The Set Communications Menu (see Figure I-5) displays:

SET COMMINICATIONS MENU	
PSP/SBP CDII NIMBEP - 1	
FORCED THE DIALOG - ENABLED	
TDLE DIALOG TIME - 5 MINS	
FORCED FOR DIALOG - FNARE	
FORCED ERROR DIALOG - ERABLED	
DERECE DIALOG TIME - 5 MINS.	
PERSISI DIALOG - ENABLED	
A010 BACKFILL = DISABLED	
DIALOG SCREEN MODE = 16 / 16	
UNPLANNED RESET STROKES = 15	
PLANNED RESET STROKES = 5	
CHANGEOVER RESET STROKES = 50	
SINGLE STROKE MODE = DISABLED	
IDLE TIMER = 5 SEC.	
SET SPECIAL NAMES	
SET CANNED NAMES	
USE THE CURSOR KEYS TO CHOOSE THE ITEM	
YOU WISH TO CHANGE. PRESS THE ENTER KEY	
DOWNTIME RESET WHEN DONE.	

Figure I-5. Set Communications Menu

- 3. Highlight each menu item you want to set, using the Up (▲) or Down (▼) cursor key, then do the following:
  - To enable or disable a feature, press ENTER until the desired setting is displayed.
  - To specify a value for an item (with the exception of IDLE TIMER), press ENTER to display the Numeric Entry window, key in your entry with the SmartPAC 2 keypad, and press ENTER again.

#### NOTICE

Make sure that the DIALOG SCREEN MODE item is set to "16 / 16." If DIALOG SCREEN MODE is set to "32 CUSTOM," you will not be able to access the Dialog Menu. The fault message "File Not Found" will display when you attempt to do so.

- Leave the DIALOG SCREEN MODE item set to "16 / 16," the default. The "32 CUSTOM" setting is for SFC customers only.
- To select a value for IDLE TIMER, press ENTER until the desired value is displayed.
- To display screens on which you can program Dialog Menu entries, press ENTER with the cursor resting in the SET SPECIAL NAMES or SET CANNED NAMES field.

Table I-1 explains each field on the Set Communications Menu and provides instructions on how to make settings.

Field	Settings
RSR/SBR CPU NUMBER	When SmartPAC 2 is connected to LETS, this field must be set to "1." Other CPU Number values may be used when SmartPAC 2 is connected to certain legacy software products that require each SmartPAC 2 to be assigned a unique identifier.
FORCED IDLE DIALOG	Indicates whether SmartPAC 2 displays the Forced Dialog message and Dialog Menu after the press has been stopped by the operator or by auxiliary equipment not connected to SmartPAC 2. The number of minutes after the press has stopped before the Forced Dialog message appears is specified in the IDLE DIALOG TIME field (see next entry). At the appearance of the Forced Dialog message, the operator must select a downtime reason on the Dialog Menu in order to restart the press. This setting allows time that elapses after the press is stopped by the operator or by equipment not connected to SmartPAC 2 to be documented with a downtime reason rather than as Idle Time. There are two settings:
	ENABLED Forced Idle Dialog mode enabled DISABLED Forced Idle Dialog mode disabled
IDLE DIALOG TIME	Specifies the number of minutes (1-60) after the press has stopped in Forced Idle Dialog mode before the Forced Dialog message displays. This setting allows you to prevent Forced Idle Dialog from being triggered by brief stops. Suggested initial value: 5 minutes.

Table I-1. Set Communications Menu Settings

Field	Settings
FORCED ERROR DIALOG	Indicates whether SmartPAC 2 displays the Forced Dialog message and Dialog Menu after the press has been stopped by a SmartPAC 2 fault. The number of minutes after the press has stopped before the Forced Dialog message appears is specified in the ERROR DIALOG TIME field (see next entry). At the appearance of the Forced Dialog message, the operator must select a downtime reason on the Dialog Menu in order to restart the press. This setting allows time that elapses after the press is stopped due to a SmartPAC 2 fault to be assigned a different downtime reason. There are two settings:
	ENABLED Forced Error Dialog mode enabled DISABLED Forced Error Dialog mode disabled
ERROR DIALOG TIME	Specifies the number of minutes (1-60) after the press has stopped in Forced Error Dialog mode before the Forced Dialog message displays. This setting allows you to prevent reporting of SmartPAC 2 nuisance faults such as "Counter preset reached." Suggested initial value: 5 minutes.
PERSIST DIALOG	Indicates whether an Unplanned Downtime reason from the Dialog Menu that is assigned before a press shutdown continues to be applied to the period during which the press is down and to the time after the press is powered up again. Normally, the interval during a press shutdown is assigned to "Offline Time" and the period after the press is powered up to "Idle Time." There are two settings:
	ENABLED Persist Dialog mode enabled DISABLED Persist Dialog mode disabled
AUTO BACKFILL	Indicates whether time occurring after the press has been stopped up to the point when the operator selects a downtime reason is automatically documented with that reason. When this item is disabled, the operator is given the option of backfilling or forward filling downtime following selection of a downtime reason. When this item is enabled, the downtime reason selected by the operator is automatically backfilled. There are two settings:
	ENABLED Auto Backfill enabled DISABLED Auto Backfill disabled
DIALOG SCREEN MODE	This item, which is set to "16 / 16" by default, should not be changed. The "32 CUSTOM" setting is for SFC customers only. If you set this item to "32 CUSTOM," the message "File Not Found" will display when you access the Dialog Menu.

Table I-1	Set Communi	cations Me	onu Settir	nas (Cont.)
	Set Commun			iys (Com.)

Field	Settings
UNPLANNED RESET STROKES PLANNED RESET STROKES CHANGEOVER RESET STROKES	Specifies the number of strokes that must occur after the press is restarted following a period of Unplanned Downtime, Planned Downtime, or Changeover Time before LETS begins documenting the machine state as "Running Time." This setting prevents additional press time from being attributed to a downtime reason when the operator forgets to select the "BACK ON LINE" item from the Dialog Menu. The number of strokes you specify should be the maximum number of press cycles that are likely to be needed to return the press to production. Valid entries: 1-9999. Suggested settings:
	Set the Unplanned Reset Strokes counter to two strokes more than the maximum number of strokes required to fill an empty die. This setting should give the operator sufficient time to complete a response to the downtime cause (such as Coil Change) that requires the longest time to address. Set the Planned Reset Strokes counter to the lowest number of strokes required to return the press to production following a lunch or other break
	Set the Changeover Reset Strokes counter to the maximum number of strokes required to complete a die setup.
SINGLE STROKE MODE	This setting, which is used for hand-fed applications when the press is being run in Single-stroke mode, indicates whether LETS counts press cycles (or parts made) within the period specified in the IDLE TIMER field (see next entry) to determine whether the press is "running." When this field is set to "ENABLED," LETS only documents the press as "Idle" when no cycles occur (i.e., no parts are made) during an Idle Timer period. There are two settings:
	ENABLED Single-stroke Mode enabled DISABLED Single-stroke Mode disabled
IDLE TIMER	Specifies the number of seconds during which SmartPAC 2 counts the number of press strokes in Single-stroke mode to determine a production rate for hand-fed applications. This value should be twice the cycle time for the slowest hand-fed job run on a press. For example, if the slowest job produces an average of 6 parts per minute, the Idle Timer should be set to 20 seconds (6 parts per minute = 10-second cycle time; 2 x 10 seconds = 20 seconds). Available selections: 5, 10, 15, 20, 30, and 60.
SET SPECIAL NAMES	Displays the Dialog Special Choice Name Menu, on which you can create up to 16 custom downtime reasons for display on the Dialog Menu and specify the order in which they will appear (see <i>Creating Special Names on the Dialog Special Choice Name Menu</i> , page I-13).
SET CANNED NAMES	Displays the Dialog Fixed Name Choice Menu, on which you can select up to 14 pre-programmed, or "canned," downtime reasons for display on the Dialog Menu and specify the order in which they will appear (see <i>Selecting Canned Names on the Dialog Fixed Name Choice Menu</i> , page I-11).

Table I-1.	Set Cor	mmunications	s Menu	Settinas	(Cont.	)
	000000	in the model of the	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Gounigo	100110	/

#### **Programming Downtime Reasons**

The SET SPECIAL NAMES and SET CANNED NAMES items on the Set Communications Menu allow you to specify the downtime reasons that appear on the Dialog Menu and the order in which they are presented. The items you program on these two menus will be the menu selections available to the operator when the Dialog Menu displays in Forced Idle Dialog or Forced Error Dialog mode, or when the operator accesses the menu at other times.

"Canned" names are downtime reasons whose text has been pre-programmed into the SmartPAC 2. "Special" names are downtime reasons whose text you assign. You can select up to 14 "canned" names and create up to 16 "special" names. The Dialog Menu can include both "canned" and "special" entries, displaying up to 30 items.

#### NOTICE

It is recommended that you create a standardized list of downtime reasons for all your presses. Having the Dialog Menu display the same downtime reasons in the same order on all SmartPAC 2s will help to minimize reporting errors.

When planning the order in which you want Dialog Menu items to display, you should attempt to predetermine the downtime causes that are likely to occur most frequently and place these at the beginning of the downtime reason sequence.

#### Selecting Canned Names on the Dialog Fixed Name Choice Menu

When you select the SET CANNED NAMES item on the Set Communications Menu, the Dialog Fixed Name Choice Menu (see Figure I-6) displays. This menu allows you to select the "Canned" names that will appear on the Dialog Menu. "Canned" names are downtime reasons whose text has already been programmed into the SmartPAC 2. You can select up to 14 of these pre-programmed entries for inclusion in the Dialog Menu.

DIALOG FIXED	OPER. NUMBER	0	
NAME CHOICE	BACK ON LINE	1	
MENU	PRESS IDLE	0	
	COIL CHANGE		
USE THE CURSOR	TOOL CHANGE		
KEYS TO CHOOSE	FORKLIFT		
A SEQUENCE	QUAL CONTROL		
VALUE. PRESS	LUBE PROBLEM		
ENTER TO CHANGE	AIR PROBLEM	15	
VALUE. PRESS	ELEC PROBLEM	11	
THE RESET KEY	MECH PROBLEM	12	
WHEN ALL DONE.	PART EJECTION	16	
	BIN FULL	0	
PRESS THE F1	PART QUALITY	13	
KEY TO INITIAL-	PLANNED DOWN	3	
IZE ALL THE			
VALUES.			

Figure I-6. Dialog Fixed Name Choice Menu

You select a "canned" name by entering a sequence number to the right of the name's text entry. The sequence number specifies the position in which that item will appear on the Dialog Menu. For example, in the screen shown in Figure I-6, the item LUBE PROBLEM has a sequence number of 7 and, so, will appear seventh on the Dialog Menu. Since "special" downtime reasons may also appear on the Dialog Menu, be sure to maintain the necessary intervals in your "canned" name numbering scheme to accommodate these items.

To prevent a "canned" name from appearing on the Dialog Menu, set its sequence number to 0.

It is recommended that you include the following "canned" items in the Dialog Menu:

- TOOL CHANGE-This downtime reason is logged to the Changeover Time machine state, enabling LETS to track time for tool changes separately from other unplanned downtime and create special Changeover reports. "Tool Change" is the only Unplanned Downtime reason that is assigned to time when power to the press is off. Powering down the press is often necessary during tool changeover.
- PLANNED DOWN-This entry is logged to the Planned Downtime machine state, which includes time for planned lunch or coffee breaks, meetings, training, etc. Planned Downtime is not used in calculating Overall Equipment Effectiveness (OEE) and, therefore, does not reduce the OEE value.
- BACK ON LINE-This selection enables the operator to end a downtime event. When BACK ON LINE is selected, the machine state will change from "Unplanned Downtime," "Planned Downtime," or "Changeover Time" to "Running Time" if the press is running or from one of these "downtime" states to "Idle Time" if the press is stopped.
- OPER. NUMBER-This "canned" name allows the operator to enter an operator number, enabling LETS to assign a period of press time such as a shift to a particular operator.

To select the pre-programmed downtime reasons that will appear on the Dialog Menu and the order in which they will appear, do the following:

- On the Set Communications Menu, highlight the SET CANNED NAMES item, using the Up (▲) or Down (▼) cursor key, and press ENTER. The Dialog Fixed Name Choice Menu (see Figure I-6) displays with the cursor resting in the OPER. NUMBER field.
- 2. Press ENTER, and when the Numeric Entry window appears, type the numeric position in which you want that item to appear on the Dialog Menu, or type "0" if you want to prevent the item from displaying on the Dialog Menu. Press ENTER to save your entry and return to the Dialog Fixed Name Choice Menu.
- 3. Move the cursor to the BACK ON LINE field, using the Down ( ) cursor key, and repeat step 2. Do the same for the remaining menu items.

#### NOTICE

Remember to leave intervals between sequence numbers to allow room for "special" downtime reasons. See *Creating Special Names on the Dialog Special Choice Name Menu*, page I-13.

If the same sequence number is assigned to both a "canned" and a "special" name, both entries will display in that position on the Dialog Menu with the "special" name shown first. 4. When you are finished setting the sequence of "canned" names, press RESET to save your entries and return to the Set Communications Menu.

#### Creating Special Names on the Dialog Special Choice Name Menu

When you select the SET SPECIAL NAMES item on the Set Communications Menu, the Dialog Special Choice Name Menu (see Figure I-7) displays. This menu allows you to select the "special" names that will appear on the Dialog Menu. "Special" names are downtime reasons created by the user. Each name can be up to 12 characters in length, and you can include up to 16 of them in the Dialog Menu.

(					
DIALOG SPECIAL	SPEC.	1	OC APPROVAL	8	
CHOICE NAME	SPEC	2	NO OPERATOR	9	
MENTI	SDEC	2	MACH MAINT	10	
I MERIO	SPEC.	1	FFFD DDOBLEM	14	
UST THE CIRCOR	SPEC.	-	ELLO ENOBLEM	7.4	
THE CORSOR	SPLC.	ວ ເ		0	
KEYS TO CHOOSE	SPEC.	5		0	
A NAME OR SE-	SPEC.	/		0	
QUENCE VALUE.	SPEC.	8		0	
PRESS ENTER TO	SPEC.	9		0	
CHANGE. PRESS	SPEC.	10		0	
THE RESET KEY	SPEC.	11		0	
WHEN ALL DONE.	SPEC.	12		0	
	SPEC.	13		0	
PRESS THE F1	SPEC.	14		0	
KEY TO CLEAR	SPEC.	15		0	
ALL THE NAMES	SPEC.	16		0	
AND VALUES.					
<u></u>					

Figure I-7. Dialog Special Choice Name Menu

You specify the order in which "special" names appear on the Dialog Menu by entering a sequence number to the right of each text entry. The sequence number specifies the position in which that item will appear on the Dialog Menu. Since "canned" downtime reasons may also appear on the Dialog Menu, be sure to maintain the necessary intervals in your "special" name numbering scheme to accommodate these items.

To prevent a "special" name from appearing on the Dialog Menu, set its sequence number to 0.

To program "special" downtime reasons for inclusion in the Dialog Menu, perform the following steps:

- On the Set Communications Menu, highlight the SET SPECIAL NAMES item, using the Up (▲) or Down (▼) cursor key, and press ENTER. The Dialog Special Choice Name Menu (see Figure I-7) displays with the cursor resting in the SPEC. 1 field.
- 2. Press ENTER, and when the Alphabetic Entry window displays, type the text (12 characters maximum, including spaces) of the downtime reason that you want to appear on the Dialog Menu; then, press F6 to save your entry and return to the Dialog Special Choice Name Menu.

- 3. Press the Right ( ▶ ) cursor key to move the cursor to the column for the SPEC. 1 sequence number.
- 4. Press ENTER, and when the Numeric Entry window displays, type the numeric position in which you want that downtime reason to appear on the Dialog Menu; then, press ENTER to save your entry and return to the Dialog Special Choice Name Menu.

#### NOTICE

Remember to leave intervals between sequence numbers to allow room for "canned" downtime reasons. See *Selecting Canned Names on the Dialog Fixed Name Choice Menu*, page I-11.

If the same sequence number is assigned to both a "canned" and a "special" name, both entries will display in that position on the Dialog Menu with the "special" name shown first.

- Move the cursor to the SPEC. 2 field, using the Down ( ) cursor key, and repeat steps 2 through 4. Do the same for the remaining menu items.
- 6. When you have finished programming "special" downtime reasons, press RESET to save your entries and return to the Set Communications Menu.

# **Documenting Downtime on the Dialog Menu**

A downtime reason can be selected on the Dialog Menu either in response to the Forced Dialog message or when the operator wants to change a previous downtime entry or add detail to reported downtime.

#### Documenting Downtime in Response to the Forced Dialog Message

With Forced Idle Dialog mode or Forced Error Dialog mode enabled (see *Making Downtime Reporting Settings*, page I-7), the operator is prompted to enter a downtime reason on the Dialog Menu whenever SmartPAC 2 detects that the press has stopped under the appropriate circumstances. This message is shown in Figure I-8, page I-15.



Figure I-8. SmartPAC 2 Run Mode Main Menu with Forced Dialog Message Displayed

To respond to this prompt, perform the following steps:

1. Press RESET to clear the message. The Dialog Menu (see Figure I-9) displays.

. 1				
	SELECT THE DOWNTIME REASON FROM THE LIST.	BACK ON LINE TOOL CHANGE PLANNED DOWN COIL CHANGE	CAMBIE AL ESPANOL DISPLAY	F1
	USE THE CURSOR KEYS	FORKLIFT	CORRENT JOB	
	TO CHOOSE A REASON. PRESS THE ENTER KEY TO SELECT THE	QUAL CONTROL LUBE PROBLEM OC APPROVAL	DISPLAY NEXT JOB	F3
	REASON.	NO OPERATOR	-	
	PRESS THE RESET	MACH. MAINT.		<b>∥F4</b> ∥
	KEI WHEN DONE.	MECH PROBLEM	-	
		PART QUALITY		F5
		AIR PROBLEM		
		PART EJECTION		F6
				F7
			Constanting	٣
			RETURN TO MAIN MENU	<b>F8</b>

Figure I-9. Dialog Menu

- 2. Highlight the downtime reason you want (in Figure I-9, MECH PROBLEM is selected as an example), using the Up (▲) or Down (▼) cursor key, and press ENTER.
- 3. If Auto Backfill has been enabled on the Set Communications Menu (see Table I-1, page I-9), the downtime reason you selected is automatically "backfilled" (i.e., assigned to the period from the time that the press was stopped up to entry of the next downtime reason or the BACK ON LINE selection). If a SmartPAC 2 fault has already been assigned to this period of press inactivity, that fault will be documented as having consumed 1 second and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will

replace that entry. The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.

4. If Auto Backfill has been disabled, the window shown in Figure I-10 displays.



Figure I-10. Dialog Menu with F2/F3 Option Window Displayed

Press the **F2** (Change Prev. Reason) function key to "backfill" the selected downtime reason, in other words, to assign it to the period from the time that the press was stopped up to entry of the next downtime reason or the BACK ON LINE selection. If a SmartPAC 2 fault has already been assigned to this period of press inactivity, that fault will be documented as having consumed 1 second and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will replace that entry.

or

Press F3 (Keep Prev. Reason) to leave documentation of the period up to the present unchanged and "forward fill" the selected downtime reason, in other words, assign it to the period from the present up to entry of the next downtime reason or the BACK ON LINE selection.

The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.

#### **Documenting Downtime in Other Situations**

You can report downtime reasons to LETS at any time without being prompted by the Forced Dialog message.

#### **EXAMPLE: UPDATING A DOWNTIME REASON**

The operator stops the press for what he assumes is a feed problem and selects the downtime reason "FEED PROBLEM" from the Dialog Menu. After further investigation, he finds that the feed is working properly but the air supply to the feed is intermittent. The operator accesses the Dialog Menu, selects "AIR PROBLEM" from the list of downtime reasons, and chooses the **F2** (Change Prev. Reason) option. LETS changes the reason for the downtime period from "FEED PROBLEM" to "AIR PROBLEM."

To report downtime without being prompted, perform the following steps:

1. On the Main Run Menu (see Figure I-11), select the DIALOG MENU item.



Figure I-11. SmartPAC 2 Run Mode Main Menu with DIALOG MENU Item Selected

- On the Dialog Menu, highlight the downtime reason you want, using the Up (▲) or Down (▼) cursor key, and press ENTER.
- 3. If Auto Backfill has been enabled on the Set Communications Menu (see Table I-1, page I-9), the downtime reason you selected is automatically "backfilled" (i.e., assigned to the period from the time that the press was stopped up to entry of the next downtime reason or the BACK ON LINE selection). If a SmartPAC 2 fault has already been assigned to this period of press inactivity, that fault will be documented as having consumed 1 second and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will replace that entry. The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.

4. If Auto Backfill has been disabled, the window shown in Figure I-10 displays.

Press the **F2** (Change Prev. Reason) function key to "backfill" the selected downtime reason, in other words, to assign it to the period of Idle Time or downtime up to entry of the next downtime reason or the BACK ON LINE selection. If a downtime reason other than a SmartPAC 2 fault has been assigned to this period, the downtime reason you selected will replace it. If a SmartPAC 2 fault has been assigned to the period and the remainder of the period filled with the downtime reason you selected. If the period has been documented as Idle Time, your downtime reason will replace that entry.

or

Press F3 (Keep Prev. Reason) to leave documentation of the period up to the present unchanged and "forward fill" the selected downtime reason, in other words, assign it to the period from the present up to entry of the next downtime reason or the BACK ON LINE selection.

The SmartPAC 2 will display a message stating that the downtime reason has been sent to the host computer.

#### **Creating Hot Keys for Dialog Menu Functions**

You can create Hot Keys on the Main Run Menu (see page 3-12 for an overview) for selections on the Dialog Menu, enabling you to perform Dialog Menu tasks from the Run Menu. To do so, perform the following steps:

1. On the Main Run Menu, select the DIALOG MENU item.

#### NOTICE

The SmartPAC 2 must be in an Idle state when you program Hot Keys. Make sure to select BACK ON LINE before attempting to make Hot Key assignments.

- 2. On the Dialog Menu, highlight the BACK ON LINE item and press ENTER to place the SmartPAC 2 in an Idle state. You are returned to the Main Run Menu.
- 3. Repeat step 1 to access the Dialog Menu again.

#### NOTICE

The keystrokes you use to select a downtime reason for a Hot Key are recorded. Make sure to scroll to the desired selection using the fewest number of keystrokes.

- 4. Highlight the Dialog Menu selection for which you want to create a Hot Key, using the Up (▲) or Down (▼) cursor key. Use the fewest number of keystrokes possible in scrolling to the item.
- 5. Press the "2" and "0" keys simultaneously for a few seconds until the Hot Keys Instruction Window displays (see Figure 6-4, page 6-4), then press the function key you want to make the Hot Key for the selected menu item.

### **Reporting Scrap and Good Parts to LETS**

If you are running LETS-compatible firmware, SmartPAC 2 enables you to document scrap so that scrap counts can be reported to LETS. The scrap counter, which appears on the Counters screen in Run mode, maintains a cumulative total of all user scrap entries for the currently running job, resetting to zero when the job is complete.

The cumulative scrap count reduces by that amount the number of good parts reported to LETS. The good parts count is maintained in the Good Parts Count field on the Counters screen (see Figure I-13, page I-20). If you wish to adjust the Good Parts counter upward, you can do so in up to 1,000-part increments in Run mode and in larger increments in Program mode.

To enable scrap entries and Good Parts counter adjustments to be made in Run mode, you must set the CHANGE COUNT and CHG GOOD PRTS CNT items on the Security Access Menu in Initialization mode to "PROGRAM AND RUN MODES," as shown in Figure I-12. (To display the Security Access Menu, select SECURITY ACCESS from the Main Initialization Menu–see Figure I-4, page I-7.)

If you want to allow scrap entries to be made in Run mode but prevent Good Parts counter adjustments, you must set the CHG GOOD PRTS CNT item on the Security Access Menu to "NO CHANGES ALLOWED" while leaving the CHANGE COUNT item set to "PROGRAM AND RUN MODES."

		The second se	
SECURITY	ACCESS MENU	CHANGE PASSWORDS	1
LOAD TOOL #:	PROGRAM AND RUN MODES		<u> </u>
DELETE TOOL #:	PROGRAM MODE		
SET CNTR PRESET:	PROGRAM AND RUN MODES	IIIE:	2
CHANGE COUNTS:	PROGRAM AND RUN MODES		
CHG GOOD PRTS CNT:	PROGRAM AND RUN MODES		ה
RESET MODE:	PROGRAM AND RUN MODES	IF:	3
CHG TOOL TEMPLATE:	PASSWORD NOT REQUIRED		
ADJ. PROPAC SENS:	PROGRAM AND RUN MODES		7
ADJ. DIPRO SENS:	PROGRAM AND RUN MODES		4
DISABLE SENSORS:	PROGRAM AND RUN MODES		_
TURN OFF SENSORS:	PASSWORD REQUIRED		F
ADJUST CAMS:	PROGRAM AND RUN MODE'S		5
ADJUST PRESS CNTL:	PROGRAM AND RUN MODES		2
LOAD MONITOR:	ALLOW RECALC/ADJUST		പ
ADJUST RAMPAC:	PROGRAM AND RUN MODES		o
MORE *			
			7
ILSE THE CIRSOR KEY	S TO MAKE CHOICES		1
DDESS THE ENTED KE	V TO CHANGE THE MODES		
DRESS THE RESET KE	V WHEN DONE		Q
CHANGEOVER / SETUP			2

Figure I-12. Security Access Menu with CHANGE COUNT and CHG GOOD PRTS CNT Items Set to "PROGRAM AND RUN MODES"

By default, the Good Parts counter does not increment during a fault condition. If you wish the counter to increment even when there is a fault, set the COUNTER INCREMENT MODE item on the Position Sensor screen to "INC ALWAYS" (see page 4-8).

#### **Making Scrap Entries**

To document scrap for a currently running job, do the following:

1. With the tool loaded and running, select "COUNTERS" on the Main Run Menu (see Figure I-11, page I-17) to display the Counters screen (see Figure I-13).

Sma DEMO TOOL 2 TOOL ID 6160 SENSORS ENABLED	rtPAC DI PAI PRI	emo RT CNTR ESS ANGLE	900 0	CAME IE AL ESPANOL RELOAD BATCH COUNTERS	F1 F2
C STROKES	1 TRUO:	PRESET VALU	£	SCRAP VALUE 0	<b>F</b> 3
BATCH 1 (TOP STOP)	0	0			<b>F4</b>
(TOP STOP) BATCH 3 (TOP STOP)	0	0			F5
TOTAL HITS USE CURSOR KEY	0 S TO MAI	0 XE SELECTIO	N.		<b>F6</b>
PRESS THE RESE PRESS CLEAR KE PRESS ENTER TO	T KEY WI Y TO CLI CHANGE	HEN DONE. EAR THE COUNT THE COUNT.	NT.	RETURN TO MAIN MENU	F7 F8

Figure I-13. Counters Screen with "Scrap Value" Function (F3) Shown

2. Press F3 (Scrap Value). The Scrap Value Entry window displays (see Figure I-14).

SmartPAC DEMO DEMO TOOL 2 PART CNTR 900 TOOL ID 6160 SENSORS ENABLED PRESS ANGLE 0	CAMBIE AL ESPANOL RELOAD BATCH COUNTERS	F1 F2
COUNT PRESET VALUE STROKES 900 0 GOOD PARTS 900 10,000 BATCH 1 0 0 (TOP STOP) BATCH 0 CT 30 BA: (TO USE THE KEYPAD TO ENTER NUMBERS. TO USE THE UP/DOWN CURSOR KEYS TO INCREASE/DECREASE. PRESS ENTER WHEN DONE. PRESS RESET TO CANCEL.	SCRAP VALUE 0	F3 F4 F5 F6 [7
PRESS CLEAR KEY TO CLEAR THE COUNT. PRESS ENTER TO CHANGE THE COUNT.	RETURN TO MAIN MENU	<b>F</b> 8

Figure I-14. Counters Screen with Scrap Value Entry Window Displayed (30 Items Shown)

3. If this is your first scrap entry for the job, perform this step; otherwise, go to step 4.

Key in the amount of scrap you wish to document, following the directions in the window, and press ENTER. (Figure I-14 shows a scrap entry of "30" as an example.)

When you press ENTER, the Scrap Value Entry window disappears, and the value you keyed in is displayed beneath the "Scrap Value" caption to the left of the **F3** function key, as shown in Figure I-15, where a scrap value of "30" is used as an example. The Good Parts counter is reduced by the amount of your scrap entry (e.g., 900-30=870 in Figure I-15).



Figure I-15. Counters Screen with Scrap Value Updated to 30 Items

#### NOTICE

#### INDIVIDUAL SCRAP ENTRIES MUST INCLUDE CURRENT SCRAP TOTAL

The Scrap Value counter maintains a cumulative total of the scrap items documented for each job. In order to increment this counter, the value you enter in the Scrap Value Entry window (see Figure I-14, page I-20) must include the current scrap total–in other words, you must add the number of scrap items you wish to document to the current value shown in the Scrap Value counter. The Good Parts counter, on the other hand, is reduced by the actual number of scrap pieces you are reporting in this session, in other words, the difference between your scrap entry and the current Scrap Value total.

For example, if the count in the Scrap Value field is "30," and you want to include an additional 10 parts in the count, you would enter "40" (not "10") in the Scrap Value Entry window. When you are returned to the Counters screen, the Scrap Value counter would display 40 parts; the Good Parts counter would be reduced by 10 parts.

4. If you have made previous Scrap Value entries for this job, key in the sum of the scrap count you wish to document this time and the current total shown in the Scrap Value field, and press ENTER. See Figure I-16, page I-22, in which "40" is used as the sample scrap input.



Figure I-16. Counters Screen with Scrap Value Entry Window Displayed (40 Items Shown)

You are returned to the Counters screen. The value you entered in the Scrap Value Entry window is displayed beneath the "Scrap Value" caption to the left of the **F3** function key (see Figure I-17, in which a scrap total of "40" is used as an example). The Good Parts counter is reduced by the difference between the amount of your Scrap Value entry and the current Scrap Value (e.g., 1,720-(40-30)=1,710 in Figure I-17).



Figure I-17. Counters Screen with Scrap Value Updated to 40 Items

5. Repeat step 4 for the remaining scrap entries associated with the current job until the job is completed.

#### Adjusting the Good Parts Counter

#### NOTICE

You can only increase the value maintained by the Good Parts counter. You cannot decrease the Good Parts counter except by entering scrap values.

#### NOTICE

You cannot adjust the Good Parts counter if the CHG GOOD PRTS CNT item on the Security Access Menu has been set to "NO CHANGES ALLOWED."

The Run mode Counters screen enables you to increase the Good Parts count to adjust for count inaccuracies, such as when good parts may be produced but not counted in Setup mode or during Fault conditions. The count can be increased by up to 1,000 parts at a time.

The Counters screen in Program mode allows you to increase Good Parts by larger amounts (see *Adjusting the Good Parts Counter in Program Mode*, next page). This capability is useful if new firmware is installed in the middle of a job, causing the Good Parts counter to reset to zero.

#### Adjusting the Good Parts Counter in Run Mode

To increase the Good Parts count in Run mode, do the following:

- 1. Select the GOOD PARTS COUNT field on the Counters screen.
- When the Good Parts Entry window (like the window shown in Figure I-14) displays, key in the number of good parts you want to add (1,000 parts maximum), and press ENTER. A Confirmation window like the one shown in Figure I-18 displays.

WARNING	G: A C	COUNTER	VALUE	IS A	BOUT
TO BE (	CHANGE	D! IF	YOU WA	NT TH	IIS TO
HAPPEN	THEN	PRESS	THE UP	CURS	SOR
KEY. II	F YOU	DO NOT	WANT	TO CH	IANGE
THE COU	JNTER	VALUE	THEN F	RESS	RESET

Figure I-18. Good Parts Counter Adjustment Confirmation Window

Press the Up (▲) cursor key to confirm that you want to change the Good Parts counter value. You are returned to the Counters screen with your adjustment reflected in the GOOD PARTS COUNT field.

#### NOTICE

If you attempt to enter a value greater than 1,000 or one that reduces (rather than increases) the Good Parts count, an error message will display briefly.

#### Adjusting the Good Parts Counter in Program Mode

#### NOTICE

In Program mode, you can increase the Good Parts count in increments greater than 1,000.

To increase the Good Parts count in Program mode, do the following:

- 1. On the Counters screen in Run mode, press RESET to return to the Main Run Menu.
- 2. Turn the Program/Run key to "PROG" to display the Main Program Menu.
- 3. Select "GO TO THE TOOL MANAGER" to display the Tool Manager screen.
- 4. Press F4 (Edit Tool) with the loaded tool selected to display the Tool Program Menu.
- 5. Select COUNTERS to display the Counters screen.
- 6. Perform steps 1 through 3 of the procedure for adjusting the Good Parts counter in Run mode, above.

# Appendix J. Option 1 User Inputs

This appendix shows you how to install, wire, program, monitor, and troubleshoot WPC 2000 Option 1. Option 1 is a "daughter" board you can install on your WPC 2000 Main Processor board to increase the number of user inputs available for connection of auxiliary equipment to WPC 2000. Option 1 is compatible with WPC 2000 systems running WPC 2000 version 1.70 and higher and, in the case of WPC 2000 Integrated units, SmartPAC 2 version 3.32 and higher.

By providing connections for other press-related equipment, user inputs allow you to monitor auxiliary press functions such as lubrication systems, conveyors, etc. and provide additional press protection and operator safety. Up to 7 non-control-reliable inputs and up to 2 pairs of control-reliable, cross-checked inputs are standard on WPC 2000 units. The Option 1 board enables you to connect up to 20 additional non-control-reliable inputs and up to 4 additional control-reliable, cross-checked input pairs to WPC 2000 (see Table J-1, page J-2).

#### A DANGER

#### USER INPUTS 1 THROUGH 7 AND 12 THROUGH 31 NOT SUITABLE FOR SAFETY USE

DO NOT use inputs 1 through 7 and 12 through 31 as part of any personnel protection system. These inputs are not control reliable.

Failure to comply with these instructions will result in death or serious injury.

Option 1 user inputs, like WPC 2000 standard inputs, are programmed to stop the press whenever connected equipment malfunctions. The type of stop (e.g., Top-stop, Emergency-stop, etc.) is determined by the setting programmed for the specific input. Input stop types are set to E-stop at the factory (see Table J-1) but can be changed at SmartPAC 2 (see *Changing User Input Stop Type*, page J-8).

Non-control-reliable user inputs (i.e., inputs12-31) can be set to Top-stop, Top-stop/Lockout (a new setting), E-stop, Estop/Lockout, or Unused. Control-reliable input pairs 32/33, 34/35, 36/37, and 38/39 can be set to E-stop or E-stop/Lockout. A setup sheet on which you can document stop type assignments for Option 1 user inputs is provided on page J-13.

When any equipment connected via Option 1 user inputs to WPC 2000 issues a stop command by opening a normally closed (N/C) input, WPC 2000 signals the press to perform the stop type programmed for that input and displays the input's fault code on the SmartPAC 2 display (see *Troubleshooting*, page J-11 for a list of the fault codes assigned to Option 1 user inputs).

When a stop command is issued for any input programmed as E-stop/Lockout or Top-stop/ Lockout, the lockout relay also opens, causing the Lockout message to appear on the display. The Lockout message must be cleared (by turning the Stroke Select switch to OFF, then to INCH or one of the other operating modes) before the press can be restarted.

Ten of the non-control-reliable inputs have an input type of NPN, and ten are PNP (see Table J-1). All of the control-reliable, cross-checked input pairs are PNP.

User Input Number	Input Type	Default Stop Type *
User input 12	NPN	E-stop
User input 13	NPN	E-stop
User input 14	NPN	E-stop
User input 15	NPN	E-stop
User input 16	NPN	E-stop
User input 17	NPN	E-stop
User input 18	NPN	E-stop
User input 19	NPN	E-stop
User input 20	NPN	E-stop
User input 21	NPN	E-stop
User input 22	PNP	E-stop
User input 23	PNP	E-stop
User input 24	PNP	E-stop
User input 25	PNP	E-stop
User input 26	PNP	E-stop
User input 27	PNP	E-stop
User input 28	PNP	E-stop
User input 29	PNP	E-stop
User input 30	PNP	E-stop
User input 31	PNP	E-stop
User input 32 (cross-checked with input 33)	PNP	E-stop
User input 33 (cross-checked with input 32)	PNP	E-stop
User input 34 (cross-checked with input 35)	PNP	E-stop
User input 35 (cross-checked with input 34)	PNP	E-stop
User input 36 (cross-checked with input 37)	PNP	E-stop
User input 37 (cross-checked with input 36)	PNP	E-stop
User input 38 (cross-checked with input 39)	PNP	E-stop
User input 39 (cross-checked with input 38)	PNP	E-stop

Table J-1. Option 1 User Inputs: Input Type and Stop Type

\* Option 1 user inputs are set to E-stop by default. Settings can be changed on the Press Control User Interlock Menu (see page J-8). Option 1 inputs 12-31 can be programmed as E-stop, Top-stop, E-stop/Lockout, Top-stop/Lockout, and Unused. Input pairs 32/33, 34/35, 36/37, and 38/39 can be set to E-stop or E-stop/ Lockout.

# Installing the Option 1 Board

To install the WPC 2000 Option 1 board (see Figure J-1, page J-4), perform the following steps:

#### CAUTION

#### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

Failure to comply with these instructions could result in property damage.

1. Making sure you are grounded, carefully unpack the Option 1 board and remove it from its anti-static bag.

#### NOTICE

Be sure to save the shipping box and protective anti-static bag in case you need to return the Option 1 board.

2. Verify that the board has not been damaged during shipment. If damage has occurred, contact Wintriss Tech. Support immediately.

#### **WARNING**

#### ELECTRIC SHOCK HAZARD

- Ensure that the power source is off before you replace electronic components in a control.
- Disconnect power from the machinery it is connected to before replacing electronic components. This includes disconnecting power to the machine control and motor.
- Ensure that servicing is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

- 3. Shut off power to WPC 2000.
- 4. Open the WPC 2000 enclosure or console.
- 5. Locate the four 1/4-in. hex standoffs in the lower left corner of the WPC 2000 Main Processor board.

#### NOTICE

If there are six 1/4-in. standoffs in the area where the Option 1 board is to be installed, remove the top middle and bottom middle standoffs, using a 1/4-in. nut driver. Be sure to remove the screws underneath the standoffs so they don't short out the board.



Figure J-1. Option 1 Board Installed on WPC 2000 Main Processor Board

- 6. Making sure you are grounded, align the holes in the four corners of the Option 1 board with the four standoffs on the WPC 2000 Main Processor board (refer to Figure J-1 for correct placement of board), and slowly push the board down until both connectors are seated. Then screw the board down, using the Phillips screws provided.
- 7. If you are ready to connect auxiliary equipment to the Option 1 board, proceed to the next section. Otherwise, close the door of the WPC 2000 enclosure or console.

# Wiring Option 1 User Inputs

Wiring connections for WPC 2000 Option 1 user inputs are made on terminal blocks TB601 and TB602 on the Option 1 board (see Figure J-2). Pin numbers are shown in Table J-2 and Table J-3, page J-6, and in Figure 25 at the end of the manual.



Figure J-2. WPC 2000 Option 1 Board

Wire from the terminal shown in Table J-2 or Table J-3 to your equipment and then back to either +24 Vdc or ground. If you remove any of the jumpers installed at the factory, make sure to bypass those inputs by connecting them to +24 Vdc or ground, as shown in Table J-2 or Table J-3. TB601 provides one +24 Vdc terminal and one ground terminal for jumper connections. TB602 provides two +24 Vdc terminals and two ground terminals.

Pin #	User Input	Terminal for Jumper Bypass Connection
Upper Row		
431	User input 32 + (cross-checked with user input 33)	+24 Vdc
432	User input 34 + (cross-checked with user input 35)	+24 Vdc
433	User input 12 -	Ground
434	User input 13 -	Ground
435	User input 14 -	Ground
436	User input 15 -	Ground
437	+24 Vdc	
Lower Row		
448	User input 22 +	+24 Vdc
449	User input 23 +	+24 Vdc
450	User input 24 +	+24 Vdc
451	User input 25 +	+24 Vdc
452	User input 36 + (cross-checked with user input 37)	+24 Vdc
453	User input 38 + (cross-checked with user input 39)	+24 Vdc
454	Ground	

Table 1-2	WPC 2000	Ontion 1	Roard.	Wirina	Connections	TR601
Table J-2.	WFC 2000	Οριιοπ τ	Duaru.	vviiiig	Connections,	10001

Table J-3. WPC 2000 Option 1 Board: Wiring Connections, TB602

Pin #	User Input	Terminal for Jumper Bypass Connection
Upper Row		
438	User input 33 + (cross-checked with user input 32)	+24 Vdc
439	User input 35 + (cross-checked with user input 34)	+24 Vdc
440	User input 16 -	Ground
441	User input 17 -	Ground
442	User input 18 -	Ground
443	User input 19 -	Ground
444	User input 20 -	Ground
445	User input 21 -	Ground
446	+24 Vdc	
447	+24 Vdc	
Lower Row		
455	User input 26 +	+24 Vdc
456	User input 27 +	+24 Vdc
457	User input 28 +	+24 Vdc
458	User input 29 +	+24 Vdc
459	User input 30 +	+24 Vdc

Pin #	User Input	Terminal for Jumper Bypass Connection
460	User input 31 +	+24 Vdc
461	User input 37 + (cross-checked with user input 36)	+24 Vdc
462	User input 39 + (cross-checked with user input 38)	+24 Vdc
463	Ground	
464	Ground	

When you have finished wiring user inputs, verify that your connections are good by checking the LEDs for the appropriate pin numbers (see Figure J-3, below). You can also verify that



Figure J-3. WPC 2000 Option 1 Board: LED Map

the inputs are connected properly by displaying the appropriate input status screen (see *Viewing the Status of User Inputs*, page J-10).

# Changing User Input Stop Type

WPC 2000 Option 1 user inputs are set to E-stop at the factory (see Table J-1, page J-2) but can be modified on the Press Control User Interlock Menu in SmartPAC 2 Initialization. User inputs 12-31 can be set to Top-stop, Top-stop/Lockout (a new setting), E-stop, E-stop/ Lockout, or Unused. Cross-checked input pairs 32/33, 34/35, 36/37, and 38/39 can be set to E-stop or E-stop/Lockout.

Top-stop/Lockout is also available as an option for WPC 2000 user inputs 1-7 if you have SmartPAC 2 firmware version 3.32 or higher. The Unused setting can be selected to bypass inputs you are not connecting.

#### NOTICE

You cannot program control-reliable, cross-checked inputs 32-39 (or inputs 8-11 in WPC 2000) as Top-stop/Lockout or Unused. These safety inputs must be set as either E-stop or E-stop/Lockout.

You can assign names to the auxiliary equipment you are connecting to Option 1 inputs on the same screen on which you set the input stop type. A setup sheet on which you can document equipment name/user input assignments is provided on page J-13.

To change the stop type for a user input, follow these instructions:

- 1. On the SmartPAC 2 Main Initialization Menu (see Figure 4-1, page 4-1), move the highlight bar to PRESS CONTROL, using the cursor keys, and press ENTER. The WPC Initialization Menu (see Figure 4-18, page 4-23) displays with the USER INTERLOCKS item highlighted by default.
- 2. On the WPC Initialization Menu, press ENTER with USER INTERLOCKS highlighted. The Change User Interlocks screen (see Figure J-4, page J-10) displays.
- 3. Press the function key (i.e., **F2**, **F3**, or **F4**) corresponding to the group of user inputs (i.e., Group 1, Group 2, or Group 3) within which the user input you wish to update falls. The Press Control User Interlock Menu for that user input group displays (see Figure 4-19, page 4-24, which uses the screen for standard user inputs 1-11 as an example) with the stop type for the first user input in the group highlighted.
- 4. Perform steps 2 through 4 of the procedure documented in *User Interlocks*, page 4-24 to change the stop type and assign a name to each user input you wish to re-program.
- 5. When you are finished, press RESET to save your settings.



Figure J-4. Change User Interlock Screen

# Viewing the Status of User Inputs

You can view the status of WPC 2000 Option 1 user inputs just as you can view the status of the standard user inputs 1-11. Viewing input status is a useful diagnostic tool for troubleshooting your Option 1 user inputs and the auxiliary equipment they are connected to.

To view input status, follow these steps:

1. On the WPC Initialization Menu (see Figure 4-18, page 4-23), move the selection bar to INPUT STATUS, using the cursor keys, and press ENTER. The Display WPC Input Status screen, shown in Figure J-5, displays.



Figure J-5. Display WPC Input Status Screen

Press the function key (i.e., F4, F5, or F6) corresponding to the group of user inputs (i.e., Group 1, Group 2, or Group 3) within which the user input whose status you want to view falls. The WPC Interlock Input Status screen for that user input group displays (see Figure 4-28, page 4-46, which uses the Group 1 screen as an example).

The status of all user inputs (OFF or ON) is shown in the STATUS column. Inputs that are ON are highlighted. OFF inputs are not highlighted. In addition, an OFF input may generate the fault code specific to that input on the SmartPAC 2 display. "Unused" inputs show an OFF status but do not generate a fault code display.

# Troubleshooting

Table J-4 shows the fault code associated with each Option 1 user input that appears on your SmartPAC 2 display when there is a problem with the auxiliary equipment that input is connected to. An additional fault code is documented following the table.

To correct the problem that caused the fault code to display, check the equipment and wiring connected to that user input. When you have corrected the problem, reset SmartPAC 2 and WPC 2000. If the problem recurs, contact Wintriss Tech. Support.

Fault Code	User Input	Stop Type	Pin #	Terminal for Jumper Connection
120	User 12	Top-stop	433	Ground
121	User 13	Top-stop	434	Ground
122	User 14	Top-stop	435	Ground
123	User 15	Top-stop	436	Ground
124	User 16	Top-stop	440	Ground
125	User 17	E-stop	441	Ground
126	User 18	E-stop	442	Ground
127	User 19	E-stop	443	Ground
128	User 20	E-stop	444	Ground
129	User 21	E-stop/Lockout	445	Ground
130	User 22	Top-stop	448	+24 Vdc
131	User 23	Top-stop	449	+24 Vdc
132	User 24	Top-stop	450	+24 Vdc
133	User 25	Top-stop	451	+24 Vdc
134	User 26	Top-stop	455	+24 Vdc
135	User 27	E-stop	456	+24 Vdc
136	User 28	E-stop	457	+24 Vdc
137	User 29	E-stop	458	+24 Vdc
138	User 30	E-stop/Lockout	459	+24 Vdc
139	User 31	E-stop	460	+24 Vdc

Table J-4. WPC 2000 Option 1 Fault Codes

Fault Code	User Input	Stop Type	Pin #	Terminal for Jumper Connection
140 144	User 32 paired	E-stop	431	+24 Vdc
140, 144	with User 33	E-stop	438	+24 Vdc
141 145	User 34 paired	E-stop	432	+24 Vdc
141, 145	with User 35	E-stop	439	+24 Vdc
142 146	User 36 paired	E-stop/Lockout	452	+24 Vdc
142, 140	with User 37	E-stop/Lockout	461	+24 Vdc
142 147	User 38 paired	E-stop/Lockout	453	+24 Vdc
143, 147	with User 39	E-stop/Lockout	462	+24 Vdc

Table J-4. WPC 2000	Option 1	Fault Codes	(Cont.)
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#### F148 Fault

- *Problem*: If the message "F148 OPTION BOARD NOT CORRECT" appears on your SmartPAC 2 display, it means either that the Option 1 board is not seated properly in the WPC 2000 board or has been removed from the WPC 2000 board.
- *Remedy*: Make sure that the Option 1 board is seated firmly and that the screws securing it to the WPC 2000 board are tight. If the Option 1 board has been removed, re-initialize WPC 2000 and cycle power to the SmartPAC 2 control.

#### NOTICE

Removal of the Option 1 board should only be performed after careful consideration of safety implications. If you have wired and programmed cross-checked user inputs on the Option 1 board, removal of the board could render press operation hazardous.

#### NOTICE

When you re-initialize WPC 2000, all press control parameters (e.g., option switch settings, brake monitor settings, etc.) are reset to their default values. To avoid losing data you have painstakingly entered, copy existing press control parameters to a table so you can replace them when WPC 2000 is re-initialized.

To re-initialize WPC 2000, put the SmartPAC 2 into Initialization mode, then select, in succession, "PRESS CONTROL" on the Main Initialization Menu, "PRESS PARAMETERS" on the WPC Initialization Menu, and, finally, "INITIALIZE PARAMETERS" on the Press Control Parameter Menu.

User Input	Fault Code	Stop Type *	Pin #	Terminal for Jumper Connection	Name of Auxiliary Equipment
User 12	120		433	Ground	
User 13	121		434	Ground	
User 14	122		435	Ground	
User 15	123		436	Ground	
User 16	124		440	Ground	
User 17	125		441	Ground	
User 18	126		442	Ground	
User 19	127		443	Ground	
User 20	128		444	Ground	
User 21	129		445	Ground	
User 22	130		448	+24 Vdc	
User 23	131		449	+24 Vdc	
User 24	132		450	+24 Vdc	
User 25	133		451	+24 Vdc	
User 26	134		455	+24 Vdc	
User 27	135		456	+24 Vdc	
User 28	136		457	+24 Vdc	
User 29	137		458	+24 Vdc	
User 30	138		459	+24 Vdc	
User 31	139		460	+24 Vdc	
User 32 paired	140 144		431	+24 Vdc	
with User 33	140, 144		438	+24 Vdc	
User 34 paired	111 115		432	+24 Vdc	
with User 35	141, 145		439	+24 Vdc	
User 36 paired	142 146		452	+24 Vdc	
with User 37	142, 140		461	+24 Vdc	
User 38 paired	1/3 1/7		453	+24 Vdc	
with User 39	140, 147		462	+24 Vdc	

# **Option 1 User Input Setup Sheet**

\* Option 1 user inputs are set to E-stop by default. Settings can be changed on the Press Control User Interlock Menu (see page J-8). Option 1 inputs 12-31 can be programmed as E-stop, Top-stop, E-stop/Lockout, Top-stop/Lockout, and Unused. Input pairs 32/33, 34/35, 36/37, and 38/39 can be set to E-stop or E-stop/ Lockout.
# Glossary

### NOTICE

Cross-references to other glossary entries are shown in *italics*.

ACTS	See Auto-compensated Top Stop.
actuation	A change in the state or condition of a sensor
actuation	A change in the state of condition of a sensor.
actuation angle	See dwell.
actuation block	A graphical indicator on the Sensor Status screen in Run mode, showing whether a sensor is actuated.
ANSI	Stands for American National Standards Institute, a U.S. clearinghouse and coordinating body for voluntary standards activity on the national level.
auto advance	A ProCamPAC feature that allows cam channels to be programmed for speed-sensitive functions (e.g., feed advance, pilot release, etc.) on variable speed presses. A channel programmed as Auto Advance automatically advances cam timing as the speed of the press increases and delays timing as speed decreases. The rate of advance or delay is controlled by an advance constant, a specified number of degrees of advance for each 100 SPM increase in press speed.
auto carry-up	A signal that causes the press to automatically complete the stroke, stopping at TDC, when the operator releases his hands from the palm buttons after the <i>Auto Carry-up Angle</i> has been reached. Also called "Operator Station mute."
auto carry-up angle	The crank angle at which the pinch point has closed to less than $1/4$ in. (6 mm), an opening determined by OSHA to be too small to pose a hazard to the operator.
auto enable by sensor	A die protection mode in which an individual sensor is automatically actuated after a specified number of strokes.
auto enable by tool	A die protection mode in which all sensors in a tool are automatically actuated after a specified number of strokes.
Auto-compensated Top Stop (ACTS)	A WPC 2000 feature, designed specifically for variable-speed presses, that adjusts the top-stop angle automatically as press speed changes or the brake wears.

Automatic Continuous On-demand	A WPC 2000 feature that allows an external device like a feeder or robot to signal WPC 2000 to start the press in Continuous mode and maintain operation in Continuous.
Automatic Single-stroke	A WPC 2000 feature that allows an external device like a feeder or robot to signal WPC 2000 to stroke the press when a feed has been completed.
batch counter	One of three counters that can be set to increment when either the good parts or strokes counter increments and to either top-stop the press or signal programmable limit switch (PLS) outputs when its preset is reached. See <i>counter</i> .
BDC	Abbreviation for bottom dead center.
brake monitor	A SmartPAC 2/WPC 2000 feature that checks for brake wear.
calculated safety distance	See safety distance.
cam channels	Relays that open and close on signals from the programmable cam switch to turn auxiliary equipment on and off at specified crankshaft angles.
checksum	A numeric value calculated when a tool is stored in memory and when it is loaded. The two values must match or SmartPAC 2 displays a fault message.
communications	Data sent by SmartPAC 2 to one of its installed options (e.g., WPC, SFI, etc.) or received from an installed option.
concurrent time	The length of time within which each pair of palm switches on all Operator Stations connected to WPC 2000 must be pressed in order to start the press. This interval is 5 seconds. If the concurrent time is exceeded by any Operator Station, the press will not start.
control component failure	Another name for <i>control reliability</i> .
control reliability	A regulation defined in ANSI B11.1-2009 and OSHA 1910.217 requiring that a single component failure in a clutch/brake control circuit not prevent the normal stopping action of the press, not create an unintended stroke, and not allow initiation of a subsequent stroke until the failure has been corrected.
counter	A SmartPAC 2 feature that maintains a count of the number of strokes made by the press, the number of good parts produced, or the number of strokes that must occur before a programmed output is actuated. See <i>batch counter</i> .

crank angle clock	A graphical indicator on the SmartPAC 2 display that shows the angle of rotation of the press's crankshaft.
critical angle	The point in the crankshaft rotation after which a stop signal to the press cannot prevent the die from closing.
depth penetration factor	A value used in the ANSI formula for calculating the <i>safety distance</i> . The depth penetration factor is a measure of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts.
diode	A component that reduces or eliminates electrical noise.
dual diverse redundancy	A WPC 2000 feature in which both microprocessor systems belong to different architectures, are programmed using different programming languages, function independently of one other, have separate power supplies, and provide different information to the operator. Dual diverse redundancy provides optimum clutch/brake control and operator safety.
Dual Safety Valve	The control-reliable device on the press that controls the flow of air to the press's clutch.
dwell	The range of angles during which a sensor or cam is actuated, or "on." Also called <i>actuation angle</i> .
emergency stop	A signal sent to the press in response to a malfunction that stops the press immediately.
fault (error) messages	Messages appearing on the SmartPAC 2 LCD that indicate a fault condition.
hand-speed constant	A value used in the ANSI formula for calculating the <i>safety distance</i> . The hand-speed constant is the distance one can theoretically move one's hand and arm in one second. OSHA recommends a hand-speed constant of 63 inches-per-second.
interrupted stroke	A condition that occurs when the press has been Emergency- stopped before the completion of the stroke by either the operator or an automatic device for personnel or equipment protection. During an interrupted stroke condition, the message "Interrupted Stroke" flashes in the status box at the top of the SmartPAC 2 screen.

lockout	A WPC 2000 function that prevents the press from being restarted after clearing of <i>fault messages</i> that indicate serious errors. The lockout condition is indicated by the lockout message, which appears on the SmartPAC 2 display. Lockout provides an added safety feature to the WPC 2000.
lockout message	A message (i.e., "PRESS CONTROL IS IN LOCKOUT MODE") that appears on the SmartPAC 2 display indicating that a serious error condition has occurred.
manual enable	A die protection mode in which sensors are manually enabled or disabled by the operator.
messaging	A SmartPAC 2 feature that allows e-mails to be sent from SmartPAC 2 to networked computers, pagers, text-enabled cell phones and other devices. This feature is set up in SmartView.
Micro-inch	A WPC 2000 feature that allows the operator to set the amount of time in milliseconds that the Dual Safety Valve is open and, therefore, the distance the ram will travel when the Run/Inch switches on the Operator Station are pushed in Inch mode. Micro-inch is designed for high-speed and/or short-stroke presses.
NEMA 12	A rating that certifies that an electrical device is protected against
	dust, water, and oil.
ninety degree (90)° stop- time test	dust, water, and oil. A test required to set the proper <i>safety distance</i> for personnel- guarding devices, including light curtains, two-hand controls, and type-B movable barriers. This test checks the stopping time of the press at its most critical stopping point, normally the midpoint of the downstroke (i.e., 90°), while the press is running in Continuous mode (or Single-stroke if the press does not have a selector setting for Continuous). Stopping time is a value required in the ANSI formula for calculating the <i>safety distance</i> .
ninety degree (90)° stop- time test object sensitivity	dust, water, and oil. A test required to set the proper <i>safety distance</i> for personnel- guarding devices, including light curtains, two-hand controls, and type-B movable barriers. This test checks the stopping time of the press at its most critical stopping point, normally the midpoint of the downstroke (i.e., 90°), while the press is running in Continuous mode (or Single-stroke if the press does not have a selector setting for Continuous). Stopping time is a value required in the ANSI formula for calculating the <i>safety distance</i> . A value required in deriving the <i>depth penetration factor</i> for a light curtain. Object sensitivity specifies the smallest diameter object that a light curtain can detect anywhere in its field.
ninety degree (90)° stop- time test object sensitivity on-off setting	dust, water, and oil. A test required to set the proper <i>safety distance</i> for personnel- guarding devices, including light curtains, two-hand controls, and type-B movable barriers. This test checks the stopping time of the press at its most critical stopping point, normally the midpoint of the downstroke (i.e., 90°), while the press is running in Continuous mode (or Single-stroke if the press does not have a selector setting for Continuous). Stopping time is a value required in the ANSI formula for calculating the <i>safety distance</i> . A value required in deriving the <i>depth penetration factor</i> for a light curtain. Object sensitivity specifies the smallest diameter object that a light curtain can detect anywhere in its field. Stroke angle settings at which the cam channel is to turn "on" (activate) and turn "off" (deactivate).

overrun limit switch	A device mounted on the press to check the accuracy of the crankshaft angle maintained by the resolver. The overrun limit switch consists of a magnet, which is mounted on the crankshaft (or other shaft), and a stationary magnetic switch, which is mounted just above the magnet so that it detects the magnetic field on every stroke. The magnetic switch is also called an "overrun sensor."
	WPC 2000 checks the resolver crankshaft angle by comparing it to the signal received from the overrun limit switch. When the signal is not received at the same resolver angle on every stroke, WPC 2000 knows that the resolver is no longer rotating at a 1:1 ratio with the press.
overrun timing	A WPC 2000 feature that provides a backup for top-stop timing, stopping the press if the top-stop output relay should fail. Overrun timing is a function of the stopping time of the press and is influenced by the condition of the brake linings and press speed. It is also dependent on proper installation of the <i>overrun limit switch</i> .
palm time	The length of time within which the two palm switches on each Operator Station connected to WPC 2000 must be activated in order to start the press. This interval is $1/2$ (0.5) second as required by ANSI. If the palm time on any Operator Station is exceeded, the press will not start. ANSI standards refer to the palm time as <i>synchronous time</i> .
pinch point	The hazardous area between the upper and lower die from which OSHA mandates that the operator should be protected by installation of safety equipment such as light curtains, two-hand controls, and other barriers.
РМА	Stands for Precision Metalforming Association.
reset	A command issued by the operator that allows the press to resume operation after it has been stopped due to a malfunction. The "reset" command clears the fault message from the SmartPAC 2 display. The command is issued by pressing the RESET key.
resolver	An electrical component mounted on the press used by SmartPAC 2/WPC 2000 to provide continuous information about the position of the crankshaft and to maintain a count of the number of revolutions it makes. The resolver, which has internal windings and works on the principle of inductance, turns at a one-to-one ratio (1:1) with the crankshaft.

response time	The length of time it takes SmartPAC 2 to activate the machine's brake.
safety distance	The distance from the pinch point that OSHA requires safety equipment such as light curtains, two-hand controls, and type-B movable barriers to be mounted to assure the safety of the operator. The safety distance is calculated using a precise formula set by OSHA regulations and/or ANSI standards. The formula uses the results of the <i>ninety degree (90°) stop-time test</i> .
security access	Settings made in Initialization that control the amount of access SmartPAC 2 users are given to SmartPAC 2 functions.
slow RPM	A setting used with the auto advance feature that indicates the slowest speed at which the press will be operated.
smart stop	A type of stop programmed for a die protection sensor that sends an emergency stop to the press when a sensor fault occurs before the critical angle or a top stop if the fault occurs after the critical angle. See <i>critical angle</i> , <i>emergency stop</i> , and <i>top stop</i> .
start time	The amount of time it takes the resolver to start turning after the Dual Safety Valve (DSV) is energized.
stopping angle	The number of degrees of crankshaft rotation required for the press to stop after a "stop" command is issued. The stopping angle is calculated by subtracting the crankshaft position when the dual safety valve (DSV) is closed from the press's position when it actually stops. The stopping angle is useful in determining where to set Top Stop and in die-protection settings.
stopping time	The length of time it takes the crankshaft to stop moving after the Dual Safety Valve (DSV) deactivates.
strokes counter	A SmartPAC 2 feature that maintains a count of the number of strokes made by the press. The strokes counter is incremented once for each cycle of the press.
suppressor	A component that reduces or eliminates electrical noise.
synchronous time	The ANSI term for <i>palm time</i> .
TDC	Abbreviation for top dead center.
timing	"ON" settings for critical press parameters like Auto Carry-up Angle and Top Stop, and "ON" and "OFF" settings for cam channels.

A tool on the Tool Manager screen that you can program with settings shared by multiple tools, then use as a "template" to copy the common settings to those tools.
A signal sent to the press in response to a malfunction that stops the press at the top of its current stroke $(0^{\circ})$ .
A feature used to accommodate a press automation function at WPC 2000. This feature works best on presses that have speed ranges of several hundred to over a thousand strokes per minute.
A counter that maintains a count of the total number of hits made by a tool, used in determining when a tool needs regrinding. See <i>counter</i> .
A closure-to-ground signal that turns on at approximately 270° and turns off at 30°. Zero cam can be used with AutoSet load monitors to "zero," or clear, the current tonnage reading. Zero cam is also used with RamPAC to check counterbalance air pressure and with MultiPAC to increment the lube counter.

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## SmartPAC 2 with WPC 2000 Setup Sheet

### Tool Name and Number: \_\_\_\_\_

### **Counter Presets**

	Batch 1 (Ch. 6)	Batch 2 (Ch. 7)	Batch 3 (Ch. 8)
Preset Value			
Output mode (circle one)	Top Stop Toggle Pulse formS	Top Stop Toggle Pulse formS	Top Stop Toggle Pulse formS
Increment mode (circle one)	Strokes Good Parts	Strokes Good Parts	Strokes Good Parts
Increment angle (degrees)			

This tool should be serviced when the TOTAL HITS count reaches

Strokes / Part: \_\_\_\_\_\_ - OR - Parts / Stroke: \_\_\_\_\_

### **Tool Information**

ltem	Value	Units

Tool Memo box text (30 characters, total):


## ProCamPAC Cam Switch – SmartPAC 2 Setup Sheet Channels 1 - 8

## Tool Name and Number: \_\_\_\_\_

Ch. #	Cam Name (function)	Global	Auto	TIMED	DSV-ON	ON/OFF		
	same for all tools	cam?	Adv.?	4 max.	Time to	Multiple are	N/OFF	
		( )	( )	ON angle	shut-off	C 6 ovti	only. Tas. tota	
		Not Ch.	2 max.	ON Time	press	Arc #		
		6, 7 or 8	Program	in mS	stops, in	Normally 1	angle	angle
			ON/OFF		seconds	arc per	<u>9</u>	<u>g</u> .e
			angles			channel,		
						to 4		
1						Arc 1		
				0	590	Arc 2		
					360	Arc 3		
				mS		Arc 4		
2						Arc 1		
				0	sec	Arc 2		
						Arc 3		
				ms		Arc 4		
3						Arc 1		
				0	sec	Arc 2		
				mS		Arc 3		
				1115		Arc 4		
4						Arc 1		
				0	sec	Arc 2		
				mS		Arc 3		
				1110		Arc 4		
5						Arc 1		
				o	sec	Arc 2		
				mS		Arc 3		
				1115		Arc 4		
6						Arc 1		
				o	sec	Arc 2		
				mS		Arc 3		
				1115		Arc 4		
7						Arc 1		
				o	sec	Arc 2		
				mS		Arc 3		
						Arc 4		
8						Arc 1		
				o	sec	Arc 2		
				mS		Arc 3		
				1115		Arc 4		

## ProCamPAC Cam Switch – SmartPAC 2 Setup Sheet Channels 9 - 16

## Tool Name and Number: \_\_\_\_\_

Ch. #	Cam Name (function)	Global	Auto	TIMED	DSV-ON	ON/OFF		
	same for all tools	cam?	Adv.?	4 max.	Time to	Multiple are	N/OFF	
				ON angle	shut off	Only. 6 extras total		
		(•)	(•)	ON time	press	0 exti		
			2 max.	in mS	stops,	Normally 1	NU	anglo
			Program		in	arc per	angic	angie
			ON/OFF		seconds	channel,		
			angles			to 4		
9						Arc 1		
				0	600	Arc 2		
					3ec	Arc 3		
				mS		Arc 4		
10						Arc 1		
				0	sec	Arc 2		
						Arc 3		
				ms		Arc 4		
11						Arc 1		
				<u> </u>	sec	Arc 2		
				mS		Arc 3		
				1115		Arc 4		
12						Arc 1		
				o	sec	Arc 2		
				mS		Arc 3		
				1110		Arc 4		
13						Arc 1		
				°	sec	Arc 2		ļ
				mS		Arc 3		
				1110		Arc 4		
14						Arc 1		
				0	sec	Arc 2		
				ms		Arc 3		
						Arc 4		
15						Arc 1		
				°	sec	Arc 2		
						Arc 3		
40				mS		Arc 4		
16						Arc 1		
				°	sec	Arc 2		
				mS		Arc 3		
						Arc 4		

## DiProPAC Die Protection – SmartPAC 2 Setup Form Sensors 1-16

### Tool Name and Number: \_\_\_\_\_

Sensor	Sensor Name	Sensor Type	Stop Type	Ready Signal
Number	(function)	(circle one)	(circle one)	Timing
1		G R Y GC GQ	E-STOP TOP STOP	ON
		GSstrokes	SMART STOP	OFF
2		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
3		G R Y GC GO	E-STOP	ON
		GSstrokes	SMART STOP	OFF
4		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
5		G R Y GC GO	E-STOP TOP STOP	ON
		GSstrokes	SMART STOP	OFF
6		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
7		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
8		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
9		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
10		G R Y GC GO	E-STOP TOP STOP	ON
		GSstrokes	SMART STOP	OFF
11		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
12		G R Y GC GO	E-STOP TOP STOP	ON
		GSstrokes	SMART STOP	OFF
13		G R Y GC GO	E-STOP	ON
		GSstrokes	SMART STOP	OFF
14		G R Y GC GO	E-STOP TOP STOP	ON
		GSstrokes	SMART STOP	OFF
15		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF
16		G R Y	E-STOP	ON
		GSstrokes	SMART STOP	OFF

Auto Enable Counter

Critical Angle

(for Smart Stop)

0

G=GREEN STD; R=RED; Y=YELLOW; GC=GREEN CONSTANT; GQ=GREEN QUICK CHECK; GS=GREEN SPECIAL

## DiProPAC Die Protection – SmartPAC 2 Setup Form Sensors 17-32

### Tool Name and Number: \_\_\_\_\_

Sensor	Sensor Name	Sensor Type	Stop Type	Ready Signal
Number	(function)	(circle one)	(circle one)	Timing
17		G R Y	E-STOP TOP STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
18		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
19		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
20		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
21		G R Y	E-STOP	Linked to
		GC GQ GSstrokes	SMART STOP	Sensor #
22		G R Y	E-STOP	Linked to
		GSStrokes	SMART STOP	Sensor #
23		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
24		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
25		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
26		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
27		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
28		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
29		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
30		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
31		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #
32		G R Y	E-STOP	Linked to
		GSstrokes	SMART STOP	Sensor #

Auto Enable Counter

Critical Angle

(for Smart Stop)

0

G=GREEN STD; R=RED; Y=YELLOW; GC=GREEN CONSTANT; GQ=GREEN QUICK CHECK; GS=GREEN SPECIAL

# SmartPAC Initialization Setup Sheet

Initialization Menu Item	Initialization Setting	Options
Position Sensor	Position Sensor Mode	Enabled
		Disabled
	Counter Setup Mode	Not incremented in Inch mode
		Is incremented in all modes
Installed Options (e.g., PM Monitor, Feed Control, Press Control, Lube/Speed Control)		
Press Name		
Set Brake Monitor	Stop Time Limit	msec
	Start Time Limit	msec
Select Cam Names	Channel 1	
	Channel 2	
	Channel 3	
	Channel 4	
	Channel 5	
	Channel 6	
	Channel 7	
	Channel 8	
	Channel 9	
	Channel 10	
	Channel 11	
	Channel 12	
	Channel 13	
	Channel 14	
	Channel 15	
	Channel 16	
Auto Advance	Advance Constant 1	
	Advance Constant 2	
	Top Stop Constant	
	Slow RPM	
Custom Sensor Names	Custom 1	
	Custom 2	
	Custom 3	
	Custom 4	
	Custom 5	
	Custom 6	
	Custom 7	·
	Custom 8	·
	Custom 9	· ·
	Custom 10	· ·

# SmartPAC Initialization Setup Sheet (Page 2)

Initialization Menu Item	Initialization Setting	Options
Custom Sensor Names (cont.)	Custom 11	
	Custom 12	
	Custom 13	
	Custom 14	
	Custom 15	
	Custom 16	
Sensor Enable Mode	Sensor Enable Mode	Manual Enable
		Auto by Tool
		Auto by Sensor
Tool Information	Tool 1	Name
		Units
		Places
	Tool 2	Name
		Units
		Places
	Tool 3	Name
		Units
		Places
	Tool 4	Name
		Units
		Places
	Tool 5	Name
		Units
		Places
	Tool 6	Name
		Units
		Places

# SmartPAC Initialization Setup Sheet (Page 3)

Initialization Menu Item	Initialization Setting	Options
Security Access	Load Tool #	Program and Run Modes
		Program Mode Only
		Password Required
	Delete Tool #	Program Mode
		Password Required
		Not Allowed
	Set Counter Preset	Program and Run Modes
		Program Mode Only
		Password Required
	Change Count	Program and Run Modes
		Program Mode Only
		Password Required
	Reset Mode	Program and Run Modes
		Program Mode Only
		Password Required
	Adjust Sensors	Program and Run Modes
		Program Mode Only
		Password Required
	Disable Sensors	Program and Run Modes
		Program Mode Only
		Password Required
	Turn Off Sensors	Password Required
		Allowed
		Not Allowed
	Adjust Cams	Program and Run Modes
		Program Mode Only
		Password Required
	Adjust Feed	Program and Run Modes
		Program Mode Only
		Password Required
	Adjust Tool Info	Program and Run Modes
		Program Mode Only
		Password Required
	Initialize Password	Must Be Used
		Not Required
	Set Passwords Menu	Init. Password
		General Password

## **Press Parameters Setup Sheet**

### **Press Parameters**

(INITIALIZATION-PRESS CONTROL-PRESS PARAMETERS)

Parameter	Setting
TOP STOP DEFLT	
CARRYUP ANGLE	
MICRO TIME [ONLY WITH MICRO-INCH]	
MICRO ANGLE [ONLY WITH MICRO-INCH]	
MAIN AIR LIMIT	
CNTR BAL +/-	
STOP LIMIT	
START LIMIT	
SHUT DOWN TIME	
FLYWHEEL TIMER	
ACTS ANGLE [ONLY WITH AUTO COMPENSATED TOP STOP OPTION]	
PRESSURE UNITS	

### **Press Control Option Switches and Other Mode Settings**

(INITIALIZATION-PRESS CONTROL-PRESS OPTIONS)

These are set to OPEN when you initialize press parameters.		
Circle current setting		
Switch 1	OPEN CLOSED	
Switch 2	OPEN CLOSED	
Switch 3	OPEN CLOSED	
Switch 4	OPEN CLOSED	
Switch 5	OPEN CLOSED	
Switch 6	OPEN CLOSED	
Switch 7	OPEN CLOSED	
Switch 8	OPEN CLOSED	

Circle current setting		
DUAL OPERATORS	SCREEN MODE REMOTE SWITCH NOT USED	
AUTOMATIC MODE	ENABLED DISABLED	
TWO HAND ONLY	ENABLED DISABLED	




LED GROUP 1 #5 Q,



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FIGURE 1

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ENG. MFG.		WPC2000 OPERATOR STATION WIRING							
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- 15 PIN CONNECTOR





CUSTIMER SUPPLIED AUXILLIARY RELAY. DUTPUT IS NORMALLY CLOSED. IT OPENS WHEN THERE IS A FAULT CONDITION, WHEN AN E-STOP STRING OPENS OR A LIGHT CURTAIN IS INTERRUPTED WHILE THE PRESS IS RUNNING.



CUSTOMER SUPPLIED AUXILLIARY RELAY. DUTPUT IS NORMALLY OPEN. IT CLOSES WHEN THERE IS AN INTERRUPTED STROKE OR THERE IS A FAULT CONDITION PRESENT. THE DUTPUT ALSO CLOSES WHILE INCHING THE PRESS.



E-STOP DUTPUTS: THESE DUTPUTS ARE INTENDED TO INTERFACE WITH ANCILLARY EQUIPMENT SURREDUDING THE PRESS. THESE DUTPUTS ARE NORMALLY CLOSED. THEY DPEN IF THE E-STOP STRING IS INTERRUPTED, THE LIGHT CURTAIN IS INTERRUPTED DR CROSS-CHECKED USER INPUT IS DPEN.

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C DUTPUT #30 RRDUND	LIGHT CURTAIN A (J COOOOOO COOOOOO Z C Z C Z C C C C C C C C C C C C C	123) LIGHT C E E H LIGHT C	URTAIN A	(J124) T	
C INPUT #77 D A IN 1	GROUP 7 #2				
C INPUT #87 D A IN 2	GREUP 7 #3				
C DUTPUT — #27 CURTAIN A ENABLE					
C INPUT #78 D B IN 1	GROUP 1 #4				
C INPUT #88 D B IN 2	GROUP 5 #6				
C OUTPUT — #35 CURTAIN B ENABLE	LIGHT CURTAIN B (J D O O O D O O O Z Q Z Q SET TO NPN W	LIGHT C	URTAIN B	(38L)	
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		MUTE 1	24VDC 0 #66	I			
GRP 4 #10	WPC INPUT			₩/BLK #1 AND #2			
	WPC INPUT	PALM TIME LAMP DUT	#65 -				
GRP 3 #9	#21 O			WHITE #1 AND #2			15 PIN CONNECTOR
	WPC INPUT	LAMP DUT	#64 – (°				
GRP 4 #9	#20 O+ DSV MONITOR		WPC INPUT	GREEN #2		W/BRN #2	
	WPC INPUT	URP 4 #8	PRIDE ACT IN N/C			W/BLK #2.	
	SPECIAL 4	PRIOR ACT B OUT		GREEN #3		GREEN #2	
GRP 4 #6	WPC INPUT #18 O					YELLOW #2	
	USER IN 11 -	PRIOR ACT IN	#61	IGREEN #1		VIOLET #2	
GRP 4 #5	#17 O		WPC INPUT		+	BLACK #2	
	WPC INPUT	GRP 4 #3	#60 O- T-STOP B2 IN			DRANGE #2	DPERATOR STATION CABLE #2
GRP 4 #4	#16 O- BAR ACTUATE		WPC DUT	YELLOV #3		W/YEL #2 RED #2	
	WPC INPUT		#59			GREY #2	
	AUTE ACT. N/C	TOP-STOP A2 IN	WPC INPUT	YELLOV #1		BLUE #2	
GRP 3 #3	WPC INPUT #14 O		#58				
		GRP 4 #2	#57 O	BRUVN #2		RED #3	
GRP 4 #1					+	DRG #3 BRDWN #3	
	WPC INPUT	E-STOP B2 OUT	#56 O	JREUWN #3		YELLOW #3	
GRP 3 #2	#12 O		WPC INPUT	BRDVN #1	+	GREEN #3	
$\mathbf{b}$	WPC INPUT	L	E-STOP A2 IN	1√IDLET #1	++	VIDLET #3	OPERATOR STATION CABLE
GRP 3 #1	' #11 O					BLACK #3	#3
TB102						GREY #3 BLUE #3	
	Г	— — — <sub>–</sub>					OPERATOR STATION A
		\^ \^	/PC TERMINAL #54 O	BLACK #1 AND #2			15 PIN CONNECTOR
		L	GROUND				
		ľ	WPC DUTPUT #530-	V/RED #1 AND #2	L	W/BRN #1 W/BLK #1.	
	#9 O		+24VDC	BLUE #3, VIDLET #3	L	WHITE #1	
		GRP 2 #6	WPC INPUT #52 O			GREEN #1 YELLOW #1	
GRP 1 #5						BROWN #1	
	WPC INPUT	TOP-STOP B1 OUT	#51			BLACK #1	
GRP 1 #3	#7 O- MTR FRWD		WPC INPUT	DRG #1		W/RED #1	OPERATOR STATION CABLE
	WPC INPUT	TUP-STUP AT IN	#50			W/YEL #1	#1
	BAR SELECT	TOP-STOP OUT A	WPC DUT	↓ ₩/YEL #1		GREY #1	
GRP 2 #4	WPC INPUT #5 O-					W/DRG #1	
		GRP 2 #3		RED #2			
GRP 1 #2							
	WPC INPUT	E-STOP B1 OUT	#47				
GRP 2 #2	H3 O DNE HAND		WPC INPUT	RED #1			
	WPC INPUT		#46	BLUE #2			
	PALM B N/C	E-STOP OUT A	WPC_BUT #45_O	<sub>V/DRG #1</sub>			
GRP 1 #1	WPC INPUT			BLUE #1			
	PALM A N/C						
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o WPC #17 (Motor	revers	e input)		
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## DUTPUT FUNCTIONS:

SPEC 1 AND ZERO CAM - BOTH ON IN CONTINUOUS ON DEMAND SPEC 2 (#123) - ON IN FOOT CONTINUOUS SPEC 1 (#124) - ON IN TWO HAND CONTINUOUS ZERO CAM (#125) - ON IN AUTO S.S COUNTER (#126) - ON IN FOOT S.S CHAN 4 (#127) - ON IN ONE HAND S.S CHAN 3 (#128) - ON IN TWO HAND S.S CHAN 2 (#129) - ON IN ALL INCH MODES AND BAR MODE

CHAN 1 (#130) - ON IN OFF MODE

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DUTPUT CONNECTOR ON EDGE DE VPC 2000 BOARD TB109 122 (GND) 122 (GND) 123 (SPEC 2) 124 (SPEC 1) 125 (ZERU CAM) 126 (COUNTER) 127 (CHAN 4) 128 (CHAN 3) 129 (CHAN 2) 130 (CHAN 1) TO DSV RESET SOLENDID								
ADB Chk.	DATE 6/27/11	- WINTRI	WINTRISS CONTROLS GROUP					
APPROVALS								
ENG.	WPC 2000 OPERATING MODE							
MFG.		- DUTPUT WIRING						
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LIGHT CURTAIN A (J123) LIGHT CURTAIN A (J124) LIGHT								
		LED G WPC INPUT O #87 SHAD 1 IN B	ROUP 7	#3				
		WPC DUTPUT O #42 +24 VDC						
		LED	GROUP	7 #2				
		WPC INPUT O #77 SHAD 1 IN A		,				
DRAWN ADB CHK.	DATE 6/27/11	- WINTRI	SS CE	INTROLS O	ROUP			
APPROVALS ENG. MFG.		TITLE WPC 2000 AND SHADOW VII						
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2000 LIGHT CURTA ATED ON WPC MAIN URTAIN A (J123)	IN MODE BOARD) LIGHT ( C E TERNAL	JUMPERS	4)	
LED ( WPC INPUT 	GREUP 7	#3		
WPC TERM -O #30 GND				
LED	GROUP	7 #2		
WPC INPUT 	$\mathbf{\hat{\mathbf{A}}}$			
WINTRI	SS CI	INTROLS C	ROUP	
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SH4 WF	ADOV ) PC 2000	VII DIN CON D WIRING DIA	TROL AGRAM	
CODE IDENT NO.	size B	DRAWING FIGUF	NUMBER RE 21	REV
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DESCRIP	DATE	APP'	D		
SWITCHES SWA FLIP DOOR ON 2 UNIT AS FOLL	AND S' BOTTOM DWS:	WB DF THE			
UTEMATIC START NABLED	-		SWA SW1 - OFF SW2 - ON	SWB OFF ON	
CODE A (Set to CODE B	o match	n transmitter	) SW3 - OFF SW3 - ON	OFF ON	
ING/BLANKING 1 ING/BLANKING 1	BEAM BEAM E	DISABLED ENABLED	SW4 - OFF SW4 - ON	OFF ON	
BLANKING DISA BLANKING ENAB	ABLED LED		SW5 - OFF SW5 - ON	OFF ON	
RANGE RANGE			SW6 - DFF SW6 - DFF	OFF ON	
WITCH BEHIND <sup>-</sup> DF THE TRANSM S:	THE FLI ITTER l	P DOOR JNIT			
IDE A (Set to ) IDE B	match r	receiver)	SW1 - OFF SW1 - ON		
SABLED		:	SW2 - OFF		
WINTRI	SS CI	INTROLS	GROUP		
WPC 2000	) ANI WIRIN	) SHADOW 8 G DIAGRAM	3 CONTROL	BDX	
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DE SWITCHES S A FLIP DOOR [ /ER UNIT AS F[	WA ANI IN BOTT ILLOWS:	) SWB TOM OF THE			
			21	√A S	WB
AUTOMATIC ST	ART		SW1 -	JFF	OFF
DISABLED			2M5 -	OFF	DFF
N CODE A (Set N CODE B	to ma	tch transmitt	ser) 2M3 - 1 2M3 - 1	JFF JN	OFF ON
ATING/BLANKINO ATING/BLANKINO	5 1 BEA 5 1 BEA	M DISABLED M ENABLED	SW4 -   SW4 -	JFF JN	OFF ON
ED BLANKING I	DISABLE NABLED	D	SW5 -   SW5 -	JFF JN	OFF ON
RT RANGE G RANGE			SW6 - SW6 -	OFF OFF	OFF ON
SWITCH BEHIN IM OF THE TRAI OWS:	ID THE NSMITTE	FLIP DOOR R UNIT			
CODE A (Set 4 CODE B	to matc	h receiver)	SW1 - OFF SW1 - ON		
DISABLED			SW2 - DFF		
WINTRI	SS CI	INTROLS (	GROUP		
	WPC 2 VII	2000 AND SH Ring Diagra	IADOV 8		
E IDENT ND.	size R		NUMBER		REV
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,, inclussi		SW1	sw2	
leflt)		POS 1 - OF	F OFF	
		POS 1 - ON	DN	
leflt)		POS 2 - ON		
		POS 2 - OF	F OFF	
RT (Deflt)		POS 3 - OF	F OFF	
INTERLOCK		POS 3 - ON	۵N	
		POS 4 - OFF	- OFF	
ENABLED (Def	~lt>	POS 5 - ON	DN	
BLED		POS 5 - OF	F OFF	
KING DISABLED	(Deflt	> POS 6 - OF	F OFF	
KING ENABLE	D	POS 6 - ON	DN	
		POS 7 - OF	F OFF	
		POS 8 - OF	F OFF	
BEHIND THE				
	LK UNI			
t> POS 1 - OFF	-			
PUS 1 - ON				
POS 2 - OFF	F POS 3	- OFF		
) POS 2 - ON	POS 3	– DN		
POS 4 - OFF	-			
WINTR	ISS	CONTRO	LS GRO	IUP
WPC 200	0 AN	D SHADOW	9 CONTR	OL BOX
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	RE∨ISIONS					
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TCHES SW1 AND SW2						
INIT AS FOL						
			SW1 SW	2		
A (Deflt)		POS	1 - OFF OF	F		
ЕB		POS		٧		
ED (Deflt) BLED		PDS PDS	2 - ON ON 2 - OFF OF	F		
START (De-	flt) RLOCK	POS POS	3 – DFF DF 3 – DN DN	F		
		POS	4 – OFF OFF			
NKING ENABL DISABLED	ED (Deflt)	POS S POS	5 – ON ON 5 – OFF OF	F		
BLANKING DI BLANKING I	SABLED (Def Enabled	it> POS	6 – OFF OF 6 – ON ON	F		
		POS	7 - OFF OF	F		
		POS	8 - OFF OF	F		
CHES BEHIN IF THE TRA S: (Def(t) POS B POS E POS (Def(t) POS POS	D THE FLIP NSMITTER UN 1 - OFF 1 - ON 2 - OFF POS 2 - ON POS 4 - OFF	DOOR NIT 3 - OFF 3 - ON				
WINTR	ISS CO	NTROI	LS GRO	UP		
WPC	: 2000 AN WIRING I	D SHAI Diagra	9 W 9			
IDENT ND.	SIZE	DRAWIN	NG NUMBER	RE∨		
	в	FIG	IURE 27			
		s	HEET O	F		



	RE∨	ISIONS					
DESCR	IPTION		DATE	AF	P'D		
N WPC 2000	WPC 2000 BOARD						
CURTAIN 1	(J124)						
⊥ ⊥ ⊥ X Z I E							
L TEST							
NOTE 1: T transmitte not used entrance	The whit er and t . Cut th and tyr	e, yellow and k the pink wire fro em off close to rap them to the	black wires f om the recieve the encolsure to ther wires.	`rom t er are e	:he		
NOTE 2: T latter to it's lengtf	NOTE 2: The red wire from the receivers may be used latter to control a remote status indicator. Preserve it's length. Just coil up and tyrap to the other wires.						
C 2000 BOA	RD						
	22>						
L H							
EST							
WINTR	ISS	CONTROL	_S GRO	UP			
WPC	2000 VIRI	) AND DUAL	SHADOW	9			
IDENT ND.	SIZE	DRAWIN	IG NUMBER		RE∨		
	В	FIG	URE 28				
		S		-			