Honeywell

User Manual

SmartPAC® Hydraulic

Press Automation Control
System kit: 1122000
Manual only: 1120800 Rev. A   November 2000

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

Thank you for purchasing a Honeywell 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.

- **Technical Assistance**

  We offer a toll-free line for technical assistance. Call our Wintriss Tech Support Hotline at 1-800-586-TECH (8324) should you have any questions about your equipment. Our technical staff is ready to assist you Monday through Friday, 8 a.m. to 5 p.m. EST. In many cases our experienced technical staff can resolve your inquiry right over the phone.

- **Return Authorization**

  Please call our "800" number for a return authorization (RA) number to return a product for repair. Return goods must arrive freight prepaid. In order to process your return quickly, we ask that you provide us with the following pertinent information when you call: order number, order date, shipping address, contact name and telephone number, and product type. The assigned RA number should appear on all packages returning to Wintriss Controls Group to ensure prompt service. Please be sure to carefully pack all returned items.

- **Restocking Charge**

  Returned goods are subject to a 20% restocking charge if returned for credit. The minimum charge is $50, not to exceed $250 per item.

- **Service and Training Centers**

  We have 2 major centers for product repair, field service, and training, located at our Wintriss Controls Group in Acton, Massachusetts, and at our Wintriss Midwest Service Center in Carol Stream, IL. If your equipment requires service, return it to us at either location. Remember to include the assigned RA number on all packages you are returning. For your added convenience, we are proud to offer our guaranteed 48-hour turnaround time on light curtain returns. Rush service on our other products is available on request.

  We also conduct a variety of seminars geared towards your changing needs including product training, safety, die protection and troubleshooting. We invite you to inquire about our frequently held sessions.

- **Board Exchange Program**

  If your needs are urgent, you can take advantage of out Board Exchange (EX) program. The EX program applies to SmartPAC, Wintriss Clutch/Brake Control (WPC), Spectrum, and all 1500 series products. Call our "800" number between 8 a.m. to 5 p.m. EST and we will air-freight a replacement to you overnight. You will be charged a $100 processing fee. For out- of-warrantee equipment, there is a $100 processing fee plus any applicable repair charges.

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.

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How to use the manual

This is the installation and reference manual for SmartPAC Hydraulic. It has information about how to install SmartPAC Hydraulic and use all the displays to make die protection sensor settings and programmable cam settings.

Chapter 1 introduces you to SmartPAC Hydraulic, tells how it works — specifically about the optional die protection (DiProPAC) and programmable cam (ProCamPAC) features, and explains how to use this product.

Chapter 2 is the installation chapter. Use it to install SmartPAC Hydraulic if you are installing it yourself. This chapter includes installation of the DiProPAC and ProCamPAC options.

Chapter 3 is an introduction to the SmartPAC Hydraulic displays and keyboard. Read this chapter to get started using SmartPAC Hydraulic. It shows you how to select items on the SmartPAC Hydraulic displays and how to perform key tasks. It also explains the various keys available. This chapter is the place to start for learning how to use the SmartPAC Hydraulic displays and keyboard.

Chapter 4 explains how to use SmartPAC Hydraulic in Initialization mode. Use it to look up things you need to know about using SmartPAC Hydraulic in Initialization mode.

Chapter 5 explains how to use SmartPAC Hydraulic in Program mode. Use it to look up things you need to know about Program mode.

Chapter 6 explains how to use SmartPAC Hydraulic in Run mode. You can look up things you need to know about Run mode.

Chapter 7 shows you fault messages or other types of messages you will see on your display when SmartPAC Hydraulic sends a stop command to the press or when there is an equipment or software problem. What the message means and how to correct the problem is explained. Use this chapter to learn about all the SmartPAC Hydraulic diagnostic messages.

Appendix A is about the optional PM (Preventative Maintenance) Monitor available with SmartPAC Hydraulic. It explains what it is, how it works, and application examples. It also provides instructions on using it in Initialization and Run modes (not used in Program mode).

A Glossary of Terms includes definitions of key terms related to SmartPAC Hydraulic.

Warranty

Honeywell Wintriss Controls Group 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 (PACNet and RSR), electro-mechanical 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. Honeywell'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 Honeywell freight prepaid, and which are, after examination, disclosed to the satisfaction of Honeywell., 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 Honeywell. No other warranty is expressed or implied. Honeywell 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. Honeywell manufactures its products to meet stringent specification and cannot assume responsibilities for those consequences arising from their misuse. SmartPAC Hydraulic, AutoSet load monitors, DiPro 1500, IC Controllers, ProCam 1500, Sensors, Spectrum Systems, and Wintriss Load Analyzers are not designed or intended for use as personnel protection devices.

Chapter 1
Introduction to SmartPAC Hydraulic

SmartPAC Hydraulic is a smart modular interface for a multiple of hydraulic press automation functions. SmartPAC is widely used on mechanical presses. We decided to keep the user interface for die protection and program cams similar to the mechanical SmartPAC. SmartPAC Hydraulic uses the same user interface.

The down stroke is converted into 0 to 180 degrees and the upstroke from 181 to 359 degrees. If you are familiar with mechanical SmartPAC, you will notice a new selection called "Ram Position". This must be programmed properly for SmartPAC Hydraulic to work correctly. The top and bottom linear positions from this selection are used to calculate the degrees of rotation mentioned above.

Every SmartPAC Hydraulic includes a magneto-strictive position transducer, eight-channel programmable cam switch, and extensive counter capabilities. SmartPAC Hydraulic features a large, bright LCD display, highly visible LED readout, a numeric keypad, and other easy-to-use keys to program and run the job.

SmartPAC Hydraulic can be optionally configured to include; return on pressure capability, up to sixteen-sensor die protection system, two or four-input load monitoring, servo-feed interface and preventive maintenance monitor. Each of these add-ons optimizes SmartPAC Hydraulic as a comprehensive hydraulic press automation package. In addition, SmartPAC Hydraulic can be optionally linked to a remote computer that collects essential data from the pressroom.

CAUTION

If this is a retrofit, do not disconnect all the existing linear and pressure sensors from your control. During installation, we will tell you to disconnect an old input and replace with new input in the same place.

How SmartPAC Hydraulic will benefit your operation

SmartPAC Hydraulic brings a multitude of press automation functions to one central location. Here are some of the benefits you will come to appreciate when using your SmartPAC Hydraulic.

Standard features:

• All the settings are made at the operator console using SmartPAC Hydraulics' large LCD display and keyboard.

• All settings for a die are automatically saved in SmartPAC Hydraulics' non-volatile memory. To use the settings when you run the job again simply re-load your stored tool number and you are ready to go. SmartPAC Hydraulic can save settings for up to 200 tools.

• Programmable upper and lower limits.

• The display, while running, shows specific diagnostics when a malfunction occurs, and when any counter presets have been reached.

Optional die protection:

• Monitors up to 16 sensors to detect malfunctions such as stock buckling, part misplacement, misfeeds, and improper part ejection

Optional Programmable cam switch features:

• Provides cam timings for upper limit lower limit, speed change, feeder signals and other hydraulic press equipment.

SmartPAC Hydraulic Front Panel

When you turn power on to SmartPAC Hydraulic, the press reading appears in the LED display. As soon as the press is running, the display switches to show the press speed. A description of each component on the front panel plus an illustration of the front of SmartPAC Hydraulic follows:
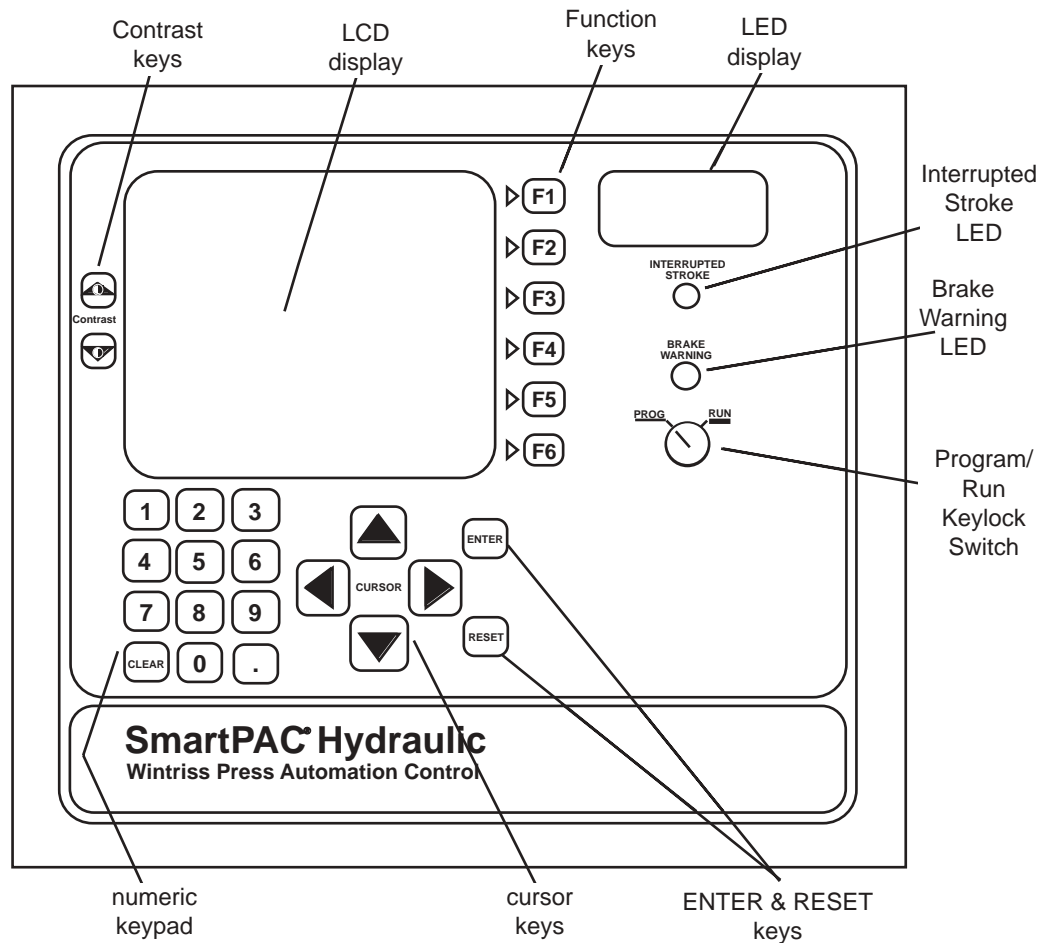
Figure 1-1. SmartPAC Hydraulic front panel

LED Display	Three-digit display shows strokes per minute when the press is running; when the press stops, the display shows the ram angle
LCD display	A large, bright 4.88" x 3.69" (10.91 x 9.37 cm) liquid crystal display used along with the keyboard to make and adjust settings, to load tool numbers, and to view diagnostic messages
Screen contrast keys	These keys adjust the brightness of the LCD display; simply press either one to make the necessary adjustment
Program/Run key	Allows you to lock the Program mode so settings cannot be changed. The key must be set at "Run" to operate the press.

	Minor adjustments, including loading an existing tool number, can be made in Run mode
Keyboard	Consists of various key and a numeric keypad described below. You use these keys along with the LCD display to make settings (covered in detail in Chapter 3, "Using the keyboard")
Cursor keys	Used to move the selection bar over the item on the display you want to select; also used to select alphabetic characters and special symbols when naming the press, tools, cam channels, and sensors
Number keys	Used to input numeric values, such as counter presets or tool numbers
Function keys	Periodically used to perform certain tasks in SmartPAC Hydraulic. The message on the LCD display will identify the specific function key number to depress (from F1 to F6).
ENTER key	Used after making a selection on the display. You also press the ENTER key after keying in a number to accept the number.
RESET key	Used to reset SmartPAC Hydraulic after fault messages appear on the display. Also used to let SmartPAC Hydraulic know you are "all done"

How SmartPAC Hydraulic works

The transducer lets SmartPAC Hydraulic know where the press is

SmartPAC Hydraulic is connected to a transducer mounted on the press, which reads the ram position. As the transducer moves up and down, its signals are interpreted by SmartPAC Hydraulics' electronics to determine the correct ram position at every point in the stroke. SmartPAC Hydraulic converts the signal from the transducer at any point in its linear motion to a number corresponding to the position of the transducer (and ram) in degrees.

SmartPAC Hydraulic makes various decisions simultaneously

SmartPAC Hydraulic comes with a powerful counter. SmartPAC Hydraulics' optional programmable cam and optional die protection capabilities can make instantaneous decisions for 8 cams and/or up to 16 sensors respectively. Because SmartPAC Hydraulic is microprocessor-based, it can monitor or control all these different functions during a press stroke. Additionally, it saves these settings to up to 200 tools.

Settings you can make on SmartPAC Hydraulic

All settings are made using the keys on the SmartPAC Hydraulic keyboard. Eight channels for controlling press equipment and up to sixteen sensors can be used with SmartPAC Hydraulic. For complete instructions on how to make settings, see Chapter 4—Programming. Here are settings you can make:

- **Assign tool numbers for tools**. You assign a tool number to your settings. This is how you keep track of all settings you make. Every tool can also be assigned a name for easy identification, and you can store additional reference information about each tool and its settings.

- **Load settings by tool number.** SmartPAC Hydraulic saves all counter settings, cam switch settings (if optional Output Assembly is installed), and sensor settings (if DiProPAC is installed) in its electronic memory. The settings are stored by tool number. To use the settings for a tool again, you recall them by selecting the tool number from the tool display. You never need to make the same settings for a tool over again. You can save up to 200 tool numbers. Settings are saved automatically as you make them. You do not have to tell SmartPAC Hydraulic to save settings by pressing a key or issuing a command. When you load the stored tool number, SmartPAC Hydraulic loads all the settings for the tool and retains the settings even when power is off. A lithium battery within the memory chip supplies power to save these settings for up to ten years when the unit is turned off.

- **Record information for each tool number.** With this option you can record up to 30 characters of customized information for each tool, plus six other useful pieces of information, i.e. material.

- **Protect settings with lockout and optional password security.** Using SmartPAC Hydraulics' security access menu in Initialization mode, you can lock many of the settings in Run mode or require a password in order to change them. This prevents

anyone from changing settings in Run mode without the Program/Run key, or changing them at any time without the necessary password. To prevent unauthorized changes to the SmartPAC Hydraulic setup, you can require a special password in order to access the Initialization menu.

- **Set counters.** The stroke counter increments at each press cycle. The good parts counter counts only "good" parts if the die protection and/or tonnage monitoring option do not generate a fault. SmartPAC Hydraulic has three batch counters that can be set to either top-stop the press, or signal programmable limit switch (PLS) outputs when their presets are reached. The total hits countercounts 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 up 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 Hydraulic**. When the SmartPAC Hydraulic detects a malfunction it will stop the press then the operator can reset the unit. SmartPAC Hydraulic gives you specific fault messages for a malfunction, which makes it easy to troubleshoot. See Chapter 7 for a complete description of errors.

- **Review recent errors.** SmartPAC Hydraulics' Error Log feature displays the 32 most recent errors that caused the press to stop. You can easily view the Error Log from the Run menu at any time. It lists the error code along with the stroke count and crankshaft angle when the error occurred.

- **Set timing for cam channels.** You can signal your press control, in many cases a PLC, as to where your upper and lower limits are, and signal material feeder, assembly operations; air cylinders, transfer devices, lubricators, air blow-off, cut off, loader/unloader controls and other equipment that requires precise timing with the press. And you can assign a name to each cam channel.

SmartPAC Hydraulic with DiProPAC

- **Set timing sensor inputs.** You can monitor up to 16 sensors to detect mal-functions such as stock buckling, misfeeds, die overload, and improper part ejection.

Sensors available for DiProPAC

SmartPAC Hydraulic with DiProPAC is the controller, the part of your die protection system that checks signals from sensors and sends a stop signal to the press when a malfunction is detected. Sensors connected to SmartPAC Hydraulic are mounted to the press or die to monitor what is happening in the dies.

Any electro-mechanical sensor can be used with SmartPAC Hydraulic as long as it can switch between an open state (sensor circuit to SmartPAC Hydraulic open) and a closed state (sensor circuit closed to ground or "grounded"). All types of NPN/PNP electronic sensors (proximity, photoelectric, fiberoptic) can be used. Simple contact sensors and probes can be used as well. If you have questions about whether a certain sensor will work with SmartPAC Hydraulic, do not hesitate to call Honeywell's Wintriss Controls Group.

Honeywell's Wintriss Controls Group makes or sells a wide range of sensors. Below are sensors, which can be connected to SmartPAC Hydraulic with DiProPAC. Many sensors

made by other manufacturers can also be used. Detailed application information is available on Honeywell's Wintriss Controls Group sensors listed below.

- **Miniature fiberoptic photoelectric sensors**—thru-beam and reflective types with adjustable sensitivity detect objects as small as .0006 in. (.015 mm). Requires 12 to 24 Vdc for power.

- **Proximity sensors**—miniature electronic sensors that detect metal objects passing in front of the sensor barrel. Sensors have no moving parts and are not affected by water or oil. Requires 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**—for contacting material at the fully advanced position.

- **Overload sensors**—for preventing expensive die damage due to overload from slugging, material thickness variations, broken tooling, or other causes.

- **Die overload sensors**—designed to detect minor changes in shut height.

- **Buckling sensor**—for detecting material buckle

- **End of material sensor**—signals when material runs out.

- **Probes**—three types available for diverse applications.

Understanding sensor terminology

In order to make the proper settings for your sensors using the SmartPAC Hydraulic display; it is beneficial to know what certain terms mean. You will see words on the display, such as ready on, ready off, N/C (normally closed), N/O (normally open), green, green quick check, green constant, yellow, and red. If you are familiar with die protection sensors and controllers, you will know what most of these terms mean already. If you do not, these key words are explained on the next page.

Normally open, normally closed

These terms refer to the way a sensor operates. A **normally open** (N/O) sensor actuates (signals SmartPAC Hydraulic) when the sensor circuit to SmartPAC Hydraulic switches from open to closed to ground. Normally open sensors are broadly classified as yellow or green sensors.

A **normally closed** (N/C) sensor works just the opposite of normally open. The sensor circuit to SmartPAC Hydraulic is closed to ground in its normal state. The sensor actuates when the circuit opens. Normally closed sensors are classified as red sensors. Most contact type sensors can be used as either normally open or normally closed depending on how they are connected. Most sensors are used as normally open just because you do not have any current flowing in the normal state. Some electronic sensors can be switched to work either as normally open or normally closed.

Ready signal

The **ready signal** is the portion of the stroke where a sensor must actuate. For many of your sensors, like those that monitor part ejection, blow-off, or feed advance, you need to be sure that the event occurs during a specific portion of <u>each</u> stroke. If the event occurs late, or not at all, you are likely to have tooling damage. The ready signal tells SmartPAC Hydraulic when to expect the actuation from the sensor. A ready signal is set only for sensors classified as cyclic (green) sensors. These are sensors, which monitor events that must occur on every stroke.

The term "ready signal" comes from older die protection systems where you had to set a mechanical cam switch on the press to send a signal to the die protection unit during the portion of the stroke where the sensor had to actuate. SmartPAC Hydraulic eliminates all this extra work because it automatically knows the position of the ram at every point in the stroke. But we still use the term "ready signal" because it is widely understood.

To set a ready signal on SmartPAC Hydraulic, you just key in the degrees of the stroke where the sensor must actuate. The beginning point is called **ready on**. The end point is **ready off**. A separate ready signal can be set for each green sensor. If the sensor does not actuate (closure to ground) during the ready signal, SmartPAC Hydraulic will send a stop command to the press. The type of stop can be an emergency return or emergency stop (see "Considerations for setting sensor stop type" pg. 12).

Impedance

The term **impedance** refers to the opposition to the flow of electric current. Some die protection controls have inputs with different impedances for electromechanical sensors. 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.

An optional "low impedance" 16-channel DiProPAC module (#9632904) is available. This option is necessary when wire probes depend upon a part/strip to complete the circuit, and the part/strip is covered with a water-based conductive lubricant. If you decide that you require this option rather than the standard DiProPAC, contact Honeywell's Wintriss Controls Group immediately to order that part, *prior to installing DiProPAC* (discussed in Chapter 2).

Sensor types

Sensors used with die protection systems are classified as red, yellow, or green. For SmartPAC Hydraulic with DiProPAC, there are four types of greens—green, green quick check, green constant, and green special.

When you make settings for a tool, you select the sensor type for each sensor connected to SmartPAC Hydraulics'sensor inputs. You can have any combination of reds, yellows, or greens for a tool. You will see how to select sensor type in Chapter 5 where you learn how to make sensor settings. Here we discuss what each type means.

Yellow sensors

Yellow sensors are normally open to ground. They are ideally suited to monitor events like stock buckling, end of stock, or die overload. SmartPAC Hydraulic sends a stop command to the press as soon as the sensor actuates. The stop type can be set for either an emergency or emergency return (see "Considerations for setting sensor stop type" pg. 12). Because yellow sensors work independent of the ram angle and do not actuate every stroke like green sensors, you do not set a ready signal for yellow sensors.

Red sensors

Red sensors are normally closed to ground. SmartPAC Hydraulic sends a stop command to the press — either emergency return or emergency stop (see "Considerations for setting sensor stop type" pg. 12) — as soon as the sensor opens (actuates). Red sensors are used where it is more convenient to use a normally closed sensor instead of a normally open one. Red sensors can monitor the same types of events as yellow sensors—die overload, end of stock, buckling, etc. No ready signal is set for red sensors.

Green sensors

Any sensor set to green, green quick check, or green constant must be cyclic. In other words, it must actuate during a portion of each stroke (during the ready signal). An actuation is a closure to ground. If the sensor does not actuate, SmartPAC Hydraulic sends a stop signal to the press. You can select an emergency stop or emergency return.

Green sensors are used to detect 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 Hydraulic displays the degrees of the stroke where the sensor turns on and where it turns off. This makes it easy to set the ready signal for the sensor. You just make the ready signal a little longer or shorter than the actuation time (depending on the sensor). See the procedures in Chapter 5 and Chapter 6 for complete instructions on making and adjusting sensor settings.

The four types of green sensors are described on the next page.

Green

When you set a sensor input to "green," the sensor must turn on at least momentarily during the ready signal. Also the sensor must be off, at least momentarily, at any point outside of the ready signal.

KEY	OK	OK	not allowed (press stops)	not allowed (press stops)
= Ready Signal = Sensor Actuation	TDC BDC Sensor actuates inside ready signal	TDC BDC Sensor stays on after the end of ready signal	TDC BDC Sensor isn't off outside ready signal. Stop signal sent at start of next ready signal.	TDC BDC Sensor never turns on. Stop signal sent at end of ready signal.
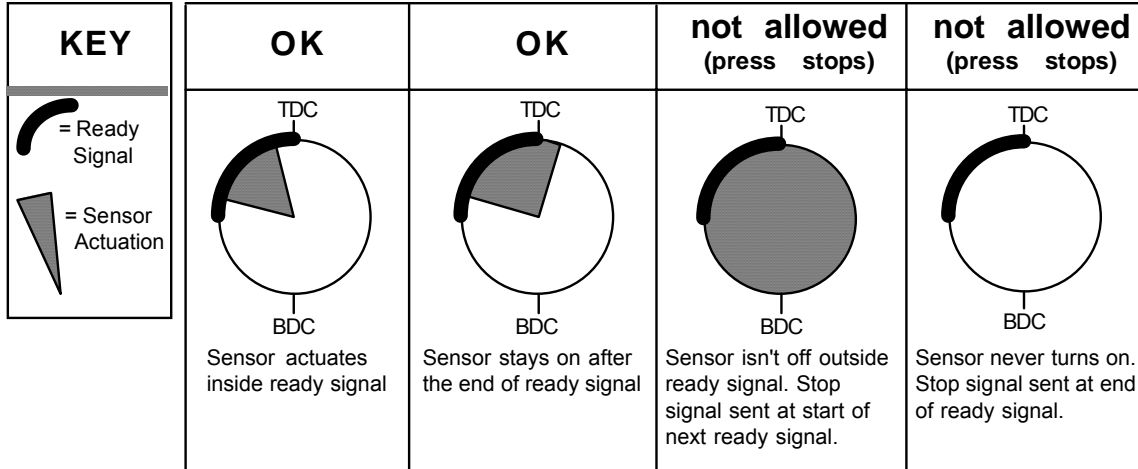
Figure 1-2. How SmartPAC Hydraulic interprets signals from a sensor set to "green"

Green quick check

A sensor input set to "green quick check" is almost the same as the "green" setting. The sensor must turn on at least momentarily within the ready signal. However, a green quick check sensor *cannot stay on or turn on* outside the ready signal. The sensor must turn on, then turn off within the ready signal. Otherwise, SmartPAC Hydraulic sends the stop signal to the press.

KEY	OK	not allowed (press stops)	not allowed (press stops)		
= Ready Signal = Sensor Actuation	TDC BDC Sensor actuates only inside ready signal.	TDC BDC Sensor never actuates. Stop signal sent at end of ready signal.	TDC BDC	TDC BDC	TDC BDC
			Sensor actuates outside ready signal. Stop signal sent when sensor is on outside ready signal.		
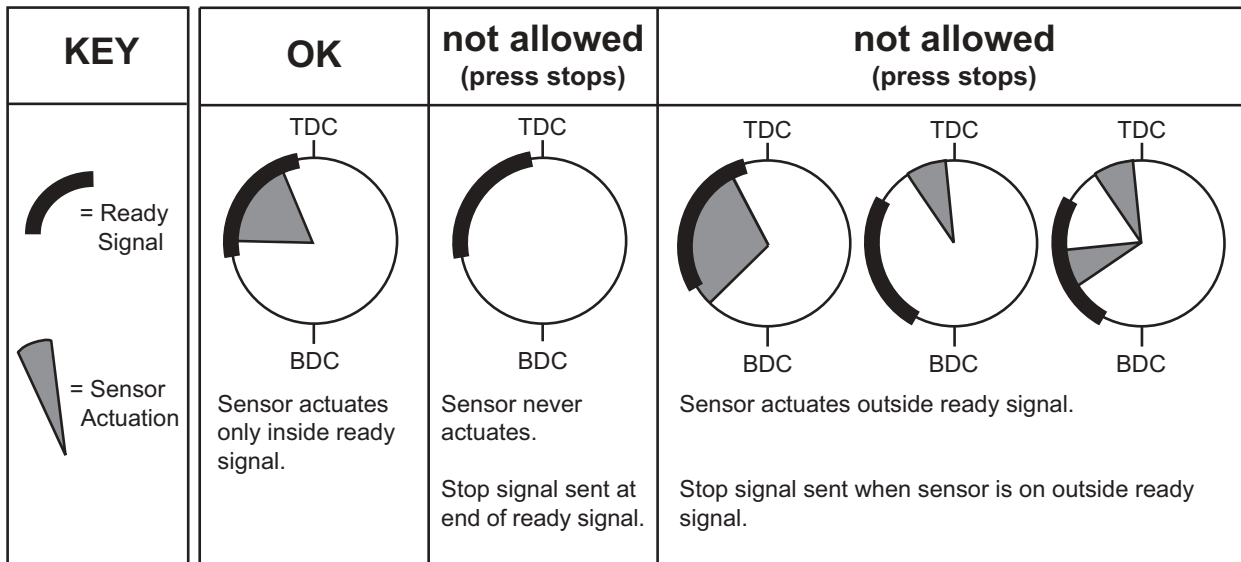
Figure 1-3. How SmartPAC Hydraulic interprets signals from a sensor set to "green quick check"

Green constant

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. That is, it must stay actuated constantly during the ready signal. However, the sensor must turn off, at least momentarily, outside the ready signal.
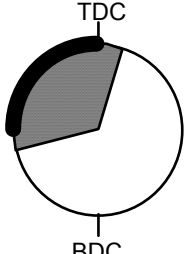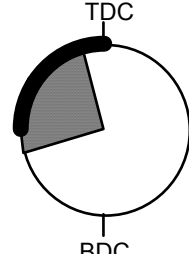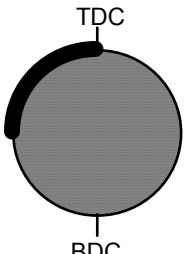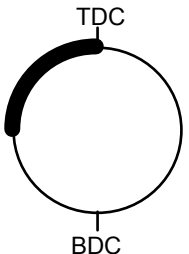
OK	**not allowed** (press stops)	**not allowed** (press stops)	**not allowed** (press stops)
TDC BDC	TDC BDC	TDC BDC	TDC BDC
Sensor stays on during complete ready signal.	Sensor turns off before ready signal ends. Stop signal sent when sensor turns off.	Sensor doesn't turn off outside ready signal. Stop signal sent at start of next ready signal.	Sensor never turns on. Stop signal sent at beginning of ready signal.

Figure 1-4. How SmartPAC Hydraulic interprets signals from a sensor set to "green constant"

Green special sensors

CAUTION

The green special sensor type is not foolproof. It is possible that an undesirable number of slugs could stack up in an ejection hole, while still satisfying a green special sensor's requirements.

Here is how it can happen: Referring to the example 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 (remember, there are still five slugs in the ejection hole). The press then makes five more strokes without ejecting a slug. There are now ten slugs stuck in the hole! Using this logic, 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.

Green special sensors are specifically designed to effectively monitor slug ejection. They are generally used to detect slugs excessively stacking up in a slug ejection hole. When slugs are ejected through the bottom of the die, they do not necessarily discharge on every stroke. It is normal for several strokes to occur with the slugs sticking in the hole before they finally

break free and all 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 slugs must come out at some time and will cause the sensor to change state. Instead of happening once per stroke like a typical green sensor, the green special 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 this sensor actuating.

Here is how it works: You install a sensor so that it will actuate when a slug passes through the slug ejection hole. In this example, assume that the die clears all the slugs out of this particular ejection hole about every four strokes. You know that something is wrong if the press makes six stokes without ejecting a slug. You would set the sensor type to "Green Special" and set the number of stokes to six. If no slugs are ejected after six strokes, the press will stop.

Considerations for setting sensor stop type

You can set the way SmartPAC Hydraulic stops the press for each sensor — emergency stop and emergency return. Here are a few general guidelines for how to set stop type.

Use **emergency stop** (E-Stop) when you want to stop the hydraulic pump. If you are monitoring a part misplacement that could happen anywhere in the stroke you would probably want to set the sensor for a **Top Stop** sometimes called **emergency return**. An E-stop setting here may cause the press to stick on bottom. That's because the stop signal would be sent just as the ram is about to contact the material.

Connecting cam channels to your equipment

With SmartPAC Hydraulic you have received a separate assembly for wiring eight cam channels to your equipment. The assembly contains the relays that open and close on signals from SmartPAC Hydraulic to turn your equipment on and off. 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 Hydraulics' three modes of operation

You can do various things with SmartPAC Hydraulic depending on the mode you are in.

- **Initialization Mode.** Used to make settings that generally only need to be made once after installation. You can set cam names and lock out certain setting parameters. Initialization mode is discussed in detail in **Chapter 4**.

- **Programming Mode.** Used to make your sensor and cam timing, counter, and other settings (if installed) for your tools. You cannot use this mode while the press is running. You can load settings for a tool in this mode. The displays you see in Program mode are described in **Chapter 5**.

- **Run Mode.** You must be in Run mode to operate the press. You can adjust timing for your sensors and cam channels (if installed) while the press is running. You see actuation angles for green sensors. You can also load tool settings in Run mode. The settings you can make in Run mode are explained in **Chapter 6**.

Specifications

Equipment	Main encl. 12.76" x 10.53" x 5.28" (32.41 x 26.75 x 13.41 cm), shock mounted. Panel mount: 12.3" x 10.3" x 6" (31.24 x 26.16 cm) Linear position transducer: Magnetostrictive; electrical stroke = 6 to 48" in 6" increments, 2.6" x 2.6", overall length = 7.4" + elect. stroke DiPro Sensor Interface: 5.88" x 4.35" x 3.35" (14.94 x 11.05 x 8.51 cm) Input power requirements: 105-132VAC, 50/60 Hz, 500mA Output voltage: 24VDC, +/- 5% Output current: 420mA (Note: DSI provides power for linear position transducer)
Electrical	Input: 115/230 VAC 50/60 Hz, 30 VA
Counters	Good parts, strokes, and 3 batch with presets (up to 7 digits) Number of hits on tool counter: Resettable to zero after Maintenance; counts all hits on tool
Display	20 line x 40 character; 4.88" x 3.69"; (10.91 x 9.37 cm) Liquid Crystal Display (LCD)
Memory	Executive program: EPROM User program: battery on chip static RAM; allows storage of settings for 200 tools
Inputs/ Outputs	Inputs for position transducer, remote reset input, setup mode input Emergency Return (Top Stop), Emergency Stop outputs: ratings 0-4A resistive @ 120V max. (AC or DC); Normally open—Held closed. Fault condition or power off opens relay(s).

Options	• DiProPAC provides up to 16 sensor inputs
	   • Power for electronic sensors (NPN only): 12 Vdc min., 100 mA total
	   • Sensor inputs 1 through 4 and 9 through 12: Low impedance
	   • Sensor inputs 5 through 8 and 13 through 16: High impedance
	   • Optional sensor inputs for all 1-16: Low impedance (<1000 Ω)
	   • Order additional DSI when 16 sensors are required
	   • DiPro RCB: 4.56" x 2.56" x 4.06" (11.6 x 6.5 x 10.3 cm)
	
	• ProCamPAC provides 8 programmable cam channels
	   • Programmable cam output assembly (holds up to 8 outputs)
	   • Enclosure: 9" x 11" x 3.5" (22.9 x 27.9 x 8.9 cm) shock-mounted
	   • Relay SPDT 0-3A resistive @ 240V
	   • DC solid state SPST 2A @ 5-60 Vdc
	   • AC solid state SPST 1A @ 70-250 VAC
	
	• AutoSetPAC[1] 10.25" x 12" x 4" (26 x 30.5 x 10.2 cm)
	   • 2 or 4 strain link inputs
	   • Can store high, low, and repeatability setpoints with tool number
	   • Display, adjust, recalculate "auto" setpoints and display actual load
	
	• SFI[1] ServoFeed Interface which integrates servofeed
	• Communications with PACNet Computerized Pressroom Reporting[1] &
	   RSR™[1] at host PC
	• Preventative Maintenance (PM) Monitor
	• Bilingual[2] (English/Spanish) status/adjustment

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[1] Consult that product's user manual. (I.e., DSI: #1100000; AutoSetPAC: #1101600; PACNet
   Computerized Pressroom Reporting #1109000 [includes RSR] or RSR Standalone: #1110700.

[2] Optional bilingual (English/Spanish) manuals available upon request (#1102900).

Chapter 2
Installing SmartPAC Hydraulic

This chapter describes how to install SmartPAC Hydraulic. It covers:
- Installation guidelines and overview
- Checking the press and setting press to upper and lower limit
- Mounting the SmartPAC Hydraulic control enclosure
- Installing panel mount (optional)
- Installing the magneto-strictive transducer
- Installing pressure transducer
- Connecting DiPro Sensor Interface
- Connecting AC power and stop circuits
- Power-up pre-checks and turning power on
- Final checkout

In addition, this chapter also covers installation of optional features, such as:
- Connecting programmable cam channels
- Upgrading SmartPAC Hydraulic module (DiProPAC)
- Replacing SmartPAC Hydraulic module (ProCamPAC)
- Wiring setup mode circuit
- Wiring remote reset switch
- Wiring a sensor-disabled relay output
- Final assembly if SmartPAC Hydraulic is installed as a panel mount

---

CAUTION

If this is a retrofit, do not disconnect all the existing linear and pressure sensors from your control. During installation, we will tell you to disconnect an old input and replace with new input in the same place.

Before you start

If you plan to install SmartPAC Hydraulic yourself, read this installation chapter entirely before you start. Find out what is required and plan your steps before taking any action. SmartPAC Hydraulic is not hard to install. But like anything else, when you are working with something new, the best way to proceed is to learn all you can about it *before* cutting wires, drilling holes, or running conduit.

You will need to use the keyboard and display during installation. Therefore, before you start installation, you should have a good basic knowledge of how to use the SmartPAC Hydraulic keyboard and displays in order to make settings. This will speed things along. *If you run into*

any problems installing SmartPAC Hydraulic, remember that Honeywell's Wintriss Controls Group service advisors are available to help you.

An installation tip

Here is a tip for learning how to use SmartPAC Hydraulic before you install it. Hook up AC power to both SmartPAC Hydraulic and DSI. Then interconnect the transducer and transducer power wiring. You can do this in an office rather than on the press floor. You can then use all the menus and make settings. Once you are familiar with the SmartPAC Hydraulic displays and keyboard, start the installation. You will be able to get SmartPAC Hydraulic up and running faster.

Installation Guidelines

These guidelines cover major points that are important for proper SmartPAC Hydraulic operation. By following these guidelines, you will eliminate problems that could occur later. The points below are addressed again in the installation procedures.

- Never run wires for 120V and for lower voltages (such as 24V, 60V) inside the same conduit. Run flexible, liquid-tight conduit for high voltage lines (120V power and relay circuits) to the upper right-hand corner of SmartPAC Hydraulic. Run one or two low voltage conduits into the lower left-hand corner of SmartPAC Hydraulic for the transducer and communications control wires. Because SmartPAC Hydraulic 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 with the enclosure.

- The AC power supply wires to SmartPAC Hydraulic should be run separately from the DC control wires run to the ProCam output assembly. Never use the SmartPAC Hydraulic power terminals as a junction point to provide power for external devices. In most cases, the AC power supply wires should be connected directly to the press control transformer at the press control.

- The communications wiring must not be run with any other wires. These wires will be installed if SmartPAC Hydraulic is connected to a Servo Feed Interface (SFI™), AutoSetPAC, RSR™, Remote Storage & Retrieval, or Computerized Pressroom Reporting.

- Do not use the ProCam output enclosure as a junction box for the AC control wires. Provide a separate junction box for this purpose.

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

- All relays, solenoids, or other inductive loads that are controlled by SmartPAC Hydraulic must be suppressed. Suppressors should be installed <u>across</u> the load and as close to the load as possible. *Never install a suppressor across relay contacts.* The suppressors can fail shorted. In some cases, suppressors are required in the Top Stop (Emergency Return) and Emergency Stop (E-stop) circuits. Additional suppressors can be obtained from Honeywell's Wintriss Controls Group.

Transducer

ProCamPAC
outputs
assembly

DiPro
Sensor
Interface

SmartPAC

Main
Valve
Control

Connections for AC wiring,
top stop wiring and emergency
stop wiring should be made
inside the press control.
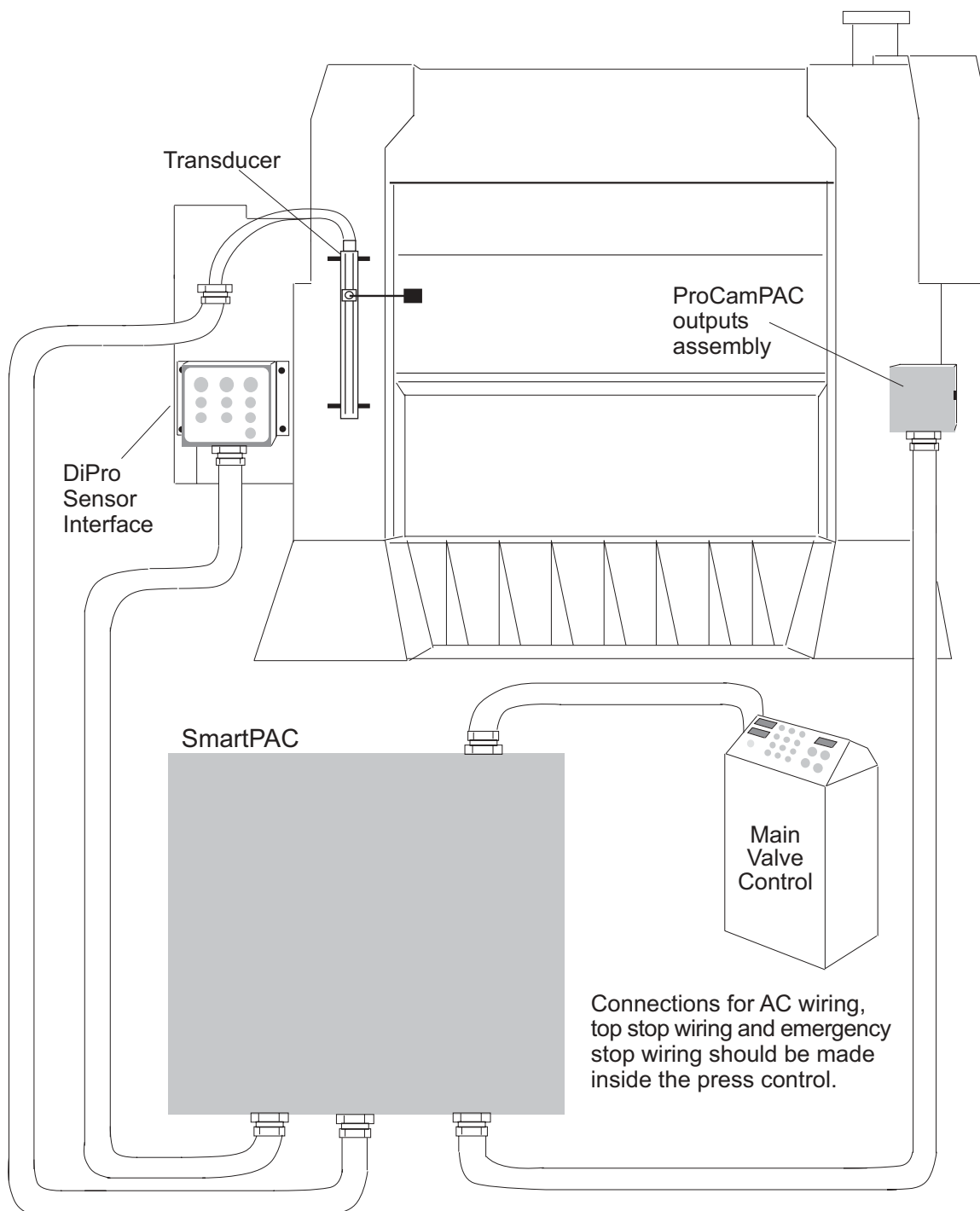
Figure 2-1. Installation overview

> **WARNING! PREVENT SHOCK!**
> Disconnect the main power before installation. All power to the press, PLC, and other equipment used with the press must be off during installation. Installation must be performed by qualified personnel only.

Overview of the installation

Figure 2-1 on the preceding page shows SmartPAC Hydraulic installed on a press. Study the drawing to get a general idea of what you will receive and what you will need to do. Of course, where you put the components (transducer, DSI, the SmartPAC Hydraulic itself, etc.) will probably be different for your installation. Your exact wiring scheme may also be different (where you connect AC power, stop circuits, etc.) however, in general, this is what your installation should look like when you are done.

The drawing also shows how to properly run your wiring based upon the previous guidelines. If you have top stop and emergency stop circuits that are 24V or other voltage *besides* 120V; you must run these wires separately.

A communications hook-up to a computer is not shown in the drawing. If you are installing wiring for communications, remember that communications wires must not be run with other wires.

The first step—checking the press

Before starting the installation, remove the die from the press. Then **check all modes of press operation**. Run the press in JOG, RUN, and CONTINUOUS modes. Make sure the press has working Top Stop (Emergency Return) and Emergency Stop circuits. Verification that the press operates and stops properly is extremely important because SmartPAC Hydraulic is tied in to the press stop circuits. Do not forget to mark your electrical prints where you wire in SmartPAC Hydraulic. Set the press ram to Upper Limit.

Mounting the SmartPAC Hydraulic control enclosure

To mount the enclosure, follow these steps:

> **PLACE SmartPAC Hydraulic AT A CONVENIENT HEIGHT**
> SmartPAC Hydraulic should be installed at a convenient height for all users. An ideal height is to have the top edge of the unit approximately at chin level. Experiment to determine a good height for everybody before mounting.
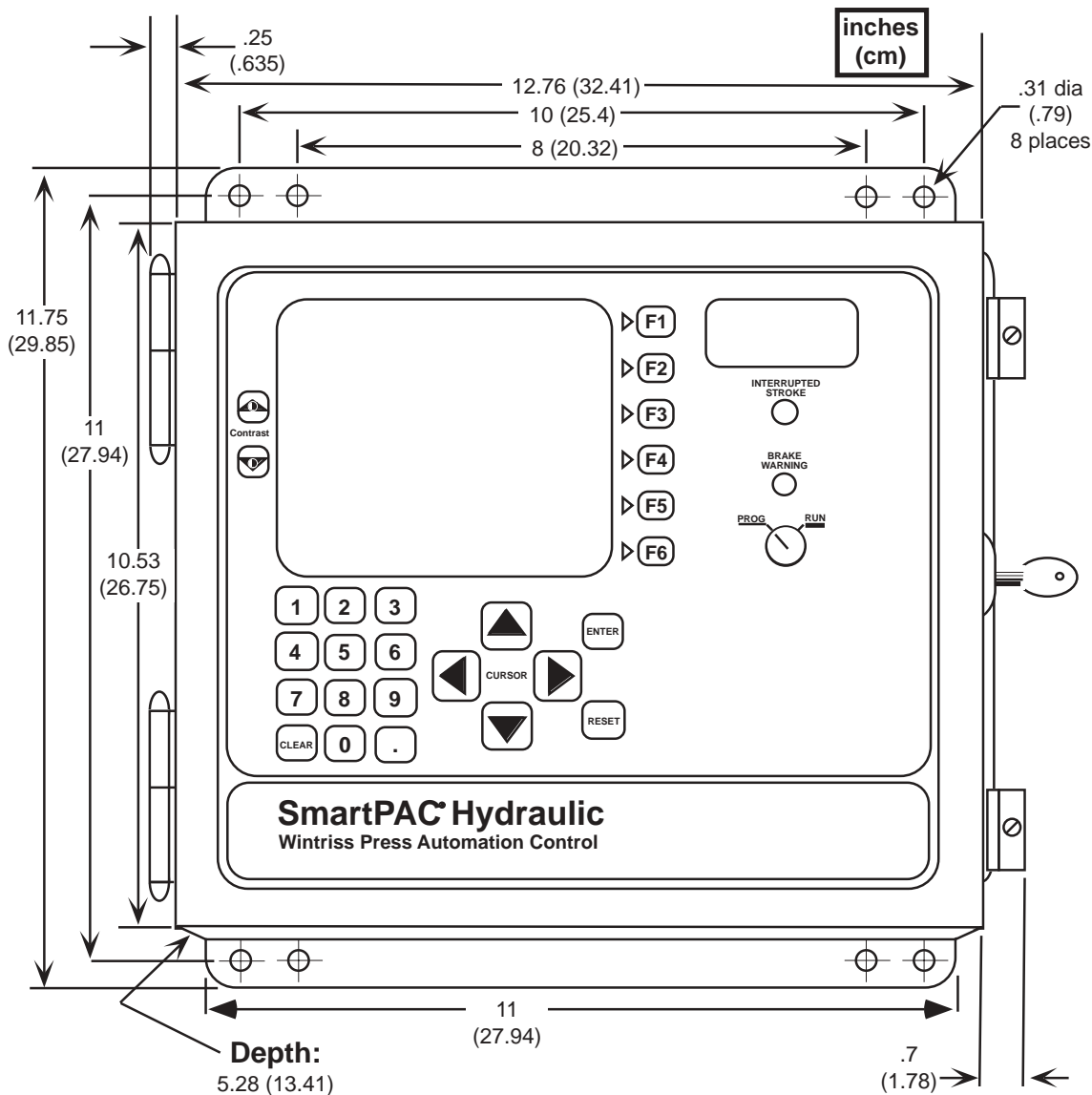
Figure 2-2. SmartPAC Hydraulic mounting dimensions

1. Determine a convenient place for the control enclosure. Ideally it should be close to where operators and setup personnel can easily see the readouts and reach the keyboard. Make sure all cables will reach. Leave enough room to open the door at least 120°. The enclosure can be mounted on a pedestal, pendant, or on the press itself. SmartPAC Hydraulic is also available for panel mounting

NOTE

If your SmartPAC Hydraulic is a panel mount, go to the next section for special installation instructions, as well as mounting and cutout dimensions.

2. Drill holes for mounting. Shockmount studs are 1/4–20. Tap holes (if necessary) and mount the enclosure using the enclosed shock mounts. Use a No. 7 drill and 1/4–20 tap.

Installing SmartPAC Hydraulic as a panel mount

This section explains how to install your SmartPAC Hydraulic as a panel mount. After you complete this section, refer to the remainder of the chapter to complete your installation.

Standard Enclosure versus Optional Panel Mount

SmartPAC Hydraulic is available either with an enclosure or as a panel mount. The panel mount can be mounted from the inside or outside. Be sure to allow *at least* 4" (10.2 cm) of clearance behind the panel-mounting plane to allow enough room for the electronics.

Preparation for mounting SmartPAC Hydraulic using your enclosure

To prepare for mounting SmartPAC Hydraulic using your panel enclosure, follow these steps:

1. Determine a convenient place to mount SmartPAC Hydraulic into your panel enclosure. Ideally it should be close to the press control so operators and setup personnel can easily see the readouts and reach the keyboard.

2. Cut out a hole in your panel enclosure, and drill and tap twelve holes for #10-32 screws. Refer to Fig. 2-3, Pg. 21 for mounting and "cutout" dimensions.

3. Temporarily mount SmartPAC Hydraulic near the location where it will ultimately be mounted. You can do this by connecting tie wraps from two of the left holes on the panel to the corresponding holes on the enclosure for a hinge-like effect. Allow up to 9" of service loop when performing the wiring connections. Also make sure all cables will reach.

4. Refer to the remainder of this chapter to complete the entire installation.

5. When the installation is complete, go to "Final assembly" Pg. 50 at the end of this chapter to mount SmartPAC Hydraulic into your panel enclosure.
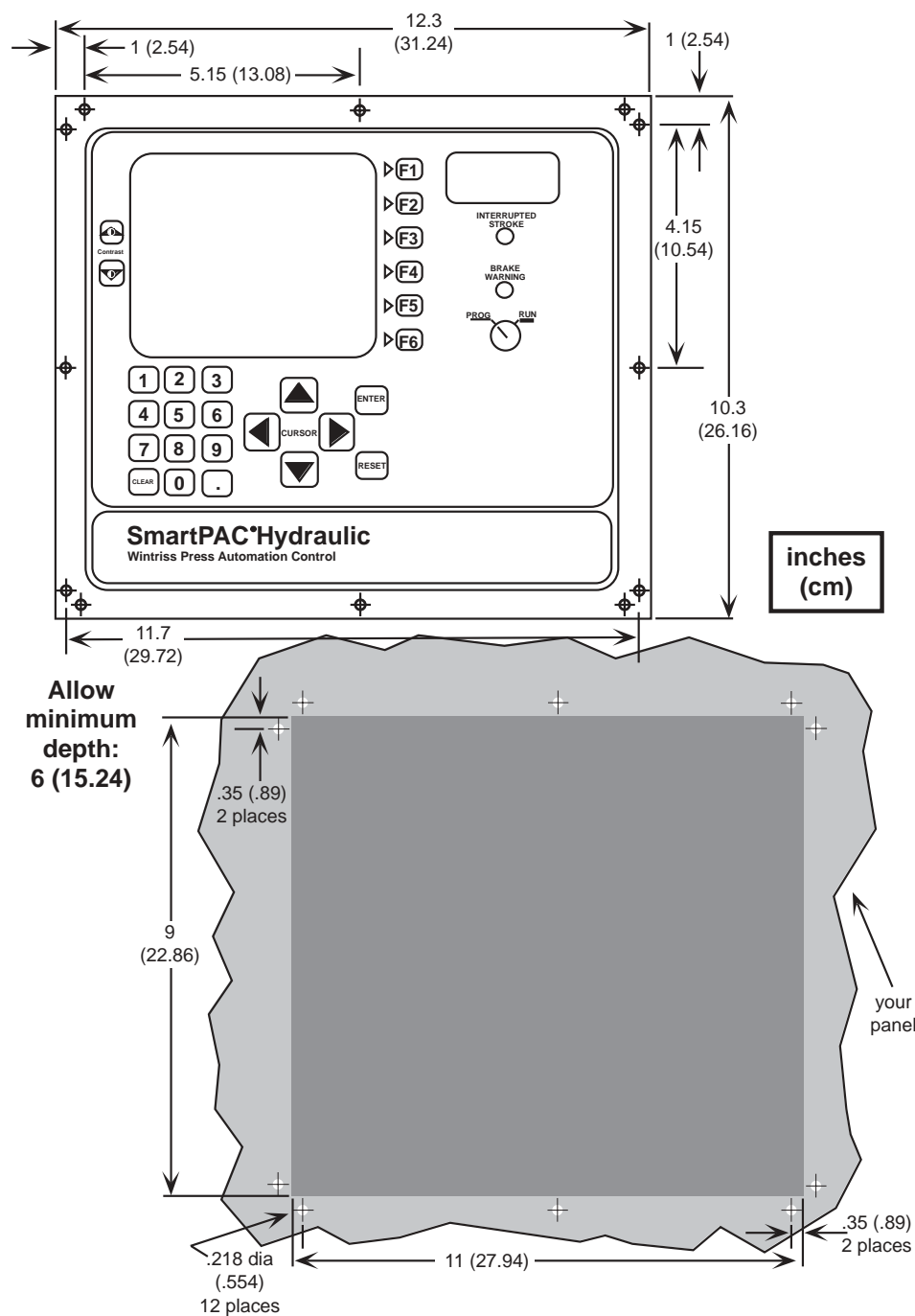
Figure 2-3. Mounting & cutout dimensions for SmartPAC Hydraulic panel mount
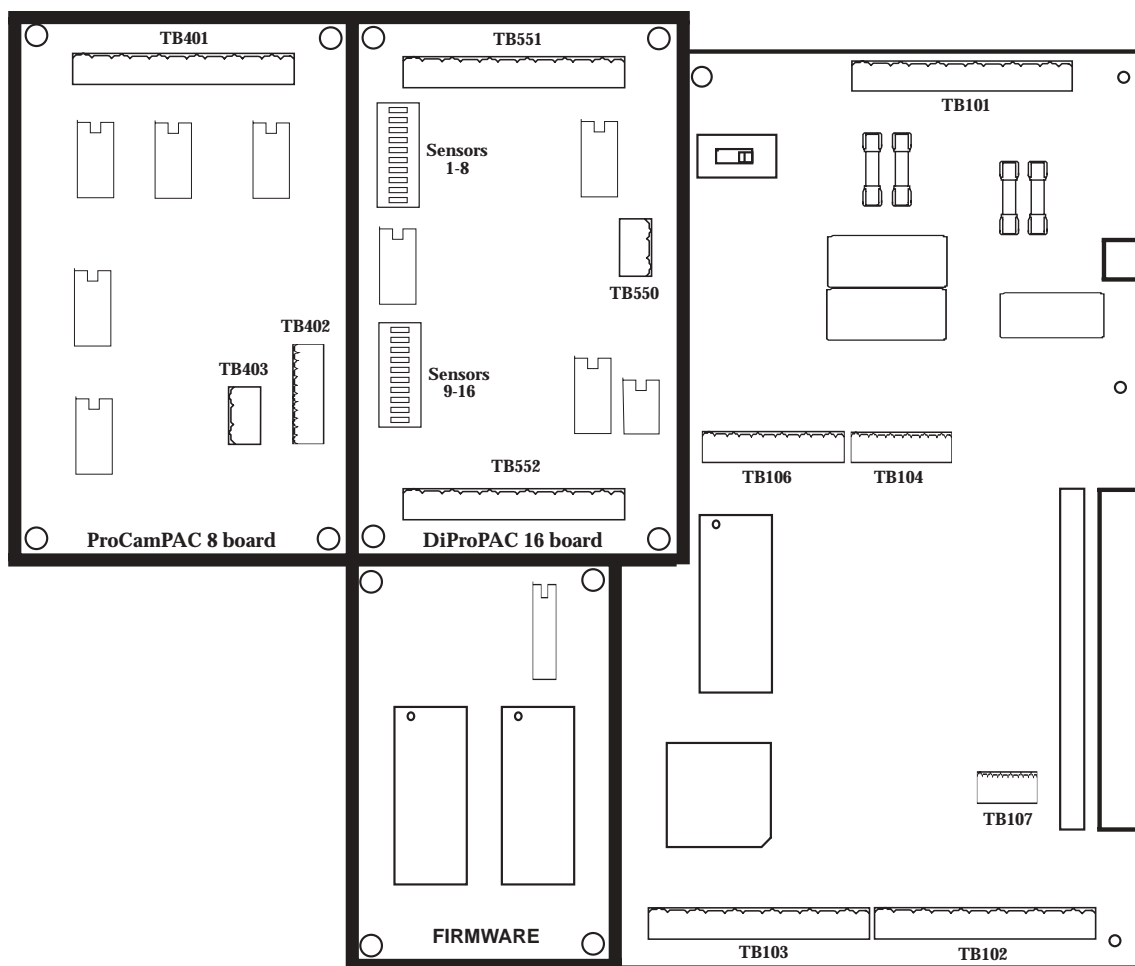
**Figure 2-4. ProCamPAC, DiProPAC, & Firmware boards
superimposed on SmartPAC Hydraulic**

NEITHER the Firmware, ProCamPAC, nor DiProPAC boards are interchangeable. Therefore it is important that you install each of them correctly. SmartPAC Hydraulic will recognize whether the DiProPAC is 8 or 16 configuration or none if not installed.
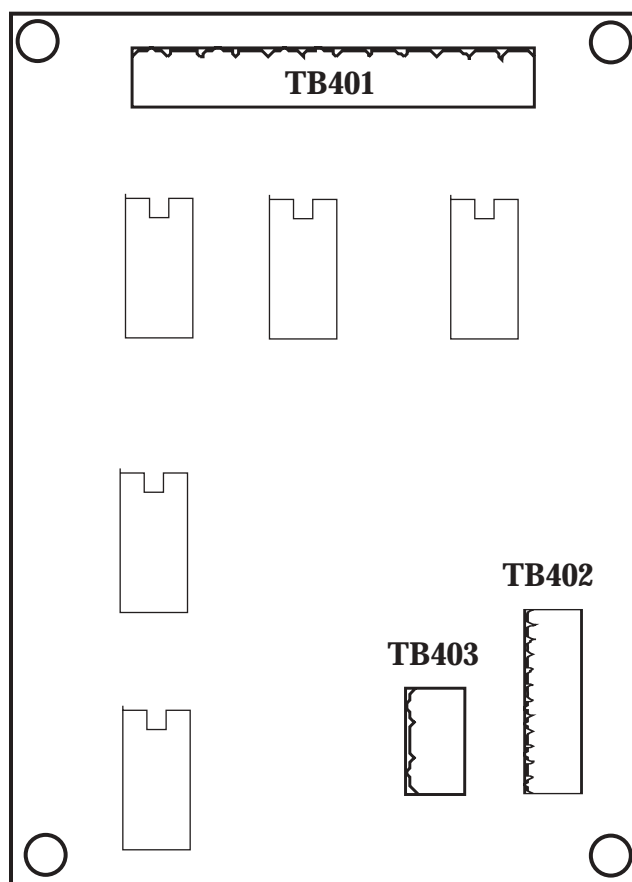
ProCamPAC 8 board

Figure 2-5. ProCamPAC board location of important components

Installing the magneto-strictive transducer

The transducer provides SmartPAC Hydraulic with the exact position of the ram at any point in the stroke (for more detail see "How SmartPAC Hydraulic works" in Chapter 1). If you chose to use ProCamPAC to control the bottom and top positions of the press, the magneto-strictive sensor needs to be mounted in a way to duplicate the current limit switch action. Mount the sensor close to the existing limit switches and use the same actuation mechanism if possible. If you don't put the transducer near the limit switches, SmartPAC Hydraulic may fail to operate correctly.

CAUTION!

It's important that the transducer cable be facing up. If the cable is facing down the transducer will not work properly.

1.1"
(28 mm)

2.4" **2.6"**
(60 mm) **(66.4 mm)**

1.9" **.04"**
(50 mm) **(1 mm)**

2.7"
(68 mm)

Shown Sideways

2.4"
(62 mm)

2.9"
(73 mm)

.6"
(15 mm)

1.6"
(40 mm)

physical length

Max. electrical stroke

2.9"
(73 mm)

.6"
(15 mm)

**Shown
installed**
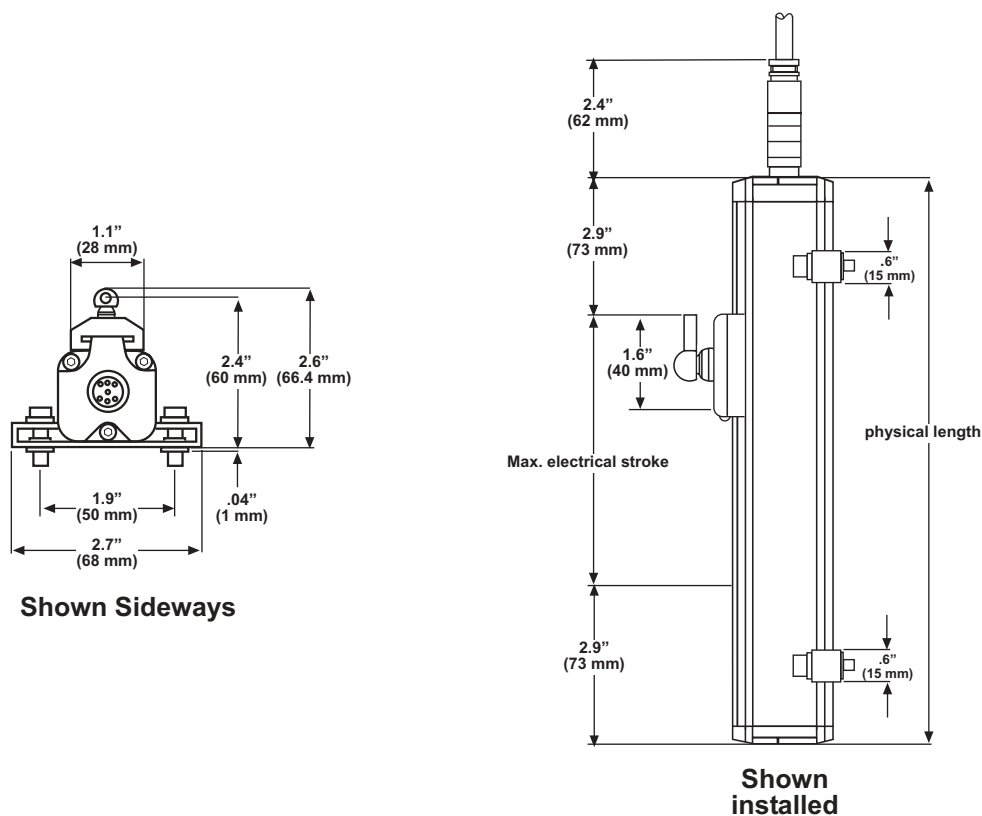
Figure 2-6. Transducer (reflects dimensions)

Install and wire transducer

Once you have thought out your design and gathered the parts, mount the transducer by bolting it to a plate then to the press or other platform at the spot you selected. See Fig. 2-1, Pg. 17. *The press should be at upper limit when you do this.*

Note: Not all Hydraulic presses are the same. Each installation will be different. The following is installation procedures for straight side hydraulic presses.

Bolting the transducer to a straight side press:

1.   Make up a bracket that will fit the length of the transducer and its mounting feet.

Table 2-1. Number of Magneto-strictive Transducer mounting feet

Transducer Length	Number of mounting feet
6 - 12"	2
18 - 24"	3
30 - 36"	4
42 - 48"	5

Make sure the bracket mounting holes are elongated or oval shaped as so the transducer can move up & down. This is done so the transducer has some play while finding the perfect spot on the press for mounting.

2. Make a second bracket that will mount to the ram and hold the magnet connecting rod. Mount the plate to the press.

3. Mount the transducer to the plate being sure you leave it loose for adjustments.

 Note: The mounting feet came with insulators. They must be installed properly for electrical isolation.

4. Attach the second bracket to the ram and connect to the magnet to the rod. Make sure the magnet is within the electrical range and the arrow on the magnet is facing the electrical connection when the press moves up and down. A line on the face of the transducer denotes the beginning of the electrical range. If the magnet falls outside of the electrical range, it will not work properly. See Fig. 2-6, Pg. 24.

5. Once the magnet is secure, tighten down the transducer.

You are now ready for wiring the transducer to the SmartPAC Hydraulic control board.

To wire the transducer:

1. Find the transducer cable (if not connected to the transducer). Plug the end with the connector into the transducer (it only goes one way). Twist the locknut so the connection is tight.

2. Run the transducer cable through 1/2" conduit from the transducer to the bottom right knockout at SmartPAC Hydraulic.

3. See Fig. 2-5**,** Pg.31 for the location of the transducer connector TB402 on the ProCamPAC board. Measure the transducer wires to fit and cut the wires.

4. Pull the connector from TB402 on ProCamPAC board.

5. Attach the wires to this connector as shown in Fig. 2-7, Pg. 26. To connect a wire, find the correct terminal and loosen the screw over it by turning it counterclockwise (see Fig. 2-8, Pg. 43). Strip the correct wire for this terminal 1/4" (6.4 mm) from end. Insert bare wire into the terminal 90% of the way. Tighten the screw. The metal tooth inside the terminal will clamp down on the bare wire for a tight connection. Make sure the metal tooth is clamped down on the bare part of the wire, not on the insulation.

NOTE: The connector can only plug in one way. Make sure you do not start at the wrong end when connecting wires. Put the connector over the base the way it will plug in and note the wire marking next to the base before starting.

6. Connect all wires and double check connections when done. Plug the L-shaped top firmly into base. It only can go one way.
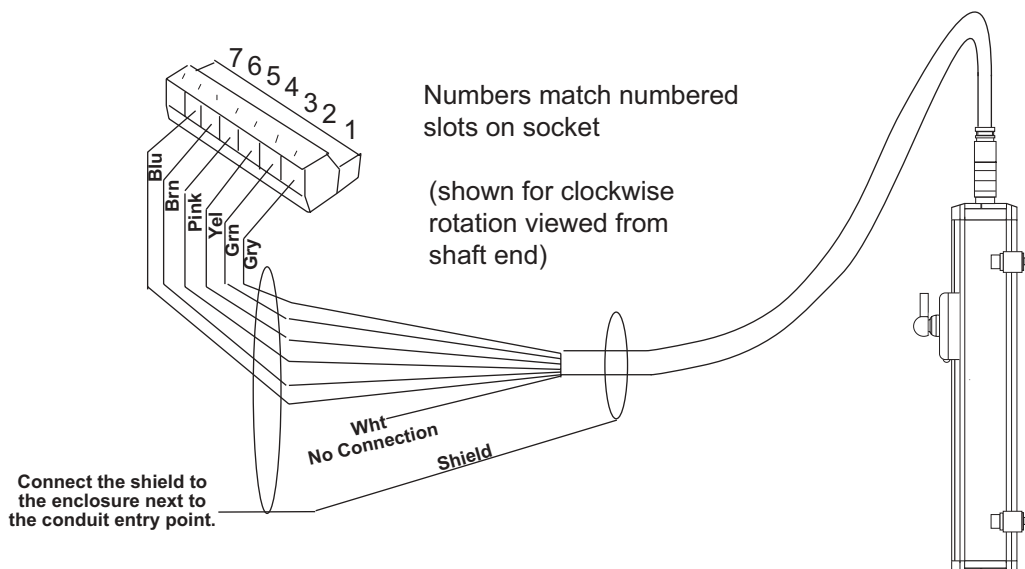
Figure 2-7. Pin out wiring for transducer cable (see Table 2-2 below)
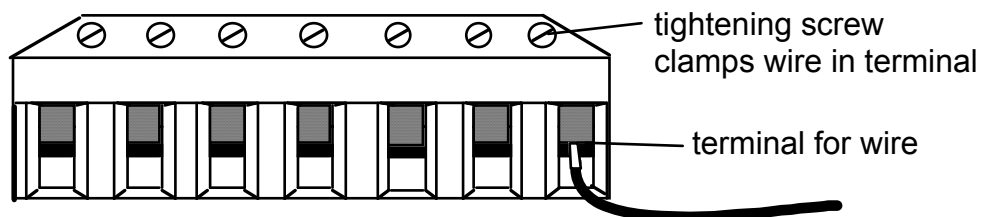
Figure 2-8. Attaching wires to connector

Table 2-2. Transducer Wiring

PIN # on TB402	Wire Color
1 (+CLK)	Yellow
2 (-CLK)	Pink
3 (+Data)	Gray
4 (-Data)	Green
5 (+24 VDC)	Brown
6 (GRN)	Blue

Note: White is not used.

Installing the Optional Hydraulic Pressure Transducer

Connector end view   Side view

1/4" NPT

1.56 (40)

0.50 (10)

1.88 (48)

0.75 (19)
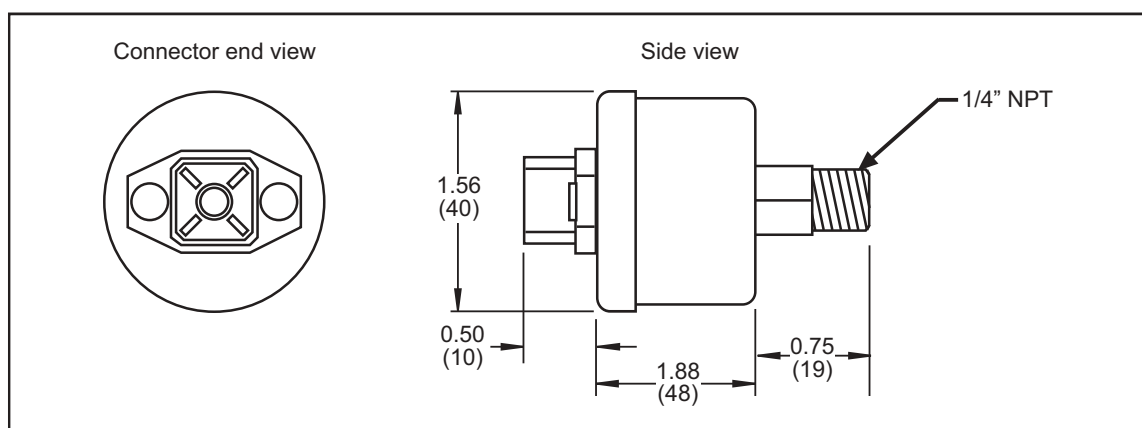
Figure 2-9. Hydraulic Pressure Transducer

The figure above shows the optional hydraulic pressure transducer used by the SmartPAC Hydraulic for reading hydraulic pressure at the bottom of the stroke. Determine a convenient location on the press to mount the transducer. Keep in mind that the transducer cable must be able to be connected and disconnected. The following steps will help you to determine a location and mounting procedures for the Hydraulic Pressure Transducer:

1. Different manufacturers of hydraulic machines use different hydraulic systems to move the rams of their machines. The simplest machines use one hydraulic cylinder with an up and a down solenoid. On a system like this; the transducer should be mounted on the top of the cylinder where the pressure is being generated. Some cylinders will have a plug in the cylinder itself which the transducer can be mounted into.

2. Other manufacturers use more complicated hydraulic systems. Some use more than one cylinder to move the ram. Systems like this will have a divider valve. This divides the main pressure into each cylinder. On a system like this; the transducer should be mounted near the input of the divider valve. This way, the total pressure will be read by the transducer and not the pressure of an individual cylinder.

3. Some machines will have fast and slow speeds for the ram, sometimes done by changing the way the oil is pumped through the cylinders. Changing speeds can change the pressure the transducer is measuring.

4. Some machines will have counter balance cylinders which require pressure to overcome. This will be read by the transducer as well.

5. The pressure which the transducer will be subject to can be as much as 5000 PSI. This high pressure should be taken into consideration when mounting the device.

6. Generally speaking every different type machine will have its own considerations for mounting the pressure transducer. Some experimenting may be needed on the more complicated systems to get the transducer to accurately read the total pressure of the system.

7. The transducer comes with a male 1/8" NPT fitting. Place a fitting into the hole in the tank or the fitting in the pipe that will allow you to install the threaded end of the transducer.

8. Wrap the threaded end of the transducer with plumbing tape and put it into the fitting you installed in step 8.

Wiring the Optional Hydraulic Pressure Transducer

Follow these steps to connect the Hydraulic Pressure Transducer to the SmartPAC Hydraulic.

1. Begin by locating the cable for the transducer. It's gray with a gray connector at one end. The connector plugs into the transducer.

2. Feed the cable through the conduit from the transducer to the SmartPAC Hydraulic. You can also run other low-voltage cables, such as the linear transducer cable, through this conduit.

3. Locate TB 404 on the ProCamPAC board (see the wiring diagram at the end of the manual). Cut the cable so you have enough left to use as a service loop to unplug the connector.

4. Strip off the gray installation to reveal approximately 2" of the 3 wires (red, black, and white) and the shield inside. Strip the end of each insulated wire so approximately ¼ to 3/16" of bare wire is exposed.

5. Connect the wires for the Hydraulic Pressure Transducer to ProCamPAC **TB 404** according to the following table (Refer to wiring diagram at the back of this manual):

Table 2-3.   Wiring Hydraulic Pressure Transducer to SmartPAC Hydraulic

Hydraulic Pressure Transducer (wire color)	TB 404 at ProCamPAC 8
(RED)	(EXT. +24 VDC)
(WHITE)	(TRANS IN.)
(BLACK)	(EXT GND)
(SHIELD)	(CHASSIS GROUND)

Installing DiPro Sensor Interface

Consult the DSI 2 user manual for complete installation and operating instructions. Call Wintriss Tech. Support at: 1-800-586-8324 if assistance is needed.

Wiring Transducer Power

Once the DSI 2 has been installed and wired to AC, you will need to wire power to the magneto-strictive transducer. Transducer power comes from the DSI 2. Make the following connections from the ProCamPAC to the DSI 2 as shown in the table below.

Table 2-4. Transducer Power Wiring

ProCamPAC	DSI 2
PIN # on TB403	Pin # on TB4
1 (+24 VDC)	11 (+24 VDC)
2 (Gnd)	10 (Gnd)

Wiring DSI 2 to DiProPAC

If your SmartPAC Hydraulic is not configured with DiProPAC go to "Connecting AC Wiring and Stop Circuits" Pg. 31.

To wire the DSI 2, connect the cable to TB501 (Fig. 2-5) for 8 inputs on the DiPro Sensor Interface 2 (DSI 2). If SmartPAC Hydraulic is configured for 16 sensor inputs, (need two DSI 2's), connect cable to TB551 1-8 sensors & TB552 9-16 sensors (Fig. 2-7). A wiring diagram for both 8 & 16 sensors can be found at the back of this manual Fig's 2 & 3.

Sensors 1-8

TB501   TB551

LEDs 1-8

Fuse
F501

Aux Out
TB500

TB500

DIPRO 8

Fuse
F551

Aux Out
TB550

TB550

302

DIPRO 16

LEDs 9-16

Sensors 9-16

TB552

TB552
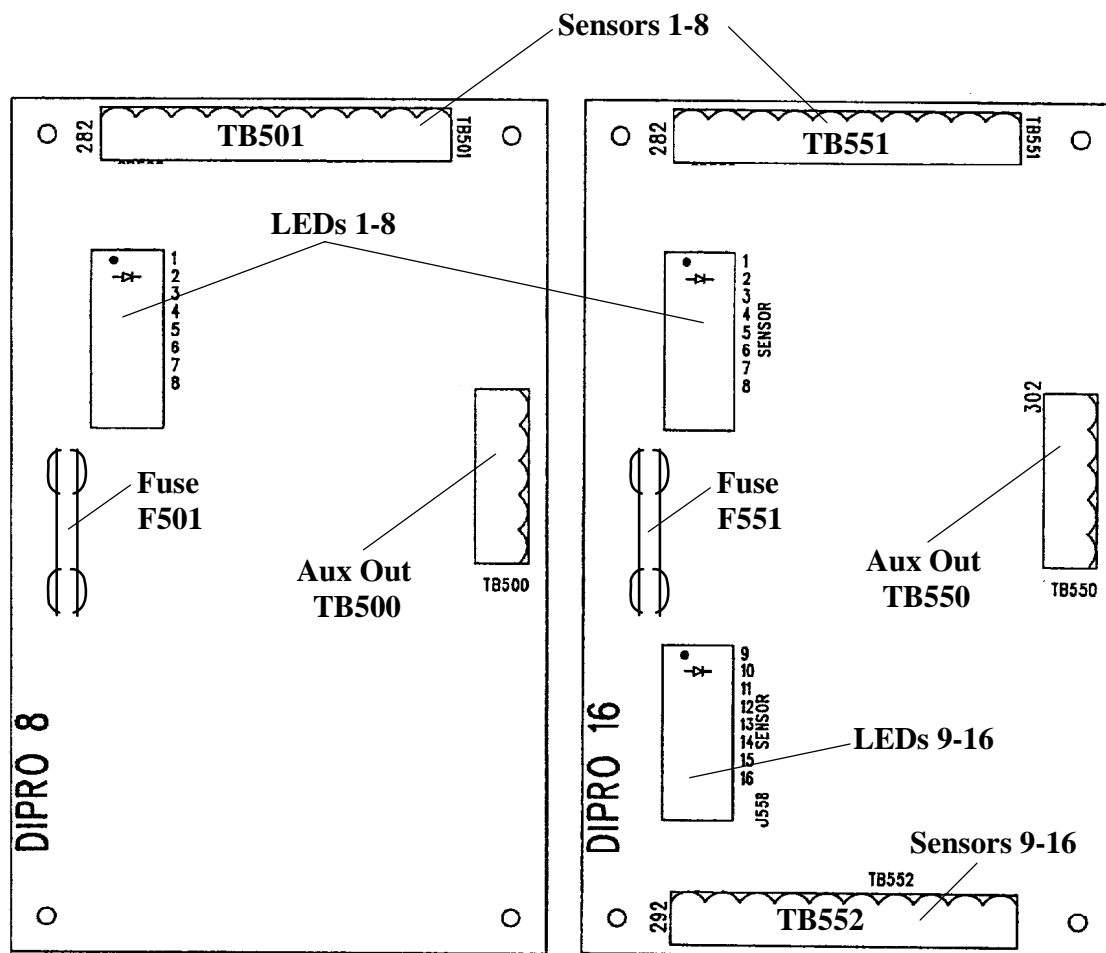
DiProPAC 8 board   **DiProPAC 16 board**

**Figure 2-10. DiProPAC boards location of important components
8 (left), 16 (right)**

Table 2-5.   DiProPAC (8 Channel) to DSI 2

Wire	DiProPAC TB501 (pin #)	1st DSI 2 TB 2 (pin #)
		Gnd (10)
Black	Gnd (291)	Gnd (9)
	Sensor power (290)	*no connection*
Gray	Sensor 8 (289)	Sensor 8 (8)
Violet	Sensor 7 (288)	Sensor 7 (7)
Blue	Sensor 6 (287)	Sensor 6 (6)
Green	Sensor 5 (286)	Sensor 5 (5)
Yellow	Sensor 4 (285)	Sensor 4 (4)
Orange	Sensor 3 (284)	Sensor 3 (3)
Red	Sensor 2 (283)	Sensor 2 (2)
Brown	Sensor 1 (282)	Sensor 1 (1)

Connecting AC wiring and stop circuits

All wires can be run through a common, 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 low-voltage wires.

Bring the wires for AC power, the emergency stop, and top stop circuits just below the top right knockout. No. 16 wire (No. 14, if local codes require it) with a minimum 75°C temperature rating is recommended for these circuits. To wire the connector, follow these steps.

1. Locate the main processor board inside the unit. You will see the connector TB101 for AC power (See Fig. 2-13, Pg. 39 for location of components for this board).

WARNING! SHOCK HAZARD!
Never apply power to SmartPAC when the power supply cover is removed. To prevent shock, always replace the cover before applying power.

2. Determine how you will bring wiring from your 115 Vac power source (or 230V source if applicable) to the unit. These wires 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. Determine how you will connect the wires from SmartPAC Hydraulic to your press control top stop circuit and emergency stop circuit. You can wire these circuits at your PLC. Refer to your PLC manual or other electrical prints. You need four wires. Two for the emergency stop circuit and two for the top stop circuit.

4. Find the 115V-230V voltage selector switch. It is located at the upper right-hand corner of the power supply board (see Fig. 2-12, Pg. 34 for components on power supply board). If your AC power is 115V, check to see that "115V" is displayed in the switch cavity. If your AC power is 230V, push the handle to the left.

Push handle to the right for 115V (to the left for 230V)
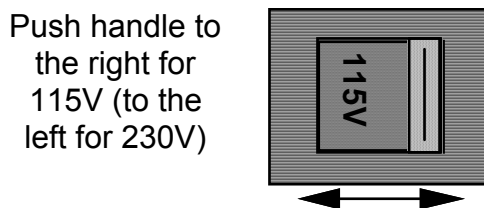
Figure 2-11. Setting voltage selector switch S201

5. Run the power and stop circuit wires to SmartPAC Hydraulic through flexible liquid-tight conduit to the enclosure. Because SmartPAC Hydraulic 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 with the enclosure. *Make ground connections as explained in the next step. Refer to the appropriate steps if you have an enclosure or panel mount.*

6. For SmartPAC Hydraulic enclosure: Your ground (green or green/yellow) wire must be connected to the ground block, not to ground (pin 203) on TB101. The ground block is located on the case of the unit just above the connector. To connect to the ground block, strip the ground wire about 1/4" (6.4 mm) from end, loosen screw on block, slide wire in hole, and tighten screw to pin wire in place. A ground wire is attached from the connector to a case lug. Leave the ground wire attached to TB101 while making connections. If you remove this wire in order to pull the connector all the way out of the unit, be sure to replace it when done.

For SmartPAC Hydraulic panel mount: Connect the ground wire from your panel enclosure to the case lug located near the left side of the SmartPAC face plate (look on the underside of the SmartPAC panel). A ground wire is already attached from this case lug to SmartPAC TB101. Leave the ground wire attached to TB101 while making connections. If you remove this wire in order to pull the connector all the way out of the unit, be sure to replace it when done.

7. Locate connector TB101 for the other AC wires and stop circuits. It should be plugged into the socket. Connect power wires and the remaining wires from the press control to SmartPAC Hydraulic as shown in the table below (Also refer to Fig. 2-4, Pg. 22). For 230 Vac connect black wire to terminal 201 and red wire to terminal 202.

Table 2-6. Wiring to SmartPAC Hydraulic TB101

Terminal	Wiring Designation
201	Line 1 HI
202	Line 2 NEU
203	Ground
204	Chas
205	Not Used
206	Not Used
207	E-Stop
208	E-Stop
209	Top Stop
210	Top Stop
211	Zero (for AutoSetPAC only)

8. Plug the connector back into its slot. Double check connections with markings at the connector base to make sure that you did not wire it backwards.

9. Connect top stop and E-stop circuit wires at the PLC or other box into which you are tying them.

10. Make all the necessary conduit connections to ensure NEMA 12 protection. SmartPAC is rated NEMA 12 (protected against dust and oil). *Be sure to number all wires in a way consistent with your press's electrical prints.*

WARNING!

PREVENT SHOCK!

Be sure you replaced the power supply cover. Do not connect AC wires to the power source until all other installation procedures are finished.

Figure 2-12. SmartPAC power supply board location of important components (shown sideways and labeled)

Replacing ProCamPAC

The following instructions describe how to replace ProCamPAC.

1. Turn power off to SmartPAC Hydraulic. The LCD display on the front panel should be blank and the angle/RPM display should be unlit.

CAUTION!

Always verify that power has been turned <u>off</u> to SmartPAC Hydraulic!

---

2. Before you proceed, you should ground yourself by touching any large metal object. This will remove any static electricity that you may be carrying around. A static electricity "zap" will destroy the components.

CAUTION

The ProCamPAC and DiProPAC boards are NOT interchangeable! Therefore, it is important that you install them correctly. See Figure 2-4, Pg. 22 for correct installation.

- If you are replacing an existing board, go to <u>step 3</u>.
- If you are adding a new board, then locate where on the main SmartPAC Hydraulic processor board it should be placed (Fig. 2-4, Pg. 22). Then go to <u>step 4</u>.

3. <u>If replacing an existing board (or boards)</u>: Complete these steps for each board you are replacing.

   a. Look inside SmartPAC Hydraulic, and locate the ProCamPAC. Fig. 2-4, Pg. 22 illustrates ProCamPAC superimposed on the main processor board.

   b. Remove the connector(s) attached to this board.

   c. Remove the four screws holding the board to the standoffs under the board, and put them aside for now.

   d. Unplug and remove the board. Be sure not to confuse the old board with the new one you will be installing.

   e. Verify that you are still "grounded", and then get the new board.

   f. Plug the board in. The connectors on the underside of the board are keyed, so that they can only be plugged in one way. These connectors will connect correctly with the mating pins on the main SmartPAC Hydraulic processor board.

   g. Once the board is properly seated, screw the four corners down again (from step 3c).

   h. Reconnect the connector(s) from SmartPAC Hydraulic to the new board.

   i. You will have to verify that you properly installed the boards. Go to the section, "Verifying ProCamPAC and/or DiProPAC Proper Installation" Pg. 46. *You need to complete this before you use SmartPAC Hydraulic.*

Adding or upgrading DiProPAC (Optional)

The following instructions describe how to add die protection capabilities to a basic SmartPAC Hydraulic or upgrade your 8-sensor system to 16 sensors. *After completing these steps, proceed to the wiring for these options. Refer to "Installing DiPro Sensor Interface" Pg. 29.*

Note: A "low impedance" 16-channel DiProPAC (#9632903) is available. This option is necessary when wire probes depend upon a part/strip to complete the circuit, and the part/strip is covered with a water-based conductive lubricant. For more information about this option, see "Understanding Sensor Terminology" Chapter 1 Pg. 6. If you decide that this is what you require, contact Wintriss Controls immediately to order that part. The installation procedure is the same as the standard version.

1. Turn power off to SmartPAC Hydraulic. The LCD display on the front panel should be blank and the angle/RPM display should be unlit.

CAUTION!

Always verify that power has been turned <u>off</u> to SmartPAC Hydraulic!

---

2. Before you proceed, you should ground yourself by touching any large metal object. This will remove any static electricity that you may be carrying around. A static electricity "zap" will destroy the components.

CAUTION

The ProCamPAC and DiProPAC boards are NOT interchangeable! It's important that you install them correctly. The 8 and 16 sensor DiProPAC boards are interchangeable. SmartPAC Hydraulic will recognize whether the board is 8 or 16 configuration. See Fig. 2-9, Pg.27.

• If you are replacing an existing board, go to <u>step 3</u>.

• If you are adding a new board, then locate where on the main SmartPAC Hydraulic processor board it should be placed (Fig. 2-4, Pg. 22). Then go to <u>step 4</u>.

3. <u>If replacing an existing board (or boards)</u>: Complete these steps for each board you are replacing.

    a. Look inside SmartPAC Hydraulic, and locate the board that you wish to replace. Fig. 2-4 Pg. 22 illustrates DiProPAC superimposed on the main processor board.

    b. Remove the connector(s) attached to this board.

        If you are upgrading DiProPAC, the connector or connectors go to DiPro Sensor Interface. If you need to connect 9-16 of the sensors, go back to the previous sections and complete the wiring.

    c. Remove the four screws holding the board to the standoffs under the board, and put them aside for now.

---

d. Unplug and remove the board. Be sure not to confuse the old board with the new one you will be installing.

e. Verify that you are still "grounded", and then get the new board.

f. Plug the board in. The connectors on the underside of the board are keyed, so that they can only be plugged in one way. These connectors will connect correctly with the mating pins on the main SmartPAC Hydraulic processor board.

g. Once the board is properly seated, screw the four corners down again (from step 3c).

h. Reconnect the connector(s) from SmartPAC Hydraulic to the new board(s). Note that if you went from 8 to 16, you will have to connect cables to the board. These are the terminal blocks to which you will connect the cables:

• DiProPAC 8: Sensors 1-8 to TB501

• DiPro 16: Sensors 1-8 to TB551; 9-16 to TB552

You will have to verify that you properly installed the boards. Go to the section, "Verifying ProCamPAC and/or DiProPAC Proper Installation". Pg. 46 *You need to complete this before you use SmartPAC Hydraulic.*

4. <u>If installing a new board (or boards)</u>: Complete these steps for each board you are adding. Refer to Figure 2-4, Pg. 22 for the location of the board to be installed.

a. Verify that you are still "grounded", and then get the new board.

b. Plug the board in. The connectors on the underside of the board are keyed, so that they can only be plugged in one way. These connectors will connect correctly with the mating pins on the main SmartPAC Hydraulic processor board.

c. Once the board is properly seated, use the four screws that came with the kit to secure the board.

d. Connect the cable(s) to the new board(s). Note that if you are going from an 8 to 16 system, you will have to connect two cables to the board.

If you are upgrading DiProPAC, the connector or connectors go to DiPro Sensor Interface or DiPro RCB. *If you need to connect 9-16 of the sensors, go back to the previous sections and complete the wiring.*

These are the terminal blocks to which you will connect the ribbon cables:

• DiProPAC 8: Sensors 1-8 to TB501

• DiPro 16: Sensors 1-8 to TB551; 9-16 to TB552

You will have to verify that you properly installed the boards. Go to the section, "Verifying ProCamPAC and/or DiProPAC Proper Installation" Pg. 46. *You need to complete this before you use SmartPAC Hydraulic.*

Table 2-7a.   DiProPAC (16 Channel) to DSI 2

(1-8 sensors)

Wire	DiProPAC TB501 (pin #)	1st DSI 2 TB 2 (pin #)
		Gnd (10)
Black	Gnd (291)	Gnd (9)
	Sensor power (290)	*no connection*
Gray	Sensor 8 (289)	Sensor 8 (8)
Violet	Sensor 7 (288)	Sensor 7 (7)
Blue	Sensor 6 (287)	Sensor 6 (6)
Green	Sensor 5 (286)	Sensor 5 (5)
Yellow	Sensor 4 (285)	Sensor 4 (4)
Orange	Sensor 3 (284)	Sensor 3 (3)
Red	Sensor 2 (283)	Sensor 2 (2)
Brown	Sensor 1 (282)	Sensor 1 (1)

Table 2-7b.   DiProPAC (16 Channel) to DSI 2

(9-16 sensors)

Wire	DiProPAC TB552 (pin #)	2nd DSI 2 TB2 (pin #)
		Gnd (10)
Black	Gnd (301)	Gnd (9)
	Sensor power (300)	*no connection*
Gray	Sensor 16 (299)	Sensor 8 (8)
Violet	Sensor 15 (298)	Sensor 7 (7)
Blue	Sensor 14 (297)	Sensor 6 (6)
Green	Sensor 13 (296)	Sensor 5 (5)
Yellow	Sensor 12 (295)	Sensor 4 (4)
Orange	Sensor 11 (294)	Sensor 3 (3)
Red	Sensor 10 (293)	Sensor 2 (2)
Brown	Sensor 9 (292)	Sensor 1 (1)
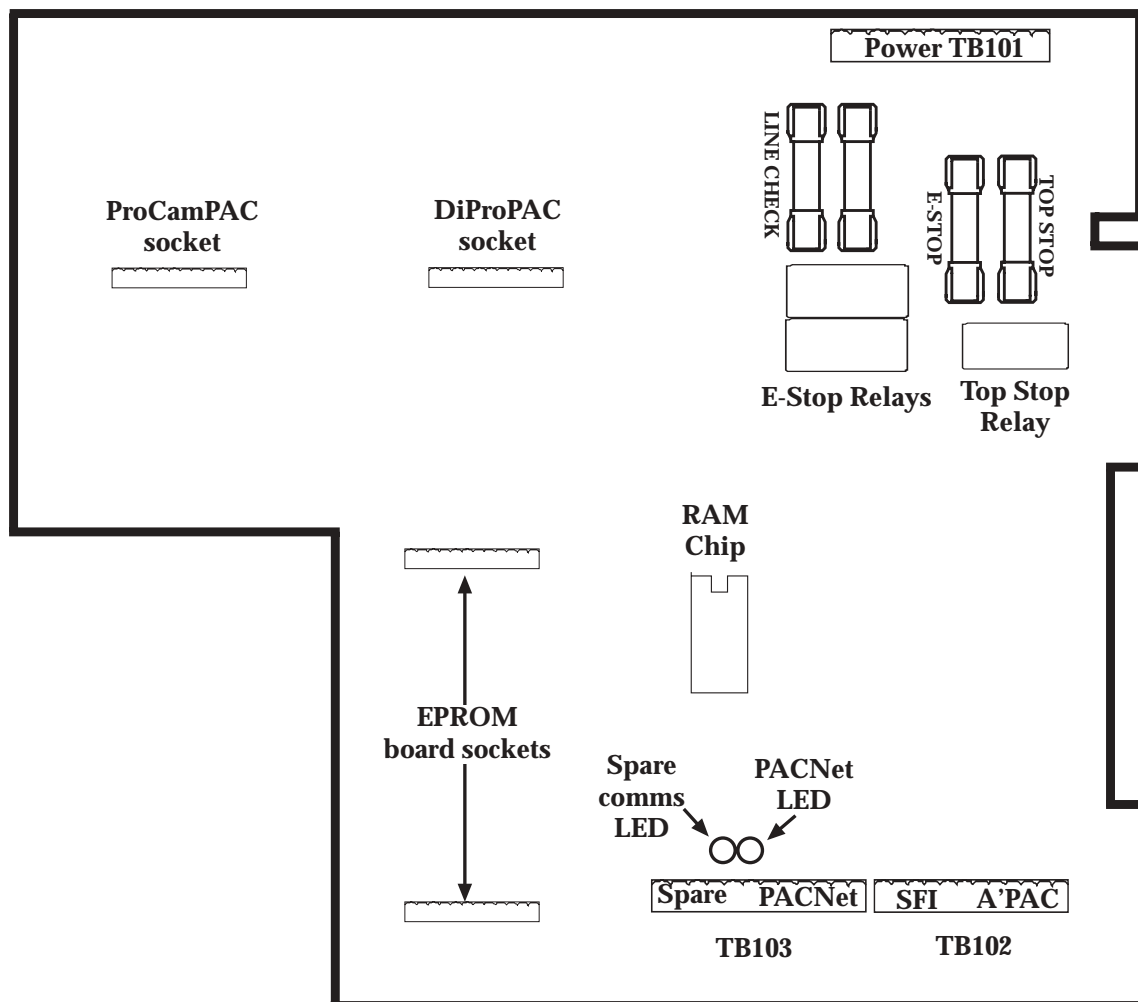
Figure 2-13. SmartPAC Hydraulic Processor Board Location of components

Connecting programmable cam channels

Making the connections

You must connect the cam channel board (eight configuration) inside the SmartPAC Hydraulic controller to the ProCam output assembly. The output assembly contains the relays that control the timing signals for your press.

Channel 1 and 2 are preprogrammed and labeled "TOP LIMIT" and "BOTTOM LIMIT". Channel 3 is used if you plan to use the optional Return-on-Pressure feature with dwell. It's labeled "DWELL". The relays open and close circuits to your equipment at the angles (the ram position) you set.

To mount and wire ProCam output assembly:

1. Select a convenient location for running conduit from the output assembly to the equipment that it will control. Once installed and wired, you will not have to work with the ProCam output assembly again.

2. Mount the output enclosure using mounting holes on the flanges (Fig. 2-13, Pg. 39).

NO CONTACT TO METAL

If you are installing the output assembly without the enclosure, mount it in a clean area that is not contacting metal. The underside of the board must not touch metal, because this can cause shorting. Do not mount the board in highly traveled areas where it could get damaged.

---

3. The relays that will control your equipment should already be plugged into the board. The type of relays you have is marked on the relay. Decide which relays will be used with which channels and arrange them in the box. The relays just pull out of their sockets. When inserting, make sure that the pins line up with the socket holes. Then press in firmly. *Proceed further for important information about where to plug each style of relay:*

    a. If you are using only *standard relays* in your programmable cam (<u>not</u> optional solid state relays), they are plugged into channels 1 through 8 — slots labeled K301 through K305, K307, K309, and K311 (See figure, Pg. 42).

    b. If you plan to use solid state relays, then they can only be plugged into channels 5 through 8 only — slots labeled K306, K308, K310, and K312.

    Do not plug both standard and solid state relays in the same channel locations for 5 through 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, Pg. 42.

    d. As an example, say you wish to use three standard relays and one solid state. You would install the three standard relays in channels 1 through 3, and the solid state relay in channel 5 on the cam outputs board assembly. Then you must skip SmartPAC Hydraulics' <u>channel 4</u> output for all wiring and programming, and instead use channel 5 for all wiring and programming.

4. Find the 12-conductor cables that run from the SmartPAC Hydraulic ProCam 8 PC board (See figure, Pg. 42 for an illustration of the board) to the terminal blocks marked TB301 inside the ProCam output enclosure. Notice there's one cable: for 1 through 8.

5. Attach one end of the cable to the connector for TB401 for channels 1-8. Refer to the Table 2-8 and Table 2-9, Pg. 43 in this section for proper wiring. The connector should be plugged into the socket.

6. Run the cable through conduit to TB301 in the ProCam output enclosure. You can use the knockouts directly below the connectors on each enclosure.

7. Attach the other end of the cable to the connector for TB301. A wire from CHAS to a lug on the ProCam output enclosure should already be connected (unless you bought the board assembly only).

8. Plug cable connectors into their sockets.

9. To connect the relays to your equipment, use connector TB302 and TB303. See Fig. 2-15, Pg. 42.

How you make connections depends 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 degrees set on SmartPAC Hydraulic. If you connect to N/C, the equipment will be on except for the degrees set. Generally, you use the N/O terminal; so equipment is off except when you use SmartPAC Hydraulic 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 side is connected. Polarity must be right for some relays — refer to Table 2-9, Pg. 43 ("Making connections to relays").
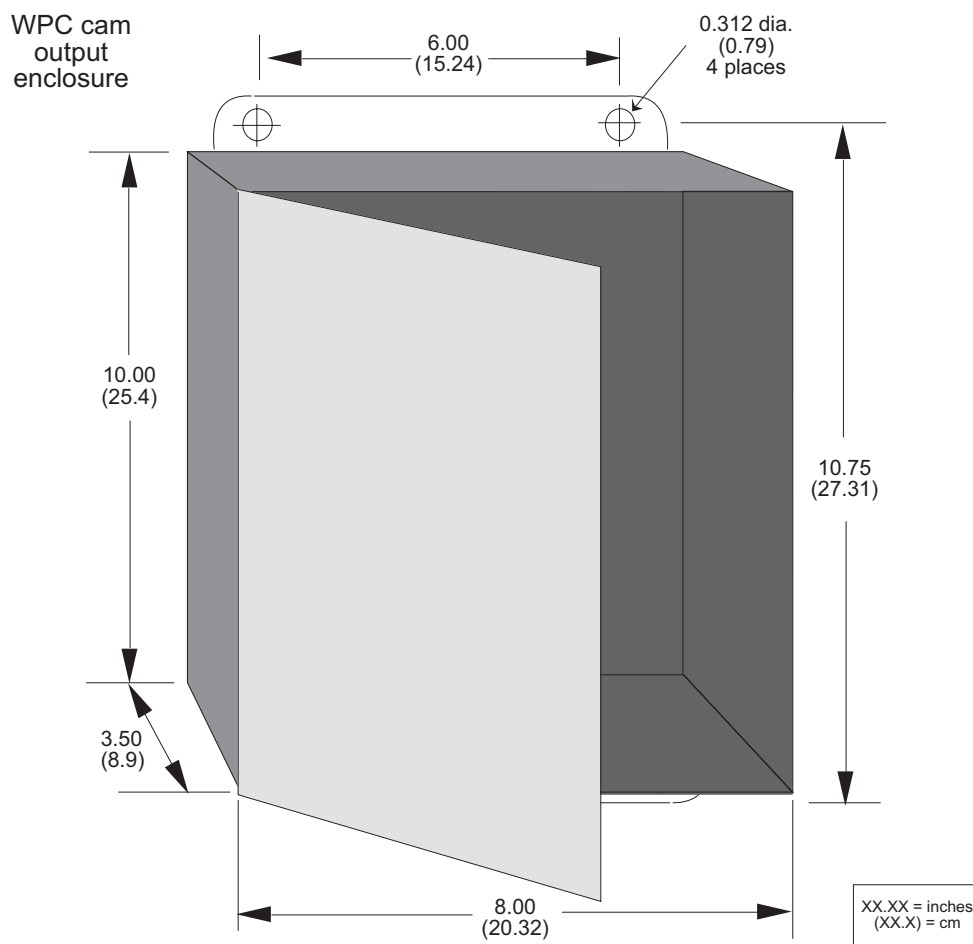
Figure 2-14. ProCamPAC Optional Output Enclosure
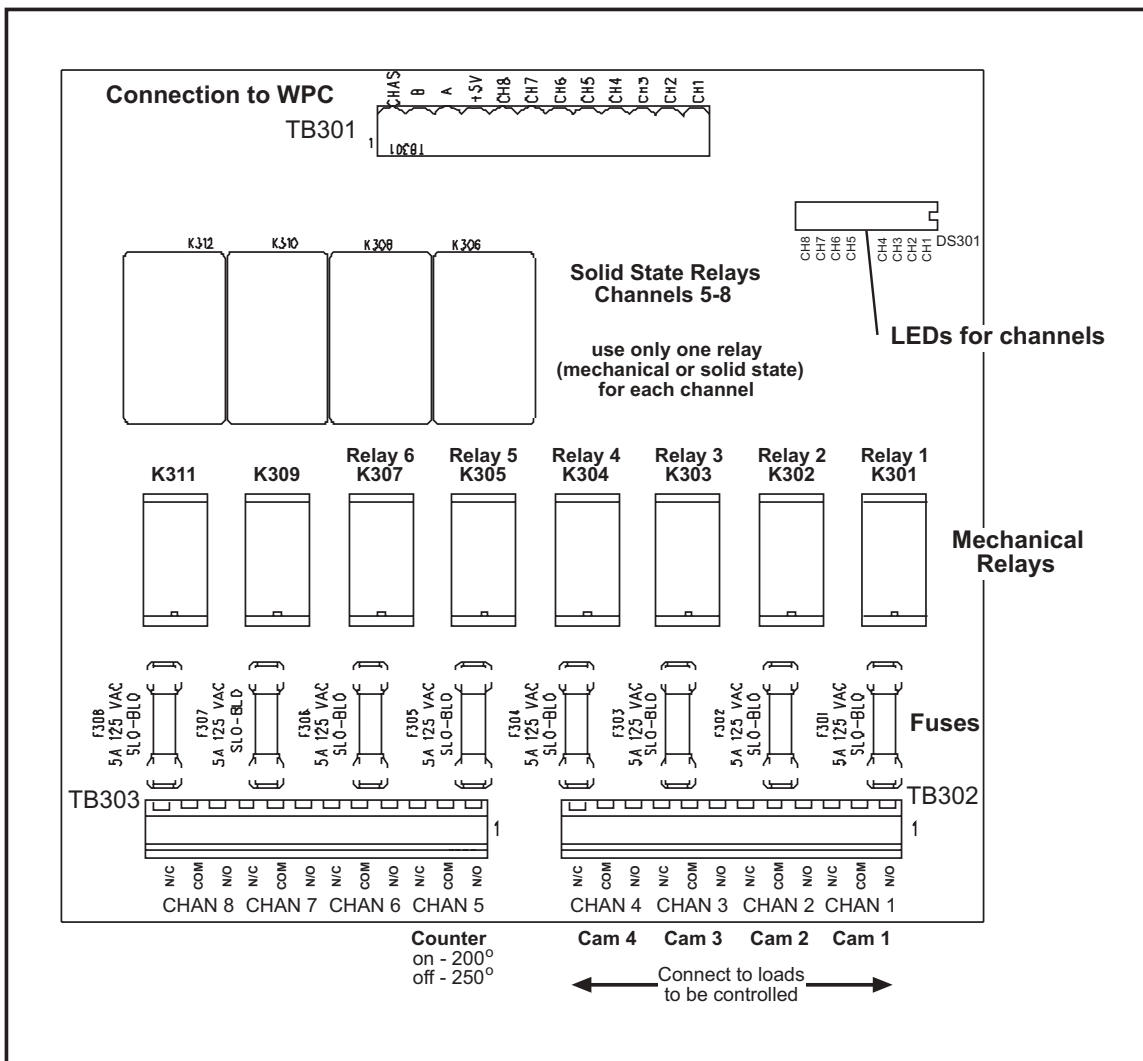
Figure 2-15. Cam outputs board assembly

Table 2-8. SmartPAC Hydraulic to ProCamPAC Output Assembly TB301

Wire	SmartPAC Hyd. 8-cam TB401 (1-8)	1st 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)

Table 2-9.   Making connections to relays

Module	How to connect	Type
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

TB303

CHAN 8	CHAN 7	CHAN 6	CHAN 5
N/C C N/O	N/C C N/O	N/C C N/O	N/C C N/O

TB302

CHAN 4	CHAN 3	CHAN 2	CHAN 1
N/C C N/O	N/C C N/O	N/C C N/O	N/C C N/O
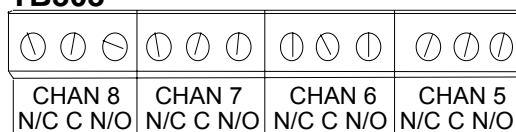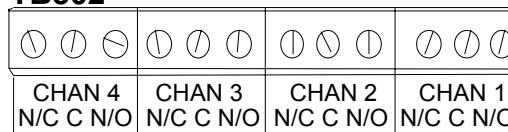
Figure 2-16. Connector TB302 and TB303 for wiring relays to equipment

10. You must install arc suppressors across each inductive load (motors, relays, coils, etc.) that is connected to an output relay. Suppressors are supplied with each relay. The suppressors reduce electrical noise and will extend the life of the relays. Find the suppressors supplied with the modules. They are blue and cylindrical in shape with leads at each end.

DO NOT INSTALL SUPPRESSORS

ACROSS RELAY CONTACTS

Suppressors must not be installed across the relay contacts inside the cam outputs enclosure. If a suppressor is installed across the relay contacts and it fails shorted, the equipment controlled by that relay will remain energized all the time.

---

11. Install the suppressors across the load and as close to the load as possible. Attach suppressors by connecting leads across existing terminals or junction points. See the following illustration for the correct way to install them. .
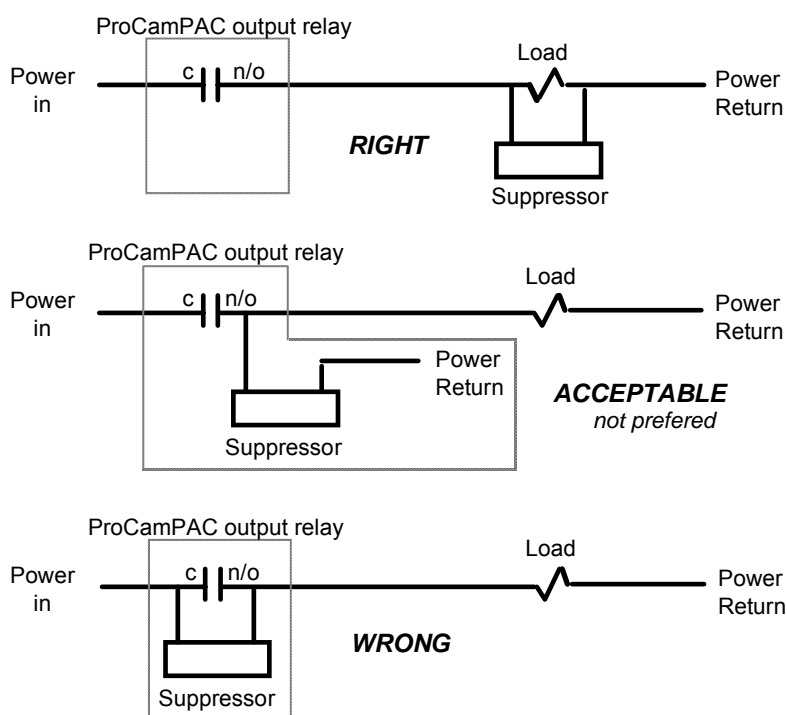
Figure 2-17. How to connect suppressors across the load

Connecting Channels 1 & 2

Channel 1 & 2 need to be wired to Top Limit and Bottom Limit inputs of your control respectively. If this is a retrofit, disconnect your previous Top Limit switch input from your control and wire Channel 1 output in the same place. Also disconnect the Bottom Limit switch input and wire Channel 2 output in the same place.

Connecting Channel 3 (Optional)

Channel 3 "Dwell" is optional. If you have installed the optional pressure transducer for reversal on tonnage feature and plan to specify dwell time at specific tonnage, you need to wire channel 3 to a proper input on your control. When this input is turned "On", the down-valve shifts to neutral position to maintain pressure/tonnage.

Connect AC power wires to power source

Connect AC power wires from connector TB101 in SmartPAC Hydraulic to the power source. Be sure that power is off at the terminals where you are connecting wires.

Turn on power to SmartPAC Hydraulic and check display

Turn on power to SmartPAC Hydraulic. Turn the Program/Run key to "Program". Then press down on both the "1" and "CLEAR" keys at the same time for one second

(See "Using the keyboard" - Chapter 3 for assistance in using the keys). You will see this display:

```
            MAIN INITIALIZATION MENU
USE CURSOR KEYS TO    INSTALLED OPTIONS
CHOOSE MENU ITEMS.    PRESS NAME
PRESS THE ENTER       SELECT CAM NAMES
KEY TO SELECT.        CUSTOM SENSOR NAMES
SWITCH TO RUN WHEN    SENSOR ENABLE MODE
DONE.                 HYDRAULIC SENSOR
                      TOOL INFORMATION
                      SECURITY ACCESS
```
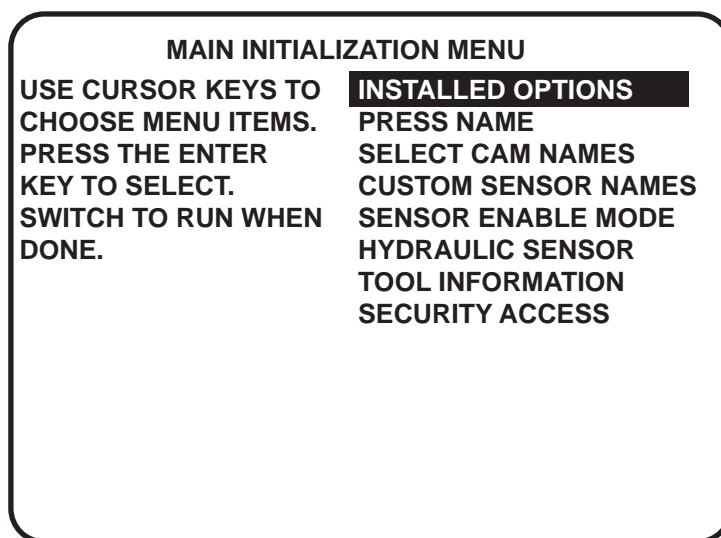
Figure 2-18. SmartPAC Hydraulic Initialization menu

Checking for power

If your screen is blank, first check the setting for the contrast adjustment keys at the upper left-hand corner of SmartPAC Hydraulic. You will see the menu now. Adjust accordingly for best viewing.

If the contrast was not the problem, there is probably a problem with power to SmartPAC Hydraulic. Turn power to SmartPAC Hydraulic off and recheck all power connections. If you still cannot get the Initialization menu, call the technical staff at Wintriss Controls for assistance.

If you received an error message on your screen when you turned power on, first press the RESET key to clear the error message. If the message still appears, go to Chapter 7 and find the section describing that error message. Follow the instructions for correcting the problem. If the error message is not described there, or you cannot fix the problem, call Wintriss Controls technical advisors.

Verifying ProCamPAC and/or DiProPAC (optional) proper installation

After installing ProCamPAC and/or DiProPAC into SmartPAC Hydraulic, you need to verify that the installation was done correctly and these options appear on the screen.

To do this, briefly get yourself out of Initialization mode and into the Run menu by turning the Program/Run key to "Run". Now look for these menu choices:

For ProCamPAC: "Cam Switch"   For DiProPAC: "Die Protection"

If you do not see these menu choices on your screen, go back to "Adding or upgrading ProCamPAC or DiProPAC" and verify that you proceeded with the installation properly. If you still cannot fix the problem, call Wintriss Controls technical advisors.

Upgrading SmartPAC Hydraulic firmware

There may be times when you will need to upgrade SmartPAC Hydraulic or add SFI™ Servofeed Interface, communications capabilities, or other future product enhancements. Many times these upgrades require that you change SmartPAC Hydraulic's firmware. Follow these steps to upgrade the firmware.

CAUTION

The SmartPAC Hydraulic firmware board location is not interchangeable. Notice too, that the style of the firmware board has changed. It is called the "4-meg" board and contains only 1 firmware chip, with 1 extra available slot (reserved by WC for future enhancement). It must be installed on the main processor board as illustrated in Fig. 2-13, Pg. 39 of this chapter.

---

1. Turn power off to SmartPAC Hydraulic. The LCD display on the front panel should be blank and the angle/RPM display should be unlit.

CAUTION!

Always verify that power has been turned <u>off</u> to SmartPAC Hydraulic!

---

2. Before you proceed, you should ground yourself by touching any large metal object. This will remove any static electricity that you may be carrying around. A static electricity "zap" will destroy the components.

3. Look inside SmartPAC Hydraulic and locate the firmware board, located toward the bottom left of the main processor board (Fig. 2-13, Pg. 39). Take note of its orientation.

4. Remove the four screws which hold the board to the standoffs under the board, and put them aside for now.

5. Unplug and remove the board. Be sure not to confuse the old firmware board with the new one you will be installing. If necessary, jot down the version number that is found on the firmware chip's white label.

6. Verify that you are still "grounded", and then remove the new board from the package.

7. Plug the board in. The connectors on the underside of the board are keyed; so they can only be plugged in one way. These connectors will connect correctly with the mating pins on the main SmartPAC Hydraulic processor board.

8. Once the board is properly seated, screw the four corners down again (from step 4).

9. Turn the power on and verify the normal operation of the unit. If the unit powers up with a garbled display or "rolling" LEDs, turn the power off and check that the board is properly seated.

    After some upgrades, you might find that SmartPAC Hydraulic generates a tool number checksum error the first time you try to reload each setup. SmartPAC Hydraulic creates a checksum for a tool number to check that the data stored in memory for the tool is the same as the data that comes out of memory when you load the tool number, (Checksum errors are explained further in Chapter 7). To correct this problem, go back into Program mode and review the currently loaded tool number setup. Check your counters for accuracy; then reload this tool number again. If the unit is still malfunctioning, call Wintriss Controls for assistance.

Final checkout

If you have completed all procedures in this chapter, SmartPAC Hydraulic is almost ready to use. All you need to do is to make a few test press runs to ensure SmartPAC Hydraulic is working properly. You will have to make some settings for a tool and load the tool number to run the press (refer to Chapter 5 for more assistance). If you are not familiar with how to use the SmartPAC Hydraulic keyboard and displays to create and load settings for a tool, begin to learn how to make settings now, and see Chapter 3 if necessary. Then complete the steps below for the final checkout:

Set up a "test" tool

1. Create a tool number and program counter settings.

2. Program typical Upper and Lower Limits in Ram Position.

3. Load the tool number and go into Run mode. Make sure there is no tool in the press.

Check Stroke Limits

Jog the press and confirm it follows the programmed lower and upper limits.

Run the press and reconfirm the limits.

Check the Auto or Continuous position if available and reconfirm limits.

Change the limits in Ram Position and confirm proper operation of limits.

If limits are not working properly, check the cam channels 1 and 2. They're called Top Limit and Bottom Limit and automatically programmed for each tool.

Ch	On	Off
1	0	2
2	180	182

NOTE: Do not adjust either On or Off angles. If you want to adjust the bottom return point, adjust the Lower Limit you set in Ram Position in the Program Mode by exactly the same amount.

If ok, confirm wiring from Output relays to your Main Valve control.

Check the top stop circuit

1. Check the top stop circuit. Set the stroke counter preset to a small value (e.g. 10) using the keyboard and display. See Chapter 5 -- " Setting or clearing the counter values " Pg. 95 if you need help. Run the press in continuous mode until the preset value is reached. Check that the press top stops and that a message telling you that the preset was reached is displayed on the screen (see Chapter 7, Pg. 136 for counter preset messages).

2. If the press did not top stop and SmartPAC Hydraulic displayed a message, there's a problem in your top stop circuit. Recheck all wiring and trace the cause of the problem. Don't continue with this procedure until the press top stops when you trip the sensor.

Check the emergency stop circuit

1. SmartPAC Hydraulics E-stop relays are always open when the Run/Program key switch is in Program position. Turn the key to Program and press the RESET key until display shows a selection "Program or Load Tool number".

2. Try to stroke the press.

3. If the ram moves, there is a problem in your Emergency stop circuit. Recheck all wiring and trace the cause of the problem. Do not continue with this procedure until you correct wiring.

Check cam channels

If you are using cam channels other than the first 2 channels, e.g., for speed changes, automation, etc. complete this section.

Go into Program mode and create some test settings for your cam channels. Load the tool settings, go into Run mode, and run the press. Ensure that the equipment (feed, blow off, lube, etc.) controlled by each channel is working properly according to the settings you made.

Test complete

If you got to this step, everything is working right. Clear any error message by pressing RESET. *Delete the test settings.* You can now load a tool, create settings for the tool, and begin to make parts using your new SmartPAC Hydraulic.

Wiring setup mode circuit (optional)

The setup mode allows you to disable green sensors and disable parts/batch counters using a remote switch. Typically the setup mode circuit is enabled when the "Jog" mode is selected. Then when you jog the press, SmartPAC Hydraulic will not stop the press when a fault condition is detected. The setup mode terminal can be wired to an extra contact on the jog switch of your main valve control, or you can use an external switch to activate the circuit. If you plan to use the setup mode circuit, plan how you will run your wiring for this connector now so you do not have to disconnect conduit or rerun wires through conduit later.

Connecting to Main Valve Control:

You must provide contact closure when the main valve control is in Jog mode. Then connect a wire from SmartPAC Hydraulic terminal block TB201, terminal #249 (jog/setup) to one side on a normally open switch. Connect the other side of the switch to Gnd (TB201, terminal 252). Refer to your electrical prints or the manual for your valve control to plan your wiring.

Wiring a remote reset switch (optional)

Like the setup mode terminal, the remote reset terminal can be wired to a normally open switch to activate the circuit. Be sure to plan how you will run your wiring for this connector so that you do not have to disconnect conduit or re-run wires through conduit later. Connect a wire from SmartPAC Hydraulic TB203, terminal 257, to a normally open switch. Connect another wire from the switch to Gnd (TB203, terminal 258). SmartPAC Hydraulic is reset with a momentary connection to ground.

Wiring a sensor-disabled output (optional)

You can wire a sensor-disabled output to a customer-supplied solid-state relay. This output can be used to warn personnel that the die protection capability (if installed) is disabled. You might connect this relay to a warning light, for instance. Connect the positive input wire from your 12Vdc solid-state relay to DiProPAC TB550, terminal 302 (relay power). Connect the negative input wire from this relay to DiProPAC TB550 terminal 306 (auxiliary 1). You cannot use more than 8 mA for your relay.

Final assembly if you have a panel mount

Once the final checkout has been confirmed and SmartPAC Hydraulic is working satisfactorily while it has been sitting outside the enclosure, you are ready to completely install the SmartPAC Hydraulic panel mount into your panel enclosure. Earlier (in the section, "Installing SmartPAC Hydraulic as a panel mount") you were instructed to cut out a hole in your panel enclosure. Mount the SmartPAC Hydraulic panel assembly into this cavity using fourteen #10-32 screws. Refer to Fig. 2-3, Pg. 21 for mounting and "cutout" dimensions for SmartPAC Hydraulic panel and your enclosure.

Chapter 3
About the keyboard and displays

This chapter gets you started in learning how to use the SmartPAC Hydraulic keyboard and displays. It explains how the displays are organized and how you perform tasks by selecting items on a display. It also explains the function of all keys on the keyboard.

Why using SmartPAC Hydraulic is easy

It is easy to use SmartPAC Hydraulic. Just read the messages to see what key to press in order to proceed to the next step. Once you get the knack of it, you will find it very fast and easy to make settings.

When you are learning, do not be afraid to try things. Push the keys. Select items on the displays. See what happens. You cannot hurt SmartPAC Hydraulic by pushing a wrong key or making a wrong selection. This chapter gives you the basics that will get you started. Later chapters explain in more detail how to use the different operating modes in SmartPAC Hydraulic.

Your starting point in each mode

When you use SmartPAC Hydraulic, you choose the displays you want to see to get the task at hand done. The displays you see depend upon which mode of operation you are in. SmartPAC Hydraulic has three modes of operation—Initialization, Programming, and Run. Each mode allows you to do different tasks.

In Initialization mode, make certain settings you generally make only once after installing SmartPAC Hydraulic. Chapter 4 explains this mode.

In Programming mode, you make counter settings, create & modify cam channel settings, load tool numbers and do other programming functions. See Chapter 5 for details.

You must be in Run mode to operate the press. In this mode, you can adjust your cams and sensors even while the press is running. You can switch between Program mode and Run mode by turning the Program/Run key to "Program" or "Run". Use Chapter 6 to operate SmartPAC Hydraulic.

Remember, what you can do in each mode is described in detail in later chapters. Here we show you how to get started in each mode.

The first displays in each mode - menus

From the first display in each mode, you can call up other displays to carry out specific tasks (set counters, adjust settings, etc.). Think of these displays as **menus**. You select from the menu what you want to do. Then you will see another display for that task. Here are the first displays–or menus–you see in each mode.

Initialization Mode

MAIN INITIALIZATION MENU

USE CURSOR KEYS TO
CHOOSE MENU ITEMS.
PRESS THE ENTER
KEY TO SELECT.
SWITCH TO RUN WHEN
DONE.

INSTALLED OPTIONS
PRESS NAME
SELECT CAM NAMES
SENSOR NAMES
SENSOR ENABLE MODE
HYDRAULIC SENSOR
TOOL INFORMATION
SECURITY ACCESS

To see this display, turn Program/Run key to "Program". Then press both the "1" and "clear" keys simultaneously.

Programming Mode

THE CURRENTLY LOADED TOOL # IS 0

SENSORS ENABLED

PROGRAM OR LOAD TOOL NUMBERS
DISABLE THE SENSORS

USE CURSOR KEYS TO CHANGE SELECTIONS
PRESS ENTER TO ACCESS TOOL NUMBERS.

To see this display, turn Program/Run key to "Program".

Run Mode

TOOL NUMBER 0   PART CNTR 0
TOOL NAME
SENSORS ENABLED

USE CURSOR KEYS TO
MAKE SELECTIONS.
PRESS ENTER TO
ACCESS SELECTION.

DISABLE SENSORS
COUNTERS
DIE PROTECTION
CAM SWITCH
TOOL INFORMATION
RAM POSITION
RAM TONNAGE
ERROR LOG
LOAD NEW TOOL

To see this display, turn Program/Run key to "Run".

NOTE
Before you switch modes, the first display in the mode that you are in must be on your screen.

Figure 3-1. First "menus" for different operating modes in SmartPAC Hydraulic

From the first display down

Now look at the flow charts for each mode on the next page. They show how you move through the SmartPAC Hydraulic displays starting with the first display. Each box represents a choice you can make or a task you can perform. Follow the black arrows that point down. See how you work your way down, choosing the tasks you want to perform. When you do this on SmartPAC Hydraulic, you will see a new display each time you make a selection. You continue to select items from each new display until your task is complete.

When you complete a task (like making settings for a tool), you have to go back up to start other tasks. You can go back just as easily as you go forward. See the gray arrows that point up. That is the route back. Try tracing a path down from the first menu. Then go back up. Try different routes. This will give you a good idea of how you carry out tasks using the displays.

Programming mode

Programming menu

- tool number display
- enable/disable sensors

- create new tool no.
- select a tool no.

- load the tool information
- modify the tool information
- delete the tool information

set sensors	set counters	set cams	set tool name	set ram position	set ram tonnage

- create or modify settings for tool
- create or modify settings for tool
- create or modify upper/lower limits
- determine reversal mode or distance only

- reset, preset counters; set count mode for tool

Run mode

Run menu

- enable/disable sensors
- load tool number

adjust sensors	adjust counters	set ram position	monitor ram tonnage	view stop time	adjust cams

- modify settings for tool
- create or modify upper/lower limits
- update max. determine monitor mode
- modify settings for tool

- reset, preset counters for tool

——— move down to do tasks

——— move back to where you started

Initialization mode

Initialization menu

- hydraulic sensor
  - set resolution, in/mm, & offset parameters
- hydraulic pressure transducer
  - set cal pressure & cal tonnage
- set communications

- set security parameters

- select names for cam channels

- lock sensors in Run mode
- lock cams in Run mode
- lock counters in Run mode
- lock tool no. in Run mode
- lock sensor disable function in Run mode
- lock reset in Run mode

Figure 3-2. SmartPAC Hydraulic "road map"

Selecting an item on a display

Here is the first display you see in Programming mode -- the tool number display. Notice that the currently loaded tool number is highlighted. If no tool number has been loaded, then the word "NEW" is highlighted.

Selection bar

```
TOOL #'s  1 USED    199 AVAILABLE
         NEW
   1234567




USE CURSOR KEYS TO CHANGE SELECTION
PRESS ENTER TO SELECT, RESET WHEN DONE
   CHAIR BRACKET
```
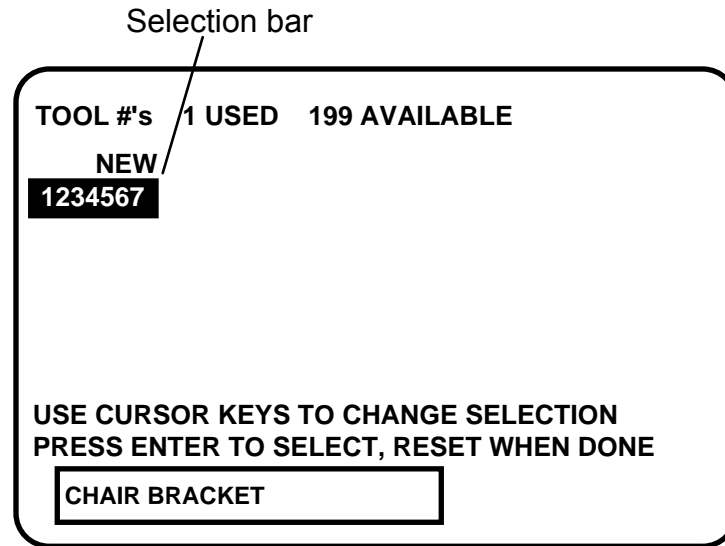
Figure 3-3. Illustrating selection bar at tool number display

The numbers (or letters) are white and are surrounded by a black box. The black box is the selection bar. Whenever an item in a display is highlighted like this, it is the one selected. In every menu you see, an item will be highlighted. You can move the selection bar to any item on the screen using the "up" and "down" cursor keys.

SELECT = HIGHLIGHT + ENTER

When we say SELECT in this manual, it means highlight the item and press ENTER.

Make the appropriate selection, and then press ENTER. SmartPAC Hydraulic shows you the next display, allowing you to make another selection or make a setting. A message at the bottom of every display tells you what to do next.

You'll use the cursor keys, the RESET key, and the ENTER key a lot to move through the menus to get your work done. It's fast and easy. See "Using the keyboard" next for a description of all the keys. See Chapter 5—"Using SmartPAC Hydraulic in Program mode" to learn what happens when you make the selections above.

Using the keyboard

The SmartPAC Hydraulic keyboard is made up of number keys, cursor keys, function keys, an ENTER key, and a RESET key
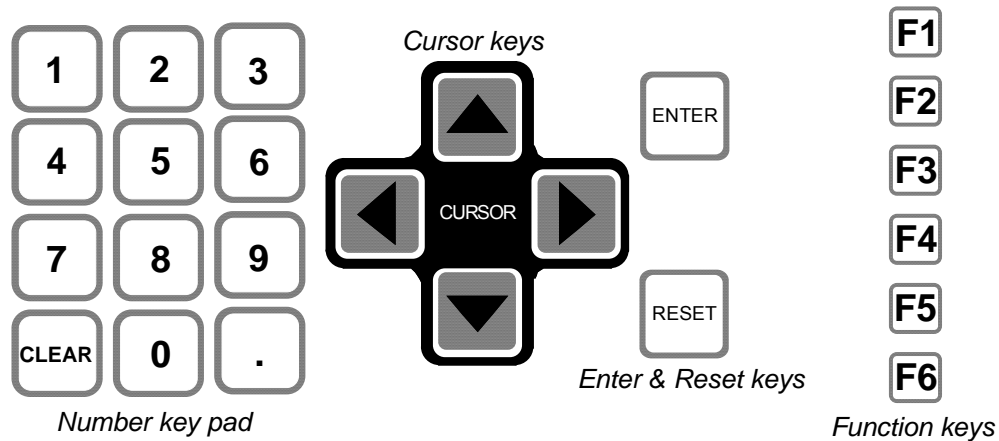
Figure 3-4. Illustrating available keys at SmartPAC Hydraulic

Number keys

You use the number keys to input numeric values, such as counter presets or tool numbers. You will see a display similar to the illustration below, which guides you on how to use the number keys, as well as the cursor keys. When you are done entering a number using the number keypad, press ENTER. SmartPAC Hydraulic will accept the number and move on to the next display. SmartPAC Hydraulic accepts numbers up to seven digits in length.
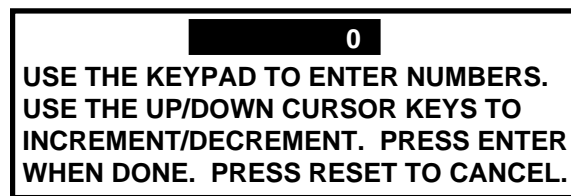
Figure 3-5. Superimposed instructions for entering numbers

You may also see the following display. This superimposed screen enables you to enter a variety of characters including: alpha-numeric, symbols, spaces, etc. Pressing the CLEAR key clears the text. You can "custom" name your press, cam channels, sensors, and the tool.

a. To key in <u>letters</u>: Use the up, down, left, and/or right cursor keys to highlight the desired letter; then press ENTER.

b. To key in <u>numbers</u>: Use the number keypad; then press ENTER.

To accept your selection, press function key **F6** (to the right of the LCD display). To cancel you selection, press RESET.

```
┌────────────────────────────────────────┐
│ ████████████████████████████           │
│                                        │
│ █  A B C D E   PRESS CLEAR TO CLEAR     │
│ F  G H I  J K   TEXT.  USE THE KEYPAD   │
│ L  M N O P Q   TO ENTER NUMBERS.  USE   │
│ R  S T U V W   CURSORS TO SELECT THE    │
│ X  Y Z , - #   LETTERS.  PRESS ENTER    │
│ .  ( )  * / &   TO ENTER THE LETTERS.   │
│                 PRESS F6 WHEN DONE.     │
│                 PRESS RESET TO CANCEL.  │
└────────────────────────────────────────┘
```
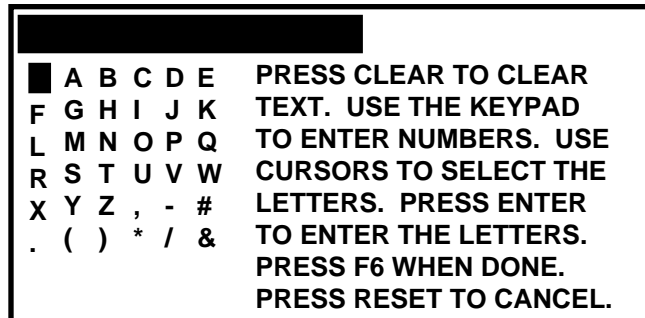
Figure 3-6. Superimposed custom name screen

Cursor keys

Use the cursor keys to move the selection bar over the item on the display you want to select.

Moving the selection bar with the cursor keys

Every menu has an item highlighted (usually the first item). The selection bar—a black bar—covers the item. The cursor keys control the selection bar.

<u>Up</u>, $(\blacktriangle)$, <u>Down</u> $(\blacktriangledown)$

These keys move the selection bar up and down a column of items on the display. For instance, if there are four items on a display, and you want to get to the fourth item, press the "down" key three times. You can also hold it down until you see the selection bar over the fourth item. If you go too far, press the "up" key to go back. When you hold a key down, the bar keeps moving.

If you have more than one column of items on a display, the bar will move from the bottom of one column to the top of the next column. It will continue moving through all the columns (and keep repeating) until you let up.

<u>Left</u> $(\blacktriangleleft)$, <u>Right</u> $(\blacktriangleright)$

If you have a display with two columns of items, you can move the selection bar from the first column to the second column quickly by pressing the "right" key. To go back to the first column, press the left key.

Sometimes a display has more columns than appear on the screen. A good example is the tool number display. It can have up to 40 columns (for 200 numbers). However, only four columns can appear on the screen at once. To see a new column, press the "right" cursor key to move the bar to the right-most column, then press the key again. A new column will appear at the right if there are more tool numbers.

You can keep pressing the "right" key to see more columns. To go back to the first four columns, move the selection bar to the left-most column using the "left" cursor key, then press the key again. New columns will appear at the left until you get back to the beginning.

If you keep holding the "right" key down when there are more than four existing columns, columns will continuously appear on the right until you let up. If you get to the end of all the columns, the columns will repeat from the beginning.

If you keep holding the "left" key down, columns will continuously appear on the left until you let up. When you get to the beginning of all the columns, they will repeat from the end.

Using cursor keys to set timing

You use the cursor keys to set timing for your optional programmable cam switch and sensors — in other words to set the angles where you want a cam channel or ready signal to turn "on" and "off".

Notice the circle diagram on your screen (see the next illustration). The **circle diagram** dynamically illustrates the on and off angle settings that you programmed for a sensor and/or cam channel. The cursor keys graphically move a circular arc around this circle diagram. These cursor keys function only when you have selected a display to make or change timing settings. See Chapter 5 for complete instructions on how to create a tool number and make all settings.

The "right" (▶) cursor key increases the "ON" setting — moves the arc clockwise.

The "left" (◀) key decreases the "ON" setting — moves the arc counter-clockwise.

The "up" (▲) cursor key increases the "OFF" setting — moves the arc clockwise.

The "down" (▼) key decreases the "OFF" setting — moves the arc counter-clockwise.

This is the starting point for setting sensor timings using cursor keys.
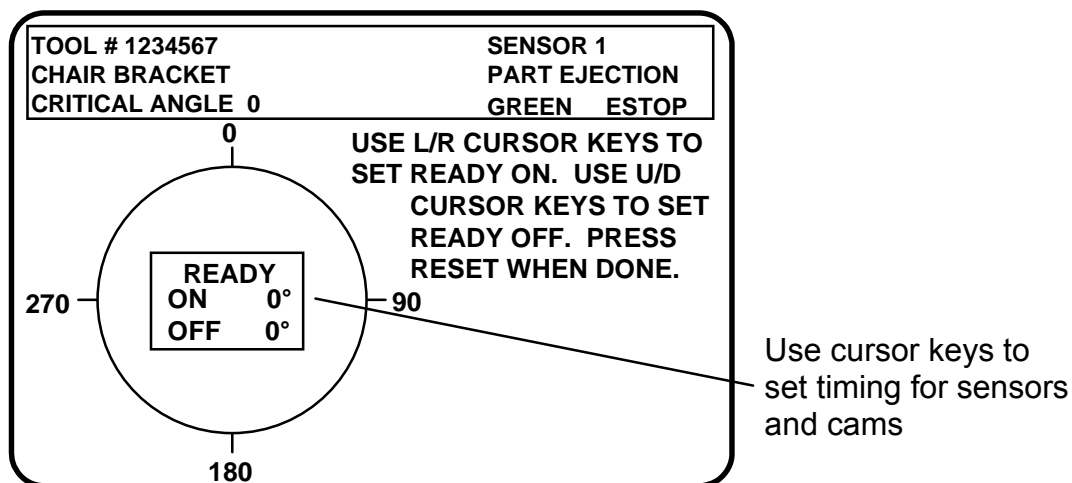
Figure 3-7. Setting timings using cursor keys

Press the "right" (▶) cursor key once. You will see this display:

```
TOOL # 1234567              SENSOR 1
CHAIR BRACKET              PART EJECTION
CRITICAL ANGLE  0          GREEN    ESTOP
                  0
                  |         USE THE CURSOR KEYS
                            TO SET THE READY
                            PRESS RESET WHEN DONE.
          ON      1°
270       OFF     0°     90
                 180
```

When you press
RIGHT cursor key
once, arc appears
to show "ON" at 1°,
"OFF" at 0°.
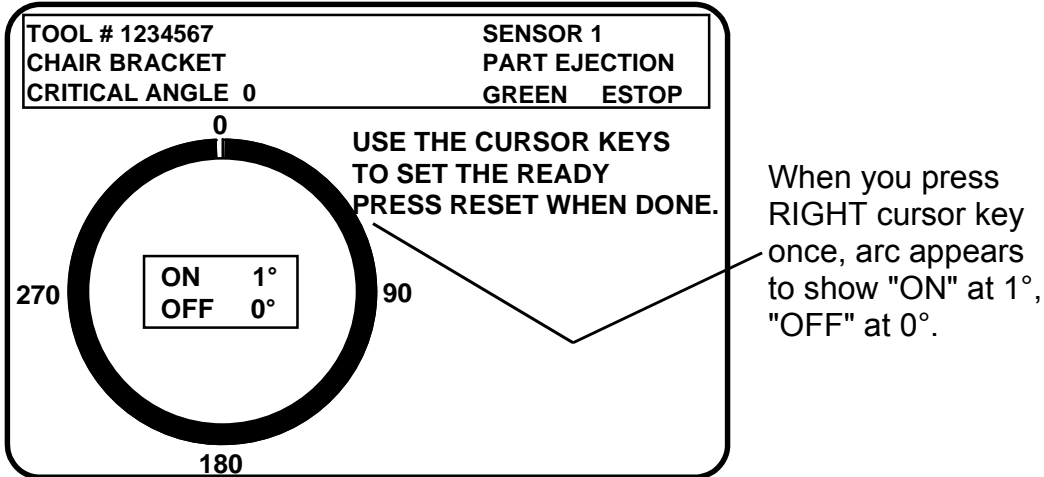
Figure 3-8. Illustrating "on" at 1°, "off" at 0°

The on/off box shows on at 1°, off at 0°, and the arc shows this graphically on the circle diagram.

NOTE: *Remember, the 0 point and the 360 point on the scale beneath the screen are the same point on the crankshaft.*

To make the "on" setting, press the right (▶) cursor key. You can hold it down so the arc keeps moving. The arc will wrap around and begin to extend from 0 towards 90°. Stop when the arc reaches 40°. This is the desired setting. Look to see that "angle ON" in the box shows 40°.

If you go too far, use the left (◀) cursor key to back up. The display will look like the following illustration:

```
TOOL # 1234567              SENSOR 1
CHAIR BRACKET              PART EJECTION
CRITICAL ANGLE  0          GREEN    ESTOP
                  0
                            USE THE CURSOR KEYS
                            TO SET THE READY
                            PRESS RESET WHEN DONE.
          READY
          ON      40°
270       OFF      0°    90
                 180
```

Right edge of arc
moves to 40°.
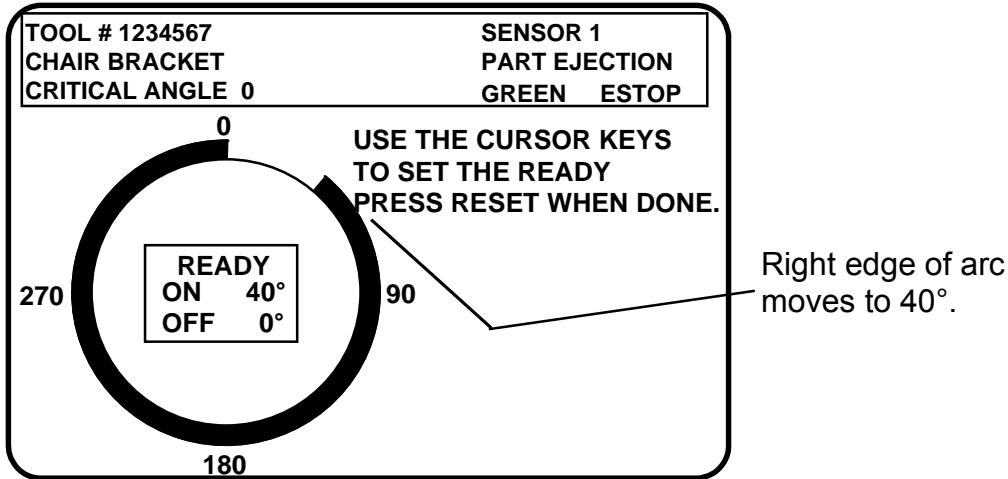
Figure 3-9. Setting "Angle ON"

To set the "off" setting use either the "up" or "down" cursor keys. In this example, press the "down" (▼) cursor key. You can hold it down and the arc will keep moving until you let up. The left edge of the arc moves counter-clockwise. Stop when the left edge is at 250°. Check the "off" setting in the box. It should show 250°. If you go too far, use the "up" (▲) cursor key to back up. Now your sensor is on at 40°, off at 250°. Here is an illustration:
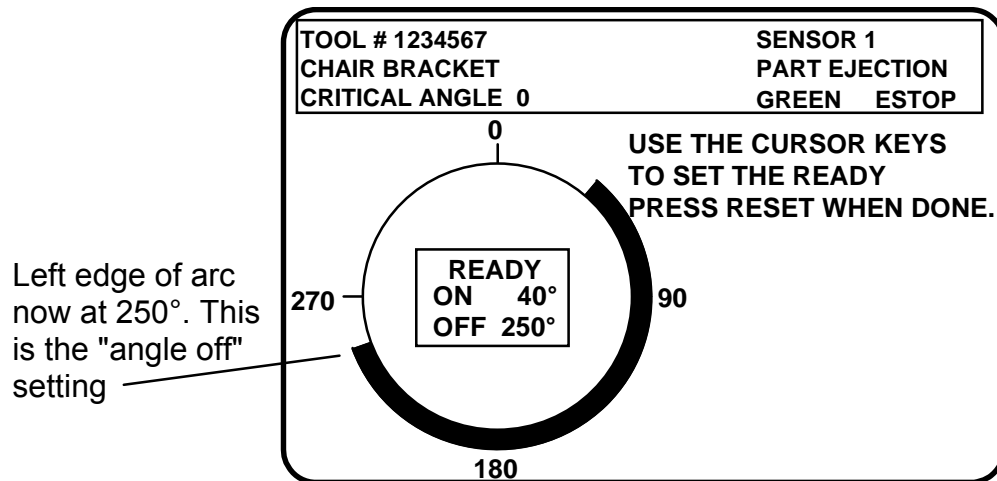
Figure 3-10. Setting "Angle OFF"

You are done making the ON-OFF setting for the sensor. You can adjust this setting any time you want using the cursor keys. The on and off setting will always show in the "ON/OFF" box.

RESET and ENTER keys

RESET key

The RESET key has two functions.

Going back to the previous display

The RESET key is used to go back to the previous display when making settings. For instance, say that you displayed your list of tool numbers on your screen. The next step is to create a new tool number or change settings for an existing one. But if you just want to see the tool numbers and then do something else, just press the RESET key, and you will go back to the previous display.

You are always told at the bottom of your screen when you can use the RESET key to go back to the previous display. For instance, the message will say, "Press Reset when done," or "Press Reset to cancel."

Resetting SmartPAC Hydraulic

The RESET key is used to reset SmartPAC Hydraulic when an error is generated or a counter preset is reached. When you press Reset, you are returned to the display where you were before the message appeared. You can once again run the press.

ENTER key

You press the ENTER key after moving the selection bar to an item on the display. When you press Enter, SmartPAC Hydraulic shows you a new display based on your selection. Using the cursor keys to make a selection and then pressing Enter or Reset are the three most frequent things you will do when using SmartPAC Hydraulic. You also press the ENTER key after keying in a number. This tells SmartPAC Hydraulic to accept the number.

Function keys

Periodically you will be instructed to use function keys to perform certain tasks in SmartPAC Hydraulic. The message on the LCD display will identify the specific function key number (from **F1** to **F6**) to press, if applicable

Chapter 4
Using SmartPAC Hydraulic in Initialization mode

This chapter describes how to use all the displays you will see in Initialization mode. It covers setting up the hydraulic sensor, counter setup, setting communications parameters, installed options, setting up press name, programmable cam-related functions such as selecting channel names, locking settings in Run mode as well as die protection-related functions, such as setting auto enable, locking settings in Run mode. Setting the reset mode, tool information and security access.

Initializing SmartPAC Hydraulic

Now that you have completely installed SmartPAC Hydraulic, you are ready to initialize the system. In Initialization mode you make settings in SmartPAC Hydraulic that you typically only need to make once during or after installation. For example, you set parameters for the hydraulic sensor. Also, you can lock certain settings in Initialization mode so unauthorized personnel cannot make adjustments or reset faults. These actions are only done once during installation.

How to get into SmartPAC Hydraulic Initialization mode

> **NOTE**
>
> 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.

To get into Initialization mode, turn the Program/Run key to "Program" and then press both the "**1**" and "**CLEAR**" keys simultaneously for one second. See "Using the keyboard" - Chapter 3. You will see a display that looks similar to the next illustration.

NOTE: *Your screen may vary depending upon the additional capabilities built into your SmartPAC Hydraulic. This display shows DiProPAC (optional).*

SELECT = HIGHLIGHT + ENTER

When we say SELECT in this manual, it means highlight the item and press ENTER.

```
MAIN INITIALIZATION MENU
USE CURSOR KEYS TO    POSITION SENSOR
CHOOSE MENU ITEMS.    INSTALLED OPTIONS
PRESS THE ENTER       PRESS NAME
KEY TO SELECT.        SELECT CAM NAMES
SWITCH TO RUN WHEN    CUSTOM SENSOR NAMES
DONE.                 SENSOR ENABLE MODE
                      HYDRAULIC SENSOR
                      TOOL INFORMATION
                      SECURITY ACCESS
```
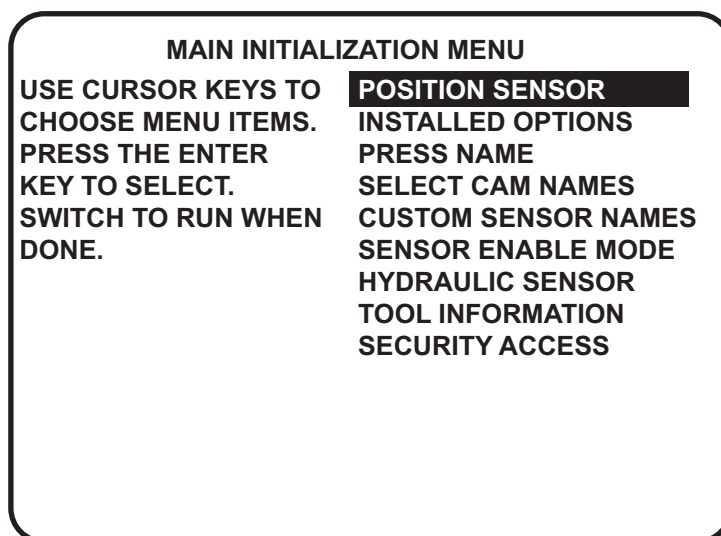
Figure 4-1. SmartPAC Hydraulic Initialization menu

(The order may vary depending upon the options you have installed)

This is the Initialization menu—the first display in Initialization mode. From this display, you can call up all the other displays in Initialization mode.

Each of the available menu choices is described next.

To get out of Initialization mode

To get out of Initialization mode and into Program mode:

Turn the Program/Run key to "Run" to go into Run mode and back to "Program".

If the Initialization menu was not displayed on your screen when you turned the key, this means that you were farther into Initialization mode. Keep pressing the RESET key until you get back to the Initialization menu. Now when you turn the key, the new mode will appear. *Get into the habit of always backing out of one mode before entering another mode.*

Using the SmartPAC Hydraulic Initialization menu choices

Setting up Hydraulic Sensor, Pressure & Tonnage

You use this choice to enter in the magneto-strictive sensor resolution, offset value and the units you want the measurement in. Also, if you have the return pressure option, enter the Calibrated pressure and tonnage specific to the hydraulic press the control is mounted on. Leave these values equal to zero (0) if you are not planning to install the optional pressure transducer.

Select Hydraulic Sensor in the Initialization Menu and you will see this screen:

```
SENSOR RESOLUTION  =        5 uM
OFFSET VALUE       =     2.000   IN
UPPER LIMIT        =     6.000   IN
CAL. PRESSURE      =       1,000 PSI
CAL. TONNAGE       =          10 TONS
UNITS              =           IN


USE THE CURSOR KEYS TO SELECT THE VALUE
PRESS THE ENTER KEY TO CHANGE THE VALUE.
PRESS THE RESET KEY WHEN DONE.


                    SAVE UPPER LIMIT  ▶  F6
```
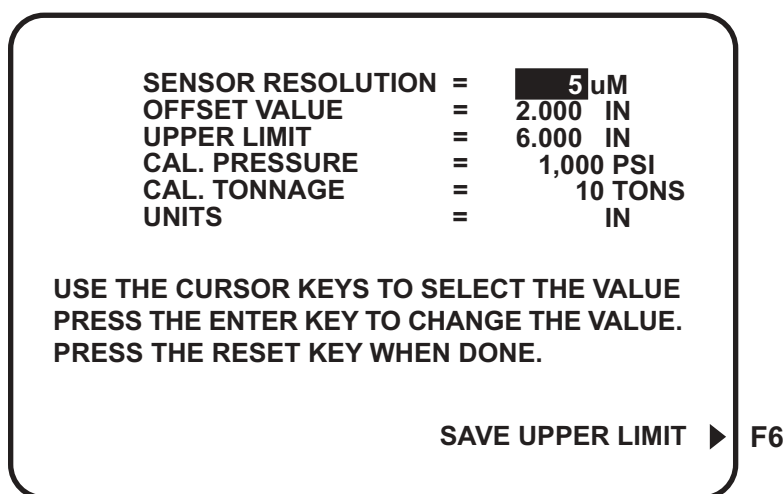
Figure 4-2. Hydraulic Sensor setup

Sensor Resolution

The sensor resolution is a constant value which, corresponds to the sensor length. There are only three possible settings.

Table 4-1.   Sensor Resolution chart

Sensor Length	Resolution
6 & 12 INCH	5 uM
18 & 24 INCH	10 uM
30, 36, 42, & 48 INCH	20 uM

Units

You can enter either "Inches" or "Millimeters". To do this just highlight IN or MM and press ENTER to change from one to another.

Max Upper Limit

This value is the highest value you can program as the Upper Limit in the ram position menu. If the ram is already at its highest possible position, press F6 and watch the Max Upper Limit automatically set to the current value. If the ram is not at its highest position, you will need to know the sensor reading at that position so that it can be entered manually. The Max Upper Limit can be less than the maximum range of the shut height sensor.

Offset Value

DO NOT enter this value until you have set the Max Upper Limit.

The data from the magneto-strictive transducer is absolute. That means at the lowest position the transducer reports zero and the highest position, the exact maximum range of the transducer. Adding an offset value could allow you to monitor the actual shut height opening instead of the absolute position of the transducer. The offset value is added to the absolute position indicated by the transducer. This corrected value is used for all displays and programming/settings.

When you are ready to enter the Offset Value, you need to measure the actual shut height opening with a dial gage if you prefer a precise display. Go to the Ram Position display in either Program or Run modes and see what the absolute value reported by the shut height sensor is. Subtract it from the actual measurement you made and you have the offset value.

Offset = Actual shut height opening – shut height value displayed.

Note: The Offset value must be a positive number smaller than 12.9 inches.

Cal Pressure & Cal Tonnage (Optional)

These values are needed for the "Reverse on Tonnage" feature. This feature needs the optional 5000 psi pressure transducer installed and wired as described in Chapter 2. These calibration (Cal.) values allow the SmartPAC to convert the pressure transducer signal into tonnage developed by the press.

Cal. Pressure and Cal. Tonnage are machine specific depending on the size and make of the hydraulic cylinders. Refer to the press manufactures specifications usually displayed as a chart on the machine.

Cal. Pressure: Enter hydraulic pressure in psi equivalent to the tonnage rating of the press or as close to it as possible.

Cal. Tonnage: Enter the tonnage equivalent to the pressure value you entered above.

Position Sensor

In this menu you can adjust the counter setup mode, view communications, sort tool table and show checksums. The factory default for the position sensor is disabled. The SmartPAC Hydraulic does not use the position sensor. If enabled and the sensor is not installed you will get an error message, "Position sensor incorrect".

Counter setup mode

Depending upon how you wired SmartPAC Hydraulic, you can disable or enable the counter setup mode (Refer to Ch. 2, Pg. 49 in the section called "Wiring setup mode circuit".) If you performed this wiring, this made your SmartPAC Hydraulic "setup mode-ready". This means that you can activate (enable) or deactivate (disable) the setup mode at this screen.

Select "Counter setup mode" and determine the most appropriate choice by pressing Enter to toggle among items explained below. *Once you press Reset to exit the screen, your choice is*

confirmed.

How any of your choices affect Strokes Counter

In all cases, strokes counter will increment regardless of the mode that you are in.

"IS ALWAYS INCREMENTED"

This means that the batch and parts counters will increment on every stroke whether you are in setup mode or not.

"NOT INCREMENTED IN SETUP MODE"

This means that the parts counter and batch counter, *(when tied to "parts" counter only),* will not increment when you are in setup mode.

View communications - press F4

Perform this function when there is a need to verify the communications port between SmartPAC Hydraulic and the various installed modules, including SFI, Module (for AutoSetPAC), PACNet®, etc. Press function key **F4** for "View communications".

Now select the module in question that you want to test, such as: "PORT 1 (SFI)".

POSITION SENSOR MODE `DISABLED`

COUNTER SETUP MODE `IS ALWAYS INCREMENTED`

POSITION SENSOR INPUT CLOSED

PRESS 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.

VIEW COMMUNICATIONS ▶ F4
SORT TOOL TABLE ▶ F5
SHOW CHECKSUMS ▶ F6
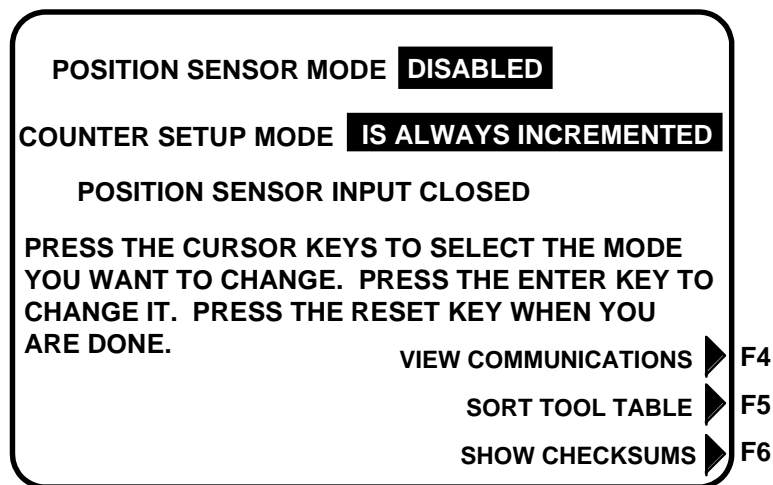
Figure 4-3. Position sensor display

COMMUNICATION DATA VIEWER
PORT 1 (SFI)
PORT 2 (MODULE)
PORT 3 (SPECIAL)
PORT 4 (PACNET)

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.

NOTE: When viewing the port data you can
perform a loop back test by jumpering the TXD and
RXD lines together and then pressing the FI key.
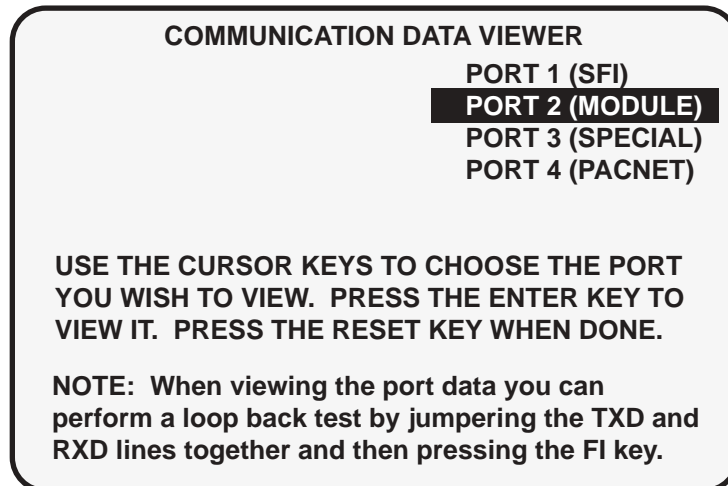
Figure 4-4. Communications data viewer screen

Here is the screen that will appear:

TRANSMIT BUFFER

data that appears here is being transmitted from SmartPAC

RECEIVE BUFFER

data that appears here is being transmitted from the communicating module
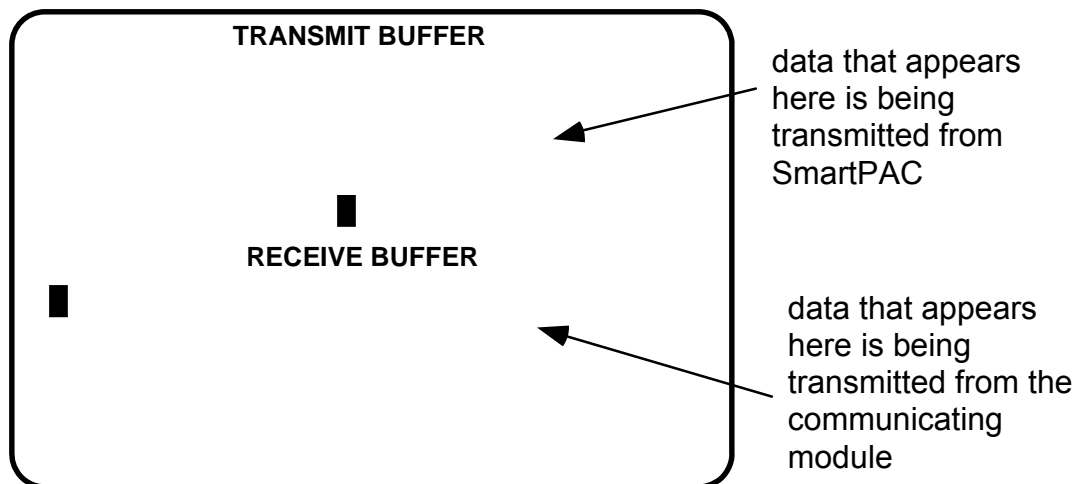
Figure 4-5. Actual communications

To view normal communications between SmartPAC Hydraulic and the communicating module (e.g. SFI), you should expect to see some text (data) in both the "transmit buffer" and "receive buffer" locations on the above screen. If you do not see any data (or only partial data), this means that SmartPAC Hydraulic and the other module are not communicating properly.

At this point if you detect a problem in communications, you may decide to perform a "loop-back test" (see Figure 3 for RS232 connections, or Figure 4 RS485 connections to properly wire the loop-back test for SmartPAC Hydraulic, located at the end of the manual). A loop-back test is one where you connect (or jumper) the TXD (transmit) and

RXD (receive) lines together, and then press **F1** to check communications. In effect, you are actually "receiving" the communications data that you are transmitting. This test is useful when verifying the accuracy of the transmit and receive hardware and wiring. If you need further assistance or direction on performing the loop-back test, contact Honeywell's Wintriss Controls Group technical advisors.

If you do, please supply: **product name** (e.g. SmartPAC Hydraulic standard); **installed options** (e.g. DiProPAC) and **firmware version number** (e.g. Vs. 2.00). You can determine the last two items, by going into "Installed options" in the Initialization mode (see the next section for details). You can also determine firmware version number from the chip on the processor board (see "location of components" in Chapter 2).

Sort tool table - press F5

Perform this function when there is a need to sort the tool number display in Program and Run modes. Sometimes, when you are adding more tools, or deleting some, SmartPAC Hydraulic may display them in a random order. Simply press the appropriate function key (see Figure 4-3, Pg. 65), and the tool numbers are automatically resorted. Don't worry. The tool information is still intact.

Show checksums - press F6

The purpose for this display is to show checksum information. SmartPAC Hydraulic creates a checksum for a tool number to verify that the data stored in memory for the tool is the same as the data that comes out of memory when you load the tool number. *More than likely, you will never have to use this function unless specifically instructed to by Honeywell's Wintriss Controls Group technical personnel.*

Installed options

This is a very useful display that indicates how your SmartPAC Hydraulic has been configured. It includes software version numbers and the specific optional capabilities that have been installed. It also tells you how many cam channels and/or sensors you can connect to SmartPAC Hydraulic. Here is an example:

```
┌─────────────────────────────────────────┐
│          LIST OF INSTALLED OPTIONS       │
│                                          │
│     SOFTWARE V0.00 4/99                  │
│     COPYRIGHT 1994-1999                  │
│     CHARACTER GENERATOR V1.09            │
│                                          │
│     ProCamPAC 8 channels installed       │
│     DiProPAC 16 sensors installed        │
│     Enhanced Features                    │
│     Hydraulic functions installed        │
│                                          │
│                                          │
│                                          │
│                                          │
└─────────────────────────────────────────┘
```
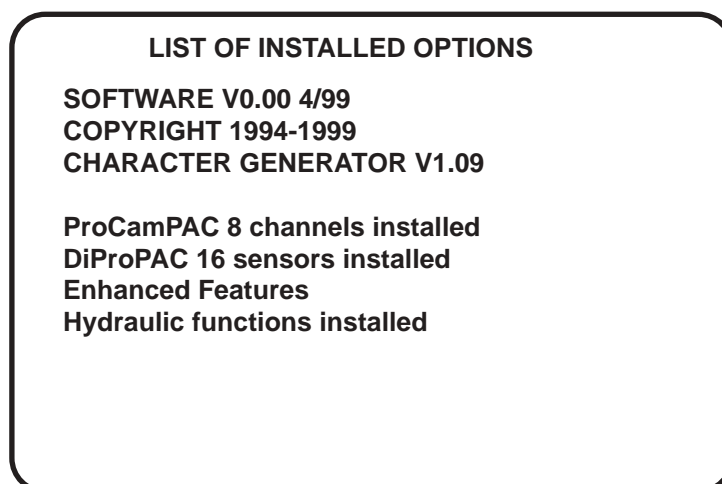
Figure 4-6. Installed options for easy identification

Press name

You use this choice to name the press on which SmartPAC Hydraulic is installed. As the screen suggests (refer to Chap. 3 or see Fig. 4-12, Pg. 73 in this chapter for an illustration), certain keys enable you to name the press. The name you choose can be any combination of alpha-numeric characters, symbols, etc. Pressing the CLEAR key clears the text. To make other entries, do the following:

1. To key in <u>letters</u>: Use the up, down, left, and/or right cursor keys to highlight the desired letter; then press ENTER.

To key in <u>numbers</u>: Use the number keypad; then press ENTER.

3.   To accept your selection, 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.)

Select cam names

Your SmartPAC Hydraulic is equipped with ProCamPAC, you can provide individual names for each of your cam channels to adequately describe their function. You can name up to 8 cam channels on your SmartPAC Hydraulic.

1.   Select "Select cam names". You will see this display (shows the 8 channels to be named):

```
┌──────────────────────────────────────────────────────┐
│                      CHANNEL 1    ▐TOP LIMIT▌         │
│  CAM CHANNEL         CHANNEL 2    BOTTOM LIMIT        │
│  NAME MENU           CHANNEL 3    DWELL               │
│                      CHANNEL 4    PRESS REV WIN       │
│                      CHANNEL 5    UNNAMED             │
│                      CHANNEL 6    UNNAMED             │
│                      CHANNEL 7    UNNAMED             │
│                      CHANNEL 8    UNNAMED             │
│                                                        │
│                                                        │
│                                                        │
│                                                        │
│  USE CURSOR KEYS TO SELECT THE CHANNEL.              │
│  PRESS ENTER TO CHANGE THE NAME.                     │
│  PRESS RESET WHEN DONE.                              │
└──────────────────────────────────────────────────────┘
```
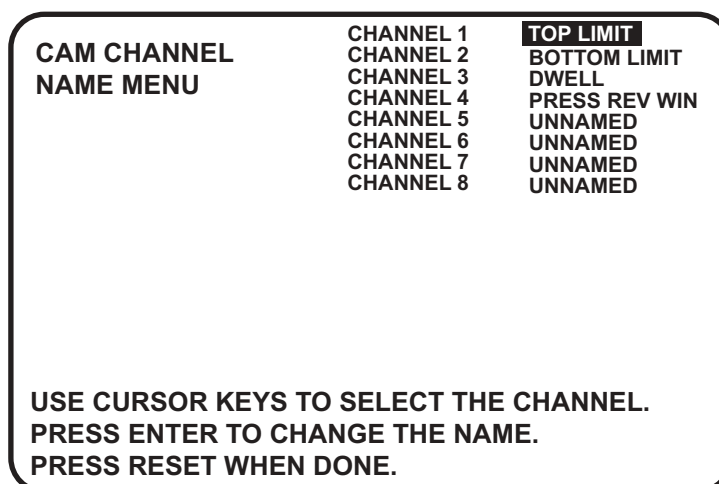
Figure 4-7. "Select cam names" display

2. Top & Bottom Limit for Channels one and two are factory pre-set. Do not change these names. They are used to signal the valve control Top and Bottom limits.

3. Channel 3, Dwell, is used for the optional feature of reverse on tonnage with dwell at the bottom. If you do not plan to use this option, you can rename channel 3 and program it appropriately for any other cam function.

4. Channel 4, Press Rev Win, may be needed if optional pressure reversal is used. On a multi-speed press the hydraulic pressure in the system can be very high during the fast speed. On such presses, the pressure measurement for the automatic reversal must be limited during the slow speed when the material is formed. This cam needs to be set to specify when to make the measurement. This channel is NOT wired to any I/O. The timing information is used internally.

5. If you do not plan to use this option, you can rename channel 4 and program it appropriately for any other cam function.

6. You can name any channel by selecting it. You will see the following display.

7. Notice that cam channels 5-8 are "unnamed". When you start, notice that the display highlights channel 1. You'll need to scroll down (using the down arrow key) to highlight the cam channel you wish to use. Remember channels 1 & 2 are factory presets. Do Not change their names.

8. Usually you will want to give the channel a name that best describes its function; so first check the list for a suitable name. However, if you wish, you can leave it unnamed, and move on to the next channel.

9. To see the complete list of names highlight a channel, press Enter, 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.

```
┌─────────────────────────────────────────────────┐
│                            ┌─────────────────┐   │
│  SELECT NAME FOR           │  UNNAMED        │   │
│  CAM CHANNEL 1             └─────────────────┘   │
│                             "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        │
│                             OUTLET 1             │
│           MORE NAMES ▼      OUTLET 2             │
└─────────────────────────────────────────────────┘
```
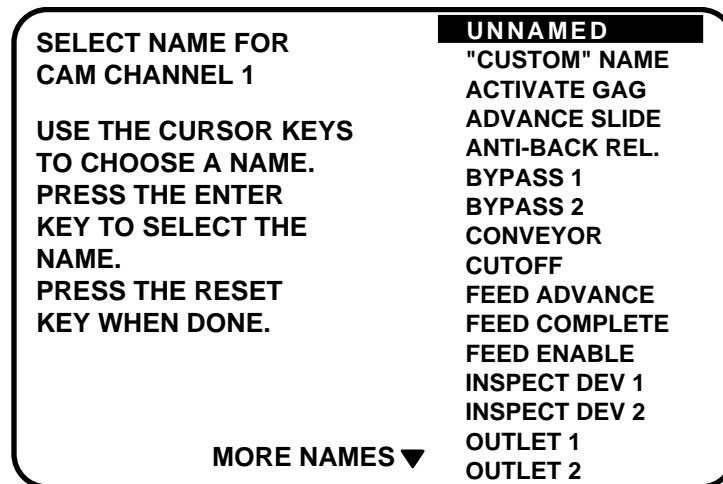
Figure 4-8. Selecting cam name for "channel 1"

10. If you do not find a suitable name but you still want to name the cam, you can select " 'Custom' Name", by highlighting it and pressing ENTER.

11. As the screen suggests (see the illustration below), certain keys enable you to custom name the tool. Your names can be any combination of alpha-numeric characters, symbols, etc. Pressing the CLEAR key clears the text. To make other entries, do the following three steps:

```
┌───────────────────────────────────────────────┐
│  ┌─────────────────────────────┐               │
│  │                             │               │
│  └─────────────────────────────┘               │
│  ■ A  B  C  D  E   PRESS CLEAR TO CLEAR        │
│  F  G  H  I  J  K   TEXT.  USE THE KEYPAD      │
│  L  M  N  O  P  Q   TO ENTER NUMBERS.  USE     │
│  R  S  T  U  V  W   CURSORS TO SELECT THE      │
│  X  Y  Z  ,  -  #   LETTERS.  PRESS ENTER      │
│  .  (  )  *  /  &   TO ENTER THE LETTERS.      │
│                     PRESS F6 WHEN DONE.        │
│                     PRESS RESET TO CANCEL.     │
└───────────────────────────────────────────────┘
```
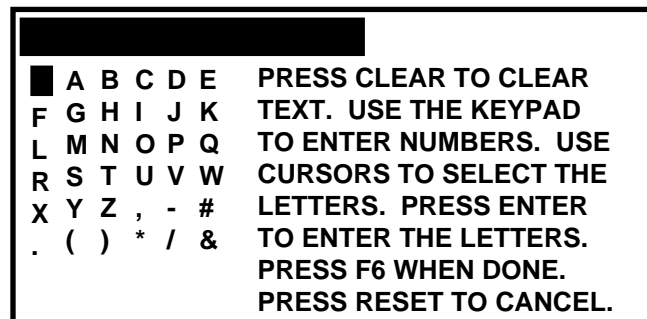
Figure 4-9. Custom Name screen superimposed over "Set cam names" display

a. To key in letters: Use the up, down, left, and/or right cursor keys to highlight the desired letter; then press ENTER.

To key in numbers: Use the number keypad; then press ENTER.

To accept your selection, 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.)

12. After you have named channel 1, you will be returned to the previous menu where channel 2 automatically is highlighted for you. You can select a name for it. Continue in this manner until all your cam channels have been named.

13. When you are completely done, press Reset to return to the Main Initialization menu.

NAMING CAM CHANNELS IN INITIALIZATION

Whatever name you select for the cam channel in Initialization is set for that channel number *no matter* what tool you program. For instance, if you "custom-named" channel 1 as "bypass 3", then channel 1 will always be "bypass 3" in the Programming mode for every tool loaded.

The display showing your channels will not change to show the new channel names. It will always say "channel 1," "channel 2," etc. This is so that you always know which channel you are naming. However, the actual channel names will appear in Program and Run modes along with their respective channel numbers.

Custom Sensor names

You select this choice to set custom sensor names (if DiProPAC is installed). This is the screen you will see.

HOW YOU USE THE CUSTOM SENSOR NAMES

You can create up to sixteen custom names for your sensors, *regardless if you have DiProPAC-8 or DiProPAC 16.* What this means is that when you actually assign names for each of your sensors in Programming mode, you can interchangeably choose from your entire list of customized names (created in Initialization). For example, you assign "custom 12" the name of "transfer arm" in Initialization mode. In Programming mode, you set sensor #1 to be named "transfer arm".

```
            CUSTOM 1    ▮▮▮▮▮▮
  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 CURSOR KEYS TO SELECT A CUSTOM
  NAME.  PRESS ENTER TO SET/CHANGE A NAME.
  PRESS RESET WHEN DONE.
```
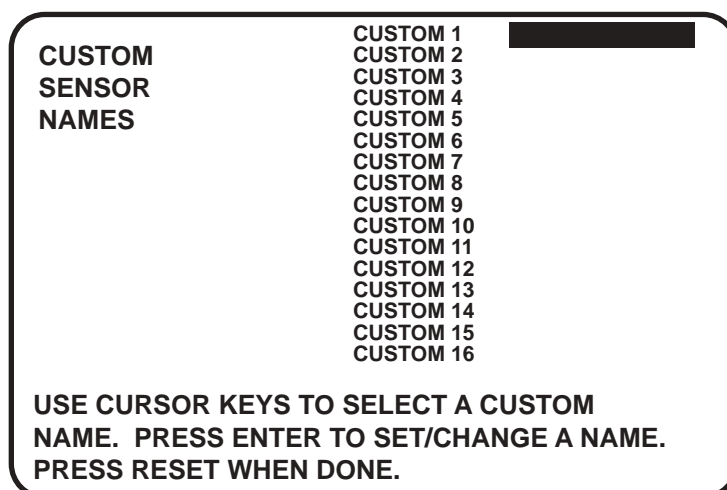
Figure 4-10. Custom naming sensors

1. Select "Custom 1", by highlighting and pressing Enter. Note that the custom name screen is superimposed over the display (refer to Fig.4-9, Pg. 70 for illustration).

2. As the screen suggests (see the illustration below), certain keys enable you to custom name the tool. Your names can be any combination of alpha-numeric characters, symbols, etc. Pressing the CLEAR key clears the text. To make other entries, do the following:

   a. To key in <u>letters</u>: Use the up, down, left, and/or right cursor keys to highlight the desired letter; then press ENTER.

   b. To key in <u>numbers</u>: Use the number keypad; then press ENTER.

   c. To accept your selection, 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.)

3. After you have named custom 1, you will be returned to the previous menu where custom 2 automatically is highlighted for you. You can select a name for it. Continue in this manner until you are done initializing the custom sensor names.

Sensor Enable mode

You use "Sensor Enable mode" screen if you have DiProPAC installed.

DIE PROTECTION ENABLE MODE MENU

SENSOR ENABLE MODE: MANUAL ENABLE
SETUP MODE: DISABLED

USE THE CURSOR KEYS TO SELECT THE MODE YOU WANT TO USE. PRESS THE RESET KEY WHEN DONE.

Pressing Enter toggles to:
 Auto by Tool
 Auto by Sensor
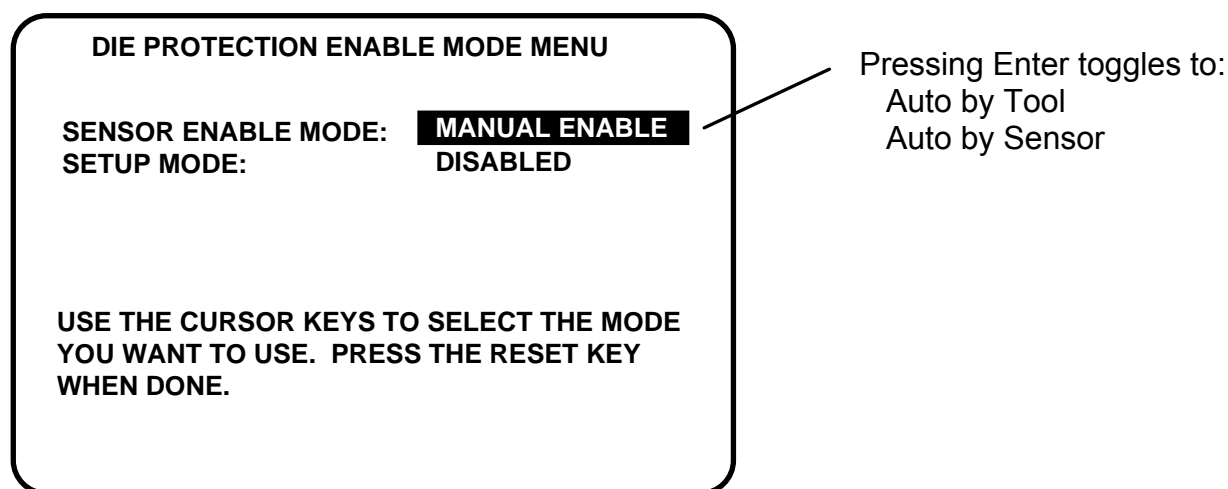
Figure 4-11. Sensor Enable mode (used with DiProPAC only)

Enabling sensors

Select **manual enable**, when you wish to manually enable or disable sensors in DiProPAC. Keep in mind that if you make this selection, DiProPAC will not re-enable sensors for you. You have to remember to do that yourself in Programming and Run modes. See "Disable (enable) sensors" discussed in both Chapter 5 and Chapter 6.

If you want SmartPAC Hydraulic to "remember" to re-enable sensors for you, choose one of the following "auto by" choices.

Select **auto by tool** when you want DiProPAC to automatically re-enable ALL sensors programmed to a specific tool. You set the specific number of "auto enable" strokes for the tool in Programming mode. Refer to the section "Die Protection" in Chapter 5.

Select **auto by sensor (and tool)** when you want DiProPAC to automatically re-enable each sensor individually. You set the specific number of " auto enable" strokes for each sensor in Programming mode. Refer to the section "Die Protection" in Chapter 5.

Sensor setup mode

Depending upon how you wired SmartPAC Hydraulic, you can disable or enable the sensor mode. (Refer to Ch. 2, Pg. 49 in the section called "Wiring setup mode circuit".) If you performed this wiring, this made your SmartPAC Hydraulic "setup mode-ready". This means that you can activate (enable) or deactivate (disable) the setup mode at this screen.

When you enable the sensor setup mode, the green sensors will be disabled while you are inching the press. If you leave this setup mode disabled (even with the wiring done), the green sensors will function as usual. See Fig. 4-11, Pg. 72. Select the second line "Setup mode". Press Enter to enable this mode. The line in the display will say: "ENABLED". Press Enter again to toggle it back to "DISABLED". Setting up tool information (optional)

Tool Information

With this option, you can record information about the same six items for every tool. In addition, you can enter up to 30 characters of special information about each tool (See "Tool information", chapters 5 and 6.). Follow the steps below to set up the six items.

IMPORTANT

Tool Information serves only as a convenient place to record information about the tool. It does not control any aspect of press operation.

Note: *This feature is not available if you have the optional PLC interface installed.*

From the main Initialization menu (Fig. 4-1, Pg. 62), select "Tool information." You will see a display similar to the following:

```
                  NAME          UNITS        PLACES

TOOL     1  NAME  1       UNS  1          0
INFO.    2  NAME  2       UNS  2          0
NAMES    3  NAME  3       UNS  3          0
         4  NAME  4       UNS  4          0
         5  NAME  5       UNS  5          0
         6  NAME  6       UNS  6          0



  USE CURSOR KEYS TO SELECT A NAME. PRESS
  ENTER TO CHANGE.  PRESS RESET WHEN DONE.
```

Figure 4-12. Tool information setup

1. Highlight the name next to number 1. Press ENTER. A screen like this appears:

```
              "CUSTOM"
USE THE CURSOR KEYS    FEED LENGTH
TO CHOOSE A NAME.      FEED RATE
PRESS THE ENTER        FEED ACCEL
KEY TO SELECT THE      FEED SPEED
NAME.                  SHUT HEIGHT
PRESS THE RESET        PASS LINE HT
KEY WHEN DONE.         LUBE TEMP.
                       MATERIAL #
                       INSPECTION
                       LUBE PRESS.
                       LUBE TYPE
                       CONVEYOR
                       HYD OVERLOAD
                       HYDRAULIC PUMP
        MORE NAMES  ▼   PART LUBE
```
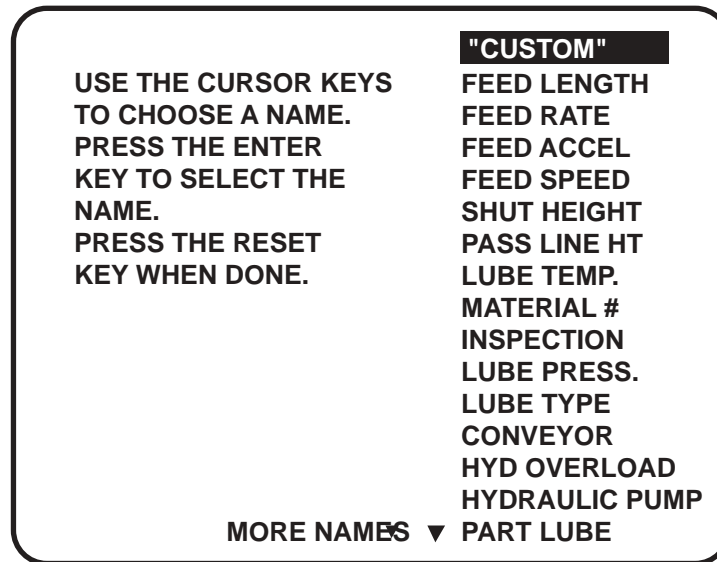
Figure 4-13. Tool information names

2. Use the cursor keys to highlight the name you want. Press ENTER to select it. If you want to make up a custom name, highlight "CUSTOM" and press ENTER. A screen overlay appears that allows you to enter up to twelve characters of text for a custom name, Figure 4-14 on the next page.

```
■A  B  C  D  E   PRESS CLEAR TO CLEAR
F  G  H  I  J  K   TEXT. USE THE KEYPAD
L  M  N  O  P  Q   TO ENTER NUMBERS. USE
R  S  T  U  V  W   CURSORS TO SELECT THE
X  Y  Z  ,  -  #   LETTERS. PRESS ENTER
.  (  )  *  /  &   TO ENTER THE LETTERS.
                   PRESS F6 WHEN DONE.
                   PRESS  RESET TO CANCEL.
```
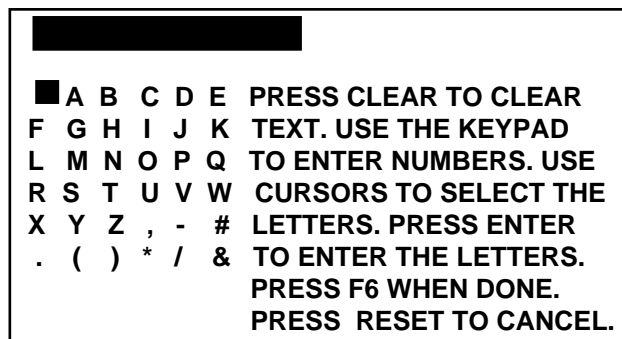
Figure 4-14. Overlay for entering text

3. To enter the units for each item, select the units column next to the desired item. A screen appears from which you can select the unit you want (see table 4-2 below) or choose to enter a "Custom" unit.

Table 4-2. Units for Tool Information setup

Screen name	Units	Screen name	Units
IN	inches	METERS	Meters
FT	feet	FT/MIN	feet per minute
MM	millimeters	FT/SEC	feet per second
CM	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	FPM	feet per minute
DEG. F	degrees Fahrenheit	MPM	Meters per minute
DEG. C	degrees Celsius		

4. To enter the number of decimal places for each item, select the "places" column next to the desired item. A screen appears where you can enter the number of decimal places you want, from 1 to 4. For items that will list YES or NO instead of numeric values, enter eight (8) for the number of places. Table 4-3 on the next page gives examples of the different numbers of decimal places you can enter.

```
                    NAME           UNITS          PLACES

TOOL      1 PASS LINE HT      IN               2
INFO.     2 STRAIGHTENER      IN               2
NAMES     3 HYD. OVLD.        TONS             0
          4 CONVEYOR                           8
          5 PART LUBE                          8




   USE CURSOR KEYS TO SELECT A NAME. PRESS
   ENTER TO CHANGE.  PRESS RESET WHEN DONE.
```

Figure 4-15. Completed Tool Number Information screen

IMPORTANT

Do not change the number of decimal places after you have entered values for any specific tools. If you change the number of decimal places, any value you entered will be changed by a factor of ten for each decimal place added or removed.

---

5. When you have finished setting up the tool number information, press RESET to return to the main Initialization menu.

Table 4-3. Decimal places and formats

Number of decimal places Example	digits to LEFT of decimal point	digits to Right of decimal point	Range
1	up to five (5)	one (1)	0.0 99,999.9
2	up to four (4)	two (2)	0.00 9,999.99
3	up to three (3)	three (3)	0.000 999.999
4 **precise values:** **material thickness**	up to two (2)	four (4)	0.0000 99.9999
8 **Yes or No designation**	not applicable	not applicable	NO (0) YES (1)

Security access

Use the Security access choice in the Initialization menu to prevent unauthorized access to SmartPAC Hydraulic settings.   For most items shown in Figure 4-17, Pg. 78 you can choose the level of security that meets your needs:

- PROGRAM AND RUN MODES - least secure: anyone can make changes anytime.
- PROGRAM MODE ONLY - changes can be made only when the Program/Run key is in the Program position. To keep users from entering Program mode and making changes, you must remove the Program/Run key after switching it to Run.
- PASSWORD REQUIRED (optional) - most secure: changes can be made only after the user enters a password.

Exceptions

The following items have different or additional security options:

- **Change Count** has an additional option of: No Changes Allowed. This prevents changes to actual counter values (for strokes, good parts, total hits, and batch counters) so the counter values cannot be altered in either Program or Run modes.

- **Init Password,** if you have the password option, enables you to require the user to enter a password in order to access the Initialization menu. To require a password, select "Must Be Used." For no password, select "Not Required"

- **Load Monitor** has four options: Allow Recalc/Adjust, Allow Recalc Only, No Recalc/Adjust, and, if you have the password option, Password required.

DO NOT SET INIT PASSWORD TO "MUST BE USED" UNTIL YOU HAVE CHECKED YOUR PASSWORDS.

Field upgraded SmartPAC Hydraulic may have different passwords from those listed in this manual. If you do not know the initialization password and change Init password to "Must be used" you will not be able to access the initialization menu again.

See Chapter 5—"Using SmartPAC Hydraulic in Program mode" and Chapter 6—"Using SmartPAC Hydraulic in Run mode" for more information about program and run modes.

When you attempt to access a menu that is password protected, the SmartPAC Hydraulic asks for your password in a display that looks like this:

```
      ENTER YOUR PASSWORD

            ████████

    USE THE  KEYPAD TO ENTER NUMBERS.
    USE THE UP/DOWN CURSON KEYS TO
    INCREASE/DECREASE. PRESS ENTER
    WHEN DONE. PRESS RESET TO CANCEL.

                        60599
```

If you forget or do not know your password(s), call DI and give this number to the tech support person.

Note: *Your number may be different.*
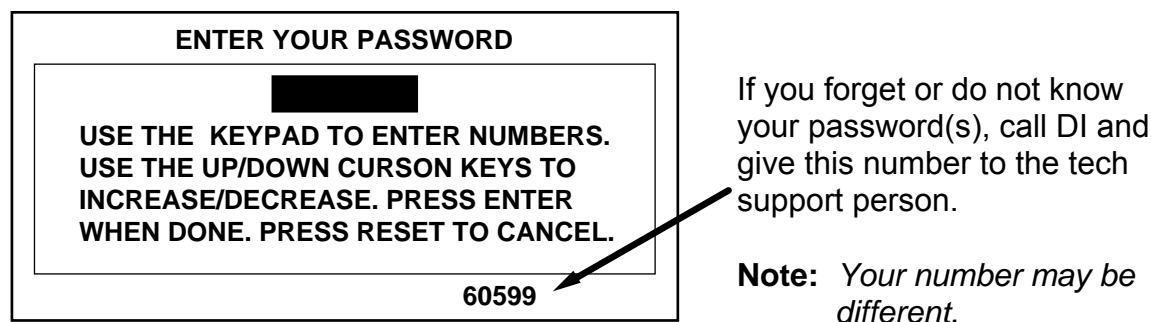
Figure 4-16. "Enter your password" screen you forget or do not know your password(s)

Call Honeywell's Wintriss Controls Group 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.

Selecting Security access options

1. In the Initialization menu, select "Security access"

   You will see a display similar to the one below. Yours may look different, depending on your SmartPAC Hydraulic system configuration. Notice that the factory (default) settings allow all actions to be performed in both Program *and* Run modes.

```
┌─────────────────────────────────────────┐
│           SECURITY ACCESS MENU           │
│                                          │
│     LOAD TOOL #: ▐PROGRAM AND RUN MODES▌ │
│   DELETE TOLL #: PROGRAM MODE            │
│  SET CNTR PRESET: PROGRAM AND RUN MODES  │
│   CHANGE COUNT: PROGRAM AND RUN MODES    │
│     RESET MODE: PROGRAM AND RUN MODES    │
│  ADJUST SENSORS: PROGRAM AND RUN MODES   │
│ DISABLE SENSORS: PROGRAM AND RUN MODES   │
│    ADJUST CAMS: PROGRAM AND RUN MODES     │
│  ADJ. TOOL INFO: PROGRAM AND RUN MODES   │
│   ADJUST HYDRO: PROGRAM MODE ONLY        │
│   ADJ. MAX/MIN: PROGRAM AND RUN MODES    │
│  INIT PASSWORD: NOT REQUIRED             │
│                                          │
│                                          │
│  USE THE CURSOR KEYS TO MAKE CHOICES.    │
│  PRESS THE ENTER KEY TO CHANGE THE MODES.│
│  PRESS F1 TO CHANGE PASSWORDS.           │
│  PRESS THE RESET KEY WHEN DONE.          │
└─────────────────────────────────────────┘
```

Figure 4-17. Security Access default settings

IMPORTANT

If you have the password option, be sure to check your passwords before changing any security access settings. Record the passwords in a safe place. See "Changing passwords" later in this chapter to check and change passwords.

---

2. To change the security access of an item, use the up and down arrows to highlight the access information for the item. Press ENTER one or more times until the type of access you want appears.

For most items, you can choose from the following access levels:

- "PROGRAM AND RUN MODES"
- "PROGRAM MODE ONLY"
- "PASSWORD REQUIRED" (if you have the password option)

If you have the password option:

DO NOT SET INIT PASSWORD TO "MUST BE USED" UNTIL YOU HAVE CHECKED YOUR PASSWORDS.

Field upgraded SmartPAC Hydraulic may have different passwords than those listed in this manual. If you do not know the initialization password and change Init password to "Must be used" you will not be able to access the initialization menu again.

---

3. Press RESET to save your choice and return to the Initialization menu.

Examples

You want to prevent **loading a tool number** in Run mode. Set the security access for this item to Program Mode Only. Highlight the access level next to "Load Tool #." Press ENTER one or more times until "PROGRAM MODE ONLY" appears. Press RESET. Now a tool can be loaded only when the Prog/Run key is switched to Prog.

You have the password option and want only certain individuals to **adjust the cams**. Set Adjust Cams to "PASSWORD REQUIRED," and tell those individuals the password. Highlight the access level next to "Adjust Cams." Press ENTER one or more times until "PASSWORD REQUIRED" appears. Press RESET. Now the cams cannot be adjusted without the user entering the correct password.

Reset Mode

Set the Reset mode security access with care. If you set access to "Program mode only" or "Password required," personnel cannot reset SmartPAC Hydraulic in Run mode after a malfunction that stops the press. If you want the operator to reset the machine after errors, select "Program and Run Modes." If you want one person to record or be aware of all faults that occur, give that person the Program/Run key, and set the access to Program mode only. He or she would be able to reset faults by turning the key to "Program" and pressing the RESET key. Turning the key back to "Run" allows the press to run again.

Changing passwords If it has the password option, your SmartPAC Hydraulic has three passwords that secure different parts of its operation:

- **Init. password** allows access to the initialization menu

- **General password** allows access to all other menus and settings, except for PM Monitor (see next bullet).

- **PM password** allows access to the PM (preventive maintenance) Monitor setup in Program mode. See Appendix A, "SmartPAC Hydraulic PM Monitor (optional)."

IMPORTANT

Your SmartPAC Hydraulic comes from the factory with all three passwords set to the default password, "1234." If you have upgraded your SmartPAC Hydraulic in the field, it may have different passwords.

A password is a one-to-four-digit number. Follow the steps below to change password(s).

1. In the Initialization menu, select Security access.

2. The display appears similar to Fig. 4-17, Pg. 78. Press **F1**.

3. The display shows the Set Passwords menu, Figure 4-18 below.

```
┌──────────────────────────────────────────┐
│                                          │
│           SET PASSWORDS MENU             │
│                                          │
│   INIT. PASSWORD       = 1234            │
│   GENERAL PASSWORD = 1234                │
│   PM PASSWORD          = 1234            │
│                                          │
│                                          │
│   USE THE CURSOR KEYS TO CHOOSE THE ITEM │
│   YOU WISH TO CHANGE. PRESS THE ENTER KEY│
│   TO CHANGE.                             │
│                                          │
└──────────────────────────────────────────┘
```
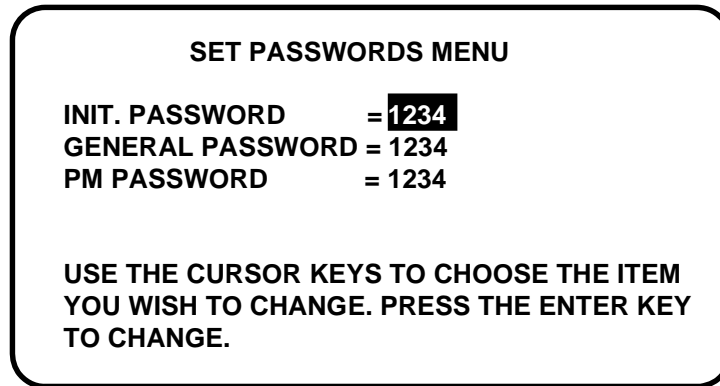
Figure 4-18. Set passwords menu

Highlight the password you want to change. Press ENTER. The following appears.

```
┌──────────────────────────────────────────┐
│                                          │
│           ENTER A NEW PASSWORD           │
│           UP TO 4 DIGITS LONG            │
│   ┌──────────────────────────────────┐   │
│   │             1,234                │   │
│   │  USE THE  KEYPAD TO ENTER NUMBERS.│   │
│   │  USE THE UP/DOWN CURSON KEYS TO  │   │
│   │  INCREASE/DECREASE. PRESS ENTER  │   │
│   │  WHEN DONE. PRESS RESET TO CANCEL.│   │
│   └──────────────────────────────────┘   │
│                                          │
└──────────────────────────────────────────┘
```
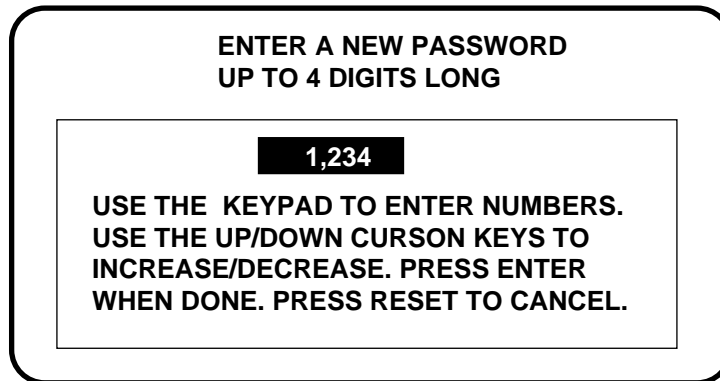
Figure 4-19. "Enter a new password" screen

Key in new password. Press ENTER. The display returns to Set password menu.

Communications (optional)

This choice on the Initialization menu lets you set an identification number for your SmartPAC Hydraulic if it is connected to one of Wintriss Controls' software products. SmartPAC Hydraulic can send and receive data from a computer running Computerized Pressroom Reporting or RSR^{TM} — Remote Storage and Retrieval. Follow these steps to set the CPU number. *If you do not require communications, then ignore this item.*

Select "Communications". You will see this display:

```
                    CPU NUMBER  = 1



        PRESS CURSOR KEYS TO CHANGE CPU NUMBER
        PRESS RESET WHEN DONE
```
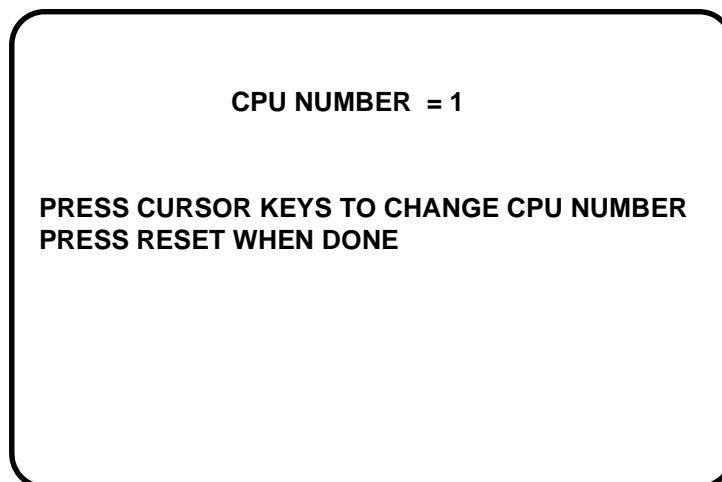
Figure 4-20. Setting CPU number

The CPU number is the identifying number of your unit. For instance, if you had several SmartPAC Hydraulic units (and possibly other controls in the network), identify them as 1, 2, etc. You have the choice of using either the number keypad or the cursor keys. If you use the number keys, press the appropriate numbers and press enter. If you use the "up" or "left" cursor keys, the number increases by 1. If you use the "down" or "right" cursor keys, the number decreases by 1, and then jumps down from 0 to 99, 98, etc. Once you have set a CPU number for the unit, press RESET to go back to the Initialization menu. For more information on which CPU number to use or on other information about the Wintriss Controls' software products, refer to the user manual for either of those products.

Chapter 5
Using SmartPAC Hydraulic in Program Mode

This chapter describes how to use all the displays you will see in Program mode. It covers, making settings for a tool, loading tool information, deleting a tool number, modifying a tool number, and setting ram position.

This chapter also includes programmable cam-related functions, such as setting cam timing, and programming timed and auto events; and die protection-related functions, such as enabling and disabling sensors, and configuring sensors.

About Program mode

You use Programming mode to make all the settings for the tool. In Program mode, you enter a tool number; then make appropriate settings for that tool. You can change settings and delete (erase) all settings for the tool. You can see a display of all the tool numbers for which you have made settings.

You cannot run the press in Program mode. That can only be done in Run mode. Here is how you use the two modes. In Program mode, you can make settings for all your tools. In Run mode, you can make certain minor adjustments for the installed tool only.

The first display—the Programming menu

To get into Programming mode from Initialization mode, turn the Program/Run key first to "Run", then to "Program". This is the first display that you will see.

```
THE CURRENTLY LOADED TOOL #  IS  1234567
CHAIR BRACKET
SENSORS ENABLED
            PROGRAM OR LOAD TOOL NUMBERS
            DISABLE THE SENSORS


    USE CURSOR KEYS TO CHANGE SELECTIONS
    PRESS ENTER TO DISABLE SENSORS.
```
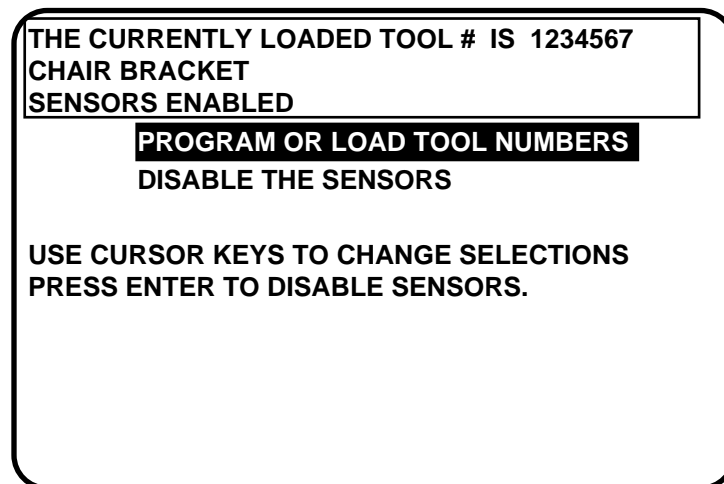
Figure 5-1. First display in Program mode

SELECT = HIGHLIGHT + ENTER

When we say SELECT in this manual, it means highlight the item and press Enter.

Select "Program/Load Tool Number" and you will see a list of available tools. This display will either highlight the currently loaded tool number, or "NEW" if no tool number has been programmed. From this display, you can call up all the other displays in Programming mode and carry out your tasks from this point. Notice that when a tool is highlighted, its "tool name" (if programmed) is also shown. However, when "NEW" is highlighted, it remains unnamed until you assign a number and name.

TOOL #'S 1 USED 199 AVAILABLE

    NEW
    1234567

USE CURSOR KEYS TO CHANGE SELECTIONS
PRESS ENTER TO SELECT, RESET WHEN DONE

                                        COPY ▶ F6

TOOL #'S 1 USED 199

        NEW
        1234567

USE CURSOR KEYS T
PRESS ENTER TO SEL

CHAIR BRACKET

Press **F6** to copy
settings from one
tool to another
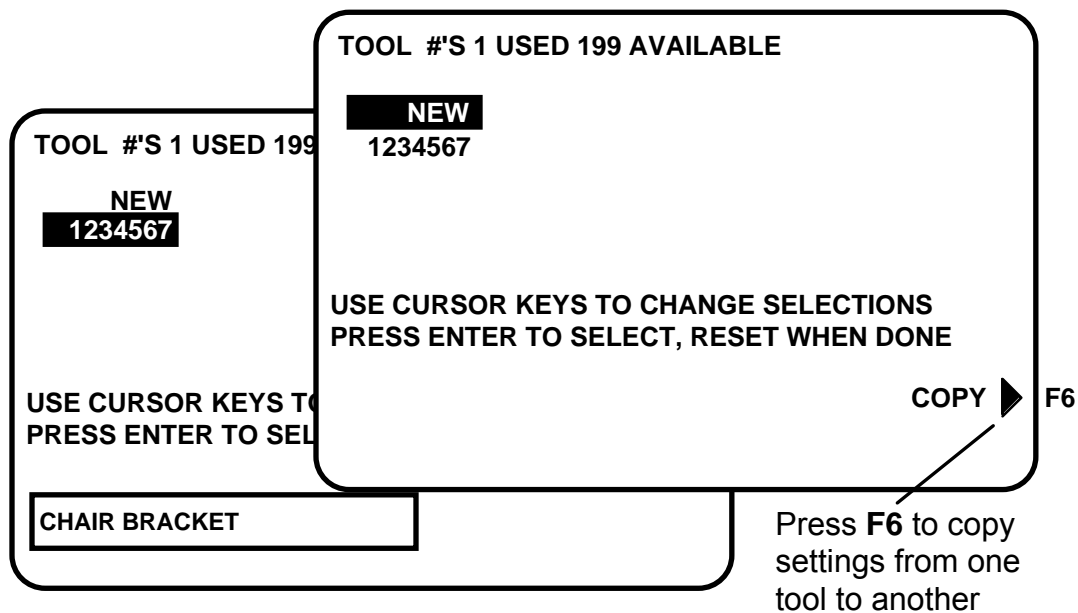
Figure 5-2. Program mode display highlighting "NEW" or "currently loaded tool"

Note: *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 hitting the RESET key. When the first display in the mode is reached, you will instantly switch to the new mode.*

This section explains how to create or select a tool number and then set (program) various parameters for that tool.

Before you can run the press, you have to load the SmartPAC Hydraulic settings for the tool being used. This retrieves the settings for the tool from SmartPAC Hydraulics memory.

To load a tool number, see "Load the tool information" later in this chapter. To delete a tool number, refer to the section "Delete the tool information" also in this chapter.

Copying a tool number

Notice that from this screen, you can also copy all the parameters of one tool to another. To copy a tool, press **F6**. A message appears, "Tool number # has been selected to be copied. Enter the new tool number". To do this, use the number keys and then press Enter. For assistance on using the number keys, see Chapter 3.

Creating a new tool number

Select NEW to enter in a new tool number. You will see the following display superimposed over the tool display (as pictured in Fig. 5-3 below):

```
                    0
USE THE KEYPAD TO ENTER NUMBERS.
USE THE UP/DOWN CURSOR KEYS TO
INCREMENT/DECREMENT.  PRESS ENTER
WHEN DONE.  PRESS RESET TO CANCEL.
```
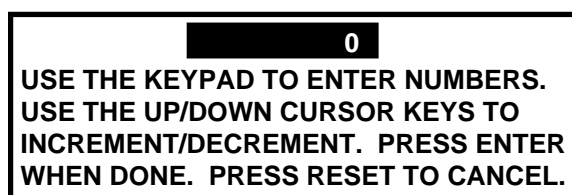
Figure 5-3. Superimposed instructions on Tool display

2. Key in the number for the tool. If you need assistance, see "Number Keys" (Ch 3).
3. Press Enter after keying in the tool number. You will see the Main Programming menu display (Fig. 5-5, Pg. 86). Once you are done, go to "Set tool name".

Selecting an existing tool number

Select the tool number from the tool number display. In this example, we are selecting tool #1234567.

```
TOOL #'s   14 USED    186 AVAILABLE
   NEW     553     3890
   225     708     44559
   389     999     89338
   397     1010    158378
   401     2299    1234567

    USE CURSOR KEYS TO CHANGE SELECTION
   PRESS ENTER TO SELECT, RESET WHEN DONE

     CHAIR BRACKET
```

tool numbers numerically sorted

highlights selected tool number & name (if set)
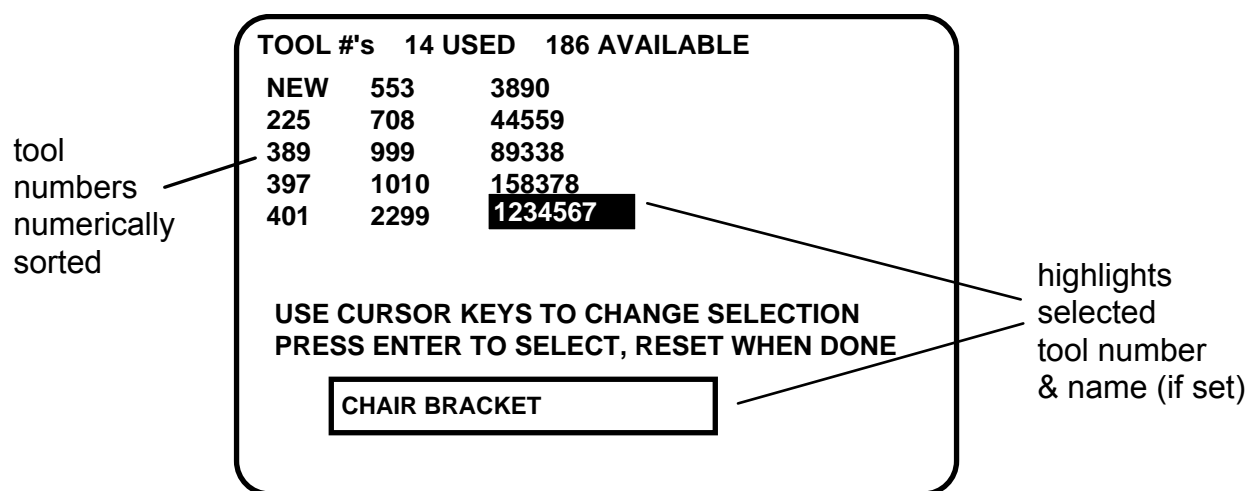
Figure 5-4. Selecting an existing tool number

2. You can move the selection bar to any number using the cursor keys (see "Using the keyboard" Ch 3 for more assistance). The tool number display can contain up to 200 tool numbers.

   If you have more than four columns of numbers, you can see more tool numbers by pressing the "right" cursor key to move your selection to the right until a new right column appears. To go back, use the "left" cursor key to move your selection to the left until a new left column appears.

3. Press Enter to select the tool. The next screen that appears is the "Main Programming menu" (Figure 5-5 below). Next, go to "Set tool name".

Set tool name

To set tool name, you need to:

- Switch SmartPAC Hydraulic to Program mode

- Select either a new or existing tool number (see the beginning of this chapter)

- Select "Tool name" and bring up that display

SELECT = HIGHLIGHT + Enter

   When we say SELECT in this manual, it means highlight the item and press Enter.

Bringing up the tool name display:

Select "Tool name" as shown below:

```
MAIN PROGRAMMING MENU FOR TOOL #  1234567
CHAIR BRACKET

Use cursor keys                            PROGRAM:
to move                LOAD THIS TOOL        TOOL NAME
Selection bar          DELETE THIS TOOL
from LOAD &                                  COUNTERS
DELETE (on left)                             DIE PROTECTION
to PROGRAM                                   CAM SWITCH
choices (on right)                           TOOL INFORMATION
                                             RAM POSITION
                                             RAM TONNAGE

                       USE THE CURSOR KEYS TO CHOOSE THE TASK
                       THAT YOU WANT TO PERFORM.  PRESS THE
                       ENTER KEY TO SELECT IT.  PRESS THE RESET
                       KEY WHEN YOU ARE DONE.
```

Figure 5-5.   Main Programming Menu
(the order may vary depending on the options installed)

You will then see this display superimposed over the "Tool name" screen:

```
■ A B C D E    PRESS CLEAR TO CLEAR
F G H I J K    TEXT.  USE THE KEYPAD
L M N O P Q    TO ENTER NUMBERS.  USE
R S T U V W    CURSORS TO SELECT THE
X Y Z , - #    LETTERS.  PRESS ENTER
. ( ) * / &    TO ENTER THE LETTERS.
               PRESS F6 WHEN DONE.
               PRESS RESET TO CANCEL.
```
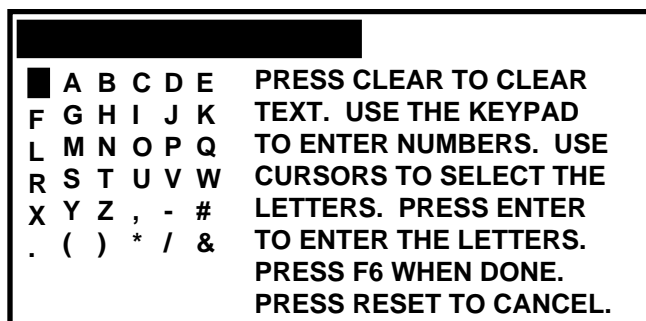
Figure 5-6. Naming the tool

3. As the screen suggests, certain keys enable you to name the tool. Pressing the CLEAR key clears the text. To make other entries, do the following:

   a. To key in <u>letters</u>: Use the up, down, left, and/or right cursor keys to highlight the desired letter; then press Enter.

   b. To key in <u>numbers</u>: Use the number keypad; then press Enter.

4. To accept your selection, press function key **F6** (to the right of the LCD display). (For assistance in using function keys, refer to Chapter 3.)

5. Once you are completely done naming your tool, press Reset to return to the Programming mode menu choices.

Ram Position

The limits in this menu must be programmed properly for each tool for SmartPAC Hydraulic to work properly. SmartPAC Hydraulic converts the Upper Limit equal to 0 degrees and Lower Limit equal to 180 degrees. The down stroke is divided equally from 0 to 180 degrees; and the upstroke equally from 180 to 360 (or 0). If the ram moves further below lower limit, SmartPAC Hydraulic holds the angle at 180. When the ram moves upwards, the angle starts increasing when it moves through the Lower Limit. Similarly, if the ram moves above the Upper Limit, SmartPAC Hydraulic holds the angle at 0 degrees until the ram moves down again.

It might be easier to set these values in Run mode. You can jog the ram to the desired upper or lower limit and press F5 or F6 respectively to automatically set the value for the loaded tool.

IMPORTANT

When you change tool numbers and the ram is below the new Upper Limit, the ram will automatically raise to the Upper Limit. If you are above the Upper Limit, the ram will not move to the Upper Limit of the new tool until the press cycles once.

1. Highlight Ram Position in the Programming Menu. You will see the following screen:

RAM POSITION

10.000 IN

PRESS THE DESIRED
FUNCTION KEY OR
USE THE CURSOR KEYS
TO SELECT A VALUE
THEN PRESS ENTER.
PRESS THE RESET KEY
WHEN DONE.

CLEAR LIMITS ▶ F4

SET UPPER LIMIT ▶ F5
4.000 IN

SET LOWER LIMIT ▶ F6
2.000 IN
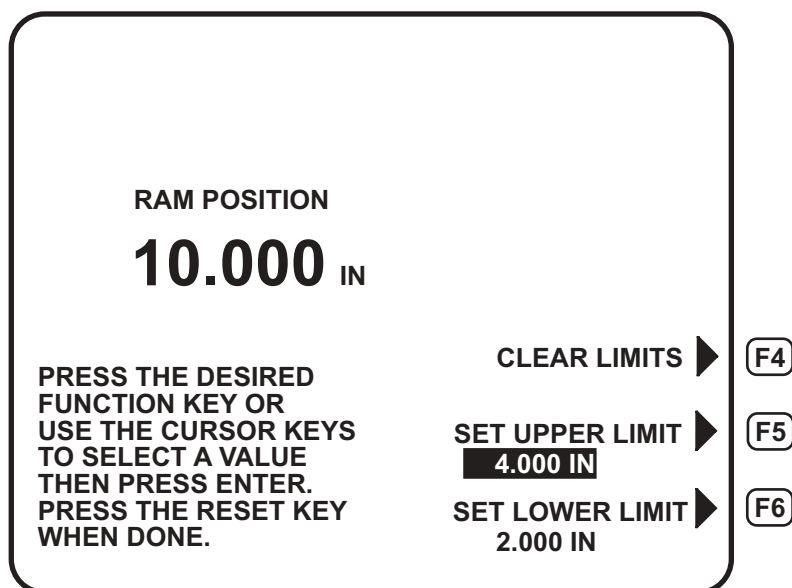
Figure 5-7. Ram Position Screen in Program Mode

2. You will need to clear all limits by pressing the F4 key (See Fig. 5-7 above). This will purge the system of all errant values.

3. Next set the upper limit. The Upper Limit must be the lowest possible position in the stroke for proper operation for the press. Jog the ram to the upper limit for this die and press the F5 key. You can also highlight the value and press Enter, type in the upper limit value and press Enter. This will place the upper limit into the SmartPAC Hydraulics memory for this tool number.

4. Now set the lower limit. The Lower Limit must be the highest possible position in the stroke to make good parts. If the ram ever returns to the Upper Limit without reaching the Lower Limit because e.g. light curtain obstruction or reaching limit, SmartPAC Hydraulic generates an error indicating, "The press cycle was interrupted before upper or lower limits were reached" and prohibits the press from further stroking until pressing reset. Jog the ram to the lower limit for this die and press the F6 key. You can also highlight the value and press Enter, type in the lower limit value and press Enter. This will place the lower limit into the SmartPAC Hydraulics memory for this tool number.

You can also set the values for upper and lower to any value within the stroke. For example; if you want a full stroke of 2 in. you can set your upper limit to 4 in. and lower at 2 in. This will give you a 2 inch stroke.

You're done. SmartPAC Hydraulic now has the upper and lower limits for the tool number.

Ram Tonnage (Optional)

This screen appears in the menu only if you enter the hydraulic pressure calibration data in the initialization menu.

The max limit in this menu must be programmed properly for each tool to return on pressure to work properly. SmartPAC Hydraulic utilizes a pressure transducer to monitor the pressure at the bottom of the stroke.

1. Highlight Ram Tonnage in the Programming Menu. You will see the following screen:

```
┌─────────────────────────────────────────┐
│                                         │
│                                         │
│    RAM TONNAGE                          │
│                                         │
│      10.0 TONS                          │
│                                         │
│                                         │
│                         REVERSAL MODE   │
│    PRESS THE DESIRED    DISTANCE ONLY   │
│    FUNCTION KEY OR                      │
│    USE THE CURSOR KEYS                  │
│    TO SELECT A VALUE                    │
│    THEN PRESS ENTER.                    │
│    PRESS THE RESET KEY                  │
│    WHEN DONE.                           │
│                                         │
└─────────────────────────────────────────┘
```
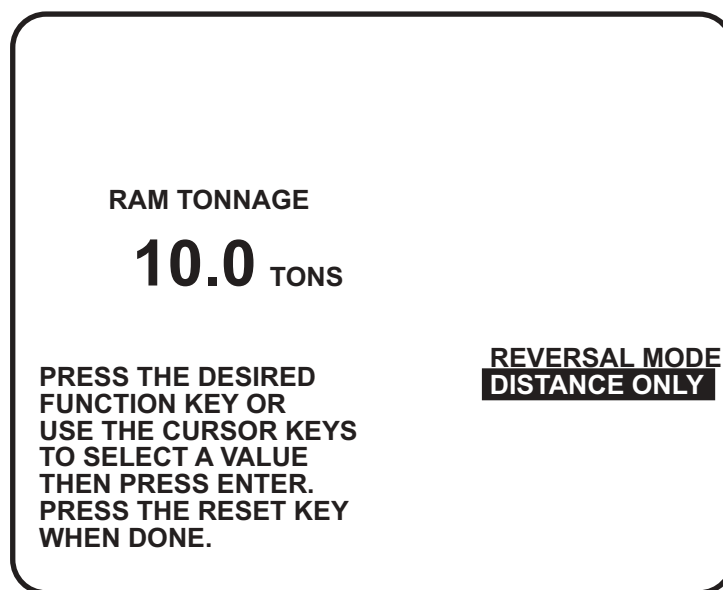
Figure 5-8. Ram Tonnage Screen in Program Mode
(Distance only)

2. Reversal Mode. You can set the SmartPAC Hydraulic to return on "Distance Only" or "Press. or Dist." by highlighting this line and pressing enter (This line toggles back and forth). For return on Distance, the SmartPAC Hydraulic returns the ram to Top once the ram reaches the Bottom Limit for the tool. The return on Dist. screen looks like fig 5-8 above.

```
┌─────────────────────────────────────────┐
│                                         │
│                                         │
│                                         │
│   RAM TONNAGE                           │
│                                         │
│   10.0 TONS                             │
│                                         │
│                                         │
│                          REVERSAL MODE  │
│   PRESS THE DESIRED      PRESS. OR DIST. │
│   FUNCTION KEY OR                       │
│   USE THE CURSOR KEYS    MAX. LIMIT     │
│   TO SELECT A VALUE       15.0 TONS     │
│   THEN PRESS ENTER.                     │
│   PRESS THE RESET KEY    DWELL TIME     │
│   WHEN DONE.              0.0 SEC       │
│                                         │
└─────────────────────────────────────────┘
```
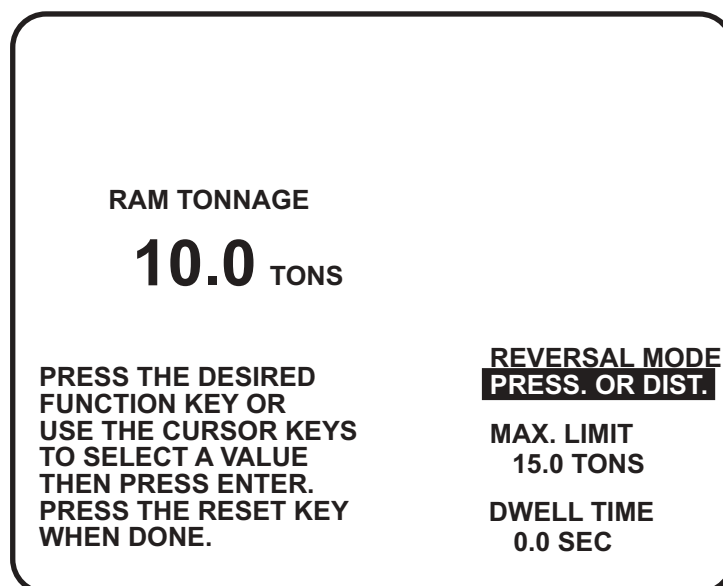
Figure 5-9. Ram Tonnage Screen in Program Mode

(Pressure or Distance)

3. For return on "Pressure or Distance", the ram will return to the top when the hydraulic pressure reaches the Max Limit or the ram reaches its Lower Limit, whichever happens first (see fig. 5-9 above). For proper functioning, the Lower Limit in ram position must be set slightly below the position where the expected pressure is developed to make the part properly. The Max. Limit value is the tonnage necessary to make the part (must be less or equal to the press capacity). Use the arrow keys to highlight the Tons line. Press Enter and enter the value.

4. Then enter your Dwell Time. Dwell time can be used to set the bottom dwell of the ram in applications such as deep draw. The ram will travel down until it reaches the desired tonnage. Once there, if you set the dwell time for 2 sec, the ram will stay at the bottom for 2 sec. Then travel back to top. Use the arrow keys to highlight the Sec line. Press Enter and enter the value.

    The Dwell function will work only if you have wired channel 3 on the cam output assembly to the "Dwell" input on your main control.

You're done. SmartPAC Hydraulic will now return on pressure or distance depending on how you set it up back in steps 2 - 4.

Cam switch

To use cam switch, you need to:

- Select "Cam switch" from the Main Programming menu
- Select a channel and make an on-off, auto, or timed output setting
- Set all other channels for the tool

Bringing up the display of cam channels

Select "Cam switch" from the Main Programming menu (Fig. 5-5, Pg. 86).
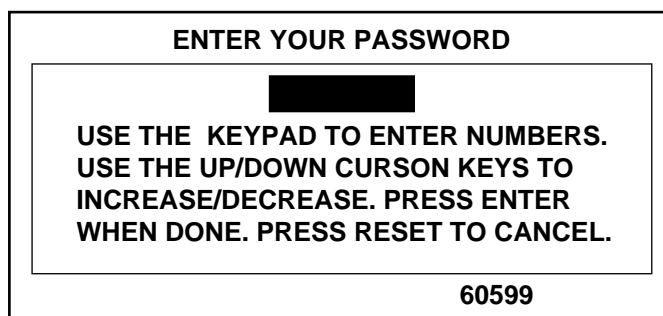
```
┌─────────────────────────────────────────┐
│         ENTER YOUR PASSWORD              │
│  ┌──────────────────────────────────┐    │
│  │          ███████████             │    │
│  │  USE THE  KEYPAD TO ENTER NUMBERS. │    │
│  │  USE THE UP/DOWN CURSON KEYS TO    │    │
│  │  INCREASE/DECREASE. PRESS ENTER    │    │
│  │  WHEN DONE. PRESS RESET TO CANCEL. │    │
│  └──────────────────────────────────┘    │
│                              60599       │
└─────────────────────────────────────────┘
```

If this display appears, you need to enter the general password to access these settings. Password access is set under Security Access in Initialization mode. See "Security Access" in Ch 4.

This is your list of cam channels. Now you can select and set a channel. (If you named your cam channels in Initialization mode, those names appear instead of channel 1, channel 2, etc.)

Top & Bottom Limit are factory set. Channel 3, Dwell, is optional. It is also factory set. If you plan to use "Reverse on Tonnage with Dwell" channels 1 and 3 must be wired properly to your main control for the press to work properly. **Do not change settings.**

```
┌────────────────────────────────────────────────┐
│                      CHANNEL 1   TOP LIMIT     │
│  CAM CHANNEL         CHANNEL 2   BOTTOM LIMIT  │
│  NAME MENU           CHANNEL 3   DWELL         │
│                      CHANNEL 4   PRESS REV WIN │
│                      CHANNEL 5   UNNAMED       │
│                      CHANNEL 6   UNNAMED       │
│                      CHANNEL 7   UNNAMED       │
│                      CHANNEL 8   UNNAMED       │
│                                                 │
│                                                 │
│                                                 │
│  USE CURSOR KEYS TO SELECT THE CHANNEL.         │
│  PRESS ENTER TO CHANGE THE NAME.                │
│  PRESS RESET WHEN DONE.                         │
└────────────────────────────────────────────────┘
```
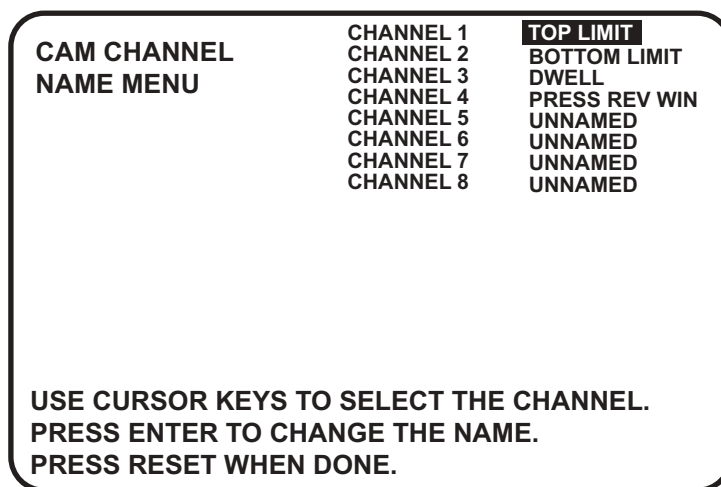
Figure 5-8. Programming cam channels

Selecting a channel and making an on-off setting

An on-off setting means you set the stroke angles where you want the channel to turn on and turn off.

To make an on-off setting for a channel:

Select a channel from the complete list. You will see the display below. Notice the tool number and channel name selected are shown in the display. Select "Program on/off angle".

```
┌─────────────────────────────────────────────────┐
│  ┌───────────────────────────────────────────┐  │
│  │ TOOL NUMBER 1234567        CHANNEL 1       │  │
│  │ CHAIR BRACKET              UNNAMED         │  │
│  └───────────────────────────────────────────┘  │
│            ▐ PROGRAM ON/OFF ANGLES ▌            │
│              PROGRAM TIMED OUTPUT                │
│              DELETE CHANNEL SETTINGS             │
│                                                  │
│                                                  │
│    USE CURSOR KEYS TO CHOOSE KEYS TO CHOOSE      │
│    THE CHANNEL TYPE.                             │
│    PRESS THE RESET KEY WHEN DONE.                │
│                                                  │
│                                                  │
└─────────────────────────────────────────────────┘
```
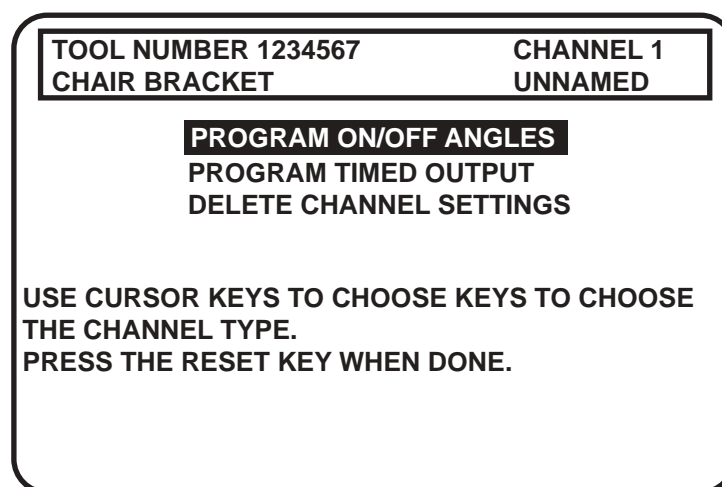
Figure 5-9. Selecting "Program on/off angles"

2. You see a display (similar to Fig. 5-10, Pg. 93) which includes information about the tool and cam channel. Notice also the circle diagram on the display.

3. Set the "on angle" and "off angle" using the cursor keys. An arc will move around the circle diagram as you set the "on" and the "off" angles. These settings are also shown numerically in the box on the display. See " Using cursor keys to set timing" Ch 3 for instructions on how to set the "on" and "off" angles.

4. Press RESET to go back to the display showing the cam channels. You can select another channel to set.

    Here is an example of a display for Bottom Limit (lower limit) set at 180° on, 182° off.

```
┌─────────────────────────────────────────┐
│  TOOL NUMBER 1234567         CHANNEL 2   │
│  CHAIR BRACKET               BOTTOM LIMIT│
│                                          │
│                          USE  L/R  CURSOR│
│               0          KEYS  TO  SET THE│
│                          ON ANGLE.  USE THE│
│                          U/DCURSOR KEYS TO│
│                          SET THE OFF ANGLE.│
│                          PRESS THE  RESET│
│           ┌──────────┐   KEY  WHEN  DONE.│
│    270  ──│ON    180 │── 90                │
│           │OFF   182 │                     │
│           │DWELL   2 │                     │
│           └──────────┘                     │
│                          ON POS =   2.000 IN│
│                          OFF POS =  2.022 IN│
│              180                          │
└─────────────────────────────────────────┘
```

arc moves around "circle diagram" as you press cursor keys to set timing

angles when cam channel turns on and off

ram linear position
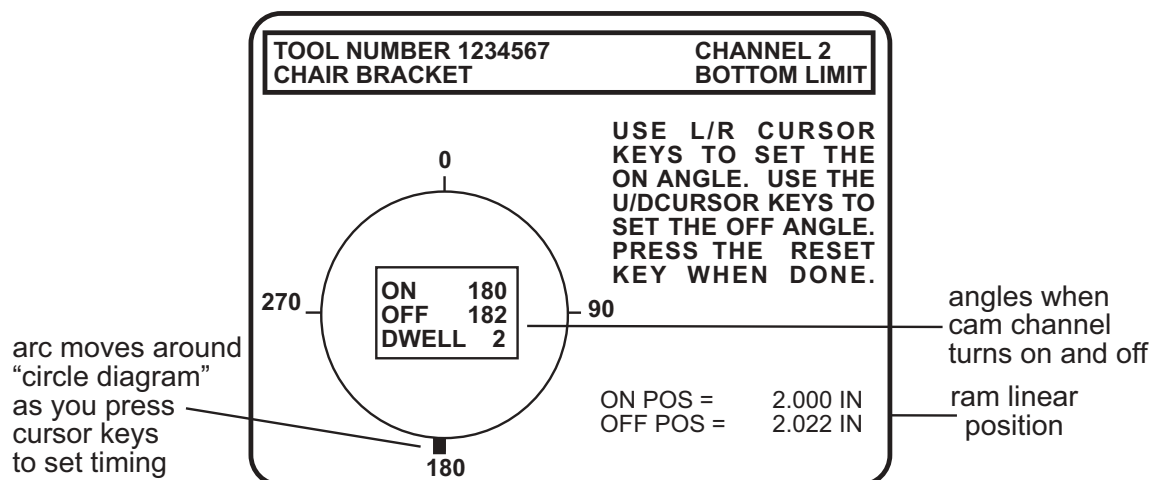
Figure 5-10. Illustrating programmed channel 1 "Bottom Limit"

Setting other channels for the tool

When you are done setting a channel, make settings for the rest of your channels. To finish making settings:

1. Choose the next channel from the list of channel names. Make settings for that channel.

2. Make settings for all your other channels.

3. When you are done with all channels, display the list of channels. Then press RESET. You will return to the display allowing you the choice of setting counters, cams or batch mode. You can perform other tasks. If you press RESET again, you will return to the first display in Programming mode.

Note: *SmartPAC Hydraulic saves your settings automatically. You do not have to push any key or issue any command to save settings.*

Deleting channel settings

To delete settings for a cam channel, select the cam channel, then select "DELETE channel settings" from the next display. The settings for the channel will go back to 0° on—0° off (or 0° On—0° time on for timed settings). You will automatically go back to the list of cam channels.

Counters

To set up the Counters, you need to:

• Switch SmartPAC Hydraulic to Program mode

• Select either a new or existing tool number (see the beginning of this chapter)

• Select "Counters" and bring up the counters display for the tool

Bringing up the counter display:

Select "Counters" from the Main Programming menu (Fig. 5-5, Pg. 86):

ARE YOU 'LOCKED OUT"?

If you cannot change items in this display, the ability to make these changes may be locked out or limited to password access. To check the security access setting, see "Security Access" in Chapter 4.

You will then see this display:

```
┌─────────────────────────────────────────────┐
│ ┌─────────────────┐                          │
│ │ TOOL #1234567   │                          │
│ │                 │     COUNTER MODES  ▶  F1 │
│ └─────────────────┘                          │
│                                              │
│                   COUNT      PRESET VALUE    │
│  STROKES            0      [     0     ]      │
│  GOOD PARTS         0            0           │
│  BATCH 1            0            0           │
│   (EMERGENCY RETURN)                         │
│  BATCH 2            0            0           │
│   (TOGGLE)                                   │
│  BATCH 3            0            0           │
│   (PULSE)                                    │
│  TOTAL HITS         0            0           │
│                                              │
│   USE THE CURSOR KEYS TO MAKE SELECTION.     │
│   PRESS ENTER TO SET THE COUNTER.            │
│   PRESS RESET WHEN DONE.                     │
│                                              │
└─────────────────────────────────────────────┘
```

Figure 5-11. Counter display

The <u>strokes counter</u> counts all press strokes.

The <u>good parts counter</u> counts the press strokes unless a die protection or other fault occurred. When the good parts preset has been reached, SmartPAC Hydraulic signals the press to emergency return.

There are three <u>batch counters</u>. You can set individual preset values for each of the batch counters. The batch counts can be incremented either to the good parts counter or the strokes counter. You can also set each batch counter to either emergency return or toggle, or pulse a programmable limit switch (PLS) output when its preset is reached. If you set the batch counters to either toggle or pulse, the counter display shows the PLS channel that is controlled by that batch counter (see Fig. 5-11 above).

The <u>total hits counter</u> counts all hits on a tool. If the tool number is loaded again after other tools are used, the counter starts counting from the last recorded number for the previous job. The counter is useful for deciding when a tool needs regrinding.

Note: *In Run mode, when the Total Hits counter reaches its preset value, the status box flashes to indicate that this has happened.*

Setting or clearing the counter

1. Highlight the value displayed in the "preset" column that you want to set, and press Enter. You will see a display superimposed over the Counter display (see Fig. 5-11 Pg. 86). This applies to strokes, good parts, or batch.

2. As the screen suggests, use the number keys to input a value. See "Number Keys" Ch 3, Pg. 51 for step-by-step instructions for entering a number. Then press ENTER, and the value will "jump to" the designated preset value location.

3. If you want to clear the counter, press the CLEAR key, then ENTER. If you do not want to make a change to that counter preset value, just press RESET.

4. To set another counter preset value, move the cursor down to the desired choice, press ENTER, and then repeat the steps shown above.

Setting or clearing the counter values

Note: *If "Change count" was set under security access to "no changes allowed", you cannot change the count.*

1. Highlight the number displayed in the "counter value" column that you want to set, and press ENTER. This applies to either strokes, good parts, or batch counters. Under some circumstances, you may want to "adjust" the count upward or downward. In this case, use the Up/Down keys.

2. Sometimes, you may want to start the count at some value other than zero. As the screen suggests (Fig. 5-11, Pg. 86), use the number keys to input a value. Then press ENTER, and the value will "jump to" the designated counter value location.

3. If you want to clear the counter, press the CLEAR key. A warning message will appear asking you to confirm the "CLEAR" command. Press the "Up" cursor key to confirm this selection. If you do not want to make a change to that counter value, just press RESET.

4. To set another counter value, cursor down to the desired choice, press ENTER, and then repeat the steps explained above.

Note: *You can disable counters by setting the preset value for parts and batch counters to zero.*

Clearing the total hits counter

1. Select "total hits".

2. To clear, press the "CLEAR" key. A warning message will appear asking you to confirm the "CLEAR" command. Press the "Up" cursor key to confirm this selection. If you do not want to make a change to that counter value, just press RESET.

Setting counter mode

The counter mode provides several selections. First, it lets you determine what will happen when any of the three batch counters reach their presets. You have three choices:

If you select **top stop**, the top stop relay is opened when the batch preset is reached. This is useful when stopping the press to change bins or chutes before resuming production.

If you choose **toggle**, this switches the state of the output relay. In other words, if the state of the relay is open, it would then be closed, and vice versa. You can use this option to activate a parts diverter. If you select **pulse**, this actuates the channel for a presettable amount of time in milliseconds. You can connect this output to any device that needs to be turned on once every fixed number of strokes (equal to the batch counter).

You can also determine if the strokes or good parts counter will increment each batch.

Setting counter output mode:

1. Press **F1** to select "Counter mode" (Fig. 5-11, Pg. 86). To illustrate the various options in counter setup mode, Figure 5-12 shows batch 2 set to "top stop", and batch 3 to "pulse". Factory settings are configured to "top stop" and "pulse".

2. Using cursor keys, highlight the output mode for "batch 1".

3. As you press ENTER, notice that the selections change from "top stop", to "toggle" to "pulse", and back again. Make your selection and then cursor down to "batch 2".

```
                 COUNTER MODE SELECTIONS

                                      ADV. MODES ▶   F1

              OUTPUT     PULSE (MSEC)   INCREMENT
              MODE       TIME            MODE
   BATCH 1    PULSE          250        STROKE
   BATCH 2    TOP STOP         0        GOOD PARTS
   BATCH 3    PULSE            0        GOOD PARTS

              COUNTER INCREMENT ANGLES

   STROKE, GOOD PARTS, BATCH 1          270
   BATCH 2                              270
   BATCH 3                              270

   USE THE CURSOR KEYS TO CHOOSE THE ITEM
   YOU WISH TO CHANGE.  PRESS THE ENTER KEY
   TO CHANGE.  PRESS RESET WHEN DONE.
```

Figure 5-12. Counter setup mode menu

4. Repeat step 2 for "batch 2" and "batch 3".

5. If you selected "pulse" for any of the batch counts, use your "right" cursor key to scroll to the "pulse (msec) time" column for that counter. Press ENTER.

6. A screen overlay appears enabling you to enter a value for channel on-time. Use the number keys to set the channel on-time in milliseconds, up to a maximum of 9,999 ms, or about 10 seconds. Then press ENTER to accept the change.

Note: *When you select "toggle" or "pulse", the channel affected appears with the batch counter on the original counter display (Fig. 5-11, Pg. 86).*

Setting counter increment angle

SmartPAC Hydraulic also provides the ability to set counter increment angles for strokes, good parts, and batch counters. The factory setting is 270°, which is satisfactory for counting parts, meaning the counters are incremented when the press passes 270°. However, if the batch counter outputs are being used to control automation, the increment angles for these counters should be set to the angle where you want the automation to activate.

1. Move the cursor over and down to the "increment mode" column at the bottom of the screen. You will be setting "stroke, good parts, batch 1". Press ENTER, then use the number keys to make your selection. Press ENTER when done.

2. Next, move the cursor down to the next one (batch 2), and repeat step 1.

3. Repeat the above steps for batch 3.

Setting counter increment mode

A third selection in "count mode" is the ability to set counter increment mode. Here you determine whether the batch counter increments with the good parts counter or the strokes counter. If you want the batch to count ALL strokes, then select "stroke". However, if you want the batch to count the press strokes unless a die protection or other fault occurred, then select "good parts". Follow these steps:

1. Move the cursor to the third column "increment mode". You will be setting batch 1. Press ENTER to toggle the selection between "stroke" and "good parts".

2. Next, move the cursor down to the next one (batch 2), and repeat step 1.

3. Move the cursor down to the last one (batch 3), and again repeat step 1. Once you are completely done, press RESET to return to the Main Programming menu.

Setting Parts/stroke or strokes/part (optional

If your SmartPAC Hydraulic has the Advanced counter option, you can set the number of parts produced per stroke or the number of strokes per part to make the parts count reflect the actual number of parts made.

1. From the Counter Mode Selections screen, press **F1** (ADV. MODES). The screen appears similar to the figure on the next page.

```
  ADVANCED COUNTER MODE SELECTIONS

PARTS MADE PER EACH STROKE   =    █ 1 █
STROKES TO MAKE EACH PART    =      1
```
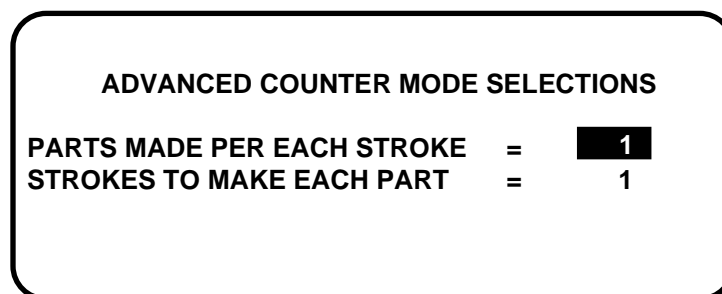
Figure 5-13. Advanced counter mode

2.   Highlight the item you want to set. Press ENTER. A box appears on the screen, as shown in Figure 5-13 on the previous page.

```
  ADVANCED COUNTER MODE SELECTIONS

PARTS MADE PER EACH STROKE   =    █ 1 █
STROKES TO MAKE EACH PART    =      1



             █  1  █
USE THE KEYPAD TO ENTER NUMBERS.
USE THE UP/DOWN CURSOR KEYS TO
INCREASE/DECREASE. PRESS ENTER
WHEN DONE. PRESS RESET TO CANCEL.
```
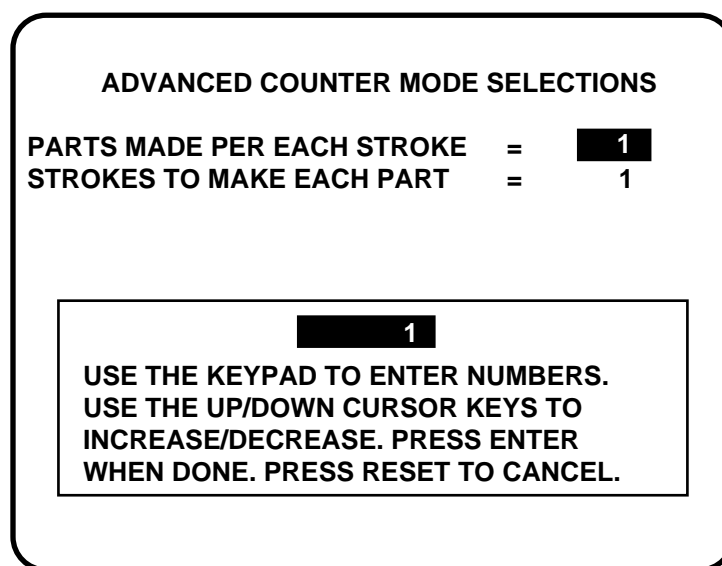
Figure 5-14. Setting parts/stroke or strokes/part

3.   Use the keypad or cursor keys to change the number of parts/stroke or strokes to make each part. Press ENTER. Press RESET to return to Counter Mode Selections.

Die Protection

To set Die Protection parameters, you need to:

- Select "Die protection" from the Main Programming menu
- Set the "Auto enable by tool" stroke counter *if this was your selection in Initialization ***
- Assign a name for each sensor
- Set the "Auto enable by sensor" stroke counter *if this was your selection in Initialization***
- Set sensor type
- Set stop type
- Set the ready signal (for a green sensor)
- Set the other sensors for the tool

** Depending on how you Initialized DiProPAC, you may be prompted to do one or the other, not both.

1. You will see the Main Programming menu (Fig. 5-5, Pg. 80) after entering a new tool number or selecting an existing one. Select "Die Protection".

ENTER YOUR PASSWORD

▉▉▉▉▉▉

USE THE KEYPAD TO ENTER NUMBERS.
USE THE UP/DOWN CURSON 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 access these settings. Password access is set under Security Access in Initialization mode. See "Security Access" Ch 4.

Setting "Auto Enable by Tool" counter value

2. *If you had selected "Auto enable by tool" in Initialization mode (Ch. 4), a screen appears asking you to enter the stroke value. If you had selected "Auto Enable by Sensor and tool" in Init, this screen will not appear (refer to Fig, 5-14, Pg. 98).*

   Use cursor keys to change the number of strokes. *The maximum number of strokes that you can enter is 24.* Then press ENTER when done.

number of strokes for DiProPAC to auto enable ALL sensors in the tool

```
TOOL NUMBER 1234567
CHAIR BRACKET


        AUTO ENABLE COUNTER FOR THIS
         TOOL IS  10  STROKES

AUTO ENABLE COUNTER DETERMINES HOW MANY
STROKES THE SENSORS CAN BE DISABLED AT
A TIME.  THEY ARE AUTOMATICALLY ENABLED
AFTER REACHING THE COUNT.

USE THE CURSOR KEYS TO CHANGE THE NUMBER
OF STROKES.  PRESS THE ENTER KEY WHEN
DONE.  PRESS THE RESET KEY TO CANCEL.
```

Figure 5-15. Setting "Auto enable by tool" counter

3.   Next you will see a list of sensors to program.

```
TOOL #1234567              SENSOR 1
CHAIR BRACKET             SENSOR 2
                          SENSOR 3
                          SENSOR 4
                          SENSOR 5
                          SENSOR 6
                          SENSOR 7
   USE CURSOR KEYS TO     SENSOR 8
   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
```
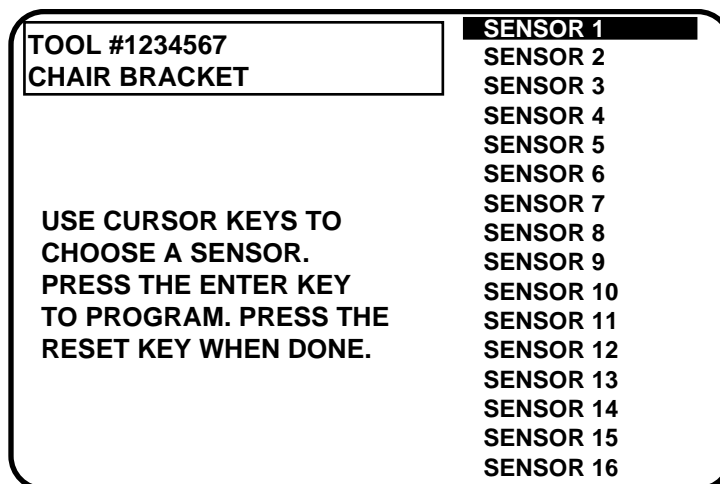
Figure 5-16. List of sensors to program

Note: *Notice that we are illustrating 16 sensors. Depending upon the way that your SmartPAC Hydraulic has been configured (with DiPro 8 sensors), your display may vary. We are showing the complete DiPro module.*

4. You can select any sensor, but it is a good idea to start with the first sensor. Select "sensor 1". After selecting it, the first thing you do is name it.

Naming the sensor

1. You see this display when you select a sensor. It allows you to name the sensor.

```
TOOL NUMBER 1234567          SENSOR 1
CHAIR BRACKET                PART EJECTION
                             GREEN STOP

                             UNNAMED
SENSOR NAME FOR              CUSTOM NAME
DIPRO SENSOR 1               AIR PRESSURE
                             BLANK FEED
USE CURSOR KEYS TO           CAM DRIVE 1
CHANGE SELECTION             CAM DRIVE 2
PRESS ENTER TO SELECT,       CLAMP PRESSURE
RESET WHEN DONE              DIE OVERLOAD
                             END OF STOCK
                             HIGH LOOP
                             MATERIAL BUCKLE
        MORE NAMES ▼         MISFEED
```
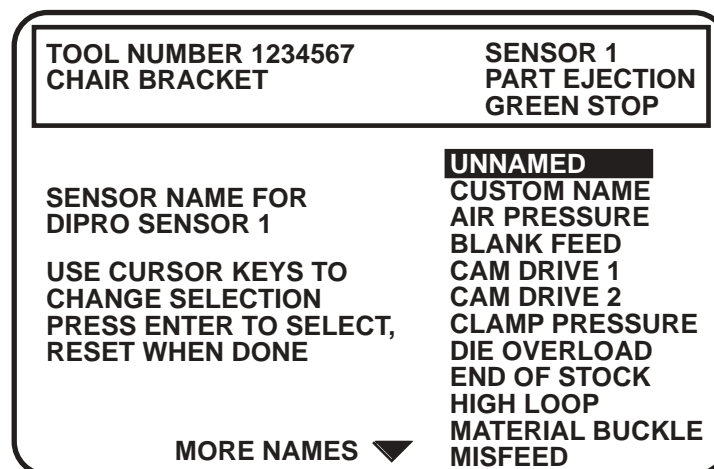
Figure 5-17. Naming the sensor

2. Ch 1 and Ch2 are pre-named as Top Limit and Bottom Limit. These are default settings and are set automatically for each tool. Do not alter or delete these settings. If the press doesn't reach the desired bottom position, adjust the Lower Limit and not the cam setting.

3. Use the "down" cursor key to move the bar and highlight the name you want.   More names appear from the bottom of the name column as you keep pressing the key. You can scroll back and forth through the name column using these keys.

4. There are several names from which to choose. You can also choose not to name a sensor by selecting "unnamed".

5. If you do not find a suitable name but you still want to select a name the sensor, you can select "Custom Name", by highlighting it and pressing ENTER.

6. If you select "Custom name", another display appears that lists all the customized names (up to 16 possible choices) that you set in Initialization mode (see "Custom sensor names" Ch 4, Pg. 66).

    Assign any one of these names to each of your sensors by highlighting the name and pressing Enter. The names are interchangeable. This means, for instance, you can assign "Sensor 3" the custom name set for "Custom 15".

Setting the "Auto Enable by Sensor and Tool" counter value

7. *If you had selected "Auto enable by sensor and tool" in Initialization mode (Ch 4, Pg. 68), a screen appears asking you to enter the stroke value. If you had selected "Auto Enable by*

tool" in Initialization, this screen will not appear. Use cursor keys to change the number of strokes. Then press ENTER when done.

number of
strokes for
DiProPAC
to auto
enable ALL
sensors in
the tool

```
TOOL NUMBER 1234567
CHAIR BRACKET

          AUTO ENABLE COUNTER FOR THIS
              TOOL IS  10  STROKES

AUTO ENABLE COUNTER DETERMINES HOW MANY
STROKES THE SENSORS CAN BE DISABLED AT
A TIME.  THEY ARE AUTOMATICALLY ENABLED
AFTER REACHING THE COUNT.

USE THE CURSOR KEYS TO CHANGE THE NUMBER
OF STROKES.  PRESS THE ENTER KEY WHEN
DONE.  PRESS THE RESET KEY TO CANCEL.
```

Figure 5-18. Setting "Auto enable by sensor" counter

8.   After you have assigned a name for sensor 1 and set the auto enable counter value, you will be returned to the previous menu where sensor 2 automatically is highlighted for you. You can select a name for it. Continue in this manner until all your sensors have been configured accordingly.

Setting sensor type

After selecting the sensor name, you will see this display. You can set sensor type. Notice that the sensor name now appears at the top right of the display. This display shows "Part ejection".

```
TOOL NUMBER 1234567            SENSOR 1
CHAIR BRACKET                  PART EJECTION
                               GREEN  ESTOP


 NOT USED              GREEN
 RED (NC)              GREEN QUICK CHECK
 YELLOW (NO)           GREEN CONSTANT
                       GREEN SPECIAL


USE CURSOR KEYS TO CHANGE SENSOR
TYPE.  PRESS ENTER TO SELECT.  PRESS
RESET WHEN DONE.
```
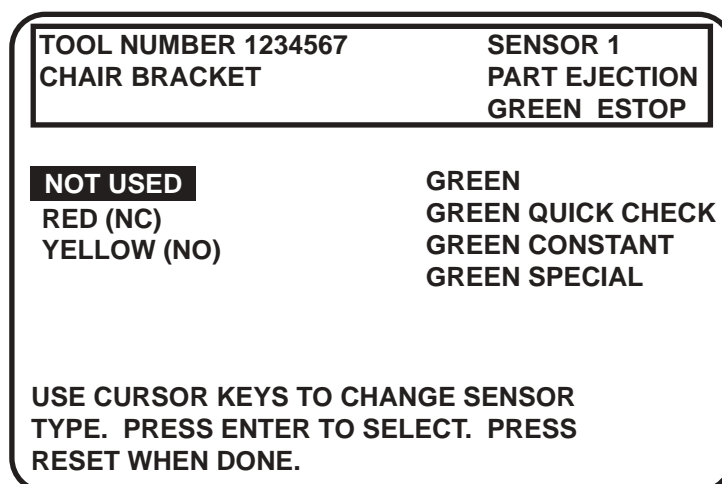
Figure 5-19. Setting sensor type

Select the sensor type you want for that sensor. You have six choices: yellow, red, green, green quick check, green constant, and green special. See Ch 1, Pg. 6 for a detailed description of each of these sensors. (The "not used" setting is for sensor inputs that are not used with the tool.) Notice that the sensor function appears at the top middle of the display and the sensor type at the top right.

Setting stop type

After selecting sensor type, you will see this display for all sensors except green special.

You do not have to set the stop type for a green special sensor. SmartPAC Hydraulic *automatically stops the press on the upstroke.*

You can set stop type for the other sensors — emergency stop or top stop (emergency return). Emergency stop is highlighted.

Use **emergency stop** (E-Stop) when you want to stop the press before the next hit. For instance, when monitoring part ejection on the upstroke, you can use the E-stop setting so SmartPAC Hydraulic will send a stop signal to the press immediately if a malfunction occurs. This ensures that the press will stop in time before the next hit.

If you are monitoring a feed taking place well into the downstroke (like a roll feed) you would probably want to set the feed sensor for a **top stop (emergency return)**.

```
┌─────────────────────────────────────────┐
│  TOOL NUMBER 1234567      SENSOR 1       │
│  CHAIR BRACKET            PART EJECTION  │
│                           GREEN  ESTOP   │
│  └───────────────────────────────────┘   │
│                                          │
│                                          │
│              EMERGENCY STOP              │
│              TOP STOP                    │
│                                          │
│                                          │
│   USE CURSOR KEYS TO CHANGE              │
│   SENSOR STOP TYPE.  PRESS ENTER  HELP ▶ │ F6 │
│   TO SELECT.  PRESS RESET WHEN DONE.     │
└─────────────────────────────────────────┘
```
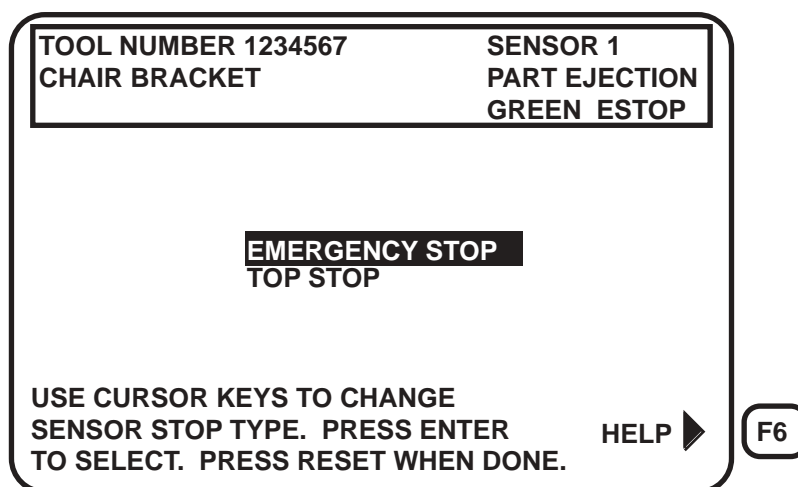
Figure 5-20. "Setting stop type" display

To set stop type for red, yellow, green, green quick check, and green constant, select the setting you want for the sensor—emergency stop or top stop (emergency return).

Once you make the stop type settings for red and yellow sensors, you are done. Green sensors, however, need additional settings to be made. SmartPAC Hydraulic brings you back to the display listing the remaining sensors. You can set another sensor. Go to the section, "Setting the other sensors for the tool".

Setting the ready signal for a green sensor

After selecting stop type for a green sensor, you will see the display in which you set the ready signal the "ready on" angle and "ready off" angle (the "ready signal"). The ready signal is the timing window during which the sensor must actuate or SmartPAC Hydraulic sends the stop signal to the press.

You set the ready signal; so it's a little longer than the sensor's actuation time for green and green quick check sensors.   For green constant sensors, you set it so it's a little shorter than the sensor's actuation time. See Ch 1, Pg. 6 for an explanation of the different types of green sensors.

Note: *If you are not sure how to set the ready signal, estimate it. You can adjust the setting later in Run mode after you run the press. SmartPAC Hydraulic will display the sensor actuation angles in the Run mode.*

Setting the "ready on" and "ready off" angles

1. Use the cursor keys to move the arc around the "circle diagram". The **circle diagram** dynamically illustrates the on and off angle settings that you programmed for a sensor and/or cam channel. To set the "Ready ON" time, you increase the angle with the "right" cursor key and decrease with the "left" cursor key. Conversely, to set the "Ready OFF" time, you increase the angle with the "up" cursor key, and decrease with the "down" key. Notice how the bar changes to reflect these keystrokes. Also the numeric values appear in the "Ready" box on the screen.

    If necessary, see "Cursor keys" under "Using the keyboard" in Ch 3, Pg's. 50 & 52 for step-by-step instructions. This display shows a green sensor with the ready signal for part ejection set to 180° on, 265° off.
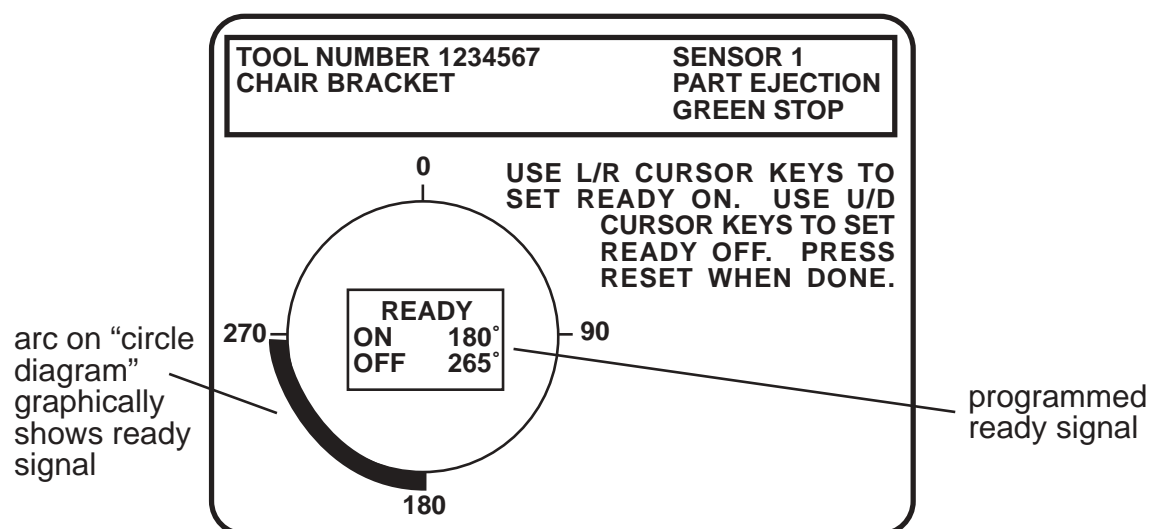
Figure 5-21. Example of a programmed ready signal for part ejection

2. After setting the ready signal, press RESET to go back to the sensor menu. If you are completely done, press RESET one more time to return to the Programming mode menu. *The highlight bar automatically scrolls down to the next sensor to program.*

Setting counter value for green special sensor

After setting the sensor type for a green special sensor, you will see the following display. You can set the maximum number of strokes that the press can make without this sensor actuating. The preset limit is 99. Use your up or down cursor keys to set the value. Then press the RESET key to set the next sensor.

number of strokes to set for green special sensor can be from 1 to 99

```
TOOL NUMBER 1234567        SENSOR 1
CHAIR BRACKET              PART EJECTION
                          GREEN  ESTOP


         THIS SENSOR MUST TURN ON
          AT LEAST ONCE EVERY
              11 STROKES.


   USE CURSOR KEYS TO CHANGE # OF STROKES.
   PRESS THE RESET KEY WHEN YOU ARE DONE.
```
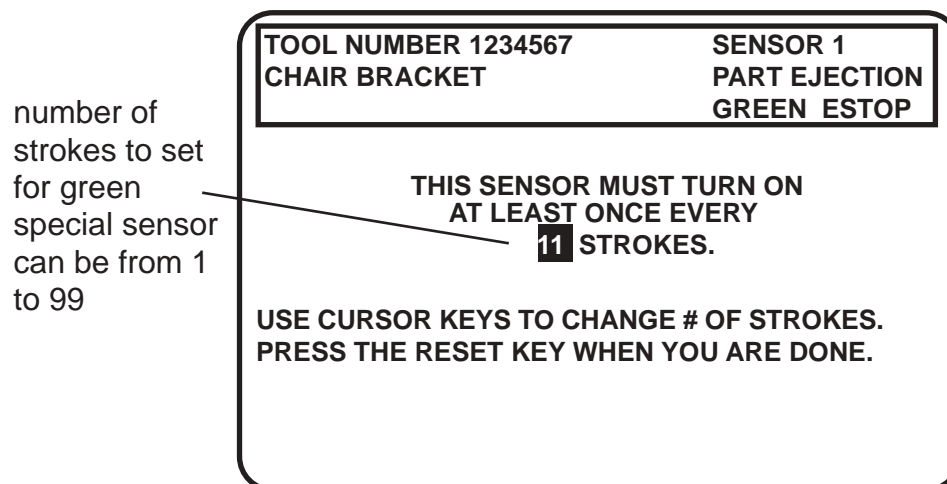
Figure 5-22. Setting "green special" sensor

FOR MORE INFORMATION

   Refer to the section "Understanding Sensor Terminology" Ch 1, Pg. 7 for a detailed description of the green special sensor and other types of sensors.

Setting the other sensors for the tool

After you make the last setting for the sensor, you will again see this display (Fig. 5-13, Pg. 89). The name of your sensor will appear in the display. The next sensor is automatically highlighted.

To set more sensors, select the next sensor from the list and make settings for the sensor. Make settings in the same way for the rest of the sensors you are using.

Going back to the Main Programming menu

When you are done making settings for all sensors and have the list of sensors on your display, press RESET once more. You will again see the main Programming menu (Fig. 5-5, Pg. 80). You can select tool name, counters, or cam timing and make those settings for the tool. You can also select "Die Protection" again to display the list of sensors for the tool and check or change settings.

If you press RESET again instead of choosing to make more settings, you will see the display allowing you to load, modify, or delete the tool number (Fig. 5-4, Pg. 79). If you press RESET again, you go back to the first Programming display in Program mode (Fig. 5-5, Pg. 80).

Note: *SmartPAC Hydraulic saves your settings automatically. You do not have to press any key or issue any command to save settings.*

ABOUT CHANGING SETTINGS FOR A TOOL

When you change settings for a loaded tool number, a display will pop up allowing you to immediately load the tool number with the new settings. This display appears when you press RESET to go back to the Programming menu. You can load the tool number or go back without loading it. *You should load the tool number.* The old settings will be used until you reload the tool number with the new settings.

What to do about sensor inputs that are not used

If a sensor input is not used for a tool, do not make any settings for the sensor. SmartPAC Hydraulic will ignore any signals from that input, even if a sensor is connected. SmartPAC Hydraulic will list an unused sensor on the sensor list as "sensor 1" or "sensor 2", whatever number it is. Sensor type is automatically set to "not used" if no settings have been made.

To change a sensor input to "not used", select "not used" for sensor type. The list of sensors will be immediately displayed. Any sensor settings for this sensor are erased.

Going back to the sensor list using the RESET key

If you press RESET instead of ENTER when making a setting for a sensor, you go back to your list of sensors. The item highlighted when you pressed RESET is the item selected.

Fine tuning the settings for green sensors

To set a precise ready signal for your green sensors, you should fine-tune the ready signal after seeing each sensor's actuation angle. You do this by loading the settings, then turning the Program/Run key to "Run". When you run the press, SmartPAC Hydraulic will record all actuation times and display the earliest "on" and latest "off" times for each sensor.

In Run mode, you can call up the display for each green sensor. The display will show each green sensor's actuation angle along with the ready signal you set. It is easy to adjust the ready signal based on what the actuation angle is. You can display and adjust your sensors quickly, even while the press is running. To learn how to use Run mode, see Ch. 6, Pg. 108 —"Using SmartPAC Hydraulic in Run Mode".

Disable (enable) sensors

Depending on how you initialized the "Sensor enable mode" in Initialization (Ch. 4, Pg. 67), there are various ways to enable die protection. If you selected "Manual enable/disable" in Initialization, you can manually enable and disable your sensors using the keyboard and display screen.   If you chose either of the "Auto enable" selections in Initialization, refer to the sensor programming section called "Die Protection" (Ch 5, Pg. 90) to make the appropriate settings for the tool. *Even in Auto mode, you can manually enable sensors at any time.*

No matter which choice you had made, you should always have sensors enabled to protect your tool. But sometimes you may want to disable sensors during setup. SmartPAC Hydraulic will *not* stop the press when sensors are disabled even if a sensor signals a malfunction. *If you do this, be sure to set sensors to "enabled" before you start making parts.*

Follow these steps to disable sensors.

IMPORTANT

When sensors are disabled, the LED display will *flash* while the press is running to remind you to reactivate die protection.

---

1. Return to the Programming menu — the first display you see in Program mode. Notice that the second line shows whether sensors are enabled or disabled. The factory setting is enabled. In the display shown on the next page, sensors are enabled.

```
THE CURRENTLY LOADED TOOL #  IS  1234567
CHAIR BRACKET
SENSORS ENABLED

          PROGRAM OR LOAD TOOL NUMBERS
          DISABLE THE SENSORS


USE CURSOR KEYS TO CHANGE SELECTIONS.
PRESS ENTER TO DISABLE SENSORS.
```
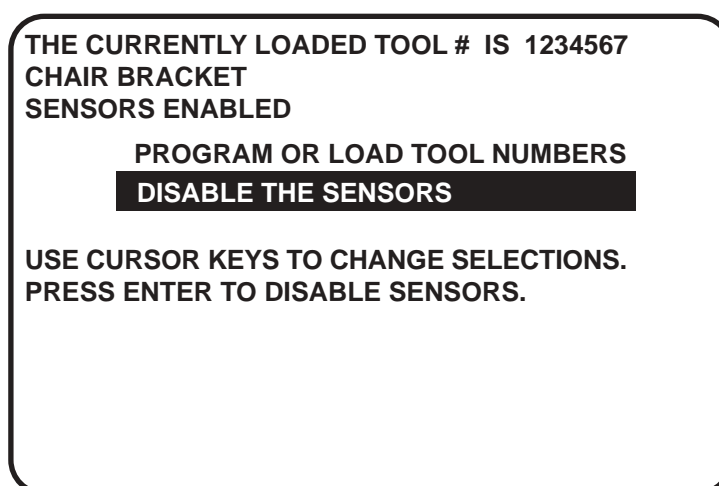
Figure 5-23. Disable/enable sensors

2. To disable sensors, highlight that second line and press ENTER.

3. Now notice at the top left of the display, it shows that sensors have been "disabled". Note that "Disable sensors" has changed to "Enable sensors". To enable sensors, just repeat the process, and "disabled" will toggle back to "enabled".

Tool number information (optional)

IMPORTANT

Tool Information serves only as a convenient place to record information about the tool. It does not control any aspect of press operation.

Note: *This feature is not available if you have the optional PLC interface installed.*

Select "Tool Information" under the main Programming menu (Fig. 5-5, Pg. 80) to record useful information about the tool you are programming. See "Tool number information" Ch 4, Pg. 69 to set up the information items.

```
                    ENTER YOUR PASSWORD

                    ████████

            USE THE  KEYPAD TO ENTER NUMBERS.
            USE THE UP/DOWN CURSON 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 access these settings. Password access is set under Security Access in Initialization mode. See "Security Access" Ch 4.

You will see a display similar to the following:

Use cursor keys to move selection bar to desired item. Press ENTER.

```
                TOOL NUMBER INFORMATION

        PASS LINE HT        4.50   IN
        STRAIGHTENER        4.25   IN
        HYD. OVLD.          100    TONS
        PRESS SPEED          65    SPM
        CONVEYOR            NO
        PART LUBE           YES

        MEMO BOX

                               MEMO LINE 1  ▶   F4
         CAREFULLY CHECK
         DIE PLACEMENT          MEMO LINE 2  ▶   F5

        USE CURSOR KEYS TO CHOOSE THE VALUE YOU
        WANT TO CHANGE. PRESS THE ENTER KEY TO
        CHANGE IT. PRESS RESET KEY WHEN DONE.
```

Figure 5-24. Tool number information screen

To enter information about the items:

1. Select the desired item. A screen overlay appears in which you can enter the appropriate value. For Yes/no items, enter 0 (zero) for NO, and 1 (one) for YES.

2. Enter text into the memo box, by pressing **F4** for the first line, and **F5** for the second line. A screen overlay (Figure 5-25 below) appears that enables you to enter fifteen characters of numbers and alphabetic text for each line. When you complete each line, press **F6** to accept it.

```
 ┌──────────────────────────────────────────────┐
 │ ███████████████                              │
 │                                              │
 │ █A  B  C  D  E   PRESS CLEAR TO CLEAR        │
 │ F  G  H  I  J  K   TEXT. USE THE KEYPAD      │
 │ L  M  N  O  P  Q   TO ENTER NUMBERS. USE     │
 │ R  S  T  U  V  W   CURSORS TO SELECT THE     │
 │ X  Y  Z  ,  -  #   LETTERS. PRESS ENTER      │
 │ .  (  )  *  /  &   TO ENTER THE LETTERS.     │
 │                    PRESS F6 WHEN DONE.       │
 │                    PRESS  RESET TO CANCEL.   │
 └──────────────────────────────────────────────┘
```
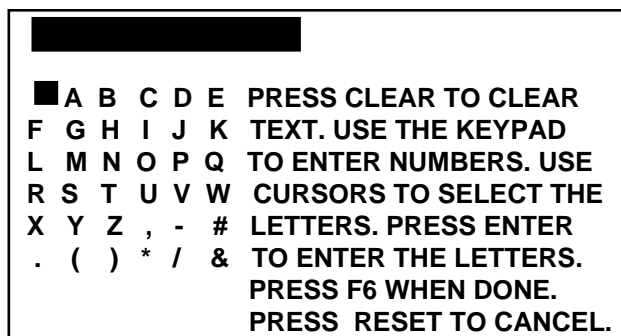
Figure 5-25. Overlay for entering memo box text

3. When you have finished entering information into the tool number information screen, press RESET to return to the main Programming menu.

Load the tool number

Before you run the press, you have to load the SmartPAC Hydraulic settings for the tool being used. This retrieves the settings for the tool from SmartPAC Hydraulics' memory and allows SmartPAC Hydraulic to use the settings to control the press.

┌──┐
│ ***** WARNING *****   │
│ Equipment may operate when you load tool settings   │
│   │
│   When you load a tool number, auxiliary press equipment may start if the press crankshaft is within the on-off setting for that device. All employees must stay away from the press and equipment that the cam operates before a tool number is loaded. │
└──┘

To load the settings for a tool number:

1. Select "Program or load tool numbers" from the first Programming menu.

┌──┐
│   │
│   ┌──┐   │
│   │   ENTER YOUR PASSWORD   │   │
│   │   │   │
│   │   ┌──────────────────────┐   │   │
│   │   │ █████████████████   │   │   │
│   │   │   │
│   │   USE THE KEYPAD TO ENTER NUMBERS.   │   │
│   │   USE THE UP/DOWN CURSON 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 load the tool number. Password access is set under Security Access in Initialization mode. See "Security Access" Ch 4. │
└──┘
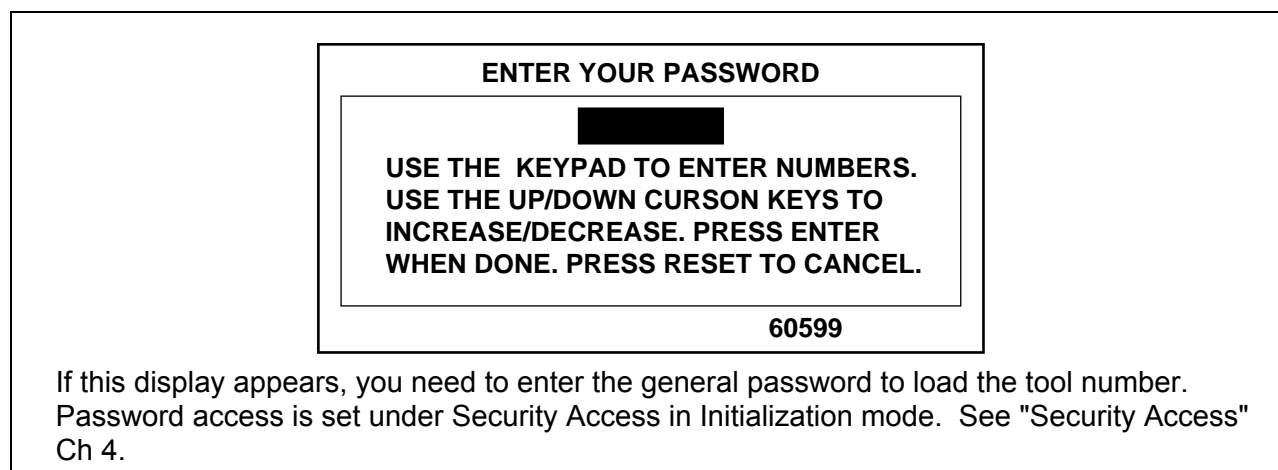
Note: *You can also load tool numbers in Run mode, if allowed by security access, as long as the press is stopped.*

Select the tool number you want to load from the tool number display. (See the beginning of this chapter if you need assistance in selecting a new or existing tool number). After selecting the tool number, the main programming menu for the tool appears:

```
╭─────────────────────────────────────────────────╮
│  ┌─────────────────────────────────────────────┐ │
│  │ MAIN PROGRAMMING MENU FOR TOOL #  1234567   │ │
│  │ CHAIR BRACKET                               │ │
│  └─────────────────────────────────────────────┘ │
│                                                   │
│                          PROGRAM:                 │
│   ████████████████                               │
│   LOAD THIS TOOL            TOOL NAME             │
│   DELETE THIS TOOL          COUNTERS              │
│                             DIE PROTECTION        │
│                             CAM SWITCH            │
│                             TOOL INFORMATION      │
│                             RAM POSITION          │
│                             RAM TONNAGE           │
│                                                   │
│                                                   │
│   USE THE CURSOR KEYS TO CHOOSE THE TASK          │
│   THAT YOU WANT TO PERFORM.  PRESS THE            │
│   ENTER KEY TO SELECT IT.  PRESS THE RESET        │
│   KEY WHEN YOU ARE DONE.                          │
╰─────────────────────────────────────────────────╯
```
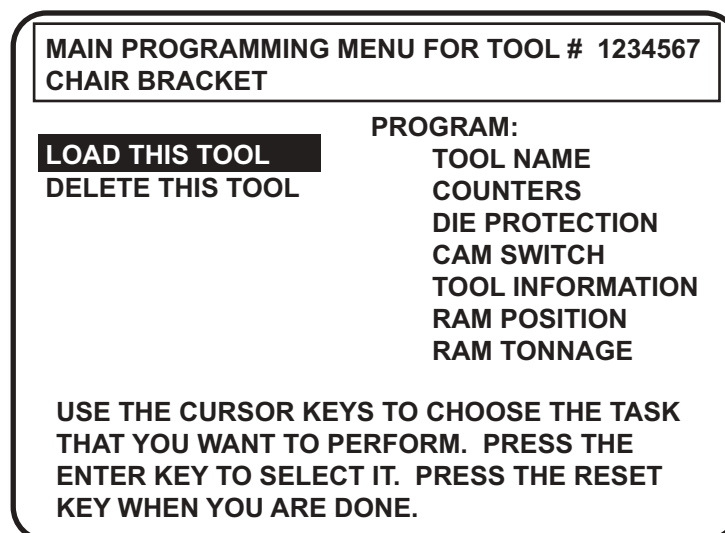
Figure 5-26. Main Programming menu for tool number

NOTE: If you started programming the tool and then pressed RESET, SmartPAC Hydraulic interprets this as an order to load the tool, and shows you the warning screen shown in Figure 5-27 below.

3. Select "Load this tool." You will see this warning message superimposed over the "Load Tool" screen:

```
┌────────────────────────────────────────┐
│      WARNING! !      WARNING!!          │
│   ANCILLARY EQUIPMENT MAY OPERATE       │
│   WHEN THIS SETUP IS LOADED. WARN       │
│   ALL PERSONNEL TO STAND CLEAR.         │
│                                         │
│    PRESS ENTER TO LOAD THE SETUP.       │
│    PRESS RESET TO CANCEL.               │
└────────────────────────────────────────┘
```

Figure 5-27. Warning message when loading tool number

4. Press ENTER to load the tool settings (a setup). You can go back without loading the tool settings by pressing RESET. When the tool number has been loaded (which takes only a few seconds), this message quickly appears on the screen:

TOOL NUMBER 1234567 IS BEING LOADED

> **IMPORTANT**
>
> If this message does not appear, but instead the screen shows an error message, find the description of that error message in Chapter 7. Follow the instructions there for correcting the problem. If the error message is not described there, or you cannot fix the problem, call Wintriss Controls' technical advisors. Be ready to provide the following important information to expedite a solution to the problem: **product name** (e.g. SmartPAC Hydraulic 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 going into "Installed options" in the Initialization mode (Ch 4, Pg. 63). You can also determine firmware version number from the chip on the processor board (see Fig. 2-5, Pg. 23).

5. Once the tool is loaded, you will again see the first Programming menu. Note that the Programming menu shows the tool number you just loaded. You can always check which tool number is loaded on this display. With settings loaded, you can switch to Run mode and run the press.
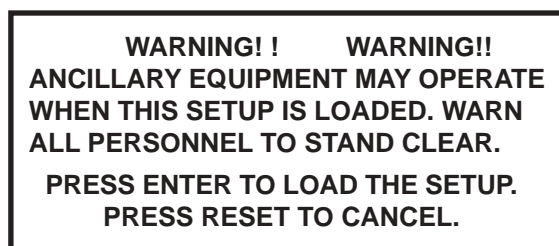
How to modify the tool number settings

Note: *When you change settings for a currently loaded tool number, a display will pop up allowing you to immediately load the tool number with the new settings. This display appears when you press Reset to go back to the Programming menu. You can load the tool number or go back without loading it.* <u>You should load the tool number.</u> *The old settings will be used until you reload the tool number with the new settings.*

After you have created a tool number (see the beginning of this chapter if you need to review the steps), it is easy to change settings for the tool. Changing settings is done the same way as you made them originally. To change settings for a tool you need to:

• Bring up the Main Programming Menu

• Select the item you want to modify

• Change the settings

Bringing up display to modify counters, cams, batch, or counter angle

To bring up the Main Programming menu (Fig. 5-5, Pg. 80):

1. Select "Program/load tool numbers" from the first display in Programming mode (the Programming menu) to see the list of tool numbers already created.

2. Select the tool number you want to change. (Remember, if you need help in selecting an existing tool, refer to the beginning of this chapter.)

3. You will be at the Main Programming menu. Select which action you wish to perform (counters, die protection, cam switch, etc.)

Modifying sensor settings

1. Select "Die Protection" from the Main Programming menu (Fig. 5-5, Pg. 86). You will see your list of sensors for the tool.

NOTE: If necessary, refer to the section "Die Protection" Pg. 99 in this chapter for illustrations of the different displays, plus detailed step-by-step instructions.

2. To change a setting, select the sensor you want to change. Then modify settings in the same way you originally made them. You can change any setting for a sensor. Or you can leave any setting the same by not changing the selection already made. (When you change sensor type, you have to reset the ready signal).

. When you are done making changes, display your list of sensors, then press RESET to see the Main Programming menu again. If you press RESET again and the tool number you changed is loaded, you will see a display allowing you to immediately reload the tool number with the new settings. If the tool number you changed is not loaded, you will see the display allowing you to load, modify, or delete the tool number. Press RESET once more and you go back to the Programming menu.

Modifying cam channels

1. Select "Cam switch" from the display giving you the choice of settings. You will see a display listing your cam channels. Remember, you set names for your channels in Initialization mode— Ch 4, Pg. 64.

Note: *If necessary, refer to the section "Cam switch" earlier in this chapter for illustrations of the different displays, plus detailed step-by-step instructions.*

2. To modify a setting for a channel, select the channel you want to change. Then you can modify settings in the same way as you originally made them.

3. When you are done making changes, display your list of cam channels; then press RESET to go back to the display to select settings. Press RESET again, and you see the tool number display.

REMEMBER TO LOAD THE TOOL NUMBER

When you press RESET new settings. You can load the tool number or go back without loading it. <u>You should load the tool number</u>. The old settings will be used until you reload the tool number with the new settings.

Delete the tool number

When you delete a tool number, you remove it completely from the tool number display and from SmartPAC Hydraulics' memory. All tool information will be lost. Here is how to delete a tool number.

1. Select "Program/load tool numbers" from the Programming menu (first display in Program mode).

2. Select the tool number that you want to delete (erase) from the tool number display. (See the beginning of this chapter if you need assistance to select a tool number.)

3. Select "Delete this tool" (see Fig. 5-5, Pg. 86).

Next, you see this message superimposed over the above display (here, we are deleting tool #1).

> **ARE YOU SURE YOU WANT TO DELETE TOOL NUMBER 1?**
>
> **PRESS THE CLEAR KEY TO DELETE.**
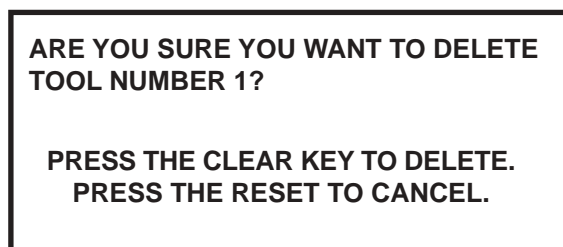> **PRESS THE RESET TO CANCEL.**

Figure 5-28. Confirmation message to delete tool

5.   Delete the tool number by pressing the "CLEAR" key. You will then get this confirmation (your tool number may vary):

DELETING TOOL NUMBER 1

6. If you do not want to delete the tool number, just press RESET to go back to the first display in Programming mode.

Chapter 6
Using SmartPAC Hydraulic in Run mode

This chapter describes how to use all the displays you will see in Run mode. It covers how to adjust counter settings for a tool, set stop and start times, and load a tool number.

This chapter also includes programmable cam-related functions, such as adjusting and viewing cam timing; and die protection-related functions, such as adjusting sensors, viewing sensor timing, and enabling and disabling sensors.

About Run mode

The Program/Run key must be set to "run" before you can operate the press. In Run mode, you can select from the displays to perform tasks just as you do in Program mode. The difference between Program mode and Run mode is this: in Program mode you can make and change settings for all existing tools and any new tool numbers you create. In Run mode, you can only adjust certain settings for the loaded tool number. You cannot view settings for a tool number if it is not loaded.

What you can and cannot do in Run mode

In Run mode you can load a tool number, adjust counters and cam settings, view stop time and view cam channel timing. You cannot create new tool numbers, nor can you modify settings for a tool number if it is not already loaded.

Why some tasks are duplicated in each mode

If you are wondering why certain tasks (like loading a tool number and adjusting timing) are duplicated in Run mode and Program mode, here is why. Sometimes you may not want personnel to get into Program mode. So you keep SmartPAC Hydraulic in Run mode by setting the key to "Run" and removing the key. Now Program mode is locked out. However, the operator can still load a tool number in Run mode and make timing adjustments when necessary in order to correct malfunctions. He or she cannot change tool settings in any other way, however, or create new tool numbers. Creating and organizing tool settings might be left to another person, such as a supervisor or setup person.

Locking Run mode

You can lock out choices on the Run menu or, if you have the password option, require a password to prevent personnel from changing settings or loading tool numbers. See Chapter 4—"Security access"—for instructions on how to lock and unlock Run menu items, and how to require a password.

The first display in Run mode — the Run menu

To get into Run mode, set the Program/Run key to Run.

NOTE

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 hitting 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 is loaded, you cannot switch from Initialization mode or Program mode to Run mode. A tool number must be loaded before SmartPAC Hydraulic 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". You will go into Run mode.

The Run menu is the first display you see in Run mode.
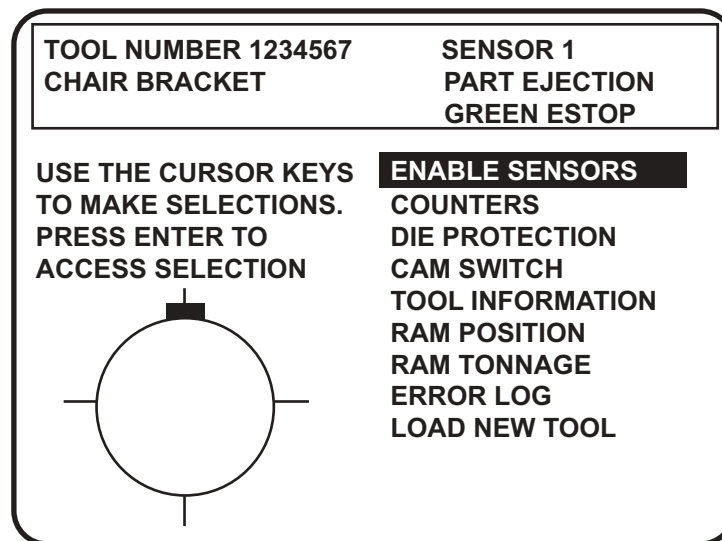
Figure 6-1. Main Run menu (the order may vary depending on the options installed)

From this display you can access all the other Run menu. A description of these displays follows.

SELECT = HIGHLIGHT + ENTER

When we say SELECT in this manual, it means highlight the item and press ENTER.

Settings locked in Run mode, or password required

SmartPAC Hydraulics security access feature can lock settings in run mode, or require a password for settings to be changed if you have the password option. Whenever settings are locked in Run mode, you will see a message on the screen telling you so when you select the item. If a password is required, enter it at the screen overlay that appears, Fig. 6-2 below.

```
           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
```
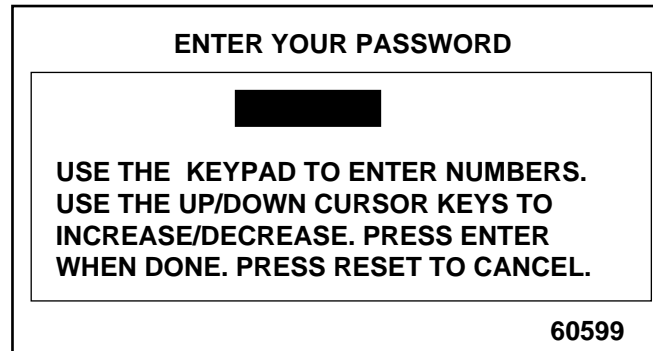
Figure 6-2. "Enter your password" display

If settings are locked in Run mode, you can display the information, but nothing happens if you try to make an adjustment. "Adjust mode locked" means you cannot adjust settings. If counters are locked, you cannot change the current count. If cam settings are locked, a message appears on the screen that reads, "CAM ADJUSTMENT IS LOCKED OUT. PRESS RESET WHEN DONE." The item "Load new tool" does not appear on the Run menu if tool numbers are locked in Run Mode.

For more details, see "Security access" in Ch. 4, Pg. 72.

Ram Position

IMPORTANT

When you change tool numbers and the ram is below the new Upper Limit, the ram will automatically raise to the Upper Limit. If you are above the Upper Limit, the ram will not move to the Upper Limit of the new tool until the press cycles once.

Highlight Ram Position in the Run Menu. You will see the following screen:

```
┌─────────────────────────────────────────────────────┐
│                                                       │
│  ┌──────────────────────────────────────────────┐     │
│  │ TOOL NUMBER 1234567        PART CNTR  59      │     │
│  │ CHAIR BRACKET                                │     │
│  │ SENSORS ENABLED                              │     │
│  └──────────────────────────────────────────────┘     │
│                                                       │
│              RAM POSITION                             │
│                                                       │
│         4.000 IN                                      │
│                                                       │
│                                                       │
│                             CLEAR LIMITS  ▶  (F4)     │
│  PRESS THE DESIRED                                    │
│  FUNCTION KEY OR                                      │
│  USE THE CURSOR KEYS        SET UPPER LIMIT ▶ (F5)    │
│  TO SELECT A VALUE            10.000 IN               │
│  THEN PRESS ENTER.                                    │
│  PRESS THE RESET KEY        SET LOWER LIMIT ▶ (F6)    │
│  WHEN DONE.                    2.000 IN               │
│                                                       │
└─────────────────────────────────────────────────────┘
```
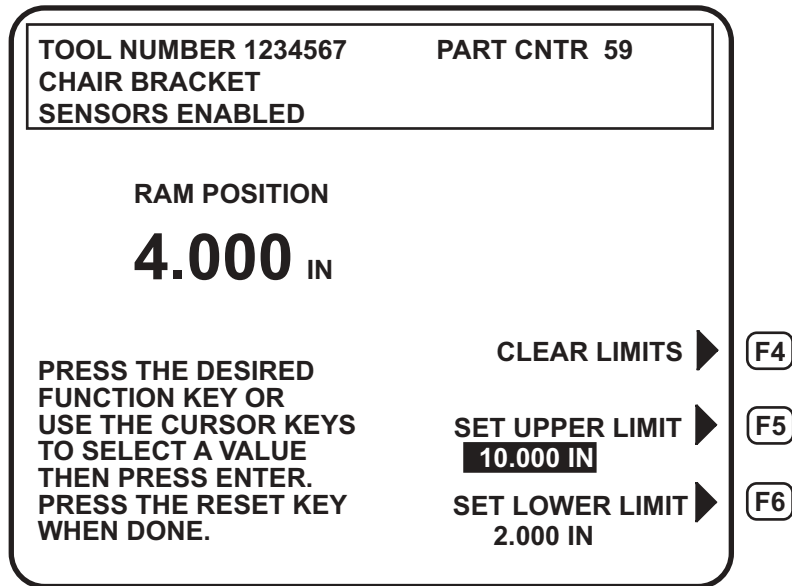
Figure 6-3. Tool number information screen

2.   As mentioned in Program mode, it is easier to set the Upper and Lower Limits in run mode. Jog the press to the desired position and press F5 or F6 to save Upper or Lower Limit respectively.

You can adjust the upper limit or lower limits while the press is in auto mode. Just highlight upper or lower limit and adjust value by pressing up and down keys. SmartPAC Hydraulic will adjust the stroke length automatically and save the new values for that tool.

Ram Tonnage (Optional)

This screen appears in the menu only if you enter the hydraulic pressure calibration data in the initialization menu.

1. Highlight Ram Tonnage in the Run Menu. You will see the following screen:

```
TOOL NUMBER 1234567        PART CNTR  59
CHAIR BRACKET
SENSORS ENABLED


    RAM TONNAGE            MIN.   3.000 IN

      10.0 TONS           UPDATE ABOVE ▶   F3


                          REVERSAL MODE
  PRESS THE DESIRED       PRESS. OR DIST.
  FUNCTION KEY OR
  USE THE CURSOR KEYS     MAX. LIMIT
  TO SELECT A VALUE         15.0 TONS
  THEN PRESS ENTER.
  PRESS THE RESET KEY     DWELL TIME
  WHEN DONE.                0.0 SEC
```
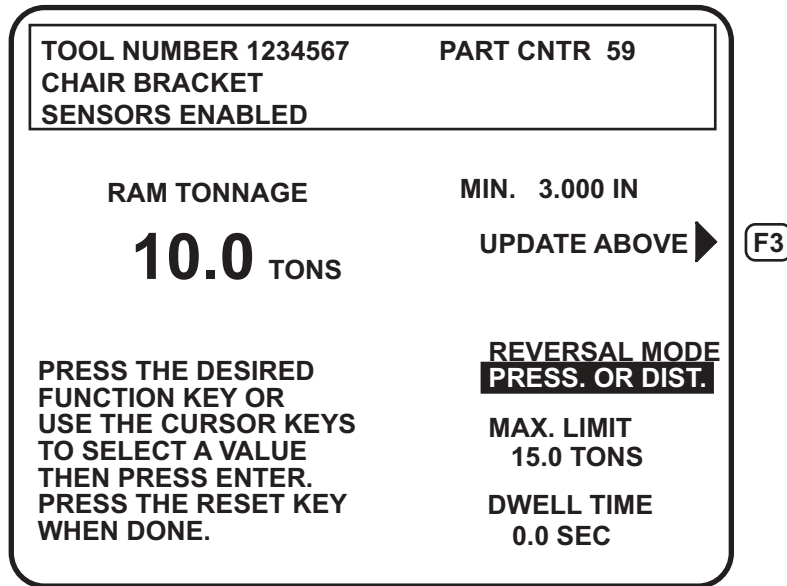
Figure 6-4. Ram Tonnage Screen

You can change the max limit or dwell time even while the press is in continuous mode. Just highlight max limit or dwell time and adjust value by pressing up and down keys. SmartPAC Hydraulic will adjust them automatically and save the new values for that tool.

The F3 key update above is used to update the Min. distance seen through each stroke. This is displayed right above the "Update Above" F3 line.

If the Ram Tonnage is set to return on pressure (Reversal Mode) and the ram does return on pressure, a star (*) appears on the display, indicating that this has happened. See the figure below.

Note: *If the ram returns without reaching the desired pressure, no star appears and the dwell does not work. This happens when the Lower Limit is set too high and the ram reaches Lower Limit before the press develops the pressure you set for Return on Pressure.*

If this happens, you should reset the Lower Limit lower, as described on page 90.

```
┌─────────────────────────────────────────────┐
│  ┌──────────────────────────────────────┐   │
│  │ TOOL NUMBER 1234567   PART CNTR  59   │   │
│  │ CHAIR BRACKET                         │   │
│  │ SENSORS ENABLED                       │   │
│  └──────────────────────────────────────┘   │
│                                              │
│         RAM TONNAGE        MIN.   3.000 IN   │
│                                              │
│         10.0 TONS          UPDATE ABOVE ▶ │F3│
│                                              │
│                                              │
│                            ▓REVERSAL MODE▓   │
│   PRESS THE DESIRED        DISTANCE ONLY     │
│   FUNCTION KEY OR                            │
│   USE THE CURSOR KEYS                        │
│   TO SELECT A VALUE                          │
│   THEN PRESS ENTER.                          │
│   PRESS THE RESET KEY                        │
│   WHEN DONE.                                 │
└─────────────────────────────────────────────┘
```
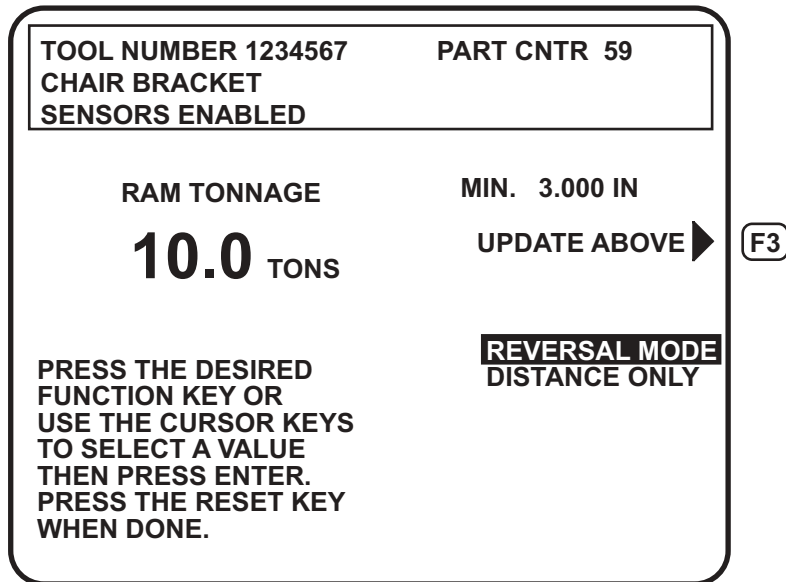
Figure 6-5.   Ram Tonnage

If you highlight PRESS. or DIST. and press Enter, you'll see the following screen:

```
┌─────────────────────────────────────────────┐
│  ┌──────────────────────────────────────┐   │
│  │ TOOL NUMBER 1234567   PART CNTR  59   │   │
│  │ CHAIR BRACKET                         │   │
│  │ SENSORS ENABLED                       │   │
│  └──────────────────────────────────────┘   │
│                                              │
│         RAM TONNAGE       MAX.   3.000 TONS  │
│                                              │
│         10.0 TONS          UPDATE ABOVE ▶ │F3│
│                                              │
│                                              │
│                            REVERSAL MODE     │
│   PRESS THE DESIRED        ▓PRESS or DIST▓   │
│   FUNCTION KEY OR                            │
│   USE THE CURSOR KEYS                        │
│   TO SELECT A VALUE                          │
│   THEN PRESS ENTER.                          │
│   PRESS THE RESET KEY                        │
│   WHEN DONE.                                 │
└─────────────────────────────────────────────┘
```
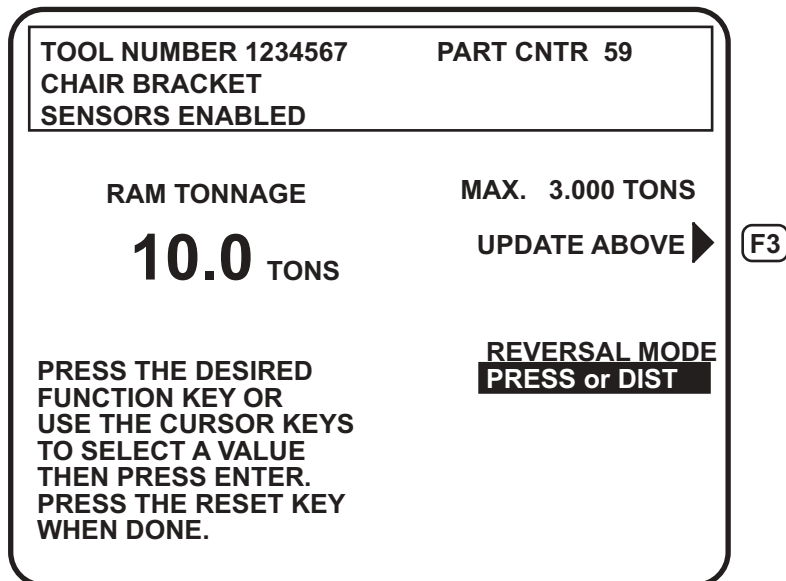
Figure 6-6.   Ram Tonnage (Distance Only)

This screen still has the Update above F3 key but, instead of seeing Inches you see the Max. Tonnage.

Counters

To set or adjust counters in Run mode, select "Counters" from the Run menu. You will see this display:

```
TOOL NUMBER 1234567          SENSOR 1
CHAIR BRACKET                PART EJECTION
                             GREEN  ESTOP

                   COUNT       PRESET VALUE
STROKES              0              0
GOOD PARTS           0              0
BATCH 1              0              0
 (TOP STOP)
BATCH 2   CHANNEL 7   0              0
 (TOGGLE)
BATCH 3   CHANNEL 8   0              0
 (PULSE)
TOTAL HITS           0              0
USE CURSOR KEYS TO MAKE SELECTION. PRESS ENTER
TO SET THE COUNTER. PRESS RESET WHEN DONE.
```

Figure 6-7. Modifying counters screen

Now you can change or reset the strokes, good parts, batch and total hits counters and presets in exactly the same way you did when you first set them. See "Counters" Ch. 5, Pg. 85 for detailed, step-by-step instructions for setting up the counters.

Note: *When the Total Hits counter reaches its preset value, the status box flashes to indicate that this has happened.*

Cam Switch

WARNING!

SmartPAC Hydraulic with programmable cam capability is designed to control auxiliary functions only.

In Run mode, you can adjust the timing signals for each programmed cam channel. To adjust cam timings for the loaded tool number:

1. Select "Cam switch" from the first display you see in Run mode.
2. You will see a display showing the list of cam channels. If you assigned names for your cam channels in Initialization mode, you will see the names, instead of channel 1, channel 2, etc. You will only see those changes that are programmed.
3. Select the channel number you want to change.

> **ARE YOU LOCKED OUT?**
>
> Access to changing the information on this screen may be limited to Program mode or may require a password. The security access settings in the Initialization menu determine when changes can be made. See "Security access" in Chapter 4.

Adjust the on-off time for the channel in much the same way you made settings in Program mode—using the cursor keys. For help with these keys, see "Cursor keys" in Chapter 3 for complete instructions. *For instructions on setting cam channels in Program mode, see these sections in Chapter 5:*

- • <u>Standard on/off channel</u>: "Selecting a channel and making an on-off setting"
- • <u>Timed channel</u>: "Selecting a channel and making a timed output setting"
- • <u>Auto channel</u>: "Selecting a channel and making an auto advance setting"

4. When you are done adjusting a particular cam channel, press RESET to go back to the display of channels. You can adjust other channels. When you are completely done adjusting the timing for your channels, press RESET to return to the Run menu.

Show cam timing

You can view real-time graphic timing information about the currently loaded tool in Run mode. You will see the degrees of rotation from 0° to 360° at the bottom of the display, and a chart showing channel numbers from 1 through 8 (press ENTER to see 9 through 16, if installed) at the left of the display. The on-off angles and auto advance for each channel are shown on the diagram as horizontal bars. These bars indicate when a channel is to be activated.

Auto advance is shown with the letter "A" on both sides of the horizontal bar. You can actually see how auto advance timing changes whenever you change press speed.

The **timed outputs** are shown with the letter "T" and a number designating the number of milliseconds that the channel is to be activated.

This display is updated once per second with the current timing information.

1. Select "Cam switch" from the main Run menu and you will see the list of cam channels that you set in Program mode. Now press **F6** to access "Show timing". You will see a display like the one below (your channels will be different).

2. Press ENTER for channels 9-16 (if installed). When you are done viewing your cam timing settings, simply press RESET. You will return to the list of cam channels.
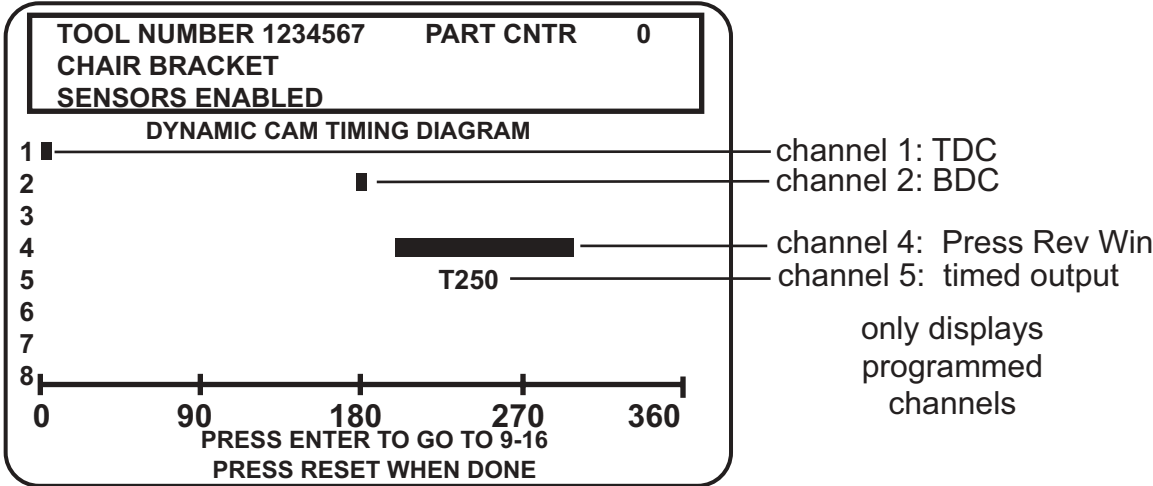
Figure 6-8. Displaying cam timing

Die Protection

In Run mode, the tool number must be loaded before you can adjust settings for the tool. You can only change the ready signal for green sensors and the preset value for the green special sensors. You cannot change any other sensor settings. Sensors set to "unused" in Program mode will not appear in Run mode. For example, if two sensor inputs are set to "unused", you will only see the sensors used displayed in Run mode. To adjust settings for the loaded tool number:

1. Select "Die Protection" from the first display you see in Run mode.

2. You will see the list of sensors names you assigned for your programmed tool.

3. Choose the sensor you want to adjust. The display will show the sensor number, name, and type. For green sensors, it will show the ready signal and sensor actuation angle. If you choose a yellow or red sensor, settings will be displayed, but you cannot make any changes.

ARE YOU LOCKED OUT?

Access to changing the information on this screen may be limited to Program mode or may require a password. The security access settings in the Initialization menu determine when changes can be made. See "Security access" in Chapter 4.

---

4. For green, green quick check, and green constant sensors, you can adjust the ready signal while the press is running or stopped. *See the next section for more information on how to use the display to easily adjust the ready signal for green sensors.*

5. Adjust the maximum number of strokes for the green special sensor, in the same way you set it in Program mode (Ch. 5, Pg. 80). Use the up or down cursor keys to adjust the number from 1 to 99.

6. When you are done adjusting sensors, return to the Run menu (the first display in Run mode), by pressing Reset. You will go back to the display of your sensors. You can choose another sensor to view and/or adjust.

FOR MORE INFORMATION

Refer to "Understanding Sensor Technology" in Chapter 1 for a detailed description of the different types of sensors available in SmartPAC Hydraulic with die protection. Refer to "Die Protection" in Ch. 5, Pg. 99 for more in-depth instructions on modifying sensors.

Adjusting the ready signal for green sensors

Adjusting the ready signal in Run mode is almost the same as adjusting it in Program mode. To adjust sensors, select "Die Protection" from the Main Run menu. There are two differences from adjusting sensors in Program mode.

First, you see the sensor's on and off time (its actuation angle), so that it is easy to set the ready signal precisely.

Second, the ready signal arc moves around the circle diagram much slower than in Program mode when you press the cursor keys. This is so that it is easier to zero in on an exact setting (and so it is harder to make big changes in the setting).

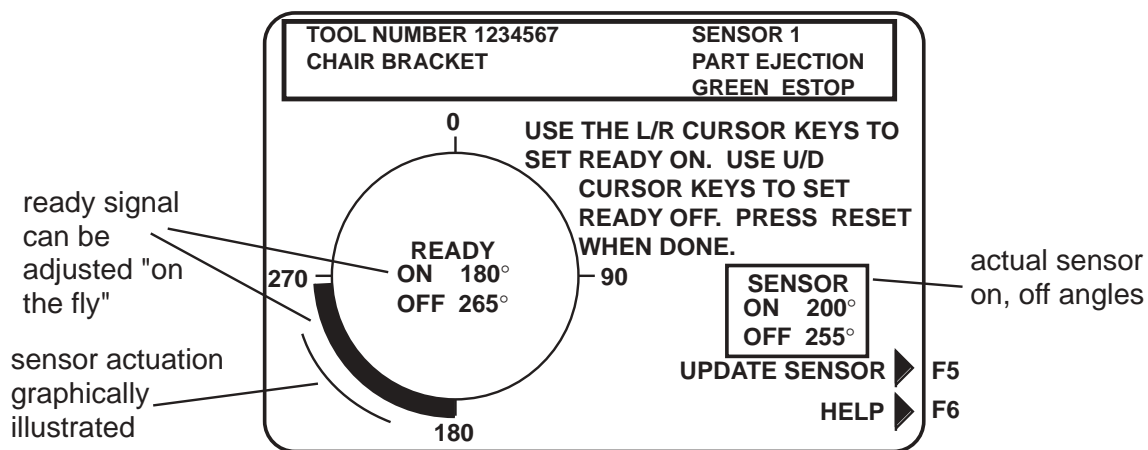Here is an example of a display for a green sensor:

Figure 6-9. Programmed green sensor

The above display is for a part ejection sensor. This display shows that the sensor turns on and off within the ready signal. You can change the ready signal using the cursor keys. To update the sensor information or to get additional help, press the appropriate function key. (Function keys are discussed in Chapter 3.) Below is the "Help" display:
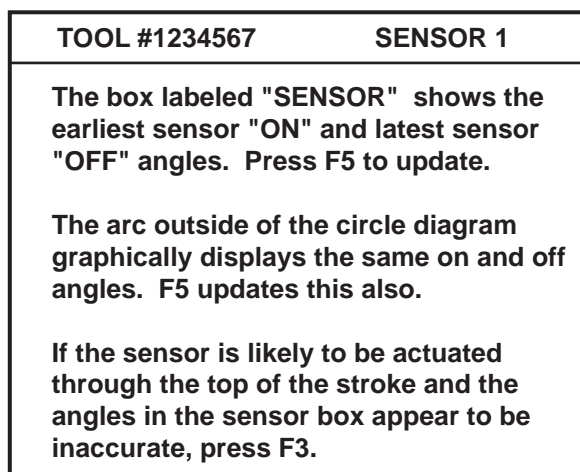

```
┌─────────────────────────────────────────┐
│  TOOL #1234567          SENSOR 1         │
├─────────────────────────────────────────┤
│                                          │
│   The box labeled "SENSOR"  shows the    │
│   earliest sensor "ON" and latest sensor │
│   "OFF" angles.  Press F5 to update.     │
│                                          │
│   The arc outside of the circle diagram  │
│   graphically displays the same on and off│
│   angles.  F5 updates this also.         │
│                                          │
│   If the sensor is likely to be actuated │
│   through the top of the stroke and the  │
│   angles in the sensor box appear to be  │
│   inaccurate, press F3.                  │
│                                          │
└─────────────────────────────────────────┘
```

Figure 6-10. Sensor "Help" screen (superimposed over Figure 6-4axx display)

Sensor on-off marker

Notice the "sensor on-off" box at the right of the screen and the on-off marker outside the ready signal arc. The numbers in the box show the degrees the sensor actuated when you ran the press. You can press the **F5** function key to refresh the screen (refer to the section on "Function keys" in Chapter 3 if help is needed). The marker outside the arc graphically shows the sensor's actuation time — the earliest "on" angle and latest "off" angle.

It is easy to adjust the ready signal so it is just a little shorter than the sensor's actuation angle (for green constant sensors) or just a little longer (for green and green quick check sensors).

Any time you run the press and display the ready signal for a green sensor, you will also see the sensor's actuation angle. Notice in the above illustration how the sensor actuation marker wraps around with the ready signal circle diagram. The **circle diagram** dynamically illustrates the on and off angle settings that you programmed for a sensor and/or cam channel.

How SmartPAC Hydraulic displays sensor actuation times

SmartPAC Hydraulic does not show every stroke-to-stroke change when displaying sensor actuation time. For sensors set to green and green quick check, it shows the earliest on angle for the sensor and the latest off angle (that is, shows an increase in the actuation angle). For sensors set to green constant, it shows the latest on angle and earliest off angle (shows a decrease in the actuation angle).

For instance, if a green quick check sensor's on angle fluctuates between 190° and 195° from stroke to stroke; SmartPAC Hydraulic would show 190°. However, if the on angle changed to 189° or lower, SmartPAC Hydraulic would immediately display the earlier on angle.

A green quick check sensor's off angle is recorded the same way. Only with the off angle, SmartPAC Hydraulic displays the *latest* off angle.

For green constant sensors, SmartPAC Hydraulic would only show a change when the actuation angle decreased, not increased. That is, it shows the latest on and earliest off. SmartPAC Hydraulic displays actuation angles this way so that you can set the ready signal using the worst

case actuation angles for the sensor. Another reason is because if SmartPAC Hydraulic showed every change on the display, it might change so rapidly that you could not read it from stroke to stroke.

Updating the sensor's on and off angles for a sensor

Press the **F5** function key. This clears the actuation angles displayed for any sensor. Zeros will be displayed. SmartPAC Hydraulic will display the actuation angles for the very next stroke. You can press the key while the press is running or stopped.

If a sensor is "on" through the top of the stroke, you may notice that the actuation angles shown in the Sensor on/off box may appear to be inaccurate. The angles shown are the earliest and latest actuations of the sensor in reference to 0° (top of stroke). If a sensor turns "on" before 0° (say, at 350°), SmartPAC Hydraulic will not recognize 350° as the earliest actuation because the number "350" is higher in value than the number "0". If the information in the Sensor on/off box does not appear to match the arc on the circle diagram, press the **F3** function key, which changes the on/off reference point to 180° instead.   This allows SmartPAC Hydraulic to correctly display the timing for a sensor that is actuated through the top of the stroke.

NOTE: *When you press F3 you will see dashes (— —) next to "ON" and "OFF" in the sensor box just before the information updates. Press F3 again to toggle back to normal actuation mode.*

NOTE

Pressing **F3** will not properly update sensor actuations when you are using a mechanical sensor, which vibrates constantly during the stroke. In cases like this, it is better to use an electronic sensor, which is not prone to constant contact bounce.

Show sensors

To access "Show sensors", first select "Die Protection" from the Main Run menu and you will see a list of sensors. Press the **F6** function key for "Show sensors" which allows you to see the status of all your sensors at once while the press is running or stopped.

The following display shows the status of every sensor for a loaded tool number. The sixteen sensor inputs are indicated by the numbers 1 through 8, and 9 through 16 (if installed). The type of sensor connected to each input is indicated by the letters (and/or numbers) under the numbered inputs. G = green; GCON = green constant; RED is a red sensor; GQC = green quick check; YEL = yellow; GS = green special (11 represents maximum number of strokes allowed); N/U = not used. The dark square above a sensor — the "actuation block" — indicates that it is actuated.
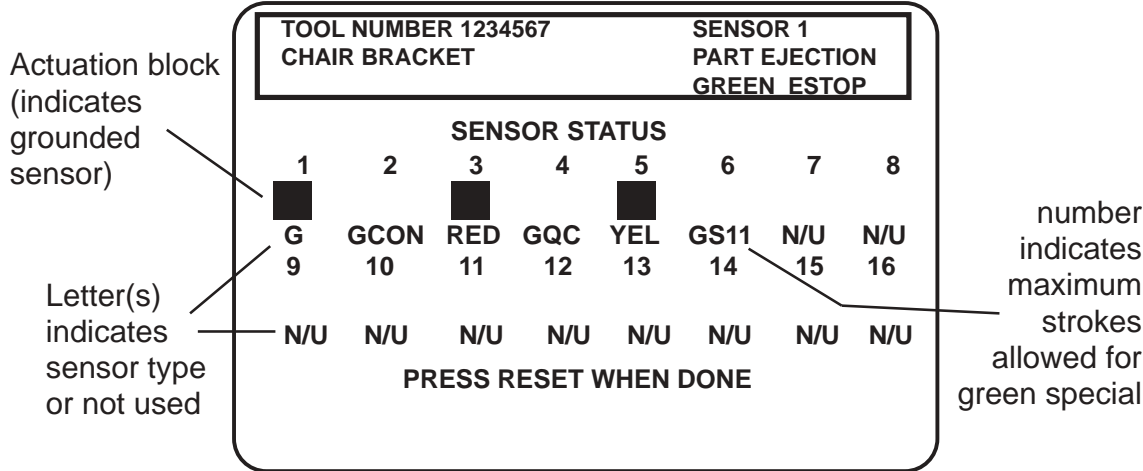
Figure 6-11. Show sensors

How to use the show sensors display

The "Show sensors" display can be used to quickly check the status of all your sensors and correct programming or wiring mistakes. When you select the show sensors display with the press running, you will see the actuation blocks for green sensors flashing. That is because green sensors normally actuate once every stroke. You will periodically see an actuation block for a green special sensor because they should actuate at least once during the preset value. You will always see an actuation block for any red sensor since they are normally grounded. You will never see an actuation block for a yellow sensor. When the press is stopped, you will see the condition that the sensor is in at that point in the stroke.

- Red sensors: Normally grounded
- Yellow sensors: Normally ungrounded
- Green , green quick check, and green constant sensors: Can be either grounded or ungrounded depending upon when they actuate during the stroke.
- Green special sensors: The counter decrements as the press runs. For example, if the counter starts at 11 and the press makes a stroke without the sensor activating, the counter will count down to 10. If another stroke occurs without a sensor actuation, the counter drops down to 9, and so forth. When the sensor activates, the counter automatically resets to 11.
- Unused sensors: It is possible to see an actuation block. This may occur if you had a sensor connected to the input by mistake. The display shows any change in an input's state, whether the sensor input is being used or not.

Due to the slow update rate, this display oftentimes misses the actuation of some sensors. This display, however, is an ideal way to catch mistakes in setting a sensor or mistakes in wiring sensors during setup. If a yellow sensor was mistakenly plugged into an input that is set to red, you could immediately detect the error when you saw that the red input has not actuated. You can also check actuation of all your green sensors, making sure the actuation blocks are flashing when the press is running. No actuation blocks would indicate wiring or setup problems. When

a sensor signals a fault, you could use the display to see the status of all your sensors at the stroke angle where the press stopped.

REMEMBER

Actuation signals from green sensors may not be seen in this display on every stroke.

Disable (enable) sensors

Depending on how you initialized the "Sensor enable mode" in Initialization (Chapter 4), there are various ways to enable die protection. If you selected "Manual enable/disable" in Initialization, you can manually enable and disable your sensors in Run mode. If you chose either of the "Auto enable" selections in Initialization, refer to the sensor programming section called "Die Protection" in Ch. 5, Pg. 99 to make the appropriate settings for the tool. *Even in Auto mode, you can manually enable sensors at any time.*

No matter which choice you made, you should always have sensors enabled to protect your tool. But sometimes you may want to disable sensors during setup or for troubleshooting. SmartPAC Hydraulic will not stop the press when sensors are disabled even when a sensor signals a malfunction. *If you do this, be sure to set sensors to "enabled" before you start making parts.*

NOTE: With sensors disabled, the LED display will flash when the press is running.

1. Get the first Run menu on your screen (Figure 6-1). Look at the next display.

2. Depending on how the sensors are set, you will see either of these status settings. Selecting the first line item toggles the status from "disabled" to "enabled" and back.

NOTE: If you manually disable sensors, you will get an additional message "PRESS THE FIVE KEY TO DISABLE SENSORS". This is your confirmation that you really want to disable sensors. Press "5" to confirm, or RESET to cancel.
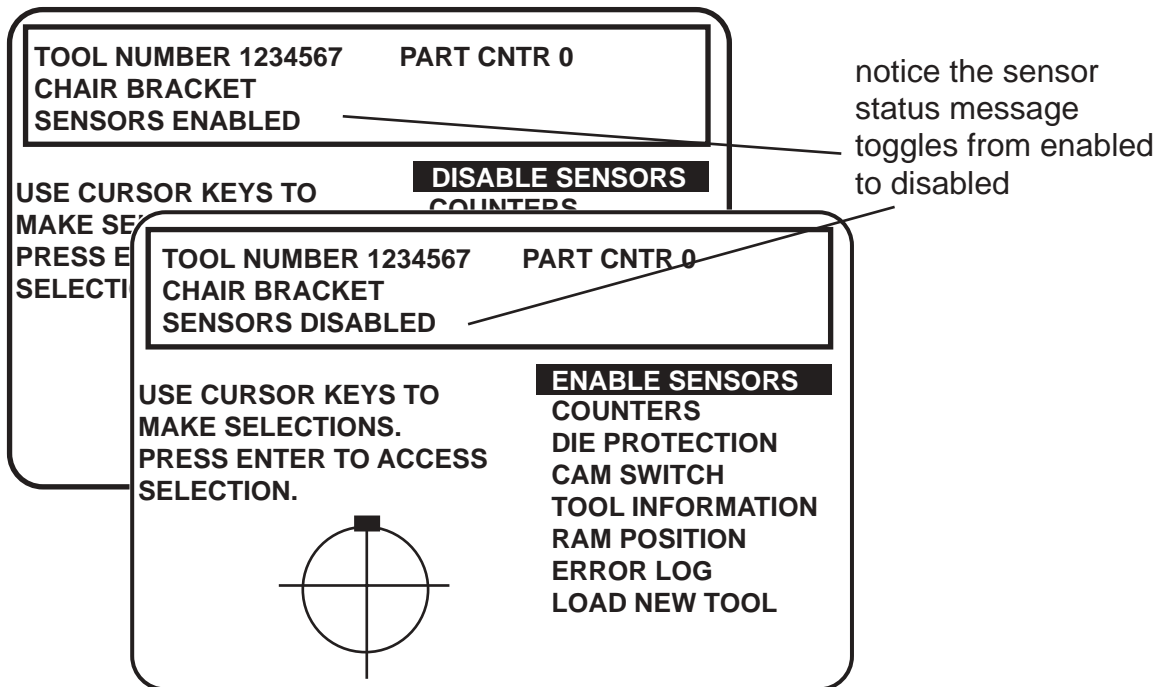

```
TOOL NUMBER 1234567        PART CNTR 0
CHAIR BRACKET
SENSORS ENABLED
```

```
                    DISABLE SENSORS
USE CURSOR KEYS TO       COUNTERS
MAKE SE
PRESS E     TOOL NUMBER 1234567        PART CNTR 0
SELECTI     CHAIR BRACKET
            SENSORS DISABLED
```

```
USE CURSOR KEYS TO          ENABLE SENSORS
MAKE SELECTIONS.            COUNTERS
PRESS ENTER TO ACCESS      DIE PROTECTION
SELECTION.                 CAM SWITCH
                           TOOL INFORMATION
                           RAM POSITION
                           ERROR LOG
                           LOAD NEW TOOL
```

notice the sensor status message toggles from enabled to disabled

Figure 6-12. Display showing "sensors enabled" or "sensors disabled"

Setup mode message

If the setup mode circuit is connected and active, you will see this message at the top left of the Run menu under the tool number: SENSORS IN SETUP MODE

This means green sensors are disabled. SmartPAC Hydraulic will not send a stop signal to the press when a green sensor signals a fault. The setup mode circuit is typically connected to the press control. When the press control is set to JOG, the circuit is grounded and green sensors are automatically disabled. To wire this circuit, see "Wiring a remote reset switch or setup mode circuit" in Chapter 2.

Tool number information (optional)

IMPORTANT

Tool Information serves only as a convenient place to record information about the tool. It does not control any aspect of press operation.

Note: *This feature is not available if you have the optional PLC interface installed.*

If you have this option, select "Tool Information" from the Run menu (Fig. 6-1, Pg. 108) to change the information about the tool you are using. (See "Tool information" in Chapter 5.) You will see a display similar to the following:
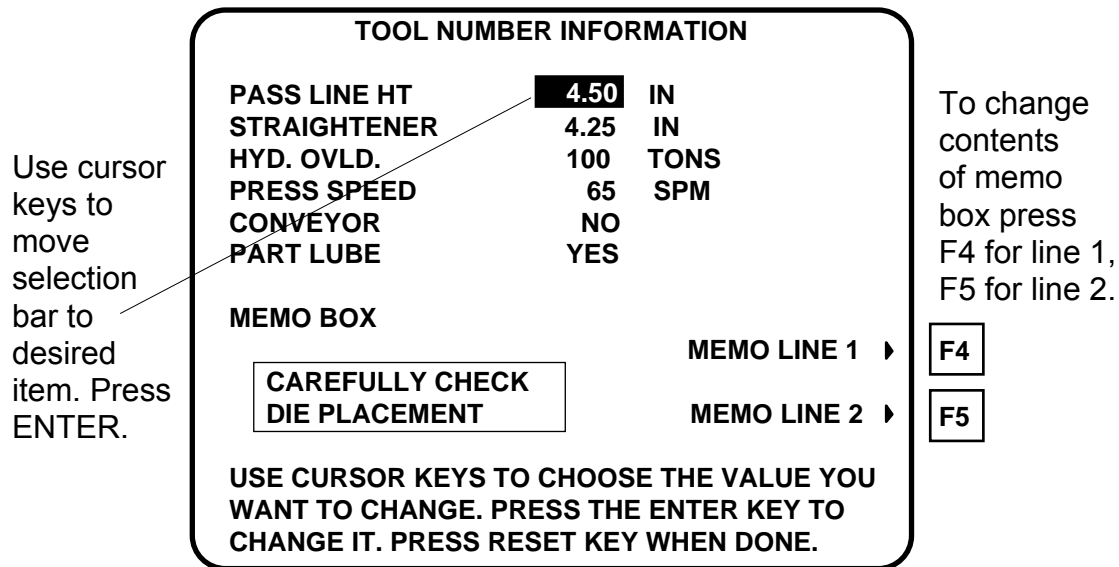
```
            TOOL NUMBER INFORMATION

      PASS LINE HT        4.50   IN
      STRAIGHTENER        4.25   IN
      HYD. OVLD.          100    TONS
      PRESS SPEED          65    SPM
      CONVEYOR            NO
      PART LUBE           YES

      MEMO BOX
                                  MEMO LINE 1  ▶   F4
        CAREFULLY CHECK
        DIE PLACEMENT             MEMO LINE 2  ▶   F5

      USE CURSOR KEYS TO CHOOSE THE VALUE YOU
      WANT TO CHANGE. PRESS THE ENTER KEY TO
      CHANGE IT. PRESS RESET KEY WHEN DONE.
```

Use cursor keys to move selection bar to desired item. Press ENTER.

To change contents of memo box press F4 for line 1, F5 for line 2.

Figure 6-13. Tool number information screen

ARE YOU LOCKED OUT?

Access to changing the information on this screen may be limited to Program mode or may require a password. The security access settings in the Initialization menu determine when changes can be made. See "Security access" in Chapter 4.
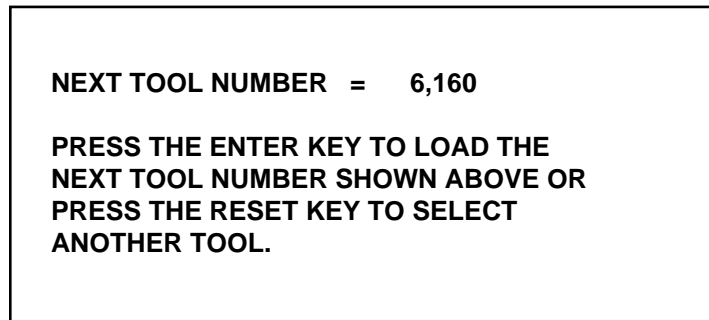

To enter information about the items:

1. Select the desired item. A screen overlay appears in which you can enter the appropriate value. For Yes/no items, enter 0 (zero) for NO, and 1 (one) for YES.

2. Enter text into the memo box, by pressing **F4** for the first line, and **F5** for the second line. A screen overlay appears that enables you to enter fifteen characters of numbers and alphabetic text for each line. When you complete each line, press **F6** to accept it.

3. When you have finished entering information into the tool number information screen, press RESET to return to the main Programming menu.

Load new tool number

You can load any *existing* tool number in Run mode from the tool number display. *However, a tool number cannot be loaded while the press is running.*

If the press is running when you attempt to load a tool number, a message will appear telling you that the press must be stopped before a tool number can be loaded. Follow these steps to load a tool number in Run mode.

IMPORTANT

"Load new tool" does not appear on the display in Run mode if "loading tool numbers" has been locked out by the security access setting in Initialization mode. You cannot load a tool from Run mode if it is locked out. With other security settings, a password may be required. For more information, see "Security access" in Chapter 4.

Select "Load new tool" from the Run menu. A Tool number display appears similar to this:

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 the Initialization menu determine when changes can be made. See "Security access" in Chapter 4.

A display appears similar to the following:

```
NEXT TOOL NUMBER  =    6,160

PRESS THE ENTER KEY TO LOAD THE
NEXT TOOL NUMBER SHOWN ABOVE OR
PRESS THE RESET KEY TO SELECT
ANOTHER TOOL.
```

Figure 6-14. Next tool number display

If you want to run the tool number shown, press ENTER. Otherwise, press RESET.
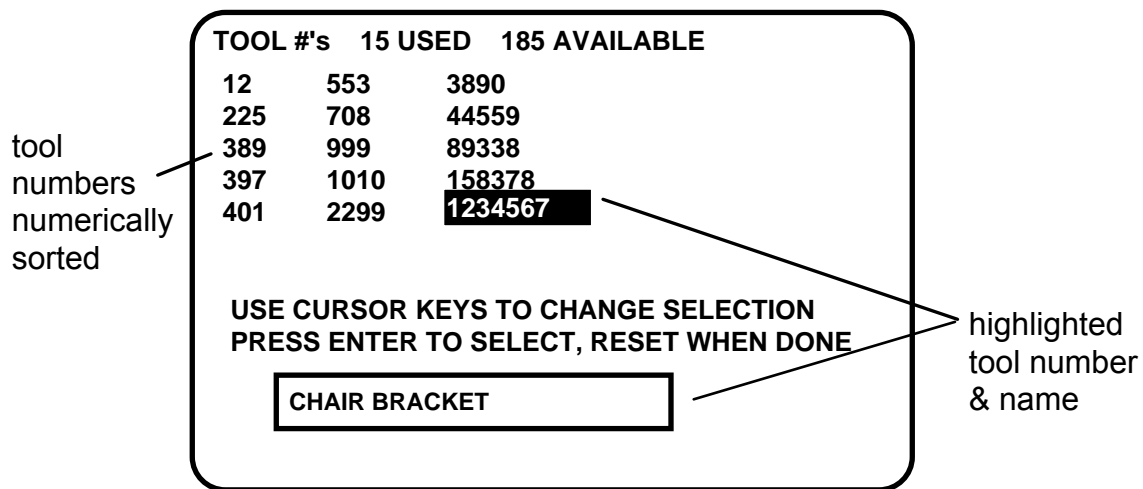
A Tool Number display appears similar to this:

tool numbers numerically sorted

```
TOOL #'s   15 USED   185 AVAILABLE
12      553     3890
225     708     44559
389     999     89338
397     1010    158378
401     2299    1234567

USE CURSOR KEYS TO CHANGE SELECTION
PRESS ENTER TO SELECT, RESET WHEN DONE

CHAIR BRACKET
```

highlighted tool number & name

Figure 6-15. Tool display shows available tools with selected tool highlighted

The display is the same as in Program mode, but you can only select an existing tool number. Notice that the tool numbers are in numerical order on the screen and that when a tool is highlighted, its "tool name" (if set) is also shown. You cannot select a "NEW" tool number. The display shows only the *existing* tool numbers.

2.   Highlight the tool you want to load and press ENTER. You will see this warning message superimposed over the Tool Number display screen (shown above):

```
          WARNING! !      WARNING!!
ANCILLARY EQUIPMENT MAY OPERATE
WHEN THIS SETUP IS LOADED. WARN
ALL PERSONNEL TO STAND CLEAR.

   PRESS ENTER TO LOAD THE SETUP
      PRESS RESET TO CANCEL
```

Figure 6-16. Warning message when loading tool number

3. Press ENTER to load the tool settings (a setup). You can go back without loading the tool settings by pressing RESET. When the tool number has been loaded (which takes only a few seconds), this message quickly appears on the screen: (Remember, your tool number may be different.)

TOOL NUMBER 1234567 IS BEING LOADED

NOTE

If you did not receive this message, but instead received an error message on your screen when you tried to load the tool, go to Chapter 7 and find the section describing that error message. Follow the instructions there for correcting the problem. If the error message is not described there, or you cannot fix the problem, call Wintriss Controls' technical advisors, and be ready to provide some important information to expedite a resolution to the problem. Please supply: **product name** (e.g. SmartPAC Hydraulic standard); **installed options** (e.g. DiProPAC, etc.); and **firmware version number** (e.g. Vs. 2.00). You can determine the last two items, by going into "Installed options" in the Initialization mode (see Chapter 4 for details). You can also determine firmware version number from the chip on the processor board (see "location of components" in Chapter 2).

Note that the first display shows the tool number you just loaded. You can always check which tool number is loaded on this display.

*** WARNING ***

Equipment may operate when you load tool settings

When you load a tool number, auxiliary press equipment may start. All employees must stay away from the press and equipment that the cam operates before a tool number is loaded.

Error Log

As a troubleshooting aid, your SmartPAC Hydraulic keeps an error log that you can view in Run mode. Each time the press is stopped, the log records the error number (which gives the reason for the stop), the stroke count when the stop occurred, and the ram angle when the stop occurred. When you stop the press to load a new tool, the error log shows the tool number. The log retains this information for the 32 most recent errors.

To see the error log, select "Error Log" from the Run menu. The display shows the log of the latest sixteen errors, with the most recent error first. To see information about the previous sixteen errors, press **F6**. To see the most recent errors again, press **F6** again. For more information about the error log, a listing of error numbers and what they mean, see "Using the error log" in Chapter 7.

Chapter 7
SmartPAC Hydraulic Fault Messages

This chapter explains the diagnostics and other messages that you may see on your LCD display or in the error log. These messages record the error or other condition when the press stops or when a fault occurs. Display messages are shown in the next section. Error log codes are listed at the end of the chapter.

Messages on the display

These types of messages are explained below:

*   Messages displayed when a counter preset has been reached
*   Messages displayed for programming problems
*   Messages displayed when a sensor signals a fault

What happens when you get a fault message

If you get a fault or error message when the press is stopped or you are in Run mode, the letters *"Err"* will blink in the LED display, as shown here. (To see where the "LED" display is located on the SmartPAC Hydraulic, refer to Chapter 1.)

Figure 7-1. "Err" on LED display

If the press stops because one of the counter presets count is reached, the letters *"Ctr"* will blink on the LED (shown below).

Figure 7-2. "Ctr" on LED display

> **PROVIDE IMPORTANT INFO!**
>
> When you contact Honeywell's Wintriss Controls Group for technical assistance, be ready to provide some important information to expedite a resolution to the problem. Please supply: **product name** (e.g. SmartPAC Hydraulic standard); **installed options** (e.g. DiProPAC, etc.); and **firmware version number** (e.g. Vs. 2.00). You can determine the last two items, by going into "Installed options" in the Initialization mode (see Chapter 4 for details). You can also determine firmware version number from the chip on the processor board (see "location of components" in Chapter 2).

How to clear the fault message from the display

To resume operation after an error message occurs, clear the error message by pressing the RESET key (or Remote Reset Button, if installed). Correct the malfunction or other problem *before* running the press.

If you cannot correct the problem after reading the remedy, contact Honeywell's Wintriss Controls Group technical support. Whenever you need help, just remember that we have expert representatives available to help you by phone. Never hesitate to call Honeywell's Wintriss Controls Group if you have trouble with SmartPAC Hydraulic.

Message displayed for interrupted stroke

" Interrupted stroke."

Explanation: This error happens when the ram goes up without reaching lower limit.

Remedy: Check if ram motion was affected by some reason such as light curtain interruption, ram hitting something, etc. Check the Lower Limit in Ram Position. It must be as high as possible to make a good part.

Messages displayed when a counter preset is reached

"Good parts counter preset "

Explanation: 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 would need to change tooling, material, etc. You can then run the press again.

NOTE: When this message appears, the good parts count is automatically reset to 0.

"Strokes counter preset reached"

Explanation: 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 would need to change tooling, material, etc. You can then run the press again.

NOTE: When this message appears, the strokes count is automatically reset to 0.

"Batch # counter preset reached"

Explanation: The value set for the one of the three batch counters has been reached when they are set to "top stop" (not "toggle" or "pulse"). The press will stop at top dead center (see Chapter 5 Program Mode, "Setting count mode")

Remedy: Press RESET to clear the message.

NOTE: *When this message appears, the corresponding batch count is automatically reset to 0.*

E-Stop errors

Explanation: If a message appears on the display that references "ESTOP", this has to do with either of the emergency stop relay circuits not working satisfactorily. One or both of these E-STOP circuits may be defective.

Remedy: You cannot reset the error. Instead, turn the unit off, then on. If the error continues to occur, contact Honeywell's Wintriss Controls Group technical service advisors for assistance.

"Onboard ram test failure"

Explanation: This means that something is wrong with the SmartPAC Hydraulic main processor board and the system cannot be reset. SmartPAC Hydraulic may need to be serviced or replaced.

Remedy: As stated above, pressing RESET will not reset the error. Try turning the power off then on. If the problem does not go away, contact Honeywell's Wintriss Controls Group technical service advisors for assistance or replacement.

Messages displayed for programming problems

These messages tell you that there is a problem with the tool number or that a tool number is not properly loaded. These messages may also indicate an internal problem with SmartPAC Hydraulic itself.

If you cannot correct the problem yourself after reading the remedy for the problem below, contact Honeywell's Wintriss Controls Group for assistance.

Once you have corrected the problem, press RESET. If the problem is corrected, you will be able to run the press again. If not, you will get the same fault message.

"No tool number has been loaded"

Explanation: A tool number is not presently loaded. You will see this message if you try to go into Run mode without a tool number loaded. A tool number must be loaded before entering Run mode.

Remedy: Turn the Program/Run key to "Program", and then press RESET. Now you can program and load the appropriate tool number in Program mode.

"Tool number table checksum error

Explanation: The information, or "**checksum**", created for the tool number loaded has become corrupted. This can occur when SmartPAC Hydraulic has been turned off while you are in the middle of programming a setup, or when you have not properly exited (by pressing RESET) from a Programming or Run menu.

 This can also occur when you upgrade SmartPAC Hydraulic. Sometimes the information in the older firmware does not correspond properly with the new firmware.

What is a Checksum: SmartPAC Hydraulic creates a checksum for a tool number to check that the data stored in memory for the tool is the same as the data that comes out of memory when you load the tool number. The checksum value calculated when data went into memory must be the same as the value calculated when the data is loaded.

Remedy: These checksum values may not match if SmartPAC Hydraulic has been turned off while you were in the middle of programming or adjusting settings for a tool. It will also happen if the stored tool number settings got damaged due to an internal SmartPAC Hydraulic malfunction.

 Go back into programming and review the tool number setup in question. Make sure that all the information you programmed is correct; then reload this tool number. If the problem 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) Go to Program mode, and select "Program/load tool numbers."
3) Select the tool number in question from the tool number display.
4) Select "Modify the tool information" from the next display.
5) Select "Set cams" from the next display.
6) Press RESET. SmartPAC Hydraulic will create a new checksum for the tool number.
7) Select the tool number again, bring up the display of cams, and verify that all settings are correct.
8) Reload the tool number. You should not get this fault message.

 If the problem is due to a system malfunction, the tool number settings will have to be created again from scratch. If this happens more than once, contact Honeywell's Wintriss Controls Group for assistance.

Messages displayed when a sensor signals a fault

Fault message for yellow sensors "This N/O sensor is grounded"

Explanation: A yellow sensor turned on (there was a contact closure to ground). When this message appears, the angle where the condition was detected is also shown on the LCD display.

Remedy: Check for the press or equipment malfunction that the sensor was supposed to detect. If none has occurred, check for a shorted sensor or pinched wire.

Fault message for red sensors "This N/C sensor is open"

Explanation: A red sensor has actuated (is open to ground). When this message appears, the angle where the condition was detected is also listed shown on the LCD display.

Remedy: Check for the press or equipment malfunction that the sensor was supposed to detect. If none has occurred, check for a malfunctioning sensor. Check for loose or detached wiring at the remote connection box or controller. Check for a severed wire from the sensor to the RCB or controller.

Fault messages for green sensors

"Green sensor missed"

Explanation: A green or green quick check sensor did not turn on during the ready signal and it did not come on late (within 50 milliseconds after the ready signal). No stroke angle is displayed with this error message 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 that 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 remote connection box. Remember, if no sensor is connected to a sensor input, that input must be set to "unused". Check connections between sensors and controller.

"Green sensor actuated late"

Explanation: A green or green quick check turned on late after its ready signal was completed. That is, it turned on within 50 milliseconds <u>after</u> the end of the ready signal. If a green or green quick check sensor does not come on during its ready signal, SmartPAC Hydraulic continues to look for the sensor signal. If it saw the sensor come on within 50 milliseconds after the ready signal, the angle where 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. You may just have to adjust the ready signal.

"Green sensor failure"

Explanation: For a green or green constant sensor, the sensor has stayed on from the end of one ready signal to the beginning of the next 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"

Explanation: A green constant sensor turned off during its ready signal. Green constant sensors must stay on throughout the entire ready signal. The angle where the sensor turned off is shown.

Remedy: Check for the malfunction that the sensor was supposed to detect.

If no malfunction at the press has occurred, check to be 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 remote connection box and controller.

"Green quick check sensor actuated outside ready"

Explanation: A green quick check sensor actuated or stayed on outside the ready signal. The stroke angle where the sensor was first detected on outside the ready is shown.

Remedy: Check for the malfunction the sensor is 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"

Explanation: A green special sensor did not actuate within the maximum number of strokes set in Programming mode (SmartPAC Hydraulic did not see a contact closure to ground). In other words, the press made strokes without this sensor actuating.

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 number is set correctly — not too low. See Chapter 1 for a complete description, and Chapter 5 to program this type of sensor.

One of the sensor auto enable counters is greater than 24

Explanation: Normally this fault will not ever occur since SmartPAC Hydraulic does not let you enter a value greater than 24. However, it could appear if there is a problem with the internal workings of SmartPAC Hydraulic.

Remedy: First press Reset. If the message reappears, contact Honeywell's Wintriss Controls Group.

Error log

As a troubleshooting aid, your SmartPAC Hydraulic keeps an Error Log that you can view in Run mode. Each time the press is stopped, the log records the error number (which gives the reason for the stop), the stroke count when the stop occurred, and the ram angle when the stop occurred. When you stop the press to load a new tool, the error log shows the tool number. The log retains this information for the 32 most recent errors.

To see the error log, select "Error Log" from the Run menu. The display shows the log of the latest sixteen errors, with the most recent error first. To see information about the previous sixteen errors, press **F6**. To see the most recent errors again, press **F6** again. See Table 7-1 on the following pages for a listing of error numbers and what they mean.
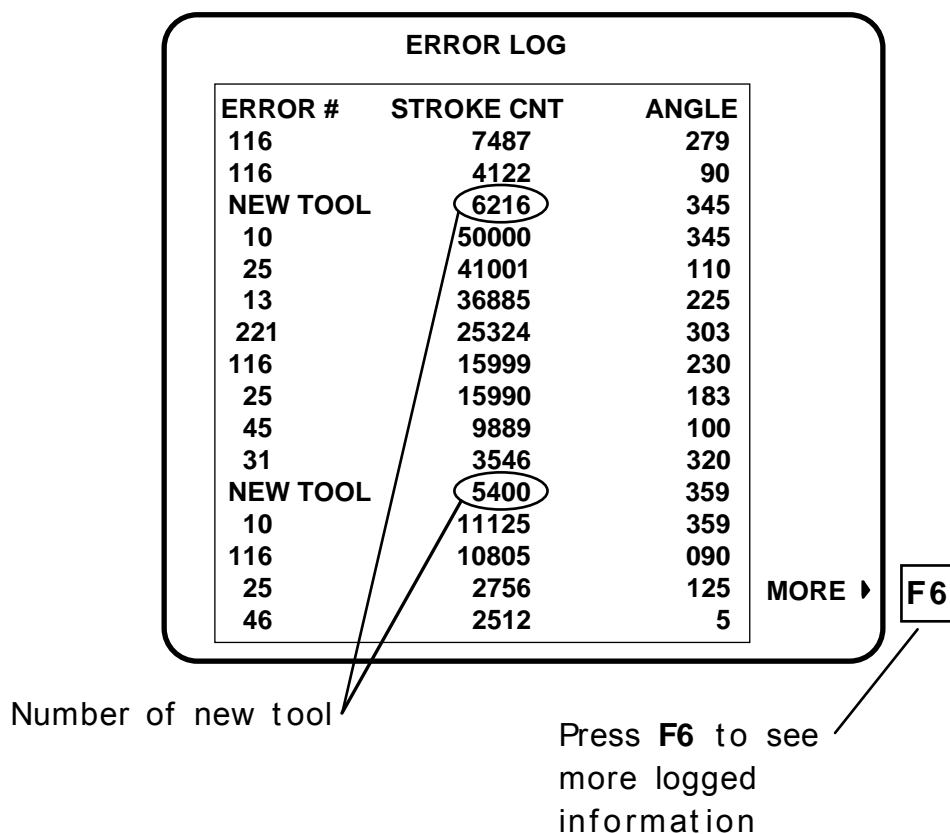

Figure 7-3. Error Log Display

Table 7-1. Error log status codes

Error #	Description
	General status codes
0	System OK
8	Estop driver failure
13	System failure
24	The press cycle was interrupted before upper or lower limits were reached.
25	Setup table checksum, loaded setup checksum or no setup loaded
31	Stroke counter preset
32	Good parts counter preset
33	Batch counter preset (1, 2, and 3)
	AutoSetPAC status codes
51-58	High setpoint exceeded, ch. 1-8
61-68	Low setpoint exceeded, ch. 1-8
71-78	Repeatability setpoint exceeded, ch 1-8
101-108	Zero offset exceeded, ch. 1-8
	DiProPAC status codes
114-129	Yellow probes 1-16
131-146	Red Probes 1-16
148-163	Green quick check on outside ready 1-16
165-180	Green missed 1-16
182-197	Green failure 1-16
199-214	Green late 1-16

Appendix A
SmartPAC Hydraulic PM Monitor (optional)

This appendix explains how to initialize, set up, and use the features of the SmartPAC Hydraulic 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.

UPGRADING FIRMWARE

If you have a SmartPAC Hydraulic system with AutoSetPAC, you must upgrade the firmware to accept PM Monitor functionality. Check the version of your AutoSetPAC firmware at "Installed Options" in the Initialization mode. If you have 2-channel AutoSetPAC and your firmware is less than vs. 1.26 (or 4-channel AutoSetPAC with firmware less than vs. 1.22), contact Honeywell's Wintriss Controls group technical support immediately to receive the correct AutoSetPAC firmware.

About SmartPAC Hydraulic PM Monitor

The SmartPAC Hydraulic PM (Preventative Maintenance) 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 need to be checked at regular intervals, such as daily, weekly, or 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 hydraulic pump every three months. During that time, the press is idle or running, and the hydraulic pump experiences wear. As a result, any time spent checking the hydraulic pump will be wasted. On the other hand, if the press were running in the single stroke mode, the many starts and stops of the machine will have caused greater-than-normal pump wear, and three months may be too long to wait between inspections.

How the PM Monitor works

In the previous example, the SmartPAC Hydraulic PM monitor would keep track of machine stops and could be set to signal a PM alert for the hydraulic pump system after 50,000 machine stops, for example.

Up to 64 items can be set up in the PM Monitor's schedule. "**Tracking units**", such as machine starts or stops, strokes, pump-on hours, cam channel actuations, die changes, tonnage overloads, etc., (depending on how SmartPAC Hydraulic 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 Hydraulics' status bar in the Run mode.

The entire PM **schedule** can be viewed in the 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 Hydraulic does not stop the press when an item is in alert status. SmartPAC Hydraulic's PM schedule is password-protected to keep unauthorized personnel from clearing an alert.

Examples of how to use the PM

Here are some examples to help you properly set up your PM monitor. Refer to the lists (shown below) — "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 on using the PM Monitor, don't hesitate to contact Honeywell's Wintriss Controls group technical advisors.

The tracking unit "**Ch. cycles**" (for cam channels 1 through 8), can be used to track the usage of various ancillary devices controlled by SmartPAC Hydraulic. Some PM items might include: feeder, 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 Hydraulic. Some PM item examples might include: hydraulic clamping mechanism and the ram adjust motor.

PM items

Hydraulic pump	**conveyor (1 through 6)**
lube filter	**drive belts**
lube system	**feeder**
lube motor	**gibs**
main motor	**oil level**

PM tracking units

weeks	days
die changes	months
press overloads[1]	ch. cycles (1 through 8)

[1] "Press overload" is only available with AutoSetPAC option.

Installing the PM Monitor

For new systems from the factory

If you purchased a SmartPAC Hydraulic system with the PM Monitor *pre-installed* at the factory, there is nothing more to install, as it was already done prior to shipment. Proceed to the section, "Using the PM Monitor in Initialization mode", for further instructions.

For existing systems

If you ordered the PM Monitor options separately (in other words, if you already had a SmartPAC Hydraulic, and you were just adding on the PM option), you must first physically upgrade your SmartPAC Hydraulic system for compatibility. To upgrade your SmartPAC Hydraulic firmware, refer to the section called "Upgrading SmartPAC Hydraulic firmware", found in Chapter 2 of this manual.

Once this has been completed, proceed to the section, "Using the PM Monitor in Initialization mode", and you will be instructed to access and initialize this option. *The PM Monitor must be initialized before you can use it.*

Using the PM Monitor in Initialization mode

How to get into SmartPAC Hydraulic Initialization and PM Monitor

SELECT = HIGHLIGHT + ENTER

When we say SELECT, it means highlight the item and press ENTER.

NOTE

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 Hydraulic 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    INSTALLED OPTIONS  │
│  CHOOSE MENU ITEMS.    PRESS NAME         │
│  PRESS THE ENTER       SELECT CAM NAMES   │
│  KEY TO SELECT.        AUTO ADVANCE       │
│  SWITCH TO RUN WHEN    CUSTOM SENSOR NAMES│
│  DONE.                 SENSOR ENABLE MODE │
│                        HYDRAULIC SENSOR   │
│                        ▐PM MONITOR▌       │
│                        TOOL INFORMATION   │
│                        SECURITY ACCESS    │
│                                           │
╰─────────────────────────────────────────╯
```
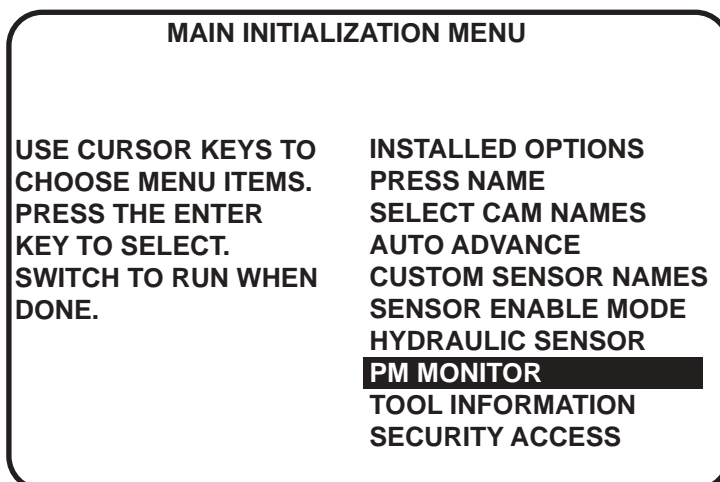
Figure A-1. "PM Monitor" in SmartPAC Hydraulic Initialization menu

(the list of options may vary depending upon the features you have installed)

2. Select "PM Monitor" from the main Initialization menu (Figure A-1). A screen will appear asking for your password.

Note: The password prompt will appear EVERY time that you select "PM Monitor" from the Initialization mode.
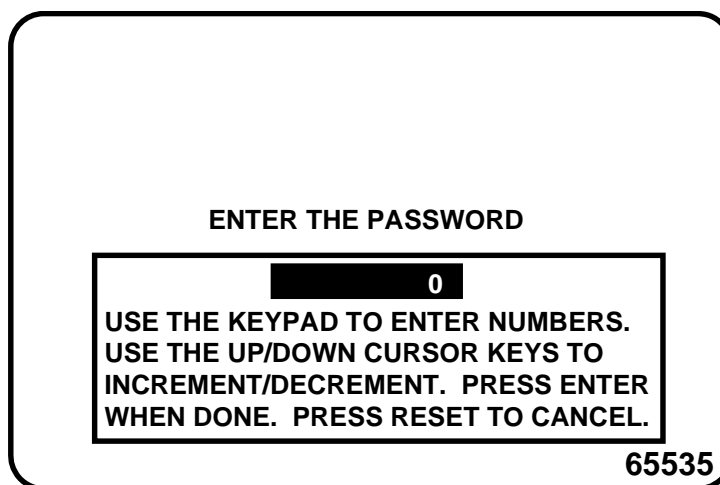
```
╭─────────────────────────────────────────╮
│                                           │
│                                           │
│                                           │
│                                           │
│          ENTER THE PASSWORD               │
│       ┌─────────────────────────┐         │
│       │          ▐ 0 ▌          │         │
│       │ USE THE KEYPAD TO ENTER NUMBERS.│  │
│       │ USE THE UP/DOWN CURSOR KEYS TO │  │
│       │ INCREMENT/DECREMENT.  PRESS ENTER│ │
│       │ WHEN DONE.  PRESS RESET TO CANCEL.││
│       └─────────────────────────┘         │
│                                    65535  │
╰─────────────────────────────────────────╯
```

Figure A-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 Hydraulic (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 Hydraulic 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 A-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.

Note: You should already have installed the 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 (Figure A-1). A screen will appear asking for your password.

Note: 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 (800) 333-3282 (DATA). *(Because you have an upgraded system, the password may not be "1234".)*
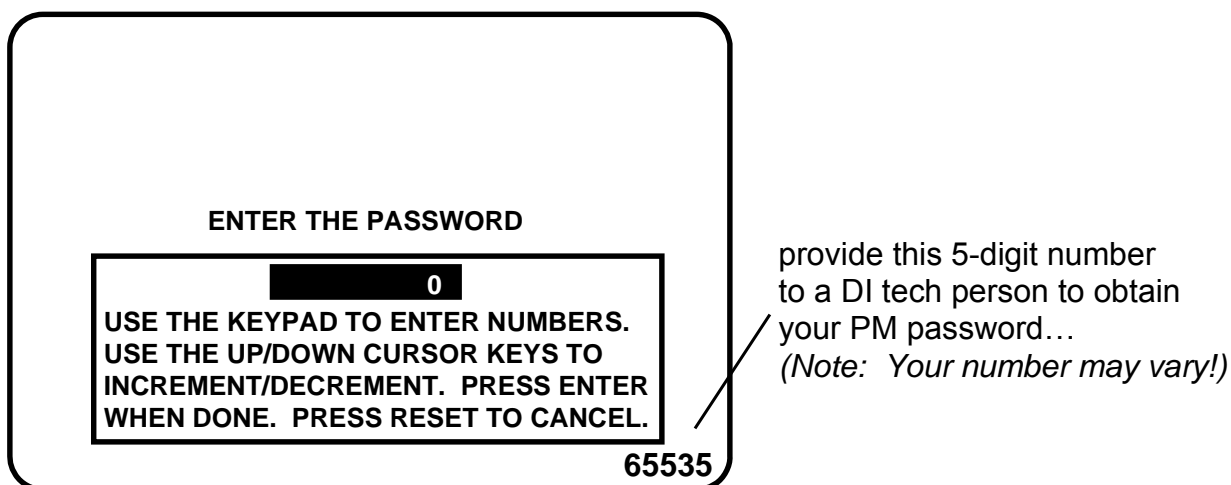
ENTER THE PASSWORD

```
                    0
USE THE KEYPAD TO ENTER NUMBERS.
USE THE UP/DOWN CURSOR KEYS TO
INCREMENT/DECREMENT.  PRESS ENTER
WHEN DONE.  PRESS RESET TO CANCEL.
```

provide this 5-digit number
to a DI tech person to obtain
your PM password…
(Note: Your number may vary!)

65535

Figure A-3. PM password screen

3. Enter the password, that you obtained from Honeywell's Wintriss Controls Group, by using the number keypad. This will take you to the PM Screen (see below). Don't worry if erroneous information appears on the screen, as it will disappear once you have completed step 5.
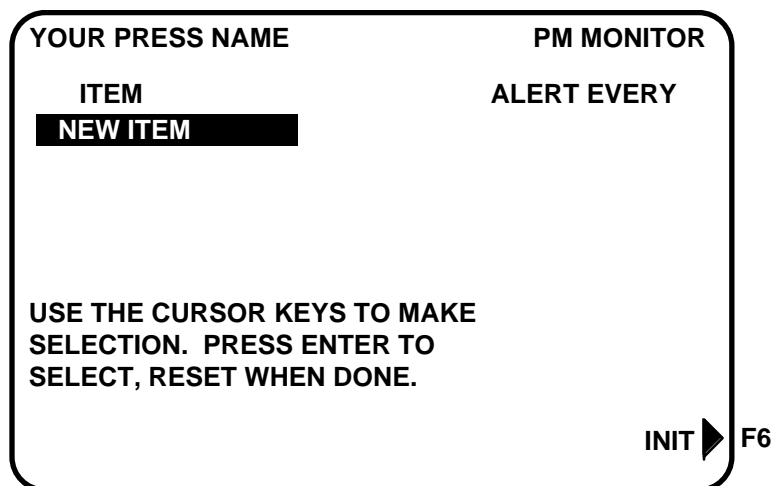
```
YOUR PRESS NAME                    PM MONITOR

      ITEM                         ALERT EVERY
 NEW ITEM




 USE THE CURSOR KEYS TO MAKE
 SELECTION.  PRESS ENTER TO
 SELECT, RESET WHEN DONE.

                                     INIT ▶ F6
```

Figure A-4. PM entry screen

4. Press the 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".)

```
YOUR PRESS NAME                    PM MONITOR


                                         select "Clear PM
                                         info" to initialize the
       CHANGE PASSWORD                   PM monitor
       CLEAR PM INFO

 USE THE CURSOR KEYS TO MAKE
 SELECTIONS.  PRESS ENTER TO ACCESS
 THE SELECTION.  PRESS THE RESET KEY
 WHEN DONE.
```
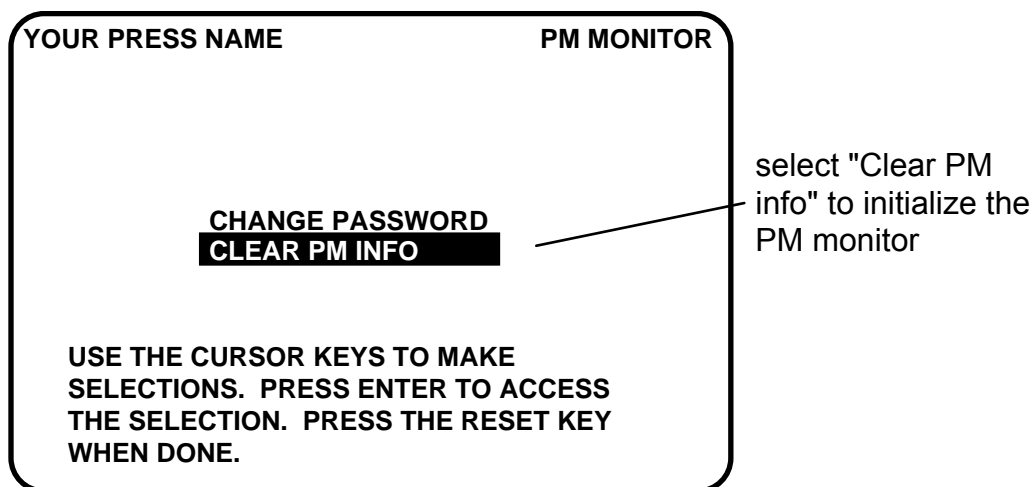
Figure A-5. Initialize PM screen

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.)
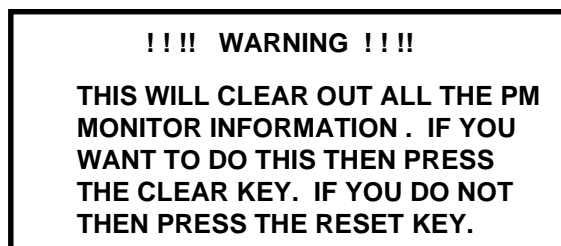
```
! ! !!  WARNING ! ! !!

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 A-6. Initialize warning screen

6. Once you press "Clear", you will briefly see the confirming message "INITIALIZING PM MONITOR".

7. 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 it. Follow the steps below to change the password. You can also change the password under the Security access menu in the Initialization menu (see Chapter 4).

1. Go to the "PM Entry" screen (Figure A-4). Press F6 "Init".

2. You will see the "Initialize PM" screen (Figure A-5). Select "Change Password".

3. As the screen indicates, enter a new password, up to 4 digits (numeric only). Use the number keypad or the up/down cursor keys. Then press Enter.

4. Make sure that you record this number somewhere else. 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 names for each preventative maintenance item which adequately describes its function. SmartPAC Hydraulic 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):
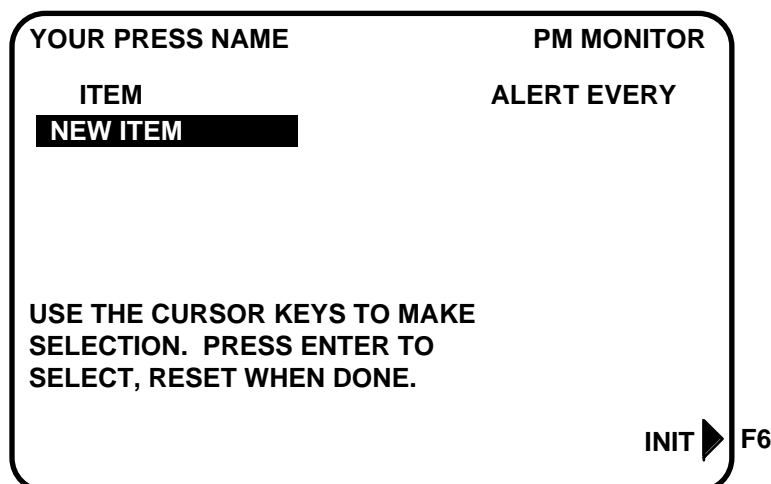
Figure A-7. PM monitor screen

2. Next, you will see the following display. You can give the item a name that best describes its function; so first check the list for a suitable name.
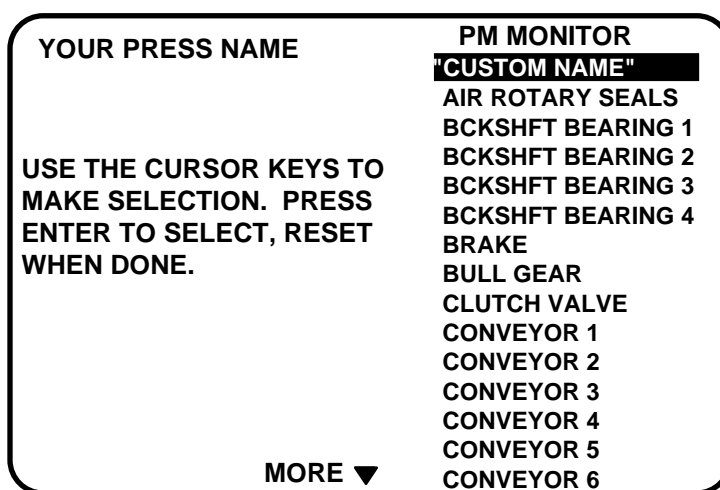

Figure A-8. Displaying available list of PM names

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 also 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 alpha-numeric 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 number 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.)
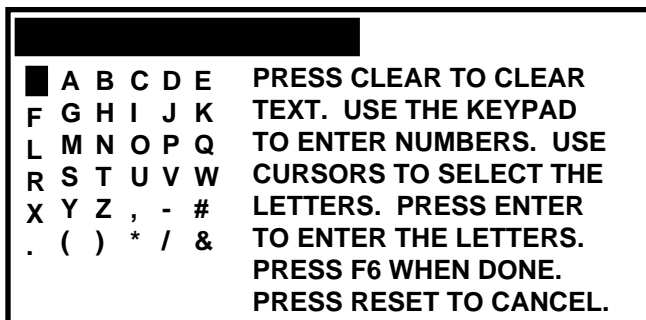
```
┌─────────────────────────────────────────┐
│  ████████████████                        │
│                                          │
│  █ A B C D E   PRESS CLEAR TO CLEAR      │
│  F G H I J K   TEXT. USE THE KEYPAD      │
│  L M N O P Q   TO ENTER NUMBERS. USE     │
│  R S T U V W   CURSORS TO SELECT THE     │
│  X Y Z , - #   LETTERS. PRESS ENTER      │
│  . ( ) * / &   TO ENTER THE LETTERS.     │
│                PRESS F6 WHEN DONE.       │
│                PRESS RESET TO CANCEL.    │
└─────────────────────────────────────────┘
```

Figure A-9. Alpha-numeric 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.
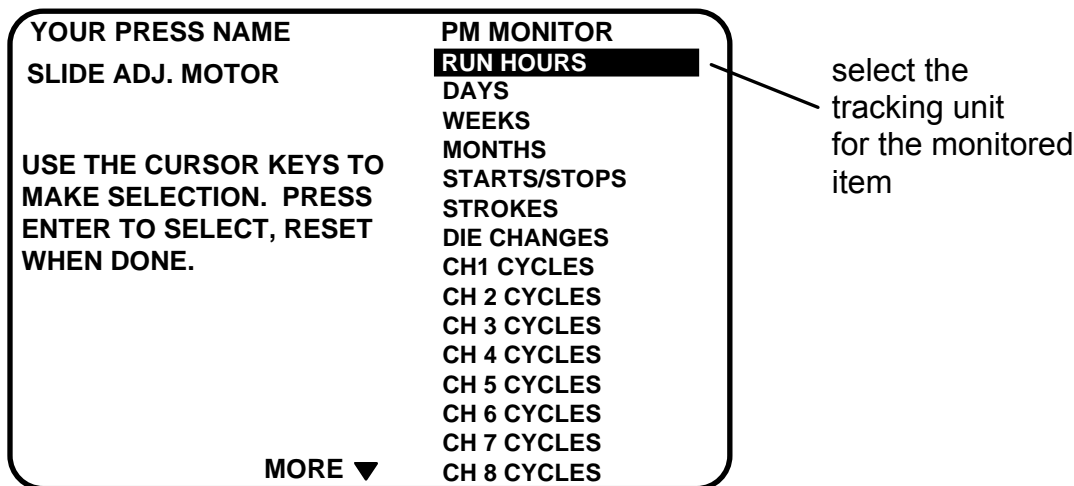
```
┌──────────────────────────────────────────────┐
│ YOUR PRESS NAME          PM MONITOR          │
│ SLIDE ADJ. MOTOR         ██RUN HOURS██        │        select the
│                          DAYS                 │        tracking unit
│                          WEEKS                │        for the monitored
│                          MONTHS               │        item
│ USE THE CURSOR KEYS TO   STARTS/STOPS         │
│ MAKE SELECTION. PRESS    STROKES              │
│ ENTER TO SELECT, RESET   DIE CHANGES          │
│ WHEN DONE.               CH1 CYCLES           │
│                          CH 2 CYCLES          │
│                          CH 3 CYCLES          │
│                          CH 4 CYCLES          │
│                          CH 5 CYCLES          │
│                          CH 6 CYCLES          │
│                          CH 7 CYCLES          │
│              MORE ▼       CH 8 CYCLES         │
└──────────────────────────────────────────────┘
```

Figure A-10. Selecting tracking unit of measure

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.
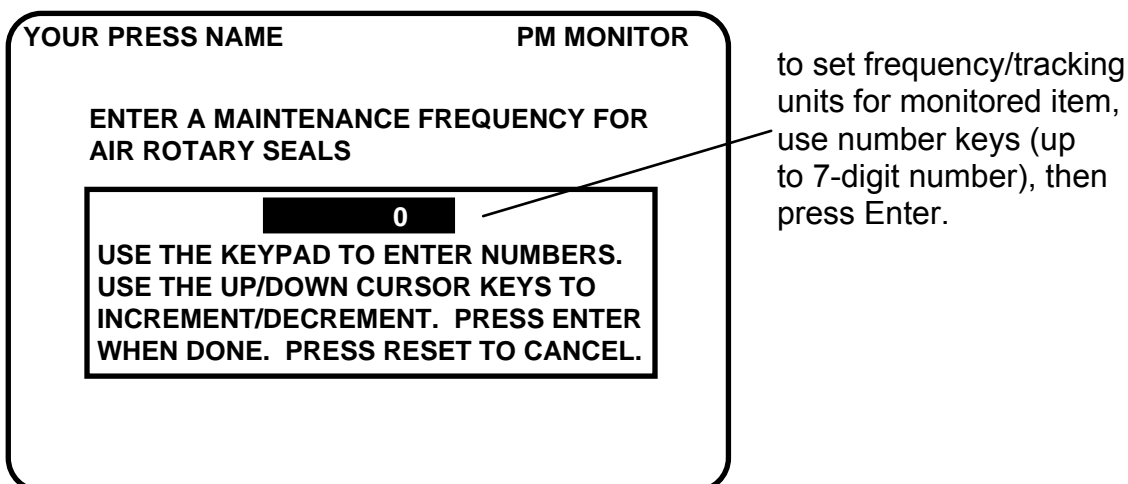
```
┌─────────────────────────────────────┐
│ YOUR PRESS NAME          PM MONITOR  │
│                                      │
│    ENTER A MAINTENANCE FREQUENCY FOR │
│    AIR ROTARY SEALS                  │
│                                      │
│    ┌─────────────────────────────┐   │
│    │          ▌    0    ▐         │   │
│    │                             │   │
│    │ USE THE KEYPAD TO ENTER NUMBERS. │
│    │ USE THE UP/DOWN CURSOR KEYS TO   │
│    │ INCREMENT/DECREMENT.  PRESS ENTER│
│    │ WHEN DONE.  PRESS RESET TO CANCEL.│
│    └─────────────────────────────┘   │
│                                      │
│                                      │
└─────────────────────────────────────┘
```

to set frequency/tracking units for monitored item, use number keys (up to 7-digit number), then press Enter.

Figure A-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".

```
┌─────────────────────────────────────┐
│ YOUR PRESS NAME          PM MONITOR  │
│                                      │
│      ITEM             ALERT EVERY    │
│    NEW ITEM                          │
│    ▌SLIDE ADJ. MOTOR▐  100 DIE CHANGES│
│                                      │
│                                      │
│                                      │
│                                      │
│                                      │
│                                      │
│ USE THE CURSOR KEYS TO MAKE          │
│ SELECTION.  PRESS ENTER TO SELECT    │
│ RESET WHEN DONE.                     │
└─────────────────────────────────────┘
```

in this example, we entered "slide adj. motor" and set it to alert at 100 die changes
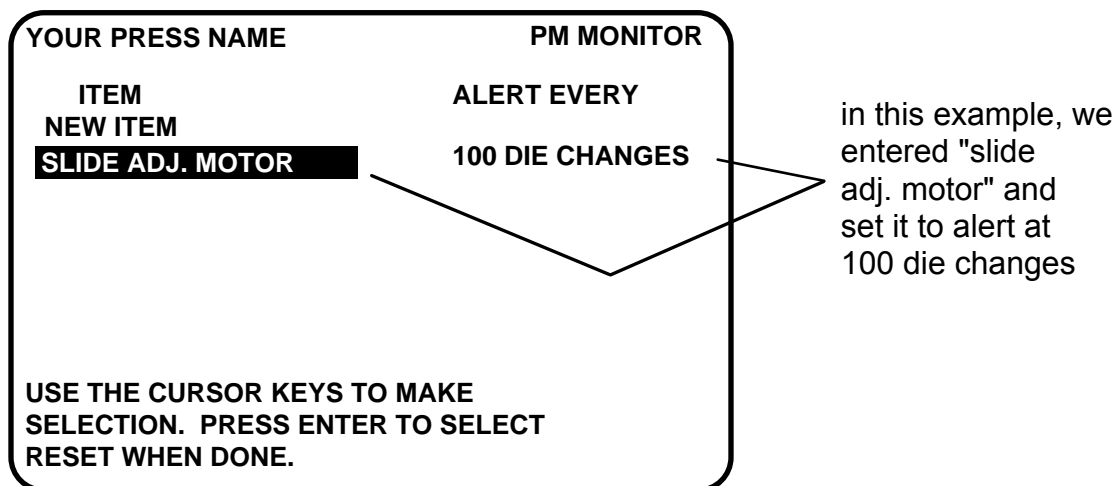
Figure A-12. Example

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 Hydraulics' Program mode. You made all the required settings in the Initialization mode.

Using the PM Monitor in Run mode

How to get into SmartPAC Hydraulic Run mode

To get into Run mode, set the Program/Run key to Run.

NOTE

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 Hydraulic 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:

<p align="center">NO TOOL NUMBER HAS BEEN LOADED</p>

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.

```
┌──────────────────────────────────────────┐
│ TOOL NUMBER 1234567          SENSOR 1     │
│ CHAIR BRACKET                             │
│ SENSORS ENABLED          ▐ PM ALERT ▌     │
│                                           │
│                                           │
│ USE CURSOR KEYS TO       DISABLE SENSORS  │
│ MAKE SELECTIONS.         COUNTERS         │
│ PRESS ENTER TO ACCESS    DIE PROTECTION   │
│ SELECTION.               CAM SWITCH       │
│                          TOOL INFORMATION │
│              ╷           RAM POSITION     │
│           ┌──┴──┐        ▐PM MONITOR ▌    │
│         ──┤     ├──      ERROR LOG        │
│           └──┬──┘        LOAD NEW TOOL    │
│              ╵                            │
└──────────────────────────────────────────┘
```

This alert message appears at the main Run menu when a PM alert condition is present.

Select PM Monitor from this screen to attend to the offending item.

<p align="center">Figure A-13. "PM Monitor" highlighted at SmartPAC Hydraulic Run menu
(the list of options may vary depending upon the features you have installed)</p>

Viewing and modifying PM

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 the Initialization status. 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 have reached the limits set in Initialization.

```
YOUR PRESS NAME                    PM MONITOR
STATUS IS NORMAL
┌──────────────────────────────────────────┐          notice that alert status
│ SLIDE ADJ. MOTOR                          │          is "normal"
│    ALERT AT           100 DIE CHANGES     │
│    CURRENT             75 DIE CHANGES     │
└──────────────────────────────────────────┘
  CLUTCH VALVE
     ALERT AT        2000 STARTS/STOPS      CLEAR ▶  F3
     CURRENT         1001 STARTS/STOPS      ALERT
  GIBS
     ALERT AT        1000000 STROKES        CHANGE ▶ F4
     CURRENT          458239 STROKES        VALUE
          MORE ▼
  USE CURSOR KEYS TO CHANGE SELECTION
  PRESS ENTER TO SELECT, RESET WHEN DONE
```

Figure A-14. Display showing PM monitor in "normal" status mode

---

Note

You may notice that some of the current values do not update on every stroke while the press is running. SmartPAC Hydraulic 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.

```
                                                          shows how many alert
YOUR PRESS NAME                    PM MONITOR             alert conditions are
THERE IS 1 ITEM WITH ALERT STATUS                        current
┌──────────────────────────────────────────┐
│ SLIDE ADJ. MOTOR          !! ALERT!!      │             PM Monitor alerts
│    CHECK AT           100 DIE CHANGES     │             you to check specific
│    CURRENT            101 DIE CHANGES     │             item in "alert" status mode.
└──────────────────────────────────────────┘             Notice "!!ALERT!!"
  CLUTCH VALVE                                            flashes.
     CHECK AT        2000 STARTS/STOPS      CLEAR ▶ F3
     CURRENT         1055 STARTS/STOPS      ALERT
  GIBS
     CHECK AT        1000000 STROKES        CHANGE ▶ F4
     CURRENT          558836 STROKES        VALUE
          MORE ▼
  USE CURSOR KEYS TO CHANGE SELECTION
  PRESS ENTER TO SELECT, RESET WHEN DONE
```

Figure A-15. Shows "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.

CAUTION

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 A-11). 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.

Glossary

actuation block	dark square above a sensor on the "Show sensors" display in Run mode which indicates that a sensor is actuated.
actuation	change in state or condition
actuation angle	sensor's on and off angle; dwell
ANSI	stands for American National Standards Institute; U.S. clearinghouse and coordinating body for voluntary standards activity on the national level
auto enable by sensor	die protection mode where the die protection module automatically enables an *individual* sensor after a designated number of strokes
auto enable by tool	die protection mode where the die protection module automatically enables *all* sensors in a tool after a designated number of strokes
batch counter	can be set to either top-stop the press or signal programmable limit switch (PLS) outputs when its preset is reached
cam channels	relays that open and close on signals from the programmable cam switch to turn equipment on and off
checksum	numeric value created for a tool number to check that the data stored in memory for the tool is the same as the data that comes out of memory when the tool number is loaded; this value is calculated when data went into memory and must be the same as the value calculated when the data is loaded
circle diagram	arc that dynamically illustrates the on and off angle settings that have been programmed for a sensor and/or cam channel
communications	ability to send and receive data from a computer running PacNet™ and/or RSR^{TM}, Remote Storage Retrieval
counters	incremented press cycles; see also *strokes*, *good parts*, and *batch*
CPU number	identifying numeric designation of the unit communicating with PacNet or RSR software products.
cursor keys	used to move the selection bar over the item on the display to be selected; also used to make certain programming and adjusting entries, and to select alphabetic characters and special symbols when naming the press, tools, cam channels, and sensors

depth penetration factor	measurement of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts
dwell duration time	how long the cam channel and/or sensor are expected to stay activated
enable mode	ability to activate or deactivate sensors connected to the die protection mode; see also *manual enable*; *auto enable by tool*; and *auto enable by sensor*
emergency stop	signal sent to the press as soon as a malfunction occurs; should be used when the operator wants the press to stop immediately
ENTER key	used after highlighting a selection or keying in a value on the display
error message	diagnostics that indicate why the press was stopped, identify the problem, and suggest how to correct
function keys	periodically used to perform certain tasks in SmartPAC; the message on the LCD display will identify the specific function key number to depress (from F1 to F6)
good parts counter	increments only "good" parts if the die protection and/or tonnage monitoring option does not generate a fault
green sensors	must actuate at least momentarily during the ready signal
green special sensor	designed to effectively monitor slug ejection (described in detail in Chapter 1)
green constant	must turn on before the ready signal begins and turn off after the ready signal ends; that is, it must stay actuated constantly during the ready signal
green quick check	like a green sensor, *except* that it cannot stay on or turn on outside the ready signal
impedance	refers to the opposition to the flow of electric current; some die protection controls have inputs with different impedances for electromechanical sensors; 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
keyboard	consists of various key and a numeric keypad described below; used along with the LCD display to make settings
LCD display	**L**iquid **C**rystal **D**isplay used along with the keyboard to make and adjust settings, to load tool numbers, and to view diagnostic messages

LED display	three-digit **L**ight **E**mitting **D**iode display showing strokes per minute when the press is running, and crankshaft angle when the press is stopped
manual enable	die protection mode where sensors are manually enabled or disabled by the operator
menu	display enabling one to carry out a specific task such as: set counters, adjust settings, etc.
N/C (normally closed)	when the sensor circuit to the die protection control is closed to ground in its normal state
NEMA 12	rating indicating that the control is protected against dust and oil; imperative to use conduit of this same rating and make proper connections to ensure NEMA 12 protection with the enclosure
N/O (normally open)	when the sensor circuit to the die protection control switches from open to closed to ground
number keys	used to input numeric values, such as counter presets or tool numbers
object sensitivity	smallest diameter object that a light curtain will detect anywhere in its field
on-off setting	stroke angle settings where the cam channel and/or sensor is to turn on (actuate) and turn off (deactivate)
OSHA	stands for Occupational Safety and Health Administration, which governs regulations pertaining to presence-sensing devices for point-of-operation guarding on mechanical power presses.
pinch point	hazardous area in and around the die; light curtains, two-hand controls, and/or other barriers must be mounted to protect the operator from it
Program/Run key	allows one to access the Program and Run modes by positioning the key to "Program" or "Run"; can also be used to lock out access to these modes so settings cannot be changed by removing the key
ready signal	portion of the stroke where activity in the die area is monitored
red sensors	normally closed to ground; a stop command is sent to the press as soon as the sensor actuates — opens to ground
reset	ability to resume operation after the control stops the press when a malfunction is detected; a specific fault message for a malfunction is communicated along with suggestions on how to troubleshoot.

RESET key	used to reset the control after fault messages appear on the display; also used to communicate "all done"
safety distance	calculated using the results from the 90° emergency stop time test to determine the distance outside of which the light curtains, two-hand controls, and type-B movable barriers must be mounted; determined by using a precise formula set by OSHA regulations and/or ANSI standards; critical for proper machine guarding
screen contrast keys	adjust the brightness of the LCD display
security access	ability to prevent or allow personnel access to programming and operating functions in the control
selection bar	black box with white alpha-numeric characters that appears on menu displays; to select, use cursor keys to move the bar up or down and press Enter
sensor on-off box	contains numbers showing the degrees the sensor actuated when you ran the press
settings	modifications made using the keypad on the control
stop types	ability to set the way the control stops the press for a malfunction
strokes counter	increments each press cycle
suppressors	reduce or eliminate electrical noise
timing	"on" and "off" settings for sensors and/or cam channels
tool name	alpha-numeric designation linked to the tool number which aids in easier identification
tool number	a numeric value assigned to keep track of all settings made
total hits counter	increments all hits on a tool; if the tool number is loaded again after other tools are used, the counter starts counting from the last recorded number for the previous job; useful for deciding when a tool needs regrinding
upper limit	signal which allows the press to stop at top of stroke (0°); used when an emergency-stop setting might cause the press to stick on bottom, and when one hit after a malfunction will not damage the die or press
voltage selector switch	enables the setting of the power supply from 115V to 230V; located on the power supply board
yellow sensors	normally open to ground; a stop command is sent to the press as soon as the sensor actuates — closes to ground.

Index

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

TB401

BRN / PURPLE / ORG / YEL / BLUE / GRAY / PINK / TAN / RED / BLACK / WHITE

260 (Ch 1) / 261 (Ch 2) / 262 (Ch 3) / 263 (Ch 4) / 264 (Ch 5) / 265 (Ch 6) / 266 (Ch 7) / 267 (Ch 8) / 268 (+5) / 269 (Grd) / 270 (R Pwr)

ProcamPAC 8 HYDRAULIC

TB403
+DATA GRY
-DATA GRN
+CLK YEL
-CLK PINK
+24 VDC BRN
GND BLUE
SHIELD
TB402

EXT. 24 VDC
EXT GND
TB404
GND / INPUT / +24 VDC

SA Pressure Transducer
5000 psi
BLK
WHT
RED

GRY (+DATA)
GRN (-DATA)
YEL (+CLK)
PINK (-CLK)
BRN (+ 24 VDC)
BLU (GND)
WHT (NC)

WHT
NO CONNECTION

CONNECT THE SHIELD TO
THE ENCLOSURE NEXT TO
THE CONDUIT ENTRY POINT

UP END   DOWN END
BALLUFF SSI LINEAR TRANSDUCER

GRD
120 VAC (L2)
120 VAC (L1)
3 2 1
TB3
L1/+24V L2 GND
DSI 2

SENSOR STATUS
POWER 1 2 3 4 5 6 7 8

OUTPUT
1 Sensor 1
2 Sensor 2
3 Sensor 3
4 Sensor 4
5 Sensor 5
6 Sensor 6
7 Sensor 7
8 Sensor 8
9 Grd
10 Grd
11 +5 VDC
TB2

2 3
1 4
1 - Sensor Power
2 - Ground
3 - Sensor Input
4 - N.C.

INPUT
Sensor 1 1
Sensor 2 2
Sensor 3 3
Sensor 4 4
Sensor 5 5
Sensor 6 6
Sensor 7 7
Sensor 8 8
Grd 9
Grd 10
+24 VDC 11
+24 VDC 12
TB4

TB301
CHAS / B / A / +5 VDC / CH 8 / CH 7 / CH 6 / CH 5 / CH 4 / CH 3 / CH 2 / CH 1
1 2 3 4 5 6 7 8 9 10 11 12
BLK / WHT / RED / TAN / PINK / GRAY / BLUE / YEL / ORG / PURPLE / BRN

8 CHANNEL CAM I/O ASSEMBLY

CH 8 CH 7 CH 6 CH 5 CH 4 CH 3 CH 2 CH 1

4A   4A   4A   4A   4A   4A   4A   4A

TB303   TB302
N/C C N/O N/C C N/O N/C C N/O N/C C N/O N/C C N/O N/C C N/O N/C C N/O N/C C N/O

BOTTOM DWELL   TOP LIMIT
BOTTOM LIMIT

NOTE: BOTTOM DWELL IS ONLY USED
WHEN A PRESSURE TRANSDUCER IS
INSTALLED.

SMARTPAC MODE SELECTOR INPUTS

TB203
258 (GRD)
257 (REMOTE RES.)

TB202
256 (GRD)
255 (LOCKOUT)
254 (OP STA 2)
253 (OP STA 1)

TB201
252 (GRD)
251 (CONT)
250 (S.S.)
249 (INCH/SETUP)
248 (OFF)

JOG RUN AUTO

INTERRUPTED CYCLE TESTS ARE DISABLED
WHEN INCH/SETUP MODE INPUT IS GROUNDED.
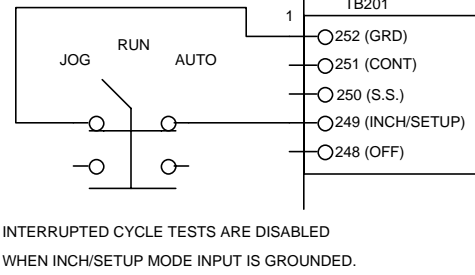
DRAWN ADB	DATE 1/12/00	**HONEYWELL** SENSING AND CONTROL		
CHK.				
APPROVALS		TITLE		
ENG.		SmartPAC HYDRAULIC Wiring Diagram		
MFG.				
FILENAME		CODE IDENT NO.	SIZE C	DRAWING NUMBER Figure 1	REV
REL		SCALE		SHEET OF

REVISIONS

REV	DESCRIPTION	DATE	APP'D

DRAWN ADB DATE 10/6/00

APPROVALS

CHK.

ENG.

MFG.

FILENAME

REL

HONEYWELL
SENSING AND CONTROL

TITLE
SMARTPAC LOOPBACK WIRING CONNECTIONS
FOR RS232 CONFIGURATIONS

CODE IDENT NO.   SIZE **B**   DRAWING NUMBER   REV
FIGURE 2

SCALE NONE   SHEET   OF

RS 232 CONNECTIONS

RS485 ONLY

Wintriss SmartPAC

TB203
- 258 (GRD)
- 257 (REMOTE RES.)

TB202
- 256 (GRD)
- 255 (LOCKOUT)
- 254 (OP STA 2)
- 253 (OP STA 1)

TB201
- 252 (GRD)
- 251 (CONT)
- 250 (S.S.)
- 249 (INCH/SETUP)
- 248 (OFF)

MAIN POWER CONNECTOR TB101
- 211 (Zero)
- 210 (TSTOP)
- 209 (TSTOP)
- 208 (ESTOP)
- 207 (ESTOP)
- 206 (B)
- 205 (A)
- 204 (Chas)
- 203 (Grd)
- 202 (L2)
- 201 (L1)

WPC PORT TB104
- 223 (Grd)
- 222 (-TXD)
- 221 (+TXD)
- 220 (-RXD)
- 219 (+RXD)

RESOLVER PORT TB106
- 218 (S4)
- 217 (R2)
- 216 (S3)
- 215 (R1)
- 214 (S2)
- 213 (S1)
- 212 (Shld)

POSITION SENSOR TB107
- 247 (Grd)
- 246 (Pos)
- 245 (+V)

MODULE PORT TB102
- 244 (-TXD2)
- 243 (+TXD2)
- 242 (-RXD2)
- 241 (+RXD2)
RS485 ONLY

SFI PORT
- 240 (Grd)
- 239 (-TXD1)
- 238 (+TXD1)
- 237 (TXD1)
- 236 (-RXD1)
- 235 (+RXD1)

CPR PORT
- 234 (-TXD4)
- 233 (+TXD4)
- 232 (TXD4)
- 231 (-RXD4)
- 230 (+RXD4)

TB103

SPARE PORT
- 229 (Grd)
- 228 (-TXD3)
- 227 (+TXD3)
- 226 (TXD3)
- 225 (-RXD3)
- 224 (+RXD3)

REVISIONS

REV	DESCRIPTION	DATE	APP'D

RS 485 CONNECTIONS

MAIN POWER CONNECTOR TB101
- 211 (Zero)
- 210 (TSTOP)
- 209 (TSTOP)
- 208 (ESTOP)
- 207 (ESTOP)
- 206 (B)
- 205 (A)
- 204 (Chas)
- 203 (Grd)
- 202 (L2)
- 201 (L1)

WPC PORT TB104
- 223 (Grd)
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- 219 (+RXD)

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- 217 (R2)
- 216 (S3)
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POSITION SENSOR TB107
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- 246 (Pos)
- 245 (+V)

MODULE PORT TB102
- 244 (-TXD2)
- 243 (+TXD2)
- 242 (-RXD2)
- 241 (+RXD2)
- 240 (Grd)

SFI PORT
- 239 (-TXD1)
- 238 (+TXD1)
- 237 (TXD1)
- 236 (-RXD1)
- 235 (+RXD1)

CPR PORT
- 234 (-TXD4)
- 233 (+TXD4)
- 232 (TXD4)
- 231 (-RXD4)
- 230 (+RXD4)
- 229 (Grd)

TB103

SPARE PORT
- 228 (-TXD3)
- 227 (+TXD3)
- 226 (TXD3)
- 225 (-RXD3)
- 224 (+RXD3)

Wintriss SmartPAC

TB203
- 258 (GRD)
- 257 (REMOTE RES.)

TB202
- 256 (GRD)
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HONEYWELL
SENSING AND CONTROL

DRAWN ADB	DATE 10/6/00	
CHK.		
APPROVALS		
ENG.		
MFG.		

TITLE: SMARTPAC LOOPBACK WIRING CONNECTIONS FOR RS485 CONFIGURATIONS

CODE IDENT NO.	SIZE B	DRAWING NUMBER	REV
SCALE NONE		FIGURE 3	
FILENAME		SHEET OF	
REL			