Honeywell



WPC II

Wintriss[®] Clutch/Brake Control 1097400 Rev. C April 2002

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Requirements You Must Meet When Installing and Using the Wintriss Clutch/Brake Control

The Wintriss Clutch/Brake Control (WPC) is designed solely for controlling operation of part-revolution metal stamping presses. Before installing or using WPC, be sure you understand and follow these requirements:

A DANGER

FULL REVOLUTION MECHANICAL POWER PRESSES AND OTHER MACHINES CANNOT BE STOPPED IN MID-STROKE OR MID-CYCLE

- DO NOT use WPC clutch/brake control on full-revolution clutched machinery or other equipment that cannot be stopped at any point in its stroke or cycle.
- Use WPC clutch/brake control only on part-revolution clutched mechanical power presses as defined in OSHA 1910.217 (b) (7). Refer also to ANSI B11.1-2001 6.12.
- Use WPC clutch/brake control only on rotating machinery that can be stopped at any point in its stroke or cycle.

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

A DANGER

IMPROPER SAFEGUARDING

- Ensure that the press on which WPC clutch/brake control is used meets all of the OSHA and ANSI regulations for safeguarding press systems in installation and use. WPC is not in itself a safeguarding device. Honeywell takes no responsibility for injury if safeguarding devices are not installed or working properly.
- Install any two-hand control used as a safety device at least the safety distance away from the hazardous area; safety distance is defined in the OSHA and ANSI regulations. Verify at each shift change that any moveable two-hand control used as a safety device is located at least the safety distance away from the hazardous area.
- Install any light curtain or curtains at least the safety distance away from the hazardous area; safety distance is defined in the OSHA and ANSI regulations.
- Install other safeguarding devices as needed to ensure operator safety. Follow the machine guarding requirements of OSHA standard 1910.217 and any other regulations and standards that apply. Test safeguarding devices for correct installation and operation after installation and after any modification or repair.
- Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

A DANGER

MORE OPERATORS THAN OPERATOR STATIONS

- Ensure that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.
- During setup, lockout/tagout the press if there are more operators than operator stations.
- Verify at every shift change that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.

FAILURE TO COMPLY WITH THESE INSTRUCTIONS WILL RESULT IN DEATH OR SERIOUS INJURY.

A DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use auxiliary outputs and cam channels for non-safety functions only. They cannot protect personnel from a moving hazard.

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

Read additional **A DANGER** and **A WARNING** notices on following pages.

A DANGER

IMPROPER INSTALLATION, USE OR MAINTENANCE

- Ensure that the machinery complies with OSHA regulations 1910.217 and ANSI B11.1-2001.
- Follow all procedures in this manual. Perform only the tests and repairs listed in this manual. Use only factorysupplied replacement parts. Ensure that all safety procedures are followed during installation and operation of WPC.
- Wire and install WPC and other equipment according to the requirements of OSHA 1910.147 Control of Hazardous Energy (Lockout/ Tagout).
- Lockout/Tagout the press during all installation, modification, repair or maintenance procedures.
- Ensure that the dual safety valve used on the press complies with OSHA 1910.217 (b) (7) (xi). Contact manufacturer to verify compliance of your model.
- Ensure that any foot control complies with OSHA 1910.217 (b) (7) (x).
- Ensure that WPC clutch/brake control is installed, tested and repaired by qualified personnel.
- Wire, install and maintain WPC clutch/brake control in accordance with the applicable safety standards. Carry out all inspection procedures in OSHA 1910.217
- Install and maintain your machine guarding system according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19
 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the
 machine over, under or around any guarding device.
- Perform all installation verification and checkout tests after installation and after any modification or repair of the WPC clutch/brake control. Correct any problems before using the press.
- Maintain all presses as stated in the applicable regulations. Honeywell takes no responsibility in cases where stopping mechanisms of machinery or other devices are not maintained or do not meet the applicable regulations or standards.
- Ensure that supervisors, die-setters, maintenance persons, machine operators, foremen, and any others responsible for operation of the machinery have read and understood all instructions for use of the WPC clutch/brake control.
- DO NOT use touch buttons for any safeguarding use.

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

A WARNING

MACHINERY NOT CONFIGURED OR WORKING PROPERLY

- Ensure that the press on which WPC clutch/brake control is used meets the machine guarding requirements of OSHA standard 1910.217 and any other regulations and standards that apply.
- DO NOT operate a press equipped with WPC clutch/brake control if the machine or any of its stopping mechanisms is not in proper working order.

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

A WARNING

OTHER EQUIPMENT CONTINUING TO OPERATE

• Ensure that all operators and other affected personnel know which equipment may continue to operate and which will not. Equipment that operates with the machinery connected to WPC clutch/brake control may continue to operate after the press has received a stop signal.

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

A WARNING

ELECTRIC SHOCK HAZARD

• Turn off and disconnect power from WPC clutch/brake control, the press and any other machinery it is connected to before making any wiring connections. This includes power to the press's motor.

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

The enforcement of the above requirements is beyond Honeywell's ability to control. For proper WPC operation, it is your responsibility to follow these requirements and any other requirements that may be specific to your machinery.

Changes for Revision C of the WPC Wintriss Clutch/Brake Control User Manual (1097400)

Revision C of the WPC User Manual covers WPC software versions 4.48 and after.

The changes for Revision C include:

- Add presettable counter option (Chapters 1, 3 and 4)
- Change option switch 7 to enable/disable changes to Stop Time Limit and Auto Carryup Angle. This switch formerly enabled/disabled Top Stop in Inch; Pin 13 now controls Top Stop in Inch. (Chapters 2, 3 and 4)
- Change wiring and information about use of user inputs (Chapters 1, 2, 3, 5 and figures at the end of the manual):

New configuration	Old configuration
Input 5 TOP STOP	ESTOP
Input 6 TOP STOP	ESTOP
Input 8 ESTOP, paired with input 9	TOP STOP (independent)
Input 9 ESTOP, paired with input 8	TOP STOP (independent)
Input 10 ESTOP/LOCKOUT, paired with input 11	TOP STOP (independent)
Input 11 ESTOP/LOCKOUT, paired with input 10	ESTOP (independent)

- Clarify labels on display interface board illustration (Chapter 2)
- Expand checkout procedures. (Chapter 3)
- Add pin numbers to LED indicator map. (Chapter 3)
- Add illustration for top-button operator station. (Chapter 2)
- Revise troubleshooting information. (Chapter 5)
- Add error codes F11, F15, F17, F18, F30, and make changes to F50 and F58. (Chapter 5)
- Revise ANSI B1.11 excerpts to 2001 revision (Appendix A)

PROVIDE IMPORTANT INFORMATION

DURING TROUBLESHOOTING WITH WINTRISS TECH SUPPORT

Whenever you need to contact Wintriss Tech Support for technical assistance, be ready to provide some important information to help solve the problem. Please supply: product name (e.g., WPC); installed options; and firmware version number (e.g., Vs. 2.10). You can determine firmware version number from the chip on the processor board (see "location of components" in Chapter 2).

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 Technical 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 (RMA) number to return a product for repair. Returned 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: purchase order number, shipping address, contact name and telephone number, and product type. The assigned RMA number should appear on all packages returned to Wintriss Controls Group to ensure prompt service.

At the time of requesting an RMA, you will be quoted a flat-rate repair price for the product you are returning. We ask that you either fax us a PO for that amount or enclose the PO with the returned item. This will enable us to ship the item back to you as soon as the repair has been completed. If the item cannot be repaired or there are additional charges, you will be contacted for approval.

Please be sure to carefully pack all returned items and ship to our Acton, MA location.

• Expedited Repair Program

Rush service providing 48 hour turnaround is available for most products upon request. An Expedite Fee will be applied to our standard repair rate.

• Board Exchange Program

If your needs are urgent, you can take advantage of our Board Exchange (EX) program. Call our "800" number between 8 a.m. and 5 p.m. EST and we will send a replacement to you overnight. A fee does apply to this service. Contact Wintriss Technical Support at 800-586-8324 for details.

• Service Center

Our Service Center for product repairs is located at our headquarters in Acton MA. If your equipment requires repair, please contact us at 800-586-8324 to obtain a return authorization number.

Nationwide field service is also available. Contact the Wintriss Service Manager at 800-586-8324, ext. 1949 or Wintriss Technical Support group at 800-586-8324.

• Product Training

We also offer both product training and maintenance/troubleshooting courses at our Acton, MA and Chicago-area facilities. On-site training is available from the factory or through your local Wintriss representative.

• 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.

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.

Table of Contents

Chapter 1 Introduction to Wintriss Clutch/Brake Control	1
Wintriss Clutch/Brake Control (WPC) and Control Reliability	1
Resolver-based	1
WPC LED Display	1
WPC Standard Features	2
WPC Main Components	4
WPC Options	6
How WPC Works	8
Specifications	9
Chapter 2 Installation	11
Section 1 System Installation	14
Before you start	14
The first step— Checking the press	14
Installation Guidelines	15
Terminating Cable Shields	17
Mounting and wiring the control enclosure	18
Wiring the control enclosure	18
Connecting AC wiring	18
Installing and Wiring Dual Safety Valve, and Clutch and Counterbalance Air Pressure Switches	22
Mounting and Wiring the Operator Station and Light Curtain(s)	24
Using a Light Curtain on Your Press	26
Mounting the Operator Station if You Do Not Use Light Curtains	27
Using Two Light Curtains on Your Press	27
Installing the Resolver	28
Installing and Wiring the Resolver	29
Checking and Setting Direction of Rotation of the Resolver	31
If You Replace Your Resolver	31
Installing the Overrun Limit Switch	38
Using WPC User Inputs	42
Using Cross-checked Input Pairs	44
Wiring WPC User Inputs	44
Wiring Lockout Relay	44
Auxiliary Outputs	45
Wiring Auxiliary 1	45
Wiring Auxiliary 2 Output (Optional)	45
Wiring Auxiliary 2 Output to Setup Mode Inputs (Optional)	46
Wiring Auxiliary 3 Output (Optional)	46
Multiple Controls Connected to a Single Resolver	47
Connecting Other Wintriss Products to WPC	47
Wiring Micro-inch	48
Wiring to Disable Top Stop in Inch	48
Wiring a Remote Reset Switch	48

Chapter 2 Installation (continued)

Installing 4-channel Programmable Cam (Optional)	49
Mounting and Wiring the Cam Output Assembly	49
Making Wiring Connections to Cam Relays	52
Enabling Cam Adjustments	54
Setting the Set Cams Switch on the Display Interface Board	55
Wiring Your Key Switch (Optional)	55
Wiring Counter Cam Output to an Auxiliary Counter	56
Wiring Zero Cam Output to AutoSet	56
Wiring Foot Switch (Optional)	57
Installing One-hand Control (Optional)	57
"Light Curtain Break" Mode	58
Mounting One-hand Control Switch	58
Wiring One-hand Control to WPC	60
Mounting and Wiring the Bar Control Enclosure	61
Wiring Automatic Single Stroke	63
Wiring Continuous on Demand	63
Installing Multiple Operator Stations	64
Installing Revised Software into WPC	65
Section 2 Installation of Display Options	67
Installing Various WPC Display Configurations	67
Installing WPC Without Enclosure	67
Mounting Dimensions and Required Clearance for Control Assembly	67
Panel Mount Clock Display with Selector Switches	69
Panel Mounting Instructions	69
Connection from WPC to Panel Mount Clock Display	70
Clock Display Kit with Selector Switches	71
Clock Display Kit Mounting Instructions	71
Connection from WPC to Clock Display Kit	73
Selector Switch Instructions	73
Second Clock Display	73
Installing Second Clock Display	73
Connecting Twin Display Adapter	73
Installation Verification	75
Checking Safeguarding Devices	76
Checking Dual Safety Valve (DSV) Wiring	78
Checking for Error Messages When the Press Is Running	79
Checking the Top Stop Circuit	79
Checking the Emergency-Stop Circuit	80
Checking the User Inputs' Operation	80
Installation Verification Complete	80

Chapter 3 Initialization, Setup, and Checkout	83
Section 1 – Initialization and Setup	85
How to View Key Press Information	85
Initializing the System	88
Zeroing the Resolver	89
Initializing Only the Start Time Limit	90
Setting Up the Top Stop "ON" Angle and Determining Test Angle for Overrun Limit Switch	91
Making Press Option Settings to Test the Overrun Limit Switch	93
Resetting Top Stop Angle	94
Adjusting Top Stop Angle at WPC	94
Using Auto Carry-up	96
Setting Auto Carry-up Angle	97
Using the Brake Monitor: Stopping Time and Stop Time Limit	98
Determining the Press's Stopping Time	98
Calculating the Press's Stop Time Limit	99
Determining the 90° Stop Time (T _S)	99
Performing the 90° Stop Test (Continuous Mode)	100
Performing the 90° Stop Test (Single Stroke Mode)	101
Setting the Stop Time Limit	102
Calculating the Safety Distance	104
ANSI and OSHA Safety Distance Formulas	105
ANSI Safety Distance Formula	105
OSHA Safety Distance Formula	107
Adding to Safety Distance for Floating or Blanking Windows	108
Setting Micro-Inch	109
How to Set Micro-inch	109
Setting the Press Option Switches	110
Switches 1 and 2 – Overrun Limit Switch Setting	110
Switch 3 - One-hand Control or Foot Switch Mode	111
Switch 4 – Auto Compensated Top Stop ("ACTS") Enabled (Optional)	112
Switch 5 – Prior Act Timing for Automatic Single Stroke and Continuous on Demand	112
Switch 6 – Dual Light Curtain Enabled	113
Switch 7 –Disable Changes to Stop Time Limit and Auto Carry-up Angle	113
Switch 8 - Top Stop Mode for F and H Errors and Auxiliary 1 Response to Interrupted Stro	ke.113
Switch 8: Selecting Top Stop Mode for F and H Errors	113
Switch 8: Selecting Auxiliary Output 1 Response to Interrupted Stroke	114
Setting Programmable Cams (Optional)	115
How to Set Cam Channels	115
Example: Setting Cam Channel 1 ON (33°) and OFF (359°) Timing	116
Section 2 – Final Checkout	118
Power Supply Test	120
Shadow Light Curtain Test	121
System Static Test	123
Single Stroke Mode Test with Light Curtain	125
Single Stroke Mode Test Without Light Curtain(s)	128
Anti-tiedown Test	130
Anti-repeat Test	131

Chapter 3 Initialization, Setup, and Checkout (continued)

Continuous Mode Test with Light Curtain	132
Continuous Mode Test without Light Curtain(s)	134
Foot Switch Test (for Units with Optional Foot Switch)	136
One-hand Control Switch Test (for Units with Optional One-hand Control)	138
Bar Mode Control Test – Optional	139
Chapter 4 Operation	143
Viewing Press Information	145
Interrupted Stroke	148
Brake Monitor Brake Warning	149
Stopping Angle	150
Using the Stroke Counter and Preset	151
Viewing the Counter Value	152
Resetting the Counter Value to Zero	152
Viewing and Setting the Counter Preset Value	153
Forcing the Counter Preset Value to Zero (0)	154
Forcing the Counter Preset Value to 999999	154
Disabling the Counter Preset Feature	154
Operating the Press in Inch Mode	155
Three Ways You Can Operate the Press in INCH Mode	155
Top Stop in Inch Mode	155
Top Stop Bypass – Top Stop in Inch Disabled (Pin #13 Connected to +24 VDC)	156
Micro-inch	156
Operating the Press in Single Stroke mode	157
One-hand Operation, Single Stroke Mode	157
Two-hand Operation, Single Stroke Mode	158
Foot Operation, Single Stroke Mode	159
Operating the Press in Automatic Single Stroke Mode	160
Setting Prior Act Timing for Automatic Single Stroke	160
Automatic Single Stroke Operating Instructions	161
Operating the Press in Continuous Mode	
Two-hand Operation, Continuous Mode	
Foot Operation, Continuous Mode	163
Operating the Press in Continuous On Demand Mode	164
Using One-hand Control	165
"Light Curtain Break" Mode	165
Operating the Press Using One-hand Control	166
Operating the Press in BAR Mode	167
Multiple Operator Stations	167

Chapter 5 WPC Troubleshooting	169
What to Do When You See an Error Code	
Lockout Message	
Brake Warning	
Brake Monitor — Stop Time Exceeded	
Description of Error Codes and How to Correct	
Resolver Faults	
Operational Faults	
Inter-processor Failures	
Input Buffer Test Failures	
Component Failures	
Customized Status Codes	
Light Curtain Faults	
Emergency Stop Circuit Driver Failure	
Top Stop Circuit Driver Failure	
DSV Interface and Lockout Relay Failures	
Loss of Rotation	
Internal Timing Input Failures	
Top Stop and Overrun Setting Faults	
Overrun Limit Switch Fault	
Overrun Limit Switch Test Angle Fault	
Overrun Limit Switch Setting Fault	
Internal Memory Failures	
Appendix A – OSHA Regulations and ANSI Standards	
Section 1 OSHA Regulation 1910.217	
Section 2 ANSI Standards for Presence-sensing Devices	

Wintriss User Manuals

Figures at End of Manual

Figure 1	Wintriss Clutch/Brake Control Operator Station A Wiring
Figure 2	Wintriss Clutch/Brake Control External Wiring
Figure 3	Wintriss Clutch/Brake Control Shadow V & Herion XSV DSV Wiring
Figure 4	Wintriss Clutch/Brake Control Dual Operator Station Wiring
Figure 5	Wintriss Clutch/Brake Control Shadow V & Ross EP DSV Wiring
Figure 6	WPC Standard Mode Selector Switches Wiring
Figure 7	Wintriss Clutch/Brake Control 4-channel Cam Output Wiring
Figure 8	Wintriss Clutch/Brake Control OEM Operator Station Wiring
Figure 9	Stop/Start Motor Control Station Wiring with Lockout
Figure 10	Wintriss Clutch/Brake Control One-hand Control Wiring
Figure 11	Cross Checked User Interlocks with Honeywell Interlocks
Figure 12	Wintriss Clutch/Brake Control, Shadow VI and Herion XSZ DSV Wiring

List of Figures

Figure 1-1. Illustration of Wintriss Clutch/Brake Control (WPC)	3
Figure 1-2. Illustration of Operator Station	5
Figure 2-1. Installation overview.	16
Figure 2-2. Terminating a Cable Shield.	17
Figure 2-3. Setting voltage selector switch	19
Figure 2-4. WPC Mounting Dimensions	21
Figure 2-5. Operator Station, Side Buttons	25
Figure 2-6. Operator Station, Top Buttons	
Figure 2-7. Resolver	
Figure 2-8. Attaching Wires to Connector	
Figure 2-9a. WPC Processor Board Layout (Right or Center Configuration)	
Figure 2-9b. WPC Power Supply Board Layout (Right/Center)	
Figure 2-9c. WPC Processor Board Layout (Left Configuration)	
Figure 2-9d WPC Power Supply Board Layout (Left)	35
Figure 2-9e WPC Display Board Layout	36
Figure 2-96 WPC Display Interface Board	36
Figure 2-9a WPC Cam Output Board	
Figure 2-10. How to Install the Overrun Limit Switch (Example: 350°)	
Figure 2-10. Now to instant the Overrun Limit Switch (Example, 557)	
Figure 2-11. Viewing Overrun Limit Switch Dwall Different Sized Shefts (@ 250°)	40
Figure 2-12. Overhan Linit Swench: Duriel Dimensions	
Figure 2-15. Call Output Assentory Mounting Differisions	
Figure 2-14. Connectors 1 D505 and 1 D502 at Call Output Assembly	
Figure 2-15. How to Connect Suppressors Across the Load	
Figure 2-16. "Set Cams" Switch (\$302)	
Figure 2-17. One-nand Control Switch Dimensions	
Figure 2-18. One-hand Control Switch Base, Showing Mounting Holes	60
Figure 2-19. Wiring Connections in One-hand Control Switch	
Figure 2-20. Bar Control Enclosure Mounting Dimensions	
Figure 2-21. Illustrating Multiple Operator Station Configurations	64
Figure 2-22. Mounting Dimensions and Space for Control Assembly	
Figure 2-23. Panel Mount Clock Mounting and Cutout Dimensions	69
Figure 2-24. Selector Switch Cutout Dimensions	71
Figure 2-25. Clock Display Kit Mounting and Cutout Dimensions	72
Figure 2-26. Illustration of Twin Display Adapter	74
Figure 3-1. WPC Displays Showing Display Indicator Segments	86
Figure 3-2. Viewing "Stop Time Limit"	86
Figure 3-3. "Int" on LED Display Indicating "System Initialized"	
Figure 3-4. "rES" Appearing on LED Display, Zeroing Resolver	89
Figure 3-5. LED Display Showing "Str," Initializing Start Time Limit	90
Figure 3-6. Example Showing How to Set Overrun Timing	93
Figure 3-7. Display Indicator Highlighting "90° Stop Test"	100
Figure 3-8. Display Indicator Highlighting "90° Stop Test"	
Figure 3-9. Distance Between Light Curtain and Pinch Point on a Press	104
Figure 3-10. Illustrating Micro-inch	109
Figure 3-11. Indicating Cam Channel Settings	115
Figure 3-12. Example: Setting Channel 1 Cam Timing to 33° ON. 359° OFF	
Figure 3-13a, WPC LED indicator map. Right or Center Configuration	
Figure 3-13b. WPC LED indicator map (Left Configuration)	
Figure 4-1. Display Indicator Segments	
Figure 4-2. Illustrating Crankshaft Angle and Crank-angle Clock	146
Figure 4-3. Viewing "Stopping Time"	
Figure 4-4. Brake Warning and Interrupted Stroke LEDs	148
Figure 4-5 "Stonning Angle" Displayed	150
Figure 4-6 Viewing Counter Value	150
Figure 4-7 Setting Counter Preset Value	
	133

List of Tables

Table 2-1.	User Inputs (Interlocks), Standalone WPC	.43
Table 2-2.	WPC Display Interface Board to Cam Output Assembly (TB301)	.52
Table 2-3.	Counter Cam Output Wiring	.56
Table 2-4.	Zero Cam Output Wiring Table	.56
Table 2-5.	Connector Pinouts for Wintriss Clutch/Brake Control (WPC)	.81
Table 2-6.	Resolver	.82
Table 2-7.	4-Channel Cam Outputs	.82
Table 2-8.	Display Board	.82
Table 2-9.	Power Supply Connectors	.82
Table 3-1.	Overrun Limit Switch Settings for Test	.93
Table 3-2.	Overrun Limit Switch Setting	110
Table 5-1.	Error Codes Relating to User Inputs	180

How to use the manual

This is the installation and reference manual for Wintriss Clutch/Brake Control. It has information about how to install Wintriss Clutch/Brake Control and how to utilize WPC to properly run your press.

Chapter 1 introduces you to Wintriss Clutch/Brake Control, lists features, and explains key terms required to use WPC.

Chapter 2 is the installation chapter. Use it to install Wintriss Clutch/Brake Control if you are installing WPC yourself. It includes the standard installation, plus various optional accessories.

Chapter 3 explains how to initialize Wintriss Clutch/Brake Control. Use it to look up things you need to know about initializing the system and making critical adjustments.

Chapter 4 explains how to operate Wintriss Clutch/Brake Control with your press.

Chapter 5 shows you fault codes that you will see when WPC sends a stop command to the press or when there is an equipment or settings problem. What the fault code means and how to correct the problem is explained. Use this chapter to learn about all the WPC-related fault codes.

Appendix A contains specific OSHA regulations and ANSI standards.

At the end of this manual you will find larger-sized wiring diagrams that are referenced throughout the manual (mostly Chapter 2). These diagrams provide detailed wiring schematics to assist you in installing your WPC and accessories.

Important Highlighted Information

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

A DANGER

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

A WARNING

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

CAUTION

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

NOTICE

A NOTICE symbol indicates important information that must be remembered and aids in job performance.

Warranty

Honeywell International warrants that Honeywell / 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's Wintriss Controls Group 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 and modules, AutoSet load monitors, DiPro 1500, ProCam 1500, Sensors, and PACNet are not designed or intended for use as personnel protection devices.

HONEYWELL Wintriss Controls Group 100 Discovery Way Acton, MA 01720-3648 Telephone: (800) 586-TECH (8324) (978) 264-9550 Fax: (978) 263-2491 Internet: http://www.wintriss.com WINTRISS[®] CLUTCH/BRAKE CONTROL USER MANUAL Revision C April 2002 1097400 ©2002, Honeywell Inc.

Chapter 1 Introduction to Wintriss Clutch/Brake Control

Wintriss Clutch/Brake Control (WPC) and Control Reliability

Wintriss Clutch/Brake Control (WPC) is an easy-to-use, dual micro-processor based system that controls part revolution mechanical power presses. With its two independent micro-processor systems in a single modular enclosure, WPC provides dual diverse redundancy — the latest technology in maintaining optimum clutch/brake control and operator safety. Both of these micro-processor systems function independently of each other, have separate power supplies, and provide separate information to the operator.

WPC meets or exceeds all ANSI B11.1-2001 and OSHA 1910.217 regulations for Control Reliability, also referred to as "Control Component Failure." Control Reliability demands that a single-component failure in a clutch/brake control circuit shall not prevent the normal stopping action of the press, shall not create an unintended stroke, and shall prevent the initiation of a successive stroke until the failure has been corrected.

Resolver-based

WPC comes with a resolver, which provides WPC with precise crank angle position information at every point in the stroke. As a result, the need for a mechanical rotary limit switch is totally eliminated. It is no longer necessary to climb on top of the press again and again to make timing adjustments. In addition, WPC's resolver can be shared with other Wintriss resolver-based products, such as DiPro[®] 1500.

WPC LED Display

WPC's highly visible digital readout displays key information about the press operation, including press speed (SPM) and crankshaft position in degrees (see Figure 1-1 for an illustration of the front panel). Its crank-angle clock dynamically indicates the location of the crankshaft, whether the press is running or at rest. WPC also shows the stopping angle, very important when you are trying to determine the critical angle for your die protection system. In addition, you can set Top Stop timing, Stop Time Limits, Auto Carry-up, and Micro-inch time using WPC's display and settings key switch.

WPC displays the stopping time of the press. When the actual stopping time is within ten milliseconds of the Stop Time Limit set, an amber "Brake Warning" LED is illuminated, to indicate that it is time to do maintenance on your brake. When the Stop Time Limit has been exceeded, WPC does not allow the press to be re-started. *You must service the brake in order to continue normal operation of the press*.

WPC Standard Features

WPC features an Interrupted Stroke provision to increase productivity. An Interrupted Stroke occurs when the press has been emergency-stopped before the completion of the stroke by either the operator or an automatic device for personnel or equipment protection. Traditional controls force the operator to take several steps to correct the problem: switch to "INCH" mode, inch to top dead center, reselect the normal stroke mode, and then reinitiate the press. All this causes is operator frustration and wasted time, and may even result in the key being left in the selector, which then defeats its supervisory intent. With WPC, the Interrupted Stroke LED illuminates when an interrupted stroke occurs. WPC immediately switches to "Two Hand Maintained" mode. Once the press has been inched to the top of the stroke, WPC automatically reverts to the original operating mode. This saves time and allows the keylock mode to be used more effectively.

WPC provides you with nine user-installed customized status codes which you can use to monitor auxiliary press functions, such as lubrication systems. When any of these functions issues a stop command, a unique status code is displayed at the digital readout to help you to identify why the press has stopped.

WPC includes a brake monitor which checks the press's braking performance every time that a top stop command is initiated or at the end of a single stroke. When the press's actual stopping time is within ten milliseconds of the pre-determined stop time limit, the Brake Warning LED illuminates.

With WPC, you can perform a 90° stop-time test (discussed in Chapter 3). The 90° stop-time test is required in order to set the proper safety distance for personnel guarding devices including light curtains, two-hand controls, and type-B movable barriers. This test is done at the press's most critical stopping point — 90°, halfway through the down stroke. Therefore, WPC is designed to check stopping time at that critical crankshaft angle, and provides you the stopping time (T_s) value referenced in both OSHA 1910.217 and ANSI B11.1-2001 (Appendix A).

WPC's resettable counter keeps track of how many strokes the press has made, and can be used to stop the press when it has completed the number of strokes you preset. Use this feature for batch sizing or periodic QC checks.

WPC provides you with inputs for multiple Shadow light curtains. WPC tests up to two Shadow light curtain inputs every time that the press is started and stopped.

WPC comes with Micro-inch. Micro-inch is the amount of time in milliseconds that the Dual Safety Valve is open when "Micro-inch" is enabled. In this mode, you determine how long the ram will travel once the RUN/INCH buttons on the operator station are pressed. This feature is ideal for high-speed and/or short stroke presses.

You can connect two operator stations to your WPC directly and many more using the Dual Operator Selection Control.

Whenever error conditions occur, WPC displays a two-digit error number, preceded by the letters "E," "F," or "H," thus diagnosing the problem, and helping the operator to resolve it expeditiously.

The lockout function built into WPC provides an added safety feature to the product. Whenever a serious error condition occurs, "Loc" will appear in the digital readout, alerting you of a problem (see Chapters 2 and 5 for more information).



Figure 1-1. Illustration of Wintriss Clutch/Brake Control (WPC)

WPC Main Components

WPC is can be configured as a complete system with all the components necessary to operate a pneumatic clutch/brake system. Most components are pre-wired, which makes WPC easy to install and minimizes the potential for costly wiring errors (see Figure 1-1).

- Control enclosure including:
 - **LED Display**, which is a highly visible, six-digit digital readout which shows the stroke counter value or press speed (SPM) when the press is running. When the press stops, the display shows the counter value or the angle of the stroke in degrees where the press stopped. For instance, it would show 0° for top dead center. Other items can be selected for viewing, as well.
 - **Display indicators**, which consist of eight LED lamps which correspond to items for viewing. To select the first four items, depress the Reset/Select button. The illuminated lamp will scroll from one selection to the next, and the corresponding value will appear on the LED display. To select the last four items, WPC must be in INCH mode before depressing the Reset/Select button.
 - **Crank-angle clock** which consists of a series of LEDs in the shape of a circle that dynamically display the approximate location of the crank shaft whether the press is running or at rest. Each of the LEDs in the clock is equivalent to approximately 11 degrees.
 - **Reset/Select button,** which allows you to clear errors under normal operating conditions and to select items for viewing on the LED display.
 - WPC Settings Adjustment Key Switch, used to adjust critical timing adjustments
 - **Brake Warning LED**, an amber-colored indicator that illuminates when the brake monitor determines that the stopping time of the press is within 10 milliseconds of the preset stop time limit. When the brake warning light comes on, the press will still operate normally, but it is time to schedule maintenance on the brake. The light can only be turned off by turning power to the unit OFF, then back ON.
 - **Interrupted Stroke LED**, an amber-colored indicator that illuminates when an "Interrupted Stroke" occurs.
 - Stroke Select key switch, used to operate the press in INCH, SINGLE STROKE, or CONTinuous modes
 - **Mode Select key switch**, used to operate the press in ONE HAND, TWO HAND, or FOOT modes
- **Resolver**, which provides WPC with accurate crank angle position information at every point in the stroke

- **Operator Station** from which the press is run. The Operator Station available from Wintriss Controls has several switches and indicator lights located on the front or sides of the unit.
 - Two **RUN/INCH palm switches**, used to initiate press action.
 - **PRIOR ACT switch**, used as an arming switch that, in certain operating modes, must be pressed before the press will initiate a stroke.
 - **PALM TIME LED**, which illuminates when any one palm button is pressed. To run the press, the other palm button must be pressed before the light goes out.
 - **EMERGENCY STOP / RESET switch**, which can be used to immediately stop the press. Either this switch or the Reset/Select switch resets WPC when a fault condition occurs.
 - **MUTE LED**, which illuminates when the light curtain is muted during the up stroke (requires optional software)
 - **TOP STOP switch**, which stops the ram at the top of stroke during continuous operation.
 - **LEFT/RIGHT SELECT key switch** for the ONE HAND trip mode, which is located on the bottom of the Operator Station (optional).



Figure 1-2. Illustration of Operator Station

- **Dual-monitored Safety Valve**, which controls the air flow that operates the clutch and brake of the press. DSVs are available in many popular sizes.
- System air pressure switches, which monitor the system air pressure.

• Shadow light curtain(s): Multiple Shadow light curtains (optional, but required for point of operation guarding if WPC is used with a Foot Switch or in the one-hand mode) can be wired to WPC to protect the back side of a straight side press. WPC tests up to two Shadow inputs every time that the press is started and stopped.

The Shadow light curtain is a presence sensing device that places an infrared light field between the point-of-operation and the operator. When something enters the sensing field and a light beam is blocked, the object is detected and the press is immediately stopped.

The standard WPC package is designed to be used with a Shadow light curtain. However, you can purchase WPC without a light curtain. In this version, the control enclosure does not have a MODE SELECT switch, and WPC will only operate in the TWO HAND mode.

The light curtain is located between the Operator Station and the die space. The mounting bracket design should allow plenty of room for adjustment.

WPC Options

Optional components also available with WPC include:

- **Counterbalance air pressure switch** works the same as the clutch air pressure switch. However, this switch is used with the counterbalance air supply. It is required by OSHA regulations on presses with counterbalances.
- **One-hand Control** is a low-force switch that can be used with any Wintriss Clutch/Brake Control (WPC) with one hand and single stroke mode. A Shadow light curtain must be used with One-hand Control for guarding the point of operation. The One-hand Control switch can be mounted on or near the press and allows the press operator to cycle the press without using the operator station. To start the press, the operator just presses the button as part of his normal hand motion after loading a part.

One-hand Control can be used in "light curtain break" mode. In this mode, the operator must press the One-hand control button within eight seconds after removing his hands from the light curtain. Otherwise the press will not start.

For complete information about One-hand Control, see Chapter 2 for installation and Chapter 4 for operation.

- **Foot Switch** frees up the operator's hands for increased, fully guarded protection and productivity. (Shadow light curtain is required with Foot Switch.)
- **Bar Mode Control** allows operators and setup personnel to bar the press by hand for die setting and adjustment (recommended for smaller capacity presses, of 65-ton capacity or less).
- Automatic Single Stroke (External Trip) allows equipment like a feeder to signal WPC to start the press for one stroke. This is useful when your press must stop after every

stroke until a feed is completed. The Automatic Single Stroke function allows the feeder to signal WPC to start the press when the feed is complete.

Refer to Chapters 2 and 4 for more information.

• **Continuous on Demand** allows an external signal to cause WPC to start operating the press in continuous mode.

• Multiple Operator Stations and Dual Operator Select Control:

NOTICE

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

You can have an unlimited number of operator stations as part of your WPC system. However, up to two operator stations can be connected directly to WPC. More than two operator stations need to be connected to WPC via a Dual Operator Selection Control (Wintriss part no. 4152100).

When more than two Operator Stations are required, the Dual Operator Select Control allows two operator stations to be connected to one of WPC's operator station inputs, and allows the operator to select either operator station or both.

See Chapter 2 to install and Chapter 4 to use Multiple Operator Stations.

DANGER

HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

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

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

• WPC display configurations: You may have ordered WPC without an enclosure or with enclosure minus display and switches. If so, be sure to follow the instructions in Section 2 of Chapter 2 which detail installing WPC without an enclosure. Then refer to one or more of the display configuration options in this section to complete the installation including: panel mount clock display with selector switches (no enclosures); clock display kit (without panel) with selector switches; and second clock (either panel mount display or clock display kit).

How WPC Works

WPC is dual micro-processor based and meets or exceeds all OSHA and ANSI standards.

Wintriss Clutch/Brake Control (WPC) is a dual micro-processor based system that controls part revolution mechanical power presses. It has two independent micro-processor systems in a single modular enclosure, thus providing dual diverse redundancy. Both of these micro-processor systems function independently of each other and provide separate information to the operator. The end result is increased operator safety and productivity.

WPC meets or exceeds all ANSI B11.1-2001 and OSHA 1910.217 regulations for Control Reliability. Operation of mechanical power presses is completely governed by these two standards. Proper operation of the press consists of such considerations as: presence-sensing point of operation devices, two hand controls, all requirements for safeguarding including safety distance and response time, and periodic and regular inspections of power presses to ensure safe operating conditions and adjustment. In the event that any of the conditions in these standards are not complied with, WPC will diagnose and communicate the reason for the error condition, and will prevent the operation of the press until the problem is completely solved.

WPC comes with a variety of standard and optional features to increase productivity.

With its many available features including various modes of operation, "Micro-inch," "Interrupted Stroke Provision," multiple customized status codes, WPC increases productivity. (See the "Options" section in the Specifications table at the end of this chapter.)

Via the optional Auto Compensated Top Stop feature (ACTS), WPC notices when the press has not stopped at the top of the stroke, compensates the Top Stop Angle that you already programmed by advancing its position, and finally stops the press as close to 0° as possible. ACTS is described further in "Setting the Press Option Switches" in Chapter 3.

The resolver tells WPC where the crankshaft is.

A key element of WPC operation is that it always knows the exact position of the crankshaft during the stroke. WPC is connected to a resolver mounted on the press which turns one to one (1:1) with the crankshaft.

The resolver is similar to an electrical generator. It has several windings inside and works on the principle of inductance. The resolver has two outputs. As the resolver turns the amplitude and the phase of the two outputs varies, these signals are interpreted by WPC's electronics to determine the correct angle. Thus, the purpose of the resolver is to tell WPC where the crankshaft is at every point in the stroke. WPC's electronics convert the analog signal from the resolver at any point in its rotation to a number. This number is the position of the resolver (and press crankshaft) in degrees.

Specifications

Enclosure	16" x 16" x 9" (40.64 x 40.64 x 22.86 cm), NEMA 12, shock mounted
	Includes 6-digit LED display, display indicators, crank-angle clock, Interrupted Stroke and Brake Warning LEDs; Mode/Stroke Selector key switches
Equipment available from	Resolver 0.75" (1.9 cm) keyed shaft, rated shaft loading: 200 lb axial, 200 lb radial
Wintriss Controls	Operator Station NEMA 12; includes two palm buttons, top-stop and emergency stop buttons, and prior act button; and palm time and mute LED indicators; pre-wired
	Dual Safety Valve (DSV): 0.75" (1.9 cm); controls air flow to the clutch. Call the factory for other sizes.
	Air Pressure Switch 12-150 PSI; monitors clutch air supply pressure (150 PSI, maximum)
Power	Input: 115/230 \pm 10% VAC (selectable); 50/60 Hz, 100 VA
Operating Temperature	32° to 122° F (0° to 50° C)
Inputs	Resolver Overrun limit switch Two Operator Stations DSV monitor Air Pressure Switch
Additional Inputs	Motor Forward and reverse contacts
	Checks proper functioning at every stroke initiation and stop
	Customized Status Codes Four for E-stop Three for top stop One pair cross-checked inputs for E-stop One pair cross-checked inputs for E-stop/lockout
Outputs	DSV 2 monitored relays: rating 4 A @ 120 VAC: for emergency and top stopping
	Lockout 1 monitored relay, rating 4 A @ 120 VAC; for de-energizing motor and other devices under critical conditions Auxiliary Stop Output
	Allows to stop auxiliary equipment during an interrupted stroke

Specifications (continued)

Speed	7-500 SPM, 500-2000 SPM optional
Displays	6-digit LED for SPM/crank angle, status/error codes, stop time/ angle/limit, presettable counter, crank-angle clock, press control timings secured with keylock, and Micro-inch
	LED indicators for Interrupted Stroke and Brake Warning
	Diagnostic LEDs on control board for power and for all inputs, including buttons and switches
Options	Presettable Counter Counts number of strokes and can be used to stop the press for batch sizing or QC checks. Includes six-digit counter on front panel of WPC.
	Shadow V[®] or Shadow VI[®] Light Curtains in heights from 6 to 60"; 25' or 50' scanning range; refer to Shadow literature for more information.
	Firmware Muting for Shadow light curtain on the upstroke; Two-hand only; One-hand**, two-hand or foot operation**; Automatic Single Stroke (external trip); Continuous on Demand; Auto Compensated Top Stop (ACTS); High Speed (>500 SPM).
	Selector Switches One-hand, two-hand or foot operation**; Automatic Single Stroke (External Trip) to slave the press to an external device; control switch for two operator stations; Micro-inch on / off
	4-Channel Programmable Cam Enclosure: 6" x 8" x 3.66" (15.24 x 20.32 x 9.3 cm) shock-mounted Relay: SPDT 0-3A resistive at 240V (standard) DC Solid State: SPST 2A at 5-60 VDC (optional) AC Solid State: SPST 1A at 70-250 VAC (optional)
	Foot Switch Safety switch for foot actuation** (foot operation firmware required)
	One-hand Control Control for one-hand actuation** (one-hand operation firmware required)
	Counterbalance Air Pressure Switch 12-150 PSI; monitors counterbalance supply (uses one customized input)
	Bar Mode Control Allows manual turning of crankshaft
	Remote Crank-angle clock display Second display can be installed up to 100' away
	Motor Control and Custom Packages Refer to Press/Control Motor Starter literature, and/or contact your Wintriss representative or factory for more details.

** Shadow light curtain required

A DANGER

IMPROPER INSTALLATION, USE OR MAINTENANCE

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

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

A DANGER

FAULTY INSTALLATION

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

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

A DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

Chapter 2 provides you with general installation instructions. Because of the wide variety of machines and applications, it is impossible to provide detailed mounting instructions. Instead, these procedures will provide you with general guidelines which can be adapted to your specific application. **Section 1** of this chapter covers these topics:

- Before you start, page 14— Installation guidelines and overview
- Mounting and wiring the control enclosure, page 18
- Installing and Wiring Dual Safety Valve, and Clutch and Counterbalance Air Pressure Switches, page 22
- Mounting and Wiring the Operator Station and Light Curtain(s), page 24
- Installing and Wiring the Resolver, page 29
- Installing the Overrun Limit Switch, page 38
- Using WPC User Inputs, page 42
- Wiring Lockout Relay, page 44
- Multiple Controls Connected to a Single Resolver, page 47
- Connecting Other Wintriss Products to WPC, page 47
- Wiring Micro-inch, page 48
- Wiring a Remote Reset Switch, page 48
- Installing 4-channel Programmable Cam (Optional), page 49

Section 1 also discusses these options:

• Wiring Counter Cam Output to an Auxiliary Counter, page 56

•

Wiring Zero Cam Output to AutoSet, page 56

- Wiring Foot Switch, page 57
- Mounting and Wiring the Bar Control Enclosure, page 61
- Wiring Automatic Single Stroke, page 63
- Installing Multiple Operator Stations, page 64
- Installing Revised Software into WPC, page 65

Section 2 details the installation of various WPC display configurations. These include:

- Installing WPC Without Enclosure, page 67
- Panel Mount Clock Display with Selector Switches (no enclosure), page 69
- Clock Display Kit with Selector Switches, page 71
- Second Clock Display, page 73
- Installation Verification, page 75

NOTICE

When you have completed installation of your WPC, perform the Installation Verification, page 75, to ensure that WPC is installed correctly and working properly *before* proceeding to the next chapters.

Section 1 System Installation

Before you start

If you plan to install WPC yourself instead of leaving the job to Honeywell/Wintriss Controls Group service personnel, read this installation chapter entirely and carefully before you start. Find out what is required and plan your steps before taking any action. The best way to proceed is to learn all you can about it first *before* cutting wires, drilling holes, and running conduit.

You may need to use the display during installation. Therefore, before you start installing, you should have a good basic knowledge of how to use WPC to speed things along. If you run into any problems installing WPC, remember that Wintriss Tech Support is standing by to help you.

The first step— Checking the press

A DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

Before starting the installation, make sure the die has been removed from the press.

Set the press ram to top dead center (TDC).

NOTICE

PRESS MUST BE AT TDC

This is an important step because the press <u>must</u> be at top dead center (TDC) when you make final adjustments for the resolver. Be accurate when setting the press to TDC. Set to $0^{\circ} \pm 2^{\circ}$. Use a dial indicator on the face of the ram if necessary.

Installation Guidelines

These guidelines cover major points that are important for proper WPC 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, input check circuit, relay circuits) to the upper right-hand corner of WPC.
- Provide a dedicated 120V power circuit from the press control transformer to WPC input power connection. *Do not power any relays or solenoids from this circuit or the auxiliary power terminals on WPC*. Doing this may cause erratic press shutdowns due to electrical noise.
- Run one or two low voltage conduits into the lower left-hand corner of WPC for the resolver wires.

Because WPC 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.

As an example, the operator station cables should not share the same conduit with 115 VAC wiring. There are two exceptions to this rule:

- The power and logic wiring for the light curtains can be in the same conduit.
- The power and logic wires for the Dual Safety Valve can be in the same conduit.

Good grounds at WPC are important. Make sure WPC is properly grounded.

All relays and solenoids that are controlled by WPC must be suppressed. Suppressors should be installed across the load and as close to the load as possible. *Never install the suppressor across the relay contacts.* The suppressors tend to fail shorted. In some cases, suppressors are required in the top stop and emergency stop (E-stop) circuits. Additional suppressors can be obtained from Wintriss Tech Support.

A DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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



Figure 2-1. Installation overview

Terminating Cable Shields

NOTICE

TERMINATE BOTH ENDS OF SHIELD

Be sure to terminate the cable shield at *both* ends where possible.

For each shielded cable, perform the following steps. Refer to Figure 2-2. If your unit has no ground stud or grounding terminal installed, call Wintriss Tech Support to obtain bonding locknuts.

- 1. If you are using bonding locknuts, install on the conduit fitting and tighten down forcefully to pierce the paint on the enclosure.
- 2. Strip the cable jacket as far as the end of the conduit fitting.
- 3. Cut drain wire to a length that wraps at least once around the ground stud or the grounding screw on the bonding locknut. Loosen the nut or screw, wrap the drain wire around clockwise and tighten down.
- 4. Connect the rest of the wires in the cable to the terminal block according to the appropriate wiring table and the applicable wiring diagram at the end of this manual.



Figure 2-2. Terminating a Cable Shield

Mounting and wiring the control enclosure

Refer to Figure 2-4 when mounting the control enclosure. Because the digital display can be on the left side, right side, or at the front of the enclosure, mount the control enclosure so that it is convenient to the operator. If possible, mount it so that the digital display can be seen and the key switches can be reached by an operator standing at the front of the press.

The control enclosure does not have to be mounted to the press. It can be mounted on a free standing pedestal, pendant, or column. For easy access to the interior, make sure that there is enough room to open the control enclosure door at least 120° . Plastic cable ties and self-sticking cable clamps are provided in the accessory parts bag. Use them to position the cable and wiring inside the control enclosure in a neat and orderly fashion.

Wiring the control enclosure

WPC requires:

- motor forward auxiliary contact (24V)
- slide adjust monitor circuit (24V)
- motor stop circuit (110V) if applicable, and
- motor reverse auxiliary contact (24V) if applicable.

The power to WPC should come from the step-down control transformer and should be capable of handling 100 VA at 115 VAC \pm 10%.

Most of the original controls on the press will be replaced except the disconnect, motor starter, and control transformer. It is important that rewiring allows proper operation of the motor starters.

Slide Adjust Considerations

If your press has a motorized slide (ram) adjustment, prevent slide adjustment while the press is running. Connect spare contacts on the slide adjustment switches (slide-adjustment-on, or up and down switches) to the WPC emergency stop circuit or a user interlock to stop the press as soon as the ram adjust switches on. For help in determining how to connect this wiring, call Wintriss Tech Support.

Connecting AC wiring

All wires can be run through a 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 circuits (for example, 24V), run two conduits—one for 115V wires and one for 24V wires.

Bring the wiring connections for AC power to a convenient point so that you can connect them to the power supply board (see Figure 2-9b for right/center configuration or Figure 2-9d for left). See also power supply wiring table, page 82. No. 16 wire (No. 14, if local codes require it) is recommended for these circuits with a minimum 75°C temperature rating. To perform the wiring, follow these steps.

DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

- 1. Locate the power supply board (situated under the main processor board). You will see the connector for AC power.
- Determine how you will bring wiring from your 115 VAC power source (or 230V source if applicable) to the unit. 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. Find the 115V-230V voltage selector switch. It can be found on the side of the power supply board (See Figure 2-9b for right/center configuration or Figure 2-9d for left).

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 right.



Figure 2-3. Setting voltage selector switch

- 4. Run the power wires to WPC through flexible liquid-tight conduit to the enclosure. Because WPC 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.
- 5. To make ground connections, refer to wiring diagrams Figure 3 (for Herion DSV) or Figure 5 (for Ross). Also refer to the power supply wiring table, Table 2-9 and power supply board layout (either Figure 2-9b for right/center configuration or Figure 2-9d for left) and Table 2-5 for pinouts (at the end of this chapter).

A WARNING

ELECTRIC SHOCK HAZARD

Complete all installation procedures before connecting AC wires to the power source.

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

- 6. Connect power wires. For 115 VAC power, connect the black wire to HI terminal and white wire to NEU. (For 230 VAC connect black wire to HI terminal and red wire to NEU). Attach wires the same way that you did for resolver wires. Make sure that you do not start at the wrong end of the connector. Put it over the socket the way it will plug in, and note wire markings next to the socket before starting.
- 7. Plug connector back into its slot. Double check connections with markings at the connector base to make sure you did not wire it backwards.
- 8. Make all necessary conduit connections to ensure NEMA 12 protection. WPC 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.*



Figure 2-4. WPC Mounting Dimensions
Installing and Wiring Dual Safety Valve, and Clutch and Counterbalance Air Pressure Switches

Your WPC may have come with a DSV manufactured by either Herion or Ross. These valves are installed differently. Refer to the appropriate wiring diagram at the end of this manual and to the documentation that came with your valve. Note the following requirements:

- Herion Make sure that you wire the Herion DSV monitor between terminal #20 and +24 VDC out. See wiring diagram Figure 3 at the end of this manual.
- Ross A Ross DSV requires a separate user-supplied reset switch. See wiring diagram Figure 5 at the end of this manual.

A DANGER

USER-SUPPLIED DUAL VALVE NOT SUITABLE FOR SAFETY USE

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

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

A WARNING

LONGER STOPPING TIME

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

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

A WARNING

DSV MUFFLER CLOGGING OR LOOSENING

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

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

Install and wire the clutch air pressure switch and counterbalance as follows:

- 1. Install a filter regulator and lubricator in-line before the air pressure switch, if not already present.
- 2. Connect shop air to the air pressure switch input port.
- 3. Set the clutch air pressure switch to 35 PSI.
- 4. On the clutch air pressure switch, wire the normally open terminals between terminal #8 and ground (Refer to Figure 2 at the end of this manual).

NOTICE

Both the clutch air and counterbalance air pressure switches are held closed when pressure is applied above the setpoint limit.

5. If the press is equipped with a counterbalance system, install a second air pressure switch after the counterbalance regulator.

NOTICE

IF YOU USE RAMPAC TO CONTROL COUNTERBALANCE PRESSURE

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

- 6. Set the counterbalance pressure switch to the pressure recommended by the press manufacturer, typically equal to the pressure required for the smallest upper die you plan to use in this press.
- 7. Wire the normally open counterbalance terminals between #83 and ground. If #83 has already been assigned for another user-selected auxiliary equipment, then be sure to wire the counterbalance contacts across a terminal on the WPC main processor board which generates an E-stop and is connected to ground. See the section "Using WPC User Inputs," page 44, for more information.

Mounting and Wiring the Operator Station and Light Curtain(s)

A DANGER

NON-WINTRISS OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

- Ensure that the operator station run buttons are placed so that two hands are required to push both buttons at the same time and no one can press both buttons with one hand or with one hand and one elbow.
- Ensure that the run buttons have ring guards in place.

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

This section explains how to wire and mount the Operator Station and light curtain (optionally, two light curtains).

The Operator Station should be located where the operator will run the press. On most OBIs this will be on the front of the bolster. For straight side presses, it may be on the press or on a pedestal. No one means is preferred or recommended. Each application will be different.

If you are not installing a light curtain, and if you are planning to use the operator station as a two-hand safety device, the operator station must be mounted at the correct safety distance away from the nearest pinch point of the press. This distance must be calculated based upon the stopping time of your press. Mounting the operator station at the correct safety distance prevents an operator from leaving the station and reaching the pinch point before the press stops.

If you are installing light curtains, the operator station needs to be installed outside of the area guarded by the light curtain. The light curtain is normally mounted in front of the die space, at least the safety distance away from any pinch point. Any opening or access to the die space not guarded by the light curtain must be guarded by mechanical barriers.

Refer to Chapter 3 for instructions on determining the stopping time of the press and calculating the correct safety distance. For complete Shadow light curtain mounting instructions, see your Shadow user manual.

NOTICE

You cannot permanently *mount* the operator station or light curtain until you have the WPC working, and have measured the stopping time and set the brake monitor, in order to calculate the correct safety distance. However, you will be able to wire the operator station and light curtain.

Refer to "Figure 2-5. Operator Station, Side Buttons" or "Figure 2-6. Operator Station, Top Buttons" and Table 2-5 (end of this chapter). Punch a hole in the operator station enclosure for conduit or sealtight. Connect the conduit or sealtight to the hole; then open the operator station box. Run the operator station cable in the sealtight. Plug the connector end of the cable into the operator station. At the other end of the cable, connect the wires to the control enclosure main connector terminals, as shown in Table 2-5 and wiring diagram Figure 1 at

the end of this manual. For a dual operator station installation, see wiring diagram Figure 4 at the end of this manual.

For the time being, place the operator station in a temporary location, on the floor or on a cart. Then wire the operator station to the control enclosure and continue with all other installation, initialization checkout steps, and operation procedures in Chapters 2 and 3. Once you find the proper safety distance (covered in Chapter 3), you can permanently mount the operator station at that distance.



Figure 2-5. Operator Station, Side Buttons



Figure 2-6. Operator Station, Top Buttons

Using a Light Curtain on Your Press

A DANGER

OPERATOR CAN STAND BETWEEN LIGHT CURTAIN AND PINCH POINT

- Mount the light curtains and operator station according to the instructions in this manual.
- Mount the operator station outside the area protected by the light curtains.
- DO NOT mount the operator station between the light curtain and the pinch point.

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

DANGER

INCORRECT LIGHT CURTAIN INSTALLATION

- Mount the light curtains at the correct safety distance as instructed in this manual. See "Calculating the Safety Distance," page 104. The light curtain will only provide full protection for operators when mounted at the correct safety distance.
- Install and wire your light curtains correctly, following the instructions in your Shadow manual.

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

If you are using light curtains on your press, they must be mounted at least the correct safety distance away from the hazardous area. This ensures that the light curtain will send a stop command to the press in time for the press to stop before anyone can reach the pinch point. If you are using light curtains, you do not need to calculate a specific safety distance for your operator station.

Proper mounting of the light curtain eliminates the need to mount the operator station at a set distance from the pinch point. That is because the light curtain now prevents access to the pinch point. Remember this however: *You must not mount the operator station between the light curtain and the pinch point*. Mount the operator station where convenient following the above guidelines.

Mounting the Operator Station if You Do Not Use Light Curtains

You must mount the operator station at least the correct safety distance away from the hazardous area. This is required by OSHA regulation 1910.217, Section C—Safeguarding the point of operation. The formula used for finding the correct distance is from the American National Standards Institute (ANSI) standard B11.1–2001 (for more information, see Appendix A).

Honeywell recommends the ANSI formula because it is more specific than the OSHA regulations. It allows you to account for brake wear when calculating your press's total stop time.

The OSHA formula is basically the same as the ANSI formula except it does not account for brake wear. When using the OSHA formula, the Precision Metalforming Association (PMA) recommends that you add additional time for brake wear as shown in the ANSI formula found in Chapter 3. By not adding in this additional time, you may compromise operator safety as the brake wears (for more information, see Appendix A).

Using Two Light Curtains on Your Press

Refer to the wiring schematics at the end of this manual to wire dual light curtains. See Figures 3 and 12 (for Herion valve) or Figure 5 (for Ross valve), and Table 2-5 (end of this chapter). Also, you will have to set option switch #6 in order to enable dual light curtains (see Chapter 3).

Installing the Resolver

DANGER

RESOLVER OUT OF SYNCH WITH CRANKSHAFT

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

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

The resolver must be driven smoothly at a 1:1 ratio with the crankshaft of the press. The resolver signals WPC the exact position of the crankshaft at every degree of the stroke (see "How WPC works" in Chapter 1). *Design a method of driving the resolver directly from the crankshaft using a chain or timing belt (not a V belt) and sprockets. Use either an idler sprocket or spring-loaded resolver base to compensate for slack or stretch.*

CAUTION

DAMAGE TO RESOLVER

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

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

Wintriss Controls Group stocks a spring-loaded base with a hole pattern to match the resolver. It does not matter which direction the resolver turns. You can switch two wires on the resolver connector to change the direction of rotation.

The drive you choose must also allow for adjustment of the resolver to its zero position at top dead center. All sprockets must be keyed or pinned. The resolver shaft has a standard key.

When designing the drive for the resolver, here is what you should not do:

- 1. Do not use a long, sloppy chain (no more than three feet in length).
- 2. Do not use gears, right angle joints, shafts with universal joints because these will develop too much backlash or too much play.
- 3. Do not try direct coupling to the crank because this requires extreme precision. If the resolver is only slightly off-center, the resolver bearing will be subjected to side loads well in excess of its rated capacity and will ultimately fail.
- 4. Do not use flexible couplings (can be inaccurate) or V belts (inaccurate, will slip).
- 5. Do not use a flexible shaft like a speedometer cable. The resolver will lag the crank because the shaft twists on start-up. When the crank stops, the resolver will turn past the true stopping point and snap backward.



Figure 2-7. Resolver

Installing and Wiring the Resolver

Once you have thought out your design and gathered the parts, mount the resolver by bolting it to the press or other platform at the spot you selected. Install your drive mechanism. It does not matter which way the resolver turns. You will set the direction of rotation when you wire it. You will also electronically zero the resolver later. Set the resolver as close to zero as you can by turning the shaft so the keyway is aligned with the arrow on the housing. Align the keyway with the arrow before attaching the chain or other drive mechanism. See Figure 2-7 and Table 2-6 (end of this chapter). *The press should be at top dead center when you do this*.

To wire the resolver:

1. Refer to processor board layouts—Figure 2-9a (right or center configuration) or Figure 2-9c (left configuration) for the WPC components board layout. Also refer to Figure 2 at the end of this manual for the resolver wiring schematic.

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

2. Run the resolver cable through 1/2" conduit from the resolver to WPC. If you have the right or center configuration, the resolver cable will go into WPC from the bottom left corner of the enclosure. If you have the left configuration, the resolver cable goes in from the lower right side and feeds through the right-hand side of the enclosure.

NOTICE

WHEN INSTALLING THE OVERRUN LIMIT SWITCH

When installing the overrun limit switch, you can run the cable through the same conduit as the resolver wires. (See "Installing the overrun limit switch" for an illustration of the overrun limit switch — the cable is attached). You cannot install the overrun limit switch until the resolver is electronically set to 359°. Run the cable through for now, and leave installation until later. Refer to installation overview Figure 2-1 to see where the overrun limit switch must be installed. It is usually near the resolver.

- 3. Refer to processor board layouts Figure 2-9a (right/center configuration) or Figure 2-9c (left configuration) for the location of the resolver connector. Also see Table 2-5 through Table 2-6. Measure the resolver wires to fit and cut the wires. (If you also ran the overrun limit switch cable through, do not cut these wires until the overrun limit switch is installed).
- 4. Notice that the resolver wires are plugged into the L-shaped resolver connector on the edge of the main board, at terminals #89 through #95.

NOTICE

CONNECTOR WIRING

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.

5. Attach the wires to the connector as shown in Figure 2 at the end of this manual. Make sure you connect the black and yellow wires correctly based upon the way your resolver will rotate—clockwise or counterclockwise, as seen viewing the end of the shaft.

To connect a wire, find the correct terminal and loosen the screw over it by turning it counterclockwise (see Figure 2-8). 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 that the metal tooth is clamped down on the bare part of the wire, not on the insulation.

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 2-8. Attaching Wires to Connector

Checking and Setting Direction of Rotation of the Resolver

Inch the press. Watch the angle/SPM readout.

- If the angle increases (goes up from 0 toward 359°), the resolver wiring is correct. Go to the next section.
- If the angle of the crankshaft decreases (goes down from 359° toward 0°) instead of increasing, this indicates that two resolver wires are reversed. Correct the resolver wiring, referring to "Installing the Resolver," page 28 and the resolver wiring table on page 82. Inch the press again and watch the display. The angle should now increase. If you need assistance, call Wintriss Tech Support.

If You Replace Your Resolver

If you need to replace your resolver, follow the instructions above. Remember that you will also have to rezero the resolver. Refer to "Zeroing the Resolver," page 89 to complete the rezeroing process.



Figure 2-9a. WPC Processor Board Layout (Right or Center Configuration) Important Components Shown and Labeled



Figure 2-9b. WPC Power Supply Board Layout (Right/Center) Important Components Shown and Labeled



Figure 2-9c. WPC Processor Board Layout (Left Configuration) Important Components Shown and Labeled



Figure 2-9d. WPC Power Supply Board Layout (Left) Important Components Shown and Labeled



Figure 2-9e. WPC Display Board Layout Important Components Shown and Labeled







Figure 2-9g. WPC Cam Output Board

Installing the Overrun Limit Switch

DANGER

OVERRUN LIMIT SWITCH DOES NOT PROVIDE CORRECT TIMING

- Install the overrun limit switch so that the magnet is attached to a component, such as the crankshaft, that always moves with the motion of the press, regardless of the condition of the resolver or the resolver's drive mechanism. Safe operation of the press depends on the overrun switch in case of a resolver failure.
- Install the overrun limit switch magnet in the correct angular location according to the instructions in this manual.

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

The overrun limit switch works in conjunction with the resolver by constantly monitoring its crankshaft angle position. WPC receives a signal from the overrun sensor and compares it to the resolver angle. WPC expects to see the overrun limit switch at the same resolver angle every stroke. If this does not occur, this means that the resolver is no longer rotating at a 1:1 ratio with the press. It could be because the resolver drive has slipped or has broken, or the resolver itself is broken. WPC will signal an E-stop and display an error code.

The overrun limit switch consists of a magnet, mounted on the crankshaft (or other shaft), and a stationary magnetic switch, mounted just above the magnet so that it detects the magnetic field on every stroke. The magnetic switch is also called an "overrun sensor"

NOTICE

DETERMINE TOP STOP ANGLE BEFORE INSTALLING MAGNET

The magnet *cannot* be installed until you first determine where the top stop angle is, as explained in the section "Setting up the Top Stop Angle" in Chapter 3. At that time, you will choose the proper position — 270°, 300°, 330°, and 359° — as described in the section "Setting up the Overrun Limit Switch," also in Chapter 3.

Remember that the overrun limit switch must be mounted *as close as possible* after the latest top stop angle as per the table referenced in that section. Examples in this section illustrate the sensor being mounted to signal WPC at 359°.

- 1. Set the press at TDC. Find a convenient place to mount the magnetic switch only, so that it can be wired through the resolver conduit.
- 2. Shut off power to WPC.
- 3. You are ready to install the overrun sensor (see Figure 2-10). Select a mounting site for the overrun sensor so that the magnet rotates 1:1 with the crankshaft of the press. Ideally the magnet is mounted on the crankshaft itself. See Figure 2-1 for an installation overview. However, you might also use the pitman *above* the adjusting screw or a drive shaft to a feed or other device.

Never mount the magnet to the resolver shaft or sprocket or any of the drive components leading to the resolver. This is because both the resolver and overrun limit switch would then be out of alignment with the crank if a failure occurred, but they might stay in alignment with each other. The overrun limit switch would not signal the fault, and WPC would be dangerously out of "sync" with the press.



Figure 2-10. How to Install the Overrun Limit Switch (Example: 359°)

- 4. Once the magnetic switch is installed, wire it to the terminals #23 through #25 on the main processor board. Black wire goes to terminal #25 (GND); white or clear goes to terminal #24 (overrun limit switch); red goes to terminal #23 (sensor power). If the resolver and the overrun limit switch share the same conduit, wire at the same time.
- 5. At this point you are ready to mount the magnet. You need to determine where to mount the magnet four possible *unzeroed* resolver angle positions 270°, 300°, 330°, and 359°. Go to "Setting Up the Top Stop "ON" Angle and Determining Test Angle for Overrun Limit Switch," page 91, to determine this angle *before* proceeding to the next step.

NOTICE

"Unzeroed" is the <u>true</u> crankshaft angle position, that is, before the resolver has been "zeroed" in Initialization.

- 6. *This step assumes you have determined the unzeroed resolver angle in Chapter 3 (from the previous step).* Turn power on to WPC. Bring the press to the overrun test angle position you determined, and then temporarily place the magnet as close as possible to the magnetic switch (use double-faced tape for now). Run the press in Inch mode for about 4 strokes.
- 7. As you perform the previous step, take time to view the overrun sensor's on/off angles at WPC. Here is how:
 - a. Select "Stopping Time" on WPC's LED display (refer to the beginning of Chapter 4 for more detailed information on viewing information at WPC). Then turn the WPC Settings adjustment key switch toward "+" to see the "on" angle or "–" to see "off."



Figure 2-11. Viewing Overrun Timing as You Install Overrun Limit Switch

- b. Jog the press (while in Inch mode) to the desired angle position. Watch the LED, paying attention to the "on" and "off" angles. These angles should correspond directly with one of the four possible unzeroed angle positions that you selected for the magnetic switch (270°, 300°, 330°, or 359°).
- c. As you prepare to install the magnet, make sure that the overrun limit switch has enough dwell to provide an adequate signal at high speeds. It is a good idea for the magnet to actuate the switch for 10 to 15 degrees. The larger the diameter of the shaft on which the magnet is mounted, the shorter the dwell, as shown next. If this is the problem, then mount the magnet on a smaller shaft. See next illustration.



Figure 2-12. Overrun Limit Switch Dwell, Different Sized Shafts (@ 359°)

Example: Determining the proper angle

Say you determined 359° to be your unzeroed angle position. Your magnetic switch might conceivably go "on" just before that angle, say at 355°, and go "off" just after, at 17°.

- Install the overrun sensor magnet as shown in Figure 2-10. The magnet should be installed plastic side up with a non-ferrous metal screw. It is important <u>not</u> to use a ferrous screw because it could cause false signals. A brass screw (6-32) is supplied. Use a No. 36 drill and a 6-32 tap.
- 9. After the magnet is installed, run the press in Inch mode for about 4 strokes. Next, run the press in Single Stroke or Continuous. If you properly installed the overrun limit switch, the press will cycle without any overrun-related error conditions.

- 10. Turn power ON to WPC, and open the enclosure. Locate the "Overrun Limit Switch" LED in Group 3 (see LED maps found on pages 140 (right/center)and 141 (left)).
- 11. If the installation was done correctly, the "Overrun Limit Switch" LED will be illuminated which indicates that the overrun limit switch closed. If so, you are done with this portion of the installation.
- 12. If the "Overrun Limit Switch" LED on the WPC board is <u>not</u> illuminated at this position, there is a problem. Since you just mounted the magnetic switch and aligned it with the magnet, the switch should be closed. Double check your wiring. Make sure the ram has not moved since you installed the switch. If so, repeat the wiring procedure explained in Step 4 in this section. You will have to run the press in Inch mode to do this. Therefore, it is unlikely that you moved the ram, but check anyway. If the ram has not moved, check the distance between the magnetic switch and magnet. Make sure they are <u>as close as possible</u> to each other. Re-adjust if necessary.

If WPC displays an overrun-related error code after running the press, it is also possible that the overrun limit switch may not have enough *dwell* to provide an adequate signal at high speeds. The larger the diameter of the shaft on which the magnet is mounted, the shorter the dwell, as shown in Figure 2-12. If this is the problem, the solution is to mount the magnet on a smaller shaft.

If none of the above procedures change the state of the overrun limit switch to closed, the magnetic switch may be defective. Try another switch, if one is available. Otherwise, call Wintriss Tech Support for further technical assistance.

Using WPC User Inputs

A DANGER

USER INPUTS 1 THROUGH 7 NOT SUITABLE FOR SAFETY USE

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

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

A DANGER

USER INPUTS ADD DELAY TO STOPPING TIME

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

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

A DANGER

CROSS-CHECKED INPUT PAIRS WIRED INCORRECTLY

Wire and use input pairs 8 & 9 and 10 & 11 as instructed in this manual. These inputs are control reliable only if correctly wired in pairs according to the instructions on page 44.

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

A DANGER

INPUT STOP TYPE DIFFERENT FROM PREVIOUS VERSIONS OF WPC

Be sure to wire the WPC inputs according to the table below and the instructions in this manual. With WPC firmware version 3.91 and higher, some of the inputs operate differently from previous versions.

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

A WARNING

PRESS DOES NOT STOP WHEN USER INPUT ACTUATES

- Remove the jumper from the main board connectors when you wire a user input. WPC comes from the factory with the inputs bypassed by jumpers. If you do not remove the appropriate jumper, WPC will not receive the signal from the input.
- Perform checkout procedures to ensure that the user inputs are wired correctly. Check after installation to make sure WPC responds correctly when the user input faults.

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

You can connect signals from other equipment to WPC inputs for monitoring auxiliary press functions, such as lubrication systems. WPC provides connections for two pairs of control-reliable cross-checked inputs (see explanation in the next section) and seven independent inputs that are not control reliable. Table 2-1 shows the stop type for each input or pair of inputs. When any of these functions issues a stop command by opening a normally closed (N/C) relay, a fault code for the input(s) appears on the LED display.

Grounding user input 7 and input pair 10 & 11 also opens the lockout relay and will cause "Loc" to appear on the WPC's display. To clear "Loc," turn the Stroke Select switch to OFF (refer to "Wiring Lockout Relay," page 44, and also Chapter 5 for more on "lockout"). If the lockout relay is wired to your motor starter, grounding of input 7, 10 and/or 11 will stop the motor, in addition to emergency-stopping the press.

Cross-checked input pair 10 & 11 can be used to detect critical safety problems, such as the removal of die receptacle blocks.

To wire these inputs, follow the instructions in "Wiring WPC User Inputs," page 44.

NOTICE

INPUTS BYPASSED

At the factory, the user inputs are jumpered to bypass their operation. Be sure to remove any jumper that bypasses operation of an input you use. Leave all unused inputs jumpered/bypassed.

Table 2-1. User Inputs (Interlocks), Standalone WPC

USER INPUT (INTERLOCK)	STOP TYPE	WIRE TO PIN #	WIRE TO (JUMPER TO BYPASS)	FAULT CODE	NAME OF AUXILIARY EQUIPMENT
User 1	ESTOP	21	+24 VDC	51	
User 2	ESTOP	82	+24 VDC	52	
User 3	TOP STOP	71	+24 VDC	53	
User 4 **	ESTOP	83 **	GROUND	54	
User 5 *	TOP STOP	72	GROUND	55	
User 6 *	TOP STOP	84	GROUND	56	
User 7	ESTOP/ LOCKOUT	73	GROUND	57	
User 8 * paired with 9	ESTOP	85	GROUND	58, 17	
User 9 * paired with 8	ESTOP	74	GROUND		
User 10 * paired with 11	ESTOP/ LOCKOUT	86	GROUND	50, 18	
User 11 * paired with 10	ESTOP/ LOCKOUT	18	GROUND		

See Chapter 5 for more information about Fault Codes

 * These stop types are different from previous versions (before 3.91) of the WPC firmware. Be sure to wire them correctly according to the needs of your installation.
 See the next section for instructions on how to use these inputs

** Reserve this pin for wiring the counterbalance pressure switch, if applicable.

Using Cross-checked Input Pairs

The cross-checked pairs are inputs 8 & 9 and inputs 10 & 11. See wiring diagram Figure 11 at the end of this manual. These input pairs provide the following stop types:

```
8 & 9 - ESTOP
10 & 11 - ESTOP/LOCKOUT
```

These input pairs cause WPC to E-stop the press and generate errors under either of these conditions:

- One or both inputs in a pair are open.
- The inputs in a pair "disagree" for longer than 100 msec. ("Disagree" means that one input is open and the other is closed.)

If you do not want to use one or both pairs of inputs, leave them wired to ground, as indicated in Table 2-1.

To use these input pairs, wire them as described in the next section.

Wiring WPC User Inputs

Wire from the referenced terminal number on the main processor board to your equipment and then back to either +24 VDC or ground ("wire between or bypass"). See Table 2-1, Table 2-5 and Figure 2 at the end of this manual. After you have wired the inputs you will use, be sure to bypass all the unused inputs by connecting them to +24V or ground, as shown in Table 2-1.

NOTICE

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

NOTICE

There are several available "ground" and "+24 VDC" terminals on the main processor board from which to choose.

Wiring Lockout Relay

The lockout function in WPC provides an added safety feature to the product. Whenever a serious error condition occurs, "Loc" will appear in the digital readout, alerting you of a problem. To clear "Loc," turn the STROKE SELECT switch toward "OFF."

To wire this relay to the WPC power supply board, refer to the wiring schematics at the end of this manual (Figure 3 for Herion DSV or Figure 5 for Ross). Note that the relay can be wired to critical press functions, such as the motor starter (see Figure 9 for an example).

Auxiliary Outputs

Wire the Auxiliary Outputs you want to use as described below.

Wiring Auxiliary 1

DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use auxiliary outputs 1, 2 and 3 for non-safety functions only. They cannot protect personnel from a moving hazard. You can use them for convenience in automation.

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

The WPC provides an output called Auxiliary 1 (pin #28) which, when connected to a usersupplied control relay, can be used to stop auxiliary equipment such as scrap choppers, conveyors, etc. when the press stops. Additionally, the N/C contacts of the relay can be used to illuminate a warning beacon on the press during a fault condition.

Auxiliary 1 is normally ON. It turns OFF when there is a fault condition, when an E-stop string opens or a light curtain is interrupted while the press is running. It may turn on when there is an interrupted stroke condition without a fault condition or an E-stop.

WPC Option Switch #8 controls how the Auxiliary Output 1 responds to interrupted stroke.

- If Switch 8 is open, Auxiliary 1 turns off when there is an Interrupted Stroke condition.
- If Switch 8 is closed, Auxiliary 1 stays on during an Interrupted Stroke condition unless there is a fault condition (error code displays) or an E-stop string open.

For more detail, see "Setting the Press Option Switches," page 110. Also see Figure 3 at the end of this manual for wiring.

NOTICE

If you want Auxiliary Output 1 to stay ON while you are inching the press during an Interrupted stroke, set Switch 8 to CLOSED.

Wiring Auxiliary 2 Output (Optional)

DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use auxiliary outputs 1, 2 and 3 for non-safety functions only. They cannot protect personnel from a moving hazard. You can use them for convenience in automation.

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

The auxiliary 2 in WPC (pin #36) is normally "OFF" and turns "ON," whenever there is an Interrupted Stroke or there is a fault condition present. Also while inching in INCH stroke, auxiliary 2 stays "on."

Wiring Auxiliary 2 Output to Setup Mode Inputs (Optional)

Wire auxiliary 2 (pin #36) to the Setup Mode inputs of DiPro 1500 and AutoSet Plus models (1500/1504). Refer to their respective manuals for details. When there is an Interrupted Stroke present or while inching in Inch stroke, this output is grounded. In Setup Mode the green sensors are disabled in DiPro 1500 and the repeatability setpoints are disabled in AutoSet Plus models (1500/1504).

Wiring Auxiliary 3 Output (Optional)

DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use auxiliary outputs 1, 2 and 3 for non-safety functions only. They cannot protect personnel from a moving hazard. You can use them for convenience in automation.

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

If you plan to use the Bar Control with your WPC, you must use auxiliary 3 whenever ProCam 1500 or DiPro 1500 is installed on the same press. Auxiliary 3 turns a low voltage (24 VDC) input check signal "on" when the DSV is energized. This is true except when Bar Control is in use so that "loss of rotation" errors are not generated.

NOTICE

The following instructions describe how to connect Auxiliary 3 to DiPro 1500. The same instructions apply for connecting to ProCam 1500 and SmartPAC.

Wire auxiliary 3 (pin #29) to the "A" connection of the input check circuit of DiPro 1500. Wire one of the +24 VDC outputs of WPC (pins #37 through #41) to the "B" connection of DiPro 1500. If your DiPro 1500 is equipped with a voltage selector switch for the input check circuit, set it to the 12-60 volt position. Refer to the DiPro 1500 manual for details.

Multiple Controls Connected to a Single Resolver

You can connect WPC's resolver to as many as three other controls (for instance - WPC, DiPro 1500, or Spectrum).

NOTICE

WPC IS "MASTER" CONTROL CONNECTED TO RESOLVER

The resolver must be connected directly to WPC, thus making WPC "master." Other Wintriss Controls can be connected in parallel to the resolver as "slaves."

- Refer to processor board layouts Figure 2-9a (right/center configuration) or Figure 2-9c (left configuration) for the location of the resolver connector. Also see Table 2-5 through Table 2-6 for pinout information at the end of this chapter.
- 2. Locate the 7-conductor shielded resolver cable. Run the cable through 1/2" conduit from terminals #89 to #95 on the main processor board to the bottom right knockout of WPC. If there is a connector on the other end, cut it off.
- 3. Pull the connector in WPC out of its socket.
- 4. Terminate the cable shield drain wire as instructed on page 17.Attach the other wires to the connector as shown in Figure 2 at the end of this manual. You will be wiring in parallel (#89 brown to brown, #90 orange to orange, etc.), so that when you are finished, you should have two wires of the same color connected to each terminal on that connector. To connect a wire, refer to page 31.
- 5. Connect the cable from that terminal strip in WPC to TB105 in the first "slave" unit. Remember to wire in parallel. If there is an additional "slave" unit, again wire from its TB105 to the next TB105 in parallel.
- 6. Locate J102 on the control board of the "slave" unit(s). Move each of those jumpers to pins 2 and 3, designating "slave."

Connecting Other Wintriss Products to WPC

You can connect other Wintriss products to WPC, such as DiPro 1500 and ProCam 1500. Before you wire, run the press in all modes of press operation — INCH, SINGLE STROKE, and CONTINUOUS (if applicable). Also make sure that the press has working top stop and emergency stop circuits. Verification that the press operates and stops properly is extremely important because WPC will be tied in to the press stop circuits. Do not forget to mark your electrical prints where you wire in WPC.

When the stopping time is critical to your operation, as it is with die protection, be sure to wire as follows. Whenever you have emergency stop circuits, wire them between terminals #67 and #68 or between terminals #68 and #69 on the main processor board. For top stop circuits, wire them between terminals #79 and #80 or between terminals #80 and #81. Refer to Figure 1 at the end of this manual for specific wiring schematics.

Use customized status code wiring (see "Wiring WPC User Inputs," page 44) when the auxiliary equipment that you are connecting does not have its own self-explanatory displays, as is available in DiPro 1500 or AutoSet load analyzers.

Wiring Micro-inch

Micro-inch provides slide movement for a pre-determined amount of time, whenever the palm buttons have been actuated. Micro-inch improves set-up for high-speed or short stroke presses. You can select either standard or Micro-inch.

In order to use the Micro-inch feature, you need to make some wiring connections. Refer to Figure 1, Figure 4, and Figure 6 (enlarged) if you have dual operator station wiring (at the end of this manual). Also see Table 2-5 at the end of this chapter.

WPC can be permanently wired to enable Micro-inch by installing a jumper between terminal #157 on the WPC display board and ground (#155). See Figure 2-9e for board layout and Table 2-8 for pinout, as well as wiring diagram Figure 1 at the end of the manual. If you prefer, you can wire a user-supplied switch to turn the Micro-inch function on and off. To set the pre-determined amount of time for Micro-inch, refer to the section "Setting Micro-inch," page 109.

Wiring to Disable Top Stop in Inch

NOTICE

METHOD FOR DISABLING TOP STOP IN INCH DIFFERENT FROM PREVIOUS VERSIONS Follow the instructions below to disable Top Stop in Inch mode.

Your WPC comes from the factory with Top Stop in Inch enabled, so the press top stops when it completes a stroke while you hold down the palm buttons in Inch mode. If you want the press to keep running as long as you hold down the palm buttons in Inch mode, disable Top Stop in Inch, by connecting Pin # 13 on the processor board to 24 VDC. You can connect to any convenient terminal that supplies +24 VDC, such as pin 9.

For more information about Top Stop in Inch mode, see page 155.

Wiring a Remote Reset Switch

The main processor board has two terminals for wiring a remote reset switch. The remote reset terminal can be wired to the equipment that you choose, or you can just use a simple switch to activate the circuit.

Connect a wire from terminal #70 on the main processor board to a normally open switch. Connect another wire from the switch to ground. WPC is reset with a momentary connection to ground.

Installing 4-channel Programmable Cam (Optional)

DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use cams for non-safety functions only. They cannot protect personnel from a moving hazard. You can use them for convenience in automation.

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

You connect the cam channels from the WPC display interface board to the cam output assembly. The output assembly contains the output modules that control the timing signals for your equipment which you connect to the modules. These modules open and close circuits to your equipment at the angles — or degrees of the stroke — that you set. Programming these cam channels is explained in Chapter 3. Follow the instructions below and refer to Figure 7 at the back of this manual.

Mounting and Wiring the Cam Output Assembly

- 1. Select a convenient location for running conduit from WPC to your equipment. Once installed and wired, you will not have to work with the cam outputs again.
- 2. Mount the cam output assembly using mounting holes on the flanges (see Figure 2-13).

CAUTION

BOARD DAMAGE OR SHORT CIRCUIT WHEN MOUNTED WITHOUT ENCLOSURE

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

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

- 3. The relay modules that will control your equipment should already be plugged into the board. The type of relay modules you have is marked on the module. Decide which relay modules will be used with which channels and arrange them in the enclosure. The relay modules just pull out of their sockets. When inserting, make sure that all pins match the socket holes. This is important so that you do not bend the pins. Then press in firmly.
- 4. Find the cable that connects WPC display interface board to the cam output assembly. Use the twelve-conductor shielded cable that you received with your order. Terminate the shield at each end of the cable near the enclosure entry point (see "Terminating Cable Shields," page 17).
- 5. Attach one end of the cable to the connector at the WPC display interface board. Reference the Table 2-2 below for proper wiring. (The connector should be plugged into the socket.)
- 6. Run the cable through flexible, liquid-tight conduit to the terminal points at the cam output assembly. (You can use the knockouts directly below the connectors, if you have the cam output enclosure.)

- 7. Attach the other end of the cable to the connector at the cam output assembly. Again, reference Table 2-2 for proper wiring. (A wire from CHAS to a lug on the cam output enclosure should already be connected, unless you bought the board only.)
- 8. Plug the cable connectors into their sockets.



Figure 2-13. Cam Output Assembly Mounting Dimensions

Wire color	WPC 4-Cam Output TB301 on Display Interface Board		8-channel Cam I/O Assembly TB301	
	Pin #	Signal	Pin #	Signal
White	118	Relay Power	3	А
Black	117	Ground	2	В
Red	116	+ 5 VDC	4	+ 5 VDC
Tan	115	not used	5	not used
Pink	114	not used	6	not used
Gray	113	Zero Cam	7	not used
Blue	112	Counter	8	Channel 5
Yellow	111	Cam 4	9	Channel 4
Orange	110	Cam 3	10	Channel 3
Purple	109	Cam 2	11	Channel 2
Brown	108	Cam 1	12	Channel 1
Shield	terminate drain wire to binding locknut or ground stud		terminate drain wire to binding locknut or ground stud	

Table 2-2. WPC Display Interface Board to Cam Output Assembly (TB301)

NOTICE

TRIM UNUSED WIRES

Your installation does not require using all 12 of the wires in the cable. Cut the extra wires flush with the ends of the cable jacket.

Making Wiring Connections to Cam Relays

DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use cams for non-safety functions only. They cannot protect personnel from a moving hazard. You can use them for convenience in automation.

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

1. To connect the cam relays to your equipment, use connector TB 302 for Channels 1 through 4 (cams 1 - 4), and TB303 for channel 5 (counter). See figure below.



Figure 2-14. Connectors TB303 and TB302 at Cam Output Assembly

- 2. 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 module. If you connect to N/O, the equipment will be on for the degrees set at WPC. If you connect to N/C, the equipment will be on <u>except</u> for the degrees set. Generally, you use the N/O terminal. Therefore, equipment is off except when you use WPC to set it on. Use the N/C terminal <u>only</u> if it is more practical to do the reverse.
- 3. You must install arc suppressors across each inductive load (motors, relays, coils, etc) that is connected to a cam relay. Suppressors are supplied with your WPC with cam outputs. The suppressors reduce electrical noise and will extend the life of the relays.

CAUTION

SUPPRESSORS INSTALLED ACROSS RELAY CONTACTS

DO NOT install suppressors across the relay contacts inside the cam output assembly. 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.

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

4. Install the suppressors across the load or as close to the load as possible. Attach suppressors by connecting leads across existing terminals or junction points. See Figure 2-15 for the correct way to install them.



Figure 2-15. How to Connect Suppressors Across the Load

Enabling Cam Adjustments

There are two ways to allow you to make adjustments to the cam angles in WPC. See the next two sections for descriptions of each method. How to make these cam angle settings at WPC is explained in Chapter 3.

NOTICE

ENABLING CAM ADJUSTMENTS

You should enable cam adjustments <u>only</u> when you are actually ready to set the cams. Otherwise, you will not be able to adjust Top Stop Angle, Auto Carry-up, etc.

Setting the Set Cams Switch on the Display Interface Board

1. Locate switch S302 on the display interface board (Figure 2-16). Refer to Figure 2-9f for an illustration of this board.



Figure 2-16. "Set Cams" Switch (S302)

- 2. For the time being, keep the switch set to <u>normal</u> operation (NORM). You will need to make some important settings in normal mode (e.g. Top Stop Angle, Stop Time Limit, etc.) before you are ready to set cams.
- 3. When you are ready to make cam adjustments, push the switch down to the "SET CAMS" position. *Remember to push the switch back to NORM when you are finished making cam settings*.

Wiring Your Key Switch (Optional)

You can use your own Set Cams key switch (not supplied by Wintriss Controls Group) to adjust cams in WPC.

To install your key switch, simply ground pin #156 on TB705 on the display board (Figure 2-9e). Refer to the wiring schematics in Figure 1 at the end of this manual. Using this method, you can remotely turn the "Set Cams" function on or off. This method supersedes the display interface switch discussed above when it is in the NORM position.

Wiring Counter Cam Output to an Auxiliary Counter

NOTICE

Because this output will not work in INCH mode, your counter will not increment in INCH

You can take advantage of the system's counter output capability by wiring WPC to an auxiliary counter. This output will automatically turn on at 200° and off at 250° on every stroke when the stroke selector is in Single Stroke or Continuous modes. You do not have to make any special settings. Refer to Figures 2-9g and 2-14, and Figure 7 (end of manual) and the following table for wiring:

Cam output board, TB303	Your counter	
Cam 5 - N/O (Counter)	Counter input	
Cam 5 - Common (GND)	Ground input	

Table 2-3. Counter Cam Output Wiring

Wiring Zero Cam Output to AutoSet

If you have an AutoSet load monitoring unit, wire WPC's zero cam output to your AutoSet This output automatically turns on at 270° and off at 30° on every stroke. You do not have to make any special settings. Refer to the following table and Figure 7 at the end of this manual.

 Table 2-4.
 Zero Cam Output Wiring Table

Display Interface Board	AutoSet 1500	AutoSet 1504	
Cam Outputs	TB1	TB101	
pin # 113 (Output)	pin # 2 (zero cam)	pin # 2 (zero cam)	

Wiring Foot Switch (Optional)

DANGER

UNGUARDED HAZARDS

Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using a foot switch.

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

DANGER

IMPROPER FOOT SWITCH

Ensure that any foot control switch complies with OSHA 1910.217 (b) (7) (x), including protection from accidental actuation by falling or moving objects or unintentional stepping on the control.

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

The Foot Switch, when used with Shadow safety light curtains, frees up the operator's hands without sacrificing safety. Wire the Foot Switch's normally closed contact to terminal #4 and the normally open contact to terminal #14 on the main processor board. Both switches are then wired to +24 VDC. See Figure 2 at the end of this manual. Optional firmware is required for Foot Switch operation. See Option Switch 3 settings, page 111, for foot switch settings.

Installing One-hand Control (Optional)

A DANGER

INSUFFICIENT SAFEGUARDS ALLOW ACCESS TO HAZARD

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

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

One-hand Control is a switch that can only be used with Wintriss Clutch/Brake Control systems with a Shadow light curtain that have ONE HAND and SINGLE STROKE modes.) *One-hand Control must be used in conjunction with a Shadow light curtain for guarding point of operation.* One-hand Control is mounted on or near the press and allows the press operator to cycle the press without using the operator station. Optional firmware is required for One-hand operation.

To cycle the press, you simply push the button as part of your normal hand motion after you load a part.
"Light Curtain Break" Mode

You can use One-hand Control in "light curtain break" mode. In this mode, you must push the button on One-hand Control within eight seconds after removing your hands from the light curtain. Otherwise, the press will not cycle. This mode prevents inadvertent operation when an operator is loading or unloading parts. If this mode is not used, One-hand Control cycles the press in single stroke mode whenever you push the button on the One-hand Control.

One-hand Control will work with or without the "light curtain break" mode turned on (see "Switch 3 – One-hand Control or Foot Switch Mode," page111). With "light curtain break" on, you must press the One-hand Control button within eight seconds after removing your hand from the light curtain. If the "light curtain break" mode is not on, One-hand Control will cycle the press in single stroke mode any time that its button is pushed.

Mounting One-hand Control Switch

A DANGER

OPERATOR CONTROL TOO CLOSE TO HAZARD

Mount the one-hand control *outside* the area protected by the light curtain. DO NOT mount the one-hand control between the light curtain and the point of operation.

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

- 1. Shut off power to the press and WPC.
- 2. Choose a location on or near the press convenient to the operator. An adjustable bracket may be necessary.

The idea is to mount One-hand Control so the operator can reach it as part of his normal hand movement after loading or unloading a part. Mount One-hand Control using the tapped holes on the bottom of its metal enclosure (see below).



Figure 2-17. One-hand Control Switch Dimensions



Figure 2-18. One-hand Control Switch Base, Showing Mounting Holes

Wiring One-hand Control to WPC

A DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

To wire One-hand Control to WPC, you need to connect three wires from the One-hand Control to contact blocks inside the operator station. Follow these instructions to wire One-hand Control. *Be sure to refer to Figure 8 at the end of this manual for specific wiring schematics.*

- 1. Turn off power to the press and to the WPC.
- 2. Loosen the clips at the bottom of the front panel of the operator station. Swing the front panel up and support it so you can work inside the box. (The cover will stay up if you slide it slightly to the left or right.)

- 3. Knock out a hole in the bottom of the operator station near the existing conduit from the WPC control enclosure. Use the conduit hole provided in the base of the One-hand Control.
- 4. Run conduit and wiring from One-hand Control to the operator station. Refer to Figure 9 for wiring connections.
- 5. Measure wires to fit before cutting. Make proper connections, by running the wires as noted in Figure 8. Fasten the switch cover onto the base with the screws provided.
- 6. Tighten all conduit connections that may have been loosened during installation. Close and latch the cover of the operator station and WPC. Make sure that you have run all your ground wires. Do not use conduit as ground. You are done installing the One-hand Control.



Figure 2-19. Wiring Connections in One-hand Control Switch

(Switch Cover, Bottom View)

Mounting and Wiring the Bar Control Enclosure

Whenever the press is in Bar mode, you will need to release the machine's brake. Therefore, mount the Bar Control enclosure in a place that is convenient to the operator while he is barring the press. *Make sure that the operator will not possibly block a light curtain while pressing the BAR control operate button.*

Refer to Figure 2-20 for dimensions. See Figure 2 (end of this manual) for wiring and Table 2-5 for pinouts.



Figure 2-20. Bar Control Enclosure Mounting Dimensions (Top and Front Views)

Wiring Automatic Single Stroke

A DANGER

PRESS STARTING UNEXPECTEDLY

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

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

Automatic Single Stroke allows the operator to automate a manual press using a feeding device or robot. Wiring information for the Automatic Single Stroke switch mechanism is shown in the wiring diagrams in figures 2 and 6 at the end of this manual. Also see Table 2-5 at the end of this chapter. Though a SPDT contact is shown in this figure, you can also use solid state switches (proximity, for example), or outputs from a programmable logic controller (PLC). To make sure that the contacts are clean and reliable, the switch or relay should be new and unused.

Wiring Continuous on Demand

A DANGER

PRESS STARTING UNEXPECTEDLY

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

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

For information on using this mode, call Wintriss Tech Support.

Installing Multiple Operator Stations

A DANGER

HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

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

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

NOTICE

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

You can connect an unlimited number of operator stations to your WPC. However, you can only wire up to two operator stations directly to the main processor board. Refer to Figure 4 (end of manual) and Table 2-5 (end of chapter) for specific wiring information.

If you wire more than two stations, you will need to connect each additional one to a Dual Operator Selection Control (Wintriss part no. 4152100). Serving as a junction box, the Dual Operator Selection Control has a switch which allows you to select those operator stations that should be enabled in series.

The following illustration depicts a multiple operator station configuration. Chapter 4 also contains for more information about multiple operator stations. If you have any questions, contact Wintriss Tech Support.



Figure 2-21. Illustrating Multiple Operator Station Configurations

Installing Revised Software into WPC

DANGER

MACHINE MALFUNCTION AFTER INSTALLING REVISED SOFTWARE

Perform the installation verification tests (page 75) and final checkout tests (page 118) after performing this software installation.

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

DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

NOTICE

RECORD SETTINGS BEFORE INSTALLING NEW SOFTWARE

Record your WPC settings, including top stop angle, auto carry-up angle, stop time limit, micro-inch timing, ON/OFF cam settings and counter preset. You must re-enter these settings after you install the new firmware chips. Also record the counter reading, if needed.

If you wish to install revised software into WPC, follow these instructions:

- 1. Verify that power has been turned off to WPC. The LED display and the clock on the front panel should be blank.
- 2. Open the front cover.
- 3. Locate the firmware chips "A" (at U108) and "B" (at U125). See Figure 2-9a or Figure 2-9c for exact locations. Each chip is labeled.
- 4. Make a note of the orientation of each firmware chip. The new chip must be installed in the same orientation as the one you remove. There is a semi-circular notch on one end of each chip to indicate orientation. The notch goes on the same side as the notch in the socket. Remove chip A and install its replacement; then remove chip B and install its replacement.
- 5. Use a chip puller to remove the old chip, or insert a small screwdriver between the bottom of the chip and the socket and carefully pry the chip out of its socket. Be careful not to get the screwdriver under the socket itself. Put the chip aside.

CAUTION

STATIC DISCHARGE DAMAGE TO CHIP

Ground yourself by touching a large metal object before you take the chip from the package. Failure to comply with these instructions could result in property damage. 6. Open the package containing the new firmware chips. Before you remove a chip from the package, ground yourself by touching any large metal object (the press will do nicely). This will remove any static electricity that you may be carrying around. A static electricity "zap" will destroy the chip.

CAUTION

CHIP INSTALLED WRONG

- Orient the chip in the same direction as the chip you removed, with the notch in the chip on the same side as the notch in the socket.
- Align pins correctly with socket before plugging chip in.

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

- 7. Once you are "grounded," remove a chip from its holder. Orient it so that the notch faces the same direction as the notch on the chip you removed. If you plug the chip in backward, it will be destroyed.
- 8. Plug the chip into its socket by starting to plug in one row of pins and then aligning the other row of pins over the socket and pushing straight in.
- 9. If the two rows of pins are spread too far apart to plug easily into the socket:
 - A. Hold the chip on its side on a desk or a flat surface with the pins pointing toward you.
 - B. Being careful NOT to overbend the pins, gently flex the top of the chip toward you. Turn the chip over so that the other row of pins is now on the desk pointing toward you. Flex it again, thus bending the other row of pins toward each other.
 - C. Try plugging the chip into the socket again, as in Step 8. If necessary, repeat Steps A and B.
- 10. Make sure that the notch is facing the correct direction and that all of the pins are in the socket. Remove and replace the other chip, starting with step 5.
- 11. When you have replaced both chips, turn the power on and verify the normal operation of the unit. If the unit powers up with "rolling" LEDs, turn the power off, remove the chip and repeat Step 9. Sometimes one or more pins are bent and not plugged in properly. If the unit still malfunctions, call Wintriss Tech Support for assistance.

DANGER

INCORRECT STOP TIME LIMIT AFTER INITIALIZATION

Determine the stopping time and set the Stop Time Limit at a value based on the actual stopping time of your press whenever you initialize your WPC. Use the stop time measured in the 90° stop time test to calculate the safety distance. When you initialize your WPC the stop time limit is reset to its factory setting of 500 ms.

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

12. Re-initialize the system according to the instructions in Chapter 3. Then re-enter the setting values you recorded before replacing the chips. Perform the installation verification tests (page 75) and final checkout tests (page 118) before operating the press.

Section 2 Installation of Display Options

Installing Various WPC Display Configurations

By this time, you have completed installation of your standard WPC package with enclosure and are heading to "Installation Verification."

If however, you purchased WPC without an enclosure <u>or</u> with enclosure minus display and switches, you are not done yet. You must first proceed to the section "Installing WPC Without Enclosure," then to one or more of the display configuration options listed below to complete your installation.

- Panel mount clock display with selector switches (no enclosures), page 69
- Clock display kit (without panel) with selector switches, page 71
- Second clock (either panel mount display or clock display kit), page 73

When you have completed installation of your WPC and the display, go to "Installation Verification," page 75.

Installing WPC Without Enclosure

When you order WPC without enclosure, you receive the control assembly — the various processor boards that make up the basic system (refer to the illustrated boards at Figures 2-9 a through g). You also receive a combination of other components including clock display(s) and selector switches.

The first thing you will need to do is to install the control assembly, which will be discussed in this section. Then you can choose between the other display configuration options which follow this section.

Mounting Dimensions and Required Clearance for Control Assembly

In order to mount the control assembly into your enclosure, you need to know the mounting dimensions as well as the space required. See Figure 2-22 for this information.

Mount the control assembly so that it is convenient during installation and maintenance. Your control enclosure does not have to be mounted to the press. It can be mounted on a free standing pedestal, pendant, or column. For easy access to the interior, make sure that there is enough room to open your control enclosure door at least 120°.

Once you have mounted the control assembly in your enclosure, proceed to the applicable display configuration option for further installation instructions.



Figure 2-22. Mounting Dimensions and Space for Control Assembly

Install your display according to the appropriate instructions:

- Panel mount clock display with selector switches (no enclosures), page 69
- Clock display kit (without panel) with selector switches, page 71
- Second clock (either panel mount display or clock display kit), page 73

Panel Mount Clock Display with Selector Switches



Figure 2-23. Panel Mount Clock Mounting and Cutout Dimensions

Panel Mounting Instructions

1. Determine a convenient place to mount your panel mount clock display and switches into your panel enclosure. You must be sure that all the switches are in close proximity to the

clock display kit assembly. The switches can be no more than one foot away from the clock. Ideally the display should be convenient so that operators and setup personnel can easily see the readouts and reach the switches.

- 2. Cut an opening in your panel enclosure. Drill and tap twelve holes for #10-32 screws. Refer to Figure 2-23 for mounting and cutout dimensions.
- 3. Prop the panel mount clock near the location where it will ultimately be situated. You can do this by connecting ty wraps from two of the left holes on the panel to the corresponding holes on the enclosure for a hinge-like effect. Allow at least 9" of service loop when performing the wiring connections. Also make sure all cables will reach.

NOTICE

Install the panel mount clock display at a height convenient for all users. Experiment to determine a good height for every user before mounting the display.

Connection from WPC to Panel Mount Clock Display

Refer to the section, "Connection from WPC to Master Control Station." Follow those steps to complete this portion of the installation.

A DANGER

CONTINUOUS MODE USED INADVERTENTLY

Disconnect the "Continuous" position on the stroke selector switch if you do not use your press in Continuous mode, and cover the "CONT" label on your control.

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

Selector Switch Instructions and Final Assembly

- 1. See Figure 2-24 for cutout dimensions for the selector switch assemblies that you purchased in your configuration. These dimensions are identical for all switches.
- 2. Remember that you must be sure that all the switches are in close proximity to the clock display kit assembly. The switches can be no more than one foot away from the clock.
- 3. To make the selector switch connections connect as follows to the appropriate terminal block on the clock processor board (see Figure 6 at the end of this manual).

Stroke Select	TB701
Mode Select	TB702
Automatic Single Stroke (External Trip)	TB703
Operator Station Select	TB704



Figure 2-24. Selector Switch Cutout Dimensions

4. If the clock panel was removed during installation, mount this panel assembly back to the Master Control Station enclosure and tighten the hardware.

Clock Display Kit with Selector Switches

Clock Display Kit Mounting Instructions

- 1. In your kit you should have received: a label, a PC board, a push button, a key switch with a wiring harness, four standoffs, and four lock nuts.
- Determine a convenient place to mount your clock display kit and switches into your enclosure. You must be sure that all the switches are in close proximity to the clock display kit assembly. The switches can be no more than one foot away from the clock. Ideally the display should be convenient so that operators and setup personnel can easily see the readouts and reach the switches.
- 3. Cut out four holes in your enclosure, and mount four #6-32 5/8 studs from inside. Refer to Figure 2-25 for mounting and cutout dimensions.



Figure 2-25. Clock Display Kit Mounting and Cutout Dimensions

- 4. Install the PC board on the four studs with standoffs and lock nuts. Make sure that the six-digit LED display is at the top facing outward. Orient the label correctly from the outside and affix it in place by removing the protective paper.
- 5. Install the push button on the left and keylock on the right. Connect the keylock harness to the PC board and the outer pins of the push button.

Connection from WPC to Clock Display Kit

Refer to the section, "Connection from WPC to Master Control Station." Follow those steps to complete this portion of the installation.

Selector Switch Instructions

A DANGER

CONTINUOUS MODE USED INADVERTENTLY

Disconnect the "Continuous" position on the stroke selector switch if you do not use your press in Continuous mode, and cover the "CONT" label on your control.

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

- 1. See Figure 2-25 for cutout dimensions for each of the selector switch assemblies that you purchased in your configuration.
- 2. Remember, you must be sure that all the switches are in close proximity to the clock display kit assembly. The switches can be no more than 1 foot away from the clock.
- 3. Connect the selector switches as follows to the appropriate terminal block on the clock processor board (see Figure 6 at the end of this manual if necessary).

TB701	Stroke Select	TB703	Automatic Single Stroke (External trip)	
TB702	Mode Select	TB704	Operator Station Select	

Second Clock Display

Installing Second Clock Display

At this point, you have already installed your first clock display, and you have followed the instructions preceding this section. In addition, you ordered a second clock display — either a panel mount clock display or just the clock display kit. If so, you first need to follow the instructions that pertain to either of those options. Therefore, you will repeat steps mentioned earlier to install that second display. Depending upon which configuration you ordered as your second clock display option, refer to the corresponding set of instructions mentioned in the table below:

Second clock display option: Refer to instructions in the appropriate section:

- Panel mount clock display with selector switches (no enclosures), page 69
- Clock display kit (without panel) with selector switches, page 71

Connecting Twin Display Adapter

1. Locate the twin display adapter in the kit you received. It is a short ribbon cable with three connectors on it — female connector at one end and two male connectors, one in the middle and one at the other end.



Figure 2-26. Illustration of Twin Display Adapter

- 2. Unplug the ribbon cable from the "primary" clock display (the one closest to the selector switches. More than likely this is at J301 on the WPC display interface board.
- 3. Plug the female connector of the twin display adapter to that port.
- 4. Reconnect the original ribbon cable (identified in step 2) to one of the male connectors on the twin display adapter. Connect the other end to the clock display (J706).
- 5. Connect the ribbon cable from the "second" clock display to the other male connectors on the twin display adapter. Connect the other end to the clock display (J706).

Installation Verification

A DANGER

INCORRECT INSTALLATION

Complete the Installation Verification procedures before operating the press.

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

When you complete all the installation procedures in this chapter, WPC is almost ready to use. Before using the press complete this checkout procedure to ensure that WPC is working properly. You may have to make some settings. If you are not familiar with how to use WPC, refer to Chapters 3 and 4. Then complete the procedures below.

Checking Safeguarding Devices, page 76

Checking Dual Safety Valve (DSV) Wiring, page 78

Checking for Error Messages When the Press Is Running, page 79

Checking the Top Stop Circuit, page 79

Checking the Emergency-Stop Circuit, page 80

Checking the User Inputs' Operation, page 80

Checking Safeguarding Devices

DANGER

INJURY DURING TESTING

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

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

DANGER

NON-SAFETY INTERLOCK SWITCHES USED IN SAFETY APPLICATIONS

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

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

Before turning on the press, verify the following:

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

Test safeguarding devices as follows:

- 1. Run the press in INCH mode. Block the light curtain, if any, with an opaque object. The press should stop immediately.
 - If the press stops, go to the next step.
 - If the press does not stop, check the wiring and correct any problems. Test again as indicated in this step. If the press still does not stop, call Wintriss Tech Support.

DANGER

INJURY DURING TESTING

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

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

- 2. Run the press in INCH mode. One at a time, keeping hands outside the guarded area, open any moveable guards just enough to open the interlock switch. In each case the press should stop immediately.
 - If the press stops immediately when you open the guard, go on to the next step.
 - If the press does not stop, check the wiring and correct any problems. Test again as indicated in this step. If the press still does not stop, call Wintriss Tech Support.
- 3. Close the guard you just tested, reset the press control, and repeat the process in step 2 for each moveable guard. When you have tested all the moveable guards, go on to the next section.

Checking Dual Safety Valve (DSV) Wiring

DANGER

INJURY DURING TESTING

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

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

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE THE ENCLOSURE

Turn off and disconnect power from WPC clutch/brake control, the press and any other machinery it is connected to before working inside the enclosure. This includes power to the press's motor.

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

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

- 1. Power down the press and the press control.
- 2. On the Power Supply board, remove one of the DSV fuses. (See "Figure 2-9b. WPC Power Supply Board Layout (Right/Center)," page 33, or "Figure 2-9d. WPC Power Supply Board Layout (Left)," page 35.)
- 3. Power up the press and press control. Select INCH with the Stroke Select switch. Push both RUN/INCH buttons. Observe what happens.
 - If the ram does not move and the display show F79 or one of the DSV valve faults, this is correct. Go on to the next step.
 - If the ram moves and/or the display shows a different fault, check the wiring of the DSV valve. Repeat this step. If the ram still moves and/or the display still shows a different fault, immediately power down the press and call Wintriss Tech Support.
- 4. Power down the press and the press control.
- 5. On the Power Supply board, replace the fuse you removed in step 2 and remove the other DSV fuse.
- 6. Power up the press and press control. Push both RUN/INCH buttons. Observe what happens.
 - If the ram does not move and the display show F79 or one of the DSV valve faults, this is correct. Go on to the next step.
 - If the ram moves and/or the display shows a different fault, check the wiring of the DSV valve. Repeat this step. If the ram still moves and/or the display still shows a different fault, immediately power down the press and call Wintriss Tech Support.
- 7. Power down the press and press control. Replace the fuse you removed in step 5.

- 8. Power up the press and press control. Make sure the press is still in inch mode. Push the RUN/INCH buttons briefly. The ram should move.
 - If the ram moves, go on to the next section.
 - If the ram does not move, check the wiring and correct any problems. Power up the press and control. Push the RUN/INCH buttons again. If the ram still does not move, call Wintriss Tech Support.

NOTICE

RUN THE FOLLOWING VERIFICATION TESTS AFTER INSTALLING OVERRUN LIMIT SWITCH MAGNET

The actuating magnet for the overrun limit switch must be installed before running the following tests. See "Installing the Overrun Limit Switch," page 38.

If the magnet is not installed, the press will run only in Inch mode, *not* in Single Stroke or Continuous.

Checking for Error Messages When the Press Is Running

Single stroke the press for a few strokes.

- If the press runs normally, go to the next section.
- If an error code between F80 and F89 (or H80 through H89) shows on the display, this indicates a problem with the overrun sensor. Check that you installed the overrun sensor and magnet correctly (Chapter 2) and set the overrun limit switch properly (Chapter 3). Press the Reset/Select button and single stroke the press again for a few strokes. If the press stops and the same error code shows, call Wintriss Tech Support.
- If another error code shows on the display, look it up in Chapter 5. Follow the instructions under the error message for solving the problem. Once you correct the problem, press the Reset/Select button and run the press again for a few strokes, checking for error codes. If you need assistance, call Wintriss Tech Support.

Checking the Top Stop Circuit

Run the press in Continuous mode, and depress the TOP STOP button. The press should stop at top dead center.

- If the press top stops, go to the next section.
- If the press does not top stop, there is a problem in your top stop circuit. Recheck wiring and correct the cause of the problem. Re-run this test. If the press does not top stop, call Wintriss Tech Support. Do not continue with this checkout procedure until the press top stops correctly.

NOTICE

CHECKING THE TOP STOP CIRCUIT IN SINGLE STROKE MODE

If your press does not run in continuous mode, run this test while holding down the run buttons in Single Stroke mode.

Checking the Emergency-Stop Circuit

DANGER

INJURY DURING TESTING

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

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

Run the press in Continuous mode, and depress the EMERGENCY STOP button. The press should Emergency-stop immediately.

- If the press Emergency-stops, go to the next section.
- If the press does not Emergency-stop, there is a problem in your E-stop circuit. Recheck all wiring and correct any problems. Re-run this test. If the press still does not Emergency-stop, call Wintriss Tech Support. Do not continue with this checkout procedure until the press E-stops correctly.

NOTICE

CHECKING THE EMERGENCY-STOP CIRCUIT IN SINGLE STROKE MODE

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

Checking the User Inputs' Operation

To be sure the user inputs you are using are wired and operating correctly, run the test below. Refer to "Wiring WPC User Inputs," page 44. If you are not using any user inputs, go to the next section.

Run the press. Actuate one of the user inputs. The press should stop and the WPC should display the appropriate fault code.

- If the press stops and the appropriate fault code displays, the input is wired and operating properly. Repeat the test for the other user inputs. When you have checked them all, go on to the next section.
- If the press does not stop and/or the appropriate fault code does not display, check the wiring and rerun this test. If the press still does not stop and/or the correct fault code does not display, call Wintriss Tech Support.

Installation Verification Complete

Your WPC Installation verification is complete. Clear any error message by pressing the Reset/Select button. Proceed to Chapter 3 to initialize and set up WPC. When you have finished initializing and setting up WPC, be sure to perform the tests at the end of Chapter 3.

Table 2-5. Connector Pinouts for Wintriss Clutch/Brake Control (WPC)

	i i		
44 Ground		88	Light curtain B 2 input –
43 Analog 2 input		87	Light curtain A 2 input –
42 +13.5 VDC out		86	User input 10 – (paired with User input 11*)
41 +24 VDC out		85	User input 8 – (paired with User input 9*)
40 +24 VDC out		84	User input 6 –
39 +24 VDC out		83	User input 4 – (counterbalance press. if applic.)
38 +24VDC out		82	User input 2 +
37 +24 VDC out		81	Top stop string in (connects internally to 49)
36 Aux. 2 out		80	Top stop string center loop connection
35 Light curtain 2 enable		79	Top stop string drive output
34 Ground		78	Light curtain B 1 input –
33 Analog 1 input		77	Light curtain A 1 input –
32 +13.5 VDC out		76	+ 24 VDC out
31 Ground		75	DSVA poppet position –
30 Ground		74	User input 9 – (paired with User input 8*)
29 Aux. 3 out		73	User input 7 –
28 Aux. 1 out		72	User input 5 –
27 Light curtain 1 enable		71	User input 3 +
26 Mute limit switch input +		70	Remote reset input –
25 Ground		69	Estop string in (connects internally to 45)
24 Overrun limit switch input	-	68	Estop string center loop connection
23 +13.5 VDC out		67	Estop string drive output
22 Top stop limit switch input	t –	66	Mute lamp output
21 Carry-up limit switch input	t (User input 1)+	65	Palm time lamp output
20 DSV Lifeguard input +		64	Prior act lamp output
19 DSVB poppet position inp	out –	63	Prior act B input +
18 User input 11 – (paired w	<i>v</i> ith User input 10*)	62	Prior act B out
17 Motor reverse input +		61	Prior act A in (connects internally to 62)
16 Bar actuator input +		60	Top stop B 2 input + pulse
15 Automatic Single Stroke (Ext. Trip) actuator N/C +	59	Top stop B 2 out
14 Foot switch N/O input +		58	Top stop A 2 in (connects internally to 59)
13 Top Stop in Inch Disable		57	Estop B 2 input + pulse
12 Palm switch B N/O input	+	56	Estop B 2 out
11 Palm switch A N/O input	+	55	Estop A 2 in (connects internally to 56)
10 Ground		54	Ground
9 + 24 VDC out		53	+ 24 VDC out
8 Clutch air pressure switch	n input –	52	Top stop B 1 input + pulse
7 Motor forward input +		51	Top stop B 1 out
6 Bar selector switch input	+	50	Top stop A 1 in (connects internally to 51)
5 Automatic Single Stroke (Ext. Trip) actuator N/O +	49	Top stop A out
4 Foot switch N/C input +	.,	48	Estop B 1 input + pulse
3 One hand A input +		47	Estop B1 out
2 Palm switch B N/C input -	+	46	Estop A 1 in (connects internally to 47)
1 Palm switch A N/C input -	+	45	Estop out A
		-	

* See "Using Cross-checked Input Pairs," page 44.

Table 2-6. Resolver

CW (clockwise) rotation shown, viewing the shaft end. For CCW, reverse black and yellow wires.

89	S4 ground (Brown)
90	R2 ground (Orange)
91	S3 ground (Yellow)
92	R1 (Red)
93	S2 Cosine (Green)
94	S1 Sine (Black)
95	Shield

Table 2-7.4-Channel Cam Outputs(Display Interface Board)

118	Relay Power
117	Ground
116	+ 5 VDC
115	Not used
114	Not used
113	Zero cam
112	Counter
111	Cam 4
110	Cam 3
109	Cam 2
108	Cam 1

Table 2-8. Display Board

141	Ground
142	Continuous selector input –
143	Single stroke selector input –
144	Inch selector input –
145	Off selector input –
146	Ground
147	PSDI selector input –
148	Foot selector input –
149	One hand selector input –
150	Ground
151	External/Two break selector input –
152	Ground
153	Operator station 2 selector input -
154	Operator station 1 selector input -
155	Ground
156	Spare selector inputs –
157	Micro-inch selector input -

Table 2-9. Power Supply Connectors

121	L1 (HI)
122	L2 (NEUTRAL)
123	Ground
124	Chassis ground
125	L1 out (HI)
126	L2 out (NEUTRAL)
127	Ground
128	L1 out
129	L2 out
130	Ground
131	DSVA relay in
132	DSVA relay out
133	DSVB relay in
134	DSVB relay out
135	Lockout relay in
136	Lockout relay out
137	Lockout relay out

Chapter 3 Initialization, Setup, and Checkout

DANGER

OPERATOR STATION WIRED INCORRECTLY

Run all necessary tests to verify that each operator station is wired correctly and provides proper anti-tie-down and anti-repeat protection.

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

DANGER

MORE OPERATORS THAN OPERATOR STATIONS

- Ensure that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.
- During setup, lockout/tagout the press if there are more operators than operator stations.
- Verify at every shift change that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.

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

DANGER

TWO-HAND CONTROL TOO CLOSE TO HAZARDOUS AREA

Verify at each shift change that any moveable two-hand controls are located at least the safety distance away from the pinch point or hazardous area.

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

This chapter describes how to initialize, set up, and check out your Wintriss Clutch/Brake Control (WPC). Use it to completely initialize the system and zero the resolver. Also, you will be making settings that will be used when you actually operate WPC. Some of these settings, such as the 90° stop time test and calculating the proper safety distance, are extremely critical to conform with OSHA and ANSI standards. You will also be guided to perform certain key tests to ensure proper operation of WPC.

The chapter consists of two sections: Section 1 – Initialization and Setup, and Section 2 – Checkout.

Section 1 – Initialization and Setup

How to View Key Press Information, page 85 Initializing the System, page 88 Zeroing the Resolver, page 89 Initializing Only the Start Time Limit, page 90 Setting Up the Top Stop "ON" Angle and Determining Test Angle for Overrun Limit Switch, page 91 Making Press Option Settings to Test the Overrun Limit Switch, page 93 Resetting Top Stop Angle, page 94 Adjusting Top Stop Angle at WPC, page 94 Using Auto Carry-up, page 96 Using the Brake Monitor: Stopping Time and Stop Time Limit, page 98 Determining the 90° Stop Time (T_8), page 99 Setting the Stop Time Limit, page 102 Calculating the Safety Distance, page 104 Setting Micro-Inch, page 109 Setting the Press Option Switches, page 110 Switch 8: Selecting Top Stop Mode for F and H Errors, page 113 Setting Programmable Cams, page 115

Section 2 – Final Checkout

Power Supply Test, page 120 Shadow Light Curtain Test, page 121 System Static Test, page 123 Single Stroke Mode Test with Light Curtain, page 125 Single Stroke Mode Test Without Light Curtain(s), page 128 Anti-tiedown Test, page 130 Anti-repeat Test, page 131 Continuous Mode Test with Light Curtain, page 132 Continuous Mode Test without Light Curtain(s), page 134 Foot Switch Test (for Units with Optional Foot Switch), page 136 One-hand Control Switch Test , page 138 Bar Mode Control Test – Optional, page 139

Section 1 – Initialization and Setup

How to View Key Press Information

You can look ten items on the WPC display:

• Angle / SPM	• 90° Stop Test
• Counter	Stopping Time
Counter Preset	Stopping Angle
• Top Stop Angle	• Stop Time Limit
Auto Carry-up	Micro-inch

NOTICE

TO VIEW INFORMATION AND MAKE SETTINGS IN LOWER SECTION PRESS MUST BE IN INCH MODE

To view the items indicated in the lower section, the press must be in INCH mode. As you repeatedly press the Reset/Select button, the LED indicator scrolls through the items in the top section, and then, if the press is in INCH mode, jumps down to the lower four items. When the press is set to single or continuous mode, you can only view the items in the top section.

With the press in Inch mode, when you first turn power ON to WPC, and clear "Loc," the current crankshaft angle reading appears in the LED display, and the "Angle/SPM" indicator segment is highlighted. Also the crank-angle clock displays that number of degrees. Each LED in the clock represents approximately eleven degrees. (Figure 3-1) As soon as the press is running in Single Stroke or Continuous mode, the current counter value appears in the digital display.



Figure 3-1. WPC Displays Showing Display Indicator Segments

Here is how to look at a different item — "Stop Time Limit." With the press in INCH mode, press the Reset/Select button until the display indicator scrolls to "Stop Time Limit." Once the "Stop Time Limit" is highlighted, you will notice that the last recorded reading appears. The crank-angle clock will not be illuminated.

See Figure 3-2 for an illustration of "Stop Time Limit."



Figure 3-2. Viewing "Stop Time Limit"

NOTICE

INTERRUPTED STROKE

The WPC stops the press when a system fault is detected or when the light curtain is blocked during any non-muted portion of the stroke.

If this occurs, the Interrupted Stroke LED on the WPC display will be illuminated. Interrupted stroke is discussed in Chapter 4. If the ram stops because of a system fault, an error code (one letter and a two-digit number) appears on the LED display.

When an interrupted stroke occurs,

- If the press is in Inch mode, it stays in Inch mode
- If the press is in any other mode, WPC automatically switches to TWO-HAND MAINTAINED SINGLE STROKE for the remainder of the stroke. In the case of a system fault, press the EMERGENCY STOP / RESET switch to reset WPC.

Initializing the System

DANGER

INCORRECT STOP TIME LIMIT AFTER INITIALIZATION

Determine the stopping time and set the Stop Time Limit at a value based on the actual stopping time of your press whenever you initialize your WPC. Use the stop time measured in the 90° stop time test to calculate the safety distance. When you initialize your WPC the stop time limit is reset to its factory setting of 500 ms.

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

Now that you have completely installed your WPC, you are ready to initialize the system.

- 1. Inch the press to top dead center (TDC).
- 2. Turn the power OFF to WPC, and locate the WPC Settings adjustment key switch.
- 3. Turn the key counterclockwise (toward "+") *while* you turn the power back ON. Once "*Int*" appears on the LED display (Figure 3-3), release the key.



Figure 3-3. "Int" on LED Display Indicating "System Initialized"

These are the parameters that have been initialized automatically:

- <u>Stop Time Limit</u>: The Stop Time Limit is automatically initialized to 500 milliseconds. When you begin operating your press with WPC, you must adjust this setting to a more suitable number (later in this chapter).
- <u>Start Time Limit</u>: Every press takes a finite amount of time from the point when the Dual Safety Valve (DSV) is energized to when the resolver signal indicates to WPC that it is turning. This elapsed time, primarily taken by the clutch mechanism, is called Start Time. WPC needs an internal limit for the start time to detect resolver drive failure. The *first* time that you start the press, the Start Time Limit is automatically set to two times the actual amount of the start time.
- <u>Resolver Zero Setting</u>: The resolver is set to zero.

Zeroing the Resolver

- 1. Any time that you want to zero the resolver, follow these steps.
- 2. Set your press at top dead center (TDC):
 - <u>If your press is set at TDC</u> (0° ±2°) before starting the installation and you have not moved the ram, go to the instructions for zeroing.
 - <u>If your press is not set at TDC</u>, you must inch the press to 0°±2°. Use a dial indicator or some other means to determine 0°. *The press must be at top dead center*. Once you are at 0°, go to the next step.
- 3. Turn the power OFF to WPC. Then hold down the Reset/Select button <u>while</u> you turn the unit back on. Once "*rES*" appears on the LED display, release the button. The Resolver Zero Correction has been performed (Figure 3-4). In effect, WPC electronically adds or subtracts the offset; so it always knows the true zero position of the ram. If the number is 0, it means the zero position of the resolver at TDC is 0°. When the press is at TDC, the crank angle value in the LED display should read 0°. If not, repeat the zeroing process. The system can zero the resolver within a $\pm 30^{\circ}$ offset, but the closer to 0° you zero the resolver, preferably within 5°, the better the system will perform.



Figure 3-4. "rES" Appearing on LED Display, Zeroing Resolver

Initializing Only the Start Time Limit

- 1. Any time that you wish to re-initialize the Start Time Limit only, follow these steps.
- 2. Locate the WPC Settings adjustment key switch, and turn the key clockwise, in the direction of "–" *while* you turn power ON to WPC. This sets the limit to two times the actual amount of start time once the press is first started. This value cannot be changed manually. Once "*Str*" appears on the LED display (Figure 3-5), release the key.



Figure 3-5. LED Display Showing "Str," Initializing Start Time Limit

NOTICE

The Start Time Limit value cannot be changed manually

- 3. To view the Start Time Limit in milliseconds, select "Stopping Angle" on the LED display (see the beginning of Chapter 4 if you need assistance on how to view the information). Then turn the WPC Settings adjustment key switch toward "–."
- 4. To view the last recorded Start Time reading, select "Stopping Angle" again, but this time turn the WPC Settings adjustment key switch toward "+."

Setting Up the Top Stop "ON" Angle and Determining Test Angle for Overrun Limit Switch

A WARNING

INCORRECT INSTALLATION OF OVERRUN LIMIT SWITCH

Ensure that the overrun limit switch is installed at a proper location if you have one of these versions: 2-Hand control without light curtains, light curtains with muting, or PSDI. Proper installation of the overrun limit switch ensures that if the top stop output relay fails, a hazardous situation will not occur on the downstroke. The overrun limit switch must be mounted <u>as close as possible</u> after the top stop "on" angle as per the table in the next section, "Making Press Option Settings to Test the Overrun Limit Switch," page 93.

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

We use the overrun sensor and magnet (both components make up the overrun limit switch) to provide overrun timing to WPC. Overrun timing is solely dependent upon the proper installation of the overrun limit switch. A function of the stopping time of the press, overrun timing provides a backup for the top stop signal. Should the top stop output relay fail, overrun will provide the signal to stop the press. If the overrun limit switch has not been properly installed, overrun timing in WPC will not work.

The overrun limit switch location is dependent upon the Top Stop Angle. You can determine and set Top Stop "ON" Angle before installing the overrun limit switch. You cannot run the press in CONT (continuous) or SINGLE STROKE modes without the overrun limit switch. However, you can inch the press.

NOTICE

For a variable speed press, you need to know the latest Top Stop Angle. Typically that would be at the *slowest* speed resulting in the *shortest* stopping angle / time.

- 1. Set option switch #7 to OPEN. This enables changing Top Stop Angle.
- 2. Make the following settings:
 - Top Stop in Inch is enabled (pin #13 is not connected to anything; see page 48).
 - If you plan to use "Micro-inch," be sure that it is *not* enabled (see page 109).
 - Option switch #4 is in the "OPEN" position to disable the "Auto Compensated Top Stop" feature (see page 112).
- 3. Power down and power up WPC to make the switch settings take effect.
- 4. With power ON to WPC and the press in "INCH" mode, press the Reset/Select button so that the display indicator highlights "Top Stop "ON" Angle."
- 5. Look at the WPC display, and locate the WPC Settings adjustment key switch found to the right of the Reset/Select button.
- 6. Temporarily set the top stop angle to 270°. To adjust the number to 270°, turn the WPC Settings adjustment key switch toward "+" (counterclockwise) to increase the number, or toward "–"(clockwise) to decrease.

- 7. Keep the stroke select in INCH. Press both the INCH/RUN switches throughout the stroke until the press top-stops.
- 8. Note the crankshaft angle value in degrees. Advance or retard your final Top Stop "ON" Angle value based upon where the press stopped at the top of the stroke by repeating steps 2 through 6.
- 9. Once you have determined the Top Stop "ON" Angle, you need to determine the <u>unzeroed</u> resolver angle. Inch the press to the Top Stop "ON" Angle that you just determined.
- 10. Make sure that the press is not running. Using the Reset/Select button, select "Angle/SPM."
- 11. Leave WPC in TWO HAND INCH mode. Turn the WPC Settings adjustment key switch toward "+." This will automatically display the <u>unzeroed</u> resolver angle. Notice the difference from the Top Stop "ON" Angle.
- 12. Select the overrun limit switch location as close as possible after the final Top Stop "ON" Angle value (determined in step 6) as per the table in the next section (next page). Make sure you record the appropriate "Overrun Limit Switch location" value in the column "Your selection." If the Top Stop position is *greater* than the unzeroed resolver angle, add the difference to the overrun limit switch location determined from the table (next page). If the Top Stop position is *less*, <u>subtract</u> the difference. Also record the applicable "Switch Setting 1/Switch Setting 2" on the second line of the table.

Here is an example: Say in step 6 you determined your final Top Stop "ON" Angle value to be 284°. Now, look at the table on the next page. Your "Overrun Limit Switch location" would be <u>330</u>° (since your Top Stop "ON" angle is located between <u>270° and</u> <u>300°</u>). Your "Switch Setting 1/Switch Setting 2" would be <u>SW1 OPEN; SW2 CLOSED</u>.

13. *Refer back to the section "Installing the Overrun Limit Switch," page 38, to properly install the overrun sensor and magnet.* Remember to use the selections you determined from the previous step.

NOTICE

WHEN DETERMINING TOP STOP "ON" ANGLE

Keep in mind that the Top Stop Angle has an internal twenty-degree dwell associated with it. In other words, the internal top stop timing actually turns off 20° *after* the Top Stop "ON" Angle that you set. This internal top stop timing must turn off <u>completely</u> before the overrun limit switch turns on.

If the top stop timing and the overrun limit switch are ON simultaneously, an "80 series" error code will appear (see Chapter 5).

- 14. When you are done, turn the key toward "–" to toggle back to resolver crank angle position or to exit from this mode. Notice that when you turn the key in this direction, the crank-angle clock is again illuminated.
- 15. Set option switch #7 to CLOSED to disable changes to the Top Stop Angle. If you are using the Auto Compensated Top Stop feature, set switch #4 to CLOSED to enable it. Power down and power up WPC to make the switch settings take effect.

Making Press Option Settings to Test the Overrun Limit Switch

WPC checks that the overrun limit switch is closed at a precise angle on every stroke. The option switches #1 and #2 are used by WPC to perform the overrun closure test.

Choose the proper <u>unzeroed</u> resolver angle settings: 270°, 300°, 330°, or 359°, and record them below. Remember that the overrun limit switch must be mounted as close as possible after the latest Top Stop "ON" Angle as per the table below.

NOTICE

To enable Switch Settings 1 and 2 (as per the following table), power the WPC down, then up.

Top Stop Angle	Less than 240°	241° to 270°	271° to 300°	More than 301°	Your selection
Overrun Limit Switch location	270°	300°	330°	359°	
Switch Setting 1 Switch Setting 2	CLOSED CLOSED	CLOSED OPEN	OPEN CLOSED	OPEN OPEN	

Table 3-1. Overrun Limit Switch Settings for Test



Be sure to record your selection!


Resetting Top Stop Angle

It is assumed that you have already preset the Top Stop "ON" Angle during the overrun limit switch installation (see the previous section). For maintenance purposes, you can perform the following procedure periodically to ensure that your press stops at top. Remember that if you adjust your Top Stop "ON" Angle, you must verify that your overrun limit switch is still set properly.

Adjusting Top Stop Angle at WPC

A DANGER

INCORRECT OVERRUN LIMIT SWITCH ANGLE AFTER RESETTING TOP STOP

Re-check the overrun limit switch angle setting whenever you change the top stop angle, and reset the overrun limit setting if necessary.

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

NOTICE

DISABLE AUTO COMPENSATED TOP STOP BEFORE DETERMINING TOP STOP ANGLE

Before running the following procedure to determine top stop angle, make sure that press option switch #4 (see page 112) is in the OPEN position to disable the Auto Compensated Top Stop (ACTS) feature.

- Confirm that option switch #4 is in the "OPEN" position to disable the "Auto Compensated Top Stop" feature. (See "Switch 4 – Auto Compensated Top Stop ("ACTS") Enabled (Optional)," page 112.)
- 2. Cycle the power to WPC off and on to make changes in switch setting take effect.
- 3. Determine how much adjustment you need to make:
 - If the press top stops after 0° (zero degrees) you need to advance the timing. In other words, you need to decrease the Top Stop Angle by as many degrees as the ram stops beyond 0° (zero degrees) at the slowest operating speed.
 - If the press top stops before 0° (zero degrees), you need to retard the timing. That is, you need to increase the Top Stop Angle by as many degrees as it stops before 0° (zero degrees) at the slowest operating speed.
- 4. Install the heaviest upper die set into your press. Adjust the counterbalance for ram weight (if the press has a counterbalance).
- 5. With power ON to WPC and the press in "INCH" mode, press the Reset/Select button so that the display indicator highlights "Top Stop Angle."
- 6. Look at the WPC display, and locate the WPC Settings adjustment key switch found to the right of the Reset/Select button.
- 7. To adjust the top stop angle approximately as you had determined at step 1, turn the WPC Settings adjustment key switch toward the "+" sign (counterclockwise) to increase the angle, or toward the "–"sign (clockwise) to decrease the angle.

- 8. Switch the mode selector to "CONTinuous," and then run the press, allowing it to reach normal operating speed.
- 9. Top stop the press. Note the crankshaft angle value in degrees. Readjust as necessary, following steps 3 through 6, this time entering the Top Stop Angle you determined when you top stopped the press during this procedure.

NOTICE

CHECK OVERRUN LIMIT SWITCH SETTING WHEN YOU CHANGE TOP STOP ANGLE

Check and reset the overrun limit switch angle when you reset the Top Stop Angle. Remember that the Top Stop Angle has an internal twenty-degree dwell associated with it. In other words, the internal top stop timing actually turns off 20° *after* the Top Stop Angle that you set. This internal top stop timing must turn off <u>completely</u> before the overrun limit switch turns on. If the top stop timing and the overrun limit switch are ON simultaneously, an "80 series" error code will appear (see Chapter 5).

10. Repeat this test and readjustment at least five times to set an accurate top stop angle.

Using Auto Carry-up

A DANGER

INCORRECT AUTO CARRY-UP ANGLE

- Ensure that the Auto Carry-up angle is correct. If the operator can reach the pinch point, the Auto Carry-up angle must be set so that any hazardous openings are smaller than 1/4" by the time the crankshaft reaches the Auto Carry-up angle.
- Determine the Auto Carry-up angle for each tool, based on the crank angle at which the tool's hazardous openings are smaller than 1/4".
- Change the Auto Carry-up angle to the correct value when you change tools.
- Use option switch 7 to prevent anyone from making changes stop time limit and auto carryup angle. See "Switch 7 –Disable Changes to Stop Time Limit and Auto Carry-up Angle," page 113, for more information.

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

NOTICE

The following Auto Carry-up function also applies to Foot Control. For more information about using Foot Control for Single Stroke mode, see "Foot Operation, Single Stroke Mode," page 159, and "Switch 3 – One-hand Control or Foot Switch Mode," page 111.

The Auto Carry-up feature causes the press to complete a stroke if the operator releases the run buttons after the Auto Carry-up angle. This feature is also called operator station mute.

Pinch points that are less than 1/4" (6 mm) are considered non-hazardous to the operator. To determine the Auto Carry-up angle, you need to determine at what crank angle, in degrees, the pinch point openings have closed to less than 1/4" (6 mm). Set the Auto Carry-up angle to at least that number of degrees.

With large presses where the stroke length is large and press speed is slow, you must ensure that the operator cannot release the buttons and reach the pinch point before it closes. This applies only when two-hand control is used to safeguard the point of operation and only if any opening allowing access to the pinch point is 1/4" (6 mm) or larger.

The factory setting for Auto Carry-up angle is different, depending upon whether you have WPC firmware for light curtains:

- If you have light-curtain firmware, the Auto Carry-up angle is factory set at 149°; you must set the Auto Carry-up angle at 149° or less.
- If you have non-light-curtain firmware, the Auto Carry-up angle is factory set at 170°.

Set the Auto Carry-up angle at the correct value to protect the operator.

Setting Auto Carry-up Angle

A DANGER

INCORRECT AUTO CARRY-UP ANGLE

- Ensure that the Auto Carry-up angle is correct. If the operator can reach the pinch point, the Auto Carry-up angle must be set so that any hazardous openings are smaller than ¼" by the time the crankshaft reaches the Auto Carry-up angle.
- Determine the Auto Carry-up angle for each tool, based on the crank angle at which the tool's hazardous openings are smaller than 1/4".
- Change the Auto Carry-up angle to the correct value when you change tools.

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

A DANGER

SAFETY SETTINGS CAN BE CHANGED WHEN KEY IS IN SETTINGS KEY SWITCH

Use option switch 7 to prevent anyone from making changes stop time limit and auto carryup angle. See "Switch 7 –Disable Changes to Stop Time Limit and Auto Carry-up Angle," page 113, for more information.

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

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE THE ENCLOSURE

Turn off and disconnect power from WPC clutch/brake control, the press and any other machinery it is connected to before working inside the enclosure. This includes power to the press's motor.

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

- 1. Set Option Switch 7 to OPEN to allow the Auto Carry-up angle to be adjusted (see Switch 7 information on page 113).
- 2. With power ON to WPC and the press in "INCH" mode, press the Reset/Select button so that the display indicator highlights "Auto Carry-up."
- 3. Look at the WPC display, and locate the WPC Settings adjustment key switch found to the right of the Reset/Select button.
- 4. To adjust the Auto Carry-up angle, turn the WPC Settings adjustment key switch either toward "+"(counterclockwise), to increase the value, or toward "-"(clockwise) to decrease the value.
- 5. When you have finished adjusting the Auto Carry-up angle, if you have Two-Hand Only firmware, set Option Switch 7 to CLOSED to prevent the Auto Carry-up angle from being changed. Cycle the power to WPC off and on to make this change in switch setting take effect.

Using the Brake Monitor: Stopping Time and Stop Time Limit

DANGER

INCORRECT STOP TIME LIMIT

Determine the stopping time and set the Stop Time Limit at a value based on the actual stopping time of your press. Use the stop time measured in the 90° stop time test to calculate the safety distance.

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

WPC's built-in brake monitor constantly checks the condition of the brake by measuring the stopping time every time the press top stops. *Stopping time* is the time that it takes the crankshaft to stop once the Dual Safety Valve (DSV) has been closed. WPC measures how long it takes from the time that the dual safety valve is de-energized to the actual stopping of the press crankshaft. WPC then displays this value in milliseconds. When WPC is first initialized, the stop time limit is factory set at 500 milliseconds. (One millisecond equals 1/1000th of a second; 1 ms = 0.001 second)

Be sure that you have completed the entire installation and that everything is operating properly. If so, you are ready to:

- determine what your press's top stopping time is
- calculate the press's stop time limit, and
- set the stop time limit.

Determining the Press's Stopping Time

First you need to determine the press's stopping time under normal stopping conditions, which is usually at top stop. Therefore, the stop time limit *must* be calculated based upon stopping time at top stop. To find press stopping time, follow these steps:

- 1. Install the heaviest upper die set into your press. Adjust the counterbalance for ram weight (if the press has a counterbalance).
- 2. Turn power ON to WPC, and notice that the current crankshaft angle reading appears in the LED display.
- 3. Start the press.
 - If the press can run in continuous mode, run it in continuous mode, allowing it to reach normal operating speed. Notice now that the actual press speed "SPM" automatically appears in the LED display. Top stop the press.
 - If the press cannot run in continuous mode, set it to single stroke mode and press the run buttons to initiate a stroke.
- 4. Press the Reset/Select button until the display indicator illuminates "Stopping Time."
- 5. Look at the reading in the LED display. This is the stopping time of your press. Remember that the number in the display is in milliseconds (ms).

6. Do this test a minimum of five more times to see if you get higher readings. Record the highest reading from all your tests. This is the stopping time you will use to set the stop time limit.

Calculating the Press's Stop Time Limit

Once you know the press's actual stopping time, you need to add extra time to this number to compensate for *normal* wear in your brake. Otherwise, WPC would stop the press as soon as the stopping time increased just slightly. This extra time is referred to as "T_{bm}." The stopping time plus T_{bm} will be the stop time limit setting.

NOTICE

$T_{\mbox{bm}}$ STOP TIME LIMIT ADJUSTMENT FOR BRAKE WEAR: 10% FOR OLD BRAKES, 20% FOR NEW BRAKES

The rule of thumb for determining the best stop time limit is to add 20% to the stopping time of your press if your brakes are new, and 10% if your brakes are old.

Here is the reasoning behind this guideline: Stopping time should be less with new brakes. So when the 20% is added to stopping time, the number should be approximately the same as the number you get when you add 10% to stopping time for older brakes.

Examples for Calculating the Stop Time Limit

Example 1: Your recorded stopping time is 207 ms and your brake is old:

Take 10% of 207: $T_{bm} = 0.10 \times 207 = 20.7$ — round it up to 21 —Add 21 to 207207 + 21 = 228228 ms is the calculated stop time limit.

Example 2: Your recorded stopping time is 175 ms and your brake is new:

Take 20% of 175:	T _{bm} = 0.20 x 175 = 35	
Add 35 to 175	175 + 35 = 210	
210 ms is the calculated stop time limit.		

Determining the 90° Stop Time (T_S)

The 90° stop-time test is required in order to set the proper safety distance for personnel guarding devices including light curtains, two-hand controls, and type-B movable barriers. This test is done at the press's most critical stopping point — 90°. The worst-case scenario occurs halfway on the down stroke, at 90°. Therefore, WPC is designed to check stopping time at that critical crankshaft angle, and provides you the T_8 value referenced in ANSI B11.1-2001 (Appendix A).

- If your press can run in continuous mode, perform the 90° stop-time test as described in the next section.
- If your press does not run in continuous mode, run the 90° stop-time test as described starting on page 101.

Performing the 90° Stop Test (Continuous Mode)

A DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the stop time limit of WPC. (See "Determining the 90° Stop Time (T_S)," page 99.)
- Recalculate the safety distance based on the new stop time limit and adjust or reinstall safeguarding devices according to the new safety distance. (See "Calculating the Safety Distance," page 101.)

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

NOTICE

If your press does not run in Continuous mode, run the 90° stop test in Single Stroke mode. See page 101.

- 1. Install the heaviest upper die set into your press. Adjust the counterbalance for ram weight, if your press has a counterbalance. Set the Stroke Selector switch to Continuous and start the press.
- 2. At WPC, select "90° Stop Test" using the Reset/Select button. See Figure 3-7. Also refer to "How to view information on the display" in Chapter 4 if you need assistance. Now locate the WPC Settings adjustment key switch, and turn the key counterclockwise toward "+." This arms the test.

NOTICE

The first time you run this test after initialization, the display will show a value of "0" (zero) until the test is completed. After that, the display shows the previously measured stopping time.

NOTICE

The "90° Stop Test" display indicator will flash to alert you that the test has been armed. (To cancel the test, press the Reset/Select button once *before* starting the press.)



Figure 3-7. Display Indicator Highlighting "90° Stop Test"

3. Once you have armed the 90° stop-time test, WPC will stop the press the next time it reaches 90°.

NOTICE

This test should be performed while the press is running in continuous mode. While the press is running, select "90° Stop Test" using the Reset/Select button. Again, turn the WPC Setting key counterclockwise toward "+." The press will automatically be initiated to stop at 90°.

- 4. Record the information displayed on the LED display (make sure that "90° Stop Test" is still highlighted on the display indicator). The stop time value is displayed in milliseconds. One millisecond equals 1/1000th of a second (1ms = 0.001 sec).
- 5. Repeat the test 5 more times. Record the highest reading from all your tests. This is the stop time value to use when calculating safety distance.

Performing the 90° Stop Test (Single Stroke Mode)

A DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the stop time limit of WPC. (See "Determining the 90° Stop Time (T_S)," page 99.)
- Recalculate the safety distance based on the new stop time limit and adjust or reinstall safeguarding devices according to the new safety distance. (See "Calculating the Safety Distance," page 101.)
- Run the 90° Stop Test in Continuous mode if your press can operate in Continuous. See the instructions in the previous section.

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

- 1. Install the heaviest upper die set into your press. Adjust the counterbalance for ram weight, if your press has a counterbalance. Set the Stroke Selector switch to Single Stroke.
- At WPC, select "90° Stop Test" using the Reset/Select button. See Figure 3-8. Also refer to "How to view information on the display" in Chapter 4 if you need assistance. Now locate the WPC Settings adjustment key switch, and turn the key counterclockwise toward "+." This arms the test.

NOTICE

The first time you run this test after initialization, the display will show a value of "0" (zero) until the test is completed. After that, the display shows the previously measured stopping time.

NOTICE

The "90° Stop Test" display indicator will flash to alert you that the test has been armed. (To cancel the test, press the Reset/Select button once *before* starting the press.)

3. After you have armed the 90° stop-time test, press and hold the run buttons to initiate a stroke. WPC will stop the press when it reaches 90°.



Figure 3-8. Display Indicator Highlighting "90° Stop Test"

- 4. Record the information displayed on the LED display (make sure that "90° Stop Test" is still highlighted on the display indicator). The stop time value is displayed in milliseconds. One millisecond equals 1/1000th of a second (1ms = 0.001 sec).
- 5. Repeat the test 5 more times. Record the highest reading from all your tests. This is the stop time value to use when calculating safety distance.

Setting the Stop Time Limit

DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the stop time limit of WPC. (See "Determining the 90° Stop Time (T_S)," page 99.) Base the stop time limit on the actual stopping time.
- Recalculate the safety distance based on the new stop time limit and adjust or reinstall safeguarding devices according to the new safety distance. (See "Calculating the Safety Distance," page 101.)
- Use option switch 7 to prevent anyone from making changes stop time limit and auto carryup angle. See "Switch 7 – Disable Changes to Stop Time Limit and Auto Carry-up Angle," page 113, for more information.

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

A DANGER

SAFETY SETTINGS CAN BE CHANGED WHEN KEY IS IN SETTINGS KEY SWITCH

Use option switch 7 to prevent anyone from making changes stop time limit, top stop angle and auto carry-up angle. See "Switch 7 –Disable Changes to Stop Time Limit and Auto Carry-up Angle," page 113, for more information.

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

By now, you should have determined the actual stopping time of the press, and have calculated the stop time limit. The built-in brake monitor will stop the press if the stopping time exceeds the stop time limit.

You set the actual stop time limit of the press based upon the press's actual stopping time. You will enter the number in milliseconds (ms), and this value should be greater than the measured stopping time, to compensate for *normal* brake wear.

1. Set Option Switch 7 to OPEN to allow the stop time limit to be adjusted (see Switch 7 information on page 113).

- 2. With power ON to WPC and the press in "INCH" mode, select "Stop Time Limit" using the Reset/Select button. Notice that when that selection is highlighted, the factory setting of 500 milliseconds appears on the LED display.
- 3. Locate the WPC SETTINGS adjustment key switch.
- 4. To decrease the number, turn the key toward "–"(clockwise). Holding the key in that position makes it decrement by 10 ms at a time. To increase the number from 500, turn the key toward "+"(counterclockwise). Holding it there makes the value increase by 10 ms at a time. When the correct stop time limit shows on the display, go to the next step.
- 5. When you have finished adjusting the stop time limit, set Option Switch 7 to CLOSED to prevent the stop time limit from being changed. Cycle the power to WPC off and on to make this change in switch setting take effect.

Calculating the Safety Distance

A DANGER

PRESS MAY NOT STOP BEFORE OPERATOR REACHES PINCH POINT

- Calculate the safety distance according to the applicable safety regulations, the instructions in this chapter and in your light curtain user manual.
- Mount the Shadow light curtain heads at least the safety distance away from the nearest pinch point or hazardous area of your press. The figure below shows how to measure the distance between the light curtain and the pinch point or hazardous area of your press.
- Mount your two-hand control at least the safety distance away from the nearest pinch point or hazardous area of your press if you are using the two-hand control as a safety device.
- Mount your light curtain heads at least 7 ½ " (19.1 cm) from the nearest pinch point hazard, even if that is greater than the safety distance you calculate.

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



Figure 3-9. Distance Between Light Curtain and Pinch Point on a Press.

Before you can calculate the correct safety distance, you must know your press's stopping time. You can find the press's stopping time using WPC. You must use the 90° stop time test to find stopping time. This is required by OSHA regulation 1910.217. During this test, the press control stops the press at 90° of the stroke and displays stop time. How to perform this test is covered in the previous section.

Once you know the press's stopping time, you can calculate the safety distance. Shadows must be mounted away from the pinch point (or hazardous area) of the machinery at a specific distance. This distance is based on stopping time. The safety distance must be calculated using a precise formula. This ensures that Shadow can send the stop signal to the press, and the press will stop, before the operator's hand reaches the hazardous area. (The safety distance is also discussed in Shadow light curtain user manuals.)

ANSI and OSHA Safety Distance Formulas

You are governed by Occupational Safety and Health Administration (OSHA) regulations when mounting a Shadow light curtain or two-hand control used as safeguarding devices. The Shadow or two-hand control must be located at the correct safety distance from the pinch point. OSHA regulation 1910.217 specifies requirements for light curtains when used with mechanical power presses.

When calculating safety distance, however, Honeywell recommends you use the formula from the American National Standards Institute (ANSI)—standard B11.1-2001. The formula represents a new consensus among manufacturers on the proper installation of light curtains. It takes into account more factors (such as brake monitor setting, object sensitivity, and depth penetration factor) than the OSHA formula. It has been developed specifically for guarding of mechanical power presses. For complete information on OSHA regulation 1910.217 and ANSI standard B11.1-2001, see Appendix A. Both the ANSI and OSHA formulas are explained in the next sections.

A WARNING

PRESS MAY NOT STOP BEFORE OPERATOR REACHES PINCH POINT

- Calculate the safety distance carefully according to the instructions below.
- Mount your light curtain heads at least the safety distance from the hazardous area. If a light curtain is too close to the hazard, there may not be enough time for the press to stop before the operator's hand (or another object) reaches the hazard.
- Mount your two-hand control, if you are using it as a safety device, at least the safety distance from the hazardous area. If the two-hand control is too close to the hazard, there may not be enough time for the press to stop before the operator's hand (or another object) reaches the hazard.
- Call Wintriss Tech Support if you are not sure how to calculate the safety distance.

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

ANSI Safety Distance Formula

This is the formula Honeywell recommends for calculating the safety distance when using light curtains:

 $D_S = K x (T_S + T_c + T_r + T_{bm}) + D_{pf}$

 $\mathbf{D}_{\mathbf{S}}$ is the safety distance we will find using the formula.

K is the OSHA-recommended hand-speed constant. This constant is 63 inches-persecond. The hand-speed constant indicates how far you could theoretically move your hand and arm in one second.

 T_s is the stopping time of a press in seconds. It is measured at approximately 90° of crankshaft rotation (or at maximum closing velocity).

 T_c is response time of the press control. This is the time it takes for the control to activate the machine's brake. In the 90° stop time test using WPC, the stop time readout includes

the stop time of the press and response time of the press control. How to do the 90° stop time test is described earlier in this chapter.

 T_r is the response time of the light curtain. Response time for Shadow V is 30 milliseconds (50 milliseconds for 36" and 48" Shadow V light curtains).

 T_{bm} is the additional time added to the stop time of the press to allow for brake wear. You must allow extra time for brake wear because any safety distance based only on stop time will become too short as the brake wears. T_{bm} is calculated when you set the stop time limit for the WPC brake monitor. You must calculate and set the stop time limit before calculating safety distance for the light curtain. You are told how to calculate T_{bm} when setting the stop time limit.

 $\mathbf{D_{pf}}$ is the depth penetration factor. This is a measure of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts. $\mathbf{D_{pf}}$ is related to the object sensitivity of Shadow. Object sensitivity is the smallest diameter object Shadow will detect anywhere in its field.

Object sensitivity (S) for Shadow V is 1.25" (3.2 cm). Based on S and ANSI B11.1–2001, $\mathbf{D_{pf}} = 3.3$ " (8.4 cm)

For Shadow V with one beam blanked, $\mathbf{S} = 2$ " (5.1 cm) and $\mathbf{D_{pf}} = 5.9$ " (15 cm). This means $\mathbf{D_{pf}}$ increases by 2.6" (6.6 cm) when you add one blanking window.

NOTICE

ANSI SAFETY DISTANCE FORMULA FOR USE WITH TWO-HAND CONTROL

The formula for safety distance when using a two-hand control as a safeguarding device is similar to the formula above, but does not include the response time of the light curtain nor the depth penetration factor. The following is the ANSI formula for calculating the safety distance for use with two-hand controls:

 $D_{S} = K \times (T_{S} + T_{C} + T_{bm})$

If you use a two-hand control as a safeguarding device, use this formula and perform the calculation in a fashion similar to that described for the light curtain formula.

Example: Calculating Safety Distance (D_S) with Light Curtain Using the ANSI Formula

Use the ANSI formula:

 $D_s = K \times (T_s + T_c + T_r + T_{bm}) + D_{pf}$

In this example, assume that the 90° Stop Time Test indicated 190 milliseconds, and use the following values for the variables:

K (hand speed constant) = 63 inches per second (set by OSHA)

 $T_r = 0.030$ sec. (response time of Shadow)

Take **T**_{bm} from Example 2 of the Stop Time Limit calculations performed earlier in this chapter.

 $T_{bm} = 0.210$ sec. (brake monitor setting) - 0.175 sec = 0.035 sec.

D_{pf} = 3.3

Now let's put our numbers into the formula:

 $D_{s} = K x (T_{s} + T_{c} + T_{r} + T_{bm}) + D_{pf}$

 $\mathbf{D_S} = 63 \times (0.190 + 0.030 + 0.035) + 3.3$

 $D_{S} = (63 \times 0.255) + 3.3$

D_{**S**} = 16.1 + 3.3

D_S = 19.4"

The distance the light curtain must be mounted from the pinch point in our example is 19.9." When using the formula, be sure to do all calculations in this order:

(1) Add $T_s + T_c + T_r + T_{bm}$ first.

(2) Multiply the result by 63.

(3) Add this result to D_{pf} . This is D_s .

If you do no follow this order, your safety distance calculation will be incorrect.

OSHA Safety Distance Formula

A WARNING

INCORRECT SAFETY DISTANCE

Use the stopping time measured in the 90° stopping time test. If you do not do this, the safety distance may be too small to allow the press to stop before someone reaches the hazardous area. See "Determining the 90° Stop Time (T_S)," page 99 for instructions on performing this test.

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

The OSHA safety distance formula as specified in OSHA regulation 1910.217 is explained below. As noted earlier, Honeywell recommends you use the American National Standards Institute (ANSI) formula, page 105, for calculating safety distance. It contains more factors that allow you to calculate the safety distance more accurately.

Here is the OSHA safety distance formula:

 $\mathbf{D}_{\mathbf{S}} = 63$ inches/second x $\mathbf{T}_{\mathbf{S}}$

D_S is safety distance.

63 inches-per-second is the OSHA-recommended hand-speed constant.

 T_s is the stopping time of the press in seconds as measured at approximately 90° of crankshaft rotation (or at maximum closing velocity). T_s must include all components that are involved in stopping press. It must include response time of the press control that activates the brake and response time of the light curtain (30 ms for 24" and smaller Shadow V).

NOTICE

OSHA SAFETY DISTANCE FORMULA FOR USE WITH TWO-HAND CONTROL

The formula for safety distance when using a two-hand control as a safeguarding device is similar to the formula above, but does not include the response time of the light curtain nor the depth penetration factor. Use the same OSHA formula for calculating the safety distance for use with a two-hand control:

 $\mathsf{D}_\mathsf{S} = 63 \ \mathsf{x} \ \mathsf{T}_\mathsf{S}$

As indicated above, T_S must include all components that are involved in stopping the press, including the response time of the press control.

In the 90° stop time test using WPC, the stop time readout includes the stop time of the press and response time of the press control. See "Determining the 90° Stop Time (T_S)," page 99 for instructions on performing this test.

An Example of Calculating the Safety Distance Using the OSHA formula

The OSHA formula for finding safety distance is: D_S = 63 inches/sec. x T_S

We will use a stop time of 0.190 seconds for this example. This number includes press stopping and response time of WPC.

Next we will add in the braking percentage factor. Let's say our brakes are new. Then we will add 20% additional time to the stop time measurement ($.20 \times 0.190 = 0.038$).

We also must add response time of Shadow V (.030 seconds). Then:

T_S = 0.190 sec. + 0.038 sec (braking factor) + 0.030 sec. (Shadow response time)

T_S = 0.258

Now, we will calculate safety distance:

$$D_{S} = 63 \text{ in/sec x } T_{S}$$

 $D_{S} = 63 \times 0.258$
 $D_{S} = 16.3 \text{ in.}$

Shadow must be mounted more than 16.3 inches from the pinch point using the OSHA formula.

Adding to Safety Distance for Floating or Blanking Windows

The above examples showed how to calculate the safety distance for Shadows when blanking windows were not used. If using blanking windows, you must add 2.6" (6.6 cm) to the calculated safety distance. This applies whether you use the ANSI or OSHA formula.

So remember this rule: when a blanking or floating window is used, you must add 2.6" (6.6 cm) to the safety distance. Blanking windows and floating windows are discussed in your Shadow light curtain user manual.

Figure 3 (for Herion valve) or Figure 5 (for Ross) found at the end of this manual shows wiring connections between Shadow V and WPC. See Figure 12 for wiring to Shadow VI.

For Shadow I or Shadow II wiring, contact Wintriss Tech Support. Note that when you connect Shadow I to WPC, WPC requires use of a device called a level shifter, available from Wintriss Tech Support. This is because WPC checks Shadow I for proper operation on every stroke. The level shifter is required for Shadow I because it has no specific terminals for making this test. Shadow V, on the other hand, has built-in terminals.

Setting Micro-Inch

Now we are going to set "Micro-inch." Micro-inch is the amount of time *in milliseconds* that the Dual Safety Valve is open when the Inch stroke is selected. In this mode, you determine how long the ram will travel once the RUN/INCH buttons on the operator station are pressed. The value you select can range from 6 to 600 milliseconds.

The press operates the same way that it does during TOP STOP INCH. However, no matter how long the switches have been pressed, the clutch is engaged for the time that you set at WPC. You can stop the ram before the set time by releasing the switches. To jog the ram through a complete stroke, press and release the RUN/INCH buttons as often as necessary.

You can enable Micro-inch permanently, as described in the section "Wiring Micro-inch," page 48, or you can turn Micro-inch on and off with a user-supplied key switch, also described in "Wiring Micro-inch."

NOTICE

INTERRUPTED STROKE

- If an interrupted stroke occurs when the press is in Inch mode, it stays in Inch mode.
- If the press is in any other mode, the control automatically switches to TWO HAND MAINTAINED SINGLE STROKE, even if Micro-inch or top stop bypass has been enabled. See "Interrupted Stroke," page 148 for an explanation of "interrupted stroke."

How to Set Micro-inch

1. With power ON to WPC and the press in "INCH" mode, press the Reset/Select button so that the display indicator highlights "Micro-inch." See Figure 3-10.



Figure 3-10. Illustrating Micro-inch

- 2. Look at the WPC display, and locate the WPC Settings adjustment key switch found to the right of the Reset/Select button.
- 3. To adjust the number in milliseconds, either turn the WPC Settings adjustment key switch toward "+" or "-." When you turn the key toward "+"(counterclockwise), this increases the time that the valve is open in Micro-inch. Turning the key toward "-"(clockwise) decreases that time.

Setting the Press Option Switches

There are several press option switch settings described in this section that you need to make so that WPC is fully operational. These changes are to be made on the switches located on a switch block at the top of the control board. This switch block is labeled "S301 OPTIONS." (Refer to Figure 2-9f for a layout of the display interface board in Chapter 2.)

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE THE ENCLOSURE

Turn off and disconnect power from WPC and from the machinery it is connected to before making any wiring connections or settings inside the enclosure. This includes power to the machine control and motor.

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

NOTICE

TO ENABLE NEW SWITCH SETTINGS POWER DOWN WPC AND POWER UP AGAIN

After you change switch settings you must power down the WPC and power up again to enable the new settings. If you do not this, the previous switch settings will remain in effect.

Switches 1 and 2 – Overrun Limit Switch Setting

There are four combinations that you can make to set the overrun limit switch. Choose the proper <u>unzeroed</u> resolver angle settings: 270°, 300°, 330°, or 359°, and record them below. Remember that the overrun limit switch must be mounted as close as possible after the latest top stop angle as per the table below. To determine the correct angle settings, see "Setting Up the Top Stop "ON" Angle and Determining Test Angle for Overrun Limit Switch," page 91.

Top Stop Angle	Less than 240°	241° to 270°	271° to 300°	More than 301°	Your selection
Overrun Limit Switch location	270°	300°	330°	359°	
Switch Setting 1 Switch Setting 2	CLOSED CLOSED	CLOSED OPEN	OPEN CLOSED	OPEN OPEN	

Fable 3-2.	Overrun	Limit	Switch	Setting
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Be sure to record <u>your</u> selection!

Switch 3 – One-hand Control or Foot Switch Mode

If you are using either the One-hand Control switch or Foot switch, Switch 3 changes functionality of one of these options installed with your WPC.

In **One-hand mode**, the One-hand Control switch can be used instead of the operator station to single stroke the press. When Switch 3 is set to "CLOSED," this activates Light Curtain Break mode, so that the press runs only after you remove your hands from the light curtain and push the One-hand Control switch within eight seconds. Otherwise, the press will not start. The light curtain must be broken again before you can initiate the next stroke. When Switch 3 is set to "OPEN," One-hand Control is enabled all the time, just like the One-hand Control on your operator station. This allows you to initiate a single stroke every time you push the One-hand Control switch.

If you are using **Foot Switch mode**, Switch 3 enables either Foot Trip or Foot Control. Set Switch 3 to "OPEN" for Foot Trip, so the press runs for one stroke after you depress the Foot Switch. Set Switch 3 to "CLOSE" for Foot Control. In Foot Control, you must depress and **hold** the Foot Switch through the Auto Carry-up Angle to single stroke the press. If you release the Foot Switch early, the press stop command is issued immediately.

Switch 3 Setting	One-hand Control	Foot Switch
OPEN	One-hand Control active all the time	Normal operation (Foot Trip)
CLOSED	"Light curtain break" mode: One-hand Control active only for 8 sec after light curtain is broken	Enables Foot Control: depress and hold foot switch

Switch 4 – Auto Compensated Top Stop ("ACTS") Enabled (Optional)

Set this switch to CLOSED to activate the "Auto Compensated Top Stop" feature. Set to "OPEN" to run the press in normal mode. You must have the correct optional firmware to use ACTS.

This feature is specifically designed for variable speed presses. WPC assumes that the Top Stop Angle (programmed previously) is set at the <u>slowest</u> speed resulting in the shortest stopping angle (if necessary, refer to "Setting up the Top Stop Angle and determining the correct test angle for the Overrun Limit Switch" earlier in this chapter). As the press runs faster, the stopping angle increases. Auto Compensated Top Stop (ACTS) notices when the press has not stopped exactly on top, and compensates the Top Stop Angle by advancing its position. ACTS cannot advance beyond 211 degrees (the same limit as with the manual Top Stop Angle setting). ACTS will require a few top-stops so that the press stops as close to 0° as possible. ACTS will also compensate against a longer stopping angle due to brake wear. It is, therefore, critical to set your brake monitor correctly so that the Brake Warning feature gives you advance notice for proper brake maintenance.

Switch 4 Setting	Press operation Normal / ACTS
OPEN	Normal operation
CLOSED	Auto Compensated Top Stop feature enabled

Switch 5 – Prior Act Timing for Automatic Single Stroke and Continuous on Demand

Option Switch 5 sets the prior act timing for Automatic Single Stroke mode and for Continuous on Demand mode. The switch in the OPEN position selects the shorter prior act time for both modes (30 seconds/1 minute, respectively). The switch in the CLOSED position selects the longer prior act time for both modes (5 minutes/10 minutes, respectively). Refer to the table below .

For more information about Automatic Single Stroke mode, see pages 63 and 160. For more information about Continuous on Demand mode, see page 164.

Option Switch 5 Setting	Prior Act Timing for Automatic Single Stroke	Prior Act Timing for Continuous on Demand
OPEN	30 seconds	1 minute
CLOSED	3 minutes	10 minutes

Switch 6 – Dual Light Curtain Enabled

Set this switch to CLOSED if you have two light curtains connected to WPC. Refer to Figures 3 or 12 (for Herion valve) or Figure 5 (for Ross) to properly wire the dual light curtains (end of this manual).

Option Switch 6 Setting	Light Curtain Configuration
OPEN	Single light curtain – normal operation
CLOSED	Dual light curtains enabled

Switch 7 – Disable Changes to Stop Time Limit and Auto Carry-up Angle

With this switch OPEN, you can change the settings for Stop Time Limit and Auto Carry-up Angle. When this switch is set to CLOSED, you cannot change these settings.

Option Switch 7 Setting	Changes to Stop Time Limit and Auto Carry-up Angle
OPEN	Enabled
CLOSED	Disabled

NOTICE

CHANGE FROM PREVIOUS VERSIONS OF WPC: TOP STOP IN INCH DISABLED WITH INPUT PIN 13

To disable top stop in inch, connect on the WPC processor board, connect Pin # 13 to +24 VDC. (Previous versions used Switch 7)

Switch 8 – Top Stop Mode for F and H Errors and Auxiliary 1 Response to Interrupted Stroke

NOTICE

NEW SETTINGS NOT ENABLED

Power down WPC after making switch settings during initialization and then power up WPC to enable those settings.

Switch 8 controls two different functions:

- Top Stop mode for F and H errors
- How Auxiliary Output 1 responds to an Interrupted Stroke condition (see below)

See the following two sections for descriptions of how to use Switch 8 to control these functions.

Switch 8: Selecting Top Stop Mode for F and H Errors

You can use option switch 8 inside the unit to select whether the unit top stops the press immediately if the error occurs after a crank angle of 210°. (See "Setting the Press Option Switches," page 110.)

Option Switch 8 Setting	Top Stop Behavior for F and H Errors
OPEN	If the error occurs after 210°, the control allows the press to complete another stroke before it top stops.
	If the error occurs before 210°, the control top stops the press on the same stroke.
CLOSED	The control top stops the press on the current stroke, even if the error occurs after 210°

Set switch 8 according to the following:

Switch 8: Selecting Auxiliary Output 1 Response to Interrupted Stroke

A DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use auxiliary outputs 1, 2 and 3 for non-safety functions only. They cannot protect personnel from a moving hazard. You can use them for convenience in automation.

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

The setting of this switch affects how Auxiliary output 1 responds to an Interrupted Stroke condition as indicated below. See also "Wiring Auxiliary 1," page 45.

Option Switch 8 Setting	Auxiliary Output 1
OPEN	 Turns OFF when one of the following occurs: an Interrupted Stroke* condition a fault condition (error code displays) an E-stop string opens a light curtain interruption while press is running
	Stays ON in Interrupted Stroke condition if no error code or E- stop occurs.
CLOSED	 Turns OFF when one of the following occurs: a fault condition (error code displays) an E-stop string opens a light curtain interruption while press is running

* In Inch mode, you can run a complete stroke without causing an Interrupted Stroke. Interrupted stroke is caused only when you release your hands from the run/inch buttons in the middle of the stroke. If you inch the entire stroke without releasing your hands, no Interrupted Stroke is caused.

Setting Programmable Cams (Optional)

With WPC, you may have received an optional four-channel programmable cam output that you can set using the WPC settings key switch and displays. Be sure the programmable cam output is installed according to "Installing 4-channel Programmable Cam (Optional)," page 49.

NOTICE

The following procedure cannot be done while the press is running.

How to Set Cam Channels

Follow the steps below to set the cam channel ON and OFF angles. An example of setting up a cam channel starts on page 116.

- 1. Turn the stroke select switch to INCH.
- 2. Enable the cam setting function by one of the following methods.
 - Set switch block S302 on the WPC display interface board to "SET CAMS." (See Figure2-9f for location of S302.)

or

• Ground terminal #156 on the display board through an auxiliary user-supplied key switch. (To wire this switch, see instructions on page 55.)



Figure 3-11. Indicating Cam Channel Settings

3. As shown in the figure above, the indicator segments on the display are used to indicate which cam channel ON or OFF angle you are programming. Press the Reset/Select button one or more times, until the segment lights up for the cam channel and angle you want to program.

NOTICE

The labels on the display do not change, but the segment that lights up shows which cam channel and angle you are programming, as shown in Figure 3-11.

- 4. Watch the numerical display, which shows the number of degrees for the angle you are setting. Use the WPC settings key switch to change the number of degrees:
 - Turn the settings switch toward "+" (counterclockwise) to **increase** the angle.
 - Turn the settings switch toward "–" (clockwise) to **decrease** the angle.

Notice that the clock display shows the arc of the ON and OFF angles (Figure 3-12).

- 5. Repeat steps 3 and 4 for ON and OFF angles for each channel you are using.
- 6. When you are finished setting up the cam channels, return the WPC to normal operation by reversing whichever method you used in step 1 to enable programming the cams:
 - Set switch block S302 on the WPC display interface board back to "NORMAL"
 or
 - Remove ground from terminal #156 on the display board by use of your key switch wired as described in step 1.
- 7. Press the Reset/Select button one more time. Continue setting up your WPC or proceed to the "Final Checkout," page 118.

NOTICE

If you do not set the WPC back to normal operation, as described in step 6, the WPC will remain in cam-setting mode and you will not be able to view or adjust Top Stop Angle, Auto Carry-up Angle and the other settings labeled on the indicator display.

Example: Setting Cam Channel 1 ON (33°) and OFF (359°) Timing

- 1. Enable cam channel setting by
 - switching S302 on the WPC display interface board to "SET CAMS." (See Figure2-9f for location of S302.)

or

- grounding terminal #156 on the display board through an auxiliary user-supplied key switch. (To wire this switch, see instructions on page 55.)
- 2. Make sure the press is in "INCH" mode.
- 3. Refer to the previous figure and/or the next figure to find the location of the Channel 1 ON and OFF indicator segments on the display. Press the Reset/Select button one or more times, until the Channel 1 ON indicator segment illuminates.
- 4. Set the ON angle by turning the WPC Settings key switch toward "--" or "+" until the correct ON angle shows on the numerical display, 33° in this example.
- 5. Press the Reset/Select button once so that the indicator segment for Channel 1 OFF illuminates.
- 6. Set the OFF angle by turning the WPC Settings key switch toward "–" or "+" until the correct OFF angle shows on the numerical display, 359° in this example. The clock display shows the angular arc of the cam setting, ON at 33° and OFF at 359°.

- 7. Set the WPC back to its normal operating mode by reversing what you did in step 1:
 - Set switch block S302 on the WPC display interface board back to "Normal."

or

- Remove ground from terminal #156 on the display board by use of your key switch wired as described in step 1.
- 8. Press the Reset/Select button one more time.



Figure 3-12. Example: Setting Channel 1 Cam Timing to 33° ON, 359° OFF

Section 2 – Final Checkout

DANGER

INJURY DURING TESTING

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

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

A DANGER

INCORRECT INSTALLATION

- Perform the necessary checkout procedures according to the instructions in this manual.
- Ensure that all procedures are performed by qualified personnel.

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

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

A WARNING

TOOLS OR OTHER MATERIAL IN THE DIE

Ensure that there are no tools or other material in or near the die before running the press.

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

NOTICE

Before performing the checkout and troubleshooting procedures, set the switches on the control enclosure to the following positions:

STROKE SELECT to OFF MODE SELECT to TWO HAND This section describes the checks and tests that you need to perform in order to verify that your WPC is fully operational. You must go through these tests *before* your proceed to Chapter 4.

Power Supply Test, page 120 Shadow Light Curtain Test, page 121 System Static Test, page 123 Single Stroke Mode Test with Light Curtain, page 125 Single Stroke Mode Test Without Light Curtain(s), page 128 Continuous Mode Test with Light Curtain, page 132 Continuous Mode Test without Light Curtain(s), page 134 Foot Switch Test (for Units with Optional Foot Switch), page 136 One-hand Control Switch Test , page 138 Bar Mode Control Test – Optional, page 139

Perform the following procedures to verify that your newly installed Wintriss Clutch/Brake Control System is installed and set up correctly. Start with the power supply test and continue through continuous mode test appropriate to your press. If your WPC has a foot switch or a Bar Mode Control, then complete the remaining tests, for foot switch, one-hand control and bar mode, if your installation has these features. These procedures will also help you troubleshoot malfunctions that may occur with the control system.

In the event your WPC fails a test, you will be directed to follow step-by-step procedures to isolate and correct the problem. If you are unable to correct a problem, contact Wintriss Tech Support for assistance. Do not run the press until the problem has been corrected. Do not attempt to replace any components on your new WPC unless instructed to by Wintriss Tech Support.

Power Supply Test

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

Refer to the LED maps on pages 140 (right/center) and 141 (left) when you perform this test.

- 1. At the control enclosure, open the front cover.
- 2. Turn on the power to WPC.
- 3. At the control board, check whether the +24 VDC, +5 VDC A, and +5 VDC B LED indicators are illuminated.
 - If all these LEDs are on, go to the test in the next section.
 - If all the LEDs are off, check that line voltage is being applied to the system. Then check power fuse labeled F1 found on the power supply board (see pages 33 and 35 for power supply board layouts). If necessary, power down the WPC and replace the fuse. Go to step 2. If the LEDs are still off, call Wintriss Tech Support.
 - If only the +24VDC is unlit, check the 24 volt power fuse found on the power supply board (see pages 33 and 35 for power supply board layouts). If necessary, power down the WPC and replace the fuse. Go to step 2. If the +24VDC LED is still off, call Wintriss Tech Support.
 - If one or both of the +5 VDC LEDs are unlit, call Wintriss Tech Support.

Shadow Light Curtain Test

WPC tests whether your Shadow(s) are working properly by momentarily de-energizing the Shadow transmitter whenever the press is started and stopped. WPC also ensures that the Emergency stop relays are open.

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

Perform this test to verify that your Shadow V or Shadow VI light curtain is wired and installed properly and operating correctly. If you have more than one light curtain on your press, perform this test on each light curtain.

- 1. Power up the light curtain. Look at the Shadow transmitter to see if the amber (power-on) indicator is illuminated.
 - If the transmitter's amber indicator is lit, go on to the next step.
 - If the transmitter's amber indicator is not lit, power down the light curtain, check the wiring to the transmitter and check the power fuse (in the receiver for Shadow V, in the control box for the Shadow VI) and replace if necessary. Power up again. If the amber indicator is still off, power down the transmitter and replace the indicator. Power up again. If the amber indicator is still not lit, call Wintriss Tech Support.
- 2. At the Shadow receiver, see if the green (curtain clear) indicator is lit.
 - If the receiver's green indicator is lit, go on to the next step.
 - If the receiver's red indicator is lit, realign the light curtain heads. If the receiver's red indicator is still lit, check the interrupt circuit. The following terminal on your unit should read 0 V relative to ground:

Shadow V: INT terminal in the transmitter Shadow VI: pin #19 on TB4 in the control

If the terminal does not read 0 V relative to ground, check and correct the ground wiring for the unit. If this does not cause the green indicator to come on, call Wintriss Tech Support.

- If neither the receiver's green nor red indicator is lit, power down the unit and check the wiring to the receiver. Also check the power fuse (in the receiver for Shadow V, in the control box for the Shadow VI), and replace if necessary. Power up again. If the receiver's green and red indicators are still off, replace them. If none of these remedies corrects the problem, call Wintriss Tech Support.
- 3. Block the light curtain. On the receiver, the green indicator should turn off and the red indicator should light up.

- If the receiver's green indicator goes off and the red indicator lights up, this is correct. Go to the next step.
- If the receiver's green indicator stays on when the curtain is blocked, check the wiring and repeat this step. If the green indicator still stays on, call Wintriss Tech Support.
- 4. Remove the obstruction from the light curtain. At the receiver, verify that the red indicator goes off and the green indicator comes on.

Refer also to the troubleshooting information in your light curtain user manual. If you have any difficulty with this test, call Wintriss Tech Support for assistance.

System Static Test

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

- 1. Turn off the system air and bleed down the system air pressure.
- 2. At the control enclosure, set the STROKE SELECT switch to INCH.
- 3. The LED display shows the crank angle. Notice whether the INTERRUPTED STROKE indicator is on.
 - If the INTERRUPTED STROKE indicator is on, go to the next step.
 - If the INTERRUPTED STROKE indicator is off, check inside the control enclosure, at the control board, whether "INCH SEL" LED is on. If it is not, check the stroke selector switch wiring and correct any problems. If the "INCH SEL" LED is still off, call Wintriss Tech Support.
- 4. At the Operator Station, press and hold the EMERGENCY STOP / RESET button.
- 5. Notice that "F13" appears on the LED display.
 - If a status code "F13" appears, go to the next step.
 - If "F13" does appear, at the control board, check whether the "E-stop #1 input" and "E-stop #2 input" LEDs turn off when the EMERGENCY STOP / RESET button is been pressed. If they do not turn off, check the wiring and correct any problems. If they still do not turn off, call Wintriss Tech Support.
- 6. Turn on the press motor (forward rotation, if applicable).
- 7. At the control board, check whether the "Motor Forward" LED is on when the motor is running in the forward direction.
 - If the Motor Forward LED is on, go to the next step.
 - If the Motor Forward LED is off, check the wiring and correct any problems. If it is still off, call Wintriss Tech Support.
- 8. At the Operator Station, push both RUN/INCH buttons at the same time.
- 9. Notice whether "F48" appears on the LED display.

NOTICE

If the E-stop and top stops are not connected according to Figure 2 (end of this manual), the status code may be different. Call Wintriss Tech Support for assistance.

- If F48 appears, go to the next step
- If F48 does not appear, at the control board, locate the "System Air Pressure" LED. It should not be illuminated. Check the wiring and correct any problems. Push both

RUN/INCH buttons at the same time. If F48 still does not appear, call Wintriss Tech Support.

- 10. Apply system air pressure to the press.
- 11. At the control board, check whether the "System Air Pressure" LED is turned on. Clear the error code on the display by pushing the Reset/Select button.
- 12. Turn off the counterbalance air pressure and bleed down the counterbalance air pressure.
- 13. At the Operator Station, push both RUN/INCH buttons at the same time. The ram should not move, and the error code should appear that is associated with the input the counterbalance pressure switch is connected to. (See "Table 2-1. User Inputs (Interlocks), Standalone WPC," page 43.)
 - If the ram does not move and the appropriate error code appears, this is correct. Restore the counterbalance air, push the Reset/Select button and go on to the next step.
 - If the ram moves and/or if the appropriate code does not appear, check the wiring and correct any problems. Push both RUN/INCH buttons at the same time. If the press still runs and/or the appropriate code still does not appear, call Wintriss Tech Support.

NOTICE

If the E-stop and top stops are not connected according to Figure 2 (end of this manual), the fault code may be different. Call Wintriss Tech Support for assistance.

14. At the Operator Station, press the EMERGENCY STOP / RESET button. Go on to the next test.

NOTICE

While the EMERGENCY STOP / RESET button is pressed, "F13" should appear on the LED display.

Single Stroke Mode Test with Light Curtain

DANGER

INJURY DURING TESTING

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

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

A DANGER

CONTINUOUS MODE USED INADVERTENTLY

Disconnect the "Continuous" position on the stroke selector switch and cover the "CONT" label on your control if you will not use your press in Continuous mode.

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

A WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

1. Set the STROKE SELECT switch to SINGLE STROKE. Make sure the light curtain is unobstructed.

NOTICE

CONTROL BOARD LEDs

- At this point, the "INCH SEL" LED should be off and the "SNGL STK SEL" should be lit.
- During this test, the "SHAD IN 1 and 2 N/C" LED should be lit when the light curtain is clear and off when the light curtain is blocked.
- 2. Push and hold both RUN/INCH buttons. Observe the ram's motion. It should cycle to complete one stroke.
 - If the ram cycles to make a full stroke and stops at top dead center, go to step 3.
 - If the ram moves but does not make a full stroke or does not stop at top dead center, and the LED display shows an error code between F80 and F89 (or between H80 and H89), this indicates a problem with the overrun limit switch. To remedy, see the troubleshooting information starting on page 184, the overrun switch installation on page 38, and the instructions for setting up the overrun limit switch on page 91. Inch the ram to the top and repeat the test, as described in this step. If the ram still does not make a full stroke or does not stop at top dead center, call Wintriss Tech Support.
 - If the ram moves, but does not make a full stroke or does not stop at top dead center, and the LED display does not show one of the error codes listed above, check the wiring. Inch the ram to the top and repeat the test, as described in this step. If the

ram still does not make a full stroke or does not stop at top dead center, call Wintriss Tech Support.

- If the ram does not move at all, check to make sure the correct version of WPC firmware is installed and check the wiring. Re-run the test, starting with step 1. If the ram still does not move when you press the RUN/INCH buttons, call Wintriss Tech Support.
- 3. Interrupt the light curtain by placing a piece of cardboard or other object between the light curtain heads to block at least two inches of the light field. Leave the object in place while you complete the test described in the next step.
- 4. Push and hold both RUN/INCH buttons. Observe the behavior of the ram. It should not move.
 - If the ram does not move, and if you have one set of light curtains, go to the next step.
 - If the ram does not move, and if you have two sets of light curtain heads connected to your WPC, repeat the test starting with step 3, removing the blockage from the first light curtain and blocking the second light curtain. When you have successfully completed the test with the second light curtain, go on to the next step.
 - If the ram *does* move, check to make sure the correct version of WPC firmware is installed and check the wiring. Re-run the test, starting with step 3. If the ram still moves with the light curtain blocked, call Wintriss Tech Support.
- 5. Remove the object from the light curtain field. Prepare to place it into the field while the ram is on the downstroke. Be sure to keep hands and other objects away from the press.
- 6. While one person pushes and holds both Run/INCH buttons, another person moves the cardboard or other object into the light field while the ram is on the downstroke. Observe the action of the ram. It should stop immediately.
 - If the ram stops immediately when the object enters the light field, and you have one light curtain connected to WPC, go to step 7.
 - If the ram stops immediately when the object enters the light field, and you have two light curtains connected to WPC, inch the ram to the top and repeat the test, interrupting the second light curtain, starting with step 5. When you have successfully completed the test with the second light curtain, go to step 7.
 - If the ram *does not* stop immediately, check the wiring. Inch the ram to the top and re-run the test, starting with step 5. If the ram still keeps moving when the light curtain is interrupted, call Wintriss Tech Support.
- 7. Change to INCH mode and bring the ram to top dead center.
- 8. Change to SINGLE STROKE mode.
- 9. Momentarily press and release the RUN/INCH buttons.
- 10. Observe the ram's behavior. It should start moving when you press the buttons, then stop immediately when you release them.
 - If the ram moves, then stops, and the INTERRUPTED STROKE indicator light comes on, continue on to step 14.

- If the ram does not move, or if it moves but does not stop immediately when you release the buttons, or if the INTERRUPTED STROKE indicator does not come on, check the wiring and run the test from step 11 again. If the ram still does not move or moves but does not stop immediately, or if the ram stops but the INTERRUPTED STROKE indicator does not come on, call Wintriss Tech Support.
- 11. The press will now be in the TWO HAND MAINTAINED SINGLE STROKE mode. Complete the stroke by pressing and holding the RUN/INCH buttons.

Single Stroke Mode Test Without Light Curtain(s)

DANGER

INJURY DURING TESTING

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

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

DANGER

CONTINUOUS MODE USED INADVERTENTLY

Disconnect the "Continuous" position on the stroke selector switch and cover the "CONT" label on your control if you will not use your press in Continuous mode.

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

Run this test if you use light curtains with your WPC installation.

1. Set the STROKE SELECT switch to SINGLE STROKE.

NOTICE

CONTROL BOARD LEDs

- At this point, the "INCH SEL" LED should be off and the "SNGL STK SEL" should be lit.
- 2. Push and hold both RUN/INCH buttons.
- 3. Observe the ram's motion.
 - If the ram makes a full stroke and stops at or near top dead center, go to step 6.
 - If the ram does not make a full stroke or does not stop at top dead center, go to step 4.
- 4. Observe the LED display.
 - If the LED display shows an error code between F80 and F89 (or H80 through H89), this indicates a problem with the overrun limit switch. To remedy, see the troubleshooting information for these error codes in Chapter 5, the overrun switch installation instructions in Chapter 2 and the instructions for setting up the overrun limit in Chapter 3, page 91. After you correct the problem, run the test again, starting from step 2. If the ram still does not cycle or does not stop at top dead center, call Wintriss Tech Support.
 - If the LED is blank or shows some other error, check and correct the wiring. After you correct the problem, run the test again, starting from step 2. If the ram still does not make a stroke or does not stop at top dead center, call Wintriss Tech Support.
- 5. Change to INCH mode and bring the ram to top dead center.
- 6. Momentarily press and then release the RUN/INCH buttons. The ram should start, then stop. The INTERRUPTED STROKE indicator light should come on and the press should now be in the TWO HAND MAINTAINED SINGLE STROKE mode.
 - If the press behaves as indicated above, go to the next step.

- If the press behaves differently, check the wiring and repeat the test described in this step. If, after you have corrected the wiring, the press still behaves differently, call Wintriss Tech Support for assistance.
- 7. Since the press is now in TWO HAND MAINTAINED SINGLE STROKE mode, complete the stroke by pressing and holding the RUN/INCH buttons.
Anti-tiedown Test

A DANGER

INJURY DURING TESTING

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

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

A DANGER

OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

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

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

Perform the following test to verify that the operator station is correctly installed and wired to require both hands to press both run buttons simultaneously.

- 1. Set the STROKE SELECT switch to SINGLE STROKE.
- 2. Press and hold down both run buttons. The press cycles to makes one stroke.
- 3. While still holding down the left button, do the following: Remove your right hand from the right button for a moment. Then press the right button again. The press should *not* cycle again.
 - If the press *does not* cycle, go to the next step to perform the test for the other side.
 - If the press *does* cycle, check the wiring. Repeat the test starting with step 2. If the press still cycles, call Wintriss Tech Support.
- 4. Remove hands from the buttons. Then press and hold down both run buttons. The press makes a stroke.
- 5. While still holding down the right button, do the following: Remove your left hand from the left button for a moment. Then press the left button again. The press should *not* cycle again.
 - If the press *does not* cycle, your anti-tiedown test is complete. Go to the next section.
 - If the press *does* cycle, check the wiring. Repeat the test starting with step 4. If the press still cycles, call Wintriss Tech Support.

Anti-repeat Test

DANGER

INJURY DURING TESTING

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

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

DANGER

OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

• Ensure that the operator station is wired correctly.

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

Perform the following test to verify that the press will cycle only once in Single Stroke when you press both run buttons simultaneously.

- 1. Set the STROKE SELECT switch to SINGLE STROKE.
- 2. Press and hold down both run buttons and continue to hold down while the press cycles and after it stops for ten seconds. The press should make only one stroke (cycle) and then top stop. It should not make any more strokes while you hold down the run buttons.
 - If the press makes one stroke (cycle) and then stops, it is operating correctly. Go to the next section.
 - If the press *does* cycle again after making one stroke, check the wiring. Repeat the test in step 2. If the press still cycles again after it makes one stroke, call Wintriss Tech Support.

Continuous Mode Test with Light Curtain

DANGER

IMPROPER SAFEGUARDING

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

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

DANGER

INJURY DURING TESTING

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

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

- If your press does not run in continuous mode, go to the next applicable test in this chapter.
- If your press runs in continuous mode and has a light curtain, perform this test.
- If your press runs in continuous mode and does not have a light curtain, perform the test in the next section, "Continuous Mode Test without Light Curtain(s)."
- 1. Set the STROKE SELECT switch to CONT (Continuous).

NOTICE

CONTROL BOARD LEDs

- At this point, the "SNGL STK SEL" LED should be off and the "CONT SEL" should be lit.
- During this test, the "SHAD IN 1 and 2 N/C" LED should be lit when the light curtain is clear and off when the light curtain is blocked.
- 2. At the operator station, press the PRIOR ACT switch/indicator. The PRIOR ACT indicator should illuminate and then turn off eight seconds later.
 - If the switch/indicator does turn off in eight seconds, go to step 3.
 - If the switch/indicator does not turn off within eight seconds, *stop!* Do not go any further! Call Wintriss Tech Support.
- 3. Press the PRIOR ACT switch/indicator and, before the light goes out, press <u>both</u> RUN/INCH buttons. Release the RUN/INCH buttons after bottom dead center (BDC) of the first stroke. The press should continue running.
- 4. At the operator station, press the TOP STOP button. Notice that the ram stops near top dead center (TDC) and that a three-digit stop time is displayed (when selected on the LED display).
- 5. Restart the press in continuous (CONT) mode.

- 6. Now block the light curtain and observe what the press does. It should come to an immediate stop and the Interrupted Stroke LED light should be illuminated.
 - If the press comes to an immediate stop, go to step 7 to complete the test.
 - If you have a WPC with the muting option, the ram should stop as soon as it reaches the non-muted part of the stroke (down stroke). This is acceptable. Go to step7 to complete the test.
 - If you have a WPC with the muting option, and the ram does not stop in the nonmuted part of the stroke (down stroke), check the wiring and re-run the test starting with step 5. If the ram still does not stop in the non-muted part of the stroke, call Wintriss Tech Support.
 - If your WPC does not have the muting option and the press does not come to an immediate stop when you interrupt the light curtain, check the wiring and rerun the test starting with step 5. If it still does not stop immediately, call Wintriss Tech Support.

When a stroke is interrupted, WPC automatically switches to TWO HAND MAINTAINED SINGLE STROKE mode for the remainder of the stroke.

7. Press and hold both RUN/INCH buttons. Move the ram to TDC. Go to the next applicable test in this chapter.

Continuous Mode Test without Light Curtain(s)

DANGER

IMPROPER SAFEGUARDING

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

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

DANGER

INJURY DURING TESTING

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

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

- If your press runs in continuous mode and does not have a light curtain, perform the test below.
- If your press runs in continuous mode and has a light curtain, perform the test in the previous section.
- If your press does not run in continuous mode, go to the next applicable test in this chapter.
- 1. Set the STROKE SELECT switch to CONT (Continuous).

NOTICE

CONTROL BOARD LEDs

• At this point, the "SNGL STK SEL" LED should be off and the "CONT SEL" should be lit.

- 2. At the operator station, press the PRIOR ACT switch/indicator. The PRIOR ACT indicator should illuminate and then turn off eight seconds later.
 - If the switch/indicator does turn off in eight seconds, go to step 3.
 - If the switch/indicator does not turn off within eight seconds, *stop!* Do not go any further! Call Wintriss Tech Support.
- 3. Press the PRIOR ACT switch/indicator and, before the light goes out, press <u>both</u> RUN/INCH buttons. Release the RUN/INCH buttons after bottom dead center (BDC) of the first stroke. The press should continue running.
 - If the press continues to run, go to the next step.
 - If the press stops, check the wiring and correct any problems. Re-run this test. If the press still stops, call Wintriss Tech Support.

4. At the operator station, press the TOP STOP button. Notice that the ram stops near top dead center (TDC) and that a three-digit stop time is displayed (when selected on the LED display).

Foot Switch Test (for Units with Optional Foot Switch)

DANGER

INJURY DURING TESTING

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

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

DANGER

MISSING SAFEGUARDS

Install a light curtain for use with the foot switch option. A light curtain is required for using the foot switch.

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

You need to perform this test only if your WPC is equipped with a Foot Switch. If necessary, refer to the LED maps on pages 140 (right/center) and 141 (left), when you are directed to the control board.

NOTICE

These instructions refer to the Auto Carry-up angle, which is factory set to

- 170° if it does not have a light curtain.
- 149° if the press does have light curtain

Refer to "Using Auto Carry-up," page 96, for detailed information about the Auto Carry-up feature.

- 1. Set the STROKE SELECT switch to SINGLE STROKE and set the MODE SELECT switch to FOOT.
- 2. Set switch 3 of the option switch to OPEN. Remember to power down, then power back up to enable the change. The WPC is now in the FOOT TRIP mode. Once tripped, the press should run to top stop.
- 3. On the control board, the "Continuous selector" LED should be off, the "Single Stroke selector" LED should be on, and the "Foot selector" LED should be on.

NOTICE

Depress the Foot Switch quickly and fully to initiate a stroke. If you depress the Foot Switch slowly or partially, a stroke will not be initiated.

4. Momentarily depress the Foot Switch. The press should make a single stroke and stop at top dead center.

If the Interrupted Stroke light is on, WPC has automatically changed to Two-hand Maintained mode. You must depress and hold the run buttons to complete the stroke and clear the Interrupted Stroke. (see "Interrupted Stroke," page 148.) Foot Switch will not work while the Interrupted Stroke light is on.

- 5. At the control board, notice that the "Foot switch N/C" LED goes off and the "Foot switch N/O" LED comes on when the Foot Switch is depressed.
- 6. Set switch 3 of the option switch to CLOSED. Power down, then power up WPC to enable the change. You are now in the foot control mode. The press should cycle to top stop only if the Foot Switch is held down until after the Auto Carry-up angle.
- 7. Press and hold the Foot Switch through the Auto Carry-up angle. Release Foot Switch after bottom dead center. The press should run and stop at top stop.
- 8. Press and hold the Foot Switch again. This time, release the switch before the Auto Carry-up angle. The press should start but stop immediately when the Foot Switch is released.
- 9. Press and hold both RUN/INCH buttons. The press will run and top stop.
- 10. Set the STROKE SELECT switch to CONT (continuous).
- 11. At the Operator Station, depress the PRIOR ACT switch.
- 12. Then depress and hold down the Foot Switch. The press should run as long as the Foot Switch is depressed.
- 13. Release the Foot Switch. The press should automatically top-stop.

If the Foot Switch is only momentarily depressed, the press stops after a single stroke. If allowed to stop, the PRIOR ACT switch must be depressed before another stroke is initiated.

One-hand Control Switch Test (for Units with Optional One-hand Control)

DANGER

INJURY DURING TESTING

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

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

DANGER

MISSING SAFEGUARDS

Install a light curtain for use with the one-hand control option. A light curtain is required for using the one-hand control.

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

You need to perform this test only if your WPC is equipped with a One-hand Control Switch. If necessary, refer to the LED maps on pages 140 (right/center) and 141 (left), when you are directed to the control board.

NOTICE

Depress the One-hand Control Switch quickly and fully to initiate a stroke. If you depress the One-hand Control Switch slowly or partially, a stroke will not be initiated.

- 1. Set the STROKE SELECT switch to SINGLE STROKE and set the MODE SELECT switch to ONE HAND.
- 2. On the control board, the "Continuous selector" LED should be off, the "Single Stroke selector" LED should be on, and the "One-hand selector" LED should be on.

NOTICE

If the Interrupted Stroke light is on, WPC has automatically changed to Two-hand Maintained mode. You must depress and hold the run buttons to complete the stroke and clear the Interrupted Stroke. (see "Interrupted Stroke," page 148.) One-hand Control will not work while the Interrupted Stroke light is on.

- 3. Momentarily depress the One-hand Control Switch. The press should make a single stroke and stop at top dead center.
- 4. At the control board, notice that the "Palm Switch N/C A" LED goes off and the "Onehand Control Switch N/O" LED comes on when the One-hand Control Switch is depressed.

Bar Mode Control Test – Optional

A DANGER

INJURY DURING BAR MODE TESTING

- Be sure there is no die or other tooling in the press during testing.
- Keep all personnel away from the press during testing.
- Use a spring-loaded turnover bar when you bar the press.

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

You need to perform this test only if your WPC is equipped with the Bar Mode Control.

- 1. Set the STROKE SELECT switch to INCH and the MODE SELECT switch to TWO HAND.
- 2. At the Bar Mode Control, set the SELECT switch to "on."
- 3. At the control board, the "Bar Selector" LED should come on.
- 4. Turn the press motor off.
- 5. While the press's flywheel is still turning, press the OPERATE button on the Bar Mode Control.
- 6. Notice that the Dual Safety Valve momentarily energizes and then de-energizes.
- 7. At the control board, the "Bar actuator" LED should remain illuminated while the Bar Mode Control OPERATE button is depressed.
- 8. At the LED display, "F26" will be displayed.
- 9. At the Operator Station, push the EMERGENCY STOP / RESET button. Wait for the flywheel to stop spinning.
- 10. At the Bar Mode Control push the OPERATE button.
- 11. Notice that the Dual Safety Valve turns on.
- 12. You can now bar the press using a spring-loaded turnover bar.

NOTICE

As you bar the press, WPC monitors the speed of the crank. If you bar the press too quickly, the dual safety valve closes and a status code of "F26" is displayed, thus stopping the press.

You are Done

At this point, you have successfully initialized, set up, and checked out your WPC. Now you are ready to operate WPC. Proceed to Chapter 4.

O + 24 VDC	 G 0 88 - Light curtain B 2 R 0 87 - Light curtain A 2 O 86 - User input 10 P 0 85 - User input 8 O 84 - User input 6 4 0 83 - User input 4 Ø 82 - User input 2
 + 5 Logic B G O DSVB driver R O DSVA driver O DSVA driver Internal Lockout driver Internal DSVA contact check Lockout contact check DSVA contact check Internal O DSVB poppet position 17 - Motor reverse 16 - Bar actuator 14 - Foot switch N/O 13 - Top Stop in Inch Disabled 	 G 0 78 - Light curtain B 1 0 77 - Light curtain A 1 0 75 - DSVA poppet position P 0 74 - User input 9 3 0 73 - User input 7 0 72 - User input 5 0 71 - User input 3 0 70 - Remote reset 0 26 - Mute limit switch 0 24 - Overrun limit switch 2 1 - User input 1 0 20 - DSV lifguard monitor P Prior act B switch 0 18 - User input 11 0 60 - Top stop 2 input 0 15 - External trip N/C actuator 0 57 - Estop 2 input
 Up button Up button 154 - Op sta 1 selector 153 - Op sta 2 selector C Reset button C Lockout switch Down button 157 - Micro inch selector 156 - Spare input 145 - Off selector 144 - Inch selector 143 - Single Stroke selector 149 - One hand selector 148 - Foot selector 147 - PSDI selector 151 - External/2 break 	 12 - Palm switch N/O B 11 - Palm switch N/O A S - System air pressure 7 - Motor forward 6 - Bar selector switch 5 - External trip N/O actuator 48 - Estop 1 input 48 - Estop 1 input 4 - Foot switch N/C 3 - One hand A N/O 2 - Palm switch N/C B 1 - Palm switch N/C A

Figure 3-13a. WPC LED indicator map, Right or Center Configuration Showing corresponding connector pin numbers

GROUP	0000000000	 Palm switch N/C A Palm switch N/C B One hand A N/O Foot switch N/C Estop 1 input External trip N/O actuator Bar selector switch Motor forward System air pressure Top stop 1 input 	D 0 151 - External/2 break	O 147 - PSDI selector	 140 - 140 - Foot selector 2 O 149 - One hand selector 0 142 - Continuous selector 0 143 - Single Stroke selector 0 144 - Inch selector 145 - Off selector 		 D O 100 - Spare Input O 157 - Micro inch selector O Down button O Lockout switch O Reset button 	 O 153 - Op sta 2 selector O 154 - Op sta 1 selector O Up button
GROUP 2 Group 3	• • • • • • • • • • • • • • • • • • • •	 11 - Palm switch N/O A 12 - Palm switch N/O B 57 - Estop 2 input 15 - External trip N/C actuator 60 - Top stop 2 input 18 - User input 11 Prior act B switch 20 - DSV lifguard monitor 21 - User input 1 22 - Top stop limit switch 26 - Mute limit switch 26 - Mute limit switch 70 - Remote reset 71 - User input 3 72 - User input 5 73 - User input 7 74 - User input 9 75 - DSVA poppet position 77 - Light curtain A 1 78 - Light curtain B 1 	G R O U P 5	• • • • • • • • • • • • • • • • • • •	13 - Top Stop in In 14 - Foot switch N/ 16 - Bar actuator 17 - Motor reverse 19 - DSVB poppe DSVA contact chee Lockout contact che DSVB contact chee Lockout driver DSVA driver DSVB driver	nch Disa I/O et posit ck heck eck	+ 5 Logic A abled tion internal	
G R O U P 4	0000000	 82 - User input 2 83 - User input 4 84 - User input 6 85 - User input 8 86 - User input 10 87 - Light curtain A 2 88 - Light curtain B 2 	O + 24 VE	ЭС				

Figure 3-13b. WPC LED indicator map (Left Configuration) Showing corresponding connector pin numbers

Chapter 4 Operation

A DANGER

IMPROPER INSTALLATION, USE OR MAINTENANCE

- Follow all procedures in this manual.
- Lockout/Tagout the press during all installation, modification, repair or maintenance procedures.
- Perform and ensure that WPC passes all tests described in previous chapters.
- Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.
- Perform the checkout sequence after installation and after any modification or repair of the WPC clutch/brake control.
- Ensure that supervisors, die-setters, maintenance persons, machine operators, foremen, and any others responsible for operation of the machinery have read and understood all instructions for use of the WPC clutch/brake control.
- Disconnect the "continuous mode" position of your stroke selector switch if the press is not properly guarded for use in continuous mode, and cover the "CONT" label on your control.

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

DANGER

MORE OPERATORS THAN OPERATOR STATIONS

- Ensure that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.
- During setup, lockout/tagout the press if there are more operators than operator stations.
- Verify at every shift change that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.

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

A DANGER

INCORRECT AUTO CARRY-UP ANGLE

- Ensure that the Auto Carry-up angle is correct. If the operator can reach the pinch point, the Auto Carry-up angle must be set so that any hazardous openings are smaller than ¼" by the time the crankshaft reaches the Auto Carry-up angle.
- Determine the Auto Carry-up angle for each tool, based on the crank angle at which the tool's hazardous openings are smaller than 1/4".
- Change the Auto Carry-up angle to the correct value for the new tool whenever you change tools.

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

DANGER

TWO-HAND CONTROL TOO CLOSE TO HAZARDOUS AREA

Verify at each shift change that any moveable two-hand controls are located at least the safety distance away from the pinch point or hazardous area.

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

A DANGER

FAULTY INSTALLATION

- Ensure that wiring is correct.
- Use only safety-certified components for safety functions, including interlock switches used in safety applications.
- Install guarding to prevent access to hazardous areas. Prevent access to hazardous areas over, under or around any guarding devices.
- Ensure that there is one active operator station for each operator if you are using two-hand mode.
- Use foot switch or one-hand control only with properly installed light curtains.

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

At this point, you should already have installed, initialized, set up, and checked out your WPC. You are now ready to operate it.

Operation of Wintriss Clutch/Brake Control (WPC) is very simple. This chapter explains how to use WPC and operate the press in various stroke settings. The topics covered include

- Viewing Press Information, page 145
- Interrupted Stroke, page 148
- Brake Monitor Brake Warning, page 149
- Stopping Angle, page 150
- Using the Stroke Counter and Preset, page 151
- Operating the Press in Inch Mode, page 155
- Operating the Press in Single Stroke mode, page 156
- Operating the Press in Automatic Single Stroke Mode, page 160
- Operating the Press in Continuous Mode, page 162
- Using One-hand Control, page 165
- Operating the Press in BAR Mode, page 167

CLEARING "Loc" WHEN YOU TURN ON POWER TO THE PRESS

 Any time that you turn power on to your press, "Loc" appears on your LED display ("Loc" is explained in the beginning of Chapter 5). To clear this message, simply turn the STROKE SELECT switch to the left toward "OFF". If your switch is already at the "OFF" position when you powered on, just switch it to the desired stroke selection. "Loc" will be cleared and you will now be able to resume operation.

NOTICE

PRESS STOPS WHEN SYSTEM FAULT DETECTED OR LIGHT CURTAIN BLOCKED

- The WPC stops the press if a system fault is detected or if the light curtain is blocked during any non-muted portion of the stroke.
- If this occurs, the Interrupted Stroke LED on the WPC display will be illuminated. Interrupted stroke is discussed later in this chapter. See Figure 4-4 for an illustration of the LED. If the ram stops because of a system fault, there will also be a fault of a letter followed by a two-digit number on the LCD display.
- When an interrupted stroke occurs, WPC automatically switches to Two-hand Maintained Single Stroke for the remainder of the stroke. In the case of a system fault, press the EMERGENCY STOP / RESET switch to reset WPC.

Viewing Press Information

You can look at up to ten items of press information on the front panel of the WPC.





When you first turn power ON to WPC and clear "Loc," one of the following happens:

If the press is in Inch mode, the Angle/SPM indicator segment is illuminated. The digital display and the crank angle clock both show the current crankshaft angle.

If the press is in Single Stroke or Continuous mode, the Counter indicator segment is illuminated. The digital display shows the current counter value.



You can view the six items at the top of the display any time. You can view the bottom four items only when the press is in Inch mode.

To show Crankshaft angle and press speed, press the Reset/Select button until the ANGLE/SPM indicator segments illuminates.



Figure 4-2. Illustrating Crankshaft Angle and Crank-angle Clock

Here is how to look at a different item — "Stopping Time." Press the Reset/Select button repeatedly until the display indicator scrolls to "STOPPING TIME." The last recorded stopping time appears. (WPC measures the stopping time value *every* time the press stops.) The crank-angle clock will not be illuminated.

See Figure 4-3 for an illustration of "Stopping Time".





PRESS STOPS WHEN SYSTEM FAULT DETECTED OR LIGHT CURTAIN BLOCKED

- The WPC stops the press if a system fault is detected or if the light curtain is blocked during any non-muted portion of the stroke.
- If this occurs, the Interrupted Stroke LED on the WPC display will be illuminated. Interrupted stroke is discussed later in this chapter. See Figure 4-4 for an illustration of the LED. If the ram stops because of a system fault, there will also be a fault of a letter followed by a two-digit number on the LCD display.
- When an interrupted stroke occurs, WPC automatically switches to Two-hand Maintained Single Stroke for the remainder of the stroke. In the case of a system fault, press the EMERGENCY STOP / RESET switch to reset WPC.

Interrupted Stroke

A WARNING

INTERRUPTED STROKE DUE TO MACHINE MALFUNCTION

Investigate and correct the cause of the interrupted stroke before resuming operation of the press.

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

An Interrupted Stroke occurs when the press has been emergency-stopped before the completion of the stroke by either the operator or a safety device. When an interrupted stroke occurs, a stop command is immediately issued to the press.

The Interrupted Stroke LED, found just above the Brake Warning LED (Figure 4-4) is illuminated. WPC automatically switches controls to TWO HAND MAINTAINED SINGLE STROKE until you reach top dead center. At this point, WPC switches you back to your original stroke select and mode select.

NOTICE

ESTOP/INTERRUPTED STROKE WHEN IN INCH MODE

If the press was in Inch mode when it is emergency stopped, it stays in Inch mode. It does *not* go into TWO-HAND MAINTAINED mode, but stays in Inch mode for the remainder of the stroke.



Figure 4-4. Brake Warning and Interrupted Stroke LEDs

Brake Monitor Brake Warning

The brake monitor in WPC accurately monitors the stopping time of the press on every top stop. Each time the press top stops, WPC determines if the stopping time is within the stop time limit you set. The amber-colored Brake Warning LED (Figure 4-4) illuminates when the stopping time is within ten milliseconds of the stop time limit that you set in WPC. This warning alerts maintenance to perform the necessary repairs on the press.

Whenever the stopping time is outside the limit you set, WPC immediately inhibits the press from further operation. It also flashes the out-of-limit value on its LED display. When this happens, you cannot run the press until you have completely corrected the problem.

Stopping Angle

Stopping angle is the crankshaft rotation angle that it takes for the press to stop. It is the stopping position in degrees minus the crankshaft position when the Dual Safety Valve (DSV) is closed. Stopping angle can help you when you set up your die protection system.

To view Stopping angle, press the Reset/Select button until the display indicator highlights that item. In Figure 4-5, it took seventy-five degrees for the press to stop, once the stop command was initiated. Stopping angle will compensate for the complete rotation when it takes *more* than 360 degrees to stop.

Notice that the illuminated LEDs in the crank-angle clock dynamically represent that number.



Figure 4-5. "Stopping Angle" Displayed

Using the Stroke Counter and Preset

A DANGER

SAFETY SETTINGS CAN BE CHANGED WHEN KEY IS IN SETTINGS KEY SWITCH

Use option switch 7 to prevent anyone from making changes stop time limit and auto carryup angle. See "Switch 7 –Disable Changes to Stop Time Limit and Auto Carry-up Angle," page 113, for more information.

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

The WPC's stroke counter counts and displays the number of strokes the press makes in single stroke and continuous modes.

If you want WPC to stop the press after a preset number of strokes, use the counter preset feature. See "Viewing and Setting the Counter Preset Value," page 153. This feature is useful for batch sizing and making periodic QC checks.

Follow the instructions below to view the counter and to view and set the counter preset value.

- Viewing the Counter Value, next section
- Resetting the Counter Value to Zero, page 152
- Viewing and Setting the Counter Preset Value, page 153
- Forcing the Counter Preset Value to Zero (0), page 154
- Forcing the Counter Preset Value to 999999, page 154
- Disabling the Counter Preset Feature, page 154

Viewing the Counter Value



Figure 4-6. Viewing Counter Value

NOTICE

When you turn the stroke select key switch to Single Stroke or Continuous, the COUNTER display segment automatically illuminates and the current counter value appears on the digital display.

To view the current value of the counter:

Press the Reset/Select button repeatedly until the display segment labeled COUNTER illuminates. The digital display will show the current counter value. The counter automatically displays when you turn the stroke select key switch from Inch to Single Stroke or Continuous.

NOTICE

The counter increments when the press passes through 180° when the press is in Single Stroke or Continuous mode.

The counter does not count strokes in Interrupted Stroke mode or in Inch Mode. In Inch mode the display defaults to showing the crank angle.

Resetting the Counter Value to Zero

With the counter segment on the display illuminated, turn the SETTINGS key switch toward "–" (clockwise). The display will show zero. The counter will then start counting again from "1."

Viewing and Setting the Counter Preset Value

When the counter reaches the preset value, WPC 1000 sends a top stop signal to the press and displays the code F15 (Stroke Counter Preset Reached) on the digital display. Press the Reset/Select button to clear the counter, returning it to zero. The counter then starts counting again from one (1). The counter preset value will remain the same until you set it to something different.

You can set the counter preset to values from 1 to 999999.

To disable the counter preset function, set the preset value to zero (0). See "Disabling the Counter Preset Feature," page 154.



Figure 4-7. Setting Counter Preset Value

To view and set the counter preset:

- 1. Press the Reset/Select button one or more times until the display segment labeled COUNTER PRESET illuminates. The digital display will show the existing preset, which may be zero (0) or another number.
- 2. Adjust the counter preset to the value you want using the WPC SETTINGS key switch.
 - To increase the value, turn the SETTINGS key switch toward "+" (counterclockwise).
 - To decrease the value, turn the SETTINGS key switch toward "-" (clockwise).

NOTICE

```
Hold the SETTINGS key switch toward "+" or "-" to make the value change faster. The longer you hold the key toward "+" or "-", the faster the value changes.
```

If the number you want to enter is very large (500,000 to 999,999), force the display to 999,999 (see "Forcing the Counter Preset Value to 999999," below). Then turn the SETTINGS key switch toward "–" and hold it there to make the displayed value decrease until it reaches the value you want.

Forcing the Counter Preset Value to Zero (0)

To make the counter preset value go to zero (0):

Turn the WPC SETTINGS key switch toward "–" (clockwise) and hold it there while you press the Reset/Select button. The display will show zero.

NOTICE

DISABLE COUNTER PRESET FUNCTION BY SETTING PRESET VALUE TO ZERO (0)

If you set the preset value at zero, this disables the counter preset function. The counter will still count, but, since there is no preset value, WPC 1000 will not stop the press at any count. After the counter reaches 999999, it rolls over to zero and starts counting again with one (1).

Forcing the Counter Preset Value to 999999

To make the counter preset value go to 999999:

- 1. Force the value on the display to zero (0) as described in the previous section.
- 2. Release the WPC SETTINGS key switch.
- 3. Turn the SETTINGS key switch momentarily toward "–" (clockwise) again. The display will show 999999.

Disabling the Counter Preset Feature

To disable the counter preset feature, set the counter preset value to zero (0). See "Forcing the Counter Preset Value to Zero (0)," above.

Operating the Press in Inch Mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

DANGER

INCH MODE NOT SUITABLE FOR PRODUCTION

DO NOT use INCH mode as a production mode, per ANSI B11.I–2001.

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

To operating the press in INCH mode, simply make these settings. Set the stroke select switch on the operator station to INCH. WPC automatically defaults to TWO HAND mode if no Shadow light curtain is installed. If you have a Shadow V with a mode select switch on your WPC, set the mode select switch either to TWO HAND or ONE HAND. The light curtain will be muted on the upstroke *only if WPC has the muting option*.

Three Ways You Can Operate the Press in INCH Mode

You can choose three different ways to operate the press in INCH mode. These modes are called Top Stop, Top Stop Bypass, and Micro-inch. See "Setting the Press Option Switches," page 110, for how to make the settings for these operating modes. This is how you operate the press in each mode.

NOTICE

These steps assume that you are running in TWO HAND mode. If you run in ONE HAND mode, you need to depress the left RUN/INCH button only (unless the operator station has an optional right/left hand selector switch).

Top Stop in Inch Mode

NOTICE

The factory setting for Top Stop in Inch is ENABLED.

To disable Top Stop in Inch, connect pin 13 to +24 VDC. (See "Wiring to Disable Top Stop in Inch," page 48, and wiring table, page 81). If Top Stop in Inch is DISABLED, the corresponding LED on the processor board is illuminated (see LED maps, pages 140 and 141).

To move the ram in this mode, depress both RUN/INCH buttons at the same time. Notice that the ram will move only as long as both RUN/INCH buttons are depressed. The ram will automatically top stop, even if both RUN/INCH buttons are pressed down. If you wish to re-initiate a stroke, simply release and press the RUN/INCH buttons again. To stop the ram before top stop, release one of the RUN/INCH buttons. The ram will also stop if the light curtain is blocked during the non-muted portion of the stroke, or if a system fault is detected. If you jog the press, you may not notice that the ram has top-stopped.

Top Stop Bypass – Top Stop in Inch Disabled (Pin #13 Connected to +24 VDC)

NOTICE

The factory setting for Top Stop in Inch is ENABLED.

To disable Top Stop in Inch, connect pin 13 to +24 VDC. (See "Wiring to Disable Top Stop in Inch," page 48, and wiring table, page 81). If Top Stop in Inch is DISABLED, the corresponding LED on the processor board is illuminated (see LED maps, pages 140 and 141).

In this mode, the press will now operate just as it would in the TOP STOP INCH mode, except that it will not automatically top stop. Rather, the press will run continuously as long as the RUN/INCH buttons are depressed.

Micro-inch

To enable Micro-inch, see "Wiring Micro-inch," page 48. The press operates the same way it does during TOP STOP INCH mode. However, no matter how long the switches are pressed, the clutch is engaged for a time that you set at "Micro-inch" on your WPC display. You can stop the ram before the set time by releasing the switches. To jog the ram through a complete stroke, press and release the RUN/INCH buttons as often as necessary.

NOTICE

ESTOP / INTERRUPTED STROKE WHEN IN INCH MODE

If the press was in Inch mode when it is emergency stopped, it stays in Inch mode. It does *not* go into TWO-HAND MAINTAINED mode, but stays in Inch mode for the remainder of the stroke.

Operating the Press in Single Stroke mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

To operate the press in single stroke mode, you first need to set the stroke select switch to SINGLE STROKE. Then set the mode select switch to either ONE HAND, TWO HAND, or FOOT. Instructions for each setting are explained below.

NOTICE

There are no ONE HAND and FOOT modes on Two-hand Only systems.

One-hand Operation, Single Stroke Mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

A DANGER

INCORRECT INSTALLATION

Shadow light curtains must be properly installed and connected to WPC in order to use ONE HAND or FOOT modes.

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

First, set the mode select switch to ONE HAND. To initiate a stroke, press the left RUN/INCH button. (The left RUN/INCH button must be used, unless the operator station has an optional right/left hand selector switch.)

You can release that switch at any time, and the ram will complete the stroke. The ram, however, will stop if a system fault is detected or if the light curtain is blocked during the down stroke.

Two-hand Operation, Single Stroke Mode

DANGER

OPERATOR STATION WIRED INCORRECTLY

Run all necessary tests to verify that each operator station is wired correctly and provides proper anti-tie-down and anti-repeat protection.

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

DANGER

MORE OPERATORS THAN OPERATOR STATIONS

- Ensure that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.
- During setup, lockout/tagout the press if there are more operators than operator stations.
- Verify at every shift change that there are the same number of active operator stations as there are operators, if the press is not equipped with properly installed and operating light curtains.

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

A DANGER

TWO-HAND CONTROL TOO CLOSE TO HAZARDOUS AREA

Verify at each shift change that any moveable two-hand controls are located at least the safety distance away from the pinch point or hazardous area.

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

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

Set the mode select switch to TWO HAND. To initiate a stroke, press the RUN/INCH buttons.

- If you have one operator station, both run buttons (switches) must be depressed within 0.5 seconds of each other.
- If you have two operator stations, the run buttons on one station must be depressed within 5 seconds of the buttons on the other operator station. The buttons on each station must be depressed within 0.5 seconds of each other.

Hold the buttons down at least until bottom dead center or until the Auto Carry-up angle. The upstroke is automatic. The ram will stop if any RUN/INCH button is released during the down stroke before the Auto Carry-up angle, if a system fault is detected, or if the light curtain is blocked during the down stroke. See "Using Auto Carry-up," page 96.

Foot Operation, Single Stroke Mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

A DANGER

INCORRECT INSTALLATION

Shadow light curtains must be properly installed and connected to WPC in order to use FOOT TRIP or FOOT CONTROL modes.

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

You can single stroke the press in one of two foot modes — foot trip or foot control. The mode is set using Option Switch 3. (See "Switch 3 – One-hand Control or Foot Switch," page 111 for instructions on setting this switch.)

In *Foot Trip* mode (Option Switch 3 OPEN), once you depress the Foot Switch, the press runs for one stroke. To run the press, set the stroke select switch to FOOT. Then press the Foot Switch. The press will run for one stroke and then will top stop.

In *Foot Control* mode(Option Switch 3 CLOSED), you must depress and hold the Foot Switch through Auto Carry-up to single stroke the press. If you do not, the press stops immediately. To run the press, set the stroke select switch to FOOT. Press and hold the foot switch through the bottom of the stroke. The press will complete one stroke and then will top stop.

NOTICE

INTERRUPTED STROKE

In Foot Control, if you do not keep the foot switch fully depressed through the auto carry-up angle, the Interrupted Stroke LED will illuminate and the press will stop. WPC automatically reverts to TWO HAND MAINTAINED SINGLE STROKE mode for the remainder of the stroke.

Operating the Press in Automatic Single Stroke Mode

A DANGER

PRESS STARTING UNEXPECTEDLY

Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using automatic single stroke. Since the external trigger starts the stroke, a stroke can occur unexpectedly.

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

The Automatic Single Stroke function allows an external event to automatically start a single stroke within thirty seconds. Generally, material feed is used as the signaling event. However, other events such as part ejection or positive part transfer, can be used.

There are three requirements for Automatic Single Stroke.

- you must have an Automatic Single Stroke switch installed. See Figure 6 at the end of this manual
- you must have a trigger mechanism
- you must install proper guarding equipment to protect personnel, such as Shadow VI light curtain and fixed guards.

As a triggering mechanism you can use a single pole double throw (SPDT) contact (switch or relay) or two solid state switches (NPN, open collector).

If you want to use Automatic Single Stroke, contact Wintriss Tech Support.

Setting Prior Act Timing for Automatic Single Stroke

For automatic single stroke mode, use option switch 5 to select 30 seconds or 5 minutes for the prior act timing. (See "Switch 5 – Prior Act Timing for Automatic Single Stroke and Continuous on Demand," page 112.)

Inside the unit, use option switch 5 to set prior act timing for Automatic Single Stroke mode, as follows:

Option Switch 5 Setting	Prior Act Timing for Automatic Single Stroke		
OPEN	30 seconds		
CLOSED	5 minutes		

Automatic Single Stroke Operating Instructions

After you have correctly installed sensors or other components required for Automatic Single Stroke, set the switches as follows:

- Stroke select to SINGLE STROKE
- Mode select to TWO HAND
- Automatic single stroke switch according to the timing you want (see previous section).

To initiate the first stroke:

- 1. Depress the PRIOR ACT button. The prior act button will blink when PRIOR ACT is armed.
- 2. Press the RUN/INCH buttons until the ram passes bottom dead center.

The up stroke and all other strokes will be automatic.

It is not unusual for the press to pause at top stop. It is waiting for the "go" signal from the external switch.

The external signal must occur after top stop within the time set with switch 5 (30 seconds or 5 minutes). If WPC does not receive the signal within this amount of time, it assumes a problem has occurred and will not start the next stroke. If this happens, repeat steps 1 and 2 to re-initiate.

Operating the Press in Continuous Mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

To operate the press in continuous mode, you first need to set the stroke select switch to continuous (CONT). Now set the mode select switch to either TWO HAND or FOOT. Instructions for each setting are given below.

Two-hand Operation, Continuous Mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

To operate the press in TWO HAND/CONT Mode, set the mode select switch to TWO HAND. Then depress the PRIOR ACT switch.

While the PRIOR ACT indicator LED is lit (for eight seconds), press both RUN/INCH buttons.

Keep the switches pressed until after the ram reaches bottom dead center. The press will now operate continuously. The ram will stop if any of the following situations occur:

- a system fault is detected
- you press the EMERGENCY STOP / RESET switch.
- the light curtain is blocked during the non-muted portion of the stroke
- you press the Top Stop switch
- you did not keep run buttons pressed until Auto Carry-up

Foot Operation, Continuous Mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

A DANGER

INCORRECT INSTALLATION

Shadow light curtains must be properly installed and connected to WPC in order to use FOOT TRIP or FOOT CONTROL modes.

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

To operate the press in the foot continuous mode, perform the following steps.

Set the mode select switch to FOOT, and then press the PRIOR ACT switch. While the PRIOR ACT LED is lit (for eight seconds), depress the foot switch.

The press will run in continuous as long as the foot switch is depressed. If the foot switch is released, the press will top stop. If you remove your foot from the foot switch and the ram top-stops, you will have to press the PRIOR ACT switch again and then depress the foot switch again while the LED is illuminated to initiate another stroke.

The press will operate continuously while the foot switch is depressed. However, the ram will stop if any of the following situations occur:

- a system fault is detected
- you press the EMERGENCY STOP / RESET switch
- you press the Top Stop switch
- the light curtain is blocked during the non-muted portion of the stroke

NOTICE

If the Interrupted Stroke light is on, WPC has automatically changed to Two-hand Maintained mode. You must depress and hold the run buttons to complete the stroke and clear the Interrupted Stroke. (see "Interrupted Stroke," page 148.) Foot Switch will not work while the Interrupted Stroke light is on.

Operating the Press in Continuous On Demand Mode

A DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

A DANGER

PRESS STARTING UNEXPECTEDLY

Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using Continuous on Demand mode, in which a stroke can occur unexpectedly.

• Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

For information on using this mode, call Wintriss Tech Support.

Using One-hand Control

A DANGER

INSUFFICIENT SAFEGUARDS ALLOWING ACCESS TO HAZARD

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

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

A DANGER

INCORRECT INSTALLATION

Shadow light curtains must be properly installed and connected to WPC in order to use ONE HAND or FOOT modes.

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

NOTICE

With One-hand Control installed, you cannot use the run buttons in ONE HAND mode. All other modes work normally as described in this manual.

One-hand Control is a switch that can only be used with any Wintriss Press Control systems having One Hand and Single Stroke modes. One-hand Control must be used in conjunction with a Shadow light curtain for guarding point of operation.

To start the press, the operator pushes the One-hand Control switch button as part of his normal hand motion after loading a part.

"Light Curtain Break" Mode

You can use One-hand Control in "light curtain break" mode. In this mode, you must push the switch button on the control within eight seconds after removing your hands from the light curtain. Otherwise the press will not start. This mode prevents inadvertent operation when an operator is loading or unloading parts. If this mode is not used, One-hand Control starts the press whenever it is pushed. Enable "light curtain break" mode by setting Option Switch 3 to OPEN.

You *must* have the right software in your WPC to use One-hand Control in "light curtain break" mode. If you are unsure of what you have, contact Wintriss Tech Support.

One-hand Control will work with or without the "light curtain break" mode set to OPEN (see "Switch 3 – One-hand Control or Foot Switch Mode," page111). If "light curtain break" is enabled, you must press the One-hand Control button within eight seconds after removing your hand from the light curtain; otherwise, the press will not start. If the "light curtain
break" mode is not enabled, whenever you press the One-hand Control button, the press will start.

Operating the Press Using One-hand Control

Follow these steps to operate the press using One-hand Control:

- 1. Set option switch 3 to the appropriate setting, depending upon whether you want to use "light curtain break" mode. See "Switch 3 One-hand Control or Foot Switch Mode," page 111.
 - If you want to use "light curtain break" mode, set Switch 3 to CLOSED.
 - If you do not want to use "light curtain break" mode, set Switch 3 to OPEN.
- 2. Set the Stroke Select Switch to SINGLE STROKE.
- 3. If an Interrupted Stroke message appears, make one stroke by pressing and holding down the dual run buttons. This clears the interrupted stroke mode.
- 4. Start the press as follows:
 - If you are using One-hand Control without "light curtain break", just push the Onehand Control switch button. The press will run and stop at the top of the stroke.
 - If you are using "light curtain break", start the press by first breaking the light curtain and removing your hands, then pushing the button on the One-hand Control within eight seconds. The press will make one stroke and stop at the top of the stroke.

NOTICE

The PRIOR ACT LED illuminates after the light curtain has been interrupted, and stays on for the time set. If the One-hand Control button is not pushed within the set time, the PRIOR ACT LED will turn off. The press will not start until you break the light curtain again and then push the One-hand Control button within eight seconds.

NOTICE

If the press does not run, turn off power to the press and WPC. Recheck all wiring and connections. Try One-hand Control again. If the press still does not run, call Wintriss Tech Support.

Operating the Press in BAR Mode

A DANGER

INJURY WHEN USING BAR MODE

- Keep all personnel away from the press while it is being barred
- Use a spring-loaded turnover bar when you bar the press.

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

You can operate in Bar Mode if you have the Bar control option. To operate the press in the Bar mode, perform these steps. Set the stroke select switch to INCH. Then set the mode select switch to TWO HAND. Turn off the press's main motor.

Turn the select switch to ON on the Bar control enclosure, and then wait for the press flywheel to stop turning. Now press the OPERATE button, and bar the press using a springloaded bar.

Make sure you do not rotate the flywheel/crank too quickly (more than an equivalent of 6 SPM), or WPC will stop the ram. If this happens, error code "F26" will appear on the digital readout. Press the Reset/Select button to continue barring the press.

Multiple Operator Stations

DANGER

HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

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

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

You can have an unlimited number of operator stations as part of your WPC system. However, up to two operator stations are standard. More than two operator stations need to be connected to WPC via a Dual Operator Selection Control (Wintriss part no. 4152100). See Chapter 2 to install and connect these components to your WPC.

When you have more than one operator station connected to WPC, the palm time allotment changes from 0.5 second to 5 seconds. This means that all the palm buttons on every station must be actuated within a 5-second time frame. If the first operator depresses his palm button, then all other palm buttons in the series must be actuated within 5 seconds. If not, the allowable "palm time" expires, and you must depress the palm button again.

If you have multiple operator stations, notice that there is a Operator Station Select Switch located on the front of your WPC. Set the switch so that it enables either the first station, the second station, or both.

Contact Wintriss Tech Support for more information relative to Multiple Operator Stations.

Chapter 5 WPC Troubleshooting

DANGER

IMPROPER REPAIR PROCEDURES

- Follow all procedures in this manual.
- Perform only the tests and repairs listed in this manual.
- Lockout/Tagout the press during all installation, modification, repair or maintenance procedures.
- Use only factory-supplied replacement parts.
- Ensure that all safety procedures are followed during installation, operation and repair of WPC.
- Ensure that WPC clutch/brake control is installed, tested and repaired by qualified personnel.
- Perform the installation verification tests (page 75) and final checkout tests (page 118) after every modification, repair or change to the press, press control or other equipment.

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

DANGER

IMPROPER SAFETY SWITCHING RELAY REPAIR

• Replace all the WPC's switching relays before placing the safety product back into operation after the first occurrence of a fused relay.

If a relay fuses

- DO NOT reset the WPC to restart the machine.
- Remove the WPC from operation immediately and replace all of its switching relays before operating the press again.

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

This chapter explains the error/status codes and other miscellaneous fault conditions that you may encounter and see on your LED display when the press stops or when problems occur.

What to Do When You See an Error Code

When a stop time limit has been exceeded, the display flashes the offending stop time value. In this example, we are illustrating a stop time value of 296 milliseconds. Your stop time value will probably be different.



A two-digit error code preceded by a letter, which appears on your LED display, corresponds to a particular error condition. An example is illustrated below. (To see where the LED display is located on WPC, refer to Chapter 1.) The letter will vary depending upon the error condition and will be discussed in greater detail later in this chapter.



When you want to resume operation after a fault condition occurs, you can clear the error code (preceded by "F" or "H") by pressing the Reset/Select button or the EMERGENCY STOP / RESET button on the operator station (or the remote reset switch, if installed). *Correct the malfunction or other problem <u>before</u> running the press.* To clear an error code, preceded by "E," turn power to WPC off, then on.

Lockout Message

In some cases, after you clear the error code, "Loc" will appear in the LED display. When you see this message, this means that a serious error condition has occurred. *Correct the problem before continuing!* To clear "Loc," turn the STROKE SELECTOR switch to "OFF." "Loc" will be replaced by "OFF" and you will be able to resume operation.

Refer to the section, "Description of error codes and how to correct" for a detailed description of each error code generated and also to see which codes will generate a lockout message.



NOTICE

"Lockout" error code numbers are indicated with an asterisk (*).

Brake Warning

DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the stop time limit of WPC. (See "Determining the 90° Stop Time (T_S)," page 99.)
- Recalculate the safety distance based on the new stop time limit and adjust or reinstall safeguarding devices according to the new safety distance. (See "Calculating the Safety Distance," page 101.)

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

DANGER

PRESS MALFUNCTION

Correct or repair any press malfunction or wiring error before restarting the press.

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

Problem: When the stopping time is within 10 ms of the stop time limit, the ambercolored brake warning LED will flash (see Chapter 1 for location of this lamp). This means that the stopping time of the press is getting extremely close to the safety limit that you had set on WPC.

How to clear: To turn off the brake warning LED, first turn the power off, then on.

Remedy: The first thing that could be wrong is that your brake may be defective and/or wearing, and needs *immediate* attention from your maintenance personnel. Or if that is not the problem, it could also mean that your stopping time limit is not great enough to account for *normal* wear.

You should have your maintenance crew immediately investigate the condition of the brake to ensure that it is not wearing and/or defective <u>before</u> you adjust the stop time limit.

Brake Monitor — Stop Time Exceeded

DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the stop time limit of WPC. (See "Determining the 90° Stop Time (T_S)," page 99.)
- Recalculate the safety distance based on the new stop time limit and adjust or reinstall safeguarding devices according to the new safety distance. (See "Calculating the Safety Distance," page 101.)

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

DANGER

PRESS MALFUNCTION

Correct or repair any press malfunction or wiring error before restarting the press.

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

- *Problem:* The offending stopping time number will flash in the LED display to alert you to this condition. *There will not be a letter preceding this number.* The actual stopping time of the press has exceeded the limit that had been set in WPC. Therefore, the press can not be used until the brake is completely repaired.
- *How to clear:* These flashing digits (representing the actual stopping time) can be cleared by pressing the Reset/Select button.

Once you've cleared the stopping time error, WPC will immediately display a **lockout** code ("Loc"). Refer to the section "Lockout," earlier in this chapter, which explains what lockout is and how to clear this condition. Review it carefully before further operation.

Remedy: (It is assumed that you were pre-warned by the brake warning fault LED, which illuminates when the stopping time is within 10 milliseconds of the stop time limit.) Your maintenance personnel must repair the brake immediately. If you try to continue the operation, the same error will persist every time that the press stops. Once you have repaired your brake back to good working order, check your press's stopping time. Perform this test several times to get an accurate reading for your press's stopping time. Compare these results to the last time that you performed the test. Decide if the stop time limit that you had set is realistic or needs to be changed slightly. See Chapter 3 to determine and set the correct stop time limit.

Description of Error Codes and How to Correct

DANGER

PRESS MALFUNCTION

Correct or repair any press malfunction or wiring error before restarting the press.

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

WPC provides a group of error codes tell you that something is wrong with the WPC, its internal components, peripheral equipment, the way that it is set, or the way that your press is running.

If you cannot correct the problem yourself after reading the remedy for the problem below, contact Wintriss Tech Support. Whenever you need help, just remember that there are expert technical representatives ready to help you. Never hesitate to call. Notice that a letter precedes the two-digit error codes that WPC communicates when a fault condition occurs. These are the three categories.

"E" Series

Any codes preceded by the letter "E" are not operator-resettable. In order to correct the malfunction and resume operation, you must power down, then power up the system. Once the problem is corrected, you will be able to run the press again. If not, you will get the same fault message again.

"F" Series

Any codes preceded by the letter "F" are operator-resettable, and are being generated by the main processor. This means that once you correct the malfunction, you can press the Reset/Select button and resume operation. If the problem is corrected, you will be able to run the press again. If not, you will get the same fault message again.

"H" Series

Any codes preceded by the letter "H" are operator-resettable, but are being generated by the second internal processor. With its two independent processor systems in a single modular enclosure, WPC provides dual diverse redundancy — critical in maintaining optimum clutch/brake control and operator safety. Both of these processor systems function independently of each other, have separate power supplies, and provide separate information to the operator. Therefore, error conditions will be detected from either <u>or</u> both of the two processors resident in the system. As with "F" series error codes, once you correct the malfunction, you can press the Reset/Select button and resume operation.

NOTICE

- The error codes preceded by the letter "F" or "H" can be cleared by either pressing the Reset/Select button or the EMERGENCY STOP / RESET button on the operator station (or remote reset switch, if installed).
- Whenever you see an error code preceded by the letter "E," you must power down, then power up WPC.

Resolver Faults

E06

- *Problem:* The press is going faster than 1000 SPM, or the resolver has failed. Or it may just be that wiring in the resolver circuit to WPC is loose or bad.
- *Remedy:* If WPC's rated press speed is exceeded, reduce the speed. If not, check the resolver wiring and connections for shorts, breaks, or loose connections. See Chapter 2 "Installing the Resolver," page 28, for complete information about resolver wiring. If the wiring is not the problem, the resolver is probably bad and will have to be replaced. If necessary, contact Wintriss Tech Support for assistance or replacement.

F04 or F05

Problem: In either of these cases, there is a problem with the resolver.

Remedy: You will need to check the resolver and wiring. Specifically check that the terminals are tightened on bare wire and not on insulation. See Chapter 2 - "Installing the Resolver," page 28. If necessary, contact Wintriss Tech Support for assistance or replacement.

E07

- *Problem:* This error occurs during the resolver zeroing process. It means that the resolver had been set outside the range of 330° to 30° .
- *Remedy:* The resolver needs to be re-zeroed properly at top dead center (TDC). (see in Chapter 3).

NOTICE

CLEARING "E" ERROR CODES

"E" error codes with the Reset/Select button or the EMERGENCY STOP / RESET button on the operator station. You must perform these operations:

- 1. Turn the stroke select switch to OFF
- 2. Power down WPC.
- 3. Power up WPC.

Operational Faults

F10

- Problem: This means that the main motor has been turned off. (Note: This code is not displayed when TWO HAND INCH operating mode is selected to enable "Dead Motor Inch.") The motor may also have been deactivated during the lockout mode. "Loc" is described at the beginning of this chapter.
- *Remedy:* Simply turn the motor back on. If this does not resolve the problem, it could also mean that when the motor is on forward, you need to replace the contact blocks on the starter with new, unused ones.

F11

- *Problem:* This means that the ram moved when the Dual Safety Valve (DSV) outputs were off.
- *Remedy:* Check the clutch, brake and DSV components for correct operation. Correct or repair any malfunction.

F13

- *Problem:* This either means that the E-Stop button on WPC has been depressed or that the E-Stop circuit is open.
- *Remedy:* Check for another control manufactured by Honeywell or another company connected to WPC's E-stop circuit which may indicate a specific error condition present. Correct that error. Refer to the user manual pertaining to that other control if you are not sure how to correct the problem.

F14

- *Problem:* This means that the PRIOR ACT button was depressed or appears open to WPC after the stroke commenced.
- *Remedy:* Reset. If the problem persists, check the wiring from the operator station to WPC. Contact Wintriss Tech Support if this cannot be solved.

Problem: This means that the preset on the counter has been reached.

Remedy: Reset. This resets the counter, which begins counting again from 1. The counter preset value remains the same as it was before, until you set it to something different.

- *Problem:* This means that either the TOP STOP button was depressed or the top stop circuit was open after the stroke commenced.
- *Remedy:* Check other equipment (e.g. DiPro 1500, AutoSet, etc.) wired into the Top Stop string. Correct the problem. Reset at that equipment; then reset at WPC and restart.

F17

- *Problem:* This means that cross-checked inputs 8 & 9 disagreed for longer than 100 msec. ("Disagree" means that one input is open and the other is closed.) See page 42 and the tables on page 43 and page 180.
- *Remedy:* Diagnose and correct the condition that the inputs are monitoring.

F18

- *Problem:* This means that cross-checked inputs 10 & 11 disagreed for longer than 100 msec. ("Disagree" means that one input is open and the other is closed.) See page 42 and the tables on page 43 and page 180.
- *Remedy:* Diagnose and correct the condition that the inputs are monitoring.

F20

- *Problem:* This means that the main motor is in reverse without TWO HAND INCH mode selected.
- *Remedy:* Switch to TWO HAND INCH mode, and then run the motor in reverse.

- *Problem:* This means the N/O inputs from the palm buttons (run buttons) do not turn off when they should.
- *Remedy:* Check all palm buttons to be sure they are the correct type of switch. Check and correct the wiring. If this error persists, call Wintriss Tech Support.
 - **F22**
- Problem: This means that the operating mode was changed while the press was running.
- *Remedy:* After clearing the error, run the press after you have made the operating mode selection.

F23

- *Problem:* This means that the operating mode you selected is not a valid one.
- *Remedy:* After clearing the error, consult Chapter 4 "Operation," to determine the correct operating mode to select.

F24

Problem: This means that one of the following happened:

A.) Both palm buttons were pressed while in One-hand mode *or*

B.) Buttons were pressed on an unselected operator station in a multiplestation setup.

Remedy: After clearing the error, take the appropriate action for your situation:

A.) In One-hand mode, press only one button when running the press. *or*

B.) In a multiple-station setup, select all the operator stations necessary for all the operators around the press. Then initiate a stroke.

- *Problem:* This means that the flywheel turned too fast, potentially creating an unsafe barring condition (more than an equivalent of 6 SPM) while the press was in Bar Mode.
- *Remedy:* After clearing the error, bar the press more slowly. Refer to Chapter 4 for more information about Bar mode.

Inter-processor Failures

F30* through F37*

- and -

H38* and H39*

Problem: These errors indicate failures that may occur within the main processor or in the case of error code #H38 and H39, in the second processor, or between the two processors.

The errors are as follows:

- **F30** The A and B processor resolver angles disagree by more than 2°
- F31 No reply received from second processor to check start request
- F33 Incorrect reply received from second processor to mode change message
- F34 No reply received from second processor to mode change message
- F35 Incorrect reply received from second processor to power-up message
- F36 No reply received from second processor to reset error message
- **F37** No reply received from second processor to compare input buffers message
- H38 The second processor did not receive the power up information correctly
- H39 The second processor did not receive the mode information correctly
- *Remedy:* Try to reset WPC. If errors persist, contact Wintriss Tech Support for assistance.

Input Buffer Test Failures

F41* through F44*

- *Problem:* These errors indicate failures that may occur when WPC performs input buffer tests within the main processor. The errors are as follows:
 - **F41** Input buffer 1 check incorrect
 - F42 Input buffer 2 check incorrect
 - **F43** Input buffer 3 check incorrect
 - **F44** Input buffer 4 check incorrect
- *Remedy:* Try to reset WPC. If errors persist, contact Wintriss Tech Support for assistance.

Component Failures

F47 and F48

- *Problem:* These errors indicate failures that have occurred to standard equipment connected to WPC. If "F47" occurs, possibly dirt or water has gotten into the DSV. You may need to rebuild the valve. If "F48" occurs, the air pressure may be turned off or set too low.
 - **F47** Dual Safety Valve (DSV) monitor switch input open
 - **F48** Clutch air pressure switch input open
- *Remedy:* Correct the problem and then reset WPC. If the error persists, contact Wintriss Tech Support for assistance.

Customized Status Codes

F49 through F59

- *Problem:* These errors indicate failures that have occurred on auxiliary equipment that you connected to WPC, such as lubrication systems. See the table below. See also separate listings for F17, F18, F50 and F58, which apply to the cross-checked input pairs (8 & 9 and 10 & 11, see "Using Cross-checked Input Pairs," page 44).
- *Remedy:* Check the auxiliary equipment that signaled the stop (see "Wiring Auxiliary Equipment to WPC for Customized Status Codes" in Chapter 2). Correct the problem. Reset WPC. If the error does not go away, contact Wintriss Tech Support for assistance.

Table 5-1. Error Codes Relating to User Inputs

FAULT CODE	USER INPUT (INTERLOCK)	STOP TYPE	WIRE TO PIN #	WIRE TO (JUMPER TO BYPASS)	NAME OF AUXILIARY EQUIPMENT
51	User #1	ESTOP	21	+24 VDC	
52	User #2	ESTOP	82	+24 VDC	
53	User #3	TOP STOP	71	+24 VDC	
54	User #4 ***	ESTOP	83	GROUND	
55	User #5 **	TOP STOP	72	GROUND	
56	User #6 **	TOP STOP	84	GROUND	
57	User #7	ESTOP/ LOCKOUT	73	GROUND	
Cross-checked pair **: Inputs #8 & #9					
58, 17	User #8 ** paired with #9	ESTOP	85	GROUND	
	User #9 ** paired with #8	ESTOP	74	GROUND	
Cross-checked pair **: Inputs #10 & #11					
50, 18	User #10 paired with #11	ESTOP/ LOCKOUT **	86	GROUND	
	User #11 paired with #10	ESTOP/ LOCKOUT **	18	GROUND	

(see also similar table on page 43)

** These inputs have changed function with WPC firmware version 3.91 and later. Be sure to wire these inputs correctly according to the needs of your installation.

*** This pin or another is used for wiring the counterbalance pressure switch, if applicable.

- *Problem:* This error applies to cross-checked input pair 10 & 11. It means that one or both of the inputs is open. See page 42, the table above, and the table on page 43.
- *Remedy:* Diagnose and correct the condition that the inputs are monitoring.

F58

- *Problem:* This error applies to cross-checked input pair 8 & 9. It means that one or both of the inputs is open. See page 42, the table above, and the table on page 43.
- *Remedy:* Diagnose and correct the condition that the inputs are monitoring.

Light Curtain Faults

F60 or H60

- and -

F61 or H61

- *Problem:* These errors indicate that the light curtain(s) failed the internal light curtain test conducted by WPC. There may be a problem with the wiring of either the first or second light curtain connected to WPC (#60 applies to the first, #61 applies to the second). This error can also be generated by the second processor.
- *Remedy:* Check that your light curtain wiring is correct. Refer to Chapter 2 either in this manual in the Shadow V user manual. If you need more assistance, contact Wintriss Tech Support.

F62

- *Problem:* This error indicates that while two light curtains are wired to WPC, only one light curtain has been selected on the WPC or the first light curtain (A) is blocked.
- *Remedy:* Check that WPC is properly configured for a second light curtain. Clear the first light curtain. Refer to the section "Setting Option Switches" in Chapter 3 to properly configure the dual setting.

- *Problem:* This error indicates that the first light curtain (A) is blocked at the start of or during the stroke.
- *Remedy:* Check to see that light curtain A is clear.

F64

- *Problem:* This error indicates that the second light curtain (B) is blocked at the start of or during the stroke. It could also indicate that you have dual light curtain selected at the option switches in WPC, but only one set of light curtains is wired.
- *Remedy:* Check to see that light curtain B is clear. If necessary, check that you have properly wired both sets of light curtains and that the option switches are set properly (refer to the section in Chapter 3, "Setting Option Switches").

F65

- *Problem:* This error indicates that the light curtains are connected with TWO HAND ONLY software installed in WPC.
- *Remedy:* Be sure that the correct version of software is installed in WPC. It should be one that expects to work with light curtains. Because there are several versions of software available, consult Wintriss Tech Support if you are not sure which is the correct one for your application..

Emergency Stop Circuit Driver Failure

F66 or H66

- *Problem:* The driver circuitry which controls the emergency stop (E-Stop) input circuitry has a failure. This error can also be generated by the second processor.
- *Remedy:* Reset. Check the E-Stop wiring. If the error persists, contact Wintriss Tech Support for immediate assistance or replacement.

Top Stop Circuit Driver Failure

F67 or H67

- *Problem:* The driver circuitry which controls the top stop input circuitry has a failure. This error can also be generated by the second processor.
- *Remedy:* Reset. Check the Top Stop wiring. If the error persists, contact Wintriss Tech Support for immediate assistance or replacement.

DSV Interface and Lockout Relay Failures

F70* through F77*

- or -

H72* through H76*

- *Problem:* These errors indicate failures that have occurred in the DSV interface. Note that #72 through #76 can also be generated by the second processor. The errors are as follows:
 - **F70** The first (DSV-A) DSV relay driver did not open at start of stroke
 - **F71** The two DSV relay drivers have shorted together
- **F72 or H72** The DSV control flip-flop not functioning properly
- **F73 or H73** The DSV missing pulse detector window not functioning properly
- F74 or H74 The DSV relay driver did not close properly at the start of the stroke
- F75 or H75 The DSV relay driver did not open properly at the end of the stroke
- F76 or H76 The Lock-out relay driver did not open properly at the end of the stroke
 - **F77** Lockout relay check contacts were not closed before the lockout relay is turned on.
- *Remedy:* Reset. If you still get these errors, contact Wintriss Tech Support for assistance or replacement.

Loss of Rotation

F79

- *Problem:* WPC sees that the valve has been activated but the resolver did not start rotating within the start time limit that was set by WPC. Also, the resolver could have stopped turning briefly while the press was running.
- *Remedy:* The Start time may not have been set properly (see Chapter 3). The drive belt on the resolver may be loose or broken so the resolver does not turn or stops turning even though the press crankshaft is turning. Also you may have low air pressure to the clutch or a bad clutch; so the crankshaft (and therefore the resolver) did not move even though the clutch control valve has been activated. An internal WPC problem could also have occurred, or the resolver could be defective.

Reset WPC. Re-initialize the start time limit (see Chapter 3). Check the resolver and resolver drive. Check and repair the clutch. If these solutions do not work, an internal problem may have occurred. Call Wintriss Tech Support.

Internal Timing Input Failures

F80 or H80	
- and -	
F82 or H82	

- *Problem:* This indicates an internal problem with the WPC timing inputs.
- *Remedy:* Reset. If you still get these errors, contact Wintriss Tech Support for assistance or replacement.

Top Stop and Overrun Setting Faults

F81, F83 through F87

- and -

H81, H83 through H87

- *Problem:* These errors indicate that the overrun limit switch is on before the Top Stop timing is off. Remember that the Top Stop Timing (actual internal dwell) is on for twenty degrees.
- *Remedy:* Check that you have properly set Top Stop "ON" Angle and installed and set the Overrun Limit Switch correctly. Refer to "Setting up the Top Stop "ON" Angle and determining the correct test angle for the Overrun Limit Switch" in Chapter 3. If you are still having difficulty, contact Wintriss Tech Support for assistance.

Overrun Limit Switch Fault

F85

- *Problem:* The overrun limit switch (made up of the overrun sensor and magnet) provides overrun timing to WPC. WPC checks that the overrun limit switch opens and closes only once per stroke, and compares its timing with the other timing signals (such as auto carry-up and top stop). If WPC detects more than one on/off occurrence, or a timing error it generates this error code.
- Remedy: To correct this problem, review "Installing the Overrun Limit Switch," page 38, and refer to the LED maps on pages 140 (right/center)and 141 (left).
 Check the overrun limit switch installation to make sure that the switch opens and closes only once per stroke. Refer to instructions for installing the overrun switch magnet on page 91, and check the magnet location. Be sure the magnet is attached using a brass or other non-ferrous screw.

Other considerations: Make sure that the overrun limit switch has enough dwell to provide an adequate signal at high speeds. The larger the diameter of the shaft on which the magnet is mounted, the shorter the dwell. If this is the problem, the solution is to mount the magnet on a smaller shaft. Also, ensure that the press is not encountering excessive shock and vibration due to operations such as blanking. If you cannot resolve this problem, contact Wintriss Tech Support immediately for further direction.

Overrun Limit Switch Test Angle Fault

F88 or H88

- *Problem:* The overrun limit switch is not closing at the overrun test angle or opening at 180°. The overrun limit switch monitors the position of the resolver to ensure that it is working correctly. The switch must be installed so that it closes at the overrun test angle. Therefore, it does not close there or open by 180°, the press stops and you see this error code. This error can also be generated by the second processor.
- *Remedy:* The resolver drive has slipped or broken. It is also possible that the overrun limit switch may not have enough dwell to close totally at high RPMs. Also, the resolver or overrun limit switch may be defective or not installed properly. Check the wiring and installation of the resolver and proximity sensor and magnet. Refer to an explanation of the overrun limit switch in "Installing the Overrun Limit Switch," page 38 and magnet installation, page 91.

Overrun Limit Switch Setting Fault

F89 or H89

Problem: These errors indicate that the overrun limit switch settings was not set correctly. *Remedy:* Check that you have properly set the test angle correctly. Refer to the section "Setting the option switches" in Chapter 3. If you are still having difficulty, contact Wintriss Tech Support for assistance.

Internal Memory Failures

F90* through F98*

- or -

H90* through H98*

- *Problem:* This means that something may be seriously wrong with the main WPC processor board or the second processor (designated by "H"), which may need servicing or replacement.
- *Remedy:* Reset. If you still get these errors, contact Wintriss Tech Support for assistance or replacement.

Appendix A – OSHA Regulations and ANSI Standards

A WARNING

SAFETY REGULATIONS AND STANDARDS MAY BE DIFFERENT

Refer to the most recent revisions of the original documents for all safety regulations and standards to ensure that you have the most up-to-date and correct information.

The following extracts from OSHA and ANSI documents are provided for the user's convenience only, and may not reflect the current revisions of these documents.

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

The Occupational Safety and Health Administration (OSHA) regulations and the American National Standards Institute (ANSI) standards for presence-sensing devices are listed here. The OSHA regulations are in Section 1. ANSI standards are in Section 2.

Section 1 OSHA Regulation 1910.217

Reprinted below are excerpts from OSHA regulation 1910.217 pertaining to the use of presence-sensing devices for point-of-operation guarding on mechanical power presses. Portions from the text of the OSHA regulations are presented in the left-hand column of the pages in this section. Additionally, an interpretation provided by the Precision Metalforming Association (PMA) is presented in the right-hand column.

Honeywell makes no claim regarding the accuracy or effectiveness of the PMA interpretation reprinted here. The material is listed for informational purposes only. It should not be relied upon for use in any specific application. Persons making use of this interpretive material do so at their own risk. It has been reprinted with the permission of the PMA.

Excerpts from OSHA Regulation 1910.217 OSHA Regulations PMA Interpretation OSHA 1910.217 (c) (3) (i) (a) Point of operation devices. (3) Presence-sensing device (i) Point of operation devices shall protect the operator by: (a) Preventing and/or stopping normal (c) (3) (i) (a) Refers to the functional requirement of a stroking of the press if the operator's presence-sensing device which prevents and/or stops hands are inadvertently placed in the point normal stroking of the press. of operation.

Excerpts from OSHA Regulation 1910.217

OSHA Regulations

PMA Interpretation

OSHA 1910.217 (c) (3) (iii)

(iii) A presence-sensing point of operation device shall protect the operator as provided in paragraph (c) (3) (i) (a) of this section, and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other part of his body is within the sensing field of the device during the downstroke of the press slide.

(a) The device may not be used on machines using full revolution clutches.

(b) The device may not be used as a tripping means to initiate slide motion.

(c) The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent the initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system.

(d) Muting (bypassing of the protective function) of such device, during the upstroke of the press slide is permitted for the purpose of parts ejection, circuit checking and feeding.

(e) The safety distance (D_S) from the sensing field to the point of operation shall be greater than the distance determined by the following formula:

 $D_{S} = 63$ inches/second x T_{S} where

 D_{S} = minimum safety distance (inches);

63 inches/second = hand speed constant and

European method (curtain of light) uses self trip safety system effectively. Variance applied for 11/17/73 by Interlake Stamping Company to use this fail safe system.

When failure occurs, the best indication is the press won't run.

Top of stroke is the point at which muting shall cease as it is not possible to set a point on the downstroke as the exact position where the hazard of die closing starts.

Safety distance represents the distance an operator can move his hand during the time it takes a press to stop. The internationally recognized hand reach speed is 63 inches/second.

To determine this safety distance, the stopping time of the press is measured with some appropriate measuring device. The measurement is taken such that the stop signal is given to the press at the 90 degree point of the crank position.

Since some stopping time increase must be accommodated due to braking system deterioration, a percentage factor must be added to the measure time to obtain the factor for use in the equation for determining safety distance. A percentage factor of

OSHA Regulations	PMA Interpretation	
T_s = stopping time of the press measured approximately 90° position of crankshaft	20% is recommended for presses with new brakes or brakes of good condition. For older brakes, a 10% factor is recommended.	
rotation (seconds)	Example:	
	Measured stopping time $= 0.190$	
	Time factor = $1.2 \times 0.19 \times 0.228$ seconds	
	Calculation = 63×0.228	
(f) Guarda shall be used to protect all	Safety distance = 14.4 inches	
areas of entry to the point of operation not protected by the presence-sensing device.	(3) (iii) (f) Great care must be taken to assure that no access to the die area exists unguarded.	
OSHA 1910.217 (c) (3) (5)	This paragraph tells the condition under which a brake monitoring system is required after November 1, 1975.	
(5) Additional requirements for safe-guarding. Where the operator feeds or removes parts by placing one or both hands in the point of operation, and a two hand control, presence- sensing device of Type B gate or movable barrier (on a part revolving clutch) is used for safeguarding:		
(i) The employer shall use a control system and brake monitor which comply with paragraphs (b) (13) and (14) of this section. This requirement should be complied with by November 1, 1975.	(b) (13) Control reliability(b) (14) Construction requirements.	
OSHA 1910.217 (c) (3) (vii) (c)		
(c) The safety distance (D_s) between each two hand control device and the point of operation shall be greater than the distance determined by the following formula:		
Ds = 63 inches/second x T _s , where:	Examples	
Ds = minimum safety distance (inches);	Example.	
63 inches/second = hand speed constant;	Measured stopping Time = 0.190 seconds	
and	Time Factor = $1.2 \times 0.19 = 0.228$ seconds	
T_{S} = stopping time of the press measured at	Safety Distance = 14.4 inches	
approximately 90° position of crankshaft rotation (seconds).		

Excerpts from OSHA Regulation 1910.217

Excerpts from OSHA Regulation 1910.217

OSHA Regulations

PMA Interpretation

OSHA 1910.217 (e) (1)

(e) INSPECTION, MAINTENANCE, AND MODIFICATION OF PRESSES

(i) It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all their parts, auxiliary equipment, and safeguards are in safe operating condition and adjustment. The employer shall maintain records of these inspections and the maintenance work performed.

(ii) Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism, anti-repeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. The employer shall maintain records of these inspections and the maintenance work performed. These requirements do not apply to those presses which comply with paragraphs (b) (13) and (14) of this section. Records of clutch and brake will be weekly. Other inspections are periodic subject to time factor determined by employer.

If brake monitoring system is installed, weekly inspection and records are not required for clutch/brake mechanism. Other parts of the press will require periodic inspections and records.

Section 2 ANSI Standards for Presence-sensing Devices ANSI Standards for Two-hand Controls

Reprinted below are the American National Standards Institute (ANSI) standards for presence-sensing devices (light curtains). Also included is Section 8.5.3 on two hand controls. ANSI is the United States clearinghouse and coordinating body for voluntary standards activity on the national level. It is a federation of trade associations, technical societies, professional groups, and consumer organizations. Some 1000 companies are affiliated with the Institute as company members.

ANSI creates voluntary standards to eliminate duplication and to weld conflicting standards into single, nationally accepted standards under the designation "American National Standards." The standards reflect a national consensus of manufacturers; consumers; scientific, technical, and professional organizations; and governmental agencies.

The ANSI standards below are American National Standard Institute B11.1-2001 for presence-sensing devices (light curtains) and two hand controls. Both the ANSI standard and its interpretation are part of ANSI standard B11.1-2001. To get a complete copy of the ANSI standard, write to: ANSI, 1430 Broadway, New York, NY 10018.

Standard Requirements	Explanatory Information
8.5.3 Presence-sensing safeguarding device	
8.5.3.1 A presence-sensing point-of-operation device, when used for safeguarding, shall protect the operator as specified in 8.5.1 (a);	<i>E8.5.3.1</i> Various presence-sensing devices employ different sensing and adjustment techniques. The point at which a device responds to an intrusion can vary.
8.5.3.2 The device shall be interfaced with the control circuit to prevent or stop slide motion if any object is within the sensing field of the device during the hazardous portion of the cycle (stroke)	<i>E8.5.3.2</i> The device should be located or adjusted so that the device always responds to the intrusion at or prior to the safety distance (D_S) .
	Also, care should be taken when installing the device so that it does not detect false signals from other devices or equipment in the area.
	The presence –sensing device cannot protect against a mechanical failure, which causes unintended cycling (stroking) action. See figure A.3.
8.5.3.3 The device shall not be used for safeguarding the point of operation on presses using full-revolution clutches.	

Extracts from ANSI B11.1-2001 8.5.3

8.5.3.4 When the sensing field has been

Standard Requirements	Explanatory Information
interrupted, use of the normal press cycle (stroke)-actuating means shall be required after clearing the sensing field to resume press operation.	
8.5.3.6 Muting of the device shall be permitted only during the non-hazardous portion of the press cycle (stroke).	<i>E8.5.3.6</i> Muting is typically accomplished by interface circuits or auxiliary controls.
	The die closing portion of the cycle (stroke) is always considered hazardous. In some cases, feeding and transfer automation or die features can cause additional hazardous conditions even during the opening portion of the cycle (up- stroke).
	See also, B11.19 for additional information.
8.5.3.7 Muting of the device shall be accomplished in a manner that conforms to the requirements of 6.8 (and 8.7)	<i>E8.5.3.7</i> Muting is typically accomplished by interface circuits or auxiliary controls. The muting element should incorporate a similar level of control reliability as the presencesensing device itself. A simple cam-operated limit switch wired in parallel with the device's output is inadequate as its failure can remain undetected
8.5.3.8 The device shall have an identifiable minimum object sensitivity so that an obstruction of an equal or greater size will be detected anywhere within the sensing field regardless of the plane of intrusion.	<i>E8.5.3.8</i> The device should have a minimum object sensitivity stated by the device manufacturer. For example, electro-optical devices may detect a 32 mm (1-1/4 inch) diameter opaque object anywhere in its sensing field but allow 25 mm (1 inch) obstructions to pass undetected at certain points in the field.
8.5.3.9 The device shall have a maximum response time which shall not be affected by object sensitivity adjustments or environmental changes.	<i>E8.5.3.9</i> The device manufacturer should state the maximum total response time, including output devices, of the presence-sensing device.
8.5.3.10 Devices which require adjustments to accommodate variations in ambient or operating conditions or which incorporate fixed blanking or floating blanking features shall be designed so that the adjustments or features are capable of being supervised by the user.	<i>E8.5.3.10</i> Typically, these adjustments or controls are key-operated or located under lockable covers.
8.5.3.11 The device shall be provided with a means that visibly indicates when it is functioning properly. The device shall also	<i>E8.5.3.11</i> Red and green indicator lamps or other means that can easily be seen by the operator and others should be used to indicate

Standard Requirements	Explanatory Information
indicate which sections, if any, have been	that the device is bypassed.
blanked out and whether floating blanking features are in use.	For radio frequency devices, it is useful to observe a display such as a meter or signal lamp to indicate the degree of penetration as an aid to set-up and shaping of the field as well as the separate signal to indicate intrusion resulting in a STOP command.
8.5.3.12 The device shall not fail to respond to the presence of the individual's hand or other body part due to the presence of a reflective object or workpiece.	
8.5.3.13 The device shall conform to the requirements of 6.8 (and 8.7). in the event of a power failure to the device, the device shall initiate a stop command to the press control system.	
8.5.3.14 The interface of the presence-sensing device to the press control shall conform to the requirements of 6.8 (and 8.7).	
8.5.3.15 The sensitivity of the device to intrusion shall not be adversely affected by changing conditions around the press.	<i>E8.5.3.15</i> Some devices can be affected by changes in the conditions around the press production system such as the placement of parts and tote boxes, grounding conditions or the operator, or the movement of forklift trucks.
8.5.3.16 The effective sensing field of the device shall be located at distance from the nearest point-of-operation hazard so that individuals cannot reach the point of operation with a hand or other body part before cessation of motion during the hazardous portion of the cycle (stroke)	E8.5.3.16 The total stopping time of the press should include the total response time of the presence-sensing device, as stated by the supplier, the response time of the interface, the response time of the control system, and the rime it takes the press to cease slide motion.
	The following formula should be used when calculating the safety distance:
	$Ds = K \left(T_s + T_c + T_r + T_{bm} \right) + D_{pf}$
	where
	K = 63 inches/second (hand speed constant)

 T_s = the stop time of the press measured from the final de-energized control element, usually

Standard Requirements	Explanatory Information
	the air valve
	$T_{\mathcal{C}}$ = the response time of the press control
	T_r = the response time of the presence-sensing device and its interface, if any, as stated by the manufacturer or measured by the user.
	T_{bm} = the additional stopping time allowed by the stopping performance monitor before it detects stop time deterioration.
	D_{pf} = the added distance due to the penetration factor as recommended in Figure 2. The minimum object sensitivity is stated by the manufacturer. If beam blankouts or floating window features are used, these figures should be added to the object sensitivity figure before using the chart.
	NOTE - $T_s + T_c$ = are usually measured by a stop time measuring device.
	See also, Annex C.
	Whenever the press-cycle (stroke) STOP command or stopping-performance monitor time or angle setting is changed, the safety distance should be recalculated. See also Stopping-Performance Monitor (6.9)
	NOTE – No increase in safety distance is required for fixed blanking applications if the blanked area is entirely occupied by the material or fixtures.
	In some instances, the use of blanking does not allow efficient production of certain piece parts. Horizontal placement of the sensing field, so that it detects the operator's waist area, may present a solution. In this application, the operator may freely manipulate the workpiece and operate the press as long as the operator stands outside of the horizontal sensing field.
	The sensing field should be located so that the operator cannot reach the point of operation prior to interrupting the sensing field and

Standard Requirements

Explanatory Information

8.5.3.17 If the position of the device will allow the operator or others to place themselves between the sensing field and the point of operation, additional means shall be provided in conjunction with the device to prevent the operator or others from exposure to the point-of-operation hazard.

8.5.3.18 The device shall not be affected by ambient light or by light-source decay so that the increase in response time or object sensitivity is greater than the value used to calculate the safety distance.

8.5.3.19 All areas of entry to the point of operation not protected by the presence-sensing device shall be otherwise safeguarded.

completion of the stopping action. Where possible, the sensing field should be of sufficient depth to prevent the operator from standing between the field and the point of operation. See also, Annex C.

E8.5.3.17 Additional means may include manual reset outside of the sensing field of the device, or additional barrier guards, safety mats, light curtains, or other devices.

Operator controls for each operator located outside of the sensing field of the presencesensing device may be used.

E8.5.3.18 Examples of ambient light are associated with windows, light fixtures, skylights, bay doors, or die lights.

E8.5.3.19 Usually the electro-optical presence-sensing devise is used in a manner that provides a protected zone in front of the primary work area with auxiliary devices or guards used to protect secondary access areas.

In some cases, mirrors may be used in conjunction with the device to provide tow-, three- or four-sided protection.

8.5.3.21 When a device is used on a press production system in a SINGLE-STROKE mode, and the protection of the operator is dependent upon the stopping action of the press, a stopping-performance monitor shall be required in compliance with 6.9.

Regarding safety distance for two-hand controls

Standard Requirements

8.5.2.1.5 Each operator's hand actuating control shall be located at a distance from the point-of-operation so that the operator(s) cannot release either hand actuating control and reach into the point-of-operation prior to die closure or prior to cessation of slide motion during the closing portion of the cycle (stroke).

Explanatory Information

E8.5.2.1.5 The total stopping time of the press should include the total response time of the control system and the time it takes the press to cease slide motion. The following formula should be used when calculating the safety distance (D_s) :

$$D_s = K (T_s + T_c + T_{bm})$$

Where:

K = 63 inches/second (hand speed constant).

 T_s = the stop time of the press measured from the final de-energized control element, usually the air valve.

 T_c = the response time of the control.

 T_{bm} = the additional time allowed by the brake monitor before it detects stop time deterioration.

NOTE $-T_s + T_c$ are usually measured by a stop time measuring device.

When the press stopping-performance monitor timer or STOP position sensor is changed, the safety distance should be recalculated. See also, Annex C.

Index

—A—

ACTS. See Auto Compensated Top Stop air pressure switch, 25 American National Standards Institute standards, excerpts, 196 American National Standards Institute (ANSI) safety distance formula, 110 ANSI. See American National Standards Institute ANSI (American National Standards Institute) standards, 196 anti-repeat test, 136 anti-tiedown text, 135 auto carry-up, 86, 101, 163, 167 enable/disable changes to, 118 Auto Compensated Top Stop (ACTS), 11 disabling during top stop test, 99 switch, 117 automatic single stroke, 9, 67, 86, 165 AutoSet wiring to zero cam, 60 auxiliary counter. See counter, auxiliary auxiliary output. See outputs

<u>—B</u>—

bar mode control, 9 error message, 183 operation, 172 testing, 144 wiring, 65 brake fault warning, 176 monitor, 2, 107 monitor and ACTS, 117 monitor warning, 154 monitor, stop time exceeded, 177 monitor, stop time limit, 111 monitor, using, 103 ninety-degree (90°) stop-time test, 2 warning LED, 2, 5, 154, 176 buttons. See switch(es)

-C--

cam outputs assembly, mounting dimensions, 55 installing, 53

PC board layout, 41 set cams switch, 58 set cams user key switch, 59 setting, 120 setting, example, 121 wiring, 56 zero cam, 60 checkout DSV wiring, 83 emergency stop circuit, 85 final tests, 124 safeguarding devices, 81 top stop, 84 user inputs, 85 clock display, 90 additional, 78 mounting and cutout dimensions, 77 mounting kit with switches, 76 panel mount, 75 twin display adaptor, 78 clutch air pressure switch, 86 codes, status. See error codes components, optional, 8 Continuous mode continuous on demand, 9 continuous on demand, wiring, 67 foot, 168 on demand, using, 169 testing with light curtain, 137 testing, without light curtain, 139 two-hand, 167 control assembly, 72 control panel, 5 control reliability, 1, 194 counter (on display), 2, 156 disabling, 159 preset value, viewing and setting, 158 preset, forcing to 999999, 159 preset, forcing to zero, 159 resetting to zero, 157 viewing, 157 counter, auxiliary timing, 60 wiring output, 60 counterbalance, 99 air pressure switch, 8, 25 crank-angle clock, 5, 155

crankshaft, 31

—D—

depth penetration factor. *See* safety distance DiPro 1500, input check circuit, 50 display board, 87 digital, 5 indicator segments, 5 PC board layout, 39 display interface, PC board layout, 39 Dpf, depth penetration factor. *See* safety distance DSV. *See* dual safety valve dual operator selection control, 9, 68, 172 dual safety valve, 8, 86, 93, 103, 184 checking, 83 failures, 188 wiring, 25

—E—

E series error codes, 178 electrical noise, 57 emergency stop / reset switch (button), 7 button, pressing to reset, 175 button, testing, 128 circuit, checkout, 85 errors, 180, 187 other Wintriss controls and, 51 enclosure installation with, 21 installation without, 72 equipment, auxiliary, 184 error codes, 175, 178. See also error code numbers in Chapter 5 brake monitor, 177 component failure, 184 cross-checked inputs, 181, 186 customized status codes, 184 DSV interface, 188 E. F or H series. 178 emergency stop (E-stop), 187 E-stop relay failure, 187 F15, stroke counter preset reached, 158 input buffer test failures, 184 internal memory failures, 191 internal timing input failures, 189 inter-processor failures, 183 light curtain faults, 186 lockout relay failures, 188 loss of rotation check, 189 overrun angle fault, 190 overrun limit switch, 191

overrun limit switch setting, 191 resolver faults, 179 status codes, customized, 2 top stop fault, 188 user inputs, 185 E-Stop. *See* emergency stop external trip, 9, 165

—**F**—

F series error codes, 178 failures, component, 184 faults. *See also* error codes operational, 181 foot switch, 8, 9, 164 pin connection, 86 setting option switch 3, 116 testing, 141 wiring, 61

—G—

guidelines, installation, 18

—H—

H series error codes, 178 hand-speed constant, 110, 112. *See* also safety distance

I

Inch mode. See also Micro-inch disabling top stop in, 52 Micro-inch, 161 top stop, 161 top stop bypass, 161 indicators, display, 5 input check circuit, DiPro 1500, 50 inputs, 46 using cross-checked, 48 installation. 15 dual safety valve, 25 foot switch wiring, 61 guidelines, 18 one-hand control, 61 panel mount clock dimensions, 74 resolver, 31 shield termination, 20 wiring tips, 18, 21 inter-processor failures, 183 interrupted stroke, 2, 49, 50, 114, 153, 171 auxiliary 1, response to, 119 LED, 5, 92, 150, 152, 153, 164

—K—

key switch(es). See switch(es)

L

LED

brake warning, 5, 154 indicator map, left, 146 indicator map, right or center, 145 interrupted stroke, 5, 92 mute, 7 palm time, 7 left/right select switch (one hand), 7 light curtain break mode, 8, 62, 170, 171 light curtains, 8, 27, 187 dual, errors, 186, 187 dual, setting switch 6 for, 118 faults, 186 level shifter for Shadow I, 113 object sensitivity, 111 setting switch 6 for dual, 118 Shadow I and II wiring, 113 Shadow V light curtain, 111 testing, 126 Loc, 3, 48, 150, 175 lockout, 3, 47, 175 relay, 87 relay failure, 188 relay, wiring, 48

_M__

magnet. See overrun sensor
master. See resolver.
Micro-inch, 2, 52, 87, 114, 160, 161. See also operating modes. See also inch mode
mode. See operating modes.See Inch, Single Stroke, Continuous, bar, setup, one-hand, foot modes
mode select key switch, 6

mute LED, 7

__N__

NEMA 12 protection, 18, 22, 23 ninety-degree (90°) stop-time test, 2

0

object sensitivity. *See* safety distance. *See* light curtains Occupational Safety and Health Administration (OSHA) regulations, excerpts, 192 safety distance formula, 110, 112 one-hand mode, 8 mode, selecting, 7 operation, 162 one-hand control, 8, 170 installing, 61 light curtain break mode, 62, 170 light curtain break mode, setting switch 3, 116 setting switch 3, 116 switch, 143 testing, 143 wiring, 64 operating modes automatic single stroke, 165 bar mode, 172 continuous mode, 167 continuous on demand, 169 one-hand control, 170 single stroke mode, 162 operation, theory of, 11 operator station(s), 7, 68, 87, 101 dual selector. 68 dual, selector, 3 mounting, 27 multiple, 9, 68, 172 options, 8, 13 OSHA. See Occupational Safety and Health Administration outputs auxiliary 1, 49 auxiliary 1, response to interrupted stroke, 119 auxiliary 2, 49 auxiliary 2, setup mode, 50 auxiliary 3, 50 overrun, 96, 98 faults, 190 limit switch, 42, 43, 84, 86, 96, 190, 191 limit switch, installing, 33 limit switch, testing, 98 magnet, installing, 42 magnetic switch, 42, 96 sensor, 42 setting option switches 1 and 2 for test angle, 115

__P__

palm time, 172 LED, 7
PC boards cam outputs layout, 41 display board layout, 39 display interface layout, 39 power supply layout, right or center, 36 power supply, left, 38

processor board layout, left, 37 processor board layout, right or center, 35 pinch point, 29, 109, 112 pinouts, 86 PLC, 67 PMA. See Precision Metalforming Association power supply AC wiring, 22 board layout, left, 38 board layout, right or center, 36 connectors, 87 testing, 125 Precision Metalforming Association, 30, 192 preset. See counter press option switches, 115 ACTS, switch 4, 117 auto carry-up adjustment lock, switch 3, 116 dual light curtains, switch 6, 118 foot trip or foot control, switch 3, 116 light curtain break, switch 3, 116 prior act timing, switch 5, 117 setting for overrun limit test angle, switches 1 and 2, 115 switch 3, one-hand or foot mode, 116 switch 4, ACTS, 117 switch 5, auto prior act timing, 117 switch 6, dual light curtains, 118 switch 8, top stop mode for F and H errors, 118 switches 1 and 2, overrun limit test angle, 115 top stop mode for F and H errors, switch 8, 118 prior act setting press option switch 5, 117 switch, 7 processor board layout, left, 37 layout, right or center, 35 ____R___

redundancy, dual diverse, 1, 11 reset, remote, 52, 86 reset/select button, 5, 91, 151 resolver, 1, 6, 11, 42, 51, 179, 189 angle, unzeroed, 97 connecting multiple controls to, 51 dimensions, 32 direction, checking and setting, 34 faults, 179, 189 installing, 31 replacing, 34 setting device as slave, 51 setting WPC as master, 51

wiring, 33 zeroing, 94 zeroing error, 179 response time, 110, 112. See also safety distance run/inch palm switches (buttons), 7

safety distance, 109, 112, 113, 193, 194. See also light curtains ANSI formula, calculating with, 110 D_{pf}, depth penetration factor, 111, 198 OSHA formula, calculating with, 112 selector switch connections, 75, 78 cutout dimensions, 76 settings adjustment key switch, 5, 93, 99, 102, 105, 106, 114 setup mode, 50 Shadow. See light curtains shield, terminating, 20 Single Stroke mode automatic (external trip), 9, 67, 165 foot operation, 164 test, with light curtains, 130 testing, 133 two-hand operation, 163 slave. See resolver specifications, 12 start time, 93, 189 automatic, setting, 93 limit, 95 limit, re-initializing, 95 station, operator. See operator station(s) status codes. See error codes user inputs, 185 stop time limit, 91 automatic initialization, 93 stopping angle, 155 stopping time, 103, 104, 110, 112, 151, 177, 193, 194. See also safety distance. See also stop time. See also brake monitor stop time limit, 103, 104, 175 stop time limit, factory setting, 103 stopping angle, 1 stroke select key switch, 5 suppressors, 18, 57 connecting, 58 switch(es) clutch air pressure, 25 clutch air pressure, error, 184 counterbalance air pressure, 8, 25 emergency stop / reset, 7

foot, 8 key, mode select, 6, 8 key, settings adjustment, 5 key, stroke select, 5 left/right select (one hand), 7 one-hand control, 8 press option, *See* press option switches, 115 prior act, 7 run/inch palm buttons, 7 selector, cutout dimensions, 76 setting one-hand control switch 3, 116 system air pressure, 8 top stop, 7 voltage selector, 22 system static test, 128

—T—

Thm, stop time adjustment for brake wear, 104, 111, 198. See also safety distance testing, 124. See also checkout anti-repeat, 136 anti-tiedown, 135 bar mode control, 144 continuous mode with light curtain, 137 continuous mode without light curtain, 139 foot switch, 141 light curtains, 126 one-hand control, 143 power supply, 125 single stroke mode with light curtains, 130 single stroke mode without light curtain, 133 system static, 128 timing. See cam outputs, counter, overrun, prior act, top stop, zero cam top stop auto compensated (ACTS) switch, 117 checkout, 84 errors, 181, 188 in Inch, disabling, 52 ON Angle, 96, 97, 99, 190 switch (button), 7 T₈, 112. See stopping time twin display adapter, 78 two-hand control, 2 as safety device, 27 two-hand mode, 8

—U—

user inputs. *See* inputs checkout, 85

voltage. See specifications. See switch(es), voltage selector

Wintriss controls, connecting to WPC, 51 wiring. *See* installation

—Z—

zero cam, wiring to AutoSet, 60 zeroing. *See* resolver, zeroing
Wintriss User Manuals

Document Name

Document Number

AutoSet 1500	1088500
AutoSet 1500 Plus	1095100
AutoSet 1504	1099500
AutoSet 1504 Plus	1099600
AutoSetPAC (Tonnage Monitor)	1101600
Die Protection Handbook	1097100
DiPro 1500	1092000
DiPro Sensor Interface (DSI)	1100000
DSI 2 Sensor Interface	1121900
Machine Monitor	1124500
PACNet (Computerized Pressroom Reporting) & RSR	1109000
ProCam 1500	1095000
ProPAC (Process Monitor – In-die Measurement)	1117500
RamPAC (Shut Height, Counterbalance & Cushion Control)	1115200
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Servofeed Interface - DiPro	1096300
Servofeed Interface - Electrocraft/Wintriss	1109200
Servofeed Interface - Indramat/Wintriss	1104500
Servofeed Interface - ProCam	1069100
Servofeed Interface - SmartPAC	1102500
Servofeed Interface - Waddington/Wintriss	1102700
Shadow I & II (& IV) Safety Light Curtain	1069100
Shadow V Safety Light Curtain	1087300
Shadow VI Safety Light Curtain	1107200
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Wintriss Brake Monitor	1096400
WPC 1000 Wintriss Press Control	1125100
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