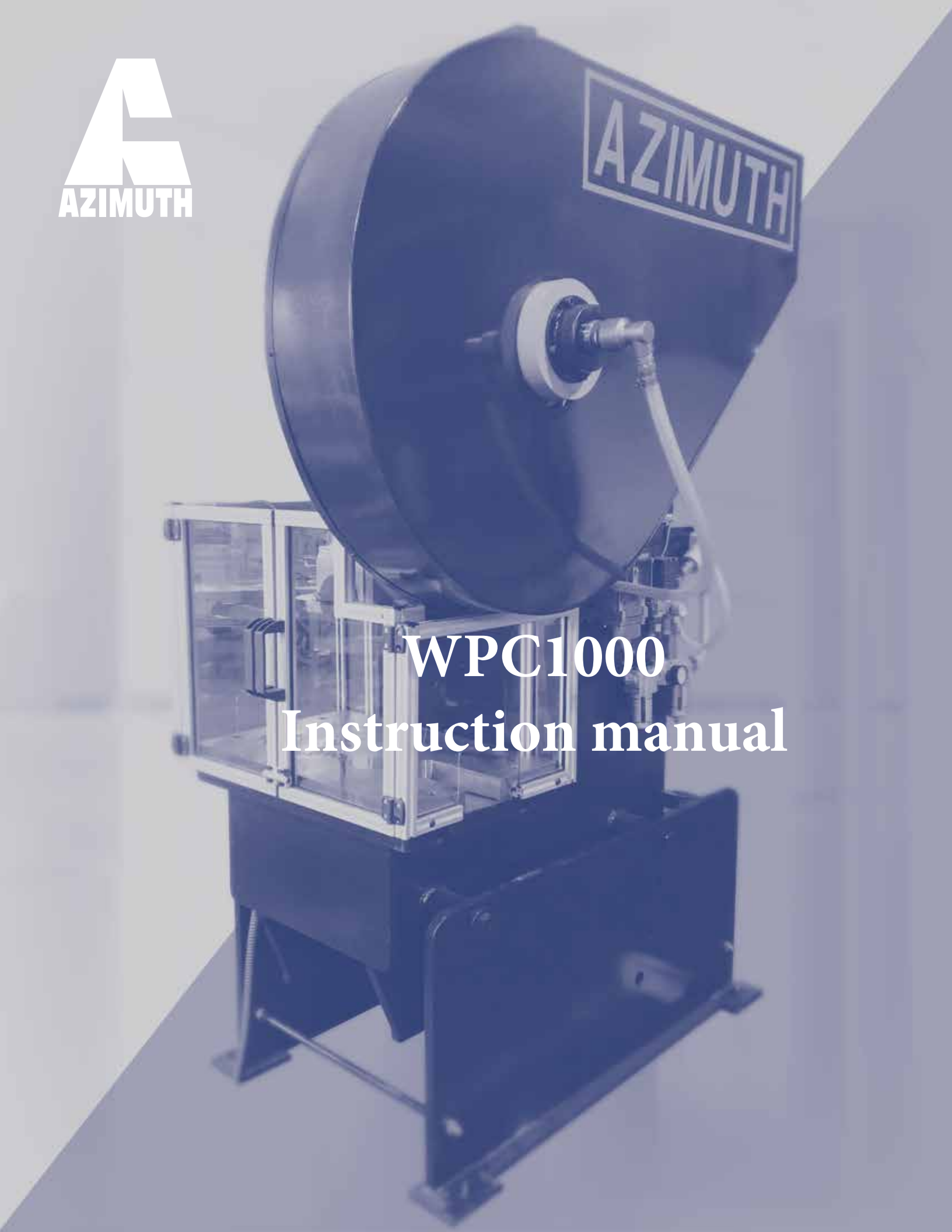
AZIMUTH



WPC1000
Instruction manual

WINTRISS®

User Manual

WPC 1000

Wintriss® Clutch/Brake Control
1125100
Rev. T January 2018

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

WINTRISS®

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  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.

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  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.

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

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  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 service 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 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.

Changes for Revision T of the WPC 1000 User Manual (1125100)

This revision of the WPC 1000 user manual covers WPC 1000 software version 2.77 and higher. The changes include:

- In How to Use This Manual, added link to downloadable product documentation.
- Added references to and information about Shadow 9 light curtains, including revised safety distance calculation and wiring diagrams 14 and 15 at the end of the manual.
- Revised Display Kit instructions to reflect the cable used.
- In Appendix A, revised Extracts from ANSI B11.19-2003 8.3 to ANSI B11.19-2010 8.3 version.

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How To Use This Manual

This manual shows you how to install, set up, operate, and troubleshoot the WPC 1000 Wintriss Clutch/Brake Control.

Chapter 1 provides an overview of WPC 1000 features and components, describes the locations and functions of the switches and LEDs on the front panel and display, and lists WPC 1000 specifications.

Chapter 2 shows you how to install both enclosure and non-enclosure versions of WPC 1000, including optional components, and perform installation verification tests.

Chapter 3 shows you how to initialize and set up WPC 1000 and perform final checkout tests.

Chapter 4 shows you how to run the press, using WPC 1000's Inch, Single-stroke, and Continuous stroke selections and Two-hand, One-hand, and Foot modes.

Chapter 5 shows you how to respond to and correct the fault codes that appear on the display when WPC 1000 detects an error.

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

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

Appendix C provides a drawing of the old WPC 1000 Control board and explains differences between the old and new boards.

The Glossary explains some terms that may be unfamiliar to you.

Figures at the back of the manual provide wiring diagrams that you can use in conjunction with the instructions in Chapter 2 to wire WPC 1000 and its components.

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

Important Highlighted Information

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

⚠ DANGER

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

⚠ WARNING

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

CAUTION

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

NOTICE

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

WARRANTY

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

Please note:

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

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WPC 1000 CLUTCH/BRAKE CONTROL
USER MANUAL
1125100

Chapter 1. Introduction

WPC 1000 Wintriss Clutch/Brake Control is an easy-to-use, dual-microprocessor-based system that controls part-revolution mechanical power presses. Housed in a single modular enclosure, both microprocessors function independently, have different power supplies, and provide separate information to the operator. As a result of its "dual diverse redundancy," WPC 1000 is able to provide optimum clutch/brake control and improved operator safety while increasing productivity.

WPC 1000 meets or exceeds all ANSI B11.1-2009 standards and OSHA 1910.217 regulations for Control Reliability, the benchmarks that govern the operation of mechanical power presses. Control Reliability demands that a single component failure in a clutch/brake control circuit *not* prevent the normal stopping action of the press, *not* create an unintended stroke, and *not* allow initiation of a subsequent stroke until the failure has been corrected.

WPC 1000 Components

WPC 1000 can be configured as a complete system with all the components necessary to operate a pneumatic clutch/brake system.

Resolver

The resolver, which is mounted on the press, turns one-to-one (1:1) with the crankshaft, allowing WPC 1000 to know the exact position of the crankshaft on every stroke.

The resolver is similar to an electrical generator and works on the principle of inductance. The resolver's two outputs vary in amplitude and phase as the resolver turns. WPC 1000 translates these analog signals to a number that indicates the position of the resolver (and press crankshaft) in degrees.

The resolver eliminates the need for a mechanical rotary limit switch. Operators no longer have to climb on top of the press to make timing adjustments. In addition, the resolver on the WPC 1000 can be shared with other Wintriss resolver-based products, such as DiPro 1500.

Control Enclosure

The WPC 1000 control enclosure (see Figure 1-1, page 1-2) can be ordered with the display and controls mounted on the front (center mount) or left (left mount) or right side (right mount). Three selector key switches are available:

- **Stroke Select** (Standard)–Provides settings for selection of either Inch, Single-stroke, or Continuous operation or Inch or Single-stroke.
- **Mode Select** (Optional)–Provides settings for selection of One-hand, Two-hand, or Foot operation. Optional One-hand/Two-hand/Foot firmware is required for use of One-hand and Foot settings.

- **Micro-inch** (Optional)–Provides a setting for turning on the Micro-inch feature (see *Standard Features*, page 1-7).

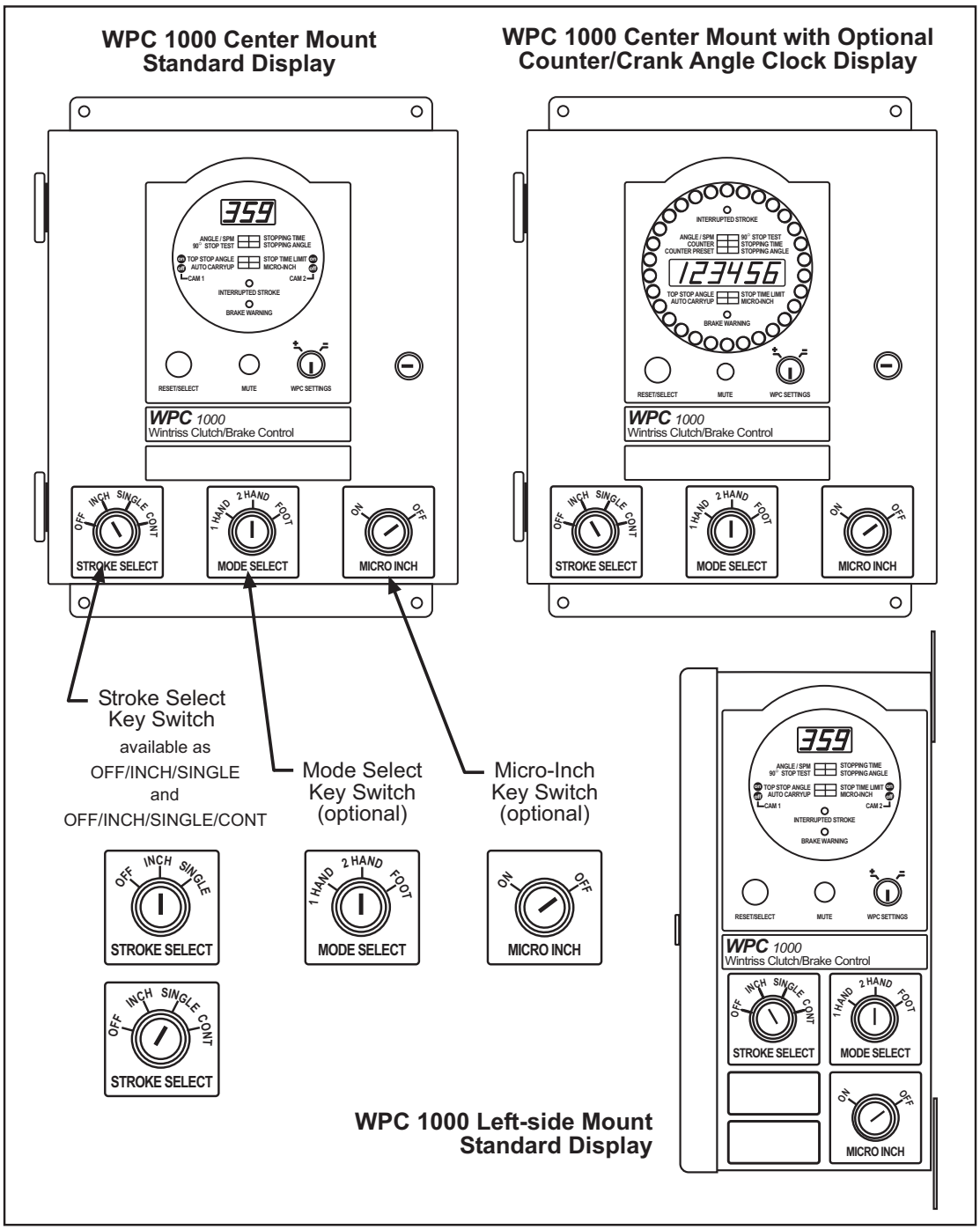


Figure 1-1. WPC 1000 Control Panels

There are two display options: standard and optional counter/crank-angle clock (see *Displays*, page 1-4).

Operator Station

The Operator Station is normally the device used to run the press in all Stroke Select positions. Wintriss provides operator stations with Run/Inch palm switches mounted on either the top or sides (see *Installing Operator Station(s)*, page 2-12 for available configurations). Figure 1-2 shows the switches and indicator lamps on an Operator Station with side-mounted Run/Inch palm switches. Functions of these components are shown below.

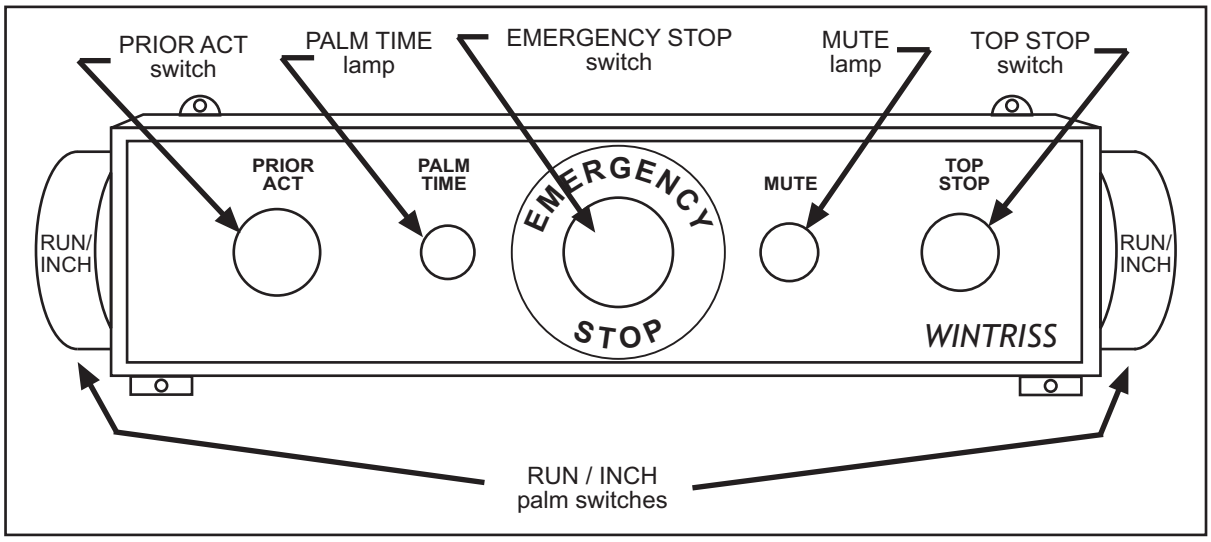


Figure 1-2. Operator Station Components (Side-mounted Run/Inch Palm Buttons)

- Run/Inch Palm Switches (2)–Initiate press action when both switches are pressed at the same time (Two-hand mode) or when only the left switch is pressed (One-hand mode).
- Prior Act Lamp and Switch–An arming device that must be pressed in Continuous Two-hand and Continuous Foot operating modes before a stroke can be initiated. When the switch is pressed, the lamp illuminates for 8 seconds, indicating the interval within which the operator must press the Run/Inch buttons or Foot Switch in order to stroke the press.
- Emergency Stop Switch–Stops the press immediately when you push it. The switch is not spring-loaded, so you must pull it back to its original position to clear the emergency stop (F13) fault (see page 5-7).
- Top Stop Switch–Stops the press at the top of its stroke when pressed during Continuous operation.
- Palm Time Lamp–Illuminates when one Run/Inch palm button is depressed, turning off after the 1/2 second palm time ("synchronous" time in ANSI terminology) on a standalone Operator Station or the 5 second concurrent time on multiple Operator Stations. The other palm button on a standalone Op. Station or all pairs of buttons on multiple Operator Stations must be pressed before the lamp turns off in order to initiate a stroke. The palm/ concurrent time setting is made on option switch 5 (see page 3-30).
- Mute Lamp–Illuminates during muting of the light curtain on the upstroke. Requires installation of a Shadow light curtain and optional light curtain muting firmware.

Other Components

Dual-monitored Safety Valve (DSV)

The DSV controls the flow of air to the press clutch and brake. Wintriss provides 3/4-in. and 1-in. Ross DM2 DSVs. See *Installing a Dual Safety Valve*, page 2-9 for further details.

Clutch Air Pressure Switch

This switch monitors the system air pressure. See *Installing Clutch and Counterbalance Air Pressure Switches*, page 2-11 for additional information.

Shadow Light Curtain

The Shadow light curtain is a presence-sensing device that places an infrared light field between the point-of-operation and the operator. When an object, like the operator's hand, enters the sensing field and blocks a light beam, the light curtain detects the object and issues an Emergency-stop command to the press.

The Shadow light curtain is required for point-of-operation guarding if WPC 1000 is used with a Foot Switch or in One-hand operating mode. WPC 1000 tests the Shadow inputs every time that the press is started and stopped. See *Installing a Light Curtain*, page 2-18 for more information.

WPC 1000 is designed to be used with a Shadow light curtain. If you order WPC 1000 without a light curtain, the control enclosure does not have a Mode Select switch, and the unit operates only in Two-hand mode.

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

Displays

WPC 1000 can be ordered with either a Standard or Optional Counter/Crank-angle Clock display.

Standard Display

The Standard display provides the following features (see Figure 1-3, page 1-5):

- **Digital LED Display**–A highly visible, three-digit readout which shows press speed (SPM), crankshaft angle, stopping time, and other press parameters. The information displayed depends on the current Stroke Select setting (see *Control Enclosure*, page 1-1) and the indicator segment (see next item) selected. The LED readout also displays WPC 1000 fault codes and abbreviated text messages.

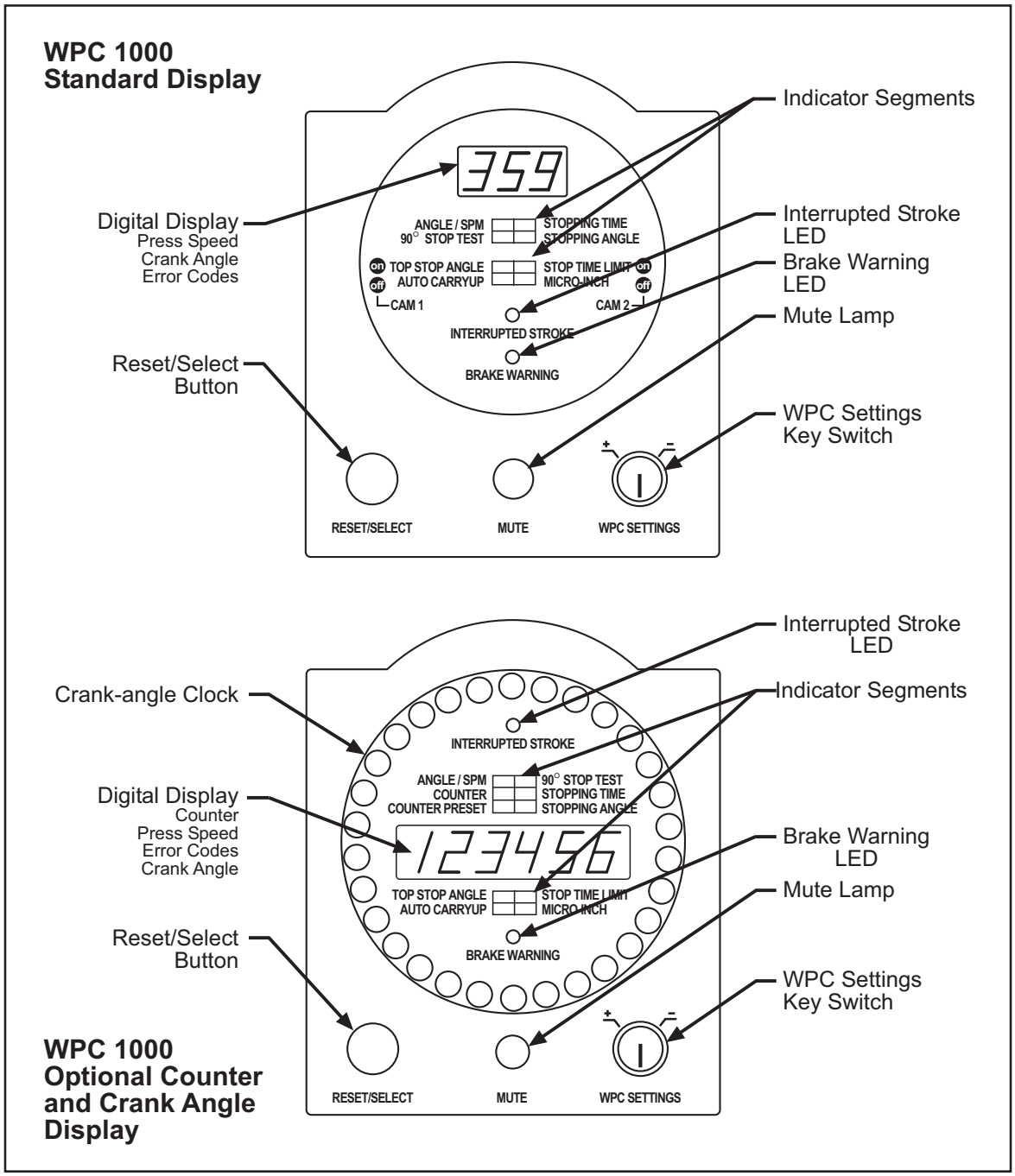


Figure 1-3. WPC 1000 Displays

- **Indicator Segments**–Eight LED indicators which, when illuminated (i.e., selected), display press information in the digital LED readout. To select a segment in the upper group of four segments, press the Reset/Select button until that segment is illuminated. The segments in the lower group of four segments can only be selected when WPC 1000 is in Inch mode. When illuminated, indicator segments display press speed, crankshaft angle, 90° stop-time test result, stopping time, stopping angle, top-stop angle, auto carry-up angle, stop-time limit, and micro-inch time. See *Viewing and Setting Press Parameters*, page 3-1.

- **Reset/Select Button**–Allows you to select indicator segments for display (see previous item) and clear, or reset, fault conditions that appear on the digital LED display.
- **WPC Settings Key Switch**–When turned to "+" (i.e., counterclockwise), increments the value displayed in the LED readout; when turned to "–" (i.e., clockwise), decrements the displayed value.
- **Brake Warning LED**–An amber LED that flashes when the stopping time of the press increases to within 10 milliseconds of the preset Stop-time Limit, alerting the operator that it is time to schedule maintenance on the brake. The LED can be turned off only by powering down WPC 1000, then powering the unit back up.
- **Interrupted Stroke LED**–A red LED that flashes when an Interrupted Stroke (see *Standard Features*, below) occurs.
- **Mute Lamp**–A lamp that illuminates when the light curtain is muted during the upstroke. Requires installation of a light curtain and optional light curtain firmware.

Optional Counter and Crank-angle Clock Display

The Optional Counter and Crank-angle display provides all the features of the Standard display as well as the following enhancements:

- **Digital LED Display**–A six-digit rather than a three-digit LED readout is provided with this option.
- **Indicator Segments**–Ten rather than eight segments are provided. The two additional segments display a counter and counter preset (see next item).
- **Counter and Counter Preset**–The counter (see page 4-4) maintains a cumulative total of the number of strokes made by the press. When the count total reaches the value set on the Counter Preset indicator segment (see page 4-5), WPC 1000 stops the press. The counter is reset to "1" with the Reset/Select button. The counter preset feature is useful for batch sizing or periodic QC checks.
- **Crank-angle clock**–A circular series of LEDs that displays dynamically the approximate angular position of the crankshaft whether the press is running or idle. Each LED in the clock represents approximately 11°.

Standard Features

WPC 1000 provides the following standard features:

- **Interrupted Stroke**–An Interrupted Stroke occurs when the press is Emergency-stopped before the completion of a stroke by either the operator or an automatic device for personnel or equipment protection. When this happens, the Interrupted Stroke LED flashes, and WPC 1000 switches to "Two-hand Maintained Single-stroke" mode. (If WPC 1000 was set to Inch mode, the press stays in Inch mode.) To clear the Interrupted Stroke, the operator pushes both Run/Inch buttons simultaneously and holds them until the press reaches the top of the stroke. At this point, the Interrupted Stroke LED turns off, and WPC 1000 automatically reverts to the original operating mode.

- **Customized Status Codes**–WPC 1000 provides three user inputs that allow you to monitor auxiliary press functions, such as lubrication systems. When one of these functions issues a Stop command, a unique status code is displayed on the digital LED readout to identify why the press stopped. One of the inputs is a cross-checked pair, which you can use for a safety interlock.
- **Brake Monitor**–WPC 1000's Top-stop brake monitor checks the press's braking performance every time a Top-stop command is initiated or when the press completes a stroke at Top-stop. When the press's stopping time is within ten milliseconds of the preset Stop-time Limit, the Brake Warning LED flashes. When the stopping time exceeds the Stop-time Limit, WPC 1000 issues a Stop command to the press and prevents the press from being restarted until the brake has been serviced.
- **90° Stop-Time Test**–This standard feature is required in order to set the correct safety distance for personnel-guarding devices including light curtains, two-hand controls, and type-B movable barriers. The test is performed at 90°, the press's most critical stopping point, with the press running in Continuous and the heaviest die installed. The results of the test provide the stopping time (Ts) value specified in both OSHA 1910.217 and ANSI B11.1-2009 (see Appendix A).
- **Micro-inch**–A feature that allows you to set the amount of time that the Dual Safety Valve is open in Inch mode when you push the Run/Inch palm buttons. Normally, in Inch the DSV is open for only as long as the Run/Inch buttons are depressed. The Micro-inch setting specifies the length of time the DSV is open regardless of how long the Run/Inch buttons are held. Allowing finer adjustments than are possible in Inch, Micro-inch is designed to facilitate setup on high-speed or short-stroke presses. Requires installation of optional Micro-inch selector switch (see page 1-2).
- **Error Codes**–WPC 1000 displays a two-digit code preceded by the letter "E," "F," or "H whenever the press is stopped because of a fault. The two-digit code identifies the specific problem that caused the fault. The initial letter indicates how the fault should be reset, and in the case of F and H errors, specifies the processor (A or B) that detected the problem. Underlying causes and remedies for each fault code are provided in Chapter 5.
- **Lockout**–Selected error codes that are associated with serious error conditions generate the lockout message "Loc," which displays in the digital LED readout when the error has been reset. The lockout function provides an added safety feature to WPC 1000, forcing the operator to perform two different Reset operations. The "Loc" message is cleared by turning the Stroke Select key switch to "OFF," then to "INCH."

Optional Features

- **Counterbalance Air Pressure Switch**–Operating identically to the clutch air pressure switch, this switch is used with the counterbalance air supply on presses equipped with counterbalances, as required by OSHA regulations.
- **Two-channel Programmable Cam Switch**–Provides cam timings for feed, pilot release, air blow-off, lubricator, or other non-safety press equipment.

- **One-hand Control**–A low-force switch that can be used with WPC 1000 running One-hand/Two-hand/Foot firmware and equipped with a Shadow light curtain guarding the point of operation. The One-hand Control switch can be mounted on or near the press, allowing the operator to press the switch as part of his normal hand motion after loading a part.
- **Foot Switch**–A device that frees the operator's hands for increased, fully-guarded protection and productivity. One-hand/Two-hand/Foot firmware is required, and a Shadow light curtain must be installed.
- **Bar Mode Control**–Allows operators and setup personnel to bar the press by hand for die setting and adjustment. Recommended for smaller-capacity presses of 65 tons or less.
- **Display Configuration Options**–WPC 1000 is available without an enclosure. Installation instructions for panel mount and display board kit options are provided beginning on page 2-48.
- **Auto Compensated Top Stop (ACTS)**–A feature that automatically adjusts the Top-stop "On" Angle to an earlier point in the stroke to compensate for increases in press speed. ACTS is designed specifically for variable-speed presses. See *Switch 4 – Enabling Auto Compensated Top Stop (ACTS)*, page 3-29 for additional information about ACTS.
- **Multiple Operator Stations**–If you wish to install more than one Operator Station, contact Wintriss Tech. Support (see *Installing Multiple Operator Stations*, page 2-17).

Specifications

WPC 1000 specifications are shown in Table 1-1.

Table 1-1. WPC 1000 Specifications

Control	Enclosure: 12.88 x 17.62 x 7.11 in. (327.2 x 447.5 x 180.6 mm), NEMA 12, shock-mounted. Panel Mount: 7.50 x 10.00 in. (190.5 x 254.0 mm) Standard items include 3-digit LED display, display indicators, Interrupted Stroke and Brake Warning LEDs, Reset/Select button, Mute lamp, and Settings key switch. Enclosure also provides Stroke Select key switch.
Equipment Available from Wintriss Controls	**Resolver** 0.75 in. (19 mm) keyed shaft. Rated shaft loading: 200 lb axial, 200 lb radial. **Operator Station** NEMA 12. Includes two palm buttons, Top-stop, Emergency-stop, and Prior Act buttons, and palm time and mute lamps. Pre-wired; unwired version also available. **Dual Safety Valve (DSV)** Available in 0.75 in. (19 mm) or 1 in. (25 mm) Ross DM2 models. **Air Pressure Switch** 12-150 PSI. Monitors clutch air supply pressure.
Wintriss AC Power Supply (Included)	Input: 100-240 ± 10% Vac (universal switching), 50 VA, 50/60 Hz. Output: 24 ± 1% Vdc, 200 mA maximum for customer use including Auxiliary Output. Auxiliary Output capable of sinking 100 mA.
Power Requirements if not Using Wintriss AC Power Supply	24 ± 5% Vdc, 0.8 A. Must be certified to CSA C22.2 No. 234 Standard.
Operating Temperature	32° to 122° F (0° to 50° C).
Inputs	Resolver Overrun limit switch One Operator Station DSV monitor Air pressure switch
Additional Inputs	**Motor** Forward and reverse contacts **Shadow Light Curtain** Checks proper functioning at every stroke initiation and stop. **Customized Status Codes** One for E-stop One for Top-stop One cross-checked pair for E-stop/Lockout

Table 1-1. WPC 1000 Specifications (Cont)

Outputs	**DSV** Two monitored relays, rated 4 A @ 120 Vac, for E-stopping and Top-stopping press. **Lockout** One monitored relay, rated 4 A @ 120 Vac, for de-energizing motor and other devices under critical conditions. **Auxiliary Stop Output** Provides a signal to stop auxiliary equipment during an interrupted stroke.
Speed	7-500 SPM; 500-2000 SPM optional.
Displays	Three-digit LED. Displays press speed, crankshaft angle, and other press parameters as well as status/error codes. Also displays press control timings, which are secured with keylock and/or internal press option switch. Counter option (see below) includes 6-digit LED and crank-angle clock. LED indicators for Interrupted Stroke and Brake Warning. Diagnostic LEDs on Control board for power and for all inputs, including buttons and switches.
Options	**Counter/Crank-angle clock display** Includes 6-digit counter display and preset function, crank-angle clock. **Shadow V, Shadow VI, Shadow VII, Shadow 8, or Shadow 9 Light Curtain** Heights from 6 to 60 in. (138 to 1524 mm), maximum scanning ranges from 23’ to 65’ (7 to 20 m). Refer to Shadow literature for more information. **Firmware** Muting for Shadow light curtain on the upstroke. Two-hand only. One-hand*, two-hand or foot operation*. Auto compensated top-stop. **Selector Switches** Mode (One-hand*, two-hand, or foot operation*), micro-inch on/off. **2-Channel Programmable Cam** Enclosure: 5.41 x 7.38 x 3.48 in. (137.4 x 187.5 x 88.4 mm), shock-mounted. Relay: SPDT 0-3A resistive at 240V (standard). **Foot Switch** Safety switch for foot actuation* (1-hand/2-hand/foot firmware required). **One-hand Control** Control for one-hand actuation* (1-hand/2-hand/foot firmware required). **Counterbalance Air Pressure Switch** 12-150 PSI. Monitors counterbalance air supply (uses one custom input). **Bar Mode Control** Allows manual turning of crankshaft. **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

Chapter 2. Installation

⚠ 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 1000 clutch/brake control is installed, tested and repaired by qualified personnel.
- Wire, install and maintain WPC 1000 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 1000 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 1000 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.

⚠ 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.

⚠ DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

NOTICE

When you have completed installation procedures, perform the tests in the *Installation Verification* section, page 2-65 to ensure that WPC 1000 is installed correctly and working properly before proceeding to Chapter 3.

NOTICE

ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH THE CONTROL BOARD

Connect all signal grounds through pins on the WPC 1000 Control board.

NOTICE

READ INSTALLATION INSTRUCTIONS BEFORE STARTING INSTALLATION

If you install WPC 1000 yourself, read this installation chapter carefully and plan how you are going to proceed before you start drilling holes, running conduit, or cutting wires. Make sure you are familiar with the WPC 1000 display (see page 1-5). If you encounter problems during installation, contact Wintriss Tech. Support.

NOTICE

PRESS MUST BE AT TDC

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

Installation Guidelines

Observe the following guidelines when installing WPC 1000, referring to Figure 2-1, page 2-4 when necessary.

- For AC wiring, use 16 AWG wire (14 AWG if required by local codes) with a minimum 75° C temperature rating. For other wiring, use 18 AWG with 600 V insulation.
- All signal grounds must run through the WPC 1000 Control Board. Use chassis ground only for terminating cable shields.
- Run flexible, liquid-tight conduit for high voltage lines (120V power, relay circuits) to the upper left knockout on the WPC 1000 enclosure.
- Never run wires for 120V and for lower voltages (such as 24V or 60V) inside the same conduit. For example, the Operator Station cables should not share the same conduit with 120 Vac wiring. However, power and logic wiring for the light curtain or Dual Safety Valve (DSV) can be run in the same conduit.
- Provide a dedicated 120V power circuit from the press control transformer to the WPC 1000 input power connection. Do not power any relays or solenoids from this circuit or the auxiliary power terminals on WPC 1000. Doing so may cause erratic press shutdowns due to electrical noise.
- Run one or two low-voltage conduits for the resolver wires to the knockouts on the bottom of the WPC 1000 enclosure.
- Because WPC 1000 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.
- Make sure the WPC 1000 is properly grounded.
- All relays and solenoids controlled by WPC 1000 must be suppressed. Suppressors should be installed across the load and as close to the load as possible. Never install a suppressor across the relay contacts. The suppressors tend to fail shorted. In some cases, suppressors are required in the Top-stop and Emergency-stop circuits. Additional suppressors (part number 2238801) can be obtained from Wintriss.

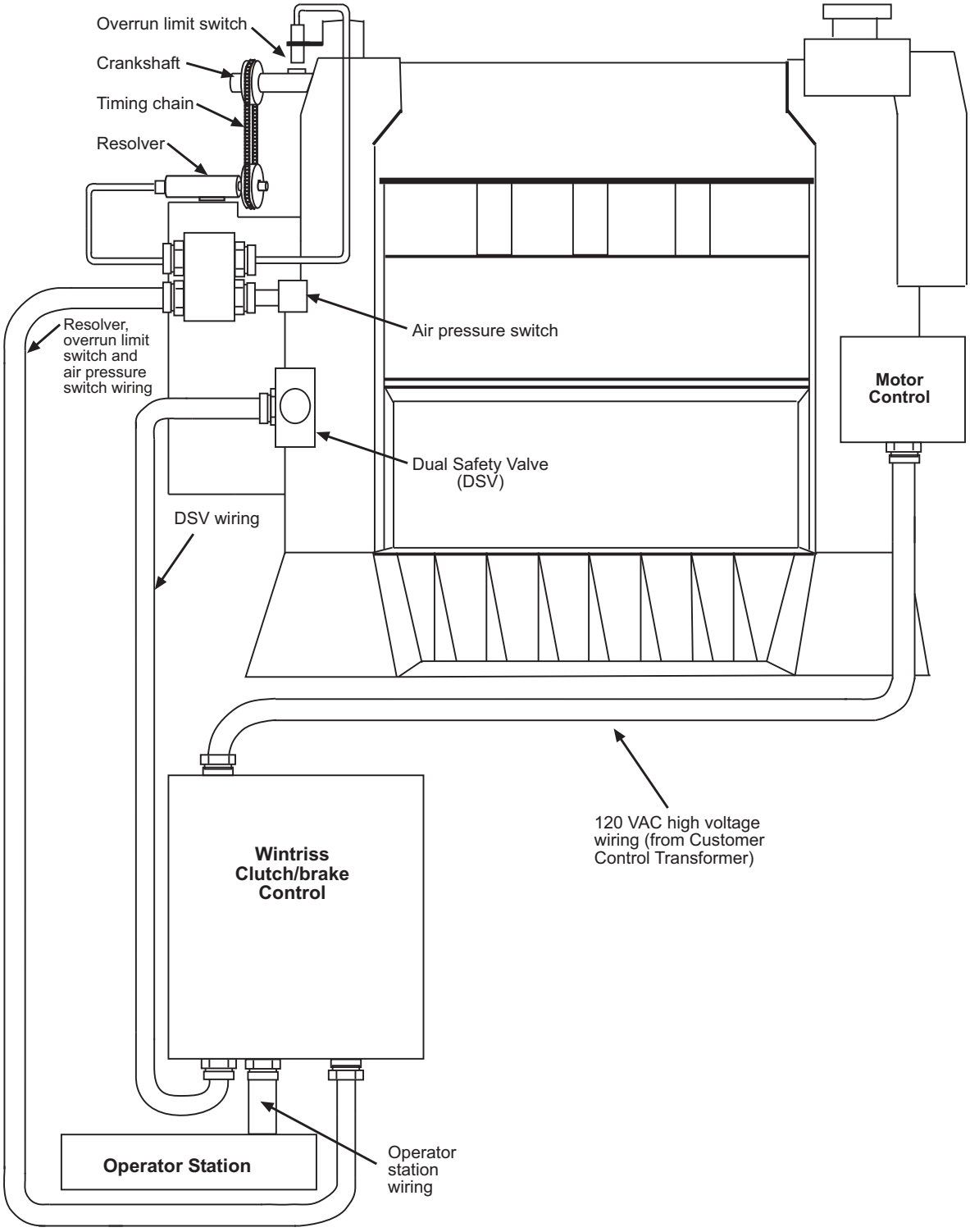


Figure 2-1. WPC 1000 Wiring Overview

Connecting Wires to Terminal Block Connectors

When connecting wires to terminal block connectors, follow these steps:

1. Find the correct terminal and loosen the screw over it by turning the screw counterclockwise (see Figure 2-2).
2. Strip the correct wire for this terminal 1/4 in. (6.4 mm) from the end.
3. Insert bare wire into the terminal 90% of the way.
4. 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.

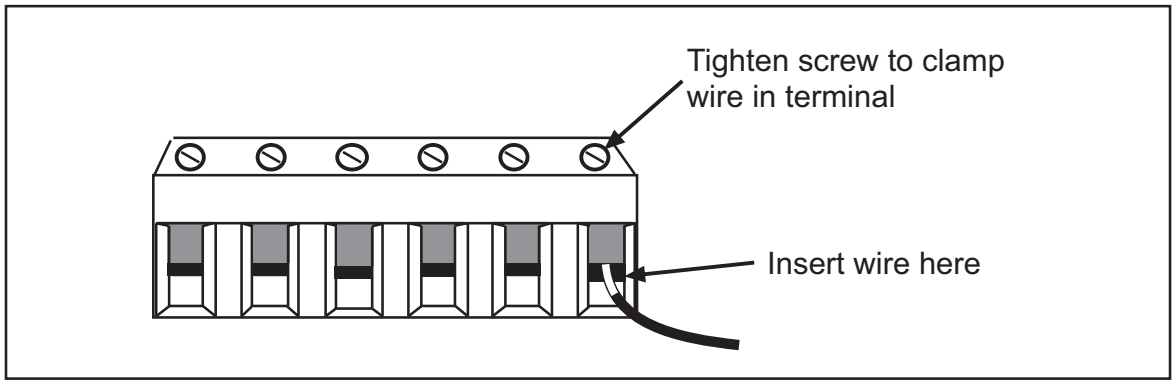


Figure 2-2. Correct Way to Attach Wires to Terminal Block Connectors

Terminating Cable Shields

NOTICE

TERMINATE BOTH ENDS OF SHIELD
Be sure to terminate the cable shield at both ends where possible.

Perform the following steps to terminate shielded cables to the ground studs located inside the WPC 1000 enclosure near the cable's point of entry, referring to Figure 2-3, page 2-6.

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

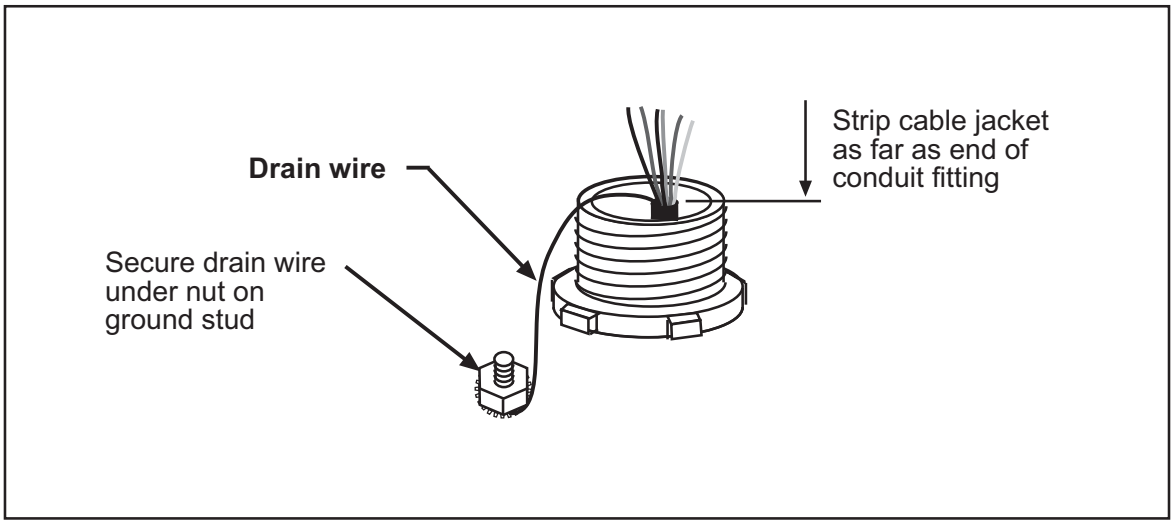


Figure 2-3. Cable Shield Termination

Mounting the Control Enclosure

Mount the control enclosure (see Figure 2-4, page 2-7 for mounting dimensions) so that it is convenient to the operator. An optimal location is one that allows the operator to read the digital display and reach the key switches while standing at the front of the press. The best location will vary depending on the type of enclosure–center mount, left mount, or right mount.

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

For easy access to the interior, 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 organize the cables and wiring inside the control enclosure.

Wiring the Control Enclosure

WPC 1000 requires the following electrical components:

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

Power to WPC 1000 should be provided by a step-down control transformer capable of handling 50 VA at 115 Vac ± 10%.

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

NOTICE

NON-ENCLOSURE INSTALLATION

See *Installing WPC 1000 without Enclosure*, page 2-48 for installation instructions if you are installing WPC 1000 in your own enclosure or console.

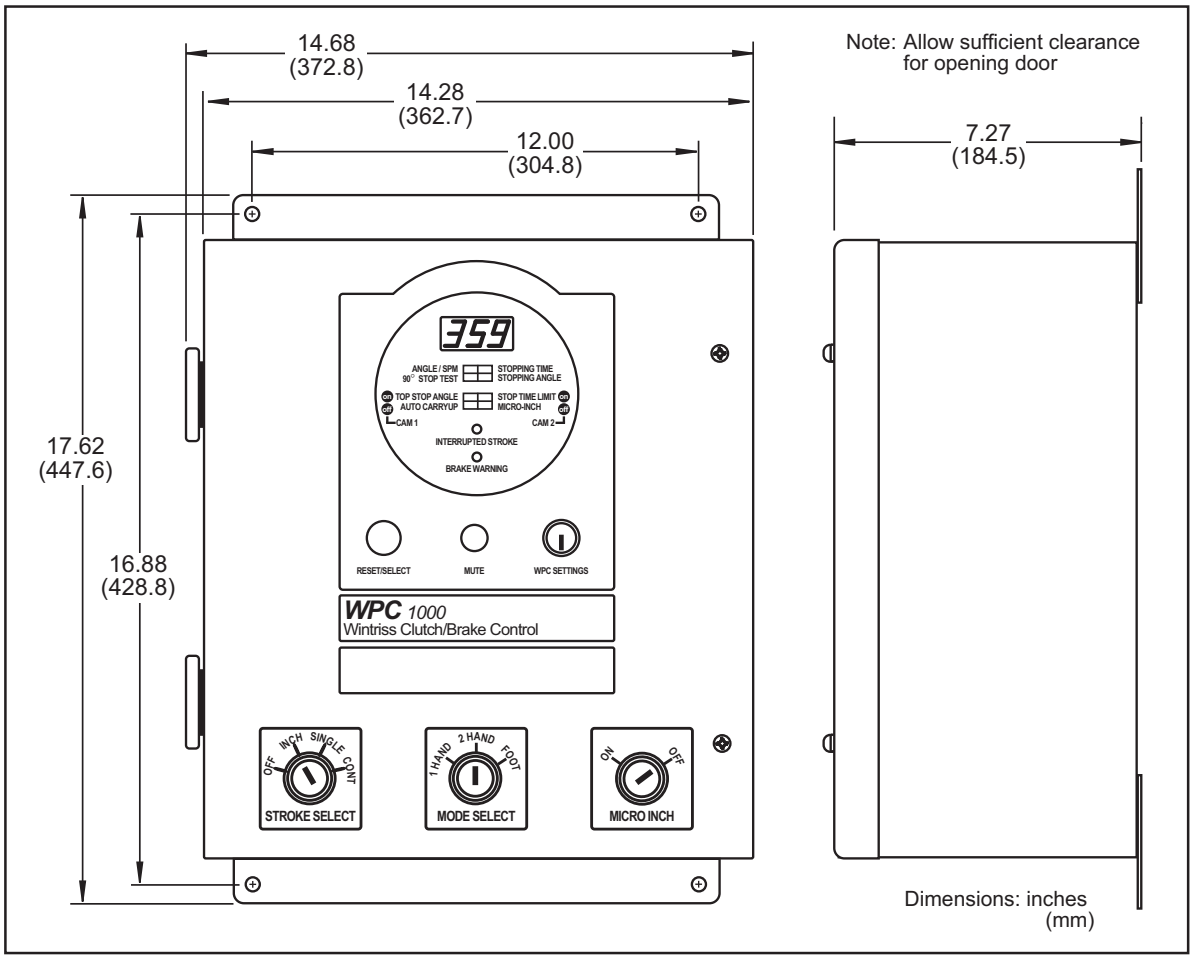


Figure 2-4. WPC 1000 Mounting Dimensions

Slide Adjust Considerations

If your press has a motorized slide adjustment for the ram, you must prevent slide adjustment while the press is running. Connect spare contacts on the slide adjustment switches (i.e., Slide Adjustment “On” or Slide Adjustment “Up”/“Down” switch) to the WPC 1000 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

⚠ DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

NOTICE

FOR 24 VDC VERSIONS OF WPC 1000:

- Refer to Table 1-1, page 1-9 for DC power requirements
- Wire 24 Vdc directly to connector J103 on the WPC 1000 Control board (see Figure 2-11, page 2-20 for location and Figure 10 at the back of the manual for wiring)
  Connect “+ volts” to pin #57 on J103
  Connect “ground” to pin #56

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

Bring the wiring connections for AC power to a convenient point so that you can connect them to the power terminal block on the back wall of the enclosure at the top left. No. 16 wire (No. 14, if local codes require it) is recommended for these circuits with a minimum 75° C temperature rating. To do the wiring, perform the following steps:

NOTICE

WPC 1000 AUTOMATICALLY ADJUSTS TO 115 OR 230 VOLT INPUT POWER

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

1. Locate the power supply input terminal block on the back wall at the top left of the enclosure, as shown in Figure 2-5, page 2-9.
2. Determine how you will bring wiring from your 115 or 230 Vac power source to the enclosure. For 115 Vac, you need three wires—high (black), neutral (white) and ground (green). For 230 Vac, wires are black and red, with green or green-yellow for ground.
3. Run the power wires to the enclosure through flexible liquid-tight conduit. Because WPC 1000 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.

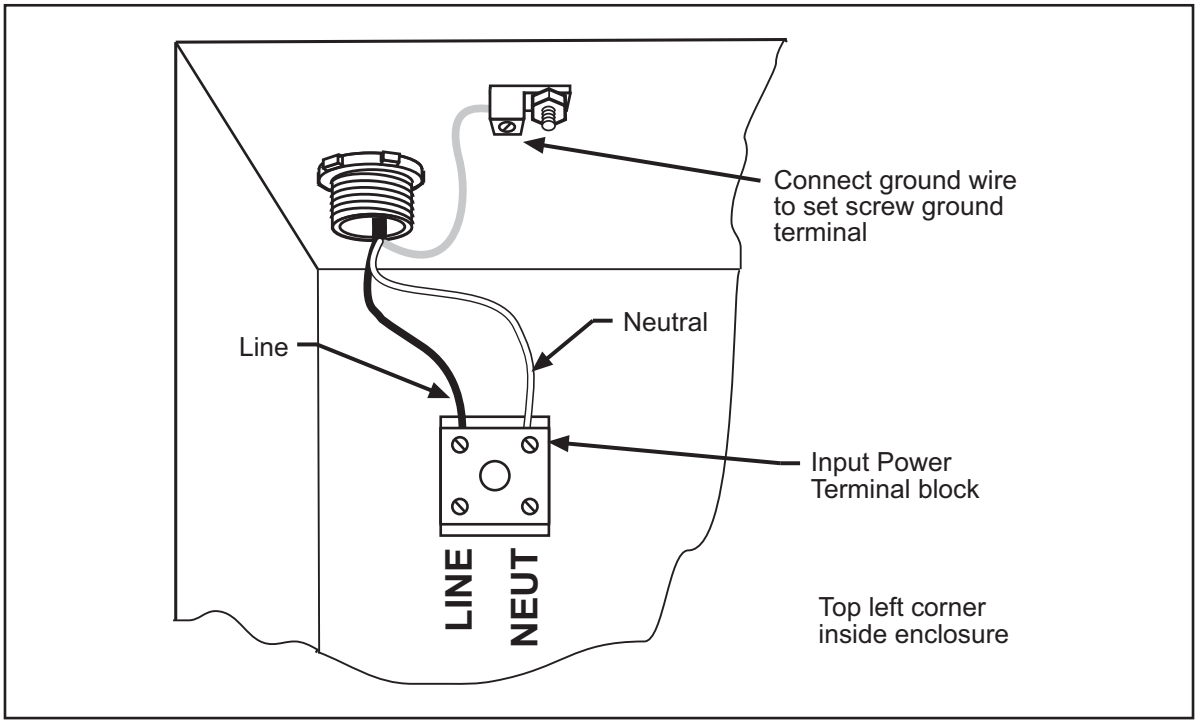


Figure 2-5. AC Input Wiring Connections

4. Connect the ground wire to the set screw terminal on the roof of the enclosure, referring to Figure 2-5 and to Figure 10 at the back of the manual.
5. Connect the power wires.

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

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

   Strip the wire 1/4 in. from the end. Loosen the screw in the input power terminal block, insert the stripped portion of the wire, and tighten the screw.
6. Double-check connections.
7. Make all necessary conduit connections to ensure NEMA 12 protection.

Installing a Dual Safety Valve

⚠ DANGER

USER-SUPPLIED DUAL SAFETY VALVE NOT SUITABLE FOR SAFETY USE

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

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

⚠ DANGER

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

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

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

⚠ WARNING

DSV MUFFLER CLOGGING OR LOOSENING

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

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

NOTICE

ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH THE CONTROL BOARD

Connect all signal grounds through pins on the WPC 1000 Control board.

If you have ordered a Ross or Herion DSV with your WPC 1000, refer to the appropriate wiring diagram at the end of this manual and to the documentation that came with your valve to install the DSV. Note the following requirements:

- **Ross DM2**

  To wire the Ross DM2 DSV, refer to figures 10 and 11 at the back of the manual.

  The Reset circuit requires that a diode be installed across the coil in the solenoid to provide noise suppression (see Figure 10). This wiring has already been done for you in the Hirschmann connector for the 24 Vdc Reset solenoid, which is provided along with two Hirschmann connectors for the 120 Vac valve solenoids in the Ross DM2 kit.

  NOTICE

  MAKE SURE TO INSTALL NOISE SUPPRESSION DEVICES

  Noise suppression devices (Pactrons) are provided in the Ross DM2 kit. Be sure to install them across the two Hirschmann connectors for the 120 Vac valve solenoids as shown in Figure 10.

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

installed. You wire the Reset solenoid and valve solenoid connectors to WPC 1000 as shown in Figure 10.

> **CAUTION**
>
> **DO NOT WIRE RESET CIRCUIT TO 110 VAC**
>
> The Reset circuit works only on 24 Vdc. Do not wire the Reset circuit to 110 Vac.
>
> **Failure to comply with these instructions could result in property damage.**

Note that the DM2 Reset circuit is wired to the OFF position on the WPC 1000 Stroke Select switch (see Figure 11). To reset the Ross DM2 DSV after an F47 error (see page 5-11), press Reset/Select, and turn the Stroke Select switch to OFF, then back to one of the other operating modes (i.e., Inch, Single-stroke, or Continuous).

Make sure to install air supply lines that match the inlet port size of the DM2 DSV to provide sufficient air to reset the unit in case of a fault (see page 5-18).

- **Ross Serpar with EP Monitor**

  This Ross DSV requires a separate user-supplied reset switch. See Figure 4 at the end of this manual. Also, all jumpers except those shown in the wiring diagram must be removed; otherwise, the WPC 1000 Control board may be damaged.

- **Herion XSZ**

  Make sure that you wire the Herion DSV monitor between pin #44 and a +24 Vdc output. See Figure 4 at the end of the manual.

Installing Clutch and Counterbalance Air Pressure Switches

Install and wire the clutch air pressure switch and counterbalance switch 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 pin #22 and ground, referring to Figure 3 at the end of the 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

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

If you use RamPAC to control the counterbalance pressure, set the WPC 1000 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 the pressure required for the smallest upper die you plan to use in this press.
7. Wire the normally open counterbalance terminals to User Input 1 (pin # 45) and + 24V (pin # 47), referring to Figure 3 at the end of the manual. See *Wiring WPC 1000 User Inputs*, page 2-28 for additional information.

Installing Operator Station(s)

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

The Operator Station should not be permanently mounted until you have calculated the correct safety distance (see *Calculating the Safety Distance*, page 3-20) and performed the applicable verification (see page 2-65) and checkout (see page 3-35) tests. When you have finished wiring, you can place the Operator Station temporarily on the floor or on a cart.

If you are not installing a light curtain, and if you are planning to use the Operator Station as a two-hand safety device, the Operator Station must be mounted at the correct safety distance from the nearest pinch point on the press. This distance must be calculated based on the Stopping Time of your press. See *Calculating the Safety Distance*, page 3-20 for details. Mounting the Operator Station at the correct safety distance prevents an operator from leaving the station and reaching the pinch point before the press stops.

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

Wiring a Pre-wired Operator Station

Checking Pre-wired Operator Station Wiring

Before connecting your pre-wired Operator Station to WPC 1000, check the wiring to the mute lamp inside the Operator Station and modify, if necessary, according to the instructions below. Operator stations shipped as part of WPC 1000 systems should not need modification.

1. Find the mute lamp on the Operator Station, as shown in Figure 2-6.

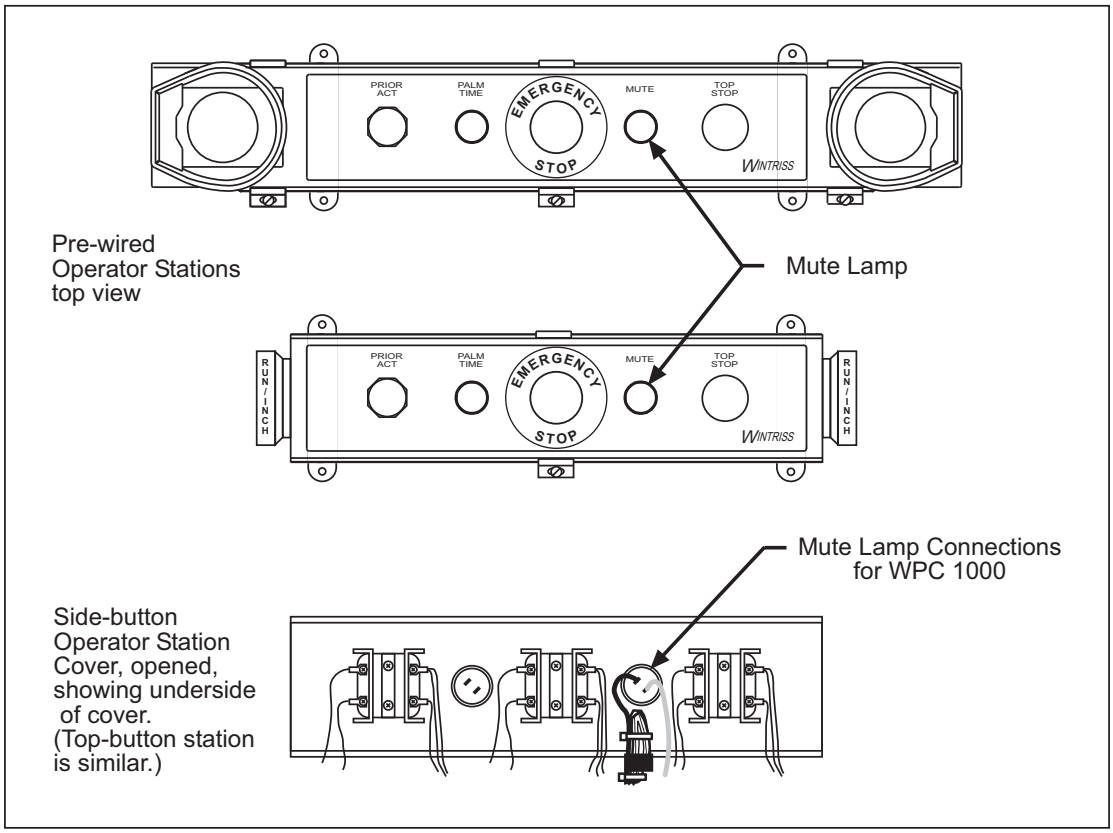


Figure 2-6. Pre-wired Operator Stations Showing Mute Lamp Connections

2. Open the Operator Station, and locate the mute lamp connections on the underside of the cover.
3. Determine whether you need to modify the mute lamp wiring:
   - If your mute lamp wiring looks like panel “E” in Figure 2-7, page 2-14 (i.e., the black wire is connected, the red-and-white wire not connected), the wiring is correct.
   - If your mute lamp wiring looks like panel “A”, follow steps A through E in Figure 2-7 to disconnect the white-and-red wires and connect the black wire.
4. When the mute lamp wiring is correct, connect the Operator Station to WPC 1000.

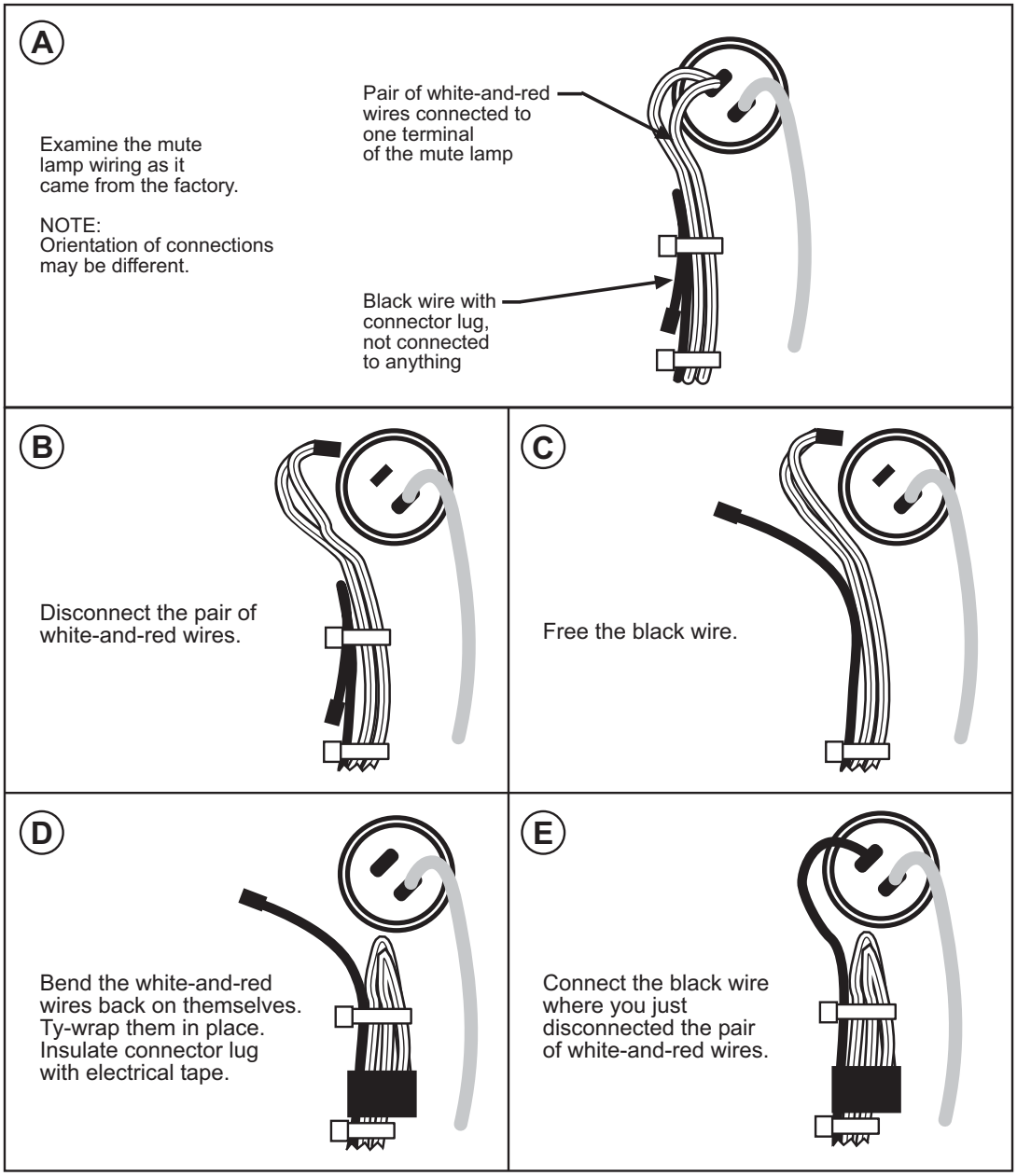


Figure 2-7. Wiring Steps to Modify Operator Station for WPC 1000

Making Wiring Connections

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

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

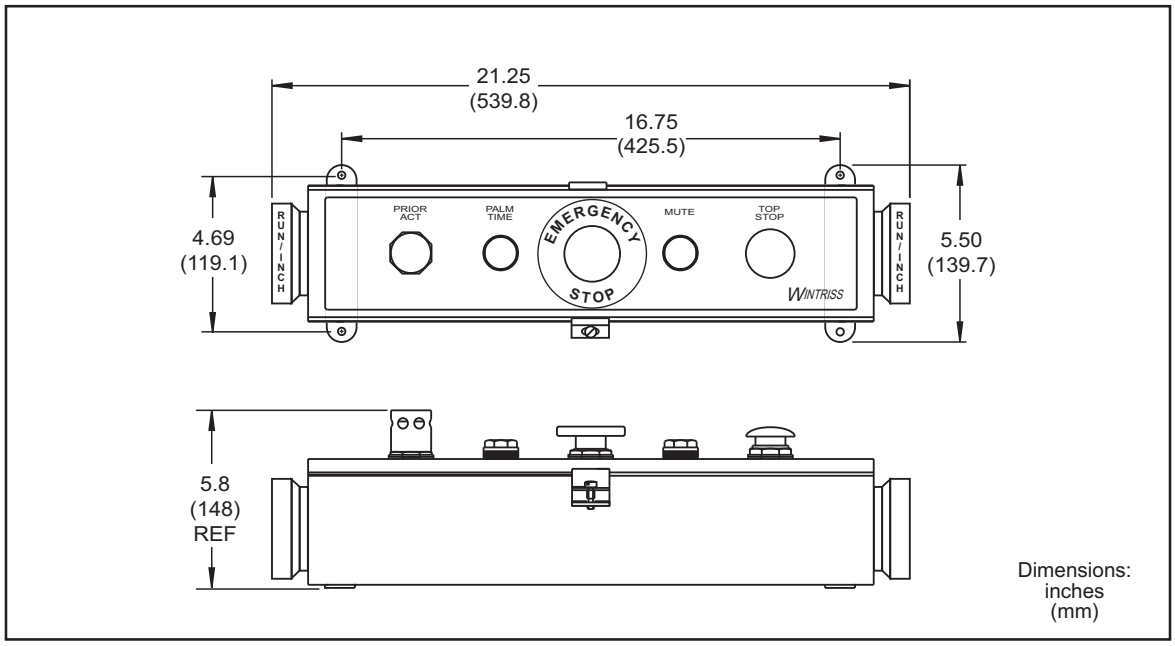


Figure 2-8. Pre-wired Operator Station with Side Run Buttons: Mounting Dimensions

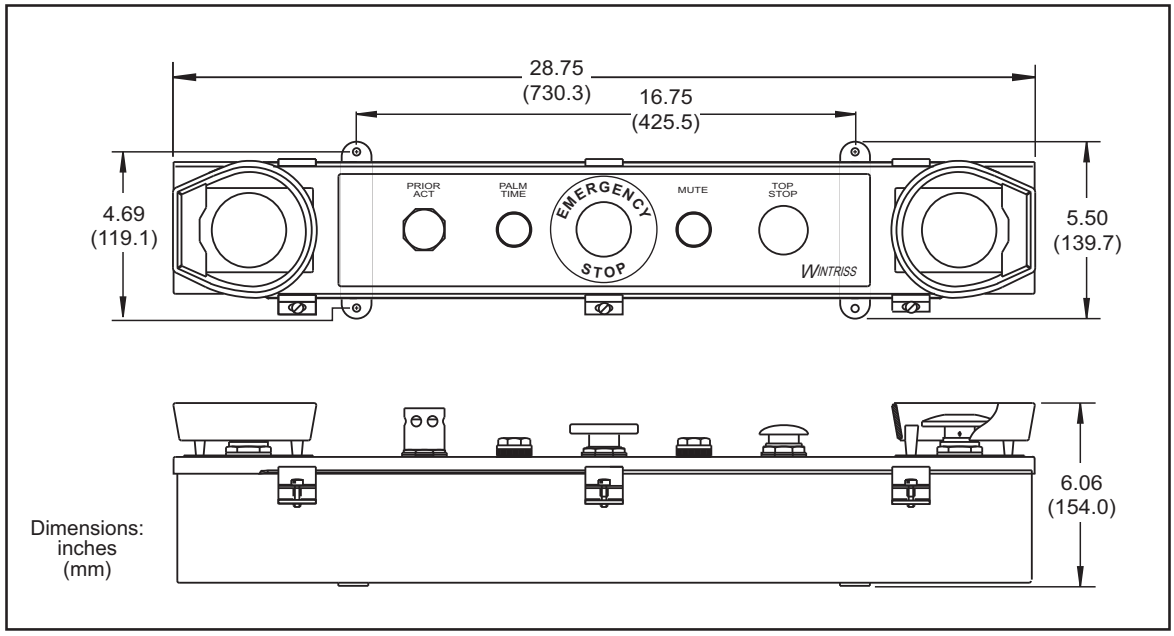


Figure 2-9. Pre-wired Operator Station with Top Run Buttons: Mounting Dimensions

5. At the other end of the cable, connect the wires to the Control board connector terminals, as shown in Table 2-16, page 2-69 and Figure 1 at the end of the manual.
6. Mount the Operator Station in a permanent location after performing the applicable verification and checkout tests and calculating the correct safety distance. Refer to Figure 2-8 and Figure 2-9, above, for mounting dimensions.

Wiring an Unwired Operator Station

⚠ DANGER

OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

- Ensure that the Operator Station is wired correctly.
- Run all necessary tests to verify that each Operator Station is wired correctly and provides proper anti-tie-down and anti-repeat protection. Test procedures are provided at the end of this chapter and at the end of Chapter 3.

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

To wire the unwired Wintriss Operator Station, follow the wiring diagram in Figure 5 at the end of this manual. Before using your press, be sure to check the wiring carefully, run all the applicable verification and checkout tests, and calculate the safety distance. You can then mount the Operator Station in a permanent location, referring to Figure 2-10 for mounting dimensions.

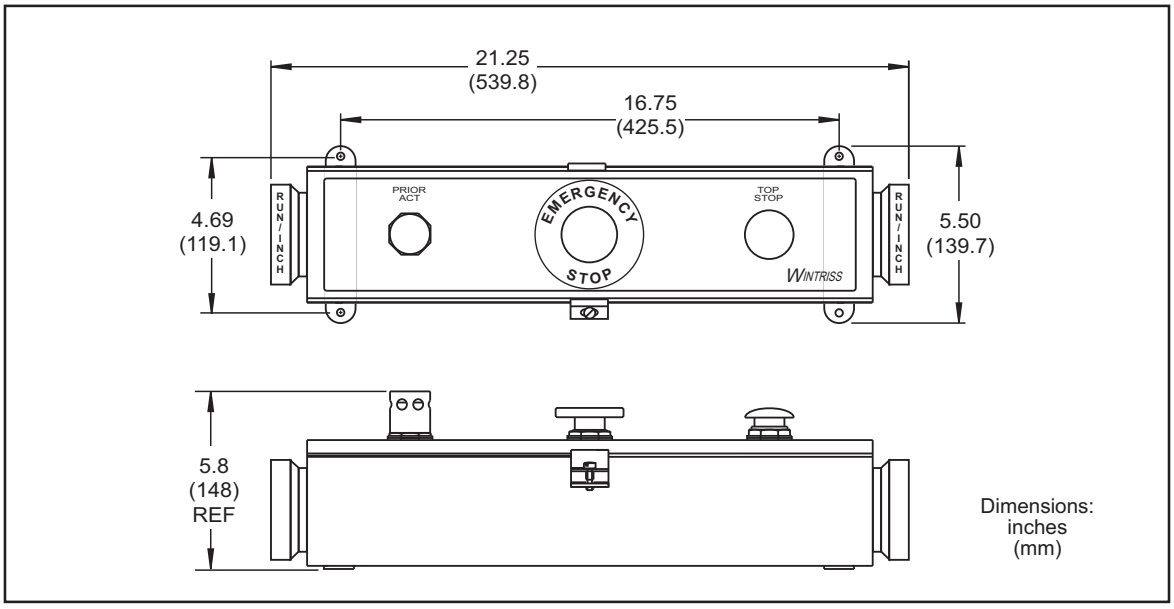


Figure 2-10. Unwired Operator Station: Mounting Dimensions

Wiring a User-built Operator Station

⚠ DANGER

NON-WINTRISS OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

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

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

If you build your own Operator Station, refer to Appendix B for applicable safety requirements. To wire your user-built Operator Station, refer to Figure 5 at the end of the manual. Before using your press, be sure to check the wiring carefully and run all the applicable verification and checkout tests. After calculating the correct safety distance, you can mount the user-built Operator Station in a permanent location.

Installing Multiple Operator Stations

⚠ DANGER

HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

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

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

NOTICE

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

If you wish to install more than one Operator Station on your WPC 1000, contact Wintriss Tech. Support. Do not order standard Wintriss “Multiple Operator Stations” when installing two or more Op. Stations. All Operator Stations in a multi-Op.-Station configuration must contain a Two-hand Control module. When you install more than one Operator Station, set option switch 5 on the WPC 1000 Control board to ON (see page 3-30). If you have any questions about installing multiple operator stations, contact Wintriss Tech. Support.

Installing a Light Curtain

⚠ DANGER

PREVENT OPERATOR FROM STANDING BETWEEN LIGHT CURTAIN AND HAZARDOUS AREA

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

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

⚠ DANGER

INCORRECT LIGHT CURTAIN INSTALLATION

- Mount the light curtains at the correct safety distance as instructed in *Calculating the Safety Distance*, page 3-20. The light curtain will only provide full protection for operators when mounted at the correct safety distance.
- Install and wire your light curtains correctly, following the instructions in your Shadow manual and referring to Figures 2, 6, 7, 8, 9, 12 and 13 at the end of this manual.

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

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

To determine the Stopping Time of the press, refer to page 3-15. To calculate the correct safety distance, see page 3-20. For complete Shadow light curtain mounting instructions, see your Shadow user manual.

NOTICE

You cannot permanently mount the light curtain until the WPC 1000 is working properly and you have measured the Stopping Time, set the brake monitor, and calculated the correct safety distance. However, you will be able to wire the light curtain.

Installing Shadow Light Curtains

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

- Shadow V–Figure 6
- Shadow VI–Figure 2
- Shadow VI Integrated–Figure 7
- Shadow VII–Figures 8 and 9
- Shadow 8–Figures 12 and 13
- Shadow 9–Figures 14 and 15

For Shadow I or Shadow II wiring, contact Wintriss Tech. Support.

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

When you install Shadow VII or Shadow 8 light curtains on your press, you must set jumpers JP106 and JP107 on the WPC 1000 Control board (see Figure 2-12, page 2-21) to the positions shown in Table 2-1. Wiring diagrams are provided in figures 8 (Shadow VII control box), 9 (Shadow VII DIN controller), 12 (Shadow 8 optional control), 13 (Shadow 8 wired directly to WPC 1000), 14 (WPC 1000 and Shadow 9 Control Box Wiring Diagram), and 15 (WPC 1000 and Shadow 9 Wiring Diagram) at the back of the manual.

Table 2-1. Shadow VII, Shadow 8, and Shadow 9 Light Curtain Jumper Settings

Jumper on Control Board	Settings
JP106	PNP
JP107	INT

Installing Non-Shadow Light Curtains

If you plan to interface a light curtain system other than Shadow with your WPC 1000, please call Wintriss Tech. Support for instructions.

⚠ WARNING

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

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

When you call Wintriss Tech. Support, you should have the following information at hand:

- Light curtain manufacturer
- Light curtain model number
- WPC model (i.e., WPC 1000)
- WPC 1000 firmware version number (located on A or B microprocessor chip label)
- Wiring diagram from the light curtain manufacturer's manual

If your WPC 1000 does not have the firmware that allows Foot or One-Hand control and/or muting of a light curtain on the upstroke, you can connect the light curtain's dry contact outputs directly in series with WPC 1000's E-stop string.

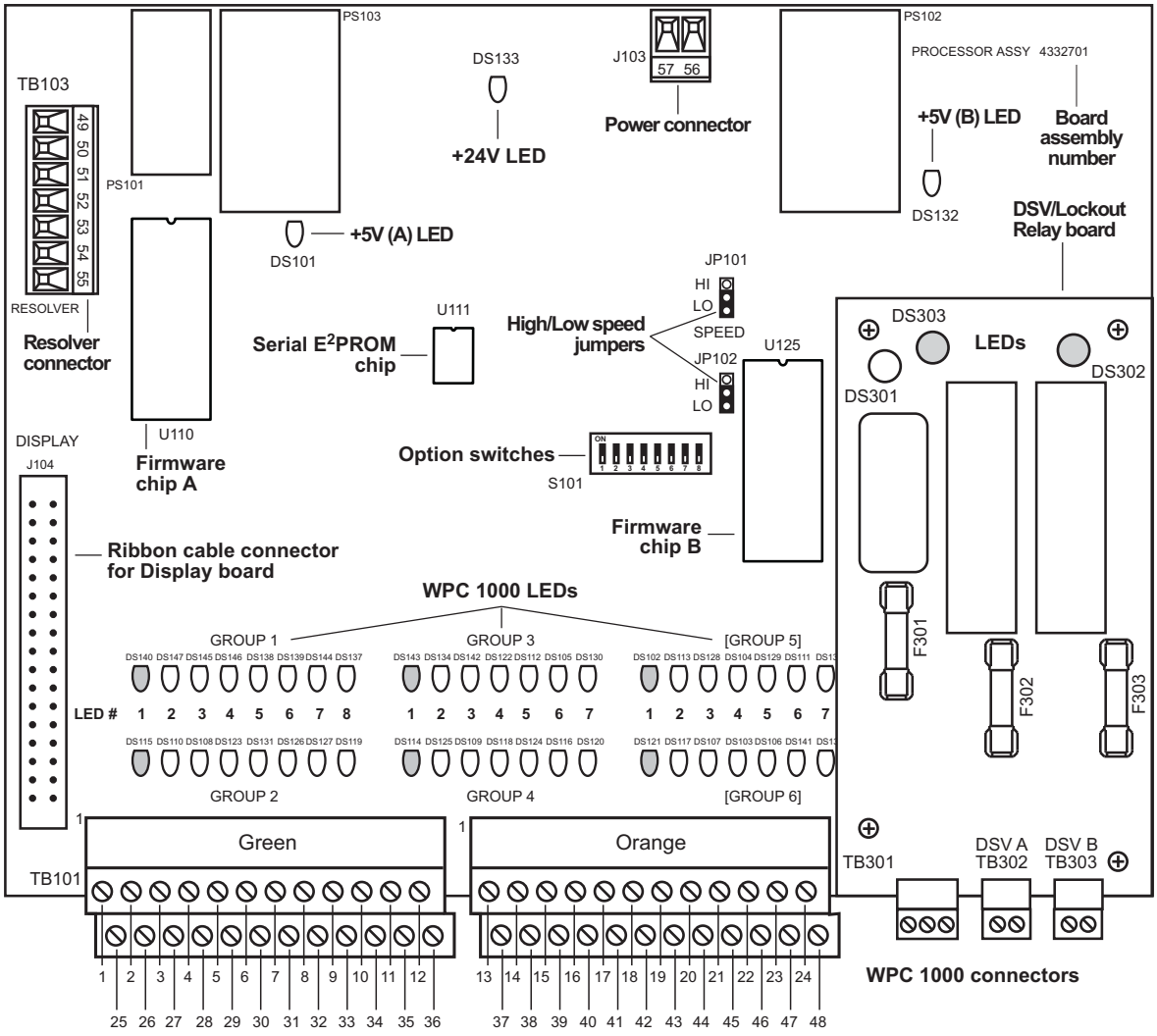


Figure 2-11. WPC 1000 Control Board with DSV/Lockout Relay Board: Location of Important Components

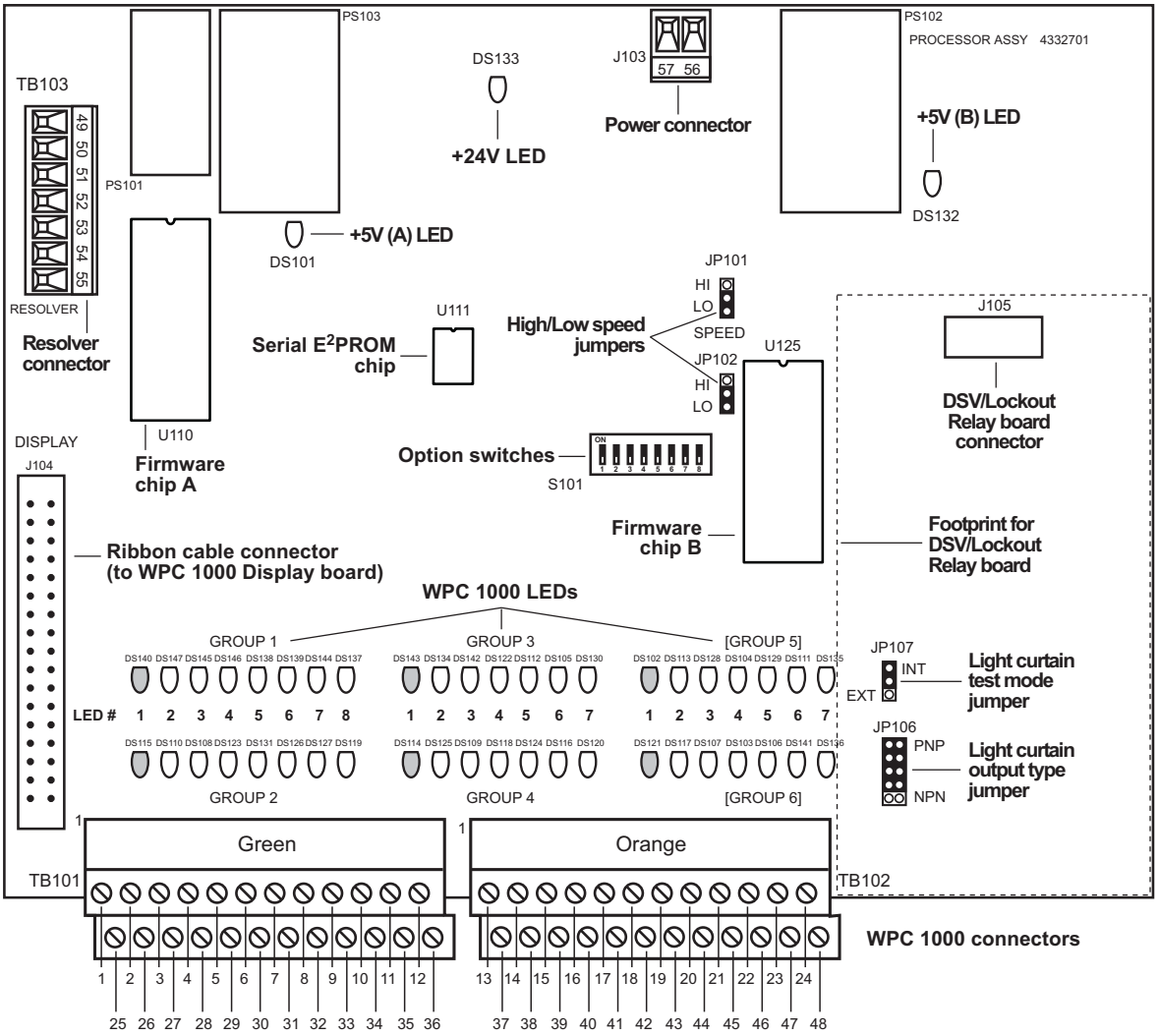


Figure 2-12. WPC 1000 Control Board with DSV/Lockout Relay Board Removed: Location of Important Components

Installing the Resolver

⚠ DANGER

RESOLVER OUT OF SYNCH WITH CRANKSHAFT

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

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

Because the resolver must provide WPC 1000 with the exact position of the crankshaft at every degree of the stroke (see *Resolver*, page 1-1), the device must be driven smoothly at a 1:1 ratio with the crankshaft of the press. Design a method of driving the resolver directly from the crankshaft, using a chain or timing belt (not a V belt) and sprockets. Use either an idler sprocket or a spring-loaded resolver base to compensate for slack or stretch.

CAUTION

DAMAGE TO RESOLVER

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

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

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

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

- Do not use a chain more than three feet in length
- Do not use gears, right-angle joints, or shafts with universal joints, which will develop either too much backlash or too much play
- Do not try to couple the resolver directly to the crankshaft. Such a placement requires extreme precision. If the resolver is only slightly off-center, its bearing will be subjected to side loads well in excess of its rated capacity and will ultimately fail.
- Do not use flexible couplings, which can be inaccurate, or V belts, which can also be inaccurate and will slip
- Do not use a flexible shaft like a speedometer cable. The resolver will lag the crankshaft because of the twisting of the shaft on start-up. When the crankshaft stops, the resolver will turn past the true stopping point and snap backward.

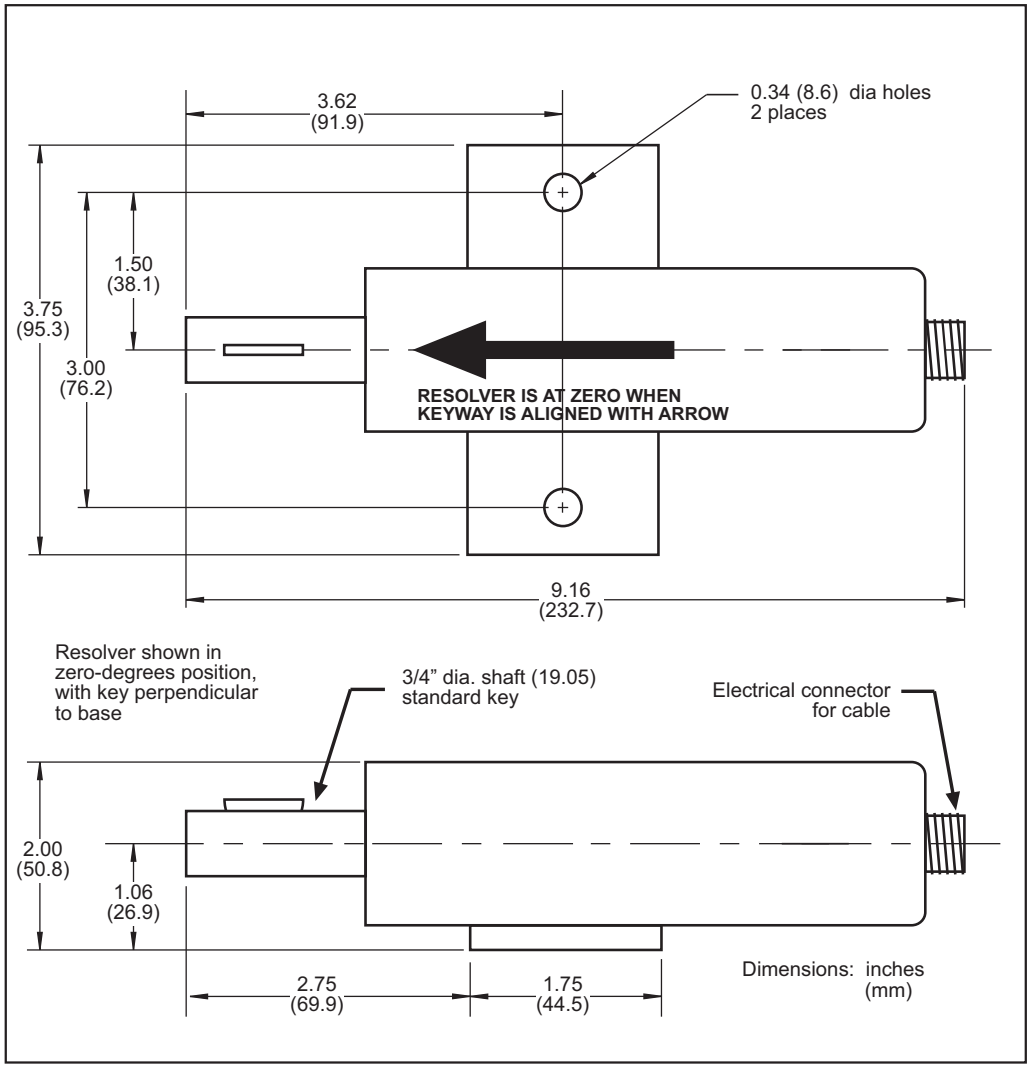


Figure 2-13. Resolver: Mounting Dimensions

Mounting the Resolver

To mount the resolver, perform the following steps:

NOTICE

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

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

Wiring the Resolver

To wire the resolver, perform the following steps:

1. If the resolver cable is not already connected to the resolver, locate the cable, plug the molded connector into the resolver (it only goes one way), and twist the locknut so the connection is tight.
2. Run the resolver cable through conduit from the resolver to one of the knockouts in the bottom of the WPC 1000 enclosure.

NOTICE

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

3. Find the resolver terminal block, TB 103, on the WPC 1000 Control board (see Figure 2-11, page 2-20), and remove the L-shaped connector.
4. Viewing the resolver from the shaft end, determine whether the shaft will turn clockwise or counterclockwise when the press runs.
5. Measure and cut the resolver wires so they reach TB 103, then wire them to the L-shaped connector, referring to Table 2-17, page 2-70, and Figure 3 at the end of this manual. Make sure you connect the black and yellow wires correctly, based on the direction in which your resolver will rotate–clockwise or counterclockwise. Refer to *Connecting Wires to Terminal Block Connectors*, page 2-5 if you need help wiring the TB 103 connector.

NOTICE

CONNECTOR WIRING

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

6. Double-check connections when you are finished wiring.
7. Plug the L-shaped connector firmly into its base. It can plug in only one way.

Checking the Resolver's Direction of Rotation

To determine whether you have wired the resolver so that it rotates in the correct direction, do the following:

1. Run the press in Inch mode, and observe whether the crankshaft angle shown in the digital LED display increases or decreases.
   - If the angle increases (i.e., moves from 0° to 1°, 2°, 3°, etc.), the resolver wiring is correct. Go to the next section.
   - If the angle decreases (moves from 0° to 359°, 358°, 357° etc.), the yellow and black resolver wires are reversed. Go to step 2.
2. Rewire the yellow and black resolver wires correctly, referring to Table 2-17, page 2-70 and Figure 3 at the end of the manual.
3. Inch the press again, and observe the movement of the crankshaft angle in the LED display. The angle should now increase.
4. If the direction of rotation is still incorrect, contact Wintriss Tech Support.

Replacing the Resolver

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

1. Perform the *Mounting the Resolver* and *Wiring the Resolver* procedures, above.
2. Rezero the resolver, following the instructions in *Re-zeroing the Resolver*, page 3-4.

Installing the Overrun Limit Switch

⚠ DANGER

MOUNT OVERRUN LIMIT SWITCH SO IT PROVIDES CORRECT TIMING

- Install the overrun limit sensor magnet on a component, such as the crankshaft, that moves independent of the resolver and whose motion is not affected by the condition of the resolver or the resolver's drive mechanism. Safe operation of the press depends on the overrun limit sensor working correctly when the resolver or its drive mechanism fails.
- Install the overrun limit sensor magnet in the correct angular location according to the instructions starting on page 3-7.

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

The overrun limit sensor, also called the "overrun sensor," enables WPC 1000 to monitor operation of the resolver and to stop the press whenever the resolver fails to work properly, as can happen when the resolver drive chain breaks or slips or when the resolver is broken. The overrun sensor provides a signal to WPC 1000 at the same resolver angle on every stroke. Whenever this angle changes, WPC 1000 "knows" that the resolver is no longer rotating at a 1:1 ratio with the crankshaft and sends an Emergency-stop command to the press and displays an error code.

Planning Your Overrun Sensor Installation

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

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

To obtain an adequate overrun signal at high speeds, the magnet should be mounted so that it can be sensed by the switch for between 15° and 25° of the stroke. The interval during which the magnet is sensed, called the "dwell," decreases as the diameter of the rotating shaft increases (see Figure 2-14). Select a shaft whose diameter will allow the sensor to detect the magnet for the required dwell.

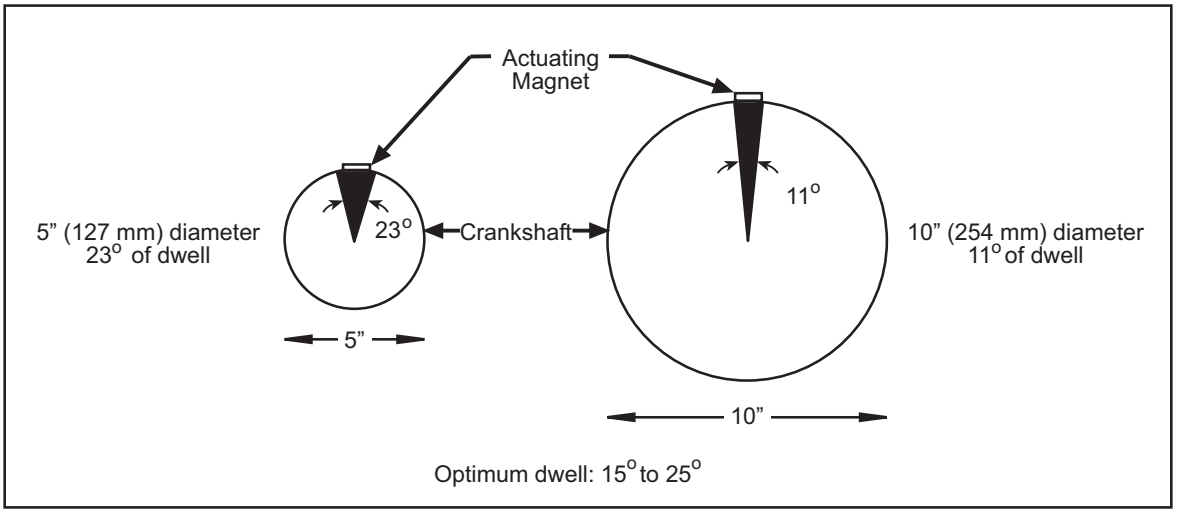


Figure 2-14. Overrun Sensor Magnet Placement: Dwell as a Function of Shaft Diameter

Mounting the Overrun Sensor Switch

NOTICE

INSTALL MAGNET AFTER MOUNTING SWITCH

Install the overrun magnetic switch as instructed in this section. Refer to page 3-7 for instructions on installing the overrun magnet.

The overrun sensor magnetic switch comes already installed in a bracket. Mount the bracket and switch at a location past which the magnet will pass on every stroke and within 1/8 in. to 3/16 in. (3 mm to 5 mm) of the magnet, referring to Figure 2-15, page 2-27.

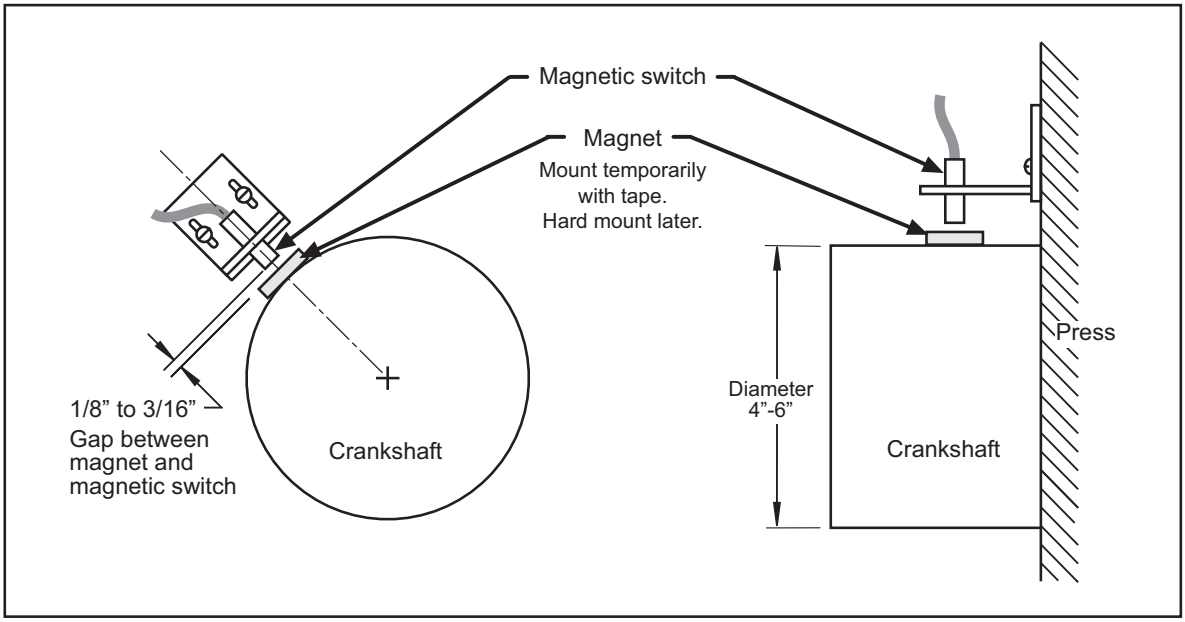


Figure 2-15. Overrun Sensor Magnetic Switch: Installation Example

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

Wiring the Overrun Sensor Switch

NOTICE

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

Run the cable for the magnetic switch through conduit to the WPC 1000. Connect the wires to terminal blocks on the WPC 1000 Control board, as shown in Table 2-2 and Figure 3 at the end of the manual.

Table 2-2. Overrun Sensor Switch Wiring Connections

Pin #	Signal	Wire Color
7	Overrun input to WPC 1000	White
12	Ground	Black
36	+24 Vdc	Red

Wiring WPC 1000 User Inputs

⚠ DANGER

USER INPUTS 1 AND 2 NOT SUITABLE FOR SAFETY USE

DO NOT use inputs 1 and 2 as part of any personnel-protection system. These inputs are not control reliable.

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

⚠ DANGER

USER INPUTS ADD DELAY TO STOPPING TIME

DO NOT connect light curtains or other presence-sensing devices to any user inputs. The cross-checked input pair (3A and 3B), though control reliable, is suitable only for applications such as connecting to safety switches used with interlocking barrier guards.

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

⚠ DANGER

MAKE SURE TO WIRE CROSS-CHECKED INPUT PAIR CORRECTLY

Input pair 3A and 3B are control reliable only if wired correctly in a pair according to the instructions in this section.

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

⚠ DANGER

CHECK PRESS TO MAKE SURE IT STOPS WHEN USER INPUT ACTUATES

- WPC 1000 comes from the factory with the inputs bypassed by jumpers. Make sure to remove the appropriate jumper from the Control board connector when you wire a user input. Otherwise, WPC 1000 will not receive the signal from the input. Leave all unused inputs jumpered/ bypassed.
- Perform checkout procedures to ensure that the user inputs are wired correctly and that WPC 1000 responds correctly when the user input faults (see page 3-54).

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

WPC 1000 user inputs allow you to connect signals from other equipment in order to monitor auxiliary press functions such as lubrication systems. WPC 1000 provides connections for a pair of control-reliable, cross-checked inputs and two independent inputs that are not control reliable.

When one of these inputs issues a Stop command by opening a normally closed (N/C) relay, a fault code for the input(s) appears on the LED display. User input 1 issues an Emergency-stop command, user input 2 generates a Top-stop, and the cross-checked input pair 3A and 3B generates an Emergency Stop, simultaneously opening the Lockout relay and displaying the “Loc” message on the digital LED readout. The stop type, fault code, and wiring connections for each input are shown in Table 2-3, page 2-29.

Table 2-3. WPC 1000 User Inputs: Stop Types, Fault Codes, and Wiring Connections

User Input (Interlock)	Stop Type	Pin #	Jumper Connection (Bypass)	Fault Code	Name of Auxiliary Equipment
User 1	ESTOP	45	+24 Vdc	51	
User 2	TOP STOP	15	+24 Vdc	52	
User 3A paired with 3B	ESTOP/ LOCKOUT	20	Ground	53, 17	
User 3B paired with 3A		6	Ground		

The cross-checked input pair generates a fault either when one or both inputs in the pair are open or when the inputs "disagree" (i.e., one input is open, the other closed) for longer than 100 mS. These inputs can be used to detect critical safety problems such as the removal of die receptacle blocks. Since input 3A and 3B faults open the Lockout relay, you can wire this relay to your motor starter so that ungrounding of either input will shut off the motor.

To clear the "Loc" message on the LED display, turn the Stroke Select switch to OFF and then back to INCH (see *Wiring the Lockout Relay*, next section, and *Lockout Message*, page 5-3).

NOTICE

ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH THE CONTROL BOARD

Connect all signal grounds through pins on the WPC 1000 Control board.

To wire the user inputs, run conductors from the appropriate terminal number on the Control board to your equipment and then back to either +24 Vdc or ground, as shown in Table 2-3 and Figure 3 at the end of the manual. (There are several available "ground" and "+24 Vdc" terminals on the Control board from which to choose.) After you have wired the inputs you will use, be sure to bypass all the unused inputs by connecting them to +24V or ground.

NOTICE

If you do not bypass the unused inputs, WPC 1000 will not work properly.

Wiring the Lockout Relay

The Lockout relay, which is designed to be wired to critical press functions such as the motor starter, provides an added safety feature to WPC 1000. Whenever a serious error condition occurs, the "Loc" message will appear in the digital LED display. To clear the "Loc" message, turn the Stroke Select switch to OFF and then back to INCH.

Wire the function you want to be controlled by the Lockout relay to TB 301 on the DSV/ Lockout relay board, which is located in the lower right corner of the WPC 1000 Control

board (see Figure 2-11, page 2-20). Wiring connections are shown in Table 2-4 and in Figure 4 at the end of the manual.

Table 2-4. Lockout Relay Wiring Connections (DSV/Lockout Relay Board)

TB301 Pin #	Signal
58	Lockout relay input
59	Lockout relay output
60	Lockout relay output

Wiring the Auxiliary Output

⚠ DANGER

NON-SAFETY OUTPUT USED FOR SAFETY FUNCTIONS

Use Auxiliary Output 1 for a non-safety function only, such as convenience in automation. Aux. 1 cannot protect personnel from a moving hazard.

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

WPC 1000 provides an output called Auxiliary 1 (pin #14 on the WPC 1000 Control board). Auxiliary 1 is normally closed (N/C), or On. The output opens, or turns Off, when a fault condition occurs, an E-stop string opens, or a light curtain is interrupted while the press is running. The output can also be programmed to turn Off during an Interrupted Stroke (see page 4-3 for an explanation of Interrupted Stroke).

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

Wiring, state changes, and change conditions for Auxiliary Output 1 are provided in Table 2-5. Wiring connections are also shown in Table 2-16, page 2-69 and in Figure 2 at the back of the manual.

Table 2-5. Auxiliary Output 1 Wiring Connection and Change Conditions

Output	Pin # (WPC 1000 Cntrl Bd.)	Normal State	Change State	Change Conditions
Auxiliary 1	14	On (N/C)	Off (or Open)	• WPC 1000 fault • E-stop string open • Light curtain interruption • Interrupted Stroke (controlled by option switch 8–see Table 2-6)

Aux. Output 1 response to an Interrupted Stroke is controlled by option switch 8 on the WPC 1000 Control board. Switch settings are shown in Table 2-6, page 2-31.

Table 2-6. Option Switch 8 Settings for Auxiliary Output 1 State Changes

Option Switch 8	Auxiliary Output 1 State Change during Interrupted Stroke
OFF	Output turns OFF when an Interrupted Stroke occurs
ON	Output remains ON during an Interrupted Stroke unless the Interrupted Stroke is preceded by a WPC 1000 fault or an Emergency Stop, in which case the output turns OFF

When switch 8 is set to OFF, Auxiliary Output 1 opens, or turns Off, at the occurrence of an Interrupted Stroke. When switch 8 is set to ON, the output turns Off during an Interrupted Stroke only when there is also a fault or Emergency-stop condition; otherwise, the output remains On during an Interrupted Stroke. See *Auxiliary Output 1 Response to Interrupted Stroke*, page 3-32 for additional details.

The switch 8 ON setting allows the press to be "inched" during an Interrupted Stroke, when the WPC 1000 is in Two-hand Maintained Single-stroke mode. Normally, in Two-hand Maintained Single-stroke, the operator must hold down the Run/Inch palm buttons until the press reaches its Top-stop position in order to avoid another Interrupted Stroke. With switch 8 set to ON, the operator may release the Run/Inch buttons while inching the press to Top-stop without initiating an Interrupted Stroke.

Connecting Multiple Controls to the Resolver

NOTICE

MAKE WPC 1000 THE "MASTER" WHEN CONNECTING MULTIPLE CONTROLS

When connecting multiple controls to the resolver, make sure that the connection between the resolver and WPC 1000 is direct, thereby making WPC 1000 the "master" control. Wire the other Wintriss controls in parallel to the resolver as "slaves."

You can connect the resolver to as many as three additional Wintriss controls (e.g., DiPro 1500). To do so, perform the following steps:

1. Check the resolver connector TB103 on the WPC 1000 Control board (see Figure 2-11, page 2-20) to make sure that the resolver is wired to the WPC 1000 as instructed on page 2-24.
2. Locate the 7-conductor shielded resolver cable. Run the cable through 1/2-in. conduit from the WPC 1000 to the other control. If there is a connector on one end of the cable, cut it off.
3. Pull the TB103 resolver connector out of its socket.
4. Attach the wires to TB103 as shown in Table 2-18, page 2-70 and in Figure 3 at the end of the manual. You will be wiring in parallel (#49 brown to brown, #50 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.
5. Connect the cable from TB 103 to the resolver connector in the first "slave" unit. Remember to wire in parallel.

6. Locate the master/slave jumper on the Control board of the "slave" unit(s). Move each of these jumpers to the pins designating "slave." Refer to the applicable user manual.
7. Repeat steps 5 and 6 to connect additional "slave" units.

Connecting Other Wintriss Products to WPC 1000

You can connect other Wintriss products to WPC 1000, such as DiPro 1500 and ProCam 1500. Before you wire, complete all WPC 1000 installation, initialization and checkout procedures. Then run the press in all modes of operation–Inch, Single-stroke, and Continuous (if applicable). Also make sure that the press has working Top-stop and Emergency-stop circuits. Verify that the press operates and stops properly before connecting WPC 1000 to other units. WPC's operation is extremely important because it will be tied in to the press stop circuits. Do not forget to mark on your electrical prints where you wire in WPC 1000.

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 #25and #26 on the Control board. For Top-stop circuits, wire them between terminals #37 and #38. Refer to Figure 1 at the end of the manual for specific wiring schematics.

Use customized status code wiring (see *Wiring WPC 1000 User Inputs*, page 2-28) when the auxiliary equipment that you are connecting does not have its own self-explanatory displays, as are available in DiPro 1500 or AutoSet load analyzers.

Wiring Micro-inch

Micro-inch is a feature that enables you to control the amount of time (and, therefore, the distance) that the ram moves when the Run/Inch palm buttons are depressed in Inch mode. Allowing finer adjustments than are possible in Inch, Micro-inch is designed to facilitate setup on high-speed or short-stroke presses.

Micro-inch can be wired to be permanently enabled or to be switched on and off.

To wire Micro-inch so that it is permanently enabled, install a jumper between pins #157 and #155 (Ground) on TB705 on the WPC 1000 Display board (see Figure 2-16, page 2-33 and Table 2-20, page 2-71).

To wire Micro-inch so that it can be turned on and off, wire a switch to pins #157 and #155 on TB705 as shown in Table 2-7, page 2-33 and Figure 4 at the end of the manual. An optional Micro-inch On/Off switch is available from Wintriss.

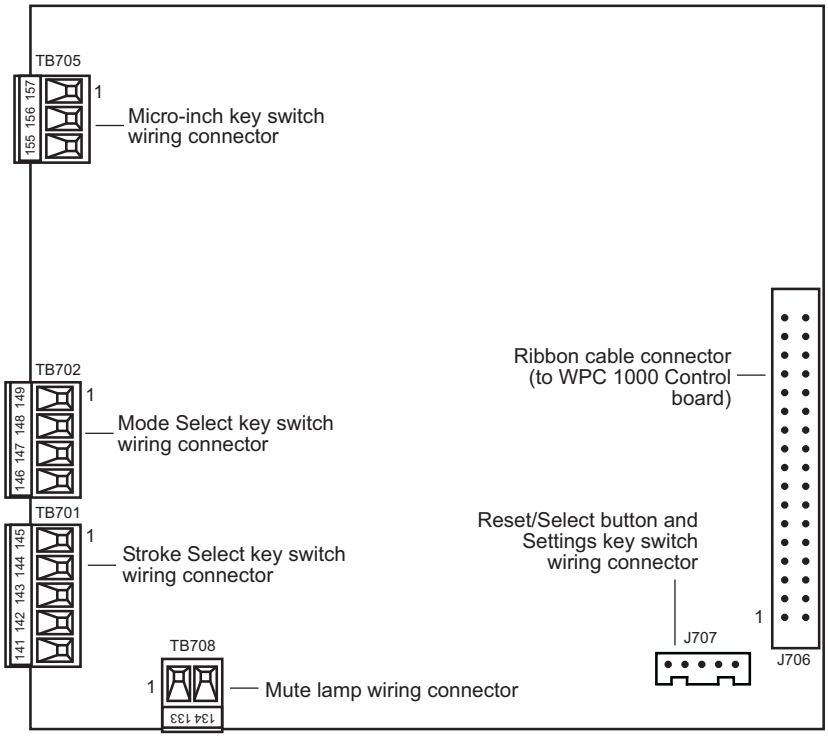


Figure 2-16. WPC 1000 Display Board: Location of Important Components

Table 2-7. Micro-inch Wiring Connections

Display Board TB705 Pin #	Signal
157	Micro-inch input
155	Ground

To set the Micro-inch time, refer to *Setting Micro-Inch*, page 3-26.

Disabling Top-stop in Inch

By default, Inch mode is set so that the ram top-stops whenever the Run/Inch palm buttons on the Operator Station are pressed and held continuously (see *Top-stop in Inch*, page 4-8). You can disable this default setting, allowing the ram to continue cycling in Inch mode as long as the Run/Inch buttons are depressed. To do so, connect pin #156 on terminal block TB 705 on the WPC 1000 Display board to ground (pin #155). See Table 2-20, page 2-71.

Wiring a Remote Reset Switch

If you would like to be able to reset the WPC 1000 from a location remote from the enclosure, the WPC 1000 Control board provides a terminal (i.e., pin #19 on TB102) for wiring a remote Reset switch (see Table 2-8). The remote Reset terminal can be wired to other equipment (e.g., the remote Reset circuit on a SmartPAC 2), or you can use a simple switch to activate the Reset function.

To wire the remote Reset circuit, connect a wire from pin #19 to a normally open switch. Connect another wire from the switch to a ground terminal (e.g., pin #23 or #24 on TB102). WPC 1000 is reset with a momentary connection to ground.

Table 2-8. Remote Reset Switch Wiring Connections

TB102 Pin #	Signal
19	Remote Reset input
23 or 24	Ground

Installing 2-channel Programmable Cam

⚠ DANGER

NON-SAFETY OUTPUTS USED FOR SAFETY FUNCTIONS

Use cams for non-safety functions only, such as convenience in automation. They cannot protect personnel from a moving hazard.

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

You connect the cam channels from the WPC 1000 Control board to the cam output assembly, which contains the output relay modules that control the timing signals for your connected equipment. These relays open and close circuits to your equipment at the crankshaft angles you program (see *Setting Programmable Cams*, page 3-33).

Mounting and Wiring the Cam Output Assembly

The cam output assembly can be ordered in an enclosure or as a PC board. To mount and wire either option, do the following:

CAUTION

BOARD DAMAGE OR SHORT CIRCUIT WHEN MOUNTED WITHOUT ENCLOSURE

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

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

1. Select a convenient location for mounting the cam output assembly, choosing one that allows you to easily run conduit from WPC 1000 to the cam outputs. You do not need to access the cam outputs once they are installed and wired.
2. Mount the cam output assembly, referring to Figure 2-17, below, or Figure 2-18, page 2-36 for mounting dimensions. Use the holes on the flanges to mount the cam output enclosure or the corner holes to mount the cam output board.
3. The relays that will control your equipment should already be plugged into the cam output board. If you need to replace a relay, simply pull the device out of its socket. Before installing a relay, make sure that all the pins match the socket holes so you do not bend the pins; then, press the relay in firmly.
4. Locate the twelve-conductor shielded cable that connects the WPC 1000 Control board to the cam outputs, and terminate the shield at each end near the entry point to the enclosure or console (see *Terminating Cable Shields*, page 2-5).
5. Remove the TB101 and TB102 connectors from the WPC 1000 Control board, and attach the wires at one end of the cable to the terminals shown in Table 2-9, page 2-36 and Figure 2 at the end of the manual. Plug each connector back into its socket when you are finished.

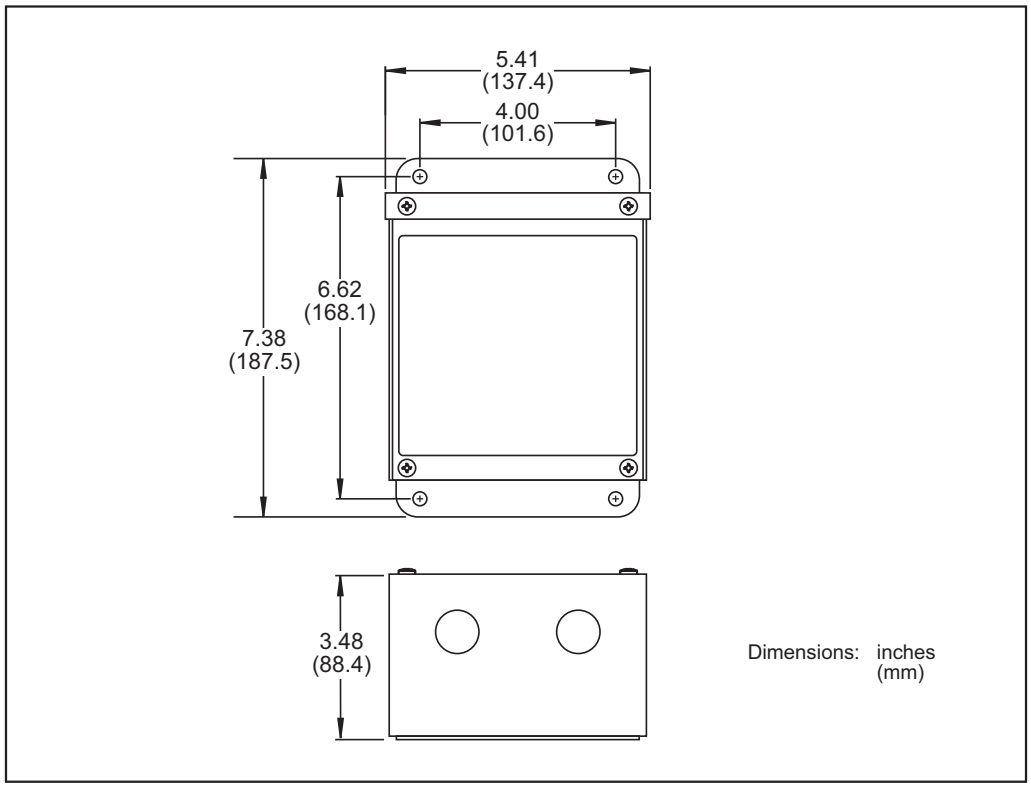


Figure 2-17. Cam Output Enclosure: Mounting Dimensions

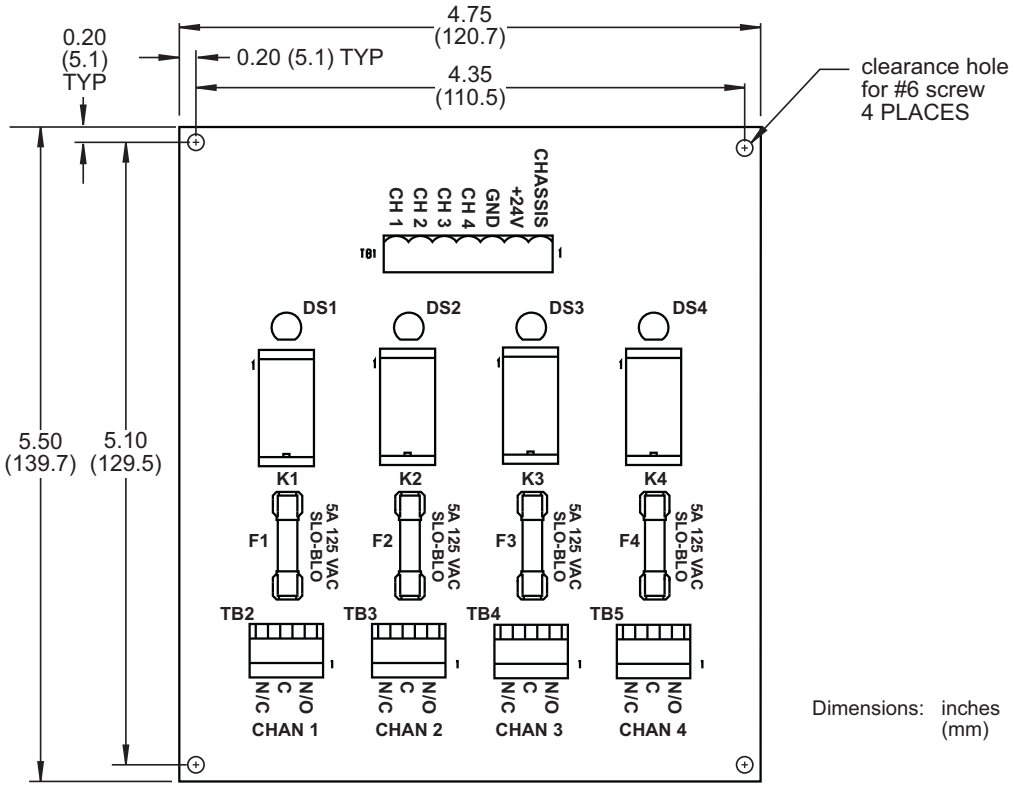


Figure 2-18. Cam Output Board: Mounting Dimensions

Table 2-9. WPC 1000 Control Board to Cam Output Assembly (TB1) Wiring Connections

Wire Color	WPC 1000 Control Board Pin #	Signal	2-channel Cam I/O Assembly (TB1) Pin #	Signal
	48 (TB102-Bottom)	+ 24 Vdc	2	+ 24 Vdc
	23 (TB102-Top)	Ground	3	Ground
	34 (TB101-Bottom)	Cam 2	6	Channel 2
	33 (TB101-Bottom)	Cam 1	7	Channel 1
	Terminate drain wire to ground stud		Terminate drain wire to ground stud	

6. Run the twelve-conductor 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. Remove the TB1 connector from the Cam Output board, and attach the wires at the other end of the cable to the terminals shown in Table 2-9 and Figure 2. If you ordered the enclosure, a wire from the CHAS terminal (pin #1) to a lug on the enclosure should already be connected. Plug the connector back into its socket when you are finished.

NOTICE

TRIM UNUSED WIRES

If your installation does not require all the wires in the cable to be used, trim the unused wires, cutting them 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, such as convenience in automation. They cannot protect personnel from a moving hazard.

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

To connect the cam relays on the Cam Output board to your equipment, do the following:

1. Remove the TB2 (for cam channel 1) and TB3 (for cam channel 2) connectors from the cam output board and wire them as follows, referring to Figure 2-19:
   - Connect one wire to the terminal labelled "C"
   - Connect the other wire to the terminal labelled "N/O" if you want your equipment to be "on" during the cam angle interval set in WPC 1000

     or

     Connect the other wire to the terminal labelled "N/C" if you want your equipment to be "on" except during the cam angle interval set in WPC 1000

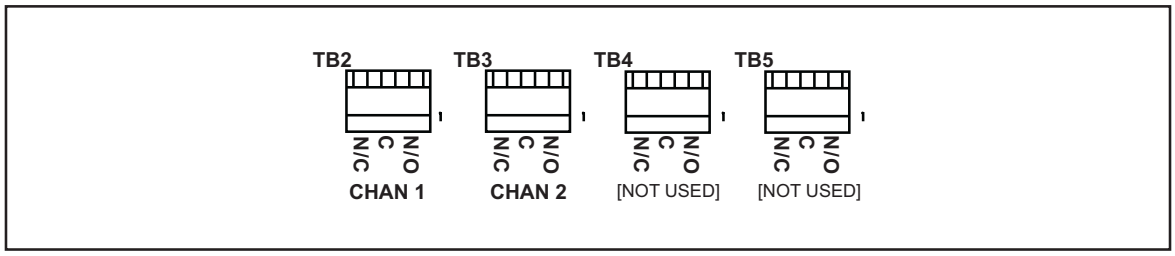


Figure 2-19. Connectors TB2 and TB3 on Cam Output Board

2. Plug TB2 and TB3 back into the Cam Output board.

NOTICE

Generally, you use the N/O terminal so that equipment is "off" except when you use WPC 1000 to turn it "on." Use the N/C terminal only if it is more practical to do the reverse.

⚠ WARNING

SUPPRESSORS INSTALLED ACROSS RELAY CONTACTS

DO NOT install suppressors across the relay contacts in the cam output assembly. If a suppressor is installed across the relay contacts and the relay fails shorted, the equipment controlled by that relay will remain energized.

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

3. To reduce electrical noise and extend the life of the relays, do the following:
   a. Install arc suppressors across each inductive AC load (motors, coils, etc.) that is connected to a cam relay. Suppressors are supplied with your WPC 1000 cam outputs. 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. Figure 2-20, below, shows the correct way to install suppressors.
   b. Install a diode across each DC load, such as relays, solenoids and PLC inputs, as shown in Figure 2-21, page 2-39.

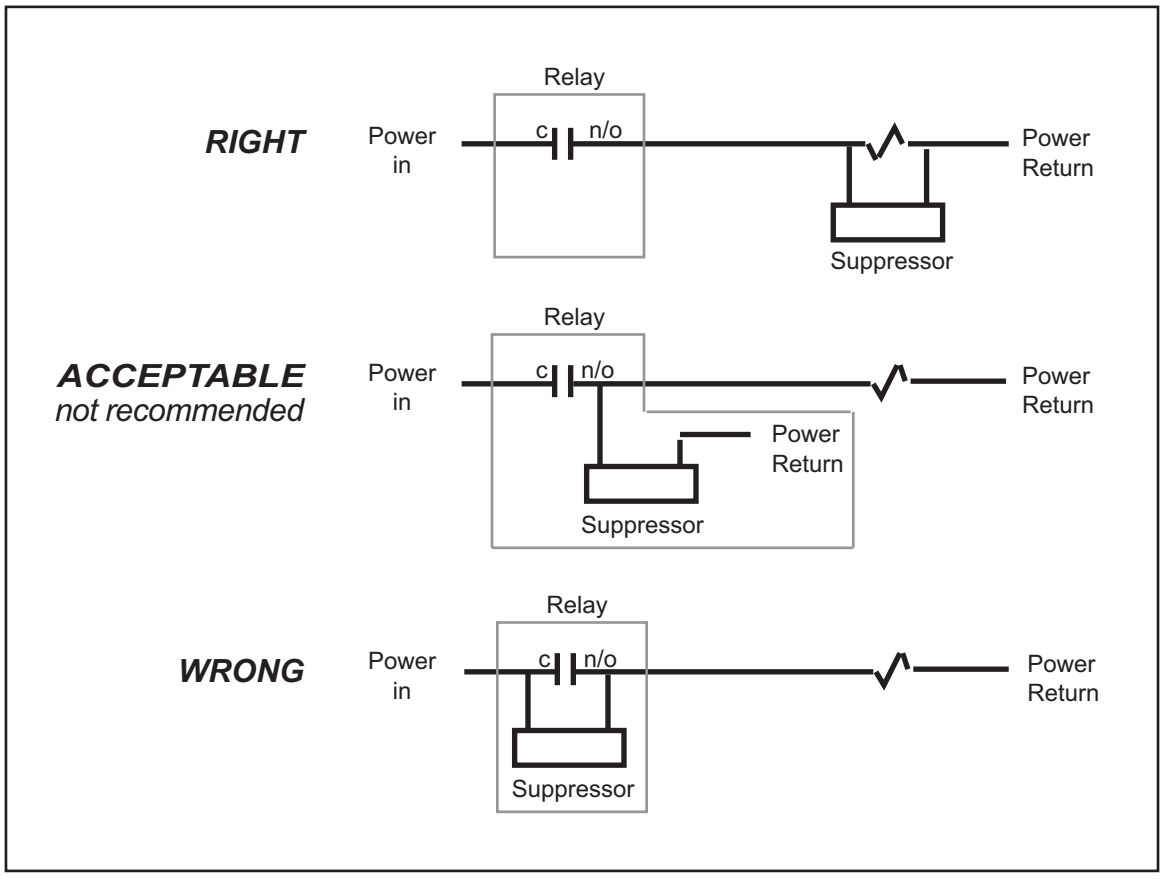


Figure 2-20. Installing a Suppressor across an AC Load

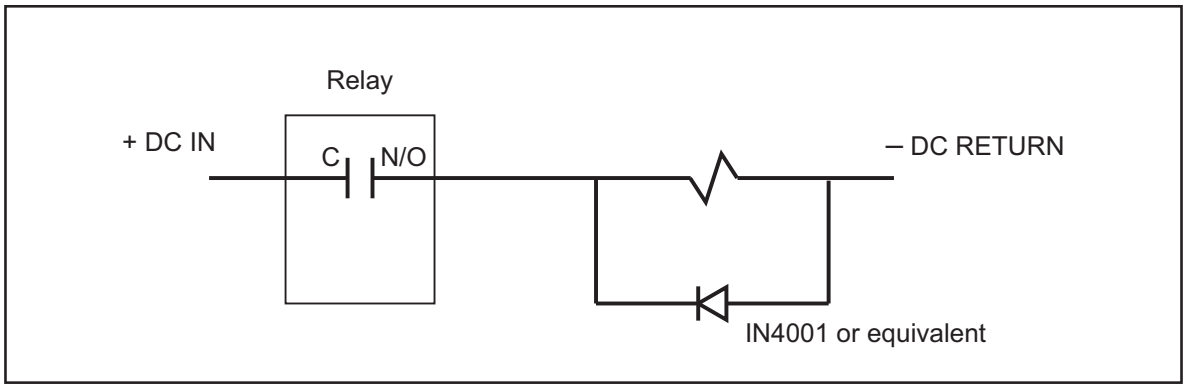


Figure 2-21. Installing a Diode across a DC Load

Wiring Zero Cam Output to AutoSet

WPC 1000 provides a zero cam output that automatically turns on at 270° and turns off at 30° on every stroke. You can wire this output to AutoSet 1500 and 1504 load analyzers, as shown in Table 2-10, below, and Figure 2 at the end of the manual.

Table 2-10. Zero Cam Output Wiring Connections

WPC 1000 Control Board		AutoSet 1500 (TB1)		AutoSet 1504 (TB101)	
Pin #	**Signal**	**Pin#**	**Signal**	**Pin #**	**Signal**
pin # 9	Zero Cam Output	pin # 2	Zero Cam	pin # 2	Zero Cam

Wiring Foot Switch

⚠ DANGER

UNGUARDED HAZARDS

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

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

⚠ DANGER

IMPROPER FOOT SWITCH

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

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

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

Wire the Foot Switch's normally closed contact to pin #16 on the WPC 1000 Control board and the normally open contact to pin #3, then wire both contacts to +24 Vdc, as shown in Table 2-11, below, and Figure 1 at the end of the manual.

Table 2-11. Foot Switch Wiring Connections

WPC 1000 Control Board Pin #	Foot Switch Contacts
16 (TB102-Top)	N/C input
3 (TB101-Top)	N/O input
+24 Vdc	Common

Installing One-hand Control

⚠ DANGER

INSTALL SAFEGUARDS TO PREVENT ACCESS TO HAZARDOUS AREA

- Follow all applicable OSHA and ANSI regulations for safeguarding your press system. Point-of-operation safeguarding is the single most important factor in the prevention of injuries.
- Follow all applicable OSHA and ANSI regulations when installing a one-hand control.
- Ensure that proper safeguarding devices are installed and working properly. Wintriss takes no responsibility if safeguarding devices are not installed or working correctly.
- DO NOT use WPC 1000 or a one-hand control as a safeguarding device.
- Install and operate WPC 1000 and a one-hand control in accordance with OSHA and ANSI regulations.

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

⚠ DANGER

PREVENT OPERATOR FROM STANDING BETWEEN LIGHT CURTAIN AND HAZARD

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

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

One-hand Control is a switch available from Wintriss that allows operators to use their free hand to feed a part while their other hand operates the switch. This option can only be used with WPC 1000 systems equipped with One-hand and Single-stroke modes, employing a Shadow light curtain to guard the point of operation, and running One-hand/Two-hand/Foot firmware.

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

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

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

The mode used for One-hand Control is determined by the setting on option switch 3 (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 3-28). When switch 3 is set to OFF, One-hand Control operates in Normal mode. When switch 3 is set to ON, One-hand Control operates in Light Curtain Break mode.

Mounting the One-hand Control

⚠ DANGER

DO NOT MOUNT OPERATOR CONTROL TOO CLOSE TO HAZARD

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

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

To mount the One-hand Control, do the following:

1. Shut off power to the press and to WPC 1000.
2. Choose a mounting location on or near the press convenient to the operator. The One-hand Control should be mounted so the operator can reach it as part of normal hand movement after loading a part. An adjustable bracket may be necessary.
3. Mount the One-hand Control, using the tapped holes on the bottom of its metal enclosure. Refer to Figure 2-22, page 2-42 and Figure 2-23, page 2-43 for mounting dimensions.

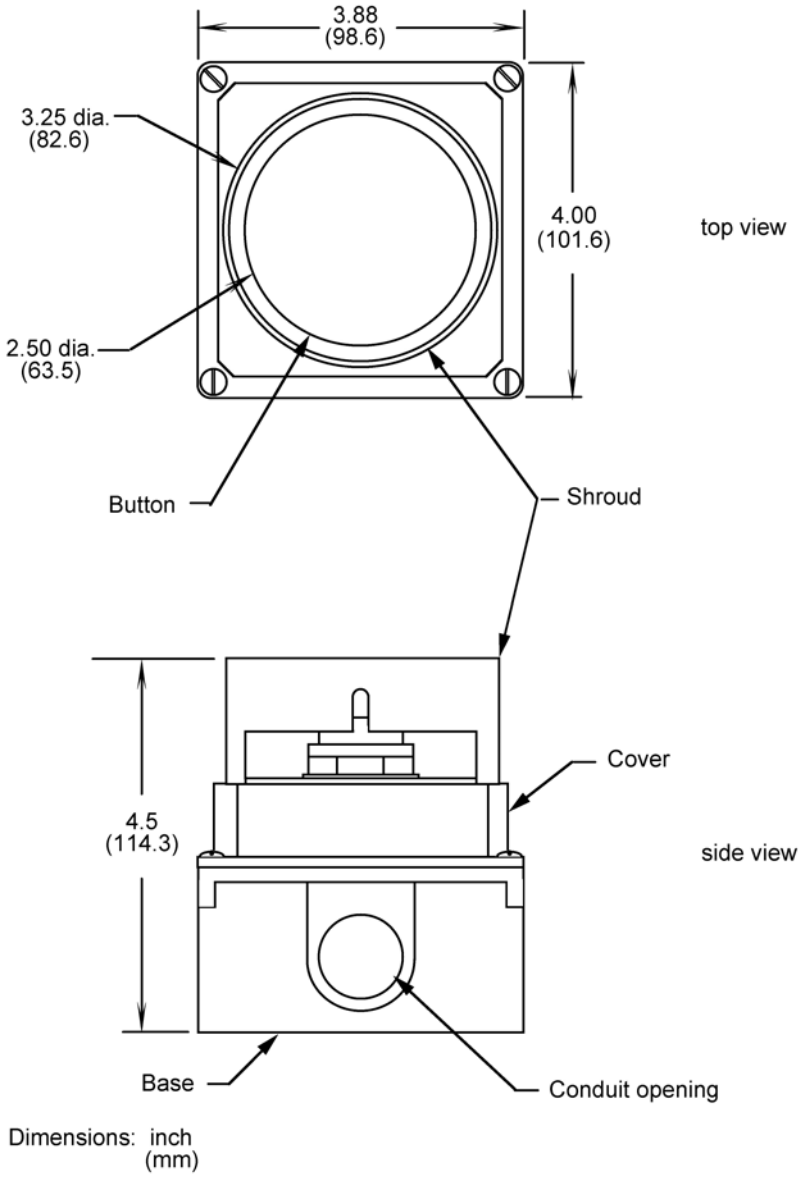


Figure 2-22. One-hand Control Switch: Mounting Dimensions

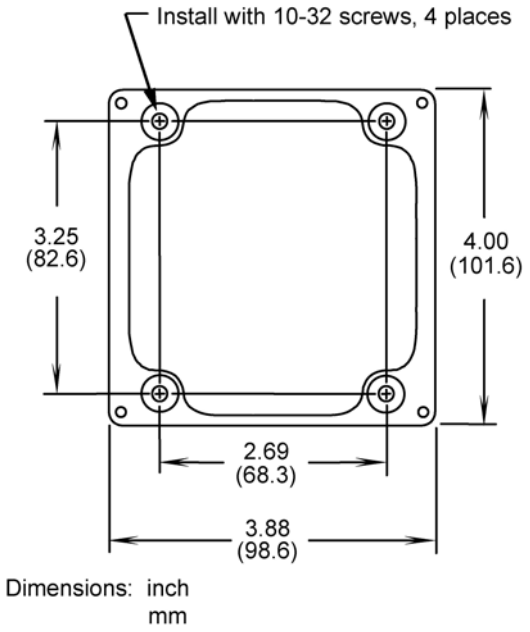


Figure 2-23. One-hand Control Switch Base: Mounting Dimensions

Wiring One-hand Control to WPC 1000

⚠ DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

To wire One-hand Control, you need to make connections to both the Operator Station and to the WPC 1000 Control board. To do so, perform the following steps:

1. Turn off power to the press and to the WPC 1000.
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 1000 control enclosure.

4. Using the conduit hole provided in the base of the One-hand Control, run conduit and wiring to the Operator Station, referring to Figure 2-24 for terminal locations on the bottom of the One-hand Control.

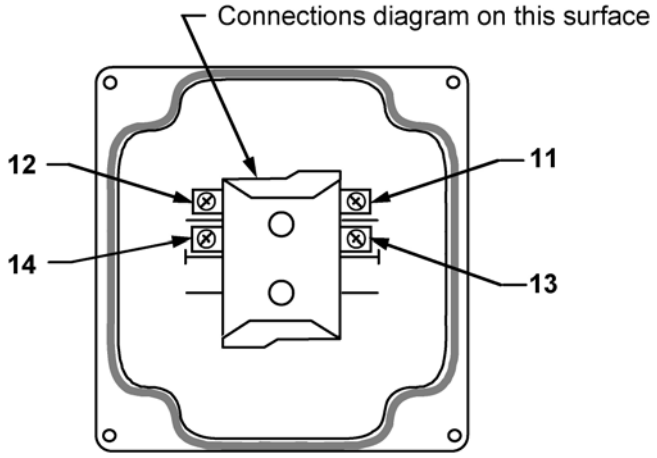


Figure 2-24. Wiring Connections in One-hand Control Switch

(Switch Cover, Bottom View)

5. Measure wires to fit before cutting, then make the appropriate wiring connections, referring to Table 2-12, below, and Figure 1 at the end of the manual.

Table 2-12. One-hand Control Wiring Connections

One-hand Control Terminal # *	WPC 1000 Control Board and Operation Station Connections Pin# Signal
11	46 Palm switch N/C input +
12	Blue wire in Operator Station cable
13	4 One-hand input +
14	Blue wire in Operator Station cable

* Refer to Figure 2-24, above

6. Fasten the switch cover onto the base with the screws provided.
7. Tighten all conduit connections that may have been loosened during installation.
8. Close and latch the cover of the Operator Station and WPC 1000.
9. Make sure that you have run all your ground wires. Do not use conduit as ground.

Mounting and Wiring the Bar Control Enclosure

Mount the Bar Control enclosure in a location that is convenient to the operator while he is releasing the machine's brake and barring the press. Make sure that the operator will not block a light curtain while pressing the Bar control Operate button. Refer to Figure 2-25 for mounting dimensions.

To wire the Bar Control, connect the Bar selector switch input to pin #31 on the WPC 1000 Control board and the Bar actuator input to pin #17, as shown in Table 2-13 and Figure 1 at the end of the manual.

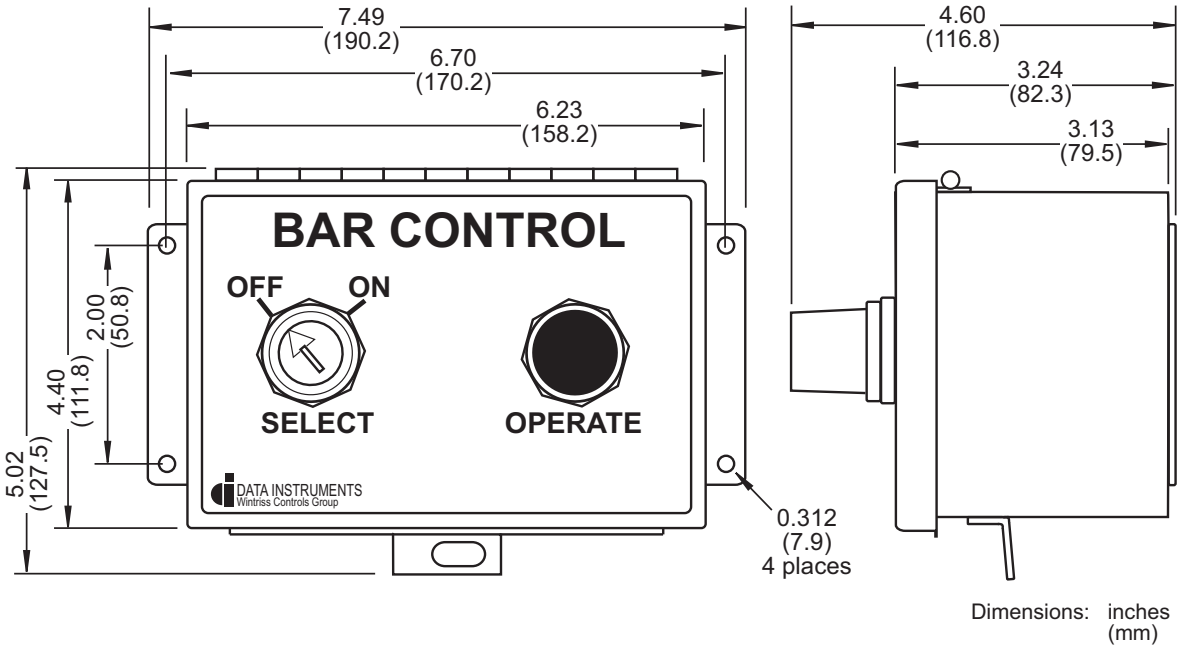


Figure 2-25. Bar Control Enclosure: Mounting Dimensions

Table 2-13. Bar Control Wiring Connections

WPC 1000 Control Board Pin #	Bar Control Contacts
17 (TB102-Top)	Bar actuator input
31 (TB101-Bottom)	Bar selector switch input
+24 Vdc	Common

Installing Revised Firmware in WPC 1000

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Ensure that the power source is off before you replace electronic components in a control.
- Disconnect power from the machinery it is connected to before replacing electronic components. This includes disconnecting power to the machine control and motor.
- Ensure that installation is performed by qualified personnel.

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

To install revised firmware in WPC 1000, follow these steps:

1. Record the following WPC 1000 settings, referring to *Viewing and Setting Press Parameters*, page 3-1 for help in displaying them in the digital LED readout:
   - Stop-time Limit
   - Auto Carry-up Angle
   - Top-stop Angle
   - Micro-inch time
   - Cam On/Off settings
   - Counter Preset
2. Turn off power to WPC 1000. The LED display should go blank.

CAUTION

STATIC DISCHARGE DAMAGE TO CHIP

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

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

3. Making sure that you are grounded, open the WPC 1000 enclosure and locate firmware chips A (labelled "U110") and B (labelled "U125") on the Control board (see Figure 2-11, page 2-20). Note that each chip has a white label and the semi-circular notch on each chip faces up.

NOTICE

Both new WPC 1000 firmware chips must also be installed with the notch facing up.

CAUTION

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

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

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

CAUTION

CHIP INSTALLED INCORRECTLY

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

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

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

NOTICE

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

7. To verify that both chips are installed correctly, power up the WPC 1000.
   - If the unit powers up normally (i.e., with “Loc” displayed in the LED readout), go to step 8.
   - If the unit powers up with “rolling” LEDs, or otherwise malfunctions, one or more pins may be bent or not plugged in properly. Turn the power off, and repeat the procedure in the Notice for step 6 for each chip. Power the unit up again. If WPC 1000 continues to malfunction, call Wintriss Tech. Support.
8. Re-initialize the system, following the instructions starting on page page 3-3.
9. Re-enter the settings you recorded in step 1.
10. Perform installation verification (see page 2-65) and final checkout (see page 3-35) tests.

⚠ DANGER

MACHINE MALFUNCTION AFTER INSTALLING REVISED FIRMWARE

- Make sure that the Stop-time Limit and Auto Carry-up Angle are correct after you install new firmware.
- Perform the installation verification tests (see page 2-65) and final checkout tests (see page 3-35) after performing this firmware installation.

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

Installing WPC 1000 without Enclosure

When you order WPC 1000 without enclosure, you receive a Control board, power supply, and input power terminal block mounted on an aluminum plate and either a panel mount display or display board kit. First, install the mounting plate as instructed in the next section, then mount the display according to instructions in *Installing the Panel-mount Display*, page 2-49 or *Installing Display Board Kit with Selector Switches*, page 2-52.

Installing the WPC 1000 Mounting Plate

The mounting plate has a hole in each corner to facilitate mounting of the WPC 1000 Control board and related components in your enclosure or console. When installing the mounting plate, refer to Figure 2-26 for mounting dimensions. Be sure to allow at least 1 in. clearance on top, bottom, and both sides of the plate and above the power supply and Control board.

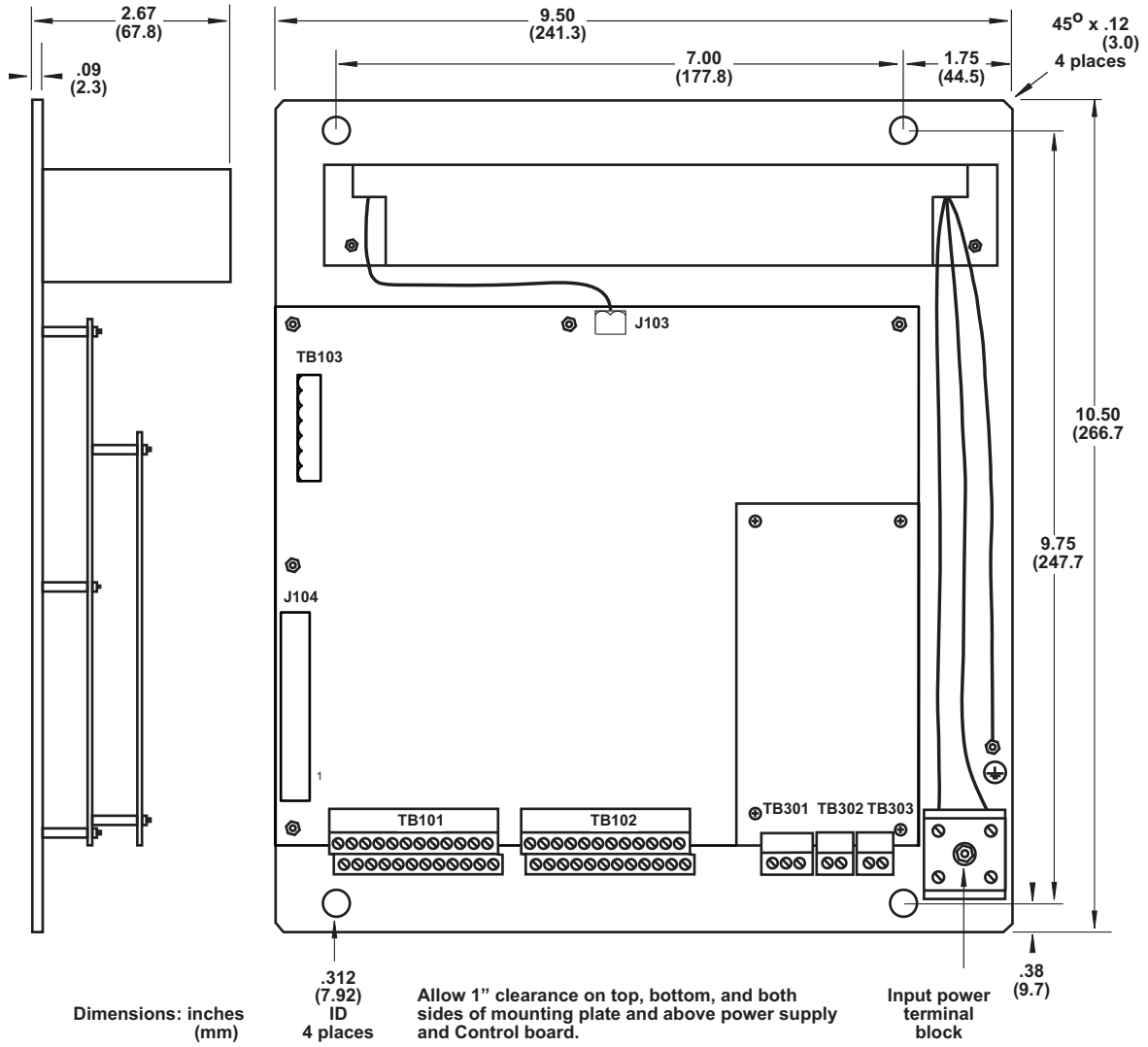


Figure 2-26. WPC 1000 Mounting Plate: Mounting Dimensions

The power supply on the mounting plate is pre-wired to the power terminal, J103, on the Control board and to the input power terminal block on the plate. To connect AC wiring to the input power terminal block, follow the instructions in *Connecting AC Wiring*, page 2-8.

Installing the Panel-mount Display

Mounting the Display

NOTICE

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

To install the panel-mount display in your enclosure or console, do the following, referring to Figure 2-27, page 2-50 for mounting and cutout dimensions:

1. Determine a convenient location to mount the display panel and selector switches in your enclosure or console. Mount the display so that operators and setup personnel can easily see the readouts and reach the switches. Make sure that all switches are no more than one foot (300 mm) from the display.
2. Cut out a hole in your enclosure or console, and drill and tap twelve holes for #10-32 screws, referring to Figure 2-27.
3. Prop the display panel near the location where you plan to mount it. You can do this by connecting ty wraps from two of the left holes on the panel to the corresponding holes on the enclosure or console, creating hinges. Allow 9 in. of service loop when performing the wiring connections, and make sure all cables will reach the connectors.

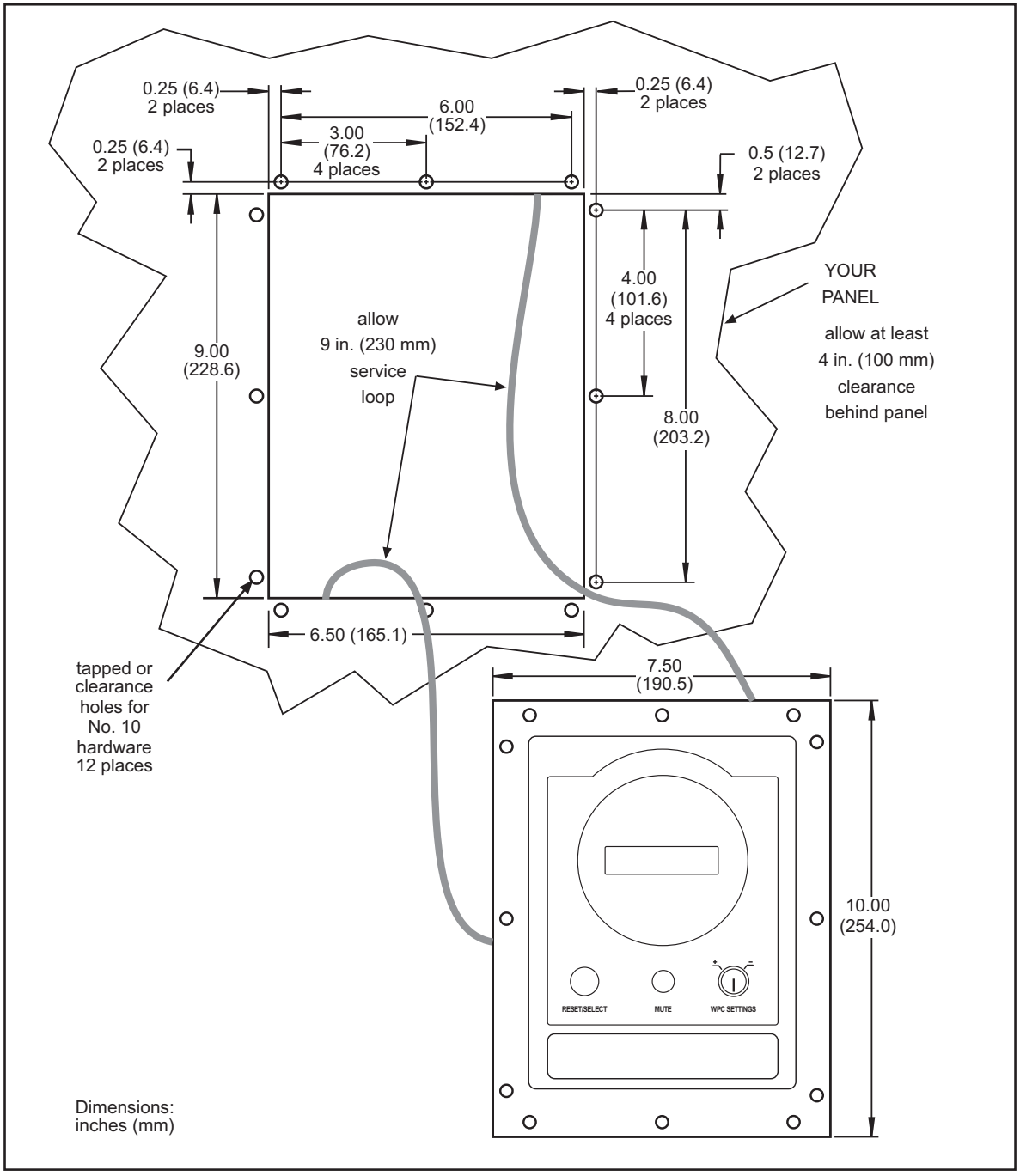


Figure 2-27. WPC 1000 Panel Mount Display: Mounting and Cutout Dimensions

Connecting the Panel-mount Display to the WPC 1000 Control Board

Connect the display cable from J706 on the Display board to J104 on the Control board, referring to *Installing the Display Cable*, page 2-55 for instructions.

Installing Selector Switches and Final Assembly

⚠ DANGER

DO NOT USE CONTINUOUS MODE ON PRESS WITHOUT PROPER GUARDING

Disconnect the “Continuous” position on the stroke selector switch and cover the “CONT” label on your control if your press is not guarded properly for use in Continuous mode or you do not run your press in Continuous mode.

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

NOTICE

Mount selector switches within one foot (300 mm) of the Display board.

1. Select a mounting location for the selector switches. Switches must be mounted within one foot (300 mm) of the display.
2. Cut holes in your enclosure or console for the selector switches, referring to Figure 2-28 for cutout dimensions. Dimensions are the same for all switches.

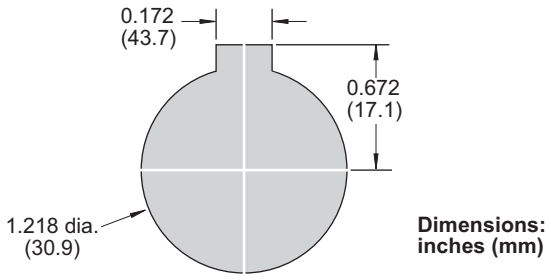


Figure 2-28. Selector Switch: Cutout Dimensions

3. Install the selector switches.
4. Wire each selector switch to the appropriate terminal block on the WPC 1000 Display board, referring to Table 2-14 and Figure 4 at the back of the manual for wiring connections

Table 2-14. Selector Switch Wiring Connections

Selector Switch	Terminal Block on WPC 1000 Display Board
Stroke Select	TB701
Mode Select	TB702
Micro Inch	TB705

Installing Display Board Kit with Selector Switches

NOTICE

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

1. Make sure that your display board kit contains the following components:
   - Label
   - PC board
   - Push button
   - Mute lamp
   - Key switch with wiring harness assembly
   - Four standoffs
   - Four lock nuts.

NOTICE

Install selector switches within one foot (300 mm) of the Display board.

2. Determine a convenient location to mount the display and selector switches in your enclosure or console. Mount the display so that operators and setup personnel can easily see the readouts and reach the switches. Make sure that all switches are no more than one foot (300 mm) from the display.
3. Cut or punch holes in your enclosure or console for the display, selector switches, and four #6-32 x 5/8 studs. Refer to Figure 2-29, page 2-53 for cutout dimensions for the display, to Figure 2-28, page 2-51 for cutout dimensions for the selector switches.
4. Install the four #6-32 x 5/8 studs from inside the enclosure or console.
5. Mount the Display board on the four studs with the standoffs and lock nuts, making sure that the LED display is at the top facing outward.
6. Orient the label correctly from outside the enclosure or console to match the cutouts, then remove the protective paper from the label and carefully affix it.
7. Connect the display cable from J706 on the Display board to the J104 on the Control board, referring to *Installing the Display Cable*, page 2-55 for instructions.

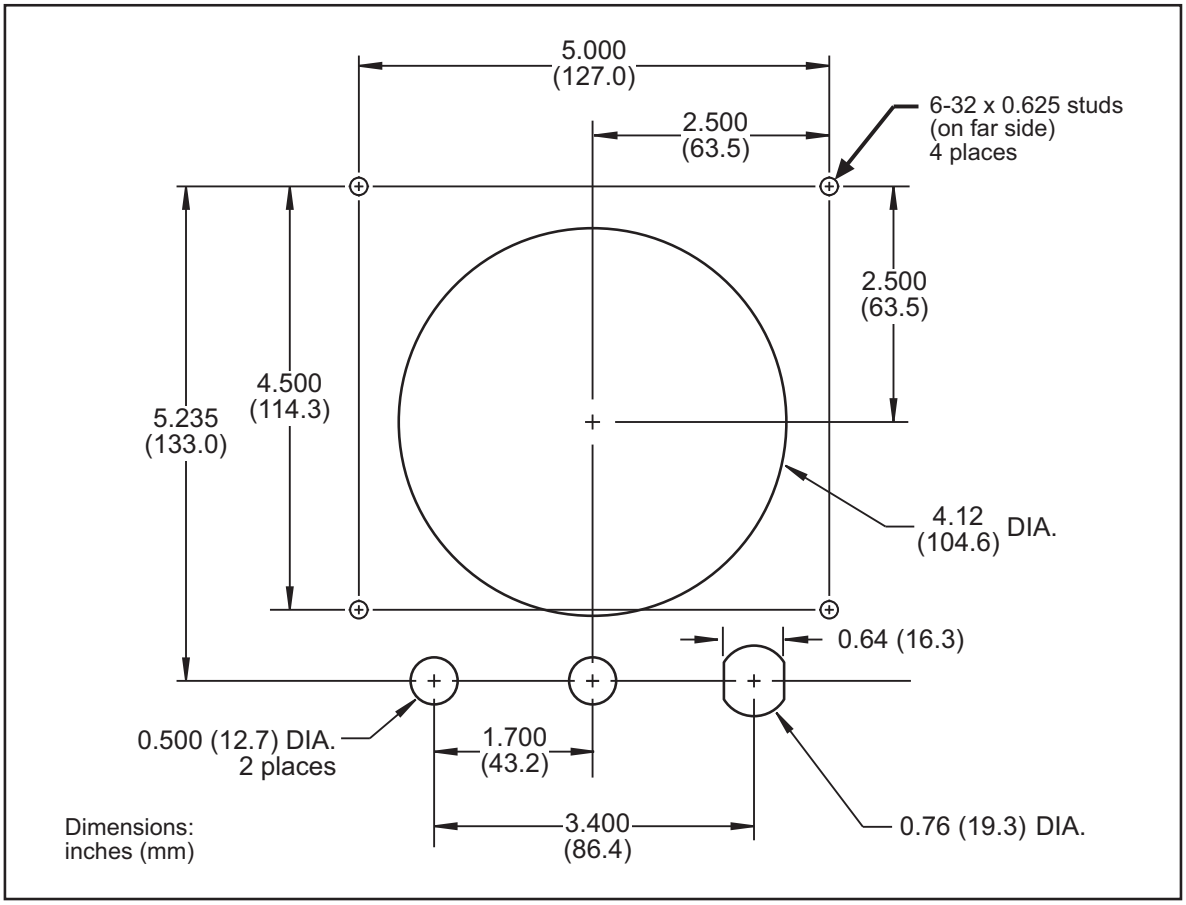


Figure 2-29. WPC 1000 Display Board Kit: Mounting and Cutout Dimensions

8. Install the Reset/Select button in the left cutout below the display. Wiring for the Reset/Select button is provided on the Settings key switch wiring harness (see step 10).
9. Install the Mute lamp in the center cutout. The Mute lamp includes wiring and a connector for attachment to the WPC 1000 Display board.
10. Install the Settings key switch in the right cutout. The Settings key switch includes a wiring harness with connectors for attachment to the Reset/Select button and the WPC 1000 Display board.
11. Slide the connector at the end of the yellow wire on one arm of the Settings key switch wiring harness over the topmost terminal on the switch body of the Reset/Select button, as shown in Figure 2-30, page 2-54.

    Slide the connector at the end of the two black wires on the same arm of the wiring harness over the lower terminal on the Reset/Select button switch body, as shown in Figure 2-30.

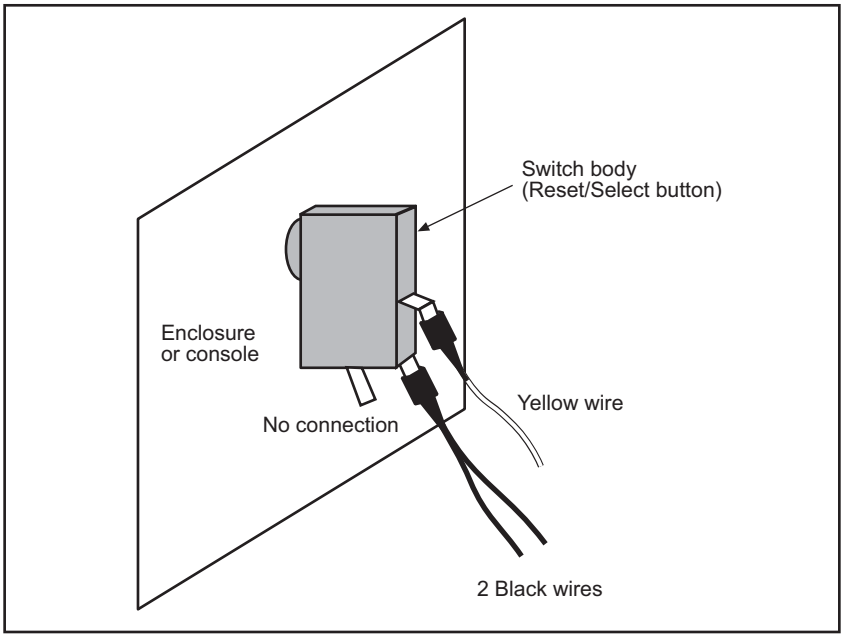


Figure 2-30. Reset/Select Button Wiring Connections

12. Plug the connector on the other arm of the Settings key switch wiring harness into J707 on the WPC 1000 Display board. Plug the connector terminating the mute lamp wiring into terminal block TB708 on the Display board. Table 2-15 summarizes these wiring connections.

Table 2-15. Reset Button, Settings Key Switch, and Mute Lamp Wiring Connections

Component	Connector on WPC 1000 Display Board
Reset button Settings key switch	J707
Mute lamp	TB708

13. Install the selector switches.

14. Wire each selector switch to the appropriate terminal block on the WPC 1000 Display board, referring to Table 2-14, page 2-51 and Figure 4 at the back of the manual for wiring connections

Installing the Display Cable

With your WPC 1000 mounting plate and panel mount display or display board kit, you should have received a 34-conductor shielded ribbon cable (10', 30', or 100') to connect the WPC 1000 Control board to the Display board. There is a connector already installed on one end of the cable. An extra connector is included for installation after the cable has been routed through the conduit.

NOTICE

CONNECT DISPLAY CABLE CORRECTLY AT BOTH ENDS

After you connect the cable at the display end, check to make sure that connections are correct at both Control and Display ends. If the display cable is plugged into the ribbon cable connectors incorrectly, your display may not work properly.

When wiring the ribbon cable to the extra connector, make sure that the orientation of the brown and tan wires at the edges of the cable is identical to the orientation of the wires attached to the installed connector (see Figure 2-31).

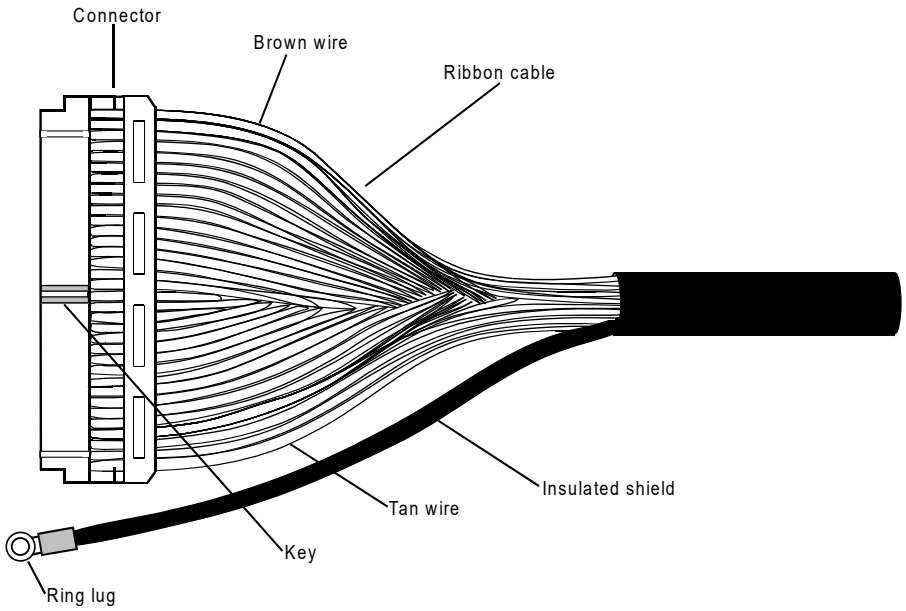


Figure 2-31. Display Cable Connector Pre-installed on Display End

To wire the ribbon cable to the extra connector and make connections at the WPC 1000 Control and Display boards, complete the steps in the following sections.

Running the Cable from the Control to the Display and Connecting on the Control Board

1. Run the end of the cable lacking a connector through flexible, liquid-tight conduit and through a knockout or other opening in the enclosure or console to the mounting location for the WPC 1000 display. Because WPC 1000 is rated NEMA 12 (protected against dust and oil), you must use conduit of the same rating and make proper connections to ensure NEMA 12 protection.
2. Leave enough cable inside the WPC 1000 enclosure to reach the 34-pin connector J104 on the WPC 1000 Control board (see Figure 2-11, page 2-20) and to allow for a service loop. Also, make sure that there is enough cable at the Display board end to reach J706.
3. Plug the ribbon cable connector into J104 on the WPC 1000 Control board.

NOTICE

The ribbon cable connector can be plugged into the J104 connector in only one direction. When inserting the connector, make sure to align the key in on the connector (see Figure 2-32) with the middle groove on the J104 connector. If the connector is not inserted correctly, the display will not work properly.

4. Connect the ring lug on the end of the insulated shield (see Figure 2-32) to the standoff beneath J104, using the hex nut that secures the board to the standoff.

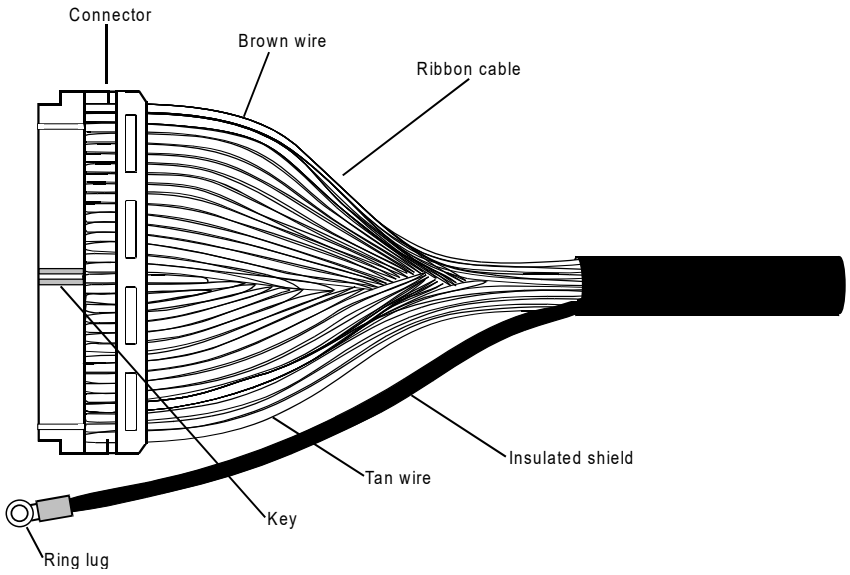


Figure 2-32. Ribbon Cable with Connector and Insulated Shield

Preparing Ribbon Cable for Installation of Connector

1. At the Display board end of the cable, look for the two parallel gray stripes stamped on the cable jacket every 18 in. (see Figure 2-33). These marks occur roughly at the midpoint of 3-inch-long sections of cable where the conductors are flattened for easy attachment to the

connector. Conductors in all other areas of the cable are twisted and cannot be attached to the connector.

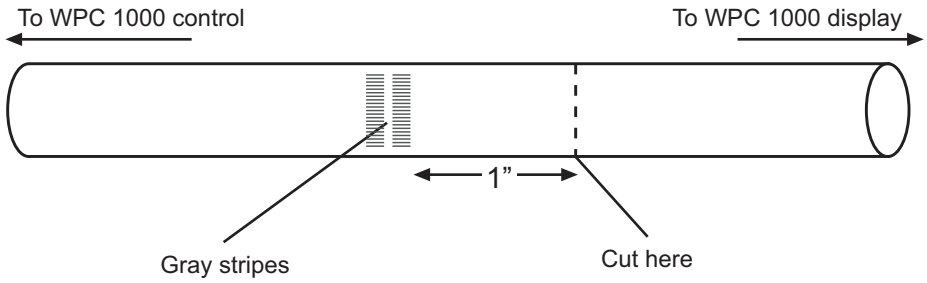


Figure 2-33. Display Cable with Gray Stripes Indicating Flat Area

2. Determine the striped marking that allows you enough cable to make a comfortable connection at J706 on the WPC 1000 Display board, then cut the cable about 1 in. away from this marking on the free end of the cable (see Figure 2-33).
3. Strip the black outer jacket from the end of the cable to expose about 4 in. of wiring, being careful not to cut through the braided shield.
4. Slide the braided shield over the foil-encased conductors toward the jacket until it bellies outward, then with your index finger pry a hole in the base of the shield at the edge of the jacket and draw the conductors through the hole until the shield wires have been completely separated from the conductors.
5. Remove the foil surrounding the conductors.
6. Pull gently on the braided shield, twisting individual wires as necessary, to straighten it and create a separate conductor (see Figure 2-34).

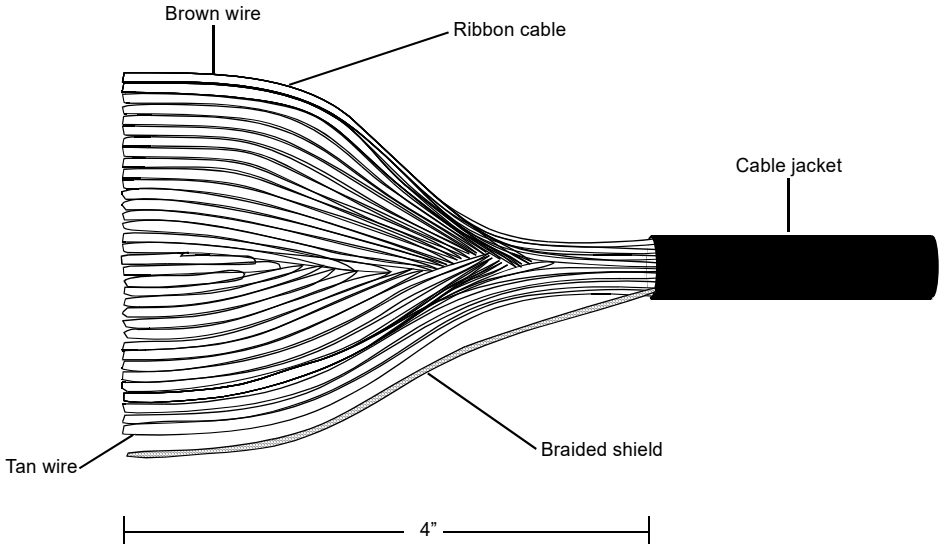


Figure 2-34. Display Cable Jacket with Ribbon Cable and Shield Exposed

7. Slide the black plastic shrink tubing that came with the cable over and along the shield until it reaches the cable jacket (see Figure 2-36, page 2-59). About 1/4 in. of braided shield should be exposed at the free end. Trim the tubing if necessary. Shrink the tubing around the shield, using a heat gun or blow drier.
8. Slide the ring lug that came with the cable over the exposed shield and sleeve until the shield is enclosed by the lug (see Figure 2-36, page 2-59). Crimp the lug and shield together, using a crimping tool. Test the connection by gently pulling the lug and insulated shield in opposite directions. The plastic sleeve covering the lug should enclose part of the shrink tubing.
9. Spread the ribbon cable conductors apart so they lie flat. Note that one edge of the exposed cable has a brown wire and the other edge has a tan wire.

Installing Connector on the Ribbon Cable

1. Locate the three components of the extra connector: the strain relief, connector top, and connector bottom–as shown in Figure 2-35.

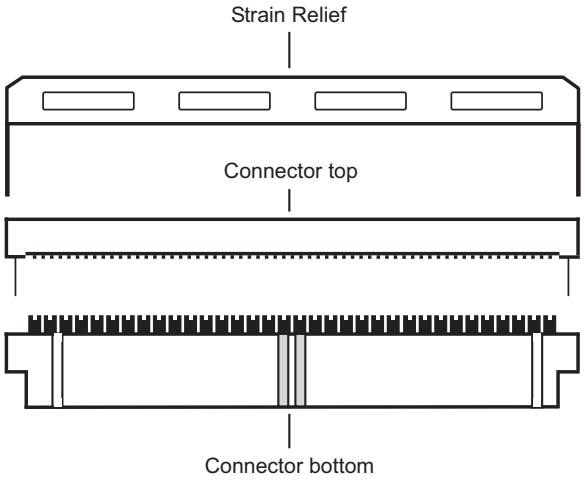


Figure 2-35. Ribbon Cable Connector Parts

2. Place the connector top, top down, on a flat surface with its recessed side facing the display cable, as shown in Figure 2-36. Remove the paper tape from the adhesive on its grooved section.

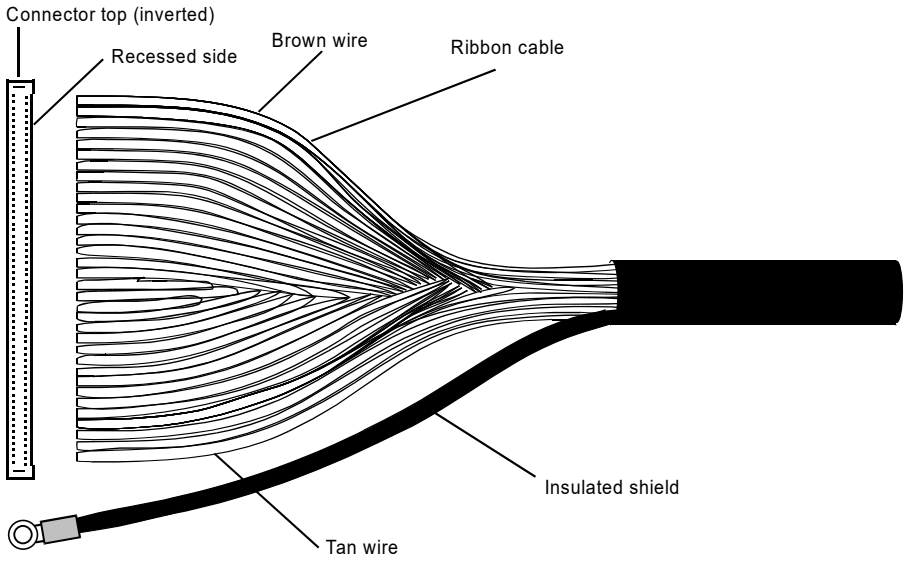


Figure 2-36. Connector Top with Ribbon Cable Conductors and Shield

3. Lay the end of the flattened ribbon cable over the grooved section in the connector top, as shown in Figure 2-37. The free end of the conductors should protrude beyond the flat side of the connector (you will trim the protruding ends in step 20). Make sure the edges of the ribbon cable stretch all the way to the edges of the grooves in the connector top.

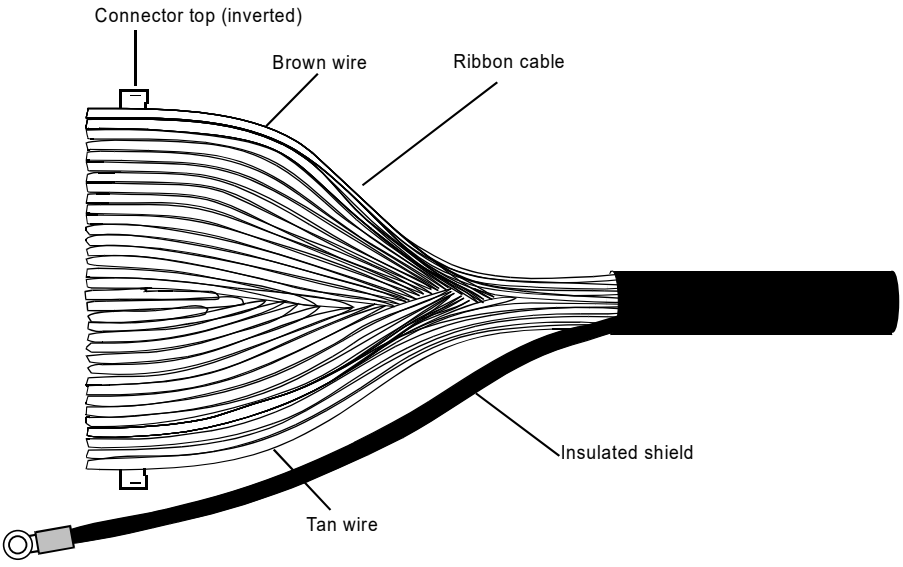


Figure 2-37. Ribbon Cable Conductors Being Laid on Connector Top

4. Invert the connector bottom, and with its keyed, grooved side facing the recessed side of the inverted connector top, slide its slotted ends down over the projections on the

connector top (see Figure 2-38); then, gently bring the V-connectors into contact with the ribbon cable conductors. Do not press the connector bottom into the connector top yet.

NOTICE

The edge of the ribbon cable with the brown wire should be positioned beneath the end of the connector bottom with the offset groove farthest from the edge of the connector bottom (see Figure 2-38). This orientation is identical to that of the ribbon cable on the connector that is already installed at the other end of the display cable.

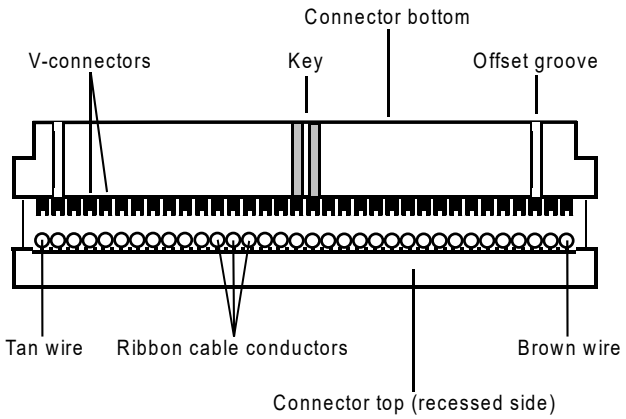


Figure 2-38. Connector Halves Brought Together

5. Check the alignment of connector top and bottom. The flat sides of both connector halves should face in the same direction; the keyed, grooved side of the connector bottom and the recessed side of the connector top should also face the same way.
6. Check the alignment and orientation of the ribbon cable with respect to the connector bottom. The wires of the cable should be centered in the vees of the forks on the connector bottom, and the brown wire at one edge of the cable should be positioned at the end of the connector with the groove inset farthest from the edge.
7. With a portable, bench-top vise (e.g., VacuVise, PanaVise, etc.), squeeze top and bottom of the connector together, using even force along the entire length of the connector, until there is no gap between the two halves. Do not use slip-joint or channel-lock pliers to crimp the connector halves.
8. Using a sharp Xacto knife, trim the extra ribbon cable protruding from the flat side of connector.

9. Fold the ribbon cable over the recessed side of the connector top. With the flat side of the strain relief facing the keyed side of the connector, slide the strain relief down over the grooves in the ends of the connector, and snap it into place (see Figure 2-39). The strain relief holds the ribbon cable against the connector top.

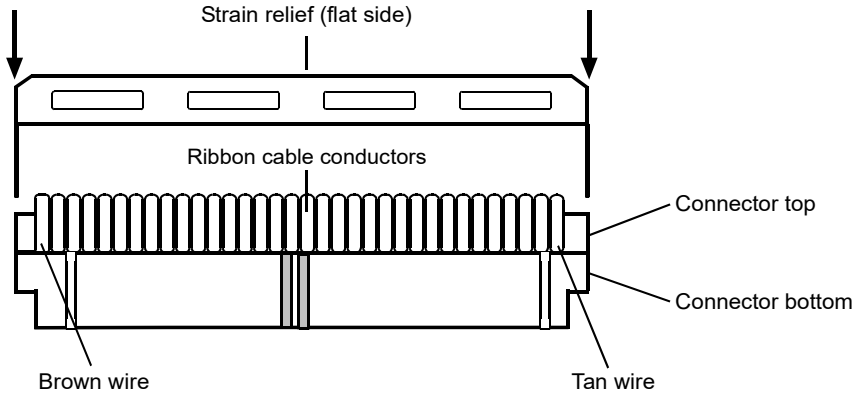


Figure 2-39. Strain Relief Installed on Connector

Plug Ribbon Cable into Display Board

1. Plug the completed ribbon cable connector assembly into J706 on the WPC 1000 Display board (see Figure 2-16, page 2-33). The connector must be inserted with the same orientation as the connector you plugged into J104 on the WPC 1000 Control board in *Running the Cable from the Control to the Display and Connecting on the Control Board*, page 2-56, step 3.

NOTICE

The ribbon cable connector can be plugged into the J706 connector in only one direction. When inserting the connector, make sure to align the connector's key with the middle groove on the J706 connector. The end of the ribbon cable connector with the brown wire must be positioned at the end of J706 labelled "1." If the connector is not inserted correctly, the display will not work properly.

2. Connect the ring lug on the end of the insulated shield (see Figure 2-37, page 2-59) to the standoff beneath J706, using the hex nut that secures the board to the standoff.

Installation Verification

⚠ DANGER

PERFORM INSTALLATION VERIFICATION BEFORE OPERATING PRESS

Complete Installation Verification procedures before operating the press.

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

NOTICE

ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH THE CONTROL BOARD

Connect all signal grounds through pins on the WPC 1000 Control board.

NOTICE

DISPLAY DOES NOT WORK

If the WPC 1000 display does not work properly, check to make sure that the display cable is connected correctly on both the Control and Display board ends, referring to *Installing the Display Cable*, page 2-55 for help. If the display still does not work, call Wintriss Tech. Support.

When you have completed all the installation procedures in this chapter, perform the following Installation Verification steps before setting up and initializing WPC 1000 as instructed in Chapter 3. When you have completed initialization and set-up procedures, be sure to perform the Final Checkout tests at the end of Chapter 3.

Checking Safeguarding Devices

⚠ DANGER

DO NOT USE NON-SAFETY INTERLOCK SWITCHES IN SAFETY APPLICATIONS

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

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

⚠ DANGER

PREVENT INJURY DURING TESTING

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

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

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

- All fixed safeguards prevent entry of a hand or other body part into the hazardous area.
- All moveable safeguards are correctly installed and wired to prevent operation of the press when they are open and prevent entry of a hand or other body part into the hazardous area.
- All interlock switches used with safeguards are designed and rated for use in safety applications. Check with the switch manufacturer to confirm their suitability for safety use.
- Interlock switches used for safeguarding are connected to control-reliable inputs.
- Any light curtains are installed 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 one is installed, with an opaque object. The press should stop immediately.
   - If the press stops, go to the next step.
   - If the press does not stop, check the wiring of the light curtain and correct any problems. Repeat the test. If the press still doesn't stop, call Wintriss Tech. Support.
2. Run the press in Inch mode. Keeping hands outside the guarded area, open one of the moveable guards just enough to open the interlock switch. The press should stop immediately.
   - If the press stops immediately when you open the guard, go to the next step.
   - If the press does not stop, check the wiring of the moveable guard and correct any problems. Repeat the test. If the press still doesn't stop, call Wintriss Tech. Support.
3. Close the guard you just tested, reset the press control, and repeat step 2 for each moveable guard. When you have tested all moveable guards, go to the next section.

Checking Dual Safety Valve (DSV) Wiring

> **⚠ WARNING**
>
> **PREVENT ELECTRIC SHOCK WHEN WORKING INSIDE THE ENCLOSURE**
>
> Turn off and disconnect power from the WPC 1000, the press and any other machinery it is connected to before working inside the enclosure. This includes power to the press motor.
>
> **Failure to comply with these instructions could result in death or serious injury.**

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

1. Power down the press and press control.
2. On the DSV/Lockout Relay board, which is installed in the lower right corner of the WPC 1000 Control board (see Figure 2-11, page 2-20), remove fuse F302 or F303. F302 and F303 are the DSV fuses.

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

Checking for Error Messages

To check for error messages, do the following:

1. Run the press in Inch for a few strokes.
   - If the press runs normally, go to the next section.
   - If a fault appears on the display, look up the fault code in Chapter 5, and follow the remedy provided. Once the problem is corrected, press the Reset/Select button, and run the press again in Inch for a few strokes, checking for error codes. If you need assistance, call Wintriss Tech. Support.

Checking the Emergency-stop Circuit

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

1. Run the press in Inch mode. While the ram is moving, have someone push the Emergency Stop button on the Operator Station. 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 wiring and correct any problems, then repeat 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.

Installation Verification Complete

The WPC 1000 Installation Verification procedure is complete. Clear any error message by pressing the Reset/Select button.

Wiring Tables

Table 2-16. WPC 1000 Control Board: TB101 and TB102 Wiring Connections

Corresponding LED Locations also shown

TB102 I/O (Top)

Pin	Signal	LED Grp. & #
24	Ground	
23	Ground	
22	Clutch Air Pressure Sw. Input –	6.4
21	Light Curtain Input 2 *	3.7
20	User Input 3A –	3.6
19	Remote Reset Input –	3.5
18	Motor Reverse Input +	3.4
17	Bar Actuator Input +	4.6
16	Foot Switch N/C Input +	4.5
15	User Input 2 +	4.4
14	Aux 1 Output	
13	Prior Act Lamp Output	

TB102 I/O (Bottom)

Pin	Signal	LED Grp. & #
48	+24 V	
47	+24 V	
46	Palm Switch N/C Input +	6.5
45	User Input 1 +	6.3
44	DSV Monitor Input +	6.2
43	Light Curtain 1 Enable	
42	E-stop Input 2 +	6.1
41	Top-stop Input 2 +	4.7
40	+24 V	
39	+24 V	
38	Top-stop String Center Loop Connection	
37	Top-stop String Drive Output	

TB101 I/O (Top)

Pin	Signal	LED Grp. & #
12	Ground	
11	Mute Lamp 2 Output	5.7
10	Counter Output	
9	Zero Cam Output	
8	Light Curtain Input 1 *	2.7
7	Overrun Limit Switch Input –	2.6
6	User Input 3B –	2.5
5	Prior Act Input +	2.4
4	One Hand Input +	2.3
3	Foot Switch N/O Input +	2.2
2	Palm Switch N/O Input +	2.1
1	Mute Lamp 1 Output	6.6

TB101 I/O (Bottom)

Pin	Signal	LED Grp. & #
36	+24 V	
35	Palm Time Lamp	
34	Chan 2 Output	
33	Chan 1 Output	
32	Motor Forward Input +	4.3
31	Bar Selector Switch Input +	4.2
30	Top-stop Input 1 +	4.1
29	E-stop Input 1 +	2.8
28	Ground	
27	Ground	
26	E-stop String Center Loop Connection	
25	E-stop String Drive Output.	

* Input polarity depends on setting (NPN or PNP) of Light Curtain Output Type jumper JP106 on the WPC 1000 Control board (see Figure 2-12, page 2-21).

Table 2-17. WPC 1000 Control Board: Resolver (TB103) Wiring Connections

CW (clockwise) rotation shown, viewing from shaft end.

For CCW, reverse black and yellow wires.

Pin #	Signal
55	Shield
54	S1 Sine (Black)
53	S2 Cosine (Green)
52	R1 drive (Red)
51	S3 ground (Yellow)
50	R2 ground (Orange)
49	S4 ground (Brown)

Table 2-18. WPC 1000 Control Board: DSV/Lockout Relay Board Wiring Connections

Terminal Block	Pin #	Signal
TB303	64	DSV A Relay
	63	DSV A Relay
TB302	62	DSV B Relay
	61	DSV B Relay
TB301	60	Lockout Relay OUT
	59	Lockout Relay OUT
	58	Lockout Relay IN

Table 2-19. WPC 1000 Control Board: Power (J103) Wiring Connections

Terminal Block	Pin #	Signal
J103	56	Com
	57	+24 Vdc

Table 2-20. WPC 1000 Display Board: Wiring Connections

Terminal Block	Pin #	Signal	LED Grp. & #
TB708		Mute Lamp	
J707		Reset Button Settings Key Switch	
TB705		Micro-inch key switch wiring	
	155	Gnd	
	156	Top-stop in Inch (Ground to Disable)	3.2
	157	WPC Input Micro-inch	3.1
TB 702		Mode Select key switch wiring	
	146	Gnd	
	147	Not used	
	148	Foot	1.4
	149	One-hand	1.3
TB 701		Stroke Select key switch wiring	
	141	Gnd	
	142	Continuous	1.6
	143	Single-stroke	1.5
	144	Inch	1.8
	145	Off	1.7

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 from the pinch point or hazardous area.

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

This chapter shows you how to initialize and set up your WPC 1000 and perform final checkout tests.

Viewing and Setting Press Parameters

The WPC 1000 allows you to view and, in some cases, to set up to ten press parameters, the number of items depending on the WPC 1000 display option you have ordered. On the standard WPC 1000 display, you can access the following items:

- Crankshaft angle or strokes per minute (SPM)
- Stopping time
- 90° stop time test result
- Stopping angle
- Top-stop angle
- Stop-time limit
- Auto carry-up angle
- Micro-inch time setting

The optional counter and crank angle display provides "Counter" and "Counter Preset" items in addition to the parameters shown on the standard display.

To select a parameter so you can view or adjust its setting, press the Reset/Select button on the WPC 1000 display until the indicator segment for that parameter is illuminated. The value of the parameter appears in the digital LED readout. Locations of the indicator segments on the WPC 1000 display are shown in Figure 3-1.

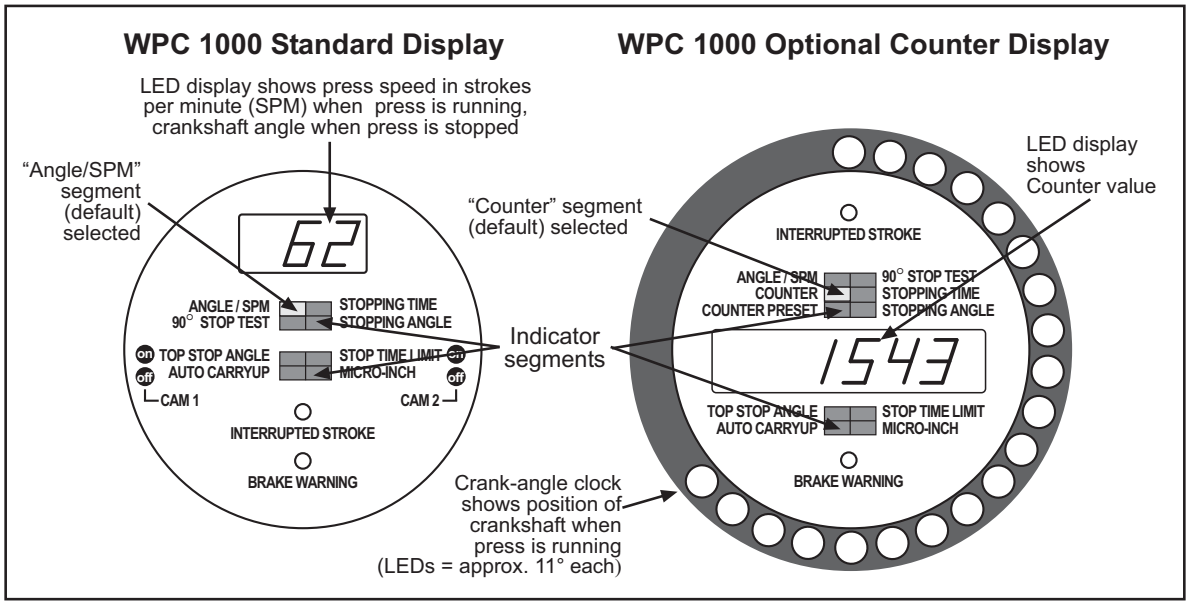


Figure 3-1. WPC 1000 Displays Showing Indicator Segments

Each time you press the Reset/Select button, the next indicator segment in the sequence is illuminated. To illuminate the group of four indicator segments in the lower half of the display, you must switch the press to Inch mode.

On the WPC 1000 standard display, the "Angle/SPM" segment is the default. Whenever you change operating mode (e.g., Inch, Single-stroke, Continuous), "Angle/SPM" becomes the active (i.e., illuminated) segment. The parameter displayed in the digital LED readout when the "Angle/SPM" segment is selected depends on the Stroke Select setting, as shown in Table 3-1. When the press is stopped and "Angle/SPM" is selected, the crankshaft angle is displayed for all Stroke Select settings.

Table 3-1. WPC 1000 Standard Display Default Parameters (Press Running)

Stroke Select Setting	Parameter Shown in Digital LED Display
Inch	Crankshaft angle (in degrees)
Single-stroke	Crankshaft angle (in degrees)
Continuous	Press speed (in strokes per minute)

If you have the optional counter display, "Angle/SPM" is the default when the press is in Inch mode, but the default switches to the "Counter" segment in Single-stroke and Continuous. Parameters displayed by default in the digital LED readout are shown in Table 3-2, page 3-3.

Table 3-2. WPC 1000 Optional Counter Display Default Parameters (Press Running)

Stroke Select Setting	Parameter Shown in Digital LED Display
Inch	Crankshaft angle (in degrees) *
Single-stroke	Parts count
Continuous	Parts count

* The Counter does not operate in Inch mode.

When the default indicator segment is selected, the crank-angle clock shows the crankshaft angle of the press in all Stroke Select settings. Each LED on the clock represents approximately 11°. The crank-angle clock shows the press Stopping Angle, Top-stop Angle, and Auto Carry-up Angle when those indicator segments are illuminated.

Initializing the System

⚠ DANGER

INCORRECT STOP-TIME LIMIT AFTER INITIALIZATION

Determine the Stopping Time and set the Stop-time Limit to a value that reflects the actual Stopping Time of your press whenever you initialize WPC 1000. Use the stop time measured in the 90° stop time test to calculate the safety distance. When you initialize WPC 1000, the Stop-time Limit is returned to its factory setting of 500 mS.

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

NOTICE

To initialize only the Start-time Limit, see page 3-5.

After you have completed installation of WPC 1000 and run the Installation Verification tests, you should first initialize the WPC 1000 system. To do so, perform the following steps:

1. Verify that your press is at top dead center (TDC), using a dial indicator or other means. TDC is considered to be any position between 358° and 2°. Inch the press to TDC if necessary.
2. Turn off power to the WPC 1000.
3. Turn the WPC Settings key switch to its "+" setting (i.e., counterclockwise) and turn power to the WPC 1000 back on. When the message "Int" appears in the LED display (see Figure 3-2, page 3-4), release the key.

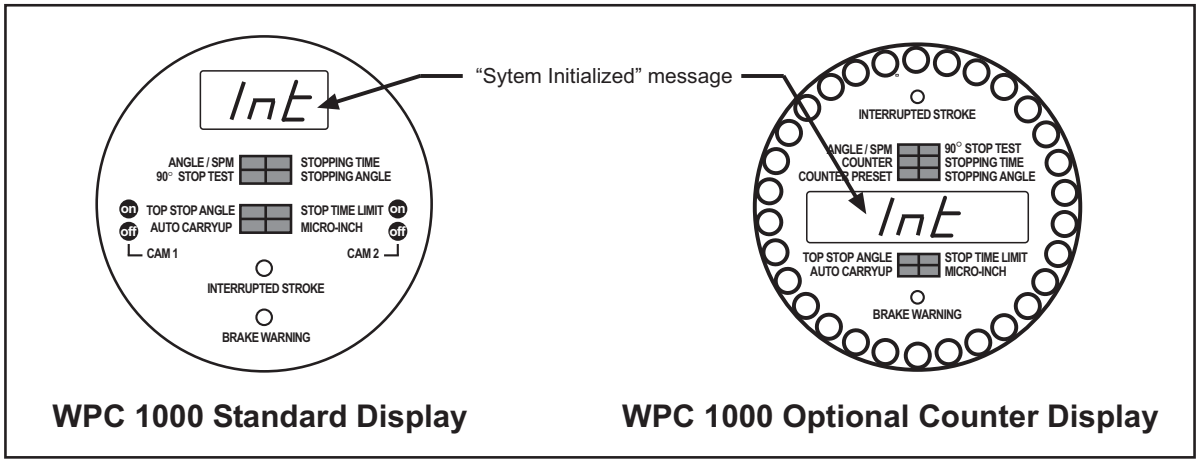


Figure 3-2. WPC 1000 Displays Showing "System Initialized" ("Int") Message

This procedure returns the following WPC 1000 parameters to their factory settings:

- Stop-time Limit–Set to 500 milliseconds. When you begin operating your press, you must adjust this setting (see *Setting the Stop-time Limit*, page 3-17).
- Start-time Limit–Set to two times the Start Time measured by WPC 1000 on the first stroke after the system has been initialized. The Start Time is the interval between the closing (turning on) of the output relays on the DSV/Lockout Relay board, which provides the signal for the Dual Safety Valve (DSV) to energize, and the resolver signal, which indicates that the crankshaft has begun to turn. The greater part of this interval is the time it takes for the clutch mechanism to activate and engage.

  The Start-time Limit allows WPC 1000 to detect resolver drive failure. When the measured Start Time exceeds the Start-time Limit, WPC 1000 sends a Stop signal to the press and displays fault code F79 (see *Loss of Rotation*, page 5-15).

  There are times when you may need to initialize only the Start-time Limit, such as during troubleshooting (see page 3-5 for instructions).
- Resolver Zero Setting–Set to zero.

Re-zeroing the Resolver

If you need to zero the resolver without re-initializing the Start-time and Stop-time limits, follow these steps:

1. Verify that your press is at top dead center (TDC), using a dial indicator or other means. TDC is considered to be any position between 358° and 2°. Inch the press to TDC if necessary.
2. Turn off power to the WPC 1000.
3. Press and hold the Reset/Select button and turn power to the WPC 1000 back on. When the message "rES" appears in the LED display (see Figure 3-3, page 3-5), release the key.

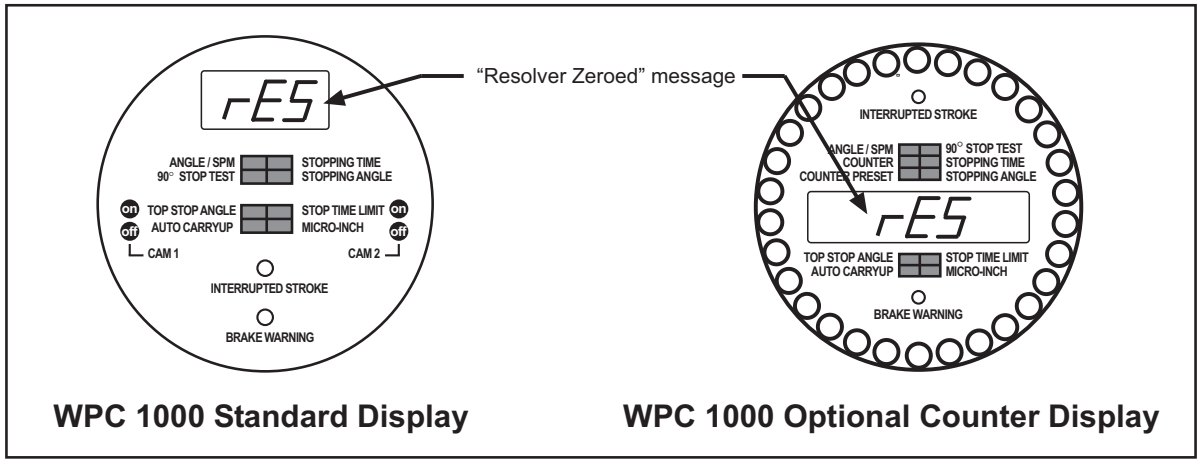


Figure 3-3. WPC 1000 Displays Showing "Resolver Zeroed" ("rES") Message

When you use this procedure to zero the resolver, WPC 1000 electronically adds or subtracts any offset between the resolver and the crankshaft, so the resolver always knows the true zero position of the ram. After zeroing, if the press is at TDC, the crank angle value in the LED display should read 0°. If it does not, repeat the zeroing process.

Initializing Only the Start-time Limit

NOTICE

The Start-time Limit value cannot be changed manually.

If you want to re-initialize only the Start-time Limit without re-initializing the Stop-time Limit and Resolver Zero settings (see *Initializing the System*, page 3-3), do the following:

1. Power down WPC 1000.
2. While powering WPC 1000 back up, turn the WPC Settings key switch to "–" (i.e., clockwise) and hold it there. When "Str" appears in the LED display (see Figure 3-4, page 3-6), release the key.

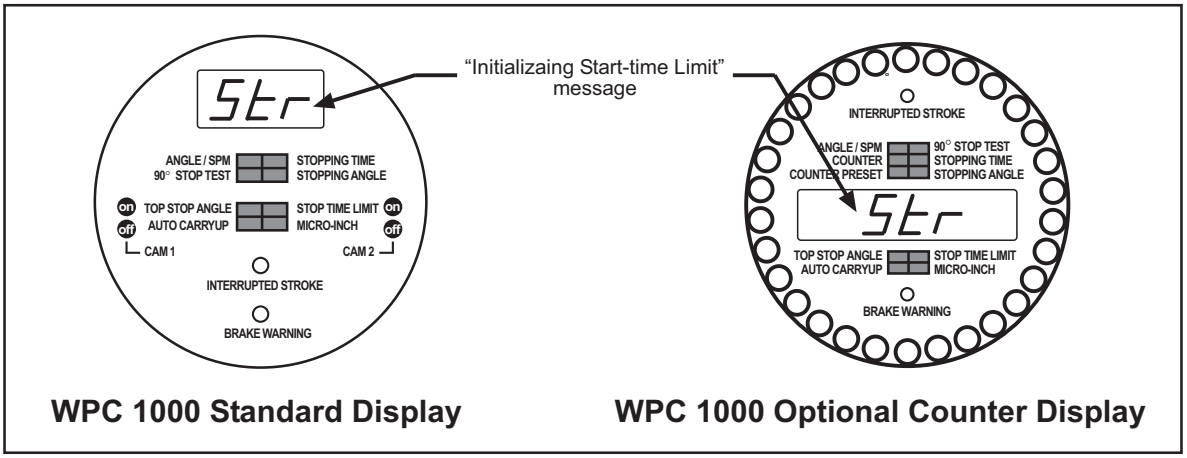


Figure 3-4. WPC 1000 Displays Showing "Initializing Start-time Limit" ("Str") Message

The next time you start the press, WPC 1000 will set the Start-time Limit to twice the Start Time measured on the first stroke. This value cannot be changed manually.

Viewing the Start-time Limit

To view the Start-time Limit, do the following:

1. Press the Reset/Select button repeatedly, until the "Stopping Angle" indicator segment illuminates.
2. Turn the WPC Settings key switch to "–" (i.e., clockwise). The Start-time Limit in milliseconds is shown in the LED display.

Viewing the Last Start Time

To view the Start Time measured the last time you started your press, do the following:

1. Press the Reset/Select button repeatedly until the "Stopping Angle" indicator segment illuminates.
2. Turn the WPC Settings key switch to "+" (i.e., counterclockwise). The Start Time in milliseconds that was measured the last time you started the press is shown in the LED display.

Installing the Overrun Sensor Magnet

⚠ WARNING

INCORRECT INSTALLATION OF OVERRUN LIMIT SWITCH

Ensure that the overrun sensor magnet is installed at a proper location if you have Two-hand Control without light curtains, or light curtains with muting. Proper installation of the magnet ensures that if the Top-stop output relay fails, a hazardous situation will not occur on the downstroke. The magnet must be mounted as close as possible to the Top-stop "On" Angle (see Table 3-3, page 3-9).

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

This section shows you how to install the magnet that, with the overrun sensor, makes up the overrun limit switch. You should already have installed the overrun sensor (see page 2-25). The overrun limit switch enables WPC 1000 to monitor operation of the resolver and to stop the press whenever the resolver fails to work properly.

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

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

Setting the Top-stop "On" Angle

NOTICE

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

NOTICE

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

- The press ram has been mechanically set to top dead center (TDC) (see NOTICE on page 2-2)
- The resolver has been aligned as close as possible to TDC (i.e., 0° ±2°) (see *Mounting the Resolver*, page 2-23)
- The resolver has been zeroed (see page 3-4)

To determine the angle at which the Top-stop command is given on your press and change the Top-stop "On" Angle setting on the WPC 1000 display, do the following:

1. Make sure the following WPC 1000 features are set correctly:
   - Option switches 1 and 2 on switch block S101 on the WPC 1000 Control board should be set to OFF so that any Top-stop "On" Angle between 211° and 355° can be set on the WPC 1000 display. See Figure 2-11, page 2-20 for location of the switch block and *Switches 1 and 2 – Top-stop "On" Angle Range*, page 3-27 for instructions on how to set the switches.
   - Pin #156 on the WPC 1000 Display board (see Figure 2-16, page 2-33) should not be wired so that Top-stop in Inch is enabled (see *Top-stop Bypass (Top-stop in Inch Disabled)*, page 4-8).
   - Micro-inch (if you have wired this feature) should be disabled (see *Wiring Micro-inch*, page 2-32).
   - Option switch 4 on switch block S101 should be set to OFF to disable the Auto Compensated Top Stop (ACTS) feature (see *Switch 4 – Enabling Auto Compensated Top Stop (ACTS)*, page 3-29). ACTS compensates for increases in press speed by adjusting the Top-stop "On" Angle backward (i.e., decreasing the "on" angle).
2. Power down, then power up the WPC 1000 to enable the new settings.
3. Clear the "Loc" message on the WPC 1000 display by turning the Stroke Select switch to OFF, then to INCH.

> **NOTICE**
>
> If you have a variable-speed press, set the press to the slowest production speed, but not slower than 6 SPM.

4. With the press in Inch mode, press the Reset/Select button until the "Top Stop Angle" indicator is lit.

> **NOTICE**
>
> The Top-stop "On" Angle is set at the factory to 211°. If you haven't changed the default setting, you can skip step 5.

5. Temporarily set the Top-stop "On" Angle to 211°, using the WPC Settings key switch. Turning the key to "+" (counterclockwise) increases the angle; turning the key to "–" (clockwise) decreases the angle.
6. Press the Reset/Display button repeatedly until the "Angle/SPM" indicator is lit. This action saves your Top-stop "On" Angle setting.
7. With the press still in Inch mode and the main motor on, press and hold both Run/Inch palm buttons until the press top-stops.
8. Note the crankshaft angle shown in the LED display. Subtract the displayed value from 360°, then add the result to the default 211° Top-stop "On" Angle setting. This is your calculated Top-stop "On" Angle.

EXAMPLE

If the displayed Top-stop "On" Angle is 287°, you would calculate as follows:

360° - 287° = 73°
211° + 73° = 284°

You would set your Top-stop "On" Angle to 284°.

> **NOTICE**
>
> **WHEN DETERMINING TOP-STOP "ON" ANGLE**
>
> Remember that the Top-stop angle has an internal dwell of 20°. The internal Top-stop timing turns off 20° after the Top-stop angle that you set. This internal Top-stop timing must turn off 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 display (see *Top-stop and Overrun Setting Faults*, page 5-16).

9. Select the "Top Stop Angle" indicator, and set the Top-stop "On" Angle to the value you calculated in step 8.
10. Save the new Top-stop "On" Angle setting by pressing the Reset/Select button until the "Angle/SPM" indicator is lit.
11. Determine the angle at which to install the overrun sensor magnet, referring to Table 3-3, below.

    First, locate the cell in the "Top-stop Angle" row displaying the range of angles within which your calculated Top-stop "On" Angle falls; then, move down one row in that column to find the mounting angle for the overrun sensor magnet. If you wish, you can use the "Your Settings" column in the second row to record the correct mounting angle.

Table 3-3. Overrun Sensor Magnet Location and Option Switch Settings

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

Example

You calculated in step 8 that your Top-stop "On" Angle is 284°, which falls in the 271° to 300° column in Table 3-3. The correct mounting angle for the overrun sensor magnet would be 330°. See Figure 3-5, page 3-10.

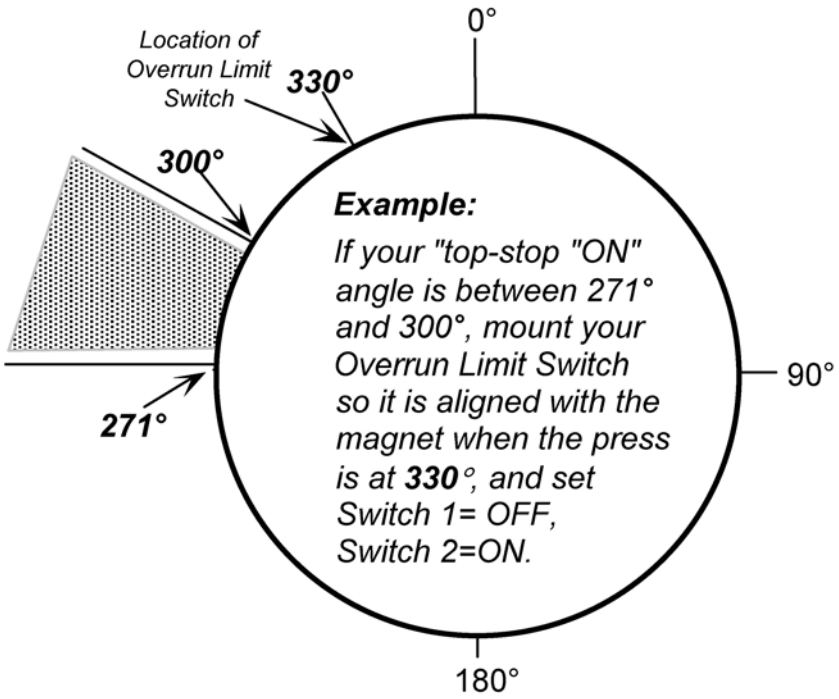


Figure 3-5. Setting Overrun Timing: Example

12. Determine the option switch 1 and 2 settings required for your calculated Top-stop "On" Angle, referring to Table 3-3. WPC 1000 uses these settings to determine at what angle to begin the overrun sensor closure test, which is used to make sure that the overrun limit switch closes at the same angle on every stroke.

    Move down from the cell in which the correct magnet mounting angle falls (see step 11) to find the correct switch settings in last two rows of the table. If you wish, you can use the "Your Settings" column in those rows to record those settings.

    Example

    You calculated in step 8 that your Top-stop "On" Angle is 284°, which falls in the 271° to 300° column in Table 3-3. The correct switch settings would be OFF for switch 1 and ON for switch 2. See Figure 3-5.

13. Set option switches 1 and 2 on S101 on the WPC 1000 Control board to the positions you determined in step 12, referring to *Switches 1 and 2 – Top-stop "On" Angle Range*, page 3-27 for instructions.

14. If you are using the Auto Compensated Top Stop feature, return switch 4 on S101 to its ON setting to enable it (see step 1).

15. Power down, then power back up the WPC 1000 to enable the new option switch settings.

Mounting the Overrun Sensor Magnet

To mount the overrun sensor magnet, perform the following steps:

1. With the press in Inch mode, press the Run/Inch palm buttons until you have inched the press to the overrun sensor magnet position you determined in step 11 of the previous procedure.
2. Using double-sided foam tape or other means, temporarily install the magnet directly beneath the overrun sensor, referring to *Mounting the Overrun Sensor Switch*, page 2-26.
3. Check to make sure that the "Overrun Limit Switch input" LED (#6) in LED Group 2 on the WPC 1000 Control board is lit, referring to the LED map in Figure 3-14, page 3-36 for location. This LED illuminates when the overrun magnetic switch senses the magnet.

> **NOTICE**
>
> Make sure that the overrun limit switch has enough dwell to provide an adequate signal at high speeds. Optimally, the magnet should actuate the switch for 15° to 25°. The larger the diameter of the shaft on which the magnet is mounted, the shorter the dwell (see Figure 2-14, page 2-26). The ideal shaft diameter is 4 to 6 in.

4. Run the press in Inch mode for about 4 strokes, viewing the overrun sensor's On/Off angles on each stroke. To display the On/Off angles, press the Reset/Select button until the "Stopping Time" indicator is illuminated, then turn the WPC Settings key switch to "+" to view the "on" angle and to "–" to view the "off" angle (see Figure 3-6).

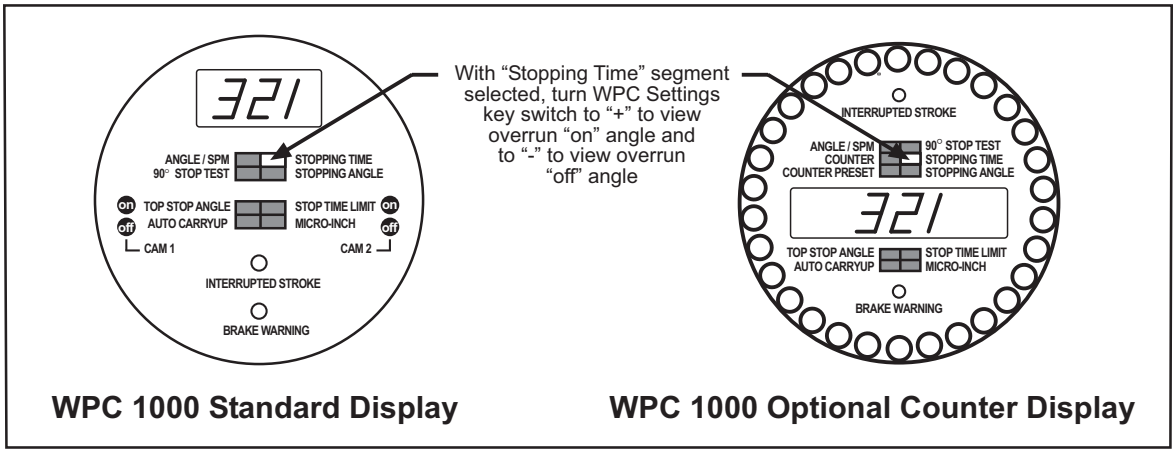


Figure 3-6. WPC 1000 Displays Showing Overrun Sensor "On" Angle

Example

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

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

   If the press cycles in every mode without a fault, go to step 6.

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

- If a fault occurs on the first stroke after you install the magnet, press the Reset/Select button and execute another stroke.
- If the fault code is between F80 and F89 (or H80 through H89), there a problem with the overrun sensor. Re-check your installation of the magnetic switch (see page 2-25) and the magnet (see step 2) and your settings for option switches 1 and 2 (see steps 12 and 13 of the *Setting the Top-stop "On" Angle* procedure, page 3-10), then press the Reset/Select button and run the press again for a few strokes. If the press stops and the same error code displays, call Wintriss Tech. Support.
- If another fault code displays, look up the fault in Chapter 5 and follow the suggested remedy. After correcting the problem, press the Reset/Select button and run the press again for a few strokes, checking for faults. If you need assistance, contact Wintriss Tech. Support.

⚠ WARNING

INJURY FROM MAGNETS THAT DETACH

Mount the magnets with the brass screws provided. Plastic screws or adhesive could fail, causing the magnets to become dangerous projectiles, especially on high-speed presses.

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

NOTICE

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

6. Permanently install the magnet in the position in which you temporarily mounted it in step 2. Drill and tap a hole, using a No. 36 drill and 6-32 tap. Mount the magnet, plastic side up, with the 6-32 brass screw provided.

Adjusting the Top-stop Angle

⚠ DANGER

INCORRECT OVERRUN SENSOR ANGLE AFTER RESETTING TOP-STOP ANGLE

Re-check the overrun sensor angle setting whenever you change the Top-stop angle, and reset the overrun sensor setting if necessary.

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

In addition to setting the Top-stop "On" Angle preparatory to mounting the overrun sensor magnet (see *Setting the Top-stop "On" Angle*, page 3-7), you can periodically adjust the Top-stop angle to ensure that your press stops at top dead center. Each time you adjust the Top-stop angle, you must verify that your overrun sensor is still set properly. To adjust the Top-stop "On" Angle, do the following:

1. Determine how many degrees you need to increase or decrease the Top-stop angle.
   - If the press top-stops after 0°, you should increase the Top-stop angle by the number of degrees beyond 0° that the ram stops at the slowest press operating speed.
   - If the press top-stops before 0°, you should decrease the Top-stop angle by the number of degrees before 0° that the ram stops at the slowest press operating speed.
2. Install the heaviest upper die in your press. Adjust the counterbalance for ram weight (if the press has a counterbalance).
3. With WPC 1000 powered up and the press in Inch mode, press the Reset/Select button repeatedly until the "Top Stop Angle" indicator is lit.
4. Set the Top-stop "On" Angle you determined in step 1, using the WPC Settings key switch. Turning the key to "+" (counterclockwise) increases the angle; turning the key to "–" (clockwise) decreases the angle.
5. Run the press in Continuous mode by turning the Mode Select switch to "CONT," checking the press speed shown in the LED display.

   If your press does not run in Continuous, initiate a stroke with the Mode Select switch set to "SINGLE."
6. When the press reaches normal operating speed in Continuous or the Auto Carry-up Angle is passed in Single-stroke, Top-stop the press. Note the crankshaft angle shown in the LED display.

   If the Top-stop angle is 0° ±2°, go to step 7.

   If the Top-stop angle is more than 2° beyond 0°, repeat steps 3 through 6 until the press top-stops at 0° ±2°.

> **NOTICE**
>
> **CHECK OVERRUN SENSOR SETTING WHEN YOU CHANGE TOP-STOP ANGLE**
>
> Check and reset the overrun sensor angle when you reset the Top-stop angle. Remember that the Top-stop angle has an internal dwell of 20°. The internal Top-stop timing turns off 20° after the Top-stop angle that you set. This internal Top-stop timing must turn off before the overrun sensor turns on. If the Top-stop timing and the overrun sensor are "on" simultaneously, an "80 series" error code will display (see page 5-16).

7. Repeat step 6 at least five times to make sure that the press top-stops at 0° ±2°.

Setting the Auto Carry-up Angle

⚠ DANGER

INCORRECT AUTO CARRY-UP ANGLE

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

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

⚠ WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE THE ENCLOSURE

Turn off and disconnect power from WPC 1000 clutch/brake control, the press and any other machinery it is connected to before working inside the enclosure. This includes power to the press motor.

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

NOTICE

The following Auto Carry-up function also applies to Foot Control. For more information about using Foot Control for Single Stroke mode, see *Single-stroke, Foot Operation*, page 4-14 and *Enabling Foot Control in a Foot Switch*, page 3-28.

WPC 1000's Auto Carry-up feature (also called Operator Station Mute) enables the press to complete a stroke whenever the operator releases the Run/Inch palm buttons after the ram has passed the Auto Carry-up Angle.

The Auto Carry-up Angle is factory-set to 149° if your WPC 1000 has light curtain firmware, to 170° if you have non-light curtain firmware. If you change the auto carry-up default setting, you must use an angle value that is at or past the crankshaft angle at which the pinch point openings on the press have closed to less than 1/4 in. (6 mm). Pinch points that are less than 1/4 in. (6 mm) are considered non-hazardous to the operator.

With large presses where the stroke is long and press speed is slow, you must ensure that the operator cannot release the buttons and reach the pinch point before it closes. This applies only when Two-hand Control is used to safeguard the point of operation (without light curtain) and only if any opening allowing access to the pinch point is 1/4 in. (6 mm) or larger.

Set the Auto Carry-up Angle at the correct value to protect the operator. To do so, perform the following steps:

1. Set option switch 7 on switch block S101 on the WPC 1000 Control board to OFF to enable changes to the Auto Carry-up Angle (see *Switch 7 – Disabling Access to Stop-time Limit and Auto Carry-up Angle Settings*, page 3-31).
2. Power down, then power up the WPC 1000 to enable this settings change.

3. With the press in Inch mode, press the Reset/Select button repeatedly until the "Auto Carryup" indicator is lit.
4. Adjust the Auto Carry-up Angle by turning the WPC Settings key switch to "+" (counterclockwise) to increase the value or to "–" (clockwise) to decrease the value.
5. When the value you want is shown in the LED display, save your setting by pressing the Reset/Select button until the "Angle/SPM" indicator is lit.
6. Set option switch 7 to ON to disable changes to the Auto Carry-up Angle (see step 1).
7. Power down WPC 1000, then power the unit back up to enable the new setting.

Running Brake Monitor Tests and Making Settings

⚠ DANGER

INCORRECT STOP-TIME LIMIT

Determine the Stopping Time and set the Stop-time Limit at a value that reflects 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 1000's built-in brake monitor constantly checks the condition of the brake by measuring the Stopping Time each time the press top-stops. Stopping time is the amount of time in milliseconds that it takes the crankshaft to stop once the Dual Safety Valve (DSV) has been de-energized. When the "Stopping Time" indicator is lit, the Stopping Time of the press on the most recent stroke is shown in the LED display.

The Stop-time Limit is a setting used by the brake monitor to determine when the press needs to be stopped to alert the operator to the need for brake repair. The Stop-time Limit is factory-set to 500 milliseconds.

Determining the Stopping Time of Your Press

First, you need to determine the Stopping Time of your press at Top-stop. To do so, perform the following steps:

1. Install the heaviest upper die in your press. Adjust the counterbalance for ram weight (if the press has a counterbalance).
2. Turn power on to the WPC 1000, and observe the current crankshaft angle shown in the LED display.
3. Run the press in Continuous mode by turning the Mode Select switch to "CONT," and check the press speed shown in the LED display. If you have the optional counter display, you will have to select the "Angle/SPM" indicator segment, using the Reset/Select button.

   If your press does not run in Continuous, initiate a stroke with the Mode Select switch set to "SINGLE."

4. When the press reaches normal operating speed in Continuous or the Auto Carry-up Angle is passed in Single-stroke, Top-stop the press.
5. Press the Reset/Select button repeatedly until the "Stopping Time" indicator becomes lit.
6. Observe the reading in the LED display. This is the Stopping Time of your press in milliseconds.
7. Run this test at least five more times, recording the highest test reading. This is the Stopping Time value you use to set the Stop-time Limit.

Calculating the Stop-time Limit

Once you know the actual Stopping Time of your press at Top-stop, you can calculate the Stop-time Limit, the setting WPC 1000 uses to determine when to alert the operator to the need for brake service. The Stop-time Limit is calculated by adding a percentage factor, abbreviated "Tbm" (i.e., Time, brake monitor), to the Stopping Time.

stop-time limit = stopping time + Tbm

The Tbm value represents normal wear on the brake and ensures that WPC 1000 does not stop the press for small increases in Stopping Time. The minimum value that you can set is 10 mS.

NOTICE

STOP-TIME LIMIT ADJUSTMENT: ADD 10% FOR OLD BRAKES, 20% FOR NEW BRAKES

The rule of thumb for calculating the Stop-time Limit is to add 20% to the Stopping Time of your press if your brakes are new, 10% if your brakes are old. The reasoning is that since Stopping Time should be shorter with new brakes, the 20% value should yield roughly the same Stop-time Limit for new brakes as the 10% value yields for old brakes.

Stop-time Limit Calculation Examples

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

Take 10% of 207 (0.10 x 207 = 20.7; round it up to 21)

Add 21 to 207 (207 + 21 = 228)

228 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 (0.20 x 175 = 35)

Add 35 to 175 (175 + 35 = 210)

210 mS is the calculated stop-time limit.

Setting the Stop-time Limit

⚠ DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Determine and enter the correct Stop-time Limit when you set up your WPC 1000.
- Perform a 90° Stop Test any time you change the Stop-time Limit of WPC 1000. (See *Determining the 90° Stop Time*, page 3-18.) 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 3-20).

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

To set the Stop-time Limit, do the following:

1. With power on to the WPC 1000 and the press in "Inch" mode, press the Reset/Select button repeatedly until the "Stop Time Limit" indicator becomes lit. The LED display shows the last Stop-time Limit you set or, if you have not previously set the Stop-time Limit, it shows the factory setting of 500 mS.

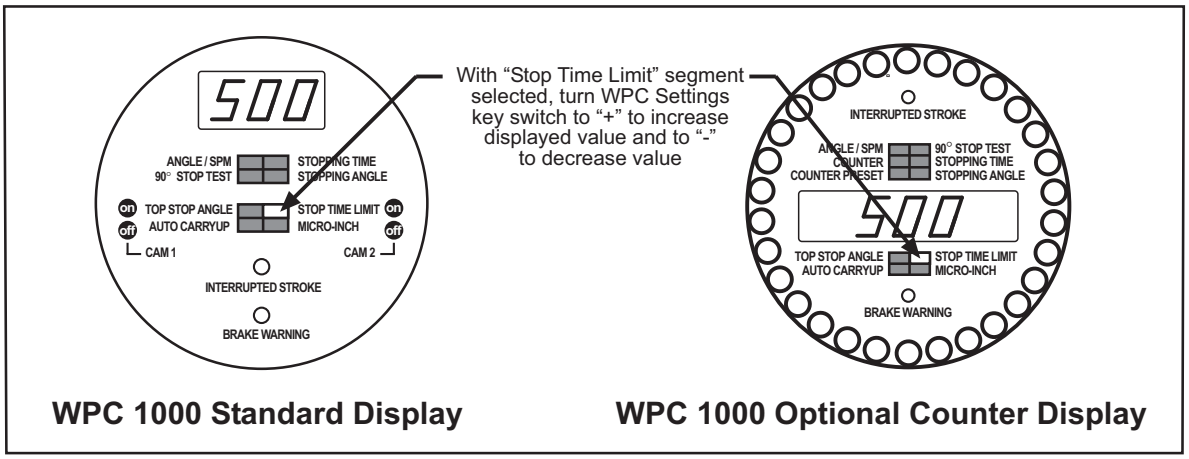


Figure 3-7. WPC 1000 Displays Showing Stop-time Limit Value

2. Adjust the Stop-time Limit by turning the WPC Settings key switch to "+" (counterclockwise) to increase the value or to "–" (clockwise) to decrease the value. The Stop-time Limit setting increases or decreases in 10 mS increments.
3. When the value you want is shown in the LED display, save your setting by pressing the Reset/Select button until the "Angle/SPM" indicator is lit.

Determining the 90° Stop Time

The 90° stop-time test is required to set the proper safety distance for personnel guarding devices including light curtains, Two-hand controls, and type-B movable barriers. The test is performed at the press's most critical stopping point– 90°– and provides the Ts + Tc value in the ANSI safety distance formula. If possible, run this test in Continuous mode (see next section). If your press does not have a Continuous setting, perform the test in Single-stroke as instructed in *Performing the 90° Stop Test (Single-stroke Mode)*, page 3-19.

Performing the 90° Stop Test (Continuous Mode)

⚠ DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the Stop-time Limit of WPC 1000.
- 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 3-20).

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

1. Install the heaviest upper die in your press. Adjust the counterbalance for ram weight, if your press has a counterbalance.
2. Set the Stroke Select switch to "CONT," and start the press.
3. Press the Reset/Select button repeatedly until the "90° Stop Test" indicator becomes lit (see Figure 3-8).

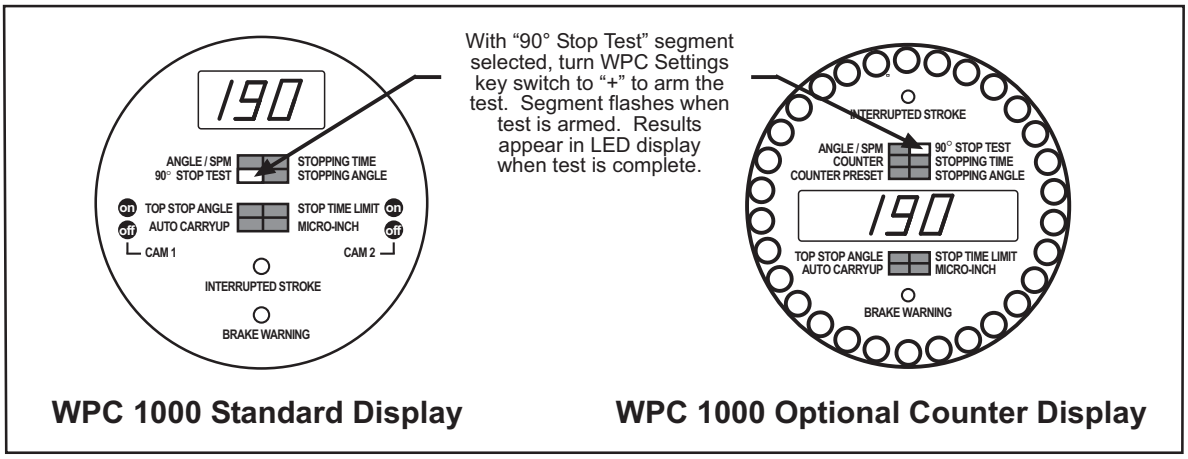


Figure 3-8. WPC 1000 Displays Showing Results of 90° Stop-time Test

4. Turn the WPC Settings key switch to "+" to arm the test. The "90° Stop Test" indicator flashes to alert you that the test has been armed. The press will stop the next time the crankshaft angle reaches 90°.

NOTICE

To cancel the test, press the Reset/Select button once before starting the press.

NOTICE

The first time you run this test, the display shows a value of "0" (zero) until the test is completed. In subsequent tests, the display shows the Stopping Time measured in the last test.

5. When the press stops, record the value shown in the LED display.
6. Run the test 5 more times. Record the highest reading from all your tests to use as the Stop-time value when calculating the safety distance.

Performing the 90° Stop Test (Single-stroke Mode)

⚠ DANGER

INCORRECT SAFETY DISTANCE DUE TO INCORRECT STOP TIME

- Perform a 90° Stop Test any time you change the Stop-time Limit of WPC 1000.
- 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 3-20).
- 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 in your press. Adjust the counterbalance for ram weight, if your press has a counterbalance.
2. Set the Stroke Select switch to "SINGLE."
3. Press the Reset/Select button repeatedly until the "90° Stop Test" indicator becomes lit (see Figure 3-8).
4. Turn the WPC Settings key switch to "+" to arm the test. The "90° Stop Test" indicator flashes to alert you that the test has been armed. The press will stop the next time the crankshaft angle reaches 90°.

NOTICE

To cancel the test, press the Reset/Select button once before starting the press.

NOTICE

The first time you run this test, the display shows a value of "0" (zero) until the test is completed. In subsequent tests, the display shows the Stopping Time measured in the last test.

5. Press and hold the Run/Inch palm buttons to initiate a stroke. WPC 1000 will stop the press when it reaches 90°.
6. When WPC 1000 stops the press, record the value shown in the LED display.
7. Run the test 5 more times. Record the highest reading from all your tests to use as the Stop-time value in calculating the safety distance.

Calculating the Safety Distance

⚠ DANGER

PRESS MAY NOT STOP BEFORE OPERATOR REACHES PINCH POINT

- Calculate the safety distance according to the applicable safety regulations, the instructions in this chapter and in your light curtain user manual.
- Mount the Shadow light curtain heads at least the safety distance from the nearest pinch point or hazardous area of your press (see Figure 3-9).
- Mount your Two-hand Control at least the safety distance from the nearest pinch point or hazardous area of your press if you are using the Two-hand Control as a safety device.
- Mount your light curtain heads at least 7 1/2 in. (191 mm) from the nearest pinch point hazard, even if that is greater than the safety distance you calculate.

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

The "safety distance," as shown in Figure 3-9, is the distance from the pinch point (or hazardous area) of the press that Shadow light curtains must be mounted to allow enough time for Shadow to react, and the press to stop, before the operator can penetrate the light curtain and reach the hazard. The "pinch point" is the area of the press where moving parts can cause injury.

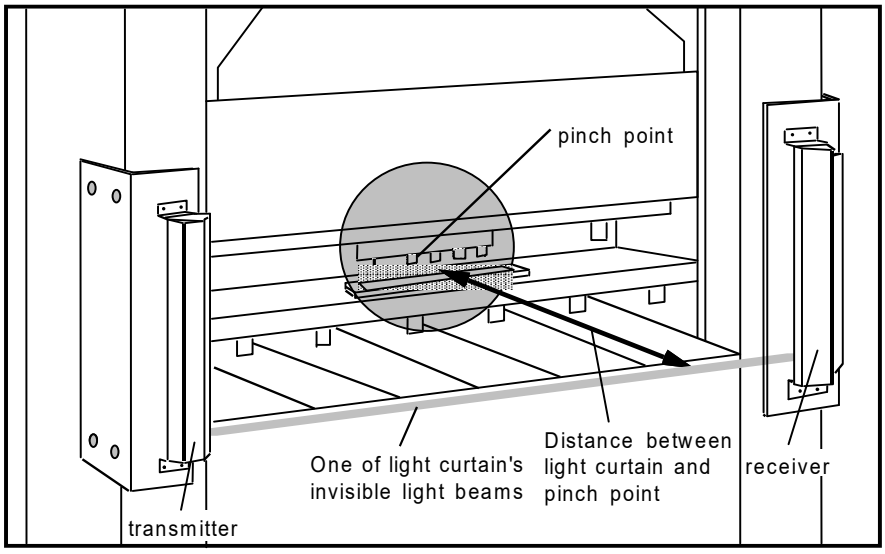


Figure 3-9. Safety Distance: Distance between Pinch Point and Light Curtain

If you have not installed light curtains and are using a Two-hand Control as a safety device, you must mount the Two-hand Control at least the safety distance from the pinch point.

The safety distance is calculated using a formula that incorporates the Stopping Time of your press as determined by the 90° stop-time test (see *Determining the 90° Stop Time*, page 3-18). You must mount your light curtains slightly beyond this calculated distance to ensure that they are able to stop the press before an operator's hand reaches the hazardous area.

ANSI and OSHA Safety Distance Formulas

OSHA regulations and ANSI standards mandate that all machine safeguarding devices, including Shadow light curtains and Two-hand controls, be located at the correct safety distance from the pinch point. OSHA regulation 1910.217 governs the mounting of infrared light curtains to protect mechanical power presses.

Wintriss, however, recommends that you use the formula contained in ANSI standard B11.1-2009. This standard has been developed specifically for guarding of mechanical power presses, and the formula contained in B11.1-2009 represents a new consensus on the proper installation of light curtains. More variables are included in the ANSI than in the OSHA formula, and the ANSI calculation is, therefore, more precise.

For complete information on OSHA regulation 1910.217 and ANSI standards B11.1-2009 and B11.19-2003, see Appendix A.

OSHA and ANSI formulas are explained below. If you need additional assistance in calculating the safety distance, call Wintriss Tech. Support.

⚠ DANGER

PRESS MAY NOT STOP BEFORE OPERATOR REACHES PINCH POINT

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

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

ANSI Safety Distance Formula

The ANSI B11.1 safety distance formula, which is recommended by Wintriss, is

$$Ds = K \times (Ts + Tc + Tr + Tbm) + Dpf$$

where

Ds *is the ANSI safety distance in inches*
K *is the OSHA-recommended hand-speed constant of 63 inches per second*
Ts *is the stopping time of the press in seconds*
Tc *is the response time of the press control*
Tr *is the response time of the light curtain*
Tbm *is the additional stopping time of the press allowed by the brake monitor*
Dpf *is the depth penetration factor*

The hand-speed constant indicates how far you could theoretically move your hand and arm in one second.

The Stopping Time of the press (Ts) is measured at approximately 90° of crankshaft rotation, or at maximum closing velocity. The response time of the press control (Tc), which is the time it takes for the control to activate the press's brake, is included in the result of the 90° stop-time test run on the WPC 1000 (see *Determining the 90° Stop Time*, page 3-18). You can use the value generated by the 90° stop-time test for the variables Ts + Tc in the ANSI formula.

Response times Tr for Shadow light curtains are shown in Table 3-4.

Table 3-4. Shadow Light Curtain Response Time and Object Sensitivity

Shadow Model	Head Length *	Response Time	Object Sensitivity
Shadow V	12 to 24 in. (305 to 610 mm)	30 mS	1.25 in.
	36 and 48 in. (914 and 1219 mm)	50 mS	
Shadow VI	6 to 24 in. (305 to 610 mm)	30 mS	1.25 in.
	30 to 48 in. (762 to 1219 mm)	35 mS	
	60 in. (1524 mm)	40 mS	
Shadow VII	6 to 30 in. (152 to 762 mm)	20 mS	1.18 in.
	36 to 59 in. (914 to 1499 mm)	23 mS	
	Up to 96 in. (2438 mm)	28 mS	
	Up to 135 in. (3429 mm)	32 mS	
Shadow 8	Up to 42 in. (1067 mm)	23 mS	1.18 in.
	Up to 85 in. (2159 mm)	32 mS	
	Up to 128 in. (3521 mm)	41 mS	
	Up to 171 in. (4343 mm)	50 mS	
	Up to 202 in. (5131 mm)	59 mS	

Table 3-4. Shadow Light Curtain Response Time and Object Sensitivity (Continued)

Shadow Model	Head Length *	Response Time	Object Sensitivity
Shadow 9	Standalone up to 31.5 in. (800 mm)	8 mS	1.18 in.
	Standalone greater than 31.5 in. (800 mm)	13 mS	
	Cascaded up to 110 in. (2800 mm) combined	13 mS	
	Cascaded greater than 110 in. (2800 mm) combined	18 mS	

* Includes extensions/cascaded heads for Shadow VII, Shadow 8, and Shadow 9 models

Tbm is the additional time added to the Stopping Time of the press to allow for brake wear and is used to calculate the brake monitor's Stop-time Limit (see *Calculating the Stop-time Limit*, page 3-16). The Tbm value is usually calculated by multiplying the press's Stopping Time at Top-stop by a predetermined factor based on the age of the brakes. The factor for new brakes is 0.20 (i.e., 20%), that for old brakes 0.10 (i.e., 10%).

The depth penetration factor (Dpf) is a measure of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts. Dpf is related to the light curtain's object sensitivity, which is the smallest diameter object Shadow can detect anywhere in its field.

Object sensitivity (**S**) for Shadow 9 is 1.18 in. (30 mm) with beam centers of 0.79 in. (20 mm). (See Table 3-4 for the object sensitivity of other Shadow models.) Based on S and ANSI B11.1-2009, **Dpf** = 3.07 in. (78 mm).

NOTICE

ANSI SAFETY DISTANCE FORMULA FOR USE WITH TWO-HAND CONTROL

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

Ds = K x (Ts + Tc + Tbm)

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

Example: Calculating the Safety Distance for a Light Curtain Using the ANSI Formula

The ANSI formula is

Ds = K x (Ts + Tc + Tr + Tbm) + Dpf

The following value is a constant:

K = 63 inches per second

We will use the following values for the variables in the formula:

Ts + **Tc** = 0.190 sec. (result of the 90° stop-time test)

Tr = 0.018 sec. (response time of Shadow 9 with greater than 110 in. (2800 mm) combined length including cascaded heads–see Table 3-4, page 3-22)

Tbm = 0.035 sec. (see Example 2 in *Stop-time Limit Calculation Examples*, page 3-16)

Dpf = 3.07

Putting these values into the formula, we get:

Ds = 63 x (0.190 + 0.018 + 0.035) + 3.07

Ds = (63 x 0.243) + 3.07

Ds = 15.309 + 3.07

Ds = 18.379 in.

The light curtain must be mounted 18.379 in. away from the pinch point.

When using the ANSI formula, be sure to perform the calculations in this order:

(1) Add **Ts** + **Tc** + **Tr** + **Tbm** first.

(2) Multiply the result by 63.

(3) Add this result to **Dpf**. This is **Ds**.

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

OSHA Safety Distance Formula

⚠ DANGER

INCORRECT SAFETY DISTANCE

Use the Stopping Time measured in the 90° stop-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*, page 3-18 for instructions on performing this test.

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

NOTICE

Wintriss recommends that you use the American National Standards Institute (ANSI) formula for calculating safety distance because it contains more factors, allowing you to calculate the safety distance more precisely. The ANSI formula is explained in the previous section (see page 3-22).

The OSHA safety distance formula as specified in OSHA 1910.217 is

$$Ds = K \times Ts$$

where

Ds *is the OSHA safety distance in inches*

K *is the OSHA-recommended hand-speed constant of 63 inches per second*

Ts *is the stopping time of the press in seconds*

The hand-speed constant indicates how far you could theoretically move your hand and arm in one second.

The Stopping Time of the press (Ts) is measured at approximately 90° of crankshaft rotation, or at maximum closing velocity. In addition to the Stopping Time of the press, the OSHA Ts value must include the following factors:

- Response time of the press control that activates the brake
- Response time of the light curtain

- Additional time (Tbm) added to the Stopping Time to compensate for brake wear

The response time of the press control is included in the result of the 90° stop-time test run on the WPC 1000 (see *Determining the 90° Stop Time*, page 3-18).

Response times of Shadow light curtains are shown in Table 3-4, page 3-22.

Calculation of the Tbm value is described in *Calculating the Stop-time Limit*, page 3-16.

NOTICE

OSHA SAFETY DISTANCE FORMULA FOR USE WITH TWO-HAND CONTROL

The formula for safety distance when using a Two-hand Control as a safeguarding device is similar to the formula above, but does not include the response time of the light curtain. Use the following OSHA formula for calculating the safety distance for a Two-hand Control:

Ds = K x Ts

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

Example: Calculating the Safety Distance for a Light Curtain Using the OSHA Formula

The OSHA formula is

Ds = K x Ts

The following value is a constant:

K = 63 inches per second

We will use the following values for the variables in the formula:

Stopping time of press + response time of press control = 0.190 sec. (result of the 90° stop-time test)

Response time of light curtains = 0.018 sec. (response time of Shadow 9 with greater than 110 in. (2800 mm) combined length including cascaded heads–see Table 3-4, page 3-22)

Additional time for brake wear = 0.035 sec. (see Example 2 in *Stop-time Limit Calculation Examples*, page 3-16)

Putting these values into the formula, we get:

Ds = 63 x (0.190 + 0.018 + 0.035)

Ds = 63 x 0.243

Ds = 15.309 in.

The light curtain must be mounted 15.309 in. (389 mm) away from the pinch point.

When using the OSHA formula, be sure to do the calculations in this order:

(1) Add the factors involved in the stopping time Ts first.

(2) Multiply the result by 63. This is Ds.

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

Adding to Safety Distance for Blanking Windows

When using fixed or floating blanking windows with your Shadow 9 light curtain, you must add a factor to the calculated safety distance for each beam that is blanked. This applies whether you use the ANSI or the OSHA formula. For a one-beam fixed blanking window,

you must add 5.38 in. (136.6 mm) to the calculated safety distance (ANSI formula). You must add 5.76 in. (146.3 mm) to the calculated safety distance for a one-beam floating blanking window (ANSI formula). See your Shadow 9 user manual for further details about fixed and floating blanking.

If you are using another Shadow light curtain, refer the appropriate Shadow user manual for the additional distance factor to add to the safety distance formula for each blanking window.

Setting Micro-Inch

Micro-inch is the length of time in milliseconds that the Dual Safety Valve is open when the operator presses the Run/Inch palm switches on the Operator Station while the press is in Inch mode.

Normally, when the press is running in Inch (see *Top-stop in Inch*, page 4-8), the DSV is open and the clutch engaged as long as the Run/Inch palm buttons are depressed. When Micro-inch is enabled (see *Wiring Micro-inch*, page 2-32), the clutch remains engaged only for the length of time specified in the Micro-inch setting unless the operator releases the Run/Inch palm buttons before the period has expired.

You can enter Micro-inch values from 6 to 600 milliseconds. The default value, set at the factory, is 100 mS.

To set Micro-inch, do the following:

1. With power on to the WPC 1000 and the press in Inch mode, press the Reset/Select button repeatedly until the "Micro-inch" indicator becomes lit (see Figure 3-10).
2. Turn the WPC Settings key switch to "+" (counterclockwise) to increase the Micro-inch time setting shown in the LED display, or turn the key to "–" (clockwise) to decrease the setting.

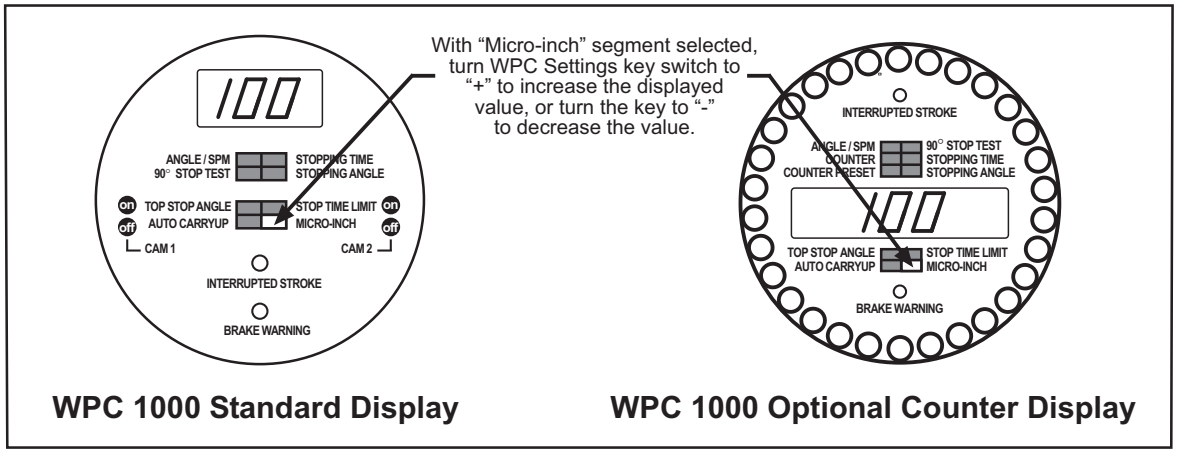


Figure 3-10. WPC 1000 Displays Showing Micro-inch Time Setting

Setting Press Option Switches

⚠ DANGER

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE THE ENCLOSURE

Turn off and disconnect power from WPC 1000 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.

This section shows you how to make settings on switch block S101, which is located roughly in the center of the WPC 1000 Control board just to the left of the DSV/Lockout Relay board (see Figure 2-11, page 2-20 for Control board layout). All eight S101 switches are factory-set to the OFF position. To set a switch to ON (see Figure 3-11), push up on the switch with a small screwdriver or your fingernail.

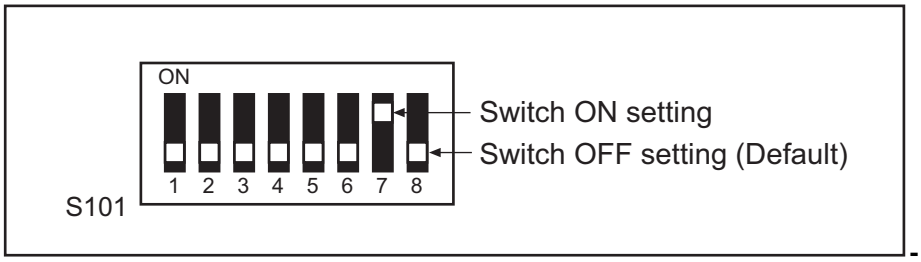


Figure 3-11. S101 Option Switch OFF and ON Settings

NOTICE

CYCLE POWER AFTER CHANGING OPTION SWITCH SETTINGS

Whenever you change an option switch setting, you must power down the WPC 1000 and power it back up again in order to enable the new setting. If you do not cycle power, the previous switch setting will remain in effect.

Switches 1 and 2 – Top-stop "On" Angle Range

Options switches 1 and 2 control the range of angles within which the Top-stop "On" Angle falls (see *Installing the Overrun Sensor Magnet*, page 3-7). WPC 1000 uses these switch settings to determine at what angle to begin the overrun sensor closure test, which is used to make sure that the overrun limit switch closes at the same angle on every stroke. Settings for option switches 1 and 2 are shown in Table 3-5.

Table 3-5. Switches 1 and 2 Settings: Top-stop "On" Angle Range

Top-stop Angle Range	< 240°	241° to 270°	271° to 300°	> 301°
Switch 1 Setting	ON	ON	OFF	OFF
Switch 2 Setting	ON	OFF	ON	OFF

Switch 3 – One-hand Control and Foot Switch Settings

When you have optional One-hand/Two-hand/Foot firmware, option switch 3 provides settings for a One-hand Control or Foot Switch. Switch 3 enables Light Curtain Break mode in a One-hand Control when the Mode Select switch is set to "1 HAND." Switch 3 enables either Foot Trip or Foot Control in a Foot Switch when the Mode Select switch is set to "FOOT."

Enabling Light Curtain Break Mode in a One-hand Control

When the Mode Select switch is set to "1 HAND," switch 3 controls the conditions under which a One-hand Control (see *Installing One-hand Control*, page 2-40) is active, as shown in Table 3-6.

When switch 3 is set to OFF, the One-hand Control is continuously active, allowing you to initiate a stroke any time you push the One-hand Control switch.

When switch 3 is set to ON, the One-hand Control is active only during the window within which the operator breaks the light curtain to feed a part and for eight seconds after his hand has cleared the light curtain. This condition is called Light Curtain Break mode. If the operator presses the switch after this window has expired, the press will not start. The light curtain must be broken again before the next stroke can be initiated.

Table 3-6. Switch 3 Settings: Enabling Light Curtain Break Mode

Setting	One-hand Control Functionality
OFF	Normal Operation (Default). One-hand control is always active. Stroke can be initiated at any time by pressing switch.
ON	Light Curtain Break Mode. One-hand Control is active only during window between initial breaking of light curtain and 8 seconds after light curtain is cleared.

Enabling Foot Control in a Foot Switch

When the Mode Select switch is set to "FOOT," switch 3 controls how the Foot Switch must be activated in order to initiate and complete a stroke, as shown in Table 3-7, page 3-29. Switch 3 Foot Switch settings apply only to Single-stroke operation.

When switch 3 is set to OFF, the Foot Switch is in Foot Trip mode, which requires only that the operator depress the Foot Switch, without holding it down, to initiate and complete a stroke.

When switch 3 is set to ON, the Foot Switch is in Foot Control mode, which requires that the operator depress and hold down the Foot Switch through the Auto Carry-up Angle in order to complete a stroke. If the Foot Switch is released before the Auto Carry-up Angle, WPC 1000 issues an Emergency-stop command to the press.

Table 3-7. Switch 3 Settings: Enabling Foot Control

Setting	Foot Switch Functionality
OFF	Normal operation–Foot Trip (Default). When operator depresses Foot Switch, press strokes.
ON	Enables Foot Control. Operator must depress and hold down Foot Switch until the press has passed the Auto Carry-up Angle in order to execute a stroke.

Switch 4 – Enabling Auto Compensated Top Stop (ACTS)

When you have Auto Compensated Top Stop (ACTS) firmware, switch 4 controls enabling of the ACTS feature (see Table 3-8). ACTS is a WPC 1000 option that adjusts the Top-stop "On" Angle to an earlier point in the stroke to compensate for increases in press speed.

ACTS is designed specifically for variable-speed presses. As the speed of the press increases, the stopping angle increases, pushing the point at which the press actually top-stops past 360°, or TDC. ACTS senses when the press has not stopped at TDC and compensates for this lengthening of the stopping angle by moving the Top-stop angle back an equivalent number of degrees. The Top-stop angle cannot be adjusted backward beyond 211°, the factory setting.

Adjustment of the Top-stop angle always lags behind press speed changes because ACTS requires several Top-stops to fine tune its settings.

If you use the ACTS feature, it is critical that you set the Stop-time Limit on your brake monitor correctly so that you have advance warning of the need for brake maintenance. Since increases in stopping angle may be due to brake wear rather than to speed changes, ACTS may increase the difficulty of detecting brake problems unless back-up systems are in place.

When switch 4 is set to OFF, ACTS is disabled and the press operates normally. When switch 4 is set to ON, the ACTS feature is enabled, allowing the Top-stop angle to be adjusted as press speed increases.

Table 3-8. Switch 4 Settings: Enabling ACTS

Setting	ACTS Functionality
OFF	Normal operation (Default). ACTS disabled.
ON	ACTS enabled. Top-stop angle is retarded as speed of the press increases.

Switch 5 – Selecting Concurrent Time for Multiple Op. Stations

NOTICE

You should only change this switch from its default setting if you have installed two or more Operator Stations on your WPC 1000. Contact Wintriss Tech. Support for further information.

Option switch 5 allows you to select a 5-second concurrent time for WPC 1000 configurations with two or more Operator Stations installed, as shown in Table 3-9.

NOTICE

Do not attempt to install multiple Operator Stations until you have contacted Wintriss Tech. Support. All Operator Stations in a mutli-Op.-Station configuration must contain a Two-hand Control module. Do not order standard Wintriss "Multiple Operator Stations."

Concurrent time is the 5-second interval within which each pair of palm switches on all connected Operator Stations must be activated in order to start the press. If the concurrent time is exceeded, the press will not start.

When switch 5 is set to OFF, its default position, and one Operator Station is connected to WPC 1000, the palm switches on that Operator Station must be pressed within a 1/2-second window (called the "palm" or "synchronous" time) in order to stroke the press.

When switch 5 is set to ON and two or more Operator Stations are connected to WPC 1000, palm switches on all connected Operator Stations must be pressed within a 5-second concurrent time window to start the press. Each Operator Station must contain a Two-hand Control module to provide the required 1/2-second palm (or synchronous) time.

Table 3-9. Switch 5 Settings: Selecting Concurrent Time for Multiple Operator Stations

Setting	Concurrent Time for Multiple Op. Stations
OFF	Normal Operation (Default). Establishes a 1/2-second palm (or synchronous) time for one Operator Station.
ON	Establishes a concurrent time of 5 seconds when two or more Operator Stations are connected to WPC 1000. Each Operator Station must contain a Two-hand Control module to provide the required 1/2-second palm (or synchronous) time.

Switch 6 – Enabling Access to Cam Settings

Switch 6 controls access to settings for cam "on" and "off" angles if you have ordered the optional two-channel cam output assembly. See Table 3-10, page 3-31.

When switch 6 is set to OFF, cam "on" and "off" angles cannot be set or adjusted. When switch 6 is set to ON, cam "on"/"off" settings can be made and changed.

Table 3-10. Switch 6 Settings: Enabling Cam Adjustments

Setting	Access to Cam Settings
OFF	Normal operation (Default). Access to cam settings disabled.
ON	Access to cam settings enabled. Cam “on” and “off” angles can be set and adjusted.

Switch 7 – Disabling Access to Stop-time Limit and Auto Carry-up Angle Settings

Switch 7 controls access to Stop-time Limit and Auto Carry-up Angle settings, as shown in Table 3-11.

When set to OFF, the default setting, switch 7 enables changes to be made to the current Stop-time Limit and Auto Carry-up Angle values stored in WPC 1000. Setting switch 7 to ON disables this feature, preventing the operator from making changes.

Table 3-11. Switch 7 Settings: Disabling Access to Stop-time Limit and Auto Carry-up Angle

Setting	Access to Stop-time Limit and Auto Carry-up Angle Settings
OFF	Normal operation (Default). Access to Stop-time Limit and Auto Carry-up Angle settings enabled. Operator can change settings.
ON	Access to Stop-time Limit and Auto Carry-up Angle settings disabled. Operator cannot change settings.

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

Switch 8 has two different functions. It controls how quickly the press top-stops when an F or an H fault occurs, and if the Auxiliary Output on the WPC 1000 Control board has been wired, it also specifies how that output responds to an Interrupted Stroke condition.

Selecting Top-stop Mode for F and H Errors

⚠ DANGER

PRESS MAKES ANOTHER STROKE AFTER BEING TOP-STOPPED ON F OR H ERROR

Use extreme caution if you set Switch 8 to OFF, which allows the press to complete another stroke if an error occurs after 210°.

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

One switch 8 function specifies whether the press takes an additional stroke before it top-stops when an F or an H fault occurs after 210°, as shown in Table 3-12, page 3-32.

When switch 8 is set to OFF, its default setting, the press top-stops on the current stroke when an F or H fault occurs before 210°, or takes an additional stroke before it top-stops if the error occurs after 210°. When switch 8 is set to ON, the press top-stops on the current stroke if an F or H fault occurs at any angle.

Table 3-12. Switch 8 Settings: Top-stop Mode for F and H Errors

Setting	Top-stop Behavior for F and H Errors
OFF	Normal operation (Default). Press top-stops on current stroke when F or H fault occurs before 210°, on next stroke if error occurs after 210°.
ON	Press top-stops on current stroke at whatever angle an F or H error occurs.

Auxiliary Output 1 Response to Interrupted Stroke

⚠ DANGER

NON-SAFETY OUTPUT USED FOR SAFETY FUNCTIONS

Use Auxiliary Output 1 for a non-safety function only, such as convenience in automation. It cannot protect personnel from a moving hazard.

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

If you have wired Auxiliary Output 1 (see page 2-30), switch 8 also controls how Auxiliary 1 responds to an Interrupted Stroke condition, as shown in Table 3-13.

When switch 8 is set to OFF, its default setting, Aux. 1 turns “off” during an Interrupted Stroke and whenever a fault occurs, an E-stop string opens, or a light curtain is broken with the press running. When switch 8 is set to ON, the Auxiliary Output stays “on” during an Interrupted Stroke when no fault condition or E-stop occurs but turns “off” whenever there is a fault, an open E-stop string, or a light curtain interruption.

Table 3-13. Switch 8 Setting: Auxiliary Output 1 Response to Interrupted Stroke

Settings	Auxiliary Output 1 State Change
OFF	Normal operation (Default). Aux. 1 turns “off” when one of the following occurs: an Interrupted Stroke* condition a fault condition (error code displays) an open E-stop string a light curtain interruption while press is running
ON	Aux. 1 stays “on” during Interrupted Stroke if no fault condition or E-stop occurs, turns “off” when one of the following occurs: a fault condition (error code displays) an open E-stop string a light curtain interruption while press is running

* An Interrupted Stroke cannot occur in Inch mode.

Setting Programmable Cams

If you have ordered the optional two-channel programmable cam output, you can set cam "on" and "off" angles via the WPC 1000 display. Before making settings, verify that the cam outputs have been installed correctly (*Installing 2-channel Programmable Cam*, page 2-34).

The indicator segments used to program cam "on" and "off" angles are labelled on the standard WPC 1000 display but are not identified on the optional counter display. When option switch 6 is set to ON, the four segments in the lower half of the display (labelled "Top Stop Angle," "Auto Carry-up," "Stop Time Limit," and "Micro-inch") function as indicators for cam channel settings. The cam channel and state (i.e., ON or OFF) assigned to each segment is shown for both standard and optional counter displays in Figure 3-12.

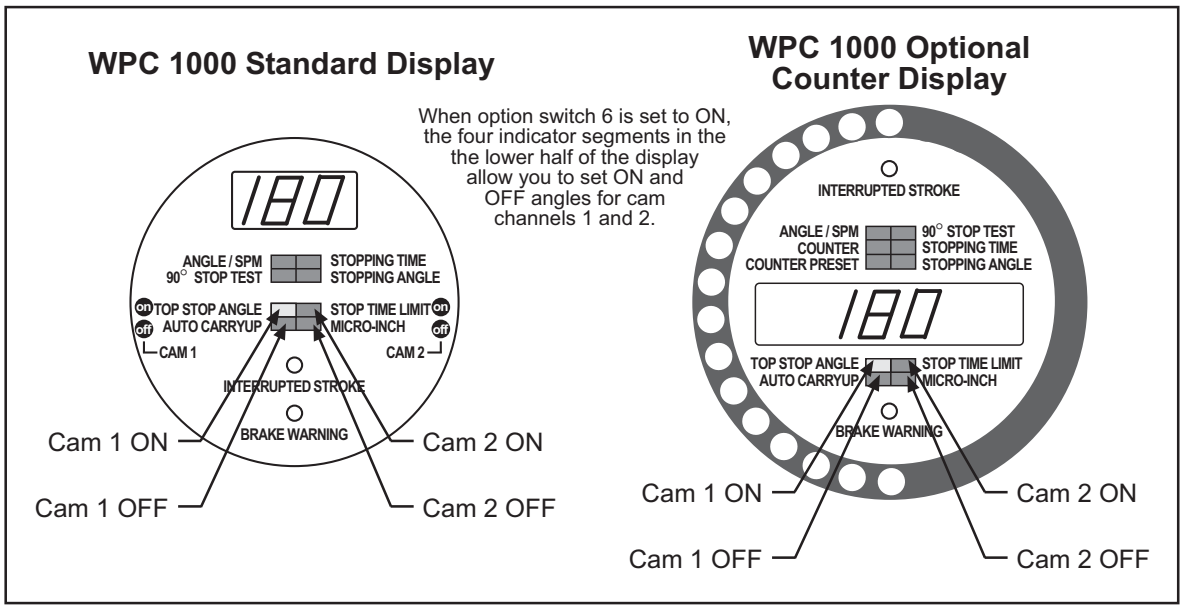


Figure 3-12. WPC 1000 Displays Showing Cam Indicator Segments

NOTICE

Cam settings cannot be made while the press is running.

To make cam channel settings, perform the following steps:

1. Set option switch 6 on S101 on the WPC 1000 Control board to ON to enable changes to cam settings (refer to *Switch 6 – Enabling Access to Cam Settings*, page 3-30).
2. Power down the WPC 1000, then power the unit back up to enable the new setting. If you do not cycle power, the previous switch 6 setting will remain in effect.
3. Turn the Stroke Select switch to "INCH" to put the press in Inch mode.
4. Press the Reset/Select button repeatedly until the "Top Stop Angle" segment is illuminated. When option switch 6 is set to ON, this indicator is used to set the Cam 1 "on" angle.

The current Cam 1 “on” angle is shown in the LED display and represented at one end of an illuminated arc of LEDs on the crank-angle clock, as shown in Figure 3-12.

5. To change the current setting, turn the WPC Settings key switch to “+” (counterclockwise) to increase the angle or to “–” (clockwise) to decrease the angle.

   As you increase or decrease the angle, additional LEDs at one end of the illuminated LED arc on the crank-angle clock are lit, or currently illuminated LEDs are turned off.

6. Press the Reset/Select button to illuminate the “Auto Carry-up” segment, which is used to set the Cam 1 “off” angle when the cam adjustment feature is enabled (see Figure 3-13).

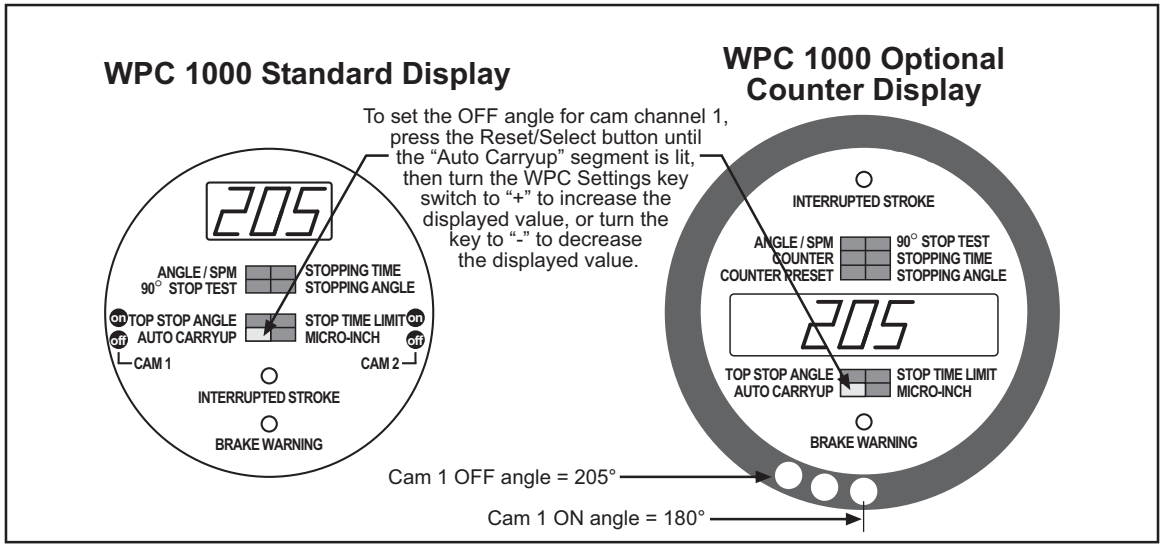


Figure 3-13. WPC 1000 Displays Showing Cam Channel 1 OFF Setting (Cam 1 ON = 180°)

7. Repeat step 5. The length of the illuminated arc of LEDs on the crank-angle clock changes as you increase or decrease the Cam 1 OFF angle. Figure 3-13 shows an LED arc for cam channel 1 settings of ON = 180° and OFF = 205°.
8. Repeat steps 4 through 7 for the Cam 2 “on” and “off” settings if necessary.
9. Set option switch 6 back to the OFF position.
10. Power down WPC 1000, then power it back up to enable the new setting. If you do not cycle power, the previous switch 6 setting may remain in effect.

> **NOTICE**
>
> If you do not cycle power to the WPC 1000 after moving option switch 6 back to its default setting, WPC 1000 will remain in cam-setting mode, and you will not be able to adjust the settings controlled by the indicator segments in the lower half of the display.

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.

⚠ 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.

⚠ WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

⚠ WARNING

TOOLS OR OTHER MATERIAL IN THE DIE

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

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

NOTICE

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

- Stroke Select to “OFF”
- Mode Select to “2 HAND”

This section provides the tests you need to perform to verify that your WPC 1000 is installed and set up correctly. These tests must be performed before you proceed to Chapter 4.

Perform the tests in order, skipping tests for optional components that do not apply to your WPC 1000 setup. If your WPC 1000 fails a test, you will be directed to follow step-by-step procedures to isolate and correct the problem. If you are unable to correct a problem, contact Wintriss Tech. Support for assistance. Do not run the press until the problem has been corrected. Do not attempt to replace any components in your new WPC 1000 unless instructed to by Wintriss Tech. Support.

Many of the tests ask you to check the state of LEDs on the WPC 1000 Control board. An LED map, showing the locations of all LEDs, is provided in Figure 3-14.

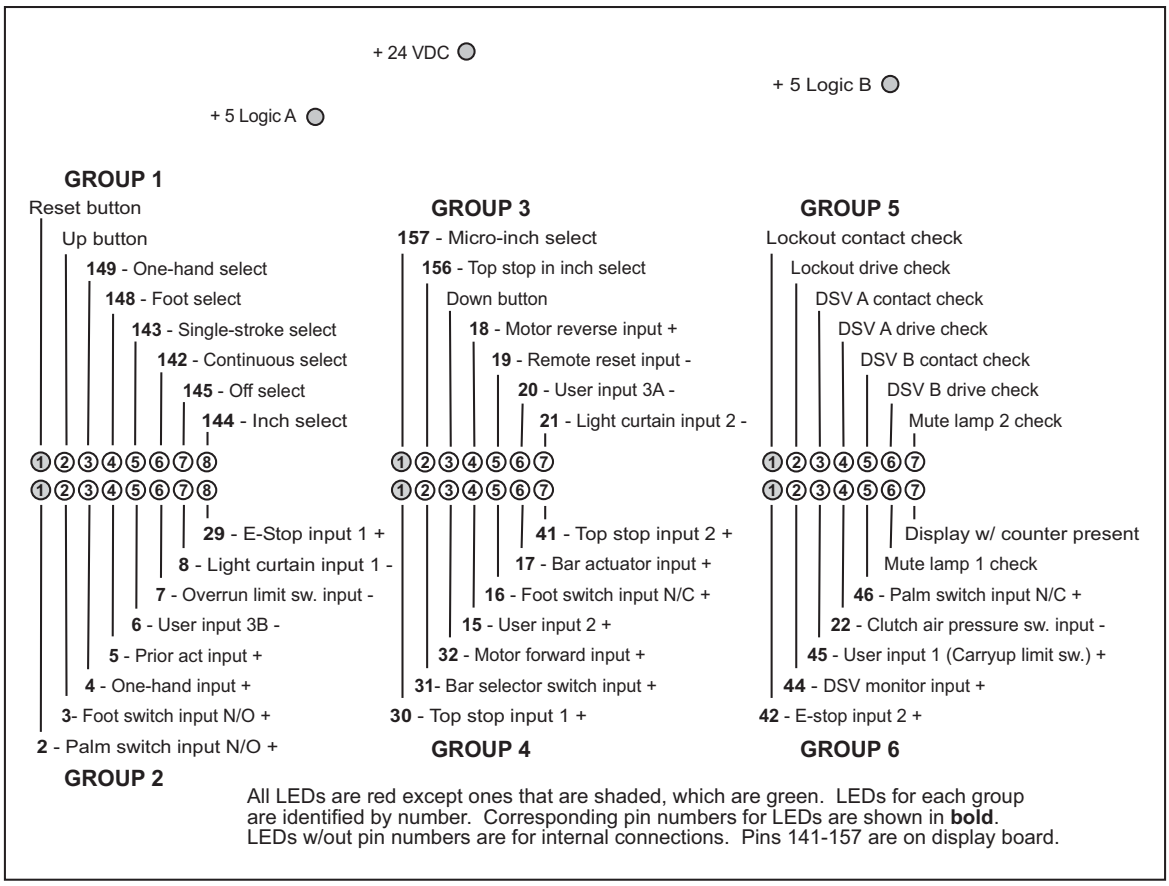


Figure 3-14. WPC 1000 LED Indicator Map

In order to run the tests, you need to know how to operate the press in Inch, Single-stroke, and Continuous modes using Two-hand, One-hand, or Foot control. Refer to the instructions starting on page 4-7 if you need help running the press using these settings.

Checking the Emergency-stop Circuit

NOTICE

CHECKING THE EMERGENCY-STOP CIRCUIT IN SINGLE STROKE MODE

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

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

1. Run the press in Continuous mode, and press the Emergency Stop button on the Operator Station. The press should Emergency-stop immediately.

- If the press Emergency-stops, go to the next applicable test.
- If the press does not Emergency-stop, check the wiring of your E-stop circuit, correcting any problems, and run the test again. If the press still does not Emergency-stop, call Wintriss Tech. Support. Do not continue with this checkout procedure until the press E-stops correctly.

NOTICE

RESET EMERGENCY-STOP BUTTON AFTER USE

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

Checking the Top-stop Circuit

NOTICE

CHECKING THE TOP-STOP CIRCUIT IN SINGLE-STROKE MODE

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

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

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

Checking for Faults When the Press Is Running

To determine whether any fault messages display when the press is running, do the following:

1. Run the press in Single-stroke for a few strokes.
   - If the press runs without displaying an error, go to the next applicable test.
   - If a fault code between F80 and F89 (or between H80 and H89) appears on the display, this indicates a problem with the overrun limit sensor. Check to make sure that you installed the overrun limit sensor (see *Installing the Overrun Limit Switch*, page 2-25) and overrun limit sensor magnet (*Installing the Overrun Sensor Magnet*, page 3-7) correctly. Press the Reset/Select button and single-stroke the press again for a few strokes. If the press stops and the same fault code displays, call Wintriss Tech. Support.
   - If another fault code appears on the display, look up the fault in Chapter 5, and perform the remedy provided. Once the problem is corrected, press the Reset/Select button and run the press again for a few strokes, checking for fault codes. If you need assistance, call Wintriss Tech. Support.

Power Supply Test

> **⚠ WARNING**
>
> **ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON**
>
> - DO NOT touch electrical connections or circuit boards.
> - Use test equipment only on the terminals specified in the instructions.
> - Ensure that this test is performed by qualified personnel.
>
> **Failure to comply with these instructions could result in death or serious injury.**

To run the power supply test, do the following, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

1. Open the front cover of the control enclosure or the door of your console.
2. Turn on power to WPC 1000.
3. On the WPC 1000 Control board, check to see whether the +24 V, +5 V (A), and +5 V (B) LED indicators are illuminated.
   - If all three LEDs are lit, go to the next applicable test.
   - If all three LEDs are unlit, check to make sure that line voltage is being applied to the system (see step 2), and correct any problems. If the LEDs are still unlit, call Wintriss Tech. Support.
   - If one or both of the +5 V LEDs are unlit, call Wintriss Tech. Support.

Shadow Light Curtain Test

> **⚠ WARNING**
>
> **ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON**
>
> - DO NOT touch electrical connections or circuit boards.
> - Use test equipment only on the terminals specified in the instructions.
> - Ensure that this test is performed by qualified personnel.
>
> **Failure to comply with these instructions could result in death or serious injury.**

WPC 1000 tests whether your Shadow(s) are working properly by momentarily de-energizing the Shadow transmitter whenever the press is started and stopped, checking at the same time to make sure that the Emergency-stop relays are open.

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

1. Power up the light curtain.
2. Check to see whether there is power to the Shadow. On Shadow V and Shadow VI units, the amber (Power On) LED on the transmitter indicates that the light curtain has power.

On Shadow VII units, the presence of power is indicated by an illuminated diagnostic code LED display. The green power LED on the optional Shadow 8 control or the LEDs on Shadow 8 Main Receiver and Transmitter indicate the presence of power. On Shadow 9, green power LED on the optional Shadow 9 control or the green POWER LED on the transmitter and the ON/OFF LED illuminated red or green on the receiver indicate the presence of power.

- If the Shadow has power, go to the next step.
- If the Shadow does not have power, turn off the light curtain, and check the input power wiring and the power fuse. (The fuse is located in the Shadow V receiver or in the Shadow VI, Shadow VII, Shadow 8, or Shadow 9 (optional) control box. The Shadow VII DIN controller has no fuse.) Rewire power connections and/or replace the fuse if necessary. Power up again. (On Shadow V and Shadow VI units, if there is still no power, turn off the transmitter and try replacing the amber indicator. Power up again.) If there is still no power to the unit, call Wintriss Tech. Support.

3. At the Shadow receiver, check to see whether the green (Curtain Unobstructed) indicator is lit.
   - If the green indicator is lit, go to the next step.
   - If the receiver's red (Curtain Obstructed) indicator is lit, realign the light curtain heads. If the red indicator is still lit, check the interrupt circuit (Shadow V and Shadow VI) or the Light Curtain Test mode jumper (Shadow VII, Shadow 8, Shadow 9). To check the interrupt circuit, make sure that the following terminal reads 0 V relative to ground:

     Shadow V: INT terminal in the transmitter (see Figure 6 at end of manual)
     Shadow VI: pin #19 on auxiliary TB4 in the control (see Figure 2 at end of manual)
     Shadow VI/WPC Interface Board: pin #5 on TB4 (see Figure 7 at end of manual)

     If the applicable terminal does not read 0 V relative to ground, check and correct the ground wiring for the unit.

     The Light Curtain Test Mode jumper, which is located in the lower right corner of the WPC 1000 Control board (see Figure 2-12, page 2-21), should be positioned at the "INT" setting when Shadow VII, Shadow 8, or Shadow 9 light curtains are installed. Reposition the jumper to the correct setting if necessary. The Light Curtain Output Type jumper, which is located just beneath the Light Curtain Test Mode jumper, should be set to "PNP."

     If the red indicator is still illuminated, call Wintriss Tech. Support.
   - If both the receiver's green and red indicators are unlit, power down the unit and check the wiring to the receiver. Also check the power fuse (located in the Shadow V receiver, in the Shadow VI, Shadow VII, Shadow 8, or Shadow 9 (optional) control box, not present in the Shadow VII DIN control), and replace if necessary. Power up again. If the receiver's green and red indicators are still off, replace them. If none of these remedies corrects the problem, call Wintriss Tech. Support.
4. Block the light curtain. On the receiver, the green indicator should turn off and the red indicator should illuminate.

- If the receiver's green indicator goes off and the red indicator comes on, go to the next step.
- If the receiver's green indicator stays on when the curtain is blocked, call Wintriss Tech. Support.

5. Remove the obstruction from the light curtain. At the receiver, verify that the red indicator goes off and the green indicator comes on.
6. Go to the next applicable test.

System Static Test

⚠ WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

To perform the system static test, do the following, referring to Figure 3-14, page 3-36 for LED locations:

1. Turn off the system air and bleed down the system air pressure to less than 35 PSI.
2. Set the Stroke Select switch to "INCH."
3. Check to see whether the Interrupted Stroke LED is lit.
   - If the Interrupted Stroke LED is lit, go to the next step.
   - If the Interrupted Stroke LED is unlit, check to see whether the "Inch select" LED on the WPC 1000 Control board is lit. If the LED is unlit, check the wiring of the Stroke Select switch and correct any problems. If the "Inch select" LED is still unlit, call Wintriss Tech. Support.
4. Press the Emergency Stop button on the Operator Station.

NOTICE

RESET EMERGENCY-STOP BUTTON AFTER USE

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

5. Check to see whether fault code F13 appears on the LED display.
   - If F13 displays, go to the next step.
   - If F13 does not display, check to see whether the "E-stop input 1" and "E-stop input 2" LEDs on the WPC 1000 Control board turn off when the Emergency Stop button is pressed. If the two LEDs do not turn off, check the wiring of the E-stop input 1 and 2

connections, and correct any problems. If the two LEDs still do not turn off, call Wintriss Tech. Support.

6. Turn on the press motor in forward rotation (if applicable).
7. Check to see whether the "Motor forward input" LED on the WPC 1000 Control board is lit.
   - If the "Motor forward input" LED is lit, go to the next step.
   - If the "Motor forward input" LED is unlit, check the wiring of the Motor Forward input connection, and correct any problems. If the LED is still unlit, call Wintriss Tech. Support.
8. Press both Run/Inch palm buttons on the Operator Station at the same time.
9. Check to see whether fault code F48 appears on the LED display.

NOTICE

If the E-stop and Top-stop circuits are not connected according to the wiring shown in Figure 1 at the end of the manual, the fault code that displays may be different. Call Wintriss Tech. Support for assistance.

   - If F48 displays, go to the next step.
   - If F48 does not display, check to see whether the "Clutch air pressure switch input" LED on the WPC 1000 Control board is unlit. If the LED is unlit, check the wiring of the Clutch Air Pressure Switch input and correct any problems. Press both Run/Inch palm buttons again. If F48 still does not display, call Wintriss Tech. Support.
10. Apply system air pressure to the press.
11. Check to see whether the "Clutch air pressure switch input" LED on the WPC 1000 Control board is lit. Clear the error code on the display by pushing the Reset/Select button.
12. Turn off the counterbalance air and bleed down the counterbalance air pressure.
13. Press both Run/Inch palm buttons on the Operator Station at the same time. The ram should not move, and the fault code associated with the input the counterbalance pressure switch is connected to (normally, F51 for User 1 Input) should display.
    - If the ram does not move and the appropriate fault code appears, restore the counterbalance air, press the Reset/Select button, and go to the next step.
    - If the ram moves and/or the appropriate fault code does not display, check the wiring of the Counterbalance Air Pressure Switch input, and correct any problems. Push both

Run/Inch palm buttons again. If the ram still moves and/or the appropriate fault code still does not display, call Wintriss Tech. Support.

NOTICE

If the E-stop and Top-stop circuits are not connected according to the wiring shown in Figure 1 at the end of the manual, the fault code that displays may be different. Call Wintriss Tech. Support for assistance.

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

Single-stroke Mode Test with 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 ON PRESS NOT GUARDED PROPERLY FOR CONTINUOUS

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

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

⚠ WARNING

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE ENCLOSURE WITH POWER ON

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

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

To test Single-stroke mode when light curtains are installed, perform the following steps, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

1. Set the Stroke Select switch to “SINGLE,” and verify that the “Single-stroke select” LED on the WPC 1000 Control board is lit.
2. Verify that the light curtain is unobstructed and that the “Light curtain input 1” and “Light curtain input 2” LEDs are lit. These LEDs turn off when the light curtain is obstructed.

3. Press and hold both Run/Inch palm buttons on the Operator Station, observing the ram's motion.
   - If the ram makes a complete stroke, stopping at top dead center, go to the next step.
   - If the ram moves but does not make a complete stroke or does not stop at top dead center and a fault code between F80 and F89 (or between H80 and H89) displays, there is a problem with the overrun limit switch. Try the remedies suggested for overrun limit switch faults, starting on page 5-16; then, Inch the ram to the top of the stroke and repeat this test. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
   - If the ram moves but does not make a complete stroke or does not stop at top dead center and an overrun limit switch fault does not display, check the wiring of the palm buttons and light curtains, correcting any problems; then, Inch the ram to the top of the stroke, and repeat the test. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
   - If the ram does not move at all, check to make sure that the correct version of WPC 1000 firmware is installed, and check the wiring of the palm buttons, correcting any problems. Re-run the test, starting with step 1. If the ram still does not move when you press the Run/Inch palm buttons, call Wintriss Tech. Support.
4. Interrupt the light curtain by placing a piece of cardboard or other object between the light curtain heads to block at least two inches of the light field. Leave the object in place while you perform step 5.
5. Press and hold both Run/Inch palm buttons, observing the behavior of the ram.
   - If the ram does not move and you have only one light curtain, go to the next step.
   - If the ram does move, check to make sure the correct version of WPC 1000 firmware is installed and check the wiring of the palm buttons and light curtains, correcting any problems. Re-run the test, starting with step 4. If the ram still moves with the light curtain blocked, call Wintriss Tech. Support.
6. Remove the object you used to interrupt the light curtain field in step 4. Prepare to insert it into the field while the ram is on the downstroke. Be sure to keep hands and other objects away from the press.
7. While one person presses and holds both Run/Inch palm buttons, have another person move the cardboard or other object into the light field while the ram is on the downstroke. Observe the action of the ram.
   - If you are using one light curtain, and the ram stops immediately and the Interrupted Stroke LED flashes, go to the next step.
   - If you are using two light curtains, and the ram stops immediately and the Interrupted Stroke LED flashes, inch the ram to the top of the stroke and repeat the test, starting with step 6, by interrupting the second light curtain. When you have successfully completed the test with the second light curtain, go to the next step.
   - If the ram does not stop immediately, check the wiring of the light curtains, correcting any problems; then, Inch the ram to the top of the stroke and re-run the test, starting with

step 6. If the ram again moves when the light curtain is interrupted, call Wintriss Tech. Support.

8. Clear the Interrupted Stroke by holding the Run/Inch palm buttons until the ram stops at top dead center.
9. Press and immediately release the Run/Inch palm buttons, observing the behavior of the ram.
   - If the ram moves when you press the Run/Inch palm buttons, then stops when you release them, and the Interrupted Stroke LED flashes, go to the next step.
   - If the ram does not move, or if it moves but does not stop immediately when you release the Run/Inch palm buttons, or if the Interrupted Stroke LED does not flash, check the wiring of the palm buttons and light curtains, correcting any problems, and run this test again, repeating step 9. If the ram still does not move or moves but does not stop immediately, or if the ram stops but the Interrupted Stroke LED does not flash, call Wintriss Tech. Support.
10. Complete the stroke by pressing and holding the Run/Inch palm buttons.
11. Go to the next applicable test.

Single Stroke Mode Test Without Light Curtain(s)

⚠ DANGER

INJURY DURING TESTING

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

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

⚠ DANGER

CONTINUOUS MODE USED ON PRESS NOT GUARDED PROPERLY FOR CONTINUOUS

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

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

To test Single-stroke mode when light curtains are not installed, perform the following steps, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

1. Set the Stroke Select switch to “SINGLE.” Verify that the “Single-stroke select” LED on the WPC 1000 Control board is lit.
2. Press and hold both Run/Inch palm buttons, observing the motion of the ram.
   - If the ram makes a complete stroke and stops at or near top dead center, go to step 6.
   - If the ram does not make a full stroke or does not stop at top dead center, go to the next step.

3. Check for fault codes on the LED display.
   - If a fault code between F80 and F89 (or between H80 and H89) is displayed, there is a problem with the overrun limit switch. Try the remedies suggested for overrun limit switch faults, starting on page 5-16; then, Inch the ram to the top of the stroke and run the test again, starting with step 2. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
   - If the LED display is blank or shows an error other than an overrun limit switch fault, check and correct the wiring of the palm buttons and light curtains, correcting any problems; then, run the test again, starting with step 2. If the ram still does not complete a stroke or stop at top dead center, call Wintriss Tech. Support.
4. Turn the Stroke Select switch to "INCH," and bring the ram to top dead center.
5. Press and then immediately release the Run/Inch palm buttons, observing the behavior of the ram.
   - If the ram moves when you press the Run/Inch buttons, then stops when you release them, and the Interrupted Stroke LED flashes, go to the next step.
   - If the ram does not move, or if it moves but does not stop immediately when you release the Run/Inch buttons, or if the Interrupted Stroke LED does not flash, check the wiring of the palm buttons and light curtains, correcting any problems, and run the test again, repeating step 5. If the ram still does not move or moves but does not stop immediately, or if the ram stops but the Interrupted Stroke LED does not flash, call Wintriss Tech. Support.
6. Complete the stroke by pressing and holding the Run/Inch palm buttons.
7. Go to the next applicable test.

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

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

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

1. Set the Stroke Select switch to "SINGLE."
2. Press and hold down both Run/Inch palm buttons to cycle the press through one stroke. When the press top-stops, continue to hold down the left button, and remove your hand from the right button; then, after a moment, replace your hand on the right button and continue to hold down both buttons.
   - If the press does not initiate the stroke, go to the next step.
   - If the press does initiate the stroke, check the wiring of the palm buttons. When the problem has been corrected, repeat step 2. If the press still initiates the stroke, call Wintriss Tech. Support.
3. Remove both hands from the Run/Inch buttons.
4. Press and hold down both Run/Inch buttons to cycle the press through one stroke. When the press top-stops, continue to hold down the right button, and remove your hand from the left button; then, after a moment, replace your hand on the left button and continue to hold down both buttons.
   - If the press does not initiate the stroke, the test has been completed successfully. Go to the next applicable test.
   - If the press does initiate the stroke, check the wiring of the palm buttons, correcting any problems, then repeat step 4. If the press still initiates the stroke, call Wintriss Tech. Support.

Anti-repeat Test

⚠ 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.

The anti-repeat test verifies that the press cycles only once when WPC 1000 is in Single-stroke mode and both Run/Inch buttons are pressed simultaneously. To perform the test, do the following:

1. Set the Stroke Select switch to "SINGLE."

2. Press and hold down both Run/Inch palm buttons until the press completes a stroke and for ten seconds after the press stops.
   - If the press makes one stroke and then top-stops, WPC 1000 is operating correctly. Go to the next applicable test.
   - If the press cycles again after making one stroke, check the wiring of the Operator Station and correct any problems; then, repeat the test. If the press still cycles after it makes one stroke, call Wintriss Tech. Support.

Continuous Mode Test with Light Curtain(s)

⚠ DANGER

IMPROPER SAFEGUARDING

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

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

⚠ DANGER

INJURY DURING TESTING

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

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

This test verifies that your press and the light curtains connected to it operate correctly in Continuous mode. To verify Continuous mode operation on a press without light curtains, go to the next test (page 3-49). If your press does not run in Continuous mode, go to the next applicable test. To run the Continuous mode test with light curtains, do the following, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

1. Set the Stroke Select switch to "CONT." Verify that the "Continuous select" LED on the WPC 1000 Control board is lit.
2. Verify that the light curtain is unobstructed and that the "Light curtain input 1" and "Light curtain input 2" LEDs are lit. These LEDs turn off when the light curtain is obstructed.
3. Press the Prior Act button on the Operator Station. The Prior Act lamp should illuminate, then turn off after eight seconds.
   - If the Prior Act lamp turns off after eight seconds, go to step 4.
   - If the Prior Act lamp does not turn off after eight seconds, stop! Do not go any further! Call Wintriss Tech. Support.
4. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.

- If the press continues to run, go to the next step.
- If the press stops, check the wiring of the palm buttons, correct any problems, press and hold both Run/Inch buttons to return the ram to top dead center, and run the test again. If the press still stops, call Wintriss Tech. Support.

NOTICE

RESET EMERGENCY-STOP BUTTON AFTER USE

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

5. Press the Emergency Stop button on the Operator Station. The ram should stop immediately, the F13 fault code should appear in the LED display, and the Interrupted Stroke LED should flash. If these conditions are not present, check the wiring of the Operator Station, particularly the E-stop wiring, and correct any problems. Rerun this test from step 4. If the conditions are still not present, call Wintriss Tech. Support.
6. Press and hold the Run/Inch palm buttons until the press returns to top dead center.
7. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.
8. Press the Reset/Select button until the “Stopping Time” indicator segment becomes lit.
9. Press the Top Stop button on the Operator Station. The ram should stop near top dead center, and the Stopping Time in milliseconds should appear in the LED display.
10. Restart the press in Continuous mode.
11. Block the light curtain. The press should come to an immediate stop, and the Interrupted Stroke LED should flash.
    - If the press comes to an immediate stop and the Interrupted Stroke LED flashes, go to the next step.
    - If your WPC 1000 has the muting option, and the ram stops as soon as it reaches the non-muted (i.e., downward) portion of the stroke, go to the next step.
    - If your WPC 1000 has the muting option, and the ram does not stop in the non-muted portion of the stroke, check the wiring of the light curtain, correcting any problems, and run the test again, starting with step 10. If the ram still does not stop in the non-muted part of the stroke, call Wintriss Tech. Support.
    - If your WPC 1000 does not have the muting option and the press does not come to an immediate stop when you interrupt the light curtain, check the wiring of the light

curtain, correcting any problems, and run the test again, starting with step 10. If the press still does not stop immediately, call Wintriss Tech. Support.

NOTICE

When a stroke is interrupted, WPC 1000 automatically switches to Two-hand Maintained Single-stroke mode for the remainder of the stroke.

12. Press and hold both Run/Inch palm buttons to return the ram to top dead center.
13. Go to the next applicable test.

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 regulation 1910.217 and any other regulations and standards that apply.
- Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

⚠ DANGER

INJURY DURING TESTING

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

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

This test verifies that your press operates correctly in Continuous mode. To verify Continuous mode operation on a press with light curtains, return to the previous test (see page 3-47). If your press does not run in Continuous mode, go to the next applicable test. To run the Continuous mode test without light curtain, do the following, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

1. Set the Stroke Select switch to "CONT." Verify that the "Continuous select" LED on the WPC 1000 Control board is lit.
2. Press the Prior Act button on the Operator Station. The Prior Act lamp should illuminate, then turn off after eight seconds.
   - If the Prior Act lamp turns off after eight seconds, go to the next step.
   - If the Prior Act lamp does not turn off after eight seconds, stop! Do not go any further! Call Wintriss Tech. Support.
3. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.

- If the press continues to run, go to the next step.
- If the press stops, check the wiring of the palm buttons, and correct any problems. Run the test again. If the press still stops, call Wintriss Tech. Support.

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

NOTICE

RESET EMERGENCY-STOP BUTTON AFTER USE

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

5. Press and hold the Run/Inch palm buttons until the press returns to top dead center.
6. Press the Prior Act button and, before the indicator lamp goes out, press both Run/Inch palm buttons, releasing them after bottom dead center on the first stroke. The press should continue running.
7. Press the Reset/Select button until the "Stopping Time" indicator segment becomes lit.
8. Press the Top Stop button on the Operator Station. The ram should stop near top dead center, and the Stopping Time in milliseconds should appear in the LED display.
9. Go to the next applicable test.

Foot Switch 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

MISSING SAFEGUARDS

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

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

This test, which should be run only if you have an optional Foot Switch, verifies that your Foot Switch is operating properly. To perform the test, do the following, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

NOTICE

These instructions refer to the Auto Carry-up Angle, which is factory set to one of the following values:

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

Refer to *Setting the Auto Carry-up Angle*, page 3-14 for information about the Auto Carry-up feature.

1. Set the Stroke Select switch to "SINGLE" and the Mode Select switch to "FOOT." Verify that the "Single-stroke select" and "Foot select" LEDs on the WPC 1000 Control board are lit.
2. Make sure that option switch 3 on the WPC 1000 Control board is set to OFF, its default setting (see *Enabling Foot Control in a Foot Switch*, page 3-28).
3. Power down, then power back up the WPC 1000, if necessary, to enable the settings change. The WPC 1000 is now in Foot Trip mode, the press stroking each time the Foot Switch is depressed.

NOTICE

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

4. Depress the Foot Switch and immediately release it. The press should make a single stroke and stop at top dead center. Verify that the "Foot switch input N/C" LED turns off when the Foot Switch is depressed and that the "Foot switch input N/O" LED illuminates.

NOTICE

If the Interrupted Stroke LED flashes, you must depress and hold the Run/Inch buttons on the Operator Station to bring the press back to top dead center and clear the Interrupted Stroke before you can operate the Foot Switch.

5. Set option switch 3 to ON.
6. Power down, then power back up WPC 1000 to enable the settings change. You are now in Foot Control mode. The press should cycle to Top-stop only if the Foot Switch is held down past the Auto Carry-up Angle.
7. Press and hold the Foot Switch through the Auto Carry-up Angle, then release the Foot Switch. The press should complete the stroke, stopping at Top-stop.
8. Press and hold the Foot Switch again, but release it before the Auto Carry-up Angle. The press should begin to cycle but stop immediately when the Foot Switch is released.

9. Press and hold both Run/Inch buttons. The press should complete the stroke, stopping at Top-stop.
10. Set the Stroke Select switch to "CONT."
11. Press the Prior Act button on the Operator Station, and, before the indicator lamp goes out, depress and hold down the Foot Switch. The press should run as long as the Foot Switch is depressed.
12. Release the Foot Switch. The press should complete the stroke, stopping at Top-stop.
13. Depress the Foot Switch and immediately release it. The press should stop after a single stroke.
14. If you want to repeat testing of the Foot Switch in Continuous mode, make sure to press the Prior Act button before attempting to initiate another stroke.
15. Go to the next applicable test.

One-hand Control 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

MISSING SAFEGUARDS

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

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

This test, which should be run only if you have an optional One-hand Control, verifies that your One-hand Control is operating properly. To perform the test, do the following, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

1. Set the Stroke Select switch to "SINGLE" and the Mode Select switch to "1 HAND." Verify that the "Single-stroke select" and "One-hand select" LEDs on the WPC 1000 Control board are lit.
2. Make sure that option switch 3 on the WPC 1000 Control board is set to OFF, its default setting (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 3-28).

3. Power down, then power back up the WPC 1000, if necessary, to enable the settings change. The WPC 1000 is now in normal One-hand Control operation, the press stroking each time the One-hand Control switch is depressed.

NOTICE

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

4. Press the One-hand Control switch and release it immediately. The press should make a single stroke and stop at top dead center. Verify that the "Palm switch input N/C" LED turns off when the One-hand Control is depressed and that the "Palm switch input N/O" LED illuminates.

NOTICE

If the Interrupted Stroke LED flashes, you must press and hold the Run/Inch buttons on the Operator Station to bring the press back to top dead center and clear the Interrupted Stroke before you can operate the One-hand Control.

5. Set option switch 3 to ON.
6. Power down, then power back up WPC 1000 to enable the settings change. You are now in Light Curtain Break mode. The press should cycle to Top-stop only if the One-hand Control is pressed within eight seconds of the operator's hand clearing the light curtain.
7. Break the light curtain to activate the One-hand Control, then remove your hand and press the One-hand Control within eight seconds. The press should complete the stroke, stopping at Top-stop.
8. Go to the next applicable test.

Bar Mode Control Test

⚠ DANGER

INJURY DURING BAR MODE TESTING

- Be sure there is no die or other tooling in the press during testing.
- Keep all personnel away from the press during testing.
- Use a spring-loaded turnover bar when you bar the press.

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

This test, which should be run only if you have an optional Bar Mode Control, verifies that your Bar Mode Control is operating properly. To perform the test, do the following, referring to Figure 3-14, page 3-36 for LED locations on the WPC 1000 Control board:

1. Set the Stroke Select switch to "INCH" and the Mode Select switch to "2 HAND."
2. Set the Select switch on the Bar Control to "ON." Verify that the "Bar selector switch input" LED on the WPC 1000 Control board is lit.

3. Turn the press motor off.
4. While the press's flywheel is still turning, press and release the Operate button on the Bar Mode Control. Verify that the following events occur:
   - The Dual Safety Valve should energize while the Operate button is depressed and de-energize when the button is released
   - The "Bar actuator input" LED should illuminate while the Operate button is depressed
   - The F26 fault code should appear in the LED display
5. Press the Reset/Select button to clear the fault.
6. When the flywheel has stopped turning, press and hold the Operate button on the Bar Mode Control. The Dual Safety Valve should energize and stay energized.
7. You can now bar the press, using a spring-loaded turnover bar.

NOTICE

As you bar the press, WPC 1000 monitors the speed of the crank. If you bar the press too quickly, the DSV de-energizes and an F26 fault code displays, stopping the press.

8. Go to the next applicable test.

Checking Operation of the User Inputs

This test verifies that any user inputs you have connected to auxiliary press functions are wired and operating correctly. If you have not wired any user inputs, go to the next section. To perform this test, do the following:

1. Run the press. Actuate one of the user inputs.
   - If the press stops and the appropriate fault code displays, the input is wired and operating properly. Repeat the test for the other user inputs. When you have checked all of the inputs, go to the next step.
   - If the press does not stop and/or the appropriate fault code does not display, check the wiring of that input and rerun the test. If the press still does not stop and/or the correct fault code does not display, call Wintriss Tech. Support.
2. You have completed the Final Checkout tests. Proceed to Chapter 4.

Chapter 4. Operation

⚠ 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 1000 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 (see page 3-35) after installation and after any modification or repair of the WPC 1000.
- 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 1000.
- Disconnect the “Continuous” position on the Stroke Select switch to prevent your press from being run in Continuous mode if it is not guarded correctly for use in Continuous mode. Also cover the “CONT” label on your control’s Stroke Select switch.

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

⚠ 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

INCORRECT AUTO CARRY-UP ANGLE

- Ensure that the Auto Carry-up Angle is correct. If the operator can reach the pinch point, the Auto Carry-up Angle must be set so that any hazardous openings are smaller than 1/4 in. by the time the crankshaft reaches the Auto Carry-up Angle.
- Determine the Auto Carry-up Angle for each tool based on the crank angle at which the tool’s hazardous openings are smaller than 1/4 in.
- Change the Auto Carry-up Angle to the correct value 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 from the pinch point or hazardous area.

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

⚠ 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.

NOTICE

CLEARING "LOC" WHEN YOU TURN ON POWER TO THE PRESS

Whenever you turn on power to your press, the message "Loc" appears in the LED display (see *Lockout Message*, page 5-3). To clear this message, simply turn the Stroke Select switch to "OFF" and then back to the previous operating mode. If the Stroke Select switch is already in the "OFF" position when you power up, turn it to the desired stroke selection to clear the "Loc" message. Once "Loc" is clear, you can resume operation.

NOTICE

PRESS STOPS WHEN SYSTEM FAULT DETECTED OR LIGHT CURTAIN BLOCKED

- The WPC 1000 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 the press stops, the Interrupted Stroke LED on the WPC 1000 display (see Figure 1-3, page 1-5) will flash and a three-character fault code, consisting of the letter "E," "F," or "H" followed by a two-digit number, will appear in the digital LED display.
- When an Interrupted Stroke occurs, WPC 1000 automatically switches to Two-hand Maintained Single-stroke mode for the remainder of the stroke (see *Responding to an Interrupted Stroke*, page 4-3). To clear a system fault, press the Reset/Select button on the WPC 1000 display.

This chapter shows you how to operate your WPC 1000, using each Stroke and Mode setting.

Responding to an Interrupted Stroke

⚠ DANGER

INTERRUPTED STROKE DUE TO MACHINE MALFUNCTION

Investigate and correct the cause of the Interrupted Stroke before resuming operation of the press.

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

An Interrupted Stroke is a condition that occurs whenever the press is stopped before a stroke can be completed, forcing the operator to return the press to its Top-stop position. The command that stops the press may be issued by the operator or a safety device or be the result of a fault condition. When an Interrupted Stroke occurs, the Interrupted Stroke LED on the WPC 1000 display flashes (see Figure 1-3, page 1-5 for location), and WPC 1000 automatically switches to Two-hand Maintained Single-stroke mode. To clear the Interrupted Stroke, press both Run/Inch palm buttons on the Operator Station until the press returns to top dead center. When the press has returned to Top-stop, the Interrupted Stroke LED turns off and WPC 1000 switches back to the stroke and mode selected when the Emergency-stop occurred.

When the Emergency-stop is caused by a system fault, you must first clear the error, by pressing the Reset/Select button; then you can return the press to top dead center.

If the press is being operated in Inch mode when the Emergency-stop occurs, WPC 1000 stays in Inch mode, allowing the operator to return the press to Top-stop by simultaneously pressing and holding the Run/Inch palm buttons just as he does in Two-hand Maintained Single-stroke mode.

Responding to a Brake Warning

The amber-colored Brake Warning LED on the WPC 1000 display (see Figure 1-3, page 1-5 for location) illuminates whenever the Stopping Time of the press, which is recorded by the Brake Monitor on every Top-stop, increases to within 10 milliseconds of the Stop-time Limit set in Initialization (see *Setting the Stop-time Limit*, page 3-17). The brake warning alerts you to the need for maintenance on or repair of the brake (see *Brake Warning LED*, page 5-3).

WPC 1000 compares the Stopping Time of the press with the Stop-time Limit each time the press top-stops.

Whenever the Stopping Time of the press becomes longer than the Stop-time Limit, the out-of-limit value flashes in the LED display and WPC 1000 prevents the press from being run until the problem has been completely corrected (see *Stop Time Exceeded*, page 5-4).

Displaying and Clearing the Stroke Counter

The stroke counter, which is available only on WPC 1000 units with the optional counter display, maintains the number of strokes made by the press in Single-stroke and Continuous modes. The "Counter" indicator segment is the default segment in these two modes. Whenever the Stroke Select key switch is turned to "SINGLE" or "CONT," the "Counter" segment illuminates, and the current counter value appears in the digital LED display.

The counter is incremented each time the ram passes the 180° position in the stroke. The counter does not count strokes in Inch Mode. In Inch, the indicator segment defaults to "Angle/SPM," and the current crankshaft angle is shown in the LED display.

Viewing the Counter Value

To view the current value of the counter, do the following:

1. Press the Reset/Select button repeatedly until the "Counter" indicator segment illuminates. The digital display will show the current counter value, as shown in Figure 4-1.

NOTICE

The "Counter" segment is selected automatically when the Stroke Select key switch is turned from "INCH" to "SINGLE" or "CONT," and the counter value is shown in the LED display.

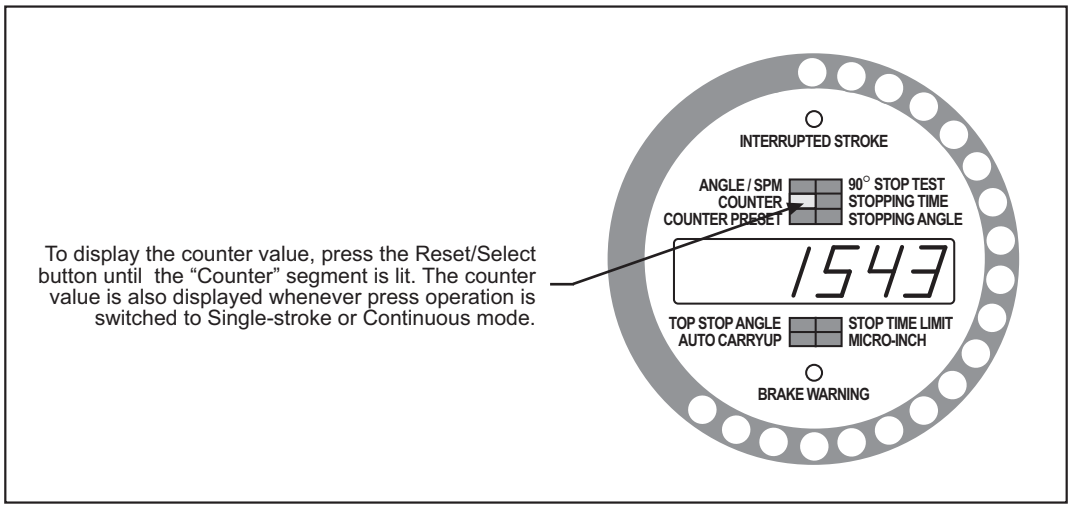


Figure 4-1. WPC 1000 Optional Counter Display with "Counter" Value Shown

Resetting the Counter Value to Zero

To reset the displayed counter value to zero, do the following:

1. With the "Counter" segment illuminated and the current counter value displayed, turn the WPC Settings key switch to "–" (clockwise). The LED display will reset to 0 (zero).

   The next time you operate the press in Single-stroke or Continuous, the counter will begin counting from "1."

Setting and Maintaining the Counter Preset Value

The counter preset feature allows you to set a stroke count that WPC 1000 uses to stop the press after the specified number of strokes. This feature is useful for batch sizing and making periodic QC checks.

When the counter reaches the preset value, WPC 1000 sends a Top-stop signal to the press and displays the F15 fault code on the digital LED display (see *Operational Faults*, page 5-6), indicating that the counter preset has been reached. 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*, page 4-6.

Setting the Counter Preset

To set the counter preset value, do the following:

1. Press the Reset/Select button repeatedly until the "Counter Preset" indicator segment illuminates. The digital display shows the current counter preset value, as shown in Figure 4-2, page 4-5.

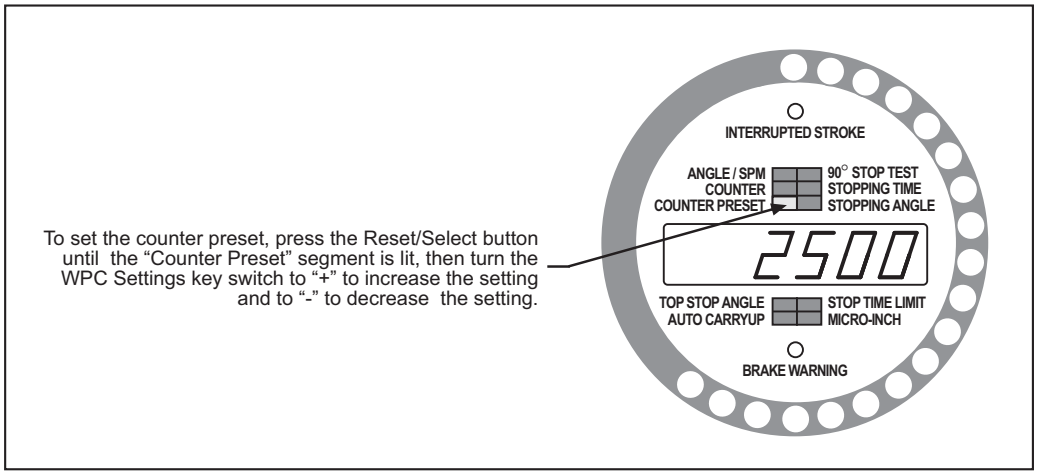


Figure 4-2. WPC 1000 Optional Counter Display with "Counter Preset" Value Shown

2. Adjust the current counter preset by turning the WPC Settings key switch to "+" (counterclockwise) to increase the setting or to "–" (clockwise) to decrease the setting.

NOTICE

The longer you turn (and hold) the key switch to "+" or "–", the more quickly the value changes.

NOTICE

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*, page 4-6). Then turn the Settings key switch to "–" and hold it there to decrease the displayed value until it reaches the value you want.

Disabling the Counter Preset

You can disable the counter preset feature by forcing the counter preset value to zero (0). Disabling the counter preset has no effect on the counter itself, which will still maintain a cumulative total of press strokes. However, since there is no preset value, WPC 1000 will not stop the press. The counter continues to increment up to the value 999999, then rolls over to zero, and starts counting again at one (1).

To disable the counter preset, do the following:

1. With the "Counter Preset" segment illuminated and the current counter preset value displayed, turn the WPC Settings key switch to "–" (clockwise) and hold it while you press the Reset/Select button. The LED display will show the value 0 (zero).
2. Release the WPC Settings key switch.

Forcing the Counter Preset Value to 999999

If the counter preset value you want to enter is very large (i.e, 500,000 or higher), you may want to force the preset to its upper limit, 999999, then decrement the preset until the value you want is displayed. To force the counter preset to 999999, do the following:

1. Force the counter preset value in the LED display to zero (0) as described in the previous section.
2. Turn the WPC Settings key switch to "–" (clockwise) again and release the key immediately. The LED display will show the value 999999.

Operating the Press in Inch Mode

⚠ DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA regulation 1910.217, ANSI standards B11.1 and B11.19, and any other regulations or standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

⚠ DANGER

INCH MODE NOT SUITABLE FOR PRODUCTION

DO NOT use INCH mode as a production mode, per ANSI B11.1-2009.

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

NOTICE

ESTOP/INTERRUPTED STROKE WHEN IN INCH MODE

If the press is in Inch mode when it is Emergency-stopped, it does not switch to Two-hand Maintained Single-stroke but stays in Inch for the remainder of the stroke.

To operate the press in Inch mode, do the following:

1. Set the Stroke Select switch to “INCH.”
2. Set the Mode Select switch as follows:

   If a light curtain is installed on the press, set the switch to “2 HAND” or “1 HAND.” The light curtain will be muted on the upstroke if WPC 1000 has the muting option.

   If no light curtain is installed, set the switch to “2 HAND.” If you set the switch to “1 HAND,” WPC 1000 defaults to Two-hand mode.

There are four different ways to operate the press in Inch mode:

- Top-stop in Inch
- Top-stop Bypass
- Micro-inch
- Dead Motor Inch

Top-stop in Inch

Top-stop in Inch is the default Inch mode. To run the press in Top-stop in Inch, do the following:

1. To move the ram a short distance, press and hold both Run/Inch palm buttons on the Operator Station at the same time, releasing them when the ram has reached the desired point in the stroke.

> **NOTICE**
>
> If you are running the press in One-hand mode, you need to depress the left Run/Inch button only.

   The ram moves only as long as both Run/Inch buttons are depressed. Releasing one of the buttons stops the ram immediately.

> **NOTICE**
>
> The ram will also stop if the light curtain is blocked during the non-muted portion of the stroke, or if a system fault is detected.

2. Repeat the previous step to continue "inching" or "jogging" the ram.
3. To move the ram to Top-stop, press and hold both Run/Inch palm buttons until the ram comes to a stop at the top of the stroke.
4. To initiate another stroke, release the Run/Inch buttons, then press and hold them until the ram again comes to rest at the Top-stop position.

> **NOTICE**
>
> When "inching" the press, you may not notice when the ram top-stops.

Top-stop Bypass (Top-stop in Inch Disabled)

Top-stop in Inch can be disabled so that the ram continues to cycle, without coming to a Top-stop, as long as the Run/Inch buttons on the Operator Station are depressed. In this alternative Inch mode, called Top-stop Bypass, the ram stops only when one or both buttons are released.

To disable Top-stop in Inch, refer to *Disabling Top-stop in Inch*, page 2-33.

Micro-inch

Micro-inch allows finer adjustments than are possible in Top-stop in Inch or Top-stop Bypass and is designed to facilitate setup on high-speed or short-stroke presses. In Micro-inch, the distance the ram moves is controlled by a time setting you make on the WPC 1000 display (see *Setting Micro-Inch*, page 3-26). When that time has elapsed, the ram comes to a stop even though the Run/Inch palm buttons are still depressed.

The ram can be stopped before the end of the Micro-inch time by releasing one or both Run/Inch buttons. To move the ram through a complete stroke in Micro-inch, you must "inch" the press. Micro-inch has no Top-stop feature.

Wiring instructions are provided in *Wiring Micro-inch*, page 2-32.

NOTICE

INTERRUPTED STROKE

When Micro-inch is enabled, WPC 1000 automatically switches to Two-hand Maintained Single-stroke during an Interrupted Stroke even though the press is in Inch. Normally, WPC 1000 remains in Inch during an Interrupted Stroke. See *Responding to an Interrupted Stroke*, page 4-3.

Dead Motor Inch

Dead Motor Inch is a feature that allows you to operate the press in Inch mode for a short time after the main motor is turned off, using the energy stored in the flywheel. Dead Motor Inch allows the press to be inched in smaller increments than is possible when the press is running, and is useful during setup. To activate Dead Motor Inch, do the following:

1. Turn off the press motor.
2. Turn the Stroke Select switch to "INCH."
3. Press both Run/Inch buttons to initiate a stroke, releasing them when the ram has moved the desired distance. Repeat this process until the flywheel has stopped turning.

Operating the Press in Single-stroke Mode

⚠ DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA regulation 1910.217, ANSI standards B11.1 and B11.19, and any other regulations or standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

To operate the press in Single-stroke mode, do the following:

1. Turn the Stroke Select switch to "SINGLE."
2. Turn the Mode Select switch to "2 HAND" for operation in Two-hand mode, to "1 HAND" for operation in One-hand or One-hand Control mode, or to "FOOT" for operation in Foot mode. Instructions for operating the press in each mode are provided below.

NOTICE

If you are running Two-hand Only firmware, One-hand and Foot modes are not available.

Single-stroke, Two-hand Operation

⚠ DANGER

OPERATOR STATION WIRED INCORRECTLY

Run all necessary tests to verify that each Operator Station is wired correctly and provides proper anti-tie-down (see page 3-45) and anti-repeat (see page 3-46) 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 from the pinch point or hazardous area.

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

To run the press, using Single-stroke, Two-hand operation, do the following:

1. Set the correct timing ("palm" time or "concurrent" time) for your Operator Station configuration on option switch 5 on the WPC 1000 Control board (refer to *Switch 5 – Selecting Concurrent Time for Multiple Op. Stations*, page 3-30). Set the switch to OFF to enable a 1/2-second palm (or synchronous) time for a single Operator Station. Set the switch to ON to enable a 5-second concurrent time for multiple Operator Stations.
2. With the Mode Select switch set to "2 HAND," initiate a stroke by pressing both Run/Inch buttons, holding them until the ram reaches the Auto Carry-up Angle, then releasing them (see *Setting the Auto Carry-up Angle*, page 3-14). The ram completes its stroke automatically, stopping at Top-stop.

   If one or both Run/Inch buttons are released before the ram reaches the Auto Carry-up Angle, the press stops. The press will also be stopped on the downstroke if a system fault is detected or if a light curtain is blocked.

Single-stroke, One-hand Operation

⚠ DANGER

INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 1000 properly in order to run the press in Single-stroke, One-hand mode.

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

Single-stroke, One-hand operation can only be used with WPC 1000 systems running Two-hand/One-hand/Foot firmware, equipped with a Mode Select key switch, and employing a Shadow light curtain to guard the point of operation. To run the press in this mode, do the following:

1. With the Mode Select switch set to "1 HAND," initiate a stroke by pressing the left Run/Inch palm button, then releasing it. The ram completes its stroke automatically, stopping at Top-stop.

   The press is stopped if a system fault is detected or if a light curtain is blocked during the downstroke.

Single-stroke, One-hand Control Operation

⚠ DANGER

INSUFFICIENT SAFEGUARDS ALLOWING ACCESS TO HAZARD

- Follow all applicable OSHA and ANSI regulations for safeguarding your press system. Point-of-operation safeguarding is the single most important factor in the prevention of injuries.
- Follow all applicable OSHA and ANSI regulations when installing a One-hand Control.
- Ensure that proper safeguarding devices are installed and working properly. Wintriss takes no responsibility if safeguarding devices are not installed or working correctly.
- DO NOT use WPC 1000 or a One-hand Control as a safeguarding device
- Install and operate WPC 1000 and a One-hand Control in accordance with OSHA and ANSI regulations.

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

⚠ DANGER

PREVENT OPERATOR FROM STANDING BETWEEN LIGHT CURTAIN AND HAZARDOUS AREA

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

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

⚠ DANGER

INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 1000 properly in order to run the press in Single-stroke, One-hand Control mode.

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

NOTICE

When a One-hand Control is installed, you cannot use the Run/Inch palm buttons on the Operator Station while the press is in One-hand mode. All other modes work normally as described in this manual.

One-hand Control is a switch available from Wintriss that allows operators to use their free hand to feed a part while their other hand operates the switch. This option can only be used with WPC 1000 systems running Two-hand/One-hand/Foot firmware, equipped with a Mode Select key switch, and employing a Shadow light curtain to guard the point of operation.

One-hand Control can be used in two different modes. In Normal mode, the press cycles in Single-stroke whenever you push the One-hand Control button. In "Light Curtain Break" mode, the press cycles only when you push the One-hand Control button within 8 seconds of removing your hand(s) from the light curtain. If the button is pushed after this interval expires, the press does not cycle.

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

You select the mode by setting option switch 3 on the WPC 1000 Control board (see step 1, below).

To run the press in Single-stroke, One-hand Control mode, do the following:

1. Set option switch 3 to OFF to operate the press in Normal One-hand Control mode (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 3-28). Set switch 3 to ON to operate in Light Curtain Break mode.

NOTICE

If the Interrupted Stroke LED flashes, press and hold the Run/Inch palm buttons on the Operator Station to return the press to Top-stop. The Interrupted Stroke LED should turn off.

2. With the Stroke Select switch set to SINGLE, use the One-hand Control to operate the press as follows:
   - Press and release the One-hand Control button if option switch 3 is set for Normal operation.
   - Break the light curtain, then remove your hand and press the One-hand Control button within 8 seconds if option switch 3 is set for Light Curtain Break mode.

The press will make a complete stroke, coming to rest at Top-stop.

NOTICE

The Prior Act lamp illuminates after the light curtain has been broken, and stays on for 8 seconds. If the One-hand Control button is not pushed within that time, the Prior Act lamp will turn off. The press will not start until you break the light curtain again and push the One-hand Control button within 8 seconds of removing your hand.

NOTICE

If the press does not run, turn off power to the press and WPC 1000. Recheck all wiring connections. Try One-hand Control again. If the press still does not run, call Wintriss Tech. Support.

Single-stroke, Foot Operation

⚠ DANGER

INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 1000 properly in order to run the press in Single-stroke, Foot mode.

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

Single-stroke, Foot operation can only be used with WPC 1000 systems running Two-hand/ One-hand/Foot firmware, equipped with a Mode Select key switch, and employing a Shadow light curtain to guard the point of operation.

Two modes are available when you run the press in Single-stroke Foot. In Foot Trip mode, you can initiate a complete stroke by simply pressing and releasing the Foot Switch. In Foot Control mode, you must press and hold the Foot Switch through the Auto Carry-up Angle to complete a stroke. You select the mode by setting option switch 3 on the WPC 1000 Control board (see step 1, below).

To run the press in Single-stroke, Foot mode, do the following:

1. Set option switch 3 to OFF to operate the press in Foot Trip mode (see *Enabling Foot Control in a Foot Switch*, page 3-28). Set switch 3 to ON to operate in Foot Control mode.
2. With the Stroke Select switch set to "FOOT," depress the Foot Switch to initiate a stroke, releasing or holding the pedal depending on the option switch 3 setting.
   - Release the Foot Switch if option switch 3 is set for Foot Trip
   - Hold the Foot Switch through the Auto Carry-up Angle if option switch 3 is set for Foot Control

   The ram completes the stroke, coming to rest at Top-stop.

NOTICE

INTERRUPTED STROKE

In Foot Control mode, if you remove your foot from the Foot Switch before the ram reaches the Auto Carry-up Angle, the press will stop, the Interrupted Stroke LED will flash, and WPC 1000 will switch to Two-hand Maintained Single-stroke mode for the remainder of the stroke. To clear the Interrupted Stroke and return to Single-stroke, Foot operation, press both Run/Inch palm buttons on the Operator Station and hold them until the press returns to Top-stop.

Operating the Press in Continuous Mode

⚠ DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA regulation 1910.217, ANSI standards B11.1 and B11.19, and any other regulations or standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

To operate the press in Continuous mode, do the following:

1. Turn the Stroke Select switch to "CONT."
2. Turn the Mode Select switch to "2 HAND" for operation in Two-hand mode or to "FOOT" for operation in Foot mode. Instructions for operating the press in each mode are provided below.

Continuous, Two-hand Operation

To run the press in Continuous, Two-hand mode, do the following:

NOTICE

You must press both Run/Inch palm buttons on the Operator Station within 8 seconds after you press the Prior Act button in order to initiate Continuous mode operation. Otherwise, the press will not start. The Prior Act lamp illuminates when you press the Prior Act button and turns off after 8 seconds.

1. With the Mode Select switch set to "2 HAND," press the Prior Act button on the Operator Station, then, within 8 seconds, press both Run/Inch palm buttons and hold them through the Auto Carry-up Angle. The ram will complete the stroke and continue stroking until one of the following events occurs:
   - You press the Top Stop button
   - You press the Emergency Stop/Reset button
   - A system fault is detected
   - The light curtain is blocked during the non-muted portion of the stroke

NOTICE

If the press is Emergency-stopped, WPC 1000 automatically changes to Two-hand Maintained Single-stroke mode and the Interrupted Stroke LED flashes. To clear the Interrupted Stroke, press and hold both Run/Inch buttons to complete the stroke and return the ram to Top-stop.

Continuous, Foot Operation

⚠ DANGER

INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 1000 properly in order to run the press in Continuous, Foot mode.

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

Continuous, Foot operation can only be used with WPC 1000 systems running Two-hand/ One-hand/Foot firmware, equipped with a Mode Select key switch, and employing a Shadow light curtain to guard the point of operation.

Option switch 3 settings, which govern Foot operation in Single-stroke (see page 4-14), do not apply to Continuous, Foot operation.

To run the press in Continuous, Foot mode, do the following:

NOTICE

You must depress the Foot Switch within 8 seconds after you press the Prior Act button in order to initiate Continuous mode operation. Otherwise, the press will not start. The Prior Act lamp illuminates when you press the Prior Act button and turns off after 8 seconds.

1. With the Mode Select switch set to "FOOT," press the Prior Act button on the Operator Station, then, within 8 seconds, depress and hold the Foot Switch pedal. The ram will complete the stroke and continue stroking until you release the Foot Switch, at which point the press will return to Top-stop.

   As long as the Foot Switch is depressed, the press will continue to stroke but will stop if one of the following events occurs:

   - You press the Top Stop button
   - You press the Emergency Stop/Reset button
   - A system fault is detected
   - The light curtain is blocked during the non-muted portion of the stroke

NOTICE

If the press is Emergency-stopped, WPC 1000 automatically changes to Two-hand Maintained Single-stroke mode and the Interrupted Stroke LED flashes. To clear the Interrupted Stroke, press and hold both Run/Inch buttons on the Operator Station to complete the stroke and return the ram to Top-stop.

Operating the Press in Bar Mode

⚠ DANGER

INJURY WHEN USING BAR MODE

- Keep all personnel away from the press while it is being barred
- Use a spring-loaded turnover bar when you bar the press.

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

To operate the press in Bar mode, you must have the Bar Mode Control option. To activate Bar mode and bar the press, do the following:

1. Turn the Stroke Select switch to "INCH."
2. Turn the Mode Select switch to "2 HAND."
3. Turn off the press motor.
4. On the Bar Control enclosure (see Figure 2-25, page 2-45), turn the Select switch to "ON."
5. When the flywheel stops turning, press the Operate button on the Bar Control enclosure.
6. Bar the press using a spring-loaded bar.

NOTICE

When barring the press, do not rotate the flywheel too quickly. If the crankshaft moves faster than 6 SPM, WPC 1000 will stop the ram and fault code F26 will appear in the LED display. Press the Reset/Select button to continue barring the press.

7. If an F26 error appears in the display, press the Reset/Select button to clear it, and continue with the barring operation.

Multiple Operator Stations

⚠ DANGER

HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

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

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

If you have wired a single Operator Station to your WPC 1000 and option switch 5 is set to OFF (see page 3-30), the palm switches on that Operator Station must be pressed within a 1/2-second "palm time" window ("synchronous" time in ANSI terminology) in order to stroke the press.

NOTICE

Do not attempt to install multiple Operator Stations until you have contacted Wintriss Tech. Support. All Operator Stations in a mutli-Op.-Station configuration must contain a Two-hand Control module.

If you have installed multiple Operator Stations (see page 2-17), you must set option switch 5 to ON to establish a 5-second concurrent time for those Op. Stations. Each pair of palm switches on all connected Operator Stations must be pressed within this 5-second window or the press will not start. In addition, all Operator Stations must contain a Two-hand Control module to provide the required 1/2-second palm (or synchronous) time.

Chapter 5. 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 1000.
- Ensure that WPC 1000 is installed, tested, and repaired by qualified personnel.
- Perform the installation verification (see page 2-62) and final checkout (see page 3-35) tests 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 RELAY REPAIR

If a relay fuses

- DO NOT reset the WPC 1000 to restart the machine.
- Remove the WPC 1000 from operation immediately and replace the DSV/Lockout relay board before operating the press again.

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

NOTICE

ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH THE CONTROL BOARD

Connect all signal grounds through pins on the WPC 1000 Control board.

NOTICE

INFORMATION NEEDED BY WINTRISS TECH. SUPPORT DURING TROUBLESHOOTING

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 1000); installed options; and firmware version number (e.g., Vs. 2.77). You can determine firmware version number from either processor chip (A or B) on the WPC 1000 Control board (see Figure 2-11, page 2-20).

This chapter shows you how to respond to the fault codes and other errors that appear on the WPC 1000 display.

Responding to WPC 1000 Faults

Whenever WPC 1000 detects a problem with the clutch/brake control, the press, or peripheral equipment, it sends a Stop command to the press and generates a fault on the WPC 1000 display. Most of these faults are shown as a three-character alphanumeric code in the digital LED readout (see Figure 5-1). The initial letter, E, F, or H, indicates how to clear the fault after it has been corrected and, in the case of F and H faults, specifies the processor (WPC 1000 has two processors) that reported the problem, as shown in Table 5-1.

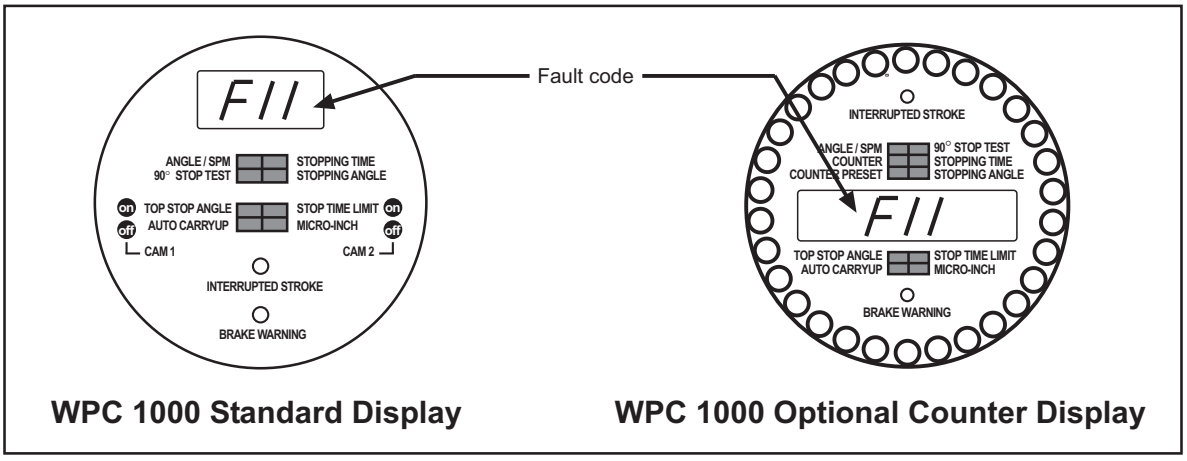


Figure 5-1. WPC 1000 Displays Showing Fault Code

Table 5-1. Fault Codes: Significance of Initial Letter

Initial Letter	Significance
E	To clear the fault, you must power down the WPC 1000, then power the unit back up. The fault cannot be cleared by pressing the Reset/Select button.
F	Generated by the main processor. To clear the fault, press the Reset/Select button.
H	Generated by the second processor. To clear the fault, press the Reset/Select button.

The two-digit number following the initial letter identifies the specific WPC 1000 fault. For example, fault code F11, which is shown in Figure 5-1, indicates that the ram moved when the DSV was de-energized. All E, F, and H faults are documented in numerical order starting on page 5-5.

To respond to a fault, do the following:

1. Correct the problem that caused the fault.
2. Clear the fault code or message on the WPC 1000 display by doing one of the following:
   - To clear F and H faults, press the Reset/Select button on the display or, if one is installed, a Remote Reset switch
   - To clear E faults, power down the WPC 1000, then power the unit back up

Lockout Message

Certain faults, called Lockout faults, generate the message “Loc” in the LED display after the fault is cleared. These are serious error conditions and require an additional step. When the problem has been corrected and the fault cleared, you must turn the Stroke Select switch to “OFF,” then back to “INCH” or one of the other stroke selections to clear the “Loc” message. Fault codes that generate the “Loc” message are identified by an asterisk (*) in documentation of the faults (see *E, F, and H Faults*, page 5-5).

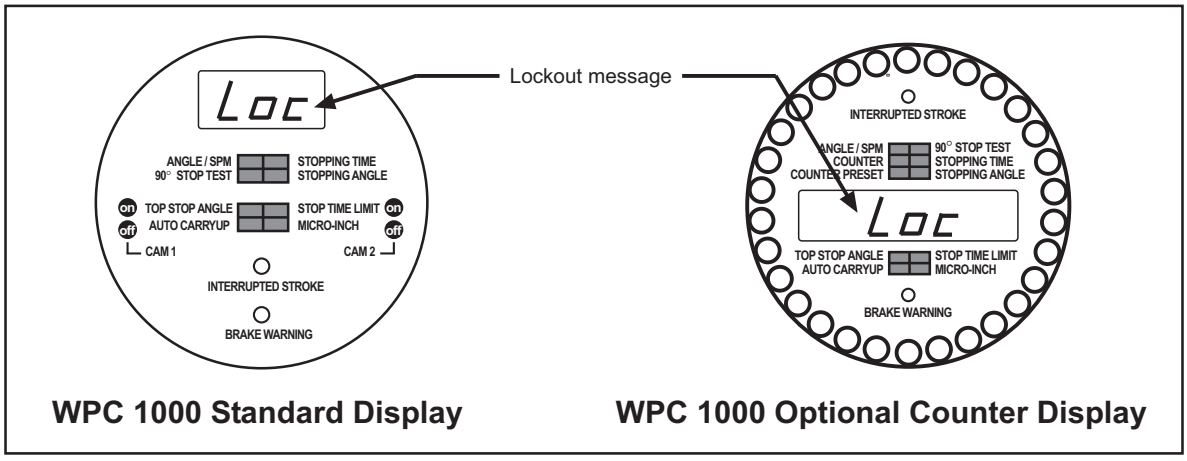


Figure 5-2. WPC 1000 Displays Showing Lockout Message

Brake Monitor Faults

Brake Warning LED

When the Stopping Time of the press increases to within 10 mS of the Stop-time Limit, the amber Brake Warning LED will flash. Illumination of this LED often means that the brake is wearing and/or defective. To respond to this error, do the following:

1. Contact your maintenance crew immediately and have them investigate the condition of the brake.
2. If the brake checks out, your Stop-time Limit is too tight, not allowing for normal wear. Set a new Stop-time Limit, following the instructions in *Running Brake Monitor Tests and Making Settings*, page 3-15.
3. Power down the WPC 1000, then power the unit back up to turn off the Brake Warning LED.

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 1000. See *Determining the 90° Stop Time*, page 3-18.
- 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 3-20.

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.

When the Stopping Time of the press exceeds the Stop-time Limit, that Stopping Time value flashes in the digital LED readout (see Figure 5-3), and WPC 1000 prevents the press from being operated until the brake has been completely repaired.

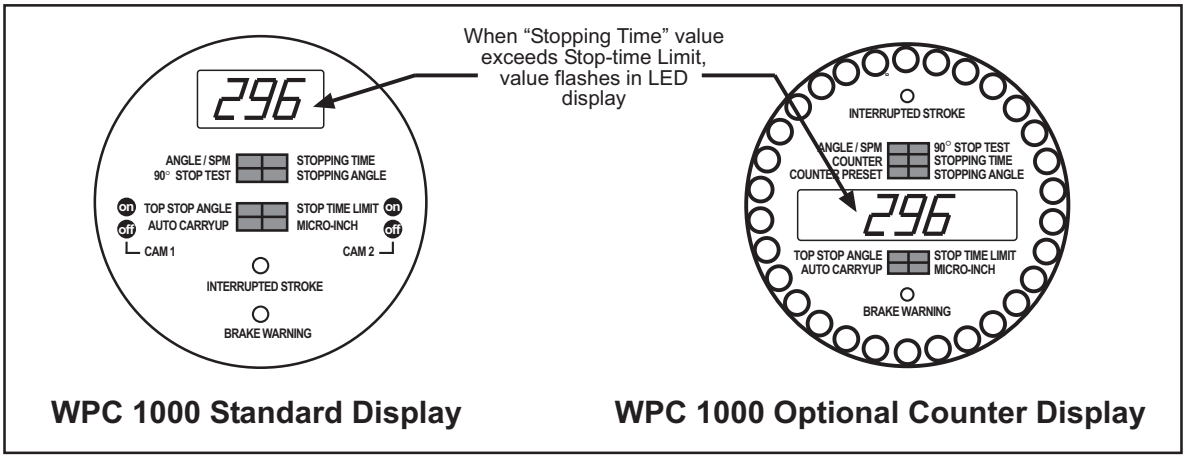


Figure 5-3. WPC 1000 Display Showing Stopping Time Fault

NOTICE

BRAKE WARNING

The Brake Warning LED alerts you when the Stopping Time of the press is within 10 mS of the Stop-time Limit.

To respond to this fault, do the following:

NOTICE

If you try to run the press without first repairing the brake, WPC 1000 will stop the press on the next stroke and again display the Stop Time Exceeded fault in the digital LED readout. The fault will continue to display until the brake has been repaired.

1. Contact your maintenance crew and have them repair the brake immediately.
2. When the brake has been repaired, press the Reset/Select button to clear the Stopping Time fault.
3. When the "Loc" message displays (see page 5-3), turn the Stroke Select switch to "OFF," then to "INCH" to clear the message.
4. Run the press several times to determine its Stopping Time, and compare this value to the result of your last Stop-time tests, referring to *Running Brake Monitor Tests and Making Settings*, page 3-15.
5. Determine whether you need to adjust the previous Stop-time Limit, and make adjustments if necessary.

E, F, and H Faults

⚠ 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.

This section documents in numerical order all WPC 1000 E, F, and H fault codes, providing for each code a description of the problem that caused the fault and suggestions for how to correct it. When you are unable to rectify a fault by following the suggested remedy, contact Wintriss Tech. Support for assistance.

Resolver Faults

E06

Problem: The press is running faster than 1000 SPM, the resolver has failed, or the wiring in the resolver circuit to WPC 1000 is loose or bad.

Remedy: If WPC 1000's rated press speed is exceeded, reduce the speed. If press speed is not the problem, check the resolver wiring for shorts, breaks, or loose connections (see *Installing the Resolver*, page 2-22). If wiring is not the problem, the resolver is probably bad and will have to be replaced. If necessary, contact Wintriss Tech. Support for assistance or replacement of the resolver.

F04 or F05

Problem: Resolver wiring is faulty, or the resolver itself is bad.

Remedy: Check resolver wiring, making sure that the screws on the terminals are tightened on bare wire and not on insulation (see *Installing the Resolver*, page 2-22). Also check the resolver. If necessary, contact Wintriss Tech. Support for assistance or replacement of the resolver.

E07

NOTICE

CLEARING "E" FAULT CODES

To clear E fault codes, do the following:

1. Turn the Stroke Select switch to "OFF"
2. Power down WPC 1000.
3. Power up WPC 1000.

Problem: During zeroing, the resolver has been set outside the range of 330° to 30°.

Remedy: Re-zero the resolver at top dead center (see *Re-zeroing the Resolver*, page 3-4).

Operational Faults

F10

NOTICE

This code is not displayed when Two-hand Inch operating mode is selected to enable Dead Motor Inch.

Problem: The main motor has been turned off.

Remedy: Turn the motor back on, clearing the "Loc" message first if the motor was deactivated during Lockout (see page 5-3). If the motor won't turn on, you may need to replace the Forward contact blocks on the starter with new, unused ones.

F11*

Problem: The resolver moved when the output relays to the Dual Safety Valve (DSV) were off (i.e., open) and the DSV was de-energized.

Remedy: Check clutch, brake and DSV components for correct operation. Correct or repair any malfunction.

NOTICE

CLEARING "LOC" MESSAGE

To clear the "Loc" message, do the following:

1. Turn the Stroke Select switch to "OFF"
2. Turn the Stroke Select switch to "INCH".

F13

Problem: The Emergency Stop button on the WPC 1000 Operator Station has been depressed or the E-Stop circuit was open after initiation of the stroke.

Remedy: If another control is connected to the WPC 1000 E-stop circuit, refer to the user manual for that control to check for a specific error condition, and correct the error.

F14

Problem: The Prior Act button on the Operator Station was depressed (i.e., switch was open) after initiation of the stroke.

Remedy: Press Reset/Select. If the problem persists, check the wiring from the Operator Station to WPC 1000. If necessary, Contact Wintriss Tech. Support.

F15

Problem: The preset on the optional counter has been reached.

Remedy: Press Reset/Select to reset the counter to 1. The counter preset value remains the same until you change it.

F16

Problem: The Top Stop button on the Operator Station was depressed or the Top-stop circuit was open after initiation of the stroke.

Remedy: Check other equipment (e.g. DiPro 1500, AutoSet, etc.) wired into the Top-stop string. Correct the problem. Reset the other equipment first; then reset WPC 1000 and restart the press.

F17

Problem: Cross-checked inputs 3A & 3B were in different states (i.e., open or closed) for longer than 100 mS.

Remedy: Diagnose and correct the condition that the inputs are monitoring (see Table 5-2, page 5-12).

F20

Problem: You are attempting to run the main motor in reverse without selecting Two-hand Inch mode.

Remedy: Switch to Two-hand Inch mode, then run the motor in reverse.

F21

Problem: The N/O inputs from the Run/Inch palm buttons on the Operator Station do not turn off (i.e., open) when they should.

Remedy: Check to make sure that the palm buttons are the correct switch type. Check and correct the palm switch wiring. If the error persists, call Wintriss Tech. Support.

F22

Problem: The operating mode was changed while the press was running.

Remedy: Make your operating mode selection before running the press.

F23

Problem: The operating mode you selected (i.e., One-hand, Two-hand, or Foot) is not valid for your stroke selection (i.e., Inch, Single-stroke, or Continuous).

Remedy: Refer to the discussion of operating modes starting on page 4-7 to determine the correct operating mode for your stroke selection.

F24

Problem: Both Run/Inch palm buttons on the Operator Station were pressed in One-hand mode.

Remedy: Press only one Run/Inch palm button when running the press in One-hand mode.

F26

Problem: The flywheel turned faster than 6 SPM while the press was in Bar mode, creating a potentially unsafe barring condition.

Remedy: After clearing the error, bar the press more slowly. Refer to *Operating the Press in Bar Mode*, page 4-17.

Inter-processor Failures

**F30* through F37*
and
H38* and H39***

Problem: One of the following processor errors has occurred:

- **F30** Resolver angles for A and B processors disagree by more than 2°
- **F31** No reply to Check Start request received from second processor
- **F33** Incorrect reply to Mode Change message received from second processor
- **F34** No reply to Mode Change message received from second processor
- **F35** Incorrect reply to Power-up message received from second processor
- **F36** No reply to Reset Error message received from second processor
- **F37** No reply to Compare Input Buffers message received from second processor
- **H38** Second processor did not receive Power-up information correctly
- **H39** Second processor did not receive Mode information correctly

Remedy: Try pressing Reset/Select. If errors persist, contact Wintriss Tech. Support.

Input Buffer Test Failures

F41* through F43*

Problem: The following errors may occur when WPC 1000 performs input buffer tests, which compare the input data provided by processor A with the data provided by processor B. When the input data doesn't match, an error is generated.

- **F41** Input buffer 1 check incorrect. This test checks clutch air pressure and motor forward inputs and user inputs 1 and 3A.
- **F42** Input buffer 2 check incorrect. This test checks remote reset, motor reverse, and bar mode selector inputs.
- **F43** Input buffer 3 check incorrect. This test checks the DSV monitor input and user inputs 2 and 3B.

Remedy: Try pressing Reset/Select. If errors persist, contact Wintriss Tech. Support.

Component Failures

F47 and F48

Problem: Failures have occurred to standard equipment connected to WPC 1000.

F47 Dual Safety Valve (DSV) monitor switch input open

F48 Clutch air pressure switch input open

Remedy: F47: Try resetting the unit by pressing Reset/Select and turning the Stroke Select key switch to OFF, then back to one of the other operating modes. If the DSV continues to fault, check to make sure that the air pressure is not set too low, and correct if necessary. Also, check to make sure that there are no restrictions in the air supply line (e.g., restrictive fittings, quick-disconnect fittings, low flow filters or regulators, or clogged filter elements) and that the supply line is sized to match the DSV inlet port. If the air pressure and air supply are sufficient, check for dirt or water in the DSV, and rebuild the valve if necessary.

F48: Check to see whether the air pressure is turned off or set too low, and correct if necessary. If the error persists after you reset the unit, contact Wintriss Tech. Support.

Customized Status Codes

F51 and F52

Problem: A failure has occurred in an auxiliary press function (e.g., lubrication system) wired to WPC 1000 user input 1 or 2 (see Table 5-2).

Remedy: Diagnose and correct the condition that the input is monitoring. If the error persists after you reset the unit, contact Wintriss Tech. Support.

F53

Problem: A failure has occurred in an auxiliary press function wired to WPC 1000 cross-checked input pair 3A and 3B (see Table 5-2, page 5-12). One or both inputs are open.

Remedy: Diagnose and correct the condition that the inputs are monitoring. If the error persists after you reset the unit, contact Wintriss Tech. Support.

Table 5-2. Fault Codes for User Inputs

Fault Code	User Input (Interlock)	Stop Type	Pin #	Jumper Connection (Bypass)
51	User 1	ESTOP	45	+24 Vdc
52	User 2	TOP STOP	15	+24 Vdc
53, 17	User 3A paired with 3B	ESTOP/ LOCKOUT	20	GROUND
	User 3B paired with 3A		6	GROUND

Light Curtain Faults

F60 or H60

Problem: The light curtain failed the WPC 1000 internal test. There may be a problem with the wiring from the light curtain to WPC 1000.

Remedy: Check to make sure that light curtain wiring is correct. If you have Shadow light curtains, refer to figures 2, 6, 7, 8, 9, 12 and 13 at the back of the manual for correct wiring. For other light curtains, refer to the user manual for that product. If you need additional assistance, contact Wintriss Tech. Support.

F63

Problem: The light curtain was obstructed during the stroke.

Remedy: Remove the obstruction.

F65

Problem: A light curtain is connected with Two-hand Only firmware installed in WPC 1000.

Remedy: Remove the Two-hand Only firmware, and install a firmware version intended for use with a light curtain, referring to *Installing Revised Firmware in WPC 1000*, page 2-46. Contact Wintriss Tech. Support for help in selecting the right firmware for your application.

Emergency-stop Circuit Driver Failure

F66 or H66

Problem: The Emergency-stop input circuit driver has failed or is about to fail.

Remedy: Check E-stop circuit wiring, and correct any problems. If the error persists after you reset the unit, contact Wintriss Tech. Support for assistance or replacement of the driver.

Top-stop Circuit Driver Failure

F67 or H67

Problem: The Top-stop input circuit driver has failed or is about to fail.

Remedy: Check Top-stop circuit wiring, and correct any problems. If the error persists after you reset the unit, contact Wintriss Tech. Support for assistance or replacement of the driver.

DSV Interface and Lockout Relay Failures

F70* through F77*

- or -

H72* through H76*

⚠ DANGER

IMPROPER SAFETY RELAY REPAIR

If a relay fuses

- DO NOT reset the WPC 1000 to restart the machine.
- Remove the WPC 1000 from operation immediately and replace the DSV/Lockout relay board before operating the press again.

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

Problem: The following errors indicate failures on the WPC 1000 Control board or the DSV/Lockout Relay board. Error codes F70, F71, F72/H72, F73/H73, and F76/H76 indicate failures with the DSV driver logic on the Control board. Codes F74/H74, F75/H75, and F77 indicate failures with the relays on the DSV/Lockout Relay board.

F70	DSV relay driver A was not off at start of stroke
F71	DSV relay drivers A and B did not turn on properly or have shorted
F72 or **H72**	DSV Control Flip-flop is not functioning properly
F73 or **H73**	DSV Missing Pulse Detector window is not functioning properly
F74 or **H74**	DSV relay A or B did not close properly at start of stroke
F75 or **H75**	DSV relay A or B did not open properly at end of stroke
F76 or **H76**	Lockout relay driver did not turn on properly during testing
F77	Lockout relay check contacts were not closed before lockout relay was turned on

Remedy: Press Reset/Select. If the error persists, contact Wintriss Tech. Support for assistance or replacement of either board.

Loss of Rotation

F79

Problem: The Dual Safety Valve (DSV) has been activated, but the resolver did not start rotating within the Start-time Limit set on the WPC 1000.

The Start-time Limit setting may be too short. Alternatively, the drive belt on the resolver may be loose or broken, and the resolver may not be turning continuously with the press crankshaft, or have stopped turning altogether. Also, the resolver may be defective.

Air pressure to the clutch may be low, or the clutch may be bad, resulting in no movement of the crankshaft (and resolver) even though the DSV is energized. In addition, an internal WPC 1000 problem could have occurred.

Remedy: Check the Start-time Limit setting, and re-initialize if necessary (see *Initializing Only the Start-time Limit*, page 3-5). Check the resolver and resolver drive, and replace the resolver if necessary. Check the clutch and repair if necessary. If these solutions do not work, contact Wintriss Tech. Support.

Internal Timing Input Failures

F80 or H80

- and -

F82 or H82

Problem: There is an internal problem with the WPC 1000 timing inputs.

Remedy: Press Reset/Select. If the error persists, contact Wintriss Tech. Support for assistance or replacement of the timing inputs.

Top-stop and Overrun Setting Faults

F81, F83 through F87

- and -

H81, H83 through H87

Problem: The overrun limit switch has turned on before the Top-stop "On" Angle timing has turned off. The Top-stop Angle internal dwell is 20°.

Remedy: Check to make sure that the Top-stop "On" Angle has been set correctly and that the overrun sensor magnet has been installed at the correct angle (see page 3-7). If settings are correct and the error persists, contact Wintriss Tech. Support.

Overrun Limit Switch Fault

F85

Problem: The overrun limit switch has provided more than one signal to WPC 1000 during a stroke. The switch should open and close only once per stroke.

Remedy: Check the overrun limit switch installation to make sure that the switch opens and closes only once per stroke, referring to *Installing the Overrun Sensor Magnet*, page 3-7 and the LED map on page 3-36. Check to make sure that the switch is installed correctly, referring to *Installing the Overrun Limit Switch*, page 2-25, and that the magnet is installed at the correct angle. Also, check to make sure that the magnet is attached using a brass or other non-ferrous screw.

Check the diameter of the shaft on which the magnet is mounted to make sure there is enough dwell for the overrun limit switch to provide an adequate signal (see *Planning Your Overrun Sensor Installation*, page 2-26). An ideal diameter is 4 to 6 in. If the shaft is larger than this, mount the magnet on a shaft with a smaller diameter.

Check to make sure that the press is not encountering excessive shock and vibration due to operations such as blanking. If you cannot resolve the problem, contact Wintriss Tech. Support.

Overrun Limit Switch Test Angle Fault

F88 or H88

Problem: The overrun limit switch was not closed during the overrun sensor closure test window (see step 12, page 3-10) or open at 180°.

Remedy: The resolver drive may have slipped or broken. If this is the case, the resolver needs to be repaired or replaced. If the resolver drive checks out, also check the wiring and installation of the resolver (see *Installing the Resolver*, page 2-22).

Check the diameter of the shaft on which the magnet is mounted to make sure there is enough dwell for the switch to provide an adequate signal (see *Planning Your Overrun Sensor Installation*, page 2-26). An ideal diameter is 4 to 6 in. If the shaft is larger than this, mount the magnet on a shaft with a smaller diameter.

Check installation of the overrun sensor and magnet and wiring of the overrun sensor, referring to *Installing the Overrun Limit Switch*, page 2-25 and *Mounting the Overrun Sensor Magnet*, page 3-11.

Overrun Limit Switch Setting Fault

F89 or H89

Problem: The angle range (e.g., 271° to 300°) within which the Top-stop "On" Angle must fall have not been set correctly on option switches 1 and 2.

Remedy: Set switches 1 and 2 for the correct Top-stop "On" Angle window, referring to Table 3-3, page 3-9. If the error persists, contact Wintriss Tech. Support.

Internal Memory Failures

F90* through F98*

- or -

H90* through H98*

Problem: There is a problem with the main or second processor on the WPC 1000 Control board. The board may need to be serviced or replaced.

Remedy: Press Reset/Select. If the error persists, contact Wintriss Tech. Support for assistance or replacement of the Control board or firmware chip.

Resetting Ross DM2 DSV Faults

If your Ross DM2 DSV faults when air is first applied to the unit, one or both poppets may have been jarred into a faulted position during shipment. When the poppets are faulted, input air can escape through the muffler port. To reset the fault, air must be applied to the DSV to return the poppets to their unfaulted position.

If the fault occurs before the unit has been wired, the problem will be signalled by air escaping from the muffler port when input air is applied to the DSV. To reset the unit, press the brass button on the bottom of the Reset solenoid while air is being applied to the DSV (see Figure 5-4).

If the fault occurs after the unit has been wired, an F47 error will appear on the WPC 1000 display. To clear the fault and reset the DSV, press Reset/Select and turn the Stroke Select key switch to OFF, then to one of the other operating modes (see page 5-11).

If you have trouble resetting the DSV, the problem may be that both poppets are faulted, requiring more air for a reset than can be supplied by the system. In this case, try resetting the unit with the muffler port obstructed. Place your hands or a rag or plastic packaging material over the muffler to restrict the escape of air, then actuate the Reset solenoid.

If the DSV still will not reset, check to see if there are restrictions in the air supply line (e.g., restrictive fittings, quick-disconnect fittings, low flow filters or regulators, or clogged filter elements) and correct if necessary. Also, check to make sure that the air supply line matches the inlet port size of the DSV, and replace with a properly-sized supply line if it doesn't.

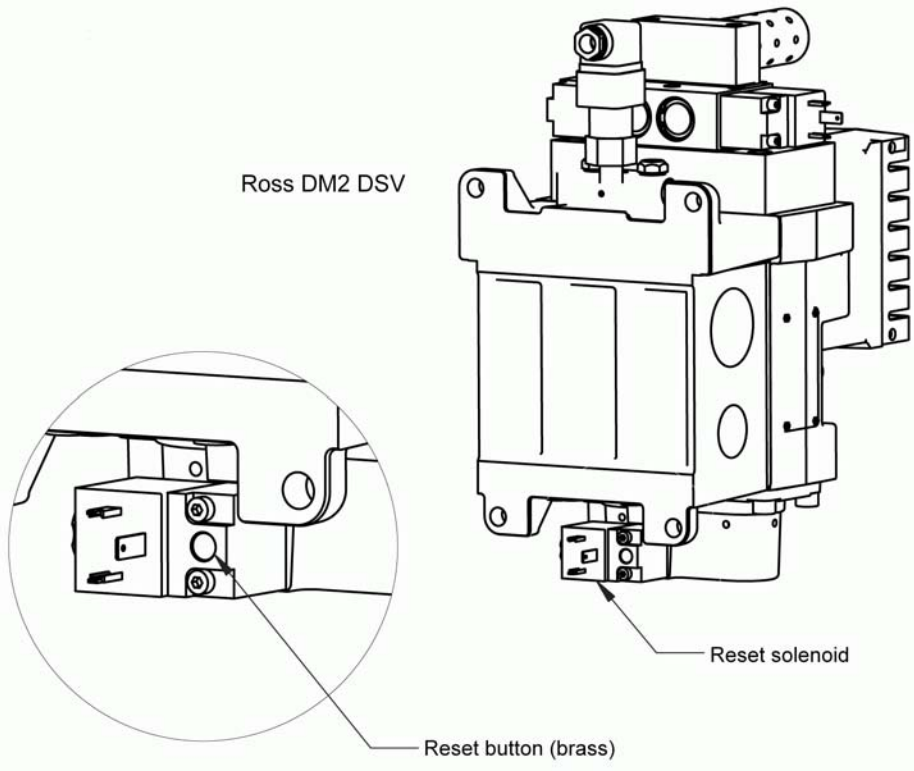


Figure 5-4. Ross DM2 DSV Showing Reset Button

Appendix A. Extracts from OSHA Regulations and ANSI Standards

> **⚠ WARNING**
>
> **REFER TO CURRENT REVISIONS OF OSHA/ANSI DOCUMENTS**
>
> The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.
>
> **Failure to comply with these instructions could result in death or serious injury.**

This appendix provides extracts from the Occupational Safety and Health Administration (OSHA) regulations and the American National Standards Institute (ANSI) standards covering presence-sensing devices.

Extracts from OSHA Regulation 1910.217

> **⚠ WARNING**
>
> **REFER TO CURRENT REVISIONS OF OSHA/ANSI DOCUMENTS**
>
> The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.
>
> **Failure to comply with these instructions could result in death or serious injury.**

Reprinted below are extracts from OSHA regulation 1910.217 pertaining to the use of presence-sensing devices for point-of-operation guarding on mechanical power presses. Also reprinted here are interpretations of selected regulations provided by the Precision Metalforming Association (PMA). Extracts from the OSHA regulation are printed in the left-hand column; interpretations by PMA are shown in the right-hand column.

Wintriss makes no claim for the accuracy or effectiveness of the PMA interpretations, and persons making use of this material do so at their own risk. PMA interpretations should not be relied upon for use in any specific application. The material is provided, with PMA's permission, for informational purposes only.

Refer to the most recent versions of OSHA documents. To obtain copies of OSHA regulations, write to: OSHA's Office of Information and Consumer Affairs, 200 Constitution Avenue NW, Room N3647, Washington, DC 20210. Tel (202) 219-8151; fax (202) 219-5986.

Extracts from OSHA Regulation 1910.217

OSHA Regulations	PMA Interpretation
OSHA 1910.217 (c).	TABLE 0-10
(c) SAFEGUARDING THE POINT OF OPERATION. –	*Distance of opening from point of operation hazard (inches)* — *Maximum width of opening (inches)*
(1) General requirements.	
(i) It shall be the responsibility of the employer to provide and insure the usage of “point of operation guards” or properly applied and adjusted point of operation devices on every operation performed on a mechanical power press. See Table 0-10.	*1/2 to 1 1/2 . . . . . 1/4* *1 1/2 to 2 1/2 . . . . . 3/8* *2 1/2 to 3 1/2 . . . . . 1/2* *3 1/2 to 5 1/2 . . . . . 5/8* *5 1/2 to 6 1/2 . . . . . 3/4* *6 1/2 to 7 1/2 . . . . . 7/8* *7 1/2 to 12 1/2 . . . . . 1 1/4* *12 1/2 to 15 1/2 . . . . . 1 1/2* *15 1/2 to 17 1/2 . . . . . 1 7/8* *17 1/2 to 31 1/2 . . . . . 2 1/8*
OSHA 1910.217 (c) (3) (i) (a)	
(3) Point of operation devices.	*Presence-sensing device*
(i) Point of operation devices shall protect the operator by:	
(a) Preventing and/or stopping normal stroking of the press if the operator’s hands are inadvertently placed in the point of operation.	*(c) (3) (i) (a) Refers to the functional requirement of a presence-sensing device which prevents and/or stops normal stroking of the press.*
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.	*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.*
(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.	*When failure occurs, the best indication is the press won’t run.*

Extracts from OSHA Regulation 1910.217

OSHA Regulations	PMA Interpretation
(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.	*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.*
(e) The safety distance (Ds) from the sensing field to the point of operation shall be greater than the distance determined by the following formula:	*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.*
Ds = 63 inches/second x Ts, where Ds = minimum safety distance (inches); 63 inches/second = hand speed constant; and	*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.*
Ts = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).	*Since some stopping time increase must be accommodated due to braking system deterioration, a percentage factor must be added to the measured time to obtain the factor for use in the equation for determining safety distance. A percentage factor of 20% is recommended for presses with new brakes or brakes of good condition. For older brakes, a 10% factor is recommended.* *Example:* *Measured stopping time = 0.190 seconds* *Time factor = 1.2 x 0.19 = 0.228 seconds* *Calculation = 63 x 0.228* *Safety distance = 14.4 inches*
(f) Guards shall be used to protect all 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) (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, Type B gate or movable barrier (on a part revolving clutch) is used for safeguarding:	*This paragraph tells the condition under which a brake monitoring system is required after November 1, 1975.*
(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.*

Extracts from OSHA Regulation 1910.217

OSHA Regulations	PMA Interpretation
OSHA 1910.217 (c) (3) (vii) (c)	
(c) The safety distance (Ds) 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 Ts, where	*Example:*
Ds = minimum safety distance (inches);	*Measured stopping time = 0.190 seconds* *Time factor = 1.2 x 0.19 = 0.228 seconds* *Calculation = 63 x 0.228* *Safety distance = 14.4 inches*
63 inches/second = hand speed constant;	
and	
Ts = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).	
OSHA 1910.217 (e) (1)	
(e) INSPECTION, MAINTENANCE, AND MODIFICATION OF PRESSES	
(i) It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all their parts, auxiliary equipment, and safeguards are in safe operating condition and adjustment. The employer shall maintain records of these inspections and the maintenance work performed.	*Records of clutch and brake will be weekly. Other inspections are periodic subject to time factor determined by employer.*
(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.	*If brake monitoring system is installed, weekly inspection and records are not required for clutch/brake mechanism. Other parts of the press will require periodic inspections and records.*

Extracts from ANSI Standards for Presence-sensing Devices and Two-hand Controls

⚠ WARNING

REFER TO CURRENT REVISIONS OF OSHA/ANSI DOCUMENTS

The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.

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

Reprinted below are the American National Standards Institute (ANSI) standards for presence-sensing devices (light curtains) and Two-hand controls. ANSI, a national federation of trade associations, technical societies, professional groups, and consumer organizations, is the United States clearinghouse and coordinating body for voluntary standards activity. Approximately 1000 companies are affiliated with the Institute as company members.

ANSI creates voluntary standards to eliminate duplication and to weld conflicting standards into single, nationally accepted standards under the designation "American National Standards." The standards reflect a national consensus of manufacturers, consumers, scientific, technical, and professional organizations, and governmental agencies.

Shown below are extracts of standards requirements and explanatory information from ANSI B11.1-2009 and B11.19-2003 for presence-sensing devices (light curtains) and Two-hand controls. Complete versions of these documents can be obtained by writing to: ANSI, 1430 Broadway, New York, NY 10018.

Extracts from ANSI B11.1-2009 8.6.2.1

Standards Requirements	Explanatory Information
8.6.2.1.7 Each operator's hand controls shall be located at a distance from the point-of-operation so that the operator(s) cannot release either hand actuating control and reach into the point-of-operation during the hazardous portion of the cycle.	***E8.6.2.1.7*** The total stopping time of the press should include the total response time of the control system and the time it takes hazardous motion to stop. The following formula should be used when calculating the safety distance (*Ds*): Ds = K (Ts + Tc + Tbm) Where: *K* = 63 inches/second (hand speed constant). *Ts* = the stop time of the press measured from the final de-energized control element, usually the air valve. *Tc* = the response time of the control. *Tbm* = the additional time allowed by the stopping-performance monitor (brake monitor) before it detects stop time deterioration. NOTE – *Ts* + *Tc* are usually measured by a stop time measuring device. When the press stopping-performance monitor setting is changed, the safety distance should be recalculated. See also Annex C.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3 Presence-sensing safeguarding device	
8.6.3.1 A presence-sensing device, when used for safeguarding, shall protect the operator as specified in E8.6.1 (a).	***E8.6.3.1*** Various presence-sensing devices employ different sensing and adjustment techniques. The point at which a device responds to an intrusion can vary. Safety mats and area scanners may not be suitable (effective) safeguards when utilized as primary point-of-operation safeguarding. Factors which can affect this suitability include but are not limited to: a) response time; b) minimum object sensitivity; c) measurement accuracy; d) breach ability; e) penetration before detection; f) single point of failure; g) large safety distances. These devices may be utilized as supplemental safeguarding.
8.6.3.2 The device shall be interfaced with the control circuit to prevent or stop slide motion if any object is within the sensing field of the device during the hazardous portion of the cycle.	***E8.6.3.2*** The device should be located or adjusted so that the device always responds to the intrusion at or prior to the safety distance *Ds*. Also, care should be taken when installing the device so that it does not detect false signals from other devices or equipment in the area. The presence-sensing device cannot protect against a catastrophic failure of the press, which causes unintended cycling action. See Annex A, Figure A.3.
8.6.3.3 The device shall not be used for safeguarding the point-of-operation on presses using full-revolution clutches.	
8.6.3.4 When the sensing field has been interrupted, use of the normal press cycle-actuating means shall be required after clearing the sensing field to resume press operation.	
8.6.3.5 When the device is used in the PSDI mode, re-initiation of the press motion shall be in accordance with 6.4.3.8.1.	
8.6.3.6 Muting of the device shall be permitted only during the non-hazardous portion of the press cycle.	***E8.6.3.6*** Muting is typically accomplished by interface circuits or auxiliary controls. The die closing portion of the cycle is always considered hazardous. In some cases, feeding and transfer automation or die features can cause additional hazardous conditions even during the opening portion of the cycle (upstroke). See also ANSI B11.19 for additional information.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.7 Muting of the device shall be accomplished in a manner that conforms to the requirements of 6.11 and 8.8.	***E8.6.3.7*** Muting is typically accomplished by interface circuits or auxiliary controls. The muting element should incorporate a similar level of control reliability as the presence-sensing device itself. A simple cam-operated limit switch wired in parallel with the device's output is inadequate, as its failure can remain undetected.
8.6.3.8 The device shall have an identifiable minimum object sensitivity so that an obstruction of an equal or greater size will be detected anywhere within the sensing field regardless of the plane of intrusion.	***E8.6.3.8*** The device should have a minimum object sensitivity stated by the device supplier. For example, an electro-optical device may detect a 32 mm (1¼ 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.
8.6.3.9 The device shall have a maximum response time, which shall not be affected by object sensitivity adjustments or environmental changes.	***E8.6.3.9*** The device supplier should state the maximum total response time, including output devices, of the presence-sensing device.
8.6.3.10 Devices which require adjustments to accommodate variations in operating conditions, or which incorporate fixed blanking or floating blanking features, shall be designed so that the adjustments or features are capable of supervisory control by the user.	***E8.6.3.10*** Typically, these adjustments or controls are key-operated or located under lockable covers.
8.6.3.11 The device shall be provided with a means that visibly indicates when it is functioning properly.	***E8.6.3.11*** Red and green indicators or other means that can be easily seen by the operator and others should be provided to indicate that the device is functioning.
Indication that the sensing field is being blanked shall be provided. For fixed blanking, the blanked area shall be identified. Supplemental safeguarding shall be provided to prevent access to the hazard through the fixed blanked area.	The blanking function of a presence-sensing safeguarding device desensitizes a portion of the sensing field by disabling one or more channels such that a specific interruption is ignored. Presence-sensing devices can be provided with either fixed or floating blanking. For fixed blanking, the desensitized area does not move or change once configured. Floating blanking allows the blanked area to move within the sensing field. Means to identify the desensitized area may include but are not limited to: a) Indicators within the device; b) Signage or marking of the fixed blanked area; c) The physical location of the object in the blanked area if movement or removal of the object can be detected and it results in a stop command.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.11 (cont)	Means of supplemental safeguarding can include completely filling the fixed blanked area to restrict access to the hazard, installing the device at a distance that accounts for the worse case object sensitivity (see 8.6.3.16), or alternate safeguarding may be provided to prevent access to the hazard.
If means are provided to bypass the device, visible indication that the device is bypassed shall be provided.	Means to provide visible indication may include but are not limited to: a) colored indicator lights; b) signage; c) physical position; d) awareness barrier (i.e., safety tape); e) other means.
8.6.3.12 The device shall not fail to respond to the presence of the individual's hand or other body part due to the presence of a reflective object or workpiece.	
8.6.3.13 The device shall conform to the requirements of 6.11 and 8.8. In the event of a power failure to the device, the device shall initiate a stop command to the press control system.	
8.6.3.14 The interface of the presence-sensing device to the press control shall conform to the requirements of 6.11 and 8.8.	
8.6.3.15 The sensitivity of the device to intrusion shall not be adversely affected by changing conditions around the press.	
8.6.3.16 The effective sensing field of the device shall be located at distance from the nearest point-of-operation hazard so that individuals cannot reach into the point-of-operation with a hand or other body part before cessation of motion during the hazardous portion of the cycle.	***E8.6.3.16*** The total stopping time of the press should include the total response time of the presence-sensing device, as stated by the supplier, the response time of the interface, the response time of the control system, and the time it takes the press to cease slide motion. The following formula should be used when calculating the safety distance: Ds = K (Ts + Tc + Tr + Tbm) + Dpf where *K* = 63 inches/second (hand speed constant) *Ts* = the stop time of the press measured from the final de-energized control element, usually the air valve *Tc* = the response time of the press control *Tr* = the response time of the presence-sensing device and its interface, if any, as stated by the supplier or measured by the user.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.16 (cont)	*Tbm* = the additional stopping time allowed by the stopping-performance monitor before it detects stop time deterioration. *Dpf* = the added distance due to the penetration factor as recommended in ANSI B11.19, Annex D, Figure D.2. The minimum object sensitivity is stated by the supplier. If beam blankouts or floating window features are used, these figures should be added to the object sensitivity figure before using the chart. NOTE - *Ts* + *Tc* is usually measured by a stop time measuring device. See also ANSI B11.19, Annex C and D. Whenever the press-cycle STOP command or stopping-performance monitor time or angle setting is changed, the safety distance should be recalculated. See also “stopping-performance monitor” (6.12). NOTE – No increase in safety distance is required for fixed blanking applications if the blanked area is entirely occupied by the material or fixtures. In some instances, the use of blanking does not allow efficient production of certain piece parts. Horizontal placement of the sensing field, so that it detects that operator’s waist area, may present a solution. In this application, the operator may freely manipulate the workpiece and operate the press as long as the operator stands outside of the horizontal sensing field. The sensing field should be located so that the operator cannot reach the point-of-operation prior to interrupting the sensing field and completion of the stopping action. Where possible, the sensing field should be of sufficient depth to prevent the operator from standing between the field and the point-of-operation. See also ANSI B11.19, Annex C and D.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.17 If the position of the device will allow the operator or others to place themselves between the sensing field and the point-of-operation, additional means shall be provided in conjunction with the device to prevent the operator or others from exposure to the point-of-operation hazard.	***E8.6.3.17*** Additional means may include manual reset outside of the sensing field of the device or additional barrier guards, safety mats, light curtains, or other devices. Operator controls for each operator located outside of the sensing field of the presence-sensing device may be used. As an alternative to the reset control and to prevent an individual from stepping behind the sensing field of a PSD, the maximum distance between the light curtain and the machine structure should not exceed 75mm (3 inches). Supplemental safeguarding may be utilized to eliminate a space greater than 75mm.
8.6.3.18 The device shall not be affected by ambient light or by light-source decay so that the increase in response time or object sensitivity is greater than the value used to calculate the safety distance.	***E8.6.3.18*** Examples of ambient light are associated with windows, light fixtures, skylights, bay doors, or die lights.
8.6.3.19 All areas of entry to the point-of-operation not protected by the presence-sensing device shall be otherwise safeguarded.	***E8.6.3.19*** 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 two-, three- or four-sided protection.
8.6.3.20 Press production systems with a configuration that would allow an individual to enter, pass through, and become clear of the presence-sensing device sensing field shall not be operated in the PSDI mode of operation.	***E8.6.3.20*** For PSDI applications see Clause 10.
8.6.3.21 When a device is used on a press production system and the protection of the operator is dependent upon the stopping action of the press, a stopping-performance monitor shall be required in conformance with 6.12. See section 8.3.9 for exceptions.	

Extracts from ANSI B11.19-2010 8.3

Standards Requirements	Explanatory Information
8.3 Electro-optical, RF, and area scanning presence-sensing safeguarding devices	
8.3.1 Design and construction	
8.3.1.1 The presence-sensing device shall be designed and constructed to create a field that detects the presence of an individual(s). The presence-sensing device shall not create a hazard in and of itself.	***E8.3.1.1*** The presence-sensing device should be designed and constructed such that it does not present hazards to individuals from: • sharp edge or pinch point hazards; • radiated light or energy hazards; • electromagnetic interference hazards; • electrical shock hazards.
8.3.1.2 The presence-sensing device shall have a minimum object sensitivity such that an obstruction of a same or greater size will always be detected anywhere within its sensing field, regardless of the plane of intrusion. The RF (radio frequency) presence-sensing device shall provide means to adjust the sensitivity of the field. The field, once adjusted, shall not decrease in sensitivity below this established level.	***E8.3.1.2*** The presence-sensing device should have a minimum object sensitivity stated by the supplier. For example, an electro-optical device may detect an opaque object with a diameter of 32 mm (1.25”) anywhere in its sensing field, but allow an obstruction with a diameter of 25 mm (1”) to pass undetected at certain points in the field.
8.3.1.3 The presence-sensing device shall not fail to change its output state, if not bypassed or muted, when it detects the presence of an individual.	
8.3.1.4 Adjustment or configuration of presence-sensing devices shall be capable of being supervised.	***E8.3.1.4*** Methods of meeting this requirement include, but are not limited to, the use of key operated controls, controls located under lockable covers, or controls that require a tool or password to access. Adjustment or configuration should only be performed by authorized individuals. Adjustments or configuration can include, but are not limited to: • muting; • blanking; • power adjustments; • sensing field configuration; • reset functions.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements	Explanatory Information
8.3.1.5 The presence-sensing device shall incorporate visual means to indicate that the device is detecting an individual within the effective sensing field of the device.	***E8.3.1.5*** Indicators, (usually red and green), displays or meters should be provided to indicate the status of the presence-sensing device. The visual means may be integral to the presence-sensing device or part of the interface or machine control system. Due to the prevalence of color blindness (10% in males for red/green), methods such as unambiguous positioning, patterning, labeling or flashing of the indicators may be effective in providing the indication required.
8.3.1.6 The presence-sensing device shall have a maximum response time that shall not be affected by object sensitivity or environmental changes. The safeguarding supplier shall provide the maximum response time of the presence-sensing device.	
8.3.1.7 The electro-optical and area scanner presence-sensing devices shall not be affected by ambient light conditions or by changes in the device light source characteristics, such that an increase in response time or object sensitivity occurs.	***E8.3.1.7*** When the electro-optical and area scanner presence-sensing devices are exposed to signals from other electro-optical presence-sensing devices or to changes in ambient light commonly associated with windows, light fixtures, skylights, bay doors or work area lights, the response time or object sensitivity should not be adversely affected.
8.3.1.8 Components, subassemblies or modules of electro-optical, RF, and area scanning presence-sensing devices shall conform to the requirements of 6.1, or shall be designed and constructed to meet the safety performance level (risk reduction) as determined by a risk assessment.	***E8.3.1.8*** See also, clause 5 and ANSI B11.0 (B11.TR3).
8.3.1.9 The area scanning presence-sensing device shall provide a means or operating mode to verify the size, shape, and detection capabilities of the detection area or zone. Information shall be provided by the area scanning device supplier to identify the: • maximum safeguarding range; • minimum object sensitivity within the stated safeguarding range; • maximum field of view in degrees; • tolerance in the range measurement; and • detection capabilities with respect to the reflectivity of an object versus the distance to the object.	***E8.3.1.9*** These presence-sensing devices typically operate on the principle of “diffuse reflectance,” which is a principle of transmitting beam(s) of light to form a detection area or zone. When an object enters the detection area, it reflects the transmitted light back to the device, which then evaluates the object‘s position. The amount of reflected light (degree of reflectance in percent) that can be reliably detected typically ranges from 1.8% to over 90% and can be represented graphically by reflectivity versus distance. For more information see IEC 61496 parts 1 and 3.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements	Explanatory Information
8.3.2 Installation, operation and maintenance	
8.3.2.1 Exposure to the hazard(s) shall not be possible by reaching over, under or around the sensing field of the presence-sensing device. Additional guards or safeguarding devices shall be provided to protect those areas.	***E8.3.2.1*** The user should select a presence-sensing device adequate to prevent individuals from reaching over, under or around the sensing field during the hazardous portion of the machine cycle. Additional safeguarding may be required in conjunction with the device to meet this requirement.
The effective sensing field shall be of adequate height, width, and depth so that entry of the individual into the hazard zone is detected.	If individuals can place themselves between the sensing field and the hazard zone, additional safeguarding should be used in conjunction with the device to prevent the individual from exposure to the hazard. It has been found by practical application that this situation can occur with as little as 75 mm (3”) depending on the positioning (e.g., height) and the minimum object sensitivity of the sensing field, and the ability of the individual to lean against the machine frame or guarding. It should not be possible to climb on or walk on the machine support structure to avoid detection by the presence-sensing device when the sensing field is orientated horizontally. When an individual can pass through the sensing field, it is considered perimeter guarding (see also, the requirements of 6.5 and 8.3.2.4). The electro-optical and area scanning presence-sensing devices may fail to detect an individual‘s presence due to reflective workpieces or objects in the vicinity of the device. Care should be used to ensure that these reflections do not render the device ineffective. Some examples of reflective objects include, but are not limited to: • machine surfaces; • tooling; • work pieces; • hand tools; • auxiliary equipment; • workholding tables and fixtures. Testing each set-up for minimum object sensitivity should be done with an appropriate test rod, following the supplier‘s recommendation.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements	Explanatory Information
	Where objects are placed within the defined sensing field of an area scanner presence-sensing device, care should be taken to ensure that: • no shadows exist behind the objects such that the device is rendered ineffective; • removal of the object will not allow undetected access to a hazard zone.
8.3.2.2 The presence-sensing device shall be installed such that it does not create additional hazards.	***E8.3.2.2*** Some installation hazards include, but are not limited to: • pinch point hazards created by interference between the presence-sensing device and moving members of the machine; • tripping hazards; • electrical shock hazards; • overhead or other “strike against” hazards; • thermal hazards. Where such conditions can exist, additional safeguarding may be required.
8.3.2.3 The presence-sensing device shall be installed at a location so that the effective sensing field prevents individuals from reaching the hazard(s) during the hazardous portion of the machine cycle.	**E8.3.2.3** The safety distance calculation is dependent upon the: • speed of approach of the individual; • total response time of the safeguarding device as stated by the supplier; • response time of the interface; • response time of the control system; • time it takes the machine to stop hazardous motion; and • depth penetration factor of the safeguarding device. See Annex D for further explanation and an example method to calculate the safety distance. Additional methods might be used as determined by the supporting risk assessment documentation. For installations in which the direction of approach is perpendicular to the sensing field (i.e., normal approach), the minimum distance between the sensing field and the closest hazard should be no less than 100mm (4”) regardless of the outcome of a safety distance calculation. Practical application has shown that less than 100 mm (4”) of safety distance can result in increased risk of harm. See also, ISO 13855.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements	Explanatory Information
	RF presence-sensing devices have sensing fields that can vary due to: • antenna(e) design; • effects of adjacent machinery and equipment; • field sensitivity adjustments; and • environmental factors (such as humidity or temperature). Before the machine is used for production purposes, the RF presence-sensing device should be checked to ensure that the effective field protects individuals at the safety distance.
8.3.2.4 The presence-sensing device shall protect individuals from hazards by initiating an immediate stop command to the machine control system when the sensing field of the device is interrupted during the hazardous portion of the machine cycle. It shall require re-initiation of the normal actuating means prior to the start or continuation of motion of the machine.	***E8.3.2.4***
When an individual can pass through the sensing field of the presence-sensing device, the device shall initiate an immediate stop command to the machine control system and shall require that the device or machine control be manually reset before hazardous situation can occur. The reset function and devices shall comply with 6.5.	The operator should ensure that no individual is in the safeguarded area before re-setting the presence-sensing device or machine control and initiating a hazardous situation
8.3.2.5 Indication that the sensing field is being blanked shall be provided. For fixed blanking, the blanked area shall be identified. Supplemental safeguarding shall be provided to prevent access to the hazard through the fixed blanked area.	***E8.3.2.5*** The blanking function of an electro-optical presence-sensing device desensitizes a portion of the sensing field by disabling one or more channels such that a specific interruption is ignored. Electro-optical presence- sensing devices can be provided with fixed or floating blanking. Floating blanking allows the blanked area to move within the sensing field. When floating blanking is enabled and the object sensitivity increases, the sensing field must be placed at a greater distance from the hazard, see 8.3.2.2 and Annex D and Figure D.1.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements	Explanatory Information
	For fixed blanking, the desensitized area does not move or change once configured. Means to identify the desensitized area may include but are not limited to: • indicators within the electro-optical presence-sensing device; • signage or marking of the fixed blanked area; • the physical location of the object in the blanked area if movement or removal of the object can be detected and results in a stop command. Means of supplemental safeguarding can include: • completely filling the fixed blanked area to restrict access to the hazard; • the electro-optical presence-sensing device installed at a distance that accounts for the worst case object sensitivity; (see 8.3.2.2) or • alternate safeguarding may be provided to prevent access to the hazard.
8.3.2.6 Components, subassemblies or modules of the interface or machine control system shall conform to the requirements of 6.1, or shall be designed and constructed to meet the safety performance level (risk reduction) as determined by a risk assessment.	***E8.3.2.6*** See also, clause 5 and ANSI B11.0 (B11.TR3).
8.3.2.7 Bypassing of the presence-sensing device shall comply with 6.6.	
8.3.2.8 Muting of the presence-sensing device shall comply with 6.7.	
8.3.2.9 The RF presence-sensing device shall not be adversely affected by changes around the machine that may alter the sensitivity of the device such that individuals are no longer detected in the sensing field at the proper safety distance.	**E8.3.2.9** The RF presence-sensing device may be affected by changes in the conditions around the machine such as ambient conditions, the placement of parts and tote boxes, grounding conditions of the operator, or the movement of industrial trucks. These changes should not adversely affect the performance of the device.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements	Explanatory Information
8.3.2.10 The total tolerance in the range measurement of an area scanning presence-sensing device shall be included in determining the distance from the nearest recognized hazard to the detection area or zone. This detection area shall be identified and tested to ensure that the device is able to detect individuals entering the detection area. The effective sensing field shall be verified for proper size and coverage upon installation, replacement, or changes of the detection area.	**E8.3.2.10** When the area scanning presence-sensing device is horizontally mounted, the detection area or zone should be visibly marked on the floor. This verification can be accomplished by using a programming device or by physically identifying the perimeter of the detection area with an appropriate test rod, following the supplier‘s recommendation. This verification is to ensure that a pre-programmed area scanning presence-sensing device with a small or improper detection area is not used by mistake in an installation requiring a larger field. Area scanning presence-sensing device may not be suitable (effective) safeguards when used to protect an individual‘s hands or fingers from hazards. Items which can affect this suitability are: • response time; • minimum object sensitivity; • measurement accuracy.

Appendix B. Specifications for User-built Operator Stations

⚠ DANGER

NON-WINTRISS OPERATOR STATION MAY NOT MEET SAFETY REQUIREMENTS

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

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

If you build your own Operator Station, be sure that it meets all the safety requirements in this manual and in the applicable safety regulations. Minimum requirements are shown in Table B-1.

Table B-1. Operator Station Requirements

Minimum Configuration Single-stroke Operation Only	Minimum Configuration Single-stroke and Continuous Operation
2 Palm buttons	2 Palm buttons
1 Emergency-stop button	1 Emergency-stop button
	1 Prior Act button

Run Button Installation

Install the Run buttons on the Operator Station according to the following requirements:

- The Run buttons must be protected against unintended operation and placed so that the concurrent use of both hands is required.
- A ring guard must be installed for each run button.
- If the buttons are in the same plane, they must be separated by a distance of at least 24 in. (610 mm). If the Run buttons are not in the same plane, they may be placed closer together. For examples of correctly designed operator stations, see the illustrations of Wintriss operator stations, starting on page 2-15.

NOTICE

A Run-button timer is built into the WPC 1000. If the Run buttons on a standalone Operator Station are not pressed within the 1/2-second "palm time" ("synchronous time" in ANSI terminology) or the Run buttons on multiple Op. Stations are not pressed within the 5-second "concurrent time," the press will not cycle. See the description of the "Palm Time Lamp" on page 1-3 and *Switch 5 – Selecting Concurrent Time for Multiple Op. Stations*, page 330.

Switch Requirements

Switches used for the Run, Emergency-stop, Top-stop and Prior Act buttons must meet the specifications shown in Table B-2:

Table B-2. Specifications for Operator Station Switches

Switch	Specifications
Run	NEMA 12 or 13, UL rated 1-NC/1-N0 single contact block with transfer-style contacts. One contact bar moves from N/C contacts to the N/O contacts to ensure that the N/C and N/O contacts cannot be closed simultaneously. (Allen Bradley AB-S 800T-D1JA, Square D 9001KR25GH13, or equivalent) Must be guarded against accidental operation per ANSI and OSHA requirements.
E Stop	NEMA 12 or 13, UL rated 2-NC contacts, positive opening operation, "self-latching"
Top Stop	NEMA 12 or 13, UL rated 2-NC contacts, positive opening operation
Prior Act	NEMA 12 or 13, UL rated 1-NC with integral green pilot lamp for 24 Vdc operation. This lamp indicates when the Prior Act timer is armed. Must be guarded against accidental operation per ANSI and OSHA requirements.

Appendix C. Old Control Board

NOTICE

IDENTIFYING OLD VS. NEW BOARDS

You can determine whether you have an old or new board by checking the assembly number, which is located in the upper right corner on new boards (see Figure 2-11, page 2-20), in the lower right corner, underneath the DSV/Lockout Relay board, on the old board (see Figure C-1, below). Old boards have assembly number D4315202; new boards have assembly number 4332701.

This appendix provides a drawing of the old WPC 1000 Control board (see Figure C-1) that was included in previous revisions of this manual. The old board is almost identical to the new board shown in Figure 2-11, page 2-20 and Figure 2-12, page 2-21 except that it lacks jumpers J106 and J107, and jumper J102 is located in a different position.

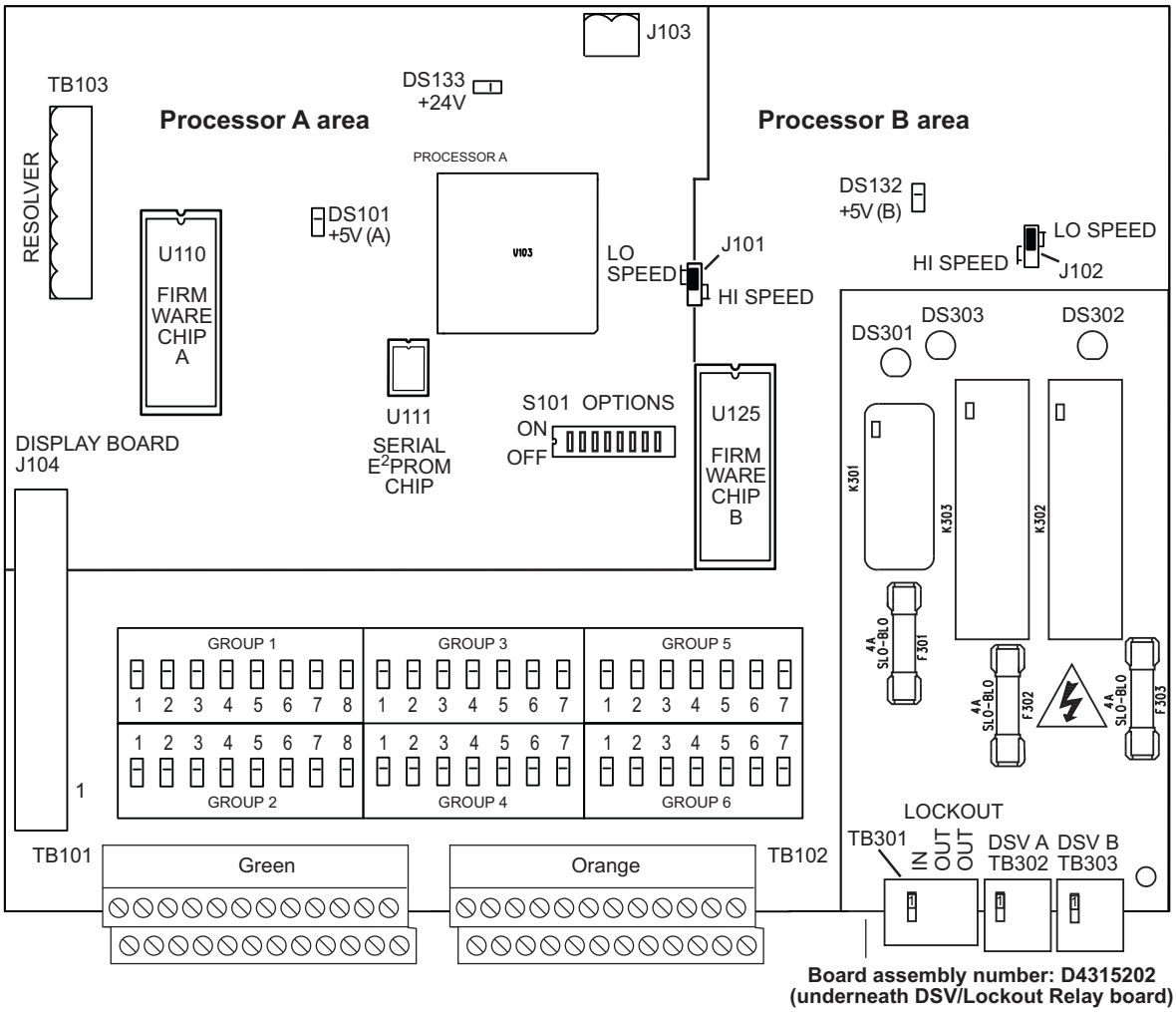


Figure C-1. Old WPC 1000 Control Board with DSV/Lockout Relay Board:

Location of Important Components

Differences between the two boards are shown in Table C-1.

Table C-1. Differences between New and Old Control Boards

Component	New Board	Old Board
Light Curtain Test Mode jumper (J107)	Located beneath DSV/Lockout Relay board (see Figure 2-12)	Not present
Light Curtain Output Type jumper (J106)	Located beneath DSV/Lockout Relay board (see Figure 2-12)	Not present
High/Low Speed Jumper J102	Located just below High/Low Speed jumper J101 (see Figure 2-12)	Located just above DSV/ Lockout Relay board (see Figure C-1)

Jumper J107 is used to set the type of test (i.e., internal or external) to run on light curtain inputs. Jumper J106 is used to set the light curtain output type (i.e., NPN or PNP). These jumpers have been added to the new board to allow Shadow VII, Shadow 8, or Shadow 9 light curtains to be connected directly to WPC 1000.

WPC 1000 firmware versions V 2.77 or higher are compatible with both old and new control boards. Firmware versions lower than V 2.77 only work with the old board. If you install a new board in WPC 1000 systems running firmware earlier than V2.77, you will get an F35 error.

Glossary

NOTICE

Cross-references to other glossary entries are shown in *italics.*

ACTS	See *Auto-compensated Top Stop*.
ANSI	Stands for American National Standards Institute, a U.S. clearinghouse and coordinating body for voluntary standards activity on the national level.
Auto Carry-up	A signal that causes the press to automatically complete the stroke, stopping at TDC, when the operator releases his hands from the palm buttons after the *Auto Carry-up Angle* has been reached. Also called "Operator Station mute."
Auto Carry-up Angle	The crank angle at which the pinch point has closed to less than ¼ in. (6 mm), an opening determined by OSHA to be too small to pose a hazard to the operator.
Auto-compensated Top Stop (ACTS)	A WPC 1000 feature, designed specifically for variable-speed presses, that adjusts the top-stop angle automatically as press speed changes or the brake wears.
BDC	Abbreviation for bottom dead center.
brake monitor	A WPC 1000 feature that checks for brake wear.
calculated safety distance	See *safety distance*.
cam channels	Relays that open and close on signals from the programmable cam switch to turn auxiliary equipment on and off at specified crankshaft angles.
concurrent time	The length of time within which each pair of palm switches on all Operator Stations connected to WPC 1000 must be pressed in order to start the press. This interval is 5 seconds. If the concurrent time is exceeded by any Operator Station, the press will not start.
control component failure	Another name for *control reliability*.
control reliability	A regulation defined in ANSI B11.1-1988 and OSHA 1910.217 requiring that a single component failure in a clutch/brake control circuit not prevent the normal stopping action of the press, not create an unintended stroke, and not allow initiation of a subsequent stroke until the failure has been corrected.
crank angle clock	A ring of LEDs on the WPC 1000 optional display that shows the angle of rotation of the press's crankshaft.

depth penetration factor	A value used in the ANSI formula for calculating the *safety distance*. The depth penetration factor is a measure of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts.
dual diverse redundancy	A WPC 1000 feature in which both microprocessor systems belong to different architectures, are programmed using different programming languages, function independently of one other, have separate power supplies, and provide different information to the operator. Dual diverse redundancy provides optimum clutch/brake control and operator safety.
Dual Safety Valve	The control-reliable device on the press that controls the flow of air to the press's clutch.
emergency stop	A signal sent to the press in response to a malfunction that stops the press immediately. An Emergency Stop can be initiated manually by the operator or automatically by WPC 1000 or external devices.
fault (error) message	An alphanumeric code that appears on the WPC 1000 display when an error condition occurs.
hand-speed constant	A value used in the ANSI formula for calculating the *safety distance*. The hand-speed constant is the distance one can theoretically move one's hand and arm in one second. OSHA recommends a hand-speed constant of 63 inches-per-second.
interrupted stroke	A condition that occurs when the press has been Emergency-stopped before the completion of the stroke by either the operator or an automatic device for personnel or equipment protection. During an interrupted stroke condition, the Interrupted Stroke LED on the WPC 1000 display flashes.
lockout	A WPC 1000 function that prevents the press from being restarted after clearing of *fault messages* that indicate serious errors. The lockout condition is indicated by the lockout message, which appears on the WPC 1000 display. Lockout provides an added safety feature to the WPC 1000.
lockout message	A message (i.e., "Loc") that appears on the WPC 1000 display indicating that a serious error condition has occurred.
Micro-inch	A WPC 1000 feature that allows the operator to set the amount of time in milliseconds that the Dual Safety Valve is open and, therefore, the distance the ram will travel when the Run/Inch switches on the Operator Station are pushed in Inch mode. Micro-inch is designed for high-speed and/or short-stroke presses.
NEMA 12	A rating certifying that an electrical device is protected against dust, water, and oil.

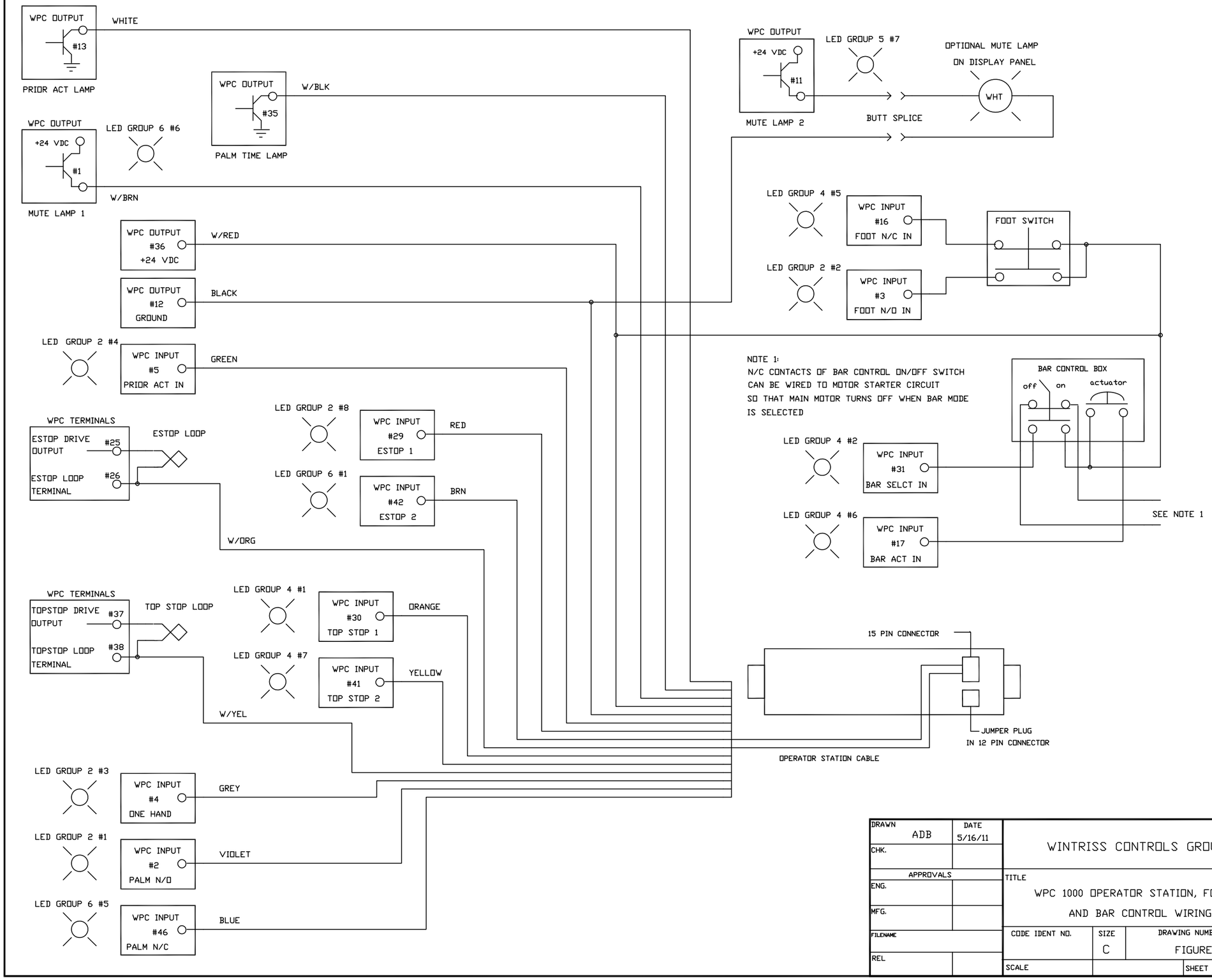
ninety degree (90)° stop-time test	A test required to set the proper safety distance for personnel-guarding devices, including light curtains, two-hand controls, and type-B movable barriers. This test checks the stopping time of the press at its most critical stopping point, normally the midpoint of the downstroke (i.e., 90°), while the press is running in Continuous mode (or Single-stroke if the press does not have a selector setting for Continuous). Stopping time is a value required in the ANSI formula for calculating the safety distance.
object sensitivity	A value required in deriving the *depth penetration factor* for a light curtain. Object sensitivity specifies the smallest diameter object that a light curtain will detect anywhere in its field.
ON-OFF setting	Stroke angle settings at which the cam channel is to turn ON (activate) and turn OFF (deactivate)
OSHA	Stands for Occupational Safety and Health Administration, a government agency that has established regulations for mechanical power presses including presence-sensing devices for point-of-operation guarding.
overrun limit switch	A device mounted on the press to check the accuracy of the crankshaft angle maintained by the resolver. The overrun limit switch consists of a magnet, which is mounted on the crankshaft (or other shaft), and a stationary magnetic switch, which is mounted just above the magnet so that it detects the magnetic field on every stroke. The magnetic switch is also called an "overrun sensor." WPC 1000 checks the resolver crankshaft angle by comparing it to the signal received from the overrun limit switch. When the signal is not received at the same resolver angle on every stroke, WPC 1000 knows that the resolver is no longer rotating at a 1:1 ratio with the press.
overrun timing	A WPC 1000 feature that provides a backup for Top-stop timing, stopping the press if the Top-stop output relay should fail. Overrun timing is a function of the stopping time of the press and is influenced by the condition of the brake linings and press speed. It is also dependent on proper installation of the *overrun limit switch.*
palm time	The length of time within which the two palm switches on each Operator Station connected to WPC 1000 must be activated in order to start the press. This interval is 1/2 (0.5) second as required by ANSI. If the palm time on any Operator Station is exceeded, the press will not start. ANSI standards refer to the palm time as *synchronous time*.

pinch point	The hazardous area between the upper and lower die from which OSHA mandates that the operator should be protected by installation of safety equipment such as light curtains, two-hand controls, and other barriers.
PMA	Stands for Precision Metalforming Association.
reset	A command issued by the operator that allows the press to resume operation after it has been stopped due to a malfunction. The "reset" command clears the fault message from the WPC 1000 display.
resolver	An electrical component mounted on the press used by WPC 1000 to provide continuous information about the position of the crankshaft and to maintain a count of the number of revolutions it makes. The resolver, which has internal windings and works on the principle of inductance, turns at a one-to-one ratio (1:1) with the crankshaft.
response time	The length of time it takes the WPC 1000 control to activate the machine's brake.
safety distance	The distance from the pinch point that OSHA requires safety equipment such as light curtains, two-hand controls, and type-B movable barriers to be mounted to assure the safety of the operator. The safety distance is calculated using a precise formula set by OSHA regulations and/or ANSI standards. The formula uses the results of the *ninety degree (90°) stop-time test*.
start time	The amount of time it takes the resolver to start turning after the Dual Safety Valve (DSV) is energized.
stopping angle	The number of degrees of crankshaft rotation required for the press to stop after a "stop" command is issued. The stopping angle is calculated by subtracting the crankshaft position when the dual safety valve (DSV) is closed from the press's position when it actually stops. The stopping angle is useful in determining where to set Top Stop and in die-protection settings.
stopping time	The length of time it takes the crankshaft to stop moving after the Dual Safety Valve (DSV) deactivates.
strokes counter	An LED display available as a WPC 1000 option that maintains a count of the number of strokes made by the press. The strokes counter is incremented once for each cycle of the press.
suppressor	A component that reduces or eliminates electrical noise.
synchronous time	The ANSI term for *palm time*.
TDC	Abbreviation for top dead center.

timing	"ON" settings for critical press parameters like Auto Carry-up Angle and Top Stop, and "ON" and "OFF" settings for cam channels.
top stop	A signal sent to the press in response to a malfunction that stops the press at the top of its current stroke (0°). A top stop can be initiated manually by the operator or automatically by WPC 1000 or other devices.
zero cam	A closure-to-ground signal that turns on at approximately 270° and turns off at 30°. Zero cam can be used with AutoSet load monitors to "zero," or clear, the current tonnage reading. Zero cam is also used with RamPAC to check counterbalance air pressure and with MultiPAC to increment the lube counter.

Index

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN	ADB	DATE	5/16/11
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

WINTRISS CONTROLS GROUP

TITLE: WPC 1000 OPERATOR STATION, FOOT SW. AND BAR CONTROL WIRING

CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	C	FIGURE 1	

SCALE | SHEET OF

JP 106 NPN PNP

JP 107 EXT INT

SET TO NPN WITH EXT TEST

CONNECTED TO 120VAC

SHADOW VI CONTROL BOARD

TB1 MAIN POWER: L1 1, L2 2, CHAS 4

TB5 LAMP OUTPUT: 1 GRN, 2 AMB, 3 RED, 4 YEL, 5 VOUT

TB4 OUTPUT CONNECTOR: FSD1, FSD2, SSD, GND

TB3 TRANSMITTER 1 CONNECTOR: VCR, VCC, GND, SHTD, SHTD, SYNC, SHLD

TB2 RECEIVER 1 CONNECTOR: FWIN, VCC, GND, 2B, 2A, SYNC, SHLD

TB4 AUXILIARY CONNECTOR: MPCE1, MPCE2, EX LCK, LCK REL, XT INT

TB3 TRANSMITTER 2 CONNECTOR: VCR, VCC, GND, SHTD, SHTD, SYNC, SHLD

TB2 RECEIVER 2 CONNECTOR: FWIN, VCC, GND, 2B, 2A, SYNC, SHLD

SHADOW VI RECEIVER UNIT

SHEILD, YEL, GRN, BRN, BLUE & BLK, RED, ORG

SHADOW VI TRANSMITTER UNIT

SHEILD, YEL, GRN, BRN, BLUE & BLK, RED, ORG

WPC OUTPUT #23 GROUND

GROUP 2 LED #7

WPC INPUT #8 LIGHT CUR 1

GROUP 3 LED #7

WPC INPUT #21 LIGHT CUR 2

WPC OUTPUT #43

SHADOW ENABLE

WPC OUTPUT #9

ZERO CAM

ZERO CAM OUTPUT CAN BE USED TO SIGNAL AN AUTOSET 1500 OR 1504

WPC OUTPUT #48 +24 VDC

WPC OUTPUT #14

AUX 1

CUSTOMER SUPPLIED AUXILLIARY CONTROL RELAY TURNS ON WHEN THERE IS NO FAULT CONDITIONS OR NO INTERRUPTED STROKE.

WPC OUTPUT #34

CAM CHANNEL 2

WPC OUTPUT #33

CAM CHANNEL 1

TB1: 1, 2 CHAS, 3 +24V, 4 GND, 5 CH4, 6 CH3, 7 CH2, CH1

CH4, CH3, CH2, CH1

TB5 N/C C N/O

TB4 N/C C N/O

TB3 N/C C N/O

TB2 N/C C N/O

THE CUSTOMER CONNECTS THE ANCILARY EQUIPMENT TO THESE RELAY OUTPUT TERMINALS.

TURN ON OPTION SWITCH 6 TO ADJUST CAMS.

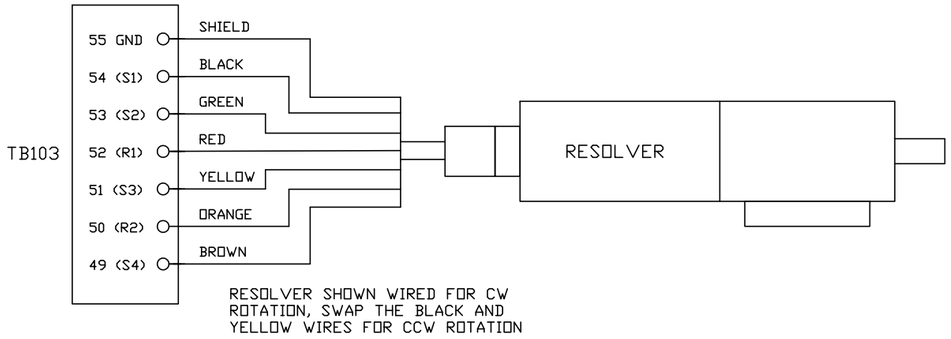
DRAWN GVR	DATE 6/10/10
CHK	
APPROVALS	
ENG.	
MFG.	
FILENAME	
REL	

Wintriss Controls Group

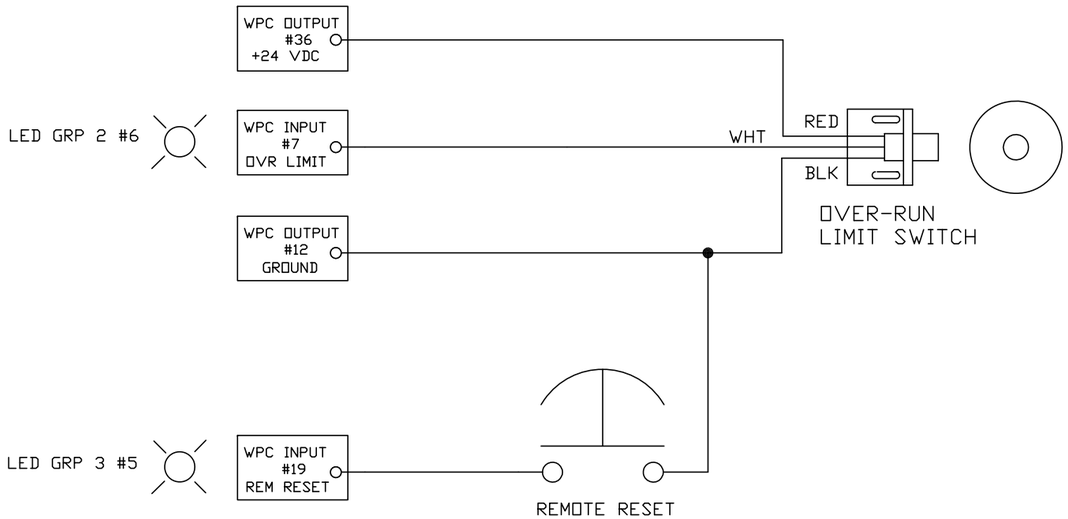
TITLE: WPC1000 SHADOW VI AND CAM OUTPUT WIRING

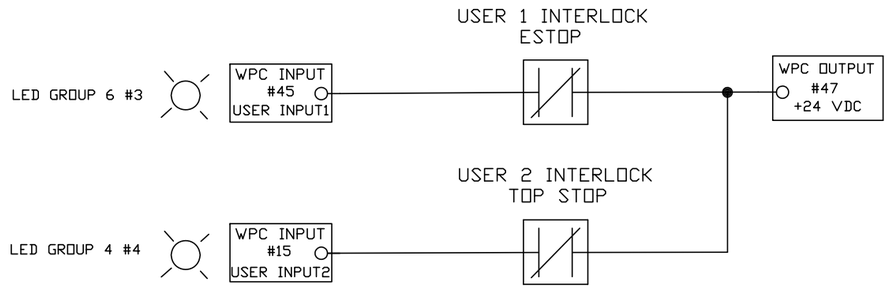
SIZE	DRAWING NUMBER	REV
C	FIGURE 2	

SCALE | SHEET 2

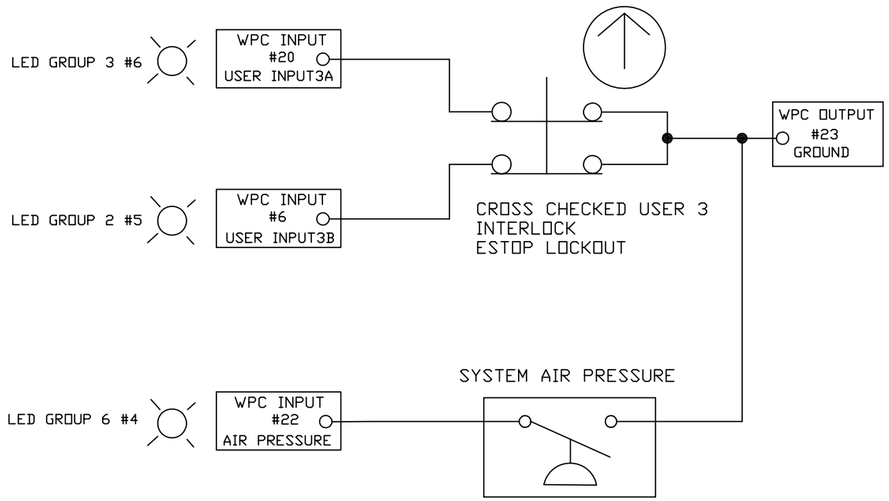


RESOLVER SHOWN WIRED FOR CW ROTATION, SWAP THE BLACK AND YELLOW WIRES FOR CCW ROTATION



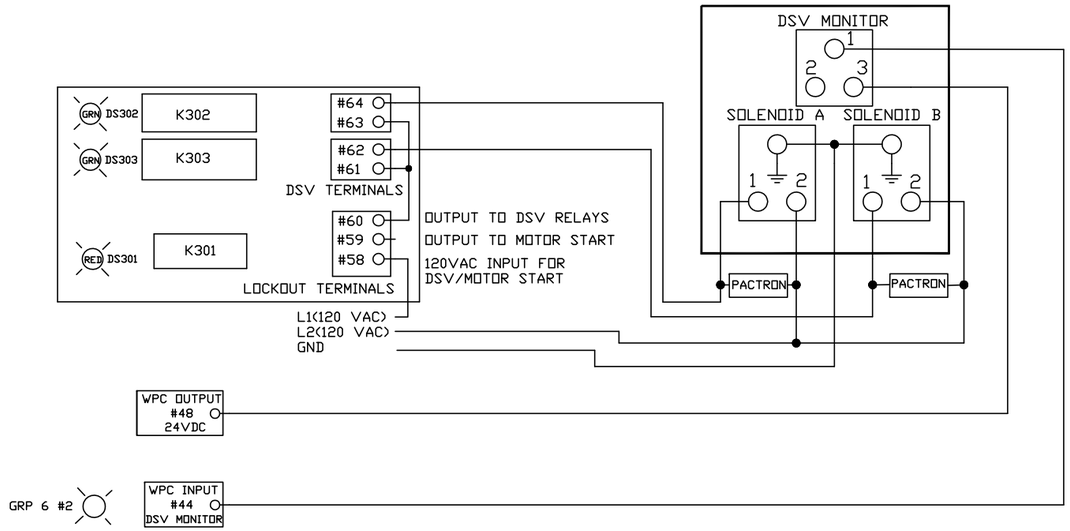


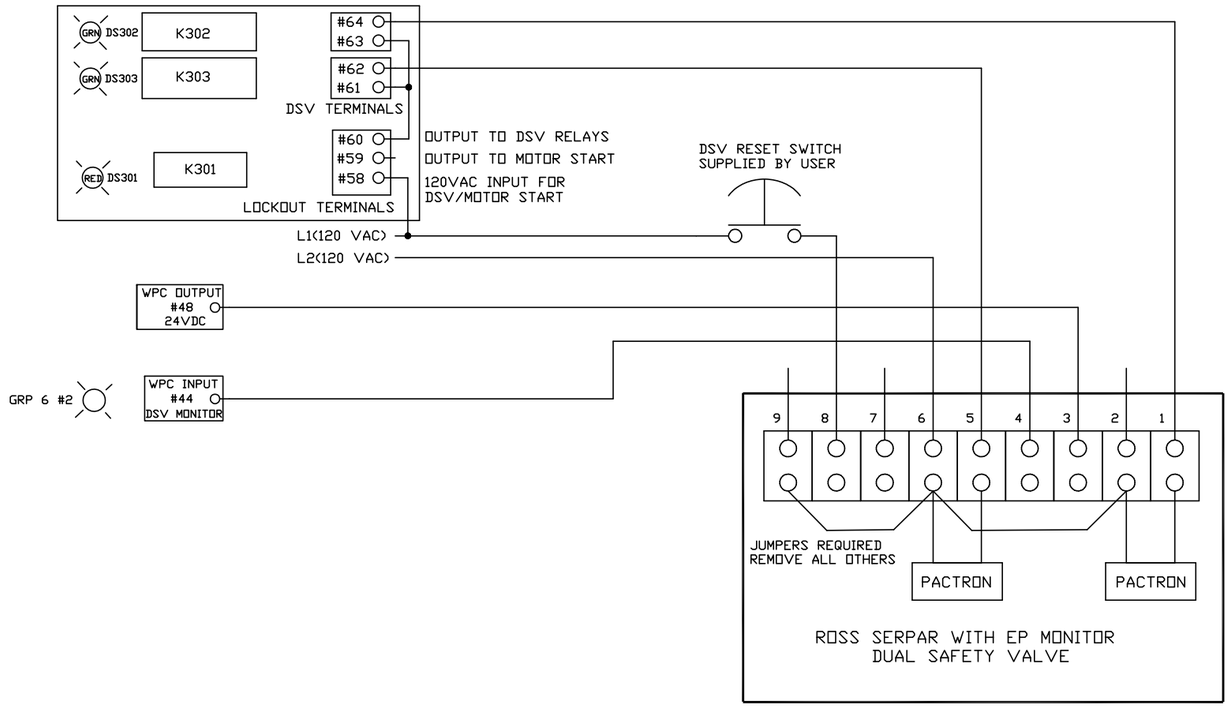
POSITIVE ACTION INTERLOCK SWITCH. SWITCH SHOWN IN KEY IN POSITION.

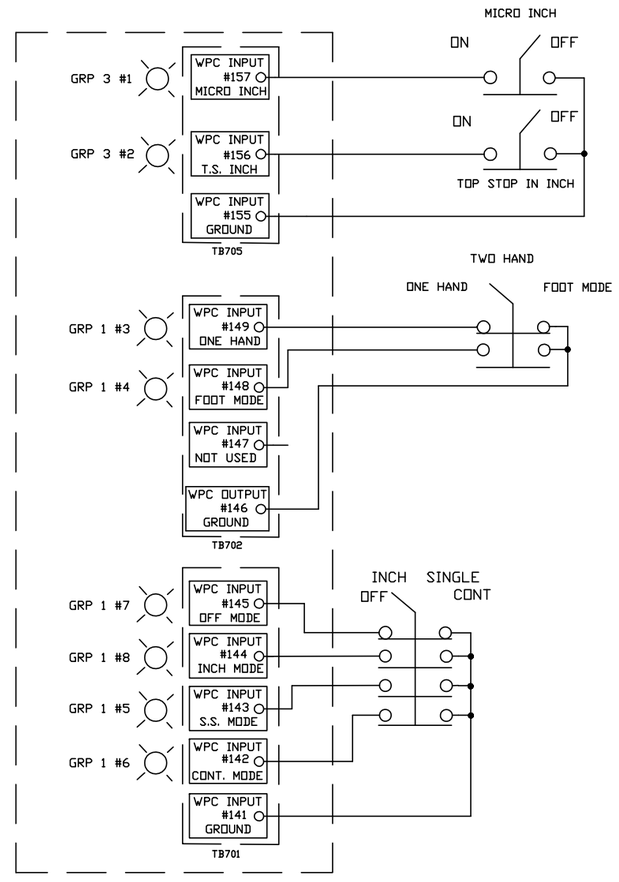


DRAWN GVR	DATE 6/16/10	Wintriss Controls Group
CHK		
APPROVALS		TITLE: WPC1000 RESOLVER AND INTERLOCK WIRING
ENG.		
MFG.		
FILENAME		SIZE C · DRAWING NUMBER FIGURE 3 · REV
REL		SCALE · SHEET 3 OF

HERION DUAL SAFETY VALVE MODEL XSZ



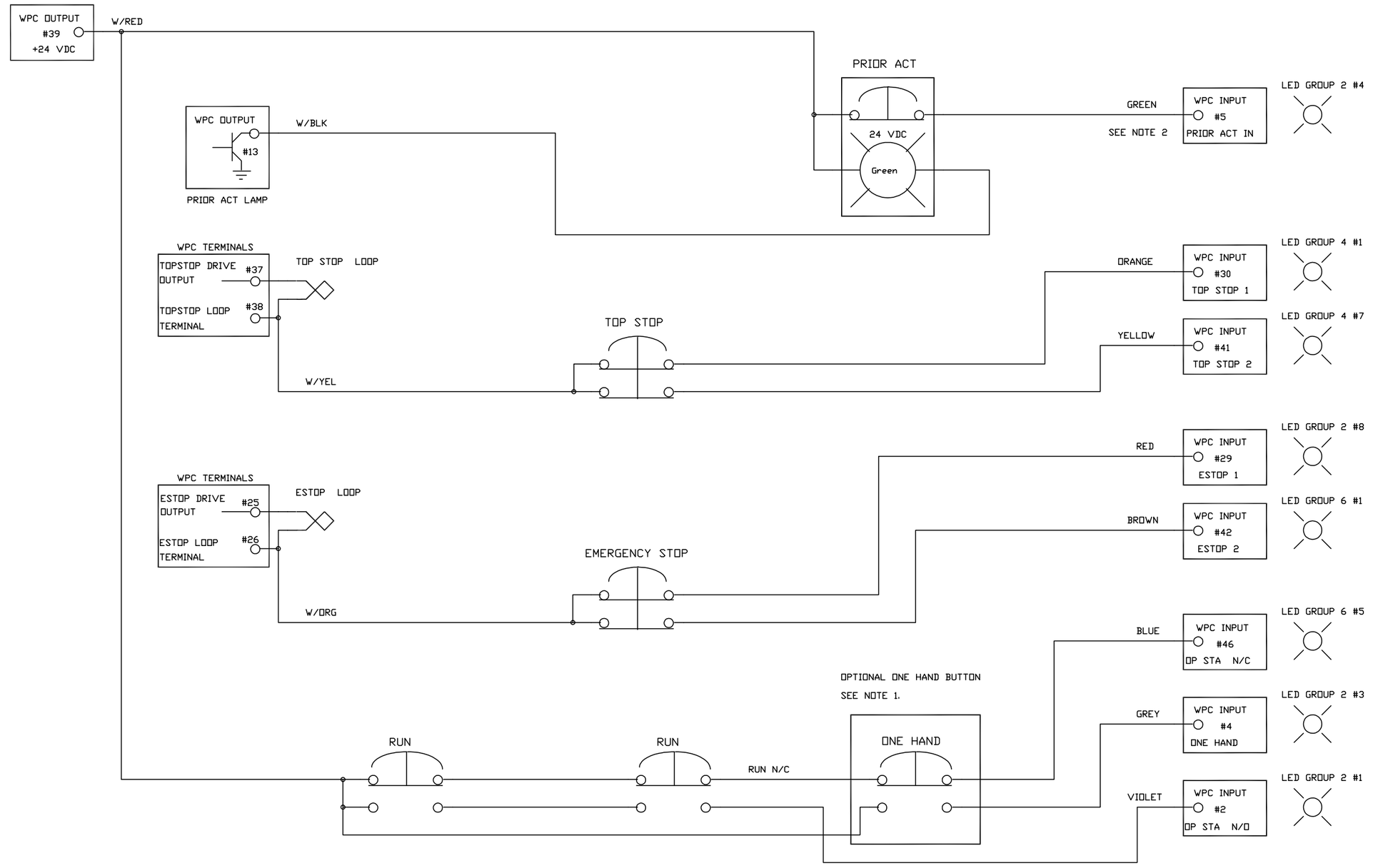




THE ABOVE CONNECTORS ARE ON THE WPC1000 DISPLAY BOARD

DRAWN GVR	DATE 6/10/10	Wintriss Controls Group	
CHK			
APPROVALS		TITLE	
ENG.		WPC1000 STROKE SELECT WIRING HERION AND ROSS DSV WIRING	
MFG.			
FILENAME		SIZE C	DRAWING NUMBER FIGURE 4 — REV
REL		SCALE	SHEET 4

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



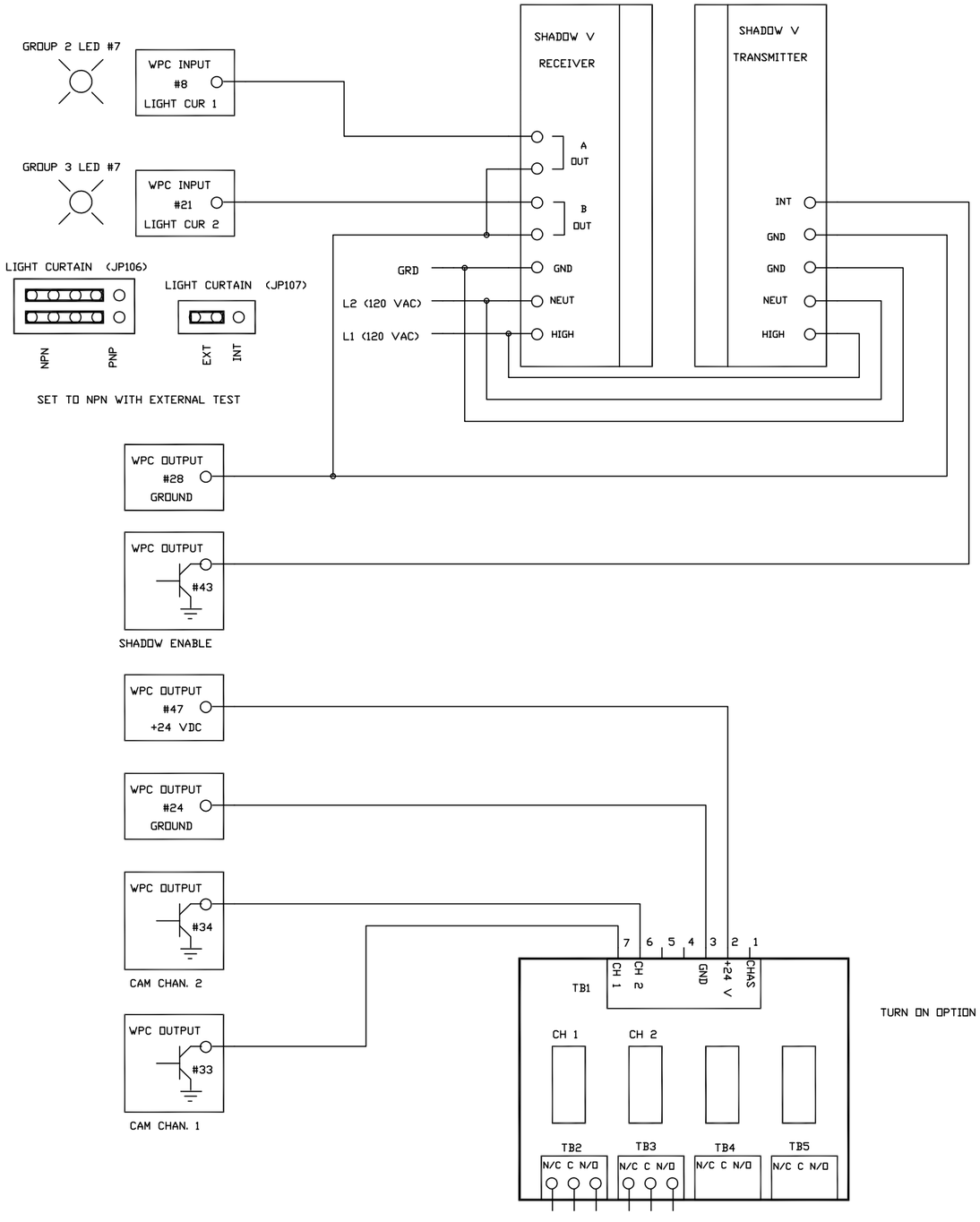
Note: Ensure that on any non-Wintriss operator station the Run buttons comply with the requirements in Table B-2 on page B-2.

NOTE 1: FOR NO ONE HAND BUTTON JUST CONNECT THE RUN N/C CONNECTION DIRECTLY TO WPC INPUT #46. LEAVE THE WPC INPUT #4 UNCONNECTED.

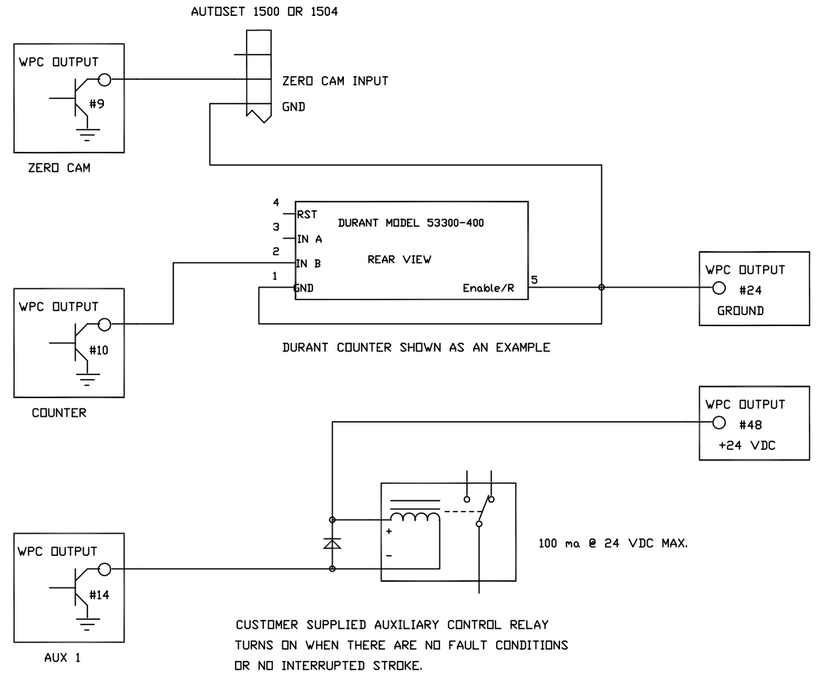
NOTE 2: WIRE COLORS ARE FOR REFERENCE ONLY. THEY REFER TO THE STANDARD WINTRISS OPERATOR STATION WIRE COLORS.

DRAWN ADB	DATE 1/24/13	WINTRISS CONTROLS GROUP
CHK.		
APPROVALS		TITLE: WPC 1000 UNWIRED OPERATOR STATION WIRING DIAGRAM
ENG.		
MFG.		
FILENAME		CODE IDENT NO. / SIZE C / DRAWING NUMBER FIGURE 5 / REV
REL		SCALE / SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



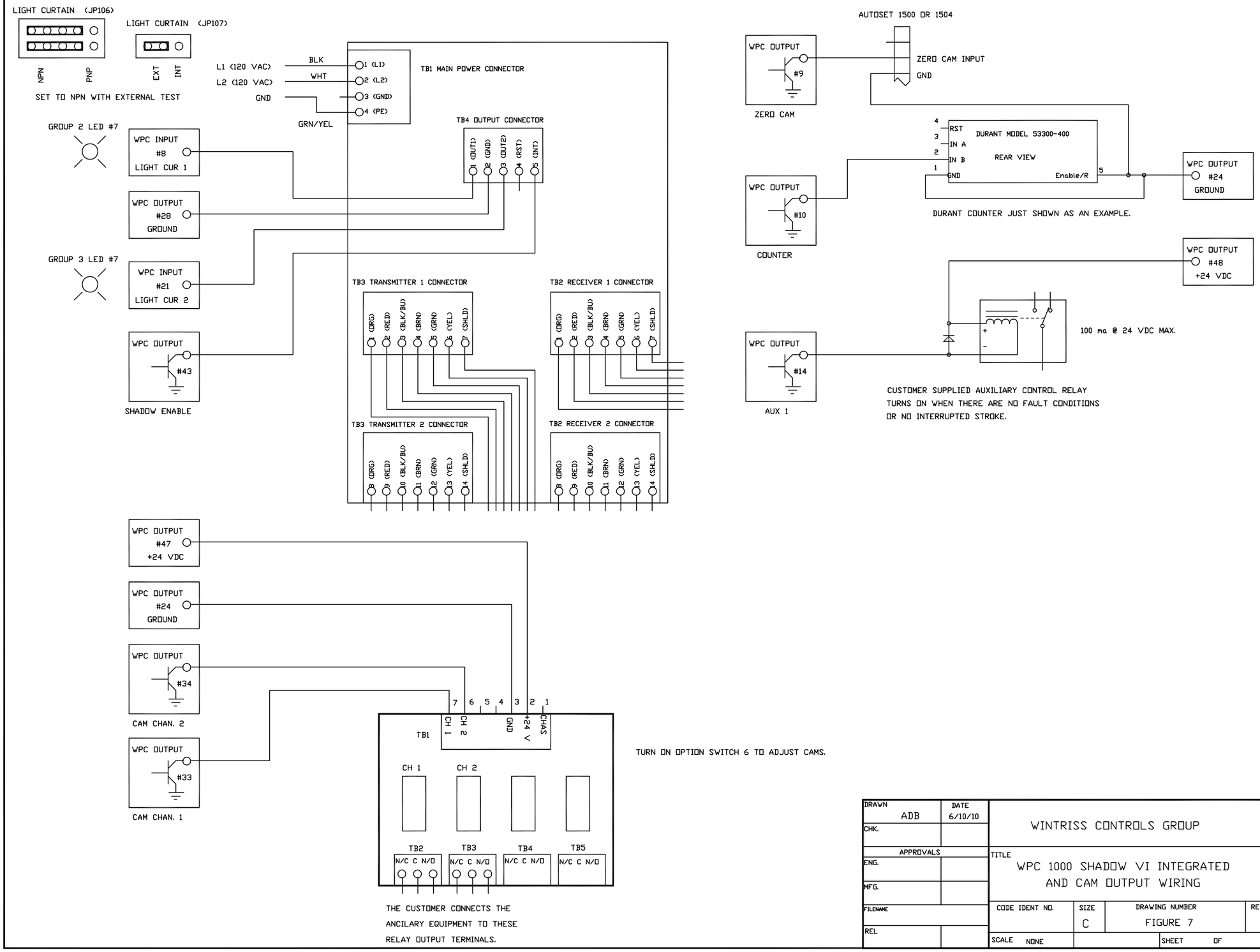
THE CUSTOMER CONNECTS THE ANCILARY EQUIPMENT TO THESE RELAY OUTPUT TERMINALS.



TURN ON OPTION SWITCH 6 TO ADJUST CAMS.

DRAWN ADB	DATE 6/10/10	WINTRISS CONTROLS GROUP	
CHK.			
APPROVALS		TITLE WPC 1000 SHADOW V AND CAM OUTPUT WIRING	
ENG.			
MFG.			
FILENAME		CODE IDENT NO.	SIZE C / DRAWING NUMBER FIGURE 6 / REV
REL		SCALE NONE	SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN	ADB	DATE	6/10/10
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

WINTRISS CONTROLS GROUP

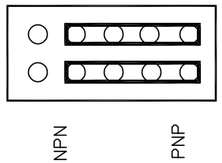
TITLE
WPC 1000 SHADOW VI INTEGRATED
AND CAM OUTPUT WIRING

CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	C	FIGURE 7	
SCALE NONE		SHEET OF	

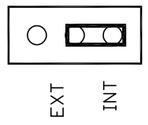
REVISIONS			
REV	DESCRIPTION	DATE	APP'D

JUMPERS LOCATED ON WPC 1000 PROCESSOR BOARD

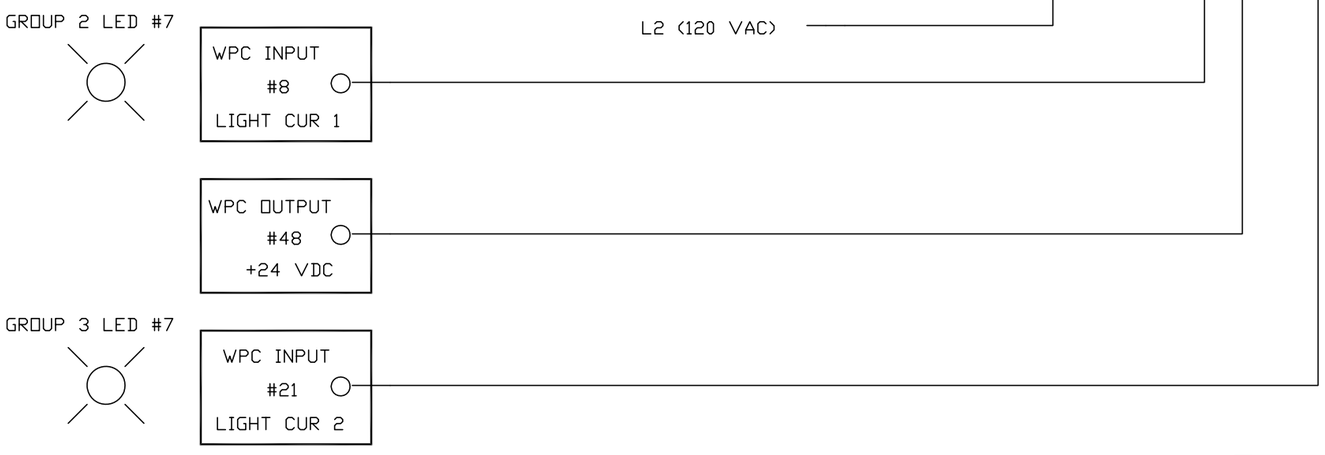
LIGHT CURTAIN (JP106)



LIGHT CURTAIN (JP107)



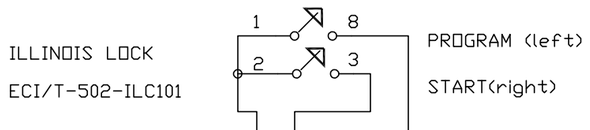
SET TO PNP WITH INTERNAL TEST

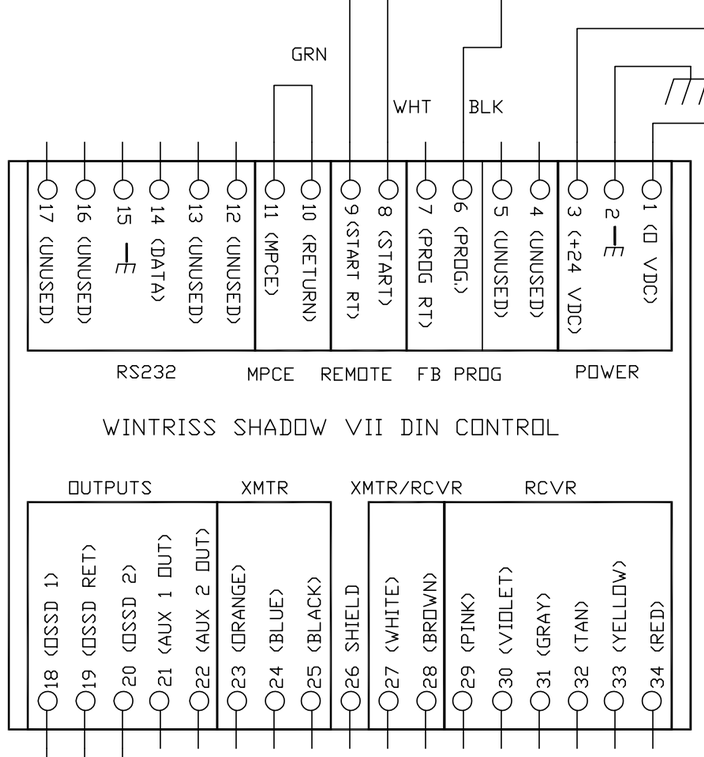


DRAWN ADB	DATE 6/10/10	WINTRISS CONTROLS GROUP	
CHK.			
APPROVALS		TITLE WPC 1000 WITH SHADOW VII WIRING DIAGRAM	
ENG.			
MFG.			
FILENAME		CODE IDENT NO.	SIZE B / DRAWING NUMBER FIGURE 8 / REV
REL		SCALE NONE	SHEET 1 OF 1

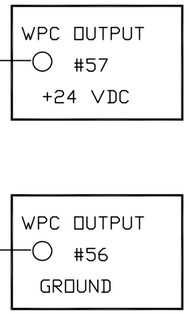
REVISIONS			
REV	DESCRIPTION	DATE	APP'D

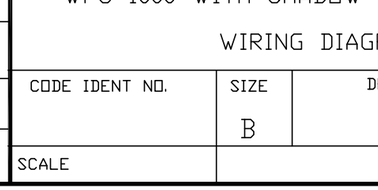
PROG/START SWITCH (MOUNTED ON DOOR)

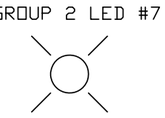


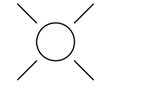


WINTRISS SHADOW VII DIN CONTROL

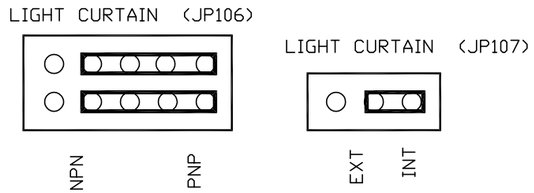








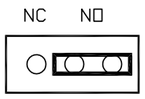
JUMPERS LOCATED ON WPC 1000 PROCESSOR BOARD



SET TO PNP WITH INTERNAL TEST

SET MODE SWITCHES SWA AND SWB UNDER THE COVER AS FOLLOWS: (BOTH MUST MATCH)

1 (OP MODE) - DWN
2 (OP MODE) - DWN
3 (MPCE) - DWN
4 (CH SEL) - UP
5 (FB1) - UP
6 (FB2) - UP
7 (AUX OUT) - DWN



REMOTE START SWITCH SENSE SELECTION. SET TO NO. (LOCATED UNDER THE COVER IN THE UPPER LEFT.)

DRAWN	ADB	DATE	6/10/10
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

WINTRISS CONTROLS GROUP

TITLE

WPC 1000 WITH SHADOW VII DIN CONTROL WIRING DIAGRAM

CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	B	FIGURE 9	
SCALE		SHEET 1 OF 1	

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

DSV MONITOR PRESSURE SWITCH IS CLOSED FROM PIN 1 TO 3 WHEN VALVE IS WORKING NORMALLY.

ROSS DUAL SAFETY VALVE
MODEL DM2

DSV MONITOR
3 (n/o)
2 (n/c)
1 (com)

RESET SOLENOID
24 VDC
GND
1
2
+
-

SOLENOID A
120 VAC
GND
1
2

SOLENOID B
120 VAC
GND
1
2

PACTRON

PACTRON

GROUP 5 LED #4
DSVA DRIVE CHECK

GROUP 5 LED #3
DSVA CONTACT CHECK

GROUP 5 LED #6
DSVB DRIVE CHECK

GROUP 5 LED #5
DSVB CONTACT CHECK

WPC RELAY OUTPUTS LOCATED ON TOP BOARD

DSVA OUTPUT RELAY
#63
4A
F303
CR1
CR2
GREEN LED DS302
#64

DSVB OUTPUT RELAY
#61
4A
F302
CR1
CR2
GREEN LED DS303
#62

WPC OUTPUT
#39
+24 VDC

WPC INPUT
#44
DSV CHECK
ESTOP

GROUP 6 LED #2

M F

WPC INPUT
#32
MOTOR FOR.

GROUP 4 LED #3

M R

WPC INPUT
#18
MOTOR REV.

GROUP 3 LED #4

TO OFF MODE SELECTOR SWITCH

MAIN POWER
TERMINAL BLOCK
GND
L2 (120 VAC)
L1 (120 VAC)

LOCKOUT RELAY
#58
4A
F301
RED LED DS301
#59
#60

CHASSIS GND
CONNECTION

L N GND
120-240 VAC
+24 VDC
L+ L- GND

GROUP 5 LED #2
LOCKOUT DRIVE CHECK

GROUP 5 LED #1
LOCKOUT CONTACT CHECK

INPUT POWER
57 (+24 VDC IN)
56 (COM)

THESE MOTOR CONTROLS ARE SHOWN AS TYPICAL. ACTUAL CONTROLS MAY BE DIFFERENT

MOTOR STOP
MOTOR START
M F
M R
MOTOR OVERLOADS
MOTOR DIRECTION
REVERSE
FORWARD
MOTOR FORWARD COIL
MF
MOTOR REVERSE COIL
MR
L2 (120 VAC)

DRAWN	ADB	DATE	6/10/10
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

WINTRISS CONTROLS GROUP

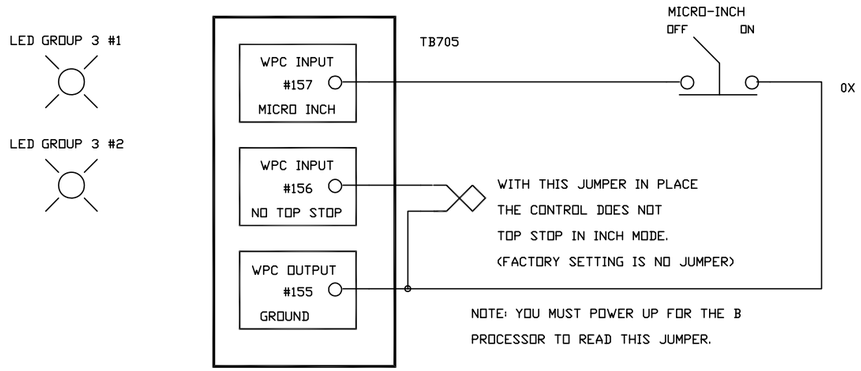
TITLE
WPC 1000 ROSS DM2 DSV WIRING

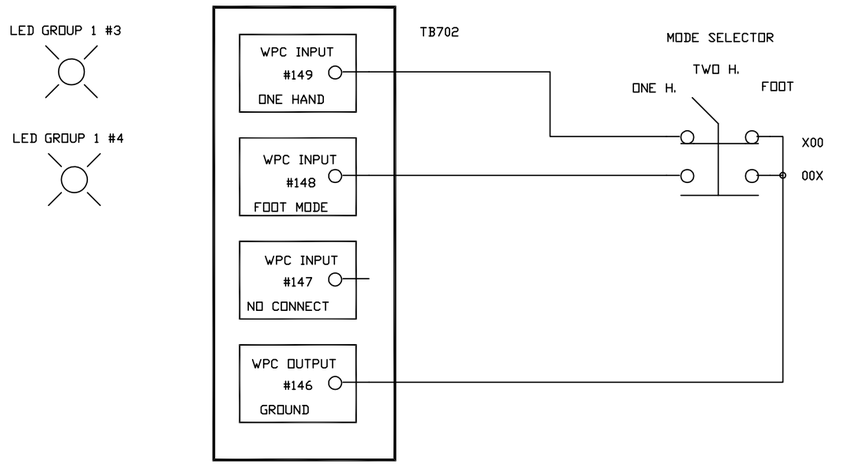
CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	C	FIGURE 10	
SCALE NONE		SHEET OF	

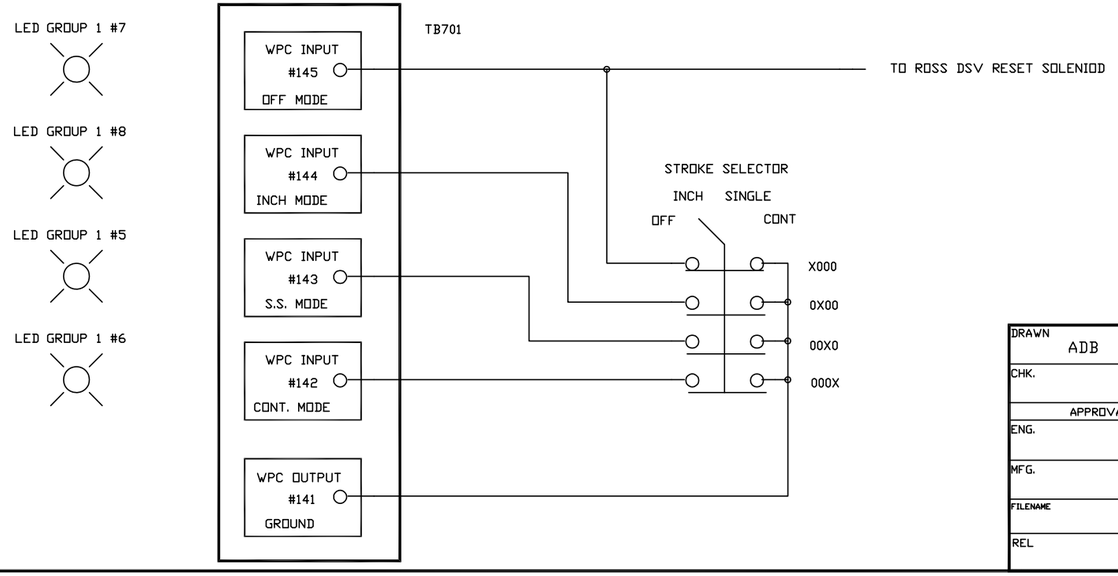
REVISIONS			
REV	DESCRIPTION	DATE	APP'D

THE LED'S ARE ON THE MAIN BOARD

THE INPUT TERMINALS ARE ON THE BACK OF THE DISPLAY BOARD







DRAWN	ADB	DATE	6/10/10
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

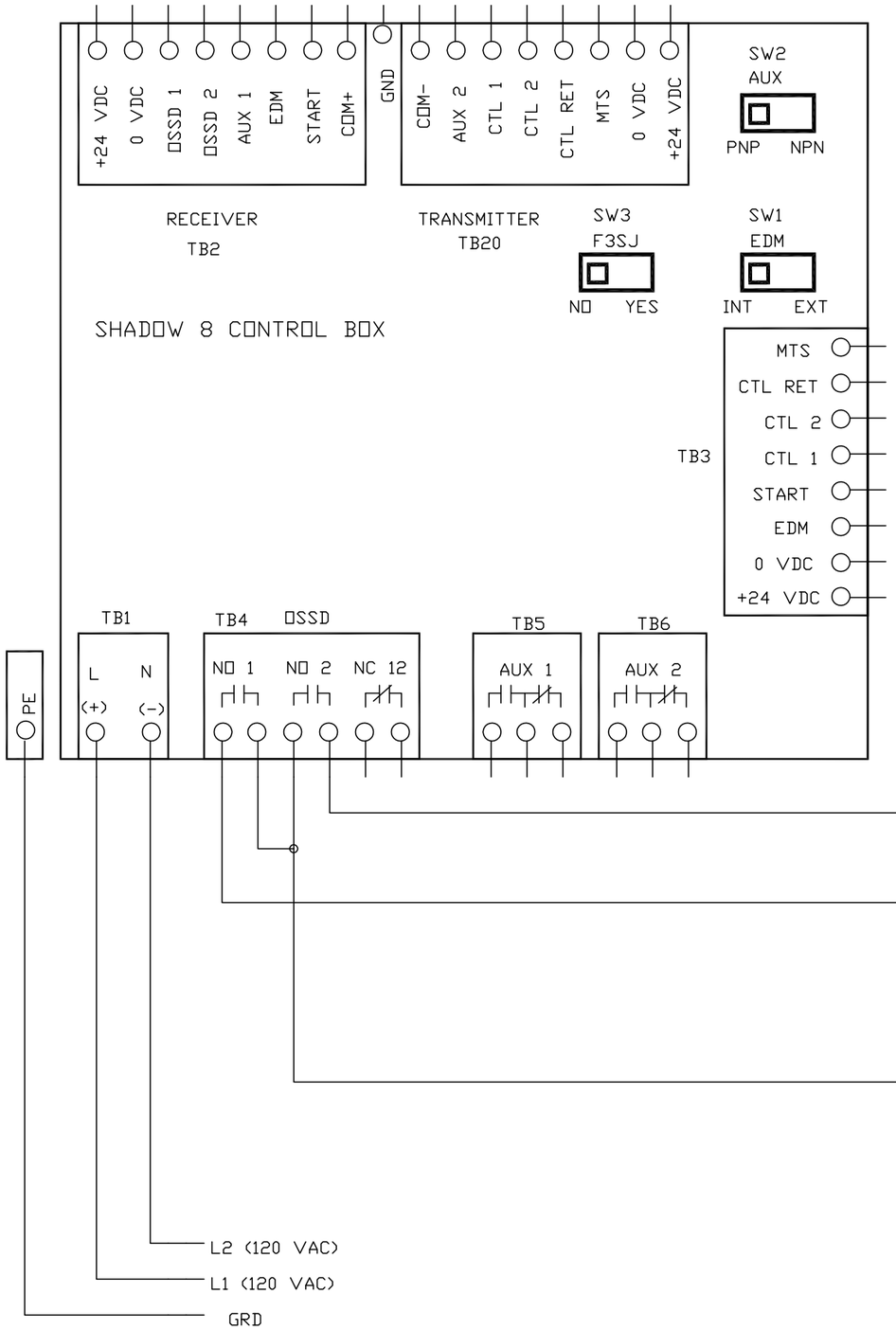
WINTRISS CONTROLS GROUP

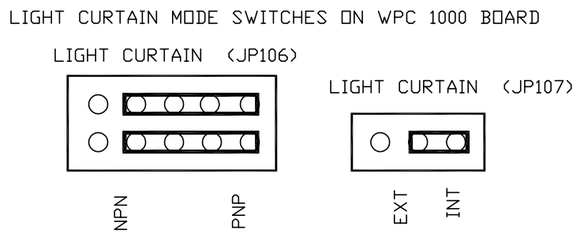
TITLE: WPC 1000 MODE SELECTOR WITH ROSS DM2 RESET WIRING

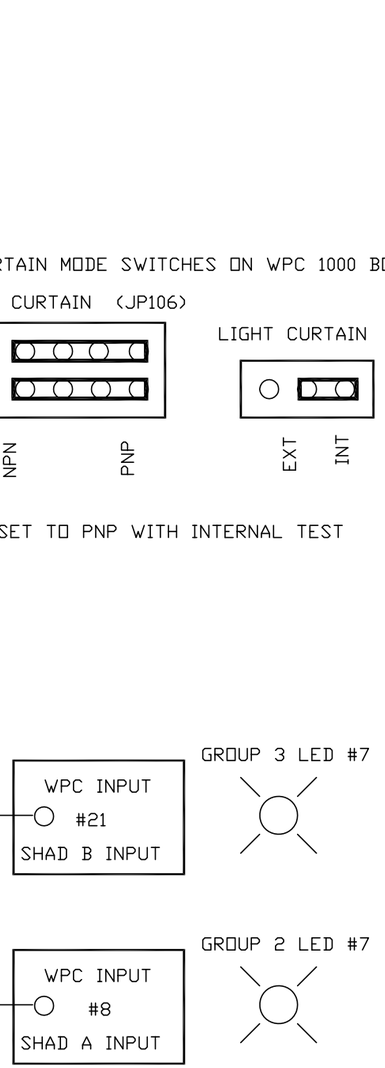
CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	C	FIGURE 11	

SCALE | SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D







SET MODE SWITCHES SWA AND SWB
BEHIND A FLIP DOOR ON BOTTOM OF THE
RECEIVER UNIT AS FOLLOWS:

		SWA	SWB
FOR AUTOMATIC START	SW1 -	OFF	OFF
EDM ENABLED	SW2 -	ON	ON
SCAN CODE A (Set to match transmitter)	SW3 -	OFF	OFF
SCAN CODE B	SW3 -	ON	ON
FLOATING/BLANKING 1 BEAM DISABLED	SW4 -	OFF	OFF
FLOATING/BLANKING 1 BEAM ENABLED	SW4 -	ON	ON
FIXED BLANKING DISABLED	SW5 -	OFF	OFF
FIXED BLANKING ENABLED	SW5 -	ON	ON
SHORT RANGE	SW6 -	OFF	OFF
LONG RANGE	SW6 -	OFF	ON

SET MODE SWITCH BEHIND THE FLIP DOOR
ON BOTTOM OF THE TRANSMITTER UNIT
AS FOLLOWS:

SCAN CODE A (Set to match receiver)	SW1 -	OFF
SCAN CODE B	SW1 -	ON
MTS DISABLED	SW2 -	OFF

DRAWN ADB	DATE 6/10/10
CHK.	
APPROVALS	
ENG.	
MFG.	
FILENAME	
REL	

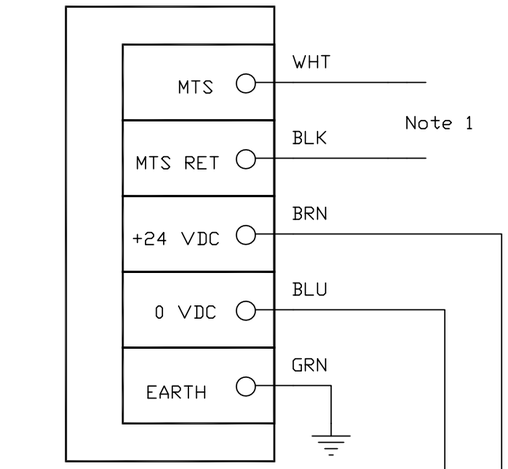
WINTRISS CONTROLS GROUP

TITLE
WPC 1000 NEW STYLE AND SHADOW 8
CONTROL BOX WIRING DIAGRAM

CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	B	FIGURE 12	
SCALE		SHEET OF	

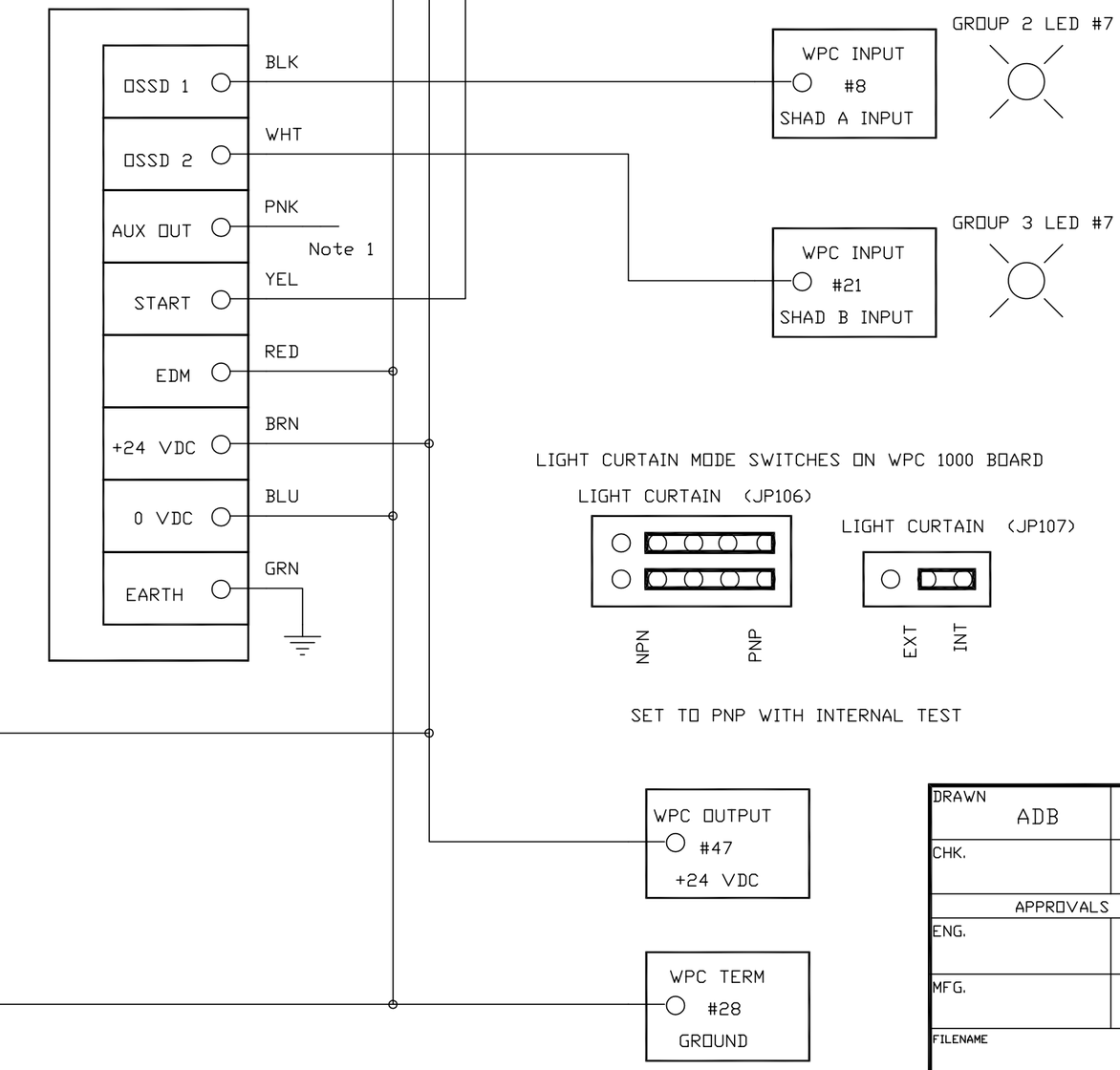
REVISIONS			
REV	DESCRIPTION	DATE	APP'D

NOTE 1: The white and black wires from the transmitter and the pink wire from the reciever are not used. Cut them off close to the encolsure entrance and tyrap them to the other wires.



RECEIVER - 24 VDC @ 500MA MAX
TRANSMITTER - 24 VDC @ 285MA MAX

AUX OUT PNP 24 VDC @ 100MA MAX.



LIGHT CURTAIN MODE SWITCHES ON WPC 1000 BOARD

SET TO PNP WITH INTERNAL TEST

SET MODE SWITCHES SWA AND SWB BEHIND A FLIP DOOR ON BOTTOM OF THE RECEIVER UNIT AS FOLLOWS:

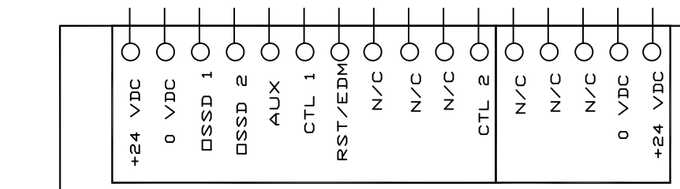
	SWA	SWB
FOR AUTOMATIC START	SW1 - OFF	OFF
EDM DISABLED	SW2 - OFF	OFF
SCAN CODE A	SW3 - OFF	OFF
SCAN CODE B	SW3 - ON	ON
FLOATING/BLANKING 1 BEAM DISABLED	SW4 - OFF	OFF
FLOATING/BLANKING 1 BEAM ENABLED	SW4 - ON	ON
FIXED BLANKING DISABLED	SW5 - OFF	OFF
FIXED BLANKING ENABLED	SW5 - ON	ON
SHORT RANGE	SW6 - OFF	OFF
LONG RANGE	SW6 - OFF	ON

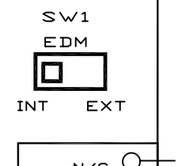
SET MODE SWITCH BEHIND THE FLIP DOOR ON BOTTOM OF THE TRANSMITTER UNIT AS FOLLOWS:

SCAN CODE A	SW1 - OFF
SCAN CODE B	SW1 - ON
MTS DISABLED	SW2 - OFF

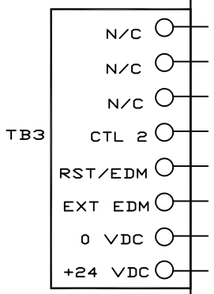
DRAWN ADB	DATE 6/10/10	WINTRISS CONTROLS GROUP	
CHK.			
APPROVALS		TITLE WPC 1000 NEW STYLE AND SHADOW 8 WIRING DIAGRAM	
ENG.			
MFG.			
FILENAME		CODE IDENT NO.	SIZE B / DRAWING NUMBER FIGURE 13 / REV
REL		SCALE	SHEET OF

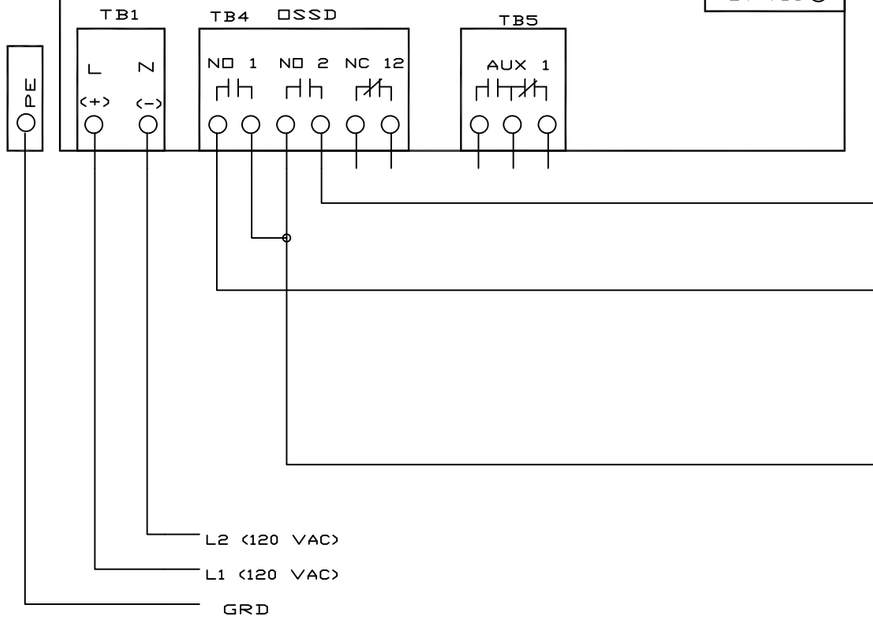
WARNING !!! - When the heads are connected to the control box make sure that the EDM is enabled. Turn on SW1 and SW2 position 2 DIP switches in the receiver unit.



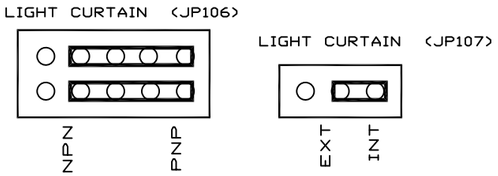


SHADOW 9 CONTROL BOX

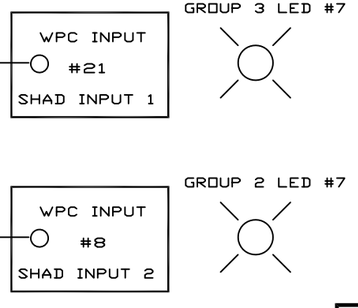




LIGHT CURTAIN MODE SWITCHES ON WPC 1000 BOARD



SET TO PNP WITH INTERNAL TEST



REVISIONS			
REV	DESCRIPTION	DATE	APP'D

SET DIP SWITCHES SW1 AND SW2 BEHIND A FLIP DOOR ON BOTTOM OF THE RECEIVER UNIT AS FOLLOWS:

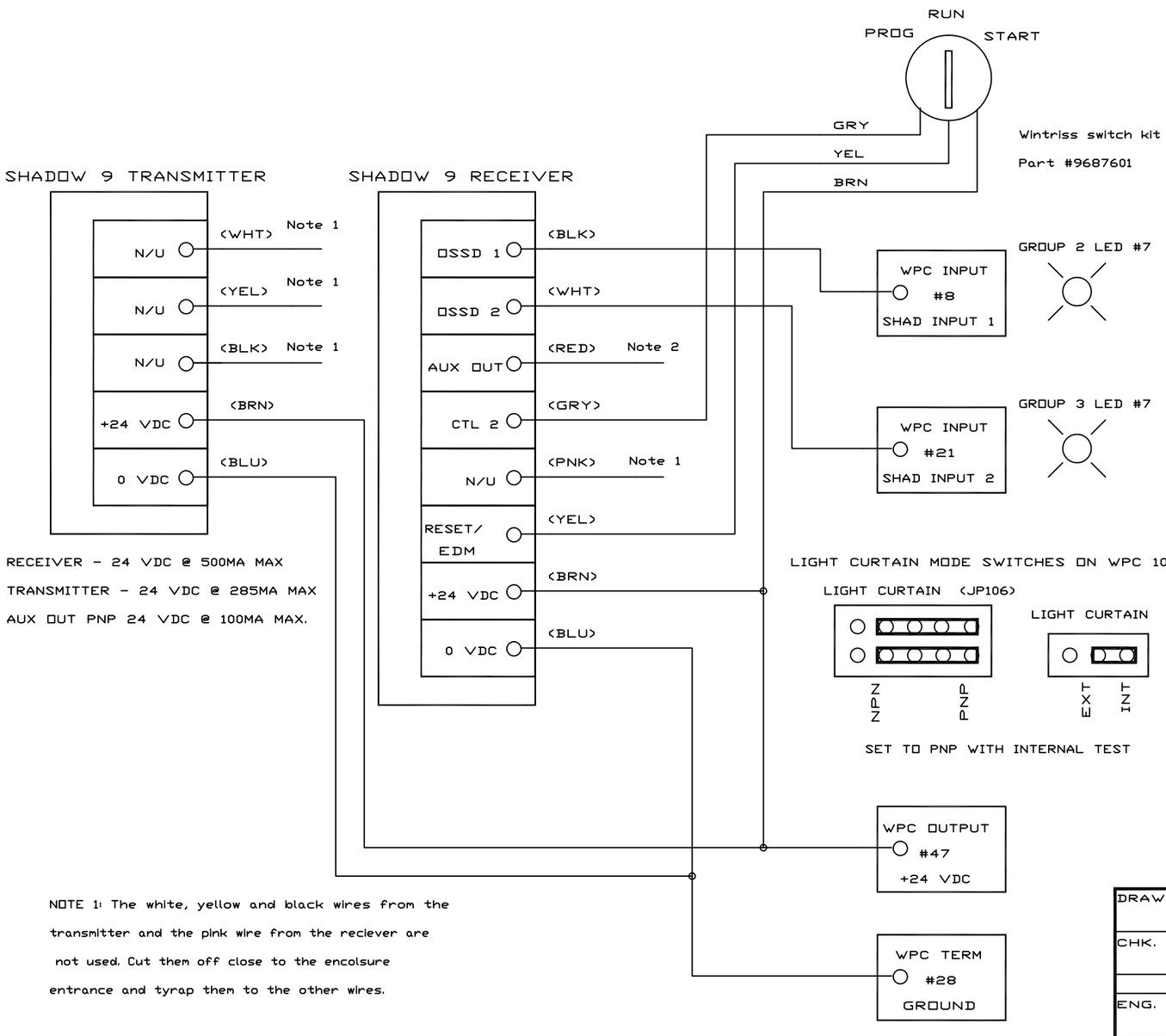
		SW1	SW2
SCAN CODE A (Deflt)	POS 1 - OFF	OFF	
SCAN CODE B	POS 1 - ON	ON	
EDM ENABLED (Deflt)	POS 2 - ON	ON	
EDM DISABLED	POS 2 - OFF	OFF	
AUTOMATIC START (Deflt)	POS 3 - OFF	OFF	
START/RESTART INTERLOCK	POS 3 - ON	ON	
NOT USED	POS 4 - OFF	OFF	
FIXED BLANKING ENABLED (Deflt)	POS 5 - ON	ON	
BLANKING DISABLED	POS 5 - OFF	OFF	
FLOATING BLANKING DISABLED (Deflt)	POS 6 - OFF	OFF	
FLOATING BLANKING ENABLED	POS 6 - ON	ON	
NOT USED	POS 7 - OFF	OFF	
NOT USED	POS 8 - OFF	OFF	

SET DIP SWITCHES BEHIND THE FLIP DOOR ON BOTTOM OF THE TRANSMITTER UNIT AS FOLLOWS:

SCAN CODE A (Deflt)	POS 1 - OFF	
SCAN CODE B	POS 1 - ON	
SHORT RANGE	POS 2 - OFF	POS 3 - OFF
LONG RANGE (Deflt)	POS 2 - ON	POS 3 - ON
NOT USED	POS 4 - OFF	

DRAWN ADB	DATE 10/19/17	WINTRISS CONTROLS GROUP	
CHK.			
APPROVALS		TITLE: WPC 1000 AND SHADOW 9 CONTROL BOX WIRING DIAGRAM	
ENG.			
MFG.			
FILENAME		CODE IDENT NO.	SIZE B / DRAWING NUMBER FIGURE 14 / REV
REL		SCALE	SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



RECEIVER - 24 VDC @ 500MA MAX

TRANSMITTER - 24 VDC @ 285MA MAX

AUX OUT PNP 24 VDC @ 100MA MAX.

LIGHT CURTAIN MODE SWITCHES ON WPC 1000 BOARD

SET TO PNP WITH INTERNAL TEST

NOTE 1: The white, yellow and black wires from the transmitter and the pink wire from the reciever are not used. Cut them off close to the encolsure entrance and tyrap them to the other wires.

NOTE 2: The red wire from the receiver may be used latter to control a remote status indicator. Preserve it's length. Just coil up and tyrap to the other wires.

SET DIP SWITCHES SW1 AND SW2 BEHIND A FLIP DOOR ON BOTTOM OF THE RECEIVER UNIT AS FOLLOWS:

		SW1	SW2
SCAN CODE A (Deflt)	POS 1 -	OFF	OFF
SCAN CODE B	POS 1 -	ON	ON
EDM ENABLED (Deflt)	POS 2 -	ON	ON
EDM DISABLED	POS 2 -	OFF	OFF
AUTOMATIC START (Deflt)	POS 3 -	OFF	OFF
START/RESTART INTERLOCK	POS 3 -	ON	ON
NOT USED	POS 4 -	OFF	OFF
FIXED BLANKING ENABLED (Deflt)	POS 5 -	ON	ON
BLANKING DISABLED	POS 5 -	OFF	OFF
FLOATING BLANKING DISABLED (Deflt)	POS 6 -	OFF	OFF
FLOATING BLANKING ENABLED	POS 6 -	ON	ON
NOT USED	POS 7 -	OFF	OFF
NOT USED	POS 8 -	OFF	OFF

SET DIP SWITCHES BEHIND THE FLIP DOOR ON BOTTOM OF THE TRANSMITTER UNIT AS FOLLOWS:

SCAN CODE A (Deflt)	POS 1 - OFF		
SCAN CODE B	POS 1 - ON		
SHORT RANGE	POS 2 - OFF	POS 3 - OFF	
LONG RANGE (Deflt)	POS 2 - ON	POS 3 - ON	
NOT USED	POS 4 - OFF		

DRAWN ADB	DATE 12/5/17	WINTRISS CONTROLS GROUP	
CHK.			
APPROVALS		TITLE WPC 1000 AND SHADOW 9 WIRING DIAGRAM	
ENG.			
MFG.			
FILENAME		CODE IDENT NO.	SIZE B / DRAWING NUMBER FIGURE 15 / REV
REL		SCALE	SHEET OF