



WPC2000 INSTRUCTION MANUAL

User
Manual

WPC 2000

Wintriss® Clutch/Brake Control
1128500
Rev. R January 2018

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Changes for Revision R of the WPC 2000 User Manual (1128500)

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

- Throughout manual, updated with Shadow 9 light curtain information, including addition of wiring diagrams Figures 21, 22, and 23 at the end of the manual.
- In Chapter 5, Troubleshooting, added notes about finding error numbers 120 or higher in WPC 2000 Option 2 User Manual and WPC 2000 Option 2 Additional Inputs Only Instruction Sheet
- In Appendix A, revised Extracts from ANSI B11.19-2003 8.3 to 2010 edition (ANSI B11.19-2010 8.3).

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How To Use This Manual

This manual shows you how to install, set up, operate, and troubleshoot the WPC 2000 Wintriss Clutch/Brake Control.

Chapter 1 provides an overview of WPC 2000 features and components, describes the locations and functions of the switches and LEDs on the front panel and display, and lists WPC 2000 specifications.

Chapter 2 shows you how to install both enclosure and non-enclosure versions of WPC 2000, including optional components, and perform installation verification tests.

Chapter 3 shows you how to initialize and set up WPC 2000 and perform final checkout tests.

Chapter 4 shows you how to run the press, using WPC 2000'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 2000 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 shows you how to install, wire, and troubleshoot WPC 2000 Option 1 user inputs.

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 2000 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 2000 CLUTCH/BRAKE CONTROL
USER MANUAL
1128500
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Thank you for purchasing a Wintriss Product. We appreciate your business and want to do whatever we can to ensure your satisfaction. Wintriss products are built to stay on the job day after day, and are backed by an ironclad guarantee, international standards approvals, and unbeatable support. Whenever you need assistance or service, we back all our products with excellent spare parts inventories, training programs, and prompt repair service. We would like to share with you a list of service options—probably the largest number of service options offered in the industry.

- **Technical Assistance**

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

- **Return Authorization**

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

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

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

- **Expedited Repair Program**

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

- **Board Exchange Program**

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

- **Service Center**

Our Service Center for product 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.

Chapter 1. Introduction

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

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

WPC 2000 Components

WPC 2000 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 2000 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 2000 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 2000 can be shared with other Wintriss resolver-based products, such as DiPro 1500.

Control Enclosure

The WPC 2000 control enclosure (see Figure 1-1, page 1-2) can be ordered with the display and controls mounted on the front (center mount) or on the left (left mount) or right side (right mount). Up to three of the following selector key switches can be mounted in the enclosure:

- **Stroke Select** (Standard)—Provides switch settings for selection of Inch, Single-stroke, or Continuous operation or Inch or Single-stroke.
- **Mode Select** (Optional)—Provides switch 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 switch setting for turning on the Micro-inch feature (see *Standard Features*, page 1-6).
- **Automatic** (Optional)—Provides a switch setting for turning on the Automatic Single-stroke (External Trip) or Continuous On-demand feature.
- **Operator Station Select** (Optional)—Provides switch settings for selection of Operator Station A, Operator Station B, or both Operator Station A and B in dual Operator Station configurations.

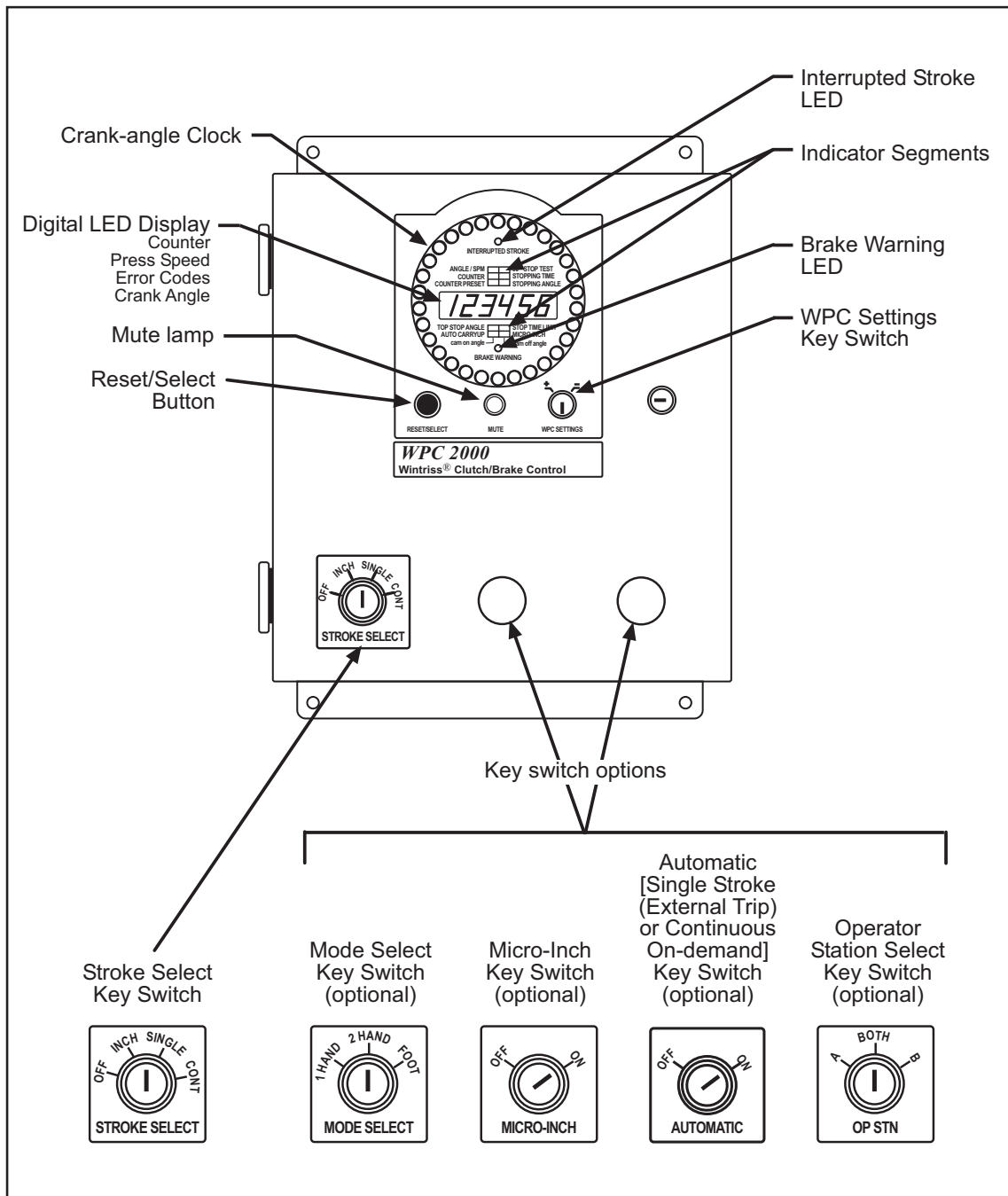


Figure 1-1. WPC 2000 Control Enclosure and Display

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.

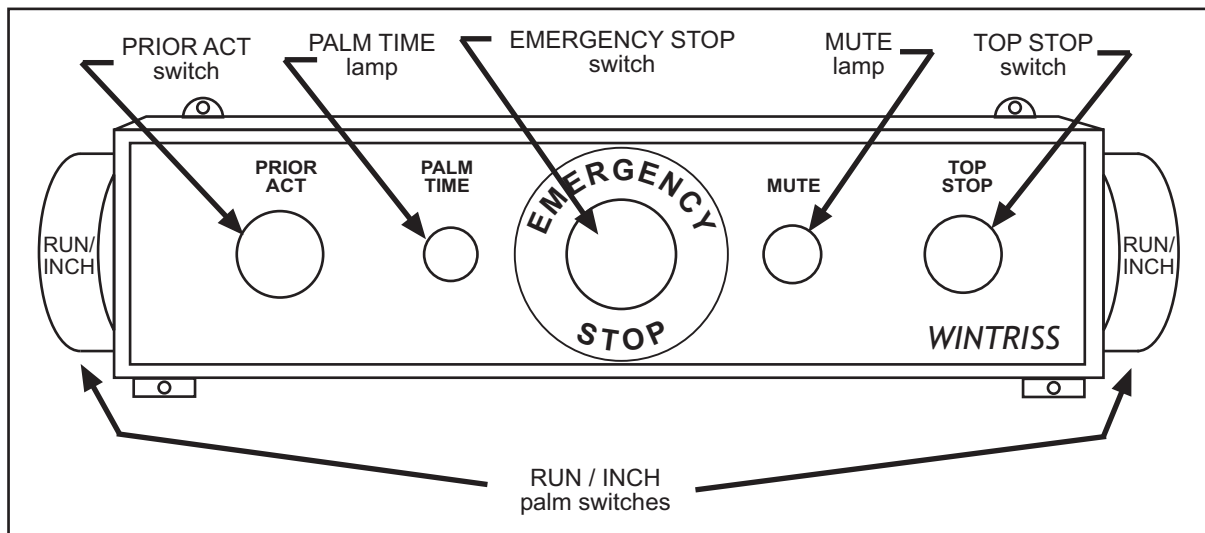


Figure 1-2. Operator Station Components (Side-mounted Run/Inch Palm Buttons)

- 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. Also used in Automatic Single-stroke operation (see page 4-16).
- 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 5-8).
- Top Stop Switch—Stops the press at the top of its stroke when pressed during Continuous operation.
- Palm Time Lamp—Illuminates when one Run/Inch palm button is depressed, turning off after the 1/2 second palm time (“synchronous” time in ANSI terminology) on a standalone Operator Station or the 5 second concurrent time on multiple Operator Stations. The other palm button on a standalone Op. Station or all pairs of buttons on multiple Operator Stations must be pressed before the lamp turns off in order to initiate a stroke.
- Mute Lamp—Illuminates during muting of the light curtain on the upstroke. Requires installation of a Shadow light curtain and optional light curtain muting firmware.

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.

System Air Pressure Switch

This switch monitors the system air pressure. See *Installing 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 2000 is used with a Foot Switch or in One-hand operating mode. Multiple light curtains can be wired to a WPC 2000. WPC 2000 tests up to two pairs of Shadow inputs every time that the press is started and stopped. See *Installing a Light Curtain*, page 2-18 for more information.

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

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

WPC 2000 Display

The WPC 2000 display provides the following features (see Figure 1-1):

- **Digital LED Display**—A highly visible, six-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 selected (see next item). The LED readout also displays WPC 2000 fault codes and abbreviated text messages.
- **Indicator Segments**—Ten 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 six 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 2000 is in Inch mode. When illuminated, indicator segments display press speed, crankshaft angle, 90° stop-time test result, stopping time, stopping angle, stroke counter, counter preset, top-stop angle, auto carry-up angle, stop-time limit, micro-inch time, and cam On/Off angles. See *Viewing and Setting Press Parameters*, page 3-1.

- **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°.
- **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 2000, 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.

Standard Features

WPC 2000 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 2000 switches to “Two-hand Maintained Single-stroke” mode. (If WPC 2000 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 2000 automatically reverts to the original operating mode.
- **Customized Status Codes**—WPC 2000 provides nine 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. Two of the inputs are cross-checked pairs, which you can use for safety interlocks. If you install the optional Option 1 board, you can connect up to 20 additional non-control-reliable inputs and up to 4 additional control-reliable, cross-checked input pairs (see Appendix C).
- **Brake Monitor**—WPC 2000’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 2000 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).

- **Counter and Counter Preset**—The counter 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 4-6), WPC 2000 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.
- **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 2000 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 2000, 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

WPC 2000 can be ordered with any of the following 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.
- **Four-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 2000 running One-hand/Two-hand/Foot firmware and equipped with a Shadow light curtain guarding the point of operation. The One-hand Control switch can be mounted on or near the press, allowing the operator to press the switch as part of his normal hand motion after loading a part.
- **Foot Switch**—A device that frees the operator’s hands for increased, fully-guarded protection and productivity. One-hand/Two-hand/Foot firmware is required, and a Shadow light curtain must be installed.
- **Bar Mode Control**—Allows operators and setup personnel to bar the press by hand for die setting and adjustment. Recommended for smaller-capacity presses of 65 tons or less.

- **Automatic Single-stroke** (External Trip)—Allows feed equipment to signal WPC 2000 to initiate a stroke upon completion of a feed. This option is useful in applications where the feed must be completed before the press can be stroked.
- **Automatic Continuous On-demand**—Allows an external device to signal WPC 2000 to start the press in Continuous mode and maintain operation in Continuous.
- **Auto Compensated Top Stop (ACTS)**—A feature that automatically adjusts the Top-stop “On” Angle to an earlier point in the stroke to compensate for increases in press speed. ACTS is designed specifically for variable-speed presses. See *Switch 4 – Enabling Auto Compensated Top Stop (ACTS)*, page 3-28 for additional information about this feature.
- **Multiple Operator Stations**—Two Operator Stations can be connected directly to WPC 2000. If you wish to install more than two Op. Stations, contact Wintriss Tech. Support (see *Installing Multiple Operator Stations*, page 2-17).

DANGER

HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

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

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

NOTICE

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

- **Display Configuration Options**—WPC 2000 is available without an enclosure. Installation instructions for panel mount and display board kit options are provided beginning on page 2-51.
- **Auxiliary E-Stop Output Relay Board**—Allows up to three auxiliary devices such as a feed or transfer to be stopped or prevented from starting when an E-stop button is pressed, a light curtain is interrupted, or a cross-checked input is open.

If your WPC 2000 has Shadow light curtain muting firmware, you can prevent the auxiliary E-stop relays from issuing a Stop command if the light curtain is interrupted during the muted portion of the stroke by setting option switch 2 on switch block S102 on the WPC 2000 Main Processor board (see page 3-33). The auxiliary E-stop muting function is necessary in applications where parts must be ejected through a light curtain. Auxiliary relay muting does not prevent the auxiliary relays from issuing a Stop command when an E-stop button is pressed or a cross-checked input is open.

Layout of the Auxiliary E-Stop Output Relay board is shown in Figure 2-12, page 2-23 or Figure 2-13, page 2-24. Wiring connections are shown in Table 2-19, page 2-63.

Specifications

WPC 2000 specifications are shown in Table 1-1.

Table 1-1. WPC 2000 Specifications

Control	<p>Enclosure: 14.00 x 19.62 x 7.00 in. (355.6 x 498.3 x 177.8 mm), NEMA 12, shock-mounted.</p> <p>Panel Mount: 7.50 x 10.00 in. (190.5 x 254.0 mm)</p> <p>Standard items include 6-digit LED display, display indicators, crank-angle clock, Interrupted Stroke and Brake Warning LEDs, Reset/Select button, Mute lamp, and Settings key switch. Enclosure also provides Stroke Select key switch and holes for two optional key switches.</p>
Equipment Available from Wintriss Controls	<p>Resolver 0.75 in. (19 mm) keyed shaft. Rated shaft loading: 200 lb axial, 200 lb radial.</p> <p>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.</p> <p>Dual Safety Valve (DSV) Available in 0.75 in. (19 mm) or 1 in. (25 mm) Ross DM2 models.</p> <p>Air Pressure Switch 12-150 PSI. Monitors clutch air supply pressure.</p>
Wintriss AC Power Supply (Included)	<p>Input: 100-240 \pm 10% Vac (universal switching), 75 VA, 50/60 Hz.</p> <p>Output: 24 \pm 1% Vdc, 200 mA maximum for customer use including auxiliary outputs.</p>
Power Requirements if not Using Wintriss AC Power Supply	<p>24 \pm 5% Vdc, 2 A.</p> <p>Must be certified to CSA C22.2 No. 234 Standard.</p>
Operating Temperature	32° to 122° F (0° to 50° C).
Inputs	<p>Resolver</p> <p>Overrun limit switch</p> <p>Two operator stations</p> <p>DSV monitor</p> <p>Air pressure switch</p>

Table 1-1. WPC 2000 Specifications (Cont)

Additional Inputs	<p>Motor Forward and reverse contacts</p> <p>Shadow Light Curtains (2) Checks proper functioning at every stroke initiation and stop.</p> <p>Customized Status Codes Four for E-stop Three for Top-stop One cross-checked pair for E-stop One cross-checked pair for E-stop/Lockout</p>
Outputs	<p>DSV Two monitored relays, rated 4 A @ 120 Vac, for E-stopping and Top-stopping press.</p> <p>Lockout One monitored relay, rated 4 A @ 120 Vac, for de-energizing motor and other devices under critical conditions.</p> <p>Auxiliary Stop Output Provides a signal to stop auxiliary equipment during an interrupted stroke.</p> <p>Optional Auxiliary E-Stop Output Relays Two monitored relays, rated 4 A @ 120 Vac, for up to three auxiliary devices (e.g., feed, transfer, etc.), which can be stopped or prevented from starting if any E-stop button is depressed, any light curtain is interrupted, or any cross-checked inputs are open.</p>
Speed	7-500 SPM; 500-2000 SPM optional.
Displays	<p>Six-digit LED. Displays press speed, crankshaft angle, presettable counter, 90° stop-time test result, stopping time, stopping angle, top-stop angle, auto carry-up angle, stop time limit, and micro-inch as well as cam on/off angles and status/error codes. Also displays press control timings, which are secured with keylock and/or internal press option switch. Crank-angle clock.</p> <p>LED indicators for Interrupted Stroke and Brake Warning.</p> <p>Diagnostic LEDs on Main Processor board for power and for all inputs, including buttons and switches.</p> <p>Presettable Counter Counts number of strokes; can be used to stop the press for batch sizing or QC checks. Includes 6-digit counter on front panel of WPC 2000.</p>

Table 1-1. WPC 2000 Specifications (Cont)

Options	<p>Shadow V, Shadow VI, Shadow VII, Shadow 8, or Shadow 9 Light Curtain Heights from 6 to 60 in. (138 to 1524 mm), scanning ranges from 23' to 65' (7 to 20 m). Refer to Shadow literature for more information.</p> <p>Firmware Muting for Shadow light curtain on the upstroke. Two-hand only. One-hand*, two-hand or foot operation*. Automatic Single-stroke (External Trip). Continuous On-demand. Auto compensated top-stop (ACTS). High Speed (>500 SPM).</p> <p>Selector Switches Mode (One-hand*, two-hand, or foot operation*). Micro-inch on/off. Automatic (single-stroke or continuous on-demand) on/off to slave the press to an external device. Operator station select for either of two operator stations or both operator stations.</p> <p>4-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) DC Solid State: SPST 2A at 5-60 Vdc optional AC Solid State: SPST 1A at 70-250 Vac (optional)</p> <p>Foot Switch Safety switch for foot actuation* (1-hand/2-hand/foot firmware required).</p> <p>One-hand Control Control for one-hand actuation* (1-hand/2-hand/foot firmware required).</p> <p>Counterbalance Air Pressure Switch 12-150 PSI. Monitors counterbalance air supply (uses one custom input).</p> <p>Bar Mode Control Allows manual turning of crankshaft.</p> <p>Motor Control and Custom Packages Refer to Press Control/Motor Starter literature, and/or contact your Wintriss representative or factory for more details.</p> <p>Option 1 User Inputs Provides 20 additional non-control-reliable inputs and 4 additional control-reliable, cross-checked input pairs for customized status codes. Eight inputs are E-stop Ten inputs are Top-stop Two inputs are E-stop/Lockout Two cross-checked pairs are E-stop Two cross-checked pairs are E-stop/Lockout</p>
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* 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 2000 clutch/brake control is installed, tested and repaired by qualified personnel.
- Wire, install and maintain WPC 2000 clutch/brake control in accordance with the applicable safety standards. Carry out all inspection procedures in OSHA 1910.217.
- Wire and install all equipment in accordance with the requirements of OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
- Install and maintain your machine guarding system according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.
- Perform the checkout sequence after installation and after any modification or repair of the WPC 2000 clutch/brake control.
- Lockout/Tagout the press during all installation, modification, repair or maintenance procedures.
- Ensure that supervisors, die-setters, maintenance persons, machine operators, foremen, and any others responsible for operation of the machinery have read and understood all instructions for use of the WPC 2000 clutch/brake control.
- Disconnect the “Continuous” mode position of your stroke 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 2-58 to ensure that WPC 2000 is installed correctly and working properly before proceeding to Chapter 3.

NOTICE**ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH MAIN PROCESSOR BOARD**

Connect all signal grounds through pins on the WPC 2000 Main Processor board.

NOTICE**READ INSTALLATION INSTRUCTIONS BEFORE STARTING INSTALLATION**

If you install WPC 2000 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 2000 display (see page 1-2). 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 $0^\circ \pm 2^\circ$. Use a dial indicator on the face of the ram, if necessary, to ensure that the ram is positioned correctly.

Installation Guidelines

Observe the following guidelines when installing WPC 2000, 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 2000 Main Processor 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 2000 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 2000 input power connection. Do not power any relays or solenoids from this circuit or the auxiliary power terminals on WPC 2000. 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 2000 enclosure.
- Because WPC 2000 is rated NEMA 12 (protected against dust and oil), you must use conduit of the same rating and make proper connections to ensure NEMA 12 protection.
- Make sure the WPC 2000 is properly grounded.
- All relays and solenoids controlled by WPC 2000 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.

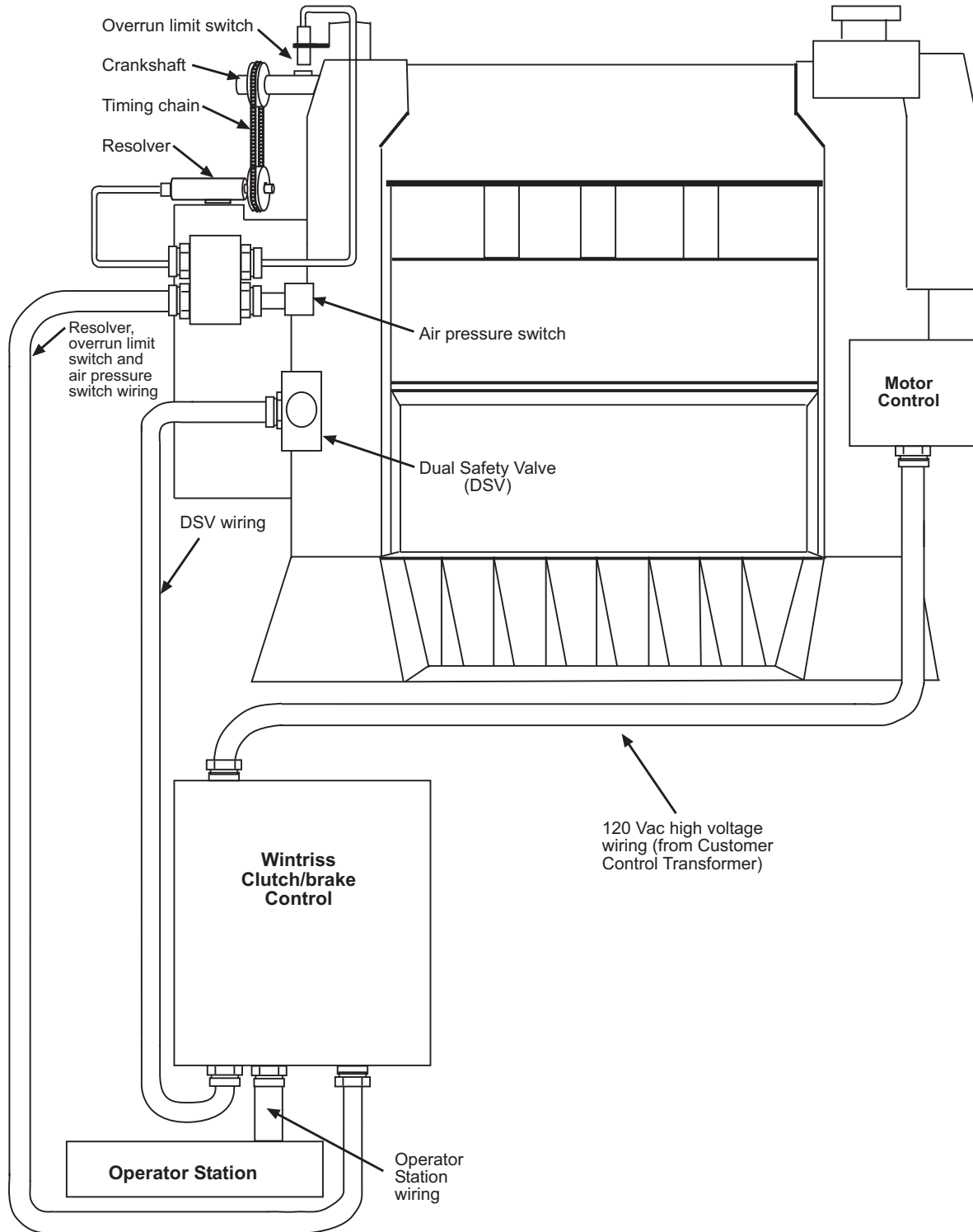


Figure 2-1. WPC 2000 Wiring Overview

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.

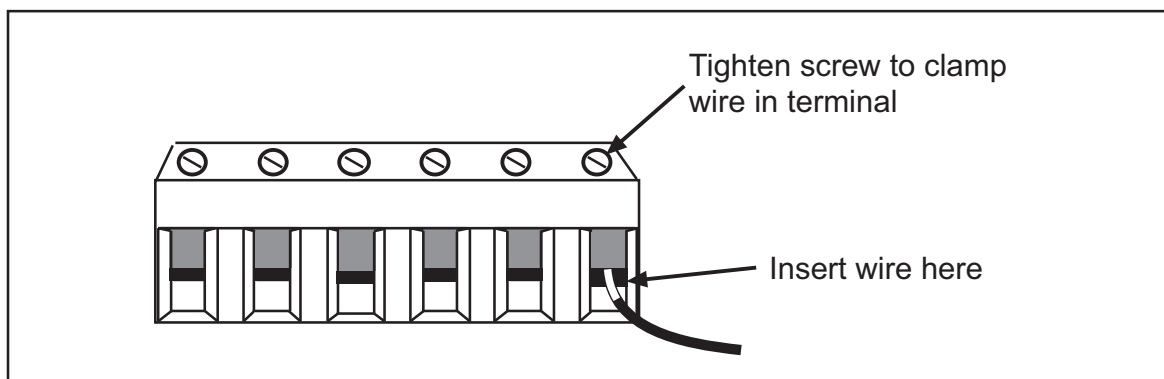


Figure 2-2. Correct Way to Attach Wires to Terminal Block Connectors

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 2000 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.

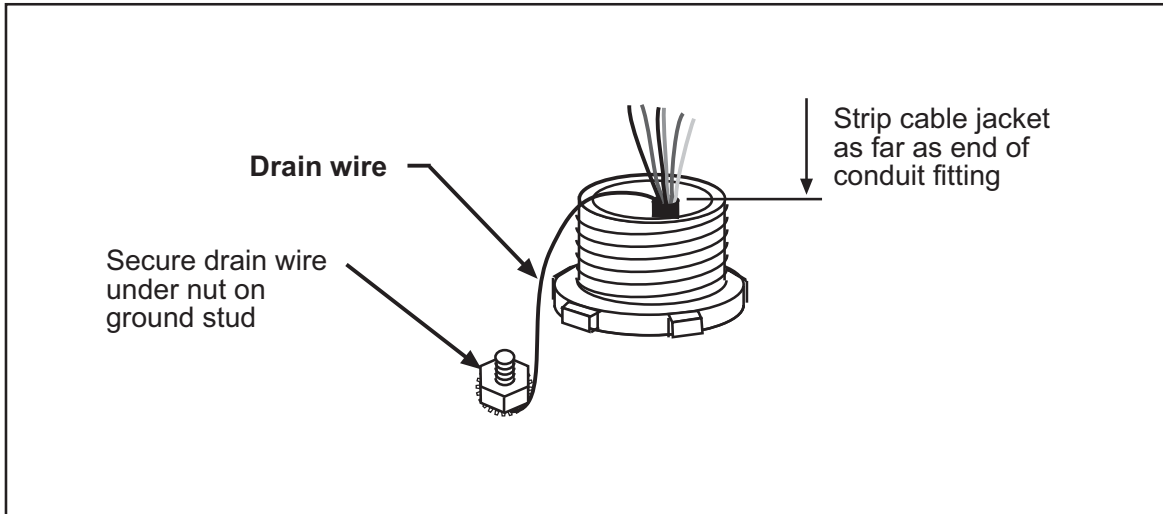


Figure 2-3. Cable Shield Termination

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 you have ordered—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 of the enclosure, 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 2000 requires the following electrical components:

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

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

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

NOTICE**NON-ENCLOSURE INSTALLATION**

See *Installing WPC 2000 without Enclosure*, page 2-51 for installation instructions if you are installing WPC 2000 in your own enclosure or console.

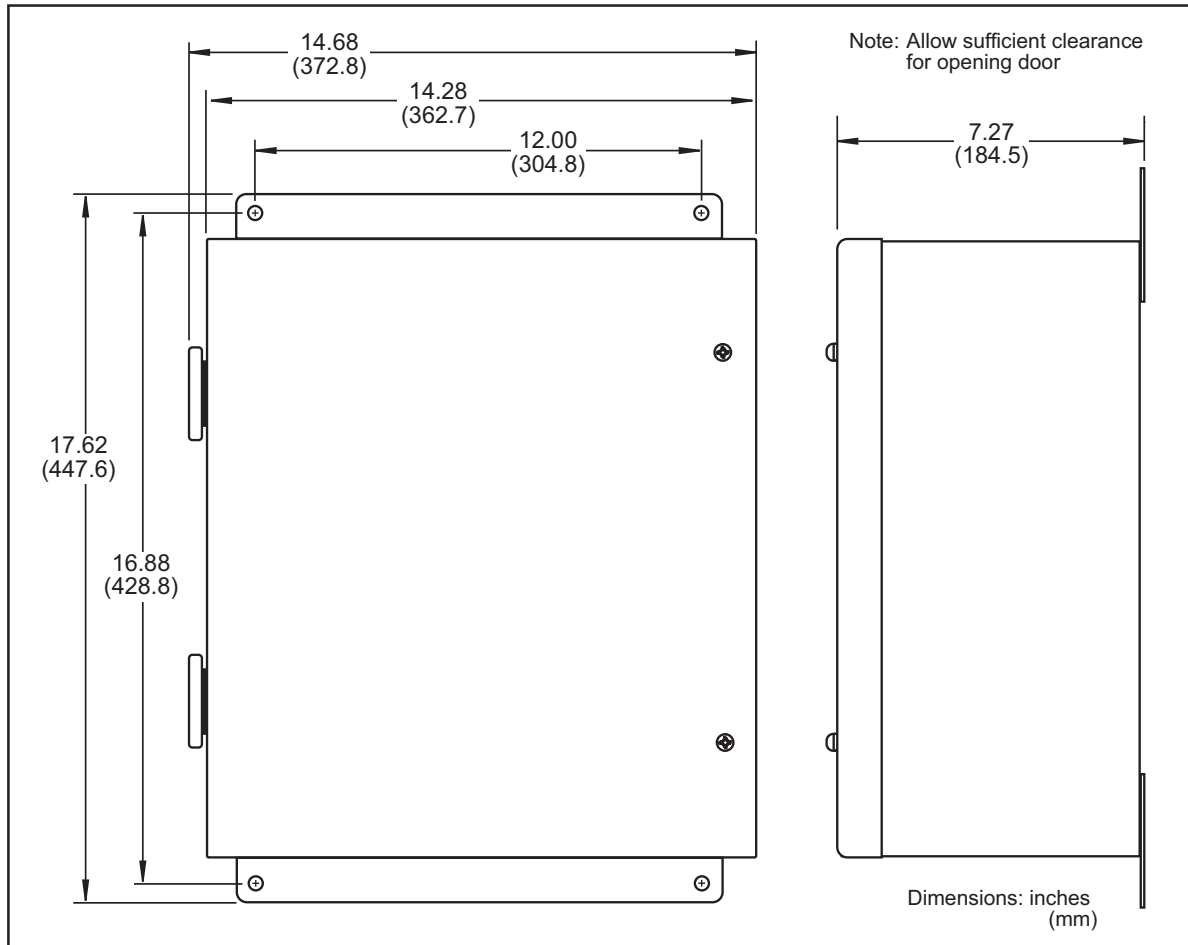


Figure 2-4. WPC 2000 Enclosure: Mounting Dimensions

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 2000 Emergency-stop circuit or a user interlock to stop the press as soon as the ram adjust switches on. For help in determining how to connect this wiring, call Wintriss Tech. Support.

Connecting AC Wiring

⚠ 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.

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

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

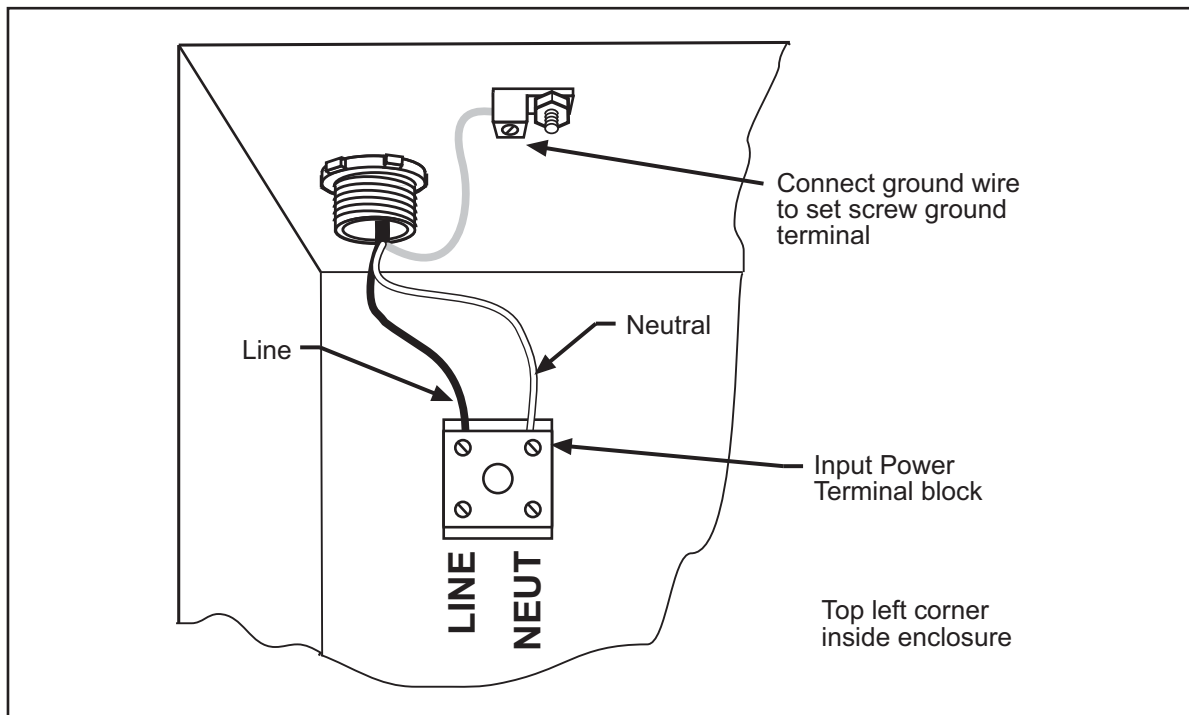


Figure 2-5. AC Input Wiring Connections

NOTICE**WPC 2000 AUTOMATICALLY ADJUSTS TO 115 OR 230 VOLT INPUT POWER**

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

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

1. Locate the power supply input terminal block on the back wall at the top left of the enclosure, as shown in Figure 2-5.
2. Determine how you will bring wiring from your 115 or 230 Vac power source to the enclosure. For 115 Vac, you need three wires—high (black), neutral (white) and ground (green). For 230 Vac, wires are black and red, with green or green-yellow for ground.
3. Run the power wires to the enclosure through flexible, liquid-tight conduit. Because WPC 2000 is rated NEMA 12 (protected against dust and oil), you must use conduit of the same rating and make proper connections to ensure NEMA 12 protection.
4. Connect the ground wire to the set screw terminal on the roof of the enclosure, referring to Figure 2-5 and to Figure 13 (Ross Serpar DSV), Figure 14 (Herion DSV), or Figure 17 (Ross DM2 DSV) at the back of the manual.
5. Connect the power wires.

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

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

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

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

Installing 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 MAIN PROCESSOR BOARD**

Connect all signal grounds through pins on the WPC 2000 Main Processor board.

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

- **Ross DM2**

To wire the Ross DM2 DSV, refer to figures 6 and 17 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 17). 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 WPC Installation Kit. Be sure to install them across the two Hirschmann connectors for the 120 Vac valve solenoids as shown in Figure 17.

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 2000 as shown in Figure 17.

CAUTION**DO NOT WIRE RESET CIRCUIT TO 110 VAC**

The Reset circuit works only on 24 Vdc. Do not wire the Reset circuit to 110 Vac.

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

Note that the DM2 Reset circuit is wired to the OFF position on the WPC 2000 Stroke Select switch (see Figure 6). To reset the Ross DM2 DSV after an F47 error (see page 5-13), 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 5-21).

- **Ross Serpar with EP Monitor**

This Ross DSV requires a separate user-supplied reset switch. See Figure 14 at the end of this manual. Also, all jumpers except those shown in the wiring diagram must be removed; otherwise, the WPC 2000 Main Processor board may be damaged.

- **Herion XSZ**

Make sure that you wire the Herion DSV monitor between pin #20 and a +24 Vdc output. See Figure 13 at the end of the manual.

Installing Air Pressure Switches

Your WPC 2000 requires switches to monitor clutch air pressure and counterbalance air pressure if there is a counterbalance.

NOTICE

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

Installing a Clutch Air Pressure Switch

Install and wire the clutch air pressure switch as follows:

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

Installing a Counterbalance Air Pressure Switch

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

1. Install a filter regulator and lubricator in-line before the counterbalance air pressure switch if they are not already present.
2. Connect shop air to the counterbalance air pressure switch input port.
3. Run the cable through flexible, liquid-tight conduit, observing NEMA 12 requirements.
4. Wire the normally open terminals of the switch to pin # 83 (User Input 4) and ground (e.g., pin # 31), referring to Figure 2 at the end of the manual.

NOTICE

If pin #83 has already been assigned to other user-selected auxiliary equipment, then wire the counterbalance switch contacts across a terminal on the WPC 2000 Main Processor board that generates an E-stop when the connection to ground is broken. See *Wiring WPC 2000 User Inputs*, page 2-28 for more information.

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

NOTICE

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

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

Installing Operator Station(s)

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 3-19) and performed the applicable verification (see page 2-58) and checkout (see page 3-36) 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 3-19 for details. Mounting the Operator Station at the correct safety distance prevents an operator from leaving the station and reaching the pinch point before the press stops.

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

Wiring a Pre-wired Operator Station

Checking Pre-wired Operator Station Wiring

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

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

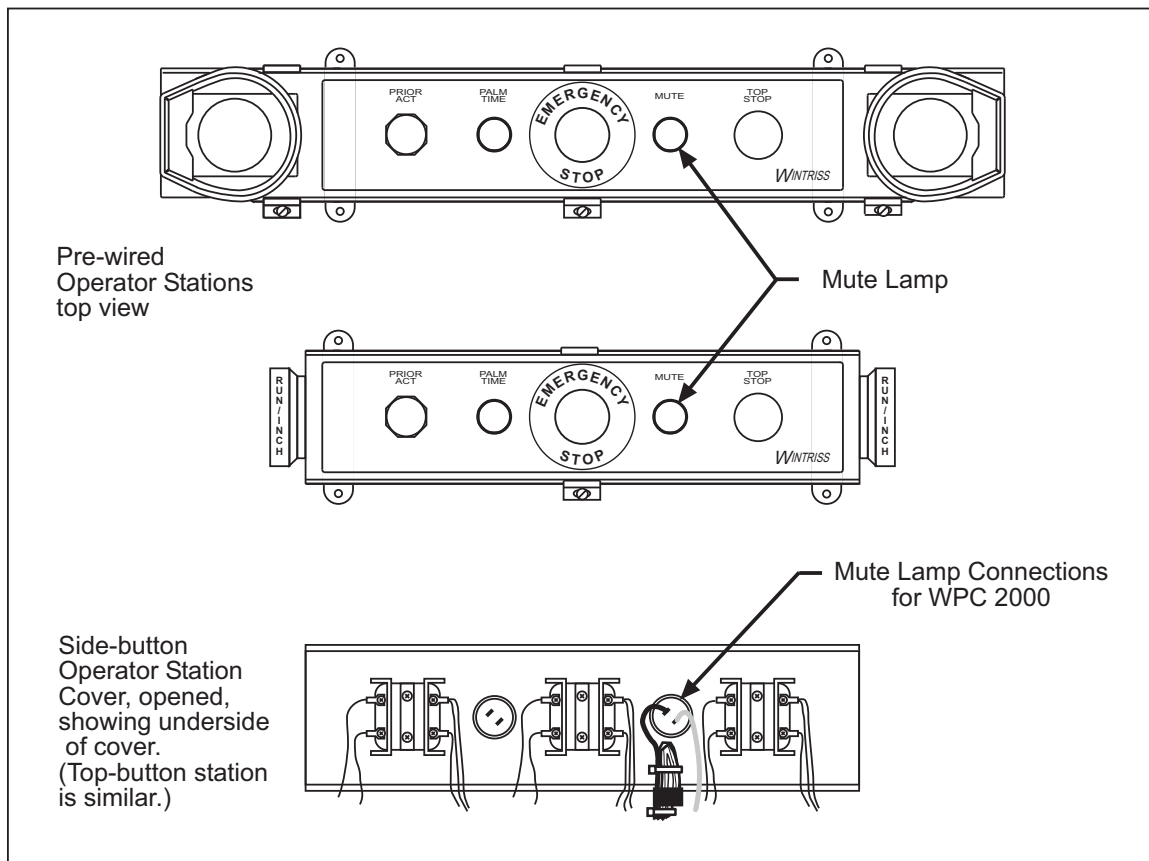


Figure 2-6. Pre-wired Operator Stations Showing Mute Lamp Connections

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 (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 2000.

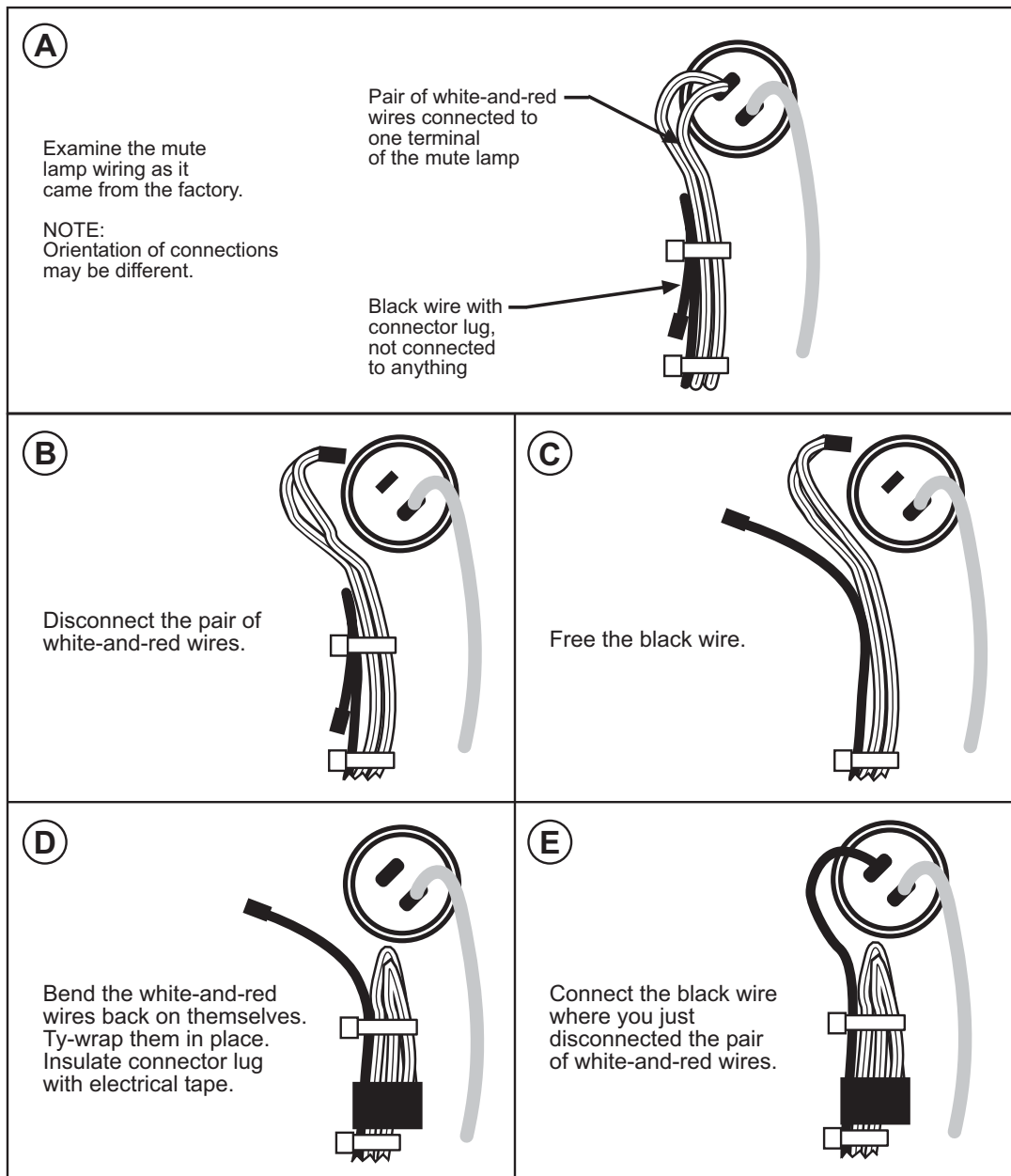


Figure 2-7. Wiring Steps to Modify Operator Station for WPC 2000

Making Wiring Connections

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

1. Punch a hole in the Operator Station enclosure for conduit or sealtight.
2. Connect the conduit or sealtight to the hole; then open the Operator Station box.

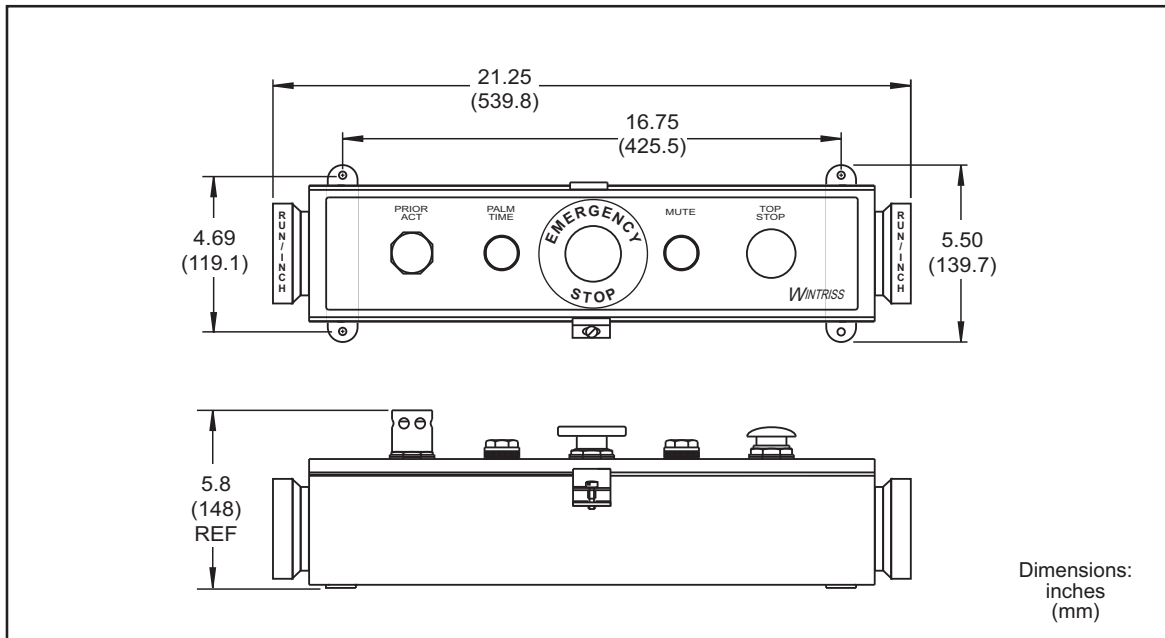


Figure 2-8. Pre-wired Operator Station with Side Run Buttons: Mounting Dimensions

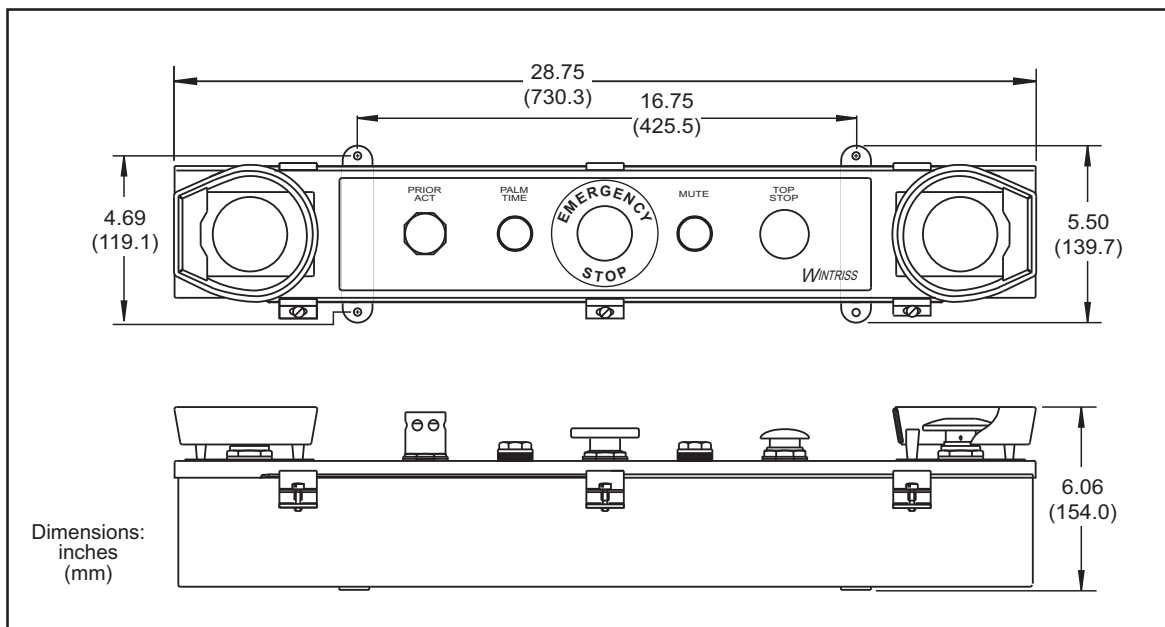


Figure 2-9. Pre-wired Operator Station with Top Run Buttons: Mounting Dimensions

3. Run the Operator Station cable in the sealtight.
4. Plug the connector end of the cable into the Operator Station.
5. At the other end of the cable, connect the wires to the Main Processor board connector terminals, as shown in Table 2-17, page 2-62 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 (previous page) 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 7 at the end of this manual. Before using your press, be sure to check the wiring carefully, run all the applicable verification and checkout tests, and calculate the safety distance. You can then mount the Operator Station in a permanent location, referring to Figure 2-10 for mounting dimensions.

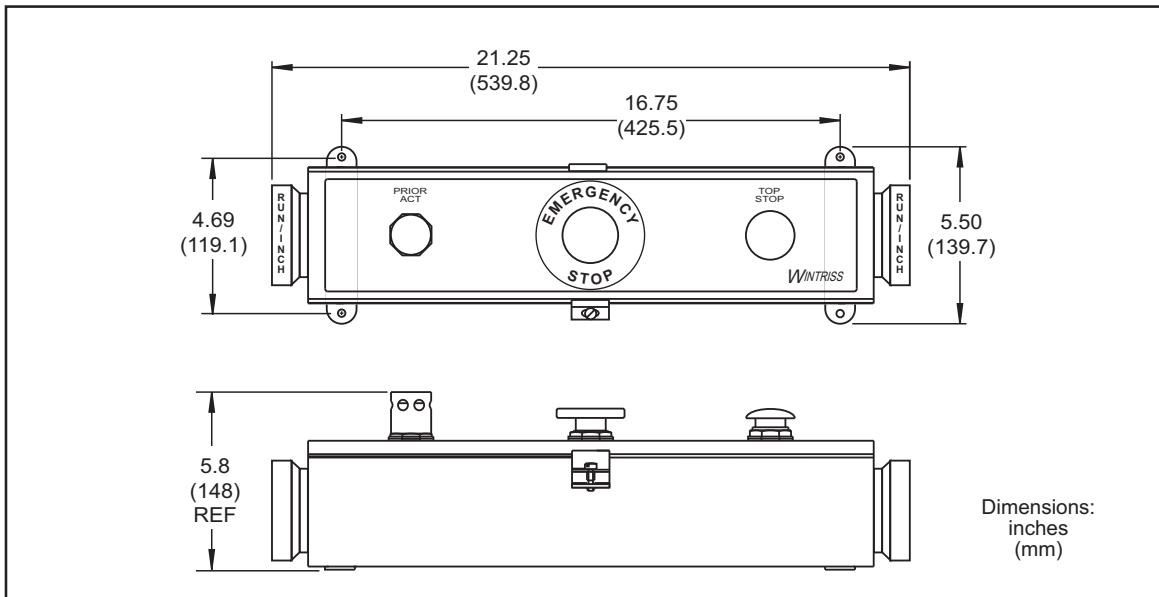


Figure 2-10. Unwired Operator Station: Mounting Dimensions

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 7 at the end of the manual. Before using your press, be sure to check the wiring carefully and run all the applicable verification and checkout tests. After calculating the correct safety distance, you can mount the user-built Operator Station in a permanent location.

Installing Multiple Operator Stations

DANGER

HAZARDS EXPOSED BY NON-WORKING OPERATOR STATION

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

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

NOTICE

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

You can wire up to two Operator Stations to the WPC 2000 (see Figure 4 at the back of the manual for dual Op. Station wiring). Make sure that switch 6 on S102 on the WPC 2000 Main Processor board is set to OFF if you connect dual Operator Stations (see page 3-33).

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

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

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

Installing a Light Curtain

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 3-19. 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 3, 10, 11, 15, 16, 18, and 19 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 3-14. To calculate the correct safety distance, see page 3-19.

NOTICE

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

WPC 2000 provides wiring connections for up to two pairs of light curtains (see Table 2-17, page 2-62). If you wire two sets of light curtains, you must enable them on S101 option switch 6 (see Table 3-9, page 3-30).

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 3
- Shadow VI—Figure 10
- Shadow VI Integrated—Figure 11
- Shadow VII—Figures 15 and 16
- Shadow 8—Figures 18 and 19
- Shadow 9—Figures 21, 22, and 23

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

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

When you install Shadow VII, Shadow 8, or Shadow 9 light curtains on your press, you must set jumpers JP121-JP124 on the WPC 2000 Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24) to the positions shown in Table 2-1. Wiring diagrams are provided in figures 15 (Shadow VII control box), 16 (Shadow VII DIN controller), 18 (Shadow 8 optional control), 19 (Shadow 8 wired directly to WPC 2000), 21 (Shadow 9 optional control), 22 (Shadow 9 wired directly to WPC 2000), 23 (dual Shadow 9 wired directly to WPC 2000) at the end of the manual.

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

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

Installing Non-Shadow Light Curtains

⚠ WARNING

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

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

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

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

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

Installing the Resolver

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 2000 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.

Mounting the Resolver

To mount the resolver, perform the following steps:

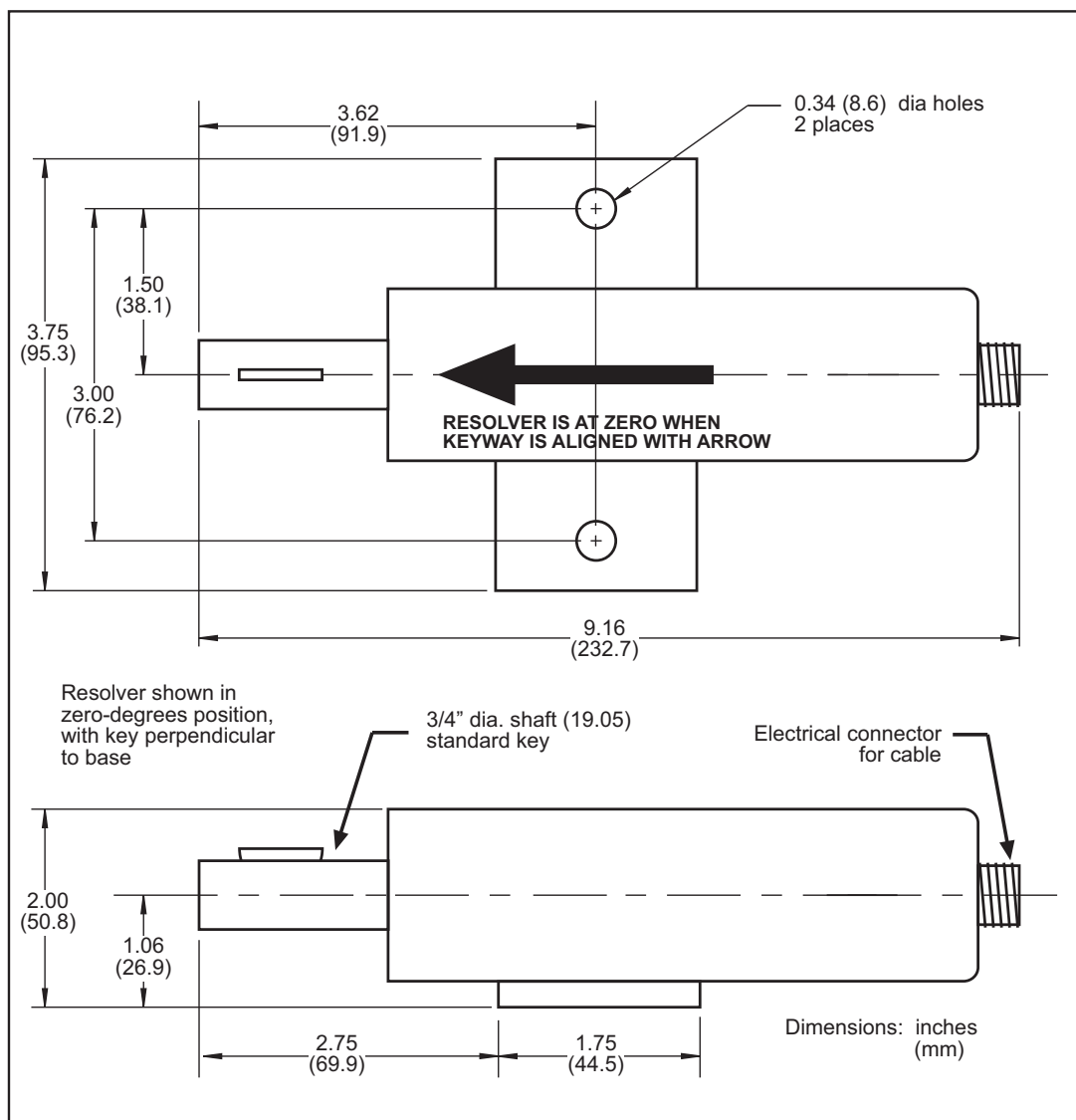


Figure 2-11. Resolver: Mounting Dimensions

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 2-11).
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 2000 enclosure.

NOTICE

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

3. Find the resolver terminal block, TB 106, on the WPC 2000 Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24), 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 106, then wire them to the L-shaped connector, referring to Table 2-21, page 2-63, and Figure 2 at the end of the manual. Make sure you connect the black and yellow wires correctly, based on the direction in which your resolver will rotate—clockwise or counterclockwise. Refer to *Connecting Wires to Terminal Block Connectors*, page 2-5 if you need help wiring the TB 106 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.

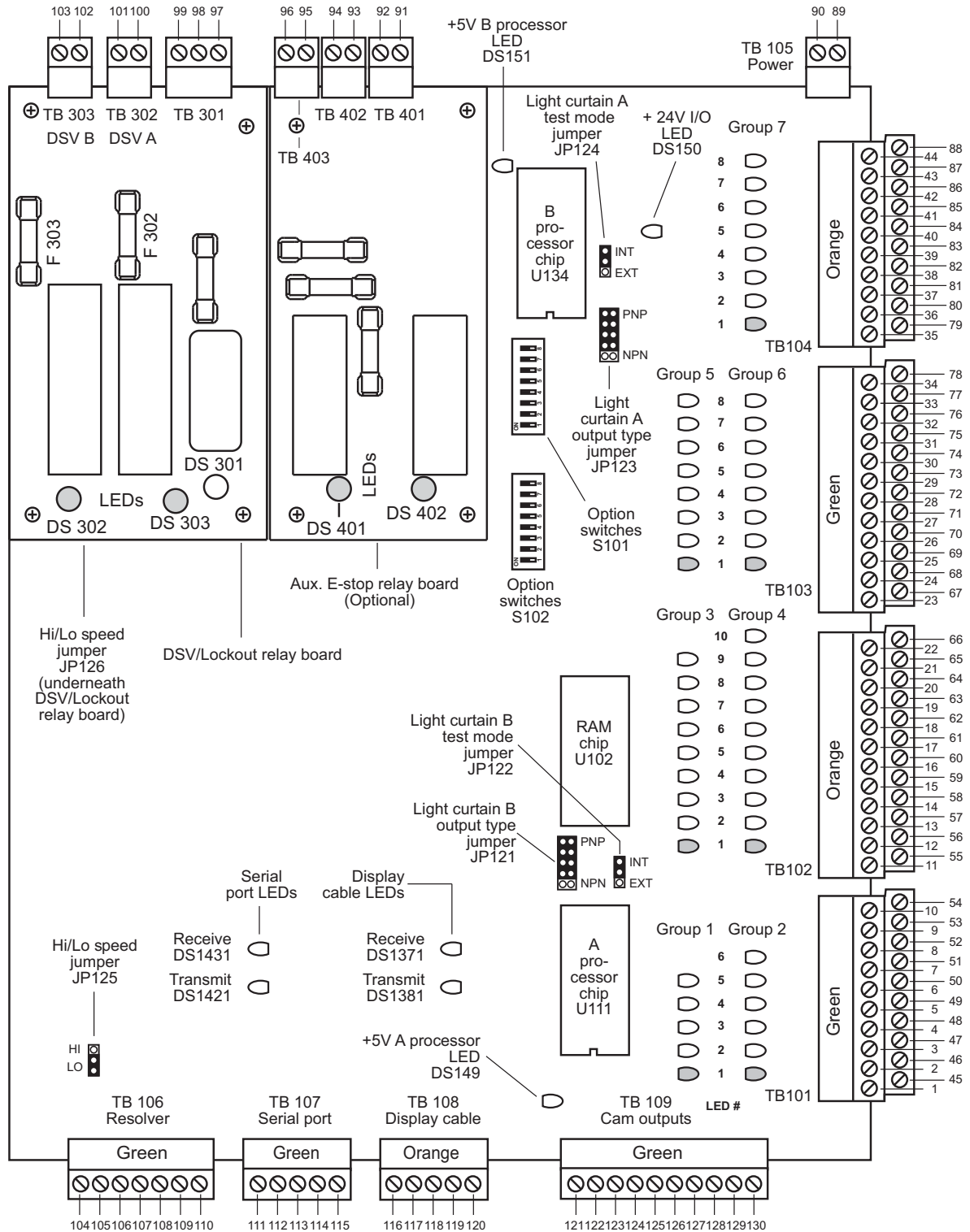


Figure 2-12. WPC 2000 Main Processor Board (Right or Center Configuration):
Location of Important Components

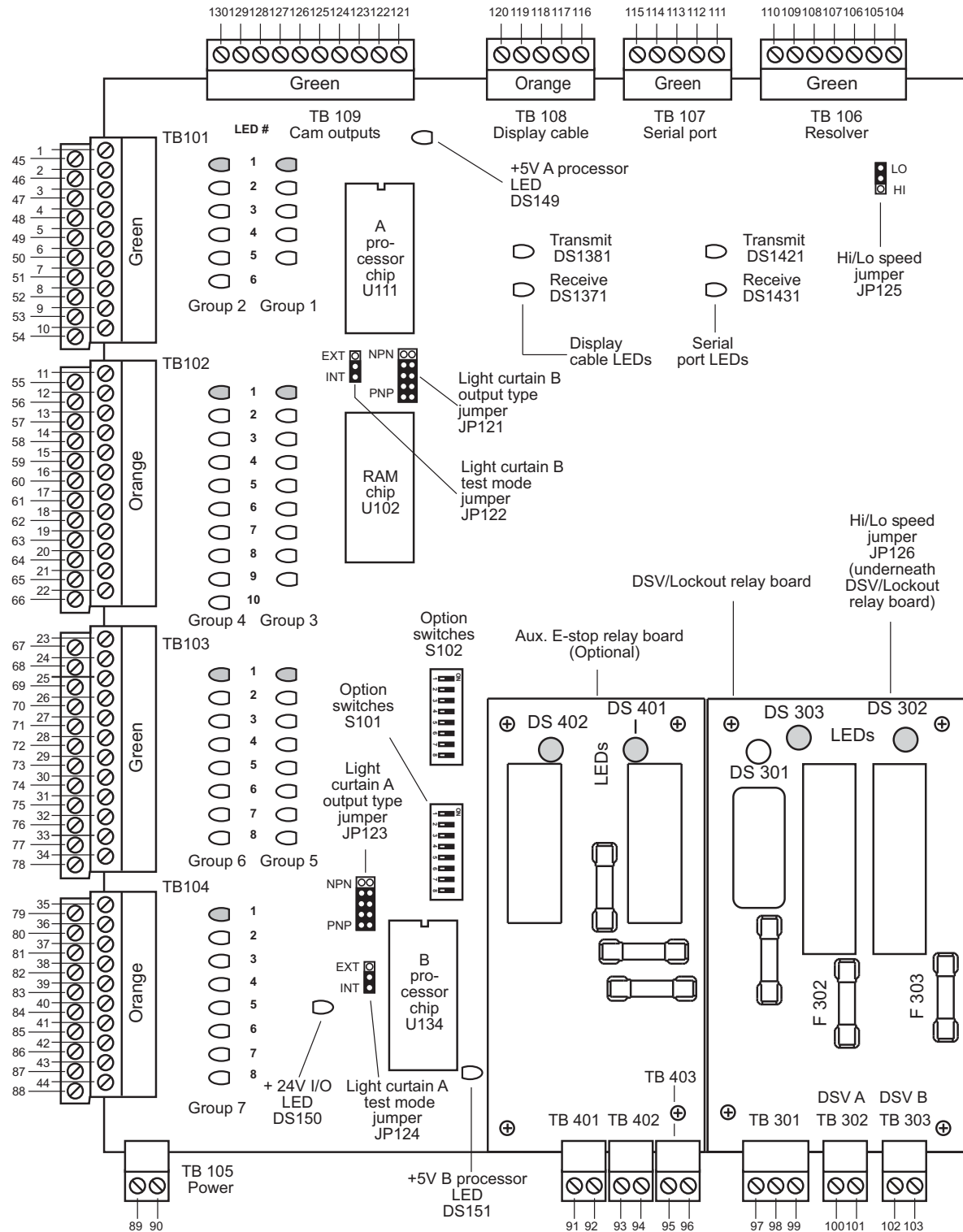


Figure 2-13. WPC 2000 Main Processor Board (Left Configuration):

Location of Important Components

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 2-21, page 2-63 and Figure 2 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 3-6.

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

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

Planning Your Overrun Sensor Installation

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

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

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

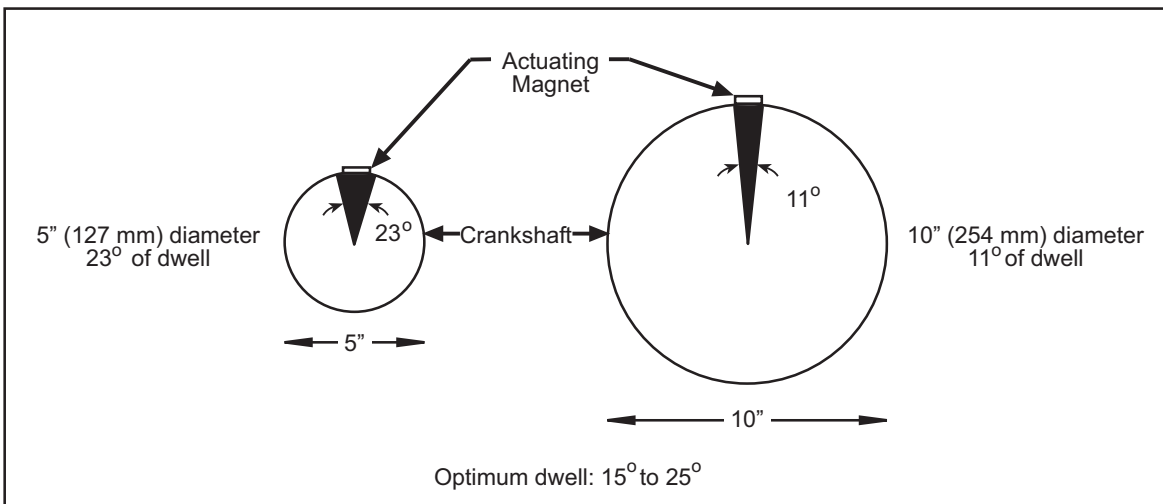


Figure 2-14. Overrun Sensor Magnet Placement: Dwell as a Function of Shaft Diameter

Mounting the Overrun Sensor Switch

NOTICE

INSTALL MAGNET AFTER MOUNTING SWITCH

Install the overrun magnetic switch as instructed in this section. Refer to page 3-6 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.

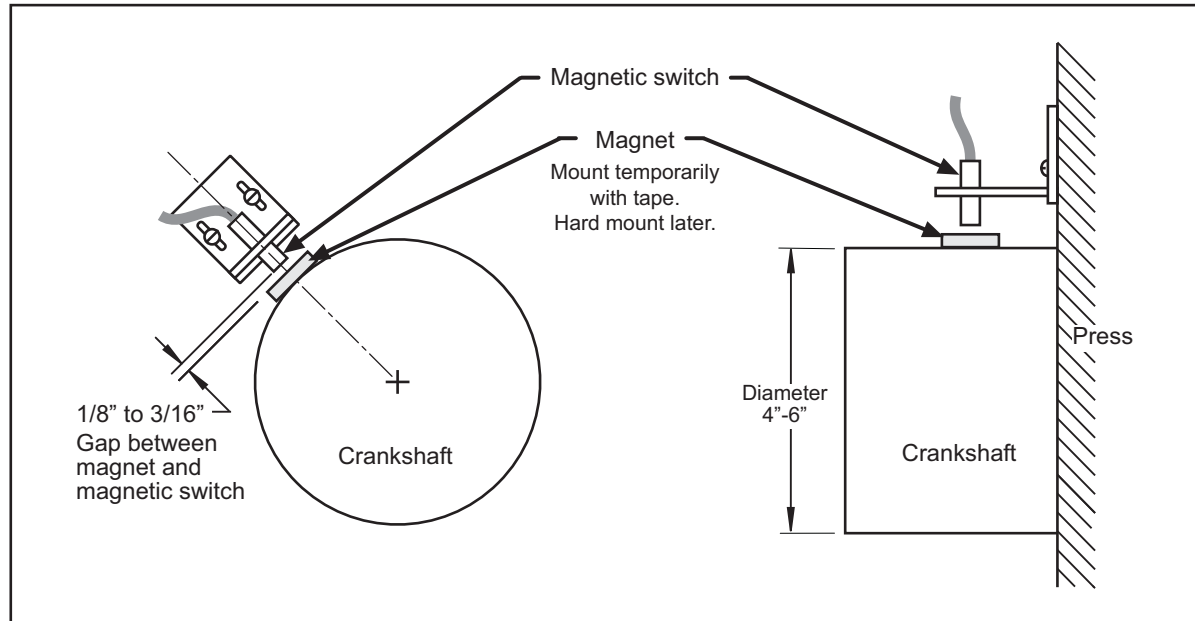


Figure 2-15. Overrun Sensor Magnetic Switch: Installation Example

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 2000. Connect the wires to terminal blocks on the WPC 2000 Main Processor board, as shown in Table 2-2 and Figure 2 at the end of the manual.

Table 2-2. Overrun Sensor Switch Wiring Connections

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

Wiring WPC 2000 User Inputs

⚠ DANGER

USER INPUTS 1 THROUGH 7 NOT SUITABLE FOR SAFETY USE

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

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

⚠ DANGER

USER INPUTS ADD DELAY TO STOPPING TIME

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

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

⚠ DANGER

MAKE SURE TO WIRE CROSS-CHECKED INPUT PAIR CORRECTLY

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

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

⚠ DANGER

CHECK PRESS TO MAKE SURE IT STOPS WHEN USER INPUT ACTUATES

- WPC 2000 comes from the factory with the inputs bypassed by jumpers. Make sure to remove the appropriate jumper from the Main Processor board connector when you wire a user input. Otherwise, WPC 2000 will not receive the signal from the input. Leave all unused inputs jumpered/bypassed.
- Perform checkout procedures to ensure that the user inputs are wired correctly and that WPC 2000 responds correctly when the user input faults (see page 3-60).

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

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

When 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 inputs 1, 2 and 4 and cross-checked input pair 8/9 issue an Emergency-stop command. User inputs 3, 5, and 6 generate a Top-stop command. User input 7 and cross-checked input pair 10/11 generate 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 2000 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	21	+24 Vdc	51	
User 2	ESTOP	82	+24 Vdc	52	
User 3	TOP STOP	71	+24 Vdc	53	
User 4	ESTOP	83	Ground	54	
User 5	TOP STOP	72	Ground	55	
User 6	TOP STOP	84	Ground	56	
User 7	ESTOP/ LOCKOUT	73	Ground	57	
User 8 paired with 9	ESTOP	85	Ground	58, 17	
User 9 paired with 8		74	Ground		
User 10 paired with 11	ESTOP/ LOCKOUT	86	Ground	50, 18	
User 11 paired with 10		18	Ground		

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

Since faults for input 7 and cross-checked input pair 10/11 open the Lockout relay, you can wire this relay to your motor starter so that ungrounding of input 7 or of either input in the input pair 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 5-4).

NOTICE

ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH THE MAIN PROCESSOR BOARD

Connect all signal grounds through pins on the WPC 2000 Main Processor board.

To wire the user inputs, run conductors from the appropriate terminal number on the Main Processor board to your equipment and then back to either +24 Vdc or ground, as shown in Table 2-3 and Figure 2 at the end of the manual. (There are several available “Ground” and “+24 Vdc” terminals on the Main Processor 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 +24 Vdc or Ground.

NOTICE

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

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

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 2000. 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, then back to INCH or one of the other operating modes.

Wire the function you want to be controlled by the Lockout relay to TB 301 on the DSV/ Lockout relay board, which is located in the upper left corner (see Figure 2-12, page 2-23) or lower right corner (see Figure 2-13, page 2-24) of the WPC 2000 Main Processor board. Wiring connections are shown in Table 2-4 and in Figures 13 (Herion DSV), 14 (Ross Serpar DSV), and 17 (Ross DM2 DSV) at the end of the manual.

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

TB301 Pin #	Signal
97	Lockout relay input
98	Lockout relay output
99	Lockout relay output

Wiring Auxiliary Outputs

⚠ DANGER

NON-SAFETY OUTPUT USED FOR SAFETY FUNCTIONS

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

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

WPC 2000 provides three optional Auxiliary outputs that you can use to automate equipment connected to your clutch/brake control. A summary of wiring connections and change conditions for these three outputs is provided in Table 2-5, page 2-31. Details about each output are given following the table. Additional wiring details are provided in Table 2-17, page 2-62 and in Figure 2 at the back of the manual.

Table 2-5. Auxiliary Output Wiring Connections and Change Conditions

Output	Pin # (WPC 2000 Cntrl Bd.)	Normal State	Change State	Change Conditions
Aux. 1	28	On (N/C)	Off (or Open)	<ul style="list-style-type: none"> WPC 2000 fault E-stop string open Light curtain interruption Interrupted Stroke (controlled by option switch 8—see Table 2-6)
Aux. 2	36	Off (N/O)	On (or Closed)	<ul style="list-style-type: none"> WPC 2000 fault Interrupted stroke Key switch in Inch and DSV energized
Aux. 3	29	Off (N/O)	On (or Closed)	<ul style="list-style-type: none"> DSV energized

Auxiliary Output 1

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

Aux. Output 1 response to an Interrupted Stroke is controlled by option switch 8 on the WPC 2000 Main Processor board. Switch settings are shown in Table 2-6.

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

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

When switch 8 is set to OFF, Auxiliary Output 1 opens, or turns Off, at the occurrence of an Interrupted Stroke. When switch 8 is set to ON, the output turns Off during an Interrupted Stroke only when there is also a fault or Emergency-stop condition; otherwise, the output remains On during an Interrupted Stroke. See *Auxiliary Output 1 Response to Interrupted Stroke*, page 3-31 for additional details.

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

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

Auxiliary Output 2

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

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

Auxiliary Output 3

Auxiliary Output 3 is normally open (N/O), or Off. The output closes, or turns On, when the DSV is energized. When Bar Control is in use (see *Operating the Press in Bar Mode*, page 4-19), Aux. Output 3 remains open, or Off, when the DSV is energized.

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

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

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

Wire Auxiliary Output 3 to the “A” connection of the input check circuit of DiPro 1500 or ProCam 1500. Wire one of the +24 Vdc outputs on the WPC 2000 Main Processor board (pins #37 through #42) to the “B” connection of DiPro 1500 or ProCam 1500. If your DiPro 1500 or ProCam 1500 is equipped with a voltage selector switch for the input check circuit, set it to the 12-60 volt position. Refer to the DiPro 1500 or ProCam 1500 manual for details.

Connecting Multiple Controls to the Resolver

NOTICE

MAKE WPC 2000 THE “MASTER” WHEN CONNECTING MULTIPLE CONTROLS

When connecting multiple controls to the resolver, make sure that the connection between the resolver and WPC 2000 is direct, thereby making WPC 2000 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., WPC 2000, DiPro 1500). To do so, perform the following steps:

1. Check the resolver connector TB106 on the WPC 2000 Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24) to make sure that the resolver is wired to the WPC 2000 as instructed on page 2-22.
2. Locate the 7-conductor shielded resolver cable. Run the cable through 1/2 in. conduit from the WPC 2000 to the other control. If there is a connector on one end of the cable, cut it off.
3. Pull the TB106 resolver connector out of its socket.
4. Attach the wires to TB106 as shown in Table 2-21, page 2-63 and in Figure 2 at the end of the manual. You will be wiring in parallel (#104 brown to brown, #105 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 TB106 to the resolver connector in the first “slave” unit. Remember to wire in parallel.
6. Locate the master/slave jumper on the Main Processor 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 2000

You can connect other Wintriss products to WPC 2000, such as DiPro 1500 and ProCam 1500. Before you wire, complete all WPC 2000 installation, initialization and checkout procedures. Then run the press in all modes of operation—Inch, Single-stroke, and Continuous (if applicable). Also make sure that the press has working Top-stop and Emergency-stop circuits. Since WPC 2000 is connected to the press stop circuits, it is extremely important to verify that the press operates and stops properly before connecting WPC 2000 to other units. Do not forget to mark on your electrical prints where you wire in WPC 2000.

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

Use customized status code wiring (see *Wiring WPC 2000 User Inputs*, page 2-28) 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 2000 Display board (see Figure 2-16 and Table 2-23, page 2-63).

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, below, and Figure 5 at the end of the manual. An optional Micro-inch On/Off switch is available from Wintriss (see page 1-2).

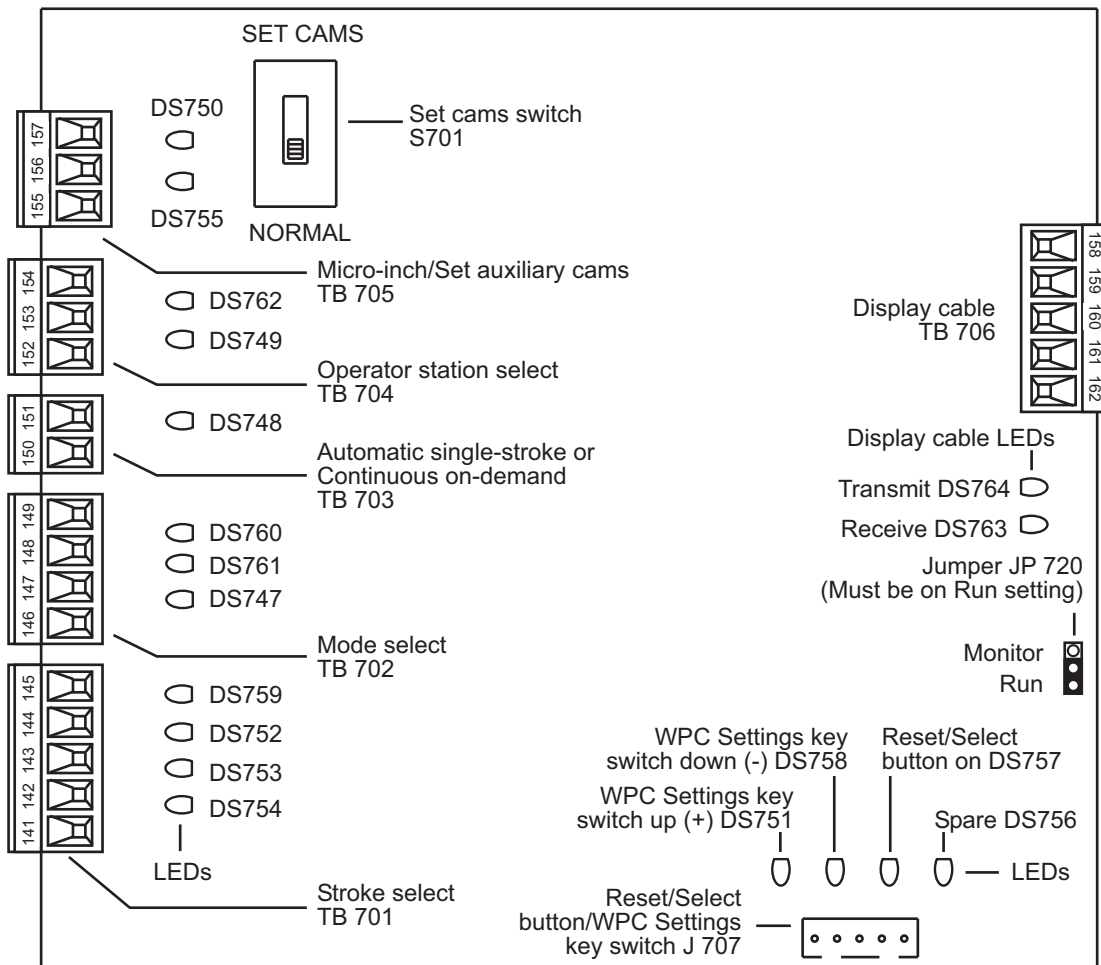


Figure 2-16. WPC 2000 Display Board: Location of Important Components

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 3-25.

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 4-9). 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 #13 on the Main Processor board to +24 Vdc. You can connect to any convenient terminal that supplies +24 Vdc, such as pin #9. See Table 2-17, page 2-62. When pin #13 is connected to +24 Vdc, the “Top stop inch disable” LED on the WPC 2000 Main Processor board is illuminated (see Figure 3-14, page 3-38 or Figure 3-15, page 3-39).

Wiring a Remote Reset Switch

If you would like to be able to reset the WPC 2000 from a location remote from the enclosure, the WPC 2000 Main Processor board provides a terminal (i.e., pin #70) for wiring a remote Reset switch (see Table 2-8 and Figure 2 at the end of the manual). 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 #70 to a normally open switch. Connect another wire from the switch to a ground terminal (e.g., pin #54). WPC 2000 is reset with a momentary connection to ground.

Table 2-8. Remote Reset Switch Wiring Connections

Main Processor Board Pin #	Signal
70	Remote Reset input
54	Ground

Installing 4-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 TB 109 on the WPC 2000 Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24) 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 3-34).

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 2000 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 or Figure 2-18, page 2-37 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 2000 Main Processor 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 TB109 connector from the WPC 2000 Main Processor board, and attach the wires at one end of the cable to the terminals shown in Table 2-9, page 2-38 and Figure 6 at the end of the manual. Plug each connector back into its socket when you are finished.

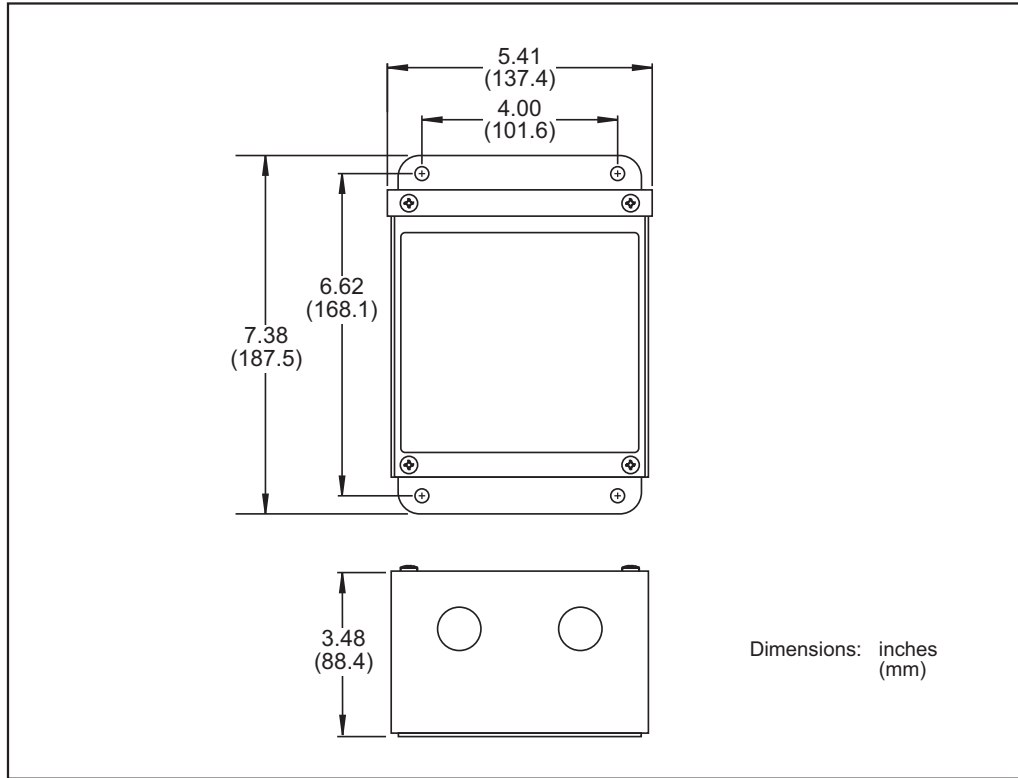


Figure 2-17. Cam Output Enclosure: Mounting Dimensions

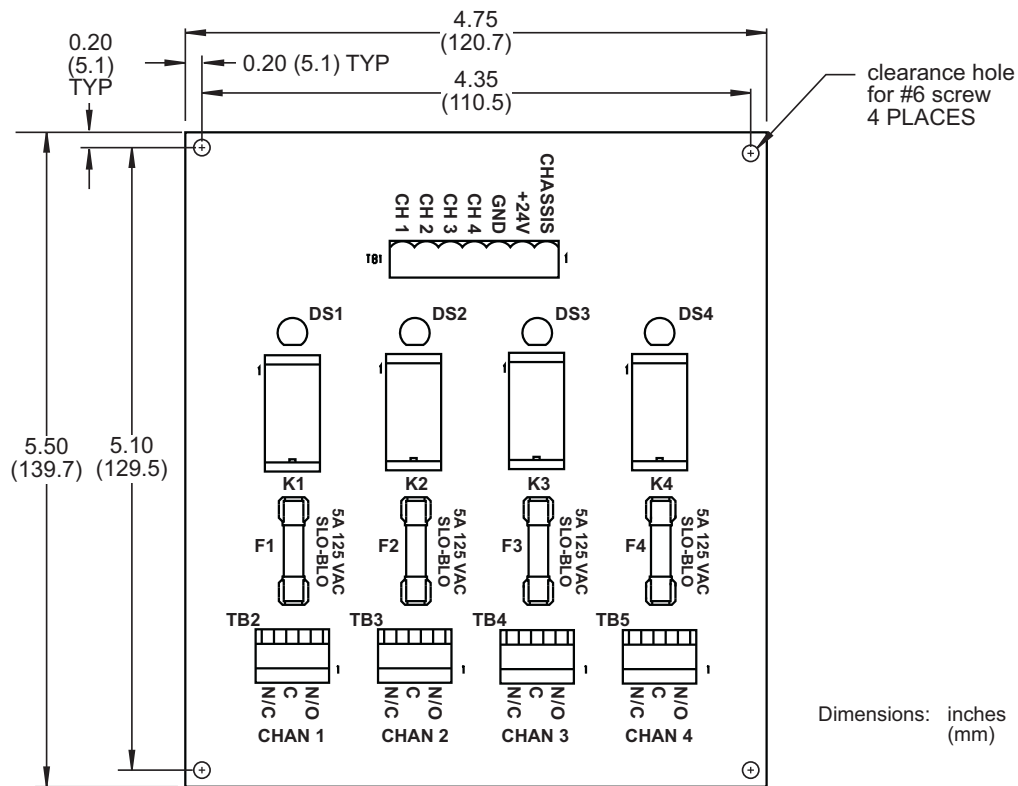


Figure 2-18. Cam Output Board: Mounting Dimensions

Table 2-9. WPC 2000 Main Processor Board (TB109) to Cam Output Assembly (TB1):

Wiring Connections

Wire Color	WPC 2000 Main Proc. Board Pin #	Signal	4-channel Cam I/O Assembly (TB1) Pin #	Signal
Brown	130	Cam 1	7	Channel 1
Violet	129	Cam 2	6	Channel 2
Orange	128	Cam 3	5	Channel 3
Yellow	127	Cam 4	4	Channel 4
	126	Counter		
	125	Zero Cam		
	124	Spec 1		
	123	Spec 2		
Black	122	Ground	3	Ground
Red	121	+24 Vdc	2	+24 Vdc
Shield	Terminate drain wire to ground stud		1	Chassis

- 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.
- 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 6. 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 through TB5 connectors (for cam channel 1 through cam channel 4) 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 2000
 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 2000

NOTICE

Generally, you use the N/O terminal so that equipment is “off” except when you use WPC 2000 to turn it “on.” Use the N/C terminal only if it is more practical to do the reverse.

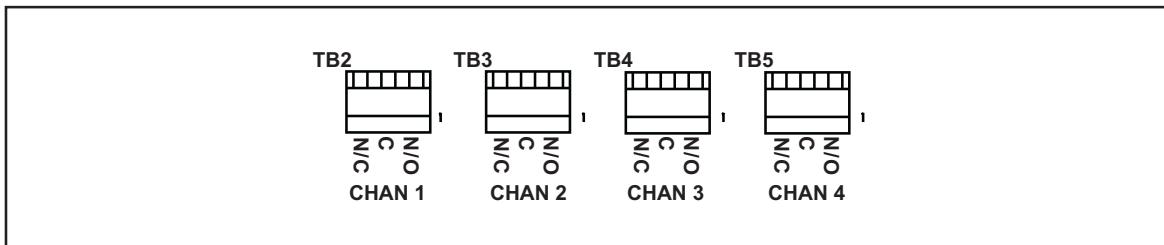


Figure 2-19. Connectors TB2 through TB5 on Cam Output Board

2. Plug TB2 through TB5 back into the Cam Output board.

⚠ 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 2000 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, page 2-40 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 2-40.

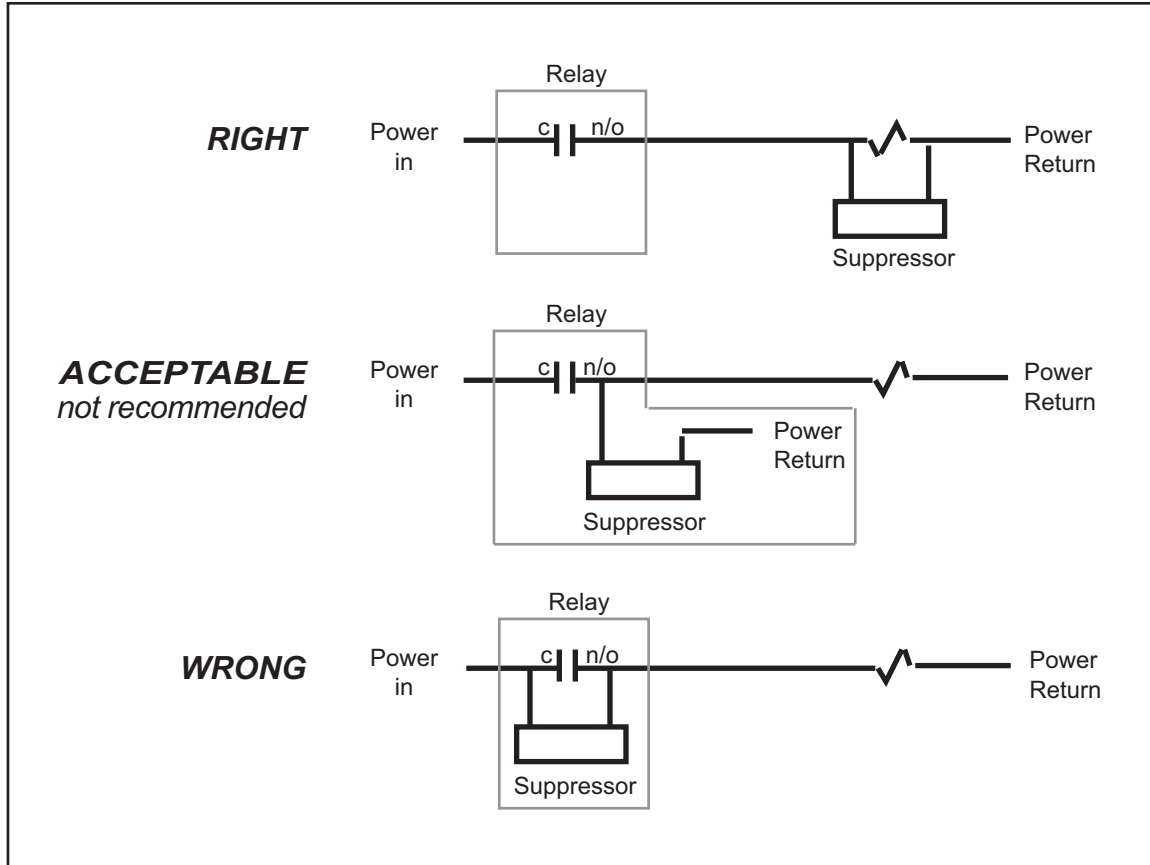


Figure 2-20. Installing a Suppressor across an AC Load

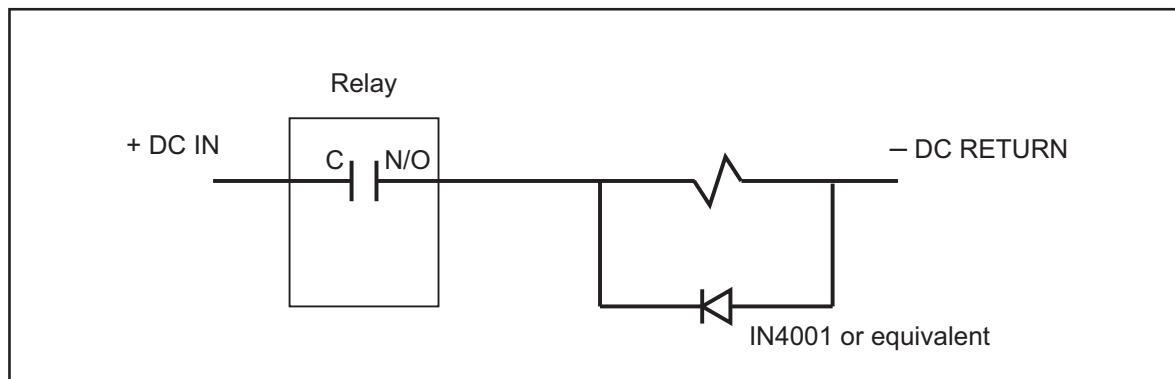


Figure 2-21. Installing a Diode across a DC Load

Enabling Cam Adjustments

You can enable adjustments to cam angles in three ways:

- Moving switch S701 on the WPC 2000 Display Board to its Up position
- Moving switch 1 on switch block S102 on the WPC 2000 Main Processor board to ON
- Wiring a key switch

NOTICE**ENABLING CAM ADJUSTMENTS**

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

Setting Switch S701 on the Display Board

You enable the Set Cams function on switch S701 (see Figure 2-16, page 2-34 for switch location) by moving the switch to its Up position, as shown in Figure 2-22.

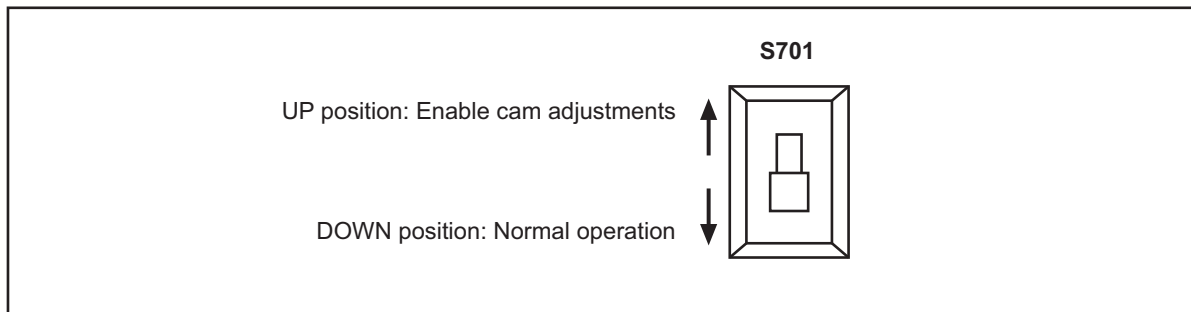


Figure 2-22. “Set Cams” Switch (S701) Positions

Setting Switch 1 on S102 on the Main Processor Board

You can also enable the Set Cams function by setting switch 1 on switch block S102 on the Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24 for location) to its ON (or Up) position. (See *Making Settings on Switch Block S102*, page 3-32 for further details.) Using this switch may be preferable if the Display board is difficult to access.

Wiring a Remote Switch

You can also enable the Set Cams function by wiring your own two-position switch and turning the function On and Off remotely. Wire the remote switch to pins #155 (Ground) and #156 (Prog. Cams) on the WPC 2000 Display board, referring to Figure 2-16, page 2-34 and Figure 5 at the end of the manual. If you opt to use a remote switch to enable cam settings, make sure that switch S701 is in the Down position.

Wiring Zero Cam Output to AutoSet

WPC 2000 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 6 at the end of the manual.

Table 2-10. Zero Cam Output Wiring Connections

WPC 2000 Main Processor Board (TB 109)		AutoSet 1500 (TB101B) or 1504 (TB101A)	
Pin #	Signal	Pin#	Signal
pin # 125	Zero Cam Output	pin # 2	Zero Cam

Wiring a 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 One-hand/Two-hand/Foot firmware from Wintriss and install a Shadow safety light curtain.

Wire the Foot Switch's normally closed contact to pin #4 on the WPC 2000 Main Processor board and the normally open contact to pin #14, then wire both contacts to +24 Vdc, as shown in Table 2-11, below, and Figure 2 at the end of the manual.

Table 2-11. Foot Switch Wiring Connections

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

Refer to page 3-27 for Foot Switch settings.

Installing a 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 2000 or a one-hand control as a safeguarding device.
- Install and operate WPC 2000 and a one-hand control in accordance with OSHA and ANSI regulations.

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

DANGER

PREVENT OPERATOR FROM STANDING BETWEEN LIGHT CURTAIN AND HAZARD

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

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

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

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

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

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

The mode used for One-hand Control is determined by the setting on option switch 3 (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 3-27). 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 a 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, perform the following steps, referring to Figure 2-23, below, and Figure 2-24, page 2-45 for mounting dimensions:

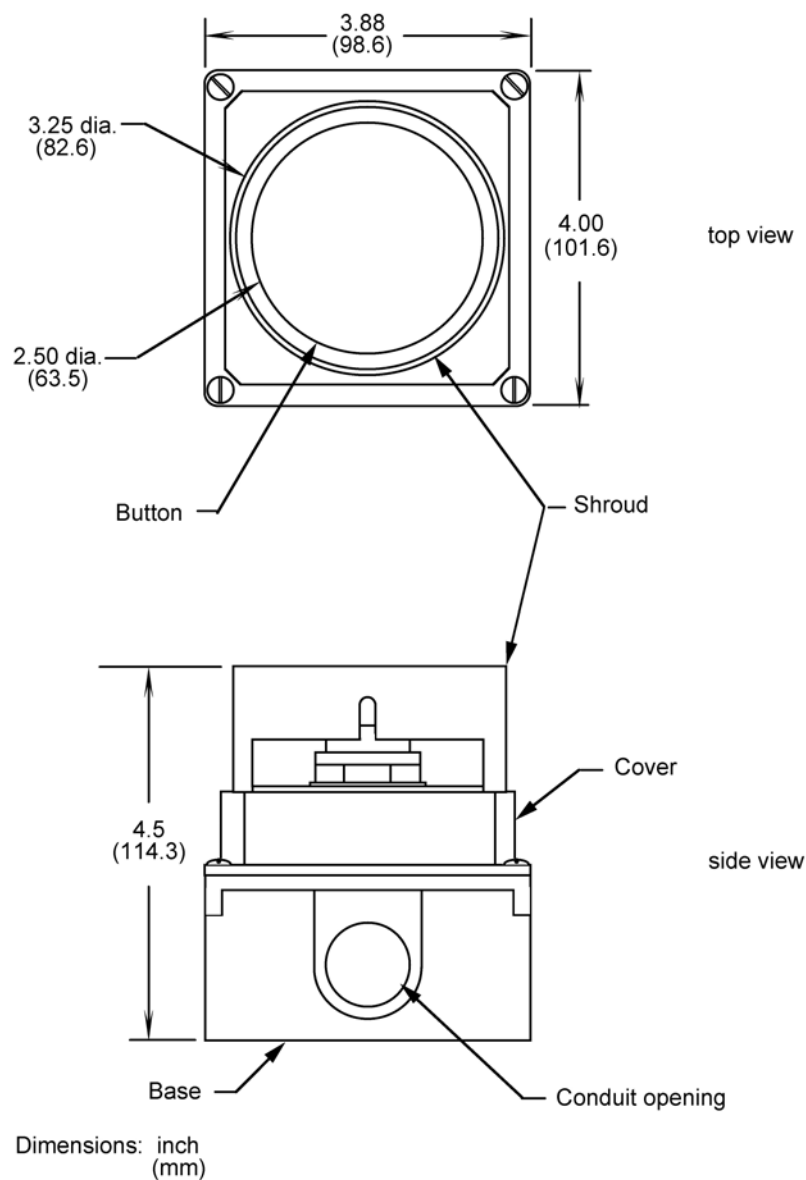


Figure 2-23. One-hand Control Switch: Mounting Dimensions

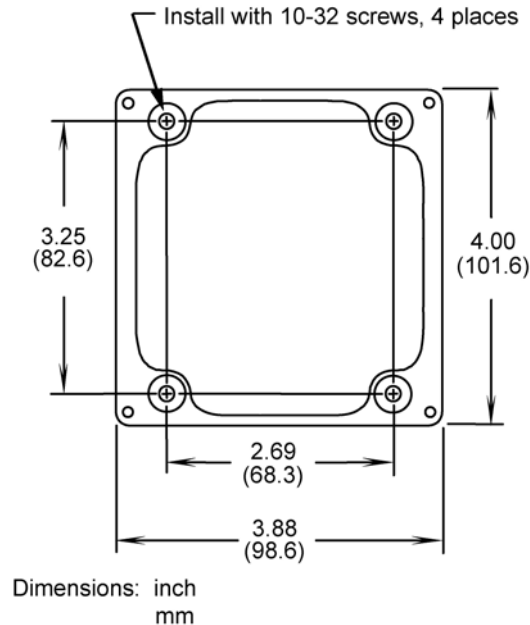


Figure 2-24. One-hand Control Switch Base: Mounting Dimensions

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

Wiring a One-hand Control to WPC 2000

⚠ DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

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

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

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

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

2. Loosen the clips at the bottom of the front panel of the Operator Station. Swing the front panel up and support it so you can work inside the box. (The cover will stay up if you slide it slightly to the left or right.)
3. Knock out a hole in the bottom of the Operator Station near the existing conduit from the WPC 2000 control enclosure.
4. Using the conduit hole provided in the base of the One-hand Control, run conduit and wiring to the Operator Station, referring to Figure 2-25 for terminal locations on the bottom of the One-hand Control.

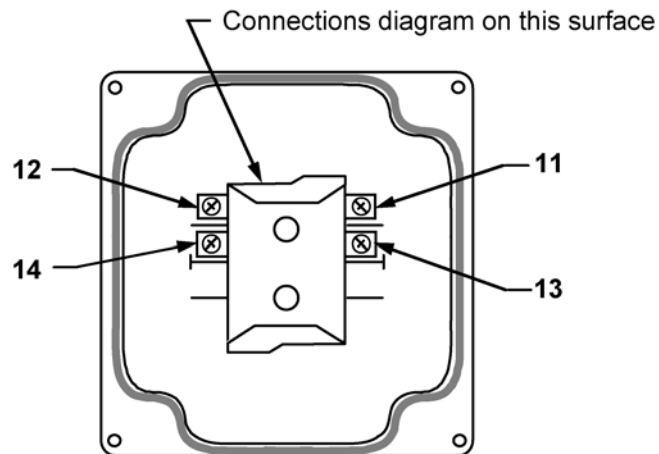


Figure 2-25. Wiring Connections in One-hand Control Switch (Switch Cover, Bottom View)

5. Measure wires to fit before cutting, then make the appropriate wiring connections, referring to Table 2-12, below, and Figure 8 at the end of the manual.

Table 2-12. One-hand Control Wiring Connections

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

* Refer to Figure 2-25, above

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

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 2-26 for mounting dimensions.

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

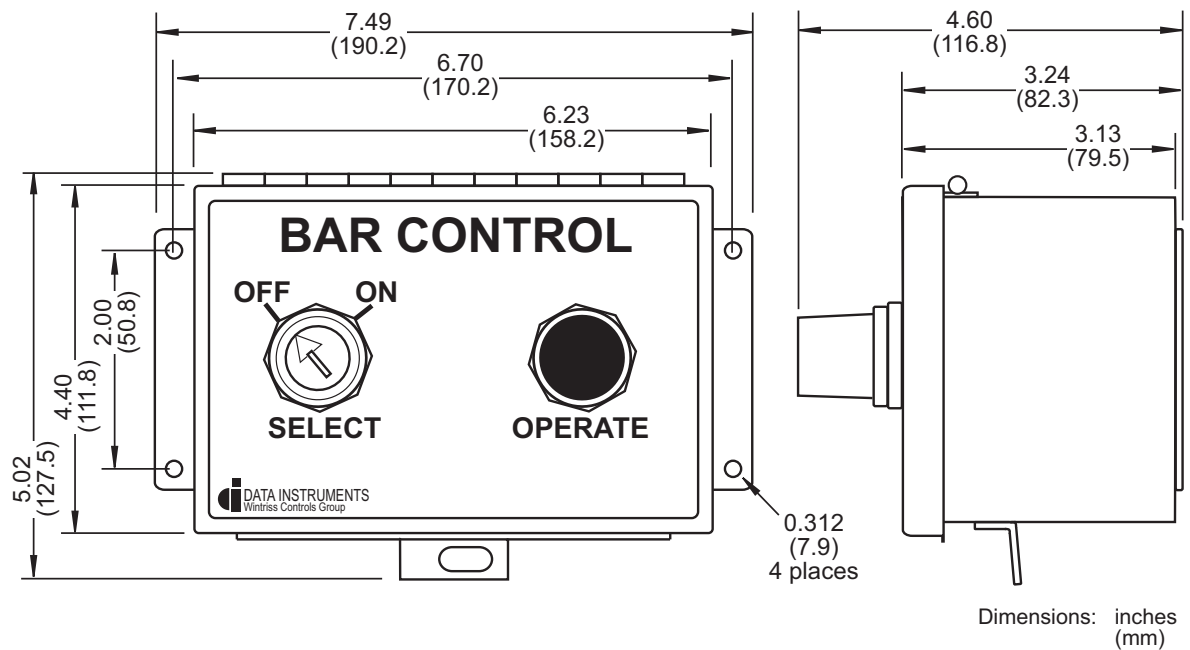


Figure 2-26. Bar Control Enclosure: Mounting Dimensions

Table 2-13. Bar Control Wiring Connections

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

Wiring Automatic Single-stroke

⚠ DANGER

PRESS STARTING UNEXPECTEDLY

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

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

Automatic Single-stroke is an operating mode that enables the operator to automate a manual press using a feeding device or robot. To wire the switch that turns on this feature, refer to Figure 5 at the back of the manual. To wire the Automatic Single-stroke actuating mechanism, refer to Table 2-14 and Figure 2 at the back of the manual.

Table 2-14. Automatic Single-stroke Wiring Connections

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

Though an SPDT contact is shown in Figure 2, you can also use solid state switches (proximity switches, for example) or outputs from a programmable logic controller (PLC). To make sure that the contacts are clear and reliable, the switch or relay should be new and unused.

You set the wait time for Automatic Single-stroke with option switch 5 (see page 3-29). To operate the press in this operating mode, refer to page 4-16.

Wiring Automatic Continuous On-demand

⚠ DANGER

PRESS STARTING UNEXPECTEDLY

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

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

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

Installing Revised Firmware in WPC 2000

⚠ DANGER

MACHINE MALFUNCTION AFTER INSTALLING REVISED SOFTWARE

Perform the installation verification (see page 2-58) and final checkout (see page 3-36) tests after performing the firmware installation.

Failure to comply with these instructions could 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.

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

1. Record the following WPC 2000 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
 - Counter (if necessary)
2. Turn off power to WPC 2000. The LED display and crank-angle clock 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 2000 enclosure and locate firmware chips A (labelled “U111”) and B (labelled “U134”) on the Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24). Note that each chip has a white label and a semi-circular notch at one end. The notch on the chip faces in the same direction as the notch on its socket.

NOTICE

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

CAUTION

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

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

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

CAUTION**CHIP INSTALLED INCORRECTLY**

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

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

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

NOTICE

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

7. To verify that both chips are installed correctly, power up the WPC 2000.
 - 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 2000 continues to malfunction, call Wintriss Tech. Support.

8. Re-initialize the system, following the instructions starting on page page 3-3.

⚠ DANGER**MAKE SURE THAT STOP TIME LIMIT IS CORRECT AFTER INITIALIZATION**

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

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

9. Re-enter the settings you recorded in step 1.
10. Perform installation verification (see page 2-58) and final checkout (see page 3-36) tests.

Installing WPC 2000 without Enclosure

When you order WPC 2000 without enclosure, you receive a Main Processor board, power supply, and input power terminal block mounted on an aluminum plate 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 2-52 or *Installing Display Board Kit with Selector Switches*, page 2-55.

Installing the WPC 2000 Mounting Plate

The mounting plate has a hole in each corner to facilitate mounting of the WPC 2000 Main Processor board and related components in your enclosure or console. When installing the mounting plate, refer to Figure 2-27, page 2-52 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 Main Processor board. Allow at least 2 1/2 in. clearance on the right side of the plate for making wiring connections to terminal blocks TB101-TB104.

The power supply on the mounting plate is pre-wired to the power terminal, TB105, on the Main Processor board and to the input power terminal block on the plate. To connect AC wiring to the input power terminal block, follow the instructions in *Connecting AC Wiring*, page 2-8.

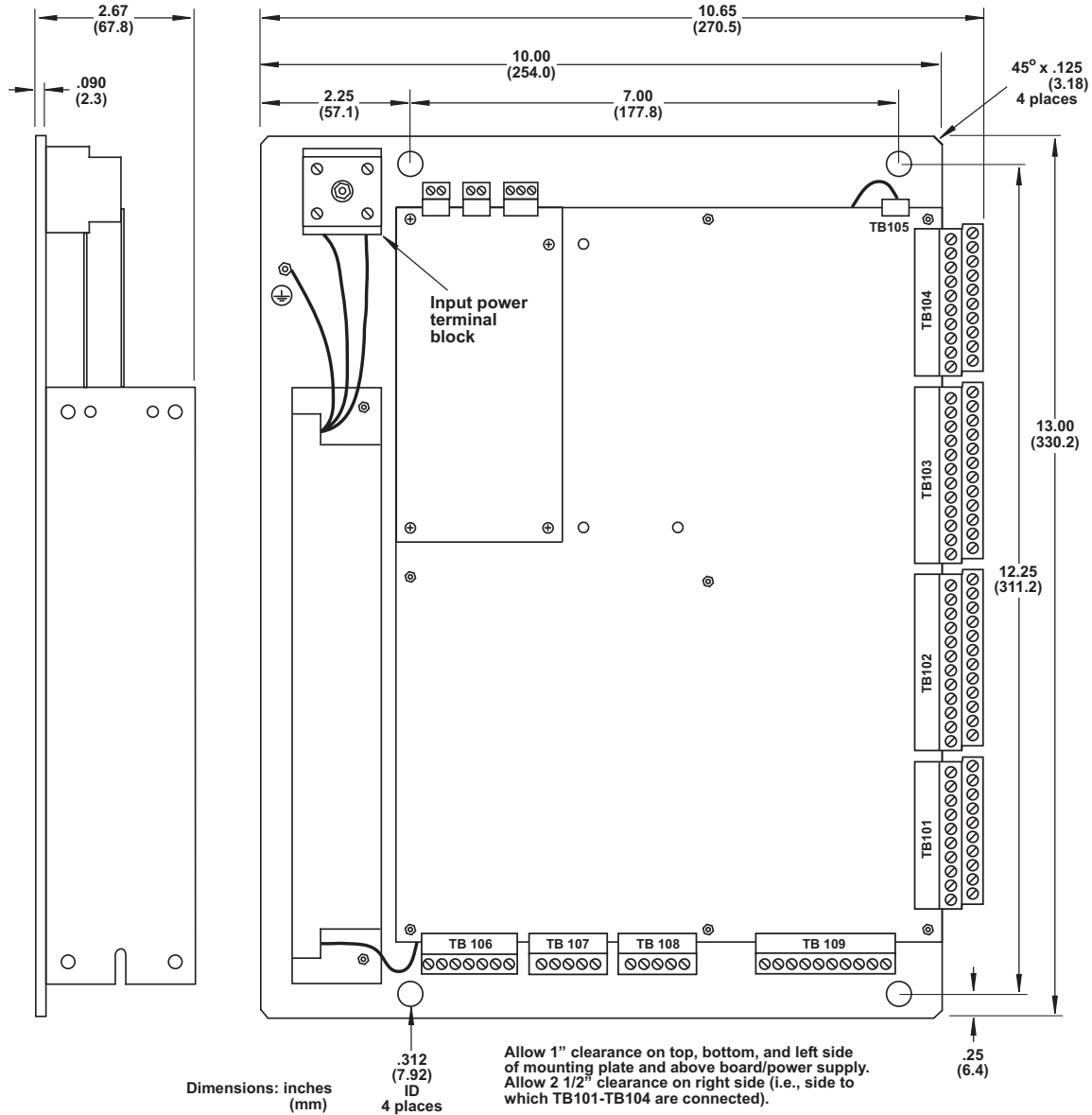


Figure 2-27. WPC 2000 Mounting Plate: Mounting Dimensions

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 2-28, page 2-53 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 ft. (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 2-28.

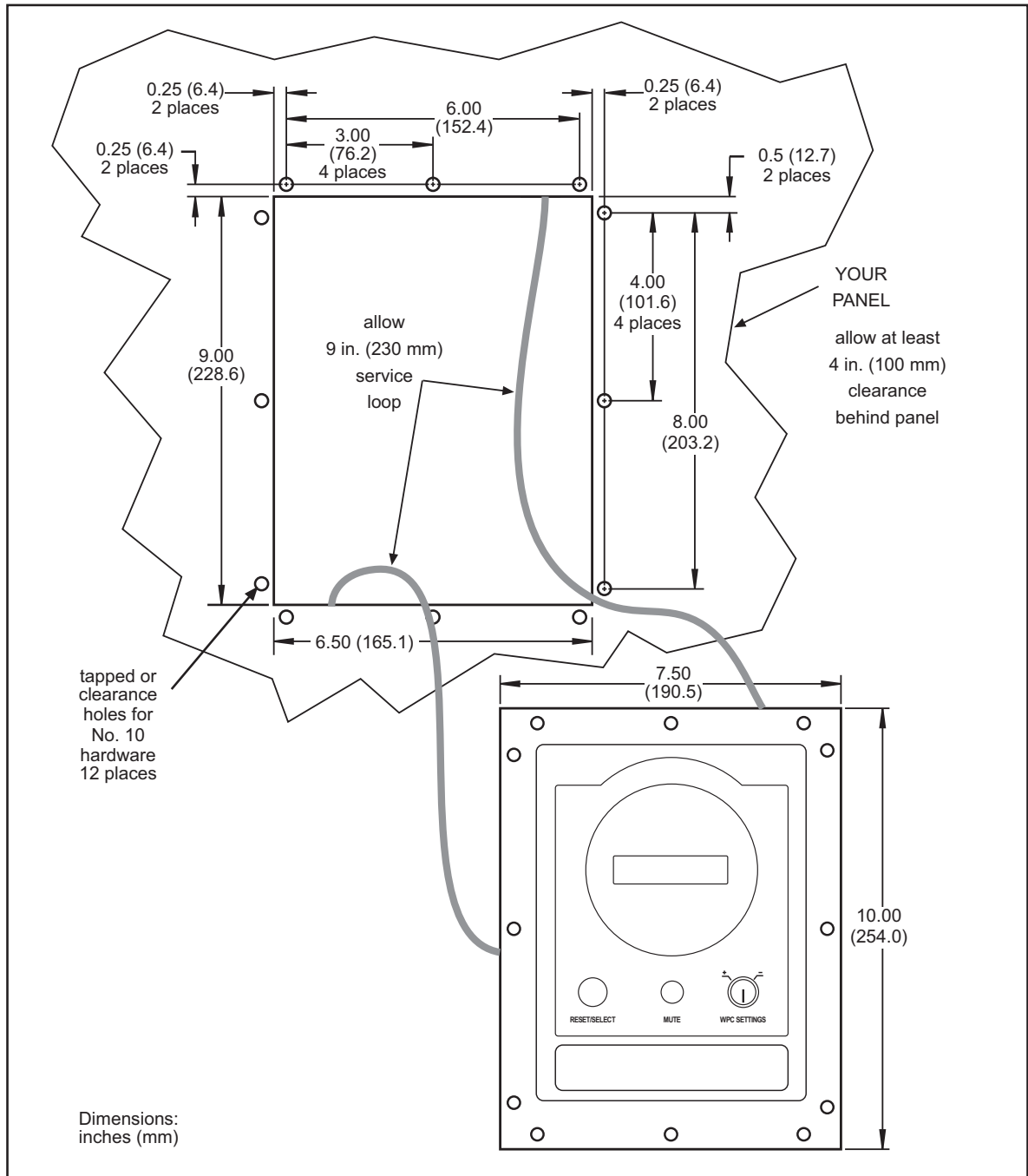


Figure 2-28. WPC 2000 Panel Mount Display: Mounting and Cutout Dimensions

- 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.

Connecting the Panel-mount Display to the WPC 2000 Main Processor Board

Connect the display cable from TB706 on the Display board to TB108 on the Main Processor board, referring to Table 2-15 and Figure 5 at the end of the manual for wiring connections.

NOTICE

CONNECT DISPLAY CABLE CORRECTLY

Make sure that the display cable is connected correctly at both ends. Connect the display cable to TB706 on the Display board with the black wire closest to the small numeral 1 toward the bottom of the board. The black wire indicates pin #1.

Table 2-15. Display Cable Wiring Connections, Display Board to Main Processor Board

Display Board TB706 Pin #	Wire Color	Signal	Main Processor Board TB108 Pin #
158	Red	V+	116
159	White	CAN+	117
160		SHIELD	118
161	Green	CAN-	119
162	Black	COM	120

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 1 ft. (300 mm) of the Display board.

- Select a mounting location for the selector switches. Switches must be mounted within 1 ft. (300 mm) of the display.

- Cut holes in your enclosure or console for the selector switches, referring to Figure 2-29 for cutout dimensions. Dimensions are the same for all switches.

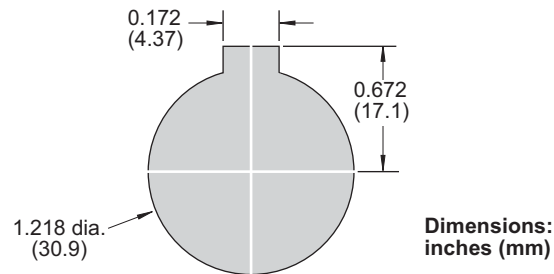


Figure 2-29. Selector Switch: Cutout Dimensions

- Install the selector switches.
- Wire each selector switch to the appropriate terminal block on the WPC 2000 Display board, referring to Table 2-16 and Figure 5 at the back of the manual for wiring connections

Table 2-16. Selector Switch Wiring Connections

Selector Switch	Terminal Block on WPC 2000 Display Board
Stroke Select	TB701
Mode Select	TB702
Automatic Single-stroke (External Trip)	TB703
Operator Station Select	TB704
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.

- 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.

7. Connect the display cable from TB706 on the Display board to TB108 on the Main Processor board, referring to Table 2-15, page 2-54 for wiring connections.

NOTICE**CONNECT DISPLAY CABLE CORRECTLY**

Make sure that the display cable is connected correctly at both ends. Connect the display cable to TB706 on the Display board with the black wire closest to the small numeral 1 toward the bottom of the board. The black wire indicates pin #1.

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 that you connect to terminals on the WPC 2000 Main Processor 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 2000 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 2-31.

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 2-31.

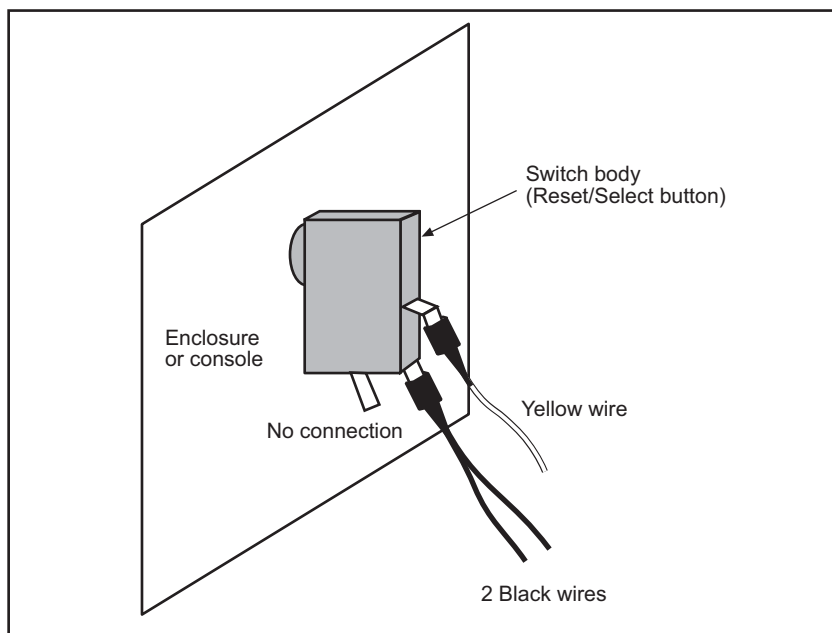


Figure 2-31. Reset/Select Button Wiring Connections

12. Plug the connector on the other arm of the Settings key switch wiring harness into J707 on the WPC 2000 Display board.
13. Connect the wiring from the mute lamp to pins #76 (+24 Vdc) and #54 (Ground) on the WPC 2000 Main Processor board (see Figure 1 at the end of the manual).

NOTICE**SPLICE ADDITIONAL WIRING ONTO MUTE LAMP WIRING**

The mute lamp comes with a 3 in. wire pigtail. You will need to butt splice an additional length of wire to the pigtail to make connections at the Main Processor board. Use 18 or 20 AWG wire and a Wintriss-supplied butt splice (part. no. Amp # 8-34070-4) or equivalent.

14. Install the selector switches.
15. Wire each selector switch to the appropriate terminal block on the WPC 2000 Display board, referring to Table 2-16, page 2-55 and Figure 5 at the back of the manual for wiring connections.

NOTICE**JUMPER JP720 ON DISPLAY BOARD MUST BE SET TO R (RUN) POSITION**

DO NOT change the position of jumper JP720 on the WPC 2000 Display board. This jumper comes from the factory in the R (or Run) position (see Figure 2-16, page 2-34 and Figure 1 at the end of the manual). If you set JP720 to the M (or Monitor) position, the clock display will not turn on.

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 MAIN PROCESSOR BOARD**

Connect all signal grounds through pins on the WPC 2000 Main Processor board.

When you have completed all the installation procedures in this chapter, perform the following Installation Verification steps before setting up and initializing WPC 2000 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 2000, the press and any other machinery it is connected to before working inside the enclosure. This includes power to the press motor.

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

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

1. Power down the press and press control.
2. On the DSV/Lockout Relay board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24 for location), 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 5-17), 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 Faults

To check for faults, 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 2000 Installation Verification procedure is complete. Clear any error message by pressing the Reset/Select button.

Wiring Tables

Tables showing WPC 2000 wiring connections are provided on the following pages.

Table 2-17. WPC 2000 Main Processor Board, TB101-TB104: Wiring Connections

Pin	Signal	Pin	Signal
TB104 Top		TB104 Bottom	
44	Analog ground	88	Light curtain B2 input **
43	Counterbalance air (Analog 2) input	87	Light curtain A2 input **
42	+24 Vdc output	86	User input 10 – (paired w/ User Input 11*)
41	+24 Vdc output	85	User input 8 – (paired w/ User Input 9*)
40	+24 Vdc output	84	User input 6 –
39	+24 Vdc output	83	User input 4 –
38	+24 Vdc output	82	User input 2 +
37	+24 Vdc output	81	Top-stop string input (connects internally to 49)
36	Aux. 2 output	80	Top-stop string center loop connection
35	Light curtain 2 enable	79	Top-stop string drive output
TB103 Top		TB103 Bottom	
34	Analog ground	78	Light curtain B1 input **
33	Main system air (Analog 1) input	77	Light curtain A1 input **
32	+24 Vdc output	76	Mute lamp 2 output +
31	Ground	75	Unused input –
30	Ground	74	User input 9 – (paired w/ User Input 8*)
29	Aux. 3 output	73	User input 7 –
28	Aux. 1 output	72	User input 5 –
27	Light curtain 1 enable	71	User input 3 +
26	Unused input +	70	Remote reset input –
25	Ground	69	E-stop string input (connects internally to 45)
24	Overrun limit switch input -	68	E-stop string center loop connection
23	+24 Vdc output	67	E-stop string drive output
TB102 Top		TB102 Bottom	
22	Top stop limit switch input –	66	Mute lamp 1 output +
21	User input 1 +	65	Palm time lamp output –
20	DSV monitor input +	64	Prior act lamp output –
19	Unused input –	63	Prior act B input +
18	User input 11 – (paired w/ User Input 10*)	62	Prior act B output
17	Motor reverse input +	61	Prior act A input (connects internally to 62)
16	Bar actuator input +	60	Top-stop B2 input + pulse
15	Auto. Single-stroke (Ext. Trip) actuator N/C +	59	Top-stop B2 output
14	Foot switch N/O input +	58	Top-stop A2 input (connects internally to 59)
13	Top Stop in Inch Disable input +	57	E-stop B2 input + pulse
12	Palm switch B N/O input +	56	E-stop B2 output
11	Palm switch A N/O input +	55	E-stop A2 input (connects internally to 56)
TB101 Top		TB101 Bottom	
10	Ground	54	Ground
9	+24 Vdc output	53	+24 Vdc output
8	Clutch air pressure switch input –	52	Top-stop B1 input + pulse
7	Motor forward input +	51	Top-stop B1 output
6	Bar selector switch input +	50	Top-stop A1 input (connects internally to 51)
5	Auto. Single-stroke (Ext. Trip) actuator N/O +	49	Top-stop A output
4	Foot switch N/C input +	48	E-stop B1 input + pulse
3	One hand A input +	47	E-stop B1 output
2	Palm switch B N/C input +	46	E-stop A1 input (connects internally to 47)
1	Palm switch A N/C input +	45	E-stop A output

* See *Wiring WPC 2000 User Inputs*, page 2-28.

** Input polarity depends on setting (NPN or PNP) of Light Curtain Output Type jumpers (JP121 and JP123) on WPC 2000 Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24).

Table 2-18. Power Supply (TB105) Wiring

Pin #	Signal
90	+24 Vdc input
89	COM

Table 2-19. Aux. E-stop Relay Board Wiring

Pin #	Signal
96	Circuit 3 output
95	Circuit 3 input
94	Circuit 2 output
93	Circuit 2 input
92	Circuit 1 output
91	Circuit 1 input

Table 2-20. DSV/Lockout Relay Board Wiring

Pin #	Signal
103	DSV B relay output
102	DSV B relay input
101	DSV A relay output
100	DSV A relay input
99	Lockout relay output
98	Lockout relay output
97	Lockout relay input

Table 2-21. Resolver (TB 106) Wiring

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

Pin #	Signal	Wire Color
104	S4 Return	Brown
105	R2 Ground	Orange
106	S3 Return	Yellow
107	R1 Drive	Red
108	S2 Cosine	Green
109	S1 Sine	Black
110	Shield	

Table 2-22. Cam Outputs (TB 109) Wiring

Pin #	Signal
130	Cam 1
129	Cam 2
128	Cam 3
127	Cam 4
126	Counter
125	Zero cam
124	Spec 1
123	Spec 2
122	Ground
121	+24 Vdc

Table 2-23. Display Board Wiring

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

Table 2-24. AC Power Wiring

Pin #	Signal
	L1 (Hi)
	L2 (Neutral)
	Ground

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 2000 and perform final checkout tests.

Viewing and Setting Press Parameters

The WPC 2000 allows you to view and, in some cases, to set the following press parameters:

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

To select a parameter so you can view or adjust its setting, press the Reset/Select button on the WPC 2000 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 2000 display are shown in Figure 3-1.

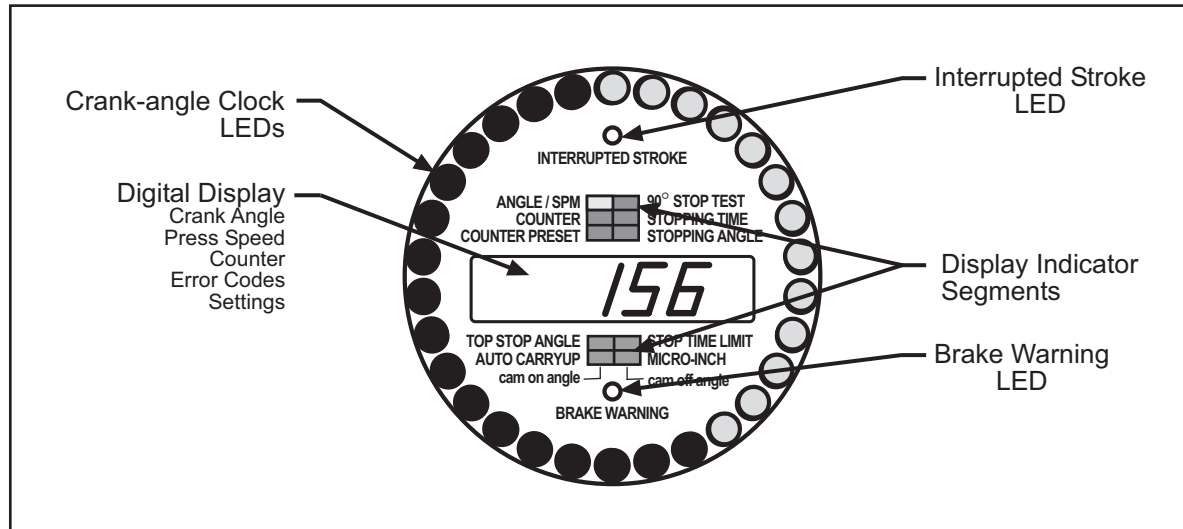


Figure 3-1. WPC 2000 Display Showing Indicator Segments

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.

“Angle/SPM” is the default indicator segment when the press is in Inch mode, the crankshaft angle being displayed in the digital LED readout. Whenever you change operating mode to Single-stroke or Continuous, “Counter” becomes the active (i.e., illuminated) segment, and the current parts count is displayed in the digital readout. These defaults are summarized 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 2000 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 2000. Use the stop time measured in the 90° stop time test to calculate the safety distance. When you initialize WPC 2000, 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 2000 and run the Installation Verification tests, you should first initialize the WPC 2000 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 2000.
3. Turn the WPC Settings key switch to its “+” setting (i.e., counterclockwise) and turn power to the WPC 2000 back on. When the message “Int” appears in the LED display (see Figure 3-2), release the key.

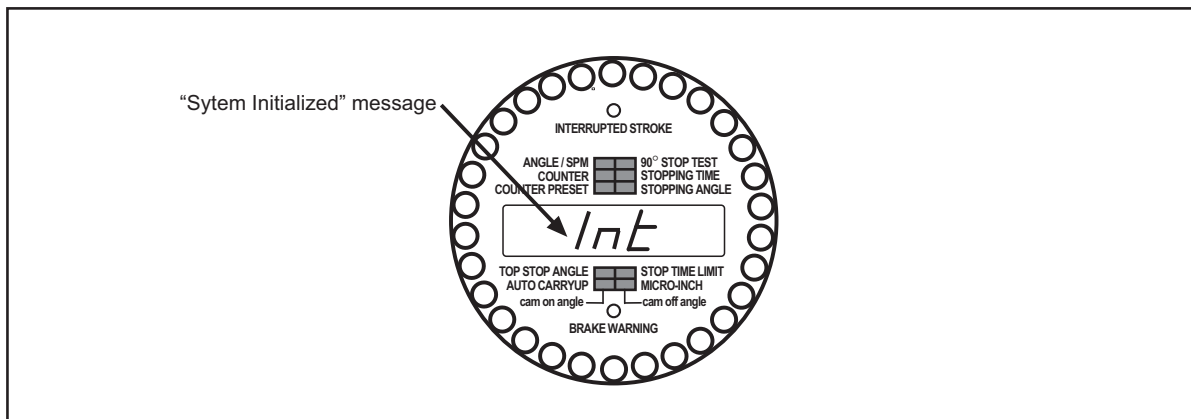


Figure 3-2. WPC 2000 Display Showing “System Initialized” (“Int”) Message

This procedure returns the following WPC 2000 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 3-16).
- Start-time Limit—Set to two times the Start Time measured by WPC 2000 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 2000 to detect resolver drive failure. When the measured Start Time exceeds the Start-time Limit, WPC 2000 sends a Stop signal to the press and displays fault code F79 (see *Loss of Rotation*, page 5-18).

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 2000.
3. Press and hold the Reset/Select button and turn power to the WPC 2000 back on. When the message “rES” appears in the LED display (see Figure 3-3), release the key.

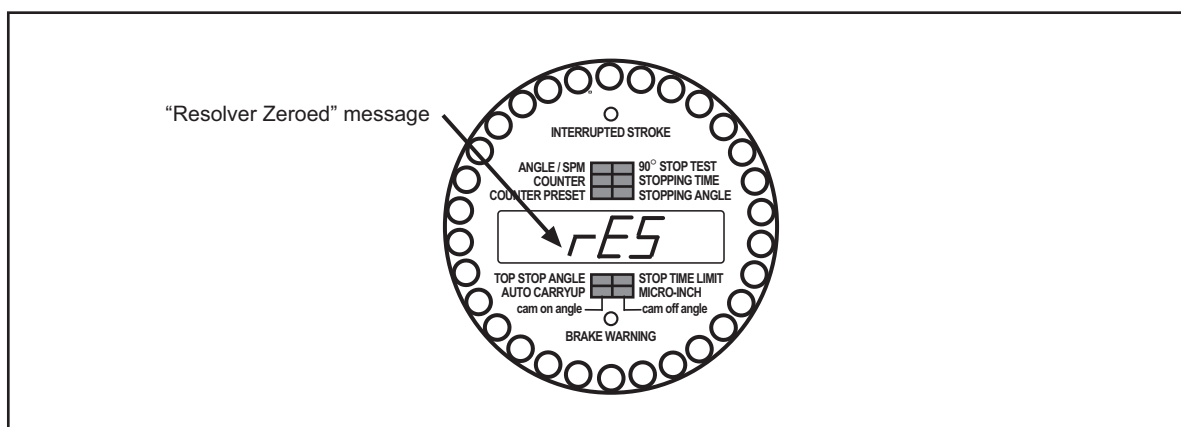


Figure 3-3. WPC 2000 Display Showing “Resolver Zeroed” (“rES”) Message

When you use this procedure to zero the resolver, WPC 2000 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 2000.
2. While powering WPC 2000 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), release the key.

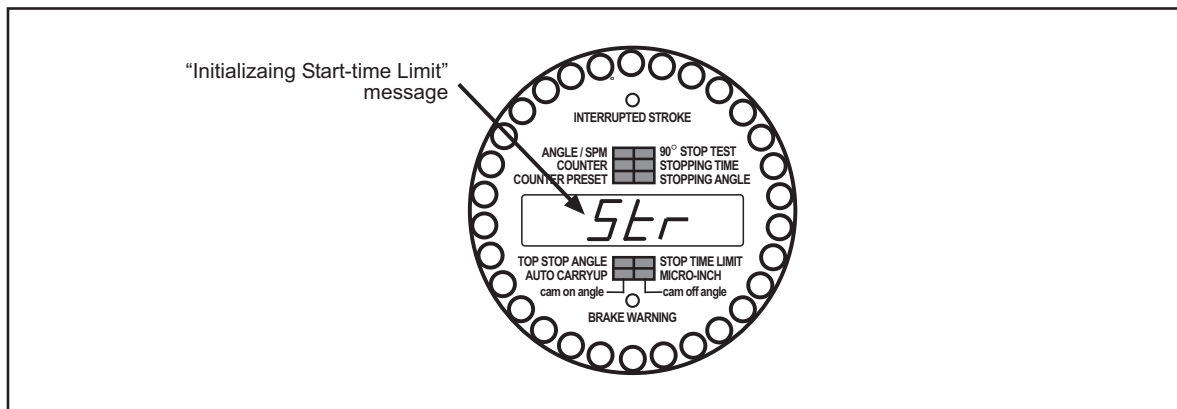


Figure 3-4. WPC 2000 Display Showing “Initializing Start-time Limit” (“Str”) Message

The next time you start the press, WPC 2000 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 3-2, page 3-8).

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 2000 to monitor operation of the resolver and to stop the press whenever the resolver fails to work properly.

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

The angle at which you mount the magnet depends on the Top-stop “On” Angle. 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., $0^\circ \pm 2^\circ$) (see *Mounting the Resolver*, page 2-21)
- 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 2000 display, do the following:

1. Make sure the following WPC 2000 features are set correctly:
 - Option switches 1 and 2 on switch block S101 on the WPC 2000 Main Processor board should be set to OFF so that any Top-stop “On” Angle between 211° and 355° can be set on the WPC 2000 display. See Figure 2-12, page 2-23 or Figure 2-13, page 2-24 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 #13 on the WPC 2000 Main Processor board should not be wired in order to disable Top-stop in Inch (see *Top-stop Bypass (Top-stop in Inch Disabled)*, page 4-9).
 - Micro-inch (if you have wired this feature) should be disabled (see *Wiring Micro-inch*, page 2-33).
 - Option switch 4 on switch block S101 should be set to OFF to disable the Auto Compensated Top Stop (ACTS) feature (see page 3-28). 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 2000 to enable the new settings.
3. Clear the “Loc” message on the WPC 2000 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/Select 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:

$$360^\circ - 287^\circ = 73^\circ$$

$$211^\circ + 73^\circ = 284^\circ$$

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 5-19).

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 3-2.

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 3-2. 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 3-2. The correct mounting angle for the overrun sensor magnet would be 330°. See Figure 3-5.

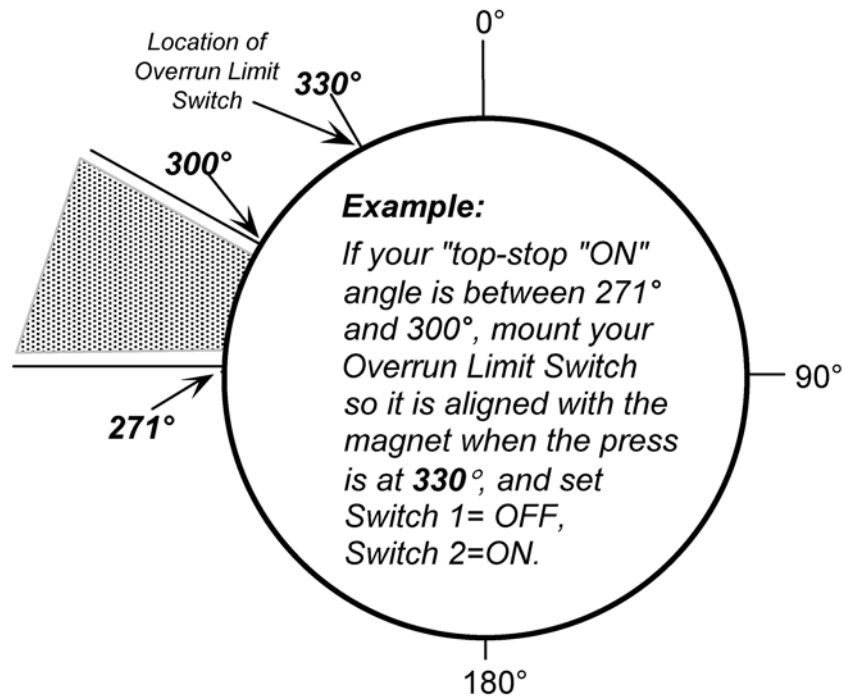


Figure 3-5. Setting Overrun Timing: Example

12. Determine the option switch 1 and 2 settings required for your calculated Top-stop "On" Angle, referring to Table 3-2. WPC 2000 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 3-2. 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 2000 Main Processor board to the positions you determined in step 12, referring to 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 2000 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” LED in LED Group 6 on the WPC 2000 Main Processor board is lit, referring to the LED map in Figure 3-14, page 3-38 or Figure 3-15, page 3-39 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 4-6 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).

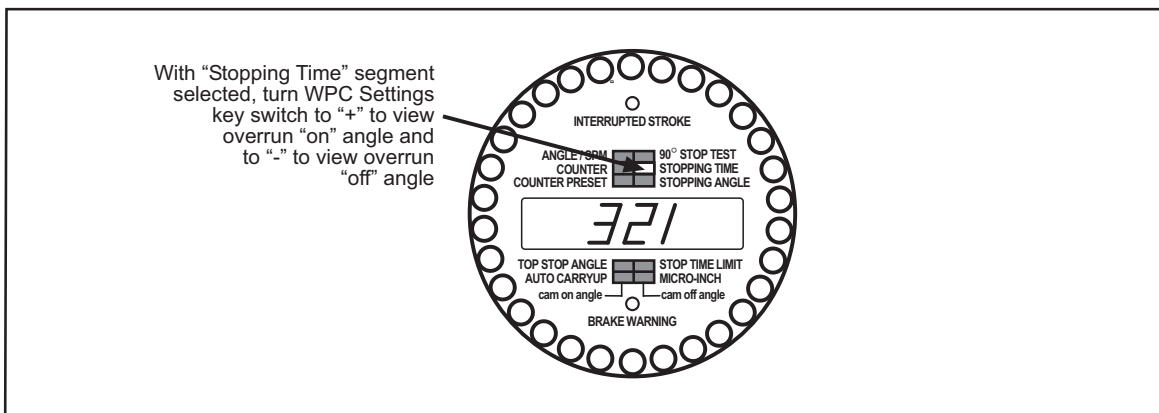


Figure 3-6. WPC 2000 Display Showing Overrun Sensor “On” Angle

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 3-9), 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 3-6), 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 2000 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,” select the “Angle/SPM” indicator segment, using the Reset/Select button, and check 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 $0^\circ \pm 2^\circ$, 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 $0^\circ \pm 2^\circ$.

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 5-19).

7. Repeat step 6 at least five times to make sure that the press top-stops at $0^\circ \pm 2^\circ$.

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.

DANGER

PREVENT CHANGES TO AUTO CARRY-UP ANGLE WHEN SETTINGS KEY IS PRESENT

Use option switch 7 to prevent anyone from making changes to the Auto Carry-up Angle (see *Switch 7 – Disabling Access to Stop-time Limit and Auto Carry-up Angle Settings*, page 3-30).

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 the WPC 2000 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 4-15 and *Enabling Foot Control in a Foot Switch*, page 3-28.

WPC 2000's Auto Carry-up feature (also called Operator Station Mute) enables the press to complete a stroke whenever the operator releases the Run/Inch palm buttons after the ram has passed the Auto Carry-up Angle.

The Auto Carry-up Angle is factory-set to 149° if your WPC 2000 has light curtain firmware and to 170° if you have non-light curtain firmware. If you change the auto carry-up default setting, you must use an angle value that is at or past the crankshaft angle at which the pinch point openings on the press have closed to less than 1/4 in. (6 mm). Pinch points that are less than 1/4 in. (6 mm) are considered non-hazardous to the operator.

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

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

1. Check to make sure that option switch 7 on switch block S101 on the WPC 2000 Main Processor board is set to OFF to enable changes to the Auto Carry-up Angle (see page 3-30).
2. Power down, then power up the WPC 2000 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 2000, 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 2000’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 2000, 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,” select the “Angle/SPM” indicator segment, using the Reset/Select button, and check 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.”
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 2000 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.

$$\text{stop-time limit} = \text{stopping time} + \text{Tbm}$$

The Tbm value represents normal wear on the brake and ensures that WPC 2000 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 ($0.10 \times 207 = 20.7$; 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 ($0.20 \times 175 = 35$)

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 2000.
- Perform a 90° Stop Test any time you change the Stop-time Limit of WPC 2000. (See *Determining the 90° Stop Time*, page 3-17.) 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 3-19).

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

⚠ DANGER

PREVENT CHANGES TO STOP-TIME LIMIT WHEN SETTINGS KEY IS PRESENT

Use option switch 7 to prevent anyone from making changes to the Stop-time Limit (see *Switch 7 – Disabling Access to Stop-time Limit and Auto Carry-up Angle Settings*, page 3-30).

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

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

1. Check to make sure that option switch 7 on switch block S101 on the WPC 2000 Main Processor board is set to OFF to enable changes to the Stop-time Limit (see page 3-30).
2. With power on to the WPC 2000 and the press in “Inch” mode, press the Reset/Select button repeatedly until the “Stop Time Limit” indicator becomes lit (see Figure 3-7). 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.
3. 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.

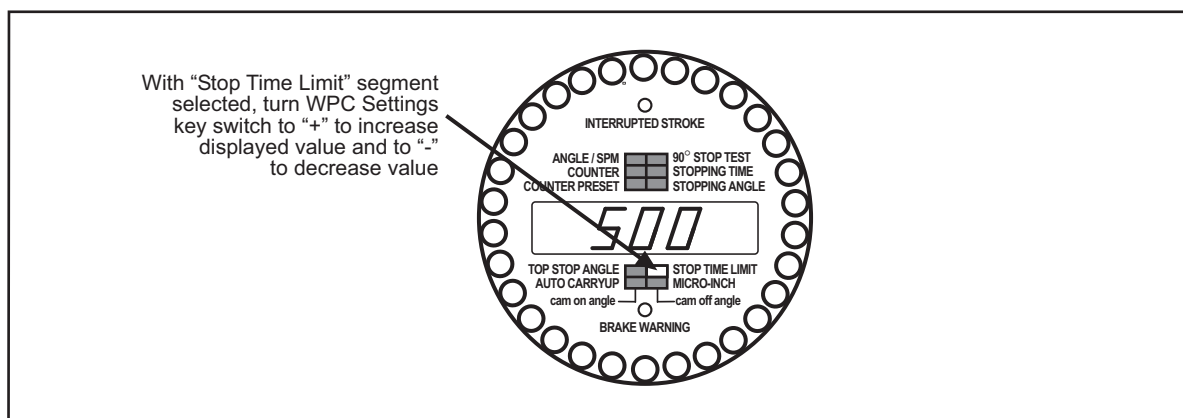


Figure 3-7. WPC 2000 Display Showing Stop-time Limit Value

4. 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.
5. Set option switch 7 to ON to disable changes to the Stop-time Limit (see step 1).
6. Power down WPC 2000, then power the unit back up to enable the new setting.

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 $T_s + T_c$ 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 3-18.

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 2000.
- 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 3-19).

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).

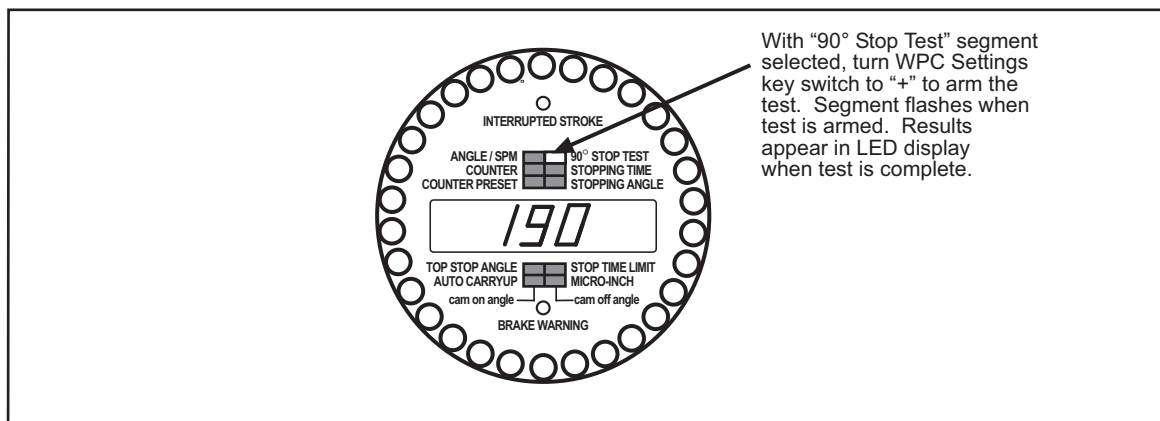


Figure 3-8. WPC 2000 Display Showing Results of 90° Stop-time Test

- 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.

- When the press stops, record the value shown in the LED display.
- 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 2000.
- 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 3-19).
- 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.

- Install the heaviest upper die in your press. Adjust the counterbalance for ram weight, if your press has a counterbalance.
- Set the Stroke Select switch to “SINGLE.”
- Press the Reset/Select button repeatedly until the “90° Stop Test” indicator becomes lit (see Figure 3-8).
- 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 2000 will stop the press when it reaches 90°.
6. When WPC 2000 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, page 3-20).
- 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, page 3-20, 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.

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 3-17). 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.

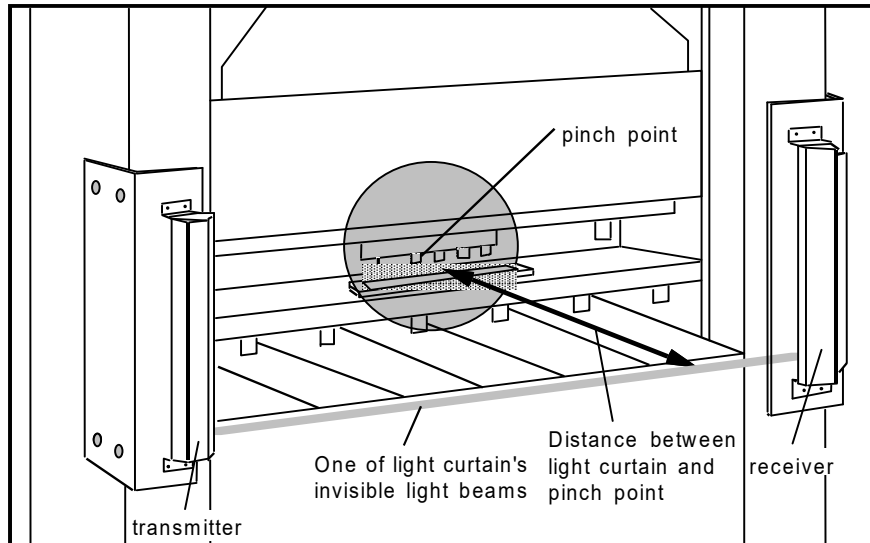


Figure 3-9. Safety Distance: Distance between Pinch Point and Light Curtain

ANSI and OSHA Safety Distance Formulas

⚠ 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.

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.

ANSI Safety Distance Formula

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

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

where

D_s is the ANSI safety distance in inches

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

T_s is the stopping time of the press in seconds

T_c is the response time of the press control

T_r is the response time of the light curtain

T_{bm} is the additional stopping time of the press allowed by the brake monitor

D_{pf} 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 (*T_s*) is measured at approximately 90° of crankshaft rotation, or at maximum closing velocity. The response time of the press control (*T_c*), 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 2000 (see *Determining the 90° Stop Time*, page 3-17). You can use the value generated by the 90° stop-time test for the variables *T_s* + *T_c* in the ANSI formula.

Response times *T_r* for Shadow light curtains are shown in Table 3-3.

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

Shadow Model	Head Length *	Response Time	Object Sensitivity
Shadow V	12 in. to 24 in.	30 mS	1.25 in.
	36 in. and 48 in.	50 mS	
Shadow VI	6 in. to 24 in.	30 mS	1.25 in.
	30 in. to 48 in.	35 mS	
	60 in.	40 mS	
Shadow VII	6 in. to 30 in.	20 mS	1.18 in.
	36 in. to 59 in.	23 mS	
	Up to 96 in.	28 mS	
	Up to 135 in.	32 mS	

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

Shadow Model	Head Length *	Response Time	Object Sensitivity
Shadow 8	Up to 42 in.	23 mS	1.18 in.
	Up to 85 in.	32 mS	
	Up to 128 in.	41 mS	
	Up to 171 in.	50 mS	
	Up to 202 in.	59 mS	
Shadow 9	Standalone up to 31.5 in. (800 mm)	8mS	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

T_{bm} 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 3-15). The T_{bm} 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 (D_{pf}) is a measure of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts. D_{pf} is related to the light curtain's object sensitivity, which is the smallest diameter object the light curtain 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 3-3 for the object sensitivity of other Shadow models.) Based on S and ANSI B11.1-2009, **D_{pf}** = 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:

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

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

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

The ANSI formula is

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

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)

Tbm = 0.035 sec. (see Example 2 in *Stop-time Limit Calculation Examples*, page 3-15)

Dpf = 3.07

Putting these values into the formula, we get:

$$Ds = 63 \times (0.190 + 0.018 + 0.035) + 3.07$$

$$Ds = (63 \times 0.284) + 3.07$$

$$Ds = 15.309 + 3.07$$

$$Ds = 18.379 \text{ in.}$$

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 not 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 3-17 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 3-21).

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

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

- Response time of the press control that activates the brake
- Response time of the light curtain
- Additional time (*T_{bm}*) 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 2000 (see *Determining the 90° Stop Time*, page 3-17).

Response times of Shadow light curtains are shown in Table 3-3, page 3-21.

Calculation of the *T_{bm}* value is described in *Calculating the Stop-time Limit*, page 3-15.

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:

$$D_s = K \times T_s$$

As indicated above, *T_s* must include all factors that are involved in stopping the press, including the response time of the press control but excluding the response time of the light curtain.

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

The OSHA formula is

$$D_s = K \times T_s$$

The following value is a constant:

$$K = 63 \text{ inches per second}$$

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 3-3, page 3-21)

Additional time for brake wear = 0.035 sec. (see Example 2 in *Stop-time Limit Calculation Examples*, page 3-15)

Putting these values into the formula, we get:

$$D_s = 63 \times (0.190 + 0.018 + 0.035)$$

$$D_s = 63 \times 0.243$$

$$D_s = 15.309 \text{ in.}$$

The light curtain must be mounted 15.309 in. away from the pinch point.

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

- (1) Add the factors involved in the stopping time T_s first.
- (2) Multiply the result by 63. This is D_s .

If you do not 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 buttons on the Operator Station while the press is in Inch mode.

Normally, when the press is running in Inch (see *Top-stop in Inch*, page 4-9), 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 2-33), 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.

NOTICE

INTERRUPTED STROKE

If an interrupted stroke occurs when Micro-inch is enabled, WPC 2000 automatically changes to Two-hand Maintained Single-stroke mode. See *Responding to an Interrupted Stroke*, page 4-3.

To set Micro-inch, do the following:

1. With power on to the WPC 2000 and the press in Inch mode, press the Reset/Select button repeatedly until the “Micro-inch” indicator becomes lit (see Figure 3-10).

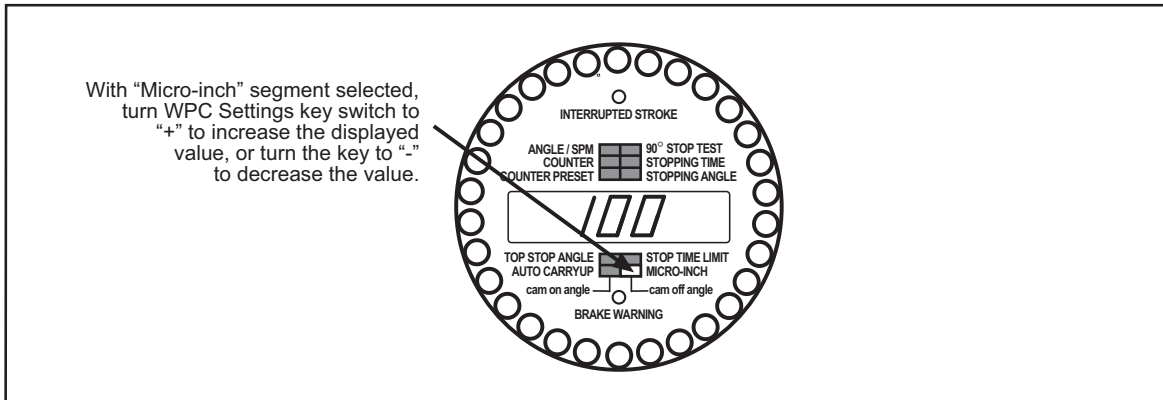


Figure 3-10. WPC 2000 Display Showing Micro-inch Time Setting

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.

Setting Press Option Switches

⚠ DANGER

ELECTRIC SHOCK HAZARD WHEN WORKING INSIDE THE ENCLOSURE

Turn off and disconnect power from WPC 2000 and from the machinery it is connected to before making any wiring connections or settings inside the enclosure. This includes power to the machine control and motor.

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

NOTICE

CYCLE POWER AFTER CHANGING OPTION SWITCH SETTINGS

Whenever you change an option switch setting, you must power down the WPC 2000 and power it back up again in order to enable the new setting. If you do not cycle power, the previous switch setting will remain in effect.

Two switch blocks are provided on the WPC 2000 Main Processor board that you can use to set various operating parameters for your presses. The two switch blocks, S101 and S102, are located just beneath the B processor chip and to the right of the Auxiliary E-stop Relay board on center- and right-mount controls (see Figure 2-12, page 2-23), above the B chip and to the left of the relay board on left-mount units (see Figure 2-13, page 2-24). The following sections describe how to make the appropriate settings on these two switch blocks.

Making Settings on Switch Block S101

This section shows you how to make settings on switch block S101. 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.

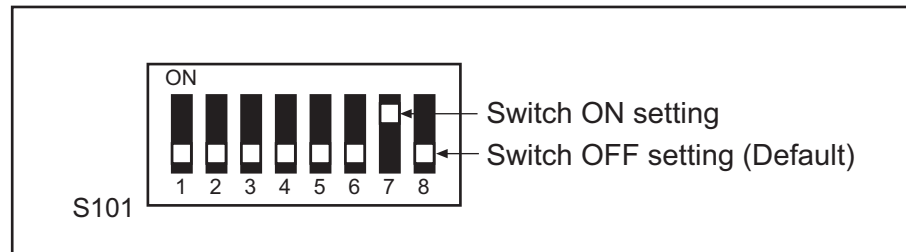


Figure 3-11. S101 Option Switch OFF and ON Settings

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 3-6). WPC 2000 uses these switch settings to determine at what angle to begin the overrun sensor closure test, which is used to make sure that the overrun limit switch closes at the same angle on every stroke. Settings for option switches 1 and 2 are shown in Table 3-4, page 3-27.

Table 3-4. Switches 1 and 2 Settings (S101): 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 a One-hand Control*, page 2-43) is active, as shown in Table 3-5.

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 3-5. Switch 3 Settings (S101): 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 3-6, page 3-28. 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 2000 issues an Emergency-stop command to the press.

Table 3-6. Switch 3 Settings (S101): 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 3-7). ACTS is a WPC 2000 option that adjusts the Top-stop “On” Angle to an earlier point in the stroke to compensate for increases in press speed.

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

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

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 3-7. Switch 4 Settings (S101): 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 – Prior Act Time for Automatic Stroke Modes

Switch 5 controls the Prior Act time for Automatic Single-stroke and Automatic Continuous On-demand operating modes if one or both of these options have been installed on your press (see Table 3-8). The Prior Act time is the interval within which the activating signal from the feed device or robot must be received in order to initiate a stroke.

When switch 5 is set to OFF, its default setting, the activating signal must be received within a 30-second window for Automatic Single-stroke and a 1-minute window for Automatic Continuous On-demand. When switch 5 is set to ON, the window increases to 5 minutes for Automatic Single-stroke and 10 minutes for Automatic Continuous On-demand.

Wiring instructions for Automatic Single-stroke are provided on page 2-48. Operating instructions for Automatic Single-stroke are provided on page 4-16. For information on wiring and operating Automatic Continuous On-demand, call Wintriss Tech. Support.

Table 3-8. Switch 5 Settings (S101): Prior Act Times for Automatic Modes

Setting	Prior Act Time Automatic Single-stroke	Prior Act Time Automatic Continuous On-demand
OFF	30 seconds (Default)	1 minute (Default)
ON	5 minute	10 minutes

Switch 6 – Enabling Dual Light Curtains

Switch 6 controls whether WPC 2000 recognizes dual light curtains when two light curtains are wired to the system, as shown in Table 3-9. Refer to page 2-18 for general light curtain installation instructions.

When switch 6 is set to OFF, its default position, dual light curtains are disabled, and WPC 2000 recognizes only a single light curtain. When switch 6 is set to ON, dual light curtains are enabled, and both light curtains, if two light curtains are wired, are recognized.

Table 3-9. Switch 6 Settings (S101): Enabling Cam Adjustments

Setting	Dual Light Curtains
OFF	Normal operation (Default). Dual light curtains disabled. WPC 2000 recognizes only one light curtain.
ON	Dual light curtains enabled. WPC 2000 recognizes two light curtains.

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 3-10, page 3-30.

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 2000. Setting switch 7 to ON disables this feature, preventing the operator from making changes.

Table 3-10. Switch 7 Settings (S101): 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 2000 Main Processor 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 3-11.

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 3-11. Switch 8 Settings (S101): 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 OUTPUTS USED FOR SAFETY FUNCTIONS

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

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

If you have wired Auxiliary Output 1 (see page 2-30), switch 8 also controls how this output responds to an Interrupted Stroke condition, as shown in Table 3-12.

When switch 8 is set to OFF, its default setting, Aux. Output 1 turns “off” during an Interrupted Stroke and whenever a fault occurs, an E-stop string opens, or a light curtain is broken with the press running. When switch 8 is set to 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 3-12. Switch 8 Settings (S101): Auxiliary Output 1 Response to Interrupted Stroke

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

* An Interrupted Stroke cannot occur in Inch mode.

Making Settings on Switch Block S102

This section shows you how to make settings on option switches 1, 2, and 6 on switch block S102. Like the switches on S101, all eight S102 switches are factory-set to the OFF position. Only switches 1, 2, and 6 are active. To set a switch to ON, push up on the switch with a small screwdriver or your fingernail.

NOTICE

Switches 3 through 5 and 7 and 8 on switch block S102 are not used.

Switch 1 – Set Cams Function

Option switch 1 on S102 controls whether the Set Cams function is enabled (see Table 3-13). When the Set Cams function is enabled, cam angles can be set on the WPC 2000 display.

Switch S701 on the WPC 2000 Display board can also be used to enable Set Cams (see page 2-41). If the Display board is difficult to access, you can use switch 1 on S102 to enable Set Cams instead.

When switch 1 is set to OFF, the default setting, the Set Cams function is disabled. When switch 2 is set to ON, Set Cams is enabled.

Table 3-13. Switch 1 Settings (S102): Enabling Set Cams Function

Setting	Set Cams Function
OFF	Normal operation (Default). Set Cams function disabled.
ON	Set Cams function enabled.

Switch 2 – Auxiliary E-Stop Relay Muting Function

The Auxiliary E-Stop Output Relay board is an optional “daughter” board that enables up to three auxiliary devices (e.g., feeds, transfers, etc.) to be stopped, or prevented from starting, when one of three conditions exist: activation of an E-stop button, penetration of a light curtain, and an “open” state in a cross-checked input.

Option switch 2 allows the Auxiliary E-Stop Output Relay board to be muted when a light curtain is penetrated during the muted portion of the stroke (see Table 3-14). The switch is functional only when your WPC 2000 has optional Shadow muting firmware, which disables the light curtain during the portion of the stroke after the Auto Carry-up Angle has been reached (see *Setting the Auto Carry-up Angle*, page 3-13).

When switch 2 is set to OFF, its default setting, muting of the Auxiliary E-Stop Output Relay board is disabled, and penetration of the light curtain at any point in the stroke causes a stop command to be sent to auxiliary devices. When switch 2 is set to ON, the Auxiliary E-Stop Output Relay board is muted during the portion of the stroke when the light curtain is muted. If the light curtain is interrupted during this muting window, a stop command is *not* sent to auxiliary devices.

Switch 2 enables muting of the Auxiliary E-Stop Output Relay board only during a light curtain interruption. With switch 2 set to ON, the board functions normally (i.e., issues a stop command) when an E-stop button is activated or a cross-checked input is open.

Table 3-14. Switch 2 Settings (S102): Enabling E-Stop Muting Function

Setting	Auxiliary E-Stop Output Muting Function
OFF	Normal Operation (Default). Disables the muting function. When the light curtain is obstructed during any portion of the stroke, a stop command is issued to auxiliary devices.
ON	Enables the muting function, allowing objects to penetrate the light curtain during the muted portion of the stroke) without triggering a stop command for auxiliary devices.

Switch 6 – Selecting Concurrent Time for More Than Two Operator Stations

NOTICE

You should only change this switch from its default setting if you have installed more than two Operator Stations on your WPC 2000. Contact Wintriss Tech. Support for further information.

Option switch 6 on S102 allows you to select a 5-second concurrent time for WPC 2000 configurations with more than two Operator Stations installed, as shown in Table 3-15.

NOTICE

Do not attempt to install more than two Operator Stations until you have contacted Wintriss Tech. Support. All Operator Stations in a multi-Op.-Station configuration except the Op. Station wired to the “A” inputs must contain a Two-hand Control module. Do not order standard Wintriss “Multiple Operator Stations.”

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

When switch 6 is set to OFF, its default position, and two Operator Stations are connected to WPC 2000, the palm switches on each Operator Station must be pressed within a 1/2-second window (called the “palm” or “synchronous” time) and both pairs of palm switches must be pressed within a 5-second concurrent time window in order to stroke the press.

When switch 6 is set to ON and more than two Operator Stations are connected to WPC 2000, palm switches on all connected Operator Stations must be pressed within a 5-second concurrent time window to start the press. All Op. Stations connected to the “B” inputs must contain a Two-hand Control module to provide the required 1/2-second palm (or synchronous) time.

Table 3-15. Switch 6 Settings (S102): Selecting Concurrent Time for Multiple Op. Stations

Setting	Concurrent Time for Multiple Op. Stations
OFF	Normal Operation (Default). Establishes a 1/2-second palm (or synchronous) time and a 5-second concurrent time for two Operator Stations.
ON	Establishes a concurrent time of 5 seconds when more than two Operator Stations are connected to WPC 2000. Also keeps a 1/2-second palm (or synchronous) time for the Op. Station connected to the “A” inputs. Each Operator Station connected to the “B” inputs must contain a Two-hand Control module to provide the required 1/2-second palm (or synchronous) time.

Setting Programmable Cams

If you have ordered the optional four-channel programmable cam output, you can set cam “on” and “off” angles via the WPC 2000 display. Before making settings, verify that the cam outputs have been installed correctly (see page 2-35).

When the Set Cams function is enabled, the “Auto Carry-up” and “Micro-inch” segments on the WPC 2000 display function as indicators for cam channel settings, as shown by the labels “cam on angle” and “cam off angle” beneath the segments (see Figure 3-12).

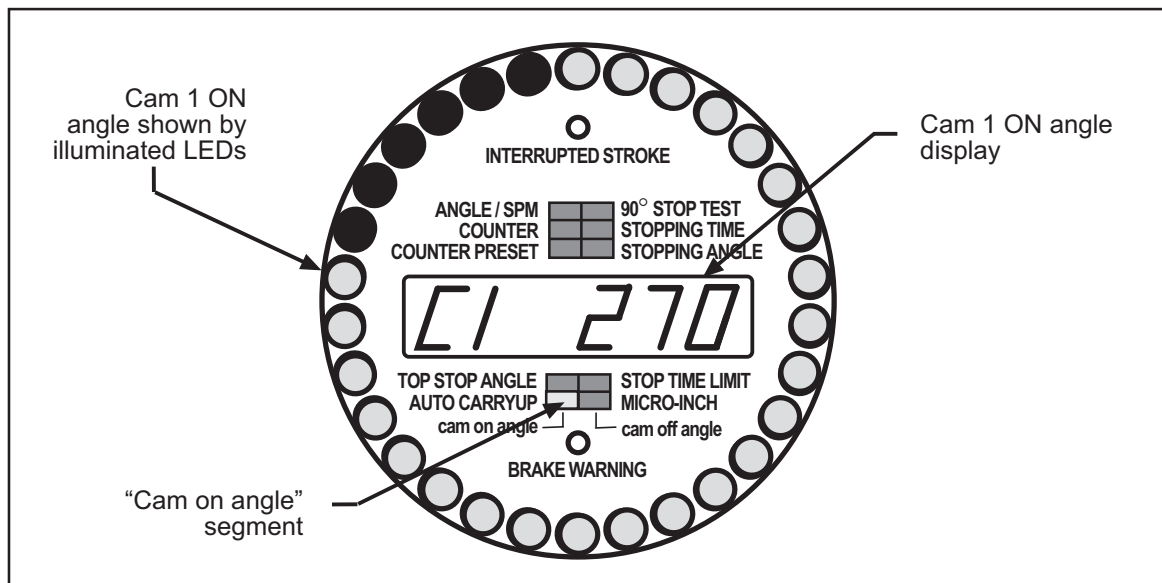


Figure 3-12. Cam Channel Settings Display: Cam 1 ON Angle (270°) Shown

NOTICE

Cam settings cannot be made while the press is running.

To make cam channel settings, perform the following steps:

1. Enable the Set Cams function (see *Enabling Cam Adjustments*, page 2-40).
2. Turn the Stroke Select switch to “INCH” to put the press in Inch mode.
3. Press the Reset/Select button repeatedly until the “cam on angle” (or “Auto Carryup”) segment is illuminated.

The identifier “C1” (for Cam 1) appears at the left of the LED display; the current Cam 1 ON angle is shown at the right of the display (see Figure 3-12). The Cam 1 ON angle is also represented at one end of an illuminated arc of LEDs on the crank-angle clock.

4. 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 turned on, or currently illuminated LEDs are turned off.

5. Press the Reset/Select button to illuminate the “cam off angle” (or “Micro-inch”) segment (see Figure 3-13, page 3-36).

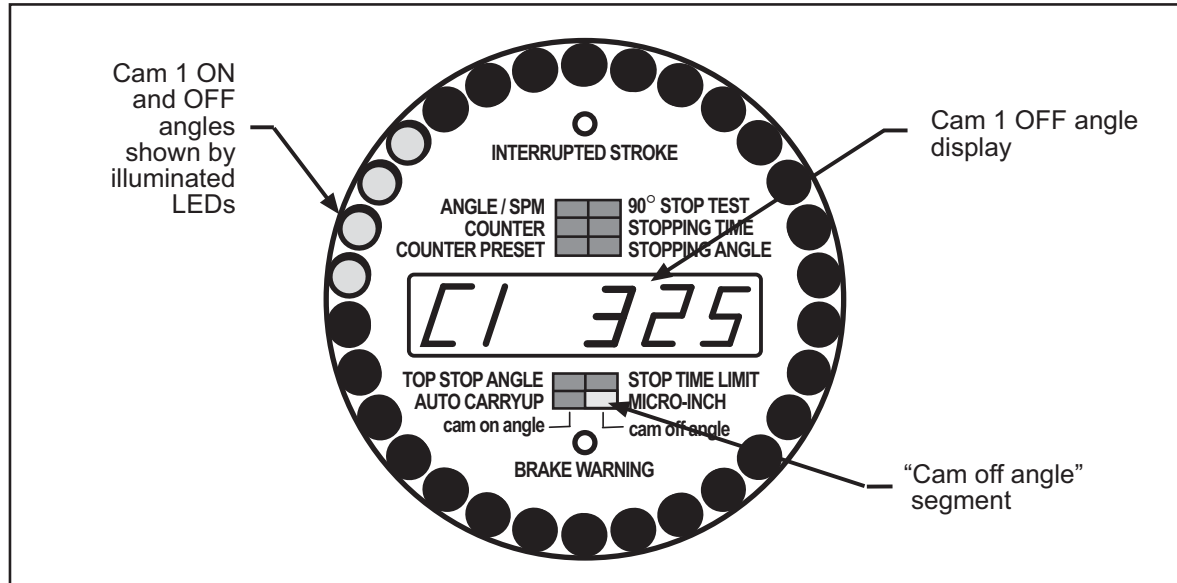


Figure 3-13. Cam Channel Settings Display: Cam 1 OFF Setting (325°) Shown

6. Repeat step 4 to change the current Cam 1 OFF setting. 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 the LED arc when cam 1 is set to ON = 270°, OFF = 325°.
7. Repeat steps 3 through 6 for Cams 2, 3, and 4 as necessary.
8. Disable the Set Cams function (see step 1). Cycle power to the WPC 2000, if necessary, or press Reset/Select to highlight the “Angle/SPM” segment.

NOTICE

If you do not disable the Set Cams function, 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 2000 is installed and set up correctly. These tests must be performed before you proceed to Chapter 4.

Perform the tests in order, skipping tests for optional components that do not apply to your WPC 2000 setup. If your WPC 2000 fails a test, you will be directed to follow step-by-step procedures to isolate and correct the problem. If you are unable to correct a problem, contact Wintriss Tech. Support for assistance. Do not run the press until the problem has been corrected. Do not attempt to replace any components in your new WPC 2000 unless instructed to by Wintriss Tech. Support.

In order to run the tests, you need to know how to operate the press in Inch, Single-stroke, and Continuous modes using Two-hand, One-hand, or Foot control. Refer to the instructions starting on page 4-8 if you need help running the press using these settings.

Many of the tests ask you to check the state of LEDs on the WPC 2000 Main Processor and Display boards. LED maps of the Main Processor board, showing the locations of all LEDs, are provided in Figure 3-14 (center- or right-mounted board) and Figure 3-15 (left-mounted board), which are shown on the following pages. An LED map of the Display board is shown in Figure 3-16, page 3-40.

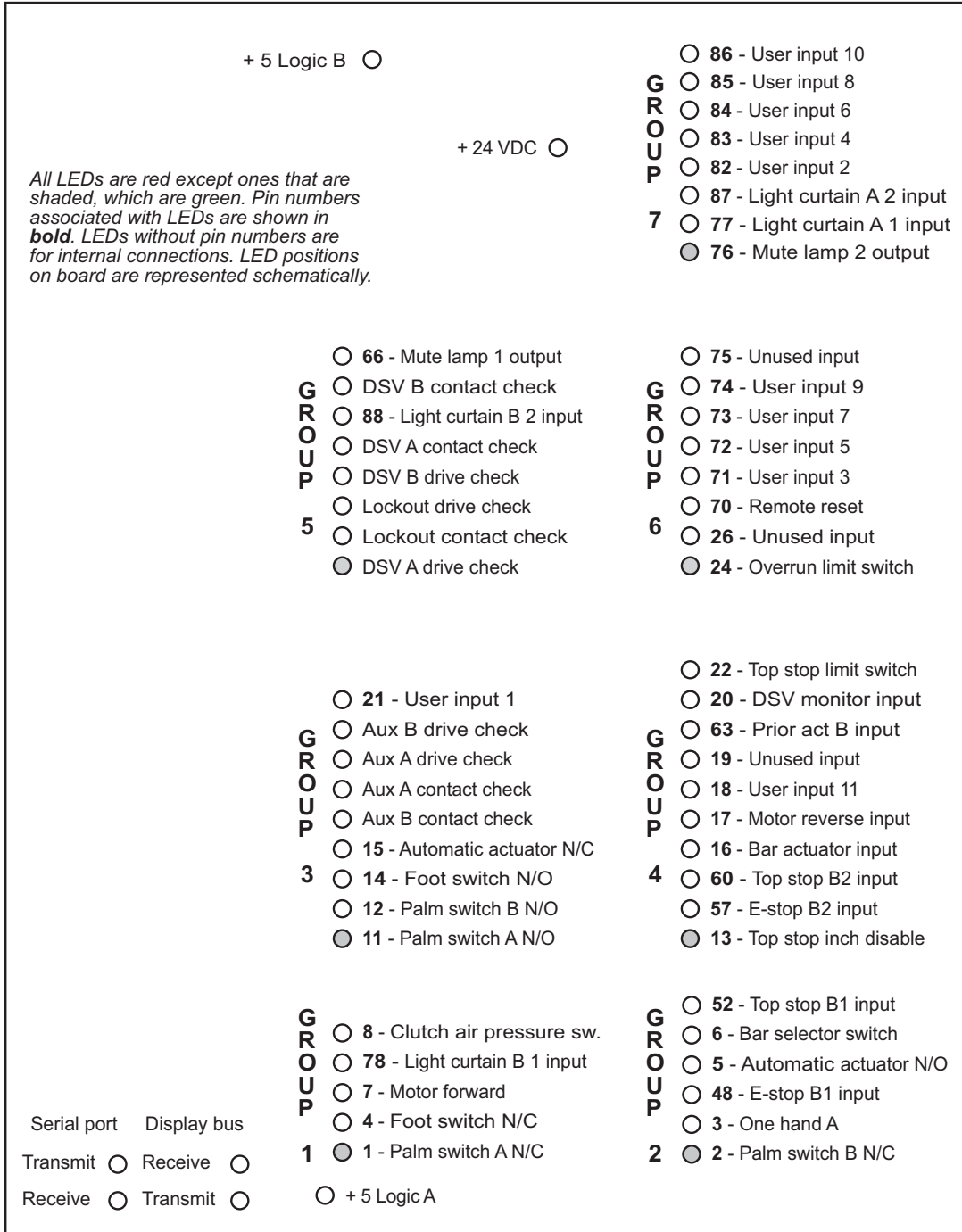


Figure 3-14. WPC 2000 LED Indicator Map (Center- or Right-mounted Board)

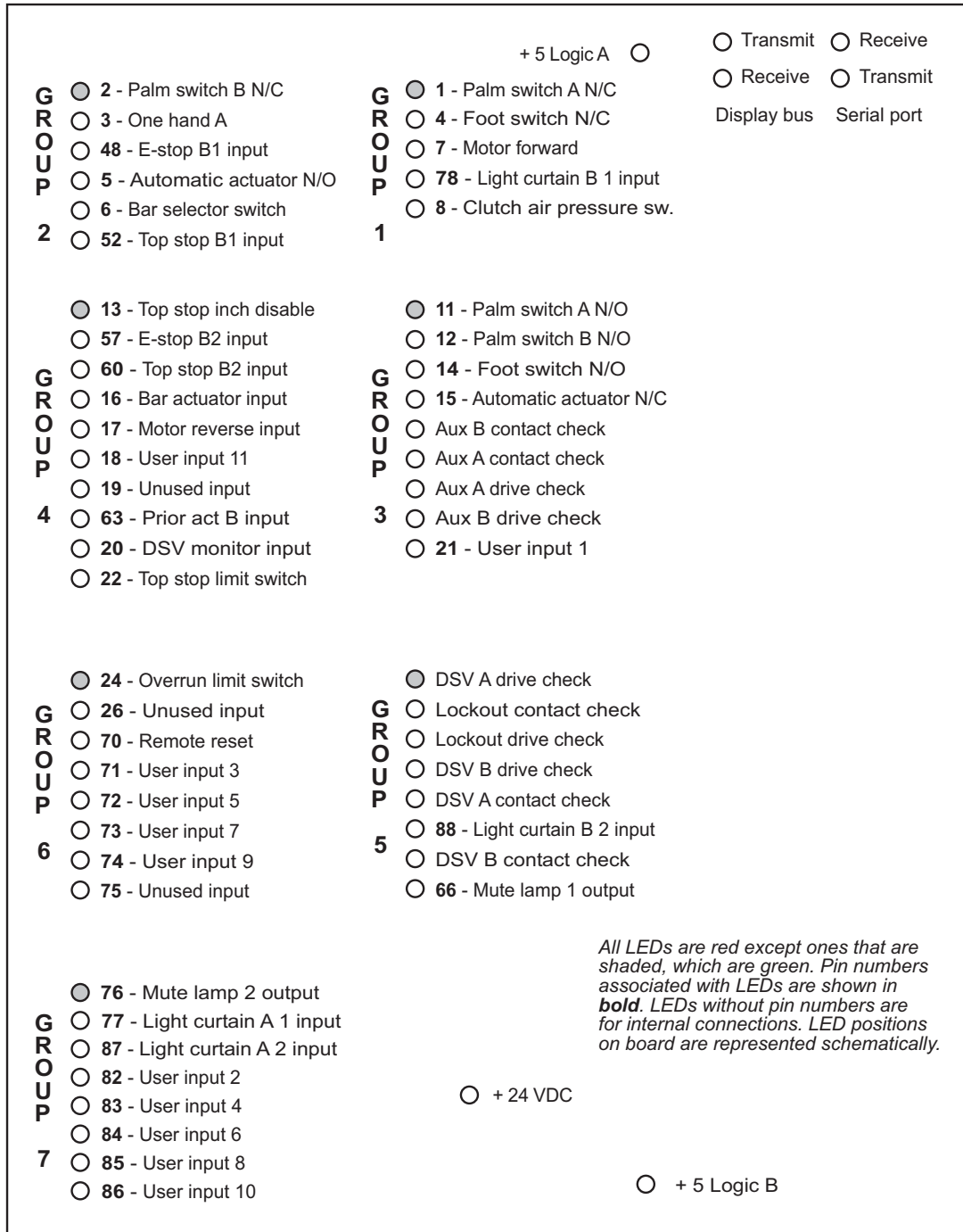


Figure 3-15. WPC 2000 LED Indicator Map (Left-mounted Board)

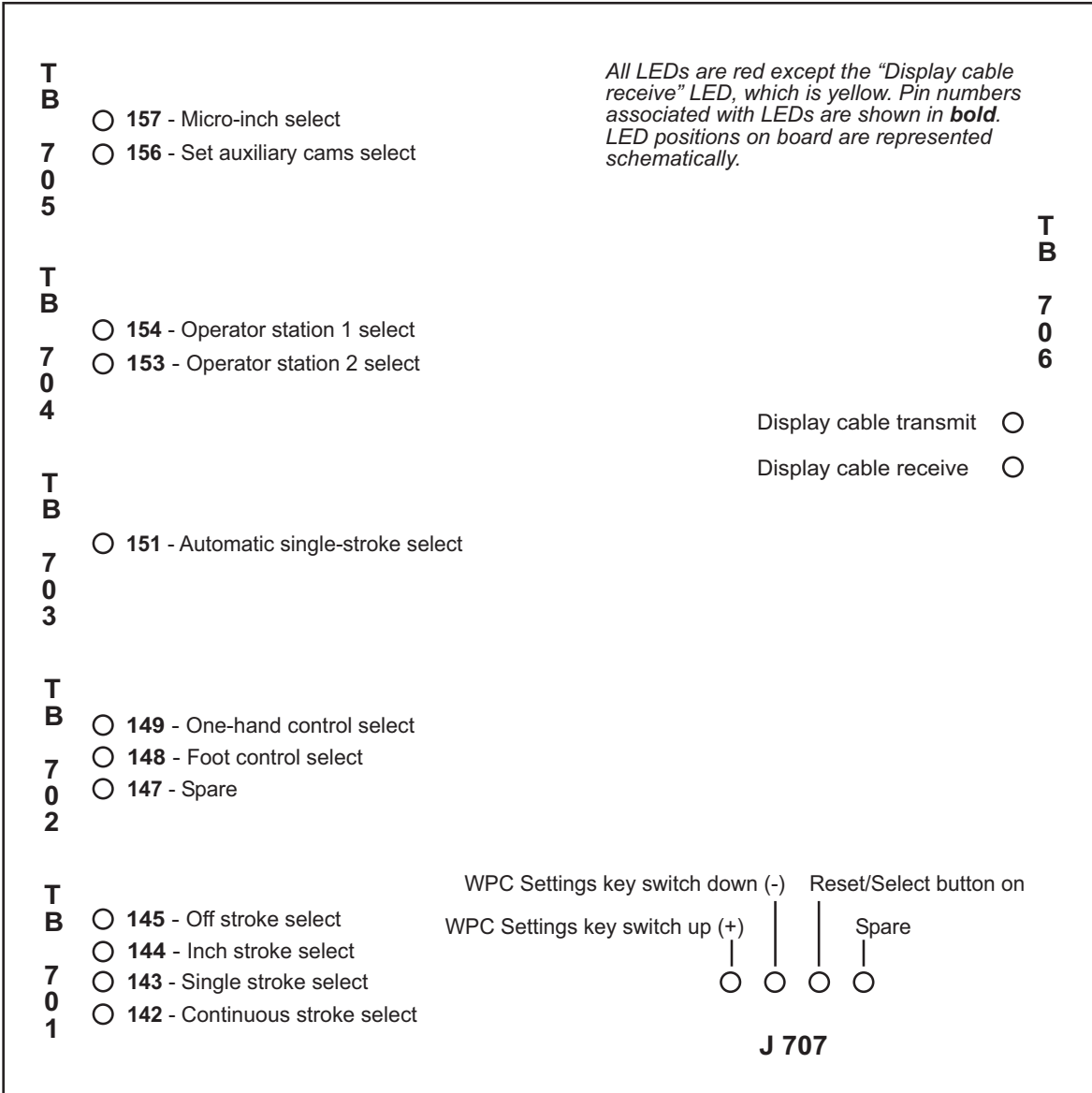


Figure 3-16. WPC 2000 Display Board LED Indicator Map

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 3-6) 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 or Figure 3-15 for LED locations on the WPC 2000 Main Processor board:

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

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 2000 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, the green power LED on the optional control, the green POWER LED on the transmitter, and the ON/OFF LED illuminated red or green on the receiver indicate the presence of power.

- If the Shadow has power, go to the next step.
 - If the Shadow does not have power, turn off the light curtain, and check the input power wiring and the power fuse. (The fuse is located in the Shadow V receiver or in the Shadow VI, Shadow VII, Shadow 8, or Shadow 9 (optional) control box. The Shadow VII DIN controller has no fuse.) Rewire power connections and/or replace the fuse if necessary. Power up again. (On Shadow V and Shadow VI units, if there is still no power, turn off the transmitter and try replacing the amber indicator. Power up again.) If there is still no power to the unit, call Wintriss Tech. Support.
3. At the Shadow receiver, check to see whether the green (Curtain Unobstructed) indicator is lit.
- If the green indicator is lit, go to the next step.
 - If the receiver's red (Curtain Obstructed) indicator is lit, realign the light curtain heads. If the red indicator is still lit, check the interrupt circuit (Shadow V and Shadow VI) or the Light Curtain Test mode jumper (Shadow VII, Shadow 8, 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 3 at end of manual)
 - Shadow VI: pin #19 on auxiliary TB4 in the control (see Figure 10 at end of manual)
 - Shadow VI/WPC Interface Board: pin #5 on TB4 (see Figure 11 at end of manual)
- If the applicable terminal does not read 0 V relative to ground, check and correct the ground wiring for the unit.
- The Light Curtain Test Mode jumper (JP124 for Light Curtain 1, JP122 for Light Curtain 2—see Figure 2-12, page 2-23 or Figure 2-13, page 2-24 for location on the WPC 2000 Main Processor board), should be positioned at the “INT” setting when Shadow VII or Shadow 8 light curtains are installed. Reposition the jumper to the correct setting if necessary. The Light Curtain Output Type jumper (JP123 for Light Curtain 1, JP121 for Light Curtain 2) should be set to “PNP.”
- If the red indicator is still illuminated, call Wintriss Tech. Support.
- If both the receiver's green and red indicators are unlit, power down the unit and check the wiring to the receiver. Also check the power fuse (located in the Shadow V receiver, in the Shadow VI, Shadow VII, Shadow 8, or Shadow 9 (optional) control box, not present in the Shadow VII DIN control), and replace if necessary. Power up again. If the receiver's green and red indicators are still off, replace them. If none of these remedies corrects the problem, call Wintriss Tech. Support.
4. Block the light curtain. On the receiver, the green indicator should turn off and the red indicator should illuminate.

- If the receiver's green indicator goes off and the red indicator comes on, go to the next step.
 - If the receiver's green indicator stays on when the curtain is blocked, 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, Figure 3-15, or Figure 3-16 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 stroke select" LED on the WPC 2000 Display board is lit. If the LED is unlit, check the wiring of the Stroke Select switch and correct any problems. If the "Inch stroke select" LED is still unlit, call Wintriss Tech. Support.
4. Press the Emergency Stop button on the Operator Station.
5. Check to see whether fault code F13 appears on the LED display.
 - If F13 displays, go to the next step.
 - If F13 does not display, check to see whether the "E-stop A input" and "E-stop B input" LEDs on the WPC 2000 Main Processor board turn off when the Emergency Stop button is pressed. If the two LEDs do not turn off, check the wiring of the E-stop A and E-stop B input connections, and correct any problems. If the two LEDs still do not turn off, call Wintriss Tech. Support.

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

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

6. Turn on the press motor in forward rotation (if applicable).
7. Check to see whether the “Motor forward” LED on the WPC 2000 Main Processor board is lit.
 - If the “Motor forward” LED is lit, go to the next step.
 - If the “Motor forward” LED is unlit, check the wiring of the Motor Forward input connection, and correct any problems. If the LED is still unlit, call Wintriss Tech. Support.
8. Press both Run/Inch palm buttons on the Operator Station at the same time.
9. Check to see whether fault code F48 appears on the LED display.

NOTICE

If the E-stop and Top-stop circuits are not connected according to the wiring shown in Figure 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 “System air pressure” LED on the WPC 2000 Main Processor board is unlit. If the LED is unlit, check the wiring of the system air pressure switch input and correct any problems. Press both Run/Inch palm buttons again. If F48 still does not display, call Wintriss Tech. Support.
10. Apply system air pressure to the press.
 11. Check to see whether the “System air pressure” LED on the WPC 2000 Main Processor board is lit. Clear the error code on the display by 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, Figure 3-15, or Figure 3-16 for LED locations. To verify Single-stroke operation on a press without light curtains, go to the next test (page 3-48).

1. Set the Stroke Select switch to “SINGLE,” and verify that the “Single stroke select” LED on the WPC 2000 Display board is lit.
2. Verify that the light curtain is unobstructed and that the “Light curtain A1 input” and “Light curtain A2 input” LEDs on the WPC 2000 Main Processor board are lit. (If you are

- testing a second pair of light curtains, verify that “Light curtain B1 input” and “Light curtain B2 input” LEDs are lit.) These LEDs turn off when the light curtain is obstructed.
3. Press and hold both Run/Inch palm buttons on the Operator Station, observing the ram’s motion.
 - If the ram makes a complete stroke, stopping at top dead center, go to the next step.
 - If the ram moves but does not make a complete stroke or does not stop at top dead center and a fault code between F80 and F89 (or between H80 and H89) displays, there is a problem with the overrun limit switch. Try the remedies suggested for overrun limit switch faults, starting on page 5-19; then, inch the ram to the top of the stroke and repeat this test. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
 - If the ram moves but does not make a complete stroke or does not stop at top dead center and an overrun limit switch fault does not display, check the wiring of the palm buttons and light curtains, correcting any problems; then, inch the ram to the top of the stroke, and repeat the test. If the ram still does not make a complete stroke or does not stop at top dead center, call Wintriss Tech. Support.
 - If the ram does not move at all, check to make sure that the correct version of WPC 2000 firmware is installed, and check the wiring of the palm buttons, correcting any problems. Re-run the test, starting with step 1. If the ram still does not move when you press the Run/Inch palm buttons, call Wintriss Tech. Support.
 4. Interrupt the light curtain by placing a piece of cardboard or other object between the light curtain heads to block at least two inches of the light field. Leave the object in place while you perform step 5.
 5. Press and hold both Run/Inch palm buttons, observing the behavior of the ram.
 - If the ram does not move and you have only one light curtain, go to the next step.
 - If the ram does not move and you have two light curtains, repeat the test, starting with step 3, removing the obstruction from the first light curtain and blocking the second light curtain. Once the test on the second light curtain is successful, go to the next step.
 - If the ram does move, check to make sure the correct version of WPC 2000 firmware is installed, and check the wiring of the palm buttons and light curtains, correcting any problems. Re-run the test, starting with step 4. If the ram still moves with the light curtain blocked, call Wintriss Tech. Support.
 6. Remove the object you used to interrupt the light curtain field in step 4. Prepare to insert it into the field while the ram is on the downstroke. Be sure to keep hands and other objects away from the press.
 7. While one person presses and holds both Run/Inch palm buttons, have another person move the cardboard or other object into the light field while the ram is on the downstroke. Observe the action of the ram.
 - If you are using one light curtain, and the ram stops immediately and the Interrupted Stroke 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 by interrupting the second light curtain, starting with step 6. When you have successfully completed the test with the second light curtain, go to the next step.
 - If the ram does not stop immediately, check the wiring of the light curtains, correcting any problems; then, inch the ram to the top of the stroke and re-run the test, starting with step 6. If the ram again moves when the light curtain is interrupted, call Wintriss Tech. Support.
8. Clear the Interrupted Stroke by holding the Run/Inch palm buttons until the ram stops at top dead center.
 9. Press and immediately release the Run/Inch palm buttons, observing the behavior of the ram.
 - If the ram moves when you press the Run/Inch palm buttons, then stops when you release them, and the Interrupted Stroke 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 or Figure 3-15 for LED locations on the WPC 2000 Main Processor board:

1. Set the Stroke Select switch to “SINGLE.” Verify that the “Single stroke select” LED on the WPC 2000 Display 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) displays, there is a problem with the overrun limit switch. Try the remedies suggested for overrun limit switch faults, starting on page 5-19; 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 2000 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 2000 is operating correctly. Go to the next applicable test.
 - If the press cycles again after making one stroke, check the wiring of the Operator Station and correct any problems; then, repeat the test. If the press still cycles after it makes one stroke, call Wintriss Tech. Support.

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 3-54). 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, Figure 3-15, or Figure 3-16 for LED locations:

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

NOTICE

RESET EMERGENCY-STOP BUTTON AFTER USE

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

6. 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 on the WPC 2000 display 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 WPC 2000 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 2000 has the muting option, and the ram stops as soon as it reaches the non-muted (i.e., downward) portion of the stroke, go to the next step.
 - If your WPC 2000 has the muting option, and the ram does not stop in the non-muted portion of the stroke, check the wiring of the light curtain, correcting any problems, and run the test again, starting with step 10. If the ram still does not stop in the non-muted part of the stroke, call Wintriss Tech. Support.
 - If your WPC 2000 does not have the muting option and the press does not come to an immediate stop when you interrupt the light curtain, check the wiring of the light curtain, correcting any problems, and run the test again, starting with step 10. If the press still does not stop immediately, call Wintriss Tech. Support.

NOTICE

When a stroke is interrupted, WPC 2000 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 3-51). 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, Figure 3-15, or Figure 3-16 for LED locations:

1. Set the Stroke Select switch to “CONT.” Verify that the “Continuous stroke select” LED on the WPC 2000 Display 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 on the WPC 2000 display 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 WPC 2000 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, Figure 3-15, or Figure 3-16 for LED locations:

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 3-13 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 control select” LEDs on the WPC 2000 Display board are lit.
2. Make sure that option switch 3 on the WPC 2000 Main Processor 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 2000, if necessary, to enable the settings change. The WPC 2000 is now in Foot Trip mode, the press stroking each time the Foot Switch is depressed.

NOTICE

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

4. Depress the Foot Switch and immediately release it. The press should make a single stroke and stop at top dead center. Verify that the “Foot switch N/C” LED on the WPC 2000 Main Processor board turns off when the Foot Switch is depressed and that the “Foot switch 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 2000 to enable the settings change. You are now in Foot Control mode. The press should cycle to Top-stop only if the Foot Switch is held down past the Auto Carry-up Angle.
7. Press and hold the Foot Switch through the Auto Carry-up Angle, then release the Foot Switch. The press should complete the stroke, stopping at Top-stop.
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. Press the Prior Act button and, before the indicator lamp goes out, depress the Foot Switch, immediately releasing it. The press should stop after a single stroke.
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, Figure 3-15, or Figure 3-16 for LED locations:

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 control select” LEDs on the WPC 2000 Display board are lit.
2. Make sure that option switch 3 on the WPC 2000 Main Processor board is set to OFF, its default setting (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 3-27).
3. Power down, then power back up the WPC 2000, if necessary, to enable the settings change. The WPC 2000 is now in normal One-hand Control operation, the press stroking each time the One-hand Control switch is depressed.

NOTICE

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

4. Press the One-hand Control switch and release it immediately. The press should make a single stroke and stop at top dead center. Verify that the “Palm switch A N/C” LED on the WPC 2000 Main Processor board turns off when the One-hand Control is depressed and that the “One-hand A 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 2000 to enable the settings change. You are now in Light Curtain Break mode. The press should cycle to Top-stop only if the One-hand Control is pressed within eight seconds of the operator's hand clearing the light curtain.
7. 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 or Figure 3-15 for LED locations on the WPC 2000 Main Processor 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" LED on the WPC 2000 Main Processor 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 2000 monitors the speed of the crank. If you bar the press too quickly, the DSV de-energizes and an F26 fault code displays, stopping the press.

8. Go to the next applicable test.

Checking Operation of the User Inputs

This test verifies that any user inputs you have connected to auxiliary press functions are wired and operating correctly. If you have not wired any user inputs, go to the next section. To perform this test, do the following:

1. Run the press. Actuate one of the user inputs.
 - If the press stops and the appropriate fault code displays, the input is wired and operating properly. Repeat the test for the other user inputs. When you have checked all of the inputs, go to the next 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 2000 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 3-36) after installation and after any modification or repair of the WPC 2000.
- Ensure that supervisors, die-setters, maintenance persons, machine operators, foremen, and any others responsible for operation of the machinery have read and understood all instructions for use of the WPC 2000.
- 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 5-4). 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” has been cleared, you can resume operation.

NOTICE**PRESS STOPS WHEN SYSTEM FAULT DETECTED OR LIGHT CURTAIN BLOCKED**

- The WPC 2000 stops the press if a system fault is detected or if the light curtain is blocked during the non-muted portion of the stroke.
- If the press stops, the Interrupted Stroke LED on the WPC 2000 display (see Figure 1-1, page 1-2) 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 2000 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 2000 display.

This chapter shows you how to operate your WPC 2000, 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 2000 display flashes (see Figure 1-1, page 1-2 for location), and WPC 2000 automatically switches to Two-hand Maintained Single-stroke mode. To clear the Interrupted Stroke, press both Run/Inch palm buttons on the Operator Station until the press returns to top dead center. When the press has returned to Top-stop, the Interrupted Stroke LED turns off, and WPC 2000 switches back to the stroke and mode selected when the Emergency-stop occurred.

When the Emergency-stop is caused by a system fault, you must first clear the error by pressing the Reset/Select button on the WPC 2000; 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 2000 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 2000 display (see Figure 1-1, page 1-2 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 3-16). The brake warning alerts you to the need for maintenance on or repair of the brake (see *Brake Warning LED*, page 5-4).

WPC 2000 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 2000 prevents the press from being run until the problem has been completely corrected (see *Stop Time Exceeded*, page 5-5).

Stopping Angle

Stopping Angle is 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. This parameter is useful in determining where to set Top Stop and in die-protection settings.

To view Stopping Angle, press the Reset/Select button until the display indicator highlights the “Stopping Angle” segment (see Figure 4-1). The Stopping Angle recorded the last time a Stop command was sent to the press is shown in the digital readout and displayed graphically by an arc of LEDs on the crank-angle clock. Figure 4-1 shows a Stopping Angle of 75° as an example.

Stopping angle will compensate for the complete rotation when it takes *more* than 360° to stop.

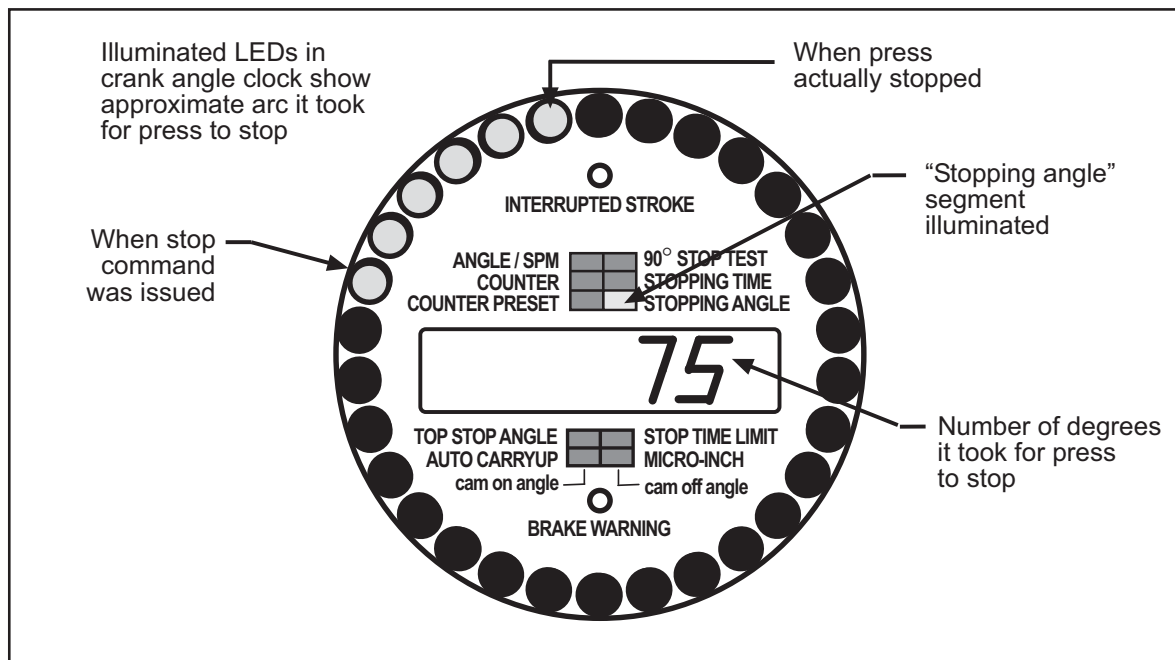


Figure 4-1. WPC 2000 Display with “Stopping Angle” Value Shown

Displaying and Clearing the Stroke Counter

The stroke counter 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 4-2.

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.

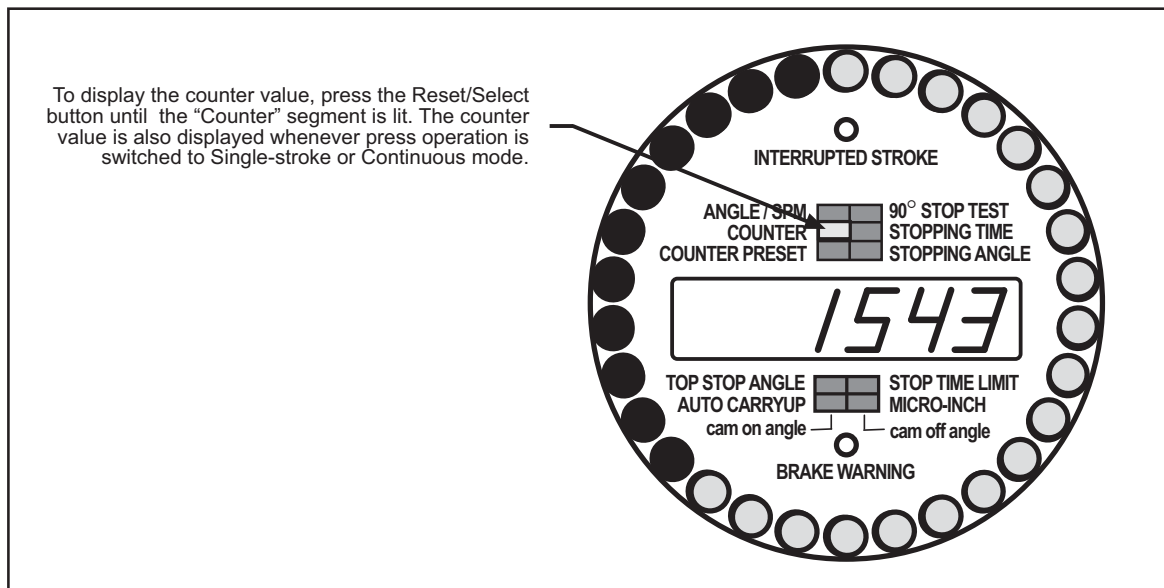


Figure 4-2. WPC 2000 Display with “Counter” Value Shown

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 2000 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 2000 sends a Top-stop signal to the press and displays the F15 fault code on the digital LED display (see *Operational Faults*, page 5-7), 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 a different value.

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 4-7.

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 4-3, page 4-7.

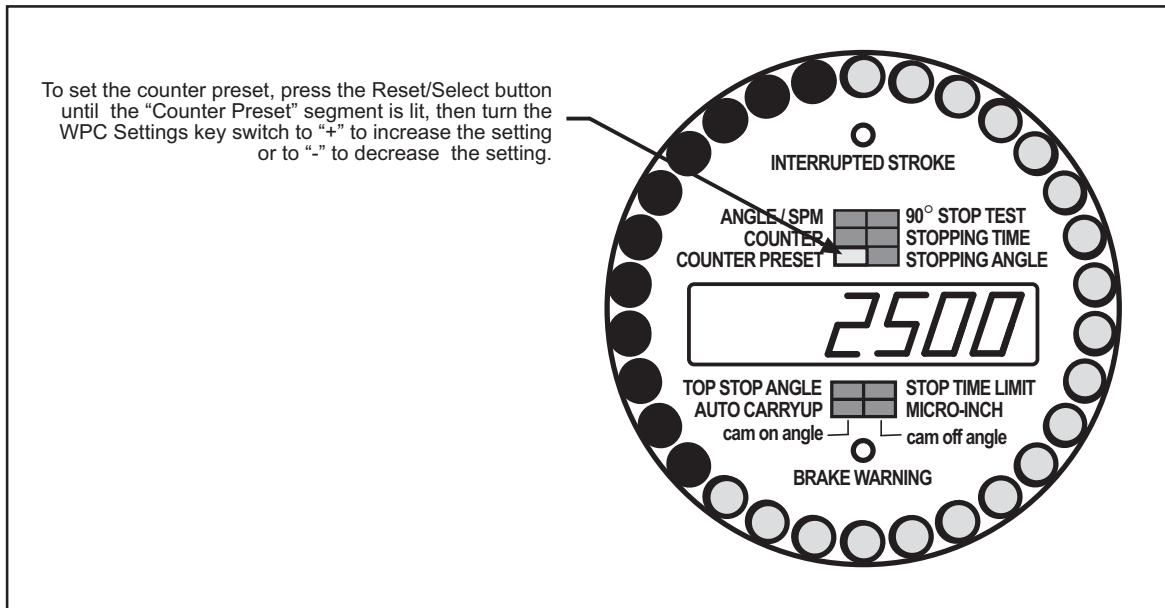


Figure 4-3. WPC 2000 Display with "Counter Preset" Value Shown

- 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 4-8). 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 2000 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:

- 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).
- 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 2000 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 2000 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” 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 2-35.

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 2000 display (see *Setting Micro-Inch*, page 3-25). 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 2-33.

NOTICE

INTERRUPTED STROKE

When Micro-inch is enabled, WPC 2000 automatically switches to Two-hand Maintained Single-stroke during an Interrupted Stroke even though the press is in Inch. Normally, WPC 2000 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 3-50) and anti-repeat (see page 3-51) 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.

When performing the following procedure, make sure to press both Run/Inch buttons on each installed Operator Station within the 1/2 second palm time (“synchronous” time in ANSI terminology) and all pairs of Run/Inch buttons on all installed Operator Stations within the 5 second concurrent time. Also, confirm that the setting on S102 switch 6 is correct for your Operator Station setup (see page 3-33).

To run the press, using Single-stroke, Two-hand operation, do the following:

1. 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 3-13). The ram completes its stroke automatically, stopping at Top-stop.

NOTICE

Both Run/Inch palm buttons on each Operator Station must be pressed within 1/2 second. Each pair of Run/Inch buttons on all Operator Stations must be pressed within 5 seconds. Make sure that the setting on S102 switch 6 is correct for your setup (see page 3-33).

If one or both Run/Inch buttons are released before the ram reaches the Auto Carry-up Angle, the press stops. The press will also be stopped on the downstroke if a system fault is detected or a light curtain is blocked.

Single-stroke, One-hand Operation**⚠ DANGER****INCORRECT INSTALLATION**

You must install a Shadow light curtain correctly and connect it to WPC 2000 properly in order to run the press in Single-stroke, One-hand mode.

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

Single-stroke, One-hand operation can only be used with WPC 2000 systems running Two-hand/One-hand/Foot firmware, 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 2000 or a One-hand Control as a safeguarding device.
- Install and operate WPC 2000 and a One-hand Control in accordance with OSHA and ANSI regulations.

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

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 2000 properly in order to run the press in Single-stroke, One-hand Control mode.

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

NOTICE

When a One-hand Control is installed, you cannot use the Run/Inch palm buttons on the Operator Station while the press is in One-hand mode. All other modes work normally as described in this manual.

One-hand Control is a switch available from Wintriss that allows operators to use their free hand to feed a part while their other hand operates the switch. This option can only be used with WPC 2000 systems running Two-hand/One-hand/Foot firmware, 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 switch block S101 on the WPC 2000 Main Processor board (see step 1, below).

To run the press in Single-stroke, One-hand Control mode, do the following:

1. Set option switch 3 on S101 to OFF to operate the press in Normal One-hand Control mode (see *Enabling Light Curtain Break Mode in a One-hand Control*, page 3-27). 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 2000. Recheck all wiring connections. Try One-hand Control again. If the press still does not run, call Wintriss Tech. Support.

Single-stroke, Foot Operation

DANGER

INCORRECT INSTALLATION

You must install a Shadow light curtain correctly and connect it to WPC 2000 properly in order to run the press in Single-stroke, Foot mode.

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

Single-stroke, Foot operation can only be used with WPC 2000 systems running Two-hand/One-hand/Foot firmware, 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 switch block S101 on the WPC 2000 Main Processor board (see step 1, below).

To run the press in Single-stroke, Foot mode, do the following:

1. Set option switch 3 on S101 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 2000 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 Automatic Single-stroke Mode

DANGER

PRESS STARTING UNEXPECTEDLY

Ensure that light curtains and other safeguards are properly installed and operating to protect operators when using Automatic Single-stroke. Since an external trigger initiates press operation, a stroke can occur unexpectedly.

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

The Automatic Single-stroke function allows an external event to automatically initiate a single stroke within a 30-second or 5-minute window, depending on the setting of option switch 5 on S101 (see step 1, below). Generally, material feed is used as the signaling event. However, other events such as part ejection or positive part transfer can be used.

There are three requirements for Automatic Single-stroke:

- An Automatic Single-stroke switch must be installed (see Figure 5 at the end of the manual)
- There must be a trigger mechanism. A single-pole, double-throw (SPDT) contact (switch or relay) or two solid-state switches (NPN, open collector) can be used.
- Proper guarding equipment, such as a Shadow light curtain and fixed guards, must be installed to protect personnel

If you intend to use Automatic Single-stroke, contact Wintriss Tech. Support.

To run the press in Automatic Single-stroke, first install the sensors and other components required for this function, then do the following:

1. Set option switch 5 on switch block S101 on the WPC 2000 Main Processor board to OFF to select 30 seconds as the prior act timing or to ON to select 5 minutes (*Switch 5 – Prior Act Time for Automatic Stroke Modes*, page 3-29).
2. Set the selector switches as follows:
 - Stroke Select to “SINGLE STROKE”
 - Mode Select to “2-HAND”
 - Automatic to “ON”
3. To initiate the first stroke, depress the Prior Act button—the Prior Act lamp will blink when Prior Act is armed—then press and hold the Run/Inch palm buttons until the ram passes bottom dead center.

The up stroke and all other strokes will be automatic.

It is not unusual for the press to pause at Top Stop. It is waiting for the “go” signal from the external switch.

The external signal must occur after Top Stop within the time selected on switch 5 (30 seconds or 5 minutes). If WPC 2000 does not receive the signal within this period, it assumes a problem has occurred and will not start the next stroke. If this happens, repeat step 3.

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 button
 - A system fault is detected
 - The light curtain is blocked during the non-muted portion of the stroke

The ram will stop in mid-stroke if you do not hold the Run/Inch palm buttons through the Auto Carry-up Angle.

NOTICE

If the press is Emergency-stopped, WPC 2000 automatically changes to Two-hand Maintained Single-stroke mode and the Interrupted Stroke 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 2000 properly in order to run the press in Continuous, Foot mode.

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

Continuous, Foot operation can only be used with WPC 2000 systems running Two-hand/One-hand/Foot firmware, 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 4-15), 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 button
- A system fault is detected
- The light curtain is blocked during the non-muted portion of the stroke

NOTICE

If the press is Emergency-stopped, WPC 2000 automatically changes to Two-hand Maintained Single-stroke mode and the Interrupted Stroke 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 Automatic Continuous On-demand Mode

DANGER

IMPROPER SAFEGUARDING

Ensure that the machine guarding system is installed and maintained according to OSHA standard 1910.217, ANSI B11.1, ANSI B11.19 and any other regulations and standards that apply. Ensure that guarding is properly installed to prevent access to the machine over, under or around any guarding device.

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

DANGER

PRESS STARTING UNEXPECTEDLY

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

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

For information on using Automatic Continuous On-demand mode, call Wintriss Tech. Support.

Operating the Press in Bar Mode

DANGER

INJURY WHEN USING BAR MODE

- Keep all personnel away from the press while it is being barred
- Use a spring-loaded turnover bar when you bar the press.

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

To operate the press in Bar mode, you must have the Bar Mode Control option. To activate Bar mode and bar the press, do the following:

1. 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 2-26, page 2-47), 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 2000 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 two Operator Stations to your WPC 2000 (see *Installing Multiple Operator Stations*, page 2-17) and option switch 6 on S102 is set to OFF (see page 3-33), the Run/Inch palm switches on each Operator Station must be pressed within a 1/2-second “palm time” (“synchronous time” in ANSI terminology) window, and both pairs of palm switches must be pressed within a 5-second “concurrent time” window.

NOTICE

Do not attempt to install more than two Operator Stations until you have contacted Wintriss Tech. Support. All Operator Stations in a mutli-Op.-Station configuration except the Op. Station wired to the “A” inputs must contain a Two-hand Control module.

If you have installed more than two Operator Stations, you must set option switch 6 on S102 to ON to establish a 5-second concurrent time for all Op. Stations. In addition, all Operator Stations except the Op. Station connected to the “A” inputs must contains a Two-hand Control module to provide the required 1/2-second palm time (“synchronous” time in ANSI terminology).

If you have dual Operator Stations, make sure to set the Operator Station Select Switch on the front panel of your WPC 2000 to enable either the first station, the second station, or both stations.

Chapter 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 2000.
- Ensure that WPC 2000 is installed, tested, and repaired by qualified personnel.
- Perform the installation verification (see page 2-58) and final checkout (see page 3-36) 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 SWITCHING RELAY REPAIR

Replace the DSV/Lockout Relay board or Auxiliary E-stop Relay board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24) before placing the WPC 2000 back into operation after the first occurrence of a fused relay.

If a relay fuses

- DO NOT reset the WPC 2000 to restart the machine.
- Remove the WPC 2000 from operation immediately and replace the defective relay board before operating the press again.

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

NOTICE

ALL SIGNAL GROUNDS MUST BE CONNECTED THROUGH THE MAIN PROCESSOR BOARD

Connect all signal grounds through pins on the WPC 2000 Main Processor 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 2000); 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 2000 Main Processor board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24).

NOTICE**SEE OTHER DOCUMENTS FOR ERROR MESSAGES 120 OR GREATER**

Error numbers equal to or higher than 120 are covered in these documents:

- WPC 2000 Option 2 User Manual (1130700)
- WPC 2000 Option 2 Additional Inputs Only Instruction Sheet (1141900)

This chapter shows you how to respond to the fault codes and other errors that appear on the WPC 2000 display.

Responding to WPC 2000 Faults

Whenever WPC 2000 detects a problem with the clutch/brake control, the press, or peripheral equipment, it sends a Stop command to the press and generates a fault on the WPC 2000 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 2000 has two processors) that reported the problem, as shown in Table 5-1.

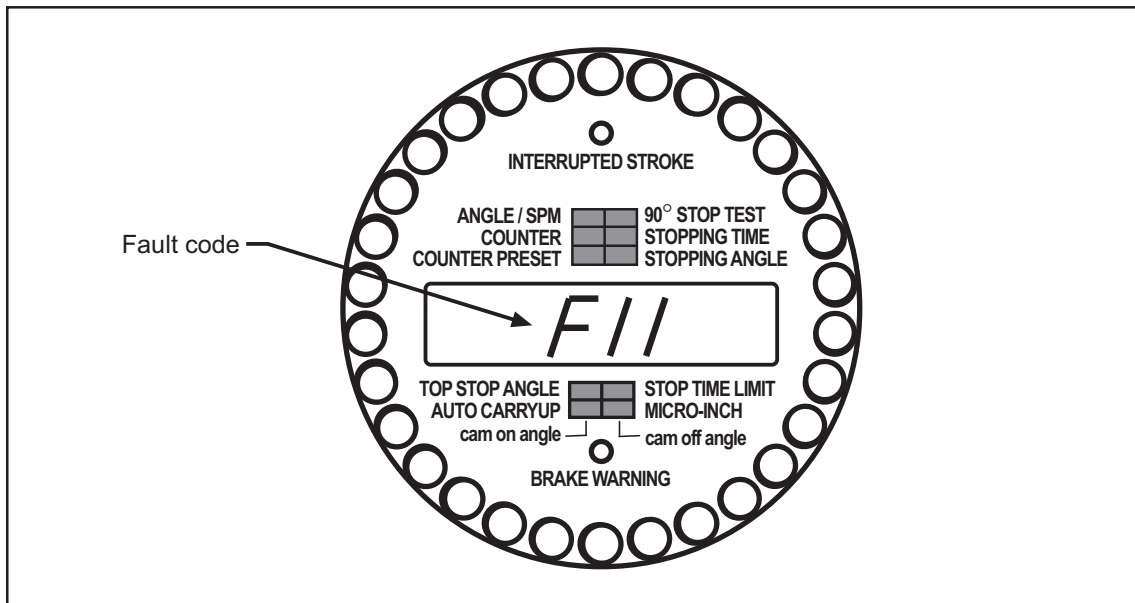


Figure 5-1. WPC 2000 Display Showing Fault Code

Table 5-1. Fault Codes: Significance of Initial Letter

Initial Letter	Significance
E	To clear the fault, you must power down the WPC 2000, 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 2000 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 5-6.

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 2000 display by doing one of the following:
 - To clear F and H faults, press the Reset/Select button on the display or a Remote Reset switch if one is installed.
 - To clear E faults, power down the WPC 2000, 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 5-6).

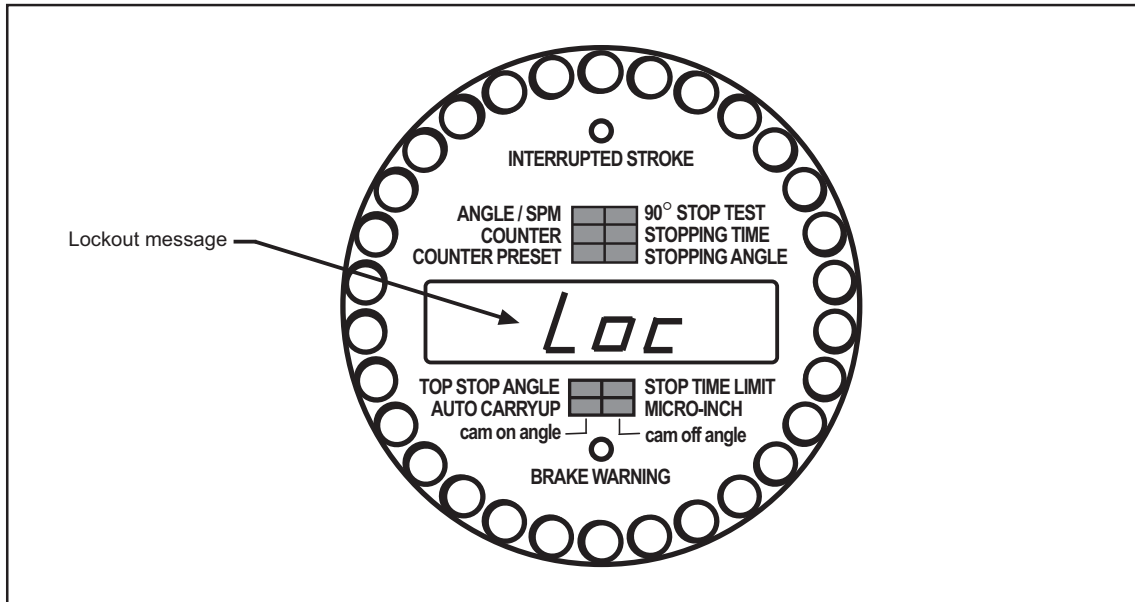


Figure 5-2. WPC 2000 Display Showing Lockout Message

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 3-14.
3. Power down the WPC 2000, 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 2000. See *Determining the 90° Stop Time*, page 3-17.
- 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 3-19.

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 2000 prevents the press from being operated until the brake has been completely repaired.

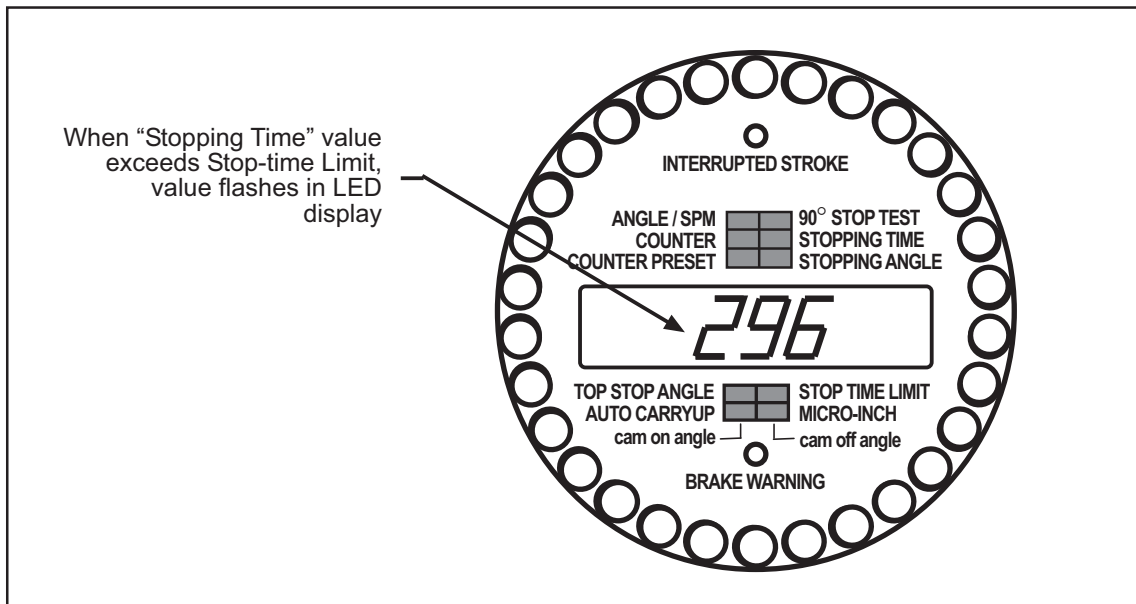


Figure 5-3. WPC 2000 Display Showing Stopping Time Fault

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 2000 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 5-4), 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 3-14.
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 2000 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 2000 is loose or bad.

Remedy: If WPC 2000’s rated press speed is exceeded, reduce the speed. If press speed is not the problem, check the resolver wiring for shorts, breaks, or loose connections (see *Installing the Resolver*, page 2-20). 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 2-20). 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 2000.
3. Power up WPC 2000.

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 5-4). 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 2000 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 2000 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 2000. If necessary, Contact Wintriss Tech. Support.

F15

Problem: The preset on the 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 2000 and restart the press.

F17

Problem: Cross-checked inputs 8 & 9 were in different states (i.e., open or closed) for longer than 100 mS.

Remedy: Diagnose and correct the condition that the inputs are monitoring (see Table 5-2, page 5-14).

F18

Problem: Cross-checked inputs 10 & 11 were in different states (i.e., open or closed) for longer than 100 mS.

Remedy: Diagnose and correct the condition that the inputs are monitoring (see Table 5-2, page 5-14).

F19 or H19

Problem: Auxiliary E-stop relay did not open properly.

⚠ DANGER

IMPROPER SAFETY SWITCHING RELAY REPAIR

- Replace the Auxiliary E-stop Relay board (see Figure 2-12, page 2-23 or Figure 2-13, page 2-24) before placing the WPC 2000 back into operation after the first occurrence of a fused relay.

If a relay fuses

- DO NOT reset the WPC 2000 to restart the machine.
- Remove the WPC 2000 from operation immediately and replace the Auxiliary E-stop Relay board before operating the press again.

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

Remedy: Press Reset/Select. If the problem persists, contact Wintriss Tech. Support for assistance or replacement of the relay board,

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 4-8 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

or

Run/Inch buttons on an unselected Operator Station were pressed in a dual-Operator-Station setup.

Remedy: Press only one Run/Inch palm button when running the press in One-hand mode

or

Select both Operator Stations in a dual-Operator-Station setup, then initiate a stroke.

F25

Problem: The flywheel speed sensor is not turning off and on properly when spin-down is enabled.

Remedy: For Bliss non-integrated, disable by connecting pin #26 to +24 Vdc.

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 4-19.

F27

Problem: E-stop inputs were in different states (i.e., open or closed) for longer than 100 mS.

Remedy: Check the E-stop circuit wiring and the E-stop buttons.

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 error persists, contact Wintriss Tech. Support.

Input Buffer Test Failures

F41* through F44*

Problem: The following errors may occur when WPC 2000 performs input buffer tests, which compare the input data provided by processor A with the data provided by processor B. When the input data doesn't match, an error is generated.

- F41** Input buffer 1 check incorrect. This test checks system air pressure and motor forward inputs and user inputs 1 and 8.
- F42** Input buffer 2 check incorrect. This test checks remote reset, motor reverse, and bar mode selector inputs.
- F43** Input buffer 3 check incorrect. This test checks the DSV monitor input and user inputs 2 and 9.
- F44** Input buffer 4 check incorrect. This test checks the motor forward input and user inputs 2, 5, 7, 8, and 10.

Remedy: Try pressing Reset/Select. If errors persist, contact Wintriss Tech. Support.

Component Failures

F45 through F48

Problem: Failures have occurred to standard equipment connected to WPC 2000.

- F45** The transducer-measured main system air pressure was below the setpoint
- F46** The transducer-measured counterbalance air pressure was outside the
- F47** Dual Safety Valve (DSV) monitor switch input open
- F48** Clutch air pressure switch input open

Remedy: Correct the problem, then press Reset/Select. If the error persists, contact Wintriss Tech. Support.

For F47 errors, 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.

For F48 errors, check to see whether the air pressure is turned off or set too low, and correct if necessary.

Customized Status Codes

F50 through F58

Problem: A failure has occurred in an auxiliary press function (e.g., lubrication system) wired to a WPC 2000 user input. Refer to Table 5-2, page 5-14 for specific faults. See also the separate remedies for faults F17, F18, F50, and F58, which apply to the cross-checked input pairs 8/9 and 10/11.

Remedy: Diagnose and correct the condition that the input is monitoring. 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	21	+24 Vdc
52	User 2	ESTOP	82	+24 Vdc
53	User 3	TOP STOP	71	+24 Vdc
54	User 4	ESTOP	83	Ground
55	User 5	TOP STOP	72	Ground
56	User 6	TOP STOP	84	Ground
57	User 7	ESTOP/ LOCKOUT	73	Ground
58, 17	User 8 paired with 9	ESTOP	85	Ground
	User 9 paired with 8		74	Ground
50, 18	User 10 paired with 11	ESTOP/ LOCKOUT	86	Ground
	User 11 paired with 10		18	Ground

F50

Problem: A failure has occurred in an auxiliary press function wired to WPC 2000 cross-checked input pair 10 and 11 (see Table 5-2). One or both inputs are open.

Remedy: Diagnose and correct the condition that the inputs are monitoring. If the error persists after you reset the unit, contact Wintriss Tech. Support.

F58

Problem: A failure has occurred in an auxiliary press function wired to WPC 2000 cross-checked input pair 8 and 9 (see Table 5-2). One or both inputs are open.

Remedy: Diagnose and correct the condition that the inputs are monitoring. If the error persists after you reset the unit, contact Wintriss Tech. Support.

Light Curtain Faults**F60 or H60**

-and-

F61 or H61

Problem: Light curtain A (fault #60) or light curtain B (fault #61) failed the WPC 2000 internal test.

Remedy: Check to make sure that the light curtain is wired correctly, referring to figures 3, 10, 11, 15, 16, 18, and 19 at the back of the manual if you have Shadow light curtains, referring to the appropriate user manual if you have another product. If you need additional assistance, contact Wintriss Tech. Support.

F62

Problem: Two pairs of light curtains are wired to WPC 2000, but only one pair has been enabled on option switch 6 (S101) on the WPC 2000 Main Processor board.

Remedy: Set option switch 6 for dual light curtains (see page 3-29).

F63

Problem: Light curtain A is obstructed during the stroke.

Remedy: Remove the obstruction.

F64

Problem: Light curtain B is obstructed during the stroke.

Remedy: Remove the obstruction.

F65

Problem: A light curtain is connected with Two-hand Only firmware installed in WPC 2000.

Remedy: Remove the Two-hand Only firmware, and install a firmware version intended for use with a light curtain, referring to *Installing Revised Firmware in WPC 2000*, page 2-49. 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.

Shadow Light Curtain Input Faults

F68 or H68

-and-

F69 or H69

Problem: Shadow light curtain A (fault #68) or B (fault #69) inputs to WPC 2000 are not in the same state (i.e., one input is “on,” the other is “off”).

Remedy: Check “Light curtain A1 input” and “Light curtain A2 input” LEDs on the WPC 2000 Main Processor board if light curtain A is generating the fault, or check “Light curtain B1 input” or “Light curtain B2 input” LEDs if light curtain B is generating the fault (see Figure 3-14, page 3-38 or Figure 3-15, page 3-39).

If one of the two LEDs is unlit, receiver wiring is bad or one of the receiver outputs may be shorted. Check the wiring at the receiver and correct if necessary.

If the wiring is good, either the receiver needs to be replaced, or there is a problem with WPC 2000. Contact Wintriss Tech. Support for assistance.

DSV Interface and Lockout Relay Failures

F70* through F78*

- or -

H72* through H76*

⚠ DANGER

IMPROPER SAFETY SWITCHING RELAY REPAIR

- Replace the DSV/Lockout Relay board before placing the WPC 2000 back into operation after the first occurrence of a fused relay.

If a relay fuses

- DO NOT reset the WPC 2000 to restart the machine.
- Remove the WPC 2000 from operation immediately and replace the DSV/Lockout relay board before operating the press again.

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

Problem: The following errors indicate failures on the WPC 2000 Main Processor board or the DSV/Lockout Relay board. Error codes F70, F71, F72/H72, F73/H73, and F76/H76 indicate failures with the DSV driver logic on the Main Processor board. Codes F74/H74, F75/H75, and F77 indicate failures with the relays on the DSV/Lockout Relay board. F78 indicates an issue with the poppet position sensors in the DSV valve itself.

- F70** DSV relay driver A was not off at start of stroke
- F71** DSV relay drivers A and B did not turn on properly or have shorted
- F72 or H72** DSV Control Flip-flop is not functioning properly
- F73 or H73** DSV Missing Pulse Detector window is not functioning properly
- F74 or H74** DSV relay A or B did not close properly at start of stroke
- F75 or H75** DSV relay A or B did not open properly at end of stroke
- F76 or H76** Lockout relay driver did not turn on properly during testing
- F77** Lockout relay check contacts were not closed before lockout relay was turned on
- F78** The position of the DSV poppets is incorrect (Minster version only).

Remedy: Press Reset/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 2000.

The Start-time Limit setting may be too short. Alternatively, the drive belt on the resolver may be loose or broken, and the resolver may not be turning continuously with the press crankshaft, or have stopped turning altogether. Also, the resolver may be defective.

Air pressure to the clutch may be low, or the clutch may be bad, resulting in no movement of the crankshaft (and resolver) even though the DSV is energized. In addition, an internal WPC 2000 problem could have occurred.

Remedy: Check the Start-time Limit setting, and 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 2000 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, F84, F86 and F87

- and -

H81, H83, H84, H86 and H87

Problem: The overrun limit switch has turned on before the Top-stop “On” Angle timing has turned off. The Top-stop Angle internal dwell is 20°.

Remedy: Check to make sure that the Top-stop “On” Angle has been set correctly and that the overrun sensor magnet has been installed at the correct angle (see page 3-6). 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 2000 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 3-6 and the LED maps on pages 3-38 and 3-39. 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 in. to 6 in. If the shaft is larger than this, mount the magnet on a shaft with a smaller diameter.

Check to make sure that the press is not encountering excessive shock and vibration due to operations such as blanking. If you cannot resolve the problem, contact Wintriss Tech. Support.

Overrun Limit Switch Test Angle Fault

F88 or H88

Problem: The overrun limit switch was not closed during the overrun sensor closure test window (see step 12, page 3-9) 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 2-20).

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 in. to 6 in. If the shaft is larger than this, mount the magnet on a shaft with a smaller diameter.

Check installation of the overrun sensor and magnet and wiring of the overrun sensor, referring to *Installing the Overrun Limit Switch*, page 2-25 and *Mounting the Overrun Sensor Magnet*, page 3-9.

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 has not been set correctly on option switches 1 and 2 on S101 on the WPC 2000 Main Processor board.

Remedy: Set switches 1 and 2 on S101 for the correct Top-stop “On” Angle window, referring to Table 3-2, page 3-8. 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 2000 Main Processor board. The board may need to be serviced or replaced. Errors are as follows:

- F90 or H90** Program memory checksum 1 is incorrect
- F91 or H91** Program memory checksum 2 is incorrect
- F95 or H95** Angle table memory checksum is incorrect
- F96 or H96** RAM memory failed memory test
- F97 or H97** No angle setup is loaded
- F98 or H98** The option switch image changed during operation
- F99 or H99** +24 Vdc failed, or the fuse blew

Remedy: Press Reset/Select. If the error persists, contact Wintriss Tech. Support for assistance or replacement of the Main Processor board or firmware chip.

NOTICE

SEE OTHER DOCUMENTS FOR ERROR MESSAGES 120 OR GREATER

Error numbers equal to or higher than 120 are covered in these documents:

- WPC 2000 Option 2 User Manual (1130700)
- WPC 2000 Option 2 Additional Inputs Only Instruction Sheet (1141900)

Resetting Ross DM2 DSV Faults

If your Ross DM2 DSV faults when air is first applied to the unit, one or both poppets may have been jarred into a faulted position during shipment. When the poppets are faulted, input air can escape through the muffler port. To reset the fault, air must be applied to DSV to return the poppets to their unfaulted position.

If the fault occurs before the unit has been wired, the problem will be signalled by air escaping from the muffler port when input air is applied to the DSV. To reset the unit, press the brass button on the bottom of the Reset solenoid while air is being applied to the DSV (see Figure 5-4, page 5-22).

If the fault occurs after the unit has been wired, an F47 error will appear on the WPC 2000 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 5-13).

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.

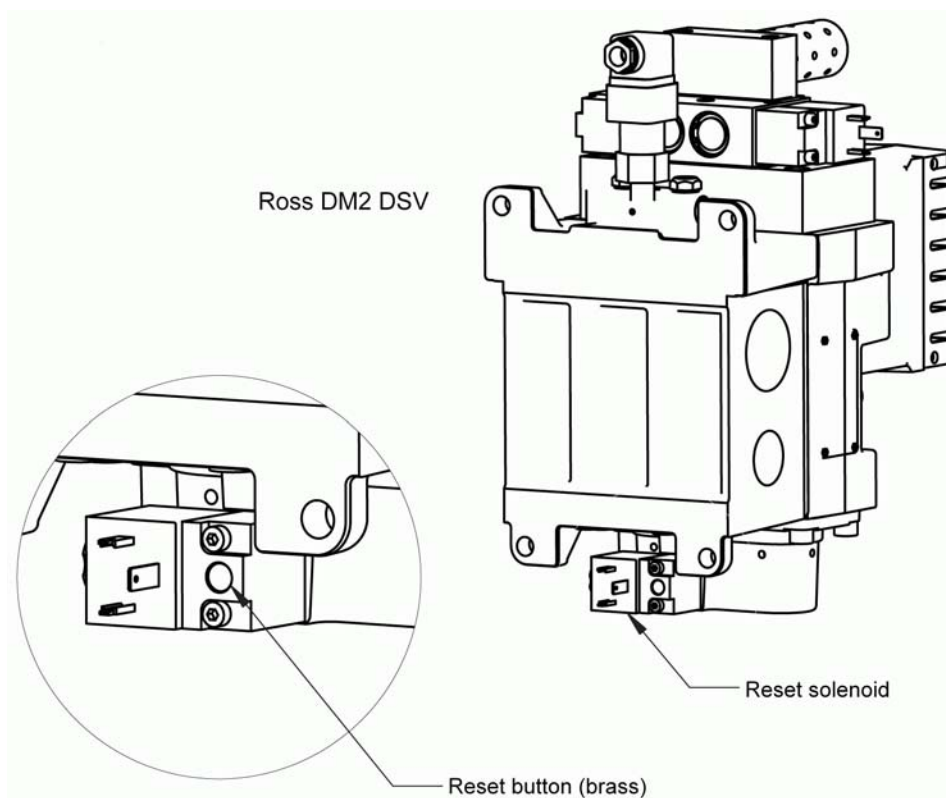


Figure 5-4. Ross DM2 DSV Showing Reset Button

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	
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OSHA 1910.217 (c).

TABLE 0-10

(c) SAFEGUARDING THE POINT OF OPERATION. –

<i>Distance of opening from point of operation hazard (inches)</i>	<i>Maximum width of opening (inches)</i>
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(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

(d) Muting (bypassing of the protective function) of such device, during the upstroke of the press slide, is permitted for the purpose of parts ejection, circuit checking and feeding.

(e) The safety distance (Ds) from the sensing field to the point of operation shall be greater than the distance determined by the following formula:

$D_s = 63 \text{ inches/second} \times T_s$, where

D_s = minimum safety distance (inches);

63 inches/second = hand speed constant;

and

T_s = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).

(f) Guards shall be used to protect all areas of entry to the point of operation not protected by the presence-sensing device.

OSHA 1910.217 (c) (3) (5)

(5) Additional requirements for safe-guarding. Where the operator feeds or removes parts by placing one or both hands in the point of operation, and a two hand control, presence-sensing device, Type B gate or movable barrier (on a part revolving clutch) is used for safeguarding:

(i) The employer shall use a control system and brake monitor which comply with paragraphs (b) (13) and (14) of this section. This requirement should be complied with by November 1, 1975.

PMA Interpretation

Top of stroke is the point at which muting shall cease as it is not possible to set a point on the downstroke as the exact position where the hazard of die closing starts.

Safety distance represents the distance an operator can move his hand during the time it takes a press to stop. The internationally recognized hand reach speed is 63 inches/second.

To determine this safety distance, the stopping time of the press is measured with some appropriate measuring device. The measurement is taken such that the stop signal is given to the press at the 90 degree point of the crank position.

Since some stopping time increase must be accommodated due to braking system deterioration, a percentage factor must be added to the measured time to obtain the factor for use in the equation for determining safety distance. A percentage factor of 20% is recommended for presses with new brakes or brakes of good condition. For older brakes, a 10% factor is recommended.

Example:

Measured stopping time = 0.190 seconds

Time factor = $1.2 \times 0.19 = 0.228$ seconds

Calculation = 63×0.228

Safety distance = 14.4 inches

(3) (iii) (f) Great care must be taken to assure that no access to the die area exists unguarded.

This paragraph tells the condition under which a brake monitoring system is required after November 1, 1975.

(b) (13) Control reliability

(b) (14) Construction requirements.

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:

$D_s = 63 \text{ inches/second} \times T_s$, where

D_s = minimum safety distance (inches);

63 inches/second = hand speed constant;

and

T_s = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).

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

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

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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

8.6.2.1.7 Each operator's hand controls shall be located at a distance from the point-of-operation so that the operator(s) cannot release either hand actuating control and reach into the point-of-operation during the hazardous portion of the cycle.

Explanatory Information

E8.6.2.1.7 The total stopping time of the press should include the total response time of the control system and the time it takes hazardous motion to stop. The following formula should be used when calculating the safety distance (D_s):

$$D_s = K(T_s + T_c + T_{bm})$$

Where:

K = 63 inches/second (hand speed constant).

T_s = the stop time of the press measured from the final de-energized control element, usually the air valve.

T_c = the response time of the control.

T_{bm} = the additional time allowed by the stopping-performance monitor (brake monitor) before it detects stop time deterioration.

NOTE – $T_s + T_c$ are usually measured by a stop time measuring device.

When the press stopping-performance monitor setting is changed, the safety distance should be recalculated. See also Annex C.

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 D_s .

Also, care should be taken when installing the device so that it does not detect false signals from other devices or equipment in the area.

The presence-sensing device cannot protect against a 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

8.6.3.7 Muting of the device shall be accomplished in a manner that conforms to the requirements of 6.11 and 8.8.

8.6.3.8 The device shall have an identifiable minimum object sensitivity so that an obstruction of an equal or greater size will be detected anywhere within the sensing field regardless of the plane of intrusion.

8.6.3.9 The device shall have a maximum response time, which shall not be affected by object sensitivity adjustments or environmental changes.

8.6.3.10 Devices which require adjustments to accommodate variations in operating conditions, or which incorporate fixed blanking or floating blanking features, shall be designed so that the adjustments or features are capable of supervisory control by the user.

8.6.3.11 The device shall be provided with a means that visibly indicates when it is functioning properly.

Indication that the sensing field is being blanked shall be provided. For fixed blanking, the blanked area shall be identified. Supplemental safeguarding shall be provided to prevent access to the hazard through the fixed blanked area.

Explanatory Information

E8.6.3.7 Muting is typically accomplished by interface circuits or auxiliary controls. The muting element should incorporate a similar level of control reliability as the presence-sensing device itself. A simple cam-operated limit switch wired in parallel with the device's output is inadequate, as its failure can remain undetected.

E8.6.3.8 The device should have a minimum object sensitivity stated by the device supplier. For example, an electro-optical device may detect a 32 mm (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.

E8.6.3.9 The device supplier should state the maximum total response time, including output devices, of the presence-sensing device.

E8.6.3.10 Typically, these adjustments or controls are key-operated or located under lockable covers.

E8.6.3.11 Red and green indicators or other means that can be easily seen by the operator and others should be provided to indicate that the device is functioning.

The blanking function of a presence-sensing safeguarding device desensitizes a portion of the sensing field by disabling one or more channels such that a specific interruption is ignored. Presence-sensing devices can be provided with either fixed or floating blanking. For fixed blanking, the desensitized area does not move or change once configured. Floating blanking allows the blanked area to move within the sensing field.

Means to identify the desensitized area may include but are not limited to:

- a) Indicators within the device;
- b) Signage or marking of the fixed blanked area;
- c) The physical location of the object in the blanked area if movement or removal of the object can be detected and it results in a stop command.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements

8.6.3.11 (cont)

If means are provided to bypass the device, visible indication that the device is bypassed shall be provided.

8.6.3.12 The device shall not fail to respond to the presence of the individual's hand or other body part due to the presence of a reflective object or workpiece.

8.6.3.13 The device shall conform to the requirements of 6.11 and 8.8. In the event of a power failure to the device, the device shall initiate a stop command to the press control system.

8.6.3.14 The interface of the presence-sensing device to the press control shall conform to the requirements of 6.11 and 8.8.

8.6.3.15 The sensitivity of the device to intrusion shall not be adversely affected by changing conditions around the press.

8.6.3.16 The effective sensing field of the device shall be located at distance from the nearest point-of-operation hazard so that individuals cannot reach into the point-of-operation with a hand or other body part before cessation of motion during the hazardous portion of the cycle.

Explanatory Information

Means of supplemental safeguarding can include completely filling the fixed blanked area to restrict access to the hazard, installing the device at a distance that accounts for the worse case object sensitivity (see 8.6.3.16), or alternate safeguarding may be provided to prevent access to the hazard.

Means to provide visible indication may include but are not limited to:

- a) colored indicator lights;
- b) signage;
- c) physical position;
- d) awareness barrier (i.e., safety tape);
- e) other means.

E8.6.3.16 The total stopping time of the press should include the total response time of the presence-sensing device, as stated by the supplier, the response time of the interface, the response time of the control system, and the time it takes the press to cease slide motion.

The following formula should be used when calculating the safety distance:

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

where

K = 63 inches/second (hand speed constant)

T_s = the stop time of the press measured from the final de-energized control element, usually the air valve

T_c = the response time of the press control

T_r = the response time of the presence-sensing device and its interface, if any, as stated by the supplier or measured by the user.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements

8.6.3.16 (cont)

Explanatory Information

T_{bm} = the additional stopping time allowed by the stopping-performance monitor before it detects stop time deterioration.

D_{pf} = the added distance due to the penetration factor as recommended in 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 - $T_s + T_c$ 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

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.

8.6.3.18 The device shall not be affected by ambient light or by light-source decay so that the increase in response time or object sensitivity is greater than the value used to calculate the safety distance.

8.6.3.19 All areas of entry to the point-of-operation not protected by the presence-sensing device shall be otherwise safeguarded.

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.

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.

Explanatory Information

E8.6.3.17 Additional means may include manual reset outside of the sensing field of the device or additional barrier guards, safety mats, light curtains, or other devices.

Operator controls for each operator located outside of the sensing field of the 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.

E8.6.3.18 Examples of ambient light are associated with windows, light fixtures, skylights, bay doors, or die lights.

E8.6.3.19 Usually the electro-optical presence-sensing device is used in a manner that provides a protected zone in front of the primary work area with auxiliary devices or guards used to protect secondary access areas.

In some cases, mirrors may be used in conjunction with the device to provide two-, three- or four-sided protection.

E8.6.3.20 For PSDI applications see Clause 10.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements

8.3 Electro-optical, RF, and area scanning presence-sensing safeguarding devices

8.3.1 Design and construction

8.3.1.1 The presence-sensing device shall be designed and constructed to create a field that detects the presence of an individual(s).

The presence-sensing device shall not create a hazard in and of itself.

8.3.1.2 The presence-sensing device shall have a minimum object sensitivity such that an obstruction of a same or greater size will always be detected anywhere within its sensing field, regardless of the plane of intrusion.

The RF (radio frequency) presence-sensing device shall provide means to adjust the sensitivity of the field. The field, once adjusted, shall not decrease in sensitivity below this established level.

8.3.1.3 The presence-sensing device shall not fail to change its output state, if not bypassed or muted, when it detects the presence of an individual.

8.3.1.4 Adjustment or configuration of presence-sensing devices shall be capable of being supervised.

Explanatory Information

E8.3.1.1 The presence-sensing device should be designed and constructed such that it does not present hazards to individuals from:

- sharp edge or pinch point hazards;
- radiated light or energy hazards;
- electromagnetic interference hazards;
- electrical shock hazards.

E8.3.1.2 The presence-sensing device should have a minimum object sensitivity stated by the supplier. For example, an electro-optical device may detect an opaque object with a diameter of 32 mm (1.25") anywhere in its sensing field, but allow an obstruction with a diameter of 25 mm (1") to pass undetected at certain points in the field.

E8.3.1.4 Methods of meeting this requirement include, but are not limited to, the use of key operated controls, controls located under lockable covers, or controls that require a tool or password to access. Adjustment or configuration should only be performed by authorized individuals.

Adjustments or configuration can include, but are not limited to:

- muting;
- blanking;
- power adjustments;
- sensing field configuration;
- reset functions.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements

8.3.1.5 The presence-sensing device shall incorporate visual means to indicate that the device is detecting an individual within the effective sensing field of the device.

8.3.1.6 The presence-sensing device shall have a maximum response time that shall not be affected by object sensitivity or environmental changes.

The safeguarding supplier shall provide the maximum response time of the 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.

8.3.1.8 Components, subassemblies or modules of electro-optical, RF, and area scanning presence-sensing devices shall conform to the requirements of 6.1, or shall be designed and constructed to meet the safety performance level (risk reduction) as determined by a risk assessment.

8.3.1.9 The area scanning presence-sensing device shall provide a means or operating mode to verify the size, shape, and detection capabilities of the detection area or zone.

Information shall be provided by the area scanning device supplier to identify the:

- maximum safeguarding range;
- minimum object sensitivity within the stated safeguarding range;
- maximum field of view in degrees;
- tolerance in the range measurement; and
- detection capabilities with respect to the reflectivity of an object versus the distance to the object.

Explanatory Information

E8.3.1.5 Indicators, (usually red and green), displays or meters should be provided to indicate the status of the presence-sensing device. The visual means may be integral to the presence-sensing device or part of the interface or machine control system. Due to the prevalence of color blindness (10% in males for red/green), methods such as unambiguous positioning, patterning, labeling or flashing of the indicators may be effective in providing the indication required.

E8.3.1.7 When the electro-optical and area scanner presence-sensing devices are exposed to signals from other electro-optical presence-sensing devices or to changes in ambient light commonly associated with windows, light fixtures, skylights, bay doors or work area lights, the response time or object sensitivity should not be adversely affected.

E8.3.1.8 See also, clause 5 and ANSI B11.0 (B11.TR3).

E8.3.1.9 These presence-sensing devices typically operate on the principle of "diffuse reflectance," which is a principle of transmitting beam(s) of light to form a detection area or zone. When an object enters the detection area, it reflects the transmitted light back to the device, which then evaluates the object's position. The amount of reflected light (degree of reflectance in percent) that can be reliably detected typically ranges from 1.8% to over 90% and can be represented graphically by reflectivity versus distance. For more information see IEC 61496 parts 1 and 3.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements

8.3.2 Installation, operation and maintenance

8.3.2.1 Exposure to the hazard(s) shall not be possible by reaching over, under or around the sensing field of the presence-sensing device. Additional guards or safeguarding devices shall be provided to protect those areas.

The effective sensing field shall be of adequate height, width, and depth so that entry of the individual into the hazard zone is detected.

Explanatory Information

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.

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

8.3.2.2 The presence-sensing device shall be installed such that it does not create additional hazards.

8.3.2.3 The presence-sensing device shall be installed at a location so that the effective sensing field prevents individuals from reaching the hazard(s) during the hazardous portion of the machine cycle.

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.

E8.3.2.2 Some installation hazards include, but are not limited to:

- pinch point hazards created by interference between the presence-sensing device and moving members of the machine;
- tripping hazards;
- electrical shock hazards;
- overhead or other “strike against” hazards;
- thermal hazards.

Where such conditions can exist, additional safeguarding may be required.

E8.3.2.3 The safety distance calculation is dependent upon the:

- speed of approach of the individual;
- total response time of the safeguarding device as stated by the supplier;
- response time of the interface;
- response time of the control system;
- time it takes the machine to stop hazardous motion; and
- depth penetration factor of the safeguarding device.

See Annex D for further explanation and an example method to calculate the safety distance. Additional methods might be used as determined by the supporting risk assessment documentation.

For installations in which the direction of approach is perpendicular to the sensing field (i.e., normal approach), the minimum distance between the sensing field and the closest hazard should be no less than 100mm (4”) regardless of the outcome of a safety distance calculation. Practical application has shown that less than 100 mm (4”) of safety distance can result in increased risk of harm. See also, ISO 13855.

Extracts from ANSI B11.19-2010 8.3

Standards Requirements

8.3.2.4 The presence-sensing device shall protect individuals from hazards by initiating an immediate stop command to the machine control system when the sensing field of the device is interrupted during the hazardous portion of the machine cycle. It shall require re-initiation of the normal actuating means prior to the start or continuation of motion of the machine.

When an individual can pass through the sensing field of the presence-sensing device, the device shall initiate an immediate stop command to the machine control system and shall require that the device or machine control be manually reset before hazardous situation can occur.

The reset function and devices shall comply with 6.5.

8.3.2.5 Indication that the sensing field is being blanked shall be provided. For fixed blanking, the blanked area shall be identified. Supplemental safeguarding shall be provided to prevent access to the hazard through the fixed blanked area.

Explanatory Information

RF presence-sensing devices have sensing fields that can vary due to:

- antenna(e) design;
- effects of adjacent machinery and equipment;
- field sensitivity adjustments; and
- environmental factors (such as humidity or temperature).

Before the machine is used for production purposes, the RF presence-sensing device should be checked to ensure that the effective field protects individuals at the safety distance.

E8.3.2.4

The operator should ensure that no individual is in the safeguarded area before re-setting the presence-sensing device or machine control and initiating a hazardous situation

E8.3.2.5 The blanking function of an 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

8.3.2.6 Components, subassemblies or modules of the interface or machine control system shall conform to the requirements of 6.1, or shall be designed and constructed to meet the safety performance level (risk reduction) as determined by a risk assessment.

8.3.2.7 Bypassing of the presence-sensing device shall comply with 6.6.

8.3.2.8 Muting of the presence-sensing device shall comply with 6.7.

8.3.2.9 The RF presence-sensing device shall not be adversely affected by changes around the machine that may alter the sensitivity of the device such that individuals are no longer detected in the sensing field at the proper safety distance.

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.

E8.3.2.6 See also, clause 5 and ANSI B11.0 (B11.TR3).

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

8.3.2.10 The total tolerance in the range measurement of an area scanning presence-sensing device shall be included in determining the distance from the nearest recognized hazard to the detection area or zone. This detection area shall be identified and tested to ensure that the device is able to detect individuals entering the detection area. The effective sensing field shall be verified for proper size and coverage upon installation, replacement, or changes of the detection area.

Explanatory Information

E8.3.2.10 When the area scanning 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 2000. If the Run buttons on a standalone Operator Station are not pressed within the 1/2-second “palm time” (“synchronous time” in ANSI terminology) or the Run buttons on multiple Op. Stations are not pressed within the 5-second “concurrent time,” the press will not cycle. See the description of the “Palm Time Lamp and Switch” on page 1-3 and *Switch 6 – Selecting Concurrent Time for More Than Two Operator Stations*, page 3-33.

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. Option 1 User Inputs

This appendix shows you how to install, wire, and troubleshoot WPC 2000 Option 1. Option 1 is a “daughter” board you can install on your WPC 2000 Main Processor board to increase the number of user inputs available for connection of auxiliary equipment to WPC 2000.

Option 1 is compatible with WPC 2000 systems running WPC 2000 version 1.70 and higher.

By providing connections for other press-related equipment, user inputs allow you to monitor auxiliary press functions such as lubrication systems, conveyors, etc. and provide additional press protection and operator safety. Up to 7 non-control-reliable inputs and up to 2 pairs of control-reliable, cross-checked inputs are standard on WPC 2000 units. The Option 1 board enables you to connect up to 20 additional non-control-reliable inputs and up to 4 additional control-reliable, cross-checked input pairs to WPC 2000 (see Table C-1, page C-2).

DANGER

USER INPUTS 1 THROUGH 7 AND 12 THROUGH 31 NOT SUITABLE FOR SAFETY USE

DO NOT use inputs 1 through 7 and 12 through 31 as part of any personnel protection system. These inputs are not control reliable.

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

Option 1 user inputs, like WPC 2000 standard inputs, are programmed to stop the press whenever connected equipment malfunctions. The type of stop (e.g., Top-stop, Emergency-stop, etc.) is determined by the setting programmed for the specific input. These input stop types are set at the factory and cannot be changed.

Ten of the non-control-reliable Option 1 user inputs are set for a stop type of Top-stop, eight are set for E-stop, and two are programmed for E-stop/Lockout (see Table C-1). Of the control-reliable, cross-checked input pairs, two are set for E-stop and two for E-stop/Lockout.

When any equipment connected via Option 1 user inputs to WPC 2000 issues a stop command by opening a normally closed (N/C) input, WPC 2000 signals the press to perform the stop type programmed for that input and displays the input’s fault code on the WPC 2000 display (see *Troubleshooting*, page C-8 for a list of the fault codes assigned to Option 1 user inputs).

When a stop command is issued for user inputs 21 or 30 or input pairs 36/37 or 38/39, the lockout relay also opens, causing “Loc” to appear on the display. The “Loc” message must be cleared (by turning the Stroke Select switch to OFF, then to INCH or one of the other operating modes) before the press can be restarted.

Ten of the non-control-reliable inputs have an input type of NPN, and ten are PNP (see Table C-1). All of the control-reliable, cross-checked input pairs are PNP.

Table C-1. Option 1 User Inputs: Input Type and Stop Type

User Input Number	Input Type	Stop Type
User input 12	NPN	Top-stop
User input 13	NPN	Top-stop
User input 14	NPN	Top-stop
User input 15	NPN	Top-stop
User input 16	NPN	Top-stop
User input 17	NPN	E-stop
User input 18	NPN	E-stop
User input 19	NPN	E-stop
User input 20	NPN	E-stop
User input 21	NPN	E-stop/Lockout
User input 22	PNP	Top-stop
User input 23	PNP	Top-stop
User input 24	PNP	Top-stop
User input 25	PNP	Top-stop
User input 26	PNP	Top-stop
User input 27	PNP	E-stop
User input 28	PNP	E-stop
User input 29	PNP	E-stop
User input 30	PNP	E-stop/Lockout
User input 31	PNP	E-stop
User input 32 (cross-checked with input 33)	PNP	E-stop
User input 33 (cross-checked with input 32)	PNP	E-stop
User input 34 (cross-checked with input 35)	PNP	E-stop
User input 35 (cross-checked with input 34)	PNP	E-stop
User input 36 (cross-checked with input 37)	PNP	E-stop/Lockout
User input 37 (cross-checked with input 36)	PNP	E-stop/Lockout
User input 38 (cross-checked with input 39)	PNP	E-stop/Lockout
User input 39 (cross-checked with input 38)	PNP	E-stop/Lockout

Installing the Option 1 Board

To install the WPC 2000 Option 1 board (see Figure C-1, page C-4), perform the following steps:

CAUTION

DAMAGE TO BOARD FROM STATIC DISCHARGE

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

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

1. Making sure you are grounded, carefully unpack the Option 1 board and remove it from its anti-static bag.

NOTICE

Be sure to save the shipping box and protective anti-static bag in case you need to return the Option 1 board.

2. Verify that the board has not been damaged during shipment. If damage has occurred, contact Wintriss Tech. Support immediately.

WARNING

ELECTRIC SHOCK HAZARD

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

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

3. Shut off power to WPC 2000.
4. Open the WPC 2000 enclosure or console.
5. Locate the four 1/4-in. hex standoffs in the lower left corner of the WPC 2000 Main Processor board.

NOTICE

If there are six 1/4-in. standoffs in the area where the Option 1 board is to be installed, remove the top middle and bottom middle standoffs, using a 1/4-in. nut driver. Be sure to remove the screws underneath the standoffs so they don't short out the board.

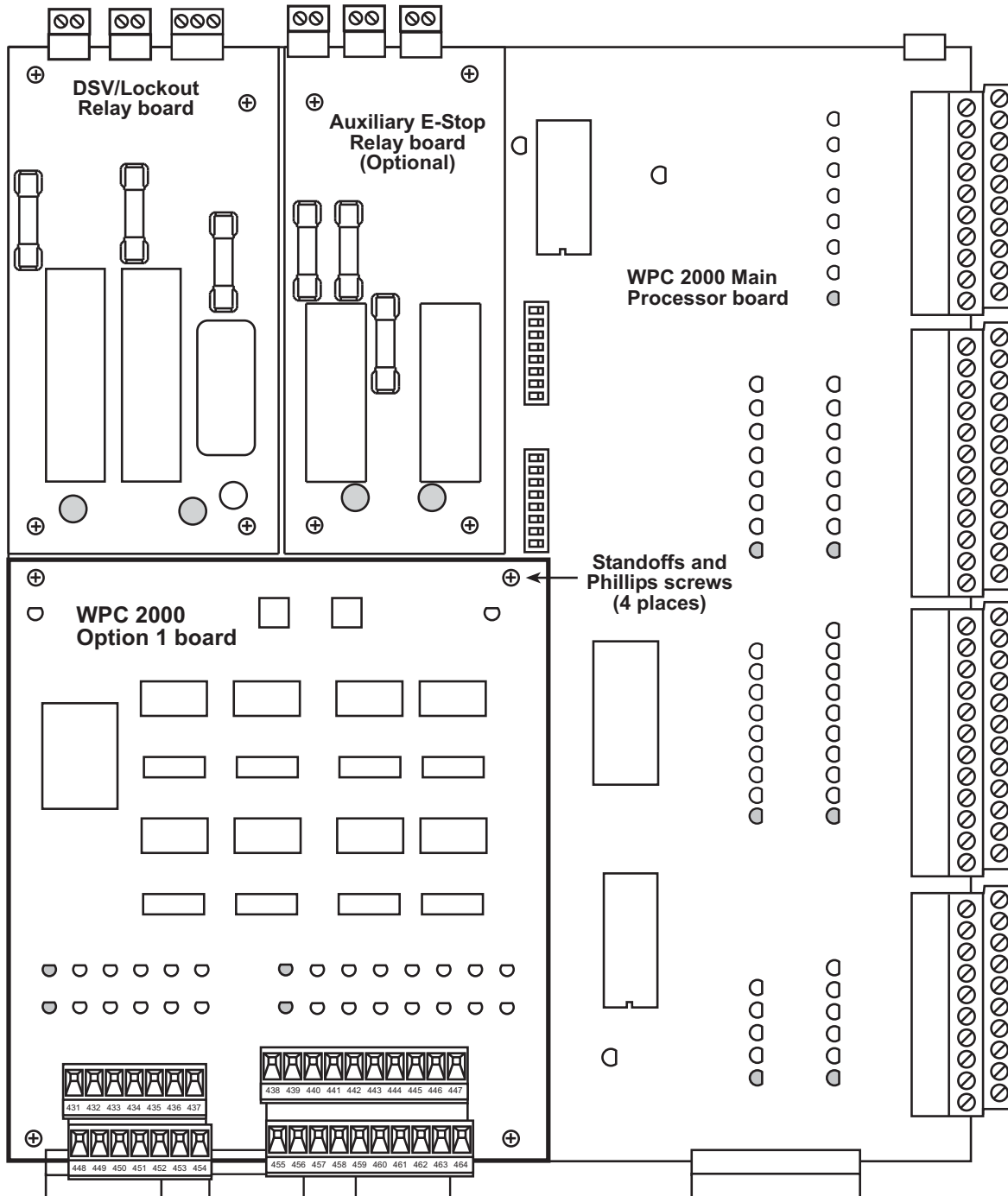


Figure C-1. Option 1 Board Installed on WPC 2000 Main Processor Board

6. Making sure you are grounded, align the holes in the four corners of the Option 1 board with the four standoffs on the WPC 2000 Main Processor board (refer to Figure C-1 for correct placement of board), and slowly push the board down until both connectors are seated. Then screw the board down, using the Phillips screws provided.
7. If you are ready to connect auxiliary equipment to the Option 1 board, proceed to the next section. Otherwise, close the door of the WPC 2000 enclosure or console.

Wiring Option 1 User Inputs

Wiring connections for WPC 2000 Option 1 user inputs are made on terminal blocks TB601 and TB602 on the Option 1 board (see Figure C-2). Pin numbers are shown in Table C-2 and Table C-3, page C-6, and in Figure 20 at the end of the manual.

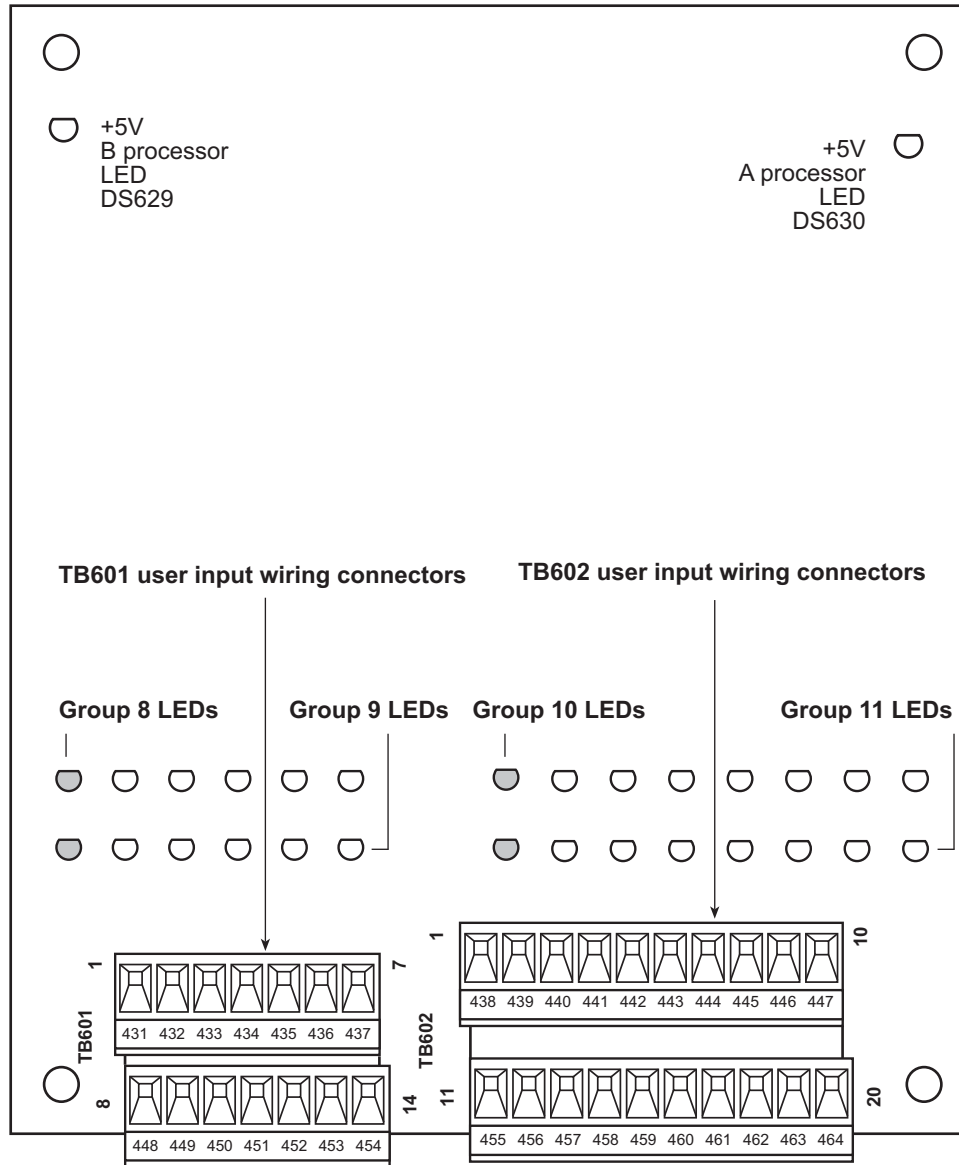


Figure C-2. WPC 2000 Option 1 Board

Wire from the terminal shown in Table C-2 or Table C-3 to your equipment and then back to either +24 Vdc or ground. If you remove any of the jumpers installed at the factory, make sure to bypass those inputs by connecting them to +24 Vdc or ground, as shown in Table C-2 or Table C-3. TB601 provides one +24 Vdc terminal and one ground terminal for jumper connections. TB602 provides two +24 Vdc terminals and two ground terminals.

Table C-2. WPC 2000 Option 1 Board: Wiring Connections, TB601

Pin #	User Input	Terminal for Jumper Bypass Connection
Upper Row		
431	User input 32 + (cross-checked with user input 33)	+24 Vdc
432	User input 34 + (cross-checked with user input 35)	+24 Vdc
433	User input 12 -	Ground
434	User input 13 -	Ground
435	User input 14 -	Ground
436	User input 15 -	Ground
437	+24 Vdc	
Lower Row		
448	User input 22 +	+24 Vdc
449	User input 23 +	+24 Vdc
450	User input 24 +	+24 Vdc
451	User input 25 +	+24 Vdc
452	User input 36 + (cross-checked with user input 37)	+24 Vdc
453	User input 38 + (cross-checked with user input 39)	+24 Vdc
454	Ground	

Table C-3. WPC 2000 Option 1 Board: Wiring Connections, TB602

Pin #	User Input	Terminal for Jumper Bypass Connection
Upper Row		
438	User input 33 + (cross-checked with user input 32)	+24 Vdc
439	User input 35 + (cross-checked with user input 34)	+24 Vdc
440	User input 16 -	Ground
441	User input 17 -	Ground
442	User input 18 -	Ground
443	User input 19 -	Ground
444	User input 20 -	Ground
445	User input 21 -	Ground
446	+24 Vdc	
447	+24 Vdc	
Lower Row		
455	User input 26 +	+24 Vdc
456	User input 27 +	+24 Vdc
457	User input 28 +	+24 Vdc
458	User input 29 +	+24 Vdc
459	User input 30 +	+24 Vdc

Table C-3. WPC 2000 Option 1 Board: Wiring Connections, TB602 (Cont.)

Pin #	User Input	Terminal for Jumper Bypass Connection
460	User input 31 +	+24 Vdc
461	User input 37 + (cross-checked with user input 36)	+24 Vdc
462	User input 39 + (cross-checked with user input 38)	+24 Vdc
463	Ground	
464	Ground	

When you have finished wiring user inputs, check the LEDs for the appropriate pin numbers to make sure that your connections are good (see Figure C-3, below).

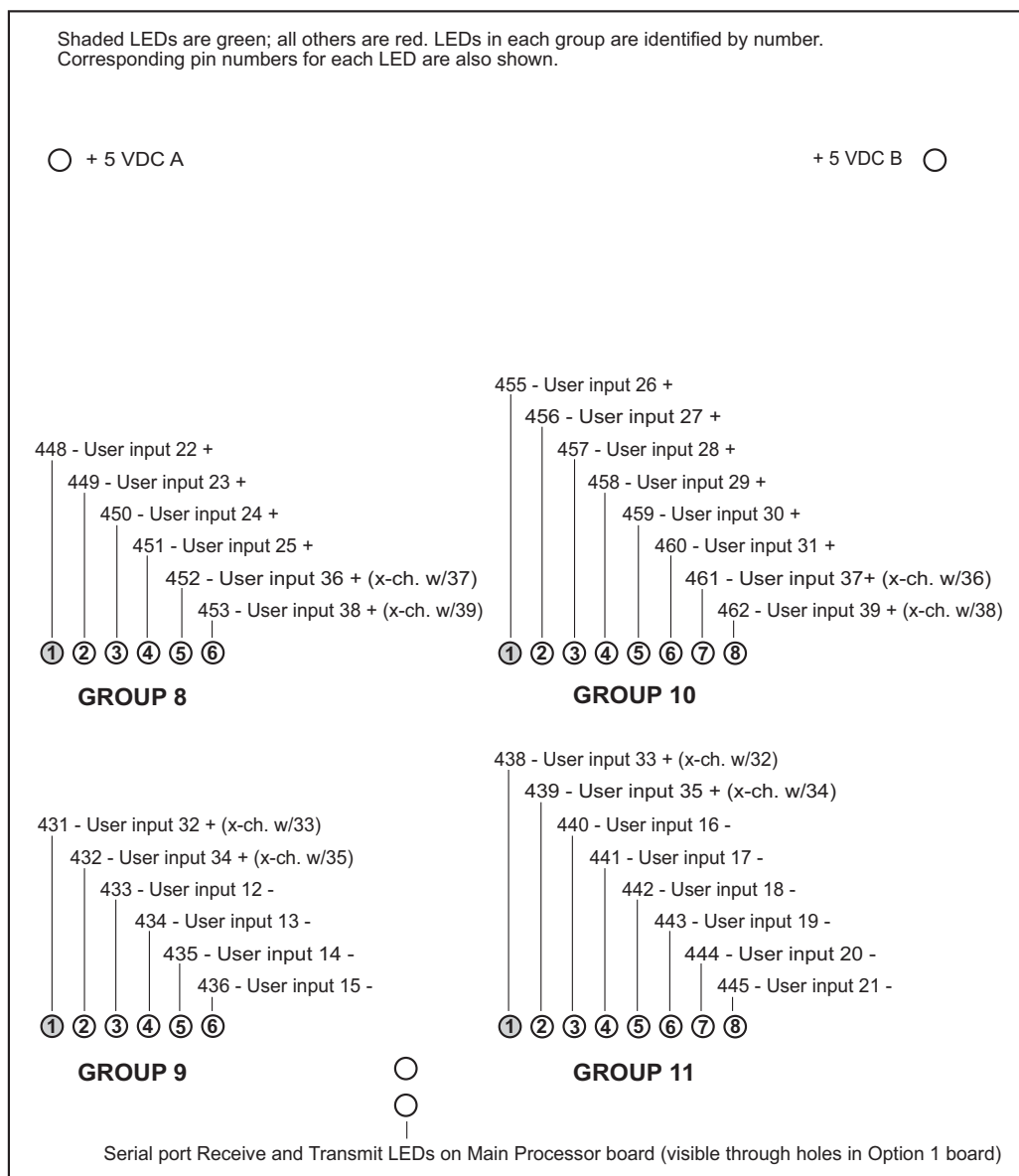


Figure C-3. WPC 2000 Option 1 Board: LED Map

Troubleshooting

Table C-4 shows the fault code associated with each Option 1 user input that appears on your WPC 2000 display when there is a problem with the auxiliary equipment that input is connected to.

To correct the problem that caused the fault code to display, check the equipment and wiring connected to that user input. When you have corrected the problem, reset WPC 2000. If the problem recurs, contact Wintriss Tech. Support.

Table C-4. WPC 2000 Option 1 Fault Codes

Fault Code	User Input	Stop Type	Pin #	Terminal for Jumper Connection
120	User 12	Top-stop	433	Ground
121	User 13	Top-stop	434	Ground
122	User 14	Top-stop	435	Ground
123	User 15	Top-stop	436	Ground
124	User 16	Top-stop	440	Ground
125	User 17	E-stop	441	Ground
126	User 18	E-stop	442	Ground
127	User 19	E-stop	443	Ground
128	User 20	E-stop	444	Ground
129	User 21	E-stop/Lockout	445	Ground
130	User 22	Top-stop	448	+24 Vdc
131	User 23	Top-stop	449	+24 Vdc
132	User 24	Top-stop	450	+24 Vdc
133	User 25	Top-stop	451	+24 Vdc
134	User 26	Top-stop	455	+24 Vdc
135	User 27	E-stop	456	+24 Vdc
136	User 28	E-stop	457	+24 Vdc
137	User 29	E-stop	458	+24 Vdc
138	User 30	E-stop/Lockout	459	+24 Vdc
139	User 31	E-stop	460	+24 Vdc
140, 144	User 32 paired with User 33	E-stop	431	+24 Vdc
		E-stop	438	+24 Vdc
141, 145	User 34 paired with User 35	E-stop	432	+24 Vdc
		E-stop	439	+24 Vdc
142, 146	User 36 paired with User 37	E-stop/Lockout	452	+24 Vdc
		E-stop/Lockout	461	+24 Vdc
143, 147	User 38 paired with User 39	E-stop/Lockout	453	+24 Vdc
		E-stop/Lockout	462	+24 Vdc

Glossary

NOTICE

Cross-references to other glossary entries are shown in *italics*.

ACTS	See <i>Auto-compensated Top Stop</i> .
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 <i>Auto Carry-up Angle</i> has been reached. Also called “Operator Station mute.”
Auto Carry-up Angle	The crank angle at which the pinch point has closed to less than 1/4 in. (6 mm), an opening determined by OSHA to be too small to pose a hazard to the operator.
Auto-compensated Top Stop (ACTS)	A WPC 2000 feature, designed specifically for variable-speed presses, that adjusts the top-stop angle automatically as press speed changes or the brake wears.
Automatic Continuous On-demand	A WPC 2000 feature that allows an external device like a feeder or robot to signal WPC 2000 to start the press in Continuous mode and maintain operation in Continuous.
Automatic Single-stroke	A WPC 2000 feature that allows an external device like a feeder or robot to signal WPC 2000 to stroke the press when a feed has been completed.
BDC	Abbreviation for bottom dead center.
brake monitor	A WPC 2000 feature that checks for brake wear.
calculated safety distance	See <i>safety distance</i> .
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 2000 must be pressed in order to start the press. This interval is 5 seconds. If the concurrent time is exceeded by any Operator Station, the press will not start.
control component failure	Another name for <i>control reliability</i> .

control reliability	A regulation defined in ANSI B11.1-1988 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 2000 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 <i>safety distance</i> . The depth penetration factor is a measure of how far an object, like an operator's hand, can move through the light curtain before the light curtain reacts.
dual diverse redundancy	A WPC 2000 feature in which both microprocessor systems belong to different architectures, are programmed using different programming languages, function independently of one other, have separate power supplies, and provide different information to the operator. Dual diverse redundancy provides optimum clutch/brake control and operator safety.
Dual Safety Valve	The control-reliable device on the press that controls the flow of air to the press's clutch.
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 2000 or external devices.
fault (error) message	An alphanumeric code that appears on the WPC 2000 display when an error condition occurs.
hand-speed constant	A value used in the ANSI formula for calculating the <i>safety distance</i> . The hand-speed constant is the distance one can theoretically move one's hand and arm in one second. OSHA recommends a hand-speed constant of 63 inches-per-second.
interrupted stroke	A condition that occurs when the press has been Emergency-stopped before the completion of the stroke by either the operator or an automatic device for personnel or equipment protection. During an interrupted stroke condition, the Interrupted Stroke LED on the WPC 2000 display flashes.
lockout	A WPC 2000 function that prevents the press from being restarted after clearing of <i>fault messages</i> that indicate serious errors. The lockout condition is indicated by the lockout message, which appears on the WPC 2000 display. Lockout provides an added safety feature to the WPC 2000.
lockout message	A message (i.e., "Loc") that appears on the WPC 2000 display indicating that a serious error condition has occurred.

Micro-inch	A WPC 2000 feature that allows the operator to set the amount of time in milliseconds that the Dual Safety Valve is open and, therefore, the distance the ram will travel when the Run/Inch switches on the Operator Station are pushed in Inch mode. Micro-inch is designed for high-speed and/or short-stroke presses.
NEMA 12	A rating 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 <i>depth penetration factor</i> 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	<p>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.”</p> <p>WPC 2000 checks the resolver crankshaft angle by comparing it to the signal received from the overrun limit switch. When the signal is not received at the same resolver angle on every stroke, WPC 2000 knows that the resolver is no longer rotating at a 1:1 ratio with the press.</p>

overrun timing	A WPC 2000 feature that provides a backup for top-stop timing, stopping the press if the top-stop output relay should fail. Overrun timing is a function of the stopping time of the press and is influenced by the condition of the brake linings and press speed. It is also dependent on proper installation of the <i>overrun limit switch</i> .
palm time	The length of time within which the two palm switches on each Operator Station connected to WPC 2000 must be activated in order to start the press. This interval is 1/2 (0.5) second as required by ANSI. If the palm time on any Operator Station is exceeded, the press will not start. ANSI standards refer to the palm time as <i>synchronous time</i> .
pinch point	The hazardous area between the upper and lower die from which OSHA mandates that the operator should be protected by installation of safety equipment such as light curtains, two-hand controls, and other barriers.
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 2000 display.
resolver	An electrical component mounted on the press used by WPC 2000 to provide continuous information about the position of the crankshaft and to maintain a count of the number of revolutions it makes. The resolver, which has internal windings and works on the principle of inductance, turns at a one-to-one ratio (1:1) with the crankshaft.
response time	The length of time it takes the WPC 2000 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 <i>ninety degree (90°) stop-time test</i> .
start time	The amount of time it takes the resolver to start turning after the Dual Safety Valve (DSV) is energized.
security access	A feature that gives supervisors the ability to control the level of access press operators have to WPC 2000 operating modes and functions.

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 that maintains a count of the number of strokes made by the press. The strokes counter is incremented once for each cycle of the press.
suppressor	A component that reduces or eliminates electrical noise.
synchronous time	The ANSI term for <i>palm time</i> .
TDC	Abbreviation for top dead center.
timing	“ON” settings for critical press parameters like Auto Carry-up Angle and Top Stop, and “ON” and “OFF” settings for cam channels.
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 2000 or other devices.
top stop constant	A feature used to accommodate a press automation function at WPC 2000. This feature works best on presses that have speed ranges of several hundred to over a thousand strokes per minute.
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.

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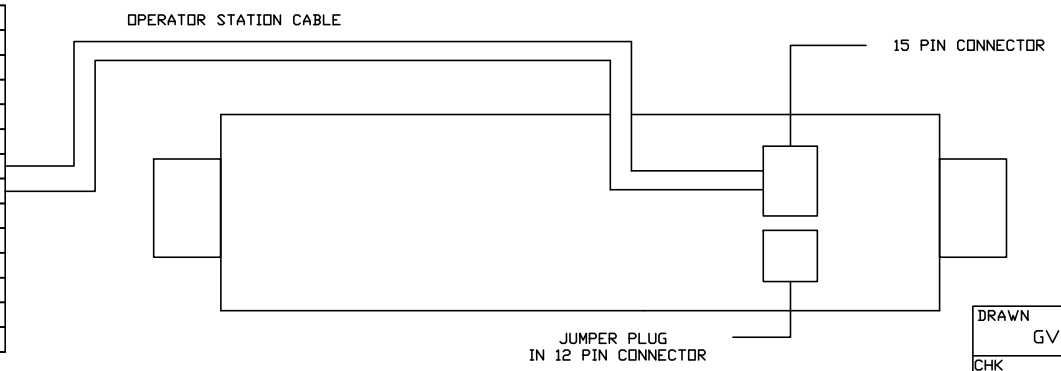
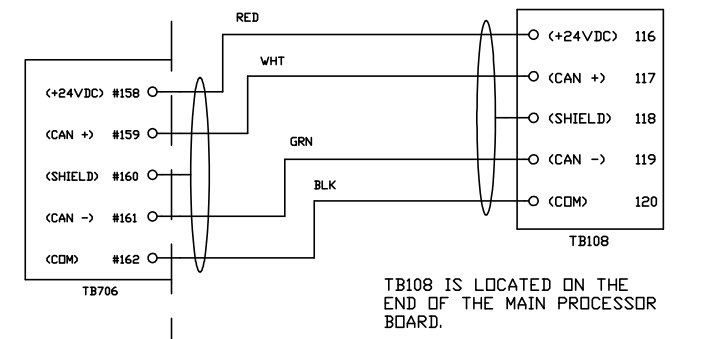
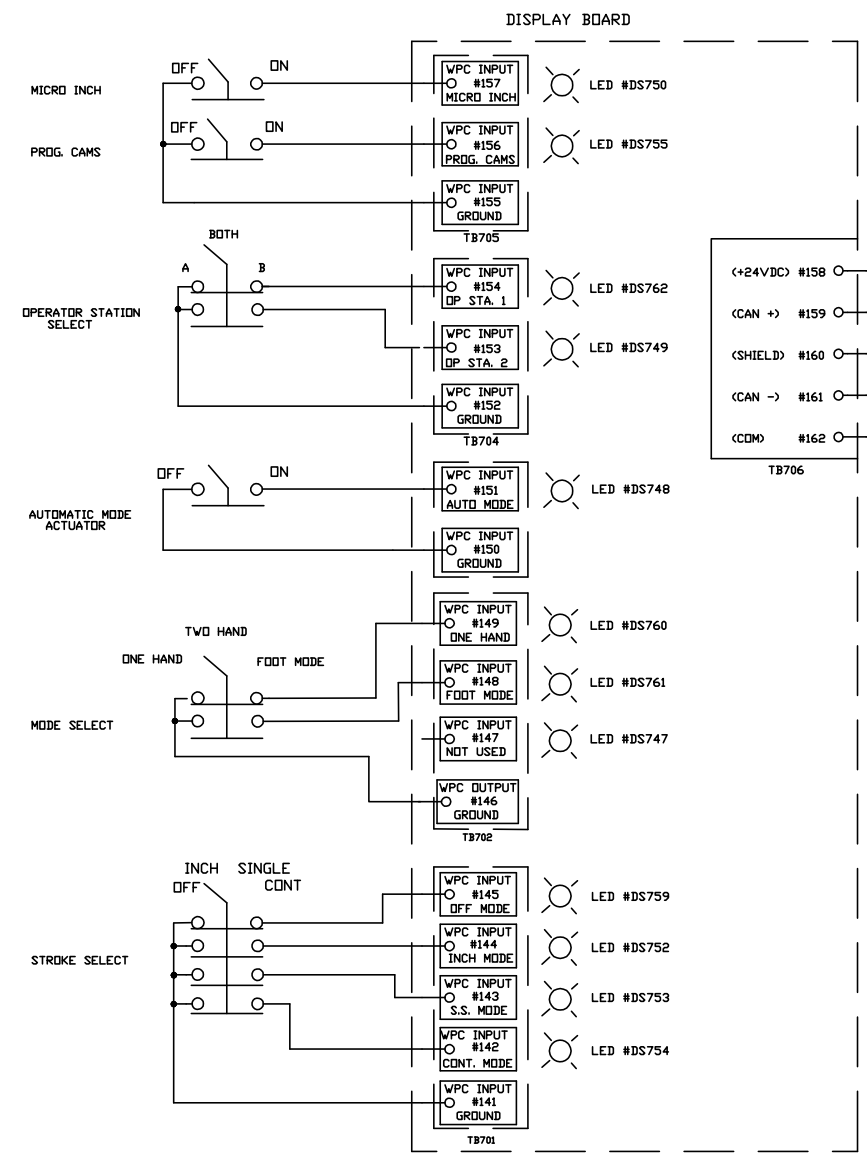
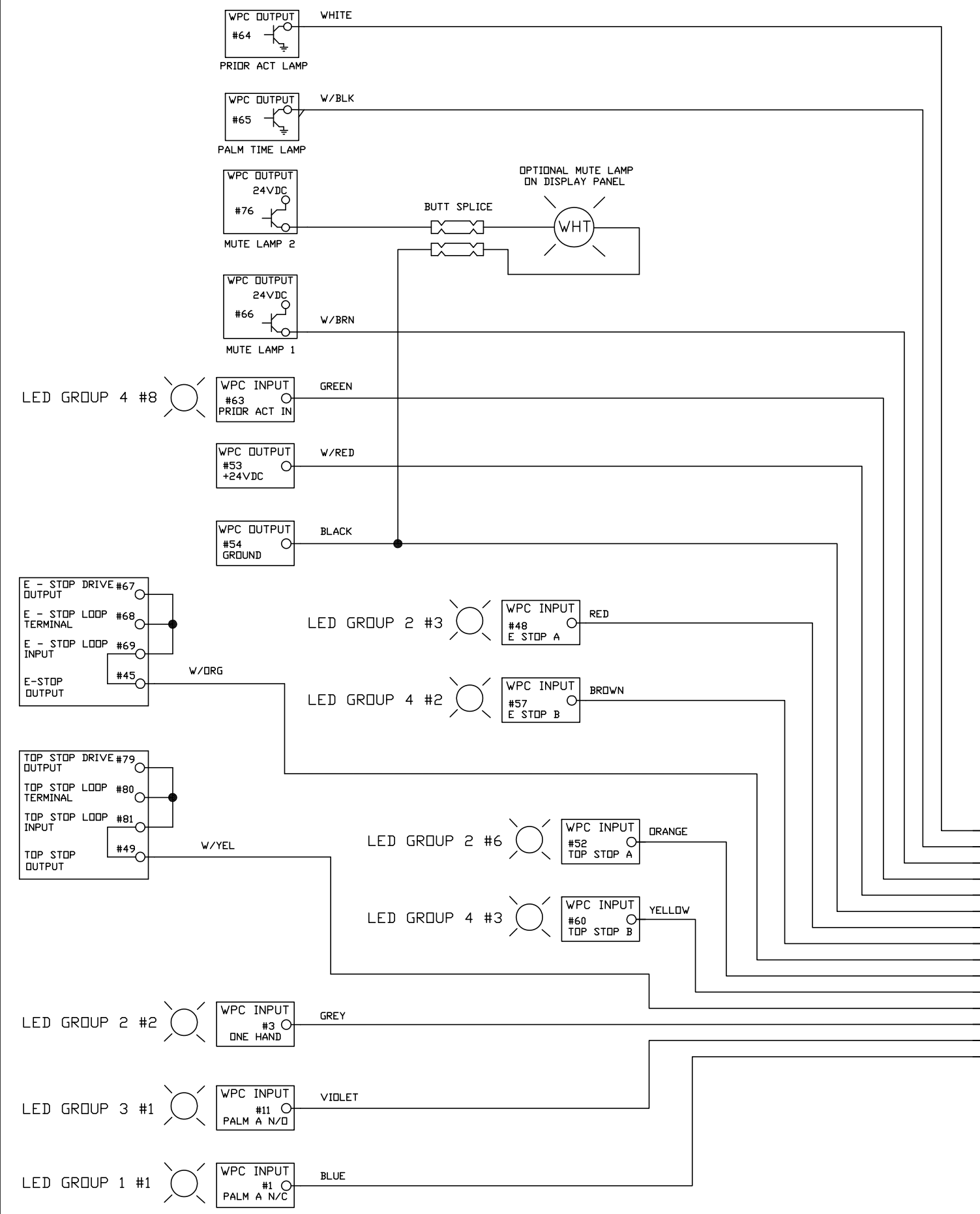
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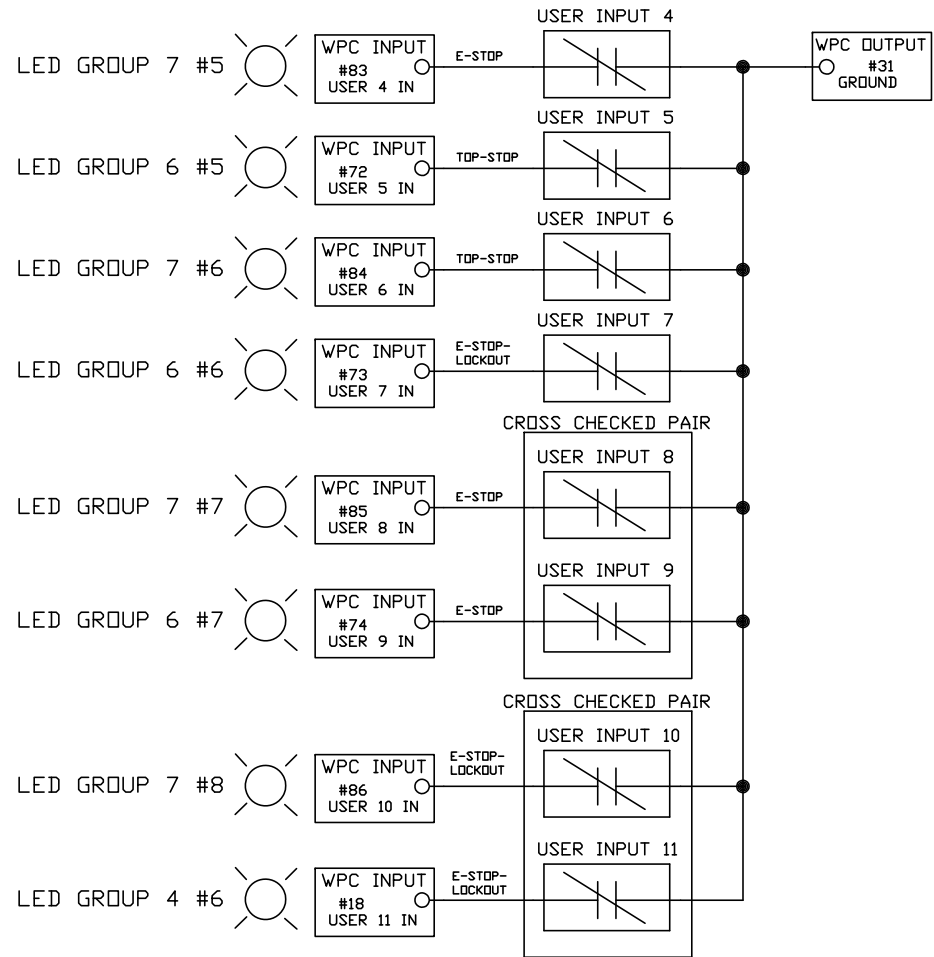
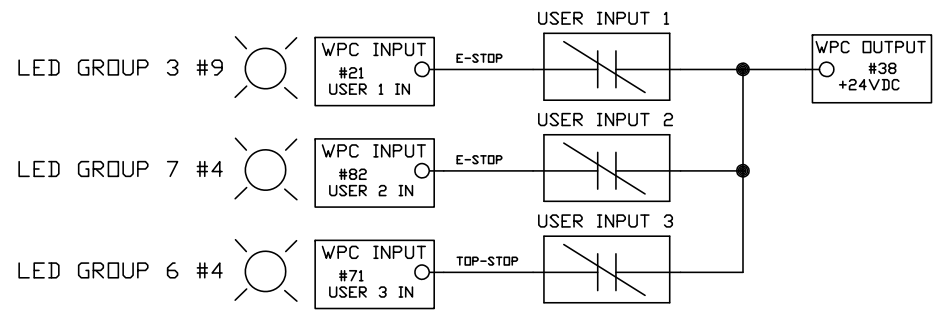
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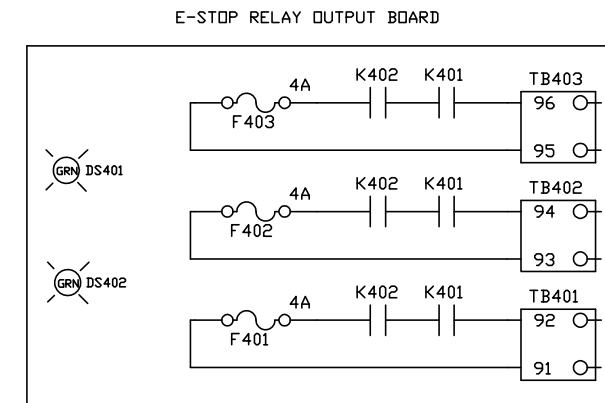
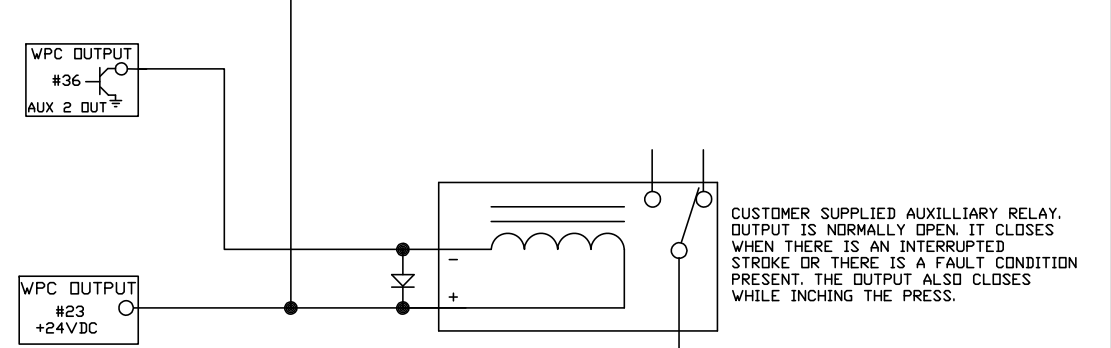
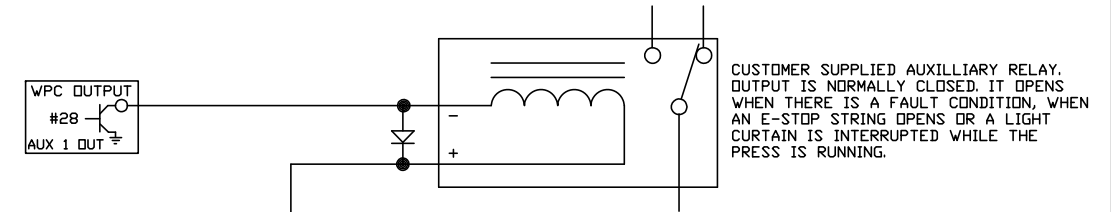
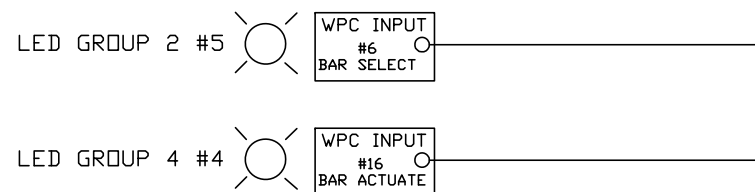
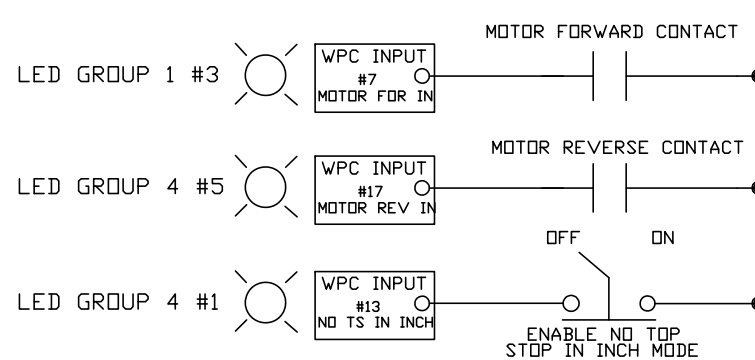
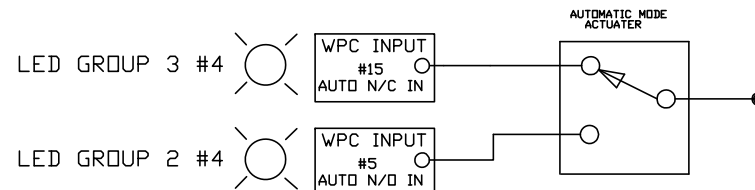
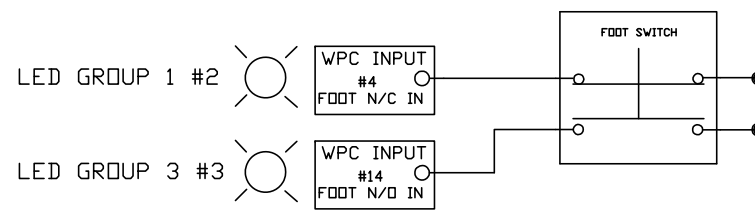
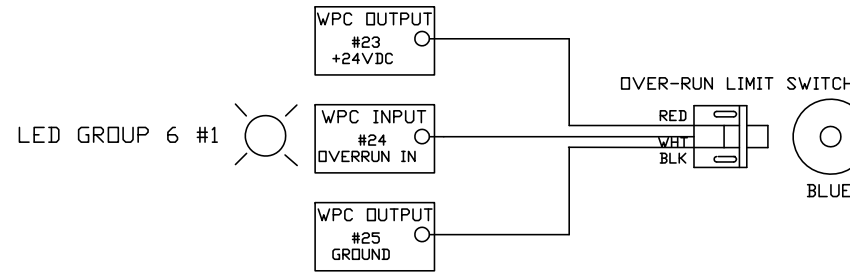
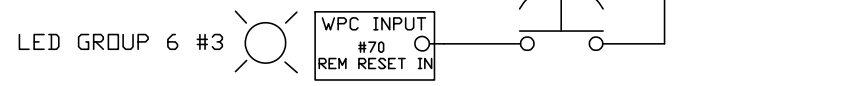
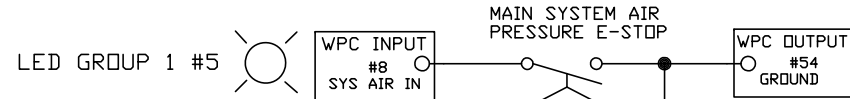
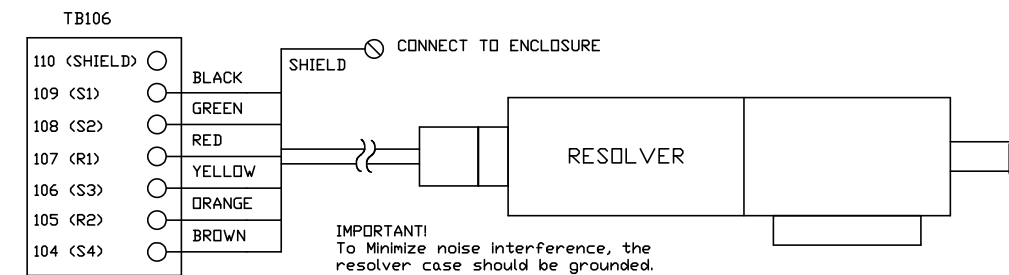
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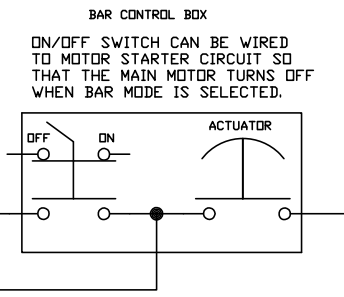
DRAWN	GVR	DATE	6/10/10	Wintriss Controls Group		
CHK						
APPROVALS				TITLE		
ENG.				WPC2000 OPERATOR STATION AND DISPLAY BOARD WIRING		
MFG.						
FILENAME				SIZE	DRAWING NUMBER	REV
REL				C	FIGURE 1	
SCALE				SHEET 1		



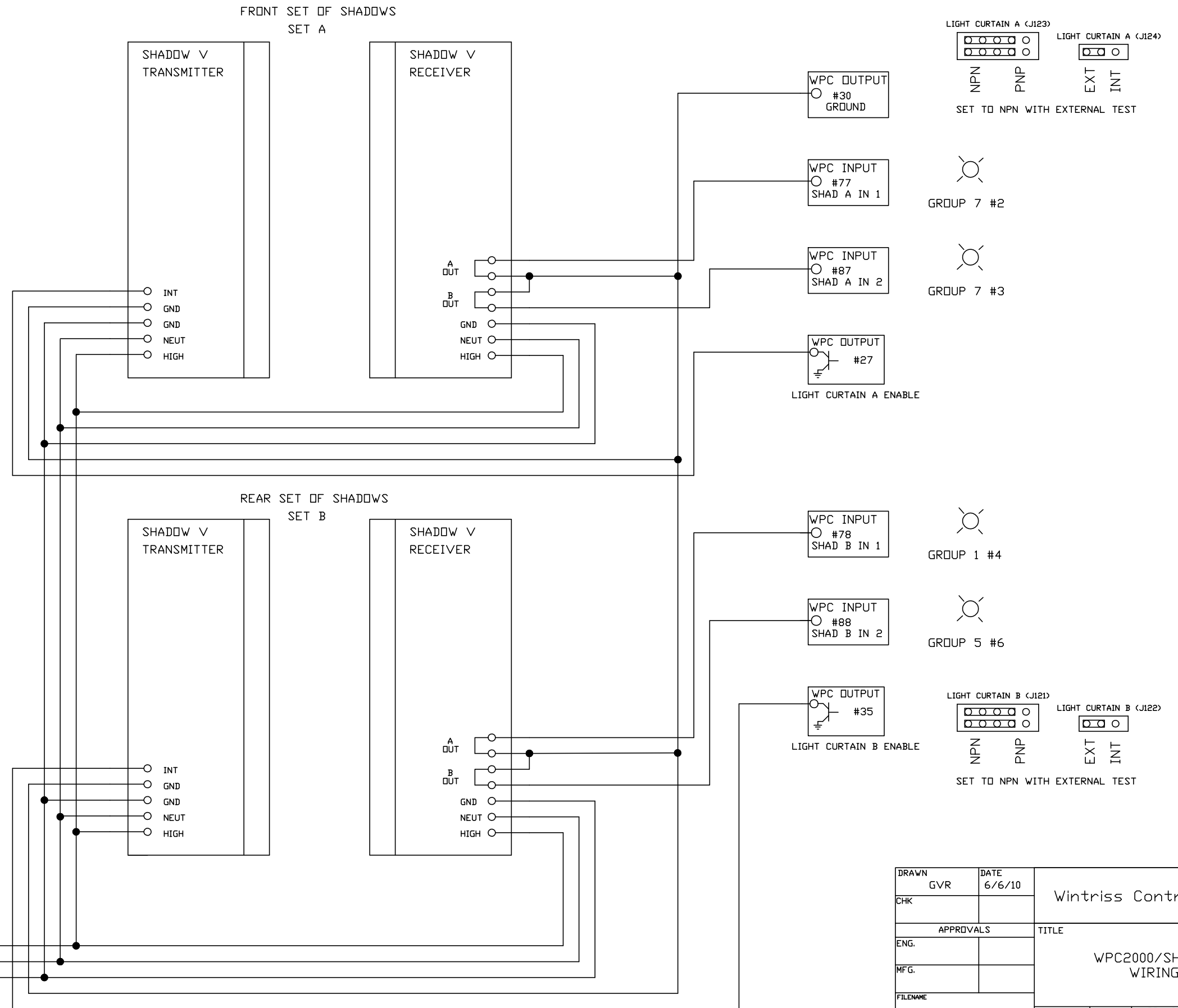
SWAP BLACK AND YELLOW WIRES TO CHANGE ROTATION



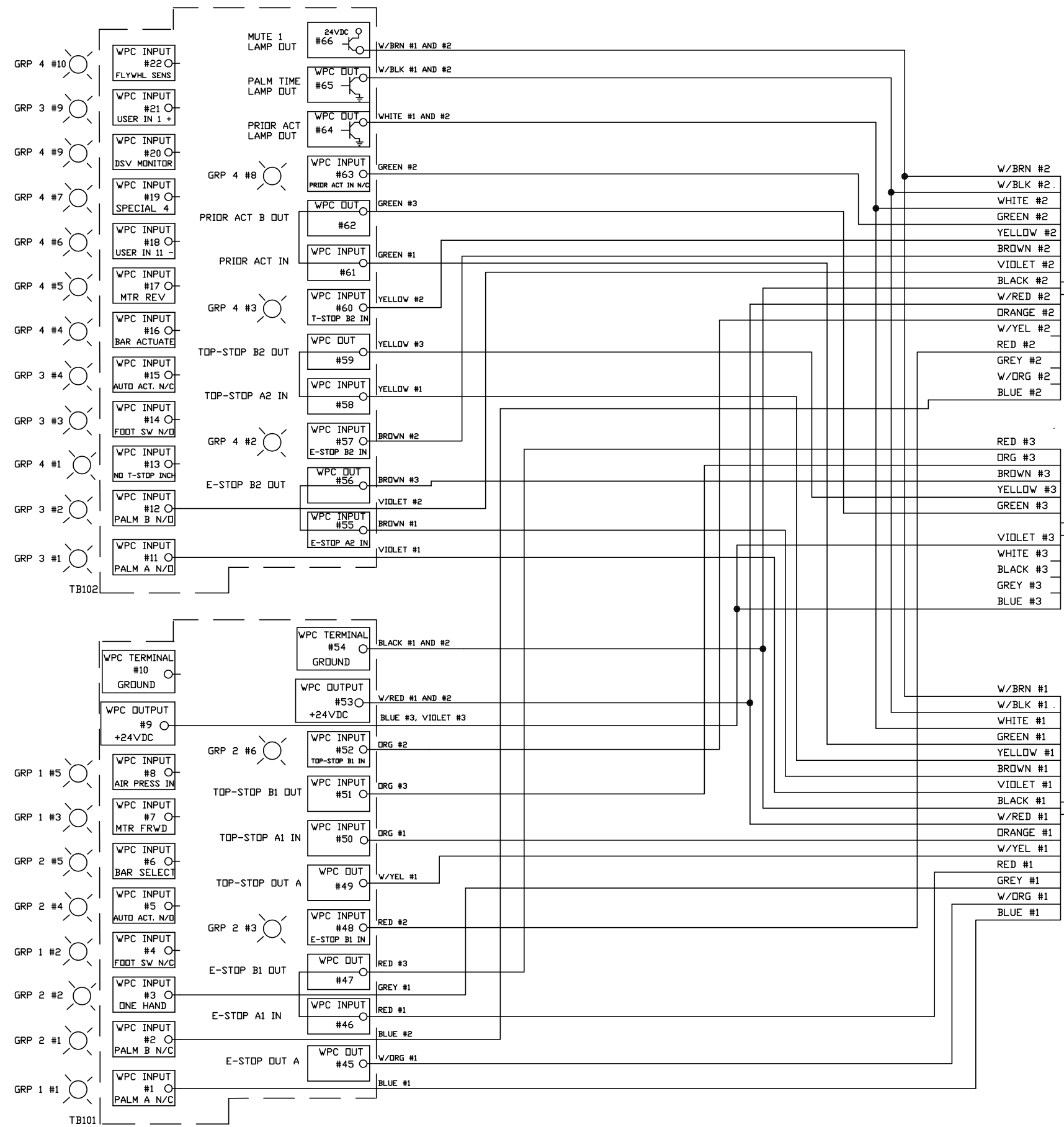
E-STOP OUTPUTS: THESE OUTPUTS ARE INTENDED TO INTERFACE WITH ANCILLARY EQUIPMENT SURROUNDING THE PRESS. THESE OUTPUTS ARE NORMALLY CLOSED. THEY OPEN IF THE E-STOP STRING IS INTERRUPTED, THE LIGHT CURTAIN IS INTERRUPTED OR CROSS-CHECKED USER INPUT IS OPEN.



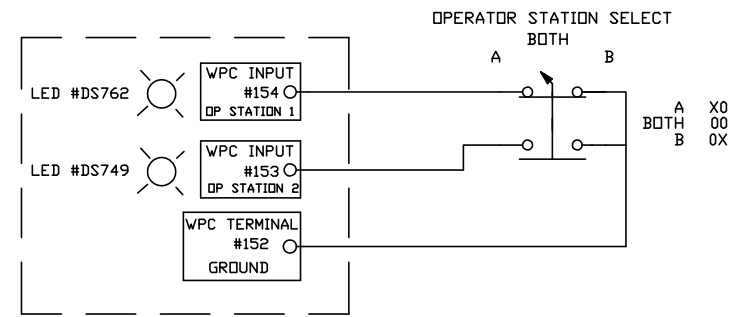
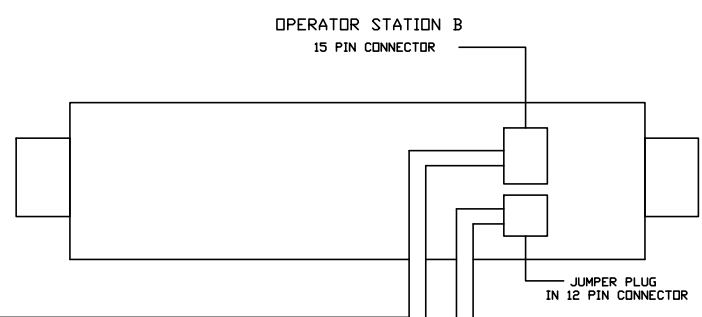
DRAWN	GVR	DATE	6/6/10	Wintriss Controls Group		
CHK		APPROVALS			TITLE	
ENG.		MFG.			WPC2000 STAND ALONE EXTERNAL WIRING	
FILENAME		REL		SIZE	DRAWING NUMBER	REV
				C	FIGURE 2	
SCALE				SHEET 1		



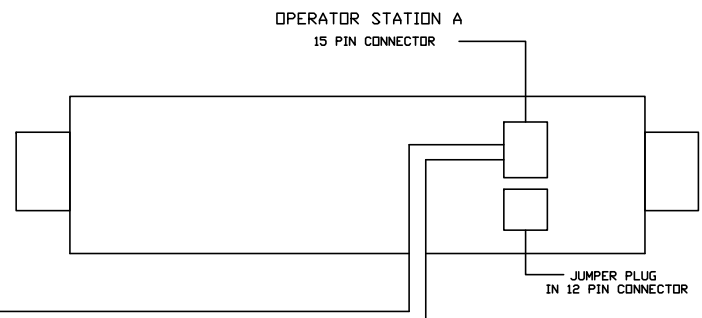
DRAWN GVR	DATE 6/6/10	Wintriss Controls Group		
CHK		TITLE		
APPROVALS		WPC2000/SHADOW V WIRING		
ENG.		SIZE C	DRAWING NUMBER FIGURE 3	REV
MFG.				
FILENAME				
REL				
SCALE		SHEET 1		



- W/BRN #2
 - W/BLK #2
 - WHITE #2
 - GREEN #2
 - YELLOW #2
 - BROWN #2
 - VIOLET #2
 - BLACK #2
 - W/RED #2
 - ORANGE #2
 - W/YEL #2
 - RED #2
 - GREY #2
 - W/DRG #2
 - BLUE #2
-
- RED #3
 - DRG #3
 - BROWN #3
 - YELLOW #3
 - GREEN #3
 - VIOLET #3
 - WHITE #3
 - BLACK #3
 - GREY #3
 - BLUE #3
-
- W/BRN #1
 - W/BLK #1
 - WHITE #1
 - GREEN #1
 - YELLOW #1
 - BROWN #1
 - VIOLET #1
 - BLACK #1
 - W/RED #1
 - ORANGE #1
 - W/YEL #1
 - RED #1
 - GREY #1
 - W/DRG #1
 - BLUE #1

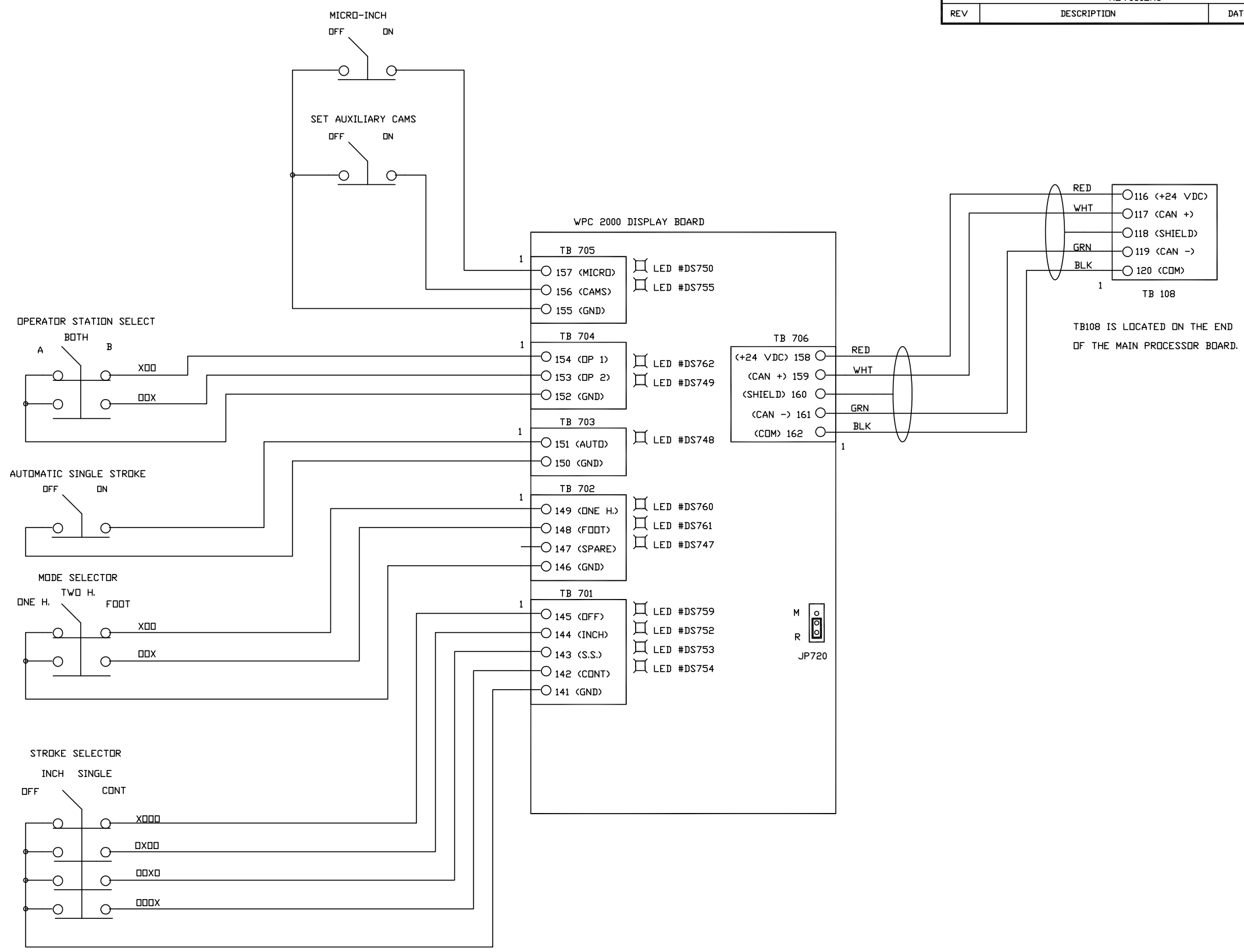


A SELECTED WITH OP STATION 1 GROUNDED
 B SELECTED WHEN OP STATION 2 GROUNDED
 BOTH SELECTED WITH NONE GROUNDED



DRAWN	GVR	DATE	6/6/10	Wintriss Controls Group		
CHK				APPROVALS		
ENG.				TITLE		
MFG.				WPC2000 DUAL OPERATOR STATION WIRING		
FILENAME				SIZE	DRAWING NUMBER	REV
REL				C	FIGURE 4	
SCALE				SHEET 1		

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



TB108 IS LOCATED ON THE END OF THE MAIN PROCESSOR BOARD.

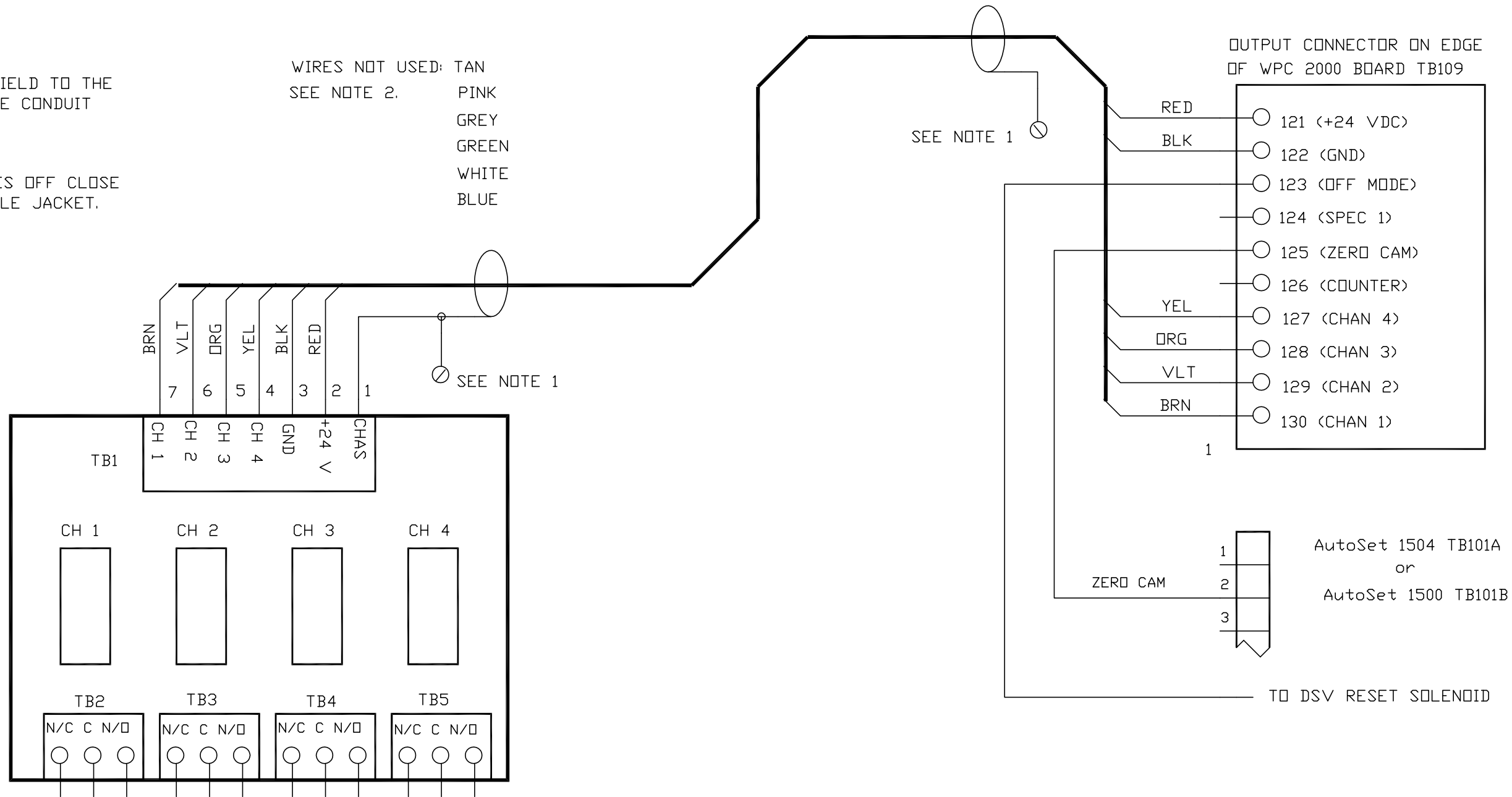
DRAWN	ADB	DATE	6/9/10		
CHK.			WINTRISS CONTROLS GROUP		
APPROVALS		TITLE			
ENG.		WPC 2000 MODE SELECTOR SWITCHES WIRING			
MFG.					
FILENAME		CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
REL			C	FIGURE 5	
SCALE				SHEET	OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

NOTE 1: CONNECT THE SHIELD TO THE ENCLOSURE CLOSE TO THE CONDUIT ENTRY POINT.

NOTE 2: CUT THESE WIRES OFF CLOSE TO THE END OF THE CABLE JACKET.

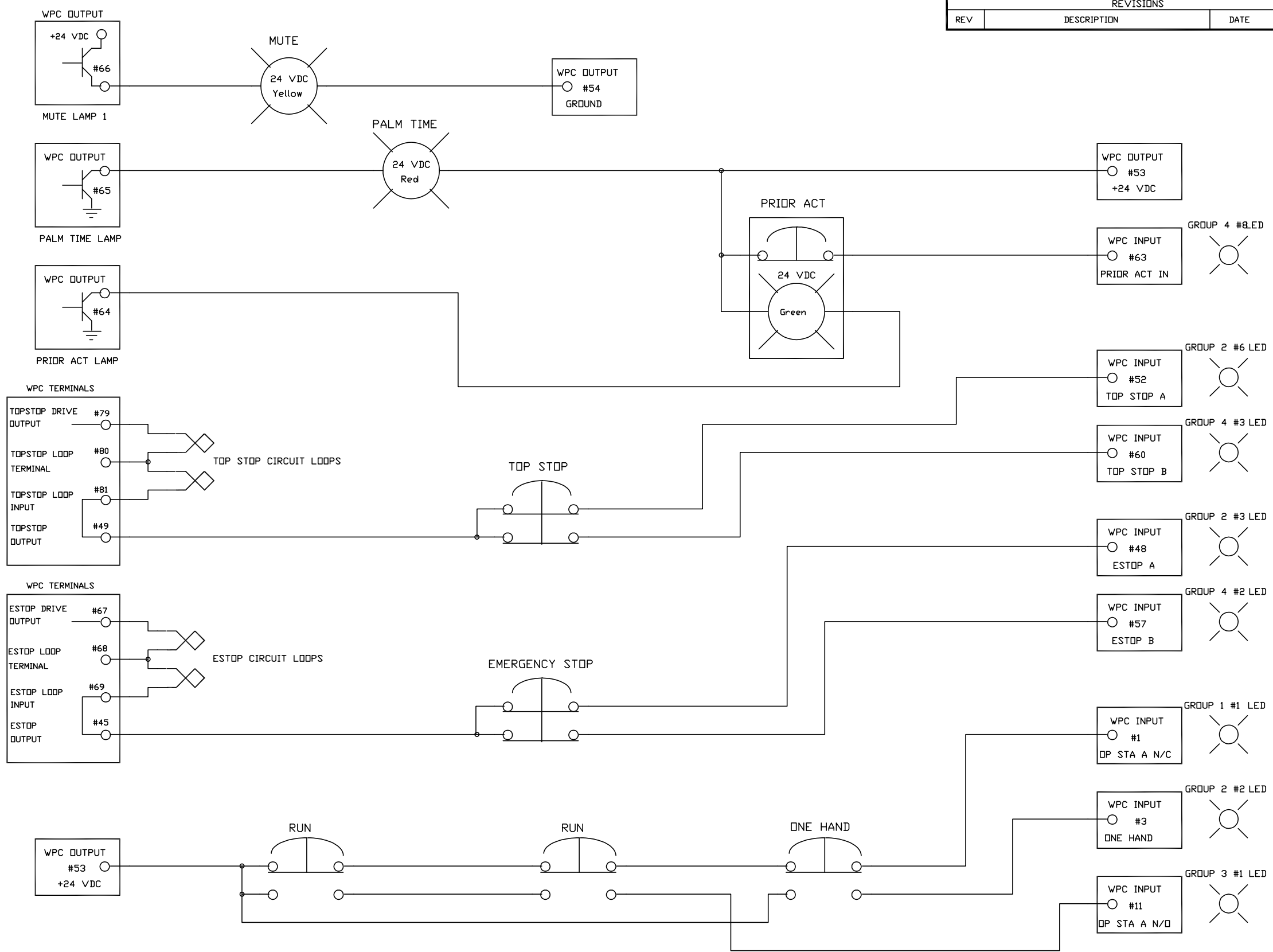
WIRES NOT USED:
 TAN
 PINK
 GREY
 GREEN
 WHITE
 BLUE



THE CUSTOMER CONNECTS THE ANCILARY EQUIPMENT TO THESE RELAY OUTPUT TERMINALS.

DRAWN	ADB	DATE	6/9/10	WINTRISS CONTROLS GROUP		
CHK.						
APPROVALS				TITLE WPC 2000 CAM OUTPUT WIRING		
ENG.						
MFG.						
FILENAME		CODE IDENT NO.		SIZE	DRAWING NUMBER	REV
REL				B	FIGURE 6	
SCALE					SHEET	OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

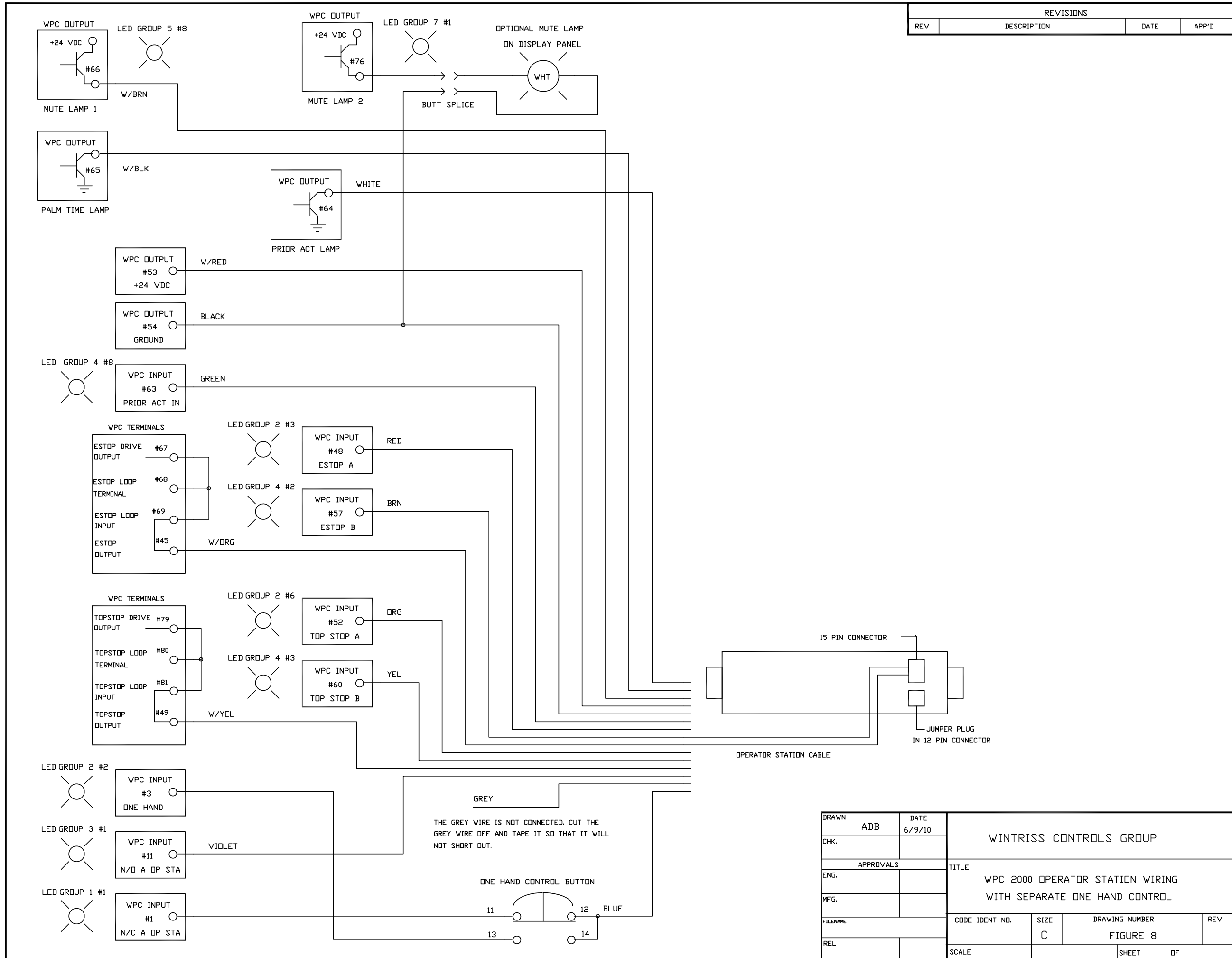


NOTE: FOR NO ONE HAND BUTTON JUST CONNECT THE RUN BUTTON N/C CONNECTION DIRECTLY TO WPC INPUT #1. LEAVE ONE HAND INPUT #3 WITH NO CONNECTION.

Note: Ensure that on any non-Wintriss operator station the Run buttons comply with the requirements in Table B-2 on page B-2.

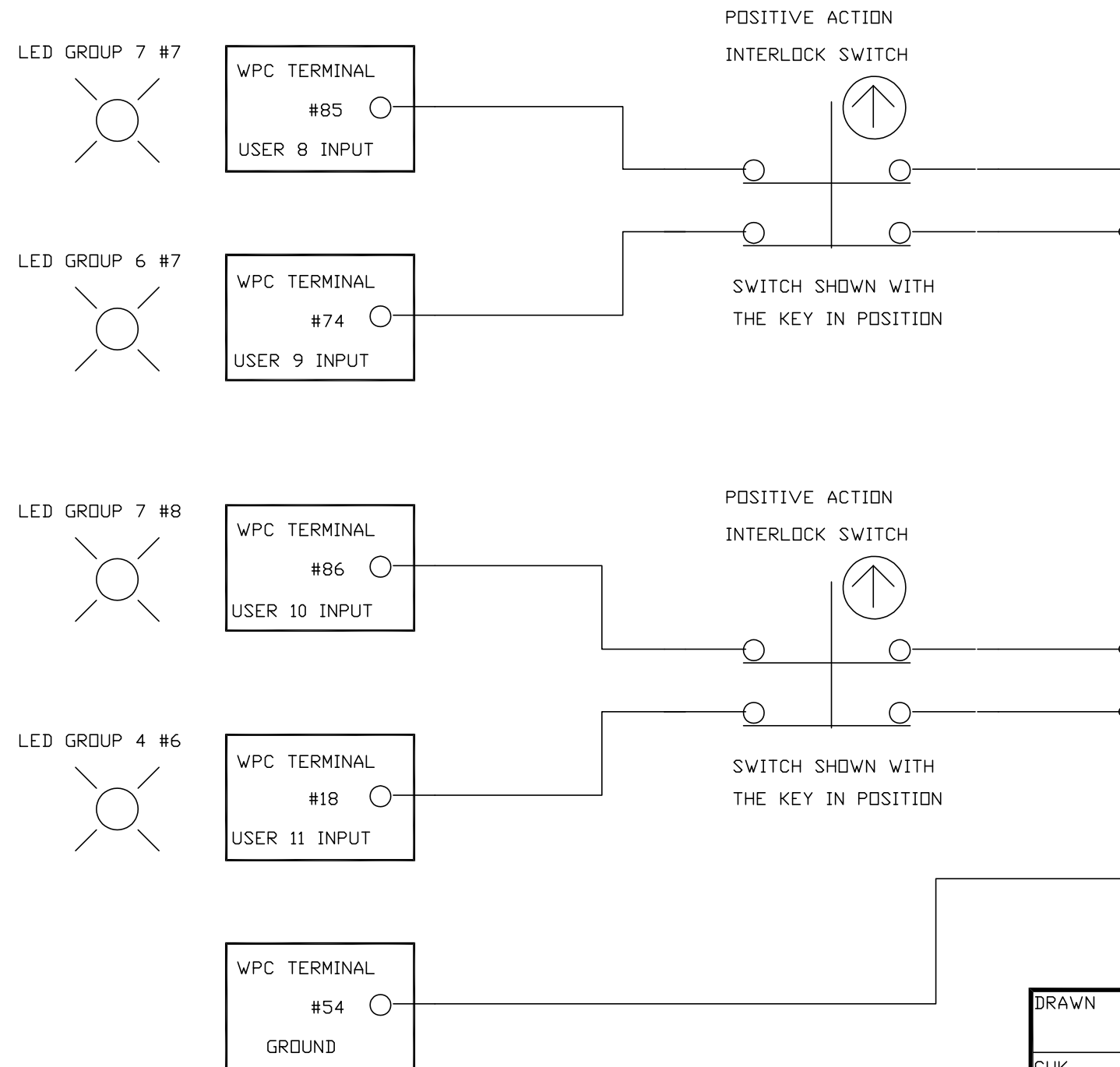
DRAWN	ADB	DATE	1/24/13	WINTRISS CONTROLS GROUP		
CHK.						
APPROVALS				TITLE		
ENG.				WPC 2000 DEM OPERATOR STATION WITH SEPARATE ONE HAND CONTROL		
MFG.				CODE IDENT NO.	SIZE	DRAWING NUMBER
REL.				C		FIGURE 7
				SCALE		SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN	ADB	DATE	6/9/10	WINTRISS CONTROLS GROUP			
CHK.				TITLE			
APPROVALS				WPC 2000 OPERATOR STATION WIRING WITH SEPARATE ONE HAND CONTROL			
ENG.				CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
MFG.					C	FIGURE 8	
REL				SCALE		SHEET	OF

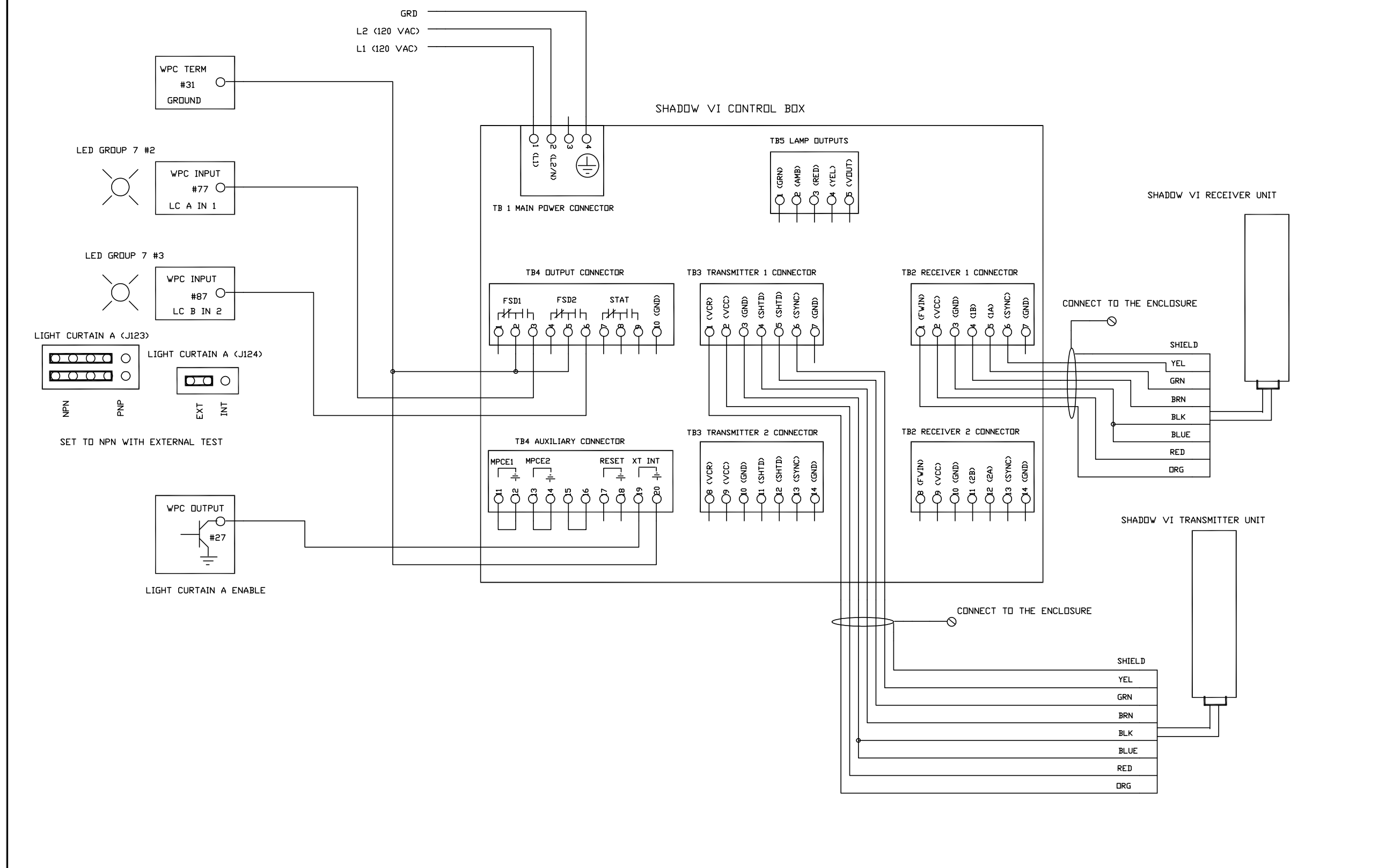
REVISIONS			
REV	DESCRIPTION	DATE	APP'D



THESE TWO CONTACTS MUST WORK TOGETHER.
 IF EITHER SWITCH OPENS AN ESTOP WILL OCCUR.
 IF THE TWO SWITCHES DO NOT BOTH OPEN WITHIN
 APPROX. 100 MSEC THEN A FAULT WILL OCCUR.

DRAWN	ADB	DATE	11/19/10		
CHK.			WINTRISS CONTROLS GROUP		
APPROVALS		TITLE			
ENG.		CROSS CHECKED USER INTERLOCKS WITH			
MFG.		POSITIVE ACTION INTERLOCKS			
FILENAME		CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
REL			B	FIGURE 9	
SCALE				SHEET	OF

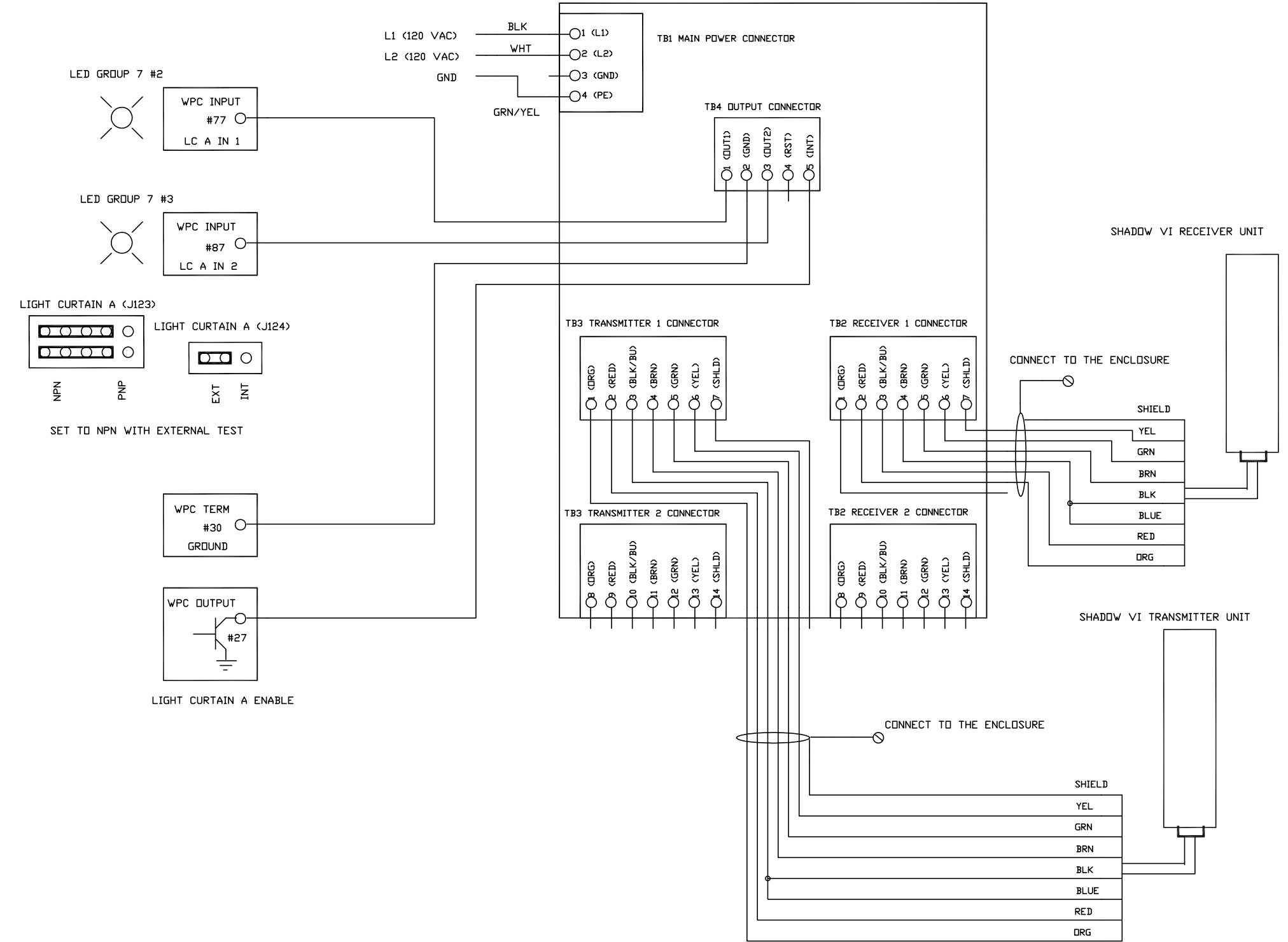
REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN	ADB	DATE	6/9/10	WINTRISS CONTROLS GROUP		
CHK.				TITLE		
	APPROVALS					
ENG.				WPC 2000 SHADOW VI A WIRING		
MFG.						
FILENAME				CODE IDENT NO.	SIZE	DRAWING NUMBER
REL					C	FIGURE 10
				SCALE		SHEET OF

SHADOW VI INTEGRATION CONTROL BOX

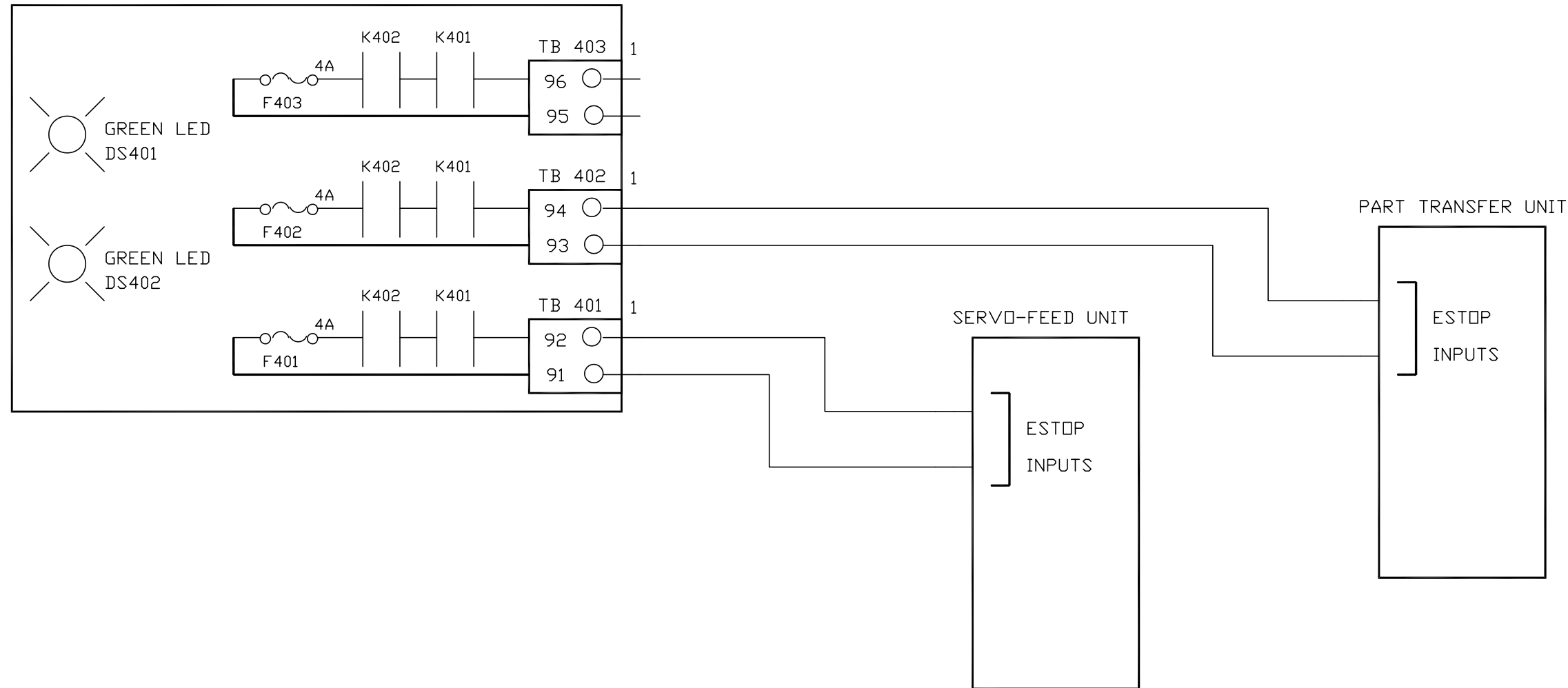
REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN	ADB	DATE	6/9/10		
CHK.	WINTRISS CONTROLS GROUP				
APPROVALS		TITLE			
ENG.	WPC 2000 SHADOW VI				
MFG.	INTEGRATION A WIRING				
FILENAME	CODE IDENT NO.	SIZE	DRAWING NUMBER	REV	
REL		C	FIGURE 11		
SCALE			SHEET OF		

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

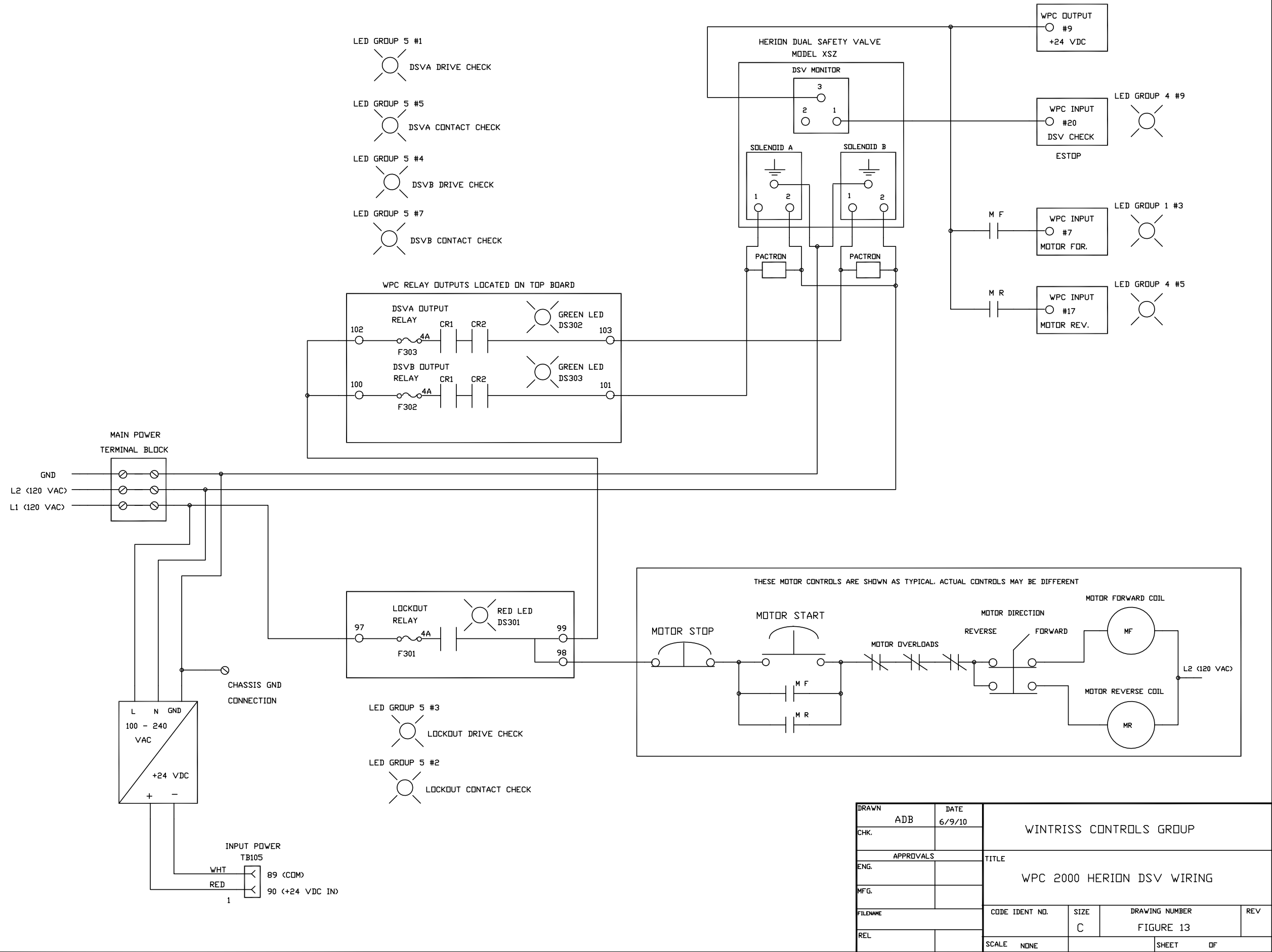
AUXILIARY ESTOP RELAY OUTPUTS LOCATED ON TOP BOARD



DRAWN	ADB	DATE	6/9/10		
CHK.			WINTRISS CONTROLS GROUP		
APPROVALS		TITLE			
ENG.		WPC 2000 AUXILIARY ESTOP OUTPUTS WIRING			
MFG.		CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
FILENAME			B	FIGURE 12	
REL		SCALE		SHEET	OF

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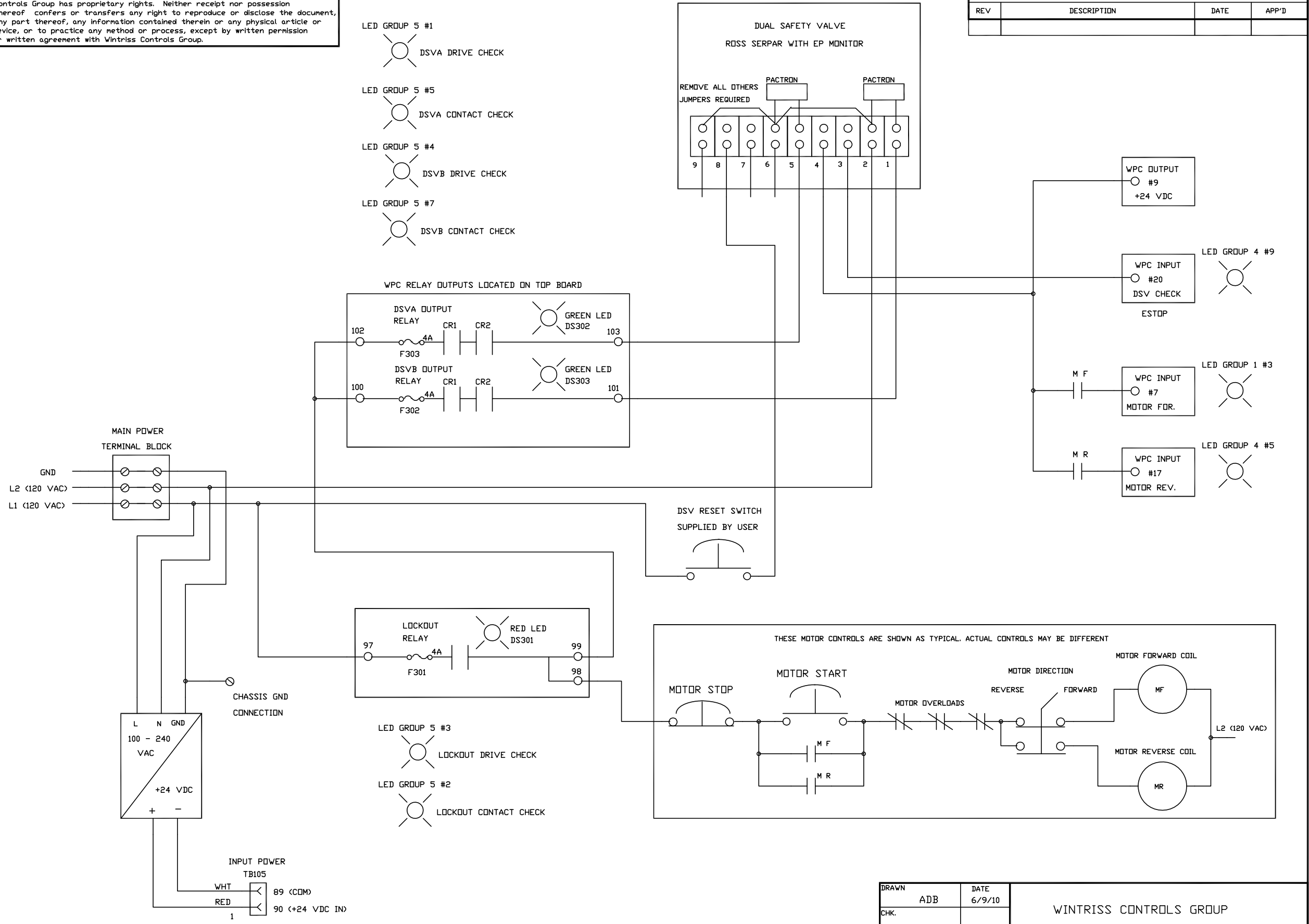
REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN	ADB	DATE	WINTRISS CONTROLS GROUP		
CHK.		6/9/10	TITLE		
APPROVALS			WPC 2000 HERION DSV WIRING		
ENG.			CODE IDENT NO.	SIZE	DRAWING NUMBER
MFG.				C	FIGURE 13
FILENAME			SCALE	NONE	SHEET
REL					OF

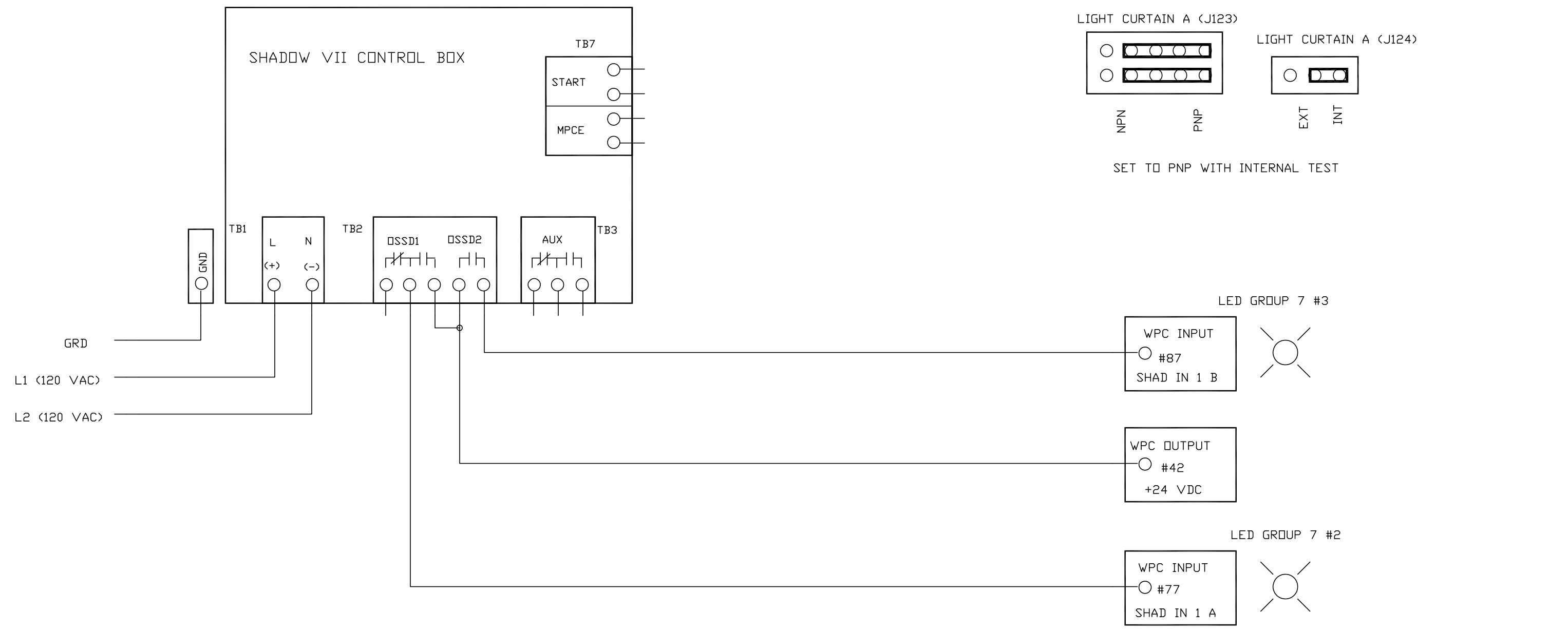
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REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN ADB	DATE 6/9/10	WINTRISS CONTROLS GROUP		
CHK.		TITLE WPC 2000 ROSS DSV WIRING		
APPROVALS		CODE IDENT NO.	SIZE C	DRAWING NUMBER FIGURE 14
ENG.		REL	SCALE NONE	REV
MFG.			SHEET	OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN	ADB	DATE	6/9/10		
CHK.					
APPROVALS		TITLE			
ENG.		WPC 2000 SHADOW VII WIRING			
MFG.		CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
FILENAME			B	FIGURE 15	
REL		SCALE		SHEET	OF

PROG/START SWITCH (MOUNTED ON DOOR)

ILLINOIS LOCK
ECI/T-502-ILC101

PROGRAM (left)
START(right)

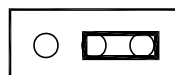
TB 105 WPC 2000
POWER CONNECTOR

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

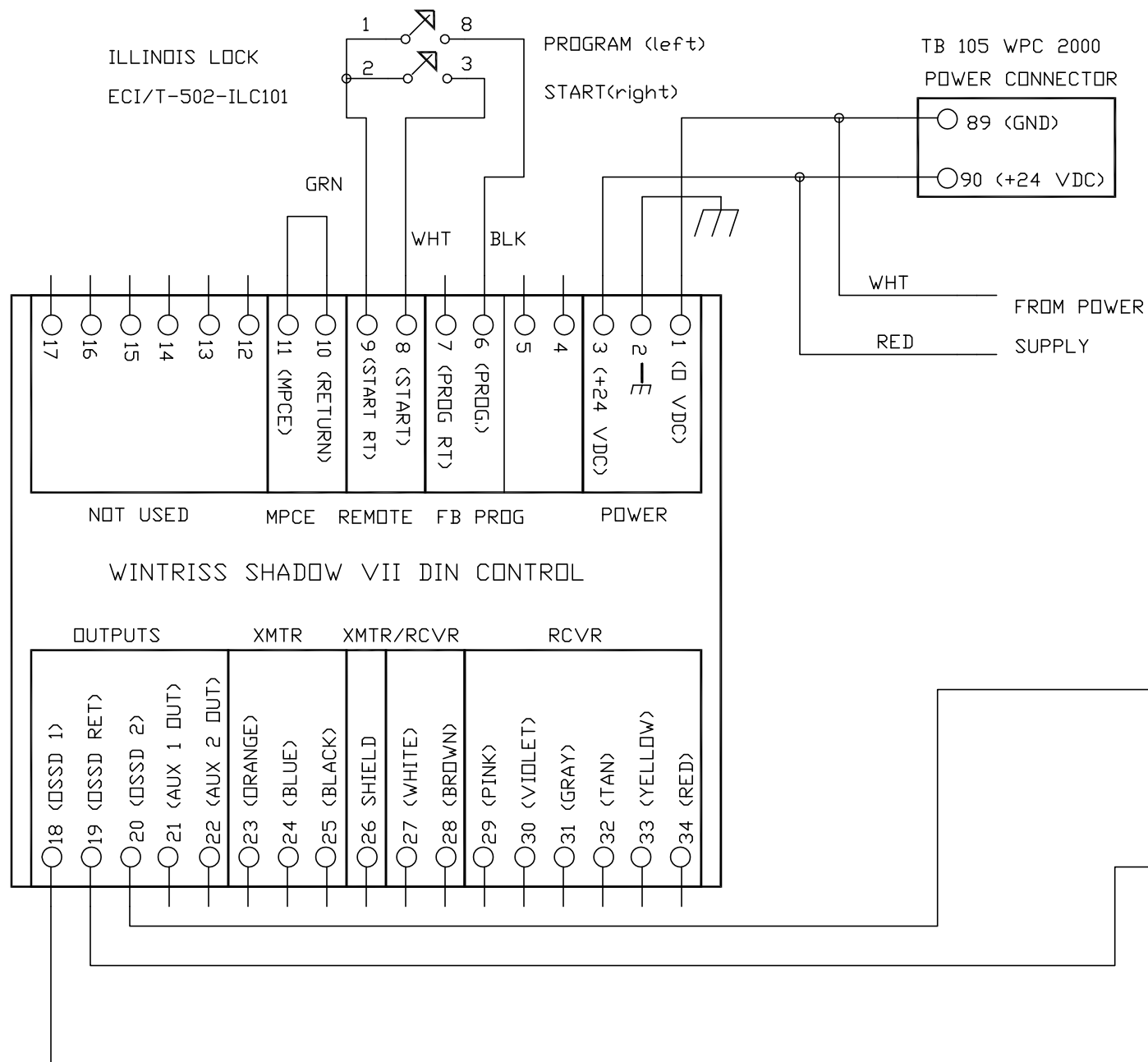
N.C. N.D.



1 2 3

REMOTE START SW.
SENSE SELECTION
SET TO N.D.

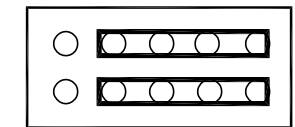
(LOCATED UNDER COVER
IN UPPER LEFT)



REVISIONS			
REV	DESCRIPTION	DATE	APP'D

WPC 2000 LIGHT CURTAIN MODE JUMPERS
(LOCATED ON WPC MAIN BOARD)

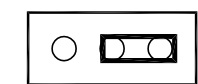
LIGHT CURTAIN A (J123)



NPN

PNP

LIGHT CURTAIN A (J124)

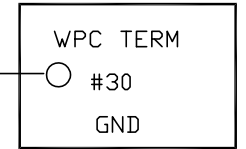
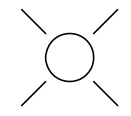
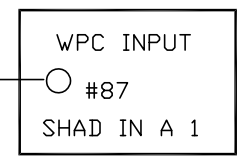


EXT

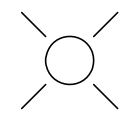
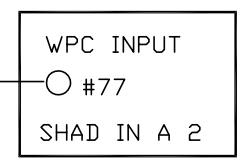
INT

SET TO PNP WITH INTERNAL TEST

LED GROUP 7 #3



LED GROUP 7 #2

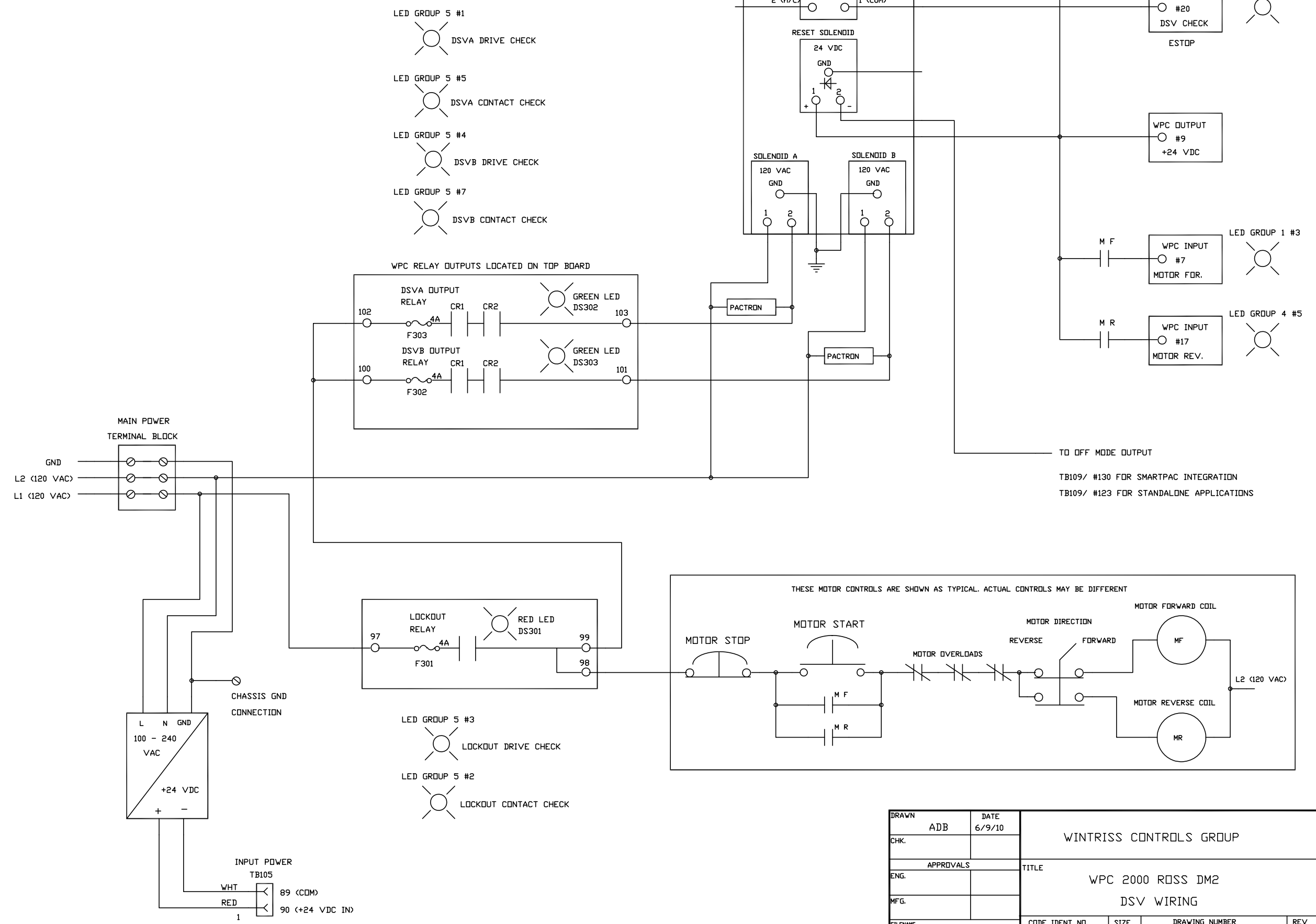


DRAWN	ADB	DATE	6/9/10	WINTRISS CONTROLS GROUP			
CHK.							
APPROVALS				TITLE			
ENG.				SHADOW VII DIN CONTROL			
MFG.				WPC 2000 WIRING DIAGRAM			
FILENAME		CODE IDENT NO.		SIZE	B	DRAWING NUMBER	
REL						FIGURE 16	REV
SCALE						SHEET	OF

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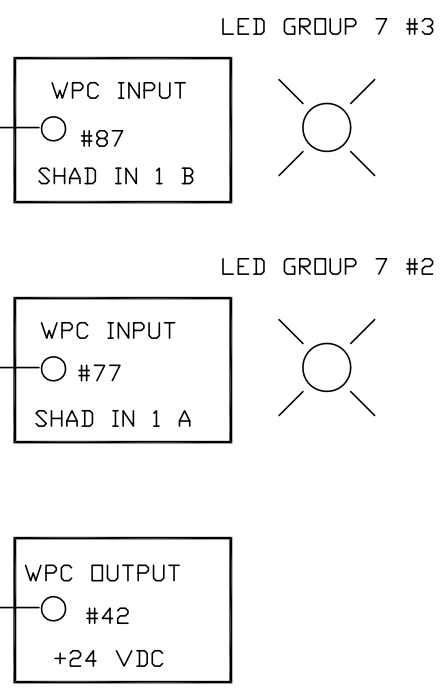
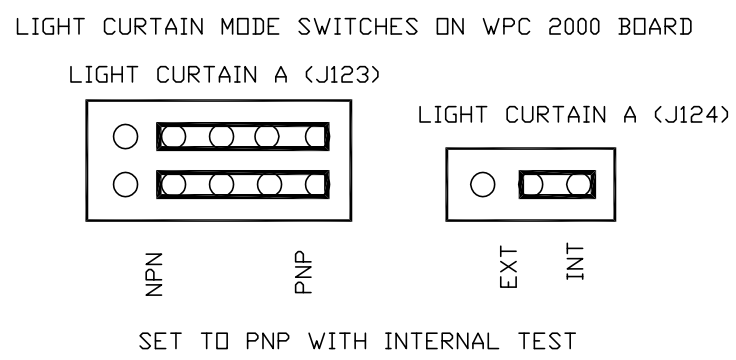
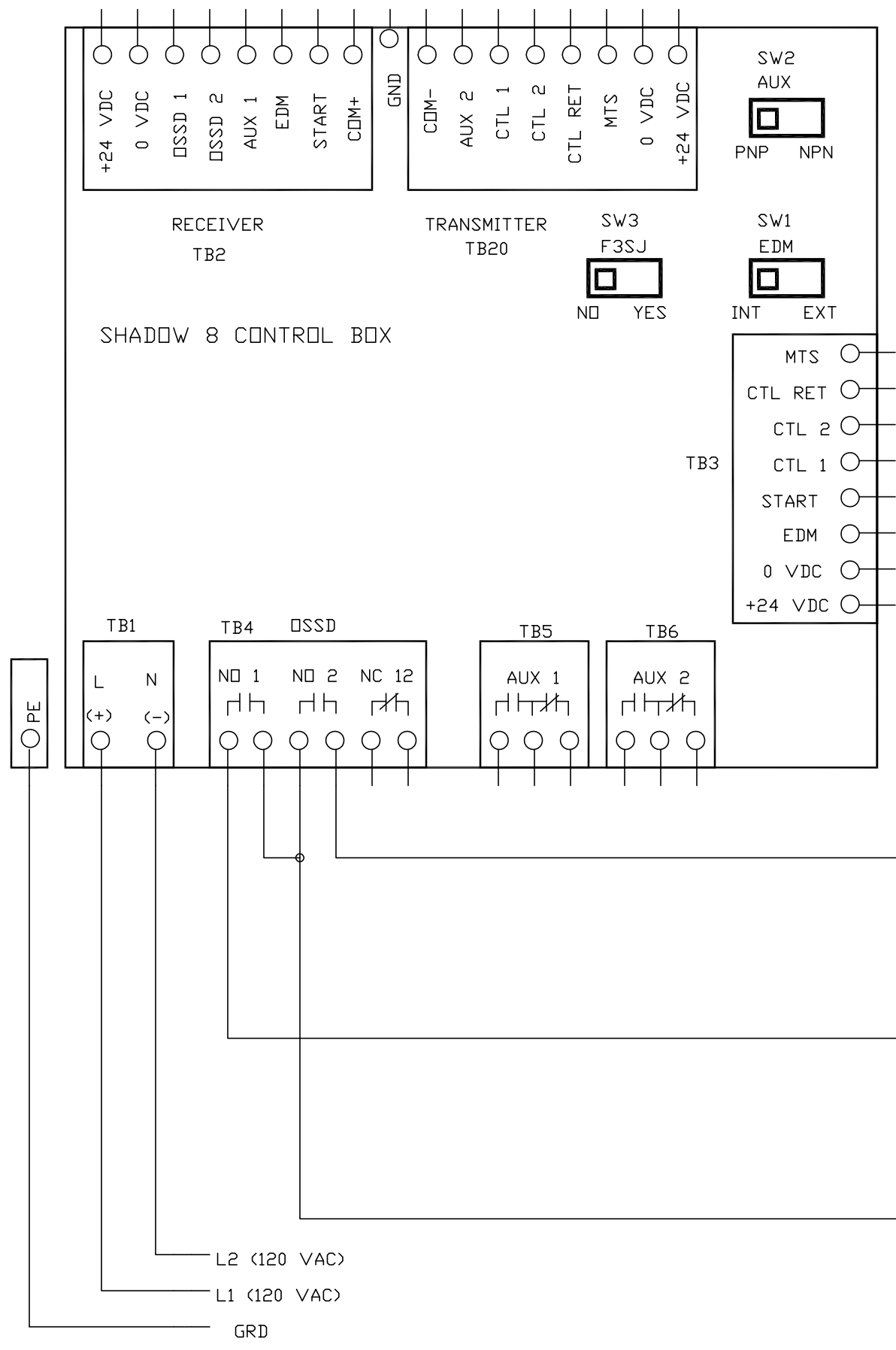
DSV MONITOR PRESSURE SWITCH IS CLOSED FROM PIN 1 TO 3 WHEN VALVE IS WORKING NORMALLY.

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



DRAWN ADB	DATE 6/9/10	WINTRISS CONTROLS GROUP		
CHK.		TITLE WPC 2000 ROSS DM2 DSV WIRING		
APPROVALS		CODE IDENT NO.	SIZE C	DRAWING NUMBER FIGURE 17
ENG.		REL	SCALE NONE	REV
FILENAME			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

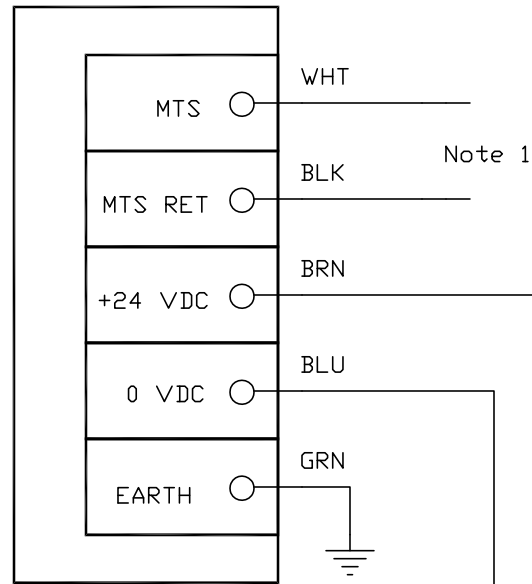
SET MODE SWITCH BEHIND THE FLIP DOOR
ON BOTTOM OF THE TRANSMITTER UNIT
AS FOLLOWS:

SCAN CODE A (Set to match receiver)	SW1 - OFF
SCAN CODE B	SW1 - ON
MTS DISABLED	SW2 - OFF

DRAWN	ADB	DATE	6/9/10		
CHK.			WINTRISS CONTROLS GROUP		
APPROVALS		TITLE	WPC 2000 AND SHADOW 8 CONTROL BOX		
ENG.		WIRING DIAGRAM			
MFG.		CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
FILENAME			B	FIGURE 18	
REL		SCALE		SHEET	OF

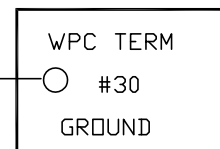
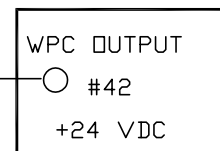
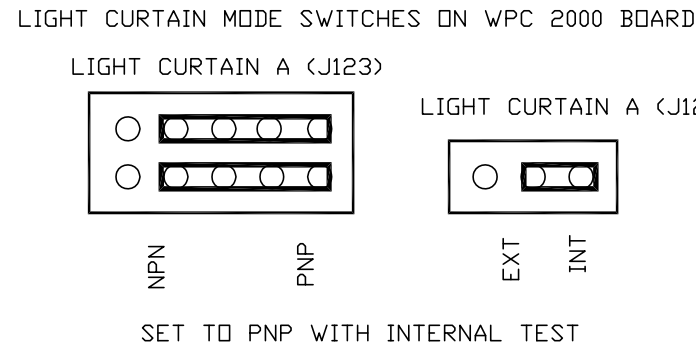
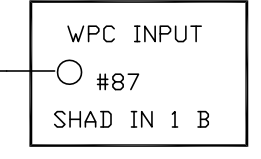
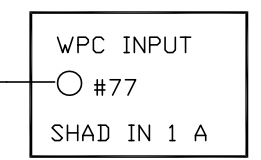
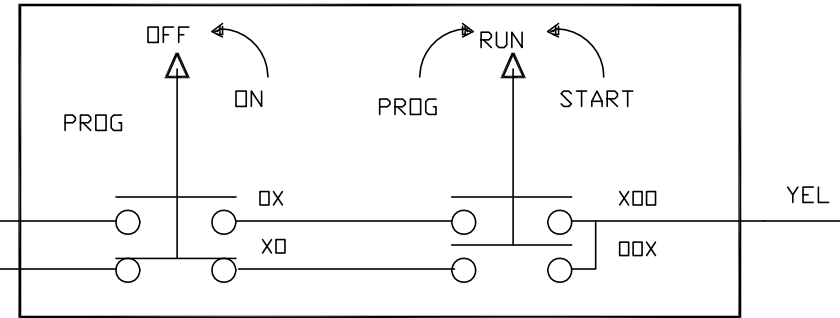
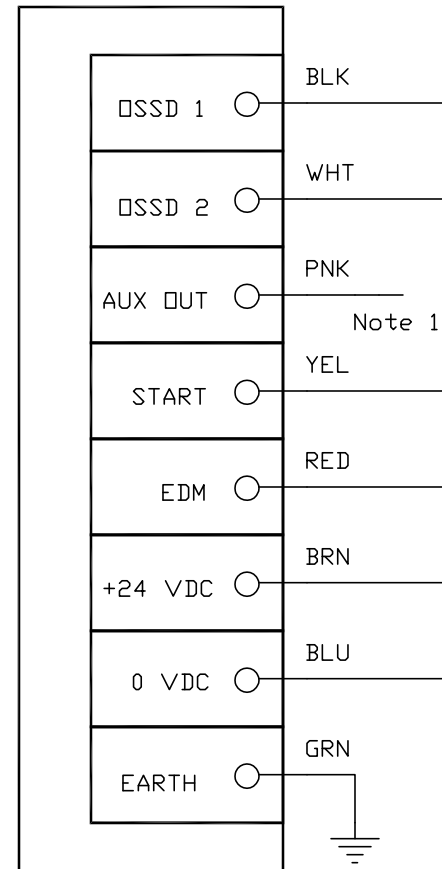
NOTE 1: The white and black wires from the transmitter and the pink wire from the receiver are not used.
Cut them off close to the enclosure entrance and tyrap them to the other wires.

SHADOW 8 TRANSMITTER



RECEIVER - 24 VDC @ 500MA MAX
TRANSMITTER - 24 VDC @ 285MA MAX
AUX OUT PNP 24 VDC @ 100MA MAX.

SHADOW 8 RECEIVER



REVISIONS			
REV	DESCRIPTION	DATE	APP'D

SET MODE SWITCHES SWA AND SWB BEHIND A FLIP DOOR ON BOTTOM OF THE RECEIVER UNIT AS FOLLOWS:

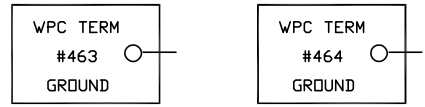
	SWA	SWB
FOR AUTOMATIC START	SW1 - OFF	OFF
EDM DISABLED	SW2 - OFF	OFF
SCAN CODE A (Set to match transmitter)	SW3 - OFF	OFF
SCAN CODE B	SW3 - ON	ON
FLOATING/BLANKING 1 BEAM DISABLED	SW4 - OFF	OFF
FLOATING/BLANKING 1 BEAM ENABLED	SW4 - ON	ON
FIXED BLANKING DISABLED	SW5 - OFF	OFF
FIXED BLANKING ENABLED	SW5 - 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:

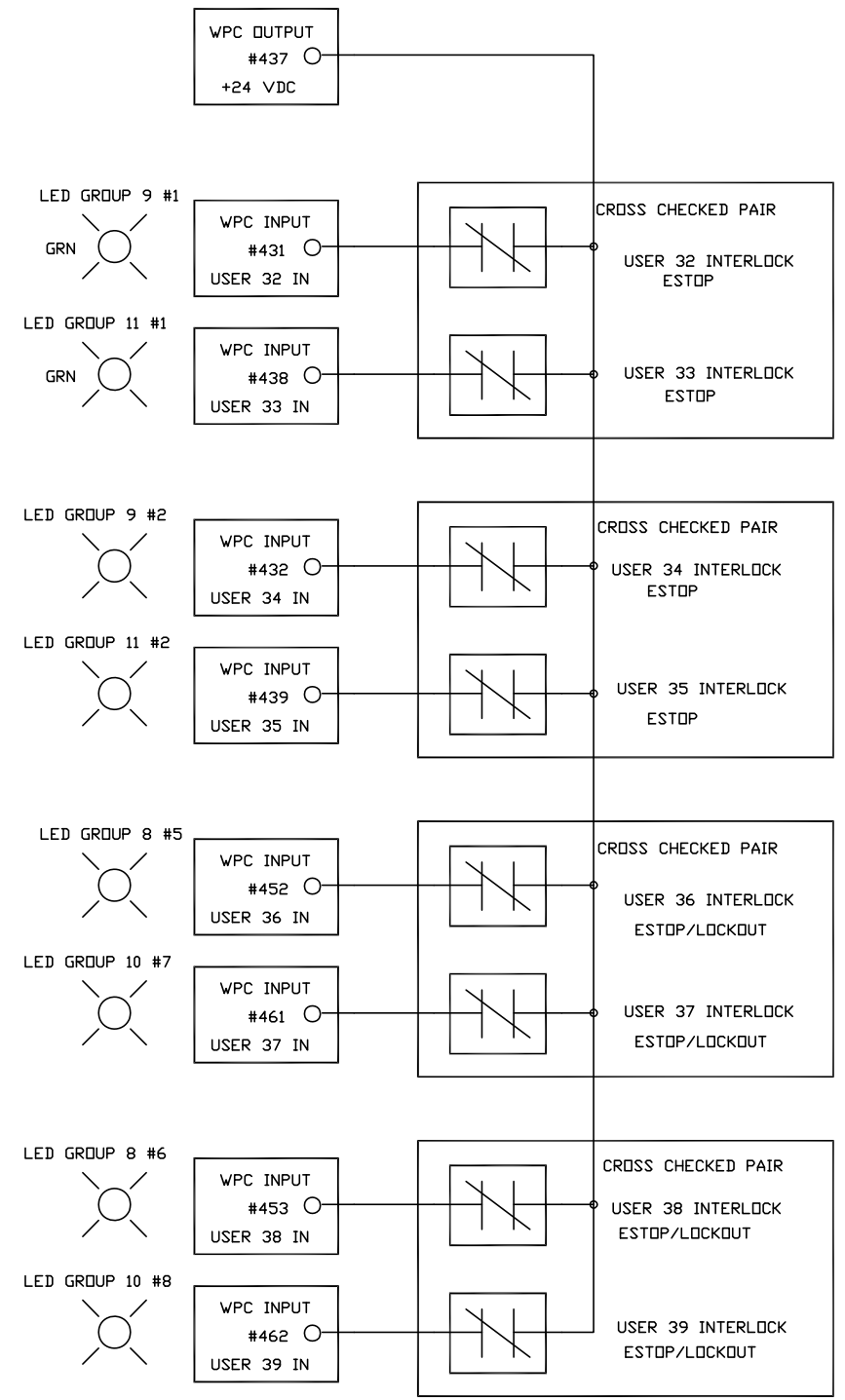
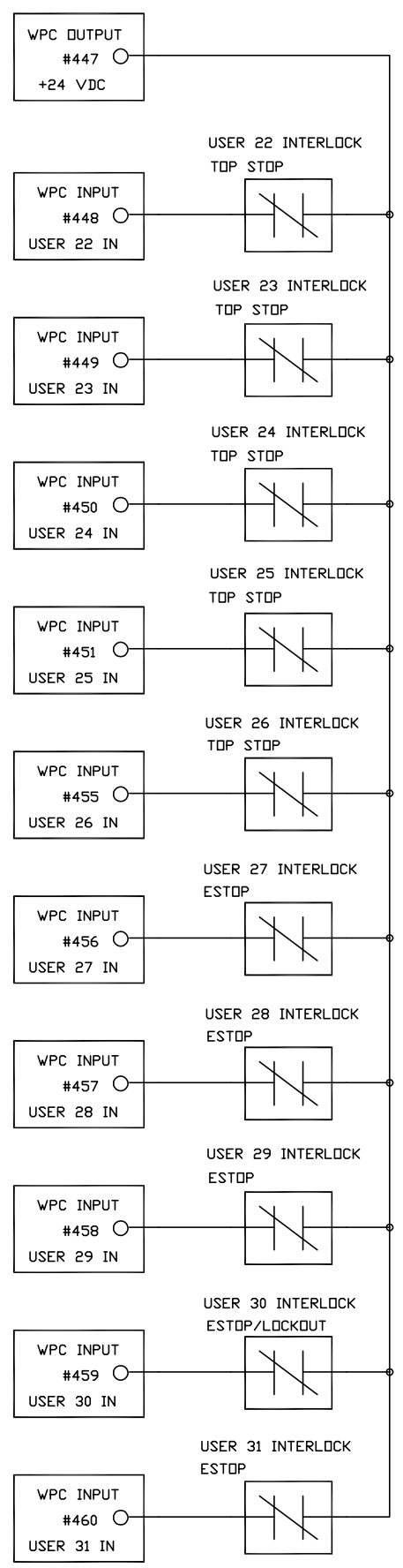
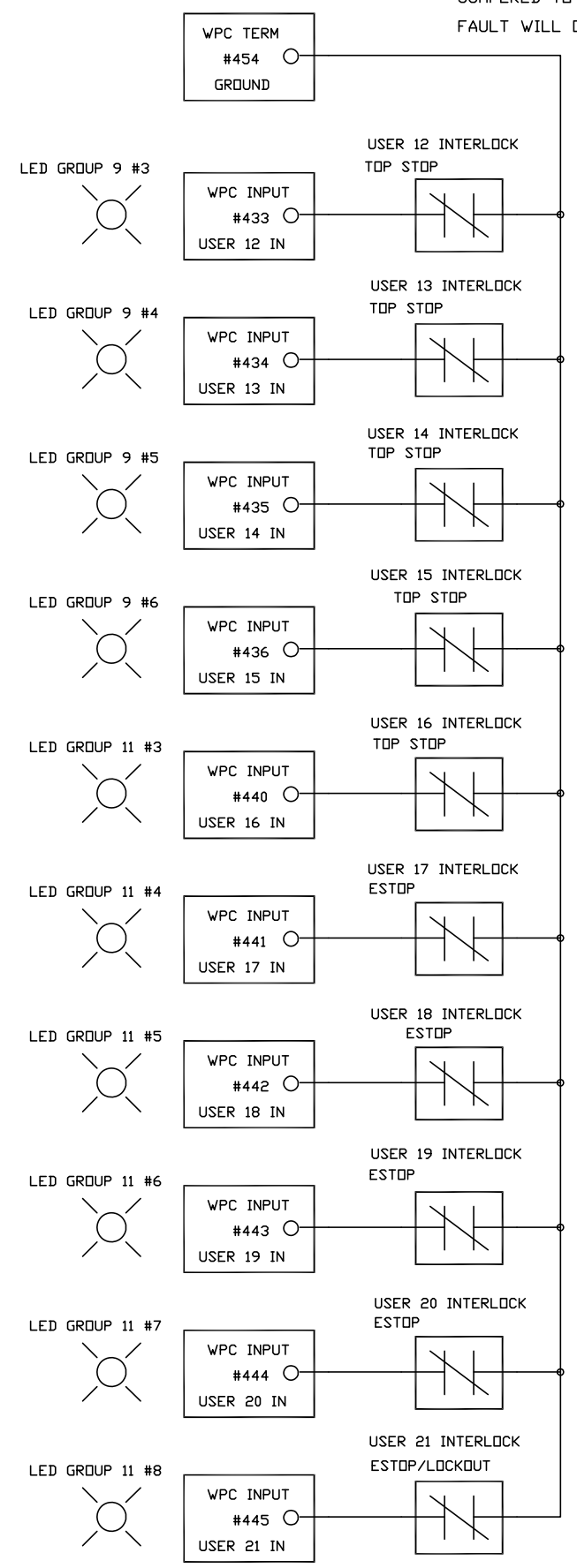
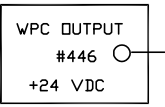
SCAN CODE A (Set to match receiver)	SW1 - OFF
SCAN CODE B	SW1 - ON
MTS DISABLED	SW2 - OFF

DRAWN	ADB	DATE	6/9/10		
CHK.			WINTRISS CONTROLS GROUP		
APPROVALS		TITLE			
ENG.		WPC 2000 AND SHADOW 8			
MFG.		WIRING DIAGRAM			
FILENAME		CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
REL			B	FIGURE 19	
SCALE				SHEET	OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



ALL THE USER INTERLOCKS MUST BE USED OR JUMPERED TO THE CORRECT VOLTAGE OR A FAULT WILL OCCUR.



DRAWN	ADB	DATE	6/9/10
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME		CODE IDENT NO.	
REL		SIZE	C
		DRAWING NUMBER	FIGURE 20
			REV
		SCALE	SHEET OF

WINTRISS CONTROLS GROUP

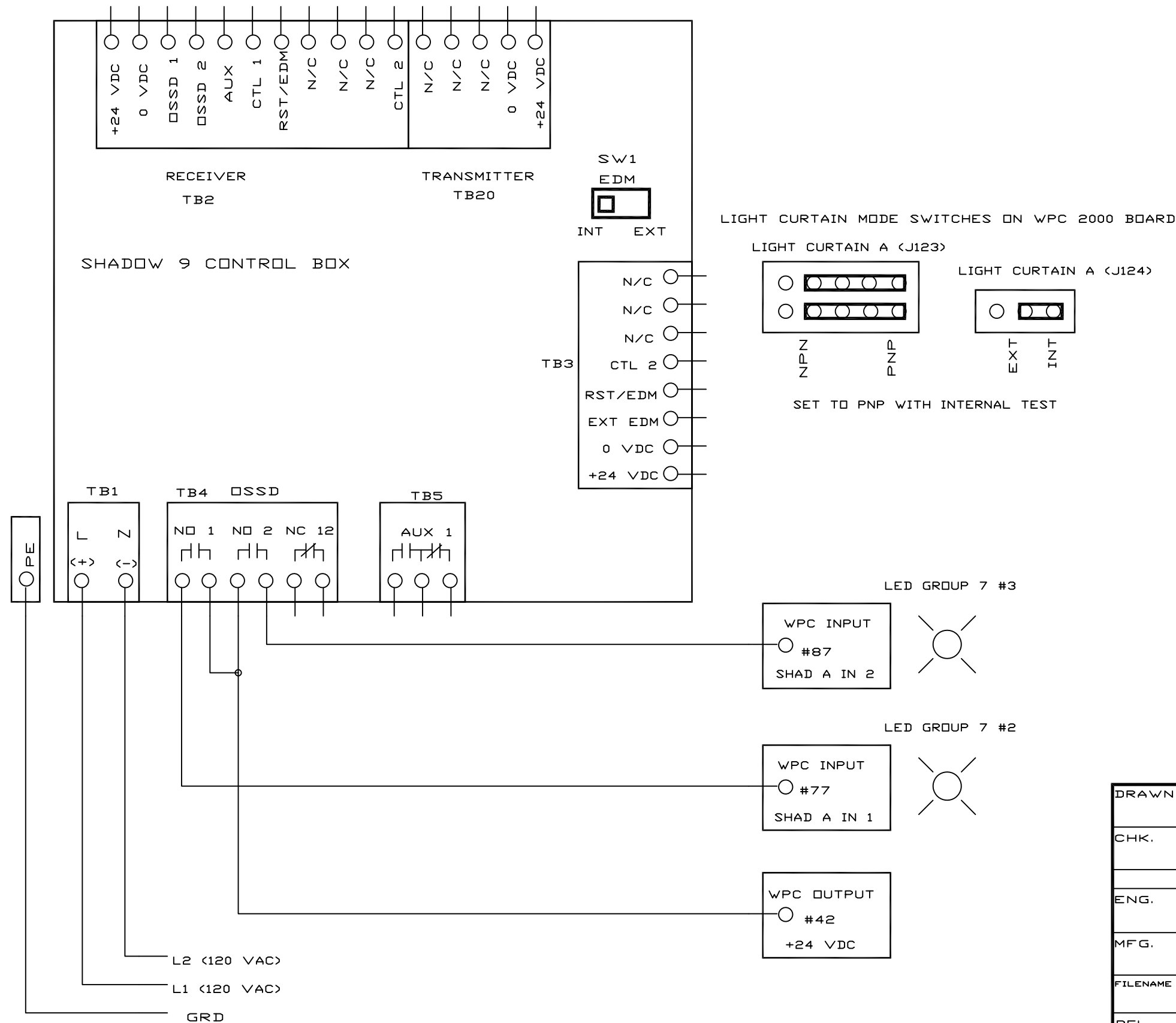
TITLE
WPC 2000 PLUS OPTION 1 USER INPUT EXTERNAL WIRING

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

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.

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

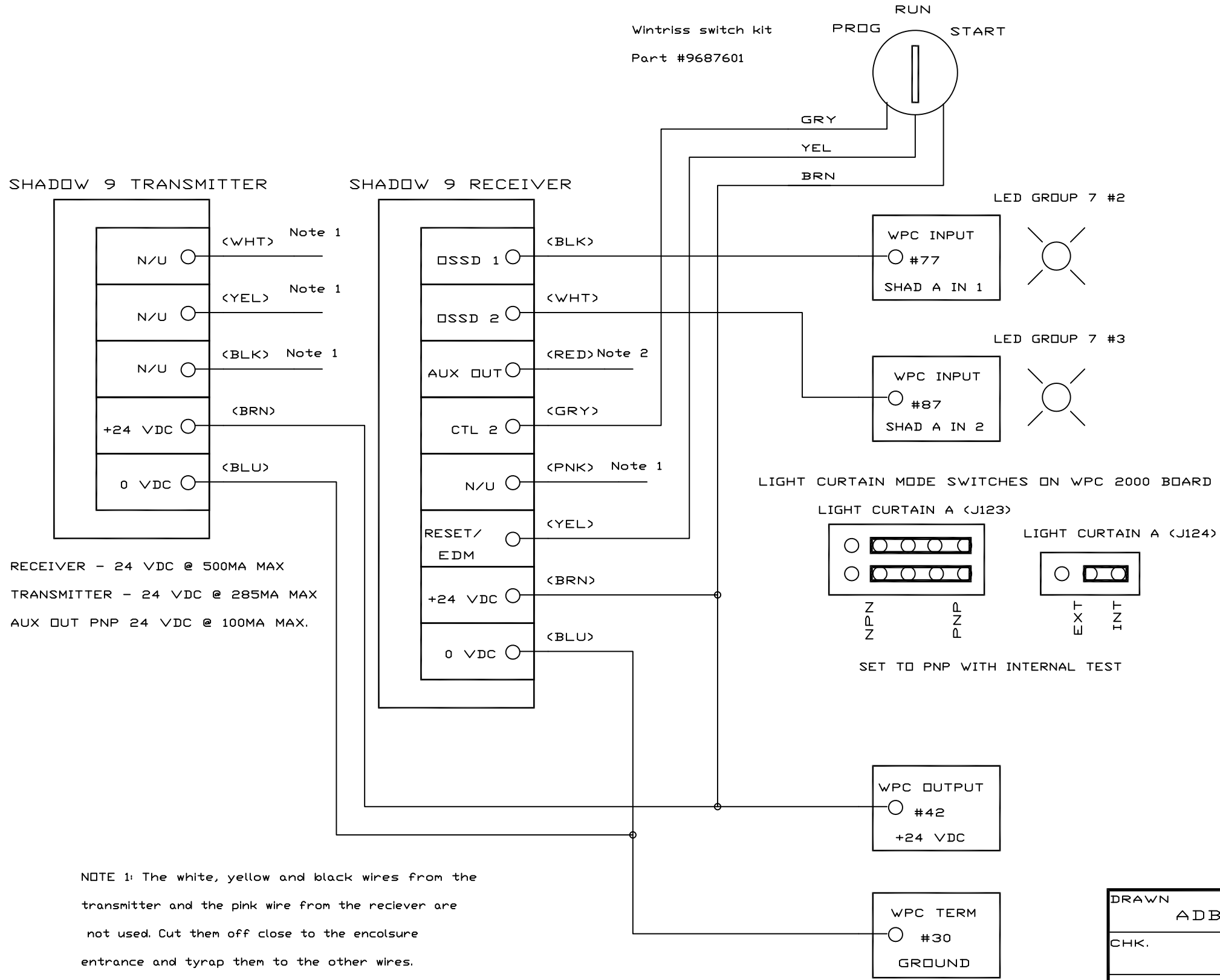


SET DIP SWITCHES BEHIND THE FLIP DOOR ON BOTTOM OF THE TRANSMITTER UNIT AS FOLLOWS:

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.		TITLE		
APPROVALS		WPC 2000 AND SHADOW 9 CONTROL BOX		
ENG.		WIRING DIAGRAM		
MFG.		CODE IDENT NO.	SIZE B	DRAWING NUMBER FIGURE 21
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.

NOTE 1: The white, yellow and black wires from the transmitter and the pink wire from the receiver are not used. Cut them off close to the enclosure 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:

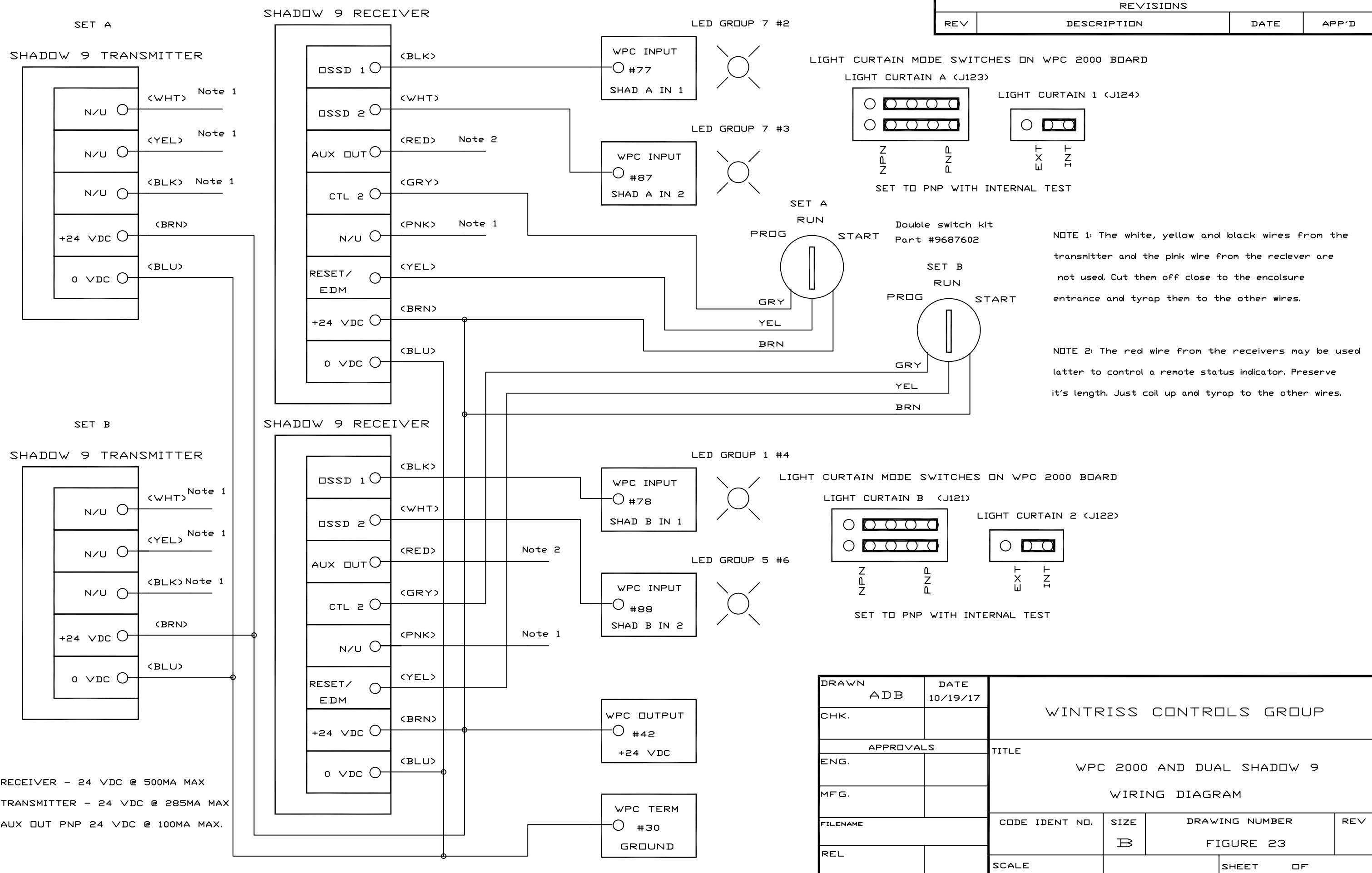
	SW1	SW2
SCAN CODE A (Deflt)	POS 1 - OFF	OFF
SCAN CODE B	POS 1 - ON	ON
EDM ENABLED (Deflt)	POS 2 - ON	ON
EDM DISABLED	POS 2 - OFF	OFF
AUTOMATIC START (Deflt)	POS 3 - OFF	OFF
START/RESTART INTERLOCK	POS 3 - ON	ON
NOT USED	POS 4 - OFF	OFF
FIXED BLANKING ENABLED (Deflt)	POS 5 - ON	ON
BLANKING DISABLED	POS 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.		TITLE		
APPROVALS		WPC 2000 AND SHADOW 9		
ENG.		WIRING DIAGRAM		
MFG.		CODE IDENT NO.	SIZE B	DRAWING NUMBER FIGURE 22
REL		SCALE		SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D



NOTE 1: The white, yellow and black wires from the transmitter and the pink wire from the receiver are not used. Cut them off close to the enclosure entrance and tyrap them to the other wires.

NOTE 2: The red wire from the receivers may be used latter to control a remote status indicator. Preserve it's length. Just coil up and tyrap to the other wires.

RECEIVER - 24 VDC @ 500MA MAX
 TRANSMITTER - 24 VDC @ 285MA MAX
 AUX OUT PNP 24 VDC @ 100MA MAX.

DRAWN ADB	DATE 10/19/17	WINTRISS CONTROLS GROUP		
CHK.		TITLE WPC 2000 AND DUAL SHADOW 9 WIRING DIAGRAM		
APPROVALS		CODE IDENT NO.	SIZE B	DRAWING NUMBER FIGURE 23
ENG.				REV
MFG.				
FILENAME				
REL				
		SCALE		SHEET OF