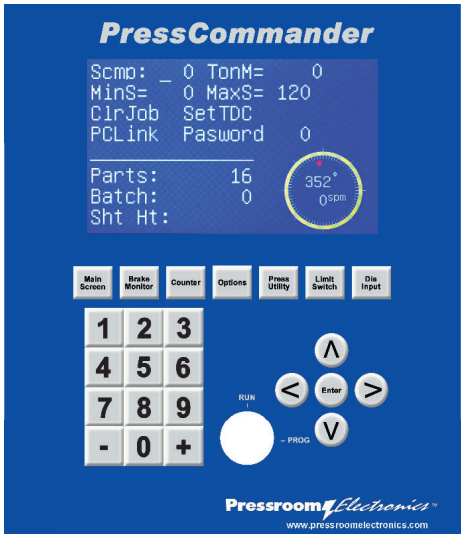
PressCommander

Dual Stop Version
Installation & Operations Manual



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DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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

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- The press on which the PressCommander is installed MUST meet OSHA 1910.217 regulations which include inspection and maintenance procedures that MUST be followed to meet these regulations. And is highly recommended that the press meet current ANSI B11.1-2009 standards. The manufacturer WILL NOT take responsibility for improperly maintained machinery.
- The PressCommander MUST be checked out before put into use, follow this manual for the proper procedures.
- The PressCommander SHALL NOT be modified or repaired except by qualified personnel and/or upon authorization of the manufacturer. Never operate machinery that is not in full working order.
- Make sure that all maintenance people, machine operators, die-setters, foremen, and supervisors have read and understand this manual.
- All procedures in this manual MUST be followed. The manufacturer WILL NOT take responsibility for operation if all procedures and warnings listed in all manuals are not followed.

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We WILL NOT and DO NOT accept responsibility for any overall system performance when factors, such as these, are beyond our control.

⚠WARNING The entire machine safety system must be tested at the start of every shift. Machine testing should include: (1) proper machine operation and stopping capability; and (2) verification of proper installation and settings of all point of operation guards and devices before the operation is released for production.

Warning on Actuating Press Valves

⚠WARNING Control Reliability requires that all Press's use only monitored DUAL SAFETY VALVES for the CLUTCH and monitored DUAL SAFETY VALVES on the BRAKE systems. Never operate a Press that uses a monitored DUAL SAFETY VALVE system on the CLUTCH but not the BRAKE (or vice versa). Dual Safety Valves used on press clutch/brake applications must be rated by the manufacturer for use on press clutch/brake applications.

FILL THIS INFORMATION OUT IMMEDIATELY

PURCHASE DATE: _____

PURCHASED FROM: _____

MODEL NO.: _____

SERIAL NO.: _____

OPTIONS: _____

SOFTWARE REVISION NO.: _____

This information will be needed in the event you need assistance

PressCommander Dual Stop Version

Installation and Operation Manual

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Introduction

System Overview

The PressCommander is a control-reliable resolver based press automation controller for use on part revolution air clutch punch presses. The PressCommander incorporates full press control along with such features as programmable cam limits (outputs), die protection (inputs), brake monitor, counters, servo control, and optional features like tonnage monitor, DeviceNet, and Ethernet.

The system is composed of a Display unit (which is mounted into the door of your control cabinet), and the Control unit (which is composed of a main supply / relay output board, and two redundant computer/resolver/ input boards). The two computer boards (Master and Slave) run independent from each other, but signals from both boards are required to energize output relays. The Display unit is connected to both Master and Slave boards and data from both boards is compared in real-time for any disparity between resolver angles, inputs, outputs, etc. Any disparity will cause the Display unit to generate a fault and shut down the Press. The large and bright 4 line display allows for easy viewing of press status and faults.

There are two Safety Relays (one for each control valve) which are constantly monitored for correct position by both Master and Slave boards. Safety Relays differ from standard relays in that the position of the primary contact can be determined from monitoring the secondary contact. Should a failure occur that keeps the primary contact of one Safety Relay closed at the wrong time, the primary contact of the second Safety Relay will automatically open. In addition there are also watchdog timers on both Safety Relays and all three control processors, voltage monitors on all three control processors, and independent power supplies for all three processors. This system complies with ANSI B11.1-2009 for microprocessor-based control systems.

Features

- Single resolver based. Master board drives resolver; both master and slave boards read resolver position.
- Dual force guided and monitored relay outputs for press valve operation.
- 32 Redundant optically isolated inputs.
- Display unit can be remoted.
- Display unit has two serial ports standard. One can be configured for either RS-232 or Half duplex RS-485. The other can be configured for RS-232 or Full duplex RS-485.
- Six programmable limit switch outputs.
- Six die inputs.
- 100 job standard, 59 job with Expander (optional memory upgrade double max jobs).
- Batch counter output relay.
- Die fault output relay.
- Speed output relay.
- System on/Ground fault indicator.
- Can operate from 24VDC, 120VAC, or 240VAC (50 or 60Hz).
- Display is 4 line x 20 character dot matrix vacuum fluorescent display.
- Display is either a 5” Color LCD with LED backlight (800 x 480 pixels) or a 4 x 20 character vacuum fluorescent display (VFD).
- Display unit computer acts as a third redundant unit by comparing data from the Master and Slave boards.
- All relays require both Master and Slave boards to turn them on. Either Master or Slave can turn any relay off (superceding the other).
- The captive contact valve relays have watchdog timers to allow them to shut off automatically in the event that both Master and Slave computers lock up.
- All board connections are made using removable connectors. This eliminates the need to unscrew wires if a board needs to be changed out.
- All relays are socketed.
- Diagnostic board LED indicators on all Opto Inputs as well as all Relay outputs.
- All Relay outputs Fused with replaceable fuses (5A fast blow).
- STOP ANGLE: Angle at which the press Valve will shut off.
- BYPASS ANGLE: Angle at which any light curtain will be bypassed and the Auto-Return feature will activate.
- LIMIT ANGLE: Angle that a press may not slide past when it comes to rest.

Specifications

24 Watts maximum (with all relays on)

Input Power
3 Voltage Ranges:
24VDC (optional)
120VAC (standard)
240VAC (optional, jumper selectable)
All AC voltages work with 50 or 60 Hz

Power for the entire PressCommander system is brought in through the Power/Relay board 52-248 (P5). The standard voltage input is 120vac, but 24vdc and 240vac are optional. (See Drawing 52-248 and 52-248 the terminal layout).

Set Points

STROKE COUNT:	0 to 999,999	strokes
BATCH COUNT:	0 to 999,999	strokes
QUALITY COUNT:	0 to 999,999	parts
PART COUNT:	0 to 4	parts/stroke
	0 to 999,999	parts total
BATCH SIZE:	0 to 999,999	strokes
Limit switch angle:	0 to 359	degrees
Limit switch timer:	0 to 9999	milliseconds
Die sensor angle:	0 to 359	degrees
Speed Compensation	0 to 99	degrees
MIN SPEED:	0 to 999	SPM
MAX SPEED:	0 to 999	SPM
Brake WARNING:	1 to 999	milliseconds
Brake FAILURE:	1 to 999	milliseconds
Brake ACTUAL:	1 to 999	milliseconds (+/-1 millisecond accuracy)
MOTION:	0 to 5.9	seconds (1/10-sec increments)
DRIFT:	preset to 2	SPM (1/10 SPM increments)
Crank Angle:	0 to 359	degrees (1° increments)
SPM:	0 to 999	strokes/minute (+/- 1 SPM accuracy)

Display Unit (Display board 52-245)

Name Fuse	***LED indicator***	
24VDC power input	1 A slow blow (20-022)	main display on = present
Ethernet		D1,D2 (status)
Programming voltage		D7

Control Unit (both Master and Slave board 52-246)

Name Fuse	***LED indicator***	
24vdc power input	1A slow blow (20-022)	D23 (on=present)
Programming voltage	-	D56 (on=present)
Inputs	-	1 to 32 (on=active)

Power / Relay (board 52-248)

Power in (110vac)	F17 1A slow blow (20-022)	D53 (on=present)
24vdc power output	5A fast blow (20-023)	
Power down	-	D52 (off=powering down)
K1, K2 Safety relays (These relays are special and can only be replaced with the same EXACT relay)	F12, F13 5A fast blow (20-023)	D1, D2 (on=energized and contacts closed)
PLS 1-6 outputs (K13,K3,K4,K5,K6,K7)	5 A fast blow (20-023)	LS1,LS2,LS3,LS4,LS5,LS6(on=energized)
Counter output	5 A fast blow (20-023)	A1 (on=energized)
Die Fault output	5 A fast blow (20-023)	A2
Speed output	5 A fast blow (20-023)	A3
Auxillary output	5 A fast blow (20-023)	A4

Specifications

Resolver
+/- 1° Resolution up to 600 RPM (+/- 2° Resolution from 601 to 1000 RPM)
Shaft loading: Radial 400 lbs., Axial 200 lbs.
Standard cable 30' (maximum length of 600')

Construction

Retrofit Kit

Display Unit
18 gauge powder coated steel NEMA 12 with gasket around edge.
5" Color LCD: 7" w x 8.1" h
VFD: 6.5" w x 7.1" h
(see "Dimensional information" in System Installation)

Control Unit
All steel plate (white) 17" x 18"

Standard Enclosure
Gray steel NEMA 12 box (20"W x 20"L x 8"D)

(240VAC with Disconnect Enclosure)
Gray steel NEMA 12 box (30"W x 20"L x 10"D)

(480VAC with Disconnect Enclosure)
Gray steel NEMA 12 box (36"W x 20"L x 10"D)

Temperature Range
0 to 50ºC

Dimensions
See *System Installation* section.

Control Box Features

Depending of the selected options, the Punch Press Control Box will contain a voltage transformer, control-reliable microprocessor logic system, micro-inch, bar turnover, motor starter, disconnect.

Keylock Selector Switches

- 4 POS. Mode Select (Off/Inch Mode/Single Stroke Mode/Continuous Mode)
- 2 POS. Hand/Foot Mode
- 2 POS. Light Curtain (on/off)
- 2 POS. Palm Button Station on/off (if more than one station)
- 2 POS. Micro-Inch on/off (optional)

Push Buttons

- System Start - to start the press control or reset the system
- System Stop - to stop the press control
- Continuous Arm - to allow continuous operation
- Motor Start (optional) - to start the press motor
- Motor Stop (optional) - to stop the press motor

Indicator Lights

System On / Ground Indicator: The white light is lit when the system Start button is pushed, no displayed faults occur, and the control circuit is properly grounded (I.E. Neutral and Ground are connected together at the step down transformer).

⚠CAUTION If the Ground Indicator is not lit after the System Start button is pushed and no faults are displayed, then check proper Grounding of the Control Panel before operating your press.

Display Readouts

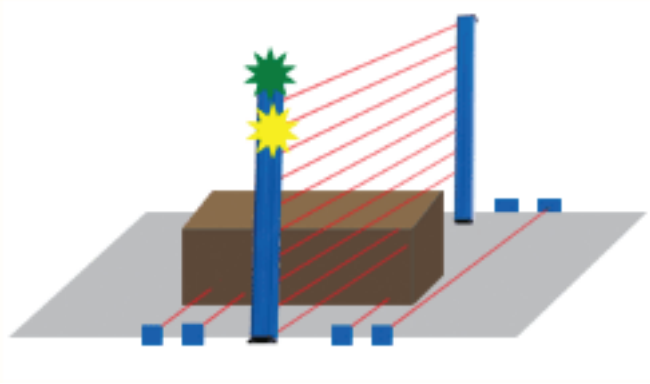
- 4 line x 20 character graphics vacuum florescent display used for readout, status, and fault messages.

Control Station Features

The Control Station will have two palm buttons, a red "Emergency Stop" button, and a yellow "Stop on Top" button to stop continuous mode.

Safety Light Curtains

The light curtain is an infrared presence sensing device that is mounted between the press operator and the point of operation. When placed the correct distance in front of the pinch point, the press will shut down when the operator tries to reach into the press and breaks the infrared beams of the light curtain. The Safety Light Curtain is made up of two self-contained pylons placed across the guarded zone and contains a redundant microprocessor system with a diagnostics display. All light curtains include an installation manual that will instruct you on how to install and calculate the proper safety distance.



Zone Control (Mat Control)

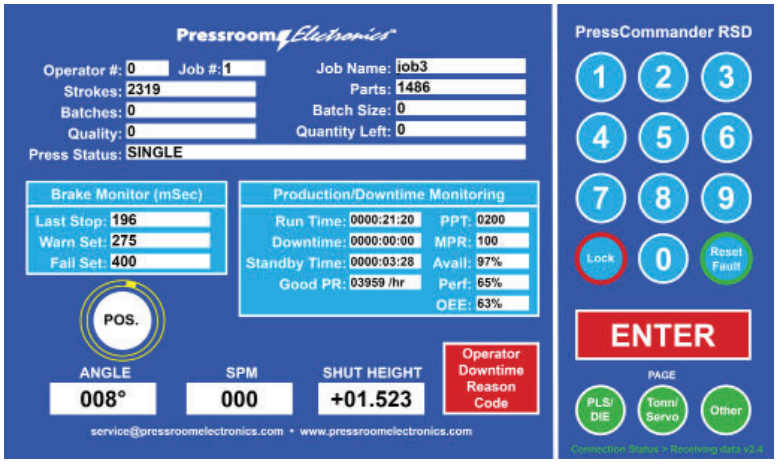
If the area you are trying to guard has no defined pinch point (i.e., robotics equipment) you may want to guard the area with a safety mat. When stepped on, the zone control box will signal the press control to shut down. The control can be set up for either automatic or manual reset. The zone control includes a manual that will instruct you on how to install and calculate the proper safety distance.

Remote Status Display (including Production Monitoring and Tonnage Profiling)

Type 1) 10.1" Color Touchscreen option replaces the standard Presscommander alpha-numeric four line by twenty character display. This allows Setup, Operation, Production Monitoring, and Profiling at the Touchscreen display (and remotely as well, including Spreadsheet log files).

Type 2) Use your own Windows PC for Remote Production monitoring, Spreadsheet log files.

(Refer to page 31 for more information)



⚠WARNING The entire machine safety system must be tested at the start of every shift. Machine testing should include: (1) proper machine operation and stopping capability; and (2) verification of proper installation and settings of all point of operation guards and devices before the operation is released for production.

NOTICE

- When using step down or isolation transformers, make sure to ground one side to prevent the Neutral from floating above ground and causing the surge suppressors (MOV's) to short out.
- The resolver cable must be kept away from high current and/or high voltage lines, or run in its own conduit to prevent excessive noise from causing nuisance faults to occur.
- All remotely wired switches, buttons, etc. must use shielded cable and be kept away from high current and/or high voltage to prevent nuisance faults.
- The J7 jumper on board 52-248 connects the "GND" to the earth ground, so you can use the machine itself as the ground.

Resolver Mounting

The resolver may be driven directly through a Lovejoy coupler, gear and chain, or timing belt.

If a chain or belt is used, it must be set for a 1:1 ratio. Clockwise or counter clockwise rotation can be setup by changing the lead configuration. Bring the press up to top dead center and set the new top dead center (see "Press Utility" in *Function Description* section of this manual for instructions).

Refer to Drawing #28-100 for Resolver Dimensions & Wiring as well as Drawing #52-246 for Internal Wiring at the end of this section. The resolver cable is connected to J5 of both Master and Slave boards using parallel connections.

Controller Mounting

Control Box Mount. Mount the Control Box at any convenient location or near the press. If it is mounted on the press, you must shock mount the enclosure against vibration. If the operator's controls are located on the enclosure, it should be mounted such that the operator has easy access to the enclosure and can readily see the controls from in front of the press.

Panel Mount. If you purchased a PressCommander without its own enclosure then you must find a location on your control cabinet that will handle the 6"w x 7"h x 3"d panel. If the controller is to be on a door, make sure that when the door is opened nothing will come into contact with the Vacuum Fluorescent Display. Mounting the unit closer to the hinge is probably a good idea for wire routing. Cut out a hole in your control cabinet and drill eight mounting holes. Insert the PressCommander into the hole and install eight #6 lock nuts. You will also need to make room in the Control Panel for the Control Unit stack (about an 8" x 8" area to allow for wiring see Drawing 52-248 for actual board mounting hole dimensions). Refer to Drawing #28-120 for Panel Cut-Out Dimensions, Drawing #28-121 for Control Panel Dimensions, and Drawings #52-245 and #52-327 for Internal Wiring on the following pages.

Electrical Wiring

Refer to Appendix C and interconnect the electrical components as shown. A separate earth ground conductor must be connected to the "G" terminal in the ground panel. This wire **must** be connected to an earth ground such as a grounding rod or a water pipe. The press should be grounded in a similar manner. **Do not** operate the press if this ground wire is not connected. Follow the National Electric Code, all state and local codes, and all applicable sections of OSHA when wiring the press.

Interlocks

On systems with air and power interlock function, additional interlocks may be wired into the system as shown in the wiring diagrams (refer to Appendix C).

Clutch Solenoid Valve

The clutch solenoid valve should be mounted as close as possible to the clutch cylinder or air clutch. The hose or pipe from the valve to the cylinder or air clutch should be as short as possible and at least the same size as the port on the cylinder or air clutch.

Disconnect Switch

If the control enclosure is provided without a main power disconnect switch, a switch capable of being locked in the off position only should be provided on or near the press.

Operator's Station

The operator's control station, or the Run (or Inch) palm buttons, if supplied separately, should be mounted on the press such that the operator can easily reach the controls. They should be mounted far enough away from the point of operation, or other hazard, such that the operator is protected against accidental contact with the point of operation (see ANSI regulations in Appendix B: Rules and Regulations).

Additionally, both palm buttons should be mounted such that the operator is required to use both hands to operate the press. **They should be far enough apart (minimum of 25") such that a hand and an elbow of the same arm nor any other part of the body except the other hand may be used to operate the press.** Both palm buttons must be wired to their correct inputs. They **must not** be wired in any other way. The press control contains the anti-tie-down programming needed to protect the operator from running the press with one hand. Each operator or his helper must have his own set of palm buttons to operate the press.

System Wiring

1) Install the 40 pin ribbon cable between the Master board 52-246 (P4) and Slave board 52-246 (P4) and the power / relay board 52-248 (P4).
2) Install the Resolver cable between the Resolver and J5 of both Master and Slave boards (52-246). Connections to Master and Slave boards should be parallel.
3) Install the straight shielded 9 pin double male serial cable between the Master board 52-246 (J12) and the Display Unit board 52-245 or 52-327 (J12)
4) Install the Display Unit 52-245 or 52-327 RUN/PROG keyswitch cable (Red and Black) on J2 and the 4 pin Green wiring plug on J3
5) Follow the wiring diagrams located in the back of this manual for connecting the outside world to the this controller.

Input Power. Power for the entire PressCommander system is brought in through the Power/Relay board 52-248 (P5). The standard voltage input is 120vac, but 24vdc and 240vac are optional. (See Drawing 52-248 and 52-248 the terminal layout).

Inputs (1-32)

- All inputs used are optically coupled and can be either 12 to 24VDC or 120VAC (optional). The voltage type must be selected before hand.
- Inputs are J6 to J9 on the Master & Slave boards 52-246.
- Every 8 inputs has its own common (the 9th terminal of each connector). This allows for choice of sinking or sourcing.
- Die sensor inputs 1-6 are the first 6 terminals of J9 on Master & Slave boards 52-246.
- The commons for J6 to J8 are normally tied to Ground, where the common to J9 will normally be tied to +24vdc since its primarily used for Die protection.

See Drawings 52-246 and 52-246 for terminal wiring.

Outputs (1-10)

- There are six Limit Switch Outputs.
- All terminals are DRY and provide you with simple N.O. and/or N.C. switches. You can place any voltage and current (up to 1/2 the relay rating) on the terminals.
- 4 additional outputs (counter,die fault, speed fault, and system on).

See Drawing #52-248 for External Wiring methods in this section and see Appendix C for wiring.

NOTICE Optional Solid-State relay outputs for PLS 1 thru 6 available in AC or DC up to 120V @3A

Relay Valve Outputs (1-2)

Both of these force-guided relay outputs must be wired up to its own coil of your dual valve. These relays should only be replaced with factory replacements.

Each force-guided relay output should control one valve of your dual control valve system. Either relay can then shut down the press.

See Drawing #52-248 for External Wiring and see Appendix C for wiring.

Resolver Check

This controller requires a pulse (contact closure) to occur anywhere between 355 and 5°. The Resolver check input must be wired to a prox sensor that is mounted on the crank of your press. This is used as a cross check with the actual resolver angle reading. This will assure that you have properly set your TDC point as well as watch for slippage of the resolver.

Presscommander Expander I/O board (pn# 52-279)

The Presscommander Expander board adds an additional 6 Die Protection inputs and 6 LS outputs to the original for a total of 12 die inputs and 12 Limit Switch outputs.
The Expanders 6 Die Protection inputs can be sinking or sourcing.
The Expanders 6 outputs are dry 5A contact relays, with the first 3 having N.O. & and N.C. outputs (just like the main 6 LS outputs). This reduces the # of Jobs to 60 total (from 100).

Requirements:

1) The PCS Display board #52-245 must have special Expander firmware loaded into its computer and the DEVICENET connecter U5 must be present. (DEVICENET can be added to older PCS units). NOTE: Firmware update will reset all JOB memory and JOB memory is limited to 60 JOBS.

2) Additional serial cable linking DEVICENET U5 on the DISPLAY board to U5 on the EXPANDER board. (Straight DB-9 double male with 1 to 1 pin out)

3) The Expander board requires its own 24vdc power supply (1/2A minimum). The optional 52-280 power supply board provides 1A @ 24vdc (unregulated), that can be used to power the 52-279 Expander board and mounts directly underneath.

4) The Expander board is identical in size to the Master/Slave PCS boards, but should not be mounted in the same stack. The Expander board should be used with its own cover (#11-168) to protect it, just like the PCS board stack has its own #11-168 cover.
24vdc power supply.

Operation:

The Expander board must be powered up at the exact same time as the PCS itself. There is a timeout search routine built into both the PCS and the Expander. If the Expander is not found at power-up, the PCS will deactivate DIE#7 to #12 and LS#7 to #12 until the Expander is connected and the PCS/Expander power is cycled.
If the Expander board is found at power-up, the power-up screen will indicate this, and additional menus are added to the “Limit Switch” and “Die Input” buttons.
If connection to the Expander board is lost while the PCS is up and running, the Expander LS outputs will all turn off automatically as a safety measure.

Pinouts:

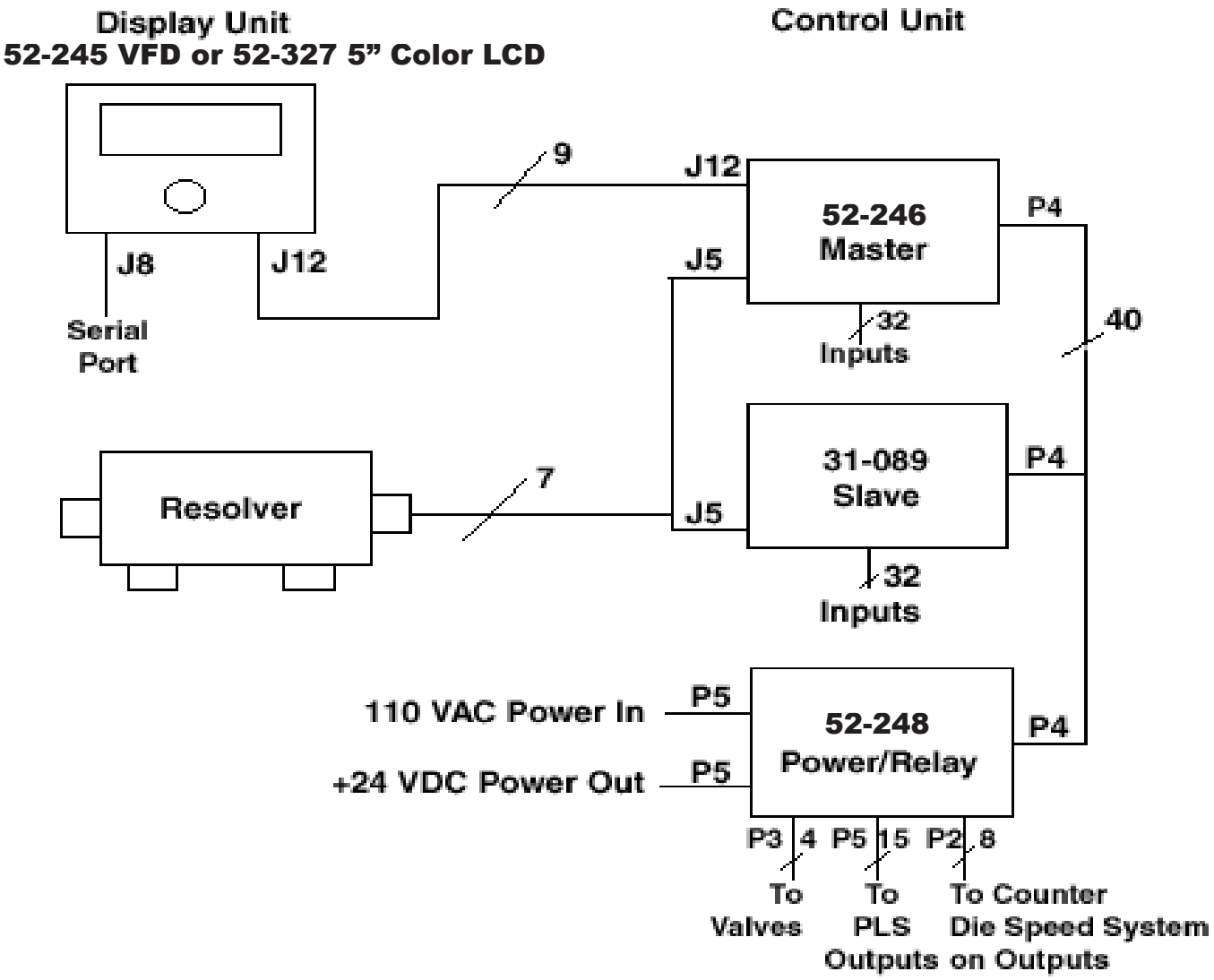
Left Connector: A and B terminals are +24vdc & Ground inputs wired either direction.

Die1A	Die1B	Die2A	Die2B	Die3A	Die3B	Die4A	Die4B	Die5A	Die5B	Die6A	Die6B		GND	+24vdc pwr In

Right Connector: Programmable Limit Switches

Pls1NO	Pls1C	PlsNC	Pls2NO	Pls2C	PlsNC	Pls3NO	Pls3C	Pls3NC	Pls4NO	Pls4C	Pls5NO	Pls5C	Pls6NO	Pls6C

Wiring Block Diagram (#28-127)



Chain Driven Resolver Installations

⚠CAUTION Normally the Resolver is mounted at one end of the Press Crank Shaft and directly driven 1:1 through a Coupler.

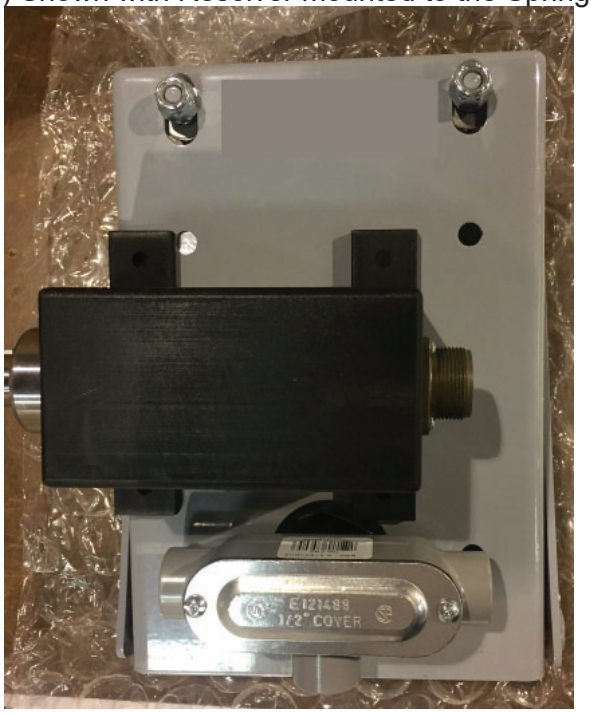
If it is not possible to directly couple the Resolver to the Crank Shaft, and you are forced to use a Chain, you MUST follow the guide below:

1)You MUST install a Resolver "Spring Plate" device PN# 39-149 with a "Chain Break" microswitch wired in series with your STOP or ESTOP circuit.

2)The Chain & Sprocket must keep the Resolver and Crank Shaft 1:1 (PN# 52-308 Chain & Sprocket)

3)You will probably need to install an idler pulley along the chain to take up slack and bounce in the chain that may cause Faults during operation.

(Below) Shown with Resolver mounted to the Spring Plate:

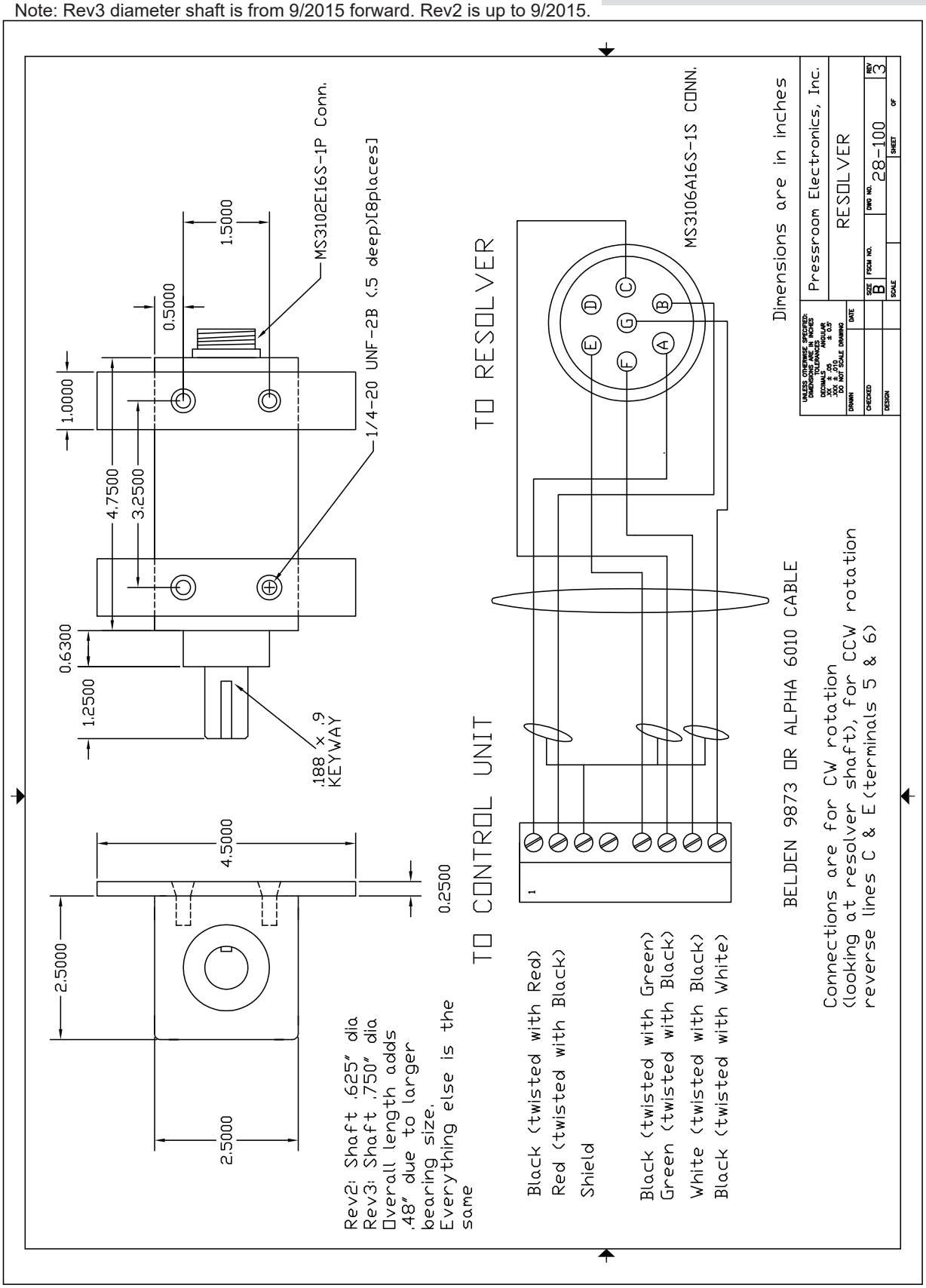


Resolver Dimensions & Wiring (#28-100R3)

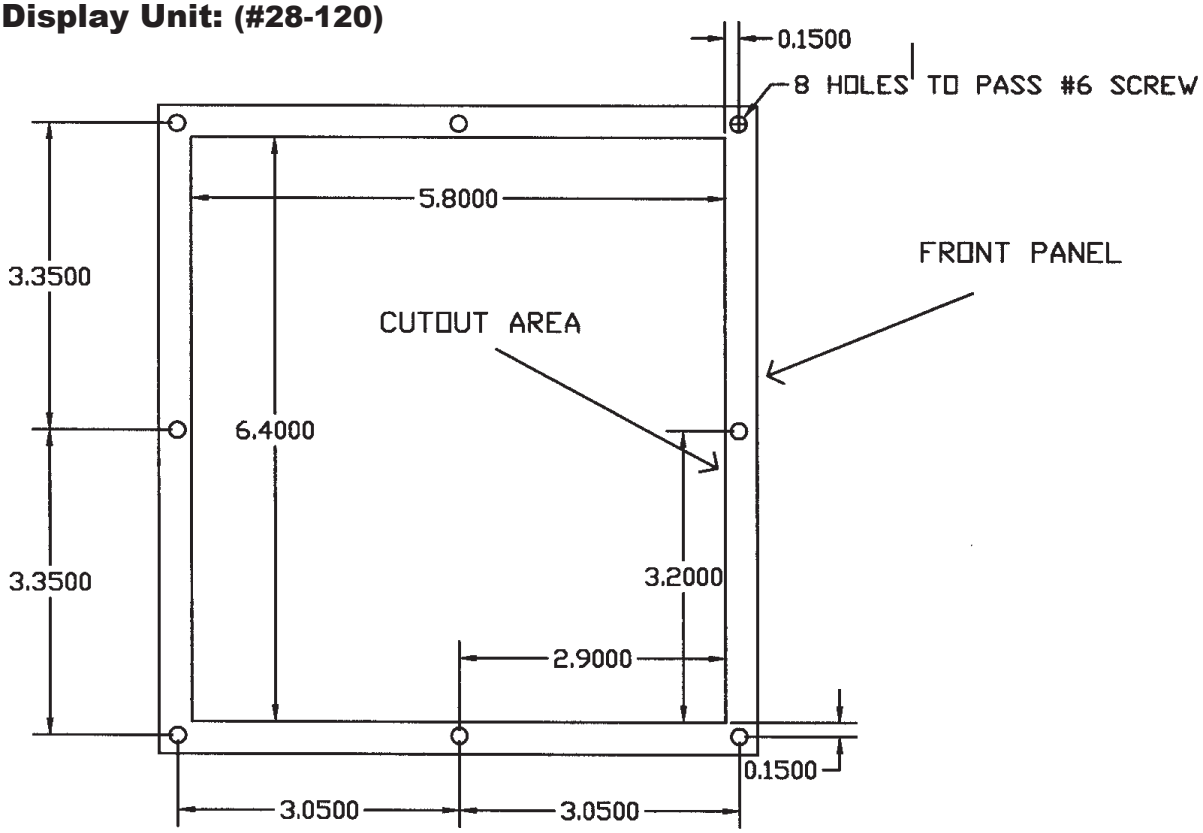
⚠CAUTION For Chain driven Resolvers, you MUST Install Chain Break detection, please refer back to page 9 for installation requirements.

Dimensions in inches
For millimeters multiply by 2.54

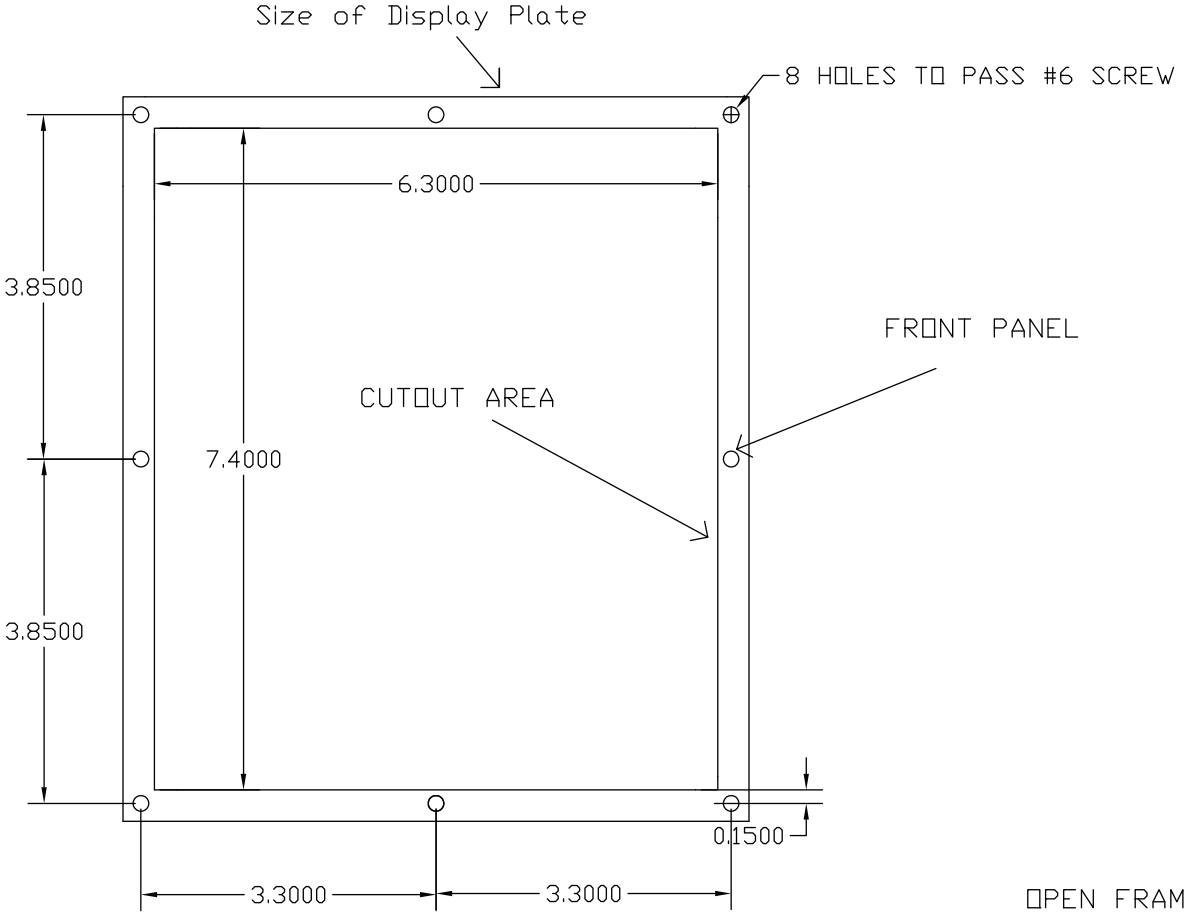
Note: Rev3 diameter shaft is from 9/2015 forward. Rev2 is up to 9/2015.



VFD Display Unit: (#28-120)

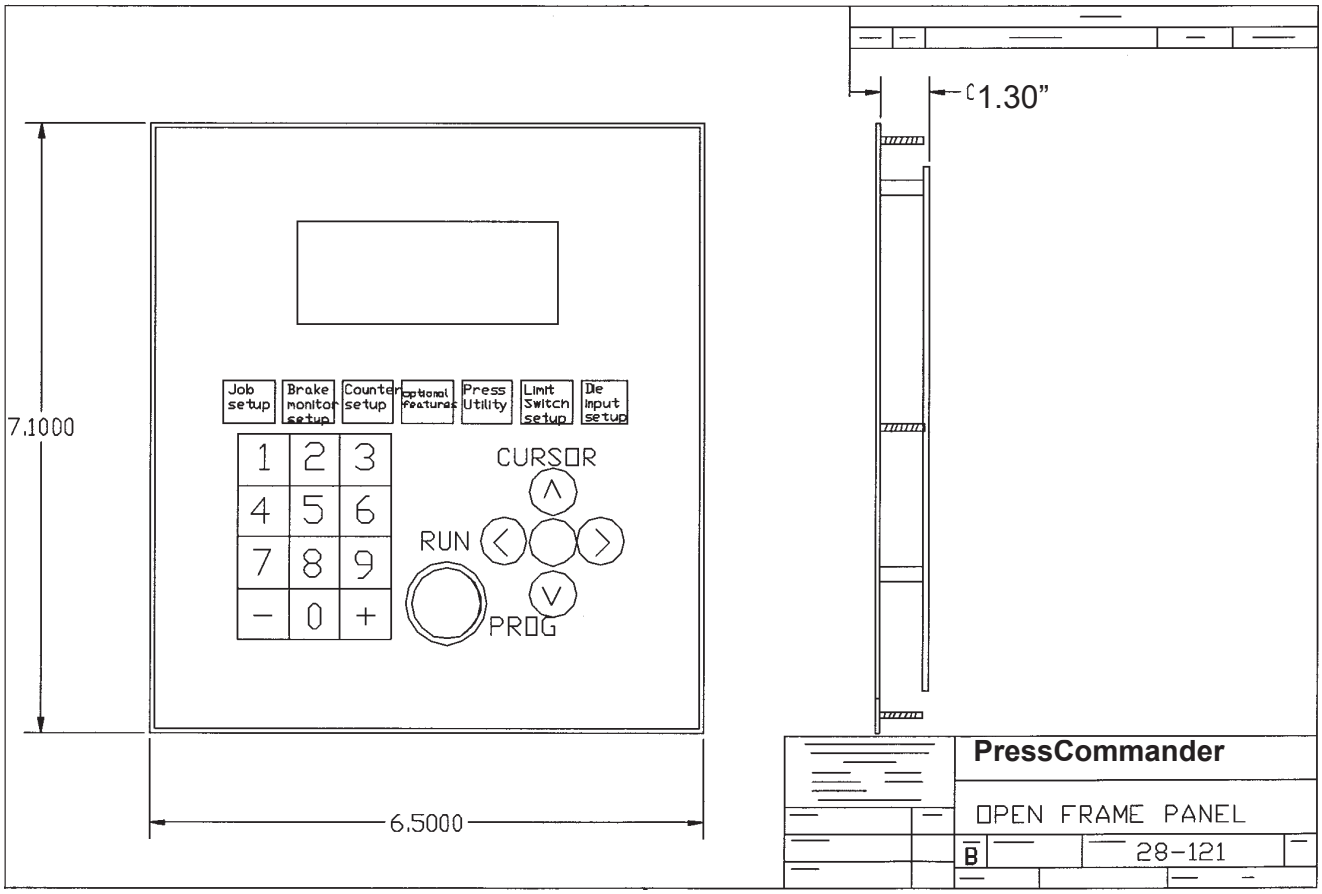


5" Color LCD Display Unit

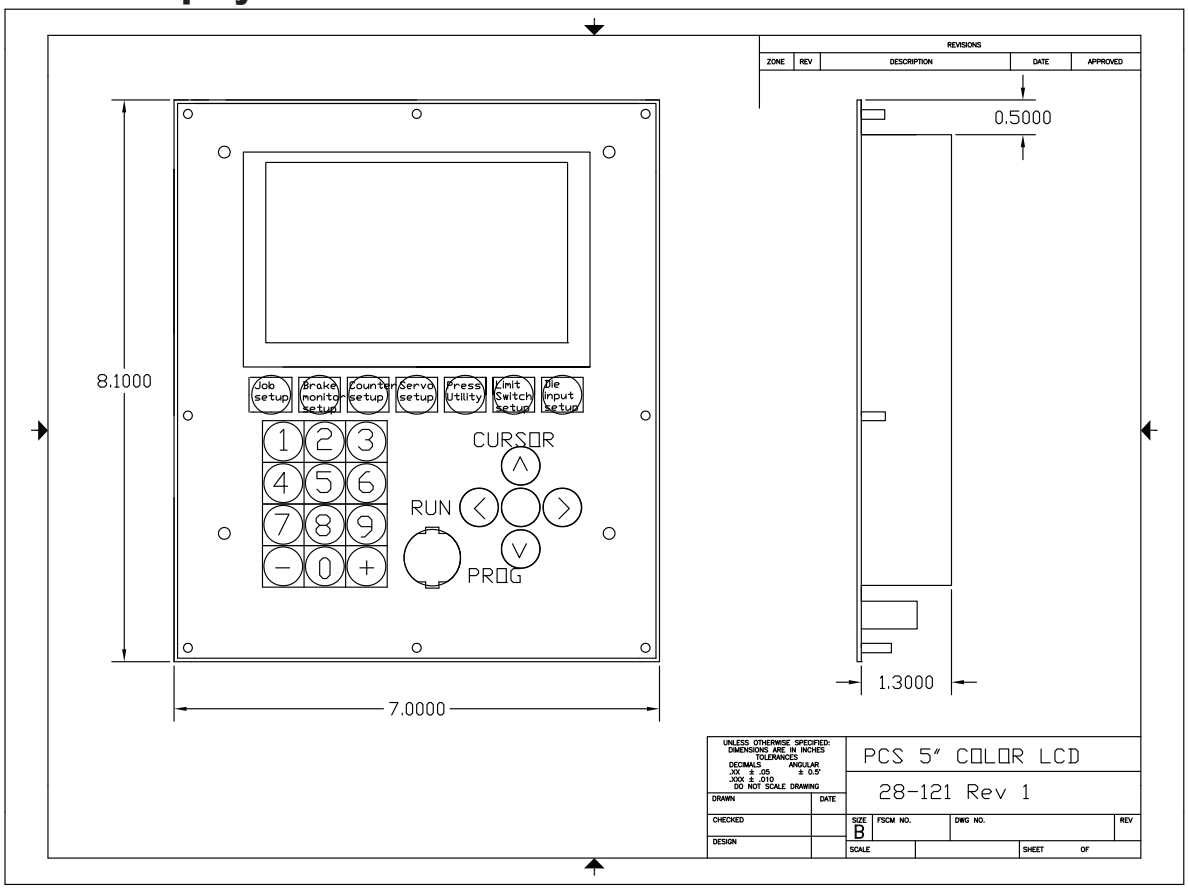


OPEN FRAME CUTOUT
28-120 Rev 1

VFD Display Unit: (#28-121)



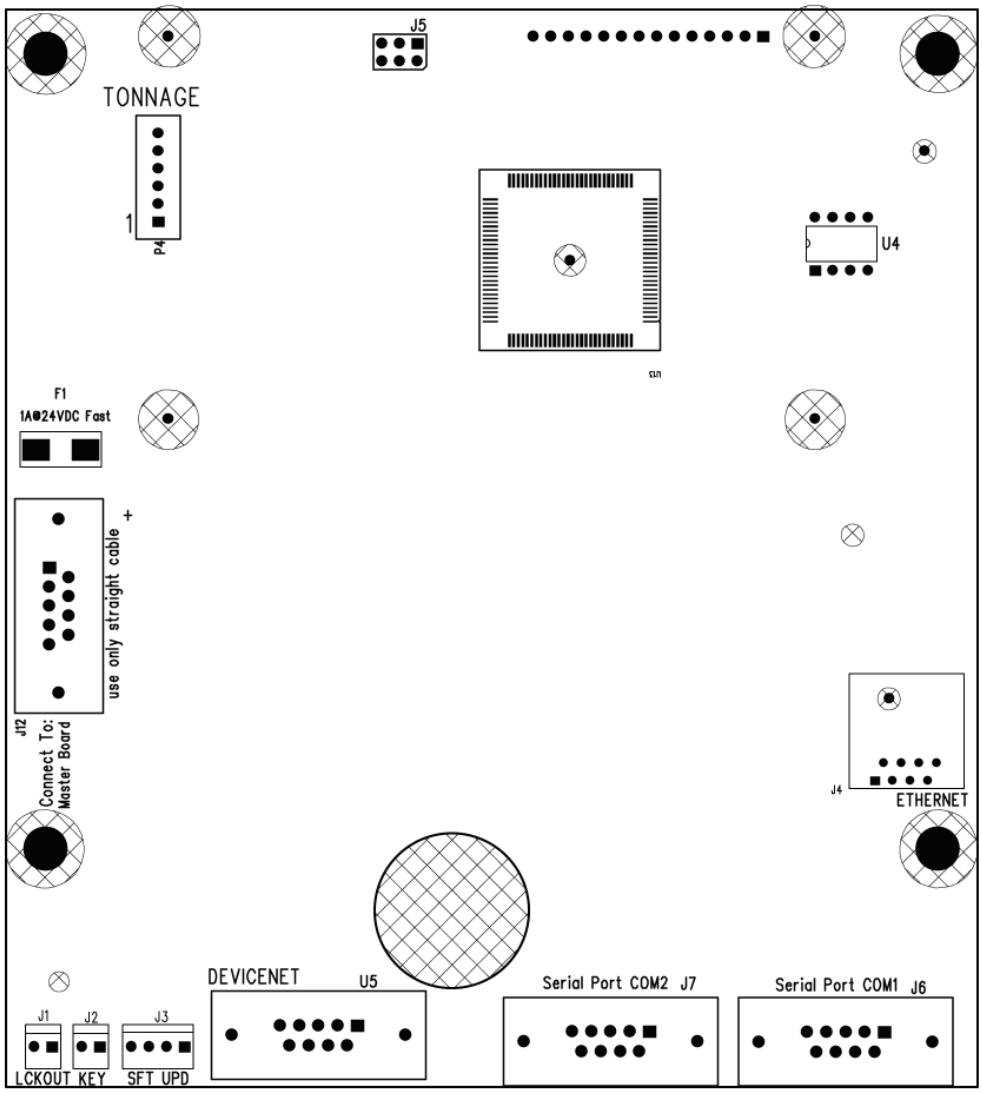
5" Color LCD Display Unit



Display Unit Terminal Chart #52-245 (see 52-245 for Diagram)

Control Unit Umbilical	J12	Power and SPI serial port link to Control unit (Master Board)	See 28-127
COM1	J6	USB COM port (RS-232). Link to your PC	USB-B
COM2	J7	RS-232 or RS-485 port. Link to your Servo	DB-9 female
DeviceNet	U5	Use only with DeviceNet networks (optional)	DB-9 female
Ethernet	J4	10baseT TCP/IP link to your PC (optional)	RJ-45
BDM	J5	Factory use only	Do not touch
Tonnage	P4	4 channel tonnage input (optional)	Requires tonnage module
Run/Prog Key	J2	keyswitch	
Lockout	J1	on = lockout stop, bypass & limit angles	Do not remove
Software Update	J3	on = normal operation, off = for updating firmware	Do NOT remove unless told by the factory

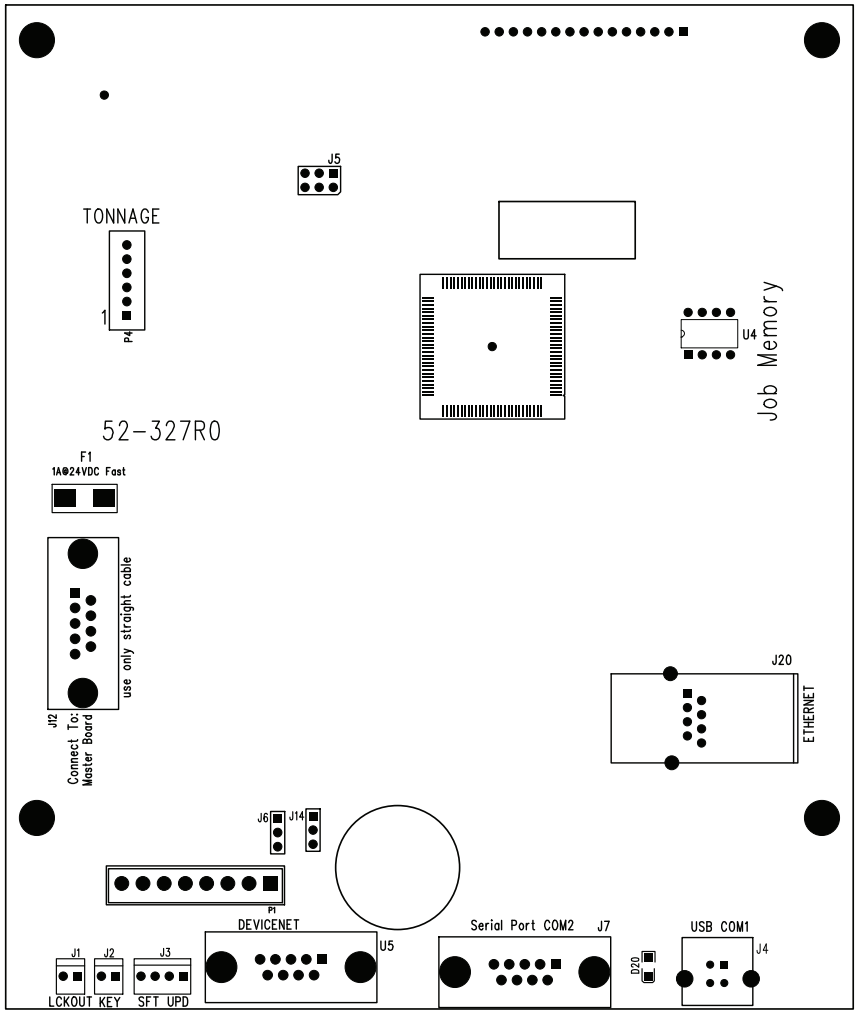
Display Unit Internal Wiring Diagram (#52-245)



Display Unit Terminal Chart #52-327 (see 52-327 for Diagram)

Control Unit Umbilical	J12	Power and SPI serial port link to Control unit (Master Board)	See 28-127
COM1	J6	USB COM port (RS-232). Link to your PC	USB-B
COM2	J7	RS-232 or RS-485 port. Link to your Servo	DB-9 female
DeviceNet	U5	Use only with optional I/O Expander board	DB-9 female
Ethernet	J4	10baseT TCP/IP link to your PC (optional)	RJ-45
BDM	J5	Factory use only	Do not touch
Tonnage	P4	4 channel tonnage input (optional)	Requires tonnage module
Run/Prog Key	J2	keyswitch	
Lockout	J1	on = lockout stop, bypass & limit angles	Do not remove
Software Update	J3	on = normal operation off = for updating firmware	Do NOT remove unless told by the factory
Shut Height Sensor	P1	Optional Shut Height monitor linear sensor input connection	8 pos mini-Euro
Option Select	J6 & J14	Top position = Shut Height, Bot position = Expander Board	(2) 3 pin jumpers

Display Unit Internal Wiring Diagram (#52-327)

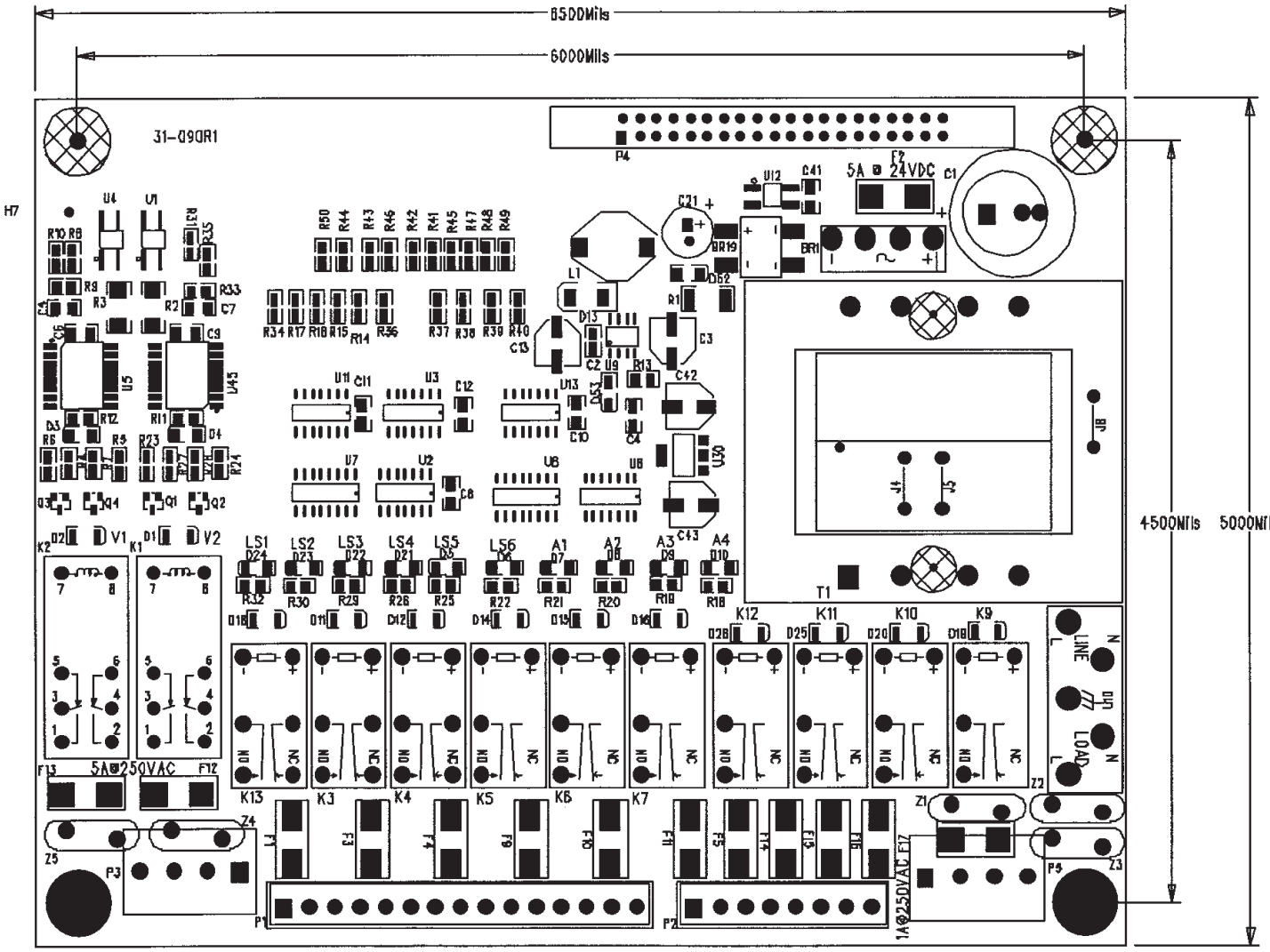


SAFETY INSTRUCTIONS

Power/Relay Board Terminal Chart #52-248 (see 52-248 for Diagram)

I/O connector	P4	To Master & Slave Board	Must be connected to all 3 boards
Valve Relays	P3	K1 & K2 Safety relays. One relay per valve. (Use only factory replacement relays)	You must use both K1 and K2 outputs seperately.
PLS (programmable limit switches)	P1	LS1 - LS6 programmable outputs (LS1-LS3 are N.O. or N.C.) (LS4-LS6 are N.O. only)	Optional Solid-State Relay outputs available in AC or DC up to 120V@3A
Counter	P2	Terminal 1 & 2 (opens when batch size reached)	To reset (energize relay) press "Counter" button
Die Fault	P2	Terminal 3 & 4 (opens when die fault)	To reset (energize relay) press "Enter" button
Speed Fault	P2	Terminal 5 & 6 (opens when min or or max speed limit broken)	To reset (energize relay) press "Enter" button
System On	P2	Terminal 7 & 8 (optional)	
Power Input	P5	Terminal 1 & 2 (Line & Neutral)	Default = 120vac in
Power Output	P5	Terminal 3 & 4 (Ground & +24vdc)	Do not draw more than 1/4A @ 24vdc

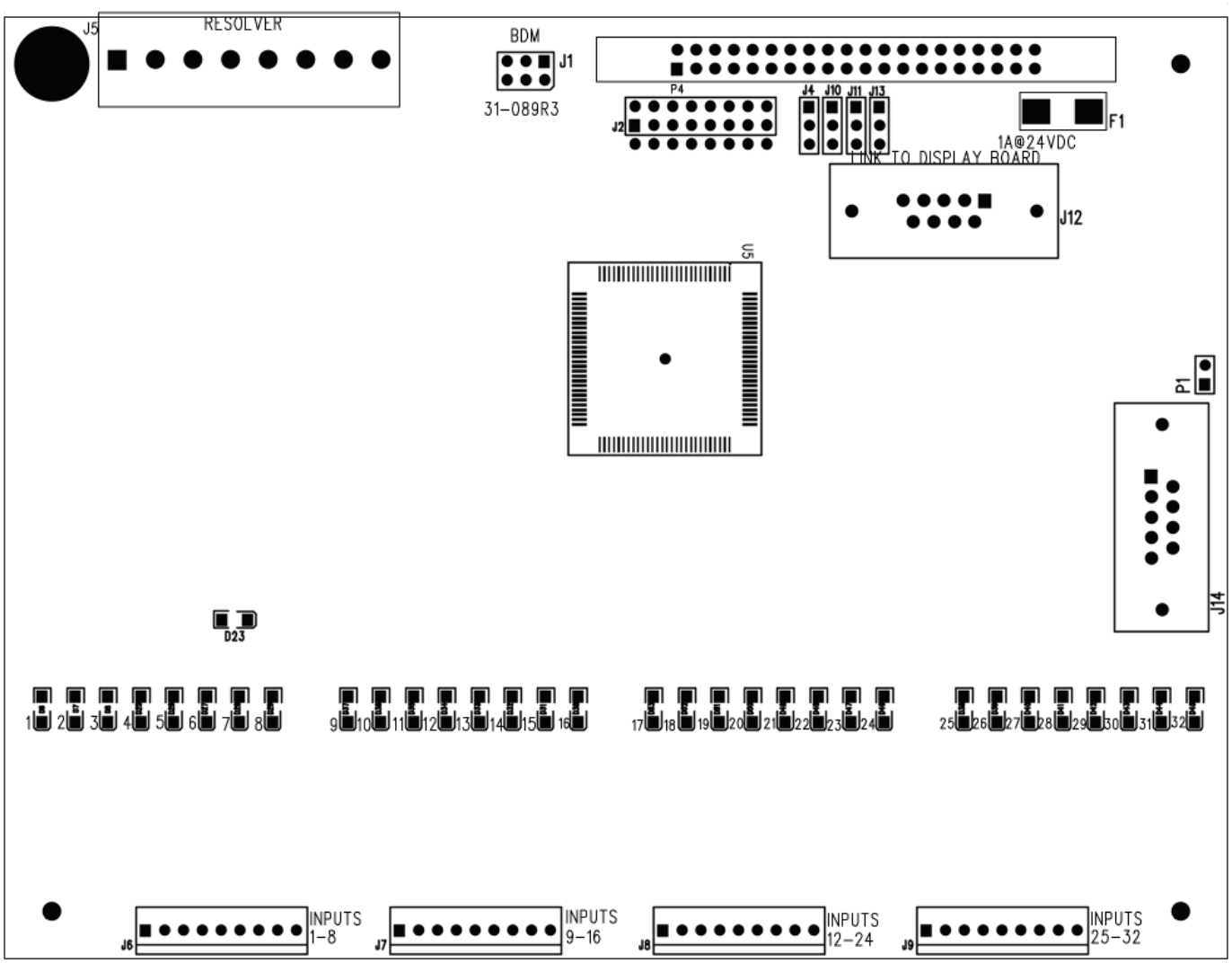
Power/Relay Board Connector Diagram (#52-248)



Master & Slave Board Terminal Chart #52-246 (see 52-246 for Diagram)

Control Unit Umbilical	J12	Power and SPI serial port link to Control unit (Master board)	See 28-127
Resolver	J5	Connection to resolver	See 28-100
I/O connector	P4	To Slave board & Power / Relay board	Must be connected to all 3 boards
Diagnostics	P1	Factory use only	Do NOT use
BDM	J1	Factory use only	Do not touch
-5vdc	D23	Resolver power	
Opto inputs (1-8)	J6	Terminal 1 thru 8=inputs 1 to 8, 9=common for this group only	See back of manual for Wiring Diagram
Opto inputs (9-16)	J7	Terminal 1 thru 8=inputs 9 to 16, 9=common for this group only	See back of manual for Wiring Diagram
Opto inputs (17-24)	J8	Terminal 1 thru 8=inputs 17 to 24, 9=common for this group only	See back of manual for Wiring Diagram
Opto inputs (25-32)	J9	Terminal 1 thru 8=inputs, 25 to 32, 9=common for this group only	See back of manual for Wiring Diagram

Master & Slave Board Connector Diagram (#52-246)



Inch Mode

⚠WARNING The Inch Mode of operation is intended for die setting and tryout work only and should never be used for production runs.

- The Press cam only run in Reverse if in “Inch” and “PROG” modes together. Reverse motion in “RUN” mode will generate a “Moving Backwards” fault.
- There is a 15 stroke limit in “inch” mode (“RUN” or “PROG”)
- Set the keylock mode selector switch to “Inch.”
- Concurrently activate both palm buttons on the run bar to start the slide moving.
- The slide will stop when one or both run buttons are released.
- The slide can be moved in small increments by momentarily activating both palm buttons.
- The motor can be turned off and the flywheel allowed to coast to slower speeds for finer increments.
- If the press is equipped with a reversing starter, the slide can be inched either forward or reverse.
- The press can only be inched with the palm buttons and not with a foot switch, if supplied.
- If you have the Micro-Inch option you can use this to move the slide in precise increments.

Jog Mode (optional)

This mode allows INCH MODE to free run with no TOP STOP. If you hold down the palm buttons, the press will continue to cycle without stopping. There is a 15 stroke limit (RUN and PROG mode both)

Adjusting the Micro-Inch

A timer for Micro-Inch is located inside the press control box. An on/off keylock selector switch is provided on the control panel. Set the press up in “Inch” / “Hand” mode and turn the “Micro-Inch” keylock on. The amount of travel of the press depends on the time selected on the Micro-Inch timer and the speed of the press. Adjust the timer for the shortest interval. Operate the press. Go back and re-adjust the timer until the desired amount of travel is obtained.

Single Stroke Mode

The Single Stroke Mode is a production mode of operation. The slide starts from the top of the stroke, comes down and performs the operation, returns to the top, and stops.

⚠CAUTION The point of operation must be properly guarded by the user (employer).

- Set the Keylock Mode Selector Switch to “Single Stroke.”
- Select either hand or foot operation from the keylock switch.
- If Hand Mode is selected, you must concurrently activate both palm buttons on the run bar to operate the press.
- The two palm buttons must be held depressed during the downward motion of the slide, otherwise the slide will stop and the “Stroke Interrupt” light will come on.
- After the slide reaches the bottom of the stroke, the palm buttons can be released.
- When the slide returns to the top, you must release both palm buttons to start the next stroke.
- If foot mode is selected, you must depress the foot switch to operate the press.
- The foot switch must be held down during the downward motion of the slide, otherwise the slide will stop and the “Stroke Interrupt” light will come on.
- After the slide reaches the bottom of the stroke, the Foot Switch can be released.
- If the “Stroke Interrupt” light comes on, the press control will automatically change over to the “Inch” / “Hand” mode to allow you to move the slide back to top stop.
- When the slide returns to the top, you must release the foot switch to start the next stroke.

External Trip (optional)

This feature allows an external input to cycle (trip) the press after an initial manual operator start-up. When this input closes, the press will cycle. There is a time limit between the last cycle and the next, before the press will require a manual restart. This feature requires the machine be completely guarded. When this feature is added, there is an additional key selector (on/off), and push button (arm). (see back section of manual for details of feature operation)

Continuous Mode

The Continuous Mode is a production mode of operation used with automatic feed equipment.

⚠CAUTION The point of operation must be properly guarded by the user (employer).

- Set the Keylock Mode Selector Switch to "Continuous."
- Select the "Hand" mode on the Keylock Switch
- Depress the "Continuous Arm" button.
- You now have five seconds to concurrently activate both palm buttons to start the press.
- You must hold in the palm buttons for two cycles to lock in continuous mode.
- To stop the continuous cycle, depress the yellow "Stop on Top" button located on the run bar. The slide will complete the present stroke and stop on top.
- This mode will operate in the hand mode only.

Continuous on Demand (optional)

This feature allows an external input to keep the press cycling (continuously) after an initial manual operator start-up. When this external input closes, the press will cycle and continue to cycle as long as the input remains closed. There is a time limit on how long this input can remain open before a manual restart is required. This feature requires the machine be completely guarded. When this feature is added, there is an additional key selector (on/off), and push button (arm). (see back section of manual for details of feature operation)

Light Guard Interface (optional)

This interface provides an additional STOP circuit input for the press that is bypassed starting at 1/4" from closure, up to the top. The Bypass Angle setpoint is used to set the 1/4" from closure location (see 2nd Press Utility screen).

You must wire up the Light Guard ON/OFF keyswitch (provided) to the Light Guard on/off input (see Appendix A) (open = on). The secondary contact block must be wired up to remove power from your light curtain when in the OFF position.

Your light curtain must have at least 2 Safety relays outputs (captive contact) wired in series and brought to the Light Guard Contact input (see Appendix A). The light curtains output must open when blocked or power removed.

⚠CAUTION The Light Guard ON/OFF keyswitch must be wired to remove power from the light curtain when the key is in the OFF position. The Light Guard ON/OFF keyswitch must always be left in the ON position. The OFF position is for press setup by authorized personnel only.

Hand / Foot Selector Switch (optional)

Palm buttons located on the run bar are the standard operating means for all punch presses. An optional foot switch can be furnished in addition to the palm button station.

- When the Keylock Selector Switch located on the electrical control box is switched to "Hand," the palm buttons will operate the press in "Inch", "Single Stroke," and "Continuous" modes of operation.
- When the Keylock Selector Switch is switched to "Foot," the foot switch is active and the palm buttons are inactive.
- The foot switch can operate the press in the "Single Stroke" mode of operation only. Any other mode will automatically disconnect the power to the controls.
- In "Single Stroke," you must use the "Hand" mode to return the press to top stop if you interrupt the press on the down stroke while in "Foot" mode.

Emergency Stop

The large red mushroom head "Emergency Stop" button is located on the operator's station (run bar). When the "Emergency Stop" button is pressed, the slide will stop immediately and power to the main drive motor will be shut off.

Bar Turnover (optional)

Bar Turnover allows manual rotation of the flywheel with the clutch engaged for die setting. Turn Keylock Selector Switch (Bar Mode) to “On”. Remove cover from flywheel guard. Wait until flywheel stops rotating. Insert the turnover bar. Depress the “Bar” button to engage the clutch and allow positioning of the ram.

⚠CAUTION A motion detection must be used to assure flywheel has stopped rotating before clutch can be engaged via pushbutton.

Forward / Reverse Selector (optional)

The Forward/Reverse Keylock Selector Switch located on the electrical control box allows the press to be run in the reverse direction by operating the main drive motor in the reverse direction. The press is generally operated in reverse during die setting or when the slide is stuck on bottom and has not passed through bottom dead center.

- To operate the press in the reverse direction, allow the flywheel to come to a complete stop, switch the Keylock Selector Switch to “Reverse.”
- Select “Inch Mode” from the Keylock Selector mode Switch.
- Select “Hand Mode” from the Keylock Selector Switch.
- Depress the black “Motor Start” button.
- The press can only be operated in the reverse direction with the selector switch in the “Inch” mode and “Hand” mode.

Interrupted Stroke

This feature is triggered when the press is in either the “Single Stroke” or “Continuous” mode and the press stops before the completion of a full stroke. The control will automatically switch to the “inch” mode and the palm buttons must be used to return the ram to the top of the stroke. When back at the top, the control switches back to the original setting and the operator may resume as before.

Highspeed Feature (optional)

This feature is used for presses running at speeds greater than ~200SPM, specifically if you intend on using SPEED COMPENSATION at speeds greater then 200SPM. If you are running over 200SPM you should be using solid state PLS outputs instead of the standard mechanical relays.

Operator Interface

The PressCommander has a keypad, menu, and cursor buttons for easy navigation and operation.

After wiring is complete, power up the system and make sure both red LED's (D35, D52) on the I/O 52-248 Board are lit up. Look at the Vacuum Fluorescent Display, the first screen shows the software version number and any optional installed software.

Run/Prog Keyswitch. In RUN mode you are not allowed to alter any parameter or change JOB's.

In RUN mode, you are only allowed to clear counters and reset die sensor faults.

When in PROG mode the Die faults will not shut down the press. This is to allow die setup. All other faults will open up the valves and shut down the press. If the password feature is enabled, you must first enter in the three digit password in order to pass into the PROG mode and be allowed to change parameters.

⚠WARNING In PROG mode, the die inputs can fault out but will not shut down your machine. You can only run ten cycles in PROG mode.

To program, the programmer must have the Supervisory Controlled Key and the PROG mode must be selected. The programmer has the capabilities to do all items that the operator has capabilities of, plus the following:

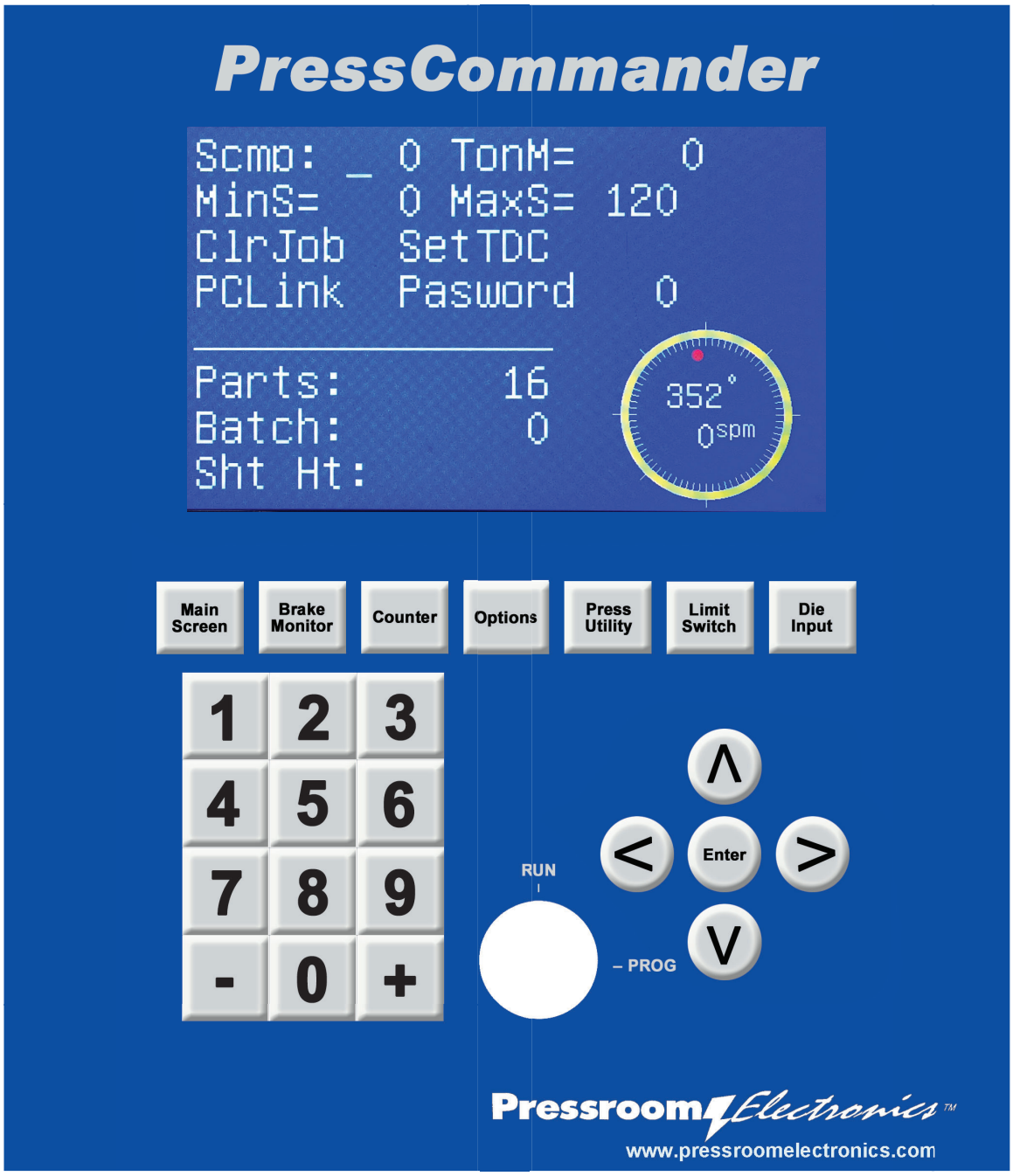
VFD Display Unit

Function Descriptions

5” Color LCD Display Unit Operator Interface

The Color LCD Display Unit operates in a similar fashion to the original VFD interface except for the addition of the Position of the Ram (crank angle, and Shut Height) and Speed of the Ram (SPM) as well as Parts and Batch counts. The Color LCD Display Unit also displays the Position and speed graphically on all screen menus of the Presscommander.

5” Color LCD Display Unit



Main Screen (2 screens)

```
Job: 01  PRESS45-B
Parts:  000000
Status: SINGLE
ANGLE: 000  SPM:  000
```

The Main Screen allows for Job number selection and Job naming, Part count resetting (See Counters section), and display of Status, Press angle & speed.

NOTICE To reset the Counters from the RUN MODE you must go to the Counter Screen. You cannot access any function of the "Main Screen" from the RUN mode.

You can reset die faults from this screen.

Pressing the Main Screen button toggles between the two screens. The first screen shows current Parts Count for the particular job. The second screen shows total Run Time.

```
Job: 01  PRESS45-B
RnTime: 00000:00 h:m
Status: SINGLE
ANGLE: 000  SPM:  000
```

Job Selection. All jobs (new and old) use only one Top Dead Center offset value. You never have to adjust the SETTDC offset once it is initially set.

Job Number (must be in PROG mode). The PressCommander has a total storage capacity of 100 jobs. The Job Number displayed indicates which Job Number is currently being run or selected.

1. Move the cursor over the Job Number.
2. Use the - / + keys till the Job Number desired is present and press the "Enter" button.

The PressCommander is now ready to run the Job Number that you have selected.

Job Name (must first select a job number). The Job Name can consist of up to ten characters. These characters can be alphanumeric and may also include symbols such as /, \, !, ?, =, etc….

1. Move the cursor over to the Name field.
2. Use the - / + keys till the proper letter is found (or the numeric keypad for the proper number).
3. Use the cursor keys to move from character to character.
4. Hit the "Enter" button when finished.

Parts. This field displays the number of parts produced since last reset. To reset this counter move the cursor over field and press "Enter." You must be in prog mode to reset this counter. (See Counters section for details on setup.)

RnTime. This indicates the total accumulated stroking time of the press (time the clutch is engaged). It is not job related. This field can be cleared only in PROG mode.

Status. Press Status is displayed including: Operating Mode (Off, Inch, Single, Continues), Stroke Interrupt, Continuous Arm, Light Guard, Stop, Estop, Top Stop.

Brake Monitor (2 screens) (timed-based)

RUN mode (shown below) shows only Last Stop Time (in mSEC) and Last Dwell angle (in degrees).

```
Last Stop Time= 000

   Last Dwell° = 000
```

PROG mode (shown below) shows Warning and Failing brake stop time setpoints, Motion detect timer setpoint, stop tests, as well as Dwell angle and Stop time.

```
Warn= 000  Fail= 000
Motion Det= 0.0  sec
90°  -  270°   test
Dwell=     Time= 000
```

The PressCommander has a time-based brake monitor in addition to the position based monitor. It does not know or care when the press comes to a stop but rather how long it takes for the press to stop from the time the brake/clutch signal is removed.

This screen shows “Warning” and “Failure” setpoints, “Motion” detection setpoint, Last Stop time, and 90 / 270° stop time checking features.

Monitoring the stop time allows you to determine a safety distance for placing electronic guarding equipment and to shut down the press should the press take longer to stop than allowed for in your safety distance. Refer to the *Regulations & Guidelines for Safe Operation* section in this manual for the safety distance formula as well as the manual that came with your electronic guarding equipment.

The brake monitor function will automatically prevent a successive stroke of the press if the stopping time deteriorates beyond the brake FAIL setpoint. The keyswitch is the only way to clear this fault. A brake warning (WARN) setpoint is also provided as a notification before the press brake must be repaired.

The PressCommander stores only one WARN and FAIL setpoint set, therefore, you must set these for the worst case situation (heaviest tool, fastest speed, and 90º stop test).

Determining the Stop Time of Your Press to Find Your Safety Distance ANSI Standard B11.19-2010 E5.6

E5.6.1 When using a time-based brake monitor it becomes necessary to measure the stopping time at both the end of the cycle (top stop) and during the closing portion of the machine cycle (90º from top stop test).

a. If the stop time is greater than the time measured during the closing cycle, set the brake monitor to this time plus the variance factor.

b. If the stopping time measured at the end of the machine cycle is less than the closing stop time, there are two methods of setting the brake monitor and calculating the safety distance:

   1. Set the brake monitor at the end of cycle time (top stop) plus the variance factor* and use the closing time plus the variance factor for calculating the safety distance. This method will allow the safety device to be located closer to the hazardous area but may cause nuisance tripping of the brake monitor if the machine tool stops during the closing portion of the machine cycle.

   2. Set the brake monitor to the closing cycle stop time. When this is done, it is necessary to increase the safety distance since the brake can now deteriorate from its normal stop time at the end of the machine cycle before the brake monitor will detect an adverse deterioration.

   The following formula may be used to determine the stop time for calculating the safety distance:

   Ts=Tsa x Tsa / Tta

   where:
   Tsa = measured closing stop time (90º from top stop test)
   Tta = measured end of cycle (top stop) time
   Ts = time used in the safety distance calculation

This method of setting the brake monitor forces the safeguarding device to be located at a greater distance from the hazardous area but eliminates the nuisance tripping of the brake monitor if the machine tool is stopped during the closing cycle.

E5.6.4 The following factors may affect stopping performance of the machine tool: clutch air supply, counter balance air supply, tooling weight or tonnage requirements, machine cycle speed, brake wear, and so forth. When the stopping time changes as a result of these conditions, it may become necessary to change the top stop limit switch position, readjust the brake monitor or adjust the brake mechanism. If such readjustment is made, care should be taken that the safety distance used to locate the safeguarding device is recalculated and, if necessary, the safeguarding should be relocated to ensure safe operation of the machine tool.

- The *variance factor* mentioned in the above ANSI standard is a number to be determined by the employer that allows for changes in the stopping time due to factors listed above in E5.6.4.

Determining the WARN and FAIL Set Points. The Failure set point is the stop time value that you have just determined above and will use in your safety distance equation (this equation should be found in the manual of all equipment used to activate or guard your equipment). This value includes the variance factor discussed above to allow for a certain amount of wear in the brake before you have to change it. The larger the failure set point, the further back your guarding equipment will have to be from the pinch point.

NOTICE Do not set the failure setpoint so large as to allow the press to stop at the top but slide forward down to the pinch point. Your press control should have a position-based monitor to prevent that situation from occurring.

For example: If you calculate a stop time of 140msec, but your press varies a little and you want to allow for brake wear so you use a failure stop time of 230msec. The variance factor is then 90msec. The 230msec should be used as your press stop time in calculating your safety distance. Set your warning set point at some value below 230msec to let you know that you are approaching the failure point ahead of time.

WARN and FAIL Set Points

1. Insert the maintenance key and turn the keyswitch from RUN to PROG (enter the password when asked).
2. Hit the “Brake Monitor” button and use the cursor to select the Warn or Fail fields.
3. Enter in value on keypad or - / + keys.

NOTICE Brake Warn and Fail setpoints need to be setup for every Job. Each Job memory will save its own Warn and Fail setpoints.

Motion Detection. The PressCommander needs to see motion within the time period selected or a fault will occur (lack of motion). Set this value to the minimum value that does not generate a fault. This will enable it to detect faults faster.

You can only use the - / + keys to change this value.

Drift Detection (not displayed). The PressCommander has built in Drift Detection. If the press starts to move without a brake/clutch signal, a drift fault will occur. The threshold is .2 spm and cannot be user altered.

90° Stop Test. Inch the press up to top. Select this feature and hit the “Enter” button. Now, run the press. The PressCommander will shut down when the press reaches 90°. The press will come to stop at some point after. This shows the worst case stop time.

270° Stop Test. Inch the press up to top. Select this feature and hit the “Enter” button. Now, run the press. The PressCommander will shut down when the press reaches 270°. The press will come to stop at some point after. This is for counterbalance setup.

Top Stop Brake Monitor

The Top Stop Brake Monitor is designed to indicate that the press is coming to a stop in the wrong position even though its stop time may be within correctly set limits.

The Top Stop Brake Monitor function differs from the Time based feature in that it checks distance traveled before stopping. You set a “Limit Angle” in the second Press Utility Screen. This is the Limit at which a fault will occur if the press slides past this Angle when it is stopping. This can also help catch an improperly set “Stop Angle”. (i.e. “Limit Angle”=10°. If the Press slides past 10° as it slides to a stop, a fault will occur.)

Counter

```
     Strokes: 000000
   Batches: 000000 /1
 Btch size: 000000
   Quality: 000000
```

NOTICE All counters are automatically stored at power down.

The PressCommander provides four types of counters: Stroke, Batch, Quality, and Part. When programmed properly a counter will increment each time a part is ejected from the machine. When the programmed value is met, the controller will initiate an action.

Stroke Count. The Stroke Counter is used to indicate the total number of strokes that has occurred since the last stroke counter reset. This number increases by one every time the resolver passes 180° regardless of job changes or faults. You can reset this count by moving the cursor over the Strokes field and pressing Enter.

Part Count. The Part counter can only be accessed from the Main Screen.
- To use an external sensor to increment the part counter, set the "dietype" for DIE#6 to "CNT" and set a start/stop window to check for the external signal (I.E. IF the part will eject at 270°, then set the DIE#6 input window to start=180°, stop=200°), this will now increment the parts counter only when a pulse is properly detected within the DIE#6 window.
- To increment the part counter every machine stroke, make sure the "dietype" for DIE#6 is NOT set to "CNT". The part counter will run internally and you can use DIE#6 for standard die checking.

You can reset the Parts Counter from the "Main Screen" menu in RUN mode by holding the Enter Key, in PROG mode by selecting the field. However, the number of "parts until Batch size reached" is reset as well as the number of "parts until Quality Count reached" is reset (i.e. If the Batch Size = 100 and you reset the Parts Counter, then the Batch Count will now increment after 100 pieces even though you may have only 2 more pieces to complete the next batch.)

Part Increment. This field is to the right of the Batches field. This determines how many parts are made per cycle. You can only get access to this field in PROG mode.

Batch Count. The Batch counter is used to indicate the number of batches completed. When the Batch increments, the Counter Output relay opens up. The relay stays open until you either press the "Counter" button on the display unit, or the "Continous Arm" button. To reset the number of batches, move the cursor to Batches field and press "Enter". The Batch counter runs off of the Parts counter, therefore you must setup the Parts counter before running. If you place the Counter relay in series with the TOP STOP button circuit, the press will top stop automatically.

Batch Size. The Batch Size determines when the Batch Count increments. When the Parts counter reaches the Batch Size, the Batch Counter increments by one. In RUN mode, this field will reset the Batch Counter, in PROG mode you can set the size.

NOTICE If you reset the Batch counter and do not reset the Parts Counter, the Batch Count will not match up with the Parts Count correctly, even though the Batch Count and Parts Count will both be correct.

Quality Count. The Quality Counter is used to stop the machine when the parts produced reaches the value in the "Quality Count." This is used to indicate to the operator that the last part should be checked for quality purposes based on your company's SPC requirements. When the "Quality Count" is reached, the Counter relay output contact will open up, and the display will indicate the reason.
If you place the Counter relay in series with the TOP STOP button circuit, the press will top stop automatically. Reset the Counter relay by either pressing the "Continous Arm" button, or the "Counter" button on the display unit. This can be cleared in RUN or PROG modes.

Function Descriptions

Tonnage Monitoring/Setup

RUN and PROG mode (shown below) shows the last stroke Peak Tonnage values for up to 4 channels.
The LOW fields indicate the lowest Peak reading recorded so far.
The HIGH fields indicate the highest Peak reading recorded so far.
You can reset the LOW/HIGH fields by hitting the "Enter" key over the field.
Values are updated along with the stroke counter (at 340°).

TONN	LR	RR	LF	RF
Last	000	000	000	000
Low	000	000	000	000
High	000	000	000	000

PROG mode (shown below) shows the tonnage peak setpoints for up to 4 channels.
The MIN fields set the minimum peak tonnage per stroke.
You must have a value in this field to activate the channel (0=channel off).
The MAX fields set the maximum peak tonnage per stroke.
The C fields show the live A/D count value (0=0volts, 512=2.5v, 1024=5.0v input)
The C field is used only for calibration and diagnostics.

TONN	LR	RR	LF	RF
Min	000	000	000	000
Max	000	000	000	000
C	0000	0000	0000	0000

NOTICE The maximum value you can put into any field is determined by the TonM field on the "Press Utility" screen. See Tonnage Load Monitor section at the back of the manual for load module information.

Tonnage Setup

Installation between the Tonnage Load Monitor (TLM) and PressCommander

1) Connect the TLM to the PressCommander (plug P4 behind Display unit) using the provided shielded cable.

   NOTE: Make sure to place a 1K resistor in series with the TLM analog output (between the TLM and the cable). This helps with preventing noise on the analog signal.

P4 connector (pin1 = bottom pin)

Pin	Color	Function
1	White	Left Rear module input (from TLM)
2	Red	Right Rear module input (from TLM)
3	Green	Left Front module input (from TLM)
4	Blue	Right Front module input (from TLM)
5	NC	Do not use this connection (for internal voltage reference.)
6	Black	Analog Ground (com) (This is not chassis ground or shield ground)

2) Connect one of the limit switch outputs to the PROBE circuit of the TLM (i.e., connect the "N.O." and "C" of LS7 to the "NPN" and "COM" of the TLM PROBE connector. Install a jumper wire from the "+12v" to "PNP" of the TLM PROBE connector).

3) Flip the Dip Switches on the TLM to PEAK and N.O. (to enable peak reading mode)

NOTICE The PressCommander analog inputs can handle 0 to 5vdc. You should calibrate the TLM outputs for 2.5vdc at full load / leg. This allows each input to catch an overload condition (i.e. > 2.5v)

⚠CAUTION You will need to rent a "LOAD CELL" from Toledo Transducer in order to calibrate the sensor outputs. The "LOAD CELL" will tell you the actual load during a hit so you can adjust the zero and gain settings of the TLM to match.

Setup and Calibration

1) Go to “Press Utility” and set the Total maximum tonnage capacity of your machine, from 10 to 9999 tons.
2) Go to “Tonnage Setup” and follow the Toledo instructions on how to calibrate the TLM load sensors. You can use the Tonnage setup screen “Counts” column as a voltage meter to help you set the proper voltages. (0 counts = 0v, 512 counts=2.5v (full load), 1024=5.0v)
3) You must set the “Min” column above 0 to activate that sensor and just below the minimum tonnage you expect for this job. The sensor input is turned off if this is set to 0.
4) Set your “Max” column to the maximum tonnage for this job, but less than ¼ of the total machine capacity.
5) Go to “Limit Switch Setup screen” and select the limit switch output that you decided on above in step 2) of the Installation section. This will trigger the peak reading function on the TLM. Set this angular window for 140° to 350°.
6) The PressCommander will expect the tonnage sensor to be less than the Max value during the entire tonnage window (140° to 350°, these values are built in to the PressCommander)
7) The PressCommander will expect the tonnage sensor to be greater than the Min value only after the press reaches 340°. The TLM peak value must be greater than the Min value. This dictates that you set up a window for the TLM that goes beyond 340° (around 350°)

NOTICE Do not run the Press in PROGRAM mode, this mode is only for setup. Faults are generated, but the fault relays will not open up.

Operation

- You must have a value placed into the “MIN” column of the “Tonnage Setup” screen. 1 tonn or more activates the sensor. 0 tonns turns off the sensor.
- The “MAX” column of the “Tonnage Setup” screen should be set to the maximum tonnage needed for the Job, but not greater than ¼ the capacity of the machine.
- The “PEAK” column of the “Tonnage Setup” screen shows the last cycle peak reading, not a live value.
- The “COUNT” column of the “Tonnage Setup” screen shows actual live value in counts.
- Make sure the PROBE LED on the TLM lights up just before the hit takes place and remains lit until just after 340°.
- The RUN screen will show the last stroke’s peak readings.

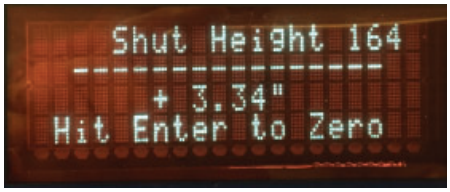
Options

There are nine screens which make up the OPTIONS menu button

1) Tonnage: Last, Low, High values
2) Tonnage: Min, Max, Count
3) Shut Height (if installed)
4) Servo Control
5) Software Version Information
6) Settings (language & Serial or Internet Ports)
7) Diagnostics: communications quality (perfect score=34, bad score > 390)
8) Diagnostics: Master & Slave Opto Input (top 2 lines Master inputs 1-32)
9) Diagnostics: Master & Slave Relay Output

Shut Height Monitor

This screen can be reached by pressing the OPTIONS button 2 times in RUN mode (or 3 times in PROG mode). The First 1 or 2 screens are for Tonnage information screen(s).



Can be viewed from RUN or PROG modes.

Shut Height Monitoring requires an Interface board PN# 52-298 and linear sensor (choose one): PN# 40-009 4”, 40-010 8”, 40-011 12”, 40-012 16”, or 40-013 24”. A magnet and 2 mounting brackets are supplied.

The display shows position of the Magnet to 100th of an inch. Dead zones are the first 3.5” of the bottom (cable end) and 3” at the top of the linear sensor. Zero is at around 3.5” from the bottom.

Since its not possible to get zero to match your machine perfectly , hitting the ENTER key (on this screen) will create an offset to Zero the display to 0.00” and save the offset with the current Job#. After creating an offset, any movement towards the cable end will be Neg – and any movement away from the cable end will be Pos +.

Connectors on the 52-298 Interface Board:

P1: To Linear Sensor

P1-1	Empty
P1-2	Green (+CLK)
P1-3	Yellow (-CLK)
P1-4	Gray (+DATA)
P1-5	Pink (-DATA)
P1-6	White (+24vdc)
P1-7	Empty
P1-8	Brown (Ground)

P2: To DeviceNet plug on back of Display Unit.

P2-1	Black (+5vdc)
P2-2	Brown (CAN RX)
P2-3	Red (Ground)
P2-4	Empty
P2-5	Yellow (+24vdc)
P2-6	Empty
P2-7	Blue (CAN TX)
P2-8	Empty

See Appendix C for Dimensions of Linear Sensor.

Servo Feed

This screen can be reached by pressing the OPTIONS button 4 times. The first 3 presses are for the Tonnage information and Shut Height screens.

```
Speed 1-100: 000
Accel 1-100: 000
MPC   1-100: 000
Feed Len.: 000.000
```

(Can be viewed only while in PROGRAM mode)

Servo control is done through the J7 COM2 port on the PressCommander.

PressCommander RS-232 DB-9 Pin out

1	do not connect
2	TX, to servo
3	RX, from servo
4	do not connect
5	Digital Ground
6	do not connect
7	do not connect
8	do not connect
9	do not connect
CASE	Chassis Ground

The only pins used in the PressCommander are 2,3, & 5.
Pins 1,6,8 are tied to +15v, and pins 5 and 9 are tied to ground

Each Job stores individual Servo Setup information and outputs through the RS-232 J7 COM2 port every time you power up the controller, change Jobs, or exit from the Servo Setup screen.

Available Servo Control Protocols:

Indramat (comes standard)
Speed (1-100%)
Feed Length (0 – 999.999)

Indramat Block Transfer CLM
Speed (1-100%)
Feed Length (0-999.999)

Indramat OPTI feed
Speed (1-100%)
Acceleration (1-100%)
Feed Length (0-999.999)

Rapid-Air S32H
Speed (1-100%)
Acceleration (1-100%)
Arc (1°-359°)
Feed Length (0-999.999)
Max SPM (0-999)
Pilot Release (always set to 1)

Automatic Feed Advisor will program the Speed and Acceleration for you when you enter or change Arc or Feed Length values. If the max SPM, ARC, or Feed Length numbers generate Speed/Acceleration numbers that are beyond the Servo's capabilities, the Speed and Acceleration values are set to 0 (note: the Feed Advisor only computes new Speed/Acceleration values when you change Arc or Feed values).

P/A Industries ultra advantage feed systems SFI
Speed (1-100%)
Acceleration (1-100%)
Feed Length (0-999.999)

COOPER-WEYMOUTH PETERSON SERVOMATIC I
Speed (1-10)
Feed Length (0-999.999)

COOPER-WEYMOUTH PETERSON SERVOMATIC II
Speed (1-10)
Feed Length (0-999.999)

Co-Press
Speed (1-100%)
Acceleration (1-100%)
MPC (1-250 10tens of seconds)
Feed Length (0-999.999)

Dallas Industries
Speed (1-100%)
Acceleration (1-100%)
Feed Length (0-999.999)

Function Descriptions
User Settings

This screen can be reached by pressing the OPTIONS button 5 times. The first 4 presses are for the Tonnage information, Shut Height and Servo Feed Screens.

```
            Settings
 Eng  *   Spa  *   Fre
 COM1:  232   *   TCP
 COM2:  232   *   485
```

(Can be viewed only while in PROGRAM mode)

Language: English Spanish French

Use the Cursor and Enter keys to select which language you wish to use.

COM1 232 This selects RS232 serial communications at 57600baud on COM1 (J6).
With this set you can send commands to the PCS to obtain realtime data (see serial port commands table)

NOTICE You must have this option set if you use the PCLink (off-line Job Programmer) feature.

COM1 TCP This selects the onboard Ethernet (optional) 10/100baseT TCP/TP connection. With this set you can use any Java enabled Internet Explorer program to obtain realtime data from the PCS. (requires Rev3 display)
COM2 232 This selects RS232 serial communications at 9600baud on COM2 (J7).
With this set Servo data will be sent as RS232 serial data.
COM2 485 This selects RS485 serial communications at 9600baud on COM2 (J7).
With this set Servo data will be sent as full duplex RS485 serial data allowing multiple PCS units to share the same serial connection. (requires Rev3 display)

Command String to PCS	Function	Return Size	Return Format
$A:	Job #	Byte (0 to 255)	@ job # &
$C:	Press Angle	Word (0 to 359)	@ angle &
$D:	SPM	Word (0 to 999)	@ SPM &
$E:	Die Fault	Byte (bit: 0=ok, 1=fault)	@ die &
$F:	PLS Status	Byte (bit: 0=off, 1=on)	@ PLS &
$G:	Status	Byte (see table)	@ status &
$H:	Fault codes1	Word (see Appendix A, each bit represents a fault code)	@ fault1 &
$I:	Fault codes2	Word (see Appendix A, each bit represents a fault code)	@ fault2 &
$J:	Fault codes3	Word (see Appendix A, each bit represents a fault code)	@ fault3 &
$K:	StopTime	Word (0 to 999 msec)	@ stoptime &
$L:	Runtime meter	Long (in seconds)	@ runtime &
$M:	Strokes	Long	@ strokes &
$N:	Parts	Long	@ parts &
$O:	Batches	Long	@ batches &
$P:	Tonnage CH 1	Word	@ tonnch1 &
$Q:	Tonnage CH 2	Word	@ tonnch2 &
$R:	Tonnage CH 3	Word	@ tonnch3 &
$S:	Tonnage CH 4	Word	@ tonnch4 &
$T:	Opto Input status	Long (Each bit corresponding to each input)	@ input &
$U:	Reset Faults Remotely	byte(always 0)	@0&

= Command String not completed within time allowed, reset command.

$ ASCII character sent to PressCommander to initiate command sequence
: ASCII character sent to PressCommander to complete command sequence

$ ASCII character sent from PressCommander to indicate valid initiate
! ASCII character sent from PressCommander to indicate command number received
@ ASCII character sent from PressCommander to indicate valid command number
? ASCII character sent from PressCommander to indicate invalid command number
& ASCII character sent from PressCommander to indicate end of transmission

Word 2 Bytes
Long 4 Bytes

Presscommander Ethernet Option (Remote Status Monitoring)

The Presscommander Ethernet Option allows for Remote Status Monitoring over your company network. The Ethernet connection is located on the backside of the DISPLAY unit (right side). This Wired Ethernet option can be made wireless by attaching a Wi-Fi access point to the Presscommander.

Software Installation:

Java for your web browser:
You must use a web browser that allows Java to run like “Internet Explorer” or “FireFox”. Chrome and Edge do not allow Java to run.
Next go to java.com to download and install the free Java program on your PC.

Creating a Log Folder:
Create a folder to hold the log files generated by the Presscommander Ethernet.
Create the following folder: C:\PCSLOGS

This is where the CSV (comma separated values, that are Excel compatible) files will go. File names are IP, Time, and date coded.
Logs contain information about Press operation including Up time, Down time and reasons.
If you have the Tonnage profile option, Tonnage profile logs will be stores in this folder as well.

DeviceInstaller for initial Network Setup:
The CD that came with your Presscommander includes a PC program called “Di32DL_4.2.0.4_Web.exe” that needs to be installed on 1 computer that will setup the Presscommander(s) Ethernet. When installed you will have a Desktop Icon called “DeviceInstaller”.

This program allows you to find all the Presscommanders plugged into your Ethernet Network.

TFTP for Web Server reprogramming in the field:
If Ethernet Remote Status Monitor ever needs to be updated or customized, you will need a program called “tftp.exe”. This program is standard on Win XP and Vista and Win 7. On Vista and Win 7 you will need to go to “Control Panel\All Control Panel Items\Programs and Features”, and click on “Turn Windows features on or off” (search & enable tftp) to enable using this program. You will then be emailed a file with the code to program. You simply run “Command.exe” (Command Prompt) and run the file you were emailed.

Wired Installation:

Cat 5e or 6 Ethernet cable allows for continuous runs up to 300ft before needing a repeater (i.e. router, hub, or switch). If you have multiple Presscommander’s then wire them all up to a single Ethernet SWITCH or Ethernet HUB, which in turn is connected to the Network you have access to.

Wi-Fi Installation: (not factory supplied)

Attach the Presscommander(s) to a multiport Wireless Router (that has a “Bridge” mode). This Wireless Router should have its DHCP turned off and be setup as a “Bridge”. This configuration will allow your MAIN Wireless Router to be the DHCP controller (hand out the IP addresses) and see the Presscommander(s) as though they were all Wired into the network (simply using the Wi-Fi as a bridge).

Setting up addresses/Ports for each Presscommander:

The MAC ID#/Web Port#/Data Port# assigned to a Presscommander is listed on a sticker next to the RJ-45 jack.

The IP address/Ports of each Presscommander can be pre-assigned at the factory. By default the IP address of each Presscommander will be assigned by your DHCP server (probably in your Router).

The Web PORT number is pre-assigned to PORT 81, the standard HTML Port, and can be changed.

The Data PORT number is pre-assigned at the factory and can only be changed at the factory.

(see Sticker next to RJ-45 Ethernet Jack on back of Display Unit for Web & Data PORT numbers)

Internal Network Presscommander Access:
Accessing the Presscommander(s) Ethernet over your internal Network is easy and straight forward. Each Presscommander needs a unique IP address, run “Internet Explorer” and type in the IP address. Each Presscommander is opened in its own Window or Tab. You can minimize the window and the log files are still created.

By default each Presscommander will get an IP automatically assigned to it when its plugged into your company Network. You will need to run “DeviceInstaller.exe” to see what address was assigned. You will
Internal Network Presscommander Access Cont.:
need to match the Mac ID# (found on the sticker next to the RJ-45 jack). You may want to make this IP static

either via your company router or via “DeviceInstaller.exe”. The reason is so that there is no chance that the router will re-assign a different IP at some future date.

(i.e. http://192.168.0.149:81) 81 is the Web Port. This might be Presscommander #1

(i.e. http://192.168.0.150:82) 82 is the Web Port. This might be Presscommander #2

Internet Presscommander Access:
The IP addresses of your Presscommander(s) cannot be reached from the outside due to your firewall. Accessing the Presscommander over the Internet requires 2 steps:

1) If your company does not have a fixed address, you must create a Dynamic DNS account so the outside world can reach the address of your company network. Go to http://www.dyndns.com for more information on this. You must then setup your Router to communicate with dyndns.com

2) You must allow PORT forwarding through your company firewall. This is done at your Router. The Router will have a table to assign Ports to be forwarded for specific internal IP addresses. There will be an table entry for the Web Port and another entry for the Data Port. This allows the Web & Data ports to be forwarded to the Internal IP address of each and every Presscommander you have on the Network.

(i.e. http://mycompany.dyndns.org:81) 81 is the Web port in this case. This might be Presscommander #1

(i.e. http://mycompany.dyndns.org:82) This might be Presscommander #2

The Web Port is used to direct your Web Browser to the correct Presscommander (as long as you setup your Port Forwarding Router tables correctly) since the IP address is exactly the same for both Presscommanders.

UsingDeviceInstaller:

As soon as you launch “DeviceInstaller.exe” it will search your Network for any Lantronix Ethernet devices. You may have other devices besides the Presscommander unit(s). You will need to match the MAC ID# of each Presscommander to determine what IP as given to each unit.

To Change the IP address of a Presscommander (make a Static address or make it Dynamic DHCP)

1) Make sure your Presscommander(s) is plugged in to your Network.

2) Double Click on the IP of the Presscommander Ethernet you want to modify. You are now on the “Device Details” Tab page for this unit.

3) Click on the “Telnet Configuration” Tab.

4) Click on the “Connect” button (just below the “Telnet Configuration” Tab.

5) Hit Enter

6) Type in the number 0 and hit enter

7) Type in your STATIC IP address (in 4 parts), or enter zero’s to make it DHCP.

8) Just Hit ENTER through to the end (the menu will redisplay

9) Type in the number 9 and hit enter

10) Close “DeviceInstaller”

You could leave the IP address 000.000.000.000 and your Presscommander Ethernet will be configured for Dynamic DHCP and be automatically assigned an IP address via your Router. This DHCP IP address might change on you at some point in the future which might cause confusion and prevent you from accessing the Presscommander until you find the new IP address that was assigned. Some Routers allow you to have the DHCP server statically keep 1 particular address. This is the preferred method, but not all Routers can do this.

Remote Status Monitor (Presscommander Ethernet):

Connect the Ethernet jack on the back of the Display unit into your company Network.
The IP address of the Presscommander is written on a label on the backside of the Display unit.
The Presscommander is now accessible from your company network.
If you want Internet access to your Presscommander you will need to setup your Router to allow “Port Forwarding” access to the Ports listed on the backside of the Display unit (consult with your IT department).

Go to the Presscommander Display unit and switch to PROG mode and hit the OPTIONS button multiple times until you reach the Settings page and select TCP *

Next, you must install Java on your Computer. Go to java.com to get a free download.

Create a Directory called C:\pcslogs (this is where log files and tonnage data and process monitor information will go)

You can run Remote Status Monitor from a web browser (i.e. IE11 or Firefox) by typing in the full IP address and port of the Presscommander (as shown on the label of the Display unit), but it is preferred that you run the JNLP java Remote Status Monitor directly from your computer, as described below.

Find the CD that came with your Presscommander and navigate to the folder: program files\Pressroom Electronics, Inc\PCS.exe\10.1 inch touch panel PC_WEB\pcslogs\
Copy the contents of this pcslogs folder into the c:\pcslogs folder you just created.

Navigate into the c:\pcslogs\images folder and find the folder matching the IP address of your Presscommander
Create a shortcut on your desktop of the file: PCS_Remote_Display.jnlp (This is the Remote Status Monitor program)

When opened for the first time Java will give you warnings. Make sure to allow and accept. Do not block Java.

Connection Status:
In the lower right corner to the Remote State Monitor window is the connection status. Look for a Green connection status.
If the connection status is Red, there is no connection.
A yellow status indicates a connection, but the Presscommander Display unit is not configured correctly.

Function Descriptions

Job and Run-Time Information:
Remote Status Monitor (RSM) can be used in Place of the Display Unit and can View and Set almost all the same parameters as the Display unit.
You can also Reset Faults after entering in a unlock code: password of the Display unit follow by 63 or a 12. Example: password 123 to unlock the Display unit, so to fully unlock the Remote Status Display, enter 12363. To partially unlock enter 12312. Partial unlock prevents changing the STOP angle and Brake Monitor setpoints.
To RELOCK, touch the LOCK button, then touch the ENTER button.
Consult the Remote Status Monitor manual for more details.

Down-Time Production Process Monitoring:
The Operator can record events that happen during the course of operation and downtime
A CSV log file will Time/Date stamp all events including Faults, Operator inputs, and Setpoint changes.
Consult the Remote Status Monitor manual for more details.

Tonnage Profiling:
The tonnage screen will allow you to view the signature of each tonnage hit for up to 4 channels. Tonnage profile data is recorded into a CSV data file.
Consult the Remote Status Monitor manual for more details.

Log and Data Files:
The Log and Data files are found in c:\pcslogs folder
Each file “opens” when you run the PCS_Remote_Display.jnlp program (or connect to the IP via a browser), and “closes” when you close your connection.
The file name contains a Time/Date stamp and IP address for identification.
These files can be viewed directly in any spreadsheet program like Open Office, or Office.

Refer to Page 4 in this manual for a photo.

NOTICE Only 1 browser can be viewing a particular Presscommander at 1 time (only 1 connection per Presscommander). If you are viewing Presscommander #1 & #3 & #4 on your Desktop, nobody else will be able to open up another connection to #1 & #3 & #4 until you close your browser window, but someone else can view Presscommander #2.

Remote Fault Reset (USB Port COM1)

First, refer to page 27 for details on establishing a serial port connection to the Presscommander.

Next, send a string command: $U: to the Presscommander, you should get a @0& response and the Presscommander fault should clear.

Function Descriptions

Press Utility (3 screens)

(Cannot view these screens from the RUN mode.)

```
Scmp: 000 TonM=0000
MinS= 000  MaxS= 000
ClrJob  SetTDC
PCLink  Pasword 000
```

(optional feature) If you hit “Press Utility” a 2nd time, you get:

```
MicroInch Operation
Must be in INCH mode
Time (mSec): 000
```

If you hit “Press Utility” a 3rd time, you get:

```
Stop Angle:    000 000
Bypass Angle:  000 000
Limit  Angle:  000
Speed comp Stop?
```

TonM. This is the machine’s tonnage rating. The maximum value is 1024 tons. This value is used to set maximum values allowed on the tonnage setup screen and to calculate tonnage values from the A/D converter.

Speed Compensation. As the press speeds up beyond its original set point, certain outputs may not respond fast enough to keep up with the increased speed of the press. Also, stop time increases as the press speed increases and therefore the Stop Angle needs to be compensated (see second Press Utility screen) in order for the press to stop on top. Outputs that the user selects for speed compensation will occur sooner (in angular position) as the press speed increases from the minimum speed to maximum speed. When setup correctly, the press will come to a stop on top at any speed between the minimum and maximum set points. Each Job has its own Speed Compensation set point and can be turned off simply by setting the value to 0º.

The user can select which outputs you want to have Speed Compensation by going to the Limit Switch Setup screen and selecting the “*” for the appropriate outputs in the “sp” column.

NOTICE The Speed Compensation value is the amount of compensation that will occur only when the press is operating at the maximum speed set point. As the press slows back down (i.e., brake applied), the amount of compensation is linearly reduced down to 0 (when the press is operating at minimum speed). If the press is run at below minimum speed, there is also no compensation.

Example: When you start up your Press, you need to ramp up speed. Your starting speed is 60spm, your final speed is 200spm. You find the correct Stop angle for 60spm is 300deg & 200spm is 200deg (with Speed comp turned off). Turn on the Speed comp and start with the following values: Scmp=120, MinS=40, MaxS=220,Stop Angle=310. You will need to adjust the Stop Angle Value to stop at TDC for 60spm, and you will need to adjust the Scmp value to stop at TDC for 200spm.

Steps:

1. Set the Speed Compensation set point to 0º (this turns off the function).
2. Set the press Minimum Speed and Maximum Speed set points to the slowest and fastest operating speeds, respectively.
3. Go to the Limit Switch Setup screen and setup the output windows and run the press at the minimum speed. Adjust windows for correct operation at this speed only.

Now you should have a correctly operating press running at minimum speed.

4. Cycle the press at maximum speed. Note the angle where it stopped. Enter the angle at which the press came to a stop (something past 0º in the Speed Compensation field). If the press came to a stop at 30º, then enter this value into the field.
5. Go back to the Limit Switch Setup screen and turn on Speed Compensation for Stop Angle by selecting the “*” under “Speed comp Stop” on second Press Utility screen.
6. Operate the press at maximum speed again and check for proper stopping position. Adjust the Speed Compensation angle (up or down) accordingly to force the press to stop on top.
7. Go back (one more time) to the Limit Switch Setup screen and select all the LS outputs you wish to have speed compensation on by selecting the “*” in the “sp” column.

⚠WARNING If the press is stopped during a normal cycle (not at top stop), it is possible that a Speed Compensated Output will trigger again as the press starts to move again to finish the current cycle. This is because you are now starting from 0 SPM and the stopped press location may have not reached the true output angle for the compensated output. If you are using a servo feed initiate, you may have to turn it off before you return back to top stop to prevent a possible double feed.

LIMITATIONS: Speed compensation can be used up to maximum speeds of 200 SPM, running STANDARD software. This limit can be extended to 300 SPM with special JOG software for higher speed presses. JOG software also frees up INCH mode, but with a 15 stroke limit.

Minimum Speed. Minimum Speed is used by speed compensation and if the press speed exceeds the minimum and then drops below, a fault will occur.

Maximum Speed. Maximum Speed is used by speed compensation and if the press speed exceeds the maximum a fault will occur.

Clear JOB (CLRJOB). Erases the entire currently selected job. You must hold in the Enter key for two seconds.

Top Dead Center (SETTDC). This allows you to zero the press when the Ram is at TDC. Start by inching the press up to TDC. Then hold in the Enter key for five seconds.

⚠WARNING This function should only be used during installation or when hardware changes. Never change TDC to fix a timing problem or any other problems with limit switches.

PCLink (off-line Job Programmer) (PCLINK). This feature puts the PressCommander into a mode that allows the serial port to communicate with the PCS.exe Windows-based software (provided on CD). Install the CD onto any Windows machine. Make sure the PC and the PressCommander are connected before running the PCS.exe or enabling the PCLINK function on the PressCommander. Now you can backup, transfer, save, add, delete, and modify job data between your PC and multiple PressCommander's.

Set Password (SETPAS). The operator enters a three digit number to be used as a password when the key switch is moved from RUN to PROG mode. Set to 000 to turn off the password feature. If you forget your password, contact the manufacturer.

If you hit "Press Utility" a second time, you get:

```
Stop Angle:    000 000
Bypass Angle:  000 000
Limit  Angle:  000
Speed comp Stop?
```

Stop Angle. The press angle that will shut off the Valve relays. You set this angle so the press will stop at TDC. This angle should range from 270° to 330° depending on how fast your press stops. You may need to cycle the press a few times to achieve the proper Stop Angle. Warning: Make sure you have set your TDC before setting this.

Bypass Angle. The press angle at which auto-return is enabled and the Light curtain input will be ignored until TDC is reached. This angle should range from ¼" pinch point to 359° to disable this feature. The ¼" pinch point angle should be just before the 180° point.

2nd Bypass Angle is the angle at which ESTOP Die Faults change to TSTOP Die Faults until the TOP of the stroke. This prevents the press from jamming on the bottom due to an ESTOP Die Fault. To disable this feature, set this angle to 0°.

Limit Angle. This is part of the position based brake monitor (see Top Stop Brake Monitor for details). This value should range from 0 to 20°.

NOTICE When the LCKOUT plug (on the back of the Display Unit) is plugged in, you will not be allowed to alter these values.

2nd Stop Angle is an option to have a Stop Angle just for Continuous mode only. The first Stop Angle then only works for Inch & Single Modes. This helps on machines that start up slowly and build speed.

MicroInch (optional feature).

```
MicroInch Operation
Must be in INCH mode
Time (mSec): 000
```

When the Press key is in PROG mode, the Mode selector is in INCH, and you hit the "Press Utility" button 2 times you will come to the MicroInch screen.
You can select the time in milliseconds. This value is a global value and is stored in non-volatile memory.
Now when you use the Palm button station to activate the Press, the Press will only activate for the Time selected (bump).

Limit Switch (5 screens)

This is where LS1-LS6 are controlled.

A unique name (consisting of 7 characters) can be created for each limit switch while viewing the monitor screen (in PROG mode only). However, the setup screens will only show the names LS1 to LS6.

The following screen is the first screen in PROG mode and the only screen in RUN mode. It monitors the status of all six relay outputs LS1-LS6 as well as displays the current crank angle. An asterisk next to the LS indicates the output relay is energized.

In PROG mode you can rename LS1 thru LS6 by moving the cursor over the proper LS field and using the + / - keys to select letters, and the number pad for numbers.

```
   LS1         LS4
   LS2         LS5
   LS3         LS6
      ANGLE: 000    MONITOR
```

Hit the “Limit Switch” button again to select LS1-LS3. Hit again to select LS4-LS6.

Cyclical Outputs

```
     S CLS-OPN CLS-OPN
LS1  000-000 000-000
LS2  000-000 000-000
LS3  000-000 000-000
```

```
    S CLS-OPN CLS-OPN
LS4  000-000 000-000
LS5  000-000 000-000
LS6  000-000 000-000
```

Outputs LS1-LS6 can have up to two limits (open/close). Closed segments take precedence over opens, so if you overlap a closed segment on top of an open segment, the output will stay closed.

Use the cursor keys to select the proper Limit Switch output field.

Select whether you want this output to be Speed Compensated. To select Speed Compensation, hit “Enter” while in the “s” field and an “*” will appear. Hit “Enter” again and it will disappear to deselect Speed Compensation.

Select the proper Close (on), and Open (off) values (up to two sets per output).

Cycle Delay & Hold Outputs

```
      DLY CY  HLD CY
LS4    000     000
LS5    000     000
LS6    000     000
```

Outputs LS1-LS6 can be delayed for a specific number of press cycles and then held on for a specific number of cycles. Selecting the Delay or Hold fields erases all other data for the selected Output (use this for Lubrication, etc.).

Hit “Limit Switch” button until you see “DLY CY HLD CY” heading at the top of the screen. Then select the number of delay cycles (off) and hold cycles (on).

The angle at which the Delay/Hold LS will turn ON/OFF is determined by angles found for the specific LS from the Cyclical Outputs screen. (i.e. LS4 CLS=330 OPN=340, LS4 DLY CY=2 HLD CY=3: LS4 will turn ON at 330° after 2 cycles, then remain on for 3 cycles, turning back OFF at 340°). The Cyclical Output window should be no larger than 10°.

Timed Outputs

```
     STRT ANG  HLDmSEC
LS4    000      0000
LS5    000      0000
LS6    000      0000
```

Outputs LS1-LS6 can be set to turn on at a specific angle and then hold for a specific time period. Selecting the Hold Time output field erases all other data for the selected Output. The Hold Time is in milliseconds (i.e., 1000=1 sec, 500= 1/2sec).

Hit “Limit Switch” button until you see “STRT ANG HLDmSEC” heading at the top of the screen. Then select the Starting angle (on) and Hold time (in milliseconds).

NOTICE All cyclical data for LS1-LS6 will be erased if you enter data on this screen.

Combining Cycle Delay with Hold Timer

If you enter in a Delay Cycle value and a Hold Timer value, the designated output will turn on at the timer setpoint angle only after the specified number of delay cycles.

Die Input (3 screens)

A unique name (consisting of 7 characters) can be created for each die sensor (SEN1-SEN6) while viewing the monitor screen (in PROG mode only). However, the setup screens will only show the names SEN1 to SEN6.

In PROG mode you can rename SEN1 thru SEN6 by moving the cursor over the proper SEN field and using the + / - keys to select letters, and the number pad for numbers.

```
SEN1        * SEN4      F
SEN2          SEN5      *
SEN3        f SEN6
```

The Die Status Screen (shown above) allows you to run the press and see when a particular sensor is active (closed) and/or faulted, relative to the press angle. A "*" indicates an active (closed) sensor that has not faulted. A "F" indicates an active (closed) sensor that has faulted. A "f" indicates a non-active (open) sensor input that has faulted. A " " indicates a non-active (open) sensor that has not faulted. This will display in both RUN and PROG modes.

NOTICE In PROG mode, the PressCommander will not shut down, but will limit you to 15 cycles of the press. Also, die faults will not display as a flashing fault message, that only occurs in RUN mode.

Die input #6 is used with the Parts Counter (see the Counter section note).

Hit the "Die Input" button again to select SEN1-SEN3. Hit again to select SEN4-SEN6.

```
      TYPE       STP   BGN END
SEN1  MOM        E     000-000
SEN2  MOM        E     000-000
SEN3  MOM        E     000-000
```

```
       TYPE      STP   BGN END
SEN4  MOM        E     000-000
SEN5  MOM        E     000-000
SEN6  MOM        E     000-000
```

How to Turn Off a Die Input: Select Momentary and 0° for both open/close angles.

Die Fault STP type: Select whether you want a Die input sensor fault to E-Stop (select E) or Top Stop (select T) the machine. Use the "Enter" key to toggle between E or T modes. The Default is to E-Stop the machine, but you may have a need to finish the current cycle should a particular die input fault out. (i.e. The parts counter Die #6)

Function Descriptions

To program a die sensor, you must first understand the five types of sensor windows that we use.

1. *Momentary Inputs (MOM)* - The die input must see a change of state from the sensor somewhere within the programmed window. The change can be open to closed or closed to open and may occur multiple times within the same window. No change of state within the window will cause the PressCommander to fault.
2. *Maintain N.O. Inputs (MNO)* - The die input must not see a change of state from the sensor from the beginning of the window through the end of the window. The signal must also be open. If a signal is received from the sensor while in the window, the PressCommander will fault.
3. *Maintain N.C. Inputs (MNC)* - The die input must not see a change of state from the sensor from the beginning of the window through the end of the window. This signal must also be closed. If no signal is received from the sensor while in the window, the PressCommander will fault.
4. *Static N.O. Inputs (SNO)* - This type of input is typically used for Buckle Detection. Being static means that it should never see a signal from the sensor anytime. If a signal is seen, the PressCommander will fault. This type of input works 360° of the press rotation.
5. *Static N.C. Inputs (SNC)* - This type of input is typically used for End of Stock detection. Being static means that it should see a signal from the sensor at all times. If a signal is not seen, the PressCommander will fault. This type of input works 360° of the press rotation.
6. *Counter (CNT)* - This type is allowed only for DIE#6 and is used to select how the parts counter gets its signal to increment. This type acts exactly like the “Momentary” type except the parts counter increments when a change of state occurs within the selected window. (see the Counter section for details).

NOTICE In software version 2.8g (and above), the “maintained” die sensor function checks outside the window for a transition. If no transition is detected when the “maintained” window is reached, a die fault occurs. Older software does not check outside the window, you may wish to run the same die sensor to a second die input and set it to check either for a “Momentary” or for an opposite “Maintained” state during some other portion of the cycle (i.e., Die #1 Maintained N.C. 180 to 270, Die #2 Maintained N.O. 50 to 120, both Die #1 and #2 inputs tied together).

How to Program a Die Input. Ensure that the unit is in PROG mode.

NOTICE The Screen does not update if you are currently changing a Begin or End angle. New or changed information is stored in nonvolatile memory as soon as the entire value is entered.

When in PROG mode, all die-input sensors are active and working, however, the press will not stop due to a die fault. All input faults are bypassed in the PROG mode.

With the unit in PROG mode,

1. Use the cursors to select the Die Input Sensor you want to program.
2. Hit the “Enter” key to cycle through the Sensor Types.
3. Cursor left when you have finished selecting the Type.
4. Enter the Beginning and Ending angles for Die Window.

Optional Custom Die Types:

If you need a Die Type not shown on this standard list, Custom Die Types can be designed and firmware changed.

Example: GNG (Go-NoGo) Die Type does not fault out the Press, but prevents movement until the Die is CLOSED and must remain CLOSED from TOP until the BYPASS angle is reached, and must OPEN in between.

Example: Die CLOSE triggers an output Relay under certain conditions.

Contact: service@pressroomelectronics.com for more help

System Setup

System Setup Procedure

1. Install and verify proper internal system wiring. See *Installation* section of this manual.
2. Install and verify proper external wiring (i.e., power, die, limits, fault outputs, etc). See back of manual for complete wiring diagrams.
3. Power up the system and push any key to get past the Start Up screen.
4. Remove the J1 security jumper (backside of Vacuum Fluorescent Display by the keyswitch).
5. Turn the keyswitch from RUN to PROG mode and select the Press Utility button. Select the Password field. Enter a new password to prevent unauthorized altering of job data (the password will remain on the screen until you leave this).
6. Select Job 1 and enter a new name (up to ten characters with the exception of Limit Switch and Die Input names where the limit is seven characters).
7. Select the Minimum and Maximum Speed fields and enter in the speed range of the press for this particular job.
8. Set your Stop, Bypass, and Limit Angles. You may need to cycle the press a few times to achieve the proper Stop Angle after you set TDC.
9. Inch Press up to Top Dead Center.
10. Select "Press Utility" button and select SETTDC. Hold in the "Enter" key for five seconds to zero the resolver angle ***(Do Not perform this setup unless the press is at Top Dead Center!)***
11. Follow the instructions for the time-based brake monitor function and select the 90º Stop Test field. The press will now travel 90º past top and stop. The ACTUAL stop time can now be used to calculate the WARN and FAIL stop time values as well as help determine proper safety distances for press guarding equipment.
12. Select the MOTION field and enter in a value slightly larger than the time it takes for the press to start moving once it gets the signal to move.
13. Set up the Counter fields for the particular job.
14. Select the Limit Switch Setup field. Select the proper open /close windows to satisfy your press control inputs (LS 1-6). Select the hold time for the timed outputs (LS 3-6).
15. Cycle the press, check the press control, adjust the Limit Switch Outputs. Repeat this step until all outputs are correct.
16. Set up Speed Compensation (if running variable speed).
17. Select the Die Sensor Setup field. Select which input(s) are static and the proper start / end window for the cyclical die inputs (inputs #1-6).
18. Return back to the main PROG mode screen and cycle the press. Watch the Die Sensor screen for faults. Repeat step 16 until faults disappear.
19. Turn the keyswitch back from PROG to RUN mode and replace the J1 security jumper. You are finished.

NOTICE To clear fault code(s) you must switch from RUN to PROG mode and hit the "Enter" key.

Tonnage Load Monitor (optional)

Overview

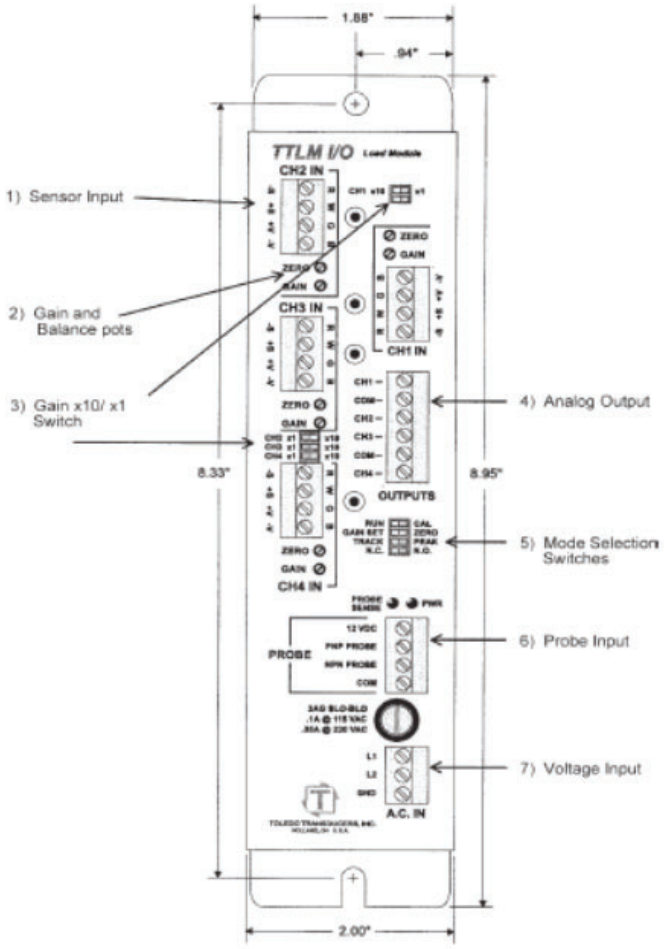
The Tonnage Load Monitor has been designed with user friendliness in mind. The analog output of the TLM provides a shielded/twisted pair cable to the P4 plug on the PressCommander Display unit. That is, each analog output must have a ground wire twisted around it. All the twisted pairs (up to 4) are then encased in a shield which must be connected to the case (usually the nut holding down the aluminum cover). The TLM should be mounted within 3 feet. Several useful functions such as auto-zeroing and peak hold circuits have been incorporated to make the TLM a versatile signal conditioner.

TONN	LR	RR	LF	RF
Min	000	000	000	000
Max	000	000	000	000
C	0000	0000	0000	0000

The “counts” is a digital representation of the voltage on the sensor input. 0 = 0v, 512 = 2.5v, 1024 = 5.0v 2.5v = machine tonnage capacity / 4. Tonnage on all 4 channels can be viewed while in RUN mode. The tonnage for any channel will only be displayed on the RUN screen when the minimum tonnage value is set above 0. You can still only change the setpoints from the Tonnage Setup screen in the PROG mode.

Mounting the TLM

Use #10 screws to securely mount the TLM in an enclosure suited to the environment. The dimensions and recommended mounting hole arrangements are shown below in **Figure 1**.

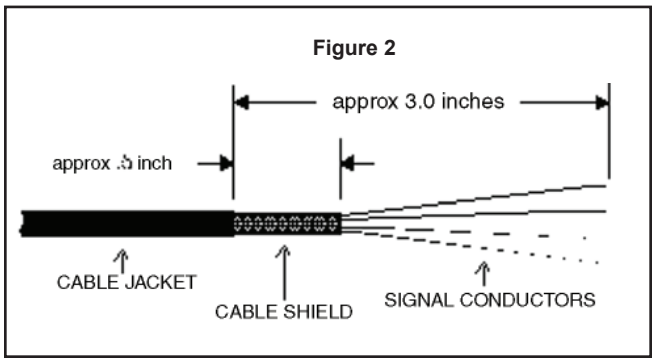


Connection Guidelines

1. Strip the sensor cable as shown in Figure 2. Be sure not to nick any of the signal conductors or strip the shield completely away. At least a ½ inch of cable shield should be exposed for proper insertion into the wire lug.

Tonnage Load Monitor (optional)

Figure 2



2. Insert the cable through the lug as shown in Figure 2a. Make sure the cable shield is aligned with the portion of the wire lug which will be crimped.

3. Next, crimp the lug on to the cable shield, do not crimp too tight and risk smashing the wires. This could cause them to short to ground. Figure 2b shows a side view of the completed operation after crimping.

Figure 2a

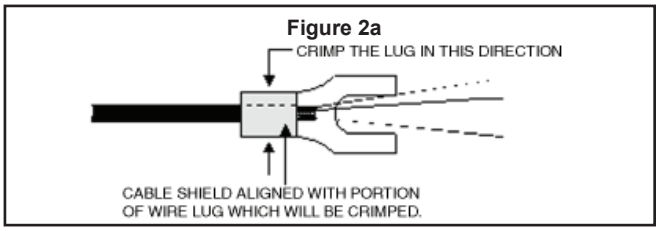
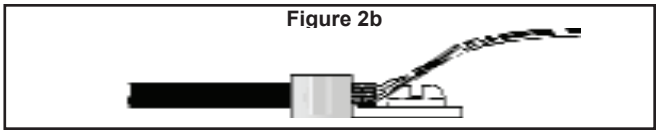


Figure 2b



4. Attach the wire lug to a ground terminal on the front of the TLM. Use a 6-32 x ¼" screw for the grounding lug connection.

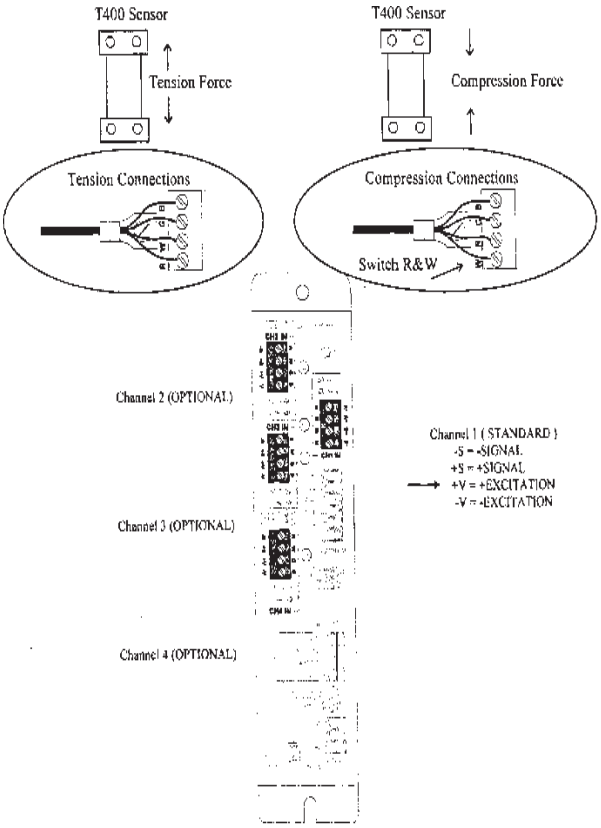
NOTICE If your sensor is not double shielded with both foil and a braid, electrical noise may affect your output readings.

Some brands of sensors use a different color code than the red/white/black colors. It is important to check the spec sheet of the sensor. The spec sheet will indicate the excitation and signal.

Connecting Sensors to the TLM

The TLM Module accepts signals from strain gages. Figure 3 illustrates the sensor connections available on the TLM.

Figure 3



The TLM can use an input of either 115 VAC or 220 VAC (factory set at 115 VAC).

Input power is connected by means of the front panel “A.C. IN” connector and fused with either a 100mA fuse for 115 VAC, or a 50mA fuse for 220 VAC.

These jumpers can be accessed by removing the six screws securing the cover and then pulling the cover off from the front.

115 VAC = Jumpers A & C

220 VAC= Jumper B Only

Figure 4
TLM Printed Circuit Board

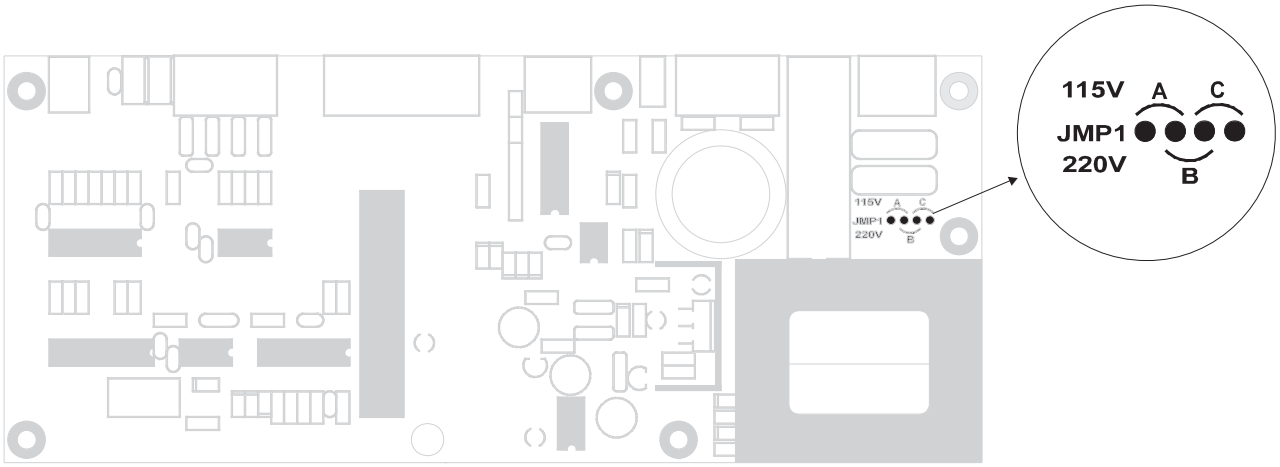
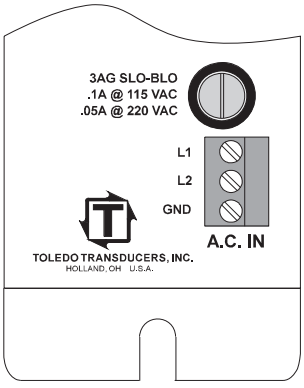


Figure 4a
Front Panel A.C. Power Connections



Tonnage Load Monitor (optional)

TLM Cam Switch Wiring Connections

The probe supply voltage is provided by the TLM via the +12VDC output connection on the PROBE interface connector.

Figure 5 illustrates the wiring for both the PNP and NPN probe types.

Either a normally open or normally closed probe may be used.

The LED directly above the probe input connector (PROBE SENSE) indicates the actual state of the probe.

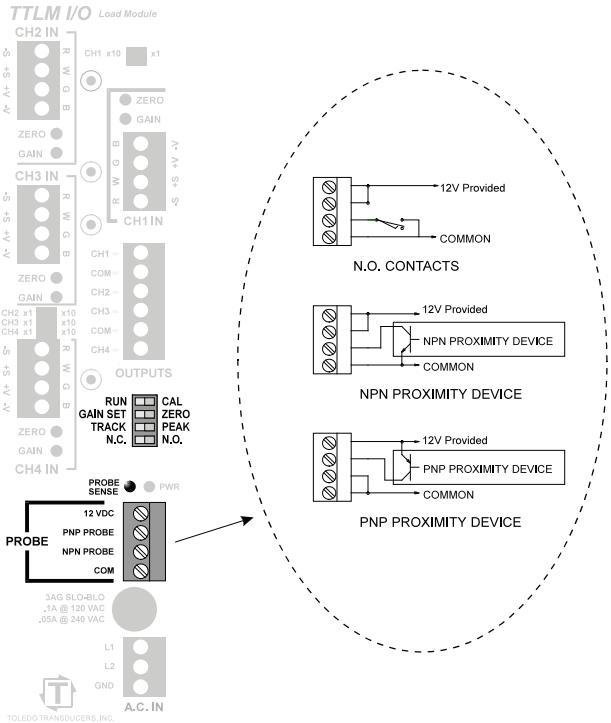
This LED should turn on at 140° and turn off at 350°. If it is working just the opposite, simply flip the N.C. -N.O. Dip Switch.

If the probe is ON during this time, the DIP switch may be moved to N.C. to invert the logic of the probe signal in the TLM.

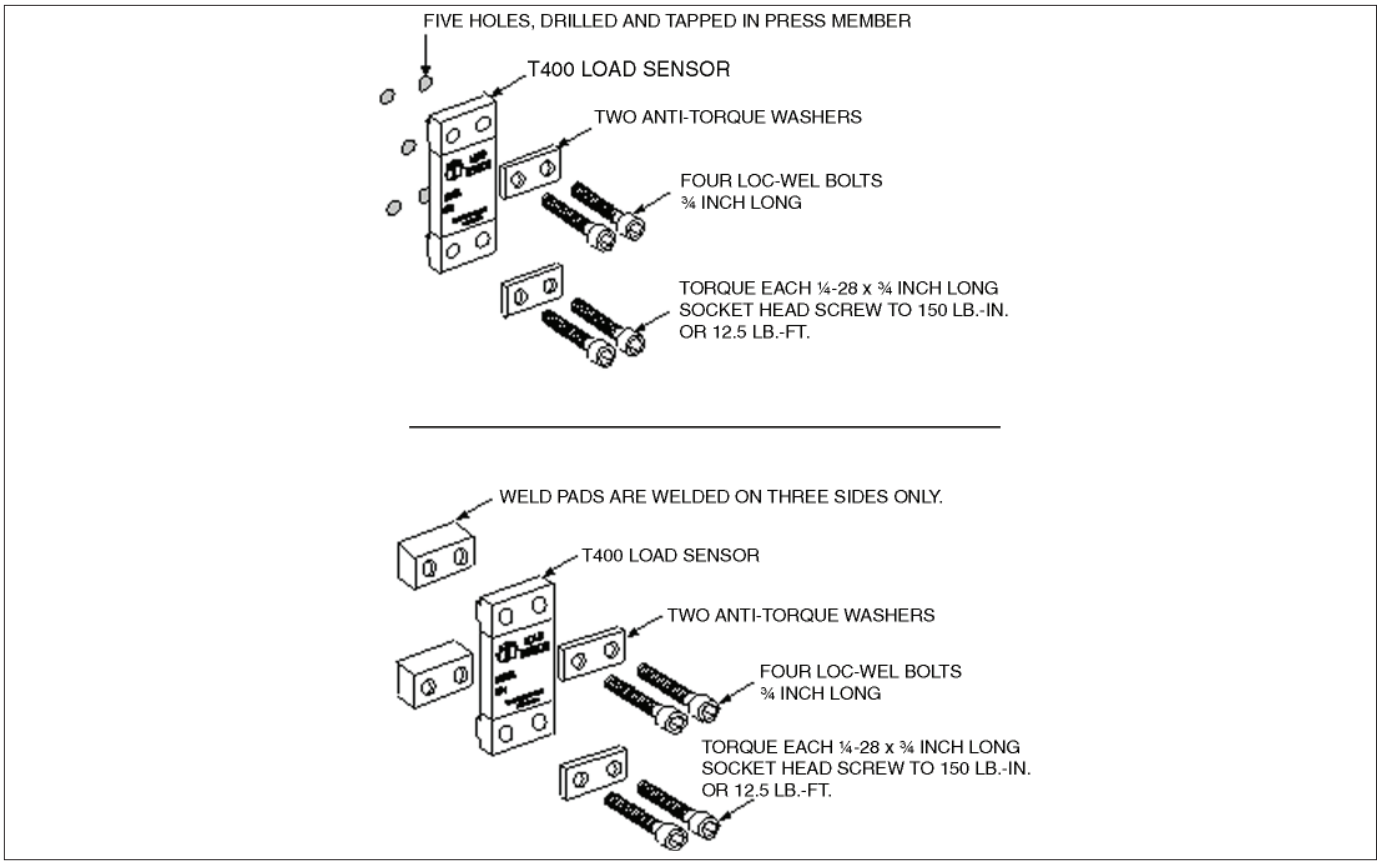
(* The state of the LED is not affected with this switch.)

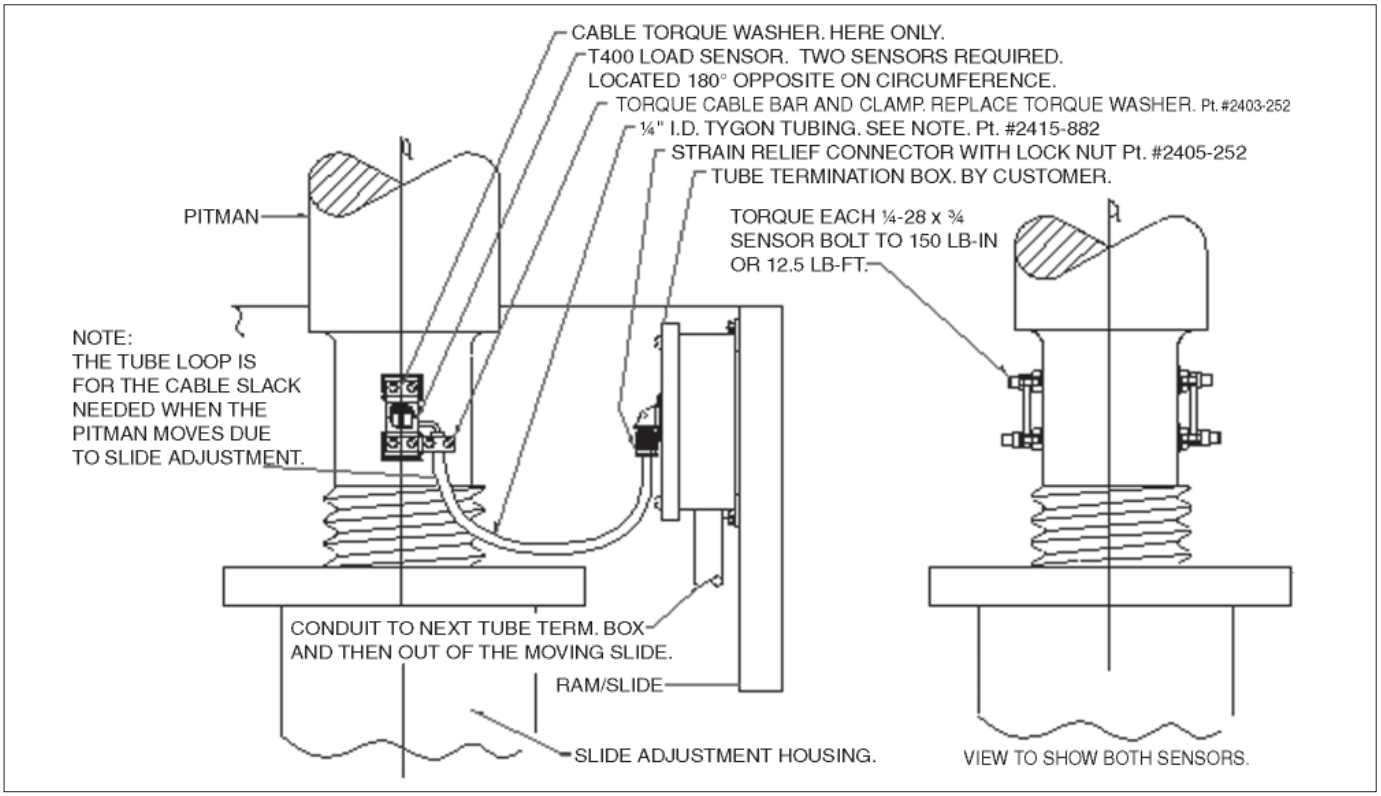
(See Function Descriptions, “Tonnage Setup”.)

Figure 5
TLM Probe Interface Connections



T400 Installation

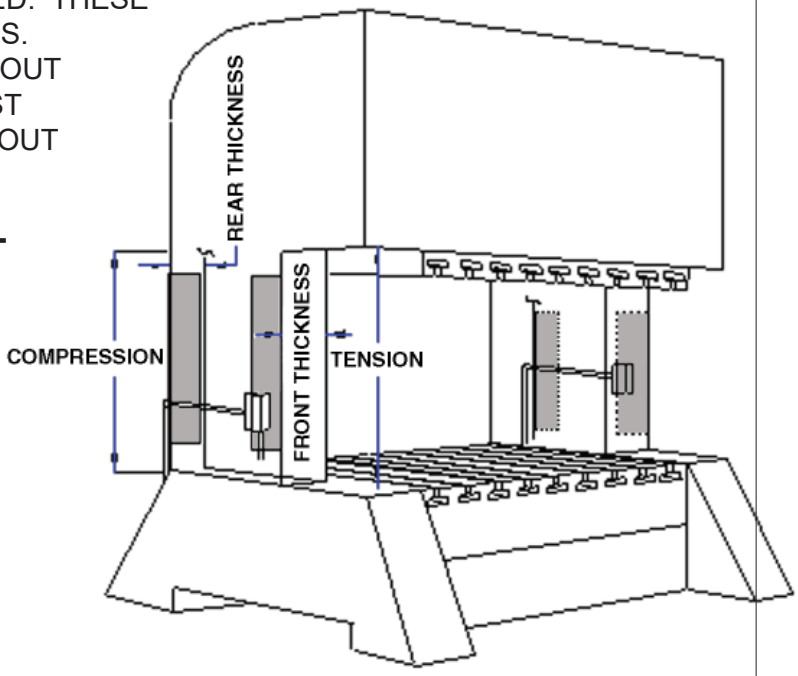




Tonnage Load Monitor (optional)

NOTES:

1) (2) SENSORS REQUIRED
2) (2) SENSOR ENCLOSURES ARE INCLUDED. THESE HELP PROTECT THE T400 SENSOR GAUGES. THESE ENCLOSURES INCLUDE ½" KNOCK-OUT HOLES. IF CONDUIT IS USED, WE SUGGEST USING ½" STRAIN RELIEFS IN THE KNOCK OUT HOLES.

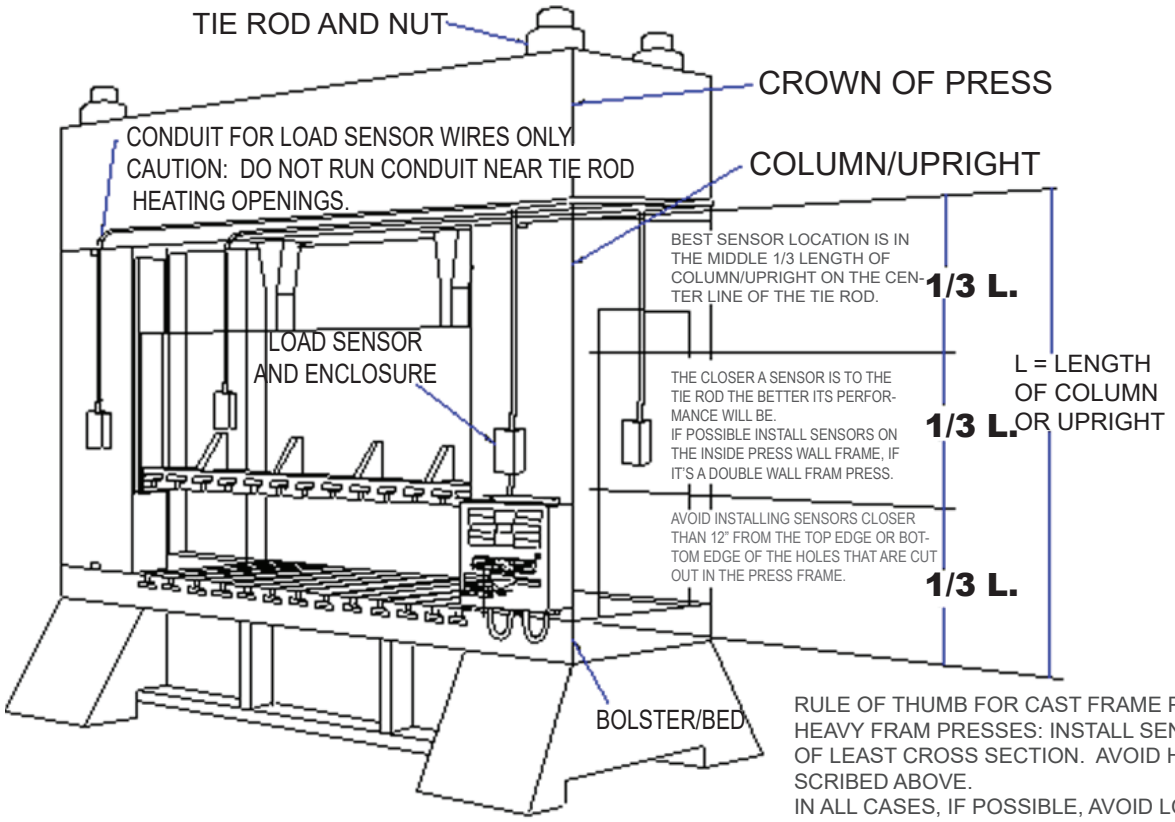


SENSOR PLACEMENT

Sensor location must be determined.
You have two locations, the front or the rear of the press. (Shown in the shaded area.)

HOW TO DETERMINE THE BEST LOCATION
* MEASURE THE REAR THICKNESS
_____REAR
* MULTIPLY BY THREE x 3 = ☐
* MEASURE THE FRONT THICKNESS
_____FRONT

If the front thickness is smaller than value in ☐, then mount sensors in the front. (This is the most common.) If the front thickness is larger, then place the sensor in the rear. Adjust the input connection for compression readings instead of tension.



RULE OF THUMB FOR CAST FRAME PRESSES OR VERY HEAVY FRAM PRESSES: INSTALL SENSORS IN AN AREA OF LEAST CROSS SECTION. AVOID HOLES AS DESCRIBED ABOVE.
IN ALL CASES, IF POSSIBLE, AVOID LOCATING SENSORS CLOSER THAN (1) COLUMN WIDTH FROM THE CROWN OR BOLSTER.

Using the T400 Sensor Installation Fixture Kit No. 1977-749

(Metric Installation Fixture Kit No. 1974-749)

Drill and Tap Method for Mounting Sensors

Step No. 1 Paint must be sanded off and or grease removed from sensor mount area. If the machine surface is flat (total indicated reading of .002") and smooth (125 µ in.) the load sensor can be bolted directly to the surface.

Step No. 2 Drill and tap the center hole for mounting the fixture to the press member. This hole should be 1/2 of an inch deep. **Be sure the sensor location follows the best location described on the print. (Drawing Numbers 3021, 4557).**

Step No. 3 Bolt the drill guide to the press member using the 1/4-28 by 1-1/4 inch (M6-1 X 35) long socket head cap screw in the center of the guide.

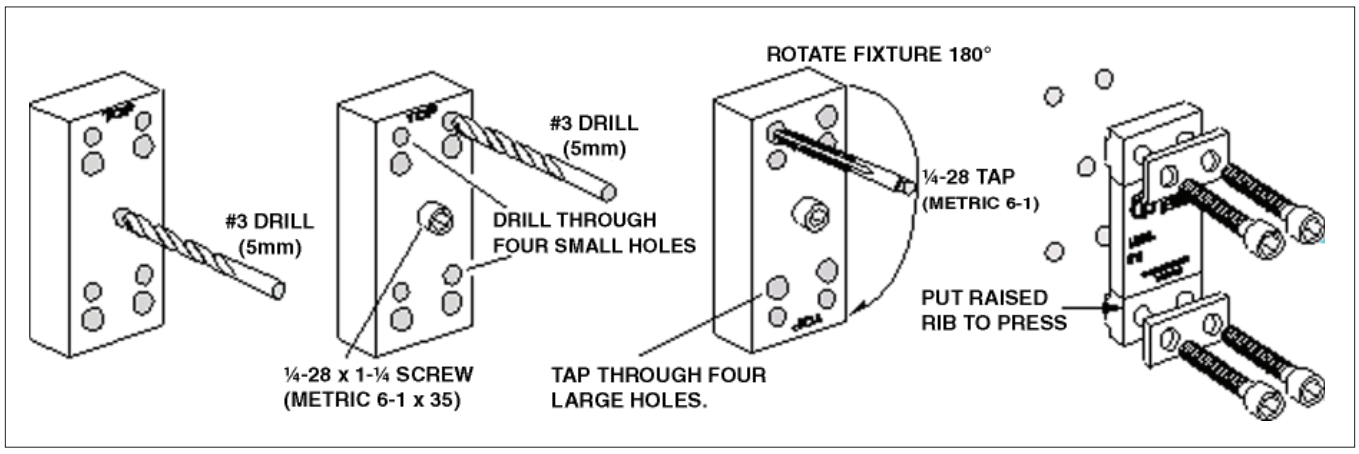
Step No. 4 Insert the number 3 drill (5mm) into the smaller hole and drill out all four holes to a depth of 3/4 of an inch.

Step No. 5 Loosen the drill guide. Rotate the drill guide 180° such that the larger holes line up with the fresh drilled holes in the press member. Insert a tap to be sure the holes line up. Lock the drill guide by tightening the center socket head screw.

Step No. 6 Insert the tap into the larger tap guide holes and tap each hole. **Be sure to use plenty of tapping fluid.**

Step No. 7 Remove the tap guide and continue with more holes where needed.

Step No. 8 Mount the sensor with raised rib to the press. The anti-torque washers should go between the screw and the sensor body.



Tonnage Load Monitor (optional)

Using the T400 Sensor Installation Fixture Kit No. 1977

Weld Pad Method for Mounting Sensors

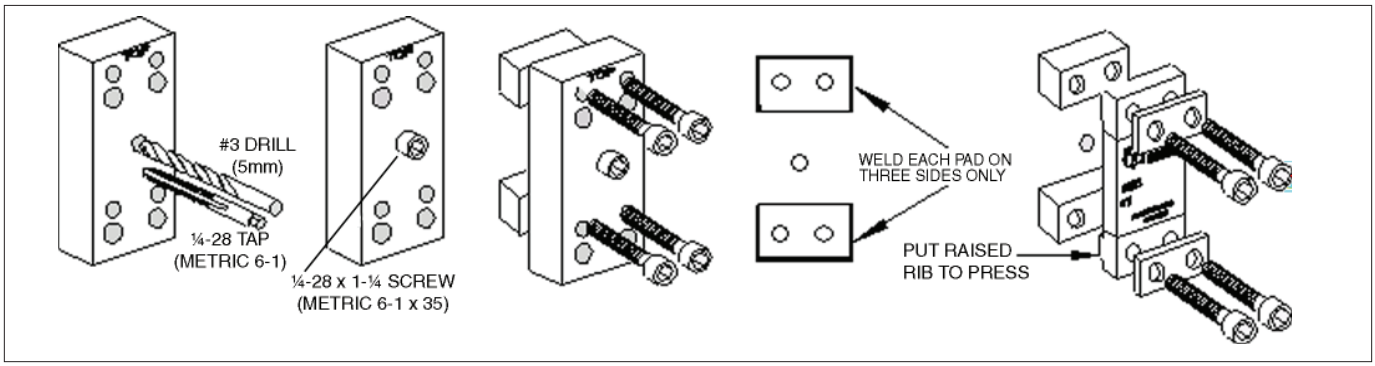
Step No. 1 Remove all paint, grease, or rust from surface to be welded (surface should be flat T.I.R. 1/32 of an inch).

Step No. 2 Bolt the weld pads to the fixture with the socket head cap screws provided. The user may want to drill and tap for the center holding screw. The center hole may be used to hold the fixture down flat and tight while welding the weld pads to the press member.

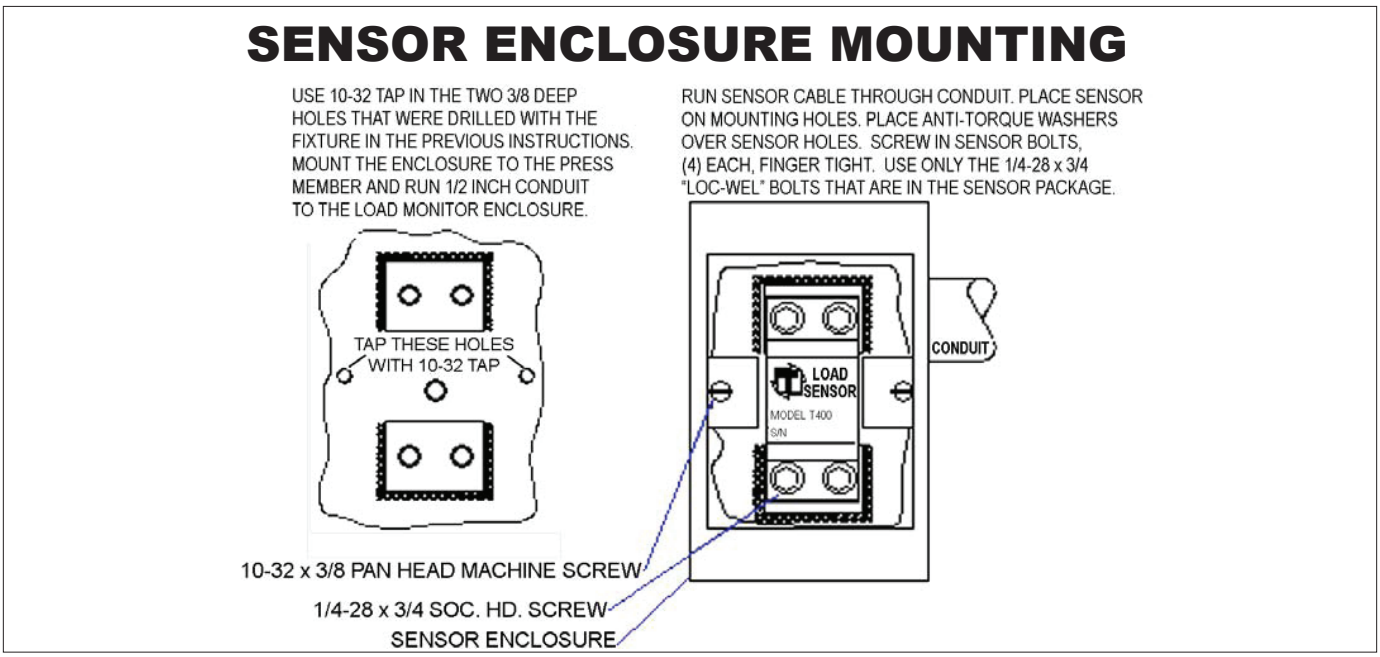
Step No. 3 Hold the fixture flat and tight. Weld the weld pads to the press member. **Be sure to only weld the weld pads on three sides, as shown.** A single pass is sufficient. Do not remove fixture until slag is removed and or assembly has cooled. The four screws may be discarded. **Do not use screws to assemble sensor**. When welding to cast iron, use a dry nickle rod such as: Lincoln Electric "Soft Weld" Hobart "NI Cast 99" MB Weld Prod. "MG 210" Strike arc on steel then puddle into the cast iron.

Step No. 4 Remove weld fixture. **Do not weld after fixture is removed**. Weld Pad surface must be clean - no weld bumps, scratches, etc. **Be sure tapped holes are clean and bottom of holes are free of weld flash**.

Step No. 5 Mount the sensor with raised rib to the press. The anti-torque washers should go between the screw and the sensor body.



SENSOR ENCLOSURE MOUNTING



Wiring a Triggering Device Into the TLM

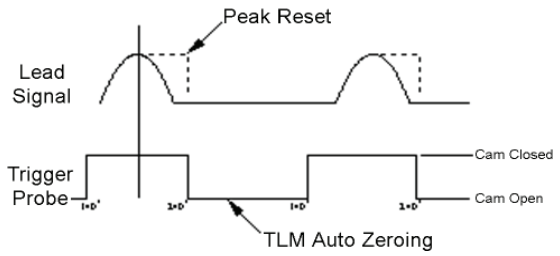
The TLM remains in the auto-zeroing mode of operation until an external probe is applied.

The auto zero feature is important for accurate readings. Over time the press frame will slightly change in its structure. This may be due to temperature or press frame tension. The TLM will compensate for the slight change. It will readjust the zero base line. This zero base line is the no-load value of the press. With a consistent zero value, the tonnage output readings should remain accurate.

When the probe turns on, the TLM opens the window to read a load signal. In peak mode the load level rises to the highest value.

When the probe turns off, the peak level is reset and the auto-zeroing function is resumed (notice the dotted line in Figure 6).

Figure 6
The recommended timing of the probe vs. the loading on the machine



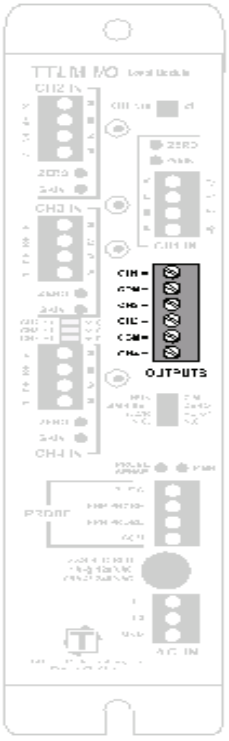
The timing of the probe should be such that it turns on just before the machine begins generating a load (140°) and remains on until the load is removed (350°) and the TLM outputs have been read.

The Analog Output Connector

The analog outputs are provided on a 6 pin Phoenix connector for easy access. The voltage level at these outputs ranges from 0V at no load, up to approximately 9V at maximum.

This output voltage level is directly related to the gain setting of each channel.

Figure 7
The analog output connections provided for interfacing to other peripherals



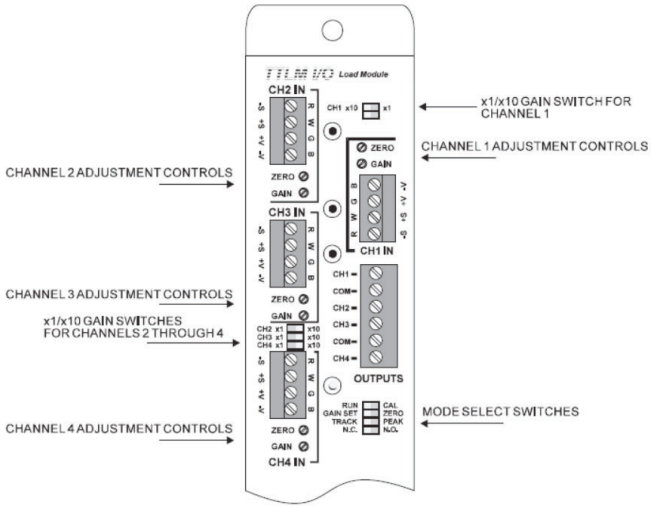
Analog Voltage Output Connector
Pin 1 = Ch 1 out
Pin 2 = Common
Pin 3 = Ch 2 out
Pin 4 = Ch 3 out
Pin 5 = Common
Pin 6 = Ch 4 out

Tonnage Load Monitor (optional)

Calibrating the TLM Load Module

**If you have a Maximizer Load Monitor (Allen Bradley based system), please refer to that manual for proper calibration of the TLM .*

Figure 8
Switches and controls used to calibrate the TLM Load Module.



Step 1: Now that you have found the best possible sensor location, torque all of the sensors down to 150 in/lbs on the sensor bolts. Do not put the sensor enclosure covers on yet. You will need to test each sensor location.

Step 2: Flip mode select switches to:

Perform the steps found on the "Tonnage Setup" page of this manual to connect the TLM to the PressCommander, and configure machine capacity.

Step 3: On the PressCommander Tonnage setup screen, set the Low limit of each channel to 1 and the High limit to the maximum limit for each leg. Now you can watch the COUNTS column on the screen and adjust the zero pot on the TLM for ~0 counts.

NOTICE The PressCommander can only read positive voltages, to avoid damage check to make sure voltages going to the PressCommander are positive)

Step 4: Again connect your volt meter to the output plug on channel one and common. Have someone put pressure on channel one's sensor with their thumb. It should slightly change as pressure is applied. This will verify your sensor location. Normally we locate our sensors:

Ch1 = Left Rear Ch3 = Left Front

Ch2 = Right Rear Ch4 = Right Front

Step 5: Coat the sensors with silicone if you are calibrating a forging press. This will help prevent water damage when the presses are washed. Put the sensor enclosure covers on each box.

Step 6: Without load cells in the press, cycle the press and stop it at bottom dead center. Measure between the ram and the bed to determine the size of the spacers you will need. Be careful to allow around a 1/8 inch gap between the ram and the load cells.

* Damage to the press could occur if the ram locks up the load cells due to an improper measurement.

Step 7: Cycle the press so the ram goes to the top. Insert the load cells and spacers. Keep the load cells symmetrical with each other in the bed of the press. Record their placement on a calibration sheet

Step 8: Cycle the press over and over. Each time lower the adjustment until you reach the tonnage rating of the press.

* The load will increase approximately 1 ton for every 1/1000 inch as you begin to lower the adjustment.

Step 9: Once you have evened out load distribution (using shims) at the press capacity, you are ready to adjust the gain pots on the TLM. Turn the mode selector switches to:

Step 10: If your PLC readout device does not adjust the tonnage, then the TLM will need to be adjusted.

Set the mode switches to:

Adjust the gain pot after each press cycle until your readings on the PressCommander match the readings on the load cells. To obtain more gain use the

switch.

Step 11: After your readings match up, check the tonnage at lighter values by backing off the slide adjustment little by little and record the results. This should be done at least four times to see the accuracy at lower tonnages. This is called a "linearity check."

Step 12: You are now done with the calibration. Refer back to the "Tonnage Setup" page for instructions on how to setup the tonnage limits.

Setup the TLM with Pre-calibrated Load Cells

Follow these steps after you have installed the TLM and place the load cell in the press *(Complete the following formulas if your TLM has anything other than a 1 meg shunt).*

Step 1: Locate the following information from the load cell calibration data sheet:

- Shunt Output Resistance _____
- Shunt Output Voltage in mV/V _____

Step 2: Find the New Shunt Output by completing the following formula:

(.000001) x (Shunt Output Resistance) x (Shunt Output Voltage) = New Shunt Output Voltage

Step 3: Set your TLM to a Full Scale voltage. Common settings are 5VDC or 2.5VDC. Label this V Full Scale.

Step 4: Find voltage output at full scale on the calibration sheet. Label this V Out Full Scale _____.

Step 5: Find the calibration voltage by completing the following formula:

(V Full Scale) X (New Shunt Voltage) = Calibration Voltage Number
(V Out Full Scale)

The Calibration Voltage Number = _____

Step 6: Switch the TLM to:

_____

And Adjust the balance to ZERO.

Step 7: Switch the TLM to:

And adjust the gain pot to the Calibration Voltage Number from Step 5. You can read this voltage with a DC voltmeter. Read from the output of the TLM.

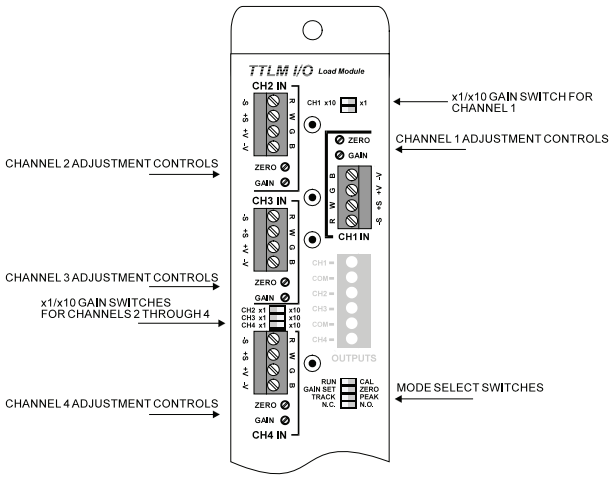
Step 8: Switch the TLM back to Run:

Tonnage Load Monitor (optional)

Operating the TLM

Once the TLM has been calibrated it is ready for continuous use. To ready the TLM for load conversions, follow these four steps: (Figure 9)

Figure 9



Step 1: Enter the run mode by switching from CAL to RUN.

Step 2: Make sure that the GAIN SET/ZERO switch is set to ZERO.

Step 3: Insure that the external probe signal is turned on before the load is generated and off after the operation is complete. If the logic of the probe is reversed, use the N.C./N.O. switch to invert the probe signal logic or adjust the probe accordingly.

Step 4: Set the TRACK/PEAK switch to the desired mode. While in TRACK mode each channel's output will follow the loading on the sensor as the load on the machine increases and decreases. In PEAK mode, the output will increase to the highest load level and remain at that voltage until the probe is released.

Alarm. A reading that is out of the high or low limit range causing the relay to de-energize. Once alarmed, the relay opens to stop the press/machine.

Balance. The balance adjustment equalizes the sensor to the monitor. The balance pot is used to bring the display to zero.

Calibration Number. A reference value dialed in during the calibration process. When the calibration number is correct, the gain/span settings are correct.

Calibration. The process in which the Tonnage Monitor mounted on the machine is adjusted to read the same tonnage as the reference load cells in the bed of the press.

Cam Input. A switching input to the unit allowing tonnage to be read at a certain position in the stroke. It is usually obtained from a rotary cam wheel or a programmable limit switch. (Only 24 VDC devices.)

Compression. The force generated by the sensor or load cell by compressing. It is usually found in the rear of a C-Frame press or on a Pitman arm.

Gain / Span. Gain, also called Span, is the amplification used by the monitor. A small amount of elongation of the sensor needs a large amount of gain to show a high reading. The gain is adjusted during calibration.

Reverse Load. The “snap through” or damaging negative forces occurring in the machine. Typically, the snap through rating is 10% of the capacity of the press.

Shut Height. The distance from the top of the bed of the press to the bottom of the ram when on BDC. Most OBI/OBS presses have a shut height of approximately fifteen inches and a ram adjust of approximately four inches.

Track Mode. When using the track mode, the output will adjust between 0 and 9VDC. The value goes back to 0V when there is no load.

Peak Mode. When using the Peak Mode the output will hold the highest force seen during the time the probe switch is on. Most PLC units use this mode.

Appendix A: Troubleshooting

General

If the press will not operate, check the following:

- Power to the press control is disconnected when the mode selector is in the “Off” position or in the “Inch” or “Continuous” modes while the hand/foot selector is in “Foot” mode.
- Make sure that TDC is set properly and that Stop, Bypass, and Limit Angles are all set.
- Check the Diagnostics Display on the front control panel. Any discrepancy between the redundant control logic systems or a fault within one of the systems will force a message to scroll across the display. The message should be fairly self explanatory, however, a detailed description can be found under External Error Messages in this section.
- With the system energized and the “Start” button pushed, the “System On/Ground Fault” indicator light should be lit. If not, check the stop circuit. Input #1 LED should be on.
- The following Inputs on 52-246 board(s) Master and Slave should be on:

  Input (from 1 to 32)

2	=	STOP
14	=	Light Guard input
15	=	Top Stop button
17	=	Pressure switch 1
18	=	Pressure switch 2
19	=	ESTOP
21	=	Palm Station 1

- The motor starter should have an auxiliary contact wired N.O. which will close when the motor is running in “FWD” to allow single and continuous operation.

To clear an error message from the diagnostics display, press “Stop.”

Status Display Messages

MESSAGE: **OFF** (0)
PURPOSE: Indicates that the computers are powered up and operating properly awaiting the “START” button.

MESSAGE: **INCH** (9)
PURPOSE: Either the key selector is in the “Inch” mode or the “Stroke Interrupt” light is on and control has reverted to “Inch” mode until you finish the stroke and return the press back to top stop. If the key selector is in “Foot” mode, the power to the controller will be disconnected and nothing will be displayed.

MESSAGE: **SINGLE** (7)
PURPOSE: The key selector is in the “Single Stroke” mode. If you stop the press before the bottom (LS3), the control will automatically revert to “Inch” mode until you return the press to top stop and force you to use the “Hand” mode even if you selected the “Foot” mode. Once you reach top stop, control will revert back to “Single Stroke” mode again.

MESSAGE: **CONTINUOUS** (8)
PURPOSE: The key selector is in the “Continuous Stroke” mode and awaiting you to press the “Continuous Arm” button (see below).

MESSAGE: **CONT ARMD** (5)
PURPOSE: Indicates that the press is in continuous mode and the “Continuous Arm” button was pushed. Once pressed, you now have five seconds to activate all the palm button stations that are turned on. Once you activate the stations, you must keep them active for two press strokes, otherwise the control will not lock into continuous mode and you will get an error message.

Messages that appear on the display, but no fault has occurred.

MESSAGE: **T.STP BM FLT** (41)
PURPOSE: Indicates that the press came to a stop past the LIMIT ANGLE setpoint (see Press Utility section). This is used as an extra cross check and determines that you have properly set your STOP ANGLE and/or properly set up your TDC.

MESSAGE: **STOP** (5)
PURPOSE: Indicates that the "Stop" button is being pushed. The display will return to display "Off" when you release this button. STOP will turn off the system relay.

MESSAGE: **E-STOP** (6)
E-STOP 2 (44)
PURPOSE: Indicates that the "Emergency Stop" button is being pushed. The display will return to display "Off" when you release this button. E-STOP will turn off the System Relay.

MESSAGE: **TOP STOP** (4)
PURPOSE: Indicates that the "Top Stop" button is being pushed. This button is used to return the press to top stop during continuous mode operation.

MESSAGE: **PALM 1/2 (3/4) (5/6) (7/8)** (17-20)
PURPOSE: Indicates that only 1 palm was activated or the 2nd palm was not activated within 1/4 second. The numbers indicate which button pair. Release both buttons to reset.

MESSAGE: **STROKE INT.** (40)
PURPOSE: Indicates that the press was stopped before auto-return point was reached (I.E. Light Curtain circuit open, hands off palm buttons, etc.), or the press came to stop past the Limit Angle (see Press Utility section). The press automatically goes into INCH mode forcing you to use the palm buttons to get back to Top of Stroke. This message will not clear until your back up to TOP and past the Limit Angle.

MESSAGE: **STAT OFF&ACT** (61)
PURPOSE: Palm button station keyswitch indicates that the station is OFF, but the palm buttons are currently activated.

MESSAGE: **GUARD OPEN** (35)
PURPOSE: Indicates that the light curtain input is open. The input must be closed (Green condition on the light curtain) before you can run, if the light curtain keyswitch is turned on. Reset this by clearing your guard (closing the contact at Terminal #18).

MESSAGE: **EXT TRIP** (37)
PURPOSE: *(optional)* External Trip mode activated by keyswitch close of Terminal #64.

MESSAGE: **EXT WAIT** (38)
PURPOSE: *(optional)* External Trip mode waiting for external trip input (Terminal #60) to cycle machine. This mode will reset back to status message (37) if no signal is received within 30 seconds.

MESSAGE: **Pressure #1** (25)
PURPOSE: Pressure switch input #1 open (Terminal #9)

MESSAGE: **Pressure #2** (26)
PURPOSE: Pressure switch input #2 open (Terminal #10)

MESSAGE: **PRIOR ACT** (36)
PURPOSE: *(optional)* External Trip mode Prior Act button pushed (Terminal #59) and
waiting for the press to cycle one time using the palm buttons. You have ten (10) seconds after the button push to cycle the press.

MESSAGE: **Must hold 2x** (23)
PURPOSE: The palm buttons must be held in for two complete strokes to lock in Continuous mode.

MESSAGE: **TRIP ACTIVE** (39)
PURPOSE: (optional) External Trip mode, External trip input (Terminal #60) held closed past the Bypass-Angle setpoint. Press "Stop" button to reset this message.

MESSAGE: **MST/SLV DISG** (50)
PURPOSE: Status messages sent from Master and Slave computers do not agree with each other. Call for assistance.

Appendix A: Troubleshooting

Input/Output designations

The following is a list of Inputs and Outputs as wired to the dual microprocessor logic system:

Numbers start out from the left side, looking at the terminal strip from the front.

Inputs 1-24 use Ground (Terminal GND) as there common. Inputs 25-32 use +24vdc (Terminal #4) as there input.

[See next page for Terminal Layout]

Diagnostics Screen

To access this screen, press the “OPTIONS” button 5 times (while in PROG mode only)

Diagnostics

xx	34	xx	34
0	0	0	0
xx	34	0	0

This screen is used to show data xfer signal quality (sent over the Display Cable) between the Display unit, and the Master & Slave boards. In general, the lower the number the better. This can help determine if electrical interferance is affect

The first 2 columns (top row) show the signal quality of master computer data transfer (the slave is the right 2 columns).

The first number is live and appears scrambled, the second number is the peak value (worst case value).

The first 2 columns (bottom row) show the signal quality of a complete master&slave data transfer

A 34 is a perfect score. A data transfer fault will occur if this number exceeds 700.

If the peak value rises above 200, you may need to find a better location to run the display cable.

Reseting:

You can reset the peak values by hitting the ENTER key.

Inputs are located on board 31-089 (master and slave boards). Outputs are located on board 31-090.
Terminals are the white and brown terminal barriers mounted to the back plate.

PressCommander – Terminal layout -DUAL

Input	Terminal	Master / Slave board input description
1 J6		
1	5	START Button (N.O. – close to start)
2m,2s	6, 7	STOP Button (N.C. – mom open to stop)
3	12	SINGLE STROKE (close for single)
4	13	CONTINUOUS (close for cont mode)
5	14	CONTINUOUS ARM Button (mom close to arm for 5 seconds)
6	15	HAND / FOOT (optional) (close for foot)
7	85 [92]	STATION #3 [PRIOR_ACT BUTTON] (active = closed)
8	93 [91]	STATION #4 [EXTRIP / CONT ON DMD KEY] (active = closed)
	GND	Common for Plug #1 (inputs 1-8)
2 J7		
9m,9s	86, 87 [93]	Palm Button #3a [LS4] (M=N.O. S=N.C.) (station 3, button a)
10m,10s	24, 25	Palm Button #1a (M=N.O. S=N.C.) (station 1, button a)
11s,11m	22, 23	Palm Button #1b (S=N.O. M=N.C.) (station 1, button b)
12	20	Foot Switch (active = closed)
13	17 [121]	Light Guard on/off [Light Guard on/off #1] (on= open)
14m,14s	18,19 [111,112]	Light Guard contact [Light Guard Contact #1] (ok = closed)
15	16	TOP STOP BUTTON (N.C. – mom open to stop on top)
16	21	Resolver check (optional)
	GND	Common for Plug #2 (inputs 9-16)
3 J8		
17	8	Pressure Switch #1 (N.C. – fault when open)
18	9	Pressure Switch #2 (N.C. – fault when open)
19m,19s	10, 11	Emergency STOP button (N.C. – mom open to stop)
20s,20m	88, 89 [113,114]	Palm Button #3b [Light Guard Contact #2] (S=N.O. M=N.C.) (station 3, button b)
21	57	STATION #1 (active = closed)
22	58 [119,120]	STATION #2 [Light Guard Contact #5] (active = closed)
23m,23s	59, 60 [115,116]	Palm Button #2a [Light Guard Contact #3] (M=N.O. S=N.C.) (station 2, button a)
24s,24m	61, 62 [117,118]	Palm Button #2b [Light Guard Contact #4] (S=N.O. M=N.C.) (station 2, button b)
	GND	Common for Plug#3 (inputs 17-24)
4 J9		
25	26	Die Input #1
26	27	Die Input #2
27	28	Die Input #3
28	29	Die Input #4
29	30	Die Input #5
30	31	Die Input #6
31m,31s	94, 95 [122]	Palm Button #4a [Light Guard on/off #2] [CONT ON DMD on=closed] [Extrip on = open] (M=N.O. S=N.C.) (station 4, button a)
32s,32m	96, 97 [123]	Palm Button #4b [Light Guard on/off #3] (S=N.O. M=N.C.) (station 4, button b)
	4 (+24v)	Common for Plug#4 (inputs 25-32)
Output	**Terminal**	**Power supply / Relay board description**
P1		
1	36,35,37	LS1 (N.O-C-N.C.) (5A fused)
2	39,38,40	LS2 (N.O-C-N.C.) (5A fused)
3	42,41,43	LS3 (N.O-C-N.C.) (5A fused)
4	44,45	LS4 (N.O.) (5A fused)
5	46,47	LS5 (N.O.) (5A fused)
6	48,49	LS6 (N.O.) (5A fused)
P2		
7	50,51	Counter (open when parts counter reaches batch size) (5A fused)
8	52,53	Die Fault (open when die faults in RUN mode only) (5A fused)
9	54,55	Speed Fault (open when SPM exceeds limits) (5A fused)
10	56,3	Motor on/off (open when off or fault) (5A fused)
P3		
11	33,3	Safety Relay #1 (N.O.) (5A fused)
12	34,3	Safety Relay #2 (N.O.) (5A fused)
P5		
1	3	Line input– 120VAC (optional 24VDC or 240VAC)
2	2	Neutral
3	GND	Ground
4	4	+24VDC output

Appendix A:
Troubleshooting

Terminal	Description
GND	Ground (chassis ground)
1	120VAC from step-down transformer (3A fused)
2	Neutral (grounded)
3	
4	24VDC (1A fused inside wire trough)
	To Master and/or Slave board input(s) (default wiring is to both Master & Slave boards)
5	START button (N.O.)
6	STOP button (N.C.) (Master only)
7	STOP button (N.C.) (Slave only)
8	Pressure Switch #1 (N.C.)
9	Pressure Switch #2 (N.C.) (Tie input to Terminal 4 if not used)
10	ESTOP button (N.C.) (Master only)
11	ESTOP button (N.C.) (Slave only)
12	SINGLE stroke mode (closed = active)
13	CONTINUOUS mode (closed = active) (INCH mode when SINGLE & CONT open)
14	CONTINUOUS ARM button (N.O.) (5 second window to activate press thereafter)
15	HAND/FOOT mode (open = HAND) (optional keyswitch)
16	TOP STOP button (N.C.)
17	Light Guard ON/OFF (open = ON)
18	LIGHT Guard Contact (Master only) (closed = good)
19	LIGHT Guard Contact (Slave only) (closed = good)
20	Foot Switch (N.O.)
21	Not used at this time
22	Palm button #1 b (N.O.) (Slave only)
23	Palm button #1 b (N.C.) (Master only)
24	Palm button #1 a (N.O.) (Master only)
25	Palm button #1 a (N.C.) (Slave only)
26	Die Sensor #1 (programmable) (ground input to activate Die1 to 6)
27	Die Sensor #2 (programmable)
28	Die Sensor #3 (programmable)
29	Die Sensor #4 (programmable)
30	Die Sensor #5 (programmable)
31	Die Sensor #6 (programmable)
Terminal	**From Power supply / Relay output board**
33	Valve Relay output #1 (N.O.) (5A fused)
34	Valve Relay output #2 (N.O.) (5A fused)
35-36-37	Programmable Limit Switch #1 (C – N.O. – N.C.) (5A fused)
38-39-40	Programmable Limit Switch #2 (C – N.O. – N.C.) (5A fused)
41-42-43	Programmable Limit Switch #3 (C – N.O. – N.C.) (5A fused)
44-45	Programmable Limit Switch #4 (C – N.O.) (5A fused)
46-47	Programmable Limit Switch #5 (C – N.O.) (5A fused)
48-49	Programmable Limit Switch #6 (C – N.O.) (5A fused)
50-51	Counter (C - N.O.) (5A fused) (open when parts counter reaches batch size)
52-53	Die Fault (C – N.O.) (5A fused) (open when TSTOP die faults in RUN mode)
54-55	Speed Fault (C – N.O.) (5A fused) (open when SPM exceeds limits)
56	Motor ON/OFF (N.O.) (5A fused) (open when off or fault occurs)
	Optional Master and/or Slave board input(s)
57	Station #1 (closed = active)
58	Station #2 (closed = active)
59	Palm button #2 a (N.O.) (Master only)
60	Palm button #2 a (N.C.) (Slave only)
61	Palm button #2 b (N.O.) (Slave only)
62	Palm button #2 b (N.C.) (Master only)
85	Station #3 (closed = active)
86	Palm button #3 a (N.O.) (Master only)
87	Palm button #3 a (N.C.) (Slave only)
88	Palm button #3 b (N.O.) (Slave only)
89	Palm button #3 b (N.C.) (Master only)
91	[DEMAND_KEY] (COD & ExtTrip) [cannot use palm station #3 or #4]
92	[PRIOR_ACT button] (COD & ExtTrip) [cannot use palm station #3 or #4]
93	Station #4 (close = active) [LS4] (trigger) [cannot use palm station #3 or #4]
94	[COD = closed, Extrip = open]
94	Palm button #4 a (N.O.) (Master only) (palm #4 ground to activate)
95	Palm button #4 a (N.C.) (Slave only)
96	Palm button #4 b (N.O.) (Slave only)
97	Palm button #4 b (N.C.) (Master only)
111	Light Curtain #1 contact (Master only)
112	Light Curtain #1 contact (Slave only)
113	Light Curtain #2 contact (Master only) [cannot use palm station #3]
114	Light Curtain #2 contact (Slave only) [cannot use palm station #3]
115	Light Curtain #3 contact (Master only) [cannot use palm station #2 or #3]
116	Light Curtain #3 contact (Slave only) [cannot use palm station #2 or #3]
117	Light Curtain #4 contact (Master only) [cannot use palm station #2 or #3]
118	Light Curtain #4 contact (Slave only) [cannot use palm station #2 or #3]
119	Light Curtain #5 contact (Master only) [cannot use palm station #2 or #3]
120	Light Curtain #5 contact (Slave only) [cannot use palm station #2 or #3]
121	Light Curtain #1 ON/OFF keyswitch
122	Light Curtain #2 ON/OFF keyswitch [cannot use palm station #3 or #4]
123	Light Curtain #3 ON/OFF keyswitch [cannot use palm station #2 or #3 or #4]

Fault Codes

15 STROKE LIMIT (fault3,8192)

Cause: Press cycled 15 times while in PROGRAM mode.

Cure: In PROG mode, Hit Enter key to reset fault.

BATCH LIMIT REACHED (NOT DISPLAYED)

Cause: The Part Count field reached the Batch Size setpoint causing the counter output to drop out.

Cure: Hit the Counter button to reset the counter output relay.

BELOW MIN SPEED (fault1,64)

Cause: The press (after three cycles) was below the Minimum Speed setpoint.

Cure:
1) Check your press.
2) Make sure resolver is 1:1 with the crank shaft.
3) Lower setpoint.

BRAKE FAULT (fault1,8)

Cause: Press ACTUAL stop time exceeded the FAIL time.

Cure: Fix the press brake.

BRAKE WARNING (fault1,4)

Cause: Press ACTUAL stop time exceeded the WARN time.

Cure: Fix the press brake.

DIE FAULT: # (fault1,32768)

Cause: Die Sensor table will display all faults.

Cure:
1) Press had die fault.
2) Angle window for sensor is incorrect.
3) Check that unit is receiving the signal from the sensor.

DRIFT FAULT (fault1,1)

Cause: The press moved faster than 1 SPM when the “control” was not signaled to move. (i.e. no clutch signal)

Cure:
1) Check that the LED on the I/O Board for the brake/clutch input is lighting up when the brake is released.
2) Value set in DRIFT may be too low and the press may be vibrating from nearby machinery.
3) Examine brake, clutch, and valves on the press.
4) Resolver miswired or bad.

EEPROM FAULT (fault3,8)

Cause: Could not store Job data into external memory Chip U4.

Cure:
1) Hit Enter to reset fault
2) Cycle power
3) Clear Job data and try again
4) Call for assistance.

INACTIVITY-TIMEOUT (fault3,16)

Cause: *(optional)* Press did not cycle within 20 minutes with motor on. This is not a true fault but a power saving feature.

Cure: Hit Enter to reset fault.

INPUTS TOO NOISY (fault2,128)

Cause: Opto-Coupled Input data was found to be electrically noisy. No stable data could be detected.

Cure: Check all input connections and hit Enter to reset fault.

INTERNAL RAM BAD

Cause: Memory in the display unit has been corrupted.

Cure: Hit Enter key to try and reset fault. If fault persists, then
1) Power down/up and try again.
2) Reload program code into display unit (consult factory).

JOB0 PAGE MEM BAD (fault2,1024)
JOB1 PAGE MEM BAD (fault2,2048)

Cause: Checksum value received from external Job memory was corrupted.

Cure: Hit Enter to reset fault. This fault will not occur while in PROG mode.

LACK OF MOTION (fault1,2)

Cause: The press showed no motion within the MOTION time period setpoint.

Cure:
1) Check that the resolver is linked to the crank shaft properly.
2) The setpoint may be too low and not allowing enough time for the press to start moving.

Appendix A: Troubleshooting

M ON/S OFF: # (fault3,1)

Cause: The input # on the Master board is ON (closed) when the same input # on the Slave board is OFF (open).

Cure: Check the wiring from the terminal barriers back to the Slave board input for bad connections. Otherwise, the input could be burned out (from excessive voltage or hardware problems).

M/S ANGLE MISMATCH (fault3,4)

Cause: The resolver angle that the Master is reporting is different from the resolver angle the Slave is reporting.

Cure: Hit Enter key to reset fault. If persists consult factory.

MASTER/SLV SPM FAULT

Cause: The SPM value that the Master is reporting is different from the SPM value the Slave is reporting.

Cure: Hit Enter key to reset fault. If persists consult factory

MAX SPEED FAULT (fault1,128)

Cause: The press was going faster than the Maximum Speed setpoint.

Cure:
1) Check your press
2) Make sure resolver is 1:1 with the crank shaft
3) Increase setpoint.

MOVING BACKWARDS (fault1,16384)

Cause: While in RUN mode the press move backwards. This fault will not occur in PROG mode.

Cure: If press is moving forward, then check the resolver wiring at the Master and Slave board connections. Hit Enter to reset fault.

MSTR CHKSUM FLT (fault2,16)
SLV CHKSUM FLT (fault2,32)

Cause: Checksum during data transfer is bad.
a) The cable that links the Master unit to the Display unit is being affected by electrical noise.
b) The proximity of the Master/Slave/ Relay board stack is being affected by the electrical noise.
c) The proximity of the Display board is being affected by electrical noise.

Cure: Reroute the Display/Master cable J12 away from other high voltage/power lines/ inductive loads/servo controls. The cable is shielded but needs a good Earth ground drain to work as a shield. The shield is connected to the case on both ends, so it's important that the door holding the Display unit as well as the control cabinet backplate be well grounded (with heavy gauge braided cable). Cycle power to reset fault.

MSTR DATA XFER FLT (fault2,4)
SLV DATA XFER FLT (fault2,8)

Cause: Data transfers between the Display unit and the Master/Slave units have failed.
a) The cable that links the Master unit to the Display unit is being affected by electrical noise.
b) The proximity of the Master/Slave/ Relay board stack is being affected by the electrical noise.
c) The proximity of the Display board is being affected by electrical noise.

Cure: Reroute the Display/Master cable J12 away from other high voltage/power lines/ inductive loads/servo controls. The cable is shielded but needs a good Earth ground drain to work as a shield. The shield is connected to the case on both ends, so it's important that the door holding the Display unit as well as the control cabinet backplate be well grounded (with heavy gauge braided cable). Cycle power to reset fault.

MSTR ANGLE FLT (fault2,16384)
SLV ANGLE FLT (fault2,32768)

Cause: Stop/By-Pass angle in Display unit does not match angles from Master and/or Slave unit.

a) The cable that links the Master unit to the Display unit is being affected by electrical noise.
b) The proximity of the Master/Slave/ Relay board stack is being affected by the electrical noise.
c) The proximity of the Display board is being affected by electrical noise.

Cure: Reroute the Display/Master cable J12 away from other high voltage/power lines/ inductive loads/servo controls. The cable is shielded but needs a good Earth ground drain to work as a shield. The shield is connected to the case on both ends, so it's important that the door holding the Display unit as well as the control cabinet back-plate be well grounded (with heavy gauge braided cable). Cycle power to reset fault

MSTR JOB XFER FLT (fault2,4096)
SLV JOB XFER FLT (fault2,8192)

Cause: Job transfers between Display unit and Master/Slave units have failed.

a) The cable that links the Master unit to the Display unit is being affected by electrical noise.
b) The proximity of the Master/Slave/ Relay board stack is being affected by the electrical noise.
c) The proximity of the Display board is being affected by electrical noise.

Cure: Reroute the Display/Master cable J12 away from other high voltage/power lines/ inductive loads/servo controls. The cable is shielded but needs a good Earth ground drain to work as a shield. The shield is connected to the case on both ends, so it's important that the door holding the Display unit as well as the control cabinet back-plate be well grounded (with heavy gauge braided cable). Cycle power to reset fault

MSTR LOCKED UP (fault3,16384)
SLV LOCKED UP (fault3,32768)

Cause: No response from Master/Slave units within allowed time period. One or both units may have locked up.

a) The cable that links the Master unit to the Display unit is being affected by electrical noise.
b) The proximity of the Master/Slave/ Relay board stack is being affected by the electrical noise.
c) The proximity of the Display board is being affected by electrical noise.

Cure: Reroute the Display/Master cable J12 away from other high voltage/power lines/ inductive loads/servo controls. The cable is shielded but needs a good Earth ground drain to work as a shield. The shield is connected to the case on both ends, so it's important that the door holding the Display unit as well as the control cabinet back-plate be well grounded (with heavy gauge braided cable). Cycle power to reset fault

NO COMM WITH M/S (fault3,32)
NO COMM WITH MSTR (fault3,64)

Cause: Cannot establish link-up between Display unit and I/O unit.

Cure: Hit Enter key to reset. If it persists consult factory

1) Check cable link between Display and I/O unit.
2) Master board maybe faulty.

POWERING DOWN!

Cause: Power was removed from the unit. All counters are stored into nonvolatile memory.

Cure: If you get this message while running, you must power down & up to clear. If this persists consult factory.

QUALITY LIMIT (fault2,256)

Cause: The Part Count field reached the Quality Count setpoint causing the Counter Output to drop out.

Cure: Hit Enter key to reset.

Appendix A: Troubleshooting

REG DID NOT CLEAR

Cause: Master or Slave units have a problem resetting the relay outputs.

Cure: Hit Enter to reset fault. If this persists consult factory.

RELAY OFF S/B ON (fault1,512)

Cause: Valve output 1 or 2 relay detected off but should be energized (on)

Cure:
1) Excessive electrical noise.
2) Bad relay.
3) Faulty circuitry.

RELAY ON S/B OFF (fault1,4096)

Cause: Valve output 1 or 2 relay detected energized, but should be off.

Cure:
1) Relay contact welded closed.
2) Excessive electrical noise.
3) Bad relay.
4) Faulty circuitry

RESOLVER FAULT 1 (fault1,16)
RESOLVER FAULT 2 (fault2,2)
RESOLVER FAULT 3 (fault2,64)

Cause: The angle reading is not stable and/or skipped.

Cure:
1) Bad connection in either end of the resolver cable.
2) Miswired resolver cable.
3) Excessive electrical noise.
4) Faulty resolver and/or circuitry.

RESOLVER MSTR FLT2 (fault3,128)
RESOLVER SLV FLT3 (fault3,256)

Cause: Angle reading from Master/Slave exceeding 359°.
a) The cable that links the Master unit to the Display unit is being affected by electrical noise.
b) The proximity of the Master/Slave/ Relay board stack is being affected by the electrical noise.
c) The proximity of the Display board is being affected by electrical noise.

Cure: Reroute the Display/Master cable J12 away from other high voltage/power lines/ inductive loads/servo controls. The cable is shielded but needs a good Earth ground drain to work as a shield. The shield is connected to the case on both ends, so it's important that the door holding the Display unit as well as the control cabinet backplate be well grounded (with heavy gauge braided cable). Cycle power to reset fault.

S ON/M OFF: # (fault3,2)

Cause: The input # on the Slave board is ON (closed) when the same input # on the Master board is OFF (open).

Cure: Check the wiring from the terminal barriers back to the Master board input for bad connections. Otherwise, the input could be burned out (from excessive voltage or hardware problems).

SPM > 999 (fault1,32)

Cause: Unit is only designed to operate up to 999 SPM. If you are not operating outside this range, then there is a fault in the system.

Cure:
1) The resolver is faulty.
2) Excessive electrical noise.
3) Computer failure.

STOP ANGLE FAULT (fault3,512)

Cause: Backup copy of Stop angle does not match with Stop angle.

Cure: Reset Job data. Reset TDC. Cycle Power.

STOP TEST COMPLETE (fault1,256)

Cause: This indicates the 90° or 270° stop test has finished.

Cure: Hit the Enter key to reset this.

TDC OFFSET WRONG (fault1,1)

Cause: The Master and Slave units offset angle does not match or does not match the Display units offset.

Cure: Hit Enter to reset fault. Bring the press to TDC, go to Press Utility and reset the TDC. If this persists, consult the factory.

TONN A/D FAULT (fault3,1024)

Cause: Analog input reference voltage is not reading the correct value.

Cure: Check wiring to Display unit plug P4 to make sure Pin 5 is reading 2.5v and that nothing is connected to it.

TONN MIN FAULT (fault3,2048)

Cause: The peak tonnage reading during the last cycle was less than the minimum set for that channel.

Cure: Check your press. Check that the PLS output used to control the peak reading on the TLM is set correctly. Check your TLM for calibration. Check your setpoint.

TONN MAX FAULT (fault3,4096)

Cause: The peak tonnage reading during the last cycle was greater than the maximum set for that channel.

Cure: Check your press. Check your TLM for calibration. Check your setpoint.

ZERO (JOB) PAGE MEM BAD (fault2,512)

Cause: External Job memory chip is bad or has been corrupted.

Cure: Hit Enter key to reset. If persists consult factory.

Appendix B: Regulations and Guidelines

American National Standards Institute (ANSI)

B11.1-2009
6.3.2 Presence-sensing Point of Operation Devices

A presence-sensing point-of-operation device, if used, shall protect the operator and others and shall be interfaced with the control circuit to prevent or stop slide motion if the operator's hand or other body part is within the sensing field of the device during the closing portion of the stroke. In addition:

(1) Presence-sensing devices shall not be used for safeguarding the point of operation on presses using full-revolution clutches.

(2) When the sensing field has been interrupted, use of the normal press stroke initiating means shall be required after clearing the sensing field to resume press operation.

(3) Muting (bypassing of the protective function) of the device shall be permitted after the hazardous portion of the press stroke has been completed. Muting of the device shall be accomplished in such a manner that no single component failure shall prevent the normal stop command but shall prevent subsequent press strokes until the failure is corrected.

(4) 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.

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

(6) The devices which require adjustments to accommodate variations in ambient or operating conditions or which incorporate channel blanking or floating window features shall be designed so that the adjustments or features are capable of being supervised by the employer.

(7) The presence-sensing device shall be provided with a means that visibly indicates when it is and is not in use and functioning properly. The device shall also indicate which sections, if any, have been blanked out.

(8) The device shall not fail to respond to the presence of the operator's or other's hand or body part due to the presence of a reflective object or work piece.

(9) The device shall be designed and constructed so that any single component failure, including output devices, shall not prevent the normal "Stop" command from being sent to the press, but shall prevent operation of the press stroke until the failure has been corrected. In the event of a power failure to the device, it shall initiate a "Stop" command to the press-control system.

(10) The device and the press-control system shall be interfaced so that the device's "Stop" command shall initiate stopping action during the closing portion of the press stroke. The interface shall be designed to ensure that a single component failure within the interface of the control system shall not prevent the normal "Stop" command from being sent to the press, but shall prevent operation of the press stroke until the failure has been corrected.

(11) The device's sensitivity to intrusion shall not be adversely affected by changing conditions around the press.

(12) The effective sensing field of the device shall be located at a distance from the nearest point-of-operation hazard so that the operator or others cannot reach into the point of operation with a hand or other body part before cessation of motion during the closing portion of the stroke.

(13) 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.

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

(15) When a device is used on a press in a single-stroke mode and when the protection of the operator is dependent upon the stopping action of the press, a stopping performance monitor shall be required.

B11.19-2010
6.3.5 Two-Hand Control Device

(3) Each operator hand control shall be located at a distance from the point of operation so that the operator cannot release either hand control and reach into the point of operation prior to die closure or prior to cessation of slide motion during the closing portion of the stroke.

Below is the formula for calculating the safety distance of a light curtain or palm buttons. The machine stop time should be measured with the machine running at its fastest speed with its heaviest die or tooling and the stop time being measured at the 90° position in the downstroke. The following formula should be used when calculating the safety distance:

$$DS = K \times (TS + TC + Tr + Tbm)$$

DS = Minimum safety distance between the device and the nearest point of operation hazard (in inches).

K = Hand speed constant. This value has been determined by various studies and, although these studies indicate speeds of 63 in/sec to over 100 in/sec, they are not conclusive determinations. The employer should determine this value by considering all factors, including physical ability of the operator.

TS = Stop time of the machine tool measured at the final control element.

TC = Response time of the control system. NOTE: TS and TC are usually measured by a stop time measurement device.

Tr = Response time of the presence-sensing device and its interface, if any, as stated by the manufacturer or measured by the employer.

Tbm = Additional time allowed for the brake monitor to compensate for variations in normal stopping time.

Occupational Safety & Health Administration (OSHA)

1910.217 (C) (3) (iii)
Safeguarding the Point of Operation

(iii) A presence sensing point of operation device shall protect the operator as provided in paragraph (c) (3) (i) (a) of this section, and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other part of his body is within the sensing field of the device during the downstroke of the press slide.

(a) The device may not be used on machines using full revolution clutches.

(b) The device may not be used as a tripping means to initiate slide motion.

(c) The device shall not be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent the initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system.

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

(e) Refer to ANSI B11.19-2010 above for calculating safety light curtain distance from the point of operation.

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

1910.217 (C) (3) (iii)
Additional requirements for safeguarding

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 or Type B gate or movable barrier (on a part revolution clutch), is used for safeguarding:

(i) The employer shall use a control system and a brake monitor which comply with paragraphs (b) (13) and (14) of this section.

(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 a safe operating condition and adjustment. The employer shall maintain records of these inspections and maintenance work performed.

(ii) Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism, antirepeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. These requirements do not apply to those presses, which comply with paragraphs (b) (13) and (14) of this section. The employer shall maintain a certification record of inspections, tests and maintenance work which includes the date of inspection, test or maintenance; the signature of the person who performed the inspection, test, or maintenance, and the serial number or identifier of the press that was inspected, tested or maintained.

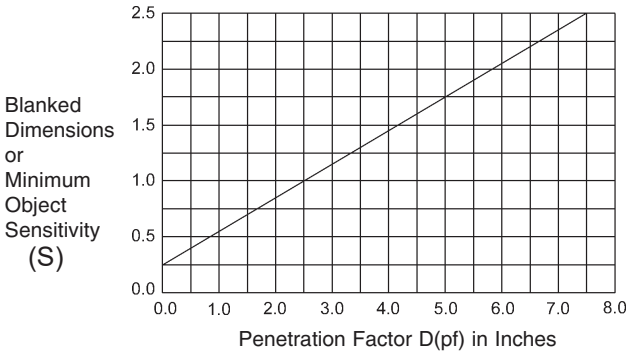
1910.212
General requirements for all machines (covers press brakes, hydraulic, and pneumatic machines not covered by mechanical power press standards).

(a) Machine guarding - (1) Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation in going nip points, rotation parts, flying chips, and sparks. Examples of guarding methods are: barrier guards, two-handed tripping devices, electronic safety devices, etc.

NOTICE These are only partial reprints, refer to your Federal Register for total construction, control reliability, and machine guarding requirements for the subject machine being guarded for all applicable OSHA Standards.

ANSI Standards B11.19-2010

Formula for calculating safety light curtain distance from point of operation.



The effective sensing field of the device shall be located at a distance from the nearest recognized hazards such that the operator or others cannot reach the hazard with a hand or other body part before cessation of motion during the hazardous portion of the machine cycle.

The point at which a device responds to an intrusion may vary. The devices should be located or adjusted such that the device always responds to the intrusion at or prior to the safety distance. Care should be exercised when installing the device to ensure that it does not detect false signals from other devices in the area.

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, however, mirrors may be used in conjunction with the device to provide 2, 3, or 4 sided protection.

The machine stop time should be measured with the machine running at its fastest speed with its heaviest die or tooling and the stop time being measured at the 90º position in the downstroke.

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

$Ds = K\ (Ts + Tc + Tr + Tbm) + D(pf)$

Ds = Minimum safety distance between the device and the nearest point of operation hazard (in inches).

K = Hand speed constant. This value has been determined by various studies and although these studies indicate speeds of 63 in/sec to over 100 in/sec, they are not conclusive determinations. The employer should determine this value by considering all factors, including physical ability of the operator.

Ts = Stop time of the machine tool measured at the final control element.

Tc = Response time of the control system.

NOTE: Ts and Tc are usually measured by a stop time measurement device.

Tr = Response time of the presence-sensing device and its interface, if any, as stated by the manufacturer or measured by the employer.

Tbm = Additional time allowed for the brake monitor to compensate for variations in normal stopping time.

D(pf) = Added distance as indicated by the chart above. The minimum object sensitivity is stated by the manufacturer. If beam blanking or floating blank features is used, these figures should be added to the object sensitivity figure before using the above chart.

Machine Control Reliability Requirements

Control Reliability:

"...control circuits shall be designed and constructed so that a single failure or fault within the system does not prevent the normal stopping action from being applied to the press when required, or does not create an unintended stroking action, but does prevent initiation of a successive stroke until the failure is corrected." (ANSI B11.1-2009)

"...control shall be designed to prevent initiation of a stroke signal in the event that a failure occurs within the press control." (ANSI B11.2-2013)

"Robots shall be designed and constructed so that any single, reasonably foreseeable failure will not cause hazardous motion of the robot." (ANSI/RIA R15.06-2012)

"...control circuits shall incorporate features to minimize the possibility of an unintended stroke in the event of the failure of the control component to function properly, including relays, limit switches, and static output circuits." (ANSI B11.1-2009)

"...control system 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 initiation of a successive stroke until the failure is corrected." (ANSI B11.1-2009)

"...the control system 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 initiation of a successive stroke until the failure is corrected." (OSHA CFR 1910.217)

Safety Guidelines for Management

Operational Safety

1. Appoint a Safety Coordinator to be responsible for safety regulations, requirements, and suggestions. He must review and investigate all accidents and "close calls."
2. Establish and issue safety rules. Inform each employee of his responsibilities. Make sure he understands them and knows what is expected of him.
3. A thorough review and an early inspection must be made of existing presses, dies, and point of operation guarding to attain the degree of responsibility required by ANSI B11.1-2009 Safety Standards and Federal State laws. Review what mandatory modifications are necessary.
4. Equipment that is no longer safe and cannot be economically upgraded should be destroyed.
5. Never allow persons legally under age to operate or assist in the operation of machinery.
6. All personnel must be properly trained to eliminate accidents and injuries.
7. Regardless of the operator's experience, education or language barrier, it is the responsibility of the supervisor to give him a thorough explanation with each new job assignment.
8. No employee should be given a work assignment that he does not fully understand. Only properly instructed and thoroughly trained personnel should be assigned to work on or with any machine.
9. It shall be the responsibility of the employer to provide an adequate, clean, safe, and uncluttered work area around each machine.

10. If a malfunction is reported, stop the machine immediately, correct the problem, then resume production.
11. Investigate all accidents and close calls. Analyze the reason for occurrence. Take action to prevent recurrences. Keep records of the investigation and preventative steps that were taken.
12. Only employees who understand the machines' operation and safety requirements and who are able to communicate this knowledge should be given the responsibility of instructing and training others to perform as operators.
13. Management must decide that personnel protective safety equipment is required to perform each job safely. Items such as safety glasses, shoes, gloves, helmets, hand pads, spats, protective sleeves, and material handling equipment are common in the metal working industry. If noise levels are excessive, protective head sets and ear muffs are recommended.
14. When designing point of operation guarding, the manufacturing process should be weighed heavily in favor of operational safety.
15. Establish safe and convenient material handling methods and procedures.
16. Post in convenient areas the names, addresses, and phone numbers of physicians and hospitals, and members of the organization who are to be called in case of emergency.
17. All equipment must be electrically connected according to the National Electric Code and be consistent with other accepted practices.
18. Provide adequate and proper fire protection equipment.

Power Press Guarding

1. Press manufacturers do not know and cannot foresee the magnitude of potential applications of power presses. Therefore, only the press user can determine the type of guards that have to be used in order to perform the job safely. It is the responsibility of the user management to make certain that point of operation guarding and other necessary safety devices are installed. The press should be guarded in such a manner that it is impossible for the operators to place their hands or any other part of the body in the die area.
2. The press user should become thoroughly acquainted with the safety devices commonly employed in power press operations.
3. Feeding devices are strongly recommended since they remove the operator from the die area and, therefore, allow more effective utilization of guards and safety devices.
4. Do not release a press for production before installing and testing all guards and covers.
5. Make frequent evaluation checks of all guarding and devices while the press is running. Correct all unsafe findings immediately.

Power Press Care Through Inspection and Maintenance

1. All maintenance and inspection personnel should be specifically instructed and must understand proper maintenance and inspection procedures contained in this manual.
2. Set up a daily, weekly, and monthly press inspection program. Use a checklist and verify that the job is done correctly.
3. Establish a preventative maintenance program. Records of all maintenance work performed must be kept.
4. Since all equipment has a limited life, quality maintenance personnel are required to obtain maximum usage of your equipment.
5. Releasing a power press for production following maintenance should be the responsibility of a qualified individual assigned by management.
6. To maintain the original level of press reliability, careful inspection of mechanical, electrical, and pneumatic areas must be made. This may give an advance warning of a hazard which then can be corrected to prevent possible injuries and damage.

Safety Enforcement

In order to have an effective safety program, management at all levels must enforce every safety rule and regulation. Strong disciplinary measures are sometimes required. They should consist of a warning, written reprimand, work suspension, transfer, demotion, or possibly a dismissal. All infractions must be reported and recorded. Once an infraction in noted, it shows that an unsafe practice or condition has existed. This may be the result of poor planning or improper training and instructing. The reason for the infraction should be analyzed in order to take corrective action.

Supervisor Training

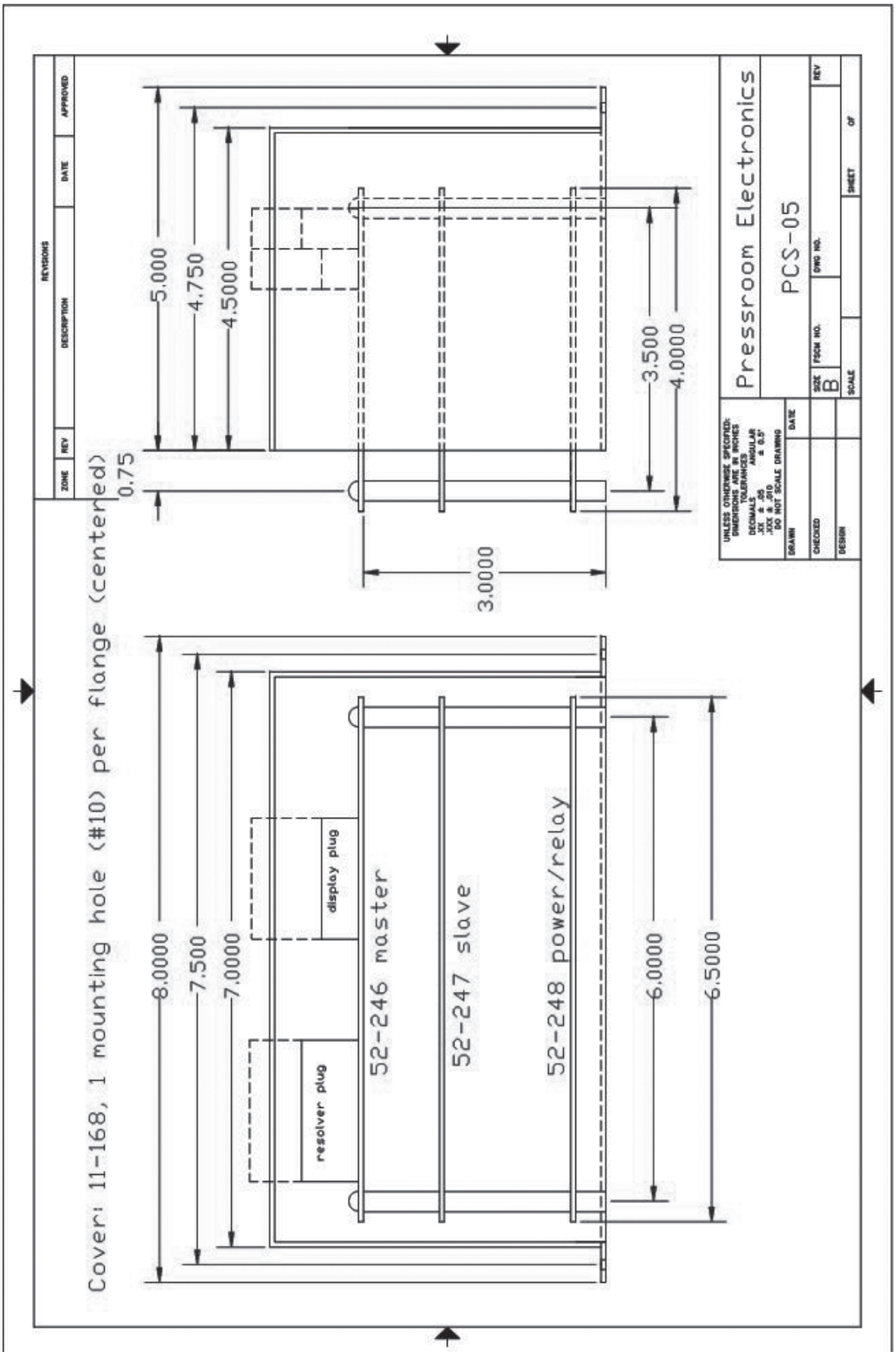
It should be the responsibility of management to instruct their supervisors on safety, giving job instructions, supervising operators, determining accident causes, and building safety attitudes among the machine operators. Accidents can occur due to inadequate training of supervisors.

Operator Training

It shall be the responsibility of management to insure proper training of operators. A specific training program should be instituted to instruct the operator in safety, proper usage of the equipment, and correct operational procedure in performing each and every job. In addition to the supervisor, the operator should be familiar with the proper guarding of the point of operation. Never permit an operator to start a job without complete instructions from his immediate supervisor.

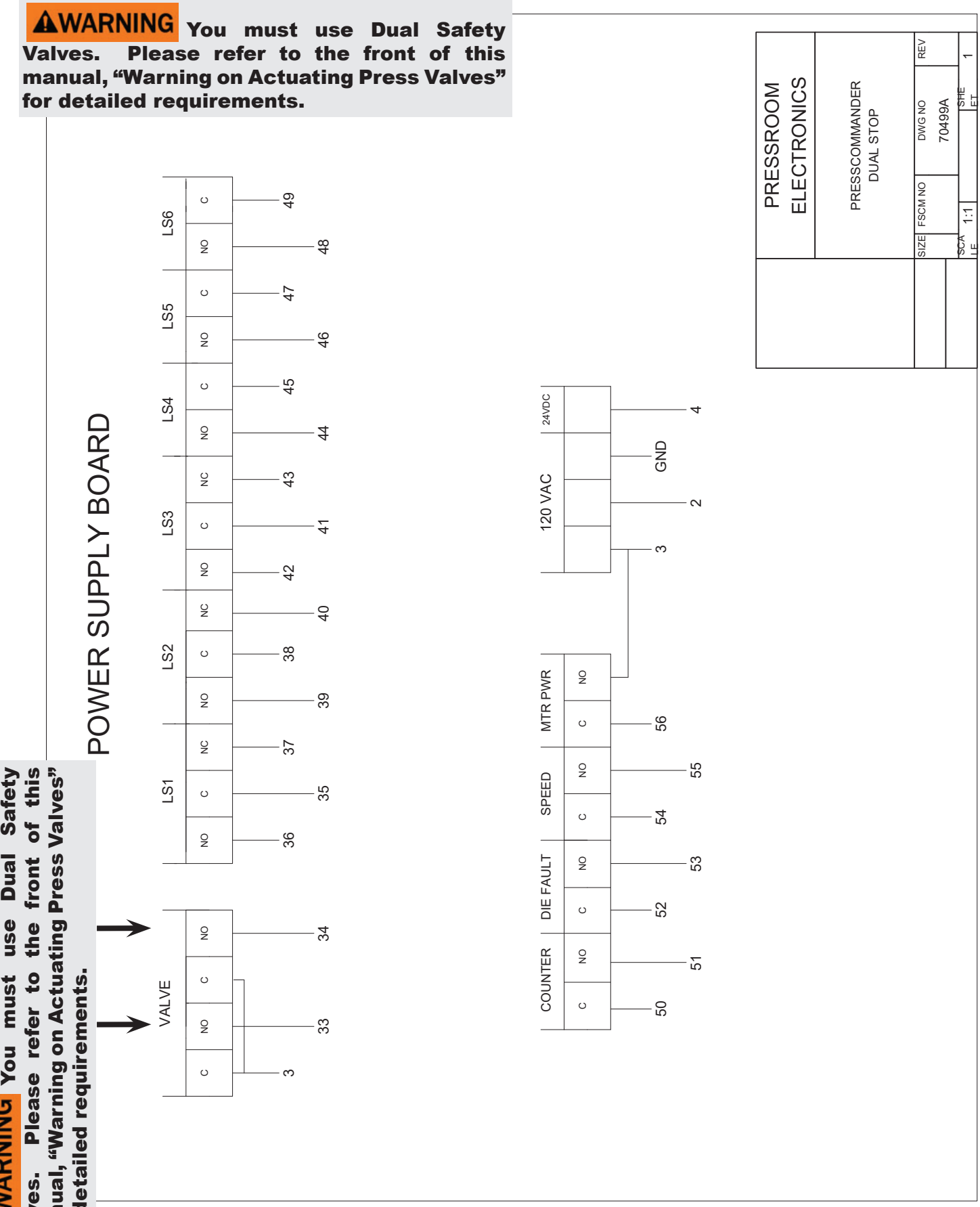
Appendix C:
Control Wiring Diagrams
NEMA Control Wiring Diagrams

Circuit Board Dimensional Layout



Appendix C:
Control Wiring Diagrams - DUAL
IEC Control Wiring Diagrams

⚠WARNING You must use Dual Safety Valves. Please refer to the front of this manual, "Warning on Actuating Press Valves" for detailed requirements.



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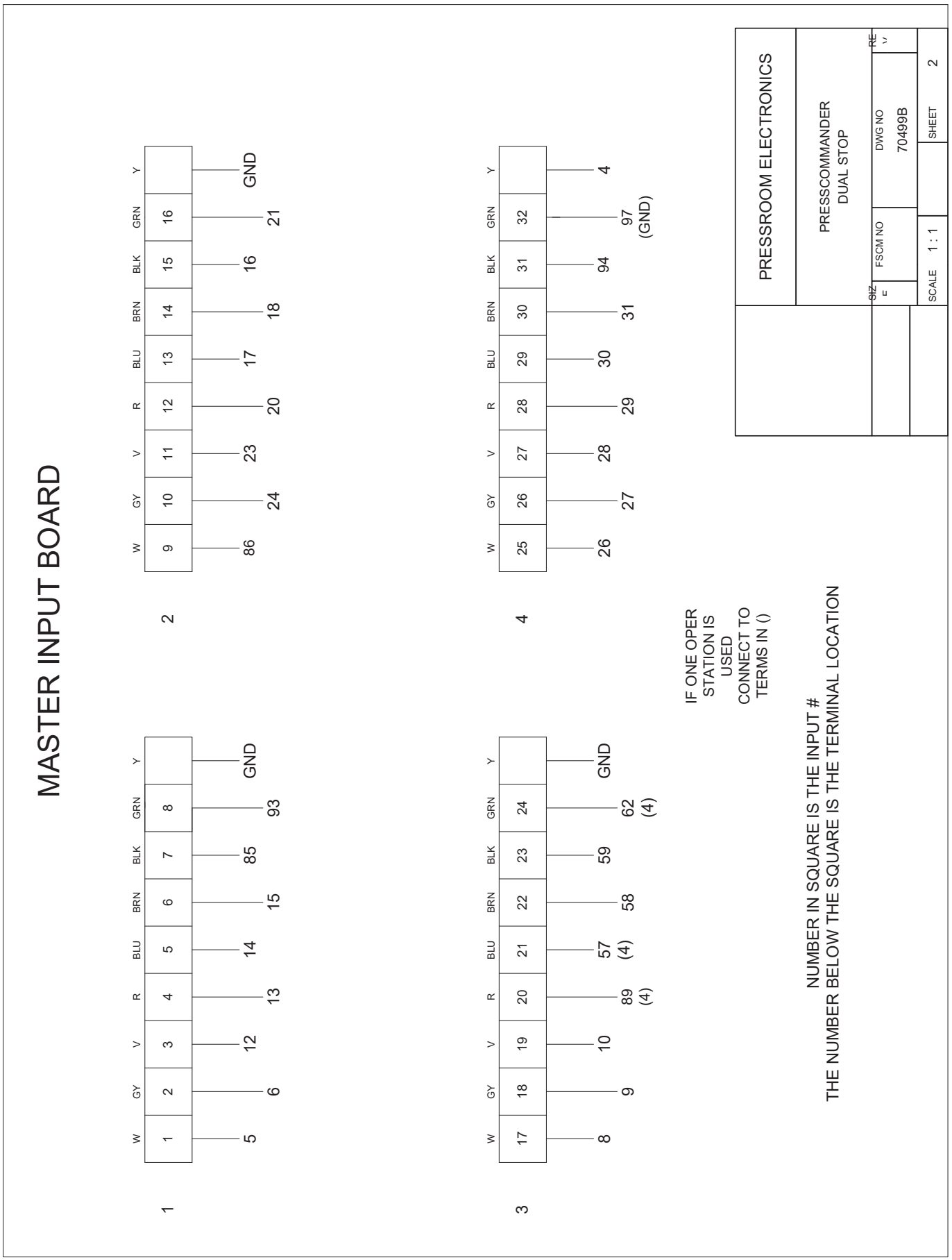
Appendix C: Control Wiring Diagrams - DUAL IEC Control Wiring Diagrams



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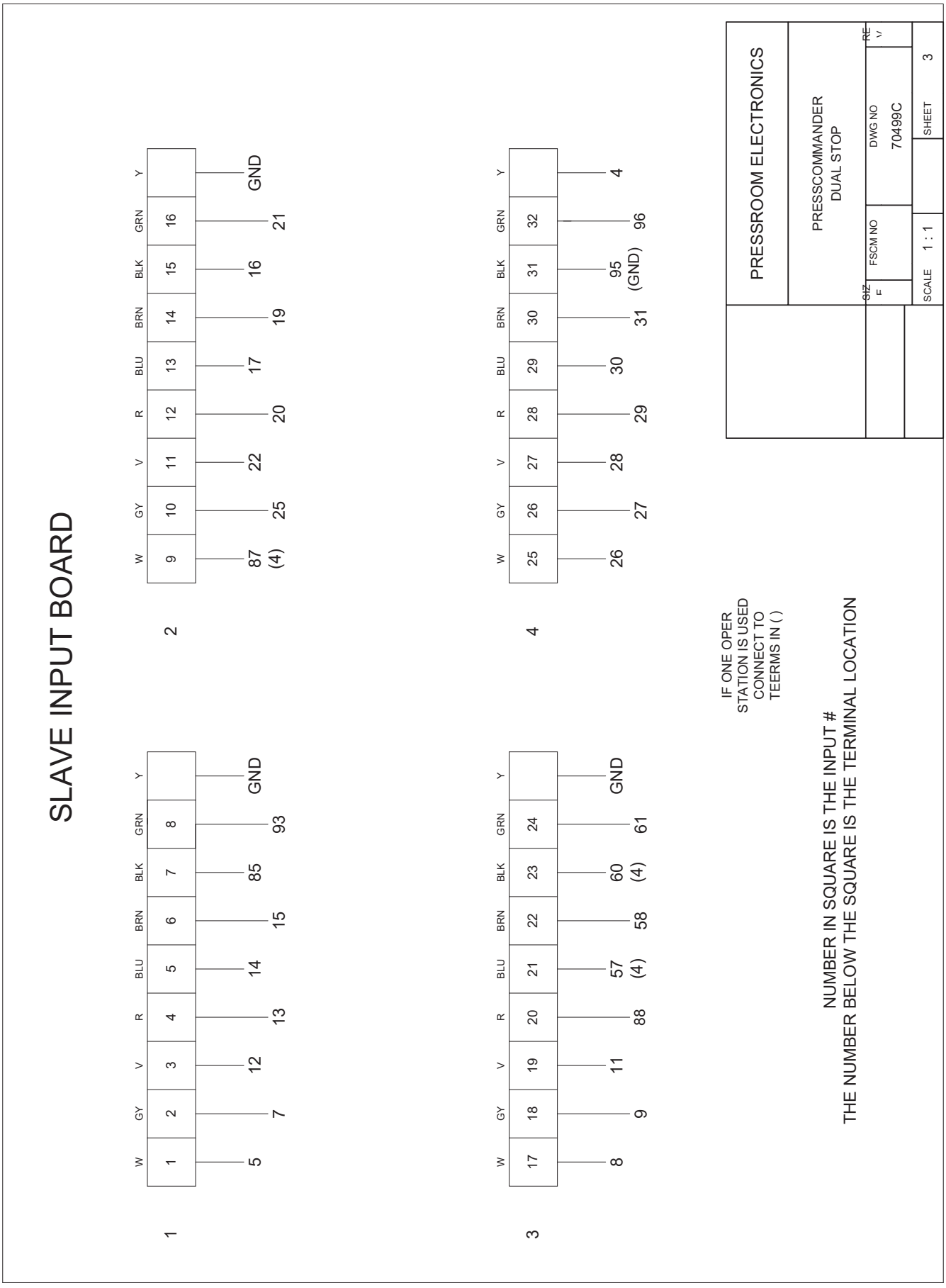
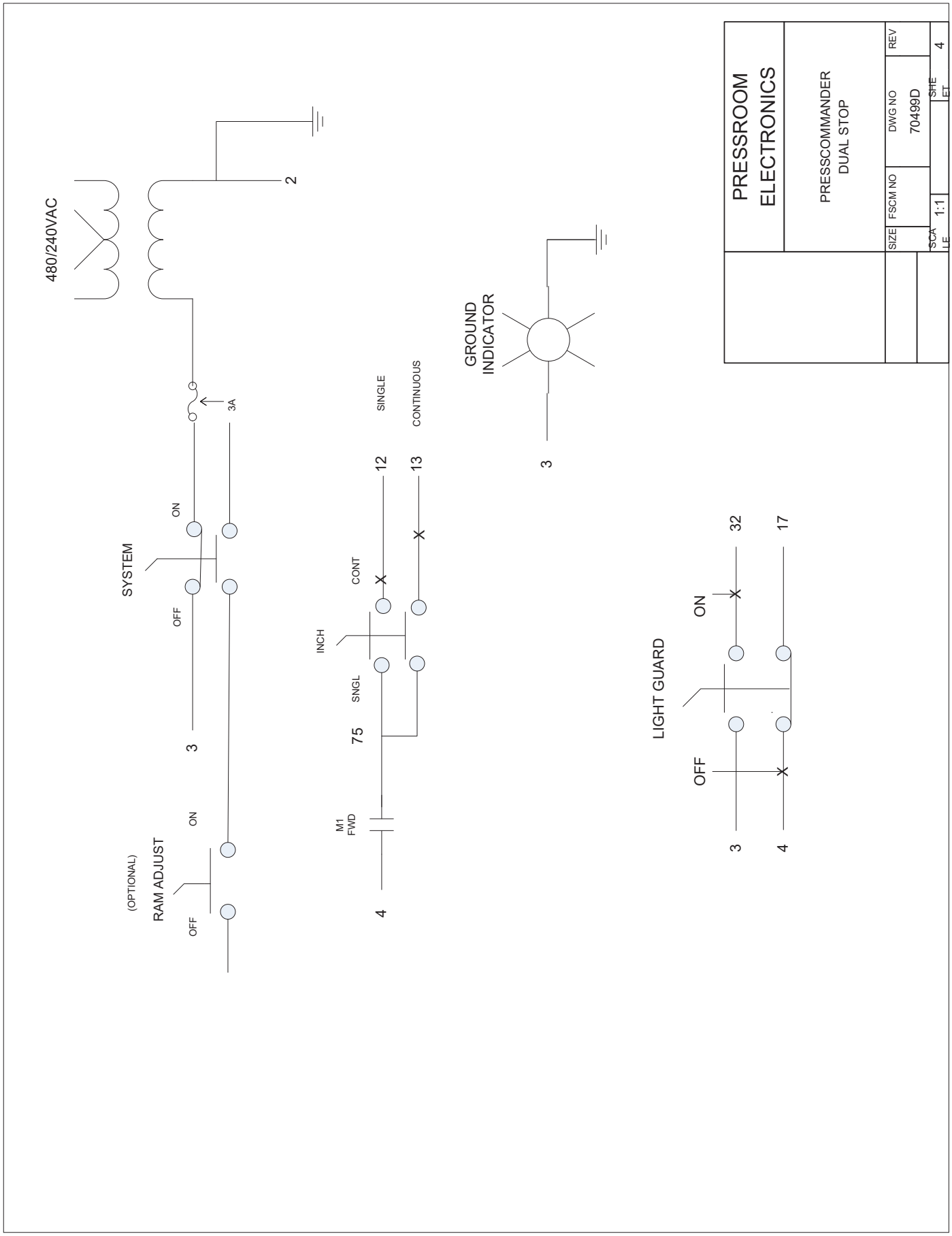
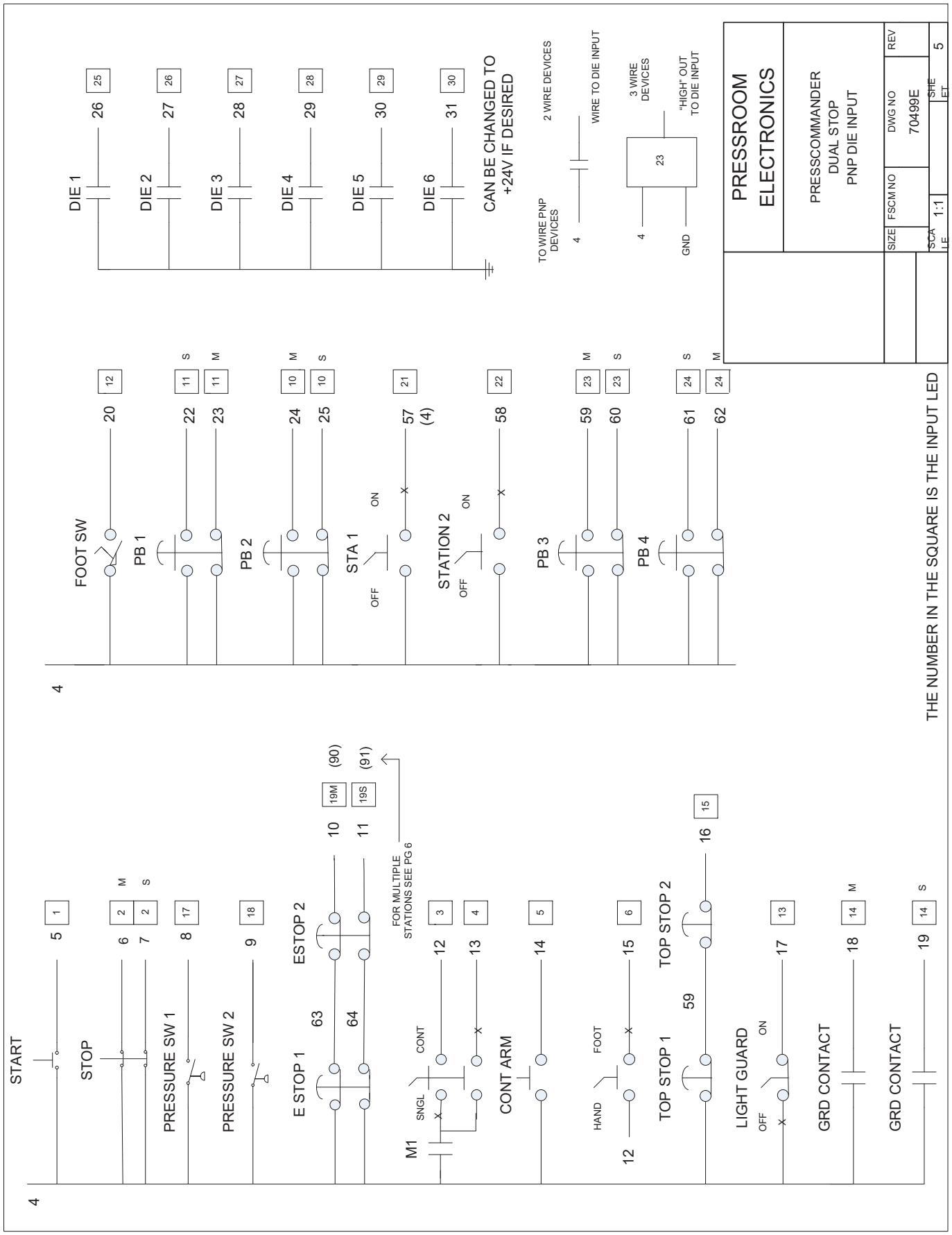
Control Wiring Diagrams - DUAL
IEC Control Wiring Diagrams



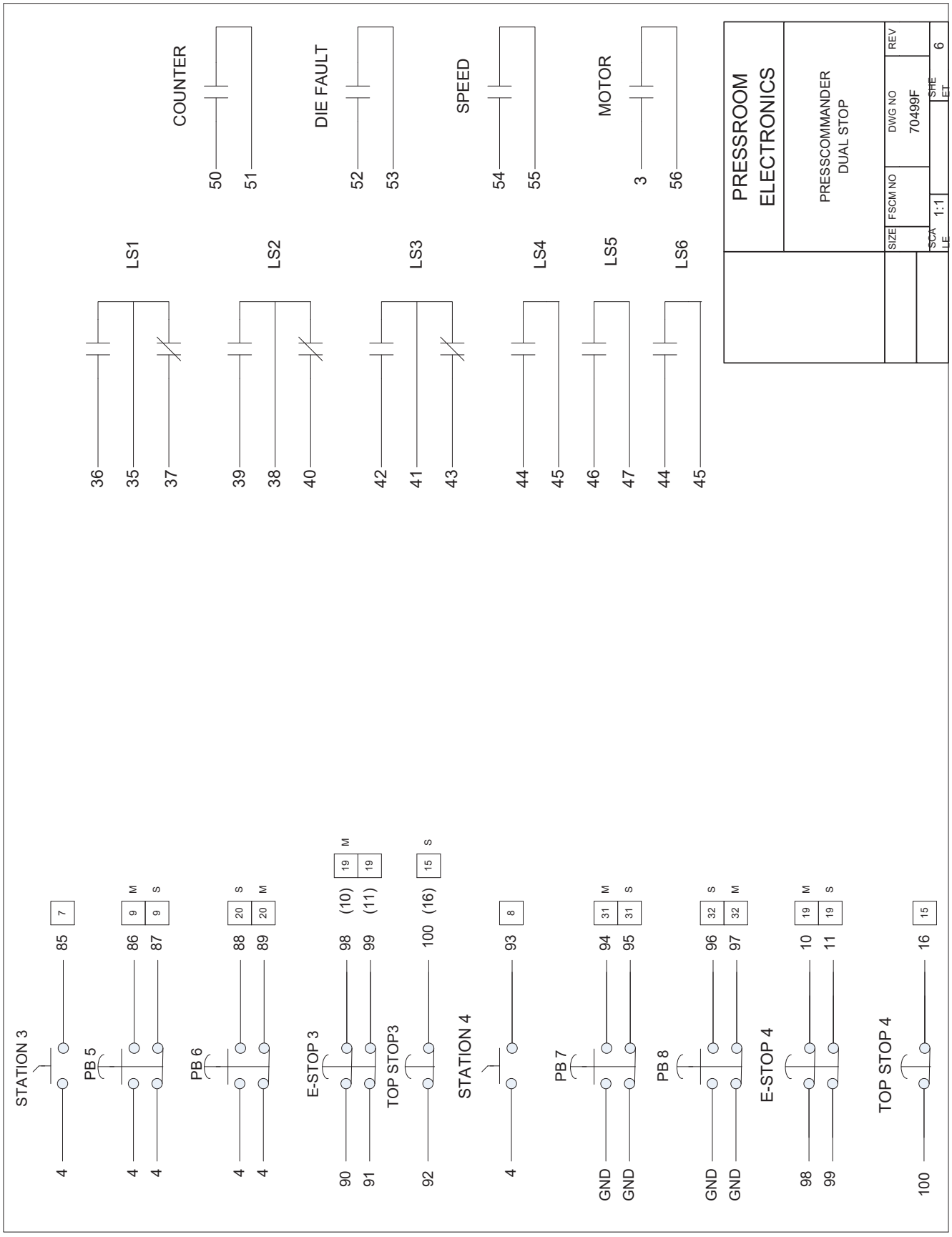
Appendix C: Control Wiring Diagrams - DUAL IEC Control Wiring Diagrams



Appendix C:
Control Wiring Diagrams - DUAL IEC Control Wiring Diagrams



Appendix C: Control Wiring Diagrams - DUAL IEC Control Wiring Diagrams



Appendix C:
Control Wiring Diagrams - DUAL IEC Control Wiring Diagrams

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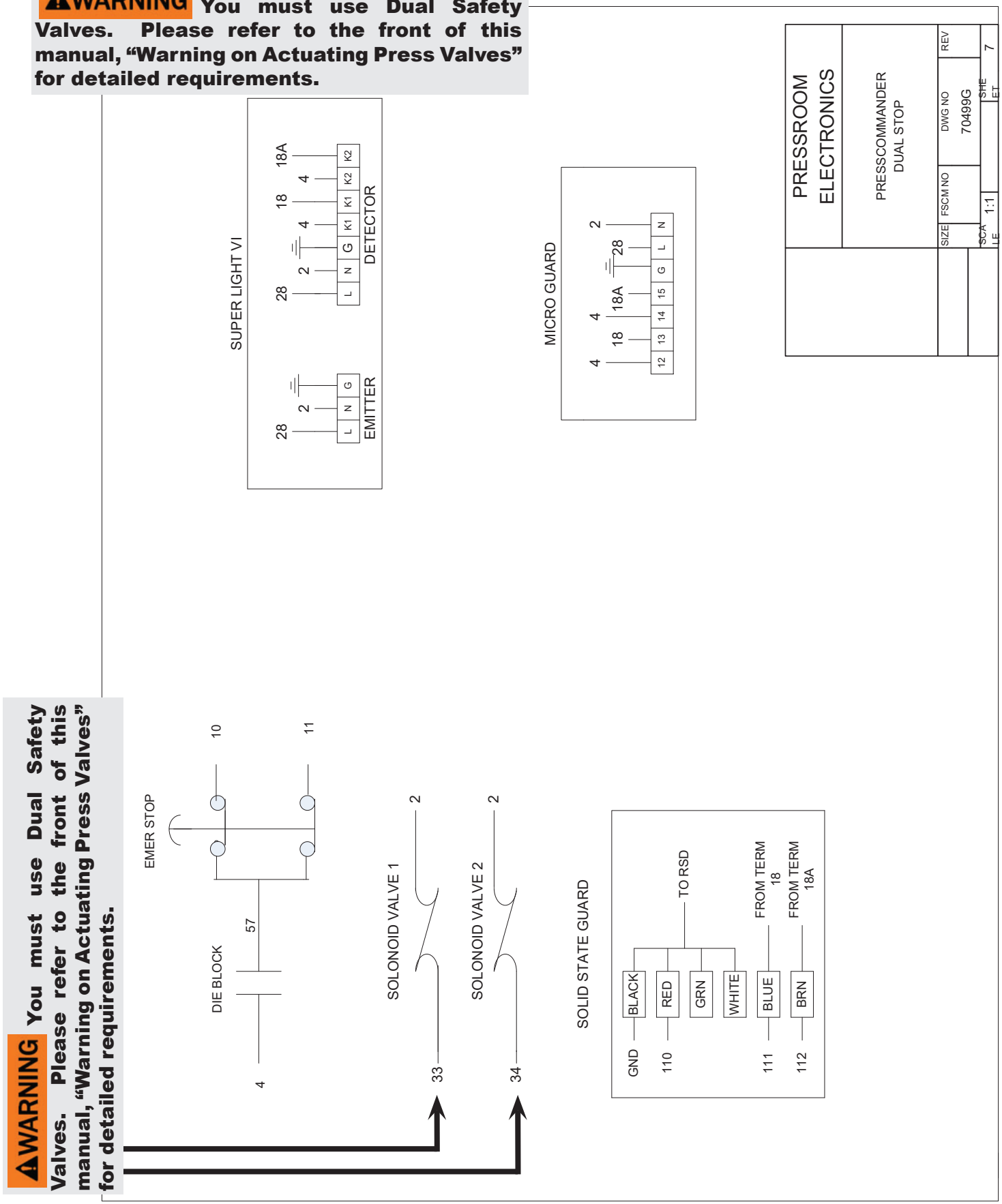

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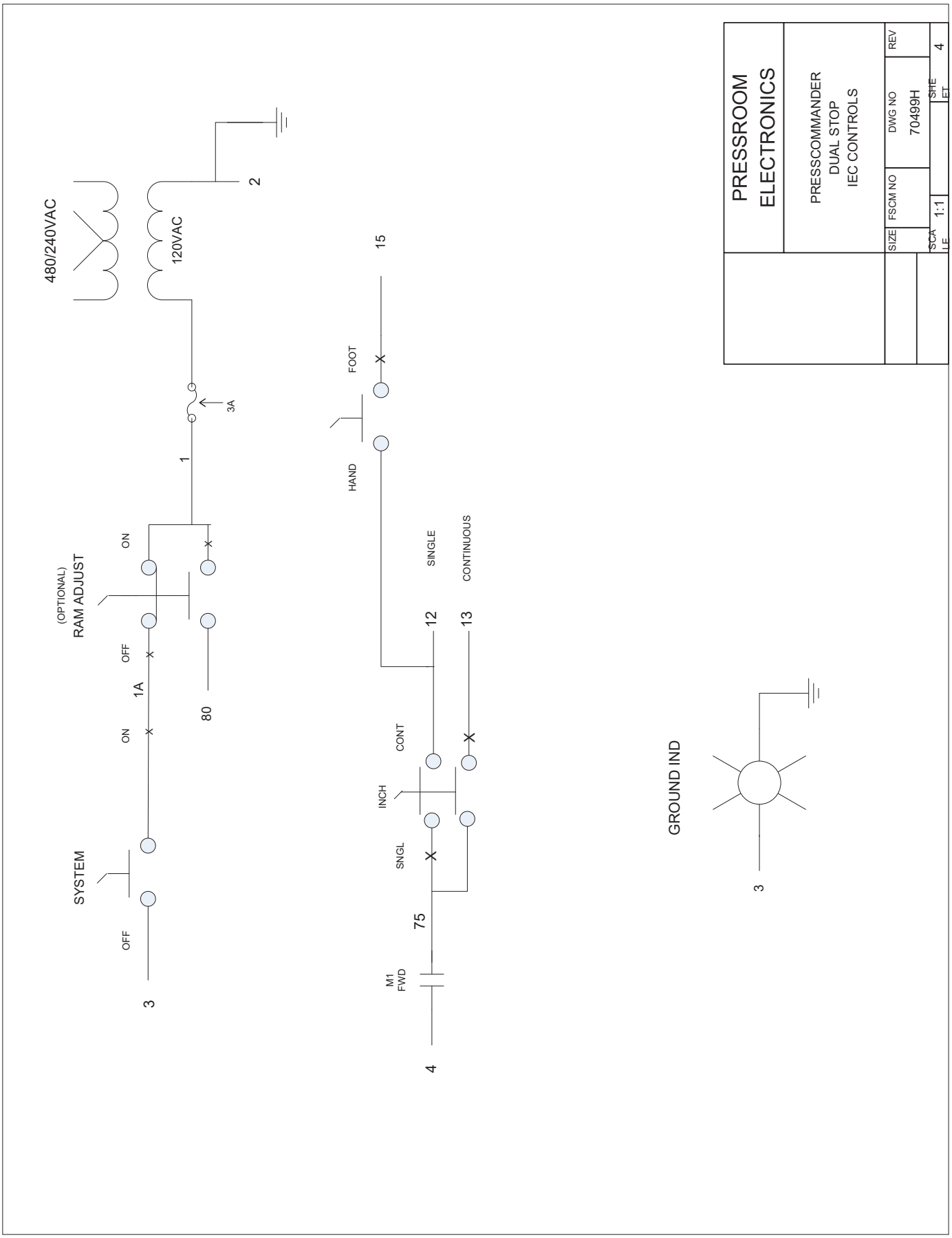
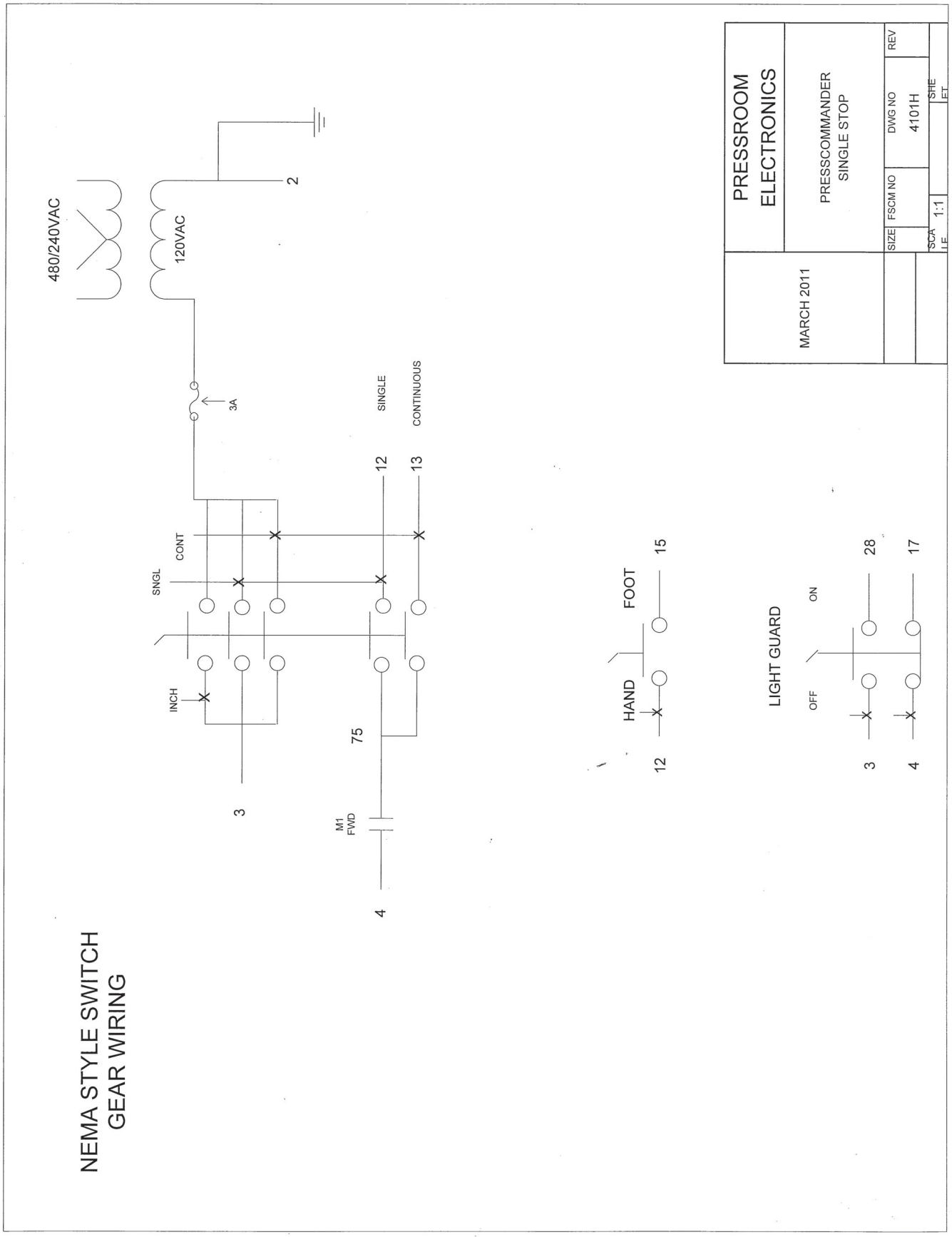
Appendix C: Control Wiring Diagrams - DUAL IEC Control Wiring Diagrams



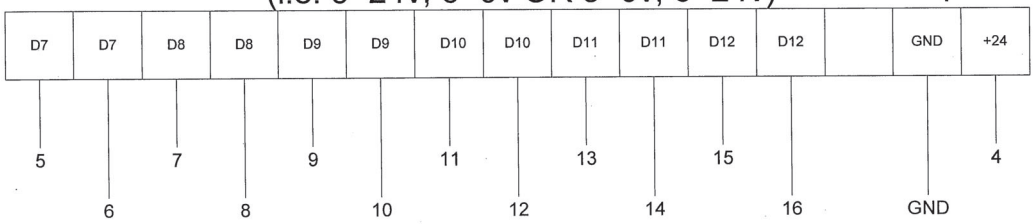

480/240VAC
120VAC
2
3A
SINGLE
CONTINUOUS
12
13
SNGL
CONT
INCH
3
75
M1
FWD
4
HAND
FOOT
15
12
LIGHT GUARD
OFF
ON
28
17
3
4
NEMA STYLE SWITCH
GEAR WIRING
PRESSROOM
ELECTRONICS
PRESSCOMMANDER
SINGLE STOP
MARCH 2011
SIZE
FSCM NO
DWG NO
4101H
REV
SCA
LE
1:1
SHE
ET

EXPANDER BOARD CONNECTORS

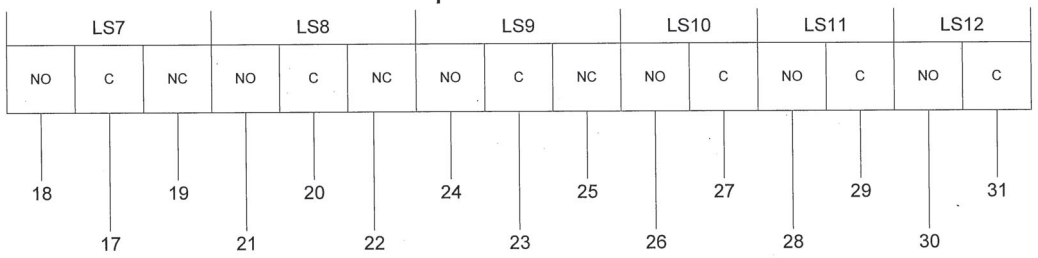
Boxes represent the Connector on the Expander board itself.
Numbers on the end of the line represent the Din-Rail Terminal #'s

Die Protection Opto Inputs DIE7-DIE12
Each Die input is +24vdc NPN or PNP
(i.e. 5=24v, 6=0v OR 5=0v, 6=24v)

Power Input



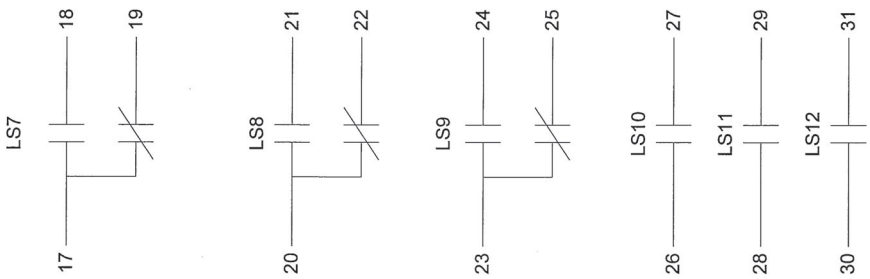
Programmable Limit Switch Dry Contract Outputs LS6-LS12



Expander board must be powered by separate +24vdc supply (30-012). You must tie the GROUNDS of all supplies together as Commons (i.e. this supply and the built in PCS supply)

Nov 2012	PRESSROOM ELECTRONICS			
	PRESSCOMMANDER EXPANDER BOARDS			
	SIZE	FSCM NO	DWG NO	REV
			4999	1
	SCALE 1:1		SHEET	1

Appendix C:
Control Wiring Diagrams
Expander Board Control Wiring Diagrams

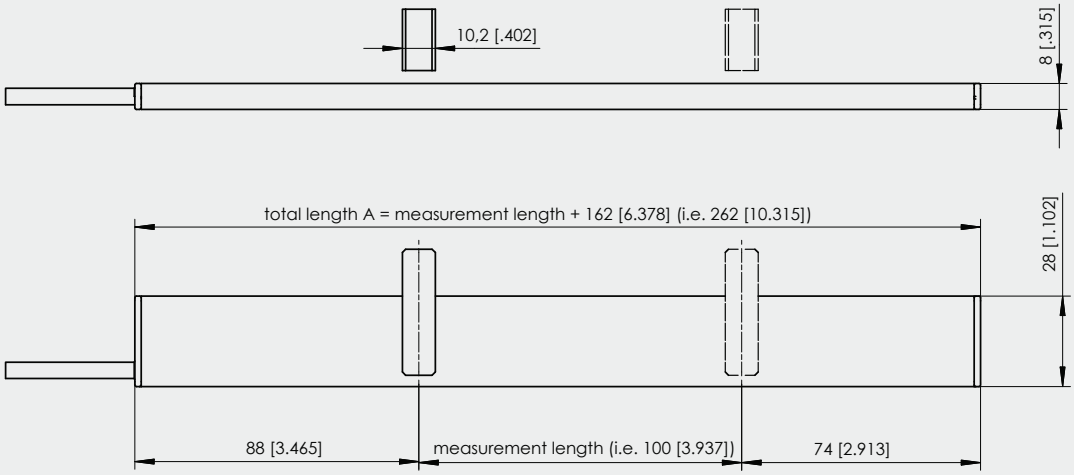


PRESSROOM ELECTRONICS	PRESSCOMMANDER EXPANDER BOARDS	SIZE	FSCM NO	DWG NO 4999 REV
MARCH 2011			SCALE 1:1	SHEET 2

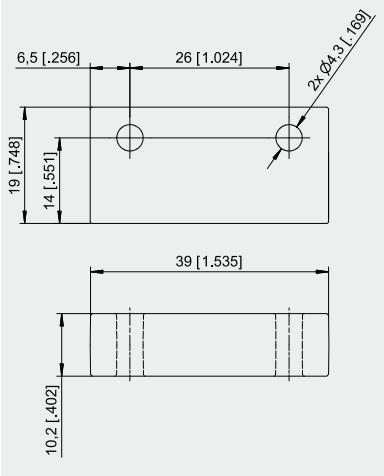
Appendix C: Control Wiring Diagrams Dimensions of Linear Sensor

Encoder Mounting

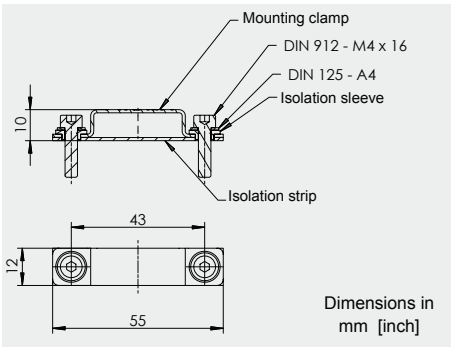
Outline drawing



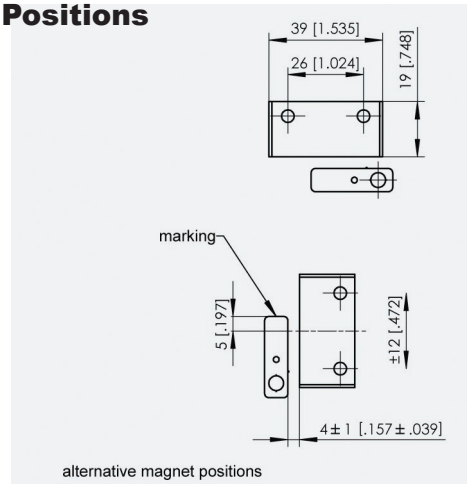
Magnet



Mounting Bracket



Alternate Magnet Positions



Optional Systems and Parts

52-279	Expander Board (adds additional 6 Die Inputs, 6 dry Programmable Relay outputs
52-280	Expander Power Supply board
	Fused Main Disconnect
	Magnetic Motor Starters
	Micro-Inching
	Light-Guard on/off supervisory controlled key switch (up to 4 curtains)
	Multiple Operator station key switch
	Bar Turnover function
	Die Block receptacle outlet
	Shutdown timer (software upgrade)
	110VAC outlet
	220VAC outlet
	Automatic External Trip (software upgrade) (with or without switch gear)
	Continuous on Demand (software upgrade) (with or without switch gear)
	Custom Software programming.
35-111	ETHERNET Remote Internet Monitoring (wired or wireless)
37-040	Solid State Output Relays (LS1 thru LS6) replacing relays)
	Safety Light Curtain Inputs (up to 4 curtains)
	Tonnage (2 or 4 channel) monitoring
	UL-501 Ultratouch Palm button run bar with ESTOP & TSTOP buttons)
311	Filter, Regulator, Lubricator
306	Heavy duty pressure switch
303b	Dual solenoid valve with muffler

Replacement Parts

11-157	Panel Mount Display unit (with Gasket)
11-167	Shield cover for Display unit
11-168	Shield cover for master/slave/power board stack
20-022	1A Fuse (slo-blo)
20-023	5A Fuse
26-091	Display Unit plastic overlay
30-009	Tonange Controller (4 channel)
30-010	Tonnage Sensor and 35’ cable
30-013	Tonnage Controller (2 channel)
32-001	Safety Relay (blue, or white, or clear, or green)
32-002	Output Relay (G6B-1174p) (for LS1 to LS3)
32-006	Output Relay (G6B-2114p) (for LS4-LS6 and remaining relays)
35-065	EEPROM JOB memory (100 jobs)
37-040	Solid State Output Relay (factory installed) and Replaced
39-084	RUN/PROG key switch, key and cable
45-020	Resolver Cable (any length) (30’ standard)
45-027	Display 6’ data/power cable
45-029	Display 15’ data/power cable
52-227	Resolver unit (no cable)
52-245	Display Board (with job memory and display)
52-246	Master Board
52-247	Slave Board
52-248	Power Supply / Relay Board (with relays and fuses)
52-251	Ribbon Cable assembly
52-271	Master/Slave Input Cable (4.5’ 9 conductor with molex connector on one end)
52-279	Expander Board (6 Die Input / 6 LS Output)
52-280	Expander Power supply

Notes

WARRANTY

Manufacturer warrants that this product will be free from defects in material and workmanship for a period of one year from the date of shipment thereof. Within the warranty period, manufacturer will repair or replace such products which are returned to it with shipping charges prepaid and which will be disclosed as defective upon examination by the manufacturer. This warranty will not apply to any product which will have been subject to misuse, negligence, accident, restriction, and use not in accordance with manufacturer's instructions or which will have been altered or repaired by persons other than the authorized agent or employees of the manufacturer.

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⚠WARNING The entire machine safety system must be tested at the start of every shift. Machine testing should include: (1) proper machine operation and stopping capability; and (2) verification of proper installation and settings of all point of operation guards and devices before the operation is released for production.

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be reassigned to fix or establish key specifications for your application. Please consult the factory.

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