

jobber Plus

Instruction Manual

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Punch Press Controls

**METAL
TECH
CONTROLS CORP.**

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Jobber Plus Installation Manual

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NOTES

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IMPORTANT SAFETY MESSAGE

Please read this message first!

The **jobber Plus** is a partial revolution punch press control which also acts as an interface between light curtains which in turn are designed to guard personnel working around moving machinery. Whenever the operator's safety is dependent on the machine's ability to stop quickly enough to prevent an injury, it is absolutely imperative that the safe stopping time of the machine shall be known and the light curtains be set the proper distance from the nearest pinch point as is regulated in the United States by the Occupational Safety and Health Administration (OSHA). The **jobber Plus** is totally dependent on the proper operation of the light curtains used to safeguard the operator. Be certain the light curtains used meet all OSHA requirements before interfacing them to the **jobber Plus**. Be certain that the light curtains are mounted the proper distance from the nearest pinch point as prescribed by the light curtain manufacturer. Regardless of the calculated distance, you should **never** mount the light curtains closer than 7.5 inches (191 mm) from the nearest pinch point. This is required by OSHA Table 0-10 in OSHA 1910-217 and Table 1 in ANSI B11-19-1990.

The **jobber Plus** can and should be used to monitor the brake stopping time. Proper setting of the brake fault limit switch on the rotary cam limit switch is the sole responsibility of the employer, purchaser and final owner of the equipment.

The proper application, installation, maintenance and operation of the **jobber Plus**, the light curtains used and the machine itself is the responsibility of the purchaser and or employer.

It is the purchaser's and or employer's responsibility to inspect the **jobber Plus**, the light curtains, and any other pertinent equipment daily for proper operation. It is also the purchaser's and or employer's responsibility to know that the brake monitoring setpoints and the mute setpoints are proper and safe for the operator.

The purchaser and or employer is also responsible for the selection and training of the personnel necessary to properly install, operate and maintain the machine and its safeguarding systems. For example; the **jobber Plus** should only be installed, checked out and maintained by a *qualified* person, as "*a person or persons who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training and experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work.*" (ANSI B30.2-1983)

The user is the person(s) identified and designated by the employer as being appropriately trained and qualified to perform a specific procedure. Often the user is the installer, die setter, electrician, maintenance personnel, supervisor, foreman, etc. involved with the setup, daily test and checkout of the machine and the safety devices.

The **jobber Plus** should never be accessed by anyone other than properly trained personnel so designated by the purchaser and or employer. If the machine operator is not properly trained to set up the machine or the **jobber Plus**, then a setup person so designated should perform the setup.

The machine operator must receive specific proper training on exactly which machinery is protected by the light curtains, the machine's operating controls, warning signs and safety instructions. The machine operator must thoroughly understand and follow the company's safety rules and always use the safeguards and proper hand tools provided by the employer. The machine operator must notify management if the machine, tooling or safety devices are not operating properly. Never use the machine if it or the safety equipment is not in proper working order.

The **jobber Plus** is provided with keyed selector switches. The purpose is to prevent untrained and unauthorized personnel from changing or modifying the operating modes. It is the purchaser's and or employer's responsibility to insure that only trained and authorized personnel have access to these functions.

The following are additional requirements the purchaser and or employer must meet before using the **jobber Plus**.

The machine on which the **jobber Plus** and light curtains are to be installed **MUST** be capable of stopping motion anywhere in the stroke or cycle in a safe time as prescribed by the OSHA formula for safe stopping times.

Do not use the **jobber Plus** or light curtains on any device with inconsistent stopping time or inadequate control devices or mechanisms.

When the **jobber Plus** and light curtains are used to protect a machine operator from a hazard, the purchaser and or employer has the responsibility to ensure that all applicable federal, state and local Occupational Safety and Health Act (OSHA) requirements and any such rules, codes and regulations which may apply are satisfied.

All Safety related machine control circuit elements, including pneumatic, electric or hydraulic controls must be control reliable.

Any power press which uses the **jobber Plus** and light curtains must meet the requirements and inspection procedures of OSHA regulation 1910.217, ANSI standards B11.3-1988 and B11-19-1990 plus any other applicable state and local regulations.

All brakes and other stopping mechanisms and controls must be inspected regularly to ensure proper working order. If the stop mechanisms and associated controls are not working properly, the machine may not stop safely even though the **jobber Plus** and the light curtains are functioning properly and should be taken out of service until repairs are made.

DO NOT OPERATE A MACHINE IN AN UNSAFE CONDITION.

A daily test must be performed by properly trained and designated personnel of the light curtains as prescribed by the manufacturer and the **jobber Plus** and its associated equipment must be tested for proper functioning.

The enforcement of these regulations are beyond Metal-Tech Controls. Corp.'s and its agent's control. The purchaser and or employer has the sole responsibility to follow the proceeding requirements and any other procedures, conditions and requirements specific to the machine.

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Jobber Plus Installation

The **jobber Plus** is an air clutch/brake part revolution press control system. It can be installed totally independent of the motor control panel. The control system comes pre-wired from the factory. **DO NOT MODIFY ANY FACTORY WIRING !**

Usually, the motor panel is mounted on the side of the press opposite the flywheel. This panel contains a disconnect switch, fuses, transformer, terminal wiring strip and the necessary starters to control the motors on the press.

Before mounting either of the panels, plan out the best location for the motor starter panel and the **jobber Plus** panel so they are convenient to service and operate. If the **jobber Plus** is the vertical mount model with a remote operator station be sure to mount it so that the operator has easy access to the controls and the LCD display is as close to eye level as possible. Be **sure to use the vibration mounts** supplied with the panel.

If the **jobber Plus** panel is the pendant mount model, determine where the pendant mount swivel bracket will be placed on the machine. The LCD display should be at eye level. If there are palm buttons on the sides of the panel take into account their location in relation to the operator's ease of use. Also be sure the panel and pendant arm has the freedom of movement required.

DO NOT USE A FUSE GREATER THEN 5 AMPS!

ON/OFF Switch:

There is an **ON/OFF** switch on the **jobber Plus** panel face, when in the OFF position power is turned off to the control preventing machine operation. If the optional ground fault interrupter is installed the switch is wired in series with it.

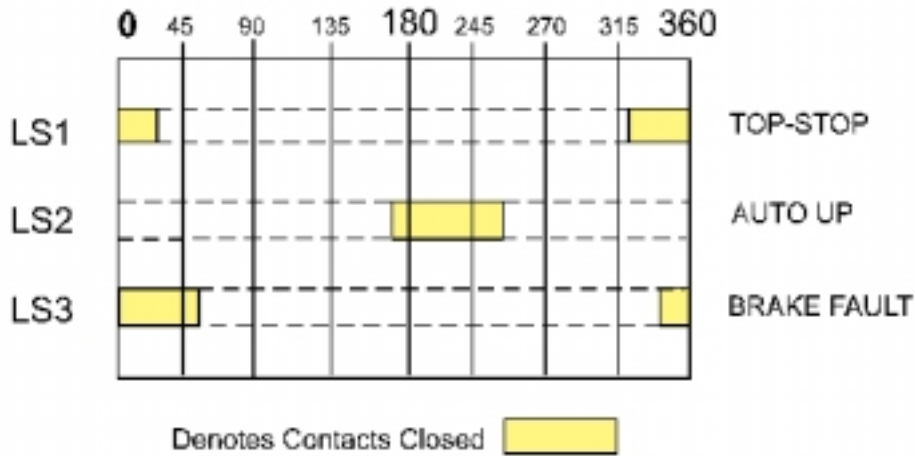
Voltages:

The **jobber Plus** inputs and outputs are 12 to 32 vdc. All termination's to the blue terminal strip are 12 to 32 vdc. All blue wires are also dc voltage. Connecting AC voltage to any of these terminals or wires will result in computer board failure and **will not** be covered under warranty. Be sure to use blue wires for all of these circuits. For runs longer than five feet use 18 gauge or greater.

Pressure Switches:

There should be a pressure switch for the air clutch and brake and a separate pressure switch for the air counter balance (if there is one). Wire them in series.

Rotary Cam Switch



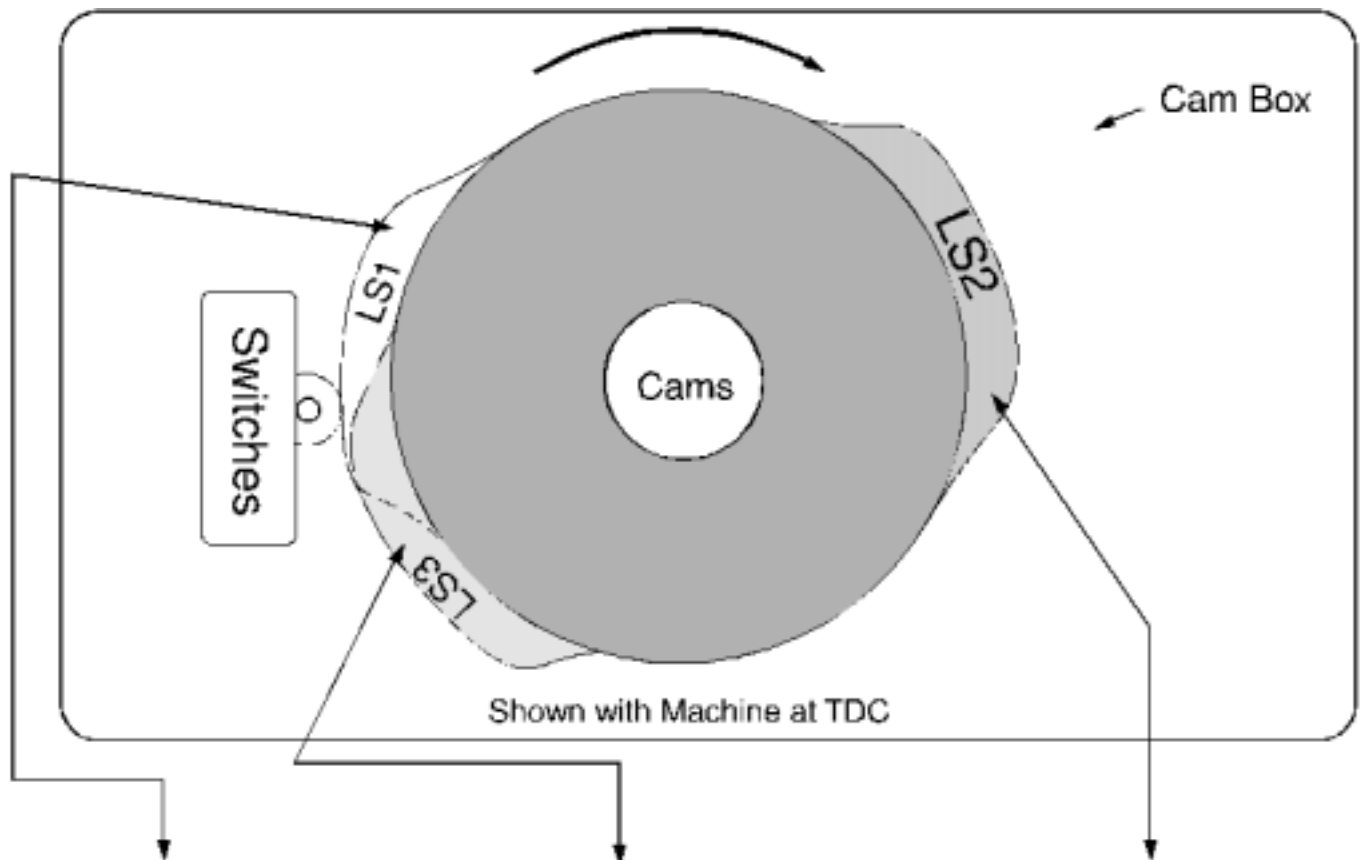
Chain Break Switch:

If you have the Time Based Brake Monitor Option disregard this.

The chain break switch acts as a lost motion indicator. The switch is usually mounted under the rotary cam switch which is mounted on a spring loaded hinged base. In the event the chain should break, the spring loaded hinged base would rise up, releasing the switch and therefore shutting the press down. Another method is to use a lever type limit switch with a hardened steel cam follower roller. The limit switch is mounted so that the switch is 'made' as long as it is in contact with the chain. Should the chain break and fall away, the limit switch opens causing a Lost Motion Fault which causes the press to stop.

Regardless of what type switch is used, it must be wired in series before the supply voltage to the rotary cam switch and the input voltage to the rotary cam switch should also be connected to terminal 15. In other words if the chain break switch should open or the connection from the switch to the cam switch opens there would be no voltage at terminal 15, causing a lost motion fault. See the wiring diagram.

Cross section view of cam box when machine is at TDC



The leading edge determines where the machine will come to a stop. Advance or retard the cam to stop the machine at TDC. Set the LS1 Dwell so that when the machine is stopped at TDC the LS1 switch remains 'made'.

As the machine comes to a stop at TDC LS3 should not have come on yet. It should be set to come on in about 5 to 10 degrees. It acts as an override check. If the machine fails to stop at TDC by within the 5 to 10 degrees, LS3 comes on and causes a Brake Fault, because the machine has failed to stop at TDC which indicates that the Brake needs adjustment or replacement. Dwell should be set at about 40 degrees.

LS2 is the auto-up cam. It controls the single stroke auto-up function which allows the palm buttons or foot switch to be released after the machine has reached BDC. It also controls light curtain muting. Its position setting of 175 to 180 degrees from TDC is critical as it is a safety factor. Dwell should be about 40 degrees.

NOTE:

There are some cam switches that cannot be adjusted to have a dwell as short as 60 degrees using the high side of the cam (as shown). If this is the case then use the low side of the cam and wire the

TIME BASED BRAKE MONITOR INSTALLATION

If you have purchased a rotary cam limit switch with the encoder installed you need not read this section, however you should review the wire connections.

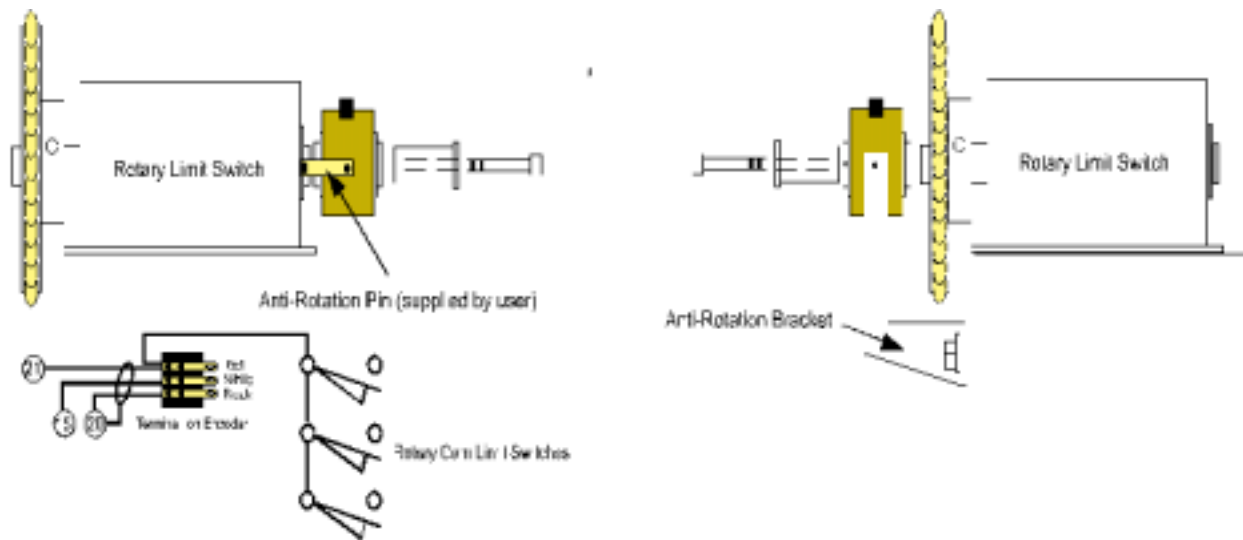
Mounting the Encoder:

The shaft which is supplied with the adapter kit should be mounted such that when the rotary cam switch is rotating the encoder is concentric to the cam shaft. Run-out of more than .010 will cause bearing failure and is not covered under the warranty. The anti-rotation bracket should be made from thin gauge metal so that if there is run-out, the flexibility of the anti-rotation bracket will allow for the run-out. Failure to observe the above could result in bearing failure.

Use the drill bushing guide (supplied) to drill a #7 hole in the end of the cam shaft as shown in the diagram below.

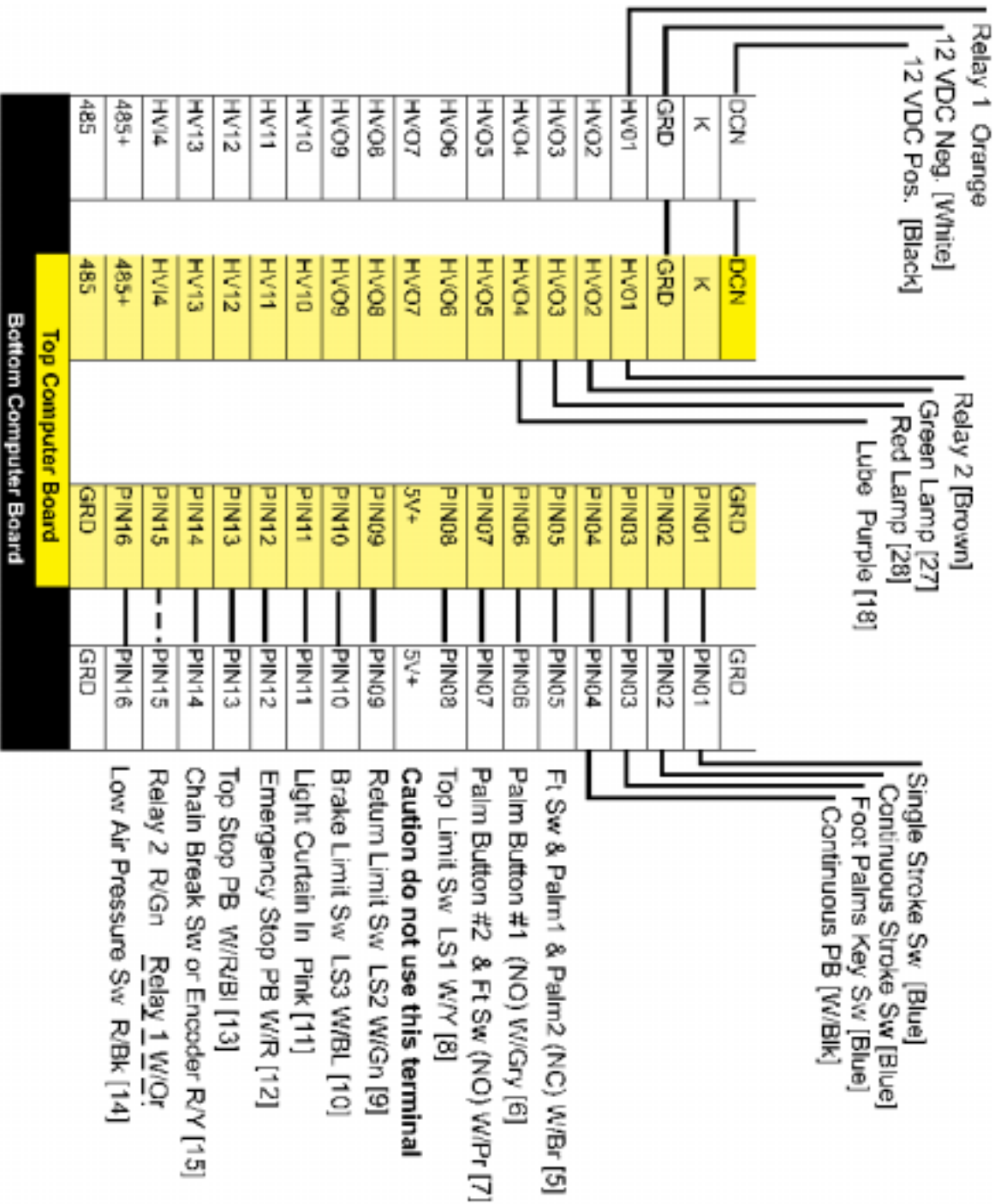
Tap the hole with a 1/4-20 tap. Insert the shaft extension into the encoder and tighten the screw securely. Install the anti-rotation bracket and test for concentricity.

Wire as shown. The shielded cable can be routed with the low voltage dc wiring but should not be placed across switched high voltage wires.



WARNING!

Use only shielded cable. Do not connect the bare drain wire to the encoder. The rotary cam limit switches MUST be supplied 12 vdc from the encoder terminal as shown or loss of voltage to the cam switches will not be detected and serious INJURY could occur.



Board Layout

Diagram for Non-Encoder Based Controller

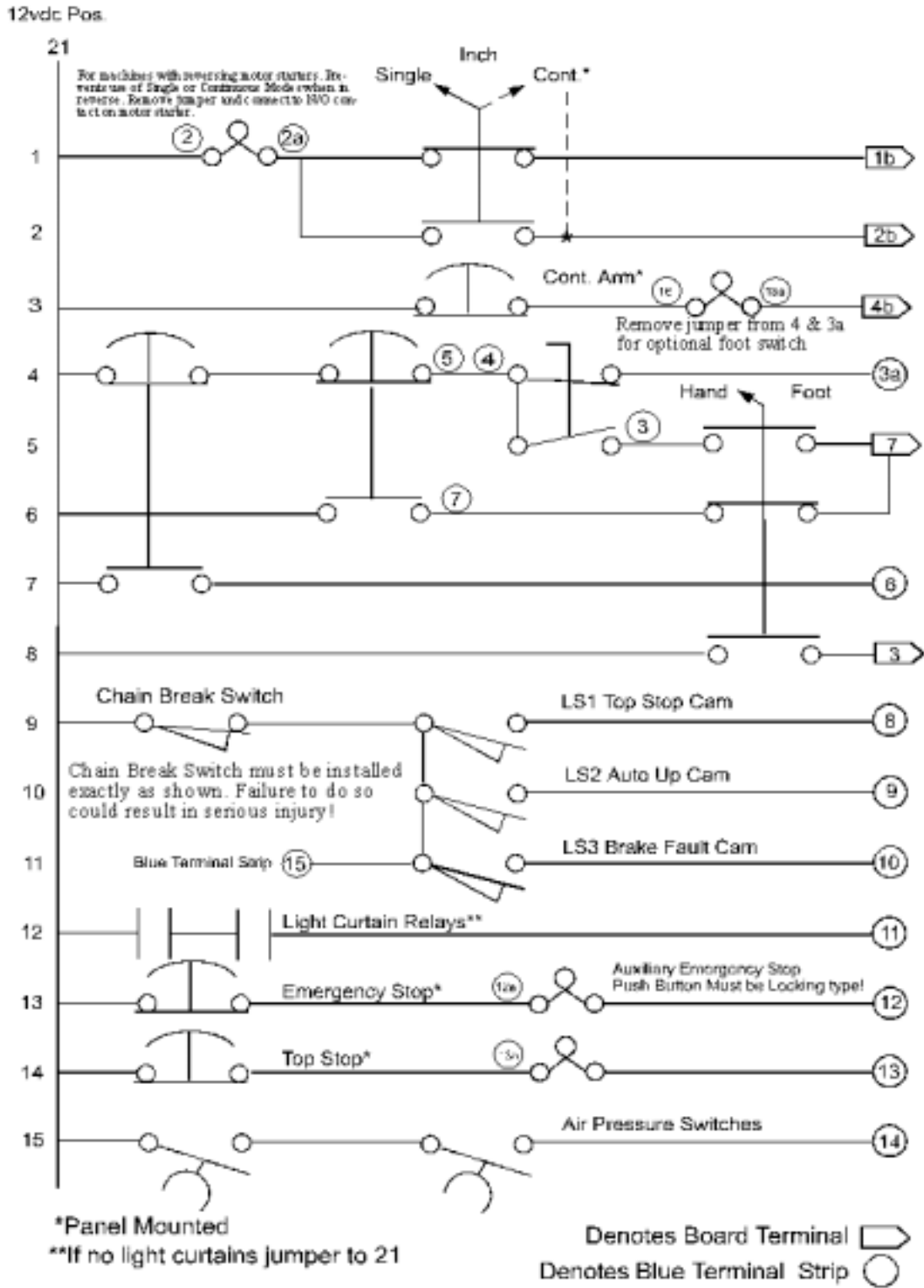
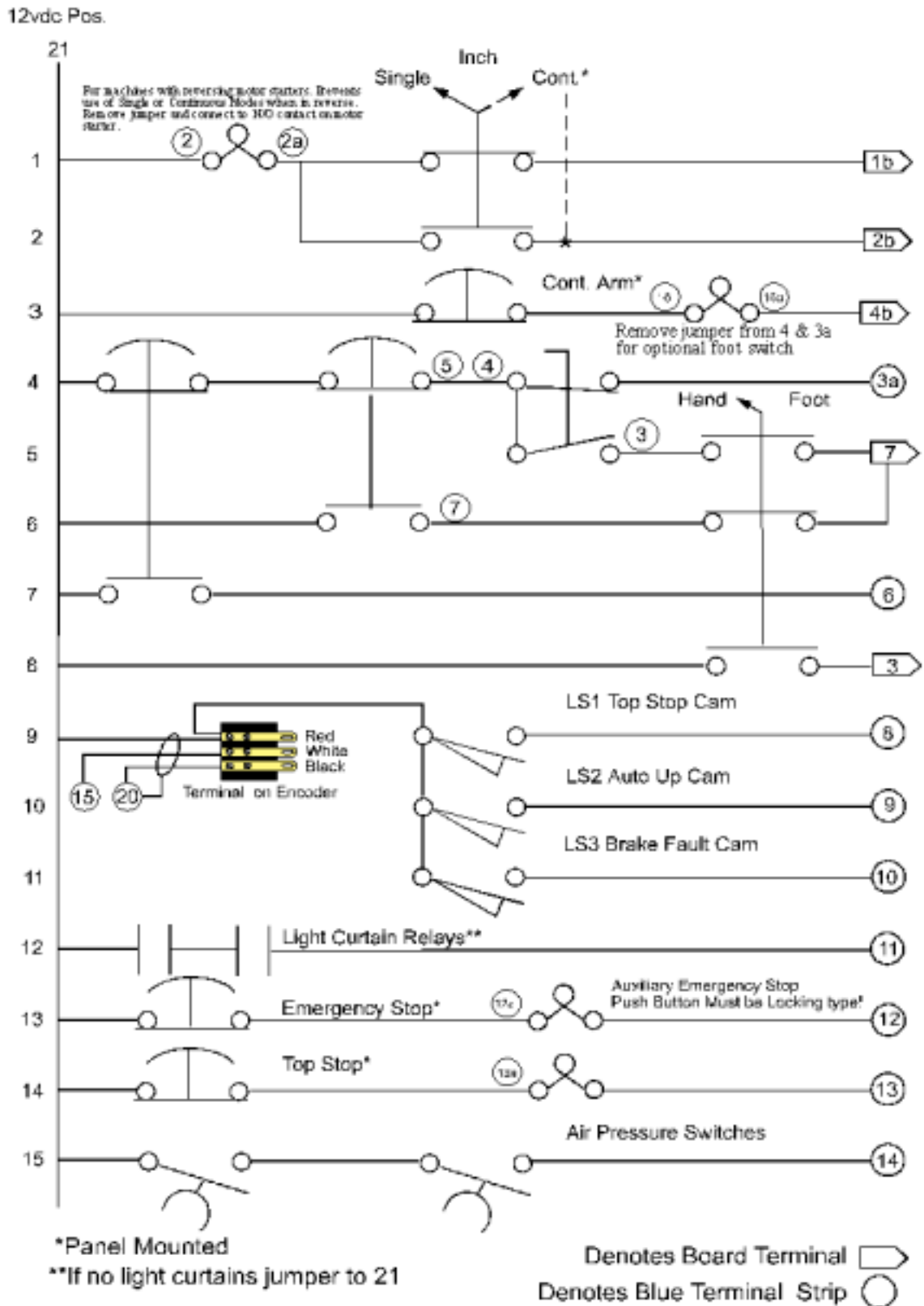
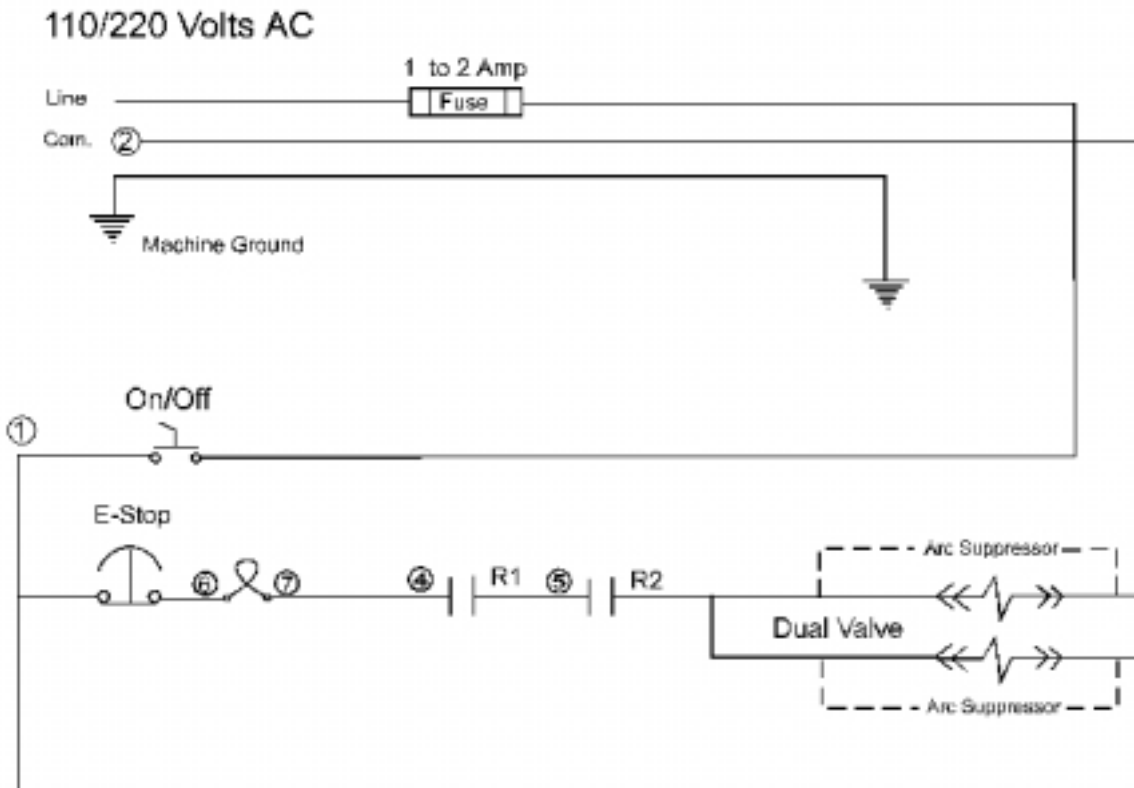


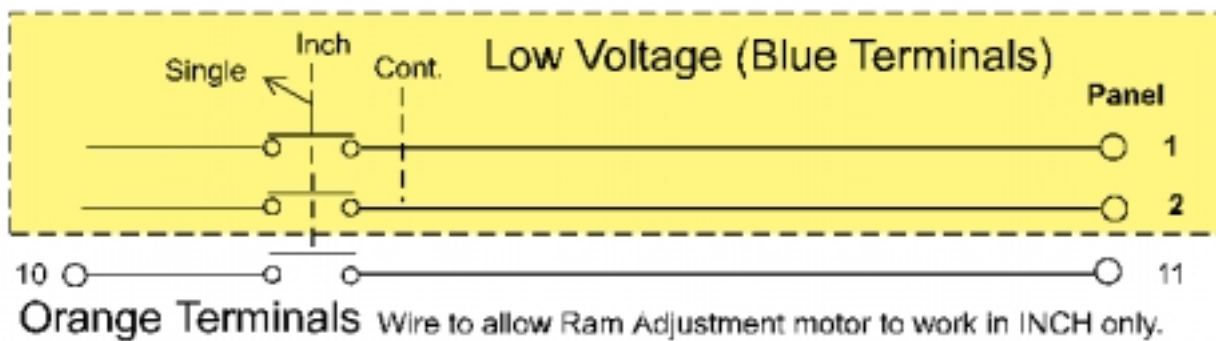
Diagram for Encoder Based Controller



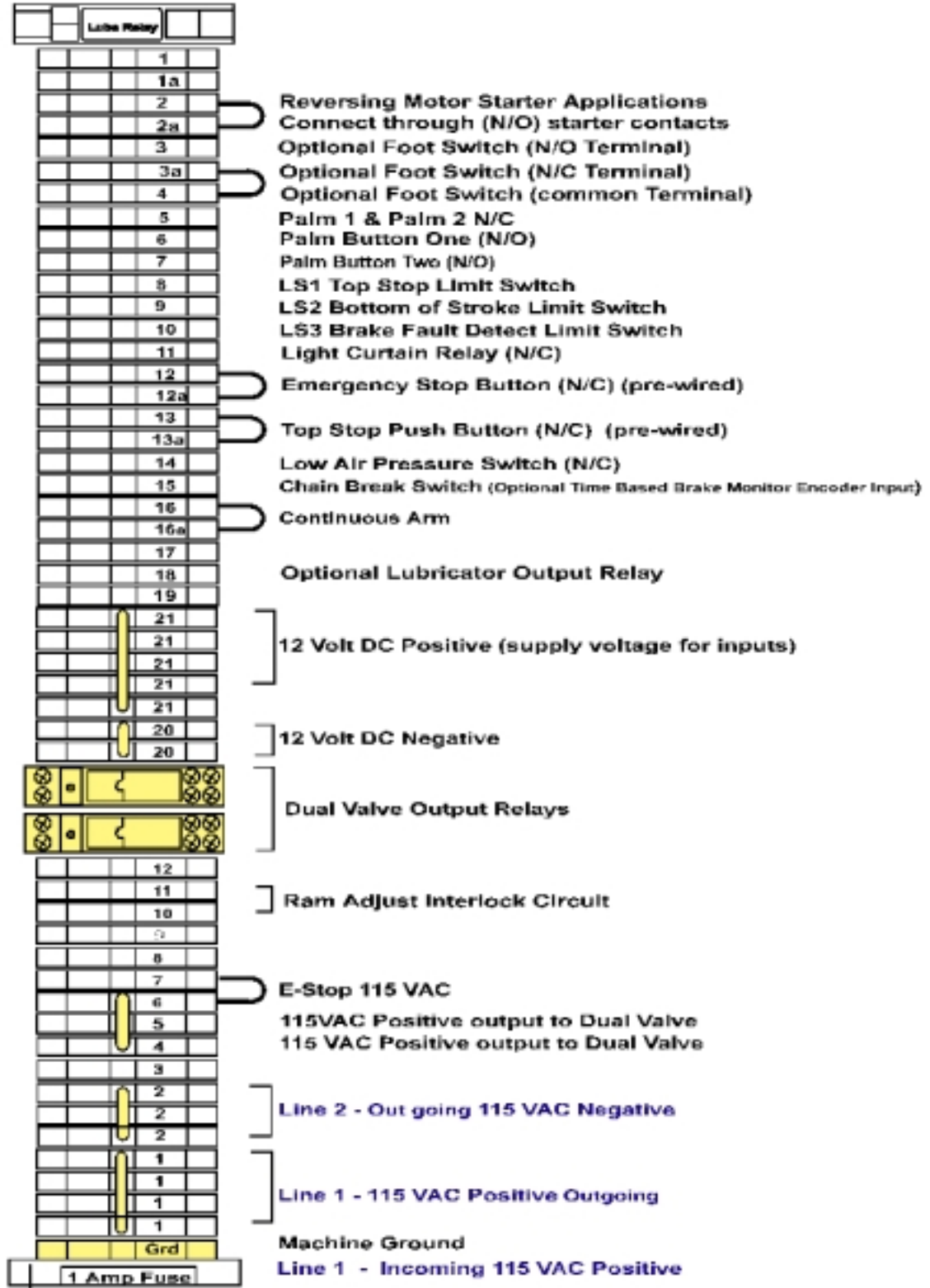
110 Volt AC Wiring Diagram



OPTIONAL: Ram Adjust Switch Circuit



Terminal Strip Layout



OPTIONAL TIME BASED BRAKE MONITOR

Principal of Operation:

The TBBM uses an encoder attached to the rotary cam switch of the press as an input to the high speed counter incorporated in the processor boards. Whenever the machine is stopped the controllers determine when the machine has come to rest and calculates the stopping time in milliseconds. It then prints the stopping time in milliseconds on the LCD display and compares the stopping time to the programmed preset limit. If the stopping time has exceeded this preset limit, the control will display a fault message, '**STOP TIME EXCEEDED**'. In order to clear the fault you will have to turn the **jobber Plus** off and then on again.

CAUTION:

If the stop time limit has been exceeded there is a reason. **DO NOT** operate the machine until the cause of the brake fault has been corrected. Have the clutch/brake mechanism checked, adjusted, repaired or replaced by a competent service person.

The control is shipped with the stoptime setpoint set at 350 milliseconds to facilitate installation. Once the machine is otherwise ready to run you will need to determine the average stopping time of ten successive strokes. The control will automatically calculate the average stopping time and add 30 percent to it. The setpoint will then be stored in non-volatile EEPROM and battery backed ram memory. This factor will be used as the setpoint to which the **jobber Plus** will compare the stopping time of the machine.

Brake Monitor Setup:

Follow these instructions exactly!

Install the heaviest upper die you use in this machine. Be sure the machine can cycle without causing anyone harm.

1. Place the machine at the Top Stop position,
2. Turn the **ON/OFF** key switch to OFF.
3. Turn the operation mode switch to SINGLE.
4. Press the **Top Stop** push button and hold it.
5. Turn the **ON/OFF** switch to 'ON' while still holding the **Top Stop** button in.
6. Wait for the LCD display to show:

CAUTION: You are about to cycle the machine, be certain no one is in harms way.

CYCLE 1 TIME 0
BRAKE MONITOR SETUP
Press Palm Buttons
Hold Until Ram Stops

Activate the press by pressing the dual palm buttons. Do not release them until the machine stops at 90 degrees. **NOTE:** if the machine fails to stop within one cycle, release the palm buttons to stop the machine and find out why the machine failed to stop at 90 degrees.

When the machine stops at 90 degrees the stopping time will be displayed in milliseconds and the CYCLE count will increment. Continue as above until ten cycles have been completed. The control is counting and when the count of ten is reached you will see the following display.

Press TOP STOP
To Save the Set Point
Average x 1.30 = 125

Press the TOP-STOP button to save the SETPOINT.

Editing the Stop Time Setpoint:

You may find that after running the press for an extended period, especially in single or inch mode, the brake has heated up and you are getting brake fault messages. If the exceeded stopping times are consistent (about the same amount of time) it is safe to assume that this is the true stopping time of the machine.

To Change the Setpoint:

1. Place the machine at the top of the stroke and turn the **jobber Plus** off.
2. Press the Emergency Stop button in until it locks.
3. Hold the Top Stop push button in and turn the **jobber Plus** on.

CHANGE STOP SETTING
Stop time setting 125
Press Cont. to Inc.
Press T-Stop to Dec.

To increase the setpoint press the Continuous Arm push button.

To decrease the setpoint press the Top Stop push button.

To save the new setting release the Emergency Stop button.

To quit without saving the new setpoint, turn the **ON/OFF** key to OFF.

Optional Lubricator Output

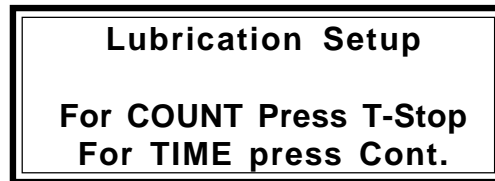
A single pole double throw (SPDT) relay is provided for timed lubricator output. The output can provide lubrication based on a pre-programmed number of strokes and the duration of the lubrication cycle can also be programmed. The maximum settings are 300 strokes and 30 seconds. If you program in more than these limits, the control will change them to the default maximum settings.

Programming the Lubricator Output:

It is not often that lubrication settings need to be changed. Therefore the manner in which programming is done has been made as easy as possible while using machine function push buttons to accomplish the programming task.

You can only program one function at a time. After programming one of the functions you must start over again to program the next setting.

1. Press the **EMERGENCY STOP** button so that it locks.
2. Turn the **ON/OFF** switch to OFF.
3. Press and hold the **CONTINUOUS** push button and turn the **ON/OFF** key to ON.



Press the Top Stop push button to change the Strokes between lubrication cycles.

Press the Continuous Arm push button to change the lubrication cycle time.

The LCD will display the previous setting. To increment the setting, press the Continuous Arm button. To decrease the setting, press the Top Stop push button.

To save the new setting, release the Emergency Stop push button.

If you made a mistake or changed your mind, turn the **ON/OFF** switch to OFF. { Do not release the Emergency Stop push button. } The setting will be unchanged from the original setting.

Micro Inch:

Micro inch is used in die setting. If the control is in inch mode and set to MICRO INCH the palm buttons may both be held in and the machine will increment 'jog' for a timed interval. The interval is programmable.

To turn on Micro Inch:

The control must be in inch mode. Press and quickly release the Continuous Arm button. The display will read MICRO INCH MODE.

To turn off Micro Inch:

Press and quickly release the Continuous Arm button.

Programming Micro Inch:

The interval for between impulses is programmable as follows:

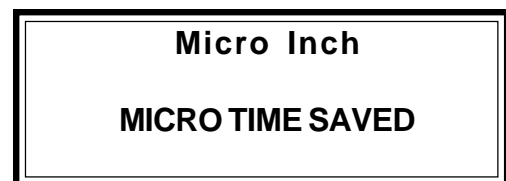
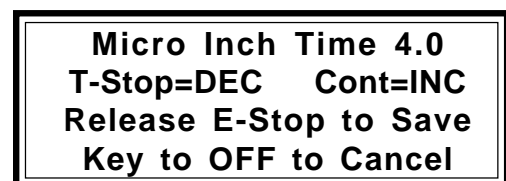
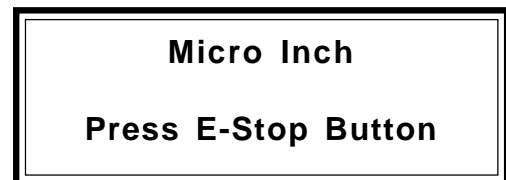
When in inch mode, press and hold the Continuous Arm button until the menu comes on the screen.

When the screen appears press the E-Stop button until it locks.

To increase (INC) the 'ON' time press the Continuous button. To decrease (DEC) the 'ON' time press the T-Stop button.

To save the new time, release the E-Stop button.

If you changed your mind turn the ON/OFF key to 'OFF', the settings will revert back to the original settings.



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Machine Stop Time Calculation

You can determine the stopping time of the press if you have two things; a way to determine the position of the ram within one degree and the maximum strokes per minute. **SPM**.

Usually the degree position of the ram can be learned from the rotary limit switch. If you purchased a rotary limit switch from us, each cam is graduated in degrees and there is a master degree wheel on the limit switch. Otherwise you will have to use a protractor.

Install the heaviest upper die you will use in this machine and set the counter balance to the proper air pressure.

Formula: {60 / SPM} / 360 x 1000 x D = Stop time in milliseconds

60 = 60 seconds

SPM = Maximum strokes per minute

360 = 360 degrees

1000 = 1 second in milliseconds

D = No. of degrees from TOP DEAD CENTER to where it comes to a stop

Example #1:

The SPM is 60. 60 seconds divided by 60 (SPM) equals 1 This means the machine travels 1 complete cycle in 1 second. Divide this by 360 degrees, equals .0027777, multiplied by 1000 to determine milliseconds, equals 2.7777. This means the machine travels one degree in 2.7777 milliseconds. If the machine travels 40 degrees past where LS1 came 'ON', 40 x 2.7777, then the stopping time is 111 milliseconds.

Example #2:

The SPM is 40. 60 divided by 40 equals 1.5. This means the machine travels 1 stroke in 1.5 seconds. Divide this by 360 degrees, equals .0041666, times 1000 to determine milliseconds, equals 4.166. This means the machine travels one degree in 4.1666 milliseconds. If the machine takes 30 degrees to stop, 30 x 4.1666, then the stopping time is 125 milliseconds.

You can use this formula to determine the proper distance for placing the dual palm buttons, or for determining the proper distance for placing light curtains. See the OSHA formula in the Appendix or your light curtain manual.

Trouble Shooting

Last Error Message

Some faults are ‘fatal’, that means the fault could be dangerous to personnel and must be corrected immediately. When any of these ‘fatal’ faults occur you are required to turn the **jobber Plus** off to reset it. Other errors such as a light curtain interrupt can be corrected without resetting, just correct the cause and continue with operating the press. Some faults can be intermittent, such as a voltage drop that causes one or both of the controllers to reset themselves or a switch or loose wire could cause a fault but because it corrects itself very quickly, the control shuts the machine down but doesn’t display the fault because the controller is satisfied that the error has been corrected. You can display the last fault error message simply by pressing the **TOP STOP** button when the machine is idle. If the control has reset itself because of low voltage or a large line spike or you reset the control by turning the power off, the last error message will be “POWER FAILURE”. So if you want to know what the last error was and the control is on press the TOP STOP button before resetting the controller.

For example; if LS1 failed to open when it was supposed to, the control will emergency stop the press and display;

ERROR
LS1 Limit Switch Failed
Check Rotary Cam
Reset jobber Plus

or the operator tries to use the foot switch in **Inch Mode**

ERROR
Foot Switch Not Allowed
In Inch Mode

There are messages for all possible faults as well as warnings against improper use.

ERROR
Relay 1 Failed
Contacts Did Not Open

The jobber Plus Will Not Power up:

Check the fuse.

Check for loose or broken wires.

Check the switch to see if it is defective.

No Air Pressure:

Be sure the air is turned on and the proper pressure is set. If it is on and the pressure is correct, check to see if you have 12 to 48 vdc at the blue terminal number 14. If there is no voltage check the circuit. If there is voltage call the factory.

Rotary Cam Switch:

The rotary cam switch consists of three adjustable cams and switches. If a contact fails to open, the ERROR message '**LS2 (LS1, LS3 etc.) FAILED TO OPEN**' would be displayed on the screen. In this example for some reason the cam limit switch has failed to open or close in the proper sequence. Check the wiring and the switch. Rotate the machine until the switch is 'made' or have someone 'make' the switch. Check to see if there is voltage at terminal 8, 9 or 10 (depending on which limit switch is faulting.) If there is no current the problem is in the wiring or the switch. If there is voltage, call the factory.

Lost Motion:

Lost motion is detected in two ways. A internal timer is zeroed each time a limit switch is passed, if for some reason one is not passed in a given time a LOST MOTION ERROR will stop the machine.

If the chain break switch opens.

Light Curtains:

If the display shows a '**LIGHT CURTAIN INTERRUPTED**' message and will not go away when the light curtains are not interrupted, check for a broken wire or loose terminal contact. If those tests check out OK then place a jumper from terminal 21 to terminal 11. If the error goes away the fault is in the light curtain. If the fault does not go away, call the factory.

Testing the Inputs:

To test the emergency inputs, low air pressure, emergency stop and light curtain fault, simply press the emergency stop button or turn the air pressure off or interrupt the light curtains. These error messages will automatically display on the LCD. Of course you could trip the rotary limit switches out of sequence to cause ERROR messages, but this would be cumbersome, so we have provided an INPUT diagnostics screen.

To View the state of the inputs

1. Turn the ON/OFF key switch to OFF.
2. Turn the mode selector switch to INCH.
3. Hold the CONTINUOUS ARM push button in and turn the power ON.

Do not release the CONTINUOUS ARM push button until you see the display shown on the left (below).

The first line instructs you that if an input is 'ON', the third line will display a '1' if it is 'OFF' the third line will display a '0'.

The second line is the input, 1 through 16. See chart for list of inputs.

Remember, if an input has a WARNING message, the message will override the screen. When the message goes away the diagnostic screen will return. The diagnostic screen is only displayed in INCH mode.

INPUTS 1=ON 0=OFF
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
0 0 0 1 0 0 1 1 0 1 0 1 0 1 1 0
0=OFF 1=ON

ERROR
Relay 1 Failed
Contacts Did Not Open

Inputs by number:

1. Single Stroke Key Switch Contact
2. Continuous Stroke Key Switch Contact
3. Foot/Palm Key Selector Switch
4. Continuous Arm Push Button
5. Foot Switch
6. *Palm Button #1
7. *Palm Button #2
8. LS1 - Top of Stroke Limit Switch (Top Stop Rotary Cam Switch)
9. LS2 - Bottom of Stroke Limit Switch (Auto-Up Rotary Cam Switch)
10. LS3 - Brake Fault Limit Switch (Brake Monitor Rotary Cam Switch)
11. Light Curtain
12. Emergency Stop Push Button (Low Voltage Side)
13. Top Stop Push Button
14. Chain Brake Switch or *encoder input for Time Based Brake Monitor Option.*
15. Dual Valve Relay Contact Monitor
16. Low Air Pressure Switches

** It is best to press both palm buttons at the same time because the controller is checking the anti-tie-down circuit and may not display if buttons are out of sequence.*

WARRANTY

Metal-Tech Controls Corp. - herein after referred to as MTCC warrants its products to be free from defects of material and workmanship and will, without charge, replace or repair any equipment found defective upon inspection at its factory, provided the equipment has been returned, transportation prepaid, within one year from date of shipment.

THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

No representation or warranty, express or implied, made by any sales representative, distributor, or other agent or representative of MTCC which is not specifically set forth herein shall be binding upon MTCC. MTCC shall not be liable for any incidental or consequential damages or loss arising from reduced or lost production, or expenses directly or indirect arising from the sale, handling, improper application or use of goods or from any other cause relating thereto and MTCC's liability thereunder, in any case is expressly limited to the repair or replacement (at MTCC's option) of goods supplied by MTCC.

Warranty is specifically at the factory. Any on site service will be provided at the sole expense of the purchaser at MTCC's standard field service rates.

All associated equipment must be protected by properly rated electronic/electrical protection devices. MTCC shall not be liable for any damage due to improper engineering or installation by the purchaser or third parties. Proper installation, operation and maintenance of the product becomes the responsibility of the user upon receipt of the product.

Returns and allowances must be authorized by MTCC in advance. There will be a 30 percent restocking charge on all returns. MTCC will assign a RETURNED GOODS AUTHORIZATION (RGA) number which must appear on all related papers and outside of the shipping carton.

WARNING! Any attempt to repair or troubleshoot MTCC's products except as limited to the user replaceable components will void the warranty and may render the product unsafe for use. MTCC's products contain complex electronics which may only be tested and repaired by an authorized MTCC trained technician.