Punch Press and Press Brake Controls

Mechanical

Air Clutch

Hydraulic/Hydro Mechanical
Advanced Design Criteria for Punch Press and Press Brake Controls
Safer, More Production, and Easier to Use

The following descriptive writing is the base design criteria for the Triad punch press and press brake control systems. The inherent design features are superb for enhancing production and safety. Please note that various production options are available within each individual system or package to aid in production.

DESIGN CRITERIA—Complete self-checking dual logic microprocessor-based punch press/press brake control with two independent running control channels and a comparison circuit. The comparison circuit assures that both channels agree as the punch press/press brake control sequence occurs. The preprogrammed dedicated inelastic control system prevents in field alterations by maintenance personnel to alter or jump out the inherent safety features of the control. The control incorporates a control reliable diverse redundant design concept to assure a higher level of safety and reliability.

CONTROL RELIABILITY “CONTROL COMPONENT FAILURE”—The Triad Punch Press/Press Brake Control meets or exceeds all OSHA 1910.217 and ANSI B11.1-1988 standards for control reliability. Control reliability standards require that clutch/brake circuits 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.

DIVERSE REDUNDANT DESIGN CONCEPT—The Punch Press/Press Brake Control system utilizes the diverse redundant design concept. This gives the clutch/brake control system a higher level of redundancy and control reliability. The two microprocessors or parallel programs are run and made up from different instruction sets written by different programmers. This high degree of safety and reliability of design is the same concept incorporated in our safety light curtains.

QUICKVIEW DIAGNOSTIC MESSAGE DISPLAY—Standard on the solid state Triad Punch Press/Press Brake Control System is the revolutionary "Quickview Diagnostic Message Display" mounted with the operator controls at a customer designated location on the control panel. The bright red LED alphanumeric scrolling message display informs the user of any faults, failures, and the current operating status of the punch press control system. The messages are in plain English and will give the press operator and front line supervisor information quickly and safely. The "Quickview Diagnostic Message Display" system is so advanced that it will immediately inform the user of such problems as pressure switch faults, failed output relays, or rotary cam mis-adjustment. The system will also pinpoint internal printed circuit board faults for immediate replacement. This self-diagnostic feature will save many maintenance dollars and will enhance machine uptime measurably due to the units captive troubleshooting ability. Best of all, this information is supplied without even opening the control panel door. Additionally, a complete series of LED’s (light emitting diodes) are mounted on the clutch/brake module for visual status of all inputs and outputs related to the machine cycle status.

SYSTEM LOGIC AND COMPONENT DIAGNOSTICS—A combination of LED’s and the alphanumeric plain English message display will enhance in-field troubleshooting greatly. The advanced design can even troubleshoot itself and advise the user if a printed circuit board is defective and if it needs to be replaced or repaired. Diagnostics are for both the control system logic and for punch press/press brake component monitoring. Twenty-nine different messages can appear on the message display.

REDUNDANT CAPTIVE CONTACT SAFETY RELAYS—Redundant relays assure safety if an output relay should fail. The system utilizes safety relays which have force-guided contacts. This is a configuration where the contacts are mechanically locked together so that if one set of contacts weld, the other contacts cannot change state. If one should fail, the message display will identify which relay has faulted and what state the relay should be in (on/off).

SOLID STATE PUNCH PRESS/PRESS BRAKE CONTROLS—Incorporates “cross checking, self-checking, and diverse redundancy” to assure an ultra-safe design.

INTERRUPTED STROKE PROVISIONS WITH INDICATOR—If the punch press/press brake is in the “single stroke” or “continuous” mode and the press stops before the completion of a full stroke, the Interrupted Stroke Provision is activated. 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 automatically switches back to the original operational mode setting and the operator may resume normal production. The Interrupted Stroke Provision improves productivity and safety significantly by eliminating the need for the operator to make mode selection adjustments on interrupted strokes.

MICRO-INCH (OPTIONAL)—Controlled by keyed selector switch on/off on the control panel, Micro-Inch provides ram movement for a predetermined amount of time. Micro-Inch is actuated by the palm buttons and the amount of ram movement is controlled by a Micro-Inch timer inside the control panel. Micro-Inch also indexes the ram in increments that eases set-up in high speed or short stroke press operations.

AUTOMATIC EXTERNAL TRIP (OPTIONAL)—Controlled by a keyed selector switch (on/off) on the control panel. This option enables a punch press/press brake to be cycled by a signal from a robot or feeding device one stroke at a time.
Punch Press Controls

Part Revolution Air Clutch/Brake Controls

Board Only Clutch/Brake System
Part #SSM-05

The Board Only Clutch/Brake Module (Part #SSM-05). The diverse redundant clutch/brake punch press control module with a quickview (remote panel mount) message display (available in English or Spanish). Please see the in-depth design criteria and system description writing available on preceding page (F1).

Part #SSM-05 includes:
• Master Board
• Slave Board
• Power Supply Board
• Quickview Diagnostic Message Display
• Connecting Cables
• Cover/Hardware
• Software (Master) microprocessor
• Software (Slave) microprocessor

Short Stack
Part #SSM-10

The Short Stack Module (Part #SSM-10) is Small in Size -- Big in Safety and Control. The diverse redundant clutch/brake punch press control module with a quickview (remote panel mount) message display (available in English or Spanish). Please see the in-depth design criteria and system description writing available on preceding page (F1).

Part #SSM-10 includes:
• Control reliable diverse redundant control module
• Quickview Diagnostic Message Display
• Fused transformer
• Control module pre-wired to terminal strip
• Pressure clamp terminal strip
• Mounted on a 17” (432mm) x 18” (457mm) backplate
• Wiring diagram and complete installation instructions supplied
• Modes of operation
  - off – inch – single – continuous
  - Continuous ARM
  - Top stop
  - Anti-tie down and anti-repeat
  - System start/stop functions
  - SPM Range - 1 to 500
  - Control reliable design
  - Interrupted stroke provision with indicator
  - Inch mode monitoring
• Control module provides anti-tie down and concurrency function for up to four sets of operator stations
• Light curtain mute-out on upstroke standard
• Clutch/brake module designed to fit into tight spaces. Printed circuit board dimensions; only 6.5” (165mm) x 5” (127mm) x 4” (102mm) including standoff.
• Control systems are captively designed, manufactured, and supported by Triad Controls.
• Self-contained plain English message display
• Self-diagnostic system
• The control module monitors the signals and circuits as specified by OSHA and ANSI standards
• Control incorporates dual logic power supplies
• Two-year warranty on control module
The Short Stack Plus (Part #SSM-20) encompasses all of the features and components of Part #SSM-10 plus all of the following switches, legend plates, push buttons, and indicator lights for easy mounting into your existing control panel.

Part #SSM-20 includes:

Keyed selector switches and legend plates for:
- Hand/foot mode
- Off/inch/single/continuous

Push buttons and legend plates for:
- System start
- System stop
- Automatic continuous set-up

Indicators and legend plates for:
- System on
- Ground fault
- Brake monitor
- Interrupted stroke provision

The Model 3200 SS (Solid State) Control System is completely prewired and ready for installation. System supplied complete with a well marked terminal strip for easy, safe, and accurate electrical interface to the various punch press components. Due to the hybrid design characteristics of the 3200 SS, a main power disconnect switch and magnetic motor starters can be supplied in the same control panel.

Customer to specify operator control location (photo displays operator controls on panel door).

Page F-8 provides a step by step format for designing the control exactly how you want it.

- **NEMA 12 Enclosure**
- **System Start** Guarded Push Button (Air and Power Interlock)
- **System Stop** Unguarded Push Button
- **System On** Indicator Light
- **Message Display** Plain English messages for status and system self-diagnostics
- **Interrupted Stroke Provision with Indicator** Described on page F1.
- **Automatic Continuous Set Up Push Button** This prior action push button must be operated to set-up the press for continuous operation. Once depressed, the operator has a preset length of time in which to depress both palm buttons concurrently to initiate operation in the continuous mode.
- **Brake Monitor–Top Stop Indicator** Oil tight light to detect top stop overrun and is tied into the rotary cam to give an electro-mechanical brake monitoring system. Time-based brake monitoring optional.
- **Ground Fault Detector** Oil tight push to test type wired to continuously monitor press grounding whenever control power is on.
- **Continuous Arm Timer Fused Secondary Pressure Clamp Terminals**
- **Hand/Foot Mode** Two position keyed selector for hand or foot mode initiation.
- **Transformer** To reduce voltage from 480/240VAC to 120VAC secondary. Consult factory for 208 or 550 volt system.
- **Keyed Mode Selector Off-Inch-Single-Continuous** Four position keyed lock selector switch for supervised selection of mode of operation of the press. When in the inch mode, the operator cannot hold or tie one run button down and use the other button to inch the press with one hand operation. Both buttons must be depressed concurrently. Micro-Inching and Automatic External Trip optional.
- **LED Diagnostics** Punch press components and system diagnostics with LED Indicator Lights are on printed circuit boards for all inputs and outputs.
Part Revolution Air Clutch/Brake Controls

(continued)

Control Package 1500 SS

Incorporates all the requirements of OSHA for control reliability and component monitoring. Also includes component and system diagnostics with indicator lights for total press monitoring. Complies with section 1910.217 of the Federal Register.

When foot actuation is used, a method of guarding the point of operation must be provided. Several methods are available in this catalog.

Refer to pages A-1 through A-31.

Control Package 1500 SS includes the following:

Dual Solenoid Valve
No. 303 The L-G monitor contains a pressure controlled spool in an assembly mounted between the pilot and valve body assemblies. Pressure signals are applied to each end of the monitor spool. If these signals differ by more than a built-in design limit, they cause the spool to shift to a latched position. The spool movement causes the pilots to be exhausted and pilot supply air to be vented to the atmosphere, thus rendering the valve inoperable. The monitor must be reset by unlatching the spool before another valve cycle can be initiated.

Rotary Cam Switch with Drive Check
No. 310A This NEMA 1 rotary switch provides limit switch functions required by control system. Spring-loaded mounting absorbs shock and will stop the press should the drive chain break. Cams are easily adjusted with tool provided.

Heavy Duty Pressure switch
No. 306 This NEMA 12 oil-tight and dust-tight switch is adjustable from 1 to 115 PSI.

Operator Station
No. UL-501
Two UltraTouch modules mounted on a NEMA 12 operator station run bar with a red mushroom emergency stop button located in the center and a yellow mushroom top stop button located off center. This style assembly is ideal for the metal stamping/metal fabrication industry. All the modules are mounted in accordance to OSHA, ANSI, and CSA standards in regards to run button spacing.

Filter Regulator Lubricator
No. 311

Features
- Model 3200 SS Control Panel
- Expandable
- Brake Monitor
- Two Hand Anti-Tie Down
- System Control Reliability
- Single Stroke
- Self-diagnostic system
- Self-contained message display for system status & diagnostics
- Non-Resumption of interrupted stroke
- Provisions for Auxiliary Equipment
- PSDI Presence Sensing Device Initiation (see below)

Two-Year Warranty
The Ultimate is the most feature intensive air clutch punch press control available. The control conforms to all current OSHA and ANSI standards for control reliability and component monitoring. The system incorporates the Triad PressCam 8 for complete punch press synchronization and flexibility for all peripheral punch press signaling needs such as feeds, die protection, lubrication, blowoffs, etc. All of the electrical timing adjustments for the complete press operation are done at the floor level by the operator. The PressCam 8 system also has a large job memory of 75. This gives the control the ability to remember 75 complete different jobs or die set-ups at the press. The memory concept at the press is an excellent feature due to the tremendous time saved during setups of various operations. Additional time is saved by being able to adjust or “fine tune” the stamping process while the press is running, which is an aid in maximizing press utilization. Detailed isolated product information on both the PressCam 8 and the 3200 SS control system can be seen on the preceding pages of this catalog.

Standard Features

- Control Panel 3200 (page F3) conforms to all current OSHA and ANSI standards.
- Eleven cam programmable limit switch.
- Dual redundant outputs for all faults such as brake monitor, motion detector, etc.
- Built-in motion detector with fast response and dual speed limits.
- Brake Monitor - Time-based brake monitor with a digital display of both the brake stopping time and the brake fault limit setpoints in milliseconds. System also displays a brake fault when stopping times are exceeded.
- Refer to Pages E-8 through E-17 for specifics on the PressCam 8.
- Built-in tachometer (SPM) and crank shaft angle in degrees with simultaneous digital display.
- Four built-in counters: stroke, batch, quality, and part.
- Built-in timers, adjustable from 1 ms to 10 seconds.
- Sixteen station die protection system (self-contained cyclic functions and two static functions) built-in with separate timing windows for each station based on the absolute position of the crankshaft. All the die protection timing windows are retained in the memory until the next time a particular die is set-up and run. Die protection timing windows can also be adjusted while the press is in motion.
- All the functions of the system that are timed or signalled through the PressCam 8 system can be retained in memory for 75 different die set-ups.
- All the operator timing adjustments are done at the floor level which eliminates the need for electricians to adjust rotary cam switches and microswitches.
- System self-diagnostics.
- Program security from tampering:
  1. Keyed selector switch for supervisory control
  2. Authorized code for program entry
- Accuracy ± 1° for all timing circuits and can be “fine tuned” while the press is cycling.
- Eases the timing of all types of feeding equipment, AC and DC servo feeds, and air feeds.
- Very easy to program and use.
- System designed specifically for the metal stamping/metal forming industry.
- Main power disconnect and magnetic motor starters can be housed in the same control panel.
- Tonnage monitoring optional.
Punch Press Controls

Part Revolution Air Clutch/Brake Controls
(continued)

Model 3200 RL Control System

The Model 3200 RL (Relay Logic) Control System is completely prewired and ready for installation and complies with current OSHA Standard 1910.217 of the Federal Register and ANSI Standard B11.1-1988. System comes complete with a well marked terminal strip for easy, safe, and accurate electrical interface to the various punch press components. The control panel can also be supplied with a main power disconnect switch and magnetic motor starters mounted in the same control panel.

Features of the Model 3200 RL Control System include:

• Ground Fault Detector Oil tight push to test indicator is wired to continuously monitor press grounding whenever control power is on.

• System Start Guarded Push Button (Air and Power Interlock)

• System Stop Unguarded Push Button

• System On Indicator Light

• Automatic Continuous Set Up Push Button This prior action push button must be operated to set-up the press for continuous operation. Once depressed, the operator has a preset length of time in which to depress both palm buttons concurrently to initiate operation in the continuous mode.

• NEMA 12 Enclosure

• Brake Monitor Top Stop Indicator Oil tight light to detect top stop overrun and is tied into the rotary cam to give an electromechanical brake monitoring system.

• Hand/Foot Mode Two position keyed selector for hand or foot mode initiation.

• Keyed Mode Selector Off-Inch-Single-Continuous Four position keyed lock selector switch for supervised selection of mode of operation of the press. When in the inch mode, the operator cannot hold or tie one run button down and use the other button to inch the press with one hand operation. Both buttons must be depressed concurrently. Micro-Inching optional.

• Transformer To reduce voltage from 480/240VAC to 120VAC secondary. Consult factory for 208 or 550VAC.

• Continuous Arm Timer Fused Secondary Pressure Clamp Terminals

• Heavy Duty Relay Logic Circuit with special contact construction for self-checking circuits.
Control Package 1500 RL is an electro-mechanical relay system (refer to Page F-4 if solid state control is desired) and incorporates all the requirements of OSHA for control reliability and components monitoring. Section 1910.217 of Federal Register and ANSI B11.1-1988.

When foot actuation is used, a method of guarding the point of operation must be provided. Refer to Pages A-1 through A-31. **Control Package 1500 RL** includes the following components:

**Dual Solenoid Valve No. 303**
The L-G monitor contains a pressure controlled spool in an assembly mounted between the pilot and valve body assemblies. Pressure signals are applied to each end of the monitor spool. If these signals differ by more than a built-in design limit, they cause the spool to shift to a latched position. The spool movement causes the pilots to be exhausted and pilot supply air to be vented to the atmosphere, thus rendering the valve inoperable. The monitor must be reset by unlatching the spool before another valve cycle can be initiated.

**Rotary Cam Switch with Drive Check No. 310A**
This NEMA 1 rotary switch provides limit switch functions required by the control system. Spring-loaded mounting absorbs shock and will stop the press should the drive chain break. Cams are easily adjusted with tool provided.

**Heavy Duty Pressure Switch No. 306**
This NEMA 12 oil-tight and dust-tight switch is adjustable from 1 to 115 PSI.

**Operator Station No. UL-501**
Two UltraTouch modules mounted on a NEMA 12 operator station run bar with a red mushroom emergency stop button located in the center and a yellow mushroom top stop button located off center. This style assembly is ideal for the metal stamping/metal fabrication industry. All the modules are mounted in accordance to OSHA, ANSI and CSA standards in regards to run button spacing.

**Filter Regulator Lubricator No. 311**

**Features**
- Top Stop Brake Monitoring
- Two Hand Anti-Tie Down
- System Control Reliability
- Single Stroke
- Non-Resumption of Interrupted Stroke
- Provisions for Auxiliary Equipment
- PSDI (Presence Sensing Device Initiation) (see Operator Station No. UL-501, Page C-7)

**Additional Options Available**
- Magnetic Motor Starters
  - Motor H.P. _____ Rev. or Non-Rev. _____
  - Voltage ______ Full Load Amps ______
- Main Power Fused Electrical Disconnect Switch
- Triad PressCam 8 - Programmable Limit/Cam Switch. Replaces standard Rotary Cam Switch. See Pages E-8 through E-17. Photo of PressCam 8 mounted in control panel can be seen on Page F-5.
- Model BM-1600 Time-based brake monitor. Refer to Pages D-1 through D-3 for specifications.
- Light curtain interface required if light curtain is used
- Additional operator stations
- Operator Station Pedestal Mounts
- Indicator Lights
- Counters
- Special Switch Locations
- Micro-Inching option - Explained on Page F-1.
- Specify any additional options desired but not shown
OEM & Rebuilder Clutch/Brake Controls [please provide quantity next to desired package(s)]

- Board Only Clutch/Brake System (SSM-05)
  Specifications on Page F-2.
- Short Stack (SSM-10)
  Specifications on Page F-2.
- Short Stack Plus (SSM-20)
  Specifications on Page F-3.
- Model 3200 SS (solid state) Control System
  Specifications on Page F-3.

Customized Control Panel Options (using Model 3200 SS Control System as a base) (See Page F-3 for the description of Model 3200). Please provide quantity next to desired option(s).

- Fused Main Power Disconnect
  mounted on control panel _________ AMP.
- Main Motor Magnetic Motor Starter
  Rev or Non-Rev ______ HP ______ Full Load Amps ______
  Includes on/off push buttons and keyed selector switch forward/reverse when applicable.
  Please circle one: IEC or NEMA style
- Ram Adjust Magnetic Motor Starter
  Rev _______ HP _______ Full Load Amps ______
  Includes up/down push buttons and keyed selector switch forward/reverse when applicable.
  Please circle one: IEC or NEMA style
- Accessory Magnetic Motor Starter
  Rev or Non-Rev _____ HP _____ Full Load Amps ______
  Includes on/off push buttons and keyed selector switch forward/reverse when applicable.
  Please circle one: IEC or NEMA style
- Time-Based Brake Monitor
  Specifications on Pages D-1 through D-3.
- Micro-Inching Feature
  Described on Page F-1.
- Automatic External Trip
  Described on Page F-1
- Light Curtain Interface
  Keyed selector switch on/off mounted on control panel for light curtain.
- Multiple Operator Stations Control
  Keyed selector switch on/off mounted on control panel to turn additional operator stations on/off.
- Bar Turnover Function
  Permits manual rotation of the flywheel with the clutch engaged for die setting. Controlled by keyswitch on/off.

- Open Space Inside Control Panel
  For mounting additional customer supplied components. Specify desired space: _______" x _______".
- Remote Master Control Station
  Operator keyed selector switches, indicators and start/stop button controls to be mounted in a remote location off of main control panel in a separate NEMA 12 enclosure.
- PressCam 8 - The Ultimate Control
  Specifications on Pages E-8 through E-17. Replaces rotary cam switch.
- PressCam 8 Junior
  Specifications on Pages E-2 through E-7. Replaces rotary cam switch.
- Console Mounted Controls
  Consult factory for specifics.
- Die Block Receptacle Outlet
  Female receptacle for an electrical interlock on a die block.
- 110VAC Outlet
  Panel mounted 110VAC outlet for powering lights, press auxiliary equipment etc.
- Shutdown Timer
  Automatically shuts off the punch press when not in use. Length of time is customer adjustable.
- Counter
  Resettable five digit numerical counter mounted on control panel.
- Electro-Mechanical Relay Logic Control System
  Model 3200 RL Control System. Description on Page F-6.
- Additional Options
  Specify any option desired but not listed.
Operational Description - Package #130
The Mute-Out Package #130 has been designed to allow the SuperLight VI or VII infrared light curtain to be muted out or bypassed during the non-hazardous portion of the machine cycle. The mute-out function is actuated by the No. 301 limit switch and the No. 300 adjustable calibrated switch actuator when the die is within 1/4" (6.35mm) of the pinch point and continues until the ram returns to top stop. At this point the infrared light curtain reactivates and gives protection during the hazardous portion of the downstroke.

Punch Presses - Reference Package #130 PP
Package #130PP enhances productivity on punch presses because parts can be loaded or unloaded during the non-hazardous upstroke or to be used when parts are ejected through the light curtain on the upstroke. Always submit machine electrical schematics to assure proper point of interface. Specify air clutch or hydraulic machine application.

Press Brakes - Reference Package #130 PB
Package #130PB interfaces directly on air clutch and hydraulic press brakes when these machines have control reliability and component monitoring. The mute out function is activated by the calibrated switch actuator No. 300 and gives the operator the capability to work with small parts and workpieces that have flanges. Always submit machine electrical schematics to assure proper point of interface. Specify air clutch or hydraulic machine application. Add suffix AC for air clutch press brake or suffix HV for hydraulic press brake.

Select-O-Stop (Option for Package #130PB)
Select-O-Stop is an option for Package #130PB. Select-O-Stop is a keyed function (on/off) that is activated by the calibrated switch actuator mounted on the side of the ram. Select-O-Stop will allow the operator to bring the ram down at a fast speed to a preset position which is 1/4" (6.35mm) above the material to be formed. At this point the ram will stop and then the light curtain mute out will begin. The Select-O-Stop function is ideal for small part forming or realignment of the work piece. Add suffix SOS to Package #130PB for this feature.
How the Floating Blank Works:
The Triad Floating Blank light curtain provides the flexibility necessary to effectively guard all types of power press brakes. The Floating Blank permits work pieces to be formed vertically or horizontally through the guarded area without shutting the machine down. Entry into the protected area by the operator or passerby will prevent the start or, if the machine is in motion, will provide a signal to stop the machine.

While other safety devices must be altered to allow materials to be fed through, the Floating Blank is controlled by a keyed selector switch that will allow a work opening of 8 cm based on 2 cm increments. Blanking adjustments required when die heights change are not necessary. The Floating Blank automatically adjusts to the various feed positions providing production with protection. The Floating Blank light curtain adapts to mechanical, air clutch, and hydraulic press brakes.

Refer to Pages H-2 through H-15 for proper press brake controls.
Refer to pages A-14 through A-31 for complete SuperLight VI and VII specifications.
Introduction - Due to the interaction required between the operator, workpiece, and the point of operation, press brake guarding requires versatility with both the press brake control system along with flexibility in the point of operation guarding device. Production can be had with the protection only when the guards and controls put on a machine are properly designed to match the operational procedures your shop may dictate; may it be a short run multiple die change job shop to the needs of a high volume long run production shop. The following packages incorporate features and functions to address the many needs of the industry based on our many years of experience in the metal stamping and metal forming industries.

OSHA & ANSI Standards:
OSHA (Occupational Safety & Health Act) - Federal Register Sub-Part O, 1910.212.

<table>
<thead>
<tr>
<th>Press Brake Classification</th>
<th>SELECT ONE Press Brake Control Options</th>
<th>SELECT ONE Point of Operation Guarding Options</th>
</tr>
</thead>
</table>
| Mechanical Partial revolution clutch-mechanical friction-currently uses mechanical pedal to actuate press brake | Package #2100 - Converts to electric foot switch and incorporates automatic slow forming. When optional ram indexing modes are added, system is excellent for the high production shop. Updates controls for control reliability and component monitoring. Refer to Pages H-3 through H-4 for details. | **Package #1** - Retains current mechanical foot treadle to retain operator feel for slow forming. Excellent for brakes working in the top end of the tonnage spectrum. Updates controls for control reliability and component monitoring. Refer to Pages H-5 through H-6 for details.  
**Package #2101** - Incorporates the two-hand/foot method of press brake control. Works well for the low volume job shop press brake. Updates the controls for control reliability and component monitoring. Refer to Pages H-7 through H-8 for details.  
**Package #2110** - Converts the mechanical press brake to electric foot switch and incorporates a single forming speed. This package is used for press brakes used as punch presses. Updates the controls to meet current OSHA standards for control reliability and component monitoring. Refer to Pages H-9 through H-10 for details.  
**Package #2120** - Updates control to meet current OSHA standards for control reliability and component monitoring. Refer to Pages H-11 through H-12 for details.  
**Package #3122** - Updates control to meet current OSHA standards for control reliability and component monitoring. This control incorporates the two-hand/foot method of control and guarding. Refer to Pages H-13 through H-14 for details.  
**Package #130 PB Mute-Out** - When an air clutch press brake meets current standards for control reliability and component monitoring, package #130 PB interfaces directly with the existing controls to mute-out the infrared light guard on the non-hazardous portion of the stroke. Refer to Page G-1 for details.  
**Package #130 PB Mute-Out** - When a hydraulic press brake meets current standards for control reliability and component monitoring, package #130 PB interfaces directly with the existing controls to mute-out the infrared light guard on the non-hazardous portion of the stroke. Refer to Page G-1 for details.  
**Package #4101** - Gives the hydraulic press brake the two-hand/foot method of guarding the point of operation. Same operational description as packages #2101 or #3122. Submit schematic for proper point of interface. |

**Package #2100** - Converts to electric foot switch and incorporates automatic slow forming. When optional ram indexing modes are added, system is excellent for the high production shop. Updates controls for control reliability and component monitoring. Refer to Pages H-3 through H-4 for details.

**Package #1** - Retains current mechanical foot treadle to retain operator feel for slow forming. Excellent for brakes working in the top end of the tonnage spectrum. Updates controls for control reliability and component monitoring. Refer to Pages H-5 through H-6 for details.

**Package #2101** - Incorporates the two-hand/foot method of press brake control. Works well for the low volume job shop press brake. Updates the controls for control reliability and component monitoring. Refer to Pages H-7 through H-8 for details.

**Package #2110** - Converts the mechanical press brake to electric foot switch and incorporates a single forming speed. This package is used for press brakes used as punch presses. Updates the controls to meet current OSHA standards for control reliability and component monitoring. Refer to Pages H-9 through H-10 for details.

**Package #2120** - Updates control to meet current OSHA standards for control reliability and component monitoring. Refer to Pages H-11 through H-12 for details.

**Package #3122** - Updates control to meet current OSHA standards for control reliability and component monitoring. This control incorporates the two-hand/foot method of control and guarding. Refer to Pages H-13 through H-14 for details.

**Package #130 PB Mute-Out** - When an air clutch press brake meets current standards for control reliability and component monitoring, package #130 PB interfaces directly with the existing controls to mute-out the infrared light guard on the non-hazardous portion of the stroke. Refer to Page G-1 for details.

**Package #130 PB Mute-Out** - When a hydraulic press brake meets current standards for control reliability and component monitoring, package #130 PB interfaces directly with the existing controls to mute-out the infrared light guard on the non-hazardous portion of the stroke. Refer to Page G-1 for details.

**Package #4101** - Gives the hydraulic press brake the two-hand/foot method of guarding the point of operation. Same operational description as packages #2101 or #3122. Submit schematic for proper point of interface.
Press Brake Controls

Mechanical Press Brake Control with Automatic Slow Forming

**Package 2100**

Package 2100 incorporates single stroke function with Select-O-Stop and ram control functions. This converts mechanically actuated press brakes to electrical foot switch actuation and gives the press brake automatic slow forming capability. Excellent for the long run and small piece part production shop where uniform piece part forming is required. Meets current OSHA standards for control reliability and component monitoring and also incorporates brake monitoring.

Package 2100 includes the following:

**Model 3400 SS (Solid State) Control System**
- Control reliable design
- Diverse redundant design concept
- Quickview diagnostic message display
- Interrupted stroke provision
- System logic and component diagnostics
- Redundant captive contact safety relays
- Control incorporates cross-checking, self checking, and diverse redundancy
- Control transformer (reduces voltage from 480/260 to 120VAC)
- Power interlock
- NEMA 12 enclosure
- Brake monitor top stop indicator
- Ground fault indicator
- Keyed selector switch for two hand/foot mode of operation
- System on illuminated indicator light
- System start guarded push button
- System stop unguarded push button
- Keyed selector switch for Select-O-Stop Function on/off
- Control design writing (Page F-1)
- Incorporates light curtain mute-out
- Light curtain interface (optional)

No. UL-102 UltraTouch Modules (optional)
No. 300 Calibrated Switch Actuator (Activates Select-O-Stop)
No. 301 Limit Switches (four)
No. 302 Guarded Foot Switch
No. 303 Dual Solenoid Valve with Muffler
No. 305 Ram Control Cylinder Assembly
No. 306 Heavy Duty Pressure Switch
No. 311 Filter, Regulator, Lubricator

A proper point of operation guarding device is required when using the electric foot switch as the activating device. Refer to Pages A1 through A-31 for details.
Mechanical Press Brake Control with Automatic Slow Forming

Ram Control Cylinder Assembly—No. 305 (Press Brake Applications)
The Triad Ram Control incorporates a No. 305 ram control cylinder assembly into the Model 3400 control system to provide a slow speed feature on mechanically actuated, friction clutch press brakes. This allows the operator to automatically slow-form a part to prevent damage to the part and to prevent potential injury due to part "whipping up" during the forming. When equipped with the Triad Ram Control, the ram advances to a predetermined position above the work with the clutch fully engaged (fast down). At this point, the ram will stop, allowing for realignment of the part before forming. The foot switch is then actuated a second time and the ram will advance slowly, forming the part and then return to the top of the stroke at a high speed (fast return). The Ram Control can be adjusted to provide the best speed for the part being formed.

Automatic Ram Cycling and Indexing Options
Auto Cycle — All systems are designed for single stroke only. Auto Cycle allows the press to continue past top stop as long as the operator has maintained foot pedal contact and stops at the Select-O-Stop position. AutoCycle may only be used with a light curtain, which will prevent the press from continuing past top stop, if the operator has his/her hand in the die area when the press reaches top stroke. Excellent for the production of small parts on press brakes and workpieces with flanges.
Auto Retrip — When Select-O-Stop has been turned on, the press will automatically stop at a preset point, which is normally set just above the piece part to be formed. The operator then has to release the pedal and depress it to continue the forming cycle. The Auto Retrip function will automatically restart the press at that point, as long as the operator maintains foot pedal contact. Excellent for large sheet forming.
Auto Form — While controlling the forming speed of a piece part, it sometimes is necessary to fully engage the clutch, just prior to the bottom of the stroke, to obtain a desired radius with the die being used. Auto Form will bypass the feed cylinder at that point, allowing full engagement of the clutch and preventing the possibility of a stall at the bottom of the stroke. Excellent for top end tonnage forming on press brakes.
Auto Return — Press will automatically return to top of stroke after piece part has been formed (requires additional limit switch). This feature enhances ram cycling.

Select-O-Stop function is activated by the calibrated switch actuator which is mounted on the side of the ram. Select-O-Stop allows the operator to bring the ram down to a preset position which is 1/4" (6.35mm) above the material being formed and will automatically stop the ram. This gives the operator the opportunity to realign the work piece and then slow form the workpiece if desired. Select-O-Stop is a keyed function on/off on the main control panel.

Light Curtain Mute-Out automatically bypasses light curtain when die has reached piece part and point of operation hazard no longer exists. Light curtain is automatically reactivated when press reaches top of stroke to prevent operator from being in point of operation during the hazardous downstroke of the press. This feature is only used when a light curtain is used as the point of operation guarding device.

Ordering Procedure (Package 2100)

- Manufacturer of Press Brake _________________ Model _______________ Serial #_________
- Bed Length ___________
- Voltage ___________ Cycle _________________ Phase ________________

OPTIONS
- Electro-mechanical relay system (RL) instead of solid state (SS) control. Photo on Page F-6.
- Motor H.P. if magnetic starter desired (Main Motor) ___ Full Load Amps ___ Rev. or Non-Rev.
- Motor H.P. if magnetic starter desired (Ram Motor) ____ Full Load Amps ___ Rev. or Non-Rev.
- Main Power fused electrical disconnect switch --- Yes ____ No _____
- Rotary cam, sprockets, and chain to replace two limit switches

PRODUCTION FUNCTIONS DESIRED
- Auto Cycle is a keyed function on control panel on/off (can only be used with a light curtain)
- Auto Retrip is a keyed function on control panel on/off
- Auto Form is a keyed function on control panel on/off
- Auto Return is a keyed function on control panel on/off (requires additional limit switch)
- SuperLight VI or VII infrared light curtain model _________________ (requires light curtain interface on control panel if light curtain is used)
- Light Curtain Mounting Brackets
  - Model 8000 Pedestal Mounts. Refer to Page I-2 for details.
  - Model 9000 Swing Mounting Brackets. Refer to Page I-2 for details.
- Model BM-1600 Time-Based Brake Monitor. Refer to Page D1 through D3 for details.
- Specify any additional options desired but not shown.

H-4
Press Brake Controls

Mechanical Press Brake Guarding
Retains Mechanical Pedal to Slow Form Parts and to Retain Operator Feel for Forming

Package 1

Package 1 was designed to retain the existing mechanical foot pedal for machine actuation in conjunction with the use of a SuperLight VI or VII Floating Blank infrared light curtain as the point of operation guard. Excellent for the long run and where versatility is needed during the forming cycle. Meets current OSHA standards for control reliability and component monitoring and also incorporates brake monitoring.

Package 1 includes the following:

Model 3400 SS (Solid State) Control System
- Control reliable design
- Diverse redundant design concept
- Quickview diagnostic message display
- Interrupted stroke provision
- System logic and component diagnostics
- Redundant captive contact safety relays
- Control incorporates cross-checking, self checking, and diverse redundancy
- Control transformer (reduces voltage from 480/260 to 120VAC)
- Power interlock
- NEMA 12 enclosure
- Brake monitor top stop indicator
- Ground fault indicator
- System on illuminated indicator light
- System start guarded push button
- System stop unguarded push button
- Keyed selector switch for Select-O-Stop Function on/off
- Control design writing (Page F-1)
- Incorporates light curtain mute-out
- Light curtain interface

No. 300 Calibrated Switch Actuator (Activates Select-O-Stop)
No. 301 Limit Switches (five)
No. 303 Dual Solenoid Valve with Muffler
No. 304 Air Cylinder Assembly
No. 306 Heavy Duty Pressure Switch
No. 311 Filter, Regulator, Lubricator

A proper point of operation guarding device is required when using the mechanical foot pedal as the press brake actuating device. Refer to Pages A1 through A31 for proper guarding device specifications.
Press Brake Controls

Mechanical Press Brake Guarding
Retains Mechanical Pedal to Slow Form Parts and to Retain Operator Feel for Forming

**Package 1** allows an operator to engage and disengage the mechanical friction clutch on a mechanical press brake with the existing mechanical pedal. The light curtain is activated at the top of the stroke (Top Stop) when the operator depresses the mechanical foot treadle and the ram begins its downward travel. This is the hazardous portion of the stroke. The light curtain stays on and the machine cycles until the light curtain is interrupted by the operator or passerby. When interrupted, the solenoid valve is de-energized and the air is dumped from the air cylinder causing the press brake to stop and the mechanical foot pedal to fall to the floor. When the interruption is cleared, the SuperLight VI or VII light curtain automatically resets and the foot pedal gently rises to continue the machine cycle. The operator has total control on the machine cycling speed and the forming speed, (slow-forming) as they currently do by retaining the mechanical pedal as the actuating device.

This system is excellent for the press brake that is working at the top end of the tonnage spectrum and that works with a wide range of products and where the operator must have control of the forming speed.

**Select-O-Stop** function is activated by the calibrated switch actuator which is mounted on the side of the ram. Select-O-Stop allows the operator to bring the ram down to a preset position which is 1/4” (6.35mm) above the material being formed and will automatically stop the ram. This gives the operator the opportunity to realign the work piece and then slow form the work piece if desired. Select-O-Stop is a keyed function on/off on the main control panel.

**Automatic Ram Cycling**
(Package 1 is designed for single stroke only)
*Auto Cycle* allows the press to continue past top stop as long as the operator has maintained foot pedal contact and stop at the Select-O-Stop position. Auto Cycle may only be used with a light curtain, which will prevent the press from continuing past top stop, if the operator has his/her hand in the die area when the press reaches top of stroke. Auto-Cycle is controlled by a keyed selector switch on the control panel, on/off. Excellent for small part production and workpieces with flanges.

**Light Curtain Mute-Out** Automatically bypasses light curtain when die has reached piece part and point of operation hazard no longer exists. Light curtain is automatically reactivated when press reaches top of stroke to prevent operator from being in point of operation during the hazardous down stroke of the press. Light curtain mute-out is only supplied when a light curtain is used as the point of operation guarding device.

---

**Package 1 Ordering Procedure**

- Manufacturer of Press Brake ___________________ Model __________ Serial #___________
  
  Bed Length ______________

- Voltage ___________Cycle _________________ Phase ________________

**OPTIONS**

- Electro-mechanical relay system (RL) instead of solid state (SS) control. Photo on Page F-6.
- SuperLight VI or VII Floating Blank infrared light curtain model. Refer to Pages A21 through A31 for selecting model (requires light curtain interface on control panel when light curtain is used).
- Light curtain Mounting Bracket
- Model 8000 Pedestal Mounts. Refer to Page I-2 for details.
- Model 9000 Swing Mounting Brackets. Refer to Page I-2 for details.
- Motor H.P. if magnetic starter desired (Main Motor) ____ Full Load Amps ____ Rev. or Non-Rev.
- Motor H.P. if magnetic starter desired (Ram Motor) ____ Full Load Amps ____ Rev. or Non-Rev.
- Main Power fused electrical disconnect switch --- Yes ____ No ____
- Rotary cam, sprockets, and chain to replace two limit switches
- Model BM-1600 Time Based Brake Monitor. Refer to Pages D-1 through D-3 for specifications.
- Auto Cycle is a keyed function on the control panel on/off (can only be used with a light curtain)
- Specify any additional options desired but not shown
Mechanical Press Brake Guarding
Two-Hand/Foot Method of Guarding and Machine Control

Package 2101

Package 2101 is for converting mechanical press brakes currently being actuated by a mechanical treadle.

This system provides a two-hand/foot method of guarding and machine control which converts the press to electric foot pedal operation. System has single stroke and is foot actuated with Select-O-Stop and automatic ram control. Excellent for the job shop for the versatility needed in short runs.

Meets current OSHA standards for control reliability and component monitoring and also incorporates brake monitoring.

Package 2101 includes the following:

Model 3400 SS (Solid State) Control System
- Control reliable design
- Diverse redundant design concept
- Quickview diagnostic message display
- Interrupted stroke provision
- System logic and component diagnostics
- Redundant captive contact safety relays
- Control incorporates cross-checking, self checking, and diverse redundancy
- Control transformer (reduces voltage from 480/260 to 120VAC)
- Power interlock
- NEMA 12 enclosure
- Brake monitor top stop indicator
- Ground fault indicator
- Keyed selector switch for two hand/foot method of guarding and machine control (optional)
- System on illuminated indicator light
- System start guarded push button
- System stop unguarded push button
- Keyed selector switch for Select-O-Stop Function on/off
- Control design writing (Page F-1)

No. UL-102 UltraTouch Modules (two)
No. 300 Calibrated Switch Actuator (Activates Select-O-Stop)
No. 301 Limit Switches (four)
No. 302 Guarded Foot Switch
No. 303 Dual Solenoid Valve with Muffler
No. 305 Ram Control Cylinder Assembly
No. 306 Heavy Duty Pressure Switch
No. 311 Filter, Regulator, Lubricator
Press Brake Controls

Mechanical Press Brake Guarding
Two-Hand/Foot Method of Guarding and Machine Control

Two-Hand, Foot Control
The two-hand/foot method of guarding and machine control of press brake operation is unique in that it provides point of operation guarding, yet allows operator to form the part without interference from a guard. Unlike some systems, no additional setup time is required.

When the press stops at the top of the stroke, the foot switch is automatically deactivated, requiring the operator to use the palm buttons once again to bring the ram down to its preset position.

If the operator does not need to hold the part at any time during the stroke, the keyed selector switch may be turned to “hand only.” Use of the hand buttons only enables the operator to cycle the press through one complete stroke without stopping. Similar to punch press work.

The press may be jogged at any time but will stop when either the palm buttons or foot pedal is released.

Many safety devices are bypassed for setup purposes. However, this system is ideal for setup since the operator must use the two-hand/foot method for setup as well as production. At the same time, it will not create any additional problems during set up.

Operational Description

• Operator depresses the two run buttons and initiates the press brake stroke.
• Operator must hold the buttons down and the ram descends at fast speed down to the 1/4” (6.35mm) position above the workpiece. If the operator releases one or both run buttons, the ram will stop automatically. If the control panel is keyed to “hand only,” the ram will make one complete stroke. This is helpful if the press brake is used for punching, piercing, notching, or blanking.
• Select-O-Stop automatically stops ram 1/4” (6.35mm) above the workpiece.
• If the workpiece is not already in die, it may be inserted at this time.
• The two-hand control or the foot switch is now re-initiated and the press brake slow forms the workpiece and then returns to top stop at high speed. The press brake is then ready for the next stroke.

Ram Control Cylinder Assembly–No. 305 (Press Brake Applications) The Triad Ram Control incorporates a No. 305 ram control cylinder assembly into the Model 3400 control system to provide a slow speed feature on mechanically actuated, friction clutch press brakes. This allows the operator to automatically slow-form a part to prevent damage to the part and to prevent potential injury due to part "whipping up" during the forming. When equipped with the Triad Ram Control, the ram advances to a predetermined position above the work with the clutch fully engaged (fast down).

At this point, the ram will stop, allowing for realignment of the part before forming. The foot switch is then actuated a second time and the ram will advance slowly, forming the part and then return to the top of the stroke at a high speed (fast return). The Ram Control can be adjusted to provide the best speed for the part being formed.

Select-O-Stop is a keyed function that is activated by the calibrated switch actuator which is mounted on the side of the ram. Select-O-Stop allows the operator to bring the ram down in fast speed to a preset position which is 1/4” (6.35mm) above the material being formed and will automatically stop the ram. This gives the operator the opportunity to realign the work piece and then slow form the workpiece if desired. Select-O-Stop is a keyed function on/off on main control panel.

Package 2101 Ordering Procedure

• Manufacturer of Press Brake ____________ Model ____________ Serial #_______________
• Voltage ___________Cycle _________________ Phase ________________

OPTIONS:
• Electro--mechanical relay system (RL) instead of solid state (SS) control. Photo on Page F-6.
• Motor H.P. if magnetic starter desired (Main Motor) ____ Full Load Amps ____ Rev. or Non-Rev.
• Motor H.P. if magnetic starter desired (Ram Motor) ____ Full Load Amps ____ Rev. or Non-Rev.
• Main Power fused electrical disconnect switch --- Yes ____ No ____
• Rotary cam, sprockets, and chain to replace two limit switches
• Model BM-1600 Time-Based Brake Monitor. Refer to Pages D1 through D3 for specifications.
• Model 8500 pedestal mount for operator run buttons. Refer to Page I-2 for specifications.
• Additional run buttons for multiple press operators, keyed switch controlled
• Auto-Return function is a keyed function on control panel on/off (requires additional limit switch)
• Specify any additional options desired but not shown
Package 2110 Control converts mechanically actuated press brakes to electrical foot switch operation and gives the press brake single forming speed when used as a mechanical power press for punching, piercing, notching, or blanking operations. The control incorporates single stroke function with Select-O-Stop and utilizes an electric foot switch for machine actuation. Meets OSHA standards for control reliability and component monitoring and also incorporates brake monitoring.

Package 2110 includes the following:

**Model 3400 SS (Solid State) Control System**

- Control reliable design
- Diverse redundant design concept
- Quickview diagnostic message display
- Interrupted stroke provision
- System logic and component diagnostics
- Redundant captive contact safety relays
- Control incorporates cross-checking, self checking, and diverse redundancy
- Control transformer (reduces voltage from 480/260 to 120VAC)
- Power interlock
- NEMA 12 enclosure
- Brake monitor top stop indicator
- Ground fault indicator
- Keyed selector switch for two hand/foot method of guarding and machine control
- System on illuminated indicator light
- System start guarded push button
- System stop unguarded push button
- Keyed selector switch for Select-O-Stop Function on/off
- Control design writing (Page F-1)
- Incorporates light curtain mute-out
- Light curtain interface (optional)

No. UL-102 UltraTouch Modules (optional)
No. 300 Calibrated Switch Actuator (Activates Select-O-Stop)
No. 301 Limit Switches (four)
No. 302 Guarded Foot Switch
No. 303 Dual Solenoid Valve with Muffler
No. 304 Air Cylinder Assembly
No. 306 Heavy Duty Pressure Switch
No. 311 Filter, Regulator, Lubricator

A proper point of operation guarding device is required when using the electric foot switch as the activating device. Refer to SuperLight VI or VII Programmable Safety Light Curtain for proper guarding device specifications.
**Mechanical Press Brake Control When Used as Punch Press**

**Operational Description**

*Package 2110* allows the press brake to be operated as a partial revolution punch press. The controls meet all current standards for control reliability and component monitoring and also incorporates brake monitoring. The normal operating procedure is the same as a partial revolution punch press.

- Operator inserts workpiece into the die area
- Operator clears body parts from hazardous zone
- Operator initiates the ram cycle
- Ram cycles and stops at top stop
- Operator then removes workpiece from die area

**Automatic Ram Cycling and Indexing Options**

*Auto Cycle* — All systems are designed for single stroke only. Auto Cycle allows the press to continue past top stop as long as the operator has maintained foot pedal contact and stops at the Select-O-Stop position. Auto-Cycle may only be used with a light curtain, which will prevent the press from continuing past top stop, if the operator has his/her hand in the die area when the press reaches top stroke. Excellent for the production of small parts and workpieces with flanges.

*Auto Return* — Press will automatically return to top of stroke after piece part has been formed (requires additional limit switch). This feature enhances ram cycling.

*Select-O-Stop* function is activated by the calibrated switch actuator which is mounted on the side of the ram. Select-O-Stop allows the operator to bring the ram down to a preset position which is 1/4" (6.35mm) above the material being formed and will automatically stop the ram. This gives the operator the opportunity to realign the work piece and then slow form the workpiece if desired. Select-O-Stop is a keyed function on/off on the main control panel.

*Light Curtain Mute-Out* Automatically bypasses light curtain when die has reached piece part and point of operation hazard no longer exists. Light curtain is automatically reactivated when press reaches top of stroke to prevent operator from being in point of operation during the hazardous downstroke of the press. This feature is only used when the SuperLight VI or VII infrared light curtain is used as the point of operation guarding device.

---

**Package 2110 Ordering Procedure**

- Manufacturer of Press Brake _____________ Model ____________ Serial #__________ Bed Length ____________
- Voltage ___________Cycle _________________ Phase ________________

**OPTIONS**

- Electro--mechanical relay system (RL) instead of solid state (SS) control. Photo on Page F-6.
- Main Power fused electrical disconnect switch --- Yes ____ No ____
- Motor H.P. if magnetic starter desired (Main Motor) ___ Full Load Amps ___ Rev. or Non-Rev.
- Motor H.P. if magnetic starter desired (Ram Motor) ____ Full Load Amps ___ Rev. or Non-Rev.
- Rotary cam, sprockets, and chain to replace two limit switches

**PRODUCTION FUNCTIONS DESIRED**

- Model BM-1600 Time Based Brake Monitor. Refer to Pages D1 through D3 for specifications.
- Auto cycle is a keyed function on control panel on/off (can only be used with a light curtain)
- Auto return is a keyed function on control panel on/off (requires additional limit switch)
- Light curtain Model. Refer to Pages A1 through A31 (requires light curtain interface on control panel if light curtain is used)
- Light curtain Mounting Brackets
  - Model 9000 Swing Mounting Brackets. Refer to Page I-2 for specifications.
  - Model 8000 Pedestal Mounts. Refer to Page I-2 for specifications.
- Palm button actuation; operator station UL-401. Refer to Pag C-7.
- Specify any additional options desired but not shown
Press Brake Controls

Air Clutch Press Brake Controls
Updates Controls to Obtain Control Reliability

Package 2120

Package 2120 updates the controls on air clutch press brakes to meet current OSHA standards for control reliability and component monitoring and also incorporates brake monitoring.

Single-stroke, foot-actuated function with Select-O-Stop.

Package 2120 includes the following:

Model 3400 SS (Solid State) Control System
- Control reliable design
- Diverse redundant design concept
- Quickview diagnostic message display
- Interrupted stroke provision
- System logic and component diagnostics
- Redundant captive contact safety relays
- Control incorporates cross-checking, self checking, and diverse redundancy
- Control transformer (reduces voltage from 480/260 to 120VAC)
- Power interlock
- NEMA 12 enclosure
- Brake monitor top stop indicator
- Ground fault indicator
- Keyed selector switch for two-hand/foot method of guarding and machine control (optional)
- System on illuminated indicator light
- System start guarded push button
- System stop unguarded push button
- Keyed selector switch for Select-O-Stop Function on/off
- Control design writing (Page F-1)
- Incorporates light curtain mute-out
- Light curtain interface (optional)

No. UL-102 UltraTouch Modules (optional)
No. 300 Calibrated Switch Actuator (Activates Select-O-Stop)
No. 301 Limit Switches (four)
No. 302 Guarded Foot Switch
No. 303 Dual Solenoid Valve with Muffler
No. 306 Heavy Duty Pressure Switch
No. 311 Filter, Regulator, Lubricator

A proper point of operation guarding device is required when using the electric foot switch as the activating device. Refer to SuperLight VI or VII Safety Light Curtain for proper guarding device applications.
Press Brake Controls

Air Clutch Press Brake Controls
Updates Controls to Obtain Control Reliability

Package 2120 is designed for the air clutch press brake that requires the controls to be updated to meet current control reliability standards. The controls are designed to meet these standards for forming operations and also for air clutch press brakes which are used for punching, piercing, or notching operations. SuperLight VI or VII safety light curtains can be added to this control to obtain proper point of operation guarding. Refer to Pages A-1 through A-31.

Operational Description
- Operator depresses foot switch and ram descends at fast speed to Select-O-Stop position 1/4" (6.35mm) above the workpiece.
- Work piece is realigned or slow-forming mode of the press brake is actuated. At this time the point of operation guard is muted-out until ram returns to top stop position.
- This control is designed to retain current press brake functions and to incorporate control reliability and component monitoring.

Select-O-Stop is a keyed function that is activated by the calibrated switch actuator which is mounted on the side of the ram. Select-O-Stop allows the operator to bring the ram down in fast speed to a preset position which is 1/4" (6.35mm) above the material being formed and will automatically stop the ram. This gives the operator the opportunity to realign the work piece and then slow form the workpiece if desired. Select-O-Stop is a keyed function on/off on main control panel.

Automatic Ram Cycling and Indexing Options
Auto Cycle — All systems are designed for single stroke only. Auto Cycle allows the press to continue past top stop as long as the operator has maintained foot pedal contact and stops at the Select-O-Stop position. Auto Cycle may only be used with a light curtain, which will prevent the press from continuing past top stop, if the operator has his/her hand in the die area when the press reaches top stroke. Excellent for the production of small parts on press brakes and workpieces with flanges.
Auto Return — Press will automatically return to top of stroke after piece part has been formed (requires additional limit switch). This feature enhances ram cycling.

Light Curtain Mute-Out — Automatically bypasses light curtain when die has reached piece part and point of operation hazard no longer exists. Light curtain is automatically reactivated when press reaches top of stroke to prevent operator from being in point of operation during the hazardous downstroke of the press. Light curtain mute out only is supplied when a light curtain is used as the point of operation guarding device.

Package 2120 Ordering Procedure
- Manufacturer of Press Brake __________________ Model __________________ Serial # __________________
- Voltage ___________ Cycle _______________ Phase ________________ Specify: Single Speed Twin Speed
OPTIONS
- Electro--mechanical relay system (RL) instead of solid state (SS) control. Photo on Page F-6.
- Motor H.P. if magnetic starter desired (Main Motor) __ Full Load Amps ___ Rev. or Non-Rev.
- Motor H.P. if magnetic starter desired (Ram Motor) ____ Full Load Amps ___ Rev. or Non-Rev.
- Main Power fused electrical disconnect switch --- Yes ____ No ____
- Rotary cam, sprockets, and chain to replace two limit switches
- Model BM-1600 Time-Based Brake Monitor. Refer to Pages D1 through D3 for specifications.

PRODUCTION FUNCTIONS DESIRED:
- Auto Cycle is a keyed function on control panel on/off (can only be used with light curtain)
- Auto Return is a keyed function on control panel on/off (requires additional limit switch)

POINT OF OPERATION GUARD OPTIONS:
- SuperLight VI or VII infrared light curtain model. Refer to Pages A21 through A31 for selecting model (requires light curtain interface on control panel if light curtain is used)
- Light curtain mounting brackets
  - Model 8000 Pedestal Mounts. Refer to Page I-2 for specifications.
  - Model 9000 Swing Mounts. Refer to Page I-2 for specifications.
Air Clutch Press Brake Controls
Updates Controls to Obtain Control Reliability for Two-Hand/Foot Method of Guarding and Machine Control

**Package 3122**

Package 3122 updates the controls on air clutch press brakes to meet current OSHA standards for control reliability and component monitoring. It also incorporates the two-hand/foot method of guarding the point of operation. The control also incorporates brake monitoring.

Package 3122 includes the following:

**Model 3400 SS (Solid State) Control System**
- Control reliable design
- Diverse redundant design concept
- Quickview diagnostic message display
- Interrupted stroke provision
- System logic and component diagnostics
- Redundant captive contact safety relays
- Control incorporates cross-checking, self checking, and diverse redundancy
- Control transformer (reduces voltage from 480/260 to 120VAC)
- Power interlock
- NEMA 12 enclosure
- Brake monitor top stop indicator
- Ground fault indicator
- Keyed selector switch for two-hand/foot method of guarding and machine control (optional)
- System on illuminated indicator light
- System start guarded push button
- System stop unguarded push button
- Keyed selector switch for Select-O-Stop Function on/off
- Control design writing (Page F-1)

No. UL-102 UltraTouch Modules (two)
No. 300 Calibrated Switch Actuator (Activates Select-O-Stop)
No. 301 Limit Switches (four)
No. 302 Guarded Foot Switch
No. 303 Dual Solenoid Valve with Muffler
No. 306 Heavy Duty Pressure Switch
No. 311 Filter, Regulator, Lubricator

A proper point of operation guarding device is required when using the electric foot switch as the activating device. Refer to SuperLight VI or VII Safety Light Curtain for proper guarding device applications.
### Package 3122 Ordering Procedure

- **Manufacturer of Press Brake**: [Enter manufacturer name]
- **Model**: [Enter model number]
- **Serial #**: [Enter serial number]
- **Voltage**: [Enter voltage]
- **Cycle**: [Enter cycle]
- **Phase**: [Enter phase]

### OPTIONS

- Electro--mechanical relay system (RL) instead of solid state (SS) control. Photo on Page F-6.
- Motor H.P. if magnetic starter desired (Main Motor) ___ Full Load Amps ___ Rev. or Non-Rev.
- Motor H.P. if magnetic starter desired (Ram Motor) ___ Full Load Amps ___ Rev. or Non-Rev.
- Main Power fused electrical disconnect switch --- Yes ____ No ____
- Rotary cam, sprockets, and chain to replace two limit switches
- Model BM-1600 Time-Based Brake Monitor Description. Refer to Pages D-1 through D-3 for specifications.
- Model 8500 Pedestal mount for operator run buttons. Refer to Page I-2 for details.
- Additional run buttons for multiple press operators
- Auto-return function--Press will return to top of stroke after part has been formed (requires additional limit switch)
- Specify any additional options desired but not shown

### Two-Hand, Foot Control

The two-hand/foot method of press brake operation is unique in that it provides point of operation guarding, yet allows operator to form the part without interference from a guard. Unlike some systems, no additional setup time is required.

When the press stops at the top of the stroke, the foot switch is automatically deactivated, requiring the operator to use the palm buttons once again to bring the ram down to its preset position.

If the operator does not need to hold the part at any time during the stroke, the keyed selector switch may be turned to "hand only." Use of the hand buttons only enables the operator to cycle the press through one complete stroke without stopping. Similar to punch press work.

The press may be jogged at any time but will stop when either the palm buttons or foot pedal is released.

Many safety devices are bypassed for setup purposes. However, this system is ideal for setup since the operator must use the two-hand/foot method for setup as well as production. At the same time, it will not create any additional problems during set up.

### Operational Description

- Operator depresses the two run buttons and initiates the press brake stroke.
- Operator must hold the buttons down and the ram descends at fast speed down to the 1/4" (6.35m) position above the workpiece. If the operator releases one or both run buttons, the ram will stop automatically. If the control panel is keyed to "hand only," the ram will make one complete stroke. This is helpful if the press brake is used for punching, piercing, notching, or blanking.
- Select-O-Stop automatically stops ram 1/4" (6.35m) above the workpiece.
- If the workpiece is not already in die, it may be inserted at this time.
- The two-hand/foot method or the foot switch is now re-initiated and the press brake slow forms the workpiece and then returns to top stop at high speed. The press brake is then ready for the next stroke.

**Select-O-Stop** is a keyed function that is activated by the calibrated switch actuator which is mounted on the side of the ram. Select-O-Stop allows the operator to bring the ram down in fast speed to a preset position which is 1/4" (6.35m) above the material being formed and will automatically stop the ram. This gives the operator the opportunity to realign the work piece and then slow form the workpiece if desired. Select-O-Stop is a keyed function on/off on main control panel.

### Automatic Ram Cycling and Indexing Options

**Auto Return**—Press will automatically return to top of stroke after piece part has been formed (requires additional limit switch). This feature enhances ram cycling.
Press Brake Controls

Press Brake Classification
Air Clutch, Hydraulic, Hydro-Mechanical

These designs of press brakes usually incorporate twin forming speeds and are normally actuated by an electric foot switch. Due to their more recent date of manufacture, the controls normally have control reliability but verification of this should be done prior to machine guarding. If the controls meet current standards, the following is needed:

- Mute-Out Package #130 PB (see Page G-1)
- SuperLight VI or VII Safety Light Curtain (see Pages A-14 through A-31)
- Mounting Brackets for light curtain (see below)

NOTE: Always submit the machine electrical schematic to assure proper point of interface.

Pedestal Mounts
Painted OSHA yellow and made of heavy angle construction. Both models are supplied with a floor mounting plate that can be lagged to the floor.

Model 8000: used to mount cornering mirrors or safety light curtains off of a machine.

Model 8500: used to mount an operator station or palm buttons off of a machine and includes a top plate for mounting.

Swing Mount Brackets

Model 9000: Excellent method of mounting light curtain for press brakes or when light curtain is to be moved for die set-ups or machine maintenance. Model 9000 consists of three 180 degree pivot points along with light curtain diagonal movement capability for virtually unlimited light curtain positioning. Model 9000 is a two-inch square tubing painted OSHA yellow which mounts directly onto the machine housing making it a heavy duty yet versatile mounting bracket.

B and C Dimensions are Required
1. Pivot Point (1) will rotate 90 degrees in either direction from position shown.
2. Pivot Point (2) will rotate 180 degrees to the right from position shown.
3. Pivot Point (3) will rotate 90 degrees in any direction from position shown.
4. Light curtain mounting plate is slotted to allow adjustment up or down.
Components for Punch Press & Press Brake Control Systems

**Automatic Ram Control Cylinder No. 305**
*(Press Brake Applications)*
Provides a slow speed feature on mechanically actuated, friction clutch press brakes allowing the operator to automatically slow-form a part preventing damage and potential injury due to part "whipping up" during the forming. When used, the ram advances to a predetermined position above the work with the clutch fully engaged (fast down). At this point, the ram will stop allowing for realignment of the part before forming. The foot switch is then actuated a second time and the ram will advance slowly forming the part and then return to the top of the stroke at a high speed (fast return). The Ram Control can be adjusted to provide the best speed for the part being formed.

**Dual Solenoid Valve No. 303**
A most important aspect of double valve design is the incorporation of two separate 3/2 normally closed valve elements which are interconnected within a common valve body assembly. Each of the two valve elements is operated by its own 3/2 normally closed solenoid pilot valve. When simultaneously energized, both main valve elements are operated simultaneously. The probability of both valve elements malfunctioning on the same cycle is extremely remote.

A mechanical power press or other hazardous machine using a pneumatically controlled clutch and brake mechanism should use a double valve with a self-contained monitoring device and/or external monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve. Of course, a double valve is just one of the components in a press control system and any other elements of the system should be planned with safety as a primary consideration.

**Air Cylinder Assembly No. 304**
A 1 1/2" (38mm) bore, 1" (25mm) stroke air cylinder, complete mounting bracket, and clevis.

**Electric Foot Pedal No. 302**
An oil-tight foot switch. Contains one set, normally-open contacts, and one set normally-closed contacts. Includes a treadle guard to protect against accidental tripping. "Requires a point of operation guard when used for machine actuation," such as safety light curtains or safety interlock systems.

**Calibrated Switch Actuator No. 300**
Used for all press brake guards for actuating Select-O-Stop.

**Filter, Regulator, Lubricator No. 311**
Components
for Punch Press & Press Brake Control Systems

Heavy Duty Pressure Switch
No. 306
NEMA 12 oil-tight and dust-tight switch is adjustable from 1 to 115 PSI.

Limit Switch
No. 301
Oil-tight limit switch contains one set normally-open contacts and one set normally-closed contacts.

Miniature Regulator, Oiler, Filter
No. 311A

Operation Station
No. UL-501
Includes two run palm buttons and one emergency stop palm button, internally wired.

Palm Button
No. 318
Includes ring guard and mounting enclosure. See ergonomic palm buttons to control carpal tunnel syndrome.

Pedestal Mounts
Painted OSHA yellow and made of heavy angle construction.
Model 8000: used to mount cornering mirrors or safety light curtains off of a machine.
Model 8500: used to mount an operator station or palm buttons off of a machine and includes a top plate for mounting. Both models are supplied with a floor mounting plate that can be lagged to the floor.

Rotary Cam Switch with Drive Check
No. 310A
The primary components which make up the Rotating Cam Limit Switch are Snap Action Switches and the Micro-Adjust Cams. The Micro-Adjust Cam Block consists of two cams with 180 degree lobes which can be adjusted relative to the cam shaft by simply rotating the adjusting disc. No tools are required to make this adjustment. The adjusting disc can be manually rotated as shown in the photograph. The cam block has a self-locking polyurethane gear which automatically locks the cams relative to the cam shaft, when the required contact setting has been obtained.

Swing Mount Brackets
Model 9000
Consists of three 180 degree pivot points along with light guard diagonal movement capability for virtually unlimited light guard positioning. Two inch square tubing painted OSHA yellow which mounts directly onto the machine housing making it a heavy duty yet versatile mounting bracket.

UltraTouch Module
No. UL-102

I-2
Shut-Off Valve

Control of Hazardous Energy Sources (Lockout / Tagout)
Dept. of Labor Occupational Safety & Health Admin. 29CFR Part 1910

TO8 Shut-Off Valves, typically attached to the inlet end of a combination unit, are manually operated, slide type valves that open and close with a short one-inch movement of the slide. The valve slide can be locked in the closed position with a customer supplied padlock. The standard valve is a three-way valve that exhausts downstream air in the closed position.

Ordering Procedure

<table>
<thead>
<tr>
<th>Part Size PTF</th>
<th>Three-Way Valves</th>
<th>Exhaust Downstream</th>
<th>Air in Closed Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot; (6mm)</td>
<td>Part #TO8-200-E1PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot; (10mm)</td>
<td>Part #TO8-300-E1PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot; (13mm)</td>
<td>Part #TO8-400-E1PA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Materials of Construction

- Body: Zinc
- Slide: Acetal Plastic
- Elastomers: Nitride

Dimensions

All dimensions in inches (millimeters)

Copies of the actual OSHA standard may be obtained from:
U.S. Department of Labor
Occupational Safety & Health Administration
Office of Public Affairs - Room N3647
200 Constitution Avenue
Washington, D.C. 20210
(202) 693-1999

International Inquires:
Jacquelyn DeMesme-Gray
OSHA Coordinator for International Affairs
U.S. Department of Labor
Occupational Safety & Health Administration
Division of International Affairs - Room N3641
200 Constitution Avenue
Washington, D.C. 20210
(202) 693-2400

www.osha.gov
OSHA Uses Our Safetimeter... Shouldn't You?

Our newly designed Semelex® II Safetimeter® Test Set is field proven to accurately measure press stop time and safety distance to verify compliance with federal and state requirements. Designed for harsh industrial environments, the unit is portable, light weight, easy to use, and incorporates new and improved features.

**Ruggedized Auto-Hand**
Built for pressrooms, it will release a run button or push an E-Stop button to initiate press stop when signaled by the position/velocity transducer.

**Redesigned Auto-Flag**
Connects to the Auto-Hand and is positioned outside the sensing field of safety light curtains. It initiates a press stop by interrupting the sensing zone at a preset point in the stroke to check stop time.

**Heavy-Duty Position/Velocity Transducer**
Industrial grade magnets for secure mounting to base and upper bolster. It provides accurate direction, position, and velocity signals to the meter for testing press strokes up to 49 inches.

**Quick-Charge Battery**
The unit's built-in battery can be fully recharged in eight hours or can run off of AC power. You can not over-charge the battery and a charge indicator signals you when the battery is low.

**Two Safetimeters in One**
The same unit can be used to check full or part revolution clutch presses.

### Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop Time (Ts)</td>
<td>9.999 seconds, max</td>
</tr>
<tr>
<td>Safety Distance (Ds)</td>
<td>999.9 inches, max</td>
</tr>
<tr>
<td>Press Stroke</td>
<td>49 inches, max</td>
</tr>
<tr>
<td>Operating:</td>
<td></td>
</tr>
<tr>
<td>Between Charges</td>
<td>3-5 days typical on/off</td>
</tr>
<tr>
<td>Charge Time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Accuracy</td>
<td>+/- 1% of reading</td>
</tr>
<tr>
<td>Power Supply</td>
<td>• 115VAC 50/60 Hz Supply/Charger</td>
</tr>
<tr>
<td></td>
<td>• 6VDC Rechargeable Battery</td>
</tr>
<tr>
<td>Options</td>
<td>• Manual Start Push-button</td>
</tr>
<tr>
<td></td>
<td>• Remote Tachometer with Magnetic Base</td>
</tr>
</tbody>
</table>

Specifications may change without notice.

The Semelex II Safetimeter Checks Stop Time, Safety Distance and More...

Stop time (Ts) is the time interval from the initiation of the stop signal to the complete stop of the press. Stop time can change as a result of wear, speed, machine use, solenoid valve response, die weight, and other factors. State and Federal guidelines require periodic checking of stop time.

Safety Distance (Ds) is the distance between the location of two-hand control or personnel safety devices and the pinch point closest to the operator. OSHA regulation 1910.217(c)(3)(iii)(e) expresses Safety Distance using the following formula: \( Ds = Ts \times 63 \text{ inches/sec} \). When selected, the Semelex II Safetimeter will display the minimum safety distance per the OSHA formula.

Counterbalance can be easily checked by measuring the down- and up-stroke stop time. When these two times are the same, counter-balance is properly set.

Personnel Safety Devices like light curtains or safety mats can be tested using the Auto-Hand and Auto-Flag to verify reaction time per the OSHA formula. The overall response time of the safety device, press control E-Stop circuit, and the clutch brake mechanism are checked when the Auto-Hand or Auto-Flag accessories are used.
We have designed our equipment to the very highest performance and safety standards known to the current technological state of the art, as evidenced by our U.S.A. and foreign patents issued and pending. However, the installation, usage, suitability, and fitness of our equipment for any purpose, known or unknown, is interdependent upon the performance of other equipment not manufactured, installed, secured or maintained by Triad Controls, Inc.

We cannot and do not accept responsibility for any overall system performance when factors, such as these, are beyond our control.

www.triadcontrols.com
sales@triadcontrols.com
service@triadcontrols.com