

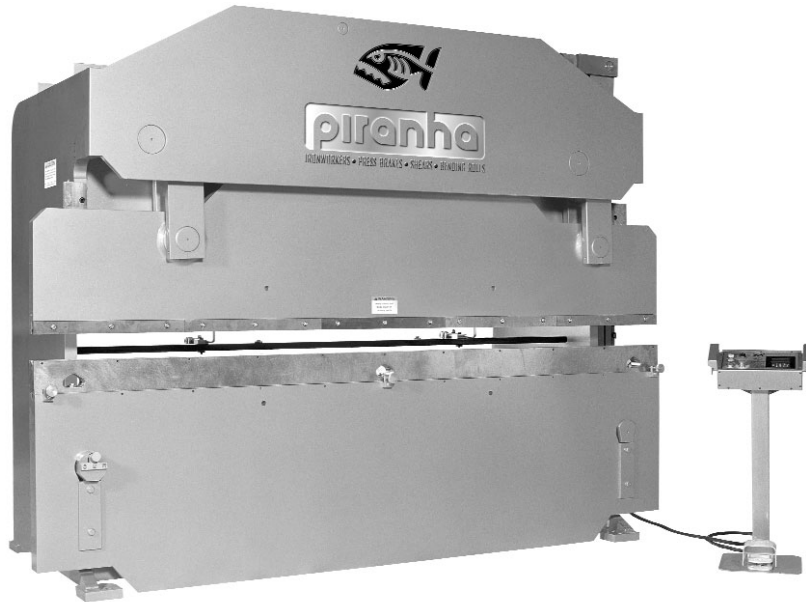
PIRANHA 250 TON PRESS BRAKE



piranha

IRONWORKERS • PRESS BRAKES • SHEARS • BENDING ROLLS

Serial No. _____



Instructions & Repair Parts Manual for Piranha 250 Ton Press Brake

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PN: T
250-14 Manual / GEN II

Table of Contents

| | |
|---|----|
| Safety..... | 7 |
| Installation..... | 8 |
| Unpacking | 8 |
| Placement | 9 |
| Initial leveling | 9 |
| Cleaning | 1 |
| Warning Labels | 1 |
| Tooling Installation Safety..... | 3 |
| Safety Standards & Specifications | 5 |
| Introduction..... | 10 |
| Precision Leveling..... | 11 |
| Electrical | 12 |
| Connecting the Pedestal Control | 13 |
| Hydraulic..... | 14 |
| Motor Rotation | 15 |
| Operator Control | 16 |
| Pedestal controls..... | 18 |
| Key pad functions | 18 |
| Operating Parameters (Key required for access)..... | 20 |
| Finishing Speed (Optional) | 20 |
| Ram Return Modes..... | 21 |
| Run Job | 28 |
| Setting Limits for Forming..... | 29 |
| Recalling a Job | 30 |
| Bed Leveling Adjustment..... | 33 |
| Tooling Installation | 34 |
| Press Brake Preparation | 34 |
| Die Insertion..... | 34 |
| Tooling Removal..... | 35 |
| Tool Adjustments | 36 |
| Tonnage Requirements..... | 36 |
| Die Rail Shimming..... | 36 |
| Maintenance Procedures | 37 |
| Maintenance Schedule..... | 37 |
| Gib Clearance Adjustment | 38 |
| Gib Adjustment | 38 |
| Side Thrust Gib Adjustment..... | 38 |
| Ram Slides | 39 |
| Hydraulic Power Unit..... | 40 |
| Oil Filter Replacement | 40 |
| Hydraulic & Electrical Diagrams | 41 |
| Electrical Diagrams | 41 |
| Hydraulic Diagram..... | 46 |
| Parts..... | 47 |
| Ram Linkage | 48 |
| Hydraulic Assemblies | 49 |
| Valve Body Assembly..... | 50 |

| | |
|---|----|
| Hose and Fittings | 53 |
| Ram Slides | 54 |
| Oil Filter Assembly..... | 55 |
| Wedge Assembly | 56 |
| Die Rail Centering Screw Assembly (Optional)..... | 57 |
| Punch Clamp Assembly..... | 58 |
| Backstop Assembly (Optional)..... | 59 |
| Back Stop Finger Assembly (Optional)..... | 60 |
| Die Rail (Optional) | 61 |
| Glossary | 63 |
| Index | 69 |
| Addendums | 71 |

Table of Figures

| | |
|---|----|
| Figure 1: Lifting Lug Location..... | 8 |
| Figure 2: Leveling Plate /Foot Detail | 9 |
| Figure 3: Precision Leveling Detail..... | 11 |
| Figure 4: 250 Ton Fuse Size Chart..... | 13 |
| Figure 5: Oil Level & Temperature Sight Gauge | 14 |
| Figure 6: Hydraulic Pump/Motor Assembly Unit | 15 |
| Figure 7: Main Electrical Enclosure | 16 |
| Figure 8: Bed Tilt Wedge Assembly | 33 |
| Figure 9: Die Rail Shimming Example | 36 |
| Figure 10: Gib Explanation | 39 |
| Figure 11: Oil Filter Assembly Exploded View | 40 |
| Figure 12: Electrical Diagram 1 of 4 | 41 |
| Figure 13: Electrical Diagram 2 of 4 | 42 |
| Figure 14: Electrical Diagram 3 of 4 | 43 |
| Figure 15 Electrical Diagram 4 of 4 | 44 |
| Figure 16: Ram Linkage..... | 48 |
| Figure 17: Hydraulic Power Unit | 49 |
| Figure 18: Valve Body Assembly Front View – T2271..... | 50 |
| Figure 19: Valve Body Assembly Rear View – T2271 | 51 |
| Figure 20: Gib Parts..... | 54 |
| Figure 21: Oil Filter Assembly Exploded View 0591550..... | 55 |
| Figure 22: Wedge Assembly | 56 |
| Figure 23: Die Rail Centering Screw Assembly..... | 57 |
| Figure 24: Punch Clamp Assembly | 58 |
| Figure 25: Back Gauge Assembly T14-805 | 59 |
| Figure 26: Back Stop Finger Assembly T14-995..... | 60 |
| Figure 27: Die Rail | 61 |

Safety

Safety must be a primary concern. When operating or performing maintenance procedures, follow all standard safety guidelines. Do not wear loose fitting clothing or any articles that may be pulled into any moving parts.

Be sure that when operating the equipment, all safety devices operate properly. Never under any circumstances disable, remove, or alter the original configuration of the safety system.

Should any component of the safety system become inoperable, immediately discontinue operation, and notify a supervisor.

- ! **NEVER** place fingers, hands, or any other body part in or under the ram area or other moving mechanisms.
- ! Proper eye protection must be worn at all times when operating the machine.
- ! Always insure that the machine is turned **OFF** before changing the tooling.

Read and understand this manual prior to operating the machine.

The area around the Piranha 250 Press Brake should be well lighted, dry, and free of obstacles.

The Piranha 250 Press Brake is designed for single person operation only.

Always insure that all tooling is properly secured in position before starting any operation.

When servicing the machine always practice standard lockout/tag-out procedures to avoid personal injury.

Qualified maintenance personnel only should perform service operations on the Piranha 250 Press Brake.

NOTE: The Run/Program keyswitch provides security for choosing initiation means and operation modes that can be supervised by the user, in accordance with ANSI B11.3 standards. The Generation II control system also provides a Footswitch Control Module. Removing the Footswitch Control Module can provide an extra level of lockout security for initiation means, if your plant safety program deems a level is needed beyond the Run/Program keyswitch. Without the Footswitch Control Module in place, Foot or Foot/Foot initiation means will not operate even if chosen using the Run/Program keyswitch.

When installing a Piranha “Plug -n- Play” light curtain assembly, the light curtain connector will replace the Footswitch Control Module.

Warning Labels

Located around the Piranha 250 Press Brake are labels warning the operator of various dangers and precautions to be aware of when operating or servicing the machine.

⚠ CAUTION

Place depth limit dog to top position or block ram when machine is stopped overnight to prevent damage to micro switches. Do not use approach speed for pressing or machine damage may result.

T0061

Place the depth limit dog to the top position or block the ram in the up position when the machine is stopped overnight to prevent damage to the micro switches. Do not use approach speed for pressing or machine damage may result.

Part – T0061

⚠ CAUTION

This machine is top and front heavy. Do not use fork truck! Use an overhead crane! See manual before attempting to move.

Do not remove this sign from this machine.

T0062

This machine is top and front heavy. Do not use a fork truck! Use an overhead crane! See manual before attempting to move.

Part – T0062

IMPORTANT NOTE

Both slides to be leveled within 0.0005 inch/foot for proper operation. Running machine in out of level condition will void warranty.

Precision Square Level
Machine Slide
Ram in lowest position
Set on steel plates, 3/4" (front) and 1/2" (rear). Shim after leveling and tighten anchor bolts.

T0063

Both slides are to be leveled within 0.0005 inch/foot for proper operation. Running the machine out of level will cause damage and void the warranty.

Part – T0063

⚠ WARNING

To prevent serious bodily injury

NEVER Place any part of your body under the ram or within the die area.

NEVER Operate, install dies, or maintain this machine without proper instruction and without first reading and understanding the operators or machine manual.

NEVER Install dies or service this machine with the motor "on" and control in "ON" position.

Do not remove this sign from this machine.

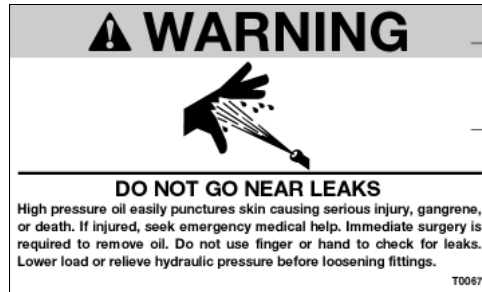
T0066

To prevent serious bodily injury;
Never place any part of your body under the ram or within the die area.

Never Operate, install dies, or maintain this machine without proper instruction and without first reading and understanding the operators or owners machine maintenance manual.

Never Install dies or service this machine with the motor "on" and control in "on" position.

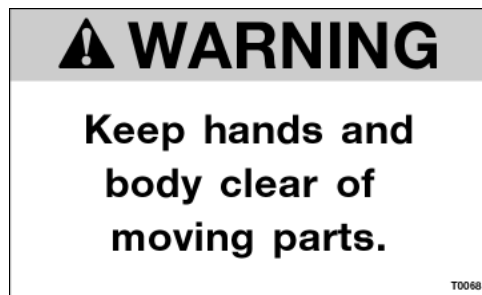
Part – T0066



Do not go near leaks

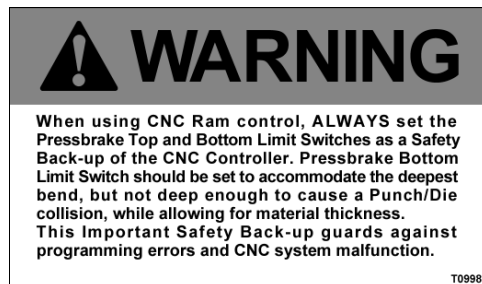
High-pressure oil easily punctures skin causing injury, gangrene and even death. If injured, seek emergency medical help. Immediate surgery is required to remove oil. Do not use finger or hand to check for leaks. Lower load or relieve pressure before loosening fittings.

Part – T0067



Keep hands and body parts clear of moving parts.

Part – T0068



When using CNC Ram control, always set the press brake top and bottom limit switches as a safety back up of the CNC controller. Press brake bottom limit switch should be set to accommodate the deepest bend, but not enough to cause a punch die collision, while allowing for material thickness.

This important safety back up guards against programming errors and CNC system malfunction.

Part – T0998

Tooling Installation Safety

Tool setting is a very important job. Safety of the operator, press brake and the tooling is involved. To properly prepare for the job, the tool setter should have a good working knowledge of press brakes, tools and materials. The person should also have been instructed in the use of tool trucks and other handling equipment. The person must also understand the importance of proper tool adjustment.

Aside from the technical knowledge the setter must develop a sense of personal safety awareness. It is not only important that tools are correctly installed in the proper size of equipment; the task must be accomplished in an organized and safe manner to complete the job.

The following steps offer a precautionary guide in the development for safe tooling installation procedures.

1. Immediately report any questionable operation, unusual action, unsafe condition or improper maintenance to the proper personnel.
2. **NEVER** at any time allow fingers or hands to be between the tools.
3. When working with other people insure that all persons are clear of the press brake prior to any ram motion (jogging, inching or cycling).
4. Insure that the proper safe material handling equipment (tongs, pliers, vacuum lifters or other mechanical devices) available to the press brake operator.
5. When changing the settings of press brake controls, insure that the controls are properly adjusted and test cycle the machine to verify correct operation.
6. Any locking type of controls should be adjusted by authorized personal, and the key must be removed to a secure location when not being used.
7. Insure that all devices are in proper working order.
8. Anytime that the machine has been left unattended or inoperative for even a brief time, verify the correct position of all controls and proper press brake operation.
9. Develop a sense of safety for yourself and any persons around you as well as your surrounding area.

Safety Standards & Specifications

Electrical System Design/Manufacture:

The machines manufactured in Hutchinson, KS, are furnished with electrical/electronic products that are UL (Underwriter's Laboratory) approved. These components have the UL numbers printed or stamped on them and can be easily traced to the point of manufacture

Hydraulic System Design/Manufacture:

Hydraulic components used in Piranha machines are approved by NFPA (National Fluid Power Association), and those approval numbers can be traced through the manufacturer's part numbers.

ANSI/OSHA Compliance:

Mega Manufacturing meets the current ANSI construction standards for manufacturing of ironworkers, press brakes, and shears:

ANSI B11.3—Power press brakes, Construction, Care, and Use

The ANSI B11 standards were developed to establish levels of responsibility for manufacturing safe products, installation, training, and use of these products. The levels of responsibility are fairly evenly distributed between the manufacturer, the owner/end user of the equipment, and the operator. Specific guarding requirements are in general assigned to the owner/end user of the equipment.

Please understand that this ruling places the primary burden of responsibility for maintenance of guarding on the owner /end user of the equipment. Inherent in this requirement is the responsibility of the owner/end user of the equipment to develop and maintain guarding specific to their application for the equipment. These ANSI safety requirements may be acquired from:

**American National Standard Institute
1430 Broadway
New York, New York 10018
Telephone (212) 354-3300**

**PO Box 457
Hutchinson, KS 67504-0457
Phone: (800) 338-5471
Fax: (620) 669-8964**

Machine Specifications

| Model | Stroke | Open Height | Appr/Retr Speed | Max Press Speed | Motor HP | Oil Capacity | Weight (lbs) | Approximate Overall height |
|--------|--------|-------------|-----------------|-----------------|----------|--------------|--------------|----------------------------|
| 250-10 | 8 | 17 | 60 | 19 | 20 | 80 | 30,500 | 122 |
| 250-12 | 8 | 17 | 60 | 19 | 20 | 100 | 36,800 | 122 |
| 250-14 | 8 | 17 | 60 | 19 | 20 | 100 | 45,500 | 122 |
| 250-16 | 8 | 17 | 60 | 19 | 20 | 100 | 50,500 | 122 |
| 250-20 | 8 | 17 | 60 | 19 | 20 | 100 | 64,000 | 128 |

Introduction

The Piranha press brake is a heavy duty, high performance hydraulic powered machine that provides several important advantages surpassing other press brakes in today's market. The Piranha's single hydraulic cylinder mechanical linkage system provides full tonnage at any point across the bed.

The machine is shipped fully assembled requiring only hydraulic oil and electric power to become fully operational. The heavy steel "C" frames, interlocking cross members, ram and bed provides the integrity and resistance to deflection that is necessary for accurate performance. State of the art, maintenance free, aerospace fiber glide bushings provide high load capacity and low friction in the form of a thin walled sleeve. They are completely non-metallic and require no lubrication. Hardened micro-finished oversize link pins allow the linkage to withstand high load forming and punching applications.

Other standard features include: emergency stop button, Generation II control system, bed tilt adjustment, spring open die clamps with hardened clamping bolts. Hardened & ground ram slides with non-metallic ram gibs, PRS.

Warranty

Mega Mfg. will replace or repair with like parts, either new or rebuilt, F.O.B. the factory, or refund the purchase price for any parts on ironworkers, pressbrakes, or shears, which are defective in materials and workmanship within (12) months of the date of purchase. Provided the buyer returns the warranty registration within (30 days) of the purchase date, and, at the seller's option, returns the defective materials freight and delivery prepaid to the seller, which shall be the buyer's sole remedy for the defective materials. A 5 year warranty against defects in materials and workmanship applies to major structural components on pressbrakes and shears. Seller shall not be liable to purchaser or any other person for consequential or incidental damages. Hydraulic and electrical components are subject to their respective manufacturer's warranties. This warranty does not apply to machines and/or components which have been altered in any way, or subjected to abusive or abnormal use, inadequate maintenance and lubrication, or to use beyond seller recommended capacities and specifications. Seller shall not be liable under any circumstances for labor costs expended on such goods or consequential damages. Seller shall not be liable to purchaser or any other person for loss or damage directly or indirectly arising from the use of the goods or any other cause. No employee, agent, officer, or seller is authorized to make oral representations or warranty of fitness or to waive any of the foregoing terms of sale and none shall be binding on the seller

Installation

BEFORE INSTALLING THIS PRESS BRAKE, READ AND UNDERSTAND THE PRESS BRAKE MANUAL WITH PARTICULAR ATTENTION TO "SAFETY TIPS FOR MAINTENANCE PERSONNEL" THE CURRENT ANSI B11-3 STANDARD-"SAFETY REQUIREMENTS FOR THE CONSTRUCTION, CARE AND USE OF POWER PRESS BRAKES."
Copies can be ordered from: American National Standards Institute, 1430 Broadway, New York, New York 10018

Unpacking

CAUTION: THE PRESS BRAKE IS HEAVY IN FRONT. GUARD AGAINST TIPPING UNTIL ANCHOR BOLTS ARE SECURED.

This machine was carefully packaged at the factory to avoid damage during shipment, should any accidental damage occur contact the responsible freight company immediately and report the damage. Indicate any damage on the Bill of Lading. All Warranty information included in this packet must be returned to the factory.

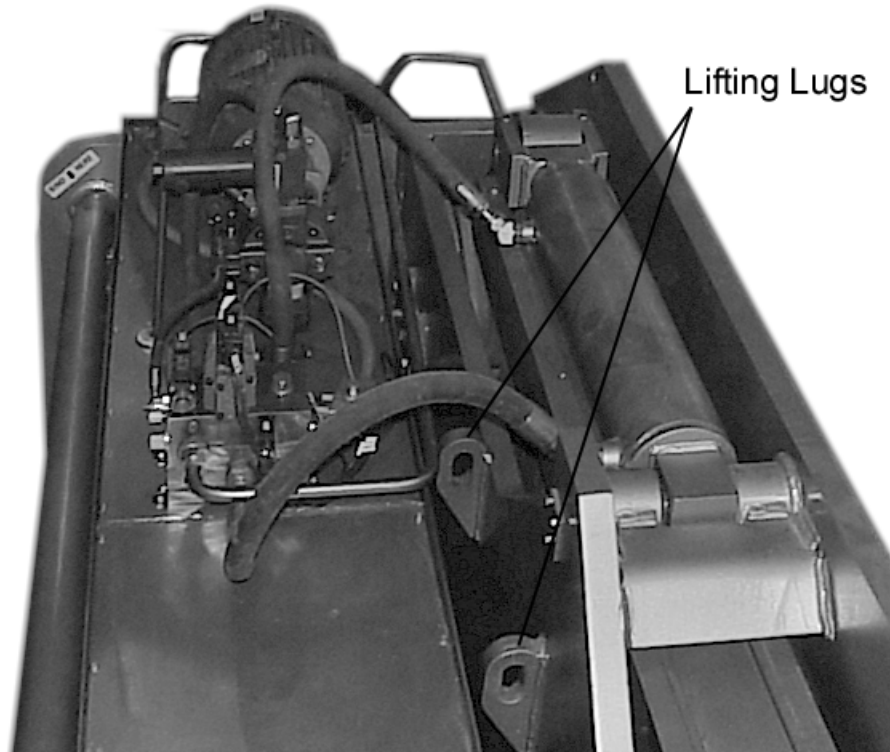


Figure 1: Lifting Lug Location

The Piranha 250 Press Brake must only be lifted using a crane, and the lifting lugs located in front of the hydraulic oil tank on top of the machine. **Do not lift the machine from the bottom** (forklift or jack) as the machine is top and front heavy and can tip resulting in serious bodily harm or death. Lifting the machine from the bottom can also result in machine damage.

Placement

Piranha recommends that the machine be placed on a reasonably level concrete foundation suitable to support the press brake's total weight and in accordance with local building codes. The machine should be placed on a single concrete pad free of cracks and seams. Prior to anchoring or setting, the press brake should be properly leveled and shimmed. **Anchoring** can be accomplished using suitable masonry anchors. Typically, only the rear feet of the machine need to be anchored. Use the machine as a template for anchoring hole locations. Placement of the machine should allow easy access around the machine for the operator and maintenance personnel. For safe operation placement should allow tooling to be installed onto the bed from the end of the machine.

It is recommended that a minimum four-foot area around the Piranha 250 Press Brake be provided.

Initial leveling

CAUTION: THE PRESS BRAKE IS HEAVY IN FRONT. GUARD AGAINST TIPPING BEFORE AND DURING LEVELING.

Level adjusting screws are only provided on the rear feet. The Piranha 250 Press Brake must be placed on four steel pads. 2 each 6" x 6" x $\frac{3}{4}$ " for the front feet and 2 each 6" x 6" x $\frac{1}{2}$ " for the rear feet. These pads are provided with the press brake.

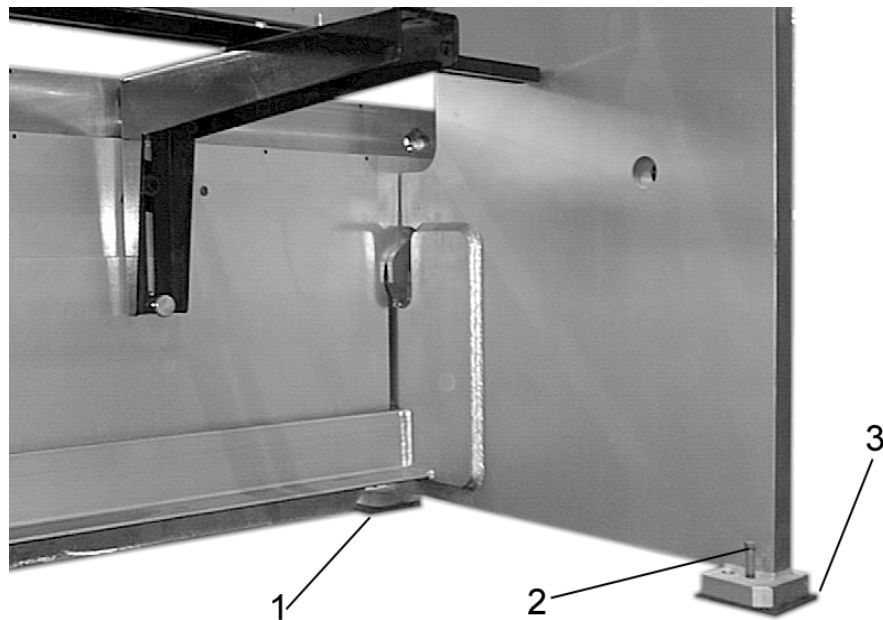


Figure 2: Leveling Plate /Foot Detail

1. Position the $\frac{3}{4}$ " thick pad under each of the front feet (*see Figure 2 Item 1*).
2. Position the $\frac{1}{2}$ " thick pad under each of the rear feet (*see Figure 2 Item 3*).

3. Before the riggers disconnect the lifting apparatus, check the press brake for rough level from the left to right plane.
4. Using a machinist square level, shim the front feet until the machined bottom surface of the **Ram** is level left to right. Desired level is within .005”-.015” inch per foot. A jack angle is located on the inside of the right C-frame to assist in leveling the machine right to left. Because of bed tilt feature, the bed can not easily be used for leveling.

Cleaning

Clean the die rail, bed surface, punch holder pocket and die clamps with a mild solvent so as not to damage the paint finish on the machine. The main cylinder rod must also be free contaminants. Any contaminants left on the cylinder rod may damage the chrome finish and related hydraulic seals. The cylinder rod must be clean and dry. Wipe down the rest of the press brake with a mild cleaning solution.

Precision Leveling

The Piranha 250 Press Brake must be leveled precisely prior to operation. The following steps represent the typical leveling procedure. These instructions must be followed to avoid damaging the machine.

This procedure will require that the press brake have electrical power connected and hydraulic fluid installed. The press brake must be functional enough to lower the ram to the bottom stop position.



Figure 3: Precision Leveling Detail

| Item | Description |
|------|-------------|
| 1 | Slides |
| 2 | Ram |

Table 1: Ram Slide Location Explanations

1. Before beginning the leveling procedure, turn on the press brake and lower the ram to the bottom of stroke position, then turn the press brake off.
2. It is important to keep in mind that the left and right side need only to be parallel with each other, rather than perpendicular with the floor.
3. Using a machinist square level having an accuracy of .0005" inch per foot graduation, place the level firmly against the front face of the right vertical ram slide as shown. (see Figure 3 Item1)

4. Adjust the rear-leveling bolt until the bubble on the level is centered.
5. Repeat this procedure for the left slide. Adjust leveling bolts as required.
6. The side frames must be parallel to each other within .0005” per foot.
7. Once the machine is level, place shims, having a thickness equal to the gap that exists between the base plate and the bottom of the press brake foot under the foot. Use Shim Pak Part # T2633
8. After the shims are in place, lower the adjusting bolts and re-check the level to ensure that the left and right sides of the machine have remained parallel to each other. The overall shim pack height may need to be adjusted in order to maintain side frame parallelism.
9. The machine may now be anchored to the floor using concrete anchor lugs.
10. After tightening the floor anchor lugs, re-check the press brake level to ensure that the machine has not moved.

Electrical

CAUTION: ELECTRICIANS CHECKING DIRECTION OF ROTATION SHOULD BE CAUTIONED NOT TO OPERATE THE PRESS BRAKE UNTIL IT HAS BEEN THOROUGHLY CHECKED, CLEANED, LEVELED AND LUBRICATED. A WIRING DIAGRAM IS FURNISHED IN THIS MANUAL. PRESS BRAKE OPERATING MODE SWITCH MUST BE IN THE OFF POSITION WHEN CHECKING MOTOR ROTATION.

BEFORE DRILLING ANY HOLES IN THE ELECTRICAL ENCLOSURE, BE SURE THAT THE ELECTRONIC CIRCUIT BOARDS/EQUIPMENT ARE PROTECTED FROM METAL CHIPS CONTACTING THE CIRCUIT BOARD(S). DO NOT USE COMPRESSED AIR TO BLOW METAL DEBRIS FROM THE ENCLOSURE. USE A VACUUM TO REMOVE ANY METAL PARTICLES.

Voltage requirements may be determined by referencing the fuse part number to the chart located on the inner door panel of the main electrical box. (See Figure 4)

**250 TON PRESS BRAKE
SHORT CIRCUIT AND OVERLOAD
FUSE PROTECTION
F1 – F2 – F3**

| VOLTAGE | TYPE | AMP |
|----------|------|------|
| 208 VOLT | J | 90.0 |
| 230 VOLT | J | 80.0 |
| 460 VOLT | J | 40.0 |
| 575 VOLT | J | 30.0 |

Figure 4: 250 Ton Fuse Size Chart

Electrical connection of the 3-phase systems requires proper phasing. When connecting the press to a 3-phase power source, the rotational direction of the pump drive motor must be correct. The rotational direction may be observed by viewing the fan through the end cover of the motor and the corresponding arrow on the electrical motor. The motor must rotate in the direction of the arrow on the electrical motor (see *Figure 6*). Before operating the machine insure the cover is securely in place.

A licensed electrician should perform all electrical connections.

! **Warning** - The control transformer is for machine operation only. Do not use the machine transformer to power any secondary devices.

If the CNC back-gauge is installed on the machine, a dedicated 115-VAC, 60Hz, 20-Amp fused service to the CNC back gauge must be provided

Connecting the Pedestal Control

Prior to operation, the pedestal control plug must be attached to the main control panel. To connect the plug, locate the receptacle on the bottom of the main electrical control box. Align the plug with the receptacle. Insert the plug and rotate the outer ring securing the plug to the receptacle.

Hydraulic

Before applying power to the Piranha 250 Press Brake, the hydraulic reservoir must be filled with oil. To fill the reservoir, locate and remove the filler/breather cap on top of the reservoir. Fill the reservoir with Mobil DTE-13 or ISO32 equivalent, filtered to an ISO 17/15/13-cleanliness level. The proper oil level is between the red and black lines of the sight gauge found on the rear of the reservoir (*See Figure 5*). Do not over fill the reservoir. Replace the filler/breather cap.

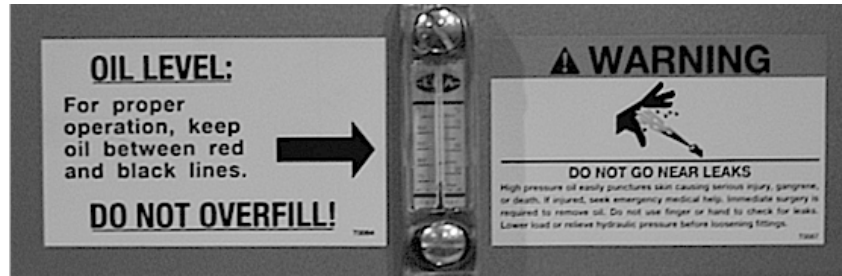


Figure 5: Oil Level & Temperature Sight Gauge

Filling the Pump Case

Prior to starting motor for the first time, the pump case must be filled with hydraulic oil. The following steps represent the typical pump filling procedure.

1. Locate the pump case drain port (*see Figure 6 Item 2*).
2. Remove the tube from the fitting and remove the fitting from the port.
3. Using a small funnel, fill the case of the pump.
4. Replace the fitting and the tube.

WARNING: Failure to follow this procedure may lead to pump damage and premature failure.

Motor Rotation

Motor rotation can be verified by quickly “Bump Starting” the motor (starting and stopping quickly) and viewing the fan blade rotation through the fan blade shroud. The rotation direction of the motor fan blades must correspond with the direction arrow on the motor.

If the fan blades are obscured, use a flashlight to view the fan blades through the grease zerk slot on the fan shroud. Shine the light towards the fan blades to view the fan blade rotation.

Upon initial start-up of the hydraulic unit visually inspect around the machine for any possible leaks. Do not search for hydraulic oil leaks using exposed flesh, hydraulic pressure can puncture the skin.



Figure 6: Hydraulic Pump/Motor Assembly Unit

| Item | Description |
|------|-----------------------------|
| 1 | Direction of Rotation Arrow |
| 2 | Pump Case Drain Tube |

Table 2: Hydraulic Pump/Motor Assembly Descriptions

Operator Control

Operator selectable controls are provided on the Pedestal Control Unit and on the Right Hand Side of the press brake. Functionality of the controls are described below.



Figure 7: Main Electrical Enclosure

| Item | Description |
|------|--------------------------|
| 1 | Safety Disconnect Switch |
| 2* | Ram Safety Switch |
| 3 | Reset Button |

*The **Ram Safety Switch** be set to engage within ½” above the speed change point to enable proper operation of the sequence modes and optional safety devices.



Fig. 8: Generation II Pedestal Control Unit



| Item | Description |
|------|------------------------------------|
| 1 | Keyed Program /Run Selector Switch |
| 2 | Ram Up Button |
| 3 | Teach/Learn Indicator Light |
| 4 | Motor Start Button |
| 5 | Motor Stop Button |
| 6 | LCD/ Keypad Unit |

Pedestal controls

Start button: Depressing the green Start pushbutton will apply power to the electric motor that drives the Piranha Press Brake hydraulic power unit. Depressing the E-Stop pushbutton will remove power from the pump unit. Before attempting to start the hydraulic motor insure that the E-Stop control is in the armed (up) position.

Stop Button: The E-Stop (Emergency Stop) control is a red, two-position maintained push button. Pressing the E-Stop button will remove electrical power from the hydraulic power unit drive motor and all base machine control circuits, stopping all machine movement. Twist the button head clockwise to reset the pushbutton.

Machine movement **cannot** resume until the E-Stop button has been reset.

Ram up Button: Depressing the Ram Up button will raise the ram from any position to the up stroke position.

Program/Run keyed switch: Supervisor key switch to limit access to programming functions, run modes, and initiation means. In the Run position it allows operation of the press brake. In the program position, it enables programming functions, run mode access, and initiation means access.

Dual palm Buttons: Depressing the palm buttons simultaneously will initiate a press cycle. If either palm button is released before the ram reaches the full down position, the ram will respond according to the Run mode selector switch setting.

Footswitch: A footswitch is provided for use according to the initiating means. If the footswitch is released before the ram reaches the full down position the ram will react according to the Run mode selector switch setting.

Key pad functions

Alpha/numeric keys: Contains numeric and alpha characters used for data entries. Programs similar to a cell phone format.

Hand/Foot: Permits the operator to toggle between the various initiation means when Program/Run switch is in the Program position.

Mode: Permits the operator to toggle between the various run modes when Program/Run switch is in the Program position.

↑ **/Yes:** Moves the cursor up and answers yes to questions requiring a positive response

↓ **/ No:** Moves the cursor down and answers no to questions requiring a negative response

Bksp: Moves the cursor backward one position per depression.

Esc: Moves display back to the previous menu

Decimal: Inserts a decimal point.

Job/Learn: Will display a job selection menu, and inputs value during teach mode. *When in the run screen, depressing the job/learn key will display the job selection menu. In the teach mode, depressing the job/learn key will input the current ram position.*

Clr: Clears most recent entry.

Enter: Confirms data entry.

Cycle counters & Timers

Machine counter: Master cycle counter, tracks total number of ram cycles and is not re-settable.

Maintenance counter: Cycle counter used for tracking maintenance intervals and may be reset. An access code is required to gain entry into the counter screen.

Parts counter: Counter used to track the number of completed parts during a production run. May be reset from the Run Screen (Job/learn key)

Hour meter: Records total “motor run” hours and is not re-settable.

Memory Tag / Job Storage and Back up

The Generation II control system is equipped with a battery backup circuit to prevent programmed job loss in the event of a power failure or when the machine electrical power is turned off. The battery has a nominal lifespan of three years after which time the battery discharges and all stored jobs will be lost if not saved to a memory tag. Stored jobs will also be lost when the battery is replaced unless jobs are “backed up” on a memory tag.

The backup procedure is detailed here:

1. Turn off main power to electrical enclosure.
2. Open enclosure door.
3. Insert Memory Tag into slot on front face of GII control module (Orientation does not matter).
4. Close electrical enclosure door.
5. Restore electrical power.
6. Start press brake.
7. After GII initializes, turn “Run/Program” switch to “Program.”
8. Select “Teach/Edit Job” and press Enter.
9. Use “Down Arrow” to select “Memory Tag” and press Enter.
10. Select desired function: “Backup Jobs” or “Restore Jobs” and press Enter.
11. Remove and store memory tag when data transfer is completed.

NOTE: *Do Not Remove Memory Stick While “Read/Write” is in progress.*

Memory Tag Part Number: T3132

Operating Parameters (Key required for access)

Initiation means

Hand: When the switch is in the “Hand” position the machine is controlled from the Two-Hand control. The palm buttons must be engaged simultaneously to initiate a press cycle.

Foot: When the “Foot” mode is selected, the press is controlled by the footswitch alone.

Hand/Foot: This is a sequencing mode of operation, which utilizes both Hand, and Foot modes. Ram movement is initialized by Hand mode and then transferred to Foot mode at the speed change position. Simultaneously depressing and maintaining both of the palm buttons initiates the sequence. At the speed change position, the ram stops and control is transferred to the footswitch. Activation of the footswitch will complete the ram cycle.

Foot/Foot: This is a sequencing mode of operation that utilizes a double Footswitch actuation. Ram movement is initiated by operating the footswitch control. The press brake ram travels downward in approach speed to the speed change point, where the ram stops movement. Reactivation of the footswitch will complete the ram cycle.

Run modes

Off: When the “Off” mode is selected, all Press Brake movement (up or down) is disabled. Only the hydraulic motor can be started when the Operating Mode switch is in this position.

Inch: When the Inch mode is selected, the Press Brake ram will descend when the palm buttons are actuated. Releasing the palm buttons will cause the ram to stop. Re-initiating the palm buttons will restart downward ram movement. At the bottom of stroke position the ram will stop, and must be raised by depressing the Ram Up button. This mode is useful for setting or changing tooling, and setting up a job.

Run 1: When the Run 1 mode is selected, the ram will descend when the dual palm buttons are depressed. When the dual palm buttons are released at any point during the down stroke, the ram will pause. Downward motion will resume when the dual palm buttons are re-activated. The ram will automatically return to the top of stroke position when the bottom stop position is reached.

Run 2: When the Run 2 mode is selected, the ram will descend when the dual palm buttons are depressed. When the dual palm buttons are released during the down stroke, or when the bottom stop position is reached, the ram will automatically return to the top of stroke position.

Run 3: When The Run 3 mode is selected, the ram will descend when the dual palm buttons are depressed. When the dual palm buttons are released during the down stroke, the ram will stop. When the ram reaches the bottom stop position, the ram may be “inched” up by “toggling the dual palm buttons. Run 3 will allow the operator control of the ram with the dual palm buttons during the return stroke

Finishing Speed (Optional)

Finishing speed is incorporated into the control configuration to permit the press brake ram to enter a slower pressing speed, enabling a greater degree of ram repeatability.

Ram Return Modes

Low

Low, or “slow” return when selected, is a function where the ram will return slowly from the bottom of stroke to the top of stroke.

Low / High

Low, or “slow” return when selected, is a function where the ram will return slowly from the bottom of stroke to the original speed change point. At the speed change point, the ram will revert to the normal or “high” return speed

High

High-speed return when selected, is a function where the ram will return ito the top of stroke position in the high speed.

Steps for Entering Names and Numbers

Refer to the letters on the number keys to select the desire characters.

With each press of a numeric key, the displayed character appears in the following order:

Number first, then the corresponding letter on the key (Upper Case only). After a character is entered, the cursor will automatically advance to the next position

| Keys | Number of Times Key is Depressed | | | | |
|-------|----------------------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 1 | 1 | | | | |
| 2ABC | 2 | A | B | C | |
| 3DEF | 3 | D | E | F | |
| 4GHI | 4 | G | H | I | |
| 5JKL | 5 | J | K | L | |
| 6MNO | 6 | M | N | O | |
| 7PQRS | 7 | P | Q | R | S |
| 8TUV | 8 | T | U | V | |
| 9WXYZ | 9 | W | X | Y | Z |
| 0 | 0 | | | | |

If a mistake is made while entering a name

Use BKSP (Backspace) to move the cursor to the incorrect character, enter the correct character.

POWER UP

The following screens are displayed upon power up of the control



Depressing the START button on the console will start the main pump motor and initialize the control for operation or programming.

Machine set-up: (Security Code required for access)

Programming menu items are accessed with the RUN/PROGRAM key selector in the Program mode. Use the UP and DOWN arrow keys to select from the main program screen.



PROGRAM

```

HAND          SINGLE
1. TEACH/EDIT JOB
2. SET BEND NUMBER
>3. MACHINE SETUP
  
```

The main program screen displays the HAND/FOOT selection and the current operation mode.



```

ENTER SECURITY CODE

**** CODE
  
```

Tip: Either Use ↑↓ keys to select desired menu item then Enter, or press number corresponding to desired menu item.

```

>1. ANTI-TIE-DOWN
2. MAINT COUNTER
3. STM TEST
4. SECURITY CODE
  
```

The MACHINE SETUP menu is for machine settings that can be modified by the user. The security code (9999 or code set by supervisor) must be entered to gain access to this screen. The security code field will accept up to six digits.

```

5. INCH/MM DISPLAY
6. MACHINE-COUNTER
7. HOUR METER
8. LIGHT CURTAIN
  
```

```

9. TONNAGE READOUT
0. TOS TEST POSN
   TOS TIMER
   BACKGAUGE
  
```

Tip: Either Use ↑↓ keys to select desired menu item then Enter, or press number corresponding to desired menu item.

>1 ANTI-TIE-DOWN

```
TIMERS:
ANTI-TIE-DOWN

500 MS
```

NOTE: 500 MS is a default parameter. This value may be changed for a specific job application if required.

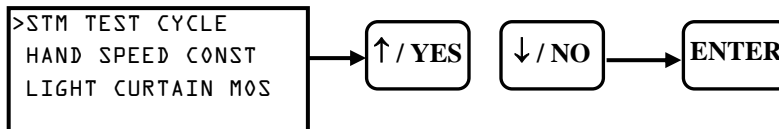
>2 MAINT COUNTER

```
MAINT COUNTER
PRESS CLR TO RESET

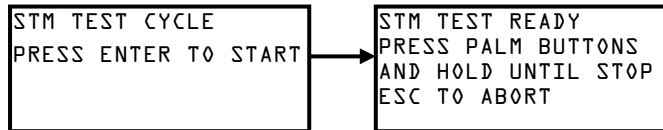
123456
```

Cycle counter used for tracking maintenance intervals and may be reset by depressing the CLR (Clear) button..

>3 STM TEST (Stop Time Measurement)



>STM TEST CYCLE



>HAND SPEED CONST

```
STM TEST:
HAND SPEED CONST

63 IN/SEC
```

NOTE: 63 in/sec is a default parameter. This value may be changed for a specific job application if required.

>LIGHT CURTAIN MOS (Minimum Object Sensitivity)

```
STM TEST:
LIGHT CURTAIN MOS

1.00 INCHES
```

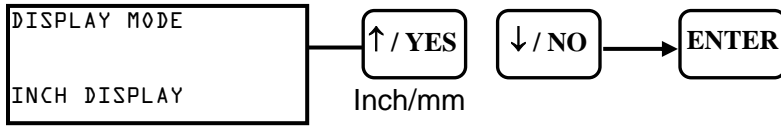
NOTE: This inch value is the minimum object sensitivity of the light curtain.

>4 SECURITY CODE

```
SEC CODE:
TO CHANGE SEC CODE
ENTER SEC CODE
Code
```

To change the security code, enter desired code. May be a combination of Alpha/Numeric symbols up to six digits long..
NOTE: Once this security code is changed, the default security code (9999) will not longer be active.

>5 INCH/MM DISPLAY



>6 MACHINE COUNTER

```
MACHINE COUNTER  
12345678  
PRESS ESC TO EXIT
```

Displays ram cycles and is not re-settable

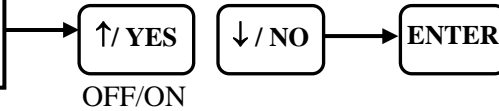
>7 HOUR METER

```
HOUR METER  
1234567.1  
PRESS ESC TO EXIT
```

Displays motor run hours and is not re-settable

>8 LIGHT CURTAIN

```
LIGHT CURTAIN:  
LIGHT CURTAIN  
OFF
```

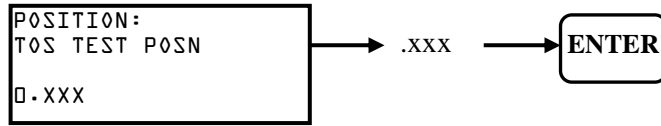


>9 TONNAGE READOUT (Optional)

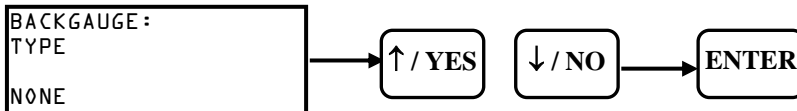
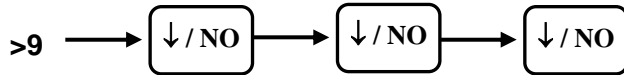
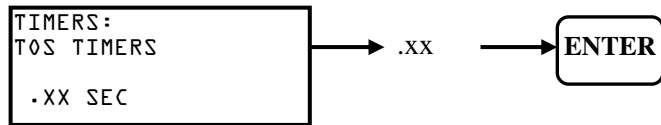
```
TONNAGE READOUT:  
  
  

```

>0 TOS TEST POSN



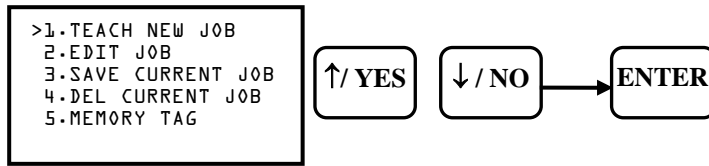
>TOS TIMER



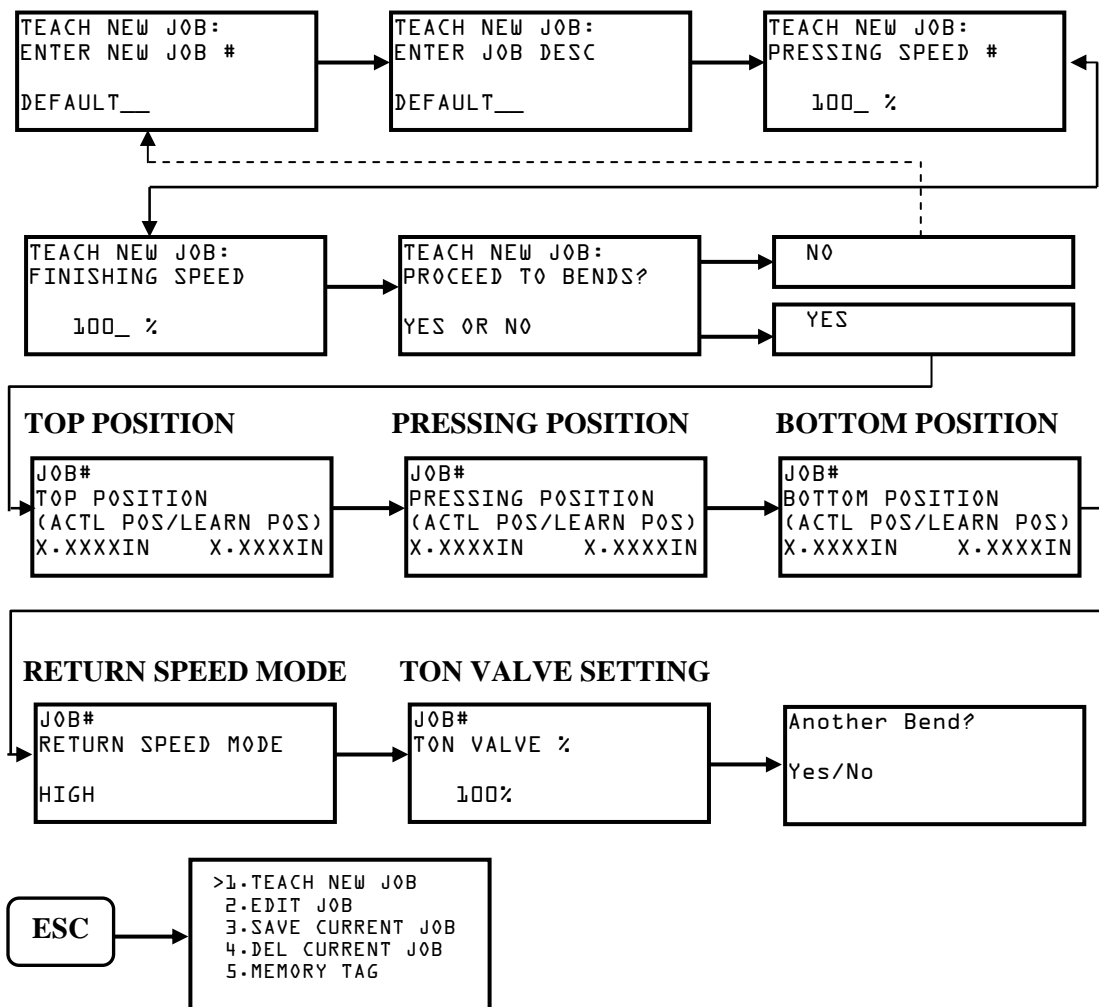
NONE/HURCO/AUTOMECH

Programming Jobs (Key required for access)

PROGRAM



>1 TEACH NEW JOB



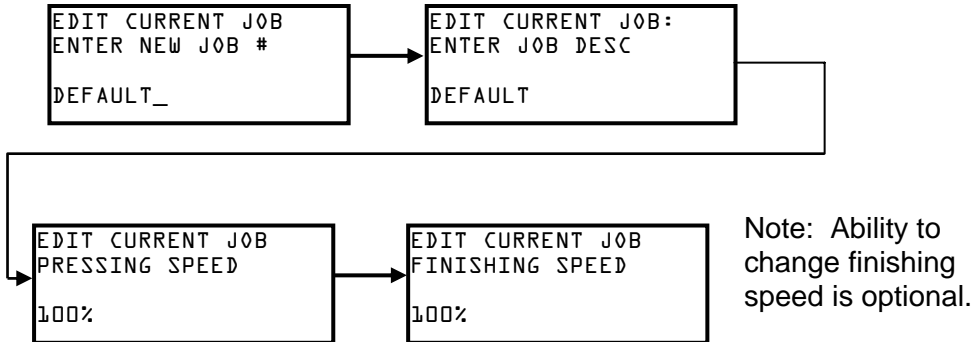
Press #3 to Save Job when complete, and press ESC to exit back to main menu.

>2 EDIT JOB

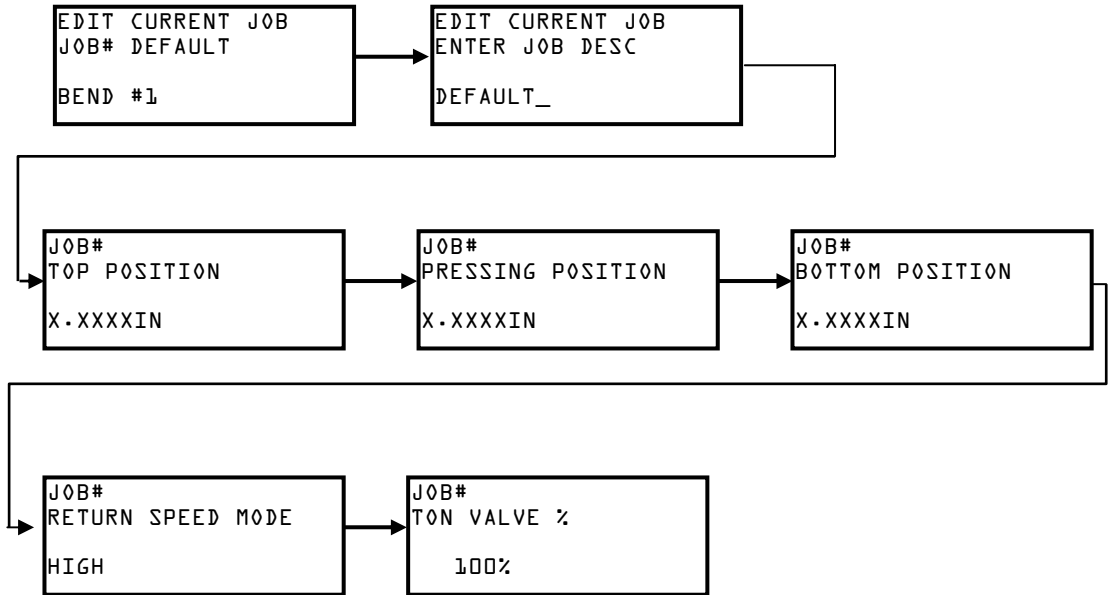
```
>EDIT JOB
EDIT BEND
DELETE BEND
INSERT BEND
```

Tip: Use ↑↓ keys to select desired menu item then Enter.

EDIT JOB



EDIT BEND



DELETE BEND

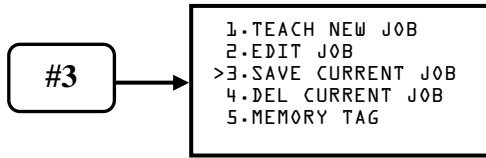
```
EDIT CURRENT JOB
JOB# DEFAULT
DELETE BEND #1
```

Enter YES or NO to delete a bend displayed for the current job.

INSERT BEND

```

EDIT CURRENT JOB
JOB# DEFAULT
INSERT BEND #1
    
```



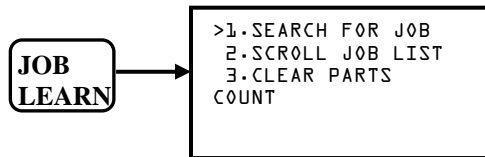
Save job when complete, and press ESC to exit back to main menu.

Run Jobs

RUN



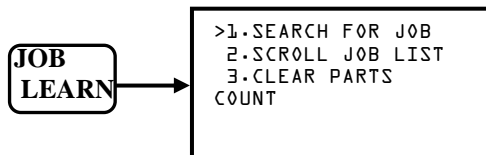
1 Choose Program



Choose Menu 1. or 2. to choose job to run.

Tip: Either Use ↑↓ keys to select desired menu item then Enter, or press number corresponding to desired menu item.

2 Reset Parts Counter



Choose Menu 3. To clear parts counter.

Run job after making selection.

Setting Limits for Forming

WARNING: NEVER GRASP THE MATERIAL WITH FINGERS OR THUMBS ON TOP OF THE MATERIAL. IF WIDE SHEETS MUST BE HELD DURING FORMING, SUPPORT THE MATERIAL FROM BELOW WITH THE OPEN PALM, KEEPING FINGERS AND THUMBS UNDER THE MATERIAL. KEEP ALL PARTS OF THE BODY CLEAR OF THE UPWARD TRAVEL OF THE MATERIAL

Programming a Simple Job

1. Start Press Brake motor by depressing the green START button.
2. Rotate keyed Programming switch to “PROG” (program) Mode.
3. Press #1 on keypad.
4. On new screen, ensure arrow is on #1 (>1), press ENTER.
5. Key in a job number (max 11 characters) and press ENTER.
6. Key in a job description (max 21 characters) and press ENTER (To bypass description screen, press CLR (clear) then ENTER)
7. Key in Pressing Speed to desired value and press ENTER.
8. Key in Finishing Speed to desired value and press ENTER.
9. Press “Yes” button to proceed to bends.
10. Key in desired Top of Stroke position and press ENTER –or-
Move press ram to desired position, then press JOB LEARN button to save position. Press ENTER.
11. Key in desired Speed Change position and press ENTER –or-
Move press ram to desired position, then press JOB LEARN button to save position. Press ENTER.
12. Key in desired Bottom of Stroke position and press ENTER –or-
Move press ram to desired position, then press JOB LEARN button to save position. Press ENTER.
13. Select Return Speed mode by toggling the UP or DOWN arrows and press ENTER.
14. Set Bend Tonnage (if equipped) and press ENTER.
15. To program additional bends, press YES and repeat steps 7-15.
16. If additional bends are not required, press NO.
17. Press #3 to save job.
18. Rotate Keyed Programming switch to “RUN” Mode and cycle press.

Edit a Bend

1. With Press Brake motor running and current job enabled, Rotate keyed Programming switch to “PROG” (program) Mode.
2. Press #1 on keypad.
3. On new screen, ensure arrow is on “EDIT BEND”(>EDIT BEND), press ENTER.
4. Arrow to EDIT BEND and press ENTER
5. Arrow to desired bend number (or bend function) and press ENTER,
6. If editing ram position, use either arrow key for minute position changes or program new ram position and press ENTER
7. Rotate keyed Program switch to “RUN”

Recalling a Job

1. Start Press Brake motor by depressing the green START button.
2. Rotate keyed Programming switch to "RUN" Mode.
3. Press "JOB/LEARN" button on keypad.
4. Select from Three Options:
 - a. SEARCH FOR JOB
 - b. SCROLL JOB LIST
 - c. CLEAR PARTS COUNT
5. Choose the desired option by depressing the corresponding number on the keypad or by depressing the "↑" or "↓" arrow keys until the desired job has a ">" next to it. Proceed as follows:

Search For Job Option

1. Enter job name/number or beginning search string identifier and press ENTER on keypad.
2. Depress the "↑" or "↓" arrow keys until the desired job has a ">" next to it and press ENTER.
3. Press ESC twice to return to the RUN screen.
4. Job is active and may be "run."

Scroll For Job Option

1. Displays complete database in alphabetical/numeric order.
2. Depress the "↑" or "↓" arrow keys until the desired job has a ">" next to it and press ENTER.
3. Press ESC twice to return to the RUN screen.
4. Job is active and may be "run."

Clear Parts Count

1. Permits the parts counter to be reset.
2. Follow onscreen instructions.
3. After confirming clear, press ESC on keypad until standard RUN screen is displayed.

Steps To Turn Off A CNC Control In Gen II

1. Rotate keyed selector switch to PROGRAM
2. Type "3" for MACHINE SETUP
3. Enter Supervisor Code and press "ENTER"
4. Use ↑ and ↓ until ">" is to the left of BACK GAUGE option and press ENTER
5. Use ↑ and ↓ until NONE is showing and press ENTER
6. Press ESC

NOTE: The press will not cycle until the CNC bypass jumper "Plug" replaces the CNC interface plug. The bypass plug is located inside the main press brake electrical enclosure. Unplug the CNC connector and replace with the bypass plug for Generation II control.

Steps To Turn On A CNC Control In Gen II

1. Rotate keyed selector switch to PROGRAM
2. Type "3" for MACHINE SETUP
3. Enter Supervisor Code and press ENTER
4. Use ↑ and ↓ until ">" is to the left of BACK GAUGE option and press ENTER
5. Use ↑ and ↓ until AUTOMECH or HURCO is showing and press ENTER
6. Press ESC – Only option 3-MACHINE SETUP should be available now
7. Rotate keyed selector switch to RUN
8. CNC is in control.

Change Speed When A 3rd Party CNC Is Running:

1. Rotate keyed selector switch to PROGRAM
2. Type "3" for MACHINE SETUP
3. Enter Supervisor Code and press "ENTER"
4. Use ↑ and ↓ until ">" is to the left of BACK GAUGE option and press ENTER
5. Use ↑ and ↓ until NONE is showing and press ENTER
6. Press ESC
7. Type "1" for TEACH/EDIT JOB
8. Type "2" for EDIT CURRENT JOB
9. Use ↑ and ↓ until ">" is to the left of EDIT JOB and press ENTER
10. Press ENTER until PRESSING SPEED is displayed
11. Type in desired Pressing Speed % and press ENTER
12. Press ESC three times until Main Program Menu is showing
13. Type "3" for MACHINE SETUP
14. Enter Supervisor Code and press ENTER
15. Use ↑ and ↓ until ">" is to the left of BACK GAUGE option and press ENTER
16. Use ↑ and ↓ until AUTOMECH or HURCO is showing and press ENTER
17. Press ESC – Only option 3-MACHINE SETUP should be available now
18. Rotate keyed selector switch to RUN
19. CNC is in control.

Setting the LOWER RAM LIMIT for AUTOMECH CNC Back Gauges

This software revision/version allows the user to set the LOWER RAM LIMIT as a back-up lower limit when a 3rd Party CNC Back Gauge is active. When an Automech or Hurco back gauge has been chosen in the supervisor code protected 3-MACHINE SETUP menu, LOWER RAM LIMIT now shows as an available parameter in the supervisor code protected 3-MACHINE SETUP menu.

Procedure for setting the LOWER RAM LIMIT for AUTOMEK CNC Back Gauges

1. Assuming that AUTOMEK has been chosen as the Back Gauge in the 3-MACHINE SETUP menu
2. Turn the key switch to PROGRAM
3. Type “3” for the 3-MACHINE SETUP menu
4. Enter the Supervisor Code (factory default is 9999) and hit ENTER
5. Use the ↑ or ↓ buttons until the “>” is next to LOWER RAM LIMIT and hit ENTER
6. Change the LOWER RAM LIMIT to 0”, this moves the Generation II LOWER RAM LIMIT out of the way and hit ENTER

CAUTION – This overrides the factory set LOWER RAM LIMIT and can allow the user to bottom out the cylinder!

7. ESC out to the menu which shows 3-MACHINE SETUP
8. Change the run MODE to INCH or RUN 3 – Mode that stops the machine at the bottom of stroke
9. Turn the key switch to RUN
10. Setup and run job using the AUTOMEK CNC
11. At the bottom of stroke, note the scale reading shown on the dual palm pedestal
12. Complete the stroke
13. Turn the key to PROGRAM
14. Type “3” for 3-MACHINE SETUP menu
15. Enter the Supervisor Code and hit ENTER
16. Use ↓ to get to LOWER RAM LIMIT and hit ENTER
17. Change the LOWER RAM LIMIT to a number that does not interfere with the AUTOMEK’s control of the bottom of the bend but meets the following AUTOMEK instructions:

IMPORTANT SAFETY NOTICE TO PRESS BRAKE OPERATORS AND SET UP PERSONNEL

ALWAYS SET PRESS BRAKE LOWER RAM LIMIT WITH PUNCH AND DIE IN PLACE BEFORE OPERATING SYSTEM. SET LOWER RAM LIMIT TO ALLOW FOR THE DEEPEST BEND BUT NOT DEEP ENOUGH TO ALLOW A PUNCH / DIE COLLISION. BE SURE TO ALLOW FOR MATERIAL THICKNESS.

THIS IMPORTANT SAFETY BACK UP GUARDS AGAINST PROGRAMMING ERRORS AND SYSTEM MALFUNCTION.

CAUTION – This allows the user to override the factory set LOWER RAM LIMIT!

18. Hit ESC to get out of MACHINE SETUP menu
19. Turn the key to RUN
20. Machine is ready to run

Bed Leveling Adjustment

Located on the left-hand side when facing the front of the machine, is the Bed Leveling Adjustment Assembly. The Bed Leveling Assembly provides a means of adjusting the Ram to Bed parallelism; adjustment also permits an out of parallel condition to produce tapered bends.

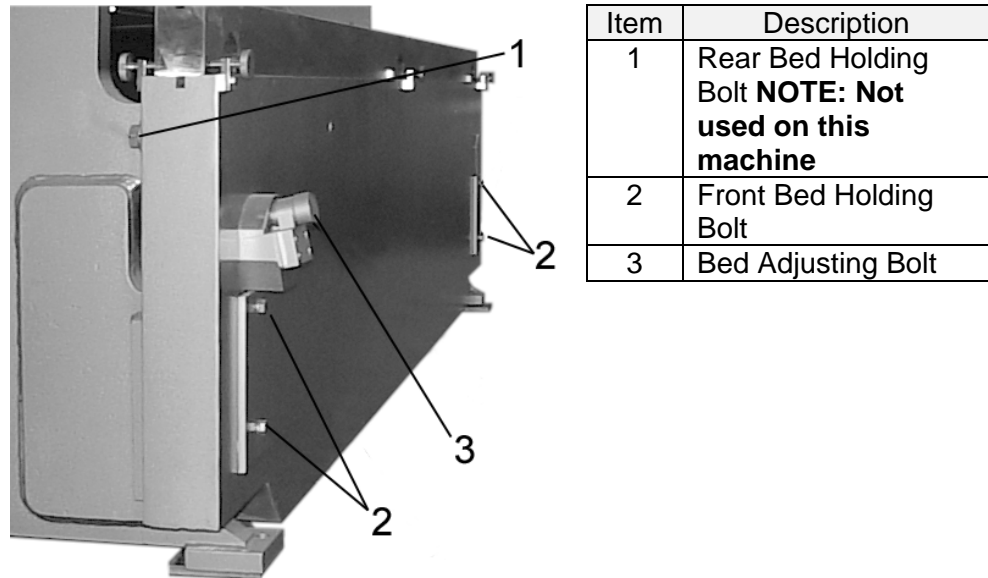


Figure 8: Bed Tilt Wedge Assembly

The following steps represent the typical bed leveling procedure.

1. To adjust the bed, loosen the four bed holding bolts. The four bolts are located front side of the bed, two on each end of the bed. (See *Figure 8 Item 2*).
2. Rotate the adjusting bolt clockwise to lift the bed and counterclockwise to lower. (See *Figure 8 Item 3*).
3. Snug the bed holding bolts. The bed holding bolts should only be snug enough to compress the lock washers, but should not be over tightened. (See *Figure 8 Item 2*)

Note: Do not adjust bed tilt with the bed under load.

Tooling Installation

Before attempting to install, set or remove any dies from the press brake, the safety section of this manual must be read and understood.

The exact procedure for installation, setting and removal of dies may vary with the type of die used. The following steps are a generalized representation and may be tempered to suit the particular application, though not to the extent of being unsafe.

Always review the instructions provided in this manual and observe the press brake safety rules!

! **NEVER** install chipped, cracked, or damaged tooling.

Insure that the die is of the correct size and type for the press brake, reducing the risk of overloading the machine.

Insure that no tools, bolts or other obstructions are in the die area prior to operating the press brake.

Locate any available safety handling tools required.

Keep the floor and surrounding area clean and free of obstruction, debris and oil.

Press Brake Preparation

1. Start the hydraulic power unit.
2. Lower the ram to the bottom position.
3. Remove all power from the press brake.
4. Turn the operating mode setting to the Off position.

Die Insertion

! **NEVER** at any time allow fingers or hands to be between the dies.

1. Insure that the Press Brake Preparation procedure has been completed before continuing with the insertion of dies.
2. Loosen the die rail set screws and punch clamps.
3. Insert the lower die from the end of the press brake, leaving several inches overhanging the end of the bed
4. Measure the distance between the ram and the lower die to the punch height, verifying sufficient clearance for insertion of the punch.
5. Adjust the position of the ram as required to allow the punch to rest on the lower die with the tongue of the die engaged in the punch clamp.

6. Safely transport the punch to the press brake and rest it on the extended portion of the lower die, aligning the tongue of the punch with the ram groove.
7. Slide the punch into the punch clamp groove aligning the ends of the punch and lower dies.
8. Adjust the ram bottom position to make the dies “kiss,” forcing the punch to fully engage in the punch clamp groove.
9. Tighten the punch clamps and the die rail set screws, securing the dies in the press brake.
10. Return the ram to the up position.

Tooling Removal

! **NEVER** at any time allow fingers or hands to be between the dies.

1. Lower the ram to have a few thousandths gap between the punch and lower die.
2. Loosen the die rail set screws and punch clamps.
3. Raise the ram position slightly upward and verify that the punch will remain resting in the lower die. If not, the punch clamps may require further loosening.
4. If additional clearance is required to allow die removal, adjust the ram position to loosen the die yet keep it well confined.
5. With the punch partially disengaged and guided in the loosened punch clamps, push both the upper and lower dies several inches out the end of the press brake. With hands at the end of the dies, push the dies from the end. **NEVER** place hands or fingers between the dies.
6. Properly position the die transport device at the end of the press brake to accept the punch.
7. With hands at the end of the punch, push the punch towards the transport device, allowing several inches to remain in the punch clamp.
8. Prepare the transport device to completely support the punch, securing the punch from falling as required.
9. Position the transport device to accept the lower die and slide it from the bed.

Tool Adjustments

The following steps are a generalized representation and may be tempered to suit the particular application though not to the extent of being unsafe. It is a good practice to allow for several sample parts during set up operation, lowering the ram in small increments until the desired bend is achieved without overloading the machine.

1. Insert a sample piece of material.
2. Adjust the ram limit settings as required until the desired bend angle is attained. Avoid *over-adjusting* the ram.

Note: Shimming may be required to compensate for punch and die wear and any bed or ram deflection.

Tonnage Requirements

See bending tonnage chart located on side of press brake for approximate bending requirements.

Die Rail Shimming

The Piranha 250 Press Brake is manufactured without a crown in the bed. Occasionally due to deflection, shimming may be required. If shimming is required under the die rail, shims must be placed in progressively thicker increments from each end of the bed (*see Figure 9*). Typically, shimming is required to compensate for bed deflection and must be performed by trained personnel. The following diagram is for reference purposes only as each application will have different requirements.

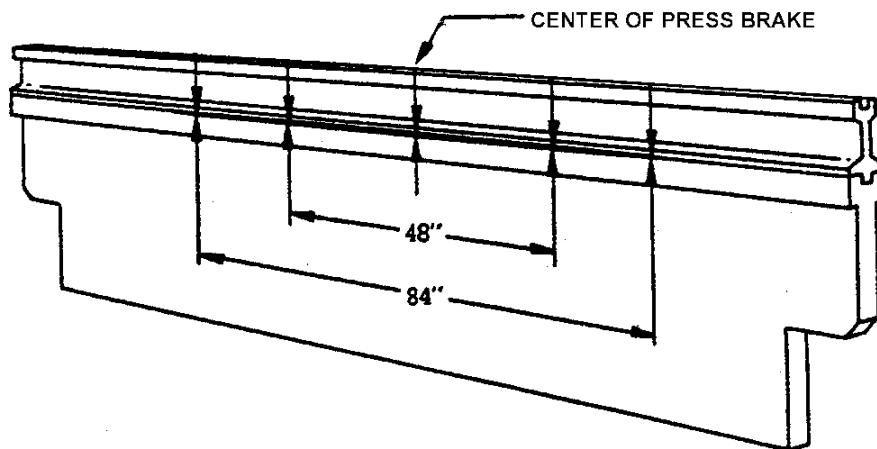


Figure 9: Die Rail Shimming Example

Maintenance Procedures

BEFORE MAINTAINING OR REPAIRING THE PRESS BRAKE, READ AND UNDERSTAND THE CURRENT ANSI B11.3 STANDARD.

This section describes the procedures and requirements for maintaining and repairing the major components of the Piranha 250 Press Brake.

Maintenance Schedule

This section outlines the suggested points and intervals for regular scheduled maintenance. The hydraulic power unit is very sensitive to dirt and other contaminants, but will provide many years of reliable service with a minimum amount of service. The operating temperature and the cleanliness of the oil directly effect the life of the hydraulic oil. Regular oil and filter changes will keep the system clean and free of sticking and clogged valves. Because hydraulic cylinders are lubricated with every stroke, keeping them clean and free of scratches and dings that may damage the cylinder rod seals is most important.

The Piranha 250 Press Brake is shipped with an extra hydraulic oil filter. It is important that after the first forty hours of operation the oil filter be replaced. Upon using the included extra oil filter it is suggested that a replacement filter be ordered for the next scheduled filter change.

See parts list for correct filter part number.

1. After First 40 hours:
 - Change hydraulic filter
 - Check fluid level
 - Check gib clearances
 - Grease ram slides
 - Clean oil cooler by blowing air through radiator portion of the cooler
 - Check fittings, bolts, nuts for tightness
2. Every 40 hours (weekly) thereafter:
 - Grease ram slides.
 - Clean oil cooler by blowing air through radiator portion of the cooler
 - Check fittings, bolts, nuts for tightness
3. Every 3 months:
 - Change hydraulic filter
 - It is recommended that the filter element be changed every 3 months depending on workload and environmental conditions. See repair parts list for re-ordering instructions and the part number.
 - Check hydraulic fluid level
 - Check gib clearances
4. Every Year:
 - Grease electric motor
5. Every Two (2) years:
 - Change hydraulic fluid

Gib Clearance Adjustment

Proper maintenance of the gibs will require periodic adjustment of the gib clearances.

Gib Adjustment

1. Position press brake ram so the ram slide is in full contact with the gibs.
2. Loosen Rear Adjustment Screw Jam Nuts on both ends of the press brake. (*See Figure 10 Item 1*)
3. Using a torque wrench of correct torque range, torque top and bottom set screws to 150-**in. lbs.** (12.5-ft. lbs.).
4. Tighten remaining set screws (between top and bottom set screws) to same torque.
5. **Repeat steps 2 & 3.**
6. Back off the set screws 1/8 turn and tighten jam nuts.
7. Repeat this procedure for the other end of the press brake.

Side Thrust Gib Adjustment

1. Position press brake ram so the ram slide is in full contact with the gibs.
2. Verify that the ram is aligned with the bed (left to right).
3. Loosen Slide Mounting Bracket Jam Nuts on both ends of the press brake. (*See Figure 10 Item 2*)
4. Using a torque wrench of correct torque range, torque top and bottom set screws to 150-**in. lbs.** (12.5-ft. lbs.).
5. Repeat step 3 on opposite end of press brake.
6. Tighten remaining set screws (between top and bottom set screws) to same torque.
7. Repeat step 3 on opposite end of press brake.
8. **Re-torque set screws on both ends of press brake.**
9. Back off set screws 1/8 turn and tighten jam nuts on **left side of press only.**
10. Tighten jam nuts on right side of press brake.

Ram Slides

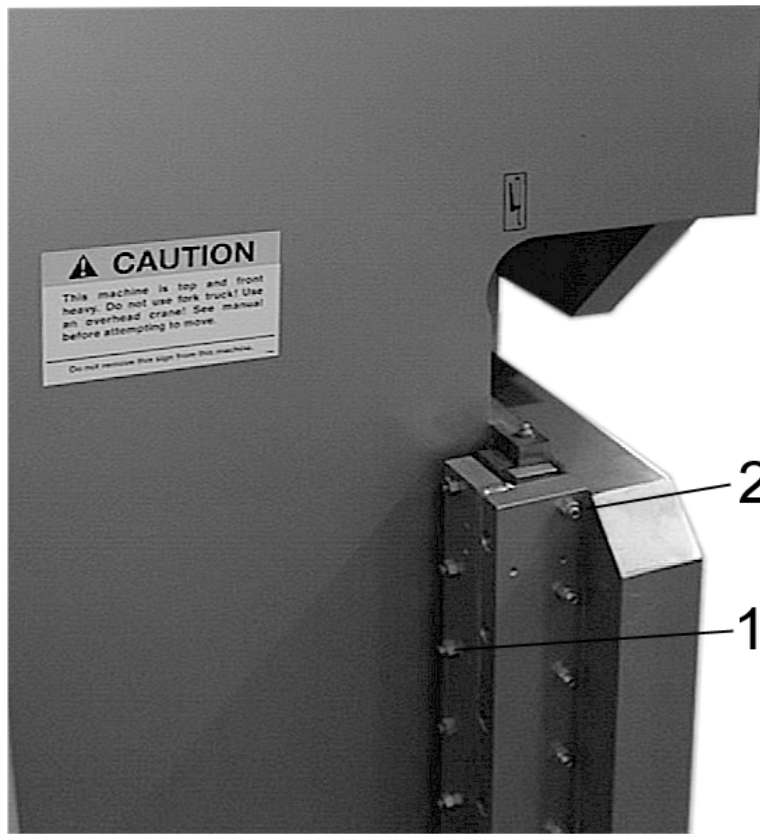


Figure 10: Gib Explanation

Hydraulic Power Unit

The hydraulic power unit is a sophisticated and complex system. Only trained personnel should attempt to perform adjustment procedures on the unit. The power unit generates very high pressures. **Never check for leaks using hands.**

Before servicing the hydraulic system, block the ram and turn power off.

Oil Filter Replacement

Verify the exact element number prior to ordering the replacement element.

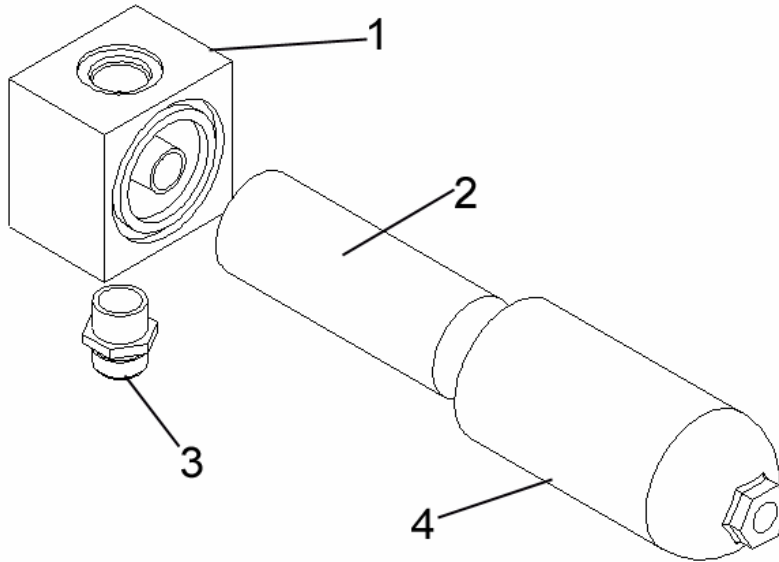


Figure 11: Oil Filter Assembly Exploded View

| Item | Description |
|------|-----------------|
| 1 | Filter Body |
| 2 | Filter Element |
| 3 | Fitting - inlet |
| 4 | Filter Bowl |

Table 3: Oil Filter Assembly Descriptions

The following steps represent a typical filter element replacement.

1. Insure the main electric power is locked out at the safety disconnect.
2. Place a small container (½-gallon) under the filter bowl.
3. Remove the filter bowl by turning in a counterclockwise direction.
4. Remove the filter element by pulling and turning at the same time.
5. Lubricate the O-ring on the new filter with hydraulic oil and slide into place.
6. Wipe the inside of the filter element bowl; lubricate the O-ring and replace.

Hydraulic & Electrical Diagrams

Electrical Diagrams

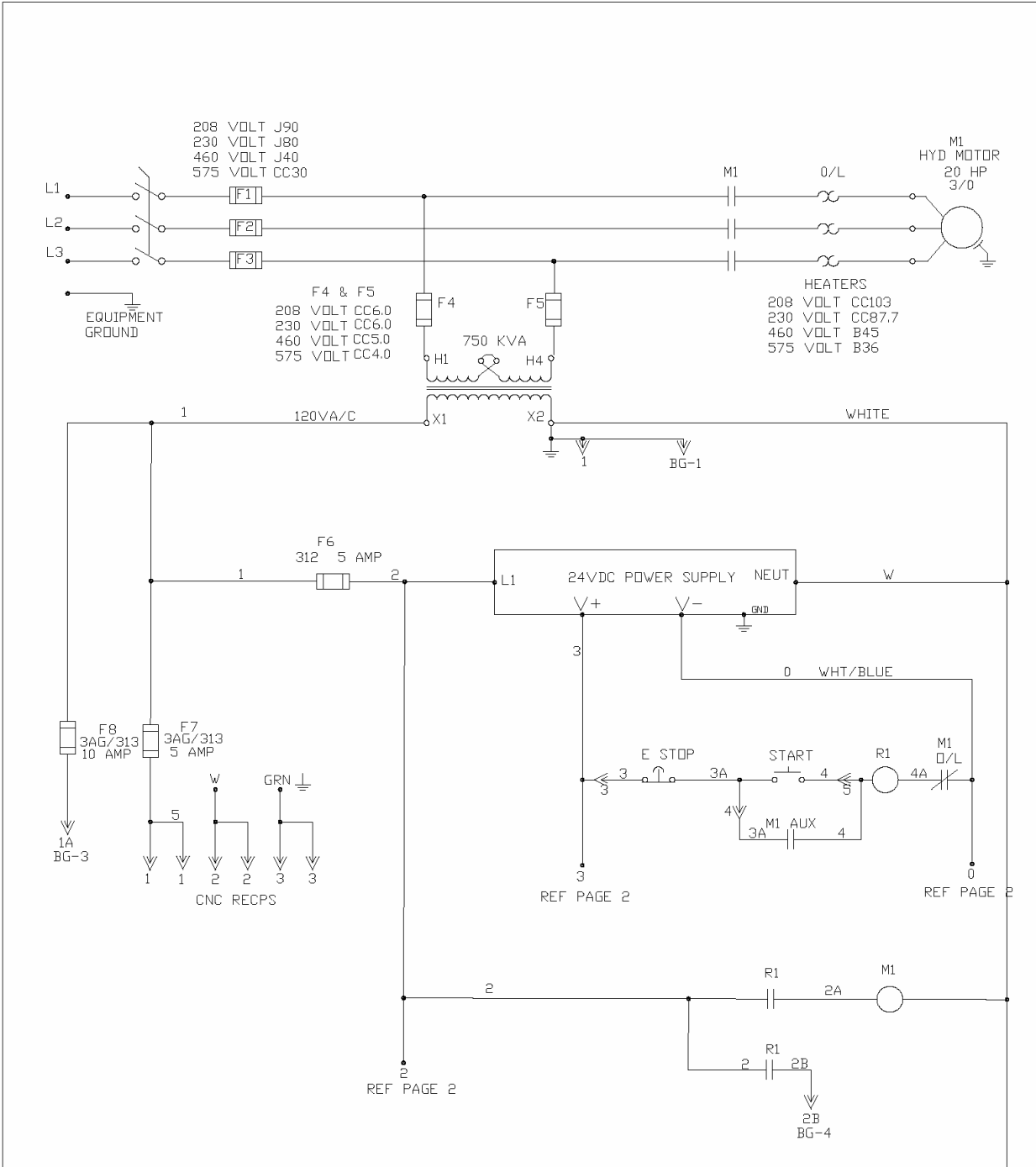


Figure 12: Electrical Diagram 1 of 4

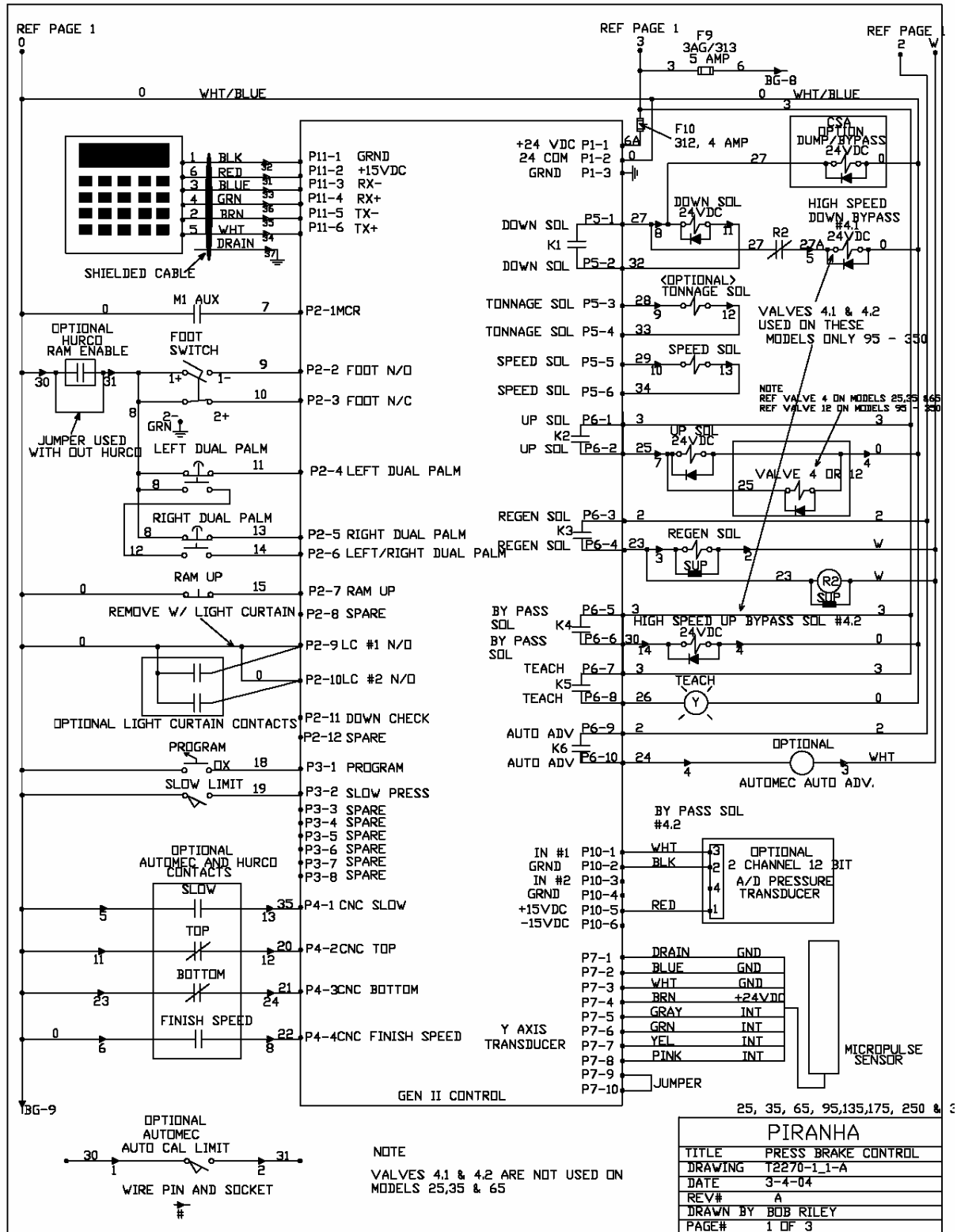
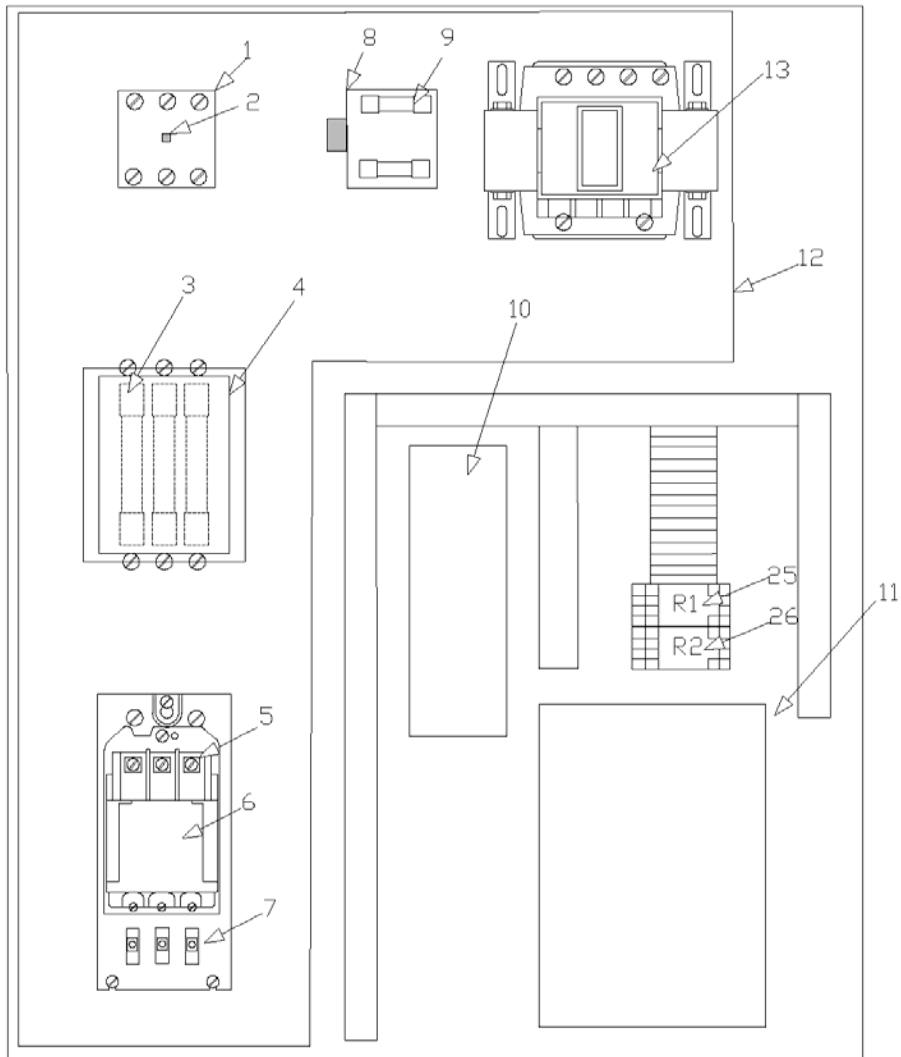


Figure 13: Electrical Diagram 2 of 4

VIEW OF BACK PLATE



| | |
|----------|---------------------|
| PIRANHA | |
| TITLE | PRESS BRAKE CONTROL |
| DRAWING | T2270-1_2 |
| DATE | 12-15-03 |
| REV# | - |
| DRAWN BY | BOB RILEY |
| PAGE# | 2 OF 3 |

Figure 14: Electrical Diagram 3 of 4

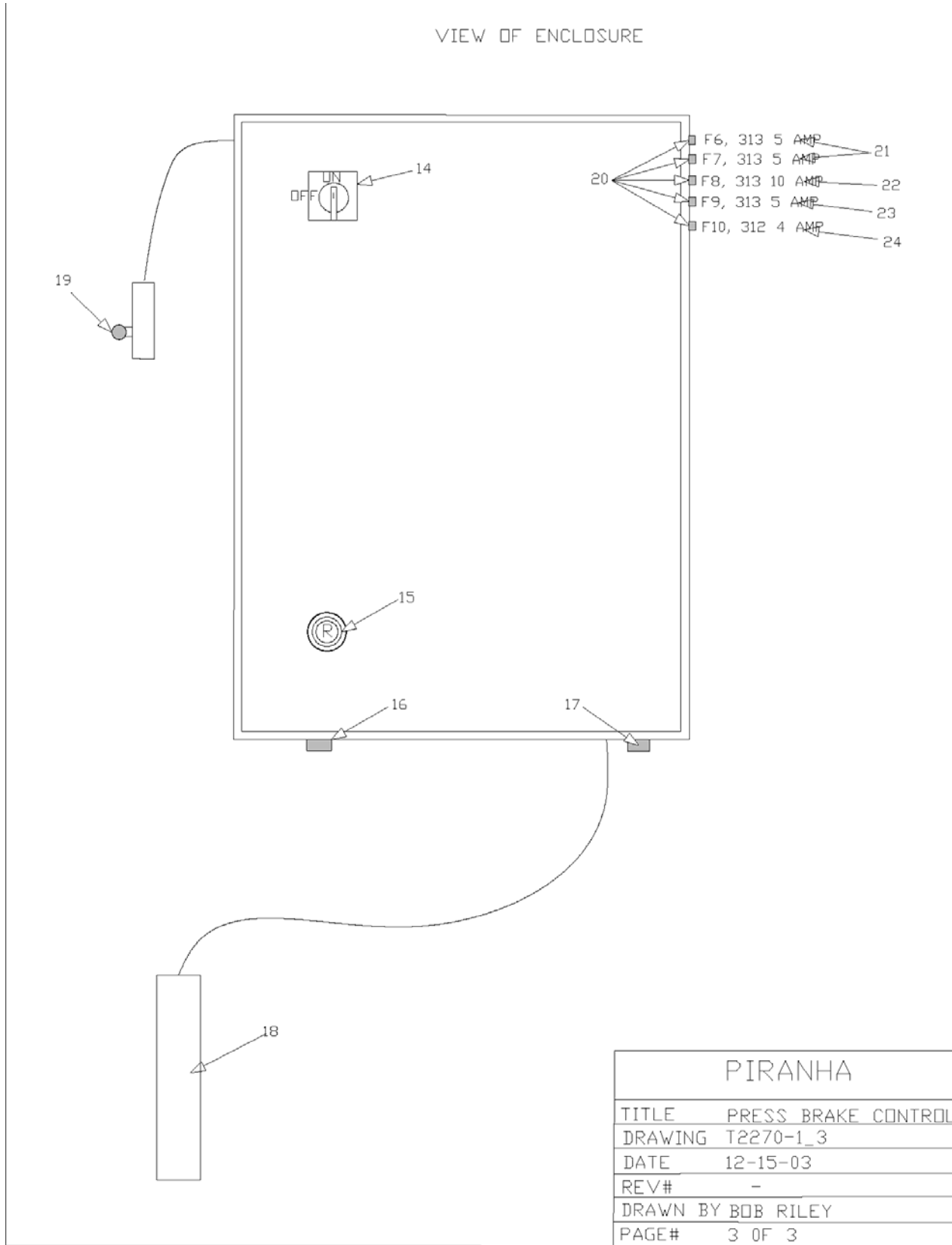


Figure 15 Electrical Diagram 4 of 4

Electrical Parts List

| DESCRIPTION | QTY | HP/VOLTAGE | PIRANHA PT# | FIG. # |
|---------------------------------------|-----|-----------------|-------------|--------|
| DISCONNECT | 1 | 20 HP 208V | 591602 | 1 |
| DISCONNECT | 1 | 20 HP 230V | 591602 | 1 |
| DISCONNECT | 1 | 20 HP 460V | 531605 | 1 |
| DISCONNECT | 1 | 20 HP 575V | 531605 | 1 |
| DISCONNECT SHAFT | 1 | ALL | 0591602 | 2 |
| FUSES, MOTOR SHORT CIRCUIT | 3 | 20HP 208V | T0781 | 3 |
| FUSES, MOTOR SHORT CIRCUIT | 3 | 20HP 230V | T0780 | 3 |
| FUSES, MOTOR SHORT CIRCUIT | 3 | 20HP 460V | T0777 | 3 |
| FUSES, MOTOR SHORT CIRCUIT | 3 | 20HP 575V | T0775 | 3 |
| FUSE BLOCK, MOTOR SHORT CIRCUIT | 1 | 20HP 208V | T0784 | 4 |
| FUSE BLOCK, MOTOR SHORT CIRCUIT | 1 | 20HP 230V | T0784 | 4 |
| FUSE BLOCK, MOTOR SHORT CIRCUIT | 1 | 20HP 460V | T0782 | 4 |
| FUSE BLOCK, MOTOR SHORT CIRCUIT | 1 | 20HP 575V | T0783 | 4 |
| STARTER, M1 | 1 | 20HP 208V | T0729 | 5 |
| STARTER, M1 | 1 | 20HP 230V | T0729 | 5 |
| STARTER, M1 | 1 | 20HP 460V | T2257 | 5 |
| STARTER, M1 | 1 | 20HP 575V | T2257 | 5 |
| STARTER AUX. CONTACT BLOCK | 1 | ALL | T2253 | 6 |
| HEATERS, OVERLOAD, MOTOR M1 | 3 | 20HP 208V | T0786 | 7 |
| HEATERS, OVERLOAD, MOTOR M1 | 3 | 20HP 230V | T0788 | 7 |
| HEATERS, OVERLOAD, MOTOR M1 | 3 | 20HP 460V | 0531638 | 7 |
| HEATERS, OVERLOAD, MOTOR M1 | 3 | 20HP 575V | T2258 | 7 |
| FUSE HOLDER, TRANSFORMER PRIMARY | 1 | ALL | T1302 | 8 |
| TRANSFORMER PRIMARY FUSES | 2 | ALL HP 208/230V | T1138 | 9 |
| TRANSFORMER PRIMARY FUSES | 2 | ALL HP 460V | T1139 | 9 |
| TRANSFORMER PRIMARY FUSES | 2 | ALL HP 575V | T2279 | 9 |
| POWER SUPPLY, 24VDC | 1 | ALL | T2560 | 10 |
| GENERATION II CONTROL MODULE | 1 | ALL | T2267 | 11 |
| MOTOR POWER SUB BACK PLATE | 1 | ALL | T2323-A | 12 |
| TRANSFORMER | 1 | 20HP 208V | T1134 | 13 |
| TRANSFORMER | 1 | 20HP 230V | T1135 | 13 |
| TRANSFORMER | 1 | 20HP 460V | T1135 | 13 |
| TRANSFORMER | 1 | 20HP 575V | T1136 | 13 |
| DISCONNECT OPERATOR | 1 | ALL | 0531604 | 14 |
| RESET BUTTON W/ SHAFT | 1 | ALL | 0531686-1 | 15 |
| RECP.,DUAL PALM | 1 | ALL | T1311 | 16 |
| RECP FOOTSWITCH CONTROL MODULE | 1 | ALL | T2561 | 17 |
| MICRO PULSE SCALE | 1 | ALL | T1976 | 18 |
| LIMIT SWITCH | 1 | ALL | 0531615 | 19 |
| FUSE HOLDER, CONTROL AND AUTOMECH CNC | 2 | ALL | T0733 | 20 |
| FUSE, CONTROL AND AUTOMECH CNC | 2 | ALL | T01140 | 21 |

Hydraulic Diagram

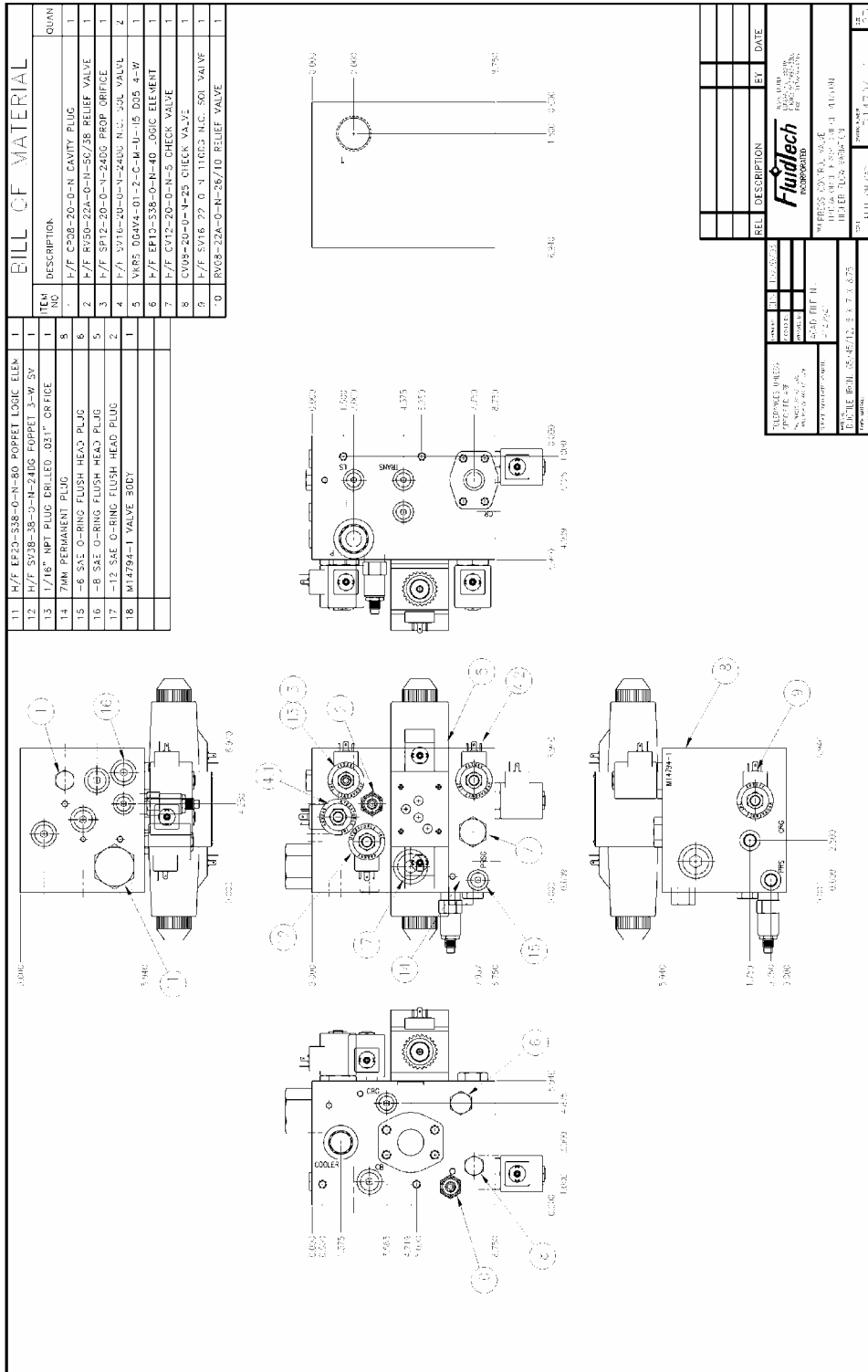
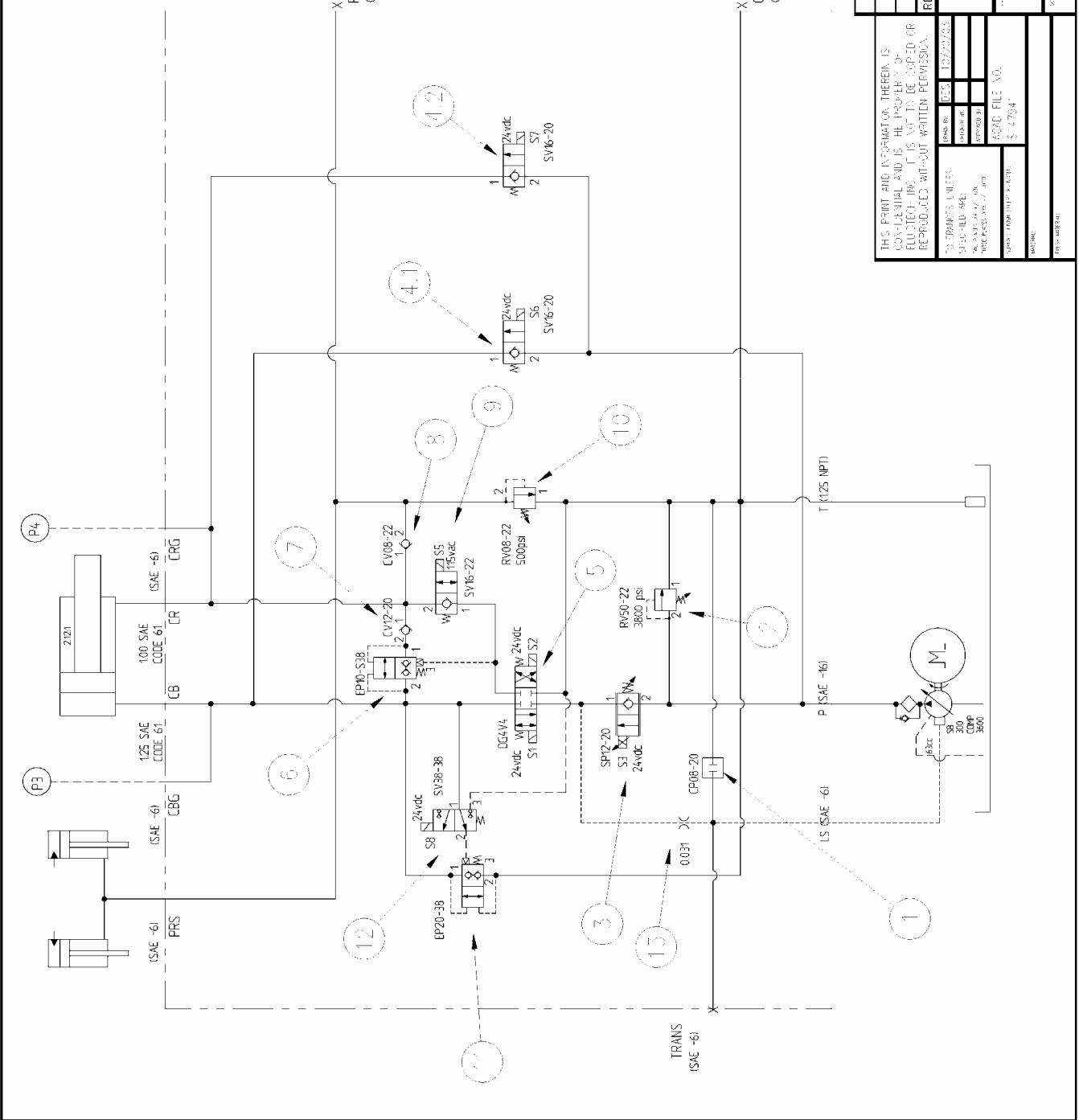


Figure 19 Hydraulic Diagram

APPROACH S1/S3/S6
 PRESS S1/S3 ONLY
 FINISH S1/S3 ONLY
 RETURN S2/S3/S7/S8



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HYDRAULIC CONTROL VALVE
 HYDRAULIC S-ELECTRIC
 INDICATOR FOR VALVE POSITION

DATE: 5-4794-1

REV: E

Parts

Diagrams are provided for the major assemblies of the press brake. The accompanying parts lists provide item references and descriptions. Part numbers and quantities are provided only where applicable.

Repair parts are available for the Piranha 250 Press Brake from the manufacturer. Always provide the model and complete serial number of the press brake along with the part number description and quantity of the desired parts.

Ram Linkage

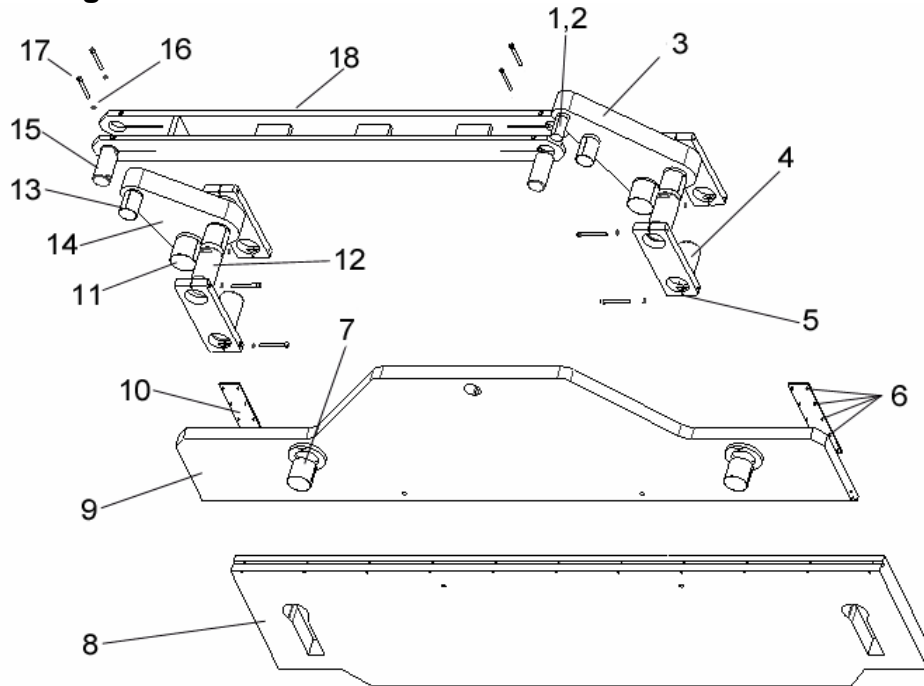


Figure 16: Ram Linkage

| Item | Description | Part # | Qty. |
|------|---------------------------------|---------|------|
| 1 | Cylinder Lever Gar-fil® Bushing | T2451 | 1 |
| 2 | Cylinder Lever Pin | T2628 | 1 |
| 3 | Long Lever | T2869 | 1 |
| 4 | Linkage Pin | T2526 | 4 |
| 5 | Link | T2517 | 4 |
| 6 | Brass Screws ¼ x ½ | T0070 | 20 |
| 7 | Link Ram Gar-fil® Bushing | T2464 | 4 |
| 8 | Bed | T10878 | 1 |
| 9 | Ram | T2871 | 1 |
| 10 | Ram Phenolic | T09793 | 2 |
| 11 | Hinge Pin Gar-fil® | T2465 | 2 |
| 12 | Hinge Pin | T2525 | 2 |
| 13 | C-Rod Gar-fil® | T2461 | 2 |
| 14 | Short Lever | T2870 | 1 |
| 15 | C-Rod Pin | T2524 | 2 |
| 16 | Lock Washer | T0709 | 12 |
| 17 | ½ X 5 SHCS | 0571055 | 12 |
| 18 | C-Rod | T2519 | 1 |

Hydraulic Assemblies

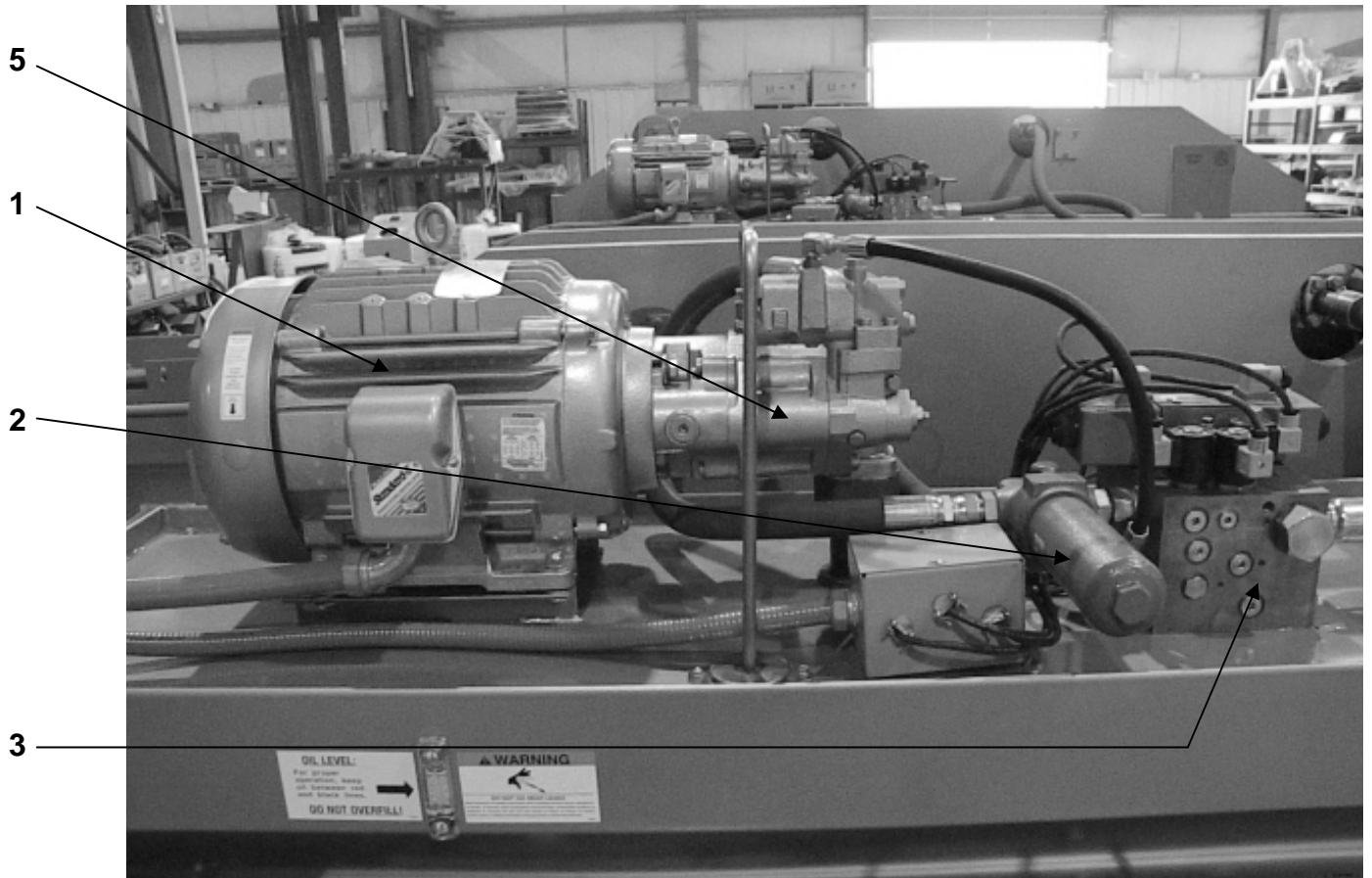


Figure 17: Hydraulic Power Unit

| Item | Description | Part # | Qty. |
|------|----------------------|-----------|------|
| 1 | Motor | | |
| | 20 HP - 208 Volt | 0571662-2 | 1 |
| | 20 HP - 220/440 Volt | 0571660-2 | 1 |
| | 20 HP - 575 Volt | 0571665-2 | 1 |
| 2 | Filter Assembly | 0591550-1 | 1 |
| 3 | Valvepak Assembly | T2271-2 | 1 |
| 4 | Cylinder Assembly | T0676-1 | 1 |
| | Cylinder Seal Kit | T0696 | 1 |
| 5 | Pump | T1051-1 | 1 |

Table 4: Hydraulic Power Unit Descriptions

Valve Body Assembly

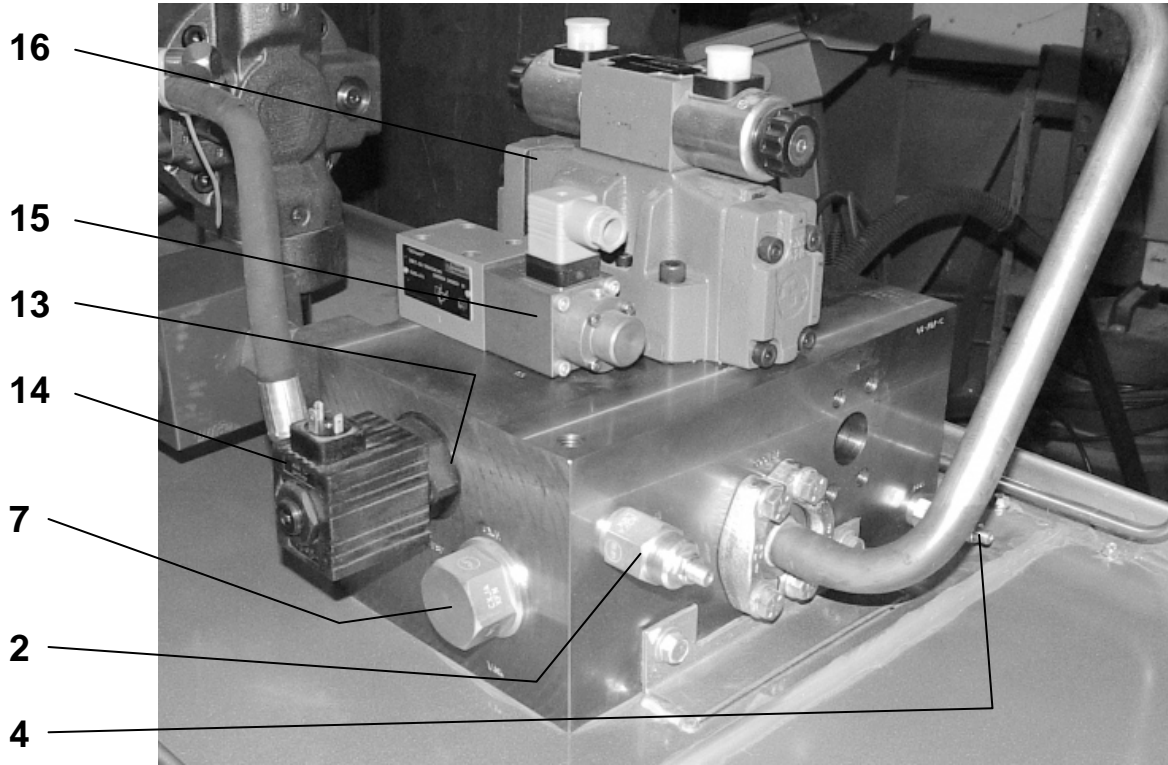


Figure 18: Valve Body Assembly Front View – T2271

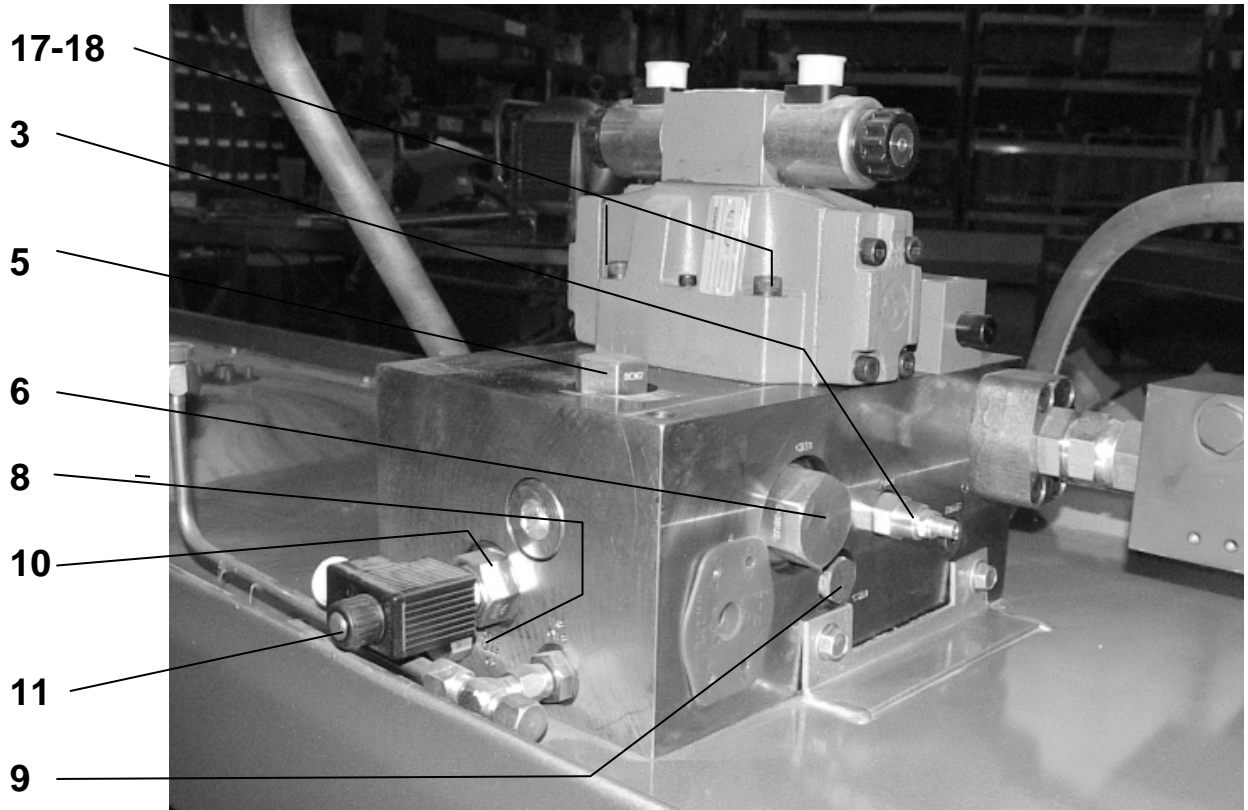


Figure 19: Valve Body Assembly Rear View – T2271

Hydraulic Valve Body Components

| Item # | Part Description | Valve Function/Location | Part # | Coil # | Seal # |
|--------|--------------------------------------|-----------------------------|---------|---------|--------|
| 1. | Valve Pack body | | T2424 | n/a | n/a |
| 2. | Relief valve | System relief | T2425 | n/a | |
| 3. | Pressure reducing valve | Pilot reducing valve | T1035 | n/a | T1036 |
| 4. | Relief valve | PRS relief | T2426 | n/a | T1034 |
| 5. | P. C. Check | Regen check | T1037 | n/a | T0869 |
| 6. | P.O. Check | Ram check valve | T2427 | n/a | |
| 7. | Check Valve | Cooler check valve | T2428 | n/a | T1057 |
| 8. | Check Valve | PRS check valve | T1070 | n/a | T1079 |
| 9. | Shuttle Valve | Load sense | T1042 | n/a | T0870 |
| 10. | Valve, 2 position, 2 way | Regen valve | T1044 | n/a | T1045 |
| 11. | Valve, normally closed, 2 way | Regen valve | T0240-1 | 0591541 | T1066 |
| 12. | Cavity Plug | Compensator | T2429 | n/a | T0869 |
| 13. | Valve, Solenoid, Proportional | Speed control w/ coil | T2430 | | |
| 14. | Coil for above if ordered separately | | | T2603 | |
| 15. | Cover plate w/ hardware & seals | Non-tonnage control config. | | | |
| 15. | * Valve proportional Pressure | Tonnage control w/ coil | T1060 | T1043 | T1048 |
| 15. | * Mounting Screws | Tonnage control | 23149 | n/a | n/a |
| 16. | Directional Control Valve, main | Cylinder | T2431 | T1052 | T1053 |
| 17. | Directional valve mtg. Screws | Cylinder | T2432 | n/a | n/a |
| 18. | Directional valve mtg. Screws | Cylinder | T2433 | n/a | n/a |

* If equipped

Hose and Fittings

| Location | Part Number | Description | QTY |
|----------------------|-------------|-----------------------------------|-----|
| Suction on pump | T0910 | 4 bolt flange 1-1/2 | 1 |
| Outlet on pump | T1636 | #16 Split Flange Kit | 1 |
| Inlet on filter | 5001024 | #16 SAE ORB/#16 37JIC Flare | 1 |
| Outlet of filter | 5001024 | #16 SAE ORB/#16 37JIC Flare | 1 |
| P-port valve | T0911 | 1" 4 Bolt Flange Adapter | 1 |
| Filter/Valve | T1727 | #16 SAE ORB/37 JIC Swivel Nut | 1 |
| A-port valve | T1636 | #16 Split Flange Kit | 1 |
| A-port cyl. | T1636 | #16 Split Flange Kit | 1 |
| B-port valve | T1735 | #20 Split Flange Kit | 1 |
| B-port cyl. | T1735 | #20 Split Flange Kit | 1 |
| Cooler Port Valve | T1735 | #20 Split Flange Kit | 1 |
| Case drain pump | T0915 | #10 SAE o-ring | 1 |
| Load sense pump | T0916 | #4 SAE o-ring | 1 |
| Load sense valve | T0917 | #6 SAE o-ring | 1 |
| Oil Cooler Outlet | T0955 | #12 ORB/#16OFS | 1 |
| Oil Cooler Inlet | T2700 | #12 ORB/#16 OFS 90 Elbow | 1 |
| Gauge port valve | 0571506 | #6 SAE o-ring | 1 |
| Gauge Ftg. Cap | 541531 | #6 JIC Cap Nut | 1 |
| Gauge Adapter | 0531514 | #6 Jic Swivel/ 1/4 NPT Female | 1 |
| Suction tube | T0908 | 1-1/2 pipe 12" long | 1 |
| Hose filter-valve | T2324 | #16 4 BOLT90/SN JIC x 42 LG | 1 |
| Return valve | T0951 | 1-1/4 pipe 12" long | 1 |
| Return case drain | T0894 | 3/4" hydraulic tube | 1 |
| Hose load sense | T0949 | #6 SN ORFS X 16 LG | 1 |
| Valve To Cooler Tube | T2623 | 1" OD Tube Assy | 1 |
| Cooler to Tank Tube | T0893-1 | 1" OD Tube Assy | 1 |
| Tank outlet | 0531516 | 1/2 Pipe plug | 1 |
| Tank outlet | T0058 | 1/2 Pipe ball valve | 1 |
| Tank outlet | T0128 | 1/2 Pipe close nipple | 1 |
| Suction tube seal | T0909 | RF-1373 LHA 2 bolt flange | 1 |
| Case Drain tube seal | T0948 | LHA #5767 2 bolt flange 3/4" tube | 1 |
| Cooler Tube Seal | T0950 | 1" Tube, 2 Bolt Flange | 1 |
| Valve A To Cyl Ret | T2397 | Hose Assy - Cyl Retract | 1 |
| Valve B To Cyl Ext | T2398 | Hose Assy - Cyl Extend | 1 |

PRS Components

| Location | Part No. | Description | QTY |
|---------------------|----------------|---------------------------------|-----|
| Tube clamp for PRS | T1802 | 1/2" Tube clamp | 1 |
| Tube Assy - RH, | T1739-2, rev A | | 1 |
| Tube Assy - LH, | T1739-2, rev A | | 1 |
| Tube Assy - Supply, | T2400 | | 1 |
| Tee, PRS system | T1751 | Tee - No. 8 JIC | 2 |
| Elbow, PRS System | 0581706 | 90 Elbow - 8 ORB/8 JIC | 2 |
| Breather Plug | T1741 | Breather Plug, 8 ORB | 2 |
| Adapter | T2331 | Adapter - #8ORB/JIC SWIV | 1 |
| Reducer | T2604 | No 8 JIC Female - No 6 JIC Male | 1 |
| Cap at Valve tee | 541531 | No 6 JIC Female | 1 |

Ram Slides



Figure 20: Gib Parts

| Item | Description | Part # | Qty |
|------|---------------------------------------|---------|-----|
| 29-1 | Slide/Rear Ram Slide Bearing | T0682 | 4 |
| 29-2 | Grease Zerk 1/3" pipe | 0531360 | 2 |
| 29-3 | Ram Slide Right (Opposite End) | T0672 | 1 |
| | Ram Slide Left | T0673 | 1 |
| 29-4 | Slide Mounting Bracket | T0631 | 2 |
| 29-5 | 3/8 x 3 1/2 SHCS | 0521030 | 12 |
| 29-6 | Side Adjustment Screw 3/8 X 2-1/4 SSS | T0078 | 10 |
| 29-7 | Rear Adjustment Screw 3/8 X 2 SSS | T0125 | 10 |
| | Rear/Side Adjustment Nut | 0531210 | 20 |

Oil Filter Assembly (Part number 0591550+)

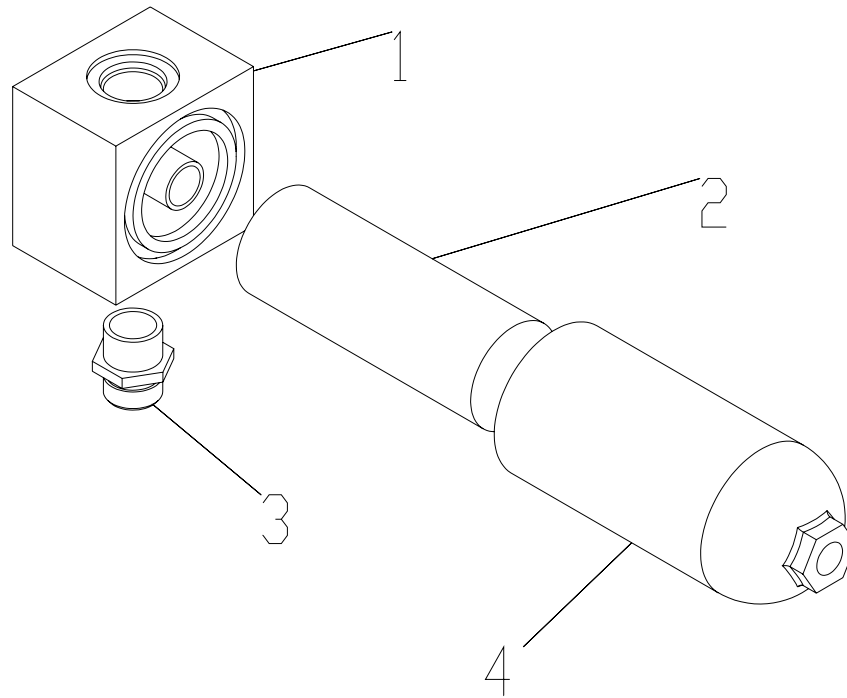


Figure 21: Oil Filter Assembly Exploded View 0591550+

| Figure-Item | Description | Part # |
|-------------|-----------------|----------|
| 31-1 | Filter Body | |
| 31-2 | Filter Element | 0591551* |
| 31-3 | Fitting – inlet | T0913 |
| 31-4 | Filter Bowl | |

+0591550-1 @ SN: 1017 and higher

*0591551-1 @ SN: 1017 and higher

Wedge Assembly

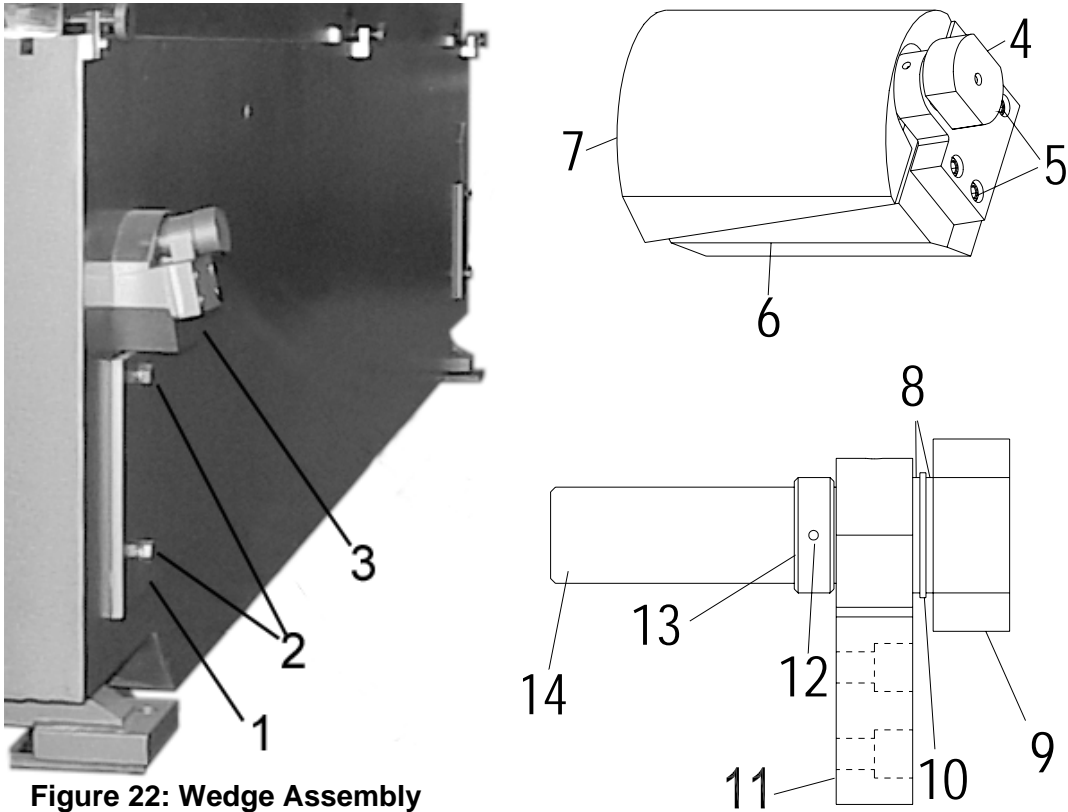


Figure 22: Wedge Assembly

| Figure-Item | Description | Qty. | Part # |
|-------------|---|------|----------|
| 32-1 | Key plate | 2 | T2767 |
| 32-2 | 5/8 x 2 SHCS | 4 | T0080 |
| | 5/8 LW | 4 | 0531304 |
| 32-3 | Wedge assembly | 1 | T2742 |
| 32-4 | Wedge adjustment bolt assembly Hem 8-12 | 1 | T0620 |
| 32-5 | SHCS 3/8 – 16 x 1-1/4 | 1 | 05131051 |
| 32-6 | Wedge bottom half | 1 | T2746 |
| 32-7 | Wedge top half | 4 | T2745 |
| 32-8 | Wedge thrust washer | 2 | T462 |
| 32-9 | Wedge bolt and nut assembly 175 | 1 | T0610 |
| 32-10 | Wedge thrust bearing | 1 | T440 |
| 32-11 | Wedge bottom plate 175 | 1 | T2749 |
| 32-12 | Roll pin 1/8 x 1-1/2 | 1 | T0694 |
| 32-13 | Wedge adjust bolt | 1 | T2750 |
| 32-14 | Wedge bolt nut | 1 | T2753 |

Die Rail Centering Screw Assembly (Optional)

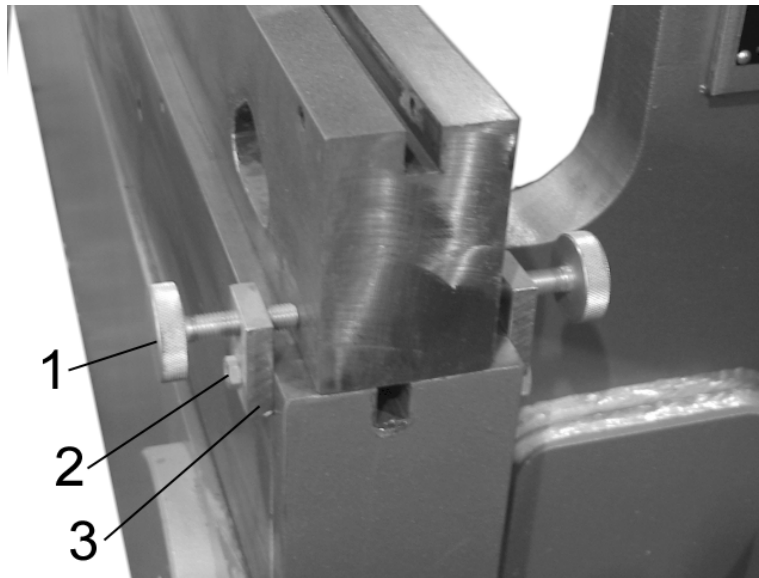


Figure 23: Die Rail Centering Screw Assembly

| Figure-Item | Description | Qty. | Part # |
|-------------|-------------------------------|------|--------|
| 33-1 | Die Rail Adjusting Hand Screw | 6 | T0056 |
| 33-2 | 7/8"-16 x 1-1/2" HHCS | 6 | T0186 |
| 33-3 | Die Rail Adjusting Block | 6 | T9202 |

Punch Clamp Assembly

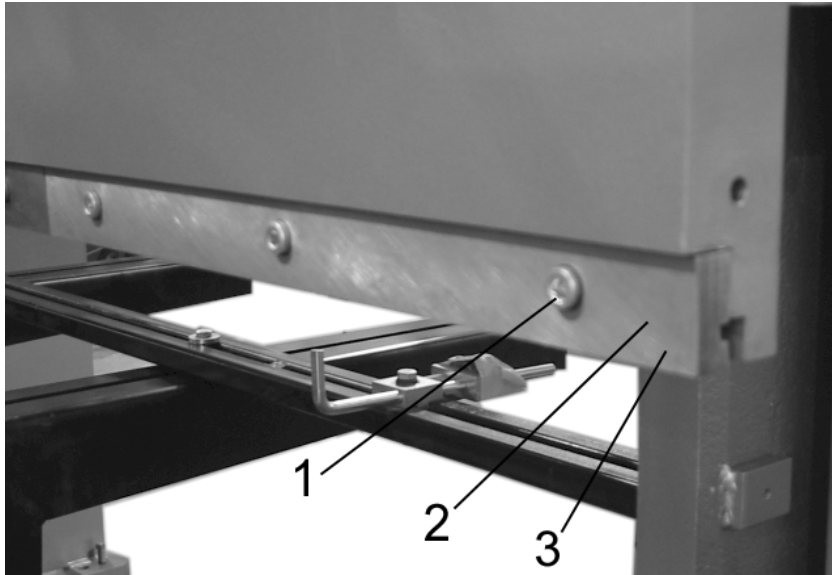


Figure 24: Punch Clamp Assembly

| Figure – Item | Description | Qty | Part # |
|---------------|------------------------------------|-----|--------|
| 35-1 | 1/2-13 x 2" Socket Head Cap Screws | 18 | T0995 |
| 35-2 | Punch Clamp Spring | 12 | T0050 |
| 35-3 | Punch Clamp | 6 | T2322 |

Backstop Assembly (Optional)

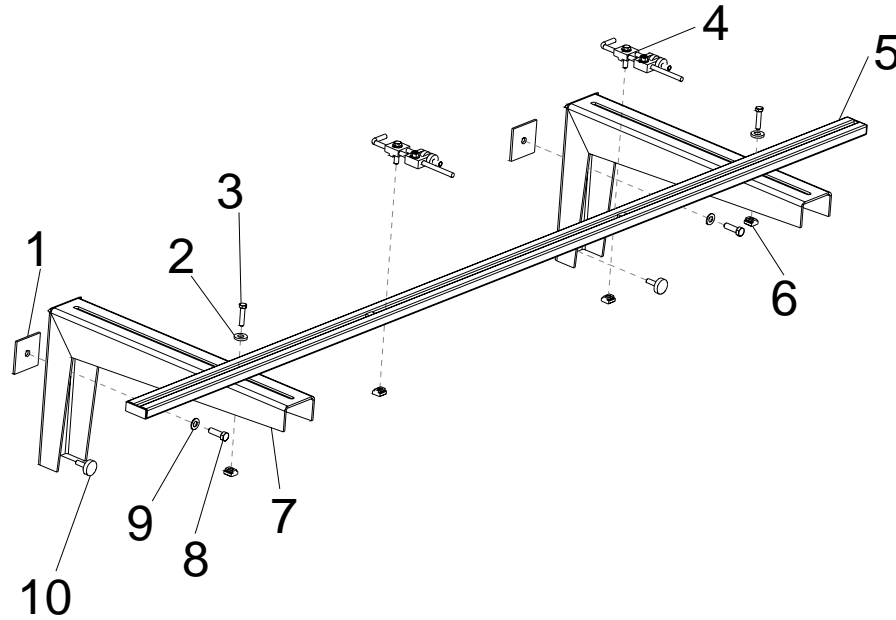


Figure 25: Back Gauge Assembly T14-805

| Figure - Item | Description | Qty | Part # |
|---------------|---|-----|---------|
| 36-1 | Spacer Plate, Back Gauge | 2 | T37311 |
| 36-2 | 1/2" Flat Washer, 1/4" Thick, 1-1/2" OD | 2 | T0057 |
| 36-3 | HHCS 1/2" x 2-1/4" | 2 | 0581108 |
| 36-4 | Back Stop Finger Assembly | 2 | T14-995 |
| 36-5 | Back Stop Bar Weldment | 1 | T37231 |
| 36-6 | T-Nut 5/8" | 2 | 0531723 |
| 36-7 | Back Gauge Mount Bracket Weldment | 2 | T37311 |
| 36-8 | HHCS 5/8" x 2" | 2 | T0080 |
| 36-9 | Washer 5/8" | 2 | 0531311 |
| 36-10 | Hand Adjusting Screw | 2 | T0056 |

Back Stop Finger Assembly (Optional)

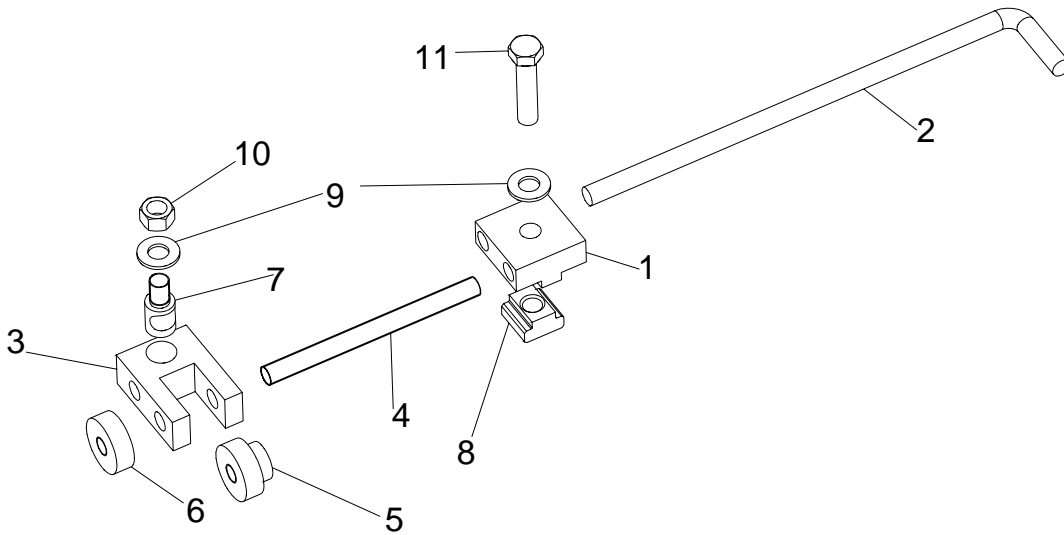


Figure 26: Back Stop Finger Assembly T14-995

| Figure - Item | Description | Qty | Part # |
|---------------|----------------------|-----|---------|
| 37-1 | Mounting Block Top | 1 | T9048 |
| 37-2 | Back Stop Finger Bar | 1 | T3801 |
| 37-3 | Adjusting Block | 1 | T0084 |
| 37-4 | Adjusting Bar | 1 | T0086 |
| 37-5 | Adjusting Nut | 1 | T0087 |
| 37-6 | Locking Nut | 1 | T0088 |
| 37-7 | Locking Bolt | 1 | T0085 |
| 37-8 | T-Nut 5/8 | 1 | 0531723 |
| 37-9 | Flat Washer 1/2" | 2 | T0057 |
| 37-10 | Hex Nut 1/2" | 1 | 0581195 |
| 37-11 | HHCS 1/2 x 2-1/4 | 1 | 0581108 |

Die Rail (Optional)

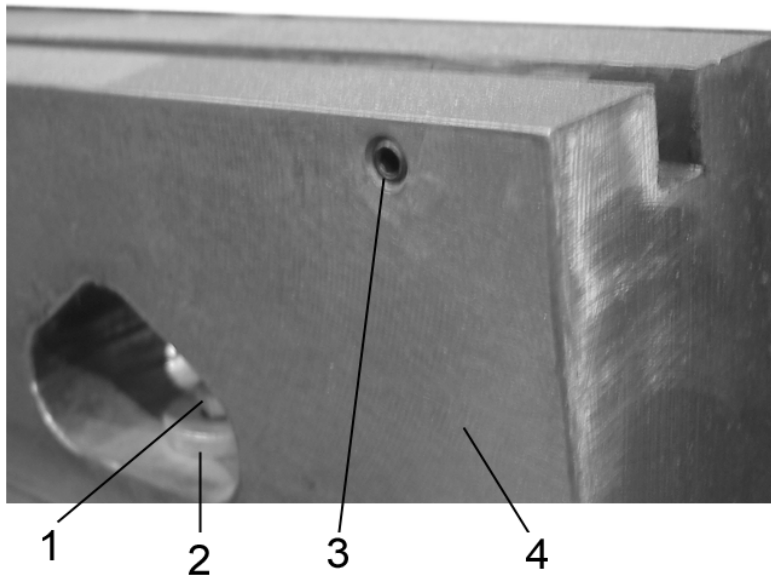


Figure 27: Die Rail

| Figure-Item | Description | Qty. | Part # |
|-------------|------------------------------|------|---------|
| 38-1 | 1/2" x 2 3/4" HHCS | 3 | 0581105 |
| 38-2 | 1/2" Hard Flat Washer | 3 | T0057 |
| 38-3 | 3/8"-16 x 3/4" SSS Cup Point | 26 | 0531056 |
| 38-4 | Die Rail 250-12 | 1 | T2334 |

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Glossary

| | |
|------------------------------------|---|
| AC Motor | <i>An electric motor designed to operate using AC power.</i> |
| Accuracy | <i>The deviation of a value from its theoretical value after the device has been correctly calibrated.</i> |
| Air Bending | <i>The forming of sheet or plate using a “V” die where the desired angle is achieved before the work piece is compressed between the upper and lower tools.</i> |
| Ambient Condition | <i>The surrounding atmosphere and environment.</i> |
| ANSI | <i>American National Standards Institute. A national, nonprofit organization. Its principle function is to establish industry-wide standards that are put in place through a process of consensus among qualified participants.</i> |
| Backlash | <i>Mechanical clearances that exists or may develop through wear between a driven component and a drive source.</i> |
| Ball Bushing/Linear Bearing | <i>A tubular shaped ball bearing assembly designed for linear movement on a shaft.</i> |
| Bed | <i>The stationary member of the press brake that supports the tooling and other associated equipment.</i> |
| Bolster (bolster plate) | <i>The plate(s) attached to the bed or ram having means for attaching die components.</i> |
| Bottom Bending | <i>The forming of sheet or plate using “V” die where the desired angle is completed after the work piece is compressed between the upper and lower tools. Typically requires 3-5 times the tonnage for air bending.</i> |
| C Frame | <i>Vertical side frame of the press brake.</i> |
| Circuit Breaker | <i>A device used with electrical equipment to provide overload protection.</i> |
| Closed Height | <i>See shut height.</i> |

| | |
|-------------------------|--|
| Coining | <i>A method of bottom bending where additional force is applied during the bend to make the work piece conform to the shape of the upper and lower tools. Typically uses "V" dies with opening of 6 times the material thickness and requires 5-7 the tonnage for air bending.</i> |
| Coupling (Shaft) | <i>A mechanical device used to join a motor output shaft to a machine part, typically a roller.</i> |
| Cycle | <i>A series of events or operations that recur regularly and usually lead back to the start.</i> |
| Cylinder | <i>A piston-type actuator.</i> |
| DC Power Supply | <i>An electrical device used to convert incoming AC power to regulated DC power.</i> |
| Die (s) | <i>The tooling used in a press brake for forming metal.</i> |
| Die Holder | <i>The plate or rail to which the lower portion of the die member is attached.</i> |
| Die rail | <i>See die holder.</i> |
| Die Shimming | <i>Method to raise or fill a void between two surfaces. Typically used to compensate for machine deflection or worn tooling.</i> |
| Die Space | <i>The space between the bed and ram.</i> |
| Dies, Bending | <i>Dies used in press brakes to perform bending and forming operations on a variety of work pieces.</i> |
| Electrical Spike | <i>An unpredictable and infrequent momentary high electrical voltage which can harm electrical/electronic devices.</i> |
| Encoder | <i>A device typically electromechanical that translates motion into electrical pulses. See also Resolver, Tachometer, or Transducer.</i> |
| Feedback | <i>The return to an input of a part of the output of a machine or control system, or process.</i> |
| Fuse | <i>Electrical overload protection device.</i> |
| Fuse Block | <i>A holder for a fuse or fuses including wire termination.</i> |

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| Gauge | <i>A stop against which the material or workpiece is placed to locate it within the point of operation.</i> |
| Gibs | <i>The machine members used for guiding the ram.</i> |
| Grease zerk | <i>Fitting designed to accept grease for lubricating components.</i> |
| Hydraulics | <i>The branch of mechanics, which uses controlled hydraulic oil flow, and pressure to provide force to an actuator.</i> |
| Inertia | <i>A property of matter by which it stays at rest or in uniform motion in the same straight line unless acted on by an external force.</i> |
| Lifting lugs | <i>Steel plates with large holes that are attached to the press brake to assist in lifting the machine.</i> |
| Limit Switch | <i>Typically, an electrical device that provides position information to a control system.</i> |
| Low Voltage | <i>A voltage reading that is lower than the required or expected voltage.</i> |
| Machinist Square Level | <i>Machinists level having four sides. Permits' measuring vertical surfaces as well as horizontal surfaces.</i> |
| Motor Starter | <i>A relay capable of withstanding inductive load generated when starting an electric motor (AC or DC).</i> |
| Open Loop | <i>A control concept in which feedback is not used to modify the characteristics of the output.</i> |
| Operator Interface | <i>Typically, a control or control panel provided for an operator to modify or monitor system variables.</i> |
| Photo Sensor | <i>An electronic sensor that uses light wavelengths to detect the position or presence of an object.</i> |
| Point of Operation | <i>The location in the press brake where the material or a workpiece is positioned and work is performed.</i> |

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| Pressure Reducer | <i>Typically, a hydraulic component that senses secondary pressure to maintain that output pressure regardless of the incoming pressure.</i> |
| Pressure Relief | <i>Typically, a hydraulic component that uses a spring to hold an orifice closed until system pressure overcomes the spring and allows flow to the reservoir.</i> |
| Proximity Sensor | <i>An electrical device capable of detecting the presence of an object.</i> |
| PSI | <i>Acronym. Available Force expressed in Pounds per Square Inch</i> |
| Punch | <i>The male part of the tool (die).</i> |
| Pushbutton | <i>A small button or knob actuated by pushing, provided for operator control, electrical, pneumatic, or mechanical.</i> |
| Ram | <i>The linear moving press brake member configured to carry a portion of the tooling.</i> |
| Relay | <i>An electromechanical device for remote or automatic control that is actuated in variation of conditions of an electrical circuit and that operates other devices in an electrical circuit.</i> |
| Repeatability | <i>The closeness of agreement among multiple measurements of an output, for the same value of the measured signal under the same operating conditions, approaching from the same direction for full range traverses.</i> |
| Reset | <i>To restart or arm a control or safety system.</i> |
| RPM | <i>Acronym. Rotational speed expressed as Revolutions per Minute.</i> |
| Safeguarding | <i>A method for protection of personnel from hazards using guards, safety devices, or safe work procedures.</i> |
| Selector Switch | <i>A small button or knob actuated by turning, provided for operator control, electrical, pneumatic, or mechanical.</i> |
| Service (Safety) Disconnect | <i>Typically, a large mechanical switch that is provided to completely remove incoming power for the purpose of storage or service of a machine.</i> |

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| Setup | <i>The process of adjusting the press brake and the installation and adjustment of work holding devices or tooling and appropriate safeguarding to ensure proper and safe operation of the press brake.</i> |
| Shield (foil or braided) | <i>Typically, a metallic encasement surrounding wiring or components to avoid interference from RF signals.</i> |
| Shut Height | <i>The distance from the bed to the ram when the ram is at the bottom of its stroke (in the closed position).</i> |
| Solenoid Valve | <i>Typically, a pneumatic or hydraulic valve actuated by an electromagnetic coil.</i> |
| Throat | <i>An opening or recess in the ram (housing) to permit the positioning of material or workpieces.</i> |
| Tool (Die) | <i>The cutting or shaping component used in a machine.</i> |
| Transducer | <i>A device typically electromechanical, that translates motion into electrical pulses.</i> |
| Transformer | <i>An electrical device that employs the principle of mutual induction to convert variations of current in a primary circuit into variations of voltage and current in a secondary circuit.</i> |
| V-Bending | <i>The forming of sheet metal material using a pair of "V" shaped tools that bend the workpiece by applying a three-point load.</i> |
| Valve | <i>Any of numerous mechanical devices by which the flow of liquid, gas, or loose material in bulk may be started, stopped, or regulated by a moveable part that opens, shuts, or partially obstructs one or more ports or passageways.</i> |

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Index

A

Adjusting Screws, 9
 Anchoring, 9
 Anchoring Hole Locations, 9
 Ansi, 8

B

Bed, 36
 Bed Adjusting Bolt, 33
 Bed Leveling Adjustment, 33
 Bed Tilt, 10
 Bed Tilt Wedge Assembly, 33

C

C Frame, 7
 Cleaning, 10
 Connecting The Pedestal Control, 13

D

Die Insertion, 34
 Die Rail Shimming, 36
 Die Rail Shimming Example, 36
 Direction Of Rotation Arrow, 15

E

Electrical, 12

F

Filling The Pump, 14
 Foundation, 9
 Front Bed Holding Bolt, 33
 Fuse Size Chart, 13

G

Gib Clearance Adjustment, 38
 Gib Explanation, 39
 Gibs, 38
 Grease Zerk, 53

H

Hydraulic, 14
 Hydraulic Assemblies, 48
 Hydraulic Power Unit, 40, 48
 Hydraulic Pump/Motor Assembly Descriptions, 15
 Hydraulic Pump/Motor Assembly Unit, 15

I

Initial Leveling, 9
 Installation, 8

Introduction, 7

L

Level Adjusting Screws, 9
 Lifting, 8
 Lifting Lugs, 8

M

Machinist Square Level, 10
 Main Control Panel, 16
 Maintenance Procedures, 37
 Masonry Anchors., 9
 Motor Rotation, 15

O

Oil Filter Assembly Descriptions, 40, 54
 Oil Filter Replacement, 40
 Oil Level & Temperature Sight Gauge, 14
 Operator Control, 16

P

Pads, 9
 Parts, 47
 Placement, 9
 Precision Leveling, 11
 Precision Leveling Detail, 11
 Prior To Start-Up, 14
 Programming A Simple Job, 29
 Pump Case Drain Tube, 15

R

Ram Linkage, 47
 Ram Safety Switch, 16
 Ram Slide, 11, 53
 Ram Slides, 39, 53
 Rear Adjustment Screw, 53
 Rear Bed Holding Bolt, 33
 Rear Ram Slide Bearing, 53
 Rotational Direction, 13; Rotation Arrow, 13

S

Safety, 1
 Setting Limits For Forming, 29
 Shim, 10, 12
 Side Adjustment Screw, 53
 Side Thrust Gib Adjustment, 38
 Sight Gauge, 14
 Slide Mounting Bracket, 53
 Speed Control Fuse, 16
 Spring Open Die Clamp, 7
 Square Level, 10
 Steel Pads, 9

T

Temperature Sight Gauge, 14
Test Cycle, 4
Tonnage Requirements, 36
Tool Adjustments, 36
Tooling Installation, 34
Tooling Removal, 35
Tooling Installation Safety, 3

U

Unpacking, 8

V

Valve Body Assembly, 49

W

Warning Labels, 1
Warranty, 7

Addendums