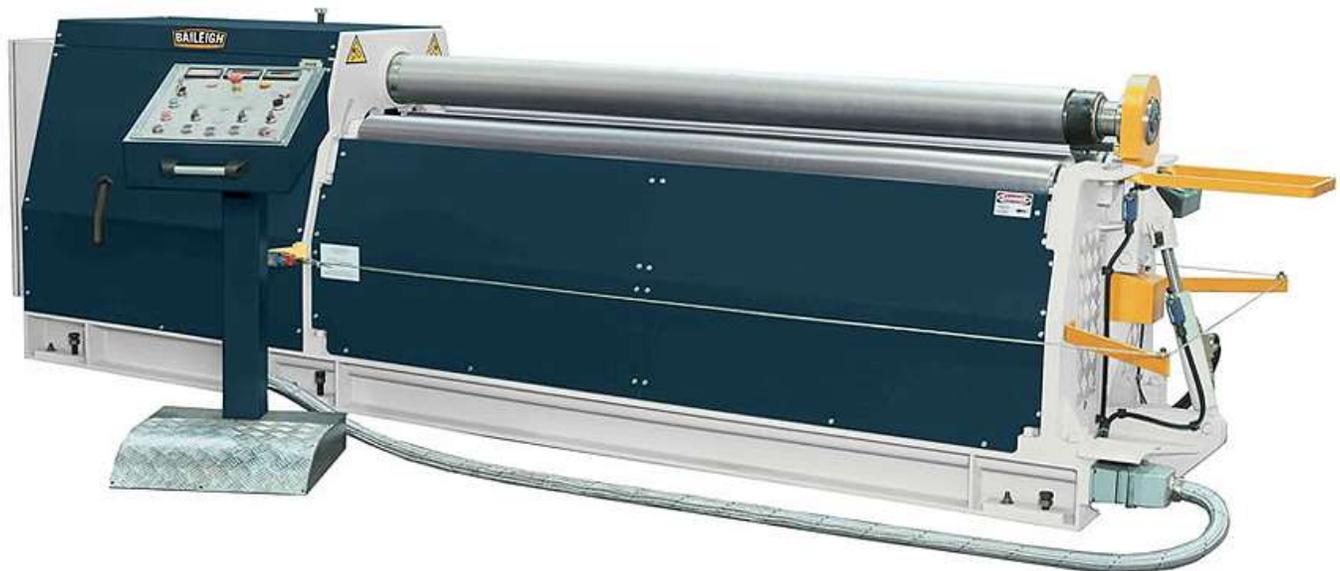




OPERATOR'S MANUAL



FOUR ROLL PLATE ROLL MODEL: PR-603-4

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THANK YOU & WARRANTY

Thank you for your purchase of a machine from Baileigh Industrial. We hope that you find it productive and useful to you for a long time to come.

Inspection & Acceptance. Buyer shall inspect all Goods within ten (10) days after receipt thereof. Buyer's payment shall constitute final acceptance of the Goods and shall act as a waiver of the Buyer's rights to inspect or reject the goods unless otherwise agreed. If Buyer rejects any merchandise, Buyer must first obtain a Returned Goods Authorization ("RGA") number before returning any goods to Seller. Goods returned without a RGA will be refused. Seller will not be responsible for any freight costs, damages to goods, or any other costs or liabilities pertaining to goods returned without a RGA. Seller shall have the right to substitute a conforming tender. Buyer will be responsible for all freight costs to and from Buyer and repackaging costs, if any, if Buyer refuses to accept shipment. If Goods are returned in unsalable condition, Buyer shall be responsible for full value of the Goods. Buyer may not return any special order Goods. Any Goods returned hereunder shall be subject to a restocking fee equal to 30% of the invoice price.

Specifications. Seller may, at its option, make changes in the designs, specifications or components of the Goods to improve the safety of such Goods, or if in Seller's judgment, such changes will be beneficial to their operation or use. Buyer may not make any changes in the specifications for the Goods unless Seller approves of such changes in writing, in which event Seller may impose additional charges to implement such changes.

Limited Warranty. Seller warrants to the original end-user that the Goods manufactured or provided by Seller under this Agreement shall be free of defects in material or workmanship for a period of twelve (12) months from the date of purchase, provided that the Goods are installed, used, and maintained in accordance with any instruction manual or technical guidelines provided by the Seller or supplied with the Goods, if applicable. The original end-user must give written notice to Seller of any suspected defect in the Goods prior to the expiration of the warranty period. The original end-user must also obtain a RGA from Seller prior to returning any Goods to Seller for warranty service under this paragraph. Seller will not accept any responsibility for Goods returned without a RGA. The original end-user shall be responsible for all costs and expenses associated with returning the Goods to Seller for warranty service. In the event of a defect, Seller, at its sole option, shall repair or replace the defective Goods or refund to the original end-user the purchase price for such defective Goods. Goods are not eligible for replacement or return after a period of 30 days from date of receipt. The foregoing warranty is Seller's sole obligation, and the original end-user's exclusive remedy, with regard to any defective Goods. This limited warranty does not apply to: (a) die sets, tooling, and saw blades; (b) periodic or routine maintenance and setup, (c) repair or replacement of the Goods due to normal wear and tear, (d) defects or damage to the Goods resulting from misuse, abuse, neglect, or accidents, (e) defects or damage to the Goods resulting from improper or unauthorized alterations, modifications, or changes; and (f) any Goods that has not been installed and/or maintained in accordance with the instruction manual or technical guidelines provided by Seller.

EXCLUSION OF OTHER WARRANTIES. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. ANY AND ALL OTHER EXPRESS, STATUTORY OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. NO WARRANTY IS MADE WHICH EXTENDS BEYOND THAT WHICH IS EXPRESSLY CONTAINED HEREIN.

Limitation of Liability. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY OTHER PARTY FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR DOWN TIME) ARISING FROM OR IN MANNER CONNECTED WITH THE GOODS, ANY BREACH BY SELLER OR ITS AGENTS OF THIS AGREEMENT, OR ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY OF LIABILITY. BUYER'S REMEDY WITH RESPECT TO ANY CLAIM ARISING UNDER THIS AGREEMENT IS STRICTLY LIMITED TO NO MORE THAN THE AMOUNT PAID BY THE BUYER FOR THE GOODS.



Force Majeure. Seller shall not be responsible for any delay in the delivery of, or failure to deliver, Goods due to causes beyond Seller's reasonable control including, without limitation, acts of God, acts of war or terrorism, enemy actions, hostilities, strikes, labor difficulties, embargoes, non-delivery or late delivery of materials, parts and equipment or transportation delays not caused by the fault of Seller, delays caused by civil authorities, governmental regulations or orders, fire, lightening, natural disasters or any other cause beyond Seller's reasonable control. In the event of any such delay, performance will be postponed by such length of time as may be reasonably necessary to compensate for the delay.

Installation. If Buyer purchases any Goods that require installation, Buyer shall, at its expense, make all arrangements and connections necessary to install and operate the Goods. Buyer shall install the Goods in accordance with any Seller instructions and shall indemnify Seller against any and all damages, demands, suits, causes of action, claims and expenses (including actual attorneys' fees and costs) arising directly or indirectly out of Buyer's failure to properly install the Goods.

Work By Others; Safety Devices. Unless agreed to in writing by Seller, Seller has no responsibility for labor or work performed by Buyer or others, of any nature, relating to design, manufacture, fabrication, use, installation or provision of Goods. Buyer is solely responsible for furnishing, and requiring its employees and customers to use all safety devices, guards and safe operating procedures required by law and/or as set forth in manuals and instruction sheets furnished by Seller. Buyer is responsible for consulting all operator's manuals, ANSI or comparable safety standards, OSHA regulations and other sources of safety standards and regulations applicable to the use and operation of the Goods.

Remedies. Each of the rights and remedies of Seller under this Agreement is cumulative and in addition to any other or further remedies provided under this Agreement or at law or equity.

Attorney's Fees. In the event legal action is necessary to recover monies due from Buyer or to enforce any provision of this Agreement, Buyer shall be liable to Seller for all costs and expenses associated therewith, including Seller's actual attorneys' fees and costs.

Governing Law/Venue. This Agreement shall be construed and governed under the laws of the State of Wisconsin, without application of conflict of law principles. Each party agrees that all actions or proceedings arising out of or in connection with this Agreement shall be commenced, tried, and litigated only in the state courts sitting in Manitowoc County, Wisconsin or the U.S. Federal Court for the Eastern District of Wisconsin. Each party waives any right it may have to assert the doctrine of "forum non conveniens" or to object to venue to the extent that any proceeding is brought in accordance with this section. Each party consents to and waives any objection to the exercise of personal jurisdiction over it by courts described in this section. Each party waives to the fullest extent permitted by applicable law the right to a trial by jury.

Summary of Return Policy.

- 10 Day acceptance period from date of delivery. Damage claims and order discrepancies will not be accepted after this time.
- You must obtain a Baileigh issued RGA number PRIOR to returning any materials.
- Returned materials must be received at Baileigh in new condition and in original packaging.
- Altered items are not eligible for return.
- Buyer is responsible for all shipping charges.
- A 30% re-stocking fee applies to all returns.

Baileigh Industrial makes every effort to ensure that our posted specifications, images, pricing and product availability are as correct and timely as possible. We apologize for any discrepancies that may occur. Baileigh Industrial reserves the right to make any and all changes deemed necessary in the course of business including but not limited to pricing, product specifications, quantities, and product availability.

For Customer Service & Technical Support:

Please contact one of our knowledgeable Sales and Service team members at: (920) 684-4990 or e-mail us at sales@baileighindustrial.com



INTRODUCTION

The quality and reliability of the components assembled on a Baileigh Industrial machine guarantee near perfect functioning, free from problems, even under the most demanding working conditions. However if a situation arises, refer to the manual first. If a solution cannot be found, contact the distributor where you purchased our product. Make sure you have the serial number and production year of the machine (stamped on the nameplate). For replacement parts refer to the assembly numbers on the parts list drawings.

Our technical staff will do their best to help you get your machine back in working order.

In this manual you will find: (when applicable)

- Safety procedures
- Correct installation guidelines
- Description of the functional parts of the machine
- Capacity charts
- Set-up and start-up instructions
- Machine operation
- Scheduled maintenance
- Parts lists

GENERAL NOTES

After receiving your equipment remove the protective container. Do a complete visual inspection, and if damage is noted, **photograph it for insurance claims** and contact your carrier at once, requesting inspection. Also contact Baileigh Industrial and inform them of the unexpected occurrence. Temporarily suspend installation.

Take necessary precautions while loading / unloading or moving the machine to avoid any injuries.

Your machine is designed and manufactured to work smoothly and efficiently. Following proper maintenance instructions will help ensure this. Try and use original spare parts, whenever possible, and most importantly; **DO NOT** overload the machine or make any unauthorized modifications.



Note: This symbol refers to useful information throughout the manual.



IMPORTANT **PLEASE READ THIS OPERATORS MANUAL CAREFULLY**

It contains important safety information, instructions, and necessary operating procedures. The continual observance of these procedures will help increase your production and extend the life of the equipment.



SAFETY INSTRUCTIONS

LEARN TO RECOGNIZE SAFETY INFORMATION

This is the safety alert symbol. When you see this symbol on your machine or in this manual, **BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY!**



Follow recommended precautions and safe operating practices.

UNDERSTAND SIGNAL WORDS

A signal word – **DANGER**, **WARNING**, or **CAUTION** is used with the safety alert symbol. **DANGER** identifies a hazard or unsafe practice that will result in severe **Injury or Death**.



Safety signs with signal word **DANGER** or **WARNING** are typically near specific hazards.



General precautions are listed on **CAUTION** safety signs. **CAUTION** also calls attention to safety messages in this manual.



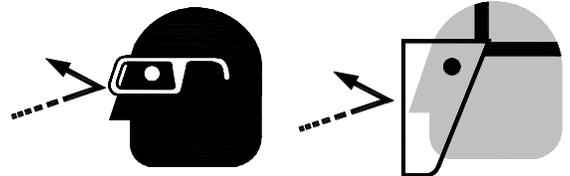


SAVE THESE INSTRUCTIONS.
Refer to them often and use them to instruct others.



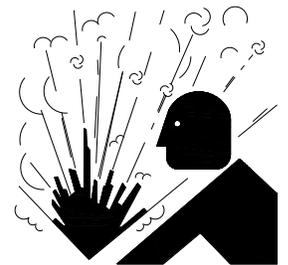
PROTECT EYES

Wear safety glasses or suitable eye protection when working on or around machinery.



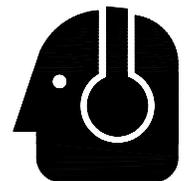
HYDRAULIC HOSE FAILURE

Exercise **CAUTION** around hydraulic hoses in case of a hose or fitting failure.



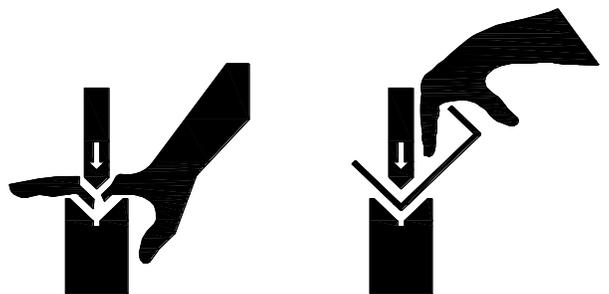
PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protective devices such as ear muffs or earplugs to protect against objectionable or uncomfortable loud noises.



BEWARE OF CRUSH HAZARD

NEVER place your hands, fingers, or any part of your body in the die area of this machine.



HIGH VOLTAGE

USE CAUTION IN HIGH VOLTAGE AREAS. DO NOT assume the power to be off.
FOLLOW PROPER LOCKOUT PROCEDURES.





ENTANGLEMENT HAZARD – ROTATING CYLINDERS

Contain long hair, **DO NOT** wear jewelry or loose fitting clothing.



KEEP CLEAR OF MOVING OBJECTS

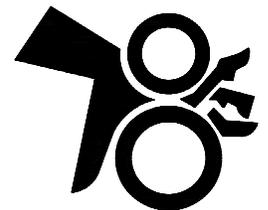
Always be aware of the position of the clamp handle and the counterweight. They are heavy and can swing back suddenly causing serious body or head injuries.



BEWARE OF PINCH POINTS AND CRUSH HAZARD

Keep hands and fingers away from the rolls when the machine is in operation.

NEVER place your hands, fingers, or any part of your body in the roller area of this machine.



EMERGENCY STOP CABLE

The Plate Roller has a safety stop cable which wraps around the machine from front to rear. Pulling on the cable actuates the limit switch which immediately stops the hydraulic pump and all movement of the rolls. Release the obstruction from the cable to allow the switch to reset.



EMERGENCY STOP BUTTON

In the event of incorrect operation or dangerous conditions, the machine can be stopped immediately by pressing the **E-STOP** button. Twist the emergency stop button clockwise (cw) to reset. Note: Resetting the E-Stop will not start the machine.





SAFETY PRECAUTIONS



Metal working can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.

Safety equipment such as guards, hold-downs, safety glasses, dust masks and hearing protection can reduce your potential for injury. But even the best guard won't make up for poor judgment, carelessness or inattention. **Always use common sense** and exercise **caution** in the workshop. If a procedure feels dangerous, don't try it.

REMEMBER: Your personal safety is your responsibility.



WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

1. **Only trained and qualified personnel can operate this machine.**
2. **Make sure guards are in place and in proper working order before operating machinery.**
3. **Remove any adjusting tools.** Before operating the machine, make sure any adjusting tools have been removed.
4. **Keep work area clean.** Cluttered areas invite injuries.
5. **Overloading machine.** By overloading the machine you may cause injury from flying parts. **DO NOT** exceed the specified machine capacities.
6. **Dressing material edges.** Always chamfer and deburr all sharp edges.
7. **Do not force tool.** Your machine will do a better and safer job if used as intended. **DO NOT** use inappropriate attachments in an attempt to exceed the machines rated capacity.
8. **Use the right tool for the job. DO NOT** attempt to force a small tool or attachment to do the work of a large industrial tool. **DO NOT** use a tool for a purpose for which it was not intended.
9. **Dress appropriate. DO NOT** wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
10. **Use eye and ear protection.** Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.

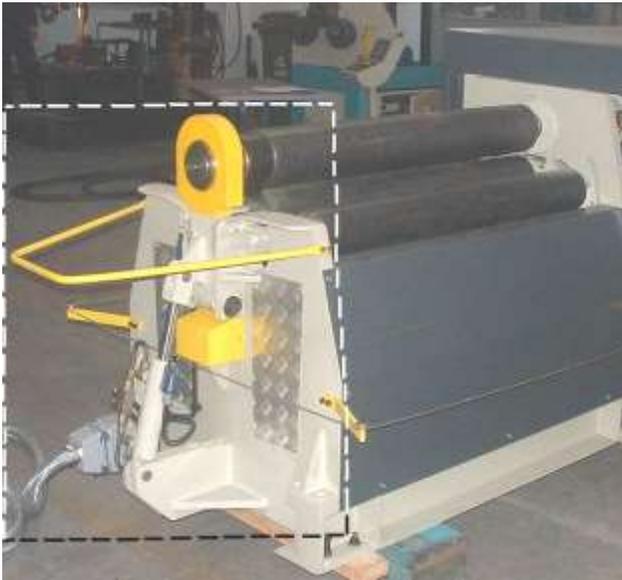


11. **Do not overreach.** Maintain proper footing and balance at all times. **DO NOT** reach over or across a running machine.
12. **Stay alert.** Watch what you are doing and use common sense. **DO NOT** operate any tool or machine when you are tired.
13. **Check for damaged parts.** Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
14. **Observe work area conditions.** **DO NOT** use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lighted. **DO NOT** use electrically powered tools in the presence of flammable gases or liquids.
15. **Keep children away.** Children must never be allowed in the work area. **DO NOT** let them handle machines, tools, or extension cords.
16. **Store idle equipment.** When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
17. **DO NOT operate machine if under the influence of alcohol or drugs.** Read warning labels on prescriptions. If there is any doubt, **DO NOT** operate the machine.
18. **DO NOT** touch live electrical components or parts.
19. **Turn off** power before checking, cleaning, or replacing any parts.
20. Be sure **all** equipment is properly installed and grounded according to national, state, and local codes.
21. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. **Bare wiring can kill!**
22. **DO NOT** bypass or defeat any safety interlock systems.
23. Keep visitors a safe distance from the work area.



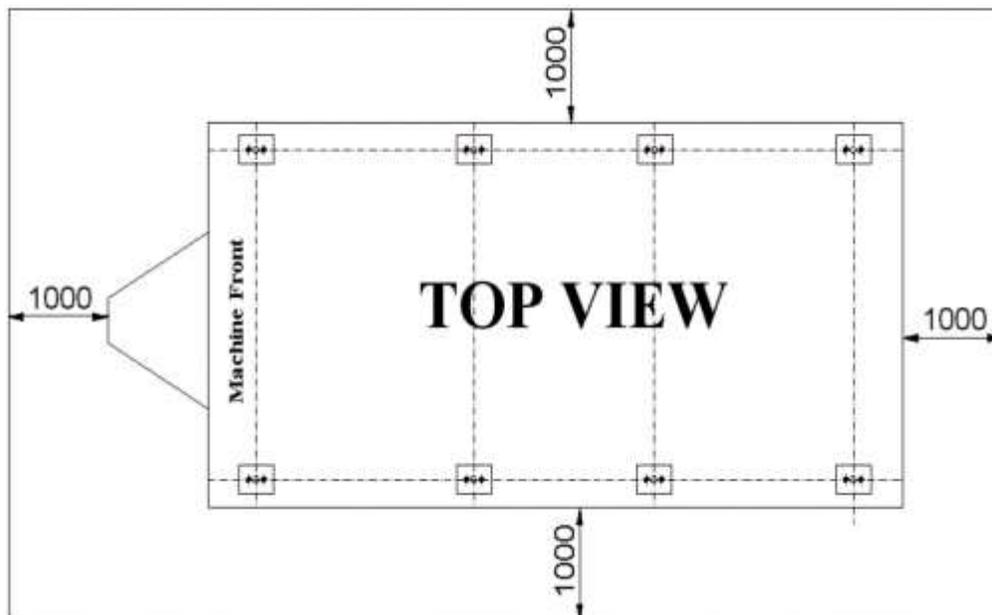
Danger Zones

- This four-roll plate bending machine is supplied with necessary guards to protect from injuries by worm-type gearbox and other gears. The other area which needs to be carefully monitored during use is the rotational area of the rolls.
- Never try to bend very hard or fragile material on the machine (e.g. hard steel, glass).
- The below shown danger zones must be kept clear during operation



Working Area Of The Machine

The below shown danger zones must be kept clear during operation.





TECHNICAL SPECIFICATIONS

Roll Length	80.70" (2050mm)
Working Length	78.74" (2000mm)
Forming Width	80" (2032mm)
Driven Rolls	2
Roll Speed	4.9-19fpm (1.5-6Mmpm)
Maximum Material Thickness (Mild Steel)	0.25" (6.35mm)]
Upper Roll Diameter	7.5" (190mm)
Side Roll Diameter	5.9" (150mm)
Minimum Forming Diameter	10.6" (270mm)
Roll Adjustment Back	Hydraulic
Motor	7.5hp (5.5kw)
Power	220V / 3ph / 60hz
Shipping Weight	7,700 lbs. (3500kg)
Shipping Dimensions	138" x 43" x 51" (3506 x 1093 x 1296mm)



IMPORTANT: Do not feed profiles having a higher thickness than specified for the capacity of the machine. Do not feed more than one piece at a time. Do not use the machine for any other job than the one for which it has been designed.

TECHNICAL SUPPORT

Our technical support department can be reached at 920.684.4990, and asking for the support desk for purchased machines. Tech Support handles questions on machine setup, schematics, warranty issues, and individual parts needs: (other than die sets and blades).

For specific application needs or future machine purchases contact the Sales Department at: sales@baileighindustrial.com, Phone: 920.684.4990, or Fax: 920.684.3944.



Note: *The photos and illustrations used in this manual are representative only and may not depict the actual color, labeling or accessories and may be intended to illustrate technique only.*



Note: *The specifications and dimensions presented here are subject to change without prior notice due to improvements of our products.*



UNPACKING AND CHECKING CONTENTS

Your Baileigh machine is shipped complete in one crate. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.

⚠ WARNING: SUFFOCATION HAZARD! Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.
If any parts are missing, do not plug in the power cable, or turn the power switch on until the missing parts are obtained and installed correctly.

Cleaning

⚠ WARNING: DO NOT USE gasoline or other petroleum products to clean the machine. They have low flash points and can explode or cause fire.

⚠ CAUTION: When using cleaning solvents work in a well-ventilated area. Many cleaning solvents are toxic if inhaled.

Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. For a more thorough cleaning, some parts will occasionally have to be removed. **DO NOT USE** acetone or brake cleaner as they may damage painted surfaces.

Follow manufacturer's label instructions when using any type of cleaning product. After cleaning, wipe unpainted metal surfaces with a light coating of quality oil or grease for protection.



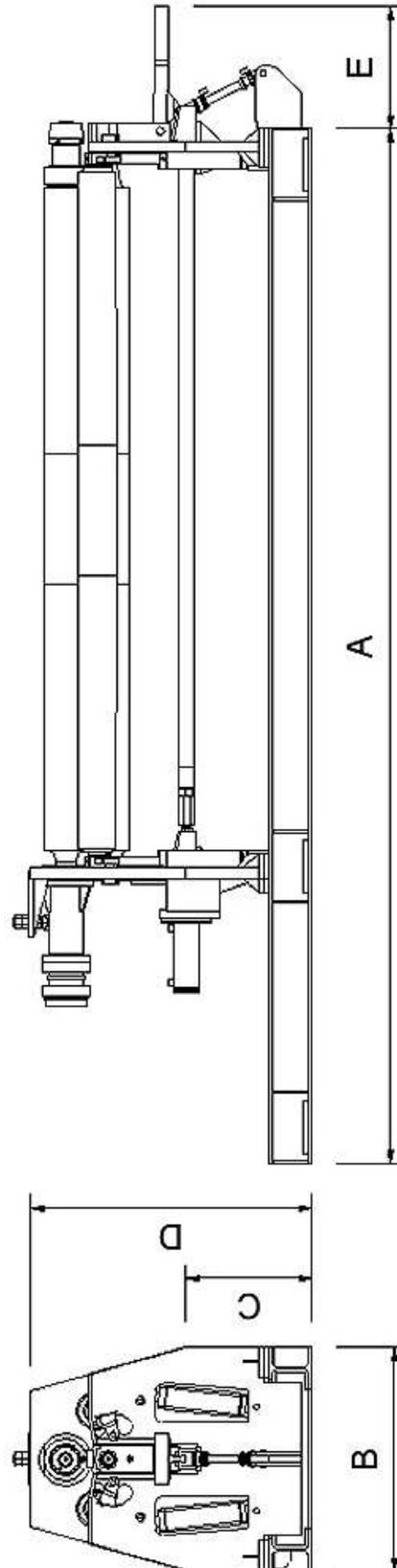
Important: This waxy coating is **NOT** a lubricant and will cause the machine to stick and lose performance as the coating continues to dry





OVERALL DIMENSIONS

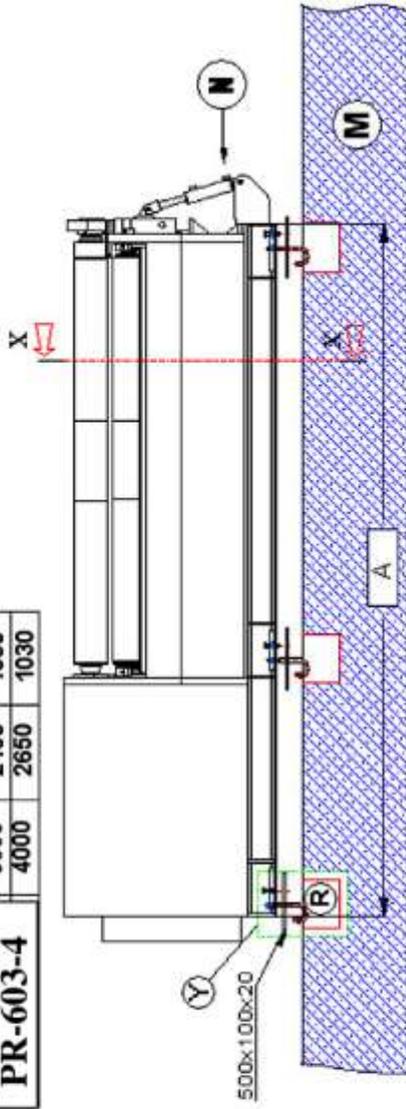
Useful Length	78.74" (2000mm)
A	133.26" (3385mm)
B	47.01" (1195mm)
C	23.23" (590mm)
D	48.43" (1230mm)
E	20.28" (515mm)





Foundation

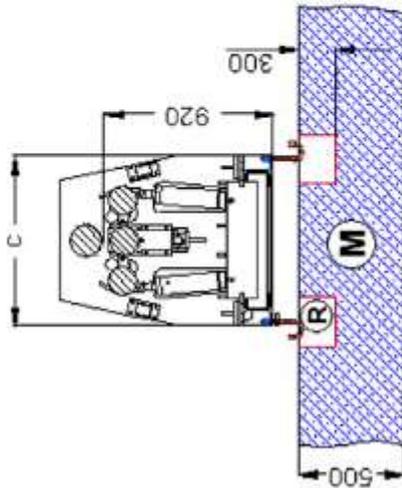
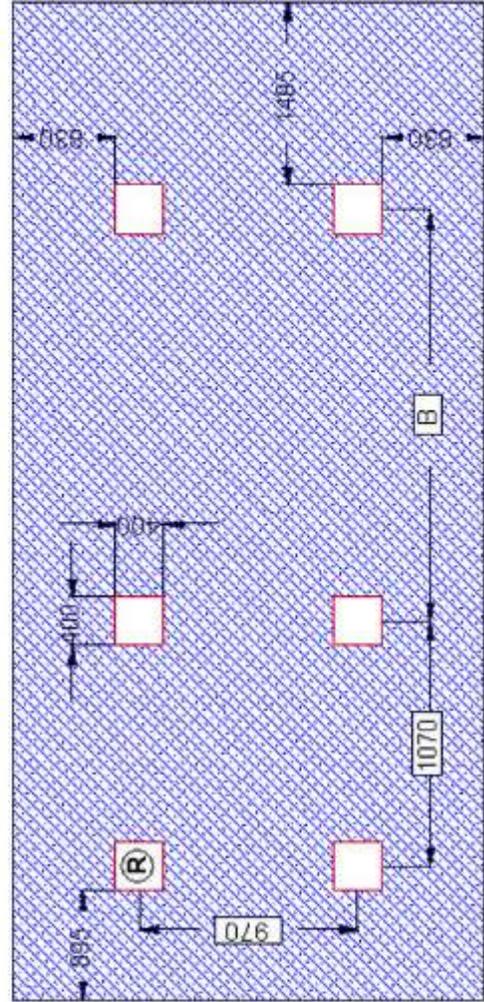
MODEL	A	B	C
PR-603-4	3500	2150	1030
	4000	2650	1030



3-After you place machine, fill with C 30 Cement on places shown as (R).

2-On place as shown (M) fill with C 20 Cement.

1-Make excavation using given measurements.



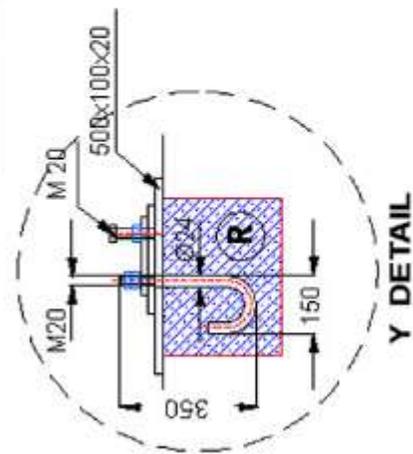
X - X SECTION

(M)

(R)

DROP-END

CONCRETE MASONRY



Y DETAIL

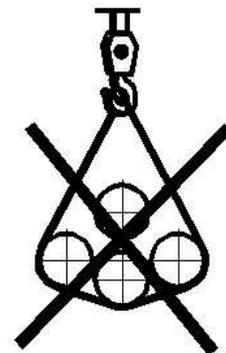
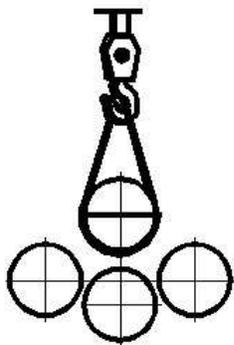
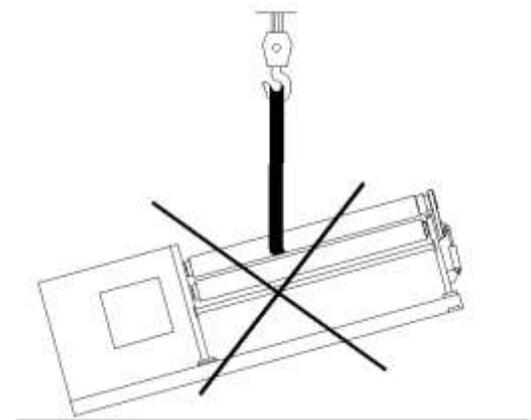
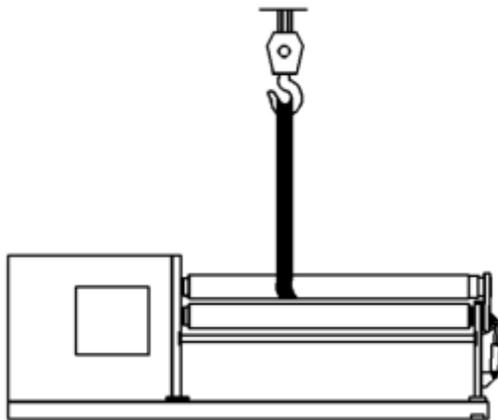


TRANSPORTING AND LIFTING

⚠ CAUTION: Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced. Choose a location that will keep the machine free from vibration and dust from other machinery. Keep in mind that having a large clearance area around the machine is important for safe and efficient working conditions.

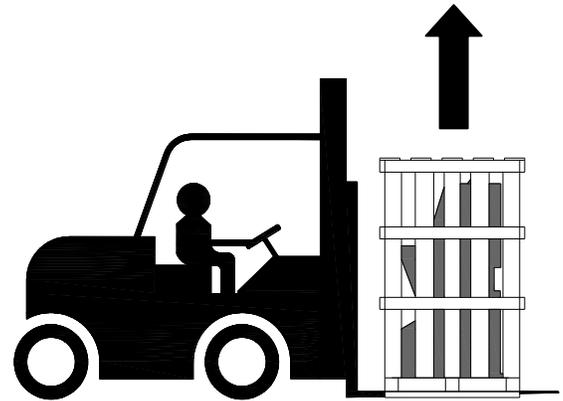
Follow these guidelines when lifting:

- Always lift and carry the machine with the lifting holes provided at the top of the machine.
- Use lift equipment such as straps, chains, capable of lifting 1.5 to 2 times the weight of the machine.
- Take proper precautions for handling and lifting.
- Check if the load is properly balanced by lifting it an inch or two.
- Lift the machine, avoiding sudden accelerations or quick changes of direction.
- Locate the machine where it is to be installed, and lower slowly until it touches the floor.





- The lift truck must be able to lift at least 1.5 – 2 times the machines gross weight.
- Make sure the machine is balanced. While transporting, avoid rough or jerky motion, and maintain a safe clearance zone around the transport area.
- Use a fork lift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine.
- Remove the securing bolts that attach the machine to the pallet.
- Approaching the machine from the side, lift the machine on the frame taking care that there are no cables or pipes in the area of the forks.
- Move the machine to the required position and lower gently to the floor.
- Level the machine so that all the supporting feet are taking the weight of the machine and no rocking is taking place.



INSTALLATION

IMPORTANT:

Consider the following when looking for a suitable location to place the machine:

- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, work tables, or other machinery.
- Clearance from walls and other obstacles.
- Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any aisles.



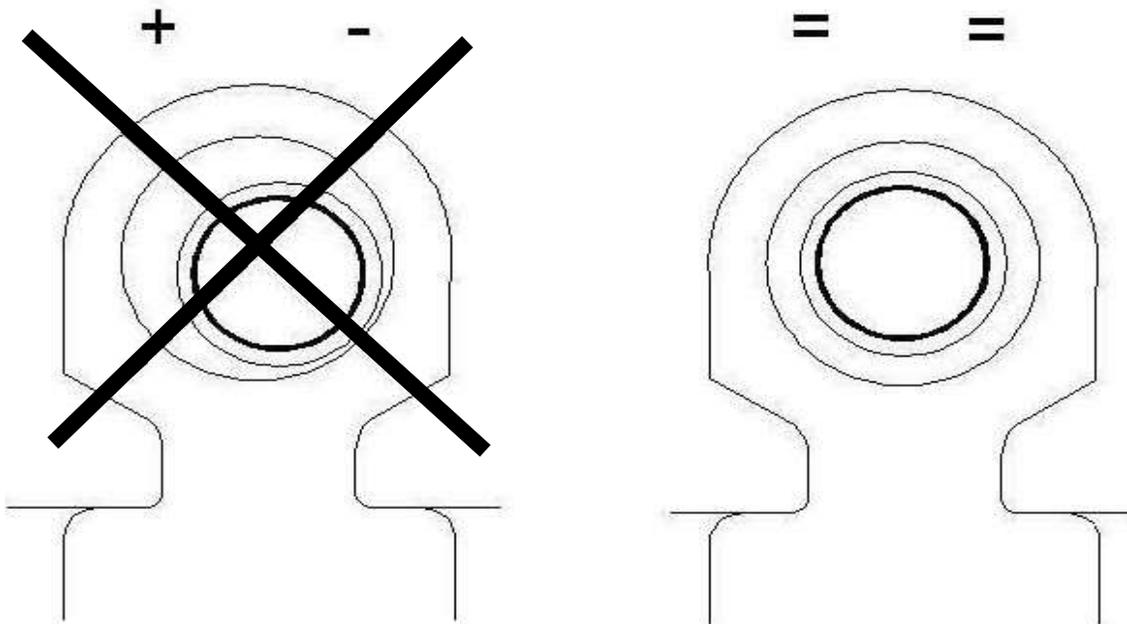
- **LEVELING:** The machine should be sited on a level, concrete floor. Provisions for securing it should be in position prior to placing the machine. The accuracy of any machine depends on the precise placement of it to the mounting surface.
- **FLOOR:** This tool distributes a large amount of weight over a small area. Make certain that the floor is capable of supporting the weight of the machine, work stock, and the operator. The floor should also be a level surface. If the unit wobbles or rocks once in place, be sure to eliminate by using shims.
- **WORKING CLEARANCES:** Take into consideration the size of the material to be processed. Make sure that you allow enough space for you to operate the machine freely.
- **POWER SUPPLY PLACEMENT:** The power supply should be located close enough to the machine so that the power cord is not in an area where it would cause a tripping hazard. Be sure to observe all electrical codes if installing new circuits and/or outlets.

Adjustment for Parallelism

After placing the machine make sure all areas of the machine is flat and check parallelism of the machine periodically by a level.



Before proceeding to the bending operation in the machine, open the bracket on the front part and verify if the upper roll enters the bracket in a symmetrical manner. If there is any deviation, first of all adjust such deviation through the leveling bolts under the machine and then start to work.



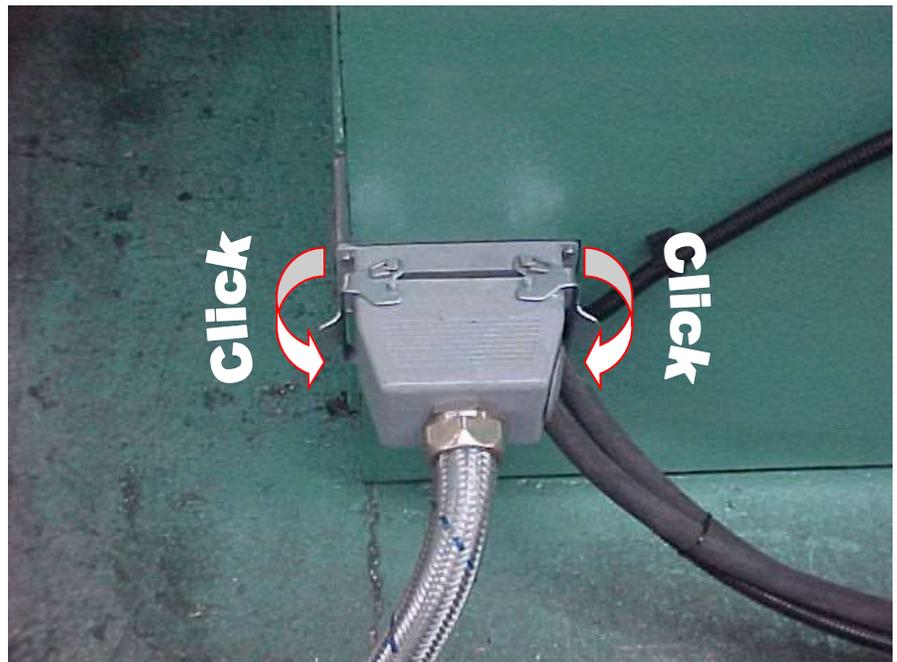


ASSEMBLY AND SET UP

⚠ WARNING: For your own safety, **DO NOT** connect the machine to the power source until the machine is completely assembled and you read and understand the entire instruction manual.

Control Console

1. Unpack the control console and route the cable to the connector located on the end of the machine.
2. Align and fully insert the plug to the socket.
3. Pull the two latches forward until each clicks into the locked position.



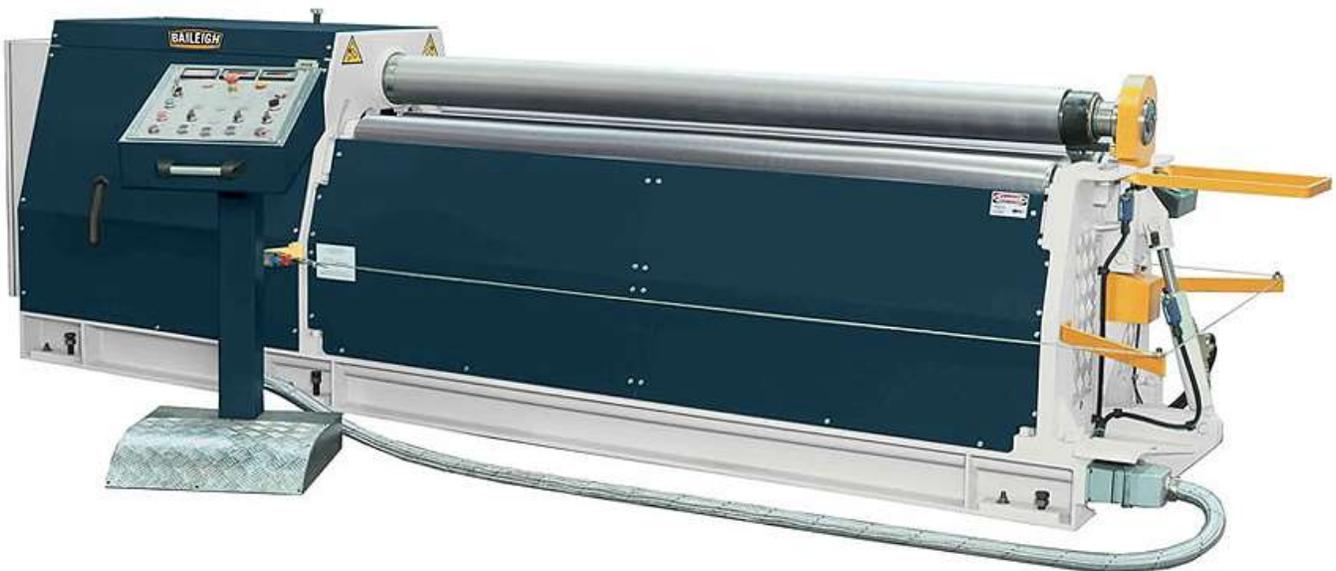
Emergency Stop Wire

1. Unpack the four wire guide stand offs.
2. Each standoff is numbered for its position on the frame. They are also welded to the mounting base at an angle to help spread the wire around the frame.
3. Align the number on the standoff to the number on the frame.
4. Use the bolts installed on the frame to mount the standoffs.
5. Position the angle of the standoffs so that the wire will be guided around the frame without contacting the frame.





6. Route the wire around the machine from the safety switch through the guides to the toggle bolt on the number four standoff.
7. Secure the wire to the toggle bolt.
8. Verify that the wire is in the guide rollers and that it is not in contact with any part of the machine or surroundings (ie. frame, cylinders, hoses, controls).
9. Tighten the toggle bolt only enough to remove any slack in the wire.



End Guard

1. Unwrap the end guard (strapped to the rollers for shipping).
2. Using the bolts provided in the end frame, install the end guard.



SETTING THE SAFETY SWITCH

The machine has been equipped with a security switch and wire for the operator's safety.

The switch is a resettable single trip design so that when the wire has been moved at any point around the machine, the machine will stop and requires action by the operator to clear the item which has contacted the wire and then to reset the safety switch.

When the safety wire is pushed, it pulls the limit switch plunger out and trips the switch to the OFF position which acts as an emergency stop and stops all machine activity.

To restart, pull the blue knob (1, fig.1) while pulling the safety wire. When engaged you should see the green (2, fig.2) line under the blue knob. Now you can restart the machine from control panel.

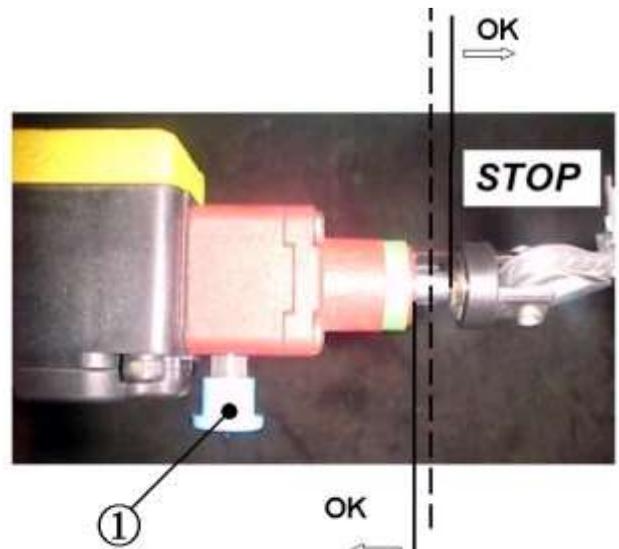
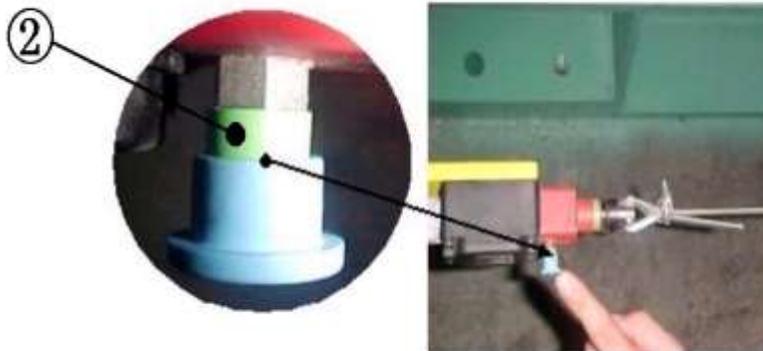


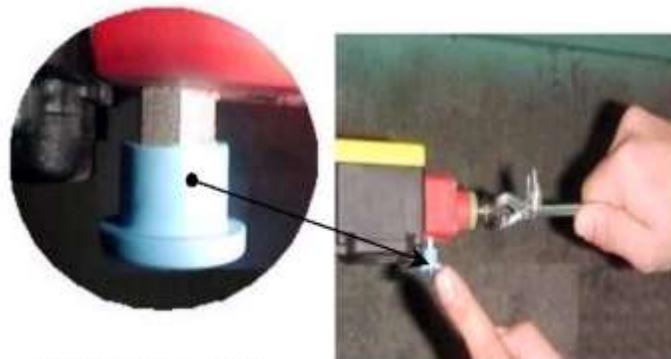
Figure 1

Safety switch's on and off positions as given below.



Switch on position

Figure 2



Switch off position

Figure 3



Drop Arm

If for any reason emergency button is used during opening and closing of the drop end arm, it will stop instantly.

After the emergency button is released and reset button is pushed you must use the start button to restart the machine.

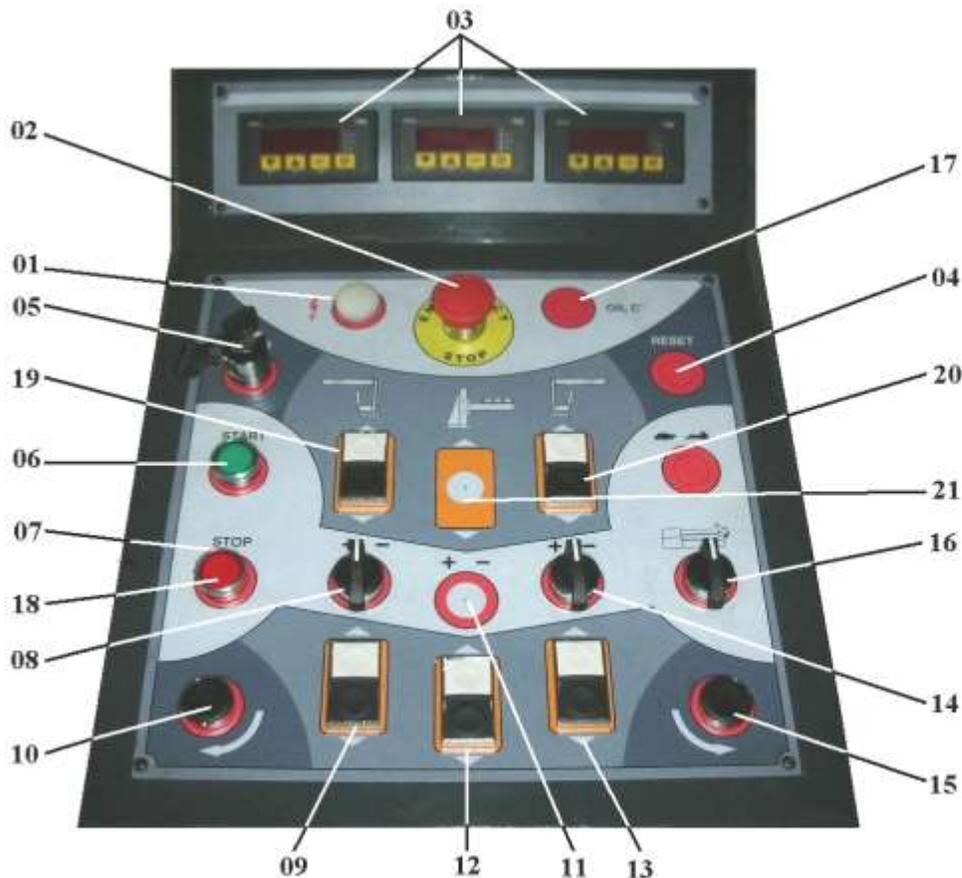
At this point the drop End arm will continue and finish opening or closing cycle. Make sure the drop arm travel area is clear before restarting.

- Emergency stop pushed or wire tripped.
- Emergency stop reset.
- Reset pushed
- Start pushed





GETTING TO KNOW YOUR MACHINE



1. Power ON Indicator – When on this indicates the machine Main Power Switch is On and ready to start.
2. Emergency Stop – Stop all machine functions.
3. Digital Display – for Roll B-C-D.
4. Reset – To reset the PLC system after emergency stop.
5. Power On Key Switch – Safety Key Switch. When the machine is not in use please remove the key to avoid unauthorized operation Start button.
6. Start Button – To start to hydraulic pump and all functions.
7. Stop – To stop machine activity and main motor before switching off the machine.
8. Roll B Tilting – This lifts only the bracket side of Roll B for conical bending.
9. Roll B parallel – Up and Down button.
10. Rolls Rotation – Left.



11. Roll D Tilting – This lifts only the bracket side of Roll D for conical bending (OPTIONAL).
12. Roll D Parallel – Up and Down button.
13. Roll C Parallel – Up and Down button.
14. Roll C Tilting – This lifts only the bracket side of Roll C for conical bending.
15. Rolls Rotation – Right.
16. Bracket Open / Close – To open and close the drop arm.
17. Oil Temperature Indicator – Lights up if oil is overheated.
18. Thermal Overload Warning Lamp – In case where the main motor is overheated this indicator lights and the motor stops to avoid burning of the motor.
19. Left support up and down button (OPTIONAL).
20. Right support up and down button (OPTIONAL).
21. Lift up and down button (OPTIONAL).



Notes: Switches for optional items are not included in the control console unless that option has been ordered and installed.

Emergency Stop

The machine has two emergency stop systems; one Emergency Stop Button (2 on the control panel) and Emergency Stop Wire around the perimeter of the machine. If the machine is stopped by pushing either one of these systems, the PLC must be reset before starting.

To restart after an emergency stop:

1. Release the Emergency Stop Button or Reset the Emergency Wire (SETTING the SAFETY SWITCH).
2. Push Reset Button (4)
3. Push Start Button (6)

Thermal Overload

If the Thermal Overload Indicator (19) is on it means the motor is disabled by the system to protect it from burning. The motor is overheated due to a problem (overloading – excess pressure due to hydraulic malfunction etc.) and must cool down before restarting. Do not restart the motor for at least 10 minutes. Let it cool down and try to find the problem.

Oil Temperature

If Oil Temperature Indicator (18) is on it means the oil in the system is overheated. The problem could be with the system. Do not restart the machine until the problem is solved.

Digital Displays

Bottom Rolls are equipped with Digital Displays. They show the actual position of the rolls.



ELECTRICAL

⚠ WARNING: Baileigh Industrial is not responsible for any damage caused by wiring up to an alternative 3-phase power source other than direct 3-phase. If you are using an alternate power source, consult a certified electrician or contact Baileigh Industrial prior to energizing the machine.

⚠ CAUTION: HAVE ELECTRICAL UTILITIES CONNECTED TO MACHINE BY A CERTIFIED ELECTRICIAN!
Check if the available power supply is the same as listed on the machine nameplate.

⚠ WARNING: Make sure the grounding wire (green) is properly connected to avoid electric shock. DO NOT switch the position of the green grounding wire if any electrical plug wires are switched during hookup.

Motor Specifications

Your tool is wired for 220 volt, 60Hz alternating current. Before connecting the tool to the power source, make sure the machine is cut off from power source.

Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with a amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your tools. Before connecting the motor to the power line, make sure the switch is in the "OFF" position and be sure that the electric current is of the same characteristics as indicated on the tool.
- All line connections should make good contact. Running on low voltage will damage the motor.
- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.



⚠ WARNING: In all cases, make certain the receptacle in question is properly grounded. If you are not sure, have a qualified electrician check the receptacle.

- Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.
- Repair or replace damaged or worn cord immediately.

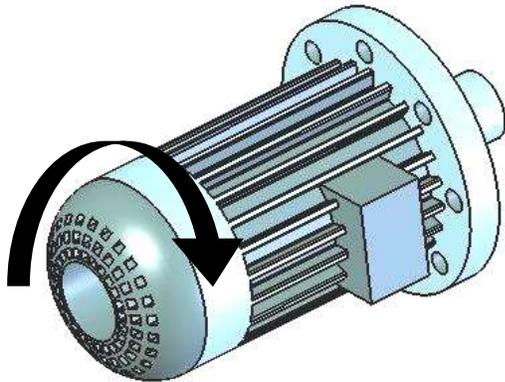
Power cord connection:

If the electrical connection of the machine is wrong the phase protection device activates and cuts off any electric supply to protect the hydraulic pumps from inverse rotating and burning out. Only when it's connected correct the relay light will light up and the machine will operate.

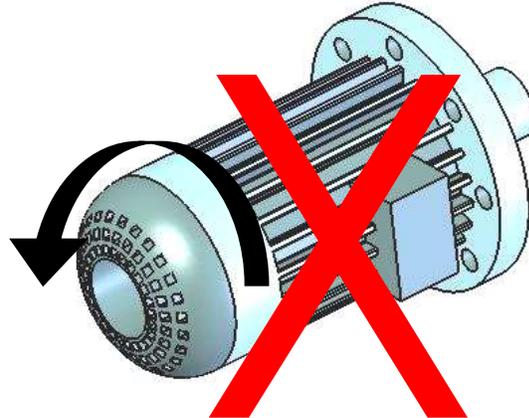
1. Unlock and open the electrical enclosure door.
2. Insert a fitting into an open hole to grip the power cord (supplied by customer).
3. Route a power cord into the electrical cabinet into position at the terminal strip at locations **L1, L2, L3, and E**.
 - a. Route the power cord so that it will NOT become entangled in the machine in any way.
 - b. Route the cord to the power supply is a way that does NOT create a trip hazard.
4. Connect the three power wires terminals **L1, L2, & L3**. Connect the ground wire (typically green) to the **E** terminal.
5. Check that the power cord has not been damaged during installation.



Check for correct rotation of the motor

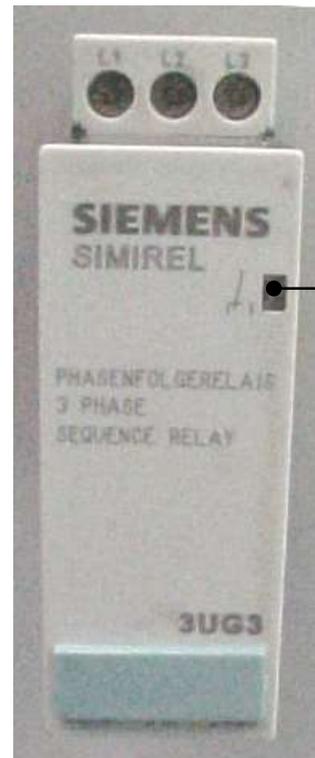


CORRECT



INCORRECT

1. Close the electrical enclosure door.
2. Your machine is equipped with a phase sequencer. If the electric connection is wrong the machine will not start up. Reverse the main electric cables and try again. The Yellow indicator light on the phase sequencer will be illuminated when the power is connected correctly.
3. When the yellow light is illuminated, the Power On Indicator will be illuminated on the control panel.
4. Press the Start Button. The motor should start up and after a few seconds you should hear the machine running.
5. Test the movements of the machine by pressing rotation and piston buttons.



Yellow - OK



OPERATION

⚠ CAUTION: Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges. When handling large heavy material make sure they are properly supported.

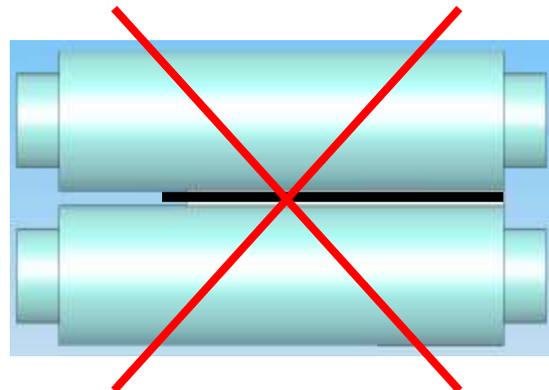
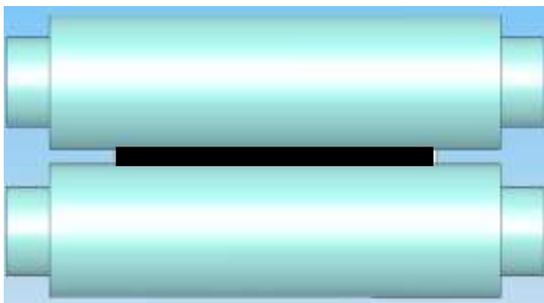
- Before the first use of this machine always check this list carefully for a safe start.
- Check the emergency stop button on the command panel.
- Make sure that the security wire around the machine is free.
- Check for visible oil leak.
- Control of the buttons on the command panel.

Pre-Bending

Pre-bending is the operation where the edges of the material are bent to the same radius of the end radius. This is used to get best results in full circle bending.

Before Operation

- Clean the material and the rolls of dust or grease.
- Make sure there are no chips or flame cutting left – over on the edges of the material.
- Make sure the material is flat.
- It's a good idea to have template of the required radius when making a bend. To make a template cut a hard cardboard or plywood piece with the necessary radius.
- Always work in the center of the rolls as shown.



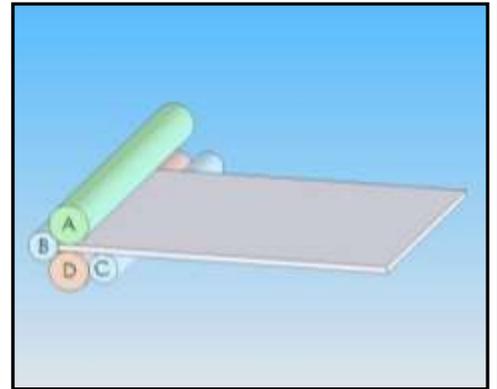


In order to achieve desired parameters, after every turn of the material you shall lift the bottom rolls step by step and after reaching the correct diameter of the material you can set the parameters for DRO.

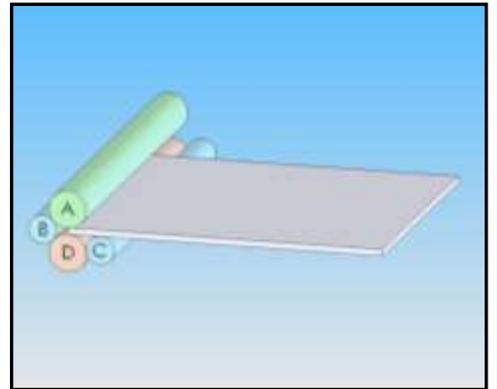
In order to make a full circle, you shall do pre-bending and after joining the two edges of the material and do point welding. Turn the welded material once or twice more on the machine to have a perfect circle.

Bending Operations

1. Start with the material centered up against the B roll.

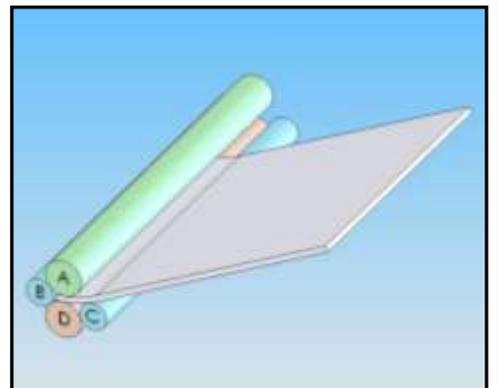


2. Lift roll D and pinch the material between the A and D rolls.



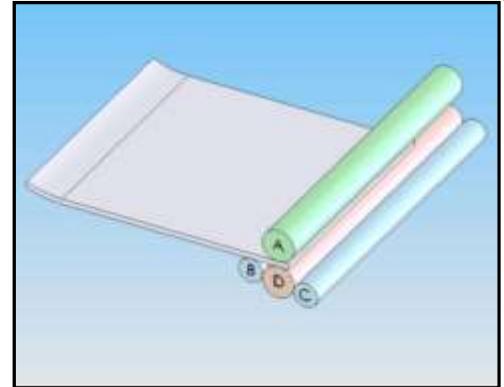
3. Use the control panel and roll the material back slightly until the leading edge of the material is centered under the A roll. The material is now ready to bend.

4. To Pre-Bend, raise roll C to start to form the edge to the desired finish / final diameter.

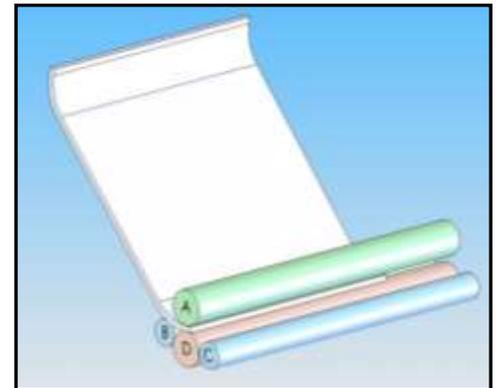




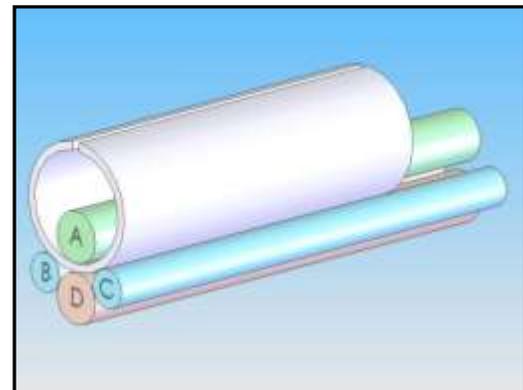
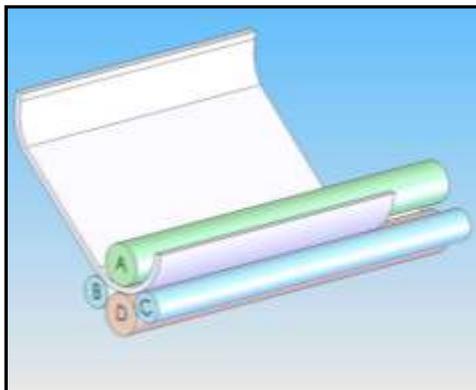
5. Lower roll C and pass the material to the other side.
6. Repeat pre-bending on other end of the material.
7. This time start with the material centered up against the C roll.



8. Keep the material pinched between the A and D rolls.
9. Use the control panel and roll the material back slightly until the leading edge of the material is centered under the A roll. The material is now ready to bend.
10. To Pre-Bend, raise roll B to start to form the edge to the desired finish / final diameter.



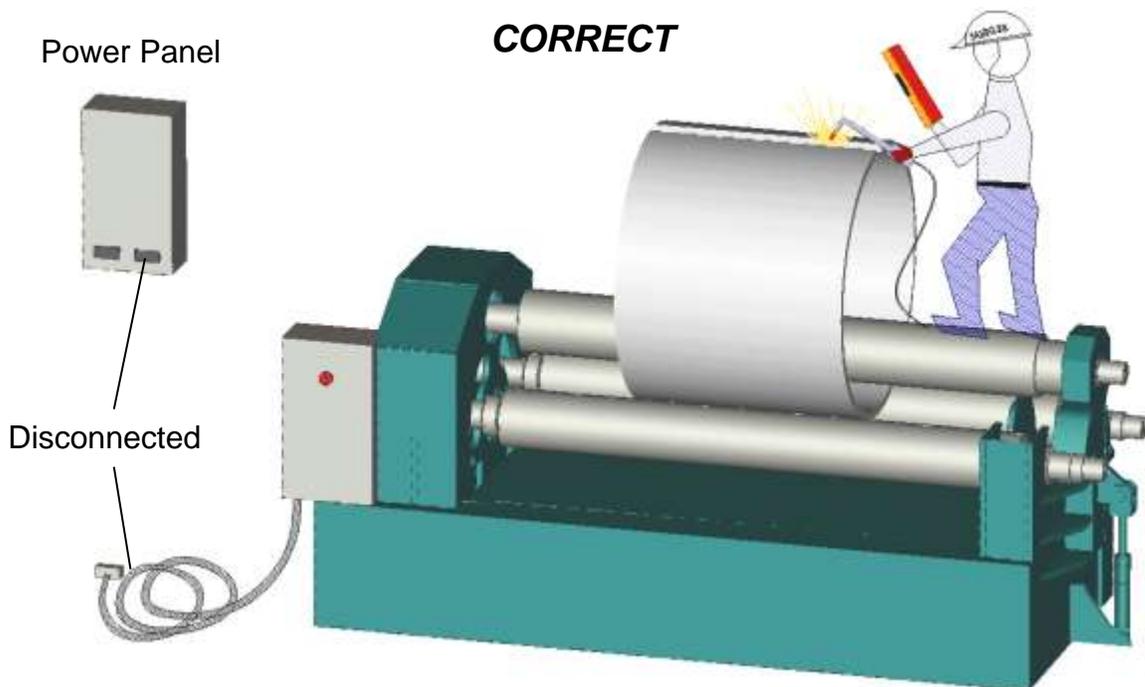
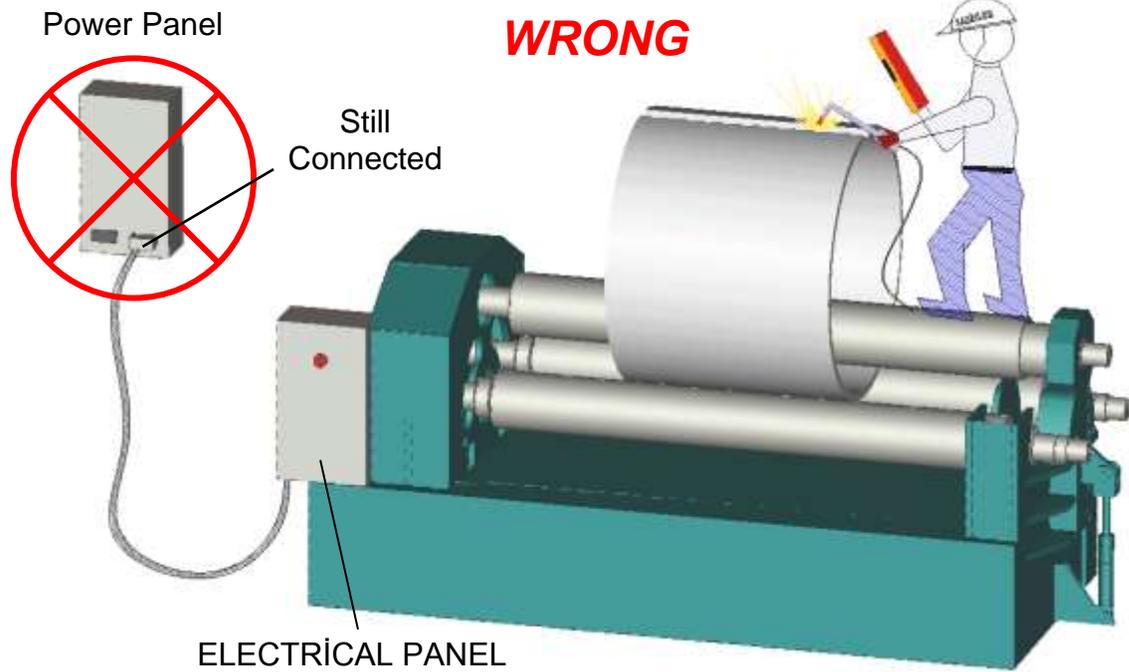
11. Start rolling the material until you get the required radius. It is normal to make several passes before getting the job done but remember that with less passes you get better finished material.



Notes: If you are working with stainless steel it is important to finish the job in as few passes as possible. Stainless Steel will harden as it is being worked. It becomes progressively harder after each pass.



⚠ IMPORTANT: Power **MUST** be disconnected from the power source before any welding operation.



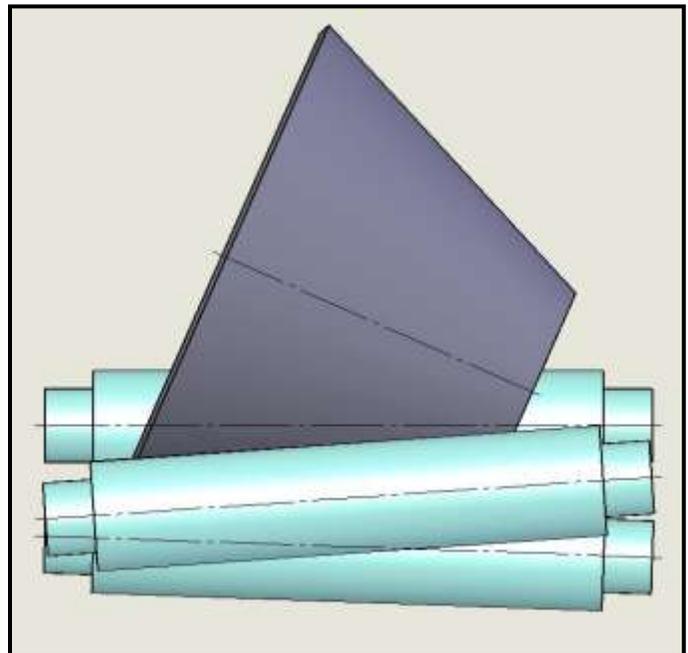
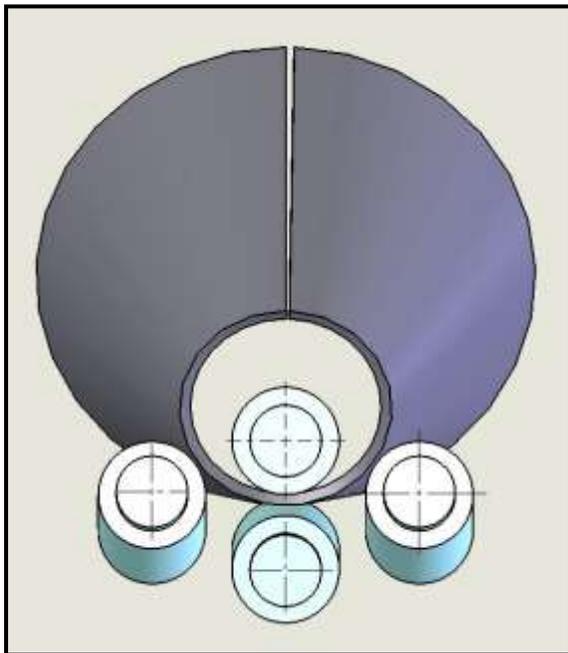


Conical Bending

Although the bending procedure is the same as above, while making the conical bend the small side of the material must ride against the conical bending device and the pinching roll must be adjusted in a tilted way as shown.

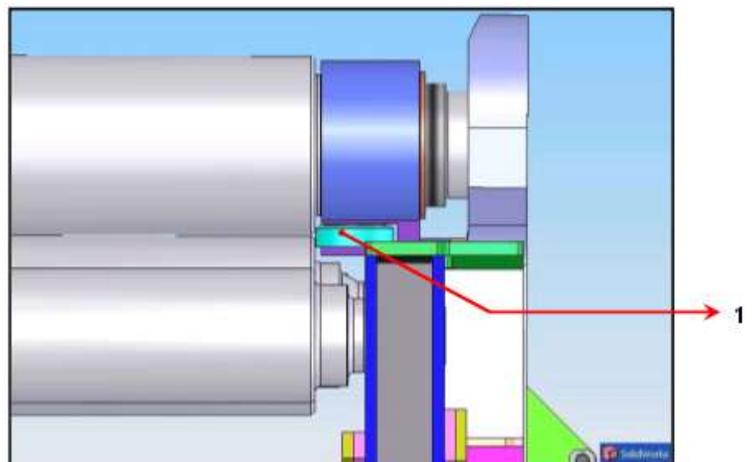
Be sure to clean any oil or grease put on the rolls before operation.

When conical bending, the material thickness and width capacities of the machine are reduced. Check with the distributor or manufacturer for your requirements.



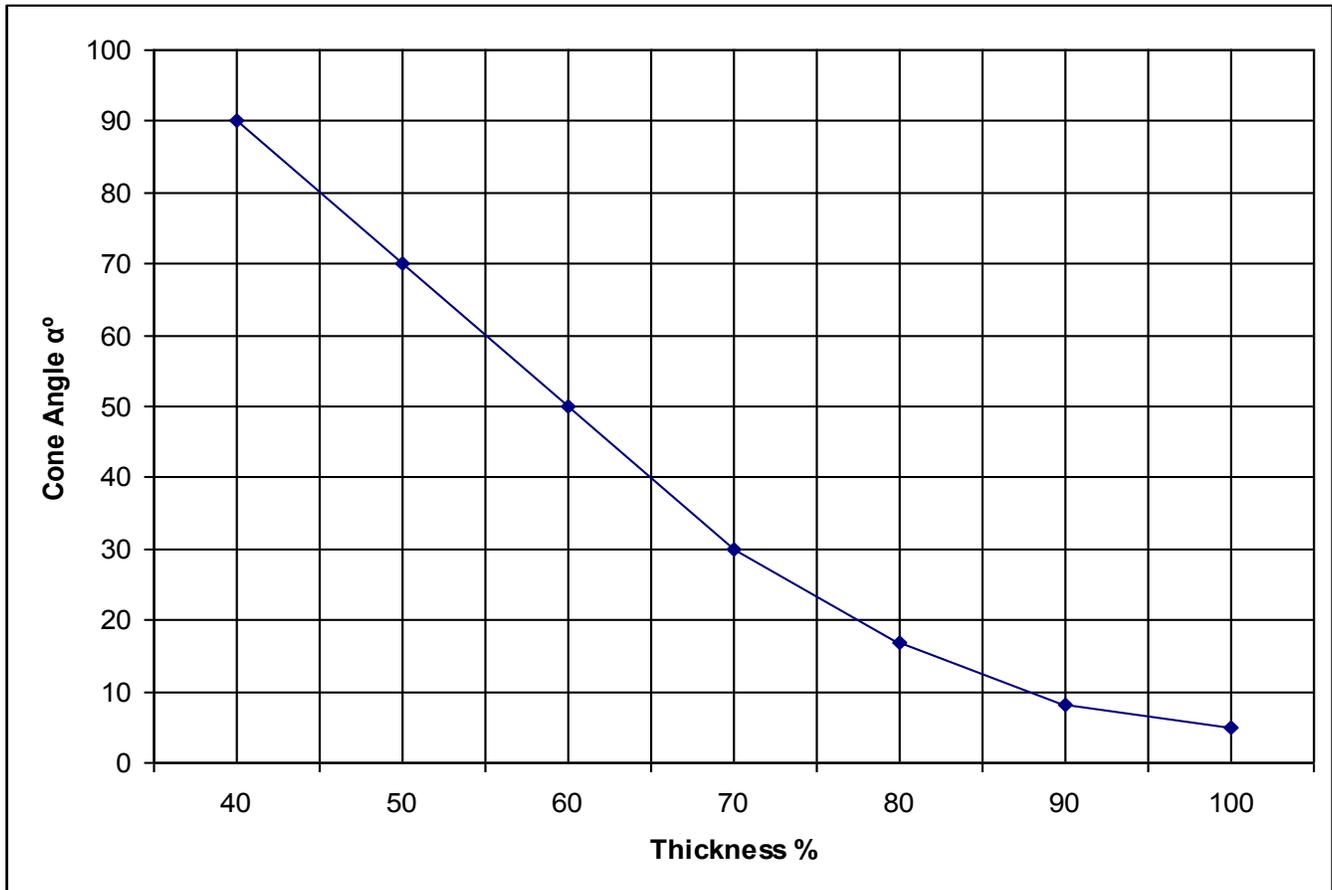
The part indicated by no.1 has been designed and hardened for supporting the part of the plate held against it during the conical bending operation.

Do not Place the sheet under the conical bending device, otherwise you damage the conical bending device.

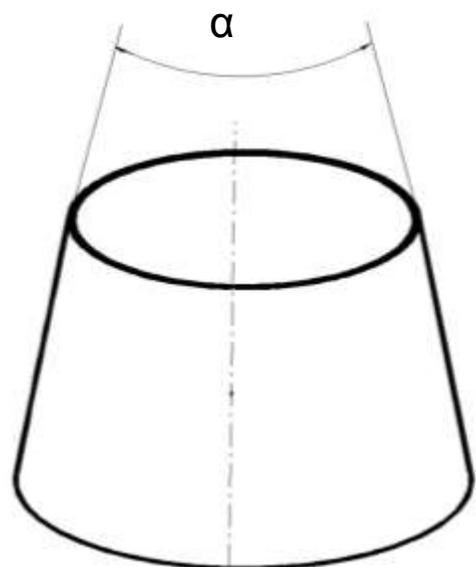




Conical Bending Capacity Compared With The Cylindrical Ferrule.



The plate Length is not influential.
To bend shorter cone does not allow for an increase in the material thickness.





BENDING ALLOWANCE

In order to bend sheet metal accurately, you will need to consider the total length of each bend. This is referred to as bend allowance. Subtract the bend allowance from the sum of the outside dimensions of the piece part to obtain the actual overall length or width of the piece. Because of differences in sheet metal hardness, and whether the bend is made with the grain or against it, exact allowances must sometimes be made by trial and error. However bend allowances for general use can be obtained from metal working books or from the Internet.

UNDERSTANDING SPRINGBACK

Springback, also known as elastic recovery, is the result of the metal wanting to return to its original shape after undergoing compression and stretch. After the bending leaf is removed from the metal and the load is released, the piece part relaxes, forcing the bent portion of the metal to return slightly to its original shape. The key to obtaining the correct bend angle is to over bend the metal a little and allow it to spring back to the desired angle. All metals exhibit a certain amount of spring back.

MATERIAL SELECTION

 **CAUTION:** It must be determined by the customer that materials being processed through the machine are **NOT** potentially hazardous to operator or personnel working nearby.

When selecting materials keep these instructions in mind:

- Material must be clean and dry. (without oil)
- Material should have a smooth surface so it processes easily.
- Dimensional properties of material must be consistent and not exceed the machine capacity values.
- Chemical structure of material must be consistent.
- Buy certificated steel from the same vendor when possible.



LUBRICATION AND MAINTENANCE

 **WARNING:** Make sure the electrical disconnect is OFF before working on the machine.
Maintenance should be performed on a regular basis by qualified personnel.
Always follow proper safety precautions when working on or around any machinery.



Note: Proper maintenance can increase the life expectancy of your machine.

Initial installation

The following should be checked at installation and verified after the first 2 weeks or 100 working hours:

- Hydraulic system oil capacity and filters, any evidence of oil leakage, bolts on the reducer.

Daily

The following should be verified before the start of each shift:

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.

Weekly

The following should be verified each week or every 50 working hours:

- Check the hydraulic reducer oil.
- Observe if there is any lack of quantity
- On a weekly basis clean the machine and the area around it.
- Lubricate threaded components and sliding devices.
- Apply rust inhibitive lubricant to all non-painted surfaces.

Quarterly

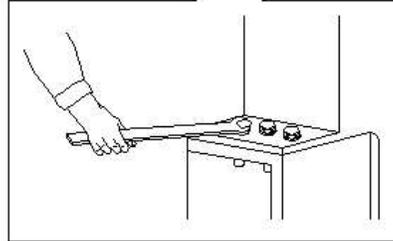
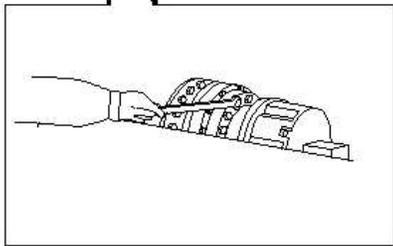
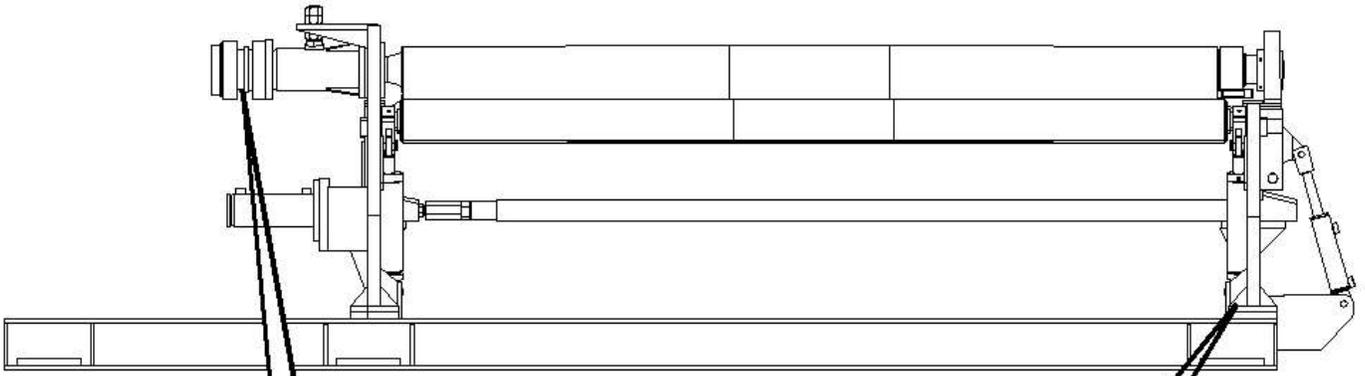
The following should be verified each month or every 500 working hours:

- Clean the absorption filter and check it.

Annually

The following should be verified each year or every 2000 working hours:

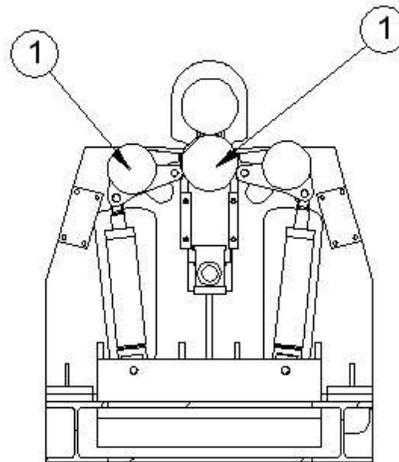
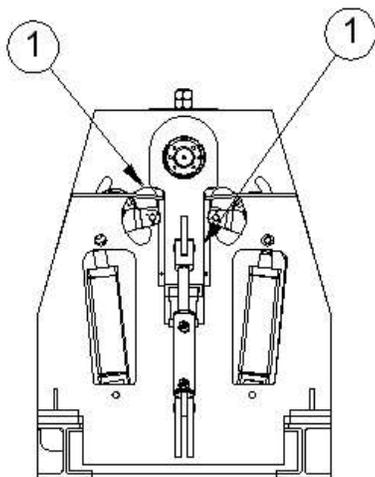
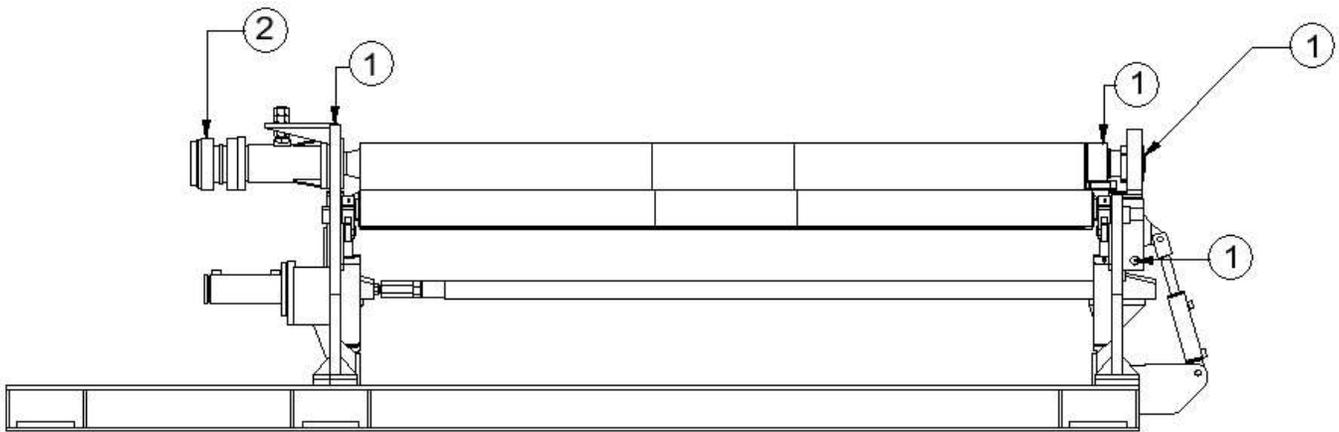
- Clean the suction line hydraulic oil filter.
- Replace the return line oil filter or reducer oil.





Lubrication of Bushings:

- The bushings shown as (1) on the drawing are lubricated by the Lubrication System. However they must be greased manually once every two weeks by hand also.
- The bushings shown as (2) on the drawing must be greased manually once a month



Oil Disposal

Used oil products must be disposed of in a proper manner following your local regulations.



Hydraulic Maintenance

The following chart list several acceptable oil choices. Use one of the oils from the list or use the list to reference an acceptable equivalent oil selection.

The hydraulic oil should be changed every 4000 hours or two years. Whichever comes first.

Recommended Hydraulic Oils

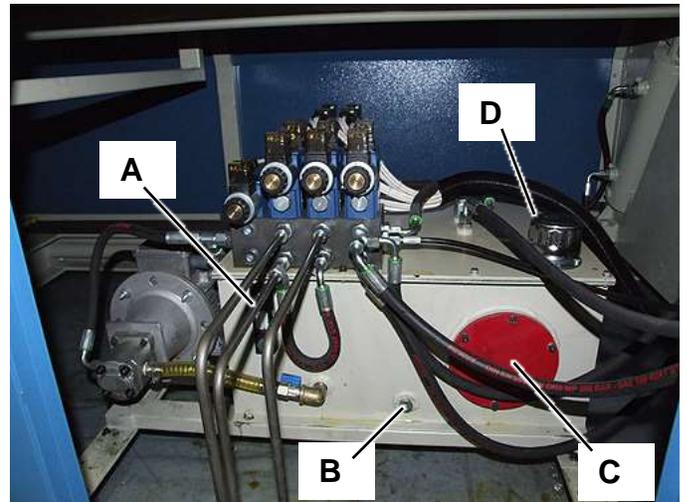
Brand	Work temperature >20°C	Work temperature <20°C
BP	Energol HLP 46	Energol HLP 32
Castrol	Hyspin AWS 46	Hyspin AWS 32
Esso	Nuto H 46	Nuto H 32
Mobil	DTE 25	
Shell	Tellus 46	Tellus 32
Texeco	Rando HD 46	Rando HD 32

This hydraulic system uses suction and return line filters. The suction filters should be removed and cleaned annually while the return line filter should be replaced annually.

Hydraulic Oil

The hydraulic oil is the primary medium for transmitting pressure and also must lubricate the running parts of the pump.

1. Use hydraulic oil #68 SHELL BRAND or an equivalent with similar specifications.
2. Before the first use and then again ever month, check the oil level. Keep hydraulic reservoir filled to 90% of capacity.
3. DO NOT rely totally on the oil gauge (A) as they can sometimes indicate an incorrect level reading. Do a visual inspection with the oil fill cap removed as well.
4. A shortage of hydraulic oil will cause hydraulic system breakdown to major mechanical components due to overheating.
5. Change the hydraulic oil every 24 months along with the oil filter.
6. To access the hydraulic system, disconnect power to the machine.
7. Open the front access door below the rolls.





8. Place a suitable container under the drain plug (B) and remove the plug and allow the oil to drain.
9. Remove the access cover (C) to clean the inside of the tank and access the suction filter.
10. When the tank has been cleaned and the suction filter installed, close the cover and fill with fresh oil to the full line on the gauge through the breather cap port.
11. Clean the breather cap and install.

Storing Machine for Extended Period of Time

If the Vertical Milling Machine is to be inactive for a long period of time, prepare the machine as follows:

- Disconnect the electrical supply from the power panel.
- Empty and clean the coolant reservoir.
- Clean and grease the machine.
- Cover the machine.



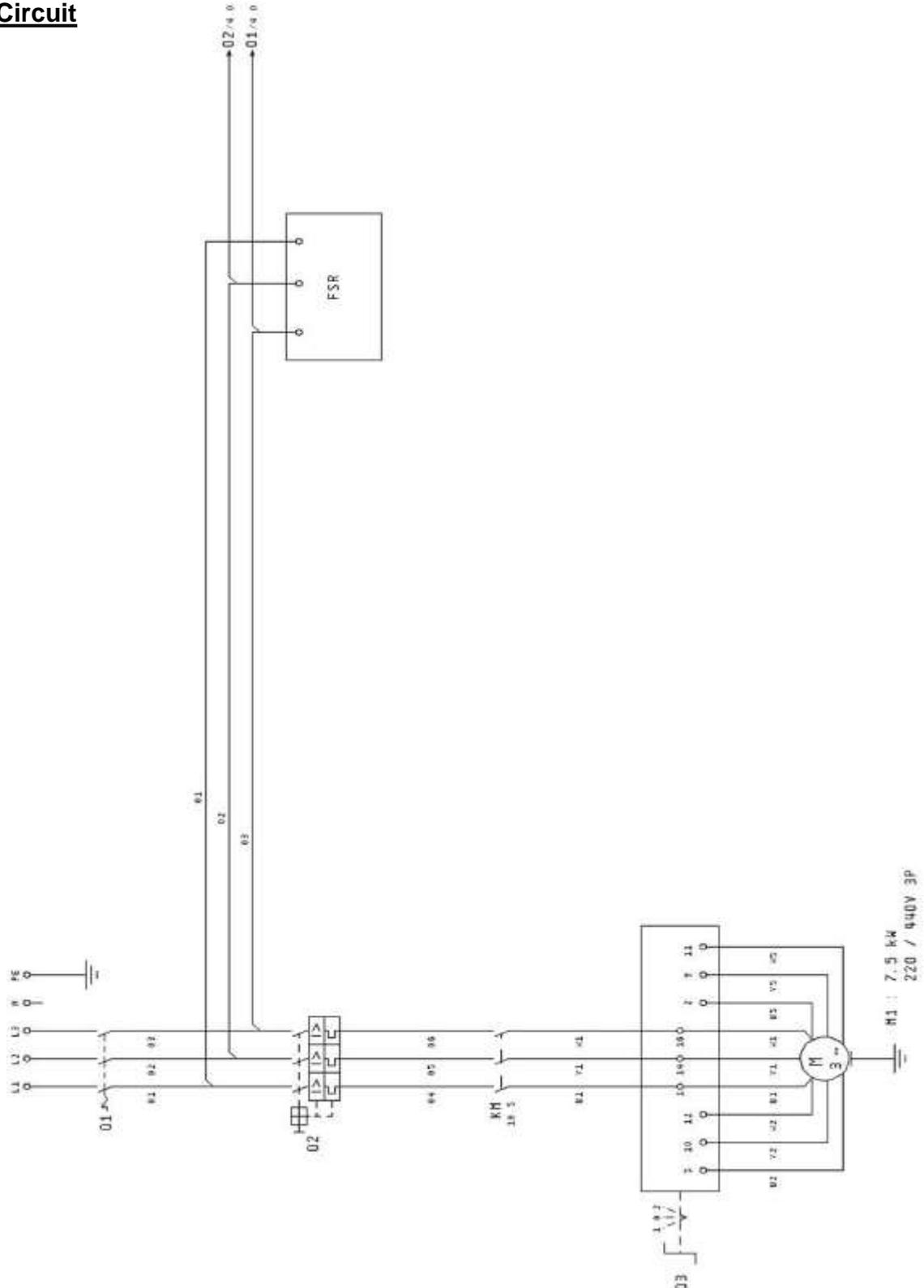
Hydraulic Components

NO	Description	Specification	Qty.
1	Hydraulic Tank	TANK 31gal (120L)	
2	Oil Sight Gauge	FSK 254	1
3	Breather / Fill Cap	FT8-C40/1	1
4	Thermostat	NT-177-DO TS5 (30°-90°C)	1
5	Hydraulic Gear Pump	2MB4.5+1MB2	2
6	Motor	10hp (7.5 KW) 60Hz	1
7	Coupler	DK42	1
8	Pressure Gauge	0-400BAR-Ø63	2
9	Pressure Relief Valve	MCD6 - SAT/ 51N	3
10	4 Way 3 Position Open Center Valve NG 6	DS3-S4/11N-K1	1
11	4 Way 3 Position Closed Center Valve NG 6	DS3-S1/11N-K1	1
12	2 Way 2 Position Valve	DS3-SA2/10N	1
13	4 Way 3 Position Tandem Center Valve NG 6	DS3-S3/10N	6
14	Double Check Valve	MVPP-D/50	5
15	Double Check Valve	VBPDL38	1
16	Hydraulic Manifold Block		1
17	Return Filter	TEF 120	1



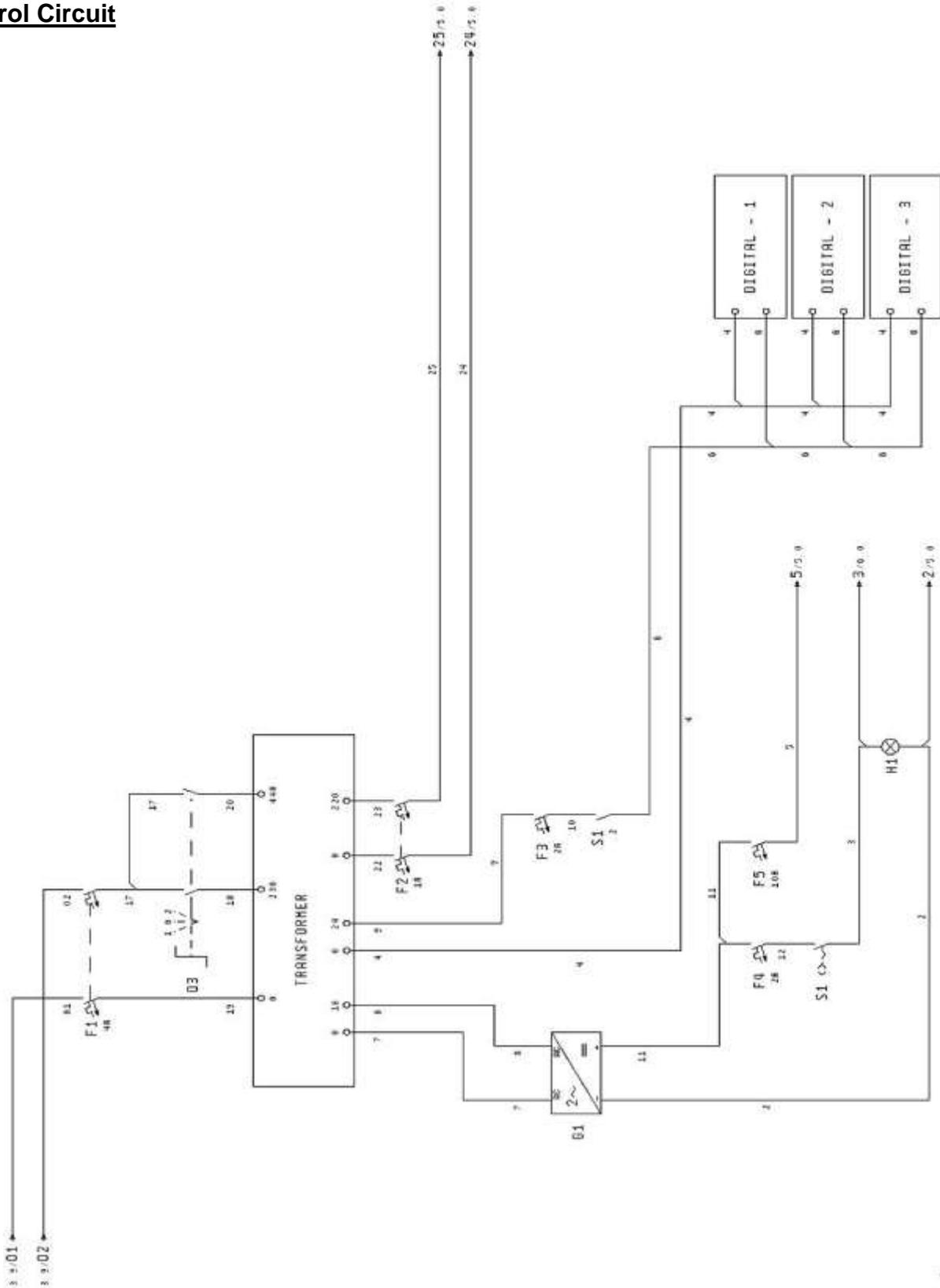
ELECTRICAL SCHEMATIC

Motor Circuit



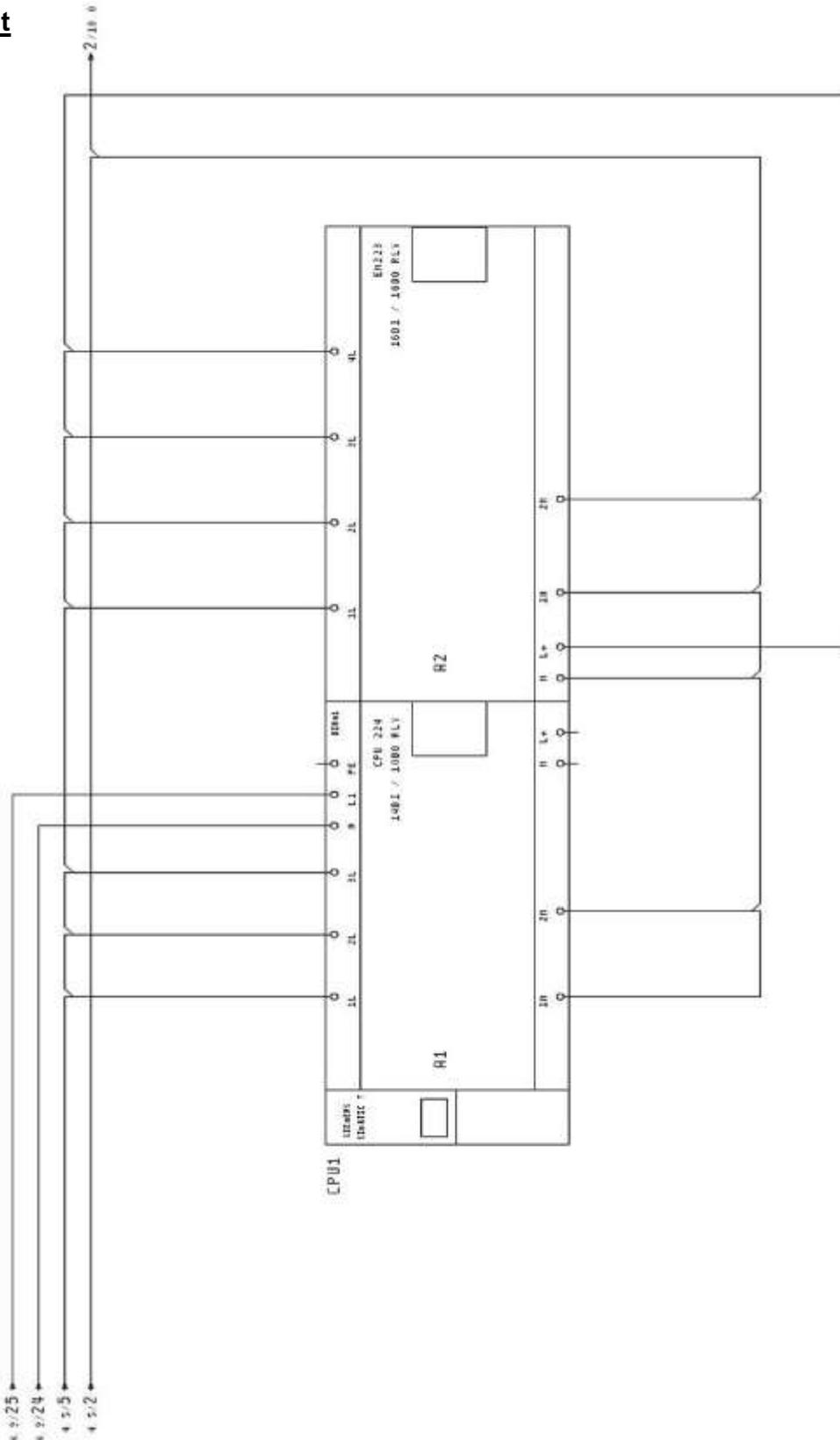


Control Circuit



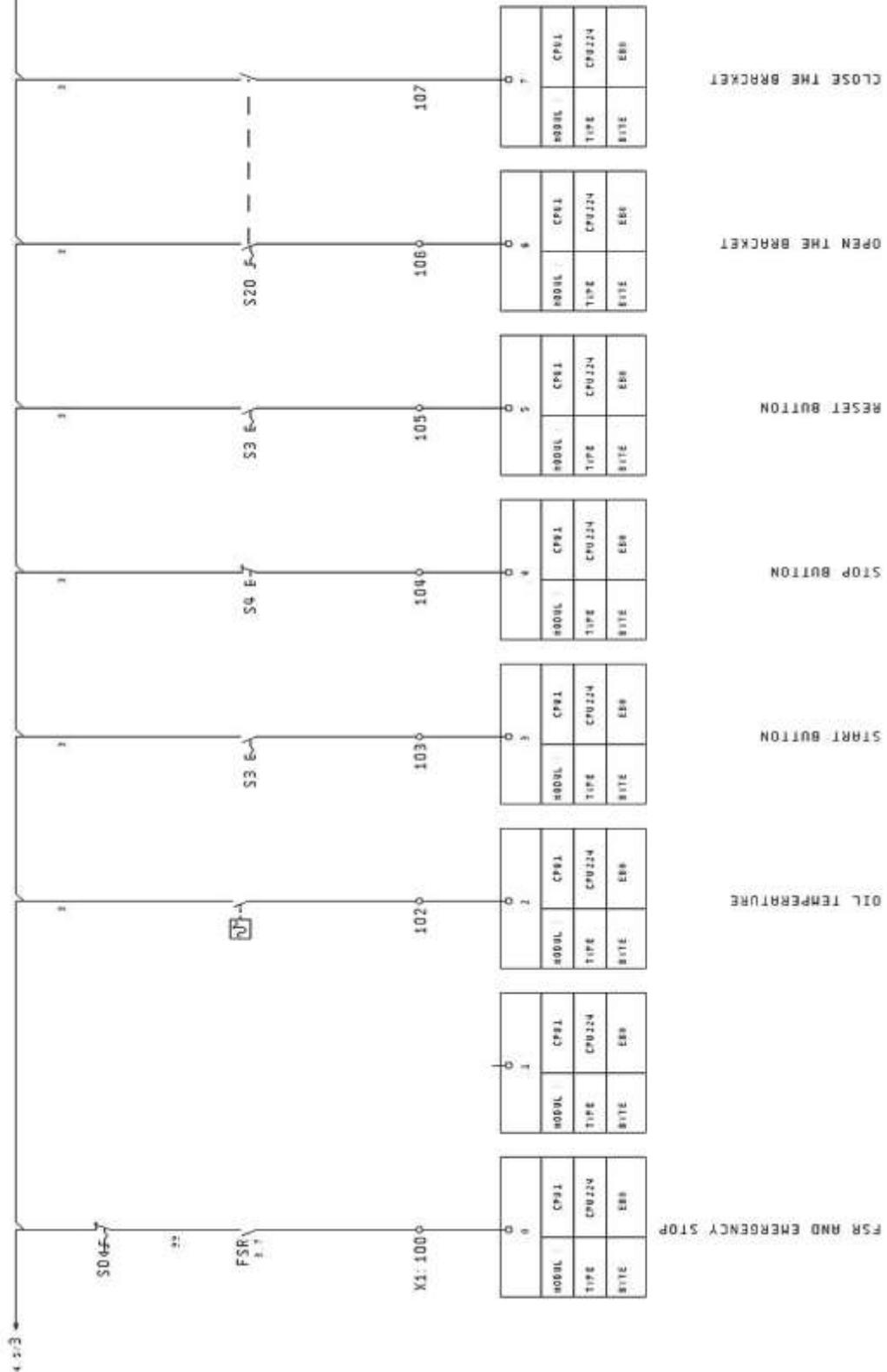


PLC Circuit



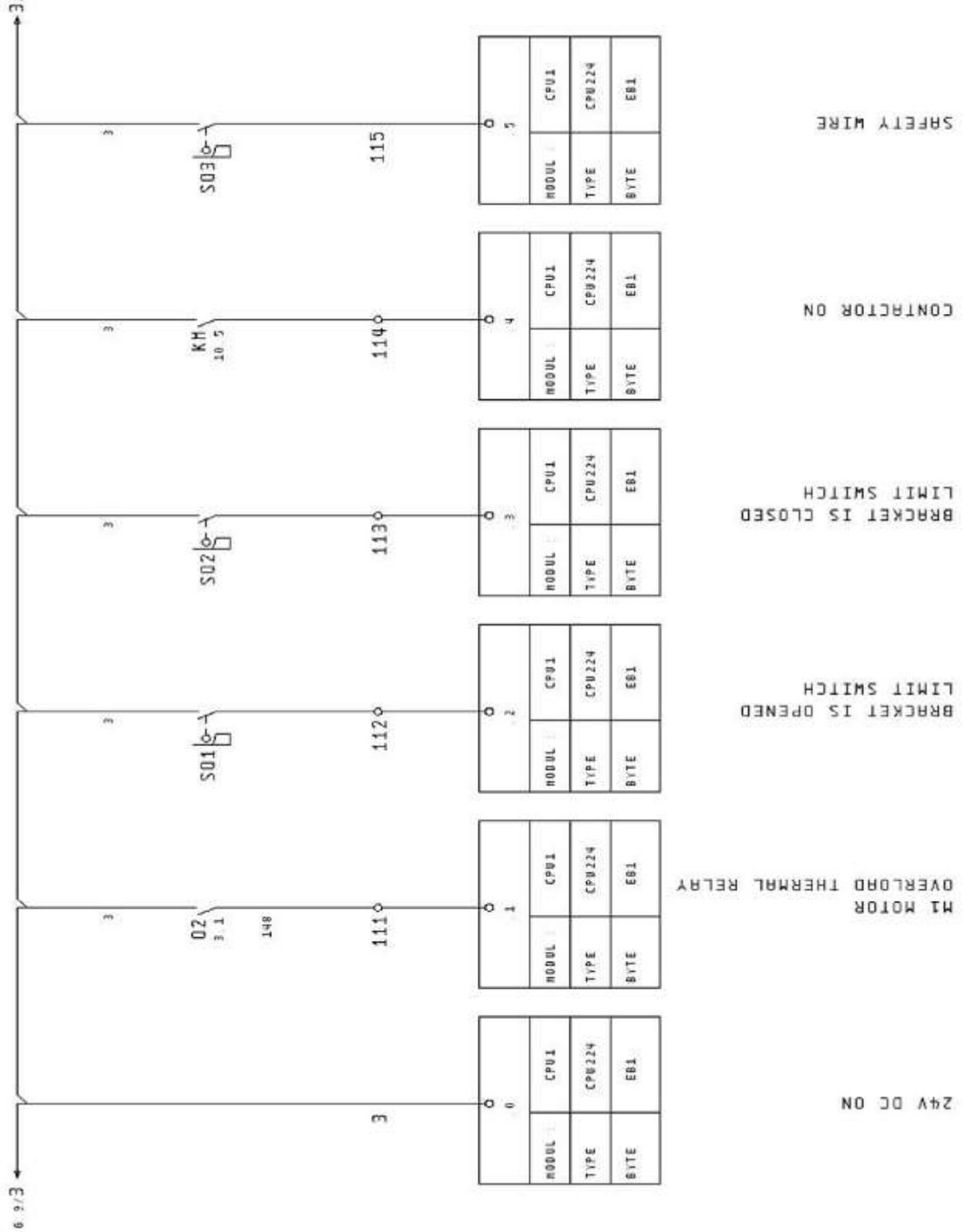


PLC Inputs 1



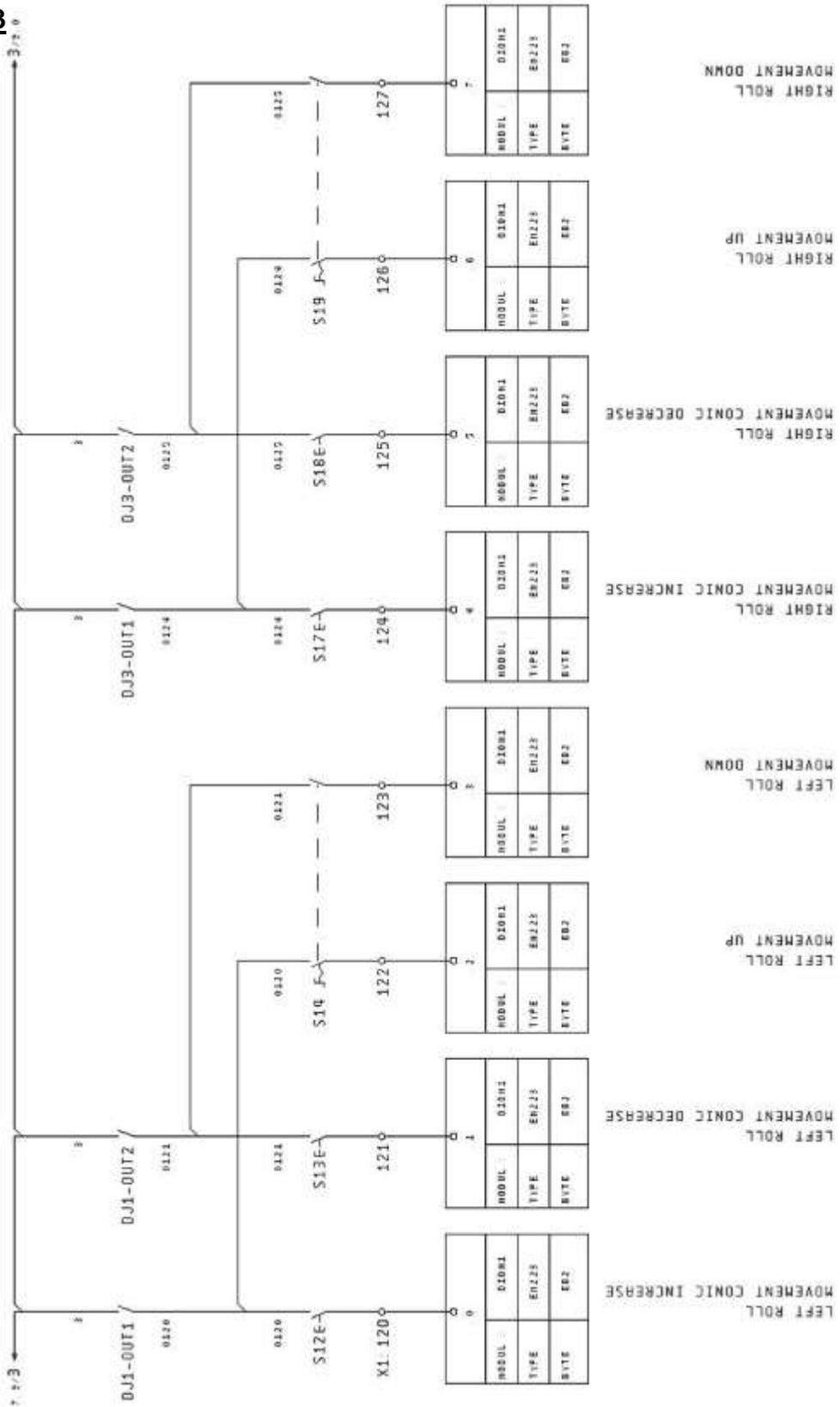


PLC Inputs 2



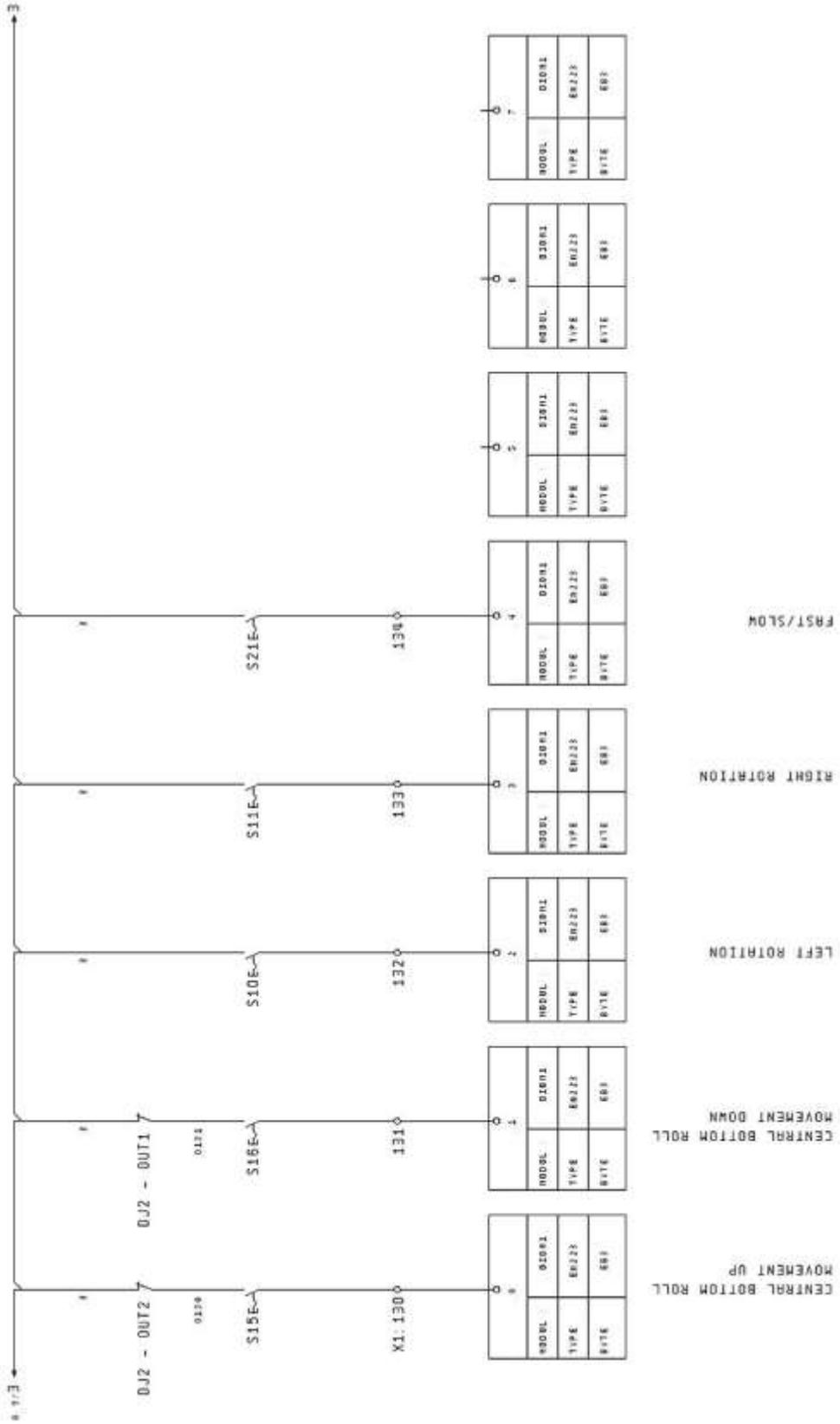


PLC Inputs 3



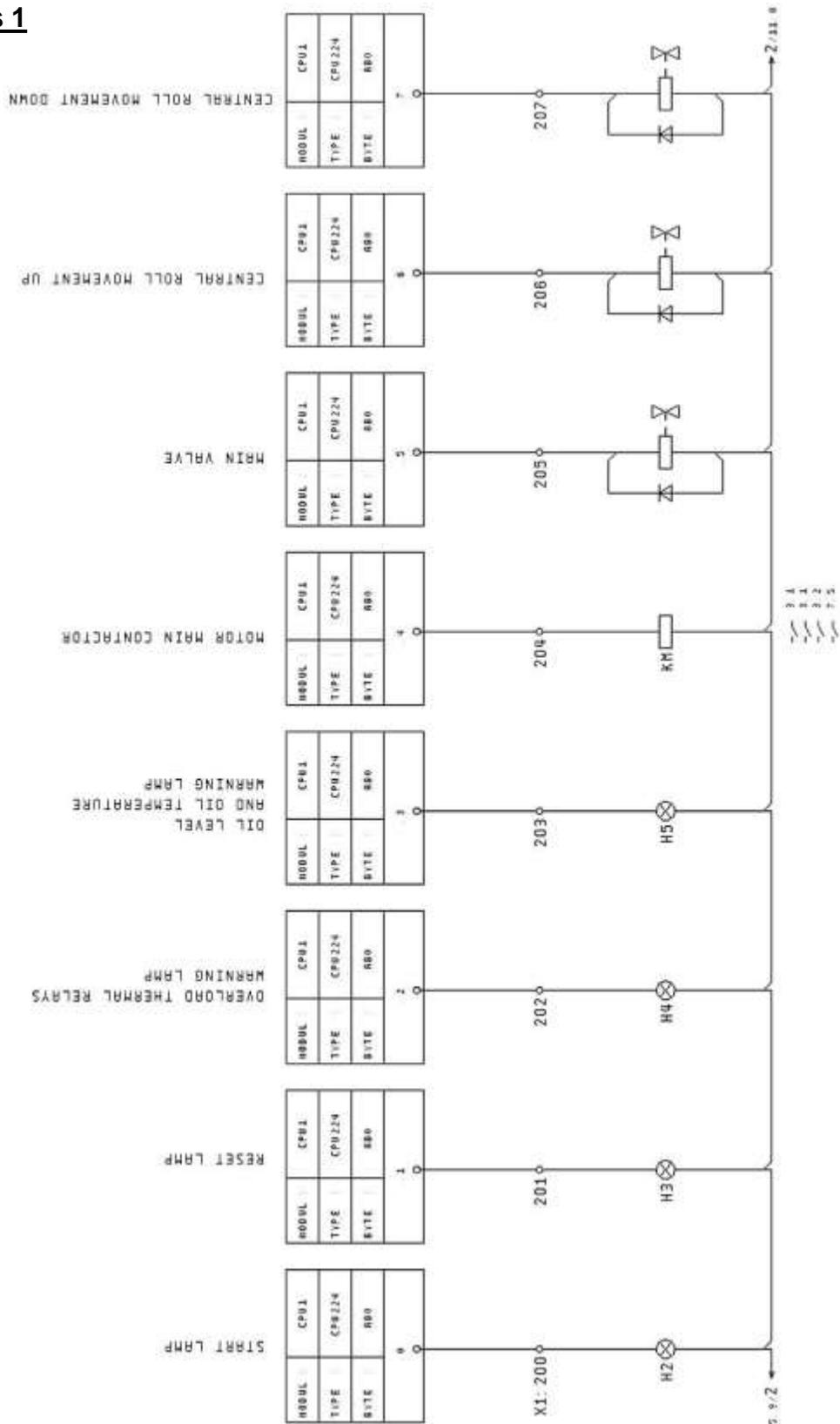


PLC Inputs 4



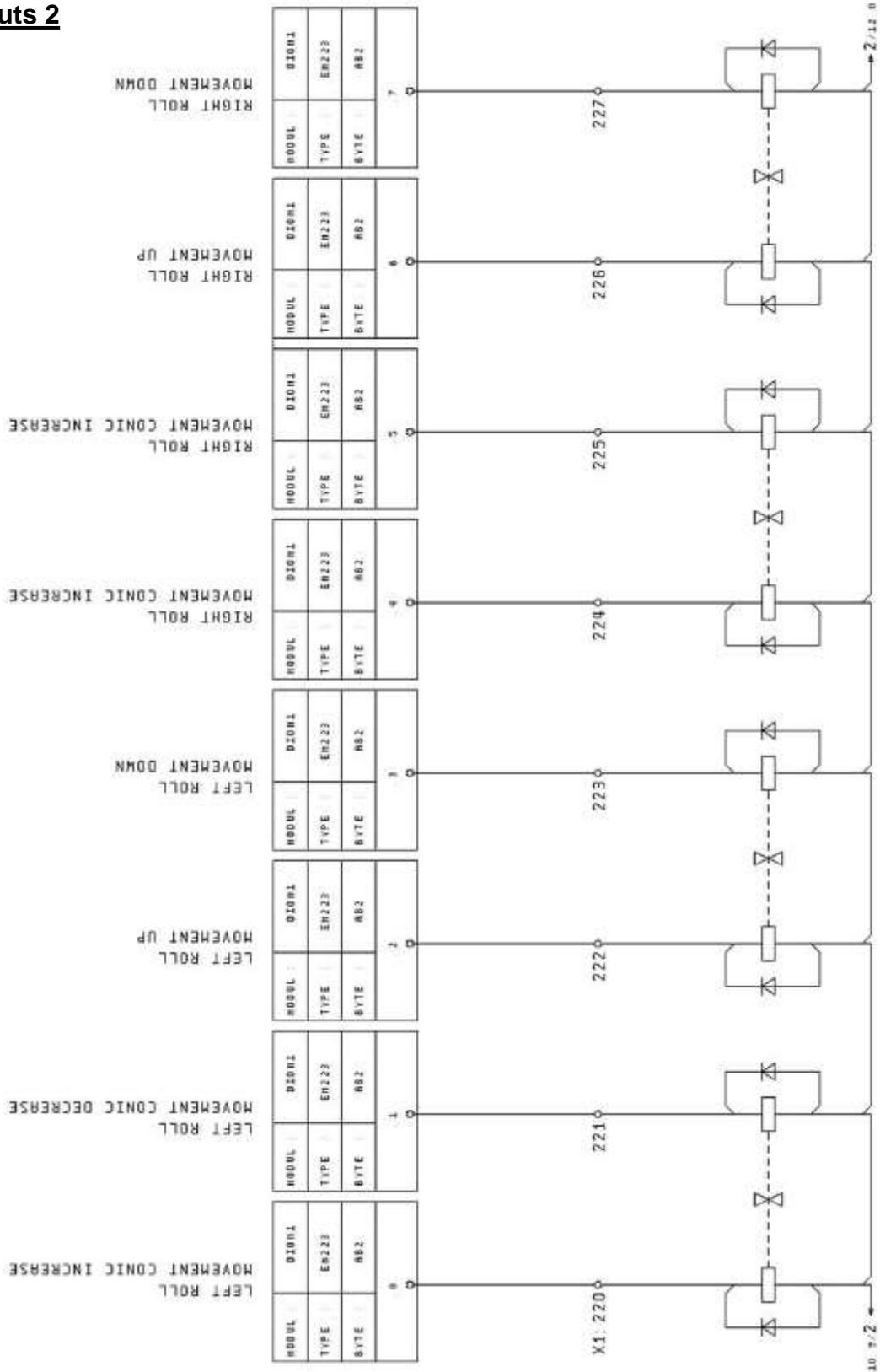


PLC Outputs 1



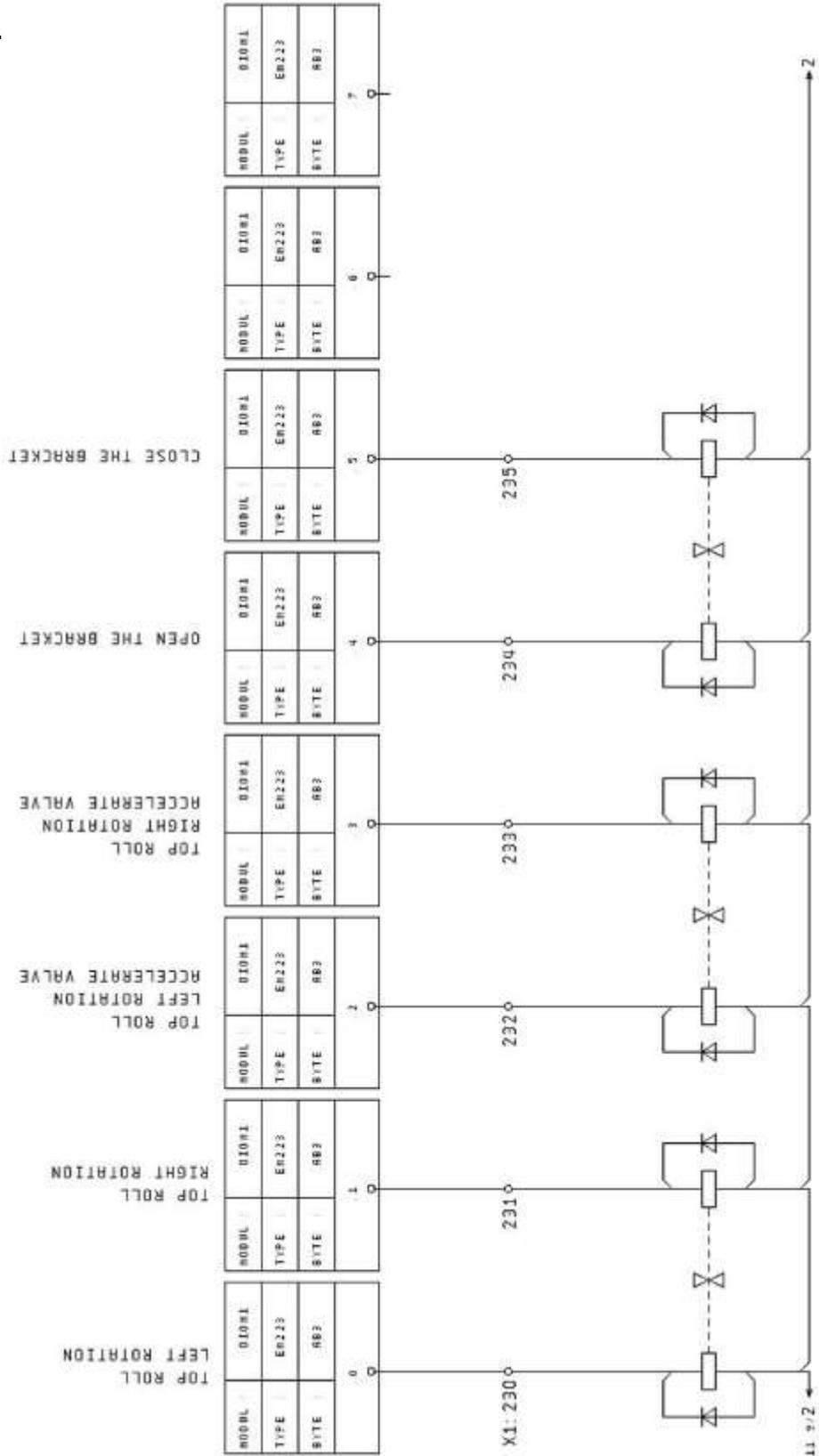


PLC Outputs 2



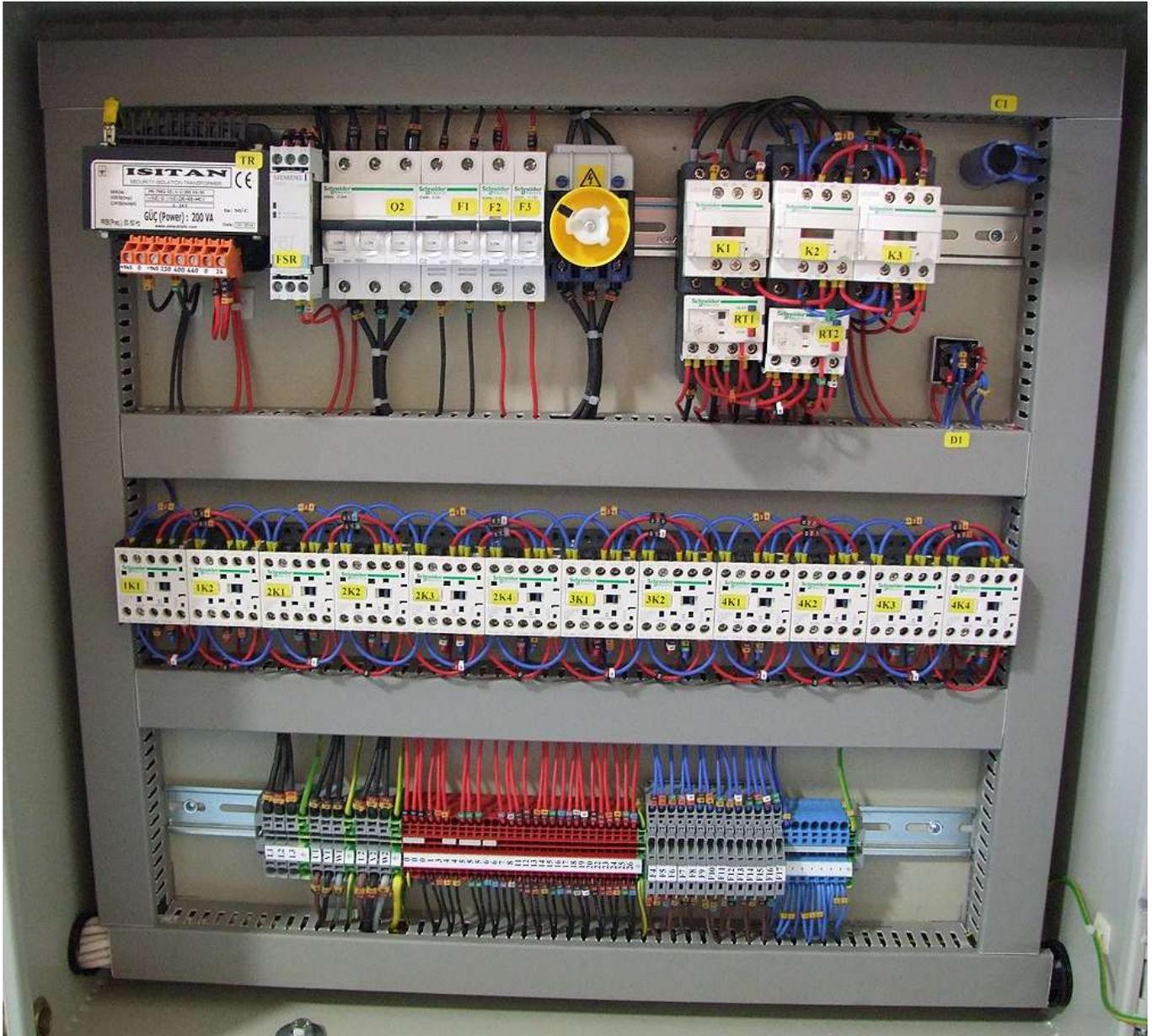


PLC Outputs 3





ELECTRICAL ENCLOSURE COMPONENTS





ELECTRICAL COMPONENTS

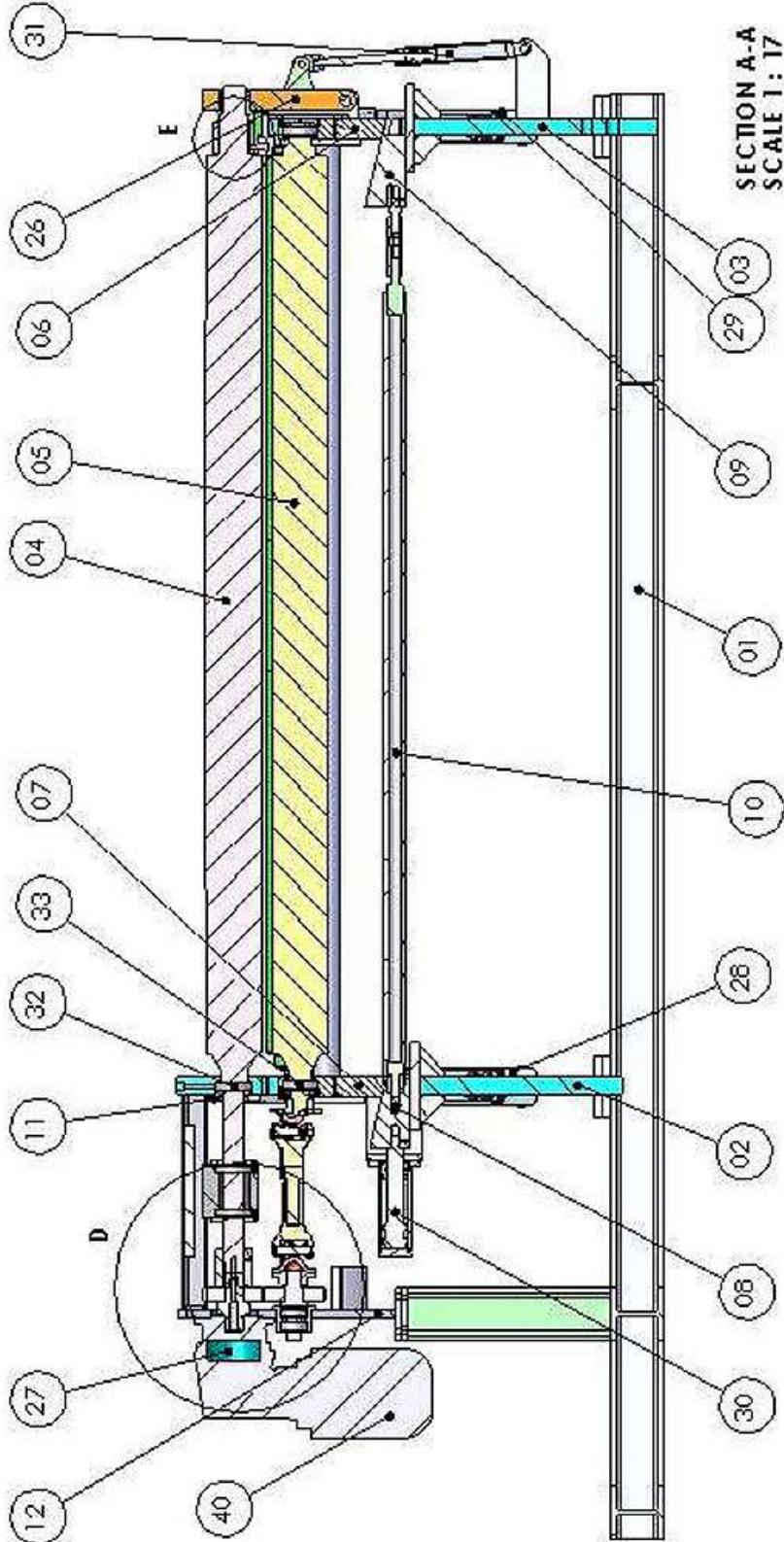
Item	Description	Part Number
Q1	Main Switch	KG64B
Q2	Motor Protection Overload Thermal Relay (11 – 16A) (For 440V)	3RY1021–4AA10
Q2	Motor Protection Overload Thermal Relay (20 – 25A) (For 220V)	3RY1021–4DA10
Q3	Working Voltage Selector Switch	C32–TR1336–50A
TR	Transformer (+20/0/-20/460/0/220/0/24/0/18V 630VA)	
FSR	Phase Sequence Relay	3UG3511-1BQ50
KM	Pump Motor Main Contactor	3RT1035-1BB40
G1	DC Voltage Filter Circuit	
F1	Fuse - Transformer Input	5SQ22-C4
F2	Fuse - Hydraulic Cabinet Illumination Lamps	5SQ22-C1
F3	Fuse – control Circuit 24V AC Feed	5SQ21-C2
F4	Fuse – PLC Inputs 24V DC Feed	5SQ21-C2
F5	Fuse – PLC Outputs 24V DC Feed	5SQ21-C10
A1	PLC CPU Unit	6ES7 214-1BD23-0XB0
A2	PLC Digital Input / Output Expansion Module – 1	6ES7 223-1PL22-0XA0
S0	Emergency Stop	XB4-BS542
S1	On (O)/ Off (I) Power Switch	XB4-BG21
H1	Power ON Lamp	XB4-BV61
S2 - H2	Start Button and Lamp	XB4-BW3365
S3 - H3	Reset button and Lamp	XB4-BW3165
S4 – H4	Stop Button and Thermal Overload Relay Warning Lamp	XB4-BW3465
H5	Oil Hot Warning Lamp	XB4-BV65
S10	Control Button for Right Rotation	XB4-BA21
S11	Control Button for Left Rotation	XB4-BA21
S12 – S13	Control Button for Left Roll Movement Up and Down	ZB4-BA8112 + ZB4-BZ101
S14	Control Button for Left Roll Movement Conical Increase / Decrease	XB4-BJ53
S15 – S16	Control Button for Central Bottom Roll Movement Up and Down	ZB4-BA8112 + ZB4-BZ101
S17 – S18	Control Button for Left Roll Movement Up and Down	ZB4-BA8112 + ZB4-BZ101



Item	Description	Part Number
S19	Control Button for Right Roll Movement Conical Increase / Decrease	XB4-BJ53
S20	Control Button for Bracket Open / Close	XB4-BJ53
S21	Control Button for Slow / Fast Rotation	XB4-BD21
SQ1	Bracket IS Open Switch	XCK-N2127-P16
SQ2	Bracket IS Closed Switch	XCK-N2121-P16
SQ3	Safety Wire Switch	FD678
DJ1 – DJ2 – DJ3	Digital Indicator for Rolls Movement	AD100
	Encoder for Left Roll	LPM-250-B-10K-S
	Encoder for Right Roll	LPM-250-B-10K-S
	Encoder for Main Roll	LPM-150-B-5K-S

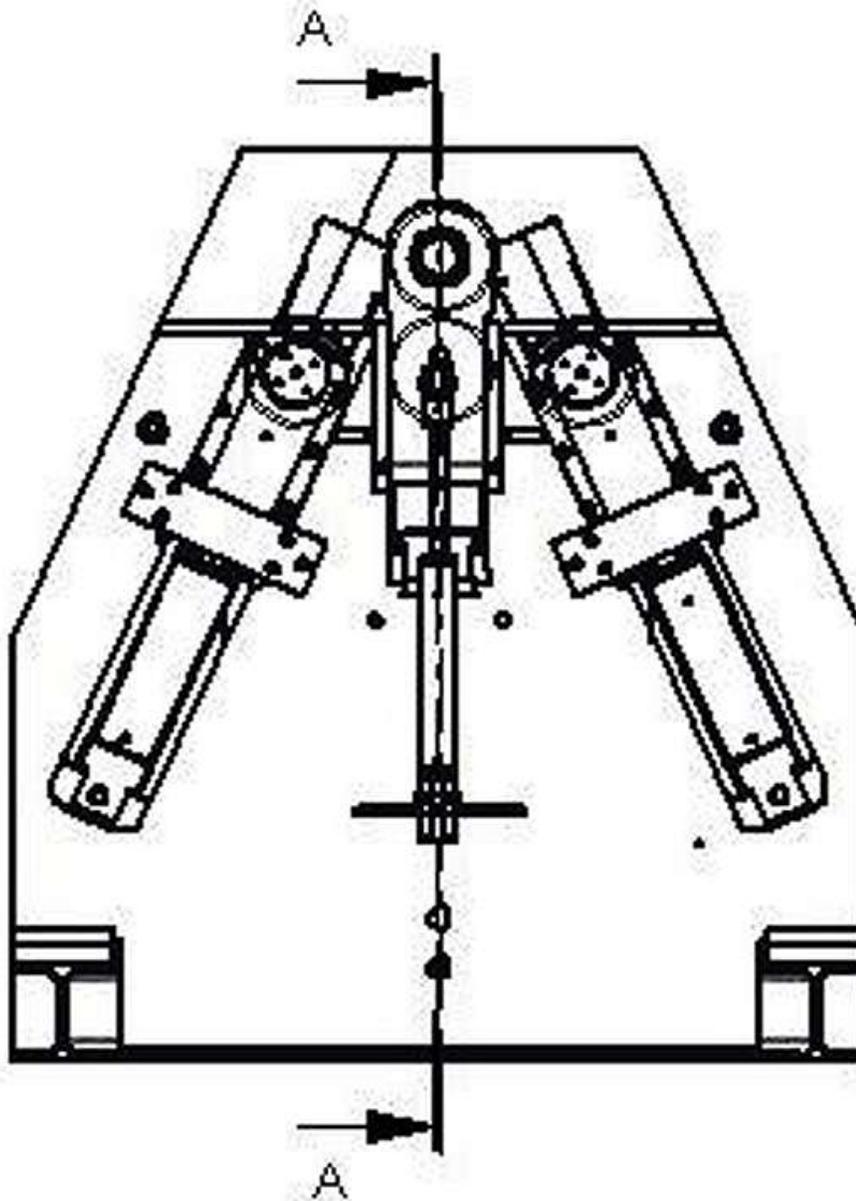


PARTS DIAGRAM - 1



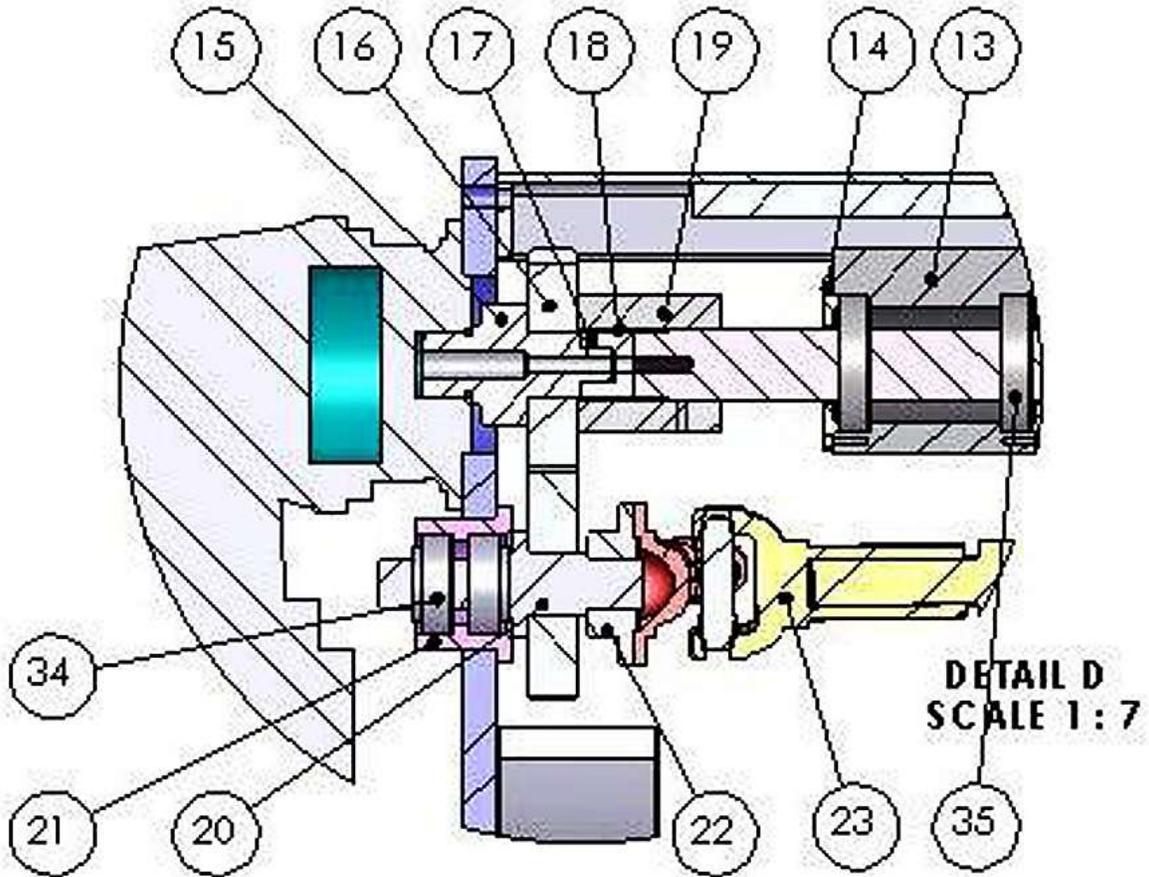


PARTS DIAGRAM - 2

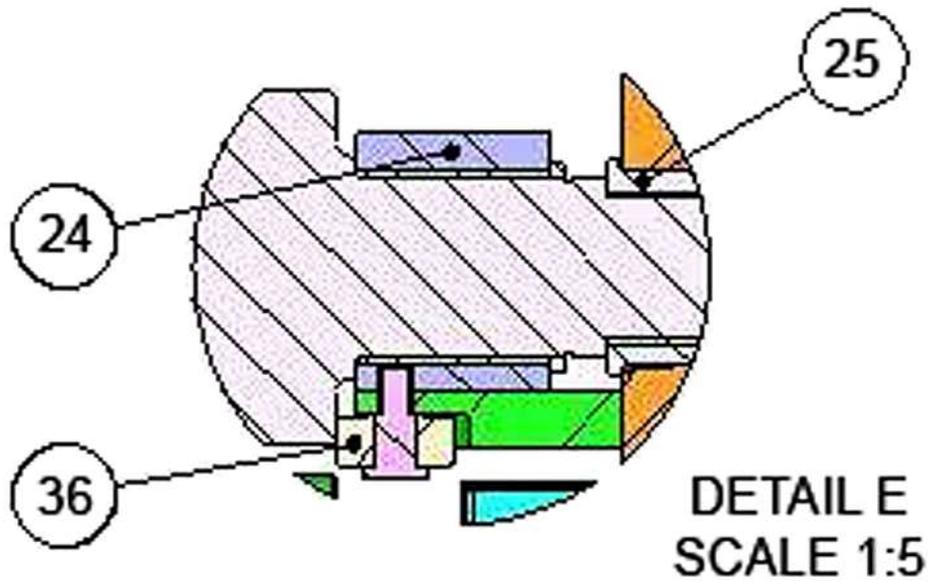




PARTS DIAGRAM - 3

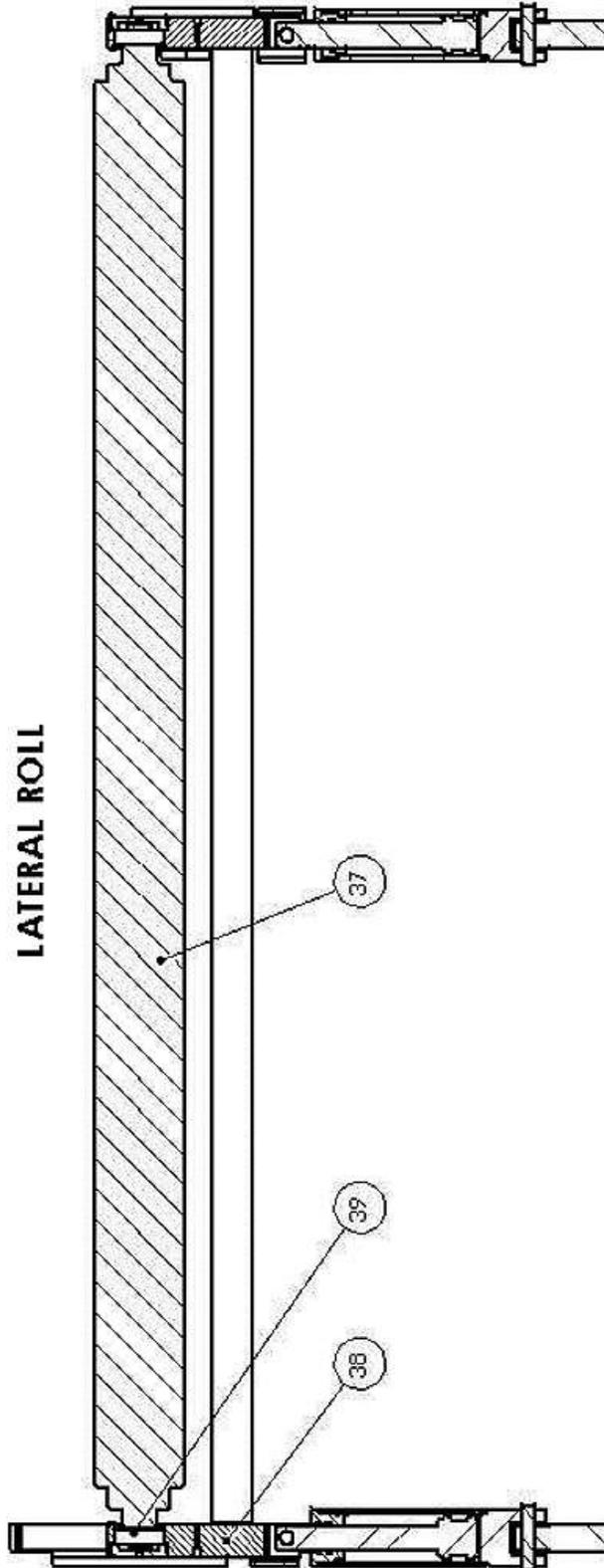


PARTS DIAGRAM - 4





PARTS DIAGRAM - 5





Parts List

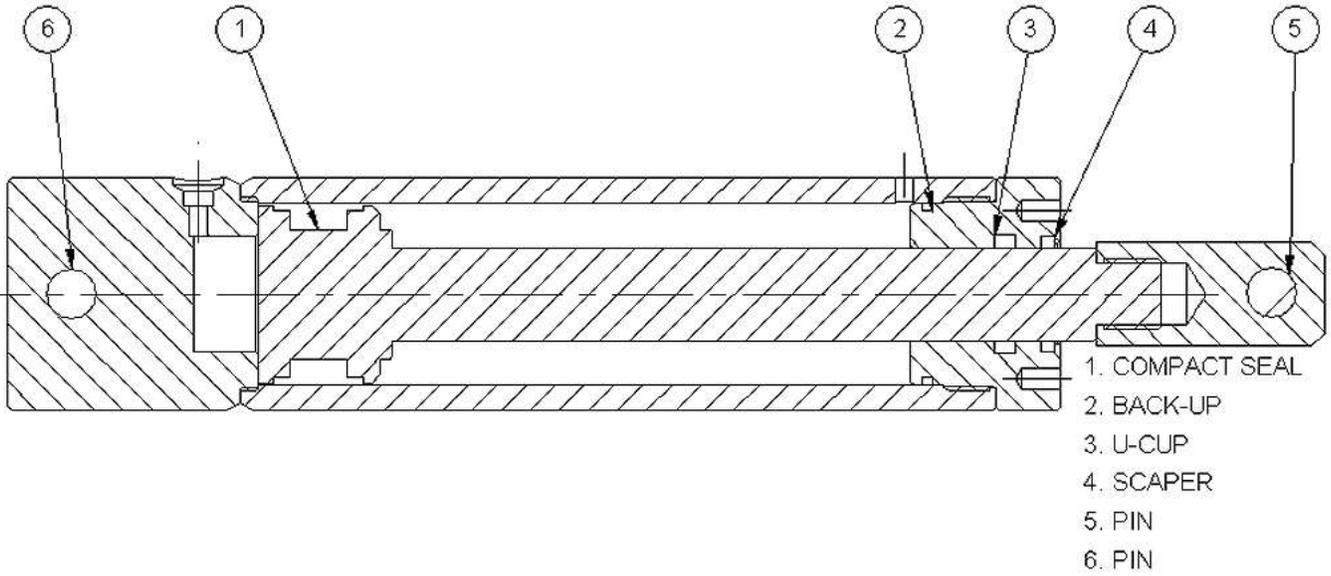
Item	Part Identification
1	Frame
2	Left Side Main Frame
3	Right Side Main Frame
4	Top Roll
5	Bottom Roll
6	Right Side Bottom Bearing
7	Left Side Bottom Bearing
8	Left Side Wedge
9	Right Side Wedge
10	Pipe
11	Bearing Flange
12	Planetary Reducer Part
13	Top Roll Support Bushing
14	Top Roll Bushing Flange
15	Planetary Reducer Shaft
16	Driving Gear
17	Top Roll Movement Coupling
18	Coupling Ring
19	Coupling Ring
20	Driving Shaft
21	Driving Shaft Bushing
22	Flange
23	Cardan Join
24	Conical Bending Part Bushing
25	Drop End Bushing
26	Drop End
27	Planetary Reducer
28	Left Side Main Frame Lateral Roll Piston
29	Right Side Main Frame Lateral Roll Piston
30	Bottom Roll Piston
31	Drop End Piston
32	Top Roll Bearing
33	Bottom Roll Bearing



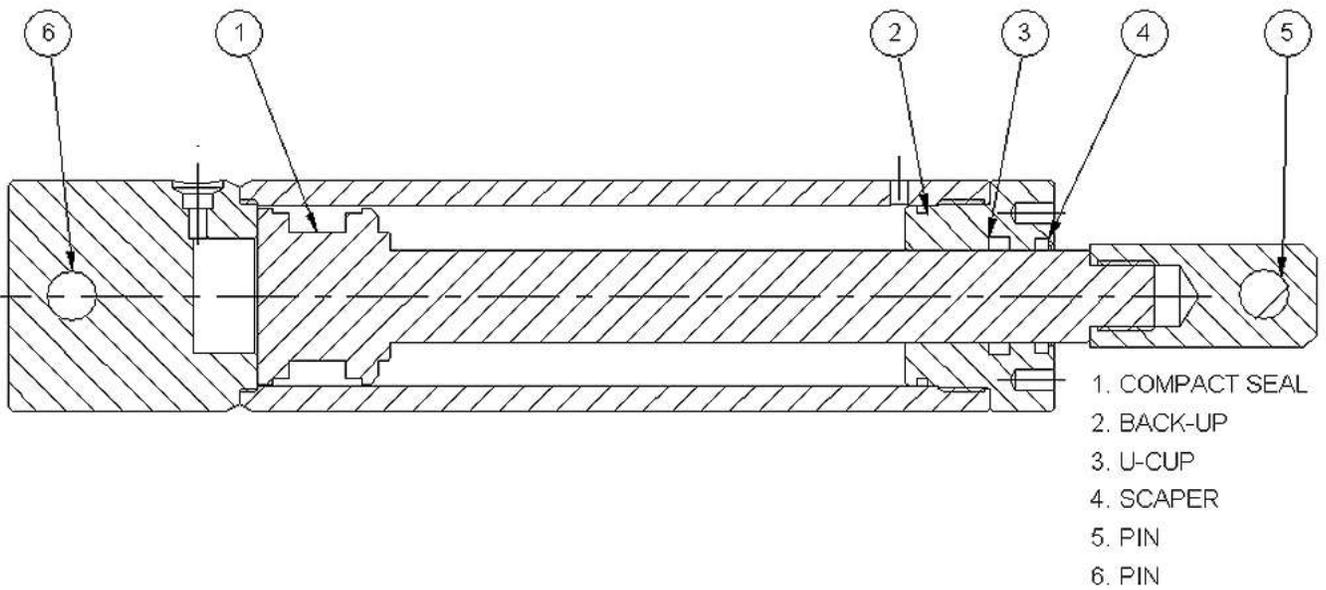
Item	Part Identification
34	Driving Shaft Bearing
35	Top Roll Support Bearing
36	Conical Bending Part Bearing
37	Lateral Roll
38	Lateral Roll Bushing
39	Lateral Roll Bearing
40	Motor
	Digital Read-Out
	Encoder



BIG FRAME SIDE CYLINDER PARTS DIAGRAM

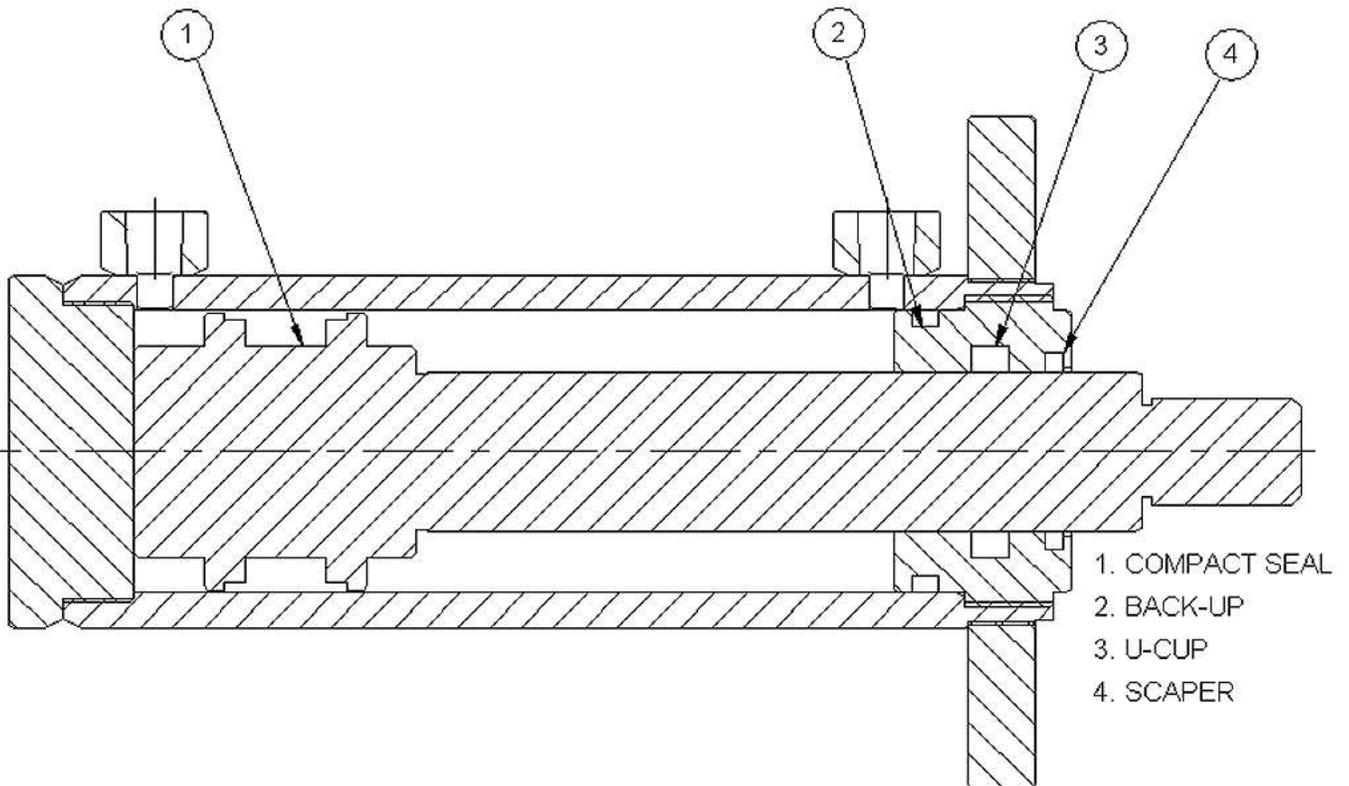


SMALL FRAME CYLINDER PARTS DIAGRAM

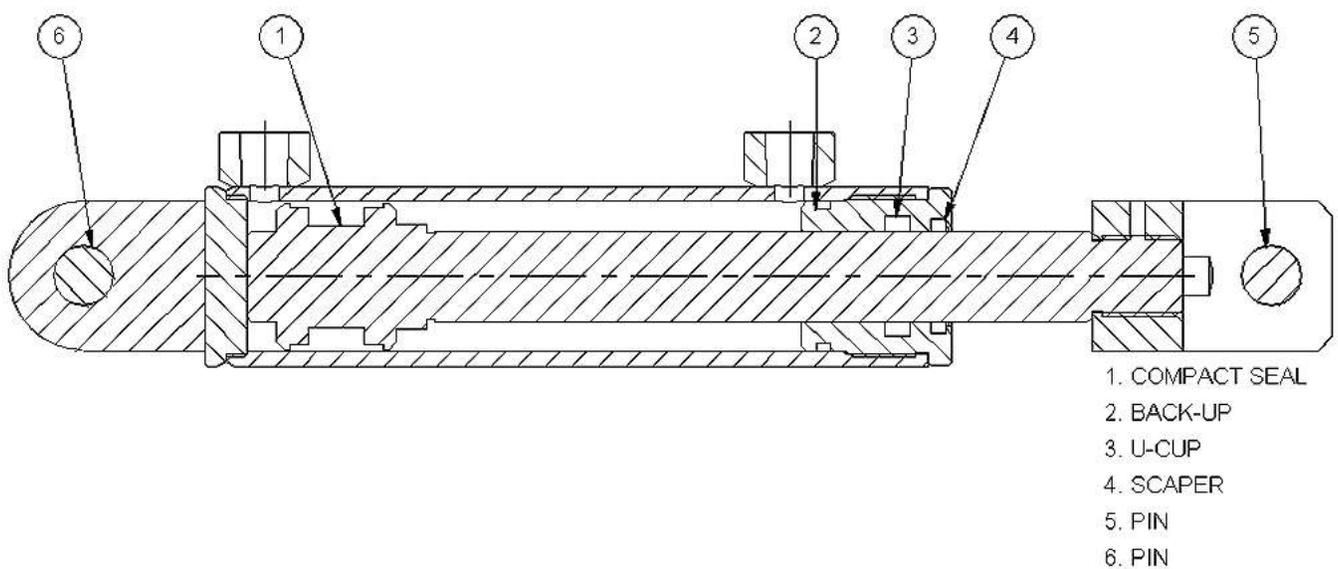




BOTTOM PINCH ROLL CYLINDER PARTS DIAGRAM



BRACKET POSITION CYLINDER PARTS DIAGRAM





NOTES

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