



OPERATOR'S MANUAL

Metal Working



HYDRAULIC PINCH POWERED ROLL BENDED MODEL: R-CNC45

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THANK YOU & WARRANTY

Thank you for your purchase of a machine from Baileigh Industrial Holdings LLC. 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 10 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 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 attorney 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 Holdings LLC 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 Holdings LLC 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@baileigh.com



INTRODUCTION

The quality and reliability of the components assembled on a Baileigh Industrial Holdings LLC 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
- Setup 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 Holdings LLC 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 modifications.



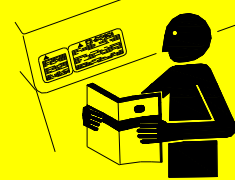
Note: This symbol refers to useful information throughout the manual.



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. **NOTICE**, which is not related to personal injury, is used without a symbol.

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

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

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE: Indicates a situation which, if not avoided, could result in property damage.

DANGER

WARNING

CAUTION

NOTICE

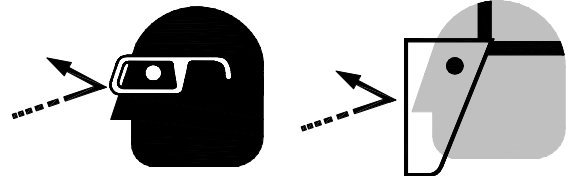


SAVE THESE INSTRUCTIONS.
Refer to them often and use them to instruct others.



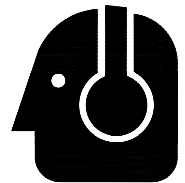
PROTECT EYES

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



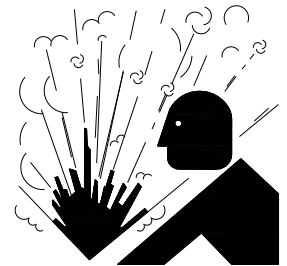
PROTECT AGAINST NOISE

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.



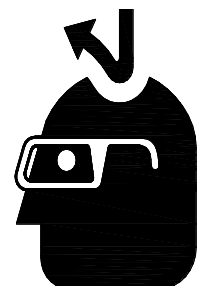
HYDRAULIC HOSE FAILURE

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



KEEP CLEAR OF MOVING OBJECTS

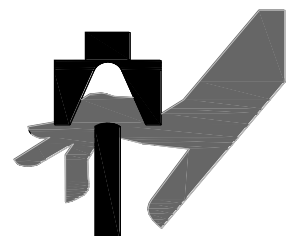
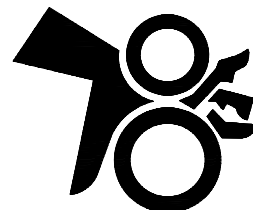
Always be aware of the position of the material. The material will swing and move during the bending cycle possibly causing serious body or head injuries.



BEWARE OF PINCH POINTS AND CRUSH HAZARD

Keep hands and fingers from between the roller and die when bending materials to avoid possible injury.

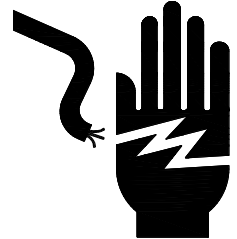
NEVER place your hands, fingers, or any part of your body in the die area of this machine.





HIGH VOLTAGE

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



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 will not 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

Dear Valued Customer:

- All Baileigh machines should be used only for their intended use.
- Baileigh does not recommend or endorse making any modifications or alterations to a Baileigh machine. Modifications or alterations to a machine may pose a substantial risk of injury to the operator or others and may do substantial damage to the machine.
- Any modifications or alterations to a Baileigh machine will invalidate the machine's warranty.

PLEASE ENJOY YOUR BAILEIGH MACHINE!PLEASE ENJOY IT SAFELY!

1. **FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE.** Learn the machine's application and limitations as well as the specific hazards.
2. **Only trained and qualified personnel can operate this machine.**
3. **Make sure guards are in place and in proper working order before operating machinery.**
4. **Remove any adjusting tools.** Before operating the machine, make sure any adjusting tools have been removed.
5. **Keep work area clean.** Cluttered areas invite injuries.
6. **Overloading machine.** By overloading the machine you may cause injury from flying parts. **DO NOT** exceed the specified machine capacities.



7. **Dressing material edges.** Always chamfer and deburr all sharp edges.
8. **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.
9. **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.
10. **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.
11. **Use eye and ear protection.** Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.
12. **Do not overreach.** Maintain proper footing and balance at all times. **DO NOT** reach over or across a running machine.
13. **Stay alert.** Watch what you are doing and use common sense. **DO NOT** operate any tool or machine when you are tired.
14. **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.
15. **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.
16. **Keep children away.** Children must never be allowed in the work area. **DO NOT** let them handle machines, tools, or extension cords.
17. **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.
18. **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.
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. Keep **all** cords dry, free from grease and oil, and protected from sparks and hot metal.
22. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. **Bare wiring can kill! DO NOT** touch live electrical components or parts.
23. **DO NOT** bypass or defeat any safety interlock systems.
24. Keep visitors a safe distance from the work area.



TECHNICAL SPECIFICATIONS

Roll Adjustment	Hydraulic
Driven Rolls	3
Pipe Capacity	Size: 2" (sch. 40) / Min. Dia.: 80"
Round Tube Capacity	Size: 2.5" (.100") / Min. Dia.: 60"
Square Tube Capacity	Size: 2" (.110")
Solid Round Capacity	Size: 1.5" / Min. Dia. 28"
Solid Square Capacity	Size: 1.25" / Min. Dia. 28"
Flat Bar Easy Way	Size: 3.5" (.50") / Min. Dia. 32"
Flat Bar Hard Way	Size: 3.15" (.375") / Min. Dia. 32"
Angle Iron Capacity	Size: 2" (.196") / Min. Dia.: 24"
Shaft Diameter	1.77" (45mm)
Shaft Center Distance Lower Rolls	Adj. (lower rolls)
Roll Diameter	6.693" (170mm)
Pinch	Single
Rolling RPM	11
Power	220VAC, 3Ph, 60hz, 30A
Main Motor	7.3hp (5.5kw) 220VAC, 3Ph, 60hz, 15A
Hydraulic Motor	2hp (1.5kw) 220VAC, 3Ph, 60hz, 8A
Hydraulic Pressure	2900psi (200Bar)
Hydraulic Capacity	2.65Gal (10L)
Shipping Dimensions	60" x 44" x 68" (1524 x 1118 x 1727mm)
Shipping Weight	1728lbs. (784g)
All Specs based on 60,000 PSI (42 Kg/mm ²) Tensile Strength – Mild Steel.	



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@baileigh.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. 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** place the machine into service 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.





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.

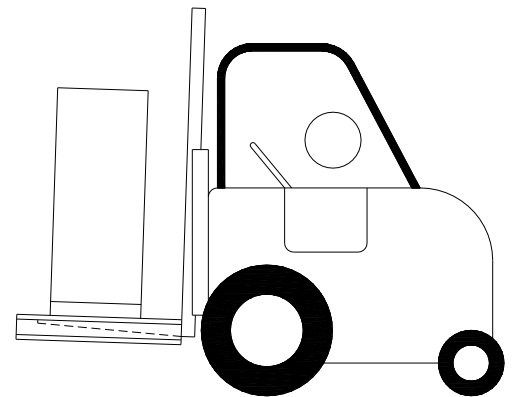
Follow these guidelines when lifting with crane or hoist:

- 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.



Follow these guidelines when lifting with truck or trolley:

- 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

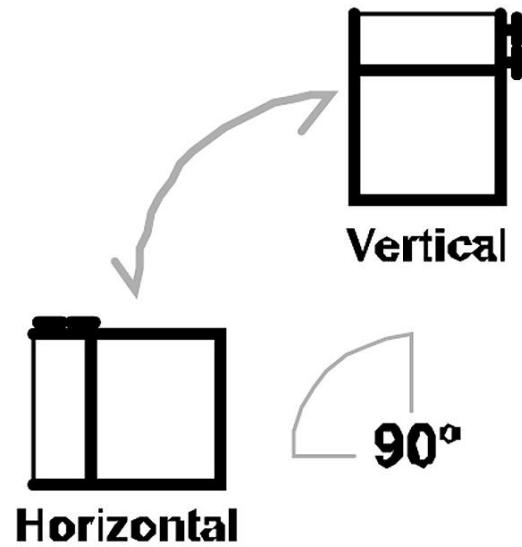
IMPORTANT:

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 machine 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.

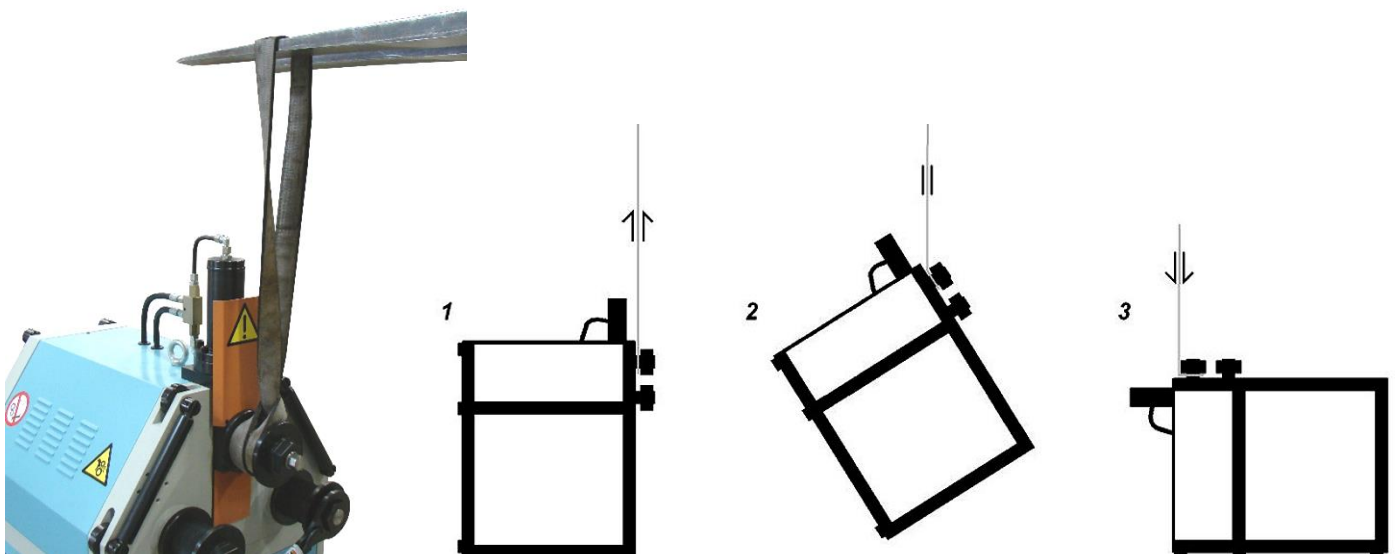


- All models of the R-H series are designed to operate either in the horizontal or vertical position.



To set this bender in a horizontal position:

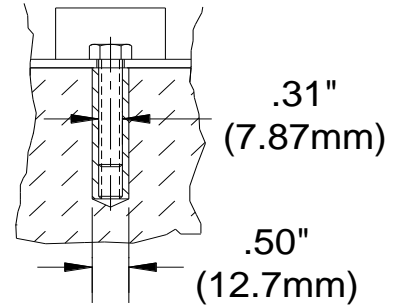
1. Secure a sling capable of lifting 1.5 to 2 times the weight of the machine onto the top roller using a choke arrangement as shown.
2. Loop the other end around the fork or crane hook.
3. Slowly raise the machine using care to prevent the machine from swinging when lifted.
4. Lower until machine base contacts the floor. Then carefully lay it on its back.





Anchoring the Machine

- Once positioned, anchor the machine to the floor, as shown in the diagram. Use bolts and expansion plugs or sunken tie rods that connect through and are sized for the holes in the base of the stand.
- This machine requires a solid floor such as concrete at a minimum of 4" (102mm) thick. 6" (153mm) minimum is preferred.



Tank Filling

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

After installation of the machine and before machine startup, bring the oil level up to 90% of capacity. Verify that any cylinder rams are in the retracted position to prevent overfilling of the tank. Recheck the oil level after the first few hours of operation and again after the first full week of operation.

A shortage of hydraulic oil can cause hydraulic system breakdown and damage to major mechanical parts due to overheating.



ELECTRICAL

⚠ WARNING: Baileigh Industrial Holdings LLC 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 Holdings LLC 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.

Power Specifications

Your machine is wired for 220 volts, 60hz alternating current. Before connecting the machine to the power source, make sure the power source is OFF.

Before switching on the power, you must check the voltage and frequency of the power to see if they meet with the requirement, the allowed range for the voltage is $\pm 5\%$, and for the frequency is $\pm 1\%$.

Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with an amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your machines. 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 machine.
- 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 machine 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 machine is properly grounded.
- Repair or replace damaged or worn cord immediately.

Power cord connection:

1. Unlock and open the electrical enclosure door.
2. Verify that the incoming power supply is OFF.
3. Route a power cord (supplied by customer) from the power supply through the back of the electrical cabinet to the terminal strip at locations **E**, **L1**, **L2**, and **L3**.
 - 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 in 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

6. Verify that the electrical cabinet is clear of any objects that could contact an energized circuit.
7. With power connected and the main disconnect turned ON, the four power light on the K1 control panel will be lit.
8. Push the spindle forward start button (F) to start the spindle. The spindle should rotate in a clockwise direction as looking down on the spindle from and overhead position.
9. If not, disconnect power to the machine, and switch the L1 and L3 wires. DO NOT move the ground wire.

MOUNTING THE ROLLS

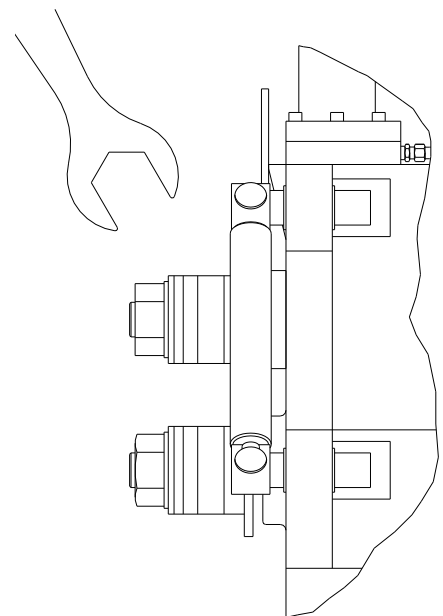
⚠ CAUTION: The rolls are heavy and usually lubricated from use and may be slippery. Use care to prevent dropping the rolls as this may not only cause damage to the rolls and but cause crushing injury to hands, feet, or ankles.

Rolls must be mounted correctly, depending on the type of profile to be bent. This will save the machine from undue stress and limit defects in the profile.

1. To change roll configurations, use the (supplied) wrench to remove the shaft nuts. All three shafts are connected to the drive so they will not spin.
2. When using the standard rolls, position the roll segments onto the shafts to create the type of profile needed to hold and form the material profile to be used. See the examples to follow.
3. After changing rolls, replace and tighten nut to shaft.

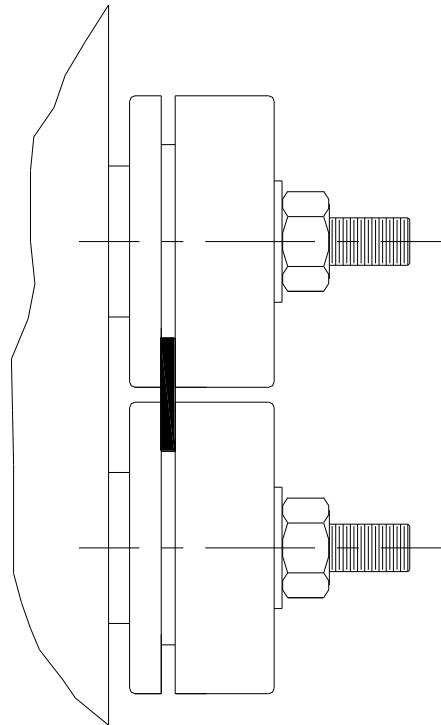
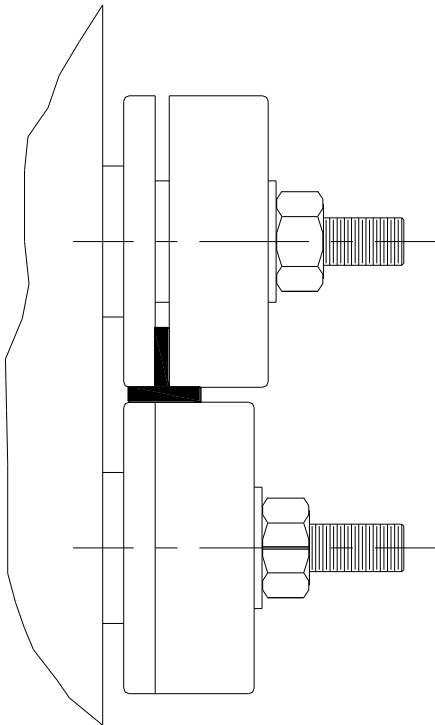
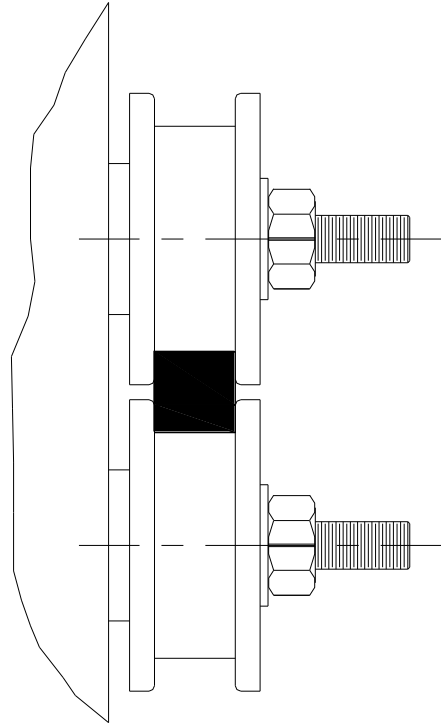
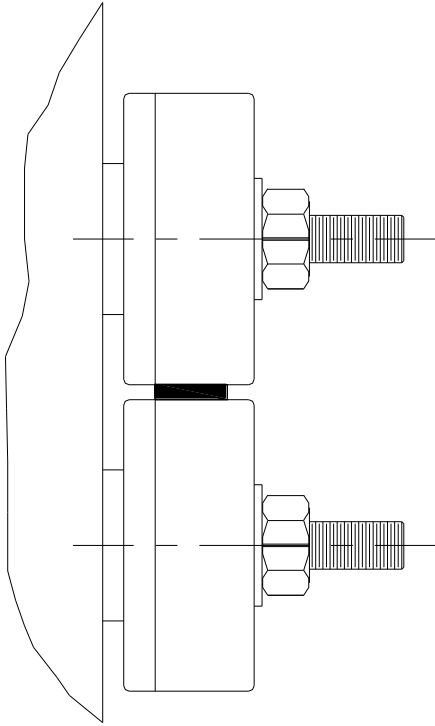
To find the distance needed between the top and bottom rolls, place a sample of the material to be bent in between the rolls. The groove of the upper roll should be 2-4 mm (.078"-.156") larger than the thickness of the material. Make a test bend with a sample of your material. This allows you to find the material spring back, and to determine the number of passes needed to achieve the desired radius.

Rolls are keyed to the shaft. If vibrations are felt during the bending process, remove the key from the lower right roller shaft to make the rolls freewheeling.



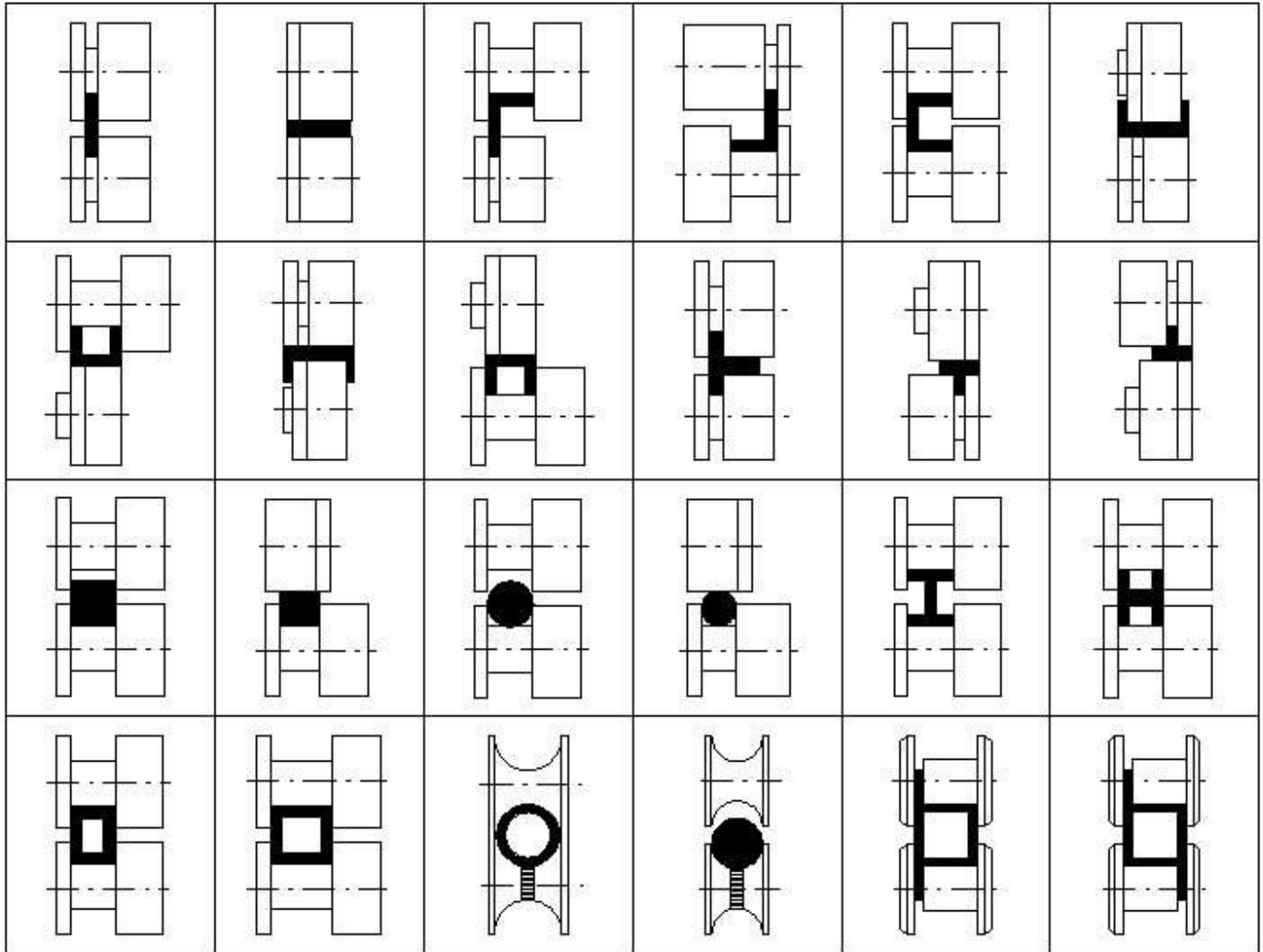


STANDARD ROLL CONFIGURATIONS





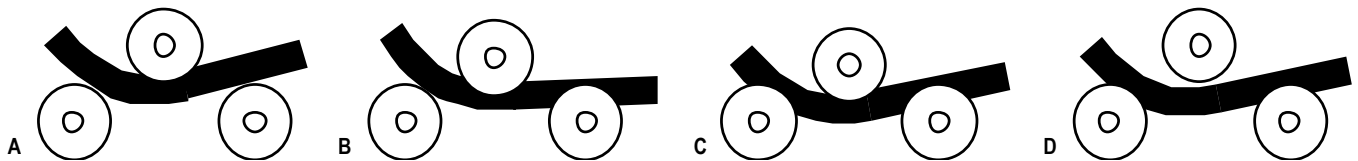
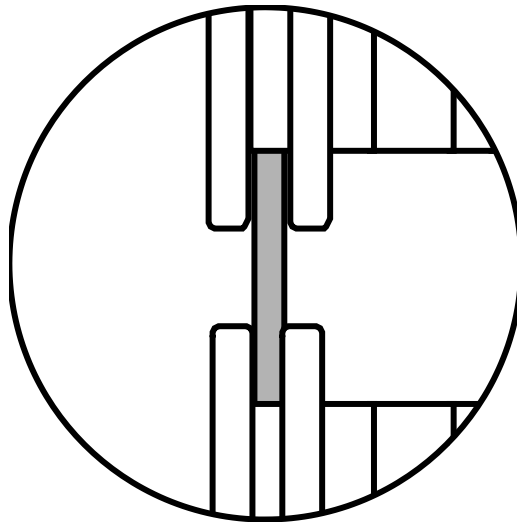
- Using specials rolls, many material profile configurations are possible.



PREVIOUS MOUNTING OF THE ROLLS

If a perfect bending is to be obtained, first introduce a wedge of precise thickness and diameter between the two half rolls in order to stand the curved flange.

The profile should move a little bit tightened and during its bending the groove of the upper roll must be 2, 3 or 4 mm larger than the thickness of the material.



BEING SO:

- Picture a): valid only for thick iron or with an almost rectangular shape;
- Picture b): valid only for flat, tall and thin bars;
- Picture c): position of the rolls to obtain bents with short circles;
- Picture d): this position is to be avoided since the peripheral speeds of the rolls, when making contact with the profiles, have different values:



LOWER ROLLS CENTER DISTANCE

(only for machines with adjustable lower rolls)

This model roll bender offers the possibility of the center distances of the lower rolls to be set into one of three possible positions.

EXAMPLE:

Long Centre Distances

- Used when bending maximum capacities of the profile;
- Square or rectangular tubing;
- Steel profiles closed and bigger section.

Medium Centre Distances

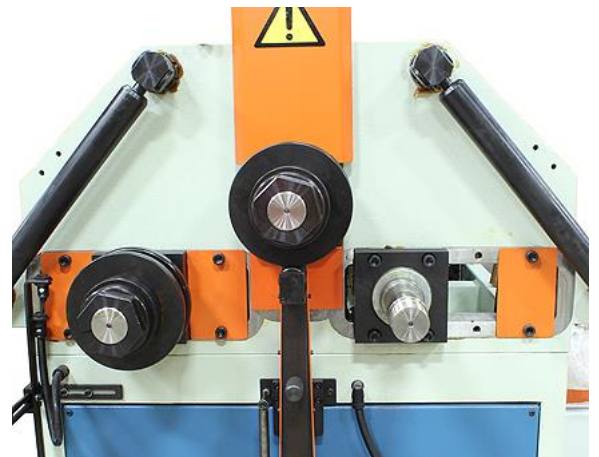
- Rounded tubes;
- Profiles iron in "T" and "U" shapes;
- Steel profiles closed or open section of medium sizes.

Short Centre Distances

- Short bending radius with short material size

NOTICE: NEVER operate the roll bender with the lower rolls in an uneven center distance. The example picture shows the rolls in different positions for explanation only.

1. Disconnect the machine from the power supply.
2. Remove the rolls for both lower roll shafts.
3. Depending upon the starting and ending positions of the lower rolls, remove as many of the orange guard panels as needed to allow the shaft to be moved to the desired position.
4. Remove the four bolts securing the roll shaft block to the frame.
5. Slide to block and shaft assembly to the desired position and install and tighten the four bolts.
6. Install the orange guard panels. NEVER operate the bender with the guards removed!
7. Repeat the steps for the opposite side, verifying that both rolls are in the same position.





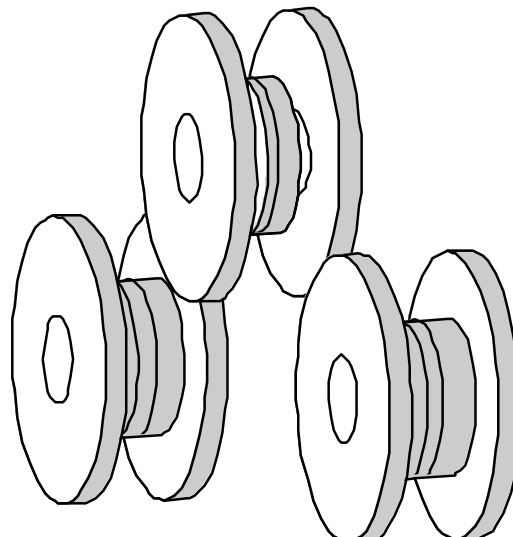
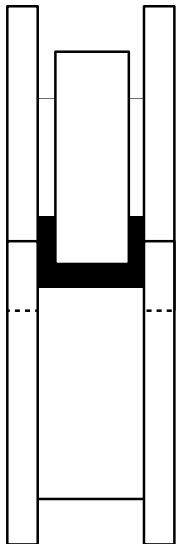
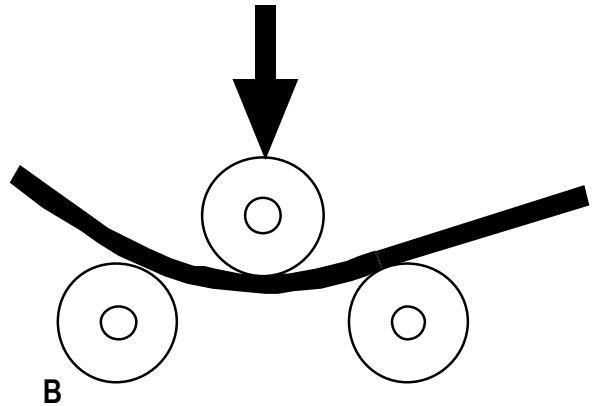
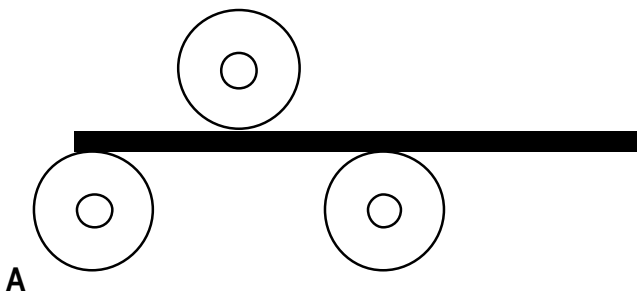
GENERAL BENDING PROCEDURES

⚠ 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 materials make sure they are properly supported.

- Introduce the profile between the left lower roll and the upper roll until a tangential position of the profile relatively to the three rolls is obtained (A).
- Extract the profile and lower the upper roll in order to obtain the desired bending position.
- Press the foot pedal; the profile will be displaced and bent according to the position of the upper roll (B).



Important: The upper roll position of a given bending diameter is different when passing the profile several times than the one obtained with a single passing.





HOW TO GET THE DESIRED DIAMETER

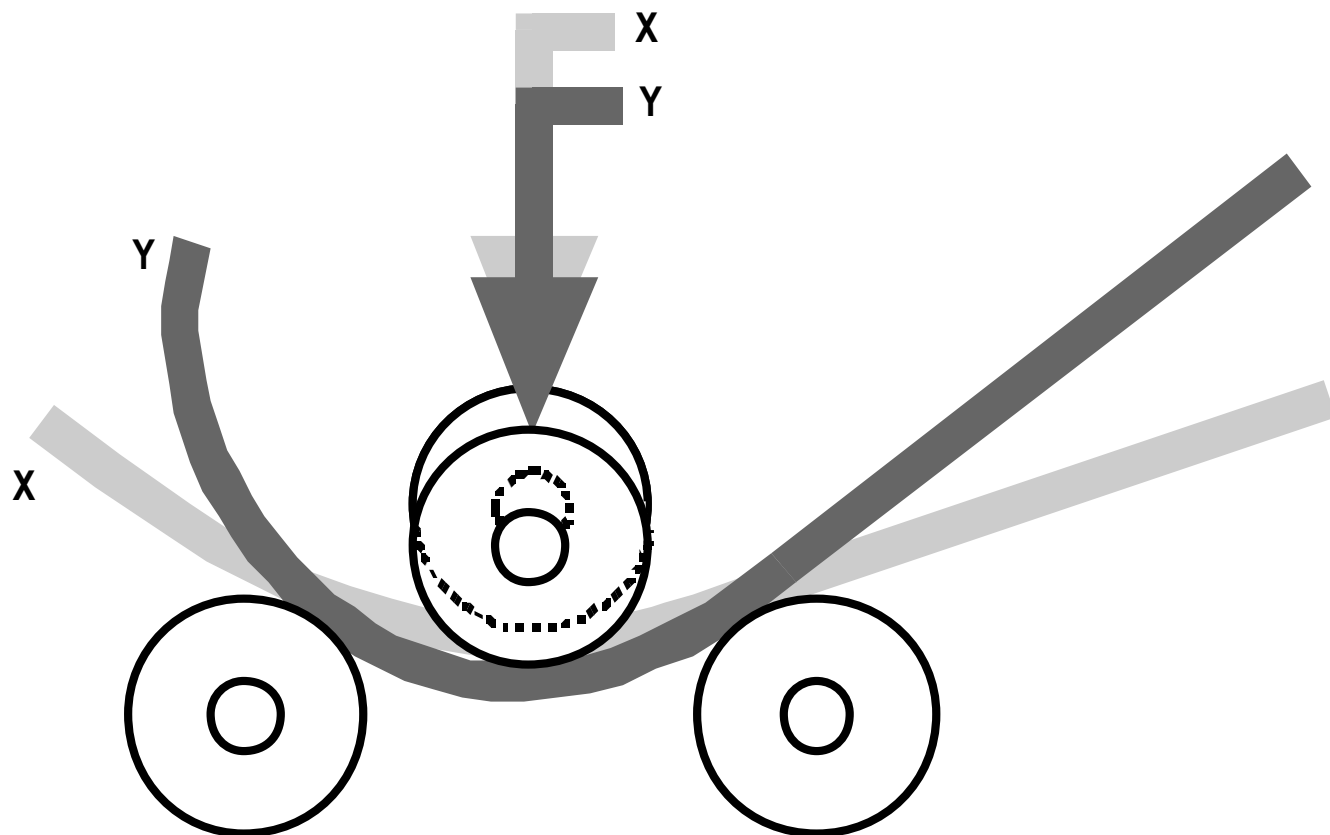
Prepare three or four pieces of new material to be bent. The minimum length for this material is 24" – 31" (60-80cm). Introduce a selected piece between the rolls and perform a bending test. (conventional machines only) – for CNC machines see: User Guide – Software Manual

The results can be two:

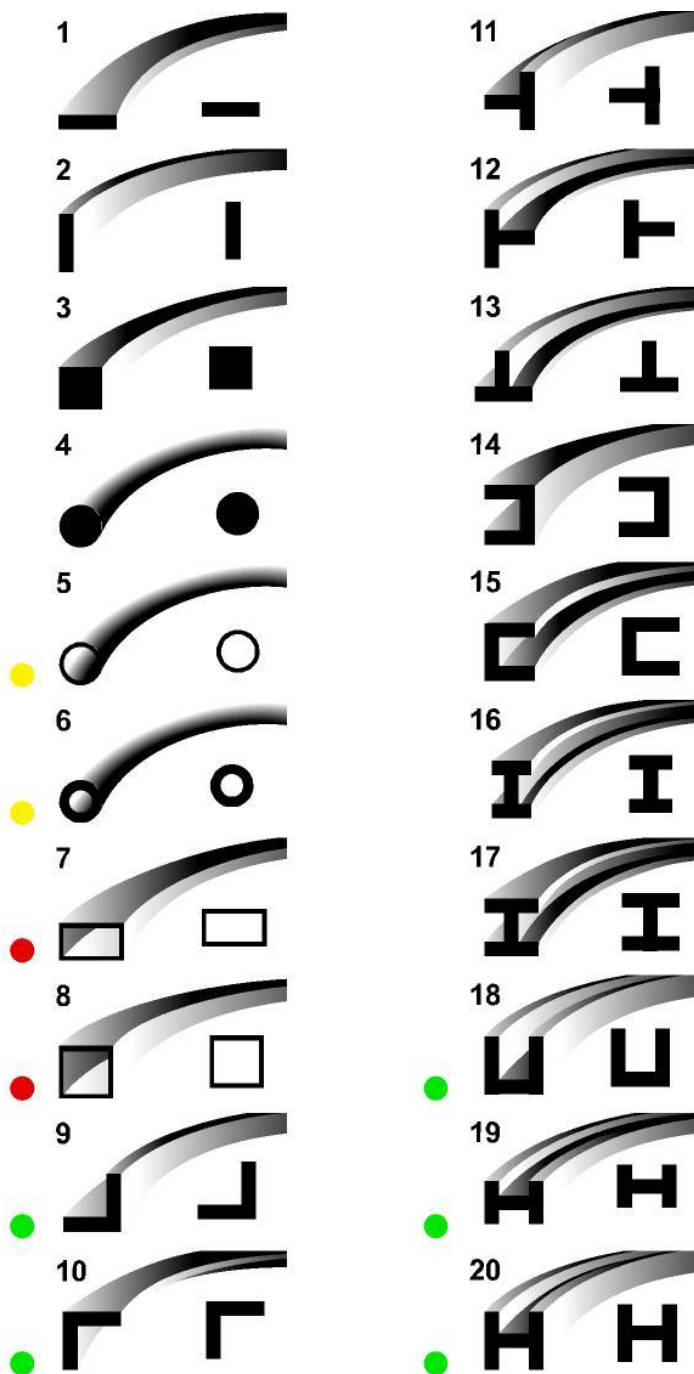
- a) The obtained diameter is the desired one: proceed with the work;
- b) The obtained diameter is too large or else too short: correct the right lower roll an introducing a second piece of material repeat the procedure until the desired diameter is achieved.



Important: On these tests use an original pieces and never the previous bent or straightened ones since the result will be different.



PROFILES, TYPES AND SHAPES



Rolos Standard / Standard Rolls / Standardwalzensatz

Um jogo de ferramentas para cada diâmetro / One set of rolls is required per each tube diameter / Für jeden Rohrdurchmesser, wird 1 satz spezialwalzen benötigt

Rolos Especiais / Special Rolls / Spezialwalzen

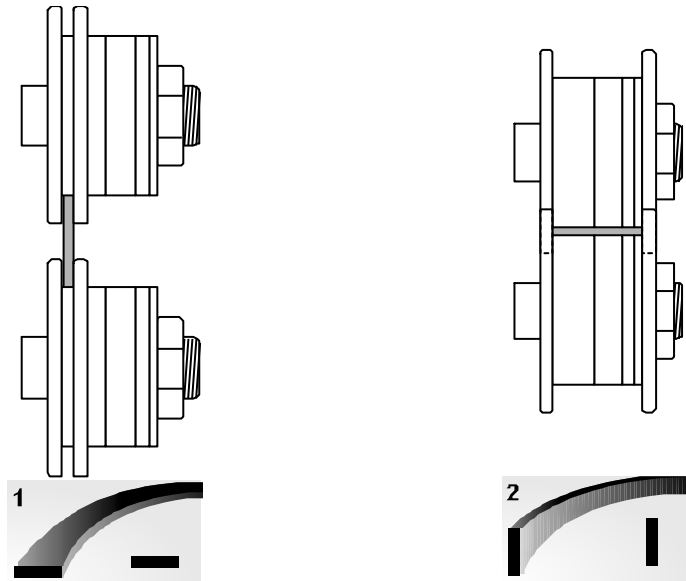
Rolos Especiais para perfis de parede fina / Special Rolls for thin wall profiles / Für dün wandige Profile werden spezielle modulwalzen verwendet

Informação técnica aproximada. As especificações dos modelos fotografados podem variar dos modelos standard de País para País. As especificações e o design podem ser modificados sem aviso prévio.
All data are approximate. Specifications of models pictured may vary from country to country. Design and specifications subject to change without notice.



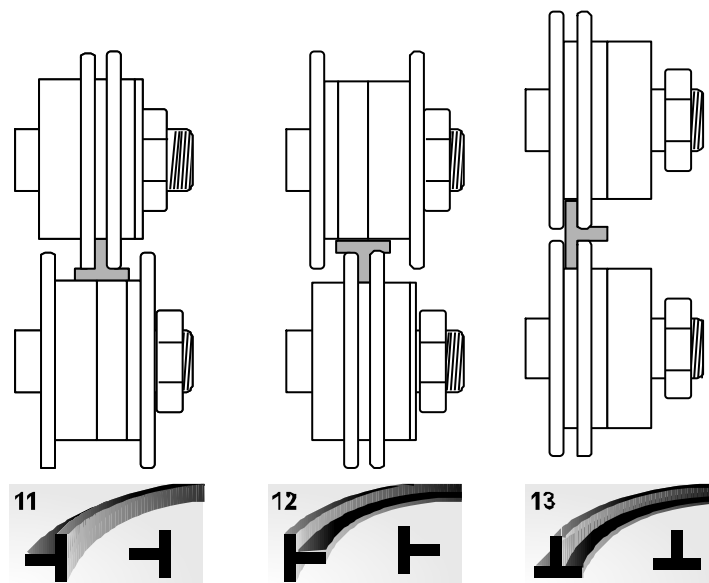
“BAR” POSITION 1 and 2

This profile can be bent in normal position, that is, the rolls must be as close as possible to each other.



PROFILE IN “T” SHAPE POSITION 11 / 12 /13

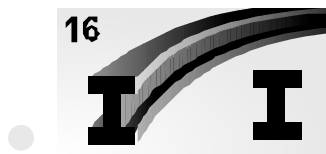
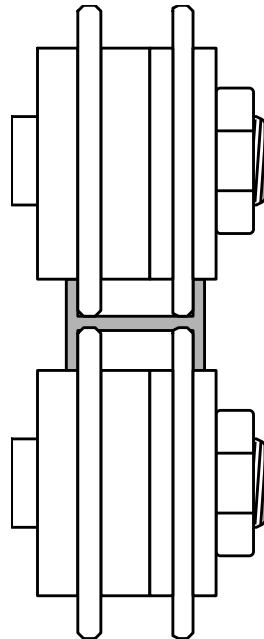
It is possible to bend this curve with standard rolls, no matter what the position is in order to avoid an excessive flexion of the shafts with subsequent swinging of the bar, stiffening tie rods be used: please contact us for further details on this device.





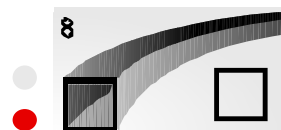
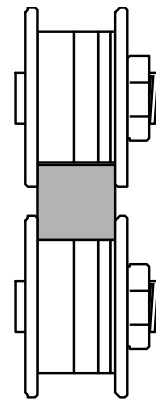
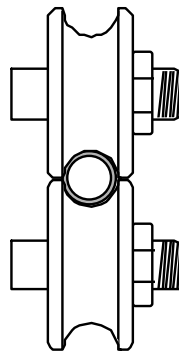
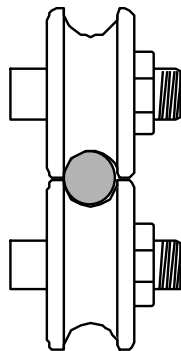
PROFILE IN "I" SHAPE - POSITION 16

It is necessary to equip the machine with roles with the correct groove size, as shown in the picture below.



TUBULAR AND ROUND TUBES

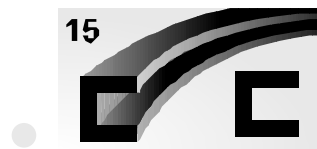
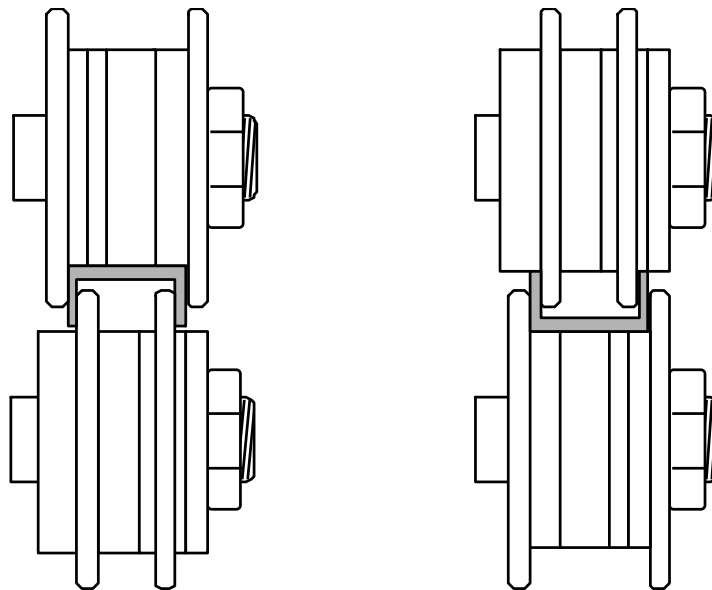
No specific difficulty when doing this work should arise: anyway, it is necessary to mount on the machine rolls similar to the bending tube; it is also possible make coils which can be determined by the lower right roll.





IRON PROFILE IN "U" SHAPE - POSITION 14 / 15

To work with this shapes it is necessary to mount special rolls on the shafts, depending on the size of the profile- for occasional works it is also possible to use standard rolls. Bending external wings requires more power. The supplied rolls are mounted in such a way that the male rolls stay close to the machine. The bottom of the bent profile in "U" shape should lay the on the male roll: the female roll should have its back turned towards the wings of the profile and will work as a guide.



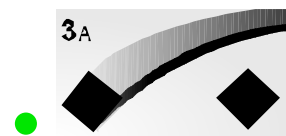
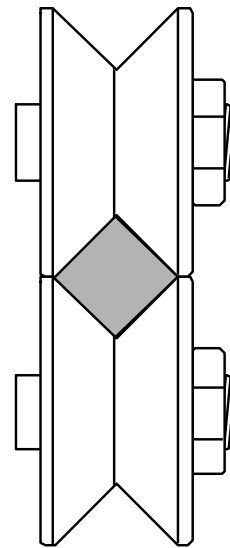
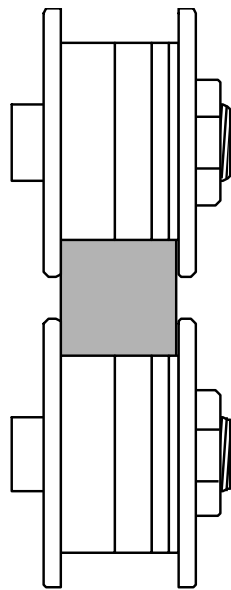


SQUARE TUBE - POSITION 3 / 3A

The rolls should be positioned as in the previous example, if the bending operation is to be continuous, it is recommended to equip the machine with rolls having a groove as large and deep as the bending profile.

While performing this operation some vibration may occur, since the peripheral speed of the rolls, do not match the inner and outer circles of the bent, to avoid this situation, remove the key from one of the three rolls, preferably from the lower right roller or install a upper roll with a smaller diameter.

For the shortest bending radius, we advise an upper roll with a groove of 2 - 3 – 4 mm wider than the material thickness.



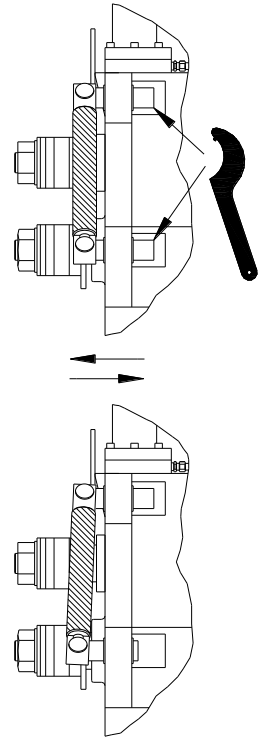


Lateral Guide Rolls

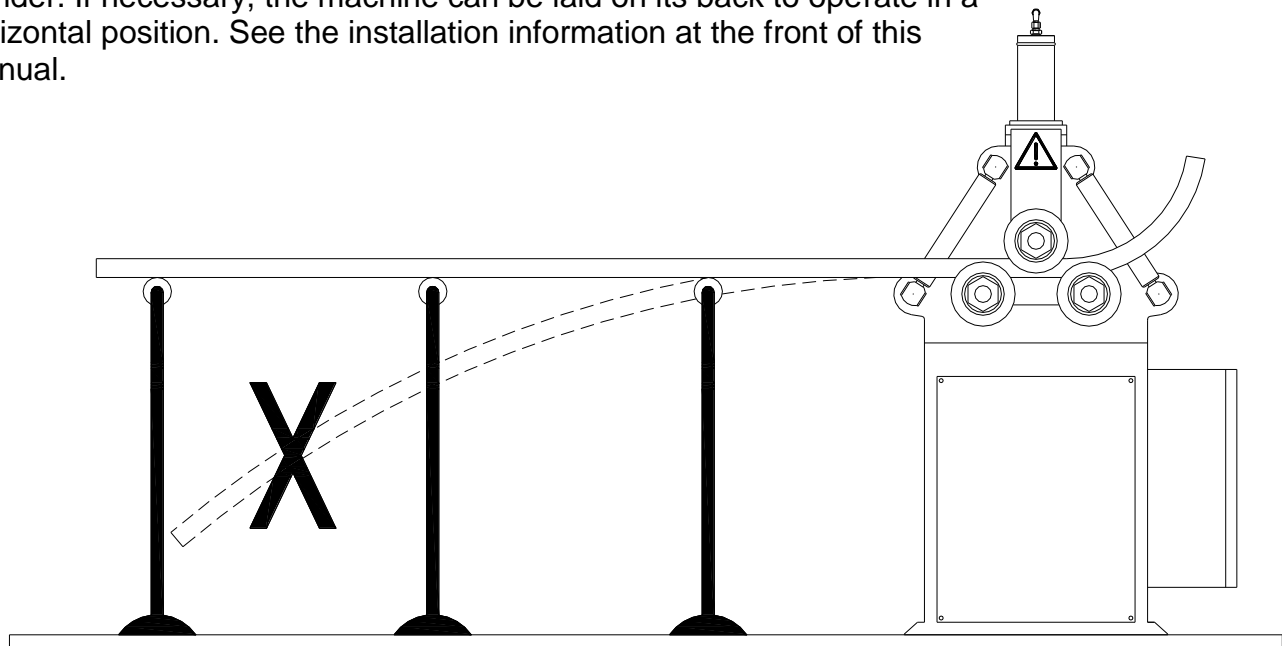
1. To prevent material from bending left or right you must adjust the guide rolls.
2. As the guides are adjustable on top and bottom, you can arrange them to the opposite direction that the material is inclined to go.



Note: To get a circular profile, side guide joints must be parallel to the machine face. Otherwise you get spiral profiles.



When bending long materials, an adjustable conveyor is recommended to keep work piece parallel to floor, allowing for easier loading of Roll Bender. If necessary, the machine can be laid on its back to operate in a horizontal position. See the installation information at the front of this manual.



CAUTION: DO NOT feed profiles having a thickness greater than specified for the capacity of the machine. DO NOT feed more than one piece at a time. DO NOT use machine for purposes other than designed for.



MATERIAL SELECTION

 **CAUTION:** It must be determined by the customer that materials being processed through this machine are **NOT** potentially hazardous to the 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.



Note: Thorough cleaning of the rolls is necessary to avoid possible sliding of the profile through the rolls.

When bending pipe or tube (round, square, or rectangular) the outer part of the bend is stretched and the inner section compressed. The result of these opposite and unequal stresses is that the pipe or tube tends to flatten or collapse. To prevent such distortion, the common practice is to support the wall of the pipe or tube in some manner during the bending operation. One such method is to fill the piece with sand and plug the ends. Other methods can be found to achieve favorable results.

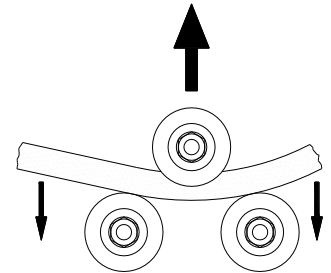
Listed below are some of the factors that control or influence the success of a bending operation.

- Mechanical properties of the material being bent
- Thickness of the material to be bent
- Size of the inside bend radius
- Speed at which the bend occurs
- Grain direction of the steel to be bent
- Coefficient of friction
- Roller design
- Consistency of the material. Specifically, the outside dimensions.



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.



CHOOSING OF BARS TO BEND

All kinds of profiles and tubes are compatibles to be bent on our machines; of course, the result of bending depends always on the quality of the material used.

If the profile has a steel compound, a spring effect is to be obtained due to the elasticity of the material: in this case a change on the diameter of the bend should be taken into account. This does not happen when using mild steel.

The tubing tends to ovalize, depending on:

- a) Tube Diameter;
- b) Material Thickness;
- c) Bending Radius;

When working with short bending radius it is necessary to choose a material with larger wall thickness, which should be proportional to the tube diameter.

To avoid ovalization, the tube can be filled with sand and its ends covered with silicone or with a simple cork.

Square and rectangular tubes tend to flatten. To avoid this, the choice of the correct material should be done according to the previous suggestions.

If the section of the profile is not constant (with a slight difference of 1/10) some irregularities may occur on the bending diameter.

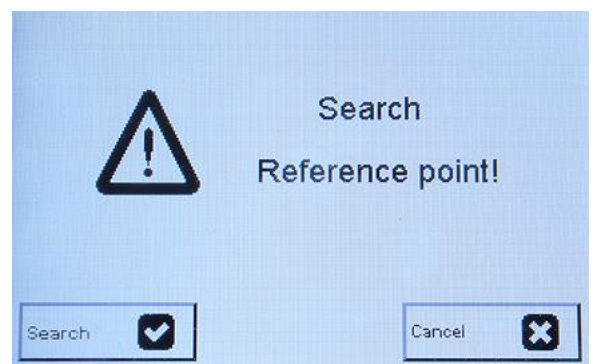
We strongly recommend to bend the profiles prior to any surface treatment since the compression of the material on the interior of the curve may produce some damage on the surface. Also the profiles should be, if possible, cleaned and completely dried.



CNC CONTROLLER OPERATION

Start of the machine

- Verify that nothing is in contact with the rolling area of the machine.
- Turn the main disconnect switch on the electrical cabinet to On.
- Allow the controller to complete the boot process at which time the logo screen will display.
- If the emergency stop button is depressed, the message will indicate an E-Stop Alarm. Release the emergency stop switch and then press the Reset button.
- Touch the screen anywhere to change to the Function Selection Screen.
- The Search Reference Point Screen will appear. Press Search and allow the machine to set its reference points. It is important to allow the machine to search (Home) the Y axis.



Function Selection

From the Function Screen, the icons may be pressed to enter Manual, Auto, Profile, or Programming functions.

Manual will enter the screen to operate the rolls manual.

Auto will execute a program stored in memory.

Programming will open the screens to create, edit and save a program.

Profile will enter the calibration function.

From any of these screens, pressing the house icon in the upper right of the screen will back up one screen. Continue to press the house icon to return to the Function Screen.





MANUAL MODE

The screen icons ↑ (up) and ↓ (down) are used to raise or lower the center roll.

The deeper the center roll is pressed into the material, the smaller the radius will be in the profile. Pressing the center roll too far into the material will simply kink and bend the material without a smooth radius.

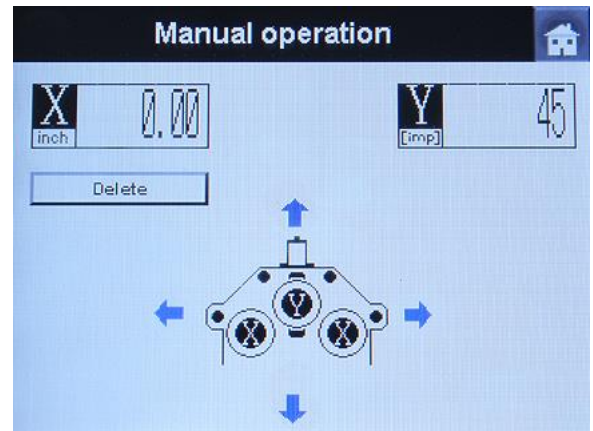
The Y digit field corresponds to the position of the center roll. This value can be used to repeat a specific bend radius using the same tooling at a later date.

The screen icons ← (left) and → (right) will cause the rolls to run and feed the material in the direction of the arrow as viewed from the front of the machine looking directly at the rolls.

When pressing any of the movement icons, this will start movement in slow speed, and will increased to fast speed after about 5 – 7 seconds. Slow speed can be used to make small adjustments in that position.

The X digit field gives provide information on the distance the material has traveled through the rolls. This is useful when only a small portion of the material is to be formed and the remainder is to stay straight.

Press the Exit or House icon in the upper right corner to return to the function Screen.



AUTOMATIC MODE

To execute a program, press the Automatic icon to enter the program selection screen.

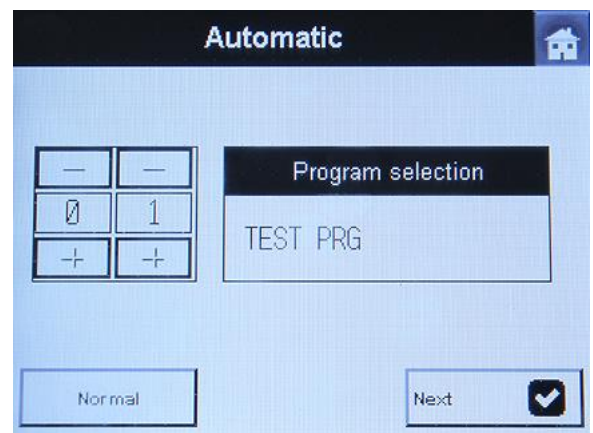
The programs are stored by using numbers from 01 – 40. Each digit field will operate sperate from the other. Use the + and - icons to change the numbers to display the desired program number. In the Program Selection field, the name of the program will appear. When the desired program is found, press the Next icon.

For example:

The program 39 is selected and you intend to select the program 40.

Place in zero the ones digit location (9 must change to 0). The display will show 30. Now the tens place digit can be changed to 4.

In the Program Selection box, the name of the file will appear. If the file is the desired file, press the Next icon.





The next screen will display the Profile (Calibration) information that will be used for this bend.



IMPORTANT! *It is critical that this data match exactly to the Profile that was created to set the calibration for this bend.*

If the Profile data DOES NOT match what is desired, press the Name icon. Use the selector keys to change to the desired Profile name and then press Next to return to this screen.

When the Profile data matches the desired data, press the Automatic icon to move to the next screen.

Automatic - Program Nr.: 1

Profile data check!			
Name:	TESTE		
Stretch	770	Roll position	2
Quality factor:	87.4		

Automatic

The Counter Screen will display the programmed number of pieces to bent and the number of pieces completed. Each of these items may be edited as needed at this time.

The Programmed number is the number of pieces intended to be bent for this production run. Press the Change icon next to the Programmed number to change the desired number of pieces to be bent. The value may range from 1 to 9999.

The Completed number must be less than the programmed number before the controller will allow the system to move to the next step. Press the Delete icon and follow the screen instructions to change the completed number to zero.

The Change row is either With Reference or Without Reference.

With Reference will stop the automated function of the roll bender at several points and wait for operator intervention as the machine is locating the material. This is very helpful when running a new job and is recommended when first learning to use the machine.

Without Reference will reduce the stopping points to only a few to allow the operator to confirm that all of the settings are correct.

When these three fields are correct, follow the instructions located at the bottom of the screen to complete the bending operation.

Automatic - Program Nr.: 1

Counter			
Programmed:	3	Change	
Completed:	0	Delete	
Change	With reference		

State:
Press Pedal to Start.



PROFILE PROGRAMMING (CALIBRATION)

For the CNC Roll Bender to perform accurate bending procedures the following information must be programmed into a Profile. This is the Calibration for the specific bend to be performed.

- Position of the Lower Rolls
- Clamping/Holding Position of the Center Roll. This value takes into consideration, the size of the rolls and the size of the material. This is a value of the Y axis as measured from the reference point. This is when the center roll is lowered down onto the material with enough pressure to hold the material firmly into all three rolls without causing any bending of the material.
- Bend Radius as based upon the position of the Center Roll (Y Axis). This is a value of the position of the Y axis and will be a number larger (center roll is lower/deeper into the material. This will cause the material to bend.



IMPORTANT: A new Calibration Profile will need to be created if any one of the following items change.

- Lower Roll Position.
- Roll Size or Profile.
- Material Size or Shape.

Calibration is a twostep process.

3. Bending and measuring material to determine the bend radius at various positions of the Y axis. This MUST include one bend radius that is larger (less bend to the material) than the production radius desired, and one bend radius that is smaller (more bend to the material) than the production radius desired. An acceptable calibration for a given material profile consists of a minimum of 3 and a maximum of 9 calibration points. The greater the number of calibration points the more accurate the finished product will become.
4. Entering the measured radius values and the Y axis position values.

Obtaining the Data



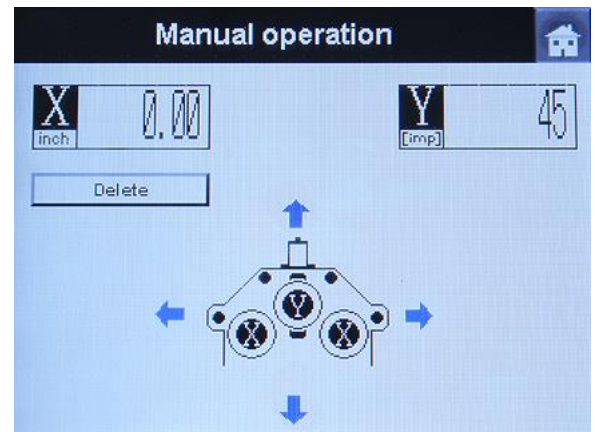
Note: This will use material. Only use new fresh material from the same batch lot as the material intended for the production operation. Using old, different, bent or otherwise damaged material will get false results which will cause inaccurate results for the production material.

1. Enter the “**Manual**” mode from the Function Screen.
2. Insert a piece of setup material (at least 5 feet long) from right to left into the rolls with the left edge of the material at 1” – 2” past the center point of the left lower roll and the longer end extending past the right roll. If a longer, say 20-foot piece of material is used, the length of



run along the X axis can be split into 48 – 50-inch runs. Be sure to use a marker and mark the line where the radius change will start at.

- Lower the center roll down until the tooling touches the material with just enough pressure that the material does not move in the rolls but is not causing the material to bend. (If the material were to be rolled through the rollers at this point, there would be NO bending of the material.)
- Record the “Y” value. This will be referred to as the “**Fixing Position**” (Holding/Clamping).
- Move the top roll down a short distance. (Example; If your Fixing Position is 755, the first step may be good at 800) The material will start to bend. This should also be the largest (less bend to the material) calibration point. Record the “Y” value as your first calibration point.
- Roll the material through the dies at least 48” or until a complete bend is achieved outside of the end roll. Measure and record this radius. Radius measurements should be taken along a number of points on the material as the radius will vary. We recommend at least 5 measurements at different points along the length of the material. (If left in the machine while measuring, be sure to not measure any point between the outside roll and the center roll. Only material beyond the outside roll should be measured). If a longer piece of material is used, be sure to mark the material under the center of the center roll before proceeding.
- Once these 5 measurements are taken, average them to get your first radius calibration and record next to the previously recorded “Y” value.
- At this point you should have your first calibration point with both a “Y” value and a corresponding radius.
- If a new piece of material is to be used for each calibration point, repeat this procedure for each subsequent calibration point making sure that the next point has the Y axis set deeper into the material than the last point.
- If using a longer piece of material, simple lower the Y axis and roll the material to the next 48 inches and repeat step 6 – 8.



Note: If the material is kinking or folding when applying pressure, especially when doing tight radius bending and or thin wall tubing, both the “X” and “Y” buttons may need to be pressed at the same time to achieve the desired point. This will spread the pressure over a greater area of the tube and enable much tighter radii than could be achieved with separate actions.

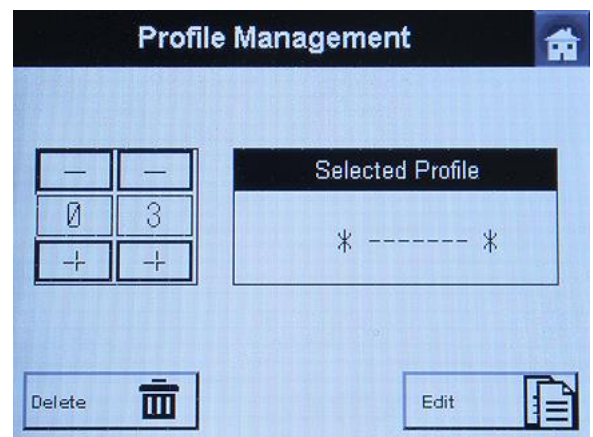
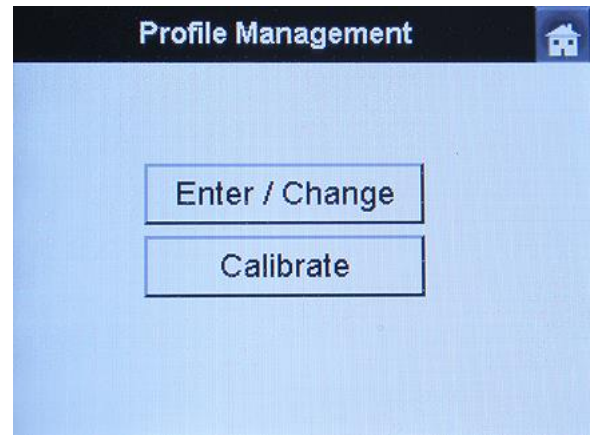


Taking the time to do the calibration correctly and accurately will pay for itself by producing parts with a greater accuracy and less waste product than a poorly calibrated unit.

ENTERING CALIBRATION POINTS

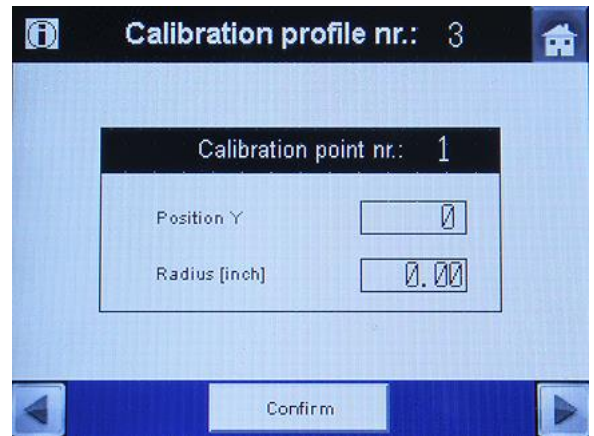
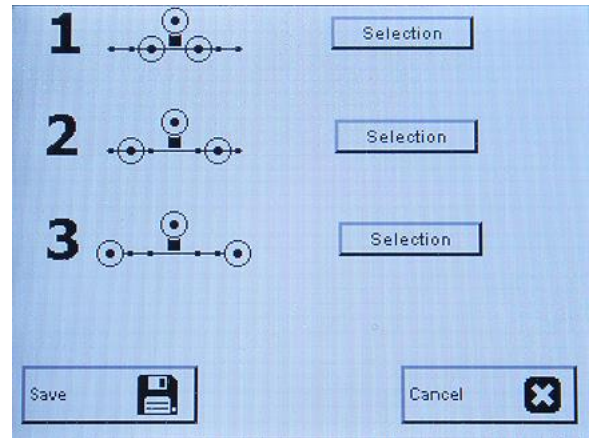
Once the calibration points have been obtained, they must be entered into the Profile Manager Screen.

1. From the main menu, choose the “**Profile**” icon.
2. Select the “**Enter/Change**” icon.
3. Select the Profile to be Created or Changed. Press the Edit icon to enter the data screens. The Profile memory can store up to 75 profiles.
4. Press the Roll Position icon.





5. From the Roll Selection screen, press the Selection icon next to the drawing that matches the position of the lower rolls for the bend to be performed.
6. Press the Save icon to save the selection and return to the previous screen.
7. Press the Holding/Clamping field.
8. Using the key pad, enter the value of the Y axis recorded as the “**Fixing Position**” (Holding/Clamping) from the steps of Obtaining the Data, then select “**Next**”
9. Enter the first Calibration Point (Y position and Radius), then select the right arrow key
10. Use the right arrow icon at the bottom of the screen to advance to the next calibration point entry field.
11. Enter the data from the second calibration point in this screen. Repeat the process for the third Calibration Point, then fourth, etc. until all points have been entered.
12. Once all calibration points have been entered, you will select the “Confirm” icon to record and save the data.
13. The screen will prompt for the data to be saved with a name. Press the name field and use the keypad to enter a name for the profile.



Note: The calibrations must be entered in order from largest radius to tightest.

Failure to do so will result in an error.

At this point the profile can be given a name of your choosing, then saved into memory for use at a later date.



PROGRAMMING MODE

From this screen is possible to create a New Program, to modify a program that already exists, or to delete a program that is not needed.

Use the Selector screen to select either a blank program location, or to find the program to edit or delete.

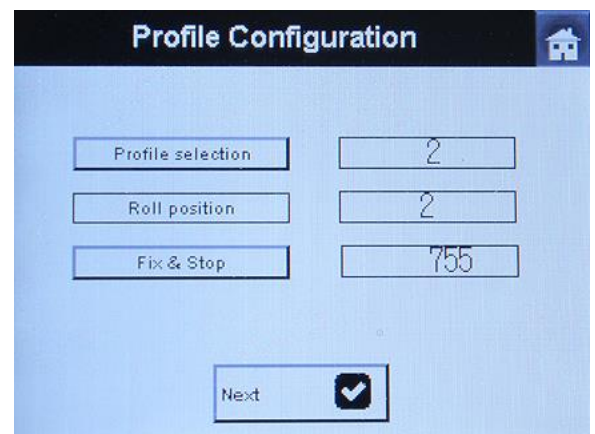
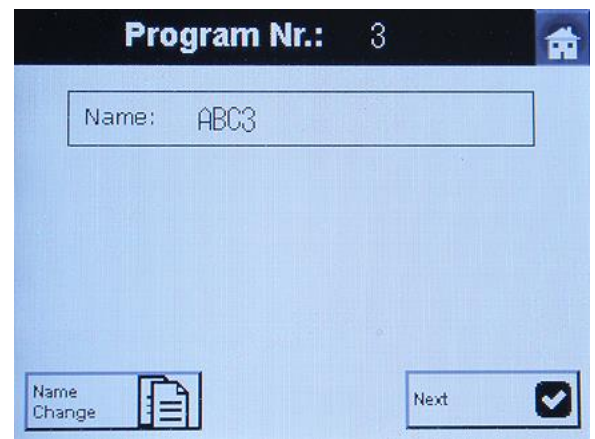
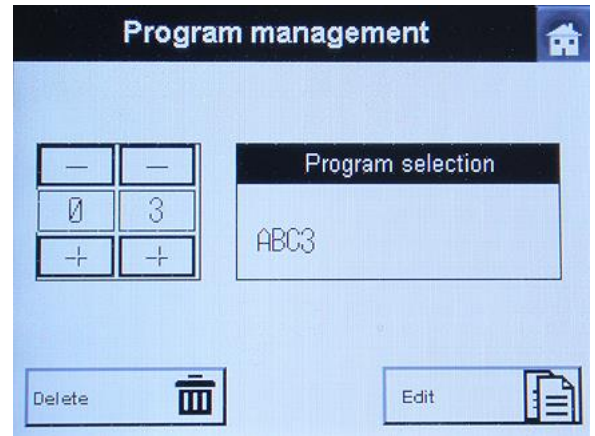
Program Deleting

Once the desired file is entered, pressing the Delete icon will start the process to delete the entire file. The screen will change to an alert screen to verify that it is intended to delete the program. Press the Delete icon again to confirm the choice.

Create or Modify a Program

The difference between creating a new program and editing an existing program is whether the various fields are empty (new) or contain data (existing).

1. From the Home Screen, press the Programming icon.
2. From the Program Management screen, select either an empty program location or the desired existing program and then press Next.
3. In the Profile Configuration Screen, select the Profile Selection which matches the specific material and setup calibrated to provide the correct bend radius. See Profile Programming (Calibration) if unsure of this step.
4. Verify the Roll Position and the Fixing Position. This information will come from the Profile Selection.
5. Pressing the Fix and Stop icon will change to Fix and Go and back again. This is simply a pause. When the program is activated, The Y axis will move down and clamp the material without causing a bend. In Fix and Stop, the operator will need to follow the screen commands to proceed. With Fix and Go, the system will continue directly to Homing the material for the bend.





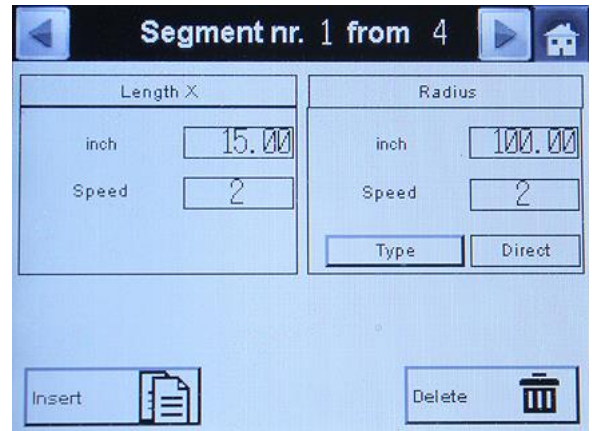
6. Pressing the Next icon will move to the Segment Programming Screen.

Program Segments

The Segment Programming screen is where the data is entered to create the specific bend desired.

If the piece of material is to have a single radius for the entire length of the bend simply enter the length of the material in inches, the radius of the bend in inches, select a speed for each entry and set the Type to Direct.

If the piece of material is to have two or more bend radii, then additional segment will need to be Inserted and data programmed for each segment.



Length X

Inch – Represents the X axis travel, (aka length in inches) for the material to travel through the rolls at the programmed Y axis position (aka arc radius).

Speed – Represents the speed (either 1 or 2) that the material will travel through the rolls during this segment.

Radius

Inch – Represents the value intended for the radius in inches.

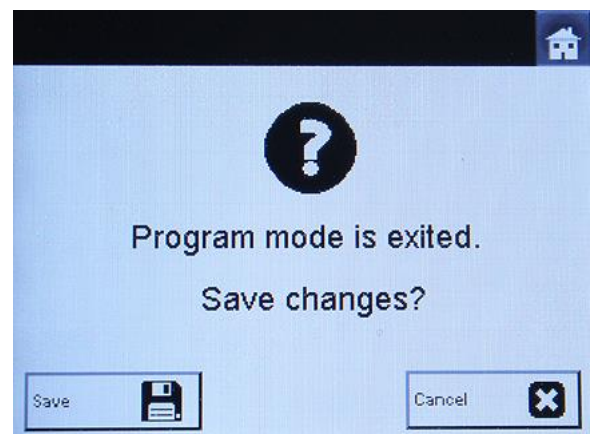
Speed – Represents the speed (1 – 4) that the Y axis will move down into the material when it transitions from the current segment to the next segment.

Type – This defines the action for when the Y axis changes position between the segments. In Direct Mode, the X will stop, Y will move and then the X will automatically start again. In Progressive Mode, the X will continue to move, and the Y will move at the selected speed causing a gradual change in the radius to the next programmed radius.

Save and Exit

When the program has been created or edited as desired, Press the Home icon in the upper right corner to leave the programming screen.

- To Save the program, press the Save icon.
- To Exit Without Saving, Press the Home icon again.





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.

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



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

Hydraulic Oil

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

After installation of the machine and before machine startup, bring the oil level up to 90% of capacity. **A shortage of hydraulic oil can cause hydraulic system breakdown and damage to major mechanical parts due to overheating.**

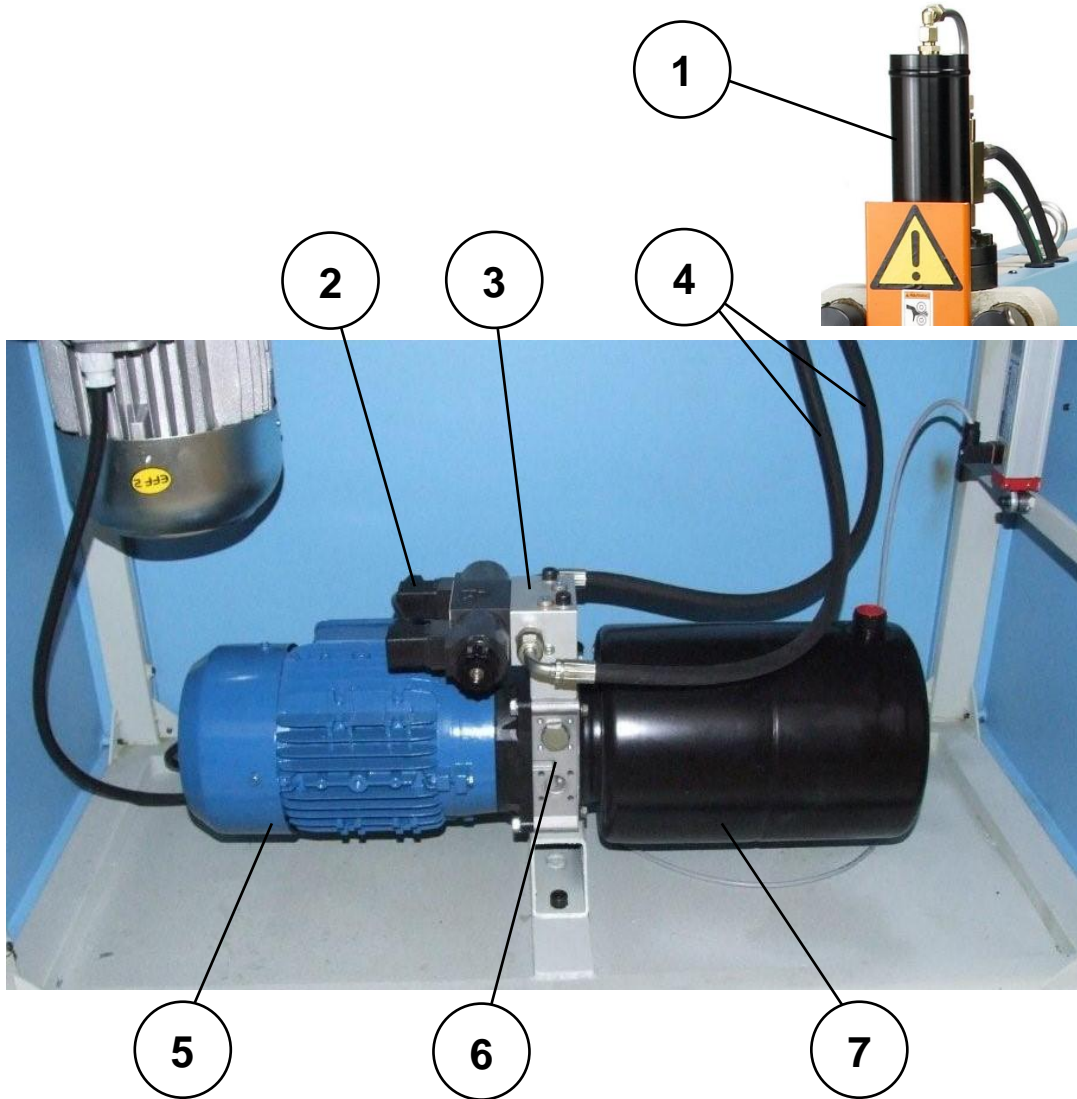
7. Use SHELL BRAND #46 or #68 hydraulic oil or an equivalent with similar specifications. (Based upon location temperature and availability.)
8. Keep hydraulic reservoir filled to 90% of capacity.
9. **DO NOT** rely totally on the oil gauge as they can sometimes indicate an incorrect level reading. Do a visual inspection with the oil fill cap removed as well.
10. A shortage of hydraulic oil will cause hydraulic system breakdown to major mechanical components due to overheating.
11. Change the hydraulic oil every 6 months along with the oil filter.

Oil Change and Disposal

Change the oil in the hydraulic tank after the first 6 months, and every 12 months after that. Clean the filter basket located under the fill cap before refilling the tank. Used oil products must be disposed of in a proper manner following your local regulations.



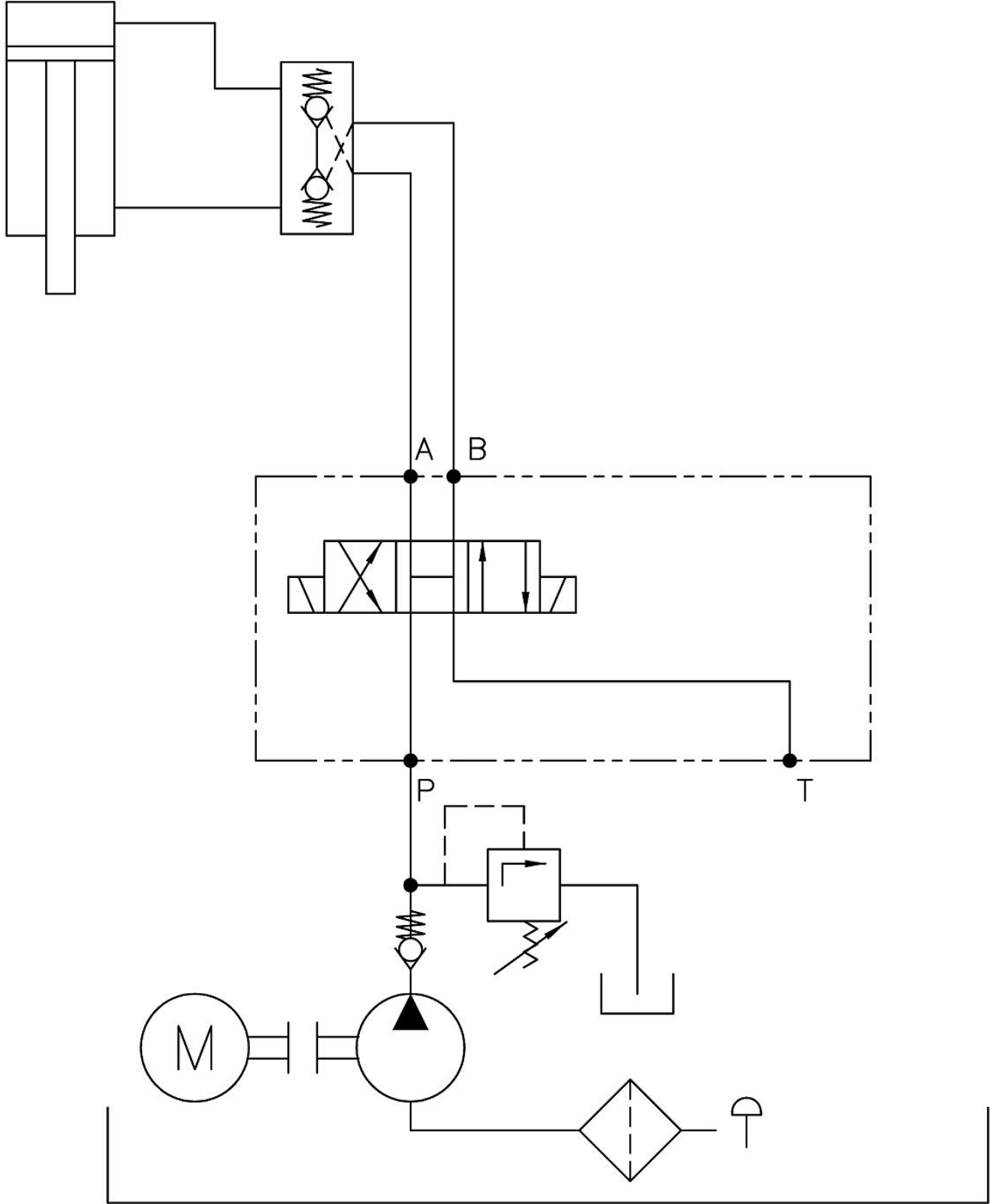
HYDRAULIC SYSTEM PARTS IDENTIFICATION



ITEM	DESCRIPTION
1	Hydraulic Cylinder
2	Solenoid Valve
3	Directional Valve
4	Hose w / Fittings
5	2Hp Motor 220v, 1 Ph.
6	Hydraulic Pump
7	Oil Reservoir

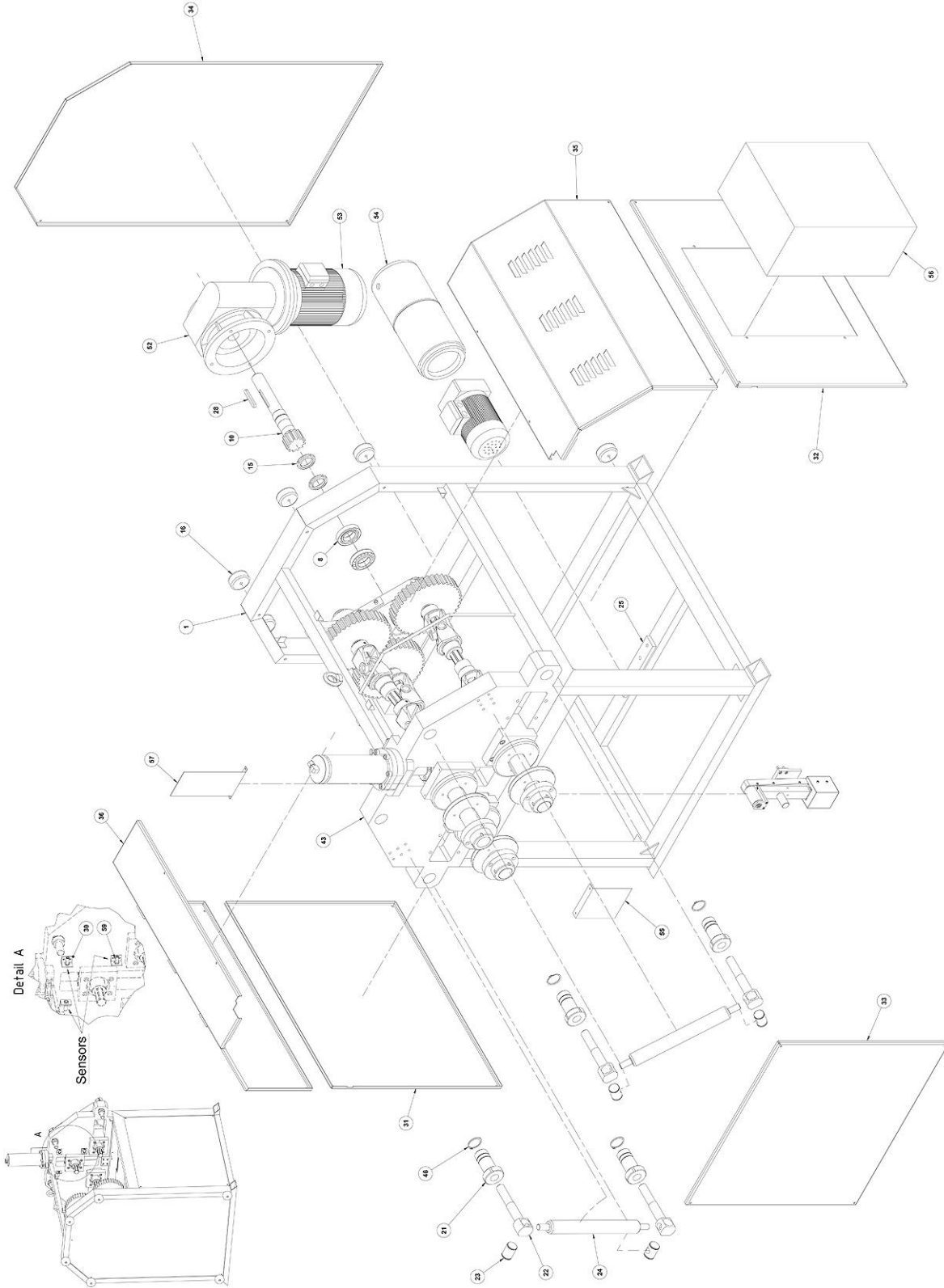


HYDRAULIC SYSTEM DIAGRAM



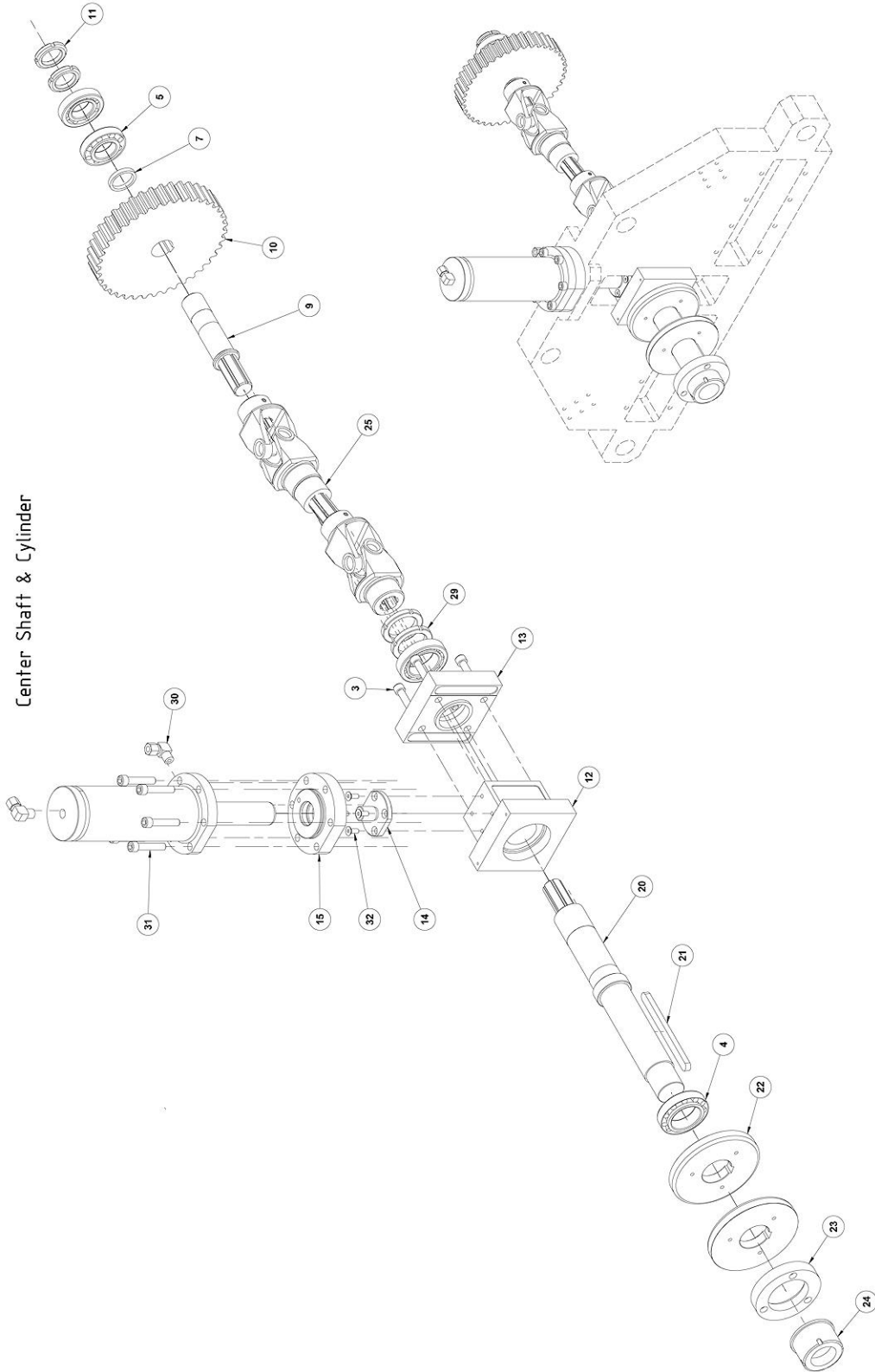


PARTS IDENTIFICATION DRAWING





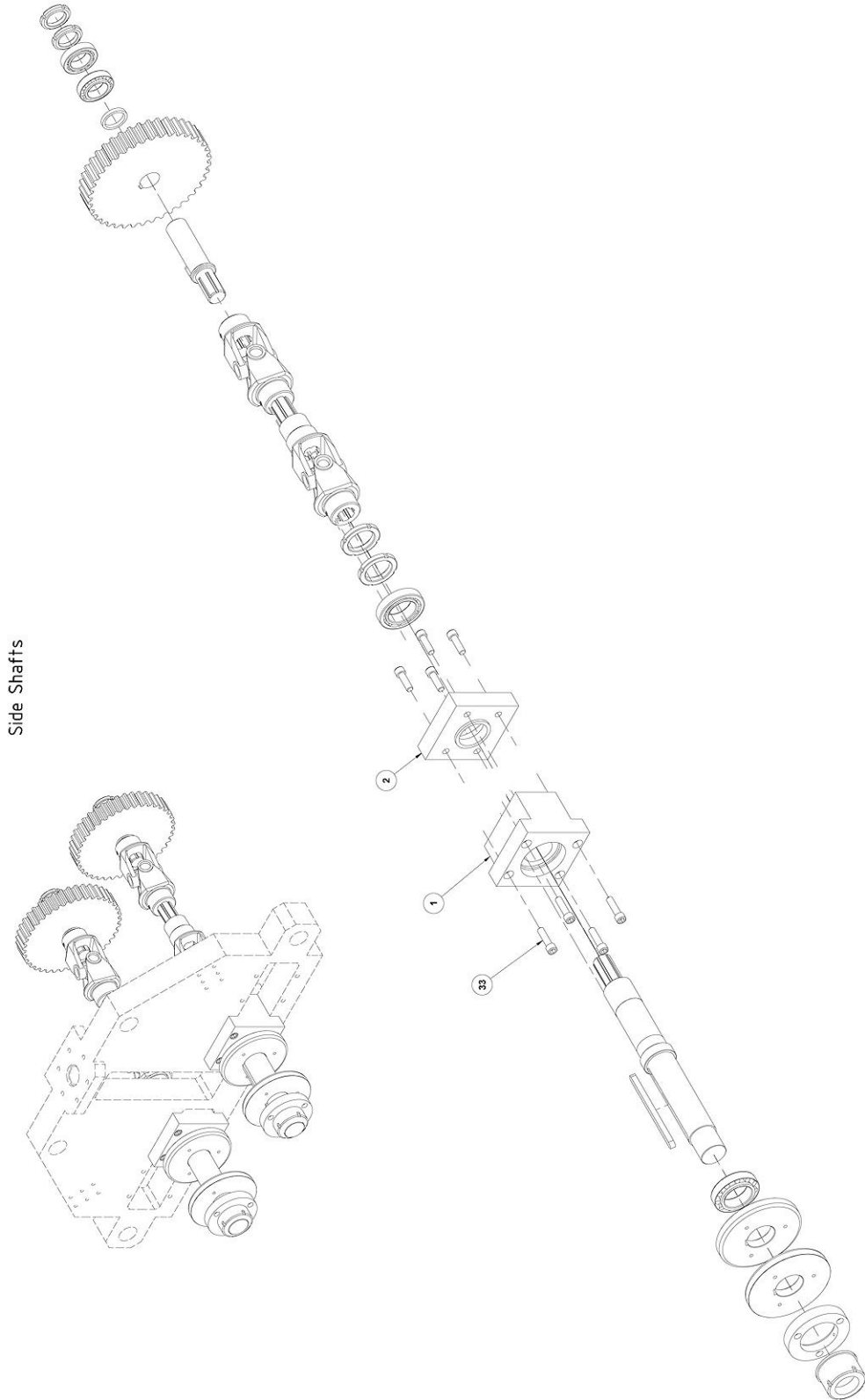
CENTER SHAFT AND CYLINDER PARTS DIAGRAM



Center Shaft & Cylinder



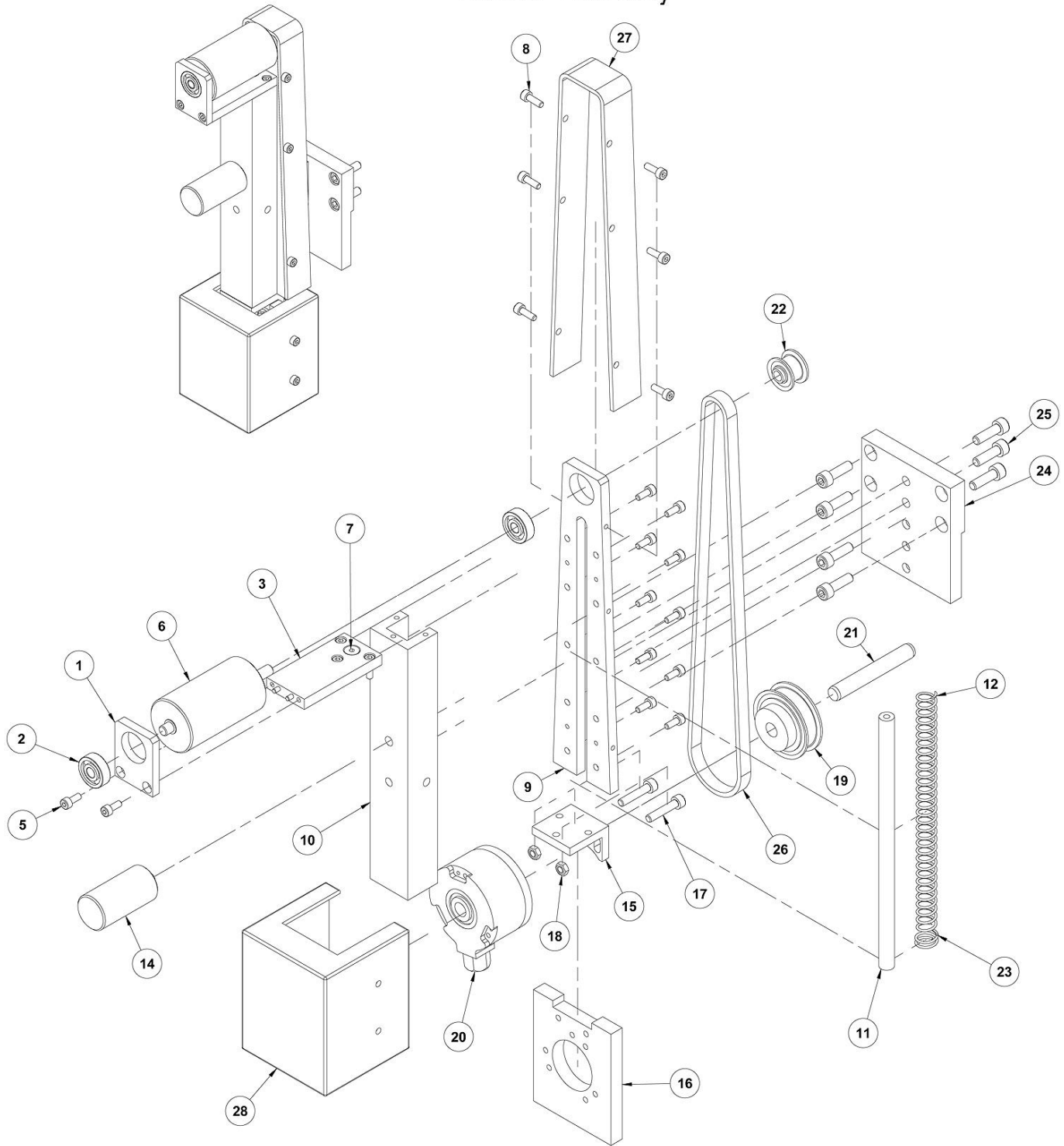
SIDE SHAFTS PARTS DIAGRAM





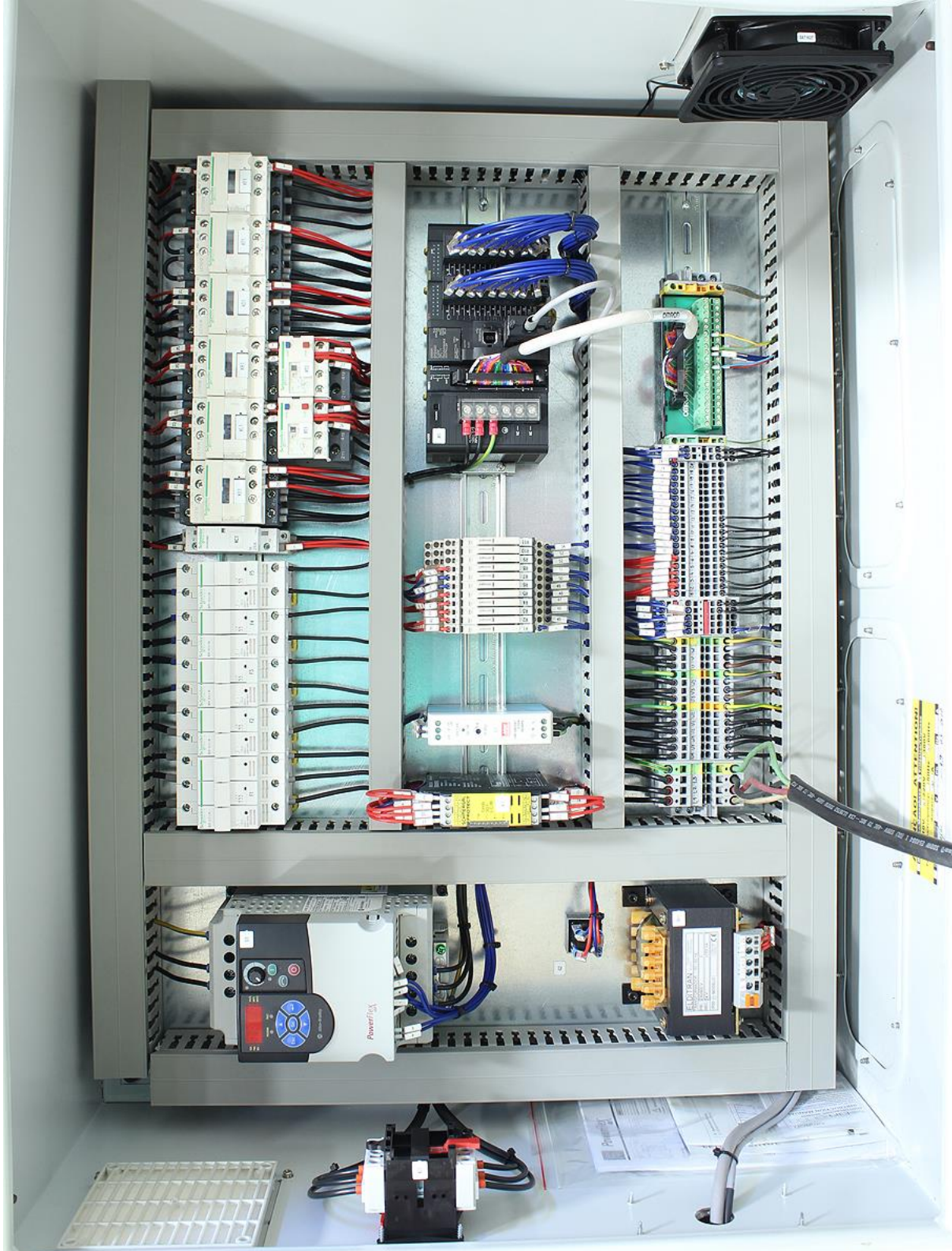
ENCODER PARTS DIAGRAM

Encoder Assembly



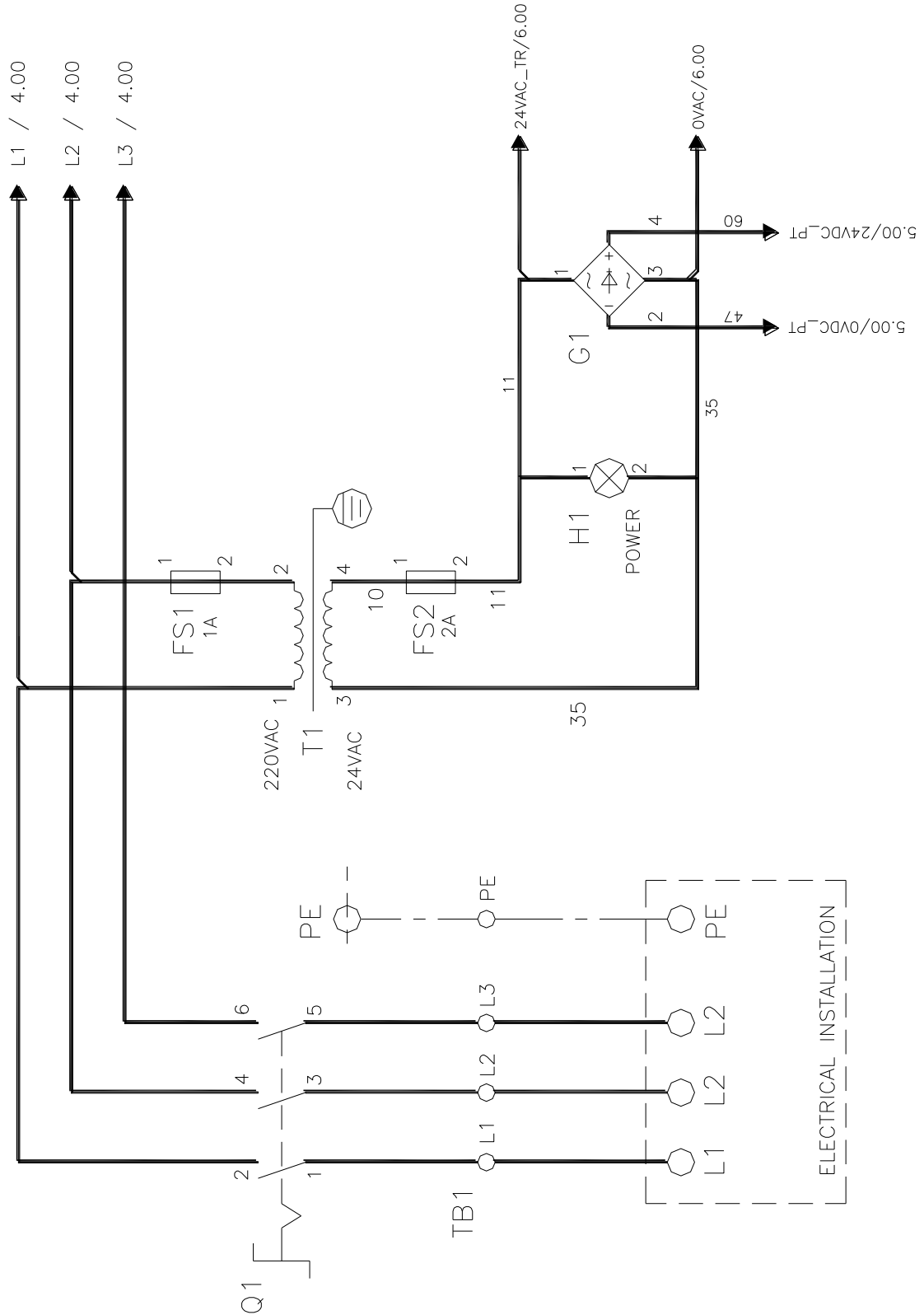


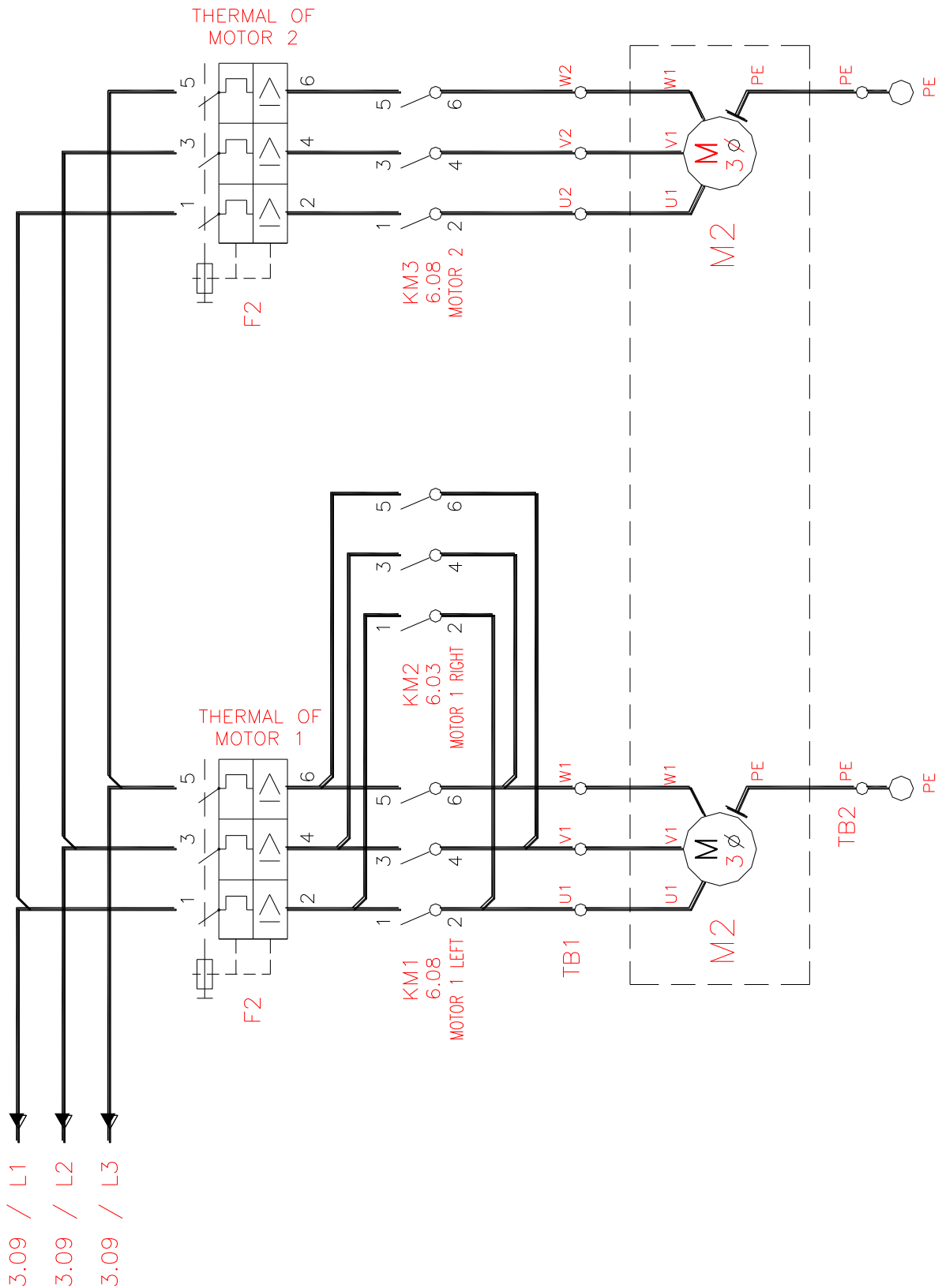
ELECTRICAL ENCLOSURE

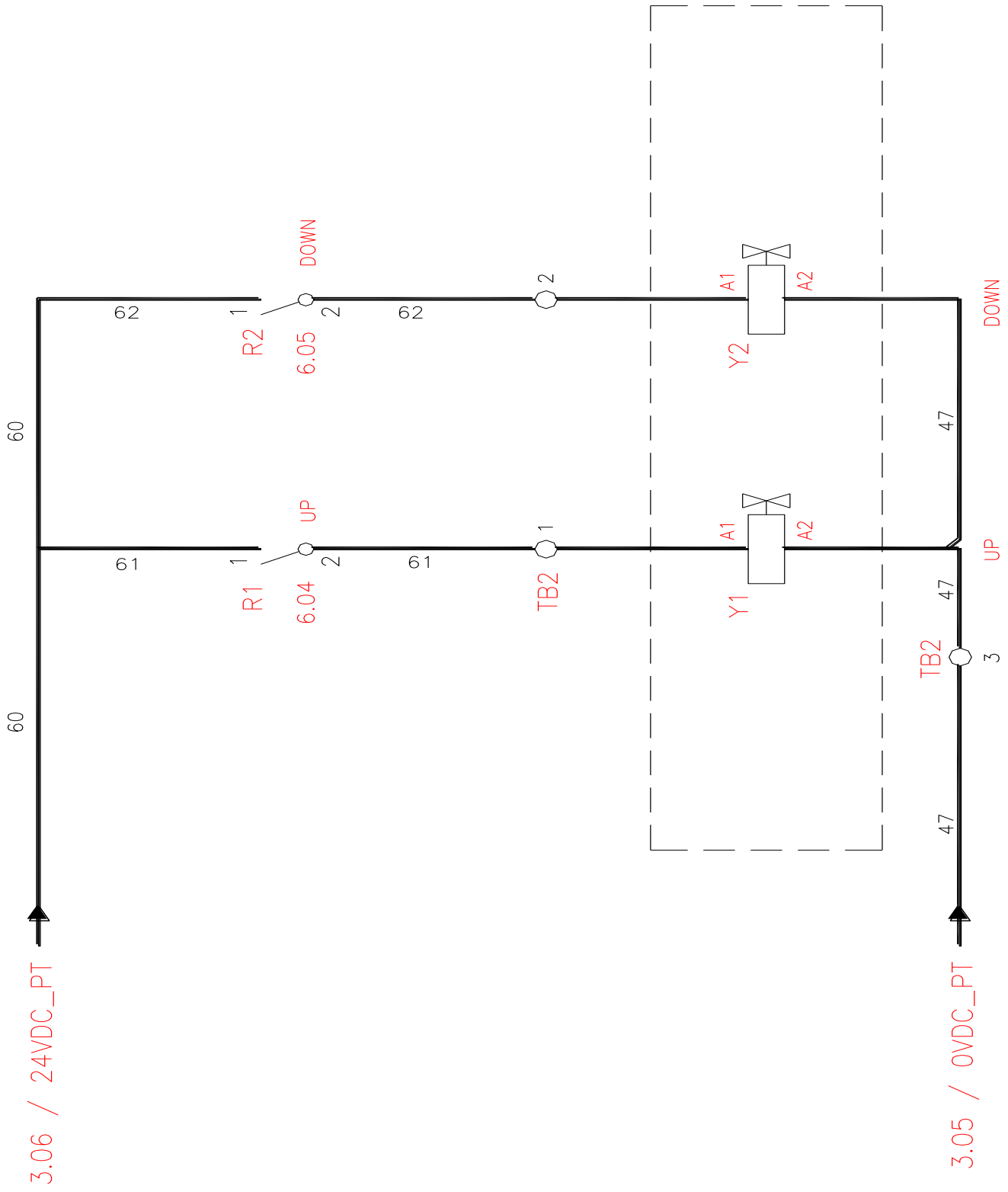


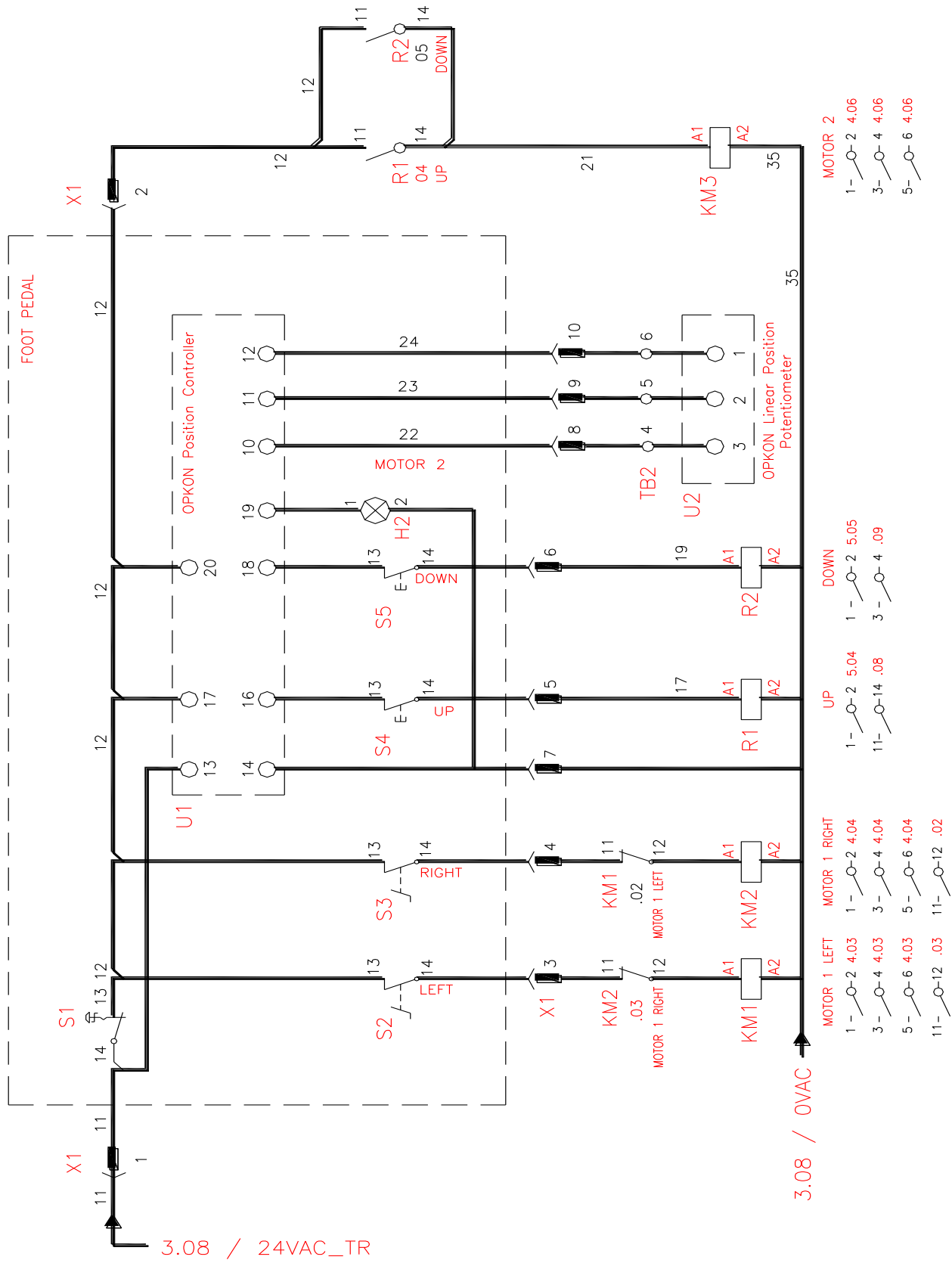


ELECTRICAL SCHEMATIC











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