OPERATOR'S MANUAL

Metal Working

HORIZONTAL HYDRAULIC PRESS BRAKE

MODEL: HPB-45NC

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Rev. 05/2021

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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 an 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, (f) 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 INCIDENTIAL, 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 Baileigh-Service@jpwindustries.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.

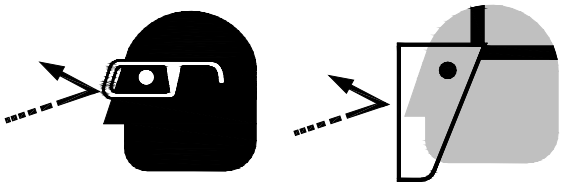
CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

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

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

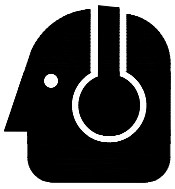
PROTECT EYES

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



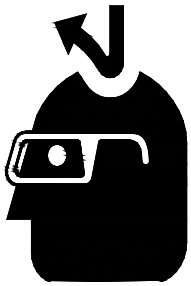
PROTECT AGAINST NOISE

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



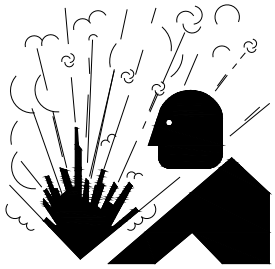
KEEP CLEAR OF MOVING OBJECTS

Always be aware of the position of the material swing path. The material will move quickly during the bending process causing serious body or head injuries.



HYDRAULIC HOSE FAILURE

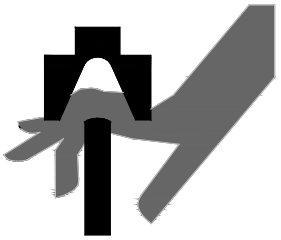
Exercise **CAUTION** around hydraulic hoses in case of a hose or fitting failure.



HIGH VOLTAGE

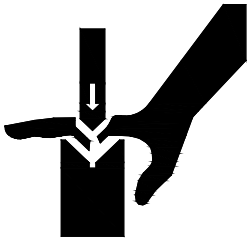
USE CAUTION IN HIGH VOLTAGE AREAS. DO NOT assume the power to be off.
FOLLOW PROPER LOCKOUT PROCEDURES.

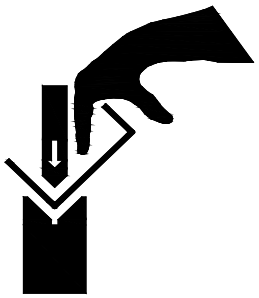
BEWARE OF PINCH POINTS AND CRUSH HAZARD



Keep hands and fingers from between the punch 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.





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.

CALIFORNIA PROPOSITION 65

WARNING: Cancer and Reproductive Harm.
www.P65Warnings.ca.gov

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 machine's 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 appropriately. 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 protection**. Always wear ISO approved protective eye wear when operating machinery. Wear a full-face shield if you are producing metal filings. Eye wear shall be impact resistant, protective safety glasses with side shields which comply with ANSI Z87.1 specification. Use of eye wear which does not comply with ANSI Z87.1 specification could result in severe injury from breakage of eye protection.
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. Keep visitors a safe distance from the work area.
18. **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.
19. **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.
20. **Turn off** power before checking, cleaning, or replacing any parts.
21. Be sure **all** equipment is properly installed and grounded according to national, state, and local codes.
22. Keep **all** cords dry, free from grease and oil, and protected from sparks and hot metal.
23. 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.
24. **DO NOT** bypass or defeat any safety interlock systems.

TECHNICAL SPECIFICATIONS

Pressure	45 tons (40metric tons)
Punch Height	7.875" (200mm)
Stroke Accuracy	+/– 0.002" (0.05mm)
Stroke Length	9.84" (250mm)
Fixture Holes	(1) @ 3.268" dia. (83mm) (3) @ 2.283" dia. (58mm)
Table Height	36.61" (930mm)
Working Speed	.51" / sec. (13mm)
Return Speed	.78" / sec. (20mm)
Power	220V / 3-phase
Motor	5hp (3.75kw)
Shipping Weight	2,266 lbs. (1028kg)
Shipping Dimensions	64" x 26" x 47" (1626 x 661 x 1194mm)

***Note**: Material thickness should not exceed the punch diameter being used.*

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: Baileigh-Service@jpwindustries.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.

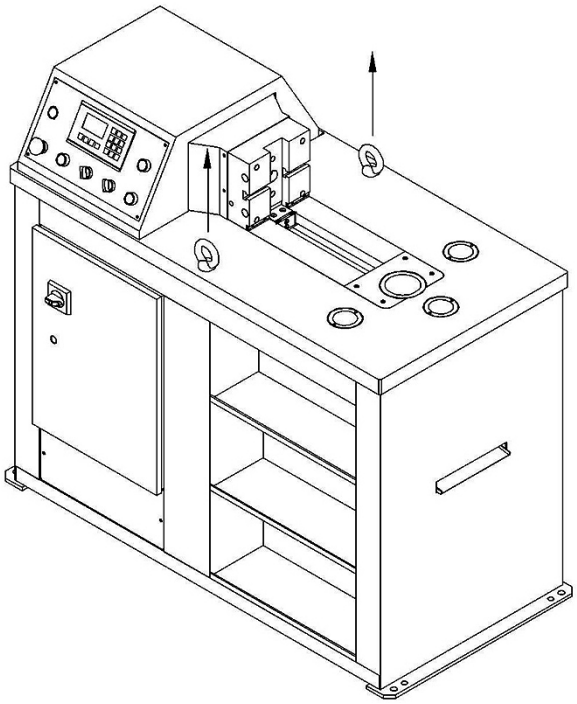
Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. 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

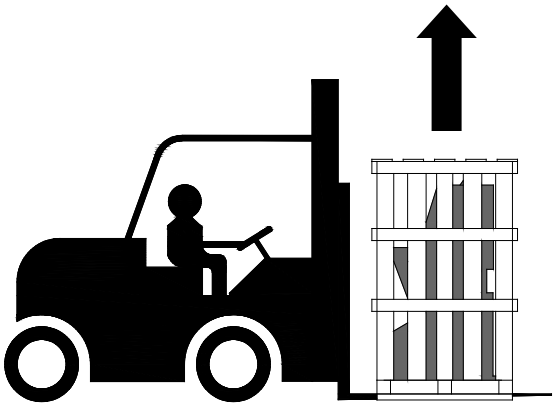
⚠ CAUTION: Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced. Keep in mind that having a large clearance area around 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, then 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 forklift 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

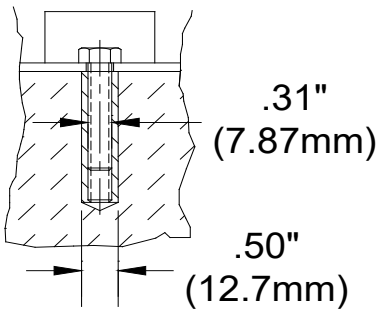
IMPORTANT:

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, worktables, 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.

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.

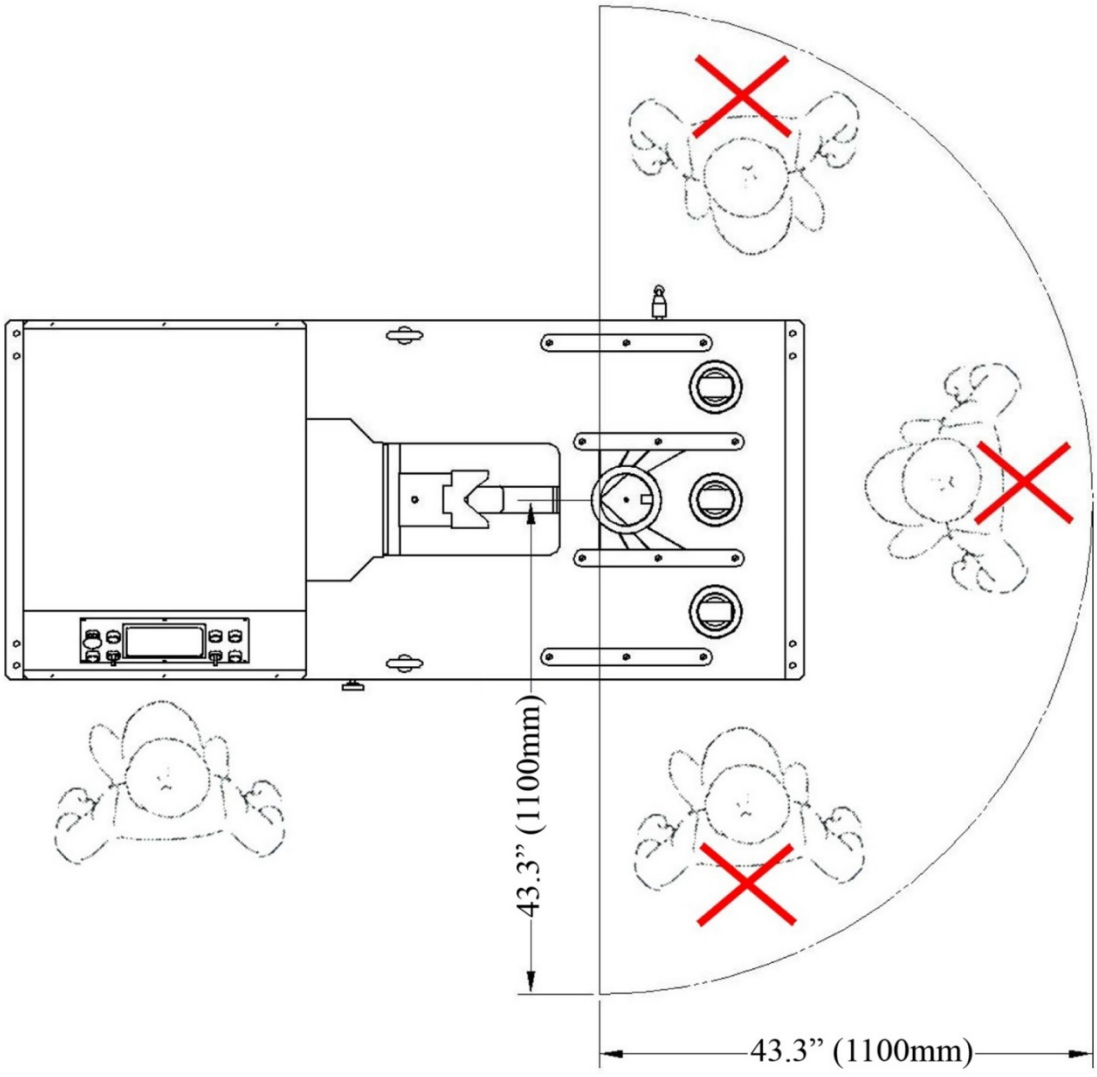


Tank Filling
The hydraulic oil is the primary medium for transmitting pressure and also must lubricate the running parts of the pump.

After installation of the machine and before machine startup, bring the oil level up to 90% of capacity. Refer to any labels or marking affixed to the outside of the machine, If none exist, use SHELL BRAND #46 or #68 hydraulic oil or an equivalent with similar specifications. (Based upon location temperature and availability.)

Verify that any cylinder rams are is 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**.

OPERATOR POSITIONING



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 ±5%, and for the frequency is ±1%.

Considerations

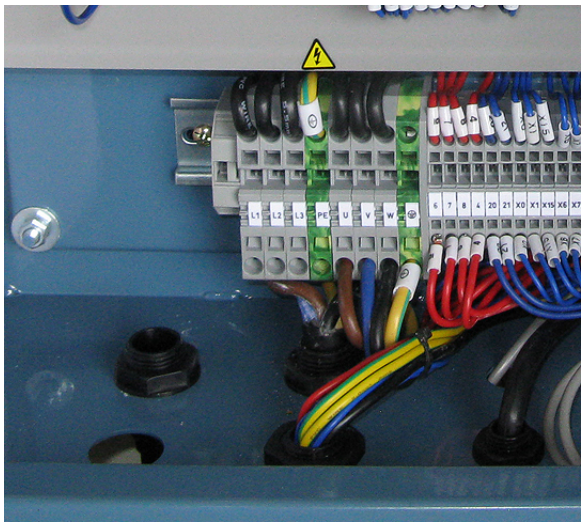
- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with an amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your machines. Before connecting 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 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.

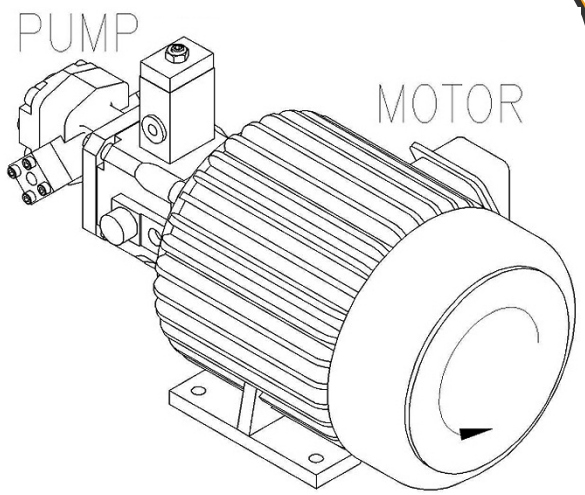
Power Cord Connection

1. Unlock and open the electrical enclosure door.
2. Remove the small panel under the electric box.
3. Insert the power cord through the entrance hole on the base of machine, and then through the base of electric box.
    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 phase wires **(L1, L2, and L3)** to the power terminal strip in the electric box.
5. Also make sure to ground **(PE)** the machine properly.
6. Check that the power cord surface is not damaged, scratched or cut during installation.
7. Reinstall the panel and close the electric box.



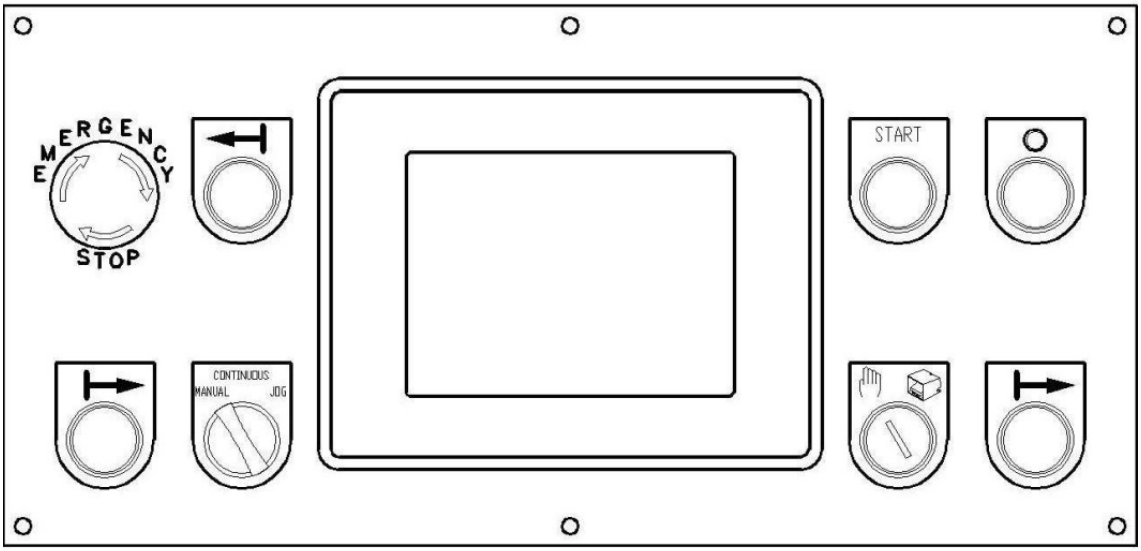
Check Correct Motor Rotation

1. Remove the back cover.
2. Briefly start and stop the motor and check that the motor rotates in the same direction as the arrow indicated on motor. Improper rotation can severely damage the pump.
3. To change the motor rotation, first make sure the power is disconnected, and then reverse any two of the three phases **(L1, L2, and L3)** of the electrical power supply.



CONTROL PANEL

MAIN DISCONNECT SWITCH - This switch is located on the front of the electrical enclosure and controls the main electric source. It also functions as a lock for the electric enclosure. At the ON position the switch locks the electric enclosure and enables you to start the machine. At the OFF position, the power is cut off and the electric enclosure door can be opened.



EMERGENCY STOP – Use the EMERGENCY STOP button to stop the machine in the event of incorrect operation or dangerous condition. The Emergency button must be released before the PUMP ON button will function. To release it, turn knob slightly to the right.

I (PUMP ON) – Push this button to turn on the machine. The EMERGENCY STOP button must be released before the PUMP ON button will function. The green POWER LIGHT stays on when the machine is turned on.

O (PUMP OFF) – Push this button to turn off the machine.

FORWARD ARROWS (TWO-HAND SWITCHES) – Use these switches to operate the machine cylinder movement for advancing the ram toward the stationary punch. Both switches must be pressed at the same time for the cylinder movement. **NEVER** allow one operator to hold the material and another operator to operate the machine.

BACK ARROW – Use this switch to move the cylinder backward in JOG mode.

HAND/PEDDLE – Use this switch for choosing operation by the two-hand switches or with the foot peddle.

MANUAL/CONTINUE/JOG – Use this switch to choose between the three operating modes.

OPERATION

CAUTION: Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges.

CAUTION: Keep hands and fingers clear of the punch and die. Stand off to the side of the machine to avoid getting hit with the material as it is being bent and formed. When handling large heavy materials make sure they are properly supported.

In **MANUAL mode**, press the two-hand switch at the same time for the forward motion of the cylinder. The cylinder slows down at the Slow position and stops at the Forward position. Releasing the switches and the cylinder retract to the Back position, and the controller moves to the next Step in the Program. After finishing the last Step set by the End parameter, the controller moves back to the first Step in the Program. Place the next work piece and start from the first step (bend).

In **AUTO mode**, press the two-hand switch at the same time and hold. The cylinder will move back and forth between the Back and Forward position. Releasing the switches and the cylinder retract to the Back position. The controller does not move to the next Step in this mode.

In **JOG mode**, press the two-hand switch at the same time for the forward motion of the cylinder. The cylinder will travel forward while the switches are held down and stops if released. The cylinder does not retract until the BACK button is pressed for the backward movement of the cylinder. This mode is useful to set the required cylinder stroke length for the required bend.

PRESSURE SETTING

In certain work job, the pressure of the cylinder will need to be adjusted to a lower level. The pressure can be adjusted by the pressure value in the machine base. A pressure gauge is included to indicate the pressure.

TWO HAND SWITCH / FOOT PEDDLE

⚠ CAUTION: When using the foot switch mode, the operator should understand the potential risk of bodily injuries. NEVER have hands or fingers in between the top (left) tool and lower (right) tool. Hence the manufacturer should not be held responsibility and liability of damages and/or body injuries by the non-compliance of the operator to the safety warnings stated in this manual.

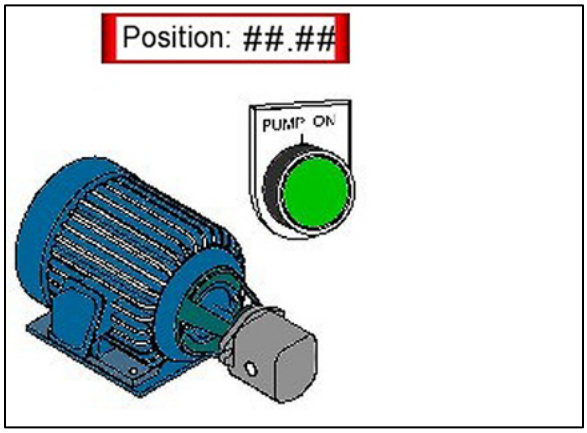
The machine uses two-hand switches for operation. **NEVER** have one operator hold the material and another operator operating the machine controls. The use of the foot peddle is only by authorized personnel. It is provided as an option only for the cases when the operator cannot use the hand switches.

The key of the Hand/Peddle selector switch must never be left on the machine. The key should be kept in a safe place by the authorized officer of the company.

PROGRAMMING INSTRUCTION

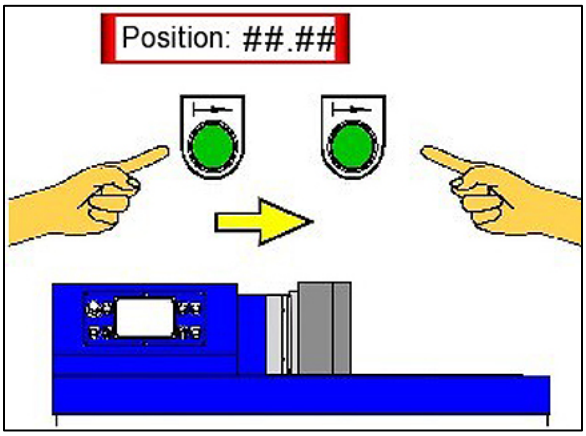
Starting

1. Turn on power. Be sure the emergency button is released. Screen will be on after a brief self-check.
2. Press Pump ON to start the motor.

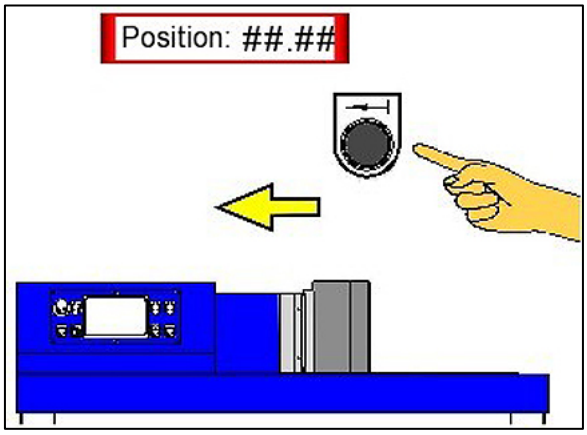


3. If the current cylinder position is in the back, the screen will ask you to press the FWD button (both button simultaneously) to move the cylinder forward.

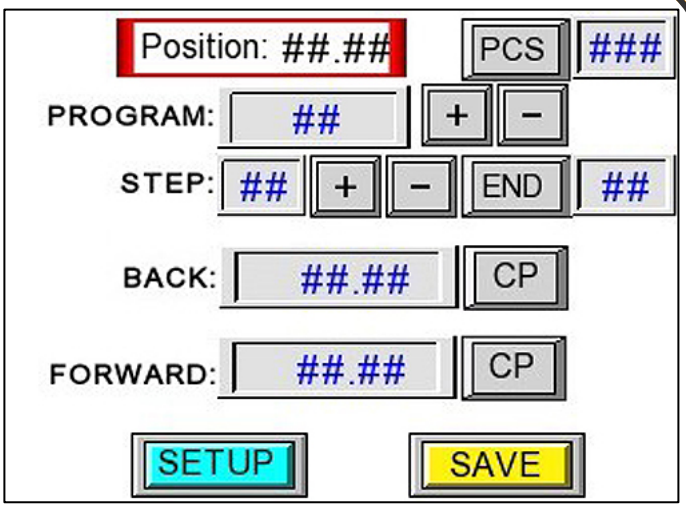
Note: *If the cylinder position is already at an extended position, the screen may just show press BACK as in next step.*



4. When the screen shows press the BACK button, press BACK to move the cylinder back for completing the calibration.

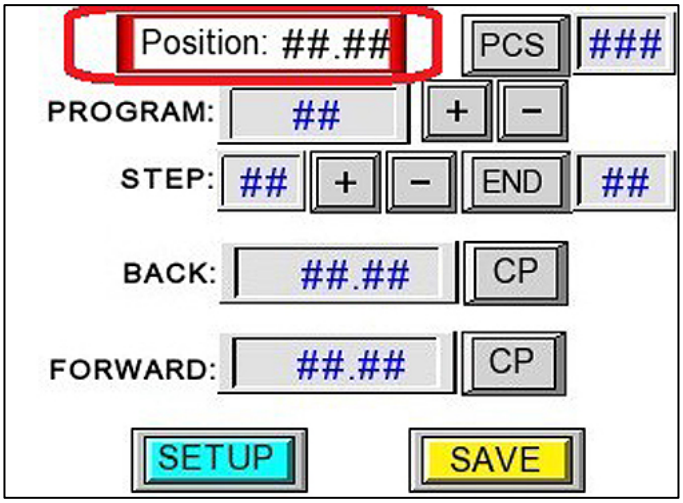


5. After the cylinder and NC stop calibrations are complete, the screen switches to the main programming screen.

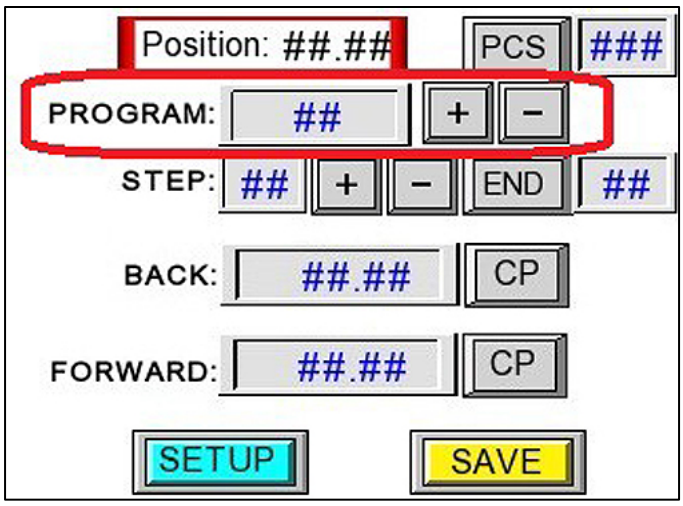


The Programming Screen

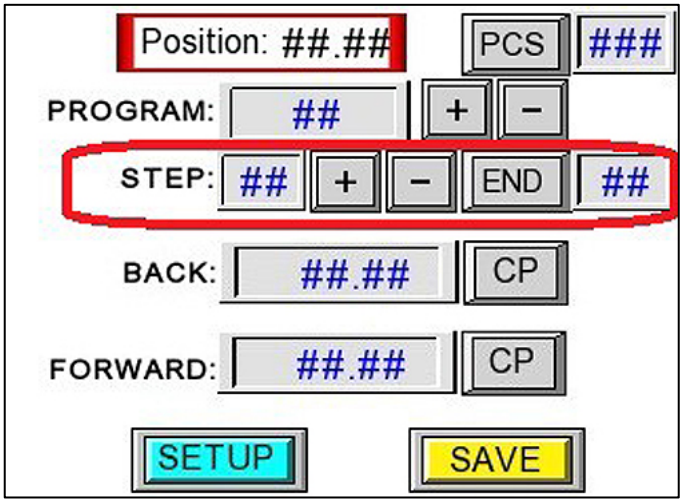
The top of the screen shows the current Cylinder position.



The controller can store 50 programs.



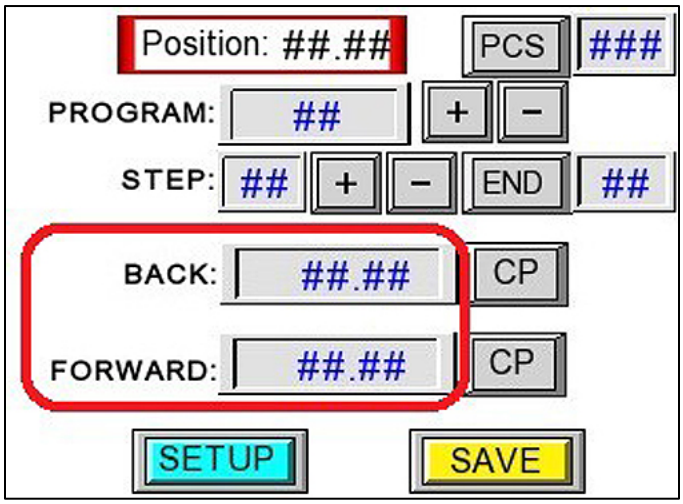
Each program can have up to 10 steps. A program can be considered as a working job, and a step is one bending operation. The END informs the controller of the last step of the program.
Example, if END=2, then only step 1 and 2 in the program will be executed.



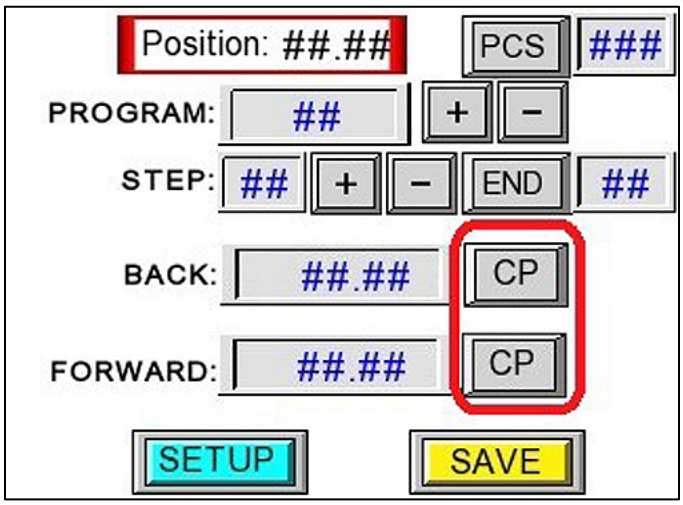
For each STEP, there are 2 parameters:

BACK: the back position of the cylinder when retracted.

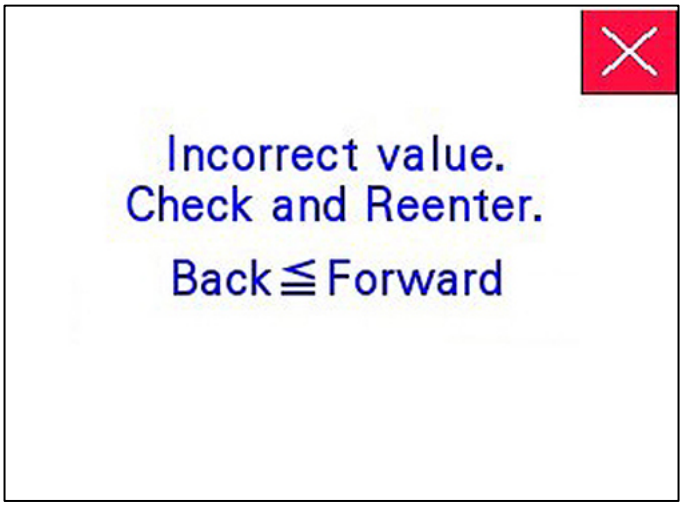
FORWARD: The cylinder stops at the **FORWARD** position. Adjust this position for the angle of bend.



Another quick way is to use the “CP” (Current Position) button to enter the current cylinder position into the “Back” and “Forward” field. This input method is especially useful to test bend a material in JOG mode to desired position, and then memorize or lock in the current position CP.

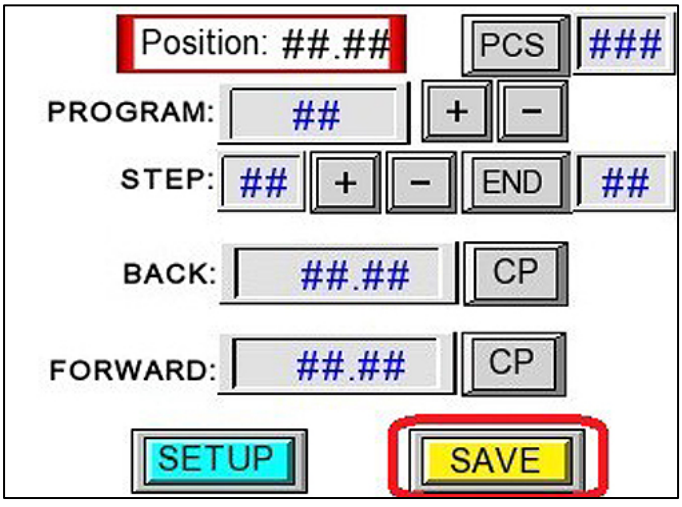


If the entered forward value is less than Back value, the following error message occur when press save.

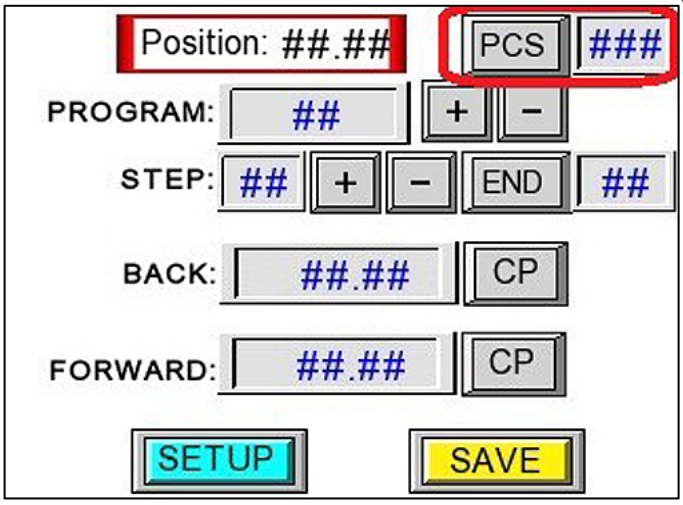


Press SAVE to save any changes made.

Note: *The values are not saved until SAVE is pressed.*

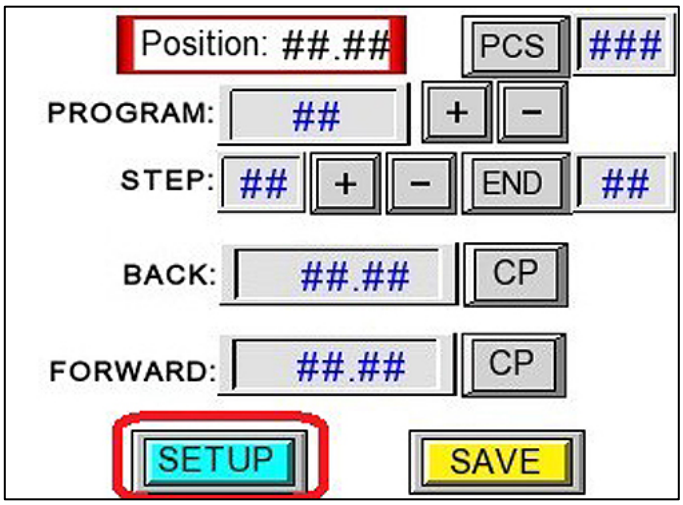


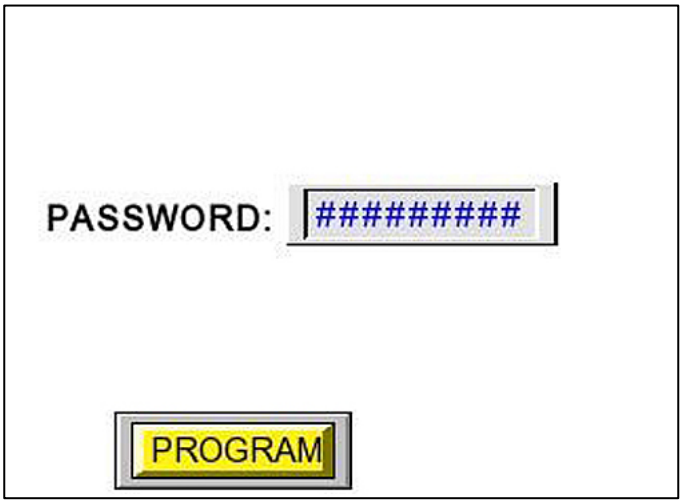
A counter function is included. Each time a program is executed and completed, the PCS number increase by one.
Press the field and enter zero to reset the counter, or any other number if desired.

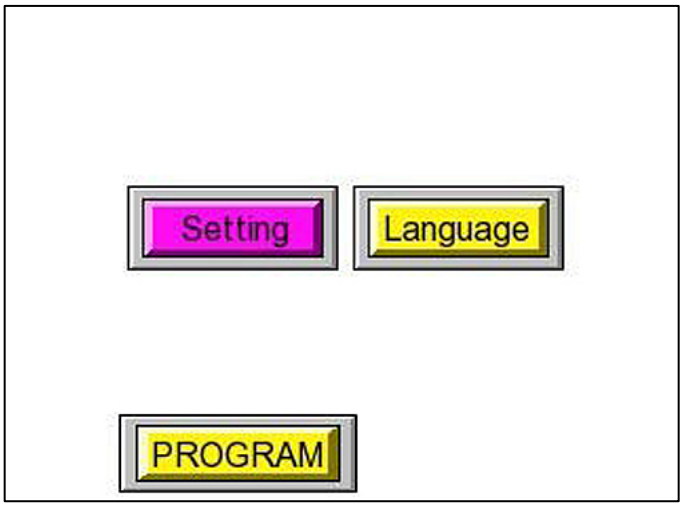


Setting Screens

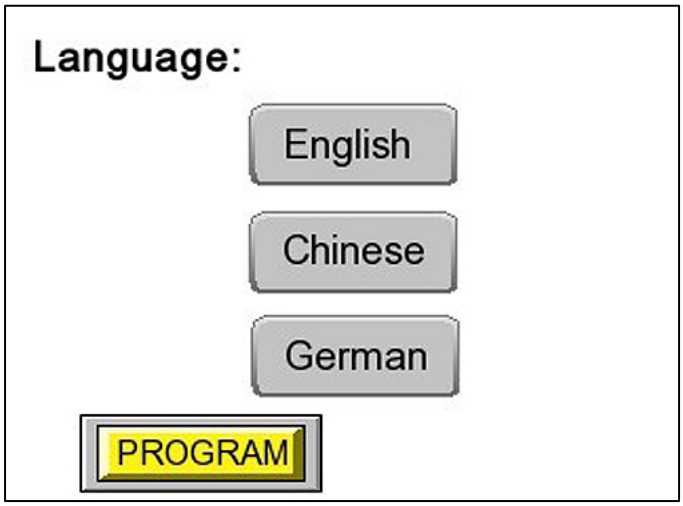
In the setting screen, the Function key allows switching between the **NC SET** (NC back gauge setting parameters) and **CY SET** (cylinder setting parameter). Press the **PROGRAM** button to go to the program screen.





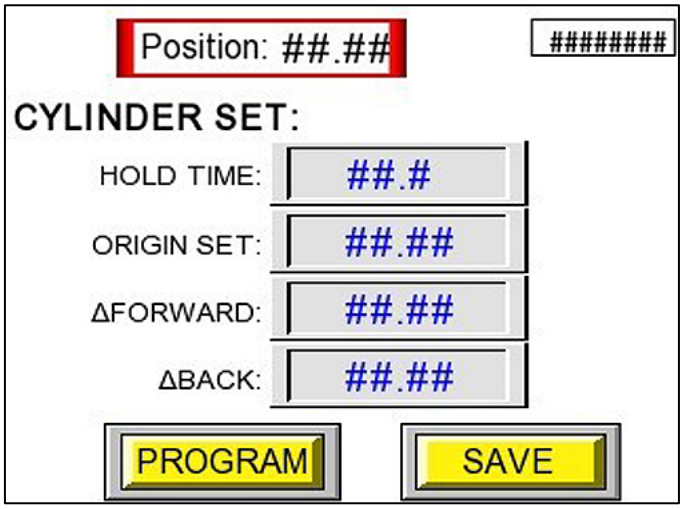


a) Language can be selected in Language



Press PROGRAM to go back to the main screen.

b) In Setting:



HOLD TIME: In **CONTINUOUS** mode, the cylinder moves back and forth between the **FWD** and **BACK** positions. At the **FWD** position, the cylinder can hold for a while before moving back. The hold time sets this temporary pause time at the **FWD** position. If set to zero, the cylinder moves back immediately.

ORIGIN SET: This is the origin position of the cylinder after calibration. Adjust this parameter if the cylinder position is off.

Δ FORWARD: If the **FORWARD** position is off from the set value, use this field to fine adjust the difference.

Δ BACK: If the **BACK** position is off from the set value, use this field to fine adjust the difference.

Press **SAVE** to save any changes.
Press **PROGRAM** to go back to the main screen.

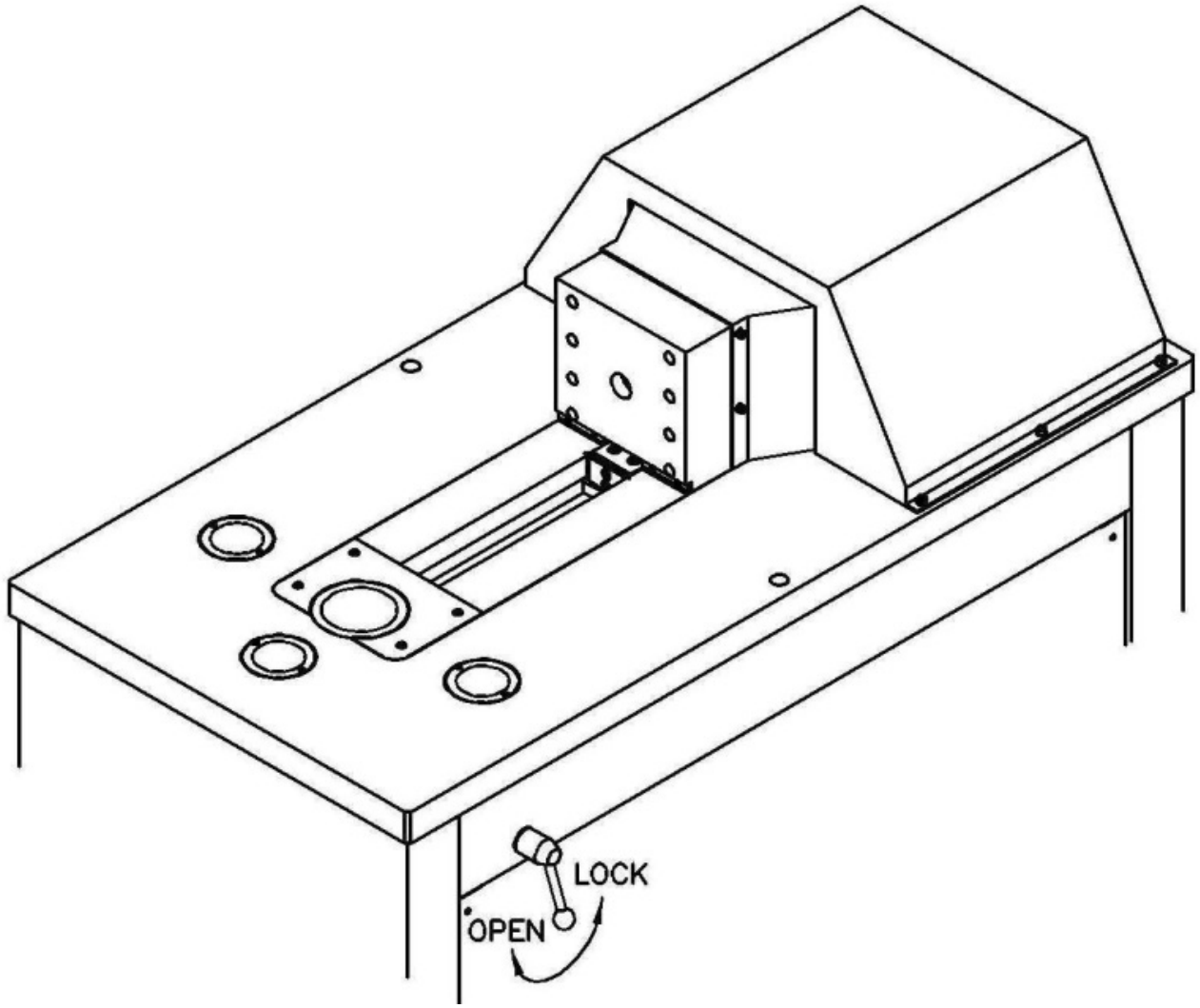
Metal Thickness		Mild Steel Press Brake Bend Tonnage Chart - Tons per linear foot of bend at specific die opening and radius (Based on 60,000PSI Tensile strength)																					
		Width of Vee Die Opening (Inches)																					
Gauge	Dec.	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4	5	6	7	8	10
20	0.036	3.1	2.3	1.8	1.4	1.2	1																
18	0.048	5.4	4	3.1	2.5	2.2	1.7	1.3					*Shaded box represents optimal lower die opening and radius*										
16	0.060	9.6	7.1	5.6	4.5	3.8	2.8	2.2	1.8	1.5													
14	0.075		11.9	9.3	7.6	6.4	4.7	3.8	3	2.5	2.1	1.9				*Once the tonnage is found on the chart, multiply by the material width (in feet) to find the total required tonnage*							
13	0.090						6.8	5.5	4.3	3.7	3.3	2.9											
12	0.105			20.5	16.7	13.5	10.4	7.7	6.5	5.6	4.4	4.1	3.2	2.2									
11	0.120					18.5	13.9	10.9	8.8	7.5	6.2	5.6	4.3	3.2	2.2								
10	0.135					25.2	17.2	14.5	11.3	9.9	8.5	7.3	5.7	4	2.9	2.3							
9	0.150									13.1	11.9	9	7	5.2	3.7								
3/16	0.188							27.4	23.1	19.3	16.4	14.3	11.2	7.6	5.8	4.5							
1/4	0.250									39.4	33.3	29.5	22.7	15.4	11.5	9.1	7.5	6.2					
5/16	0.313											50.4	39.8	27	19.7	16	12.7	10.6	7.7				
3/8	0.375												61.1	42.3	30.9	24	19.6	16.3	12.3	9.5			
7/16	0.437													61.7	45.8	35.4	28.6	24.4	17.3	14.8	11.2		
1/2	0.500		*Tonnage adjustment for other materials:*											85.2	63.6	48.8	39.7	33.3	24.6	19.4	15.9		
5/8	0.625		*Stainless steel: 50% More*												110	86.2	70	58.3	43.1	33.3	27.4	23.3	16.9
3/4	0.750		*Aluminum & brass (soft): 50% Less*														110	93	69	53.5	43.6	36.5	27.1
7/8	0.875		*Aluminum (hard or alloys): Same as mild steel*															137	104	80.7	64.6	52.9	39.7
1	1.000																		143	113	91.2	76.2	56.3
Formed Radius		1/32	3/64	1/16	5/64	5/64	3/32	1/8	9/64	5/32	11/64	3/16	15/64	5/16	25/64	15/32	25/64	5/8	25/32	15/16	1-3/32	1-1/4	1-9/16
Minimum Flange		3/16	7/32	1/4	9/32	5/16	7/16	1/2	9/16	5/8	11/16	3/4	15/64	1-3/16	1-7/16	1-3/4	2	2-1/4	2-3/4	3-3/8	4	4-1/2	5-1/2

OPTIONAL TOOLING

The bending machine can be used with a variety of optional tooling, including various bending tools, punching, shearing, profile strengthening, as well as many custom made tools.

Depending on the tooling, the upper die set is fixed at the cylinder head block, and the lower die set is fixed using one or a combination of the ø83mm and ø58mm fixing holes. The ø83mm fixing hole has a handle on the backside of the machine to lock up the tool. After installing the tooling, turn the handle to the right to lock the tool. Loosen the handle counterclockwise (ccw) before uninstalling the tool.

Because this manual cannot cover all the possibilities of the optional tooling, the user should refer to the appropriate instructions for the specific tooling installation, operation, and maintenance.



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.

- 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.*

MAINTENANCE

1. Before operating the machine:

Routinely check the electrical power cable and the foot switch cable for any loosening or damage. Clean all slugs, cut off pieces, and other waste material from and around the machine.

2. Filter and Oil Change:

Take off and clean the suction filter inside the oil tank every time the oil is changed. The first oil change should be performed after approximately 600 operating hours. Further oil changes are needed after every 1200 operating hours. A drain outlet is located at the base of the oil tank. Re-attach the cleaned suction filter after draining the oil. If the suction filter is damaged or clogged, replace the suction filter. Do not mix different brands of oil.

Hydraulic Fluid (or equivalent)

- Mobil DTE 46
- Esso Nuto H46
- Shell Tellus 46 or Hydraulic oil 46
- B.P. Energol HLP 46
- Castrol Hyspin AWS 46 6018

3. Oil level:

Make sure the hydraulic oil level is in the range indicated on the oil level gauge. It is better to keep the oil level close to the high mark indicated on the gauge.

4. Oil temperature:

The oil temperature should be under 122° Fahrenheit (50° Celsius). If the upper/lower limit switches are not set correctly for unloading of the pump, the oil temperature can rise quickly. Adjust the limit switches so the pump will be in the unloading condition.

5. Hydraulic pressure:

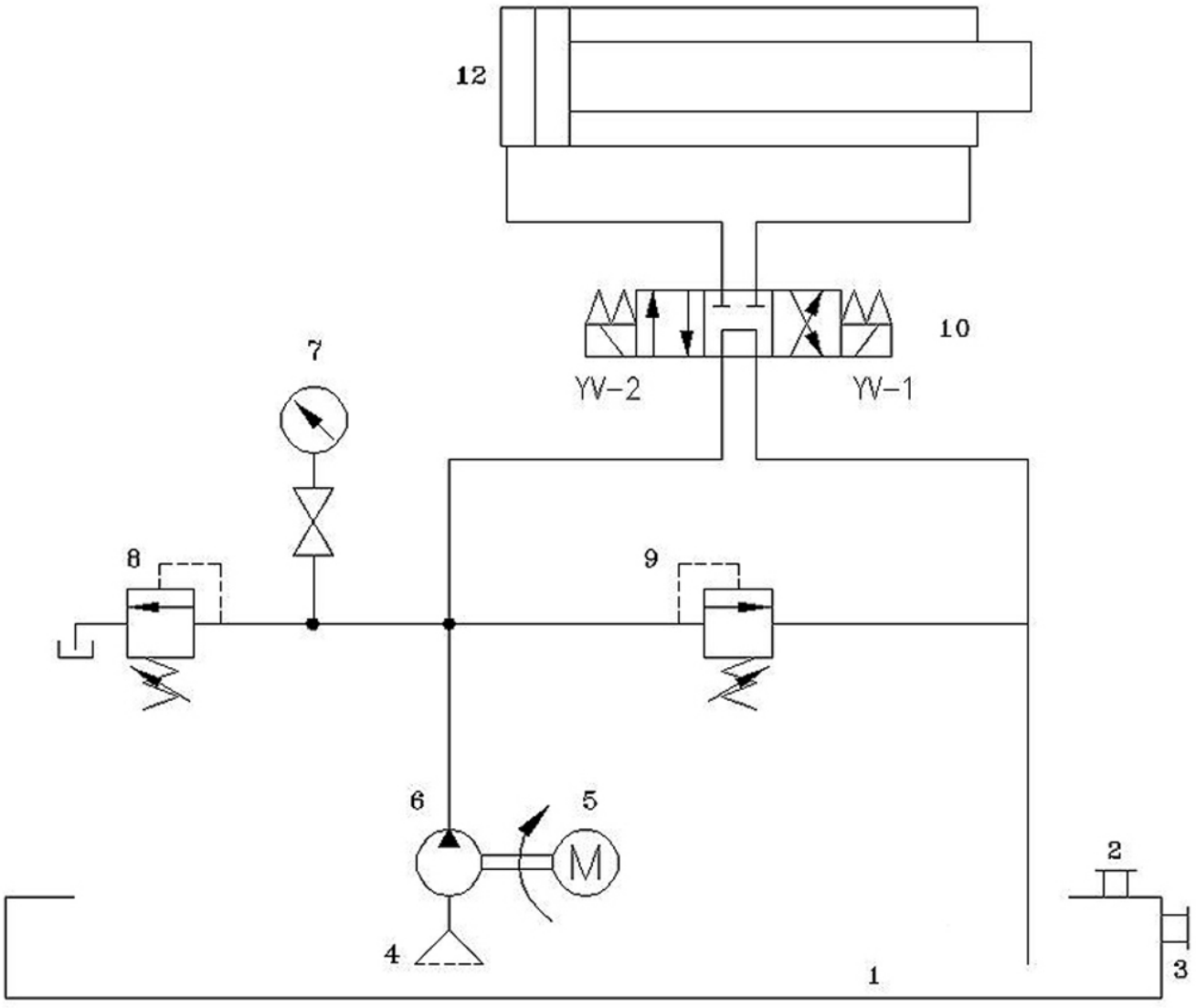
The working pressure of the hydraulic system is pre-set in the factory. There is a pressure gauge to indicate the working pressure of the machine. The pressure gauge should normally be closed and be used only during service/maintenance work.

- Max Pressure 210 Kg/cm2

AIRBORNE NOISE

The continuous airborne noise level of the machine under normal condition is approximately 75dB ± 5dB.

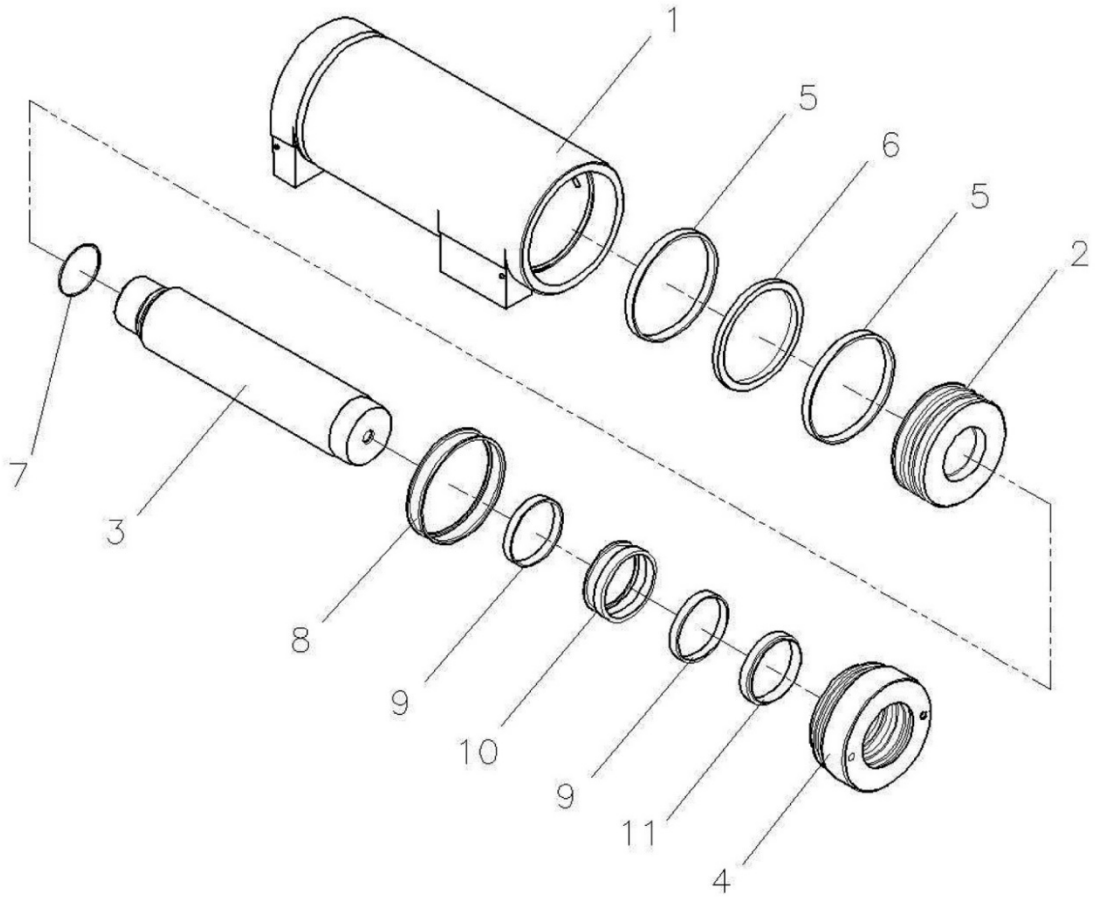
HYDRAULIC CIRCUIT



Hydraulic Circuit Parts

No.	Description	Qty.	Part No. (HPB-45)
1	Tank	1	6102910B
2	Breather & Filter	1	OLHW-HY-08A
3	Oil Level Gauge	1	OLHW-LG-4
4	Suction Oil Filter	1	OLFL-MF-086
5	Motor	1	5hp (3.75kw)
6	Pump	1	OLPM-ALP2A-S13E
7	Pressure Gauge	1	OLOV-35DSK
8	Relief Valve	1	OLOV-DG-02-H-22
9	Relief Valve	1	OLOV-RPEC-FAN
10	Solenoid Valve	1	OLSV-DFA-02-3C60
12	Cylinder	1	6103900C

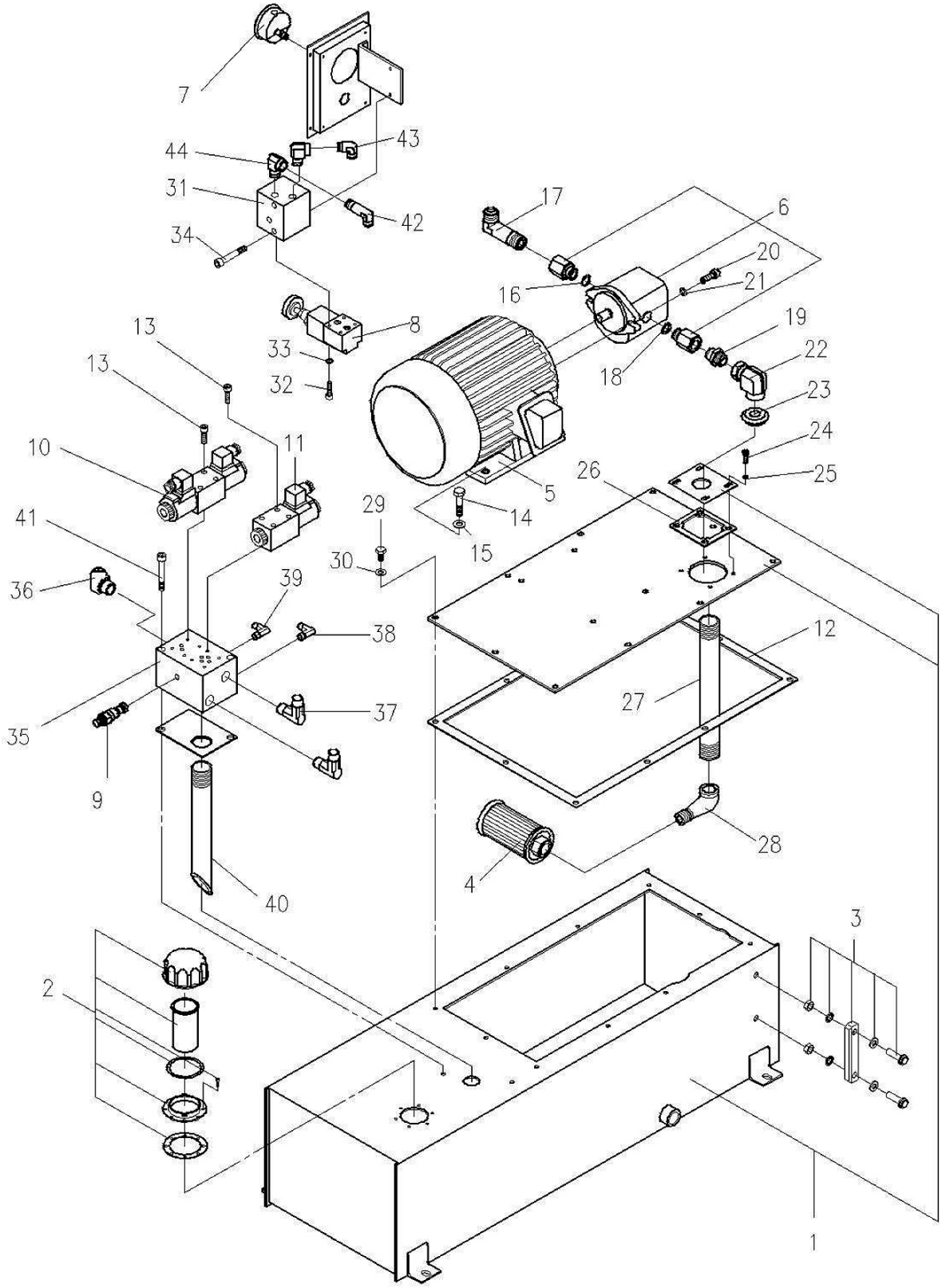
CYLINDER ASSEMBLY PARTS DIAGRAM



Cylinder Assembly Parts List

Item	Part Number		Description	Qty.
1	226103902C		Cylinder Pipe	1
2	213003003C		Piston	1
3	226103002B		Piston Rod	1
4	213003002A		Cylinder Rod Cover	1
5	534013003900B	53407WN12506000500	Wear Ring	2
6		534020203R538106000379A	Piston Seal	1
7		53403G070	O-Ring	1
8		534032358 534048358	O-Ring + Back Up Ring	1
9		53407WN12503750500	Wear Ring	2
10		5340525003500375B 534041016089003	U Packing + Back Up Ring	1
11		53406H3500	Dust Seal	1

HYDRAULIC COMPONENTS ASSEMBLY PARTS DIAGRAM

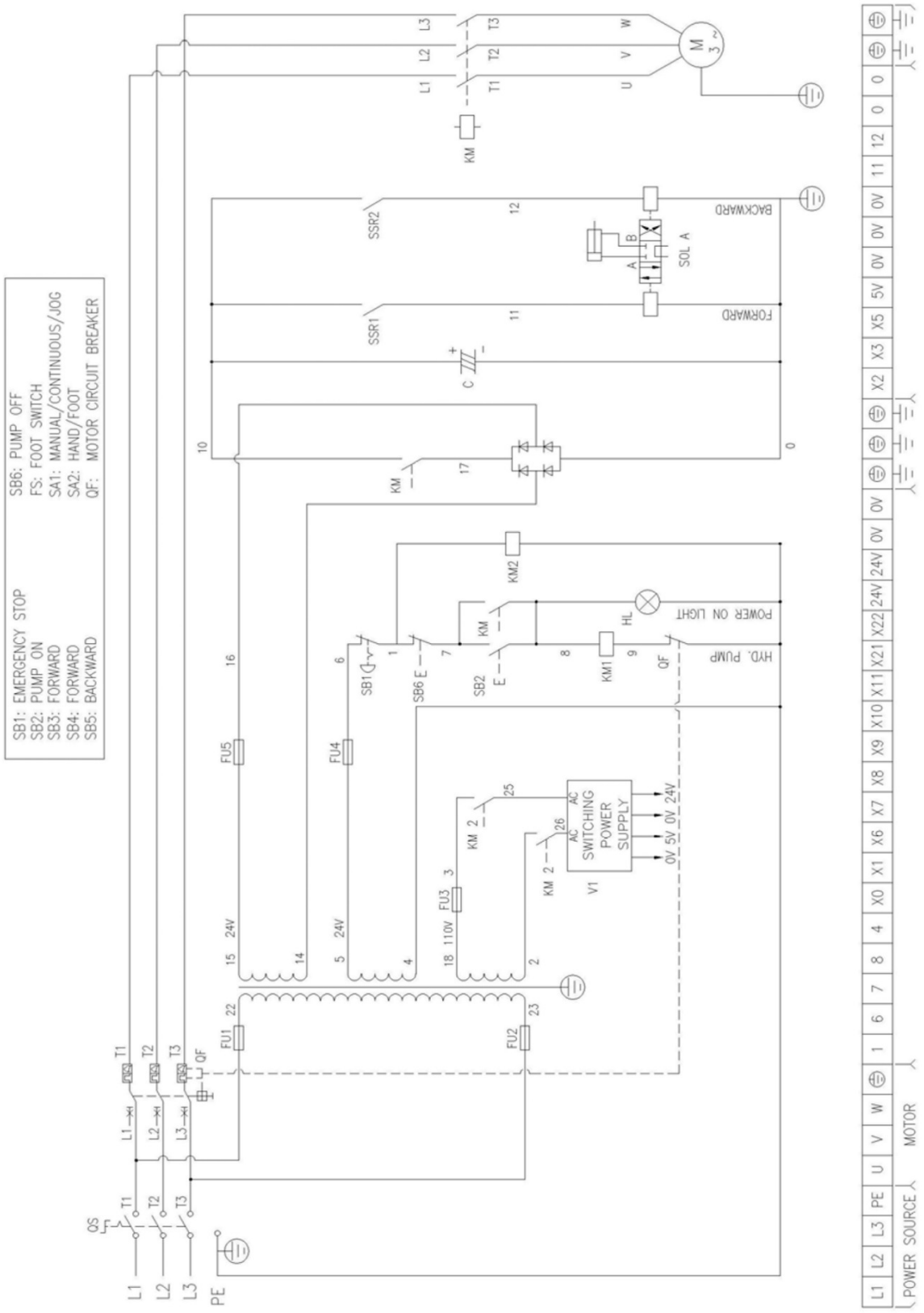


Hydraulic Components Assembly Parts List

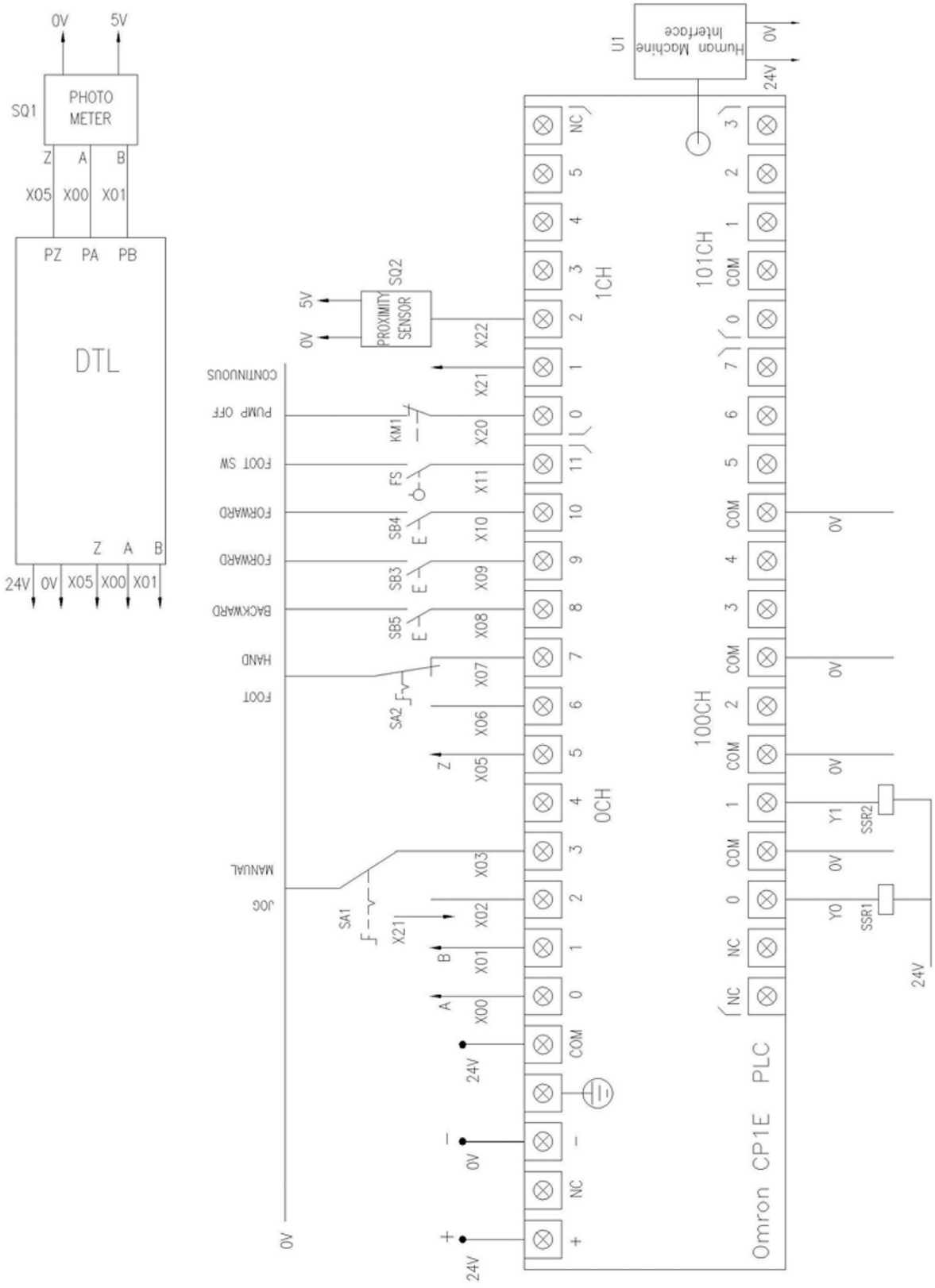
Item	Part Number		Description	Qty.
1	226102910B	226102020A 226102017C 811602048	Oil Tank	1
2	53702HY08A		Filter Breather	1
3	53701LG4		Oil Level Gauge	1
4	53301MF086		Suction Filter	1
5	5HP 50Hz	380V : 52301050JN 400V : 52301050JN 415V : 52301050JN	Motor	1
	5HP 60Hz	220V : 52301050FG 230V : 52301050FG 380V : 52301050FG 460V : 52301050FG 575V : 52301050BD		
	5HP 60Hz	220V : 52303050LK 380V : 52303050LK		
6	50Hz.: 53201ALP2AS10C1FA 60Hz.: 53201ALP2AS10C1FA		Pump	1
7	5362135DSK		Pressure Gauge	1
8	53657DG02H22		Relief Valve	1
9	53656RPECFAN		Relief Valve	1
10	53651DFA02005		Solenoid Valve	1
11	53651DFA03001		Solenoid Valve	1
12	211303008		Oil Tank Cover Seal	1
13	56301A0005045		Hex Bolt M5X45	8
14	56301D0010030		Bolt M10X30	4
15	56303A00010		Spring Washer M10	4

Item	Part Number	Description	Qty.
16	53403P020VT	O-Ring	1
17	56203810808	1/2” Pipe 90 degree joint	1
18	53403P024VT	O-Ring	1
19	56203111212	Pipe joint	1
20	56301A0010030	Hex Bolt M10X30	2
21	56303A00010	Spring Washer M10	2
22	562313112	3/4” 90 degree joint	1
23	53409NT06	Dust Seal For Pipe Standard	1
24	56301A0006012	Hex Bolt M6X12	4
25	56303A00006	Spring Washer M6	4
26	211603005	Packing	1
27	56278011208K	Pipe 3/4"X240mm	1
28	56225321212	Reducing Street Elbow	1
29	56301D0008025	Bolt M8X25	10
30	56303A00008	Spring Washer M8	10
31	226103008	Manifold Block	1
32	56301A0005045	Hex Bolt M5X45	4
33	56303A00005	Spring Washer M5	4
34	56301A0006075	Hex Bolt M6X75	2
35	226203006	Manifold Block	1
36	56203210608	45°Joint 3/8TX1/2H	1
37	56203310808	90°Joint 1/2TX1/2H	2
38	56203810404	90°Joint 1/4TX1/4H	1
39	56203310404	90°Joint 1/4TX1/4H	1
40	56278010808K	Pipe 1/2"X240mm	1
41	56301A0008095	Hex Bolt M8X95	2
42	56203810404	90°Joint 1/4TX1/4H	1
43	56203310404	90°Joint 1/4TX1/4H	1
44	56225330404		2

ELECTRICAL CIRCUIT



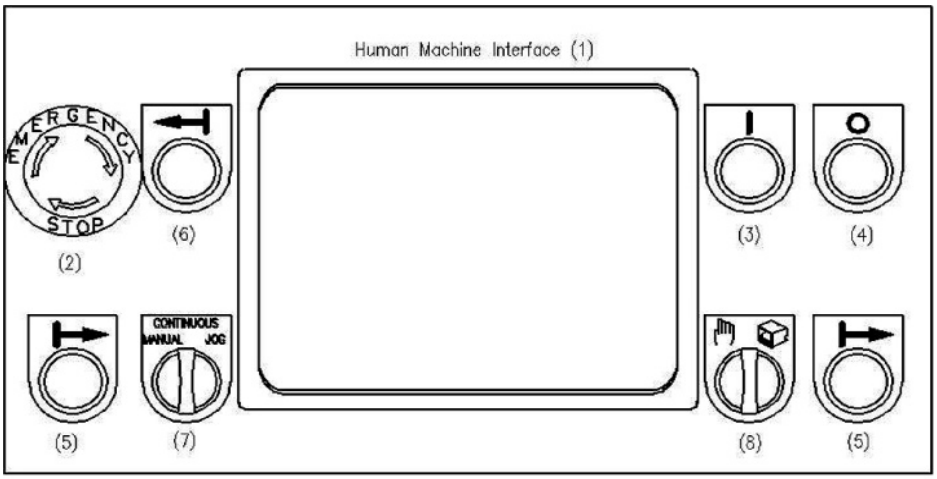
PLC I/O LAYOUT

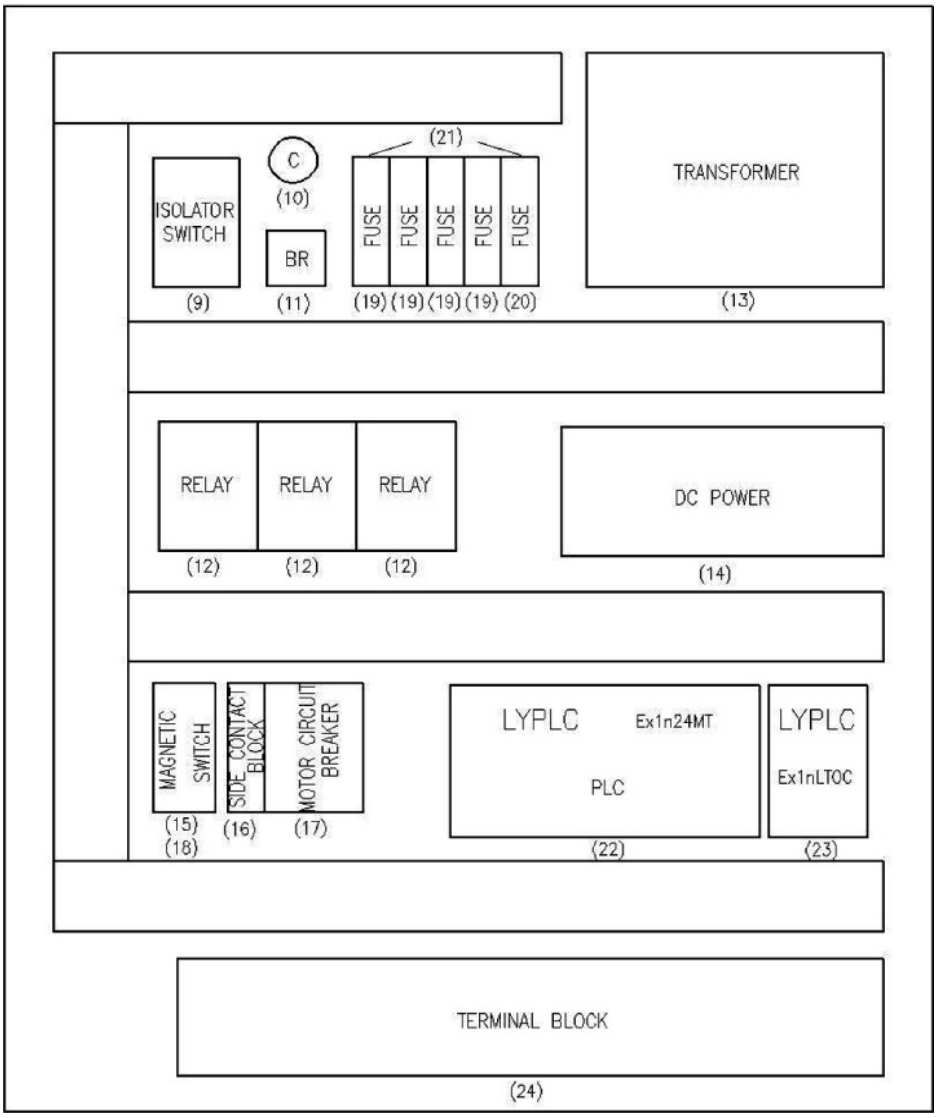


Electrical Parts List

Code	Description	Model	Specifications
QF	Motor Circuit Breaker	GV2-ME14	6-10A
FU1, FU2, FU3, FU4	Fuses	FUSE-2A	2A
FU5	Fuses	FUSE-6A	6A
QS	Isolator Switch	OT16F3	Circuit Interrupter
SB1	Push-Lock Push Bottom	XB5AS542	Emergency Stop
SB2	Flush Push Bottom (Green)	TEXB5AL42	Pump On
SB3 / SB4	Two-hand Push Bottoms	ZB5-AA3	Forward (Extend)
SB5	Push Bottom	ZB5-AA2	Backward (Retract)
SA1	Selector Switch	ZB5-AD3	MANUAL/CONT/JOG
SA2	Selector Switch	ZB5-AG2	HAND/FOOT
FS	Foot Switch	YC-135N/1A1B(BNA)	Foot Switch Control
KM1	Magnetic Switch (Contactors)	TENLC1D25B7	25A/ AC24V
VC	Bridge Rectifiers	KBPC2506	KBPC2506
TC	Transformer	SP-TBSW-1025D	350VA secondary instrument: 110V (1.5A) 24V (6A) 24V (1A)
SSR1	Solid Relay	SSR-10DD	Forward
SSR2	Solid Relay	SSR-10DD	Backward
YV1 / YV2	Solenoid Valves Coil	DFA-02-3C60-DC24V-35	Forward / Backward
SQ1	Photo Meter	AT216-250T / AT216-350T	Stroke gauging meter
PLC	PLC	EX1N24MT	PLC controller
U1	Human Machine Interface	DOP-B05S100	Interface Screen
GS1	Switching Power Supply	52201NED35B	For Photo Meter and Interface
SB6	Flush Push Bottom (Red)	XB5-AL42	Pump Off
SQ2	SENSOR	TL-Q5MC1-Z (NO)	Cylinder origin position sensor

ELECTRICAL COMPONENTS ASSEMBLY PARTS DIAGRAM



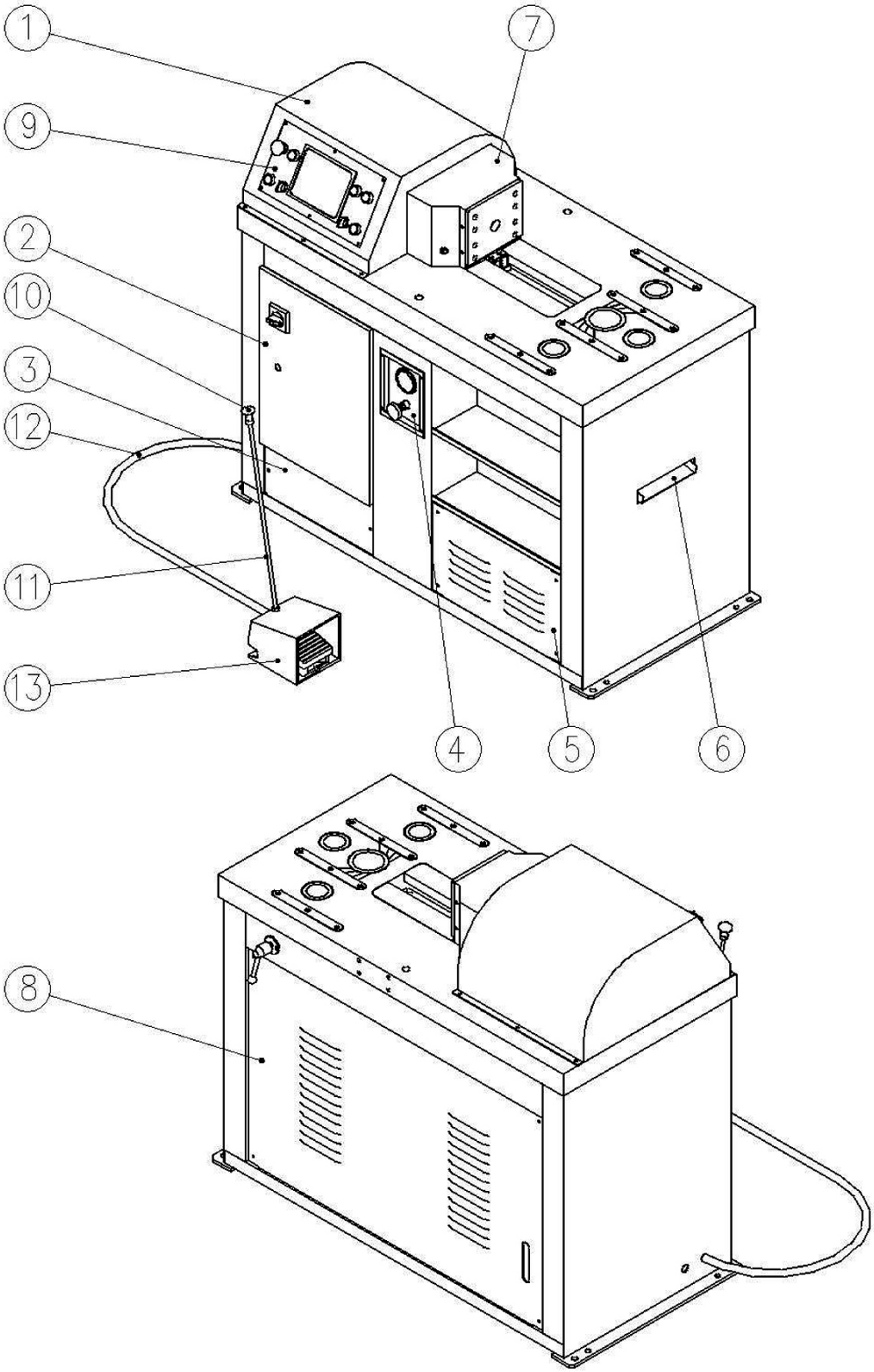


Electrical Components Assembly Parts List

Item	Part Number		Description	Qty.
1	52503DOPB05S100		Human Machine Interface	1
2	52421XB5AS542		Emergency Stop Button	1
3	52420XB5AW3361		Pump ON Push Button	1
4	52407XB5AL42		Flush Push Button (Red)	1
5	52420ZB5AA3		Push Button (Forward)	2
6	52420ZB5AA2		Push Button (Backward)	1
7	52415ZB5AD3		Selector Switch	1
8	52415ZB5AG2		Selector Switch	1
9	5HP 50Hz	380V : 52407OT16F3 400V : 52407OT16F3 415V : 52407OT16F3	Isolator Switch	1
	5HP 60Hz	220V : 52407OT25F3 230V : 52407OT25F3 380V : 52407OT16F3 460V : 52407OT25F3 575V : 52407OT16F3		
	5HP 60Hz	220V : 52407OT25F3 380V : 52407OT16F3		
10	522034700UF50V		Capacitor	1
11	52202KBPC2506		Bridge Rectifiers	1
12	52404SSR10DD		Relay	3

Item	Part Number	Description	Qty.
13	220V：524033802510 230V：524035752520 380V：524033802510 460V：524035752520 575V：524035752520	Transformer	1
14	52201NED35B	DC Power	1
15	220V：52401LC1D18B7 230V：52401LC1D18B7 380V：52401LC1D12B7 460V：52401LC1D18B7 575V：52401LC1D09B7	Magnetic Switch	1
16	52419GVAN11	Side Contact Block	1
17	220V：52402GV2ME20 230V：52402GV2ME20 380V：52402GV2ME14 460V：52402GV2ME14 575V：52402GV2ME10	Motor Circuit Breaker	1
18	52419LADN11	Contact Block	1
19	52801A02A	FUSE-2A	4
20	52801A06A	FUSE-6A	1
21	52801CFBSCHM1D	Fuse Base	5
22	52506EX1N24MT	PLC	1
23	52599EX291	Signal conversion module	1
24	5270106006204201	Terminal Block	1

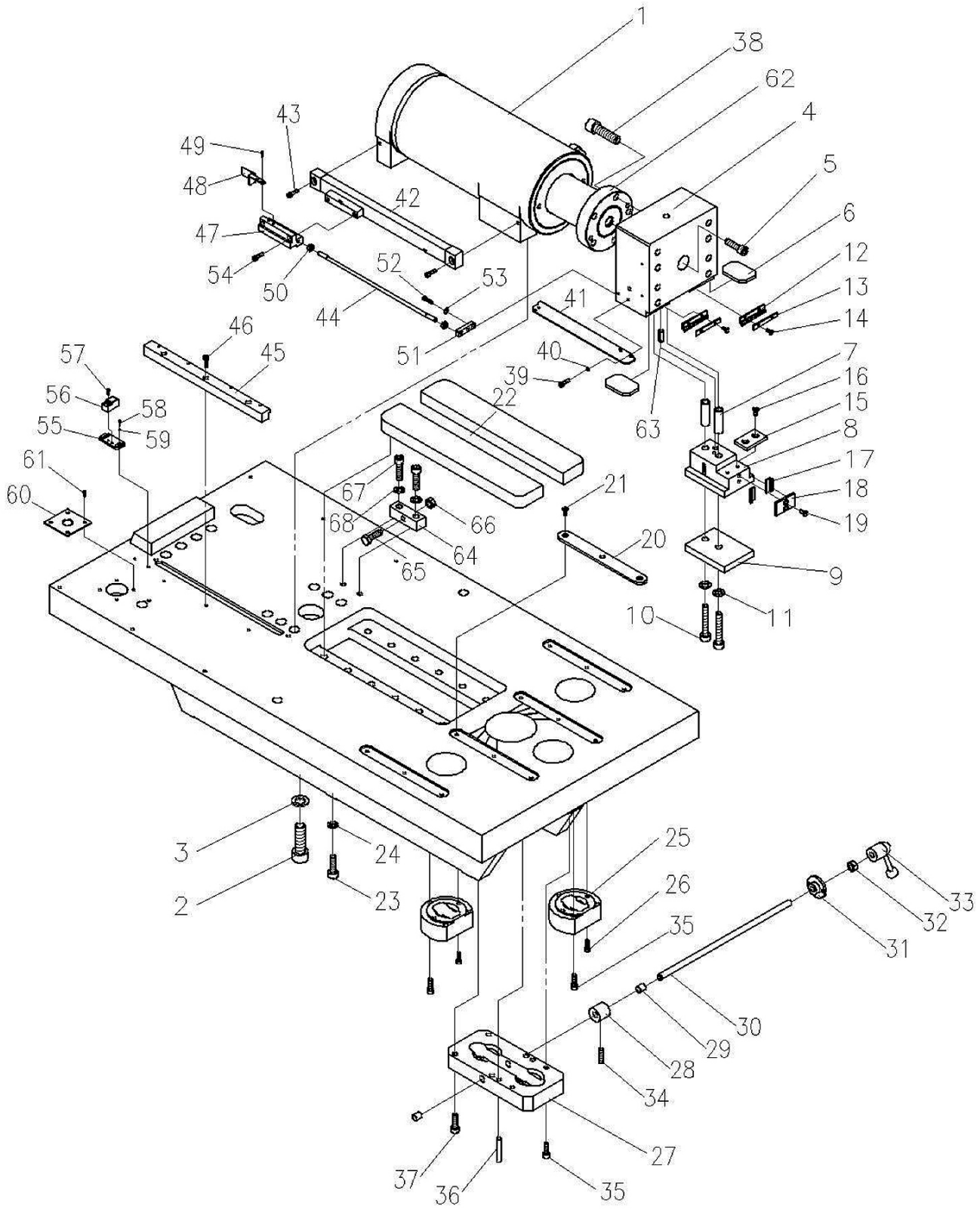
COVER PLATES PARTS DIAGRAM



Cover Plates Parts List

Item	Part Number		Description	Qty.
1	226102003A		Cylinder Stationary Cover	1
2	226102900A	226102007A 226102008 226102009 52414APL93902	Electrical Box	1
3	226102021		Front Base Cover	1
4	226102024A		Pressure Control Panel	1
5	226102027		Front Base Cover	1
6	226102025		Scrap slide out plate	1
7	226102004B		Cylinder Moving Cover	1
8	226102022		Rear Base Cover	1
9	226102002B		Panel	1
10	56314118036M10		Waist Shaped Knobs 1180-36-M10	1
11	213210008		Foot Switch Handle	1
12	56320G0061300A		Foot Switch Cable 3/8”X1300	1
13	52413YC135D		Foot Switch YC-135D(CE)	1

FRAME PARTS DIAGRAM



Frame Parts List

Item	Part Number	Description	Qty.
1	226103900C	Cylinder Set	1
2	510932321420050	Hex Bolt M20X50	10
3	56303A00020	Spring Washer M20	10
4	226101013C	Die Set Bolster	1
5	56301A0020065	Hex Bolt M20X65	1
6	226101014	Die Set Bolster Gasket	2
7	226101026	Guide Block Bushing Pin	2
8	226101011	Guide Block	1
9	226101025	Guide Block Gasket	1
10	56301A0012090	Hex Bolt M12X90	2
11	56303A00012	Spring Washer M12	2
12	226101027	Dust Scrape Piece (1)	2
13	226101028	Scrape Piece Pressure Plate	2
14	56301I0005008	Button Head Capscrew M5X8	4
15	226101012	Die Set Bolster Gasket	1
16	56301F0006008	Sunk Head Hex Bolt M6X8	2
17	226101030	Dust Scrape Piece (2)	2
18	226101029A	Scrape Piece Anchor Plate	1
19	56301F0006008	Sunk Head Hex Bolt M6X8	2
20	226101024B	Prevent Scratch Gasket	4
21	56301F0006008	Sunk Head Hex Bolt M6X8	12
22	226101009C	Slide Base	2
23	56301A0012040	Hex Bolt M12X40	12
24	56303A00012	Spring Washer M12	12
25	226101017A	Blade Fix Plate (2)	2
26	56301A0006030	Hex Bolt M6X30	4
27	226101016	Blade Fix Plate (1)	1
28	226110004	Eccentric locking block	1
29	56309BLFB1215	Bearing	2
30	226110005	Blade Fix Plate Axle	1
31	226110006	Blade Fix Plate Axle Bushing	1
32	56302B0112	NTU M12	1
33	56315502025M12	Tension Levers	1

Item	Part Number	Description	Qty.
34	56307A012	9040-M12	1
35	56301A0008045	Hex Bolt M8X45	8
36	56306S0100060	Spring Pin 10X60	2
37	56301A4010045	Hex Bolt M10X45	4
38	56301A0012040	Hex Bolt M12X40	5
39	56301A0005012	Hex Bolt M5X12	2
40	56303A00005	Spring Washer M5	2
41	226102028B	Gauge fixing plate	1
42	52505AT11250T	Linear Scale	1
43	56301A0006025	Hex Bolt M6X25	2
44	226101034	Gauge pull rod	1
45	226101035	Gauge sensor rail	1
46	56301A0006030	Hex Bolt M6X30	3
47	226201036	Gauge sensor fixing block	1
48	226202016	Origin actuator	1
49	56301I0004008	Button Head Capscrew M4X8	2
50	56302B0108	NTU M8	2
51	226201039	Pull rod fixing block	1
52	56301A0006020	Hex Bolt M6X20	2
53	56303A00006	Spring Washer M6	2
54	56301A4006025	Hex Bolt M6X30	2
55	33N011024	Proximity fixing block	1
56	524090TLQ5MC1Z	Origin proximity sensor	1
57	56301G0003020	Button Head Capscrew M3X20	2
58	56301A0005012	Hex Bolt M5X12	2
59	56303A00012	Spring Washer M12	2
60	226101033	Wire hole plate	1
61	56301A0005012	Hex Bolt M5X12	4
62	226103014	Rod-bolster join plate	1
63	56306S0100025	Spring Pin 10X25	1
64	226201040	Cylinder fixing block	1
65	56301D0012040	Bolt M12X40	1
66	56302B0112	NTU M12	1
67	56301A0012045	Hex Bolt M12X45	2
68	56303A00012	Spring Washer M12	2

NOTES

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