INSTRUCTION MANUAL

HBM-75
Hydraulic NC Horizontal Bender (415V)
75 Tonne Force

P159

SUNRISE
HYDRAULIC BENDING MACHINE

HBM-40
HBM-75

OPERATION & MAINTENANCE MANUAL

Original Instructions
OMEG072

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INTRODUCTION

The Sunrise Bending Machine is a hydraulically powered metal bender for thick material. There are many bending tooling available for a wide range of bending operation. Furthermore, optional accessories such as Plate Shearing, Punching and Profile Strengthening tool can increase the versatility of the machine. This multi-function aspect allows the Sunrise Bending Machine to meet the diversified needs of the metal forming industry.

Each machine has been individually tested in the factory and under-gone an extensive pre-delivery check to ensure that the machines meet the highest quality standard. The bending machine has been designed to be a reliable and dependable machine with excellent performance. We know the working quality of the machine will confirm that you have made a good choice by selecting Sunrise products for your facility.

In order to have a better understanding of the operating procedures, to obtain maximum benefits from the machine, and to minimize the maintenance cost of the equipment, please have the operators and engineers read this Manual thoroughly and carefully before operating the machine.

SAFETY PRECAUTIONS

IMPORTANT:
It is the duty of both employer and employees to acquaint themselves with the safe working practices contained in this manual and ensure that all operators adopt these practices.

To ensure safe operation, two-hands switch should be used to avoid accidents of hand/finger injury. The foot paddle is also provided as an option to be used only by authorize personnel and with safety guards installed.

This equipment, if not operated and maintained properly, has the potential to cause serious injury or death. A thorough knowledge of the machine and operating with carefulness is the best protection against accidents.

The operator should be familiar with the control and function of the switches before perform the operation.

Warning labels are fixed on the machine. NEVER REMOVE THESE LABELS.
Be sure to follow these warnings to avoid injury.
Please also pay attention to the following general rules:

1. Only one operator is allowed to operate on the HBM bending machines. Before each operation, make sure no other person is near the machine.

2. Operator must wear Protective Glasses during operation to protect the eyes.

3. Use of optional attachments/tooling should have proper guards installed.

4. Any maintenance/repair of electrical/hydraulic circuit; change/adjust of tooling should be done only by qualified engineers or personnel.

5. Always turn off power and disconnect electric supply before doing any tool change or maintenance work.

6. **Keep hands clear of all moving parts at all times.**

7. Do not bend, punch, or shear parts that are too small for safe operation.

8. If any problem or abnormal condition arises during operation, stop the machine immediately and report to a supervisor. Do not turn on the machine again until the problem is rectified by qualified personnel.

9. The machine should never be left under power when not in operation or unattended. After completing of work, always isolate the machine power supply after turned the power off.

10. After completion of operation, all slugs and waste materials must be cleaned away from the machine.

11. Regularly check tooling for defects and wear to ensure safety and maintain good condition.

12. Use handling equipment when lifting heavy tooling and materials.

13. Never exceed the rated capacity of the machine. Refer to the specification chart for details.

The manufacturer shall not be held any liability for damages/body injuries or other consequences to machine, material, and persons caused by the non-compliance of the above safety precaution procedures, in particular for the following situations:

1. Non-use of the two-hand switches or use of foot switch without safety protections.
2. Did not wear protective glasses for the eyes.
3. Did not interrupt the main electric power supply before any maintenance work.
4. Damage of electric parts due to incorrect electric power supply.

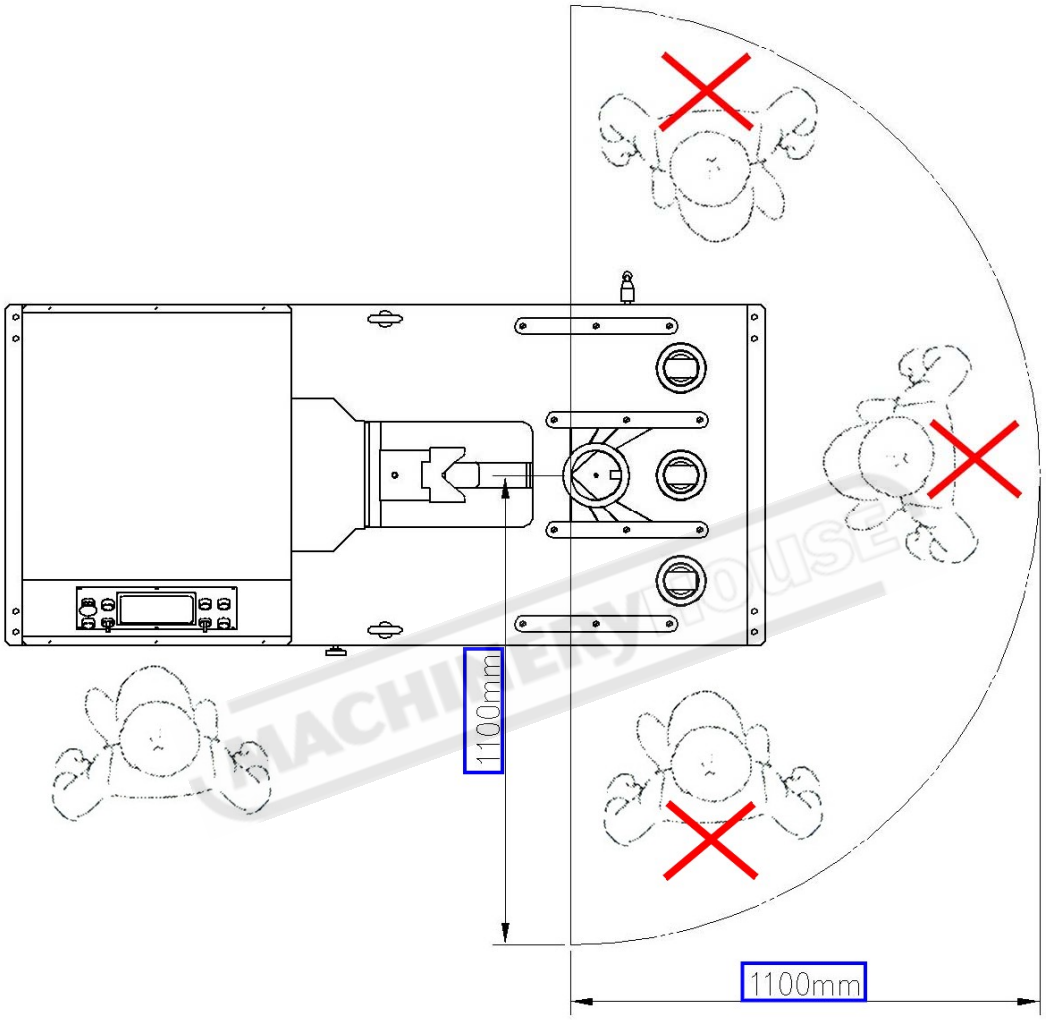
DANGER

- **KEEP HANDS CLEAR OF ALL MOVING PARTS.**
- **ALL GUARDS AND HOLD-DOWNS MUST BE IN POSITION BEFORE OPERATING THE MACHINE.**
- **ALL SAFETY PROTECTION MUST BE IN POSITION BEFORE OPERATING THE MACHINE.**

CAUTION

- **THOROUGHLY READ THE OPERATION MANUAL BEFORE OPERATION.**
- **TURN OFF POWER AND ISOLATE THE MACHINE WHEN CHANGING TOOLING OR DOING MAINTENANCE.**
- **ALL MAINTENANCE/REPAIR WORK MUST BE DONE BY QUALIFIED PERSONNEL.**
- **IF ANY PROBLEM OR ABNORMAL CONDITION OCCURS, STOP THE MACHINE IMMEDIATELY. DO NOT OPERATE THE MACHINE AGAIN UNTIL THE PROBLEM IS FIXED.**

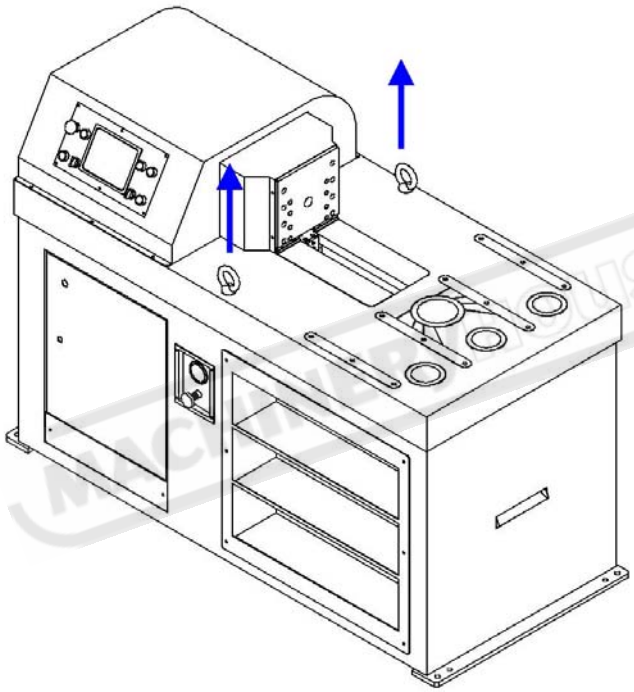
Opertators's working positions:



Proper environment condition
a.Ambient temperature: 0~50℃
b.Relative humidity: 20~85%
c.The required space around the machine is at least 1000 mm.

TRANSPORT

When transporting the machine by a crane, hook the crane to the two eye bolts provided for the machine. **Do not use slings under the machine.** Pay special care if lifting / transporting the machine with forklifts. The forks should extend fully to cover the width of the machine.



Model	HBM-40	HBM-75
Machine Weight (kg)	1030	2080
Crane/Forklift (kg)	＞1030	＞2080

INSTALLATION

The machine only requires the normal industrial concrete foundation. If the ground is uneven and the machine vibrates during operation, use foundation bolts to tighten the machine firmly to the ground or alternatively mount the machine on anti-vibration pads.

IMPORTANT:

- Maintain a spacious working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Clean the scraps and waste materials regularly, and make sure the work area is free of obstructing objects.
- Keep the ground free of oil and make sure it is not slippery.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any gangways.

Crowded, poorly illuminated or slippery areas are often causes for accidents.

Remove all anti-corrosion grease after installing the machine. Check that the oil reservoir, located in the machine base, has been properly filled. When refilling oil, use recommended oil and fill the reservoir to the upper level of the oil level gauge.

Connecting Power Supply

Electrical wiring must be done by a qualified electrician. Before connecting the electrical supply, make sure the voltage and current is compatible to the electrical components in the machine. Check the data shown in the electrical control box.

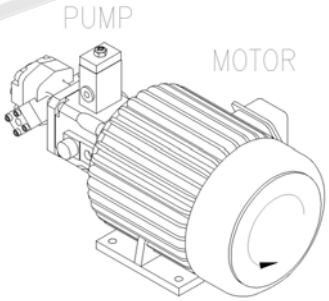
IMPORTANT: Turn off Supply Electricity at your facility's circuit breaker before making electrical connections to the machine.

To connect the power cord

1) Open the electric box.
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.
4) Connect the three phase wires to the power terminal strip in the electric box.
5) Also make sure to ground 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.

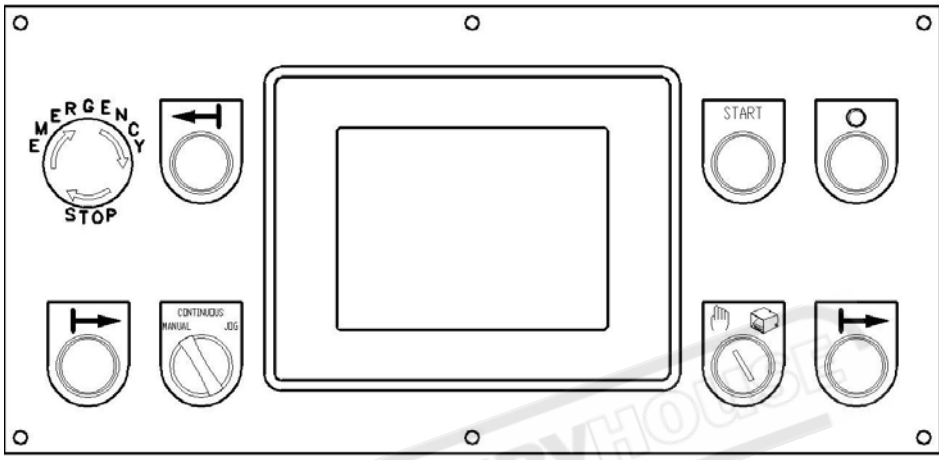
To check the correct rotation of the motor.

- Remove the back cover.
- 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.**
- To change the motor rotation, first make sure the power is disconnected, then reverse any two of the three phases of the electrical power supply.



CONTROL PANEL

ISOLATOR Switch - This switch controls the main electric source. It also functions as a lock for the electric box. At the ON position the switch locks the electric box and enables you to start the machine. At the OFF position, the power is cut off and the electric box can be opened.



EMERGENCY STOP - Use the EMERGENCY STOP button to stop the machine in an emergency. 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 (TWO-HAND SWITCHES) – Use these switches to operate the machine cylinder movement. Both switches must be pressed at the same time for the cylinder movement. **NEVER has one operator hold the material and another operator operating the machine.**

BACK – Use these switches to move the cylinder backward in JOG mode.

HAND/PADDLE - Use this switch for choosing operation by the two-hand switches or with foot paddle.

Manual/Continue/JOG – Use this switch to choose the three operating modes.

OPERATING MODES

In MANUAL mode, press the two-hand switch together 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 finish 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 together 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 together for the forward motion of the cylinder. The cylinder goes only forward and does not retract. Press the BACK button 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 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 PADDLE

The machine uses two-hand switches for operation. **NEVER has one operator hold the material and another operator operating the machine.** The use of foot paddle 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/Paddle 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.

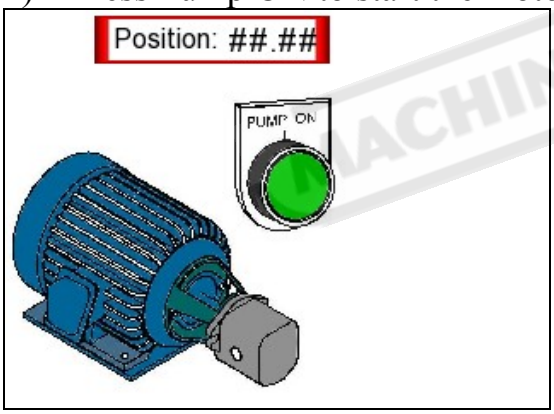
When using the foot switch mode, the operator understands and accepts the potential risk of body injuries, and should use extra caution when use the foot switch. **NEVER has hands/fingers in between the top(left) tool and lower(right) tool.** Hence the manufacturer should not be held responsibility and liability of damages and/or body injuries by the non-compliance of the operator to the safety warnings stated in this manual.

PROGRAMMING INSTRUCTION

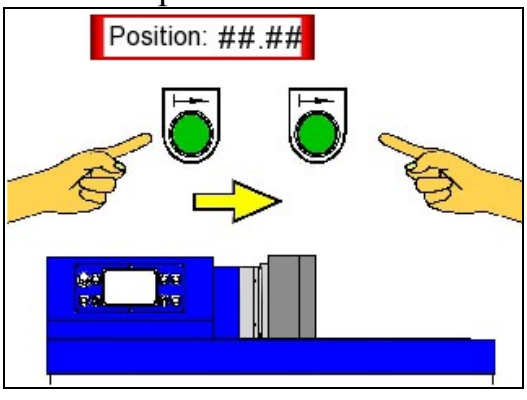
I. STARTING

1) Turn on power. Be sure the emergency button is released. Screen will be on after a brief self-check.

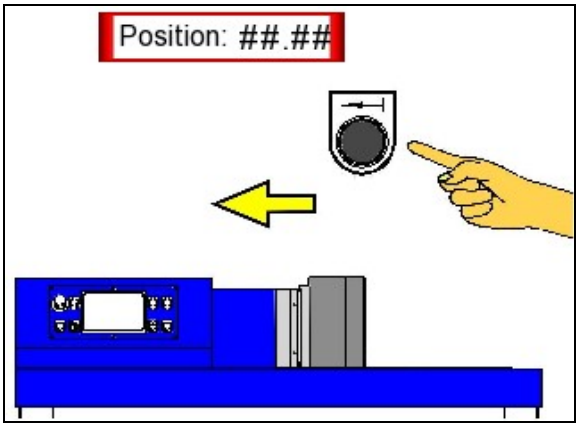
2) Press Pump ON to start the motor



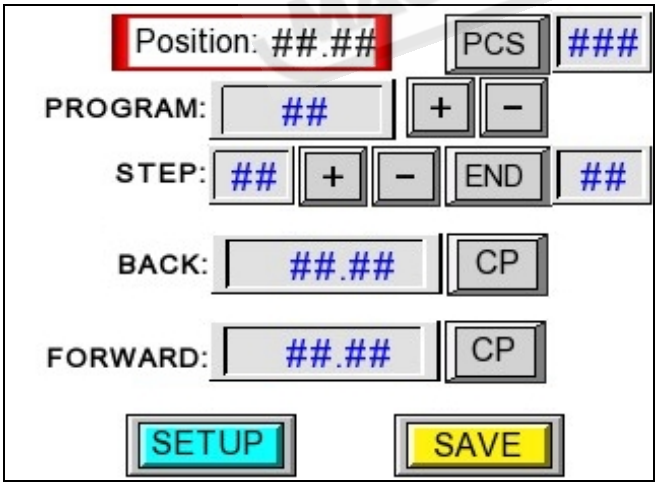
3) If the current cylinder position is in the back, the scren will ask you to press the FWD button (both button simultaneously) to move the cylinder forward. Note: if the cylinder position is already at an extended position, the screen may just show press BACK as in next step.



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

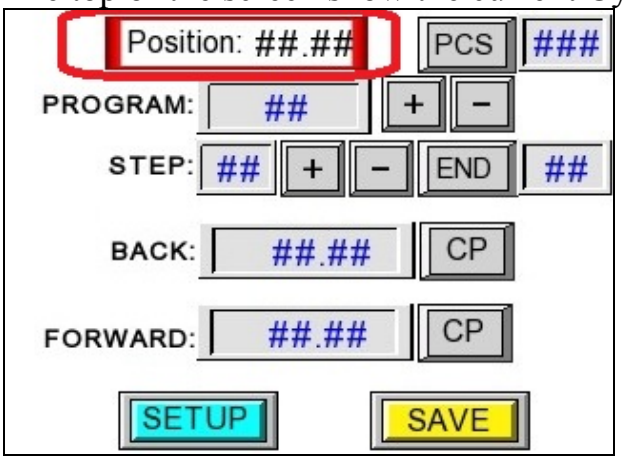


5) After the cylinder and NC stopper calibrations, the screen switches to the main programming screen.

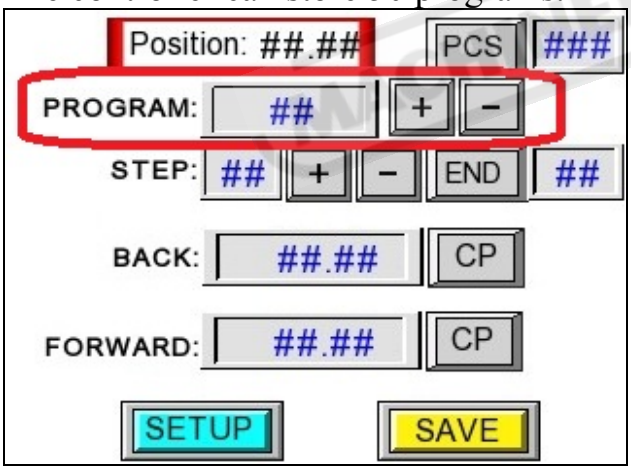


II. The Programming Screen

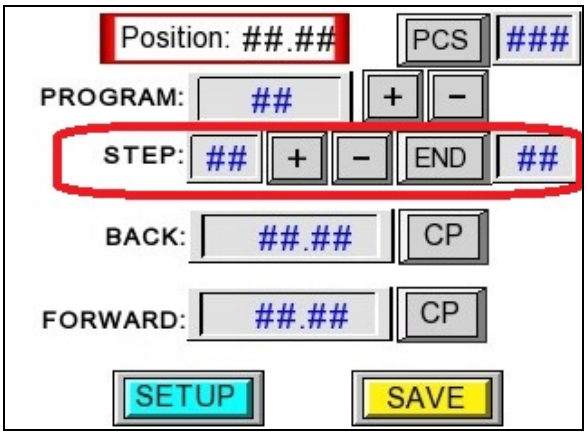
The top of the screen show the current Cylinder position.



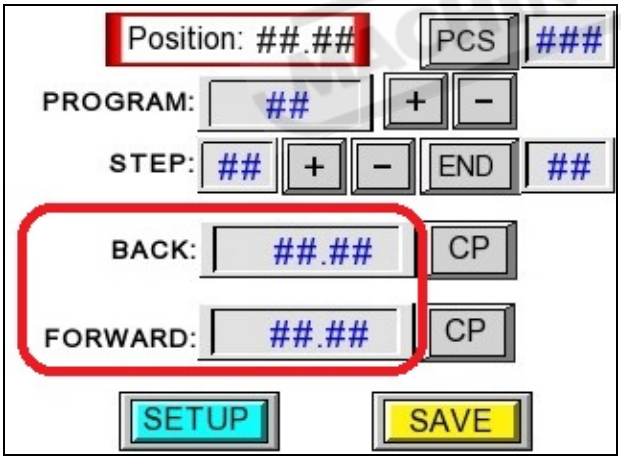
The controller can store 50 programs.



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



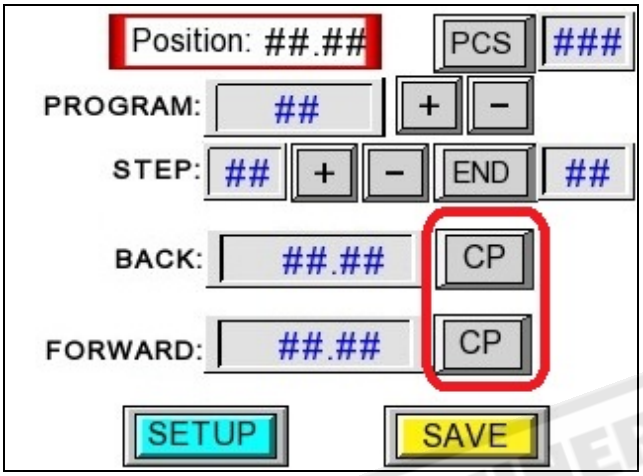
For each STEP, there are 2 parameters:



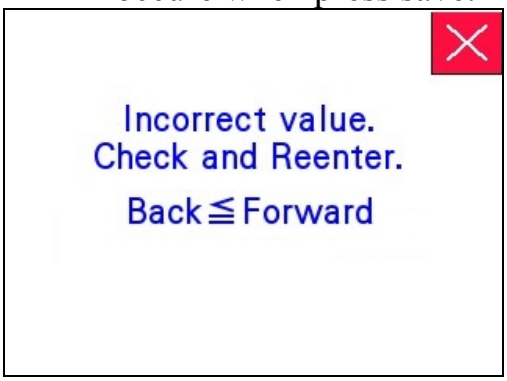
BACK: the back position of the cylinder when retracted.

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

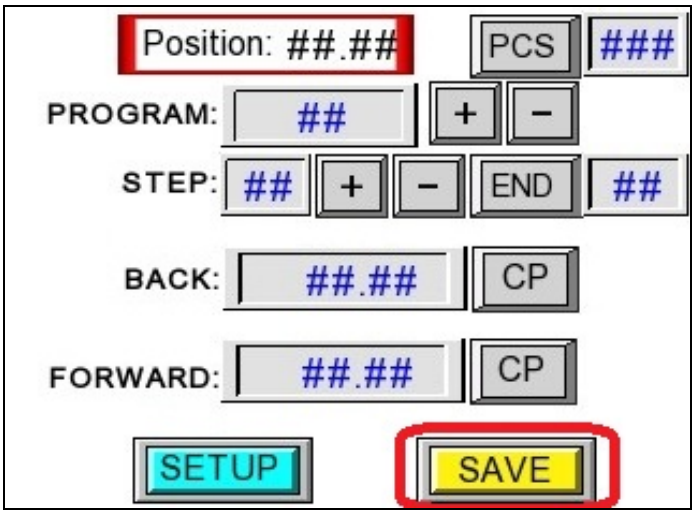
Another quick way is to use the CP "current position" button to enter the current cylinder position into the "Back" and "Forward" field. This input method is especially useful to test bend a material in JOG mode to desired position, then memorize the current position CP.



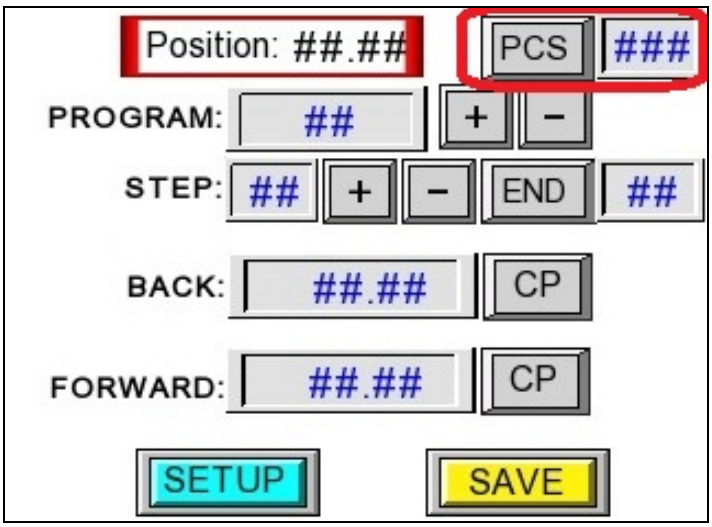
If the entered forward value is less than Back value, the following error message occure when press save.



Press SAVE to save any changes made. Note: the values are not saved until SAVE is pressed.

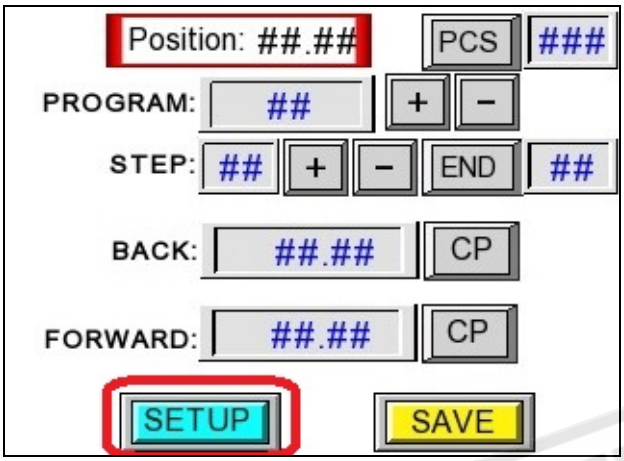


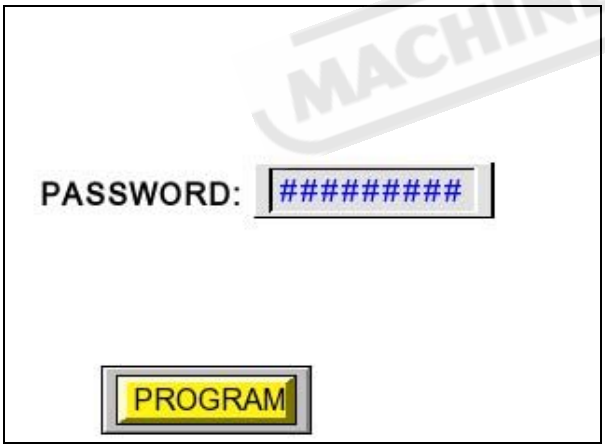
A counter function is included. Each time a program is executed and completed, the PCS number increase by one. Press the field and enter zero to reset the counter, or any other number if desired.



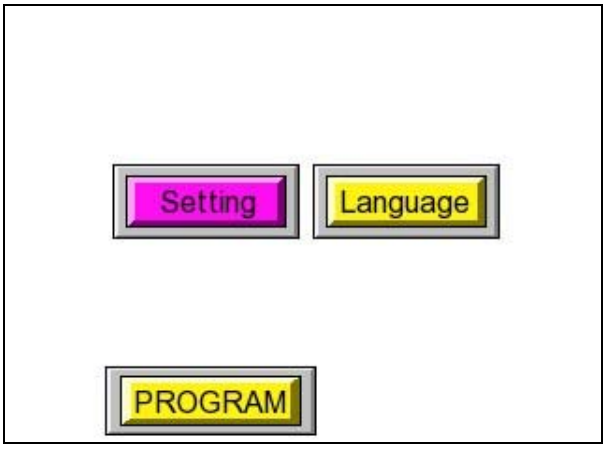
III. Settting Screens:

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

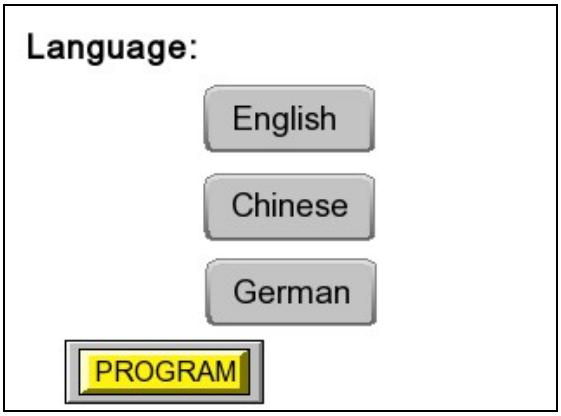




Password: 9999

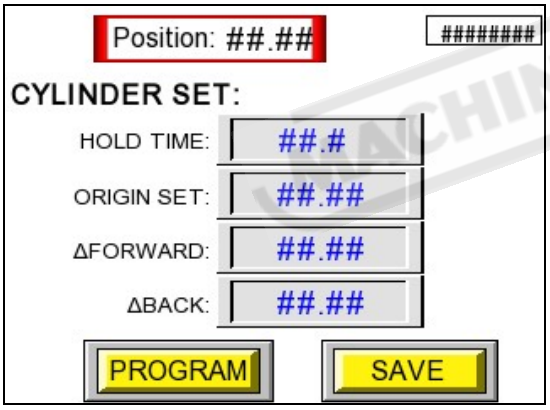


a) Language can be selected in Language



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 set this temporary pause time at the FWD position. If set to zero, the cylinder moves back immediately.

ORIGIN SET: 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.

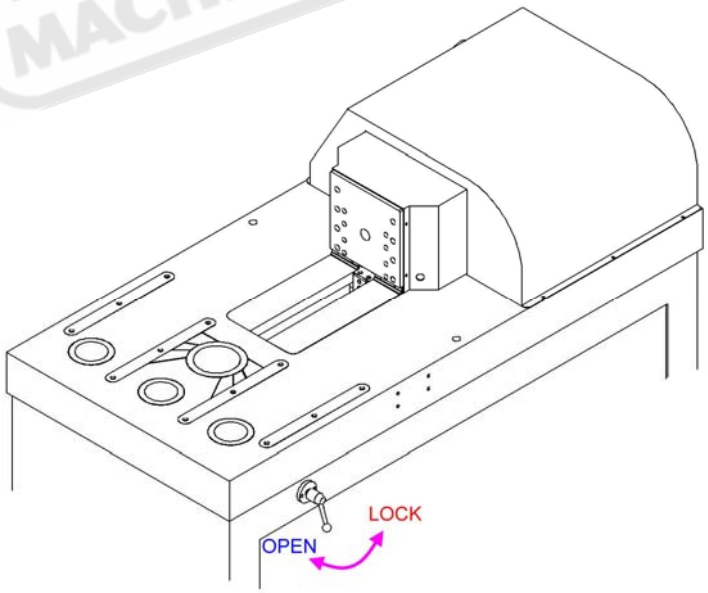
Press PROGRAM to go back to the main screen.

OPTIONAL TOOLING

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

Depend on the tooling, the upper die set is fixed at the cylinder head block, and the lower die set is fixed using one or combination of the ø83mm and ø58mm fixing holes. The ø83mm fixing hole has a handle on the backside of the machine for lock up the tool. After install the tooling, turn the handle to right to lock the tool. Lose the handle to left before uninstall the tool.

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



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 when changing oil. The first oil change should be performed after approximately 600 operating hours. Further oil change is needed for every 1200 operating hours. A drain outlet is located at the base of the oil tank.

   Screw back the cleaned suction filter after the 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 50 degrees Celsius. If the upper/lower limit switches are not set correctly for unloading of the pump, the oil temperature can raise quickly. Adjust the limit switches so the pump will be in the unloading condition.

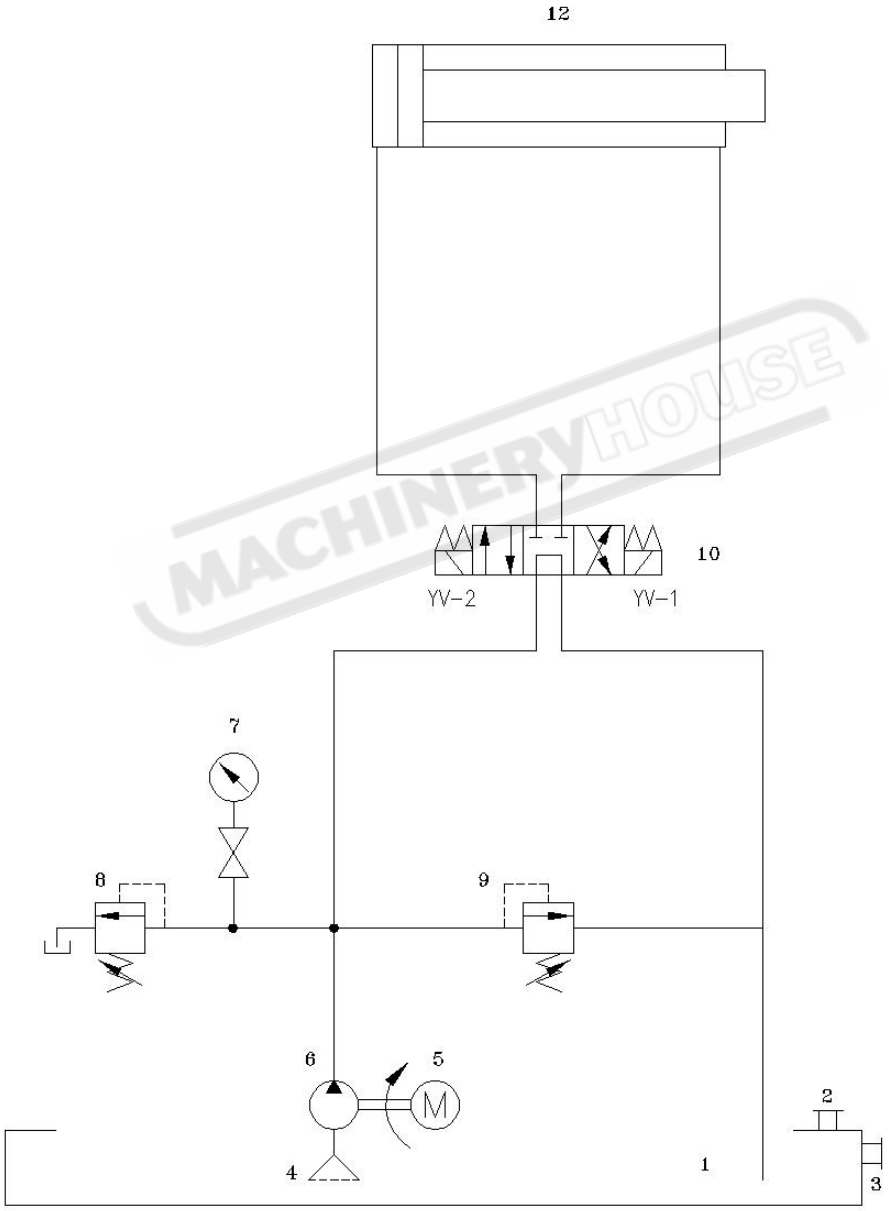
5. **Hydraulic pressure**:
   The working pressure of the hydraulic system is pre-set in the factory. There is a pressure gauge to indicate the working pressure of the machine. The pressure gauge should normally be closed and be used only during service/maintenance work.

Model	HBM-40	HBM-75
Max Pressure	210 Kg/cm^2	210 Kg/cm^2

AIRBORNE NOISE

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

Hydraulic Circuit
HBM-40,HBM-75



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Hydraulic Circuit Parts

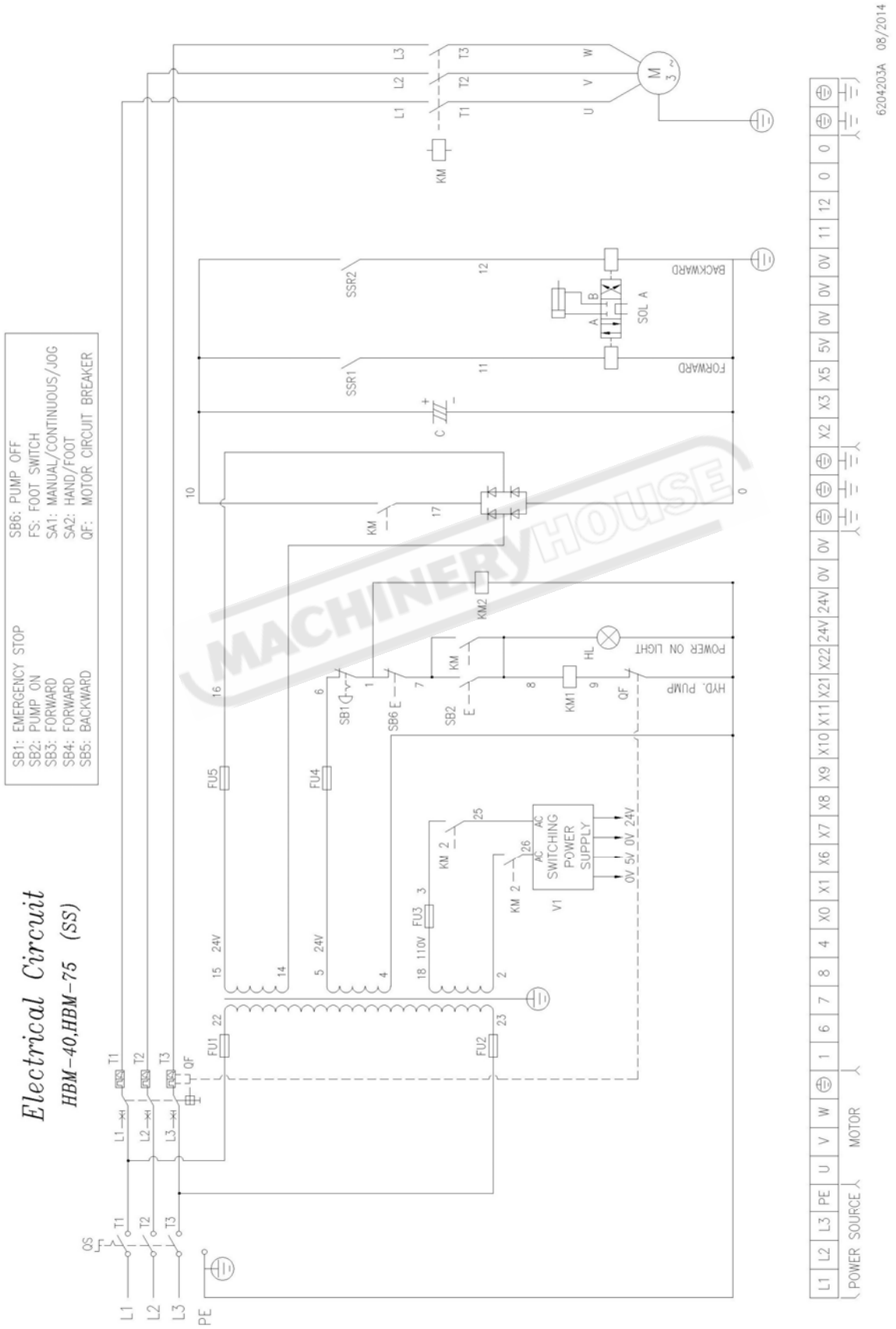
HBM-40

No.	Description	Qty	Specification / Part No.
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	5 HP (3.75 kW)
6	Pump	1	Gear Pump
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

Hydraulic Circuit Parts

HBM-75

No.	Description	Qty	Specification / Part No.
1	Tank	1	6202910
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	7.5 HP (5.625 kW)
6	Pump	1	Gear Pump
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	6203900B


Electrical Circuit
HBM-40,HBM-75 (SS)
SB1: EMERGENCY STOP
SB2: PUMP ON
SB3: FORWARD
SB4: FORWARD
SB5: BACKWARD
SB6: PUMP OFF
FS: FOOT SWITCH
SA1: MANUAL/CONTINUOUS/JOG
SA2: HAND/FOOT
QF: MOTOR CIRCUIT BREAKER
SWITCHING POWER SUPPLY
POWER ON LIGHT
HYD. PUMP
BACKWARD
FORWARD
SOL A
POWER SOURCE
MOTOR
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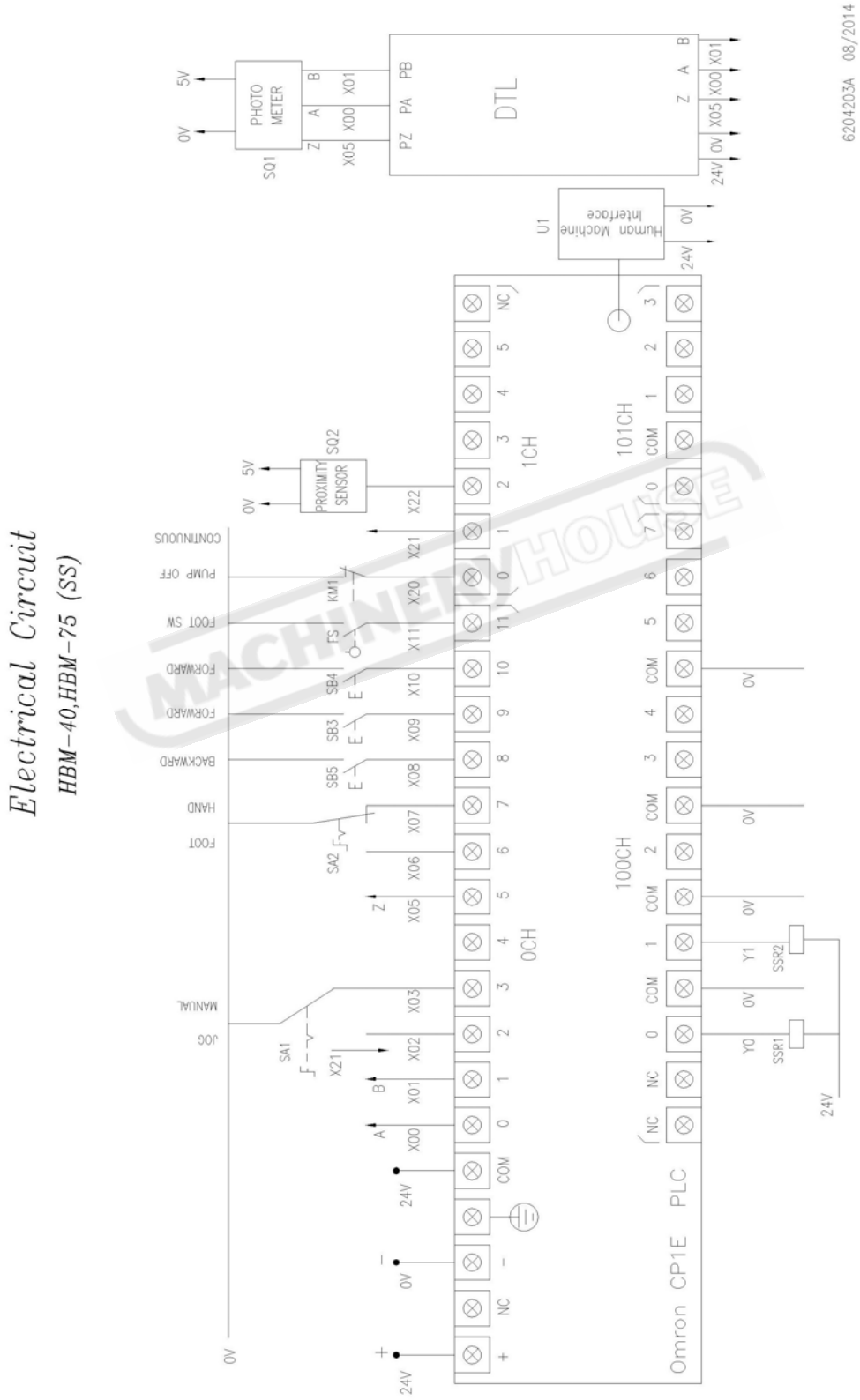
PLC I/O layout



Electrical Parts

HBM-40, HBM-75

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