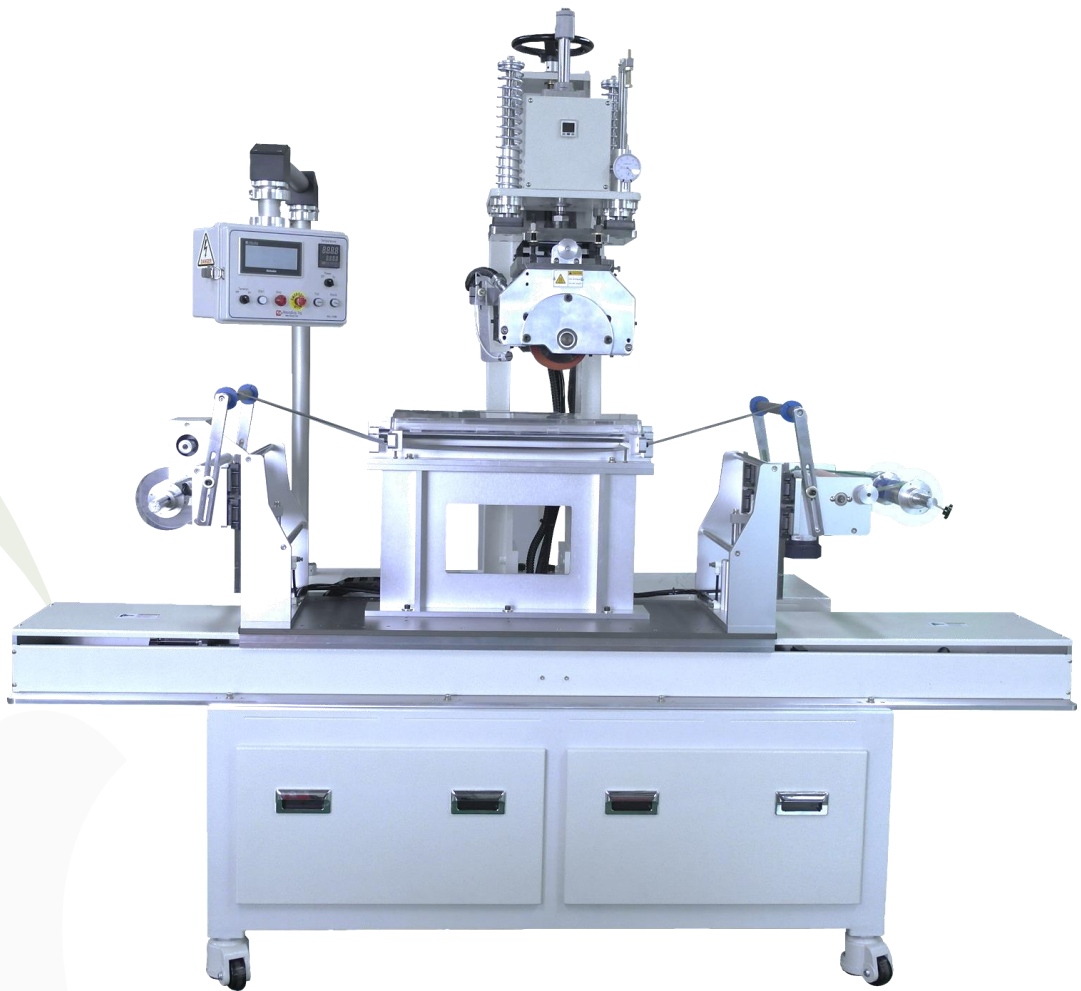


# MS RHS30-100 Manual



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## Greetings

Thank you very much for purchasing the equipment which Myoung sung Engineering has manufactured.

This equipment is the printing equipment with hot stamping functions with the use of thermal transfer for high-quality printing onto products.

This User Manual consists of cautions in use, how to operate and part list for the productivity improvement of your company by operating the machine safely and accurately.

- ❖ Pay special attention to any safety accident after reading through this User Manual before any use. Please keep this User Manual well while thoroughly managing it for reference all the time, if necessary.

## Warranty Details

1. Warranty period shall be a year from the date of installation.
2. Any failure under normal conditions within the warranty period shall be repaired with no charge in accordance with this warranty details.
3. User Manual shall be kept in a good manner because it shall not be issued again.
4. Any of the following shall not be applicable to the free repair, but a certain amount of A/S cost shall be requested.
  - ✓ If the warranty period is expired.
  - ✓ If there was any carelessness and/or mistake in use by the consumer.
  - ✓ Any failure or loss due to any modification in other places than our company or the designated business branches.
  - ✓ Any failure or loss due to the movement or transportation after the completion of purchase and installation.
  - ✓ Any damage from force majeure (fire, wind or water damage, earthquake, thunder or lightning, damage from sea water, gas damage, pollution, etc.) or abnormal power supply.
  - ✓ If the disassembly and/or assembly of the product is necessary to move from the place of initial installation to other places.
5. Head Office
  - 9-12, 113, Bongusunhwan-ro, Siheung-si, Gyeonggi-do, Korea.
  - TEL : 031-497-3440~1
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# Safety Manual

## 1-1. Safety Related Guidance

- A. The machine uses high temperature heat to print thus workers shall always pay attention to burning when working.
- B. As electric heater is laid in the machine which can cause fire, fire extinguisher shall be always located near the machine.
- C. When the machine stops during power shortage, the heat roller can burn.
  - ✓ It is the general principle to separate heat roller as soon as possible at the time of power shortage. It has the potential to cause fire and has significant effect to the life cycle of heat roller. Protective gloves shall always be used to separate heat roller while paying a special attention to burns.
- D. Unnecessary manual operation can cause machine malfunction or trouble. Operations not listed in the manual shall not be performed.
- E. As there are many switch devices such as chain gear and conveyor gear, worker clothing shall be the one complying with safety regulation.
- F. There shall be enough transfer and work space for workers.

## 1-2. Classification of Worker, Operator, Technician and Outsider

### 1-2-1. User Description

- A. User' listed in the manual refers to worker, operator and technician. According to user ability, levels and responsibility shall be clearly distinguished.
- B. As machine control and operation possible range is designated per user standard, operator shall make sure any violation or outsiders controlling machines.
- C. Operator shall always be present at job site when there is more than 1 person operating a machine.
- D. There shall be 1 or more technician present at a company. When unable to comply such is impossible, operator shall contact Myoung sung Tech. for responsibilities of a technician.
- E. Individuals who do not comply with the conditions of workers are all considered outsiders.
- F. Special attentions shall be paid to prevent outsiders from operating machines.

### 1-2-2 Worker Standards

- A. Shall be capable of product inspection.
- B. Shall be capable of automatic operation of machines.
- C. Shall be capable of solving problems with the help from operator or technician at the time of abnormal function of barriers are found in a machine.

### 1-2-3. Criteria of the operators

- A. Shall be capable of all worker standards.
- B. Shall be capable of all machine operations listed in the manual.
- C. Shall be capable of machine maintenance and repair work of a machine.
- D. Shall be capable of offering operation education to workers.

### 1-2-4. Technician Standards

- A. Shall show clear understanding of the principle of machine.
- B. Shall show thorough understanding of the capable range of machine operation.
- C. Shall be capable of replacing machine components not listed in the manual such as superannuated component, bearing and cylinder.
- D. Shall be capable of resolving problems at the time of machine damage or severe obstacle occurrence

※ Generally refers to technician of a manufacture company.

## 1-3. Safety Label

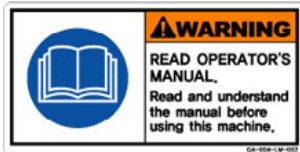
- A. Various kinds of labels are attached along the risk rating of the machine.
- B. Risk factor was written in the labels with the brief explanation.
- C. They are mainly attached to the safety covers and the covers should not be opened during the operation of the machines absolutely.
- D. In case the safety label is damaged, the operator should attach the label to its original location again

### 1-3-1. Kinds and explanation of safety labels



- A. Danger label: It means the cases that cause the fatal risks such as serious injury, disability and death, etc. due to occurrence of dangerous situation when the machine is misused by disregarding the labels that indicate the danger.

✓ It is written in red color and contains brief explanation.



- B. Warning label: It is attached when the serious injury or fatal risk can be occurred in case of misuse disregarding the warning.

✓ It is written in orange color and contains brief explanation.



- C. Caution label: It is attached when the worker gets slight injury or simple malfunction happens to the machine due to carelessness.

✓ It is written in yellow color and contains brief explanation.



- D. Caution to electric shock: It indicates the case electric shock accident or short circuit can happen when misusing disregarding this label.

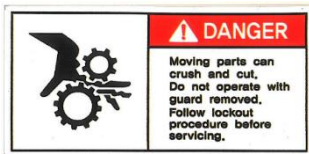
## 1-3-2. Location of dangerous area & explanation of attaching label

### A. Electricity danger label



- The worker should not open it because there are the electrical parts inside.
- The operator should be capable of exchanging the internal parts with technical support from the engineers, however, at this time special attention should be paid to avoid water, other liquids and electric shock.

### B. Danger of gear and chain



- Now that the label is attached to safety cover and there is gear or chain inside the cover, the worker should not open them.
- The operator should not open the cover except for the case of refueling and open the cover after blocking the electricity in case of refueling.

### C. Caution to hot surface



- The users should not touch the surface of hot box cover because its is very hot.

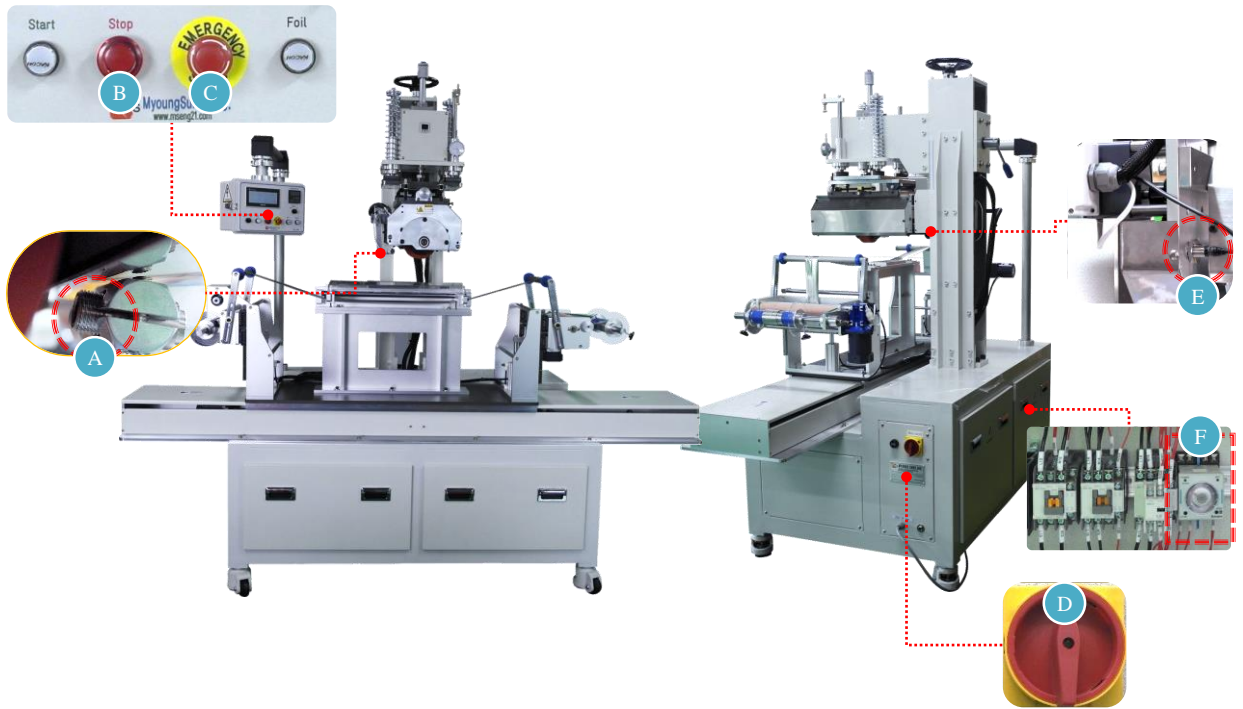
### D. Moving Part Caution



- Machine Department hands squeezed or you must be careful to put ourselves.

## 1-4. Safety Device and Emergency Stop Device

### ➤ Name and Directions



- A. Heat Detection Device : Heat-roll detector: It should be placed 10~20mm from the heat-roller and detects the temperature of the heat-roller.
- ✓ Prevents from overheating.
  - ✓ Prevent from the internal part overheating of the heat-box by shutting off the electrical supply of the heater once it reaches the thermometer's set temperature.
- B. Stop Button : Used to stop the machine when the machine is in operation.
- Use the button when wish to ascend malfunctioning heat roller head.
  - Pressing a start button after the stop operates the machine.
  - Machine operation at the time of stop button
- ✓ Head rises.
  - ✓ The transfer of the film is stopped.
  - ✓ The power is supplied to the heater.
  - ✓ Hot roller rotates
- C. Emergency Stop Button
- It is an emergency stop button. It shuts off the power of the control part of the machine. It is released by rotating to the clockwise direction.



#### D. Main Switch

- Stops the machine by completely shutting off the power of the machine. All operations stop if the power is shut off. Heat roller shall be taken out to avoid heat roller from being over heated when power switch is turned off while in use.
  - ✓ **Operator shall make prompt measures at the time of power shortage to take the heat roller out. Protection gloves must be worn and directions listed in manual shall be complied when removing rubber roller.**

#### E- Heat-Roller Rotation Detection Sensor

- The buzzer alarms and the heater is shut off, if the detecting place of the heat-roller stops.

#### F- Heat-Roller Rotation-Timer

- A safety device to prevent decolorization, deformation (this is because heat is concentrated at the one side of the rubber roller, only if the revolution of the rubber roller stops with the remaining heat at the heater although the heater is turned off) and burning of the heat-roller as the high temperature heat of the heater is continuously delivered to some parts of the stopped heat-roller at the heat-roller stopped status.
- ✓ Even after a main power switch is turned off after operation, a heat roller is continue to rotate for another 30 to 40 min and then it stops automatically and then, all the power supplied to a machine gets blocked automatically.



# Installation Manual

## 2. Installation and transportation

### 2-1. Specifications of installing the machine

- It should be installed at the position or location that complies with the standards by referring to manual always when moving or installing the machine.

#### 2-1-1. Dimensions of the machine

- Size : 2200mm x 930mm x 2000mm(W x D x H)

#### 2-1-2. Specifications of the machine

- A. Power : AC220V 2P 50Hz
- B. Power consumption : 4.0kW
- C. Power cable : above 3c x 2.5mm minimum

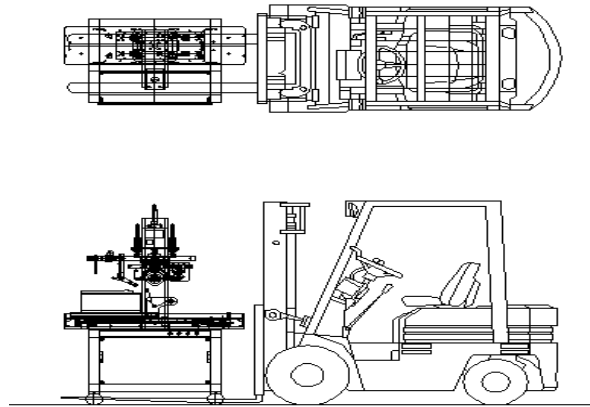
#### 2-1-3 Specifications of air supply

- Pressure of the regulator should not go down below 6kgf.
- Filter and air drier should be installed.
- Air input line should be above  $\varnothing$ 12mm minimum.

## 2-2. Installation environment

- A. It should never be installed at the place where dust is generated.
- B. It should never be installed at the place where vibration is generated.
- C. It should never be installed at the place where the slop of floor is extreme or uneven.
- D. Direct sunlight should be avoided.
- E. There should be no wind from outside.
- F. Surrounding temperature should not be changed much.
- G. It is recommended to avoid the place with high humidity.
- H. Lighting of working environment should be more 300Lux minimum.
- I. It is recommended to prepare the noise device separately because there is slight noise (max. 65dB) during operation of the machine.

## 2-3. Moving and fixing the machine



- A. In case of moving the machine with the forklift, it should be moved by inserting the fork over the mark of fork of the forklift(label in blue color) and forklift whose capacity is more than 5 tons should be used. At this time, the fork of forklift should come out beyond the machine
- B. Now that the wheels are mounted, a team of 2 female adults can move that easily
- C. It is alright to move that after releasing the check nuts of lower wheels. If rotates them clockwise, it gets fixed and if rotates them anticlockwise, it gets released.
- D. It should be moved after releasing power cord and air input without fail and it never should be moved during the operation.
- E. It should be fixed horizontally with the set screws after moving the machine.



# Operator's Manual

### 3. Operation of the machine

- A. The operator should use the machine after learning the contents in the manual without fail before operating the machine and the worker shall be operate the machine.
- B. When operating touch screen, sharp or keen material should not be used for operation and there are some cases the machine does not work if the surrounding temperature is low.
- C. Now that digitalized power control switch and timer setting value influence on printing quality or operation of the machine, it is recommended for other than the operators not to operate power control.
- D. The worker should learn how to insert and take out the products and operate start button and stop button definitely and should take action with the operator in case of malfunction of the machine.
- E. The worker should use the basic switches only and should not operate other switches.



### 3-1. Cautions machine

**3-1-1.** Before operating a machine, a roller must be pre-heated for more than 30 min after turning on a power switch.

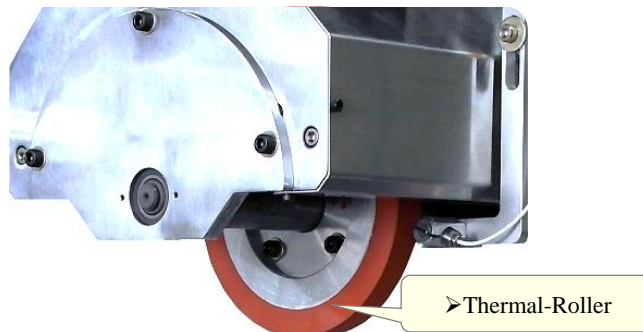
- It should be preheated in stages( 100℃ → 130 ℃ → 150 ℃ → 210 ℃)
- Life-span of “a roller” would be damaged if there is no sufficient pre-heating.

**3-1-2.** In case of black out or turning off of “main power”, such cause must be resolved immediately and then, main power should be supplied.

- Since high heat of a heater is continuously applied to a certain part of a heat roller when the heat roller is stopped and it would cause transformation or damage to the heat roller.

**3-1-3.** Must turn off a “Power Switch” only after the completion.

- Never turn off “Main Power”.
- Make sure whether a “Thermal-roller” keeps rotating after turning off a ‘Main power switch’.
- Even after a main power switch is turned off after operation, a heat roller is continue to rotate for another 30 to 40 min and then it stops automatically and then, all the power supplied to a machine gets blocked automatically.



**3-1-4.** Be Aware of Burning

- Print head (thermal head) gets extremely hot during operation. Therefore, an operator should be careful not to touch a print head(thermal head) during operation.

## 3-2. Machine operating procedures

### 3-2-1. Controller Structure & Function

- As both operator and workers need to use the basic switches, operator must give directions for the basic switches usage to workers for workers to acquire.



#### ➤ Temperature

- Indicates the current temperature.
- Can be set to the desired temperature.
- Turn on the heater in the touch screen of heater control part and the temperature of set value is set.

#### ➤ Power On/Off

- It turns the power of the machine on and off.

#### ➤ Tension Off/On

- It switches on an off of tension adjustment device.
- When you turn off the device, and printing film replacement replace the inversion.

#### ➤ Start

- Press it to operate a machine.

#### ➤ Stop

- It is for stopping a machine while in operation.

#### ➤ Emergency

- When it gets pushed during manual/auto-mode, every machine-system(electric/mechanical) stops.

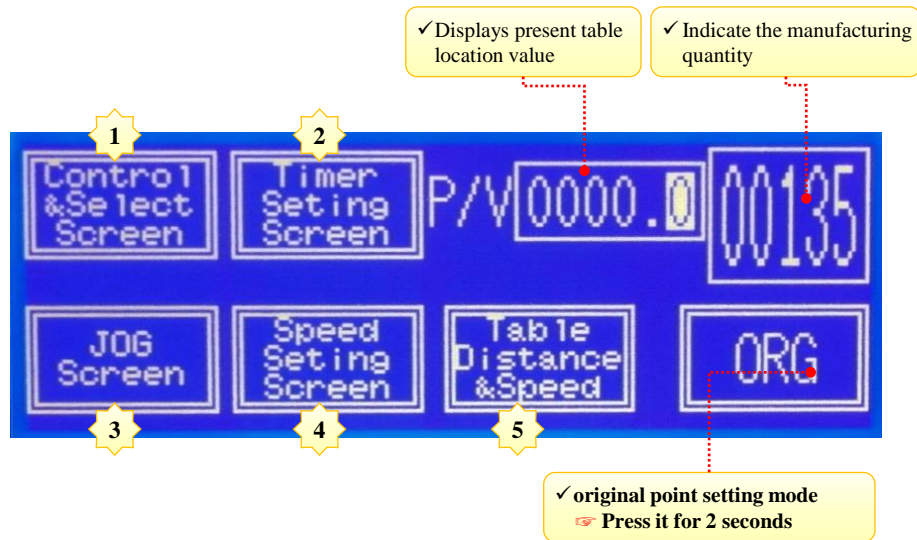
#### ➤ Foil

- It transports print film manually.
- The film is transferred only when pressed.

#### ➤ Ready

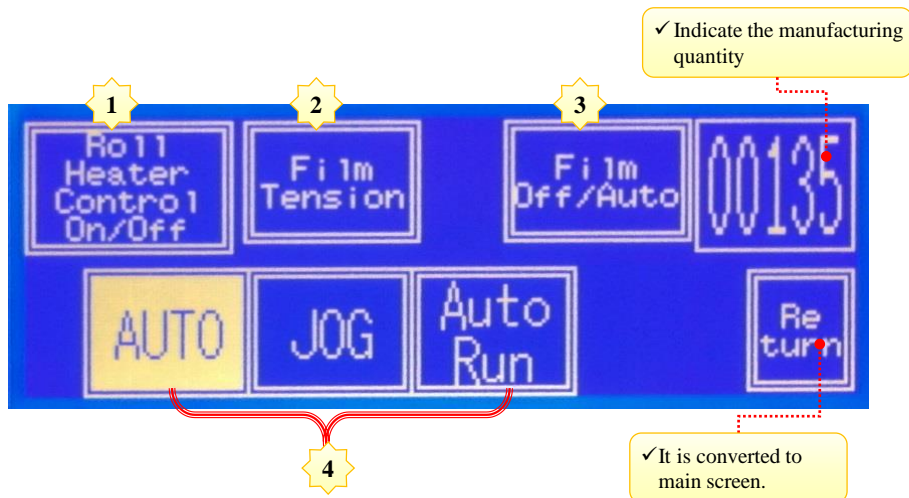
- The power is supplied by pressing Ready button after turning on power when the machine is turned off.

### 3-2-2. Touch screen function( I ) – Main



- ① Control & Select Screen : It turns the heater and film transferring unit on and off or convert it to the screen that can set auto run or single run.
  - ② Timer Setting Screen : It is converted to the screen of timer setting screen of head, table and film transfer.
  - ③ JOG Screen : It is converted to the screen that can be operated by table jog.
  - ④ Speed Setting Screen : It is converted to speed setting screen for each part.
  - ⑤ Table Distance & Speed : It is converted to the screen of setting servo table at bottom.
- ✓ ORG : It is the button to set starting point of servo table. It should be set again if the power is turned on and off.
  - ✓ P/V : It displays current table position value.
  - ✓ Count : It displays the completed quantity and it is reset if keeps pressing for 2 seconds.

### 3-2-3. Touch screen function(II) – Control & Select Screen



- ① Roll Heater Control On/Off : Power of hot roller heater can be turned on and off.
- ② Film Tension : It controls power-on and off of the film tension device.
- ③ Film Off/Auto : Film transfer unit can be turned on and off.
- ④ Auto / JOG / Auto Run : It is the button that selects operation and converts it to single run, jog and auto run.

If it is set to auto, the machine stops after working single run, if it is set to auto-run, the machine works single run and restarts automatically after passing auto run hour. If it is set to job, each part of job screen can be operated by manual(It is set only if pressing it for more than 2 seconds).

- ✓ Return : It is returned to main screen.

### 3-2-4. Touch screen function(III) – Timer Setting Screen(1)



- ① Film left up Timer : Head goes up, and it is cured for the set time, and then a film left guide gets to go up.
- ② Film right guide up Timer : Head goes up, and it is cured for the set time, and then a film right guide gets to go up.
- ③ Film start time : After a table moves forward, the set time passes, and then the film is fed.
- ④ Film stop time : After starting the feed of film, the film is fed for the set time, and then it stops.
- ⑤ Film Feed speed : Controls film transfer speed.
- ⑥ Film Feed : It can perform film transfer manually. The film is transferred only when pressed, and the speed is the same as that of film auto transfer.

### 3-2-4. Touch screen function(III) – Timer Setting Screen(2)



- ① Roll speed switching : The moment hot roller goes up after going down, the changed time is set.  
When the hot roller goes down, the rotating speed is set lower than table speed.
- ② Roll press up & down time : Set the time the hot roller goes up & down.
- ③ Roll press #1/#2 : If the time that is set at #1 passes, head cylinder exhausts quickly from the time when the head goes down. It is exhausted as much as the time set at #2 and 2nd pressure presses the cylinder again.
- ④ Auto-Run Time : Auto-run standby timer.
- ⑤ Table Start F/w : Table moves forward after start button is pressed and the set time passes.
- ⑥ Table Start R/V : It moves backward after the table approaches the set distance and the set time passes.

### 3-2-5. Touch screen function(IV) – Jog Screen



- ① Stamping Head Up & Down : Head can be operated by manual.
- ② Film left Guide Manual : Film left guide can be manually moved up & down.
- ③ Film right Guide Manual : Film right guide can be manually moved up & down.
- ④ Jog Table Left & right : Table can be moved from side to side by manual.

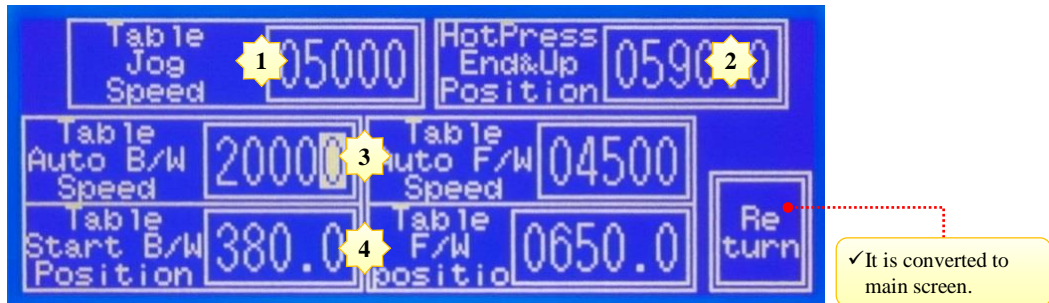
### 3-2-6. Touch screen function(V) – Speed Setting Screen



- ① Press Roll Up & Down Speed : Set the time the hot roller goes up & down.
- ② Film / Feed Winding Speed : It adjusts the winding speed of film winding part.



### 3-2-7. Touch screen function(VI) – Table Distance & Speed Setting Screen



- ① Table Jog Speed : It adjusts the speed when operating the table with the jog.
- ② Hot Press end & up Position : Head rises if it approaches the set position after moving the table.
- ③ Table Auto B/W & F/W Speed : It adjusts the speed of move forward/backward when table operates automatically.
- ④ Table Start B/W & F/W Position : It sets the starting position and transfer completion position of the table.



### 3-3. Temperature setting and operation

- A. The desired printing temperature can be set and current temperature can be checked with the thermometer.
- B. When the present temperature reached set-up temperature, heater power automatically shuts down. At this time, you will hear a click.

#### 3-3-1. Explanation on operating thermometer



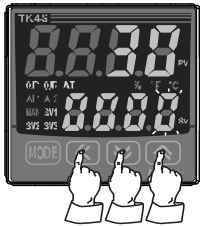
- ① PV(Present Value) : PV(Present Value) display part(Red)
- ② Temperature Unit(°C/°F/%) : It shows current temperature unit.
- ③ SV(Setting Value) : SV(Setting Value) display part(Green)
- ④ Auto-Tuning Indicator : It will be flickering every 1 sec during Auto-tuning.
- ⑤ Control output(Heating, Cooling) Indicator \*1 : It will be ON when control output is ON.
- ⑥ Alarm1, 2 output indicator : It will be ON when each alarm output is ON.
- ⑦ Manual Control Indicator : It will be ON in case of selecting manual control mode.
- ⑧ Multi SV Indicator : One of SV 1~3 lamp will be ON in case of selecting multi SV function.
- ⑨ MODE Key : Used when entering into parameter setting mode and moving parameters.
- ⑩ Shift Key(◀) : Used when entering into set value(SV) change mode and Digit moving.
- ⑪ SV Down/Up(▲/▼) : Used when entering into set value change mode and changing set value(Digit).

※ 1

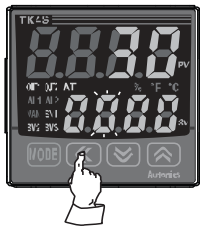
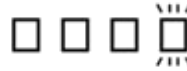
- In case of SSRP output support model, It will be on when MV is over 5.0%.
- In case of selecting current output (4-20mA DC, 0-20mA DC),

Control mode	Output lamp Off	Output lamp On
Manual control	MV is 0.0%.	It will be always ON except MV is 0.0%.
Auto control	MV is below 2.0%.	MV is over 3.0%

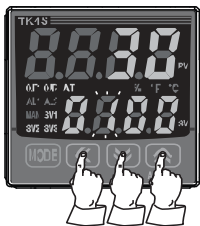
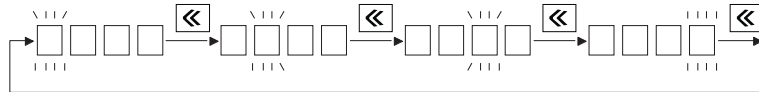
### 3-3-2. How to change temperature and its order



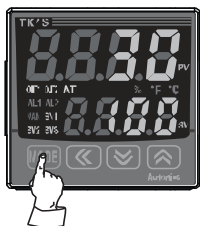
1. Press ◀ key when wants to change the set value in the condition of Run. 10° digit blinks at SV display part.



2. If presses ◀ key that is digit movement key, blinking digit moves in order.



3. It sets the number by operating ◀ and ▼ keys in the condition that the digit to be changed blinks.



4. Press MODE key to save the setting value. If there is no additional key operations in 3 sec. changed SV(Setting Value) will be automatically saved.

### 3-4. Print head operation

- Please pay attention to the high temperature when you control the heat box.

#### 3-4-1. Horizontality control of Print head

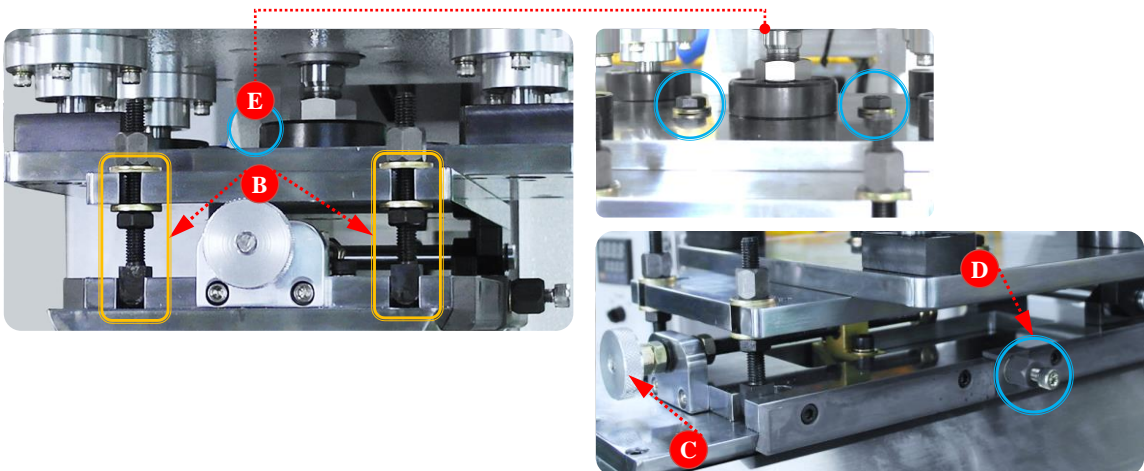
- Can adjust horizontality of the container box and product. Adjust the product to make its external diameter parallel to that of the hot roller. How to adjust them is to loosen B nut and adjust horizontality.

#### 3-4-2. Control of front and rare of head

- You can control front and rear of heat box . If position of products and heat-roller is not connected, It can be controlled by loosening the bolt “D” and “C” turning the heat box, then the heat box turns.

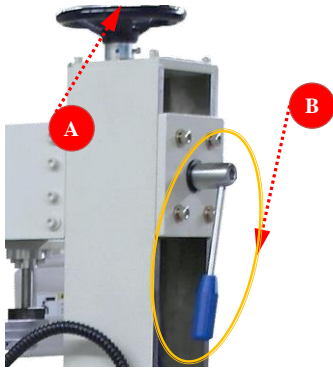
#### 3-4-3. Order of adjusting head angle

- You can turn the angle of heat box as you want. The shaft line between the product and the heat roller should be the same. It can be controlled by loosening the bolt “E” and turning the heat box, then the heat box turn.



### 3-4-3. Height adjustment of printing head

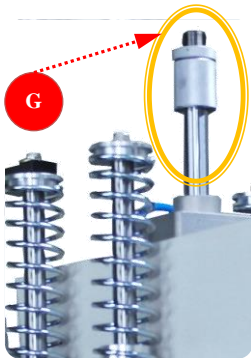
- ✓ The height of product means the height from the floor of table including the height of jig.
- ✓ The operator should adjust the height considering up/down stroke of head cylinder along the product.



#### ❖ Order of adjusting the height

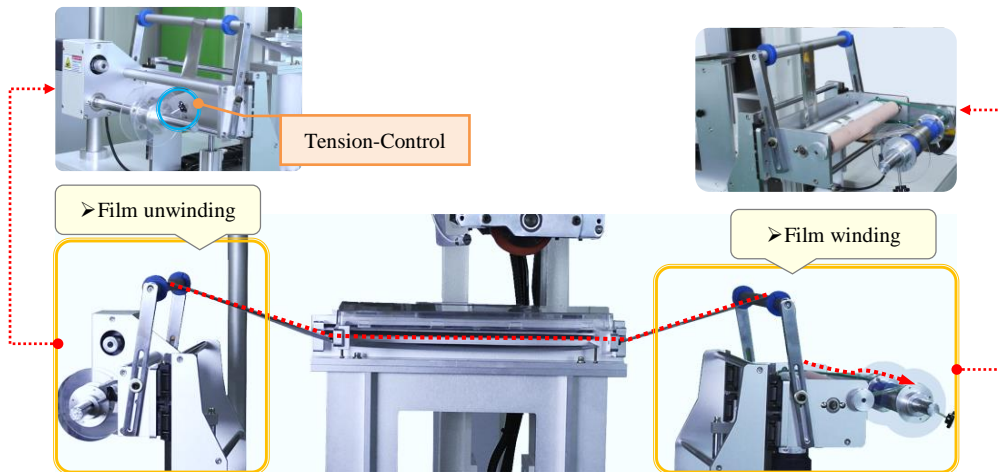
- Rotate "**B**" lever anticlockwise.
- Adjust the height by rotating "**A**" wheel.
- Lock "**B**" lever again.

### 3-4-4. Pressure control of Print head



- The force that heat roller pushes the product minutely can be adjusted by controlling typical stroke of cylinder.
- If the pressure is high, adjust it by turning "**G**" nut clockwise. If the pressure is low, adjust it by turning it counterclockwise.

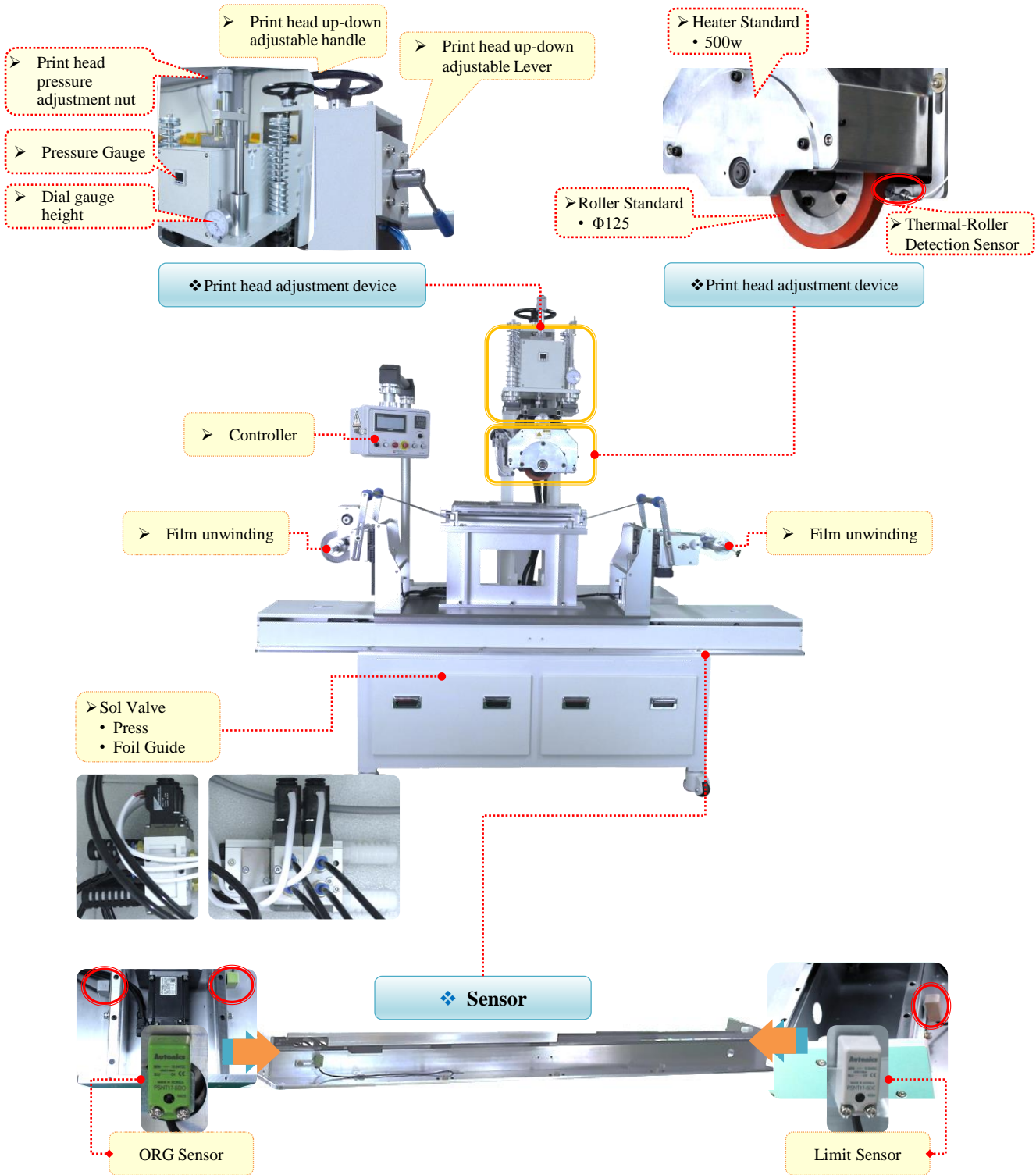
### 3-5. How to install film



- If the film is normally installed, the state is shown as the above figure.
  - Film rewinding is arranged by following the red arrow.
- ✓ **When you install film, turn off Tension in touch screen and install it.**

### 3-6. Machine Structure

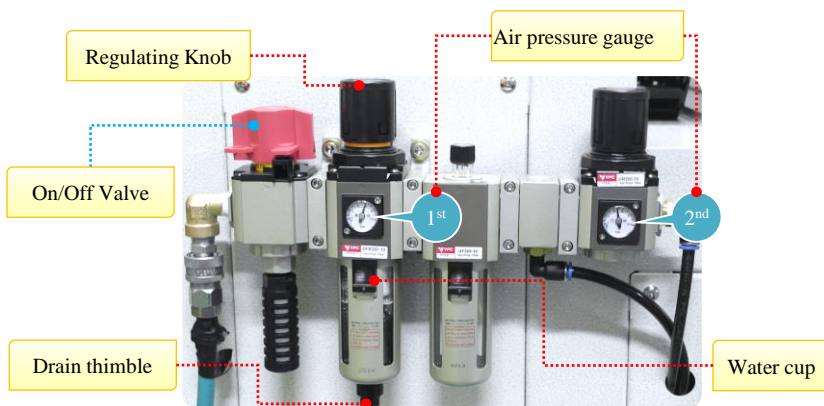
#### 3-6-1. Front Structure



### 3-6-2. Left side of the structure - Air Regulator-Ass'y

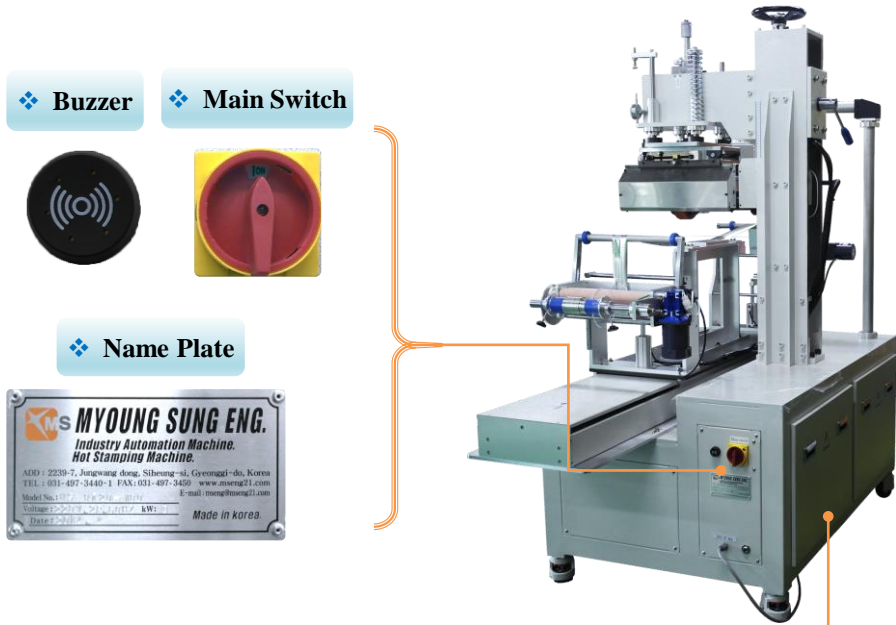


❖ Air Regulator-Ass'y

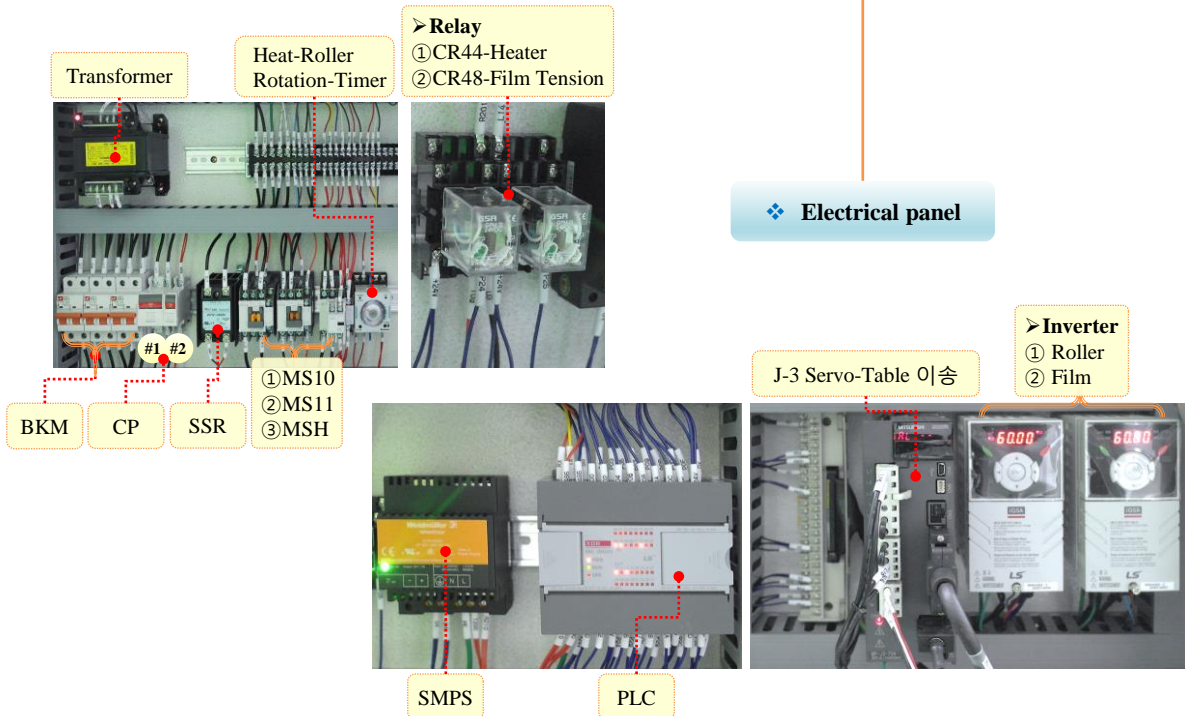




### 3-6-3. Right side of the structure



### 3-6-4. . Rear of the structure





### 3-7. Heat-roller replacing method

- The heat-roller should be replaced if damaged or the life ends, as it belongs to a consumable product. The product quality falls if worked with a silicon roller which the life has ended.

#### matters that require attention

- Be careful of burn when replacing hot roller. Replace it after hot roller gets cold completely.
- Hot roller should be never replaced by the worker.
- The timer of machine is designed to stop hot roller after passing certain time though the power is turned off. The power plug should not be unplugged when hot box does not get cold.

### 3-7-1. Heat-roller replacing method



- The roller stops by setting the stamp speed to 0 on the touch screen once the heat-box is cooled down. Open the box in front of the heat-box once the heat-roller stops.



- The heat-roller comes off by slowly pulling it off while holding the rubber roller axis and supporting the roller with one hand. Here, beware of the damage of the heat-roller by bumping into the heater or the jig.



- Assemble by leaving a distance of 5mm between the silicon rubber and the fixing clamps of both sides (A gap is needed as the silicon roller expands by heat). Insert the new roller to the direction towards the axis with a hole at the end, like the picture of the left side.



- Looking at inside of heat box, there is a pin to be inserted in the groove of hot roller axis, however, match this direction to direction of hot roller axis and push it. At this time, assemble them carefully not to damage rubber roller as the same as pulling out.



- When closing the front cover, ensure to assemble on the heat-box accurately by lifting the front cover up with one hand like the picture of the left side.
- ✓ The timer of the heat-roller is set to stop after a certain time even after power off. Ensure not to pull off the plug before the heat-box is completely cooled down. Ensure to pull off the heat-roller immediately at blackouts, and be careful of burns.

### 3-7-2. Pre-heating of heat-roller

- In case of heating silicone roller, the work should be performed after pre-heating process. The working condition of previous day can be kept and it is good to extend the lifetime of roller only if pre-heating is implemented for 20 minutes at about 80°C, for 20 minutes at 100~150°C and for 20 minutes at working temperature. If the external diameter of roller is Ø125mm before the temperature rises, the diameter gets expanded more than Ø125mm when the temperature rises enough.

## 4. Thermal transfer printing

### 4-1. Features of thermal transfer printing

- A. Thermal transfer printing is the printing method that prints by melting the film and product with heat and welding the product and film.
- B. The printed matter is not erased. It is not skinned or erased easily by the chemicals, etc. not that it is welding method of the product and film.
- C. Various colors can be printed. It is possible to print logos, pictures or photos in various colors at once without restriction of the colors.
- D. It can be also applied to metallic evaporation printing and hologram printing that are impossible in other printing.

### 4-2. Printing conditions

- A. If three conditions of pressure, temperature and time are not satisfied, the printed matter in good printing quality cannot be gained.
- B. Those three conditions can be changed along the materials of work piece, shape or kinds of stamping foil.
- C. The operator should attain proficiency so that he or she can get good quality of printed matters by adjusting those three conditions along the products and foils.

#### 4-2-1. Printing pressure

- a. The pressure means the force that the hot roller presses the products. The transferred products are pressed as the printing cylinder descends, however, at this time the maximum printing pressure is determined along diameter of piston of head cylinder and main input.
- b. Regarding pressure adjustment, the pressure can be raised with pressure controller of air unit and it is mounted on roller part of the machine (head).
- c. The hardness of silicone roller influences on printing pressure much too. The products with low hardness is used when printing the uneven surface of the product curve and lifetime of silicone rubber roller becomes longer as much its hardness is higher

#### 4-2-2. Printing temperature

- a. Temperature means the surface temperature of hot roller when the heater mounted in printing head heats hot roller. Now that it is printing method that welds the products with film with heat of hot roller, temperature is very important.
- b. Temperature is controlled by the thermometer in operator's control panel and it is used in the range of 150°C~220°C usually. Printing temperature is determined along the materials of the products and characteristics of the film. And it is closely related with printing time.

- c. If temperature is low, printed matter is peeled off or not printed at all due to poor welding between the product and the film.
- d. If temperature is high, the printed surface looks like being burned, not glossy and can be cut due to the melted foil.

#### **4-2-3. Printing time**

- a. The pressing time that hot roller presses the product influences on printing quality most.
- b. Now that the products and film should be welded with hot roller, it takes a little time. Time is related with the time so much. .

#### **4-2-4. Tension of film**

- a. It is the force that keeps the tension of film.
- b. The tension is adjusted by using tension control unit at film releasing part and the tension gets stronger as much as the spring of film hanging pole is pressed strongly.
- c. If the tension is too strong, the film can be cut or wrinkle occurs on the printing surface and if it is too weak, printing surface is pulled back or the film is rolled up by hot roller

#### **4-2-5. Film transferring speed**

- a. It is the speed that the film is transferred. It is adjusted so that it can be transferred naturally together with printing speed of the product.
- b. If film transferring speed is fast, the wrinkle occurs on the printing surface or cut off. If film transferring speed is slow, the film is rolled up by hot roller

#### **4-2-6. Separating time**

- a. Separation is the work that separates the film from the products after printing.
- b. Good quality of products can be gained only if the film is separate after surface of film gets cold.

### 4-3. Quick reference of printing

➤ Representative items are enumerated though there are various conditions and variables.

Symptom	Measure
Printing seems to be burned	<ul style="list-style-type: none"> <li>• Lower its temp.</li> </ul>
Printing gets peeled off	<ul style="list-style-type: none"> <li>• Raise either its temp or printing pressure.</li> </ul>
Film is cut off.	<ul style="list-style-type: none"> <li>• Low the temperature.</li> <li>• Decrease the tension.</li> </ul>
One side only is printed well.	<ul style="list-style-type: none"> <li>• Adjust the horizontality of the head.</li> <li>• Raise the printing pressure.</li> <li>• Adjust the horizontality of the Jig.</li> </ul>
Central part only is printed well.	<ul style="list-style-type: none"> <li>• Check if the central part of rubber is extruded and implement the grind processing.</li> </ul>
Wrinkle occurs on the printed surface.	<ul style="list-style-type: none"> <li>• Increase the tension.</li> <li>• Check if temperature is too high.</li> <li>• Check the pressure of the press.</li> </ul>
Printed surface is taken off.	<ul style="list-style-type: none"> <li>• Lower film transfer speed or head transfer speed, or increase the separation time by adjusting the product guide position of winding part.</li> </ul>

※ Now that printing quality and production amount are decided by printing skill of the operator, the operator should spend much time and effort to improve the printing skill.

## 5. Setting and handling of the machine

- Setting and handling of the machine means all mechanical operation except electrical operation of the machine. Now that incorrect handling of the machine can cause the fatal disorder, attention should be paid.
- The operator shall adjust film hanger, table transfer speed and temperature of hot roller by taking the guidance and education from the engineer and raise the skill to process the print even after the film and the product are changed.
- The operator shall keep the data by making a note of the setting values along the specific product and film now that temperature and pressure table transfer speed change along the materials of the product and kinds of film.
- The operator shall learn the position of film transfer guide pole, usage and principle of film pressing unit and attain proficiency by taking education from the engineer.

### ➤ Cautions and operation

- A. In case of handling the machine, it should be conducted after blocking the power without fail. In case of blocking the power, if inside of heat box is hot, block the power after waiting it gets cold.
- B. The worker cannot operate the machine and the operator shall not operate for purpose other than what are specified as below.
  - ✓ Print head angle and horizontal adjustment
  - ✓ **Height adjustment of printing head between the product**
  - ✓ **Precision pressure adjustment of printing head**
  - ✓ **Adjustment of head up/down transfer speed**
  - ✓ **Replacement of product jig and change of its position**
- C. Though the operation of machine that is not specified in the manual can be performed by the engineer or operator by being guided from the engineer, it is not recommended.
- D. When operating the machine according to operator's manual, manual should be understood correctly and the order explained in the manual should be observed for the work.
- E. In case of occurrence of disorder during operation of the machine, the work should be stopped immediately and the condition of the problem should be kept as it is and the situation should be notified to the engineer.





# Maintenance Manual

## 6-1. Contents of maintenance and cautions

- A. It is the work that enables the work to be conducted smoothly by keeping the machine in best condition. It should be carried out now that it extends the lifetime of machine and supplies.
- B. Safety accident can be prevented by replacing the supplies or worn bearing, etc.
- C. Now that the rubber of hot roller or O-ring is the supply, it should be replaced if it is damaged or cut, and there are the products that have the specific lifetime among the electrical parts, however, spare parts should be prepared so that they can be replaced immediately.
- D. It is recommended to check refueling status though it is not the period to refuel because the abrasion of shaft or gear, sprocket, etc. get more intensive and noise occurs if refueling is neglected. Especially now that the belt and chain would get loosened if they are used for long time, it is very important to check the condition of tension.
- E. Now that safety accident may occur during maintenance, the work should be conducted with correct use of tools in correct method after blocking the power completely without fail.
- F. Safety cover or safety device should be placed in correct condition definitely after working with safety cover is removed.
- G. When implementing replacing work for rubber roller or film, etc., it should be performed in correct order and method.
- H. Electric shock accident or other accident should be prevented by blocking main switch without fail during maintenance. And the work should be performed by hanging the sign, etc. that notifies it is under construction.**
- I. The wastes (film, silicone rubber, O-ring and belts, etc.) generated from the use of machine should not be thrown away and they should be disposed according to environmental regulations.**

## 6-2. Checkpoints

- Now that examination period is the minimum requirement, it should be kept definitely and the operator should keep the machine in best condition though it is examination period. Especially the constant examination enables the operator to take prompt action as the worker checks them out too.

### 6-2-1. Constant checkpoints

- A. Air pressure check: The pressure should be kept with 6kgf. If it goes down below 5kg, pull the bottom knob of regulator and tighten it clockwise and press the knob again after making the needle point 6. If the pressure goes up, check the air line or replace or repair the regulator.
- B. Status of rubber roller: Check if the surface of rubber roller is smooth. If it is cracked or broken, replace it or use it after grinding.
- C. Table under machine: Other article should not be placed on the operating part of table.

### 6-2-2. Daily checkpoints

- A. Status of releasing part, winding part and O-ring
  - ✓ Now that O-ring can be loosened due to its characteristics, check it out every day.
  - ✓ In case it is cut, it is alright to connect that again by melting with fire.
- B. Bearing of hot roller: If it becomes oil less bearing and the bearing is broken, it should be replaced with new one because the power comes out.
- C. Guide pole of upper head and cylinder: Wipe out alien substance at rod part. At this time, it is good to wipe it out with some oil.

### 6-2-3. Weekly checkpoints

- A. Air filter: In case the air line is defective, water is stagnated in the filter much, however, the water should be removed. Water comes out if the knob at the bottom is rotated anticlockwise.
- B. Bake brake part of reversing gear: Refuel when creaking sound comes out from bake brake unit part of film winding part or the tension gets stronger suddenly.
- C. Hot roller chain: Attention should be paid to prevent safety accident because safety cover should be removed when refueling. If the chain gets loosened, adjust the tension by pulling it.
- D. Refueling tension pole and film guide pole.

## 6-3. Quick reference of breakdown

Symptom	Cause	Measure
Electricity is not available though power switch is on.	<ul style="list-style-type: none"> <li>• Breakdown of power switch</li> <li>• Disconnection of circuit protector</li> </ul>	Replace
Head cylinder does not work.	<ul style="list-style-type: none"> <li>• Disorder of up/down cylinder of head</li> <li>• Disorder of guide pole</li> <li>• Disorder of valve</li> </ul>	Repair, replace Repair, replace Replace
Temperature does not rise.	<ul style="list-style-type: none"> <li>• Disconnection of heater or lead wire</li> <li>• Disorder of temperature regulator</li> <li>• Disconnection of temperature detection sensor</li> </ul>	Check & repair, replace Replace Check & repair, Replace
Silicone roller does not rotate.	<ul style="list-style-type: none"> <li>• Disorder of motor</li> <li>• Disorder of relay</li> <li>• Disorder of speed controller</li> </ul>	Check & repair, replace Replace Replace
Film tension device does not operate	<ul style="list-style-type: none"> <li>• Disorder of motor</li> <li>• Disorder of relay</li> <li>• Disorder of speed controller</li> <li>• Disorder of bearing.</li> </ul>	Check & repair, replace Replace Replace Replace
Table is not transferred.	<ul style="list-style-type: none"> <li>• Disorder of motor</li> <li>• Disorder of servo drive</li> </ul>	Repair, replace Repair, replace

※ Please contact our customer services center in case not solved with the countermeasures at above failures

☎ Tel : +82 -31-497-3440~1, Fax : +82-31-497-3450

## 6-4. Spare parts and tools

### 6-4-1. Explanation and kinds of supplies

- A. The supplies are the parts of the machine or articles that are required for the operation and they should be basically prepared by the company that purchases the machine when their lifetime ends.
- B. Parts that cannot be used if they get old after long time use: Springs and belts
- C. Parts that can be used once: Printing film and hydraulic oil are included in this item.
- D. Parts whose number of use or using amount is fixed: Relay,
- E. magnetic contactor, clutch, bearings and ball screws, etc.

### 6-4-2. Tools required for maintenance


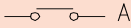
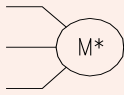
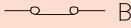
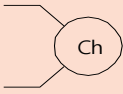
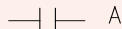

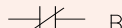


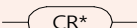
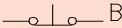
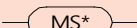
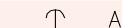

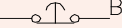
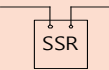

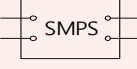
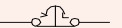
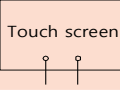
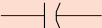

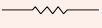



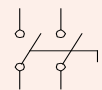
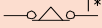

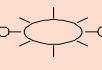

- Now that these are the tools required for maintenance or using the machine basically, they should be prepared in the tool box always.
  - ✓ Allen wrench spanner set: Set whose range are 2~12mm
  - ✓ Hexagon spanner: 13, 17, 19mm
  - ✓ +,- screw driver
  - ✓ Monkey spanner 200mm
  - ✓ Manual hand oil pump

## 7. Definition of special terms and abbreviation

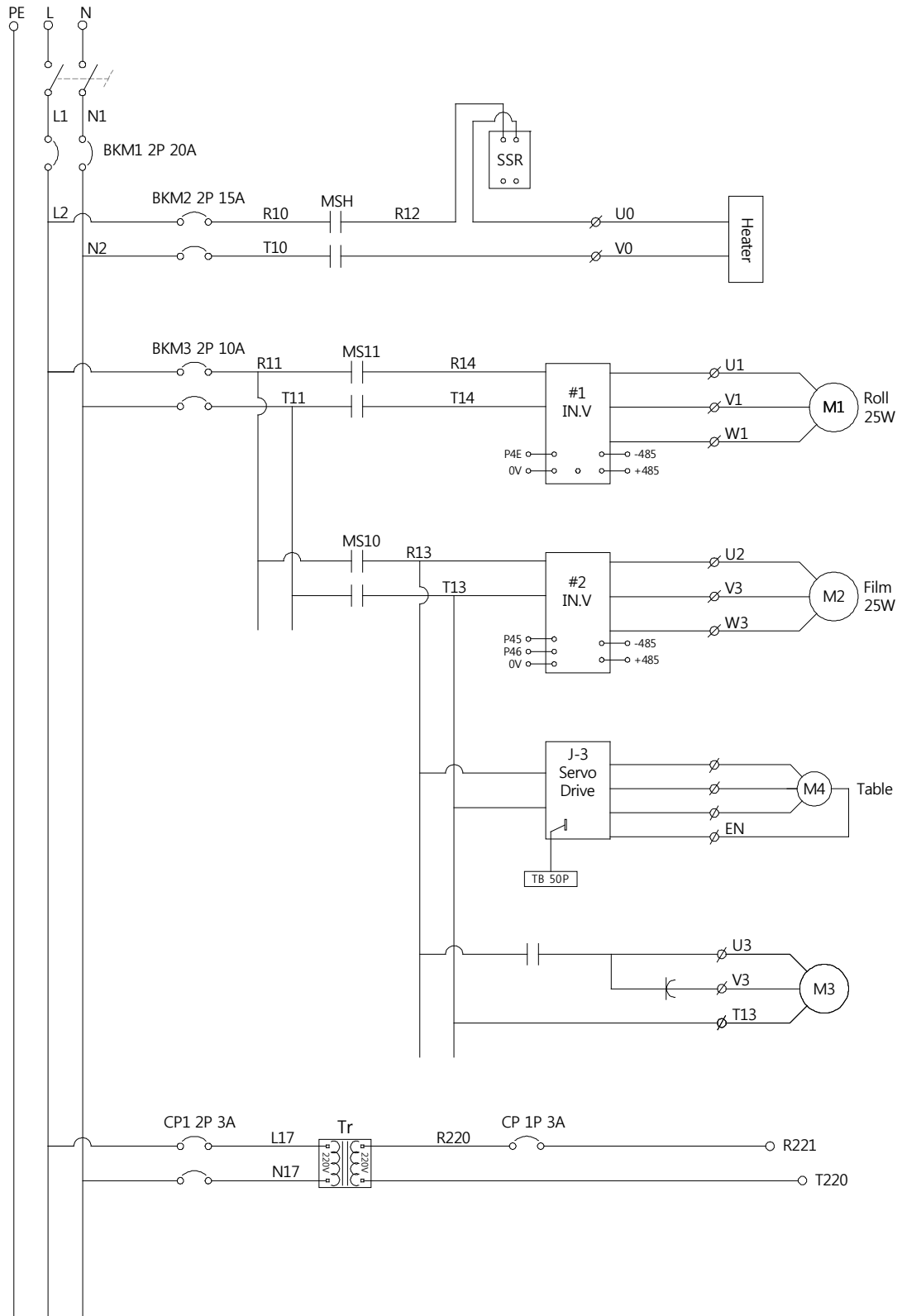
No	Items	Function
1	Press button, button	<ul style="list-style-type: none"> <li>Switches that operate the machine by pressing them by manual</li> </ul>
2	Lubricator	<ul style="list-style-type: none"> <li>Parts that provide the inside of air cylinder with oil minutely</li> </ul>
3	Motor speed controller(pack)	<ul style="list-style-type: none"> <li>Electrical part that controls speed of small motor</li> </ul>
4	Volume switch	<ul style="list-style-type: none"> <li>Switch that variable resistance that increases the voltage if it is rotated clockwise is attached</li> </ul>
5	Selector switch(selector)	<ul style="list-style-type: none"> <li>Switches that control the machine by rotating the knob by manual</li> </ul>
6	Solenoid valve(Sol valve)	<ul style="list-style-type: none"> <li>Air valves that are electrically operated</li> </ul>
7	Air regulator(regulator)	<ul style="list-style-type: none"> <li>Part that controls air pressure and keeps that uniformly</li> </ul>
8	Air volume control	<ul style="list-style-type: none"> <li>Part that controls speed of air cylinder by controlling air amount</li> </ul>
9	Air filter	<ul style="list-style-type: none"> <li>Part that filters moisture or dust in the air</li> </ul>
10	Reversing gear, tension unit	<ul style="list-style-type: none"> <li>Machines that makes the film tight by pulling it to opposite direction to transferring direction</li> </ul>
11	Hot roller	<ul style="list-style-type: none"> <li>It means the roller that is made of silicone rubber. Heat-resistant silicone rubber is used and its length or hardness is different along the products</li> </ul>
12	Temperature	<ul style="list-style-type: none"> <li>It means the set value of thermometer that is mounted on the machine or displayed temperature</li> </ul>
13	Thermometer	<ul style="list-style-type: none"> <li>Electric products that are mounted on the machine and control the temperature</li> </ul>
14	Separation	<ul style="list-style-type: none"> <li>To separate the product from the film after printing</li> </ul>
15	Inverter	<ul style="list-style-type: none"> <li>Electric products that change the number of rotation of motor by changing the frequency</li> </ul>
16	Printing head	<ul style="list-style-type: none"> <li>Heater box that mounts hot roller. It is operated up and down by cylinder and core unit of the printing machine</li> </ul>
17	Transfer printing (thermal transfer)	<ul style="list-style-type: none"> <li>It means the printing method that welds transfer printing film with the product by high heat</li> </ul>
18	Transfer film(film)	<ul style="list-style-type: none"> <li>Thin film that picture or color pattern or photo, etc. required for printing is printed. Now that property of film can be different along the product, the films that are suitable for the products should be secured.</li> </ul>
19	Caster	<ul style="list-style-type: none"> <li>Wheel that is mounted on the machine and can adjust horizontality from side to side</li> </ul>
20	Timer	<ul style="list-style-type: none"> <li>Electric product that is mounted on the machine and control time</li> </ul>
21	Time	<ul style="list-style-type: none"> <li>It means the time that is set in the timer that is mounted on the machine</li> </ul>
22	Toggle switch(toggle)	<ul style="list-style-type: none"> <li>Switches that control the machine by rotating small lever to left or right by manual</li> </ul>
23	Profile	<ul style="list-style-type: none"> <li>Profile specified in the manual is the aluminum extrusion material in specific shape. The body of conveyor and base of the machine are profile in here</li> </ul>

## 8. Circuit drawing

### 8-1. Circuit symbol

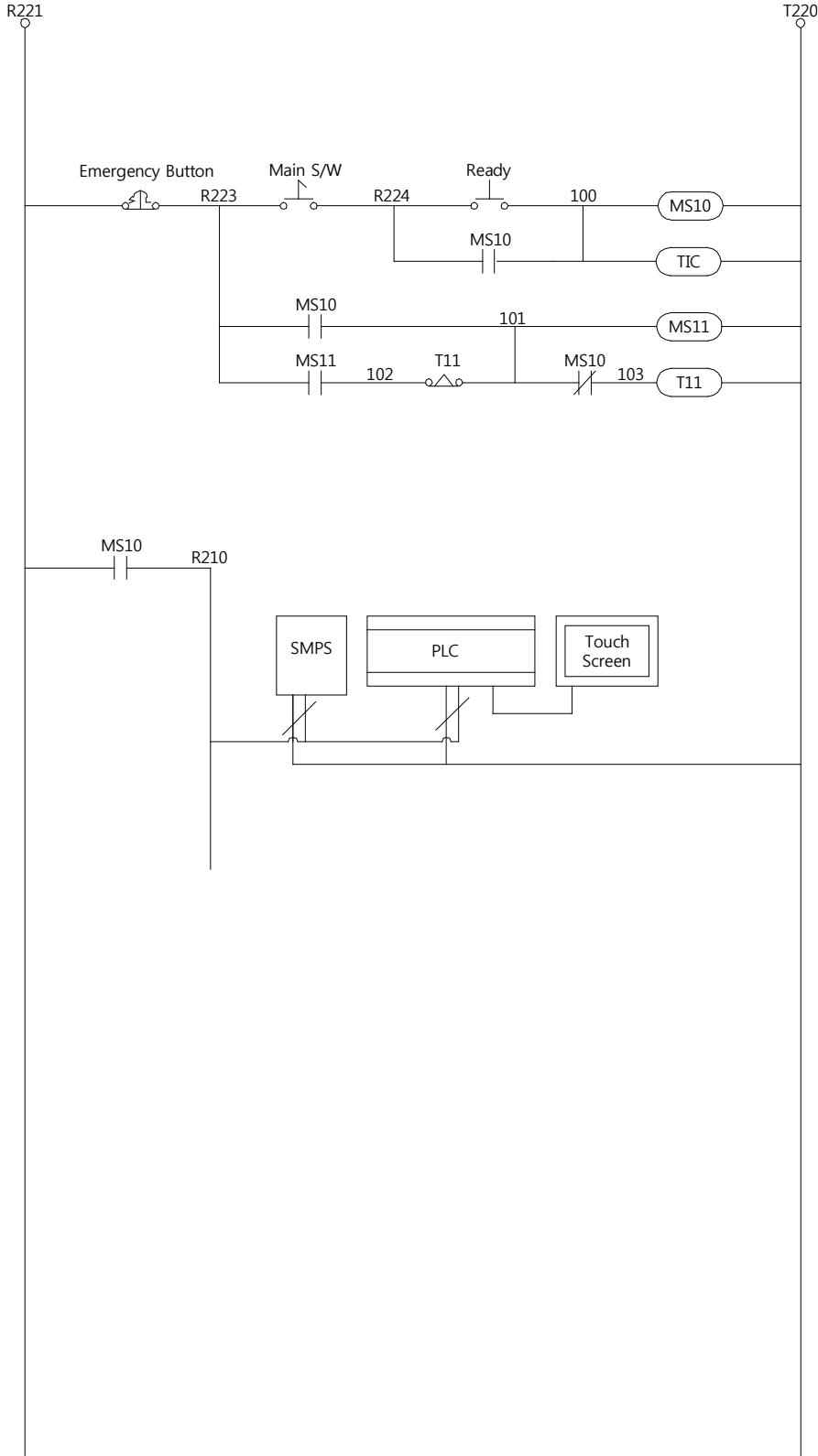
Symbol	Description	Symbol	Description
	Circuit Breaker		Sensor
	Motor		
	Electric Clutch		Electric Contact
	Motor Speed Controller		
	Transformer		Push Button
	Relay Coil		
	Magnetic Coil		Mushroom Push Button
	Temperature Controller		
	Solid State Relay		Select Switch
	Switched Mode Power Supply		
	Touch Screen		Condenser
	Heater		
	Buzzer		Solenoid Coil
	Battery		
			Timer
			Parts Feeder
			Warning Light
			Fan Motor

## 8-2. Circuit drawing - I

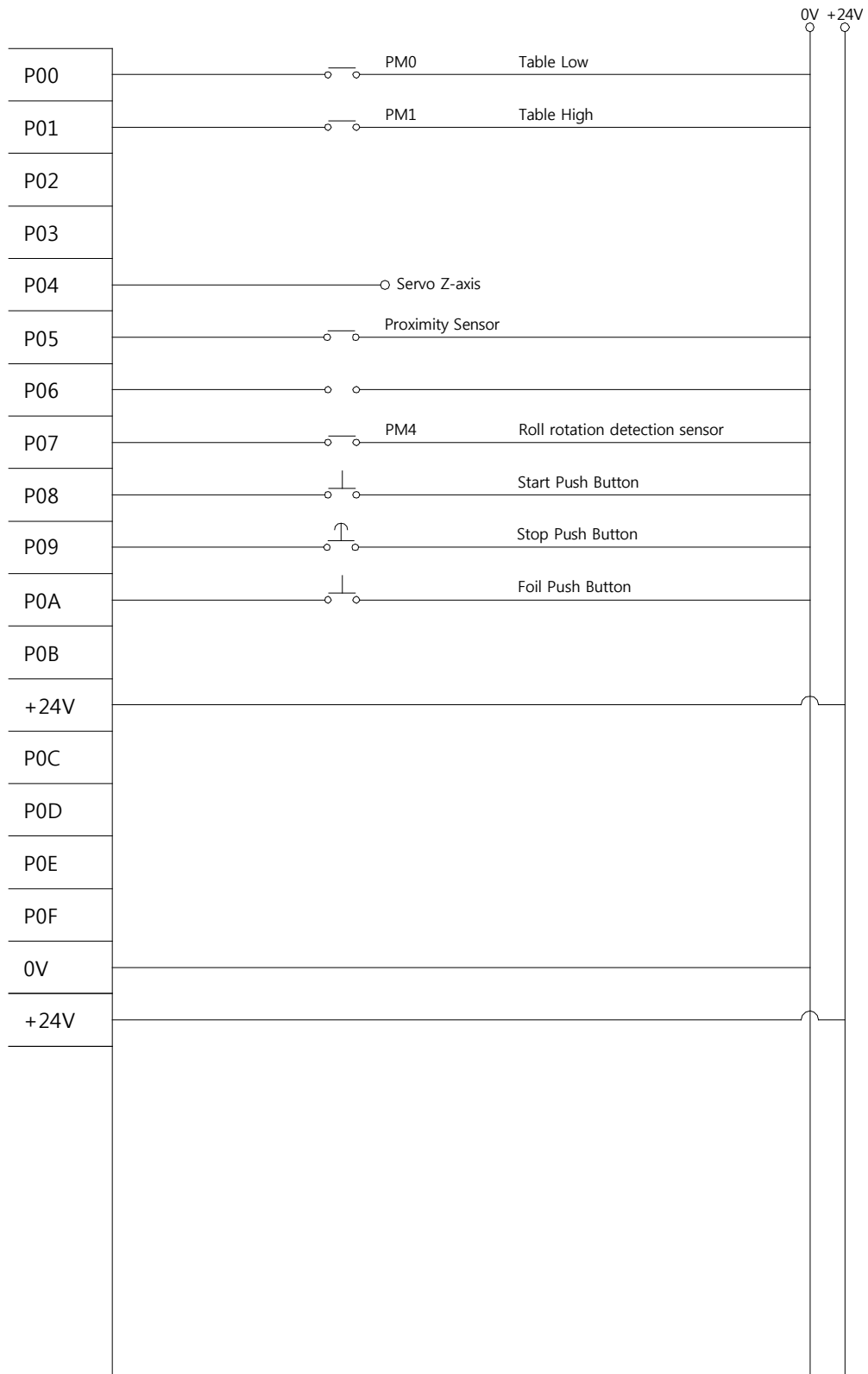




### 8-3. Circuit drawing - II



### 8-4. Circuit drawing -III



### 8-5. Circuit drawing -IV

