CP-15

FULL AUTOMATIC SCREEN PRINTING MACHINE

INSTRUCTION MANUAL

marushin

CONTENTS

1-1 Outline of CP-15

① ALIGNMENT SECTION ——— set inserted PCB on correct position

② PRINTING SECTION ——— print on PCB (detailed on 1-2-2)

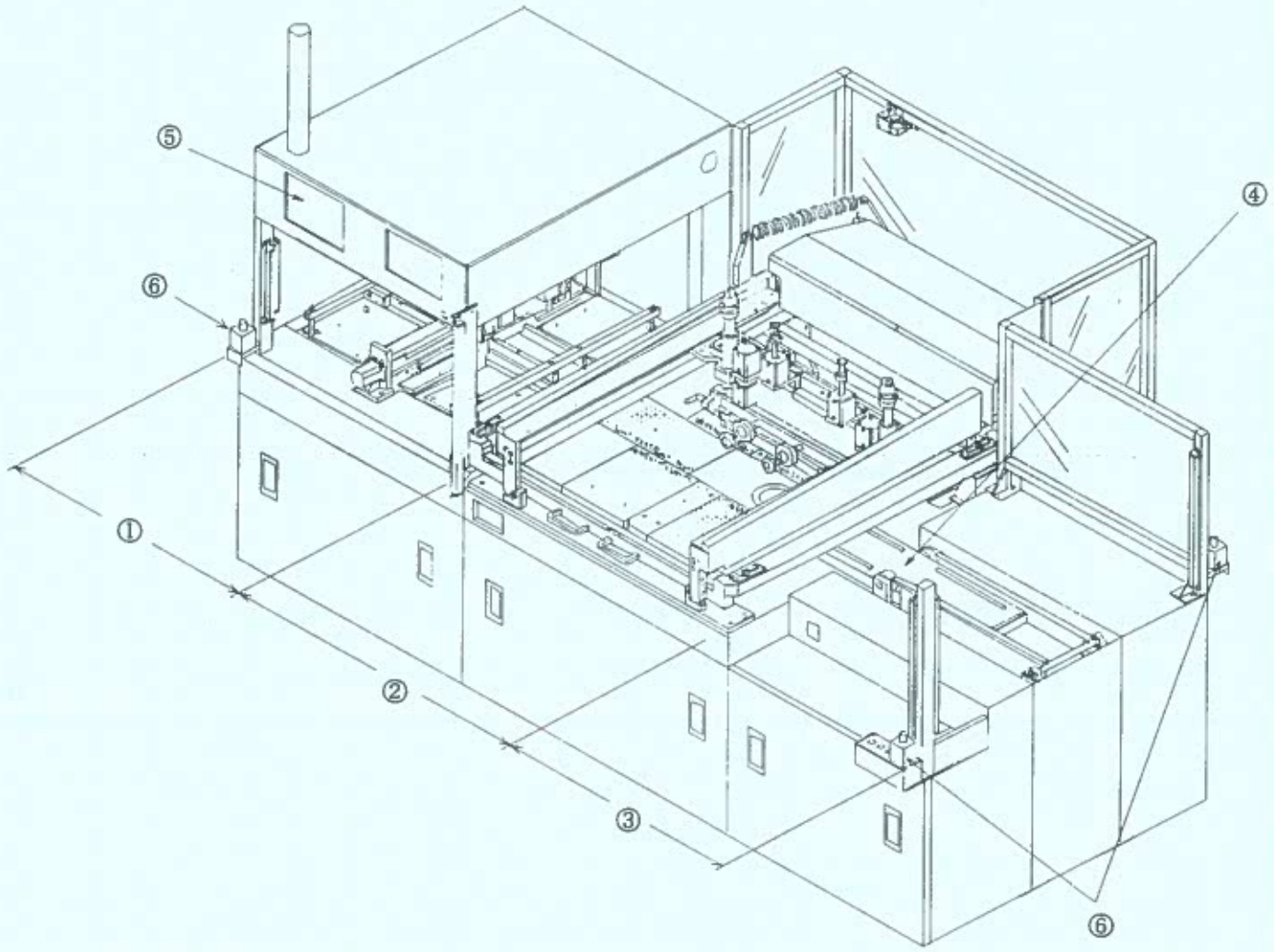
③ CARRY-OUT SECTION ——— carry out printed PCB (detailed on 1-2-3)

④ CARRIER ——— carry PCB from ALIGNMENT SECTION, PRINTING SECTION, to CARRY- OUT SECTION .

⑤ OPERATING SECTION ——— have touch panels and each kind of switches for operating this machine

⑥ EMERGENCY STOP SWITCH——— stop all movement in an emergency

ft.) In this chapter, all directions and figures are considered that the flow on machine is from left to right (as standard).



Overview of CP-15

1-2 Explanation of each section

1-2-1 ALIGNMENT SECTION

① Carry-in Conveyor ——— carry in a PCB to Alignment Table.

② Alignment Table ——— set PCB on the correct positioning (pre-positioning and alignment- positioning) on this Table.

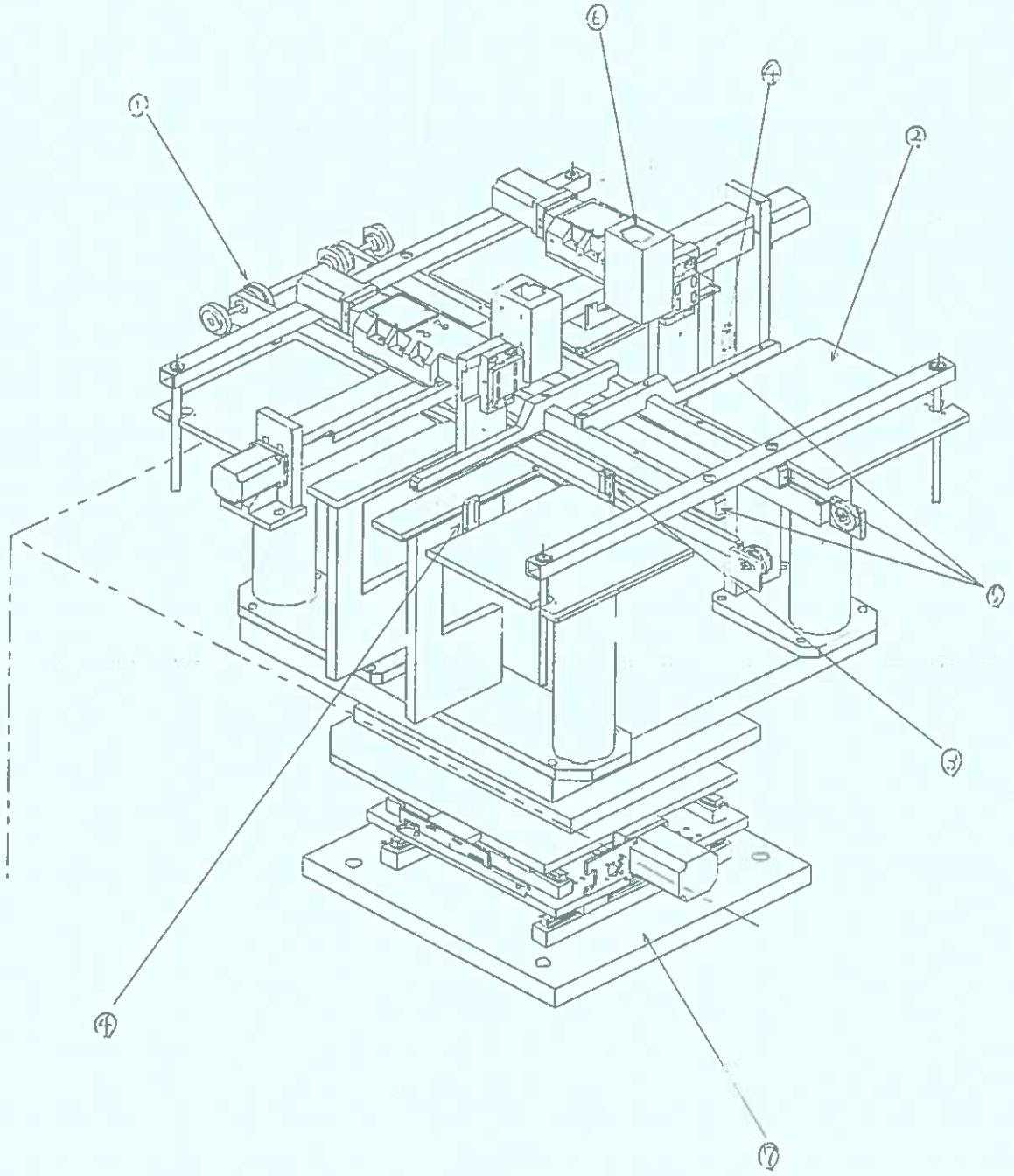
③ Siding Pin (Flowing direction)
④ Siding Pin (Squeeging direction)
——— pre-set PCB position in all directions by 6 pins.

- Right reference mode ····· PCB is set based on 2 siding front pins and right side pin.
- Left reference mode ····· PCB is set based on 2 siding front pins and left side pin.

⑤ Board Clamp ——— fix PCB on the Alignment Table to make alignment.

⑥ CCD Camera
⑦ 3-axis Table
——— align of PCB on correct position. detect marks in both sides of PCB by 2 CCD Cameras. According to the mark data, 3-axis Table moves to make alignment.

※Flowing side unit have pins on the left and right side. In case , the right pin would be chosen as the stop pin, it called right reference mode. On the other hand, the left pin would be chosen, it called left reference mode.



Alignment Section

1-2-2 Printing section

① CARRIER ——— carry PCB to Printing section. Alignment positioned PCB is fixed on Carrier by vacuum.

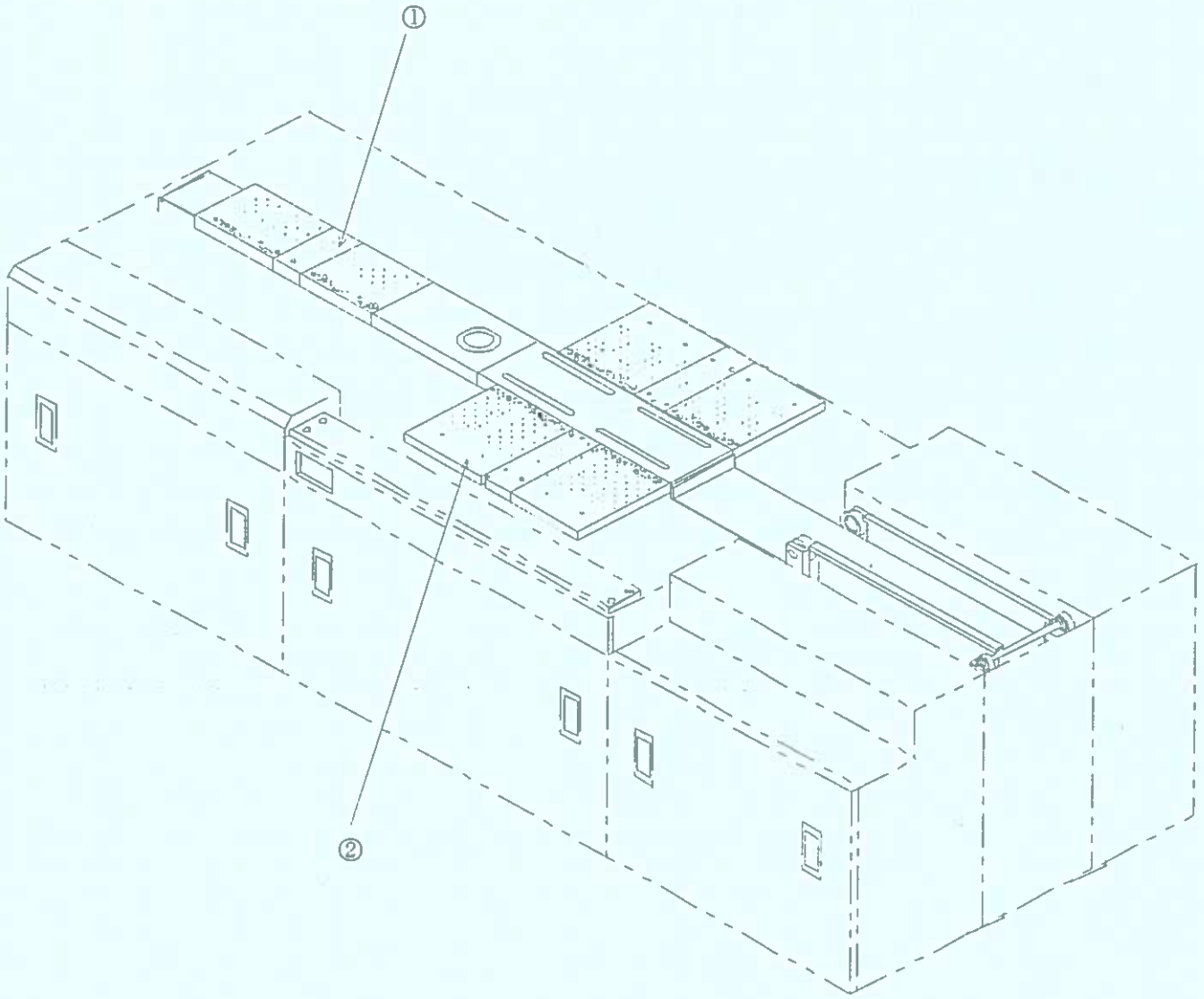
② PRINTING TABLE

——— fix PCB by vacuum in printing
The surface of Printing section has holes.

③ SCREEN FRAME

——— clamp Screen (detailed on 1-2-2-1)
Adjust Screen position by Micro-adjuster on Sub- clamping. Then clamp completely by Main-clamp. (There are 4 cylinders for each)

④ SQUEEGEE ——— print Screen pattern on PCB.
Printing direction is from front to rear.(detailed on1-2-2-2)



Printing Section

1-2-2-1 Screen Frame — This is the unit for Screen positioning and clamping.

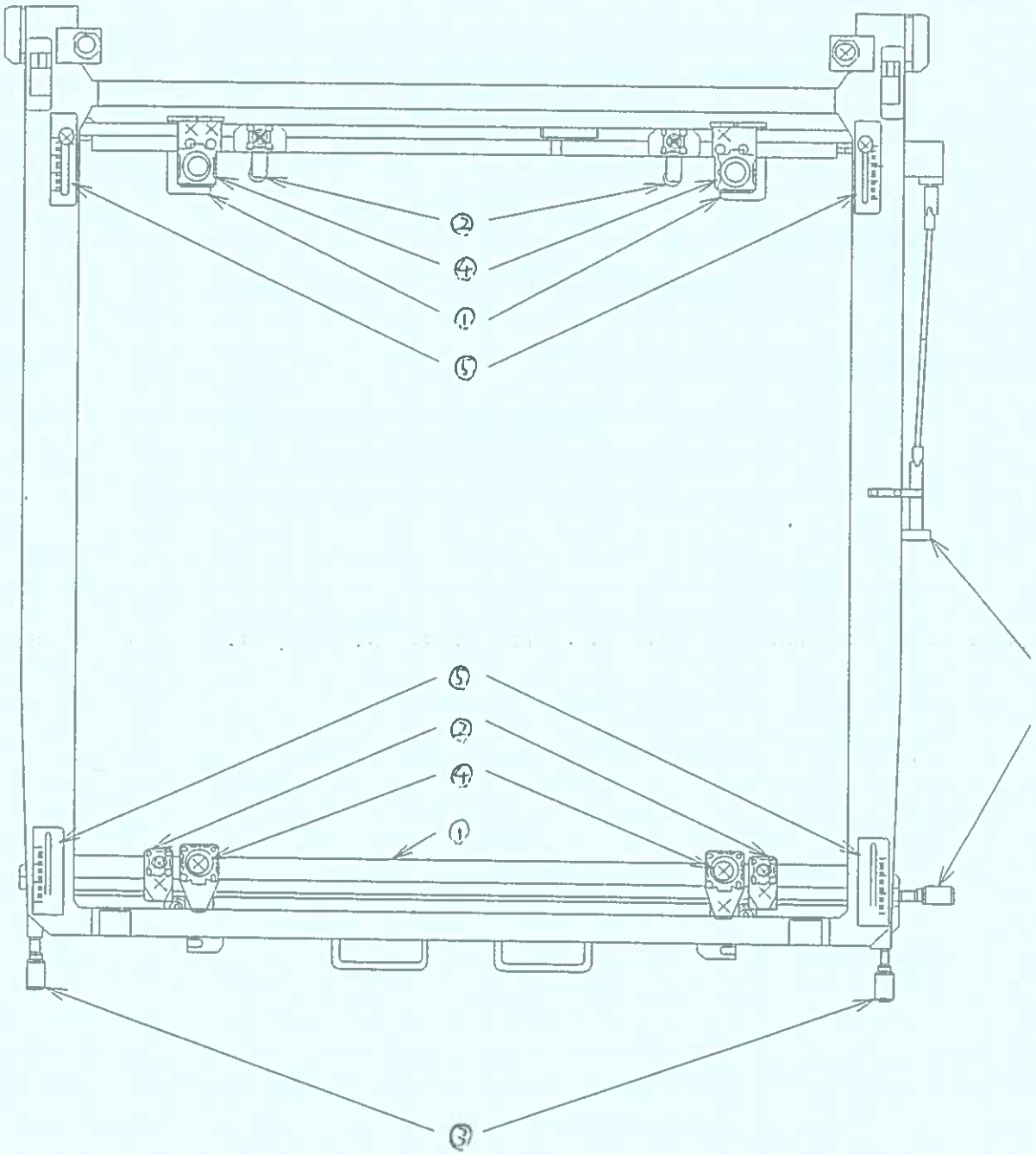
① Screen Guide ——— put Screen on Screen Guide.

② Sub- clamp ——— clamp Screen on Frame temporarily.
There are 2 clamp cylinders each in front and back.
They clamp Screen on Frame.

③ Screen Micro-adjuster
——— Screen sub-clamped on Frame can be micro-adjusted in all directions.

④ Main-clamp ——— clamp Screen on Frame completely. There are 2 clamp cylinders each in front and back after adjustment of Screen.

⑤ Screen Size Gauge
——— adjust Frame size depending on the screen size



Screen Frame

1-2-2-2 Squeegee Unit

——— This Unit is for squeegee out ink from screen and making pattern on PCB. And it has scooper function that carry ink to squeegee start position after printing.

① Squeegee angle adjuster

——— adjust Squeegee angle against Screen Frame

② Squeegee lowest point adjuster

——— adjust Squeegee lowest point on Squeegee is down position in case of printing by down stroke.
In case of printing by pressure, the scale should be set 0.

③ Squeegee parallel adjuster

——— adjust parallel degree of Squeegee against Screen

④ Squeegee height on scooping adjuster

——— adjust the height of Squeegee on scooping ink

⑤ Scooper height adjuster

——— adjust the height of Scooper on scooping

⑥ Scooper moving amount adjuster

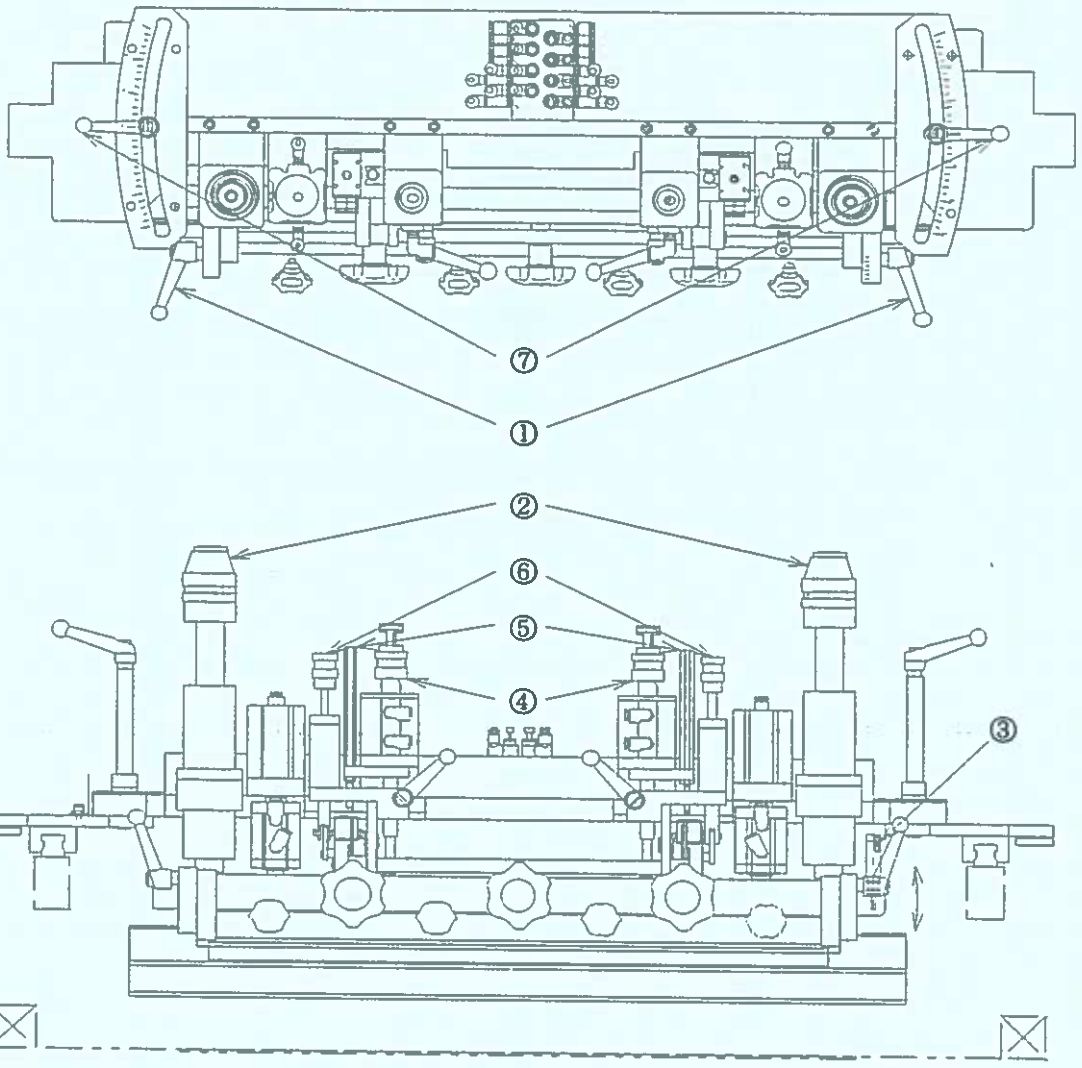
——— adjust Scooper moving amount on scooping

⑦ Squeegee Unit bias adjuster

——— adjust bias of the Squeegee Unit

⑧ Scooper —— bring ink back to start position without touch Screen.

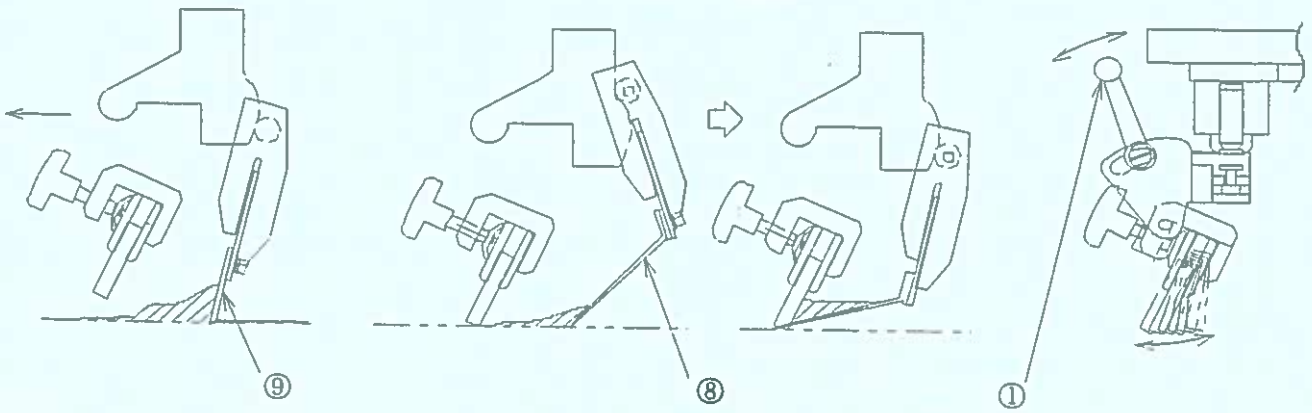
⑨ Scraper —— scrape ink back to start position after printing



SCREEN

SCRAPING

SCOOPING



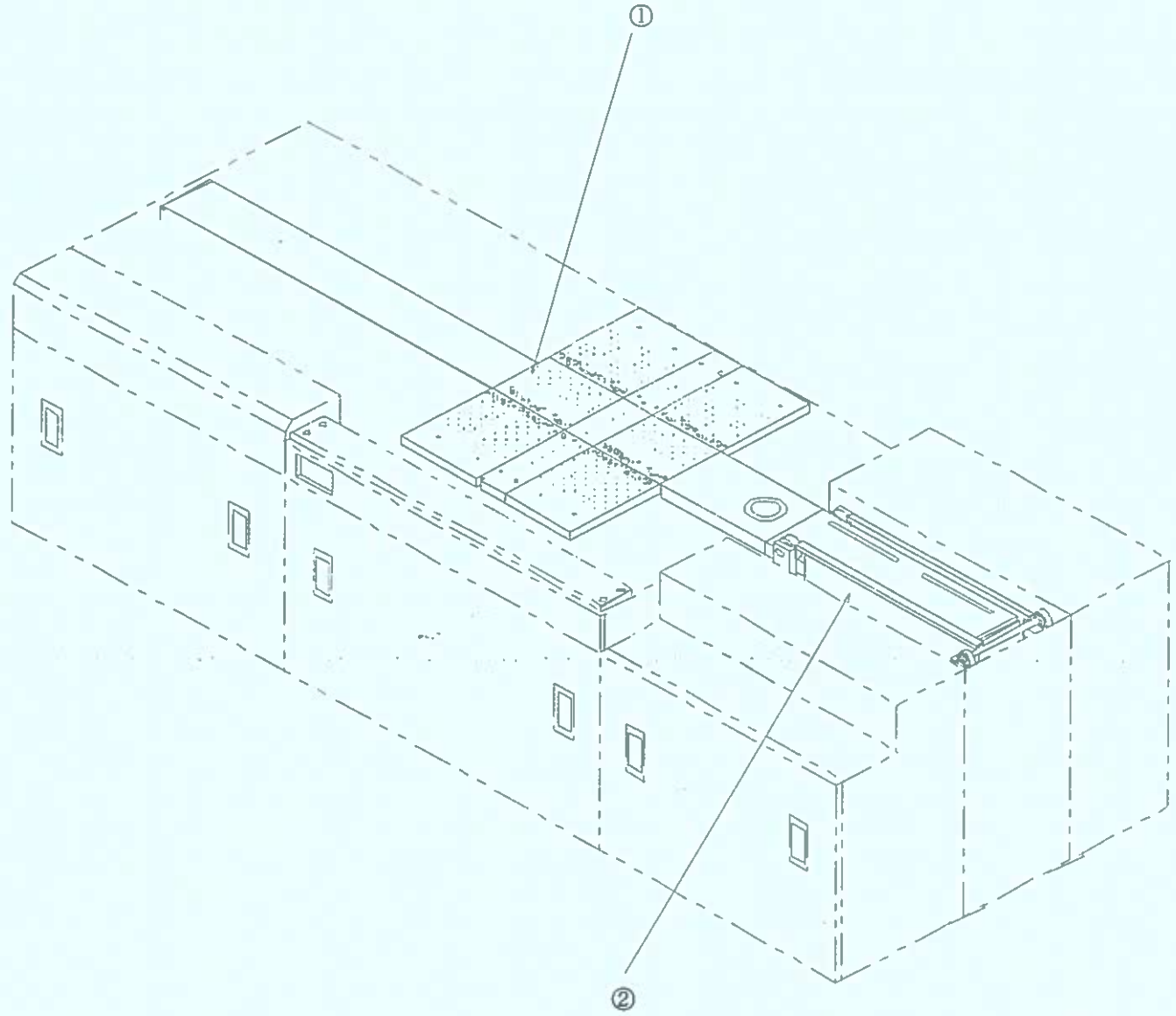
Squeegee Section

1-2-3 Carry-out section

① Carrier — carry PCB from Alignment section, printing section, to Carry-out section
Carrier is separated from left and right part.
The left part carries PCB from Alignment section to Printing section,
the right part carries PCB from Printing section to Carry-out section.

② Carry-out Conveyor

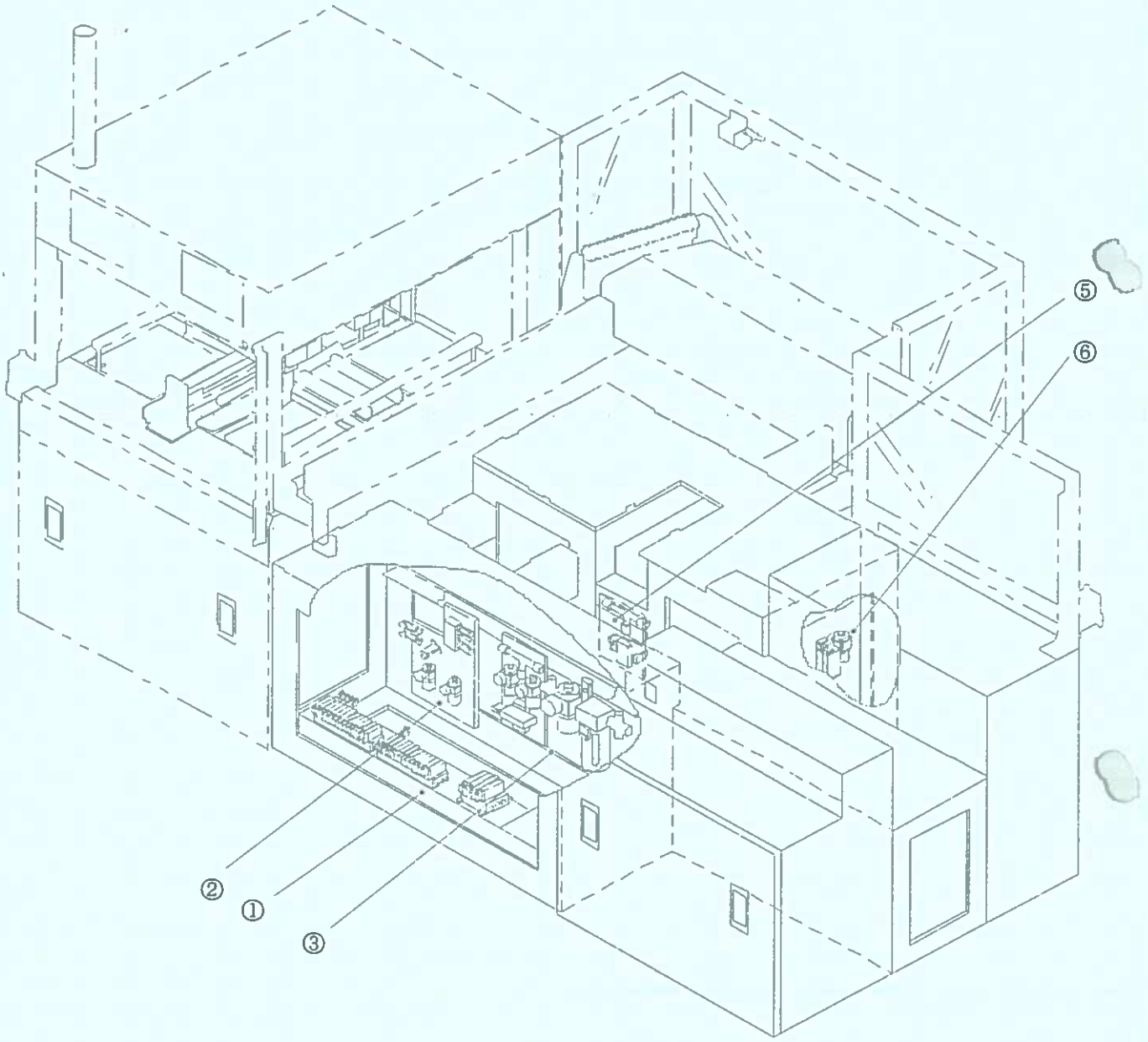
After finished printing, PCB that is carried by Carrier is conveyed out to the next machine.



Carry-Out Section

1-3 Air Apparatus

1-3-1 Overview Drawing



Overview Drawing

1-3-2 Detailed drawing of ①

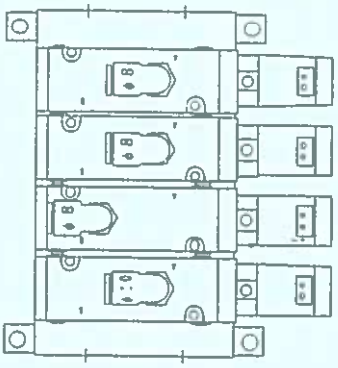
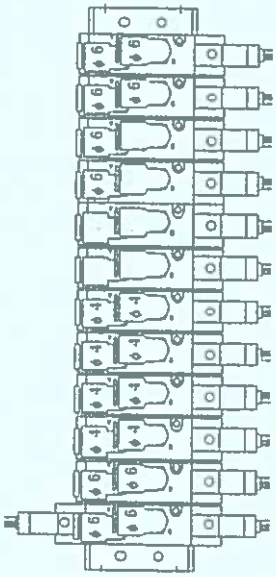


TABLE VACUUM

CARRIER VACUUM

SQUEEGEE PRESS

VACUUM REVERSE



SCOOPING POSITION

SCOOPER MOVE

BALANCING CYLINDER (4kgf/c m²(0.4MPa))

BALANCING CYLINDER (2kgf/c m²(0.2MPa))

SPARE VALVE

SPARE VALVE

SIDING LOCK(FRONT)

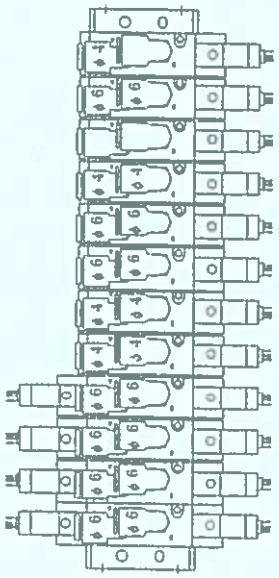
SIDING LOCK(RIGHT)

SIDING LOCK(LEFT)

EJECT PIN UP/DOWN

EXHAUST BALANCING CYLINDER

CARRIER (PCB GUIDE PIN) UP/DOWN



BOARD CLAMP

BOARD CLAMP MIDDLE POSITION

SPARE VALVE

F.SIDING PIN FORWARD

R.SIDING PIN UP

L.SIDING PIN UP

SQUEEGEE FRAME HOOK

SPARE VALVE

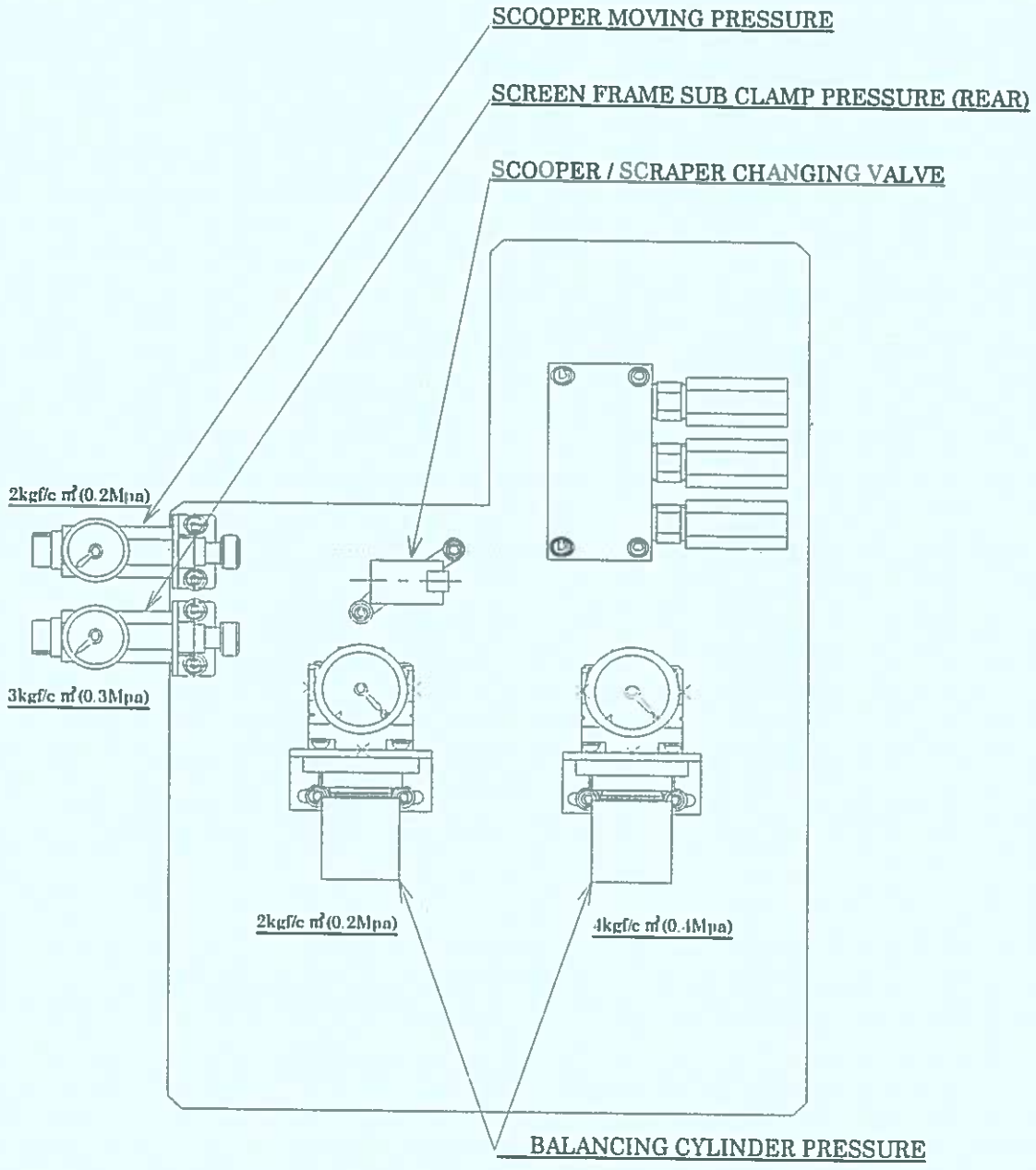
ALIGNMENT TABLE UP/DOWN

SCREEN FRAME UP/DOWN(FRONT)

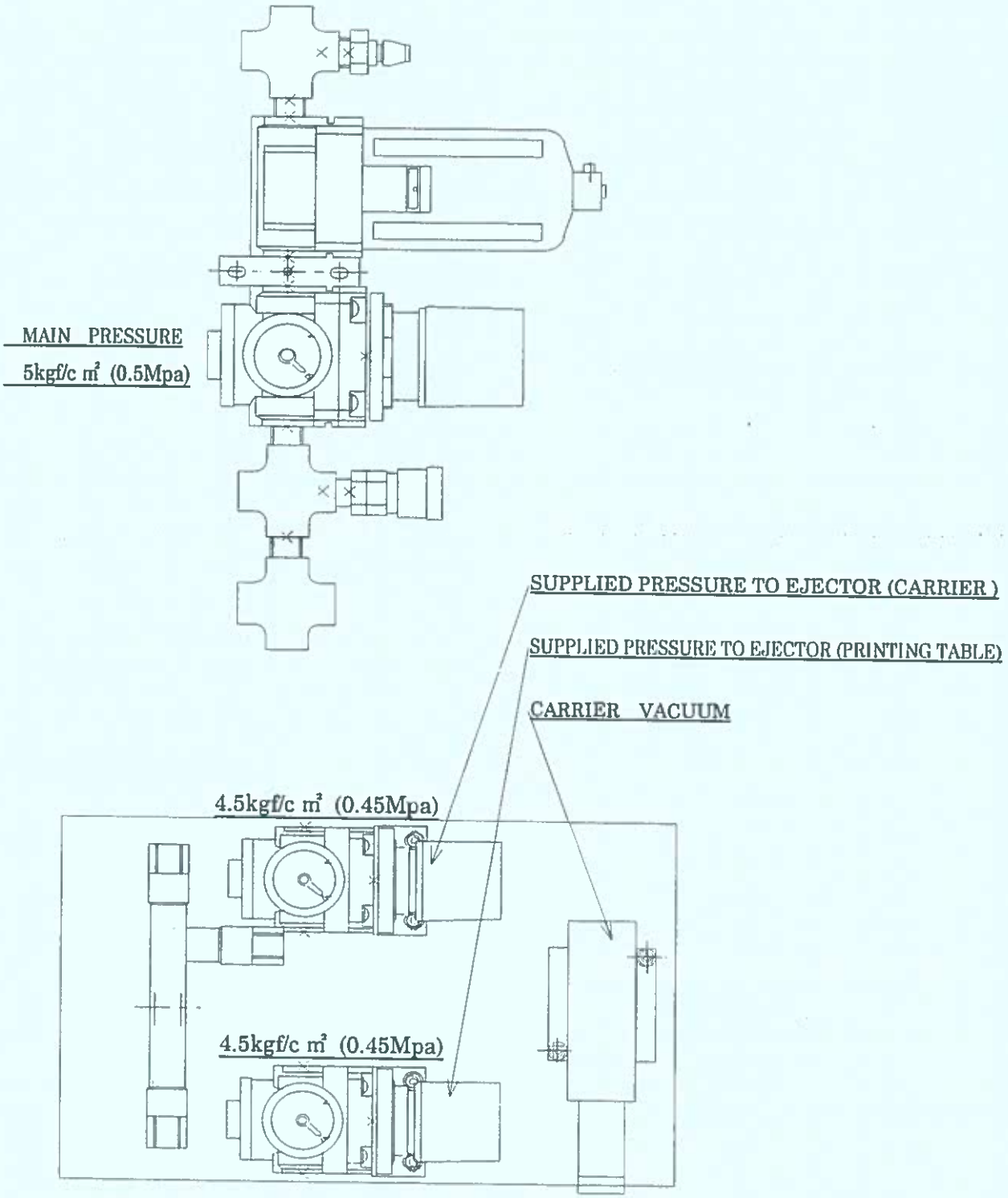
SCREEN FRAME UP/DOWN(REAR)

SQUEEGEE FRAME UP/DOWN

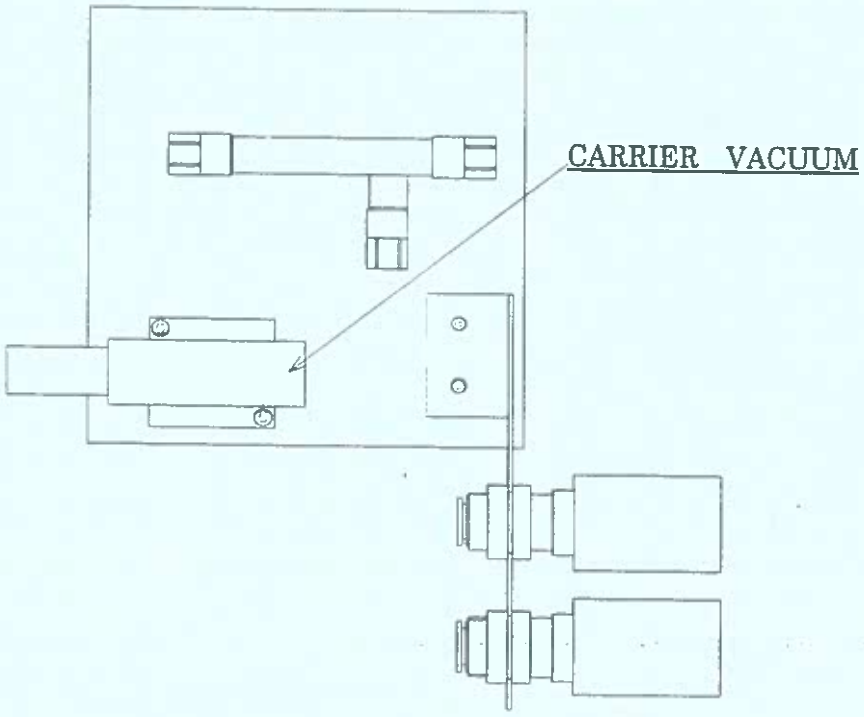
1-3-3 Detailed drawing of ②



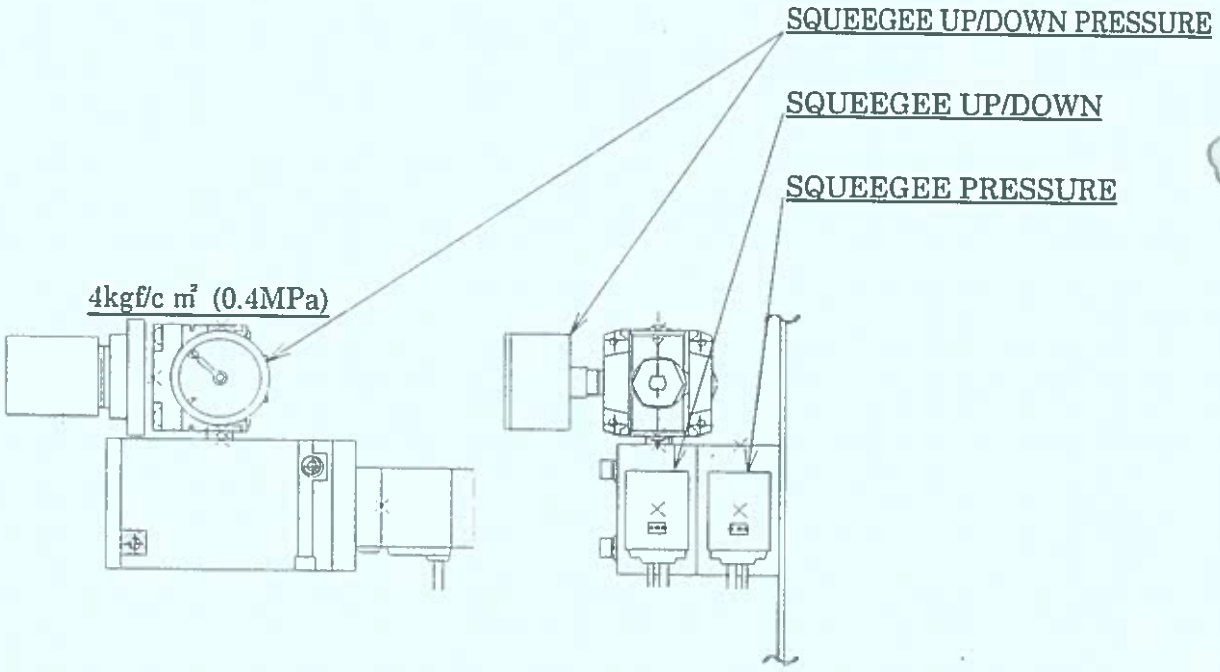
1-3-4 Detailed drawing of ③



1-3-5 Detailed drawing of ④



1-3-6 Detailed drawing of ⑤



Chapter2 Operation

2－1. Supplied electricity and air

2－1－1. Installation in Japan

Electricity AC200～220V、3phase、20A

2－1－2. Installation abroad

When CP－15 is installed in your country, put a transformer on it to adjust to Japanese supplied electricity.

Let us know the voltage in your country.

We will attach an appropriate transformer to CP－15.

fn. 1 Keep the cause of noise away from CP－15.
2 Make sure that CP－15 is connected to the earth. (ϕ 4 or more)
3 The changing rate of supplied voltage must be within±15%.

2－1－3. Air supply

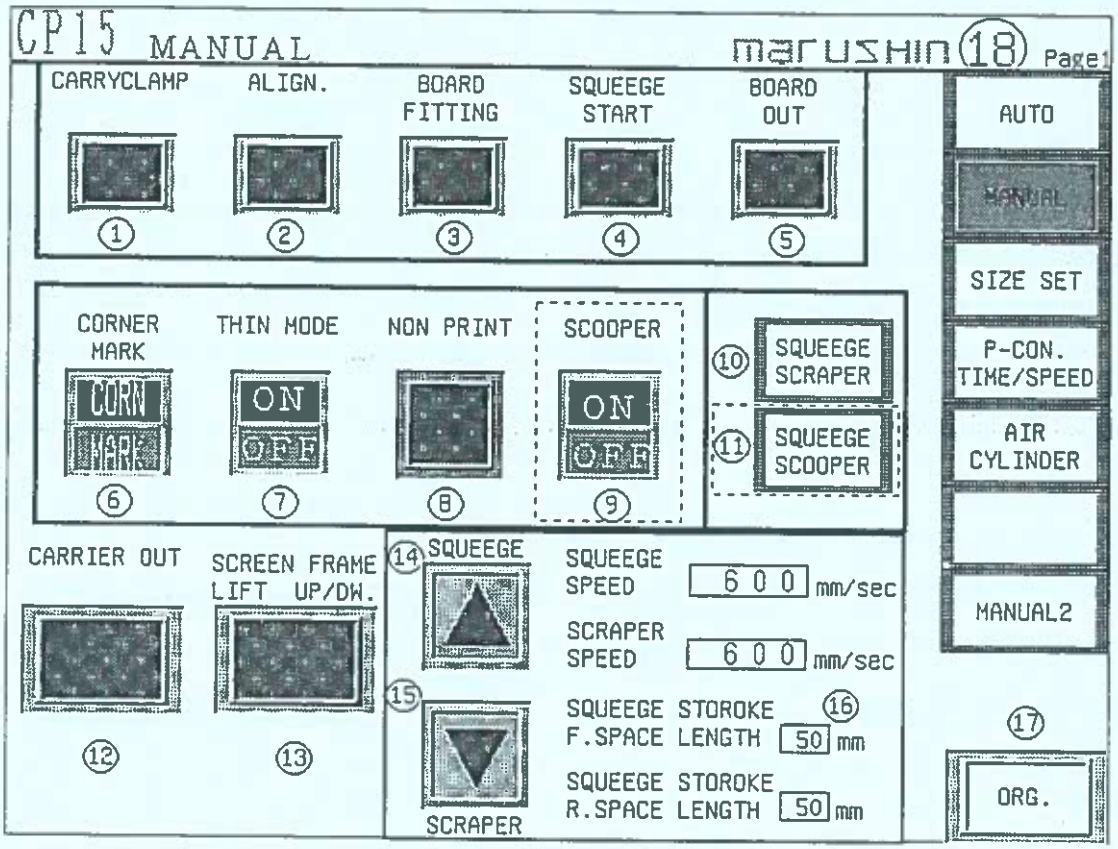
5kg/cm^2、540nl/min

fn. The changing rate of supplied air pressure must be within ±15%, otherwise CP－15 could make an air-presser-down error and stop operation immediately.

2-2 How to operate Touch Panel (MANUAL)

2−2−1. How to operate Touch Panel

When CP−15 gets to turn on, the image below shows up on Operation Touch Panel.



For detailed explanation of the above keys, please refer each section as below.

①: M1
②: M2
③: M3
⋮
⑰:M17
⑱:M18

Functions of all the keys of MANUAL image screen are as follows.

M1. CARRY CLAMP /Manual set up mode

Press ORG (⑰) to complete to return the cylinders and motors to the original positions, and press this key CARRY CLAMP. When this key gets pressed 3- axis Table moves to the original position and Carry-in Conveyor starts rotating to wait for PCB.

Siding and board-clamping are done after a PCB is carried in and stops at the center of Alignment Section (Carry-in Conveyor is stopped).
ALIGN. key blinks in green after the movements are completed.

fn. Before pressing this key, ORG key (⑰)should be pressed to return cylinders and motors to the original position.
Carry-clamp/manual set-up mode is not available unless the original positions are returned.
Warning below is shown if this key is pressed without the return to the original position.

WARNING
NOT CYLINDER
ORIGINAL POSITION !
PUSH ORG KEY

M2. ALIGN.

When the movements of CARRY CLAMP are finished, this key ALIGN. gets to blink in green.
Press the blinking key, so 3-axis Table aligns PCB within the limits of "Alignment allowance" .
The movements are finished after a PCB is completed to align, BOARD-FITTING (③) blinks in green.
For the explanation of image processing on Touch Panel, refer to ch.2 § 4.

M3. BOARD FITTING

The movements of ALIGN. are finished, and then this BOARD-FITTING gets to blink in green after alignment is completed..
If the blinking key is pressed, Carrier goes up to fix an aligned PCB by vacuum and carries it into PRINTING SECTION.
Use Micro-adjuster to adjust the position of Screen.
When the movements of BOARD-FITTING are completed, SQUEEGE-START (④) blinks in green.

M4. SQUEEGE START

This key, SQUEEGE-START gets to blink in green after board-fitting is completed.
is completed.
Press the blinking key so that Screen Frame goes down and printing start .
BOARD OUT (⑤) blinks in green when the movements of SQUEEGE-START are completed.

M5. BOARD OUT

This BOARD OUT starts to blink in green when the movements of SQUEEGE START are completed.
Carrier carries out a printed PCB to Carry-out Conveyer when this blinking key gets pressed.
Carry-out Conveyer stops to check out the board.
Touch keys M1~M5 must be used on manual set-up.

fn. The keys (M1~M5)are used on manual set-up. These keys are not for auto-running. For auto-running, refer to ch.2 § 6.

M6. CORNER MARK

This key has below two modes. This key turns green from white when either mode gets chosen.

M6-1. CORNER

In this mode, PCB gets printed without alignment by camera.
If a PCB has no target mark or hole, use this mode.

M6-2. MARK

In this mode, PCB gets to be printed after alignment by camera.

fn. 1. This mode is available only on MANUAL mode, not on AUTO mode.

M7. THIN MODE

This key has below two modes. The key turns green from white when either mode gets chosen.

M7−1. 「ON」side ----- THIN MODE ON mode

This side is to be chosen for PCB thickness from 0.3 to 0.5mm.

When this mode is chosen, Step Action gets slow, so the tact time gets 20% longer than thicker board because of protection against edge-down.

M7−2. 「OFF」side ----- THIN MODE OFF mode

Turn this off when the board thickness is more than 0.5mm.

fn. This mode is available only on MANUAL mode, not on AUTO mode.

M8. NON PRINT

This key is used not to print PCB.

When this mode is on, the key turns green from white.

fn. 1.This mode is available only on MANUAL mode, not on AUTO mode.

M9. SCOOPER <option>

This key has below two modes to choose.

The key turns green from white when either On mode or OFF mode is chosen.

M9－1. 「ON」side ----- Scooper mode

Scooper carries printing ink to the front of Screen Frame.

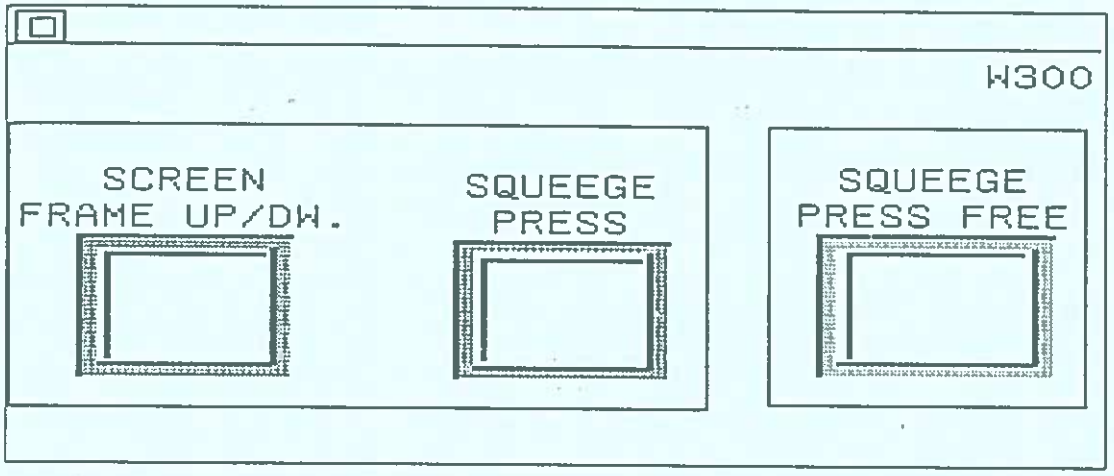
M9－2. 「OFF」side ----- Scraper mode

Scraper carries printing ink to the front of Screen Frame.

fn. 1.This mode is available only on MANUAL mode, not on AUTO mode.
2.Whenever the mode gets changed, mechanical part, Scraper or Scooper, also should be changed.
If not, it causes mechanical damage or the tear of Screen.

M10. SQUEEGE SCRAPER ----- Scraper mode

This key is available when SCOOPER key is OFF.
Manual keys on Scraper mode are shown as below.



SCREEN FRAME UP/DW.

This key is used to move Screen Frame up/down.
Screen Frame goes up when this key gets pressed.
Screen Frame goes down when this key gets pressed again.

SQUEEGE PRESS

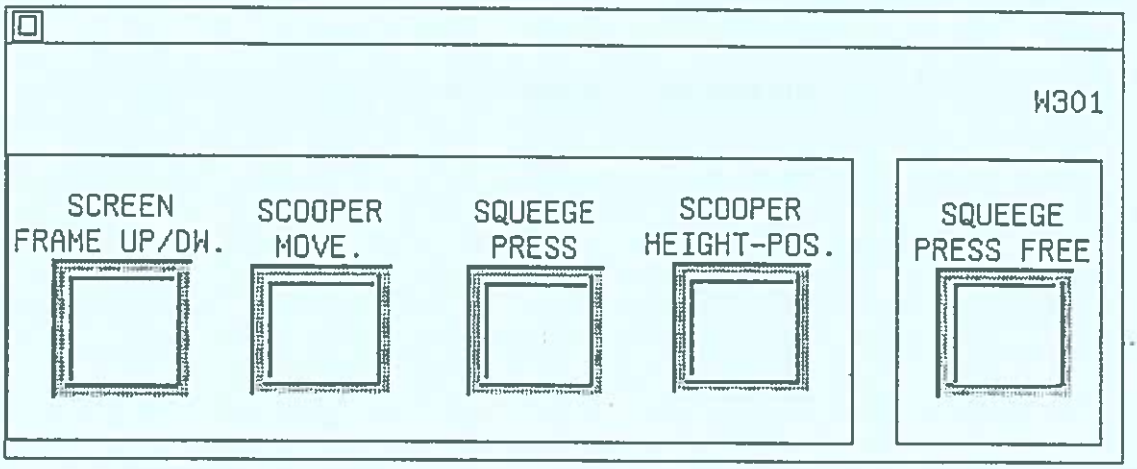
This key is to get Squeegee up and down.
This is used to make appropriate attach condition of Squeegee Rubber with Screen, and check the squeeging pressure.

SQUEEGE PRESS FREE

This key is used to cut off air pressure and to check a parallel between Squeegee Rubber and Screen.

M11. SQUEEGE SCOOPER ----- Scooper mode

Scooper is available when SCOOPER key is on..
Manual keys on Scooper mode are shown as below.



SCREEN FRAME UP/DW.

This key is used to move Screen Frame up/down.
Screen Frame goes up when this key gets pressed. Screen Frame goes down when it gets pressed again..

SCOOPER MOVE

This key is to used to make Scooper scoop up and down..

SQUEEGE PRESS

This key is to get Squeegee up and down.
This is used to make an appropriate attach condition of Squeegee Rubber with Screen.
and check the squeeging pressure.

SCOOPING POS.

This key is to move Squeegee Unit to the scooping position.
This position is to check Scooper and Squeegee Rubber height on scooping.

SQUEEGE PRESS FREE

This key is to cut off air pressure to adjust Screen Rubber parallel with Screen.

M12 CARRIER OUT

Carrier conveys out a PCB to Carry-out Section when this key gets pressed.

fn. This key is available only on MANUAL mode, not on AUTO mode.

M13. SQUEEGEE FRAME UP/DW.

Squeegee Frame goes up when this key gets pressed, and Squeegee Frame goes down when it gets pressed again.
While Squeegee Frame is moving, the key is green and it turns white when the movement is completed.

fn. 1.This key is available only on MANUAL mode, not on AUTO mode.
In case of AUTO mode, use SQUEEGEE FRAME LIFT UP/DW. key on the image of AUTO mode .
2.Squeegee Frame moves up automatically if anything intercepts Safety Area Sensor while Squeegee Frame is moving down.
Please get out of the space of Safety Area Sensor and press this key to get down Squeegee Frame again.

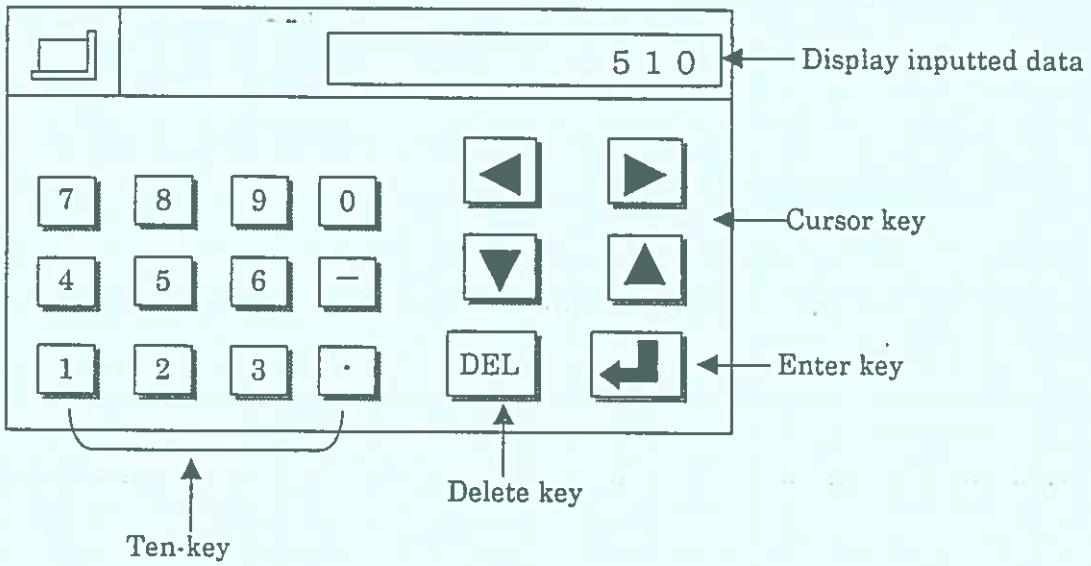
M14. SQUEEGE

Squeegee Unit moves backward while this key is pressed.

It moves at the displayed speed on the image.

To change the squeegee speed, touch "[ ]mm/sec" on the image and then,

Ten Key Overlap Window shows up as below.



An example of inputting data:

Inputting [5], [1], [0], make the squeeging speed 510 mm/sec.

After the Squeegee speed gets inputted, Ten Key Overlap Window is gone automatically on pressing Enter key.

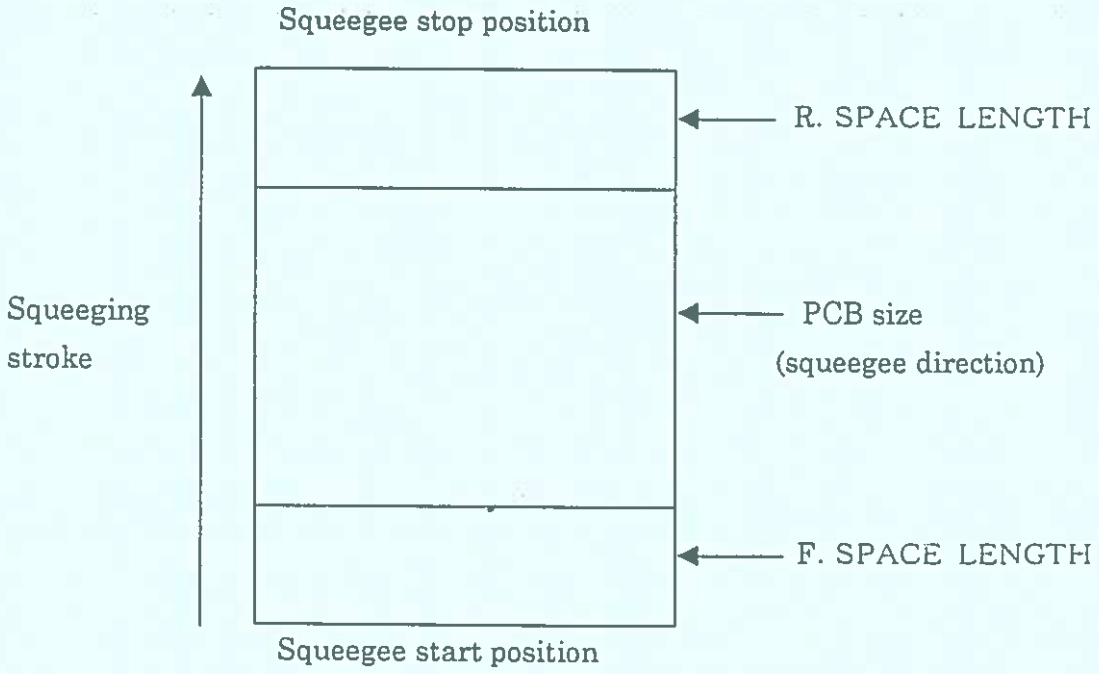
M15. △ SCRAPER

Squeegee Unit moves forward while this key is pressed.
On pressed, this key turns green from white, and turns white back when it released.
It moves at the displayed speed on the image.
To change the squeegee speed, touch "[ ]mm/sec" on the image and then,
Ten Key Overlap Window shows up.

M16

SQUEEGE STROKE
F.SPACE LENGTH
and
SCRAPER SPEED
R.SPACE LENGTH

These are to input Front space length and Rear space length drawn as below.



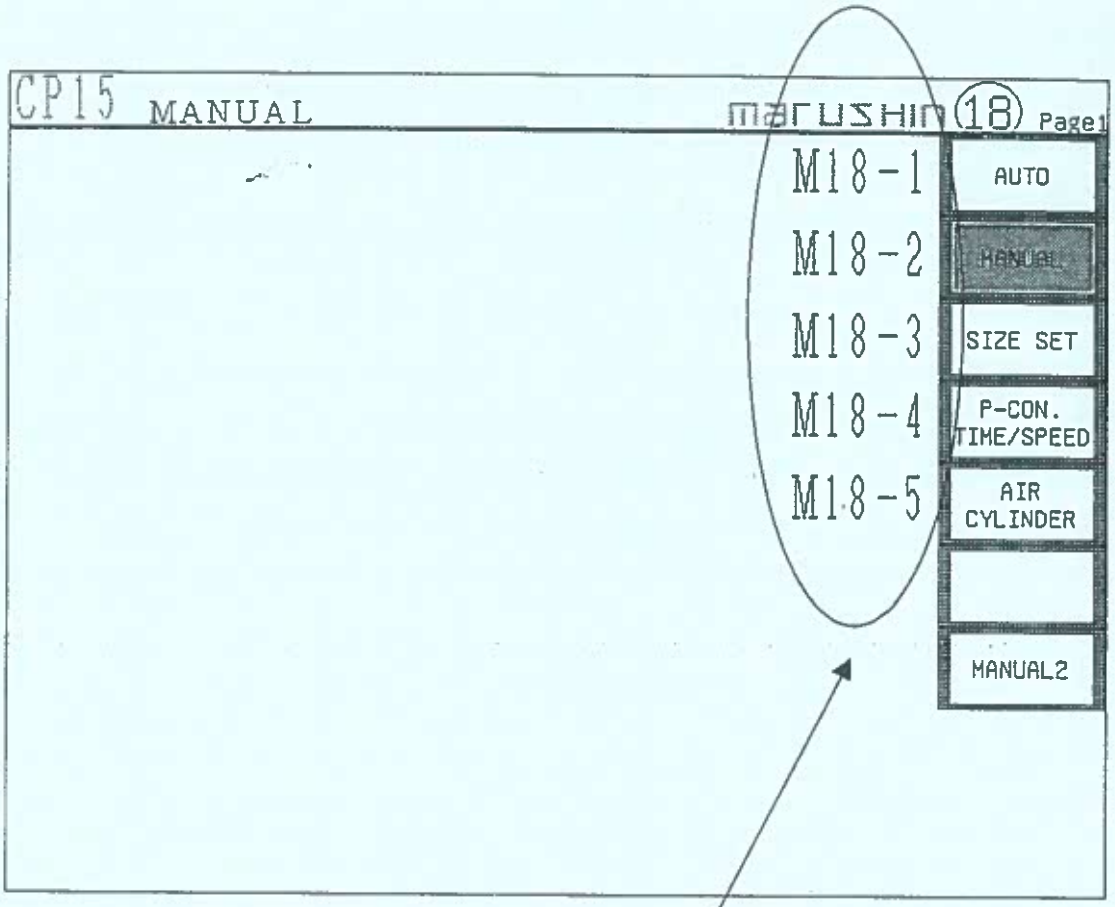
M17. ORG

When this key gets pressed, all the cylinders except Screen Frame cylinder return to the original position and Carrier returns to IN- position.
When all movements are completed, this key turns green from white.
If ORG key is not blinking in green, the mode can't be changed from MANUAL to AUTO.

Warning below gets shown on Overlap Window if AUTO key gets pressed without pressing ORG key.

WARNING
NOT CYLINDER
ORIGINAL POSITION !
PUSH ORG. KEY

M18. Function key on MANUAL image



The function of each key is explained in these shown sections.

M18-1. AUTO key ----- Auto-running image shows up.

For more details, refer to ch.2 § 3 "How to operate Touch Panel(AUTO)"

fn. Make sure to press ORG (original position) key to return the cylinders and motors to the original position before turning from MANUAL mode to AUTO mode.

M18-2. MANUAL key ----- Manual image shows up.

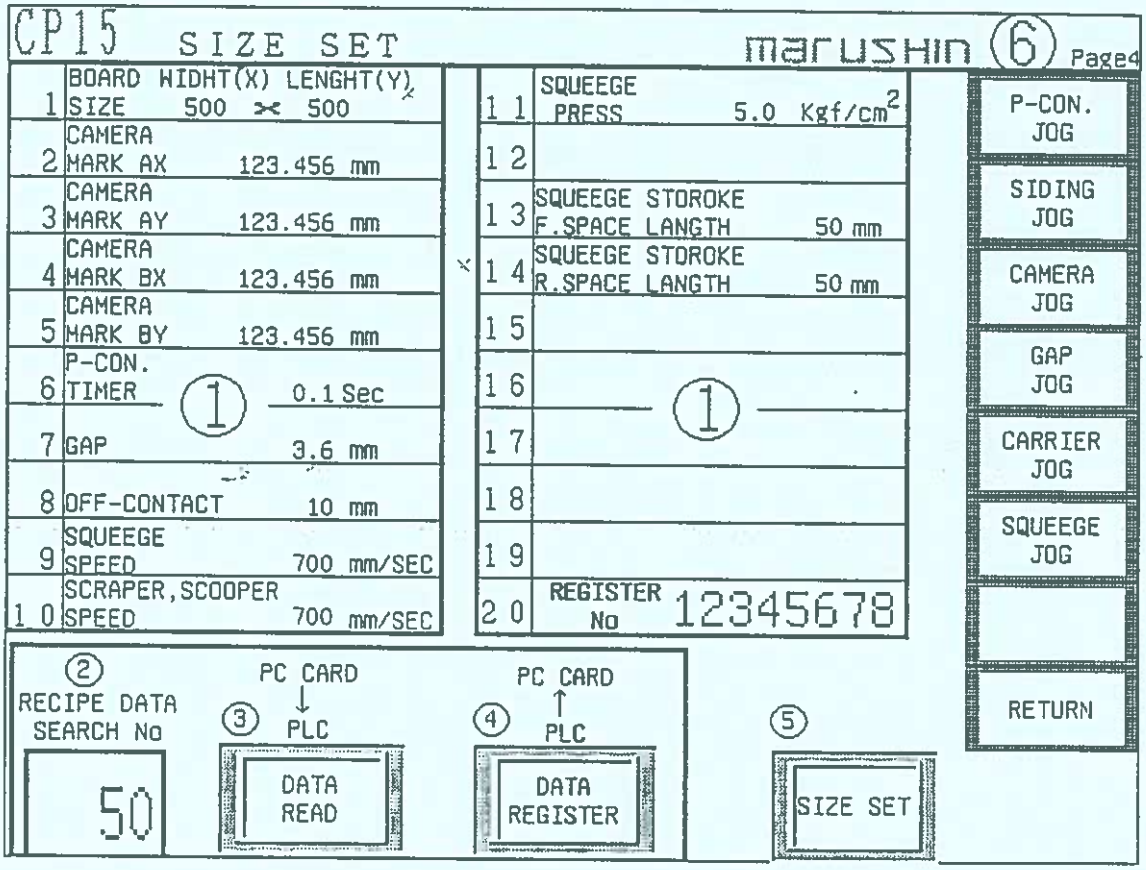
When CP-15 turns on, MANUAL image shows up after initialization. MANUAL image also shows up if CP-15 gets any error or alarm on auto-running.

For more details, refer to ch. 2 § 2 "How to operate Touch Panel(MANUAL)".

M18-3. Explanation of SIZE SET key

The image below is shown when this key gets pressed.

On this image , PCB size and printing parameters can be registered.



For detailed explanation of the above image, please refer to each section as below.

①: SZ1 ②: SZ2 ③: SZ3

④: SZ4 ⑤: SZ5 ⑥: SZ6

The touch keys [SIZE SET] and its contents are explained below. .

SZ1. PCB size and printing parameters can be registered on this menu.

[-1.BOARD SIZE] ----- PCB size(mm).

[-2.CAMERA MARK AX] ----- The position of A-CAMERA on X-axis(mm)

[-3.CAMERA MARK AY] ----- The position of A-CAMERA on Y-axis(mm).

[-4.CAMERA MARK BX] ----- The position of B-CAMERA on X-axis(mm)

[-5.CAMERA MARK BY] ----- The position of B-CAMERA on Y-axis(mm)

[-6.P−CON. TIMER] ----- Stop timer of Carry-in Conveyor from Board-in sensor is activated.

[-7.GAP] ----- The clearance between Printing Table and Screen on printing.(Max. 10mm) .

[-8.OFF CONTACT] ----- The pushing up value of Screen Frame on squeeging (Max. 15mm)

[-9.SQUEEGE SPEED] ----- Squeeging speed (Max.720mm／sec.)

[-10.SCRAPER SCOOPER SPEED] ----- Scraping/Scooping speed (Max.720mm／sec.)

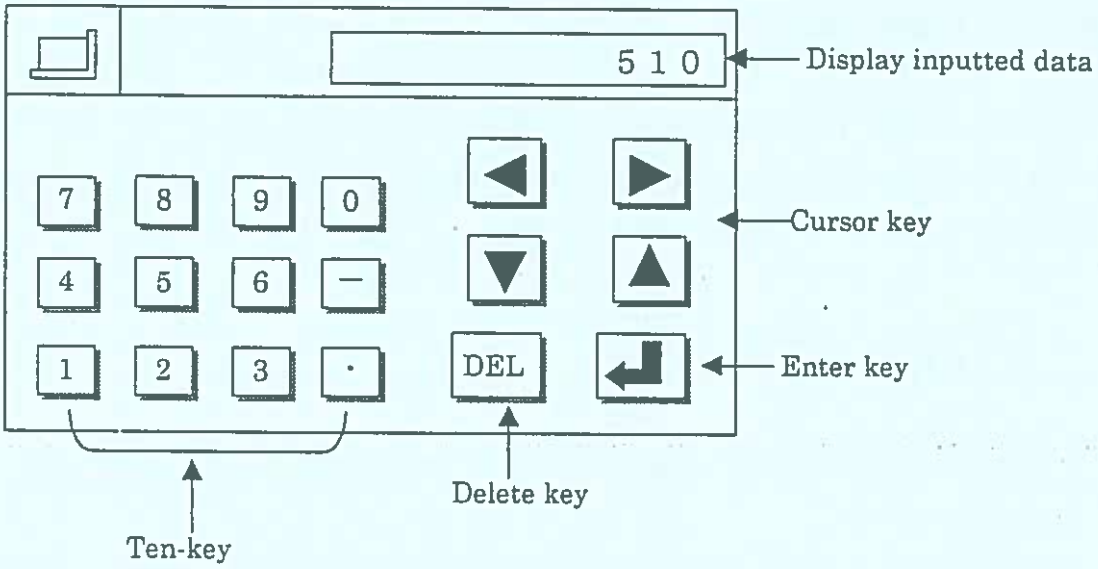
[-11.SQUEEGE PRESS] ----- The air pressure of squeeging cylinder (kgf/cm)

[-13.SQUEEGE STROKE F.SPACE LENGTH] ----- The front margin in squeegee stroke (mm)

[-14.SQUEEGE STROKE R.SPACE LENGTH] ----- The rear margin in squeegee stroke (mm)

-20.REGISTER No. ----- User's product number of PCB
(Max.8 numbers).

To change value of each parameter, press each counter.
And then, Ten key Overlap Window as below turns up.



After each parameter gets inputted, Ten key Overlap Window is gone automatically on pressing Enter key.

SZ2. RECIPE DATA SEARCH NO.

The present recipe No. is displayed. This display is to search the registered recipe No. or to register new parameters to the recipe No.

SZ3. PC CARD→PLC

This key is PLC reads registered recipe data from PC CARD.
While the data is read, the key is yellow. When the reading is finished, the key turns yellow off and the recipe data is changed.

SZ4. PC CARD←PLC

This key is PLC writes the recipe data in PC- CARD after the size and printing parameters are set.
While the data is written, the key is yellow. When the writing is finished, the key turns yellow off and the recipe data is saved in PC CARD.

fn. 1.Make sure to write the changed parameters in PC CARD before turning off CP-15. Without the writing, the changed parameter and data get disappeared.
2.Unwritten Recipe No. has no data.
3. To change the registered recipe data, input new data and re-write in PC CARD.

SZ5. SIZE SET

Press this key to move each unit to the position according to inputted PCB size and printing parameters.

-1. Writing in INPUT conveyor stop timer

-2.Setting the position of siding units

-3. Setting A/B-camera positions

-4. Setting Squeegee stroke and speed

-5. Setting GAP amount

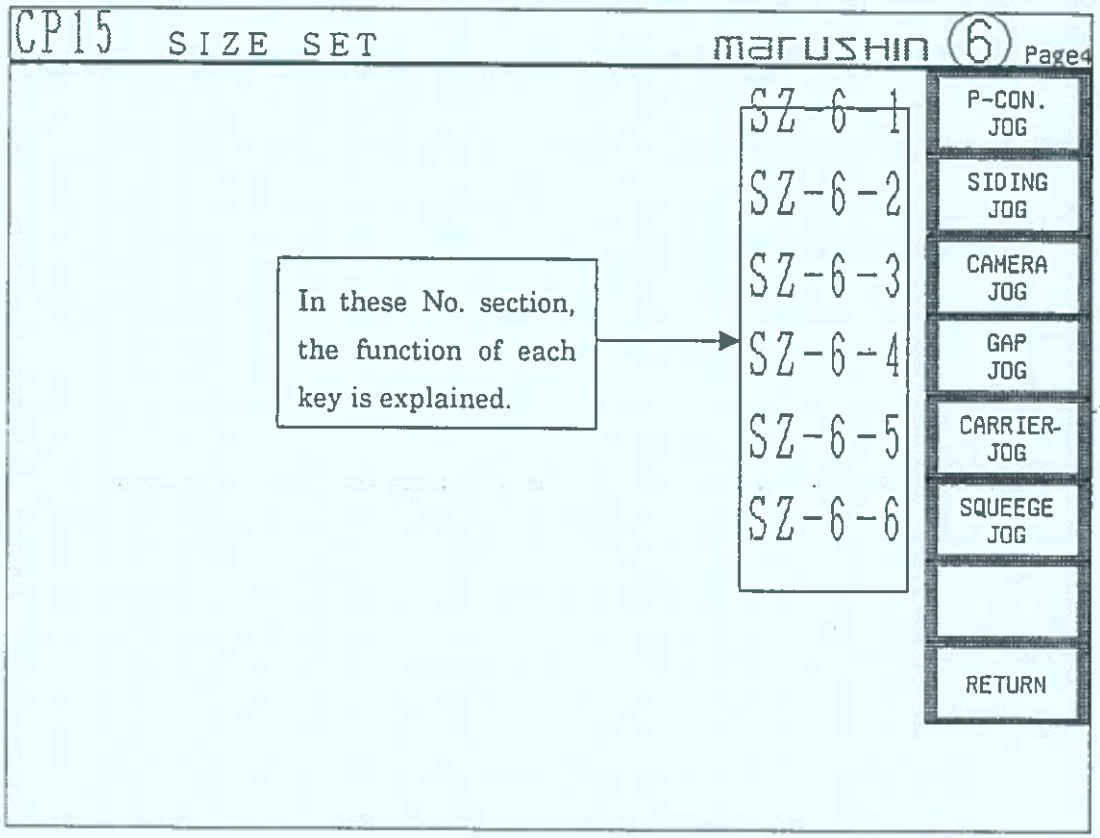
-6. Writing OFF-CONTACT amount

While each unit moves to the position, this key turns green. The key turns white when the position set-up is competed. Over Lap Window below is showed while setting up.

fn.
1. It takes about 40 seconds to complete the movement.
2. Please confirm to write in PC-CARD from PLC to register the recipe after setting the size of PCB and printing conditions.
3. Please confirm to match the read recipe No. to user's management No.

SZ6. SIZE SET

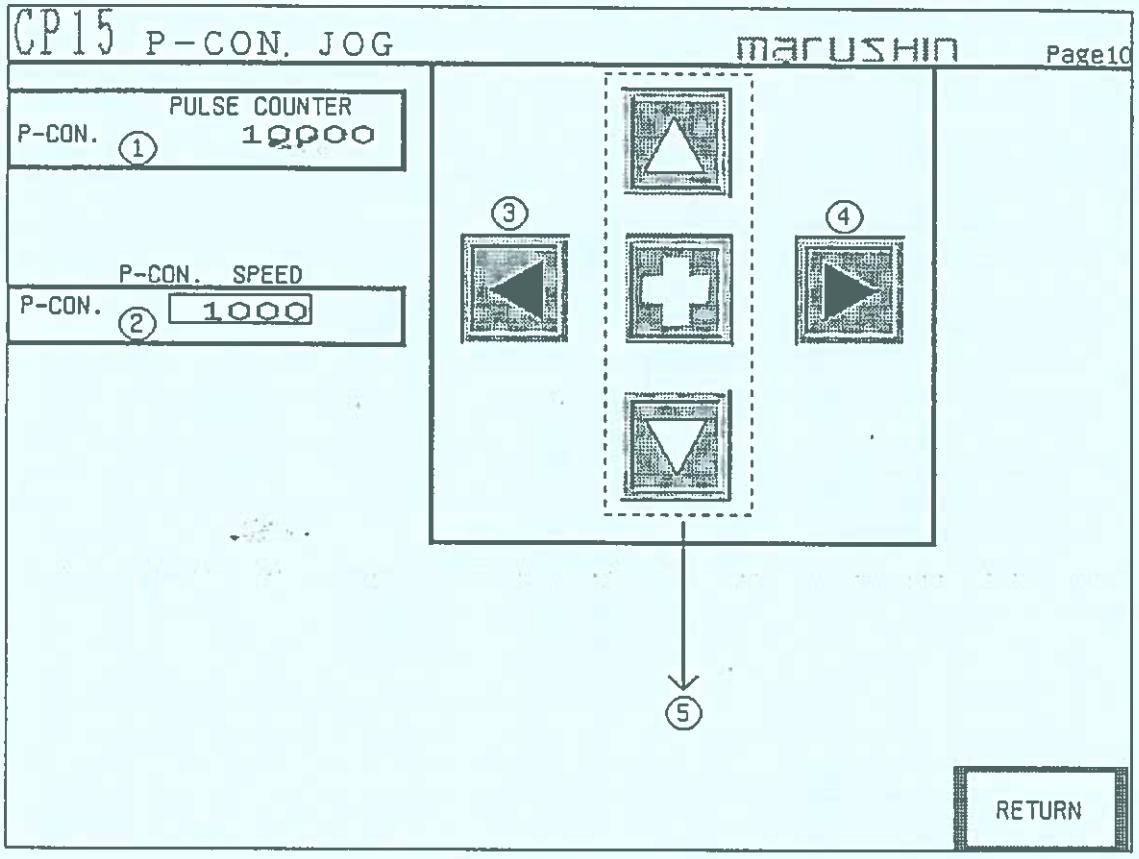
Function keys on SIZE SET image are explained next.



SZ6－1. EXPLANATION OF P－CON. JOG KEY

This is the image of Carry-in Conveyor jog feed.

The image of P-CON.JOG is down as below.



PC 1 . P-CON. PULSE COUNTER -----The present value of Carry-in Conveyor is display on this counter. [ex.] 100PULSE＝about 45mm

PC2. P－CON. SPEED ----- Setting the speed of Carry-in Conveyor in pulse

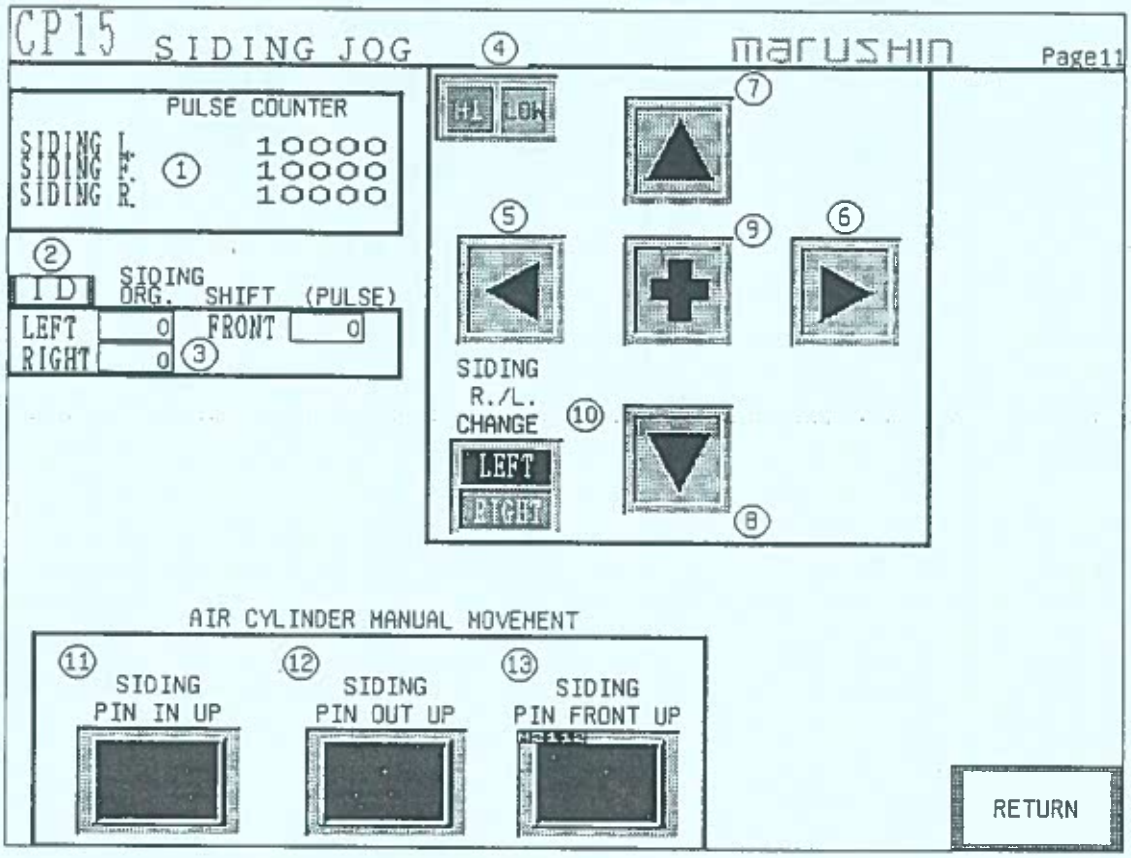
PC3. ◁ JOG key ----- This key is to move Carry-in Conveyor leftward on jog feed .

PC4. ▷ JOG key ----- This key is to move Carry-in Conveyor rightward on jog feed.

PC5. △ ✥ ▽ ----- These keys can't be used on this image.

SZ6－2. SIDING JOG KEY ----- This is the image of Siding Unit jog feed.

The image of SIDING JOG is drawn as below.



For detailed explanation of the above image, refer to each section as below.

①：SD1

②：SD2

③：SD3

⑫：SD12

⑬：SD13

The image of SIDING JOG is explained below..

SD1. PULSE COUNTER ----- The present value of each Siding axis is shown in pulse.

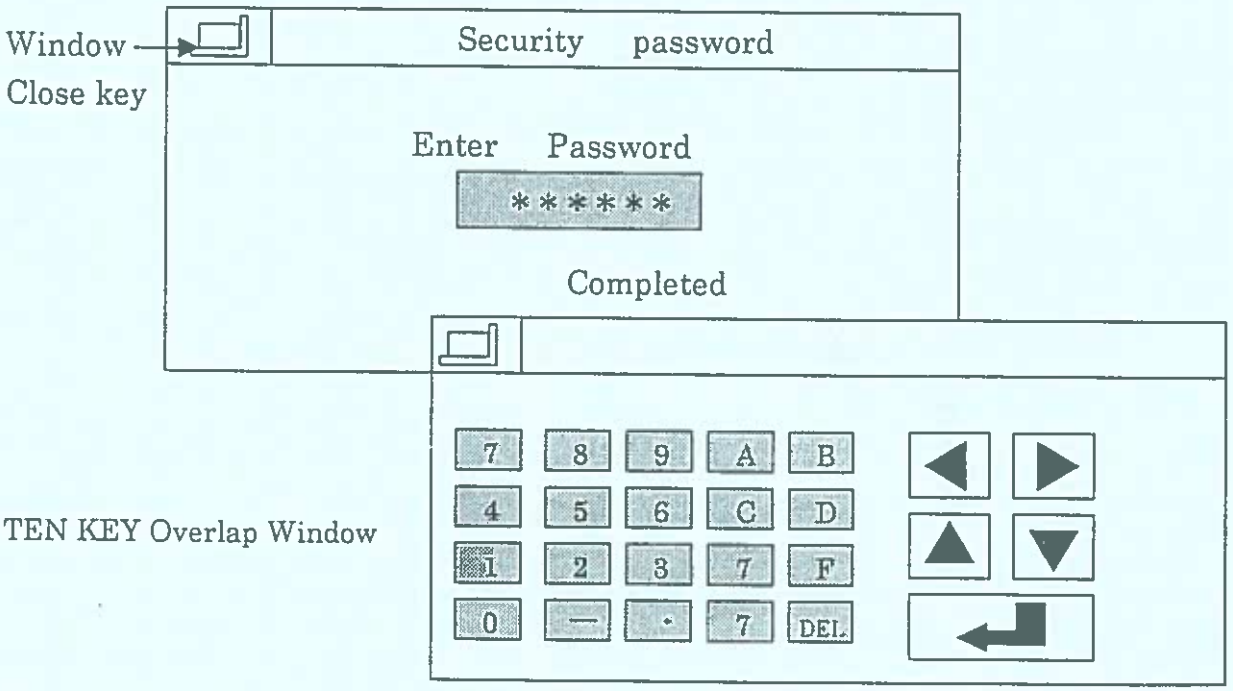
SIDING L. ----- The present value of pulse motor for left-reference.

SIDING F. ----- The present value of pulse motor on front.

SIDING R. ----- The present value of pulse motor for right-reference.

SD2. ID

The original position of stoppers can be changed intentionally. Original position shift is to change the original point of Siding axis electrically.
Before changing the original position, ID No. must be inputted to unlock the security.
The inputted number is not shown on Touch Panel.



TEN KEY Overlap Window

If the password is incorrect, the message below shows up.

"UNMATCHED PASSWORD"

In this case, delete it by DEL key, and input the correct one. After inputting the correct password, press Window close key to get back to SIDING JOG image.

SD3. SIDING ORG. SHIFT(PULSE)

Press the counter of each siding, then Ten Key Overlap Window turns up to input original position shift in pulse. For example, 100pulses equal about 6.3mm.
After its completion, turn off CP-15 and turn it on again to Siding to the new original position. And check out that original position is changed.

SD4. SIDING moving speed HI&LOW

This key is to choose HI or LOW speed on jog feed.

HI ----- 126 mm/sec
LOW ----- 6. 3mm/sec

SD5. SIDING KEY ◁

This is flowing-direction jog feed key of siding stopper chosen on SD10.
Feeding direction is leftward.

SD6. SIDING KEY ▷

This is flowing-direction jog feed key of siding stopper chosen on No. SD 10.
Feeding direction is rightward.

SD7. SIDING KEY △

This is squeeging-direction jog feed key of siding front stopper.
Feeding direction is backward.

SD8. SIDING KEY ▽

This is squeeging-direction jog feed key of siding front stopper.
Feeding direction is forward.

SD9. SIDING KEY 

This key is to return all Siding pins to the original position.

SD10. SIDING R./L. CHANGE

It's possible to choose right or left reference on both-reference option. The chosen reference is shown on auto-running image.

LEFT ----- Left reference

RIGHT ----- Right reference

SD11. L.SIDING PIN UP

Left siding pin pops up when this key gets pressed.
This key turns green with the pin up. When this key gets pressed again, the pin goes down and this key turns white back.

SD12. R.SIDING PIN UP

Right siding pin pops up when this key gets pressed.
This key turns green with the pin up. When this key gets pressed again, the pin goes down and this key turns white back.

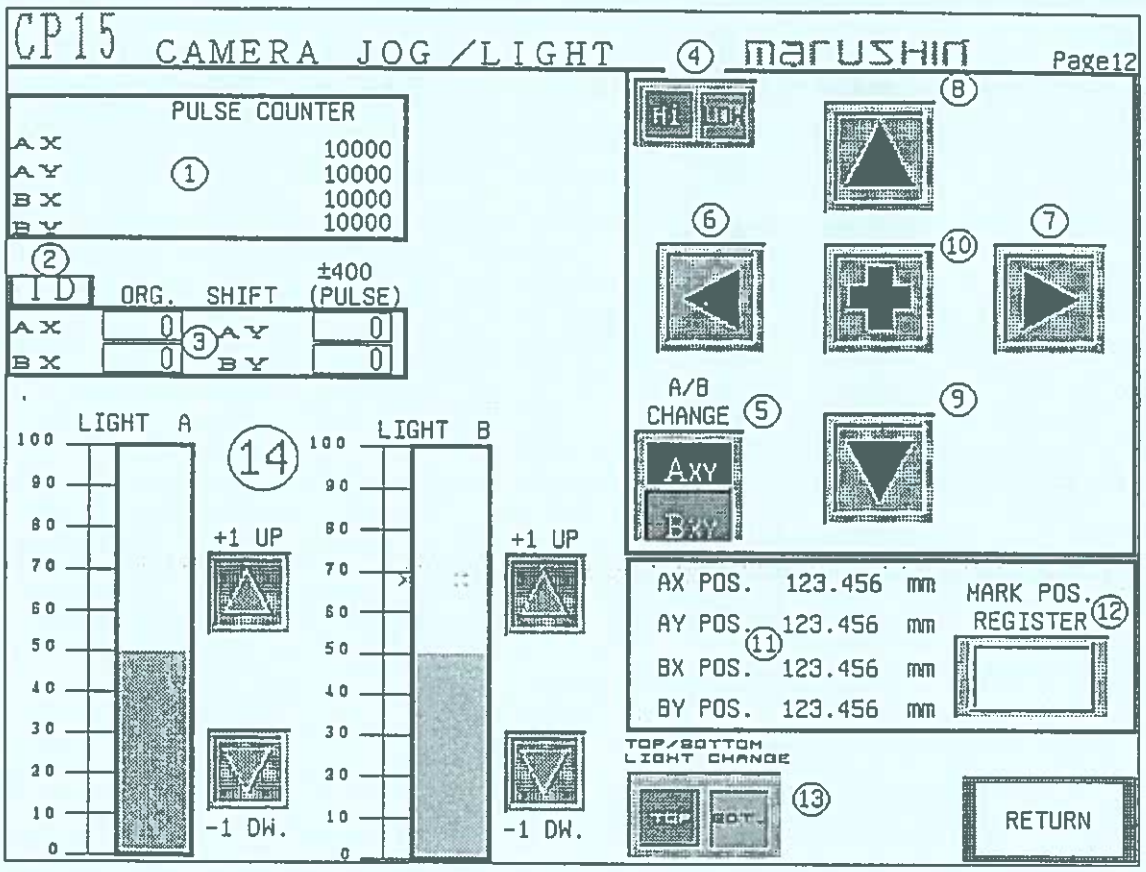
SD13. F.SIDING PIN FORWARD

Front siding pins move toward the center when this key gets pressed.
This key is green with the pins moving.
When this key gets pressed again, the pins move away from the center and this key turns white back.

SZ 6−3. CAMERA JOG KEY

The below image turns up when this key gets pressed.

The image of CAMERA JOG/LIGHT is drawn below.



For detailed explanation of the above image, refer to each section as below.

①: CM1

②: CM2

③: CM3

⋮

⑬: CM13

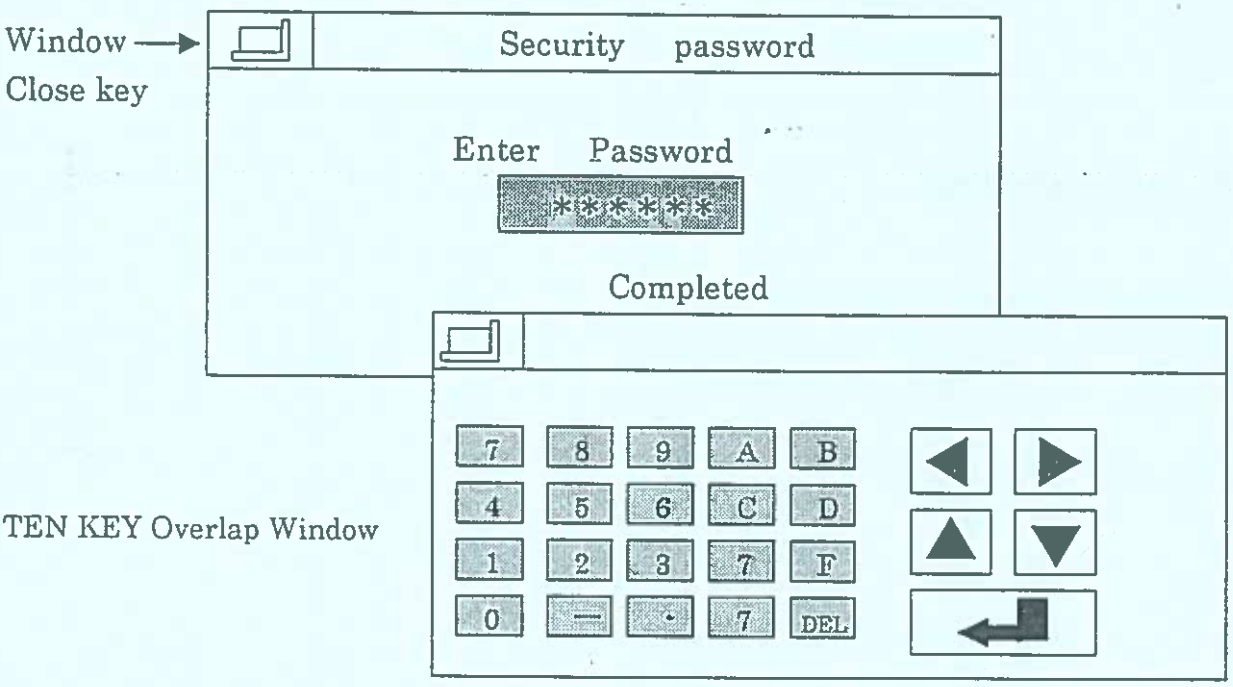
⑭: CM14

CM1. PULSE COUNTER

This is the pulse counter of present position of A／B-Camera. (unit:pulse)

CM2. ID

The position of the origin can be changed intentionally. Origin shift is to change the original point of A/B-Camera electrically.
Before changing the data, ID and NO, ＊＊＊＊＊＊ (6figures) must be pressed.
ID No. is a security password, the inputted number is not shown on touch panel.
Password, Ten Key Overlap Window pops up by pressing this ID key.



TEN KEY Overlap Window

Input a security password (6 figures) with Ten Key.
The message below turns up if the inputted password was incorrect.

"UNMATCHED PASSWORD"

In this case, delete it with DEL key and input the correct one.
When the correct password is inputted and Window Close key gets pressed, the image gets back to CAMARA JOG.

CM3. [ORG. SHIFT(PULSE)]

Input the origin shift in pulse on Ten Key Overlap Window.
For example, 100 pulses equal about 0.5mm of origin shift.
After setting is completed, turn off CP15 and turn it on again to set the new original point.
Check the position of the origin is moved.

CM4. [HI] , [LOW] KEY

This key is to choose HI or LOW speed of camera on jog feed .

[HI]	10 mm/sec.
[LOW]	0. 5mm/sec.

CM5. [A/B CHANGE] KEY

This key is to choose A or B Camera .

[AXY]	Choice of A-Camera
[BXY]	Choice of B-Camera

CM6. CAMERA JOG KEY [◁]

This is X axis jog feed key chosen camera on CM5 key.
The feeding direction is leftward in flowing .

CM7. CAMERA JOG KEY [▷]

This is X axis jog feed key chosen camera on CM5 key.
The feeding direction is rightward in flowing.

CM8. CAMERA JOG KEY [△]

This is Y axis jog feed key chosen camera on CM5 key.
The feeding direction is backward in squeeging.

CM9. CAMERA JOG KEY [▽]

This is Y axis jog feed key chosen camera on CM5 key.
The feeding direction is forward in squeeging.

CM10. CAMERA JOG KEY [✥]

This is the key to the chosen camera onCM5.to return the original position.

CM11. The present positions of A/B-Camera are shown as below. (unit: mm)

CAMERA AX POS.	The present position of the X axis of A-Camera
CAMERA AY POS.	The present position of the Y axis of A-Camera
CAMERA BX POS.	The present position of the X axis of B-Camera
CAMERA BY POS.	The present position of the Y axis of B-Camera

CM12. [MARK POS. REGISTER] KEY

This key is used to register the camera position on [SIZE SET] image after setting A/B-CAMERA by jog feeding.

CM13. TOP/BOTTOM LIGHT CHANGE KEY

This switch is to choose Top or Bottom light.

TOP. ----- Top light

BOT. ----- Bottom light

CM14. LIGHT A & LIGHT B KEY

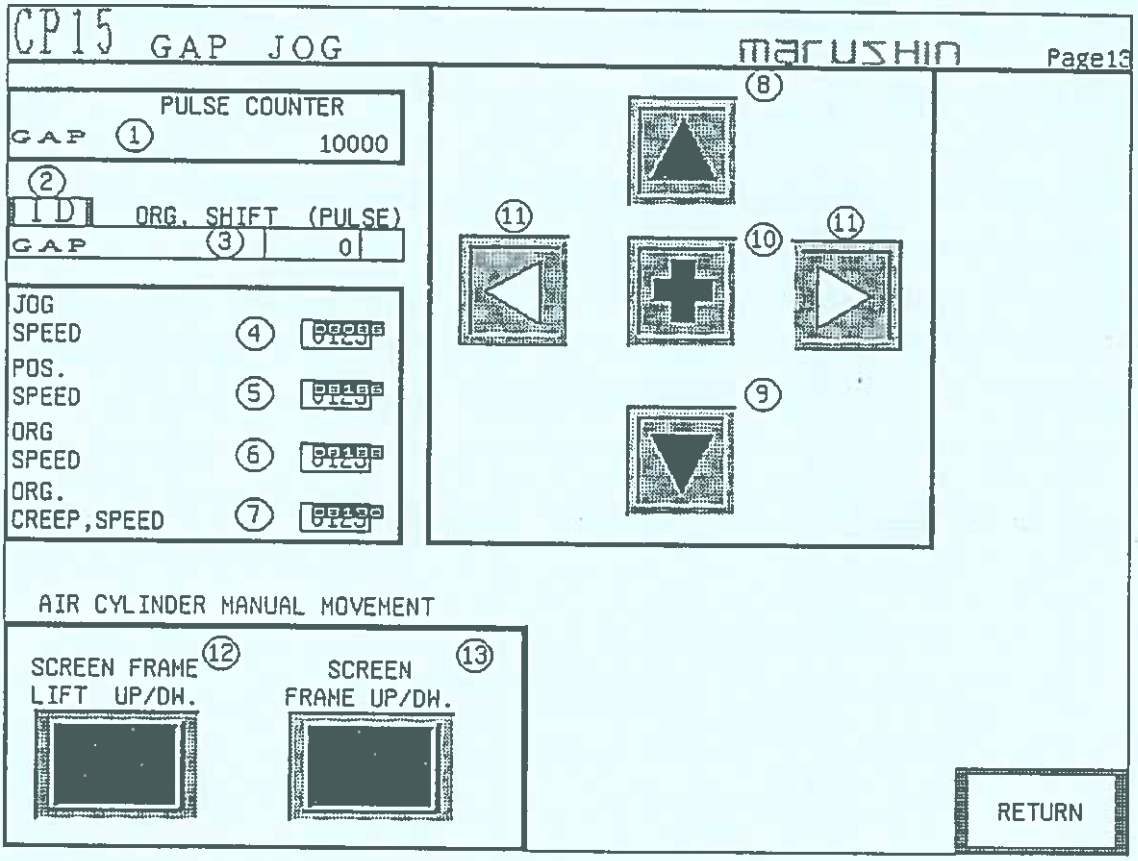
These are to adjust the light level of A/B-Camera.

The bar graphs under LIGHT A&B show the present light level and the range is from 0 % to 100%. On changing the light level greatly, touch this bar graph.

Use △ +1 UP、▽ −1 DW to change by each percent.

SZ6－4. GAP JOG KEY

This is the image of Screen Gap jog feed. The image of GAP JOG is drawn below.



For detailed explanation of the above image, refer to each section as below.

①:GP1
②:GP2
③:GP3

⑫:GP12
⑬:GP13

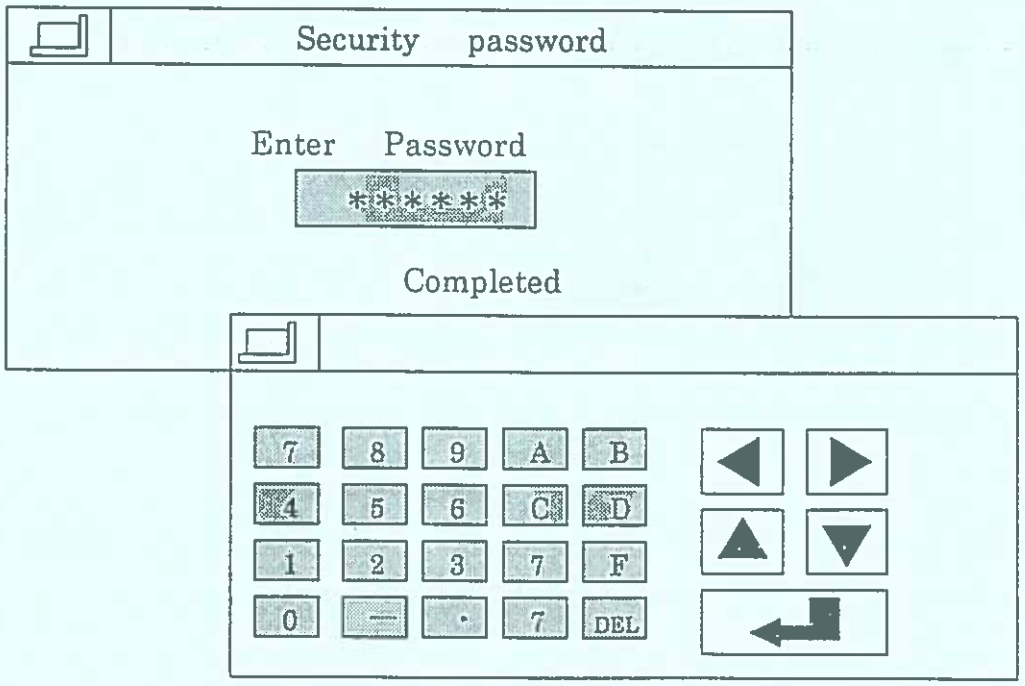
The image of GAP JOG is explained below.

GP1. PULSE COUNTER (unit: pulse)

The present value of Screen Gap is showed on this counter.

GP2. ID (unit pulse)

The original position of Screen Gap can be changed intentionally. Origin shift is to change the original point of Screen Gap unit electrically.
Before changing the data, ID and NO, ＊＊＊＊＊＊ (6figures) must be pressed.
ID No. is a security password, the inputted number is not shown on touch panel.
Password, Ten Key Overlap Window pops up by pressing this ID key.



Input a security password (6 figures) with Ten Key.

The message below turns up if the inputted password was incorrect.

"UNMATCHED PASSWORD"

In this case, delete it with DEL key and input the correct one.

When the correct password is inputted and Window Close key gets pressed, the image gets back to GAP JOG.

GP3. GAP ORG. SHIFT(PULSE)

Input the origin shift in pulse on Ten Key Overlap Window.
For example, 100 pulses equal about 0.005mm of origin shift.
After setting is completed, turn off CP15 and turn it on again to set the new original point.
0.005mm-moved position from the original position turns new original position.
Confirm that the original position is moved.

GP4. JOG SPEED

This display shows the present jog feed speed of GAP. To change the speed, touch the present value. Then, Ten Key Overlap Window pops up.

GP5. POS. SPEED

This display shows the setting speed to the set position of GAP. To change the speed, touch the present value. Then, Ten Key Overlap Window pops up.

GP6. ORG. SPEED

This display shows the returning speed of GAP to the original position.
To change the speed, touch the present value. Then, Ten Key Overlap Window pops up.

GP7. ORG. CREEP SPEED

This display shows the creep speed of GAP to return GAP to the original position.
To change the speed, touch the present value. Then, Ten Key Overlap Window pops up.

GP8. SCREEN GAP KEY 

This is the jog key of Screen GAP. It moves upward.

GP9. SCREEN GAP KEY 

This is the jog key of Screen GAP. It moves downward.

GP10. SCREEN GAP KEY 

This is the key to return Screen GAP to the original position mechanically.

GP11. SCREEN GAP KEY 

These keys can't be used on GAP JOG image .

GP12. SQUEEGEE FRAME UP/DW

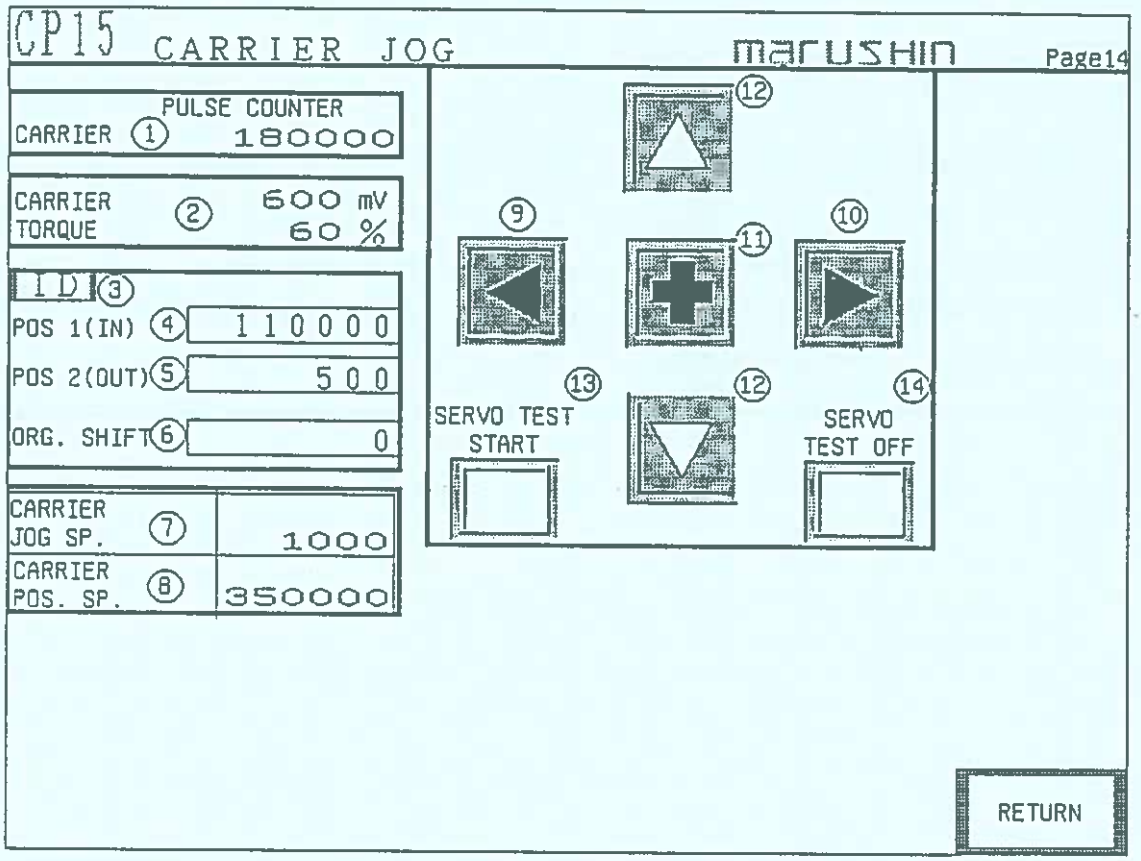
Squeegee Frame goes up to the limit when this key gets pressed. Squeegee Frame goes down to the lowest point when it gets pressed again. While Squeegee Frame moving, this key remains green. After the moving is completed, this key turns white back.

GP13. SCREEN FRAME UP/DW

Screen Frame goes to the down position when this key gets pressed. Squeegee Frame goes to up position when it gets pressed again. While Squeegee Frame moving, this key remains green. After the moving is completed, this key turns white back.

SZ6−5. CARRIER JOG KEY

This is the image of the jog feed of Carrier.
The image of CARRIER JOG is drawn as below.



For detailed explanation of the above image, refer to each section as below.

①:CR1
②:CR2
③:CR3
⋮
⑬:CR13
⑭:CR14

The image of CARRIER JOG is explained below.

CR1. PULSE COUNTER

The present value of Carrier position is shown on this counter.

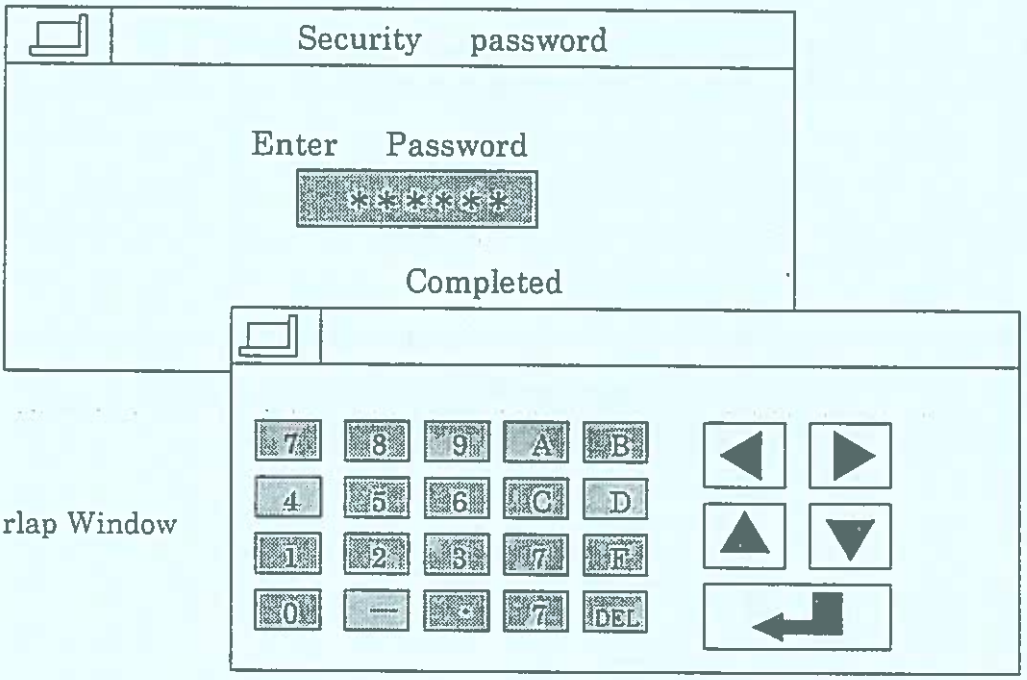
CR2. CARRIER TORQUE

The servo motor torque of Carrier is shown. The appropriate torque ranges is from 50% to 80%.

fn.1. If the torque gets over 100%, CP- 15 makes a servo-motor-overloaded alarm. Make sure to keep it from 50% to 80%.

CR3. ID

The position of the origin can be changed intentionally. Origin shift is to change the original position of Carrier electrically.
Before changing the data, ID and NO, ＊＊＊＊＊＊ (6figures) must be pressed.
ID No. is a security password, the inputted number is not shown on touch panel.
Password, Ten Key Overlap Window pops up by pressing this ID key.



TEN KEY Overlap Window

Input a security password (6 figures) with Ten Key.
The message below turns up if the inputted password was incorrect.

"UNMATCHED PASSWORD"

In this case, delete it with DEL key and input the correct one.
When the correct password is inputted and Window Close key gets pressed, the image gets back to CARRIER JOG.

CR4. POS 1(IN)

This is the position pulse data of Carrier servo motor at IN-side.
To change it, input ID No. surely. For details how to input ID No., refer to CR3.

CR5. POS 2(OUT)

This is the position pulse data of Carrier servo motor at OUT-side.
To change it, input ID No.surely. For details how to input ID No., refer to CR3.

CR6. ORG. SHIFT

Press the counter of the key, so Ten key Overlap Window turns up to input origin shift in pulse. For example, 100 pulses equal about 0.478 mm. After its completion, turn off CP-15 and turn it on again to set the new original position.
And check out the origin is moved.

CR7. CARRIER JOG SP.

This display shows the jog feed speed of Carrier.
To change the speed, touch the present value. Then, Ten Key Overlap Window pops up.

CR8. CARRIER POS. SP.

This key shows the speed of setting the position of Carrier.
To change the speed, touch the present value. Then, Ten Key Overlap Window pops up.

CR9. CARRIER JOG KEY ◁

This is the jog feed key of Carrier. It moves leftward.
When the key No. CR14 SERVO TEST is on, this key gets Carrier to the IN-position.

CR10. CARRIER JOG KEY ▷

This is the jog feed key of Carrier. It moves rightward.
When the key No. CR14 SERVO TEST is on, this key gets Carrier to the OUT-position.

CR11. CARRIER JOG KEY ⌂

This key returns Carrier to the original position mechanically.

CR12.CARRIER JOG KEY △ ▽

These keys can't be used on CARRIER JOG .

CR13. SERVO TEST START KEY

Press this key to test-run Carrier IN and OUT automatically. Make sure to turn on No.CR14 SERVO TEST is ON, otherwise test-running of Carrier can't start.

CR14. SERVO TEST

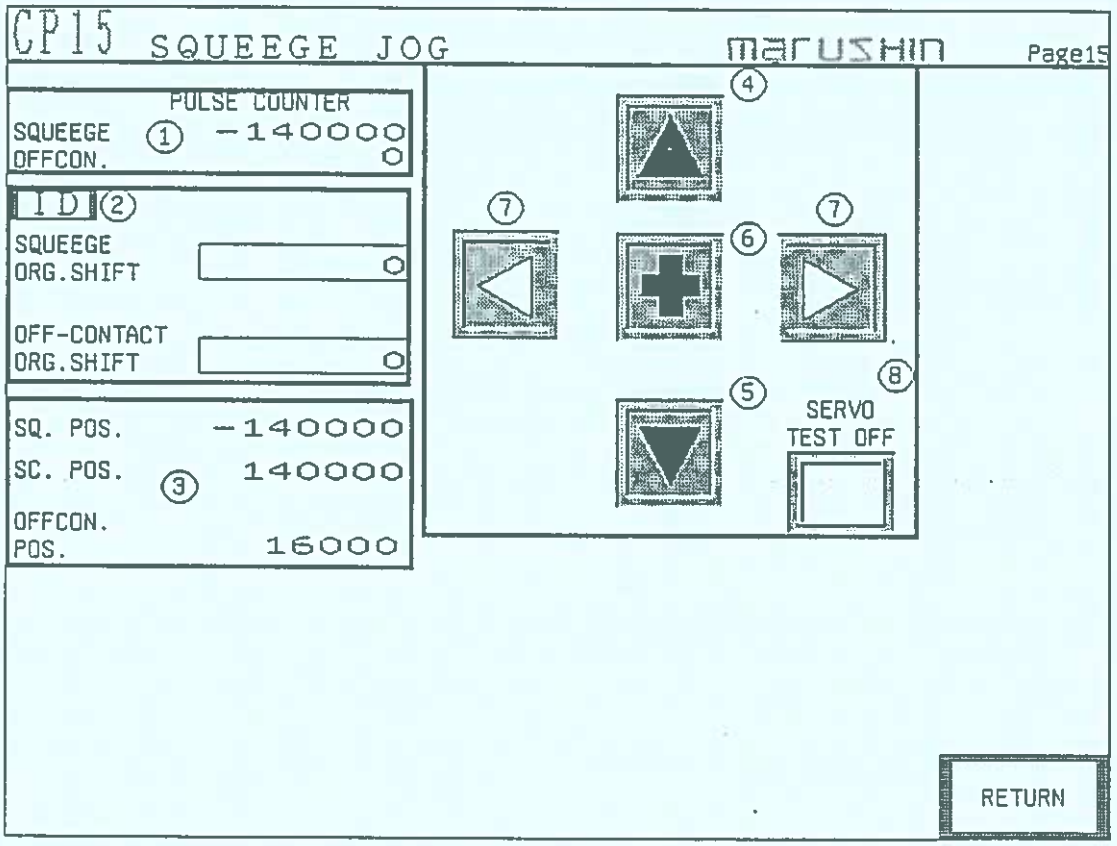
This key is to choose moving Carrier by jog feed or by each set position data.

ON -----By set position data
OFF -----By jog feed

SZ6－6. SQUEEGE JOG KEY

This is the image of Squeegee and Off-Contact axis.

The image of SQUEEGEE JOG is drawn below



For detailed explanation of the above image, refer to each section as below.

①:SE1

②:SE2

③:SE3

⑦:SE7

⑧:SE8

The image of SQUEEGEE JOG is explained below.

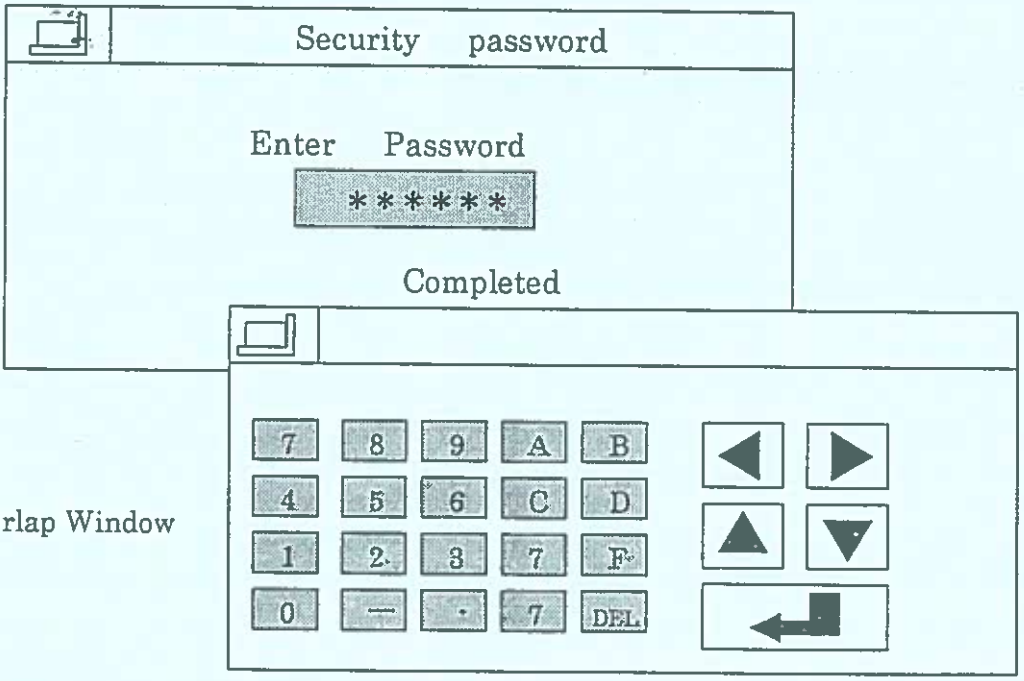
SE1. PULSE COUNTER

The present position of Squeegee and Off-Contact are shown on this pulse counter.

SE2. ID

The position of the origin can be changed intentionally. Origin shift is to change the original position of Squeegee and Off-Contact electrically.
Before changing the data, ID and NO, ＊＊＊＊＊＊ (6figures) must be pressed.
ID No. is a security password, the inputted number is not shown on touch panel.
Password, Ten Key Overlap Window pops up by pressing this ID key.

Window Close key →



TEN KEY Overlap Window

Input a security password (6 figures) with Ten Key.

The message below turns up if the inputted password was incorrect.

"UNMATCHED PASSWORD"

In this case, delete it with DEL key and input the correct one.

When the correct password is inputted and Window Close key gets pressed, the image gets back to SQUEEGE JOG.

SQUEEGE ORG. SHIFT

Press the counter, so Ten key Overlap Window turns up to input origin shift in pulse. For example, 100 pulses equal about 0.245 mm. After its completion, turn off CP-15 and turn it on again to set the new original position. And check out the origin is moved.

OFF-CONTACT ORG. SHIFT

Press the counter, so Ten key Overlap Window turns up to input origin shift in pulse. For example, 100 pulses equal about 0.06 mm. After its completion, turn off CP-15 and turn it on again to set the new original position. And check out the origin is moved.

SE3. SQ. POS., SC. POS., OFFCON. POS.

SQ. POS. ----- The display of starting position of Squeegee
SC. POS. ----- The display of ending position of Squeegee
OFFCON. POS. --- The display of the amount of Off-Contact

fn. The displays above can't be changed deliberately. These are automatically changed by setting the size of PCB and the amount of Off-Contact in SIZE SET image.

SE4. SQUEEGE JOG KEY [△]

This is the jog feed key of Squeegee and Off-Contact.
Squeegee ----- backward direction
Off-Contact ----- up direction

When [SERVO TEST] is ON, Squeegee and Off-Contact simultaneously move to the set position.

SE5. SQUEEGE JOG KEY [▽]

This is the jog feed key for Squeegee and Off-Contact.
Squeegee ----- forward direction
Off-Contact ----- down direction

When [SERVO TEST] is ON, Squeegee and Off-Contact simultaneously move to the set position.

SE6. SQUEEGE JOG KEY [✥]

This key returns Squeegee and Off-Contact to the original position mechanically.

SE7. SQUEEGE JOG KEY [◁] [▷]

These keys can't be used on [SQUEEGE JOG].

SE8. SERVO TEST

This key is to choose moving Squeegee and Off-Contact by jog feed or by each set position data.

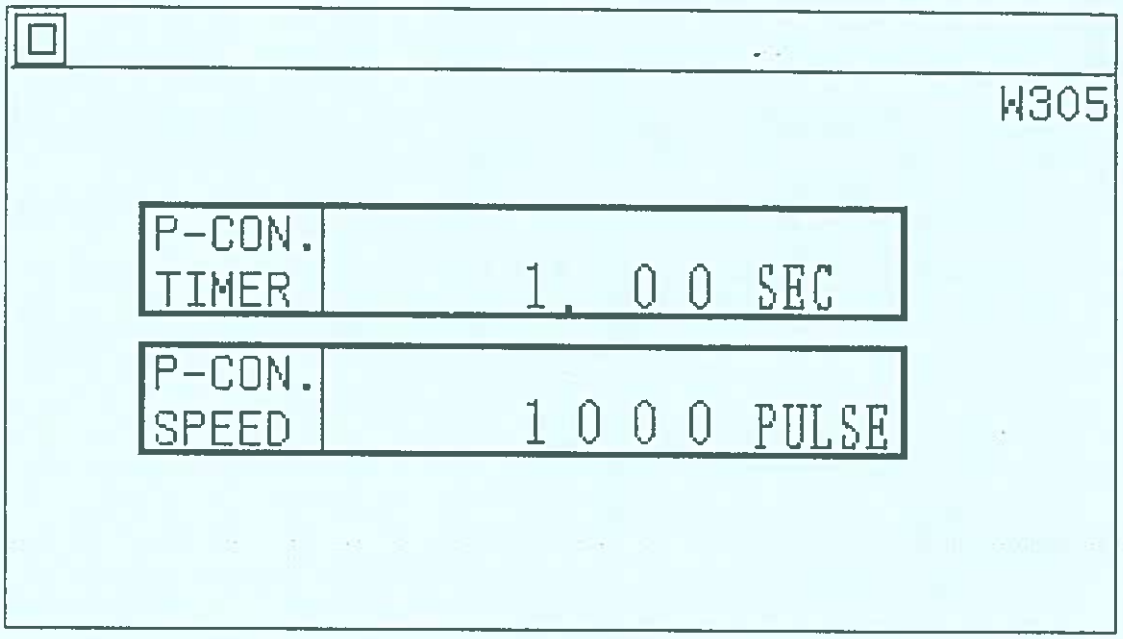
ON -----By set position data

OFF -----By jog feed

M18-3. P−CON. TIME/SPEED KEY

Setting the rotating time and the speed of Carry-in Conveyor .

When this key gets pressed, the below window pops up.



P-CON. TIMER (unit: sec.)

This timer is to stop Carry-in Conveyor from the Board-in sensor gets activated.

Press the counter to input a new value. Then, Ten-Key Overlap Window pops up.

P-CON. SPEED (unit: pulse)

This display shows Carry-in Conveyor speed (Unit pulse)

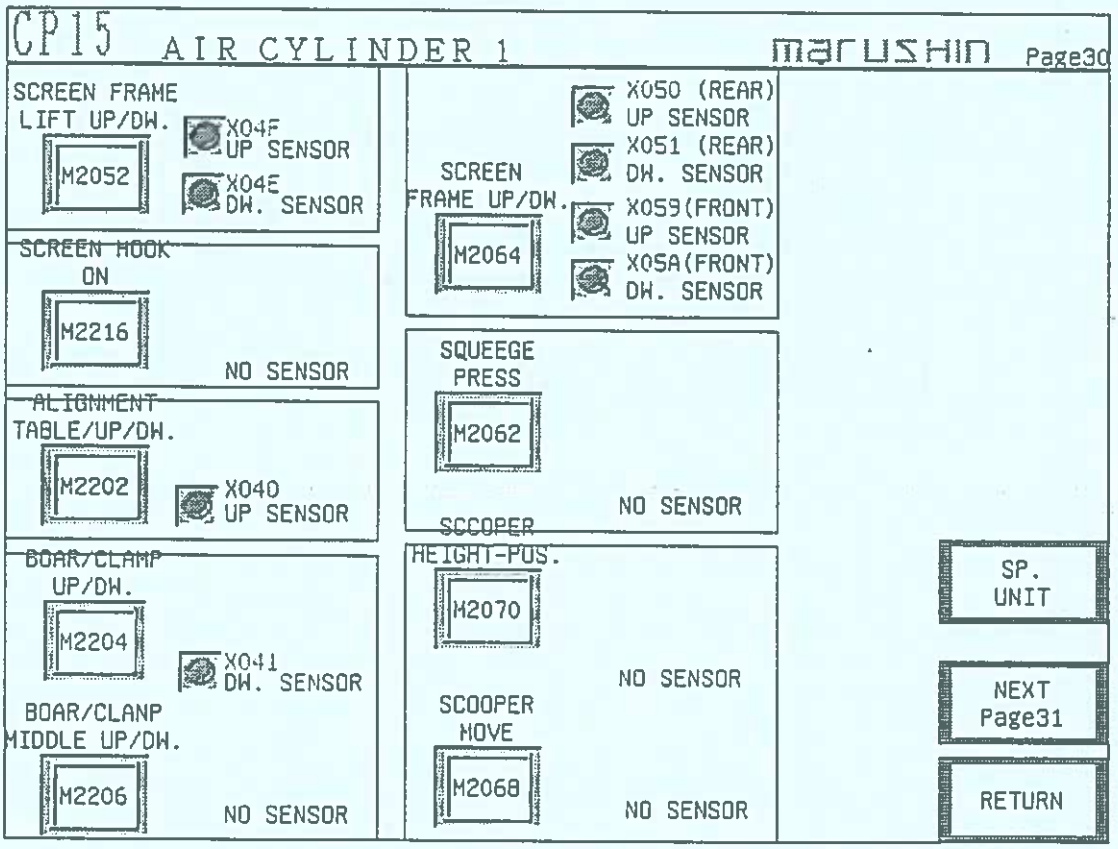
Press the counter to input a new value. Then, Ten-Key Overlap Window pops up.

M18-5. AIR CYLINDER KEY

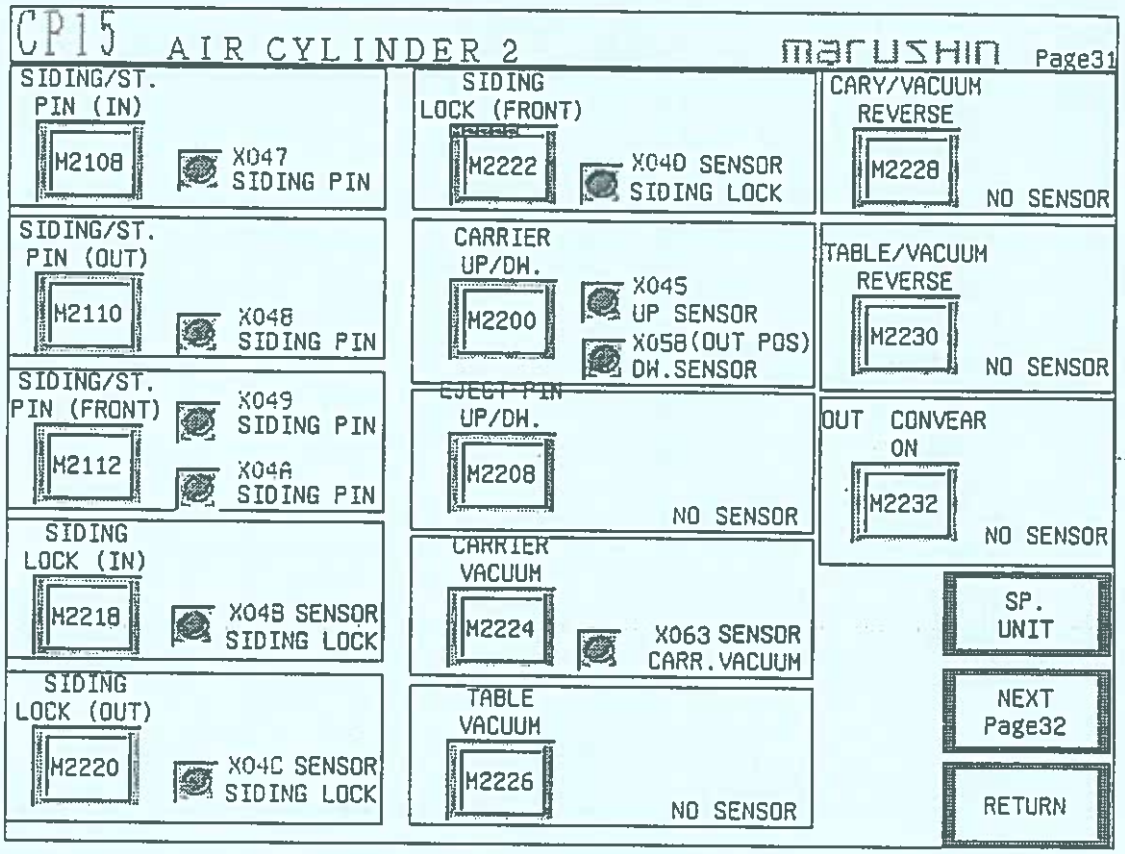
On this image, each cylinders can gets moved separately.

It is used to check the movement.

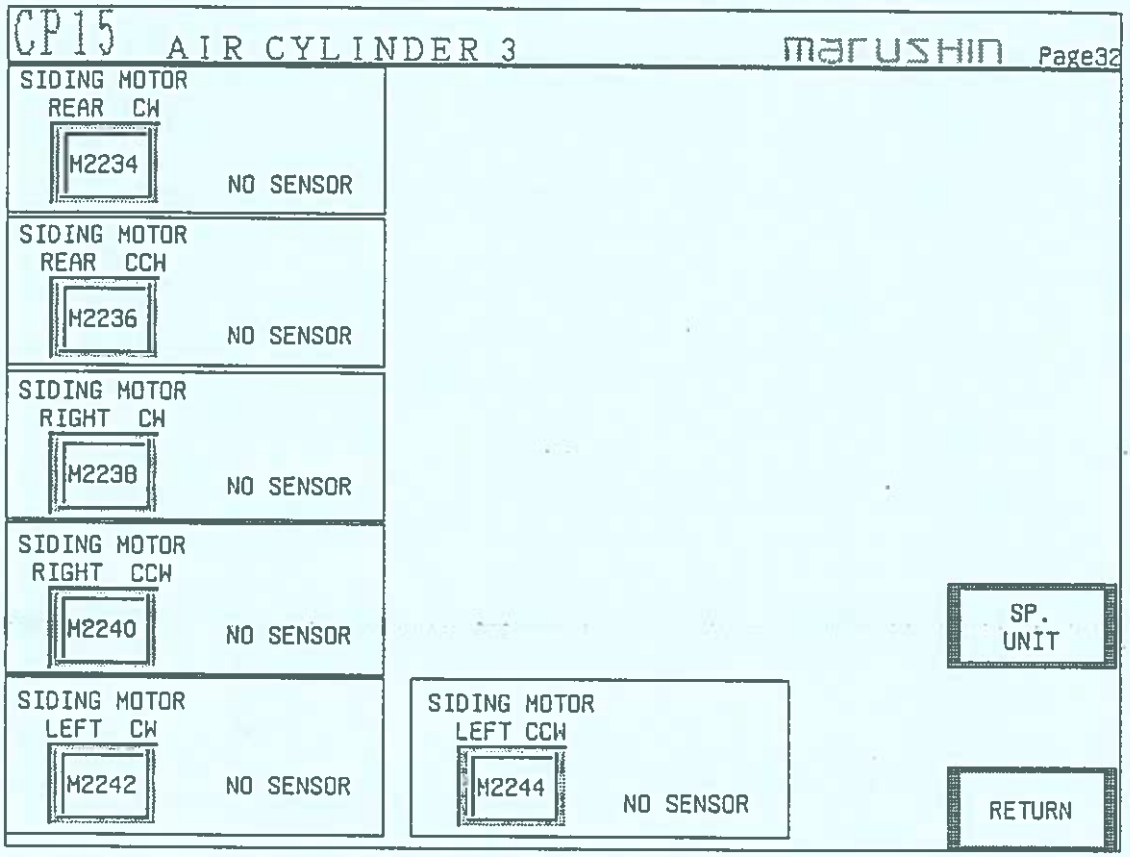
The below image is AIR CYLINDER 1



The image of AIR CYLINDER 2 is drawn as below.



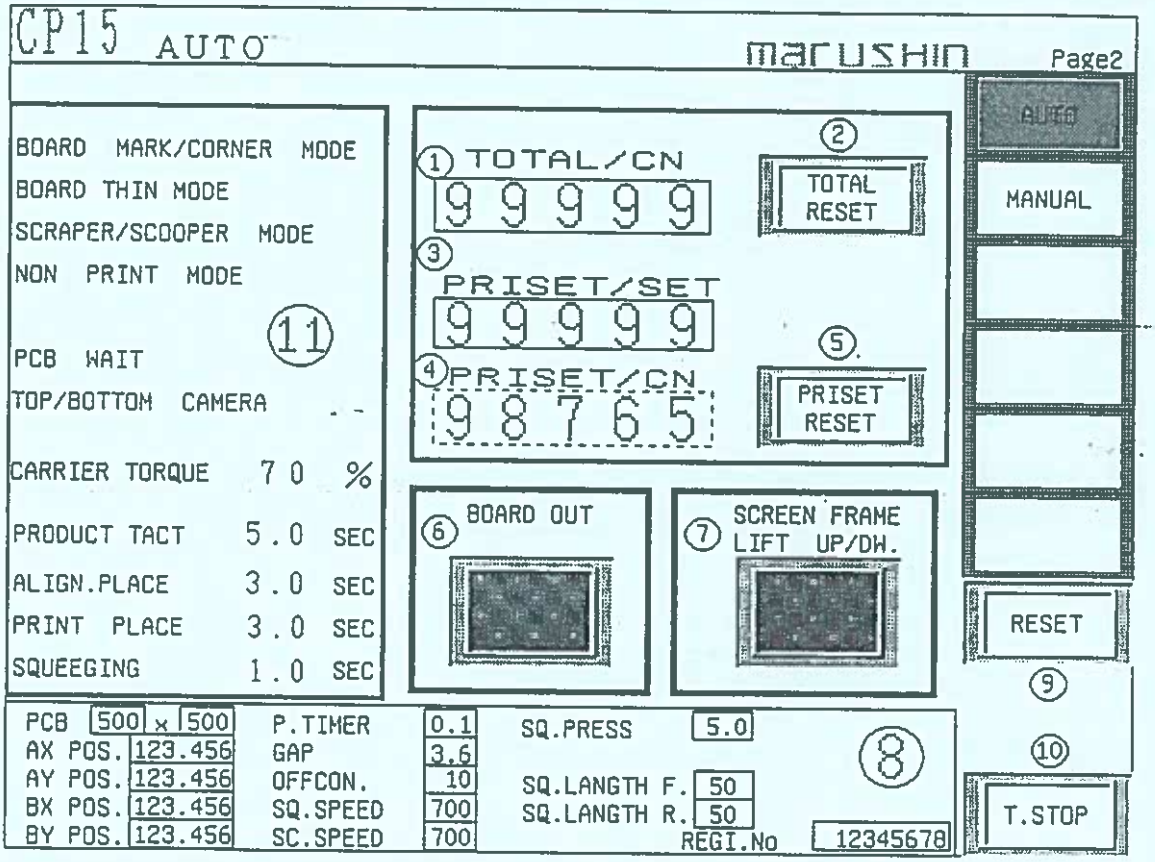
The image of AIR CYLINDER 3 is drawn below.



A signal lamp of the device turns on if the key of the cylinder with the sensor gets pressed.

2—3. How to operate Touch Panel (AUTO)

The image below shows up when [AUTO] key gets pressed.



For detailed explanation of the above image, refer to each section as below.

①:A1
②:A2
③:A3
⋮
⑩:A10
⑪:A11

Functions of all the keys of [AUTO] image are as follows.

A1. [TOTAL/CN]

This counter shows the total of boards printed on auto− running.
The maximum count is 99, 999.

A2. [TOTAL RESET]

The counted number on [TOTAL/CN] turns 0 if this key gets pressed.

A3. [PRISET/SET]

This key is to stop auto−running at the set total.
To change the number, touch the counter, and then Ten Key Overlap Window shows up.

A4. [PRISET/CN]

This is the up−counter. If the number on [PRISET/CN] turns number of [PRISET/SET] exactly, CP−15 stops carrying in a PCB to clean Screen. Press Start switch to re-start CP−15, and the counter of [PRISET/CN] gets to clear 0.

fn. 1. CP−15 doesn't re-start unless it's on AUTO mode. Make sure to press Entry switch and get an OK when you enter the space of Area Sensor. If you enter there without this deed, the motors and air get to be cut off.

A5. [PRISET RESET]

This key is used to clear [PRISET/CN].
It's possible to make the figure of Priset Counter0 while running.

A6. [BOARD OUT]

If this key gets pressed on auto-running, CP−15 carries a remaining board onto Carry-out Conveyor after alignment and printing.
While this function is on, another board is not carried in to CP-15 and [BOARD OUT] blinks in green.

[BOARD OUT] turns white back if [START] get pressed to release this function.

A7. [SQUEEGEE FRAME UP/DW]

Squeegee Frame goes up if this key gets pressed with Squeegee Frame down on auto-running. Squeegee Frame doesn't move on squeeging even if this key is pressed. Squeegee Frame starts to move after squeeging is completed

fn. 1. Make sure to press Entry switch and get an OK when you enter the space of Area Sensor to clean Screen Mask. If you enter the space without this deed, the motors and air turn cut off.

A8. Displaying selected printing conditions of CP－15

These are displayed based on [RECIPE] in [SIZE SET] which are explained ahead.

[PCB 610×510]	board size (flowing direction ×squeeging direction)
[AX POS. 123. 456]	X axis position of A-Camera
[AY POS. 123. 456]	Y axis position of A-Camera
[BX POS. 123. 456]	X axis position of B-Camera
[BY POS. 123. 456]	Y axis position of B-Camera
[P. TIMER 0. 1]	Carry-in Conveyor Stop timer
[GAP 3. 6]	The amount of Screen Gap
[OFFCON. 10. 0]	The amount of Off-Contact
[SQ. SPEED 700]	Squeeging speed
[SC. SPEED 700]	Scraper／Scooper speed
[SQ. PRESS 5. 0]	Squeeging pressure
[SQ. LENGTH F. 50]	Squeegee front blank length
[SQ. LENGTH R. 50]	Squeegee back blank length
[REGI. NO 12345678]	Use's registered number (maximum 8figures)

For more details, refer to M18-3 [SIZE SET] key.

A9. [RESET]

If this key gets pressed on auto-running, PLC program turns reset.
All the movements come to a stop as soon as this key is pressed. Moving parts come to a stop after the moving is completed. Take away a remaining board to re-start, press [START] switch after returning all the units and motors to the original position.

fn. 1. This key is to reset PLC program, not for an emergency stop.
An emergency stop not only resets PLC program but cuts off the supply of electricity to the motors and the air-actuators .

A10. [T. STOP]

CP－15 comes to a temporary stop [T. STOP] gets pressed. But moving parts come to a stop after the moving is completed.
Signal tower turns yellow and START switch blinks in green to let you know a temporary stop. Press START switch to re-start.

fn. 1. Use this key for check-out without taking away a remaining PCB. CP－15 is not guaranteed to run correctly if a remaining PCB gets moved or taken away while running.

A11. Displaying of present chosen mode and tact

The displays are explained below.

BOARD MARK
/ CORNER MODE ·····Display of the present chosen alignment mode.

BOARD THIN MODE ····In case thin board mode is on, this display shows up.

SCRAPER
/ SCOOPER MODE ·····Scraper or Scooperis chosen, either one shows up.

NON PRINT MODE ····In case non print mode is on, this display shows up.

For more details of the display above, refer to Ch.2 §2 "How to operate Touch Panel".

PCB WAIT ·····This sign blinks in green if a given time is passed and a PCB is not carried in.

TOP
/BOTTOM CAMERA ····· This shows the choice of Top Camera or Bottom Camera.

CARRIER TORQUE ····This shows Carrier pushing torque of Carrier axis at IN/OUT.

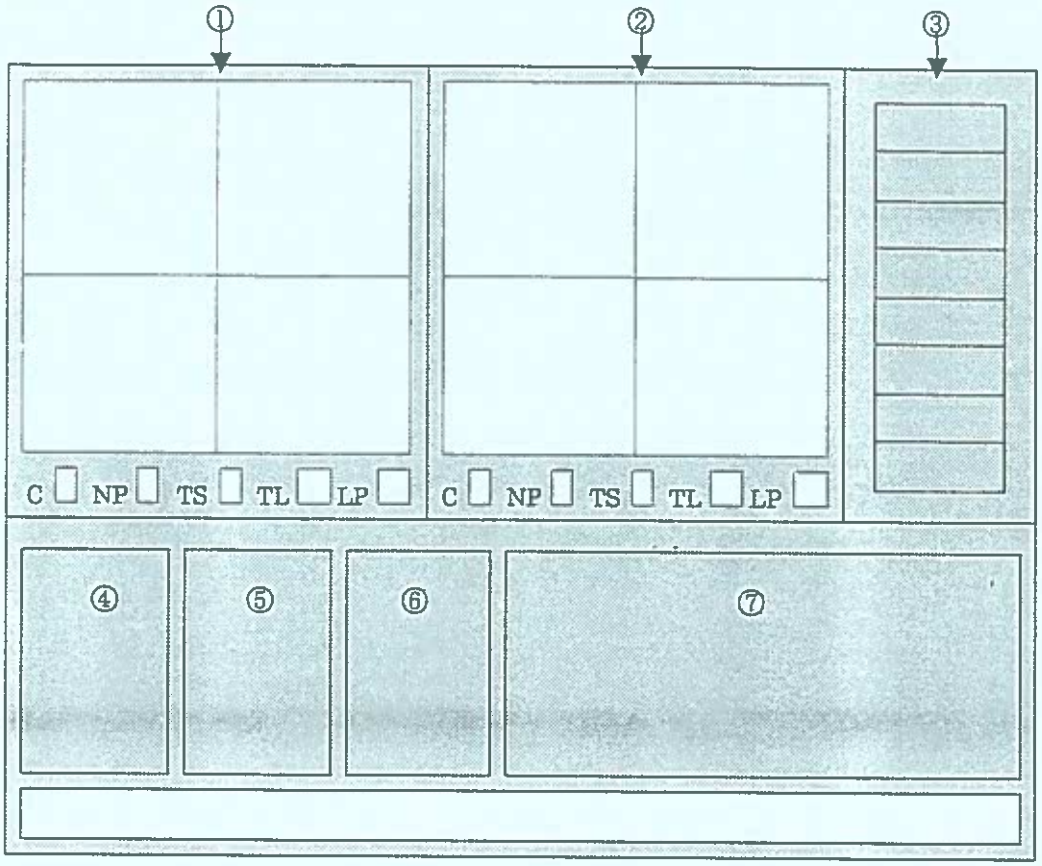
PRODUCT TACT ····This shows time to produce a PCB from Carry-in to carrying-out, which is tact time per board to produce

ALIGN. PLACE ····This shows time for a PCB from being carried in onto Carry-in Conveyor to being aligned on auto-running

PRINT PLACE ·····This shows time for a PCB to be completed this at Printing Section on auto-running.

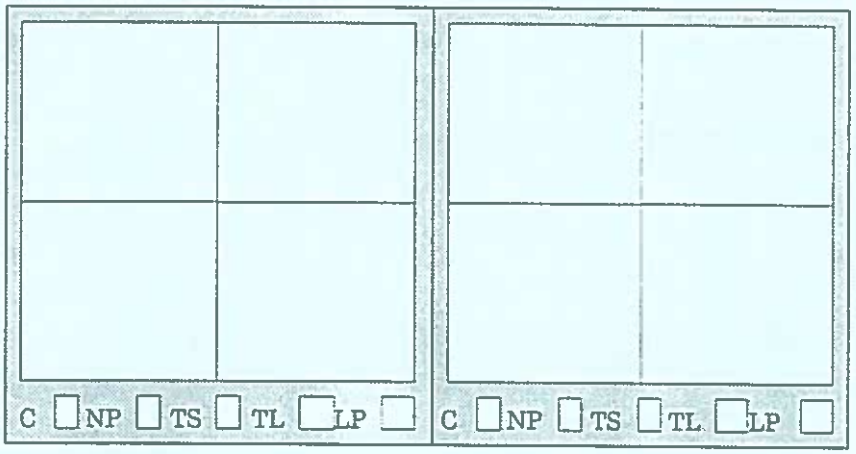
SQUEEGING ·····This shows time for Squeegee from starting to stopping.

2-4. EXPLANATION OF IMAGE PROCESSING TOUCH PANEL



①	A-CAMERA MONITOR	—— display the image of A-CAMERA
②	B-CAMERA MONITOR	—— display the image of B-CAMERA
③	FUNCTION KEY	—— use for initialization and each single motion
④	BINARY 1	—— use for binary setting
⑤	ALIGNMENT	—— use for alignment setting
⑥	JUDGEMENT	—— set the alignment allowance
⑦	MEASUREMENT	—— display measured values

①. ② MONITOR OF A-CAMERA, B-CAMERA



C—Camera No.

1 A-CAMERA (Top)
2 B-CAMERA (Top)
3 A-CAMERA (Bottom)
4 B-CAMERA (Bottom)

* Camera No. can be changed by choosing camera on Operation Touch Panel.

N P—Conversion of Negative / Positive

N - set dark part as the mark
P - set light part as the mark

*Press ALIGN to be able to change this setting.

T S—Background level

H - High sensitivity
M - Middle sensitivity
L - Low sensitivity

*Press ALIGN to be able to change this setting.

T L—Binary level

Input the value by Ten Key

Normal range ± 20

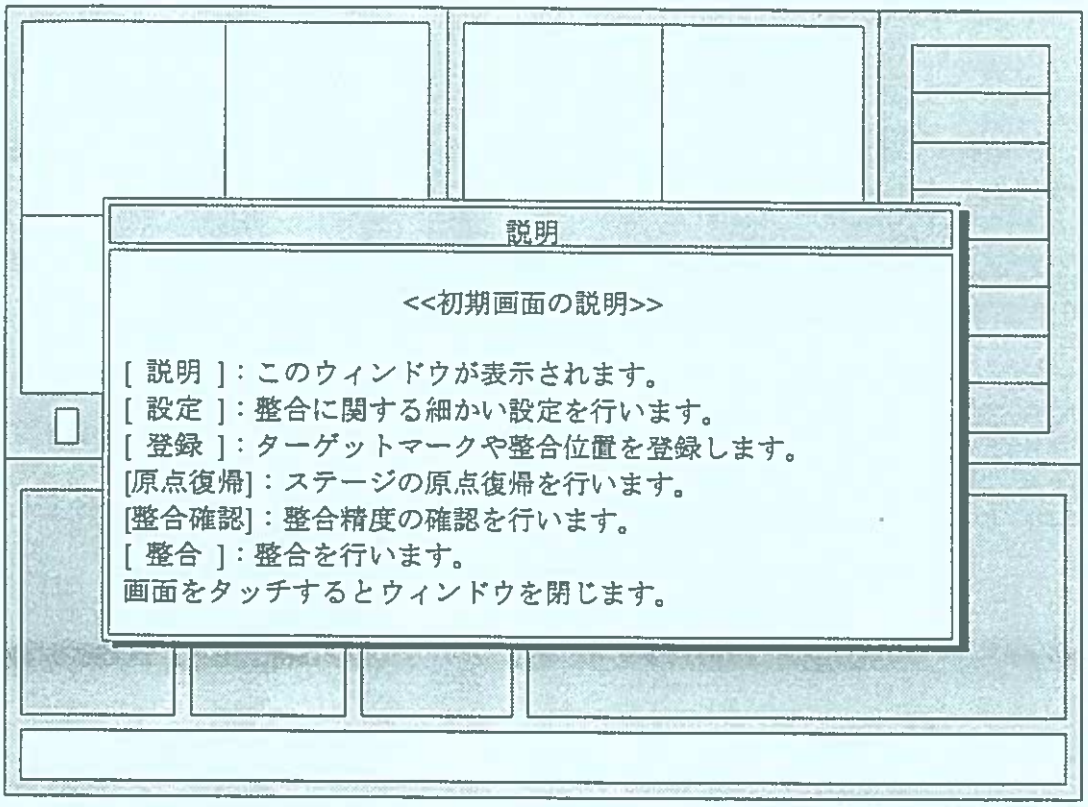
*Press ALIGN to be able to change this setting.

L P—Light level

No use for CP-15
Set up the light level on Operation Touch Panel.

③ FUNCTION KEY

③－1 EXPLAN. KEY

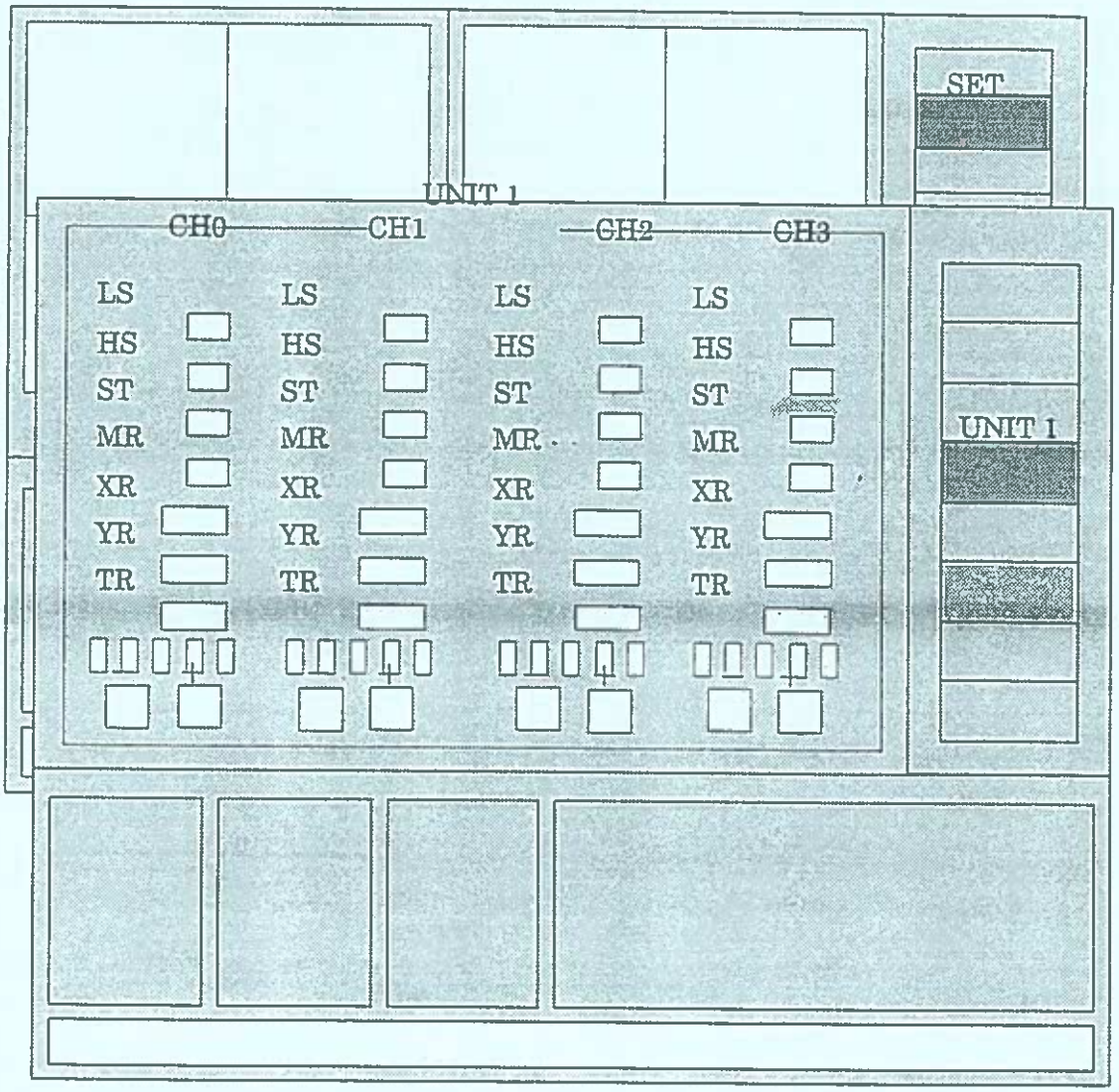


If EXPLAN. is pressed, the above window shows up. However, at this moment, only Japanese is available. The meaning of above Japanese window is as follows.

<<Explanation of initial menu>>
[EXPLAN.] : display this window.
[SET] : set detail parameters about alignment.
[MEMORY] : register target marks and alignment position.
[ORG.] : get 3-axis Table to the original position.
[AL.CHECK] : check the result of alignment.
[ALGN.] : make alignment.

③－2 [SET] KEY

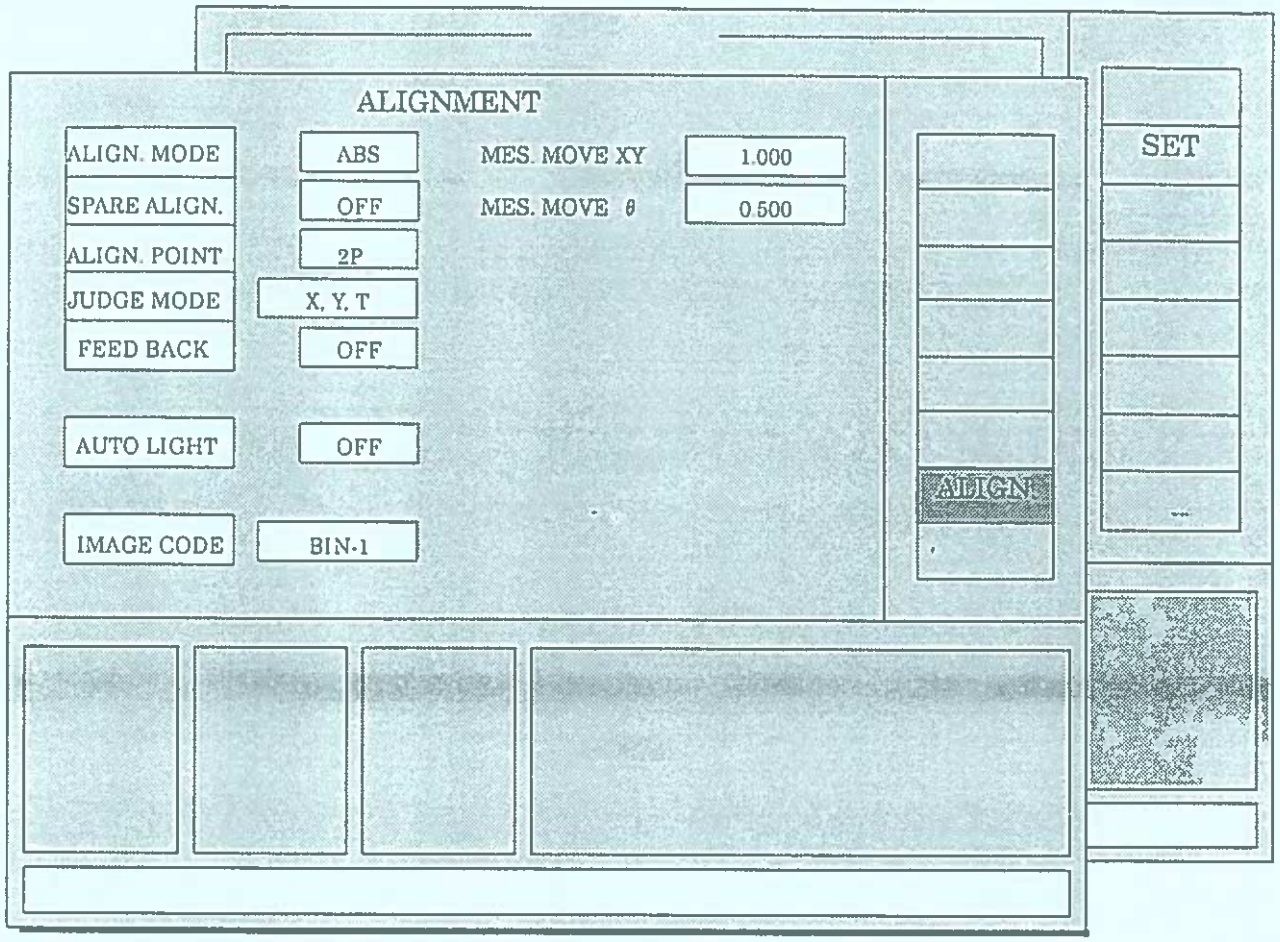
③－2－1 [UNIT 1] KEY



CH0 :X axis of 3-axis table
CH1 :Y axis of 3-axis table
CH2 : θ axis of 3-axis table
CH3 : no use

LS :Low speed (mm/sec.)
HS :High speed (mm/sec.)
ST :Speed up/down time (sec.)
MR :Pulse per 1mm of motor
XR :Pulse per 1mm of X axis
YR :Pulse per 1mm of Y axis
TR :Pulse per 1degree of θ axis
[+] :Jog key of +direction
[−] :Jog key of −direction

③— 2 — 2 [ALIGN.] key



ALIGN. MODE
- ABS — Absolute alignment
- REL — Relative alignment

SPARE ALIGN.
- ON — Pre-set alignment ON
- OFF— Pre-set alignment OFF

ALIGN. POINT
- 2P — Alignment based on 2 points
- 4P — Alignment based on 4 points

JUDGE MODE
- X,Y,T — Judge alignment position
- DX, DY — Judge measured position

FEED BACK
- ON — Automatic revision
- OFF— No automatic revision
- CLR— Clear the feed back value

AUTO LIGHT
- ON — Auto setting of light level
- OFF— Manual setting of light level

IMAGE CODE
- BIN-1 — Binary processing mode1
- BIN-2 — Binary processing mode 2
- PTTRN— Pattern search mode

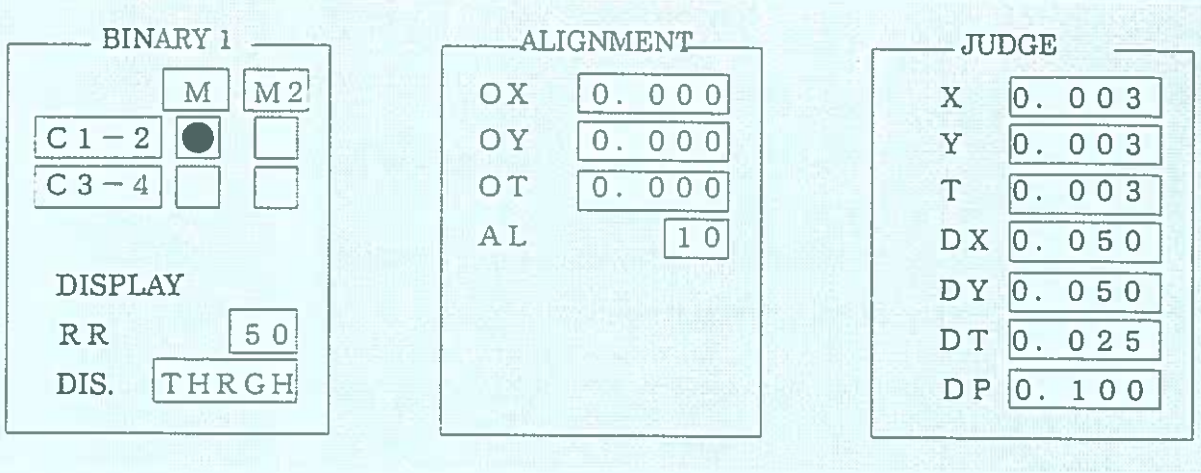
MES. MOVE
- X,Y — Moving amount of X and Y
- θ — Moving amount of θ

③— 3 MEMORY key

EXPLAN.	No use
AUTO SET	set of light and binary level automatically
MARK ME.	register target marks
CALIBRA.	make calibration and set alignment position
AL.POS.	change alignment position
ORG.	move 3-axis table to the original position
END	get back to the initial menu

③— 4 OTHER KEYS

EXPLAN.	
SET	
MANUAL	no use
MEMORY	
AL.CHECK	measure the position after alignment
ALIGN.	make alignment
ORG.	move 3-axis table to the original position



BINARY 1

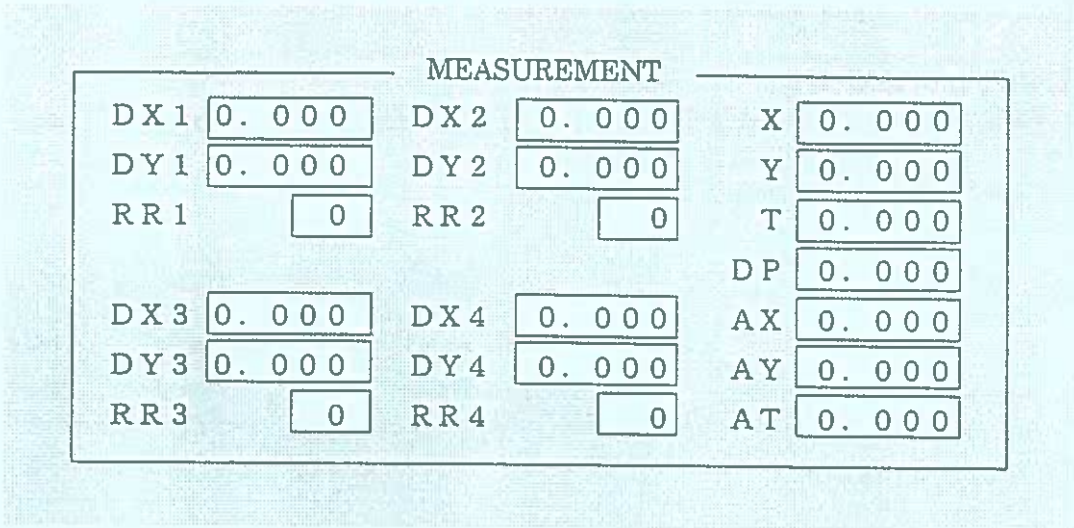
- M1 — Memory 1
- M2 — Memory 2
- C1-2 — Top camera
- C3-4 — Bottom camera
- RR — The mark area allowance against registered area (%)
- DIS. — BINARY display binary image
  THRGH display live image

ALIGNMENT

- OX — Offset value of X axis on alignment
- OY — Offset value of Y axis on alignment
- OT — Offset value of θ axis on alignment
- AL — Alignment times limit

JUDGE

- X — Allowance range of X axis on alignment
- Y — Allowance range of Y axis on alignment
- T — Allowance range of θ axis on alignment
- DX — Allowance range of X axis on measurement
- DY — Allowance range of Y axis on measurement
- DT — Allowance range of θ axis on measurement
- DP — Allowance range of distance between marks



MEASUREMENT — display alignment data on each time

- DX1 — The shift value of mark position on X axis at CAMERA1
- DY1 — The shift value of mark position on Y axis at CAMERA1
- RR1 — The mark area allowance against registered area at CAMERA1(%)
- DX2 — The shift value of mark position on X axis at CAMERA2
- DY2 — The shift value of mark position on Y axis at CAMERA2
- RR2 — The mark area allowance against registered area at CAMERA2(%)
- DX3 — The shift value of mark position on X axis at CAMERA3
- DY3 — The shift value of mark position on Y axis at CAMERA3
- RR3 — The mark area allowance against registered area at CAMERA3(%)
- DX4 — The shift value of mark position on X axis at CAMERA4
- DY4 — The shift value of mark position on Y axis at CAMERA4
- RR4 — The mark area allowance against registered area at CAMERA4(%)
- X — Average shift value on X axis of CAMERA1 and 2 (or CAMERA3 and 4)
- Y — Average shift value on Y axis of CAMERA1 and 2 (or CAMERA3 and 4)
- T — Average shift value on θ axis of CAMERA1 and 2 (or CAMERA3 and 4)
- DP — MAX. difference of the distance between marks
- DX — Feed back value on X axis
- DY — Feed back value on Y axis
- DT — Feed back value on θ axis

Note:
- CAMERA1 — A CAMERA (Top)
- CAMERA2 — B CAMERA (Top)
- CAMERA3 — A CAMERA (Bottom)
- CAMERA4 — B CAMERA (Bottom)

＊＊＊ EXPLANATION OF MARK SETTING ＊＊＊

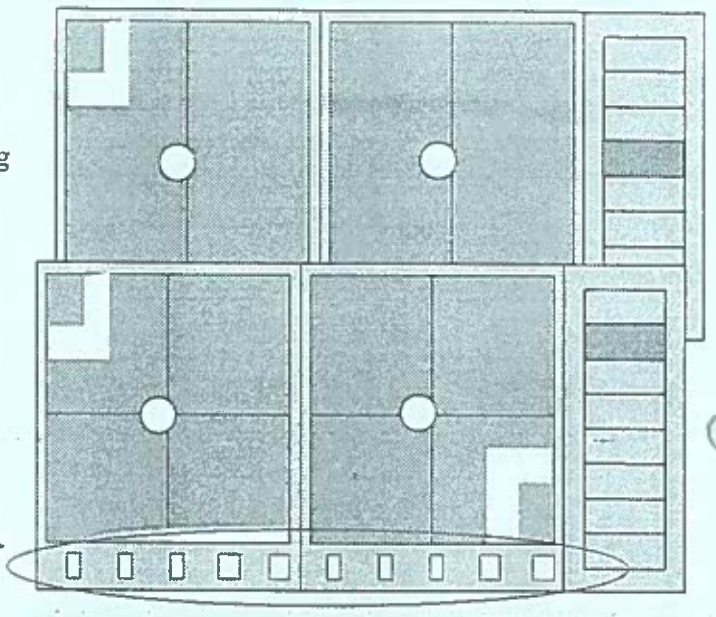
① Insert PCB with clear target, and clamp it.
② Move each camera to make target be centered on the monitor.
　＊ To insert PCB, and move cameras are operated from Operation Touch Panel

③ Press [MEMORY] key

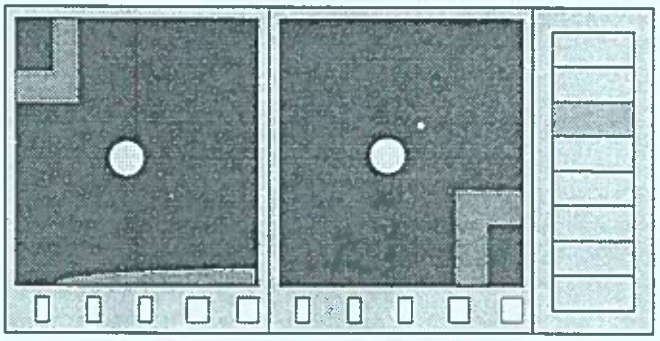
④ Press [AUTO SET] to make the auto setting of alignment condition.

If target mark is not clear, set the alignment condition on manual.

NP-Turn target color from black to white.
TS-Change background level.
TL-Change binary level
Light level can be changed on Operation touch panel. →



⑤ Press target mark on Touch Panel.
The mark turns to be yellow and others to be blue and black.

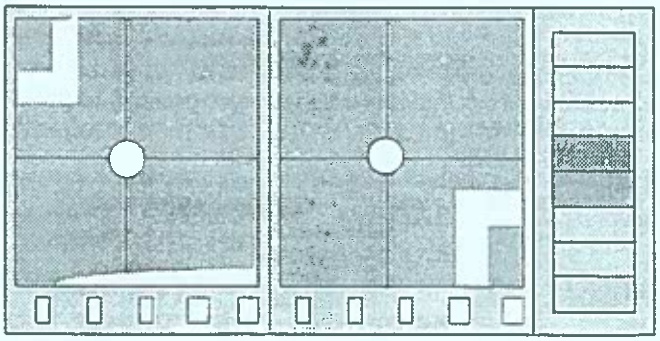


⑥ Press [MARK ME.] to register marks.

⑦ Press [CALIBRA.] to make calibration.

⑧ Press [AL. POS.] to change alignment position.

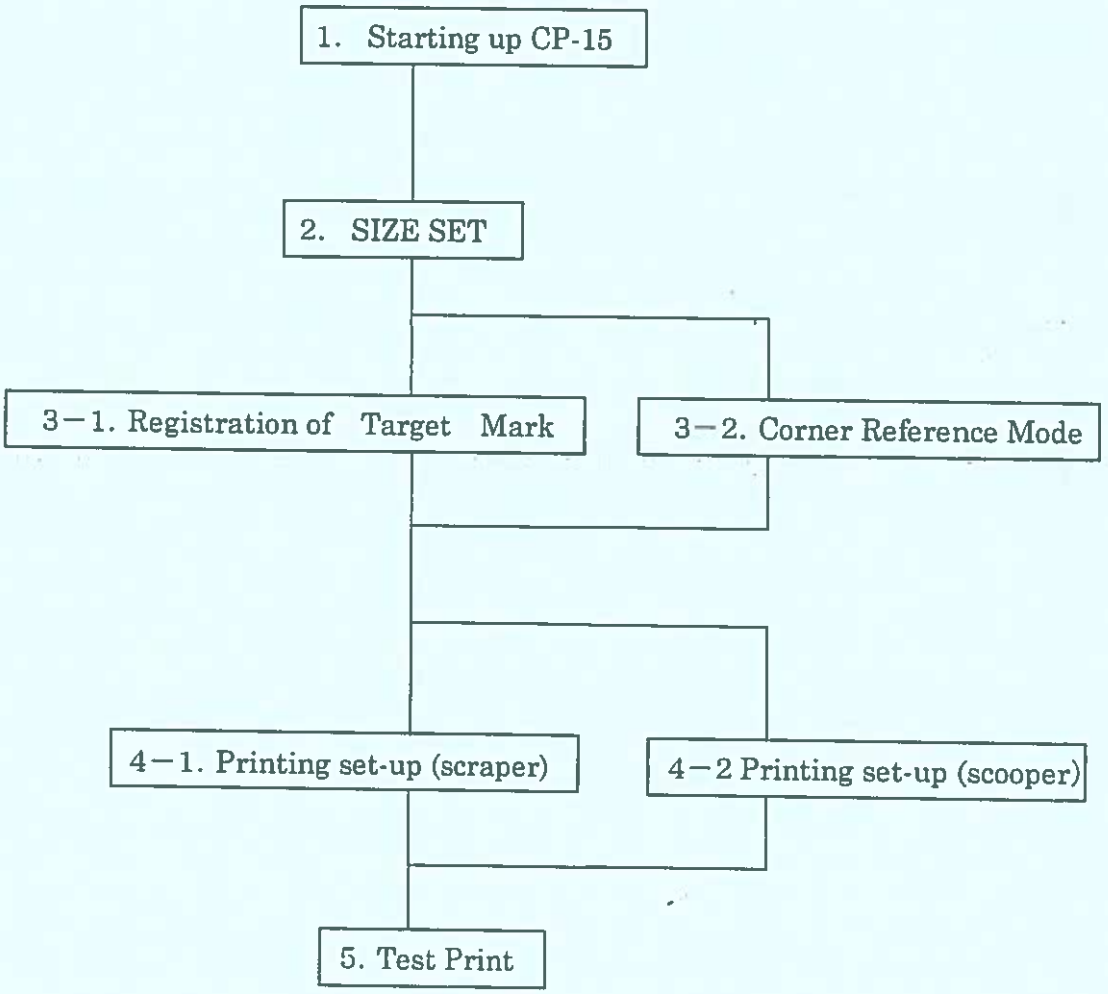
＊Please confirm the red lines go through the center of targets.



⑨ After setting alignment position, press [ALIGN.] to confirm the alignment gets to be done correctly.

2-5Manual set-up

- Overview of the procedure of operation



・ The procedure of operation

1. Starting up CP-15

1-1 Turn on CP-15

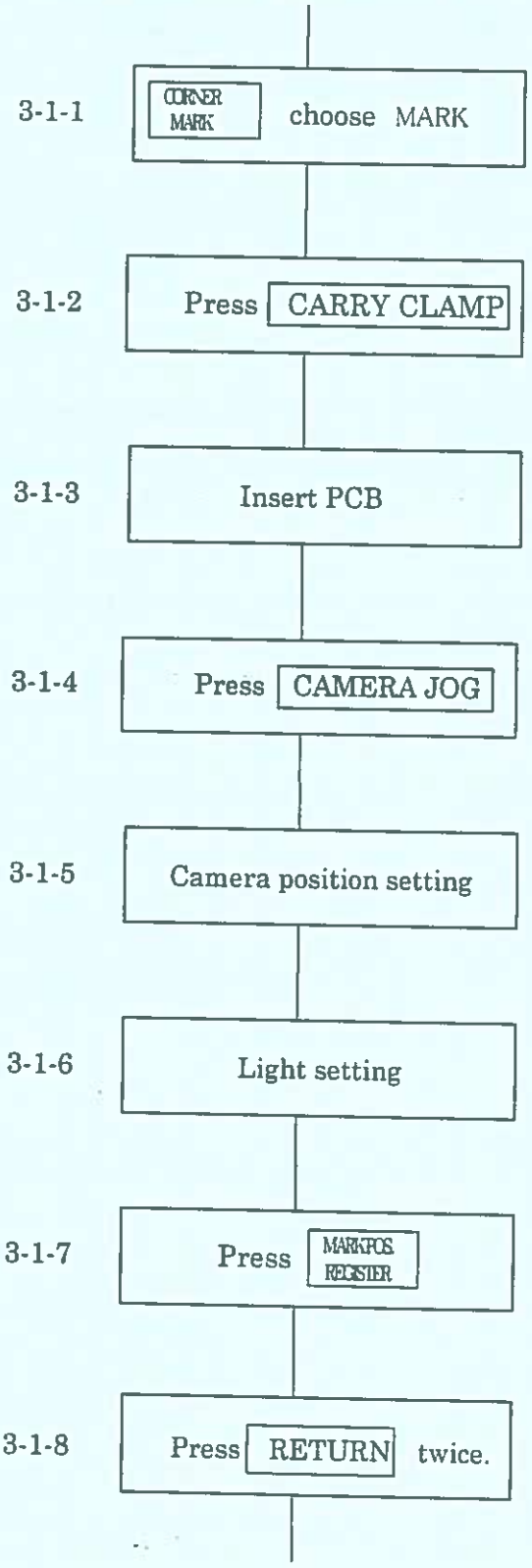
1-2 Press [ORG] — Operation Touch Panel in drawing 2 ⑰

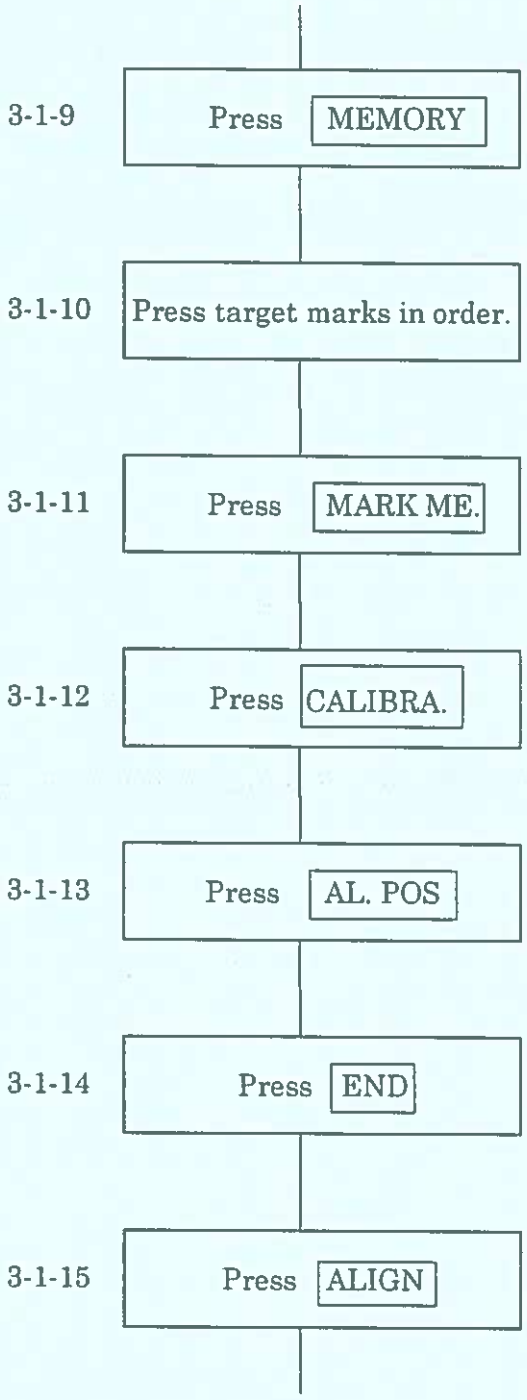
2. Registration of Target Mark

2-1 Press [SIZE SET] — Operation Touch Panel in drawing 2 ⑳

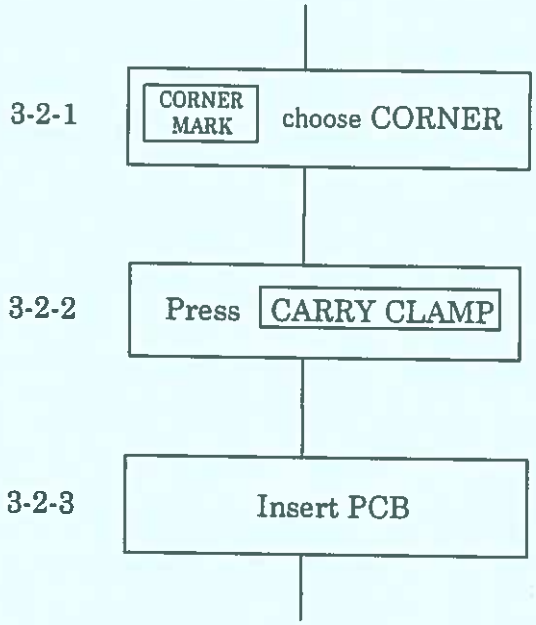
2-2 Input each setting value. — Input the PCB size and parameters etc.

3－1. Registration of Target Mark

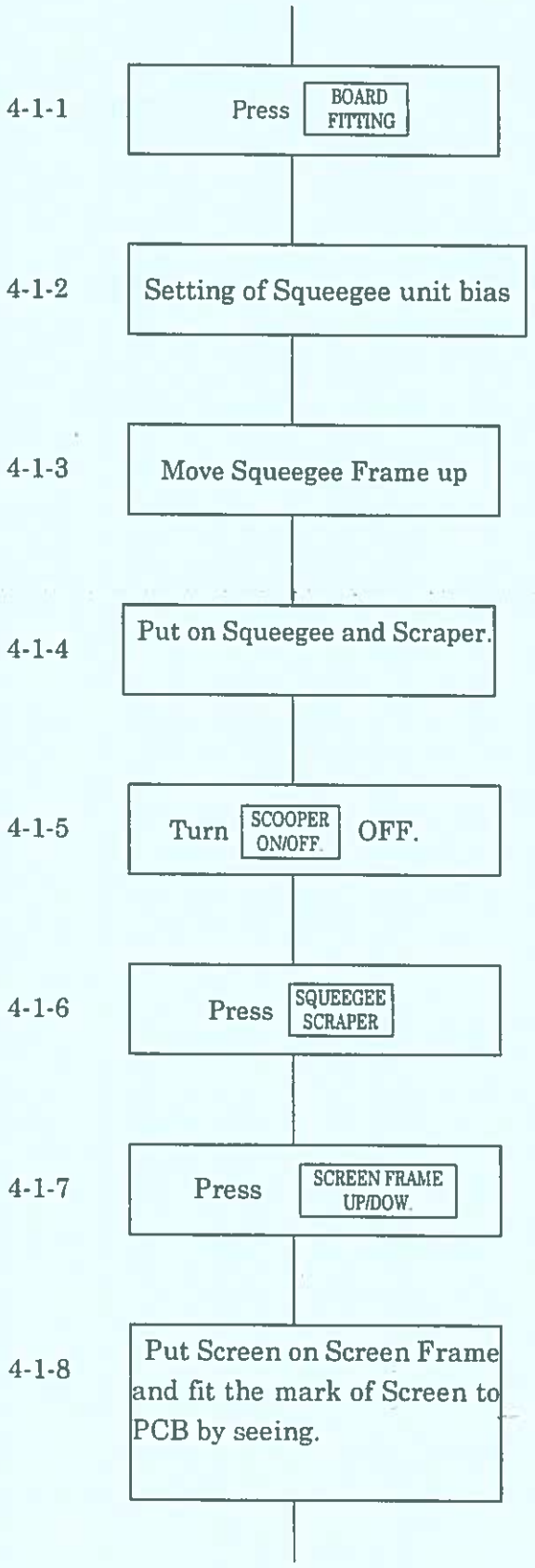


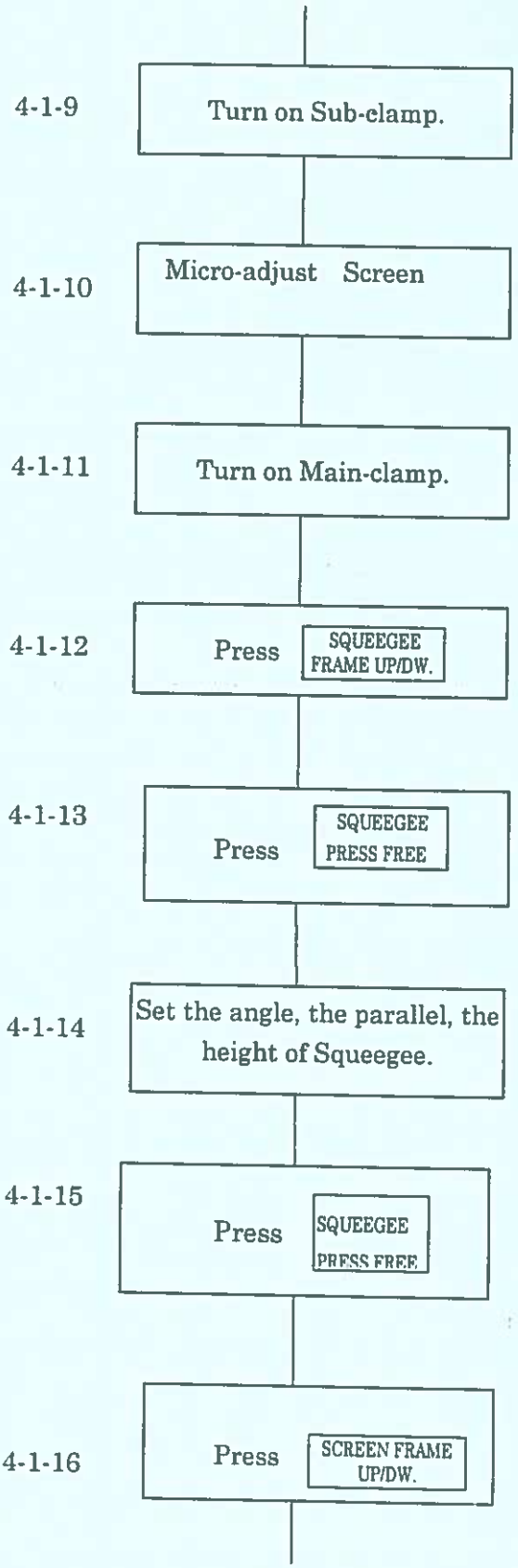

3-1-9
Press MEMORY
Image Processing Touch Panel in drawing 7 ②
3-1-10
Press target marks in order.
Image Processing Touch Panel in drawing 8 ①
3-1-11
Press MARK ME.
Image Processing Touch Panel in drawing 8 ②
3-1-12
Press CALIBRA.
Image Processing Touch Panel in drawing 8 ③
3-1-13
Press AL. POS
Image Processing Touch Panel in drawing 8 ④
3-1-14
Press END
Image Processing Touch Panel in drawing 8 ⑤
3-1-15
Press ALIGN
Operation Touch Panel in drawing 2 ②

3－2. Corner Reference Mode



4－1. Printing set-up (Scraper)





front of Printing Section in drawing 11 ①

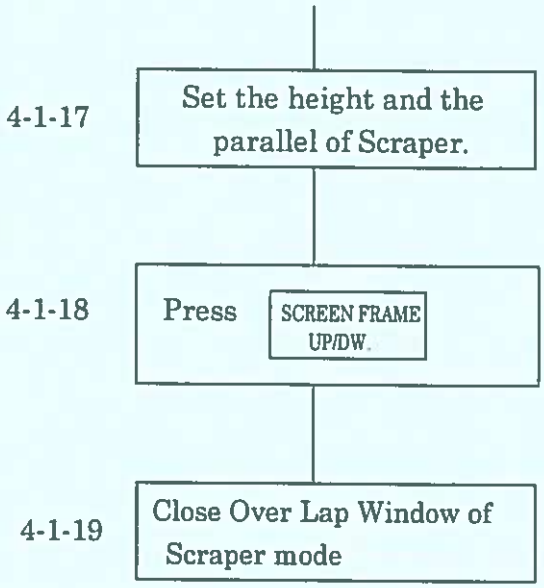
front of Printing Section in drawing 11 ②

Operation Touch Panel in drawing 2 ⑬

Operation Touch Panel in drawing 10 ③

Operation Touch Panel in drawing 10 ③

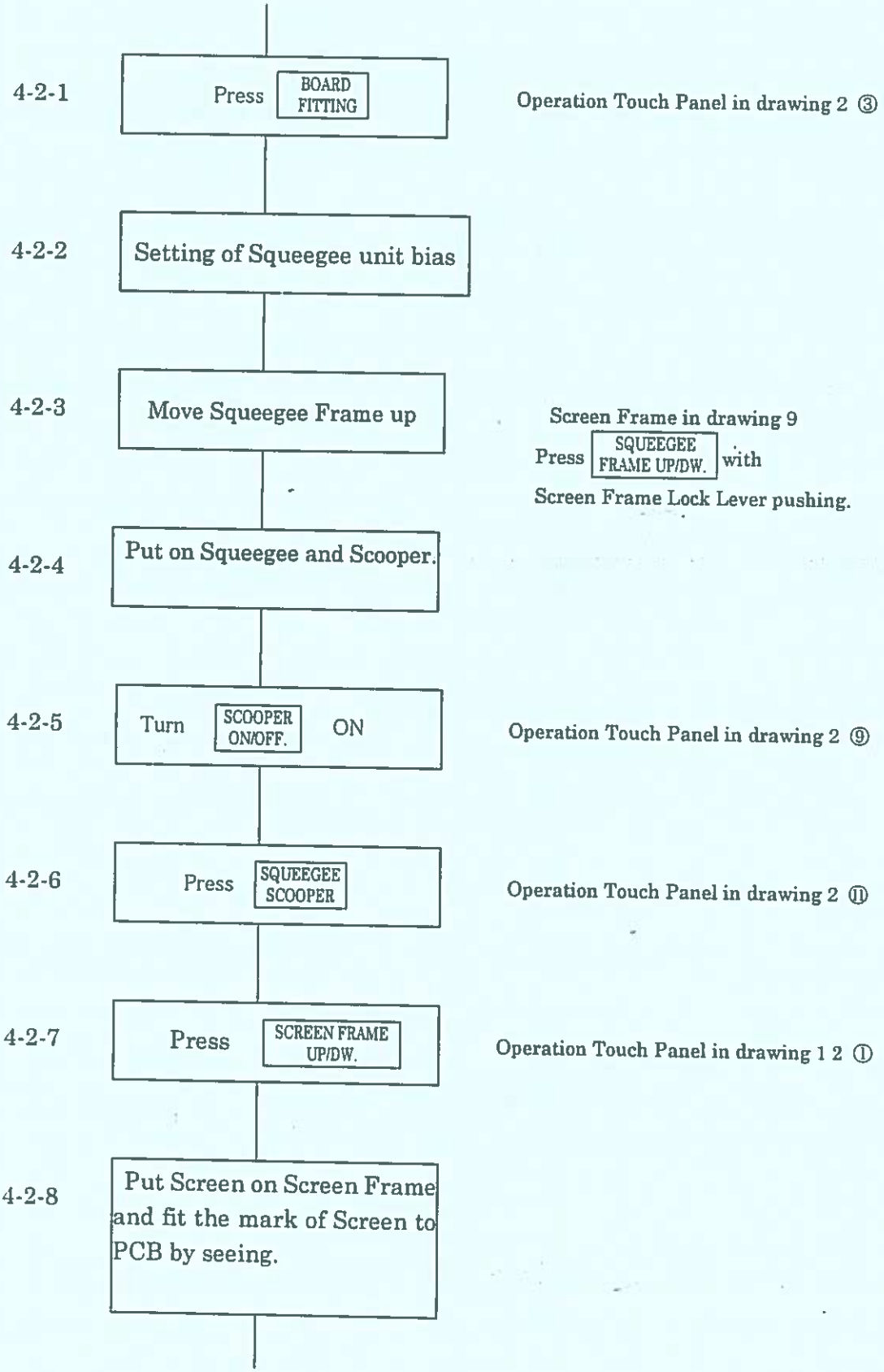
Operation Touch Panel in drawing 10 ①

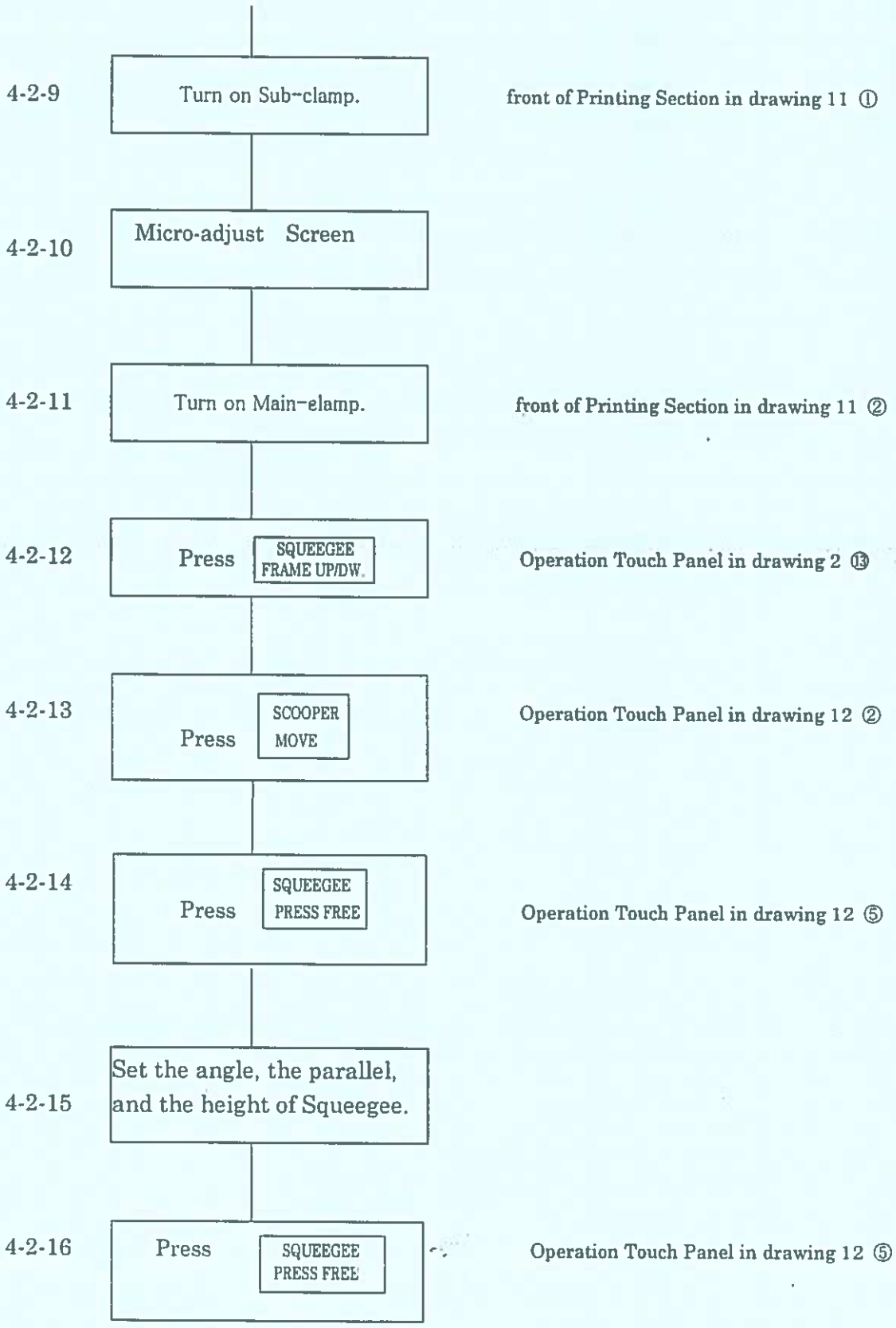


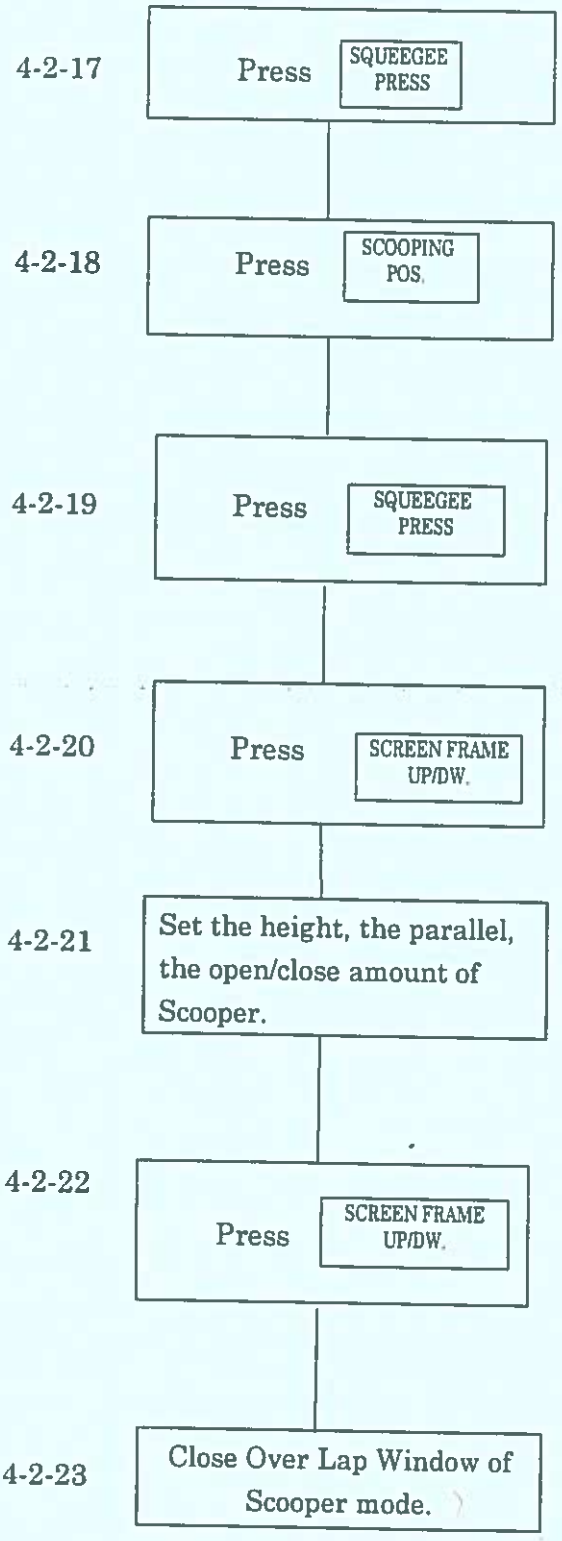
Operation Touch Panel in drawing 10 ①

Press □ button on Operation Touch Panel in drawing 10 ④

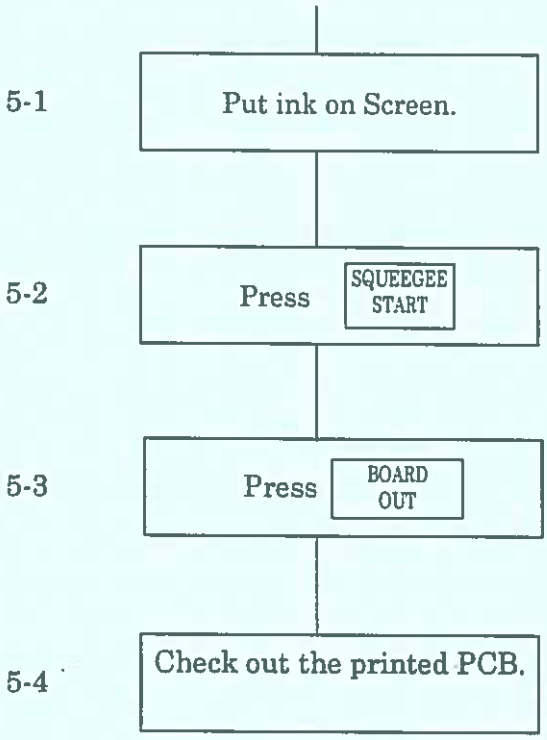
4－2. Printing set-up (Scooper)




4-2-9
Turn on Sub-clamp.
front of Printing Section in drawing 11 ①
4-2-10
Micro-adjust Screen
4-2-11
Turn on Main-elamp.
front of Printing Section in drawing 11 ②
4-2-12
Press
SQUEEGEE FRAME UP/DW.
Operation Touch Panel in drawing 2 ⑬
4-2-13
Press
SCOOPER MOVE
Operation Touch Panel in drawing 12 ②
4-2-14
Press
SQUEEGEE PRESS FREE
Operation Touch Panel in drawing 12 ⑤
4-2-15
Set the angle, the parallel, and the height of Squeegee.
4-2-16
Press
SQUEEGEE PRESS FREE
Operation Touch Panel in drawing 12 ⑤


4-2-17
Press
SQUEEGEE PRESS
Operation Touch Panel in drawing 12 ③
4-2-18
Press
SCOOPING POS.
Operation Touch Panel in drawing 12 ④
4-2-19
Press
SQUEEGEE PRESS
Operation Touch Panel in drawing 12 ③
4-2-20
Press
SCREEN FRAME UP/DW.
Operation Touch Panel in drawing 12 ①
4-2-21
Set the height, the parallel, the open/close amount of Scooper.
4-2-22
Press
SCREEN FRAME UP/DW.
Operation Touch Panel in drawing 12 ①
4-2-23
Close Over Lap Window of Scooper mode.
Press □ button on Operation Touch Panel in drawing 12 ⑥

5. Test Print



Operation Touch Panel in drawing 2 ④

Operation Touch Panel in drawing 12 ⑤

fn.)
For more details are on next.

Details of operation order

1. Starting up CP-15

- Turn on CP-15.
  Image processing and Operation Touch Panels turn live, and after a few seconds, Manual Image in drawing 2- ⑲ turns lighting in blue.

> fn.1. Make sure to take PCBs or any unnecessary things away from CP-15 before turning it on.

- Check [MANUAL] in drawing 2-⑲ is lighting in blue.

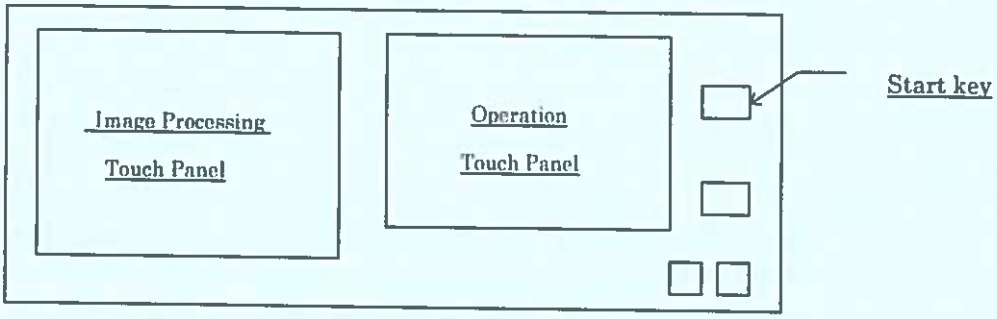
- Press [ORG] in drawing 2-⑰.
  The cylinders and motors return to the original position, and Manual set-up mode can be started.

- For more details, refer to ch.2 § 2-1Explanation of operating Touch Panel (Manual Operation ').

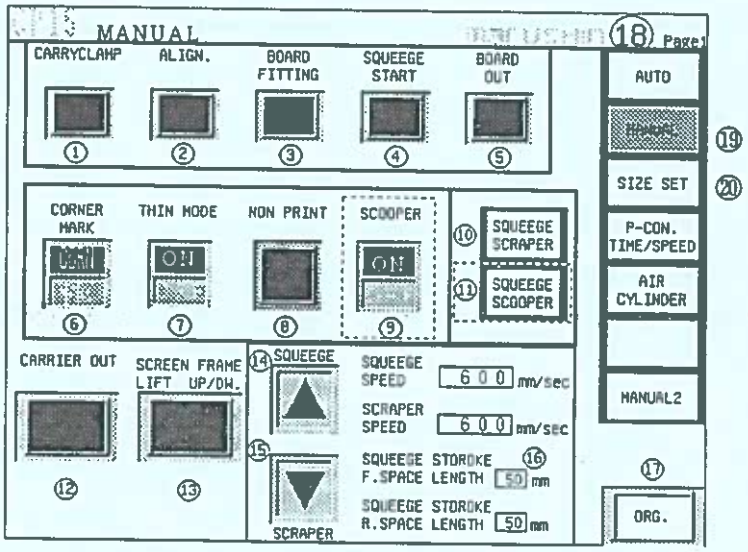
2. SIZE SET

- Press the key [SIZE SET] in drawing 2-⑳, and the image of SIZE SET in drawing 3 shows up.
  At the image of [SIZE SET], the size of PCB for print or parameters printing can be input.
  In case using unregistered PCB, it can't be set about the camera positioning drawing 3-2～5 at this moment.
  If printing parameters have been already kept in PC card, call recipe data No..

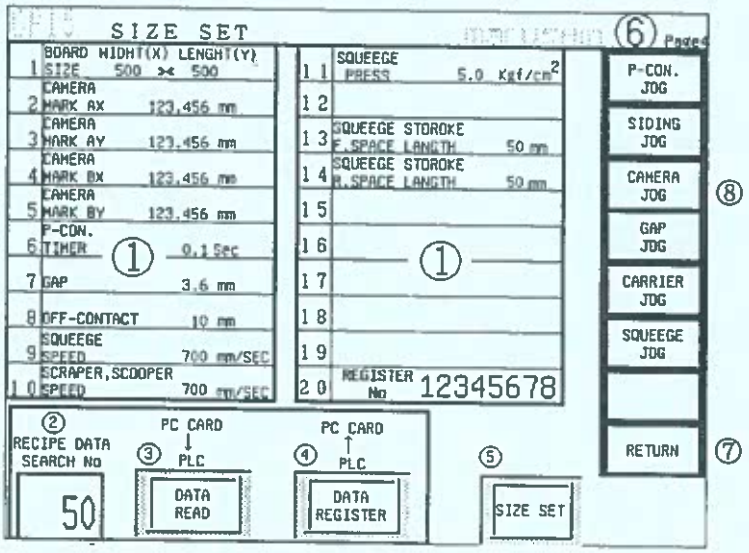
- When new type of PCB is printed, input each parameter. Refer to 'SIZE SET keys' , M18-3 ' , in ch. 2, § 2



drawing 1 OPERATION SECTION



drawing 2 MANUAL IMAGE

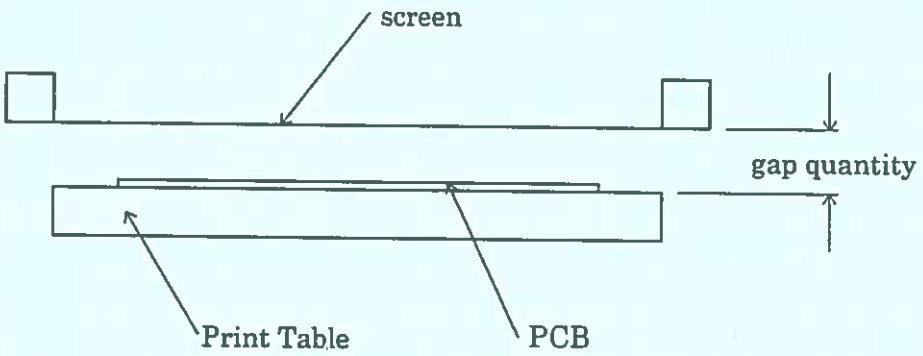


drawing3 SIZE SET IMAGE

- Explanation of 7 GAP and 8 OFF-CONTACT in drawing 3 'SIZE SET' image

- 7 GAP

  Gap is the clearance between of Screen and Print Table. (For more details, refer to 'GAP' in drawing 4.)



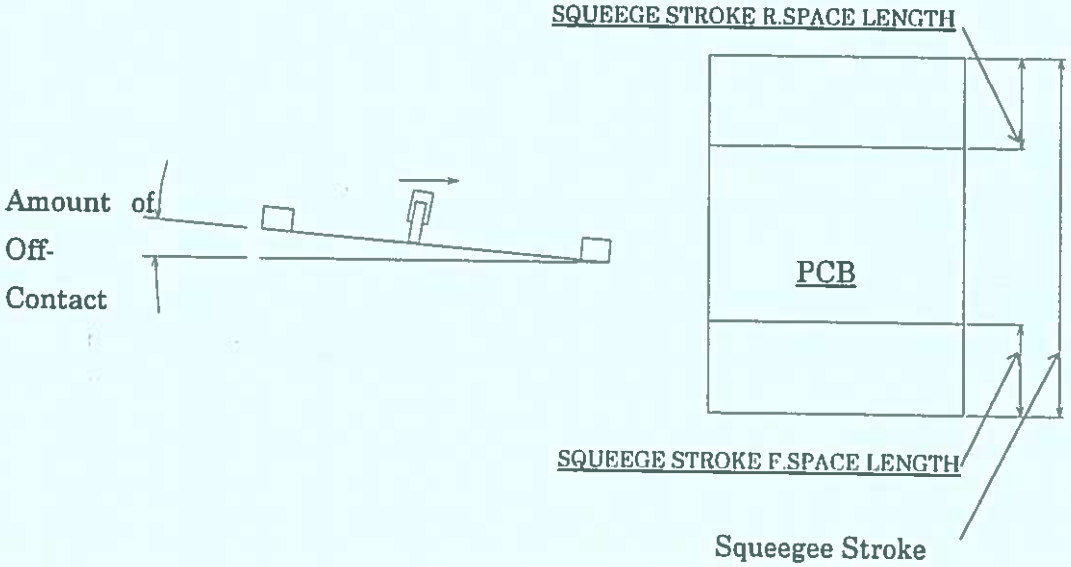
drawing 4 GAP

- 8 OFF-CONTACT

  For much clearer printing, CP-15 has Off-contact function. That is, it prints with taking off Screen from PCB gradually from front. Lifting amount against squeegee stroke is called frame separate quantity.

  The details are 'OFF-CONTACT'.

  Squeegee stroke means PCB size of Y direction plus SQUEEGEE STROKE F.SPACE LENGTH in drawing 2-⑯ and drawing 3-13 and plus SQUEEGEE STROKE R in drawing in drawing 2 №. and drawing 3-14.



drawingM-5 OFF-CONTACT

3.Alignment

- Press the key [CARRY-CLAMP] in drawing 2-①

  Carry-in conveyor starts to move after 3-axis table returns to the original point.
- Insert PCB.

  After siding is done, Board Clamp fixes a PCB.
- Press [CAMERA JOG] in drawing 3 ⑧.

  CAMERA JOG image in drawing 6 shows up. Set-up of camera positions and adjustment of the light can be done.

  (For more details, refer to CAMERA JOG image are on ch.2 § 2 SZ-3 [CAMERA JOG] function)
- See Image Operation Touch Panel. It shows the initial image of drawing 7

  (For more details, refer to Image Operation Touch Panel are on ch.2 § 4.)
- Use the keys of ⑤~⑨ in drawing 6 to make two marks of PCB come to the center of drawing 7-①.
- Press [MARKPOS REGISTER] key in drawing 6-⑫.

  A,B Camera positions value can be automatically registered for the image SIZE SET in drawing 3 - 2 to 5.

- Press [RETURN] key 2 times to get back to the image of MANUAL in drawing 2.

- Press [MEMORY] key in drawing7 on Image Operation Touch Panel shows up. The image of Image operation Touch Panel in drawing 8 shows up.

- Touch target marks in drawing 8-① in order. Target marks turn yellow from white.

- Press [MARK ME] key in drawing 8-②

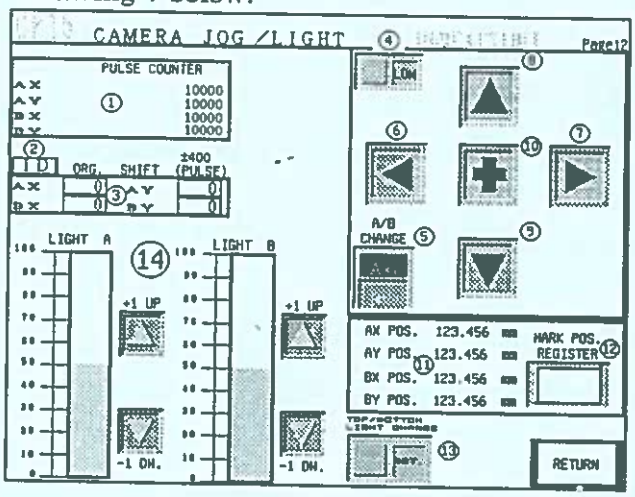
  The position and shape of the target marks are registered.

- Press [CALIBRA.] key in drawing 8-③.

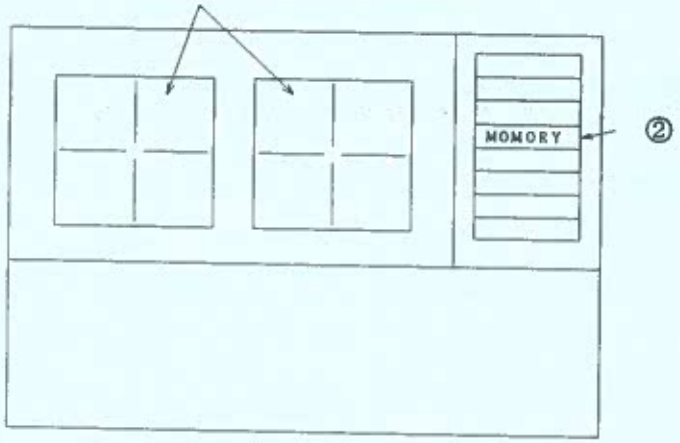
  Image processing system learns the present target position.

· Press AL.POS in drawing 8-④.

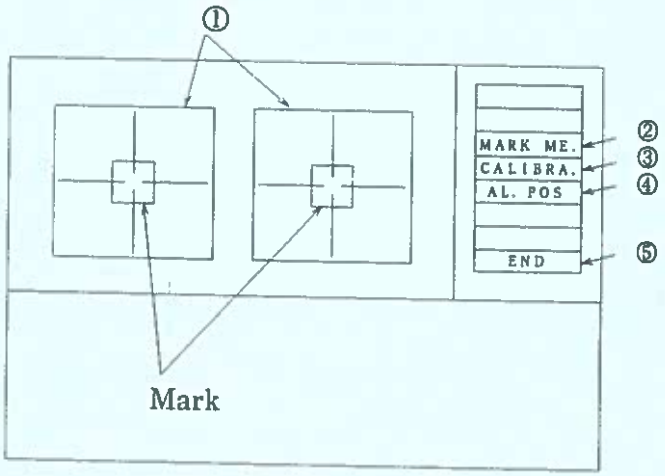
Lines are drawn at the center of both X and Y axis of target mark as drawing 7 below.



drawing6 CAMERA JOG



drawning7 Image Processing Touch Panel



drawing8 Image Processing Touch Panel

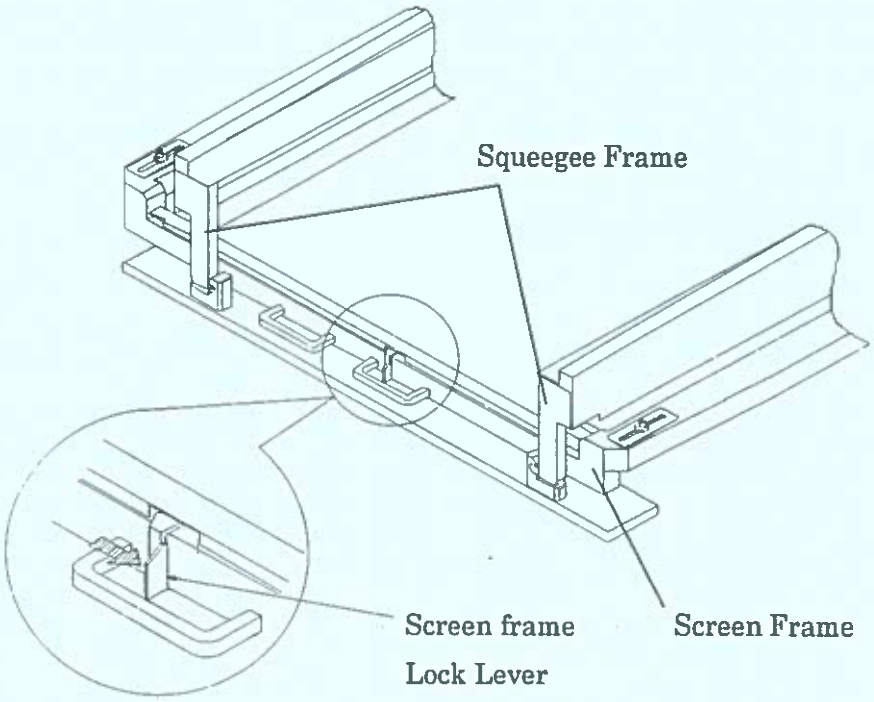
- Press [ALIGN] key in drawing 2-②.
  3 axis table makes a micro-alignment.

4. Print
   - Press [BOARD FITING] key in drawing 2-③.
     Carrier conveys PCB to Alignment Section to Printing Section from Alignment Section.
   - Set squeegee bias.(For more details, refer to ch.1 § 2-2-2'Squeegee' of explanation of squeegee adjustment)
     Adjust it with Squeegee Frame down. Press [SQUEEGE FRAME UP/DW.] in drawing 2-⑬,so Squeegee Frame and Screen Frame can go up/down.

   - Press [SQUEEGE FRAME UP/DW.] in drawing2-⑬, make only Squeegee Frame go up.

     Press [SQUEEGE FRAME UP/DW.] with pushing Screen Frame Lock Lever in drawing 2 ,to move up only Squeegee Frame. Squeegee Frame can move up.

   - Put on Squeegee Rubber and Scraper or Scooper.



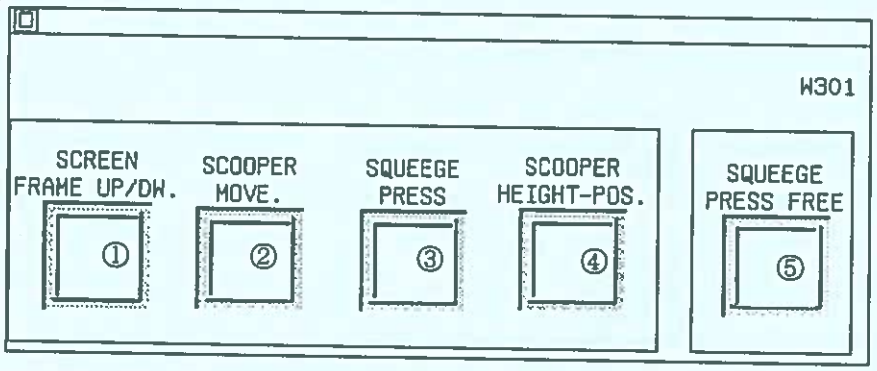
drawing9 Screen Frame Lock

Using Scooper

- Turn on [SCOOPER ON/OFF] in drawing 2-⑨.
  It shows the key [SQUEEGE SCOOPER] in drawing M-2-⑪.

- Press the key [SQUEEGE SCOOPER] in drawing 2-⑪.
  Overlap Window of 'Scooper Mode' in drawing 10 Shows up.
  (For more details, refer to ch.2 § 2 M11 of Manual Operation part.)

⑥



drawing10 Scooper mode

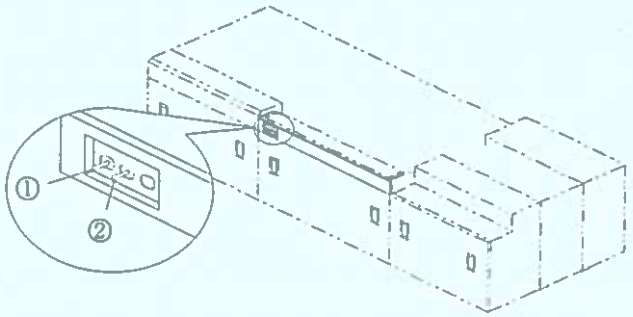
- Press the key [SCREEN FRAME UP/DW.] in drawing 10-①.
  Screen Frame goes down.(For more details, refer to ch.1 § 2-2-1 'Screen Frame'.)

- Put screen on Screen Frame and fit to PCB to the mark of Screen Mask by seeing.

- Turn on Sub-clamp key and clamp Screen Mask temporary.

- Make a micro-adjustment to set up on the correct position of Screen by using 4 Micro-Adjusters on Screen Frame.

- Turn on Main-clamp key in drawing 11-②,and clamp Screen on Screen Frame.



drawing11 Clamp Key

- Press the key [SCOOPER MOVE] in drawing 10-②.(The details are on ch.1 § 2-2-2 'Squeegee')

  Scooper opens.

- Press the key [SQUEEGE PRESS FREE] in drawing 10-⑤.

  Air pressure is cut off and Squeegee goes down.

- Adjust the angle, the parallel, the height of Squeegee.

- Press the key [SQUEEGE PRESS FREE] in drawing 10-⑤.

  Air pressure is on and Squeegee goes up.

- Press the key [SQUEEGE PRESS] in drawing 10-③.

  Squeegee goes down to squeeging position.

- Press the key [SCOOPING HEIGHT POS.] in drawing 10-④.

  Middle stopper goes down.

- Press the key [SQUEEGE PRESS] in drawing 10-③.

  Squeegee goes up to scooping position.

- Press the key [SCREEN FRAME UP/DW.] in drawing 10-①.

  Screen Frame goes up.

- Adjust the height matching of Scooper and Squeegee with Screen, and closing condition of Scooper.

- Press the key [SQUEEGE FRAME UP/DW.] in drawing 2-⑬.

  Squeegee frame goes down.

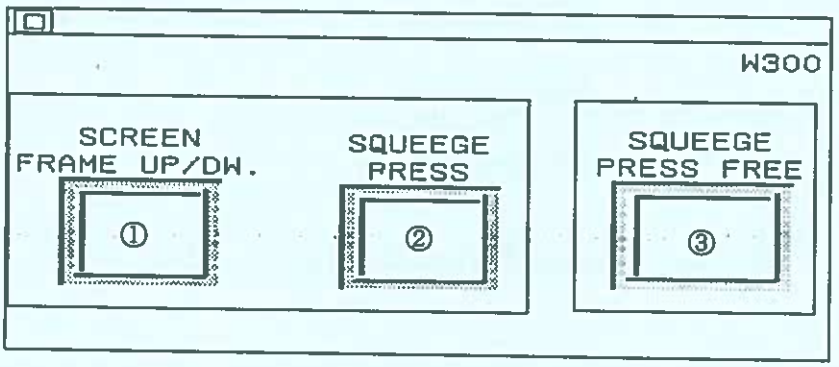
- Press the key [□] in drawing 10-⑥ to close the Overlap Window of Scooper mode.

using scraper

- Turn off the key [SCOOPER ON/OFF] in drawing 2 ⑨.
  It shows the key [SQUEEGE SCRAPER] in drawing 2 ⑩.

- Press the key [SQUEEGE SCRAPER] in drawing 2 ⑩.
  It shows the Overlap Window of 'Scraper Mode' in drawing 12.
  (For more details, refer to in ch2 § 2 M10 of Scraper mode.)

④



drawing12 scraper mode

- Press the key [SCREEN FRAME UP/DW.] in drawing 12 ①.
  Screen Frame goes down.(For more details, refer to 1-2-2-1 'Screen Frame'.)

- Put Screen Mask on Screen Frame and fit to PCB.

- Turn on Sub clamp key and clamp Screen Mask temporarily.

- Make a micro-adjustment to set up to the correct position of Screen Mask using 4 micro-adjusters on Screen Frame.

- Turn on Main-clamp in drawing 11 ②,and clamp Screen by on Screen Frame.

- Press the key [SQUEEGE PRESS FREE] in drawing 12 ③.
  Air pressure is cut off and Squeegee goes down.

- Adjust the angle, the parallel, the height of Squeegee.

- Press the key [SQUEEGE PRESS FREE LIFT UP/DW.] in drawing 12-③.
  Squeegee goes up.

- Press the key [SCREEN FRAME UP/DW.] in drawing 12-①.
  Screen Frame goes up.

- Adjust the height, the parallel of Scraper with Screen.

- Press the key [□] 12-④ to close Touch Panel of Scooper mode.

- Press the key [SCREEN FRAME UP/DW.] in drawing 12-①.
  Screen Frame goes down.

- Move Squeegee unit backward to put ink on Screen Mask.

- Press the key [SQUEEGE START] in drawing 2-④.
  Begin printing a PCB.

5. Carrying out a PCB
   - Press the key [BOARD OUT] in drawing 2-⑤.
     Carrier conveys PCB from Printing Section to Carry-out Section.

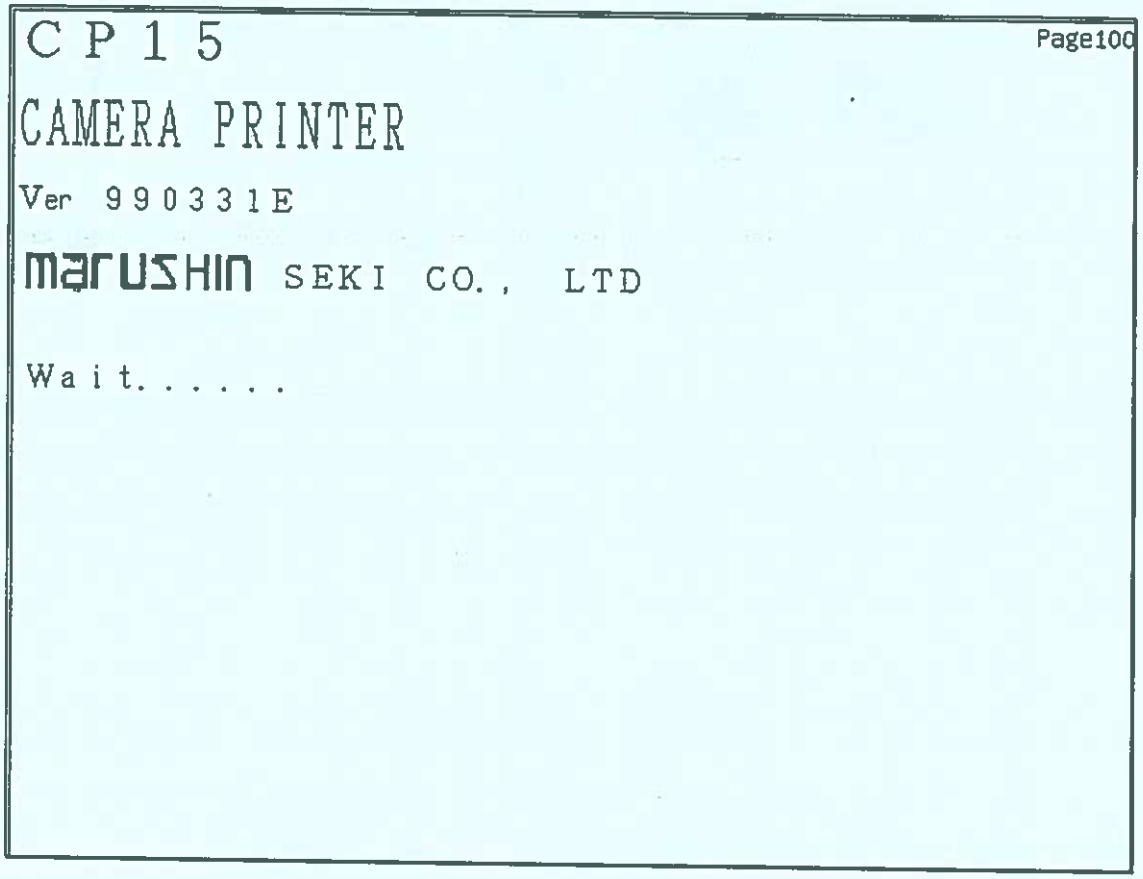
6. Check
   - Check the printed PCB isn't correct.
     In case that printing has trouble, Make an appropriate adjustment and setting again, and print another PCB.

2-6.Auto-running

Auto-running is explained below.

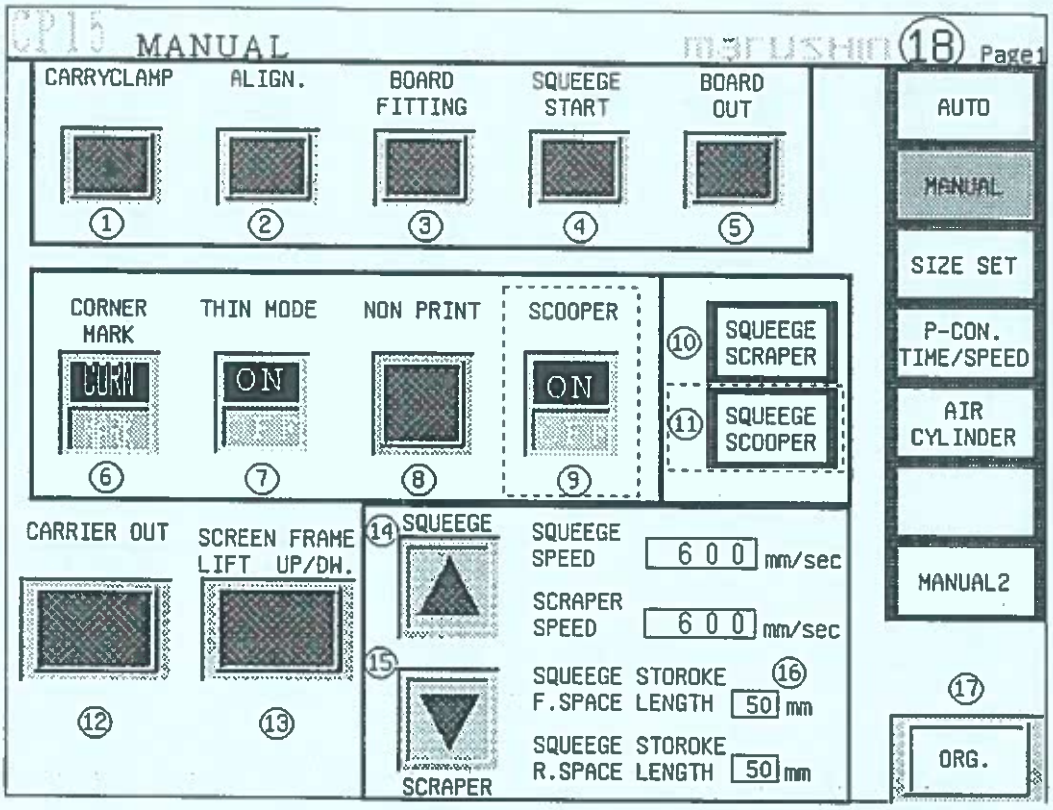
-1.T urn on CP－15

-2.T hen the initial set-up image shows up below.



The image of Manual Shows up.

-3.The image of MANUAL is drawn below.



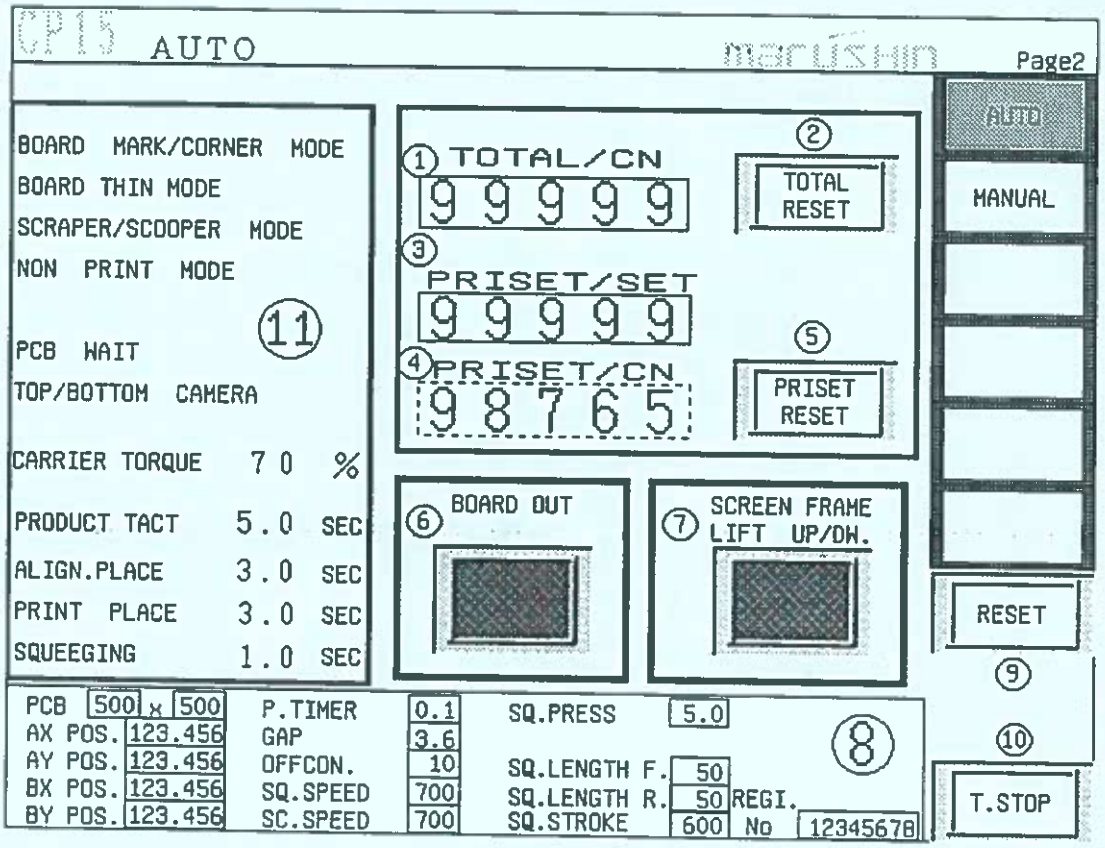
-4.Press No. M17 ORG to return the cylinders and motors to the original position. This key ORG turns green after return to the original position. Warning below is showed on Overlap Window if AUTO is pressed without pressing this key.

.

WARNING
NOT CYLINDER
ORIGINAL POSITION !
PUSH [ORG] KEY

In this case, press ORG. key on Overlap Window or on MANUAL to return the cylinders and motors to the original position.

-5. Press AUTO key on MANUAL, and then the image of AUTO shows up.
The image is drawn below.

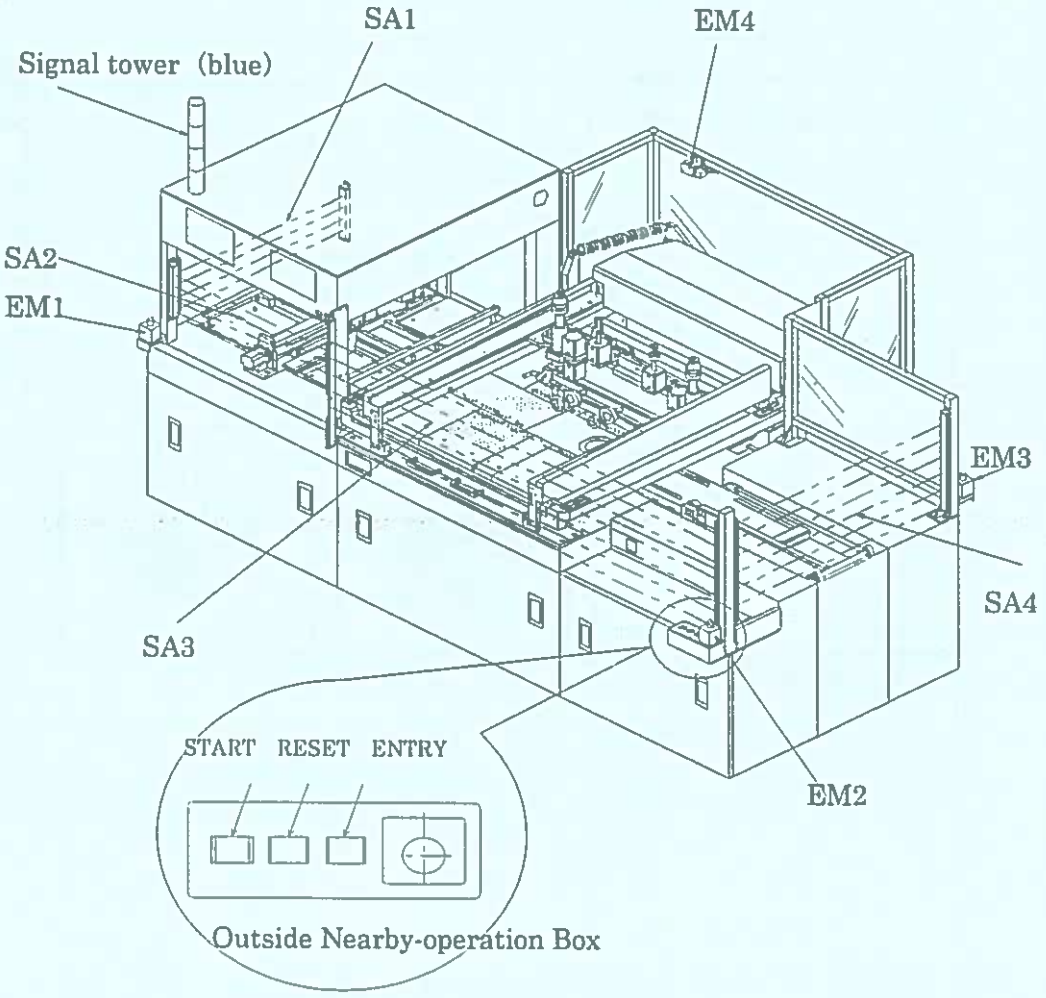


Check out the choice and set-up of the modes on AUTO.
Press [START] out of Touch Panel if nothing is wrong with the choice and set-up.

2-7. CE Modification

CP-15 is suitable for CE.

T he overview drawing of CP-15 modified into CE is drawn below.



For detailed explanation of the above drawing, please refer to each section as below.

EM1,2,3,4 : CE-EM

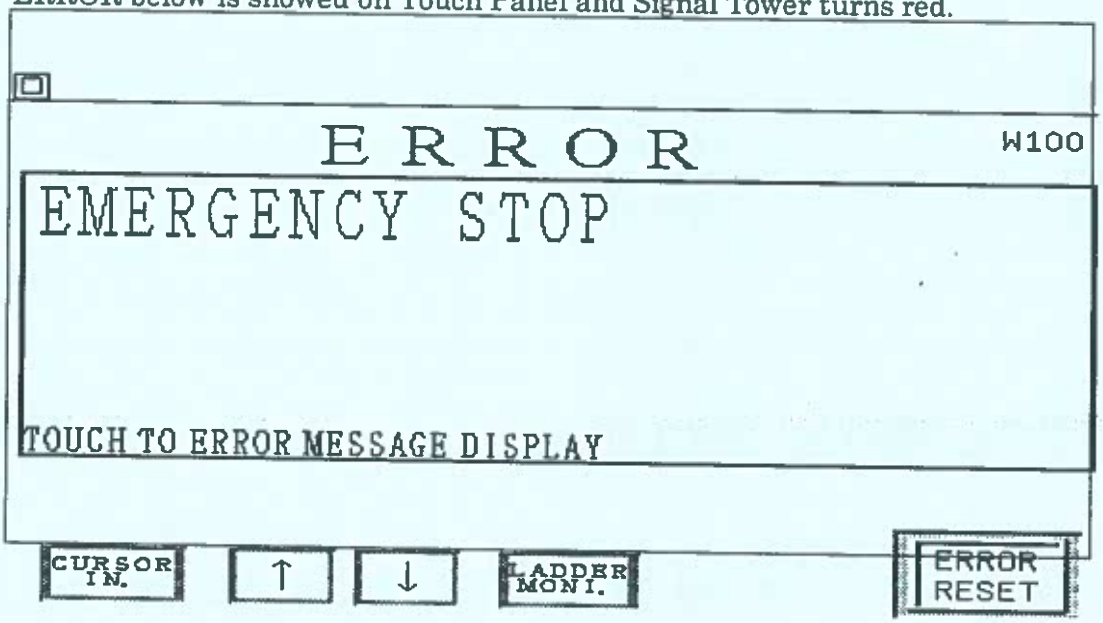
SA 1,2,3,4 : CE-SA

The apparatus attached to CP-15 is explained next.

CE-EM ①~④ outside Emergency Stop Switches and Cover Sensor

Pressing this switch leads CP-15 to an immediate stop and the servo motors, stepping motors and actuators to a cut-off of electricity.

ERROR below is showed on Touch Panel and Signal Tower turns red.



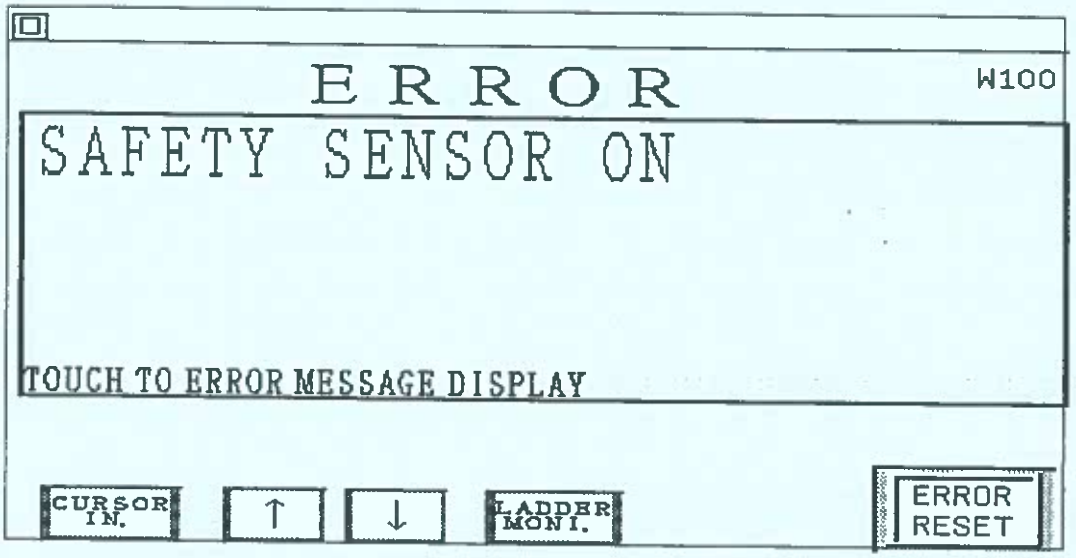
Pull up this Emergency Stop switch to re-start, and press ERROR RESET to release the error.

To re-start auto-running, refer to "2-6. Auto-running".

CE-SA ①~④ Safety Sensor s (to keep a worker from being hurt)

Safety Sensor is explained next.

-1.Shutting out this Safety Sensor without pressing ENTRY on auto-running leads CP-15 to an immediate stop and the servo motors, stepping motors and air-actuators to a cut-off of electricity.



Leave the space of Safety Sensor area to re-start, and press ERROR RESET to release the error.

To re-start auto-running, refer to "2-6. Auto-running".

-2.Enter the space of Safety Area Sensor after making sure to press ENTRY and confirming that blue Signal Tower is on, otherwise Electricity turns off.

Chapter 3 How to deal with errors and maintenance

3 — 1 If CP-15 falls into an error, ...

3 — 3 CP-15 Error Message Display

Error Message Display is explained next.

Error Message Display

If something wrong happens to CP-15, Error Message Display appears automatically.

If Error Message Display shows up, CP-15 comes to a stop and Signal Tower turns red.

How to deal with an error.....
See the details of an error

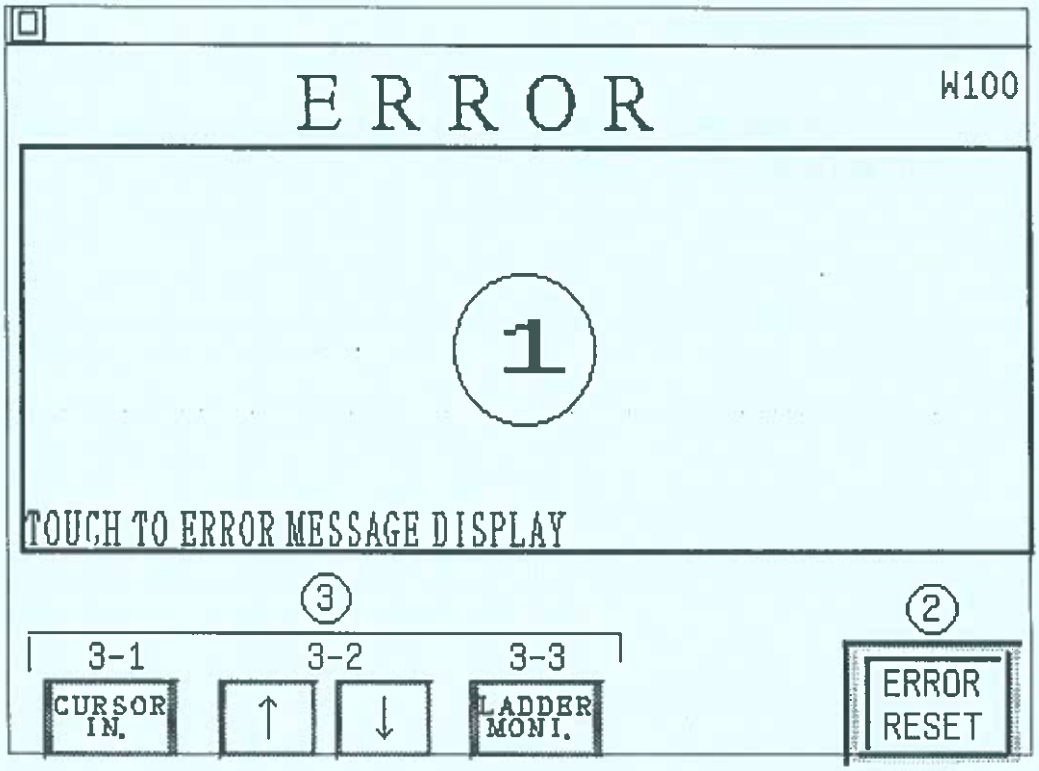
How to release an error.....
Press ERROR RESET key to release
In case of a fatal error, turn off CP-15.

Chapter 3 How to deal with errors and maintenance

3 — 1 If CP-15 falls into an error, ...

If CP-15 falls into an error, Error Message Display below automatically appears and Signal Tower turns red.

Error Message Display is explained next.

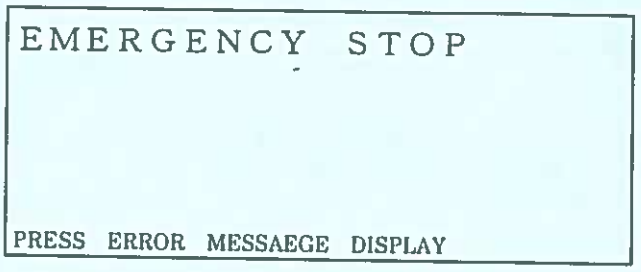


For detailed explanations, refer to each section as below. :

① : E-1
② : E-2
③ : E-3

E－① Example of error message is explained.

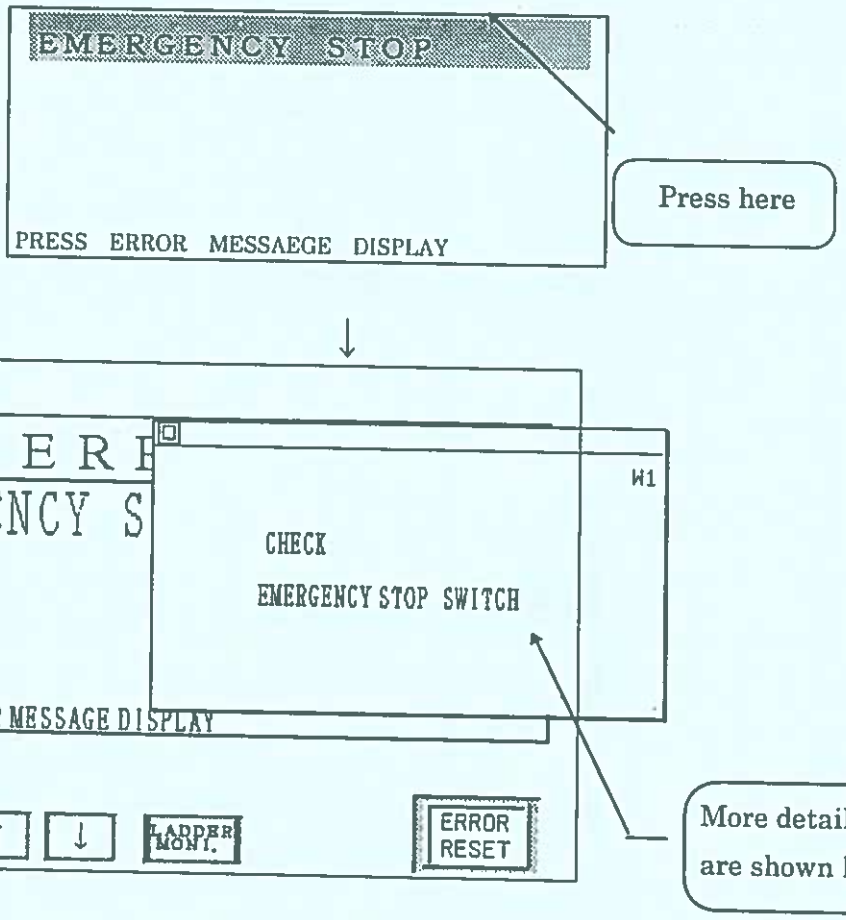
Example>



(4 messages can be shown at most if CP-15 falls into consecutive errors.)

↓

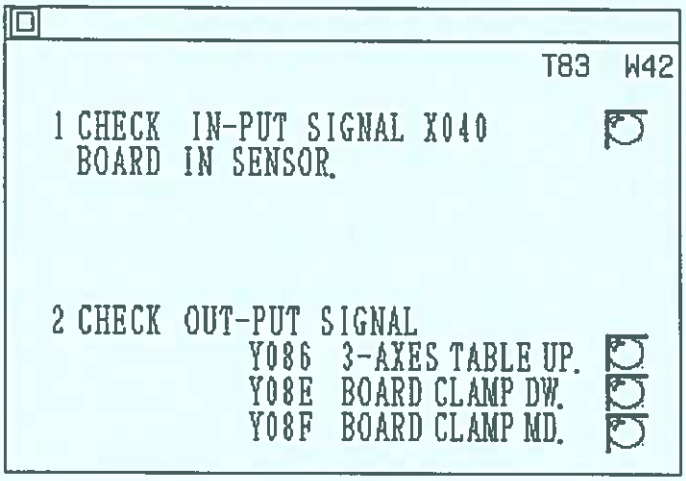
The details are explained next.



↓

Detailed Error Message Display

Example>



Lamp to check
X040Input Signal
ON : green
OFF : white

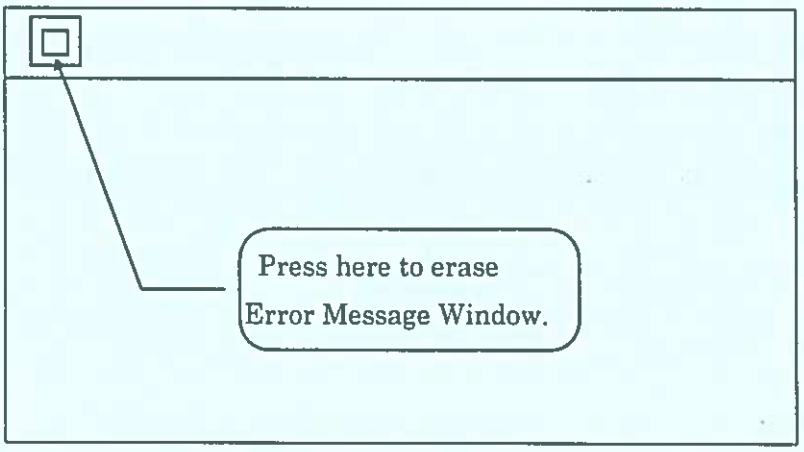
Check items are shown here

Y...,M...,
Lamp to check
Output Signal
ON : green
0FF : white

<For more details on errors, refer to ch.3 § 2.>

↓

How to erase Error Message Window after checking the details.



E－② [ERROR RESET] key

ERROR RESET — Press [ERROR RESET] key to release the error and Error Message Window disappears.

fn.

[ERROR RESET] If an error can't be released, make sure to release it by Detailed Error Message Display.

If the error can't be released along the details, give us a contact.

E—③

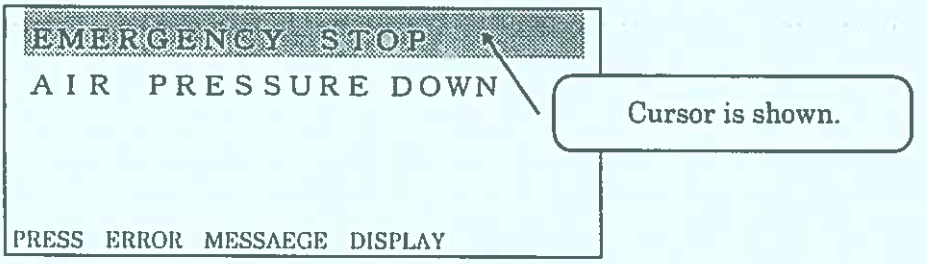
Function ③ is used when error can't be released on Detailed Error Message Display.

PLC program gets to be read and is monitored on Touch Panel.

The reading procedure of program on the error is explained below.

3 — 1 [CURSOR IN] key

A cursor shows up on Error Message when this key is pressed.

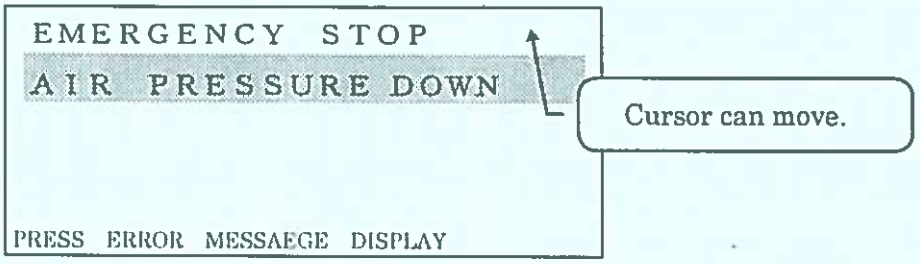


fn. Even though plural errors are shown on Error Message Display, cursor is always on the top.

↓

3 — 2 [↑] [↓] key

Cursor display can move up/down.



3 – 3 LADDER MONI. key

PLC program image is shown on error.

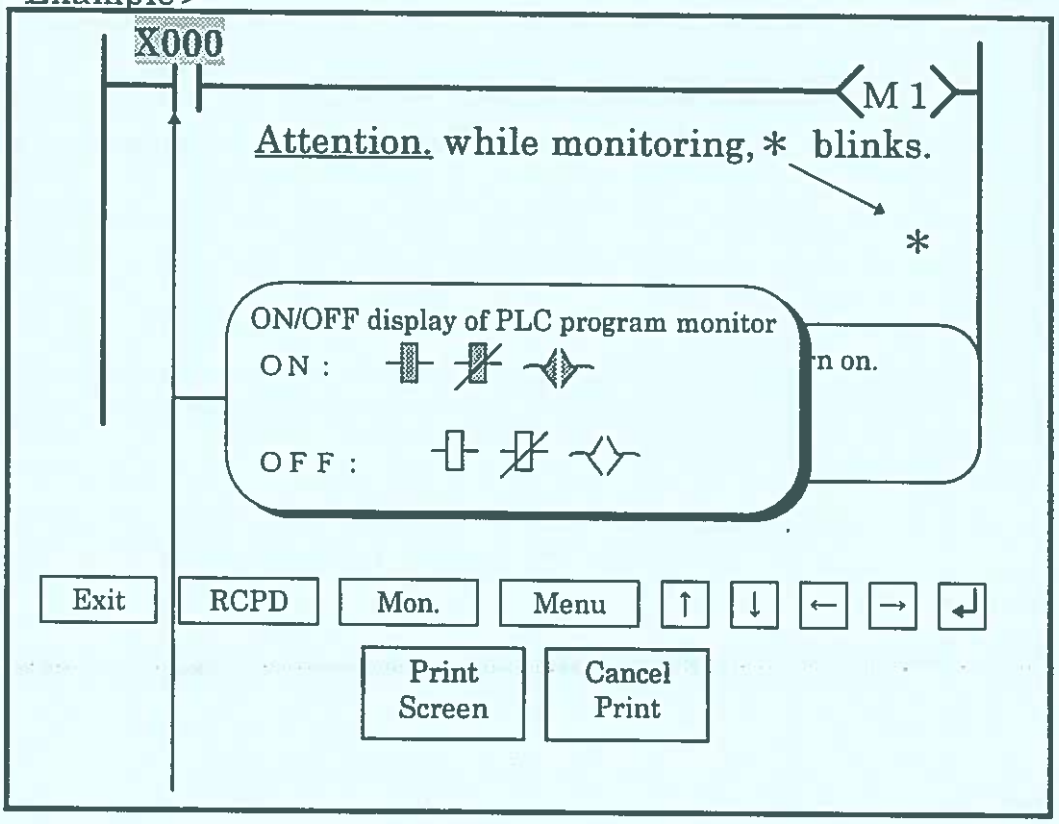
Point LADDER MONI. key is available only when cursor is on the Error Message Display.

PLC program Monitor automatically search the error and shown it.

Turn to the next page.

PLC program image

Example >



Check PLC program monitor and press Exit key ,then the former image gets back.

Key Functions

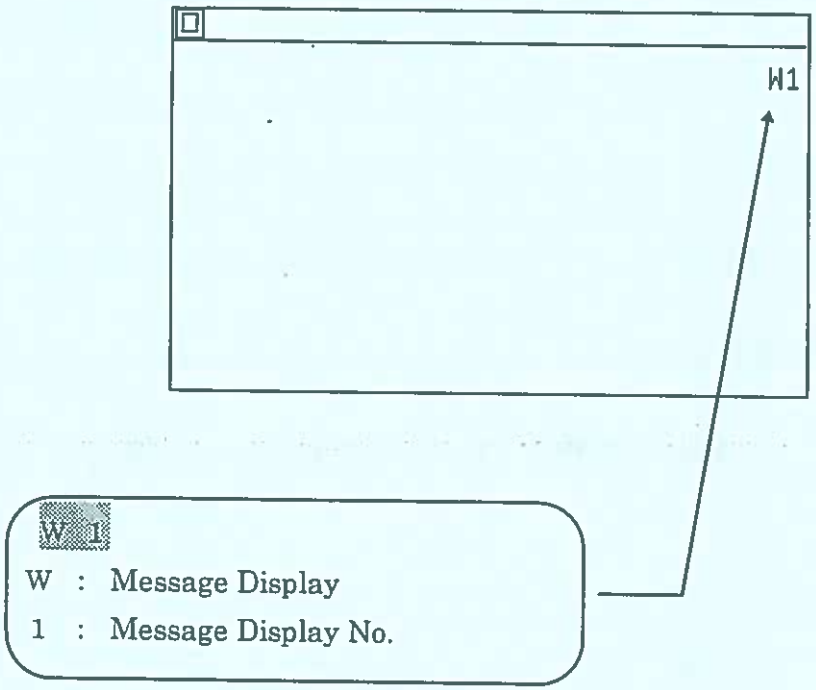
Exit	PLC program image ends. The former image gets back.
PCRD	PLC program begins to be read.
Mon.	Program monitoring begins to be done. (* blinks)
Menu	Devices, Coil etc. in program are sought.
↑ ↓	One circuit of program can be scrawled.
↵	Next program is read.
Print Screen /Cancel Print	These are not used at the moment.

Chapter 3 How to deal with error and maintenance

3 — 2 How to maintain CP-15

How to deal with details

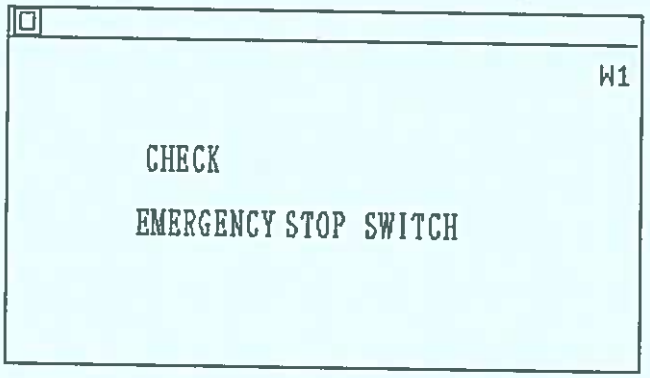
Detailed Error Message Display No.



Detailed Error Message is explained next in numerical order as W···.

How to deal with details W 1

W 1 >



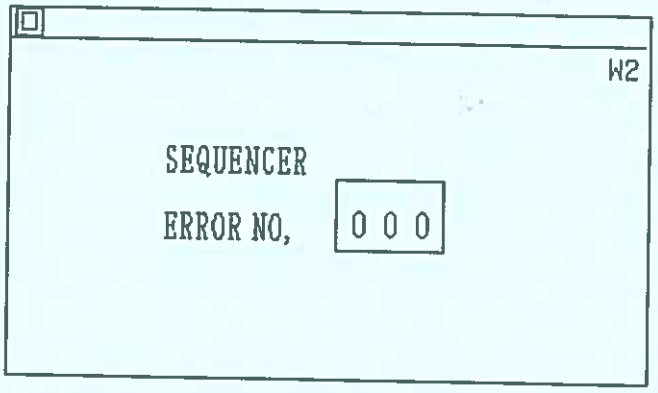
(Explanation) Emergency Stop Switch is pressed.

(Countermeasure) Release the Emergency Stop Switch.

Press ERROR RESET to release the error..

How to deal with details W 2

W 2 >



(Explanation) PLC Sequencer unit makes an error.

(Countermeasure)

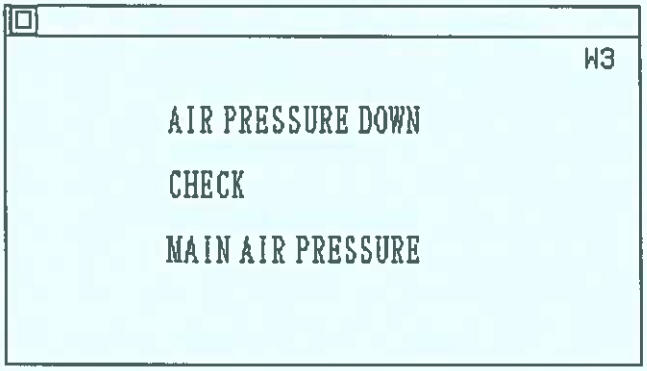
1 : Turn off power supply, and turn it on again.

2 : If error No. 7 0 is shown battery voltage in Sequencer goes down. Change the battery

3 : Give us a contact in case showing another error No.

How to deal with details W 3

W 3 >



(Explanation) Air pressure (main pressure) is down.

(Countermeasure)

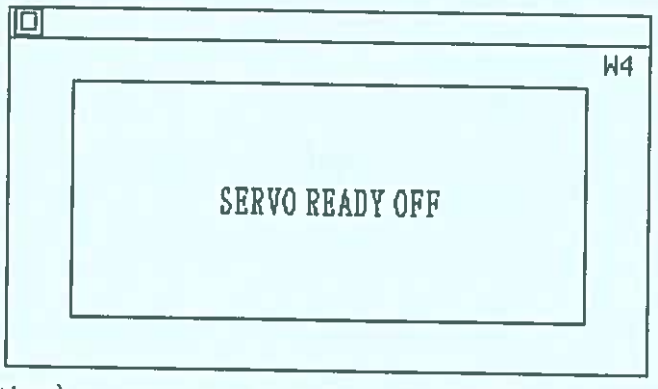
1 : Check the pressure on main air pressure gauge.

2 : Check the input signal of pressure sensor and circuit lines.

Press ERROR RESET to release the error.

How to deal with details W 4

W 4 >



(Explanation) Servo Amplifier turns off.

(Countermeasure)

1 : Turn off CP-15, and turn it on again.

2 : Give us a contact if it shows again after re-start.

How to deal with details W 5

W 5 >

(Explanation) Safety Areas sensor cut off.

(Countermeasure)

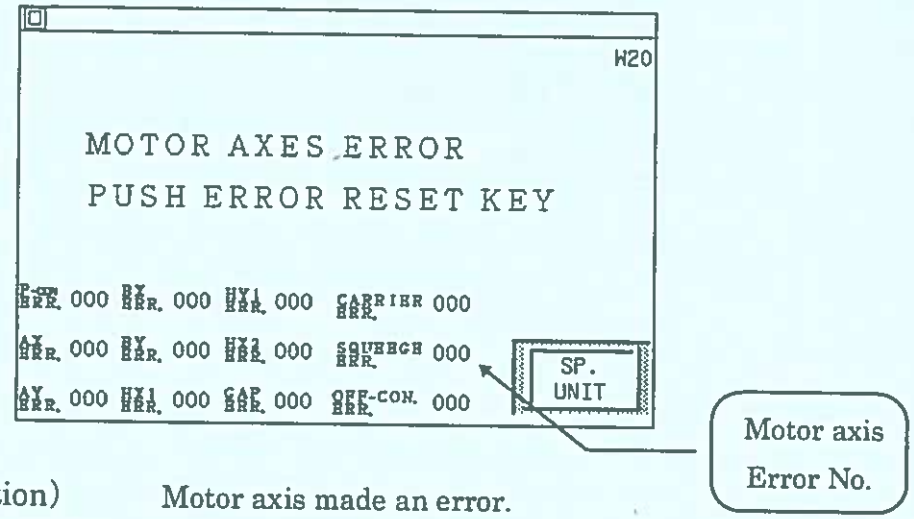
1 : Step away from safety Area Sensor, or check if there is any obstacle or not.

2 : Check the input signal of device No.X05C.

Press ERROR RESET to release the error.

How to deal with details W 2 0

W 20>



(Explanation) Motor axis made an error.

ex> No. 000-regular

Except for No. 000-irregular

A motor axis on which No. 000 is not showed makes an error.

(Countermeasure)

1 : Press ERROR RESET key to release the error.

2 : In case ERROR RESET can't release it, turn off CP-15.

3 : How to deal with error codes is described below.

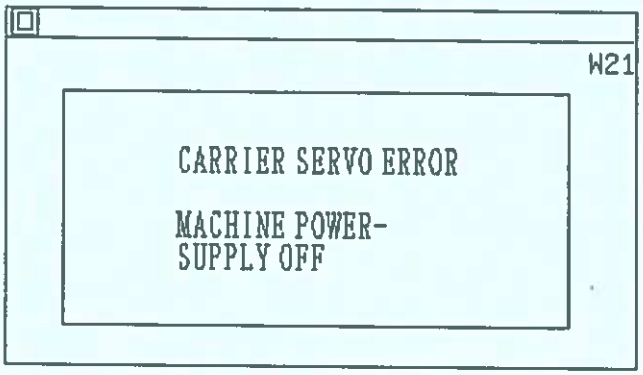
Countermeasure of error code chart

error code	Explanation	Countermeasure
1 0 4	OT sensor on +	Move to minus direction by using JOG key.
1 0 5	OT sensor on −	Move to plus direction by using JOG key.
5 0 7	soft stroke (out) starting +	: Size set ,numerical value settings. : Check the input of OT sensor. : In case the present position is out of the limits, move it by using JOG key.
5 0 8	soft stroke (out) starting −	
5 0 9	soft stroke (out) starting +	
5 1 0	soft stroke (out) starting −	

5 1 1	soft stroke (out) starting +	
5 1 2	soft stroke (out) starting −	
0 0 4	over flow	: Re-set CP-15 : Change Positioning unit.

How to deal with details W 2 1

W 2 1 >

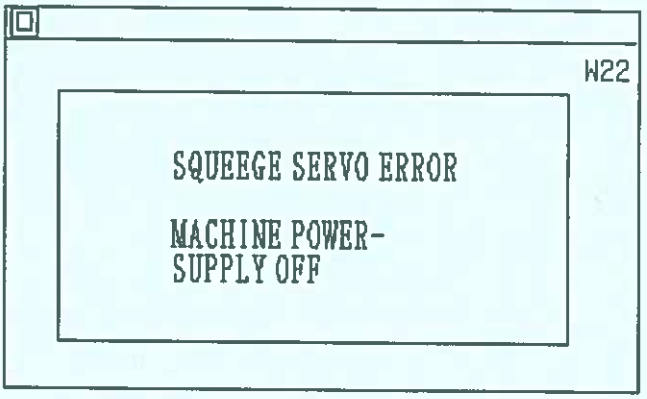


(Explanation) Carrier motor axis made an error.

(Countermeasure) 1 : Turn off CP-15, and turn on again.

How to deal with details W 2 2

W 22>

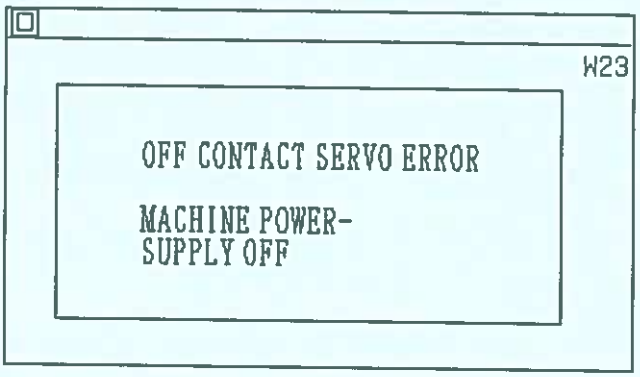


(Explanation) Squeegee motor axis made an error.

(Countermeasure) 1 : Turn off CP-15, and turn it on again.

How to deal with details W 2 3

W 23>

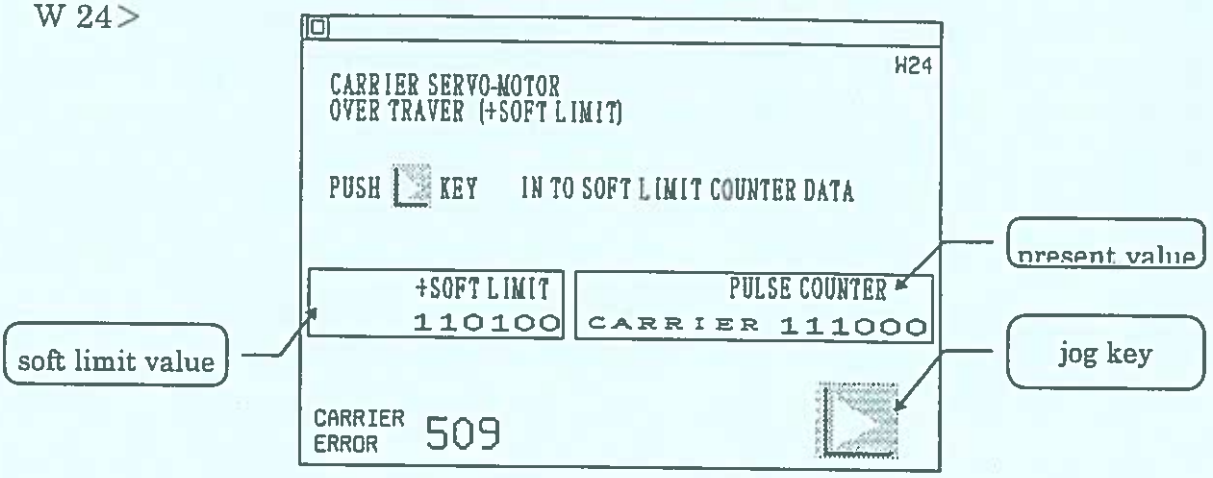


(Explanation) Off Contact (Frame Separation) motor axis made an error.

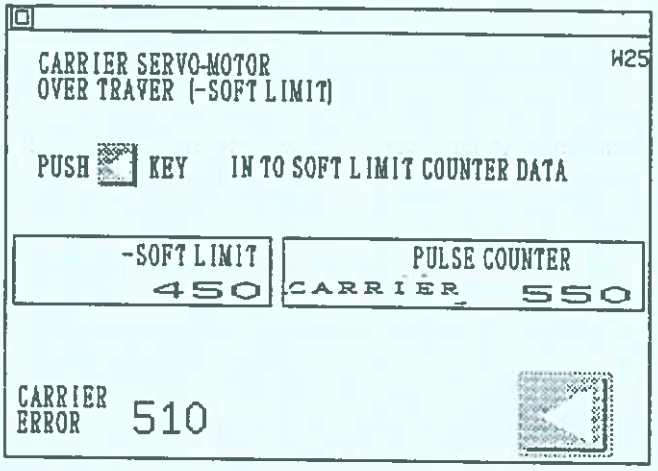
(Countermeasure) 1 : Turn off CP-15, and turn it on again.

How to deal with details W 2 4 ~W 2 5

W 24>



W 25>



(Explanation) The present value of Carrier Servo axis exceeds soft limit value.

(Countermeasure)

1 : present value(out of the limits), the color of numerical value =red

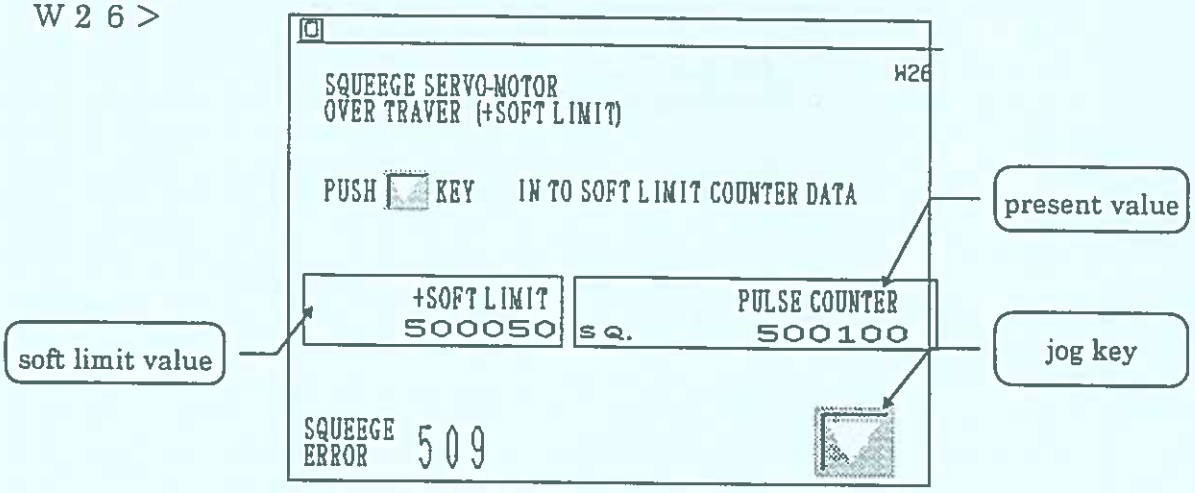
present value(within the limits), the color of numerical value =black

2 : Change the value to one within the limits of soft limit by jog key.

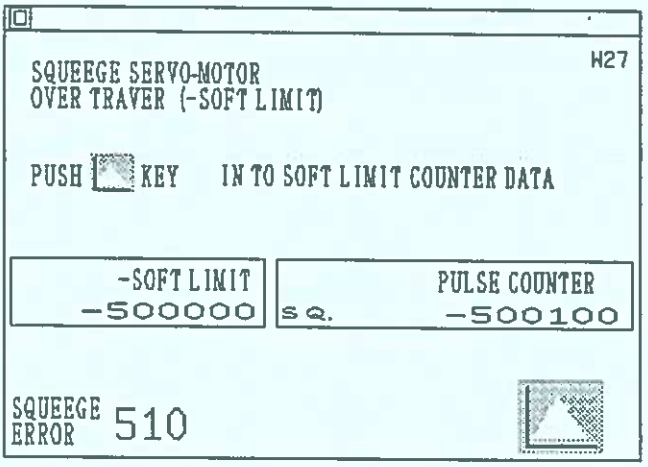
Press ERROR RESET to release the error.

How to deal with details W 2 6 ~ W 2 7

W 2 6 >



W 2 7 >



(Explanation) The present value of Squeegee Servo axis exceeds soft limit value.

(Countermeasure)

1 : present value(out of the limits), the color of numerical value =red

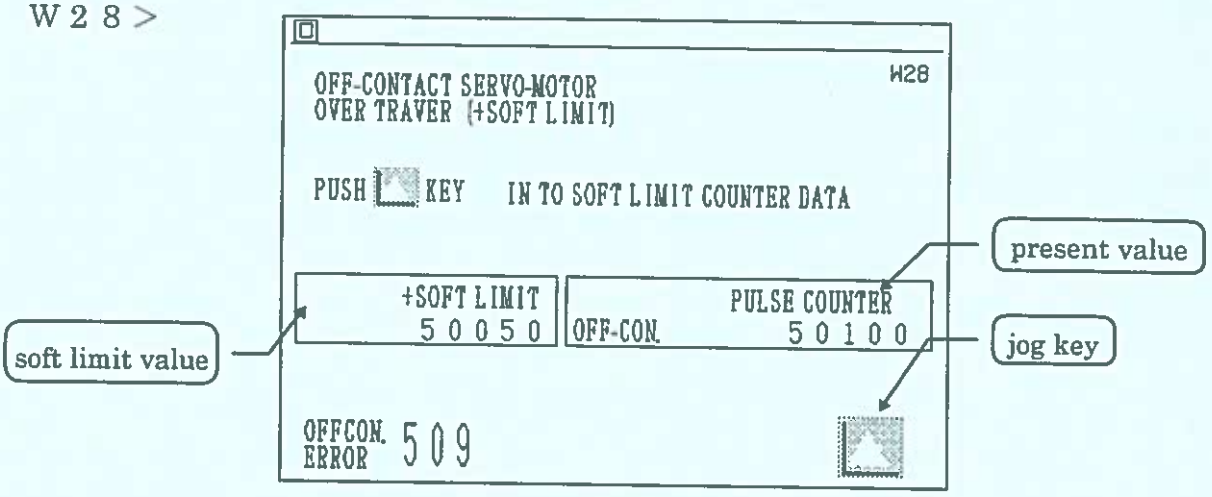
present value(in the limits), the color of numerical value = black

2 : Change the value to one in the limits of soft limit by jog key.

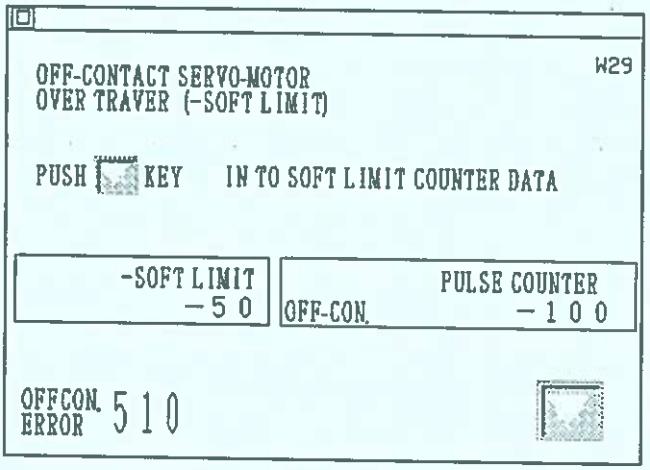
Press ERROR RESET to release the error.

How to deal with details W 2 8 ~ W 2 9

W 2 8 >



W 2 9 >



(Explanation) The present value of Off -Contact Servo axis exceeds soft limit value.

(Countermeasure)

1 : present value(out of the limits), the color of numerical value =red

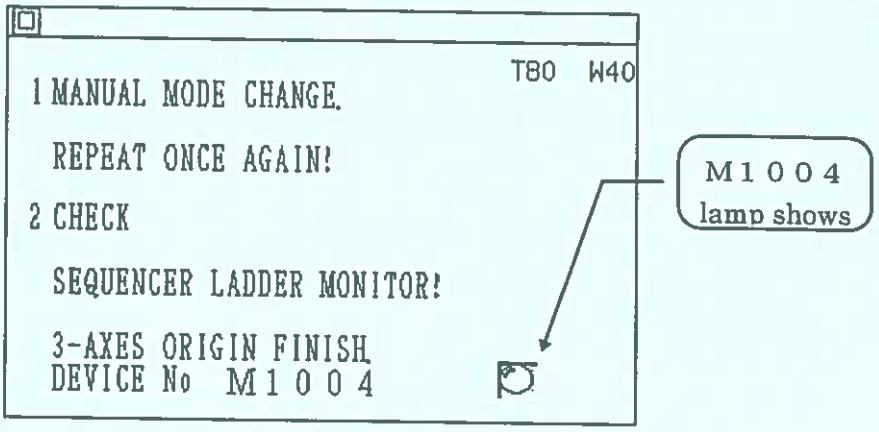
present value(within the limits), the color of numerical value =black

2 : Change the value within the limits of soft limit by jog key.

Press ERROR RESET to release the error.

How to deal with details W 4 0

W 4 0 >



(Explanation) 1 The return of 3-axis Table to the original point failed.

(Countermeasure)

1 : Go back to Manual image, and start auto-running again.

2 : Check if the Over-Travel sensors for all the motor axes of 3-axis table (X Y θ)are on.

3 : Find No. M 1 0 0 4 with Coil Search key on PLC program image and check which Input Signal is off.

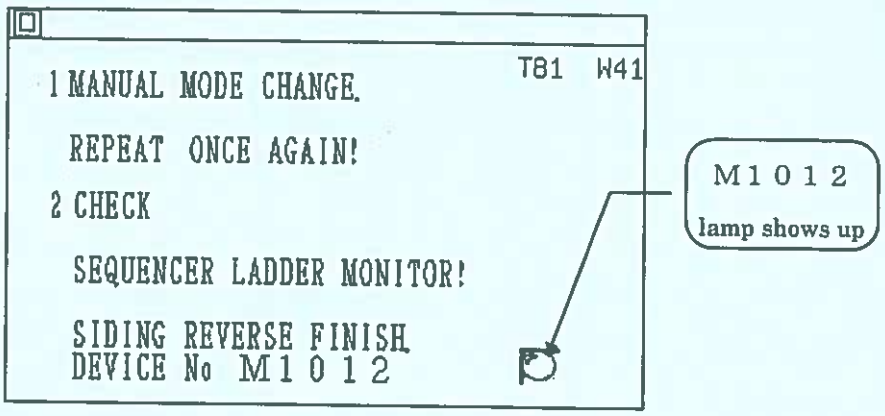
fn.
Use PLC program image on error.

For the details of Coil Search, refer to ch.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 4 1

W 4 1 >



(Explanation) 1 : The return of siding to the original point failed.

(Countermeasure)

1 : Return to Manual image to start auto-running again.

2 : Find No. M 1 0 1 2 with Coil Sea. key on PLC program image, and check which Input Signal is off.

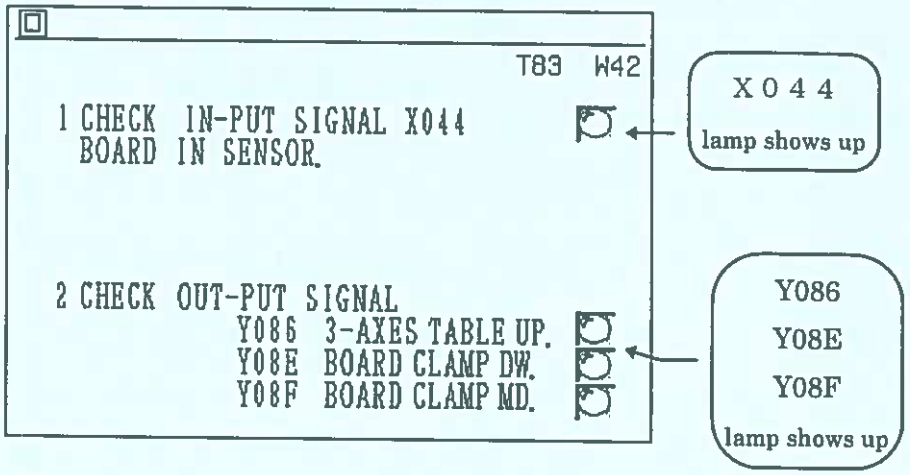
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 4 2

W 4 2 >



(Explanation) 1 Error happens at Carry-in section.

(Countermeasure)

1 : Check Input Signal of Board-In Sensor and check sensitivity of sensor.

2 : Find Output Signal No. Y··· which lamp is not green with Coil Sea. key and check which Input Signal is off.

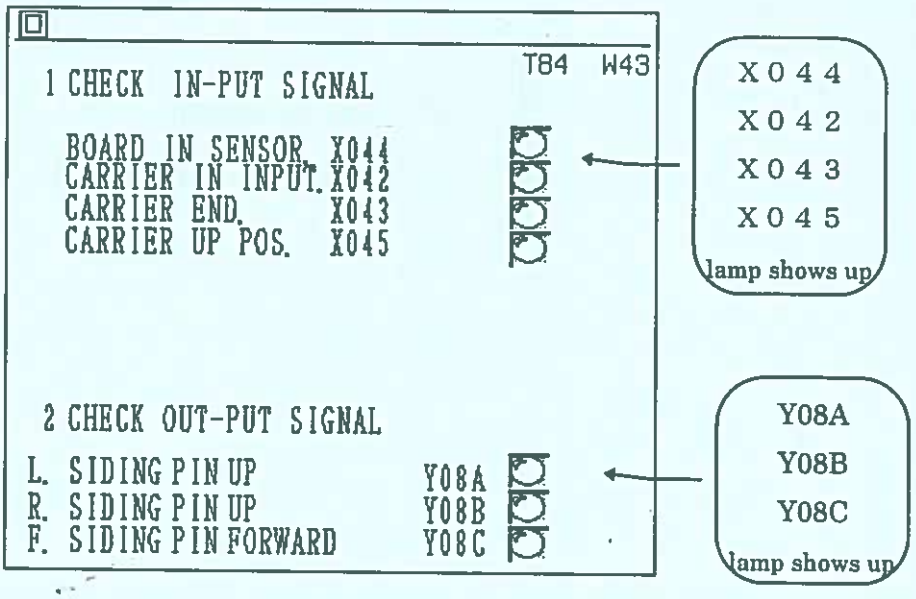
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 4 3

W 4 3 >



(Explanation) 1 Siding pins don't move at the time of siding.

(Countermeasure) 1 : Find the sensor which Input Signal X ··· lamp is not green on Detailed Error Message Display.

fn.
Input Signal X045 is normal in off(white).

2 : Find Output Signal No. Y··· which lamp is not green with Coil Sea key and check which Input Signal is off.

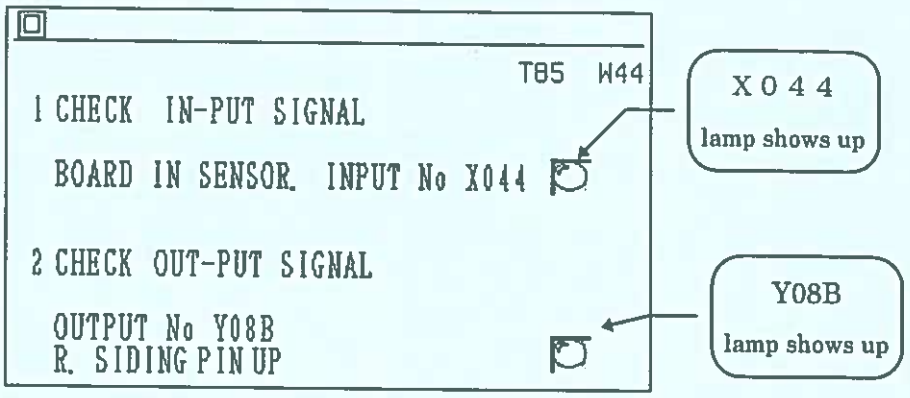
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 4 4

W 4 4 >



(Explanation) 1 Right siding pin doesn't move up.

(Countermeasure)

1 : Find the sensor which Input Signal X··· lamp is not in green on Detailed Error Message Display.

2 : Find Output Signal No. Y··· which lamp is not green with [Coil Sea.] key and check which Input Signal is off.

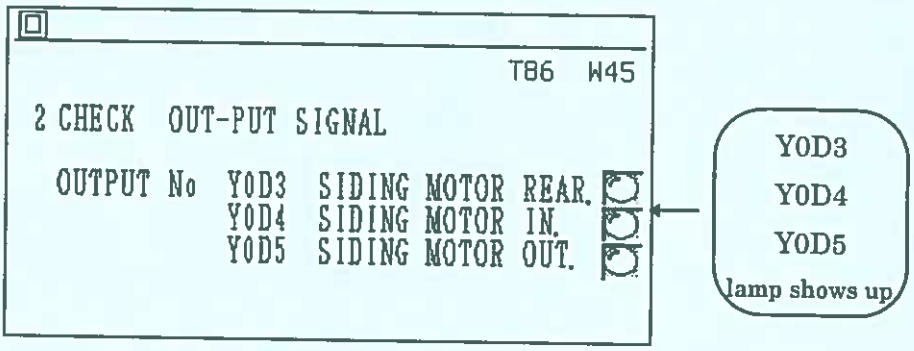
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 4 5

W 4 5 >



(Explanation) 1 Siding doesn't work.

(Countermeasure)

1 : Find Output Signal No. Y··· which lamp is not green with Coil Sea. key and check which Input Signal is off.

Point

: The check-out of Y0D4 is not needed when reference is left.

: The check-out of Y0D5 is not needed when reference is right.

fn.

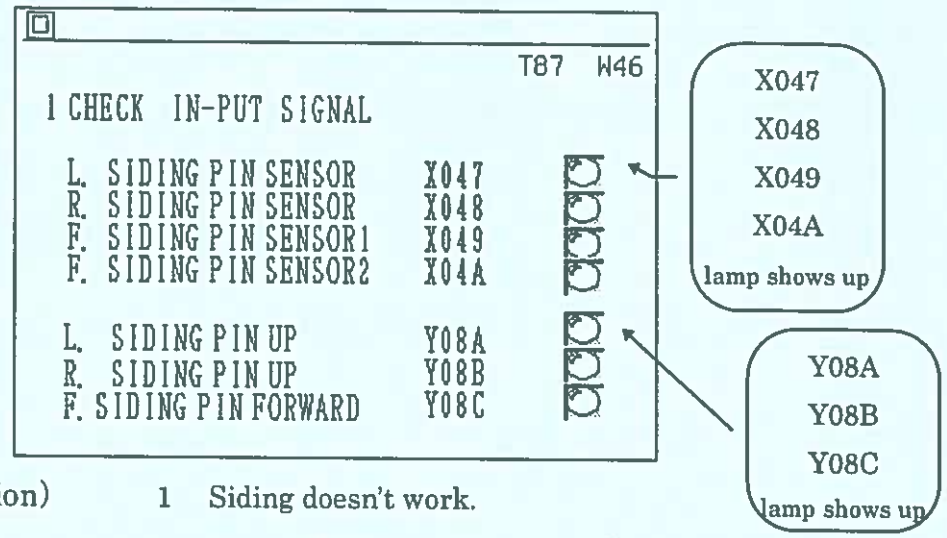
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 4 6

W 4 6 >



(Explanation) 1 Siding doesn't work.

or

Siding check-out sensor remains off.

(Countermeasure)

1 : Check out the sensor which input lamp is not green.

2 : Check out siding powder clutch and push-up torque.

3 : Find Output Signal No. Y··· which lamp is not green with Coil Sea. key and check which Input Signal is off.

Point

: Check Counter Measure 1 : and 2 : if Y··· is in green.

: The check-out of X048 is not needed when reference is left.

: The check-out of X047 is not needed when reference is right.

fn.

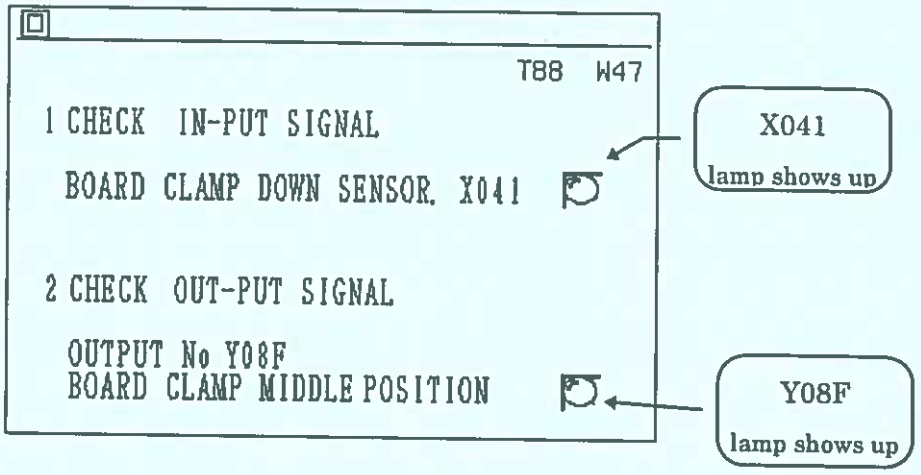
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 4 7

W 4 7 >



(Explanation) 1 The lowest-position sensor of Board Clamp remains off.

or

The middle-position air-cylinder of Board Clamp.

(Countermeasure)

1 : Check the sensor of device No. X041 (the lowest PCB clamp).

2 : Check the movement of Board Clamp up / down

3 : Find Output Signal No. Y08F which lamp is not green with Coil Sea. key and check which Input Signal is off.

Point

Check Counter Measure 1 : 2 : if Y08F is green.

fn.

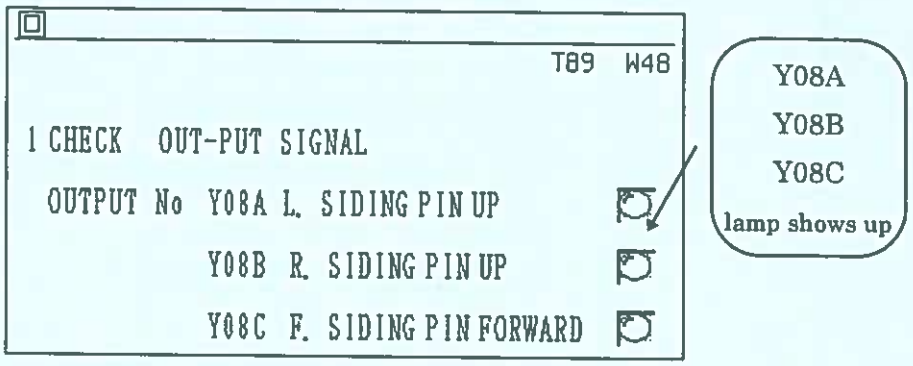
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error. .

How to deal with details W 4 8

W 4 8 >



(Explanation) 1 Siding pin(right / left) doesn't move down.

or

Siding pins (front) don't move backward.

(Countermeasure)

1 : Find Output Signal No. Y··· which lamp is not green with Coil Sea. key and check which Input Signal is off.

fn.

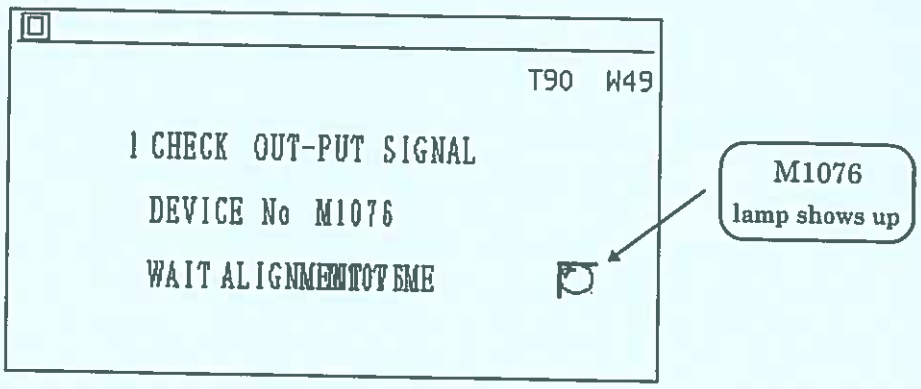
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error. .

How to deal with details W 4 9

W 4 9 >



(Explanation) 1 Alignment waiting time is up.

(Countermeasure)

1 : Find Output Signal No. M1076 which lamp is not green with Coil Sea key and check which Input Signal is off.

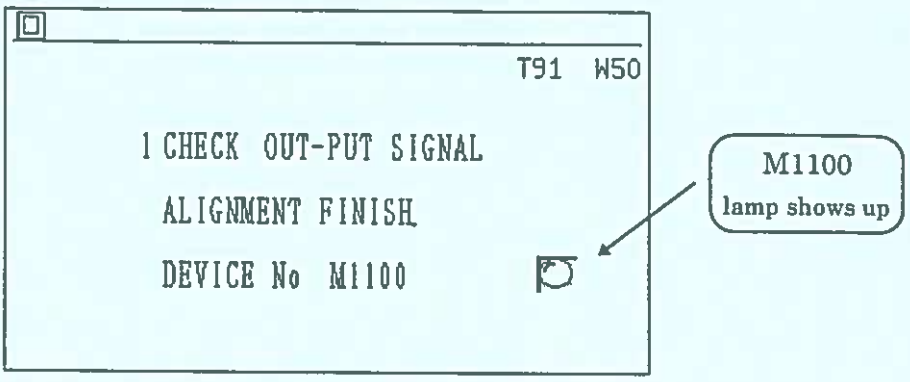
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details　W 5 0

W 5 0 >



(Explanation)　1　Alignment isn't completed.

or

2　Input signal doesn't turn on even though alignment is completed.

(Countermeasure)

1 : Find Output Signal No. M1100 which lamp is not green with Coil Sea. key and check which Input Signal is off.

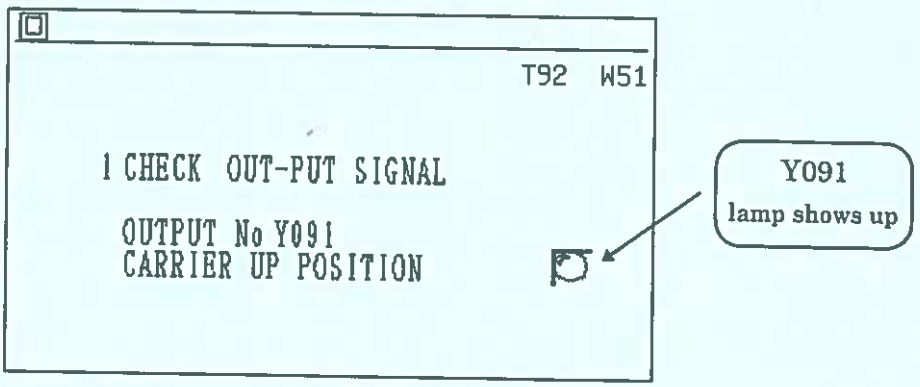
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET　to release the error.

How to deal with details W 5 1

W 5 1 >



(Explanation) 1 Carrier doesn't move up at THIN MODE .

(Countermeasure)

1 : Check the input of Carry-in END Sensor
Check the input of Catty-in Down Sensor

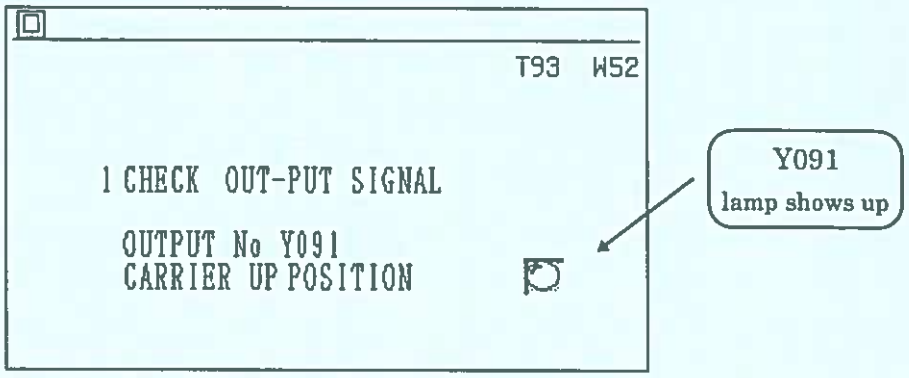
2 : Find Output Signal No. Y091 which lamp is not green with Coil Sea. key and check which Input Signal is off.

fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.
Press ERROR RESET to release the error.

How to deal with details W 5 2

W 5 2 >



(Explanation) 1 Carrier doesn't move up.

(Countermeasure)

1 : Check the input of Carry-in END Sensor
Check the input of Catty-in Down Sensor

2 : Find Output Signal No. Y091 which lamp is not green with Coil Sea. key and check which Input Signal is off.

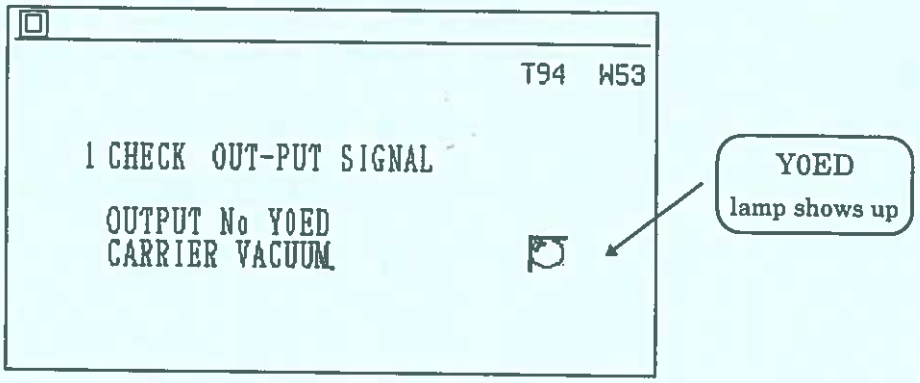
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 5 3

W 5 3 >



(Explanation) 1 Carrier Vacuum doesn't work.

(Countermeasure)

1 : Check if Carry-in Down Sensor is off .
Check if Carry-in END Sensor is on.

1 : Find Output Signal No. Y0ED which lamp is not green with [Coil Sea.] key and check which Input Signal is off.

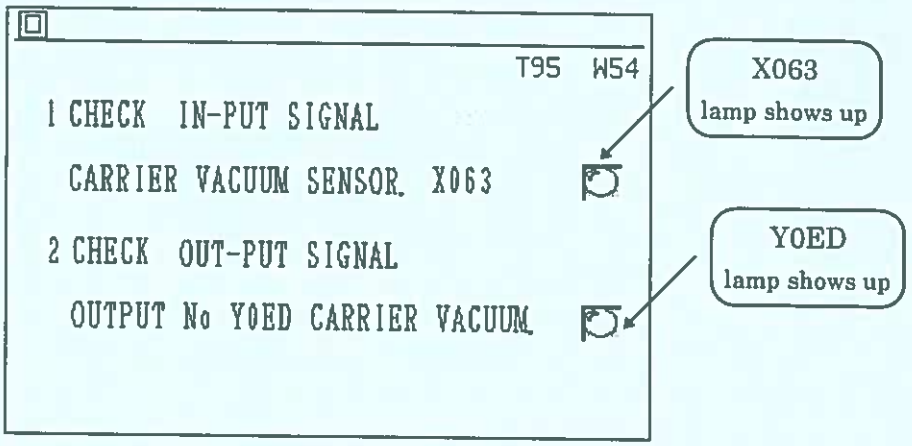
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 5 4

W 5 4 >



(Explanation) 1 Carrier Vacuum Sensor is not on.

or

2 Carrier Vacuum doesn't work.

(Countermeasure) 1 : X063 (Carrier Vacuum Sensor) Lamp is off (white)

↓

Check the difference between the set value and the present value.

↓ NO

The present value is lower than the set value. → Check Sensor and electrical lines

↓ YES NO

Carrier Vacuum is leaking → Decease the set value

↓ YES

Re-set Vacuum values

1 : Find Output Signal Y0ED with Coil Sea. key and check which input signal is off.

fn.

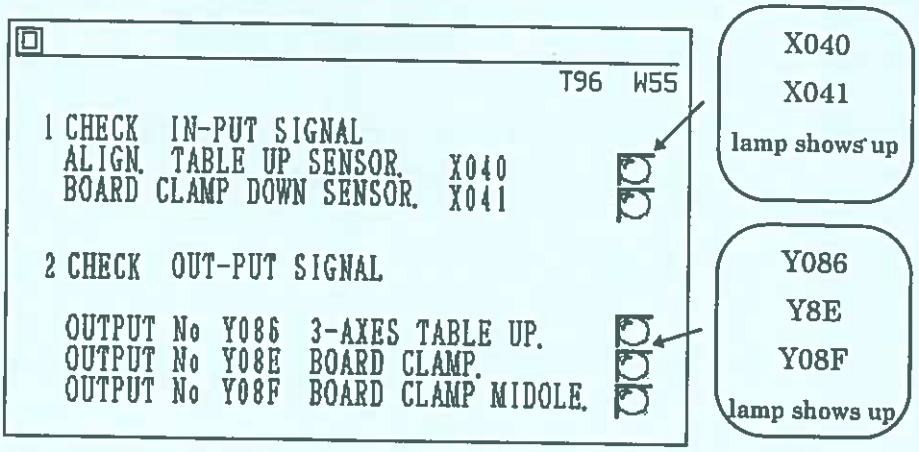
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 5 5

W 5 5 >



(Explanation) 1 : Board Clamp is not waiting.

or

Board Clamp can not wait.

fn.

One lamp at least is usually green on W55 error.

(Countermeasure)

1 : Check that all the Output Signals (Y···) are off (white) on Detailed Error Message Display.

↓

If there is any Output Signal which is on (green), check it with Coil Sea. key.

fn.

Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

↓

(Countermeasure)

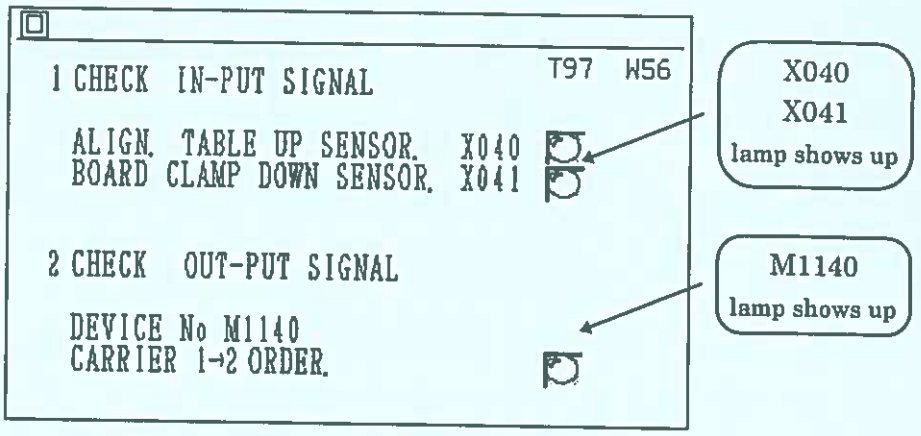
2 : Check Input Signal of Alignment Table Up Sensor X040
OFF(white) is Normal.

3 : Check Input Signal of Board Clamp lowest Sensor X041
OFF(white) is Normal.

Press ERROR RESET to release the error.

How to deal with details W 5 6

W 5 6 >



(Explanation) 1 Carrier Servo axis move from Carry-in position to Printing position.

(Countermeasure)

1 : Alignment Table Up Sensor (X040)is on.

↓

Check that Alignment Table is at the lowest.

↓

Check input of X040 sensor or electrical lines.

2 : Board Clamp Down Sensor (X041)is still on.

↓

Check that Board Clamp is at the highest.

↓

Check Input of X041 sensor o electrical lines.

3 : Find Output Signal M1140 with Coil Sea. key and check which input signal is off.

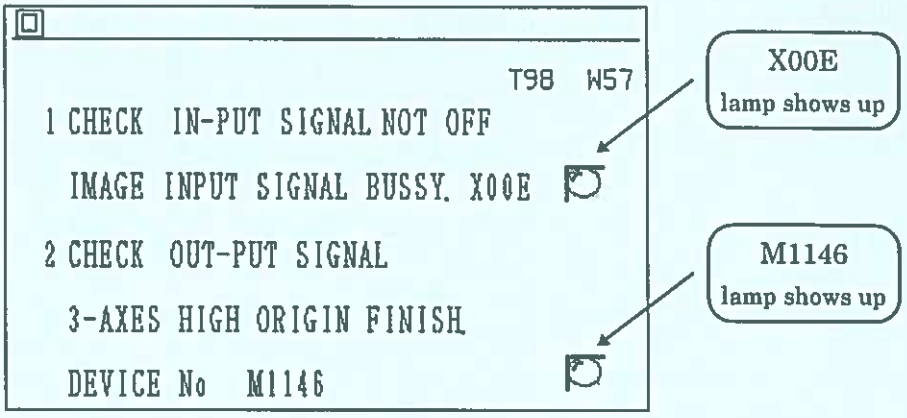
For the details of Coil Search, refer toCh.3 § 3

Press ERROR RESET to release the error.

fn.
Use PLC program image on error.

How to deal with details W 5 7

W 5 7 >



(Explanation) 1 The high-speed return of 3-axis Table the original position failed and time up.

(Countermeasure)

1 : Release the error to return Manual image and start auto-running.

2 : Find Output Signal M1146 with Coil Sea. key and check which input signal is off.

fn.
X00E is correct in white(OFF). M1146is correct in green(ON).

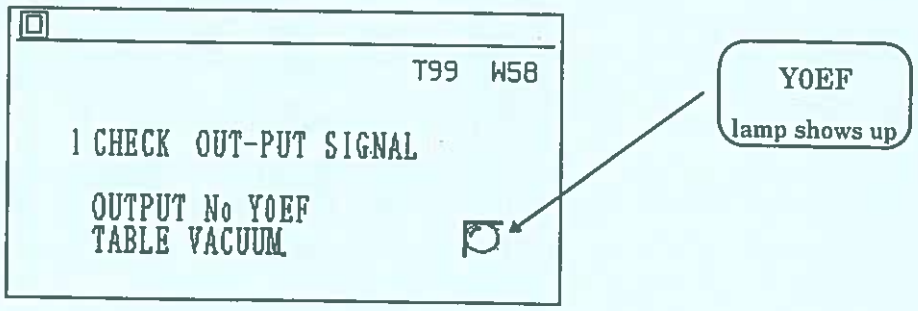
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 5 8

W 5 8 >



(Explanation) 1 Printing Table Vacuum doesn't work.

(Countermeasure)

1 : Check Input Signal of Lowest -Carrier Sensor(X058).

2 : Check Input Signal of Carry-out End Sensor(X05D).

3 : Find Output Signal Y0EF with Coil Sea. key and check which input signal is off.

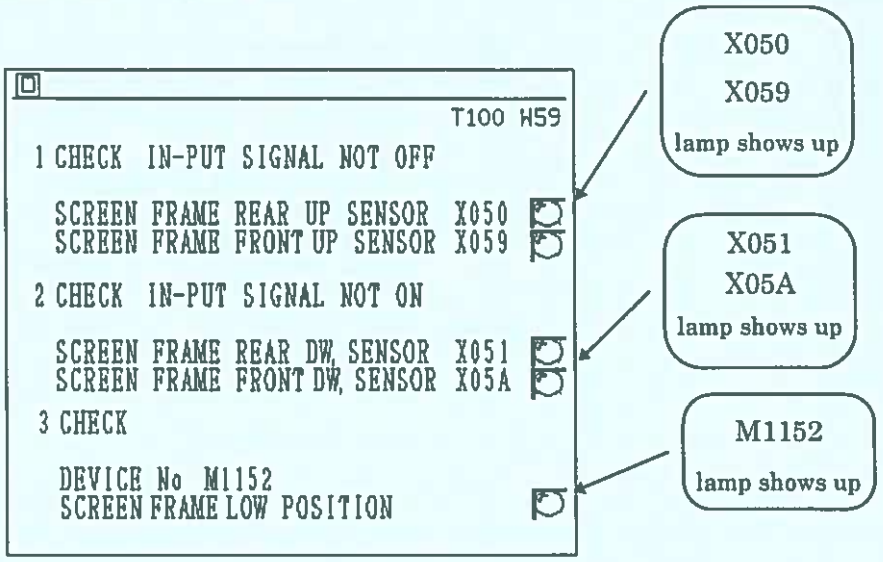
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 5 9

W 5 9 >



(Explanation) 1 Screen Frame is not at the lowest.

(Countermeasure)

1 : Check if Screen Frame is at the lowest.

2 : Check Screen Frame Sensor on Error Detailed-Massage Display.
X050,X059 the highest sensor OFF(white)
X50,X05A the lowest sensor ON(green)

3 : Find Output Signal M1152 with Coil Sea. key and check which input signal is off.

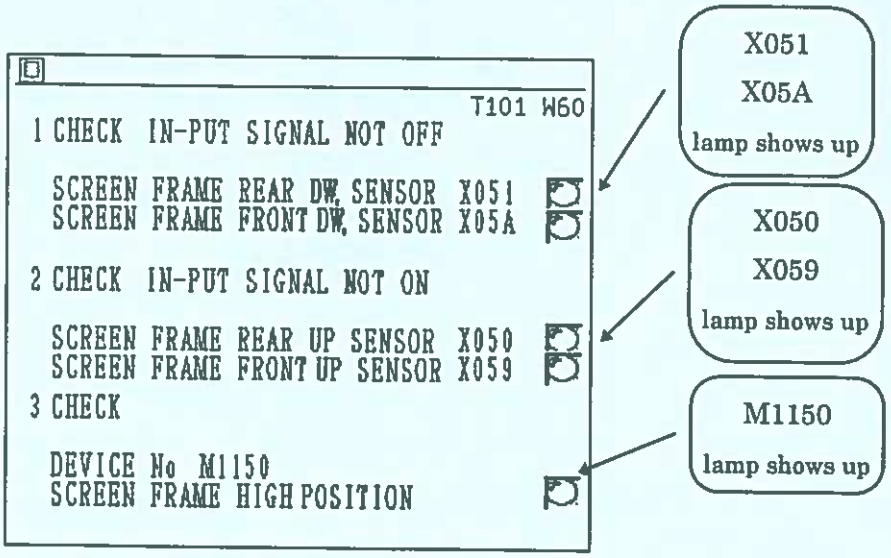
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 6 0

W 6 0 >



(Explanation) 1 Screen Frame is not at the highest.

(Countermeasure)

1 : Check if Screen Frame is at the highest.

2 : Check Screen Frame Sensor on Error Detailed-Massage Display.
X051,X05A the highest sensor OFF(white)
X50,X05A the lowest sensor ON(green)

3 : Find Output Signal M1152 with Coil Sea. key and check which input signal is off.

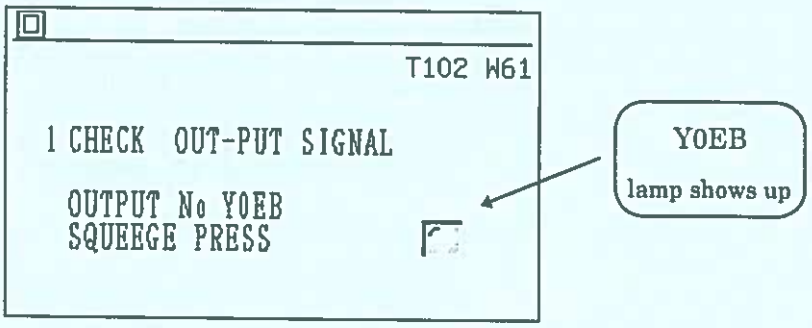
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 6 1

W 6 1 >



(Explanation) 1 Squeegee Press doesn't move down.

(Countermeasure)

1 : Find Output Signal Y0EB with Coil Sea. key and check which input signal is off.

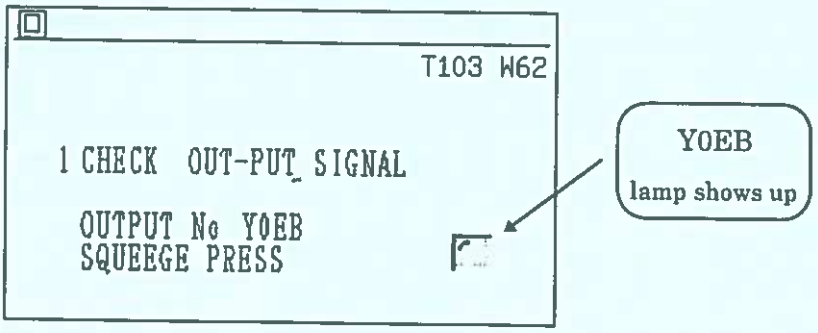
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details W 6 2

W 6 2 >



(Explanation) 1 Squeegee Press doesn't move up.

Point

Y0EB Lamp is correct in white (OFF) if Squeegee Press move-up makes an over-time error(W 6 2).

(Countermeasure)

1 : Find Output Signal Y0EB with Coil Sea. key and check which input signal is off.

fn.

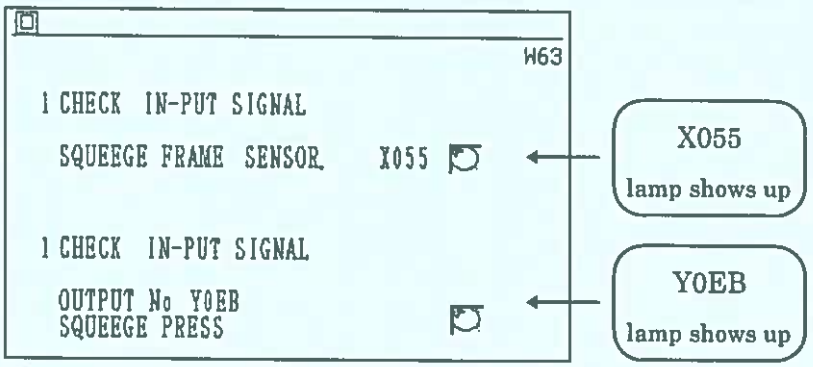
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

How to deal with details　W 6 3

W 6 3 >



(Explanation)　Squeegee Frame moves up and Squeegee pressure gets cut off while printing.

(Countermeasure)

1: Check Input Signal(X055)of Squeegee Frame Sensor .

2 : Find Output Signal Y0EB with Coil Sea. key and check which input signal is off.

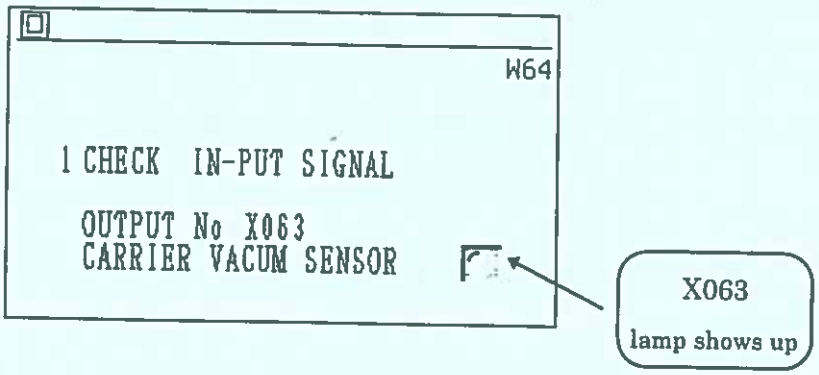
fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET　to release the error.

How to deal with details W 6 4

W 6 4 >



(Explanation) Carrier Vacuum pressure gets down while printing and Squeeging pressure gets cut off.

(Countermeasure)

1 : Check Input Signal (X063) of Carrier Vacuum Sensor.

2 : Find Output Signal M1100 with Coil Sea key .
If coil is off, it is normal.

fn.
Use PLC program image on error.

For the details of Coil Search, refer toCh.3 § 3.

Press ERROR RESET to release the error.

Chapter 3 How to deal with errors and maintenance

3－3 CP-15 Warning Image Window

Warning Image Window is explained next.

Warning Image Window shown on auto-running··· • •

Warning message shows up if something abnormal happens on auto-running.

This is different from Error, so auto-running doesn't stop.

Warning message automatically disappears when running conditions are set.

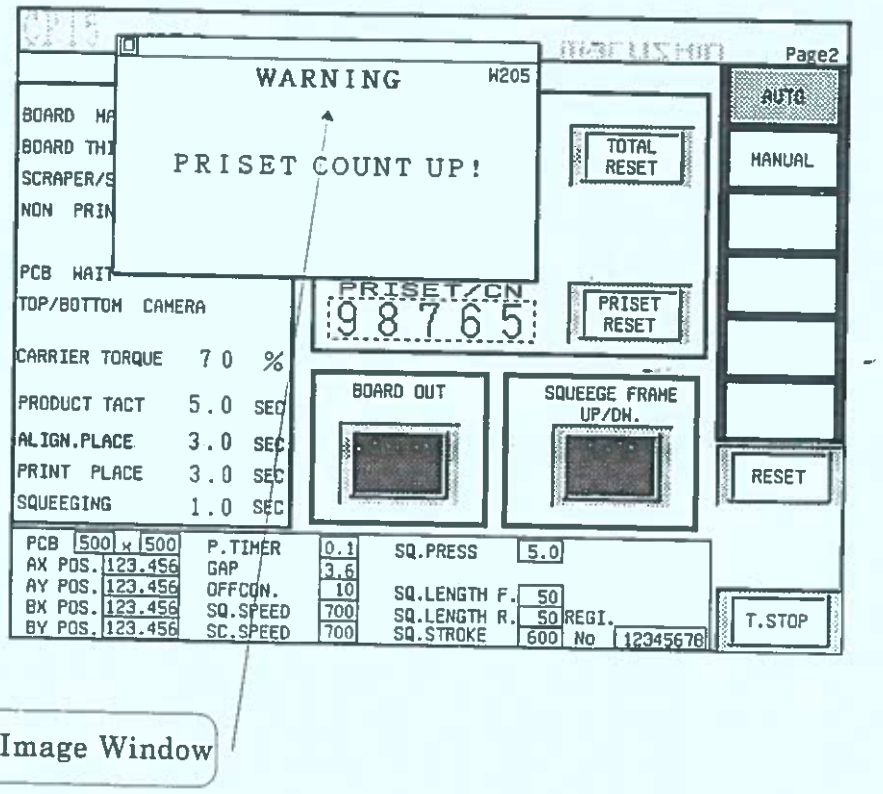
Warning Image Window shown on Manual··· • •

Warning message is shown to protect against an operational mistake on Manual. Warning message automatically disappears when running conditions are set.

3－3　CP-15　Warning Image Window

Warning Image Window is explained next.

Example >



↓

It's impossible to erase Warning Message deliberately. Warning message automatically disappears when running conditions are set.

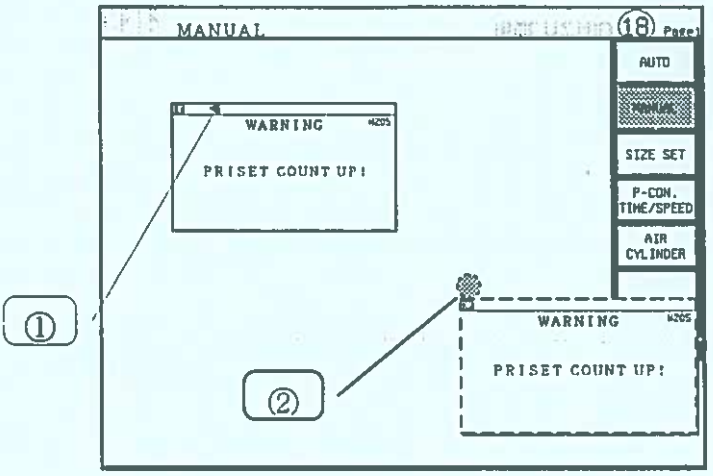
The position of Warning Message Window can be changed.

How to change the position is explained next.

3－3　CP-15　Warning Image Window

How to change the position of Warning Message Window is explained next.

Example>



↓

Press ①(It buzzes)

Press ②(It's available while buzzing)

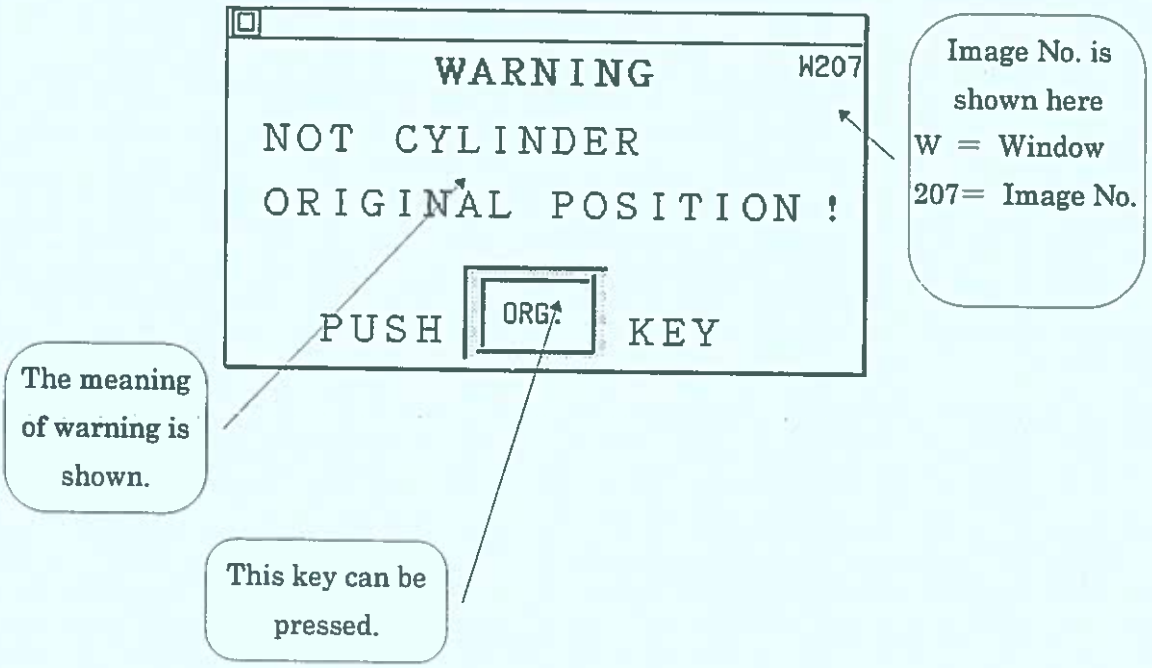
Point

② is a new position.

3－3　CP-15　Warning Image Window

How to see Warning Image Window

Example >

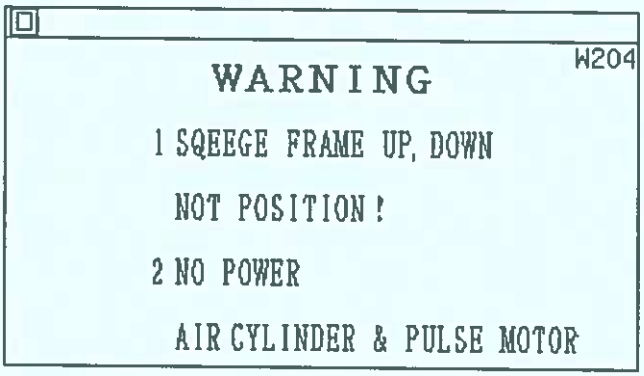


Each Warning Message Window is explained next.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window　W204

W204>



(Explanation)　Squeegee Frame remains in between

or

AIR apparatus or pulse motor are cut off.

(Cause)　Input Signal of　No. X5C Safety Sensor or X4E, X4F Squeegee Frame up/down Sensor is not on.

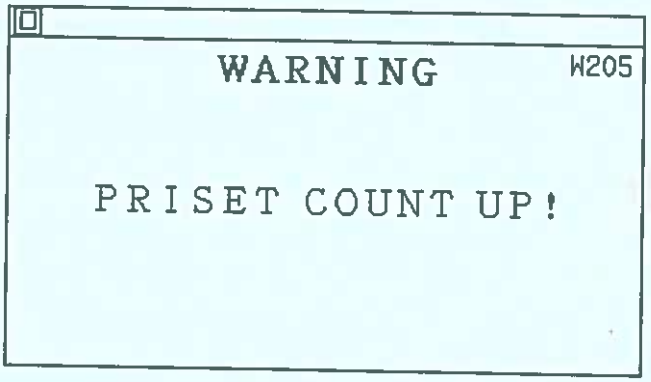
(Countermeasure)　Check Input Signal of Safety Sensor.

Press [Squeegee Frame up/down] key to move it up.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window　W205

W205>



(Explanation)　Preset Counter caught up with the set value.

(Countermeasure)

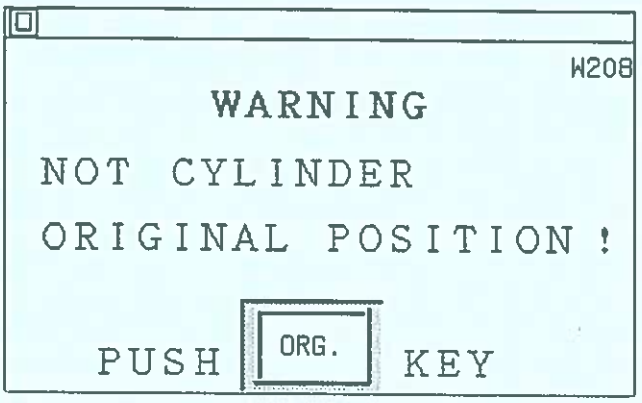
1 : Press [PRISET RESET] key to clear 0 on auto-running image.

2 : Move Squeegee Frame up and down. The counter gets to clear 0.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W207

W207>



(Explanation)　This Warning massage shows up when Manual set-up or Auto-running is done with [ORG] key on Touch Panel NOT green.

(Cause)　The cylinders except Squeegee cylinder and Carrier haven't returned to the original position.

(Countermeasure)

Press [ORG.] key to return the cylinders and Carrier to the original position.

Warning Message Window automatically disappears after [ORG.] key turns green.

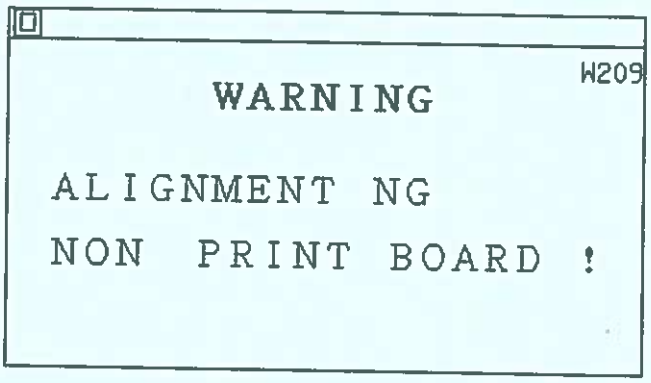
fn.

Make sure to take any PCBs away from CP-15 to press [ORG.] key, otherwise CP-15 could be damaged.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W209

W209>



(Explanation)　Image processed value gets to be out of the allowance the limits,

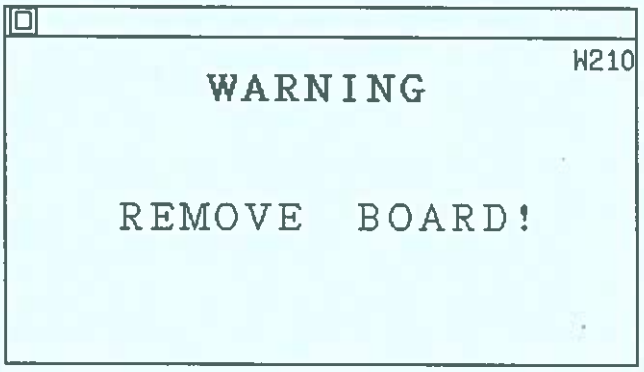
so PCB is conveyed onto Carry-out Conveyer.

(Countermeasure)　If a next PCB is correctly image-processed, Warning Message Window automatically disappears.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W210

W210>



(Explanation)　A PCB is at Carry-in Section, so CP-15 doesn't run.

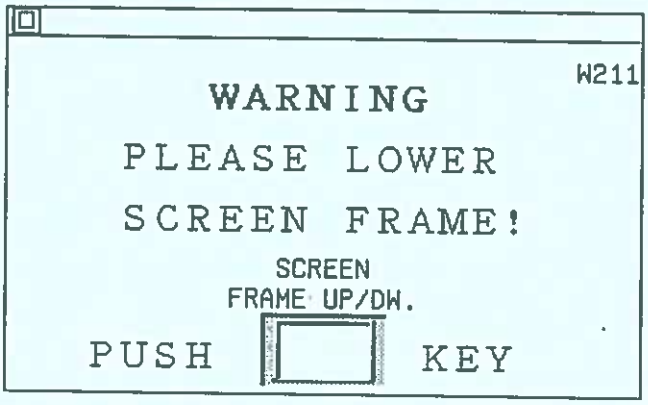
(Countermeasure)

Take a remaining PCB away from Carry-in Section, so Warning Message Window automatically disappears.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W211

W211>



(Explanation)　Screen Frame remains up when squeeging on Manual.

(Countermeasure)

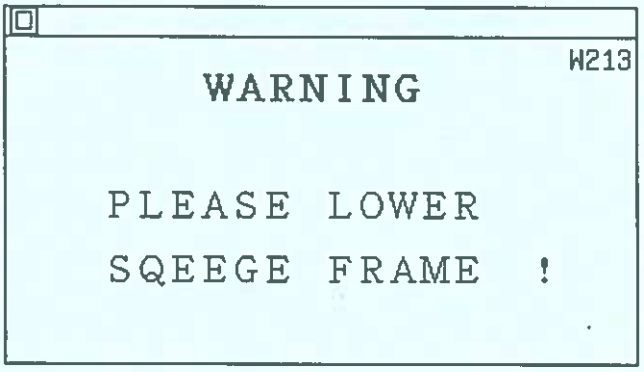
Press SCREEN FRAME UP/DW key to move Screen Frame down.

When Screen Frame lowest point is sensed, Warning Message Window automatically disappears.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W213

W213>



(Explanation)　Printing can't be done with Squeegee Frame up.

(Countermeasure)

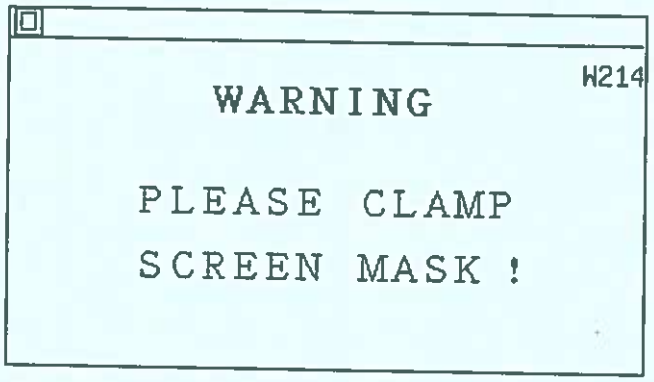
Press SQUEEGE FRAME UP／DW. key to move Squeegee Frame down.

When Squeegee Frame lowest point is sensed, Warning Message Window automatically disappears.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W214

W214>



(Explanation)　Main-clamp is not clamping Screen on auto-running.

(Countermeasure)

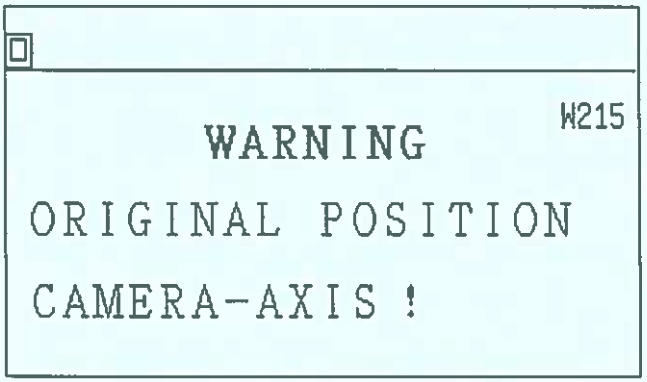
Turn on Main-clamp switch at the front.

Warning Message Window automatically disappears when Main-clamp is done.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W215

W215>



(Explanation)　Camera axis doesn't return to the original position.

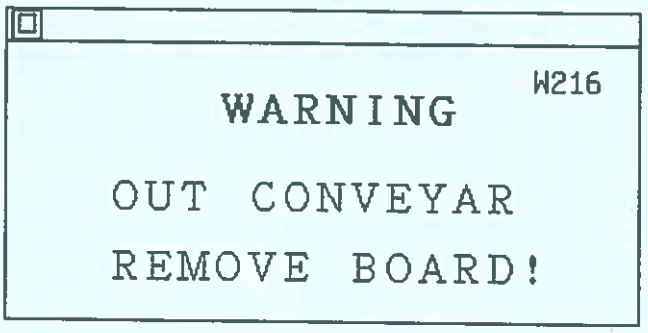
(Countermeasure)　Press jog key to return Camera axis to the original point.

Warning Message Window automatically disappears after the return of Camera axis is done.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W216

W216>



(Explanation)　A PCB is on Carry-out Conveyor.

(Countermeasure)

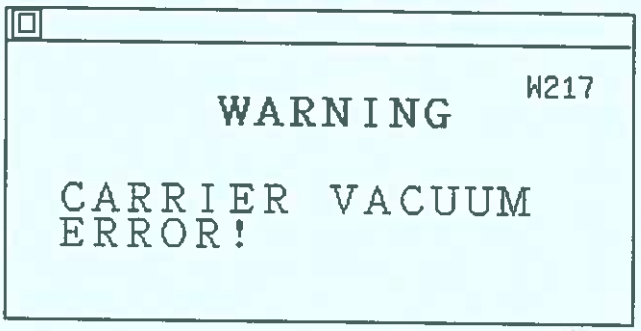
Take a PCB away from Carry-out Conveyor.

Warning Message Window automatically disappears after a PCB removed.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W217

W217>



(Explanation)　Carrier Vacuum pressure is too low to print on auto- running.
Carrier moves at low speed on this warning.

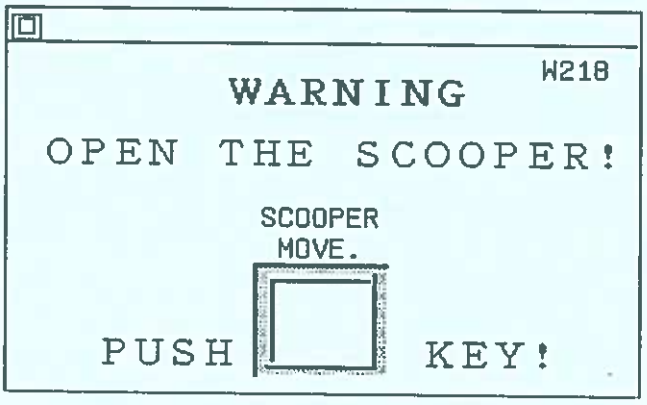
(Countermeasure)

Warning Message Window automatically disappears after a PCB is carried out.

3－3　CP-15　Warning Image Window

Explanation of Warning Image Window W218

W218>



(Explanation)　Scooper is closed (scoop up) on squeeging on Manual.

(Countermeasure)

Press the key to open Scooper (scoop down).

Warning Message Window automatically disappears after scooper is open(down).

Chapter 3 How to deal with errors and maintenance

3 – 3 CP-15 PLC program (functions)

PLC program is explained next.

PLC program can be seen on Touch Panel.

When PLC program image is on, the images on Manual or Auto-running is not shown.

It's recognizable how CP-15 is working at the moment on PLC program image.

PLC program can't be changed on this image because this is only for reading.

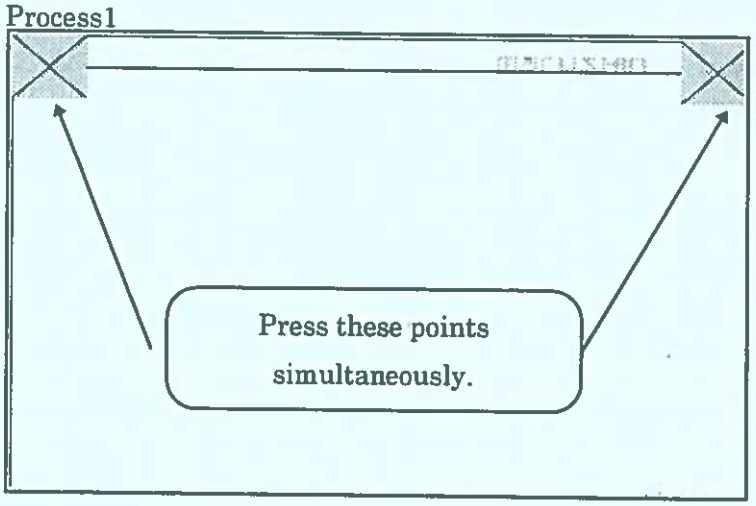
The procedure to read PLC program is explained next.

Chapter 3 How to deal with errors and maintenance

3 – 3 CP-15 PLC program (reading)

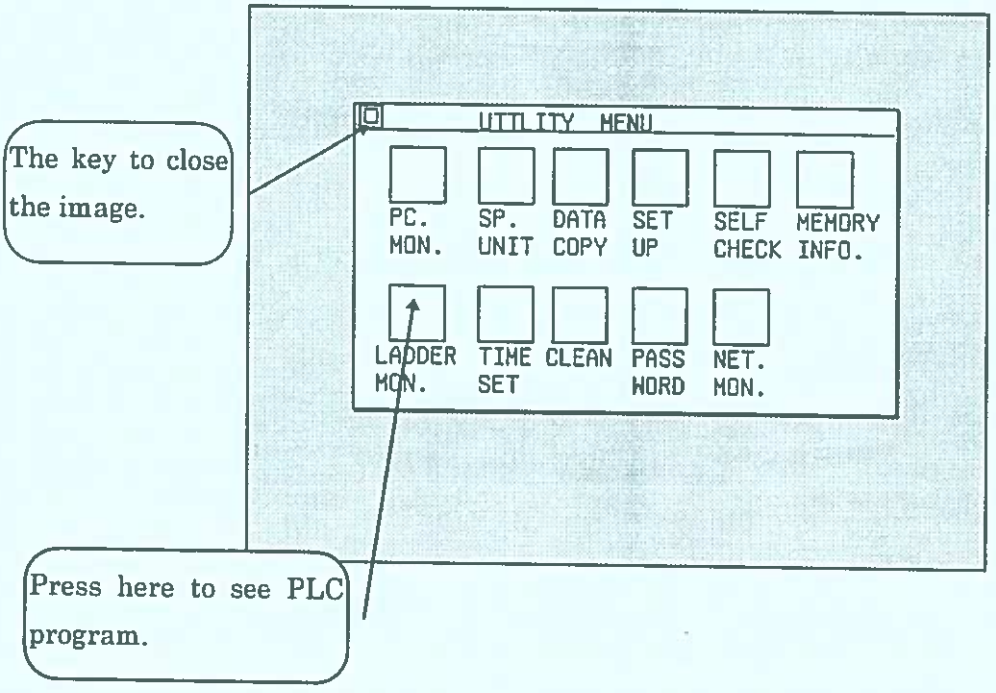
The procedure to read PLC program is explained next.

Process1



↓

Process2

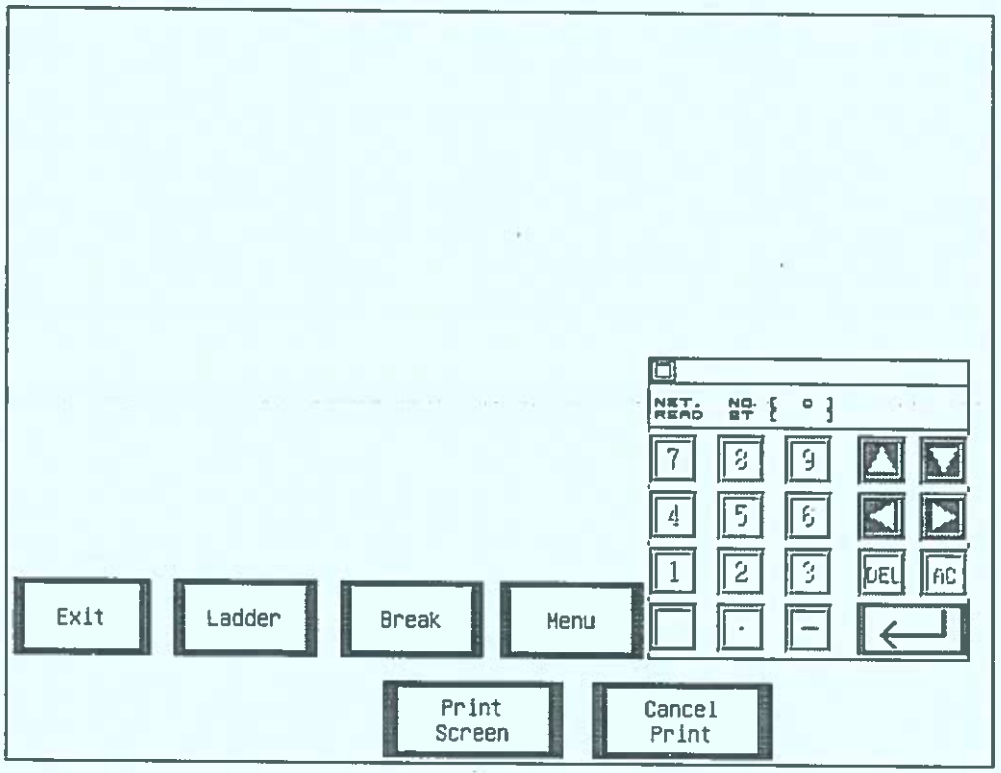


↓

3 — 3 CP-15 PLC program (reading)

The procedure to read PLC program is explained next.

Process3



↓

NET NO. [0] blinks on Ten Key Overlap Window.

↓

Press  key.

↓

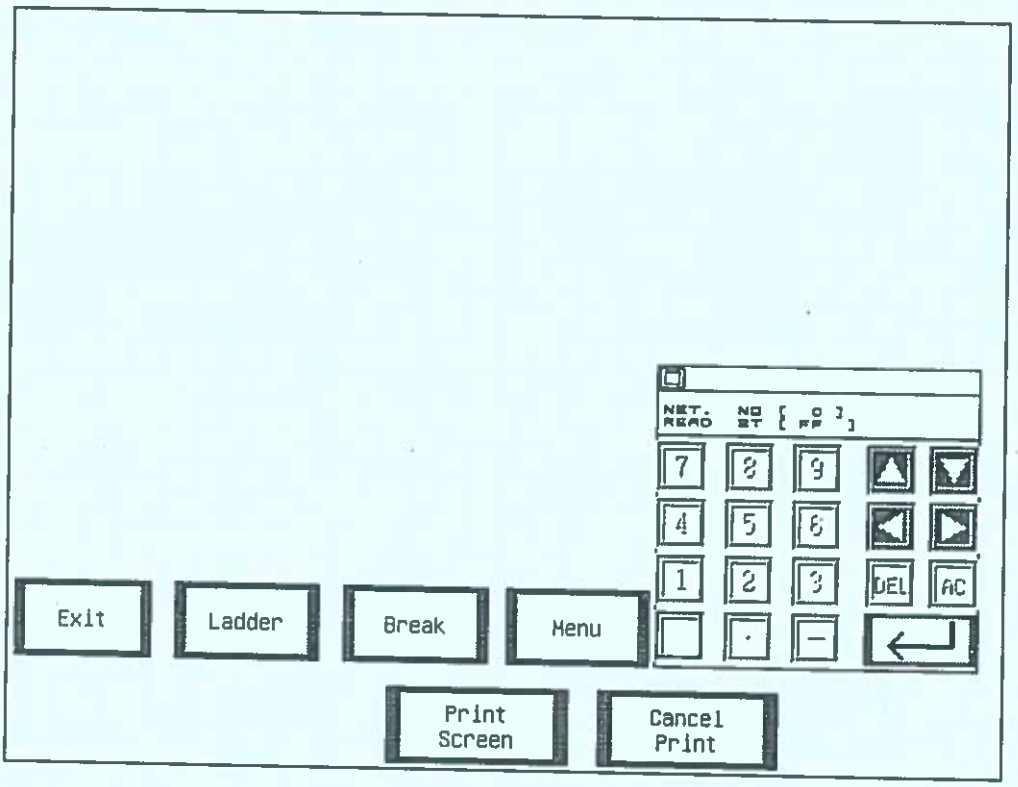
NET. NO [0] is chosen.

↓

3 — 3 CP-15 PLC program (reading)

The procedure to read PLC program is explained next.

Process4



↓

NET NO. [FF]blinks on Ten Key Overlap Window.

↓

Press ↵ key

↓

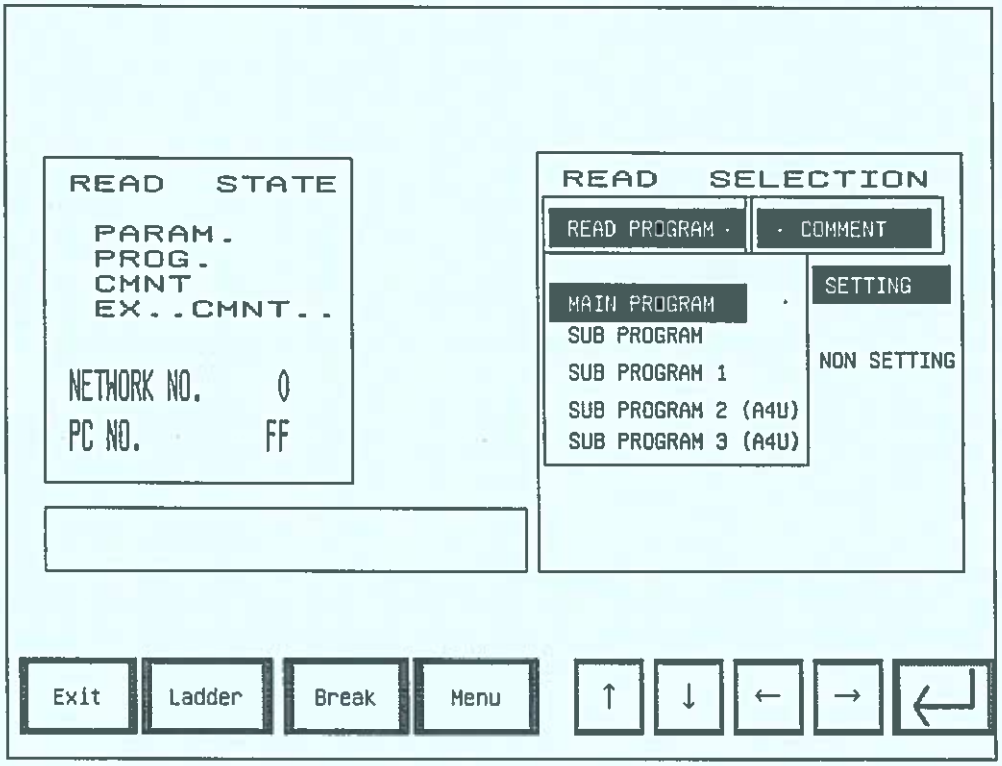
NET. NO [FF] is chosen.

↓

3 — 3 CP-15 PLC program (reading)

The procedure to read PLC program is explained next.

Process5



↓

press  key when the image above is on.

↓

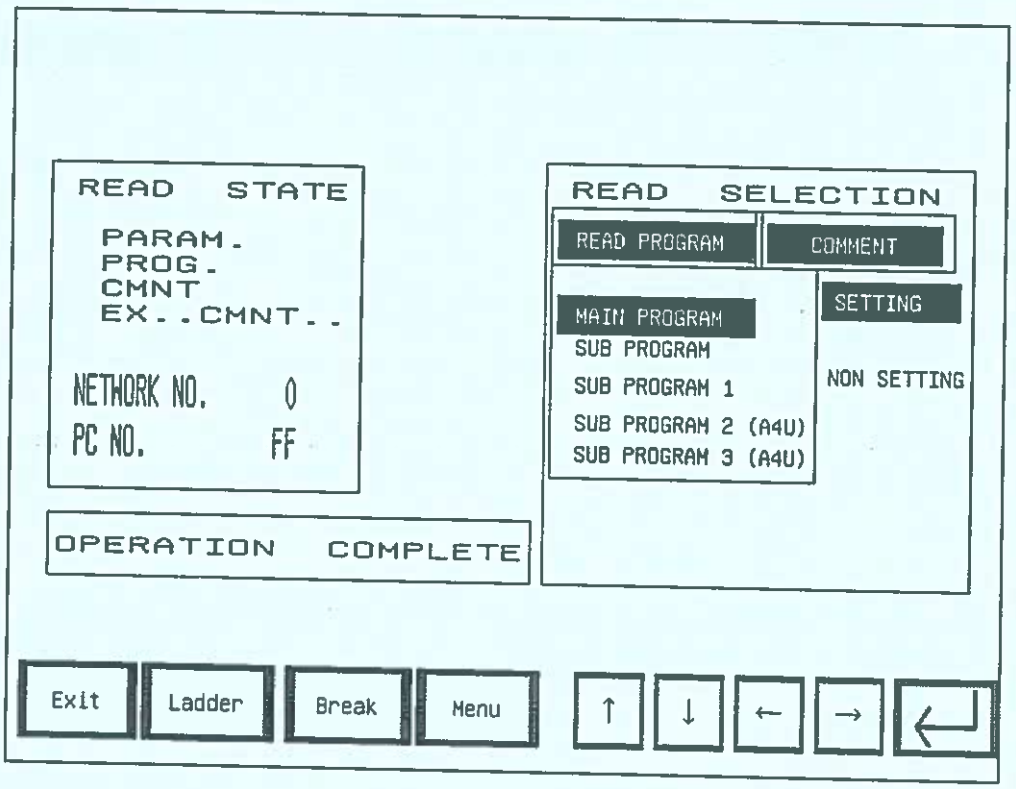
PLC program begins to be read.

↓

3 — 3 CP-15 PLC program (reading)

The procedure to read PLC program is explained next.

Process6



↓

(OPERATION COMPLETE) gets to be shown.

It takes some time to complete reading.

↓

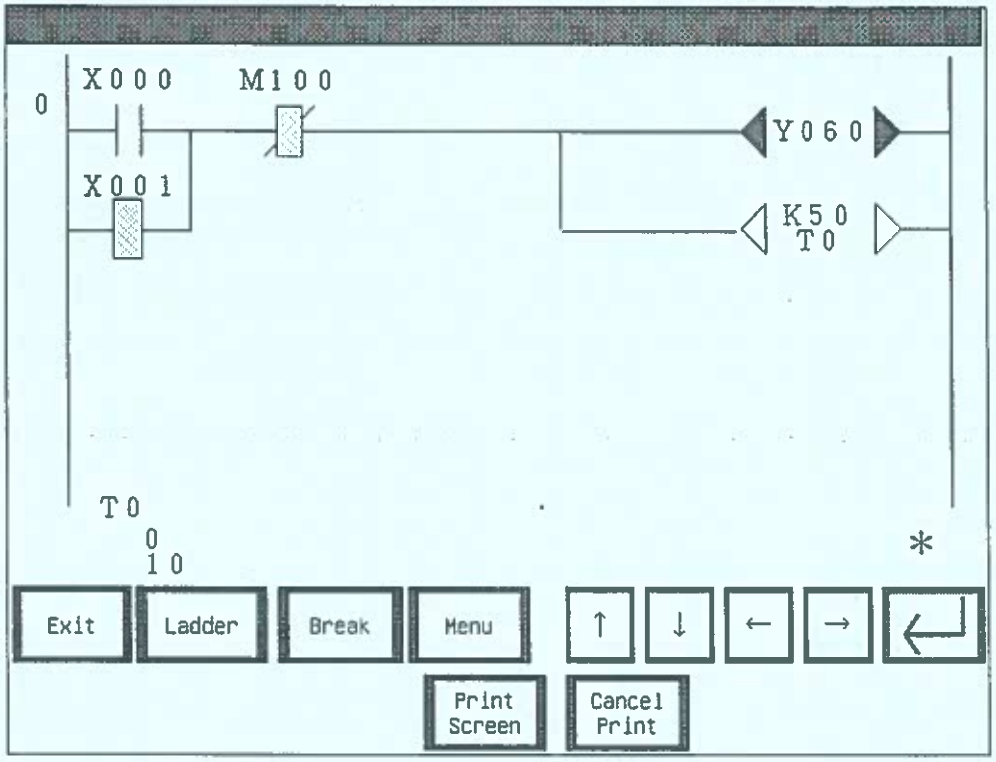
Press [LADDER] key after reading is completed.

↓

3 — 3 CP-15 PLC program (reading)

The procedure to read PLC program is explained next.

Process7



↓

PLC program image gets to be shown on Touch Panel.

↓

Press [MONI.] key.

fn.

1 : Asterisk * blinks on the right of the image on monitoring.

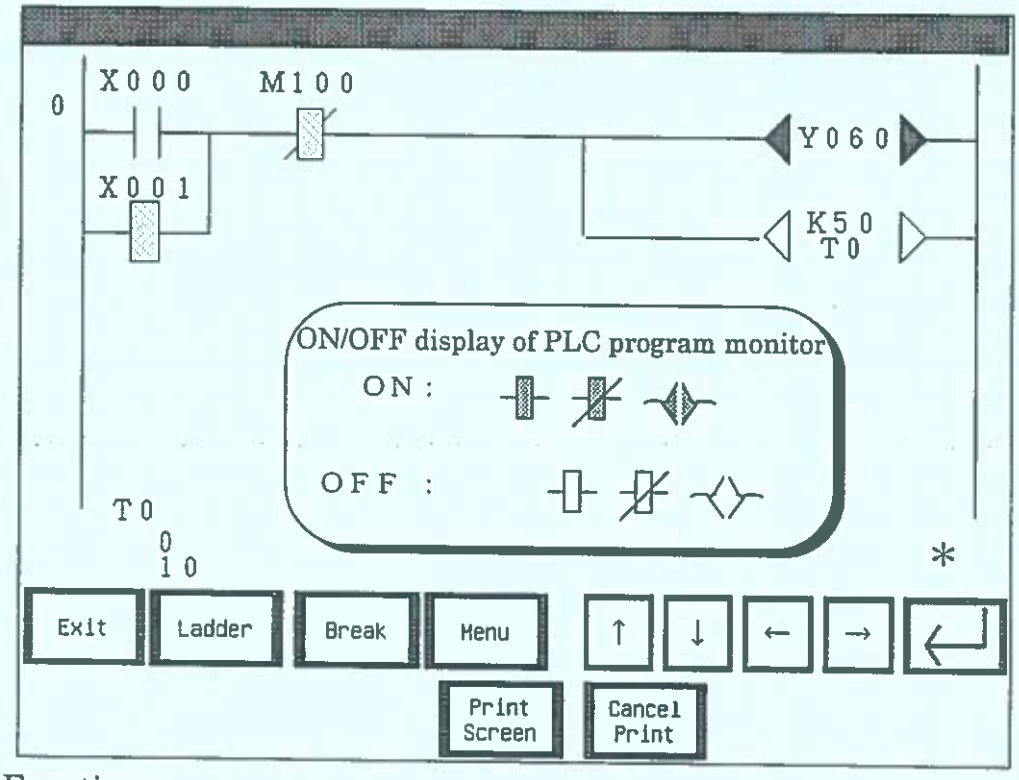
2 : PLC program above is different from CP-15 program.

Chapter 3 How to deal with errors and maintenance

3 – 3 CP-15 PLC program (operation key)

Operation keys of PLC program is explained next.

Example>



Key Functions

Exit	PLC program image ends. The former image gets back.
PCRD	PLC program begins to be read.
Mon.	PLC program begins to be monitored. (＊blinks)
Menu	Devices, Coil etc. in program are sought.
↑ ↓	One circuit of program can be scrawled.
↵	Next program is read.
Print Screen /Cancel Print	These are not used at the moment.

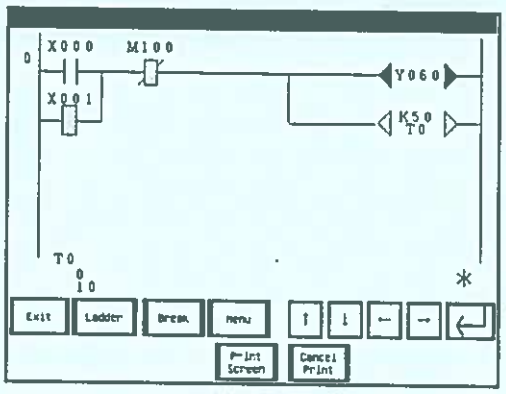
↓

Chapter 3 How to deal with errors and maintenance

3 — 3 CP-15 PLC program (How to operate coil search)

The procedure of Coil Search is explained next.

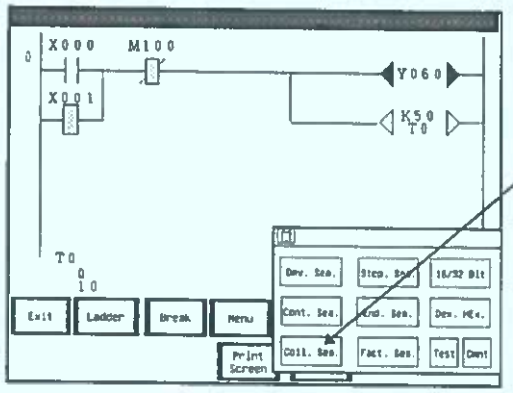
Process1>



Press MENU key.

↓

Process2>



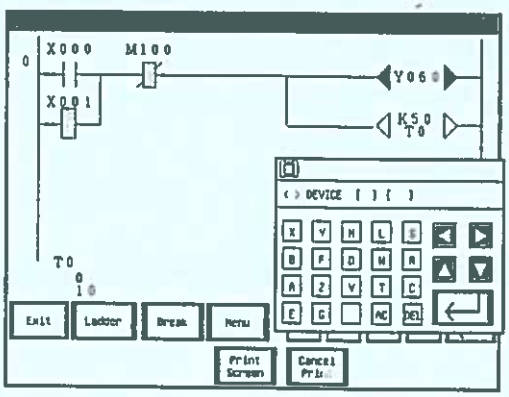
Press Coil Sea. key.

↓

↓

3 – 3 CP-15 PLC program (How to operate coil search)

Process 3 >



ex.> Seek No.Y080 by Coil Search.

Press [Y] key.

↓

Press [↵] key.

↓

Press [8] [0] .

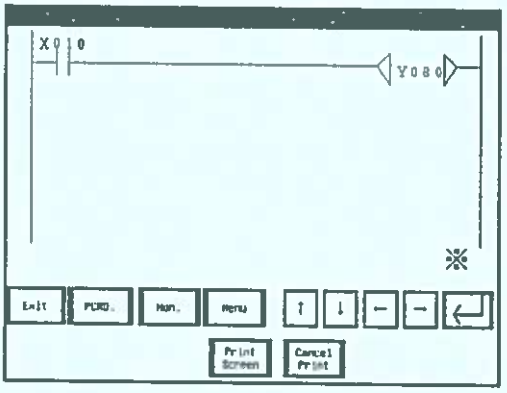
↓

Display <> DEVICE [Y] [80]

Press [↵] key.

↓

Process 4 >



The result of Y080 Coil Search is shown.

Point

The procedure above is only an example, so M···and D··· can be sought in the same way.

Press [Cont Sea.] key to search Input Signal in Process 2 .

Chapter 3 How to deal with errors and maintenance

3 – 3 CP-15 PLC program Check the signal In / Output (X,Y)

The image to check Input Signal is explained next.

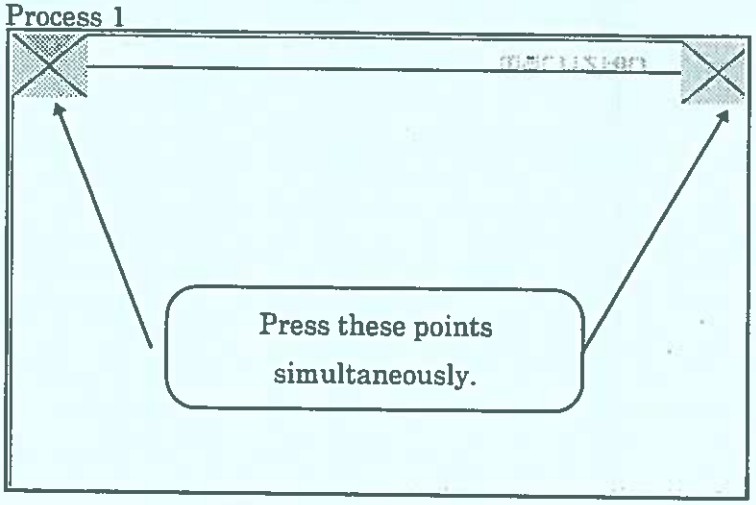
> This function makes both X input and Y output checked.

Chapter 3 How to deal with errors and maintenance

3 – 3 CP-15 PLC program Check the signal In / Output (X,Y)

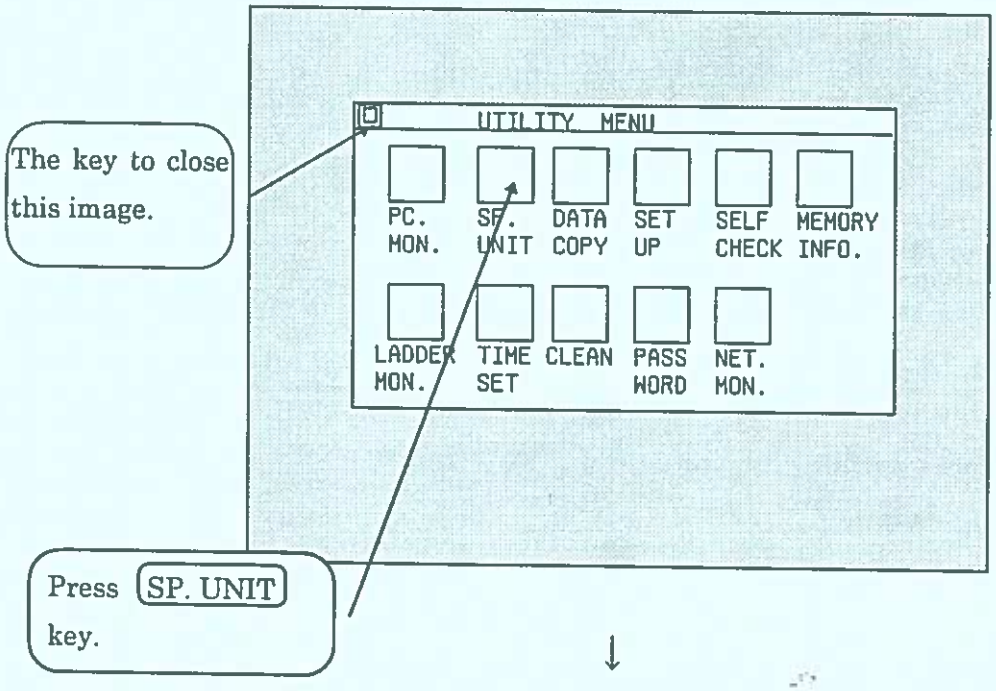
The procedure of In and Out-put Signal Check is explained next.

Process 1



↓

Process 2

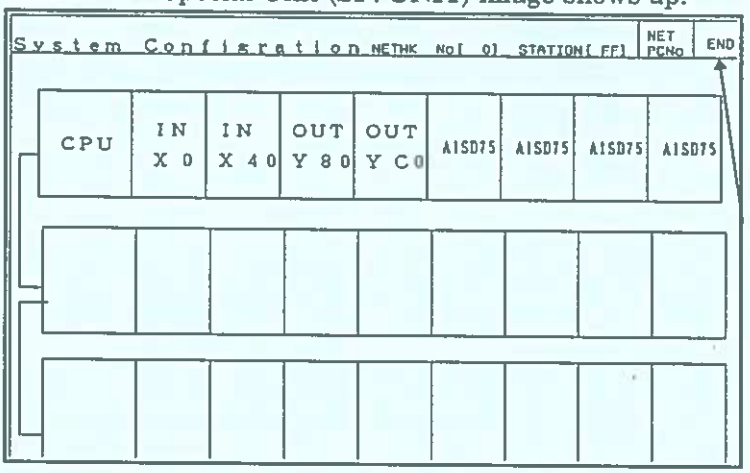


↓

3 – 3 CP-15 PLC program Check the signal In / Output (X,Y)

The procedure of In and Out-put Signal Check is explained next.

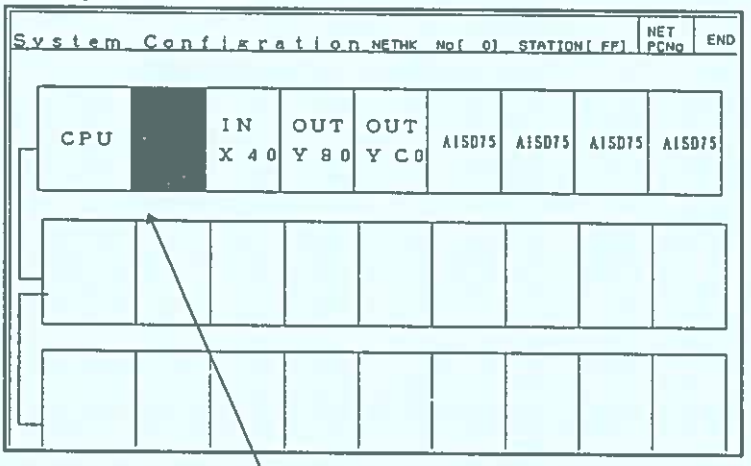
Process 3 Special Unit (SP. UNIT) image shows up.



Press here to close the image.

↓

ex.> Input Signal of X030



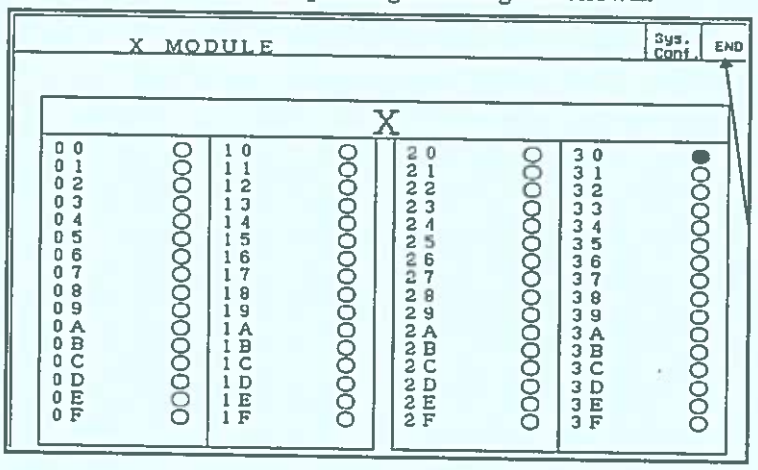
Press here.

↓

3 – 3 CP-15 PLC program Check the signal In / Output (X,Y)

The procedure of check In and Output Signal X0 to X30 is explained next.

Process 4 In and Out-put Signal image is shown.



In and Out-put Signal check

● ON

○ OFF

It's recognizable with ●○

Press [END] key after checking In and Out-put Signal.

The image goes back to Utility image.

3-4 Check-out items

- Purpose of stated check-out
  - ·To keep CP-15 well-conditioned and drive it effectively.
  - ·To find a trouble at the early stage.

- Types of stated check-out
  - ·Daily check-out
  - ·Weekly check-out
  - ·Monthly check-out

fn.

Turn off CP-15 to check the inside and the driving parts.
The air circuit drawing is at the end of Ch.3 § 4

1. Daily Check-out

1) Air Pressure

・checking point

Check the pressure of regulator (Main pressure) indicated on the drawing 1.
The appropriate air pressure is 5kgf/c m² (0.5MPa)

・adjustment

Pull down Pressure Adjuster and turn it around to correct air pressure.
Push up Pressure Adjuster to lock.

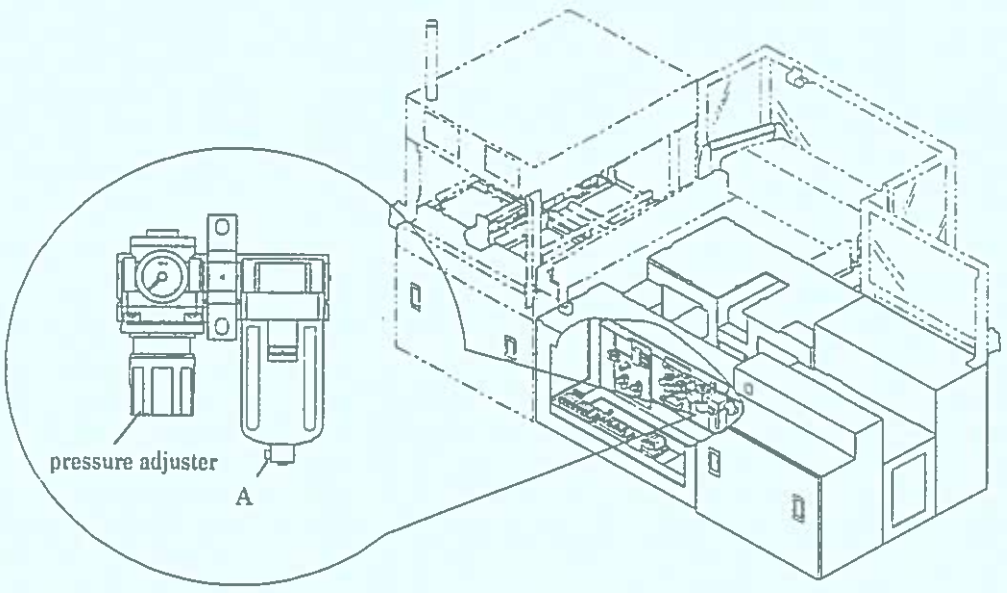
2) Air Filter

・checking point

Check if water is pooled in Air Filter.

・adjustment

Push the button A (Drawing 1) to take out water.



drawing1 Air supply

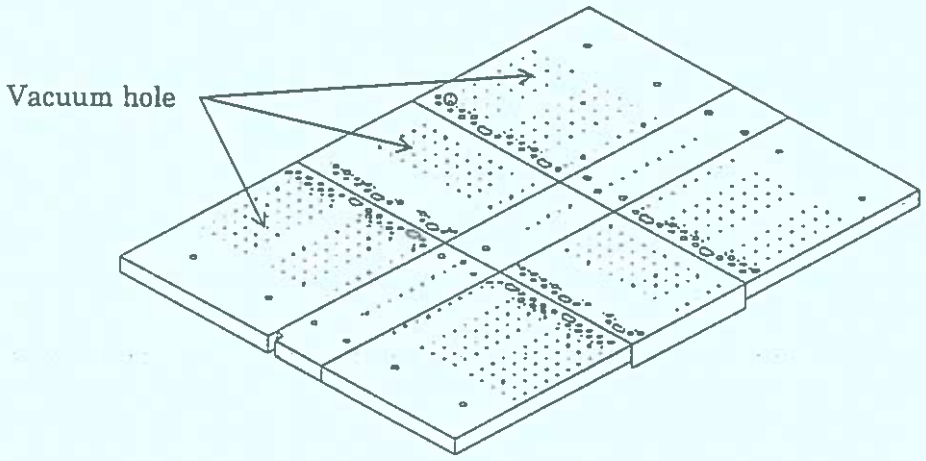
3) Printing Table, table-part of Carrier

・checking point

Check if Printing Table and the table-part of Carrier are stained with ink.

・adjustment

Take away stained ink. Use Vacuum Reverse function (For more details, refer to Ch.2 § 2 M18-5 AIR CYLINDER.



drawing2 Printing. Carrier Table

fn.

Stained ink could pop up with Vacuum Reverse function.

4) Cleaning of the interior

・checking point

Take away dust or ink with care to circuit wires and circuit pipes.

fn.

Letting ink stain long could lead to rust, worse movement or worse precision.

2. Weekly Check-out

1) circuit lines, circuit pipes

①Check circuit lines with care

- ·damage on cords?
- ·connectors off ?

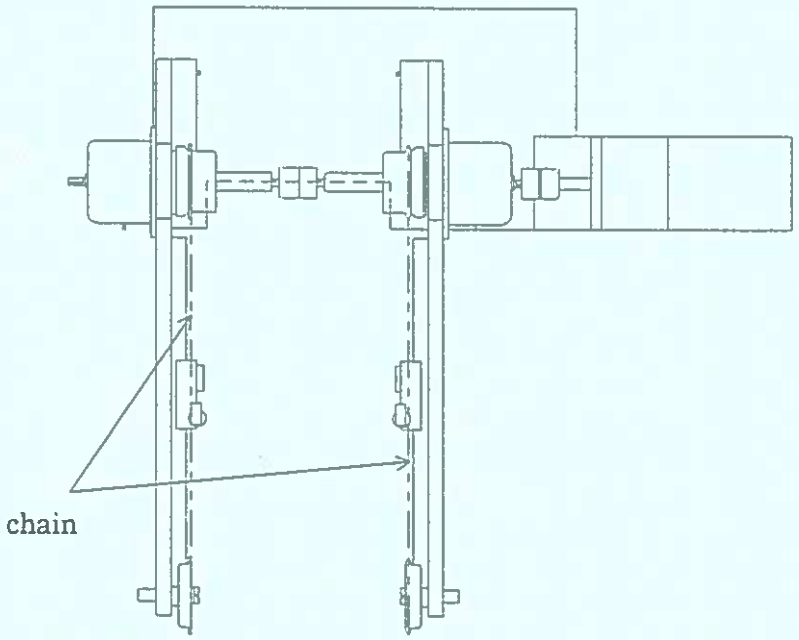
②Check circuit pipes with care

- ·damage on air hoses?
- ·air hoses off ?
- ·Air leaking from air cylinder rods.

3) Pouring oil to Alignment Section

·Pour oil drawn below.

Rear Siding chain-part (refer to drawing3)



drawing 3 Rear Siding

fn.

Keep Conveyor Belts from being stained with oil and the like to stay PCB clean.

4) Check how the state of smeared grease is.

· Smear new grease after removing the remaining one if the grease is running or dirty.

fn.
Use lithium soap thickener grease (extreme pressure).

① Carrier Sliding unit (refer to Drawing 4 overview)

②Siding Sliding unit (refer to Drawing 4 overview)

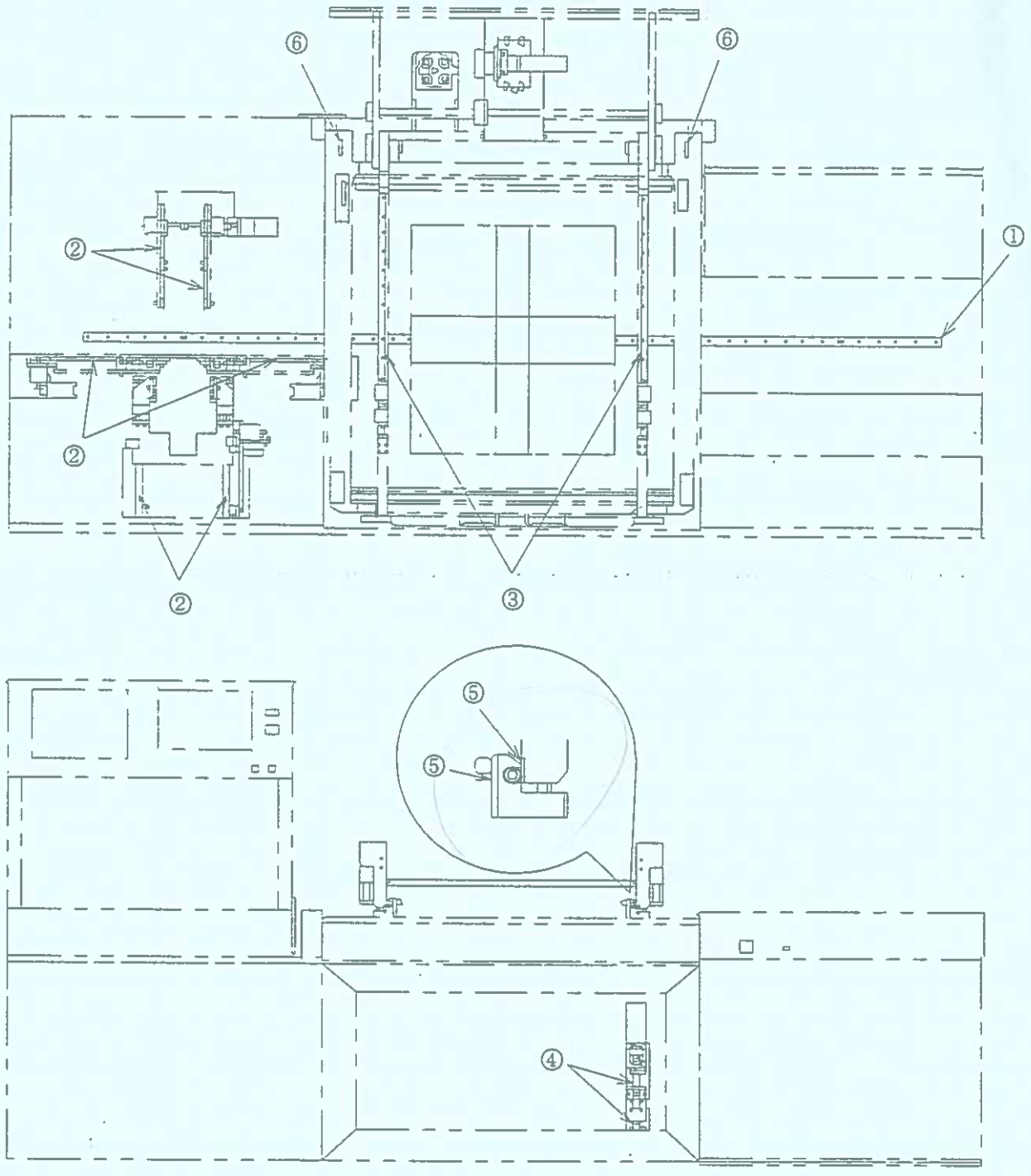
③Squeegee Sliding unit (refer to Drawing 4 overview)

④Off-Contact Sliding unit, Ball Screws (refer to Drawing 4 overview)

⑤Screen Frame unit, Squeegee Frame unit, Cam Followers (refer to Drawing 4 overview)

⑥Screen Frame unit, Sliding unit (refer to Drawing 4 overview)

fn.
In case there is no nipple or it's impossible to pour grease, smear grease widely on Sliding unit or Ball screws. Check the other gears not described above. Covers are the only parts to take off when grease is smeared or oil is poured. (②—3)



Drawing 4 overview

2. Monthly Check-out

1) Check the state of belts

・Check if there are any tears or extensions on belts described below.

①Squeegee belt (refer to Drawing 5 overview)

②Carry-in Conveyor belt(refer to Drawing 5 overview)

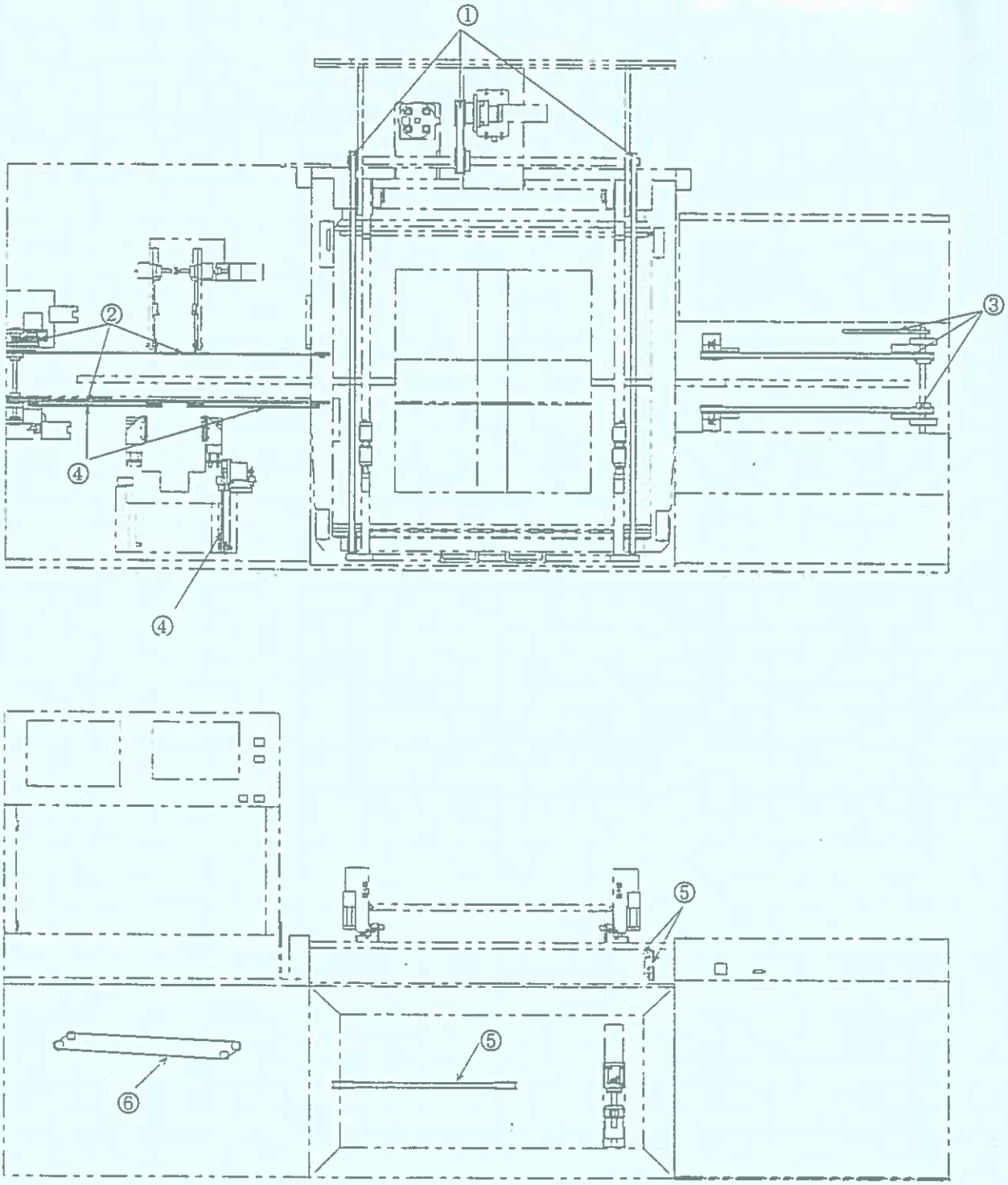
③Carry-out Conveyor belt (refer to Drawing 5 overview)

④Siding unit belt (refer to Drawing 5 overview)

⑤Screen Gap unit belt (refer to Drawing 5 overview)

⑥Board Clamp belt (refer to Drawing 5 overview)

fn.
Check the other belts.



Drawing 5 overview

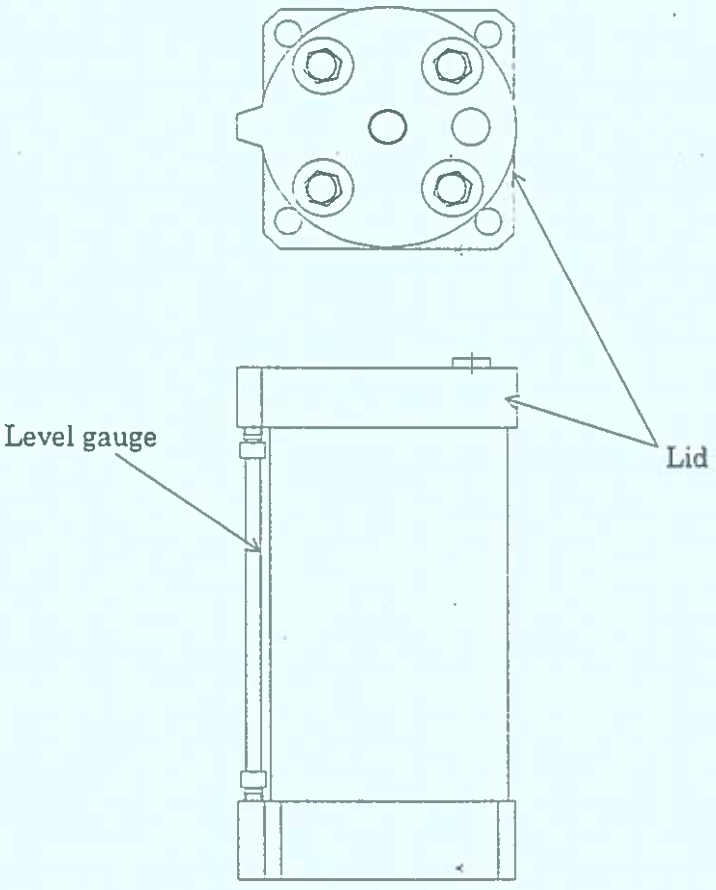
5) Air-Hydro Converter oil

・checking point

Check the remaining oil of Air-Hydro Converter for Squeegee up/down.

・adjustment

Take off the lid and add ISO VG32 turbine oil to the upper level of the level gauge if it is short of oil. (refer to drawing 6 Air-Hydro Converter)



drawing 6 Air-Hydro Converter