APOLLO SEIKO

# JS COMET

# Operation Manual

Thank you for purchasing the JS-COMET.
Read these instructions thoroughly for proper use of this machine.
Make sure to read "Safety Notes" before you use machine. This information protects you from possible dangers during use.

**Apollo Seiko Ltd.**

**Rev. 1.04E**

## Safety Notes

- This manual includes the important information to use machine safely. This also includes useful information to prevents avoiding injury or damaging property. Please read this manual carefully prior to connecting or operating the JS COMET..
- Keep this manual nearby the machine all the time.

### Supply only specified voltage

- Do not connect to a power supply greater than the specified voltage. If not, electrical shock and /or damage to the unit may occur.
- Make sure that the electrical outlet is properly grounded. If the outlet is not properly grounded, electrical shock and/or damage to the unit may occur.

### Working ambient temperature and relative humidity

- This machine have been designed to use between 0℃～40℃、10%～90%. Do not use this machine under the condition exceeding here-in.

### Handle with care

- This machine is designed to use solder feeder and heating iron for soldering. If you touch a heated soldering iron, it will burn yourself. So, make sure the iron is cool down before you are touching it for replacing the iron cartridge.
- Please handle this machine with care. If you drop or make a big impact / vibration, it may cause malfunction.

### If you do not use the machine for a long time

- Please turn off the power, remove the power cable and keep it in dry and cool place.

### If you note malfunction on machine

- If the machine become a malfunction, turn off the power immediately and contact a dealer you purchased machine from.

### Immunity from responsibility

- We do take NO responsibility on a damage caused by misuse, mistake, accident, uses in abnormal condition or natural disaster such as an earthquake, a fire etc.
- We do take NO responsibility on contingency loss （Business loss、Business stop） caused by machine stop.
- We do take NO responsibility on a loss caused by the operation not mentioning on this manual.
- We do take NO responsibility on a loss caused by a wrong connection with other equipment.
- If for any reason the internal circuitry is tampered with altered or repaired without written consent of Apollo Seiko, the warranty is null and void. The customer is allowed to make necessary tooling adjustment, replace solder iron tips and make any necessary adjustments to the temperature controller.

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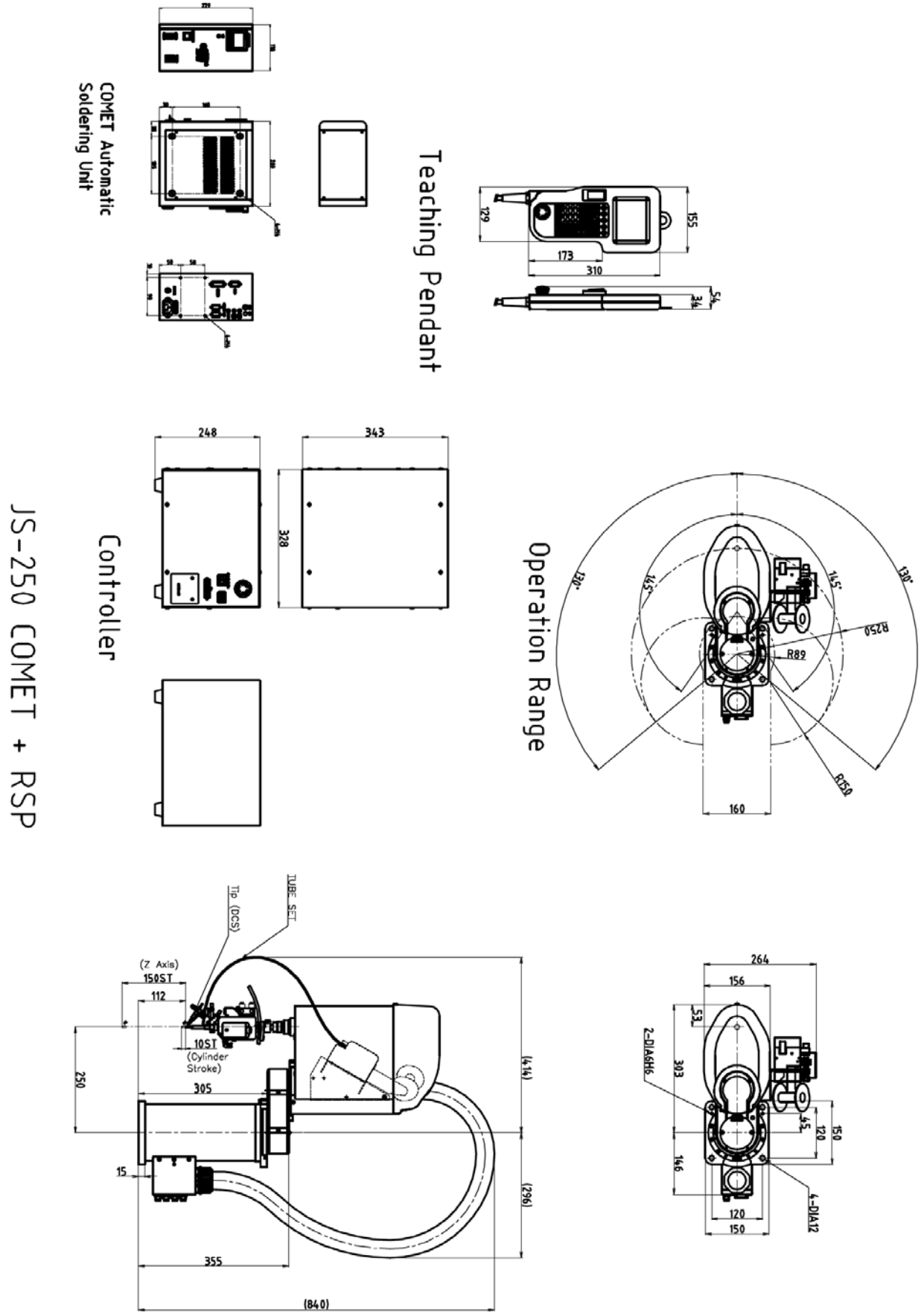
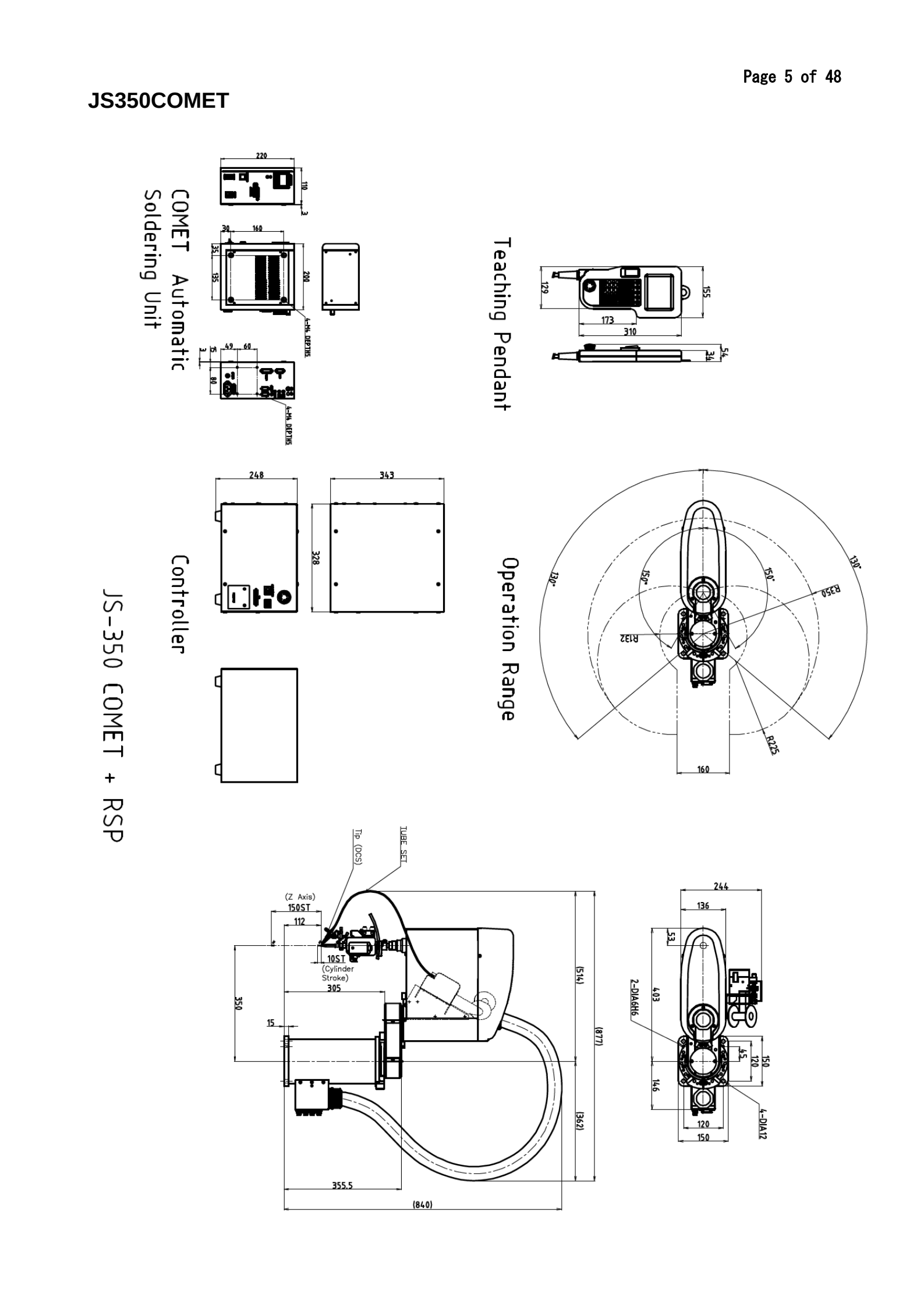
# 1. Dimensions

## JS250COMET

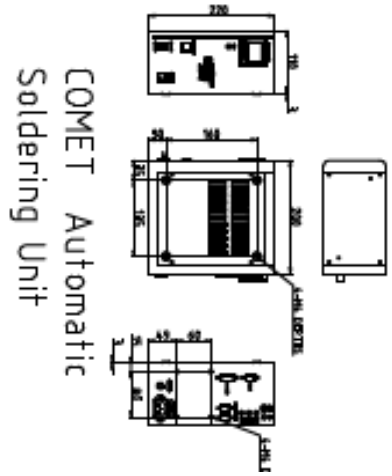


**JS350COMET**

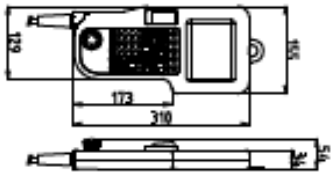

JS-350 COMET + RSP
COMET Automatic Soldering Unit
Controller
Teaching Pendant
Operation Range
220
110
3
30
160
35
135
200
4-M4 DEPTH6
49
60
15
3
80
4-M4 DEPTH6
248
343
328
129
155
173
310
54
34
R350
R132
R225
130°
150°
160
Tip (DCS)
TUBE SET
(Z Axis)
150ST
112
10ST
(Cylinder Stroke)
305
350
15
(514)
(877)
(362)
355.5
(840)
244
136
53
2-DIA6H6
403
45
120
150
146
4-DIA12

**JS450COMET**

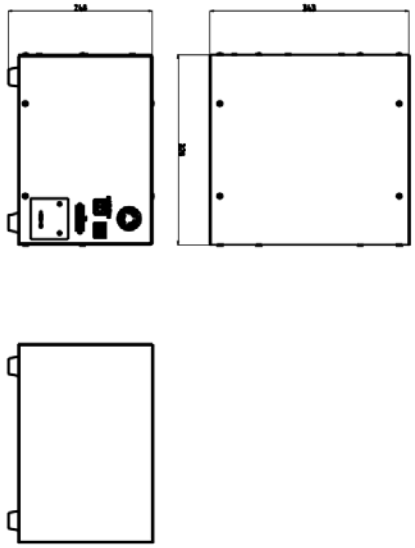
COMET Automatic Soldering Unit



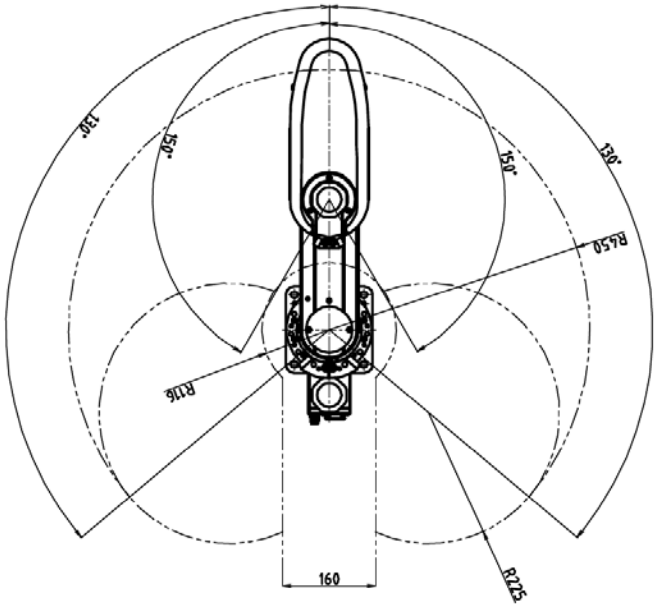
Teaching Pendant

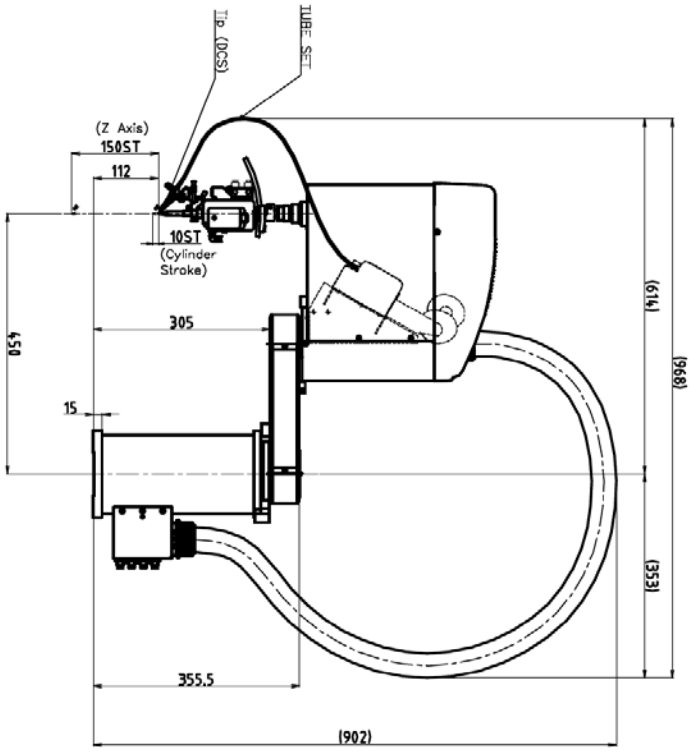


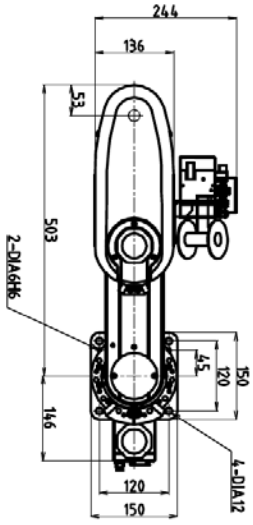

Controller



Operation Range

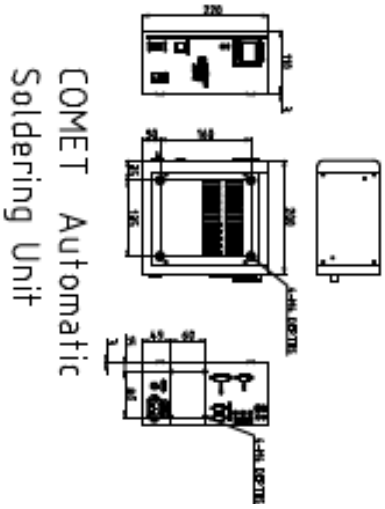


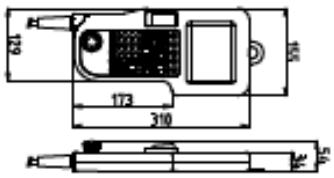



**JS550COMET**

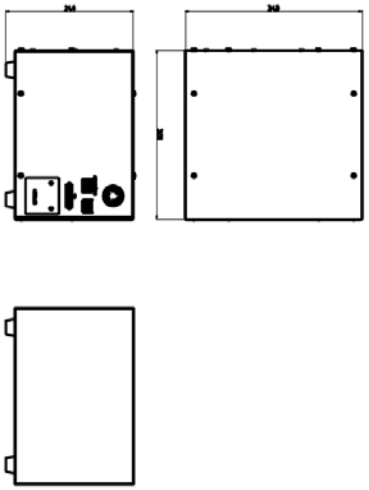
COMET Automatic Soldering Unit



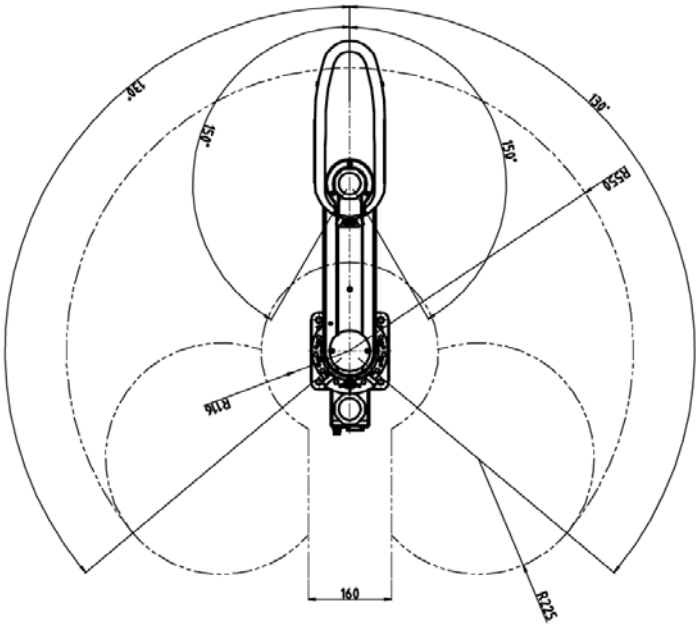
Teaching Pendant

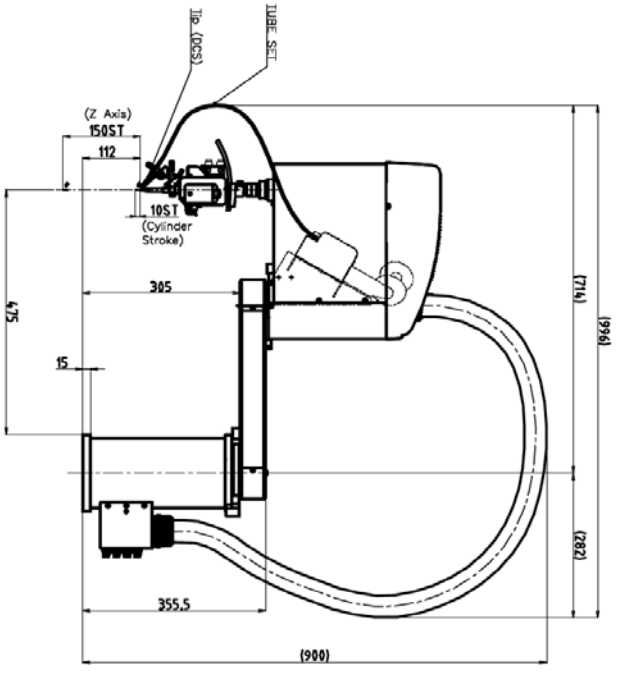


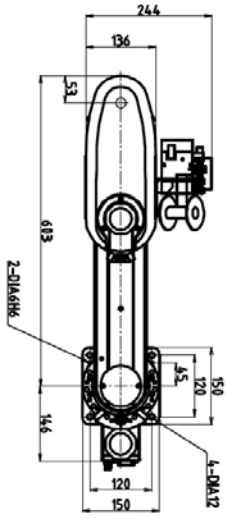
Controller



Operation Range



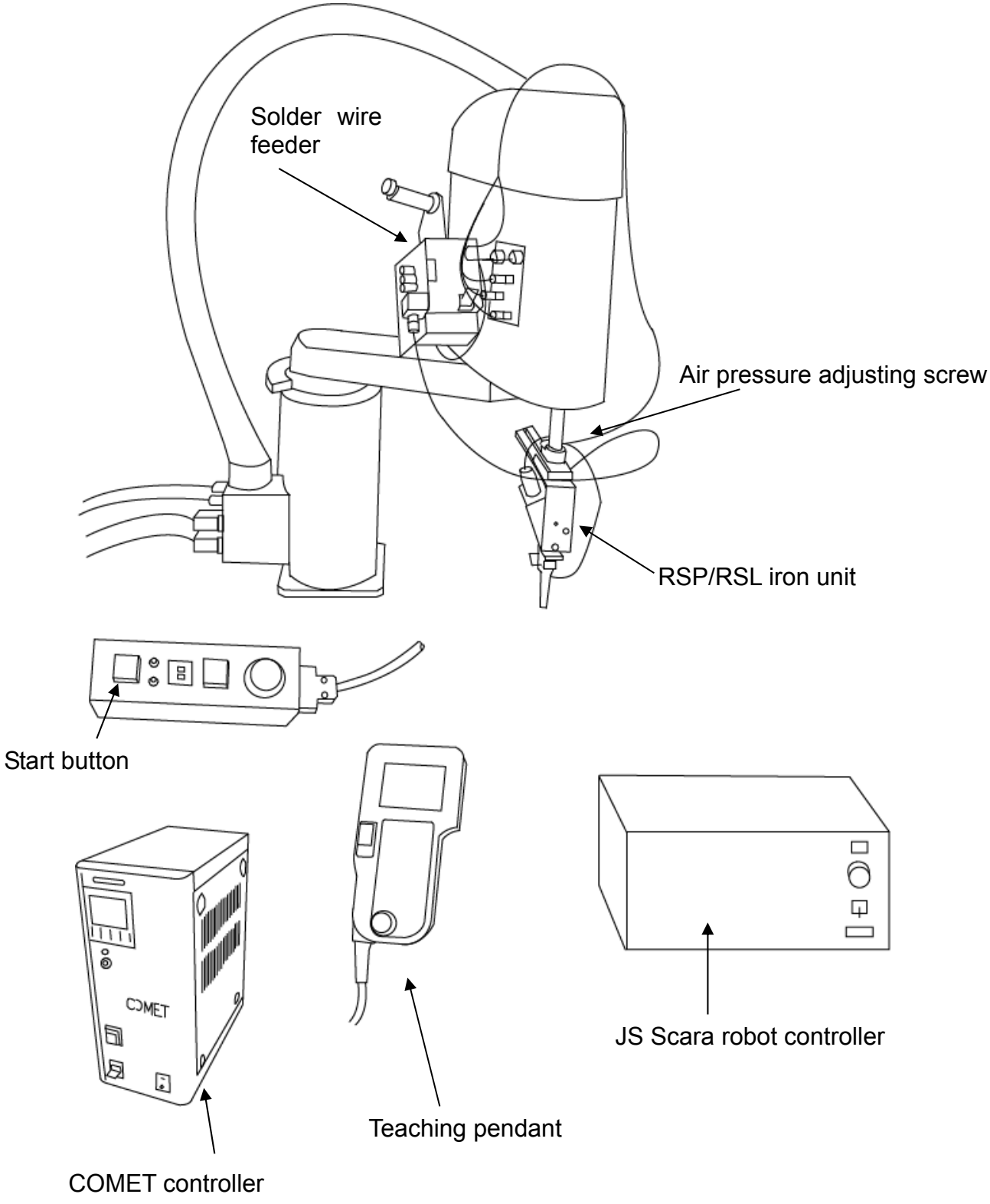




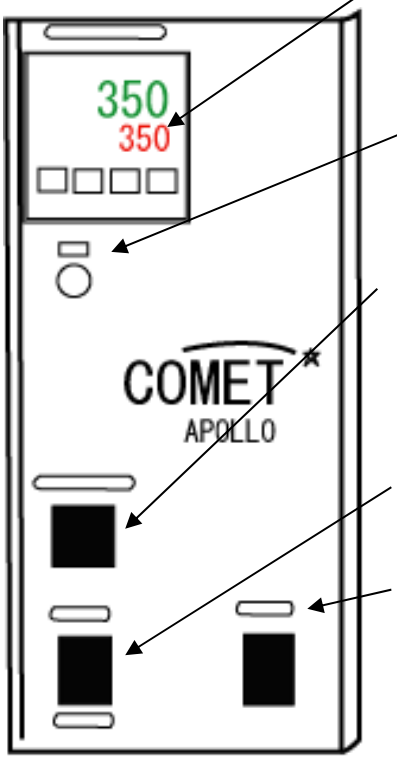
## 2. Summary of JS COMET

The RSP/RSL iron unit and ZSB feeder are built-in with JS COMET. The DCS iron will assure very stable soldering temperature and the ZSB will guarantee zero solder ball soldering result.

## 3. Description



## Description of COMET controller




① Temperature controller
Iron temperature can be set using this controller. To change the temperature, refer to the page 10-11 of this manual.

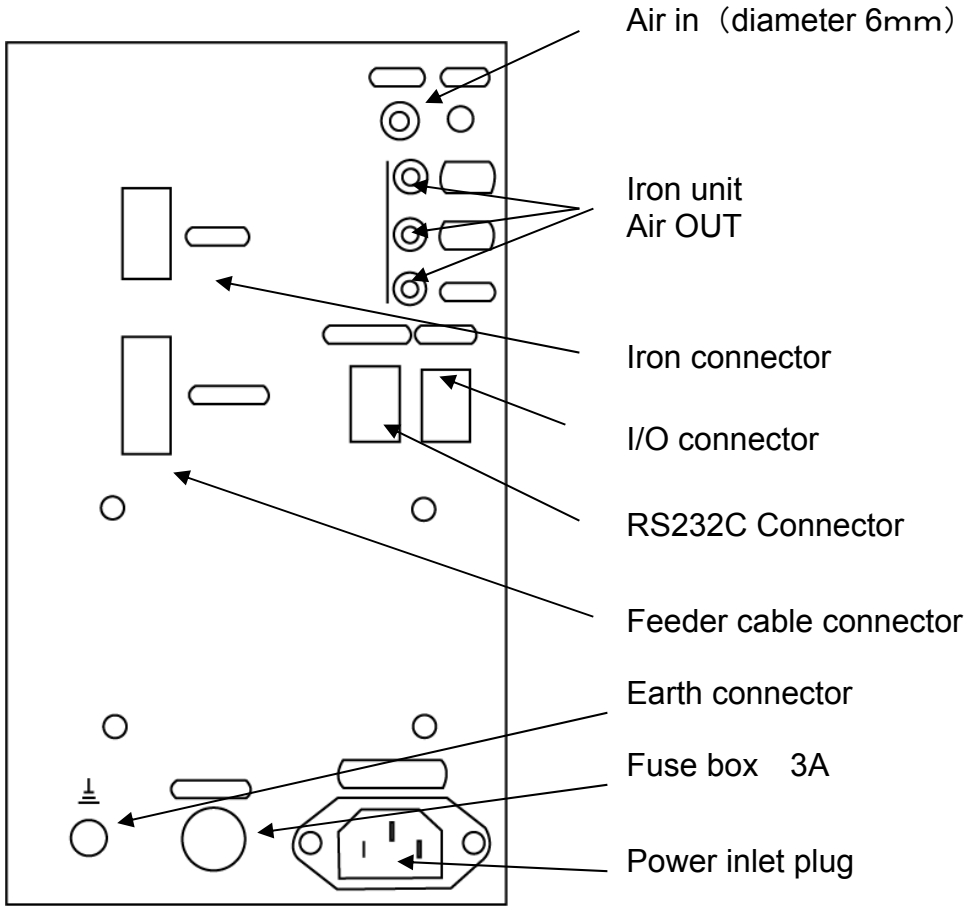
② Data download connector
Temperature data to track tip can be downloaded using this connector.

③ Iron down button
While you press this button, the iron stays at soldering position. So, when you teach soldering position, check the position using this button.

④ Solder feed forward button
Wire solder is forwarded while this button is pressed.

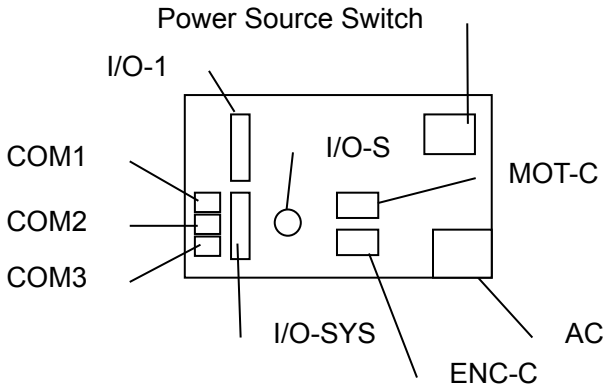
⑤ Power switch
Turn on the power switch. Then, the screen changes to green color to show the machine is ready to solder. In case the machine is not ready, check the air supply and the heater switch.

COMET Back

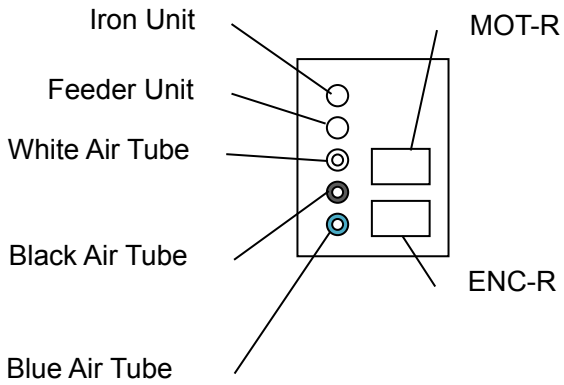


## Description of Robot and Robot Controller

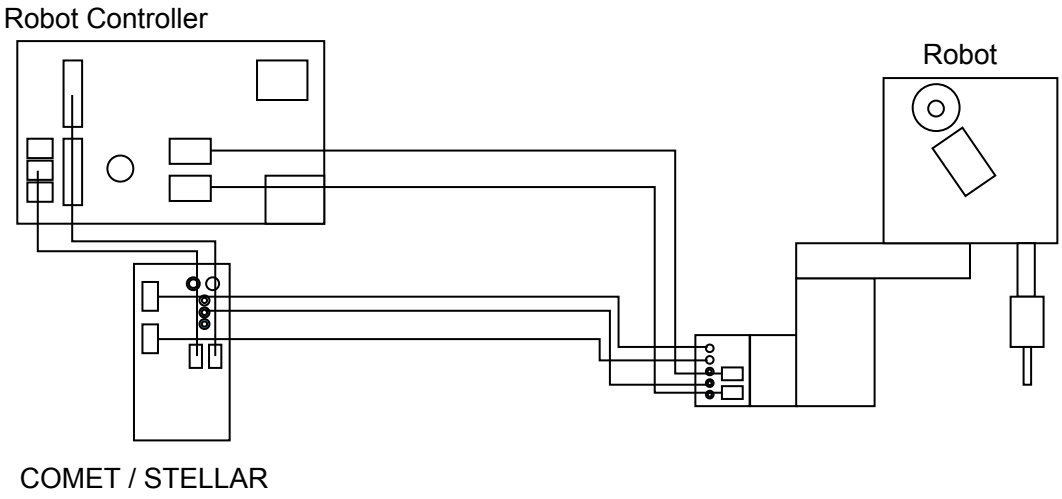
| Robot Controller | |
|---|---|
| I/O-SYS | If the control Box is used, connect to the control box.<br>If not, connect to a controller such as PLC. |
| I/O-1 | Connect to I/O on COMET / STELLAR |
| I/O-S | Connect I/O-S connector that is included in the robot. |
| COM1 | For connecting PC. |
| COM2 | Connect to RS232C on COMET / STELLAR. |
| COM3 | For optional device |
| MOR-C | Connect to MOR-R on the robot. |
| ENC-C | Connect to ENC-R on the robot. |




| Robot | |
|---|---|
| Iron Unit | Connect to IRON on COMET / STELLAR. |
| Feeder Unit | Connect to FEEDER on COMET / STELLAR |
| White Air Tube | Connect to the white joint on COMET / STELLAR |
| Black Air Tube | Connect to the black joint on COMET / STELLAR |
| Blue Air Tube | Connect to the blue joint on COMET / STELLAR |
| MOR-R | Connect to MOR-C on the robot controller. |
| ENC-R | Connect to ENC-C on the robot controller. |

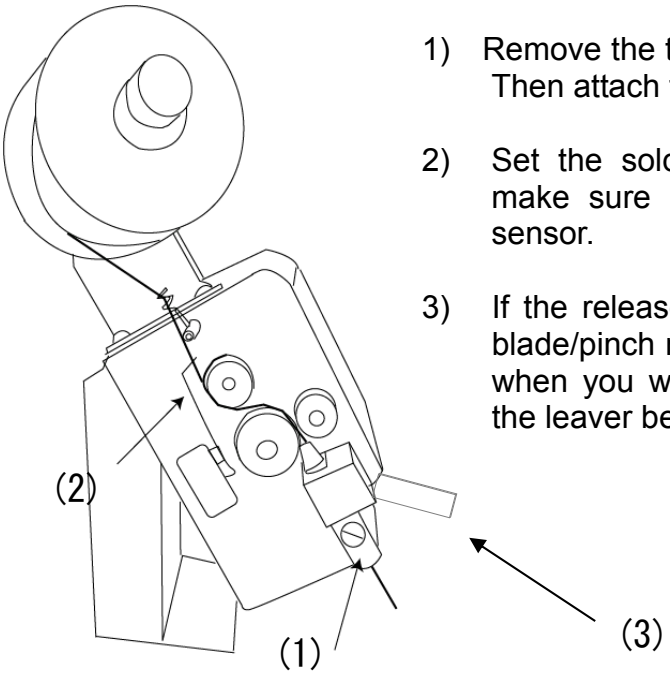



Wiring Diagram



## 4. Preparation

4.1 How to set solder wire

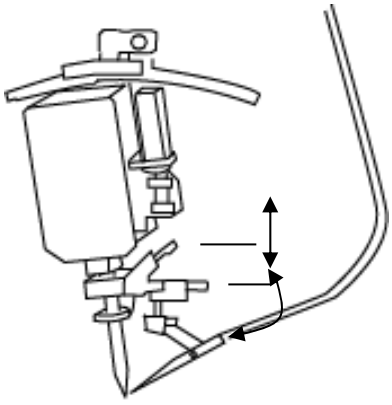



1) Remove the tube and pull solder wire through first. Then attach the solder tube.

2) Set the solder wire as per the diaggram. And make sure to set solder wire on the shortage sensor.

3) If the release lever is upper position, the cutting blade/pinch roller does not feed a solder wire. So, when you would like to feed the wire, put down the leaver before.

4.2 How to adjust RSP iron unit

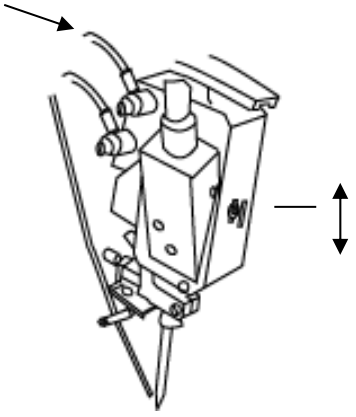


4) Solder wire feeding position can be adjusted.

Upper adjusting screw : Up down direction
Lower adjusting screw : Side way direction

5) Iron up down speed can be adjusted by turning screws after undoing nut.

Upper black screw : Raising speed
Lower white screw : Go down speed

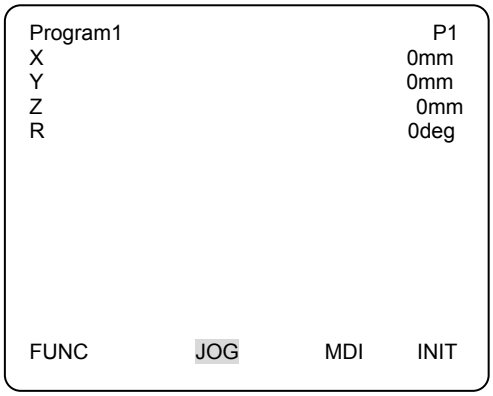


6) Second solder feeding position can be altered by moving this screw. Adjusting the screw position, First solder wire can be put between the iron tip and a solder pattern.

Move it to lower : The same feeding positions.
Move it to upper: The second feeding position become higher and the first solder would be melt down between the iron tip and a solder pattern.

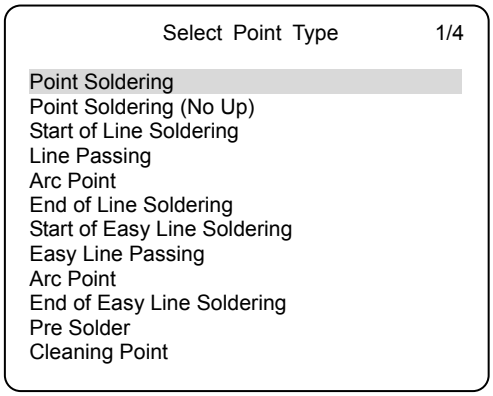
# 5. Program setting

## 5.1. Point Soldering



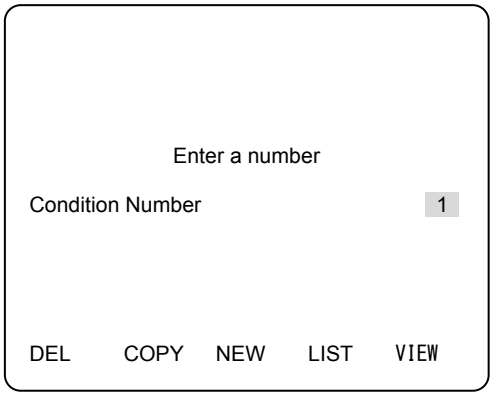

Using JOG key to move iron cartridge until the “Point soldering” point.

Press ENTER.




Select the type “Point Soldering” by SEL key.

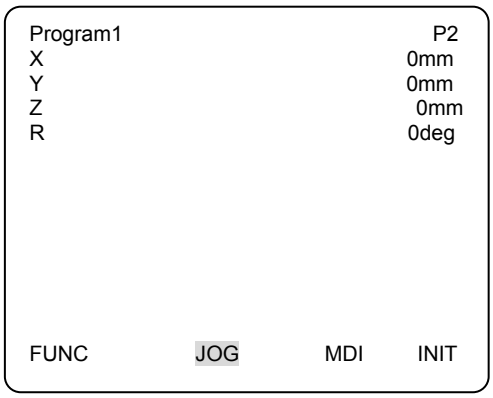
Press ENTER.




Enter condition number 1-100.

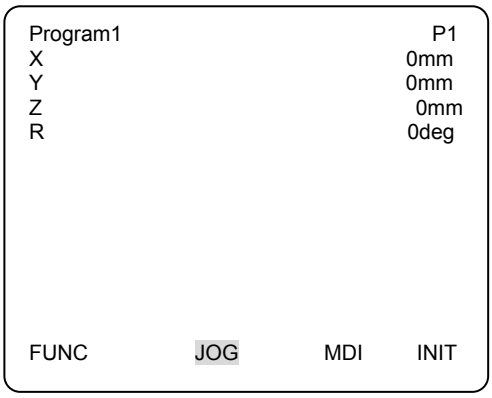
Note:
100 conditions can be selected. Do not enter the same number as the slide soldering condition.

Press ENTER.



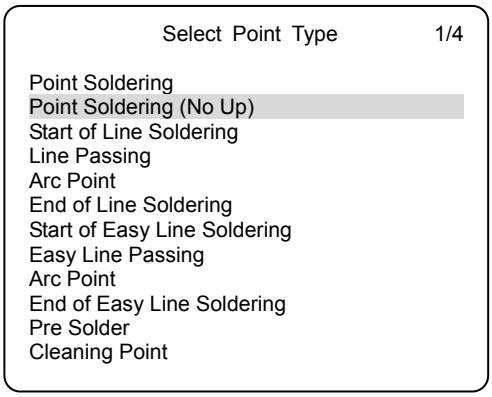

The point soldering has been registered and the next point screen is displayed.

## 5.2. Point Soldering (No Up)



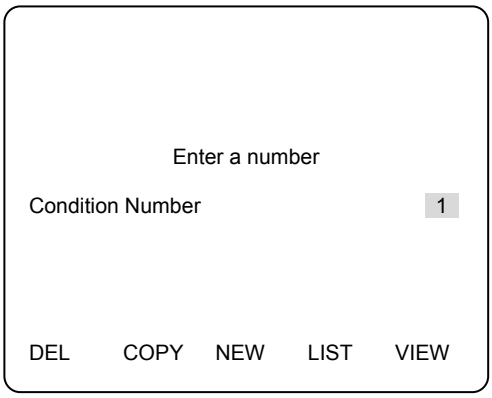

Using JOG key to move iron cartridge until the “Point Soldering (No Up)” point.

Press ENTER.




Select the type “Point Soldering (No Up)”by SEL key.

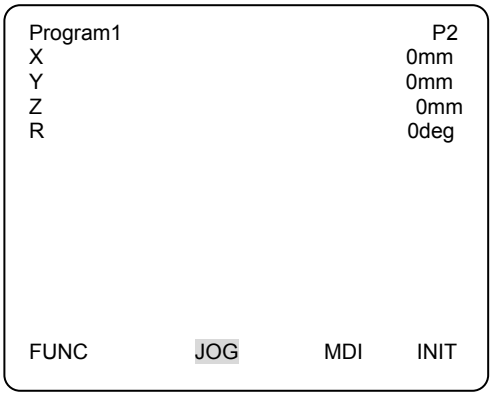
Press ENTER.




Enter condition number 1-100.

Note:
100 conditions can be selected. Do not enter the same number as the slide soldering condition.

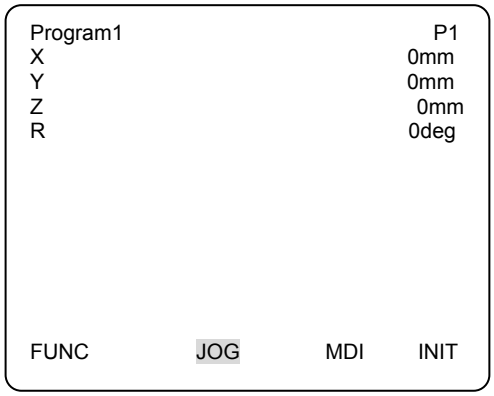
Press ENTER.




The point soldering has been registered and the next point screen is displayed.

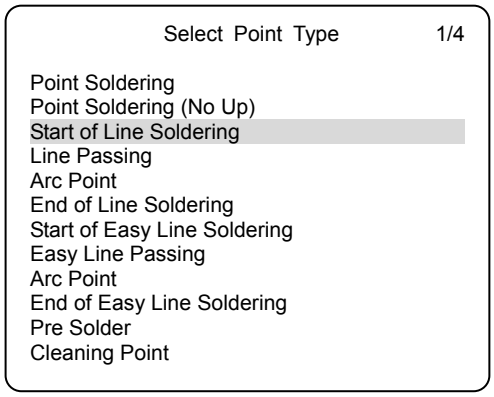
## 5.3 Start of Line Soldering

Slide soldering program requires both starting point and end point.



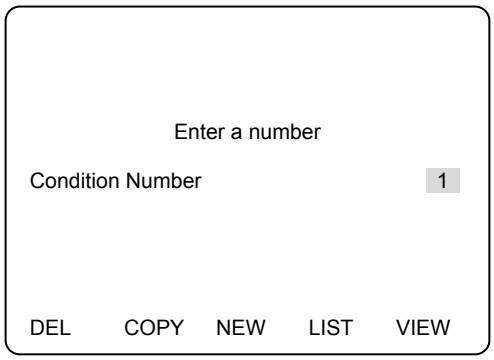

Using JOG key to move iron cartridge until the “start of line soldering” point.

Press ENTER.




Select the type “Start of Line Soldering” by SEL key.

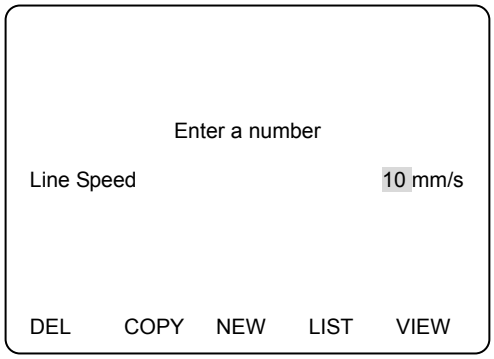
Press ENTER.




Enter condition number 1-100.

Note:
100 conditions can be selected. Do not enter the same number as the point soldering condition.

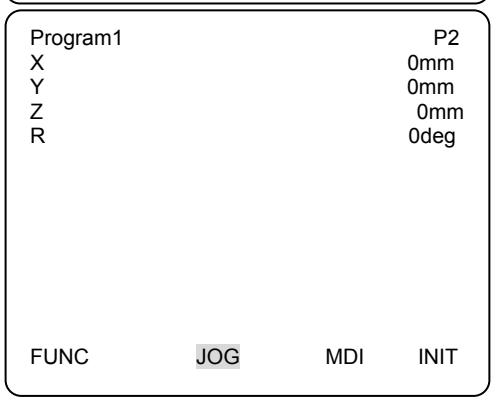
Press ENTER.




Enter the slide line speed.

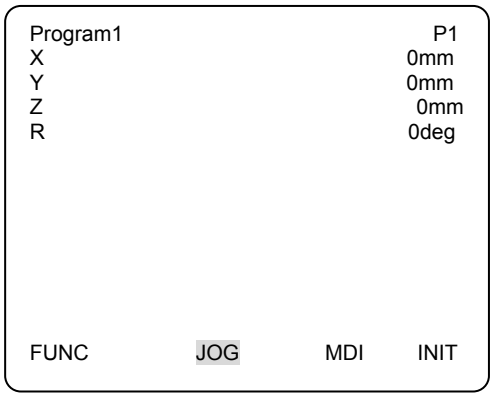
(Normally3-10mm/sec setting is recommended.)

Press ENTER.



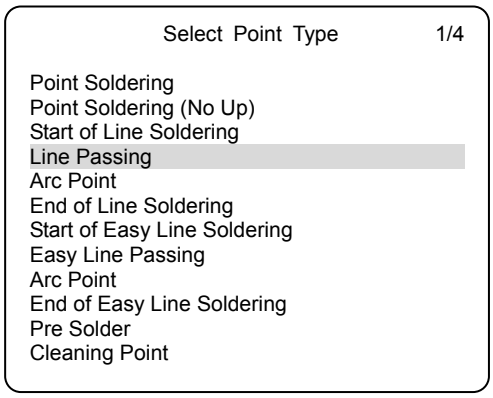

The start of line soldering point has been registered and the next point screen is displayed.

## 5.4 Pass point of Line soldering



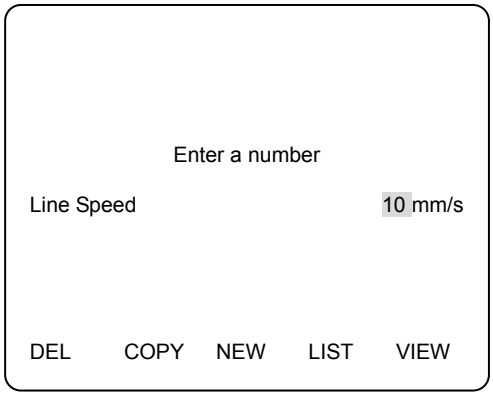

Using JOG key to move iron cartridge until the “pass point of line soldering”.

Press ENTER.




Select the type “Line Passing” by SEL key.

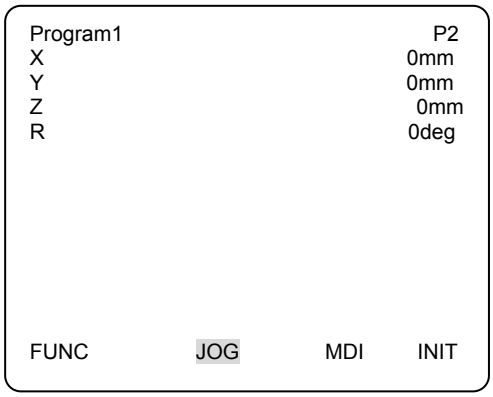
Press ENTER.




Enter the slide line speed.

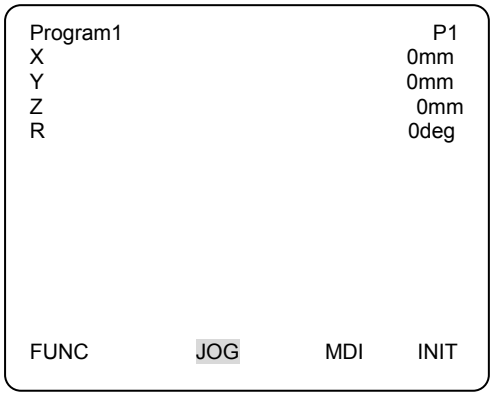
(Normally 3-10mm/sec setting is recommended.)

Press ENTER.



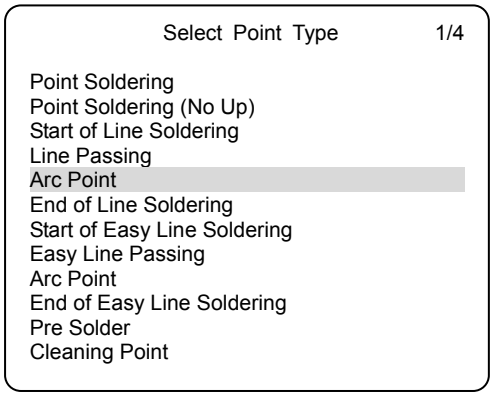

The pass point of line soldering has been registered and the next point screen is displayed.

## 5.5 Arc point of Line soldering



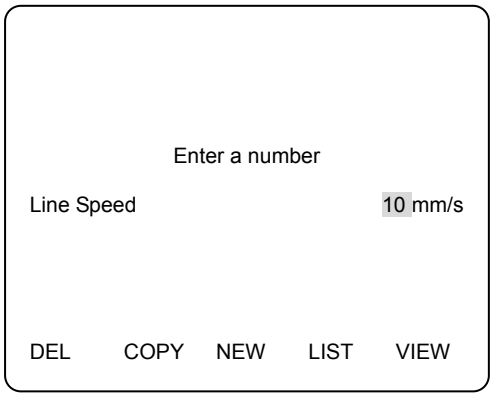

Using JOG key to move iron cartridge until the ”arc of line soldering point”.

Press ENTER.




Select the type “Arc Point” of Line Soldering by SEL key.

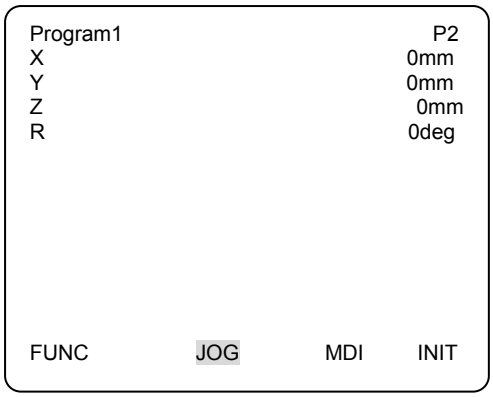
Press ENTER.




Enter the slide line speed.

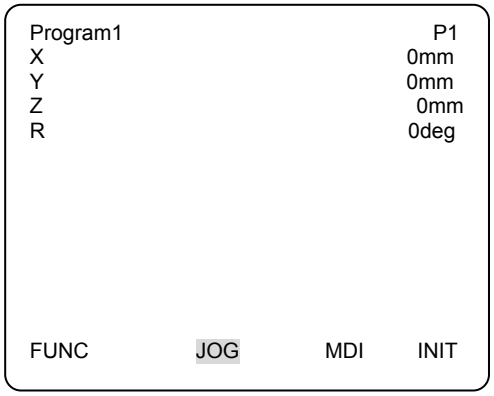
(Normally 3-10mm/sec setting is recommended.)

Press ENTER.



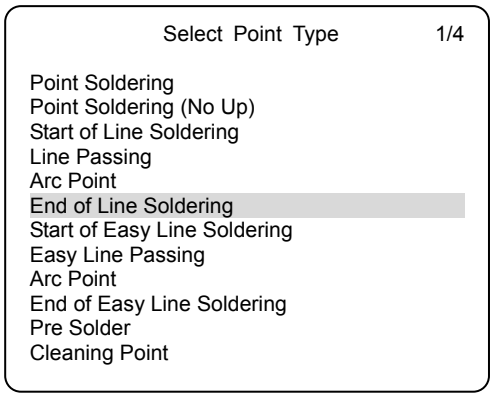

The arc point of line soldering has been registered and the next point screen is displayed.

## 5.6 End of Line soldering



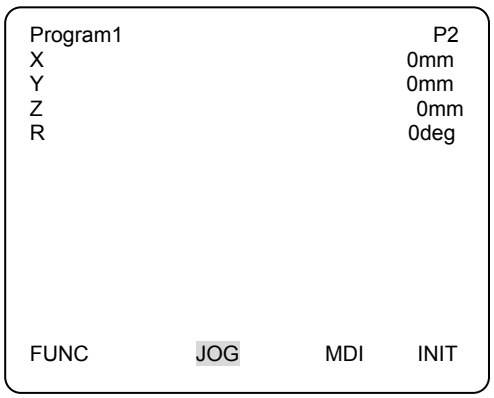

Using JOG key to move iron cartridge until the “end of line soldering” point.

Press ENTER.




Select the type “End of Line Soldering” by SEL key.

Press ENTER.




The end of line soldering point has been registered and the next point screen is displayed.

## 5.7 Sart of Easy Line Soldering

Refer to the 5.3 Start of Line Soldering and follow the same procedure.

## 5.8 Easy Line Soldering

Refer to the 5.4 Pass point of Line soldering and follow the same procedure.

## 5.9 Arc Point of Easy Line Soldering

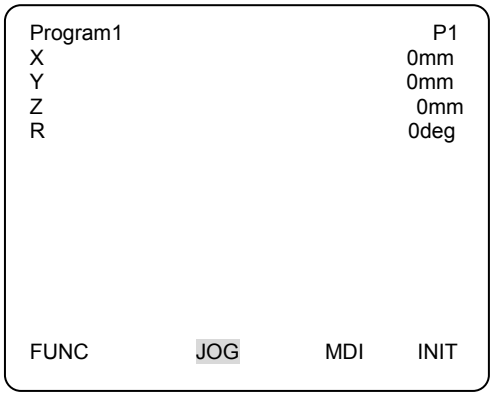
Refer to the 5.5 Arc point of Line soldering and follow the same procedure.

## 5.10 End of Easy Line Soldering

Refer to the 5.6 End of Line soldering and follow the same procedure.

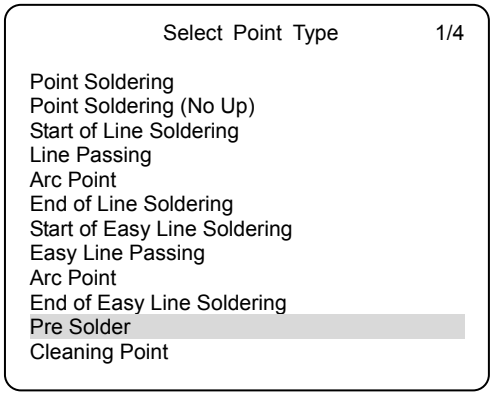
## 5.11 Pre Solder

It can be used at solder feeding before cleaning iron cartridge and at pre soldering after the cycle.



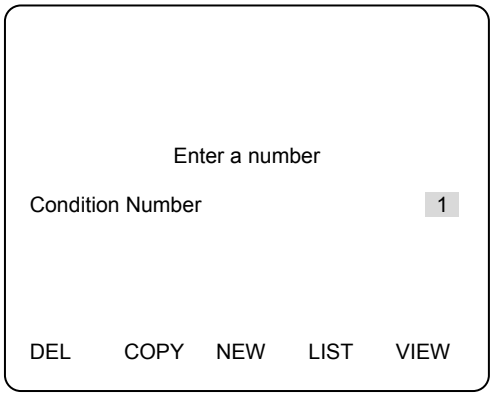

Using JOG key to move iron cartridge until the “pre solder “ point.

Press ENTER.




Select the type “Pre Solder” by SEL key.

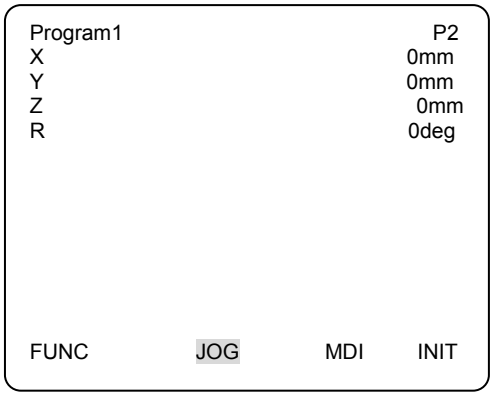
Press ENTER.




Enter condition number 1-100.

Note:
100 conditions can be selected. Do not enter the same number as the slide soldering condition.

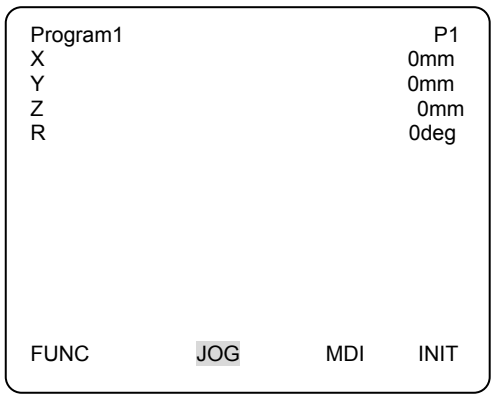
Press ENTER.




The pre solder point has been registered and the next point screen is displayed.

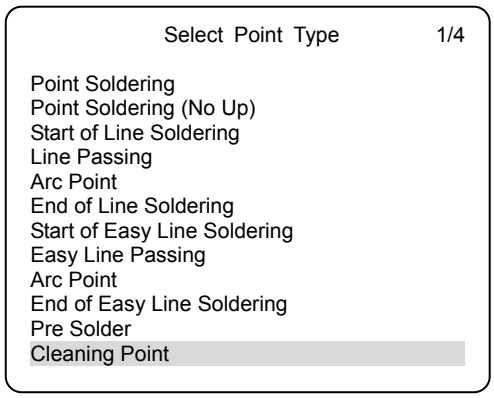
## 5.12 Cleaning point

The point and condition of air-blowing iron cartridge can be set.



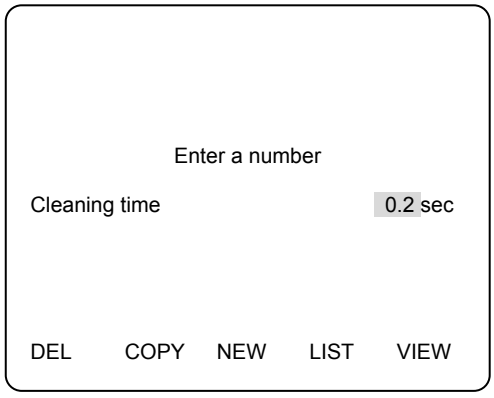

Using JOG key to move iron cartridge until the “cleaning point”.

Press ENTER.



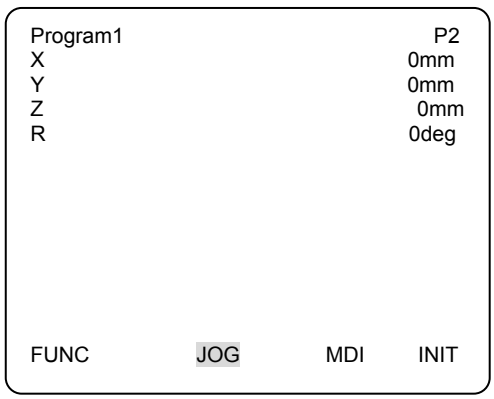

Select the type “Cleaning Point” by SEL key.

Press ENTER.



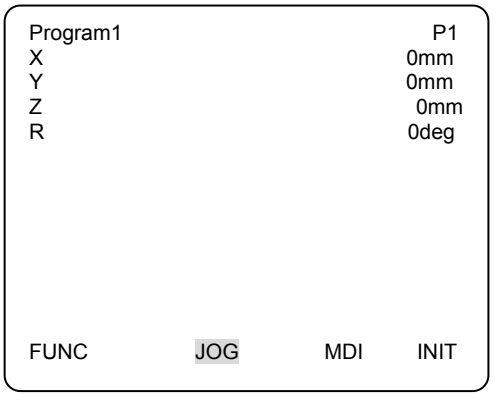

Enter required cleaning air blow time.
(0.2~0.3 sec is recommended.)

Press ENTER.



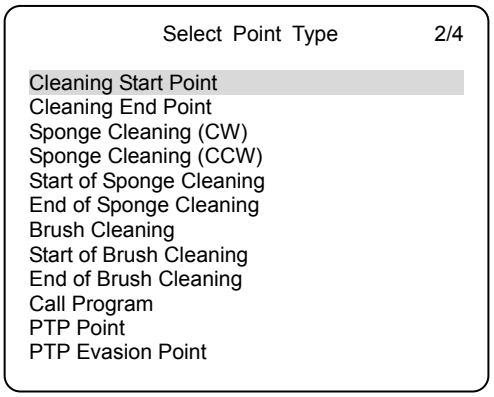

The cleaning point has been registered and the next point screen is displayed.

## 5.13 Cleaning Start point



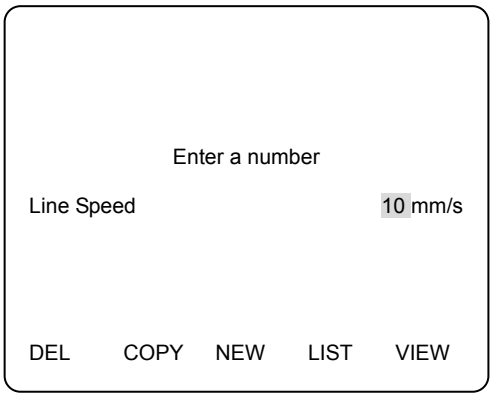

Using JOG key to move iron cartridge until the “cleaning start point”.

Press [ENTER].

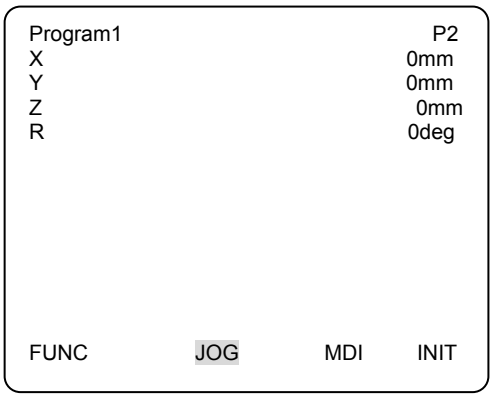



Select the type “Cleaning Start Point” by SEL key.
*Page 2 is displayed by SHIFT+CURSOR↓key.

Press [ENTER].

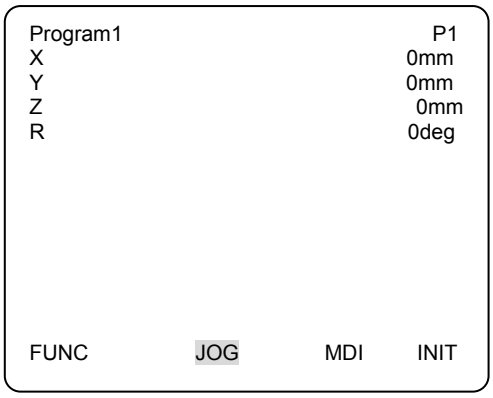



Enter the slide line speed.
(Normally 3~10mm/sec setting is recommended.)



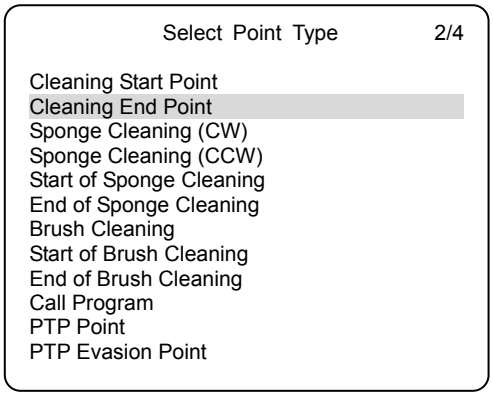

The cleaning start point has been registered and the next point screen is displayed.

## 5.14 Cleaning End Point




Using JOG key to move iron cartridge until the “end of line cleaning point”.

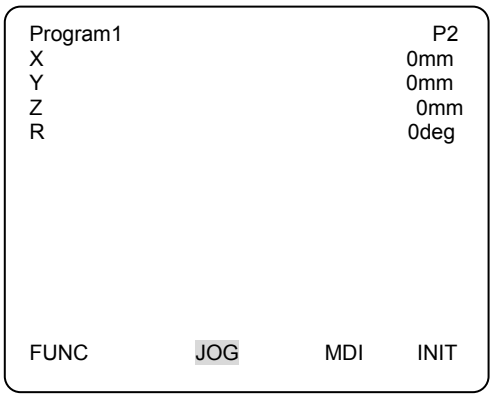
Press ENTER.




Select the type “Cleaning End Point” by SEL key.

*Page 2 is displayed by SHIFT + ↓ key.

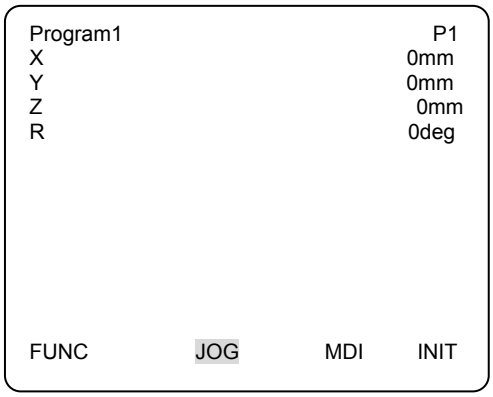
Press ENTER.




The cleaning end point has been registered and the next point screen is displayed.

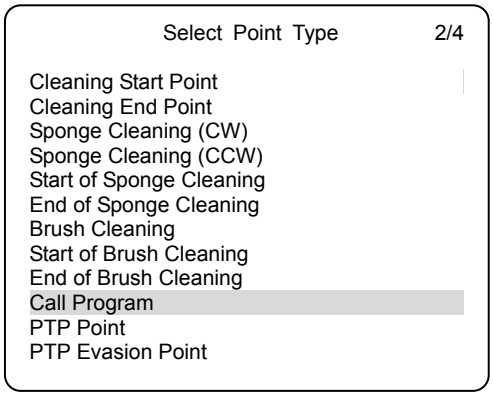
## 5.15 Call Program

This program can run the created program.
Also, the number of interval for Call program operation can be set.




Using JOG key to move iron cartridge until the “Call Program” point.

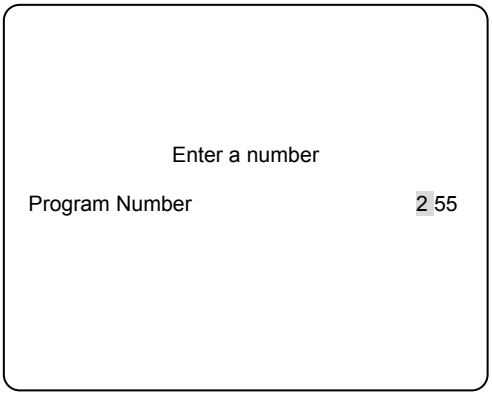
Press ENTER.




Select the type “Call Program ” by SEL key.

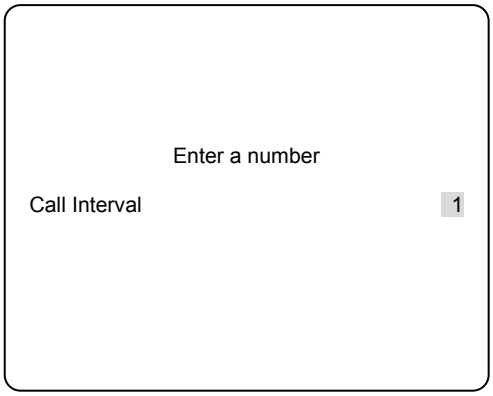
*Page 2 is displayed by SHIFT + ↓ key.

Press ENTER.




Enter the desired program number.

Press ENTER.




Enter a interval number. (*Initial value: 1)

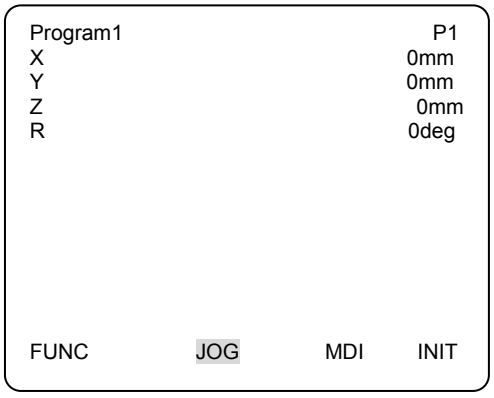
Press ENTER.

The count is updated at the end of one cycle (No display), also it is updated when the program is stopped on the way such as error.
Aftre power on, emergency stop or after opreation mode is switched, Call Program is always carried out in the 1st cycle.
The count is cleared after power-off or operation mode is switched.

e.g) Cleaning interval is “3”.
The three cycles end, then Call Program is carried out at the 4th cycle.
The 4th cycle is counted as one cycle, so the next Call Program is carried out at 7th cycle.

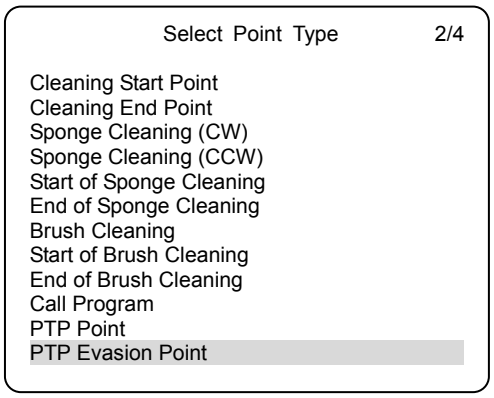
## 5.16 PTP Evasion point

It can be used in order to evade such as obstacle on the moving line of iron cartridge.




Using JOG key to move iron cartridge until the “PTP Evasion point”.

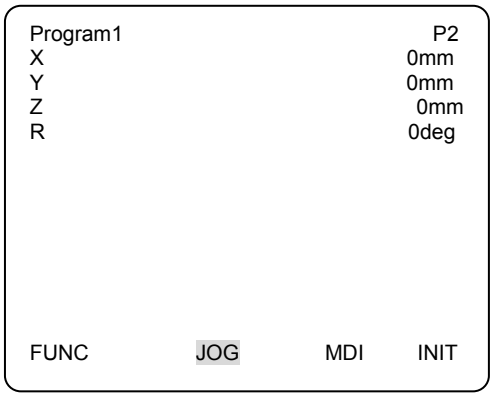
Press ENTER.




Select the type “PTP Evasion Point” by SEL key.

*Page 2 is displayed by SHIFT+CURSOR↓key.

Press ENTER.




The Evasion point has been registered and the next point screen is displayed.

*Iron cartridge always moves the shortest distance between the coordinates.
Set more than one PTP evasion point as necessary.

## 6. Initial value of soldering condition

Three type of soldering condition can be selected. The following initial setting can be changed using the teaching pendant.

| WK1-500 | | Initial setting | Adjustable range |
|---|---|---|---|
| Point soldering | 1st Amount | 7.0mm | 0-99.9mm |
| | 1st Feed Speed | 15.0mm/s | 1-50.0mm/s |
| | 1st Rev. Amount | 3.0mm | 0-99.9mm |
| | 1st Rev. Speed | 50.0mm/s | 1-50.0mm/s |
| | Pre-Heat Time | 0.5sec | 0-9.9sec |
| | 2nd Amount | 7.0mm | 0-99.9mm |
| | 2nd Feed Speed | 10.0mm/s | 1-50.0mm/s |
| | 2nd Rev. Amount | 3.0mm | 0-99.9mm |
| | 2nd Rev. Speed | 50.0mm/s | 1-50.0mm/s |
| | Heating Time | 1.0sec | 0-9.9sec |
| | 3rd Amount | 0.0mm | 0-99.9mm |
| | 3rd Feed Speed | 10.0mm/s | 1-50.0mm/s |
| | 3rd Rev. Amount | 0.0mm | 0-99.9mm |
| | 3rd Rev. Speed | 50.0mm/s | 1-50.0mm/s |

| WK1-500 | | Initial setting | Adjustable range |
|---|---|---|---|
| Slide soldering | 1st Amount | 7.0mm | 0-99.9mm |
| | 1st Feed Speed | 15.0mm/s | 1-50.0mm/s |
| | 1st Rev. Amount | 3.0mm | 0-99.9mm |
| | 1st Rev. Speed | 50.0mm/s | 1-50.0mm/s |
| | Pre-Heat Time | 0.5sec | 0-9.9sec |
| | 2nd Amount1 | 10.0mm | 0-99.9mm |
| | 2nd Feed Speed1 | 15.0mm/s | 1-50.0mm/s |
| | 2nd Amount2 | 0.0mm | 0-99.9mm |
| | 2nd Feed Speed2 | 15.0mm/s | 1-50.0mm/s |
| | 2nd Amount3 | 0.0mm | 0-99.9mm |
| | 2nd Feed Speed3 | 15.0mm/s | 1-50.0mm/s |
| | 2nd Amount4 | 0.0mm | 0-99.9mm |
| | 2nd Feed Speed4 | 15.0mm/s | 1-50.0mm/s |
| | Solder start pool time | 0.0sec | 0-9.9sec |
| | 2nd Rev. Amount | 3.0mm | 0-99.9mm |
| | 2nd Rev. Speed | 50.0mm/s | 1-50.0mm/s |
| | Heating Time | 0.0sec | 0-9.9sec |

**About the 2nd Rev. Amount of Slide soldering**

It is possible to change the soldering speed and amount up to three times.
This is a good function to solder various pin size.
If the soldering amount is not enough at the 1st amount, increase the amount form the 2nd amount on. When it is not needed, set the amount "0" from the 2nd amount on.

| WK1-500 | | Initial setting | Adjustable range |
|---|---|---|---|
| Easy Slide soldering | 1st Amount | 7.0mm | 0-99.9mm |
| | 1st Feed Speed | 15.0mm/s | 1-50.0mm/s |
| | 1st Rev. Amount | 3.0mm | 0-99.9mm |
| | 1st Rev. Speed | 50.0mm/s | 1-50.0mm/s |
| | Pre-Heat Time | 0.5sec | 0-9.9sec |
| | 2nd Feed Speed | 15.0mm/s | 1-50.0mm/s |
| | Solder start pool time | 0.0sec | 0-9.9sec |
| | Solder end pool time | 0.0sec | 0-9.9sec |
| | 2nd Rev. Amount | 3.0mm | 0-99.9mm |
| | 2nd Rev. Speed | 50.0mm/s | 1-50.0mm/s |
| | Heating Time | 0.0sec | 0-9.9sec |

Useful function with the teaching pendant

Teaching screen in **JOG mode:**

| Key | Action |
|---|---|
| 0 | The solder iron will go down while this key is pressed. |
| 1 | The solder iron will go down if this key is pressed once. To raise, press "0" or "2" key again. |
| 3 | The solder wire feed forward while this key is pressed. |
| 4 | The machine blows an air while this key is pressed. |
| 6 | The solder wire feed reverse while this key is pressed. |
| 9 | One touch long solder wire feeding key. Set length (e.g. 600mm) is fed with one touch key pressing. |

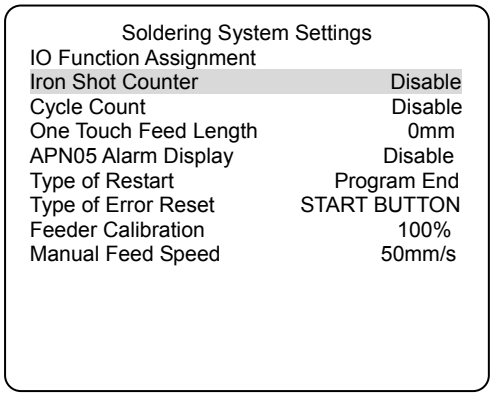
Setting display screen :

| Key | Action |
|---|---|
| Go | The machine moves to the displayed position. |
| F4 | The machine moves to the displayed position and do the soldering with the entered condition. |

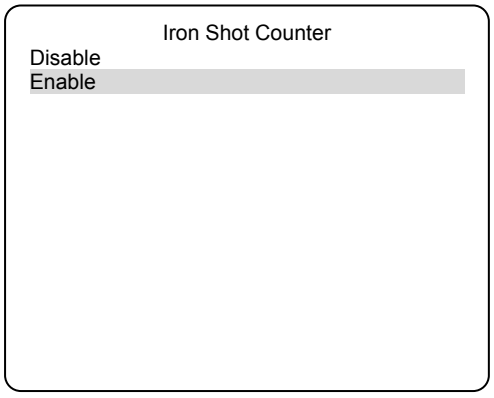
# 7. Soldering System Settings

## 7.1 Iron Shot Counter

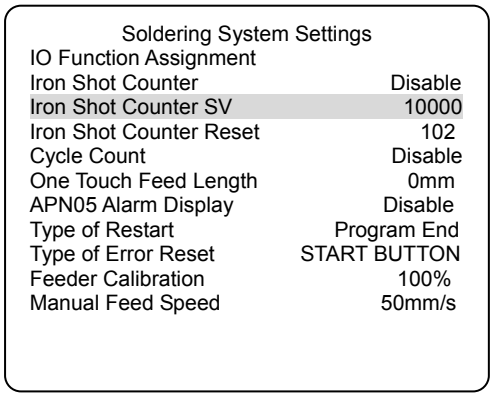
When the present value of the counter reaches the set iron shot counter, the message on teaching pendant appears and a buzzer sounds. This is useful function to exchange iron tip.
*Factory setting: “Enable”



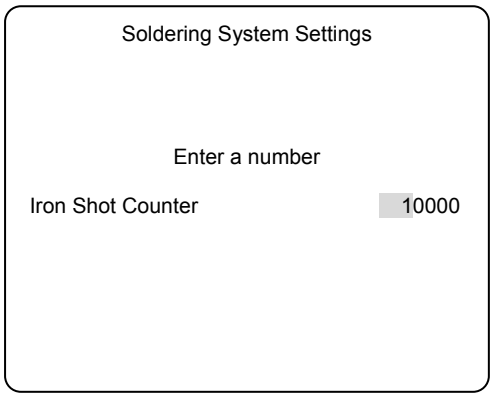

Press [MENU] key at teaching mode,
and select “Soldering System Settings”.
Then, select “Iron Shot Counter” and press [ENTER].




Select “Enable” and press [ENTER].




Select “Iron Shot Counter SV” and press [ENTER]..



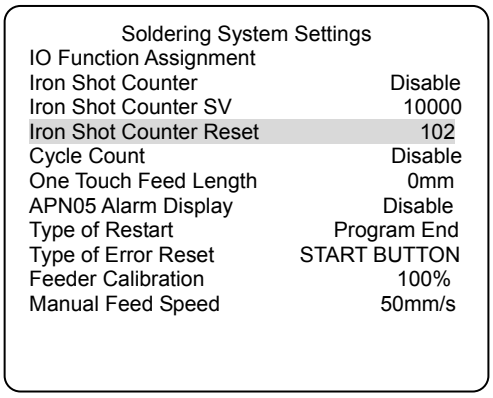

Enter the maximum setting value.

*The maximum set value:99999

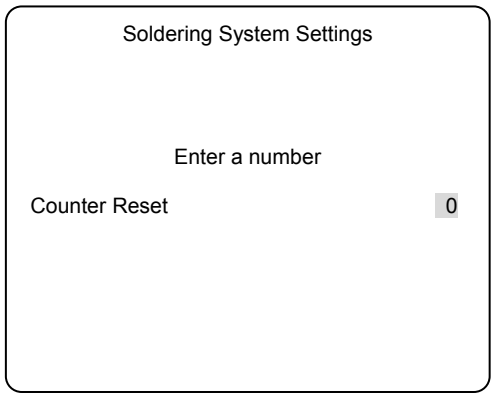
*The maximum count value:99999

### 7.1.1 Iron Shot Counter Reset

How to reset Iron Shot Counter



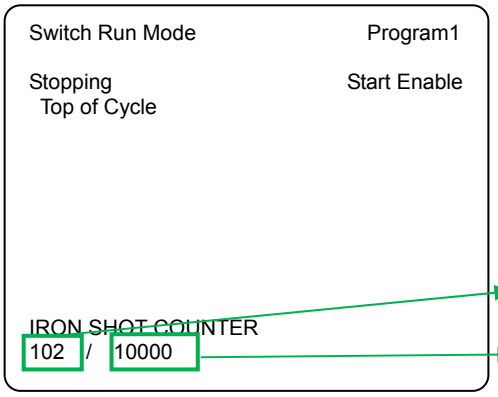

Press [MENU] key at teaching mode, and select “Soldering System Settings”. Then, select “Iron Shot Counter Reset” and press [ENTER].




Press [CLEAR] key to clear the number.
It should be done everytime after replacing to new iron cartridge.

### 7.1.2 Iron Shot Counter (Display at the operation mode)

Iron Shot Counter is displayed in External Run Mode or Switch Run Mode as follows:

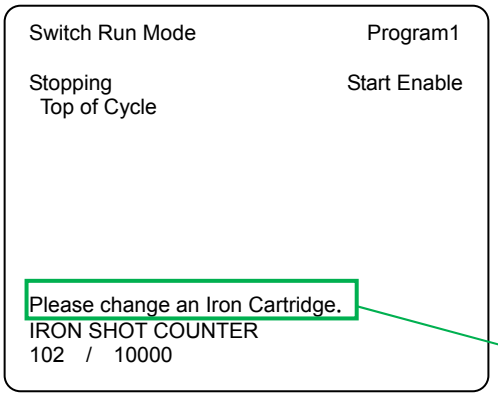



During the operation mode,
the iron shot counter is updated in every one shot.

Iron Shot Counter Present value

Iron Shot Counter Setting value

When the present value of the counter reaches the maximum iron shot counter point, the message on teaching pendant appears and a buzzer sounds. (The robot operation enables after reaching set value.)



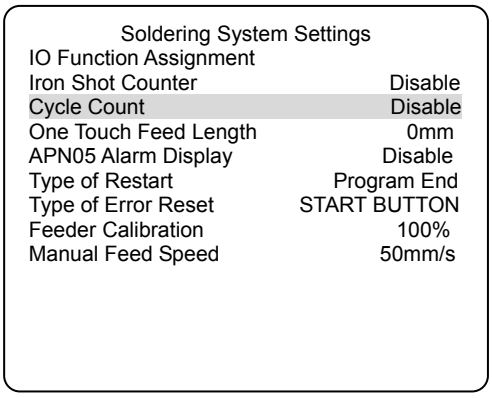

To turn off the buzzer, reset the counter current value while the machine is stopping.

Because iron shot counter checking is done at the time of the program end, the current value becomes bigger value than maximum iron shot number.

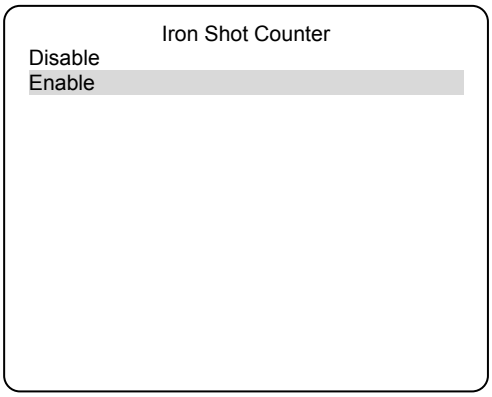
This message is displayed.

## 7.2 Cycle count

The number of program cycle can be counted.
1 cycle is 1 count. ( It is not counted during the continuous operation mode.)
*Factory setting: “Enable”.

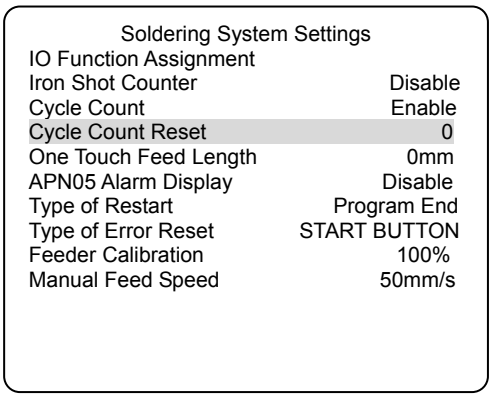



Press [MENU] key at teaching mode,
and select “Soldering System Settings”.
Then, select “Cycle Count” and press [ENTER].

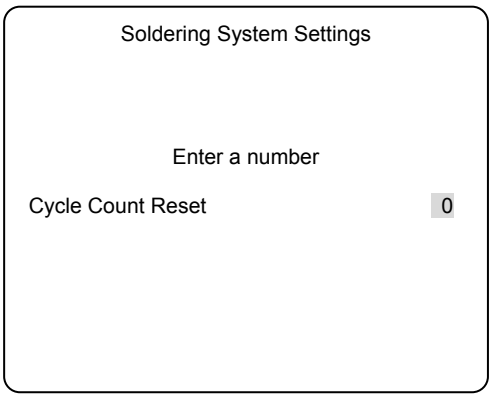



Select “Enable”.

### 7.2.1 Cycle Count Reset



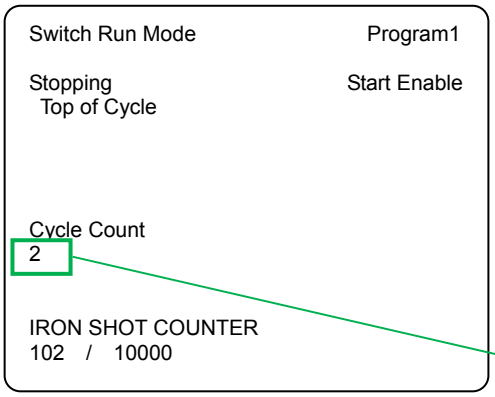

Press [MENU] key at teaching mode,
and select “Soldering System Settings”.
Then, select “Cycle Count Reset”
and press [ENTER].




Press [CLEAR] key to reset the number.

### 7.2.2 Cycle Count (Display at the operation mode)

Iron Shot Counter is displayed in External Run Mode or Switch Run Mode as follows:




During External operation mode or Switch run mode, it is counted at the time running program ends 1 cycle, then it is displayed on teaching pendant.

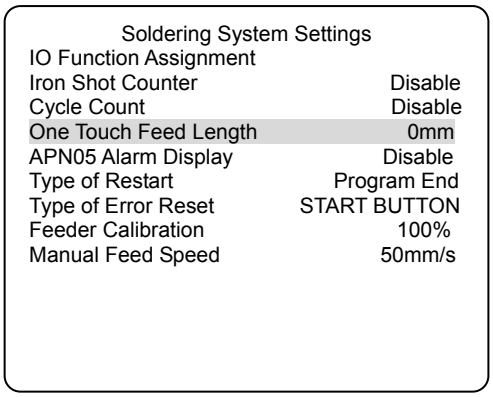
The cycle count value is not updated during robot running. Indication is reflected after the end of the program.

*It is not counted during continuous operation mode.

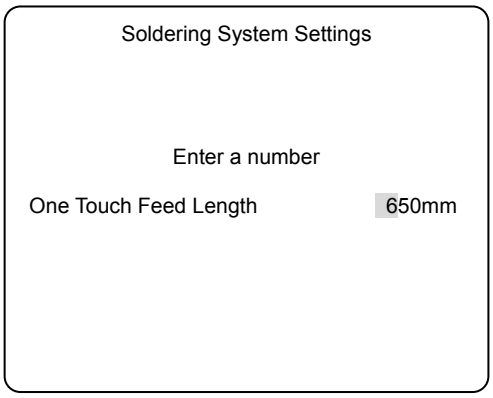
The maximum setting number of cycle count is 99999, if it's 10000cysles, it becomes 0. (This is repeated.)

### 7.3 One Touch Feed Length

Solder wire can be fed to the top of solder tube.
It is useful function, when solder wire is replaced.
*Initial value: "0"




Press [MENU] key at teaching mode, and select "Soldering System Settings". Then, select "One Touch Feed Length" and press [ENTER].



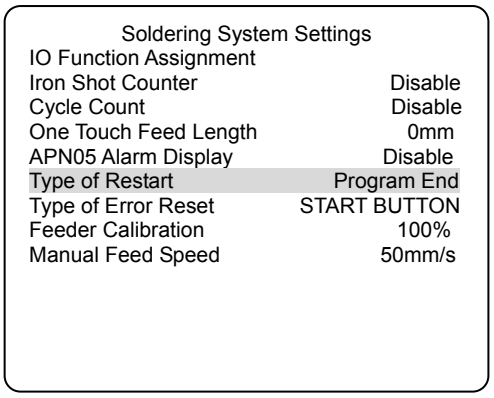

Enter the same length of the solder tube.

The solder wire is fed in 20mm shorter than the entered length to avoid solder wire overrun.

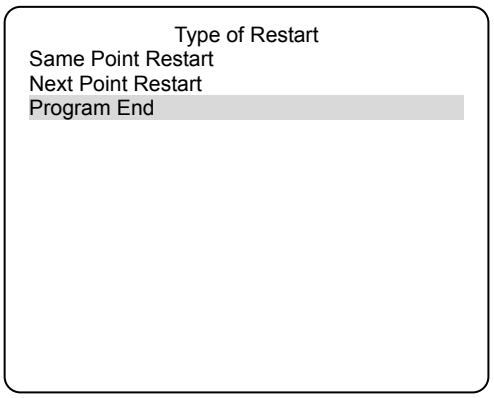
By pressing [9] on teaching pendant, the solder wire can be fed.

## 7.4 Type of Restart

Restart setting can be selected in case of Solder shortage, Solder clogged, Heater error. There are three types of restart setting, Same Point Restart, Next Point Restart, Program End.
*Initial value: “Program End”




Press [MENU] key at teaching mode, and select “Soldering System Settings”. Then, select “Type of Restart” and press [ENTER].




Select restarting way.

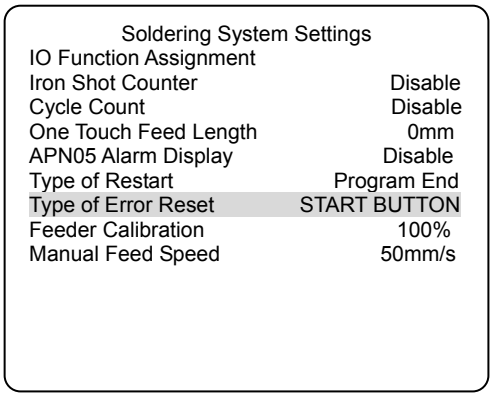
Same Point Restart:
Restarting from the point that error occurs.

Next Point Restart:
Restarting from the next point that error occurs.

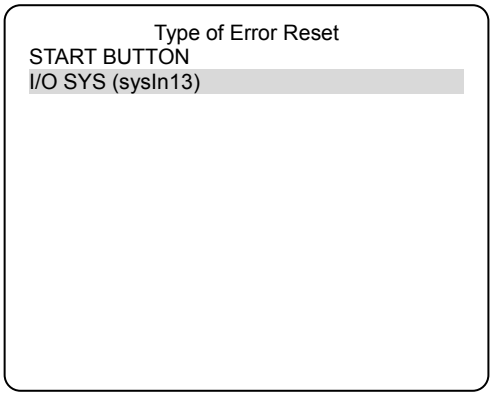
Program End:
Back to the home position and program ends.

## 7.5 Type of Error Reset

Error resetting that is by Start button on the robot or by inputting signal (I/O SYS) of external device can be selected in case of Solder shortage, Solder clogged or Heater error occurs.
*Initial value : “START BUTTON”




Press [MENU] key at texching mode, and select “Soldering System Settings”. Then, select “Type of Error Reset” and press [ENTER].



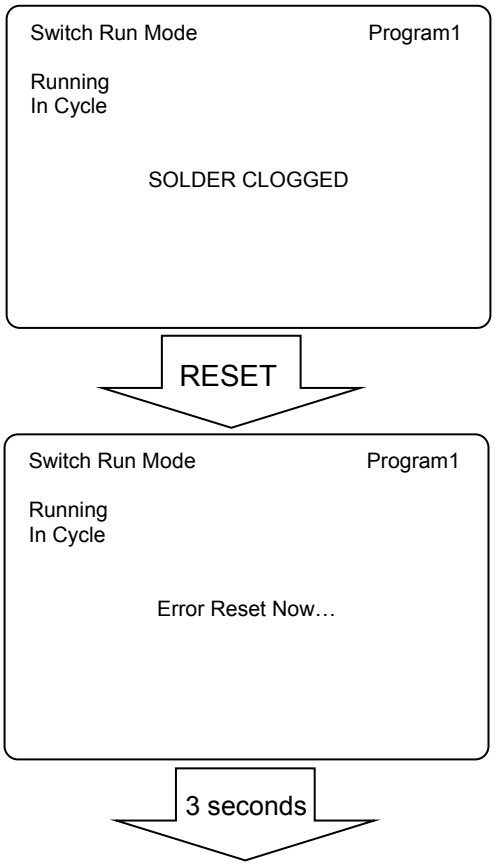

Select “START BUTTON” or “I/O SYS”.

START BUTTON:
Resetting by the start button on the operation box, in case the opearation box is connected.
If the opearaion box is not connected, #sysIn1 is the input of START BUTTON

I/O SYS:
Resetting by Error Reset of #sysIn 13.

*If error, I/O SYS OUT ouputs.
(Refer to 8. Function Assignment List)

Reset by the selected way, when error occurs.




e.g) Solder clogged error

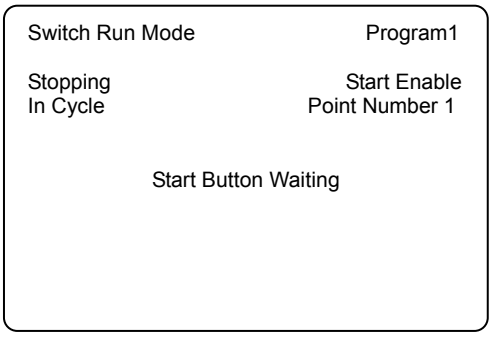
After the reset button (signal) is input, the display is changed as follows.

“Error Reset Now…” is displayed for three seconds.

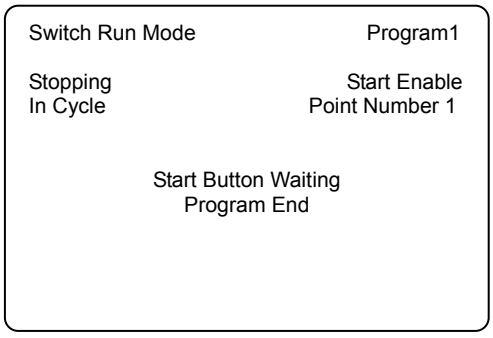
It cannot be restarted during this time.

The display depends on the setting of restart.

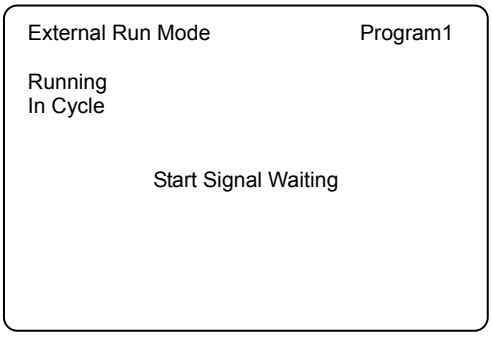
For
“Same / Next point Restart” and
“START BUTTON”



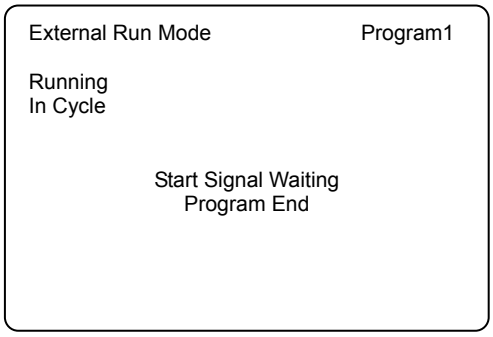

For
“Program End” and
“START BUTTON”




For
“Same / Next point Restart” and
“I/O SYS”

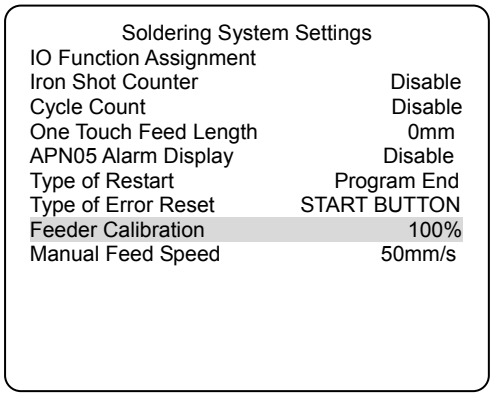



For
“Program End” and
“I/O SYS”

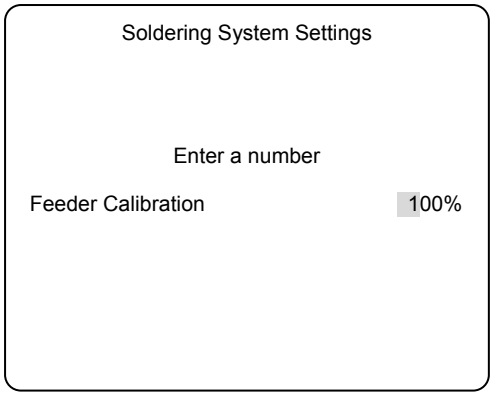


## 7.6 Feeder Calibration

The solder wire feed/ reverse amount can be adjusted.
When the solder diameter is changed, the balance between setting amount and measured amount can be calibrated. *Initial value: 100%




Press [MENU] key at teaching mode,
and select “Soldering System Settings”.
Then, select “Feeder Calibration” and press [ENTER].




Enter the calibration value (1~200%).

*Initial value: 100%

It calibrates the feeding and reversing amount.

Less than setting amount: 100% < 200%
More than setting amount: 1% < 100%

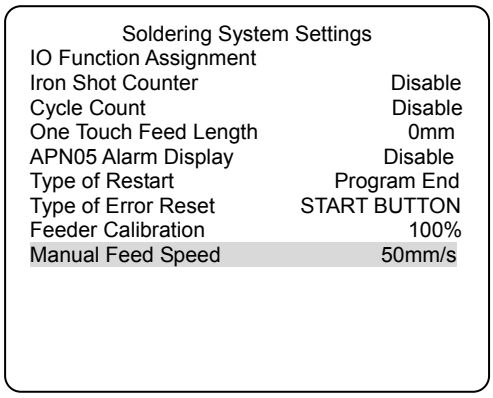
e.g)
When the feeding amount is set in 10mm, the measured value is 90mm.

Feeding amount ÷ Measured amount = Calibration value (Convert to % , per 1%)
100mm ÷ 90mm = 1.11…. → Calibration value is 111%

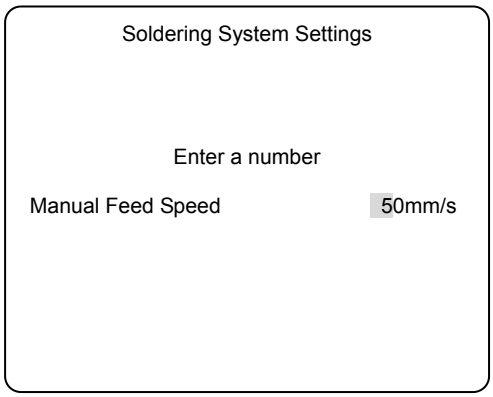
*When the calibration value is changed, save the data.
Then in order to reflect the calibration value, turn the power off and turn it on again, or switch to operation mode.

## 7.7 Manual Feed Speed

The manual feeding speed can be adjusted.
The reverse speed is fixed at 50mm/sec.
*Initial value: 50mm/sec




Press [MENU] key at texching mode,
and select “Soldering System Settings”.
Then, select “Manual Feed Speed” and press [ENTER].




Enter the speed value.
Setting range is 10mm/sec ~ 50mm/sec.

## 7.8 Note for JR C-points

Before using “JR C-points”, save the programmed data at first then send a new data, or the data may be deleted.

# 8. Function Assignment List (I/O-SYS, I/O-1)

## I/O-SYS

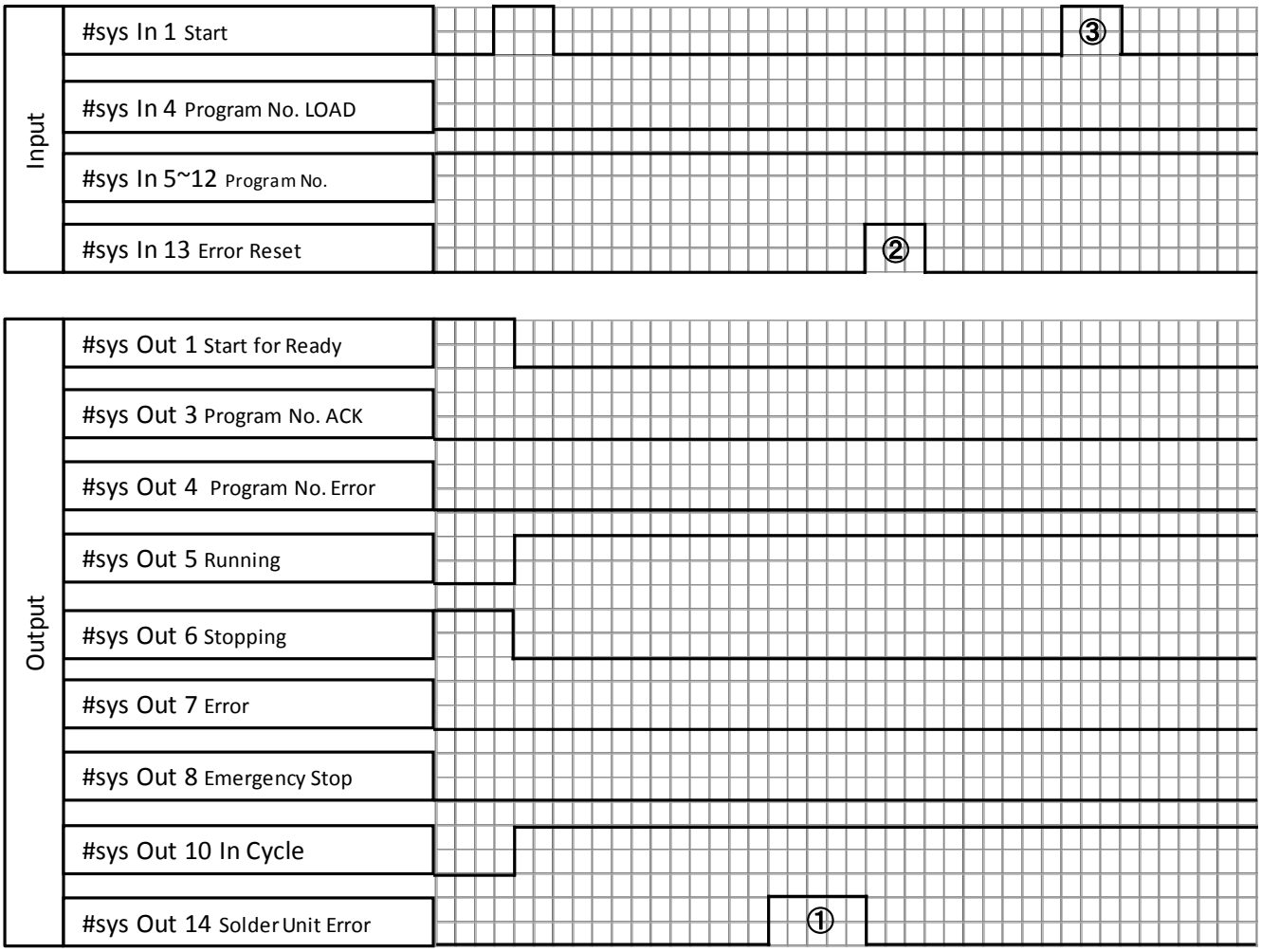
| | Name | Description | Pin No. |
|---|---|---|---|
| Emergency stop input | | Emergency Stop Switch Contact 1 Port 1 Input | 1 |
| | | Emergency Stop Switch Contact 1 Port 2 Input | 2 |
| | | Emergency Stop Switch Contact 2 Port 1 Input | 3 |
| | | Emergency Stop Switch Contact 2 Port 2 Input | 4 |
| | | Emergency Stop Switch Contact 3 Port 1 Input | 5 |
| | | Emergency Stop Switch Contact 3 Port 2 Input | 6 |
| Input | #sys In 1 | Start / Start Switch | 7 |
| | #sys In 2 | Free / Go Home | 8 |
| | #sys In 3 | Reset | 9 |
| | #sys In 4 | Program No. LOAD | 10 |
| | #sys In 5 | Program No. bit0 $2^0 = 1$ | 11 |
| | #sys In 6 | Program No bit1 $2^1 = 2$ | 12 |
| | #sys In 7 | Program No. bit2 $2^2 = 4$ | 13 |
| | #sys In 8 | Program No. bit3 $2^3 = 8$ | 14 |
| | #sys In 9 | Program No. bit4 $2^4 = 16$ | 15 |
| | #sys In 10 | Program No. bit5 $2^5 = 32$ | 16 |
| | #sys In 11 | Program No. bit6 $2^6 = 64$ | 17 |
| | #sys In 12 | Program No. bit7 $2^7 = 128$ | 18 |
| | #sys In 13 | Error Reset | 19 |
| | #sys In 14 | Free/ Start Inhibition/ Stop-Start Inhibition/ Soft Lock/ Stop | 20 |
| | #sys In 15 | Motor Power ON | 21 |
| Output | #sys Out 1 | Ready for Start | 22 |
| | #sys Out 2 | Work Home | 23 |
| | #sys Out 3 | Program Number ACK | 24 |
| | #sys Out 4 | Program Number Error | 25 |
| | #sys Out 5 | Running | 26 |
| | #sys Out 6 | Stopping | 27 |
| | #sys Out 7 | Error | 28 |
| | #sys Out 8 | Emergency Stop | 29 |
| | #sys Out 9 | Motor Power OFF | 30 |
| | #sys Out 10 | In Cycle | 31 |
| | #sys Out 11 | Operation Mode Code 1 (Run Mode) / Green LED | 32 |
| | #sys Out 12 | Operation Mode Code 2 (Teaching Mode) / Red LED | 33 |
| | #sys Out 13 | Start Source Code 1 (I/O SYS Start) | 34 |
| | #sys Out 14 | Solder Unit Error | 35 |
| Others | COM + | DC24V | 36 |
| | COM - | GND | 37 |

*#sysIn1~#sysIn12, #sysIn14,#sysIn15, #sysOut1~#sysOut13 can be changed to”Free”.

## I/O-1

| | Name | Description | Pin No. |
|---|---|---|---|
| Input | #gen In 1 | Solder Shortage | 1 |
| | #gen In 2 | Solder Clogged | 2 |
| | #gen In 3 | Temperature Error | 3 |
| | #gen In 4 | Upper Limit Sensor | 4 |
| | #gen In 5 | Lower Limit Sensor | 5 |
| | #gen In 6 | Free | 6 |
| | #gen In 7 | Free | 7 |
| | #gen In 8 | Free | 8 |
| | #gen In 9 | Free | 9 |
| | #gen In 10 | Free | 10 |
| | #gen In 11 | Free | 11 |
| | #gen In 12 | Free | 12 |
| | #gen In 13 | Nitrogen flow rate | 13 |
| | #gen In 14 | Free | 14 |
| | #gen In 15 | Free | 15 |
| | #gen In 16 | Tip ADJ Z sensor | 16 |
| | #gen In 17 | Tip ADJ X sensor | 17 |
| | #gen In 18 | Tip ADJ Y sensor | 18 |
| Output | #gen Out 1 | Iron UP / DOWN | 19 |
| | #gen Out 2 | Air Blow | 20 |
| | #gen Out 3 | Solder Feed (Line) | 21 |
| | #gen Out 4 | EMERGENCY | 22 |
| | #gen Out 5 | Free | 23 |
| | #gen Out 6 | Free | 24 |
| | #gen Out 7 | Free | 25 |
| | #gen Out 8 | Free | 26 |
| | #gen Out 9 | Free | 27 |
| | #gen Out 10 | Free | 28 |
| | #gen Out 11 | BRC-3000 Brush rotation | 29 |
| | #gen Out 12 | SRC-500DC CW | 30 |
| | #gen Out 13 | SRC-500DC CCW | 31 |
| | #gen Out 14 | Free | 32 |
| | #gen Out 15 | Free | 33 |
| | #gen Out 16 | Free | 34 |
| | #gen Out 17 | Free | 35 |
| | #gen Out 18 | Free | 36 |
| | #gen Out 19 | Solder Feed (Relay output) | 37 |
| | #gen Out 19 | Solder Feed (Relay output) | 38 |
| | #gen Out 20 | Solder Reverse (Relay output) | 39 |
| | #gen Out 20 | Solder Reverse (Relay output) | 40 |
| | #gen Out 21 | Free (Relay output) | 41 |
| | #gen Out 21 | Free (Relay output) | 42 |
| | #gen Out 22 | Free (Relay output) | 43 |
| | #gen Out 22 | Free (Relay output) | 44 |

## Solder Unit Error

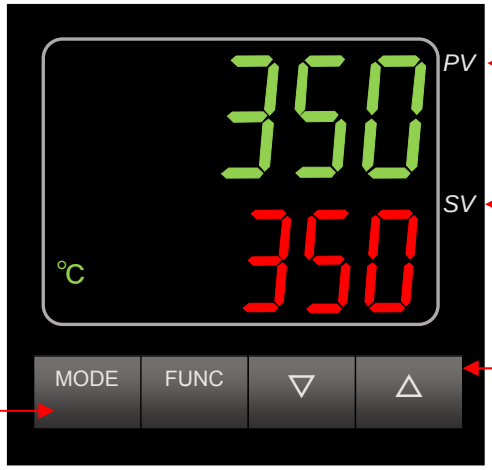



① It turns on at Solder shortage, Solder clogged and Heater error, then the robot will be paused.

② The error is cleared after the operator removes the cause of error and turns the signal ON of Error Reset..

③ Because the robot is waiting, when Start signal is input, the robot starts operating according to the setting of “Type of restart” in “Soldering System Settings”.

## 9. How to set temperature controller



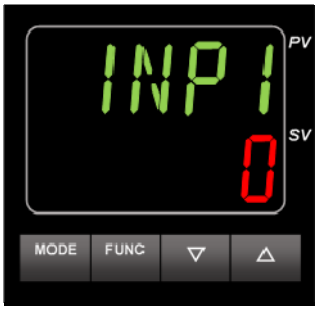

**PV (Present temperature)**

**SV (Set temperature)**

SV can be changed by pushing ▽ △ (0~500℃)

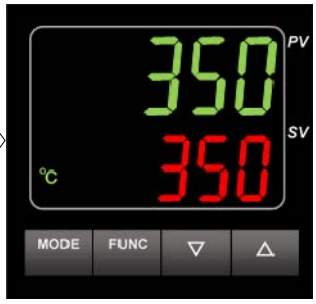
**Parameter change**
Refer to Flow chart.

**Initial setting mode**




**4 sec.**

**Operation screen**

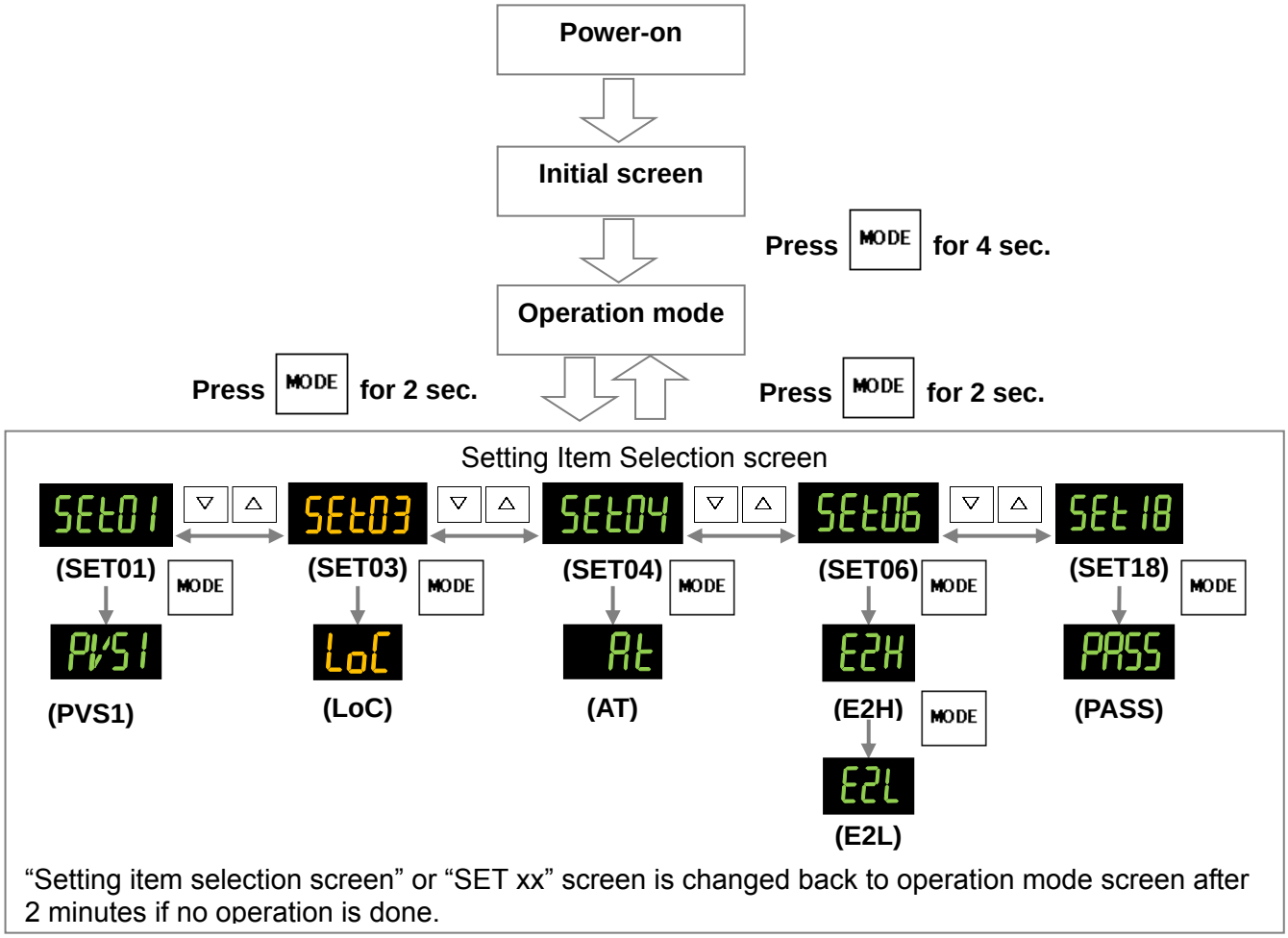



*When the PV display shows in green color, PV value alarm is within the setting range. When it is in red, it is out of its range.

### 9-2. Parameter showing

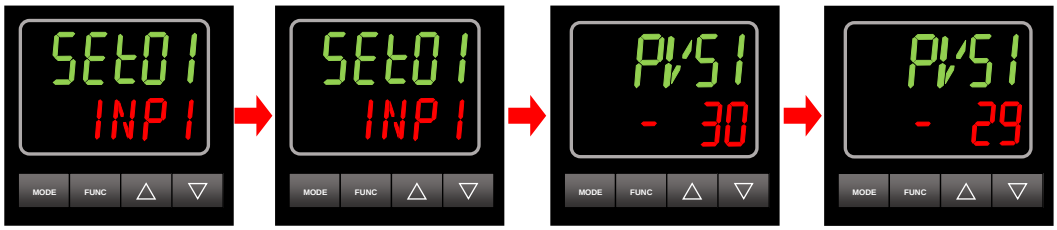
| | Description | Setting detail | Initial value |
|---|---|---|---|
| PVS1 | PV calibration zero setting | Use ▲or▼key to change .<br>-500~500 (℃) | -35 |
| LoC | Key lock setting mode | Use ▲or▼key to change.<br>0:OFF<br>1:All lock<br>2:Lock in operation mode<br>3:Lock except operation mode | 0 |
| AT | Auto-tuning operation mode | Push ▲or▼key to turn on.<br>“AT” is flashing during auto-tuning on the SV line.<br>It finishes when oFF is displayed<br>(When ERR02 is displayed, the solder wire may not be set properly.) | oFF |
| E2H | PV value alarm upper limit setting | Use ▲or▼key to change .<br>0~500 (℃) | 50 |
| E2L | PV value alarm lower limit setting | Use ▲or▼key to change .<br>0~500 (℃) | 50 |
| PASS (flash) | Password setting | No need to set | — |

9-3 Operation flow chart




"Setting item selection screen" or "SET xx" screen is changed back to operation mode screen after 2 minutes if no operation is done.

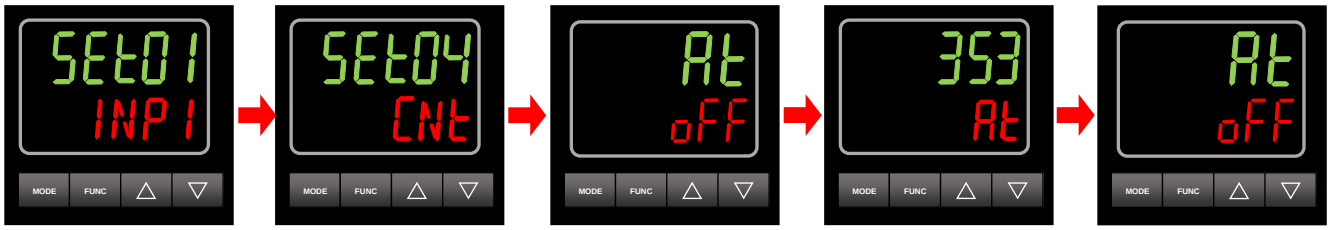
**<Temperature calibration PVS1>**




Press MODE for 4 sec. | Press MODE once. | Change value by ▽ △ | Press MODE for 2 sec to return.

*If temperature calibration with higher accurancy, leave the soldering unit for 30 minutes,

**<Auto tuning AT>**




Press MODE for 4 sec. | Press △ until above screen appears. | Press MODE once. | Press △ once. | Press MODE for 2 sec to return.

## <Temperature alarm upper limit E2H>

Press MODE for 4 sec. | Press △ until above screen appears. | Press MODE once. | Change value by ▽ △ | Press MODE for 2 sec to return.

## <Temperature alarm upper limit E2H>

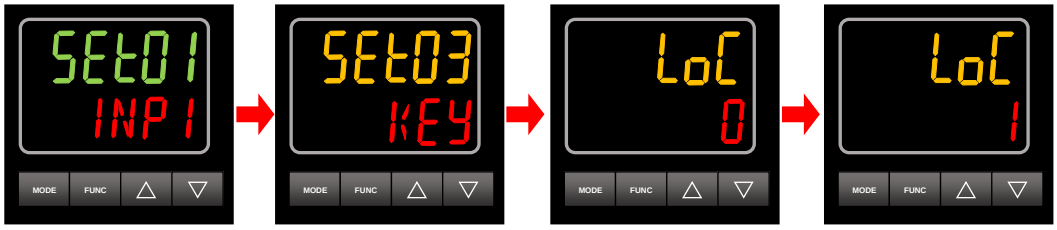
Press MODE for 4 sec. | Press △ until above screen appears. | Press MODE twice. | Change value by ▽ △ | Press MODE for 2 sec to return.

## <Digit change function>

Push FUNC once to change 1st digit. | Push FUNC twice to change 2nd digit. | Push FUNC three times to change 3rd digit.

Press MODE or leave for 4 sec to return.

## <Temperature lock function>




Press MODE for 4 sec. | Press △ until above screen appears. | Press △ once.
0:off
1:All lock
2:Lock in operation mode
3:Lock except operation mode

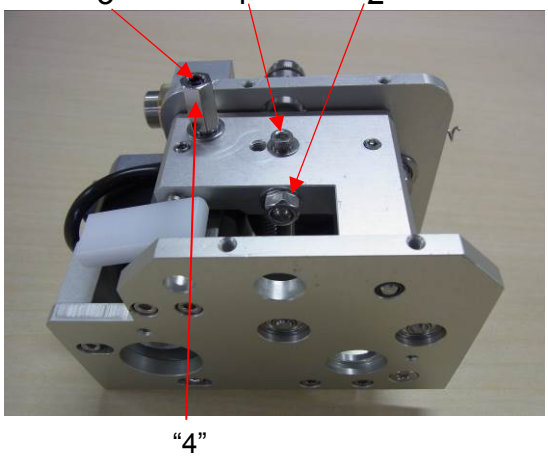
Press MODE for 2 sec to return.

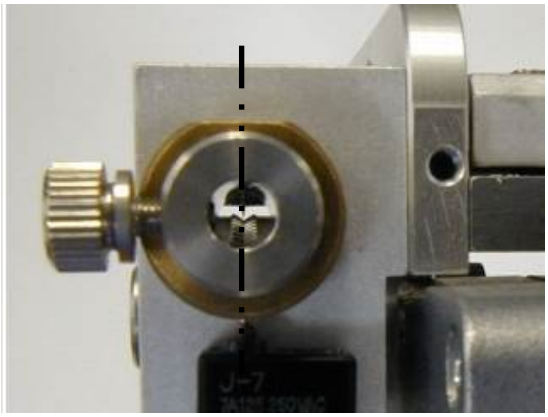
## 10. ZSB feeder adjustment and alignment

Adjust the ZSB feeder as follows
The cutting depth of ZSB blade must be adjusted properly to operate properly. Adjust and clean it every time before use.

(1) Remove the cover after loosing five setting screws.

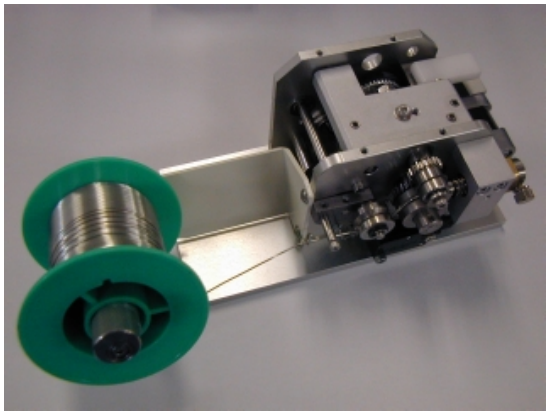
(2) Loosen the set screw “1” for alignment cutting blade shaft and the setting nut “2” to adjust the shaft position. Then move the blade shaft position to match the center of the cutting blade and V grove of the lower roller.



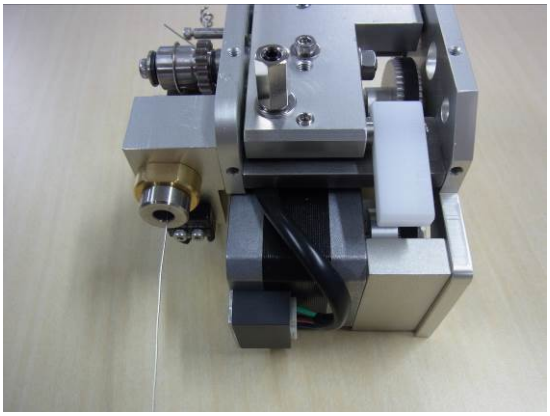


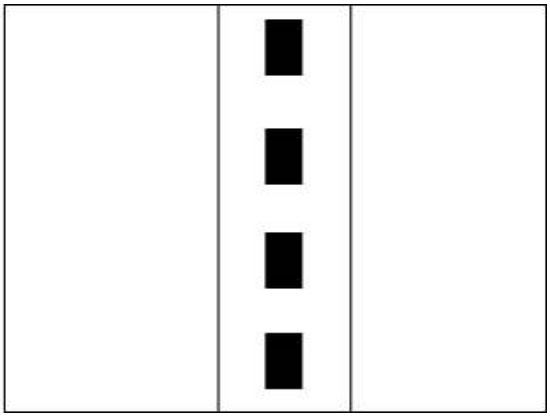
(3) Tighten the set screw “1”.

(4) Attach the reel pin as it stays without the cover, and then set the solder wire.

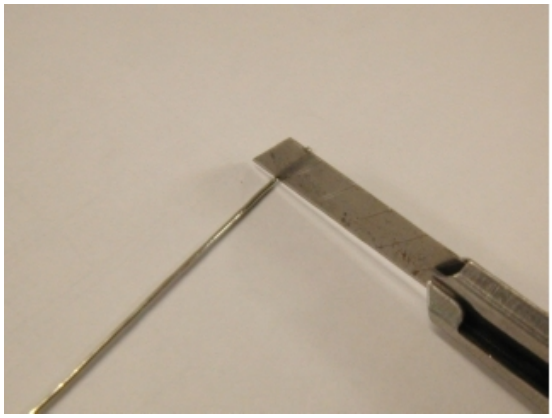


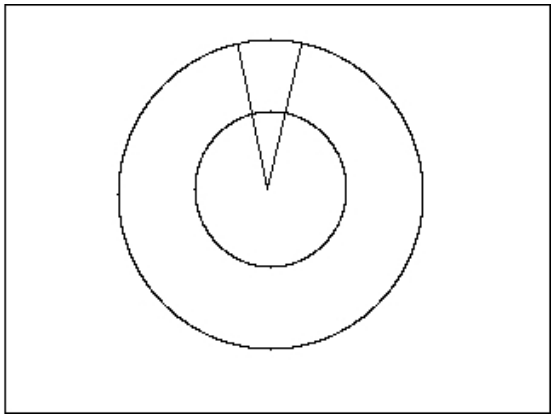
(5) Push down the forward/reverse lever and feed the solder wire, then make sure the cutting blade makes holes on the center of the solder wire. If the holes were not on the center, adjust the cutting blade shaft position, then feed the solder wire and check it.



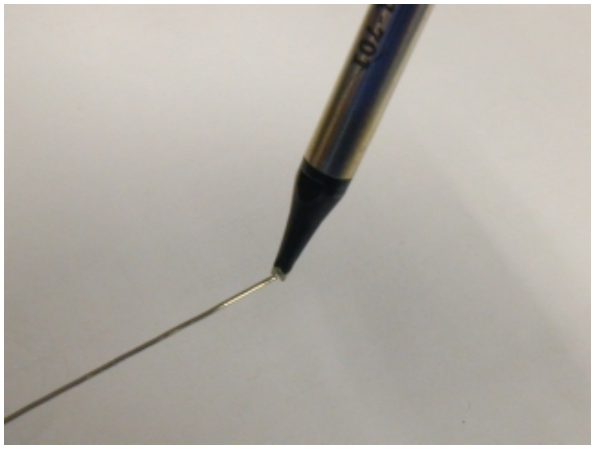


(6) Cut the solder wire with holes perpendicularly and check the cross section. Make sure the cutting blade penetrates into flux core.
If the cutting depth was not enough or too deep, loosen the nut “4” then adjust the adjusting screw “3” for the cutting depth to penetrate into flux core.
After that feed the solder again, cut the wire and check the cross section again.





(7) Complete adjusting the alignment and depth of the cutting blade and increase the temperature of iron tip. Then, melt the solder wire with holes.
And make sure the flux is coming out from the holes.



(8) Put back the cover and tighten five set screws.

## 11. Maintenance

■ Daily inspection requirement items are as follows:

Note: when the inspection, turn off the power and cool down the iron tip.

1) Existence of solder wire:
   If the solder wire is not sufficient, please change to new one.

2) Wear of iron tip
   If soldering result became unstable, please change it to new one. The life time of the iron tip is depends on the heating time, the solder feeding point and speed.

3) Breaking of heater
   The causes of a breaking of heater when the lamp for indication of temperature error is on and the temperature controller is normal are as follows:

   1. The breaking of heater. Change the iron cartridge
   2. The breaking of the relay cord Change the iron cord.
   3. The iron tip is worn. Change the iron cartridge

4) Air pressure
   Make sure the air pressure if it is adequate. (0.5MPa)

5) Clog of the tube set
   If the top (exit side) of the tube set clog by a flux or solder wire, please remove it and clean it with alcohol.

6) Up/down movement
   Make sure if the up/down movement of iron unit is smooth. Also, make sure if there is no flux sticking in moving parts.

7) Cutting blade and pinch roller for solder wire feeding
   Make sure flux or solder does not stick to the above parts. If so, clean it with a soft (brass) wire brush and alcohol.

■ After every 5,000 points soldering
   Check the solder tip temperature with a thermometer.
   Refer to the page of temperature calibration.

■ Every month
   Make sure a solder wire run through the solder wire tube. If not, clean the inside of tube or replace.

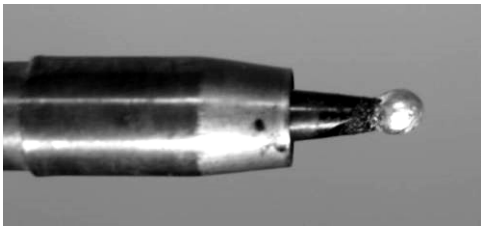
■ Every year
   Send the thermometer to an authorized agent for the calibration

## 12. Handling of iron tip

**Introduction**
Soldering is a technique which connects a metal to another metal by alloy reaction.
Solder material melts, but mother material (metal pieces on the work-piece) never melt by soldering.
There are three important factors (Three great factors of soldering) for the alloy reaction as follows:
Cleaning the metal surface
Formation of alloy layer which by melting solder and connecting to metal surface
Heat source which should be maintained in suitable temperature in order to form alloy layer by soldering.
Solder iron tip is related to the formation of alloy layer and the heat source.
So, It is very important for a good care of solder tip to make a stable soldering.

**<Handling of iron unit>**
Apollo soldering tip, HI-TIP (AS, HQ, TM and DC model) realized the high performance and long life by using oxygen-free copper as a mother material with special iron plating and careful after treatment.
Usually, the life of the tip is about 50,000 points. However, if it is used at more than 400°C or if solder with a bad solder feeding position, the life is shorten extremely to approximately 5,000 points caused by "Iron plate Corrosion". Therefore, please use it with suitable condition. If the condition is proper, the life exceeds 100,000 points.

1. Attach an iron tip, then the vinyl resin coating on the iron tip is cracked and peel off during the temperature rising. Please use it after making pre-soldering by the solder including flux.



2. Iron tip should be placed at iron stand after pre-solder on iron tip. If tip is left at the stand without solder after cleaning, the tip oxidizes and cannot be getting wet with solder.

3. If flux or some oxide residues were left over the iron tip, please remove them with back of a cutting edge like a cutter lightly.

   Do NOT file the iron tip because iron plating may be peeled off, then the iron tip cannot be getting wet with solder.

If a tip is not getting wet with solder…..

Remove pre-solder on tip completely.
Brush the iron tip lightly with a brass wire brush.
Melt a new solder including flux on the tip or dip the iron tip into a soldering pot.
Remove the needless solder with a wet sponge.
Make pre-solder soon

The tip will wet with solder by the above process.

**<Care of Iron tip>**

1) Check iron tip by eyes every fixed time

| | |
|---|---|
| Oxide is left on the iron tip. | Study of the number of air blow cleaning. |
| “Solder rise” exceed the solder plated area. | A malfuction is occurred by leavening a corrosion by chloride element in flux.<br>Replace the iron tip. |
| Bad solder flow | Remove pre-soldering on the iron tip completely. Cool it to room temperature and remove oxidation by a sand paper. Then turn it on again and make pre-soldering to the iron tip surface during rising temperature. |
| Transformation of iron tip | Need to change of iron tip by the corrosion of chloride element in flux and wear phoenomenon. |

2) Check for soldering defect

| | |
|---|---|
| Imperfection of electric connection by of flux membrane. | Clean the surface and make iron tip temperature high and heating longer. |
| Rough soidering surface | This defect occurs if the heating temperature is high or low. Adjust it to proper temperature. |
| Soldering removes and comes off because the solder does not melt. | Shortage of heat |
| Solder flow | A malfuction is occurs if the heating temperature is high, the heating time is long or the exceeding solder feed amount is supplied. |

There are many solder defects except the above mentioned as follows:
“Solder shortage”, “Icicle”, “Solder excess”, “Burning film” etc.
Please select suitable condition by seeing through the solder states.

## 13. Error sign

The list below is the error sign on the teaching pendant.

| Error display | Description | Failure reason | Recommend solution |
|---|---|---|---|
| SOLDER SHORTAGE | Detection of solder shortage sensor | End of solder wire feeding | Replace with a new solder wire. ☞ 4. Preparation |
| | | Breaking of solder wire. | Remove the solder in solder tube and reset solder wire. ☞ 4. Preparation |
| | | Misdetection of sensor | Check solder wire is set properly. ☞ 4. Preparation |
| | | Sensor is damaged. | Contact Apollo Seiko or our agency for repair. |
| SOLDER CLOGGED | Detection of solder clogged sensor | Release lever is upper position. | Lower the release lever. ☞ 4. Preparation |
| | | Solder wire is clogged in solder tube. | Replace a new solder tube. ☞ 4. Preparation |
| | | Solder wire does not melt properly. | Slow down the speed of solder feeding. ☞ 6. Initial value of soldering condition |
| | | | Adjust the position of solder feeding. ☞ 4. Preparation |
| HEATER ERROR | Error detection of temperature controller- related | The iron cartridge is not inserted properly. | Check the iron cartridge is set properly. ☞ 17. How to change iron cartridge |
| | | Breaking of iron tip heater | Replace new iron cartridge. ☞ 17. How to change iron cartridge |
| | | Thermocouple is damaged. | |
| | | The range between temperature alarm upper value and lower value is small. | Enter proper value in the system parameter. ☞ 7. How to set temperature controller |
| LOWER SENSOR TIME UP | Detection failure of iron unit lower sensor by air cylinder. | Piping failure | Check air leakage of air tube and joint part. ☞ 3. Description |
| | | Adjustment of the speed controller is not proper. | Adjust the speed controller properly. ☞ 4. Preparation |
| | | Lower sensor of air cylinder is damaged. | Contact Apollo Seiko or our agency. |

| Error display | Description | Failure reason | Recommend solution |
|---|---|---|---|
| UPPER SENSOR TIME UP | Detection failure of iron unit upper sensor by air cylinder | Air is not supplied | Check the air pressure.<br>☞ 3. Description |
| | | Reduction of air pressure | |
| | | Piping failure | Check air leakage of air tube and joint part.<br>☞ 3. Description |
| | | Adjustment of the speed controller is not proper. | Adjust the speed controller properly.<br>☞ 4. Preparation |
| | | Upper sensor of air cylinder is damaged. | Contact Apollo Seiko or our agency. |
| COMET NOT READY | COMET is not ready properly. | Power is not supplied. | Turn on the power.<br>If the power is not turned on, contact to Apollo Seiko or our agency.<br>☞ 3. Description |
| | | Error of the unit | Restart the unit. (Turn off and on the power switch)<br>☞ 3. Description |
| COMET COMMUNICATION ERROR | Communication error of the robot and COMET | RS-232C cable is disconnected. | Connect the RS-232C cable.<br>☞ 3. Description |
| | Mismatch of soldering condition data etc. | The parameter is not entered properly. | Check the parameter of soldering condition. |
| FEEDER COMMUNICATION ERROR | Communication error of COMET and feeder | Feeder cable is not disconnected. | Connect feeder cable.<br>☞ 3. Description |
| | | Error of the unit. | Turn on the power of COMET.<br>If the power is not turned on, contact to Apollo Seiko or our agency<br>☞ 3. Description |

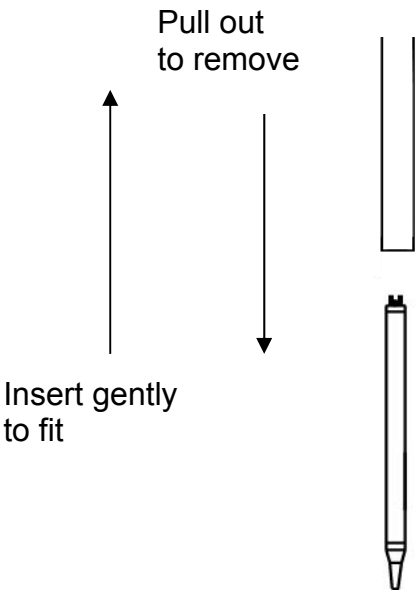
## 14. Troubleshooting

This table is designed to help trouble shoot common problems that may occur with the COMET unit. If you have tried the recommended solution and the problem persists, please contact Apollo Seiko directly for technical support.

| Problem | Failure reason | Recommended solution |
|---|---|---|
| COMET is not receiving power | The power code is disconnected | Check the power cord connection |
| | Fuse is blown | Replace with a 3 Amp fuse |
| | Control PCB is damaged. | Contact Apollo Seiko or our agency for repair |
| The iron tip does not heat properly | Heater is broken. | Replace with a new heater |
| | Heater connector is disconnected. | Check the heater connection. |
| | Heater cable is broken. | Replace with a new heater cable. |
| | The tip is at end of life. | Replace with a new iron tip. |
| | Parameter setting is not proper. | Check the system parameter and input proper value/. |
| | Control PCB is damaged. | Contact to Apollo Seiko or our agency for repair. |
| Solder is not properly fed. | The release lever is upper position. | Lower the release lever. |
| | The feeding cutting blade is idling | Adjust the position of cutting blade. |
| | Speed setting is ‘0’. | Check the system parameter. |
| | The motor is damaged. | Contact Apollo Seiko or our agency for repair. |
| | Control PCB is damaged. | Contact Apollo Seiko or our agency for repair. |
| The temperature controller cannot be adjusted. | Heater is broken. | Replace with a new heater. |
| | Heater cable is broken. | Replace with a new cable. |
| | Heater cable is disconnected. | Check the cable connection. |
| Temperature abnormality does not disappear. | Upper/ lower temperature alarm value is not proper. | Check the system parameter and enter proper value. |
| Iron unit does not move up/down. | Air is not supplied to the unit. | Check air supply. |
| | Control PCB is damaged. | Contact Apollo Seiko or our agency for repair. |

## 15. How to change iron cartridge

DCS-***, DCN-***type

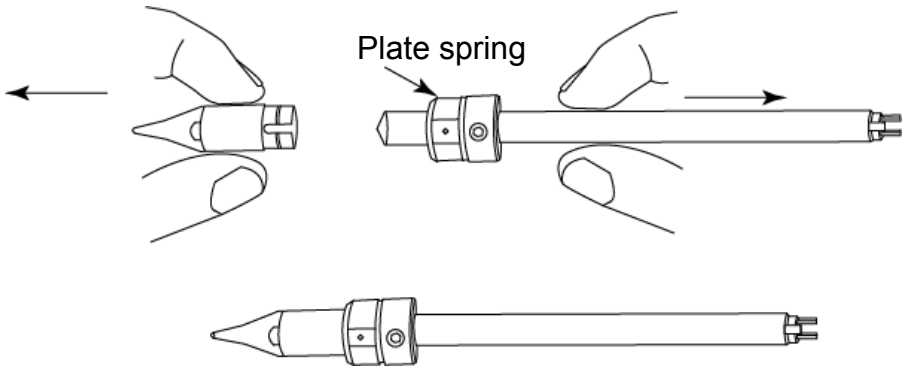



1) Make sure to turn the power off and cool down the iron cartridge room temperature and pull down the iron cartridge to replace a new one. If it does not come out, using silicone ring pull it down strongly. In case flux is jammed, remove it carefully with an alcohol.

2) To attach a new one, insert it gently until the holder end.
Then turn it until you feel the position key in the position.
When you feel a clicking, insert it firmly.
Do not turn the iron cartridge while the key is not in the position or the key is damaged.

DC-X type, X-***

Make sure to turn the power off and cool down the temperature of iron cartridge. Then pull down the iron cartridge. Next pull out the iron tip. At this time, if cannot pull out, pull out with pushing the flat spring as follows.
When replace with the new one, make sure the tip getting a burning inhibitor. Then adjust the position and insert it strongly.

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