APOLLO SEIKO™

J-CAT COMET Series

Operation Manual

Thank you for purchasing the J-CAT 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.201701

Safety Notes

- This manual includes the important information to use this machine safely. This also includes useful information to prevent injury or damage to property. Please read this manual carefully prior to connecting or operating the J-CAT COMET.
- Keep this manual near the machine at all times.

Supply only specified voltage

- Do not connect to a power supply greater than the specified voltage. If voltage is exceeded, 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 has been designed for use between 0～40 degrees C,10%～90%. Do not use this machine exceeding these conditions.

Handle with care

- This machine is designed to use a solder feeder and hot iron for soldering.
  Touching a heated soldering iron will cause severe burns. Make sure the iron has cooled down before you are touching it for replacing the iron cartridge.
- Please handle this machine with care. If the machine is dropped or sustains great 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 a dry and cool place.

If you note malfunction on machine

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

Immunity from responsibility

- We **do not** take responsibility for damage caused by misuse, mistakes, accidents, use in abnormal conditions or natural disasters, such as in an earthquake, a fire etc.
- We **do not** take responsibility on contingency loss, (Business loss, Business stop) caused by machine stop.
- We **do not** take responsibility for losses or damages caused by operating with other means not mentionined in this manual.
- We **do not** take responsibility for losses or damages 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 adjustments, replace solder iron tips and make any necessary adjustments to the temperature controller.

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1. Summary of J-CAT COMET

This 4-axis soldering robot consists of the soldering controller unit “COMET”, the solder feeder and the iron unit “RSP/RSL”. You can easily set the soldering condition such as pre-heat, heating time by the teaching pendant.

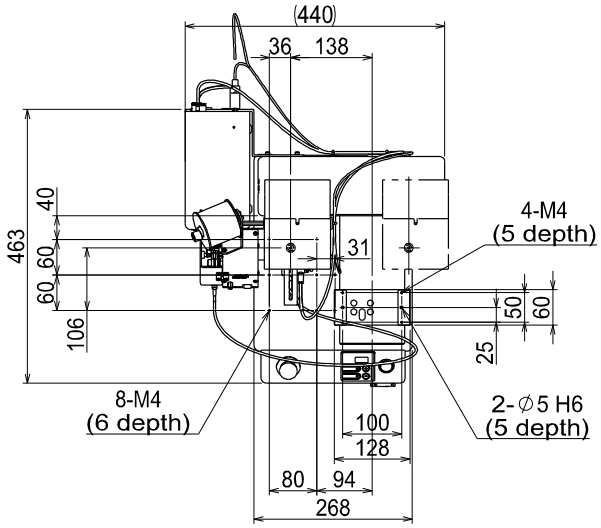
*Please refer to JANOME “Quick Start” and “Teaching Pendant” operation manuals for more details.

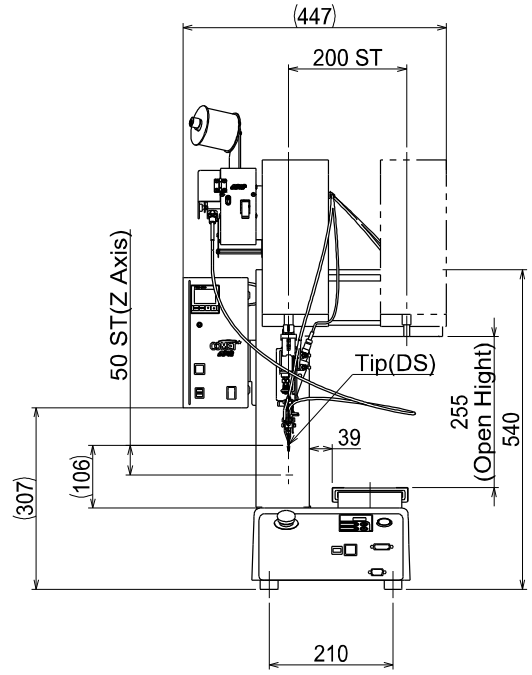
2. Specification

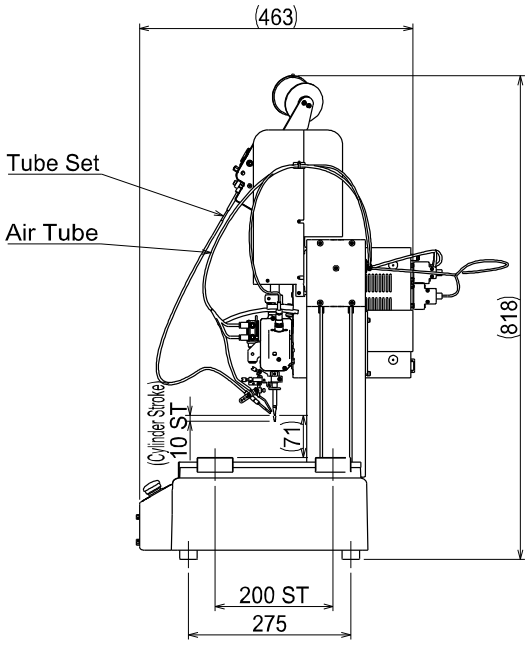
Type		J-CAT320 COMET	J-CAT330 COMET	J-CAT340 COMET	J-CAT350 COMET
Drive Method		5-phase stepping motor			
Encoder		4-axes applicable			
Resolution	X, Y, Z Axes	0.01mm			
	R Axis	0.08°			
Operation Range	X, Y Axes	200 x 200 mm	300 x 320 mm	400 x 400 mm	510 x510 mm
	Z Axis	50mm	100mm	150mm	
	R Axis	±360°			
Portable Weight		7.0kg	15.0kg		
Maximum Speed	X, Y Axes	700mm/sec	900mm/sec		
	Z Axis	250mm/sec	400mm/sec		
	R Axis	600°/sec	900° /sec		
Repeatability	X, Y, Z Axes	±0.01mm			
	R Axis	±0.008°			
Teaching Method		Remote teaching (JOG)			
		Manual data input (MDI)			
External Input / Output		Input: 16 Output: 16			
Program Capacity		999 programs			
Memory Capacity		32,000 points			
Soldering Condition		500 conditions			
Setting Temperature		0~500℃ (1℃ increments)			
Solder Feeding Speed		1.0mm/sec ~ 50.0mm/sec			
Solder Feeding Amount Resolution		0.1mm			
Solder Diameter	Using ZSB Feeder	φ0.4 ~ φ1.0mm（Option: φ0.3, 1.2, 1.6mm）			
	Using Normal Roller	φ0.3 ~ φ1.6mm			
Heater Capacity		130W			
Air		0.4 ~ 0.5MPa Dry-Clean Air			
Power Source		AC94 ~ 260V (Single-phase)			
Power Consumption		366W			
Usage Environment *Indoor use only	Temperature Range	0 ~ 40℃ (This is different from the temperature to keep the yield rate of the product.)			
	Humidity Range	10% ~ 90% (Non condensing)			

3. Dimensions

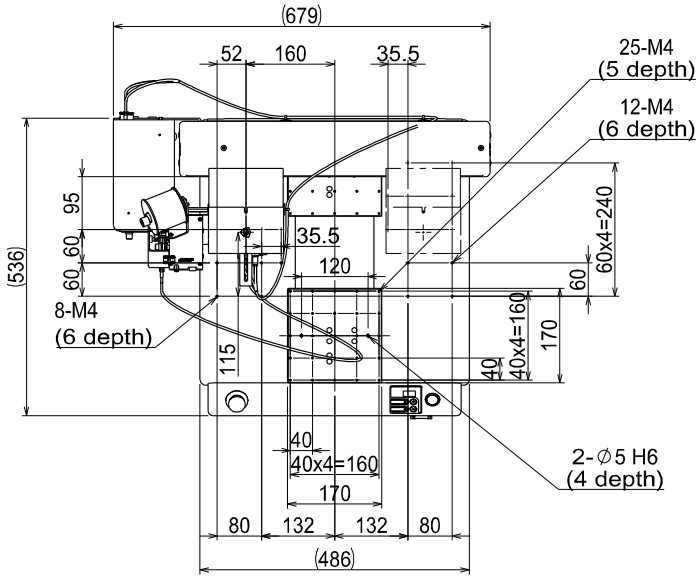
J-CAT320 COMET + RSP

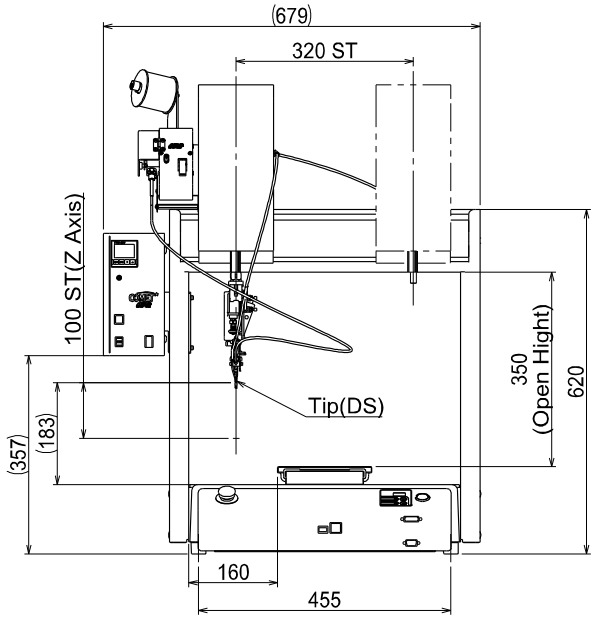


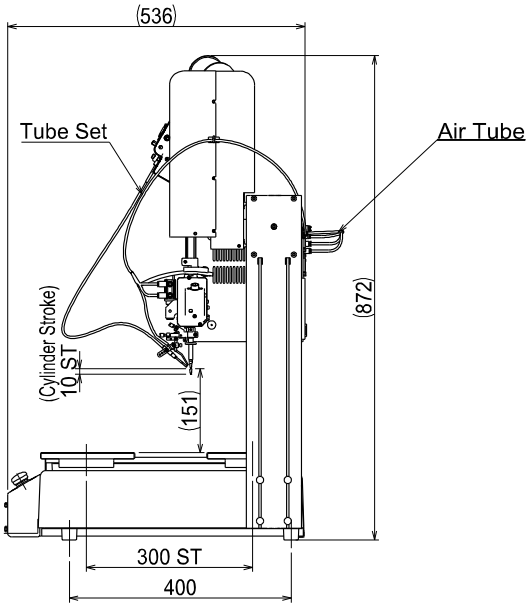




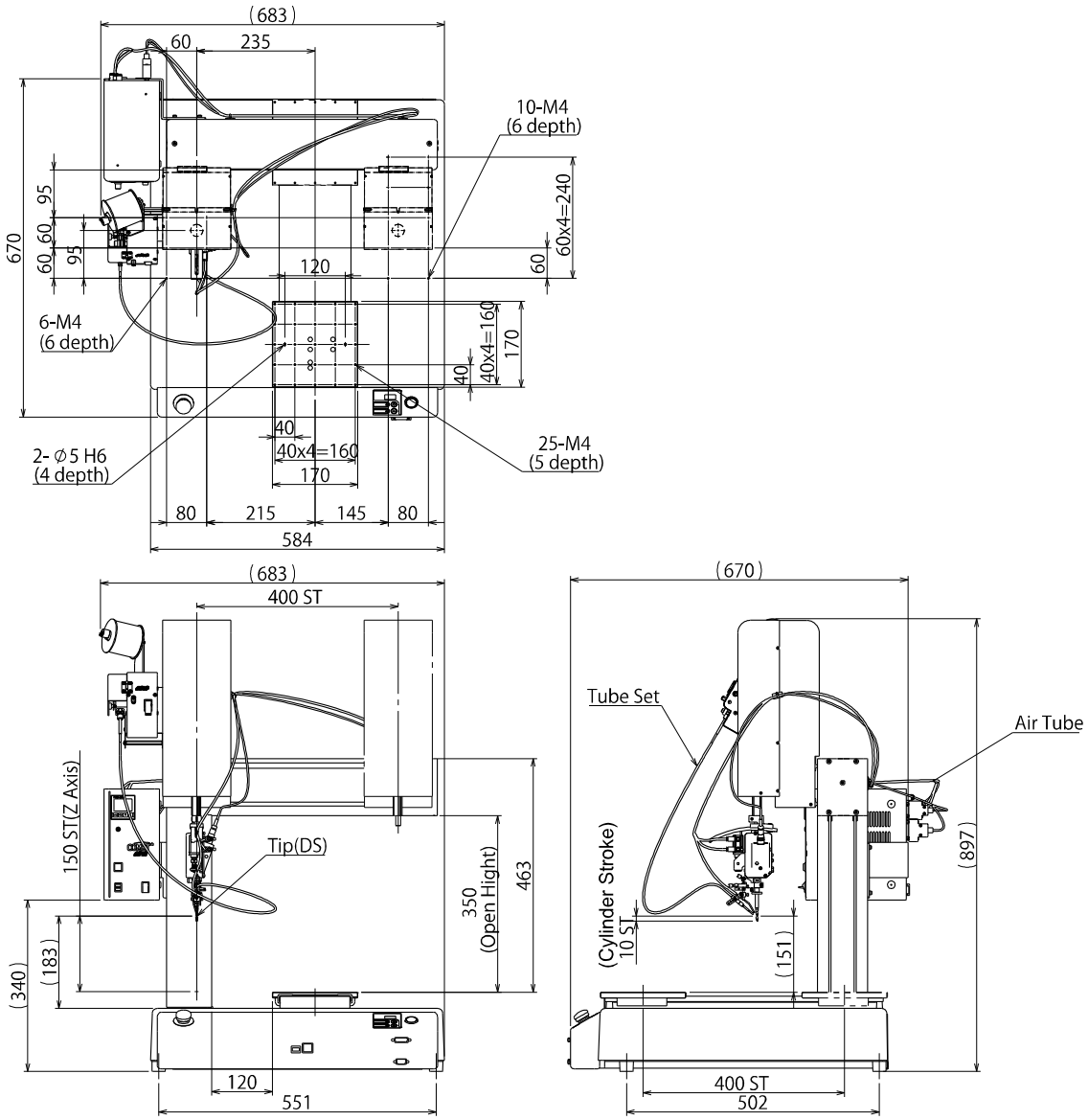
J-CAT330 COMET + RSP





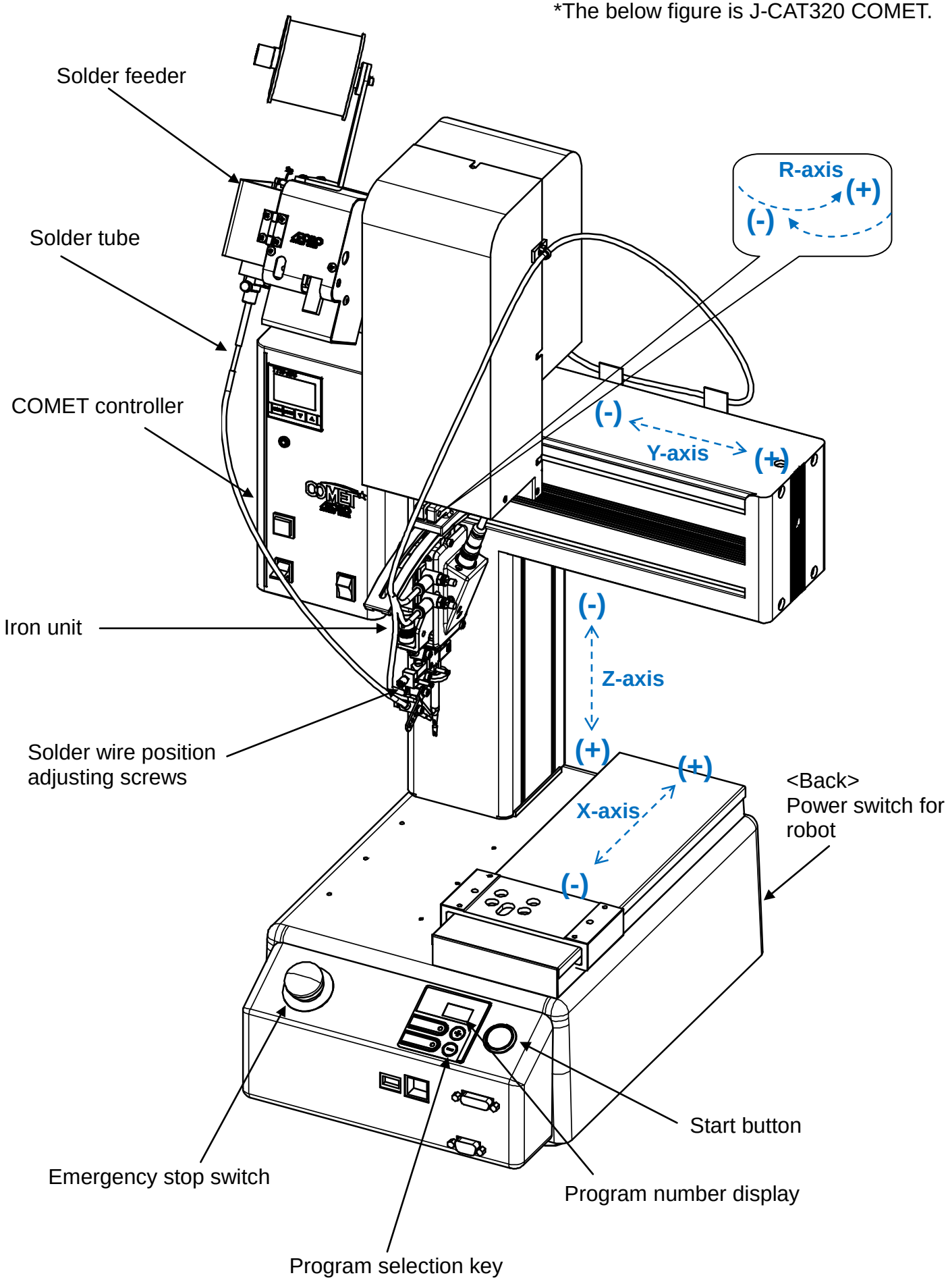


J-CAT340 COMET + RSP

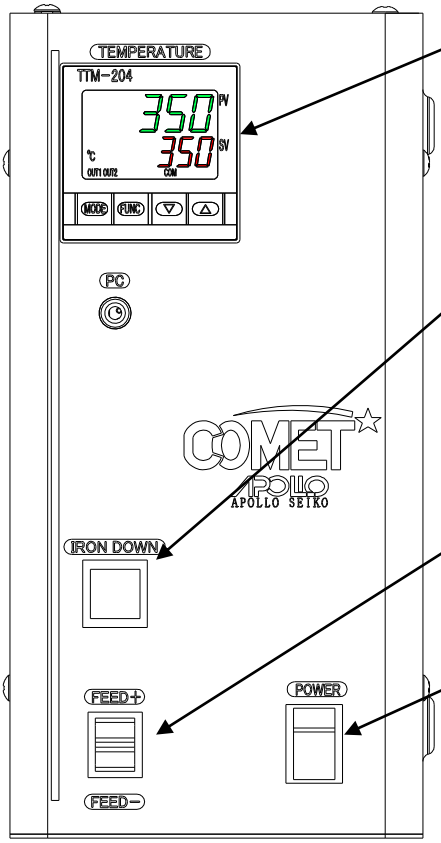


4. Description

*The below figure is J-CAT320 COMET.



Soldering Controller COMET Description



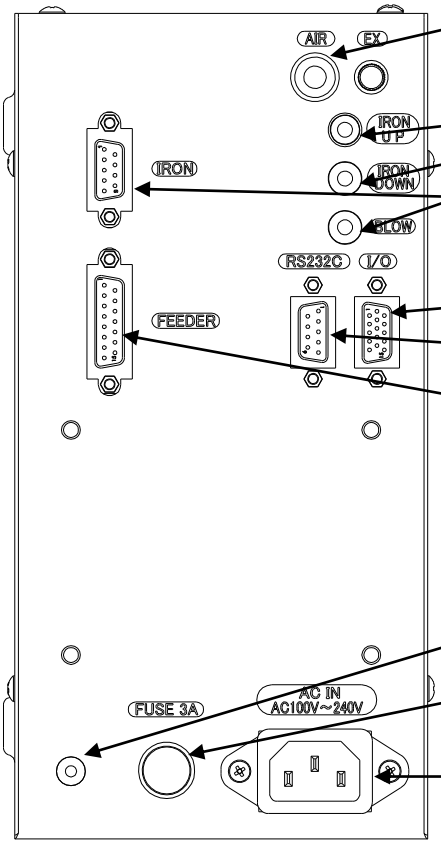
1. Temperature Controller:
   Displays the present and set iron temperature
   The temperature can be set by the buttons.
   Refer to “How to Set the Temperature Controller” page.

2. Iron Down Button
   Pressing this button will actuate the iron, holding it the down position.
   While teaching the soldering position, the position can be checked with this button
   .

3. Solder feed forward button
   Solder wire is forwarded while this button is pressed.

4. Power switch for COMET
   Temperature will be displayed on the temperature controller when the power turned on after a while.

COMET back



Air in（diameter 6mm）

Iron unit
Air OUT

Iron connector

I/O connector

RS232C Connector

Feeder cable connector

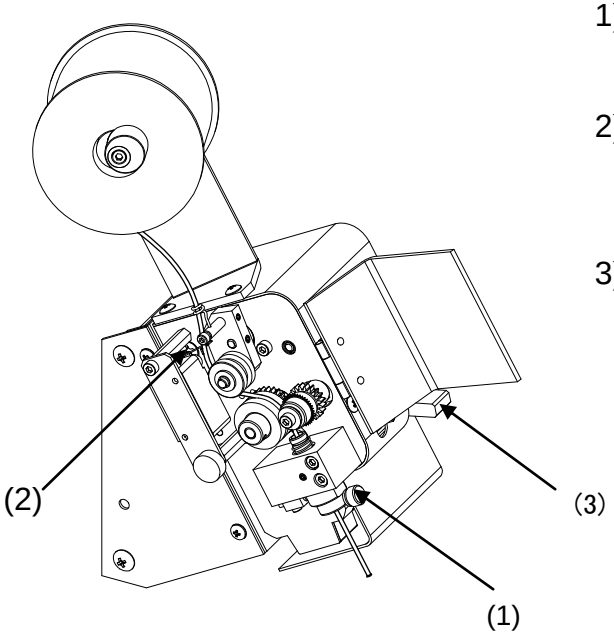
Earth connector

Fuse box　3A

Power inlet plug

5. Preparation

Set Solder Wire

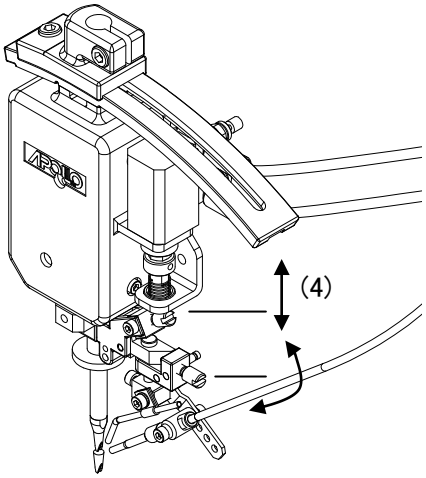


1) Remove the feed tube and pull solder wire through first. Then attach the solder tube.

2) Set the solder wire as per the diagram, and make sure to set solder wire on top of the solder shortage senseor arm.

3) If the release lever is upper position, the cutting blade/pinch roller will not feed the solder wire. When ready to feed the wire, put the leaver in the “down” position.

4.2 How to Adjust RSP Iron Unit

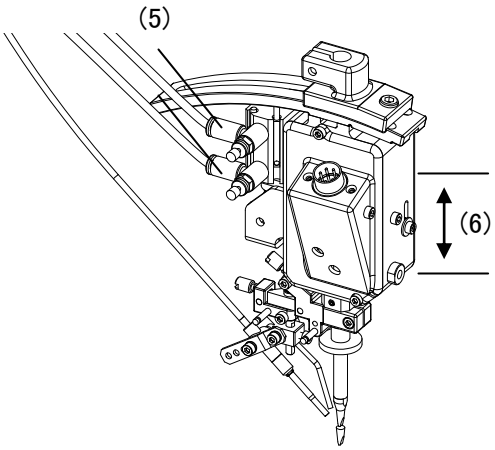


4) Solder wire feeding position can be adjusted.

Upper adjusting screw : Up/down direction
Lower adjusting screw : Left/right direction

5) Iron up down speed can be adjusted by turning screws after loosening the locking nut.

Upper black screw : Iron Up Speed
Lower white screw : Iron Down Speed



6) Second solder feeding position can be altered by moving this screw. Using this adjustment screw, solder can be prefed under the tip then fed into the joint with the iron down.

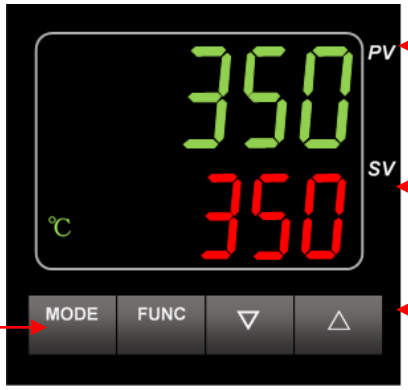
Lowering the screw position:

- Decreases the distance the Iron moves for second feed.

Rasing the screw position:

- Increases the distance the iron moves for second feed.

6. How to Set Temperature Controller



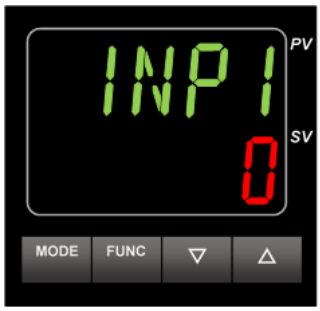
PV (Present temperature)

SV (Set temperature)

Parameter change
Refer to Flow chart.

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

Initial setting mode



4 sec.

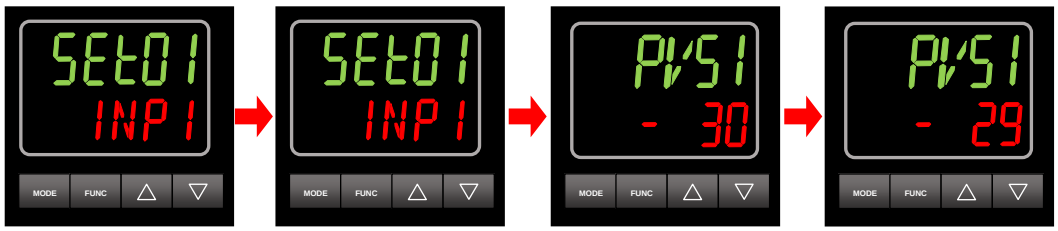
Operation screen

*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.

6.1 Parameter showing

	Description	Setting detail	Initial value
PVS1	PV calibration zero setting	Use ▲or▼key to change . -500~500 (℃)	-35
AT	Auto-tuning operation mode	Push ▲or▼key to turn on. “AT” is flashing during auto-tuning on the SV line. It finishes when oFF is displayed (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 . 0~500 (℃)	50
E2L	PV value alarm lower limit setting	Use ▲or▼key to change . 0~500 (℃)	50
PASS (flash)	Password setting	No need to set	—

<Temperature calibration PVS1> *Make sure to carry out after replacing iron



Press MODE for 4 sec.

Press MODE once.

Change value by ▽ △

Press MODE for 2 sec to return.

*For more higher accuracy, leave the soldering unit for 30 min. Then start temperature calibration.

<Auto tuning AT> *Make sure to carry out after replacing iron cartridge.

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 lower limit E2H>

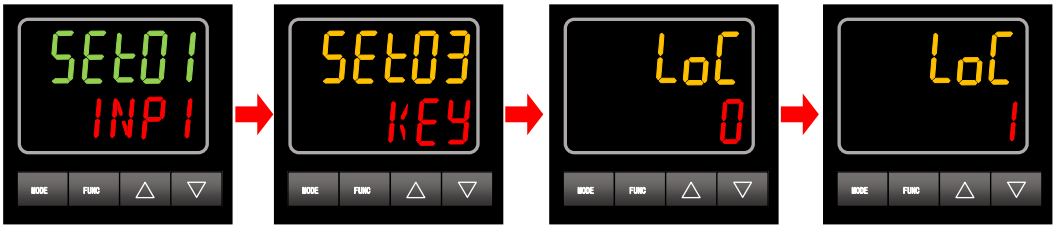
Press MODE for 4 sec. | Press △ until above screen appears. | Press MODE twice. | Change value by ▽ △ | Press MODE for 2 sec to return.

<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.

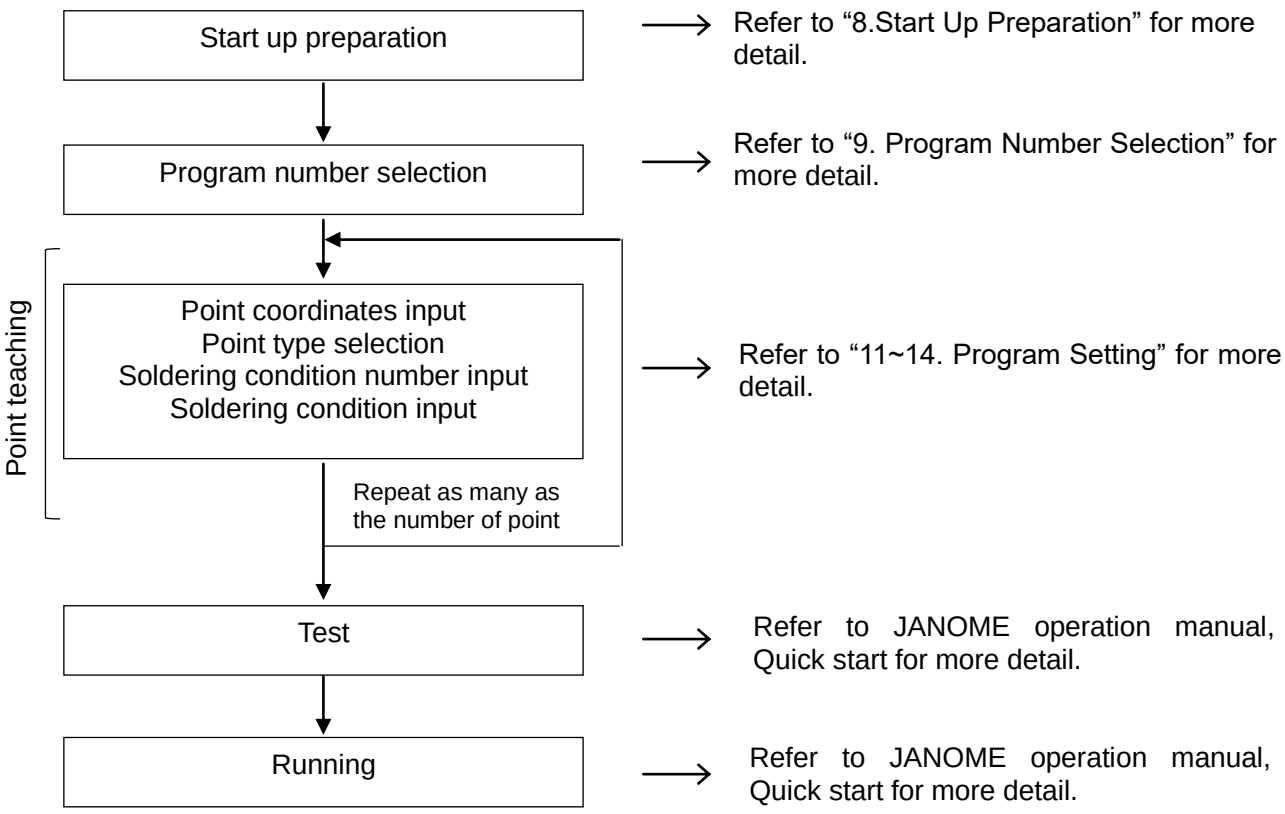
<Temperature lock function>



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.

7. Operation Process

This robot variously operates by program operation.
To operate the robot, creating program is firstly necessary.
Operating process is as follows:



“Teaching” means creating program and inputting any setting to the robot.

It is called “Teaching data” that is registered to the robot by “Teaching”.

8. Start Up Preparation

8.1 Returning to Home Position (Mechanical Initializing)

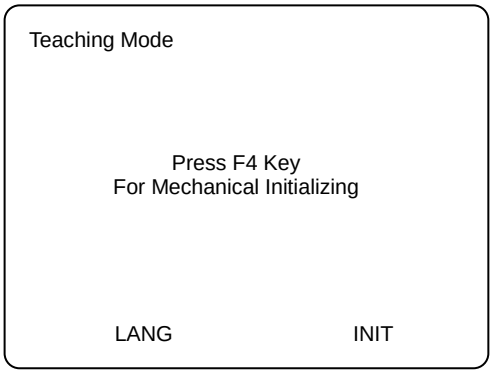
After turning on the power switches of COMET and the robot, proceed to home the machine (initializing) according to the display of the teaching pendant.

・Teaching Mode:
Initialized by F4 key on the teaching pendant

・Switch Run Mode:
Initialized by the start button on the robot

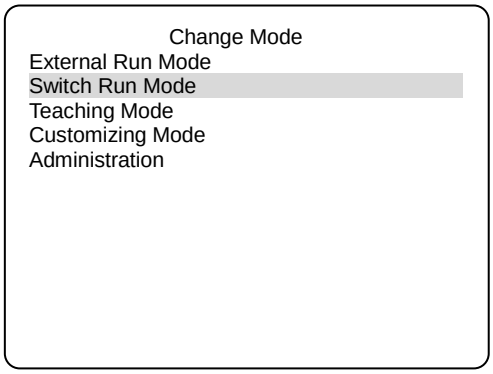
・External Run Mode:
Initialized by the external start.

Display Example of Teaching Mode



8.2 Mode Switching

By pressing MODE key, “Change Mode” display is shown on the teaching pendant.



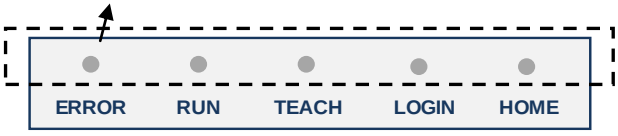
Select “Switch Run Mode” for running program.
Select “Teaching Mode” for Teaching.

Then press ENTER.

* In order to run program, make sure that LED of Start button is flashing.
  Then press Start button.

・External Run Mode…… To start running programs using a signal from the I/O SYS or COM1
・Switch Run Mode……To start running programs by pressing Start button on the robot
・Teaching Mode……To create programs
・Administration……. For administration and adjustment

LED lights on the teaching pendant indicate the current mode.

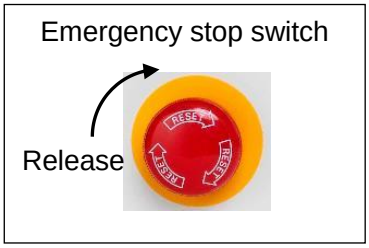


LED Names	LED Condition
ERROR	ON when an error has occurred.
RUN	ON during External Run Mode or Switch Run Mode.
TEACH	ON during Teaching Mode.
LOGIN	ON when in Customizing Mode and/or logged in.
HOME	ON when the homing operation and/or mechanical initialization is complete.

8.3 Emergency Stop

Use the emergency stop switch to stop the robot if any accident has occurred during operation. The motor's power (power to the motor) will be turned off and the robot will stop running by pressing this button.
Also during soldering, the soldering will be stopped and the iron tip will go up.

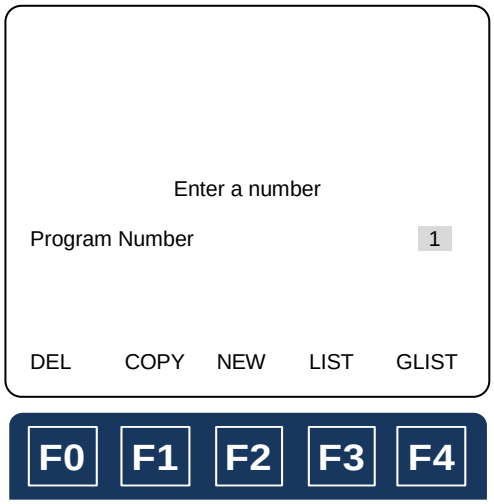
How to release the emergency stop:
Turn the depressed emergency stop switch clockwise.
Then initialize the robot according to the teaching pendant display.



9. Program Number Selection

When pressing PRO. NO key on the teaching pendant at Teaching mode, the following display is shown.

If there is no registered program, the following display simply appears by starting Teaching mode.



F0 DEL: Deletes program.

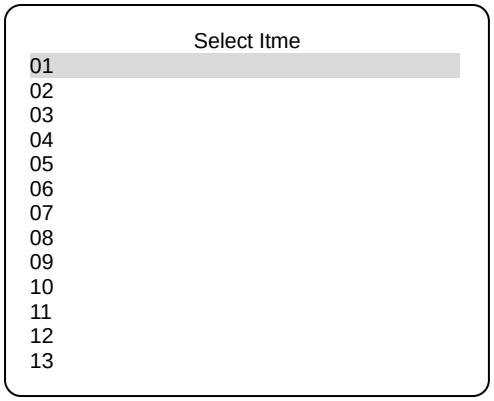
F1 COPY: Copies program number.

F2 NEW: Displays the list of unset program number.

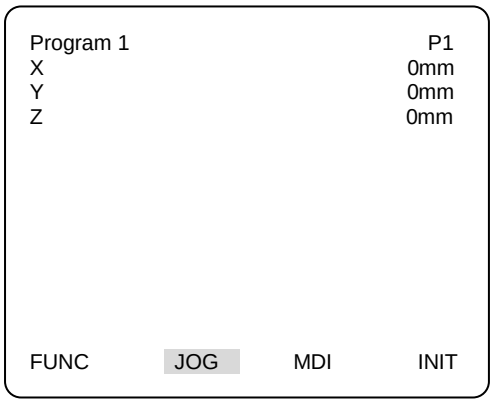
F3 LIST: Displays the list of set program number.

F4 GLIST: Shows the programmed teaching point on the sreen.

For setting the new program number, press **F2** in order to display the unset program number list.



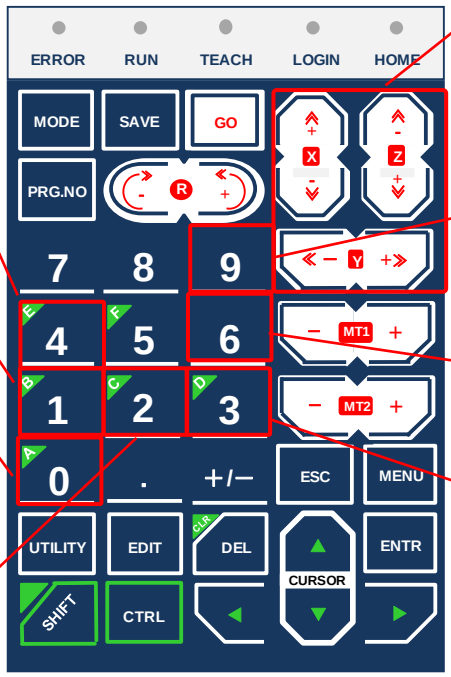
Select the setting program number by CURSOR key, then press ENTER to register.



Point 1 (P1) screen of the selected program number appears.

10. Teaching Pendant Basic Key Operation

■ In the Teaching Mode



By pressing and holding, air-blowing

By pressing once, Iron goes down.

By pressing and holding, Iron goes down and stays at lower position.

By pressing once, Iron goes up.

JOG Keys
Used to move 4-axis in the JOG Mode*1.

One Touch Feed Length
Refer to Soldering System Setting page.

By pressing and holding, solder wire is fed in reverse.

By pressing and holding, solder wire is fed.

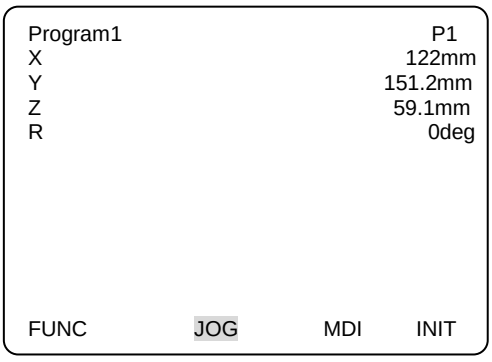
Soldering is operated with the iron staying at the lower position.
While teaching the soldering position, check the position with the iron down key “1” or “0”.

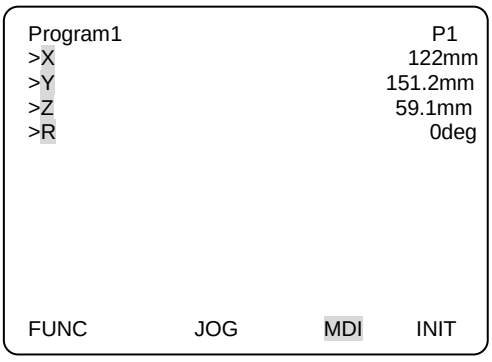
■ At the setting screen that displays the programmed coordinate

: Used to switch the screen to previous / next screen.
GO : The axes move to the coordinate value of the displayed current screen.
F4 : The axes move to the coordinate value of the displayed current screen and operates the programmed point job.
SHIFT + GO : Used to move the axes to the home position.

JOG Mode *1
In the JOG Mode, move the arms to the setting position by JOG keys.

MDI Mode
In the MDI Mode, enter the setting coordinate value by the numeric keys. The arms does not move in the MDI Mode.



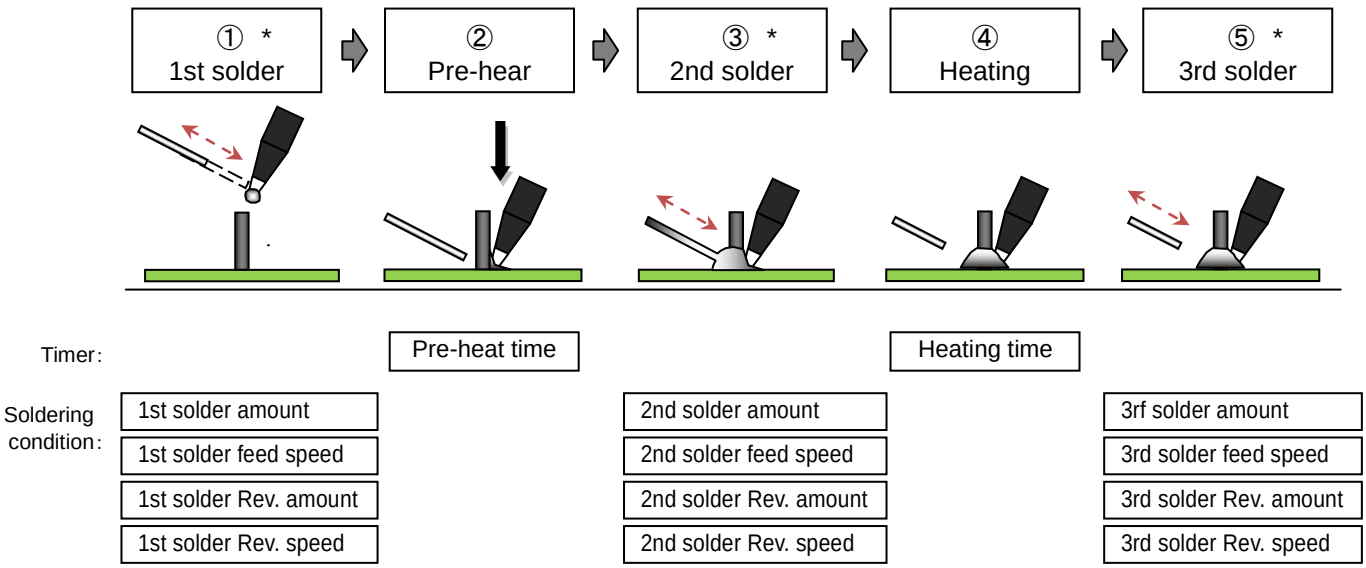


By F2 and F3 keys, the mode can be switched between JOG and MDI Mode

11. Point Soldering Program Setting

11.1 Point Soldering Flow

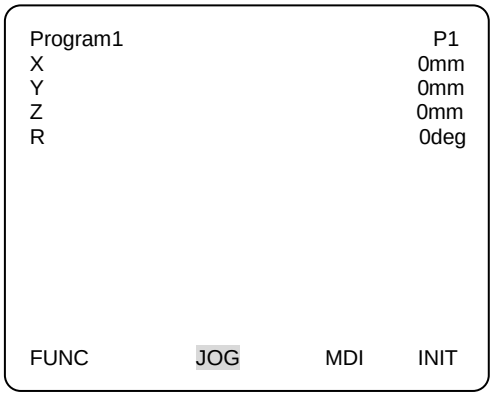
The flow of point soldering as follows:



*When the soldering feed/ Rev.amount is “0”, it is jumped to next soldering condition.

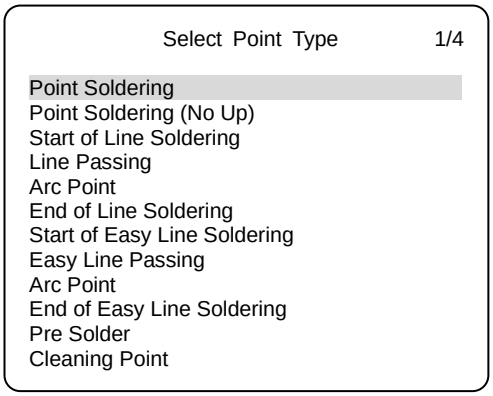
Name	Description
1st solder amount / feed speed	Set 1st solder amount and feed speed. With the iron tip being up, the solder wire feeds to the iron tip. By feeding a few solder wire to the iron tip, the heat can quickly transfer to the joint area. The setting value depends on the joint/ substrate and the type of iron tip.
1st solder Rev. amount / Rev. speed.	Set the amount and speed to retract the solder wire after 1st solder feeding. The purpose of the 1st solder Rev. is to prevent the solder wire from melting by the heat of iron tip. Also the next solder amount can accurately feed by retracting the solder wire.
Pre-heat time	Set the time that the iron tip goes down and heats the joint/ substrate. Pre-heat time depends on the size of joint/ substrate.
2nd solder amount / speed	Set 2nd solder amount and feed speed that the joint requires. Although 2nd solder amount depends on the joint, 1st solder Rev. amount also needs to be considered.
2nd solder Rev. amount / Rev. speed	Set the amount and speed to retract the solder wire after 2nd solder. In the same way as 1st solder Rev, the next solder amount can accurately feed by retracting the solder wire.
Heating time	It is the heating time after 2nd solder is finished. This heating time allows solder for proper wetting and flow.
3rd solder amount / feed speed	If necessary, set 3rd solder amount and feed speed to add flux and prevent “icicling.” When the heating time is long after 2nd solder, the flux does not activate and the solder becomes “icicling.”
3rd solder Rev. amount / feed speed	As with 2nd solder Rev, it is the amount and speed to retract the solder wire after 3rd soldering.

11.2 Point Soldering Teaching



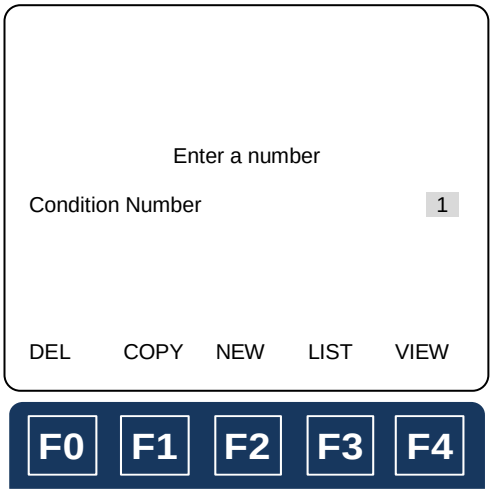
Using JOG key to move iron cartridge until “Point Soldering” point.

Press ENTER.



Select the type “Point Soldering” by CURSOR 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.

F0 DEL: Deletes soldering condition.

F1 COPY: Copies soldering condition.

F2 NEW: Displays the list of unset soldering condition number.

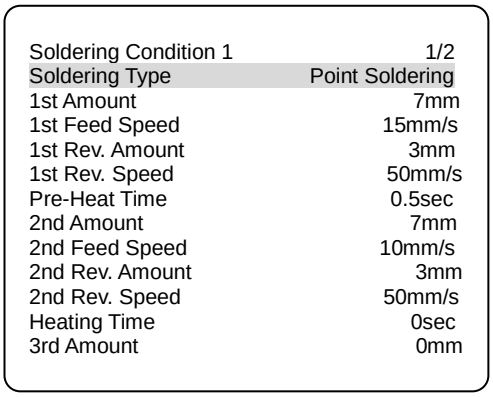
F3 LIST: Displays the list of set soldering condition number.

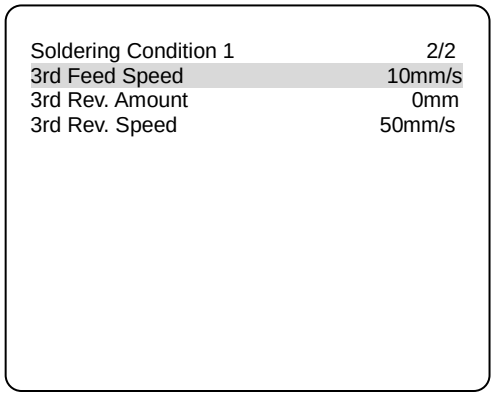
F4 VIEW: Shows the soldering condition of the displayed number.
*Refer to the next page.
*If the solderting condition is not set, initial value is displayed.

* The programmed solderting condition number can be used in the other point soldering program.

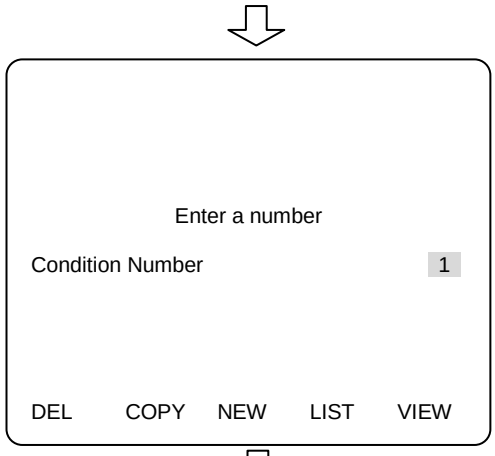
Point Solderting Condition Entry Screen

When you press F4 VIEW when entering Soldering condition number, the following Soldering condition entry screen appears.
Select the each condition that is necessary to the point where you did Teaching by CURSOR key, then press ENTER → Input value → ENTER for register.

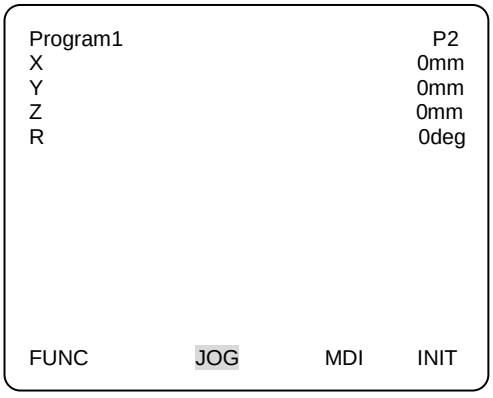




After entering necessary value, the screen returns to Soldering condition number entry screen by ESC key.



Press ENTER.



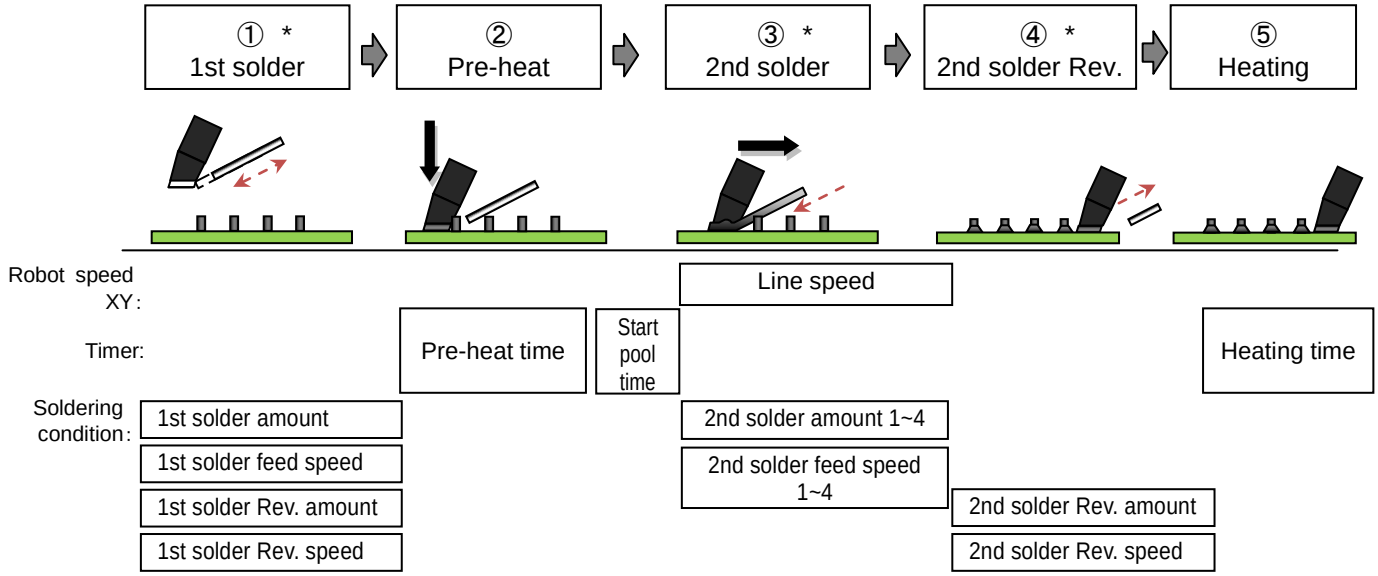
"Point soldering" point has been registered and the next point screen is displayed.

*Soldering condition can be also enterd in "Soldering condition" by pressing MENU key at Teaching mode.

12. Slide Soldering Program Setting

12.1 Slide (Line) Soldering Flow

The flow of slide soldering as follows:



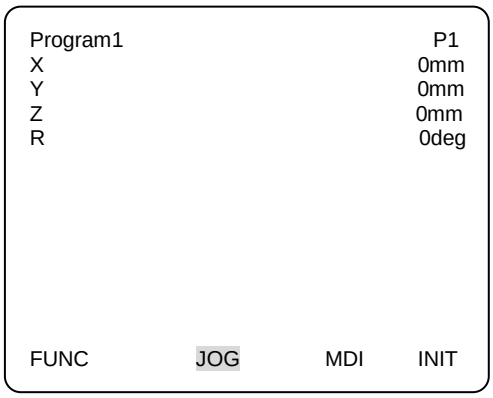
*When the soldering feed/ Rev. amount is “0”, it is jumped to next soldering condition.

Name	Description
1st solder amount / feed speed	Set 1st solder amount and feed speed. With the iron tip being up, the solder wire feeds to the iron tip. By feeding a few solder wire to the iron tip, the heat can quickly transfer to the joint area. The setting value depends on the joint / substrate and the type of iron tip.
1st solder Rev. amount / Rev. speed	Set the amount and speed to retract the solder wire after 1st solder feeding. The purpose of the 1st solder Rev. is to prevent the solder wire from melting by the heat of iron tip. Also the next solder amount can accurately feed by retracting the solder wire.
Pre-heat time	Set the time that the iron tip goes down and heats the joint / substrate. Pre-heat time depends on the size of joint/ substrate.
Start pool time	It is the solder pooling time before sliding start. The sliding starts after the set pool time.
2nd solder amount 1 / speed 1	Set 2nd solder amount and feed speed that the joint requires. Although 2nd solder amount depends on the joint, 1st solder Rev. amount also needs to be considered.
2nd solder amount 2 / speed 2	It is possible to change the soldering amount and feeding speed up to three times. This is a useful function to solder various pin size. If the solder amount is not enough at 2nd solder amount 1, increase the amount from 2nd solder amount 2 on. If unnecessary, set the amount “0” from 2nd solder amount 2 on.
2nd solder amount 3 / speed 3	
2nd solder amount 4 / speed 4	
2nd solder Rev. amount / Rev. speed	Set the amount and speed to retract the solder wire after 2nd solder. In the same way as 1st solder Rev. the next solder amount can accurately feed by retracting the solder wire.
Heating time	It is the heating time after slide finishing. It depends on the size of joint / substrate.

12.2 Slide (Line) Soldering Teaching

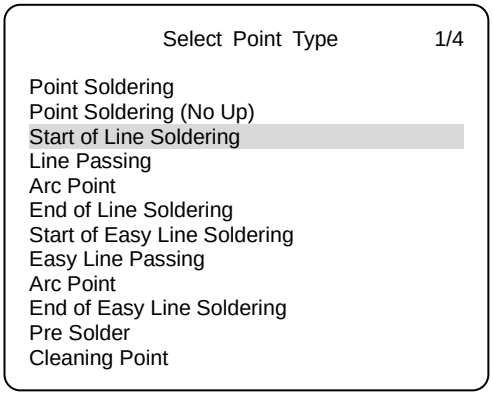
Slide soldering program requires both starting point and end point.

Start of Line Soldering



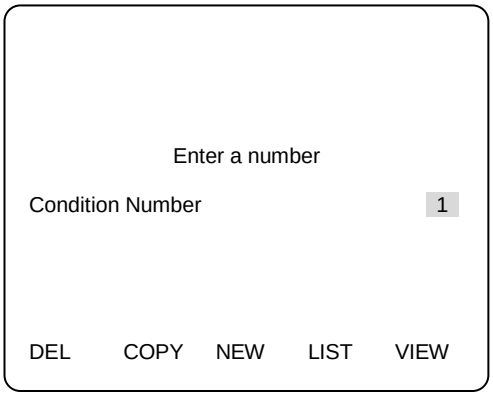
Using JOG key to move iron cartridge until “Start of Line Soldering” point.

Press ENTER.



Select the type “Start of Line Soldering” by CURSOR 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.

F0 DEL: Deletes soldering condition.

F1 COPY: Copies soldering condition.

F2 NEW: Displays the list of unset soldering condition number.

F3 LIST: Displays the list of set soldering condition number.

F4 VIEW: to check the soldering condition of the displayed number.
*Refer to the next page.
*If the solderting condition is not set, initial value is displayed.

* The set solderting condition number can be used in the other slide soldering program.

Slide Solderting Condition Entry Screen

When you press F4 VIEW when entering Soldering condition number, the following Soldering condition entry display appears.
Select the each condition that is necessary to the point where you did Teaching by CURSOR key, then press ENTER → Input value → ENTER for register.

Soldering Condition 1	1/2
Soldering Type	Line Soldering
1st Amount	7mm
1st Feed Speed	15mm/s
1st Rev. Amount	3mm
1st Rev. Speed	50mm/s
Pre-Heat Time	0.5sec
2nd Amount 1	10mm
2nd Feed Speed 1	15mm/s
2nd Amount 2	0mm
2nd Feed Speed 2	15mm/s
2nd Amount 3	0mm
2nd Feed Speed 3	15mm/s

Soldering Condition 1	2/2
2nd Amount 4	0mm
2nd Feed Speed 4	15mm/s
Start Pool Time	0sec
2nd Rev. Amount	3mm
2nd Rev. Speed	50mm/s
Heating Time	0sec

After entering necessary value, the screen returns to Soldering condition number input screen by ESC key.

Enter a number

Condition Number 1

DEL COPY NEW LIST VIEW

Press ENTER.

Enter a number

Line Speed 10 mm/s

Enter the line speed and press ENTER.

***Slide soldering requires to synchronize the axis moving and solder feed speed.**
Calculating formula:

$$\text{Absolute distance between 2 points} \frac{(\text{End of slide soldering coordinate} - \text{Star of slide soldering coordinate})}{\text{Line Speed}} = \frac{\text{2nd solder feed amount}}{\text{2nd solder feed speed}}$$

Right side and left side need to be same value.

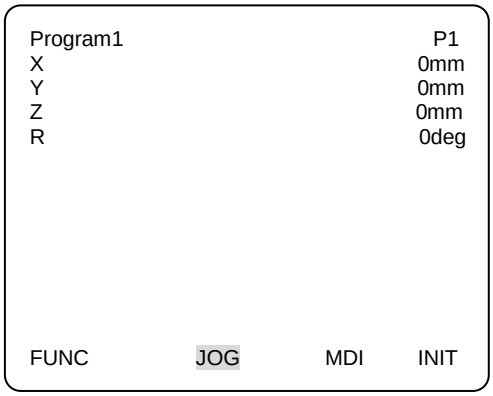
Program1	P2
X	0mm
Y	0mm
Z	0mm
R	0deg

FUNC JOG MDI INIT

"Start of Line Soldering" point has been registered and the next point screen is displayed.

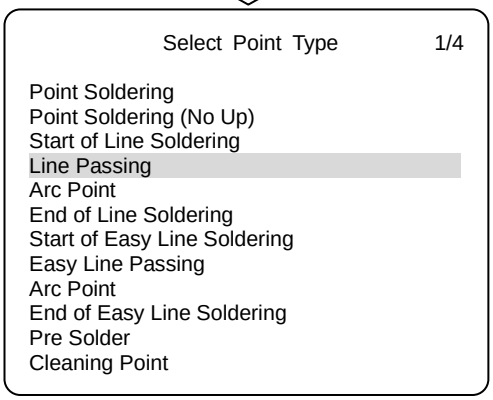
*Soldering condition can be also entered in "Soldering condition" by pressing MENU key at Teaching mode.

Line Passing of Slide Soldering



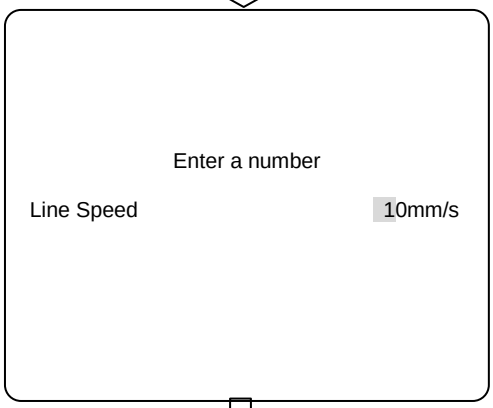
Using JOG key to move iron cartridge until “Line Passing” point.

Press ENTER.



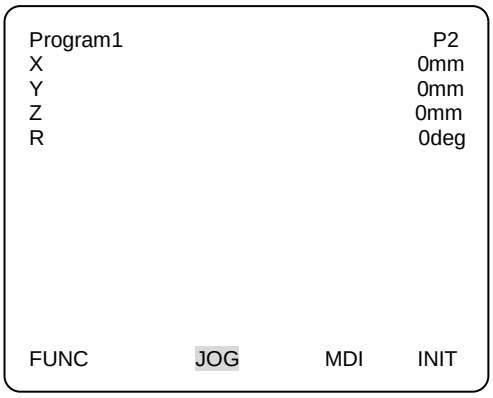
Select the type “Line Passing” by CURSOR key.

Press ENTER.



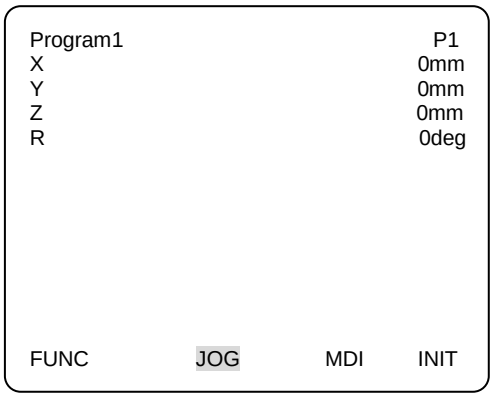
Enter Line speed.

Press ENTER.



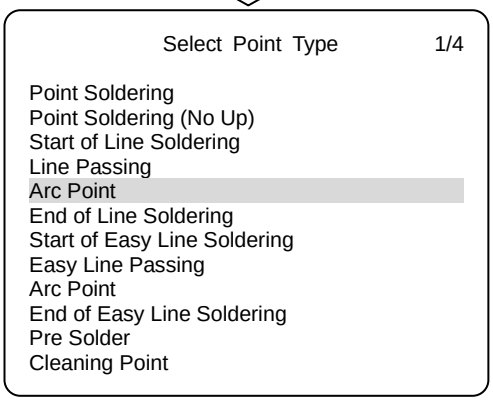
“Line Passing” point has been registered and the next point screen is displayed.

Arc Point of Slide Soldering



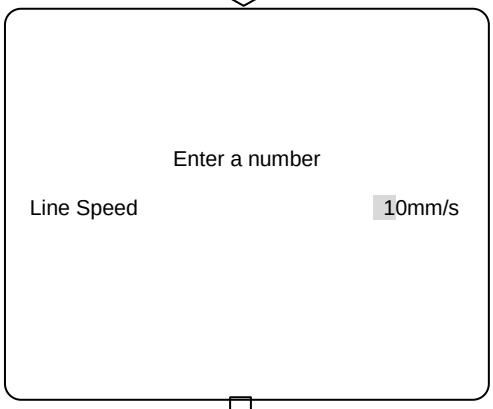
Using JOG key to move iron cartridge until “Arc Point.”

Press ENTER.



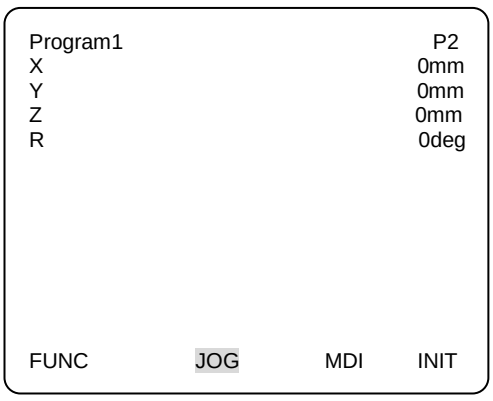
Select the type “Arc Point” by CURSOR key.

Press ENTER.



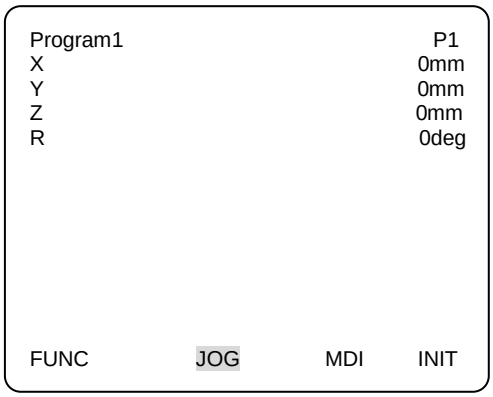
Enter Line speed.

Press ENTER.



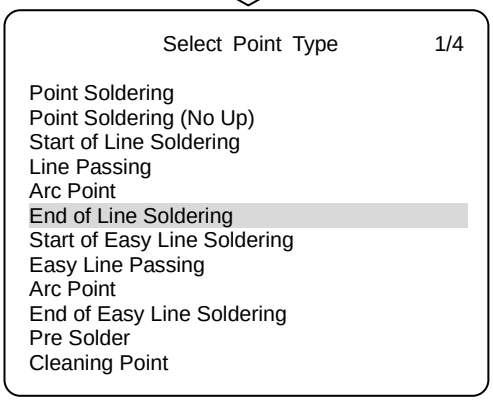
“Arc point” point has been registered and the next point screen is displayed.

End of Slide Soldering



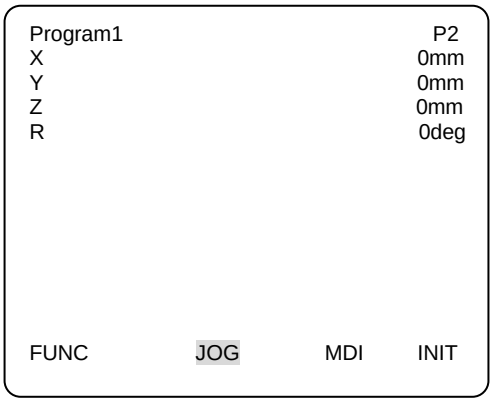
Using JOG key to move iron cartridge until “End of Line Soldering” point.

Press ENTER.



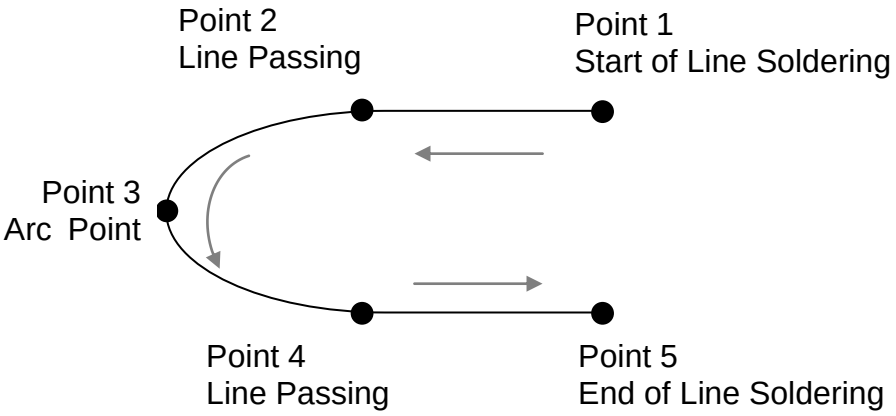
Select the type “End of Line Soldering” by CURSOR key.

Press ENTER.



“End of Line Soldering” point has been registered and the next point screen is displayed.

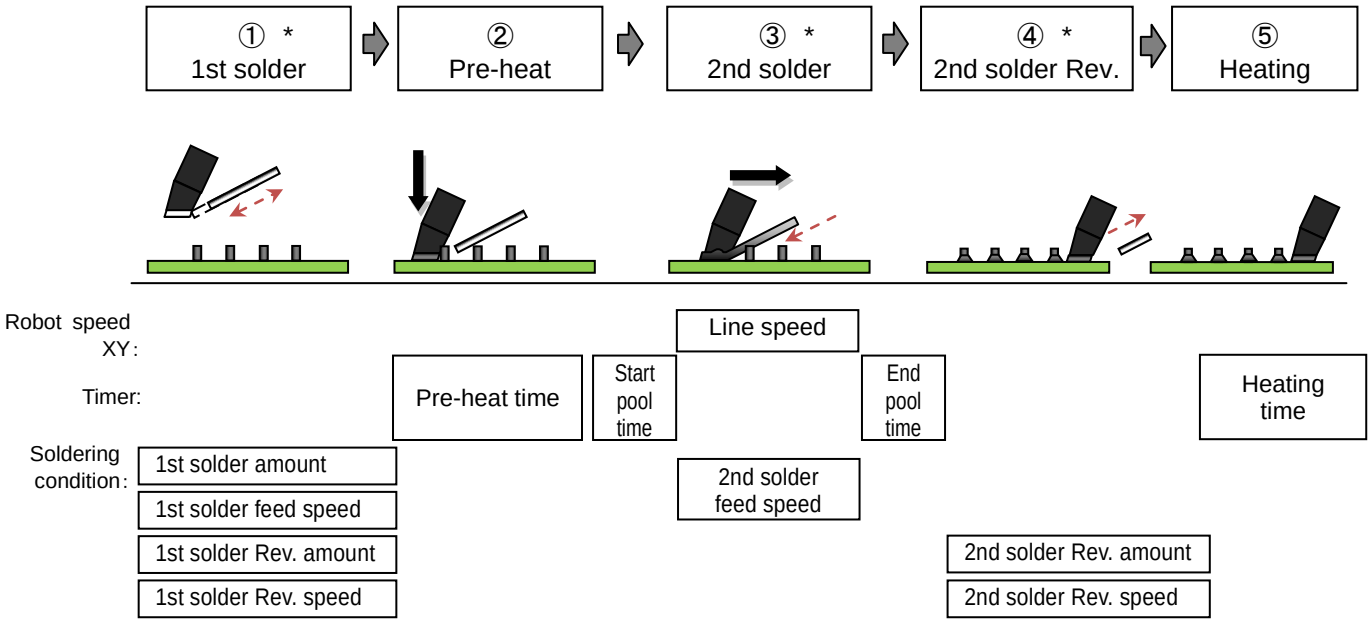
[Slide soldering Teaching example]



13. Easy Slide Soldering Program Setting

13.1 Easy Slide (Line) Soldering flow

The flow of easy slide soldering as follows:



*When the soldering feed/ Rev. amount is “0”, it is jumped to next soldering condition.

Name	Description
1st solder amount / feed speed	Set 1st solder amount and feed speed. With the iron tip being up, the solder wire feeds to the iron tip. By feeding a few solder wire to the iron tip, the heat can quickly transfer to the joint area. The setting value depends on the joint / substrate and the type of iron tip.
1st solder Rev. amount / Rev. speed	Set the amount and speed to retract the solder wire after 1st solder feeding. The purpose of the 1st solder Rev. is to prevent the solder wire from melting by the heat of iron tip. Also the next solder amount can accurately feed by retracting the solder wire.
Pre-heat time	Set the time that the iron tip goes down and heats the joint substrate. Pre-heat time depends on the size of joint/ substrate.
Start pool time	It is the solder pooling time before sliding start. The sliding stats after the set pool time.
2nd solder feed speed	Set 2nd solder feed speed that the joint requires. The feeding amount is decided by 2nd solder feed speed and the time that the iron tip moves from the start point of Easy Line Soldering to the end point. Although 2nd solder amount depends on the joint, 1st solder Rev. amount also needs to be considered.
End pool time	It is the solder pooling time after slide finishing.
2nd solder Rev. amount / Rev. speed	Set the amount and speed to retract the solder wire after 2nd solder. In the same way of 1st solder Rev, the next solder amount can accurately feed by retracting the solder wire.
Heating time	It is the heating time after solder feeding and slide finishing. It depends on the size of joint / substrate.

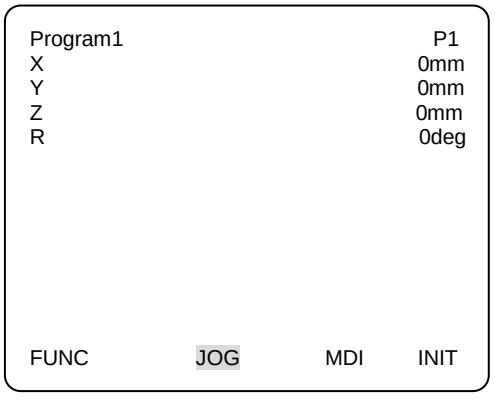
13.2 Easy Line Soldering Teaching

Refer to 12.2 Slide (Line) Soldering Teaching and follow the same procedure.

14. The Other Program Setting

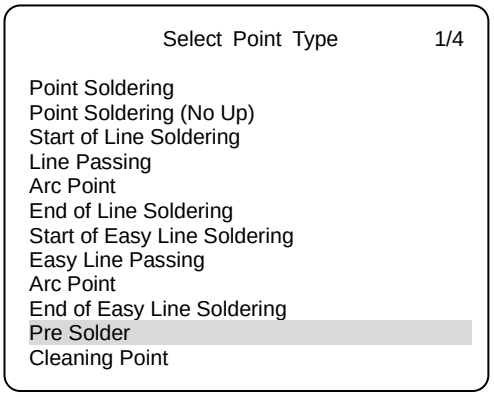
14.1 Pre Solder

It can be used at solder feeding before cleaning iron cartridge or after the cycle ends.



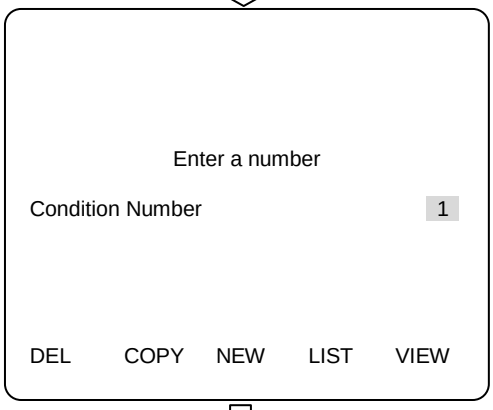
Using JOG key to move iron cartridge until “Pre Solder” point.

Press ENTER.



Select the type “Pre Solder” by CURSOR key.

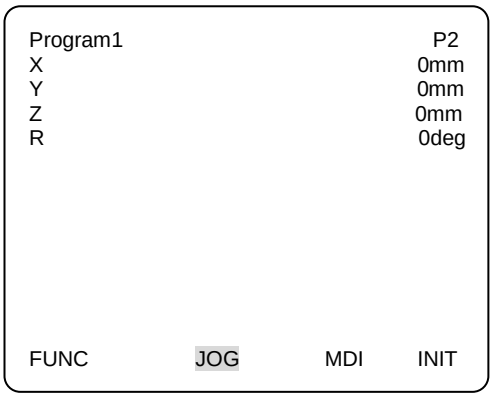
Press ENTER.



Enter condition number 1-100.

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

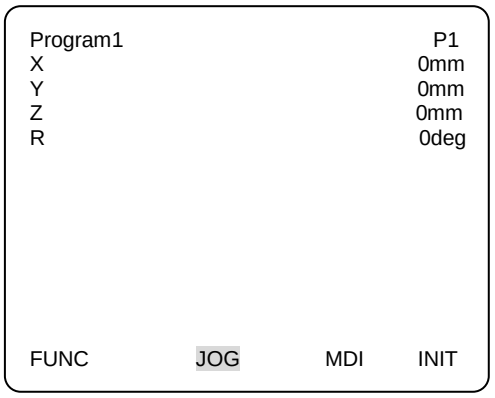
Press ENTER.



“Pre Solder” point has been registered and the next point screen is displayed.

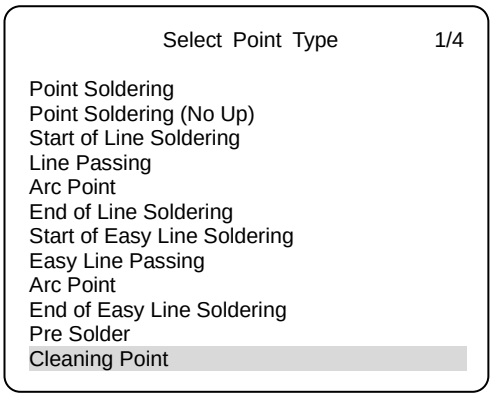
14.2 Cleaning Point

This program is used for air blowing at cleaning iron cartridge.



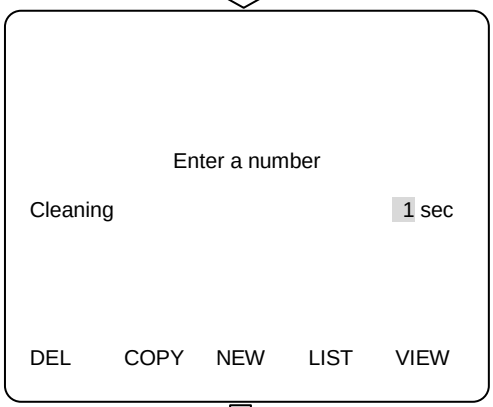
Using JOG key to move iron cartridge until “Cleaning point” (Air blow).

Press ENTER.



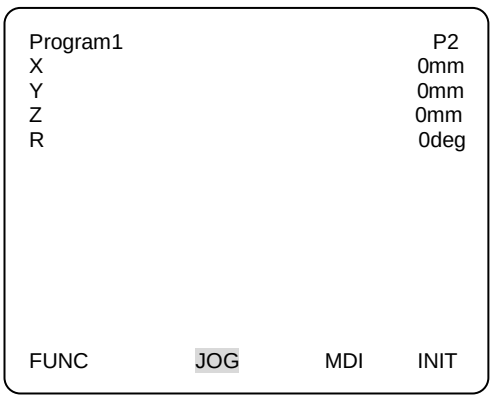
Select the type “Cleaning Point” by CURSOR key.

Press ENTER.



Enter the air blowing time.

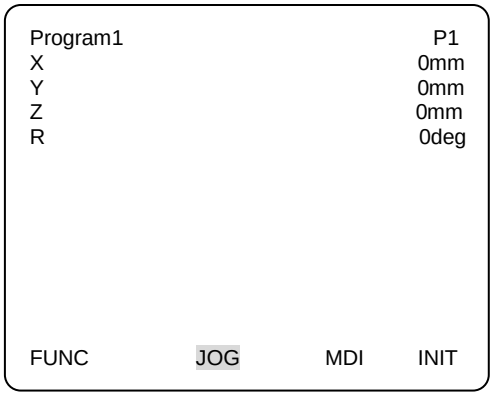
Press ENTER.



“Cleaning Point” has been registered and the next point screen is displayed.

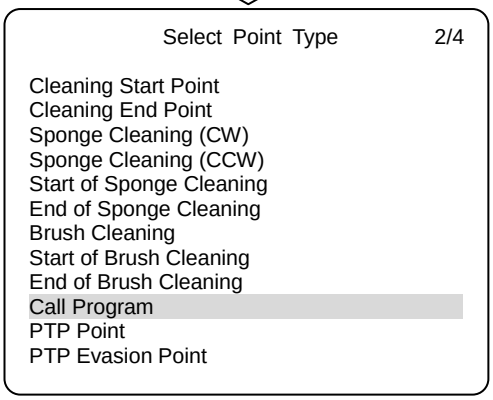
14.3 Call Program

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



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

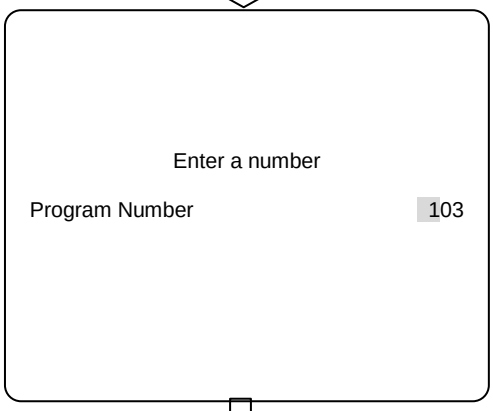
Press ENTER.



Select the type “Call Program” by CURSOR key.

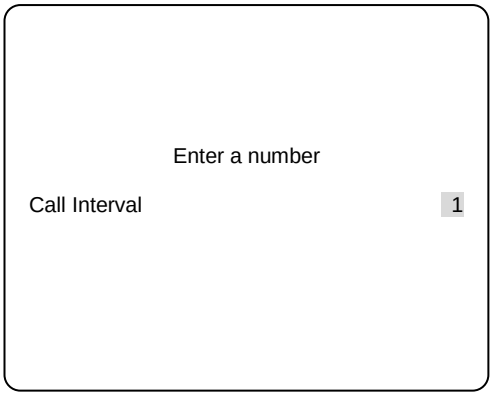
*Page 2 is displayed by SHIFT + ↓ key.

Press ENTER.



Enter the desired program number.

Press ENTER.



Enter the interval number. (Initial value: 1)

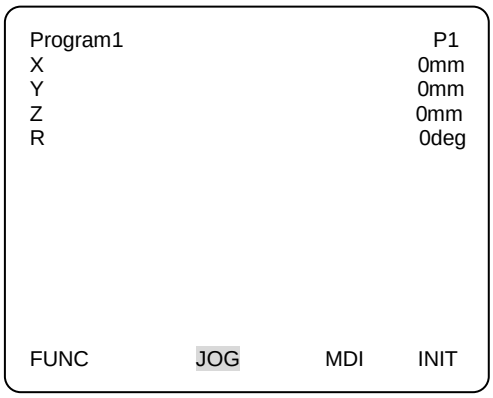
Press ENTER.

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.

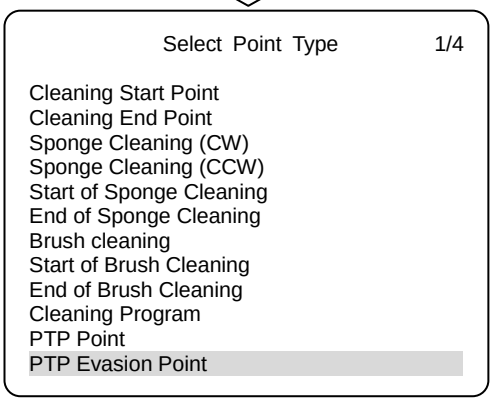
14.4 PTP Evasion Point

It can be used in order to evade such as obstacle on the moving line of iron cartridge.
Iron cartridge always moves the shortest distance between the coordinates.
Set more than one PTP evasion point, if necessary.



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

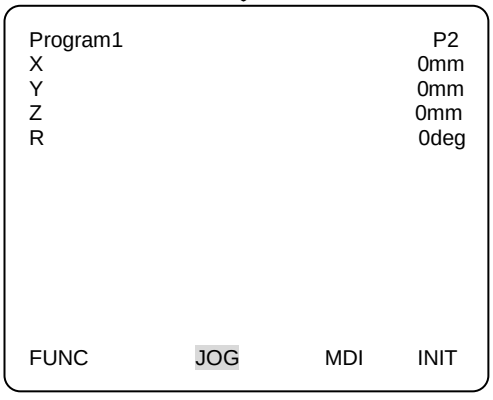
Press [ENTER].



Select the type “PTP Evasion Point” by [CURSOR] key.

*Page 2 is displayed by [SHIFT]+ [↓] key.

Press [ENTER].



“PTP Evasion Point” has been registered and the next point screen is displayed.

15. Point Type List

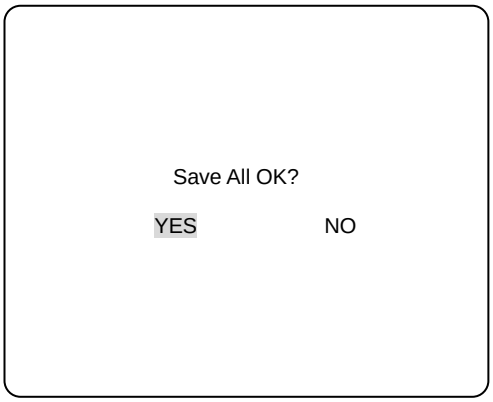
Point Type	Base Type	Job Settings	Description
Point Soldering	PTP Point	Point Job	After moving to the teaching point, Point Soldering is executed with the programmed soldering condition.
Point Soldering (No Up)	PTP Point	Point Job	After moving to the teaching point, Point Soldering is executed with the programmed soldering condition. The air cylinder is not retracted. (Iron cartridge is not raised.)
Start of Line Soldering	CP Start Point	Point Job	After moving to the teaching point, Line Soldering starts with the programmed soldering condition and speed.
Line Passing	CP Passing Point	—	
Arc Point	CP Arc Point	—	
End of Line Soldering	CP End Point		After moving to the teaching point by CP drive, soldering is executed with the programmed remaining soldering condition.
Start of Easy Line Soldering	CP Start Point	Point Job	After moving to the teaching point, Line Soldering starts with the programmed soldering condition and line speed. (This condition is different from the Start of Line Soldering condition.)
Easy Line Passing	CP Passing Point	—	
Arc Point	CP Arc Point	—	
End of Easy Line Soldering	CP End Point		After moving to the teaching point by CP drive, soldering is executed with the programmed remaining soldering condition.
Pre Solder	PTP Point	Point Job	Same as the Point Soldering. The iron does not go up / down,
Cleaning Point	PTP Point	Point Job	After moving to the teaching point, air-blow is executed with the programmed time.
Cleaning Start Point	CP Start Point	Point Job	Same function as CP Start Point.
Cleaning End Point	CP End Point	—	Same function as CP End Point.
Sponge Cleaning (CW)	PTP Point	Before Moving Point Job	For the Sponge Roller Cleaner SRC-500DC. The sponges start rotating clockwise before axes moving. Then the axes moves to the teaching point. The sponges stop rotating after the programmed time.
Sponge cleaning (CCW)	PTP Point	Before Moving Point Job	For the Sponge Roller Cleaner SRC-500DC. The sponges start rotating counterclockwise before axes moving. Then the axes moves to the teaching point. The sponge rotation stops after the programmed time.
Start of Sponge Cleaning	CP Start Point	Before Moving Point Job	For the Sponge Roller Cleaner SRC-500DC. The sponge starts rotating clockwise. Then the axes move to the teaching point. After the programmed time, CP drive starts with the programmed speed.

Point Type	Base Type	Job Settings	Description
End of Sponge Cleaning	CP End Point	Point Job	For the Sponge Roller Cleaner SRC-500DC. The axes move by CP drive. After reaching to the teaching point, the sponge rotation stops.
Brush Cleaning	PTP Point	Point Job	For the Brush Cleaner BRC-3000. The brushes starts rotating clockwise. Then the axes move to the teaching point. The brush rotation stops after the programmed time.
Start of Brush Cleaning	CP Start Point	Before Moving Point Job	For the Brush Roller Cleaner BRC-3000. The brushes start rotating clockwise. Then the axes move to the teaching point. After the programmed time, CP drive starts with the programmed speed.
End of Brush Cleaning	CP End Point	Point Job	For the Brush Roller Cleaner BRC-3000. The axes move by CP drive. After reaching to the teaching point, the sponge rotation stops.
Call Program	PTP Point	Point Job	Calls the specified program by the programmed cycle.
PTP Point		Point Job	General driving point
PTP Evasion Point			Used to evade the obstacle.
Wait Start Point	PTP Drive	Point Job	After moving to the teaching point, the robot waits the start button is pushed.
Standby Point on Error	PTP Drive	Point Job	
CP Start Point			General CP drive point
CP Passing Point			General CP passing point
CP Stop Point			General CP stop point
CP Arc Point			General CP arc point
CP End Point			General CP end point
Circle Start Point			
Circle Center Point			
Iron Basic Value (X)	PTP Point	Point Job	For F71RH (Tip Position Calibration Unit) X axis moves (max. 10mm) to + direction from the teaching point until the sensor reacts.
Iron Basic Value (Y)	PTP Point	Point Job	For F71RH (Tip Position Calibration Unit) Y axis moves (max. 10mm) to + direction from the teaching point until the sensor reacts.
Iron Basic Value (Z)	PTP Point	Point Job	For F71RH (Tip Position Calibration Unit) Z axis moves (max. 10mm) to + direction from the teaching point until the sensor reacts.
Iron Adj. Value (X)	PTP Point	Point Job	For F71RH (Tip Position Calibration Unit) X axis moves (max. 10mm) to + direction from the teaching point until the sensor reacts.
Iron Adj. Value (Y)	PTP Point	Point Job	For F71RH (Tip Position Calibration Unit) Y axis moves (max. 10mm) to + direction from the teaching point until the sensor reacts.
Iron Adj. Value (Z)	PTP Point	Point Job	For F71RH (Tip Position Calibration Unit) Z axis moves (max. 10mm) to + direction from the teaching point until the sensor reacts.

16. How to Save The Teaching Data

Press SAVE key for saving data. You can also save the data when switching the mode.

Pressing SAVE key, the following screen appears. Then select “Yes.”



Teaching data is temporarily saved in the robot, however if you turn off the power, the data is deleted.
Make sure to save the data whenever you create or edit teaching data.

16.1 Note for JR C-Points (PC Soft)

Before using “JR C-Points,” save the programmed data at first then send a new data,
If not, the data may be deleted.

If the updated data is sent to the robot from PC, the current data in the robot is deleted.

17. Initial Value and Adjustable Range of Soldering Condition

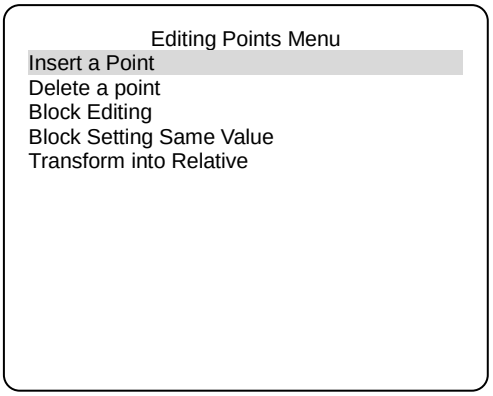
Condition		Initial setting	Adjustable range
Point soldering	1st Amount	7.0mm	0-99.9mm
	1st Feed Speed	15.0mm/s	1-50.0mm/s
	1st Rev. Amount	3.0mm	0-99.9mm
	1st Rev. Speed	50.0mm/s	1-50.0mm/s
	Pre-Heat Time	0.5sec	0-9.9sec
	2nd Amount	7.0mm	0-99.9mm
	2nd Feed Speed	10.0mm/s	1-50.0mm/s
	2nd Rev. Amount	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

Condition		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
	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

Condition		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
	Start pool time	0.0sec	0-9.9sec
	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

18. Point Edit Menu

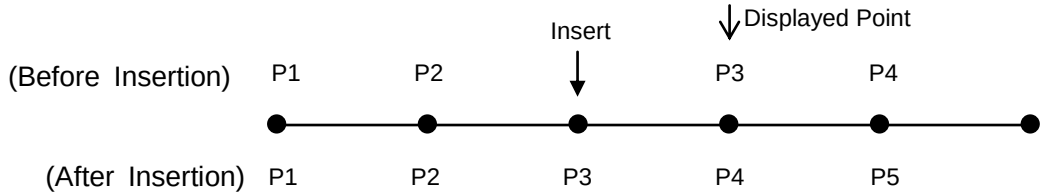
When pressing EDIT key at the setting screen that displays the coordinates, the point can be inserted or deleted.
Also the specified range of the points can be edited by the “Block Editing”.



18.1 Insert a Point

New point can be inserted.

Display the setting screen for the point that the new point is inserted.
Press EDIT and select “Insert a Point”.
New point is created before the point that was shown on the screen.
Enter the point positon and select the point type.
Each point that comes after the inserted point shifts down by one number.

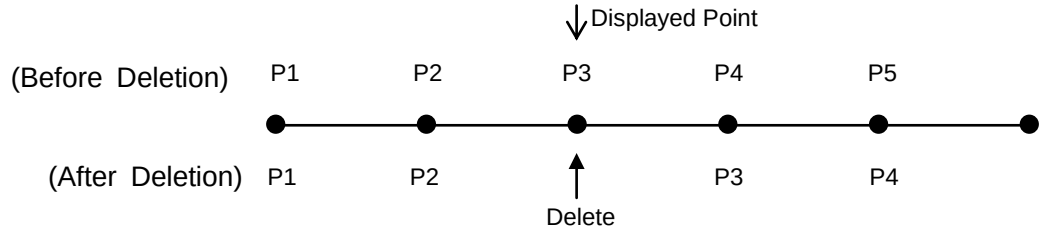


18.2 Delete a Point

The created point can be deleted.

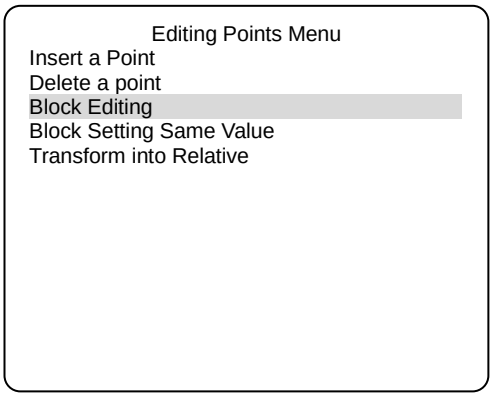
Display the setting screen for the point to be deleted.
Press EDIT and select “Delete a Point”.

The displayed point is deleted, the next point setting screen is shown.
Each point that comes after the deleted point shifts up by one number.

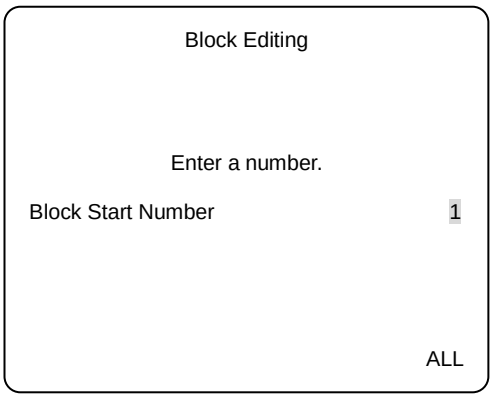


18.3 Block Editing

The specified points range in the program can be edited (moved/ deleted/ copied/ mirror copied/ offset/ rotated) by block unit.
(*Please refer to JANOME “Teaching Pendant” operation manual for more details.)

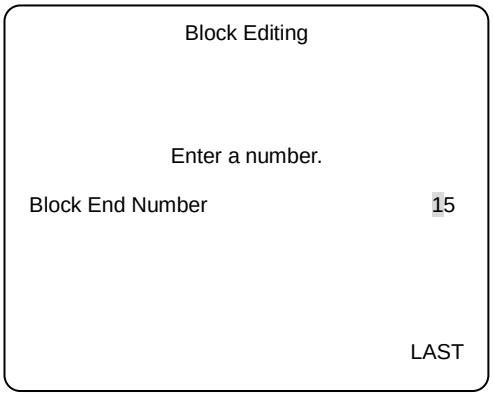


Press EDIT at the point setting screen.
Select “Block Editing”.



Enter the Block start (point) number.

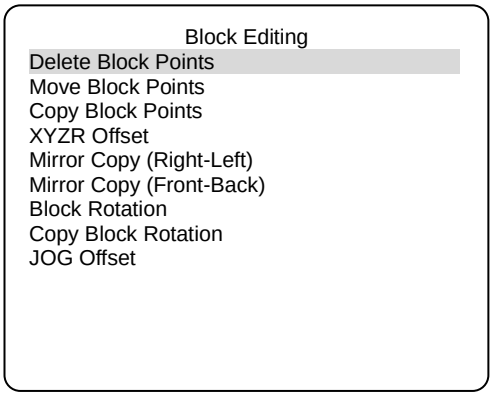
*If pressing F4 (ALL), all the programmed points are selected. (In this case, the screen of Block End does not appear.)



Enter the Block end (point) number.

*If pressing F4 (LAST), the last point in the program is entered.

Also the Block start/ end point number can be set in advance.
At the point setting screen:
Press F0 (S.MARK) to set the Block start point number.
Press F1 (E.MARK) to set the Block end point number.
*The displayed point is set the Block start / end point number.

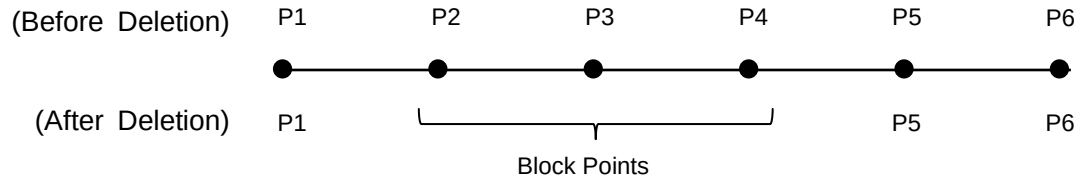


Select the Block Editing menu.

18.3.1 Delete Block Points

The specified points range in the program can be deleted by block unit.
Select “Delete Block Points” from the Block Editing Menu.

The screen to confirm the delete block points appears. Then select “Yes”.

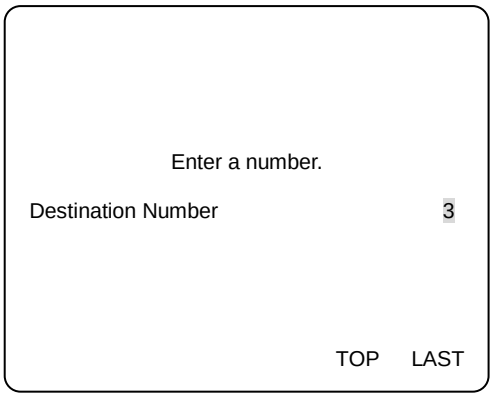


Each point that comes after the deleted block shifts forward.

18.3.2 Move Block Points

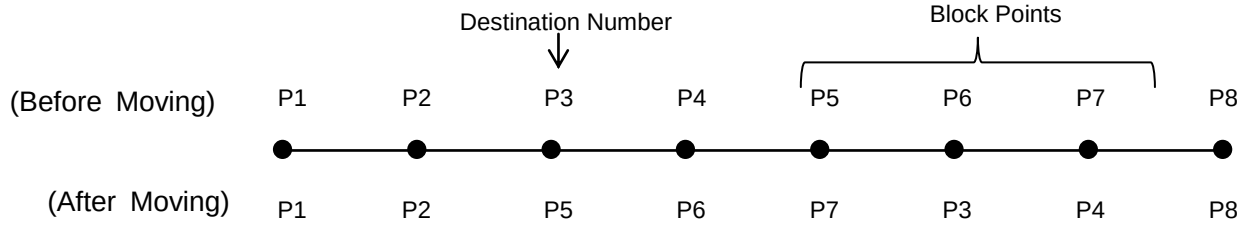
The specified points range in the program can be moved by block unit.
However the points cannot be moved to the other programs.

Select “Move Block Points” form the Block Editing Menu.
The screen on the right is shown.



Enter the Destination (Point) Number.
The specified block moves forward to the Destination Point number.

*The Block points move to P1 by pressing F3 (TOP).
The Block points move to “the last point number + 1” by pressing F4 (LAST).

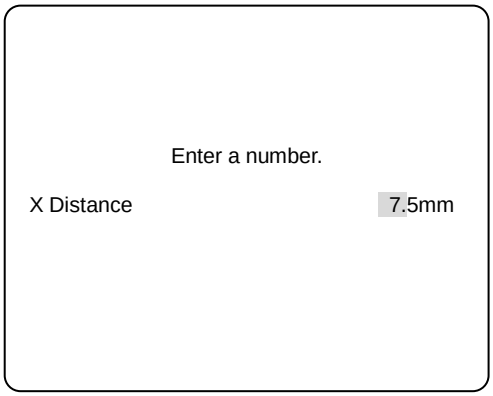


*It is invalid, if the Destination Point Number is selected from the block points.

18.3.3 Copy Block Points

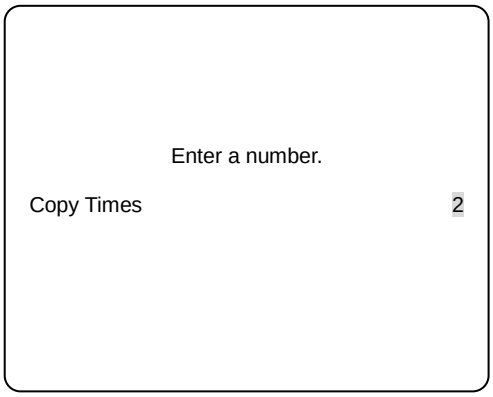
The specified points range in the program can be copied by block unit.
The number of times to copy and the parallel shifting distance in X/ Y direction can be set.
However the points cannot be copied to the other programs.

Select “Copy Block Points” from the Block Editing menu.
The screen on the right is shown.
Enter the X-direction shifting distance.
After the “X Distance”, the screen moves to “Y Distance” entry Screen.



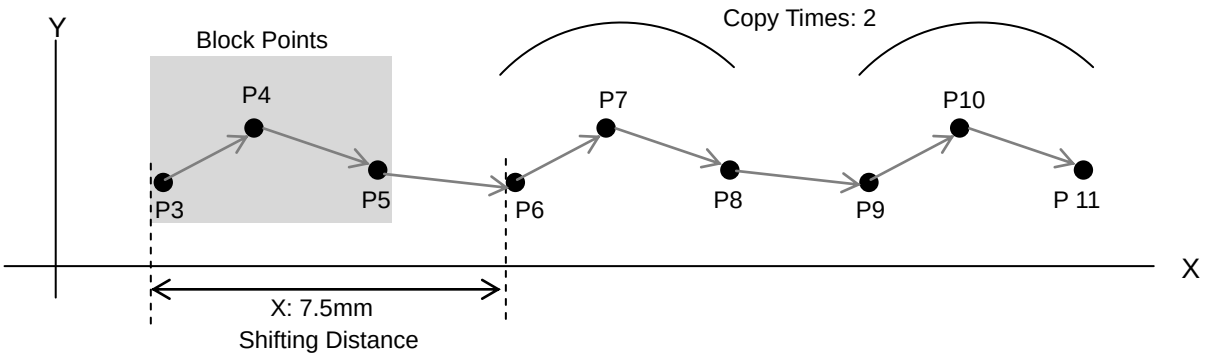
Enter the number of times to copy.
The block copy is executed and the screen returns to the setting screen.

The copied block points are inserted behind the original block points.



The coordinates after block copy may exceed the operation range.
Make sure to execute the “Checking Data” by pressing MONITOR on the teaching pendant.

Example) Block Points: P3-P5, Shifting Distance: X-direction +7.5mm, Copy twice



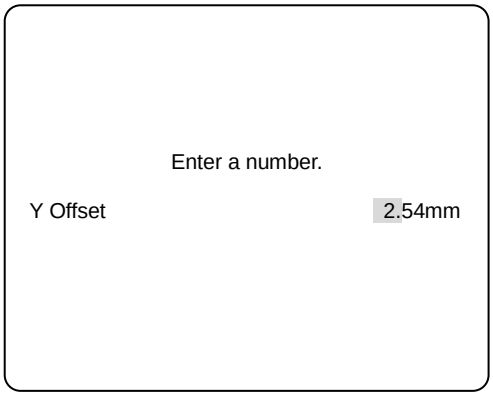
18.3.4 XYZR Offset

The specified points range in the program can be offset.

Select “XYZR Offset” from the Block Editing menu.

The screen to enter the offset value appears in the order of X-Y-Z-R axis.

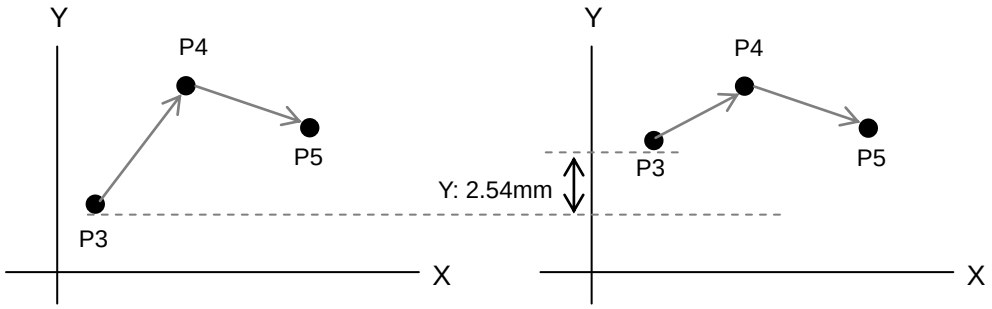
Enter “0” for the unnecessary axis shifting distance.



The offset value adds to all the points in the block points.
Then the screen returns to the point setting screen.

The coordinates after offset may exceed the operation range.
Make sure to execute the “Checking Data” by pressing MONITOR on the teaching pendant.

Example) Block Points: P3-P5, Y Offset +2.54mm

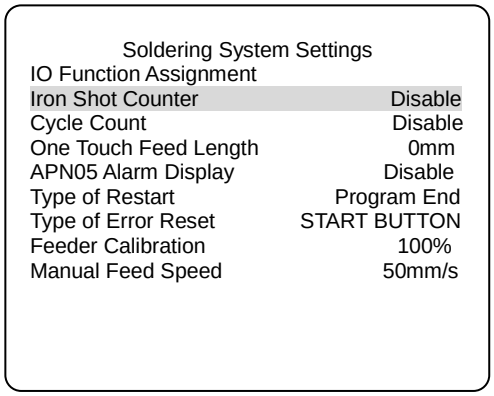


(Before Offset) (After Offset)

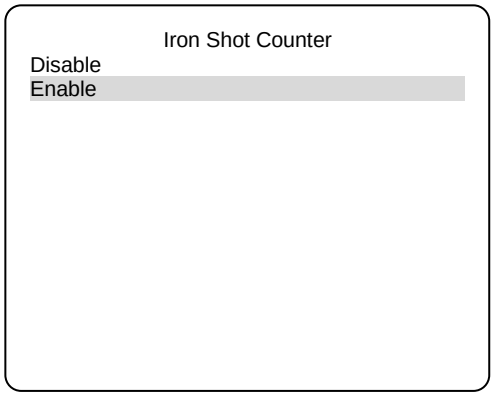
19. Soldering System Settings

19.1 Iron Shot Counter

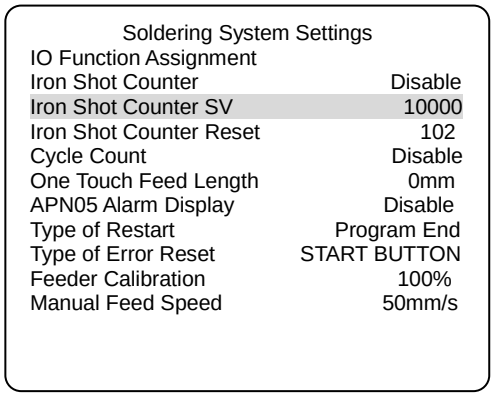
When the present value of the counter reaches the set iron shot counter, the message on teaching pendant appears and a buzzer sounds. This is useful function to exchange iron tip.
*Factory setting: “Enable”



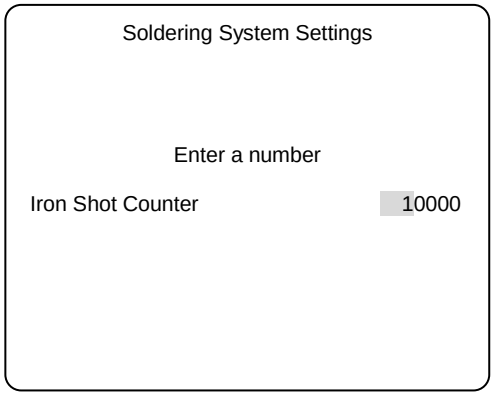
Press [MENU] key at teaching mode, and select “Soldering System Settings”.
Then, select “Iron Shot Counter” and press [ENTER].



Select “Enable” and press [ENTER].



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



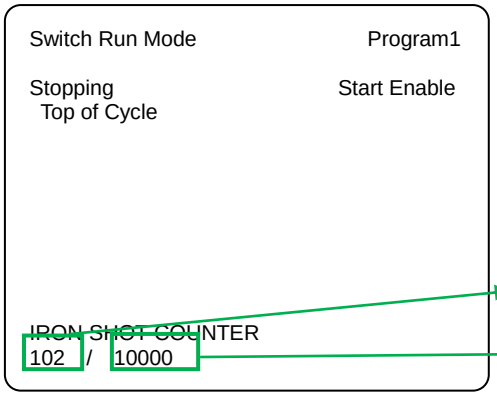
Enter the maximum setting value.

*The maximum set value:99999

*The maximum count value:99999

19.1.1 Iron Shot Counter (Display at the operation mode)

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

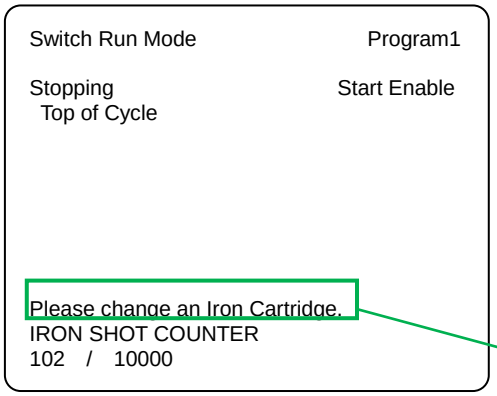


During the operation mode,
the iron shot counter is updated in every one shot.

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.)



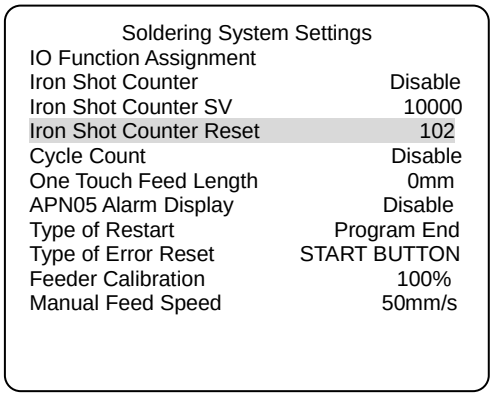
To turn off the buzzer, reset the counter current value while the machine is stopping.

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.

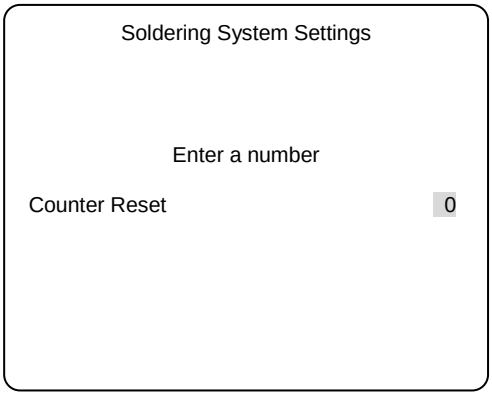
This message is displayed.

19.1.2 Iron Shot Counter Reset

How to reset Iron Shot Counter



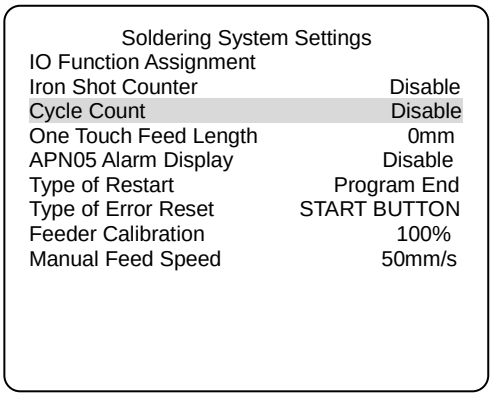
Press [MENU] key at teaching mode, and select “Soldering System Settings”.
Then, select “Iron Shot Counter Reset” and press [ENTER].



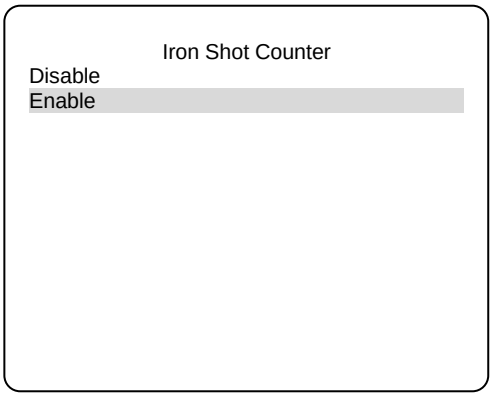
Press [CLEAR] key to clear the number.
It should be done everytime after replacing to new iron cartridge.

19.2 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”.



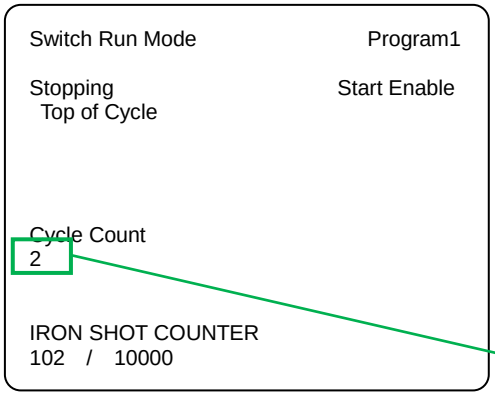
Press [MENU] key at teaching mode, and select “Soldering System Settings”.
Then, select “Cycle Count” and press [ENTER].



Select “Enable”.

19.2.1 Cycle Count (Display at the operation mode)

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



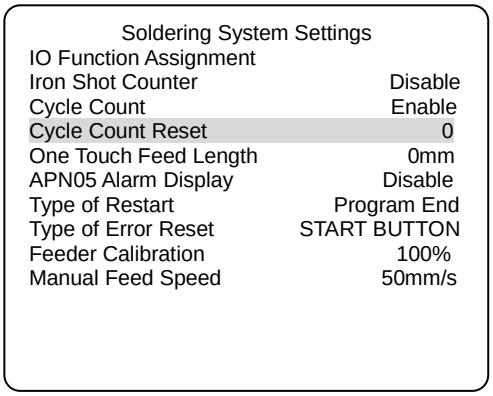
During External operation mode or Switch run mode,
it is counted at the time running program ends 1 cycle,
then it is displayed on teaching pendant.

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

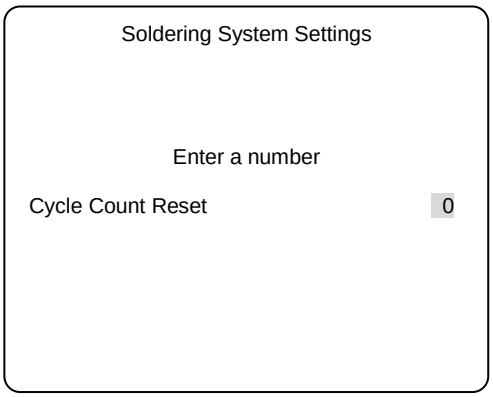
*It is not counted during continuous operation mode.

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

19.2.2 Cycle Count Reset



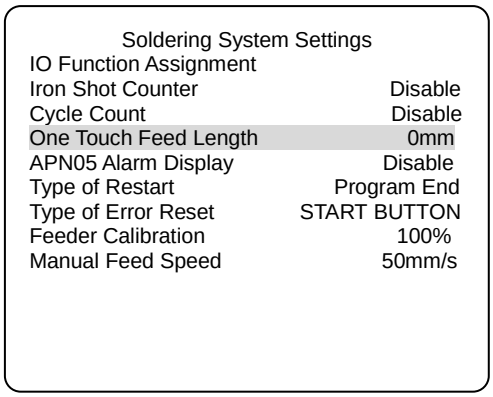
Press [MENU] key at teaching mode, and select “Soldering System Settings”.
Then, select “Cycle Count Reset” and press [ENTER].



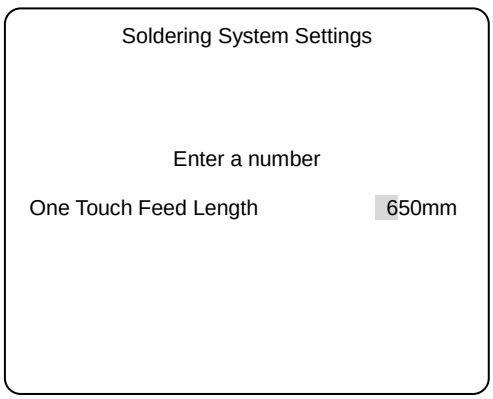
Press [CLEAR] key to reset the number.

19.3 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” (Setting range 0~900mm)



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



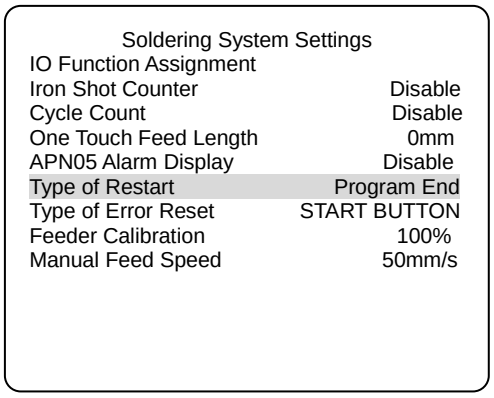
Enter the same length of the solder tube.

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

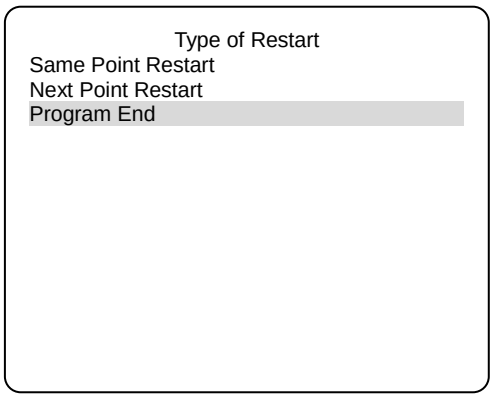
By pressing [9] on teaching pendant, the solder wire can be fed.

19.4 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.

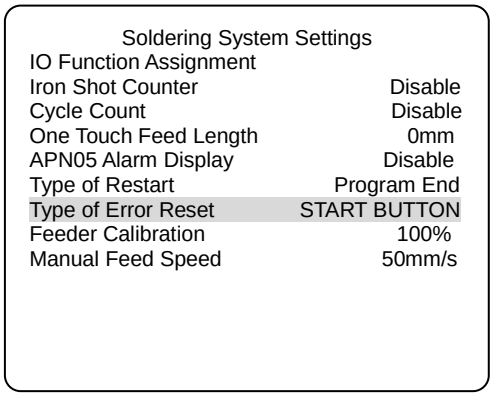
Same Point Restart:
Restarting from the point that error occurs.

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

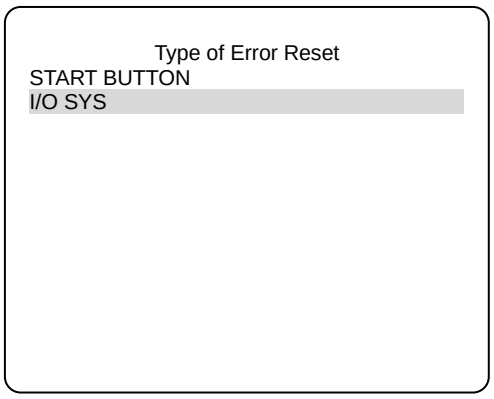
Program End:
Back to the home position and program ends.

19.5 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].



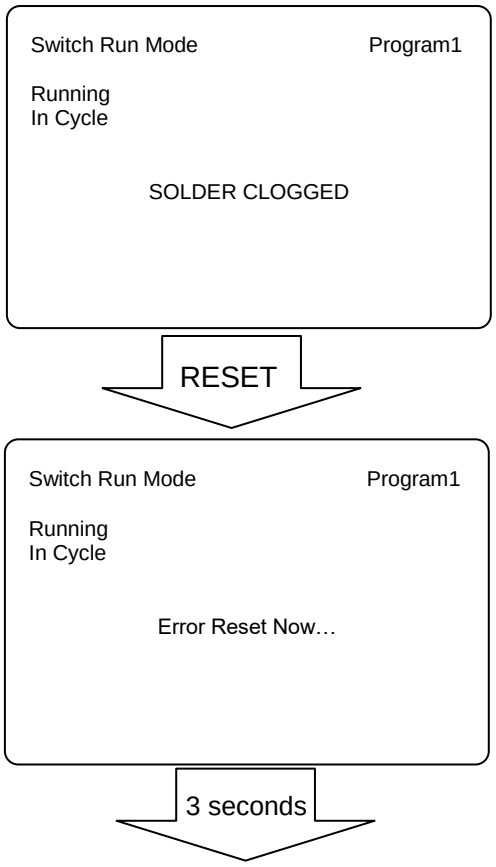
Select “START BUTTON” or “I/O SYS”.

START BUTTON:
Resetting by pressing the start button on the robot.
*Set “Switch Run Mode”.

I/O SYS:
Resetting by the external device.
*Set “External Run Mode”.
*It also outputs I/O SYS 9 at the error ouputting.
(Refer to 20. Function Assignment List)

Reset by the selected way, when error occurs.

e.g) Solder clogged error



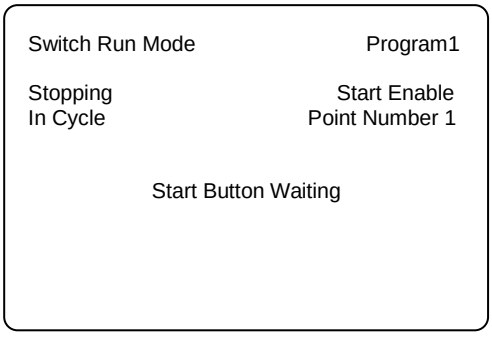
After the reset button (signal) is input, the display is changed as follows.

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

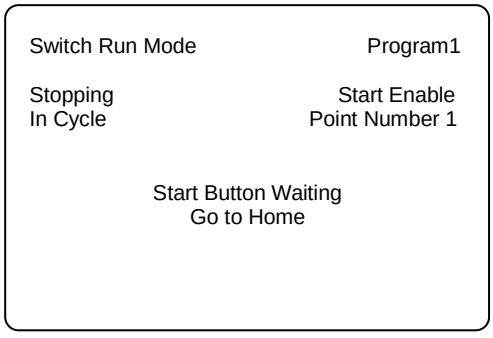
It cannot be restarted during this time.

The display depends on the setting of restart.

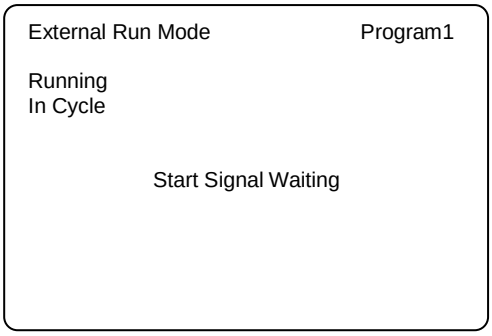
For
“Same / Next point Restart” and “START BUTTON”



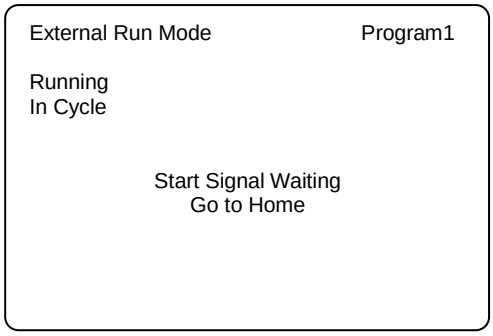
For
“Program End” and “START BUTTON”



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

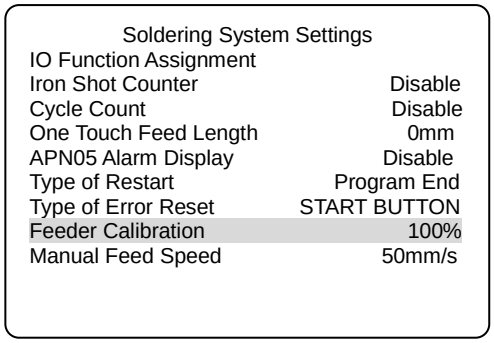


For
“Program End” and “I/O SYS”

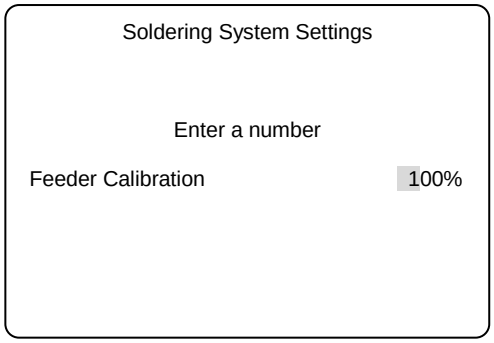


19.6 Feeder Calibration

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%

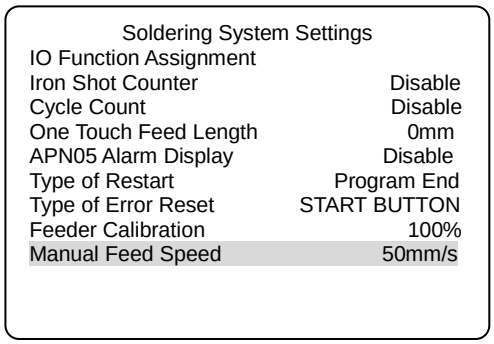
e.g)
When the feeding amount is set in 100mm, the measured value is 90mm.

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

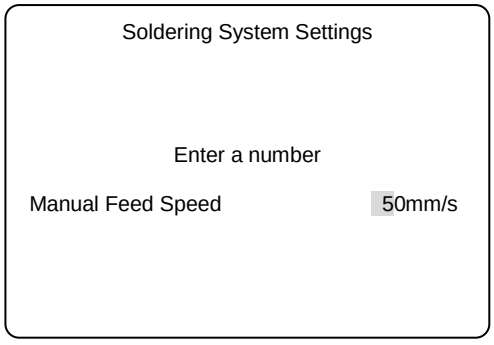
*When the calibration value is changed, save the data.
Then in order to reflect the calibration value, turn the power off and turn it on again, or switch to operation mode.

19.7 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 1mm/sec ~ 50mm/sec.

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

I/O SYS

	Name	Description	Pin No.
Input	#sys In 1 (Ex)	Start	1
	#sys In 2	Free / Start Inhibition / Stop-Start Inhibition / Soft Lock / Emergency Stop	2
	#sys In 3	Program No. LOAD	3
	#sys In 4	Program No. bit0 $2^0 = 1$	4
	#sys In 5	Program No. bit1 $2^1 = 2$	5
	#sys In 6	Program No. bit2 $2^2 = 4$	6
	#sys In 7	Program No. bit3 $2^3 = 8$	7
	#sys In 8	Program No. bit4 $2^4 = 16$	8
	#sys In 9	Program No. bit5 $2^5 = 32$	9
	#sys In 10	Program No. bit6 $2^6 = 64$	10
	#sys In 11	Last Work / Program No. bit7 $2^7 = 128$	11
	#sys In 12	Free / Temporary Stop / Program No. bit8 $2^8=256$	12
	#sys In 13	Nitorogen flow rate error / Free / Program No. bit9 $2^9=512$	13
	#sys In 14 (Ex)	Error Reset / Free / Start Inhibition / Stop-Start Inhibition / Soft Lock / Emergency Stop	14
	#sys In 15	Tip ADJ Z sensor / Free	15
	#sys In 16	Tip ADJ X/Y sensor / Free	16
Output	#sys Out 1	BRC-3000 Brush rotation / Ready for Start	17
	#sys Out 2	SRC-500DC CW / Robot Stopping	18
	#sys Out 3	SRC-500DC CCW / Program Number ACK	19
	#sys Out 4	Program Number Error	20
	#sys Out 5	Running	21
	#sys Out 6	Error	22
	#sys Out 7	Emergency Stop	23
	#sys Out 8	Position Error	24
	#sys Out 9 (Ex)	Solder Unit Error	25
	#sys Out 10	Free	26
	#sys Out 11	Free	27
	#sys Out 12	Free / Finish Initialize	28
	#sys Out 13	Free	29
	#sys Out 14	Free	30
	#sys Out 15	Free	31
	#sys Out 16	Free	32
	-	No connection	33
Others	COM +	DC24V Input	34
	COM -	GND	35
	COM -	GND	36
	COM -	GND	37

*(Ex): Activated only in External Run Mode

* The leftmost desctiprions are the initial setting.

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
Output	#gen Out 1	Solder Feed	9, 10
	#gen Out 2	Soldering Reverse	11, 12
	#gen Out 3	Free	13, 14
	#gen Out 4	Free	15, 16
	#gen Out 5	Iron U/D	17
	#gen Out 6	Solder Feed (Line)	18
	#gen Out 7	Air Blow	19
	#gen Out 8	EMERGENCY	20
Others	COM +	DC24V	21
	COM +	DC24V	22
	COM -	GND	23
	COM -	GND	24

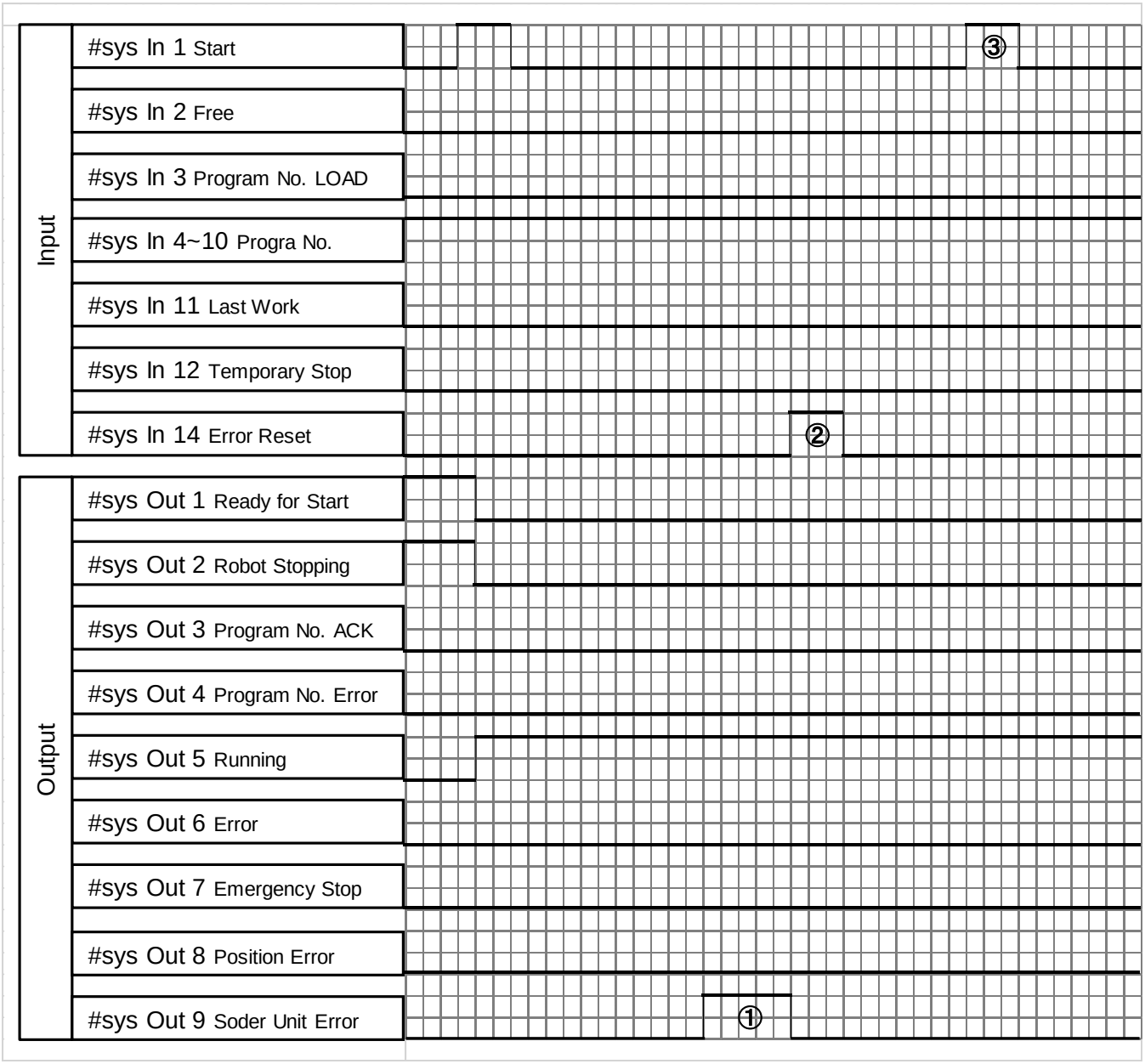
How to change I/O SYS Function Assignment

It is possible to change the I/O SYS function assignment of the previous page.
The leftmost descriptions are the initial setting for each signal.

In order to change the I/O SYS function,
Press MENU key in the Teaching Mode → Run Mode Parameter → I/O Settings
Then change the I/O SYS funciton.

If impossible, assign a variable (mv, mkv, etc.) of the “I/O-SYS Funcition Assignment” in the “Teaching Mode Menu”. Then, change again the I/O SYS function in the “I/O Settings” of “Run Mode Parameter”.

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”.

21. 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. ☞ 5. Preparation
		Breaking of solder wire.	Remove the solder in solder tube and reset solder wire. ☞ 5. Preparation
		Misdetection of solder shortage sensor	Check solder wire is set properly. ☞ 5. Preparation
		Soldert shortage sensor is damaged.	Contact Apollo Seiko or our agency for repair.
SOLDER CLOGGED	Detection of solder clogged sensor	Solder wire is clogged in solder tube.	Replace a new solder tube. ☞ 5. Preparation
		Solder wire does not melt properly.	Slow down the speed of solder feeding. ☞ 17. Initial Value of Soldering Condition
			Adjust the position of solder feeding. ☞ 5. Preparation
HEATER ERROR	Error detection of temperature controller	The iron cartridge is not inserted properly.	Check the iron cartridge is set properly. ☞ 26. How To Change Iron Cartridge
		Breaking of iron tip heater	Replace new iron cartridge. ☞ 26. 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. ☞ 6. How To Set Temperature Controller
COMET NOT READY	COMET is not ready properly.	Power is not supplied.	Turn on the power. If the power is not supplied, contact to Apollo Seiko or our agency. ☞ 4. Description
		Unit error	Turn off and on the unit power switch. ☞ 4. Description
COMET COMMUNICATION ERROR	Communication error of the robot and COMET	RS-232C cable is disconnected.	Check the RS-232C cable. ☞ 4. Description
		Unit error	Turn off and on the unit power switch. If the error is not resolved, contact to Apollo Seiko or our agency. ☞ 4. Description
	Mismatch of soldering condition data etc.	The parameter is not entered properly.	Check the parameter of soldering condition. ☞ 11.~14. Program setting
FEEDER COMMUNICATION ERROR	Communication error of COMET and feeder	Feeder cable is not disconnected.	Connect feeder cable. ☞ 4. Description
		Unit error	Turn off and on the unit power switch. If the power is not turned on, contact to Apollo Seiko or our agency ☞ 4. Description

22. Troubleshooting

This table is designed to help trouble shoot common problems that may occur with 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 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.
	The value of Feeder Calibration is not proper.	Check if the Feeder Calibration value in the Soldering System Settings is set around 100%.
	The value of Manual Feed Speed is not proper.	Check if the Manual Feed Speed value in the Soldering System Settings is proper.
	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.

23. Maintenance

■ Daily inspection requirement items are as follows:

Note: When inspecting, turn off the power and let the the iron tip cool down.

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

2) Wear of iron tip:
   If soldering results become inconsistant, please change it to a new iron tip. The life of the iron tip depends on the heating time, the solder feeding point and speed.

3) Heater Malfunction:
   If the temperature error lamp is on check the following. :

   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

   If these items check out to be OK there may be a malfunction with the heater.

4) Air pressure:
   Check for sufficient air pressure. (0.5MPa)

5) Feed tube clog:
   If the solder clogs near the feeder, remove the tube and clean it with alcohol.

6) Up/down movement:
   If the iron unit sticks while moving up or down, clean the area with flux remover and ensure all flux residue is removed.

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 temperature calibration page.

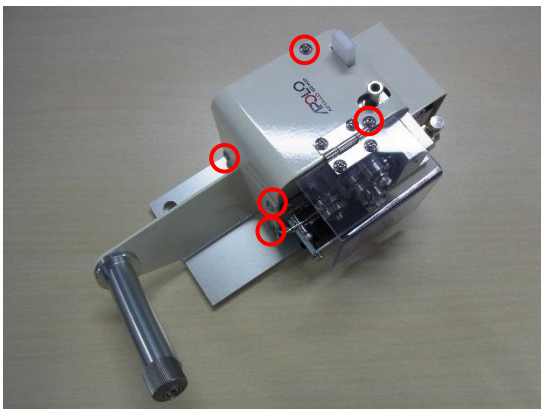
■ Every month
   Make sure a solder wire runs through the solder wire tube. If not, clean the inside of tube or replace.

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

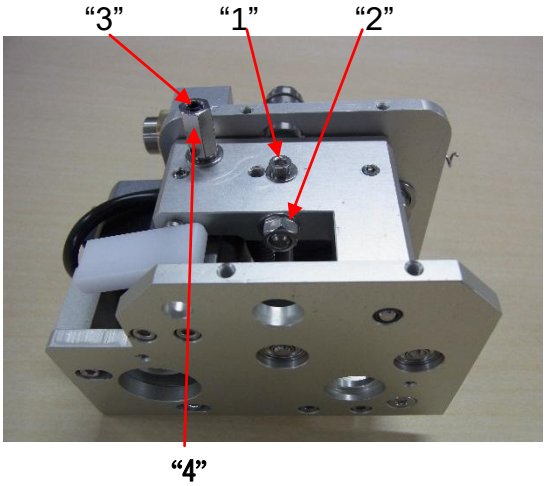
24. ZSB feeder adjustment and alignment (Option)

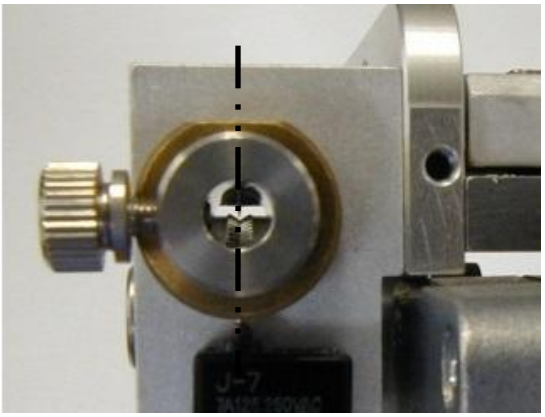
Adjust the ZSB feeder as follows:
The cutting depth of ZSB blade must be adjusted properly to optimal operation. Clean the ZSB cutting wheel and rollers daily.

1) Remove the cover after loosening the five setting screws.



2) To align the cutting blade shaft, loosen the set screw “1”. To adjust the shaft position, set the nut to “2”. ove the blade shaft position to match the center of the cutting blade and V grove of the lower roller.

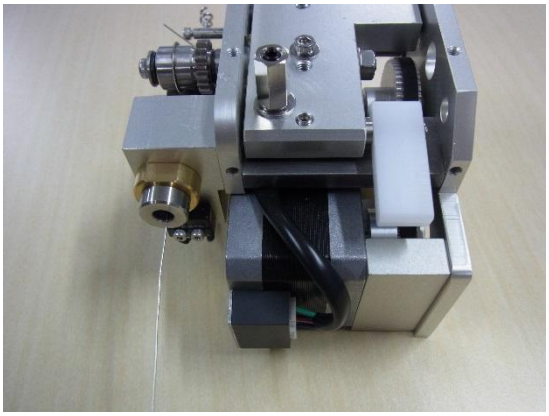


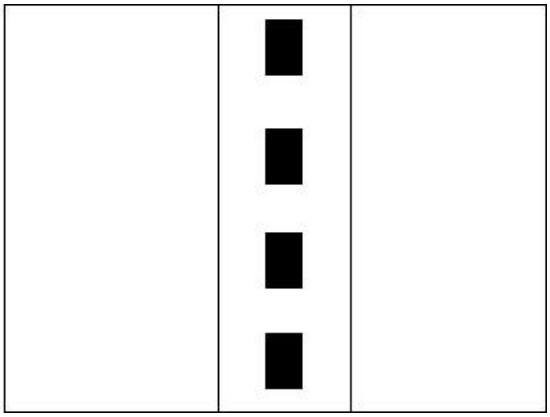


3) Tighten the set screw “1”.

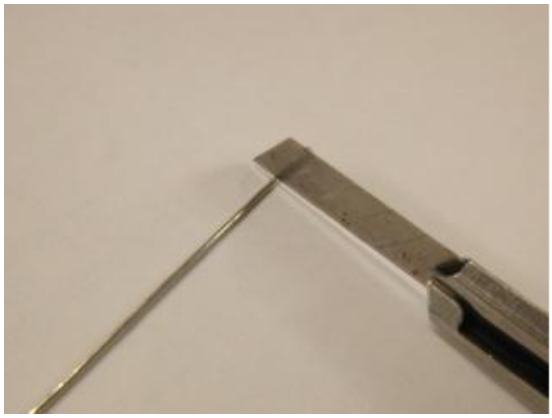
4)With the cover removed, attach the reel pin and set the solder wire.

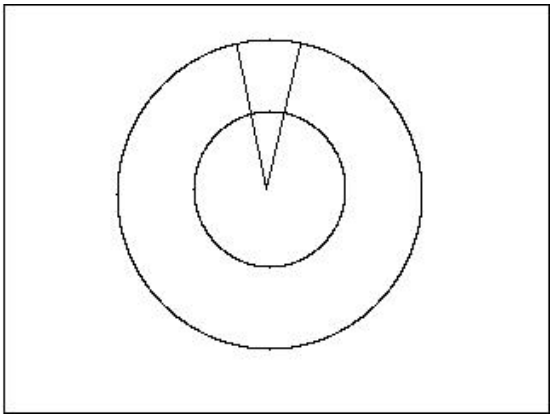
5) Push down solder clamp lever and feed the solder wire. Make sure the cutting blade makes holes on the center of the solder wire. If the holes were not on the center, adjust the cutting blade shaft position, then re-feed the solder wire and re-check it.





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.
Repeat until desired depth is acquired.





7) Complete adjustment and the alignment of the cutting blade and increase the temperature of iron tip. Melt the solder wire with holes, and make sure the flux is coming out the holes.

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

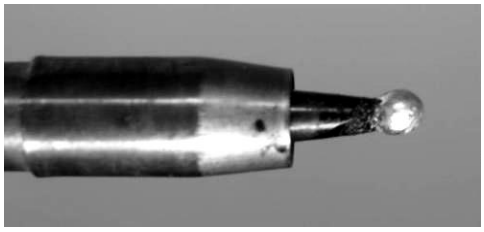
25. Handling of Iron Tip

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^{o}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. 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.

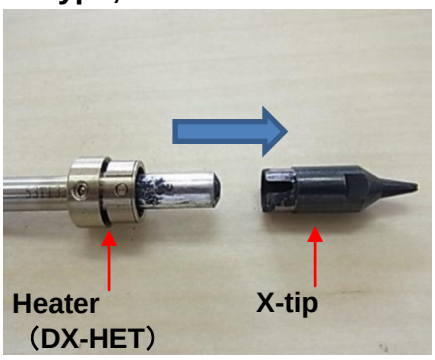
2) Check for soldering defect

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.

26. How to Change Iron Tip

DX Type, X-***

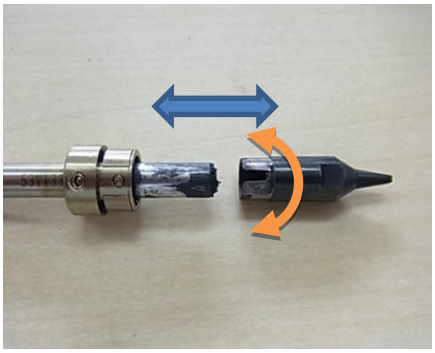


1) Make sure to “power off” the unit and let the iron cartridge (DX-HET and X-tip) cool down.
Pull down on the DX-HET and the X-tip..

2) Pull out X-tip from DX-HET.

3) Wipe off the burning inhibitor substance stuck on the top of DX-HET.
It can be easily wipped off with a dry cloth.

4) Insert a new X-tip to DX-HET.
Make sure that burning inhibitor substance has been applied and insert a new X-tip.

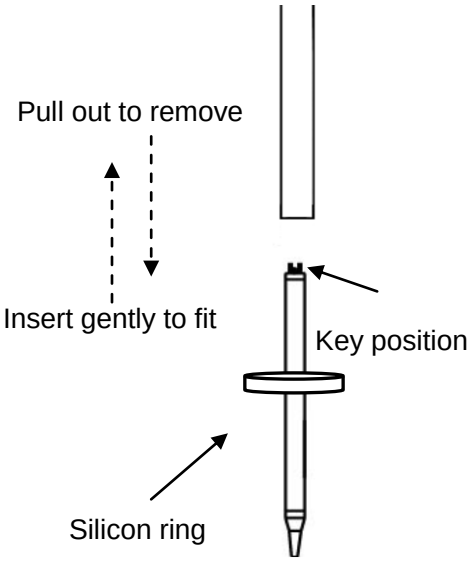


5) As shown on the left, the top of DX-HET has not been covered with burning inhibitor substance.
In order to apply burning inhibitor substance on DX-HET, re-insert the X-tip, pull it down, roatate it to the left and right several times.

6) Make sure that burning inhibitor substance has been applied to the whole top of DX-HET as shown on the left.
Then insert the X-tip firmly while adjusting the key groove to the correct position.

Make sure to turn off the power of the unit and let the DX-HET and X-tip cool down before replacing.

DS-*, DN-*** Type**



1) Make sure to turn the power off and let the iron cartridge cool down. Pull down on the iron cartridge to remove.
If it does not come out, use a silicone tube to pull it down using “some force”.

2)To insert the new iron cartridge, insert gently until it reaches the end of the cartridge tube.
Turn it until you feel the key drop or click into position.
When you feel it click, insert it firmly.

*Do NOT insert the iron while the key is in the incorrect position or the key is damaged.

2) Slip the silicon ring over the iron cartridge.

Caution

- Make sure to turn the power off and let the iron cartridge cool down.
- Carry out “Auto Tuning” after replacing the iron cartridge.
- Make sure that the displayed temperature on the temperature controller and the temperature measured by the tip thermometer are matched after replacing the iron cartridge.

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