

Soldering Unit STELLAR

Operation Manual



Thank you for purchasing the STELLAR.
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.

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 STELLAR.
- 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.

Setting temperature of heater controller

- Do not set the temperature of heater controller over 500 degrees C. It may cause a malfunction.

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.

The warranty period

- The warranty period is one year after the product is delivered. If an unexpected malfunction which our company bears responsibility occurs within the warranty period, we repair it in free of charge.

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 mentioned 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.

INDEX

Safety Notes	2
INDEX	4
1. Summary	5
2. Specification	5
3. Dimensions	6
4. Description	7
5. Connection	8
6. Preparation	9
7. How to Set Temperature Controller	10
8. Pin Assignment	12
9. Feeder Communication Command	15
10. Trouble Shooting	17
11. Maintenance	18
12. ZSB feeder adjustment and alignment	19
13. Handling of Iron Tip	21
14. How to Change the Iron Cartridge	23

1. Summary

STELLAR is the unit for soldering. It can be operated the solder feeder and the iron unit by issuing a command from the external controller to STELLAR.

Solder feeder can be set the feeding amount and speed by COM communication.

The temperature setting is set at the temperature controller of STELLAR front panel.

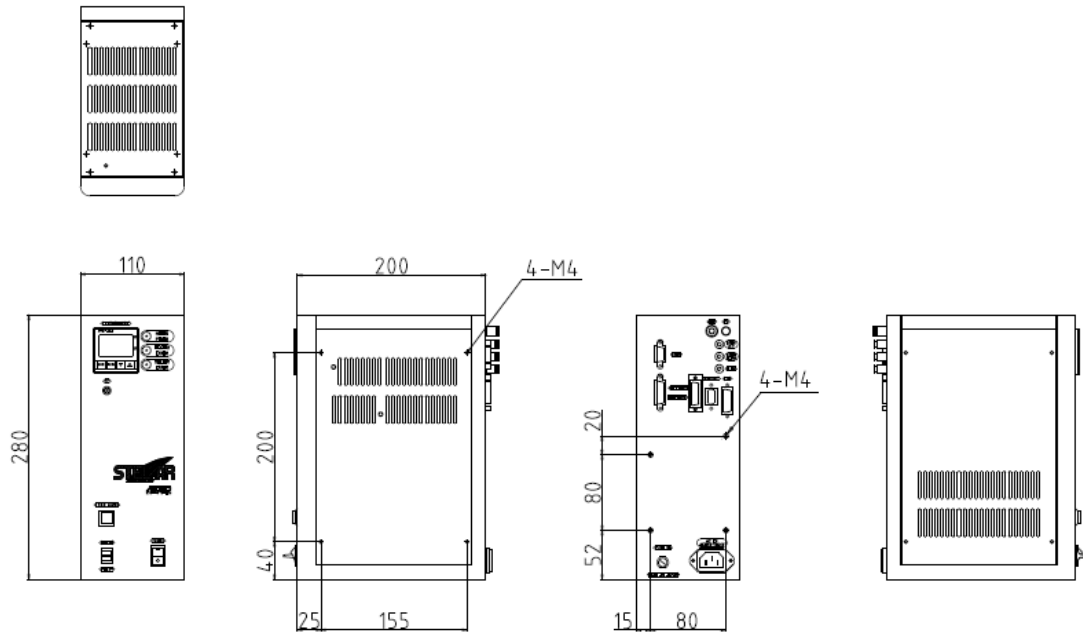
It is possible to make various soldering conditions because each operation can be controlled by the customer's program.

2. Specification

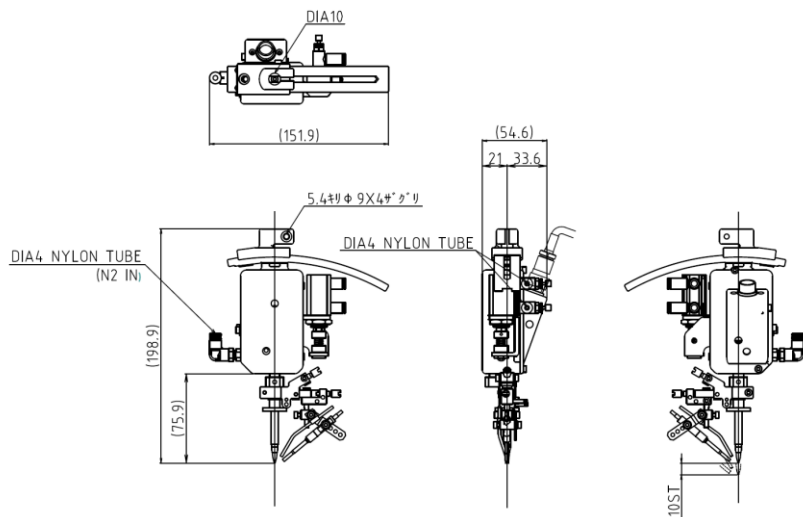
Type	STELLAR
Power	AC85~264V (Single phase)
Power consumption	200VA
Iron heater power	240W / DC48V
Air supply	0.4~0.5MPa
Solder feeding speed	Max.:99.0mm/s Min.:0.1mm/s
Solder feeding amount	Max.:99.9mm Min.:0.1mm
Solder diameter	φ0.3~2.0mm

3. Dimensions

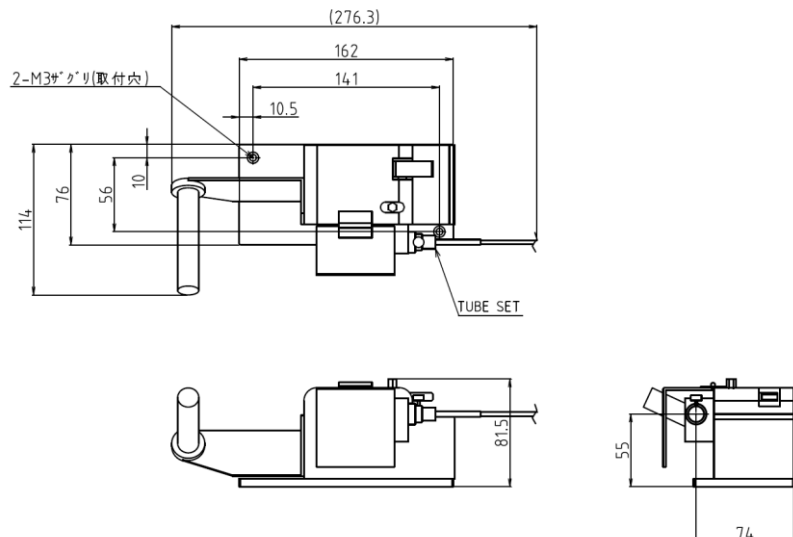
Soldering Unit STELLAR



Iron Unit RSP



Solder Feeder LFD



4. Description

Soldering Controller STELLAR



Temperature controller

Iron temperature can be set using this controller.

Connector for PC communication

The temperature management can be done by connecting USB cable to PC. (USB cable is option)

Iron UP/DOWN switch

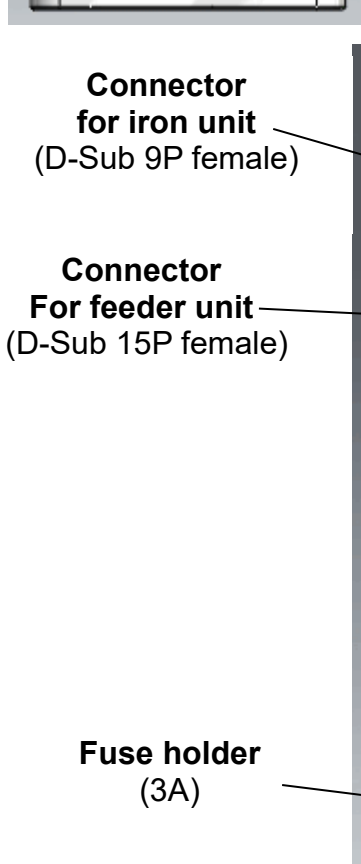
While you press this button, the iron stays at soldering position. So, when you teach soldering position, check the position using this button.

Solder feed forward / backward button

Wire solder is forwarded while this button is pressed.

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.



Connector for iron unit
(D-Sub 9P female)

Connector For feeder unit
(D-Sub 15P female)

Fuse holder
(3A)

Air IN (φ6)

Air filter

Air OUT for iron UP (φ4 White)

Air OUT for iron DOWN (φ4 Black)

Air OUT for air blow (φ4 Blue)

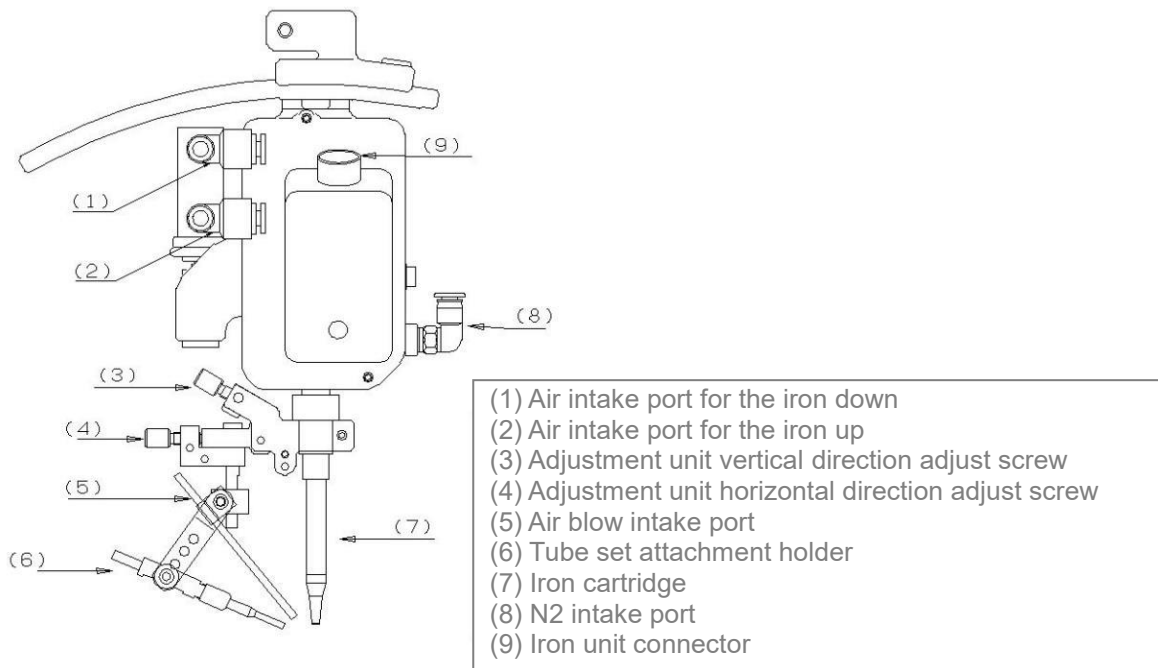
I/O connector
(D-Sub 15P female)

RS232C connector
(D-Sub 9P female)

Power inlet plug

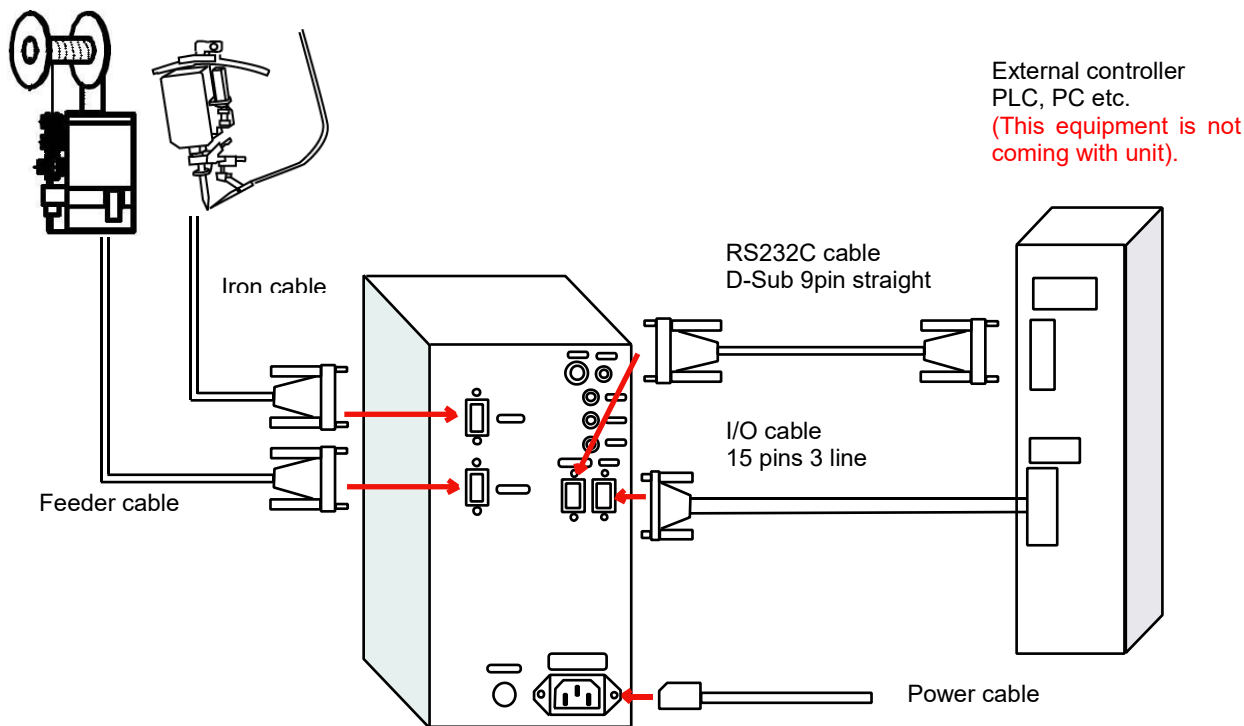
STELLAR (back)

Iron Unit RSP



Refer to “14. How to Change Iron Tip” about changing method of iron cartridge.

5. Connection

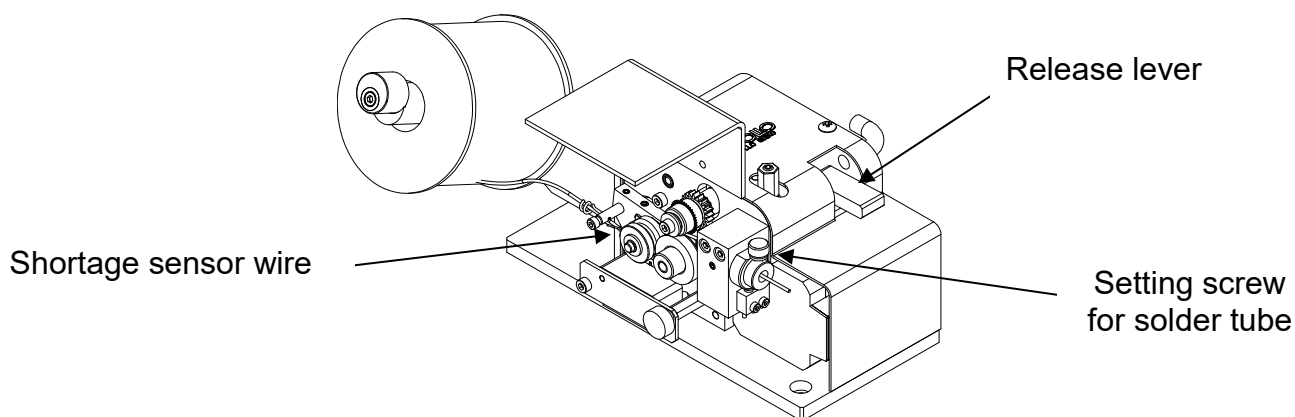


- Diagram. 1 -

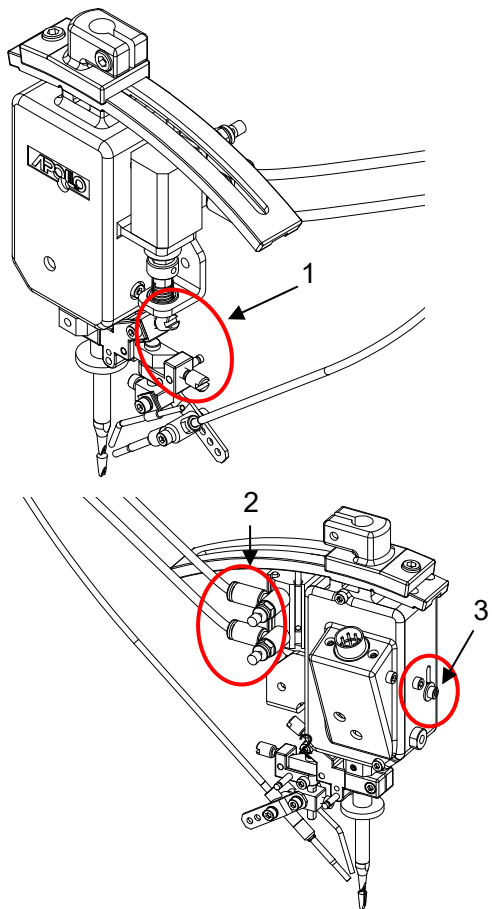
6. Preparation

How to set solder wire

1. Loosen the setting screw for the solder tube, and pull out the tube.
2. Lift the lever and pinch roller for solder feeding or lift the cutting blade.
3. Put through the solder wire like below the illustration. Push down the shortage sensor wire, make sure the shortage sensor wire is set under the solder wire.
4. After that push down the release lever, set the solder tube.



How to adjust RSP iron unit



1. Solder wire feeding position can be adjusted.

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

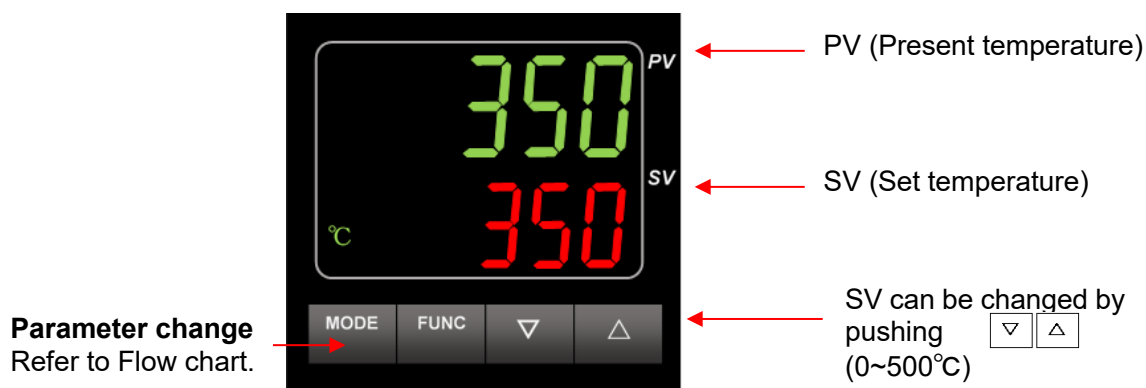
2. Iron up down speed can be adjusted by turning screws after undoing nut.

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

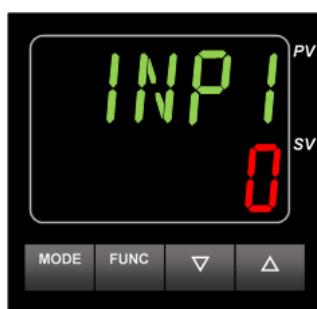
3. Second solder feeding position can be altered by moving this screw. Adjusting the screw position, First solder wire can be put between the iron tip and a solder pattern.

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.

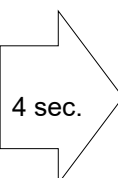
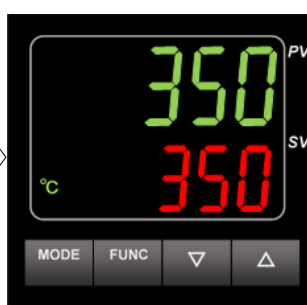
7. How to Set Temperature Controller



Initial setting mode



Operation screen

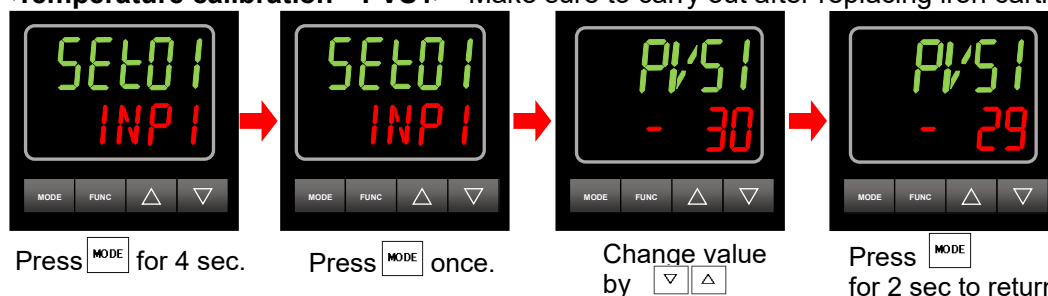


*When the PV display shows in green color, PV value alarm is within the setting range. When it is in red, it is out of its range.

Parameter showing

	Description	Setting detail	Initial value
PVS1	PV calibration zero setting	Use ▲ or ▼ key to change . -500~500 (°C)	-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 (°C)	50
E2L	PV value alarm lower limit setting	Use ▲ or ▼ key to change . 0~500 (°C)	50
PASS (flash)	Password setting	No need to set	—

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



*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 E2L>

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>

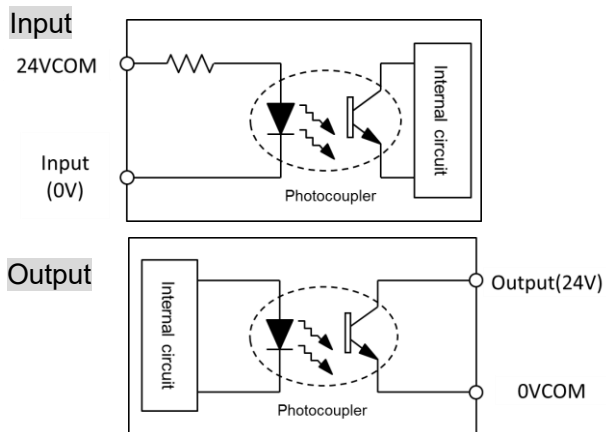
Press **MODE** for 4 sec. Press **△** until above screen appears. Press **△** once. Press **MODE** for 2 sec to return.

0:off
1:All lock
2:Lock in operation mode
3:Lock except operation mode

8. Pin Assignment

I/O			
Pin No.	Signal Name	Description	Signal type
1	P24V	STELLAR DC24V	External power
2	TIP DOWN	Down the iron tip.	From OUT to STELLAR
3	AIR BLOW	Blow air for cleaning.	From OUT to STELLAR
4	SEND	Turn solder feed motor forward.	From OUT to STELLAR
5	SLIDE	Turn solder feed motor forward during ON.	From OUT to STELLAR
6	REVERSE	Turn solder feed motor reverse by fixed speed.	From OUT to STELLAR
7	ARM	Stop solder feed motor emergency. (Stop by external signal OFF)	From OUT to STELLAR
8	COM	STELLAR NPN type:0V PNP type:DC24V	
9	COM	STELLAR 0V	
10	SOLDER SHORTAGE	Solder shortage sensor	From STELLAR to OUT
11	SOLDER CLOGGED	Solder clogging sensor	From STELLAR to OUT
12	TEMPERATURE READY	Output when the iron tip temperature is within the setting.	From STELLAR to OUT
13	TIP DOWN LS	Iron tip down detection sensor	From STELLAR to OUT
14	TIP UP LS	Iron tip up detection sensor	From STELLAR to OUT
15	N/C	Not used	
16	N/C	Not used	
17	HEATER ERROR LED	Light LED in front of the unit.	
18	SOLDER ERROR LED	Light LED in front of the unit.	
19	COM24V	24VCOM for LED	

Internal circuit

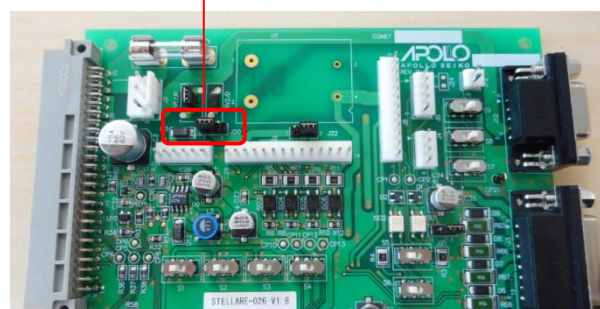
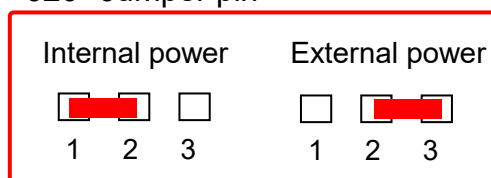


Use the machine with less than Voltage DC24V and Current 100mA.

Switching internal / external power

Switch internal / external power by STELLAR board.
 Change the position of the short connector inserted J20
 Jumper pin refer to the below.
 *The factory setting is internal power setting.

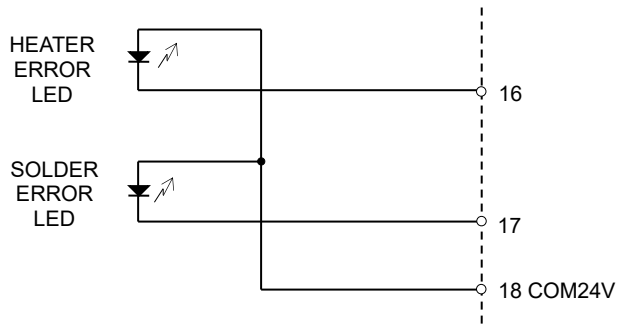
J20 Jumper pin



STELLAR board

LED internal circuit

<STELLAR internal>



LED specification

Usage voltage range: DC24V ± 10%
 Rated current: 15mA

Heater Connector			
Pin No.	Signal Name	Description	Signal type
1	-TC	Thermocouple(-)	From OUT to STELLAR
2	+TC	Thermocouple(+)	From OUT to STELLAR
3	N/C	Not used	
4	-HEATER	Heater power 0V	From STELLAR to OUT
5	TIP UP LS	Iron tip up detection sensor	From OUT to STELLAR
6	+HEATER	Heater power DC48V	From STELLAR to OUT
7	COM	STELLAR 0V	
8	COM	STELLAR 0V	
9	TIP DOWN LS	Iron tip down detection sensor	From OUT to STELLAR

Feeder Connector			
Pin No.	Signal Name	Description	Signal type
1	P24V	STELLAR DC24V	
2	M - Ap	Feeder A phase pulse command	From STELLAR to OUT
3	M - Bp	Feeder B phase pulse command	From STELLAR to OUT
4	M - Am	Feeder A phase pulse command	From STELLAR to OUT
5	M - Bm	Feeder B phase pulse command	From STELLAR to OUT
6	N/C	Not used	
7	SOLDER SHORTAGE	Solder shortage detection signal	From OUT to STELLAR
8	N/C	Not used	
9	COM	STELLAR 0V	
10	COM	STELLAR 0V	From STELLAR to OUT
11	N/C	Not used	
12	N/C	Not used	
13	N/C	Not used	
14	SOLDER CLOGGED	Solder clogged detection sensor	From OUT to STELLAR
15	N/C	Not used	

RS-232C		
Pin No.	Signal Name	Description
1	N/C	
2	RxD	Reception data
3	TxD	Transmission data
4	N/C	
5	GND	Ground
6	N/C	
7	N/C	
8	CTS	Transmission request
9	N/C	

9. Feeder Communication Command

● Communication specification

Baud rate 9600
 Data bit length 8
 Parity None
 Start bit 1
 Stop bit 1
 Header \$ (ASCII)

Delimiter

CR(Control code)

● Communication detail

Operation	Command	Signal type
STELLAR preparation check	7F000M000S	From OUT to STELLAR
Solder feeder forward	7F***M***S	From OUT to STELLAR
Solder feeder reverse	7R***M***S	From OUT to STELLAR
*1 Slide solder feeding speed	7S000M***S	From OUT to STELLAR
Manual feeder forward speed	7F000M***S	From OUT to STELLAR
Manual feeder reverse speed	7R000M***S	From OUT to STELLAR
*2 Operation command work completion	OK	From STELLAR to OUT
Error detection after command transmission	NG	From STELLAR to OUT

***M Specify the feeding length.
 e.g.) 300M : 30.0mm
 ***S Specify the feeding speed.
 e.g.) 300S : 30.0mm/sec.

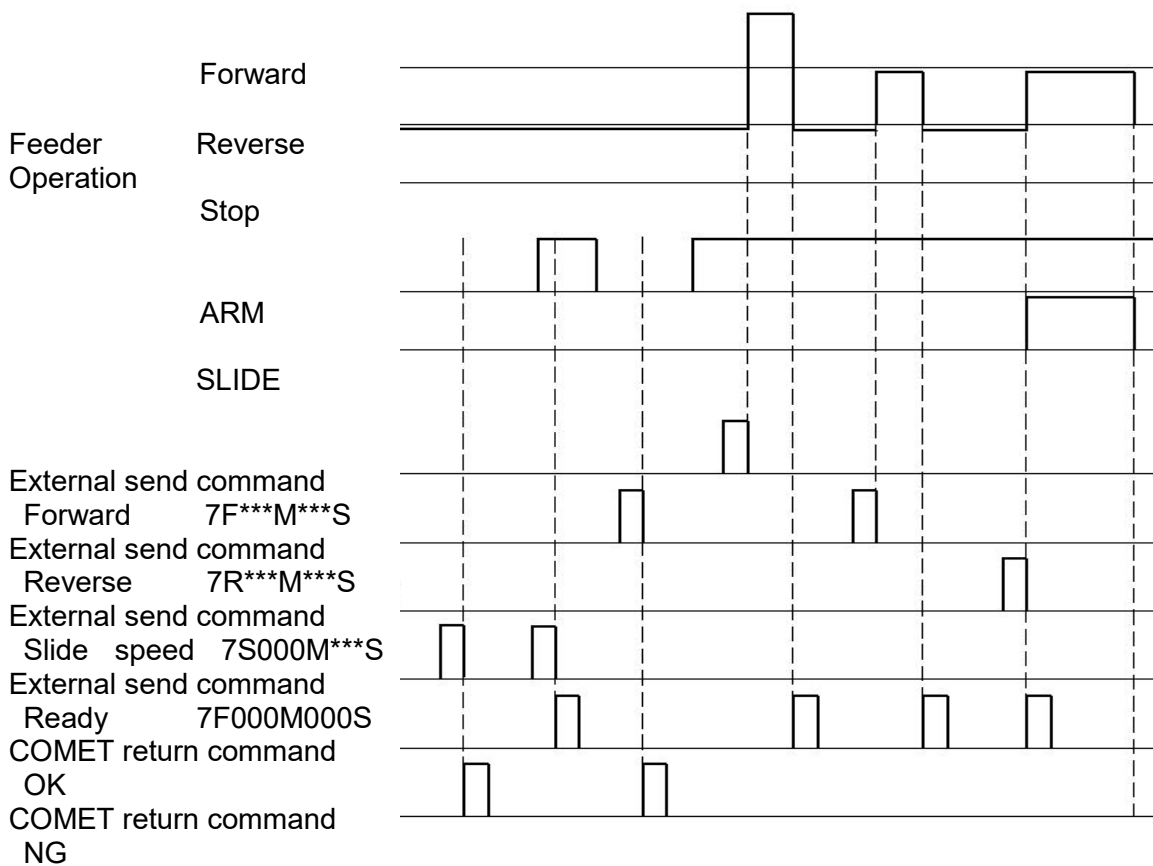
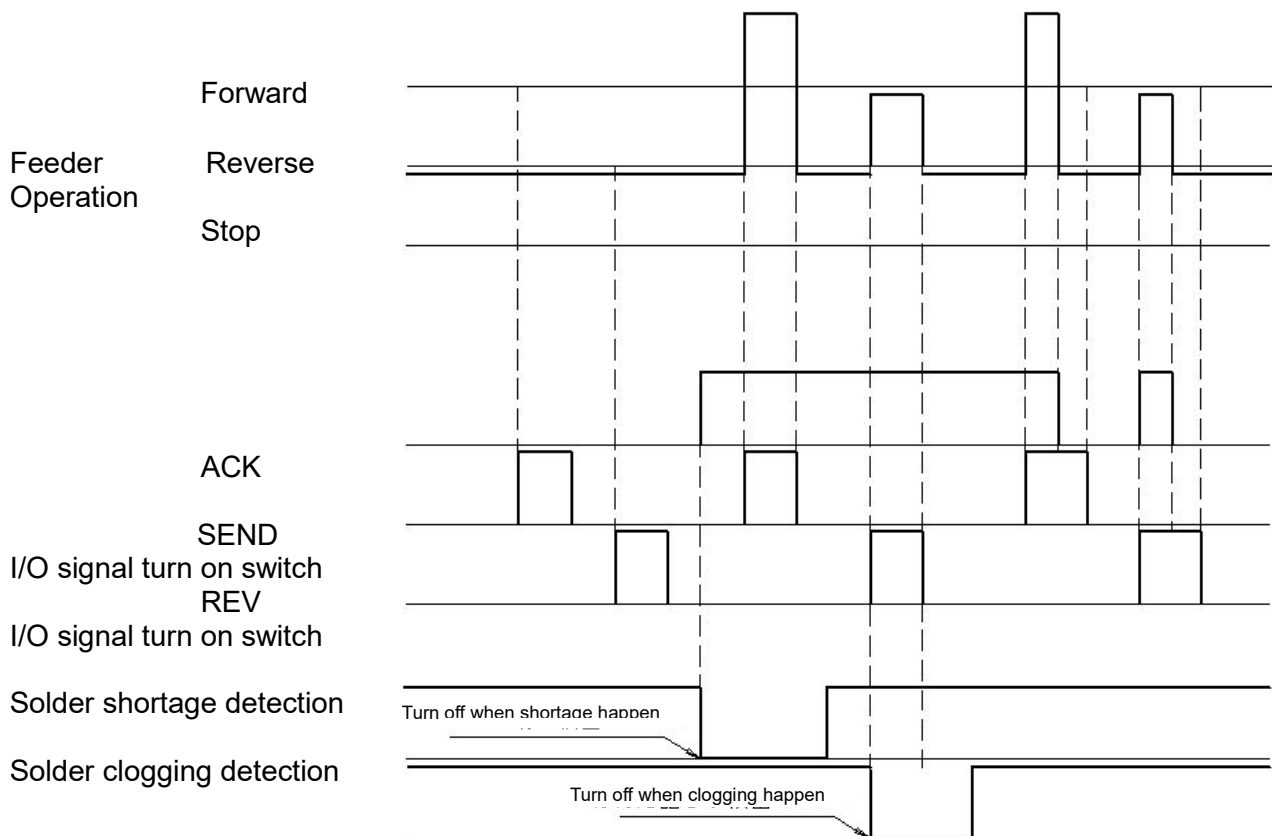
*1: This is used with I/O signal SLIDE simultaneously, it feeds solder by specified speed until SLIDE signal becomes OFF.

*2: If “Slide solder feeding speed” is sent, return OK signal.

Communication example:

Send data (HEX)	24	38	52	30	35	30	4D	30	35	30	53	0D				
Send data (ASCII)	\$	8	R	0	5	0	M	0	5	0	S	CR				
Receive data (HEX)													24	4F	4B	0D
Receive data(ASCII)													\$	O	K	CR

● Timing chart



10. Trouble Shooting

Problem	Failure reason	Recommended solution
STELLAR is not receiving power.	The power cord 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 the end of life.	Replace with a new iron tip.
	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 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.
	The air is not provided.	Check the air is sent and the air tube is connected properly.
	Control PCB is damaged.	Contact to Apollo Seiko or our agency for repair.

11. Maintenance

11-1 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 becomes unstable, please change it to new one. The life time of the iron tip 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 (CC-5F) 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. (0.4-0.5 MPa)
 - 5) Clog of the tube set
If the top (exit side) of the tube set clog by a flux or solder wire, please get rid of it and clean it with alcohol.
 - 6) Up/down movement
Make sure if the up/down movement of iron unit 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 for thermo-controller temperature display calibration.
 - Every month
Make sure a solder wire run through the solder wire tube. If not, clean the inside tube or replace.
 - Every year
Send the thermometer to an authorized agent for the calibration.

12. ZSB feeder adjustment and alignment

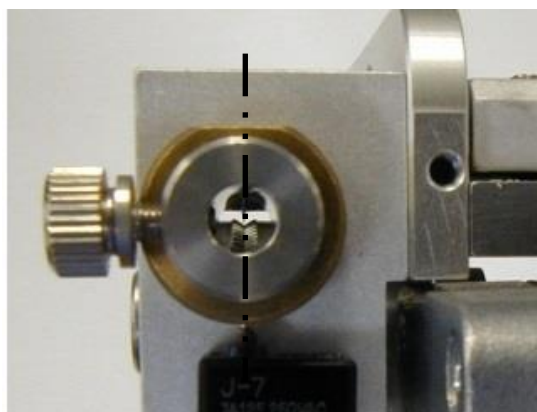
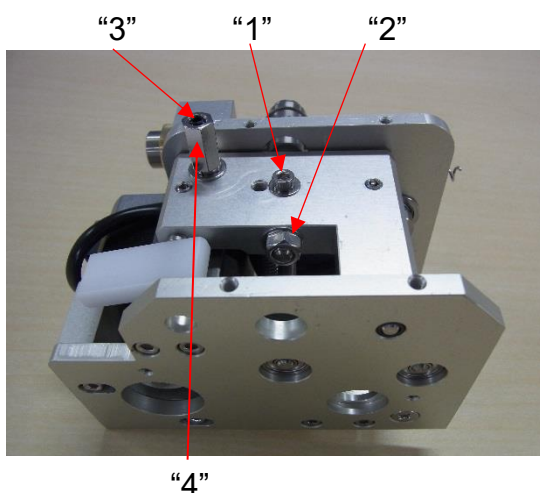
Adjust the ZSB feeder as follows:

(In the case of the pinch roller, adjust only the height.)

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

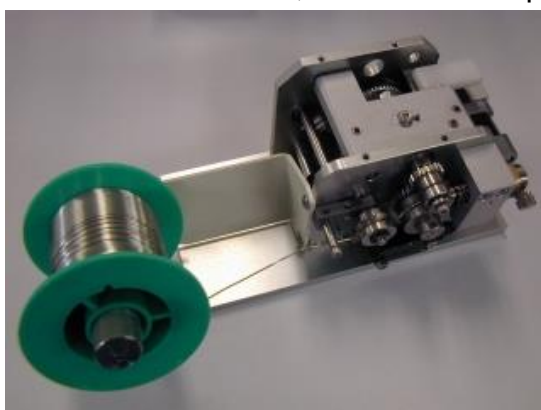


2) To align the cutting blade shaft, loosen the set screw "1". To adjust the shaft position, set the nut to "2". Move the blade shaft position to match the center of the cutting blade and V groove of the lower roller.

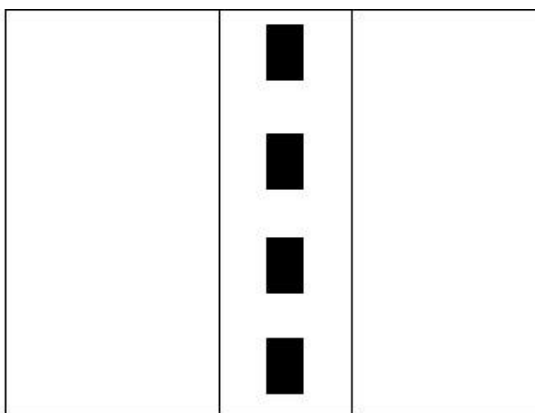
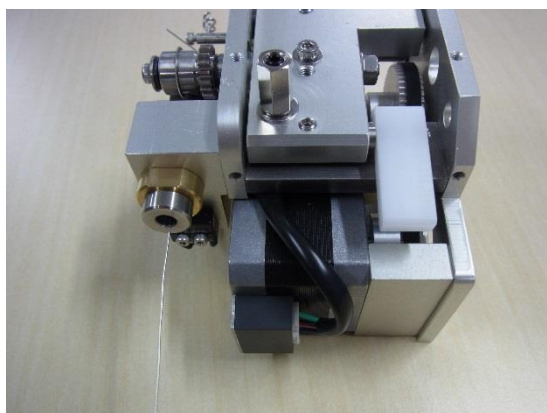


3) Tighten the set screw "1".

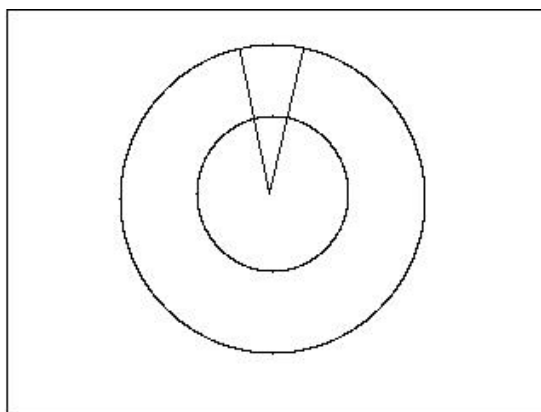
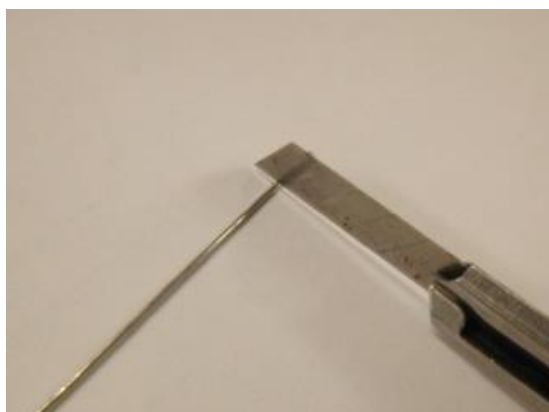
4) With the cover removed, attach the reel pin and set the solder wire.



- 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 the 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.

13. 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.

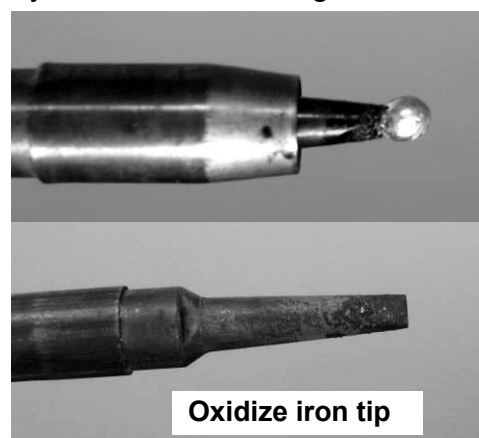
<Handling of iron unit>

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 20,000 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 malfunction 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 phenomenon.

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 soldering 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 malfunction is occurs if the heating temperature is high, the heating time is long or the exceeding solder feed amount is supplied.

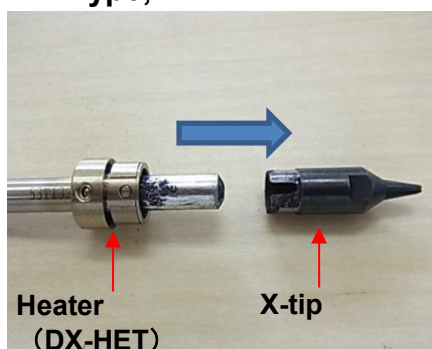
There are many solder defects except the above mentioned as follows:

"Solder shortage", "Icicle", "Solder excess", "Burning film" etc.

Please select suitable condition by seeing through the solder states.

14. How to Change the Iron Cartridge

DX- Type, X-***



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

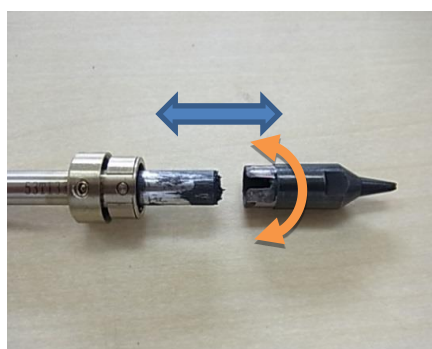
- 2) Pull out X-tip from DX-HET.



- 3) Wipe off the burning inhibitor substance stuck on the top of DX-HET.
It can be easily wiped 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, rotate it to the left and right several times.

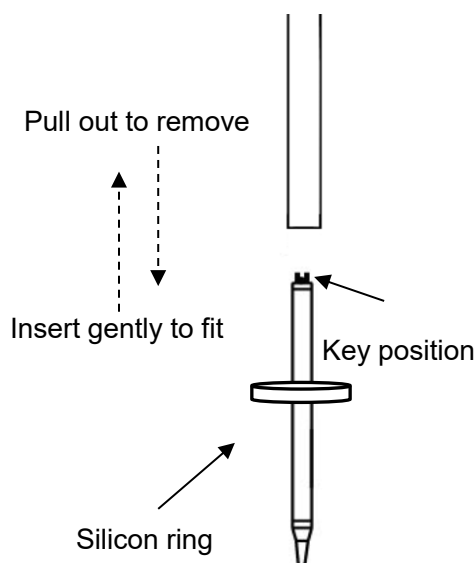


- 6) Make sure that burning inhibitor substance has been applied to the whole top of DX-HET as shown on the left.
Then insert the X-tip firmly while adjusting the key groove to the correct position.



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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