

PATRIOT

MW50

LA type soldering iron controller Instruction manual (QSS-4000)

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The 6th edition

JAPAN BONKOTE CO., LTD.



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1. Preface

Thank you very much for purchasing [MW50 Controller].

Please read Notes for safety before use, and use this machine properly, keep this manual after read.

2. Notes for safety



CAUTION!

Be sure to read this manual before using this machine.

- Never touch the power and 5P core relay cord with damp hands. Otherwise, you may get hurt due to electric shock and etc. (death at worst)
- Never dampen the iron tip with water or other liquid. Otherwise, burst cord may cause fire, malfunction, electric shock and etc. (death at worst)
- Take great care to handle the soldering iron while it is not rested on the workbench. Otherwise the heated tip may cause fire or adjacent operators may get hurt.
- Never touch the iron tip while current is being passed. Otherwise, you may get burnt. If you have to touch the tip like replacement of iron tip or parts, turn off the power and pull out the power plug from the receptacle, wait for a while and check if it has already cooled down sufficiently by using a thermometer or etc.
- Do not overhaul the machine when the machine has trouble. Otherwise, it may cause malfunction, electric shock and etc (death at worst). Contact with our customer service department and follow instructions to make maintenance.
- Be sure to use proper replacement parts such as fuse, checking capabilities. Otherwise, parts with wrong capacities may cause fire, malfunction and etc.

3. Recommendation of Auto-tuning before use

It is recommendable to do Auto-tuning before use, to operate with good effect for each conditions (iron tip temperature, shape of iron tip, etc.) and each environment, although each parameter is set with the standard parameter value at the shipment.

※Auto-tuning with simple key operation.(How to use, please refer P.7)

4. Notes for installation and use

- This machine is designed with earth specification. For safety, be sure to use an earth-equipped receptacle. (If you do not have such receptacle, install an earth separately.)
- For surrounding conditions, use this machine on a neat work bench on which a conductive mat is put.
- Refrain from place where the machine would be exposed too much moisture, direct sunshine, much dust and vibration.
- In order to prevent static electricity, it is recommended using a static electricity removal device, wrist strap etc.
- Odor is generated due to the use of solder and flux. Be sure to ventilate work places. (E.g. fitting of ventilator etc.)
- Be sure to pull out the power plug, when the machine is not used.
- Be sure to grab the power plug instead of cable, when inserting and pulling out the plug.
- If the power voltage is changed from 100V to 220V, make sure of confirm the specifications of the soldering iron unit before the change.
- If flammable objects are placed near this machine, there is a danger of fire. Be careful.
- Be sure to check the slack of each screw before use. If the screw is loosen, tight it.
- Do not use this machine for purpose other than the original purpose.

5. How to use MW50 controller

(A) Contents

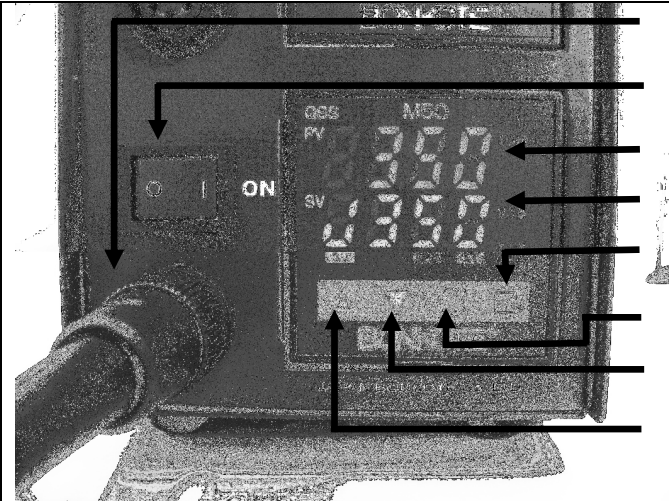


- ① MW50 Controller
- ② 3P Power Cable

※100V with 3PCHI-plug cable, 220V with 3EPV-plug cable will be attached.

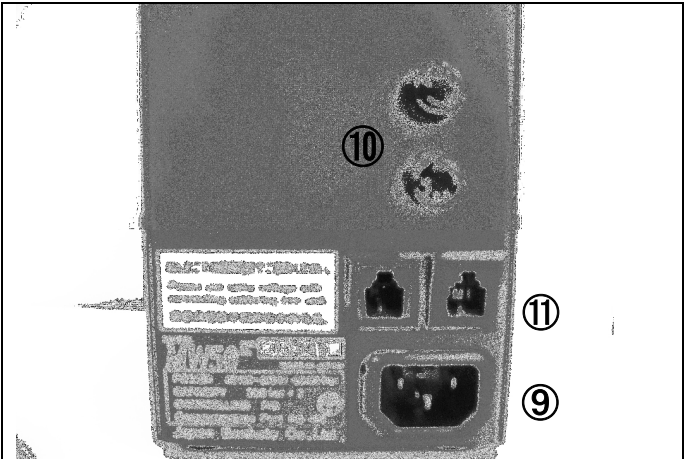
(B) Name of the body

《 Front 》



- ① 5P Connector
- ② Power switch
- ③ PV display(Working temperature)
- ④ SV display(Setting temperature)
- ⑤ □key(Speed setting)
- ⑥ ○ key(Function key)
- ⑦ ▽key(Setting value Down key)
- ⑧ △key(Setting value Up key)

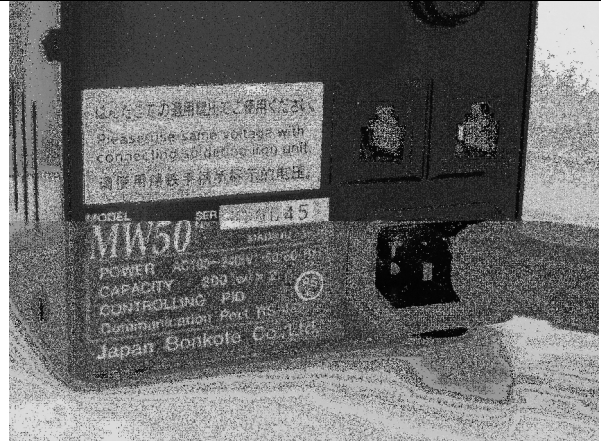
《 Back 》



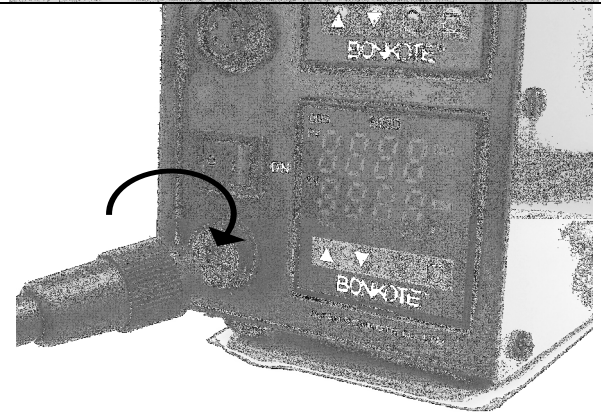
- ⑨ 3P inlet
- ⑩ Fuse holder (2pcs)
- ⑪ Modular jack (2pcs)

(C) How to assemble

- ① Insert the Power cable into 3P inlet.



- ② Connect the soldering iron to 5P connector at the front, and lock it with rotating to right. Please make sure the voltage of the soldering iron unit is applicable to the input-voltage of MW50 controller.



(D) How to use

① Turn on Power

Insert the power plug into the receptacle and confirm the input voltage of soldering iron and the one of this controller are same , then set the power switch to ON.

※If use 100V type of soldering iron with 220 input voltage in oversea, it makes heater damaged.



② Setting and confirmation of the sensor input type

MW50 controller is workable for 2 different kinds of soldering iron units, one is J-sensor type and other K-sensor type. Please make sure that the each sensor-type of soldering iron unit and the one of controller should be the same. Otherwise, temperature control is unable to work.

※The sensor type is set at the shipment.

~How to confirm the sensor type~

A: Controller

At the operation mode,  or  is indicated at left side of SV screen.

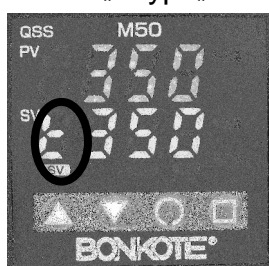
Controlling with J type indicates . Controlling with K type indicates .

Please check the sensor type of the controller is same with the one of connecting soldering iron unit.

《J type》



《K type》



B: Soldering iron unit

LA soldering iron unit has 2 different kinds of sensor type, J type and K type

Please check the label of the soldering iron unit.

Letter J printed after the model number is J type, no letter printed after the model number is K type.

K type soldering iron unit



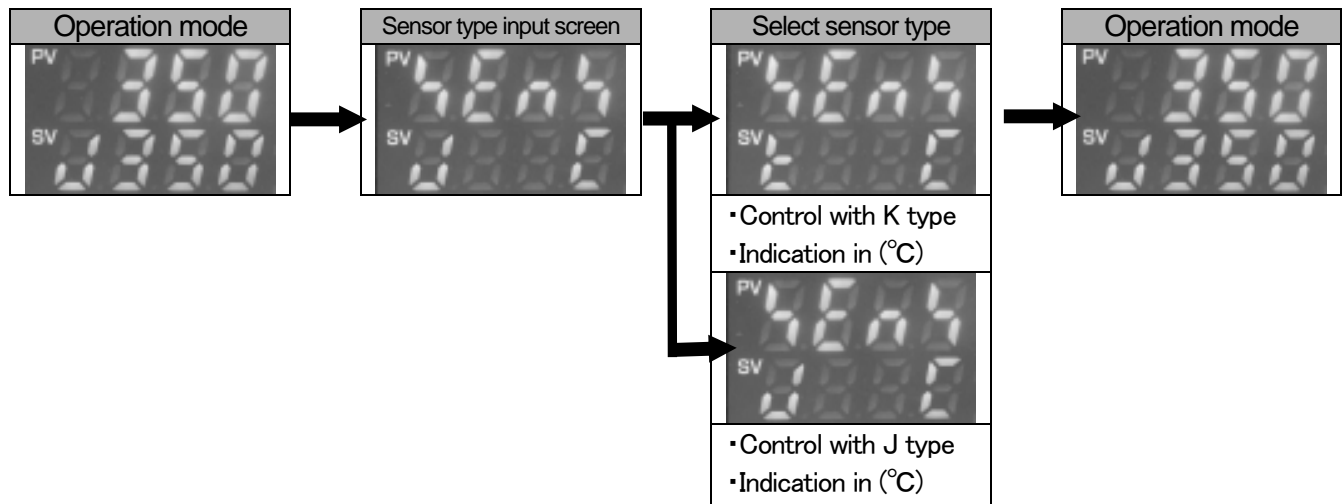
J type soldering iron unit



~How to set the sensor type and temperature indication~

I : At the operation mode, press \bigcirc key approx. 3 seconds with pressing ∇ key.
 $\hookrightarrow E \rightarrow \hookrightarrow$ is indicated at PV screen.

II : Input suitable sensor type by Δ or ∇ key, and push \bigcirc key 8 times to return to operation mode.



③ Set the temperature

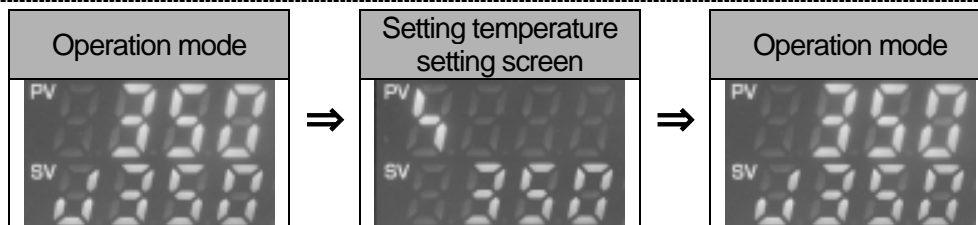
Initial setting : 350°C

Setting range : 0~500°C

I : At the operation mode, press \bigcirc key once and \hookrightarrow is indicated at PV screen.

II : Set the temperature by Δ or ∇ key.

III : Press \bigcirc key once to return to operation mode.



④ Compensation of temperature differences

Initial setting: 0°C

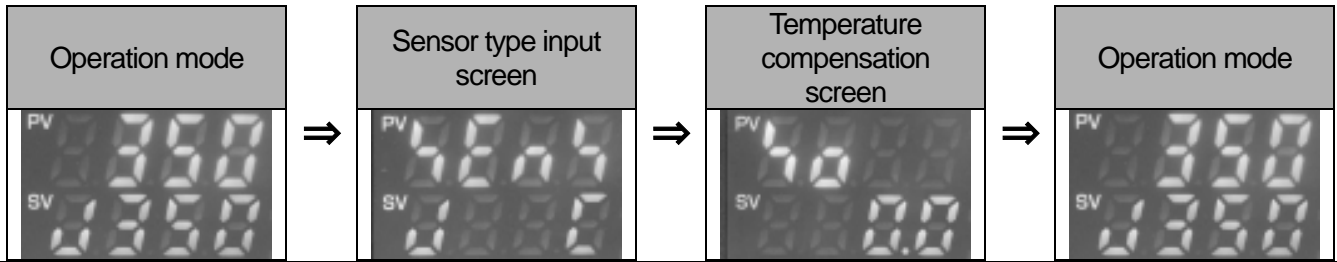
Setting range: -100.0°C ~ 100.0°C

I : At the operation mode, press \bigcirc key approx. 3 seconds with pressing ∇ key.
 $\hookrightarrow E \rightarrow \hookrightarrow$ is indicated at PV screen.

II : Push \bigcirc key 3 times and $\hookrightarrow \square$ is indicated at PV screen.

III : Input the compensate value by Δ or ∇ key at SV screen.

IV : After input the value, push \bigcirc key 5 times to return to operation mode.



How to calculate the compensation value by Standard measurement instrument

Example:

Temperature instruments indicates : 350°C

Controller indicates : 355°C

Set the compensation value as -5

The compensation value = Standard measurement instrument indication - Controller indication
 $\Rightarrow 350 - 355 = -5$

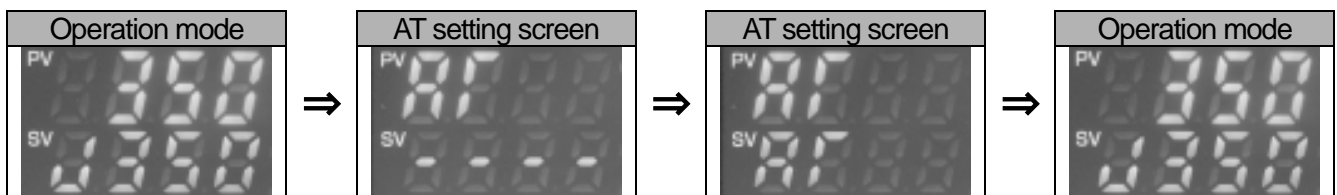
⑤ Start Auto-tuning after reach to setting temperature

I : At the operation mode, push \odot key with pressing \triangle key, AT is indicated at PV screen.

II : Push \triangle key once in order to indicate AT at SV screen as well.

III : Push \odot key to start Auto-tuning. (AT blinking starts at right bottom of the screen)

Auto-tuning is done about 2minutes(AT stops at right bottom of the)



Auto-tuning: It automatically calculate suitable PID value which control soldering iron.

Please make sure to do Auto-tuning otherwise, soldering iron may not perform with enough effect.



Please make sure to do Auto-tuning **after reach to setting temperature.**

Please **do not touch the soldering iron** during Auto-tuning (during AT is blinking at right bottom of the screen). PID value is automatically calculated by fluctuating temperature (about 2minutes). Touching the soldering iron during the fluctuation in temperature, it cause incorrect PID value calculation and soldering iron may not perform with enough effect.

Auto-tuning is done when the blinking stops.

Above ④、⑤ are unnecessary to do every time. Please do it when change iron tip and change setting temperature.

✘At shipment, Auto-tuning is not done yet. Please make sure to do Auto-tuning before use.

6. Optional setting

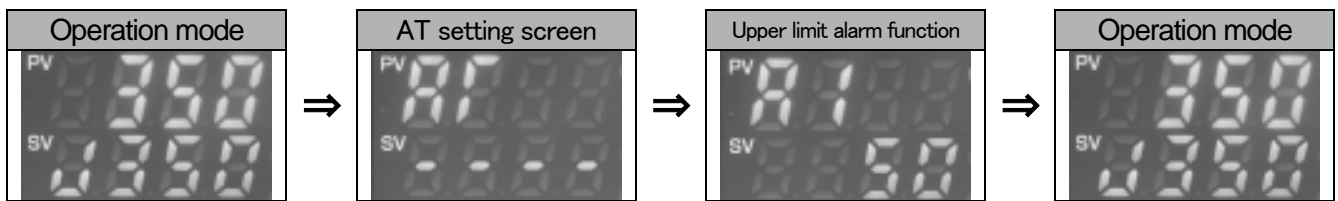
MW50 has various functions. Please use the function with your convenience.

(A) Alarm function Upper limit setting

① Set the upper limit alarm of soldering temperature

Initial setting: 50°C

- I : At the operation mode, press \odot key with pressing Δ key. \overline{AF} is indicated at PV screen.
- II : Push \odot key 5 times, $\overline{A5}$ is indicated at PV screen.
- III : Input the value by Δ or ∇ key at SV screen. Push \odot key 2 times to return to operation mode.



Upper limit alarm: It alarms when the temperature exceed the range OO°C of setting temperature.

Example:

The upper limit is set as 50. setting temperature is 350°C .

It alarms when temperature become over 400°C .

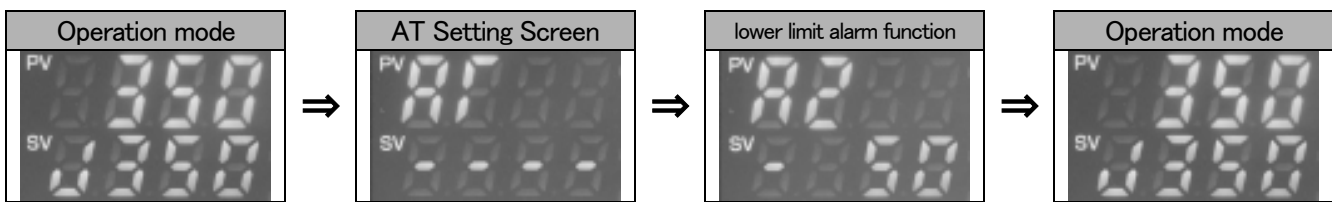
Set 0 when alarm function is unnecessary.

(B) Alarm function Lower limit setting

① Set the lower limit alarm of soldering temperature

Initial setting : -50°C

- I : At the operation mode, press \odot key with pressing Δ key. \overline{AF} is indicated at PV screen.
- II : Push \odot key 6 times, $\overline{A6}$ is indicated at PV screen.
- III : Input the value by Δ / ∇ key at SV screen. Push \odot key once to return to operation mode.



Lower limit alarm: It alarms when the temperature exceed the range OO°C of setting temperature.

Example:

The lower limit is set as -50 . setting temperature is 350°C .

It alarms when temperature become under 300°C .

Set 0 when alarm function is unnecessary.

(C) Speed Setting

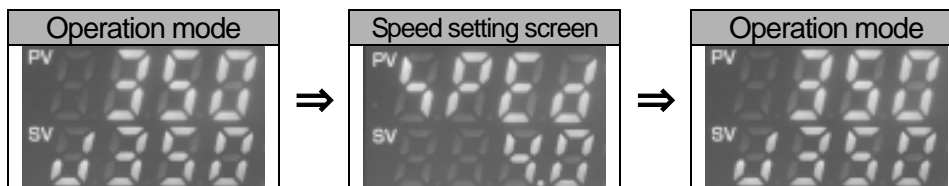
① Control the recovery speed to setting temperature

Initial setting : 4.0 Setting range : 1.0 ~ 10.0

I : At the operation mode, push \square key once. $\curvearrowright P E \curvearrowleft$ is indicated at PV screen.

II : Input suitable value by \triangle or ∇ key at SV screen.

III : After input the value, push \square key once to return to operation mode.



Set 1.0 : Recovery speed is fast, and overshooting become large.

Set 10.0 : Recovery speed is slowly, and overshooting become less.

(D) Upper limit of setting temperature

① Set the upper limit of setting temperature

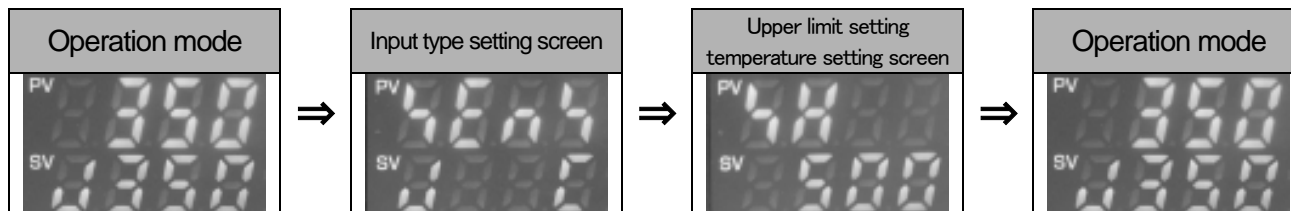
Initial setting : 500°C Setting range : 0 ~ 500°C

I : At the operation mode, press \bigcirc key with pressing ∇ key about 3 seconds.

$\curvearrowright E n \curvearrowleft$ is indicated at SV screen.

II : Push \bigcirc key twice. $\curvearrowright H \curvearrowleft$ is indicated at SV screen.

III : Input the value by \triangle or ∇ key at SV screen, push \bigcirc key 6 times to return to operation mode.



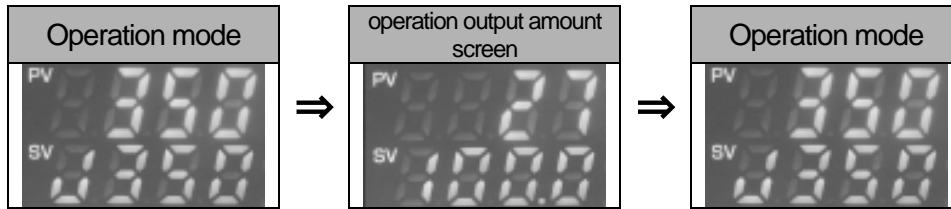
(E) Monitor indication of operation output amount

① Monitoring operation output amount of heater

I : At the operation mode, press \bigcirc key about 3 seconds.

Operation output amount (0~100%) is indicated at SV screen.

II : Push \bigcirc key to return to operation mode.

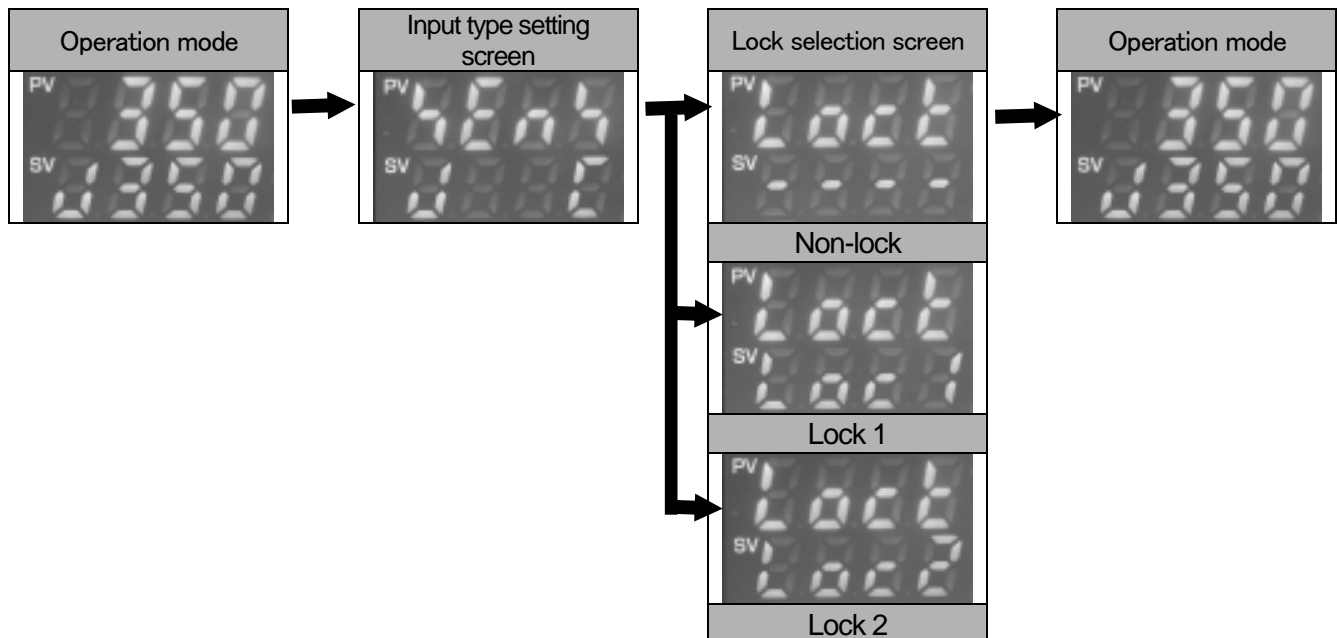


(F) Lock function

① Lock setting value prevention from error setting

Initial setting : Non-lock

- I At the operation mode, press \bigcirc key with pressing ∇ key about 3 seconds.
 Lock is indicated at PV screen.
- II Push \bigcirc key once, Lock is indicated at PV screen.
- III Select the type of lock by Δ or ∇ key, push \bigcirc key 7 times to return to operation mode.



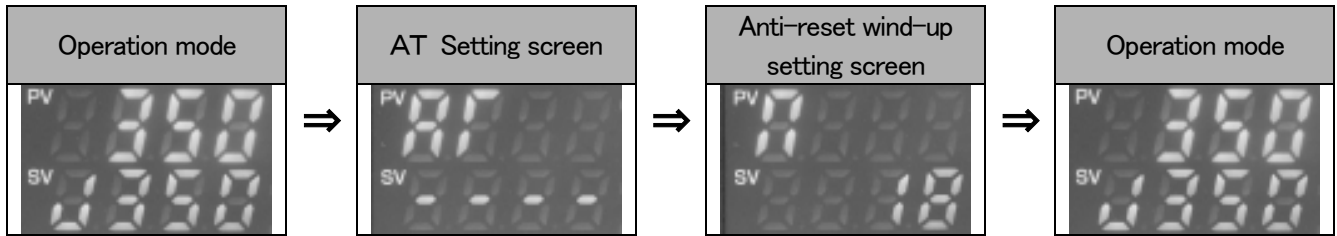
- - - - : Non lock
- Lock : Lock up all function-setting except lock function.
- Lock : Lock up all function-setting except lock and temperature function.

(G) Anti-reset wind-up setting

① Control Overshooting

Initial setting : 18% Setting range : 0 ~ 100%

- I : At the operation mode, push \bigcirc key with pressing Δ key. AF is indicated at PV screen.
- II : Push \bigcirc key 4 times, AF is indicated at PV screen.
- III : After input the value by $\Delta\nabla$ key at SV screen, push \bigcirc key 3 times to return to operation mode.



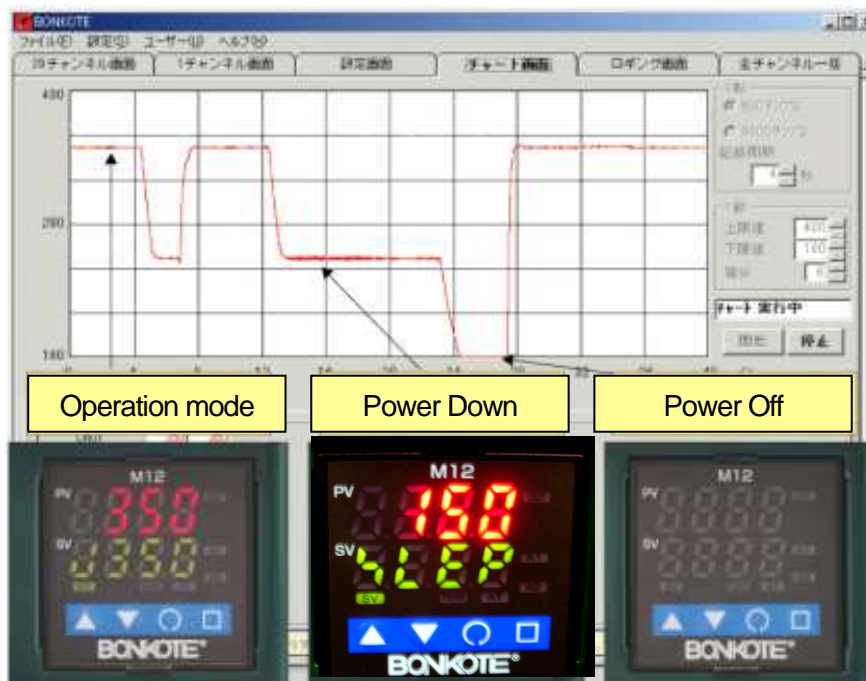
It is recommendable NOT to change the initial setting value. Setting lower value could restrain from overshooting, however, there is possibility unable to recover to the setting temperature.

(H) Auto-Power Down / Auto-Power Off setting

(1) Setting of parameter value

Prevent from Deterioration and Oxidization of the iron tip, the soldering iron tip temperature is lowered (Power Down) and supplying electric power to the heater is stopped (Power Off) automatically when the iron tip temperature is no changed during the specified time(available to set the time).

This function is also effective for saving energy and safety.

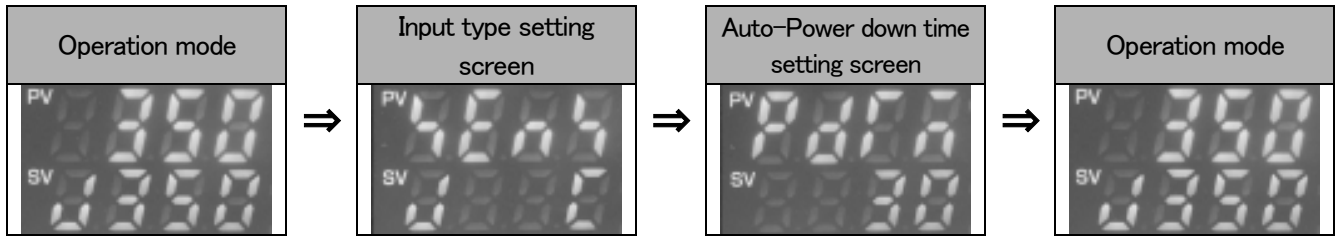


① Setting of Auto-Power Down time

Initial setting : 30 minutes

Setting range : 0 ~ 120 minutes

- I At the operation mode, press \odot key with pressing ∇ key about 3 seconds to indicate $\text{P}\text{D}\text{F}\text{O}\text{F}$ on PV screen.
- II Push \odot key 5 times to indicate $\text{P}\text{D}\text{F}\text{O}$ on PV screen.
- III Set the value by Δ or ∇ key, push \odot key 3 times to return to operation mode.



About Auto-Power Down time:

e.g.: set value 30 minutes

No fluctuation in the temperature of iron tip during stand-by mode for more than 30 minutes, the decline in temperature will start automatically.

During the process “ P_{d} ” and the setting value of Auto-Power Down will be indicated alternately.

Set the value “0” if you want to cancel this mode.

② Setting of Auto-Power Down temperature

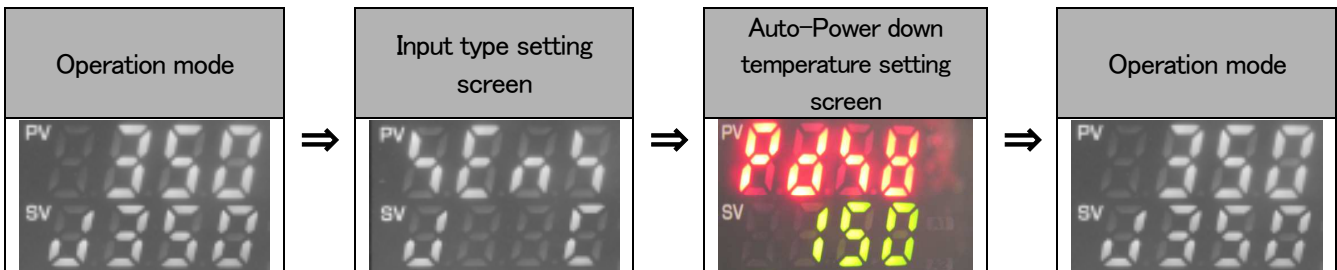
Initial setting : 150°C Setting range : 0 ~ Setting temperature—1°C

I At the operation mode, press O key with pressing ∇ key about 3seconds.

P_{d} is indicated at PV screen.

II Push O key 6 times to indicate P_{d} is indicated at PV screen.

III Input the value by Δ or ∇ key, push O key 3 times to return to operation mode.



Auto-Power Down temperature is the temperature during Auto-Power Down procedure.

Example:

When set Auto-Power Down temperature to 「150°C」, controller will stand by with 「150°C」.

Setting temperature in operation is 350°C It only can set to lower than 349°C.

③ Setting of Auto-Power Off time

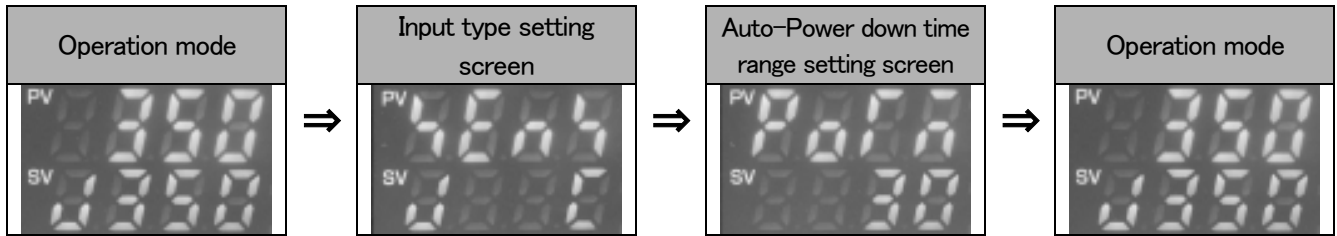
Initial setting : 30 minutes Setting range : 0 ~ 120 minutes

I At the operation mode, press O key with pressing ∇ key about 3seconds to indicate

P_{off} on PV screen.

II Push O key 7 times to indicate P_{off} on PV screen.

III Set the value by Δ or ∇ key, push O key once to return to operation mode.



About Auto-Power Off time:

e.g.: Setting value **「30 minutes」**

During Auto-Power Down operation (LEEP is blinking at SV value), no fluctuation within the temperature range while **「30 minutes」**, the controller recognizes that soldering iron is not using, and automatically turn off the power.

Once Auto-Power Off operation starts, it becomes same condition with Power off.

Set the value "0" if you want to cancel this mode.

(2) Other operation method

① Return to operation mode from Auto-Power Down mode

I : When the temperature move out from the Auto-Power Down temperature range(initial value: 5°C), Auto-Power Down function is released, and return to operation mode. For example clean iron tip by moisturized sponge is easy to return.

When Auto-Power Down function is not released, press Δ or ∇ key more than 3seconds to release.

II : At Auto-Power Down mode, press Δ or ∇ key more than 3 seconds to return to operation mode.

② Return to operation mode from Auto-Power Off mode

I : Turn on the power again.

③ Manual operation

I : At the operation mode, after reach to setting temperature, press Δ or ∇ key more than 3 seconds to move to Auto-Power Down mode.

II : At Auto-Power Down mode, press Δ or ∇ key more than 3 seconds to return to operation mode.

(I) PID value manual setting

This machine is basically unnecessary to do PID setting due to loading Auto-tuning function. It is able to do manual setting if overshooting which soldering iron tip temperature become high occurred with special work. Please use PID manual setting with your convenience.

	Major effect
P Proportional band	Overshoot become less with bigger value however, temperature recovery time become longer and temperature drops during soldering may be larger.
I integration time	Overshoot become less with bigger value however, temperature recovery time become longer and temperature drops during soldering may be larger.
D	Overshoot become less with smaller value however, temperature recovery time

derivative time	become longer. This value will be set or adjusted after P value and I value is set.
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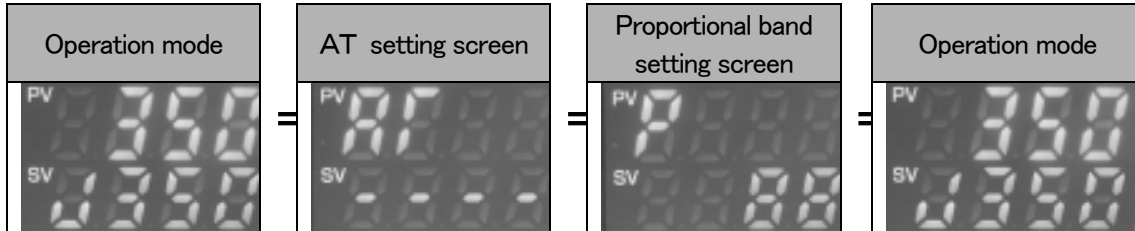
① Setting of Proportional band

Initial setting : 88°C Setting range : 0 ~ 1000°C

I : At the operation mode, push ○ key with pressing △ key. \overline{P} is indicated at PV screen.

II : Push ○ key once, \overline{P} is indicated at PV screen.

III : Input the value by △ or ▽ key, push ○ key 6 times to return to operation mode.



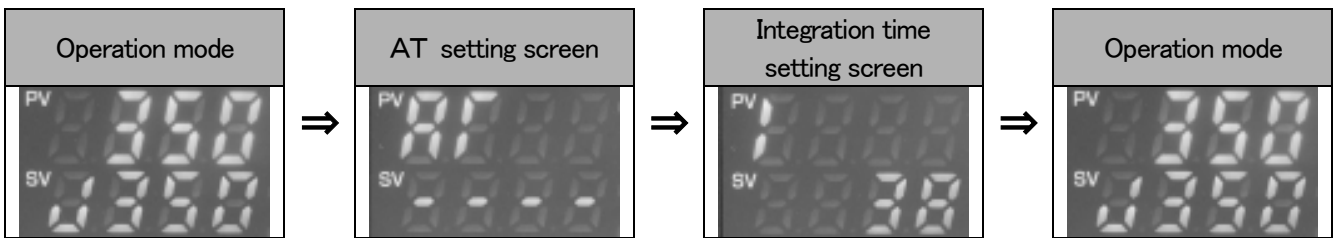
② Setting of Integration time

Initial setting : 38seconds Setting range : 0 ~ 1000°C

I : At the operation mode, push ○ key with pressing △ key. \overline{I} is indicated at PV screen.

II : Push ○ key 2 times, \overline{I} is indicated at PV screen.

III : Input the value by △▽ key, push ○ key 5 times to return to operation mode.



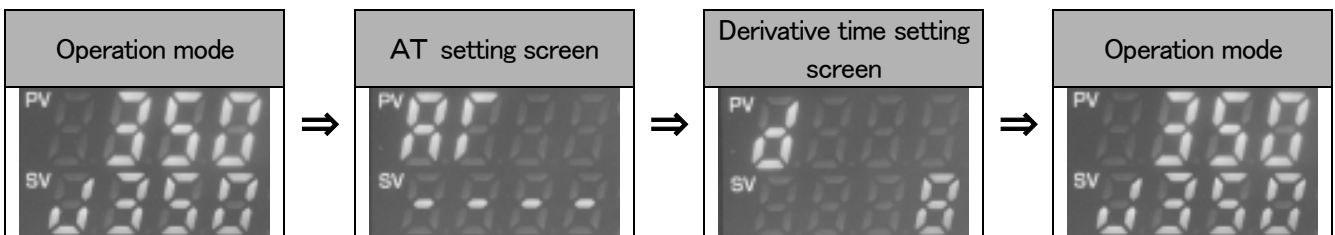
③ Setting of Derivative time

Initial setting: 8 seconds Setting range: 0 ~ 300°C

I : At the operation mode, push ○ key with pressing △ key. \overline{D} is indicated at PV screen.

II : Push ○ key 3 times, \overline{D} is indicated at PV screen.

III : Input the value by △▽ key, push ○ key 4 times to return to operation mode.



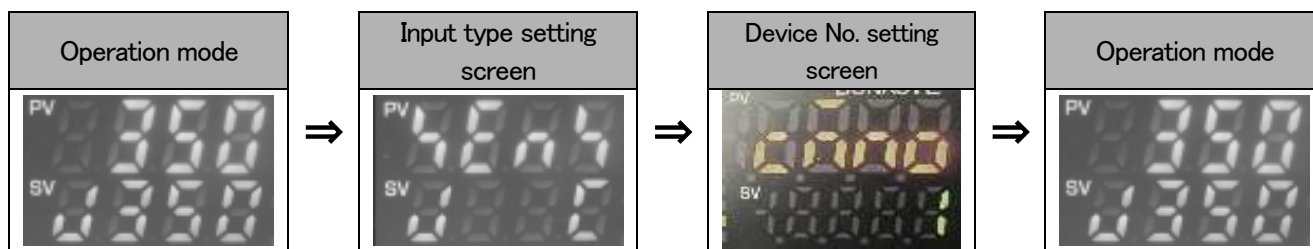
(J) Device Number Setting

(1) Device Number Setting is required under the condition of QSS-4000 Concentrated temperature management System for soldering iron.

① Setting of Device Number

Initial Setting: 1 Setting Range: 1 ~ 95

- : At the operation mode, push \bigcirc key with pressing Δ key in 3 seconds, hE n h is indicated at PV screen
- : Push \bigcirc key 4 times, e n n e is indicated at PV screen.
- : Input Device Number by $\Delta \nabla$ key on the SV screen, then push \bigcirc key 6 times to return to operation mode.



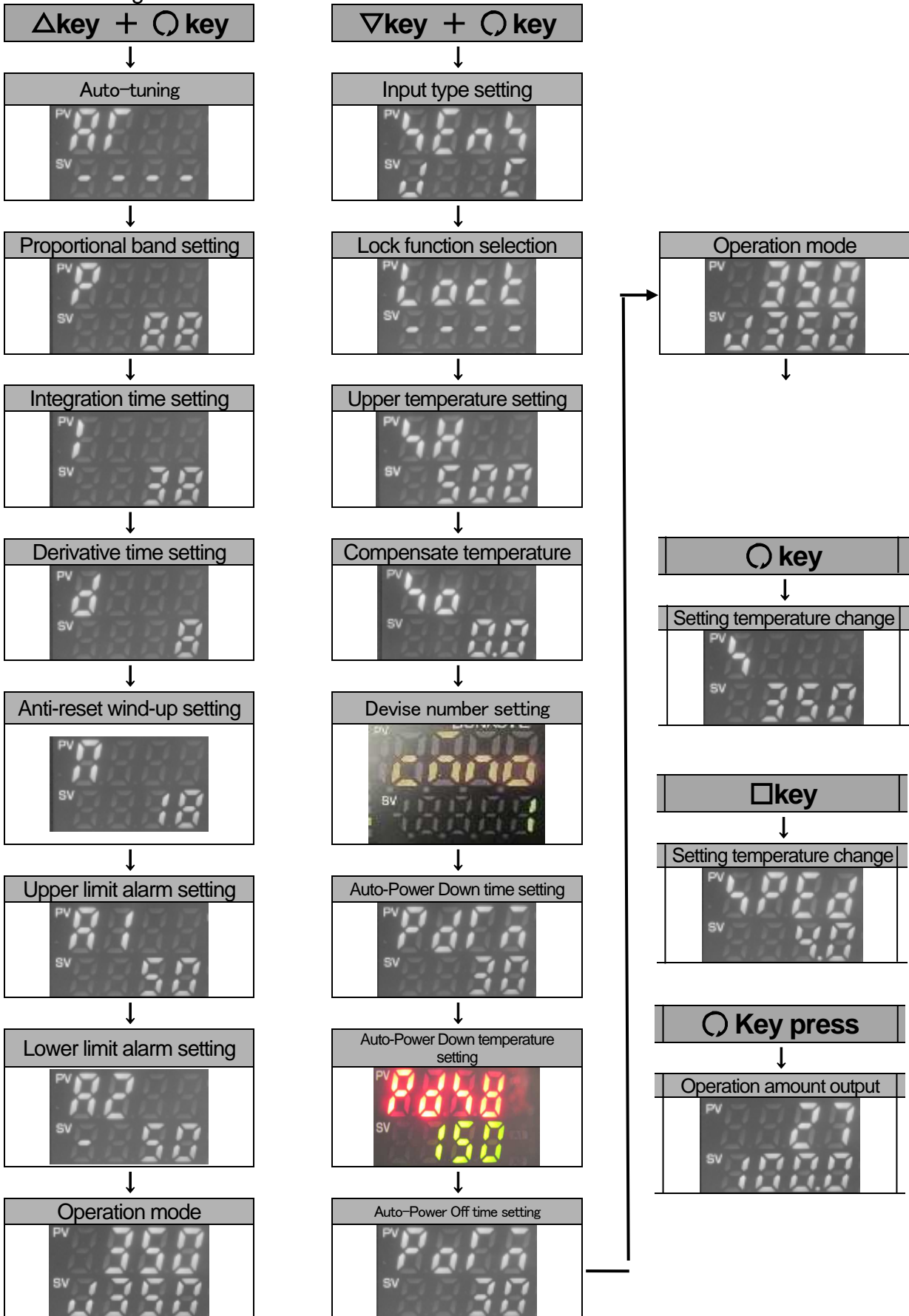
Attention

The numbering must start with “1”

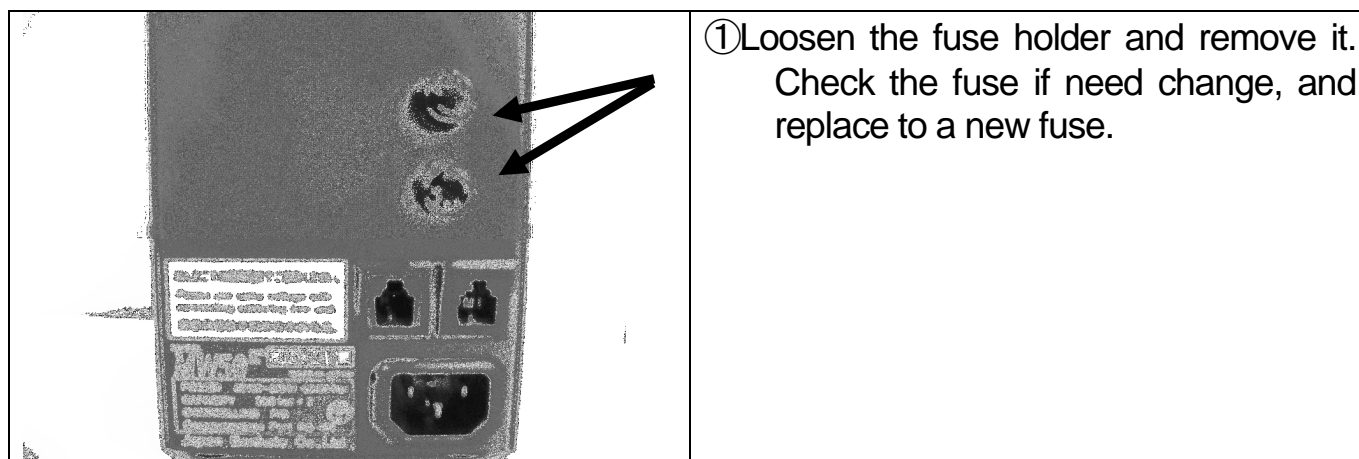
e.g. The first connected M50 's device number must be “1”, and 2nd one is “2” and continued

7. Character list

All character setting of M50 listed.



8. How to maintenance



Model No.	Specification
Fuse 3A	Glass fuse 250V 3A(φ5.2x20mm)

9. Standard specification

Input voltage	AC100~240V
Temperature range	0~500°C (At shipment)
Power code	100V:3PCHI 220V:3EPV
Dimension	97(W)x73(H)x130(D)mm
Weight	Less than 750kg
Fuse	3A
Temperature control method	PID control (Auto-tuning setting)
Temperature indication	PV:LED(red), SV:LED(green)
Error indication	<p>“ _ _ _ _ ” Over scale : Temperature exceed upper limitation of indicatable temperature ※ Error of sensor (indication)</p> <p>“ _ _ _ _ ” Under scale : Temperature exceed lower limitation of indicatable temperature ※ Opposite pole of sensor (indication)</p>
Material (case)	Steel
Power consumption	Less than 10VA (Controller only)

10. Guarantee and After sales service of MW50

(A) Trouble shooting

Condition	Cause	Measures	Pag
-----------	-------	----------	-----

			e
Soldering iron does not heat.	1. Unable to power on		
	① The power cable/switch are set correctly ?	Check the power cable and the switch	4
	②Is the fuse blown?	Replace to a new fuse	17
	2. Soldering iron is not heated although power on		
	①Is the soldering iron and the controller completely connected?	Check the connecting	
	② Is the soldering iron tip sensor completely connected to the soldering iron?	Check how to replace soldering iron tip	
	③Is the heater element consumed?	Check the conduction and replace to new heater element	
Temperature unstable	①Is Auto-tuning done?	Set up Auto-tuning function	7
	②Temperature does not reach to setting temperature	Set up Anti-reset wind function	10
	③Over-shooting is large		
Key operation is unable	①Is the lock function effective?	Check the setting of Lock function	10

(B) Guarantee

Our products are shipped after sever factory tests and inspections. However, if you find malfunctions or defects due to problems in workmanship or transportation, please contact your dealers or us. The guarantee period of your products is in one year after your purchase, except for replacement parts.

(C) After sales service

When you think the product does not operate properly, read this manual again to check. If still troubles are not solved, please contact with your dealer or us.

BONKOTE®

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