Instruction Manual of Instrument for Automatic Control of Temperature SU-105		
Model	Kinds of Sensor	Output
SU-105KRR	K(-200.0℃~999.0℃)	OUT1,2:RELAY
SU-105PRR	Pt100 (-200.0℃~400.0℃)	OUT1,2:RELAY
SU-105ip	ic(-50.0℃~150℃)	OUT1,2:RELAY

※ Thank for purchasing Products of SAMWON ENG.
Instruction Manual is provided to prevent Products from being damaged or defected by user's mistake and to inform user the accurate how to use. Please keep it in safe place. Thank you.

⚠ Warning

It' s not guaranteed to prevent any hazards in personal, property, and expensive peripheral, as it' s not provided for the purpose of safety. Please utilize additional duplex safety instruments.

⚠ Danger

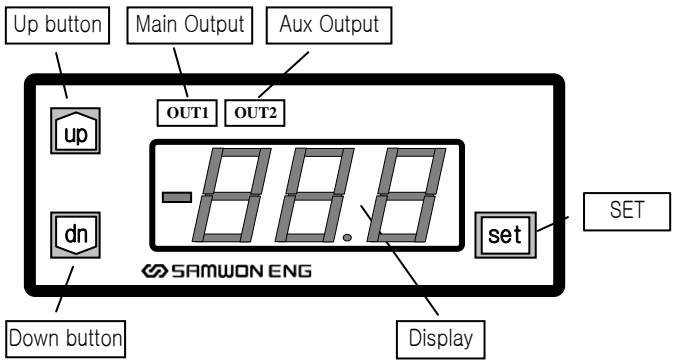
①Electrical shock - Please do not access to any AC terminal, while in use. Electrical shock is expected.
②Please shut down the electrical power, whenever you check the power input.

⚠ Caution

1. A terminal (M3.5, Wide 7.2mm in maximum) shall be used to connect AC power.
2. A hazard in personal and property is expected, when you do not follow the instructional recommendation by manufacturer.
3. A keen attention shall be expected to ensure that any ingress of dirt, water, oil and debris of cable do not exist inside the product, in order to prevent any damage on product and a fire hazard.
4. Any modification and disassembly are not allowed. It may cause a critical damage on product.
5. Relay durability depends on the load capacity and the on-off frequency. * durability : mechanical durability (a million times), electrical durability (0.1 million times at AC250VAC 2A)
6. Connect the terminal by confirming the polarity and usage.
7. Isolate the wiring from the cable of high-voltage, electrical power and motor in order to prevent any derived noise.
8. Avoid the followings.
   ①dirt, corrosion gas, oil, humidity.
   ②danger of high humidity and freeze.
   ③radiant heat of sun shine.
   ④vibration impact.
   ⑤altitude higher than 2,000M.
   ⑥less than grade 2 environment.
9. Power switch or a circuit breaker are recommended for shut-down.
10. Utilize a switch or a circuit breaker equivalent to IEC947-1 or IEC947-3 to be attached to panel.
11. An authorized Compensating Lead Wires shall be used as a extension wire which connects Thermo Couple and Controller. Normal Lead Wire may cause a differential in temperature at the wiring connection between Thermo Coupleand Normal Lead Wires. A sensor cable longer than 3M may cause a variation of temperature. Correct it by using compensation feature(rSt).
12. When RTD sensor is selected, ① extension of wire shall be connected in 3 wires, which have the same thickness and length. A different resist in wire may cause a differential in temperature. ② A sensor cable longer than 3M may cause a variation of temperature/humidity. Correct it by using compensation feature(rSt).
13. Isolate the product from the power cable to prevent any noise.
14. Avoid the equipment which creates a strong high frequency noise, such as welding machine, a sewing machine and SCR controller.
15. Utilize additional terminal to be used in solenoid valve.
16. Turn controller off when lighting and thunder.
17. Mobile radio may cause a defect. Please refrain.

*** Please pay keen attention to above. It may cause a defect to product.**

1. Picture



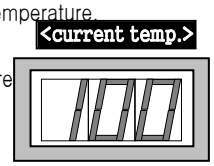
Display	Display the current & set temperature.	
Main/AuxOutput	Display on-off state of main/aux output.	
SET	set	Temperature to be set.
Up	up	Up to amend preset.
Down	dn	Down to amend preset.

2. Feature

▶on-off control or PI control for cooler/heater only.
Variation(dIF) 0.1~25.0℃, Delay timer of power-on switch for 0~300 seconds. Selectable in right/opposite direction.
Proportional, Integral compensation, Period timer (1~120seconds) to be selectable.
▶Digital period timer inside for Defreeze. 999minutes in max.
(controllable by every minute/second.)
▶Lock feature for installer. / Allowance of range.
° Preset temperature could be regulated in range. ⇒ Allowance of range
° Feature shall be locked. (Hysteria, Delayed time, direction..) ⇒LOCK feature
▶In case of error in sensor, output leveling feature.(applied to TH, IC, HUM, A only)

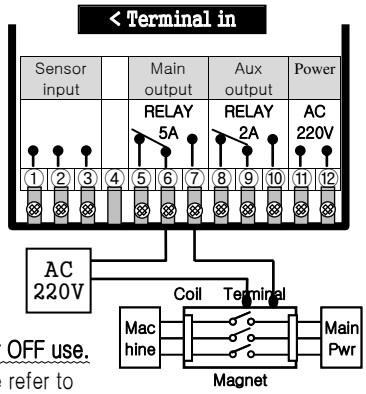
3. Set Control

▶ Supply power to controller to display current Temperature.
▶Set key only once. Set indicator blinks.
▶ Use Up(Up),Down(Dn) key to reset Temperature
Up/Down key for longer than 1 second will speed up its feature.



※If "Allowance of range" is on state, reset range will be limited in the dedicated range.

▶Set key once more again will Memorize the reset value.
Even if power is turned-off, its set Set value will not be erased.
▶Current temperature is displayed And controller will be active.
▶Main output shall be connected to terminal 6~7.



※ Terminal 5 is not available, only for OFF use.
※For Aux output(Alarm/Timer), please refer to <9. reset alarm output> and <10. set period timer>.

4. How to wire Sensor

① How to wire sensor.

▶ Connect the wire as shown in the picture in right. Wrong wiring shall cause an error. "Err" in display.

②How to extend sensor wire.

▶In case to extend RTDsensor and K, T sensor, refer to caution 11 and 12 in Page 1.

▶Extension of IC, humidity and themistor sensor is available within 100m.

< Terminal at

Sensor input		Main output	Aux output	Power
		RELAY 5A	RELAY 2A	AC 100~240V

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

A B B

+ −

▶ Use the wire which has a shield In order to prevent any noise input, when you want to extend cable of sensor.

Sensor	①	②	③
K	red/white		Black
PT100	White	Black	Black Black
IC	Black	White	Red

③ How to compensate the variation. (when current indicator of temperature is wrong.)

▶ A long sensor wire and a old sensor may cause a variation in temperature. Compensation feature(rSt) could be used.

▶ At current temperature, press set key for 3~ seconds.

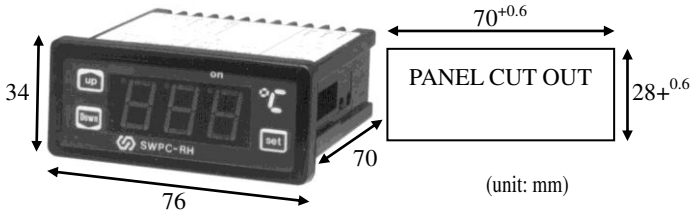
▶ Release set key when dIF or P is displayed. Set key several times to move to rSt.

▶ Up(up),Down(dn)key to input the compensation. Set key for 3~ seconds will memorize and amended value will be displayed.

Such as

Current temperature		compensation temperature (rSt)		Displayed current temperature
20 ℃	+	-5 ℃	=	15 ℃
20 ℃	+	10 ℃	=	30 ℃

5. Out appearance for panel



6. Limit of RESET, Lock of RESET

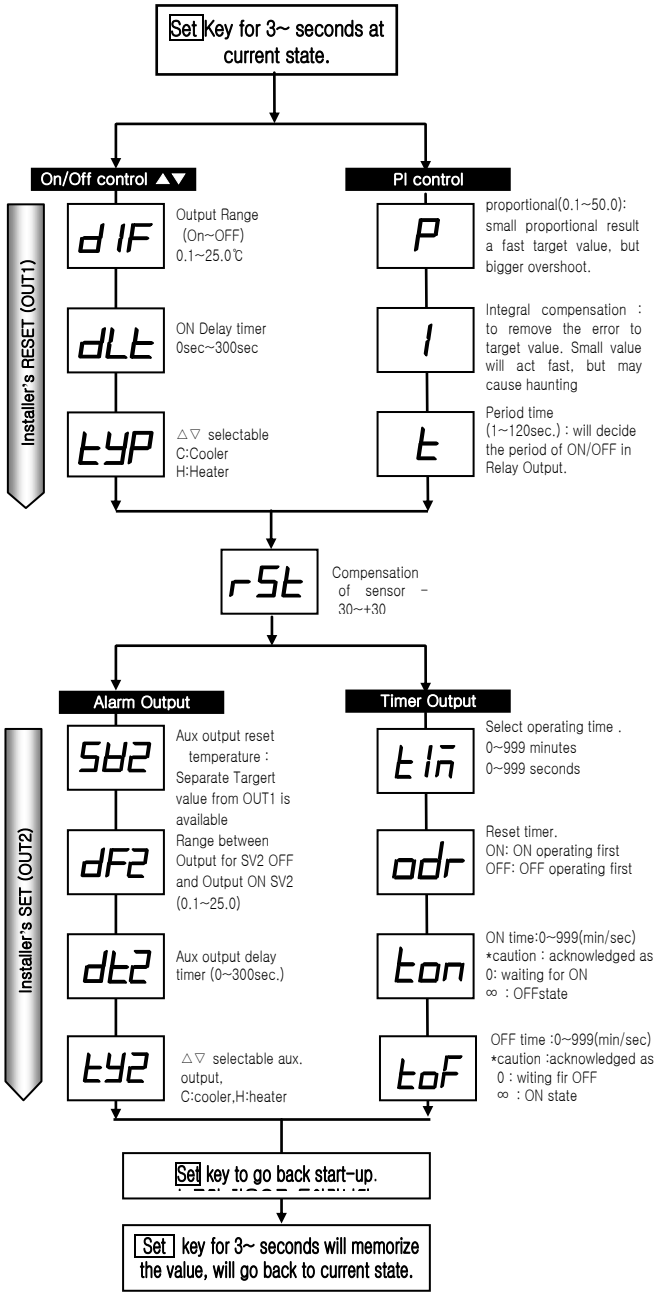
① By using lock feature, installer's reset could be prevented.

	Item	Value	EXPLANATION
PRESET at FAC.	LoC	OFF	Release of lock and reset of all feature are available.
		ON	Locked. All of reset is not available, except preset of temperature.
	Item	Value	EXPLANATION
	StH	50	Up limit of temperature to 50 degree.
	StL	40	Down limit of temperature to 40 degree.

▶ set key for3~ seconds will memorize the value as effective from that time on. ※ Since then, reset if temperature is available in the range of 50℃~40℃only.

7 Installer's RESET

▶ Main output could be reset by using the bellows. (set key will skip to next step at every pressing.)



* Example : DIF and TYP input value

① TYP = at C(cooler(in reverse direction)) state

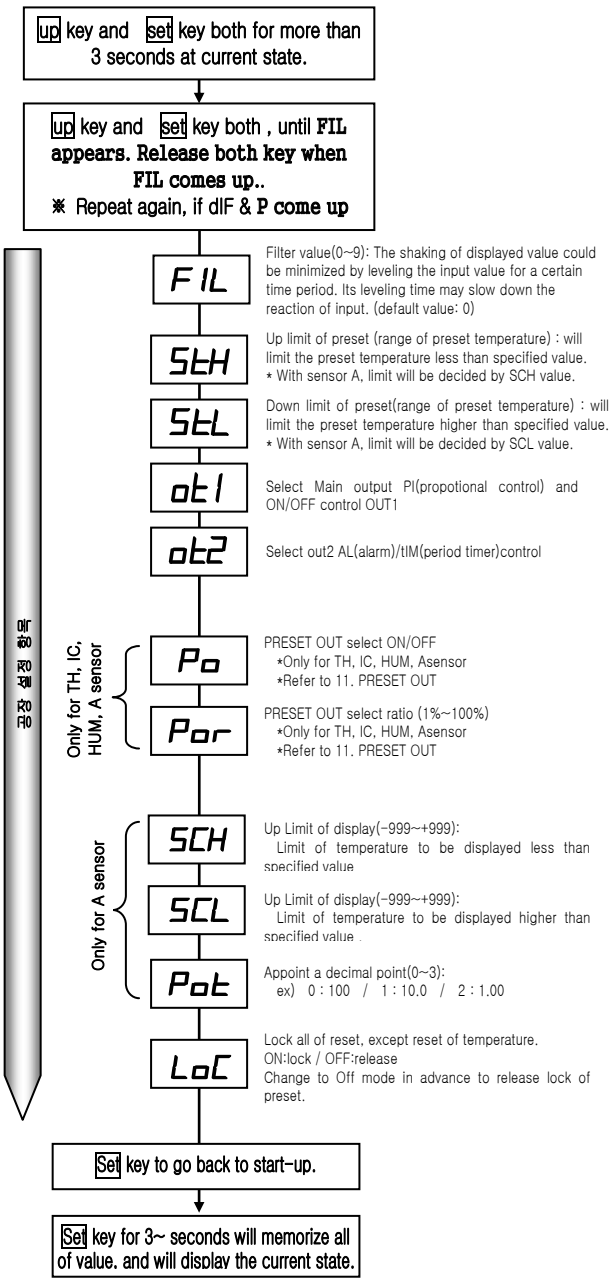
ex) assuming of preset temperature 10.0℃, DIF = 2.0,
Relay ON : 12.1℃, Relay OFF : 10.0℃

② TYP = at H(heater(in right direction)) state

ex) assuming of preset temperature 10.0℃, DIF = 2.0,
Relay ON : 7.9℃, Relay OFF : 10℃

* assuming dLt=10, Relay will be ON in 10 seconds.
* assuming tyP = C(cooler), will be used for lowing temperature.
* assuming tyP = H(heater), will be used for increasing temp.

8. PRESET at manufacturer's site



9. RESET ALARM OUTPUT (AUX OUTPUT)

① Reset Aux. output as Alarm Output.

▶ Aux. output is selectable for Alarm output and Period Timer output. Therefore, it should be reset as Alarm output.
(It's preset as Alarm output at manufacturer's site.)

▶To reset manufacturer's preset, press up key and set key both simultaneously for more than 3 seconds at current state.

▶ up key and set key both , until FIL appears. Release both key when FIL comes up on display.

▶ set key several times to move to ot2.

▶ When ot2 comes up, Up(up),Down(dn) key to change the preset value as below.

FAC SET	ITEM	VALUE	EXPLANATION
	ot2	AL	Aux output is set as alarm output.

▶ set key for 3~ seconds will memorize the changed value.

② How to set the temperature of Alarm output.

▶ set key for more than 3 seconds at current state. Release set key when DiF or P comes up.

▶ set key several times to move to SV2.

▶ Change the set value by using Up(up),Down(dn), SET(set) key.

	Item	Value	Said to
Installer's Reset	SV2	Range of available temp.	To set temperature of Alarm output.
	dF2	0.1~25.0	To set the value in the range of Alarm output OFF~ output ON.
	dt2	0~300 sec.	To set the delay time of Alarm output ON.
	ty2	H / C	To set the value of Alarm output Heating(H/in right direction) and Cooling(C/in opposite direction).

▶ set key for more than 3 seconds to memorize the value.

Ex.1) Assuming 20.0℃ of Alarm output temperature, dF2=5.0, dt2=10, ty2=H,
Relay ON : ON after 10 seconds waiting at 14.9℃
Relay OFF : 20.0℃

Ex.2) assuming 20.0℃ of Alarm output temperature, dF2=2.0, dt2=20, ty2=C,
Relay ON : ON after 20 seconds waiting at 22.1℃
Relay OFF : 20.0℃

※ Alarm output will operate being isolated from the operation of Thermometer.

10. SET PERIOD TIMER

① Set Aux. output to Period Timer output.

▶ Aux. output is selectable for Alarm output and Period Timer output. Therefore, it should be reset as Period Timer output..
(It's preset as Alarm output at manufacturer's site.)

▶ To reset manufacturer's preset, press up key and set key both simultaneously for more than 3 seconds at current state.

▶ up key and set key both , until FIL appears. Release both key when FIL comes up on display.

▶ set key several times to move to ot2.

▶Change the set value by using Up(up),Down(dn) key.

FAC. SET	ITEM	VALUE	EXPLANATION
	ot2	tIM	Aux output is set as Period Timer output.

▶ set key for 3~ seconds will memorize the changed value.

② How to set On/Off time of Period Timer output.

▶ set key for more than 3 seconds at current state. Release set key when DiF or P comes up.

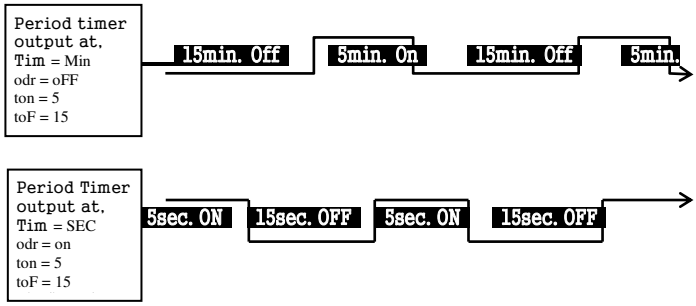
▶ set key several times to move to tIM.

▶ Change the set value by using Up(up),Down(dn), SET(set) key.

	ITEM	VALUE	EXPLANATION
Installer' SET	tIM	MIn / SEC	Select value of Min/SEC.
	odr	on / oFF	Select value of initial output
	ton	0 ~ 999	Select output ON time value. * 0 → continuous OFF state without ON time.
	toF	0 ~ 999	Select output OFF time value. * 0→ continuous ON state without OFF time.

▶ set key for more than 3 seconds to memorize the value.

③ Explanation of Period Timer operating process



※ Period Timer will operate being isolated from the operation of Thermometer.

11. RESET of PRESET OUT

※ Only for sendor TH, IC, HUM, A..

①When there's an error in sensor during instrument's operating, a damage could be minimized by leveled output value of prior output value, instead of shut-down.

②This PRESET OUT feature is available only in the condition of ON/OFF control, On/OFF time should be within 1 second/18hours in average respectively.

③Sampling leveled value for PRESET OUT is from the latest 5 ON/OFF output value in the condition that output ON/OFF should be done 30 times lately. At every 30 output, its leveled value would be re-calculated.

④How to PRESET OUT

▶ Press up key and set key both simultaneously for more than 3 seconds at current state.

▶ up key and set key both , until FIL appears. Release both key when FIL comes up on display.

▶ set key several times to move to ot1.

▶ Change the set value by using Up(up),Down(dn) key.

	ITEM	VALUE	EXPLANATION
FAC SET	ot1	onF	Select ON/OFFcontrol.
	Po	on	Turn on PRESET OUT feature. (Default :OFF)
	Por	1~100%	Set the ratio of value to be leveled. (Default :90%)

▶ set key for more than 3 seconds to memorize the value.

▶Since then, this feature could be used after setting controller with ON/OFF control.

④If " Pro" is displayed during the normal operation of instrument, please do the needed arrangement, as it says that there' s something wrong in sensor and PRESET OUT is running. After fixing sensor, PRESET OUT will stop itself and the instrument will work normally.

12. Product Specification

Power Currency	AC100~220V (50/60Hz both) ±10%
Power consumption	About less than 5VA
Input sensor	Thermo Couple : K/T(CA) allowed resist in wiring less than 100Ω Resistance Temperature Detector : PT100Ω allowed resist in wiring less than 5Ω
Indication level	Thermo Couple : ±0.5% +1digit of indicated value, Resistance Temperature Detecto :±0.2%
Variation(dIF)	0.1℃ ~ 25.0℃
Control Output	Output from contact point of relay : AC250V 5A(resist load) Durability of contact point : higher than 300 thousands(rating load)
Control operation	PI control or ON/OFFcontrol Selectable
Set method	Digital by using Increase/decrease key
Other feature	Correction of sensor input, delayed ON timer, selectable direction Timer for Defreeze, Correction of defected sensor
Temperature around	0℃ ~ 50℃
Humidity around	Less than 85% RH

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