

Read all instructions thoroughly

INSTRUCTIONS

THERMOSTAT

Type LWS · FWS · RWS · EWS



IMPORTANT

Failure to read and follow all Instructions carefully before installing or operating this WS Thermostat could cause personal injury and/or property damage. Save these Instructions for future use.

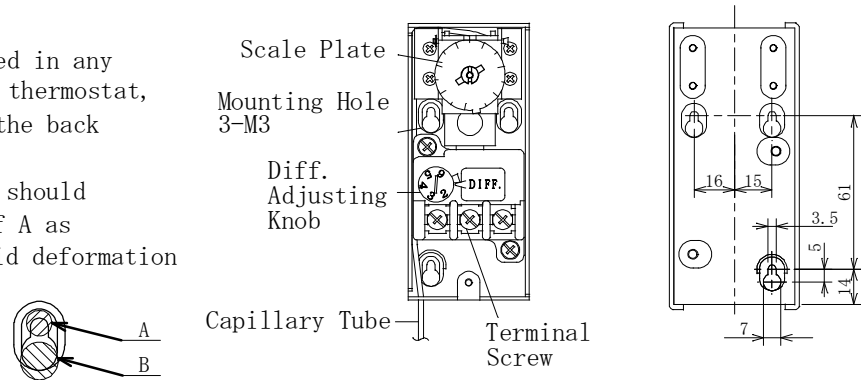
NOTES FOR SAFETY

WARNING

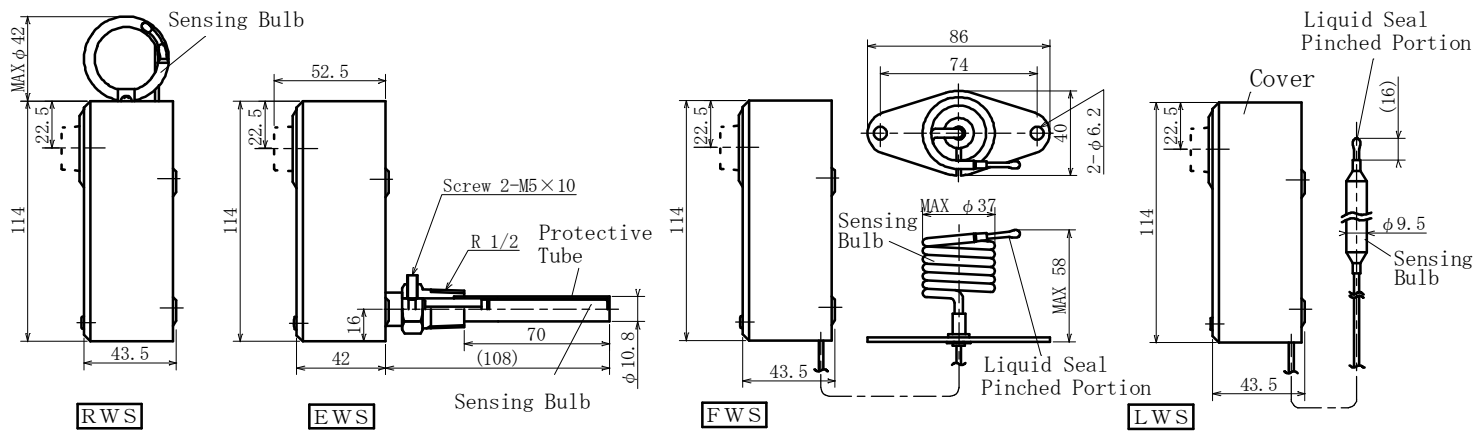
- Do not remove a cover while power is supplied as it may cause electrical shock.
- Before wiring and services, be sure to turn off power supply otherwise, may cause electrical shock.
- Do not pour water on the thermostat as it may cause electrical shock.
- Be sure to connect code without removing a conduit rubber or please put code through the conduit gland as it may cause electrical shock with damaged code cover.

MOUNTING

The thermostat can be mounted in any positions. When you install thermostat, use mounting screw hole at the back of control housing. Mounting hole of lock shape should be fastened at a position of A as following fig. not B to avoid deformation of the Body and any defects.



OUTSIDE DIMENSION



NOTES

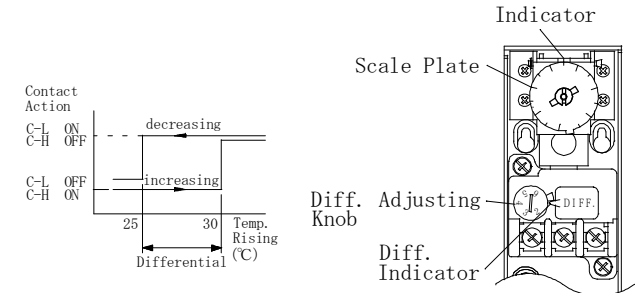
- Installation should be done in the following manner to avoid causing malfunction.
- Installation for thermostat
    - Switch and sensing element should be located where ambient temperature change is as small as possible because this sensing element is liquid expansion type.
    - It is recommended to install the thermostat at a place where vibration is 1G or less.
    - When detecting gaseous temperature such as air or gases, the thermostat should be positioned where good ventilation is provided and the influence of radiation from sun, lamps, radiator cooling and heating line can be eliminated.
  - Be careful to handle the capillary tube because the characteristics of the thermostat might be lost due to the inside liquid leak if bending and/or twisting the capillary tube by the radius of less than 10mm or if bending the place within 40mm of distance from soldered portion.

- Installation for sensing bulb
  - Do not bend and / or scratch the liquid seal pinched portion of the sensing bulb end.
  - As sensing bulb is made of copper, copper alloy, silver solder, do not use it for liquid which is harmful for such materials.
  - When using in corrosive refrigerant, be sure to use a stainless insert holder.
  - Sensing Bulb can be mounted in any position.
- There is not any limitation on temperature condition among Temp. at switch body (TS), Temp. at sensing bulb(TB) and Temp. at capillary tube(TC).

OPERATION/SETTING

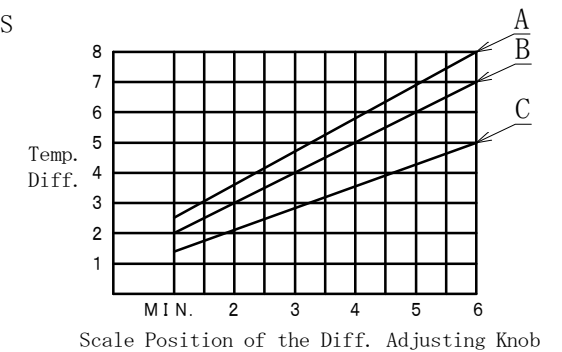
An example of setting method for temperature differential adjustable model (with the diff. adjusting knob for temperature differential) is as follows. (Set at 30°C for temp. increase and 25°C for Temp. decrease : See right table)

- First, Set at 30°C (the higher set temp.)
    - For setting, turn scale plate to match indicator pointer with the required temperature.
  - Next, Set at 25°C (the lower set temp.)
    - Calculate the differential. (Between the points of ON & OFF : 30°C-25°C=5°C)
    - Find the proper scale position of the diff. adjusting knob from the characteristic table of temperature differential which is shown on the back side of the cover. (On the case of "060" series, temperature differential of 5°C is equivalent to the scale 4 of the differential indicator.)
    - Turn the diff. Adjusting knob and set the indicator to the scale 4. (Note that the scale of the diff. adjusting knob does not mean temperature differential. Relation between temperature differential and scale position of the diff. adjusting knob is shown in the chart below.)
  - After setting, install the cover and supply power for checking of actual operation. In case there is an error between the setting point and actual operation, re-adjust with the scale plate and the micro switch knob and re-check the actual operation.
- Since the model of fixed temperature differential (without the diff. adjusting knob) is only adjustable for high temperature point (setting point of high temperature side), turn the scale plate and set the indicator point.



DIFFERENTIAL TEMPERATURE CHARACTERISTIC CHARTS

Catalog No.	Diff. (°C)		Chart No.
	Min	Max	
LWS-C1 FWS-C1	080, 120, 160, 200, 240	2.5 8	A
RWS-C1	030, 060, 090	2 7	B
EWS-C1	034, 054, 074, 094	1.4 5	C



NOTES

- Operation and setting should be done in following manner.
- Do not turn any other screws except screws of the scale plate, of the diff. adjusting knob and on the terminal block.
  - This thermostat should be used in ambient temperature between -20 to 70°C.
  - Right figure shows max sensing element temperature for each catalog No. If the product is used over max sensing element temperature, it could be a cause of setting change.
  - Make sure to keep temperature variable acceleration more than 3 minutes per 1°C by liquid, or more than 18 minutes per 1°C by air.

Catalog No.	Limit of bulb temp. (°C)	Catalog No.	Limit of bulb temp. (°C)
LWS-C1	030 <sup>A</sup> / <sub>F</sub> 60	FWS-C1	030 <sup>A</sup> / <sub>F</sub> 60
	034 <sup>A</sup> / <sub>F</sub> 60		060 <sup>A</sup> / <sub>F</sub> 90
	054 <sup>A</sup> / <sub>F</sub> 80		090 <sup>A</sup> / <sub>F</sub> 120
	060 <sup>A</sup> / <sub>F</sub> 90		120 <sup>A</sup> / <sub>F</sub> 150
	074 <sup>A</sup> / <sub>F</sub> 100	RWS-C1	034 <sup>A</sup> / <sub>F</sub> 60
	090 <sup>A</sup> / <sub>F</sub> 120		054 <sup>A</sup> / <sub>F</sub> 70
	094 <sup>A</sup> / <sub>F</sub> 120		060 <sup>A</sup> / <sub>F</sub> 70
	120 <sup>A</sup> / <sub>F</sub> 150	EWS-C1	080 <sup>A</sup> / <sub>F</sub> 110
	160 <sup>A</sup> / <sub>F</sub> 190		120 <sup>A</sup> / <sub>F</sub> 150
	200 <sup>A</sup> / <sub>F</sub> 230		
240 <sup>A</sup> / <sub>F</sub> 270			

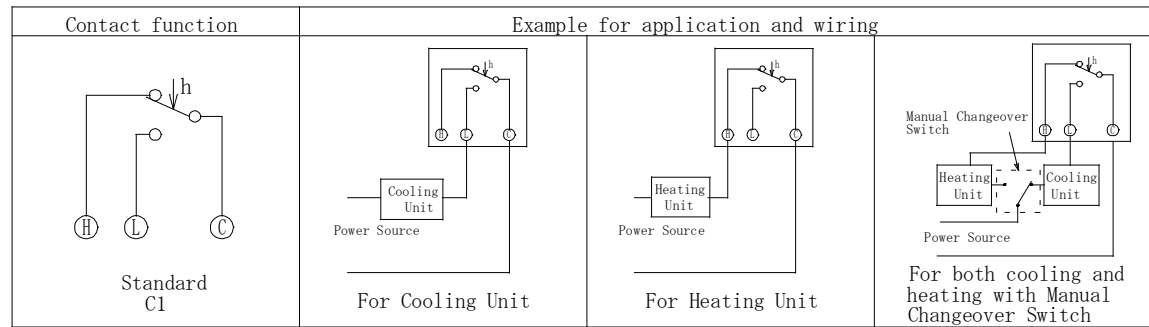
"A" : Model of adjustable temperature differential  
 "F" : Model of fixed temperature differential

## WIRING

Electrical wires should be connected to the terminal screws of microswitch in accordance with the individual application by referring the wiring diagram.

- Be sure to check terminal symbols before wiring.
- Be sure to use the terminal screw with M4×0.7×6 as supplied.

(Recommended tightening torque for terminal screw : 0.7~1.0N·m)

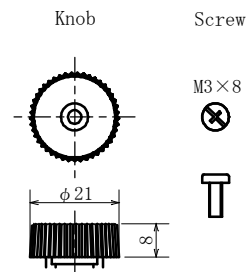


Arrow marking indicates a direction of switch action.

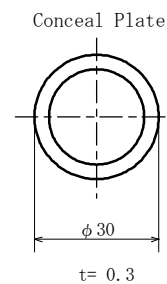
## ELECTRIC RATINGS

Rating Code	Voltage (V)		P. F. $\cos \phi$	AC		DC
	Amps (A)			125	250	24
R	Non-inductive Amps		1	0.05~8.5	0.05~4.5	0.05~2
	Inductive Load	Full load Amps	0.75	0.05~8.5	0.05~4.5	0.05~1
		Locked rotor Amps	0.45	51	27	6
G	Non-inductive Amps		1	0.5~16	0.5~8	—
	Inductive Load	Full load Amps	0.75	0.5~16	0.5~8	—
		Locked rotor Amps	0.45	96	48	—

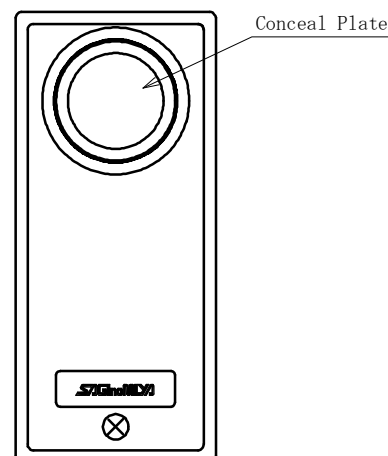
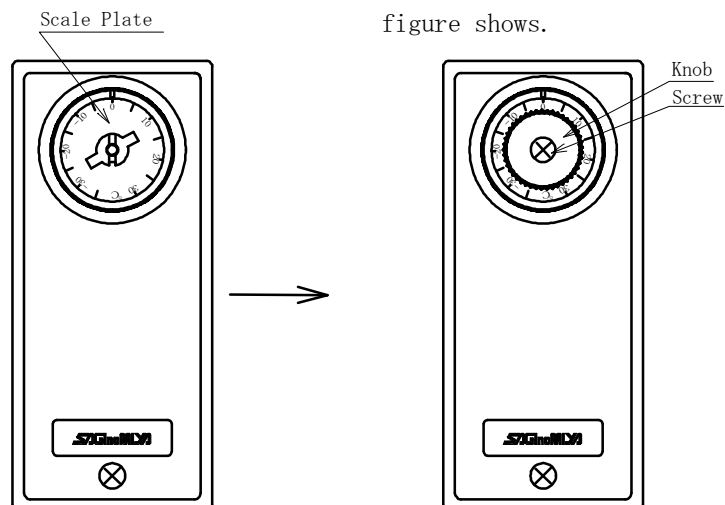
## STANDARD ACCESSORIES



To turn scale plate by hand, install the knob as below figure shows.



To conceal scale plate, attach conceal plate as below figure shows.



## CONSENT RELATED TO DISCLAIMERS

### CONFIRMATION OF OPERATION

All customers using this Product (hereinafter referred to as "Customers") are requested to, after properly installing this Product, test the operation of this Product to confirm that all the systems in connection with this Product fully function. In order to prevent the occurrence of bodily injury, fire accidents, serious damage, etc., in connection with the Customers' machinery or equipment due to improper installation of this Product, Saginomiya kindly requests the Customers to take the necessary safety measures by preparing safe designs such as a fail-safe design (\*1) and a fire spread prevention design, as well as to make the proper adjustments for product reliability necessary for fault-tolerance (\*2).

- (\*1) Fail-safe design: Design to ensure safety in the event of any mechanical failure
- (\*2) Fault-tolerance: Utilization of redundancy technology

Periodic Inspection of this Product

Be sure to confirm the proper operation of this Product and keep records of such operation at least once a year.

Saginomiya shall be held harmless and be indemnified by the Customers from any damages incurred due to the Customers failing to conduct the above operational procedures, provided, however, that, this shall not apply if the damages which the Customers incurred due to the defect of this Product caused by Saginomiya.

### RESTRICTIONS OF USE

This Product is designed and manufactured for the purpose of using them for cooling and heating and refrigerating appliances and air-conditioning equipment or various industrial equipment, but is not designed and manufactured for the purpose of using this Product for any instrument or system related to human life or health purposes.

Therefore, the use of this Product in fields related to items (1) through (3) below is not intended whatsoever.

Saginomiya shall be held harmless and be indemnified from any and all damages incurred by use of this Product under item (3).

- (1) In any field related to nuclear power and radiation;
- (2) In any field related to space or seafloor equipment;
- (3) In any equipment or device requiring a high degree of reliance on such equipment or device with respect to which it is reasonably foreseeable that failure or malfunction of the equipment or device would either directly or indirectly cause serious damage to human life, health or property;

Also, when using this Product under the fields related to items (1) through (10), (except for item (3), in relation to which this Product must never be used), please be sure to notify Saginomiya's contact desk in charge of sales and obtain Saginomiya's prior written approval for such use.

Saginomiya shall be held harmless and be indemnified from any and all damages incurred by use of this Product in relation to these fields if the Customers do not notify Saginomiya's contact desk and obtain Saginomiya's prior written approval.

- (4) Heating, cooling and air conditioning equipment that uses flammable and/or toxic refrigerants, or various industrial equipment that uses flammable and/or toxic fluids;
- (5) Transportation device (railroad, aviation, ship or vessel, vehicle equipment, etc.);
- (6) Disaster-prevention or crime-prevention device;
- (7) Facility or application directly related to medical equipment, burning appliances, electro thermal equipment, amusement rides and devices, facilities/applications associated directly with billing;
- (8) Equipment requiring high reliance on supply systems such as electricity, gas, water, etc., in large-scale communication system, or in transportation or air traffic control system;
- (9) Facilities that are to comply with regulations of governmental / public agencies or specific industries or
- (10) Other machineries or equipment equivalent to those set forth in the above items (4) to (9) which require for high reliability and safety.

It is recommended to replace this Product within 5 to 10 years of delivery if no other duration of use is provided in the applicable specifications or instruction manual because the conditions and environment of use also have an impact on this Product.

### SCOPE OF WARRANTY

SAGINOMIYA WILL PROVIDE THE CUSTOMERS WITH REPLACEMENT OR REPAIRED THIS PRODUCT DELIVERED, FREE OF COST, ONLY WITHIN ONE YEAR OF DELIVERY TO THE CUSTOMER, IF FAILURE OCCURS IN THE CUSTOMERS' EQUIPMENT USING THIS PRODUCT DUE TO A DEFECT OF THIS PRODUCT; PROVIDED, HOWEVER, THAT IN ANY EVENT THE RATIO OF THE AMOUNT THAT SAGINOMIYA BEARS FOR THE DAMAGES INCURRED BY THE FAILURE OF THIS PRODUCT OR CUSTOMERS' EQUIPMENT SHALL NOT EXCEED THE PRICE OF THIS PRODUCT WE DELIVERED. IN ADDITION, SAGINOMIYA SHALL BE HELD HARMLESS AND BE INDEMNIFIED FROM ANY AND ALL DAMAGES INCURRED WHEN THE FAILURE OF THE CUSTOMERS' EQUIPMENT OCCURRED DUE TO ANY CAUSE SET FORTH BELOW.

- (1) WHEN CAUSED BY INAPPROPRIATE HANDLING OR USE OF THIS PRODUCT BY THE CUSTOMERS (SUCH AS NOT COMPLYING WITH THE CONDITIONS, ENVIRONMENTAL SPECIFICATIONS OR CAUTIONS INDICATED IN ANY APPLICABLE CATALOGUE, SPECIFICATIONS, INSTRUCTION MANUAL, ETC.);
- (2) WHEN FAILURE OCCURRED DUE TO ANY REASON OTHER THAN THIS PRODUCT;
- (3) WHEN CAUSED BY MODIFICATION OR REPAIR OF THIS PRODUCT MADE BY ANYONE OTHER THAN SAGINOMIYA OR DESIGNEE OF SAGINOMIYA;
- (4) WHEN CAUSED BY THE USE OF THIS PRODUCT IN VIOLATION OF THE ABOVE "RESTRICTIONS OF USE" OR "CONFIRMATION OF OPERATION";
- (5) WHEN SUCH FAILURE WAS NOT REASONABLY FORESEEABLE AT THE TIME OF SAGINOMIYA'S SHIPMENT; OR
- (6) BY ANY OTHER CAUSE NOT ATTRIBUTABLE TO SAGINOMIYA, SUCH AS AN ACT OF GOD, DISASTER, OR ACT OF ANY THIRD PARTY.

PLEASE NOTE THAT THE CUSTOMERS WILL NOT BE ENTITLED TO ANY OF THE ABOVE WARRANTY IF THE CUSTOMERS PURCHASED THIS PRODUCT FROM INTERNET AUCTION, ETC.

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