

# Read all instructions thoroughly

## INSTRUCTIONS

# TYPE ALE

DIGITAL THERMOSTAT 2 Thermo



### 1. Important

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

### 2. Notes For Safety

#### ⚠ WARNING Failure to observe the items below may result in fire, electrical shock and/or malfunction of the unit.

- Do not use the device in locations where the device is exposed to water or oil, or in a highly humid environment.
- Do not use or store in an environment with presence of flammable gas or corrosive gas (such as sulfide gas, or ammonia gas).
- Do not insert metals or easily flammable materials inside the unit.
- Perform wiring, maintenance and inspection only after turning the power off. Otherwise, there is a possibility of electric shock.
- There is a high voltage component in the main unit of the thermostat. Do not touch the device while the power is on.
- Install an overcurrent circuit breaker. Install protection devices (ground-fault interrupter, molded case circuitbreaker, fuse, etc.) according to the related laws and regulations such as the "Technical Standards Concerning Electrical Equipment", "Occupational Safety and Health Regulation", etc.
- Always check to make sure the supply voltage and wiring are correct. Never connect the power wire to the sensor terminals.
- Do not remodeling, the dismantle or the repair.
- To use this thermostat continuously and safely, regular maintenance is recommended. Some components of this thermostat have a lifespan, and other parts deteriorate with time.

#### ⚠ CAUTION Failure to observe the cautions below may result in damage of the unit or loss in performance.

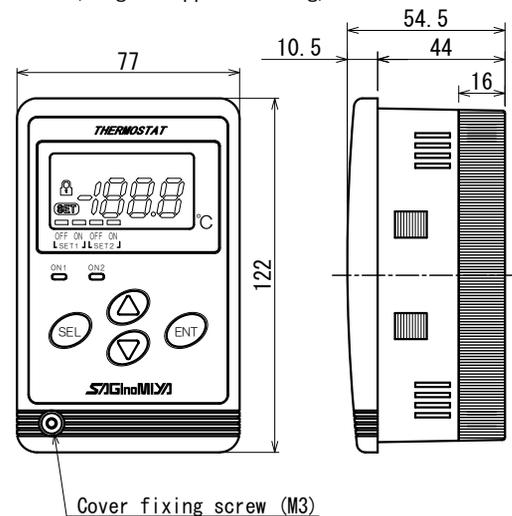
- Do not use, store or transport the unit or temperature sensor to the following locations:
  - Locations where severe mechanical vibration or shock could affect the device.
  - Dusty places, places where there are harmful insects or large amounts of salt or iron.
  - Places that generates silicon gas, or near products containing silicon.
  - Location with humidity of 90%RH or more, or an environment with risk of condensation or presence of extreme moisture.
  - Places exposed to water, oil, chemicals, organic solvents, vapor or steam.
  - Places exposed to the weather, briny air, direct sunlight.
- Sufficiently check the operation of any devices generating electromagnetic waves, and take caution to prevent operational errors. Avoid facing the side transmitting electromagnetic waves to the front to prevent influence by such waves.
- Do not use in a location generating strong high-frequency noise.
- When installing the unit in a location where devices generating noise or electromagnetic waves are used, install the unit at least 3m from devices transmitting such waves. In the case noise is generated from the power supply of the system, install a noise filter or noise cancelling transformer to prevent transmission of noise.
- Sensor line should be isolated over 30cm from power and lead lines to prevent from induction noise influence.
- Do not press the keys of the operation panel using sharp-pointed objects.
- When cleaning the case, wipe with a cloth moistened with neutral detergent and wrung tightly. Do not use organic solvents such as paint thinner, benzene, etc., or strongly acidic/alkaline substances.
- A liquid crystal display (LCD) is used for the display unit. Information displayed is often hard to read at an angle because of the nature of an LCD.
- Do not press the display unit (LCD) strongly as this would make it hard to read the display.
- When static electricity is generated by rubbing the display with a cloth, patterns will appear on the display but they will disappear after a while due to discharge. This is not a sign of a malfunction.
- When energization restarts after a power failure, operation mode, settings and calibration values backed up to memory are read and resume automatically. For the sake of safety, verify that the entire system, including this thermostat, is fully operational.

### 3. Specifications

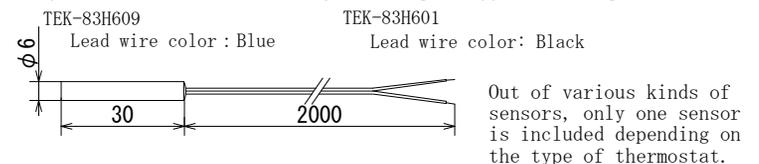
Type	2 step type	ALE-SD12-011	ALE-SD22-011	
Used		For low temp. in air	For high temp. in air	
Power Voltage		85Vac to 264Vac		
Power consumption		5VA or less		
Ambient temp./hum.		-10°C to 50°C/90%RH or less (Provided that no condensation or freeze)		
Storage temp./hum.		-20°C to 70°C/90%RH or less (Provided that no condensation or freeze)		
Function	Temp. indication	※1 -55 to 40°C	※1 0 to 110°C	
	Preset Temp.	-50 to 30°C		
	Initial setting	Setting 1	OFF	0.0°C
			ON	2.0°C
		Setting 2	OFF	1.0°C
			ON	3.0°C
	Unit of temp. display	Select 0.1°C/0.5°C/1°C		
		※ When 0.1°C is selected as the temperature display unit, every 0.5°C changes in 30°C or more.		※ When 0.1°C is selected as the temperature display unit, every 0.5°C changes in 70°C or more.
	Unit of temp. setting	0.5°C when 0.1°C or 0.5°C is selected as the temperature display unit. 1°C when 1°C is selected as the temperature display unit.		
	Output	Relay output (No-voltage contact output)		
Relay Output Electrical ratings	AC250V 10A (Resistance load: cos φ=1) AC250V 6A (Inductive load: cos φ=0.7) AC250V 3A (Inductive load: cos φ=0.4) ※Use a load at or below the allowable output rush current.			
Temperature sensor catalogue number	TEK-83H609	TEK-83H601		
Sensor used temp.	in air	-55 to 80°C	-40 to 110°C	
	in liquid	Cannot use.		
Storage temp. of sensor	-55 to 80°C	-40 to 115°C		

※1 When the temperature display slightly goes out of the temperature display range, "Lo" or "Hi" will light up or blink if there is a disconnection/short circuit.

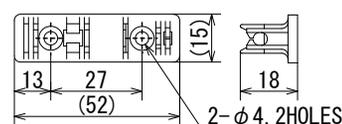
#### ● Thermostat (Weight: approx. 0.2kg)



#### ● Temperature sensor (Accessory) (Weight: approx. 0.02kg)

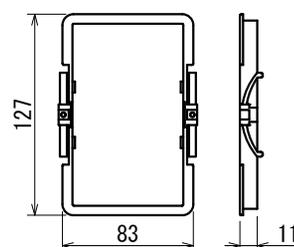


#### ● Sensor holder 1 pcs. (Accessory)



#### ● Panel mounting part (Option parts)

Catalog number : ALE-AA02 (Packing included)



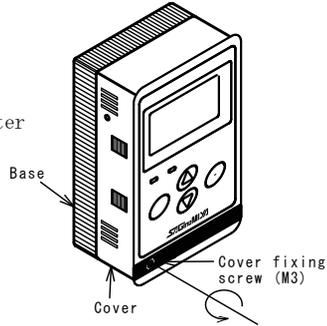
## 4. Installation

Install the device in a dust-free, stable location such as inside the housing of equipment for indoor use. Mount the temperature sensor in a location where adequate air flow exists and the representative temperature could be detected.

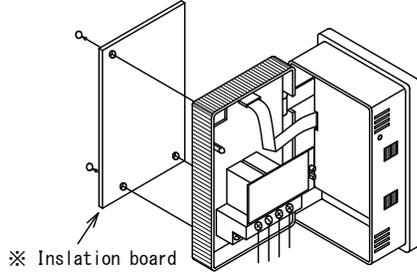
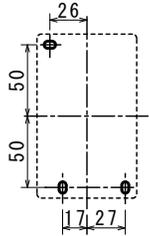
### 1. Installation of Thermostat

#### ● In case of install to wall

- ① Loosen the cover fixing screw with a + (plus) screwdriver less than axis diameter of 6mm.
- ② Open the cover to the right side.  
※ The base and cover are hinged, and cannot be separated.
- ③ Install thermostat in a wall.  
Fix the base with M4 screw with three holes of the thermostat.  
Place insulation board between the base and the wall as necessary.  
※ An insulation board is not accessories.



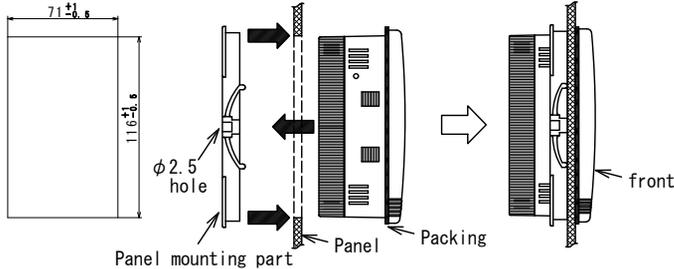
Installation dimension



#### ● In case of install to panel

- ① Cut a hole of the appropriate size in the panel before fitting.
- ② Install the panel mounting part (optional part) from the back ①, and insert the thermostat into the panel from the front by placing the panel between the panel mounting part and the thermostat.  
Press in the panel mounting part until the thermostat is flush against the panel.  
※ Panel t=1.0mm~5.0mm

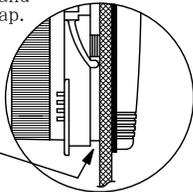
Panel cutting dimension



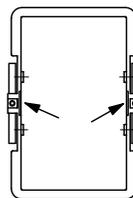
#### Incorrect installation

Install the mounting part and panel without leaving a gap.

There is a gap between the mounting part and panel.



#### How to remove



Insert a tapered object like a flat head screwdriver into the groove in the back of the mounting part and remove the catch.

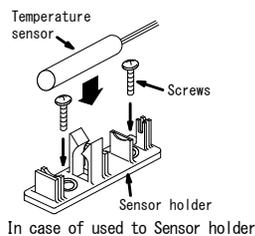
### CAUTION failure to observe the following could result in injuries of operators, or damage and malfunction of the device.

- A protective structure between the front of the thermostat and the panel conforming to the IP44 is provided by proper installation. To ensure good performance, use a gasket during installation.  
Incorrect installation may impair the functionality of the protective structure.
- Insert the mounting part parallel to the panel leaving no gaps, to prevent the device mounted at an incline.
- If there is a gap, tighten the screw (M3X14 self-tapping screw) in the 2.5mm holes in the mounting part to eliminate the gap. Care should be taken as over-tightening the screws could cause the mounting part to slip out of the stopper.

### 2. Installation of Temperature sensor

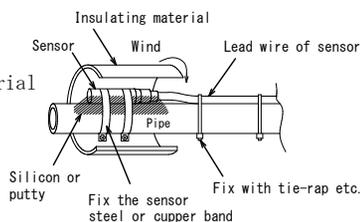
#### ● In case of used to Sensor holder (accessory)

After mount the sensor holder by screws or tapping screws (M3, M4), push the temperature sensor into the sensor holder and fix the sensor.



#### ● In case of used to pipe mounting

Fix the sensor by copper plate with adequate isolation, and put around the insulating material on the sensor.



#### ● In case of used inserton to pipe, bath

Apply the bulb well as option.

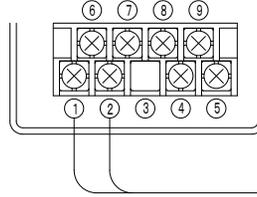
## 5. Wiring

Make sure to cut off the power before wiring, and start it after safety check. Further, apply the power to the ALE after make sure to re-check the wiring and close the case with fixing screw. The tightening torque is 0.5N·m.

For wiring, use pressure terminals for M3.5, and fasten wires securely onto each terminal on the terminal block with M3.5 screws referring to the wire connection diagram. The tightening torque is 0.6N·m.

When pull out lead wire, use a knock-out (back side and bottom of body) according to the direction of pull out lead wire.

#### ● Wiring of temperature sensor.

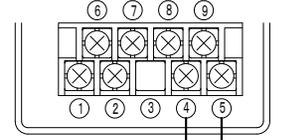


Temperature sensor

Cannot use the 2nd temperature sensor. The sensor does not have polarity. Do not use ③. (Non working number)

#### ● Connect the power supply.

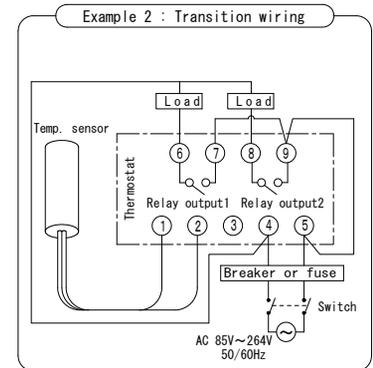
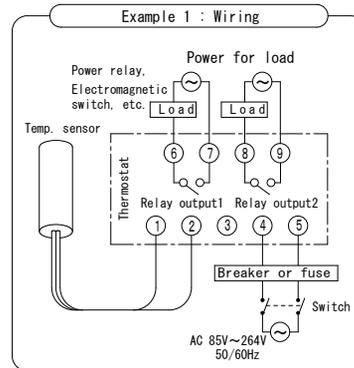
When connect the voltage more than 264Vac, the products might damage or malfunction.



#### ● Connect the load and the power for load.

Terminal ⑥-⑦ is relay output 1, and terminal ⑧-⑨ is relay output 2. Since a relay connect output (no-voltage relay) system is used, the load circuit needs to be supplied with the power from an external source.

When using transition wiring, please refer to the example 2 shown in the following. However, the capacity of the used breaker or fuse must be appropriate to the capacity of load to be charged.

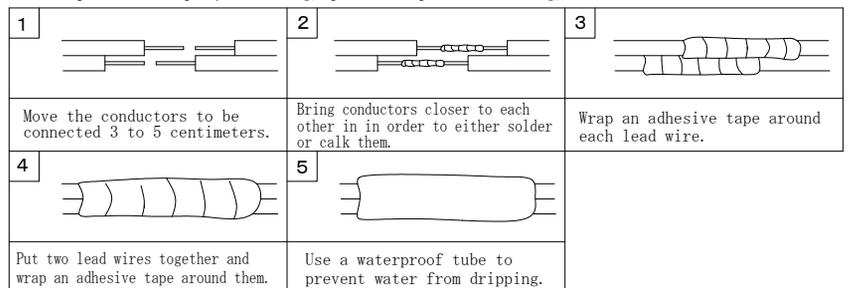


### CAUTION failure to observe the following could result in injuries of operators, or damage and malfunction of the device.

- Please all wiring an expert of the electric construction according to a local electrical regulations.
- Check carefully if any feathering wires are in touch with other terminals than those they are connected to.
- Keep the values of the current for the loads to be connected to the control power output and the alarm power output lower than that of the output permissible current.
- At times, the incoming current for the capacitive load and the inductive load of motors and compressors could be nearly 10 times more than the rated current. In order to avoid possible welding of contact points, make sure to use protective devices such as a "power relay" and an "electromagnetic switch."
- When the inductive load is blocked, a large counter-electromotive voltage will be generated between relay contacts, depending on the type of blockage, which may result in a surge noise source. If the surge noise is significantly large, it is recommended that a surge-absorbing element (such as a spark killer made by Okaya Electric Industries Co., Ltd.) be installed to prevent a controller malfunction or breakdown.
- When the operating frequency is high, use the device in consideration of load capacity and the life of the built-in relay (for example, consider installation of an external relay).
- Do not use a space terminal as a relay terminal.
- Do not insulation tests and withstand voltage tests among terminals. Such tests could destroy internal electronic components.
- Use the attached accessories temperature sensor only. Otherwise, it may cause the damage or malfunction.
- Do not pull the temperature sensor lead wire with excessive force.

#### How to extend a lead wire for the temperature sensor

- In case of extending the sensor lead wire, the maximum length of extension should be kept less than 100m. (Lead wire: 0.5mm<sup>2</sup> or more)
- For outdoor extension or extension in an environment where condensation is expected, use weather proof wires and insulate splices with waterproof thermal contraction tubes, or place extension lead wires and their splices in a water proof case.
- After connecting wires by reliable methods such as soldering and crimping, take drip proof and insulating measures by taping. Place splices in a location free from rainwater and condensation.
- Install the connector for the lead wires in a place where there is no risk of condensation or rain water entering.
- Inadequate water proof or insulating measures could cause malfunctions ( temperature display wobbling, power output chattering, etc.) of the device.

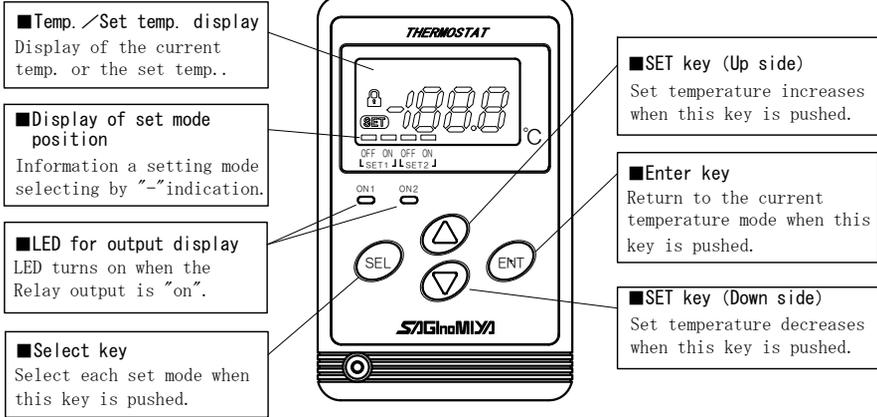


## 6. How to Setup

### Part name & function

#### ●Display panel

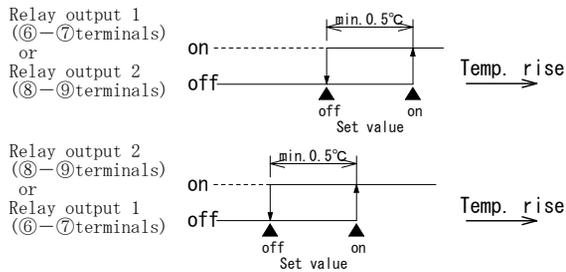
(Front side of Thermostat)



### Operation pattern

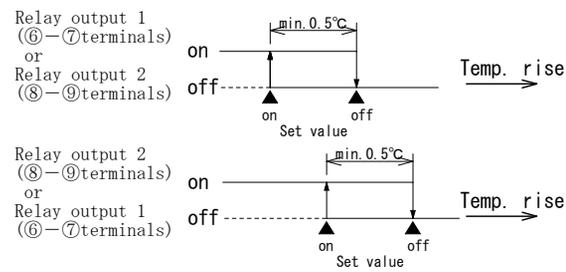
2 thermostat type can operate it as follows.

#### ●Cooling mode



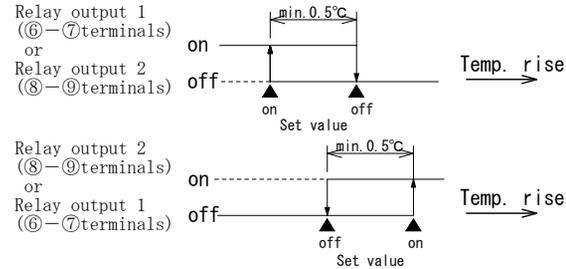
The temperature setting point of OFF should be lower than that of ON.

#### ●Heating mode



The temperature setting point of OFF should be higher than that of ON.

#### ●Floating mode



An each function of the two-step, the floating and the limit can be carried out by a combination of settings.

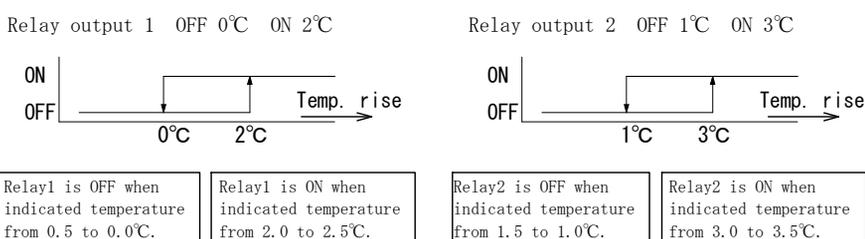
- Enter [OFF] and [ON] setting.
- When the set value of ON is changed, the set value of OFF remains unchanged.  
When the set value of OFF is changed, the set value of ON remains unchanged.
- And two thermostat function is set the each point regardless the mutual set points.
- Air conditioner / heating operation setting there is no key push and hold function [select].
- The setting can be fast forwarded by pressing and holding the  $\nabla$  or  $\triangle$  key.  
For a two-step thermostat, fast forwarding stops at the point where the ON/OFF setting is reversed.

### CAUTION failure to observe the following could result in injuries of operators, or damage and malfunction of the device.

- The minimum value difference between [ON] and [OFF] is 0.5°C. Do not make the [DIFF] unnecessarily small. It may shorten the life span of the thermostat, solenoid valve, compressor, etc..

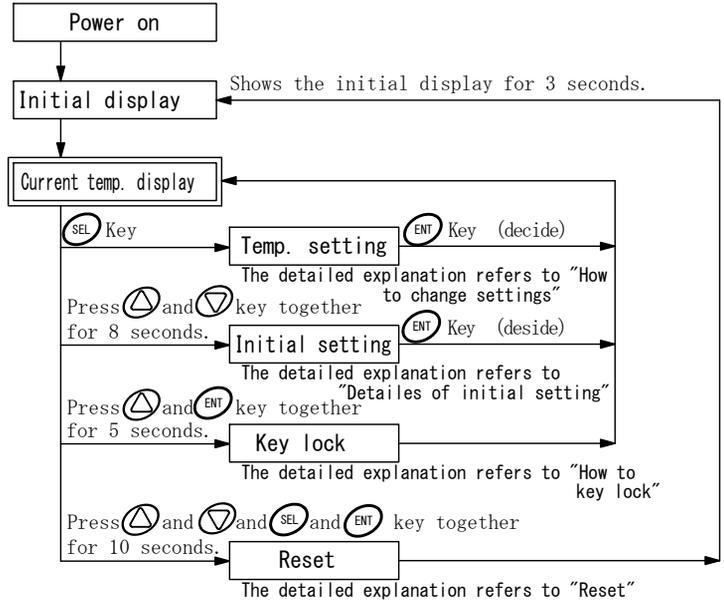
### Initial setting value

Example: ALE-SD12-011



ALE-SD22-011 is the same movement too. (The difference is a set point.)

## How to Operation



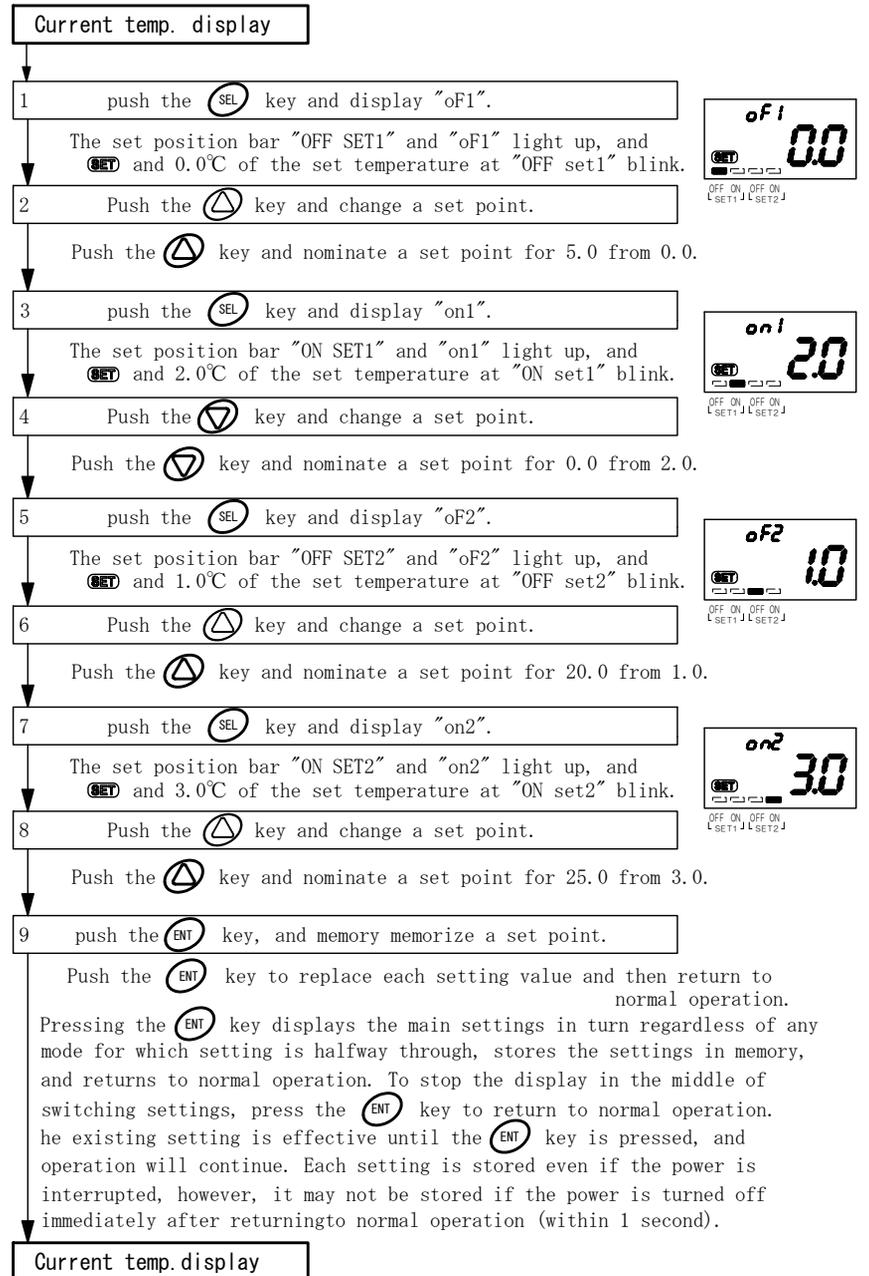
### How to change the set point

This section describes changing cooling operation settings to heating operation settings or floating operation settings by changing the ON/OFF settings of control output 1 and 2. As each setting changes independently, each time the difference between the ON and OFF settings (DIFF) and the difference in step between control output 1 and 2 change.

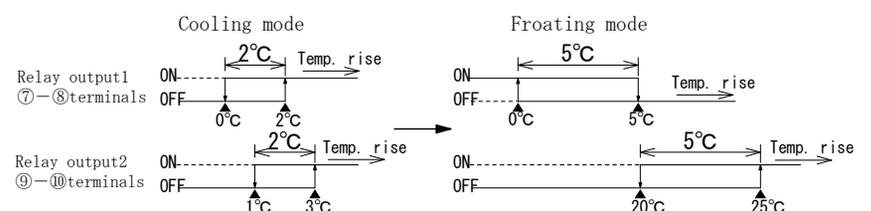
The set temperature unit varies depending on display units.  
Temp. display units: 0.1°C & 0.5°C units => Set temperature unit 0.5°C unit  
Temp. display unit: 1°C unit => Set temperature unit 1°C unit

(Example) How to change the set point for ALE-SD12-011  
Cooling mode setting: [OFF1]0.0°C [ON1]2.0°C [OFF2]1.0°C [ON2]3.0°C

Floating mode setting: [OFF1]5.0°C [ON1]0.0°C [OFF2]20.0°C [ON2]25.0°C



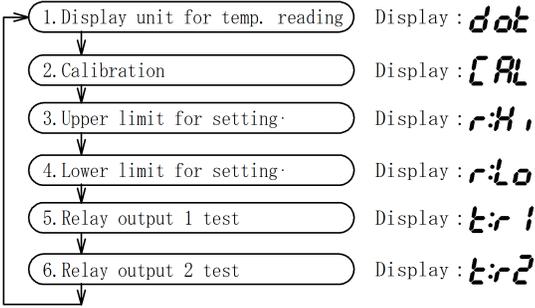
The operation is as follows by this setting change



## Details of initial setting

In initial settings, the controls you use are set and operation is verified. Initial settings can be performed by pressing and holding the and key for approximately 8 seconds while the current temperature is displayed.

Each time the key is pressed, the setting items change in the following order.



※ When the key is pressed, data are determined, and thereafter control of the settings changed will start.

### 1. Display unit for temp. reading

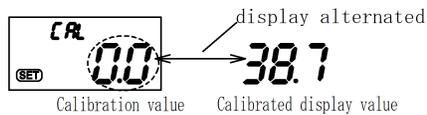
Operate the or key to enter settings by selecting the display unit for temperature reading from 0.1°C, 0.5°C and 1°C.

When the temperature display unit is changed, the unit of the settings is automatically adjusted. When ever the temperature display unit is changed, be sure to check each setting.

### 2. Calibration

Operate the or key to enter the calibration value and correct the measured temperature value and control value.

The setting range is -5.0 to +5.0°C and the setting unit is the same as the temperature display unit.



**CAUTION** failure to observe the following could result in injuries of operators, or damage and malfunction of the device.

- Make sure that calibration is performed accurately using the standard thermometer when the temperature to be measured is stable and without fluctuations.
- There may be greater disagreement between the real temperature values and the preset temperature values that are not calibrated.

### 3. Upper limit for setting

Allows limiting of the setting range.

The input upper limit is 30°C.

The setting unit is 1°C.

※ Minimum set difference between the lower limit will be 10°C.

### 4. Lower limit for setting

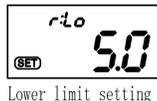
Allows limiting of the setting range.

The input lower limit is -50°C.

The setting unit is 1°C.

※ Minimum set difference between the upper limit will be 10°C.

Example) Upper limit setting: 20°C Lower limit setting: 5°C



The temperature can be set only within the range of 5°C to 20°C. A temperature in a range other than that cannot be set.

### 5.6. Relay output 1 test / Relay output 2 test

The operation can be verified by forcefully turning on/off the Output 1 and Output 2 relays.

When the key is pressed, the relay contact will turn on, and **on** will appear. When the key is pressed, the relay contact will turn off, and the **off** will appear.

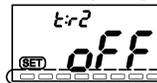
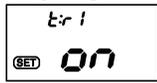
t:r 1 ... Output 1

t:r 2 ... Output 2

Once the or key is operated, output will be maintained until the initial settings are completed while control function will be stopped.

All of the bar display areas light up while maintaining output.

Example) Display



During maintenance of output (control is stopped)

Output 1 test: Contact ON

Output 2 test: Contact OFF

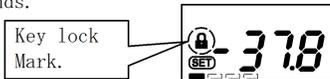
**CAUTION** failure to observe the following could result in injuries of operators, or damage and malfunction of the device.

This operation causes the relay to forcefully operate. After carefully checking the wiring, conduct a test.

## How to Key Lock

Pressing and holding the and key for approximately 5 seconds locks the keys. No key can be operated while the keys are locked.

The keys can be unlocked by pressing and holding the key and key for approximately 5 seconds.



The key lock setting remains valid after a power failure or deactivation.

## Reset

Press and hold , , and key for approximately 10 seconds during main display to perform initialization operation.

When the initialization operation has been successfully completed, the device is restarted, and thereafter control operation on the factory default setting will be started. We recommend initializing after taking a note of the settings.

## 7. Check Points on Trouble

Please confirm the following troubleshooting.

Symptom	Item to check	Possible remedy
All of digital indications disappear.	Is the unit properly supplied with the power?	Feed the power into the unit properly.
Digital displays "Lo" blink.	Check whether the sensor was detached or the wire were disconnected.	Check the connected sensor.
Digital displays "Lo" indication.	Check to see if the temperature of the sensor falls below the displayed temperature range.	Check the temperature where the sensor is installed.
Digital displays "Hi" blink.	Has the sensor short-circuited?	Check the connected sensor.
Digital displays "Hi" indication.	Check to see if the temperature of the sensor goes beyond the displayed temperature range.	Check the temperature where the sensor is installed.
Digital displays "Er.1" indication.	Memory error.	Turn the power off and turn it back on. Recheck each set value. If "Err" remains on the screen, this indicates a failure of the unit.
Digital displays "SET" indication, and Digital displays temperature blink.	Setting is not completed. Did you push the  key when setting is over?	Push to the  key. Return to the current temperature display.
Cannot select a setting position even if push  key.	Check to see if the key locked.	Cancel the key lock by pressing and holding the  key and the  key simultaneously for 5 seconds.
Does not turn "ON" and "OFF" as set.	Does the current temperature display it between ON set point and OFF set point? Check whether the set temperature, especially the "ON" temperature, has been changed.	Change the detective temperature of the sensor Please confirm the output. Recheck the set temperature.
The output LED turns on, but the relay does not output.	Was a power supply connected for relay load?  The relay might break down. • A power supply more than the electrical rating was supplied. • A short circuit electric current applied it.	No-voltage relay system is employed for the relay contact point in this product. The power therefore needs to be connected to the load circuit.  Please check the electric ratings and the wiring load for relay.
The output LED turned off the light, but the relay does not OFF.	There is a possibility that adhesion has occurred in the relay contact point.	Check the load capacity.
Displayed temperatures fluctuate by more than 1°C.	Check whether the relay contact point in the sensor is thoroughly insulated? Check for any condensation within the main unit.	Insulate the relay point in the sensor completely.

When a phenomenon except the above was caused, please contact us.

## 8. 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.

## 9. 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.

## 10. 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.

**SAGINOMIYA**  
**SEISAKUSHO, INC.**

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