

1. CAUTION:

- 1.1 Before wiring, please make sure that power is switched off to prevent from getting electric shock.
- 1.2 The product should be avoided to install at humid environment.
- 1.3 To prevent the controller burning out, please make sure the water-proof procedure is undertaken during installation.
- 1.4 Before supplying the power, please always check if the wiring and input power is connected correctly.
- 1.5 Please install according to the wiring diagram to avoid incorrect wiring.
- 1.6 Please always read this instruction carefully before installation. This product is beyond our warranty if any damage is caused by incorrect wiring.

2. SPECIFICATION:

- 2.1 Display panel size: 32.5mm (H) x 174mm (L) x 46.5mm (D) \pm 1mm
- 2.2 Mounting hole size: 160mm x 28mm \pm 1mm
- 2.3 Operating environment temperature: -5°C ~ 55°C, <90% RH (non-condensing)
- 2.4 Storage environment temperature: -10°C ~ 65°C, <90% RH (non-condensing)
- 2.5 Power supply: AC100 ~ 240V \pm 10%, single phase 50/60Hz
- 2.6 Power consumption: Max. 10 watts (not including each output contact)
- 2.7 Temperature display range:
 - 2.7.1 -40°C ~ -20°C, 20°C ~ 70°C, accuracy \pm 1°C, in 1°C step
 - 2.7.2 -19.5°C ~ 19.5°C, in 0.5°C step
 - 2.7.3 -40°F ~ 158°F, accuracy \pm 2°F, in 1°F step
- 2.8 Output/ Input:
 - 2.8.1 Sensor: NTC sensors, 1.5m(L) x 2
(Grey: room temp. sensor / Black: evaporator temp. sensor)
 - 2.8.2 Compressor output contact: 1.5HP/ 250VAC
(Allow to change 2HP relay for optionally requirement)
 - 2.8.3 Defrost output contact (Electric heater / 4-way valve): 7A/ 250VAC Resistance.
 - 2.8.4 Fan output contact: 2A/ 250VAC Resistance.
 - 2.8.5 Defog output contact: 2A/ 250VAC Resistance.
 - 2.8.6 Light output contact: 2A/ 250VAC Resistance.
 - 2.8.7 Alarm output: One build-in buzzer
 - 2.8.8 External temp. alarm input (Cutting off DI jumper and connecting to external temp. switch with NC contact).

3. FUNCTION:

- 3.1 Button operation:
 - 3.1.1 In normal status (excluding E1, E2 and EE), press and hold SET for 3s to enter set mode, and display parameter code "tS".
 - 3.1.2 When displaying the parameter code, press "▲" or "▼" to select the code, the order is tS, td, dF, dt, AU, AL, HS, LS, Ad, AC, Cr, CS, Ot, dS, Ft, dr, dO, FC, dL, Ut, and OU.
 - 3.1.3 After selecting the parameter code for modification, press "SET" to display the parameter value, and press "▲" or "▼" to adjust the parameter value.
 - 3.1.4 After amending the parameter, press "SET" to save (memory) the value immediately and return to the page of parameter code.
 - 3.1.5 If not pressing any button within 15s or after selecting "OU" for 2s, it will save the amended parameter value automatically and return to display the indoor temperature.
 - 3.1.6 After selecting "Ut" and changing the temperature unit, the controller will reset automatically and revert to the default of chosen unit.

3.1.7 Quick setpoint mode:

- 3.1.7.1 In normal status (excluding E1, E2, and EE), press the button "▼" for 3s to enter quick setpoint mode and it will display the value of setpoint "tS" with blinking.
- 3.1.7.2 Under this mode, press the button "▲" or "▼" to adjust setpoint "tS" directly.
- 3.1.7.3 If not pressing any button within 5s or pressing the button "SET", it will save the parameter value automatically and return to display the indoor temperature.

3.2 Functions:

3.2.1 Compressor Operation:

- 3.2.1.1 When indoor temperature \leq tS, the compressor is OFF ;
when indoor temperature \geq (tS + td), the compressor is ON ;
if it doesn't reach AC delay time, the compressor is OFF.
- 3.2.1.2 When the compressor stops operating, it will start to countdown AC time.
- 3.2.1.3 When power is supplied, under AC=0, the compressor will still delay 1 minute to operate.
- 3.2.1.4 Please refer to item 3.2.2 for learning about compressor operation when under defrosting.
- 3.2.1.5 Operation under failure conditions: When it occurred E1, E2, and EE, the compressor operates according to Cr; the compressor will operate automatically once CS terminates. The compressor will be inactive under Cr and CS = 0.

3.2.2 Defrost operation:

- 3.2.2.1 Defrost cycle:
 - 3.2.2.1.1 When power is supplied, it begins to countdown the defrost cycle.
(Ex. DF=6 · it will defrost every 6 hours, and 4 times one day.)
 - 3.2.2.1.2 When it reaches (dF - dt), it begins defrosting (defrost automatically);
however, if it is under defrosting by manual at that time, defrost period (dt) will not be recounted.
 - 3.2.2.1.3 Once it occurred failure or alarm, it won't affect the defrost cycle.
 - 3.2.2.1.4 After changing "dF", it will load a new parameter value from next defrost cycle. If changing the value before entering defrost period "dt", dt take effect immediately; if changing the value during automatic defrost, it will take effect from next cycle.
- 3.2.2.2 Manually enter/ terminate defrost: in normal status, press the button "▲" and "▼" for 3s simultaneously, it will manually enter / terminate defrosting without affecting its cycle.
- 3.2.2.3 Defrost by heater (dO = 0) :
 - 3.2.2.3.1 When it is ready for defrosting, it begins to countdown defrosting period "dt", compressor is OFF, fan is OFF, defrosting (by heater) output will be enabled.
 - 3.2.2.3.2 Under defrosting, when evaporator temperature \geq dS, heater will be OFF and delay 25s for startup; once evaporator temperature < dS, and finished delay on, defrost output will be ON.
 - 3.2.2.3.3 When defrosting is completed, defrost output will be disabled.
- 3.2.2.4 Defrost by hot gas (dO = 1) :
 - 3.2.2.4.1 When it is ready for defrosting, "dt" (defrost period) begins to countdown, compressor is OFF, fan is OFF. After 30s, defrost output will be enabled. After another 30s, compressor output will be enable again.
 - 3.2.2.4.2 Under defrosting, when evaporator temperature \geq dS, compressor will be OFF and delay 1 minute for startup; once evaporator temperature < dS, and the delay time is finished, compressor will be ON.
 - 3.2.2.4.3 When defrost period "dt" is completed, compressor is OFF, and 4-way valve will be OFF after 30s.
- 3.2.2.5 Defrost termination:
When "dt" is completed, it begins to countdown the dripping time "dr" (If dO = 1 and AC = 0, the compressor protection is performed for 30s), and it will return to operation mode once "dr" is done. If "dr" is not finished, compressor is OFF.

3.2.2.6 Indoor temperature lockup (dL):

- 3.2.2.6.1 When dL = 0, cabinet temp. shows normally during defrost period.
 3.2.2.6.2 When dL = 1, under defrosting period, indoor temp. on display will be fixed; when defrosting has completed, and the indoor temp. \leq setpoint " tS ", current cabinet temperature will begin to be displayed.

3.2.3 Fan operation:

- 3.2.3.1 During defrosting, fan output is OFF.
 3.2.3.2 Under E1, E2 and EE status, fan output will be ON constantly.
 3.2.3.3 When evaporator temp. \geq " Ft " fan motor stop temp., fan output is OFF.
 3.2.3.4 When draining period haven't terminated, fan output is OFF.
 3.2.3.5 When fan mode is FC = 0, fan output will be ON / OFF according to compressor.
 3.2.3.6 When fan mode is FC = 1, fan output will be ON constantly.

3.2.4 Indoor temp. calibration : Indoor temp. display = Indoor temp. + Temp. calibration (Ot).

3.2.5 Abnormal temp. alarm:

- 3.2.5.1 When cabinet temp. is higher than AU (UA and cabinet temp. are displayed alternately) or cabinet temp. is lower than AL (LA and cabinet temp. are displayed alternately) , it will start to countdown alarm delay time; when delay period is completed, alarm will be enabled.

(Conditions:after power is supplied, and indoor temp. reaches the setpoint at one time, alarm function would be enabled.)

- 3.2.5.2 External temp. warning: When DI is in " open circuit " (HA and cabinet temp. are displayed alternately), it will start to countdown alarm delay time; when delay period is completely, alarm will be enabled; When DI is in " short circuit ", it will recover to normal status.

3.2.6 Alarm output (Buzzer):

- 3.2.6.1 When displaying UA,LA and HA for temp. warning, it starts to countdown "Ad " time and alarm is enabled once " Ad " is completed.
 3.2.6.2 When displaying E1, E2, and EE for failure warning, alarm is enabled immediately.
 3.2.6.3 When alarm is performed, press "▼" to cancel its output temporarily, and to press "▼" again to start its output if the failure / warning doesn't be eliminated.

3.4 Evaporator temp. display: In normal status, press "▲" for 3s and to display evaporator temp.

3.5 Defog / Light control: In normal status, press the key of defog or light for 1 second to turn on/off defog and light; it will still get memory for light and won't be affected when power failure.

3.6 LED indicators:

3.6.1 "❄️" Cooling indicator

- 3.3.6.1 The LED is illuminated constantly when the compressor is operating.
 3.3.6.2 The LED is blinking when the compressor is in delay on / stand-by status.
 3.3.6.3 The LED is off while defrosting.

3.6.2 "❄️" Defrost indicator:

- 3.6.2.1 The LED is illuminated constantly under defrosting, 4-way valve/ heater is active.
 3.6.2.2 The LED is blinking under defrosting; hot gas defrost: compressor is inactive, or electric heater defrost: electric heater is inactive (evaporator temperature \geq dS).

3.6.3 "💡" Defog indicator: The LED is illuminated constantly when defog is ON and light out when it is OFF.

3.6.4 "💡" Light indicator: The LED is illuminated constantly when light is ON and light out when it is OFF.

3.7 Parameter lockup:

- 3.7.1 In normal status, press " SET " and " ▼ " simultaneously and keep holding 3s, except the setpoint " tS ", it will lock " LC " / unlock " UL " the setting parameter.
 (It has been locked for further layer if displaying " Lt ").

3.7.2 In normal status, press " SET " and " ▼ " simultaneously and keep holding 6s, it will lock " Lt " / unlock " UL " parameter completely; All of parameter, including the setpoint " tS ", won't be amended under lockup " Lt " .

3.7.3 Parameter lockup will not be affected if power failure happens.

3.8 Failure / Alarm:

- 3.8.1 E1: Room temp. sensor is failure, please replace the sensor or send it back to the factory for inspection.
 3.8.2 E2: Evaporator temp. sensor is failure, please replace the sensor or send it back to the factory for inspection.
 3.8.3 EE: Memory is failure; if " EE " can't be eliminated after reboot, that means the memory is broken and please send the controller back to the factory for inspection.
 3.8.4 UA: High temp. (indoor) alarm, it displays "UA" and alternately with indoor temperature.
 3.8.5 LA: Low temp. (Indoor) alarm, it displays " LA " and alternately with indoor temperature.
 3.8.6 HA: External temp. alarm, it displays " HA " and alternately with indoor temperature.

3.9 Restore default values:

Press " ▲ " and " ▼ " simultaneously before power is supplied to restore default values, after displaying " rS " for 3s, it will reset automatically and reboots soon after.

4. PARAMTER LIST:

Code	Function	Range		Default	Unit	Description
		Min	Max			
tS	Setpoint	LS	HS	-18 0	°C °F	Compressor stops when it reaches the setpoint.
td	Temp. Differential	0.5 1	10 20	4 8	°C °F	Compressor will start to operate when the temp.=tS+td
dF	Defrost cycle	0	99	6	hr	Set the interval between defrost cycles (dF = 0, it won't defrost automatically, but it can defrost by manually.)
dt	Defrost period	1	55	30	min	Defrost duration is subject to the present defrost time. Defrost is terminated when defrost time is enough.
AU	Max. temp for alarm	AL+1	70 158	45 113	°C °F	Cabinet temp. \geq AU, alarm will be enabled. (Start conditions: Cabinet temp. must reaches the setpoint once.)
AL	Min. temp for alarm	-40	AU-1	-40	°C °F	Cabinet temp. \leq AL, alarm will be enabled. (Start conditions: Cabinet temp. must reaches the setpoint once.)
HS	Max. Setpoint	tS	60 140	25 77	°C °F	To limit the max. setpoint.
LS	Min. Setpoint	-40	tS	-30 -20	°C °F	To limit the min. setpoint.
Ad	Alarm delay	0	60	15	min	When alarm is performed, the delay time of buzzer output. (except E1,E2, and E3)
AC	Compressor delay Protection	0	30	0	min	Interval time between compressor stop and restart as a protection.
Cr	Compressor operation period under any failure	0	60	15	min	The time of compressor is enforced to operate when under EE, E1, and E2. (When Cr = 0, compressor is always off.)
CS	Compressor termination period under any failure	0	60	15	min	The time of compressor is enforced to terminate when under EE, E1, and E2. (When Cr = 0, compressor is always on.)
Ot	Temp. Calibration	-12 -24	12 24	0	°C °F	Indoor temp. display = Indoor temp. + Temp. Calibration
dS	Defrost stop temp.	0 32	70 158	20 68	°C °F	During defrost period , when evaporator temp. \geq dS , defrost is deforced to terminate to avoid the damage of the storage.
Ft	Fan motor stop temp.	0 32	70 158	15 59	°C °F	When the evaporator temp. \geq Ft, fan stops operating.
dr	Drop period	0	60	0	min	Set the drop period when end defrost. Compressor is off during this period.
dO	Defrost mode	0	1	0	-	When dO = 0, defrosting by heater. When Do = 1, defrosting by hot gas.
FC	Fan mode	0	1	1	-	0 : fan operates according to compressor; 1 : fan operates continuously.
dL	Indoor temp. Lockup	0	1	0	-	0 : cabinet temp. shows normally during defrost period; 1 : cabinet temp. is locked and fixed during defrost period.
Ut	Temp. Unit	°C	°F	°C	-	After setting or changing the temp. unit, and showing rS, it will reboot automatically. Ot, FC, and DI won't be restored to default value.
OU	Exit	-	-	-	-	Exit setting mode.