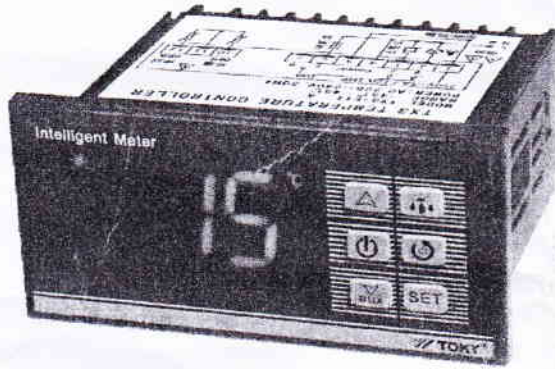


Tx3 Series Refrigerator Temperature Controller Manual



Features :

1. Microprocessor temperature controller suitable for single refrigerating, air cooling system,
2. Relay output to control compressor, evaporator fan, light, and electric heating defrosting, or air heating defrosting.
3. NTC sensor input, used to control temperature, defrosting stop temperature, and condenser temperature over-limit alarm.
4. Special parameter can be easily programmed through the keyboard.

1. Notes

1.1 Please read the below content carefully before you use the manual.

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application range before proceeding.

1.2 Safety precautions

- Check if the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture circumstance, preventing formation of condensation caused by sudden atmospheric temperature changes.
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where is not accessible by the End User. The instrument must not be opened.
- If any failure, please send the instrument back to us with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (pls refer to 8 Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of application in industrial environments, the use of mains fuses in parallel with inductive loads could be useful.

2. Ordering model

2.1 Model Indication

TX3-E□□□

- Blank (ordinary controller): built-in transformer & relay; A(A type controller): external transformer & relay.
- Output function number: See the model function specifications
- 1 : with storage temperature sensor 2 : with storage temperature & defrost sensor
- E : Economic
- Tx3 series refrigerator temperature controller

Note: If user requires both fan control and light control, needs to select A type controller.

2.2 Model & function

Model & function								
Function Model	Compressor control	Defrosting control		Evaporator fan control	Light control	Storage temperature sensor	Defrosting sensor	Output function number
		Electric heating/air heating defrosting	Defrosting by turning off					
TX3-E11(A)	●		●			●		1: Compressor control, defrosting by turning off
TX3-E22(A)	●		●			●	●	
TX3-E23(A)	●		●	●	○	●	●	2: Compressor control, defrosting by turning off, evaporator fan control
TX3-E24(A)	●	●		●	○	●	●	3: Compressor control, air heating defrosting, evaporator fan control

Note: 1. Mark "●" means having this function and parts, mark "○" means optional function and parts.

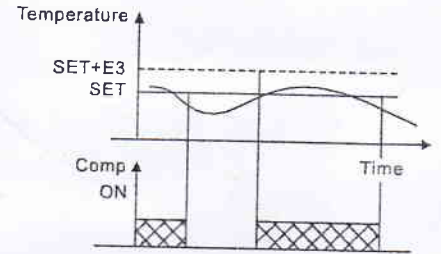
Part: Ordinary controller, nylon stand 1 piece/manual 1 copy/sensor 1~2 pieces (quantity of sensor refer to above function table).

A type controller, external transformer 1 piece/nylon stand 1 piece/manual 1 copy/sensor 1~2 pieces/external relay 1~3 piece, (quantity of sensor and relay refer to above function table);

3. Controlling loads

3.1 Compressor

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point: if the temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again. In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters "E8", stop time "E9", and display "Er1".



3.2 Defrost

- Defrost mode: electric heating(F=00) and air heating(F0=01) defrost.
- Defrost condition: Defrost probe temperature < defrost ended temperature set value(F4 parameter value) enter defrost, otherwise exit defrost.
- Electric heating defrost: Work after a defrost cycle, automatically enter the defrost status, defrost LED turns on, compressor and fan stop working, heating wire is connected. When defrost is ended, heating wire stops working, after drip time(F6 parameter value) enter normal temperature control status.
- Air heating defrost: Work after a defrost cycle, automatically enter the defrost status, defrost LED turns on, change over valve opens, fan stops, after "F01" time compressor starts; when defrosting is over, after set drip time (F6 parameter value), it enter normal temperature control status.

3.3 Evaporator fan control

Select the evaporator fan control mode by parameter "P1";

P1=00, start and stop simultaneously with compressor(stop while defrost); P1=01, P1=01, keep operating (stop while defrost);

P1=02, start and stop simultaneously with compressor(start while defrost); P1=03, keep operating (start while defrost).

Fan terminated temperature;

Set the fan terminated temperature by adjusting parameter "P5", it is invalid for the initial start-up, but valid after compressor's first stop. When defrost is terminated,

When P2 is set as "00", after P3 time fan starts, P4 parameter has no effect. If P2 is set as "01", P3 parameter has no effect; when temperature is lower than P4 temperature, fan starts.

4.Keyboard



SET To display the current set point. In programming mode it select parameter or confirm an operation.

❄ (DEF) Start or stop defrosting; (LAMP) connect or disconnect lighting.

⏻ To open or close the temperature controller.

🌀 To start the compressor compulsively.

▲ (UP) To increase the parameter value, check the probe temperature of the evaporator.

▼ (DOWN) To decrease the parameter value.

KEY COMBINATIONS: ▲ + ▼ Resume the parameters to factory defaults

4.1 Use of LEDs

Each LED function is described in the following table:

LED	Mode	Function
❄	ON	Compressor enabled
❄	FLASH	Compressor start delay
❄	ON	Defrosting enabled
❄	FLASH	Drip time or display lock time
🌀	ON	Fan enabled
⏻	ON	Mandatory cooling
⚠	ON	Alarm at probe temperature overlimit
⏻	ON	Parameter locking
°C °F	ON	Temperature unit

4.2 Check evaporator probe temperature

Press ▲ key and hold 6s, flashing defrosting probe temperature, and wait 10s to resume to storage temperature display.

4.3 Check control temperature

1. Press SET key and release immediately, flashing current control temperature set point;
2. Press SET key and release immediately, or wait for 10s to resume storage temperature display.

4.4 Temperature control setting

1. Press SET key and release immediately: flashing current control temperature set point;
2. Press Δ or ∇ key to change control temperature value; (setting cannot exceed E2 and E1)
3. Press SET key to save, or do not press any key within 10s to resume to storage temperature display and autosave changed data.

4.5 Manually start or stop defrosting

Press ☼ key more than 6s to start or stop defrosting.

4.6 Start/stop temperature controller

Press ⏻ key more than 6s to stop temperature controller, the screen displays "---", all control is disconnected; in a close status, press ⏻ key 1s to restart the temperature controller.

4.7 Mandatory cooling

Press ⏻ key 6s, enter mandatory cooling state, compressor keeps operating, after "t1" time it auto exits mandatory cooling; during mandatory cooling process, if press ⏻ key 6s, it exits mandatory cooling.

4.8 Resume to factory default

Press ∇ key 1s, then press Δ key 6s at same time, flashing display, all parameter resume to factory default.

4.9 Revise parameter

1. Press SET key for 6s, enter programming mode (PA flashing);
2. Press SET key again to display E1, E2.....CPA, E1, by cycle, press Δ or ∇ to display or revise its value.
3. Wait for 30s to exit and save new set value.

Notes: Only when the correct password is input into the programming mode (Display PA), the parameter value can be changed. If the password is incorrect, the parameter could be checked only, but could not be changed, temperature control is still valid. If the password is forgot, it needs to be resumed to factory default value (refer to operation 4.8).

4.10 Change menu password

The CPA value can be checked or revised only after you input correct password in programming mode (Display PA). After enter programming mode "CPA", press Δ or ∇ to display and revise password, then press ☼ key to confirm and save new password. (If "CPA" value is set to "00", means to cancel password locking).

5. Parameter

Password

PA Menu password: The code what must be inputted to change the parameter, namely the "CPA" value.

CPA Password revision: The code what must be inputted to change the parameter, it means locking cancelled if CPA is set "00".

Regulation

E3 Differential: Intervention differential for set point. Compressor Cut IN is Set Point Plus Differential. Compressor Cut OUT is when the temperature reaches the set point.

- E1 Minimum set point: Set the minimum acceptable value for set point.
- E2 Maximum set point: Set the maximum acceptable value for set point.
- E4 Output activation delay: time for compressor activation delay when it is powered on.
- E5 Compressor restart delay after stop: interval between the compressor stop and the following restart.
- E6 Thermostat probe calibration: Allows to adjust possible offset of the thermostat probe.
- E7 Defrost probe calibration: Allows to adjust possible offset of the defrost probe.
- E8 Compressor OFF time with faulty probe: During "E8" time the compressor is OFF, then it operates.
- E9 Compressor ON time with faulty probe: During "E9" time the compressor is activated, then it stops.
- t1 Mandatory cooling time: the maximum time for compressor continuous operation, timing started by pressing mandatory cooling key.

Defrost

F0 Defrost mode: 00=electric heating defrost; 01=air heating defrost.

F1 (Maximum) Defrost time: set the maximum time for defrost.

- F01 Time for compressor activation delay when compressor is delayed activated to enter air heating defrost.

F5 Temperature displayed during defrost: 00=real temperature; 01=temperature at defrost start; 02=defrost code "dER".

If choose "01" or "02", it will keep displaying for 20 min after defrost is stopped; if storage temperature reach set point +2 degree, it resumes normal display.

F6 Drip time: Time interval between reaching defrost termination temperature and the restoring of the control's normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.

F2 Interval between defrost cycles: Determines the time interval between the beginning of two defrost cycles.

F3 Defrost activated temperature: Determines the activated temperature of defrost, which is detected by evaporator probe.

F4 Defrost terminate temperature: Determines the terminate temperature of defrost, which is detected by evaporator probe.

Fan

P1 Fan operation mode:

00=Fan starts and stops simultaneously with compressor: (stop while defrost); 01=keep operating(stop while defrost).

02=Fan starts and stops simultaneously with compressor: (start while defrost); 03=keep operating(start while defrost).

P2 Fan operation after defrost:

00=It is activated after "P3" set time.

01=It is activated when temperature reaches "P4" set value.

If defrost probe is faulty, fan will be activated in 2 min after compressors's activation.

P5 Fan terminated temperature: when evaporator probe temperature \geq set temperature (P5), fan stops.
For the initial starting, before the first stop of compressor, fan is out of the control of P5.

Alarm

- H1 Maximum temperature alarm for thermostat probe: When storage temperature reaches or exceeds this set temperature, the alarm is enabled after the delay time; the display flashes "H1" and current storage temperature value.
- H2 Minimum temperature alarm for thermostat probe: When storage temperature reaches or is under this set temperature, the alarm is enabled after the delay time; the display flashes "H2" and current storage temperature value.
- H3 Maximum temperature alarm for defrost probe: When defrost probe temperature reaches or exceeds this set temperature, the alarm is enabled after the delay time; the display flashes "H3" and current storage temperature value.
- H5 Alarm delay at initial start up: Time interval between the detection of an alarm condition and alarm signaling at initial start up. (Only for initial start up)
- H6 Temperature alarm delay: Time interval between the detection of an alarm condition and alarm signaling.

Display

C1 Option of temperature unit: 00= $^{\circ}$ C; 01= $^{\circ}$ F.

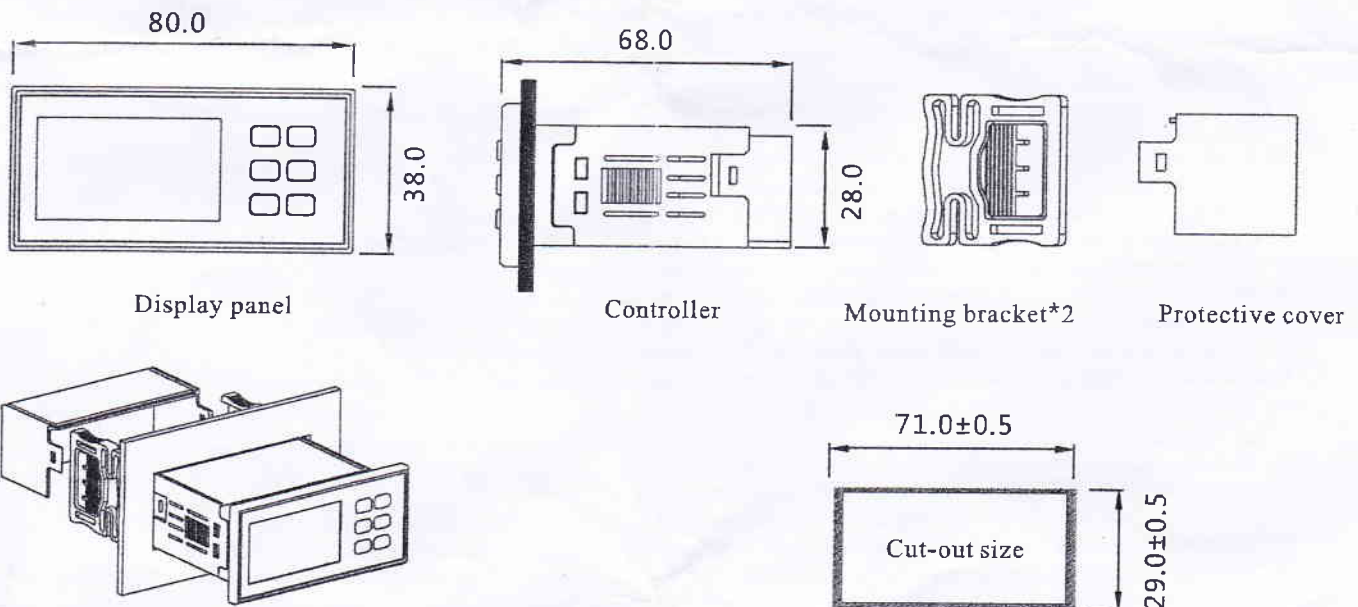
Failure code		
Code	Failure cause	Compressor state
H1	Thermostat probe temperature over upper limit(eg probe is not put in place)	Maintain the original state
H2	Thermostat probe temperature over upper limit(eg relay circuit is closed)	Maintain the original state
H3	Thermostat probe temperature over upper limit(eg relay circuit is closed)	Maintain the original state
Er1	Thermostat probe open circuit/ short circuit	Start or stop according to parameter "E8, E9"
Er2	Defrost probe open circuit/ short circuit	Maintain the original state

After the failure occurred, the display flashes failure code until the failure is ended.

6. Installing and mounting

- Product dimension: 80(W) X 38(H) X 68(L) mm;
- Mounting dimension: 71(W) X 29(H) mm;

Controller is fixed to special bracket, waterproof rubber ring is installed in front panel. Environment temperature should be $-10\sim+60^{\circ}$ C, it is forbidden to be exposed to corrosive gases, humidity, excessive dirt environment.



7. Electrical Connection

Use the thermal wire (screw terminal block $\leq 2.5^2$ mm) to connect and fix; before the connecting, please check if the power supply meets the requirement. Ensure that the wires for probes, power, output device and power connector are separated; don't exceed the maximum permissible current of each relay; should use the external relay if overload.

Probe connection

The probe and light should be installed upward and together, to prevent the danger caused by the leak of liquid. Ensure the thermostat probe is away from the venthole to guarantee the correct measurement of storage temperature. The defrost probe should be placed on the finned tube of evaporator, where the temperature is very low, and the icing up is very often. Ensure the defrost probe is away from heater or high temperature area to prevent untimely ending of defrost.

8. Technical data

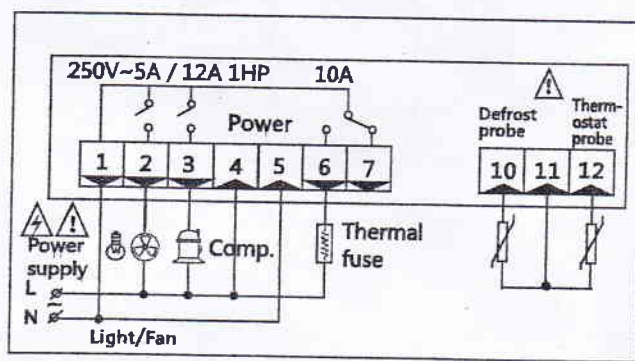
Item	Specification
Housing	ABS light grey flame retardant material
Protection level	Ip20
Protection level of front panel	IP65
Power supply	AC 230V/±10% , 50/60Hz
Power Consumption	<5W
Input	1 piece or 2 pieces of NTC probe
Display range	-45~45°C (-40~120°F)
Control range	-45~45°C (-40~120°F)
Factory default temperature control value	TX3-E11(A): 04°C ; TX3-E22(A): 04°C ; TX3-E23(A): 04°C ; TX3-E24(A): -18°C
Accuracy	±1°C (±2°F)
Software level	A
Relative humidity	20~85% (frost-free)
Ambient temperature	-10~+60°C
Storage temperature	-30~+80°C
Connection method	Wire (screw terminal block ≤2.5mm)
Built-in relay output	Compressor: normally on 30A/240V~, 50/60Hz; defrost: normally on 10A/250V~, 50/60Hz; Fan: normally on 5A/250V~, 50/60Hz; light: normally on 5A/250V~, 50/60Hz.

9. Default Settings

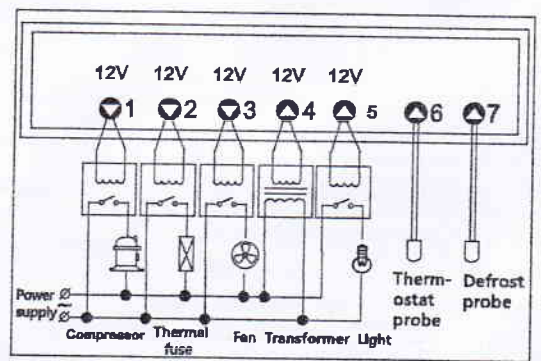
Label	Name	Range	Default setting			
			TX3-E11(A)	TX3-E22(A)	TX3-E23(A)	TX3-E24(A)
PA	Menu password	00 ~ 99	00	00	00	00
E1	Lower set point value	-45°C -40°F ~ Set temperature	-05°C 22°F	-05°C 22°F	-05°C 22°F	-05°C 22°F
E2	Higher set poing value	45°C 120°F ~ Set temperature	20°C 68°F	20°C 68°F	20°C 68°F	20°C 68°F
E3	Temperature hysteresis	01 ~ 10°C 01 ~ 36°F	04°C 07°F	04°C 07°F	04°C 07°F	04°C 07°F
E4	Compressor start delay time	00 ~ 10 min	02	02	02	02
E5	Compressor start delay time after stop	00 ~ 10 min	02	02	02	02
E6	Offset on storage temperature	-05°C ~ 05°C / °F	00	00	00	00
E7	Offset on defrost temperature	-05°C ~ 05°C / °F	- - -	00	00	00
E8	Compressor ON time when storage temperature error	01 ~ 180 min	45	45	45	45
E9	Compressor OFF time when storage temperature error	01 ~ 180 min	15	15	15	15
t1	Mandatory cooling	01 ~ 180 Min	15	15	15	15
F0	Defrost mode	00=electric heating defrost 01=air heating defrost.	- - -	- - -	- - -	00
F01	Compressor start delay for air heating defrost	00 ~ 20 min	- - -	- - -	- - -	00
F1	Max. defrost duration	01 ~ 60 min	- - -	20	20	20
F2	Defrost interval time	00 ~ 24 hour, when it is set as 0, no defrost function.	- - -	06	06	06
F3	Defrost activated temperature	00 ~ 45°C 32 ~ 110°F	- - -	00°C 32°F	00°C 32°F	00°C 32°F

F4	Defrost terminated temperture	00 ~ 45°C 32 ~ 110°F	---	08°C 45°F	08°C 45°F	08°C 45°F
F5	Display during defrost	00=Normal display 01=Last value before defrost 02="dEF"	---	01	01	01
F6	Drip time after defrost	00 ~ 60 min	---	02	02	02
P1	Fan operation mode at start up	00=operate simultaneously with compressor (stop while defrost) 01=keep operating(stop while defrost) 02=operate simultaneously with compressor (start while defrost) 03=keep operating(start while defrost)	---	---	03	01
P2	Fan operation mode after defrost	00 = delay activation 01 = temp. activation	---	---	00	00
P3	Fan activation delay after defrost (valid when P2=00)	00 ~ 60 min	---	---	02	02
P4	Fan activated temp. after defrost (valid when P2=01)	-45 ~ 45°C -40 ~ 120°F	---	---	12°C 54°F	00°C 32°F
P5	Fan terminated temperature	45 ~ -45°C 120 ~ -40°F	---	---	20°C 68°F	20°C 68°F
H1	Storage temp. overhigh alarm	45°C ~ H2 120°F ~ H2	45°C 115°F	45°C 115°F	45°C 115°F	45°C 115°F
H2	Storage temp. too low alarm	H1 ~ -45°C H1 ~ -40°F	-45°C -40°F	-45°C -40°F	-45°C -40°F	-45°C -40°F
H3	Evaporator temp. overhigh alarm	00 ~ 45°C 32~120°F	---	45°C 115°F	45°C 115°F	45°C 115°F
H5	Alarm delay at initial start up	00 ~ 180 min	60	60	60	60
H6	Temperature alarm delay	00 ~ 180 min	00	00	00	00
C1	Temp. unit	00=°C 01=°F	00	00	00	00
CPA	Changing menu password	00 ~ 99 (Setting 00, the menu password is cancelled)	00	00	00	00

10. Wiring diagram



Connection method for common controller:
built-in compressor and relay



Connection method for A type controller:
external compressor and relay

Notes: connection diagram for other type please refer to the function table, e.g., leave the corresponding terminal if without light or defrost sensor.