# User Manual of STC-2304 Thermostat
## Refrigeration & Defrosting & Fan Controller
### (Version 21.08.04GEN)

STC-2304 is a digital temperature controller **with two sensors, three output relays,** and six touch-sensitive keys; it controls the **refrigeration & defrosting unit & the fan**.

## 1. Package

Controller: 1PCS      Sensor: 2PCS      Clips:  2PCS      Manual:1 PCS

## 2. Specification

| | |
|---|---|
| Input Power | 220V AC ± 10% 50/60HZ; (12/24/48/110V Option) |
| Maximum current | 10A (Default) under 220V AC |
| Sensor | NTC, 25°C /10 KΩ, the sensor cable 200cm |
| Protection Class | IP65 to the front panel |
| Storage | -10°C ~ 60°C, RH < 90%, without condensation |
| Working | -5°C ~ 60°C, RH < 80%, without condensation |
| Temp. Range | Measurable: -40°C ~ 99°C; Controllable: -40°C ~ 85°C |
| Resolution | 0.1°C |
| Accuracy | ± 1°C from -30°C to +50°C; ± 2°C in other range |
| Power Consumption | ≤ 5W |

## 3. Interface & Operation
### 3.1. Front Panel
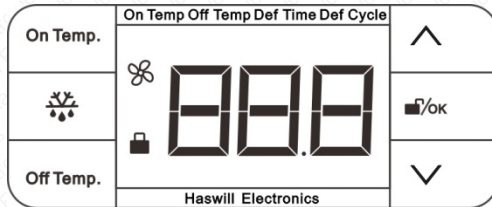


Under normal status, the screen shows:

1) English characters on the top bar;
2) Instant room temperature in 𝟪𝟪.𝟪;
3) The 🔒 lighting means keys locked.

### 3.2. Indicator / Character in Display

| Indicator / Light | Meaning | On | Hide | Wink | Fast Wink |
|---|---|---|---|---|---|
| 🔒 | Keys Locker | Locked | Unlocked | N/A | N/A |
| On | Compressor status | Working | Stop | Delay | N/A |
| On Temp | Compressor Startup Temp. | Editable | Locked | N/A | N/A |
| Off Temp | Compressor Stop Temp. | Editable | Locked | N/A | N/A |
| Def | Defrosting status | Working | Stop | Delay | Water dripping |
| Def Time | Defrosting Lasting Time | Editable | Locked | N/A | N/A |
| Def Cycle | Defrosting Cycle / Interval Time | Editable | Locked | N/A | N/A |
| ❄ | Fan status | Working | Stop | Delay | N/A |

### 3.3. Operation

**A. Under Normal Locked Status**

a) **Unlock all keys:** Hold the [🔓/OK] key for 1s to unlock; the 🔒 icon in the left bottom of the screen will dim; it will auto-lock again if without operation in the 30s.

b) **Restore Factory Setting:** hold the [∧] key for 10s, the screen will show "ᴦᴇ𝟧"; Now release the [∧] key and touch the [🔓/OK] key **in 3s**, to restore the default factory setting, the screen will
- Shows "𝗬𝗘𝟱" once succeed;
- Shows "Eᴦᴦ" if failed; you must power it on again before trying.

**B. Under Editable Unlock Status**

a) **[On Temp] Key:** touch this to check/edit the existing refrigeration start temperature (max 85.0°C), the character "On Temp" lighting;

b) **[Off Temp] Key.:** touch this to check/edit the existing refrigeration stop temperature (Min -40.0°C), the character "Off Temp" lighting;

c) **[❄] key:** hold this for 3s to change the status to forced-defrosting manually.

d) Enter into The **Function Menu List:** Hold the [🔓/OK] key for 3s until seeing F ꜒.

**Tip: In above a), b), d)**
- Touch the [∨] key or the [∧] key to change (hold this key to accelerate speed), and then tap [🔓/OK] to save new data and back to normal status;
- It will autosaves the new value and back to normal status if without operation in 30 s, or hold the [🔓/OK] key for 3 s to saving data and quit.
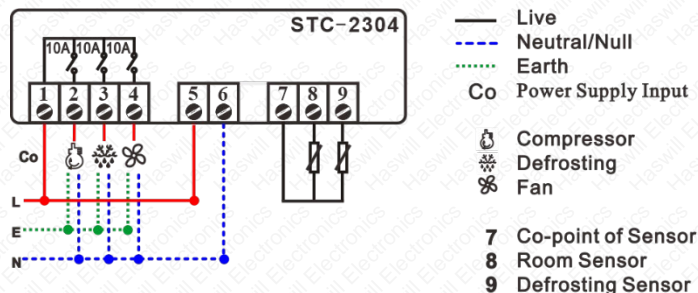- There must be at least a 1.0 ℃ gap between the Temperature for Load Turn-On and the Temperature for Load Turn-Off.

**C. Check the Defrosting Temp.:** hold the [∧] key for 3s to check no matter locked or not.

### 3.4. Dimensions & Installation
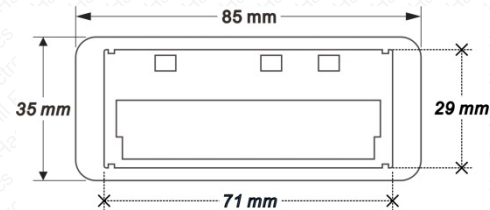


A. Suggested amount dimension: 71*29*72 (W*H*D)
B. Detach the slide fasteners, put the controller into a hole, wiring follow the diagram
C. Install the fasteners, and install the waterproof cover.
D. Please **avoid** installing in the below environments:
- Relative humidity > 85%, have condensation
- The places that temperature <-5°C or >60°C;
- The places that have inflammable and explosives;
- Strong vibration or struck
- Exposed to the continuous water mist spraying or the dust;
- Exposure to corrosive and pollution gas (for example, the gas, smoke, or salt fog that contain sulfur or ammonia;
- Wireless electromagnetic interference or strong magnetic fields.

## 3.5. Wiring Diagram



| | |
|---|---|
| —— | Live |
| - - - | Neutral/Null |
| ···· | Earth |
| Co | Power Supply Input |

| | |
|---|---|
| 🌡 | Compressor |
| ❄ | Defrosting |
| ❀ | Fan |

| | |
|---|---|
| 7 | Co-point of Sensor |
| 8 | Room Sensor |
| 9 | Defrosting Sensor |

# 4. Configurations

## 4.1. Code and Function Menu

Hold the [■/OK] key for 3s to enter the function Menu List interface.

| Code | Function | Min | Max | Default | Unit |
|---|---|---|---|---|---|
| F1 | Defrosting Lasting Time | 1 | 120 | 10 | Min |
| F2 | Defrosting Cycle / Interval Time | 0 | 120 | 6 | Hour |
| F3 | Defrosting Cycle / Interval Time Count Mode | 0 | 1 | 1 | °C |
| | 0    The sum working time of the controller | | | | |
| | 1    The sum working time of the compressor | | | | |
| F4 | Water dripping Time | 0 | 120 | 3 | Min |
| F5 | Defrosting by,<br><br>0 = Electric-Thermal,  1 = Hot Gas, 2 = Wind | 0 | 2 | 0 | Min |
| F6 | Defrosting Stop Temperature | -40.0 | 50.0 | 10.0 | °C |
| F7 | Fan mode, Ref. 4.2 | -180 | 300 | d | S |
| F8 | Time delay for fan 1st time running after pass F4 | 0 | 300 | 30 | S |
| F9 | Delay Time only for Compressor Protection | 0 | 10 | 0 | °C |
| F10 | Room Temp. Alarm Delay for this unit 1ST-time power on | 0.1 | 24.0 | 2.0 | Hour |
| F11 | Over-Temperature Value to Trigger Alarm (ref. 5) | 0 | 50.0 | 5.0 | °C |
| F12 | Alarm Delay time after time pass F10 | 0 | 120 | 10 | Min |
| F13 | Temp. Calibration = Real Temp.-Measured Temp. | -10.0 | 10.0 | 0.0 | °C |

## 4.2. When will the Fan Start/Stop Works？?

| F7 Value | Description |
|---|---|
| -180 to -1 | Fan startup earlier than the compressor starts |
| 1 to 300 | Fan startup later than the compressor starts |
| 0 | Fan keep synchronous with the compressor |
| C | Fan continuous working without interrupt |
| d | Fan continuously working unless defrosting time and water dripping time. |

F8: Wait for the hot air around the evaporator to cool the cold gas from the compressor.

## 4.3. When will the Defrosting Start/Stop Works？

A. **Defrosting start automatically** or **manually** need to reach all below conditions
   1) Defrosting Cycle Time $F2 \neq 0$ (disable the defrosting function by set $F2 = 0$)
   2) Instant time passed the F2 or forced running defrosting by press [❄] key
   3) Defrost Sensor Temperature < Defrost Stop Temperature ( F6 )
B. **Defrosting stop automatically or manually** once reach any of the below conditions
   1) The time passed the defrosting lasting time F1
   2) Forced stop defrosting by hold the [❄] key for 3s.
   3) Defrost Sensor Temperature > Defrost Stop Temperature ( F6 )
   After defrosting, it's the dripping water time; the compressor will start after this.

## 4.4. When will the Compressor Start/Stop Works？?

A. According to the defrosting type, the **working condition** of the compressor is as follows
   a) $F5 = 0$ (Defrost by Electric-Thermal) or $F5 = 2$ (Defrost by the wind from the fan).
      All of the following conditions must be reached:
      1) The time should be later than
         the compressor last stops moment + the compressor delay time F9
      2) Room Sensor Temperature ≥ On Temp. (Ref. 3.3-B-a)
      3) **Fan mode in F7 has been executed**
   b) $F5 = 1$, **Defrost by Hot Gas** from compressor reversal, requires
      1) Passed the **3min delay time** (fixed) before the compressor reversal to offer hot gas for defrosting;
      2) Once defrosting time is over, passed the **2min delay time** (fixed) before the compressor forward running to provide cold air for refrigerating.
B. The compressor will **stop once it reaches any below conditions:**
   1) Room Sensor Temperature ≤ Off Temp (Ref.3.3-B-b);
   2) Electric-Thermal defrosting start;
   3) Hot gas defrosting over.
C. Once alarming with error code "E1", the compressor will repeat "works 15m + stop 30min".

# 5. Error & Alarm

When an alarm occurs, the buzzer is screaming, and the display shows an error code; press any key to stop the screaming, but the error code will not disappear until all problems are fixed.

| Code | Reason | Troubleshooting |
|---|---|---|
| E1 | Room Sensor Error | Ensure the sensor was installed firmly or replace a new sensor; the Alarm will disappear in 15s once the problem is fixed. |
| E2 | Defrost Sensor Error | |
| HA | **Room Temperature** ≥ On Temp + F11 | Check the room temperature, then change the compressor / defrosting device's working status manually if necessary. |
| LA | **Room Temperature** ≤ Off Temp - F11 | |

# 6. Environmental Information



The package's material is 100% recyclable. Just dispose of it through specialized recyclers.
The electro components can be recycled if it is disassembled for specialized companies.
Please do not burn or throw the controllers in domestic garbage. Observe the respective law in your region concerning the environmentally responsible manner of disposing of its devices.