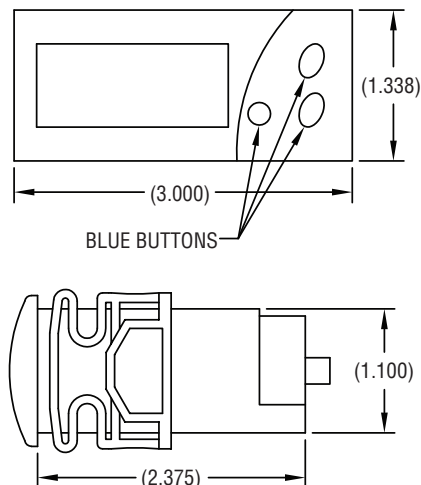




## Series TSX Temperature Digital Controller

### Specifications - Installation and Operating Instructions



The Series TSX are designed for refrigerating or cooling applications. It has two inputs for temperature probes type PTC or NTC (selectable by parameter). The probe temperature is displayed on the bright 3-digit display. The user is able to program 23 different parameters including set point, hysteresis, defrosting time and ambient probe adjustment using the silicone front keypad. The configuration key input allows easy programming of the parameters. The unit features error warning and password protection. Select between red or green display color, temperature display in °C or °F and 115 VAC, 230 VAC, 24 VAC/DC or 12 VAC/DC power supplies.

#### INSTALLATION

NOTE: Unit must be mounted away from vibration, impacts, water and corrosive gases.

- Cut hold in panel 71 x 29 mm (2.80 x 1.14 inches)
- Apply silicone (or rubber gasket) around the perimeter of the hold to prevent leakage.
- Insert unit into hole of panel.
- Slide removable fitting clips onto unit from the back until secure to panel.
- Wiring diagram is displayed on the top of the unit.
- Note: DO NOT INSTALL PROBE CABLE NEAR POWER CABLES.

#### MAINTENANCE, CLEANING, AND REPAIR

After final installation of the unit, no routine maintenance is required.

Clean the surface of the display controller with a soft and damp cloth. Never use abrasive detergents, petrol, alcohol or solvents.

Upon final installation of the Series TSX Temperature Digital Controller, no routine maintenance is required. A periodic check of the system calibration is recommended. The Series TSX is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

#### SPECIFICATIONS

##### Probe Range:

PTC: -58 to 302°F (-50 to 150°C);

NTC: -58 to 230°F (-50 to 110°C).

**Input:** PTC/NTC thermistor 1000Ω @ 25°C.

**Output:** 16A SPST relay @ 250 VAC resistive, 5A inductive; Dual output units also have one 8A SPDT relay @ 250 VAC resistive, 3A inductive.

**Horsepower Rating (HP):** 16A: 1HP 240 VAC - 10FLA, 60LRA 250 VAC.

**Control Type:** ON/OFF.

**Power Requirements:** 110 VAC; 230 VAC; 24 VAC/DC; 12 VAC/DC (depending on model).

**Accuracy:** ±1% FS.

**Display:** 3-digit, red, 1/2" (12.7 mm) digits.

**Resolution:** 0.1° (<100°); 1° (≥100°).

**Memory Backup:** Nonvolatile memory.

**Ambient Operating Temperature:** 14 to 131°F (-10 to 55°C).

**Storage Temperature:** -4 to 176°F (-20 to 80°C).

**Weight:** 2.3 oz (65 g).

**Front Panel Rating:** IP64.

**Agency Approvals:** UR pending.

#### Configuration Key TS2-K Compatible

## LIST OF PARAMETERS

	Description	Units	Range
SP	Set Point	Degrees	r1 to r2
r0	Differential or Hysteresis	Degrees	1 to 20
r1	Lower Value for SP	Degrees	-58 to r2
r2	Higher Value for SP	Degrees	r1 to 302
d0	Type of Defrosting	Option	rE/In
d1	Temperature Defrosting Stop	Degrees	-58 to 302
d2	Defrosting Duration	Minutes	0 to 59
d4	Delay of First Defrosting	Minutes	0 to 999
d5	Display on Defrosting	Option	off/on/-d-
d7	Compressor Drip Time	Minutes	0 to 999
d8	Defrosting Interval Time	Hours	0 to 24
d14	Defrost Counting Mode	Option	ct/rt
c0	Minimum Stopping Time	Minutes	0 to 59
c2	ON Time of Fault Cycle	Minutes	0 to 999
c3	OFF Time of Fault Cycle	Minutes	0 to 999
c4	Minimum ON Time	Minutes	0 to 999
c5	Minimum Time Between 2 Activations	Minutes	0 to 999
P1	Ambient Probe Adjustment	Degrees	-10 to 10
P2	Defrosting Probe Adjustment	Degrees	-10 to 10
P4	Number of Probes	Option	1/2
H1	Keyboard Protection	Option	yes/no
H5	Access Code to Parameters	Numeric	0 to 255
H6	Probe Type	Option	Ptc/ntc

## PARAMETER DESCRIPTIONS

**SP** = Set point. Temperature we wish to regulate the machine (variable from r1 to r2)

**r0** = Differential or hysteresis

**r1** = Lower value for SP

**r2** = Higher value for SP

**d0** = Type of defrosting

rE = Defrosting without connecting compressor

in = Defrosting by connecting compressor

**d1** = End of defrosting temperature. When this temperature is reached the defrosting will end

**d2** = Defrosting duration (if d2=0 no defrosting is performed)

**d4** = Time to carry out the first defrosting

**d5** = Display during the defrosting

Off = The temperature will be shown real time during defrosting

On = The temperature at defrost beginning is frozen on display until the end and until the actual temperature be equal or lower than initial, or 1 hour elapses

-d- = Label -d- is displayed during defrosting until the end and the actual temperature be equal or lower than initial, or 1 hour elapses

**d7** = Time since defrosting ends until the compressor can be connected

**d8** = A defrosting cycle is performed every d8 hours (if d8 = 0 no periodic defrosting is performed)

**d14** = Defrost counting mode

rt = Controller running hours

ct = Compressor running hours

**c0** = Minimum stopping time of the load

**c2** = ON time of fault cycle, when ambient probe is broken

**c3** = OFF time of fault cycle, when ambient probe is broken

**c4** = Minimum time since the compressor start-up until the next start-up

**P1** = Ambient probe adjustment. If the probe is not place in the exact point to control use a standard thermometer to offset the measured temperature

**P2** = Defrosting probe adjustment. If the probe is not placed in the exact point to control use a standard thermometer to offset the measured temperature

**P4** = Number of probes

**H1** = Keyboard protection. To modify SET, activate/de-activate defrosting we have to enter the code and then quit. The protection disappears momentarily. It becomes activated again 1 minute after the last key is pressed.

**H5** = Access code to parameters (it is set to 0 from factory)

**H6** = Probe Model PTC or NTC

## PARAMETER DESCRIPTIONS

**Set Point (SP) is the only parameter the user can access without code protection.**

- Press SET.SP text will appear on the display.
- Press SET again. The real value is shown on the display.
- The value can be modified with the UP and DOWN arrows.
- Press SET to enter any new values.
- Press SET and DOWN at the same time to quit programming or wait one minute and the display will automatically exit programming mode.

### Access to all code protected parameters.

- Press SET for 8 seconds. The access code value 0 is shown on the display (unit comes with code set at 0 from factory).
- With the UP and DOWN arrows, code can be set to user needs.
- Press SET to enter the code. If the code is correct, the first parameter label is shown on the display (SP).
- Move to the desired parameter with the UP and DOWN keys.
- Press SET to view the value on the display.
- The value can be modified with the UP and DOWN arrows.
- Press SET to enter the value and exit.
- Repeat until all necessary parameters are modified.
- Press SET and DOWN at the same time to quit programming or wait one minute and the display will automatically exit programming mode.

\*The keyboard code can be reset to ZERO by turning off the controller and turning it on again while keeping the SET pressed.

### Activating/Deactivating Defrosting

Holding the UP arrow pressed for 8 seconds the defrosting is activated. Repeating this operation the defrosting is stopped. If a cool cycle is activated the defrosting is disabled.

### Default Working

In case of probe error, the control performs a continuous regulation, C2 min. load connected - C3 min. load disconnected. In case of memory error, the control performs a continuous regulation, 5 min. load connected - 5 min. load disconnected.

### LED Indication and Display Messages

The LED OUT indicates if the load is connected or not.

The LED DEF indicates if the control is performing defrosting.

In normal operation, the probe temperature will be shown on the display. In case of alarm or error, the following messages can be shown:

- Er = Memory Error
- Ep2 = Defrosting Probe Error
- oo = Open Probe Error
- -- = Short Circuit Probe Error