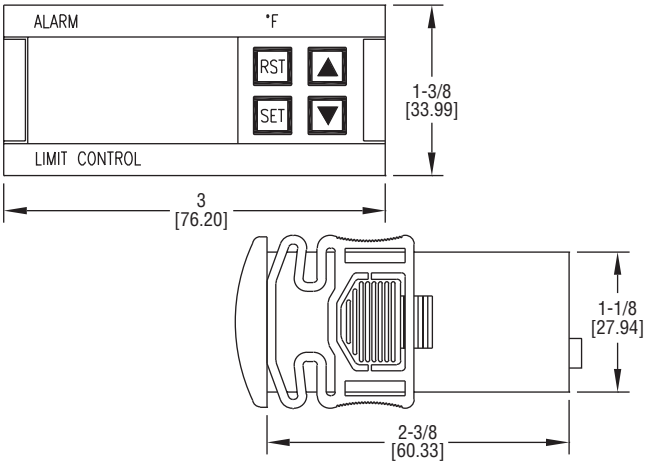
Series TSF-DF Digital Thermocouple Limit Alarm

Specifications - Installation and Operating Instructions



The Series TSF-DF Digital Thermocouple Limit Alarm is a UL approved temperature limit control that provides visual alarm status, along with a 16 amp SPST relay output when a process temperature limit has been reached. After the input temperature returns to normal conditions, the alarm can be either manually or automatically reset depending on how the unit is programmed.

Program settings on model TSF-DF controls cannot be changed through the buttons on the device. Desired program parameters are entered on a TSF-MDF programming control. Using the TS2-K configuration key, the parameters can be easily copied from the TSF-MDF and transferred to the TSF-DF Limit Alarms.

INSTALLATION

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

- Cut hole in panel 2.80 x 1.14 inches (71 X 29 mm).
- Use the included gasket, or apply silicone around the perimeter of the hole to prevent leakage.
- Insert unit into the hole in panel, and secure using the included mounting clips.
- Wire the unit per the wiring diagram on the product label or in IOM.

OPERATION

Note: A Model TS2-K configuration key and a Model TSF-MDF is required to change the parameter settings of the TSF-DF controls.

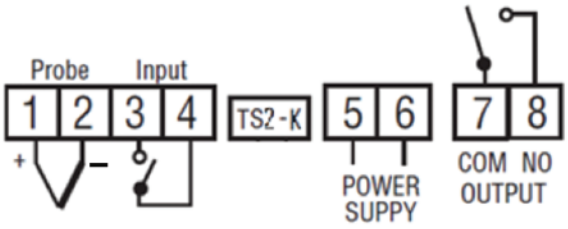
Programming Steps:

Using a Model TSF-MDF enter in the desired control parameters following the TSF-MDF Parameter Programming section of this bulletin. After the parameters have been entered, they are transferred to the TSF-DF controls by following the TSF-DF Parameter Programming section of this bulletin.

SPECIFICATIONS

Probe Range: 32 to 999°F (0 to 700°C) for thermocouple Type J; 32 to 999°F (0 to 999°C) for thermocouple Type K or S.
Input: Type J, K, or S thermocouple.
Output: NO SPST relay rated 16A @ 240 VAC resistive.
Horsepower Rating (HP): 1 HP.
Control Type: ON/OFF; manual/automatic reset.
Power Requirements: 115 VAC, 230 VAC, 12 VAC/VDC or 24 VAC/VDC (depending on model).
Power Consumption: 4 VA @ 230 VAC.
Accuracy: ±1% FS.
Display: 3-digit, red, 1/2″ (12.7 mm) digits, plus sign.
Resolution: 1°.
Memory Backup: Nonvolatile memory.
Ambient Operating Temperature: 32 to 140°F (0 to 60°C).
Storage Temperature: -4 to 176°F (-20 to 80°C).
Weight: 2.3 oz (65 g).
Front Panel Rating: IP64.
Agency Approvals:
DF Models: CE, cUR, UR;
MDF Models: None.

Wiring Diagram



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List of Parameters

	Description	Units	Range
SP	Set Point	Degrees	r1 to r2
r0	Differential or Hysteresis	Degrees	1 to 99
r1	Lower Limit for SP	Degrees	0 to r2
r2	Higher Limit for SP	Degrees	r1 to 999
r3	Reset Control	Option	Aut/hoL/PNP
r4	Short Circuit Probe Detection	Degrees	0 to 999
d0	High or Low Limit Control	Option	Hi/Lo
c0	Minimum Stopping Time	Seconds	0 to 999
c2	Output Status with Probe Error	Option	Off/On
c3	Alarm Energize Condition	Option	No/Yes
P1	Ambient Probe Adjustment	Degrees	-30 to 30
P5	Ambient Probe Type	Option	tcJ, tch, tcS
H5	Access Code to Parameters	Numeric	0 to 255

Parameter Descriptions

SP = Set Point. Temperature we wish to activate relay output.
r0 = Differential or hysteresis.
r1 = Lower value for SP.
r2 = Higher value for SP.
r3 = Alarm reset
Aut = Automatic
hoL = Manual
PuP = Reset on Power Up
r4 = If the probe reading does not fluctuate r4 degrees in 1 minute, the control will enter alarm condition.
d0 = High or low limit control.
Where TS is the probe input temperature.
If d0 = Hi and r3 = Aut:
If TS ≥ SP relay output ON, AL displayed.
If TS ≤ SP - r0 relay output OFF, TS displayed.
If d0 = Hi and r3 = hoL:
If TS ≥ SP relay output ON, AL displayed.
If TS ≤ SP - r0 it waits for reset of relay output OFF, TS displayed.
If d0 = Lo and r3 = Aut:
If TS ≤ SP relay output ON, AL displayed.
If TS ≥ SP + r0 relay output OFF, TS displayed.
If d0 = Lo and r3 = hoL:
If TS ≤ SP relay ON, AL displayed.
If TS ≥ SP + r0 it waits for reset to relay output OFF, TS displayed.
c0 = Minimum stopping time of the load.
c2 = Output status with probe error.
c3 = Energize relay on alarm condition (Determines fail state during power loss).
Yes = Relay energized during alarm condition,
No = Relay de-energized during alarm condition.
P1 = Ambient probe adjustment.
P5 = Ambient probe type.
tcJ = (Type J), **tch** = (Type K), **tcS** = (Type S).
H5 = Access code to parameters (factory set at 0).

LED Indication and Display Messages

The **Alarm LED** indicates if the relay output is connected or not. When the relay output is connected, the message AL is displayed alternated with the probe temperature.
In normal operation the probe temperature will be shown on the display.
In case of error, the following messages can be shown:
Erl = memory error
ooo = open probe error
--- = ambient temperature out to range.

TSF-MDF Parameter Programming

Set Point Parameter Access:

- Press SET. SP text will appear on the display.
- Press SET again. The set point value is shown on the display.
- Use the UP and DOWN arrows to modify set point value.
- Press SET to save any new values.
- Press SET and DOWN at the same time to quit programming, or wait one minute and the display will automatically exit the programming mode.

Code Protected Parameters Access:

- Press SET and hold for 8 seconds. The access code value 0 is shown on the display. With the UP and DOWN arrows, enter the access code (unit comes with access code set at 0 from the factory).
- 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 arrows.
- Press SET to view the value on the display.
- Use the UP and DOWN arrows to modify the parameter value.
- Press SET to save the value and exit the parameter.
- 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.

NOTICE The keyboard security code can be reset to ZERO by turning off the controller and turning it on again while keeping the SET key depressed.

TSF-DF Parameter Programming

After all the parameters have been set to their desired values on the TSF-MDF, a Model TS2-K is used to transfer the parameters from the TSF-MDF to all TSF-DF controls that require those parameters. Dip switches are located inside the TS2-K to select between upload and download conditions.

Upload Parameters from TSF-MDF to TS2-K Key:

- Set the internal dip switches on the Model TS2-K programming key to the upload position.
- Connect the TS2-K into the port on the back of the TSF-MDF.
- Press and hold the blue button on the TS2-K.
- When the LED on the TS2-K turns green, the parameters have been successfully uploaded; otherwise one of the following errors may have occurred:
  - Flashing Green LED: Low battery.
  - Flashing Red LED: A communication error has occurred, check the connection between the TS2-K and the control.

Download Parameters from the TS2-K to the TSF-DF Control:

- Set the internal dip switches in the Model TS2-K programming key to the download position.
- Connect the TS2-K into the port on the back of the TSF-DF.
- Press and hold the blue button on the TS2-K.
- When the LED on the TS2-K turns green, the parameters have been successfully loaded on the TSF-DF control; otherwise one of the following errors may have occurred:
  - Flashing Green LED: Low battery.
  - Flashing Red LED (90% off, 10% on): A communication error has occurred. To solve this problem, check the connection between the TS2-K and the control.
  - Flashing Red LED (10% off, 90% on): A memory error has occurred. To solve this problem, repeat the steps to upload the parameters from the TSF-MDF to the TS2-K configuration key.
  - Alternating Red and Green LED: A program error has occurred. To solve this problem, check that the version number on the TSF-MDF and the TSF-DF are the same.
- Repeat the download step for the rest of the TSF-DF controls.

Reset An Alarm:

When the parameter r3 = Aut, the alarm condition will automatically reset once the probe temperature reading returns to non-alarm conditions. When the parameter r3 = hoL, the alarm condition will remain activated until a reset signal is received either by pressing the RST key on the front face of the control or by closing contact to the rear input.

- When d0 = Hi the reset is accepted when the probe temperature TS ≤ SP - r0.
- When d0 = Lo the reset is accepted when the probe temperature TS ≥ SP + r0.

MAINTENANCE

Upon final installation of the Series TSF-DF Thermocouple Limit Control, no routine maintenance is required. A periodic check of the system calibration is recommended. The Series TSF-DF 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.

CLEANING & REPAIR

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

Printed in U.S.A. 7/14 FR# R0-444144-00 Rev. 1

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