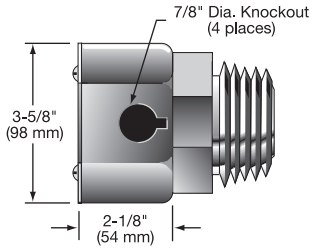
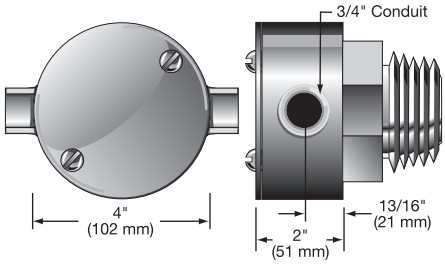
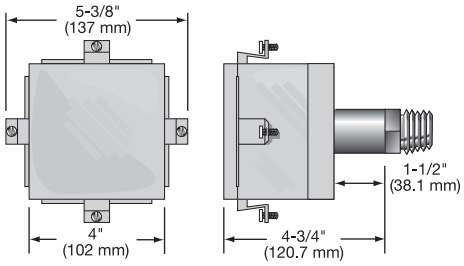
Alternate NEMA 1 Housing
Type 3N
(for no thermostat)
for 1", 1-1/4", 2" and 2-1/2" Screw Plug Heaters



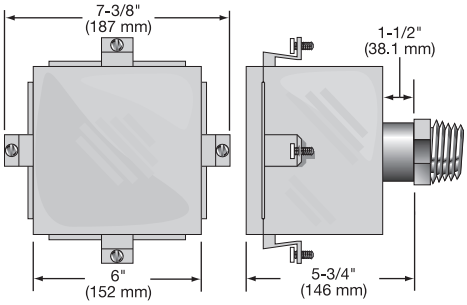
Alternate NEMA 4 Housing
TYPE 4N
(for no thermostat)
for 1", 1-1/4", 2" and 2-1/2" Screw Plug Heaters



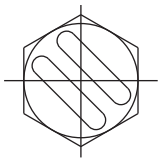
Alternate NEMA 4 Housing
TYPE 4T
(for a single pole thermostat)
for 1" and 1-1/4" Screw Plug Heaters



Alternate NEMA 4 Housing
TYPE 5T
(for a single or double pole thermostat)
for 2" and 2-1/2" Screw Plug Heaters

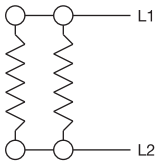


Wiring Diagrams — Screw Plug Heaters with Two Elements



Two Element
1-1/4" and 2" NPT Plugs

Single-Phase—Series Connection
Element Voltage
Equals
One Half-Line Voltage

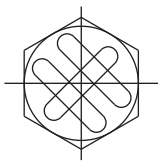


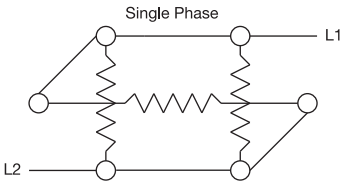
Single-Phase—Parallel Connection
Element Voltage
Equals
Full Line Voltage

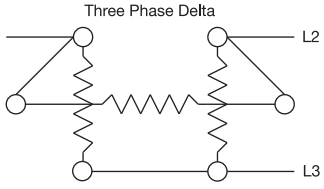
Note: Dual-Voltage heaters are factory wired for the higher voltage (series connection) unless otherwise specified. Easily rewired for lower voltage operation (parallel connection).

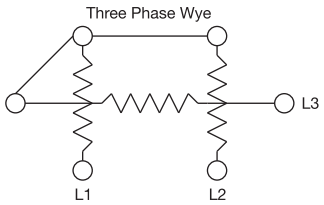
Wiring Diagrams — Screw Plug Heaters with Three Elements

Three Element
Crisscross Pattern
2" NPT Plugs
(Optional on 2-1/2" NPT Plugs)

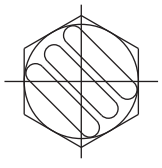


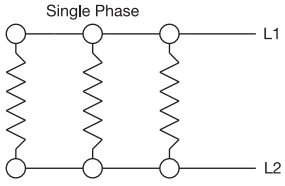


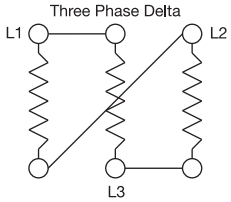


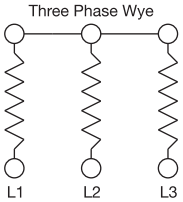


Three Element
Parallel Pattern
2-1/2" NPT Plugs









NOTE: Standard screw plug immersion heaters with three elements, factory wired for three-phase delta, can be rewired for single-phase operation with no wattage change. Wattage can be reduced to one-third of the designed wattage by switching from three-phase delta to wye connection.

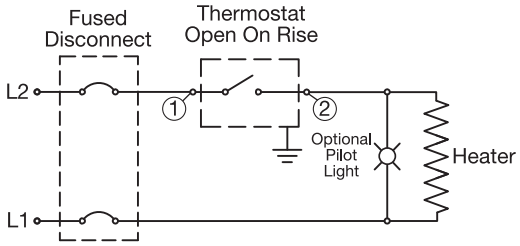
CAUTION

Heaters wired for three-phase wye should not be changed to single-phase or three-phase delta connection, since this will increase wattage and watt density on the elements by three times the original designed wattage, causing premature heater failure.

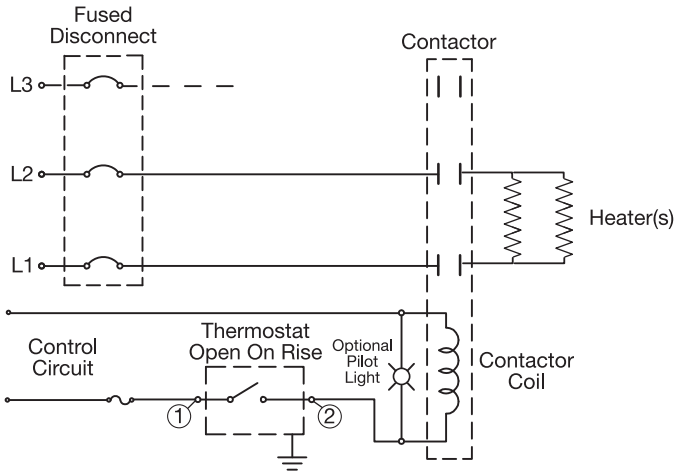
Thermostat Wiring Diagrams

Thermostat Style A (Single Pole—Single Throw)

Typical circuit when voltage and/or line current does not exceed thermostat ratings

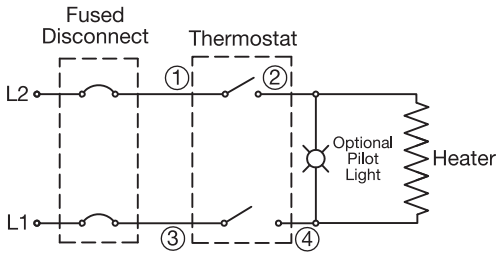


1Ø or 3Ø circuit if line voltage and/or current exceeds thermostat rating

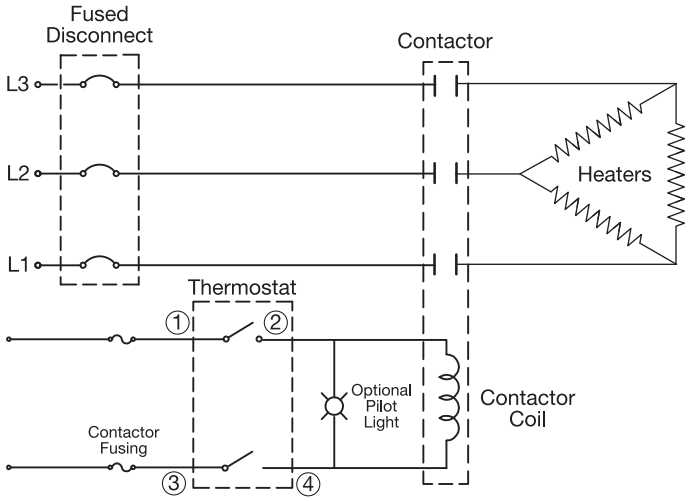


Thermostat Style B (Double Pole—Single Throw)

Typical circuit when voltage and/or line current does not exceed thermostat ratings



1Ø or 3Ø circuit if line voltage and/or current exceeds thermostat rating



Stock Thermostat Kits

Double-Pole Thermostat Kits include the following components:

Kit Number TSTR-1008 with Style B Thermostat	
TST-110-103	Thermostat with 100 to 550°F Range
TST-104-104	Knob
EHD-109-103	Pilot lamp
TST-111-101	Bezel

Kit Number TSTR-1009 with Style B Thermostat	
TST-110-102	Thermostat with 60 to 250°F Range
TST-104-103	Knob
EHD-109-103	Pilot lamp
TST-111-101	Bezel

Note: Double-Pole Thermostat Kits can also be installed separately from the heater in housing HSGR-1004 shown on page 11-9.

Made in USA

Thermostat Styles and Selection

Style C Double-Pole Thermostat

- *Secondary high limit circuit with manual reset*
- *High limit tracks 25°F above setpoint temperature*
- *High limit latches open until manual reset is pushed in the event that temperature goes up to 25°F above setpoint*
- *Capable of controlling loads up to 30 Amps at 277 VAC*

Style D Single-Pole Thermostat

- *General purpose thermostat recommended for most applications*
- *Capable of controlling loads up to 25 Amps at 240 VAC*

Thermostat Electrical Ratings: Normally Closed Contacts, Open on Temperature Rise – Adjustable

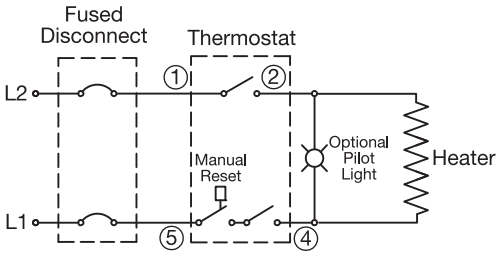
Stock Items Are Shown In RED

Control Type	Style	Temp Range °F	Ampacity at Line Voltage 120V	240V	277V	480V	Bulb Dia. in	Bulb Length in	Capillary Length in	Terminals	Thermostat Part Number	Optional Thermostat Parts Knob	Bezel	Pilot Lamp	Instruction Sheet P/N
DPST	C	60–250	30	30	30	—	0.38	4.50	18	#10 screw	**TST-110-127**	TST-104-103	TST-111-102	EHD-109-103	IDP-119-106
		60–250	30	30	30	—	0.38	4.50	24	#10 screw	**TST-110-128**	TST-104-103	TST-111-102	EHD-109-103	IDP-119-106
		60–250	30	30	30	—	0.38	4.50	36	#10 screw	**TST-110-129**	TST-104-103	TST-111-102	EHD-109-103	IDP-119-106
		60–250	30	30	30	—	0.38	4.50	72	#10 screw	**TST-110-113**	TST-104-103	TST-111-102	EHD-109-103	IDP-119-106
SPST	D	20–120	25	25	—	—	0.26	4.15	24	6" leads	**TST-101-109**	TST-104-105	n/a	n/a	IDP-119-101
		40–107	25	25	—	—	0.27	5.88	6	6" leads	**TST-101-119**	TST-104-102	n/a	n/a	IDP-119-101
		47-107	25	25	—	—	0.32	2.85	8	6" leads	**TST-101-106**	TST-104-102	n/a	n/a	IDP-119-101
		55–115	25	25	—	—	0.26	3.70	42	6" leads	**TST-101-118**	TST-104-102	n/a	n/a	IDP-119-101
		60-180	22	22	18	—	0.28	4.20	6	6" leads	**TST-101-105**	screw adj.	n/a	n/a	IDP-119-101
		60-250	25	25	—	—	0.28	3.00	12	6" leads	**TST-101-101**	TST-104-101	n/a	n/a	IDP-119-101
		60-250	25	25	—	—	0.26	3.35	70	¼" quick conn.	TST-101-111	TST-104-101	n/a	n/a	IDP-119-101
SPDT	D	60-250	25	25	22	—	0.27	4.10	12	#10 screw	**TST-101-116**	TST-104-114	n/a	n/a	IDP-119-103

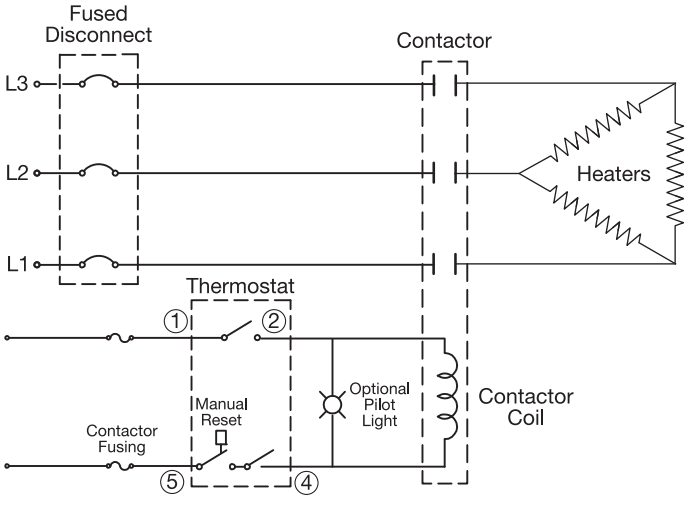
NOTES:

1. Knobs, Bezels and Pilot Lamps are optional and must be ordered separately from the thermostat.
2. Knob **TST-104-119** graduated in °C (15-120) is available as an alternate for the standard TST-104-103 knob graduated in °F (60-250).
3. Knob **TST-104-105** is a plain pointer knob, not calibrated for the range.
4. Knob **TST-104-102** is printed with 4 through 10, not calibrated for the range.
5. For Thermostat Enclosures refer to page 11-9.

Thermostat Style C (Double Pole—Single Throw) with Reset



Typical circuit when voltage and/or line current does not exceed thermostat ratings



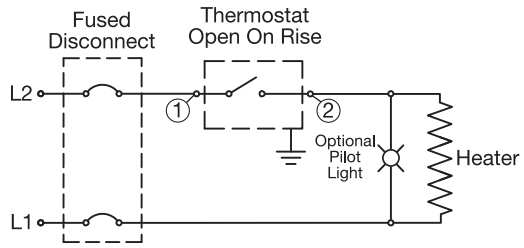
1Ø or 3Ø circuit if line voltage and/or current exceeds thermostat rating

View Product Inventory @ www.tempco.com

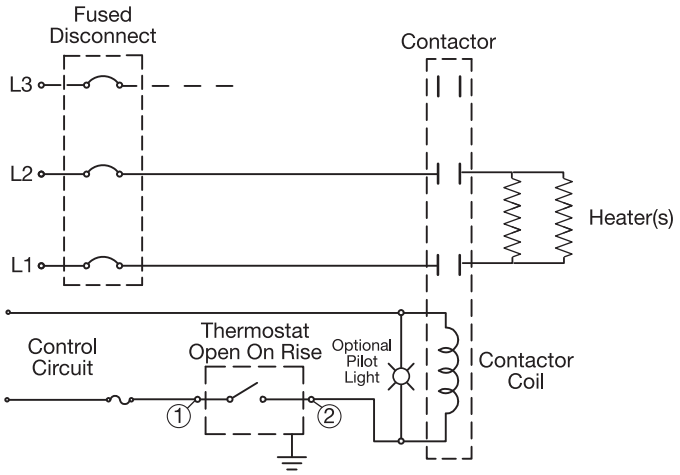
Thermostat Wiring Diagrams

Thermostat Style D (Single Pole—Single Throw)

Typical circuit when voltage and/or line current does not exceed thermostat ratings

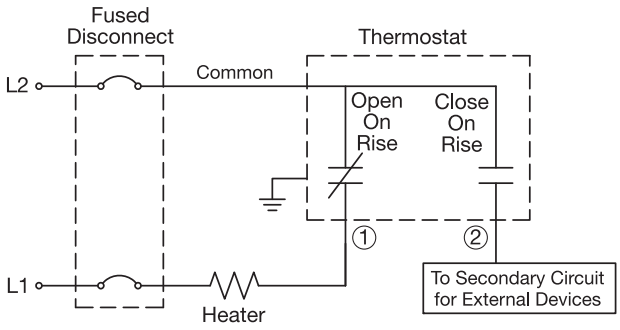


1Ø or 3Ø circuit if line voltage and/or current exceeds thermostat rating

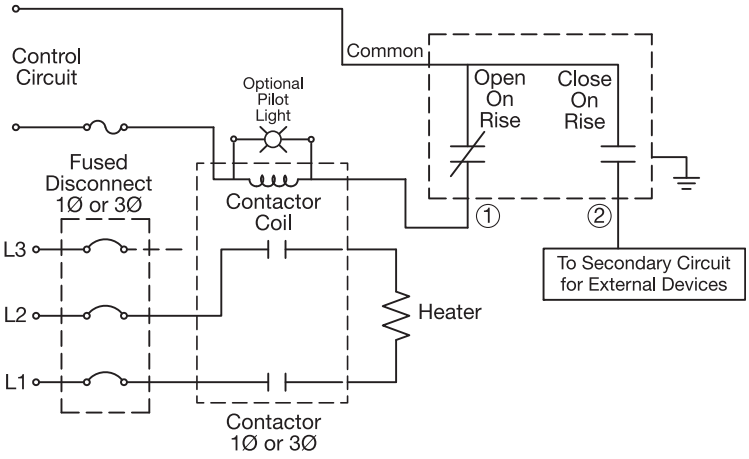


Thermostat Style D (Single Pole—Double Throw)

Typical circuit when voltage and/or line current does not exceed thermostat ratings



1Ø or 3Ø circuit if line voltage and/or current exceeds thermostat rating



Thermostat Installation Warnings & Recommendations

1. **Do not use the thermostat as a power switch. Use some other means of disconnecting power to the heater for servicing.**
2. **A thermostat is not a fail-safe device. Use an approved high temperature limit control and/or pressure limit control for safe operation.**
3. **Avoid kinking or bending the capillary tube too sharply as this will alter the calibration and/or render the thermostat inoperable.**
4. **Excess capillary tube should be coiled neatly in junction box.**
5. **The capillary tube must never touch the thermostat contacts as this will create an electrical short capable of harming personnel and/or equipment.**

Stock Thermostat Enclosures

NEMA 1 Enclosure

For Single-Pole Thermostats

Size: 4-1/4"H × 3"W × 2"D with 3/4" trade size knockout

Part Number: HSGR-1003

NEMA 1 Enclosure

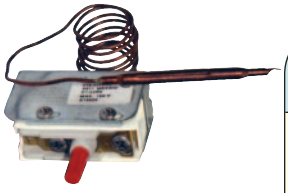
For Double-Pole Thermostats

Size: 5-3/4"H × 3"W × 2"D with 1/2" trade size knockout

Used with Thermostat kits TSTR-1008 and TSTR-1009 shown on page 11-7.

Part Number: HSGR-1004

Style F Temperature High Limit Switch with Manual Reset



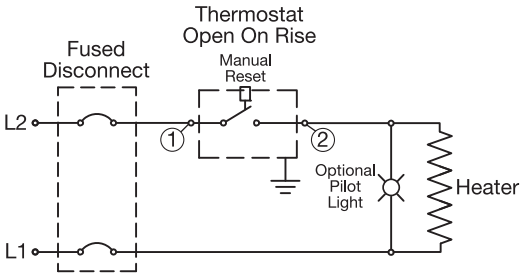
Thermostat Electrical Ratings: High Limit – Manual Reset, Normally Closed Contacts, Open on Temperature Rise at Fixed Temperature

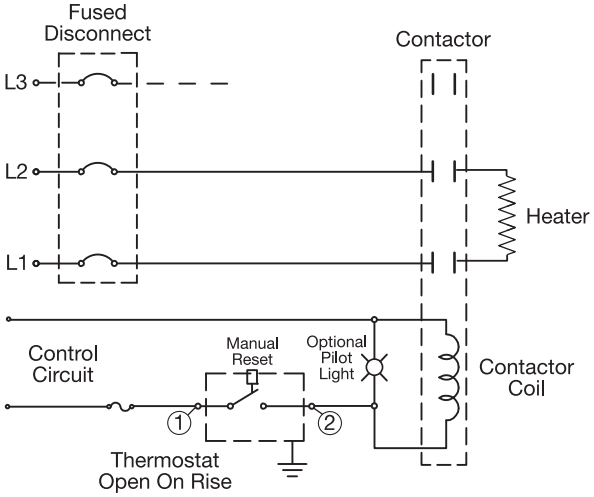
Stock Items Are Shown In RED

Control Type	Style	Temp Range °F	Ampacity at Line Voltage 120V	240V	277V	480V	Bulb Dia. in	Bulb Length in	Capillary Length in	Terminal	Thermostat Part Number	Instruction Sheet P/N
SPST	F1	118 ±3	30	30	20	20	0.32	3.00	12	#10 screw	TST-103-102	IDP-119-104
	F1	118 ±4	30	30	20	20	0.27	3.35	6	#10 screw	**TST-103-109**	IDP-119-104
	F1	125 ±2	30	30	20	20	0.25	3.35	36	#10 screw	**TST-103-108**	IDP-119-104
	F1	165 ±15	30	30	20	20	0.21	2.63	30	#10 screw	TST-103-107	IDP-119-104
	F1	200 ±5	30	30	20	20	0.31	4.00	12	#10 screw	TST-103-104	IDP-119-104
	F1	350 ±8	30	30	20	20	0.25	3.50	36	#10 screw	**TST-103-103**	IDP-119-104
	F2	420 ±15	30	30	30	30	0.25	4.85	30	#10 screw	TST-103-110	IDP-119-104
	F1	572 ±15	30	30	30	20	0.21	2.63	30	#10 screw	TST-103-106	IDP-119-104

NOTES: F2 style has a side vertical mounting bracket instead of #8 tapped holes for mounting. Refer to IDP-119-104 for mounting details.

Hi-Limit Thermostat Style F (Single Pole—Single Throw)





- ***General purpose high limit switch with manual reset***
- ***Once fixed trip point is reached, the high limit switch will remain open until the manual reset button is pushed***

Thermowells *(Stainless Steel or Plain Steel)*

Thermowells provide protection for bulb and capillary sensors. They are supplied with a 1/2" NPT male thread for mounting and a 3/8" NPT internal thread that can be used with the stuffing box assembly to secure the capillary to the well. ID: 0.50", OD: 0.56"

See pages 14-76 through 14-83 for other thermowell styles.

Stock Items Are Shown In RED

Immersed Length in	Immersed Length mm	Part Number Steel	Part Number Stainless Steel
12	305	**MPT-120-101**	**MPT-121-101**
18	457	MPT-120-102	MPT-121-102
24	610	MPT-120-103	MPT-121-103
36	914	MPT-120-104	MPT-121-104

Stuffing Box Assembly

The Stuffing Box Assembly is used to seal the thermostat capillary when the sensing bulb (3/8" max. OD) is immersed directly in a liquid rather than in a thermowell. The Stuffing Box consists of six slotted washers used to compress a graphite packing into a 3/8" NPT male pipe thread fitting.

Assembly Instructions

Feed sensing bulb through hole in upper and lower fitting. Insert washers and packing into top cavity of lower fitting. Upper fitting then screws into lower fitting, creating the seal.

Part Number: TST-109-101