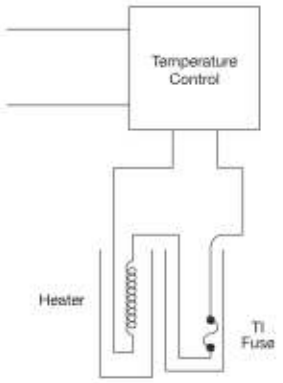
# Application Guide for Thermal Over-Temperature Devices

## T1 Thermal Fuse Devices

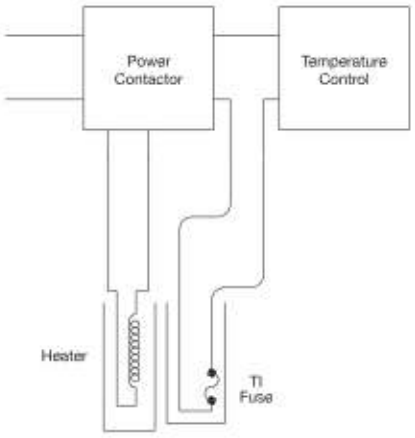
The T1 Over-Temperature Device is a eutectic switch with a pre-specified melt temperature. The "one shot" characteristic is useful in alerting operators to identify and remedy the cause of the over-temperature condition in the course of T1 fuse replacement.

UL listed rating of 15 Amps up to 277 Vac

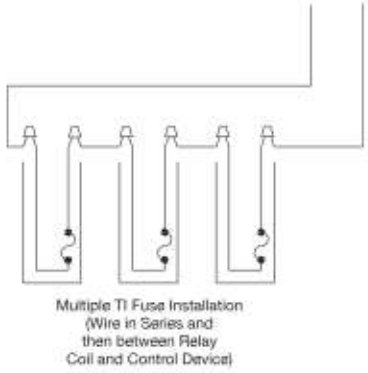
### Single-Phase




### Power Contactor




### Multi-Phase



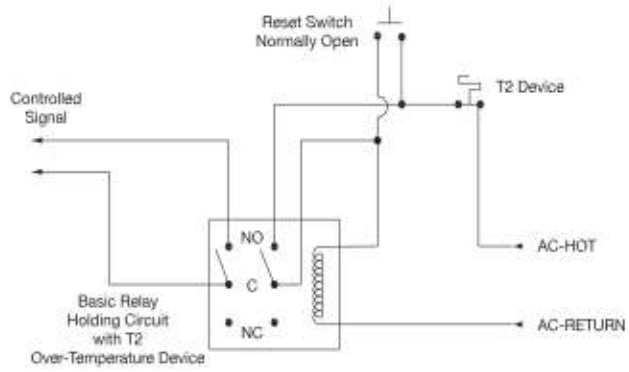

## T2 Bi-Metal Switch

The T2 Over-Temperature Device is a slow make/slow break bimetallic thermostat with a pre-specified calibration temperature. The slow break characteristic coupled with the pushbutton reset feature is extremely useful when a low liquid level occurs.

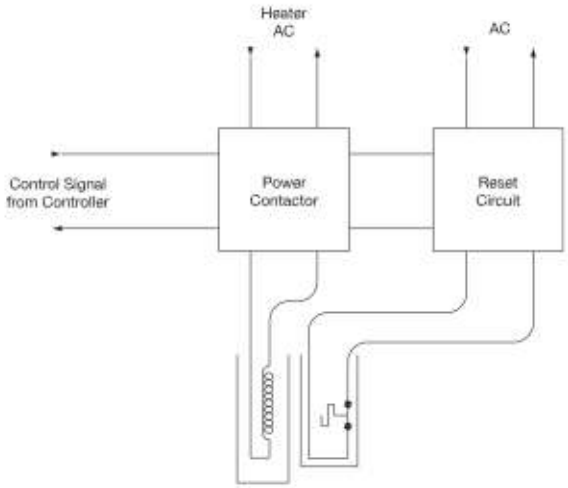
The T2 Over-Temperature Device is electrically installed with a holding circuit in conjunction with a power contactor to energize the heater. ***The T2 device must never be used to directly control heater power.***

UL listed rating of 6 Amps @ 120 Vac or 4 Amps @ 240 Vac

### Basic Relay Holding Circuit




### Typical Installation




**NOTE:** 1. Multiple heaters are hooked up according to standard electrical practices.

2. Multiple T2 devices are hooked up in series on one reset circuit.

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## Replacement Thermal Protection Accessories

Various construction methods are used in the manufacture of PTFE, Quartz and Metal Tube Over-the-Side Immersion Heaters.

The T1 or T2 Thermal Protection Devices are matched to the item they protect for lead length and mounting style.

### T1 Thermal Fuse Devices

| Description | Catalog Number |
|---|---|
| T1 Thermal Fuse for **PTFE** Over-the-Side Heaters (to 190°F) | TMC90001 |
| T1 Thermal Fuse for **PTFE L-Shaped** Over-the-Side Heaters (to 190°F) | TMC90004 |
| T1 Thermal Fuse for **Quartz** Over-the-Side Heaters (w/SS Braid Sleeving) | |
| • Low Temperature Range (to 180°F) | TMC90002 |
| • Medium Temperature Range (to 220°F) | TMC90003 |
| T1 Thermal Fuse for **Straight Metal** Over-the-Side Heaters | |
| • Low Temperature Range (to 180°F) | TMC90005 |
| • Medium Temperature Range (to 220°F) | TMC90006 |
| • High Temperature Range (to 300°F) | TMC90007 |
| T1 Thermal Fuse for **L-Shaped Metal** Over-the-Side Heaters | |
| • Low Temperature Range (to 180°F) | TMC90008 |
| • Medium Temperature Range (to 220°F) | TMC90009 |
| • High Temperature Range (to 300°F) | TMC90010 |

### T2 Bi-Metal Switch

| Description | Catalog Number |
|---|---|
| T2 Bi-Metal Switch for **PTFE** Over-the-Side Heaters (rated to 190°F) | TMC90101 |
| T2 Bi-Metal Switch for **PTFE L-Shaped** Over-the-Side Heaters (to 190°F) | TMC90111 |
| T2 Bi-Metal Switch for **Quartz** Over-the-Side Heaters (w/SS Braid Sleeving) | |
| • Low Temperature Range (to 180°F) | TMC90102 |
| • Medium Temperature Range (to 220°F) | TMC90103 |
| T2 Bi-Metal Switch for **Straight Metal** Over-the-Side Heaters | |
| • Low Temperature Range (to 180°F) | TMC90105 |
| • Medium Temperature Range (to 220°F) | TMC90106 |
| • High Temperature Range (to 300°F) | TMC90107 |
| T2 Bi-Metal Switch for **L-Shaped Metal** Over-the-Side Heaters | |
| • Low Temperature Range (to 180°F) | TMC90108 |
| • Medium Temperature Range (to 220°F) | TMC90109 |
| • High Temperature Range (to 300°F) | TMC90110 |

**High Temperature Range**— Solutions from 220°F to 300°F (104.4°C to 149.0°C)

**Medium Temperature Range**— Solutions from 180°F to 220°F (82.2°C to 104.4°C)

**Low Temperature Range**— Solutions up to 180°F (82.2°C)

## Thermal Over-Temperature Protection


The realities of any plating, cleaning, anodizing, etching or pickling operation are that something could go wrong such as:

- An undetected tank leak
- Undetected evaporation losses
- Failure to refill the system

Any of these conditions creates a situation where the potential for fire or other hazard is increased.

**Standard Setup** — All Tempco Over-the-Side Teflon®, quartz and metal tube heaters come equipped with a replaceable thermal fuse placed in a thermowell and positioned at the top of the heater's hot zone. When wired into the heater circuit, it will instantly cut power to the heater when the preset temperature is reached. If the heater is over 15 amp, the thermal fuse would be wired into the control relay circuit. Also available is the T2 bi-metal switch which would be wired into the control relay circuit and used with additional components to form a resettable system.

We highly recommended the use of liquid level switches tied into control circuitry to provide a failsafe backup to the thermal fuse.