

36T Series Snap-Action Temperature Controls



Snap-Action Temperature Control

The 36T Series of 1/2" bimetal temperature controls from Therm-O-Disc offers proven reliability in a compact, versatile, cost-effective design. The snap action of the bimetal disc provides high-speed contact separation resulting in excellent life cycle characteristics at electrical loads up to 15 amps at 120VAC and 10 amps at 250VAC (100,000 cycles) and 16 amps at 250VAC (30,000 cycles).

A variety of terminal and mounting configurations are available for maximum design flexibility. The quality, reliability, affordability, versatility and world-wide agency approvals of the 36T Series make it the thermostat of choice for a wide variety of temperature control applications.



Switch Actions

The 36T is available in three single pole, single throw (SPST) switch actions:

Automatic Reset – Can be built to either open or close its contacts on temperature rise.

Manual Reset – Available with contacts that open on temperature rise. The contacts can be reset by depressing the button after the control has cooled down.

Single Operation Fuse Disc – Available with contacts that open on temperature rise, and which never reclose unless the ambient temperature drops below +32°F (0°C) or below -31°F (-35°C).

Typical Applications

The 36T is applied to a wide variety of applications as either a regulating control or a safety limit. Examples of applications include:

- Coffeemakers
- Sandwich toasters
- Dishwashers
- Dryers
- Washing machines
- Refrigerators
- Microwave ovens
- Water heaters
- Furnaces
- Boilers
- Electric heaters
- Office equipment
- Automotive seat heaters

Mounting Configurations

The 36T is available in several mounting configurations:

No Mounting Bracket – The 36T may be specified without a mounting bracket. One popular version (designated 36TM or 36TMH) has a switch body designed to accept the customer's clamp bracket (see Figure 1).

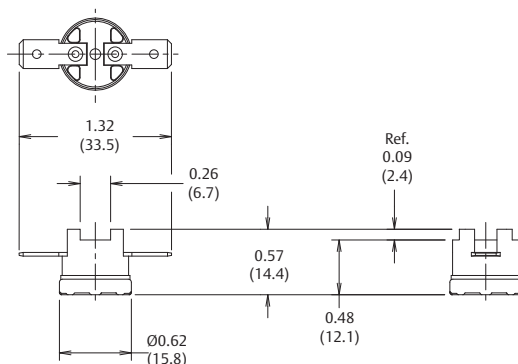


Figure 1

Dimensions are shown in inches and (millimeters).

Surface Mount Bracket – The bimetal disc sensing element is positioned firmly against the mounting surface so it senses the actual mounting surface temperature (see Figure 2). There are many available surface mounting brackets available – typically in either aluminum or stainless steel.

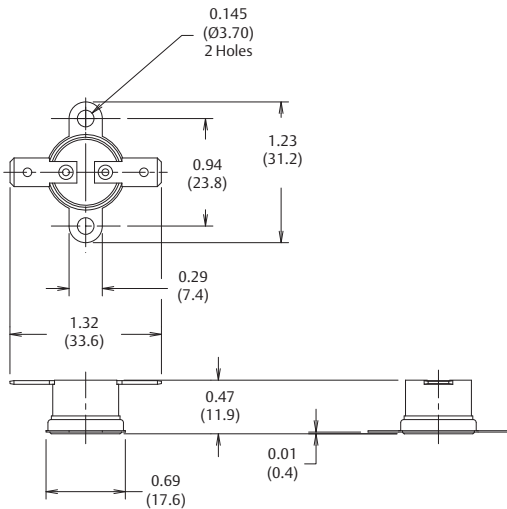


Figure 2

Dimensions are shown in inches and (millimeters).

Surface brackets can be supplied on the 36T either loose or crimped in a fixed position (except for ceramic body 36Ts, 36Ts with stainless steel disc housings, and 36Ts with raised pad disc housings, which must be supplied loose).

Airstream Mount – The bimetal housing extends through a hole in the mounting surface into the airstream (see Figure 3). There are many available aluminum and stainless steel airstream mount configurations.

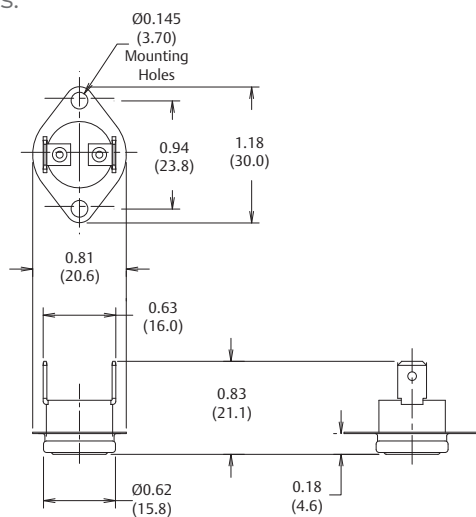
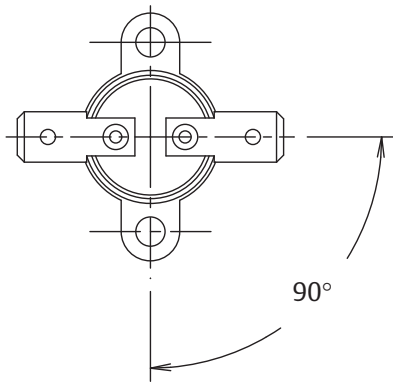


Figure 3

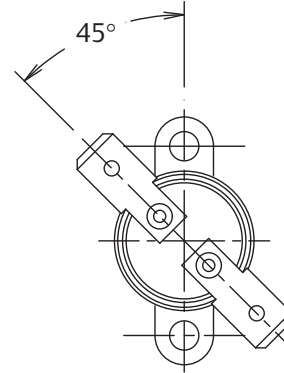
Dimensions are shown in inches and (millimeters).

Terminal to Mounting Hole Crimp Angle

Both surface brackets and air stream housings can be supplied where the customer can specify the angular orientation (in 15 degree increments) of the terminals with respect to the mounting hole centerline (see figure 4).



90° crimp angle



45° counterclockwise crimp angle

Figure 4

Stud Mount – The 36T can be supplied with an integral threaded stud mount. Figure 5 shows two popular brass stud mounts with hex shape (brass stud available with plastic switchcases only). Figure 6 shows an aluminum stud mount available with plastic or ceramic switchcases.



Figure 5



Figure 6

36T Board Mount – The 36T is mounted on extension straps, for applications where the thermostat must extend further into the airstream to sense adequately (see Figure 7). Available strap lengths include 2” (50.4mm), 3” (75.6mm), 5” (126mm) and 7” (176.4mm). Insulating sleeves can be provided for the extension straps, and various mounting board configurations are available.



Figure 7

Thermal Response

Most 36Ts are provided with an enclosed disc. The enclosed disc construction provides greater protection against airborne contaminants entering the control. It also protects the bimetal disc from possible damage during customer handling. In applications where faster response to radiant heat is required, an exposed bimetal disc can be specified.

36T Mounting Options

The letter “A” means available. Consult a Sales Engineer for other available configurations.

Surface Mount – No Mounting Bracket

| Description | Aluminum | Stainless Steel (not available with ceramic body) | Drawing |
|-----------------------|----------|--|-----------|
| Enclosed (raised pad) | A | A | Figure 8 |
| Enclosed (fl at) | A | A | Figure 9A |
| Exposed | A | A | Figure 9B |

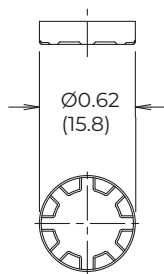


Figure 8

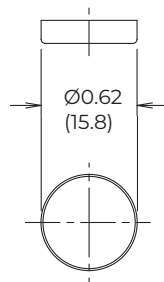


Figure 9A

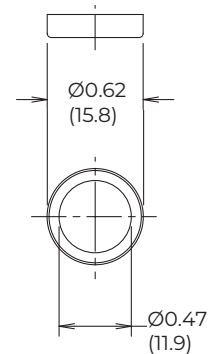


Figure 9B

Dimensions are shown in inches and (millimeters).

Surface Mount – With Mounting Bracket

| Mounting Hole | Aluminum Bracket | Stainless Steel Bracket | Drawing |
|-------------------------|------------------|-------------------------|------------|
| 0.125" (3.2mm) diameter | A | A | Figure 10A |
| 0.145" (3.7mm) diameter | A | A | Figure 10B |
| 0.172" (4.4mm) diameter | — | A | Figure 11 |

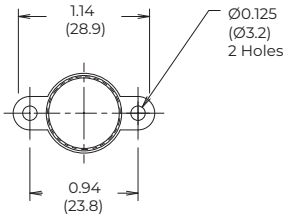


Figure 10A

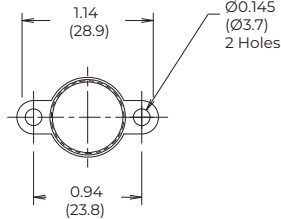


Figure 10B

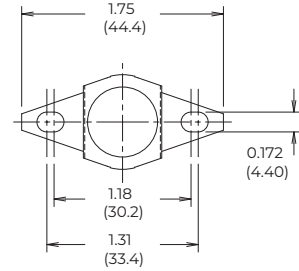


Figure 11

Dimensions are shown in inches and (millimeters).

Airstream Mount

| Mounting Hole | Aluminum (enclosed) | Aluminum (exposed) | Stainless Steel (enclosed) | Stainless Steel (exposed) | Drawing |
|---------------------------|---------------------|--------------------|-----------------------------------|---------------------------|-----------|
| | | | (not available with ceramic body) | | |
| 0.145" (3.7mm) diameter | A | A | A | A | Figure 12 |
| 0.188" (4.74mm) wide slot | A | A | A | A | Figure 13 |
| 0.170" (4.28mm) wide slot | — | A | A | A | Figure 14 |

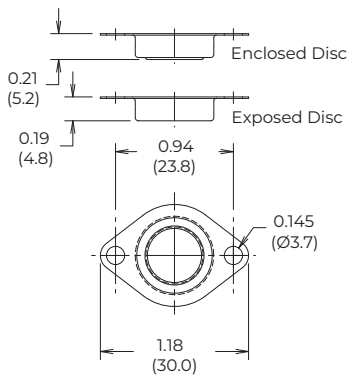


Figure 12

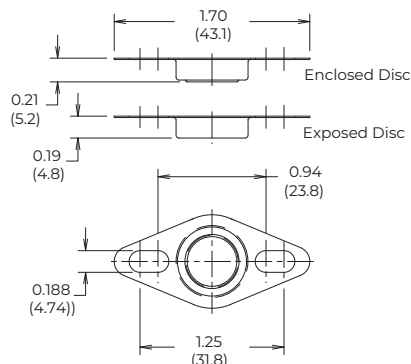


Figure 13

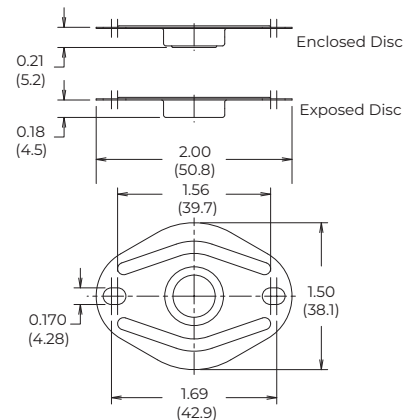


Figure 14

Dimensions are shown in inches and (millimeters).

Stud Mount

| Thread | Stud length | Material | Drawing |
|------------|----------------|--|-----------|
| M4 x 0.7mm | 0.24" (6mm) | Brass (not available with ceramic body) | Figure 15 |
| M4 x 0.7mm | 0.190" (4.7mm) | Aluminum | Figure 16 |

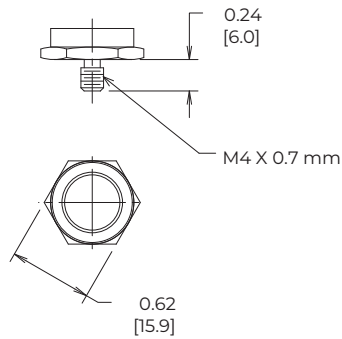


Figure 15

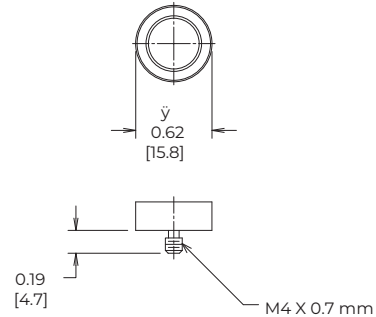


Figure 16

Dimensions are shown in inches and (millimeters).

36T Terminals

Most 36Ts are supplied with 1/4" x .032" (6.3mm x .8mm) quick connect blade terminals that are available in unplated brass, tin plated brass and nickel plated steel. We also have 3/16" (4.8mm) blade terminals available in both .020" (0.5mm) and .032" (0.8mm) thicknesses. Most of these blade terminals are available in 0, 45 and 90 degree angles. The 36T can also be supplied with various weld tab and crimp/solder terminals. Please see the 36T Standard Terminals chart that shows our most frequently used terminals. Note that other configurations/platings may be available if our standard offerings do not satisfy your application. Please contact a Sales Engineer to discuss requirements.

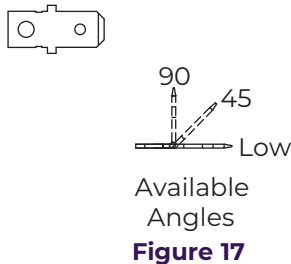


36T Standard Terminals

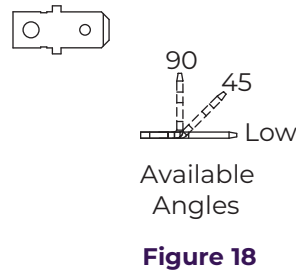
Dimensions are shown in inches and (millimeters). "A" designates available.

| Mounting Hole | Terminal Angle | Unplated Brass | Tin Plated Brass | Tin Plated Brass Steel | Drawing |
|--|----------------|----------------|------------------|------------------------|-----------|
| 3/16 x .020 (4.8 x 0.5 blade) | low | A | A | A | Figure 17 |
| | 45° | -- | A | A | |
| | 90° | A | A | A | |
| 3/16 x .032 (4.8 x 0.8 blade) | low | A | A | A | Figure 18 |
| | 45° | A | A | -- | |
| | 90° | A | A | A | |
| 1/4 x .032 (6.3 x 0.8 blade without stops) | low | A | A | A | Figure 19 |
| | 45° | A | A | A | |
| | 90° | A | A | A | |
| 1/4 x .032 (6.3 x 0.8 blade) | low | -- | A | A | Figure 20 |
| | 45° | A | A | -- | |
| | 90° | A | A | A | |
| .020 (0.5) weld tab | 90° | -- | -- | A | Figure 21 |
| .020 (0.5) crimp/solder | 90° | -- | A | -- | Figure 22 |
| .020 (0.5) solder | low | -- | A | -- | Figure 23 |
| .020 (0.5) PCB solder | 90° | -- | A | -- | Figure 24 |

3/16 (4.8) x 0.020 (.5) Blade



3/16 (4.8) x 0.032 (.8) Blade



1/4 (6.3) x 0.032 (.8) Blade Without Stops

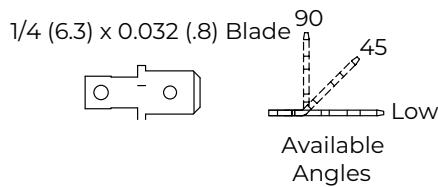
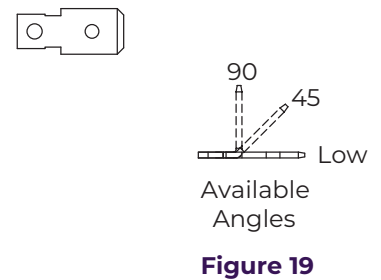


Figure 20

0.020 (.5) Weld Tab



Figure 21

0.020 (.5) Crimp / Solder

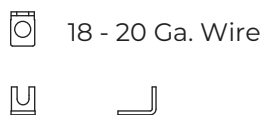


Figure 22

0.020 (.5) Solder



Figure 23

0.020 (.5) PCB Solder

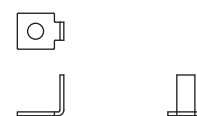


Figure 24

Dimensions are shown in inches and (millimeters).

36T Switchcases

There are many available switchcases (or switchbodies) available for the 36T. When choosing a particular switchcase, there are several key items to consider:

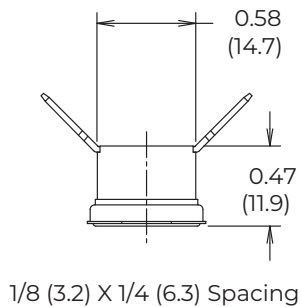
Electrical Spacing – This is the minimum distance required to prevent electrical “arcing” from a live part (terminal) to a dead part (disc housing). The required electrical spacing is determined by the customer’s agency spacing requirements. There are 36T switchcases with two different spacings available:

- 1/8” (3.2mm) by 1/4” (6.3mm) air/surface – designated by an ‘X’ in the nomenclature (see Figure 25). (Preferred)

- 1/16” (1.6mm) by 1/16” (1.6mm) air/surface (see Figures 26, 27).

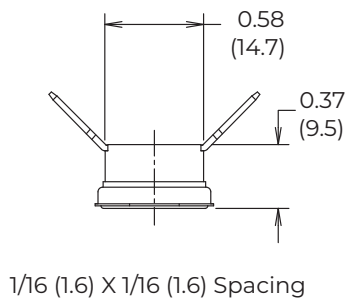
The greater spacings are achieved by an increased switchcase height.

Mounting – All of the available switchcases can be provided in both surface (with or without brackets) or airstream mount configurations. There are several switchcases designed to accept a customer clamp bracket (over the top of the switchcase). These are designated by an ‘M’ in the nomenclature. (See Figure 27)



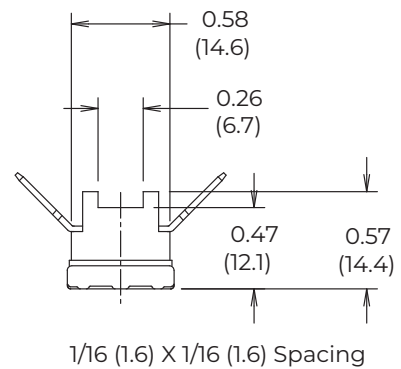
TX, TXE, TXH

Figure 25



T, TE, TH

Figure 26



TM, TMH, TME

Figure 27

Dimensions are shown in inches and (millimeters).

Switchcase Material – For calibrations up to 350°F (177°C), plastic can be specified; for calibrations above 350°F (177°C), ceramic is available. Ceramic switchcases are designated by ‘H’ in the nomenclature.

Manual Reset – Manual reset switchcases are basically similar to those used on automatic reset and fuse disc configurations except for a hole in the top of the case (for the reset pin) and a pad on the top of the case to prevent over travel of the reset pin. Please refer to the manual reset portion of the catalog for more information.

Calibration Temperatures, Differentials and Tolerances

36Ts (automatic reset) are supplied to customer specified open and close calibration set points with a tolerance on both set points.

Please refer to the chart below. To use this chart, start by finding the higher of your open/close calibration set points in the far left hand column. Then look across the top (left to right) to locate your desired nominal differential. Differential is the difference between your nominal open and close calibration set points. The available open and close set point tolerances are shown where the two columns converge. Please note that this chart is applicable to either normally closed contacts (contacts open on temperature rise) or normally open contacts (contacts close on temperature rise).

Example 1:

If you require a nominal open temperature of 250°F (121°C) and a nominal close temperature of 210°F (99°C), then the nominal differential = 40°F (22°C), so the tolerance on the open temperature is ±7°F (±4°C), and the tolerance on the close temperature is ±11°F (±6°C). (Refer to the yellow shaded area in the chart.)

Example 2:

If you require a nominal close temperature of 160°F (71°C) and a nominal open temperature of 140°F (60°C), then the nominal differential = 20°F (11°C), so the tolerance on the open temperature is ±5°F (±3°C), and the tolerance on the close temperature is ±7°F (±4°C). (Refer to the gray shaded area in the chart.)

| Highest Calibration Set Point (Open or Close) | NOMINAL DIFFERENTIAL (temperature difference between nominal open and close set point) | | | | | | | | | | | | | | | |
|---|---|------------|------------------|------------|----------------|------------|--------------------|-------------|----------------|------------|--------------------|-------------|------------------|-------------|-------------------|-------------|
| | *F15-19 *C8.5-10.5 | | 20-24 11-13.5 | | 25-29 14-16 | | 30-39 16.5-21.5 | | 40-49 22-27 | | 50-60 27.5-33.5 | | 61-80 34-44.5 | | 81-100 45-55.5 | |
| | Open | Close | Open | Close | Open | Close | Open | Close | Open | Close | Open | Close | Open | Close | Open | Close |
| 35°F-79°F 2°C-26°C | ±5 ±3 | ±6 ±3.5 | ±5 ±3 | ±6 ±3.5 | ±5 ±3 | ±7 ±4 | ±5 ±3 | ±8 ±4.5 | ±6 ±3.5 | ±8 ±4.5 | ±7 ±4 | ±9 ±5 | - | - | - | - |
| 80°F-180°F 27°C-82°C | ±5 ±3 | ±6 ±3.5 | ±5 ±3 | ±7 ±4 | ±5 ±3 | ±7 ±4 | ±5 ±3 | ±8 ±4.5 | ±5 ±3 | ±8 ±4.5 | ±6 ±3.5 | ±10 ±5.5 | ±7 ±4 | ±11 ±6 | ±9 ±5 | ±13 ±7 |
| 181°F-230°F 83°C-110°C | ±5 ±3 | ±7 ±4 | ±5 ±3 | ±7 ±4 | ±5 ±3 | ±8 ±4.5 | ±5 ±3 | ±8 ±4.5 | ±6 ±3.5 | ±9 ±5 | ±7 ±4 | ±11 ±6 | ±8 ±4.5 | ±12 ±6.5 | ±10 ±5.5 | ±14 ±8 |
| 231°F-300°F 111°C-149°C | - | - | - | - | ±6 ±3.5 | ±9 ±5 | ±6 ±3.5 | ±10 ±5.5 | ±7 ±4 | ±11 ±6 | ±8 ±4.5 | ±11 ±6 | ±9 ±5 | ±14 ±8 | ±11 ±6 | ±17 ±9.5 |
| 301°F-350°F 150°C-177°C | - | - | - | - | - | - | - | - | - | - | ±8 ±4.5 | ±12 ±6.5 | ±10 ±5.5 | ±15 ±8.5 | ±12 ±6.5 | ±20 ±11 |
| 351°F-428°F 178°C-220°C | - | - | - | - | - | - | - | - | - | - | - | - | ±16 ±9 | ±23 ±13 | ±18 ±10 | ±25 ±14 |

NOTES:

1. We can supply tolerances that are tighter than those shown at extra cost. Please contact a Sales Engineer.
2. Wider tolerances required for conical contact construction. Please contact a Sales Engineer.
3. Requires ceramic construction for temperatures above 350°F (177°C)
4. Lowest nominal open or close calibration is -6°F (-21°C).

36T Manual Reset

The 36T manual reset is available with normally closed contacts that open on temperature rise and is a non-trip free design. The 36T manual reset is normally supplied so that it does not automatically reset unless the ambient temperature drops below -31°F (-35°C).

Once the 36T manual reset has opened at its calibration temperature, the ambient temperature must drop before it can be reset. To determine the manually resettable temperature for a specific open temperature – refer to the graph in Figure 28. The manually resettable temperature is the temperature at which (or below which) the 36T can be reset. To use this chart, first find the point on the vertical axis that designates the nominal open temperature minus the tolerance. Then, move across to the curve and find the manually resettable temperature on the horizontal axis. There are two lines shown: one without a compressible washer, and one with a compressible washer. The compressible washer (located under the reset button) can be specified (at extra cost) when the customer desires a higher manually resettable temperature.

Example:

For an open temp/tolerance of 210°F (99°C) ±10°F (±5.5°C), the manually resettable temperature is 100°F (38°C) without the compressible washer, which means that the 36T can be reset when the temperature is at or below 100°F (38°C).

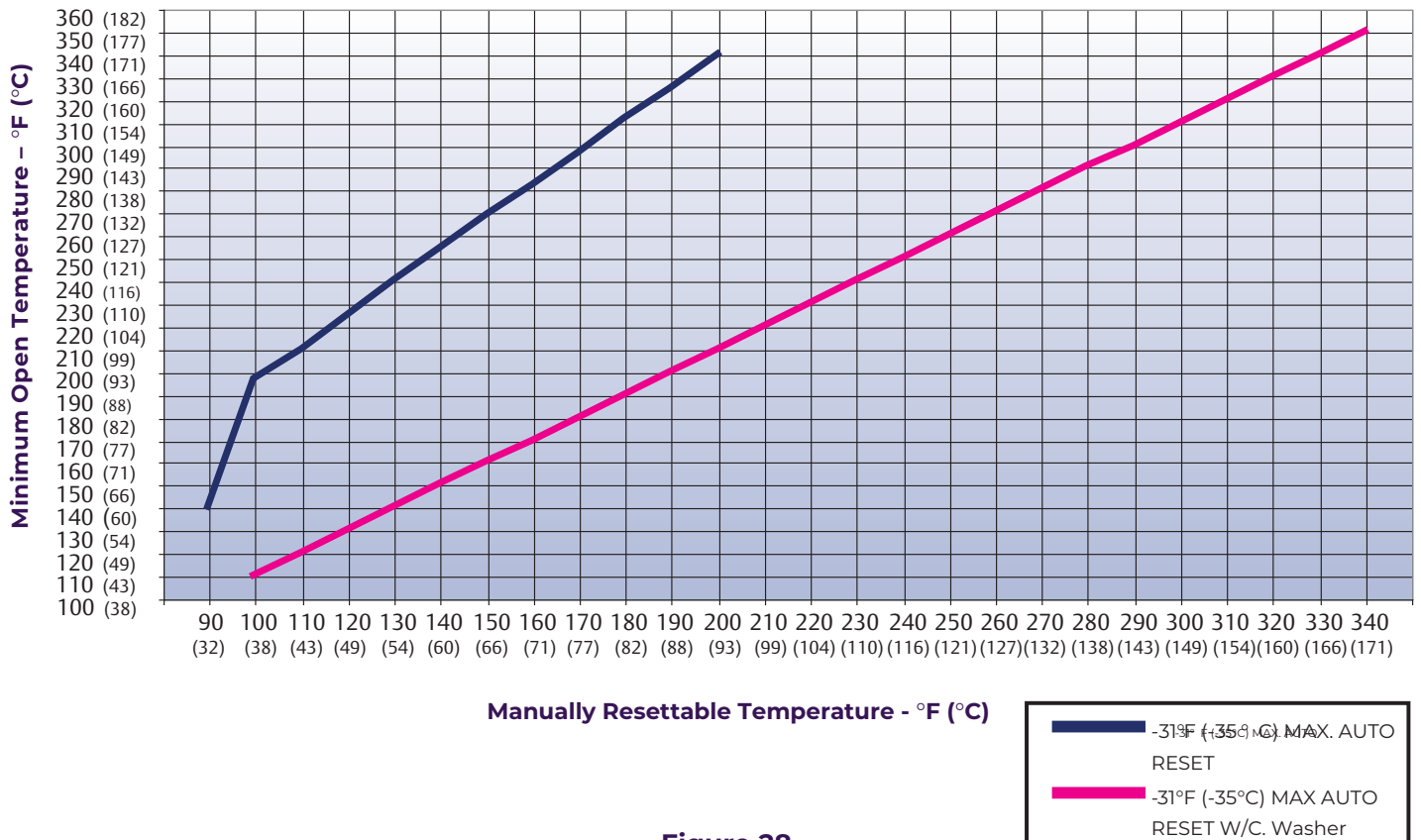


Figure 28

For 36T manual reset calibrations/tolerances, see the table below. Please contact a Sales Engineer if non-standard calibrations or tolerances are required.

| Calibration Range | | Standard Calibration Tolerance | |
|-------------------|---------|--------------------------------|------|
| °F | °C | °F | °C |
| 150-200 | 65-93 | ±8 | ±4.5 |
| 201-240 | 94-115 | ±10 | ±5.5 |
| 241-280 | 116-138 | ±12 | ±6.5 |
| 281-320 | 139-160 | ±14 | ±8 |
| 321-350 | 161-177 | ±16 | ±9 |

36T Manual Reset Mounting and Terminals – The 36T manual reset is available with all of the mounting and terminal configurations that are available on the automatic reset 36T. Figures 29 and 30 show two very common configurations.



Figure 29



Figure 30

Single Operation 36F

The 36F fuse thermostat is a single operation version of the 36T. Once the electrical contacts have opened, they will not reclose unless the ambient temperature drops below +32°F (0°C), or below -31°F (-35°C).

The 36F is available with any of the terminals, mounting configurations or switchcases that are available on the 36T automatic reset version.

The 36F is available with the same open temperature set points and tolerances as the 36T manual reset. Please refer to the chart in the manual reset section. The customer should specify either a +32°F (0°C) or a -31°F (-35°C) maximum automatic reset temperature for the 36F.

General Electrical Ratings

The 36T series of controls has been rated by major agencies throughout the world. Agencies include UL, CSA, VDE, CQC, MITI, and KETI. 36T series controls are rated up to 15Amps @ 120Volts, and 16Amps @ 240Volts. The agency ratings can be used as a guide when evaluating specific applications. However, the mechanical, electrical, thermal and environmental conditions to which a control may be exposed in an application may differ significantly from agency test conditions. Therefore, the user must not rely solely on agency ratings, but must perform adequate testing of the product to confirm that the control selected will operate as intended in the user's application. Please consult a Sales Engineer for rating information that covers your specific application.

Type Numbering System

The following table summarizes the type numbering system for the 36T. These designations represent the type numbers that are agency recognized.

| |
|---|
| 36 _____ |
| T – Automatic Reset or Manual Reset |
| F – Single Operation (fuse disc) |
| M – Switchcase designed to accept customer clamp (<i>see figure 1</i>) |
| X – Switchcase with increased electrical spacing 1/8" (3mm) through air and 1/4" (6.3mm) over surface |
| V – Conical movable contact – silver |
| VG – Conical gold movable contact (with gold-plated stationary contact) |
| E – Eyelet construction (required for European agency approval) |
| H – Ceramic switchcase |
| 0 – No mounting bracket |
| 1 – Airstream mount |
| 2 – Surface mount bracket |
| 3 – Stud mount |
| 4 – Large flange – airstream mount |
| 1 – Contacts open on temperature rise |
| 2 – Contacts close on temperature rise |
| 4 – Fuse disc with automatic reset temperature below -31°F (-35°C) |
| 6 – Manual reset or fuse disc with automatic reset temperature below 32°F (0°C) |

36T Board Mount Nomenclature

36

- T** – Automatic Reset – plastic switchcase
- TH** – Automatic Reset – ceramic switchcase
- TVH** – Automatic Reset – ceramic switchcase – conical silver movable contact

- 0** – No mounting bracket
 - 1** – Contacts open on temperature rise
 - 2** – Contacts close on temperature rise
- B** – Board mount
 - 2** – 2" strap length*
 - 3** – 3" strap length*
 - 5** – 5" strap length*
 - 7** – 7" strap length*

* Approximate length

Important Notice

Users must determine the suitability of the control for their application, including the level of reliability required, and are solely responsible for the function of the end-use product. These controls contain exposed electrical components and are not intended to withstand exposure to water or other environmental contaminants which can compromise insulating components. Such exposure may result in insulation breakdown and accompanying localized electrical heating.

A control may remain permanently closed or open as a result of exposure to excessive mechanical, electrical, thermal or environmental conditions or at normal end-of-life. If failure of the control to operate could result in personal injury or property damage, the user should incorporate supplemental system control features to achieve the desired level of reliability and safety. For example, backup controls have been incorporated in a number of applications for this reason.