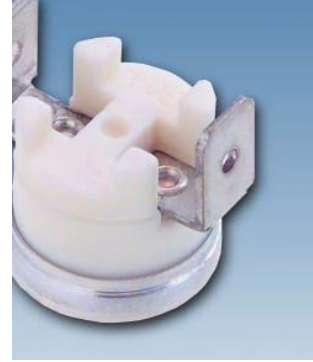


36T Series

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:

- Automatic drip 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).

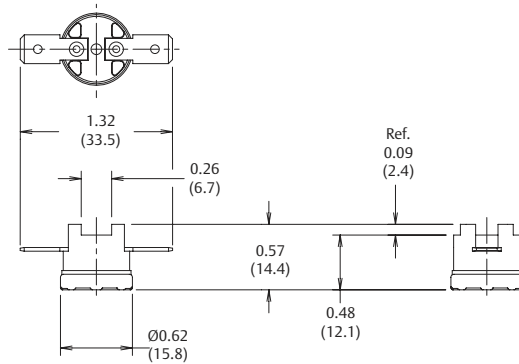


Figure 1

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.

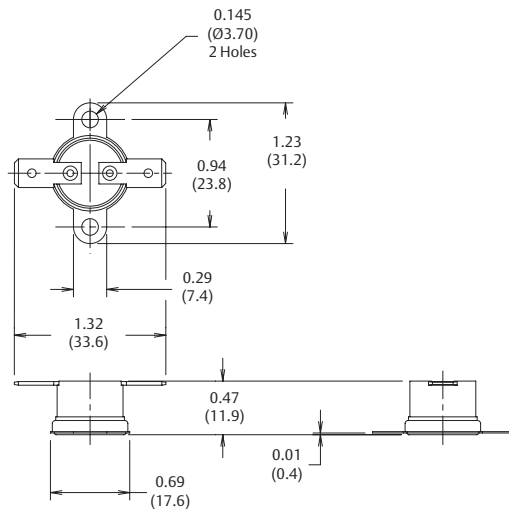


Figure 2

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). For additional flexibility, the orientation of the terminals, with respect to the bracket mounting holes, may be specified in 15 angular degree increments, referenced clockwise or counterclockwise to the bracket mounting hole centerline (*see figure 3*).

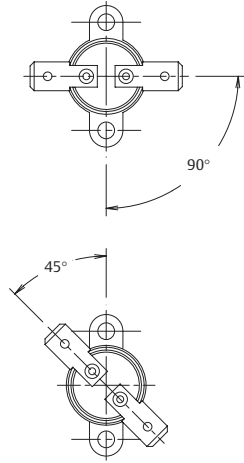


Figure 3

Airstream Mount – The bimetal housing extends through a hole in the mounting surface into the airstream (*see figure 4*). There are many available aluminum and stainless steel airstream mount configurations. The orientation of the terminals with respect to the mounting holes may be specified in 15 angular degree increments, referenced clockwise or counterclockwise to the mounting hole centerline.

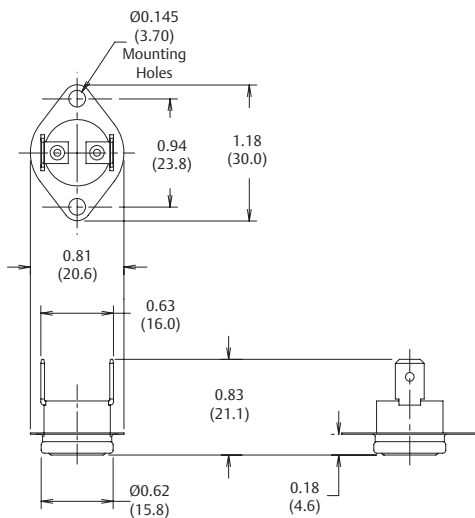


Figure 4

Dimensions are shown in inches and (millimeters).

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

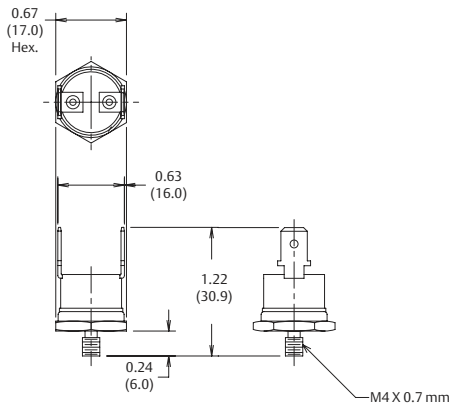


Figure 5

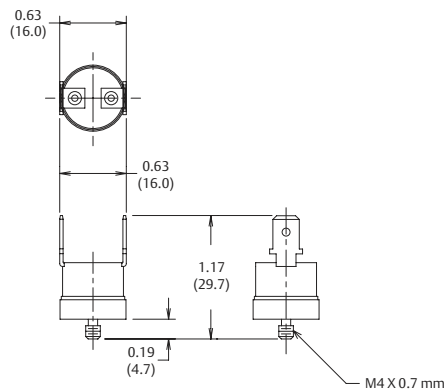


Figure 6

Dimensions are shown in inches and (millimeters).

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.

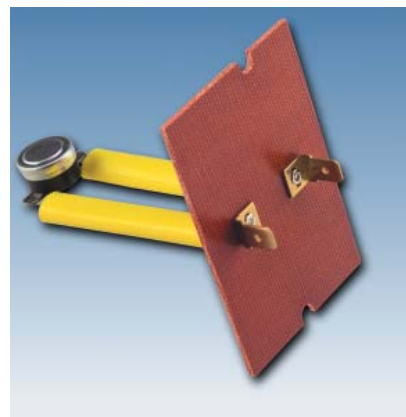
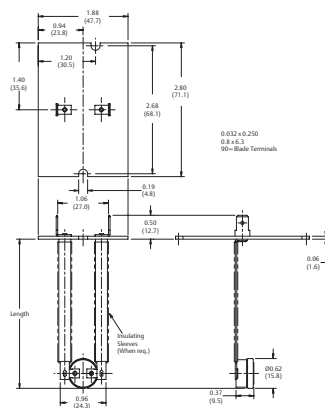


Figure 7

Dimensions are shown in inches and (millimeters).

Please refer to the following listings of popular 36T mounting options. There are others available – if those shown are not acceptable – please contact our sales engineers to discuss specific mounting requirements.

36T Mounting Options

- a. Parts in **bold** are considered standard. Consult a sales engineer for other available configurations.
- b. “A” means available.
- c. Dimensions are shown in inches and (millimeters).

Surface Mount – no mounting bracket

Description	Aluminum	Stainless Steel <i>(not available with ceramic body)</i>	Drawing
Enclosed (raised pad)	A	A	Figure 8
Enclosed (flat)	A	A	Figure 9A
Exposed	A	A	Figure 9B

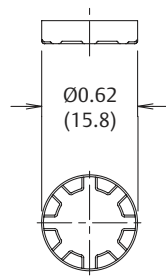


Figure 8

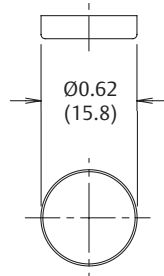


Figure 9A

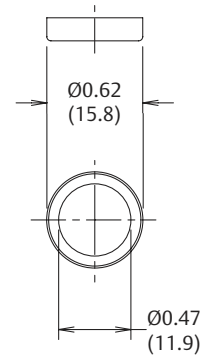


Figure 9B

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) wide slot	—	A	Figure 11

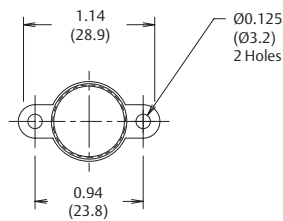


Figure 10A

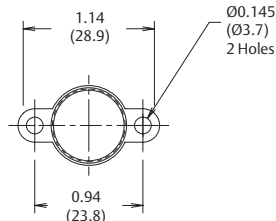


Figure 10B

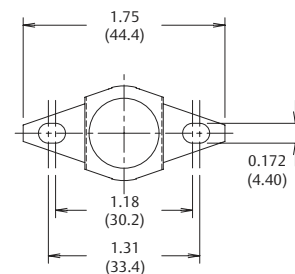


Figure 11

Dimensions are shown in inches and (millimeters).



Airstream Mount

Mounting Hole	Aluminum (enclosed)	Aluminum (exposed)	Stainless Steel (enclosed) <i>(not available with ceramic body)</i>	Stainless Steel (exposed)	Drawing
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

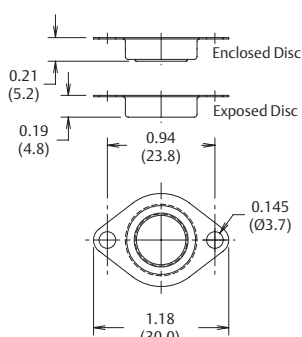


Figure 12

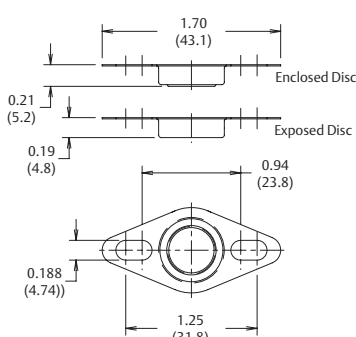


Figure 13

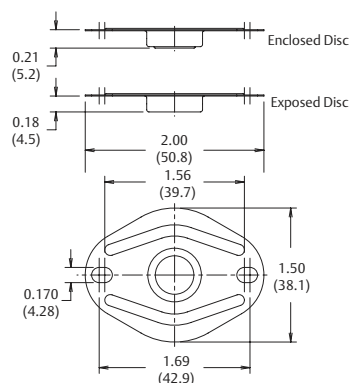


Figure 14

Dimensions are shown in inches and (millimeters).

Stud Mount

Thread	Stud Length	Material	Drawing
M4 x 0.7mm	0.24" (6mm)	Brass <i>(not available with ceramic body)</i>	Figure 15
M4 x 0.7mm	0.190" (4.7mm)	Aluminum	Figure 16

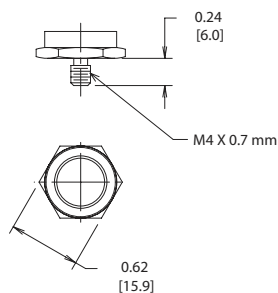


Figure 15

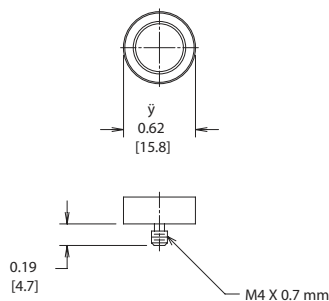


Figure 16

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 summary below 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.

Description	Terminal Angle	Unplated Brass	Tin Plated Brass	Nickel Plated Steel	Drawing
3/16 x .020 (4.8 x 0.5) (blade)	low	A	A	A	Figure 17
	45 degrees	—	A	A	
	90 degrees	A	A	A	
3/16 x .032 (4.8 x 0.8) (blade)	low	A	A	A	Figure 18
	45 degrees	A	A	—	
	90 degrees	A	A	A	
1/4 x .032 (6.3 x 0.8) (blade-without stops)	low	A	A	A	Figure 19
	45 degrees	A	A	A	
	90 degrees	A	A	A	
1/4 x .032 (6.3 x 0.8) (blade)	low	—	A	A	Figure 20
	45 degrees	A	A	—	
	90 degrees	A	A	A	
.032 (0.8) weld tab	low	—	—	A	Figure 21
.020 (0.5) weld tab	90 degrees	—	—	A	Figure 22
.020 (0.5) crimp/solder	90 degrees	—	A	—	Figure 23
.020 (0.5) solder	low	—	A	—	Figure 24
.020 (0.5) PCB solder	90 degrees	—	A	—	Figure 25



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

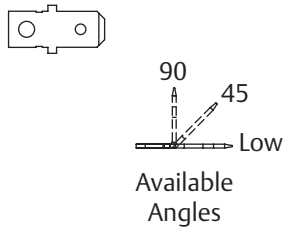


Figure 17

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

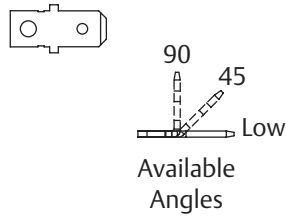


Figure 18

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

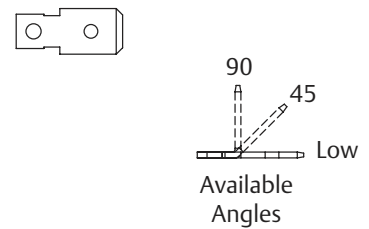


Figure 19

1/4 (6.3) x 0.032 (.8) Blade

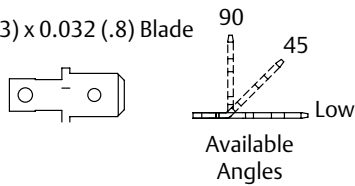


Figure 20

0.032 (.8) Weld Tab



Figure 21

0.020 (.5) Weld Tab



Figure 22

0.020 (.5) Crimp / Solder



Figure 23

0.020 (.5) Solder



Figure 24

0.020 (.5) PCB Solder

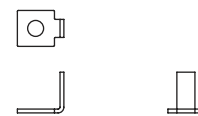


Figure 25

Dimensions are shown in inches and (millimeters).

36T Switchcases

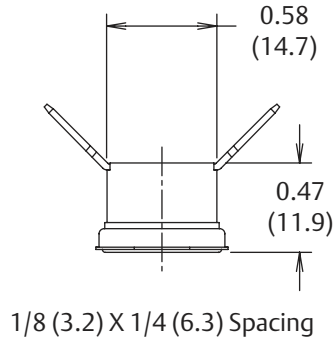
There are many available switchcases (or switchbodies) available for the 36T. When choosing a particular switchcase, there are several key items to consider:

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 26). (Preferred)
- 1/16” (1.6mm) by 1/16” (1.6mm) air/surface (see figures 27, 28).

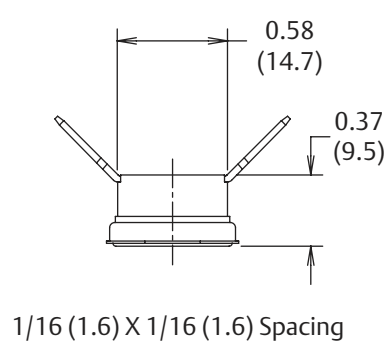
The greater spacings are achieved by an increased switchcase height.

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 figures 26-28)



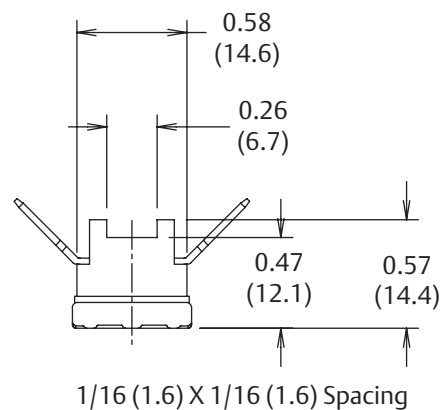
TX, TXE, TXH Surface Mount

Figure 26



T, TE, TH Surface Mount

Figure 27



TM, TMH, TME Surface Mount

Figure 28

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 overtravel of the reset pin. Please refer to the manual reset portion of the catalog for more information.

The following table helps summarize possible switchcase choices for your application requirements.

36T Switchcase Summary

Description	Typical Application Notes	See Figure for Switchcase Height
TX	1, 3, 6, 7, 8	figure 26
T	2, 3, 6, 7, 8	figure 27
TXE	1, 3, 6, 8, 10, 11	figure 26
TE	2, 3, 6, 7, 8, 10	figure 27
TM	2, 3, 5, 6, 7, 8	figure 28
TXH	1, 4, 6, 7, 8, 9	figure 26
TH	2, 4, 6, 8, 9	figure 27
TMH	2, 4, 5, 6, 8, 9	figure 28

TYPICAL APPLICATION NOTES:

1. Electrical spacing – 1/8" x 1/4" (3.2mm x 6.3mm) air/surface (preferred).
2. Electrical spacing – 1/16" x 1/16" (1.6mm x 1.6mm) air/surface.
3. Maximum calibration temperature 350°F (177°C).
4. Calibration above 350°F (177°C) up to 428°F (220°C).
5. For use with customer's clamp bracket.
6. Use on automatic reset.
7. Use on manual reset (but not where European agency approvals are required).
8. Use on fuse disc.
9. Cannot be used with: stainless steel disc housings, brass stud disc housing or with a fixed position surface bracket.
10. Only where European agency approvals are required.
11. Use on manual resets where European agency approvals are required.

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. 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 and a nominal close temperature of 210°F, then the nominal differential = 40°F, so the tolerance on the open temperature is $\pm 7^\circ\text{F}$, and the tolerance on the close temperature is $\pm 11^\circ\text{F}$. (Refer to the yellow shaded area in the chart.)

Example 2:

If you require a nominal close temperature of 160°F and a nominal open temperature of 140°F, then the nominal differential = 20°F, so the tolerance on the open temperature is $\pm 5^\circ\text{F}$, and the tolerance on the close temperature is $\pm 7^\circ\text{F}$. (Refer to the tan shaded area in the chart.)

Calibration Temperatures, Differentials and Standard Tolerance for the 36T Series

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°-79°F ** 2°-26°C **	± 5	± 6	± 5	± 6	± 5	± 7	± 5	± 8	± 6	± 8	± 7	± 9	-	-	-	-
	± 3	± 3.5	± 3	± 3.5	± 3	± 4	± 3	± 4.5	± 3.5	± 4.5	± 4	± 5	-	-	-	-
80°-180°F 27°-82°C	± 5	± 6	± 5	± 7	± 5	± 7	± 5	± 8	± 5	± 8	± 6	± 10	± 7	± 11	± 9	± 13
	± 3	± 3.5	± 3	± 4	± 3	± 4	± 3	± 4.5	± 3	± 4.5	± 3.5	± 5.5	± 4	± 6	± 5	± 7
181°-230°F 83°-110°C	± 5	± 7	± 5	± 7	± 5	± 8	± 5	± 8	± 6	± 9	± 7	± 11	± 8	± 12	± 10	± 14
	± 3	± 4	± 3	± 4	± 3	± 4.5	± 3	± 4.5	± 3.5	± 5	± 4	± 6	± 4.5	± 6.5	± 5.5	± 8
231°-300°F 111°-149°C	-	-	-	-	± 6	± 9	± 6	± 10	± 7	± 11	± 8	± 11	± 9	± 14	± 11	± 17
	-	-	-	-	± 3.5	± 5	± 3.5	± 5.5	± 4	± 6	± 4.5	± 6	± 5	± 8	± 6	± 9.5
301°-350°F 150°-177°C	-	-	-	-	-	-	-	-	-	-	± 8	± 12	± 10	± 15	± 12	± 20
	-	-	-	-	-	-	-	-	-	-	± 4.5	± 6.5	± 5.5	± 8.5	± 6.5	± 11
351°-428°F * 178°-220°C *	-	-	-	-	-	-	-	-	-	-	-	-	± 16	± 23	± 18	± 25
	-	-	-	-	-	-	-	-	-	-	-	-	± 9	± 13	± 10	± 14

NOTE: The tolerances shown in bold print are preferred.

The tolerances not shown in bold print are available but not preferred.

We can supply tolerances that are tighter than those shown at extra cost. Please contact a sales engineer.

* For nominal differentials not shown above, please contact a sales engineer.

** Wider tolerances required for conical contact construction. Please contact a sales engineer.

*** Requires ceramic construction

**** Lowest nominal open or close calibration is -6°F (-21°C).



36T High Temperature Construction

The 36T is available with a ceramic switchbody for applications with ambient temperatures above 350°F (177°C). Calibration temperatures up to 428°F (220°C) can be provided. Most terminal and mounting configurations available on the standard 36T can be provided on the high temperature construction (see figure 29).

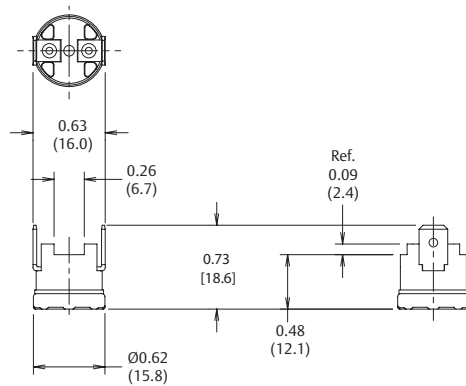


Figure 29

Dimensions are shown in inches and (millimeters).

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 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 chart (see figure 30). 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).

36T Minimum Open Temperature vs. Manually Resettable Temperature

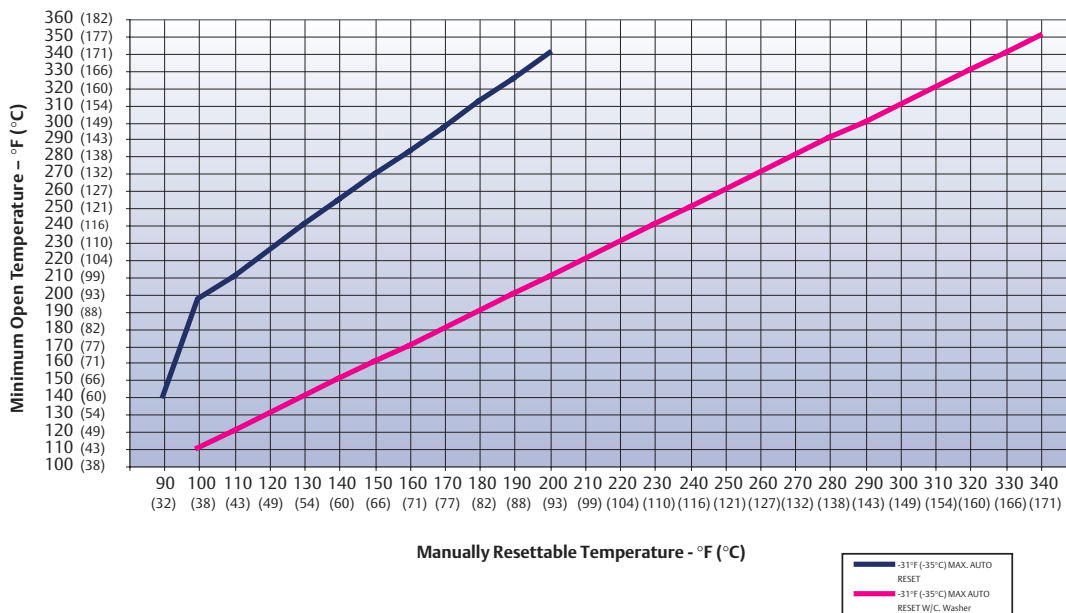
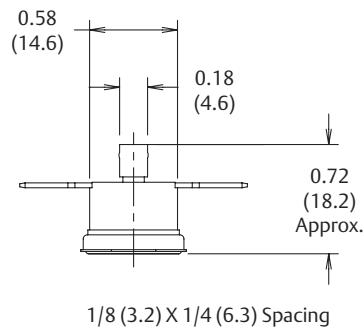


Figure 30

36T manual reset calibrations/tolerances, see chart. Please contact a sales engineer if non-standard calibrations or tolerances are required.

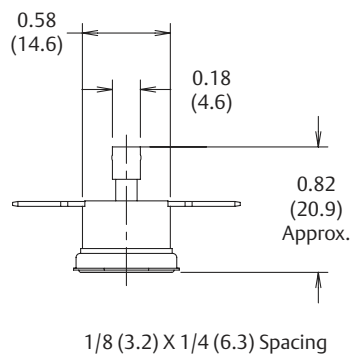
Calibration Range		Standard Calibration Tolerance	
°F	°C	°F	°C
150-200	65-93	±8	±4.5
201-240	94-115	±10	±5.5
241-280	116-138	±12	±6.5
281-320	139-160	±14	±8
321-350	161-177	±16	±9

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 31 and 32 show two very common configurations.



TX Surface Mount

Figure 31



TXE Surface Mount

Figure 32

NOTE: Meets European agency Approval
Spacing recommendations – Type 36TXE

Dimensions are shown in inches and (millimeters).

Single Operation Fuse Disc (36F)

The 36F “fuse disc” 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. 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.

The following chart summarizes the most common 36T ratings. Please consult a sales engineer if a specific application requires a rating not shown.

UL/CSA	Maximum Calibration	Volts AC	Resistive amps	Inductive amps		Cycles	Notes
				FLA	LRA		
Automatic Reset	350°F	120	15	3	12	100,000	CSA rating 5.5 FLA/20.5LRA Requires ceramic switchcase; CSA rating is 400°F max calibration Requires ceramic switchcase; CSA rating is 400°F max calibration Conical contact
	350°F	240	10	1.5	6	100,000	
	428°F	120	15	—	—	100,000	
	428°F	240	10	—	—	100,000	
Manual Reset	350°F	120	5	—	—	100,000	Requires ceramic switchcase and conical contact
	350°F	240	10	1.5	6	6,000	
	400°F	120	2	—	—	6,000	
Fuse Disc	350°F	120	15	—	—	1	UL only
	350°F	240	10	—	—	1	
European Ratings – per IEC 730/EN60730 Requirements							
Automatic Reset	175°C	250	10	—	—	100,000	Requires ceramic switchcase Requires ceramic switchcase Requires ceramic switchcase Conical contact Conical contact, requires ceramic switchcase
	220°C	250	10	—	—	100,000	
	175°C	250	16	7	7	30,000	
	220°C	250	16	7	7	30,000	
	175°C	400	10	1.66	1.66	10,000	
	220°C	400	10	1.66	1.66	10,000	
	175°C	250	2	—	—	100,000	
220°C	250	2	—	—	100,000		
Manual Reset	175°C	250	16	7	7	300	
	175°C	400	10	1.66	1.66	300	
Fuse Disc	175°C	250	16	7	7	1	Requires ceramic switchcase Requires ceramic switchcase
	175°C	400	10	—	—	1	
	220°C	250	16	—	—	1	
	220°C	400	10	—	—	1	
Miti (Japan)							
Automatic Reset	150°C	250	15	—	—	10,000	Requires ceramic switchcase
	210°C	250	15	—	—	10,000	
Manual Reset	150°C	250	10	—	—	5,000	
	150°C	250	5	—	—	10,000	
	150°C	125	10	—	—	10,000	

NOTE: UL Guide XAPX2, File E19279

CSA File LR77886 / LR109556

VDE License 118631

At thermostat end-of-life, the contacts may remain permanently closed or open.



Part Numbering System

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

36 _____

T – Automatic Reset or Manual Reset

F – Single Operation (fuse disc)

M – Switchcase designed to accept customer clamp (*see figure 1*)

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

How to Select a 36T for Your Application

Please check that a specific application’s electrical load does not exceed the rating of the 36T. Please refer to the General Electrical Ratings section for the most common 36T ratings. If an application load is higher than those shown, its requirements may be met with another Therm-O-Disc product.

Then, there is a need to determine the calibration set point temperatures, as well as the terminals and mounting for that application’s requirements. Please see the appropriate sections of this catalog for information on these items.

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.