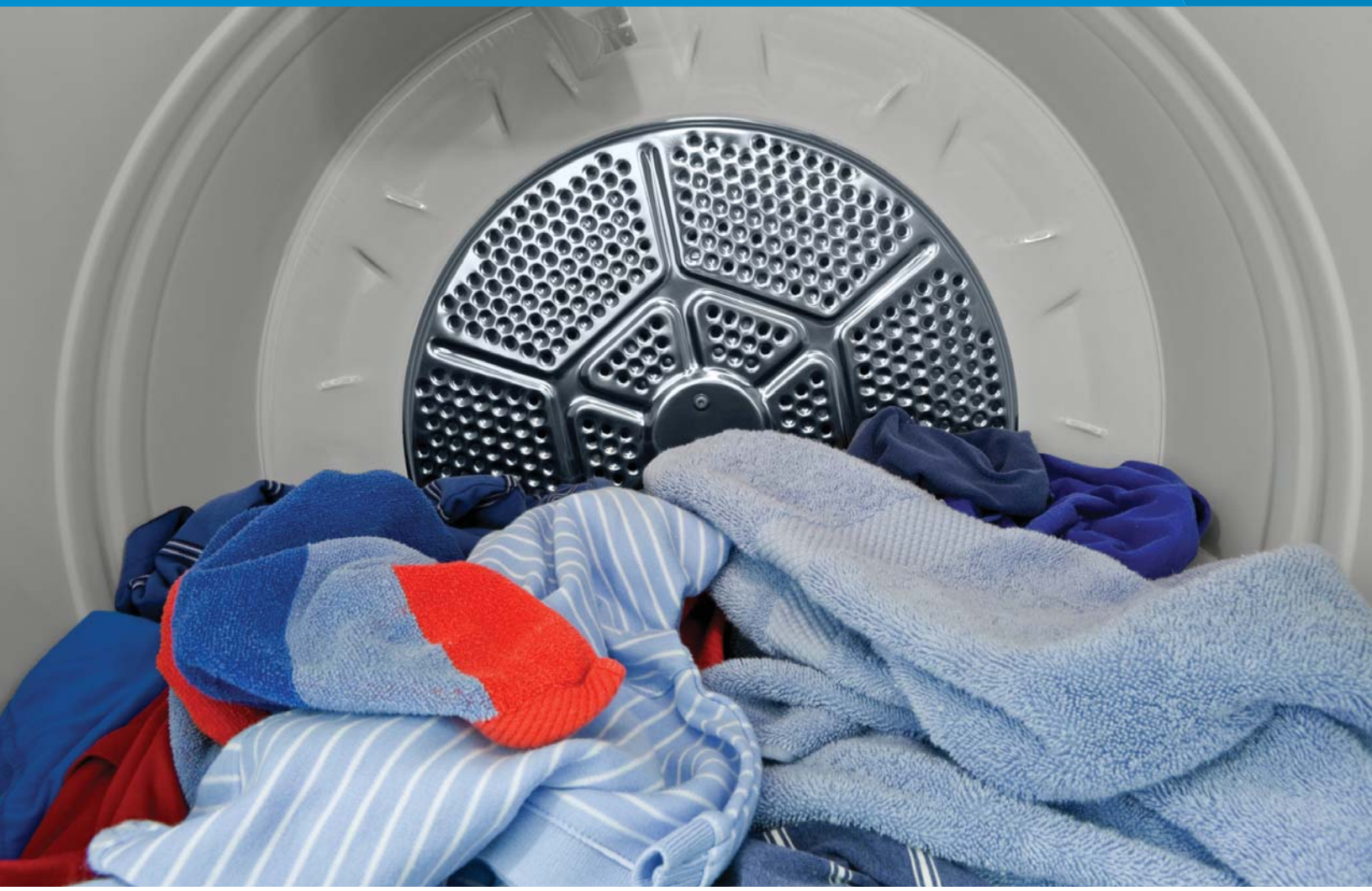
sensience
ADVANCED SENSING TECHNOLOGIES

60T Series
Snap-Action Temperature Controls



Snap-Action Temperature Control

The 60T line of 3/4” (19mm) bimetal disc temperature controls from Therm-O-Disc offers proven reliability in a versatile, cost-effective design. The snap-action of the temperature sensing bimetal disc provides high-speed contact separation, resulting in exceptional life characteristics at electrical loads up to 25 amps at 240VAC. A wide variety of terminal and mounting configurations are available for maximum design flexibility. This unsurpassed flexibility and time proven reliability, at an affordable price, has made the Therm-O-Disc 60T the most popular and widely applied temperature control in the major appliance and heating/air conditioning industries.

Switch Actions and Typical Applications

The 60T is available in three switch actions:

- Automatic Reset SPST
- Automatic Reset SPDT
- Manual Reset SPST (M2 Trip Free)

Automatic Reset SPST – In this design, the switch can be built to either open or close its electrical contacts on temperature rise. Once the temperature of the bimetal disc has returned to a specifi ed reset temperature, the contacts will automatically return to their original state. Typical uses of this construction include limiting and regulating temperatures in clothes dryers and heating/air conditioning systems (see fi gures 1 and 2).

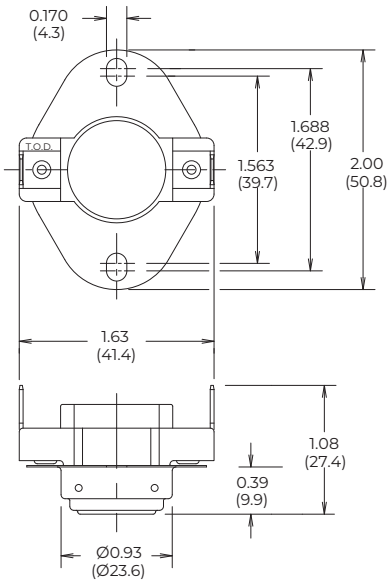


Figure 1
Airstream Mounting
(enclosed)

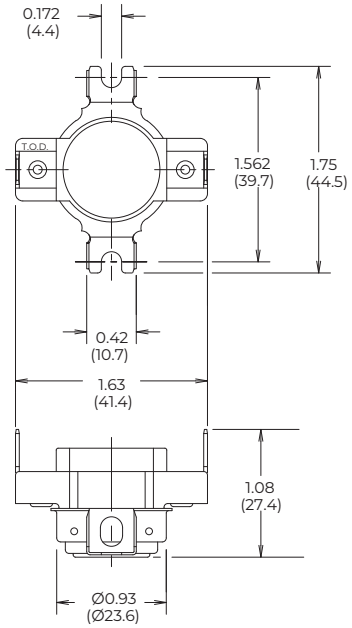


Figure 2
Surface Mounting (enclosed)
Dimensions are shown in inches and
(millimeters).

Automatic Reset SPDT – This design is the same as the SPST described above with the addition of an auxiliary contact which makes circuit upon the opening of the main contacts and breaks circuit when the main contacts reset. Refer to the “General Electrical Ratings” chart for rating limitations on the auxiliary contacts. Typical uses of this construction include fan speed changeover at a specified temperature and lighting of an indicator lamp when an abnormal temperature condition has been reached (see figure 3).

CAUTION...When designing a circuit for a single pole, double throw control, an electrical load must be applied to terminal number 2 and/or 3 to avoid a possible short circuit condition.

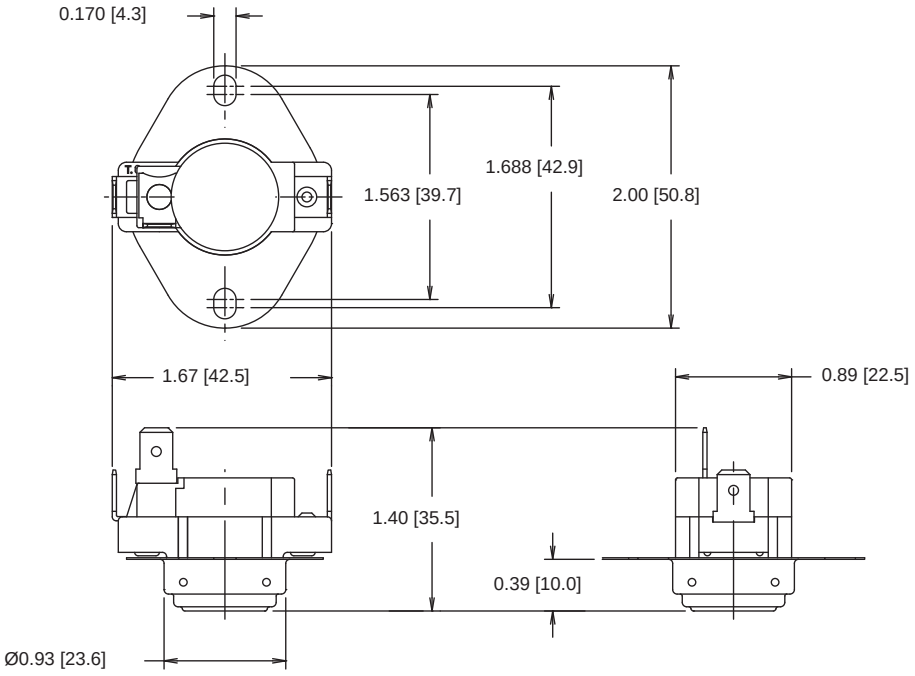


Figure 3
SPDT automatic reset - airstream mounting

Dimensions are shown in inches and (millimeters).

Manual Reset SPST – This design is available only with electrical contacts which open on temperature rise. The contacts may be manually reset after the control has cooled below the open temperature calibration. This construction is classified as 'M2 Trip Free' by the approval agencies. A patented design holds the contacts open in the event the reset button is held in the depressed position in an attempt to defeat the manual reset func-tion of the thermostat. Typical uses include any temperature limiting application where operation of the ther-mostat should result in the user or service personnel having to attend the unit (see figure 4).

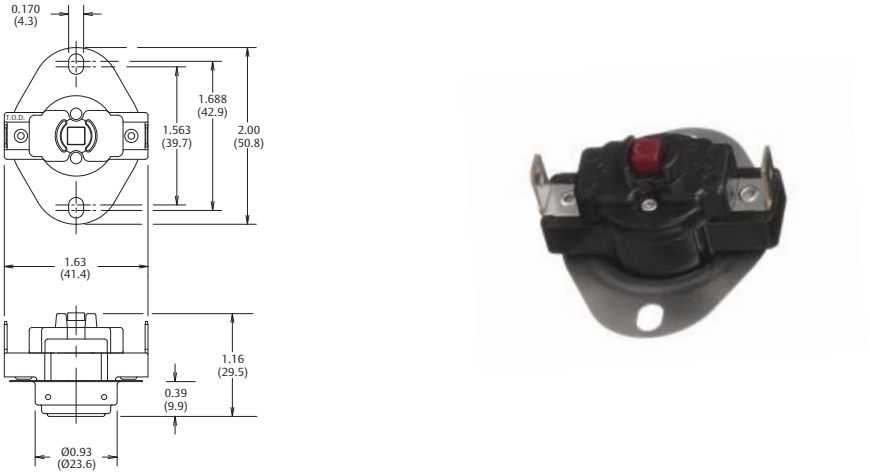


Figure 4

SPST manual reset - airstream mounting

Thermal Response

An enclosed (see Figure 5) or exposed (see Figure 6) disc may be specifi ed with any of the airstream or surface mounting configurations. The enclosed disc construction provides greater protection than the exposed disc construction, keeping airborne contaminants such as dirt and dust from entering the control. It also protects the bimetal disc from possible physical damage during assembly and in the final application. In applications where faster response to radiant heat is required, an exposed bimetal disc or an optional matte finish disc may be specifi ed.

Figure 5

Enclosed Disc

Figure 6

Exposed Disc

Dimensions are shown in inches and (millimeters).

Mounting Confi gurations

The 60T is available in an airstream or a surface mount configuration:

Airstream Mounting – This mounting configuration positions the bimetal disc through a hole in the mounting sur-face to sense temperature within an enclosure such as a heater box or air duct. The standard configuration (see figure 1) positions the bimetal disc .39" (9.9mm) into the airstream while an optional version (see figure 5) positions the bimetal disc .78" (19.8mm) into the airstream. Airstream configurations may be specified with a flange (see figure 5) or without a flange (see figure 6) to suit specific application needs.

Surface Mounting – This optional mounting configuration positions the bimetal disc firmly against the mounting sur-face to sense [illegible] erature.

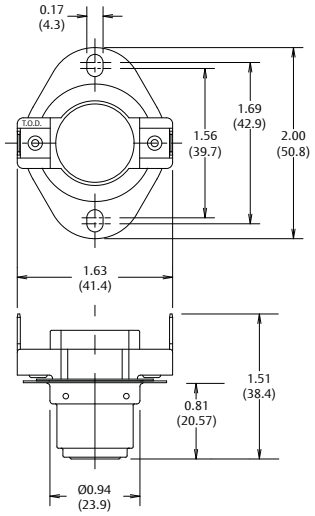


Figure 5

SPST Airstream Mounting - Deep Disc Cup

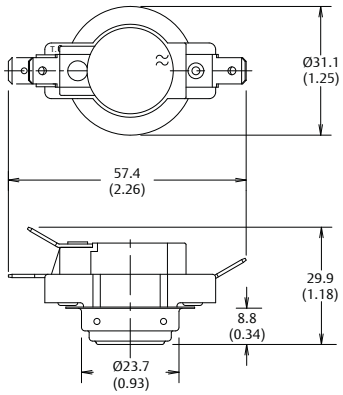


Figure 6

SPDT Airstream - No Flange

Dimensions are shown in inches and (millimeters).

Terminal Configurations

Standard Terminals – Standard terminations for the 60T are .250” x .032” (6.3 x .8mm) tin-plated brass blade termi-nals formed at 90 angular degrees to the thermostat mounting surface. Terminal angles of 0 and 30 degrees can also be provided (see below).

0° Terminal Angle

90° Terminal Angle

30° Terminal Angle

Blade Terminal Angles

Non-Standard Terminals – The 60T can also be provided with a variety of optional terminals. Some of the more common variations include .188” (4.8mm) blade terminals, 8-32 screw inals and ons such as double or offset blade terminals are a le (see

Non-Standard Terminals

Terminal Orientation

For added flexibility, the orientation of the terminals with respect to the mounting bracket can be specified in 45 angular degree increments (see below).

Terminals 90° to mounting holes (standard)

Terminals 45° **clockwise** to mounting holes

Terminals 45° **counterclockwise** to mounting holes

Terminal to Mounting Bracket Orientation

Calibration Temperatures, Differentials and Tolerances

To use the calibration chart, locate the range in the left hand column, in which the highest calibration set point (open or close) falls. Locate across the top, the range in which the nominal differential falls. The standard open and close set point tolerances are shown where the two columns converge. The chart also indicates what differen-tials are available in each of the calibration set point ranges. Tighter open and close tolerances are available at added cost. Thermocouple samples can be provided to assist in determining the appropriate calibration temperature for specific application.

For more information on tightened tolerances or availability of differentials not listed in the chart, please consult one of our sales engineers.

Calibration Temperatures, Differentials and Standard Tolerance for the 60T Series

Highest Calibration Set Point (Open or Close)	NOMINAL DIFFERENTIAL (temperature difference between nominal open and close set point)													
	10-14°F 5.5-8°C		15-19°F 8.5-10.5°C		20-29°F 11-16°C		30-39°F 16.5-21.5°C		40-49°F 22-33°C		50-80°F 33.5-44.5°C		Manual Reset 34-44.5 °C	
	Open	Close	Open	Close	Open	Close	Open	Close	Open	Close	Open	Close	Open	Close
0°-79°F -18°-26°C	±6 ±3.5	±6 ±3.5	±6 ±3.5	±6 ±3.5	±6 ±3.5	±6 ±3.5	±6 ±3.5	±7 ±4	±6 ±3.5	±8 ±4.5	±7 ±4	±8 ±4.5	- -	- -
80°-200°F 28°-93°C	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±6 ±3.5	±5 ±3	±7 ±4	±6 ±3.5	±8 ±4.5	±8 ±4.5	<- 31 <-35
201°-250°F 94°-121°C	- -	- -	± 5	±6 ±3.5	±5 ±3	±6 ±3.5	±5 ±3	±7 ±4	±6 ±3.5	±8 ±4.5	±7 ±4	±9 ±5	±7 ±4	<- 31 <-35
251°-300°F 122°-149°C	- -	- - -	±3 -	- -	±6 ±3.5	±8 ±4.5	±6 ±3.5	±8 ±4.5	±7 ±4	±10 ±5.5	±8 ±4.5	±11 ±6	±8 ±4.5	<- 31 <-35
301°-350°F 150°-177°C	- -	- - -	-	- -	±7 ±4	±9 ±5	±7 ±4	±10 ±5.5	±8 ±4.5	±12 ±6.5	±9 ±5	±13 ±7	±9 ±5	<- 31 <-35

NOTES: Tighter tolerances and/or differentials than those listed in the chart are also available. Please consult a Therm-O-Disc sales engineer for assistance.

General Electrical Ratings

The 60T series of controls has been rated by major agencies throughout the world including UL, CSA, VDE, CQC, and KETI. 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 sig-nificantly from agency test conditions. Therefore, the user must not solely rely on agency ratings, but must perform adequate testing to confirm that the control will operate as intended in the users' application.

The first table below summarizes many of our UL / CSA ratings. The maximum nominal open temperature is 350°F (175°C). The auto reset ratings shown are 100,000 cycles and the manual reset ratings shown are 6,000 cycles.

The second table below summarizes many of our VDE ratings. The maximum nominal open temperature is 350°F (175°C).

Thermostat Type	Contact Arrangement	Inductive Amps		Pilot Duty	Resistive Amps	Volts AC	Agency Recognition
		FLA	LRA	VA			
60T Auto Reset	Contacts 1 &3 SPST or SPDT	10	60	125	25	120	UL E19279
		5	30	125	25	240	
		-	-	125	21.6	277	
		-	-	125	12.5	480	
		2	12	400	10	600	
60T Auto Reset	Contacts 1 &2 SPDT	-	-	125	-	277	
		5.8	34.8	-	10	120*	
		2.9	17.4	-	10	240*	
60T Manual Reset	Contacts 1&3	-	-	-	25	277	
		0.65	3.9	125	12.5	480	
		5.5	33	1061	-	480	
		2	12	400	10	600	
60T Auto Reset	Contacts 1 &3 SPST or SPDT	10	60	125	25	120	CSA LR10281C
		5	30	125	25	240	
		-	-	125	21.6	277	
		-	-	125	12.5	480	
		2	12	400	10	600	
60T Auto Reset	Contacts 1 &2 SPDT	-	-	125	-	277	
		5.8	34.8	-	10	120*	
		2.9	17.4	-	10	240*	
60T Manual Reset	Contacts 1&3	-	-	-	25	277	
		0.65	3.9	125	12.5	480	
		5.5	33	1061	-	480	
		2	12	400	10	600	

*6000 cycles

Thermostat Type	Contact Arrangement	Inductive amps FLA	Resistive amps	Voltage VAC	Cycles	Agency Recognition
60T Auto Reset SPST	Contacts 1 &3 SPST	3.3	16	250	100,000	VDE 40021320
		3.3	16	400	1,000	
		3.3	25	250	100,000	
		-	45	250	6,000	
60T Auto Reset SPDT	Contacts 1&3 SPDT	3.3	25	250	10,000	
	Contacts 1&2 SPDT	2.2	5	250	10,000	
60T Manual Reset	Contacts 1 &3	3.3	16	250	1,000	
		3.3	25	250	300	
		-	37.5	250	300	

Part Numbering System

60T

G – Gold contacts for low electrical loads

None – 1/8" x 1/4" electrical spacings

X – 1/4" x 3/8" electrical spacings

XX – 3/8" x 1/2" electrical spacings

0 – Flangeless airstream mount (.38" depth)

1 – Flanged airstream mount (.38" depth)

2 – Surface mount

3 – Tube or stud mount

8 – Flanged or flangeless airstream mount (.81" depth)

1 – Normally closed contacts; contacts open on temperature rise

2 – Normally open contacts; contacts close on temperature rise

3 – Single pole, double throw (SPDT)

5 – Manual reset (trip free M2)

Example: *60TG11=60T control with gold contacts, airstream mounting bracket and normally closed contacts that open on temperature rise.*