

69T Series Internal Heater Biased Temperature Controls



Snap-Action Temperature Controls

The 69T line of 3/4" (19mm) bimetal disc temperature controls from Therm-O-Disc offers multiple temperature operation in a unique, cost-effective design. The snap-action bimetal disc provides high-speed contact separation resulting in exceptional life characteristics at electrical loads up to 25 amps at 240VAC. By utilizing resistors mounted internally, the open or close calibration of the bimetal disc can be biased lower. The more power applied to the internal resistors the more supplemental heat is generated to bias the operating temperature of the control. The 69T is a cost-effective alternative in applications where multiple temperature control is required, such as clothes dryers.



Features and Benefits

The 69T features include:

- Internal resistor construction for consistent temperature depression.
- Available in automatic reset SPST and SPDT switch configurations.
- Snap-action bimetal disc for high-speed contact separation.
- A wide variety of terminal and mounting options for design flexibility.
- Welded construction for integrity of current-carrying components.
- Exposed or enclosed bimetal disc for either increased thermal response or protection from airborne contaminants.

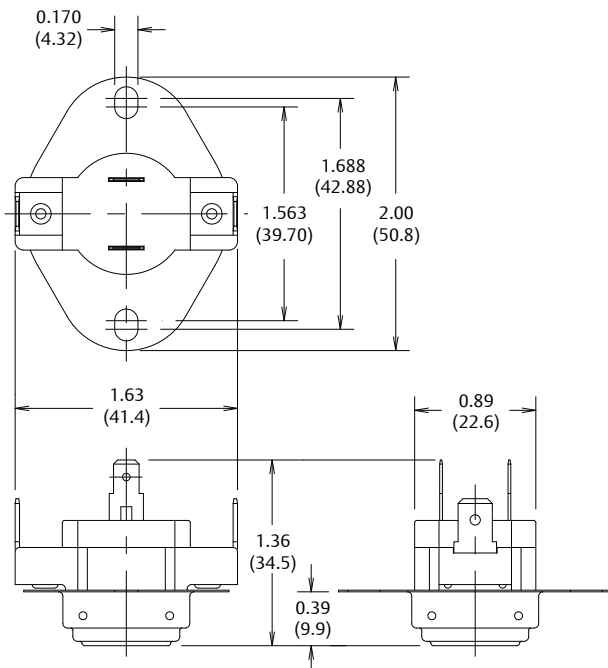
Switch Actions and Typical Applications

The 69T is available in two automatic reset switch actions:

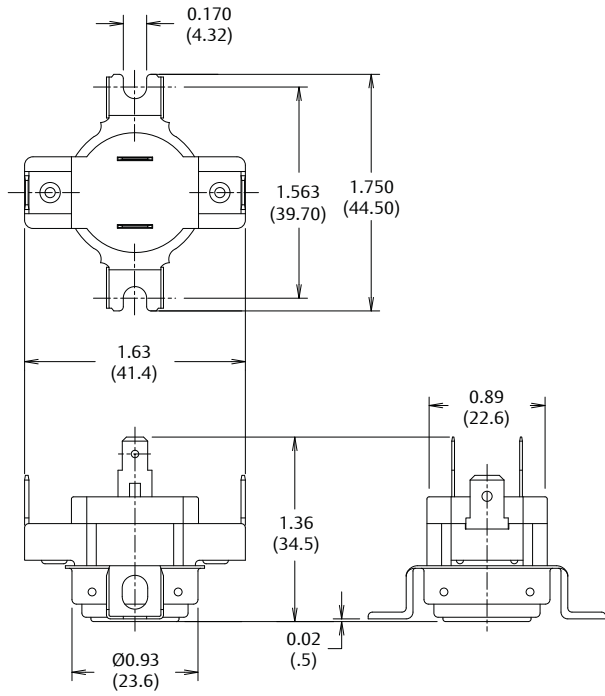
Automatic Reset SPST – In this design, the switch can be built to either open or close its electrical contacts on temperature rise. Once the temperature of the bimetal disc has returned to the specified reset temperature, the contacts automatically return to their original state. The SPST switch action is typically used to regulate clothes dryer drum temperatures (see figures 1 and 2).

Automatic Reset SPDT – This design is the same as the SPST described above with the addition of an auxiliary set of contacts that open and close in opposition to the main contacts. 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).

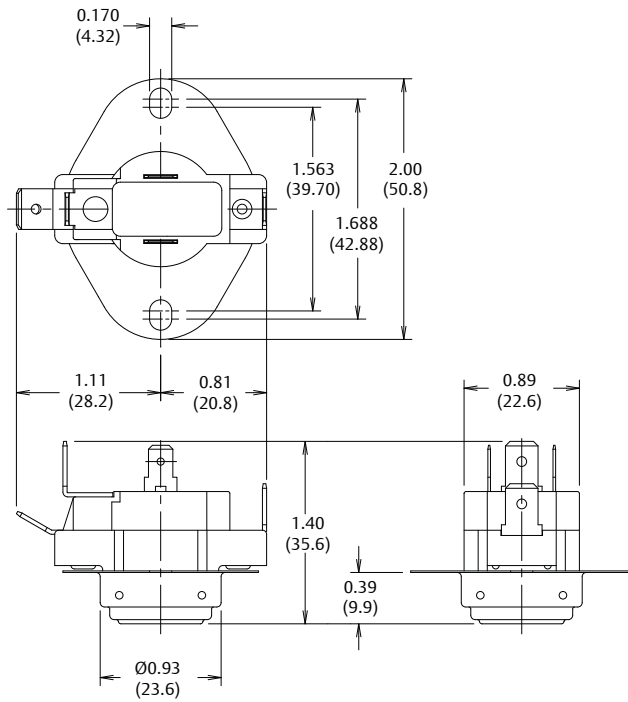
CAUTION . . . When designing a circuit for a single pole, double throw control, an electrical load must be applied to terminal number 2 and/or 3 to avoid a possible short-circuit condition.



SPST Automatic Reset Airstream Mounting Figure 1
Dimensions are shown in inches and (millimeters).



SPST Automatic Reset Surface Mounting Figure 2
 Dimensions are shown in inches and (millimeters).



SPDT Automatic Reset Airstream Mounting Figure 3
 Dimensions are shown in inches and (millimeters).

Mounting Configurations

Airstream Mounting – This mounting configuration positions the bimetal disc .39" (9.9mm) through a hole in the mounting surface to sense temperature within an enclosure such as a heater box or air duct (see figure 1).

Surface Mounting – This optional mounting configuration positions the bimetal disc firmly against the mounting surface to sense the actual mounting surface temperature (see figure 2).

Thermal Response

An exposed or enclosed bimetal disc may be specified 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.

Terminal Configurations

Standard terminations for the 69T are .250" x .032" (6.3 x .8mm) tin-plated brass blade terminals formed at 90 angular degrees to the thermostat mounting surface. Terminal angles of 0 and 30 degrees can also be provided.

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 figure 4).



Terminals 90° to mounting holes (standard)

Terminals 45° counterclockwise to mounting holes

Figure 4

Temperature Depression

The amount of change in the open or close calibration that results from energizing the internal resistors is referred to as temperature depression. The amount of depression which can be realized in an actual application is dependent upon several characteristics. Resistor wattage and voltage, ambient, airflow, thermal off-set and rate of temperature change are all variables which affect temperature depression. As a point of reference, the depression chart reflects the approximate temperature shift after energizing the internal resistors in a circulating air chamber. Due to the material rating of the thermostat body, limitations to the resistors wattage and thermostat calibration are necessary. Refer to the temperature depression chart for maximum resistance and thermostat calibration are necessary. Refer to the temperature depression chart for maximum resistance and calibration combinations. The depression data shown was obtained in a controlled test environment; application performance may vary.

Temperature Depression

Internal Heater		Maximum Calibration	Temperature Depression	
Voltage	Resistance		Open	Close
120 VAC	7000 Ohms	180°F(82.2°C)	3°F (7.2°C)	15°F (8.3°C)
120 VAC	9000 Ohms	233°F(111.7°C)	9°F (5.0°C)	11°F (6.1°C)
120 VAC	3600 Ohms	155°F(68.3°C)	27°F (15°C)	32°F (17.8°C)
24 VAC	281 Ohms	171°F(77.2°C)	10°F (5.6°)	11°F (6.1°C)



Calibration Temperature, Differentials and Tolerance

To use the calibration chart, locate the range in the left hand column, in which the highest calibration set point (open or close) falls. Then 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 differentials 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 of the 69T Series

Highest calibration Set Point Range (Open or Close)	Nominal Differentials (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		40-59°F 22-33°C	
	Open	Close	Open	Close	Open	Close	Open	Close	Open	Close
0°-79 °F -18°-26°C	±5 ±3	±6 ±3.5	±5 ±3	±6 ±3.5	±5 ±3	±6 ±3.5	±5 ±3	±7 ±4	±5 ±3	±7 ±4
80°-283 °F 28°-111.7°C	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±5 ±3	±7 ±4	±5 ±3	±7 ±4

Part Numbering System

69T

None- 1/8" x 14"
(3.18 mm x 6.3 mm)
electrical spacings

X- 1/4" x 3/8"
(6.3 mm x 9.53 mm)
electrical spacings

K- 3600 Ohm resistance

1- Flangeless airstream mount (.38" depth)

2- Flanged airstream mount (.38" depth)

3- Surface mount

1- Contacts open on temperature rise (normally closed)

2- Contacts close on temperature rise (normally open)

4- Single pole, double throw (SPDT)

Example: 69T23=control with surface mount and single pole double throw switching

General Electrical Ratings

The 69T, 69TK 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.

Thermostat Type	Contact Arrangement	Inductive Amperes		Pilot Duty	Resistive Amperes	Volts AC	Agency Recognition
		FLA	LRA				
69T	Contacts 1 & 3 SPST or SPDT	10	60	125	25	120	UL E19279
		5	30	125	25	240	
		-	125	-	12.5	277	
	Contacts 1 & 2 SPDT	-	-	125	-	120	
69T	Contacts 1 & 3 SPST or SPDT	10	60	125	25	120	CSA LRI0281C
		5	30	125	25	240	
		-	-	125	-	277	
	Contacts 1 & 2 SPDT	-	-	125	-	120	
69T	Contacts 1 & 3 SPST	-	-	-	16*	250	VDE 40010454
		-	-	-	25**	250	

* 169°F (76°C) Max Nominal Calibration

**158°F (70°C) Max Nominal Calibration