

69T, 69TK 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. Our "TK" model offers an increased temperature depression for even greater design flexibility. 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 heaters mounted internally, the open or close calibration of the bimetal disc can be biased lower. The more power applied to the internal heaters 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.

Features and Benefits

The 69T features include:

- Internal heater 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

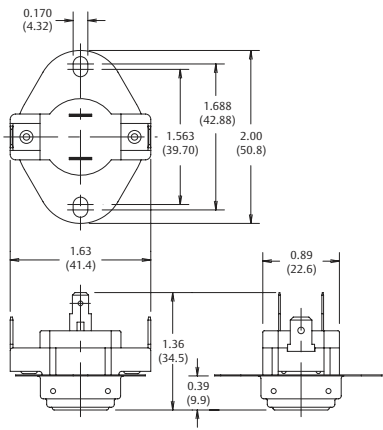
The 69T is available in two automatic reset switch actions:

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.

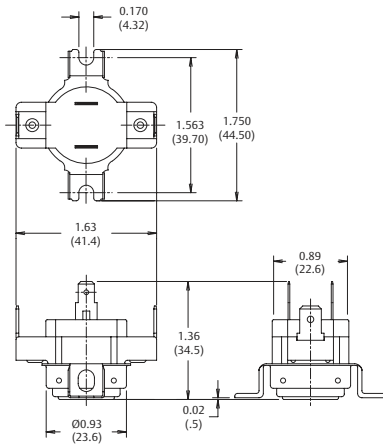
Refer to the "General Electrical Ratings" chart for rating limitations on the auxiliary contacts. Typical uses of this construction include fan speed changeover at a specified temperature and lighting of an indicator lamp when an abnormal temperature condition has been reached (*see figure 3*).

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.



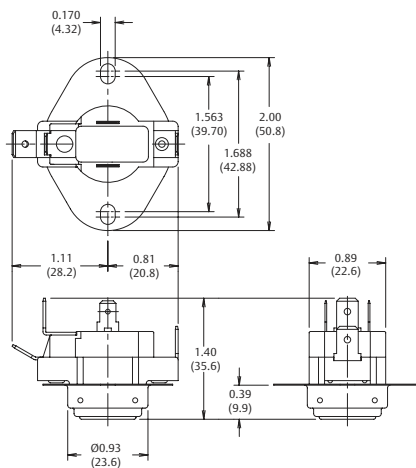
SPST Automatic Reset Airstream Mounting

Figure 1



SPST Automatic Reset Surface Mounting

Figure 2



SPDT Automatic Reset Airstream Mounting

Figure 3

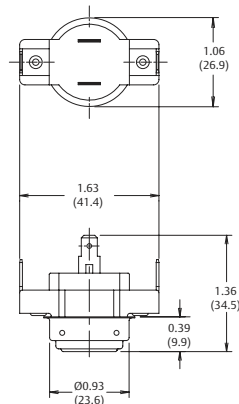
Dimensions are shown in inches and (millimeters).



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. Airstream configurations may be specified with a flange (see figures 1 and 3) or without a flange (see figure 4) to suit specific application needs.

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).



SPST Automatic Reset Airstream Mounting

Figure 4

Dimensions are shown in inches and (millimeters).

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. In applications where faster response to radiant heat is required, an exposed bimetal disc or an optional black oxide mounting finish may be specified.



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 5*).



Terminals 90° to mounting holes (standard)



Terminals 45° counterclockwise to mounting holes



Terminals 45° clockwise to mounting holes

Figure 5



Temperature Depression

The amount of change in the open or close calibration that results from energizing the internal heaters is referred to as temperature depression. The amount of depression which can be realized in an actual application is dependent upon several characteristics. Heater 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 heaters in a circulating air chamber. Due to the material rating of the thermostat body, limitations to the heater wattage and thermostat calibration are necessary. Refer to the temperature depression chart for maximum heater and calibration combinations.

Temperature Depression

Internal Heater		Maximum Calibration	Temperature Depression*	
Voltage	Wattage		Open	Close
120VAC	2.00	180°F (82.2°C)	13°F (7.2°C)	15°F (8.3°C)
120VAC	1.40	233°F (111.7°C)	9°F (5.0°C)	11°F (6.1°C)
120VAC**	3.90	155°F (68.3°C)	27°F (15°C)	32°F (17.8°C)
4VAC	2.00	171°F (77.2°C)	10°F (5.6°C)	11°F (6.1°C)

NOTE: * Depression data obtained in a controlled test environment; application performance may vary.

** TK style configurations.

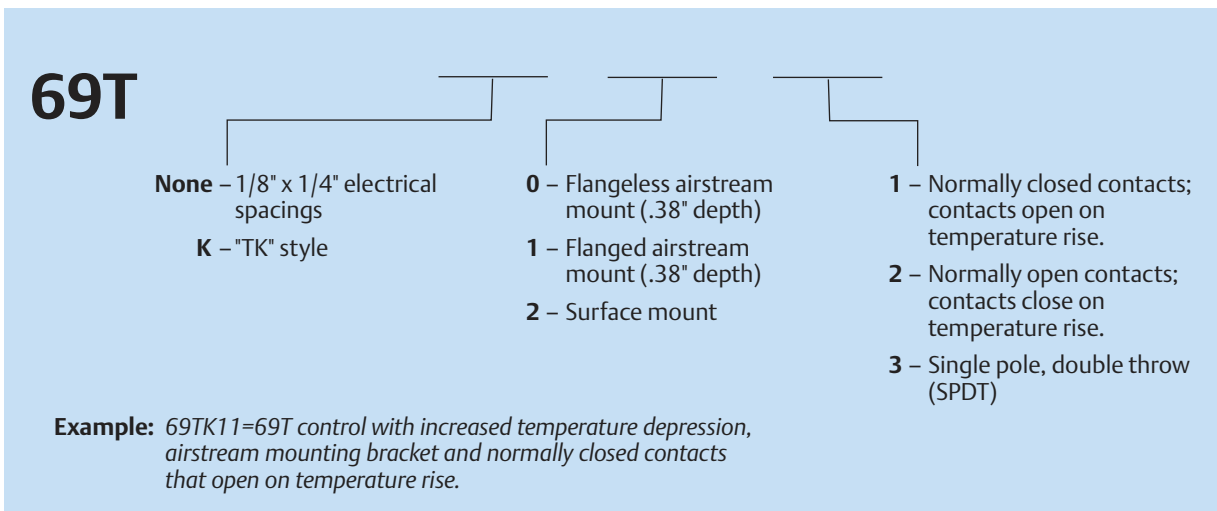
Calibration Temperatures, Differentials and Tolerances

To use the calibration chart, locate the range in the left hand column, in which the highest calibration set point (open or close) falls. 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, 69TK 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		60-80°F 33.5-44.5°C	
	Open	Close	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°-233°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	-	-

Product Numbering System



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 VA	Resistive Amperes	Volts AC	Agency Recognition	
		FLA	LRA					
69T 69TX*	Contacts 1 & 3 SPST or SPDT	10	60	—	25	120	UL E19279	
		5	30	—	25	240		
		—	—	125	12.5	277-480		
	Contacts 1 & 2 SPDT		—	—	125	—		120-277
69T 69T*	Contacts 1 & 3 SPST or SPDT	5.8	34.8	—	10	120	CSA LR10281	
		2.9	17.4	—	10	240		
		Contacts 1 & 2 SPDT		—	—	125		—
	Contacts 1 & 3 SPST or SPDT		10	60	125	25		120
69T 69T*	Contacts 1 & 3 SPST or SPDT	5	30	125	25	240	CSA LR10281	
		—	—	125	—	240-480		
		Contacts 1 & 2 SPDT		—	—	125		—
	Contacts 1 & 3 SPST or SPDT		10	60	125	25		120

These are consolidated ratings some of which are limited to 6,000 cycles. For complete and current ratings, please contact our Sales Engineering Department. At thermostat end-of-life, the contacts may remain permanently closed or open.

* The 69TX has electrical clearances of 1/4" through air and 3/8" over surface which may be required for some heating and air conditioning applications. Overall physical dimensions are the same as the 69T.

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.