ThermTROL CORPORATION

Your Thermal Protection and Wire Harness Partner

www.thermtrol.com

PRODUCT CATALOG

Introduction to Thermtrol

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www.thermtrol.com
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IN ASIA: Thermtrol Asia, Ltd. • Hong Kong • China • (852) 2873-3788 • Fax (852) 2873-3718 • chinasales@thermtrol.com

ISO 9001 DNV Certification, Inc. REGISTERED FIRM

Founded in 1985 in North Canton, Ohio by Mark and Wendy Jeffries, Thermtrol has grown from a small home-based business into a progressive, efficient global entity with customers around the globe. Today, we offer a variety of products for a multitude of industrial applications including industrial equipment, automotive, agriculture, HVAC, communications, and more.

With humble beginnings as Light Time Delay Sales, we offered a single product – the TD-7, a garage door light time delay relay. In just few short years, the company reorganized as Thermtrol after engineering a successful line of probe thermostat switches for pressure washer and related industrial equipment manufacturers. In 1990, Thermtrol was recognized as a key value-added partner to Texas Instruments Sensors & Controls Division (now Sensata Technologies) for our demonstrated pattern of superior customer service, product quality, and pragmatic "can do" attitude.

Following continued alliances and value-added partnerships with many firms in the thermal overload industry, Thermtrol made its first major acquisition in 1996 with the purchase of Mighty Mite Controls of Akron, Ohio. Mighty Mite Controls, a vanguard in the development of bimetal thermostats for the appliance market with origins dating back to the 1950s, helped propel Thermtrol into an innovative products company. In 1997, we successfully released the SH7AM series self-hold protector, a device that has become the standard in many motor and appliance protective applications.

In 2002, Thermtrol pioneered into the global market by opening its first international sales branch office in Hong Kong. This move followed the increase in demand for Thermtrol products, most notably in Asia. At the same time, Thermtrol launched its first wholly owned manufacturing subsidiary, Thermtrol VSIP Co. Ltd., on the outskirts of Ho Chi Minh City, Vietnam, to take advantage of the solid Asian manufacturing environment and established local sourcing with related electrical component assembly including wiring harness assembly.

Most recently, Thermtrol continued to its successful plan of adding businesses and product lines with the acquisition of MGI Manufacturing in Cary, Illinois, renamed as Thermtrol MGI Global to reflect the global capabilities of the entire Thermtrol family. This acquisition brings specialty engineering and plastic molding expertise in manufacturing wire harnesses for the automotive and related industries.

In the future, Thermtrol will continue to grow at a pace that ensures our commitment to success by filling our customers' unique needs while reducing their total cost. Thermtrol strives to be not only your partner in Thermtrol Protection and Wire Assembly, but also Your Partner for the Future.

Terms and Conditions

Samples:
Samples for engineering purposes may be ordered from our sales department or by placing a sample order via Thermtrol's web site at www.thermtrol.com. Samples generally ship within 24 hours; however, some custom products may require more time.

Pricing:
Written quotations outlining release quantities, terms, and pricing are issued upon request and are valid for 30 Days. Thermtrol reserves the right to revise pricing at any time prior to accepting an order.

Ordering:
Thermtrol requires written confirmation of purchase orders via fax, mail, or e-mail.

Disclaimer:
Since Thermtrol does not possess full access to data concerning customers' products and uses, Thermtrol assumes responsibility neither for customer product design nor for any patent or rights infringement resulting from Thermtrol assistance.

Self-Hold 7AM Series Thermal Protectors

Motor Protection FEATURES

- Recognized component in UL product category XCSZ2, overheating protection for motors.
- Tested to UL standard 2111:
  - 18 day locked rotor test
  - limited short circuit test
  - 10 cycle locked rotor and 50 cycle endurance test
  - 0°C ambient test
- Miniature size.
- Reliable temperature performance over the life of the device.
- Both current and temperature sensitive for maximum design flexibility.
- Short lead time.
- Thermtrol will customize to your specifications by adding leads and terminals, or even a complete harness if desired.
- ROHS compliant.

APPLICATIONS

- Remote location motors
- Vacuum cleaner motors
- Submersible pump motors
- Fractional horsepower motors
- Can be used virtually anywhere an auto reset and/or a one shot protector is used!

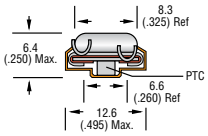
Appliance Protection FEATURES

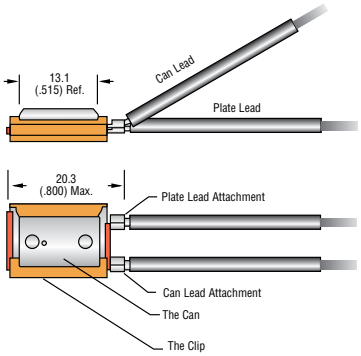
- Recognized component in UL product category XAPX2, temperature indicating and regulating equipment.
- Tested to UL standard 873.
- Miniature size.
- Reliable temperature performance over the life of the device.
- Both current and temperature sensitive for maximum design flexibility.
- Short lead time.
- Thermtrol will customize to your specifications by adding leads and terminals, or even a complete harness if desired.
- ROHS compliant ratings available.

APPLICATIONS

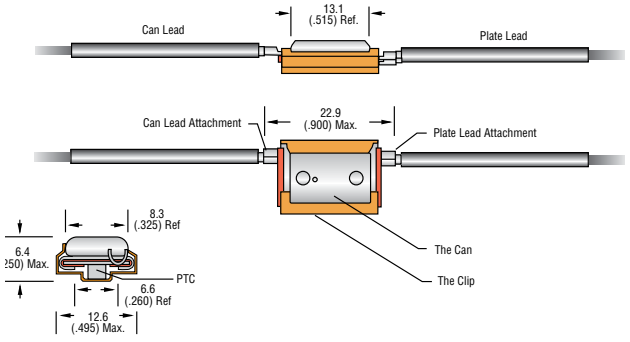
- Countertop appliances
- Transformers
- Vacuum cleaners
- Medical equipment
- Lighting
- Battery chargers
- Welders

Thermtrol's innovative Self-Hold 7AM thermal protector combines the protection of a Klixon® 7AM with a self-holding feature. Designed to prevent overheating in motors, the Self-Hold 7AM offers the best attributes of one shot protectors and auto reset protectors in a single package. The Self-Hold 7AM, once activated in a fault condition, maintains its open state until power is removed. No reset button here-simply remove power and the device will cool and reset. This inherent design feature adds an extra level of security over automatic reset devices of any type. It is the reliable, cost effective solution for numerous applications.





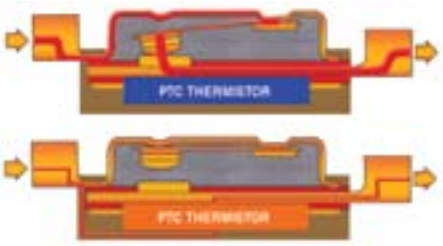
Type A, Radial Lead Configuration



Type B, Axial Lead Configuration

Here's how the Self-Hold 7AM functions. . .

- Developed by Thermtrol, the Self-Hold 7AM is a Thermal Protector/PTC Heater combination. The PTC Heater is electrically located across the contacts of the protector.
- When the protector contacts are open, the heater is in series with the load. The heater then maintains the temperature sensitive bimetal of the protector in an open state.
- To reset the Self-Hold 7AM, power must be removed for sufficient time to allow the Self-Hold 7AM to cool to below the protector's reset point.



All dimensions mm (in.)

Klixon® is a registered trademark of Sensata Technologies.

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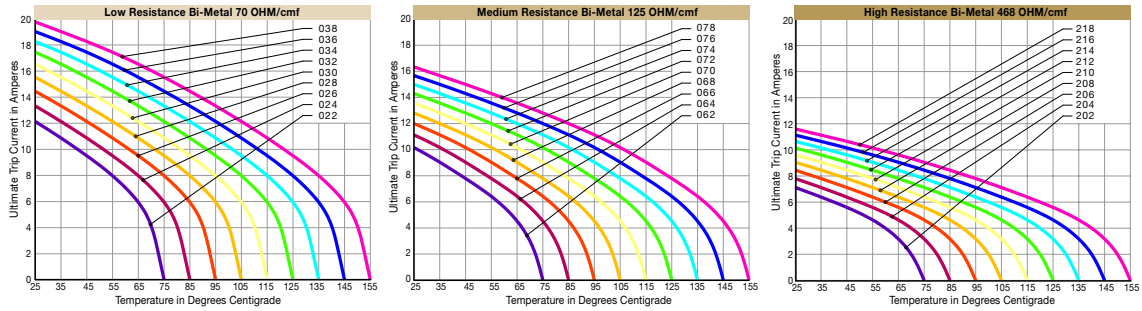
Bi-Metal Options

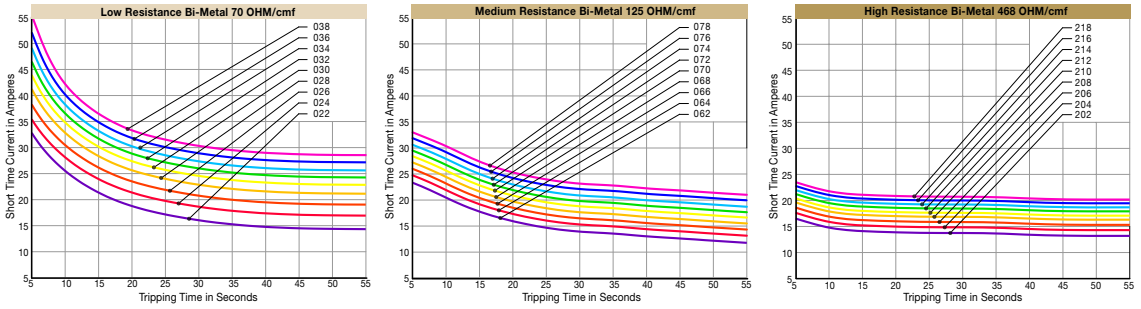
Self-Hold 7AM performance is dependent upon the applied current as well as temperature. Differenct Bi-metals are incorporated to achieve various performance characteristics. In applications where temperature rise is less than 2°C per second, use low-resistance ratings. High-resistance Bi-Metal is recommended for applications with 2°- 5°C per second rates of temperature rise. Contact Thermtrol for additional application consideration if the rate of temperature rise exceeds 5°C per second. Use these curves to determine which Bi-Metal may trip in the manner required for your application.

Ultimate Trip Current vs. Protector Ambient Temperature

Approximate: to be used for selecting samples only



Average First Cycle Tripping vs. Current in 25°C Ambient



Leads

Thermtrol's state-of-the-art automated lead processing equipment can produce lead wires to meet customer application needs for overall length, wire type, wire size, terminated connection and stripped length requirements. Standard lead size is 18AWG. 20AWG-14AWG is also available.

Agency Approvals

Model Type	Primary Applications	Approved Ratings	Approved Values		UL/CUL Approval		VDE Approval	
			Temp. Code	Temp. (°C)	File No.	Standard	Lic. No.	Standard
SA7AM	Appliance	120Vac/15/ FLA 85LRA	020-037, 072, 201-217, 329	65-150	E19340 Vol. 1 Sec. 5	ULB73& C22.2 NO. 24-93	–	–
SH7AM	Appliance	120Vac/15/ FLA 85LRA	020-029, 329	65-110	E19340 Vol. 1 Sec. 3	ULB73& C22.2 NO. 24-93	–	–
SI7AM	Appliance	120Vac/15/ FLA 85LRA	029-031, 329	110-120	E19340 Vol. 1 Sec. 6	ULB73& C22.2 NO. 24-93	–	–
	Motor	120Vac	072	125	E40044 Vol. 1 Sec. 2	UL211 C22.2 NO. 77	–	–
SJ7AM	Appliance	240Vac/10Amp 208Vac/12Amp	020-028, 329, 201-208, 429	65-110	E19340 Vol. 1 Sec. 7	UL873 C22.2 NO. 24-93	–	–
SK7AM	Motor	240Vac	020-036, 201-216	65-145	E40044 Vol. 1 Sec. 3	UL211 C22.2 NO. 77	–	–
			020-036, 201-216	65-145	–	–	40010337	0631 PART 1, 2-2
	Appliance	250Vac/8Amp	020-036, 201-216	65-145	–	–	40010338	0631 PART 1, 2-9
SL7AM	Motor/Appliance	240Vac/8Amp	020-036, 201-216	65-145	–	–	40010337	0631 PART 1, 2-2
SM7AM	Motor	120Vac	020-036, 201-216, 061-076, 161-176, 329	65-145	E40044 Vol. 1 Sec. 3	UL211 C22.2 NO. 77	–	–
	Appliance	120Vac	020-037 072 201-217 329	65-145	E19340 Vol. 1 Sec.5 &8	UL 873 C22.2 NO. 24-93	-	-
SP7AM	Appliance	240Vac/10Amp 208Vac/12Amp	029-037, 209-217	110-150	E19340 Vol. 1 Sec. 7	UL873 C22.2 NO. 24-93	–	–
		250Vac/8Amp	020-036, 201-216	65-145	–	–	40010338	0631 PART 1, 2-9

Sleeving

In order to achieve optimum heat transfer from the protected medium or ambient to the thermostat, the Self Hold 7AM has been designed with the case connected to the bimetallic disc. This feature makes it necessary to electrically insulate the 7AM from the mounting surface. Typically, this is accomplished with a Mylar sleeve marked with the part number. Custom markings and other sleeve materials are available.

Numbering System

SH7AM	202	A	5	-XXX-5
Select Model	*Select Code for Low, Medium or High Resistance*	*Select A or B*	*Opening Temperature Tolerance is ± 5°C*	*Use Only if High Seal Gasket is Required*

Motor Protection

Model	Temperature	Voltage & Current Rating
SM7AM	65°C–145°C	120 Vac 85 LRA
SK7AM	65°C–145°C	240 Vac 85 LRA
SX7AM	65°C–165°C	120Vac 85 LRA

OR

Appliance Protection

Model	Temperature	Voltage & Current Rating
SH7AM	65°C–110°C	120 Vac 22 Amps
SA7AM	65°C–150°C	120 Vac 22 Amps
SJ7AM	65°C–110°C	240 Vac 10 Amps
SP7AM	110°C–150°C	240 Vac 10 Amps

Note: Unless otherwise requested, samples will be produced with 6" long, #18 gauge, XLPE 125C 600V (UL3173) leads. Thermtrol will apply mylar insulation to electronically isolate the protector body.

Nonstandard opening temperatures and bimetal resistances are available. Contact conditioned device also available.

Terminal Config.

A	Type A Radial Leads
B	Type B Axial Leads

High-Seal Gasket

Designate this special order, high seal gasket for applications subjected to over-molding, dipping, or varnishing. Otherwise leave this space blank.

Standard Opening Temp. Code

Opening Temp. °C	Low Resis. Bi-Metal 70 /cmf	Med Resis. Bi-Metal 125 /cmf	High Resis. Bi-Metal 468 /cmf
65	020	—	—
70	021	061	201
75	022	062	202
80	023	063	203
85	024	064	204
90	025	065	205
95	026	066	206
100	027	067	207
105	028	068	208
110	029	069	209
115	030	070	210
120	031	071	211
125	032	072	212
130	033	073	213
135	034	074	214
140	035	075	215
145	036	076	216
150	037	077	217
155	038	078	218
160	039	079	219
165	040	—	220
170	336	—	—
175	316	403	—

7AM Series Thermal Protectors

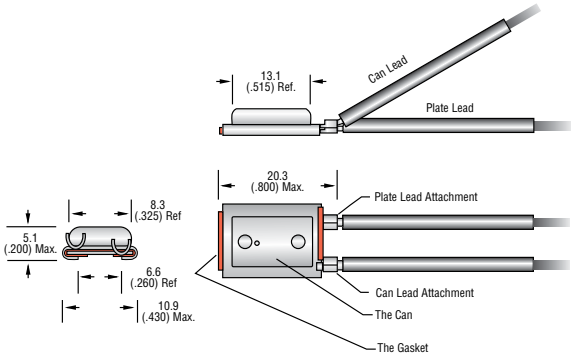
FEATURES

- Miniature size
- Current rating up to 22 Amps
- Individually temperature calibrated and checked
- Positive make and break with Klixon® snap-action disc
- Reliable temperature performance over life of protector
- Gasketed steel case suitable for impregnation processes
- Current and temperature sensitivity for maximum design flexibility
- Same side or opposite side terminations
- ROHS compliant ratings available

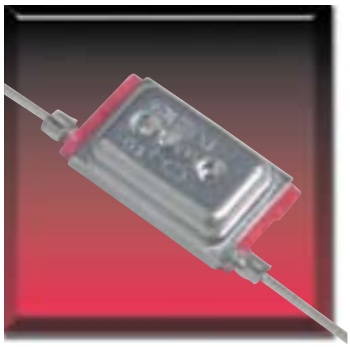
APPLICATIONS

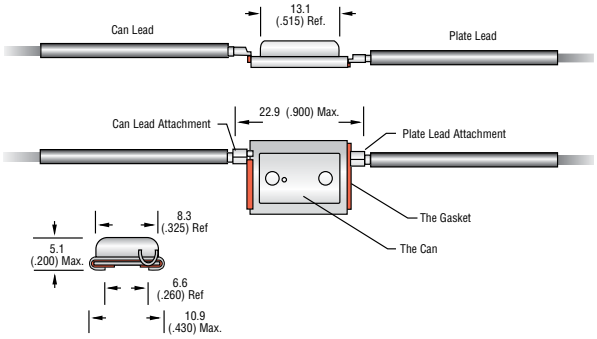
- Battery packs
- Battery chargers
- Permanent split capacitor motors
- Shaded pole motors
- HID ballasts
- Fluorescent lighting ballasts
- Transformers
- Vacuum cleaners
- Recessed lighting fixtures
- Automotive accessory motors, solenoids, etc...
- PC boards

The Klixon® 7AM thermal protector prevents overheating in a variety of consumer, industrial and commercial products. It is a miniature, snap-acting, thermally operated device that is a proven performer in protection technology. It is the right choice for applications where available space is at a premium. Thermtrol can provide these units with a variety of leads, terminations and insulating sleeves to meet specific requirements, including nickel strip leads for NI-CAD battery packs.



Type A, Radial Lead Configuration

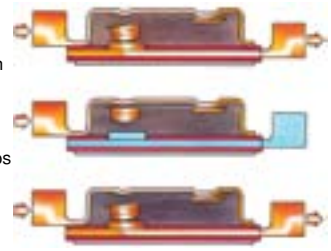




Type B, Axial Lead Configuration

Here's how the 7AM protects against overheating. . .

- Current flows through your lead connection into the can crimp terminal, through the can member, bimetal disc, and mating contacts. The current completes its path by exiting through the plate member and the integral plate crimp terminal to your lead connection.
- As the temperature rises, the heat is transferred to the bimetal disc. The disc then snaps open at the factory-calibrated opening temperature, thus breaking the current path.
- The bimetal disc snaps closed when the reset temperature level is achieved.



All dimensions mm (in.)

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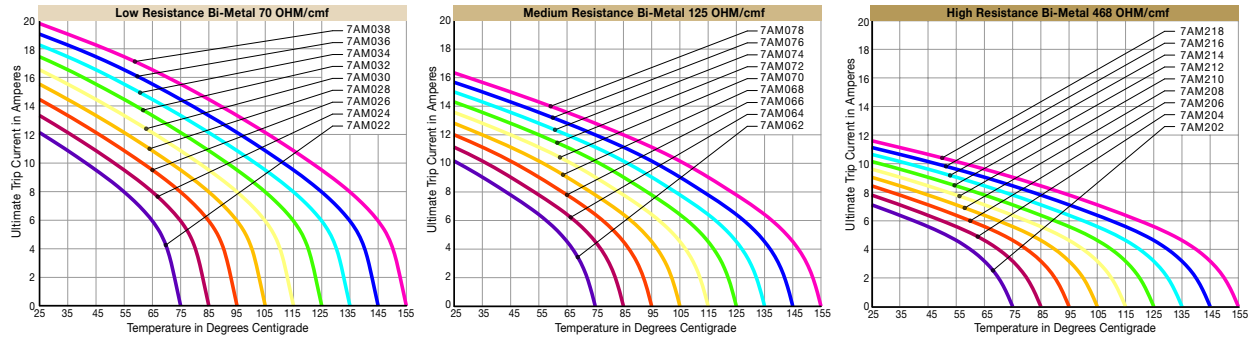
Bi-Metal Options

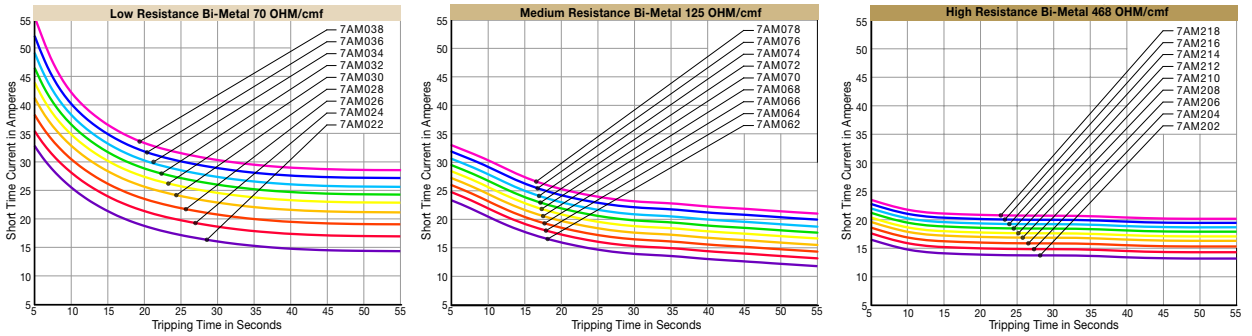
7AM performance is dependent upon the applied current, as well as temperature. Different Bi-metals are incorporated to achieve various performance characteristics. In applications where temperature rise is less than 2°C per second, use low-resistance ratings. High-resistance Bi-Metal is recommended for applications with 2°-5°C per second rates of temperature rise. Contact Thermtrol for additional application consideration if the rate of temperature rise exceeds 5°C per second. Use these curves to determine which Bi-Metal may trip in the manner required for your application.

Ultimate Trip Current vs. Protector Ambient Temperature

Approximate: to be used for selecting samples only



Average First Cycle Tripping vs. Current in 25°C Ambient



Leads

Thermtrol's state-of-the-art automated lead processing equipment can produce lead wires to meet customer application needs for overall length, wire type, wire size, terminated connection and stripped length requirements. Standard lead size is 18AWG. 20AWG-14AWG is also available.

Leads

Unless otherwise specified, the following tolerances apply to all assemblies.

Lead Lengths		Minimum Pull Strength		
		AWG	Lead to Thermostat	Lead to AMP Terminal
0" to 2"	±0.062"	20 ga.	20 lbs.	20 lbs.
2.1" to 6"	±0.125"	18 ga.	20 lbs.	20 lbs.
6.1" to 12"	±0.250"	16-14 ga.	20 lbs.	50 lbs.
12.1" to 36"	±0.500"			
36.1" to 120"	±0.750"			

Sleeving

In order to achieve optimum heat transfer from the protected medium or ambient to the thermostat, the 7AM has been designed with the case connected to the bimetallic disc. This feature makes it necessary to electrically insulate the 7AM from the mounting surface. Typically, this is accomplished with a Mylar sleeve marked with the part number. Custom markings and other sleeve materials can also be provided.

UL Approvals

Applications	Approved Ratings	Approved Values		UL/CUL Approval	
		Temp. Code	Temp.(°C)	File No.	Standard
Appliance	120Vac/15FLA 85LRA	021-050, 061-070, 081-090, 101-110, 121-130, 141-150, 161-170, 181-190, 201-214, 219, 316-318, 325-336, 008, 805	70-175	E19340 Vol. 1 Sec. 4	UL873 & C22.2 No. 74 (CUL)
Flourescent Ballast Protector	120Vac/5.5Amp				
	200Vac & 240Vac/2Amp				
	277Vac/1.75Amp				
	600Vac/1Amp				
Incandescent Lamp Progector	600 Watts Tungsten 120V	021-039	70-160		
Motor	120Vac, 240Vac	020-036, 061-079, 134, 201-216	65-145 70-160 135 70-145	E40044 Vol. 1, Sec. 5	UL2111

Contact Ratings

16Vdc	20 Amps
115Vac	22 Amps
277Vac	8 Amps
600Vac	4 Amps

Ensure maximum contact needs do not exceed these voltage/current combinations. These ratings are applicable for 10,000 cycles.

Numbering System

7AM	202	A	5	-XXX-5
	Select Code for Low, Medium or High Resistance	*Select A or B*	*Opening Temperature Tolerance is ± 5°C*	*Use Only if High Seal Gasket is Required*

Standard Opening Temp. Code

Opening Temp. °C	Low Resistance Bi-Metal 70 /cmf	Medium Resistance Bi-Metal 125 /cmf	High Resistance Bi-Metal 468 /cmf
65	020	—	—
70	021	061	201
75	022	062	202
80	023	063	203
85	024	064	204
90	025	065	205
95	026	066	206
100	027	067	207
105	028	068	208
110	029	069	209
115	030	070	210
120	031	071	211
125	032	072	212
130	033	073	213
135	034	074	214
140	035	075	215
145	036	076	216
150	037	077	217
155	038	078	218
160	039	079	219
165	040	—	220
170	336	—	—
175	316	403	—

High-Seal Gasket

Designate this special order, high seal gasket for applications subjected to over-molding, dipping, or varnishing. Otherwise leave this space blank.

Terminal Configuration

A	Type A Radial Leads
B	Type B Axial Leads

Note: Unless otherwise requested, samples will be produced with 6" long, #18 gauge, XLPE 125C 600V (UL3173) leads. Thermtrol will apply Mylar insulation to electronically isolate the protector body.

Nonstandard opening temperatures and bimetal resistances are available.

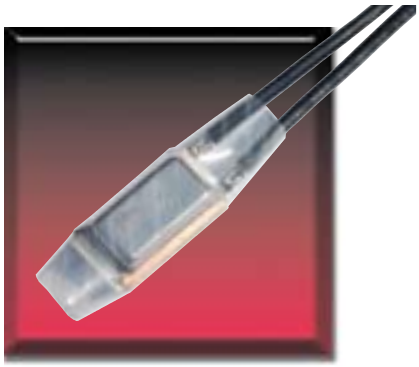
SX8AM Series Self-Hold Motor Protectors

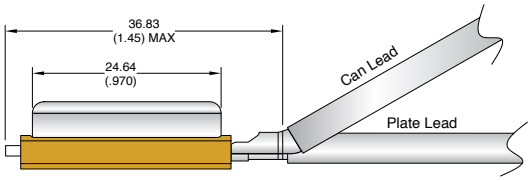
FEATURES

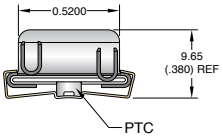
- Individually temperature calibrated
- Positive make and break with snap-action disc
- Gasketed seal suitable for many impregnation processes
- Current and temperature sensitive
- Drop in configurations made to your specs
- Agency Recognition: UL
- ROHS compliant ratings available

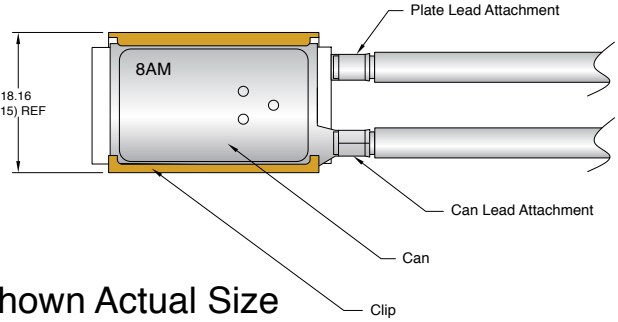
APPLICATIONS

- High locked rotor current applications
- Air compressor
- Universal motors
- Industrial motors
- Blender motors





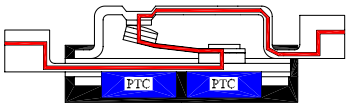




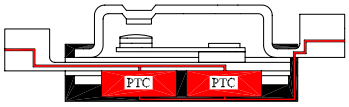
Shown Actual Size

Here's how the SX8AM functions ...

Developed by Thermtrol, the SX8AM is a thermal protector/PTC heater combination. The Dual PTC heaters are electrically located across the contacts of the protector.



When the protector contacts are open, the heaters are in series with the load. The heaters then maintain the temperature sensitive bimetal of the protector in an open state.



To reset the SX8AM, power must be removed for sufficient time to allow the SX8AM to cool below the protector's reset temperature.

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Leads

Thermtrol's state-of-the-art automated lead processing equipment can produce lead wires to meet customer application needs for overall length, wire type, wire size, terminated connection and stripped length requirements. Standard lead size is 16AWG. 14AWG-18AWG is also available.

Sleeving

In order to achieve optimum heat transfer from the protected medium or ambient to the thermostat, the SX8AM and 8AM have been designed with the case connected to the bimetallic disc. This feature makes it necessary to electrically insulate the thermostat from the mounting surface. Typically, this is accomplished with a Mylar sleeve marked with the part number. Custom markings and other sleeve materials can also be provided.

Leads

Lead Lengths		Minimum Pull Strength	
0" to 2"	± 0.062"	18	20lbs.
2.1" to 6"	± 0.125"		
6.1" to 12"	± 0.250"	16	30lbs.
12.1" to 36"	± 0.500"	14	50lbs.
36.1" to 120"	± 0.750"		

UL Approvals

Applications	Approved Ratings	Temp. (°C)	File No.	Standard
Motor Protector	115Vac	100-160	E40044	UL2111

Numbering System

SX	8AM	4	B	X	M	F	11
Self Hold Device	Base Sensata Device	Contact Rating (115V)	Bimetal Code	Open Temp (±5°C)	Close Temp (±15°C)	Terminal Type	Heater Code

Contact Rating (115V)
1-50 Amps
2-35 Amps
4-60 Amps

Bimetal Code
B
C
E
G
H
J
K
L

Code	Open Temp. °C
J	100
K	105
L	110
M	115
N	120
P	125
R	130
S	135
T	140
U	145
V	150
W	155
X	160

Code	Close Temp. °C
B	45
C	49
D	52
E	57
F	61
G	65
H	69
J	73
K	75
L	78
M	81
N	84
P	87
R	92
S	94

Code	Type
A	Weld
F	Crimp

Heater Code
1
2
3
4
5
6
7
8
9
10
11
12
13

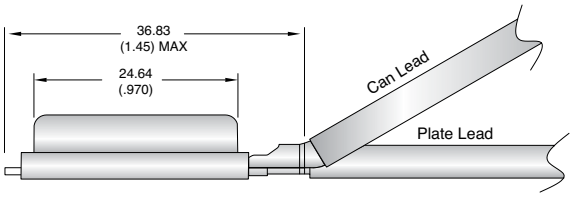
8AM Series Motor Protectors

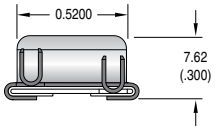
FEATURES

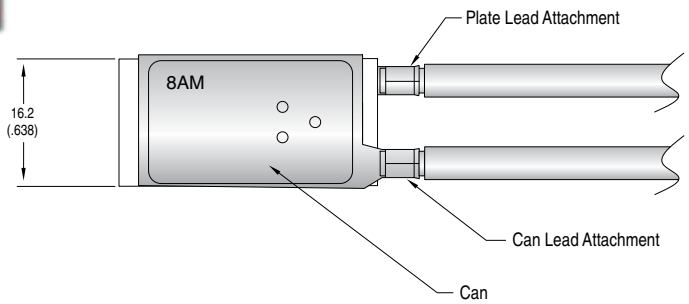
- Individually temperature calibrated make and break with snap-action disc
- Gasketed seal suitable for many impregnation processes
- Current- and temperature-sensitive
- Drop in configurations made to your specs
- Agency Recognition: UL
- ROHS compliant ratings available

APPLICATIONS

- High locked rotor current applications
- Air compressor
- Universal motors
- Industrial motors
- Blender motors

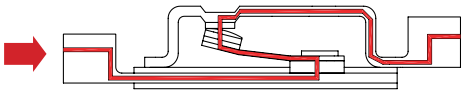




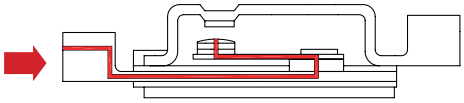


Here's how the 8AM protects against overheating ...

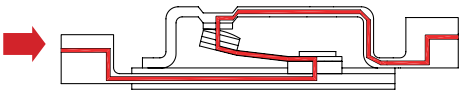
- Current flows through your lead connection into the plate terminal, through the plate member, heater material, bimetal disc and mating contacts. The current completes its path by exiting through the can member and the integral can crimp terminal to your lead connection.



- As the temperature rises, the heat is transferred to the bimetal disc. The disc then snaps open at the factory-calibrated opening temperature, thus breaking the current path.



- The bimetal disc snaps closed when the reset temperature level is achieved.



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Leads

Thermtrol's state-of-the-art automated lead processing equipment can produce lead wires to meet customer application needs for overall length, wire type, wire size, terminated connection and stripped length requirements. Standard lead size is 16AWG. 14AWG-18AWG is also available.

Sleeving

In order to achieve optimum heat transfer from the protected medium or ambient to the thermostat, the 8AM has been designed with the case connected to the bimetallic disc. This feature makes it necessary to electrically insulate the thermostat from the mounting surface. Typically, this is accomplished with a Mylar sleeve marked with the part number. Custom markings and other sleeve materials can also be provided.

Leads

Lead Lengths		Minimum Pull Strength	
0" to 2"	± 0.062"	18	20lbs.
2.1" to 6"	± 0.125"		
6.1" to 12"	± 0.250"	16	30lbs.
12.1" to 36"	± 0.500"		
36.1" to 120"	± 0.750"	14	50lbs.

UL Approvals

Applications	Approved Ratings	Temp. (°C)	File No.	Standard
Motor Protector	120Vac	100 - 160	E40044	UL2111

Numbering System

8AM	4	B	X	M	F	11
Base Sensata Device	Contact Rating (115V)	Bimetal Code	Open Temp (±5°C)	Close Temp (±15°C)	Terminal Type	Heater Code

4
1-50 Amps
2-35 Amps
4-60 Amps

B
B
C
E
G
H
J
K
L

X	
Code	Open Temp. °C
J	100
K	105
L	110
M	115
N	120
P	125
R	130
S	135
T	140
U	145
V	150
W	155
X	160

M	
Code	Close Temp. °C
B	45
C	49
D	52
E	57
F	61
G	65
H	69
J	73
K	75
L	78
M	81
N	84
P	87
R	92
S	94

F	
Code	Type
A	Weld
F	Crimp

11
1
2
3
4
5
6
7
8
9
10
11
12
13

TC100 Series Battery Protectors

FEATURES

- Isolated bi-metal construction
- Miniature size
- Electrically insulated housing
- Snap Action
- Normally closed, contacts open on temperature rise.
- Automatic reset
- Long cycle Life
- Current and temperature sensitivity for maximum design flexibility
- Available with Nickel Strip leads or wire leads to your specifications

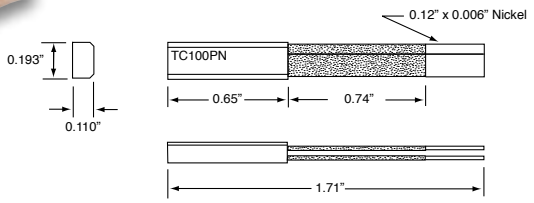
APPLICATIONS

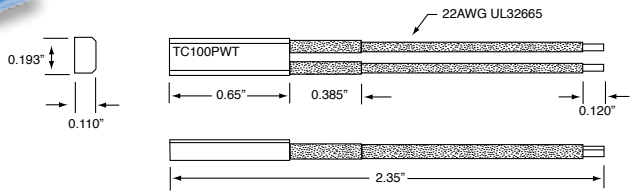
Battery pack overcharge and limited short circuit protection in:

- Portable tools
- Notebook computers.
- Rechargeable battery packs

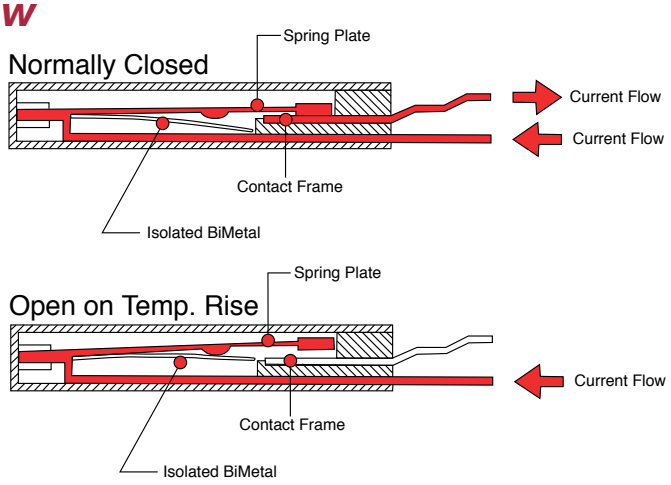
TC100 Series

Thermtrol's TC100 Series is designed specifically for over temperature and short circuit protection in battery pack applications. The TC100 functions by detecting elevated heat and over-current in the battery pack and breaks the electrical circuit at the TC100's pre-selected temperature set point. With a variety of termination styles, internal resistivity values for varying the current sensitivity, and a large range of nominal temperature settings, the TC100 is the device for your battery pack protection requirements. In applications where a one-shot thermal cutoff fuse or multiple redundancies are required in addition to a bimetal limit protector, please ask Thermtrol about supplying your entire system protection needs.





Current Flow



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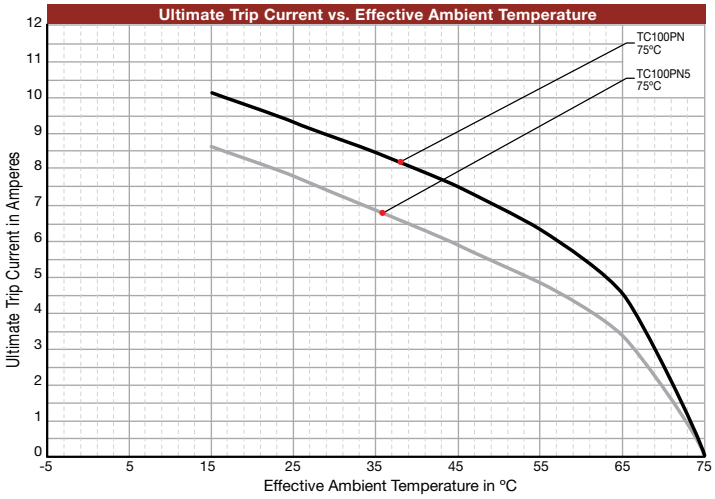
Performance Curves

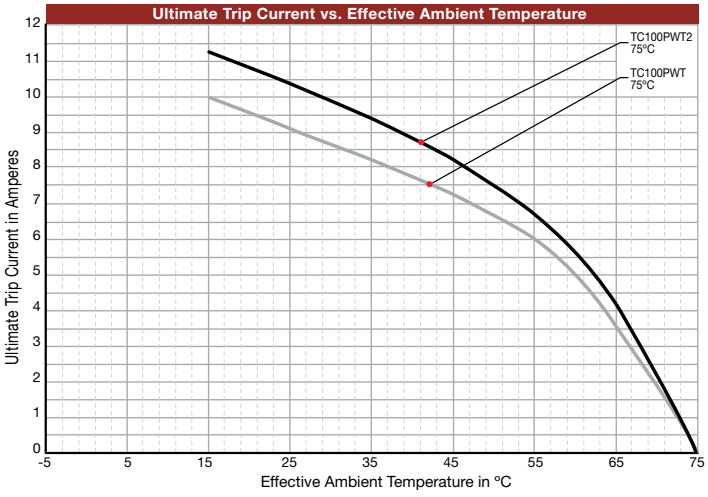
TC100 Performance is dependent upon the movable arm material, the temperature setting, and the lead material. The graphs below show representative devices and illustrate the relative characteristics of various configurations.

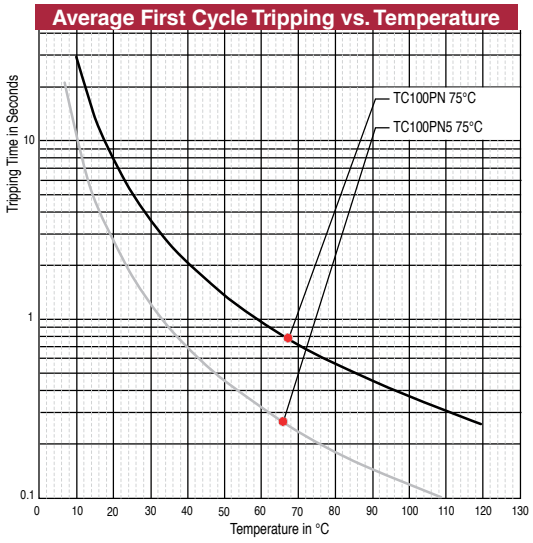
Model#	Contact Frame Material	Spring Plate Material	Termination	Overall Resistance
PN	Phosphorus Bronze	Beryllium Copper	Nickel Plate Lead	Low
PN5	Phosphorus Bronze	Titanium Copper	Nickel Plate lead	High
PWT	Phosphorus Bronze	Beryllium Copper	Lead Wire	Low
PWT2	Brass	Beryllium Copper	Lead Wire	High

TC100-PN Series

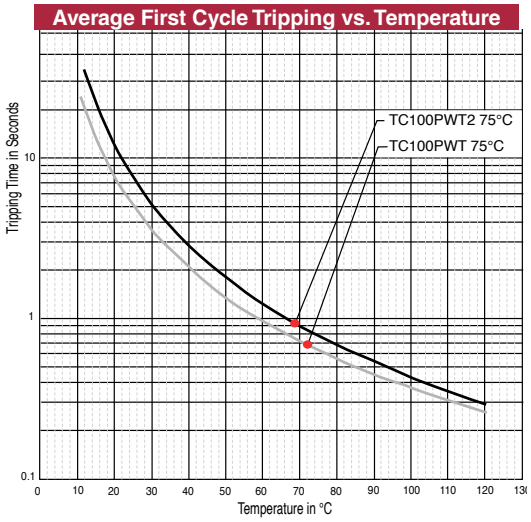


TC100-PWT Series





Approximate: to be used for selecting samples only



Contact Ratings

- 8A@18Vdc, 3A@24vDC
- Maximum Breaking Current: 100A 12Vdc
- Minimum Electrical Current: 10mA 5Vdc

Specifications

- Open Temperature: 45°C to 105°C ± 5°C
- Differential: 6°C

UL Approvals

- UL: E19340

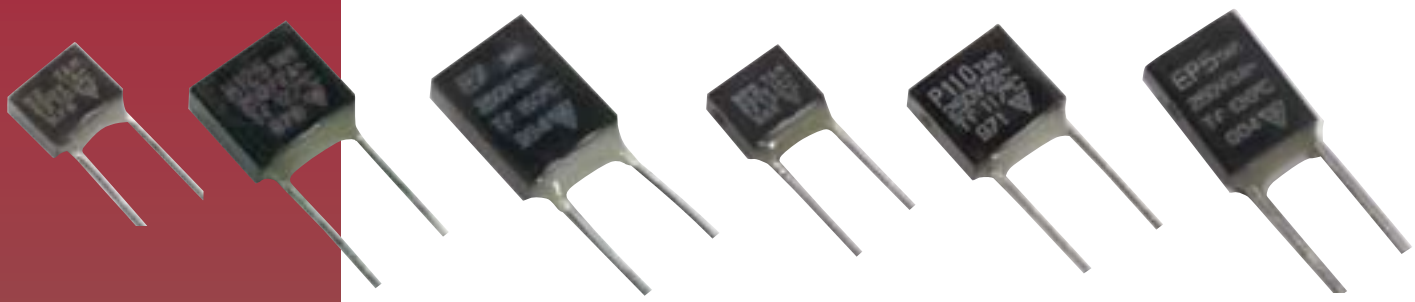
Numbering System

TC100	PN	55

PN
PN5
PWT
PWT2

Set Temperature - select in increments of 5°C from 45°C to 105°C.

1/2 Amp - 7 Amp Thermal Cutoffs



Thermal cutoffs are single action devices that open when a preset temperature is reached. They do not reset. The active component of a thermal cutoff is a fusible alloy surrounded by a special resin. Under normal operating temperatures the fusible alloy joins the two lead wires within the body of the cutoff. When the preset temperature of the cutoff is reached, the fusible alloy melts and with the aid of the special resin, complete cutoff is ensured. Thermal cutoffs are available in both Axial and Radial configurations as shown and with current ratings from 1/2 Amp to 7 Amps.

FEATURES

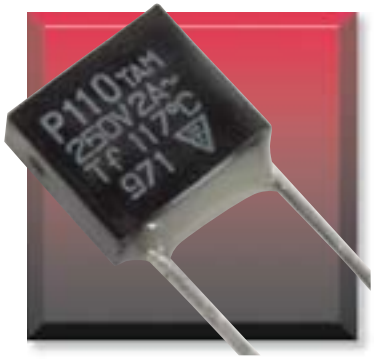
- Various temperature settings
- Miniature size
- Current rating: Up to 7 Amps
- Economical
- Accurate
- Large inventory; same day shipping
- Various mounting options
- ROHS compliant ratings available

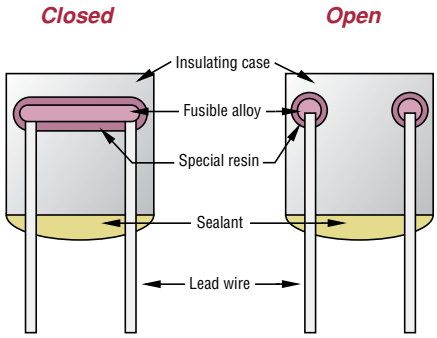
APPLICATIONS

Thermal cutoffs are widely used to prevent damage from overheating in electrical products.

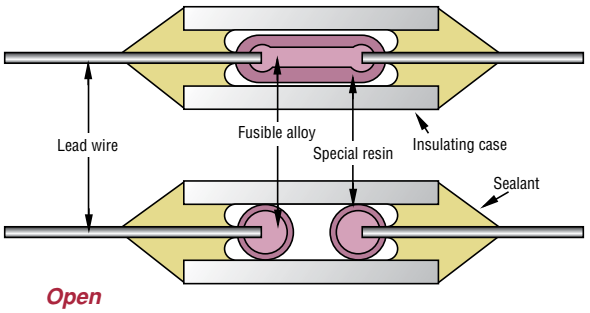
- APPLIANCES - space heaters, irons, stoves, electric blankets, hair dryers, clothes dryers, cookers, toaster ovens, crock pots, mixers, toasters, microwave ovens, etc.
- MOTORS - air conditioners, copiers, fans, washing machines, compressors, etc.
- ELECTRONICS - TVs, stereos, tape recorders, video recorders, fluorescent lamps, transformers, computers, surge suppressors, telecommunication equipment, etc

Radial Type





Axial Type



Terminology:

Functioning Temperature (TF)
The temperature at which a thermal cutoff changes its state of conductivity to open a circuit with detection current of 10mA or less as the only load. The temperature tolerance for the UL and CSA standard is +0°C / -10°C.

Holding Temperature (TH)
The maximum temperature at which a thermal cutoff can be maintained while conducting rated current for 168 hours without functioning.

Maximum Temperature (TM)
The maximum temperature at which mechanical and electrical properties of a thermal cutoff can be maintained for 10 minutes without resuming conductivity after functioning.

NOTE: Select Axial and Radial cutoffs are available with a special higher temperature sealant making these devices suitable for automatic wave soldering. Devices possessing this characteristic are noted as “designed for automatic wave soldering.”

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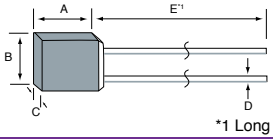
NF Series

UL: E73591
CSA: LR60621
VDE: 40009789
BEAB: C1121



Dimensions [mm]		
	A	4.1±0.5
	B	5.2±0.5
	C	2.0±0.3
	D	0.53±0.1
	E	36±3.0

*1 Long lead type 68±3.0mm [N-F-L]

NF Series

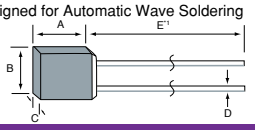
Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
N06F	65	61±3	AC	250	1	50	200		●	●	●	●
N0F	76	72±3	AC	250	1	50	200	●	●	●	●	●
				125	2	50		●	●	●		●
N1F	86	81±2	AC	250	1	60	95	●	●	●	●	●
			DC	50	2.5	60		●	●	●		●
N2F	102	98±3	AC	250	1	75	200	●	●	●	●	●
				125	2.5	65		●	●	●		●
			DC	50	3	60		●	●	●		●
N3	117	112±2	AC	250	1	85	180	●	●	●	●	●
			DC	50	3	85		●	●	●		●
N3F	115	111±2	AC	250	1	95	200	●	●	●	●	●
				125	2.5	90		●	●	●		●
			DC	50	3	90		●	●	●		●
N4F	127	123±2	AC	250	1	105	200	●	●	●	●	●
				125	2.5	100		●	●	●		●
			DC	50	3	95		●	●	●		●
N13F	133	129±3	AC	250	1	105	200	●	●	●	●	●
				125	2.5	100		●	●	●		●
			DC	50	3	95		●	●	●		●
N5F	136	131±2	AC	250	1	100	200	●	●	●	●	●
				125	2.5	95		●	●	●		●
			DC	50	3	90		●	●	●		●
N6F	139	134±2	AC	250	1	110	200	●	●	●	●	●
				125	2.5	105		●	●	●		●
			DC	50	3	100		●	●	●		●

All products are approved by DENAN (AC250V)

NX Series

Designed for Automatic Wave Soldering

UL: E73591
CSA: LR60621
VDE: 40009789
BEAB: C1121



Dimensions [mm]		
	A	4.1±0.5
	B	5.2±0.5
	C	2.0±0.3
	D	0.53±0.1
	E	36±3.0

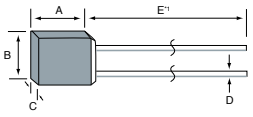
NX Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
N06X	65	61±3	AC	250	1	50	200		●	●	●	●
N0X	76	72±3	AC	250	1	50	200	●	●	●	●	●
				125	2	50		●	●	●		●
N1X	86	81±3	AC	250	1	60	200	●	●	●	●	●
				125	2	60		●	●	●		●
N2X	102	98±3	AC	250	1	75	200	●	●	●	●	●
				125	2.5	65		●	●	●		●
			DC	50	3	60		●	●	●		●
N3X	115	111±2	AC	250	1	95	200	●	●	●	●	●
				125	2.5	90		●	●	●		●
			DC	50	3	90		●	●	●		●
NP3	117	112	AC	250	1	85	180	●	●	●	●	●
			DC	50	3	85		●	●	●		●
N4X	127	123±2	AC	250	1	105	200	●	●	●	●	●
				125	2.5	100		●	●	●		●
			DC	50	3	95		●	●	●		●
N13X	133	129±3	AC	250	1	105	200		●	●	●	●
				125	2.5	100		●	●	●		●
			DC	50	3	95		●	●	●		●
N5X	136	131±2	AC	250	1	100	200	●	●	●	●	●
				125	2.5	95		●	●	●		●
			DC	50	3	90		●	●	●		●
N6X	139	134±2	AC	250	1	110	200	●	●	●	●	●
				125	2.5	105		●	●	●		●
			DC	50	3	100		●	●	●		●

All products are approved by DENAN (AC250V)

HF Series

UL: E73591
CSA: LR60621
VDE: 40009806
BEAB: C1120



Dimensions [mm]		
	A	5.9±0.5
	B	6.7±0.5
	C	2.5±0.3
	D	0.55±0.1
	E	36±3.0

*1 Long lead type 68±3.0mm [H-F-L]

HF Series

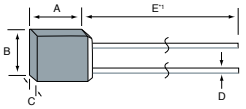
Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
H06F	65	61±3	AC	250	2.5	50	200	●	●	●	●	●
H0F	76	72±3	AC	250	2.5	50	200	●	●	●	●	●
				125	3	50		●	●	●		●
H1F	86	81±2	AC	250	2	60	95	●	●	●	●	●
H2F	102	98±3	AC	250	3	75	200	●	●	●	●	●
				125	3.5	65		●	●	●		●
			DC	50	4	60		●	●	●		●
H110	117	112±2	AC	250	2	85	180	●	●	●	●	●
H3F	115	111±2	AC	250	3	95	200	●	●	●	●	●
				125	3.5	90		●	●	●		●
			DC	50	4	90		●	●	●		●
H4F	127	123±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	95		●	●	●		●
H13F	133	129±3	AC	250	3	100	200		●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	90		●	●	●		●
H5F	136	131±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	90		●	●	●		●
H6F	139	134±2	AC	250	2.5	110	200	●	●	●	●	●
				125	3.5	105		●	●	●		●
			DC	50	4	100		●	●	●		●
H7F	145	140±2	AC	250	2	115	200	●	●	●	●	●
				125	3.5	110		●	●	●		●
			DC	50	4	105		●	●	●		●
H145	150	145±2	AC	250	2	115	180	●	●	●	●	
H160	165	160±2	AC	250	2	130	180	●	●	●	●	
H169	169	169±3	AC	250	2	130	180	●	●	●	●	

All products are approved by DENAN (AC250V)

HX Series

Designed for Automatic Wave Soldering

UL: E73591
CSA: LR60621
VDE: 40009806
BEAB: C1120



Dimensions [mm]		
	A	5.9±0.5
	B	6.7±0.5
	C	2.5±0.3
	D	0.55±0.1
	E	36±3.0

HX Series

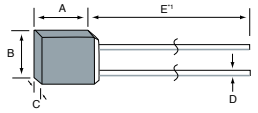
Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
H06X	65	61±3	AC	250	2.5	50	200	●	●	●	●	●
H0X	76	72±3	AC	250	2.5	50	200	●	●	●	●	●
				125	3	50		●	●	●		●
H1X	86	81±3	AC	250	2.5		200	●	●	●	●	●
				125	3			●	●	●		●
H2X	102	98±3	AC	250	3	75	200	●	●	●	●	●
				125	3.5	65		●	●	●		●
			DC	50	4	60		●	●	●		●
P110	117	112±2	AC	250	2	85	180	●	●	●	●	●
			DC	50	3.5			●	●	●		●
H3X	115	111±2	AC	250	3	95	200	●	●	●	●	●
				125	3.5	90		●	●	●		●
			DC	50	4	90		●	●	●		●
H4X	127	123±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	95		●	●	●		●
H13X	133	129±3	AC	250	3	100	200		●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	90		●	●	●		●
H5X	136	131±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	90		●	●	●		●
H6X	139	134±2	AC	250	2.5	110	200	●	●	●	●	●
				125	3.5	105		●	●	●		●
			DC	50	4	100		●	●	●		●
H7X	145	140±2	AC	250	2	115	200	●	●	●	●	●
				125	3.5	110		●	●	●		●
			DC	50	4	105		●	●	●		●
P145	150	145±2	AC	250	2	115	180	●	●	●	●	
P160	165	160±2	AC	250	2	130	180	●			●	
P169	169	165±3	AC	250	2	130	180	●			●	

All products are approved by DENAN (AC250V)

1/2 Amp - 7 Amp Thermal Cutoffs

EF Series

UL: E73591
CSA: LR60621
VDE: 40009796
BEAB: C1119



Dimensions [mm]		
	A	8.5±0.5
	B	6.6±0.5
	C	2.5±0.3
	D	0.7±0.1
	E	36±3.0

*1 Long lead type 65±3.0mm [E-F-L]

EF Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
E06F	65	61±3	AC	250	3	50	200	●	●	●	●	●
E0F	76	72±3	AC	250	3	55	200	●	●	●	●	●
				125	4	55		●	●	●		●
E1F	86	81±3	AC	250	3	65	200	●	●	●	●	●
				125	4	60		●	●	●		●
E2F	102	98±3	AC	250	3	70	200	●	●	●	●	●
				125	5.5	65		●	●	●		●
			DC	50	6	60		●	●	●		●
E3	117	112±2	AC	250	3	85	180	●	●	●	●	●
				125	5	85		●	●	●		●
E3F	115	111±2	AC	250	3	90	200	●	●	●	●	●
				125	5.5	85		●	●	●		●
			DC	50	6	85		●	●	●		●
E4F	127	123±2	AC	250	3	95	200	●	●	●	●	●
				125	5.5	90		●	●	●		●
			DC	50	6	90		●	●	●		●
E13F	133	129±3	AC	250	3	95	200	●	●	●	●	●
				125	5.5	85		●	●	●		●
			DC	50	6	85		●	●	●		●
E5F	136	131±2	AC	250	3	95	200		●	●	●	●
				125	5.5	90		●	●	●		●
			DC	50	6	90		●	●	●		●
E6F	139	134±2	AC	250	3	105	200	●	●	●	●	●
				125	5.5	100		●	●	●		●
			DC	50	6	100		●	●	●		●
E7F	145	140±2	AC	250	3	115	200	●	●	●	●	●
				125	5.5	110		●	●	●		●
			DC	50	6	105		●	●	●		●
E8	169	165±3	AC	250	3	130	180	●	●	●	●	

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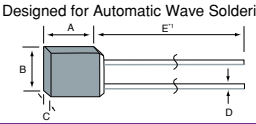
EX Series

Designed for Automatic Wave Soldering

UL: E73591
CSA: LR60621
VDE: 40009796
BEAB: C1119



Dimensions [mm]		
	A	8.5±0.5
	B	6.6±0.5
	C	2.5±0.3
	D	0.8±0.1
	E	36±3.0

EX Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
E06X	65	61±3	AC	250	3	50	200	●	●	●	●	●
E0X	76	72±3	AC	250	3	55	200	●	●	●	●	●
				125	4	55		●	●	●		●
E1X	86	81±3	AC	250	3	65	200	●	●	●	●	●
				125	4	60		●	●	●		●
E2X	102	98±3	AC	250	3	70	200	●	●	●	●	●
				125	5.5	65		●	●	●		●
			DC	50	6	60		●	●	●		●
EP3	117	112±2	AC	250	3	85	180	●	●	●	●	●
				125	4	85		●	●	●		●
E3X	115	111±2	AC	250	3	90	200	●	●	●	●	●
				125	5.5	85		●	●	●		●
			DC	50	6	85		●	●	●		●
E4X	127	123±2	AC	250	3	95	200	●	●	●	●	●
				125	5.5	90		●	●	●		●
			DC	50	6	90		●	●	●		●
E13X	133	129±3	AC	250	3	95	200		●	●	●	●
				125	5.5	85		●	●	●		●
			DC	50	6	85		●	●	●		●
E5X	136	131±2	AC	250	3	95	200	●	●	●	●	●
				125	5.5	90		●	●	●		●
			DC	50	6	90		●	●	●		●
E6X	139	134±2	AC	250	3	105	200	●	●	●	●	●
				125	5.5	100		●	●	●		●
			DC	50	6	100		●	●	●		●
E7X	145	140±2	AC	250	3	115	200	●	●	●	●	●
				125	5.5	110		●	●	●		●
			DC	50	6	105		●	●	●		●

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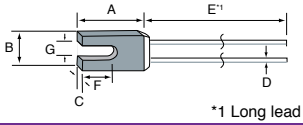
HUF Series

UL: E73591
CSA: LR60621
VDE: 4009806
BEAB: C1120



Dimensions [mm]		
	A	11.0±0.5
	B	6.7±0.5
	C	2.5±0.3
	D	0.55±0.1
	E	36±3.0
	F	4.5±0.2
	G	3.2±0.3

*1 Long lead type 68±3.0mm [HU-F-L]

HUF Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
HU06F	65	61±3	AC	250	2.5	50	200	●	●	●	●	●
HU0F	76	72±3	AC	250	2.5	50	200	●	●	●	●	●
				125	3	50		●	●	●		●
HU1F	86	81±3	AC	250	2.5	60	200	●	●	●	●	●
				125	3	60		●	●	●		●
HU2F	102	98±3	AC	250	3	75	200	●	●	●	●	●
				125	3.5	65		●	●	●		●
			DC	50	4	60		●	●	●		●
H110A	117	112±2	AC	250	2	85	180	●	●	●	●	●
HU3F	115	111±2	AC	250	3	95	200	●	●	●	●	●
				125	3.5	90		●	●	●		●
			DC	50	4	90		●	●	●		●
HU4F	127	123±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	95		●	●	●		●
HU13F	133	129±3	AC	250	3	100	200		●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	95		●	●	●		●
HU5F	136	131±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	90		●	●	●		●
HU6F	139	134±2	AC	250	2.5	110	200	●	●	●	●	●
				125	3.5	105		●	●	●		●
			DC	50	4	100		●	●	●		●
HU7F	145	140±2	AC	250	3	115	200	●	●	●	●	●
				125	3.5	110		●	●	●		●
			DC	50	4	105		●	●	●		●

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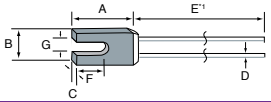
HUX Series

Designed for Automatic Wave Soldering

UL: E73591
CSA: LR60621
VDE: 4009806
BEAB: C1120



Dimensions [mm]		
	A	11.0±0.5
	B	6.7±0.5
	C	2.5±0.3
	D	0.55±0.1
	E	36±3.0
	F	4.5±0.2
	G	3.2±0.3

HUX Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
HU06X	65	61±3	AC	250	2.5	50	200	●	●	●	●	●
HU0X	76	72±3	AC	250	2.5	50	200	●	●	●	●	●
				125	3	50		●	●	●		●
HU1X	86	81±3	AC	250	2.5	60	200	●	●	●	●	●
				125	3	60		●	●	●		●
HU2X	102	98±3	AC	250	3	75	200	●	●	●	●	●
				125	3.5	65		●	●	●		●
			DC	50	4	60		●	●	●		●
P110A	117	112±2	AC	250	2	85	180	●	●	●	●	●
			DC	50	3.5	85		●	●	●		●
HU3X	115	111±2	AC	250	3	95	200	●	●	●	●	●
				125	3.5	90		●	●	●		●
			DC	50	4	90		●	●	●		●
HU4X	127	123±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	95		●	●	●		●
HU13X	133	129±3	AC	250	3	100	200		●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	95		●	●	●		●
HU5X	136	131±2	AC	250	3	100	200	●	●	●	●	●
				125	3.5	95		●	●	●		●
			DC	50	4	90		●	●	●		●
HU6X	139	134±2	AC	250	2.5	110	200	●	●	●	●	●
				125	3.5	105		●	●	●		●
			DC	50	4	100		●	●	●		●
HU7X	145	140±2	AC	250	2	115	200	●	●	●	●	●
				125	3.5	110		●	●	●		●
			DC	50	4	105		●	●	●		●
P160A	165	160±2	AC	250	2	130	180	●			●	
P169A	169	165±2	AC	250	2	130	180	●			●	

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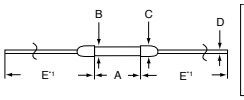
TF Series

UL: E73591
CSA: LR60621
VDE: 40005277, 40009915
BEAB: C1083, C1117



Dimensions [mm]		
	A	6.3±1.0
	B	2.0±0.1
	C	2.3 and under
	D	0.53±0.1
	E	68±3.0

*1 Short lead type 38±3.0mm [T-F-C]

TF Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
T06F	65	61±3	AC	250	1	50	200	●	●	●	●	●
T0F	76	72±3	AC	250	1	55	200	●	●	●	●	●
				125	2	55		●	●	●	●	●
			DC	50	2.5	50		●	●	●		●
T1F	86	81±2	AC	250	1	60	200	●	●	●	●	●
			AC	125	20	60		●	●	●	●	●
			DC	50	2.5	60		●	●	●		●
T2F	102	98±3	AC	250	2	75	200	●	●	●	●	●
				125	3	70		●	●	●		●
			DC	50	4	65		●	●	●		●
VS11	117	112±2	AC	250	1	95	160	●	●	●	●	●
			DC	50	3	95		●	●	●		●
T3F	115	111±2	AC	250	2	95	200	●	●	●	●	●
				125	3	90		●	●	●		●
			DC	50	3.5	85		●	●	●		●
T4F	127	123±2	AC	250	2	110	200	●	●	●	●	●
				125	3	110		●	●	●		●
			DC	50	4	105		●	●	●		●
T13F	133	129±3	AC	250	2	105	200	●	●	●	●	●
				125	3	95		●	●	●		●
			DC	50	4	80		●	●	●		●
T5F	136	131±2	AC	250	2	105	200	●	●	●	●	●
				125	3	95		●	●	●		●
			DC	50	4	80		●	●	●		●
T6D	139	134±2	DC	50	9	80	200	●	●			●
T6F	139	134±2	AC	250	2	120	200	●	●	●	●	●
				125	3	110		●	●	●		●
			DC	50	4	90		●	●	●		●
T7F	145	140±2	AC	250	1	125	200	●	●	●	●	●
				125	2.5	125		●	●	●	●	●
			DC	50	3	115		●	●	●		●
VS16	169	165±2	AC	250	1	130	180	●	●	●	●	
VS18	187	183±3	AC	250	1	160	200	●	●	●	●	

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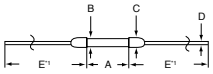
TX Series

Designed for Automatic Wave Soldering

UL: E73591
CSA: LR60621
VDE: 40005277, 40009915
BEAB: C1014



Dimensions [mm]		
	A	6.3±1.0
	B	2.0±0.1
	C	2.3 and under
	D	0.53±0.1
	E	38±3.0

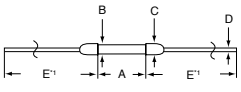
TX Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
T06X	65	61±3	AC	250	1	50	200	●	●			●
T0X	76	72±3	AC	250	1	55	200	●	●			●
				125	2	55		●	●			●
			DC	50	2.5	50		●	●			●
T1X	86	81±3	AC	250	1	60	200	●	●			●
				125	2	60		●	●			●
			DC	50	2.5	60		●	●			●
T2X	102	98±3	AC	250	2	75	200	●	●			●
				125	3	70		●	●			●
			DC	50	4	65		●	●			●
P11	117	112±2	AC	250	1	95	160	●	●	●	●	●
			DC	50	2.5	95		●	●	●		●
T3X	115	111±2	AC	250	2	95	200	●	●			●
				125	3	90		●	●			●
			DC	50	3.5	85		●	●			●
T4X	127	123±2	AC	250	2	110	200	●	●			●
				125	3	110		●	●			●
			DC	50	4	105		●	●			●
T13X	133	129±3	AC	250	2	105	200	●	●			●
				125	3	95		●	●			●
			DC	50	4	80		●	●			●
T5X	136	131±2	AC	250	2	105	200	●	●			●
				125	3	95		●	●			●
			DC	50	4	80		●	●			●
T6X	139	134±2	AC	250	2	120	200	●	●			●
				125	3	110		●	●			●
			DC	50	4	90		●	●			●
T7X	145	140±2	AC	250	1	125	200	●	●			●
				125	2.5	125		●	●			●
			DC	50	3	115		●	●			●
P14	150	145±2	AC	250	1	115	160	●	●	●	●	

All products are approved by DENAN (AC250V)

KF Series

UL: E73591
CSA: LR60621
VDE: 40005100, 40009857
BEAB: C1159



Dimensions [mm]		
	A	6.0±1.0
	B	1.5±0.1
	C	1.8 and under
	D	0.53±0.1
	E	68±3.0

*1 Short lead type 38±3.0mm [K-F-C]

KF Series

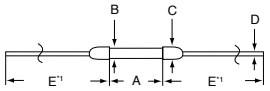
Type No.	Tf [°C]	Functioning Temperature [°C]	Rating			TH [°C]	TM [°C]	● Approved				
			AC/DC	Voltage [V]	Current [A]			UL C-UL	VDE	BEAB	CCC	RoHS
K06F	65	61±3	AC	250	1	55	200	●	●	●	●	●
K2F	102	98±3	AC	250	1	80	200	●	●	●	●	●
				125	2	75		●	●	●		●
			DC	50	3	70		●	●	●		●
K11	115	112±2	AC	250	1	95	160	●	●	●	●	●
			DC	50	3	90		●	●	●		●
K3F	115	111±2	AC	250	1	99	200	●	●	●	●	●
				125	2	95		●	●	●		●
			DC	50	3	90		●	●	●		●
K4F	127	123±2	AC	250	1	110	200	●	●	●	●	●
				125	2	110		●	●	●		●
			DC	50	3	110		●	●	●		●
K13F	133	129±3	AC	250	1	110	200	●	●	●	●	●
				125	2	105		●	●	●		●
			DC	50	3	95		●	●	●		●
K5F	136	131±2	AC	250	1	115	200	●	●	●	●	●
				125	2	105		●	●	●		●
			DC	50	3	95		●	●	●		●
K6F	139	134±2	AC	250	1	120	200	●	●	●	●	●
				125	1.5	120		●	●	●		●
			DC	50	3	105		●	●	●		●
K7F	145	140±2	AC	250	1	125	200		●	●	●	●
				125	2	125		●	●	●	●	●
			DC	50	3	120		●	●	●	●	●
K18	187	183±2	AC	250	1	120	200	●	●	●	●	
			DC	50	3	160		●			●	

All products are approved by DENAN (AC250V)

1/2 Amp - 7 Amp Thermal Cutoffs

VF Series

UL: E73591
CSA: LR60621
VDE: 40004916, 40009713
BEAB: C1162, C1116



Dimensions [mm]		
	A	8.9±1.0
	B	2.5±0.1
	C	3.0 and under
	D	0.58±0.1
	E	68±3.0

*1 Short lead type 38±3.0mm [V-F-C]

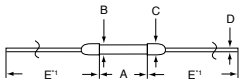
VF Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating AC/DC	Rating Voltage [V]	Rating Current [A]	TH [°C]	TM [°C]	● Approved UL C-UL	VDE	BEAB	CCC	RoHS
V06F	65	61±3	AC	250	3	50	200	●	●	●	●	●
V0F	76	72±3	AC	250	2	50	200	●	●	●	●	●
				125	3.5	50		●	●	●	●	●
			DC	50	4	40		●	●	●		●
V086	86	81±2	AC	250	2	60	95	●	●	●	●	●
			DC	50	4	45		●	●			●
V2F	102	98±3	AC	250	3	75	200	●	●	●	●	●
				125	4	70		●	●	●		●
			DC	50	5	65		●	●	●		●
V110	117	112±2	AC	250	2	95	160	●	●	●	●	●
			DC	50	5	85		●	●			●
V3F	115	111±2	AC	250	3	95	200	●	●	●	●	●
				125	4	90		●	●	●		●
			DC	50	4.5	85		●	●	●		●
V4F	127	123±2	AC	250	3	110	200	●	●	●	●	●
				125	4	105		●	●	●		●
			DC	50	5	95		●	●	●		●
V13F	133	129±3	AC	250	3	100	200	●	●	●	●	●
				125	4	85		●	●	●		●
			DC	50	5	80		●	●	●		●
V5F	136	131±2	AC	250	3	100	200	●	●	●	●	●
				125	4	85		●	●	●		●
			DC	50	5	80		●	●	●		●
V6F	139	134±2	AC	250	3	115	200	●	●	●	●	●
				125	4	100		●	●	●		●
			DC	50	5	85		●	●	●		●
V7F	145	140±2	AC	250	3	125	200	●	●	●	●	●
				125	4.5	110		●	●	●	●	●
			DC	50	5	100		●	●	●		●
V169	169	165±3	AC	250	2	50	180	●	●	●	●	
V187	187	183±3	AC	250	2	50	200	●	●	●	●	

All products are approved by DENAN (AC250V)

YF Series

UL: E73591
CSA: LR60621
VDE: 40005099, 40009685
BEAB: C1115, C1085



Dimensions [mm]		
	A	10.0±1.0
	B	3.0±0.2
	C	3.3 and under
	D	0.7±0.1
	E	68±3.0

*1 Short lead type 38±3.0mm [Y-F-C]

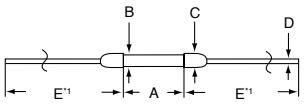
YF Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating AC/DC	Rating Voltage [V]	Rating Current [A]	TH [°C]	TM [°C]	● Approved UL C-UL	VDE	BEAB	CCC	RoHS
Y06F	65	61±3	AC	250	4	45	200		●		●	●
Y0F	76	72±3	AC	250	5	55	200	●	●		●	●
				125	5.5	55		●	●			●
			DC	50	6	50		●				●
Y1F	86	81±3	AC	250	5	60	200	●	●		●	●
				125	5.5	55		●	●			●
			DC	50	6	50		●				●
Y2F	102	98±3	AC	250	5	70	200	●	●	●	●	●
				125	5.5	65		●	●	●		●
			DC	50	6	60		●	●	●		●
Y3	117	112±2	AC	250	3	95	180	●	●	●	●	●
			DC	125	5	95		●	●	●		●
Y3F	115	111±2	AC	250	5	90	200	●	●	●	●	●
				125	5.5	85		●	●	●		●
			DC	50	6	80		●	●	●		●
Y4F	127	123±2	AC	250	5	100	200	●	●	●	●	●
				125	5.5	95		●	●	●		●
			DC	50	6	90		●	●	●		●
Y13F	133	129±3	AC	250	5	100	200		●	●	●	●
				125	5.5	85		●	●	●		●
			DC	50	6	80		●	●	●		●
Y5F	136	131±2	AC	250	5	105	200	●	●	●	●	●
				125	5.5	90		●	●	●		●
			DC	50	6	75		●	●	●		●
Y6F	139	134±2	AC	250	5	115	200	●	●	●	●	●
				125	5.5	95		●	●	●		●
			DC	50	6	75		●	●	●		●
Y7F	145	140±2	AC	250	5	112	200	●	●	●	●	●
				125	5.5	110		●	●	●		●
			DC	50	6	105		●	●	●		●

All products are approved by DENAN (AC250V)

LF Series

UL: E73591
CSA: LR60621
VDE: 40016342
BEAB: C1086



Dimensions [mm]		
	A	11.5±1.0
	B	3.3±0.2
	C	3.6 and under
	D	1.0±0.1
	E	68±3.0

*1 Short lead type 38±3.0mm [L-F-C]

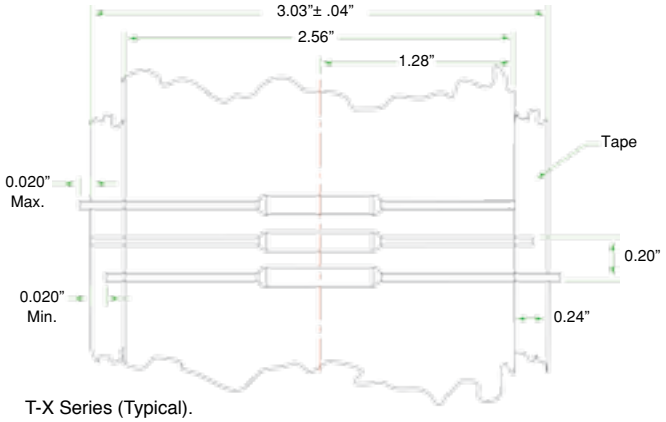
LF Series

Type No.	Tf [°C]	Functioning Temperature [°C]	Rating AC/DC	Rating Voltage [V]	Rating Current [A]	TH [°C]	TM [°C]	● Approved UL C-UL	VDE	BEAB	CCC	RoHS
L06F	65	61±3	AC	250	4	50	200	●	●	●	●	●
L1	84	81±2	AC	250	4	60	95	●	●	●	●	●
				125	5	60		●	●	●		●
L2F	102	98±3	AC	250	5	70	200	●	●		●	●
				125	7	60		●	●			●
L3	115	112±2	AC	250	5	95	160	●	●	●	●	●
				125	7	95		●	●	●		●
L3F	115	111±2	AC	250	5	95	200	●	●	●	●	●
				125	7	90		●	●	●	●	●
			DC	50	8	80		●	●	●		●
L4F	127	123±2	AC	250	5	100	200	●	●		●	●
				125	7	95		●	●			●
L13F	133	129±3	AC	250	5	100	200	●	●		●	●
				125	7	85		●	●			●
L5F	136	131±2	AC	250	5	105	200	●	●		●	●
				125	7	90		●	●			●
L6F	139	134±2	AC	250	5	115	200	●	●	●	●	●
				125	7	105		●	●	●	●	●
			DC	50	8.5	90		●	●	●		●
L7F	145	140±2	AC	250	5	125	200	●	●	●	●	●
				125	7	110		●	●	●	●	●
			DC	50	10	100		●	●	●		●

All products are approved by DENAN (AC250V)

Tape and Reel

Tape and Reel option available on all axial devices.



T-X Series (Typical).

Contact Thermtrol for more information regarding reel capacity and dimensions.

www.thermtrol.com
E-mail: sales@thermtrol.com

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Precautions When Using Thermal Cutoffs

The following information describes the correct methods of using thermal cutoffs to insure proper and safe performance. To achieve the full use and capacity of a thermal cutoff, it is necessary for the customer to exercise proper storage and execute appropriate circuit design, proper installation, and adequate testing. Thermtrol Corporation does not assume responsibility for problems which occur as a result of improper storage and installation, or inappropriate circuit design, evaluations or tests.

• Do not use thermal cutoffs for purposes other than for what they are intended. Thermal cutoffs operate only when they sense an ambient temperature greater than the factory pre-set temperature. They have no ability to function by current overload and are not current limiting devices.

• Do not use thermal cutoffs in equipment, appliances or devices intended to be used in the aerospace industry, aviation, nuclear power generation systems, life support systems, engine control systems, or safety control systems for transportation. Thermal cutoffs are applicable for electrical household devices, appliances and electronics. Other applications include: office automation equipment, audio-visual equipment, communication systems, measuring instruments and specific transportation systems.

• Do not use thermal cutoffs in applications exceeding the listed ratings in the specification charts.

• Do not use thermal cutoffs in a liquid, in a corrosive atmosphere such as sulfurous gas, or in a high humidity environment.

• Customers shall choose the thermal cutoff appropriate for the application and determine the proper mounting position and/or method. To judge whether the selected thermal cutoff and chosen position and method of mounting is suitable for the final application, we recommend that the customer fully test and evaluate the unit in an environment that duplicates the final application as closely as possible. This includes mounting and securing the thermal cutoff identically to the method that will be used in production.

Handling and Installation Instructions

When using thermal cutoffs, considerable caution should be exercised as follows:

A. Installation

• Mount the thermal cutoff in a location where uniform radiation of heat is sustained over the body of the unit.

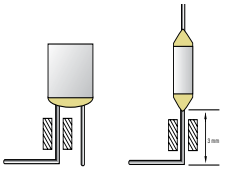
• Keep the leads as long as possible to maximize the area of exposure to heat.

• Place and connect the thermal cutoff in a manner so that no external mechanical force will be applied to the body and/or leads of the cutoff.

• Allow adequate space for mounting the thermal cutoff.

B. Lead Bending

• When bending a lead, bend at a location 3mm minimum from the body of the thermal cutoff. See below.
• Take caution not to damage either the thermal cutoff body or the lead.
• Keep the thermal cutoff body free from any push, pull or twist force.



Specifications for push, pull and twist test according to UL Standards 1200

Type / Test	Push	Pull	Twist
N • T • K	1.2 (0.12)	4.5 (0.45)	90°/1 Time
H • HU	1.2 (0.13)	4.8 ()0.49)	90°/1 Time
V	1.4 (0.14)	5.3 (0.54)	90°/1 Time
E • Y	2.0 (0.20)	7.7 (0.79)	90°/1 Time
LE — T	2.5 (0.26)	10.1 (1.03)	90°/1 Time
L • LE	4.0 (0.41)	15.8 (1.81)	90°/1 Time

Units: Newtons

C. Soldering

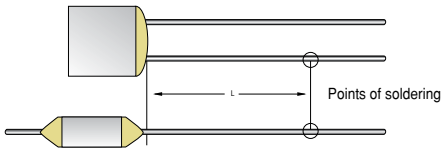
NOTE: The special sealant joining the lead wires to the case will soften during soldering. Care must be taken to not move the leads or body during the soldering process as the softened joints could shift and become disconnected. The sealant will resume its initial strength after cooling.

• Minimize the conduction of excessive heat to the thermal cutoff body when soldering.

• Maximum soldering time is shown below.

• During soldering, both the thermal cutoff body and leads should be free of any push, pull or twist force.

• After manual soldering, allow the thermal cutoff to cool for 30 seconds minimum without moving it. Automatic wave soldered units must cool for a minimum of 5 minutes.



Type	Rated Functioning Temperature (°C)	Length (L) 7mm	10mm	15mm
K-F	65	•	•	•
	76~102	•	•	1
	115~127	•	3	5
	133~145	1	3	5
T-F	65	•	•	•
	76~102	•	•	1
	115~127	•	3	5
	133~145	1	5	5
V-F	65	•	•	•
	76~102	•	•	3
	115~127	•	3	5
	133~145	1	5	5
Y-F	65	•	•	1
	76~102	•	1	3
	115~127	•	5	5
	133~145	1	5	5
L-F	65	•	1	3
	76~102	•	5	5
	115~127	1	5	5
N-F	65	•	•	5
	76~102	•	•	1
	115~127	•	•	5
	133~145	•	3	5
H-F HU-F	65	•	•	•
	76~102	•	•	1
	115~127	•	3	5
	133~145	1	5	5
E-F	65	•	•	•
	76~102	•	•	•
	115~127	•	1	5
	133~145	1	5	5

Units: Seconds

DF Series 15 Amp Thermal Cutoffs

FEATURES

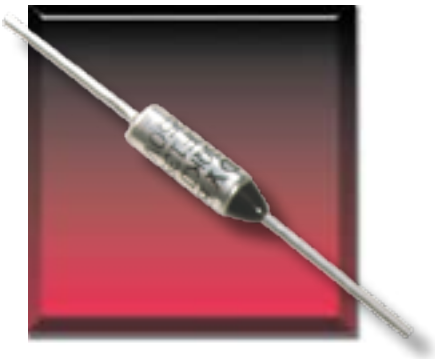
- Various temperature settings
- Miniature size
- Current rating: 15 Amp/125 Vac, 10 Amp/250 Vac
- Economical
- Accurate
- Large inventory; same day shipping
- Various mounting options
- RoHS Compliant

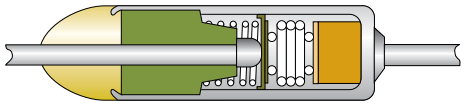
APPLICATIONS

Thermal cutoffs are widely used to prevent damage from overheating in electrical products

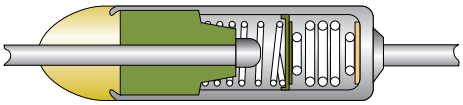
- APPLIANCES - space heaters, irons, stoves, electric blankets, hair dryers, clothes dryers, cookers, toaster ovens, crock pots, mixers, toasters, microwave ovens, etc.
- MOTORS - air conditioners, copiers, fans, washing machines, compressors, etc.
- ELECTRONICS - TVs, stereos, tape recorders, video recorders, fluorescent lamps, transformers, computers, surge suppressors, telecommunication equipment, etc.

The Thermal DF Series Thermal Cutoffs are single action devices that open when a preset temperature is reached. They do not reset. The active component of a thermal cutoff is an electrically insulated thermal pellet. This pellet holds a spring loaded contact against a fixed contact under normal operating temperatures. (See Fig. 1) When the preset temperature of the cutoff is reached, the pellet liquifies, the springs relax, and the spring loaded contact is moved away from the fixed contact, opening the circuit. (See Fig. 2) The DF Series is the right choice for applications requiring an inexpensive limit protector with 15A capability.

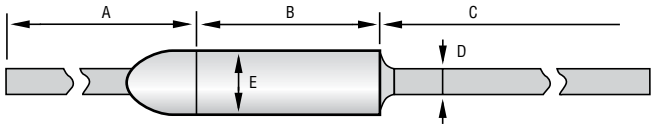




(Fig. 1) CLOSED



(Fig. 2) OPEN

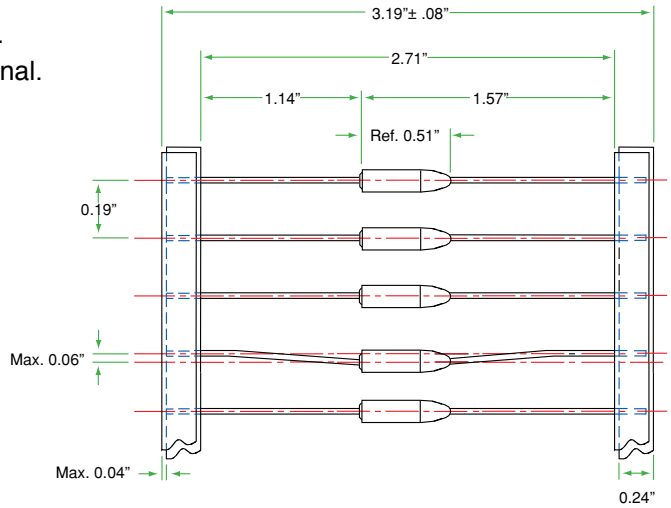


Standard Dimensions (mm)				
A	B	C	D	E
25.4±1	10.5±0.5	35±1	ø1±0.05	ø4.0±0.1

Custom lead lengths are available.

Tape and Reel

Standard Bulk Pack.
Tape and Reel optional.
3K pieces per reel.
Contact Thermtrol
for reel dimensions.



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- Do not use thermal cutoffs for purposes other than for what they are intended. Thermal cutoffs operate only when they sense an ambient temperature greater than the factory pre-set temperature. They have no ability to function by current overload and are not current limiting devices.
- Do not use thermal cutoffs in equipment, appliances or devices intended to be used in the aerospace industry, aviation, nuclear power generation systems, life support systems, engine control systems, or safety control systems for transportation. Thermal cutoffs are applicable for electrical household devices, appliances and electronics. Other applications include: office automation equipment, audiovisual equipment, communication systems, measuring instruments and specific transportation systems.
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- Do not use thermal cutoffs in a liquid, in a corrosive atmosphere such as sulfurous gas, or in a high humidity environment.
- Customers shall choose the thermal cutoff appropriate for the application and determine the proper mounting position and/or method. To judge whether the selected thermal cutoff and chosen position and method of mounting is suitable for the final application, we recommend that the customer fully test and evaluate the unit in an environment that duplicates the final application as closely as possible. This includes mounting and securing the thermal cutoff identically to the method that will be used in production.

Electrical Ratings and Selected Agency Approvals

Part Number	Functioning Temperature (°C) Tol: +0°C/-4°C	TH (°C)	TM (°C)	15 Amp/125Vac 10 Amp/250Vac	CCC 15 Amp/250Vac	10 Amp/250Vac
DF66S	66	42	130	●	●	●
DF72S	72	50	110	●	●	●
DF77S	77	55	130	●	●	●
DF84S	84	60	114	●	●	●
DF91S	91	67	121	●	●	●
DF98S	98	76	130	●	●	●
DF100S	100	78	135	●	●	●
DF104S	104	80	150	●	●	●
DF110S	110	88	140	●	●	●
DF119S	119	95	170	●	●	●
DF128S	128	106	155	●	●	●
DF139S	139	117	170	●	●	●
DF141S	141	117	171	●	●	●
DF144S	144	120	240	●	●	●
DF152S	152	128	175	●	●	●
DF167S	167	142	210	●	●	●
DF170S	170	146	190	●	●	●
DF184S	184	160	214	●	●	●
DF192S	192	167	210	●	●	●*
DF198S	198	170	244	–	–	–
DF216S	216	186	241	–	●	●*
DF228S	228	193	248	●	●	●*
DF240S	240	200	260	●	●	●*
DF260S	260	220	300	–	–	–
DF280S	280	230	320	–	–	–

UL/ CUL: E117626
VDE: 115369, *116219
CCC: 2003010205079617

● Approved

Handling and Installation Instructions

When using thermal cutoffs, considerable caution should be exercised as follows:

A. Installation

- Mount the thermal cutoff in a location where uniform radiation of heat is sustained over the body of the unit.
- Keep the leads as long as possible to maximize the area of exposure to heat.
- Place and connect the thermal cutoff in a manner so that no external mechanical force will be applied to the body and/or leads of the thermal cutoff.
- Allow adequate space for mounting the thermal cutoff.

B. Lead Bending

- When bending a lead, bend at a location 5mm minimum from the body of the thermal cutoff.
- Take caution not to damage either the thermal cutoff body or the lead.
- Keep the thermal cutoff body free from any push, pull or twist force.

C. Soldering

NOTE: The special sealant joining the lead wires to the case will soften during soldering. Care must be taken to not move the leads or body during the soldering process as the softened joints could shift and become disconnected. The sealant will resume its initial strength after cooling.

- Minimize the conduction of excessive heat to the thermal cutoff body when soldering.
- Maximum soldering time is shown in table above.
- Solder 20 mm minimum from the thermal cutoff body.
- During soldering, both the thermal cutoff body and leads should be free of any push, pull or twist force.
- After soldering, allow the thermal cutoff to cool for 30 seconds minimum without moving it.

Maximum soldering time at solder bath temperature of 300°C

Opening Temp.	Max. Soldering Time
Under 120°C	2 seconds
Over 120°C	3 seconds

Terminology:

Functioning Temperature (TF)
The temperature at which a thermal cutoff changes its state of conductivity to open a circuit with detection current of 10mA or less as the only load. The temperature tolerance for the UL and CSA standard is +0°C / -10°C.

Holding Temperature (TH)
The maximum temperature at which a thermal cutoff can be maintained while conducting rated current for 168 hrs. without functioning.

Maximum Temperature (TM)
The maximum temperature at which mechanical and electrical properties of a thermal cutoff can be maintained for 10 minutes without resuming conductivity after functioning.

1NT Series 1/2” Disc Thermostats

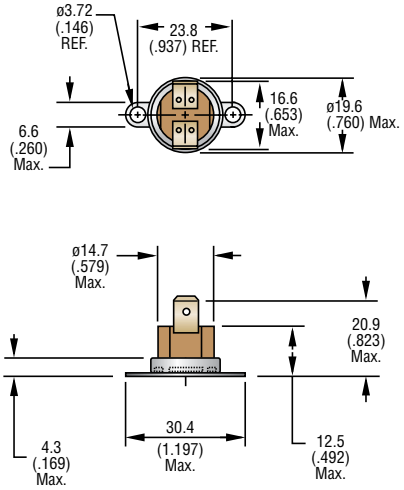
Thermtrol offers The Klixon® line of 1NT fixed temperature thermostats. Approved by numerous testing agencies, all 1NT thermostats pass a series of rigorous quality control checks including continuity, function, contact resistance and dielectric strength. Excellent multipurpose thermostat available in both automatic reset and push button manual reset configurations. A wide range of operating temperatures, as well as a small size and a variety of physical configurations, permit the flexibility to meet your specific needs.

FEATURES

- Bi-metal disc, factory pre-set
- Switch Actions:
  - -Automatic reset: Available with both normally open and normally closed switch logic
  - -Manual reset: Mechanically resettable device
  - -Trip free manual rest: UL M2 class rating that resists consumer tampering
- Variety of accessories and mounting options
- Compact dimensions, high load capacity
- High operating speed
- Current insensitive

APPLICATIONS

- Vending machines
- Microwave ovens
- Electric space heaters
- Overhead projectors
- Hair care appliances
- Clothes dryers
- Audio speakers
- Copiers
- Refrigeration compressors
- Food processing equipment
- Toasters
- Coffee makers
- Vacuum cleaners
- Medical equipment
- Dishwashers
- Gas furnace protection
- Power supplies
- Communications equipment
- Welding equipment



Auto Reset Construction

Options shown: Vertical 1/4” Q.C. Terminals
and Surface Mount Flange

Manual Reset Construction

Options shown: Horizontal 1/4” Q.C. Terminals
and Airstream Mount Flange

All dimensions mm (in.)

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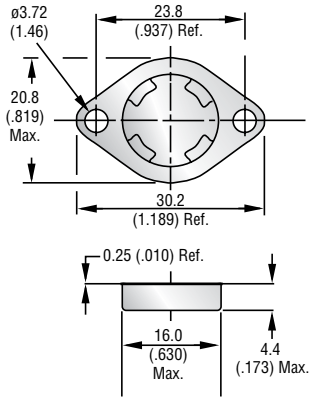
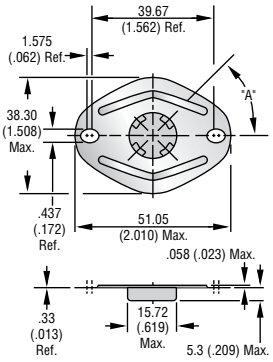
Mounting Options

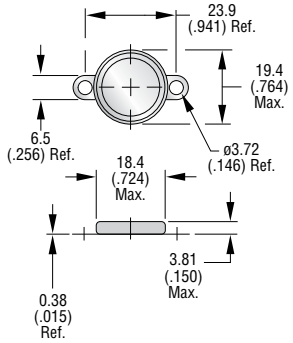
Airstream Mount Flange Cup
Code: AM Material: Aluminum



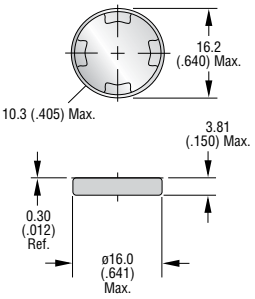
Large Oval Integral Cup
Code: LO Material: Aluminum



Loose Ear Surface Mount Flange
Code: SM Material: Aluminum



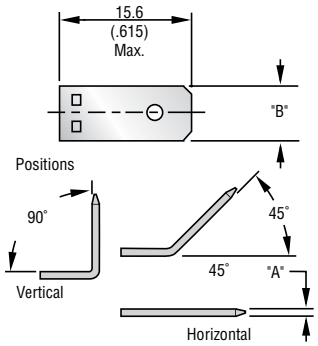
Flat Cup
Code: FC Material: Aluminum



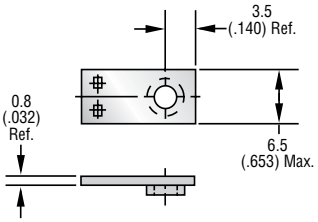
Terminal Options

Quick Connects
Material: Brass, Tin Plated

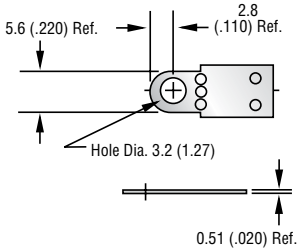
	1/4"	3/16"
Thickness (A):	0.8 (.031)	0.5 (.020)
Width (B):	6.3 (.250)	4.8 (.187)
Orientation	**Codes**	
Vertical	4V	3V
Horizontal	4H	3H
45°	4A	3A



Screw Terminals
Code: SC Material: Steel, Nickel Plated
M3 x 0.5 Class 6H Thread



Solder Terminals
Code: ST Material: Brass, Tin Plated



10A Max. on all terminals 0.5mm (0.020") thick.

All dimensions mm (in.)

Electrical Ratings and Selected Agency Approvals

Model Type	Cycles (X 1000)	Electrical Rating	Max. Temp. (°C)	Agency
1NT01	100	120 Vac / 15 Amps 240 Vac / 10 Amps 277 Vac / 7.2 Amps	204	UL / CSA
	30 100 30	250 Vac / 16 Amps 250 Vac / 10 Amps 380 Vac / 4 Amps	175	VDE
	50	12/24 Vdc / 25 Amps	–	–
1NT08	1 + 5	240 Vac / 25 Amps	204	UL / CSA
1NT15L	6	250 Vac / 16 Amps 380 Vac / 4 Amps	175	VDE
1NT11 **1NT12L** **1NT15L**	100	125 Vac 30Vdc / 50mAmps - 1Amp	204	UL / CSA

Agency File Numbers

E9977	LR53590	4464.9-4510-1105	C0166

The 1NT Series has approvals through nine listing agencies. If you require information on an agency not listed, please contact Thermtrol for the latest information.

Standard Tolerances: *Manual Reset*

Set Temperature		Open Tolerance	
°C	°F	°C	°F
0-60	32-140	+/-4.0	+/-7.5
61-160	141-320	+/-5.0	+/-9.0
161-204	321-399	+/-6.0	+/-11.0

Standard Temperature Differential and Tolerances: *Automatic Reset*

Set Temperature		Differential		Open Tolerance		Close Tolerance	
°C	°F	°C	°F	°C	°F	°C	°F
0-93	32-199	11	20	+/-3.0	+/-5.5	+/-4.0	+/-7.5
94-121	200-249	11	20	+/-3.5	+/-6.5	+/-4.5	+/-8.5
122-149	250-300	14	24	+/-4.0	+/-7.5	+/-5.5	+/-10.0
150-204	301-399	14	24	+/-5.0	+/-9.0	+/-7.0	+/-13.0

Numbering System *(for requesting samples only)*

1NT	08	L	3H	AM	199°C

Contact Type

01	Automatic Reset, Silver Contacts
11	Automatic Reset, Gold Contacts**
08	Manual Reset, Silver Contacts
12	Manual Reset, Gold Contacts**
15	Trip Free MR*, Silver Contacts
19	Trip Free MR*, Gold Contacts**

**MR = Manual Reset*
***Gold contacts are applicable for circuits from 50mAMP to 1AMP*

Contact Configuration

L	Normally Closed, Open on Rise
F	Normally Open, Close on Rise

F contacts not applicable for Manual Reset devices.

Mounting Options

FC	No Mounting Provision, Flat Cup
AM	Airstream Mount Integral Flange
SM	Surface Mount Flange, Loose Ear
LO	Large Oval Airstream Mount Integral Flange

Other mounting types available.

Terminal Options

3/16" Quick Connects	
3V	Vertical
3H	Horizontal
3A	45°
1/4" Quick Connects	
4V	Vertical
4H	Horizontal
4A	45°
Other	
ST	Solder Terminals
SC	Screw Terminals

Other terminal types available.

Set temperature - select in increments of 1°C from 0°C to 204°C

GT Series Ceramic Disc Thermostats

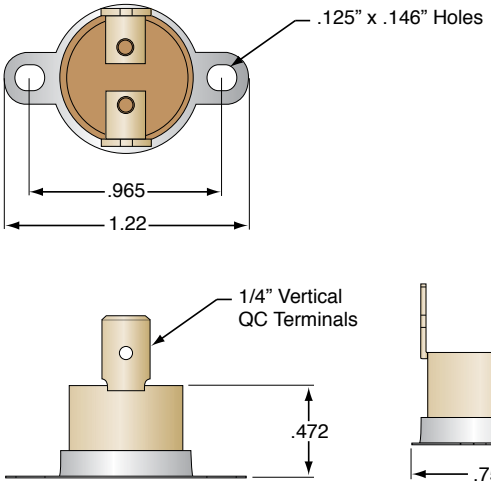
Thermtrol offers the GT line of 1/2" disc fixed temperature thermostats. Approved by numerous testing agencies, all GT thermostats pass a series of rigorous quality control checks including continuity, function, contact resistance and dielectric strength. Excellent multipurpose thermostat available in both automatic reset and push button manual reset configurations. A wide range of operating temperatures, as well as a small size and a variety of physical configurations, permit the flexibility to meet your specific needs.

FEATURES

- Bi-metal disc, factory pre-set
- Switch Actions:
  - -Automatic reset: Available with both normally open and normally closed switch logic
  - -Manual reset: Mechanically resettable device
- Variety of accessories and mounting options
- Compact dimensions, high load capacity
- High operating speed
- Current insensitive

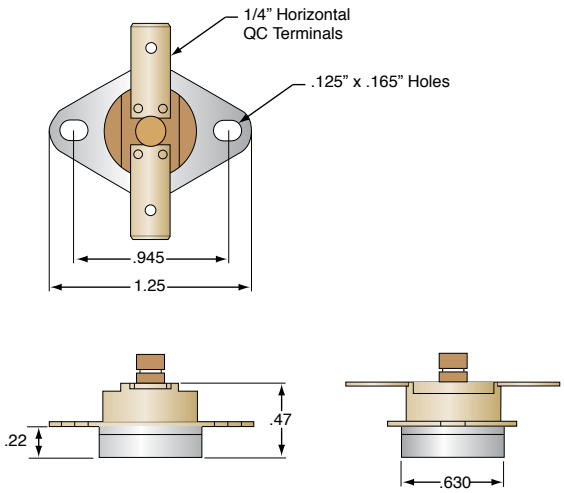
APPLICATIONS

- Vending machines
- Microwave ovens
- Electric space heaters
- Overhead projectors
- Hair care appliances
- Clothes dryers
- Audio speakers
- Copiers
- Refrigeration compressors
- Food processing equipment
- Toasters
- Coffee makers
- Vacuum cleaners
- Medical equipment
- Dishwashers
- Gas furnace protection
- Power supplies
- Communications equipment
- Welding equipment



Auto Reset Construction

Options shown: Vertical 1/4" Q.C. Terminals
and an 8-32 Stud Mount Cap



Manual Reset Construction

Options shown: Horizontal 1/4" Q.C. Terminals
and Airstream Mount Flange

All dimensions mm (in.)

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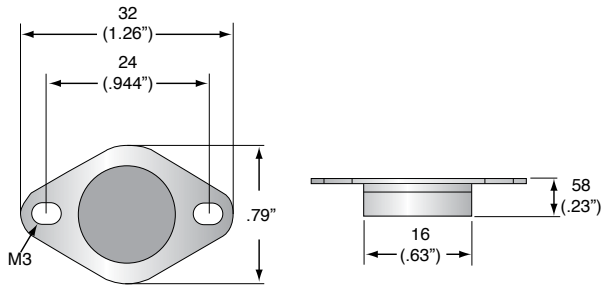
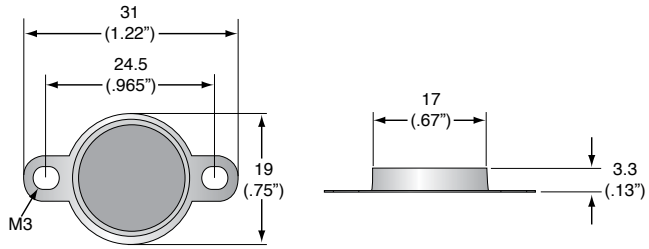
Mounting Options

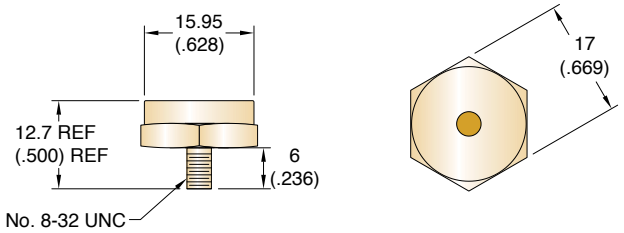
Airstream Mount Flange Cup
Code: AM • Material: Aluminum



Loose Ear Surface Mount Flange
Code: SM • Material Aluminum



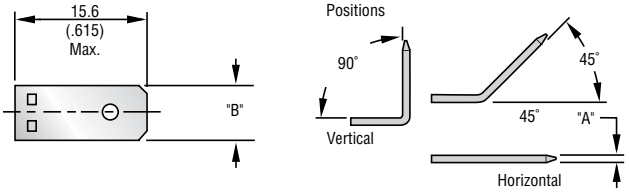
8-32 Stud Mount Cap
Code: ST • Material Brass



Terminal Options

Quick Connects
Material: Brass, Tin Plated

	1/4"	3/16"
Thickness (A):	0.8 (.031)	0.5 (.020)
Width (B):	6.3 (.250)	4.8 (.187)
Orientation	**Codes**	
Vertical	4V	3V
Horizontal	4H	3H
45°	4A	3A



All dimensions mm (in.)

Electrical Ratings and Selected Agency Approvals

Model Type	Cycles (X 1000)	Electrical Rating	Max. Temp. (°C)	Agency
GT52N	100	120 Vac/15 Amps 240 Vac/10 Amps	230°C	UL/CSA/VDE
GT52N	30	120 Vac/15 Amps 240 Vac/10 Amps	260°C	UL ONLY
GT52X	30	120 Vac/0.5 Amps	230°C	UL/CSA/VDE
GT52P	100	42Vdc/0.2 Amps	230°C	UL/CSA/VDE
GT15N	6	120 Vac/15 Amps 240 Vac/10 Amps	250°C	UL ONLY

Agency File Numbers

GT52	E43273	067165/6	100896
GT15	E201152		

Standard Tolerances: *Manual Reset*

Set Temperature		Open Tolerance	
°C	°F	°C	°F
150-250	302-482	+/-8.0	+/14.4

Standard Temperature Differential and Tolerances: *Automatic Reset*

Set Temperature		Differential		Open Tolerance		Close Tolerance	
°C	°F	°C	°F	°C	°F	°C	°F
150-260	302-500	25	45	+/-5.0	+/-9.0	+/-7.0	+/-13.0

Numbering System *(for requesting samples only)*

GT	52	N	L	4V	SM	165

Contact Type

52	Automatic Reset
15	Manual Reset

Contact Material

N	Silver Nickel Alloy
P	Gold Platinum Silver
X	Gold Platinum Silver

Contact Configuration

L	Normally Closed, Open on Rise
F	Normally Open, Close on Rise

Terminal Options

3/16" Quick Connects	
3V	Vertical
3H	Horizontal
3A	45°
1/4" Quick Connects	
4V	Vertical
4H	Horizontal
4A	45°

Other terminal types available.

Mounting Options

FC	No Mounting Provision, Flat Cup
AM	Airstream Mount Integral Flange
SM	Surface Mount Flange, Loose Ear
ST	8-32 Stud Mount

Other mounting types available.

Set temperature - select in increments of 1°C from 150°C to 260°C

Higher set points available, contact Thermtrol for details.

GT20 Series Moisture Resistant Disc Thermostats

FEATURES

- Bi-metal disc, factory pre-set
- Automatic reset: Available with both normally open and normally closed switch logic
- Variety of accessories and mounting options
- Compact dimensions, high load capacity
- High operating speed
- Current insensitive
- Moisture resistant

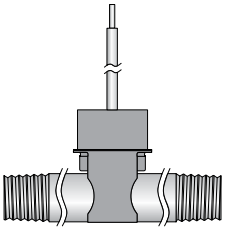
APPLICATIONS

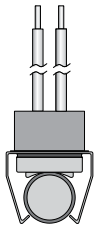
- Hydronic fan coils:
- Humidifier
- Dehumidifier
- HVAC
- Major appliances
- Medical/lab equipment
- Vending machines
- Electric space heaters
- Hair care appliances
- Audio speakers
- Copiers
- Refrigeration compressors
- Commercial food equipment
- Vacuum cleaners
- Medical equipment
- Gas furnace protection
- Welding equipment

Thermtrol offers the GT20 line of 1/2" disc fixed temperature thermostats. Approved by numerous testing agencies, all GT thermostats pass a series of rigorous quality control checks including continuity, function, contact resistance and dielectric strength. Excellent multipurpose thermostat with a moisture resistant body. A wide range of operating temperatures permit the flexibility to meet your needs.

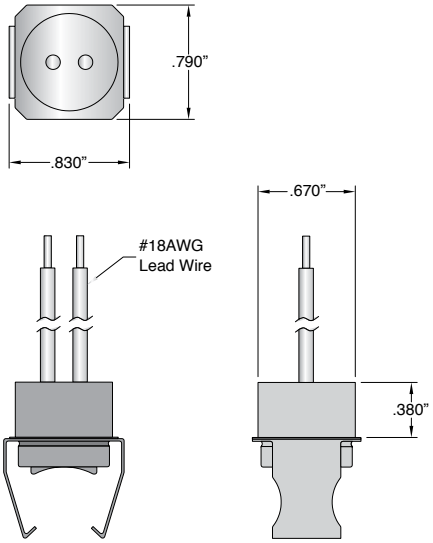
Auto Reset Construction

Options shown: 1/2" diameter pipemount. Lead wires.





Typical pipe mount installation.



Numbering System *(for requesting samples only)*

GT	20	N	L	W	RE	60

Contact Type

20	Automatic Reset

Contact Material

N	Silver Nickel Alloy

Contact Configuration

L	Normally Closed, Open on Rise
F	Normally Open, Close on Rise

Terminal Options

W	6" #18AGW Black PVC lead wire. UL1007

Custom lead lengths available upon request.

Mounting Options

FC	No Mounting Provision, Flat Cup
AM	Airstream Mount Integral Flange
SM	Surface Mount Flange, Loose Ear
ST	8-32 Stud Mount
RM	1/4" - 5/16" OD Pipe Mount
RJ	3/8" OD Pipe Mount
RE	1/2" OD Pipe Mount
RK	5/8" OD Pipe Mount
RL	3/4" - 7/8" OD Pipe Mount

Set temperature - select in increments of 1°C from 0°C to 80°C

Electrical Ratings and Selected Agency Approvals

Model Type	Cycles (X 1000)	Electrical Rating	Max. Temp. (°C)	Agency
GT20	100	120 Vac/15 Amps 240 Vac/10 Amps 125 Vac/7.5 Amps IND.	80°C	UL E201152

Standard Temperature Differential and Tolerances: *Automatic Reset*

Set Temperature		Differential		Open Tolerance		Close Tolerance	
°C	°F	°C	°F	°C	°F	°C	°F
0-80	32-176	10	18	+/-3	+/-5.4	+/-7.0	+/-13.0

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GT43 Series Disc Thermostats

FEATURES

- Bi-metal disc, factory pre-set
- Automatic reset: Available with both normally open and normally closed switch logic
- Variety of accessories and mounting options
- Compact dimensions, high load capacity
- High operating speed
- Current insensitive
- ROHS Compliant

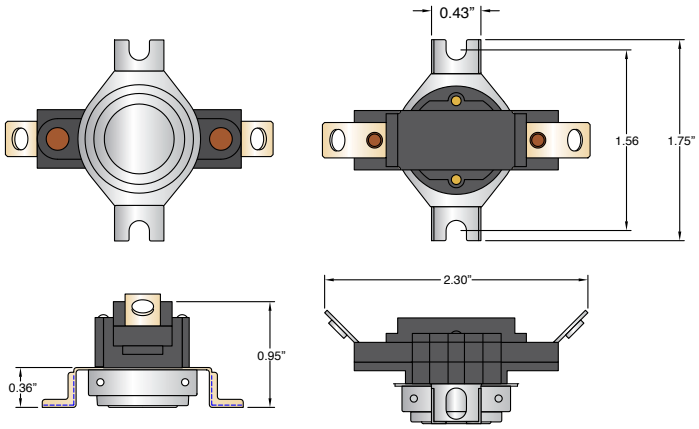
APPLICATIONS

- HVAC
- Major appliances
- Medical/lab equipment
- Vending machines
- Electric space heaters
- Overhead projectors
- Hair care appliances
- Audio speakers
- Copiers
- Refrigeration compressors
- Commercial food equipment
- Vacuum cleaners
- Medical equipment
- Gas furnace protection
- Power supplies
- Communications equipment
- Welding equipment

Thermtrol offers the GT43 line of 3/4" disc fixed temperature thermostats. Approved by numerous testing agencies, all GT thermostats pass a series of rigorous quality control checks including continuity, function, contact resistance and dielectric strength. Excellent multipurpose thermostat with increased contact capacity. A wide range of operating temperatures permit the flexibility to meet your needs.

Auto Reset Construction

Options shown: Vertical 1/4" Q.C. Terminals and Surface Mount Flange



Electrical Ratings and Selected Agency Approvals				
Model Type	Cycles (X 1000)	Electrical Rating	Max. Temp. (°C)	Agency
GT43	100	250 Vac/25 Amps 480 Vac/13 Amps	150°C	UL E201152

Standard Temperature Differential and Tolerances: *Automatic Reset*							
Set Temperature		Differential		Open Tolerance		Close Tolerance	
°C	°F	°C	°F	°C	°F	°C	°F
0-119	32-246	10	18	+/-3	+/-5.4	+/-7.0	+/-13.0
120-150	248-302	10	18	+/-5	+/-9	+/-7.0	+/-13.0

Numbering System *(for requesting samples only)*

GT43	1	1	3	2	5	090	85

Contact Configuration

1	Normally Closed, Open on Rise
2	Normally Open, Close on Rise

Body Material

1	Phenolic

Cap

0	Open
3	Closed

Terminal Options

1	1/4" QC Terminal Flat
2	1/4" QC Terminal 45 Degrees
3	1/4" QC Terminal Vertical
6	8-32 Screw Thread Flat
7	8-32 Screw Thread 45 Degrees

Mounting Options

0	None
5	Airstream Mount
N	Surface Mount

Terminal to Bracket Orientation

000	0° from Terminals
045	45° from Terminals
090	90° from Terminals

Set temperature - select in increments of 1°C from 0°C to 150°C.

Manual Reset version also available. Contact Thermtrol for details.

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Immersion Thermostats

FEATURES

- Factory pre-set fixed temperature
- Normally open or normally closed contact configurations
- Current rating: to 15 Amp@ 120 Vac, 10 Amp@250 Vac
- Available temperatures from 0°C to 177°C
- Controlling or limit functionality
- Brass or stainless steel construction
- Pressure ratings up to 7000 psi

APPLICATIONS

- Food service equipment
- Mold platens
- Electric heaters
- Refrigerators and freezers
- Test pots & temperature control chamber
- Livestock warmers
- Agricultural equipment
- Environmental controls
- Vending machines
- Electric & gas ovens
- Automotive
- Hydraulics

Immersion Thermostats

Immersion thermostats are thermally sensitive bi-metallic switches housed in a rugged brass or stainless steel case. The switches are manufactured to either make or break an electrical circuit at a factory pre-set temperature and they reset automatically on cooling. Some devices are ideally suited as regulating thermostats, which cycle open and closed more rapidly to maintain a temperature level. Other devices can be used as over-temperature protectors to limit a temperature from exceeding a predetermined value. Thermtrol offers complete design flexibility for custom immersion thermostats by drawing from an extensive inventory of standard components and building the thermostat that is correct for your application. Please contact Thermtrol's sales team for more information.

Regulating Thermostats

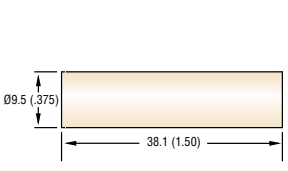
Available Temperature Range: 10°C to 177°C
Standard Set Temperature Tolerance: ± 6°C
Standard Differential: No built-in differential

Regulating Thermostats

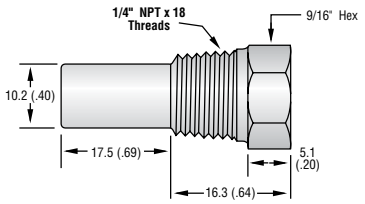
Switch Type Code	Contact Capacity	Contact Life
TCC (Normally Closed)	6.0Amps@120Vac	100,000 Cycles
	8.0Amps@12Vdc	5,000 Cycles
	4.0Amps@24Vdc	5,000 Cycles
TCCR (Normally Open)	6.0Amps@120Vac	100,000 Cycles

Gold contact devices available for micro current applications. Contact Thermtrol for more information.

Regulating Thermostats Housing Styles (Custom Designs Available)



Style 20 500 p.s.i.



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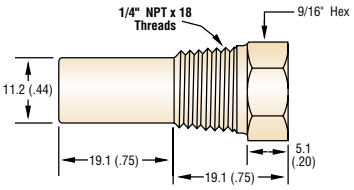

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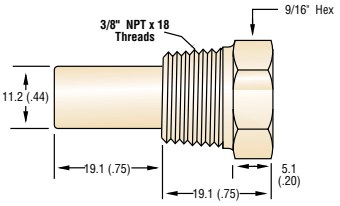

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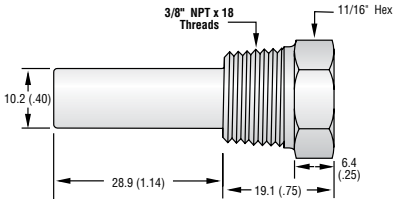
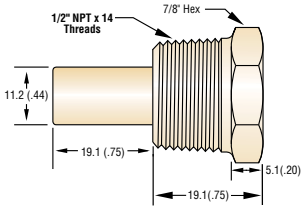


Style 124S 2500 p.s.i.



Style 132 1000 p.s.i.

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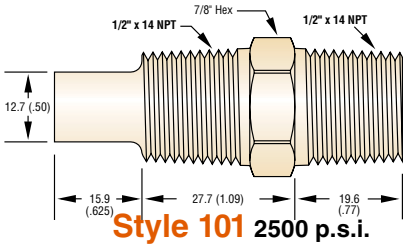
Overtemperature Thermostats

Standard

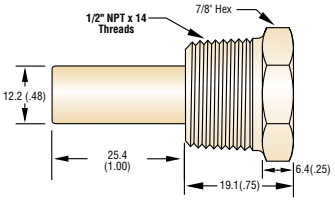
Available Temperature Range: 60°C to 170°C
Standard Set Temperature Tolerance: ± 10°C
Standard Differential: 25°C ± 15°C

Standard Thermostats		
Switch Type Code	Contact Capacity	Contact Life
TC (Normally Closed)	6.3Amps@120Vac/250Vac	6,000 Cycles
TCR (Normally Open)	3.0Amps@120Vac/250Vac	6,000 Cycles

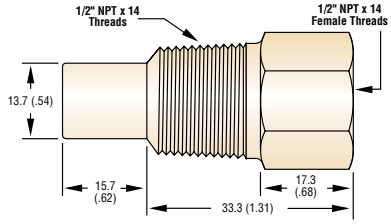
Standard Housing Styles (Custom Designs Available)



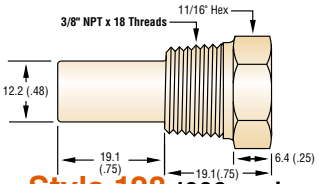
Style 101 2500 p.s.i.



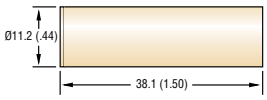
Style 105 2500 p.s.i.



Style 113 7000 p.s.i.



Style 128 1000 p.s.i.



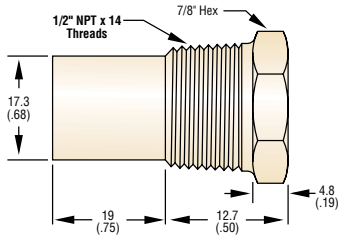
Style 30 500 p.s.i.

High Contact Capacity

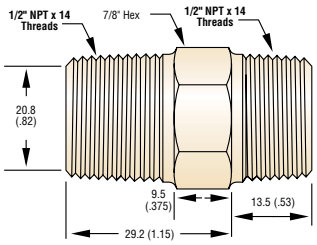
Available Temperature Range: 5°C to 177°C
Standard Set Temperature Tolerance: ± 6°C
Standard Differential: 11°C ± 6°C

High Contact Capacity Thermostats		
Switch Type Code	Contact Capacity	Contact Life
TCD (Normally Closed)	15.0Amps@120Vac, 10.0Amps@240Vac, 7.2Amps@277Vac	100,000 Cycles
	25.0Amps@12Vdc, 11.0Amps@24Vdc	50,000 Cycles
TCDR (Normally Open)	15.0Amps@120Vac, 10.0Amps@240Vac, 7.2Amps@277Vac	100,000 Cycles
	25.0Amps@12Vdc, 11.0Amps@24Vdc	50,000 Cycles

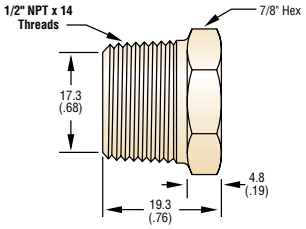
High Contact Capacity Thermostats (Custom Designs Available)



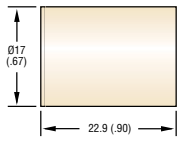
Style 133 1000 p.s.i.



Style 140 2500 p.s.i.



Style 137 1000 p.s.i.



Style 40 500 p.s.i.

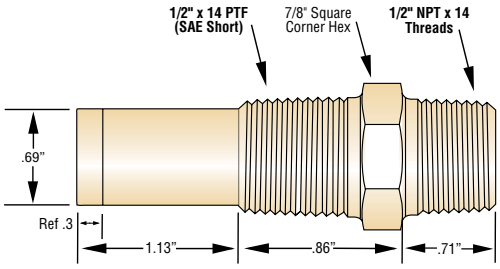
Immersion Thermostats

High Temperature High Contact Capacity

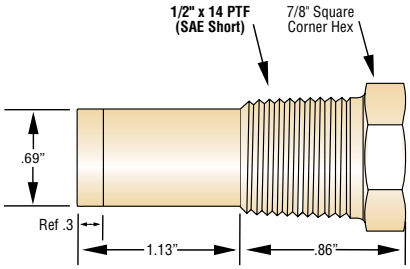
Available Temperature Range: 180˚C - 240˚C
Standard Set Temperature Tolerance: ± 10˚C
Standard Differential: 25˚C ± 10˚C

Switch Type Code	Contact Capacity	Contact Live
TCDH (Normally Closed)	15 Amps@120Vac, 10 Amps @ 240Vac	100,000 Cycles
TCDHR (Normally Open)		

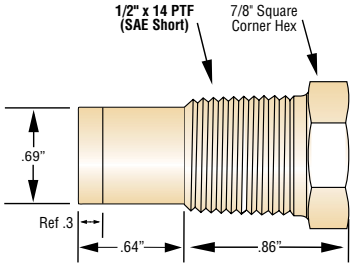
High Temperature High Contact Capacity Housing Styles



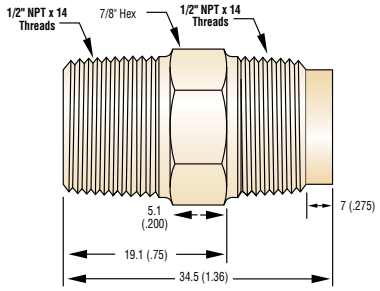
Style 800 1000 p.s.i.



Style 801 1000 p.s.i.



Style 802 1000 p.s.i.



Style P141

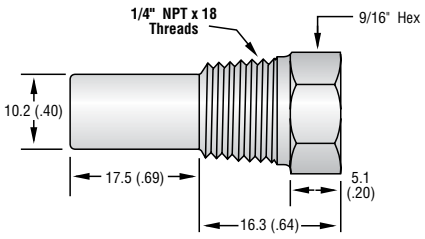
Miniature Thermostats

Available Temperature Range: 45˚C - 150˚C
Standard Set Temperature Tolerance: ± 10˚C
Standard Differential: 30˚C. Lower temperatures have smaller differential. Consult factory for details.

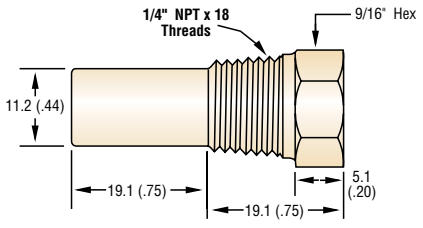
Miniature Thermostats

Switch Type Code	Contact Capacity	Contact Life
TCM (Normally Closed)	10 Amps@125Vac, 7 Amps @ 250Vac	10,000 cycles
	6 Amps @ 24Vdc	10,000 cycles

Miniature Thermostat Housing Styles



Style 112S 2500 p.s.i.



Style 117 1000 p.s.i.

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Numbering System

TC	30	A	0	100°C

Regulating Thermostats

Switch Code Type	
TCC	Normally Closed, Open on Rise
TCCR	Normally Open, Close on Rise
TCC/TCCR Housing Style Code	
20	Brass, Cartridge
117	Brass, 1/4" NPT
112S	Stainless #303, 1/4" NPT
123	Brass, 3/8" NPT
124S	Stainless #303, 3/8" NPT
132	Brass, 1/2" NPT

Standard Overtemperature Thermostats

Switch Code Type	
TC	Normally Closed, Open on Rise
TCR	Normally Open, Close on Rise
TC/TCR Housing Style Code	
30	Brass, Cartridge
128	Brass, 3/8" NPT
105	Brass, 1/2" NPT
101	Brass, Dual 1/2" NPT
113	Brass, Dual 1/2" NPT

Overtemperature Thermostats / High Contact Capacity

Switch Code Type	
TCD	Normally Closed, Open on Rise
TCDR	Normally Open, Close on Rise
TCD/TCDR Housing Style Code	
40	Brass, Cartridge
43	Brass, #10-32 Stud
135	Brass, 1/2" NPT (No extension)
133	Brass, 1/2" NPT
140	Brass, Dual 1/2" NPT

High Temperature High Contact Capacity

Switch Code Type	
TCDH	Normally Closed, Open on Rise
TCDHR	Normally Open, Close on Rise
TCDH/TCDHR Housing Style Code	
800	Brass, Dual 1/2" PFT/NPT
801	Brass, Dual 1/2" PFT/NPT
802	Brass, 1/2" PTF Short
141	Brass, Dual NPT

Miniature Thermostats

Switch Code Type	
TCM	Normally Closed, Open on Rise
TCM Housing Style Code	
117	Brass, 1/4" NPT
112S	Stainless #303 1/4" NPT

Note: With the exception of the Cartridge and Stud Mount Housings, all Housing Styles are available Nickel Plated. A suffix of "N" is added to the Housing Style Code to designate this. For example, 128N designates a Nickel Plated Style 128 Housing.

Collar Code

1	Mylar Collar (for temp. settings below 135°C)
2	Nomex Collar (for temp. settings above 135°C)
0	No Collar

A collar is used as a component of the termination on all units except Stud Mount, Cartridge, and Style 113.

Set Temp. (°C)

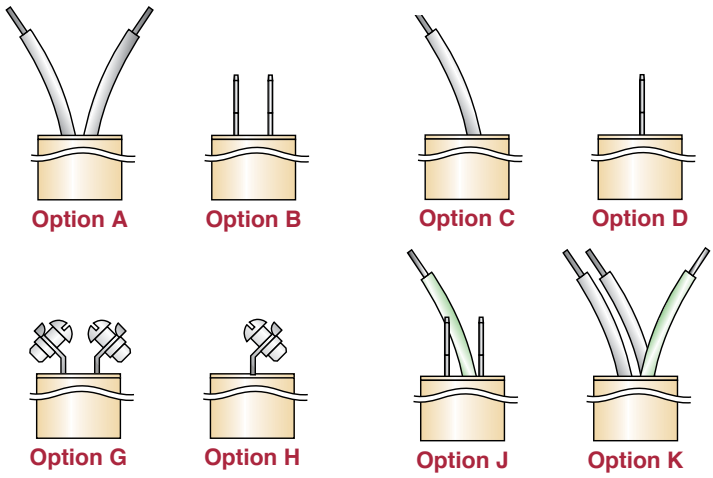
Select from the range of 5°C to 230°C in 5°C increments

See pages 26, 27 and 28 for temperature availability by product.

Termination Options

A	Dual Lead Wires
B	Dual 1/4" Male QC Terminals
C	Single Lead Wires (live housing)
D	Single 1/4" Male QC Terminals (live housing)
G	Dual 45° Screw Terminals
H	Single 45° Screw Terminals (live housing)
J	Dual 1/4" QC Terminals with Ground Lead
K	Dual #18 Gauge Leads with Ground Lead

Note: Termination Code A is the only option available for the Cartridge and Stud Mount Housings. All A, C, J, & K termination code thermostat samples will be produced with 6" long, #18 gauge, XLPE 125°C (UL3173) leads.



TS Series Bulb & Capillary Thermostats

Thermtrol offers the versatile TS Series of adjustable bulb and capillary thermostats suitable for applications requiring variable temperature setting ability and remote control. The TS Series design incorporates a changeover thermal switch and an auxiliary switch useful for fan control or alarm signal. A variety of available features, a large in-stock inventory, and a surprisingly low price combine to make the Thermtrol TS Series an excellent value.

FEATURES

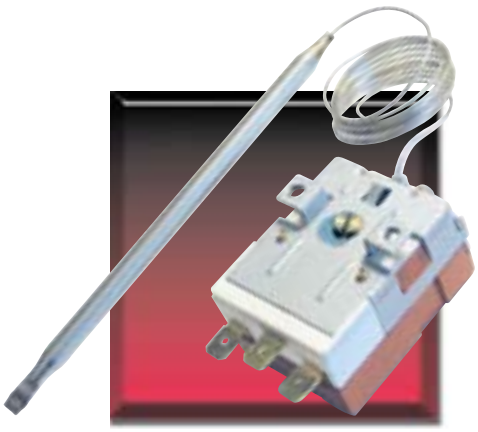
- Temperature range: -30°C (-22°F) through 320°C (608°F)
- Durable stainless steel construction
- UL rated for:
  NC contacts 16A @ 250V
  NO contacts 10A @ 250V
- S.P.D.T. contacts are standard
- Standard capillary length of 39" (1,000 mm); other lengths special order
- Supplied complete with adjustment knob, bezel & mounting screws
- All adjustable models available special order with screw adjustment instead of knob
- All models available with bushing for sealing
- Fixed temperature and fixed temperature with manual reset versions available
- Special high-pressure (HP) versions available

APPLICATIONS

- Food service equipment
- Mold platens
- Electric heaters
- Refrigerators and freezers
- Test pots & temperature control chamber
- Livestock warmers
- Agricultural equipment
- Environmental controls
- Vending machines
- Electric & gas ovens

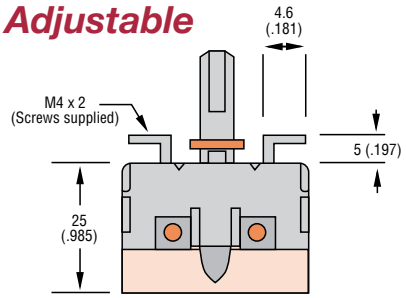
TS Adjustable, Automatic Reset

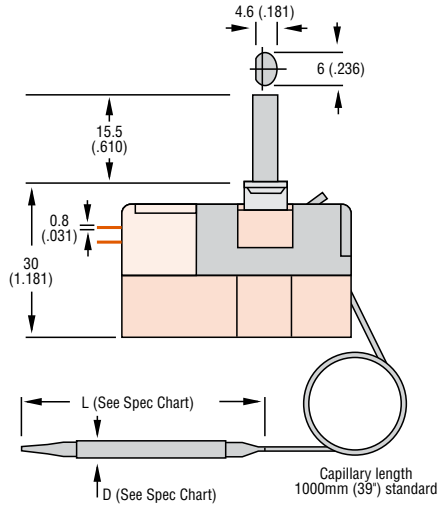
Shown with knob adjustment

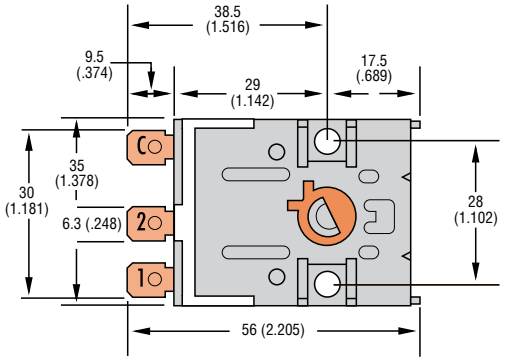


TSF Fixed Temperature, Automatic Reset

TS Adjustable







All dimensions mm (in.)

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Specifications of Standard Models Available From Stock

Model	Temperature Range		Tolerance		Differential		Bulb Dia. "D"		Bulb Length "L"		Max. Bulb Temp.	
	°C	°F	°C	°F	°C	°F	mm	inch	mm	inch	°C	°F
TS-030S	-30 to 30	-22 to 86	±3	±5.4	4 ± 2	7.2 ± 3.6	5.8	0.23	125	4.92	50	122
TS-050S	0 to 50	32 to 122	±3	±5.4	4 ± 2	7.2 ± 3.6	5.8	0.23	125	4.92	65	149
TS-080S	0 to 80	32 to 176	±4	±7.2	4 ± 2	7.2 ± 3.6	5.8	0.23	117	4.61	100	212
TS-090S	0 to 90	32 to 194	±4	±7.2	4 ± 2	7.2 ± 3.6	5.8	0.23	117	4.61	120	248
TS-120S	0 to 120	32 to 248	±4	±7.2	4 ± 2	7.2 ± 3.6	5.0	0.20	101	3.98	140	284
TS-200S	0 to 210	32 to 410	±10	±18	10 ± 5	18±9	5.0	0.20	61	2.40	300	572
TS-320S	50 to 320	122 to 608	±10	±18	10 ± 5	18±9	3.0	0.12	170	6.69	370	698

Maximum case temperature is 80°C.
Inquire for ceramic case device. Ceramic case rated to 150C.

Agency File Numbers

E173663	LR115853	120125

Numbering System *(For Requesting Samples Only)*

TS – 030 – S – F

Model Type

TS	Adjustable, Automatic Reset
TSF	Fixed Temperature, Automatic Reset
TSR	Fixed Temperature, Manual Reset

Bulb & Capillary Material

S	Stainless Steel (Standard)
C	Copper (Special)

Adjusting Provision
(applicable to Adjustable devices only)

Knob	
C	Centigrade Knob
F	Fahrenheit Knob
Screw	
S	Screw Adjustment

Temperature Code

Adjustable

	Centigrade °C	Fahrenheit °F
030	-30 to 30	-22 to 86
050	0 to 50	32 to 122
080	0 to 80	32 to 176
090	0 to 90	32 to 194
120	0 to 120	32 to 248
200	0 to 210	32 to 410
320	50 to 320	122 to 608

OR

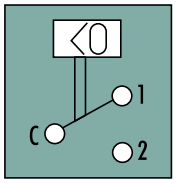
Fixed

Select from range of 1°C to 350°C in 1°C increments.

Examples:	
001	1°C (Minimum)
350	350°C (Maximum)

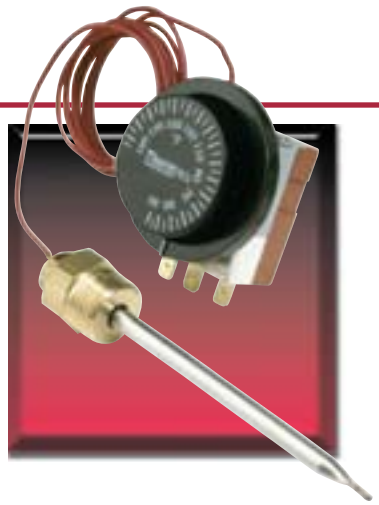
Agency approvals apply to 320°C max. only

TSR Fixed Temperature, Manual Reset



S.P.D.T. Contact Configuration

Note: All automatic reset samples will be supplied with 1000mm capillary and S.P.D.T. contact configuration unless otherwise specified. Manual reset devices will be supplied in S.P.S.T. contact configuration (S.P.D.T. is not available). Order stuffer bushings, and other special requests by description.



Specifications of High Pressure Bulb Models Available From Stock

Part Number	Temperature Range		Tolerance		Differential		Bulb Dia. "D"		Bulb Length "L"		Max. Bulb Temp.	
	°C	°F	°C	°F	°C	°F	mm	inch	mm	inch	°C	°F
TS-090S-HP	0 to 90	32 to 194	±4	±7.2	4 ± 2	7.2±3.6	6.4	0.26	120	4.73	120	248
TS-120S-HP	0 to 120	32 to 248	±4	±7.2					87	3.43	140	284
TS-150S-HP	30 to 150	80 to 302	±8	±14.4					85	3.35	200	392

Maximum case temperature is 80°C.

- Brass 1/2" NPT stuffer bushing standard
- 1825mm (72") capillary standard
- Protective plastic coating on capillary standard
- Supplied with Black Fahrenheit Knob
- Maximum pressure is 7500 p.s.i.

TS Adjustable with High Pressure Bulb

M Series Regulating Thermostats

The Thermtrol M Series is a premium thermostat for premium applications requiring a long life, regulating thermostat. The long life capability of the M Series derives from its semi-permanent snap spring with flat, non-distorting twin bi-metal construction. A narrow differential maintains uniform temperature stability and a low thermal-resistant plastic housing permits the M Series to react quickly to temperature variations. All M Series thermostats are built on a per order basis to your temperature specifications and are not available from stock.

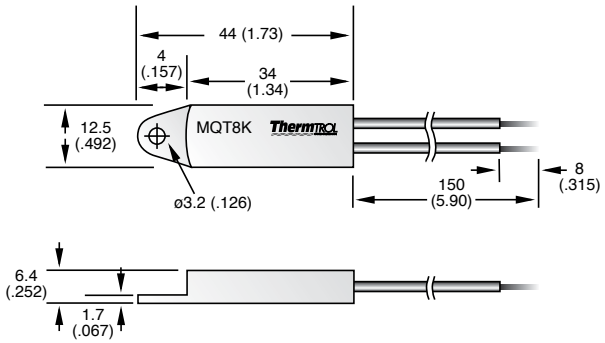
FEATURES

- High precision
- Snap-action
- Narrow differential
- Water resistant
- Extreme long life
- Low profile
- Factory pre-set
- ROHS compliant

APPLICATIONS

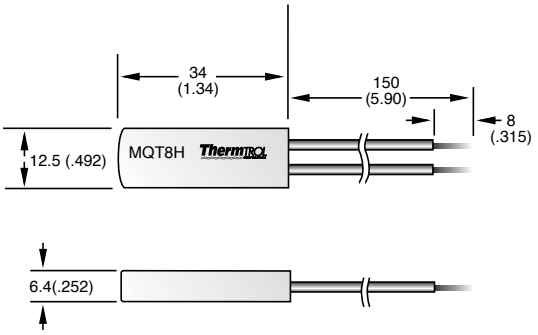
- Heating appliance
- Water bed heaters
- Blanket heaters
- Anti freeze sensors
- Medical applications
- Vending machines
- Communication equipment
- Power supplies
- Refrigeration
- Air conditioners

2 Amp Series
Set Temperature Availability from -20°C to 100°C



MQT8K
With mounting hole

UL: E104206 VDE: 102854 BEAB: C0935

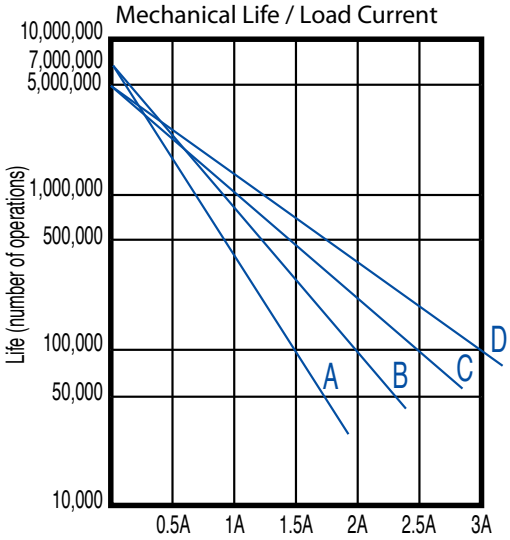


MQT8H
No mounting hole

UL: E104206 VDE: 102854 BEAB: C0935

2 Amp Series

Mechanical Life / Load Current



2 Amp Series

Rating & Characteristics					
Voltage		Standard Contact		k contact (low current applications)	
		Differential Code	Current	Differential Code	Current
125Vac	12Vdc	D	50mA ~ 2A	D	1mA ~ 100mA
		C	50mA ~ 2A	C	
		B	50mA ~ 1.5A	B	
		A	50mA ~ 1A	A	
250Vac	24Vdc	D	30mA ~ 1.3A	D	1mA ~ 100mA
		C	30mA ~ 1.3A	C	
		B	30mA ~ 0.9A	B	
		A	30mA ~ 0.6A	A	
—	48Vdc	D	20mA ~ 0.6A	D	1mA ~ 100mA
		C	20mA ~ 0.3A	C	
		B	20mA ~ 0.3A	B	
		A	20mA ~ 0.3A	A	

"2 Amp Series" represents the standard maximum current at 125Vac.

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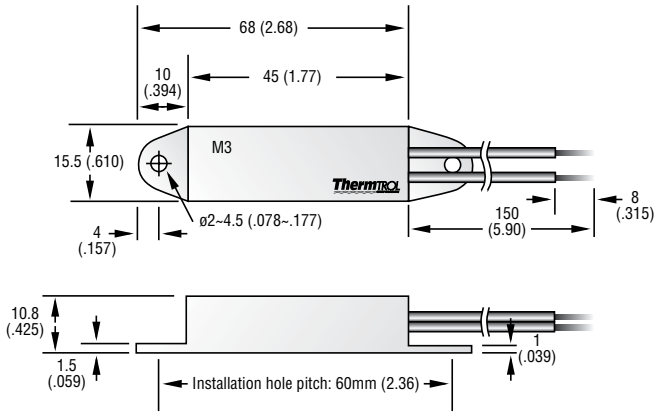
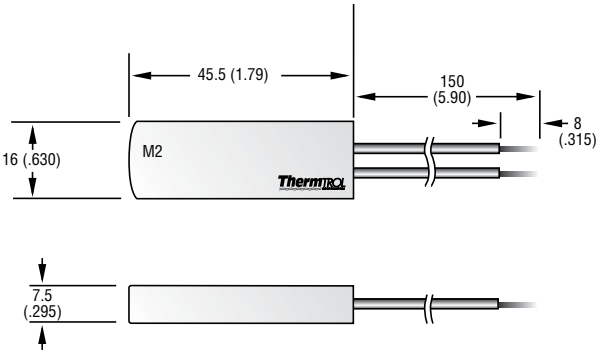
5 Amp Series Set Temperature Availability from -10°C to 110°C



M3
With mounting hole

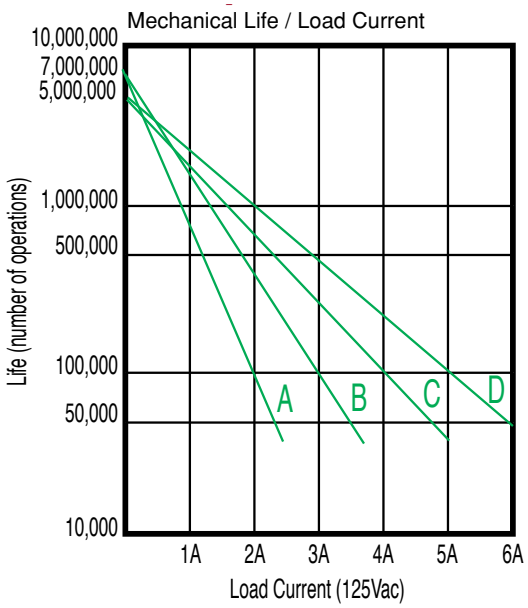
UL: E104206
VDE: 102855
BEAB: C0935



M2
No mounting hole

UL: E104206
VDE: 102855
BEAB: C0935

5 Amp Series



5 Amp Series

Rating & Characteristics			
Voltage		Standard Contact	
		Differential Code	Current
125Vac	12Vdc	D	50mA ~ 5A
		C	50mA ~ 5A
		B	50mA ~ 4A
		A	50mA ~ 3A
250Vac	24Vdc	D	30mA ~ 3A
		C	30mA ~ 3A
		B	30mA ~ 2A
		A	30mA ~ 1.5A
—	48Vdc	D	50mA ~ 0.8A
		C	50mA ~ 0.8A
		B	50mA ~ 0.5A
		A	50mA ~ 0.3A

"5 Amp Series" represents the standard maximum current at 125Vac.

M Series Regulating Thermostats

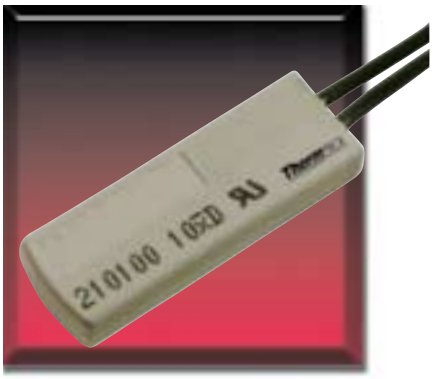
3 Amp High-Temperature Series
Set Temperature Availability from 115C to 200C

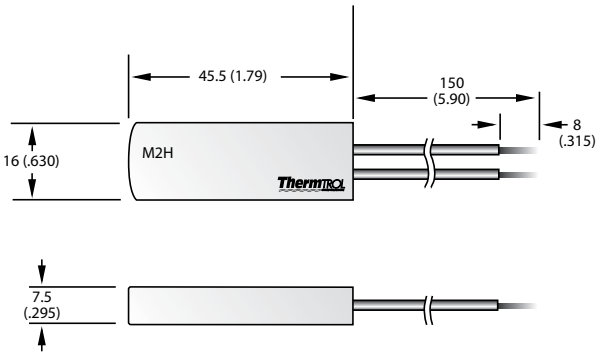
FEATURES

- High precision
- Snap-action
- Narrow differential
- Water resistant
- Extreme long life
- Low profile
- Factory pre-set
- ROHS compliant

APPLICATIONS

- Heating appliance
- Water bed heaters
- Blanket heaters
- Anti freeze sensors
- Medical applications
- Vending machines
- Communication equipment
- Power supplies
- Refrigeration
- Air conditioners





M2H
No mounting hole

UL: E104206
VDE: 102855
BEAB: C0935

3 Amp Series

Relation Between Operating Voltage, Temperature Range, and Differential Rank

Operating Voltage	Temperature Setting	Differential Rank	Contact Capacity
250Vac 24Vdc	115C ~ 150C	D	50mA ~ 3A
	151C ~ 200C	E	50mA ~ 2A
125Vac 12Vdc	115C ~ 150C	D	50mA ~ 4A
	151C ~ 200C	E	50mA ~ 3A

"3 Amp Series" represents the standard maximum current at 125Vac.

M-Series Additional Specifications:

-30°C - 105°C (standard). Use within 60 degrees above the set temperature.

Insulation resistance:
100m or more

Contact resistance:
30m or less (lead wire resistance not included)

Voltage tolerance:
2000V for 2 sec. (600V for 1 minute between contacts)

Vibration tolerance:
Selected from JIS • C • 0911-1984
Constant vibration: 50Hz fixed/0.2mm fixed (1 G)
Sweep vibration: 10-55Hz/0.35mm fixed (0.1 - 2.2G)

Impact tolerance:
No damage when dropped three times from the height of 40cm onto a concrete floor (about 70G).
Withstands substantial impact once mounted.

Life:
2 million mechanical operations, 100,000 electrical operations at rated load.

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Numbering System (For Requesting Samples Only)

MQT8K	SPACE	50	—	KX	—	D	—	T1

Model Number

MQT8K	2 Amp with Mounting Hole
MQT8H	2 Amp without Mounting Hole
M3	5 Amp with Mounting Home
M2	5 Amp without Mounting Hole
M2H	3 Amp Hi Temp

Set Temperature

Select from range of -20°C to 200°C in 1°C increments.

Examples:

-20	-20°C (Minimum)
200	200°C (Maximum)

Differential Code

Code	Temp. Range °C	-10°C min for 5 AMP / -20 - 0		1 - 50		51 - 75		76 - 110	100°C max for 2 AMP	115-150	M2H Only	151 - 200	M2H Only
	Contact Type	X, X(BAR)	Y, Y(BAR)	X, X(BAR)	Y, Y(BAR)	X, X(BAR)	Y, Y(BAR)	X, X(BAR)	Y, Y(BAR)	X,X(BAR)	Y, Y(BAR)	X, X(BAR)	Y, Y(BAR)
A	3°C±1°C*	AV	AV	AV	AV	NA	NA	NA	NA	NA	NA	NA	NA
B	4.5°C±1.5°C*	AV	Std.	AV	Std.	AV	Std.	NA	NA	NA	NA	NA	NA
C	6.5°C±1.5°C*	Std.	AV	Std.	AV	Std.	AV	AV	AV	NA	NA	NA	NA
D	10°C±-2°C*	AV	AV	AV	AV	AV	AV	Std.	Std.	Std. 10C±3C	NA	NA	NA
E	15°C±-3°C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Std.	NA

* Denotes that tighter tolerance on differential available (-20C through 110C only). M2 devices are offered with differential D. Differential A, B, & C are not available on M2 devices.

Tolerance of Temperature Setting in C

Code	Set Temperature	-20 - 0	1 - 50	51 - 75	76 - 110	110 - 150	151 - 200
T1	Standard Tolerance °C	±3	±3	±4	±5	±5	±7
T2	Special Tolerance °C	±1.5	±1.5	±2	±3	NA	NA

Contact Type

For Currents above 100mA		For Currents below 100mA (applicable to MQT8H, MQT8K, and MQT11H Models only)	
X	Contacts Open on Temperature Rise – where normal operating temp. is below thermostat activation point.	**KX**	Contacts Open on Temperature Rise – where normal operating temp. is below thermostat activation point.
X(BAR)	Contacts Close on Temperature Fall – where normal operating temp. is above thermostat activation point.	**KX(BAR)**	Contacts Close on Temperature Fall – where normal operating temp. is above thermostat activation point.
Y	Contacts Close on Temperature Rise – where normal operating temp. is below thermostat activation point.	**KY**	Contacts Close on Temperature Rise – where normal operating temp. is below thermostat activation point.
Y(BAR)	Contacts Open on Temperature Fall – where normal operating temp. is above thermostat activation point.	**KY(BAR)**	Contacts Open on Temperature Fall – where normal operating temp. is above thermostat activation point.

Note: M Series Thermostats are supplied with 6” long, #20 gauge PVC (UL1015) insulated leads.

Wire Harnesses and Molding Capabilities

Miniature Injection Molded Parts

Over Molded Tubing

Over Molded Wire Harnesses

Custom Over Molding

Over Molded Housings

Over Molded Strain Reliefs

Multi-conductor Harness Assemblies

Insert and Injection Molded Assemblies

Simple Single Lead Terminations

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Thermtrol MGI Global: 1175 Alexander Court • Cary, IL 60013 • (847) 516-8080 • Fax (847) 516-0747 • sales@thermtrol.com

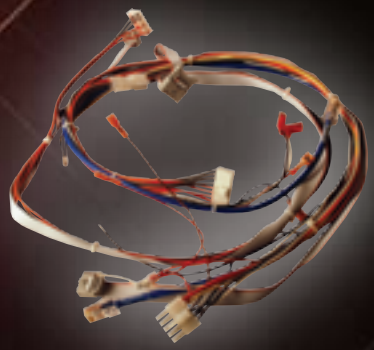
Ribbon Cable
Assemblies

MS/Water Proof
Terminations

Sensor and
Control Harnesses

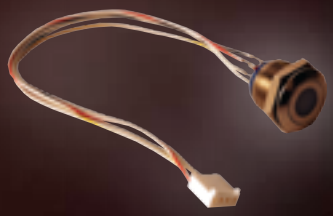
Combination Crimp and IDC
Connector Harnesses

Complex Multi-connector
Large Equipment and
Vehicle Harnesses

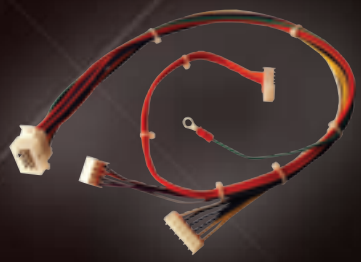


Data and Signal Harnesses

Ultrasonic
Welding Capabilities



Component
Integration Harnesses

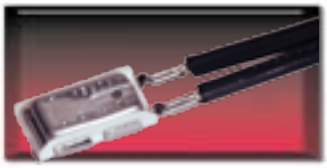


Appliance Harness,
RAST and Crimp
Connections

Additional Products

Although Thermtrol's standard product lines are already available for customizing, they are not necessarily the best fit for all applications. Due to varied requirements for various agency approvals, lot sizes, special physical or performance characteristics and any number of other attributes, a Thermtrol representative may guide you to one of the devices in this section. By no means does this addition of the products in this section offer a comprehensive view of all Thermtrol products, but it does serve to illustrate some of Thermtrol's more popular non-standard items.

17AM: AUTO RESET THERMAL PROTECTOR
- Standard operating temperatures 65°C to 160°C
- 125 VAC, 18 Amps/250 VAC 9 Amps
- UL, KEMA, CQC Certified
- Motors, Ballasts, Transformers, Battery Packs, Lighting Fixtures



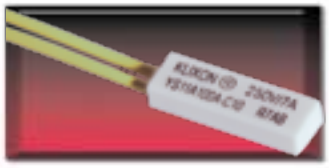
3MP/SH3MP: AUTO OR MANUAL RESET THERMAL PROTECTOR
- Standard operating temperatures 65°C to 145°C
- 250 VAC, 6 Amp
- UL, CSA, KEMA, CQC BEAB Certified
- Washing Machines, Clothes Dryers, Dish Washers, Vacuum Cleaners

8CM & SMNV AUTO OR MANUAL RESET THERMAL PROTECTOR
- Standard Operating Temperatures 65°C to 155°C 120Vac 12AMPS
- UL

70M/70MR & 325: MIGHTY MITE THERMOSTAT
- 70M/MR 120VAC 8AMPS 240VAC 6AMPS, 325 50Amps LRC
- 40C to 177C UL

YS10: AUTO RESET THERMAL CUTOFF
- Standard operating temperatures 60°C to 150°C
- 120 VAC, 16 Amps/250 VAC 12 Amps
- UL, CSA, KEMA, CQC MITI Certified
- Hair Dryers, Fans, Heaters

TH10: AUTO RESET/SELF HOLD, SNAP ACTION THERMAL PROTECTOR
- Standard operating temperatures 45°C to 170°C
- 13 Amps/250 VAC 30,000 cycles
- UL, CSA, KEMA Certified
- Hair Dryers, Fan Heaters, Transformers,
- Convector Heaters



YS11: AUTO RESET THERMAL PROTECTOR
- Standard operating temperatures 45°C to 150°C
- 250 VAC, 10 Amps / 250 VAC, 7 Amps / 24 VDC, 6 Amps / 18 VDC, 15 Amps
- UL, KEMA, CQC Certified
- Thermal Cutoff and Motor Protector

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AM01, AM11, AM03, AM13 AUTO RESET THERMAL PROTECTOR

- Standard operating temperatures 65C to 180C
- 250VAC 2.5Amps
- UL, VDE, BEAB

STC-80: BI-METAL THERMOSTAT

- UL: 13.75A/120 VAC VDE:10A/250VAC
- 70°C to 130°C
- UL File E212098, VDE File 130488

AT – 500: THERMAL PROTECTOR

- 40A / 250 VAC Auto Reset 3000 cycles
- 50A / 250 VAC Manual Reset 50 cycles
- 25A / 48 VAC Manual Reset 50 cycles

RNTS: HIGH AMPERE BULB & CAPILLARY THERMOSTAT

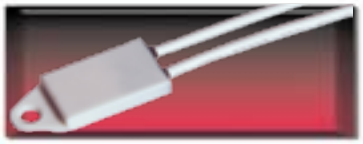
- 30A / 250 VAC
- 0°C to 320°C
- SPST (Single Pole Single Throw)

H702S/P: FIXED HIGH TEMPERATURE THERMOSTAT

- 3A/125VAC 2A/250VAC (.1A MIN)
- S Contacts – Normally closed, open on rise
- P Contacts – Normally open, close on rise

54N: ½" DISC THERMOSTAT

- 15A/120 VAC 10A/240 VAC 100,000 cycles
- Normally closed or normally open contacts
- 15°C t0 230°C



SSI: MINATURE THERMOSTAT

- 2A / 125 VAC
- 30,000 cycles resistive load

ARR03: SELF HOLD ½" DISC THERMOSTAT

- 16A / 115 VAC 6A / 230 VAC 3,000 cycles
- 20A / 200 cycles
- 60°C to 180°C

THERMISTOR SENSOR & PROBE ASSEMBLIES

- Medical
- Industrial
- Automotive
- Customized designs available

Thermtrol VSIP Company, LTD. Experienced Asian Manufacturing

- Wholly-owned facility
- ISO 9001 approved facility
- Low-cost, highly skilled labor
- Work with US facilities
- Process coordination
- Logistics expertise

Leverage our location, expertise and purchasing economies

Location

Located on the outskirts of Ho Chi Minh City, Vietnam, Thermtrol's wholly-owned Asian Manufacturing center, Thermtrol VSIP Company, LTD. is the perfect location to leverage purchasing economies and manufacturing efficiencies. Located in a modern, state-of-the-art industrial park with convenient access to both air and sea ports, Thermtrol VSIP is proven to be a dependable and centrally located facility, not only for Asia, but the world.

Expertise

Our unique approach with this ISO 9001 approved facility is our "treat-it-as-your-facility" proposition. Let us evaluate your needs to determine if leveraging Thermtrol VSIP's competencies can best meet them.

Competencies include:

- Low-cost, highly skilled electrical component assembly
- Welding, crimping, soldering, and processing of electrical components
- Plastic injection and insert molding
- Custom wire harness assemblies

Purchasing Economies

Southern Vietnam is a rapidly growing industrial area with world class manufacturing of many electric components. Thermtrol VSIP's location to local and regional suppliers and factories producing complementary products, teamed with our established in-house expertise, allows us to offer an attractive value proposition for all types of assembly. Our customers in the appliance, commercial vehicle, industrial and agricultural equipment industries rely on Thermtrol VSIP for their needs.

Modern facility, experienced staff

Crimp cross sectioning analysis equipment

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Utilize Thermtrol's North American Offices

Our customer service operation for Thermtrol VSIP is at either of our North American locations – Thermtrol Corporation, North Canton, Ohio, USA or Thermtrol MGI Global, Cary, IL, USA. These sales offices coordinate with our Vietnam facility on your behalf to serve all your needs. Submit purchase orders and expedite requests to the assigned sales office and we'll take care of the rest.

Special Requests
Whether you need sample parts quickly or warehousing, Thermtrol's North American sales offices can assist you.

ThermTROL CORPORATION
North Canton, Ohio 44720

ThermTROL MGI GLOBAL LLC
Cary, Illinois, 60013

Concept photo of our New 90,000 square ft. production facility to open in 2009.

To ensure that we continue to provide our customers with the best possible products, services, and solutions, we are expanding our capacity and enhancing our facility. Our new 90,000 square foot State-of-the-Art facility will enable us to continue to meet and exceed our customers current and future requirements, while providing our experienced staff with an environment that promotes excellence and accommodates the necessary tools to achieve it.

Thermtrol MGI Global LLC

CAPABILITIES

Order Size:
- Short run specialty production
- High volume commercial automotive

Complexity:
- Simple wire leads
- Multiple circuit harness

Range of Wiring:
- 30 gauge wiring
- Substantial load cables

Overmolding:
- Wires and simple grommets
- Complex large volume stampings

Control Panels:
- One or two circuits
- Dozens of relays, wires, controls

Customer size:
- Small firms that dominate their industrial niche
- Teir-1 auto manufacturers

INDUSTRIES SERVED

- Automotive (TS16949:2002)
- Agriculture
- Commercial vehicles
- Diesel engines
- Sensors
- Controls
- Specialty lighting
- Pumps
- Motors
- HVAC
- Food processing equipment
- Medical
- Industrial equipment
- Communications
- Defense
- Marine
- Appliance

Thermtrol MGI Global: Custom Wire Harness and Insert/Overmolding

Thermtrol MGI Global, a wholly owned subsidiary of Thermtrol, is the expert in custom wire harness and plastic injection insert/overmolding. With ISO TS16949 certification, which ensures unfailing accuracy and dependable performance, Thermtrol MGI Global ranks in the top 2% of USA manufacturers. With customers in commercial vehicle manufacturing, automotive supply, industrial equipment, agricultural equipment and sensors and controls, Thermtrol MGI Global can provide your company with:

- Flexible manufacturing facilities with the ability to handle both high production programs and short run orders
- Quick turn-around time on our USA-based short run lines to fulfill prototype, samples to support program development and production launches regardless of which facility full production will be manufactured
- Assistance in selecting the right Thermtrol facility – Thermtrol MGI Global in Cary, IL or Thermtrol VSIP Co. Ltd. in HCMC, Vietnam – for the most economical price
- Engineering support through all phases of design and engineering

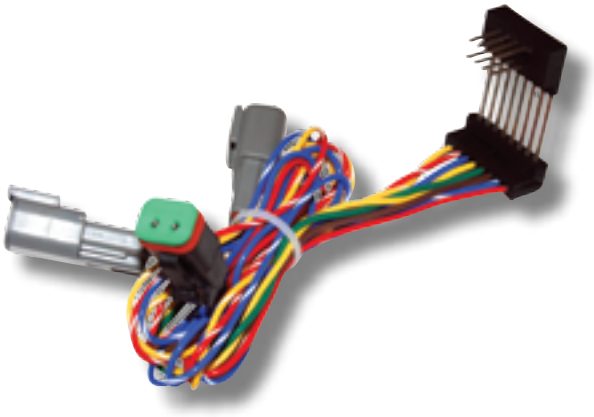
Engineering Assistance

Thermtrol MGI Global supports all phases of design and engineering of new wire harnesses and over molded products. This includes the three major steps in development:

Step 1: Conceptual configuration to determine the relative dimensions needed.

Step 2: Pre-production design proof of the proper form to be used in manufacturing.

Step 3: Manufacturing and pre-production test-runs to support testing and prove manufacturing process prior to full-scale production.



In addition, we offer timely and cost-effective evaluation of your existing or planned custom wire harness assembly and overmolding needs. Thermtrol MGI Global customers rely on our engineering assistance to redesign components and help them maximize product reliability, simplify installation and streamline their supply chain.

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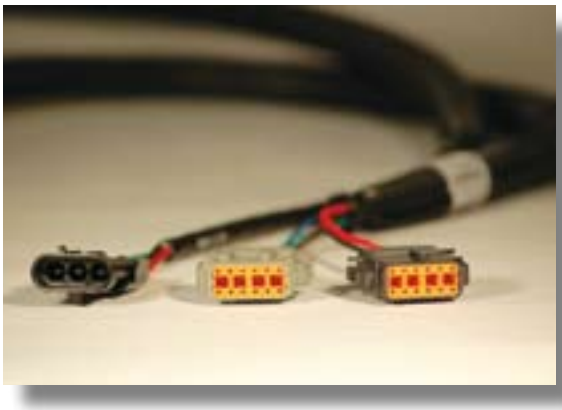
Specialties

Insert & Overmolding



Thermtrol MGI Global, a leading producer of wire harness and over molded products, has the broad capabilities to mold virtually anything our customers' require:

- Wire & terminal overmolding
- Insert & stamping overmolding
- Connectors over terminals
- Grommets
- General plastic injection molding

Thermtrol MGI Global's ability to meet precise thickness and tolerance standards required of the automotive, sensor, agriculture, defense and other industries, coupled with our exacting quality and superior delivery, ensures our customers the peace of mind to meet their production schedules on time.

Electromechanical & General Assembly

Thermtrol MGI Global is a premier provider of electro-mechanical assembly services. Our highly skilled work force is responsible for our reputation of meeting or exceeding precise customer specifications. Plus, Thermtrol MGI Global is a specialist in value-added test procedures to guarantee that every component you receive has already demonstrated its 100% conformance to your standards.

Simplify your supply chain – allow Thermtrol MGI Global and Thermtrol VSIP Co. Ltd. to assemble multiple parts and supply you with components ready for your own manufacturing process. With fewer parts to inventory and our just-in-time delivery methods serviced from our centrally located USA warehouse, your efforts can be directed to your core competency, saving you time and expense.

Sample Request Form

Sample Request Form

Date: _____ Company: _____

Phone: _____ Street Address: _____

Fax: _____ City: _____ State/Prov: _____

Email: _____ Country: _____ Postal Code: _____

Thermtrol Model # (if known): _____ Number of samples desired: _____

Estimated Annual Usage: _____ Requested quantities for price quotation: _____

If you do not have a specific model in mind, or are not familiar with our products and would like Thermtrol to assist you with selecting the right product for your application, please fill out the application information below to the best of your ability and we will be in contact with you shortly.

Application Description

Brief Summary of Application: _____

❑ New Product ❑ Existing Product

Thermostat Function

❑ High Limit Protector ❑ Temperature Control ❑ Overcurrent Protector
❑ Motor Protector ❑ Transformer Protector ❑ Appliance Protector

Environmental Conditions

❑ Chemical ❑ Dust ❑ Humidity ❑ Vapor ❑ Fluid ❑ Air

Explanation: _____

Electrical Requirements

❑ Votage ❑ AC ❑ DC ❑ Amperage: ❑ Resistive ❑ Inductive

Thermostat Specifications

Contacts normally closed, open on temperature rise at: ____°C ____°F Contacts normally open, close on temperature rise at: ____°C ____°F

Desired reset temperature: ____°C ____°F Desired reset temperature ____°C ____°F

Please copy and fax or email completed form to:
Fax:330-497-4189
Email: sales@thermtrol.com
If you need immediate assistance feel free to contact us @ 330-497-4148

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Locations Contact Information

North American Headquarters
Americas & Europe Sales

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Fax: 1-330-497-4189
Email: sales@thermtrol.com
Web Site: www.thermtrol.com

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THERMTROL INTERNATIONAL
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11 Yip Hing Street,
Wong Chuk Hang,
Hong Kong
Telephone : 852.2873.3788
Fax: 852.2873.3718

NORTH AMERICAN
WIRE HARNESS
MANUFACTURING

THERMTROL MGI GLOBAL
1175 Alexander Court
Cary, Illinois, 60013
USA
Phone: 847-516-8080
Fax : 847-516-0747
Web Site: www.thermtrolmgiglobal.com

ASIAN MANUFACTURING

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12 VSIP Street 2
Vietnam Singapore Industrial Park
Thuan An Dist. - Binh Duong Province
Vietnam
Postal Code 72
Telephone : 84.0650.782.872
Fax: 84.0650.782.875

Centigrade to Fahrenheit Conversion Chart

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-40	-40.0	+10	50.0	+60	140.0	+110	230.0	+160	320.0	+210	410.0
39	38.2	11	51.8	61	141.8	111	231.8	161	321.8	211	411.8
38	36.4	12	53.6	62	143.6	112	233.6	162	323.6	212	413.6
37	34.6	13	55.4	63	145.4	113	235.4	163	325.4	213	415.4
36	32.8	14	57.2	64	147.2	114	237.2	164	327.2	214	417.2
35	31.0	15	59.0	65	149.0	115	239.0	165	329.0	215	419.0
34	29.2	16	60.8	66	150.8	116	240.8	166	330.8	216	420.8
33	27.4	17	62.6	67	152.6	117	242.6	167	332.6	217	422.6
32	25.6	18	64.4	68	154.4	118	244.4	168	334.4	218	424.4
31	23.8	19	66.2	69	156.2	119	246.2	169	336.2	219	426.2
30	22.0	20	68.0	70	158.0	120	248.0	170	338.0	220	428.0
29	20.2	21	69.8	71	158.9	121	249.8	171	339.8	221	429.8
28	18.4	22	71.6	72	161.6	122	251.6	172	341.6	222	431.6
27	16.6	23	73.4	73	163.4	123	253.4	173	343.4	223	433.4
26	14.8	24	75.2	74	165.2	124	255.2	174	345.2	224	435.2
25	13.0	25	77.0	75	167.0	125	257.0	175	347.0	225	437.0
24	11.2	26	78.8	76	168.8	126	258.8	176	348.8	226	438.8
23	9.4	27	80.6	77	170.6	127	260.6	177	350.6	227	440.6
33	7.6	28	82.4	78	172.4	128	262.4	178	352.4	228	442.4
21	5.8	29	84.2	79	174.2	129	264.2	179	354.2	229	444.2
20	4.0	30	86.0	80	176.0	130	266.0	180	356.0	230	446.0
19	2.2	31	87.8	81	177.8	131	267.8	181	357.8	231	447.8
18	-0.4	32	89.6	82	179.6	132	269.6	182	359.6	232	449.6
17	+1.4	33	91.4	83	181.3	133	271.4	183	361.4	233	451.4
16	3.2	34	93.2	84	183.2	134	273.2	184	363.2	234	453.2
15	5.0	35	98.0	85	185.0	135	275.0	185	365.0	235	455.0
14	6.8	36	96.8	86	186.8	136	276.8	186	366.8	236	456.8
13	8.6	37	98.6	87	188.6	137	278.6	187	368.6	237	458.6
12	10.4	38	100.4	88	190.4	138	280.4	188	370.4	238	460.4
11	12.2	39	102.2	89	192.0	139	282.2	189	372.2	239	462.2
10	14.0	40	104.0	90	194.0	140	284.0	190	374.0	240	464.0
9	15.8	41	105.8	91	195.8	141	285.8	191	375.8	241	465.8
8	17.6	42	107.6	92	197.6	142	287.6	192	377.6	242	467.6
7	19.4	43	109.4	93	199.4	143	289.4	193	379.4	243	469.4
6	21.2	44	111.2	94	201.2	144	291.2	194	381.2	244	471.2
5	23.0	45	113.0	95	203.0	145	293.0	195	383.0	245	473.0
4	24.8	46	114.8	96	204.8	146	294.8	196	384.8	246	474.8
3	26.6	47	116.6	97	206.6	147	296.6	197	386.6	247	476.6
2	28.4	48	118.4	98	208.4	148	298.4	198	388.4	248	478.4
-1	30.2	49	120.2	99	210.2	149	300.2	199	390.2	249	480.2
0	32.0	50	122.0	100	212.0	150	302.0	200	392.0	250	482.0
+1	33.8	51	123.8	101	213.8	151	303.8	201	393.8	251	483.8
2	35.6	52	125.6	102	215.6	152	305.6	202	395.6	252	485.6
3	37.4	53	127.4	103	217.4	153	307.4	203	397.4	253	487.4
4	39.2	54	129.2	104	219.2	154	309.2	204	399.2	254	489.2
5	41.0	55	131.0	105	221.0	155	311.0	205	401.0	255	491.0
6	42.8	56	132.8	106	222.8	156	312.8	206	402.8	256	492.8
7	44.6	57	134.6	107	224.6	157	314.6	207	404.6	257	494.6
8	46.4	58	136.4	108	226.4	158	316.4	208	406.4	258	496.4
9	48.2	59	138.2	109	228.2	159	318.2	209	208.2	259	498.2