

## 20M, 30M MOTOR PROTECTOR Series

### *Special Purpose Controls*



### ***Snap-Action Motor Protectors***

The Therm-O-Disc line of Motor Protectors offers accurate and reliable protection against hazardous overheating in single phase/single voltage A/C motors. Available in a variety of product types, these motor protectors employ a snap-acting, current and temperature responsive bimetal disc for proven performance over life. An internal resistance heater utilizes the effects of current to bias the operation of the bimetal disc for added thermal response. A wide range of bimetal and heater combinations are available to cover specific design requirements. This design flexibility and proven performance has made Therm-O-Disc Motor Protectors a popular choice among the leading manufacturers of fractional horsepower motors.

### ***Features and Benefits***

The Motor Protector features include:

- High-speed contact separation ensures long contact life.
- Current and temperature responsiveness for excellent design flexibility.
- Manual and automatic reset switching actions combined with a wide selection of bimetal discs and heaters to meet a variety of possible application needs.
- 100% temperature calibration and trip time tests assure high quality levels.

### ***The Operating Principle of Motor Protectors***

The operating mechanism inherent to all Therm-O-Disc Motor Protectors is the snap-action bimetal disc. During abnormal conditions, heat generated by resistance and/or motor ambient causes the bimetal disc to snap at the specified calibration temperature. This allows the circuit to open within the maximum safe limits of the motor windings. Once the motor returns to a normal operating temperature, the bimetal disc resets (automatically or manually). This closes the circuit and re-energizes the motor. This same snap-action principle is utilized in millions of Therm-O-Disc products applied in the appliance, heating and air conditioning industries.

Type 20M – The Therm-O-Disc Type 20M SPST automatic reset protector is a rugged device designed for use on appliance and specialty motors up to 3/4 horsepower. Available with side entry (see figure 2) or end entry (see figure 3) terminations, this device offers optional heater and bimetal combinations for additional design flexibility. The durable molded phenolic construction provides protection to live internal components and eliminates the need for mylar insulation.

### Side Entry Terminals

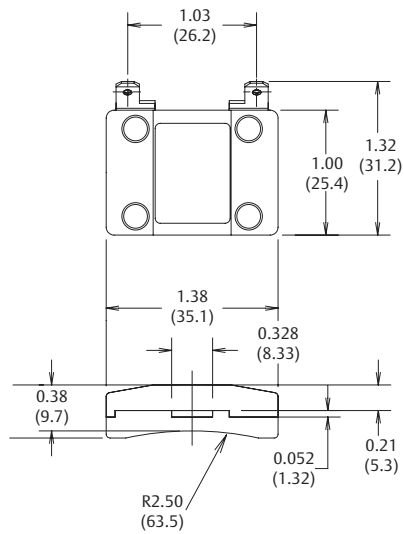


Figure 2

### End Entry Terminals

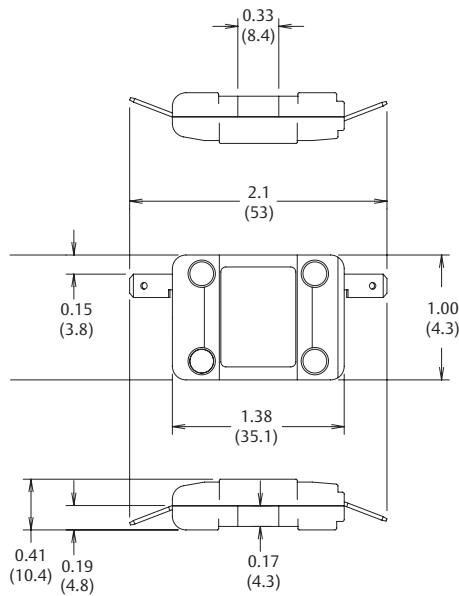


Figure 3

*Dimensions are shown in inches and (millimeters).*



Type 30M – The Therm-O-Disc Type 30M (see figure 4) SPST manual reset protector is a compact device designed for applications where inadvertent equipment restarts may result in potential hazard. The contacts may be manually reset after the control has cooled 30°-50°C below the open temperature calibration. The 30M features a “trip free” manual reset design. UL designates the 30M reset as “M1,” meaning the motor protector shall automatically reset to the closed position after normal operating conditions have been restored if the reset button is held in the reset position. Typical uses include disposer and oil burner applications where “tripping” the device should result in the end user taking corrective action. Standard terminations are weld-type connections. Male quick connect terminals, lead wire assemblies and bimetal and heater combinations are available to meet specific requirements. This “trip free” construction means that processing the reset button will not reclose the contacts until the control has cooled.

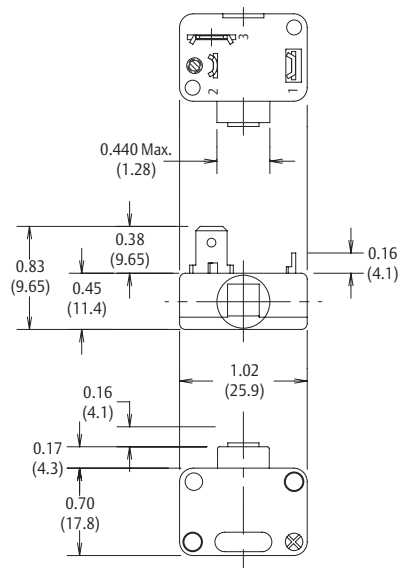


Figure 4

*Dimensions are shown in inches and (millimeters).*



### ***Lead Wire and Terminal Configurations***

All Therm-O-Disc Motor Protectors can be furnished with a variety of terminal and lead wire configurations. Custom packages or special assemblies may be specified to meet unique application needs. By taking advantage of our high volume production methods, Therm-O-Disc may be able to provide significant savings. Our sales engineers can assist in selecting a package that is tailored to specific requirements.

### ***Mounting Configurations***

Due to the variation of terminal and switch configurations, Therm-O-Disc Motor Protectors may be mounted in a number of positions. For maximum performance, we recommend locating the protector as close to the motor windings as possible. Customers typically provide their own mounting methods.

### ***Product Quality***

Therm-O-Disc Motor Protectors are assembled, calibrated and tested automatically, using the latest manufacturing technologies and quality methods. Each motor protector is 100% temperature calibrated and tested to ensure high quality levels. Our goal of providing motor protectors of the highest uniform quality is reinforced by the training of our operators in modern statistical techniques. Therm-O-Disc is committed to continuously improving our quality and manufacturing capabilities. This objective, in turn, allows our products to meet the escalating standards of our customers.



## Protector Selection

To determine which Therm-O-Disc Motor Protector is right for a specific application, simply use the following steps:

- Select the appropriate switch action (manual or automatic) and product type.
- Verify that electrical load does not exceed the recommended rating of the device.
- Determine calibration based on test data.
- Determine the specific bimetal and heater resistance required for the application. (Consult factory for trip curves.)
- Test the protector to verify compliance with specific requirements.
- Choose from a variety of optional components to complete a package.

## Calibration Temperatures, Differentials and Standard Tolerance of Motor Protectors

Protector Type	20M	30M
Open Range (°C)	80-150	80-150
Open Tolerance (°C)	±5	±5
Close Range (°C)	45-110	45-110
Close Tolerance (°C)	±10	±10
Minimum Differential (°C)	45	30
Maximum Differential (°C)	95	50

NOTE: For additional information on calibrations, tolerances or differentials not listed in this chart, please contact our Sales Engineering Department.

## General Electrical Ratings

The Motor Protector series has been rated by major agencies throughout the world. The agency ratings can be used as a guide when evaluating specific applications. However, the mechanical, electrical, thermal and environmental conditions to which a control may be exposed in an application may differ significantly from agency test conditions. Therefore, the user must not rely solely on agency ratings, but must perform adequate testing of the product to confirm that the control selected will operate as intended in the user's application.

Protector Type	Maximum Temperature (°C)	Recommended Contact Ratings*	Limited Short Circuit	Group Fusing Short Circuit	Agency Recognition
20M	150	66 amp L.R. @ 120V (maximum)	1000 amp Circuit: 60 amp fuse @ 240V	5000 amp Circuit: 60 amp fuse @ 240V	UL File E52937 CSA File LR80616
30M	150	50 amp L.R. @ 120V 37 amp L.R. @ 240V	1000 amp Circuit: 40 amp fuse @ 240V	2000 amp Circuit: 80 amp fuse @ 120 V	

\* Therm-O-Disc Motor Protectors are recognized by Underwriters Laboratory (UL) and certified by the Canadian Standards Association (CSA). For complete details on European Agencies or the latest rating information, please contact our Sales Engineering Department.

## Product Numbering System

# 20M

Bimetal Size/Resistance	Heater Resistance	Terminal Type	Open (C°)	Close (C°)
A - .0052Ω	O - No Htr	3 - 1/4" x 45° side entry	A - 85	A - 45
C - .0073Ω	A - .0226Ω	5 - 1/4" x 0° side entry	B - 90	B - 50
E - .0063Ω	D - .0381Ω	6 - 3/16" x 0° side entry	C - 95	C - 55
K - .0037Ω		7 - Crimp weld end entry	D - 100	D - 60
L - .0095Ω		8 - 3/16" x 15° end entry	E - 105	E - 65
		L - 3/16" x 45° and 1/4" x 45° side entry	F - 110	F - 70
			G - 115	G - 75
			H - 120	H - 80
			J - 125	J - 85
			K - 130	K - 90
			L - 135	L - 95
			M - 140	M - 100
			N - 145	N - 105
			P - 150	P - 110
			S - 80	



## 30M

Bimetal Resistance		Heater Resistance		Terminal Type		Open (C°)		Close (C°)	
A	-.0015Ω	A	-.0320Ω	No. 1	No. 3	A	85	A	45
B	-.0042Ω	B	-.0260Ω	5 - Stub	1/4" MQC	B	90	B	50
L	-.0075Ω	C	-.0390Ω	6 - Stub	Stub	C	95	C	55
		D	-.0620Ω			D	100	D	60
		E	-.0490Ω			E	105	E	65
		G	-.0980Ω			F	110	F	70
		L	-.0200Ω			G	115	G	75
		M	-.0150Ω			H	120	H	80
						J	125	J	85
						K	130	K	90
						L	135	L	95
						M	140	M	100
						N	145	N	105
						P	150	P	110
						S	80		

### ***Important Notice***

Users must determine the suitability of the control for their application, including the level of reliability required, and are solely responsible for the function of the end-use product.

These controls contain exposed electrical components and are not intended to withstand exposure to water or other environmental contaminants which can compromise insulating components. Such exposure may result in insulation breakdown and accompanying localized electrical heating.

A control may remain permanently closed or open as a result of exposure to excessive mechanical, electrical, thermal or environmental conditions or at normal end-of-life. If failure of the control to operate could result in personal injury or property damage, the user should incorporate supplemental system control features to achieve the desired level of reliability and safety. For example, backup controls have been incorporated in a number of applications for this reason.