| PHENOLIC MOTOR PROTECTORS

Hermetically Sealed Motor Protector for Single-Phase On-Winding Protection

Introduction

Klixon Phenolic Motor Protectors are equipped with a bimetallic snap acting disc, on which the contacts are mounted, and through which the current flows. If overheating conditions occur, the heating effect of the current flow through the Klixon disc and the influence of motor heat will cause the disc temperature to rise.

When the disc reaches the calibrated setpoint, the Klixon protector automatically opens and shuts down the motor, limiting the winding and shell temperature.

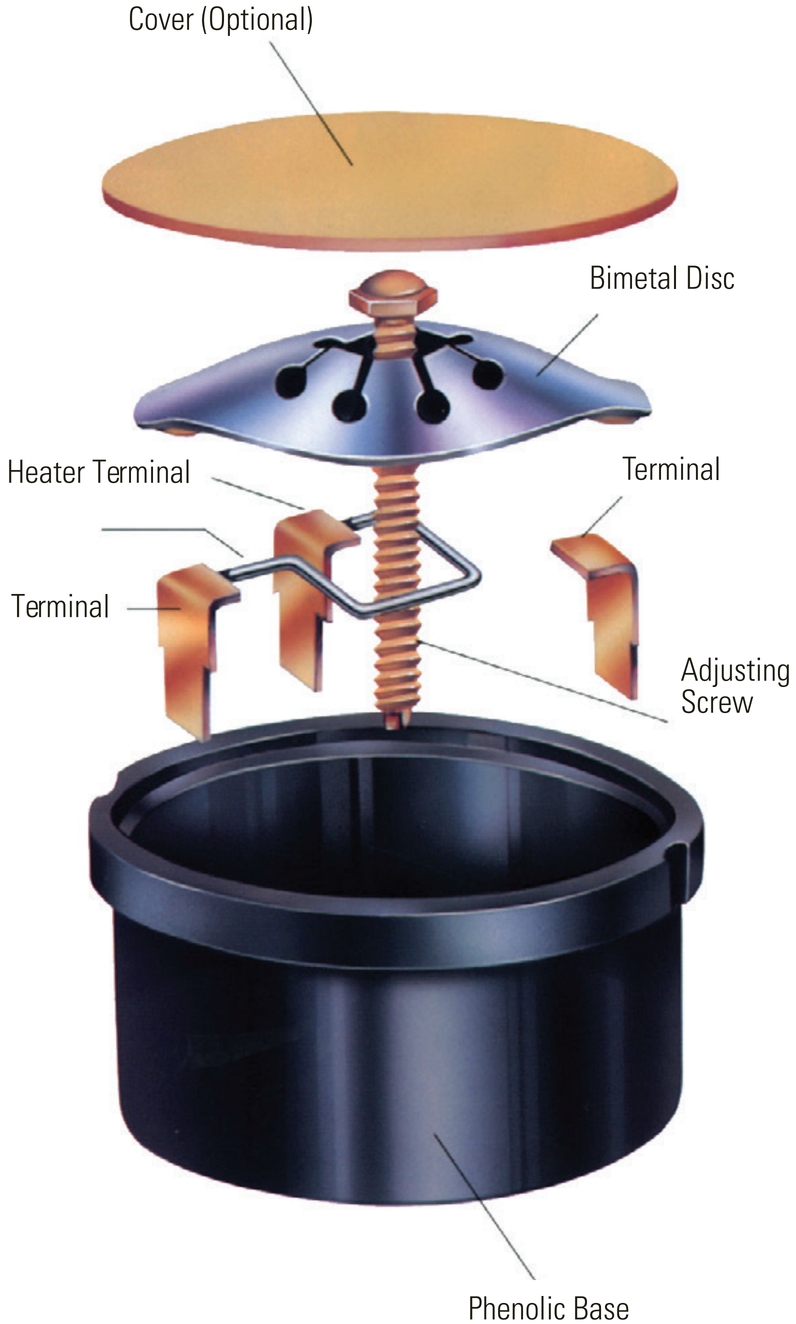
When the motor has cooled to an acceptable operating level, allowing the protector to cool to its reset temperature, the Klixon protector resets automatically to a closed contact position allowing the motor to restart.

Manual reset versions are also available for applications where automatic restarting may be hazardous to equipment or operations.

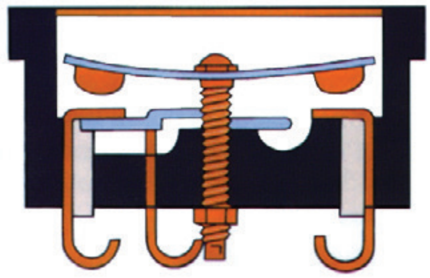
Features

- Normally closed "make or break" Klixon® contact system, which is operated by a snap action disc, is sensitive to both temperature and current.
- Precision calibration – temperature calibrated and inspected under controlled conditions for dependable performance.
- Automatic or manual reset series available
- Easy to install
- VDE certificate with production surveillance, overheating protector. 37 amperes maximum locked rotor 230 VAC, File 4464.4-4510-1013, License No. 3938 UG for 3/4" M.P. only.
- Inherent protection devices for approximately 1/2 to 5 h.p. motors used in applications such as industrial motors, agricultural equipment, well and sump pumps, fans, air conditioners, refrigerators, home appliances, etc.
- When properly applied, protector shuts off motor when temperature exceeds maximum safe level due to an overload or stalled (locked rotor) condition.

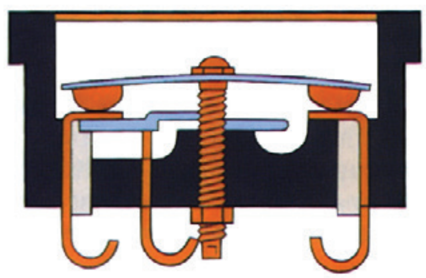
Automatic Reset Exploded View



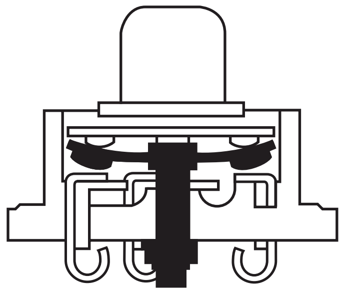
Contacts Open



Contacts Closed

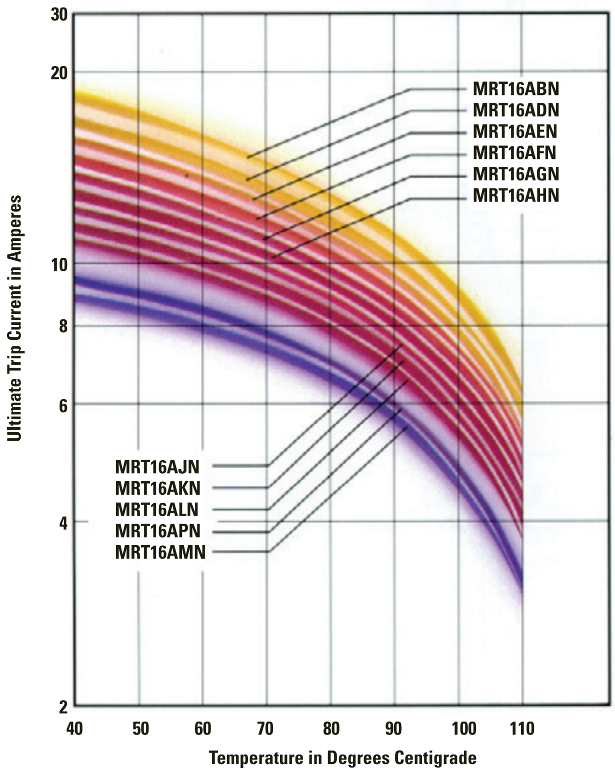


Manual Reset

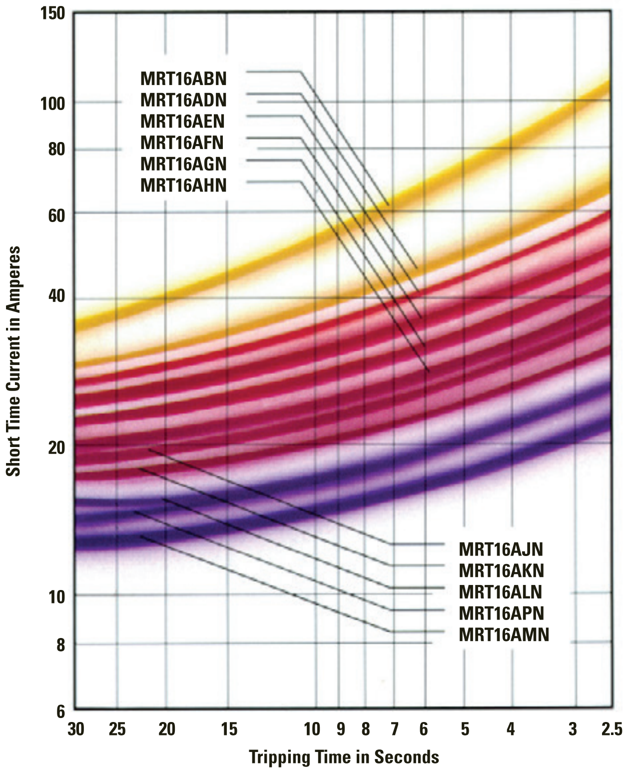


Curves

Ultimate Trip Current vs Protector Ambient Temperature
(Approximate, to be used only for selecting samples for motor verification test)

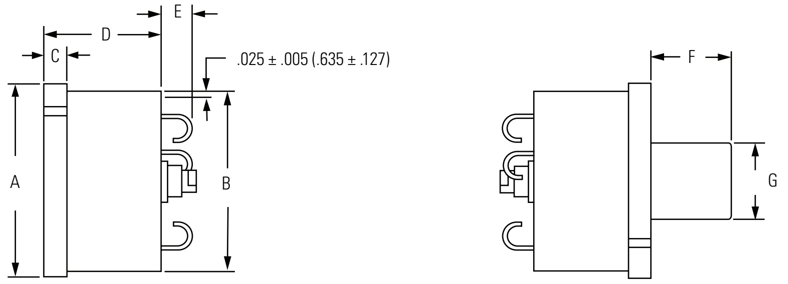


Average first Cycle Tripping Time vs Current in 25°C Ambient
(Approximate, to be used only for selecting samples for motor verification test)



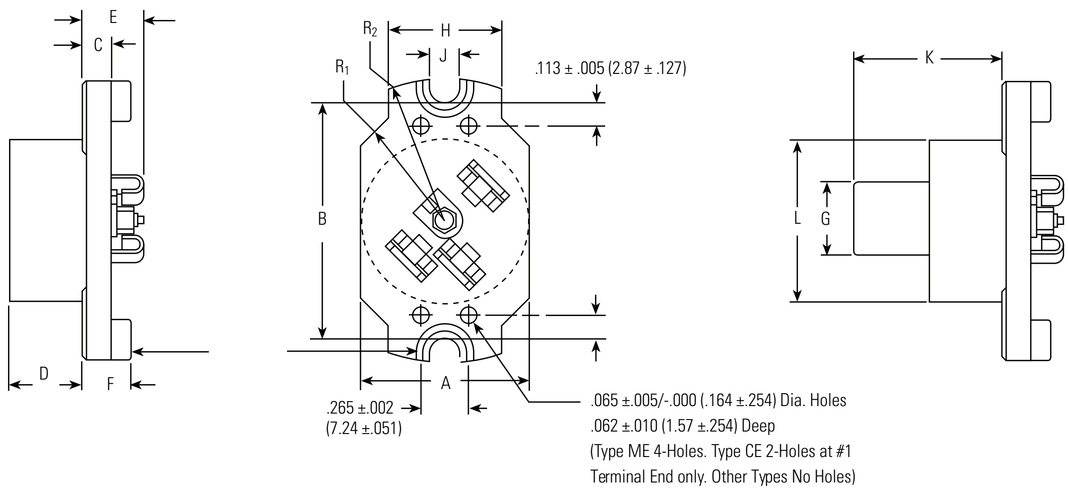
Note: Other ratings available for single and three phase applications.
Computer software is available to assist in application.

Round Base



Type	Size	A	B	C	D	E Max.	F	G
MR	3/4″	1.031 ±.010	.970 ±.006	.125 ±.005	.625 ±.010	.171	23/64 ±1/32	.375 ±.006
CR	1″	1.312 ±.010	1.218 ±.010	.125 ±.005	.640 ±.010	.218	31/64 ±1/32	.442 ±.006
BR	1-1/4″	1.640 ±.010	1.555 ±.010	.156 ±.010	.930 ±.015	.313	27/64 ±1/32	.442 ±.006
LR	1-1/2″	1.983 ±.010	1.881 ±.010	.154 ±.010	.830 ±.015	.375	15/32 ±3/64	.781 ±.006

Eared Base



Type	Size	A	B	C	D	E	F	G	H	J	K	L	R_1	R_2
ME	3/4″	.970 ±.010	1.390 ±.015	.175 ±.010	.450 ±.015	.354	–	.436 ±.007	.625 ±.010	.176 ±.010	.953	.970 ±.006	.656 ±.010	.845 ±.010
CE	1″	1.187 ±.010	1.390 ±.015	.175 ±.010	.464 ±.015	.406	–	.440 ±.008	.625 ±.010	.176 ±.010	1.000	1.187 ±.010	.656 ±.010	.845 ±.010
BE	1-1/4″	1.594 ±.010	2.125 ±.010	.223 ±.010	.715 ±.010	.552	.332 ±010	.440 ±.008	1.000 ±.010	.218 ±.010	1.180	1.552 ± .010	.844 ±.010	1.344 ±.010
LE	1-1/2″	1.875 ±.010	2.125 ±.020	.267 ±.010	.890 ±.010	.683	.517 ±.010	.781 ±.006	1.250 ±.010	.218 ±.010	1.370	1.875 ± .010	1.000 ±.010	1.344 ±.010

ORDERING OPTIONS

Example : M R P 36 A X - 63

X X X # Y Z – ##

Size

M = 3/4”
C = 1”
B = 1–1/4”
L = 1–1/2”

Base

E = Eared commercial
R = Round commercial
C† = Round commercial, cut down and cover
G* = Eared commercial and cover
S* = Round commercial and cover
* Except 1–1/4” size which always has cover. E&R designate this.
* Only 1–1/2” applications.

Terminals

F = 2 solder low cap
H = 2 solder high cap
K = 2 std screw low cap
M = 2 std screw high cap
P = 2 stub low cap
T = 2 stub high cap
G = 3 solder low cap
J = 3 solder high cap
L = 3 std screw low cap
O = 3 std screw high cap
P = 3 stub low cap
T = 3 stub high cap

Heater

Selected to satisfy application requirements

Disc and Contact

See Table on Page 6

Operating Temperature

See Table on Page 6

Terminations

Maximum Recommended Protector Contact Ratings

This chart is used to determine protector size needed when making an application.

Size	Disc Contacts	Terminals	Max. Current V = 120	Max. Current V = 240
3/4”	HC	LC	32	25
3/4”	HC	HC	50	37
1”	LC	LC	40	30
1”	HC	LC	40	30
1”	LC	HC	40	30
1”	HC	HC	80	60
11/4”	STD	STD	135	100
11/2”	STD	STD	175	130

HC = High Capacity **LC** = Low Capacity **STD** = Standard Capacity
For reference only. Please contact Sensata for application assistance.

KLIXON®

Disc and Contact

3/4″		1″	
High Cap		Low Cap	High Cap
A	AB	F	C
B	AD	G	D
C	AE	J	E
D	AF	P	H
E	AG	L	I
	AH	S	K
	AI	O	
	AJ	T	
	AK	AB	
J	AL	AE	X
	AM	AF	
L	AP	AG	
		AH	
		AI	
R		AJ	
		AK	
		AL	
		AM	
		AN	

Operating Temperature

Automatic Reset		
Open ±5°C		Close ±9°C
J	= 90	57**
K	= 105	61
L	= 105	69
V	= 105	78
Z	= 120	61
N	= 120	69
X	= 120	78
Y	= 120	92
W	= 135	61
U	= 135	69
M	= 135	78
R	= 135	92
S	= 135	102
H**	= 150**	78**
P**	= 150**	115**
O**	= 150**	102**
Manual Reset		
Open ±5°C		Close ±12°C
G	= 90	54**
F	= 105	63***
A	= 105	74*
B	= 120	74
D	= 135	96
E**	= 150**	96**

* 1-Phase Protectors only.
** Special temperatures.
Consult net additions.
*** 3-Phase Protectors only.

APPLICATION WORKSHEET

A sample worksheet provides the information needed for a proper application. It is not possible to apply a Klixon protector based on horsepower, amperage, or name plate data only.

Motor Data

A. Locked Rotor Requirements

1. Locked Rotor Current Cold: the current which exists the instant the motor is turned on.
2. Locked Rotor Current Hot: The current level that exists at end of 1st cycle test. Typically 10 to 30 seconds after motor is first turned on.
3. Time elapsed during above test to raise motor winding temperature from room temperature to around maximum allowed temperature for the UL class of motor insulation. An example would be, for a class A motor, 25ºC to 175ºC in 12.5 seconds.
4. Ambient Temperature During test: Room temperature (usually 25ºC).

B. Running Overload Requirements

1. Load Current: With the motor running, the load on the motor is to be increased in small increments until the motor winding has completely stabilized at approximately 10ºC below the maximum allowed by the UL class of the motor. An example would be, for a class A motor, the maximum allowed is 140øC. The motor winding temperature was completely stabilized at 130ºC and the current draw at that time would be recorded.
2&3. Protector Location Temperatures: These temperatures are taken at the conclusion of the above load current test while the motor is running under the above load.
4. Ambient Temperature: Room temperature (usually 25ºC).

C. Abnormal Conditions for Protection.

1. Max/min Ambient Temperatures: temperature in the surroundings of protector.
2. Max/min Line Volts: The highest and lowest voltages for which protection should be effective.
3. Other environmental considerations: i.e., exposed to agricultural weather conditions.

Name Plate Data

A. Horsepower	**H.P**
B. Voltage	**Volts**
C. Single or three phase	**Phase**
D. FLA (full load amps)	**Amps**
E. LRA (locked rotor amps)	**Amps**
F. Insulation class (UL/CSA) (indicate one)	**ABFH**

Protector Requirements

A. Automatic or manual reset	________
B. Round or eared base	________
C. Termination type	________

Motor Data Required

A. Locked rotor requirements	
1. Locked rotor current cold	**Amps**
2. Locked rotor current hot	**Amps**
3. Time required to raise motor winding to max. temperature	**Sec**
4. Ambient temperature during test	**Deg**
B. Running overload requirements	
1. Load current required to stabilize main winding temp. at 10ºC below maximum allowed	**Amps**
2. Protector location temperature below protector surface	**Deg**
3. Protector location temperature above protector (air temp)	**Deg**
4. Ambient temp during test	**Deg**
C. Abnormal conditions for protection	
1. Max/min ambient temperatures	**Deg**
2. Max/min line volts	**Volts**
3. Other environmental considerations	________

Note: Application assistance available from Sensata.

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