



8AM



2AM-4AM



**Sensata**  
Technologies

## 2AM/3AM/4AM/8AM Motor Protectors

**KLIXON**  
®

### Proven products backed by the leading innovators in protection technology.

Klixon® automatic motor protectors (AM series) are small, light weight and sensitive to temperature and current. The sealed steel cases will stand most dip and bake processes and can be mounted directly on motor windings for fast detection of temperature changes.

#### Operation

These on-winding motor protectors feature the Klixon® snapaction bimetallic disc in a normally closed circuit. The disc is actuated by the current passing thru it and the heat conducted from the motor windings. When the temperature reaches a predetermined calibration point corresponding to the maximum specified limit of the windings, the disc snaps open and interrupts the circuit. This permits maximum output while limiting the windings to a specified operating temperature. After the windings have cooled to the normal operating limit, the device resets automatically.

Closed Contacts



Open Contacts



#### 2AM/3AM/4AM wide application range

Available in a range of temperature and current sensitivities, the 2AM is suitable for a wide variety of applications. Designed to be mounted on the windings of electric motors and transformers, the 2AM protects against overheating and electrical overloading, offering the highest standards of safety and long term reliability.

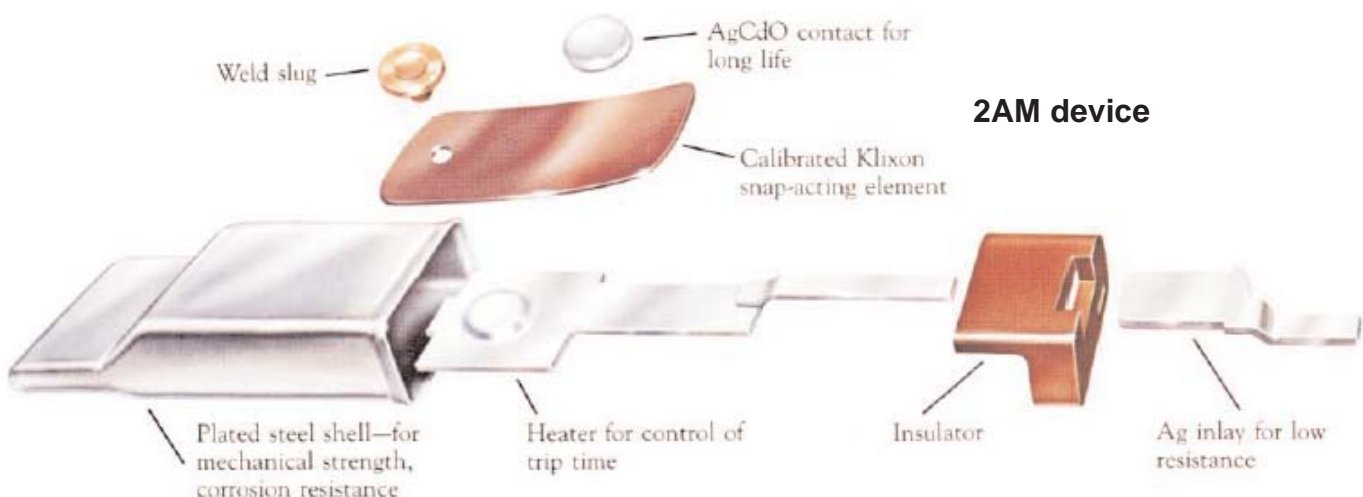
#### Robust sealed construction

The 2AM's steel case is epoxy sealed and then insulated with a Mylar® sleeve allowing direct mounting on the windings. Robust construction and ability to withstand typical mechanical pressures make the 2AM ideal for installation during the manufacture of electric motors and transformers. Where necessary, additional sealing can be provided to prevent epoxy ingress with specialized impregnation processes.

#### Flexibility

By adding a customized 3rd lead, the standard device becomes a dual circuit 4AM, ideal protection for dual voltage or dual speed applications. For higher horse power applications, the 3AM provides protection for fault conditions up to 60 Amps. With a range of anticipating heaters matching protector to motor from 6 to 60 Amps and operating temperatures from 90 to 150°C, the 2AM series provides unsurpassed design flexibility for motor and transformer applications.

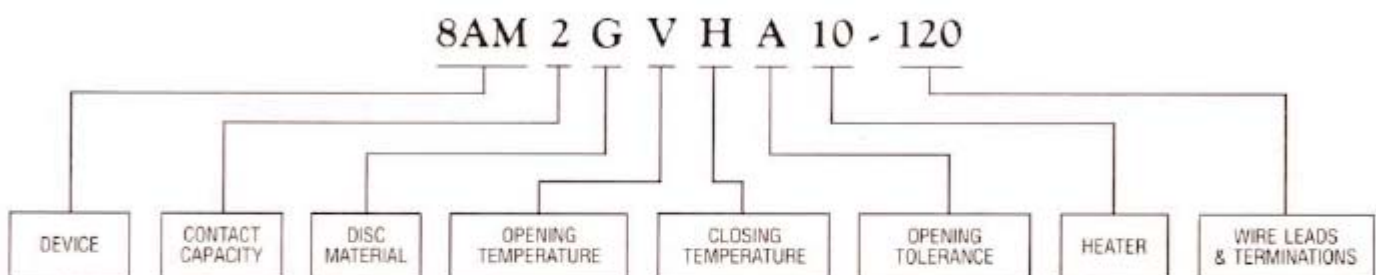
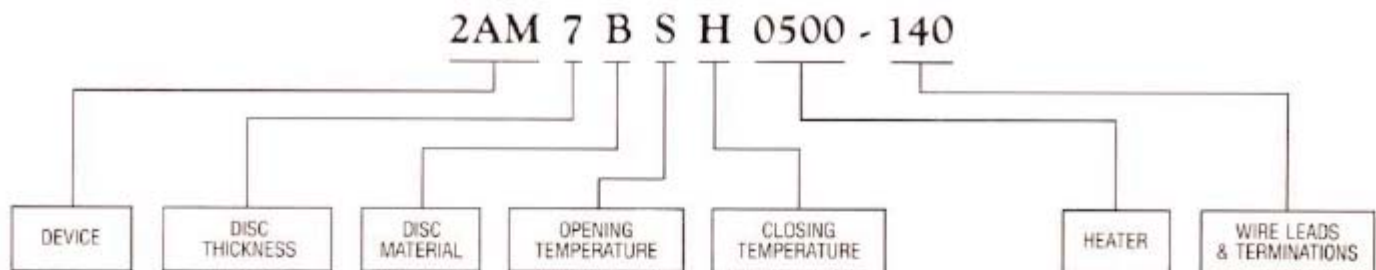
Mylar is registered trademark of Dupont



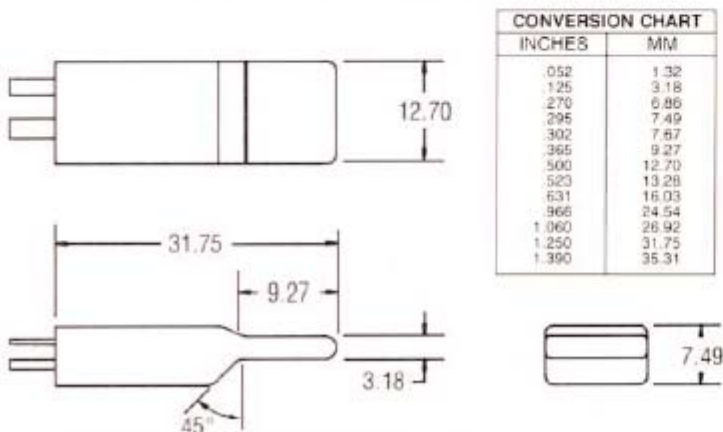


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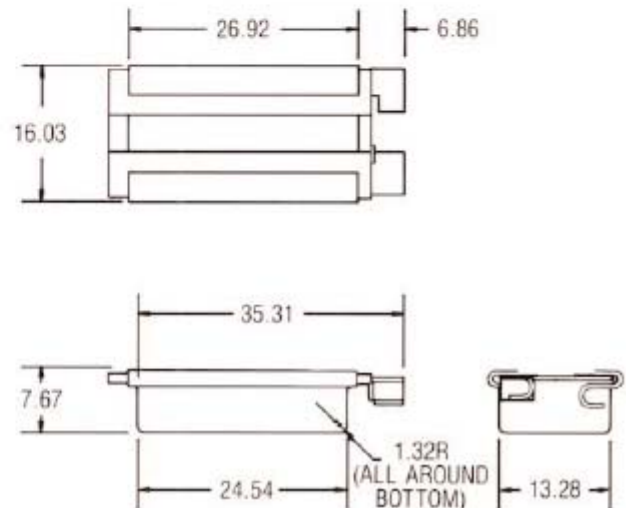


## 2AM Dimensions



CONVERSION CHART	
INCHES	MM
.052	1.32
.125	3.18
.270	6.86
.295	7.49
.302	7.67
.365	9.27
.500	12.70
.523	13.28
.631	16.03
.966	24.54
1.060	26.92
1.250	31.75
1.390	35.31

## 8AM Dimensions



NOTE: Nominal dimensions for reference purposes only (Millimeters)

## Certifications

	115V	230V	UL	CSA		ENEC
2AM	50	37	standard 547	File LR23241C		standard EN60730-2-2
3AM	60	45	Guide No. 400-H13-C	Guide No. 184-N-13.90		File 2014531-19
4AM	50	37	File E15962	Class 3211		
8AM1	50		USR		CNR	standard EN60730-2-2
8AM2	35		standard UL2111		standard C22.2 No 77	File 2014531-08
8AM4	60					



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## 8AM

Designed specifically for motors with a fast rate of temperature rise (25-35°C/sec), the 8AM provides economical protection for a full range of motors and transformers ranging from washing machines to vacuum cleaners; computer disk drives to high capacity automotive motors.

This unique design is capable of providing all mode protection:

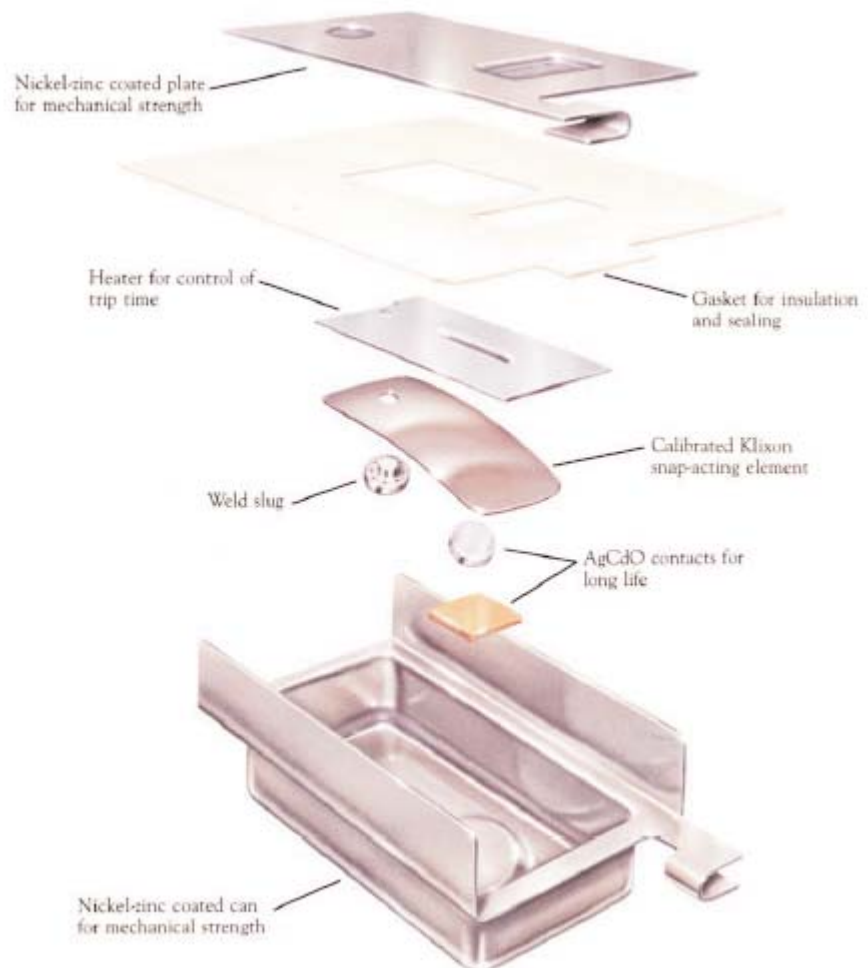
- Locked rotor
- Running overload
- Low voltage
- Run both winding

### Here's why you should be using the 8AM protector in your product:

- Compact, easy to install
- Individually temperature calibrated and checked
- Positive make-and-break with Klixon® snapaction disc
- Gasketed steel case suitable for many impregnation processes
- Current and temperature sensitivity for maximum design flexibility
- Specially designed terminals for easy addition of wireleads.

### Typical applications:

- Split-phase motors
- Capacitor start motors
- Ballast protection
- Transformers
- Automotive motors
- Solenoids



### TECHNICAL / SALES SUPPORT

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## 7AM Thermal Protectors

### KEY BENEFITS

Over 3 billion sold

Miniature size

Individually temperature checked on modern, custom-designed equipment

Positive make and break with Klixon® snap-action disc

Repeatable temperature performance over life

Gasketed steel case suitable for most impregnation processes

Current and temperature sensitivity for maximum design flexibility and application

Wide selection of leads and insulating sleeves

The Klixon® 7AM Thermal Protector is the market leader, backed by proven innovations in protection technology. The 7AM is a thermally operated snap-action device which delivers the maximum protection in the smallest package at an affordable price.

The 7AM is a proven performer in protection technology with over 35 years of design experience combined with a modern state-of-art manufacturing facility.

### Operation

The operating principle of the 7AM is both simple and effective. At the heart of the protector is a Klixon® bimetal snap-action disc. When the temperature of this disc reaches its precalibrated temperature it snaps open, resulting in an open circuit. This temperature is reached during a fault condition, caused by either an increase in ambient temperature, an increase in current flowing thru the disc, or a combination of both. After the 7AM breaks the circuit, the system cools and the 7AM automatically resets allowing power to be restored in the circuit.

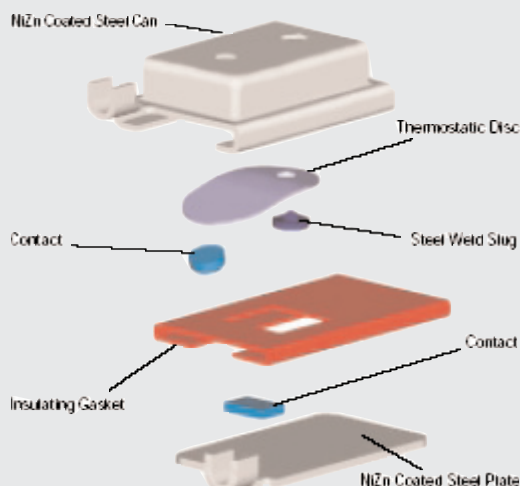
### Quality

Each 7AM rating has a bimetal disc designed and manufactured for the specific temperature rating. Each individual device is then calibrated and checked for opening temperature. This results in precise operating characteristics necessary to achieve consistent, reliable performance over the required life cycle.

This high level of performance is obtained thru Sensata Technologies traditional emphasis on quality. A corporate-wide thrust, re-emphasizes the supplier's responsibility and integrates modern statistical techniques into the production and quality assurance processes. As continuous inputs to the quality monitoring systems, more than 12 different checks are made during the manufacturing process.

### Applications

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



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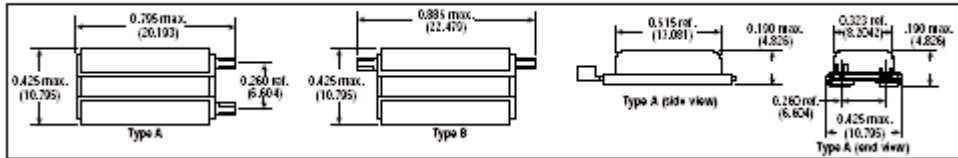




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## Dimensions Inches (Millimeters)



## Numbering System

7AM			XXX	X	X	-	XXX	-	X
Standard Opening Temperature			Terminal Configuration			Non-Standard Gasket Material (optional)			
Opng. Temp. °C	Low Resistance Bimetal Disc	High Resistance Bimetal Disc	Code	Code	Terminals	Code	Gasket Type / Color		
65	020	-		A	Same end	5	High Seal / White		
70	021	201		B	Opposite end				
75	022	202							
80	023	203							
85	024	204							
90	025	205							
95	026	206							
100	027	207							
105	028	208							
110	029	209							
115	030	210							
120	031	211							
125	032	212							
130	033	213							
135	034	214							
140	035	215							
145	036	216							
150	037	217							
155	038	218							
160	039	219							
165	040	-							
170	336	-							
175	316	-							

Temperature Tolerance

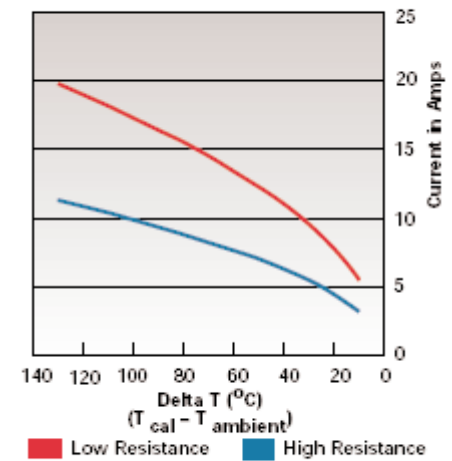
Code	Tolerance
5	±5°C

Physical Characteristics  
i.e. Wire leads, Insulating sleeve

Some ratings may not have UL listing. Please consult agency file listings

## Ultimate Trip Current vs. Delta Temperature

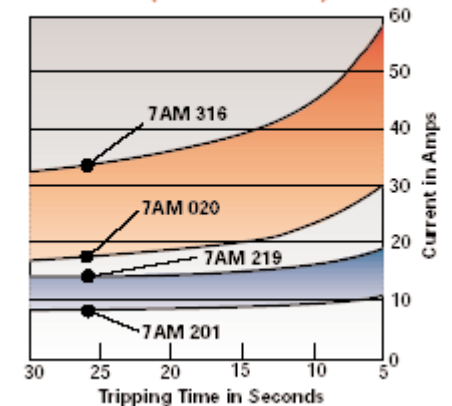
Approximation, to be used only for selecting samples for verification tests.



Note:

Delta T is the difference between the zero current calibrated opening temperature (T<sub>cal</sub>) and ambient temperature (T<sub>ambient</sub>) at the protector location.

## Average First Cycle Tripping Time vs. Current (25°C Ambient)



## Maximum Contact Ratings (10,000 Cycles)

Voltage	Current
16 VDC	20 amperes
120 VAC	22 amperes
277 VAC	8 amperes
600 VAC	4 amperes

## Certifications

Agency	File Number	Standard Number	Application
UL	E 15962	2111	Motor Protection
	E34618	873	Limit and regulating controls
CSA	11372	C22.2, #77	Motor Protection
	24458	C22.2, #74	Limit and regulating controls
KEMA(ENEC)	2014531.03	EN 60730-2-2	Motor Protection
		EN 60730-2-3	Ballast Protection
		EN 60730-2-9	Thermal cut-out

## TECHNICAL / SALES SUPPORT

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# Sensata

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# 15AM

## Motor Protector/Thermal Cut-Out

### KEY BENEFITS

Sensata Technologies Engineering knowledge base

Provides mounting flexibility

European supply

Competitive price

Local Engineering

#### Certifications

Agency	File number	Standard	Rating
ENEC	2014531.04	EN60730-2-9 Thermal Cut-Out	13 (5) A 250Vac / 10.000 cycles
ENEC	2014531.04	EN60730-2-2 Thermal Motor Protector	
UL / C-UL	E 15962	UL2111/CSA C22.2 No.77	

#### Specifications

Standard operating temperature range	from 65°C - 170°C
Tolerance on open temperature	± 5K
Maximum Ambient temperature	180°C
Maximum terminal temperature	185°C

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As world market leader in appliance motor protection Sensata Technologies builds the 15AM motor protector to meet almost any application in this field. The 15AM is designed to provide locked rotor and overload protection in a wide variety of motors for industrial and domestic appliances. The 15AM is a leader in the European AC motor protection market.

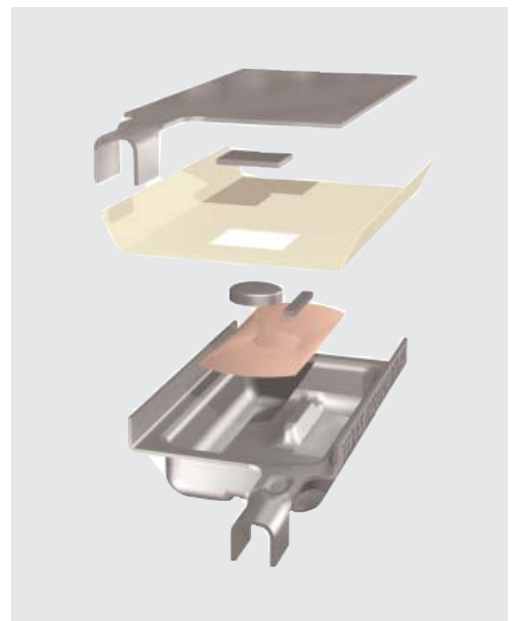
#### Design & operating principles

In the 15AM design the nickel plated shell holds and protects the inner components against varnish penetration and mechanical forces. The heart of the device is the calibrated Klixon® bimetal disc, responding to current and temperature changes. It is supported by a slug and a contact welded on the disc. The fixed contact is placed on the opposite nickel-zinc coated plated steel shell, separated by a coated gasket for insulating and sealing. The 15AM can be supplied as a basic device with leads and other integrated quick connectors or automated connection systems. Customized lead configurations are available on request. The 15AM can be fitted in the best possible mounting location in combination with the optimum assembly operation. As the 15AM is a metal device it may be necessary to insulate the device from other conductive parts. An insulating sleeve is available on request.

The operating principle of the 15AM is both simple and effective. A current flows through the resistive Klixon® bimetal disc. When a fault condition occurs, the increased current and shell temperature heats up the bimetal disc which snaps and opens the contacts. As the device cools down to a safe temperature, the contacts will automatically reset.

#### Applications

The 15AM operates as an incorporated thermal sensitive protector in electric motors for pumps, washing machines, dish washers, dryers, vacuum cleaners, fans, battery chargers and microwave ovens.

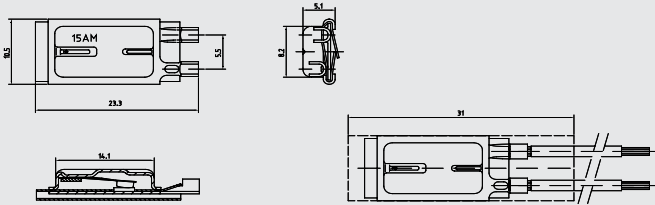




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## Dimensions (mm)



## Coding System

15AM

345

A

034

A

Sealing	
Code	Type
A	Standard
B	Hotmelt sealed

Standard Lead coding	
Length (mm)	Code
55	031
60	032
65	033
70	034
75	035
80	036
90	037
100	038
110	039
125	040
140	041
160	042
180	043
210	044
240	045
Others on request	

Sleeve coding	
Code	Type
A	Standard
	No sleeve

Standard opening temperature												
Specific Bimetal resistivity	30		70		100		250		500		850	
Nominal differential**	20 K	45 K	20 K	45 K	20 K	45 K	20 K	45 K	20 K	45 K	20 K	45 K
Opening Temp*	65°C	006		305	007		008		009			
	70°C	011		310	012		013		014			
	75°C	016		315	017		018		019			
	80°C	021		320	022		023		024			
	85°C	026		325	027		028		029			
	90°C	036		335	037		038		039			
	95°C	046		345	047		048		049		050	
	100°C	056	061	355	360	057	062	058	063	059	064	060
	105°C	071	076	370	375	072	077	073	078	074	079	075
	110°C	086	091	385	390	087	092	088	093	089	094	090
	115°C		106		405		107		108		109	
	120°C		121		420		122		123		124	
	125°C		136		435		137		138		139	
	130°C		151		450		152		153		154	
	135°C		166		465		167		168		169	
	140°C		181		480		182		183		184	
	145°C		196		495		197		198		199	
	150°C		211		510		212		213		214	
	155°C				520		222		223		224	
	160°C				530		232		233		234	
	165°C				540		242		243		244	
	170°C				550		252		253		254	

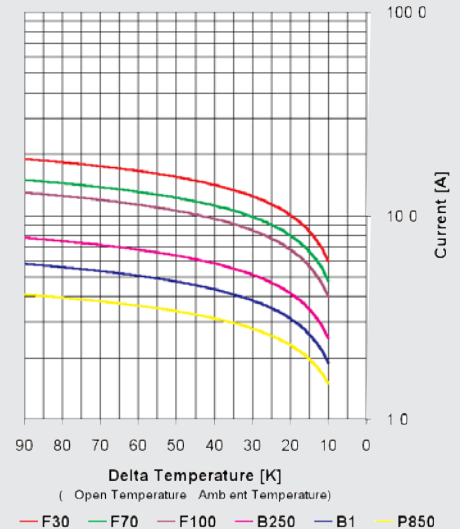
\* Opening temperature tolerance  $\pm 5K$ 

\*\* Nominal differential equals nominal opening temp. minus nominal closing temp.

Tolerance on closing temperature: 20K differential  $\pm 10K$   
45K differential  $\pm 15K$ 

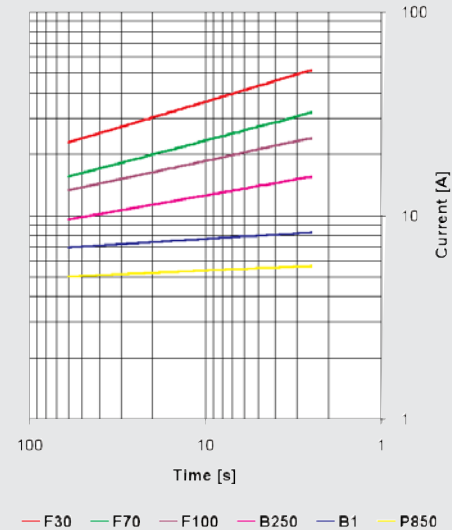
## Ultimate Trip Current vs. Ambient Temperature (non-circulating air)

Approx. to be used for selecting samples for verification on tests



## Average First Cycle Tripping Time vs. Current (ambient is 25°C)

Approx. to be used for selecting samples for verification on tests



## Declarations

Declarations to EN60730-2-9		Declarations to EN60730-2-2	
Purpose of the control	Thermal Cut-Out	Purpose of the control	Thermal Motorprotector
Construction	Incorporated, non-electronic		
Degree of protection	IP00		
Terminals for ext. conductors	For internal conductors only		
Temperature limits of the switchhead	180°C		
PTI of insulation materials	PTI 175	PTI of insulation materials	PTI 175
Method of mounting	Inserting, clamping, bracketing or the like	Method of mounting	Inserting, clamping, bracketing or the like
Operating time	For continuous operation		
Type of action	Type 2C (T-open) Type 1C (T - close)	Type of action	Type 3C
Reset characteristic	Automatic	Reset characteristic	Automatic
Extent of sensing element	Whole control		
Control pollution degree	Degree 2	Control pollution degree	Degree 2

## TECHNICAL / SALES SUPPORT



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# 17AM

## Thermal Protector for Motor / Ballast for Fluorescent and Temperature Sensing Controls

The World Depends on Sensors and Controls

The Sensata Technologies 17AM delivers the maximum protection in the smallest package at an excellent price... The KLIXON 17AM Thermal protector prevents overheating. It's a miniature, snap acting, thermally operated device that is a proven performer in protection technology. It protects against overheating in:

- Shaded Pole Motor
- Permanent split capacitor motor
- Fluorescent lighting ballasts
- HID ballasts
- Transformer
- Recessed lighting fixtures
- Battery packs
- Vacuum cleaners
- Automotive accessory motors, solenoids, PC boards

and other applications

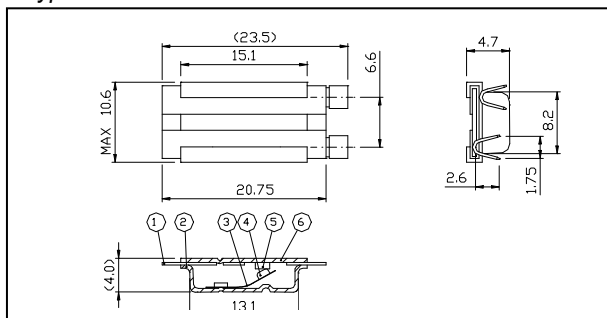
Here's why you should be using Sensata Technologies 17AM Thermal Protectors in your product:

- Miniature size.
- Individually temperature calibrated and checked.
- Positive make and break with Klixon snap action disc.
- Repeatable temperature performance over life.
- Gasket steel case suitable for many impregnation processes.
- Current and temperature sensitivity for maximum design flexibility.
- Wide selection of leads and insulating sleeves.
- Same size and opposite side terminations.
- Cadmium free contacts

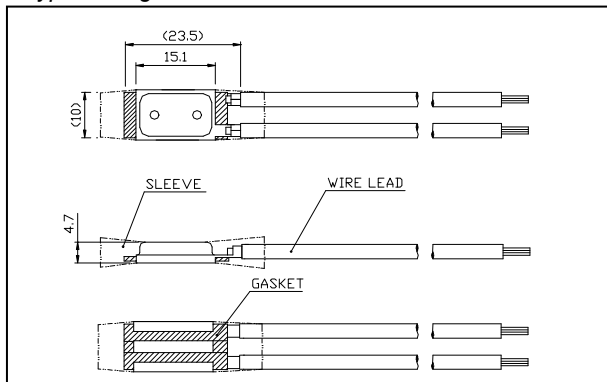
### Operation

The 17AM Thermal protector uses the same snap-action principle of other KLIXON protectors. The bimetal disc senses both heat and current from the equipment which 17AM is installed on. When the temperature of the disc reaches a predetermined calibration point, the disc snaps open the contacts, thus breaking the current path. When the equipment returns to a normal operating range, the 17AM protector resets (close circuit) automatically. Construction and Configuration is as shown below.

### A-type Construction



### A-type Configuration



### Technical Characteristics

Contact Capacity:	125Vac18A for TCO 250Vac9A for TCO 250Vac1A for TBP
Temperature Range:	65°C to 160°C for TCO/TMP 65°C to 135°C for TBP
Tolerance on Open Temp:	+/- 5K, +/- 8K or +/- 10K
Max. temp. of the switch head:	max. 160°C
Automatic Action:	Type3C for motor Type2C for ballast Type2B for TCO
Operating time:	Continuous
Pollution Situation:	Normal
Extent of sensing element:	whole control
PTI for Insulation:	250
Degree of protection:	IP00
Electrical connections:	On winding, Inserting, Clamping, Bracketing or like

### Certifications

Category	UL	ENEC	CQC
Motor Protector	E15962	2014531.05	CQC0200 2001332
Ballast for Fluorescent and Thermal Cut Out	E34618	2014531.05	-
Temperature Sensing Controls	E34618	2014531.05	-

Protectors are not registered in CCC(China Compulsory Certification) products list at present.

CQC(China Quality Certification Centre) is a national certification body in China.

# KLIXON®

Sensata Technologies





# 17AM

## Thermal Protector for Motor / Ballast for Fluorescent and Temperature Sensing Controls

The World Depends on Sensors and Controls

### Unique Type Reference

It is clearly defined the numbering system to find what user needs to know as follows.

**17AM XXX Y Z - ZZ**

**ZZ** : Lead length

Serial number is assigned for each lead length and configuration. No number identifies bare device.

**Z** : Open Temperature Tolerance

5 :  $\pm 5^{\circ}\text{C}$

8 :  $\pm 8^{\circ}\text{C}$

10 :  $\pm 10^{\circ}\text{C}$

**Y** : Termination Configuration

A/J: Terminals on same side

B/K: Terminals on opposite side

E: Terminals on same side with longer gasket and terminals

H: Terminals on opposite side with longer gasket and terminals

**XX** : Open Temperature

3 digit number for opening temperature

Nominal Operating Temperature	Type of Bimetal Disc (ohms/cm <sup>2</sup> )			
	70	125	350	468
Temperature Code				
65	020	060	-	-
70	021	061	161	201
75	022	062	162	202
80	023	063	163	203
85	024	064	164	204
90	025	065	165	205
95	026	066	166	206
100	027	067	167	207
105	028	068	168	208
110	029	069	169	209
115	030	070	170	210
120	031	071	171	211
125	032	072	172	212
130	033	073	173	213
135	034	074	174	214
140	035	075	175	215
145	036	076	176	216
150	037	077	177	217
155	038	078	178	218
160	039	079	179	219

Example :

**17AM033A5-4**

Bimetal of 70ohms/cm<sup>2</sup>, 130°C opening temperature, 5°C tolerance with 66.7mm length leads.



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Sensata Technologies Inc.  
Control products Business Unit

Website: [www.sensata.com](http://www.sensata.com)

**17AM** : Device Identification

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