

CLIFF

CIRCUIT PROTECTORS CP-SERIES

(COMBINED SWITCH / FUSE TYPE)

FOR OFFICE AUTOMATION, INDUSTRIAL AND CONSUMER EQUIPMENT



CP-Series circuit protector is designed to fit into standard fuseholder size cutout. It is available in two styles - Push button type, and lever type. Both types can be used as a single pole power on / off switch. Five current ratings are available for CP-101 series. CP-151 is rated 15A. @ 125VAC. 50/60 Hz.

Unique Feature : Switch will not reset whilst overload current remains connected.

Optional transparent snap on covers are available to prevent the protector being accidentally operated. (Cover must be removed before circuit can be reactivated).

Characteristics.

- Rapid action cutoff.
- High degree of sensitivity.
- Long operating life.
- Easy installation (Snap-in fixing)
- Range of optional accessories.
- Space saving - All versions can be used as a power switch.
- Eliminates fuse changing.
- Connection by 1/4" faston tag - which is solderable.
- Visual status of on-off.
- High reliability - UL approved.

Specification

Model No.		CP-101	CP-101P	CP-151	CP-151P
Type		Lever type	Push Button	Lever type	Push Button
Rated Voltage	VAC / Hz	AC 250V 50/60Hz		AC 125V 50/60Hz	
	DC	32V		32V	
Rated Current @ 25°C.		2A, 3A, 5A, 7.5A, 10A.		15A	
Interrupting	UL 1077	AC 250V 300AMP DC 32V 200AMP			
	JIS C4610	Rated Current x 20		AC 125V - 200A.	
Life	Mechanical	10,000	50,000	10,000	50,000
	Electrical	6,000	30,000	6,000	30,000
Shock Resistance		100G (without current)		100G (without current)	
Vibration Resistance		20G (10-100Hz. with 80% of rated current)		20G (10-100Hz. with 80% of rated current)	
Ambient Temperature Range		-10°C ~ +60°C (without freezing)		-10°C ~ +60°C (without freezing)	
Tripping Time (At ambient temperature 25°C).		No Trip at 100% of rated current. Trip within 1 hr at 135% of rated current.		No Trip at 100% of rated current. Trip within 1 hr at 135% of rated current.	
Resetting Time (By manual resetting)		When tripped, reclose after 10 sec. or over.		When tripped, reclose after 10 sec. or over.	

19
20
BUTTON TYPE

10

1-2.6

SAME BODY FOR
LEVER TYPE
OR
BUTTON TYPE

PANEL CUTOUT
OPTIONS

15.1^{+0.2}₋₀

13.1^{+0.2}₋₀

18
17
LEVER TYPE

53°
ON
OFF

Ø15

10.2

4.4

29.8

9.6

10.2

Ø15.1^{+0.1}₋₀ DIA

13.1^{+0.2}₋₀

Standard Overall Colour - Black

Rated Current VS. Temp

Ambient Temperature °C.	% of Rated Current
0	125
10	115
20	105
30	95
40	85
50	80

Thermal Protection Characteristics of the 1000 Series Thermal Protection Relay

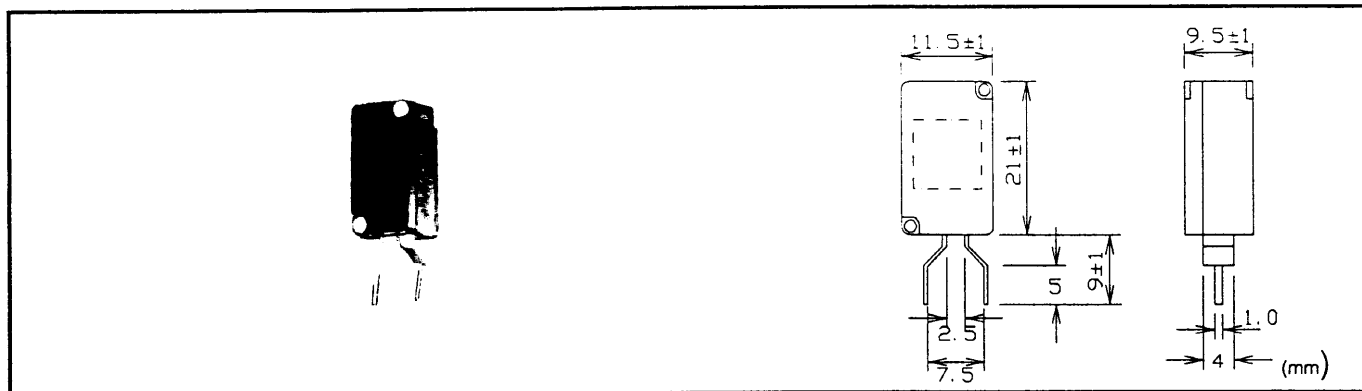
Current (Percent rated current)	Max Tripping Time (Hr)	Min Tripping Time (Hr)	Max Tripping Time (Min)	Min Tripping Time (Min)	Max Tripping Time (Sec)	Min Tripping Time (Sec)
100	> 6	> 6	> 60	> 60	> 3600	> 3600
125	4	1	40	10	2400	600
150	2	0.5	20	5	1200	300
200	1	0.2	10	2.5	600	150
300	0.5	0.1	5	1.25	300	75
400	0.3	0.06	3	0.75	180	45
500	0.2	0.04	2	0.5	120	30
600	0.15	0.03	1.5	0.375	90	22.5
800	0.1	0.02	1	0.25	60	15
1000	0.08	0.015	0.8	0.2	48	12
1500	0.05	0.008	0.5	0.125	30	7.5
2000	0.04	0.006	0.4	0.1	24	6
3000	0.03	0.004	0.3	0.075	18	4.5
4000	0.025	0.003	0.25	0.0625	15	3.75
5000	0.02	0.002	0.2	0.05	12	3

- Transparent covers for lever or button type (TC) They prevent accidental operation.
- Colour bezels for lever type (CB) Colours Black (STD) Red, Green, Yellow, White.
- Din rail metal adaptor (DRM) Permits mounting in Din rail enclosures.
- LED bezel for lever type (LED) LED can indicate power on / off. LED colours red or green.
LED Bezel colours - Red, Green, Yellow, White.

e.g. CP101P - 5A - TC = Button type 5 amp with cover.

2.

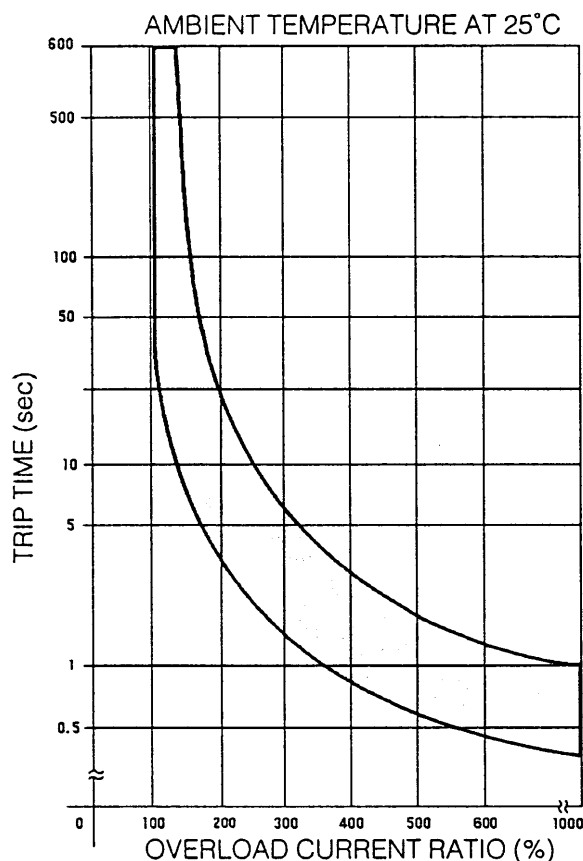
CIRCUIT BREAKER A - SERIES



FEATURES

These overcurrent protectors are designed to protect audio speaker systems, amplifiers and power supplies from internal overcurrents.

1. High current accuracy.
2. Protection against excessive temperature.
3. Snap action.
4. Automatic reset type.
5. Long life. Low cost.
6. Phenolic resin enclosure / Polycarbonate cover.
7. Easy mounting on PCB.
8. Economically priced.
9. Reliable.



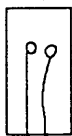
OPERATING SEQUENCE

Normal



Stage 1

Trip



Stage 2

Reset



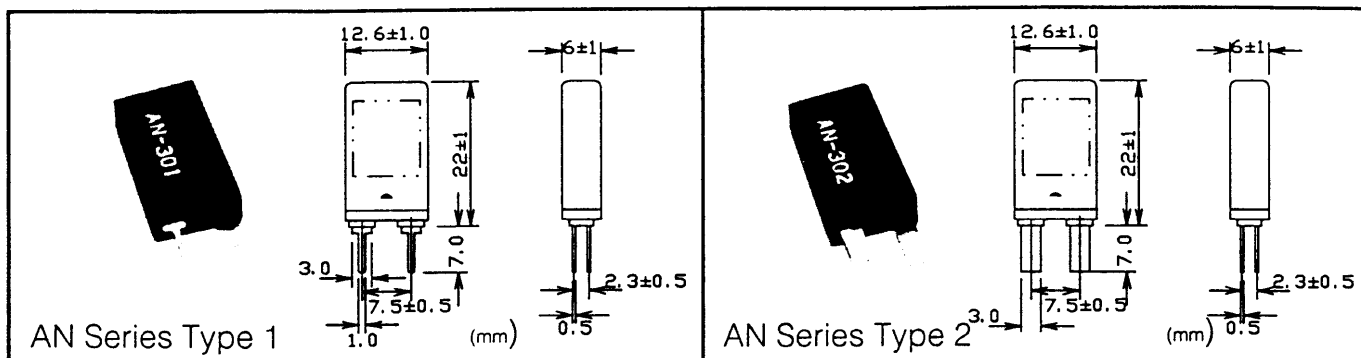
Stage 3

Bimetal

CHARACTERISTICS

TYPE	RATED HOLD CURRENT (A)	MAX VOLTAGE (V)	Trip Time		INTERNAL RESISTANCE (mΩ)	MAXIMUM INTERRUPT CURRENT (A)
			200%	300%		
	AC at 25°C		Overload Current			
A .06	0.6	250	within 30secs	within 7 secs	Under 600	10
A .085	0.85	250	"	"	Under 500	10
A .10	1.0	250	"	"	Under 300	10
A .12	1.25	250	"	"	"	15
A .14	1.4	250	"	"	Under 175	15
A .16	1.6	250	"	"	Under 120	15
A .17	1.75	250	"	"	"	15
A .19	1.9	250	"	"	Under 100	20
A .22	2.2	250	"	"	"	20
A .25	2.5	250	"	"	"	25
A .27	2.7	250	"	"	"	25
A .30	3.0	250	"	"	"	30
A .32	3.2	250	"	"	"	30
A .35	3.5	250	"	"	"	35
A .40	4.0	250	"	"	"	40
A .50	5.0	250	"	"	"	50
A .60	6.0	250	"	"	"	60

CIRCUIT BREAKER AN - SERIES



The AN - Series Circuit Breaker is a new compact size version of A - Series. It is available for currents up to 12 amps.

FEATURES

1. High current accuracy.*
2. Protection against excessive temperature.
3. Snap action.
4. Automatic reset type.
5. Long life.
6. P.B.T. resin enclosure.
7. Economically priced.
8. Reliable.
9. Two mounting options.

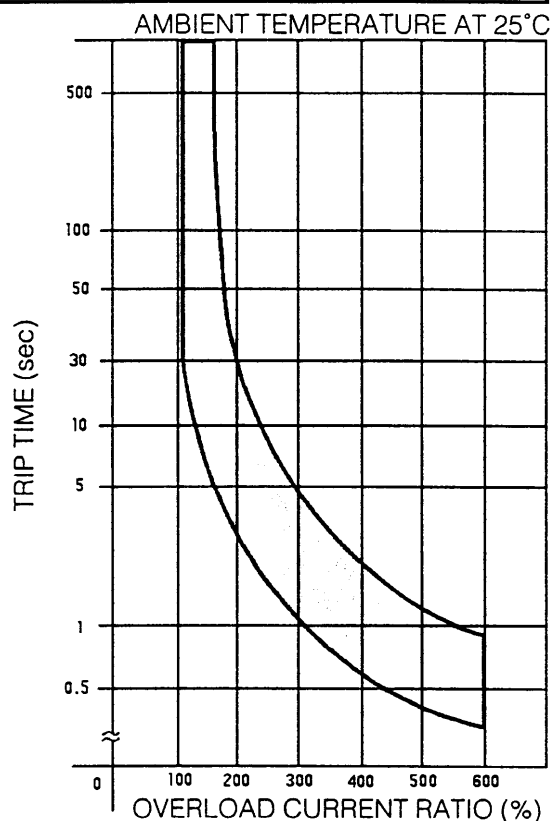
* Low current models should be used within following maximum ambient temperatures :

AN-04, AN-05 50°C

AN-06 - 60°C

AN-08 - 70°C

Note : Rated hold current decreases with temp >25°C, and increases with temp <25°C.



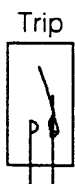
CHARACTERISTICS

OPERATING SEQUENCE

Normal



Stage 1



Stage 2



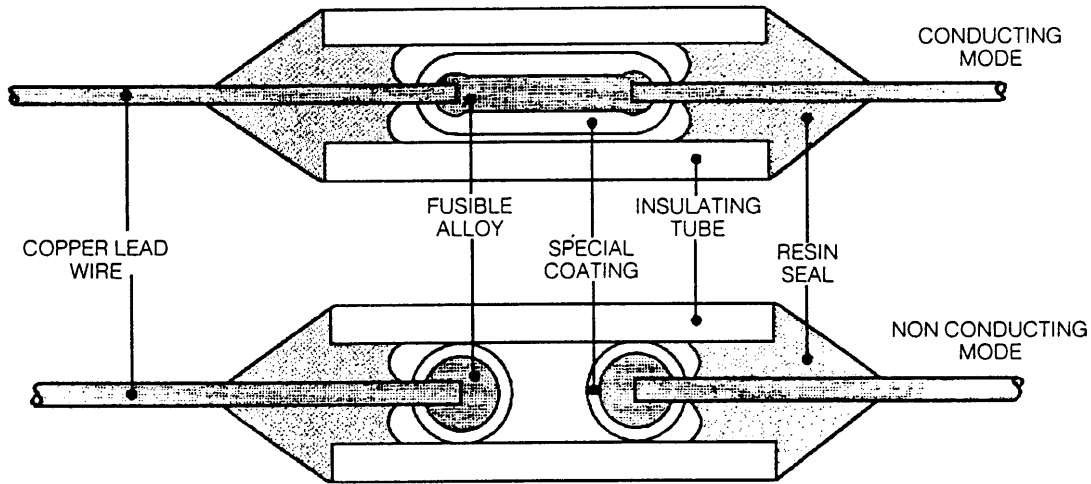
Stage 3

TYPE 1	TYPE 2	RATED HOLD CURRENT (A)	MAX VOLTAGE (V)	Trip Time		INTERNAL RESISTANCE (mΩ)	MAXIMUM INTERRUPT CURRENT (A)
				200%	300%		
		PC	TAGS	AC at 25°C			
AN-041	-	0.4	250	within 30secs	within 5 secs	Under 700	4
AN-051	-	0.5	250	"	"	Under 600	5
AN-061	-	0.6	250	"	"	Under 500	6
AN-081	-	0.85	250	"	"	"	10
AN-101	AN-102	1.0	250	"	"	Under 150	20
AN-121	AN-122	1.25	250	"	"	"	20
AN-141	AN-142	1.4	250	"	"	Under 100	20
AN-161	AN-162	1.6	250	"	"	"	20
AN-171	AN-172	1.75	250	"	"	"	20
AN-191	AN-192	1.9	250	"	"	Under 75	20
AN-221	AN-222	2.2	250	"	"	"	20
AN-251	AN-252	2.5	250	"	"	"	25
AN-271	AN-272	2.7	250	"	"	"	25
AN-301	AN-302	3.0	250	"	"	Under 35	30
AN-401	AN-402	4.0	250	"	"	"	40
AN-501	AN-502	5.0	250	"	"	Under 30	50
AN-601	AN-602	6.0	250	"	"	"	60
AN-701	AN-702	7.0	250	"	"	"	60
AN-801	AN-802	8.0	250	"	"	"	60
AN-901	AN-902	9.0	250	"	"	"	60
AN-1001	AN-1002	10.0	250	"	"	"	60
AN-1201	AN-1202	12.0	250	"	"	"	60

THERMAL CUTOUTS

A Range of low cost one-shot cutouts for circuit protection applications

PRINCIPLE OF OPERATION



APPLICATIONS

CLIFF Thermal Cutouts are available with Axial and Radial leads. They are widely used to prevent over-heating of electrical components like motors, transformers and solenoids. They are particularly used to keep the electronic circuits from over-heating in equipment such as computers, VTR, Inverter, Switching power supply and Medical equipment.

STRUCTURE

Tin/Lead plated soft copper wire leads are welded to a fusible alloy with a specific melting point. Special resins coat the alloy in order to prevent surface oxidation and to ensure complete cutoff function at melting point.

The fusible alloy is completely insulated within the case by sealing the leads and the case with a special resin compound.

WORKING THEORY

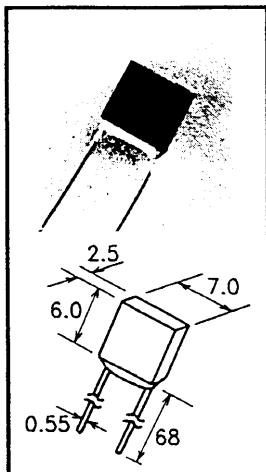
When the ambient temperature of the thermal cutout rises, the fusible alloy melts. The electrical circuit in the thermal cutout is opened. Two separate spheres form at the edges of the leads through surface tension of the melting fusible alloy. Additional insulation between the spheres is provided by the coating resin, which encapsulates the surface.

FEATURES

1. Available in two types - Axial and Radial.
2. Cliff thermal cutouts are approved by various international standards, the Japan Electric Appliance Law (JEAML), UL, CSA, VDE and BEAB.
3. Highly reliable due to their outstanding thermal sensitivity.

SPECIFICATIONS

H TYPE HE TYPE (2 AMP)



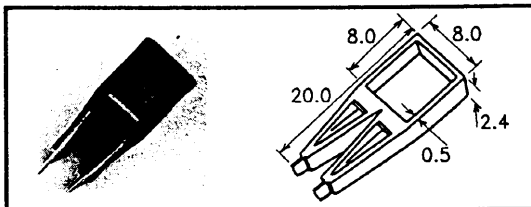
RADIAL LEADS FOR PC MOUNTING OR HARD WIRING. RATED 2A. - 250VAC

MODEL	NOMINAL OPERATING TEMP (°C)	OPERATING TEMP (°C)	TH (°C)	TM (°C)	RATING		APPROVALS				
					(A)	(V)	JEAML	UL	CSA	VDE	BEAB
H100	103	98 ± 2	70	180	2.0	250	O	O	O	O	O
H110	117	112 ± 2	85	180	2.0	250	O	O	O	O	O
H125	127	124 ± 2	95	180	2.0	250	O	O	O	O	O
H130	136	130 ± 2	105	180	2.0	250	O	O	O	O	O
H135	140	135 ± 2	105	180	2.0	250	O	O	O	O	O
H145	150	145 ± 2	115	180	2.0	250	O	O	O	O	O
H160	165	160 ± 2	130	180	2.0	250	O	*	O	*	*
H169	169	165 ± 3	130	180	2.0	250	O	*	O	*	*

O - APPROVED * - PENDING

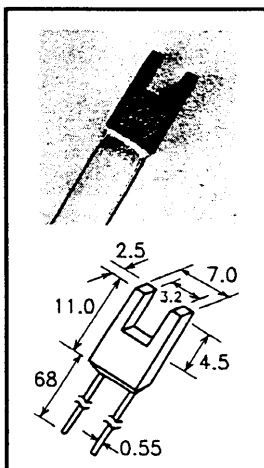
NOTE : For BEAB Approved Model, add suffix 'E' to Model No. e.g. H100E.
UL - E73581, CSA - LR50521, VDE - 13710-4510-1002 (VDE0831) BEAB - 0532

HOLDER FOR H TYPE



Simple plug-in holder for mounting H type thermal cutouts. No insulation tube is required. (Labour saving in the transformer assembly line).
Material : PBT

H - A TYPE H-AE TYPE (2 AMP)

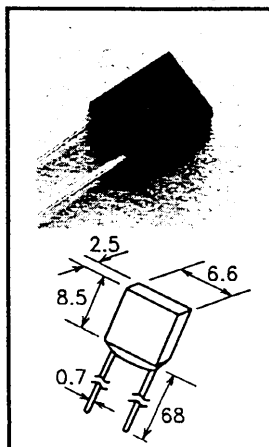


FOR SCREW MOUNTING. RATED 2A. - 250VAC

MODEL	NOMINAL OPERATING TEMP (°C)	OPERATING TEMP (°C)	TH (°C)	TM (°C)	RATING		APPROVALS				
					(A)	(V)	JEAML	UL	CSA	VDE	BEAB
H100A	103	98 ± 2	70	180	2.0	250	O	O	O	H100AE	*
H110A	117	112 ± 2	85	180	2.0	250	O	O	O	H110AE	*
H125A	127	124 ± 2	95	180	2.0	250	O	O	O	H125AE	*
H130A	136	130 ± 2	105	180	2.0	250	O	O	O	H130AE	*
H145A	150	145 ± 2	115	180	2.0	250	O	O	O	H145AE	*
H160A	155	160 ± 2	130	180	2.0	250	O	*	*	*	*
H169A	160	165 ± 3	130	180	2.0	250	O	*	*	*	*

O - APPROVED * - PENDING

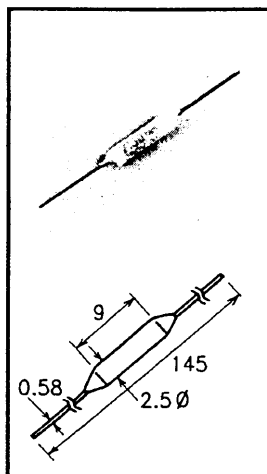
E TYPE (3/5 AMP)



MODEL	NOMINAL OPERATING TEMP (°C)	OPERATING TEMP (°C)	TH (°C)	TM (°C)	RATING		APPROVALS				
					(A)	(V)	JEAML	UL	CSA	VDE	BEAB
E2	103	98 ± 2	70	180	3	250	33-696	*	*	*	*
E3	117	112 ± 2	85	180	3	250	33-696	*	*	*	*
					5	125		*	*	*	*
E4	127	124 ± 2	95	180	3	250	33-411	*	*	*	*
					5	125		*	*	*	*
E5	136	130 ± 2	105	180	3	250	33-411	*	*	*	*
					5	125		*	*	*	*
E7	150	145 ± 2	115	180	3	250	33-412	*	*	*	*
					5	125		*	*	*	*
E8	169	165 ± 3	130	180	3	250	33-706	*	*	*	*

O - APPROVED * - PENDING

V TYPE (2 AMP) VE TYPE



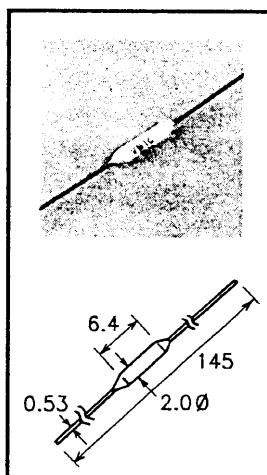
AXIAL LEADS. RATED 2A. - 250VAC

MODEL	NOMINAL OPERATING TEMP (°C)	OPERATING TEMP (°C)	TH (°C)	TM (°C)	RATING		APPROVALS				
							JEAML	UL	CSA	VDE	BEAB
					(A)	(V)					
V100	103	95 ± 2	70	160	2.0	250	O	O	O	O	*
V110	117	112 ± 2	95	160	2.0	250	O	O	O	*	*
V125	131	126 ± 2	95	160	2.0	250	O	O	O	O	*
V130	135	130 ± 2	100	160	2.0	250	O	O	O	O	*
V145	150	145 ± 2	115	160	2.0	250	O	O	O	O	*
V169	169	165 ± 3	130	180	2.0	250	O	*	O	*	*

O - APPROVED * - PENDING

NOTE : For VDE / BEAB Approved models add suffix E to Model No. e.g. V100E.

VS TYPE (1 AMP) VS-E TYPE



SUBMINIATURE TYPE AXIAL LEADS. RATED 1A. - 250VAC

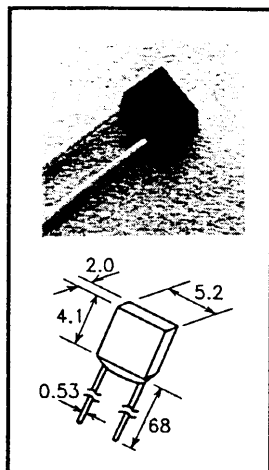
MODEL	NOMINAL OPERATING TEMP (°C)	OPERATING TEMP (°C)	TH (°C)	TM (°C)	RATING		APPROVALS				
							JEAML	UL	CSA	VDE	BEAB
					(A)	(V)					
VS10	103	98 ± 2	70	160	1.0	250	O	O	O	O	*
VS11	117	112 ± 2	95	160	1.0	250	O	O	O	O	*
VS12	128	124 ± 2	100	160	1.0	250	O	O	O	O	*
VS13	136	131 ± 2	100	160	1.0	250	O	O	O	O	*
VS14	150	145 ± 2	115	160	1.0	250	O	O	O	O	*
VS15	169	165 ± 3	130	180	1.0	250	O	*	O	*	*

O - APPROVED * - PENDING

(E TYPE VDE / BEAB ONLY e.g. VS100E)

UL - E73591, CSA - LR50521, VDE - 13710-4510-1007

N TYPE (1 AMP)



MODEL	NOMINAL OPERATING TEMP (°C)	OPERATING TEMP (°C)	TH (°C)	TM (°C)	RATING		APPROVALS				
							JEAML	UL	CSA	VDE	BEAB
					(A)	(V)					
N2	103	98 ± 2	70	180	1	250	33-696	O	O	*	*
N3	117	112 ± 2	85	180	1	250	33-696	*	O	*	*
N4	127	124 ± 2	95	180	1	250	33-411	*	O	*	*
N5	136	130 ± 2	105	180	1	250	33-411	*	O	*	*
N6	140	135 ± 2	105	180	1	250	33-411	O	O	*	*
N7	150	145 ± 2	115	180	1	250	33-412	O	O	*	*
N8	169	165 ± 3	130	180	1	250	33-706	O	O	*	*

O - APPROVED * - PENDING

Definitions of the characteristics:

1) Nominal Functioning Temperature. - It is called 'Nominal Operating Temperature' under the Japan Electric Appliance and Material Law (JEAML). Under such standards as UL, CSA and VDE which basically comply with the IEC specifications, it is called 'Rated Functioning Temperature'. According to the JEAML, thermal cutouts, when conducting the detection current and subject to the increasing rate of temperature designated by the specifications, must function in the tolerance range of $\pm 7^{\circ}\text{C}$ to the rated functioning temperature. With the IEC specifications, on the other hand, they must function in the range of $+0^{\circ}\text{C} \sim -10^{\circ}\text{C}$ to the rated functioning temperature.

2) Operating Temperature - Operating temperature of a thermal cutout carrying current less than 0.1A. and placed in an oil bath where the temperature rises 1°C per minute.

3) TH : Holding Temperature - TH is the maximum temperature at which a thermal cutout can be maintained without operating while conducting the rated current for a period of time specified by the manufacturer.

4) TM : Maximum Temperature Limit - TM is the maximum temperature at which mechanical and electrical properties of a thermal cutout can be maintained without resuming conductivity after operating.

TH SERIES THERMAL CUTOFFS. ONE SHOT TYPE

• Description

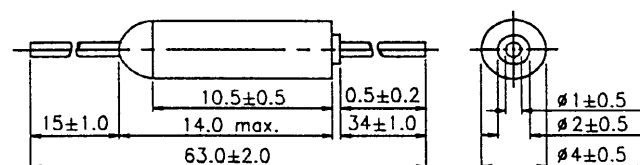
TH type thermal cutoffs comprises special heat-sensitive compound, encapsulated in a metal case, with flame retardent epoxy resin end seal and tinned copper wire axial leads. The thermal cutoffs are specially designed for consumer and industrial applications : audio, TV, VTR, air conditioners, washing machines, fans, refrigerators, hair dryers, hair curler, electric sewing machine, electric irons, electric blankets, lamps, fluorescent lamp, storage radiators, cookers, cooking hob, microwave ovens, electric water pots, coffee percolators, coffee grinders, juice mixer, dishwashers etc. etc.

• Electrical Characteristics

Rated Voltage : 250VAC 50 - 60Hz
 Rated Current : 10A. Max.
 Rated Opening Temp. : 75°C to 230°C
 Actual Opening Temp. : ... 71°C to 226°C

• Dimensions

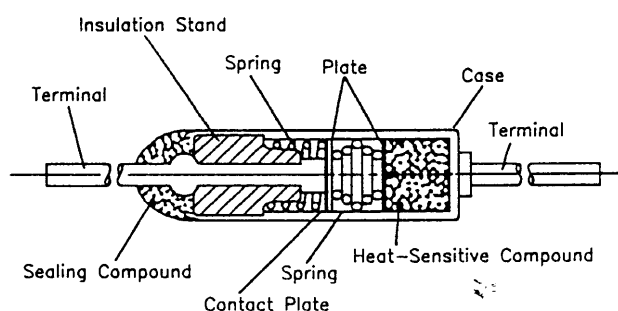
(Unit = mm)



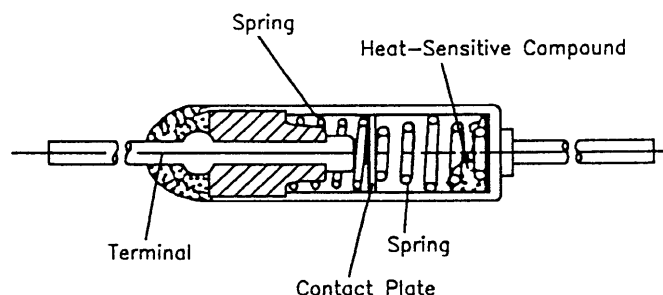
• Construction

Cutoff Device :

★ Before Cutoff



★ After Cutoff



• Standard Rating and Model Number

Model	Electrical Rating	Rated Opening Temp (°C)	Actual Opening Temp. & Tolerance (°C)
TH071E06	250VAC/10A.	75	71 +1, -3
TH083E02	"	87	83 +1, -3
TH099E04	"	103	99 +1, -3
TH106E04	"	110	106 +1, -3
TH117E01	"	121	117 +1, -3
TH127E09	"	131	127 +1, -3
TH132E02	"	136	132 +1, -3
TH143E09	"	147	143 +1, -3
TH153E07	"	157	153 +3, -1
TH169E09	"	173	169 +0, -4
TH188E06	"	192	188 +4, -0
TH226E09	"	230	226 +4, -0
TH236E07	"	240	236 +3, -1

Approvals:- CSA - LR97837, UL - Pending,
 T Mark - All Models

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