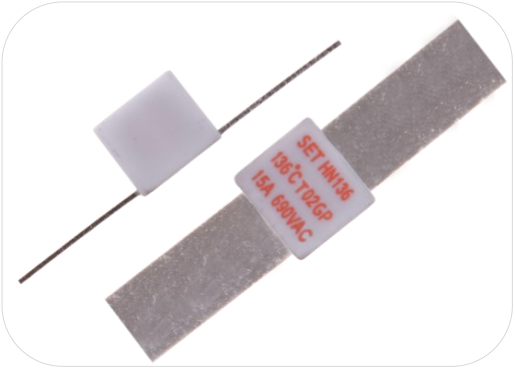
Thermal-Link (ATCO)-Alloy Type

HN Series



Description

Alloy Thermal-Link / Alloy Thermal Cutoff (ATCO) is defined as a non-resettable protective device functioning one time only. It is widely used in electrical equipment. ATCO is mainly consist of fusible alloy, flux resin, case, sealant and lead wires. Normally, fusible alloy is jointed to the two lead wires. Under abnormal conditions, when the temp. reaches to the fusing temp. of ATCO, the fusible alloy melts and quickly retracts to the two lead wire ends with the aid of the flux resin and disconnects the circuit completely.

SETsafe | SETfuse Alloy Thermal-Link (ATCO) HN series Rated Functioning Temp. from 125 ℃ to 145 ℃, Rated Current: 15 A, safety certification Includes UL, cUL, TUV, PSE, CCC, and complies with RoHS and REACH.

Features

- Non-Resettable
- High Accuracy of Functioning Temp.
- High Operating Voltage
- RoHS & REACH Compliant

Applications

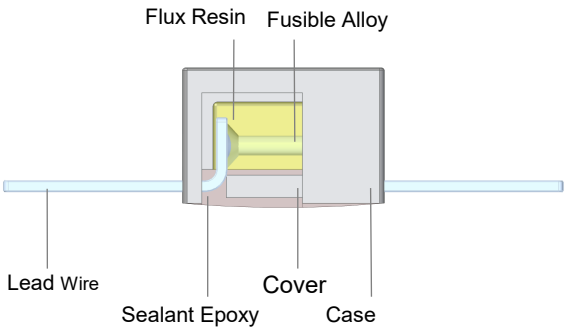
- Surge Protective Devices
- Batteries
- Automobile Electronic

Customization

- Other Temp.
- The Length of Lead Wires
- Leads Forming Types

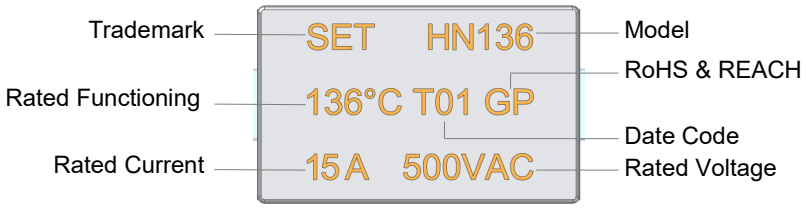
Structure Diagrams

Axial



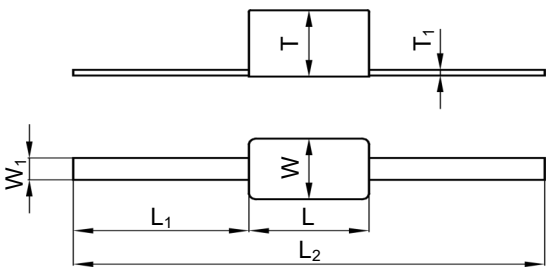
Marking

Axial (Color for reference only)



Remark: The first letter of the Date Code Year/quarter A stands for 2000, B stands for 2001, 01 stands for the first quarter, 02 stands for the second quarter, and so on.

Dimensions (mm)



L	L_1	L_2	W	W_1	T	T_1
10.0 ± 1.0	30.0 ± 2.0	70.0 ± 3.0	10.0 ± 1.0	7.6 ± 1.0	7.4 ± 1.0	0.5 ± 0.1

Thermal-Link (ATCO)-Alloy Type

HN Series

Specifications

Rated Functioning Temp. (T_f) °C

	Model	Fusing Temp.	T_h	T_m	I_r	U_r	UL	cUL	TUV	PSE	CCC	RoHS REACH
		(°C)	(°C)	(°C)	(A)	(V)						
145	HN145	140 ± 2	115 111[a]	250	15	AC 690	●	●	●	●	●	●
						DC 200	●	●	●	○	●	●
136	HN136	131 ± 2	106 102[a]	250	15	AC 690	●	●	●	●	●	●
						DC 200	●	●	●	○	●	●
125	HN125	121 ± 2	90 86[a]	250	15	AC 690	●	●	●	●	●	●
						DC 200	●	●	●	○	●	●

Note:

1: "●"Means certificated, "○"Means non-certificated, RoHS & REACH Compliant .

2: " a ": The temperature measurement point for holding temperature (Th) shall be positioned 50 mm away from the product body, in accordance with the requirements specified in Appendix I of GB/T 9816.1-2023.

Agency Information

Institution	Standards	The File No. and certification No. obtained by SETsafe | SETfuse
	UL 60691	E214712
	CAN-CSA-E60691	E214712
	EN 60691	R50336499
	J60691	JET2121-32001-2030、JET2121-32001-2031
	GB 9816.1	2020980205000176

Soldering

Hand-Soldering

1. Soldering should be carried out according to Table T-1.
2. The thermal element of ATCO is fusible alloy with low melting point, which is jointed with ATCO lead wires. Improper soldering operation (too high soldering temp. , too long soldering time, too short lead wire etc.) may transfer more heat to the thermal element and ATCO may open in advance.
3. When soldering conditions are more severe than those listed in Table T-1, a heat sink fixture should be used between soldering point and ATCO body.
4. When soldering, please do not pull / push or twist ATCO body or lead wires.
5. After soldering, let it naturally cool for longer than 20 seconds. During cooling, never move the ATCO body or lead wires.

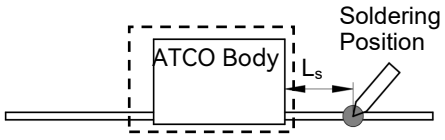


FIGURE T-1

TABLE T-1 Hand-Soldering Time

Rated Functioning Temp. (T_f)	Max. Allowable Soldering Time for Different Lead Wire Length (Fig.T-1)									Max. Soldering Temp.
	L_s Length	Time		L_s Length	Time		L_s Length	Time		
		Tinned Copper Wire	CP Wire		Tinned Copper Wire	CP Wire		Tinned Copper Wire	CP Wire	
(°C)	(mm)	(s)	(s)	(mm)	(s)	(s)	(mm)	(s)	(s)	(°C)
125 to 135	10	1[a]	4	20	3	6	30	5	8	400
136 to 145	10	3	6	20	5	8	30	5	8	400

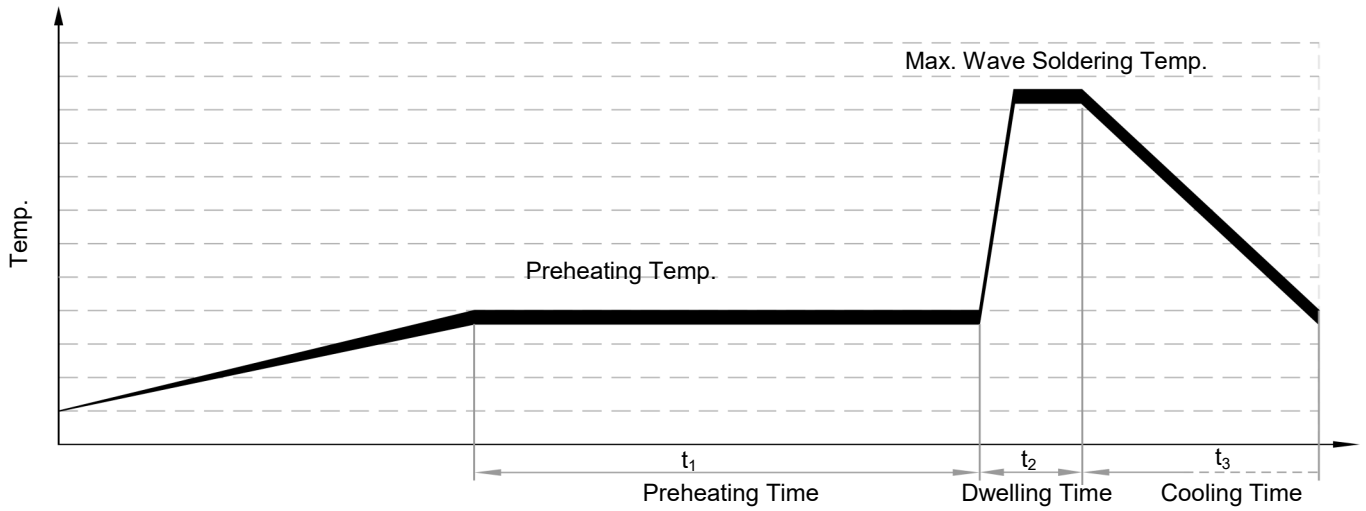
Note:
a: Auxiliary Heat Sink Fixture is Required to Avoid ATCO Cutting off Unexpectedly.

Wave Soldering

The wave soldering parameters as Table T-2, for reference only, when ATCO is for practice use, you need to do some validation experiments. For example, using X-RAY to see the fusible alloy of ATCO whether damage after wave soldering.

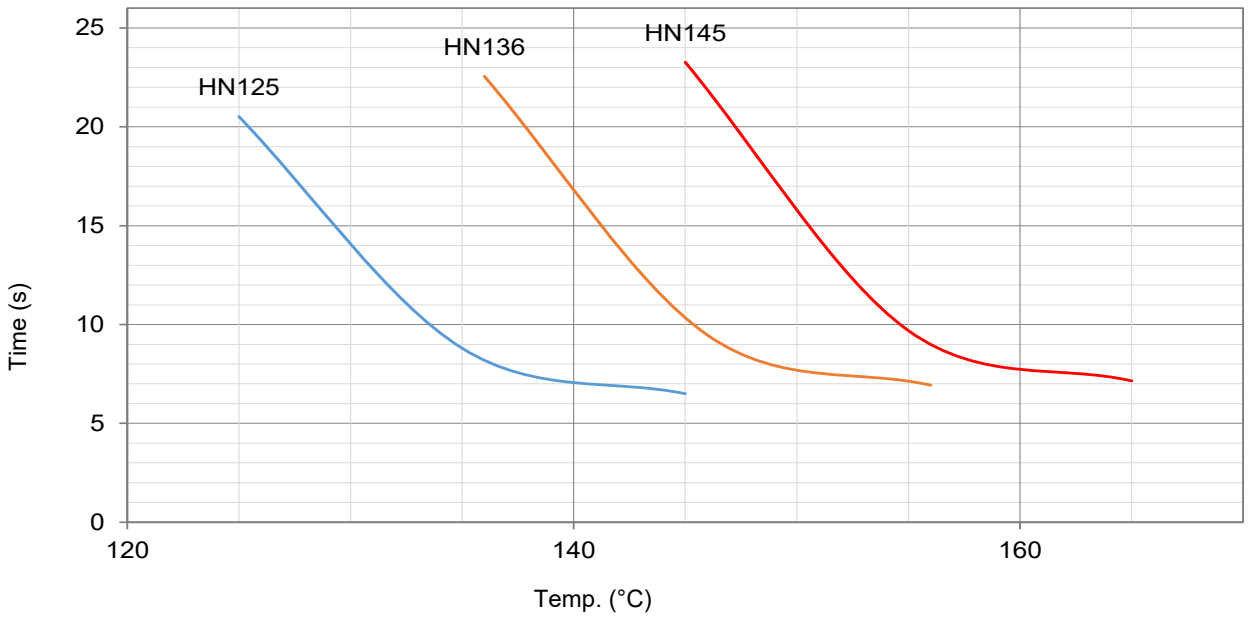
TABLE T-2 Wave Soldering Parameters Setting

Rated Functioning Temp. (T_f)	Max. Allowable Preheating Temp. When the Length of Lead Wire is Different (Fig.T-1)				Preheating Time (t_1)	Max. Wave Soldering Temp.	Dwelling Time (t_2)	Cooling Time (t_3)
	L_s Length	Preheating Temp.	L_s Length	Preheating Temp.				
(°C)	(mm)	(°C)	(mm)	(°C)	(s)	(°C)	(s)	(s)
125 to 130	Recommend Hand-Soldering							
131 to 145	20	80	30	90	< 60	≤ 260	≤ 3	≤ 10



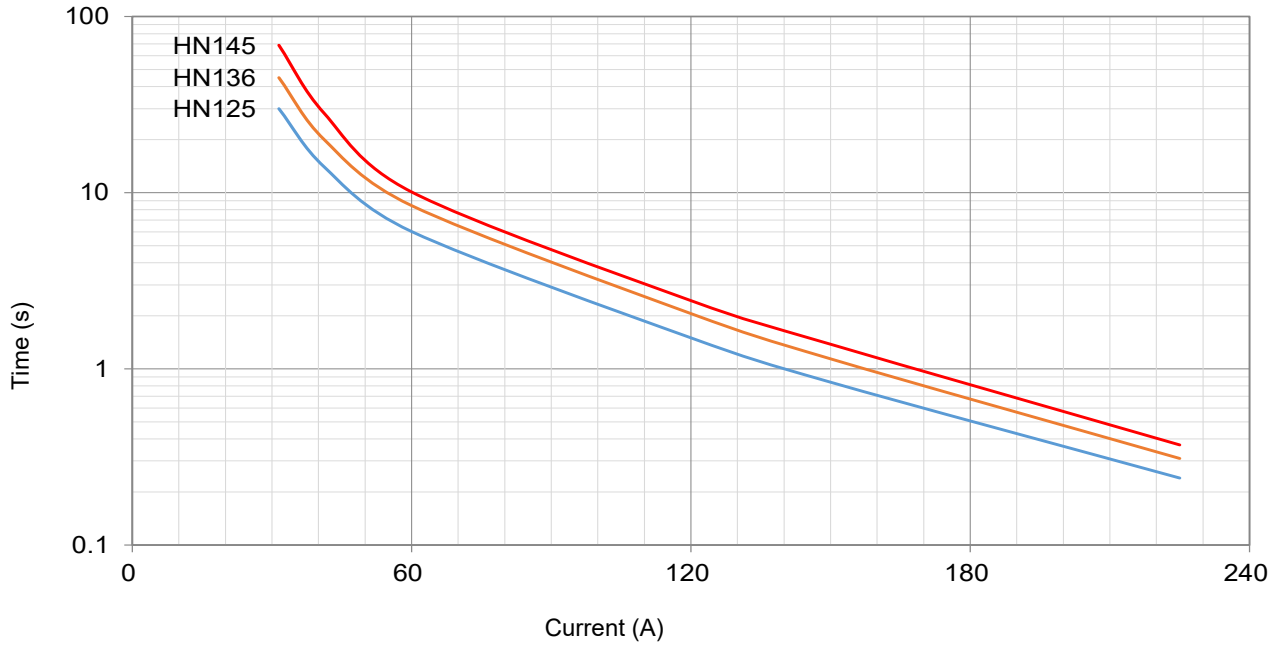
Product Temp.-Time Curve (Reference)

The Temp.-Time Curve of Thermal-Link in different temp. oil bath.



Product Current-Time Curve (Reference)

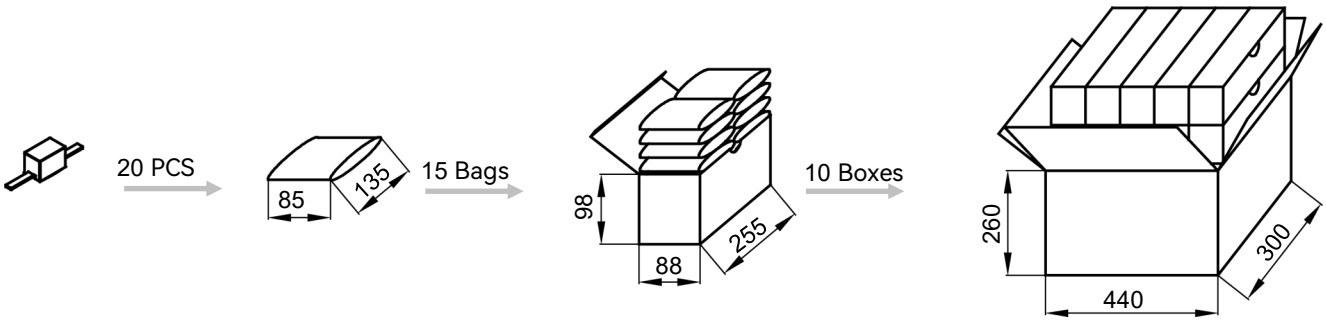
The Current-Time Curve shows functioning time at multi-times rated current at room temperature 25 ± 2 °C.



Packaging Information

Bulk

Item	PE Bag	Box	Carton
Dimensions (mm)	135 × 85	255 × 88 × 98	440 × 300 × 220
Quantity (PCS)	20	300	3000
Gross Weight (kg)			13.0 ± 10%



Part Numbering System

ATCO - HN136 - G N N A B - 001

Other Options

Packing

B	Bulk
T	Taping

Leads Forming

A	Straight Lead
B	Single Lead Bending
C	Leads Bending

Color of Insulation Tube

W	White
R	Red
K	Black
N	None

Insulation Tube Material

T	Teflon
P	Polyester
N	None

Lead Wire Type

G	Flat Electrode Chamber
M	Multi stranded tinned copper wire

Rated Functioning Temp.

136	136 °C, See Specifications

Series

HN	Series See Specifications

Product Category

ATCO	Alloy Thermal-Link

Glossary

Item	Description
TCO	**Thermal-Link** A non-resettable device incorporating a THERMAL ELEMENT which will open a circuit once only when exposed for a sufficient length of time to a temperature in excess of that for which it has been designed. — (GB 9816.1)
ATCO	**Alloy Thermal-Link** Alloy Type Thermal-Link, Alloy is the thermal element. — (GB 9816.1)
T_f	**Rated Functioning Temp.** The temperature of the Alloy Thermal-Link which causes it to change the state of conductivity with a detection current up to 10 mA as the only load. — (GB 9816.1) Tolerance: T_f °C (GB 9816.1, EN 60691, K60691). Tolerance: T_f ± 7 °C (J60691).
Fusing Temp.	**Fusing Temp.** The temperature of the Alloy Thermal-Link which causes it to change its state of conductivity is measured with silicone oil bath in which the temperature is increased at the rate of 0.5 °C to 1 °C / minute, with a detection current up to 10 mA as the only load. — (GB 9816.1)
T_h	**Holding Temp.** The Maximum temperature at which a Alloy Thermal-Link will not change its state of conductivity when conducting rated current for 168 hours. — (GB 9816.1)
T_m	**Maximum Temp. Limit** The temperature of the Alloy Thermal-Link stated by the manufacturer, up to which the mechanical and electrical properties of the Alloy Thermal-Link having changed its state of conductivity, will not be impaired for a given time. — (GB 9816.1)
I_r	**Rated Current** The current used to classify a Alloy Thermal-Link, which is the Maximum current that Alloy Thermal-Link allows to carry and is able to cut off the circuit safely. — (GB 9816.1)
U_r	**Rated Voltage** The voltage used to classify a Alloy Thermal-Link, which is the Maximum voltage that Alloy Thermal-Link allows to carry and is able to cut off the circuit safely. — (GB 9816.1)
I_n	**Nominal Discharge Current** Being able to withstand 15 peak currents of waveform 8/20 μs to test the product's durability of withstanding pulse current. — (UL 1449)
I_{max}	**Max. Discharge Current** Being able to withstand 1 peak current of waveform 8/20 μs to test max. pulse current that the product can withstand. — (UL 1449)

ATTENTION

Usage

1. When atmosphere pressure is from 80 kPa to 106 kPa, the related altitude shall be from 2000 meters to - 500 meters.
2. Operating voltage less than rated voltage of ATCO, operating current less than rated current of ATCO.
3. Do not touch the ATCO body or lead wires directly when power is on, to avoid burn or electric shock.

Replace

ATCO is a non-repairable product. For safety sake, it shall be replaced by an equivalent ATCO from the same manufacturer, and mounted in the same way.

Storage

Do not store the ATCO at the high temp., high humidity or corrosive gas environment, avoid influencing the solder-ability of the lead wires, the product shall be used up within 1 year after receiving the goods.

Installation

Make Sure the Temp. of Installation Position.

1. It is recommended that a dummy ATCO with inbuilt thermo-couple shall be used to determine the proper temp.
2. The terminal product should be tested to ensure that potential abnormal conditions do not cause ambient temp. to exceed the T_m of the ATCO.
3. Mount the ATCO at the location where temp. rises evenly.

Installation position of mechanical performance requirements.

1. Do not locate the ATCO in a place where severe vibration always occurs.
2. Ensure that the lead wire is long enough, and avoid actions such as press, tensile or twist.
3. The seal or body of ATCO must not be damaged, burned or over heated.

Mechanical Connection

Riveting

1. Choose small resistivity riveting material and be riveted.
2. A flexible lead or lead with low resistance should be used to rivet the ATCO.
3. Contact resistance should be minimal, large contact resistance will lead to higher temp., ATCO Functioning in advance.

Crimping

1. Choose small resistivity crimping material and be crimped.
2. A flexible lead or lead with low resistance should be used to rivet the ATCO.
3. Contact resistance should be minimal, large contact resistance will lead to higher Temp., ATCO Functioning in advance.

Lead Wire Forming

1. If lead wire has to be bent, please pay attention to the distance between body and bending point. Refer to Table T-3.
2. When bending leads, please use pincher or similar tools to fix the product as shown in Fig.T-2, to avoid damaging the product.
3. During forming and mounting, lead wire should not be cut, nicked, bent sharply, to avoid breaking the product.
4. Tangential forces on the leads must be avoided (i.e. pushing or pulling on the leads at angle to ATCO body) as such forces may damage the seal of ATCO.

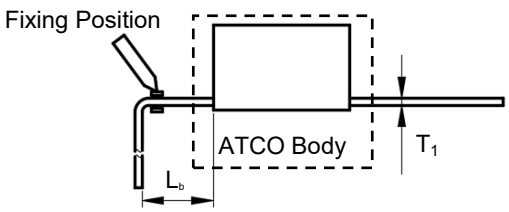


FIGURE T-2

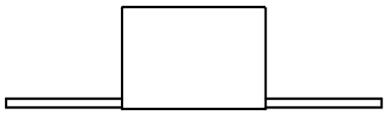
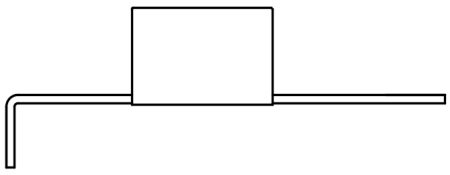
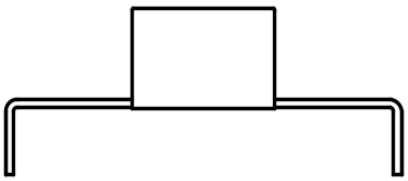
TABLE T-3 Distance between Body and Bending Point

Flat Electrode Chamber	T_1	(mm)	< 0.25	0.25 - 0.5	> 0.5
	L_b	(mm)	≥ 3	≥ 5	≥ 10

Leads Forming Types

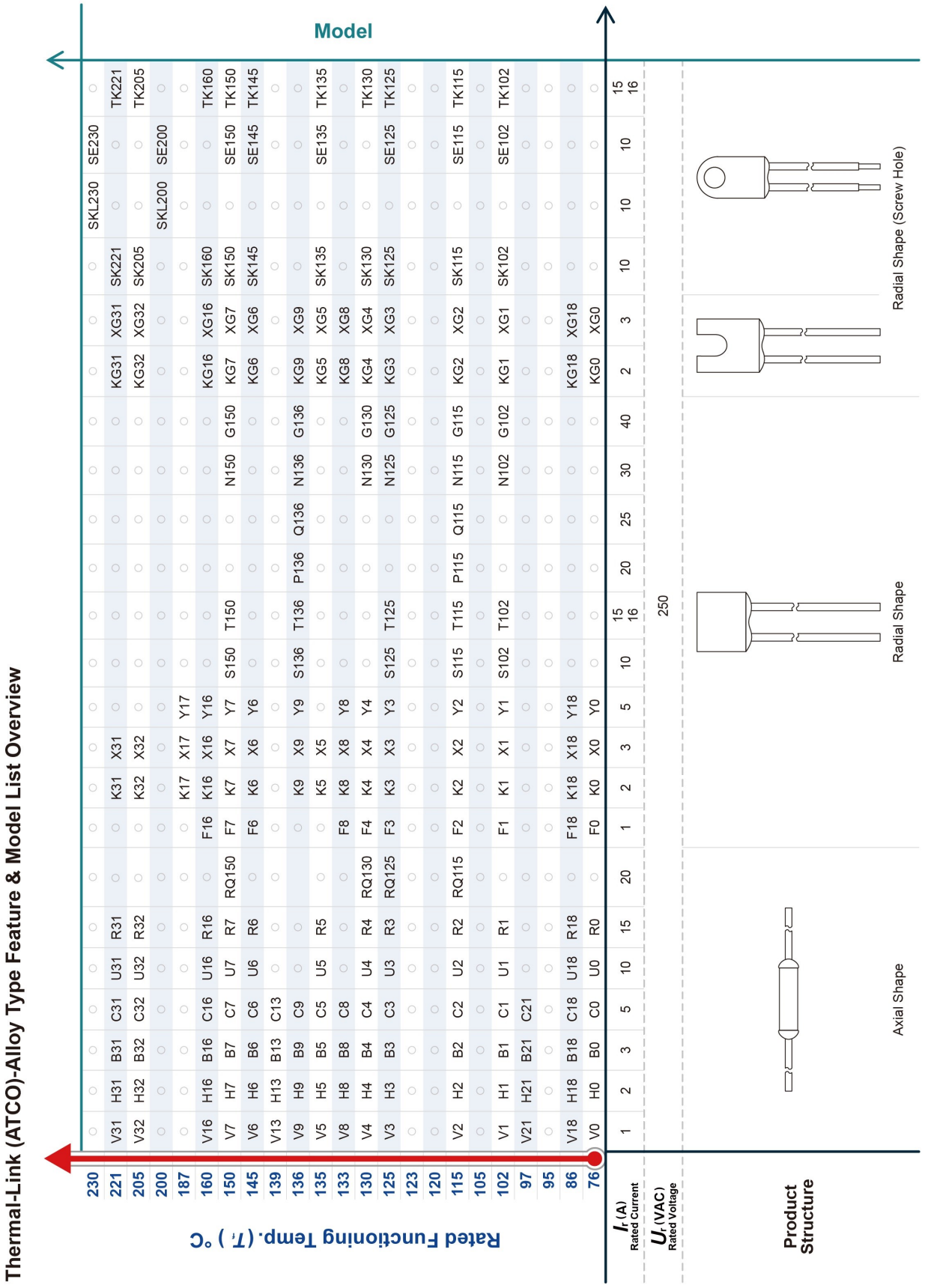
The below leads forming is for reference, more leads forming can be customized.

Axial

A	B	C
		

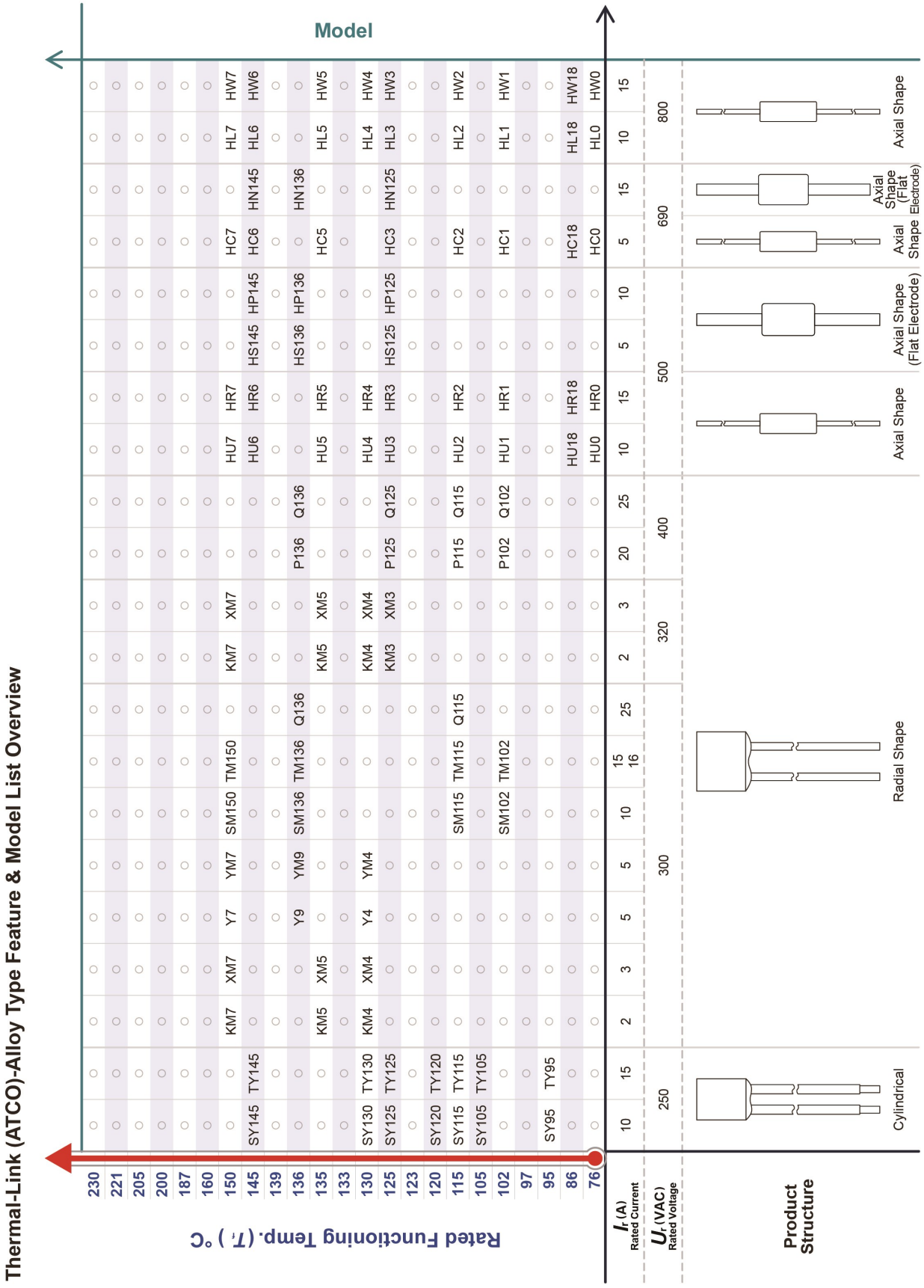
Thermal-Link (ATCO)-Alloy Type

Thermal-Link (ATCO)-Alloy Type Feature & Model List Overview



Thermal-Link (ATCO)-Alloy Type

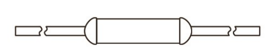
Thermal-Link (ATCO)-Alloy Type Feature & Model List Overview



Thermal-Link (ATCO)-Alloy Type Feature & Model List Overview

Model

Rated Functioning Temp. (T_f) °C																					
230	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
221	○	○	○	○	○	V31	H31	○	B31	○	○	○	C31	○	○	○	○	○	U31	R31	○
205	○	○	○	○	○	V32	H32	○	B32	○	○	○	C32	○	○	○	○	○	U32	R32	○
200	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
187	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
160	○	○	○	○	○	V16	H16	○	B16	○	○	○	C16	○	○	○	○	○	U16	R16	○
150	V7	H7	B7	○	C7	○	○	○	○	○	○	○	○	○	○	○	○	○	U7	R7	○
145	V6	H6	B6	○	C6	○	○	○	○	○	○	○	○	○	○	○	○	C6	U6	R6	○
139	V13	H13	B13	○	C13	○	○	○	○	○	SF13	V13	○	○	○	C13	M13	○	○	○	CR13
136	V9	H9	B9	○	C9	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
135	V5	H5	B5	○	C5	○	○	○	○	○	○	○	○	○	○	○	○	○	U5	R5	○
133	V8	H8	B8	○	C8	○	○	○	○	SF8	○	V8	○	○	○	○	○	○	○	○	○
130	V4	H4	B4	○	C4	○	○	○	○	SF4	○	V4	○	○	○	○	○	○	U4	R4	○
125	V3		B3	○	C3	○	H3	○	○	○	○	○	○	○	○	○	○	○	U3	R3	○
123	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
120	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
115	V2	H2	B2	○	C2	○	○	○	○	SF2	○	V2	○	○	C2	○	○	○	U2	R2	○
105	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
102	V1	H1	B1	C1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	U1	R1	○
97	V21	H21	B21	C21	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
95	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
86	V18	H18	B18	C18	○	○	○	V18	○	○	○	○	○	C18	○	○	○	○	U18	R18	○
76	V0	H0	B0	C0	○	○	○	○	○	○	○	○	○	○	○	○	○	○	U0	R0	○
I_r (A) Rated Current	1	2	3	5	7	1	2	2.5	3	3	5	4	5	6	8	8.5	9	10	10	15	15
U_r (VDC) Rated Voltage	50					60															
Product Structure	Axial Shape																				



Axial Shape

Thermal-Link (ATCO)-Alloy Type

Thermal-Link (ATCO)-Alloy Type Feature & Model List Overview