

## **U** 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) U series Rated Functioning Temp. from 76 °C to 221 °C, Rated Current: 10 A, safety certification Includes UL, cUL, TUV, PSE, CCC, and complies with RoHS and REACH.

## Features

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

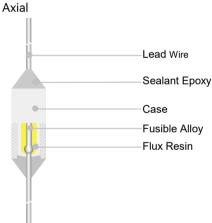
# Applications

- Lamps
- Switched-Mode Power Supplies
- Home Electrical Appliances
- Transformers
- Motors
- Power Strips

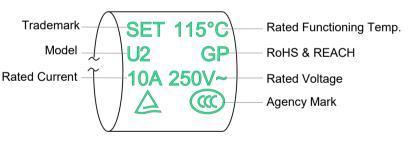
# Customization

- Other Temp.
- The Length of Lead Wires
- Taping Packing Available
- Lead Wires can be Insulated
  - Tinned Copper Wires or CP Wires
  - Leads Forming Types

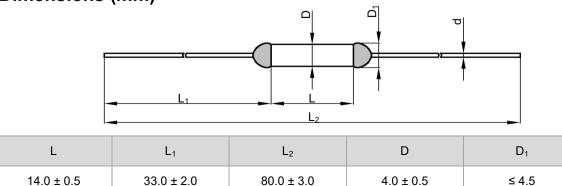
# Structure Diagrams



#### Marking Axial (Color for reference only)



# **Dimensions (mm)**



d

 $1.05 \pm 0.05$ 

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# Thermal-Link (ATCO)-Alloy Type

## **Specifications**

		Model	Fusing Temp.	T <sub>h</sub>	T <sub>m</sub>	I <sub>r</sub>	U <sub>r</sub>	/ <sub>n</sub> 8 / 20 μs (15 Times)	/ <sub>max</sub> 8 / 20 μs (1 Time)	<b>A1</b> ®	c <b>FN</b> ®	4	And the second s	۲	RoHS REACH
			(°C)	(°C)	(°C)	(A)	(V)	(kA)	(kA)	UL	cUL	τυν	PSE	ccc	
	221	U31	218 ± 2	186 182ª	250	10	AC 250	5	10	•	•	●	0	•	•
	221	001	210 ± 2	182ª	200	10	DC 60	5	10	0	0	●	0	•	•
	205	U32	199 ± 3	167 163ª	250	10	AC 250	5	10	0	0	•	0	•	•
	200	032	100 2 0	163ª	200		DC 60	5	10	0	0	•	0	•	•
ပ္	160	U16	155 ± 2	130 126ª	200	10	AC 250	4	8	0	0	•	•	•	•
。 ( 」	100		100 ± 2	126ª	200		DC 60	4	8	0	0	•	0	•	•
E	150	U7	145 ± 2	120 116ª	200	10	AC 250	4	8	0	0	•	•	•	•
Temp. $(T_{\rm f})$				116°			DC 60	4	8	0	0	•	0	•	•
em	145	U6	140 ± 2	115 111ª	200	10	AC 250	4	8	0	0	•	●	•	•
<u>Б</u>				111"			DC 60	4	8	0	0	•	0	•	•
Functioning	135	U5	130 ± 2	105 101ª	200	10	AC 250	4	8	•	•	•	•	•	•
tiol				101°			DC 60	4	8	0	0	●	0	•	•
nc	130	U4	125 ± 2	100 96ª	200	10	AC 250	4	8	0	0	•	•	•	•
				90-			DC 60	4	8	0	0	•	0	•	•
Rated	125	U3	121 ± 2	95 91ª	200	10	AC 250	4	8	0	0	•	•	•	•
Rat				91			DC 60	4	8	0	0	•	0	•	•
	115	U2	111 ± 2	85 81ª	200	10	AC 250	4	8	•	•	•	•	•	•
				01			DC 60	4	8	0	0	•	0	•	•
	102	U1	98 ± 3	72 68ª	200	10	AC 250	4	8	0	0	•	•	•	•
				00			DC 60	4	8	0	0	•	0	•	•
	86	U18	81 ± 2	51 43ª	200	10	AC 250	3	6	0	0	•	0	•	•
				40			DC 60	3	6	0	0	•	0	•	•
	76	UO	73 ± 2	43 39ª	200	10	AC 250	3	6	•	•	•	0	•	•
				39			DC 60	3	6	•	•	•	0	•	•

#### Note:

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

2: " \* "Customizable DC voltage.

3: " a ": The temperature measurement point for holding temperature ( $T_h$ ) 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.

# **U** Series

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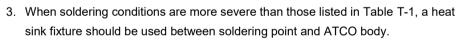
## **Agency Information**

Institution	Standards	The File No. and certification No. obtained by SETsafe   SETfuse
<b>RI</b> ®	UL 60691	E214712
c FL®	CAN-CSA-E60691	E214712
$\boldsymbol{\mathbb{A}}$	EN 60691	R50207621
PS E	J60691	JET2121-32001-2029、JET2121-32001-2030 JET2121-32001-2031
	GB 9816.1	2020980205000193

## Soldering

#### Hand-Soldering

- 1. Soldering should be carried out according to Table T-1.
- 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.



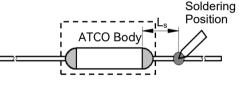
- 4. When soldering, please do not pull / push or twist ATCO body or lead wires.
- After soldering, let it naturally cool for longer than 20 seconds. During cooling, never move the ATCO body or lead wires.

#### TABLE T-1 Hand-Soldering Time

Rated Functioning Temp.		Max. Allow	vable Sol	dering Tin	ne for Differer	nt Lead V	Vire Lengt	h (Fig.T-1)		Max. Soldering Temp.
( <i>T</i> <sub>f</sub> )	Ls	Time	)	L <sub>s</sub>	Time		L <sub>s</sub>	Tim	e	
	Length -	Tinned Copper Wire	CP Wire	Length	Tinned Copper Wire	CP Wire	Length	Tinned Copper Wire	CP Wire	
(°C)	(mm)	(s)	(s)	(mm)	(s)	(s)	(mm)	(s)	(s)	(°C)
76 to 101	10	1 <sup>a</sup>	4	20	2	5	30	3	6	
102 to 115	10	1 <sup>a</sup>	4	20	2	5	30	3	6	
116 to 135	10	1 <sup>a</sup>	4	20	3	6	30	5	8	400
136 to 150	10	3	6	20	5	8	30	5	8	
151 to 221	10	4	7	20	6	9	30	7	10	

Note:

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



**FIGURE T-1** 

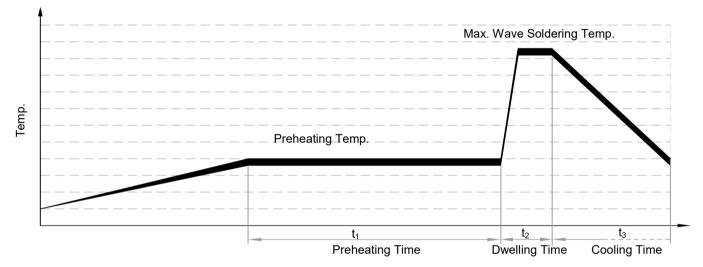
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#### Wave Soldering

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.	Who	-		ng Temp. re is Different	Preheating Time (t <sub>1</sub> )	Max. Wave Soldering	Dwelling Time (t <sub>2</sub> )	Cooling Time (t <sub>3</sub> )
( <i>T</i> <sub>f</sub> )	L <sub>s</sub> Length	Preheating Temp.	L <sub>s</sub> Length	Preheating Temp.		Temp.		
(°C)	(mm)	(°C)	(mm)	(°C)	(s)	(°C)	(s)	(s)
76 to 130				Recommend	Hand-Soldering	l		
131 to 150	20	80	30	90	< 60	≤ 260	≤ 3	≤ 10
151 to 221	20	90	30	100	< 60	≤ 260	≤ 3	≤ 10



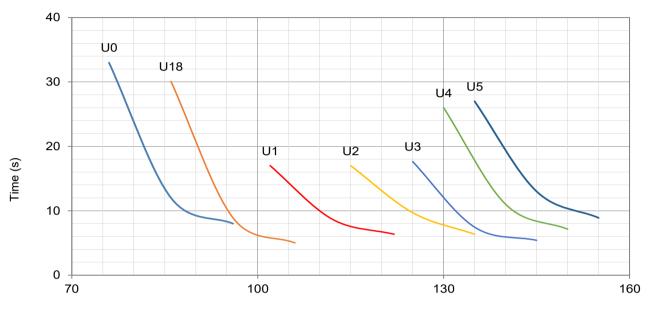
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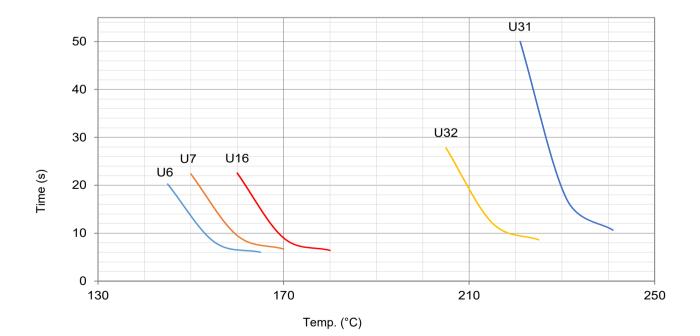
# Thermal-Link (ATCO)-Alloy Type

## **Product Temp.-Time Curve (Reference)**

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



Temp. (°C)



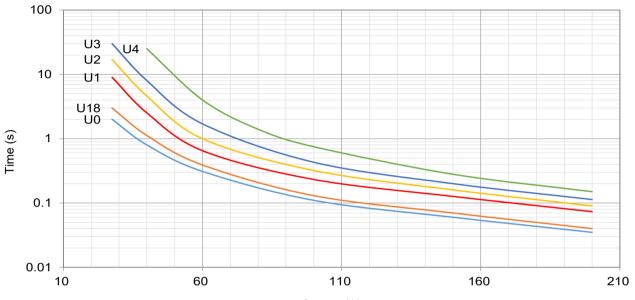
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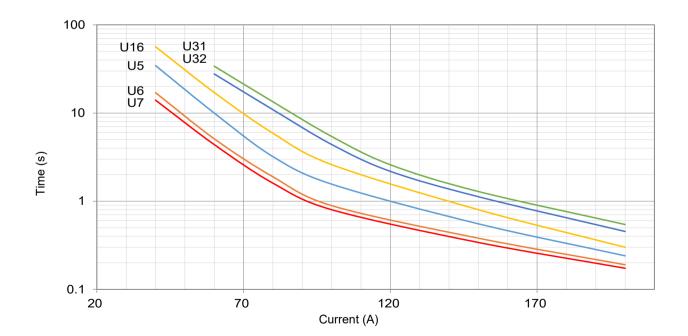
# Thermal-Link (ATCO)-Alloy Type

## **Product Current-Time Curve (Reference)**

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



Current (A)



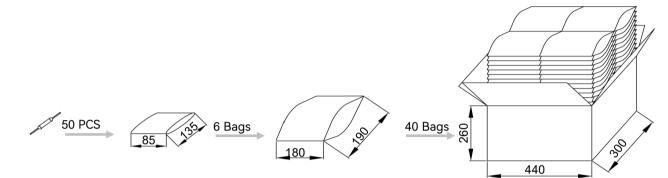


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# **Packaging Information**

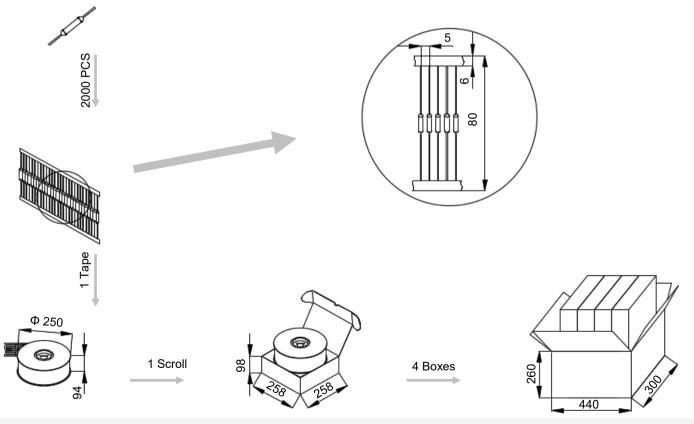
#### Bulk

Item	PE Bag	PE Bag	Carton
Dimensions (mm)	135 × 85	190 × 180	440 × 300 × 260
Quantity (PCS)	50	300	12000
Gross Weight (kg)			16.0 ± 10%



#### Taping

Item	Scroll	Box	Carton
Dimensions (mm)	Φ 250 × 94	258 × 258 × 98	480 × 300 × 260
Quantity (PCS)	2000	2000	8000
Gross Weight (kg)			10.5 ± 10%



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# Part Numbering System

TCO - U 2 - A N N A B - 001	
	Other Options
	Packing
	B Bulk
	T Taping
	Leads Forming
	A Straight Lead
	B Single Lead Bending
	C Leads Bending
	D Leads Kinking
	E Leads Bending and Kinking
	Color of Insulation Tube
	W White
	Y Yellow
	R Red
	K Black
	N None
	Insulation Tube Material
	T Teflon
	P Polyester
	N None
	Lead Wire Type
	A Tinned Copper Wire
	B Tinned Copper Plated Wire
	Rated Functioning Temp.
	2 115 °C, See Specifications
	Series
	U Series
	See Specifications
	Product Category
	ATCO Alloy Thermal-Link



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# Glossary

Item	Description
тсо	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
	sufficient length of time to a temperature in excess of that for which it has been designed. — (GB 9816.
АТСО	Alloy Thermal-Link Alloy Type Thermal-Link, Alloy is the thermal element.
	— (GB 9816.
T <sub>f</sub>	<b>Rated Functioning Temp.</b> 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.
- 1	— (GB 9816.
	Tolerance: <i>T</i> <sub>f</sub> °C (GB 9816.1, EN 60691, K60691). Tolerance: <i>T</i> <sub>f</sub> ± 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 th only load.
	— (GB 9816.
	Holding Temp.
T <sub>h</sub>	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.
	Maximum Temp. Limit The temperature of the Alloy Thermal-Link stated by the manufacturer, up to which the mechanical and electrical properties
T <sub>m</sub>	of the Alloy Thermal-Link having changed its state of conductivity, will not be impaired for a given time.
	— (GB 9816.
	Rated Current The current used to classify a Alloy Thermal-Link, which is the Maximum current that Alloy Thermal-Link allows to carry an
I <sub>r</sub>	is able to cut off the circuit safely.
	— (GB 9816.
	Rated Voltage The voltage used to classify a Alloy Thermal-Link, which is the Maximum voltage that Alloy Thermal-Link allows to carry ar
<i>U</i> r	is able to cut off the circuit safely.
	— (GB 9816.
,	<b>Nominal Discharge Current</b> Being able to withstand 15 peak currents of waveform 8/20 μs to test the product's durability of withstanding
I <sub>n</sub>	pulse current. — (UL 1449
	Max. Discharge Current
I <sub>max</sub>	Being able to withstand 1 peak current of waveform 8/20 µs to test max. pulse current that the product can withstand.
	— (UL 1449

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# 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.



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### **Mechanical Connection**

#### Riveting

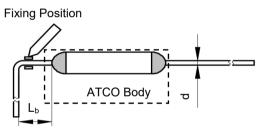
- 1. Choose small resistivity riveting material and be riveted.
- 2. A flexible lead or lead with low resistance should be used to rivet the ATCO.
- 3. Contact resistance should be minimal, large contact resistance will lead to higher temp., ATCO Functioning in advance.

#### 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

	d	(mm)	< 1.0	1.0 - 1.2	> 1.2
Circular lead	L <sub>b</sub>	(mm)	≥ 3	≥ 5	≥ 10

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										Μ	od	el										1	N		
0	TK221	TK205	0	0	TK160	TK150	TK145	0	0	TK135	0	TK130	TK125	0	0	TK115	0	TK102	0	0	0	0	15 16		
SE230			SE200			SE150	SE145			SE135			SE125			SE115		SE102				0	10		
SKL230			SKL200																			0	10		
0	SK221	SK205	0		SK160	SK150	SK145			SK135		SK130	SK125			SK115		SK102				0	10		
	XG31	XG32			XG16				XG9		XG8	XG4	XG3			XG2		XG1			XG18	XG0	ю		
	KG31	KG32			KG16	KG7	KG6		KG9	KG5	KG8	KG4	KG3			KG2		KG1			KG18	KGO	5		
						G150			G136			G130	G125			G115		G102				0	40		
						N150			N136			N130	N125			N115		N102				0	30		
									Q136							Q115						0	25		
									P136							P115						0	20		
						T150			T136				T125			T115		T102				0	15 16	250	
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	K31	K32		K17	K16	K7	К6 К		6X	K5	K8	K4	ξ			X		¥			K18	КO	2		
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	B31	B32			B16	B7	B6	B13	B9	B5	B8	B4	B3			B2		B1	B21		B18	BO	ო		
	H31	H32			H16	H7	9H	H13	бH	H5	H8	Η4	H3			H2		Ħ	H21		H18	ОН	7		Ĩ
	V31	V32			V16	77	V6	V13	67	V5	V8	V4	V3			V2		۲1	V21		V18	0V (	Ļ.		
230	221	205	200	187	160	150	145	139	136	135	133	130	125	123	120	115	105	102	97	95	86	76	Ir (A) Rated Current	Ur (VAC) Rated Voltage	Product Structure
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Thermal-Link (ATCO)-Alloy Type Feature & Model List Overview

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<ul> <li>(1)</li> <li>(2)</li> <li>(3)</li> <li>(4)</li> <li>(5)</li> <li>(6)</li> <li>(7)</li> <li>(7)</li></ul>		<ul> <li>(a) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c</li></ul>	000 <td>0       0</td> <td>000</td> <td>0       0</td> <td>0</td> <td>0</td> <td>&gt;</td> <td>0</td> <td>0</td> <td>0</td> <td>C</td> <td></td> <td></td> <td>0</td> <td>0</td> <td>TM136</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td>0</td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>15 16</td> <td>     </td> <td></td>	0       0	000	0       0	0	0	>	0	0	0	C			0	0	TM136	0	0	0	0	0	0		0		0	0	0	0	15 16	   	
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# **U** Series

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# **U** Series

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<ul> <li>Control</li> <li>Control</li></ul>	<ul> <li>○</li> <li>○</li></ul>	○         ○         ○         ○           ○         ○         ○         ○         ○           ○         ○         ○         ○         ○         ○           ○         ○         ○         ○         ○         ○           ○         ○         ○         ○         ○         ○           □         ○         ○         ○         ○         ○           □         ○         ○         ○         ○         ○           □         □         ○         ○         ○         ○           □         □         □         ○         ○         ○           □         □         □         □         ○         ○           □         □         □         □         □         ○           □         □         □         □         □         □         □           □	○         ○         ○         ○         ○         ○         ○           ○         ○         ○         ○         ○         ○         ○         ○         ○           ○         ○         ○         ○         ○         ○         ○         ○         ○         ○           ○	0						GA150			GA136			GA130	GA125			GA115		GA102			GA86	GA76	50		
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