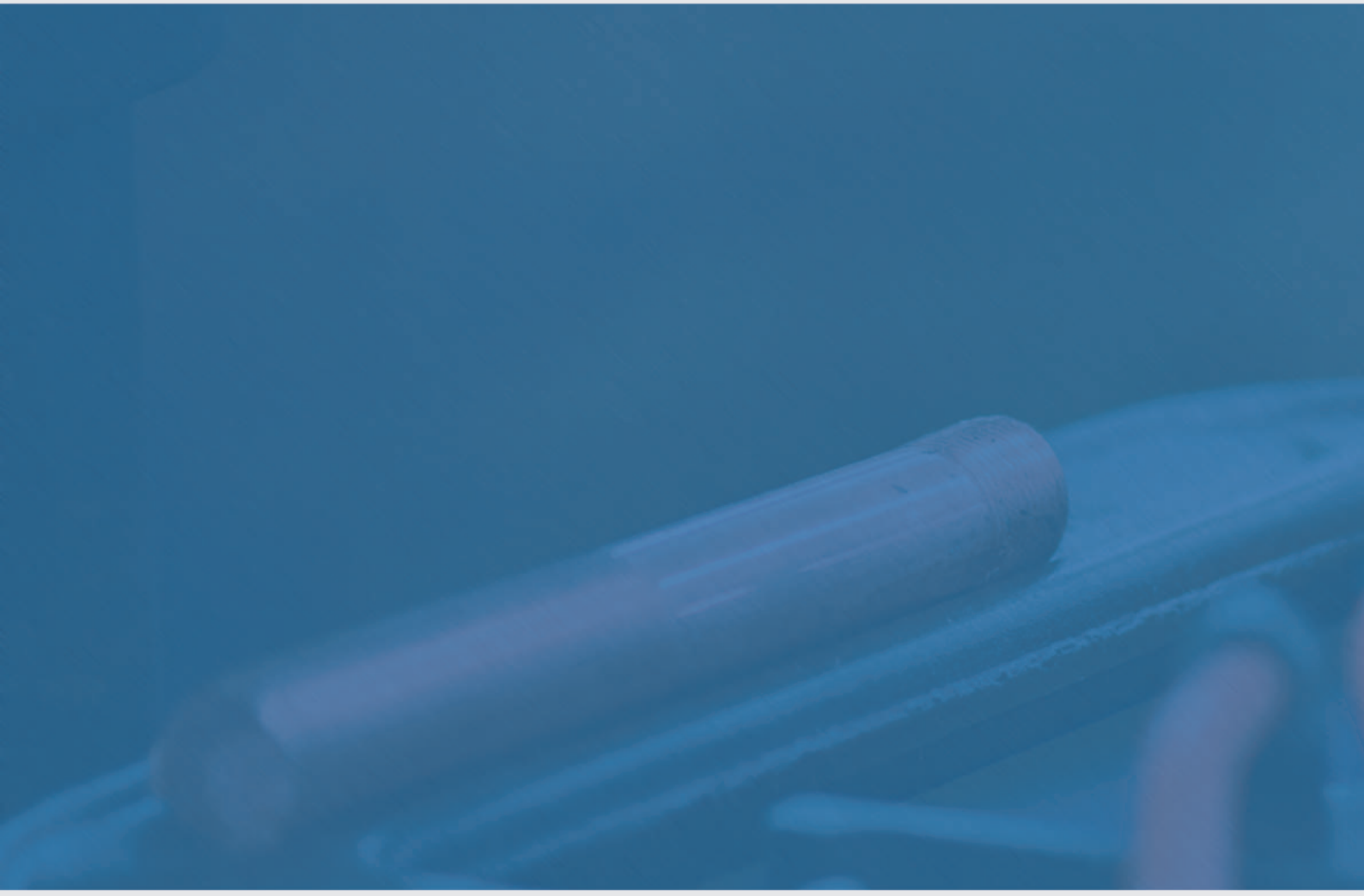
PRODUCT CATALOGUE

Transformer Components

JAKER ELECTRIC



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About Us

Established in 1983, Jaker Electric Co., Ltd., has over 35 years of experience in this industry and continues to develop and invest in electrical power solutions. The company is engaged mainly in the development, manufacturing, and sales of power-equipment products. Its wide range of products includes circuit breakers, disconnecting switches, load break switches, line switches, arresters, and transformer components. It is worth emphasizing that we have a firm commitment to maintaining competitive prices and providing the highest quality, safest, and most practical products.

TR01 & TR14 Oil-Immersed Interrupter

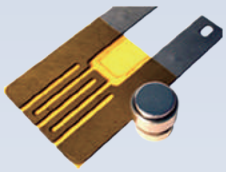
TR14


TR01

The TR01&14 is an overcurrent protective device that protects the oil-immersed distribution transformer from damaging overloads and secondary faults, and is also used for switching the transformer on and off. The TR01&14 provides high-sensitivity interrupter mechanisms to switch the load current and fault current of transformer. All electrical characteristics of the TR01&14 are in full compliance with IEEE C37.41. These are load current, fault current breaking, short-time extra overload operation (EO), oil automatic trip and indication function. It provides complete protection for distribution transformers.

Characteristics

· Current sensor :



The current sensing element is made of a special magnetic alloy. It detects the transformer temperture, when the load current passes through the sensing element and the transformer's winding. The magnetic sensing element changes its characteristics, when the temperature reaches the maximum operating temperature (140°C). The current sensing element, then, loses its magnetism, and the trip mechanism is triggered, breaking the current (load or fault current). After 3 to 5 minutes, the oil temperature of transformer drops, then the TR01 & TR14 can reclose to restore the electric current.

· Interrupting device :

The interrupting device is designed to direct and side-blow arc; the case of the interrupting device is made of one-piece molded cylinder compression capability to provide robust, resistance to breaking fault currents arising from pressure; the contactors are made of special tungsten-copper alloy. The interrupting test complies with ANSI/IEEE C37.41-1981 TABLE 3, at a voltage of 8.3/ 15.5 kV and 2,500/ 1,500 A interrupting capacity, it can provide high fault current protection.

· Trip indication :

The tripped breaker switch handle and the rod are connected. When the overload and the fault current happen to trigger the trip mechanism, the switch will turn the operating handle about 10°, by the handle end of the instruction pointer, providing the user clear indication.

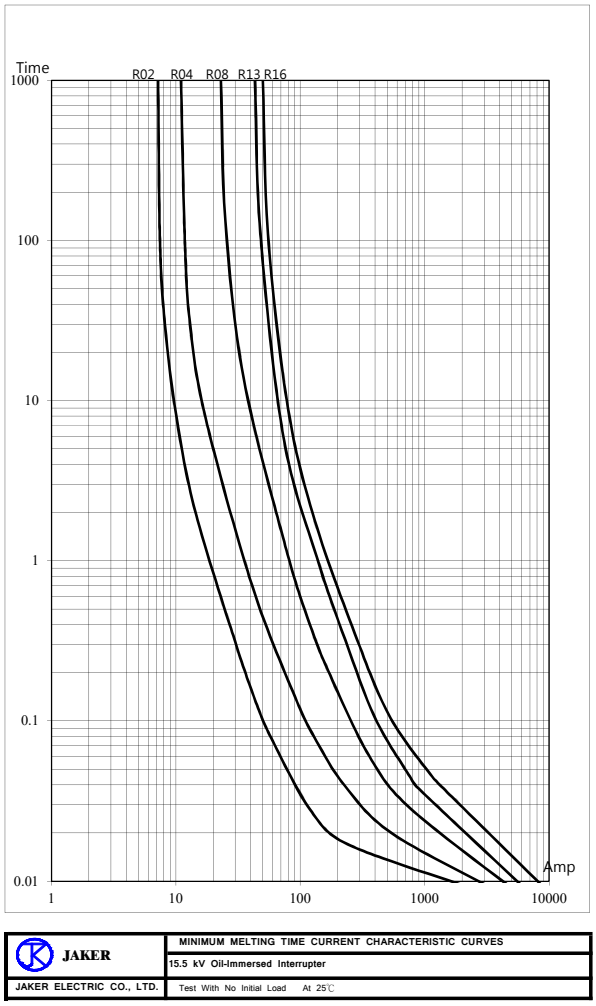
· Oil level sensor :

The oil-sensing element is a float cup full with oil, its feature is designed not to float on top of the oil, thus avoiding transformer vibration or seismic shaking caused by the malfunction to trigger the trip mechanism to switch off the transformer. The weight of the oil cup provides the necessary pressure to trigger the driving mechanism. It will automatically detect transformer oil levels, when the oil is leaking, to protect the transformer from serious fault due to lack of oil in the transformer.

· Material :

The TR01 & TR14 is made of a special formula of polymer materials and molds. The polymer materials commonly used outdoors with excellent weather resistance properties and electric shock characteristics, as well as excellent mechanical and thermal strength. It continuous to function normally, even after a long period at 140°C oil temperature.

Minimum melting time & current curve



TR14

Total clearing time & current curve

TR14

Specifications

Type	TR01	TR14
Suitable for transformer capacity	1 Φ 25 - 100 kVA	1 Φ 25 - 167 kVA 3 Φ 75 - 500 kVA
Max. system voltage	8.3 kV	15.5 kV
Rating voltage	6.9 kV	13.2 kV
Rating current	25 A	42 A
BIL	125 kV	150 kV
AC withstand voltage	40 kV 1 min.	50 kV 1 min.
Interrupting current	2200 A (sym) ; 3500 A (Asym)	1500 A (sym) ; 2250 A (Asym)
Magnetizing current	0.25 A	1.42 A
Operation temperature	0°C - 140°C	
The rate of temperature shift	0.7%/°C	
TCC tolerance	± 10%	
Mechanic operation	> 1,000 times	
Current limiting fuse	TR02 oil-immersed full-range current limiting fuse	TR07 oil-immersed full-range current limiting fuse

TR02 & TR07 Oil-Immersed Current Limiting Fuse

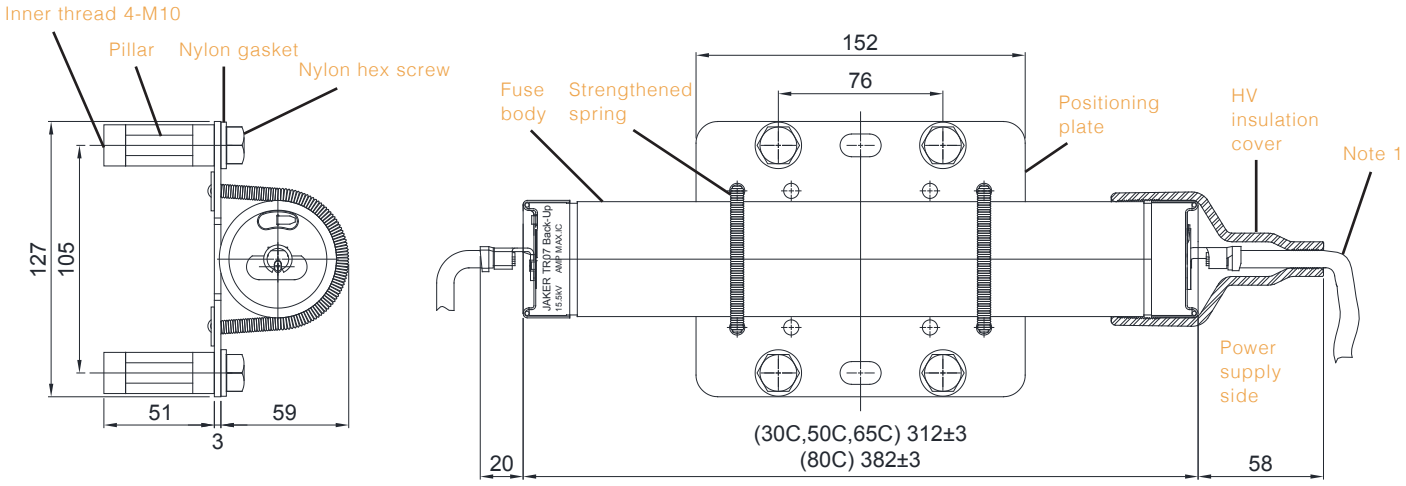
- *TR02 Full-range current limiting fuse and TR07 Back-up current limiting fuse*
- *Electric characteristics : meet ANSI/IEEE C37.41 and IEC 60282-1 standards*
- *TCC curve : meet ANSI/IEEE C37.41 type C requirements*
- *The transformer's maximum working temperature is 140°C.*
- *The protection fuse applies the press-connected terminals linking to the wire harness. The user can add the insulation bushing to reduce events caused from oil lack or insulation oil degradation, and promote fuse's reliability.*

TR07

Specifications

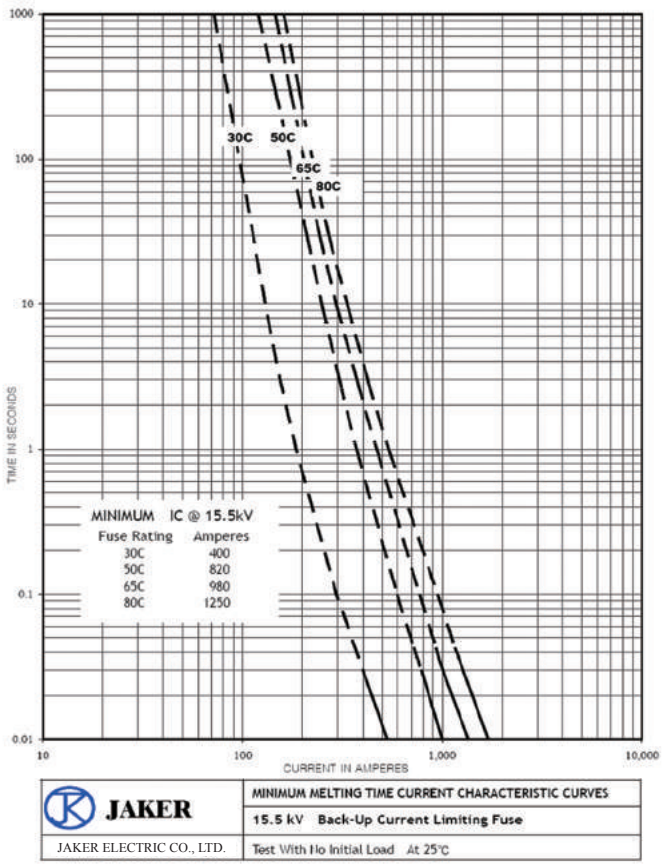
Type	TR02-20C	TR07-30C	TR02-40C	TR07-50C	TR02-40C-N	TR07-65C	TR07-80C
Applicable capacity of transformer	1Φ25 kVA		1Φ50 kVA		1Φ100 kVA		1Φ167 kVA
	3Φ75 kVA		3Φ150 kVA		3Φ300 kVA		3Φ500 kVA
Maximum operation voltage	8.3 / 15.5 kV						
Rated voltage	15 / 25 kV (system voltage)						
Rated current	20 A	30 A	40 A	50 A	40 A	65 A	80 A
BIL	125 kV						
AC dielectric voltage	50 kV 1 min.						
Interrupting current	50 kA (sym)				25 kA (sym)		
Operation temperature	0°C – 140°C						
Product's type test items	AC voltage withstand test BIL RIV Partial discharge test Thermo-circulation and seal test Load switch Air tight test						

TR07 Drawing



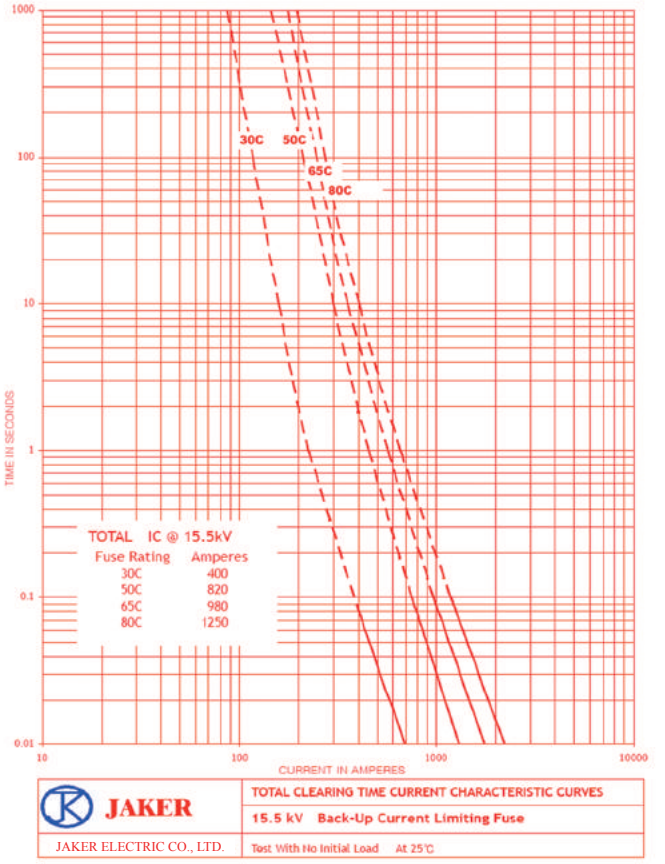
Note 1: oil- & thermo-endurable cable is for oil-immersed transformer.

Minimum melting time & current curve



TR07

Total clearing time & current curve



TR07

TR03 High-Voltage Bushing Well

- *15/25KV, 200A HV Bushing Well*
- *Electric characteristics :*
  meet IEEE Std 386 and IEEE Std 592
- *Connecting part's dimensions :*
  meet IEEE Std 386, Fig 3: 200A
  Bushing-well interface requirements
- *Oil-leaking prevention measures*

Characteristics

- **Oil-leaking protection device :**

  The bushing well is connected to a silicon rubber elbow well. The elbow well is filled with insulation oil, when transformer is implanted in oil. The elbow exhibits good insulation properties, even when the transformer lacks its oil. The TR03 silicon rubber tube has enough space for two 125-mm² wires, and can be easily assembled without any extra treatment.

- **Conductor seal :**

To prevent any unexpected leakage, after extended or inappropriate use, from the central conductor/ epoxy interface, we use a special bonder on the conductor surface before casting to create a secure junction between the conductor and the epoxy. It contains an oil seal O-ring on the conductor end.

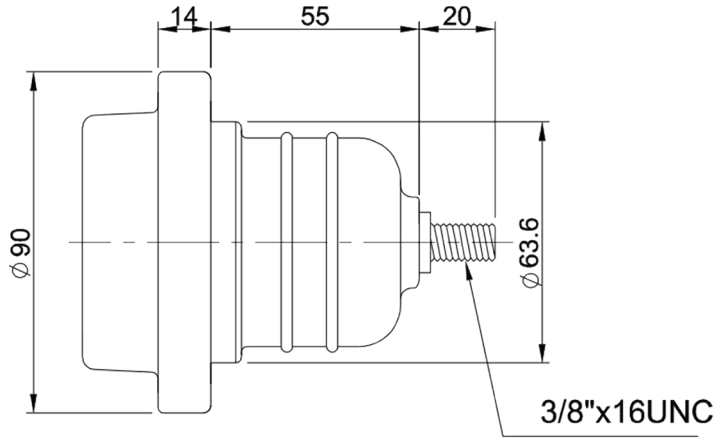
- **Shield layer :**

The electrical junction between the bushing well surface and fixed steel plate pass the shield resistance and fault current initiation test. TR03 uses plasma coating to place an aluminum alloy coating layer on the surface of the bushing well, which provides very effective shielding.

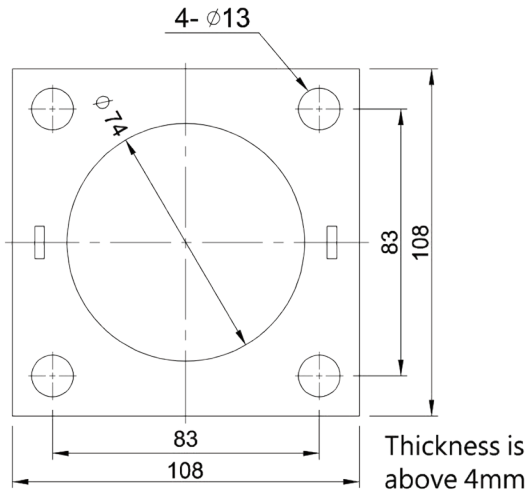
- **Materials :**

  The TR03 central conductor is made of high-conductivity copper. The conductor's jacket is made of a casting C-class temperature-resistant and good electric performance epoxy and with UV resistance additives, which exhibits excellent weather resistant and mechanical characteristics. The insulation temperature class of the silicon rubber elbow well is H class.

TR03 Drawing



Bushing well body



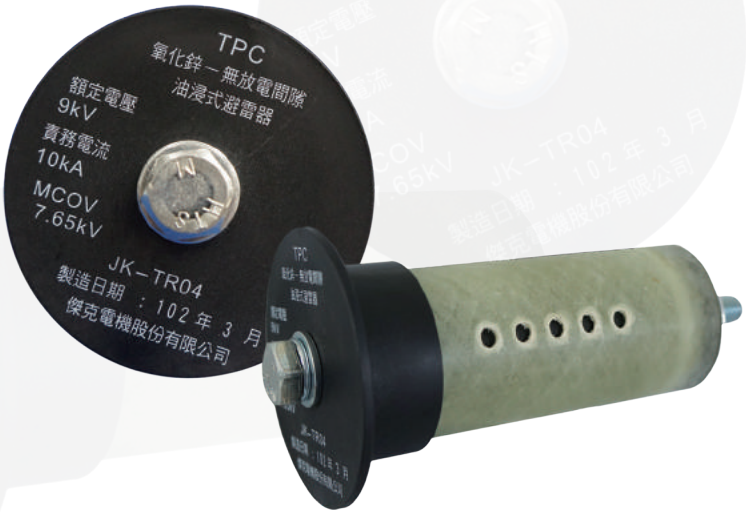
Seat (SUS304)

Specifications

Type	TR03
Maximum working voltage	8.3 / 15.5 kV
Rated voltage	15 / 25 kV (system voltage)
Rated current	200 A
BIL	125 kV
AC dielectric voltage	40 kV
Operation temperature	0°C – 140°C
Product's type-test items	DC voltage withstand test AC voltage withstand test BIL Partial discharge test Short-time current test Shielded layer aging test Thermal shock test Shielding layer fault-current test Thermo-accelerated test Seal-lifetime accelerated test

TR04
Oil-Immersed Type Arrester

- *Electric characteristics : meet IEEE Std C62.11*
- *Gapless*
- *The ZnO part uses glass encasing with oil-resistance and temperature tolerance.*
- *The arrester design must comply with the expulsion fuse or the full-range current limiting fuse.*

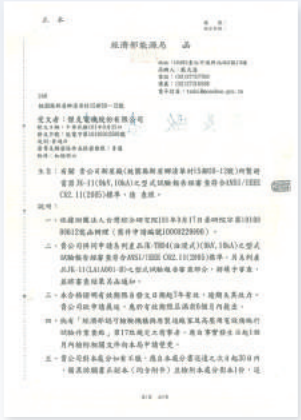


Specifications

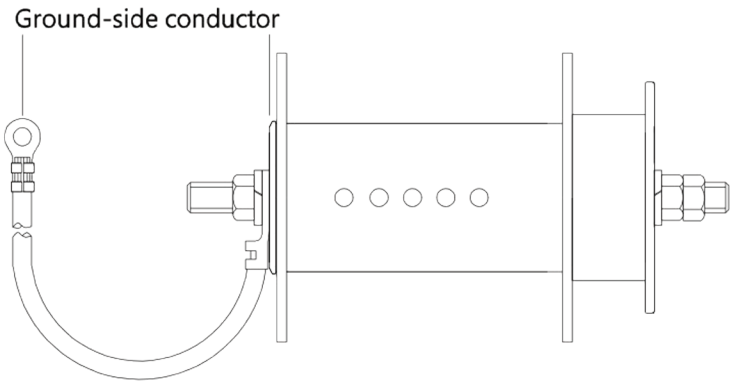
Type	TR04
System Voltage	11.4 kV
Rated Voltage	9 kV
MCOV	> 7.65 kV
Duty Current	10 kA

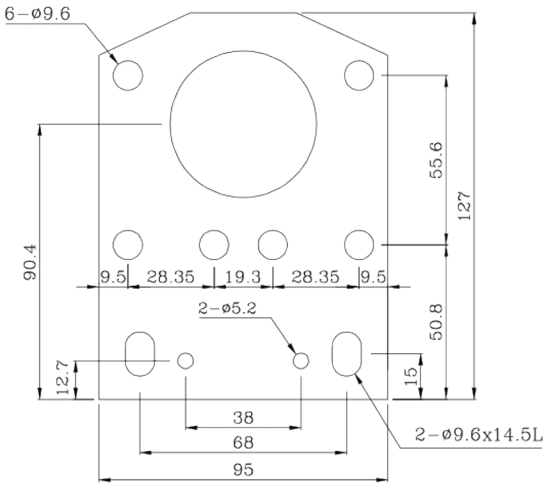
Certification license

The certification license
of the Bureau of Energy
(Ministry of Economic Affairs), Taiwan



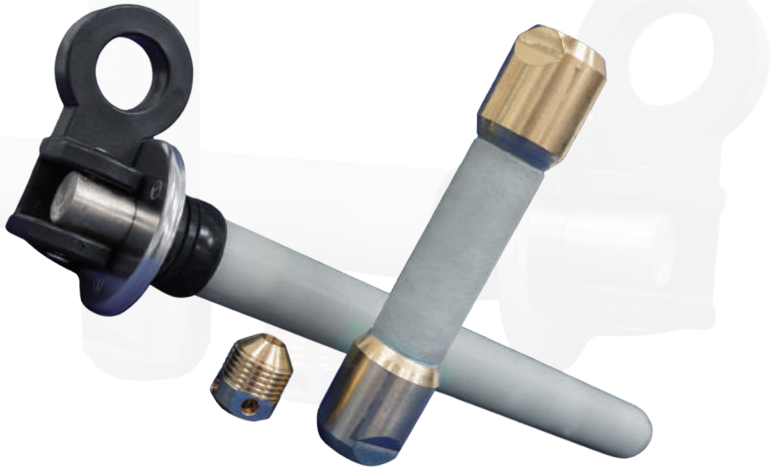
TR04 Drawing





TR05 & TR06 Overcurrent Protection Fuse Kit

Jaker developed an oil-immersing arc-elimination protecting fuse kit for the overload and fault protection of a 15/25 kV underground power-distribution pad-mounted transformer. It has electric characteristics that fully comply with ANSI/IEEE C37.41, and it has passed the related international standard tests. It has a load break switch to control a fault current breaker that provides excellent protection against overload or fault.



Specifications

Type	TR05 & TR06
Max. operation voltage	8.3 / 15.5 kV (related to earth)
Rated voltage	15 / 25 kV grade (system voltage)
Rated current	150 A
BIL	150 kV
AC dielectric voltage	60 kV 1 min.
Interrupting current	2,180 A (sym) @ 15.5 kV
Operation temperature	0°C – 140°C
Temperature swift	0.5%/°C
Mechanical life cycles	> 10,000 times
Product's type-test items	Fault closing test Load switch test AC withstand voltage test BIL Mechanical strength test Time-current curve test Thermo-circulation and seal test Temperature-rise test Partial-discharge test RIV Interchangeable-capability test Oil-proof gasket characteristic test TERTEC Test No. 95097

Characteristics

- **TR05 fuse tube casing operating shell:**

A fuse tube casing is made of a special polymer mold that is normally applied in an oil-immersion, elevated-temperature environment. This casing has excellent oil resistance, low moisture-absorbing properties, anti-aging capability, extremely good mechanical strength, and high heat endurance. The TR05 product's mechanism remains fully operational under 140°C oil temperature for a long time.

The fuse's operating shell is assembled with the upper operating shell and lower tube; the front end of the upper operating shell can expand to fit tightly. The fuse's overcurrent protection link contains an operating hook and lower tube.

- **TR06 overcurrent protection fuse link:**

The fuse element of the overcurrent protection fuse link is protected against overloading through an element made of an alloy with a specific melting temperature; when an overload current continuously passes through this fuse element, transformer wiring is overheated, and the fuse element alloy reaches its melting temperature. Then, the element is cut, and thus, the device shuts down. Moreover, when an instant fault current passes through the fuse, the fuse element's temperature will sharply increase to its melting temperature and break the element, isolating the transformer and preventing serious damage. This fuse kit can provide protection from both fault current and long-term overload.

To rapidly switch off the fault current, we also cascaded a highly conductive alloy element to the fuse kit, and by applying the characteristics of different melting temperatures of two alloys and I^2t, the high-conductivity alloy element will melt to break instantly while a fault current passes through it, which accelerates isolation and fault protection abilities.

- **TR06 fuse link arc-eliminating tube casing**:

The arc-eliminating tube casing of the fuse overcurrent protection link is made of a material enduringly to high temperatures and oil corrosion. When the fuse element breaks, hot arc is generated. As a result, the element's casing releases ionic gas to neutralize the arc electronics. We designed an arc-eliminating oil runway in the fuse tube, which will generate high-pressure oil vapor to blow off the arc. The upper & lower contactors located at both ends of element's casing are made of silver-electroplated special alloy copper. Our fuse link dimensions are compatible to the ABB 1C10775G01 and COOPER 4000361C99MC fuse holder assembly products.

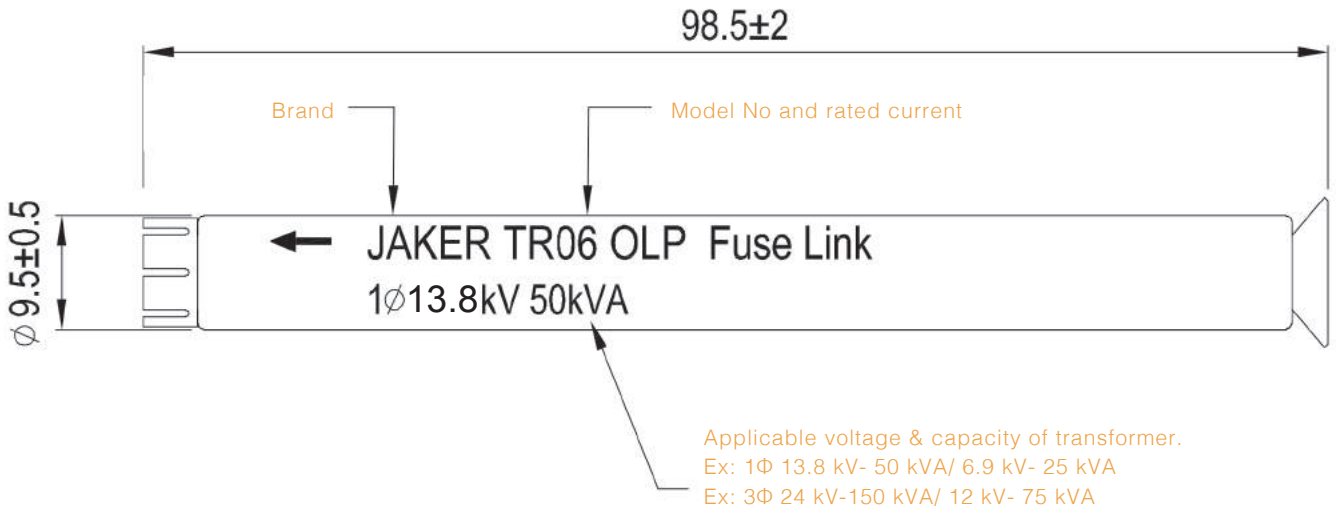
- **Application:**

By cooperating with our back-up current limiting fuse, the TR05 & TR06 overcurrent protection fuse kit can provide full-scale protection for the transformer. Install this kit at the primary side of the transformer to protect against overload and fault current and to reduce losses.

Recommended specification

Fuse model number / Voltage grade / Transformer's capacity	6.9 kV	13.8 kV
1Φ25 kVA 3Φ75 kVA	JAKER OLP FUSE LINK 12 A	JAKER OLP FUSE LINK 5 A
1Φ50 kVA 3Φ150 kVA	JAKER OLP FUSE LINK 15 A	JAKER OLP FUSE LINK 12 A
1Φ100 kVA 3Φ300 kVA	JAKER OLP FUSE LINK 25 A	JAKER OLP FUSE LINK 15 A
1Φ167 kVA 3Φ500 kVA	JAKER OLP FUSE LINK 35 A	JAKER OLP FUSE LINK 25 A

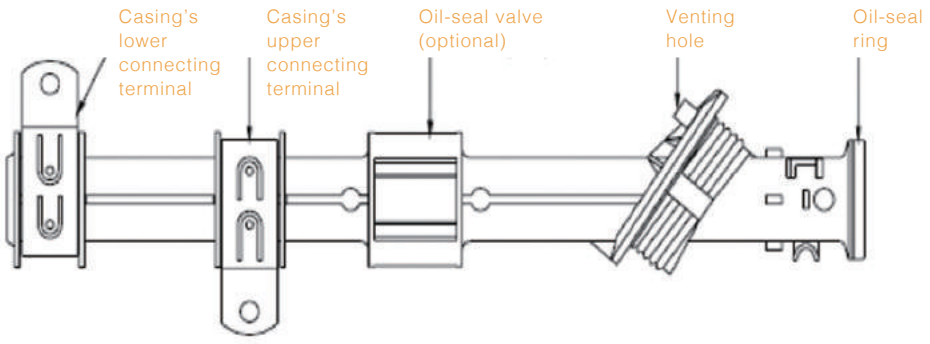
TR06 drawing



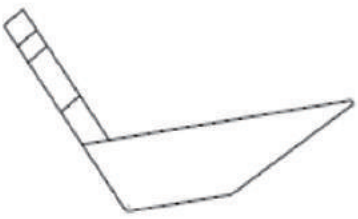
Note: the labels are made through a thermo-transformed process, are oil-proof and anti-wear.

Fuse specification and model No.	TR06 "applicable voltage & capacity of transformer" labeling	
	Single-phase transformer	Three-phase transformer
JAKER OLP FUSE LINK 5 A	13.8 kV– 25 kVA	24 kV– 75 kVA
JAKER OLP FUSE LINK 12 A	13.8 kV– 50 kVA/ 6.9 kV– 25 kVA	24 kV– 150 kVA/ 12 kV– 75 kVA
JAKER OLP FUSE LINK 15 A	13.8 kV– 100 kVA/ 6.9 kV– 50 kVA	24 kV– 300 kVA/ 12 kV– 150 kVA
JAKER OLP FUSE LINK 25 A	13.8 kV– 167 kVA/ 6.9 kV– 100 kVA	24 kV– 500 kVA/ 12 kV– 300 kVA
JAKER OLP FUSE LINK 35 A	6.9 kV– 167 kVA	12 kV– 500 kVA

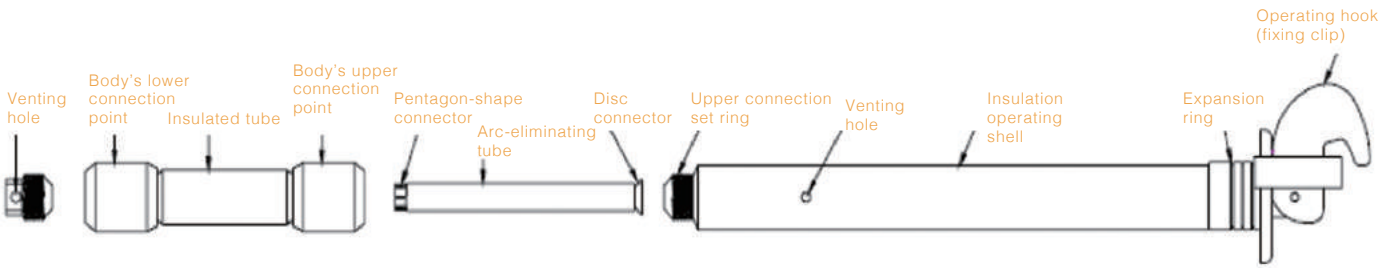
Fuse kit parts



Fuse tube casing



Lubricant cap



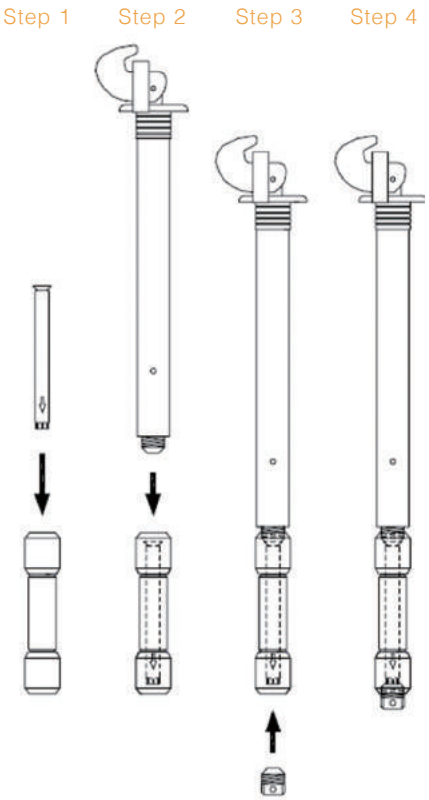
Lower connecting plug

Lower tube

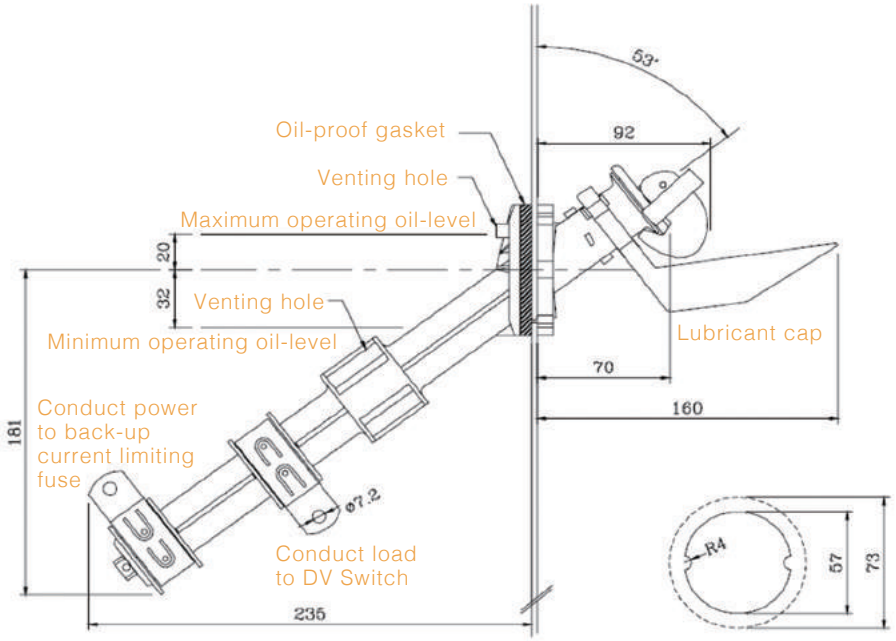
Overcurrent protecting fuse link (device)

Fuse's upper operating shell

Fuse link assembling



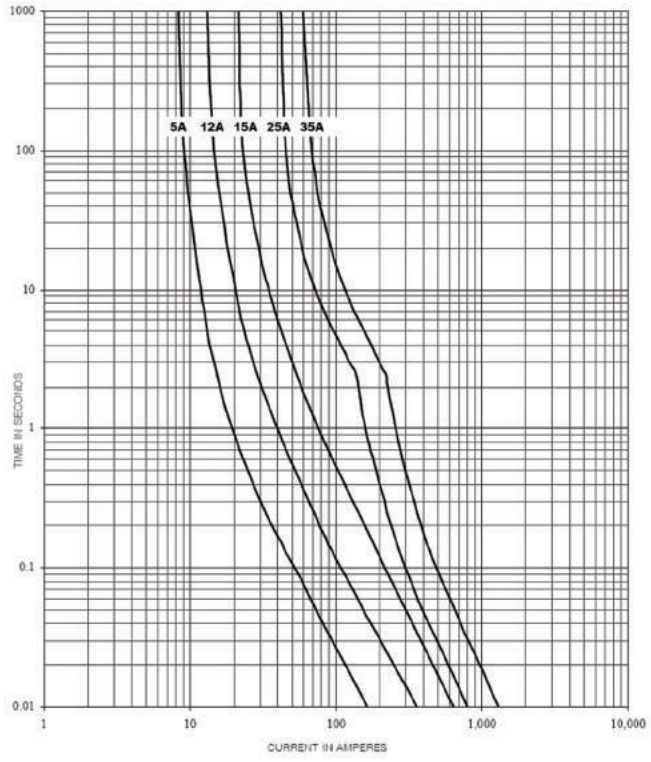
Fuse kit assembly drawing



Assembly diagram

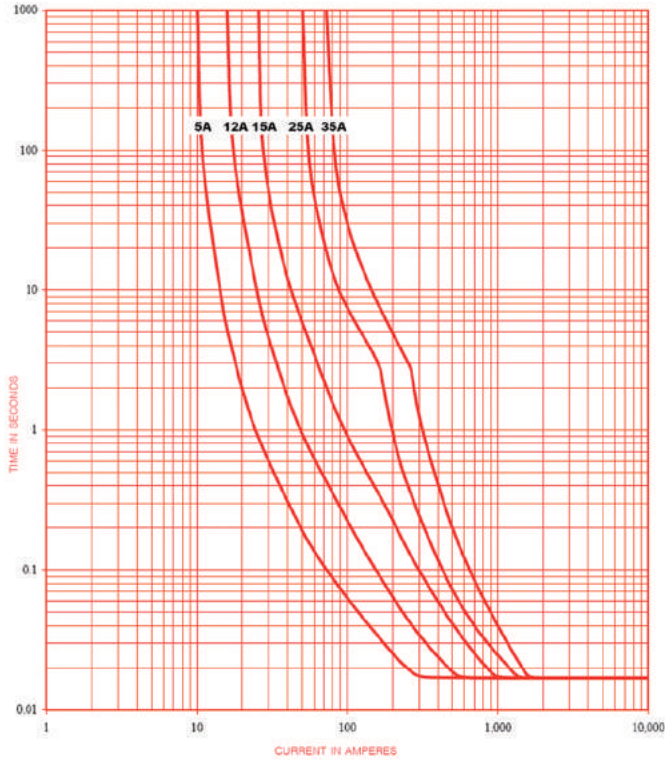
Erection hole

Minimum melting time & current curve



JAKER	MINIMUM MELTING TIME CURRENT CHARACTERISTIC CURVES
	8.3/15.5 kV Over Loading Protect(OLP) Fuse Link
JAKER ELECTRIC CO., LTD.	Test With No Initial Load At 25°C

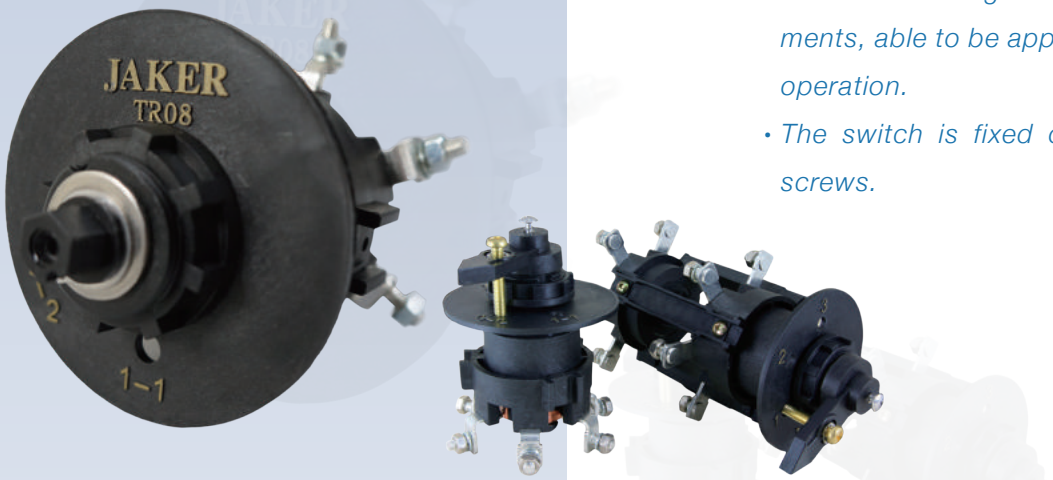
Total clearing time & current curve



JAKER	TOTAL CLEARING TIME CURRENT CHARACTERISTIC CURVES
	8.3/15.5 kV Over Loading Protect(OLP) Fuse Link
JAKER ELECTRIC CO., LTD.	Test With No Initial Load At 25°C

TR08 DV Switch
TR09 Tap Changer

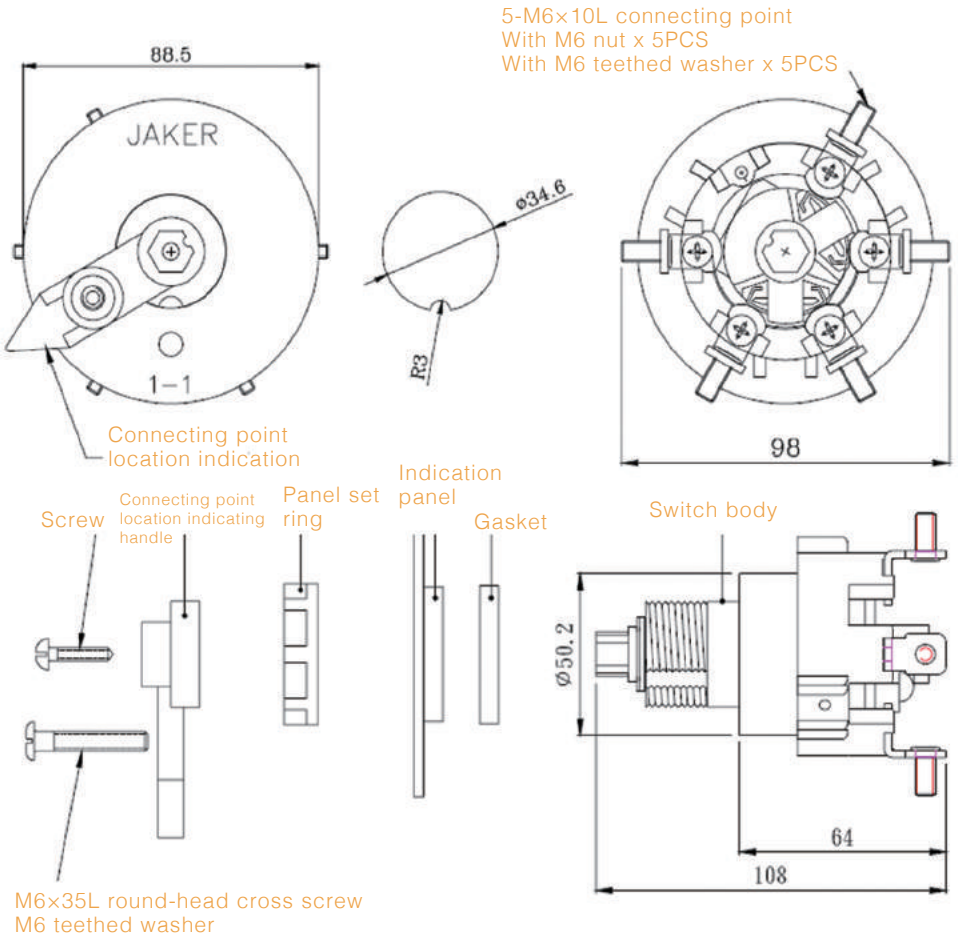
- *TR08 25 kV 100 A oil-immersed DV switch and TR09 35 kV 100A oil-immersed tap changer*
- *Electric characteristics : meet ANSI/IEEE C57.12.00 and TPC C001 Standard*
- *The allowable working temperature is 140°C or above that can meet transformer's working temperature requirements, able to be applied under no-load operation.*
- *The switch is fixed on the panel with screws.*



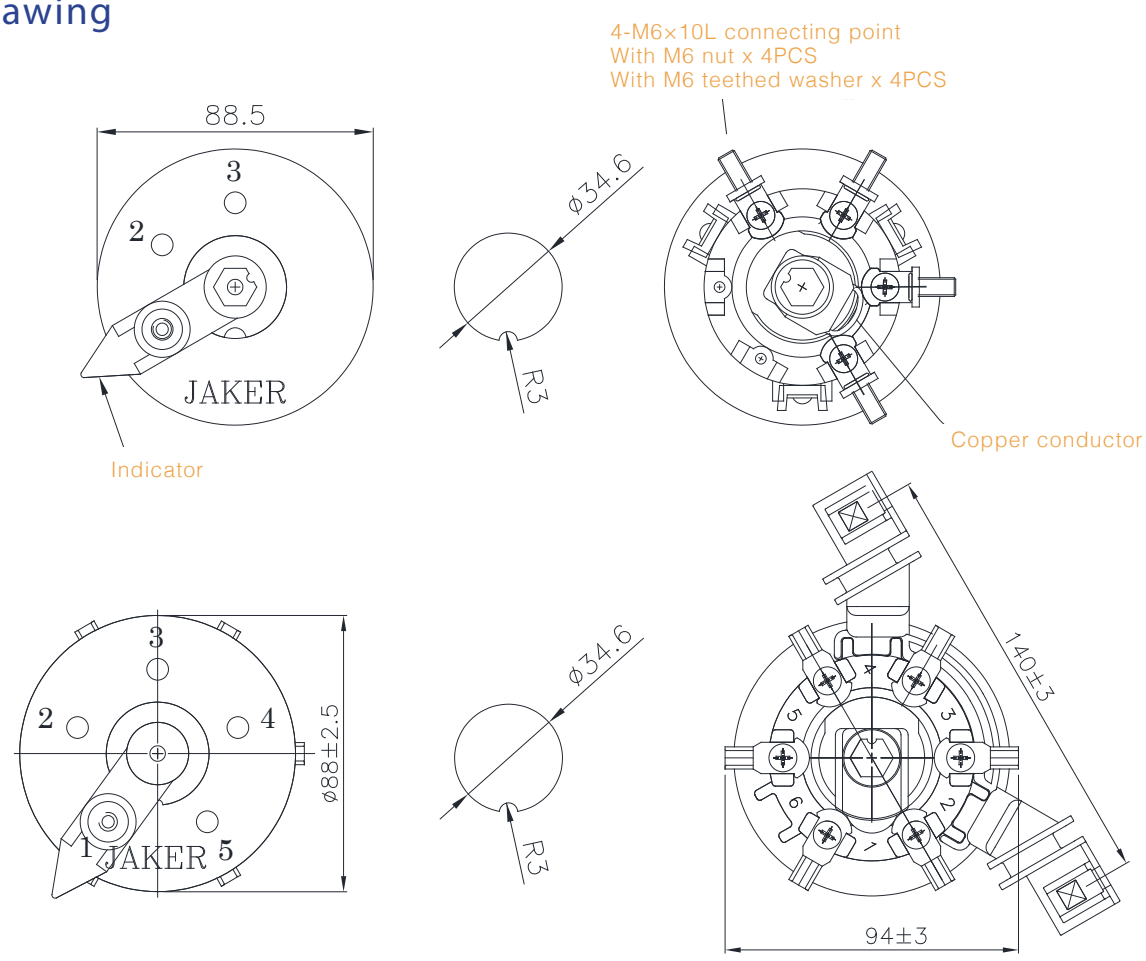
Specifications

Type	TR08	TR09
Rated voltage	25 kV	35 kV
Rated current	100 A	
BIL	125 kV	150 kV
AC dielectric voltage	AC 40 kV 1 min.	AC 50 kV 1 min.
Insulation resistance	2,000 MΩ	
Contact temperature rise	≦ 15°C @100 A	
Pressure-endurable capability	> 30 PSI	
Mechanical life cycles	> 1,000 times	
Product's type-test items	Appearance, dimension, and structure checks Continual operation test Short-time current test Low-frequency voltage-withstand test Thermal-shock test Temperature-rise test Corona test BIL Insulation resistance test Sealing test	

TR08 Drawing



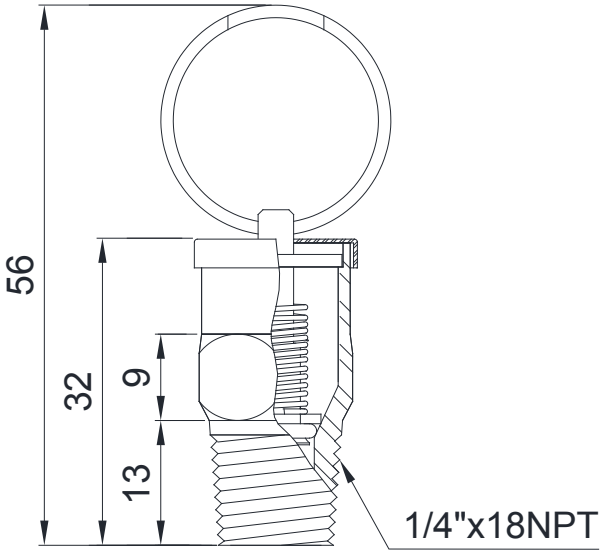
TR09 Drawing



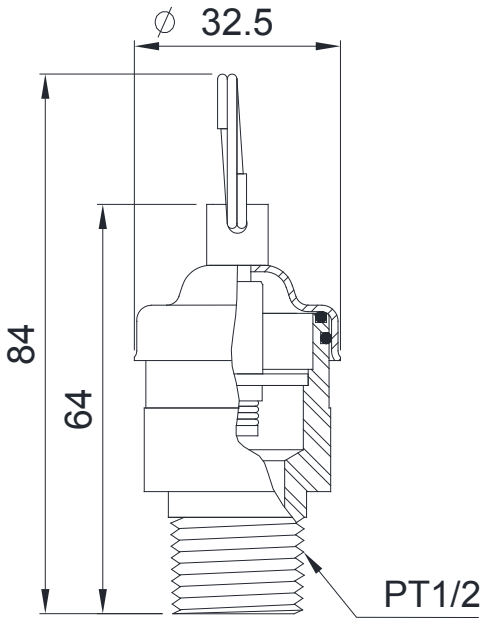
Pressure-Relief Valve

- *Mechanical characteristics : according to ANSI/IEEE Std C57.12.00*
- *Max. operation temperature ≦140°C meet transformer requirement*

Drawing



1/4” 18 thread



JK-07

Specifications

Type	1/4” 18 threads	JK-07
General application	Pad-mounted, pole type transformers	Waterproof (suitable for submersible transformers)
Release pressure	10 PSI ± 1	10 PSI ± 2
Close pressure	7 PSI ± 2	
Flow capacity	35 SCFM @1.05 kg/cm² (15 PSI)	
Mechanical life cycle	> 10,000 times	
Materials (metal parts)	Valve body and ring-pull is made of brass alloy, spring is made of stainless steel	All metal parts are made of stainless steel

CS06
Low-Voltage Bushing

Jaker Electric's CS06 transformer mounted low-voltage bushing is designed for use as secondary bushing in liquid filled transformer bushing. Units are available for both outdoor (UV exposed) and enclosed applications. The bushing is designed to use in ambient temperatures range from -50°C to 155°C and at a maximum continuous temperature of 110°C. Current ratings are based on 65°C rise above ambient and are typical for sidewall mounting with shanks below oil level.

Specifications

Type	CS06
Standard voltage class	1.2 - 2.5 kV
Rating current	850 A
AC 60 Hz 1 min. withstand	10 kV
BIL and full wave crest	30 kV

Characteristics

CS06 secondary bushing is constructed of high electrolytic grade copper with tin plated coating for maximum conductivity. The rating current is 850 A.

Insulation is cast epoxy for enclosed applications. Outdoor units are supplied with cycloaliphatic epoxy material. CS06 bushing is designed for external clamping applications, and it is used for connecting cables outside of pad-mounted transformer tanks to the secondary coil winding leads inside the tanks.

All metallic parts of the bushing are tin plated for more efficient current interchange. The sealing gasket is contained in the molded body for controlling compression and ensuring an effective seal.

Custom options:
Jaker Electric's CS06 secondary bushing is easily customized for non-standard applications. Spade and stud options can be adapted to meet customer requirements for easy installation in existing equipment.

CS06 Drawing