Toroidal Leakage Current Relay (KAR01 & KAR11) User Manual



ADRESS: Ikitelli OSB Mah. Cevre 14. Blok Sok. Telas Blok Dis Kapi No: 1 Kat: 1-2 Basaksehir/Istanbul

Phone: +90 212 438 80 24
Fax: +90 212 438 80 25

info@gruparge.com

V.25.1

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PROPER USE AND SAFETY REQUIREMENTS



Cut all the power when connecting and disconnecting the device to a panel.



Do not clean the device with a solvent or similar material. Only use a dry cloth.



Please do not intervene to the device when a technical problem is encountered and get in contact with a technical service within the shortest time.



If the warnings are not taken into account, our company or the authorized dealer shall not be held responsible for the negative consequences.



Do not dispose in the trash, the device must be delivered to the collection centers (electronic device recycling centers). It should be recycled or disposed of without harming human health and environment.



The installation, assembly, activation and operation of the device should be done and used by only expert professionals and in accordance with safety regulations and instructions.



The device operates with current transformers. Do not strictly leave current transformer tips unattached. Dangerous high voltage can occur.

1. INTRODUCTION

1.1. General Features

KAR01 and KAR11 protect the system from overload and short circuit currents in case leakage current is detected. The leakage current protection relay (Table 1) is used together with the toroidal current transformer (Table 2), and it measures the leakage current value coming from the toroidal transformer and ensures that the circuit breaker is activated.

In addition, the KAR11 model has a harmonic filter and is not affected by harmonic signals occurring on the line. In this way, it can be used easily in environments with harmonic noise.

1.2. Technical Features

TOROIDAL LEAKAGE CURRENT RELAYS

Product Code	Product Name	Product Description	Leakage Current Value Range	Power On Delay Time Interval	Supply Voltage	Time Tolerance	Output Relay	Operating Temperature	Assembly	*Harmonic Filtering	Sealable	Test and Reset	Dimensions W x H x D (mm)	Type
GA8501	KAR01	TOROIDAL LEAKAGE CURRENT RELAY	30mA - 30A	0sec - 5sec	200-240 V AC (50 Hz)	± %15	10 A @250 VAC	- 20 / 60 °C	DIN2		✓	Manuel/ Remote	34x91x64	A
GA8511	KAR11	HARMONIC FILTER TOROIDAL LEAKAGE CURRENT RELAY	30mA - 30A	0sec - 5sec	200-240 V AC (50 Hz)	± %15	10 A @250 VAC	- 20 / 60 °C	DIN2	✓	✓	Manuel/ Remote	34x91x64	A

Table 1 : Toroidal Leakage Current Relays

*Harmonic Filtering Feature; It is used to prevent faulty tripping of the leakage current relay in panels where loads causing high harmonics such as motor drives, UPSs, arc furnaces, welding machines are connected

Type:	A Type
Operating Voltage:	200-240 V AC Supply
Operating Frequency:	50 Hz
Switch On Time Setting:	0,045 – 5 sec
Reset:	Manual / Electrical (Remote)
Relay Output:	1 × C/O, 5 A @ 250 VAC
Time Tolerance:	±%15
Indicator:	6 pieces LED
Operating Temperature:	-20°C, +60°C
Moisture:	40 - 85 % RH
Protection Class:	IP20
Mounting:	DIN Rail Mounting

1.3. Technical Drawing

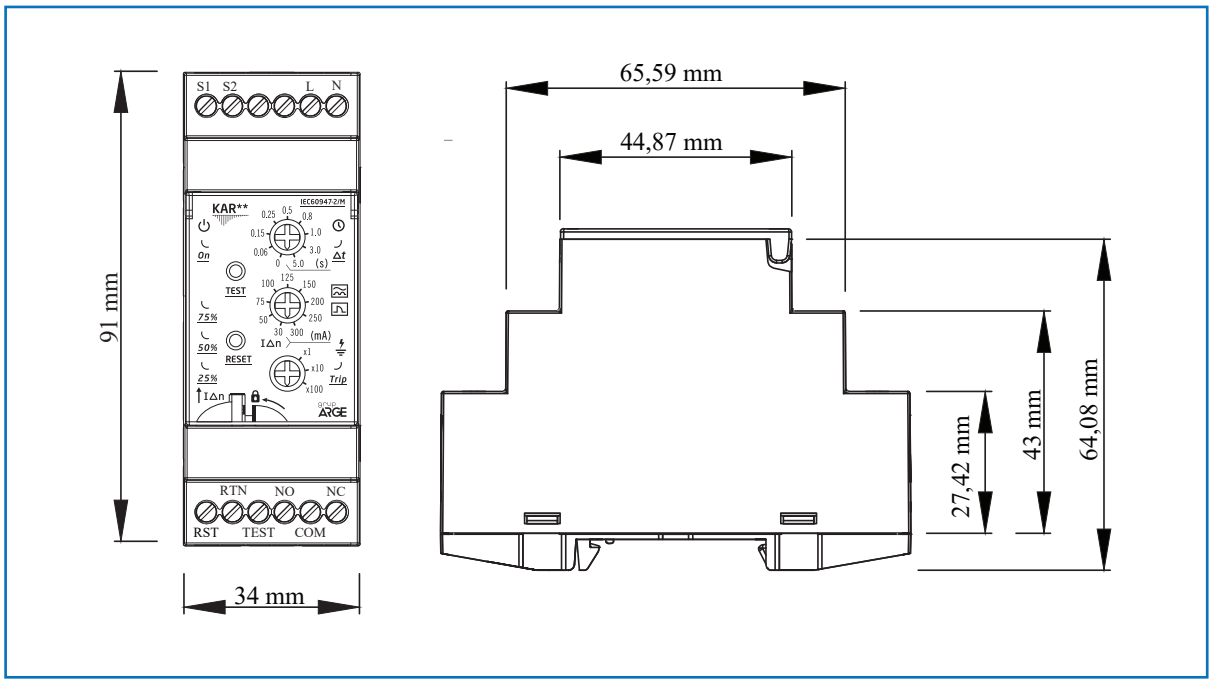


Figure 1 : KAR01-KAR11 Toroidal Leakage Current Relay Teachnical Drawing

1.4. Product Assembly and Disassembly

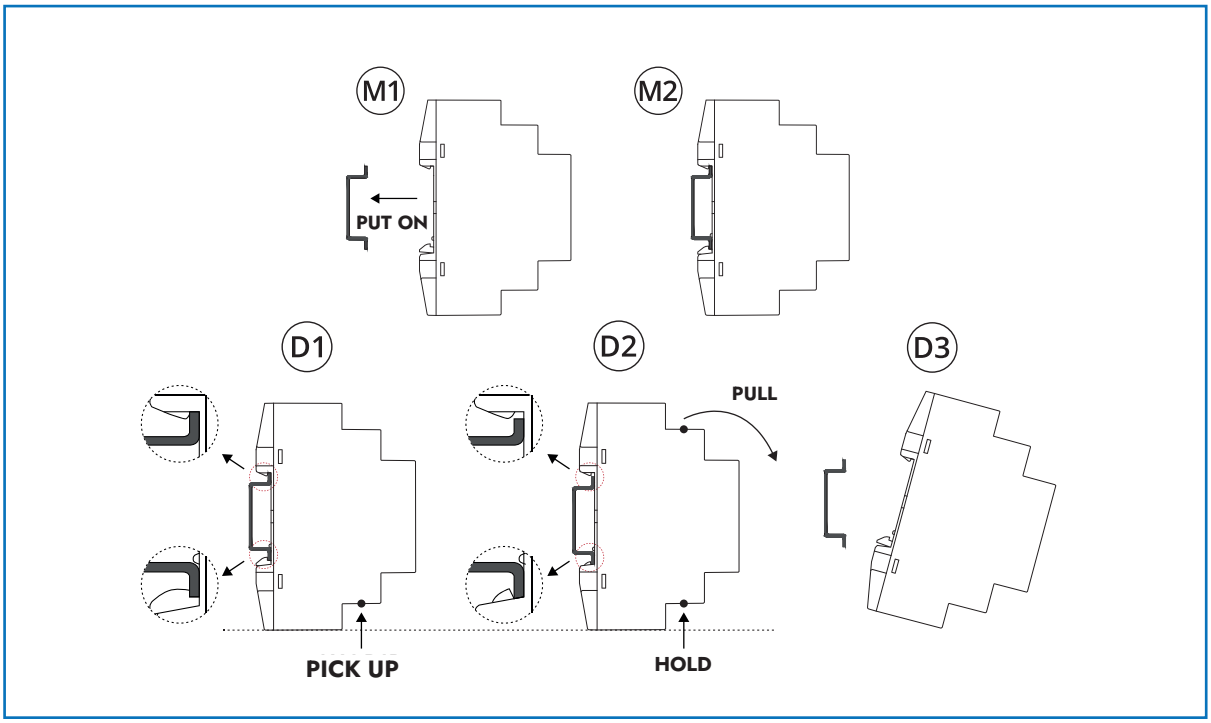


Figure 2: KAR01-KAR11 Toroidal Leakage Current Relay Product Assembly and Disassembly

1.4.1. Installation

The device has DIN2 box standards and can be mounted on the rail as shown in the figure. All phase cables and neutral cable, if any, are routed through the toroidal transformer. Make sure that the earth cable is not routed through the toroidal transformer. The secondary cables of the toroidal transformer are connected to the terminals of the toroidal leakage protection relay and the appropriate voltage is applied to the supply input terminals of the relay.

1.4.2. Issues to be Considered in Installation

- KAR01 and KAR11 devices must be used with Grup Arge brand TAT** model toroidal current transformers. Otherwise, material and life-threatening risks may occur.
- Cables should be routed through the center of the toroidal transformer as far as possible.

1.5. LED's and Their Functions

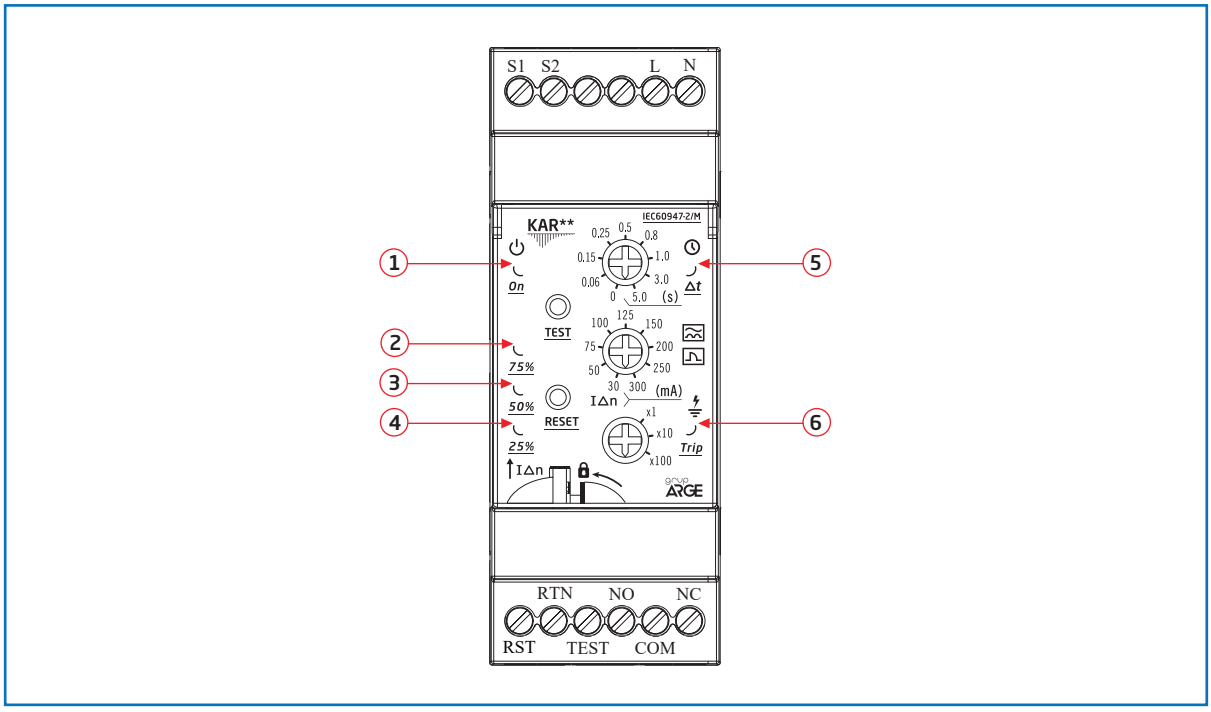


Figure 3: Front View of KAR01-KAR11 Leakage Current Relay

There are 6 LEDs on the device, as seen in Figure 1. These are in order from top to bottom:

1. **Power On LED:** It is the LED that shows the power status of the device Led Color is blue.

2. % 75 LED: It shows that the leakage current value passing through the device is at 75 % level. LED color is red.

3. % 50 LED: It shows that the leakage current value passing through the device is at 50 % level. LED color is red.

4. % 25 LED: It shows that the leakage current value passing through the device is at 25 % level. LED color is red.

5. Time LED: It shows the minimum time required for the relay to open the circuit during leakage current. LED color is green.

6. Trip LED: It refers to the process of determining the leakage current level of the relay.

This LED indicates that the relay output is active when the specified leakage current parameters occur. LED color is red.

1.6. Device Connections

1.6.1. Toroidal Leakage Current Relay Connection Diagram

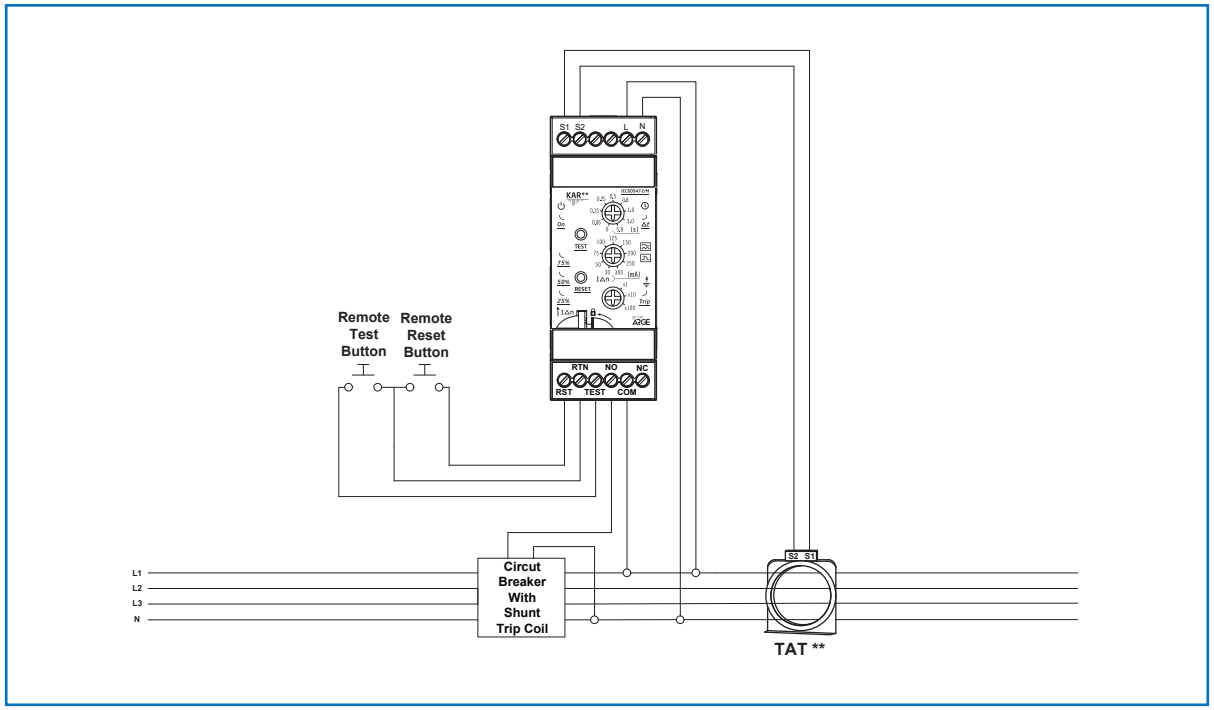


Figure 4: Toroidal Leakage Current Relay Connection Diagram

1.6.2. Supply and Transformer Connections

All connections of the device are made from L, N, S1, S2, RST, RTN, TEST, NO, COM and NC terminals as seen in Figure 2. Toroidal transformer inputs are S1 and S2, and supply connection inputs are L and N terminals.

1.6.3. Relay Connections

COM is the input terminal and NO and NC are the output terminals. When the relay is not engaged, that is, the output is not active, the COM terminal and NC terminal are short circuited. Therefore, the signal entering from the COM terminal is transferred directly to the NC terminal. Meanwhile, COM and NO terminals are open circuit, that is, there is no output at the NO terminal. When the relay activates, that is, when the output becomes active, COM and NO terminals become short circuit, and COM and NC terminal become open circuit. The signal entering from the COM terminal is no longer output from the NC terminal, but from the NO terminal. NC terminal does not give output until the relay releases.

1.6.4. Remote Test and Reset Connections

"Remote Test" and "Reset" connections of the device are made via "TEST", "RTN" and "RST" terminals. Relay output connections are made from NO, COM and NC terminals. When the "TEST" terminal is short-circuited with "RTN", the function of the TEST button is realized and the device pulls the relay output. When the "RST" terminal is short-circuit-ed with "RTN", the function of the RESET button is realized and if the relay output is pulled, the device releases the relay. This operation can be realized by placing a button or other switching element between the terminals.

2. TOROIDAL CURRENT TRANSFORMER

Toroidal current transformer is a current transformer used to detect the leakage current in the line. After passing phase and neutral lines through the transformer, the output terminals must be connected to the S1 and S2 (direction is not important) terminals of KAR01 and KAR11. There are 8 different models of leakage current transformers and the most suitable one can be used according to the needs.

TOROID CURRENT TRANSFORMERS

Product Code	Product Name	Product Description	Leakage Current Value Range	Type	Inner Diameter Ø (mm)	Dimensions G x Y x D (mm)
GA6930	TAT00	TOROID CURRENT TRANSFORMER (40 mm)	30 mA - 30 A	Circular	40	80 x 99,5 x 17,5
GA6931	TAT01	TOROID CURRENT TRANSFORMER (80 mm)	30 mA - 30 A	Circular	80	121 x 139 x 34
GA6932	TAT02	TOROID CURRENT TRANSFORMER (110 mm)	30 mA - 30 A	Circular	110	155 x 174 x 34
GA6933	TAT03	TOROID CURRENT TRANSFORMER (160 mm)	30 mA - 30 A	Circular	160	205 x 224 x 35,5
GA6934	TAT04	TOROID CURRENT TRANSFORMER (210 mm)	30 mA - 30 A	Circular	210	254 x 272 x 33,8
GA6935	TAT05	TOROID CURRENT TRANSFORMER (300 mm)	30 mA - 30 A	Circular	300	345 x 367 x 47
GA6936	TAT06	TOROID CURRENT TRANSFORMER (280 * 115 mm)	30 mA - 30 A	Rectangle	280 x 115	350 x 185 x 40
GA6937	TAT07	TOROID CURRENT TRANSFORMER (470 * 160 mm)	30 mA - 30 A	Rectangle	470 x 160	545 x 235 x 40

Table 2: Toroidal Current Transformers

NOTE: Toroid Current Transformers must be used together with Toroid Leakage Current Relay as they are com-patible with Toroid Leakage Current Relay.

WARNING: The leakage current value for life protection is 30 mA and the leakage current value for fire protection is 300 mA. Setting above these values is dangerous and is not recommended.
It is not recommended to use with LV current transformers and collector transformers with different conversion ratios.