

Installation and operating instructions for the DCT A residual current transformer



These installation and operating instructions are aimed at qualified electrical specialists. The installation of devices of this type is not appropriate for electrical laypersons due to the considerable potential dangers. These installation and operating instructions must be retained, so that they can be referred to at a later stage. The operator of the electrical installation must be informed about the use and function of this protective device.

Application instructions and warnings

The following notes and warnings must be observed in order to ensure safe operation:

1. Devices with visible damage must not be installed or used.
2. If the equipment is used in a manner that does not comply with the intended use this may result in both material damage and personal injury.
3. The warranty will be rendered null and void should the equipment be subject to improper interventions and changes.
4. Disposal is subject to the statutory regulations of the European Union (WEEE/ German Electrical and Electronic Equipment Act).

You will find further information and data sheets at www.doepke.de by searching for the item number or product name.

Intended use

The DCT A-series residual current transformers are components of modular residual-current operated protective and monitoring devices as per DIN IEC 60947-2-M and DIN EN 62020. They are used solely to detect residual current. Currents are displayed and indicated using the DMRC D 1 A and DRC M 1 A control relays, which are available separately. In the event of insulation faults, the 'automatic switch-off of power supply' is ensured using the DMRC D 1 A in conjunction with a separate external switch-off device. The DRC M 1 A is used to monitor electrical installations or electrical circuits for the occurrence of residual current and to indicate this via an alarm if a specified value is exceeded.

The DCT A transformer detects all currents flowing through it to the consumer. During fault-free operation, the sum of the instantaneous values of these currents will be zero. If a leakage current is caused due to an insulation fault upstream of the transformer, this leads to a proportional signal in the transformer, which is used by the control/signal relay for evaluation. It is not possible to use the transformer without the accompanying evaluation unit.

Electrical connection and installation

The manufacturer's safety and assembly instructions must be observed. Terminals 1 and 2 of the residual current transformer are connected to terminals k and l of the evaluation unit. The installation should only be carried out by an authorised expert who is familiar with the relevant installation regulations. Observe the national regulations and safety requirements during installation.

The devices are designed for installation in any position in power distributors or systems in dry indoor conditions. The devices are mounted on stable surfaces or a mounting plate using the supplied screw points. Monitored lines must be equipped with basic insulation designed for rated voltage as a minimum.

The transformers as bushing transformers are only permitted for operation with insulated cable and line systems. All active lines must be routed through the transformer. The direction of insertion is irrelevant here. The protective conductor is not an active line. If no sheathed cables are monitored, the individual wires must be closely bundled and routed centrally through the transformer, otherwise the likelihood of faulty trips will increase.

The internal diameter of the transformer must be set to at least 1.5 times the size of the external diameter of the cable(s) to be wired. The monitored line(s) must be mechanically fixed in such a way that there is no mechanical stress placed on the transformer. Other high-voltage lines that are not routed through the transformer must be kept a minimum distance of 20 cm away from the transformer, in order to reduce the risk of faulty trips caused by external magnetic fields. The transformer line to the control/signal relay should be treated like a signal line. The wires must always be twisted.

For EMC reasons, avoid laying high-voltage lines and transformer lines in parallel. Crossovers should be implemented at right angles and a minimum distance of 15 mm must be maintained. A transformer must only be connected to one control/signal relay. The relevant rated current I_n of the device does not reflect the load current actually permitted. This can be six times higher ($6 \times I_n$). The reason for this is that the physical effects of a high load current generate what are known as 'symmetry errors', which can affect the accuracy of the response threshold. With a rated current that is six times higher, the relay would be quick to trip even without residual current.

Specifying a much lower rated current should ensure that there are no false alarms when a motor starts up, for example.

Danger from open voltage

Because of the integrated protective diode, there is no danger from high voltage peaks in the event of contact with open terminals in 'open mode'. Therefore, spark-overs and flashovers cannot occur between the terminals in the transformer.

Risk of not tripping

If residual currents with frequencies $\neq 50/60$ Hz are expected (multiphase operated electronic equipment such as frequency converters), correct display and indication of a $\neq 50/60$ Hz residual current cannot be guaranteed.

Warranty

All professionally installed, unaltered devices are covered by warranty for the duration of the statutory warranty period from the day of purchase by the end user. The warranty is not applicable to damage incurred during transport or caused by short-circuit, overloading or improper use. In the event of defects in workmanship or material being discovered within the warranty period, the company will provide repair or replacement free of charge. The warranty will be rendered null and void if the device is opened without authorisation.

Technical data

DCT A residual current transformer					
Application	Detection of Type A residual currents in electrical facilities with earthed networks and insulated cable systems; only in conjunction with DRC M 1 A or DMRC D 1 A relays				
Rated frequency	50 – 60 Hz				
Residual current detection characteristic curve	Type A/AC and pulsating DC residual current 50–60 Hz				
Rated residual operating current $I_{\Delta n}$ can be adjusted on the evaluation unit	30 mA - 3000 mA				
Rated voltage U_n	690 V				
Rated impulse withstand voltage U_{imp}	8 kV				
Max. overcurrent regarding non-tripping	$6 \times I_n$				
Rated short-circuit residual current $I_{\Delta c}$	10 kA				
Transformer line to the evaluation unit	max. 10 m PVC single core, twisted: LiY 0.5 mm ² or at least comparable design with approval for use in low-voltage switchgears				
Thermal Continuous residual current I_{cth}	$1,5 \times I_n$				
Thermal rated short-term residual current I_{th}	$10 \times I_n$ (for 1 s)				
Rated surge residual current I_{dyn}	$25 \times I_n$				
Terminals					
Type/cross-section of terminals	Screw-type terminal with strain-relief/0.2 mm with ferrule/4 mm ² rigid				
Tightening torque	0.25 Nm				
Protection class (terminals)	IP 20				
Other information					
Item no	09 340 ...	320	321	322	323
Transformer type designation DCT A-...		20	35	70	105
Internal diameter of transformer		20 mm	35 mm	70 mm	105 mm
Max. perm. outer diameter of cable(s)		13 mm	23 mm	46 mm	70 mm
Rated current I_n		50 A	125 A	200 A	250 A
Housing material/positioning	Polycarbonate/anywhere				
Protection class (housing)	IP 40				
Operating temperature range	-25 °C to +65 °C				
Storage temperature range	-40 °C to +85 °C				
Design regulations/approval marks	DIN EN 62020 DIN EN 60947-2-M DIN EN 61869-2				
Evaluation units					
DMRC D 1 A	09 340 350				
DRC M 1 A	09 340 250				