UK Technical Data 08

DRCA-1-Set

Measuring system for analysing complex leakage currents

Function

To ensure trouble free operation with RCDs, the sum of the operational leakage currents or PE current must not exceed 30% of the RCD sensitivity - see 531.3.2 (ii). Modern power drive systems (PDS) and equipment containing semiconductors (power electronic converter systems or PECS for short), produce complex capacitive leakage currents at frequencies related to to the filters, bridge and switching frequency of the inverter plus the associated harmonics. Under normal operating conditions these currents flow to the earth via parasitical capacitance, EMC capacitors or line capacitance, and must be allowed for in the design. The design of the equipment earthing must take into account that in the event of a fault, these high leakage currents impact the touch voltage under resistive fault conditions e.g. residual current. The RCD must be selected to detect residual current faults i.e. currents above the design leakage current, but within the defined limits of the system safety design requirements. See BS7671 for further advise e.g. systems with power electronic equipment Fig A53.1 / Types of RCD.

The DRCA-1 Measuring system facilitates the analysis of leakage current values and their frequencies resulting from the individual components of the PDS and the associated harmonic currents that deviate from the mains frequency. This helps the designer to identify potential issues with the design and possible solutions e.g. checking the filter resonant frequency is not a multiple of the inverter switching frequency, checking the effect of changing the inverter switching frequency and motor speed. More information on this subject is given in our Technical Publication 17. Following a good design process will enable the engineer to identify which Type B RCD is most suitable for the application, and more importantly if the prototype equipment design has any design flaws associated with the levels of expected leakage current. The DRCA-1 incorporates a number different analysis tools, these are explained in detail in the Manuel - this can be downloaded via the DRCA-1 web page.

The set consists of DRCA 1 measuring unit for connection to a separate PC via a standard USB port. The DRCA 1-MC measuring cable ensures correct transmission of the measured values to the measuring unit from the DRCA 1-CT70 measuring transformer: This is positioned to cover all of the active conductors leading to the load, detecting the sum of all conductor currents flowing through it. This signal is evaluated by the measuring unit and displayed on the connected PC. The DRCA1-SW analysis software provides a range of functions for displaying and evaluating the measured values.

Features

DRCA 1-CT70: Inside diameter 70 mm, detection range currents from 10 Hz to 100 kHz. Other sizes available 105 and 140 mm.
DRCA 1-MC: Cable length 3 m, reverse polarity protection through plug/socket arrangement.
DRCA-1 measuring unit: Detection range from 10 Hz to 100 kHz and an amplitude up to max. 10 A, immunity against DC residual currents up to 3 A with maximum -10% measurement deviation.
DRCA-1-SW analysis software: Including display of residual current signal curve, analysis of frequency range (Fourier analysis), display of effective values, long-term measurement with measured values stored for later detailed analysis, recording of signals by defining trigger conditions for determining transient leakage currents, compatible with Windows 7, Windows 8 and Windows 10.

Applications

Measurement in commercial and industrial installations with TN-S and TN-C-S systems, where power electronics equipment is used without galvanic isolation from the mains, e.g. frequency converters, UPS equipment, switching power supplies or high-frequency converters.

Notes The DRCA 1-CT should be mounted immediately below or above the location of RCD, mounted securely on a a backplate. This gives an accurate reflection of the current flowing through the RCD. Cables must be positioned centrally within the CT and not be subjected to sharp bends, as this will give inaccurate readings.

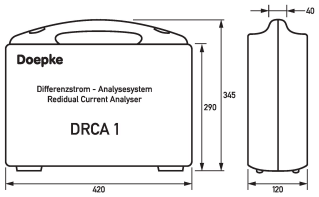
Accessories

Measuring transformers DRCA CT

Technical Data

Technical Data	DRCA-1-Set
Series	DRCA 1 set
min. Sensor, measuring range, current	0 A
max. Sensor, measuring range, current	10 A
Operating system	Windows 2000 (SP3), Windows 2003, Windows 7,8,10
Languages	German / English
	General data
Operating position	any
max. Operating altitude above MSL	2000 m
Storage temperature	-20 °C ... 70 °C
Ambient temperature	0 °C ... 45 °C
Climate resistance	max. 90% rel. humidity, condensation not permitted
Housing type	none
Housing material	Polycarbonate (PC)
Width	420 mm
Height	345 mm
Depth	120 mm
Design requirements/Standards	EN 61010-1, VDE 0411 Teil 1
Degree of pollution according to EN 60664	2

Dimensions



Dimensional drawing Group view