

# DIZ

## DOEPKE-INFO-ZEITUNG

FREE CUSTOMER NEWSLETTER BY DOEPKE SCHALTGERÄTE GMBH

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## Saving energy starts right from the distribution board

*Reducing thermal losses... getting to the heart of the problem!*

**When project engineering a circuit-breaker combination, modular DIN rail components such as residual current circuit-breakers or miniature circuit-breakers are selected not only for their installation size, but also for their properties under rated conditions.**

Standard DIN EN 60439-1 has been replaced by DIN EN 61439-1 and the new regulations it contains have been in force since 24 September 2014. DIN VDE 61439-1 sets out general requirements for circuit-breaker combinations such as building-site or domestic distribution boards. The requirements should provide the user with a high standard of quality, availability and



documentation. As part of this, it is necessary to calculate the total dissipation power of a circuit-breaker combination, taking the nominal criteria given in DIN EN 61439-1 into consideration. However, this calculation can only be carried out if the circuit-breaker manufacturer has provided this required information to the switching device installer.

Series DFS residual current circuit-breakers have an extremely low dissipation power per pole. Even at the rated current and an ambient temperature of +40°C with a duty cycle of 100%, the devices' self-heating is well below the average in comparison to products from competitors. The residual current circuit-breakers in "HD" design are suitable for higher ambient temperatures, with a maximum permissible ambient temperature for these devices of 60°C.

Due to the low self-heating, the electrical dissipation power is also



▲ Our residual current circuit-breakers have low self-heating.

low. Thanks to this low dissipation power our DFS residual current circuit-breakers are environmentally friendly. The switching mechanism of the DFS residual current circuit-breakers is highly short-circuit-proof.

Furthermore, the thermal overload protection for the DFS 2 up to the 63 A design and for the DFS 4 up to the 80 A design can be provided at the rated current for the safety fuse in gG design.

The large terminals for individual chargers up to 50 mm<sup>2</sup> make easy

wiring and through-wiring possible, even with large conductor cross-sections.

With DFS residual current circuit-breakers, the switching device installer is ideally equipped to meet the requirements set out in DIN EN 61439-1.



Heino Thoben-Mescher  
Product Management



## HEA electrical installation values certified by RAL

For building owners and renovators it is important to work from the outset with architects, property developers, consultant electrical engineers and electrical contractors to plan the scope and complexity of the electrical installation. During this planning process current technologies and individual wishes should be taken into account.

A well planned building or renovation project should include sufficient flexibility to develop or extend the electrical system in the future. This is particularly important as later changes can be difficult and expensive. For example, to modify the electrics in a room the walls must be opened up and then after the laying of additional cables have to be replastered and painted or papered. The retrofitting and extension of electrical systems is up to five times more expensive than their original installation! The ELEKTRO+ Initiative recommends the HEA Electrical Installation Values, in accordance with RAL-RG 678, to building owners and renovators for use as a planning tool. (RAL is the German Institute for Quality Assurance and Certification e. V.) ■



### Installation values and their certifications

Installation value	Certification	Description
1	*	Minimum level installation according to DIN 18015-2
2	**	Standard level installation
3	***	Optimum level installation
1 plus	* plus	Minimum level installation according to DIN 18015-2 with allowance for the future implementation of building system technology according to DIN 18015-4
2 plus	** plus	Standard level installation with at least one living space designed according to DIN 18015-4
3 plus	*** plus	Optimum level installation with at least two living spaces designed according to DIN 18015-4

The brochure "Electrical installation systems in residential buildings - Revision of RAL-RG 678" can be downloaded as a PDF in German only here: [www.elektro-plus.com/elektroplanung/ausstattungswert](http://www.elektro-plus.com/elektroplanung/ausstattungswert)

## Stylish and smart: DCTM residual current transformers

### Emergency switch-off without a separate basic unit

Doepke's new transformers with their fresh design represent a flexible solution to residual current protection in industrial systems. The rated current is determined by the cable cross-section and the transformer's internal diameter.

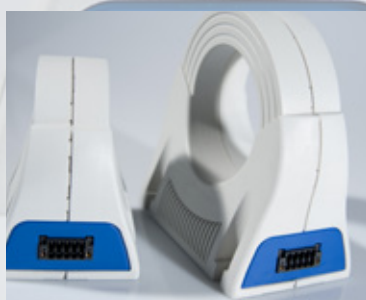
An integrated relay in the residual current sensor is used to switch off the system in combination with a circuit-breaker in the event of a fault. This approach ensures optimal

personal and fire protection as per DIN VDE 0100-410 and VDE 0100-530. The MRCD version of the residual current sensors can be used in numerous industries, such as metal working, food production, plastics processing or paper manufacture. With the additional special feature of a 4-20 mA interface, several transformers can in turn be connected with a market-standard, multi-channel evaluation unit, saving space and money.

When using the MRCD version of the residual current sensor, a relay is incorporated for the main alarm. Supported by external evaluation units, the 4-20 mA interface provides additional functions, such as a pre-alarm and monitoring. Standard-compliant switch-off is

not affected when faults arise. The adjustable pre-alarm can be used to detect residual currents early. The actual alarm is only triggered by the integrated relay in the residual current sensor, causing a switch-off. This can avoid the unexpected costs that may arise from the immediate shutting down of production processes.

Doepke will supply the DCTM in the pulsating current-sensitive and AC current-sensitive design type A until the end of this year. Next year the AC-DC sensitive design type B+ will be supplied. The product range is completed by the 30 mA and 300 mA variants. The residual current sensors with an internal diameter of 35 mm or 70 mm are operated by a 24 V DC power supply. ■



## STANDARDISATION

### DIN VDE 0100-753:

#### 2003-06

*Construction of low voltage installations – Part 753: Floor and ceiling panel heating*

This installation standard (and a new draft dated August 2013) stipulates that both for additional protection (personal protection) and for fault protection through automatic switch-off of the power supply, only residual current operated protective devices (RCDs) with a rated residual current  $I_{\Delta n} \leq 30$  mA are permitted for use. Even under DIN VDE 0100-420, only RCDs with a rated residual current  $I_{\Delta n} \leq 30$  mA are permitted for fire protection when using panel heaters.

In order for a fire to break out due to insulation faults in electrical systems, a power output of approx. 60 W is required at the fault point. For fire protection under DIN VDE 0100-420, therefore, RCDs with a rated residual current  $I_{\Delta n} \leq 300$  mA are required.

In the event of insulation faults in panel heaters, however, even an output of approx. 7 W at the fault point can lead to a risk of fire, as resistive faults can occur over a longer period of time. In this case, only RCDs with a rated residual current  $I_{\Delta n} \leq 30$  mA are permitted for use.

As an aside, the electrical energy converted into heat at the fault point in the event of an insulation fault is independent of the frequency of the residual current. Even residual currents with high-frequency components (e.g. due to faults in frequency converters) can cause a fire at the same effective value. ■

Günter Grünebast  
Head of  
Standardisation/Test-  
ing/Certification



# VdS-accredited EMC expert used residual current measurement

## RCD tripping resolved with the DRCA 1 system

**Damage to technical systems increasingly occurs due to lightning strikes, surges and other electromagnetic influences. This is due to a lack of effective protective measures. For this reason, electricians must urgently be trained in this area.**

That's why the VdS has worked with other specialist organisations, the ZVEH and renowned industry companies to develop an accreditation process for project designers and installers of electrical systems. Training: the training courses cover all necessary information in the areas of lightning and surge protection as well as harmonics and electromagnetic compatibility (EMC).

Special importance is placed on:

- » Describing the legal specifications and applicable standards and guidelines on which the training is based
- » Explaining the required terminology
- » Explaining the physical and technical principles
- » Planning and implementing necessary and practical measures for reducing damage and interference
- » Testing to assess interference as well as the implemented protective measures in a system.

Both training parts have a final exam and participants must successfully complete both training parts to be accredited as an "EMC expert". Initial situation: the technical schools in Steinfurt District created eight training models for drive technology (image 1) two years ago. The essential components of the drive models consist of the G 120 frequency converter installed in a steel sheet housing and the motor.



▲ Image 1: Training models with G 120 frequency converter

Type B RCDs with a residual current of 30 mA are installed in the main distribution board of the electrical laboratory. Initial commissioning of the practical models resulted in undesired tripping of the RCD, and the manufacturer of the practical models was contacted and the problem described. EMC filters (image 2) were installed in the practical models to reduce the leakage currents, which, according to the manufacturer, should have resolved the problem. Unfortunately this was not the case and the RCD continued to switch off unexpectedly.

As another possible solution, the manufacturer of the practical models suggested leakage current compensation.

Mr Bröcker from the technical schools in Steinfurt contacted Mr Walfort from the BBS (vocational

institute) in Ahaus about the problem. The BBS is an accredited training institute for EMC experts and carries out EMC measurements using the Doepke residual current analysis system. The following measurements describe the procedure for solving the problem.



▲ Image 2: EMC filter

**Measurement analysis:** the residual current analysis system from Doepke was deployed for the measurement. The residual current transformer was installed directly behind the RCD in the supply line to the practical models. No further equipment was switched on except for the practical models.

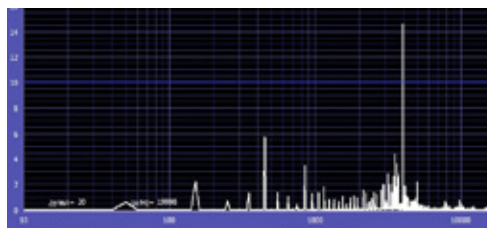
**1st measurement (image not shown):** the practical models were switched on in series. It was determined that the leakage currents briefly exceeded 300 mA when the devices were switched on. This is normal for an uncharged direct current intermediate circuit for frequency converters.

**2nd measurement:** the measurement showed the operation of a frequency converter with a corresponding drive. The motor worked at maximum speed. According to the technical documentation for the G 120 converter, leakage currents of 10–50 A are possible. The measurement confirmed this information.

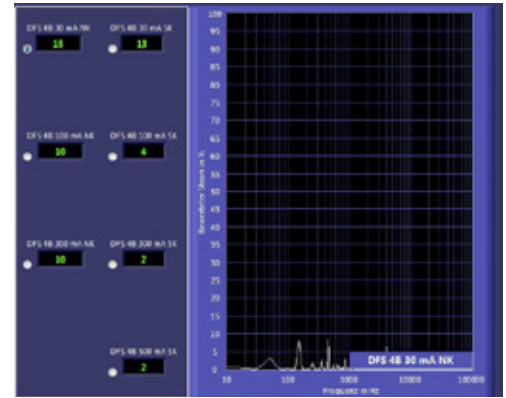


It should be noted that the leakage currents predominantly occur in a frequency range above 100 Hz.

The following image shows the frequency analysis for the second measurement.



**3rd measurement:** four practical models were used. The analysis indicated that an RCD with 30 mA NK is only loaded with 15% and therefore will not trip.



The subsequent frequency analysis with RCD tripping characteristic curve showed that the RCD will not trip in this frequency range.

**Measurement results:** these showed that operating eight practical models is possible, because their leakage currents occur in a higher frequency range and do not cause the RCD to trip. The cause of tripping are high leakage currents when the models are switched on. For this reason distribution across multiple circuits with individual RCDs is necessary.

**Summary:** DIN VDE 0100-723 stipulates that in training rooms with experimental equipment, type B residual current devices (RCDs) with a residual current of 30 mA must generally be installed, due to the smooth DC residual currents that can be generated by frequency converters in the event of a fault. Even VDE 0100-530 ("Construction of low voltage installations – Part 530: Selection and construction of equipment – switching and control devices") stipulates the use of type B residual current devices, which must be used, for example, even with preventative fire protection, for residual current circuit-breakers in systems and equipment where smooth DC residual currents can occur (e.g. frequency converters). These types of circuit-breakers are also recommended in guideline VdS 3501. The DFS 4 B residual current circuit-breaker with NK characteristic curve is designed for this application. As a practical solution for the case of the technical schools in Steinfurt, the electrical system must be extended. The power supply must be extended to three circuits with three individual RCDs. ■

Johannes Walfort  
Team Leader, Electrical and  
Automation Systems

Berufsbildungsstätte  
Westmünsterland GmbH  
for trade and industry





Who answers the phone when you call our main telephone switchboard on +49 (0)4931 1806-0?

**Anne Hänfler** (Administration, Head Office)

Anne Hänfler joined us on 1 January 2013. She is part of the administrative team for the company management and also works the telephone switchboard. Together with her colleague Christa Steinke, Anne takes care of numerous administrative tasks as well as taking on the role of the friendly, welcoming voice to all calls received on +49 (0)4931 1806-0. Anne is a trained wholesale and foreign trade salesperson who spent 17 years working in various departments in the East Frisian company, Lufttransport GmbH OLT. She spends most of her free time with her family.

**Angel out and about**

Our previous mascot, the Doepke Angel, has once again been spotted – this time on the famous Golden Gate Bridge in the USA.

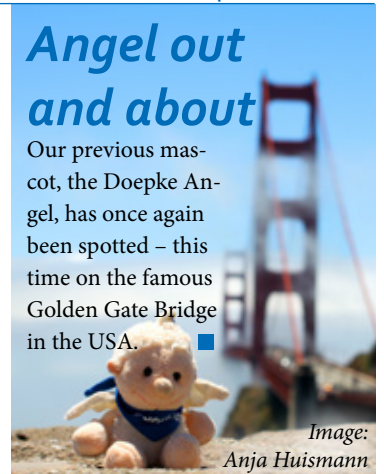


Image: Anja Huisman

**Courtyard fête once again a success**

Summer party with a little "pick me up"

A brief rain shower at the start of this year's summer party could not spoil our mood, and after we finished enjoying the food, which was provided by Speicher 77 this year, the dark clouds had almost completely vanished and we were able to go out of the marquee into the fresh air.

The small courtyard had a marquee, a drinks tent and various seating arrangements.

The temperatures later became truly summery, and it was really lovely to

spend time outdoors. Those who found it too cool outside, however, could enjoy the cosy fire or dance in the marquee to the music of DJ Elmar.

We were especially happy to see our colleagues from the Bickenriede office, who travelled the extra distance to join in the fun.

All in all, it was yet another successful summer party with great food, music, a good atmosphere and after a few initial hiccoughs, good weather too!



▲ DJ Elmar finds the right beat to keep the party in full swing.



Stefan Ahrling Sales Promotion Region West

**Doepke's bikers in Rhineland**

Siegbert Caspers, Fred Hoppen, Gerhard Janssen, Astrid and Holger Meier met at Andrea and Stefan Ahrling's home in Puderbach, West-erwald, for the first motorbike tour outside of East Frisia.

After a hot, approx. 450 km-long ride, the tour took off the next morning through the West-erwald area, past Montabaur to the Gelbachtal towards Wirzenborn, which the bikers really enjoyed. Following a visit to the private motorbike museum in Montabaur,

the tour continued towards Nassau an der Lahn. From the Niederwald Monument in Assmannshausen, the view of the UNESCO world heritage site and of the Rheingau was very impressive. The tour continued past the Roman limes in Hillscheid and then returned to Puderbach. After approx. 300 kilometres – with no accidents! – and a hearty biker meal, everyone ended the day in a good mood. The second motorbike tour is already set in the calendar for 2015 and is headed for the Erz Mountains.



◀ Cosy conversation around the fire

**DATES/NOTES**

**Belektro, Berlin**  
15/10 – 17/10  
Hall 1.2, Stand 206  
www.belektro.de

**GET Nord, Hamburg**  
20/11 – 22/11  
Hall B5, Stand B5.120  
www.get-nord.de

**SPS/IPC/Drives, Nuremberg**  
25/11 – 27/11  
Hall 4, Stand 261  
www.mesago.de/de/sps

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**QUARTERLY QUOTE**

*No man can taste the fruits of autumn*

*while he is delighting his scent*

*with the flowers of spring.*

*Samuel Johnson*