Doepke
e.Guard

DETECT
AND PREVENT

Intelligent residual current monitoring
with **e.Guard**.

PREVENTION IS BETTER THAN RESPONSE — SAFETY — AVAILABILITY — MAINTENANCE OPTIMISATION — LOWER COSTS — eguard.de
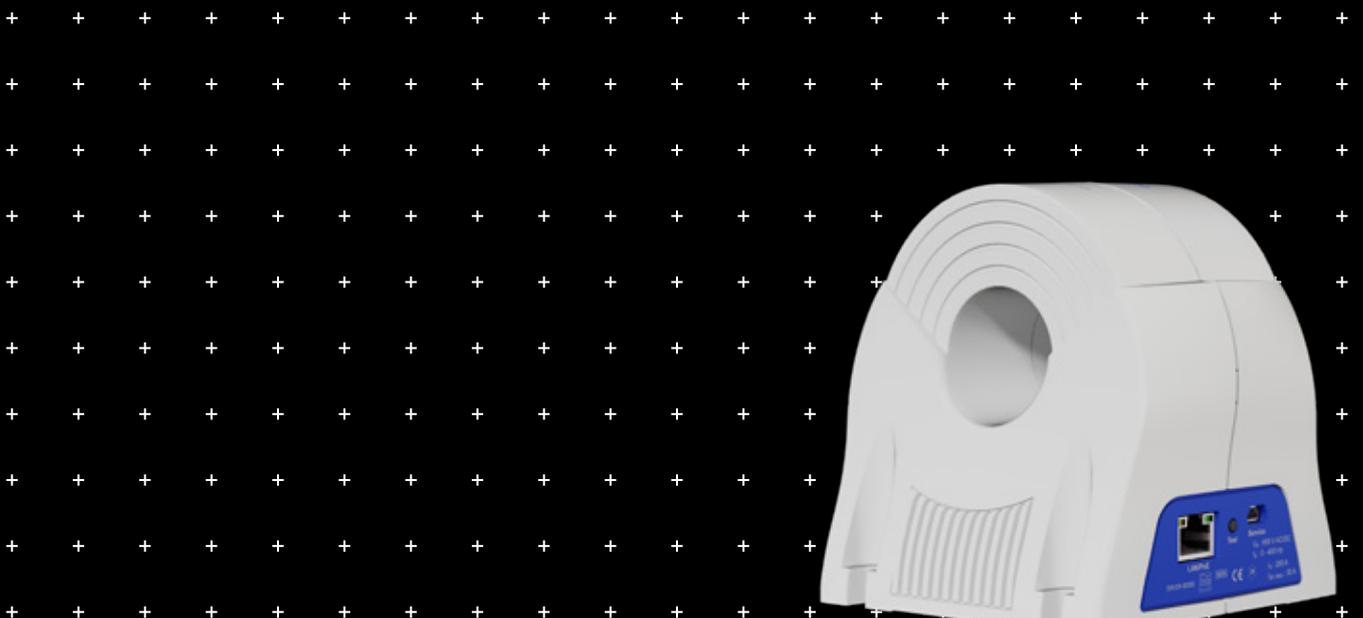
PREVENTATIVE SAFETY

Predictive Maintenance is a central component of Industry 4.0. It refers to proactive maintenance of installations with the goal of avoiding costly failures or damage. Data on the condition of the installation and forecasts regarding future installation behaviour are used for this.

Doepke e.Guard is a smart, modular system for monitoring the condition of electrical installations e.Guard continually collects residual current data, provides information on the installation's insulation resistance and thereby eliminates the need for repeated insulation testing in accordance with DIN VDE 0105-100/A1. e.Guard also uses artificial intelligence (AI) and machine learning (ML) methods in order to predict the future condition of installations. This allows for maintenance to be scheduled, for multiple activities to be performed at the same time and for expensive installation failures or serious damage, for example due to fires, to be avoided. This means interruptions can be effectively minimised and downtime costs reduced.

e.Guard therefore minimises risks and increases safety for your company.


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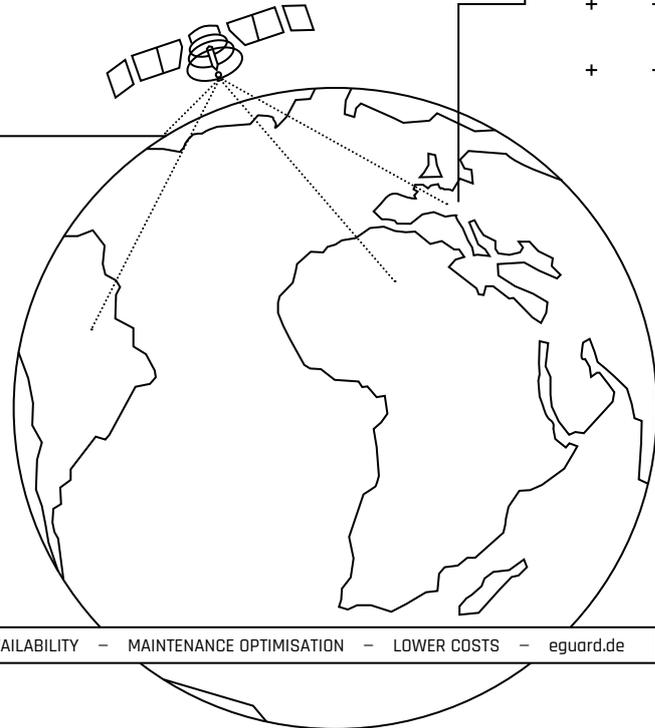
e.Guard IS:

CUSTOMISED

e.Guard is available as either a flexible individual solution for smaller systems OR as a fully integrated element in the system landscape of more complex systems.
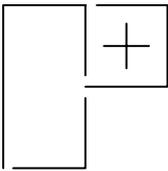
INTELLIGENT

e.Guard recognises and learns individual residual current patterns during operation. This allows maintenance activities to be predicted.
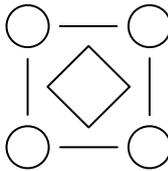
EASY

e.Guard has low requirements for commissioning. Usable data are made available quickly.
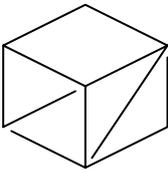
VISUAL

For analysis and control, e.Guard offers intuitive dashboards that are even optimised for mobile devices.
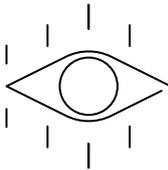
ADAPTS TO ANY SITUATION

e.Guard gives back the ability to act precisely where it is most needed: in industrial electrical supply. e.Guard visualises residual currents and enables you to intervene in time.
e.Guard is flexible and protects your installations in accordance with their specific requirements.
e.Guard combines safe use of electricity with intelligent prediction and prevention – a product made by experts.
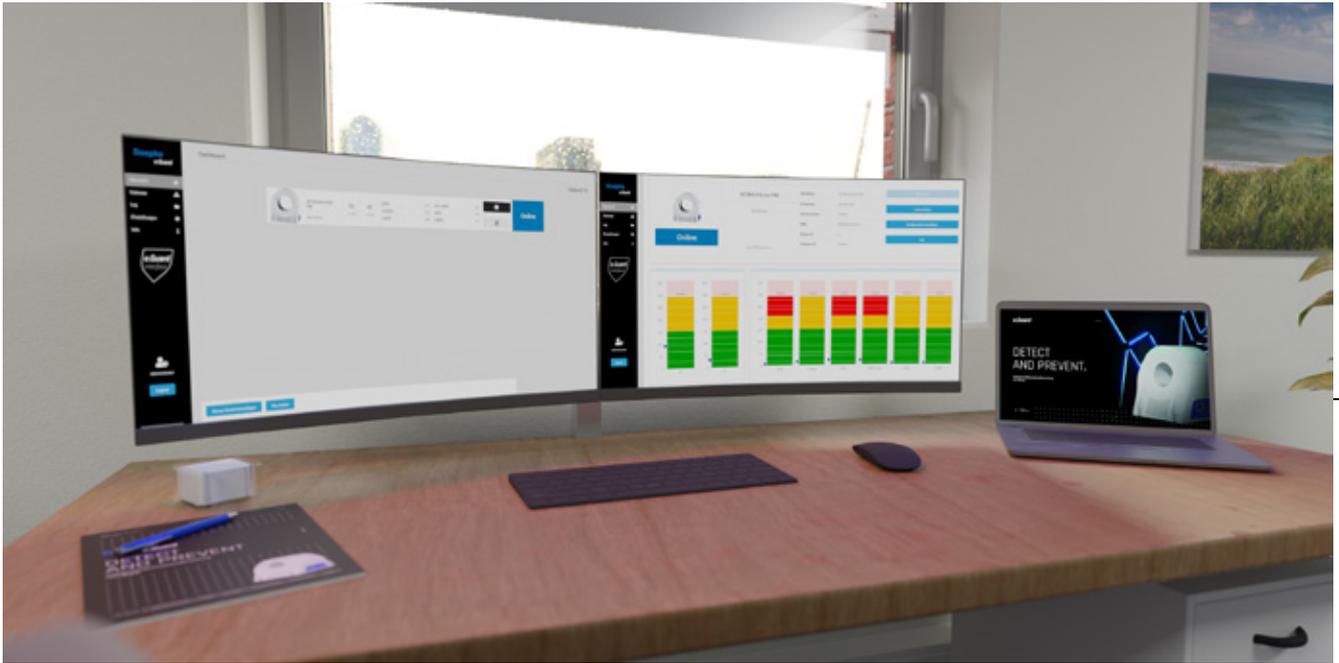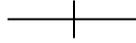
WHY e.Guard?

☑ SAFETY

e.Guard increases operational and installation safety.
e.Guard identifies potential sources of ignition early.
e.Guard significantly improves the insurability of electrical systems and installations. e.Guard protects against data losses.

☑ MAINTENANCE OPTIMISATION

e.Guard optimises and simplifies maintenance routines and intervals.
e.Guard improves maintenance scheduling using machine learning (ML) and artificial intelligence (AI).
e.Guard eliminates the need for repeated insulation testing in accordance with DIN VDE 0105-100/A1:06/19.

☑ LOWER COSTS

e.Guard avoids cost-intensive damage or reduces the extent of any damage.
e.Guard reduces maintenance costs.
e.Guard can lower insurance premiums.

☑ AVAILABILITY

e.Guard increases installation and system availability by reducing interruptions to operation and downtimes.

MODULAR HARDWARE-
SOFTWARE COMBINATION

e.Guard is a product for intelligent residual current monitoring that combines the strengths of sophisticated hardware and flexible software. The number of hardware components and the range of software can be adjusted on a modular basis.

SMART TRANSFORMERS

› AC/DC sensitive residual current monitor (Type B)
› integrated evaluation unit
› detects and evaluates residual currents of up to 30 A on eight frequency channels
› large frequency range of 0 Hz to 100 kHz
› easy commissioning and straightforward power supply via Ethernet interface (PoE)
› two adjustable potential-free contacts, e.g. for triggering alarms and switch-off

INDUSTRIAL IOT GATEWAY

› gateway as an interface for local and cloud-based data recording and storage (DIN rail device)

FLEXIBLE SOFTWARE

The e.Guard software visualises, stores and documents the recorded residual currents. You can use the software to manage the residual current monitors on the network and to set the alarm thresholds. The various e.Guard levels offer additional optimised functions. The software can run either locally or in the cloud.

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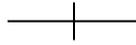
THE FIVE LEVELS WITHIN THE e.Guard SYSTEM

There are five levels within e.Guard to choose from depending on the desired scope of performance. This can involve using either tried-and-tested standard components or customised solutions. The spectrum ranges from proven hardware combined with streamlined software, to continuous monitoring, to intelligent, self-learning complete solutions based on machine learning modules.

basic	*expertise*	*cloud*	*advance*	*excellence*
Level **1** of 5	Level **2** of 5	Level **3** of 5	Level **4** of 5	Level **5** of 5
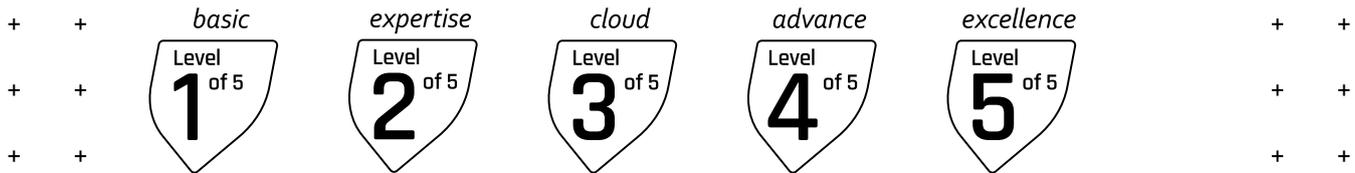
e.Guard

basic – Level ONE of 5

SAVE TIME WHILE MAKING THE BEST POSSIBLE USE OF IT: TAKE PREVENTATIVE ACTION WITH e.Guard BASIC

e.Guard basic combines smart transformers with local monitoring software. With level ONE, residual currents are signalled and visualised, and the data is saved on a locally available hard drive, thereby implementing constant residual current monitoring as a substitute for periodic insulation tests.

e.Guard basic offers the following key functions:
› integration of up to 20 residual current monitors
› configuration of the residual current monitors
› adjustable threshold values for triggering an alarm and/or switch-off
› pre-warnings and alarms sent via email
› freely configurable reports and logbook
› data stored and history kept for one year
› automatic backups and easy data export
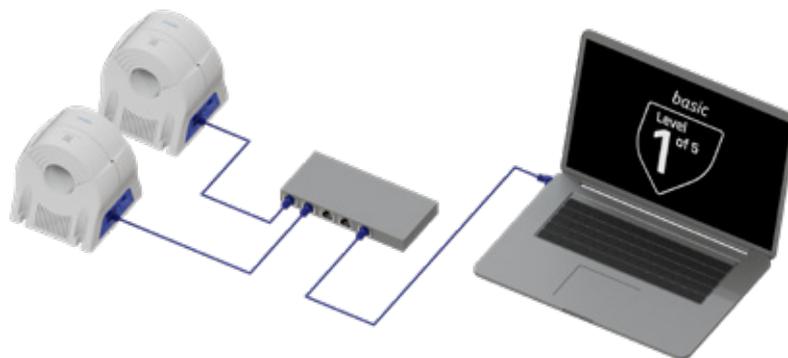
e.Guard

expertise – Level TWO of 5

AN EARLY WARNING IS PREFERABLE: CONTINUOUS MONITORING AND SIGNALLING ON THE NETWORK WITH e.Guard EXPERTISE

e.Guard expertise combines smart transformers with an IoT gateway for data storage and retrieval. Even the software runs on the gateway. With level TWO, you therefore no longer need a PC to store data.

e.Guard expertise offers the following key functions:
› integration of up to 20 residual current monitors per e.Guard gateway
› configuration of the residual current monitors
› software/gateway (dashboard) can be accessed via any standard internet browser
› custom thresholds for triggering an alarm and/or switch-off
› pre-warnings and alarms sent via email
› configurable reports and logbook
› data stored and history kept for one year
› backups and easy data export
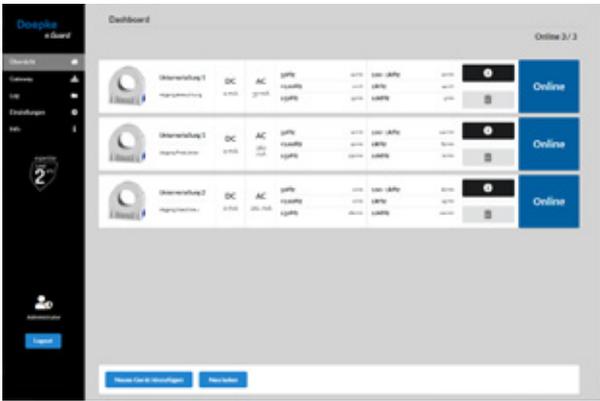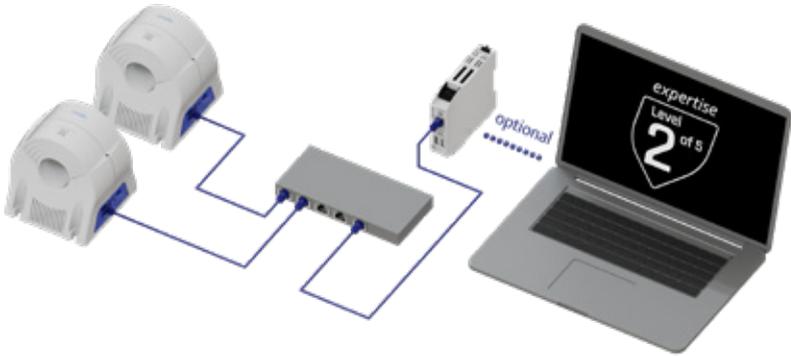
Software e.Guard Interface for Level TWO: Status display of the connected residual current monitors.

e.Guard

cloud – Level THREE of 5

IDENTIFY WEAKNESSES IN THE SYSTEM: VISUALISE RESIDUAL CURRENTS AND MONITOR THEM IN THE CLOUD WITH e.Guard CLOUD

e.Guard cloud combines a smart residual current monitor with an IoT gateway.
You can store data and use the software regardless of your location by accessing the system via the cloud.

In addition to those of level TWO, e.Guard cloud also offers the following key functions:
› integration of up to 40 residual current monitors per e.Guard gateway
› configuration of the residual current monitors
› custom alarm thresholds for triggering switch-off and/or an alarm
› audit-proof data storage – including the date – in an unchangeable format
› data can be accessed at any time and from anywhere using any standard internet browser
› pre-warnings and alarms sent via email
› status map: Visualisation of alarm history
› data is stored in the maximum possible resolution (one value per second) for a year
  and the history is kept for seven years in a lower resolution
› configurable reports
› data stored in the cloud
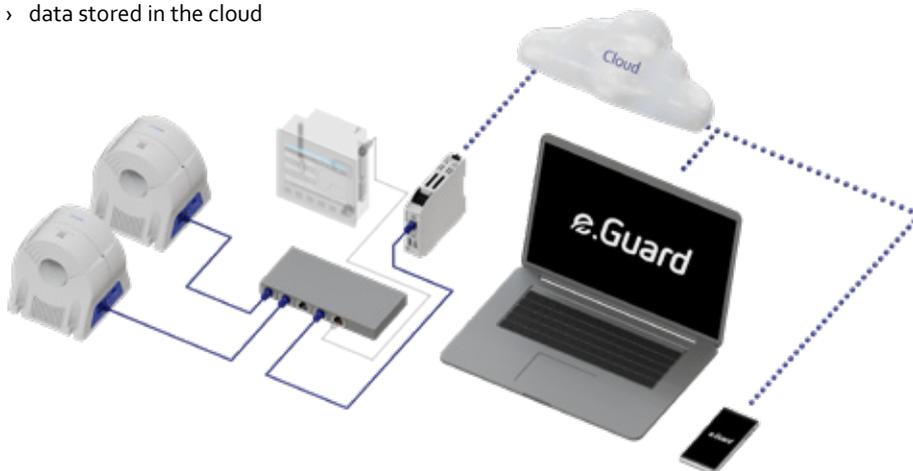
Identification of anomalies in residual current patterns from Level FOUR.
Power Quality Monitoring (PQM) incorporated from Level FIVE.

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advance – Level FOUR of 5

LEARN AND PREDICT THE ELECTRICAL BEHAVIOUR OF INSTALLATIONS WITH e.Guard ADVANCE

e.Guard advance uses the recorded residual current data together with artificial intelligence methods to predict the future condition/status of the installation.

In addition to the functions of level THREE, e.Guard advance also offers the following key features:
› intelligently learns individual residual current patterns during operation (machine learning)
› detects and signals anomalies across all frequency components up to 100 kHz
› triggers an alarm if the threshold value is exceeded and/or if anomalies are detected in the residual current, e.g. creeping insulation faults, deterioration of EMC filters

e.Guard

excellence – Level FIVE of 5

THE FLEXIBLE RESPONSE TO DYNAMIC RISKS – NOTHING CAN BEAT THE LEVEL OF EXPERTISE AND EXCELLENCE YOU GET WITH e.Guard EXCELLENCE

e.Guard excellence is the individually tailored solution for predictive maintenance in relation to complex industrial installations.

In addition to the functions of levels THREE and FOUR, e.Guard excellence also offers the following key features:
› a solution geared specifically towards the customer's requirements
› set-up performed by senior experts in accordance with a custom project timetable
› tailored machine learning meta data matched precisely to your needs
› customisation of the hyperparameters (which are required to control the machine learning training algorithm)
› customised interfaces with insurance providers and ERP systems, cloud-to-cloud interfaces

Screenshot from the e.Guard Interface for Level FIVE.
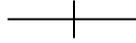
A COMPARATIVE LOOK AT e.Guard LEVELS

|	LOCAL		CLOUD		
	basic Level 1 of 5	*expertise* Level 2 of 5	*cloud* Level 3 of 5	*advance* Level 4 of 5	*excellence* Level 5 of 5
Maximum number of residual current monitors per software/gateway	20	20	40	40	40
Configuration of the residual current monitors	+	+	+	+	+
Alarms in the software	+	+	+	+	+
Alarms sent via email	+	+	+	+	+
Alarms	when threshold values are exceeded			when threshold values are exceeded or anomalies are detected	
Machine learning of individual residual current patterns, anomaly detection				+	+
AI and ML-based maintenance predictions					+
Custom, customer-specific solution					+
PDF reports	+	+	+	+	+
Data storage and history	1 year*	1 year**	1 or 7 years***		
IoT gateway		+	+	+	+
Test run of residual current sensors via software	Manual	Automatic	Automatic	Automatic	Automatic
Data storage	Local (Windows PC)	Local (gateway)	Cloud	Cloud	Cloud
Data access	Local (Windows PC)	Local (browser)	Online	Online	Online
Incorporation of power quality components					+
User	Up to 3 users	Up to 5 users	Up to 10 users	Up to 20 users	Up to 50 users

* last month resolution 1 s = one measurement per second | thereafter resolution 15 minutes
** last month resolution 1 s = one measurement per second | thereafter resolution 1 minute
*** 1 year resolution 1 s = one measurement per second | 7 years lower resolution
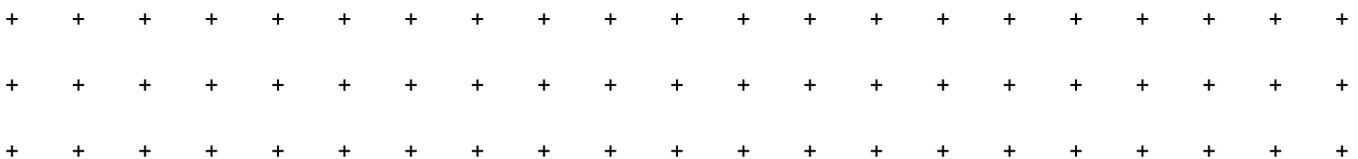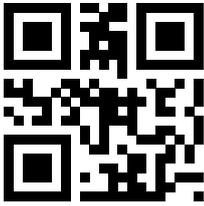
FIND OUT MORE ABOUT e.Guard

You can find further information, videos, tutorials and much more relating to the e.Guard system on our **e.Guard** platform.

YOUR CONTACTS

Norden

NORTH

Bickenriede

SOUTH

North area

MARIO SEMBRITZKI

Head of Industrial Sales Promotion

J+49 (0) 151 40 21 38 53
Ç mario.sembritzki@doepke.de

South area

ANDREAS FRIES

Industrial Sales Promotion South

J+49 (0) 151 40 21 33 26
Ç andreas.fries@doepke.de

We work with you to develop the right e.Guard for your installation.
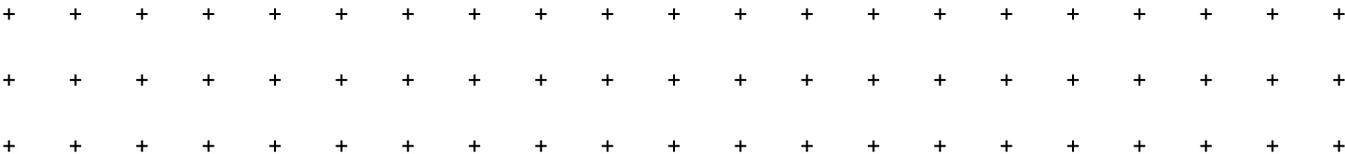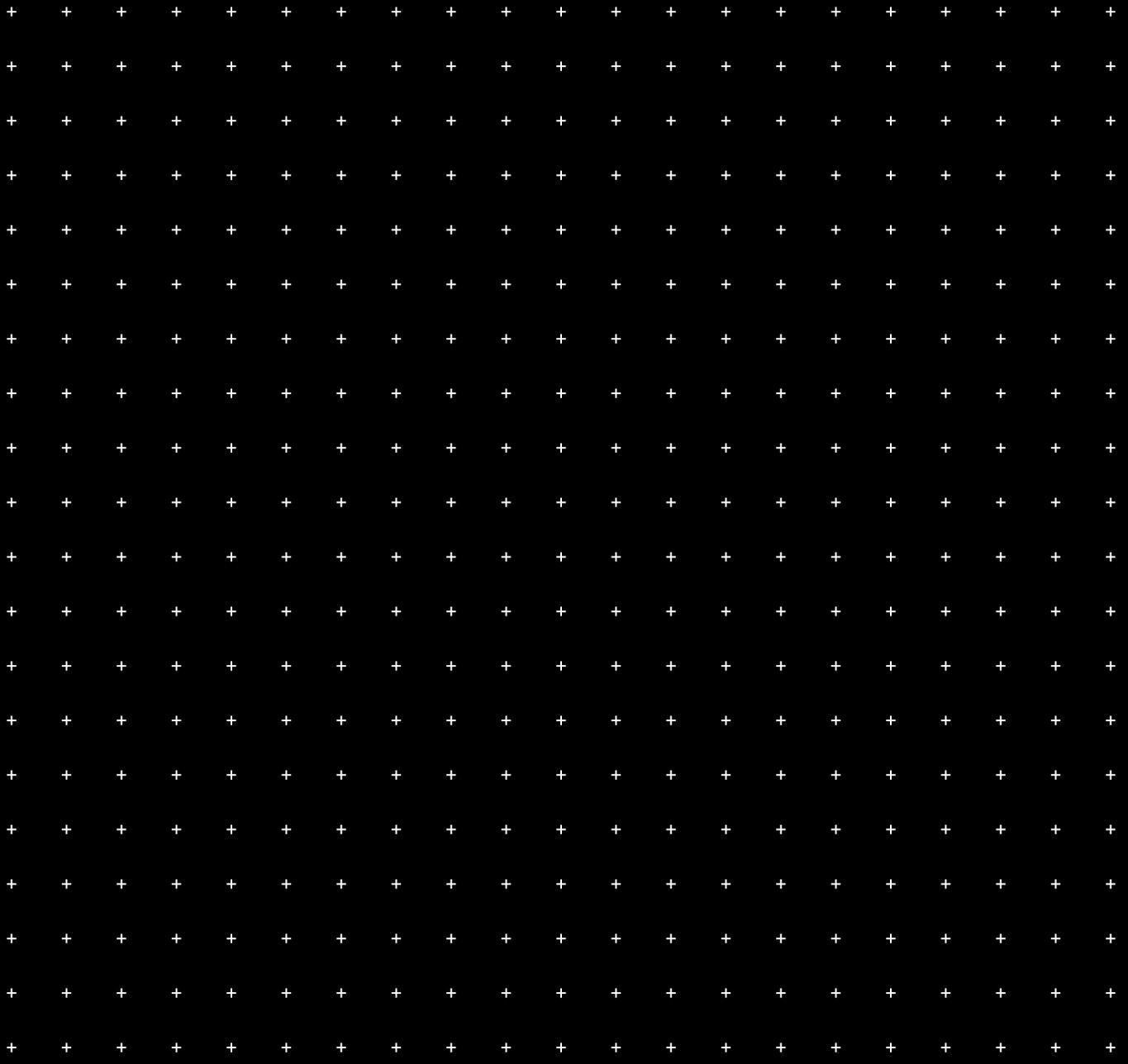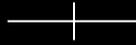
Doepke
e.Guard

Doepke

Doepke Schaltgeräte GmbH
Stellmacherstraße 11
26506 Norden

Tel: +49 (0) 49 31 18 06-0
Fax: +49 (0) 49 31 18 06-101

info@doepke.de
www.doepke.de

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