

The operating instructions can be found at: www.a-eberle.de



Device and Safety Information

*for the earth fault detection relay EOR-D
as well as
for Arc Suppression Coil regulator REG-DP*



and Arc Suppression Coil regulator REG-DPA



IMPORTANT

READ CAREFULLY BEFORE USE

KEEP FOR FUTURE REFERENCE

1. Notes

1.1 General information

This product and safety information provides important information for the installation, commissioning, maintenance, transport and storage of the device. However, it does not constitute an operating manual that describes the installation, operation and maintenance of the device in detail. Please read the manual carefully and completely. It contains important information about the product. Observe the instructions and follow the safety and warning instructions in particular. Keep the manual in a safe place, ensure that it is always available, and can be viewed by the user of the product.

The company **A. Eberle GmbH & Co. KG** does not accept any liability for damage or loss of any kind resulting from failure to observe the information products or resulting from printing errors or changes in these operating instructions. The company **A. Eberle GmbH & Co. KG** does not accept any liability for damage or loss of any kind resulting from faulty equipment or from equipment that has been modified by the user.

1.2 Revisions

Please note that these installation instructions may not always represent the most up-to-date reference to the device. If, for example, you have changed the firmware of the device in the direction of a higher firmware version, the present version may no longer be suitable in every point.

In this case, either contact us directly or use the latest version of the operating manual available on our website (www.a-eberle.de) and the other documentation, available for the unit.

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Subject to modifications

1.3 Disposal

The disposal of the device is handled by A. Eberle GmbH & Co. KG.

Send all components to A. Eberle:

A. Eberle GmbH & Co. KG
Frankenstraße 160
GERMANY-90461 Nuremberg



1.4 Warranty

A. Eberle warrants this product and accessories to be free from defects in materials and workmanship for a period of five years from the date of purchase.

Warranty does not apply to damage caused by:

- Accidents
- Misuse
- Abnormal operating conditions

To claim warranty, contact A. Eberle GmbH & Co. KG in Nuremberg, Germany, or directly use the RMA document on the homepage at www.a-eberle.de.

1.5 Manufacturer Contact Details

A. Eberle GmbH & Co. KG

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2. Safety

2.1 Safety instructions

IT IS IMPORTANT FOR PERSONAL SAFETY TO FOLLOW THESE INSTRUCTIONS. THESE INSTRUCTIONS MUST BE KEPT IN A SAFE PLACE!


- ➔ Observe operating manual.
- ➔ Read the operating manual completely and do not use the product until you have understood the operating manual.
- ➔ Always keep the operating manual with the appliance.
- ➔ Ensure that the device is only operated in perfect condition.
- ➔ Never open the device (except covers that must be removed/opened e.g. for connecting or operating the device).
- ➔ Ensure that only qualified personnel operate the device.
- ➔ Only connect the device according to the instructions.
- ➔ Ensure that the device is only operated in its original condition.
- ➔ Only operate the device with recommended accessories.
- ➔ Ensure that the device is not operated above its rated data (see technical data).
- ➔ Ensure that the original accessories are not operated above the rated data.
- ➔ Do not operate the device in environments where explosive gases, dust or vapours are present.

This document does not represent a complete list of all safety instructions required for the operation of the device. Special operating conditions may require further instructions. The product and safety instructions contain information that you must observe for your personal safety and to prevent damage to property and supplement, but do not replace, the operating manual that describe the installation, operation and maintenance of the equipment. For details, refer to the operating manual of the appliance. These are binding and must be observed.

If you require further information or if special problems occur which are not dealt with in this document or not dealt with in sufficient detail in this document or in the operating manual of the device, please contact A. Eberle GmbH & Co. KG or the local representative.





2.2 Structure of the warnings

Warnings are structured as follows:

 SIGNAL WORD	<p>Nature and source of the danger!</p> <p>Consequences if not observed.</p> <ul style="list-style-type: none"> ➡ Steps to avoid the danger.
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2.3 Graduation of warnings

Warnings differ according to the type of danger as follows:

 DANGER!	Warns of an imminent danger which, if not avoided, will result in death or serious injury.
 WARNING!	Warns of a potentially dangerous situation that can result in death or serious injuries when not avoided.
 CAUTION!	Warns of a potentially dangerous situation that can result in fairly serious or minor injuries when not avoided.
NOTICE!	Warns of a potentially dangerous situation that, if not avoided, could result in material or environmental damage.
	Refers to processes where there is no risk of injury or damage to property, but which must be observed for reliable operation of the device!

2.4 Intended use and operation

The product REG-DP(A) is designed as a permanently installed measuring and regulation device for controlling arc suppression coils (ASC). The product EOR-D is designed as a permanently installed measuring and evaluation device for the detection of earth faults for up to four feeders per device. The products are intended exclusively for use in systems and equipment for electrical power engineering in which trained specialists carry out the necessary work. The devices are intended for use for indirect measurement in medium and high-voltage networks via voltage and current transformers in CAT III with a maximum of 150 V AC (REG-DP(A): U_{en} , I_p und I_2 ; EOR-D: $U_{en1..4}$ und $I_{o1..4}$). All technical connection values and rated data must be observed!

The following requirements must be met to ensure proper and safe operation:

- Proper transport
- Proper storage, installation and assembly
- Proper operation and maintenance

2.5 Other applicable

For the safe and correct use of the device, please also observe the other documents such as the complete operating manual, the device specific circuit and terminal diagrams as well as additionally supplied documents and relevant standards and laws.

NOTICE!

Installation, connection notes, dimensions, overview and circuit diagrams and technical data are part of the device manuals as well as the applicable documents. The manuals are available on the Internet at

<https://www.a-eberle.de/en/downloads>

and on the data media supplied with the device. Other applicable documents (e.g. circuit diagrams) are attached to the device in paper form or also on the data media.

2.6 Target group

This document is intended for use by trained specialists as well as trained and tested operating personnel. The contents of these instructions must be made available to the persons entrusted with the installation and operation of the system. In order to avoid damage to property and personal injury, the qualified personnel must be trained electro technically and have the following knowledge:

- Knowledge of national accident prevention regulations
- Knowledge of safety engineering standards
- Knowledge of installation, commissioning, ESD guidelines and operation of the device and the system in which it is installed

Electro technically qualified personnel

Only electro technically qualified personnel are allowed to commission and operate the device (the assembly and / or the device) described in this document. Electrically qualified personnel within the meaning of the safety instructions in this document are persons who can prove that they are qualified as electricians. These persons are allowed to commission, disconnect, ground and mark devices, systems and circuits according to the standards of safety engineering.

DANGER!

Danger of serious personal injury or death or serious material damage

During operation, dangerous electrical voltages can occur in the devices and modules depending on the design and application.

- ➔ Always observe the following instructions listed under the section “Electro technically qualified personnel”.
- ➔ Always observe the following safety instructions as well as the information and notes in the operating instructions and on the device.

2.7 Standards

The national and international standards to which the devices and assemblies have been developed, built and tested can be found in the technical data of the devices. A type test certificate of the respective device can also be provided on request.

2.8 Cleaning

Use a soft, slightly moistened and lint-free towel. Make sure that no moisture penetrates into the housing. Do not use window cleaners, household cleaners, sprays, solvents, cleaners containing alcohol, ammonia solutions or scouring agents for cleaning. Please use only water for cleaning.

NOTICE!

Cleaning the device

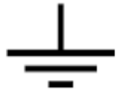
Damage to the device surface and detachment of markings

- ➔ Follow the cleaning instructions of the manufacturer.

2.9 Meaning of the symbols used on the device



Nature and source of the danger! Read the safety instructions inside the manual!



Functional earth of the measuring device



Protective earth of the device



USB-interface



TCP-IP interface



CE marking guarantees compliance with the European directives and regulations regarding EMC



AC alternating voltage



DC direct voltage

3. Mounting and connection

3.1 General

When installing and connecting the devices, observe the instructions in the operating manual and, if necessary, in the device. Particular attention must be paid to the following:

- Ground connection of the device
- Protection of auxiliary and control circuits
- Safe execution of circuits of current measuring transformers
- Conductor cross-sections of the individual cables
- Stripping lengths and use of wire end sleeves if necessary
- Tightening torques of the terminals and if necessary screw connections
- Correct and tight fit of cable lugs and connectors

Nominal value

The nominal values indicated on the nameplate of the device or in the technical data must be observed.

CAUTION!

Risk of destruction of the device due to static discharges

The modules must be handled in such a way that destruction due to static discharges is excluded. It is not permitted to plug or unplug modules while they are alive!

- ➡ When handling individual modules or spare parts or carrying out repair work, the relevant EMC guidelines must be applied.
- ➡ There is no hazard when installed.

WARNING!

Damage to persons and property due to non-observance of the safety regulations

- ➡ Before making any connections, please read this manual thoroughly and follow the safety measures described here.

3.2 Mounting

The ASC regulator REG-DP and the earth fault detection relay EOR-D offer different housing variants and therefore mounting options:

- 19"-rack
- Panel mounting housing
- Wall mounting housing

The exact method of installation depends on the respective design. The different types of installation and the necessary installation steps can be taken from the operating manual.

The ASC regulator REG-DPA offers a housing version with different mounting options:

- Wall mounting
- Panel mounting
- Top hat rail installation (type B1)

Different mounting accessories are required depending on the type of mounting. For mounting, please observe the instructions in the operating manual.

Operating temperature

Recommended temperature range for continuous operation:

- REG-DP: -10 to +50 °C
- EOR-D: -25 to +55 °C
- REG-DPA: -15 to +60 °C

The operating temperature range can vary depending on the unit and the version. Please refer to the information in the technical data sheet.

Protection class (according to IEC 60529)

The devices are designed for use in environments with pollution degree 2.

The protection class of the device in the present version (device, housing design, etc.) can be found in the technical data sheet or in the operating manual.

NOTICE!



Material damage due to non-observance of the installation instructions!


Non-observance of the installation instructions or incorrect installation can damage the device!

- ➡ Pay attention to the load-bearing capacity and suitability of the place intended for mounting.
- ➡ Observe the permissible screw diameters and tightening torques.
- ➡ Ensure that the mounting material used (e.g. screws and nuts) is firmly seated.
- ➡ The design of the device or the use of accessories (e.g. sealing) can influence the protection class (IP) of the device. For this reason, please observe this during installation.
- ➡ Ensure sufficient heat dissipation during installation, especially when mounting several units directly one above the other.

3.3 Ground connection

The equipment must always be grounded. This condition is fulfilled when connected to an auxiliary voltage network with a protective conductor. If the auxiliary voltage network does not have a protective conductor, an addition connection must be made from the protective conductor terminal to earth. In some cases, the devices have additional grounding points to the PE terminal. In this case all grounding points must be connected. The different connection points are conductively connected to each other.


The ground connections are marked with  or  or by the use of a green-yellow terminal or wire.

 DANGER!	Danger to life from electric shock
<p>Improper connection of this device can lead to death, serious injury or fire hazard</p> <ul style="list-style-type: none"> ➤ All existing grounding connections must always be connected to PE potential. ➤ Under no circumstances may the grounding carry a dangerous voltage. 	

3.4 Supply voltage

The devices are available with different auxiliary voltage ranges. The specification is made via ordering feature H. Before connecting, please take the correct supply voltage from the type plate or from the associated circuit diagram or from the technical data sheet. The connection terminals for the supply voltage depend on the internal wiring of the REG-DP and/or EOR-D system and must therefore be taken from the specific circuit diagrams!

On the REG-DPA, the supply voltage is connected to terminal 21 (L or +) and 22 (N or -).

 DANGER!	Danger to life from electric shock!
<p>Serious body injury or death can occur through:</p> <ul style="list-style-type: none"> ● Touching bare or stripped wires that are energized. ● Dangerous to touch inputs on the device. ➤ Ensure that the device is connected in a de-energized state. ➤ Ensure that all connecting cables are fixed and strain relief is provided. ➤ All cable requirements of the terminal blocks must be observed (e.g. stripping length of the cables, wire end sleeves, cable cross sections). 	

NOTICE!

Material damage due to non-observance of the connection conditions or impermissible overvoltages!

Failure to observe the connection conditions or exceeding the permissible voltage range may damage or destroy your device.

Before applying the supply voltage to the device, the following points must be observed:

- Voltage and frequency must correspond to the specifications on the type plate! Observe the limit values as described in the technical data!
- Observe features of the device H1 / H11 / H2
- In the building installation, the supply voltage must be provided by a listed miniature circuit breaker and fuse that meets the requirements of IEC 60947-1 and IEC 60947-3!
- The miniature circuit breaker
 - be easily accessible to the user and installed close to the device.
 - must be labeled for the respective device.
- Provide a fuse for the neutral conductor if the neutral connection of the source is not grounded.

3.5 Connection to the process (e.g. measurement, binary inputs and outputs)

The connection options of the ASC regulators REG-DP(A) and the earth fault detection relay EOR-D are very diverse and depend on the respective design of the device. The terminal assignment is also variable. The terminal assignment of the present unit can be taken from the specific circuit diagram of the unit. The corresponding nominal values can also be taken from the circuit diagram or the technical data sheet of the device.

For regulation the ASC regulator must measure the zero-sequence voltage. The zero-sequence voltage can be measured directly at the ASC (100 VAC measurement winding), at an external accordingly wired voltage transducer or at an open delta winding. The current can be measured at the current transducer of the ASC directly, however this value is not mandatory for the regulation. For the angle evaluation of the zero-sequence voltage a synchronisation voltage has to be wired. Therefore any power supply phase is suitable.

At the earth fault detection relay EOR-D there can be connected up to four voltages (100 VAC measurement winding or open delta winding) and up to four currents (1A/5A core balanced current transformer) depending on the station configuration and used detection methods. For a correct voltage measurement, please take care of the reference earth. Please observe the regarding notes in the EOR-D manual. For the angle evaluation of certain location methods a synchronisation voltage has to be wired. Therefore any power supply phase is suitable.

The measurement inputs of the REG-DP(A) and EOR-D are galvanically isolated. This means that there is no connection between the measurement inputs and other circuits or ground.

 **DANGER!**

Danger to life from electric shock

Attention dangerous contact voltage!

Flashover and high short circuit currents are possible in CAT III and CAT IV!

- ➔ Ensure that the PE conductor (ground) is connected.
- ➔ Before starting work, ensure that there is no voltage present!
- ➔ Even after disconnecting the power supply, dangerous voltages may still be present in the device (capacitors).
- ➔ Provide protective equipment for CAT II, CAT III or CAT IV.
- ➔ High-load fuses >10kA or >50kA must be used in accordance with the CAT.
- ➔ Short-circuit current transformers before starting work.
- ➔ Ensure that all connecting cables are fixed and strain-relieved.
- ➔ All cable requirements of the terminal blocks must be observed (e.g. insulation length of the cables, wire end sleeves, cable cross sections).

 **WARNING!**

Laser beam! Risk of eye injuries

The devices can include a class 1 laser, depending on the equipment and design. This is part of the optical communication device(s) of the SCADA communication modules.

- ➔ Do not look directly into the laser beam or the corresponding connection openings.

4. Maintenance

The maintenance tasks that can be carried out by the customer are described in the operating manual or the maintenance manual. The latter can be obtained from A. Eberle headquarters.



DANGER!

Danger of serious personal injury or death or serious material damage

Non-observance of the following measures can result in death, physical injury or considerable damage to property.

- During maintenance work, the same safety measures must always be observed as during assembly, installation and connection of the device.
- The device must be disconnected from all auxiliary and control voltage circuits before carrying out maintenance work. Current measuring transformer circuits must be short-circuited.



CAUTION!

Risk of fire or burns

The battery in this device may cause fire or chemical burn if used improperly. There is a risk of explosion if the battery is not replaced properly!

- Do not recharge, disassemble, heat above 100°C or incinerate.
- Dispose of empty batteries immediately.
- Keep away from children!



CAUTION!

Risk of destruction of the device due to static discharges

The modules must be handled in such a way that destruction due to static discharge is excluded. It is not permitted to plug or unplug modules while they are alive!

- When handling individual modules or spare parts or carrying out repair work, the relevant EMC guidelines must be applied.
- There is no danger when installed.

NOTICE!

Battery replacement and disposal

Batteries may only be replaced by the same type or by the type recommended by the manufacturer. When disposing of batteries local national/international regulations must be observed.

5. Transport and storage

CAUTION!

Risk of destruction of the device due to static discharges

The modules must be handled in such a way that destruction due to static discharges is excluded.

- ➡ When handling individual modules or spare parts or carrying out repair work, the relevant EMC guidelines must be applied.
- ➡ The transport and storage of individual assemblies or spare parts must be carried out in suitable ESD-protected packaging, if the components require it.

5.1 Device unpacking

The equipment has been subjected to a final inspection prior to delivery. The test report of this test is attached to each device. The devices are packaged in the factory in such a way that the requirements of the ISO 2248 standard are met.

- Check the packaging for external transport damage. A damaged package indicates a possible damage to the equipment.
- Unpack the equipment carefully and without the use of force.
- Use visual inspection to check the devices for their perfect mechanical condition.
- Use the delivery note or the operating instructions to check the completeness of the enclosed accessories.
- Keep the packaging for possible storage, transportation or return.
- Return damaged equipment to the manufacturer, stating the defect. Use the original packaging or a transport packaging that meets the requirements of the ISO 2248 standard. Contact the manufacturer before returning the product.

5.2 Device storage

- Store only devices which have undergone an initial check. This prevents the warranty from being forfeited.
- The devices should be stored in dry and clean rooms. The following temperature ranges apply to the storage of the devices or associated replacement modules:
 - REG-DP(A): -25 to +65 °C
 - EOR-D: -40 to +70 °C
- The relative humidity must not lead to condensation or ice formation.
- It is recommended to maintain a limited temperature range between -10 °C and +55 °C during storage in order to prevent premature aging of the used electrolytic capacitors.
- It is advisable to connect the device approximately every two years to auxiliary voltage in order to form the electrolytic capacitors used. The same procedure should be followed before a planned use of the device. In extreme climatic conditions (tropics), “preheating” is simultaneously achieved and condensation avoided.

- Before putting the device into operation for the first time, it should be stored for at least two hours in the operating room in order to provide a temperature compensation, as well as to avoid moisture and condensation.
- The device lithium batteries (if used) meet the international requirements of the dangerous goods regulations for the different modes of transport. This only applies to the original battery or original replacement batteries.

5.3 Device repackaging

- If you store equipment after the initial inspection, please pack it in a suitable storage package (for example, manufacturer's original packaging).
- Pack the device for transport in a suitable transport packaging (for example, original packaging from the manufacturer).
- Insert the supplied accessories (for example, mounting material, cables, instructions, data carriers) and the test report as well as this document.

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