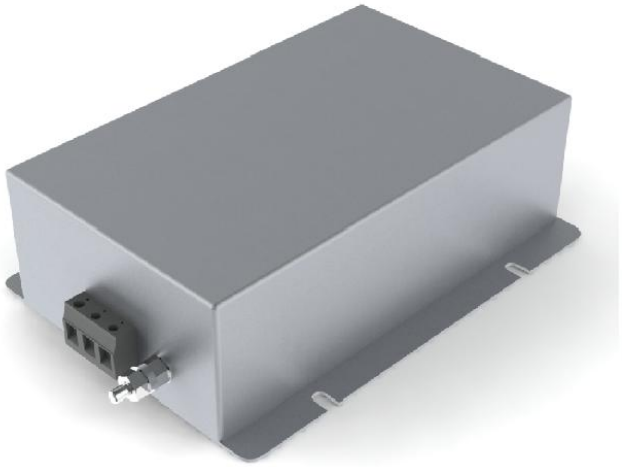

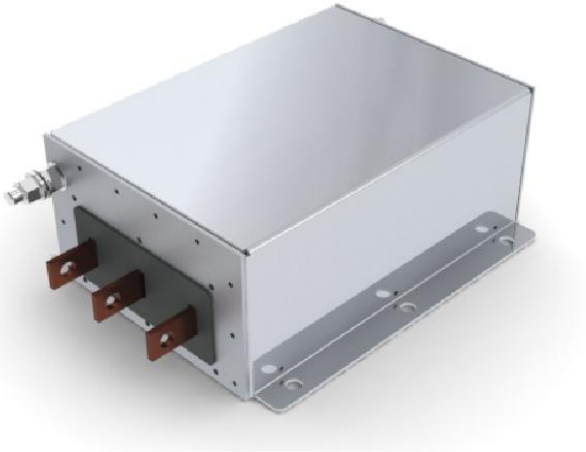

Operating Instructions

REO EMC Filter

REO_EMV-Filter_rev00.en
09.03.2026

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Safety Instructions for the User

Important Note!

READ CAREFULLY BEFORE USE AND KEEP FOR FUTURE REFERENCE

These instructions contain all the information required for the proper use of the products described. They are intended exclusively for qualified personnel.

Qualified personnel are persons who, due to their professional training, experience, and instruction in the specific field of drive and electrical engineering, as well as their knowledge of relevant standards, regulations, accident prevention regulations, and operational procedures, have been commissioned by the operator to perform the necessary tasks. These persons must be able to recognize potential dangers and implement appropriate protective measures. Definition of qualified personnel is contained in VDE 1000-10; DIN EN 50110-1 (VDE 0105-1).

It must be ensured that all basic planning work on the machine or system, as well as all activities related to transport, assembly, installation, commissioning, maintenance, and repair, are carried out by qualified personnel or supervised by appropriately responsible specialists.

The following points in particular must be observed:

Safety Instructions for Assembly and Commissioning

The following instructions must be observed during all work related to assembly, installation, commissioning, maintenance, and repair:

- **Compliance with technical data and permissible areas of application**, as specified in catalogs, order documents, type plates, and product labels, for example.

- **Observe general installation and safety regulations**, in particular the applicable standards (e.g., VDE regulations, DIN standards) and legal requirements.

- **Take local and system-specific requirements into account**, in particular with regard to electrical protective measures, ambient conditions, and access regulations.

- **Professional use of suitable tools and lifting and transport equipment** to prevent damage and dangers.

- **Use of personal protective equipment (PPE)** in accordance with the applicable occupational safety regulations.

- **Compliance with the specified installation conditions**, in particular:
    - Ensuring the necessary protection against contact during operation,
    - Protection against electric shock caused by unintentional touch (e.g., covers).

General Safety Instructions

The following instructions are intended to protect operating personnel and ensure the safety of the products described and all connected equipment.
Compliance with these safety instructions is essential to prevent personal injury and property damage and to ensure safe, standards-compliant operation.

DANGER! — Risk of death, highest level of hazard.

WARNING! — Medium hazard, risk of serious injury or damage.

CAUTION! — Lower hazard, minor injury, property damage, or malfunctions.

ATTENTION! — Hot surface.

Warning:
Improper handling of electrical energy can result in property damage, serious personal injury, or fatal accidents.

DANGER!

Dangerous voltage - risk of fatal electric shock!

Improper contact with the connection terminals or supply conductors may result in electric shock. Improper use may cause short circuit, fire, or other serious damage.

Safety measures:

- The REO EMC filter must not be opened, disassembled, or modified.
- Any use deviating from the intended use specified in this document is prohibited.

DANGER!

Risk of fatal electric shock caused by interrupted protective conductor

During operation of REO EMC filters, increased leakage currents to earth may occur. If the protective conductor (PE) is interrupted, safe discharge cannot be ensured. This may result in hazardous touch voltages on metallic parts.

Safety measures:

- The protective conductor (PE) must always be connected first and must not be interrupted during operation.
- During deinstallation, the PE connection must be disconnected last.
- Installation and maintenance may only be carried out by qualified personnel.
- When connecting to residual current devices (RCDs), unintended tripping may occur.

DANGER!

Risk of fatal electric shock during installation and connection

Electric shock resulting in severe injury or death, as well as destruction of the device or damage to adjacent systems, may occur if the device is installed or connected while energized or without proper grounding.

Safety measures:

- Install or connect the device only when it is de-energized and properly grounded.
- Before starting work, verify absence of voltage and secure the system against re-energization.
- During electrical connection, always connect the protective conductor (PE) first and disconnect it last.
- Installation and maintenance may only be carried out by qualified personnel.

WARNING!

Device overload

The overload capacity of REO EMC filters is limited. Overloads exceeding the specified limits are not permitted. Non-permissible overload conditions may result in serious injury or property damage.

Safety measures:

- Maximum **1.5 × rated current** for one minute per hour.
- When switching on, the operating current must **not exceed 4 × rated current**.
- REO EMC filters must be protected against short circuits and overload by suitable devices.

WARNING!

Risk of injury from hot surfaces

Surfaces and terminals of REO EMC filters may become hot due to internal power losses. Contact may result in burns.

Safety measures:

- Touch the device only after it has cooled down or wear appropriate personal protective equipment.

WARNNG!

Danger to persons with active implants caused by electromagnetic fields

REO EMC filters and chokes generate electric and magnetic fields during operation and may influence active medical implants, such as pacemakers. Persons with active implants may be at risk when in close proximity to a converter or other EMF-emitting equipment.

Safety measures:

- As the operator of an EMF-emitting installation, assess the individual risk to persons with active implants and take appropriate protective measures.

WARNING!

Damage caused by mechanical impact

Blunt impacts, shocks, or unspecified mechanical forces can damage the REO EMC filter. This may impair or destroy its function, IP protection rating, or electrical insulation. In such cases, there is a risk of electric shock and potential damage to adjacent systems.

Safety measures:

- Do not install, operate, or energize devices that are deformed or visibly damaged.
- Observe the permissible torque values for terminals as specified in Chapter 5.0 “Assembly / Installation / Commissioning”.

WARNING!

Operation in unsuitable environments

Storage, transport, installation, or operation in an unsuitable environment may damage the device; this also applies to open cable ends.

Safety measures:

- The maximum permissible IP protection rating is specified on the type plate of the REO EMC filter and in the product data sheet (DIN EN 60529).
- Failure to observe this may result in electric shock or damage to the device.

WARNING!

Risk of electric shock caused by device manipulation

Improper intervention can lead to damage, malfunction, loss of IP protection, and impairment of electrical insulation. This can result in electric shock or further damage to the device.

Safety measures:

- Screw connections, rivet connections, cable glands, clamp connections, cable guides, or attachments on the REO EMC filter must not be loosened, modified, manipulated, or replaced.

WARNING!

Risk of injury during transport and installation

Transport, lifting, or installation using attachment points not intended for this purpose is not permitted. Failure to comply may result in personal injury, damage to the device, or damage to adjacent systems.

Safety measures:

- Existing lifting eyes, attachment points, or specified lifting points (e.g., threads or holes for lifting eyes) must be used.

WARNING!

Operation in an Unsuitable Power Network or Application

Installation, wiring, or operation of REO EMC filters in unsuitable power network types or applications is not permitted. Failure to comply may result in electric shock and severe injury. In addition, there is a risk of destruction of the device or damage to adjacent systems.

Safety measures:

- Connect the device only to the specified power network types according to the data sheet and manual.
- Carry out installation and wiring strictly in accordance with the manufacturer's specifications.
- Before commissioning, verify that the application is approved for the use of the REO EMC filter.
- Installation and maintenance may only be performed by qualified personnel.

WARNING!

Danger caused by reduced insulation

Storage under condensing conditions or in environments with conductive media or contamination may reduce the insulation resistance of the EMC filter. This can result in hazardous touch voltages and increased leakage currents. There is a risk of electric shock.

Safety measures:

- Store EMC filters only in dry, clean, and non-condensing environments.
- Observe the storage conditions and climatic limits specified in the data sheet and in this operating manual.
- Before commissioning, ensure that the device is completely dry, clean, and free of conductive deposits.
- If moisture or contamination is suspected, do not put the device into operation and have it inspected.

WARNING!

Damage caused by improper cable routing

Improper routing of connection cables may lead to cable damage, impairment of the sealing function, loss of the IP protection rating, and risk of electric shock due to insufficient observance of the minimum bending radii or excessively tight bending of the connection cables.

Safety measures:

- Route connection cables in accordance with the specifications of the cable manufacturer.
- Observe the minimum bending radii specified by the manufacturer.
- If no specifications are available, a minimum bending radius of **RB = 10 × outer diameter of the cable** must be maintained.
- Do not bend cables directly at cable glands or cable entries.
- Maintain a minimum distance of **10 mm** between the bend and the device housing or cable entry.

WARNING!

Damage to cable insulation

If connection cables come into contact with sharp edges or pointed components, damage to the cable insulation, loss of electrical safety, and the risk of electric shock may occur.

Safety measures:

- Route connection cables so that they do not come into contact with sharp edges or pointed components.
- Provide suitable protective measures such as edge protection, protective sleeves, or appropriate cable routing systems.
- Before commissioning, verify that the application is approved for the use of the **REO EMC filter**.
- Regularly inspect the cable routing for signs of damage.

WARNING!

Damage caused by mechanical stress on the cables

Mechanical stress on the device can cause damage, loss of function, reduction of the IP protection class, and compromise of electrical insulation. Using connection cables to lift or move the device may also create a risk of electric shock.

Safety measures:

- Do **not** use connection cables to lift, carry, or move the device.
- Handle the device **only** at the designated mounting or transport points.
- Protect cables from mechanical stress and ensure they are routed without tension.

CAUTION!

Risk of injury from sharp edges

REO EMC filters are industrial products. Despite design measures to minimize sharp edges and pointed corners, there is a risk of injury during unpacking, installation, or at the mounting location.

Safety measures:

- Exercise **extra caution** when handling the device to avoid cuts or puncture injuries.

Intended use

The devices described in this manual are electrical equipment for use in industrial plants. They are not intended for use in private households.

REO products may only be used for their intended purpose within the specified values, in compliance with the information provided in the REO data sheets, in low-voltage networks. The conditions at the place of use must correspond to all specifications for the device used.

Applied directives and harmonized standards

When using products of **REO AG**, the following standards, directives, and legal regulations must be observed in their currently applicable versions:

- **DIN EN 61558**
- **DIN EN 61800**
- **German Product Safety Act (ProdSG)**
- **German Ordinance on Industrial Safety and Health (BetrSichV)**
- **DGUV regulations** of the German Social Accident Insurance
- **General VDE, DIN, EN, and IEC provisions**

To ensure proper function and avoid interference, the principles of **EMC-compliant installation** (electromagnetic compatibility) must also be followed.

Technical standards (excerpt)

The following standards are relevant for the use and installation of the products. Depending on product type and application, additional specific standards may apply.

Norm	Title / Scope of Application
DIN EN 60204-1 / VDE 0113-1	Safety of machinery - Electrical equipment of machines
DIN EN 60529 / VDE 0470-1	Degrees of protection provided by enclosures (IP Code)
VDI 2230	Systematic calculation of high duty bolted joints
DIN EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
DIN EN 62444	Cable glands for electrical installations
DIN EN 50178	Electronic equipment for use in electrical installations

Note:
The selection, application, and compliance with the applicable standards lie with the user/operator. Depending on the intended use, industry, and system context, additional technical standards, directives, and legal requirements may apply and must be considered.

The directives and harmonized standards listed below were considered during the design and manufacture of the referenced products:

Directive	Title	Applied harmonized standards
2014/30/EU	Electromagnetic Compatibility (EMC)	EN IEC 61000-6-4:2019 EN IEC 61000-6-2:2019
2014/35/EU	Low Voltage Directive (LVD)	EN IEC 62477-1:2023 + AC:2024
2011/65/EU	Restriction of Hazardous Substances (RoHS)	–

CE

RoHS COMPLAINT

Changes and Copyright

We reserve the right to make technical changes and to modify the content and structure of this documentation without prior notice.

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1.0 General

1.1 Product applicability and scope of this document

This operating manual applies generally to all **EMC filters** from **REO AG**. It covers a wide range of designs, power ratings, and electrical connection types.

The specific characteristics, operational limits, and connection or integration requirements of the delivered unit are determined by the corresponding nameplate, the product-specific datasheet, and the technical project planning carried out by REO or the system manufacturer.

The products are intended for industrial use. They may be employed in various systems and applications provided that intended use, technical limits, and installation and environmental conditions are observed.

All EMC filters described in this manual have been developed and manufactured in accordance with applicable European directives. When used as intended, the products meet the requirements for CE marking.

For certain product series (e.g., CNW 101, CNW 102, CNW 103, CNW 114), an optional UL-certified version may be supplied. Availability depends on the product version and order quantity and must be arranged separately if required.

The CE marking is affixed to the nameplate. The complete EU Declaration of Conformity is available upon request.

2.0 Functional Description

2.1 Intended use

EMC filters are used to reduce conducted electromagnetic disturbances. They improve the electromagnetic characteristics and compatibility of electrical and electronic devices and contribute to compliance with applicable EMC standards. In this way, they support the requirements for CE marking.

Typical applications include drive and inverter technology, railway and energy technology, automotive, and applications industrial automation systems

Note on Electromagnetic Compatibility (EMC)

REO AG EMC filters have been developed in accordance with Directive 2014/30/EU on electromagnetic compatibility.

To ensure compliance with limits for emission and immunity, the installation, grounding, and connection instructions must be strictly observed. The effectiveness of the filters depends in particular on:

- Correct mounting orientation
- Appropriate shielding
- Low-impedance and professional grounding connection

Improper installation or wiring can lead to a loss of EMC performance.

EMC filters may only be used within the values specified by REO, as indicated in product-specific datasheets, catalogs, or operating instructions.

The devices are intended exclusively for installation in technical systems and equipment. The permissible operating limits with regard to electrical, thermal, and mechanical load capacity as well as the degree of protection (e.g., IP protection class) are documented in the respective product-specific data sheets and must be observed.

Intended use includes in particular:

- operation within the defined operating limits (e.g., voltage, current, temperature, environmental influences),
- Use only in environments compliant with the specified protection class,
- Installation and operation exclusively by qualified personnel

2.2 Improper use

Improper use is considered, in particular, in the following cases:

- Operation outside the limits specified in the product datasheet
- Use in explosive or hazardous environments without the corresponding certification
- Application in industries or environmental conditions for which the product is not intended
- Improper modification or mechanical damage
- Use for purposes other than intended, e.g., as a heating element

Failure to comply with the intended use may result in overheating, damage, fire hazards, and risk to personnel. REO assumes no liability for any damage resulting from improper use.

3.0 Technical Data

The technical specifications of REO AG EMC filters vary depending on the series, size, power rating, and intended application. These specifications must be considered during planning, selection, installation, and operation.

EMC filters must only be operated within the values specified by the manufacturer, as indicated in the product-specific datasheets, catalogs, or user manuals.

The devices are intended exclusively for use in low-voltage networks. Conditions at the installation site must comply with the specifications of the filter, such as voltage, current, and ambient temperature.

The respective product-specific data sheet is authoritative for safe use. In case of uncertainties or special applications, contact REO AG technical support and, if necessary, obtain a project-specific approval.

The intended use includes operation strictly within the specified technical parameters and in accordance with all safety and installation instructions by qualified personnel. Any deviation constitutes improper use and may result in hazards to personnel or property.

All EMC filters are designed for nominal frequencies of 50 Hz and 60 Hz. Operation at higher frequencies is only permissible after consultation with REO.

Unless otherwise specified, the maximum installation altitude is 0 m to 4000 m above sea level. For altitudes above 2000 m, a current derating of 1% per 100 m must be applied.

Unless otherwise indicated, the permissible installation orientation is vertically suspended or lying flat.

For further details, see Chapter 5.2 “Assembly”.

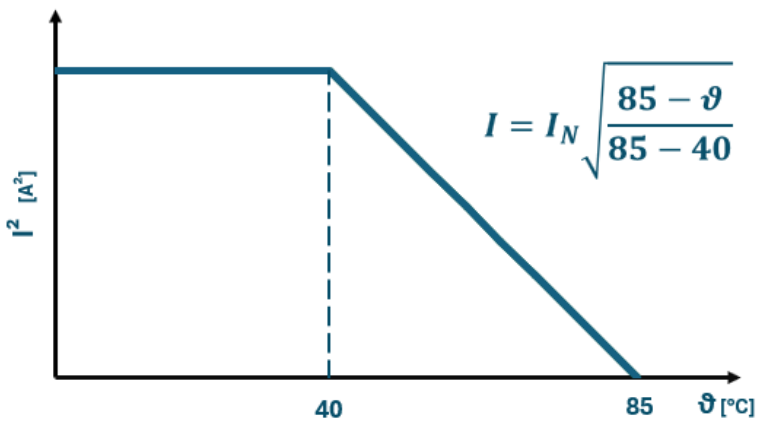
3.1 Rated current, maximum continuous operating current, and ambient temperature

The rated current is the maximum continuous operating current under the following conditions:

- 100% load,
- correct installation,
- mains frequency of 50 Hz or 60 Hz,
- maximum permissible ambient temperature of 40 °C.

At higher ambient temperatures, the permissible continuous operating current is reduced. This also applies to loads with mains harmonics.

Short-term overcurrents are permissible, provided that the subsequent current load is appropriately reduced. The allowable load must be evaluated on an application-specific basis.



The permissible current carrying capacity is a function of the ambient temperature:

- Up to 40 °C, the filter can be operated at the rated current.
- At higher temperatures, the permissible current decreases.
- At 85 °C, continuous current loading is no longer permissible.

3.2 Leakage current

Leakage current is an important parameter for mains filters. It is caused by parasitic capacitances and capacitors used between live conductors and protective earth or ground potential.

For safety reasons, the permissible limit values must not be exceeded. These limits are device- and country-specific and must be observed.

In single-phase mains filters, the leakage current refers to the current between each live conductor and the protective conductor.

The leakage currents of mains filters in three-phase networks specified in the technical data apply under the following worst-case conditions:

- Nominal voltage tolerance +10%,
- Capacitance tolerance of the capacitors +20%,
- One phase live, two phases interrupted.

Leakage currents must be taken into account during planning and installation:

- High leakage currents can trigger RCDs.
- Select suitable residual current devices (e.g., type A or type B) according to the application.
- Observe the limit value for devices according to EN 60939 (e.g., differential current < 3.5 mA).

3.3 Climate category (IEC 60068-1)

Unless otherwise specified, REO EMC filters comply with the following climate categories according to **IEC 60068-1**:

Upper temperature limit: + 85 °C		
Lower Limit temperature: - 25 °C	25/85/21	Relative humidity: 95% 21days/year

4.0 Transport and storage

REO AG EMC filters are precision-manufactured electrical components that are assembled and tested under controlled conditions. Special precautions must be taken during transport and storage to ensure electrical and mechanical functionality.

4.1 Transport

- EMC filters must be transported with protection against shocks and vibrations.
- Mechanical impacts such as shocks, housing deformations, or tensile and compressive forces on the terminals must be strictly avoided.
- The products must not be thrown or stacked unless this has been expressly approved.
- The original packaging provides optimal protection and should be used until installation.
- Permissible transport temperature range: -15 °C to +70 °C (short-term), in accordance with IEC 60068-2-1/-2, unless otherwise specified by REO.
- Transport is permitted only at relative humidity up to 85%, non-condensing, according to IEC 60068-2-30, unless otherwise specified by REO.

4.2 Storage / storage conditions

General Requirements:

- EMC filters should be stored in their original packaging to preserve product properties.
- Typical storage life is at least 3 years from the date of manufacture, provided the specified conditions are observed.

Temperature Range:

- Recommended temperature range for storage and transport: -15 °C to +55 °C.
- Temperature gradients should not exceed 20 K/h.

Relative Humidity:

- Annual average ≤ 75%.
- Maximum 95% on up to 21 days per year.
- Condensation must be avoided at all times; generally below 95%.

Additional Conditions:

- Aggressive atmospheres (e.g., corrosive gases) or condensation are not permitted.
- Storage should be in an environment protected against mechanical impacts, dust, and moisture.

Note: See also Section 5.0 “Assembly / Installation / Commissioning”.

5.0 Assembly / Installation / Commissioning

5.1 General information

- Assembly and electrical installation may only be carried out by qualified personnel in accordance with applicable regulations and standards.
- Before installation, check that the EMC filter is free from mechanical damage and that the name-plate is fully legible. Damaged or deformed devices must not be used.
- The conditions at the installation site must comply with the protection ratings and operating limits specified in the product data sheet. Before installation, the product data sheet and this document must be carefully reviewed.

Warning!

Danger caused by residual voltage in EMC filters!
After switching off the mains voltage, life-threatening voltages may remain at the connections of EMC filters for a considerable period of time (at least 10 minutes). There is therefore a risk of electric shock when touching the terminals or connection cables. Work on the filter may only be carried out after a waiting period of at least 10 minutes.

If the protective conductor is interrupted, safe discharge is no longer guaranteed. This can lead to dangerous contact voltages on metallic parts. The protective conductor must always be connected first and must not be interrupted. When dismantling, the PE connection must be disconnected last.

Installation and maintenance may only be carried out by qualified electricians.

EMC compliance is only guaranteed if all installation and connection specifications are observed. Failure to comply with the generally accepted rules of electromagnetic compatibility, in particular with regard to the installation of EMC filters and the routing of power and control cables, can significantly reduce or completely negate the effectiveness of the filter.

5.2 Assembly

5.2.1 Safety rules

When working on electrical equipment, the **"Five Safety Rules" according to EN 50110** must always be observed:

1. Disconnect the installation from the power supply.
2. Secure the installation against reconnection.
3. Verify that the installation is de-energized.
4. Ground and short-circuit the installation.
5. Cover or isolate adjacent live parts

5.2.2 Electrical connection

- The electrical connection shall be made by properly connecting the unit to the customer-side terminals, terminal strips or busbars in accordance with the applicable regulations.
- Strain relief and mechanical protection of the cable routing shall be ensured by the customer.
- Protection against accidental contact must be provided on site if the connection cables are freely accessible.

- Moisture protection of cable entries (e.g. by IP-rated cable glands) must be ensured.
- The conductors must not be subjected to mechanical stress. Strain-free cable routing must be ensured.

Protective conductor (PE):

- The PE conductor must always be connected first and disconnected last during deinstallation.
- Work on the filter may only be carried out after a waiting time of at least 10 minutes has elapsed.
- EMC conformity can only be ensured if all installation and connection instructions are observed. Failure to comply with generally accepted EMC installation practices, particularly regarding the installation of EMC filters and the routing of power and control cables, may significantly reduce or completely cancel the effectiveness of the filter.

5.2.3 Fixed protective conductor connection (PE)

In accordance with DIN EN 50178, EMC filters must have a fixed and secure connection to the protective conductor (PE) in order to ensure electrical safety and reliably dissipate leakage currents. The protective conductor must always be connected first and must not be interrupted. When dismantling, the PE connection must be disconnected last.

5.2.4 Installation location and clearances

The filter should be installed as close as possible to the inverter. It may only be attached to the mounting points provided for this purpose.

To prevent overheating and ensure sufficient convection cooling, a minimum clearance of 20 mm must be maintained from external heat sources that may exceed the permissible ambient temperature.

5.2.5 EMC-compliant installation

- Filters and converters must be installed on the same, highly conductive mounting plate.
- The mounting plate should be electrically conductive and connected to the control cabinet, preferably via copper braided strips for large-area contact.
- All components should be mounted on a bare metal, conductive mounting surface.

5.2.6 Cable routing and shielding

- The connection between the filter and the inverter must be as short and direct as possible.
- Shielded motor cables must be used and connected flat to the shield supports on both sides (at the filter and at the motor), e.g., with suitable shield clamps.
- Power and signal cables must be laid separately. Minimum distances must be observed: at least 100 mm from power cables and 300 mm from signal cables.
- Cables from different EMC zones must not be routed together in cable ducts. Crossing is permitted, but parallel routing should be avoided if possible.
- Minimum bending radii in accordance with the cable manufacturer's specifications must be observed.
- If no manufacturer's specifications are available, a minimum bending radius of RB = 10 × outer diameter of the cable must be observed.

5.2.7 Grounding

The entire control cabinet must be grounded in accordance with EMC requirements. In case of doubt, a large-area ground connection, e.g., via copper braided strips, must be established in addition to the protective ground.

5.2.8 Protection against overvoltage

The entire control cabinet must be grounded in accordance with EMC requirements. In case of doubt, a large area ground connection, e.g., via copper braided straps, must be established in addition to the protective ground.

Note:

Tightening torques, screw strength, and connecting elements such as washers must be selected in accordance with VDI 2230 and manufacturer-specific specifications. The responsibility for this lies with the plant operator.

5.2.9 Torques for connection terminals and threaded bolts

The following torques apply to the terminals of REO EMC filters, depending on the terminal cross-section:

Terminal cross-section [mm²]	Torque [Nm]	Max. Rated Current (A)
4	0,6	32
6	1,5	41
10	1,5	57
16	2	76
25	3	101
50	6	150
95	12	232

The actual connection circuit cross-section installed can be found in the respective product data sheet.

The following torques apply to brass threaded bolts on REO EMC filters:

Thread	Torque [Nm]
M4	1,1 - 1,3
M5	1,9 - 2,1
M6	2,9 - 3,2
M8	5,7 - 6,3
M10	9,0 - 11,0
M12	14,0 - 17,0

5.2.10 Screw connections for busbars

Copper bars are used as connection elements for EMC filters with rated currents above 280 A. REO recommends the following torques in accordance with DIN 43673-1 for screwing these busbars together:

Threaded bolt	Torque [Nm]
M8	13,5 – 16,5
M10	27,0 – 33,0
M12	54,0 – 66,0

The use of a calibrated torque screwdriver is strongly recommended for safety reasons.

For cable connection technology (e.g., crimping, ferrules, cable lugs), only DIN/VDE-standardized connecting devices may be used, e.g.:

- DIN 46228 for ferrules
- DIN 46235 for cable lugs
- VDE 0603-1 / DIN EN 60998 for terminals

The cables used must be selected according to the specified cross-sections and current-carrying capacities.

Warning!

Improperly tightened terminals, e.g. due to insufficient or excessive tightening force, can lead to contact problems, overheating, or damage to the device. The system operator is responsible for proper and standard-compliant installation.

Some REO EMC filters have factory-fitted cable glands or cable bushings, especially on terminal boxes or individual profiles.

These factory-installed glands are part of the certified overall system. They must **not be opened, modified, replaced, or retightened** by the user.

Any modification may compromise the IP protection class, electrical safety, and CE conformity of the product and will void the warranty.

6.0 Operation

Separate switching on or switching in is not necessary.

Operation is only permitted within the parameters specified in the product-specific data sheet. This applies in particular to:

- Operating voltage
- Rated current
- Overload capacity
- Ambient temperature

At elevated ambient temperatures or high installation altitudes, operation is only permitted with reduced rated current (current derating).

Warning!

EMC filters can generate increased leakage currents to ground during operation.

- If the protective conductor is interrupted, safe discharge is no longer possible, which can lead to dangerous contact voltages on metal parts.
- When connected to a residual current device (RCD), unwanted tripping may occur, especially in the case of unbalanced mains voltages or the failure of one or more phases.
- Switching operations at the input of the EMC filter can cause very high leakage currents for a short time.

Note: During operation, all installation and connection specifications must be observed and the rated values must be adhered to in order to avoid injury to persons and damage to equipment.

7.0 Cleaning / Maintenance / Servicing

EMC filters are generally maintenance-free.

Cleaning should be carried out depending on the degree of contamination. It is recommended that the devices be checked at least once a year. In particular, screw connections must be checked for tightness during this inspection.

Shorter maintenance and inspection intervals should be specified by the operator in accordance with the respective operating conditions.

8.0 Malfunctions and Troubleshooting

REO EMC filters are maintenance-free and designed for long-term operation within the specified environmental conditions.

If faults or irregularities nevertheless occur, operations must be stopped immediately, and the cause must be identified.

8.1 Possible malfunctions

Symptom	Possible Cause	Corrective Action
Noise during operation	• Severe disturbances or high harmonics in the mains supply • Mechanical vibrations • Vibrations caused by frequency influences	• Switch off immediately • Check current load and voltage peaks • Check frequency range
Increased temperature	• Overload • Unsuitable environment	• Switch off immediately • Check current load • Check environmental conditions and current derating
Residual current device (RCD) trips	• Leakage current too high	• Switch off immediately • Compare EMC filter leakage current specification with the RCD rating • Check leakage current in the system
No or poor filtering performance	• Inductance enters saturation • Poor PE connection • Incorrect cable routing	• Check PE connection • Check cable routing • Check current load • Check environmental conditions and current derating • Verify compliance with generally accepted EMC installation practices
Smoke generation or unusual smell	• Overload • Thermal overstress • Short circuit	• Switch off immediately • Inspect EMC filter for visible damage • Check application and electrical connections

8.2 Behavior in case of malfunctions

- In case of a fault, the REO EMC filter must be disconnected from the mains immediately.
- An external visual inspection for damage, discoloration, breaks, or leaks must be carried out.
- Electrical measurements may only be carried out by qualified personnel.
- Check whether the operating limits defined in the product data sheet (e.g., temperature, power, environmental influences, IP protection, forced cooling) have been observed.
- Restarting the device is only permitted after the cause has been clearly identified and resolved.

Verification of electrical safety and full functionality may only be performed by REO.

A damaged or thermally overloaded EMC filter must not be operated further. There is a risk of fire and electric shock.

For fault analysis or return shipment, contact REO AG in advance.

9.0 Disassembly and Disposal

9.1 Safety during disposal

Hazard!

Residual voltage in EMC filters!

After switching off the mains voltage, life-threatening voltages may remain at the connections of EMC filters for a considerable time (at least 10 minutes). There is a risk of electric shock if the terminals or connection cables are touched.

Safety measures:

- Ensure the device is completely de-energized before beginning any disassembly work.
- Secure the device against re-energization.
- Perform disassembly only after a waiting period of at least 10 minutes.
- Before loosening electrical connections, ensure that no residual charge remains.
- Electrical and mechanical disassembly must only be carried out by qualified personnel.

Caution – Property damage and hazards:
Improper disassembly can lead to electric shock, fire hazard, or property damage.

9.2 Disposal

Disposal must comply with applicable legal regulations.

The device is subject to the requirements of the WEEE Directive 2012/19/EU and the German ElektroG (Electrical and Electronic Equipment Act). WEEE Registration Number: DE 32383152.

Disposal via household waste is not permitted. Devices must be processed through certified recycling companies or municipal collection points.

Where possible, the following materials should be separated and recycled:

- Aluminum profiles and heat sinks
- Connection terminals
- Insulating materials and silicone gaskets
- Copper wires and leads

Packaging materials are recyclable and must be disposed of in accordance with local regulations.

	Name	Signature	Date	Department	Function
Created by	S. Reimann		07.05.2025	EW	Development
Reviewed by	C. Wrzesinski		25.06.2025	KO	Design / Engineering
Approved by	I.Przybilla		04.07.2025	QM	Quality / Management

Rev.	Modified by	Date:	Additions / Revisions	Checked by	Date:

REO AG
Brühler Straße 100 · D-42657 Solingen
Tel.: +49 (0)212 8804 0 · Fax: +49 (0)212 8804 188

E-Mail: info@reo.de
Internet: www.reo.de

Divisions:

REO Vibratory Feeding and Power Electronics Division

REO Vibratory Feeding and Power Electronics Division
Brühler Straße 100 · D-42657 Solingen
Tel.: +49 (0)212 8804 0 · Fax: +49 (0)212 8804 188
E-Mail: info@reo.de

REO Train Technologies Division

REO Train Technologies Division
Erasmusstraße 14 · D-10553 Berlin
Tel.: +49 (0)30 3670236 0 · Fax: +49 (0)30 3670236 10
E-Mail: zentrale.berlin@reo.de

REO Drives Division

REO Drives Division
Holzhausener Straße 52
D-16866 Kyritz
Tel.: +49 (0)33971 485 0 · Fax: +49 (0)33971 485 90
E-Mail: zentrale.kyritz@reo.de

REO Medical and Current Transformer Division

REO Medical and Current Transformer Division
Schuldholzinger Weg 7 · D-84347 Pfarrkirchen
Tel.: +49 (0)8561 9886 0 · Fax: +49 (0)8561 9886 40
E-Mail: zentrale.pfarrkirchen@reo.de

REO Test and PowerQuality Division

REO Test and PowerQuality Division
Brühler Straße 100 · D-42657 Solingen
Tel.: +49 (0)212 8804 0 · Fax: +49 (0)212 8804 188
E-Mail: info@reo.de

PRODUCTION+SALES:

- India
  REO GPD INDUCTIVE COMPONENTS PVT. LTD
  E-Mail: info@reogpd.com · Internet: www.reo-ag.in
- USA
  REO-USA, Inc.
  E-Mail: info@reo-usa.com · Internet: www.reo-usa.com

SALES:

- France
  REO VARIAC S.A.R.L.
  E-Mail: reovariac@reo.fr · Internet: www.reo.fr
- Great Britain
  REO (UK) Ltd.
  E-Mail: main@reo.co.uk · Internet: www.reo.co.uk
- Italy
  REO ITALIA S.r.l.
  E-Mail: info@reoitalia.it · Internet: www.reoitalia.it
- Poland
  REO CROMA Sp.zo.o
  E-Mail: croma@croma.com.pl · Internet: www.croma.com.pl
- Spain
  REO ESPAÑA 2002 S.A.
  E-Mail: info@reospain.com · Internet: www.reospain.com
- Switzerland
  REO ELEKTRONIK AG
  E-Mail: info@reo.ch · Internet: www.reo.ch
- Turkey
  REOTURKEY ELEKTRONİK San. ve Tic. Ltd. Şti.
  E-Mail: info@reo-turkey.com · Internet: www.reo-turkey.com
- China
  REO Shanghai Inductive Components Co., Ltd
  E-Mail: info@reo.cn · Internet: www.reo.cn
- United Arab Emirates
  REO INDUCTIVE COMPONENTS FZCO
  E-Mail: info@reo-middle-east.com · Internet: www.reo-middle-east.com

If you have any further questions, please visit our website at WWW.REO.DE