

**Operating instructions**  
**REO - Mains chokes, DC chokes**  
**Motor chokes, sine-wave filters, du/dt chokes**

## Warning and safety instructions

This description contains the information required for the intended use, transport and installation, commissioning and maintenance of the products described therein. It addresses technically qualified personnel.

Qualified personnel are persons who have been authorized by the person responsible for the safety of the installation to carry out the required activities due to their training, experience and instruction in the special field of drive technology and their knowledge of relevant standards, regulations, accident prevention regulations and operating conditions identify and avoid possible dangers (definition for qualified personnel according to IEC 364).

Please read all safety instructions and warnings carefully before installing and commissioning the choke. This also applies to the warning labels attached to the choke. Please make sure that the signs are not removed or that the readability is affected by external influences.

When using chokes, the standard series DIN EN 61558 and EN 61800 must be observed. In addition, the BetrSichV, the German Social Accident Insurance (DGUV) regulations and the general VDE, DIN, EN and IEC regulations apply. To ensure proper operation, the basic rules of EMC-compliant installation must be observed.

## Warnings

The following information is used, for the personal safety of the operating personnel, as well as for the safety of the described products and connected devices.



### Caution, danger to life due to high voltage!

Failure to do so may cause death, serious bodily injury or damage to property.

## General information

- Observe the accident prevention and safety regulations applicable for the specific application.
- Before commissioning, check whether the nominal voltage of the device corresponds to the local mains voltage.
- Emergency stop devices must remain effective in all operating modes. Unlocking the emergency stop devices must not cause an uncontrolled restart.
- The electrical connections must be covered!
- Protective conductor connections must be checked for proper function after installation!
- **Electrical power engineering systems generate electromagnetic fields (EMF) during operation. As a result, especially persons with pacemakers or implants, who are in the immediate vicinity of the equipment are at risk.**

## Product specific notes:

- Nominal voltage and current can be found on the respective nameplate. Values listed there must not be exceeded. In addition, the frame parameters listed in the technical data sheets must be adhered to.
- Disconnect the supply voltage before assembly or disassembly work as well as when changing fuse or structural changes. In particular, it must be ensured that the energy stored in the capacitors is reduced to low values within a short period of time, so that the voltage applied to the terminals drops to permissible values. Otherwise, contact could lead to a life-threatening shock.
- Chokes produce a voltage drop, depending on inductance, frequency and current. When using line reactors, DC chokes, du/dt chokes, motor chokes or sine filters, the inverter output voltage will be

lower than the mains input voltage. The voltage drop must be taken into account when dimensioning the motor and the frequency converter, since a reduction of the motor voltage requires a higher current if the power is to be kept constant.

- Make sure that the inputs and outputs of the choke are not reversed, otherwise damage to the frequency converter may occur. Operation of the choke without load is also not permitted in order to protect the inverter against damage.
- For du/dt choke, motor choke and sine filter, the specifications of the permissible motor frequencies, clock frequencies and motor cable lengths must be observed.
- The current must be reduced if the rated ambient temperature or rated frequency is exceeded. In addition, an automatic frequency changeover and a "two-phase modulation" is not permitted and must be switched off via the parameter setting of the inverter.
- Due to the power loss of the choke, the surface of the choke becomes relatively warm. Therefore, because of the radiant heat, special attention must be paid to the installation location and the ventilation of the choke. The installation position is crucial to avoid a thermal overload of the chokes.

### **Intended use**

The chokes may only be used for their intended use within the specified values, taking into account the information given in the data sheets in low-voltage networks. The conditions at the place of use must agree with all information on the choke used.

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

Devices with open electrical connections are intended for installation only.

**This device complies with the Low Voltage Directive 2006/95/EC. 2014/35/EU**

## Environmental conditions

The maximum ambient temperature, unless otherwise stated, is 40 ° C. Ensure adequate ventilation. At higher temperatures make sure to drive with reduced current.

For adequate ventilation and undisturbed thermal radiation, clearance to adjacent components and side walls must be ensured on all sides of the choke. Temperatures of more than 130 ° C can be achieved in various ways, especially in the case of starting components. Therefore, it is important to pay particular attention to the necessary distances to peripheral devices or built-in walls.

Since REO chokes are distributed in various protection classes (IP00, IP20, IP54, IP65 and IP66), they must be protected against the corresponding unprotected influences, depending on the protection class.

## Functionality

### REO Mains and DC Chokes:

Input chokes are used on the line side of frequency converters, i.e. between the mains and the inverter. They reduce mains disturbances and the recorded mains current of the frequency converter. By reducing the mains current, the dimensioning of the supply components, such as fuses, motor protection switches, safeguards, RFI filters and supply lines can be made more cost-effective. Mains chokes lessen mains faults from / to the inverter. In order to guarantee the network transient protection according to DIN 0160, the use of mains chokes is absolutely necessary.

### REO engine and du/dt chokes:

REO output chokes are used on the load side of frequency converters, i.e. between the inverter and the motor. They compensate for capacitive recharging currents of the motor cables and limit the voltage gradient at the motor terminals. This leads to reduced life of the motor due to the reduced voltage load of the insulation system.

### REO sine-wave filter:

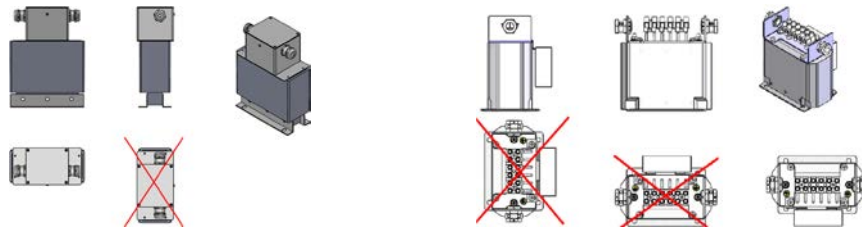
REO sine-wave filters are also used on the load side of frequency converters. They filter the frequency converter output variables so that almost network-like conditions are created for the motor. In addition to the limitation of the voltage gradient at the motor terminals according to DIN VDE 0530 or IEC 60 034-17, this results in the possibility of using longer or unshielded motor cables. In addition, engine noise is greatly reduced and engine life is prolonged by the reduced stress on the isolation system.

## Assembly and installation position

The choke assembly must be carried out as follows on a bare metal plate in the cabinet:

- Please place the choke as close as possible to the inverter (observe heat radiation!).
- Make the wiring as short as possible.
- The motor cables should be laid separately from other cables, such as signal or mains cables, so that no interference is coupled in.

- The choke is fastened with 4 screws each over the fixing holes provided in the foot plate. The installation position of the choke should be selected as follows to avoid thermal overload:
  - Arrange cooling ducts - if available - vertically
  - The cooling air flow (natural convection) must not be affected by neighbouring components, connecting cables, etc. The capacitors must not be affected by the waste heat of another choke or heat source.



## Connection

The choke may only be connected and commissioned by electrical specialists. The following should be noted:

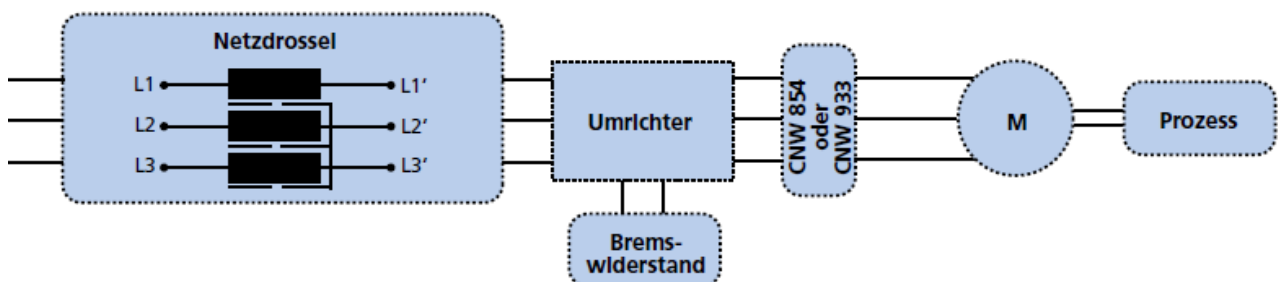
- The PE connection of the choke must be connected to the PE conductor.
- For protective conductor connection via connecting bolts, a tightening torque of 6 Nm applies.
- For protective conductor connection via tabs on the foot angle, a tightening torque of 10 Nm applies.
- For connections via tabs on flat connections, the following applies:
- The customer's connection is made using cable lugs or external bus bars using the parts listed in the table.
- The flat contact surfaces of the flat connections must be metallically bright. Aligning the cable lugs after tightening the screw connection is not permitted (risk of loosening)!
- For connections via terminals:
  - The cables must be stripped to the point where the stripped part of the cable can be completely inserted in the contact part of the terminals, without tilting. The insulation of the cable should be applied to the contact part of the terminal, without being squeezed when screwing the conductor.

## Pin assignment

### Line chokes

The terminals L1 / L2 / L3 are to be connected to the mains side, the terminals L1' / L2' / L3' to the load side.

*Netzdrossel* = Line choke, *Umrichter* = Inverter, *Bremswiderstand* = Brake resistor, *Prozess* = Process



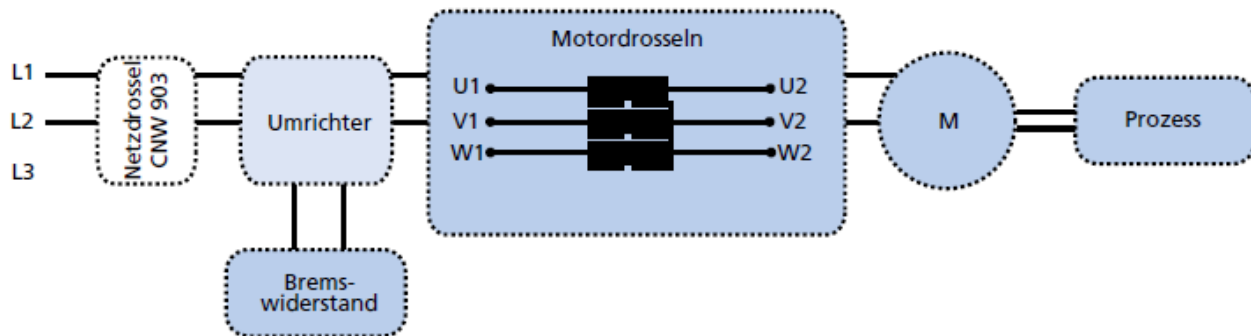
### REO engine and du/dt chokes:

Terminals U1 / V1 / W1 must be connected to the inverter output, terminals U2 / V2 / W2 to the motor. The cable between choke and inverter should be as short as possible.

### Sine-wave filters

Terminals U1 / V1 / W1 must be connected to the inverter output, terminals U2 / V2 / W2 to the motor. The cable between the filter and the inverter should be as short as possible.

*Motordrossel = Motor choke, Umrichter = Inverter, Bremswiderstand = Brake resistor, Prozess = Process*



### **Commissioning**

For commissioning, the parameters given in the respective data sheet must be observed. Please also note that the operation of the unit may be impaired if there are any changes from normal operation (higher power, temperatures or oscillations, unusual sounds or smells, response of monitoring equipment, etc.). In this case, the responsible maintenance personnel must be informed immediately in order to avoid faults that could lead to personal injury or material damage. In case of doubt, switch off the corresponding equipment immediately!

### **Maintenance**

Before commencing maintenance or servicing work, the choke must be checked for absence of voltage by means of a measuring device:

1. Activate
2. Secure against restart
3. Determine absence of voltage
4. Grounding and shorting
5. Cover adjacent, live parts

It is recommended to carry out the following maintenance work regularly, preferably annually:

- General visual inspection
- Remove excessive dust deposits with compressed air (max 2.5 bar) and a suitable vacuum cleaner
- Retighten connecting elements to the specified torque
- Replacement of the capacitors after maximum life expectancy

### **Disposal:**

Electrical and electronic devices must not be disposed of with household waste! The chokes must be disposed of at the end of their service life in accordance with applicable legislation.





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