

**REO achieve highest IP protection ratings**  
for safe use in aggressive environments

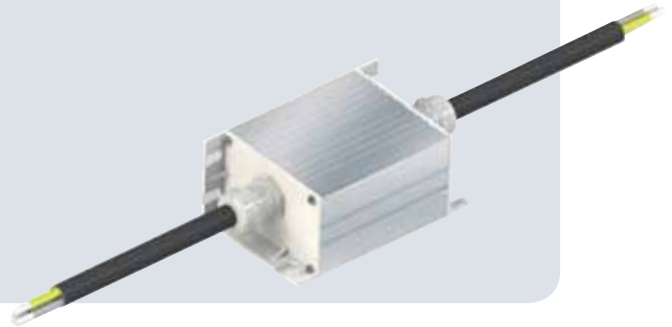
## REO achieve highest IP protection ratings for safe use in aggressive environments

Electrical equipment is often required to work safely and reliably for many years under the most difficult conditions. In industry often aggressive substances - for example fuels, vapours and bases - are used and it is necessary to ensure that electronic devices work properly there too. In addition, the ingress of dust and water must be prevented.

The parameters give the user information about the usability of electrical equipment in certain environments. Furthermore the parameters tell us about the protection for people.

### The advantages at a glance:

- ✓ **The special design ensures external mounting outside of the inverter without the need for an additional enclosure**
- ✓ **Particularly robust**
- ✓ **Protection from dust, liquids and slurries**
- ✓ **EMC Filters with special design provide corrosion – and salt water protection**
- ✓ **Very good heat dissipation**
- ✓ **Worldwide production facilities and sales offices**



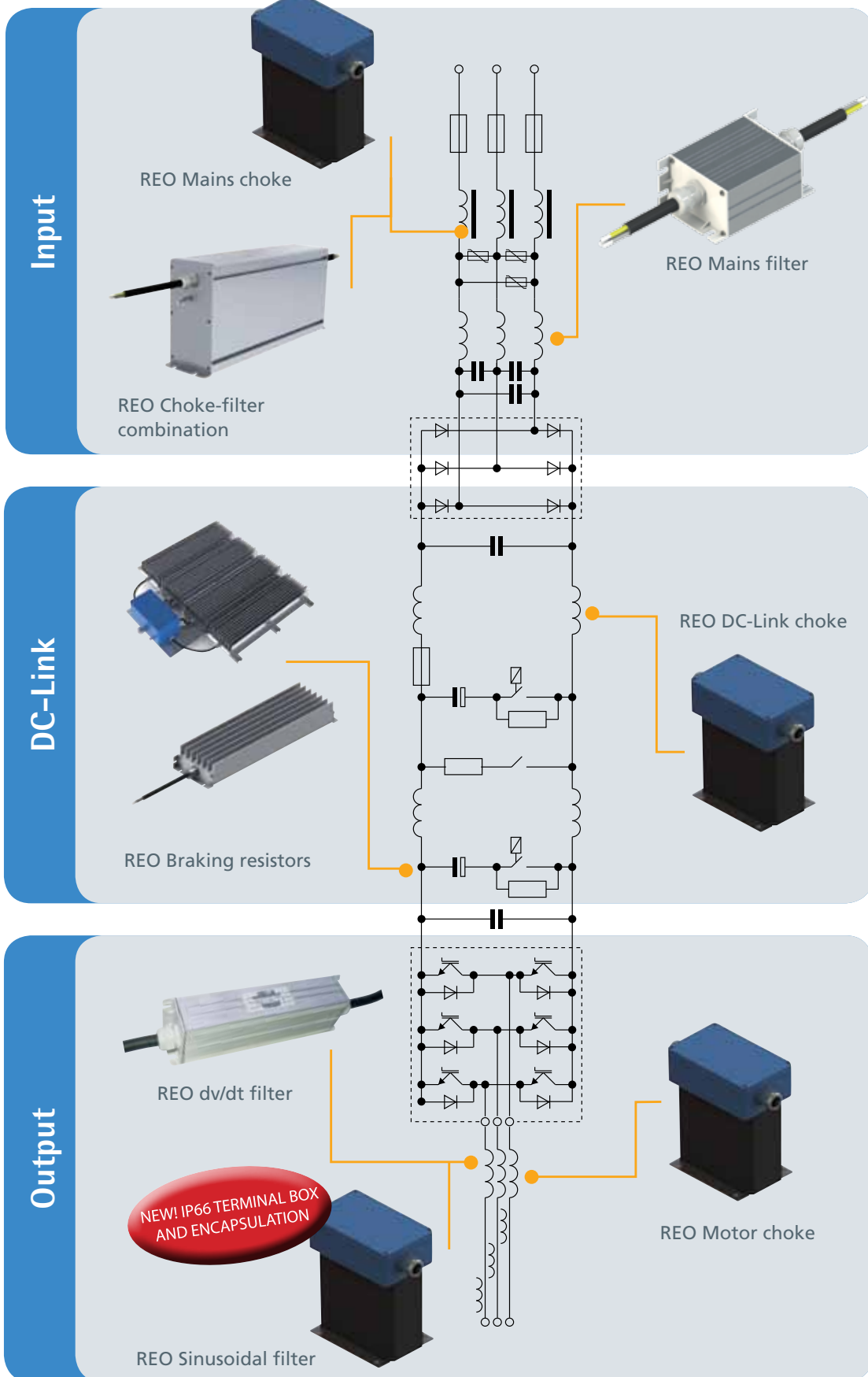
The degrees of protection are divided into IP ratings. The two following parameters to "IP" provide information about the environments in which the device can be used. These codes are defined in the standard IEC 529 (DIN EN 60529 / VDE 0470, T1).

The IP65/66 devices from REO can be used outside of the cabinet next to the frequency converter. Due to its special structure, the components are protected from dust and moisture. Required EMC specifications are achieved by the use of shorter cable lengths. The resulting increase of energy efficiency also reduces operating costs.

REO solutions are easy to install and user-friendly. They are particularly suitable for applications such as pumps, fans, conveyors, cranes, hoists, compressors and lifts.

# REO system components

with high protection IP ratings for inverters



## IP Protection Rating – Explanation

Below is a list of the classification of degrees of protection IP according to DIN EN 60529. The first parameter after IP has the meaning of protection against contact and foreign bodies and the second parameter describes the scope of protection against moisture and water.

1. Parameter: Protection against contact and foreign bodies		
0		No protection
1		Large foreign bodies (diameter from 50 mm upwards)
2		Medium foreign bodies (diameter from 12,5 mm upwards, Length up to 80 mm)
3		Small foreign bodies (diameter from 2,5 mm upwards)
4		Grain-shaped foreign bodies (diameter from 1mm upwards)
5		Ingress of dust is not entirely prevented
6		No ingress of dust



## 2. Parameter: Protection against moisture and water

0		No protection
1		Protection against dripping water (vertically falling drops)
2		Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position
3		Water falling as a spray at any angle up to 60° from the vertical shall have no harmful effect.
4		Water splashing against the enclosure from any direction shall have no harmful effect
5		Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects
6		Water projected in powerful jets (12.5 mm nozzle) against the enclosure from any direction shall have no harmful effects
7		Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion)
8		The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer
9		Protected against close-range high pressure, high temperature spray downs

Naturally, REO harmonic filters can also be specially made to customer requirements.

## Usual types of protection in practice

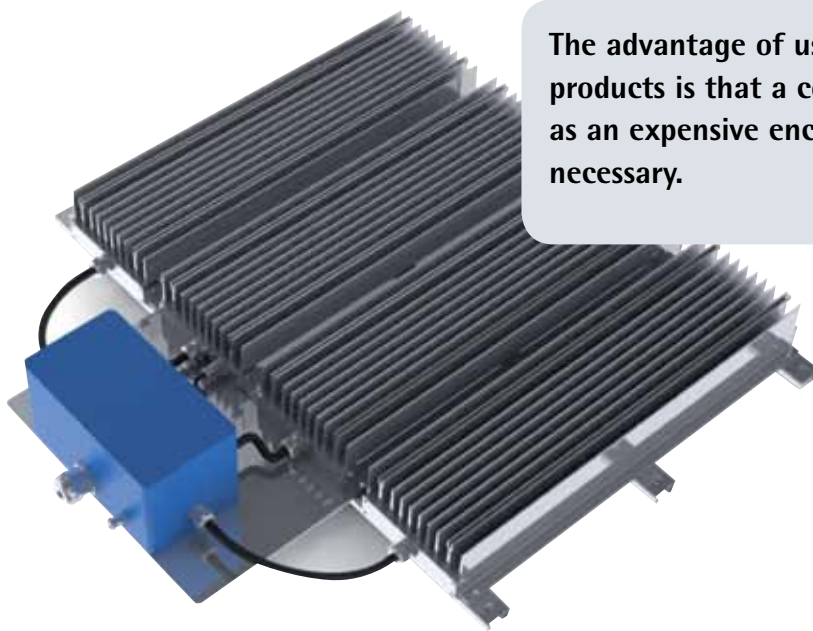
Common industrial systems in closed factories generally require IP20 protection. Here the protection IP54 (splash-proof + Dust-proof) is becoming more common. Outdoor systems need protection to IP65/66 (Dustproof + watersplash safe).

Protection  $\leq$  IP40 only offers protection against contact and is only useful when the system is installed in an enclosure.

## IP Protection Ratings - Typical Applications

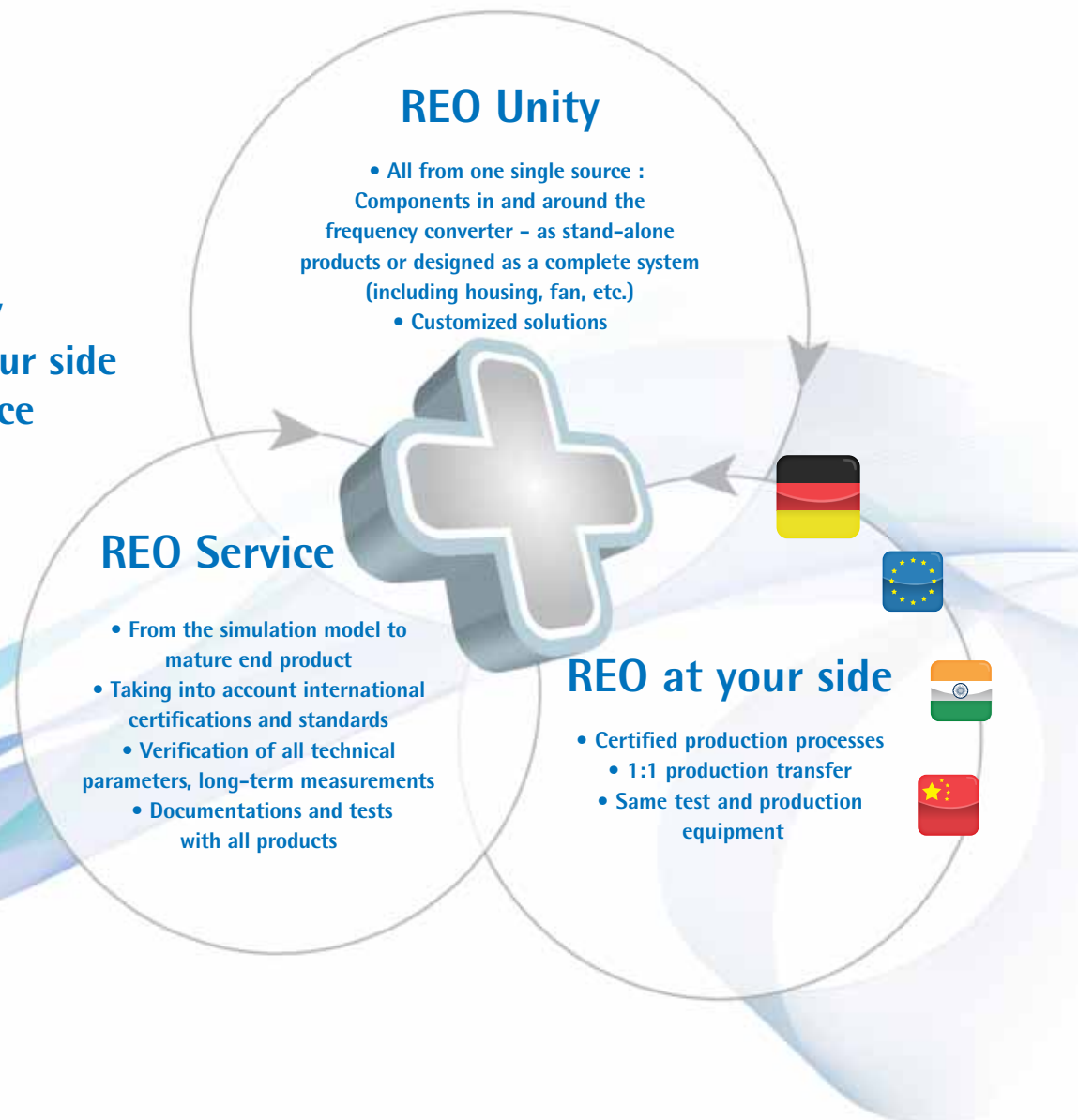
The need for accessories for frequency converters with high protection is rapidly increasing. As frequency converters are being used in more applications and in more aggressive environments.

The market is demanding these types of protection systems and REO offers a wide range of standard products in aluminium profile: chokes (motor chokes, output chokes, sinusoidal filters) in encapsulated versions as the CNW M, EMC filters (CNW) and resistors (REOHM).



**The advantage of using high IP rated products is that a cost saving is made, as an expensive enclosure is no longer necessary.**

- REO Unity
- REO at your side
- REO Service



### Worldwide Sales Network

With a worldwide sales network and comprehensive product portfolio, REO can react rapidly to your requirements anywhere in the world - no matter what language you speak. Besides our wide selection of standard products, we can of course offer you tailor-made solutions, developed specifically to meet your requirements. Our production facilities in China, India and the USA are equipped in exactly the same way as those in Germany, and designed to provide the same product at the same quality.

Using the same software and with development and design in Germany we ensure that REO products are always up to the latest technology.



#### ■ Headquarters - Germany

##### REO ELEKTRONIK AG

Brühler Straße 100 · D-42657 Solingen

Tel.: +49 (0)212 8804 0 · Fax: +49 (0)212 8804 188

##### REO INDUCTIVE COMPONENTS AG

Brühler Straße 100 · D-42657 Solingen

Tel.: +49 (0)212 8804 0 · Fax: +49 (0)212 8804 188

E-Mail: [info@reo.de](mailto:info@reo.de)

Internet: [www.reo.de](http://www.reo.de)

#### ■ Divisions - Germany

##### REO INDUCTIVE COMPONENTS AG

###### REO Train Technologies Division

###### Train Technologies Division

###### Centre of Competence Berlin

Erasmusstraße 14 · D-10553 Berlin

Tel.: +49 (0)30 3670236 0 · Fax: +49 (0)30 3670236 10

E-Mail: [zentrale.berlin@reo.de](mailto:zentrale.berlin@reo.de) · Internet: [www.reo.de](http://www.reo.de)

###### Fertigung/Production

###### Train Technologies Division

Eduard-Maurer-Straße 13 · D-16761 Hennigsdorf

###### REO IBK Drives Division

###### IBK Drives Division

Holzhausener Straße 52 · D-16866 Kyritz

Tel.: +49 (0)33971 485 0 · Fax: +49 (0)33971 485 90

E-Mail: [ibk@reo.de](mailto:ibk@reo.de) · Internet: [www.reo.de](http://www.reo.de)

###### REO Setzermann Medical Division

###### Setzermann Medical Division

Schuldhölzinger Weg 7 · D-84347 Pfarrkirchen

Tel.: +49 (0)8561 9886 0 · Fax: +49 (0)8561 9886 40

E-Mail: [setzermann@reo.de](mailto:setzermann@reo.de) · Internet: [www.reo.de](http://www.reo.de)

###### REO Test and PowerQuality Division

###### Test and PowerQuality Division

Brühler Straße 100 · D-42657 Solingen

Tel.: +49 (0)212 8804 0 · Fax: +49 (0)212 8804 188

E-Mail: [main@reo.de](mailto:main@reo.de) · Internet: [www.reo.de](http://www.reo.de)

Give us a call –  
our team in Kyritz is glad to  
help if you have any  
questions or suggestions.

Tel.: +49 (0)33971 485 0

#### ■ China

##### REO Shanghai Inductive Components Co., Ltd

No. 536 ShangFeng Road · Pudong, 201201 Shanghai · China

Tel.: +86 (0)21 5858 0686 · Fax: +86 (0)21 5858 0289

E-Mail: [info@reo.cn](mailto:info@reo.cn) · Internet: [www.reo.cn](http://www.reo.cn)

#### ■ France

##### REO VARIAC S.A.R.L.

ZAC Du Clos aux Pois 1 · 6/8 rue de la Closerie-LISSES · F-91048 Evry Cédex

Tel.: +33 (0)1 6911 1898 · Fax: +33 (0)1 6911 0918

E-Mail: [reovariac@reo.fr](mailto:reovariac@reo.fr) · Internet: [www.reo.fr](http://www.reo.fr)

#### ■ Great Britain

##### REO (UK) Ltd.

Units 2-4 Callow Hill Road · Craven Arms · Shropshire SY7 8NT · UK

Tel.: +44 (0)1588 673 411 · Fax: +44 (0)1588 672 718

E-Mail: [main@reo.co.uk](mailto:main@reo.co.uk) · Internet: [www.reo.co.uk](http://www.reo.co.uk)

#### ■ India

##### REO GPD INDUCTIVE COMPONENTS PVT. LTD

2/202 Luna Road · Village Luna · Taluka Padra

Vadodara - 391440 · India

Tel.: +91 (2662) 221723, +91 (265) 2396148 · Fax: +91 (265) 2396971

E-Mail: [info@reogpd.com](mailto:info@reogpd.com) · Internet: [www.reo-ag.in](http://www.reo-ag.in)

#### ■ Italy

##### REO ITALIA S.r.l.

Via Treponti, 29 · I-25086 Rezzato (BS)

Tel.: +39 030 279 3883 · Fax: +39 030 279 0600

E-Mail: [info@reoitalia.it](mailto:info@reoitalia.it) · Internet: [www.reoitalia.it](http://www.reoitalia.it)

#### ■ Poland

##### REO CROMA Sp. zo. o

ul. Pozaryskiego 28, bud 20 · PL-04-703 Warszawa

Tel.: +48 (0)22 812 3066 · Fax: +48 (0)22 815 6906

E-Mail: [croma@croma.com.pl](mailto:croma@croma.com.pl) · Internet: [www.croma.com.pl](http://www.croma.com.pl)

#### ■ Spain

##### REO ESPAÑA 2002 S.A.

C/Manuel Ventura i Campeny 21B · local 9 · E-08339 Vilassar de Dalt (Barcelona)

Tel.: +34 937 509 994 · Fax: +34 937 509 995

E-Mail: [info@reospain.com](mailto:info@reospain.com) · Internet: [www.reospain.com](http://www.reospain.com)

#### ■ Switzerland

##### REO ELEKTRONIK AG

Im Halbiacker 5a · CH-8352 Elsau

Tel.: +41 (0)52 363 2820 · Fax: +41 (0)52 363 1241

E-Mail: [info@reo.ch](mailto:info@reo.ch) · Internet: [www.reo.ch](http://www.reo.ch)

#### ■ Turkey

##### REOTURKEY ELEKTRONIK San. ve Tic. Ltd. Şti.

Halil Rifatpasa Mah. · Darülcenze CD Perpa Tic Merkezi

B Blok Kat 8 No:1095 · TR-34384 Sisli – Istanbul

Tel.: +90 (0)212 2215 118 · Fax: +90 (0)212 2215 119

E-Mail: [info@reo-turkey.com](mailto:info@reo-turkey.com) · Internet: [www.reo-turkey.com](http://www.reo-turkey.com)

#### ■ USA

##### REO-USA, Inc.

8450 E. 47th St · USA-Indianapolis, IN 46226

Tel.: +1 (317) 899 1395 · Fax: +1 (317) 899 1396

E-Mail: [info@reo-usa.com](mailto:info@reo-usa.com) · Internet: [www.reo-usa.com](http://www.reo-usa.com)