OPERATION MANUAL

2mag MIX-series

Magnetic stirrers with internal control and one or more stirring positions



MIX 1	**Order no.: 30001**
MIX 6	**Order no.: 30006**
MIX 15	**Order no.: 30015**
MIX 15 eco	**Order no.: 30115**
MIX 8 XL	**Order no.: 30208**
MIX 12 XL	**Order no.: 30212**

Thank you for your confidence shown in us!
Congratulations to the purchase of your new product.
For any enquiries, questions or suggestions please do not hesitate to contact us at info@2mag.de.

2mag
Main competence of **2mag** is based upon mixing, tempering and measuring/controlling. In these fields we are offering support with our products to the modern laboratory within the standardized daily business as well as for the implementation of highly complex processes in the state-of-the-art research. Due to the fact that **2mag** is developing according to customer's needs, is manufacturing self-contained and under permanent quality control and is also selling on-site together with competent contact persons, we can guaranty our customer an outstanding quality and product performance.

Includes

Quick start
Operation Manual
Technical Documentation
Specifications

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A Quick start

1. Overview of your product

Magnetic stirrer MIX 1 / MIX 6 / MIX 15 / MIX 15 eco / MIX 8 XL / MIX 12 XL



Image 1: 15-position magnetic stirrer MIX 15 (without power supply unit 100-240 volts)

Your product contains at despatch:

- A modern inductive magnetic stirring system (**MIX 1, MIX 6, MIX 15, MIX 15 eco, MIX 8 XL or MIX 12 XL**) consisting of a stainless-steel stirring plate with 1, 6, 8, 12 or respectively 15 stirring points.
- An external power supply unit (Input: 100-240 volts / 50-60 Hz / 1.5 A; Output 48 V / 70 W) with fixed cable for connecting the magnetic stirrer and pluggable power cable (country-specific).

2. Application fields

2.1 Operator

The 100% maintenance- and wear-free magnetic stirrers
MIX 1 / MIX 6 / MIX 15 / MIX 15 eco / MIX 8 XL / MIX 12 XL
are used in the fields of chemistry, medicine, pharmacy, microbiology and biotechnology.
The operators are generally working in research and development, production and quality assurance.

2.2 Basic functions

Basic function is stirring of liquids in suitable and chemically resistible vessels.
The stirrer housing is hermetically closed and therefore easy to clean under running water.
Please ensure BEFORE you connect the power supply unit again that the socket is 100% dried!
The maximum ambient temperature is +50°C in air.

2.3 Product combinations

In addition to the use at the conventional laboratory desk our products have also been tested for the application in

- Laminar flow devices
- Safety cabinets
- Safety cabins

2.4 Application not for the intended use

The magnetic stirrers **MIX 1/6/15/15 eco/8 XL/12 XL** are **explicitly not intended** for the application:



- Stirring and warming of flammable liquids
- Warming of pressure-tight closed and NOT pressure resistant vessels or glasses
  (e.g. Erlenmeyer flasks, lab flasks)
- At general atmosphere or danger of explosion
- Using immersed in water or oil baths
- Using in incubators (lost heat of the stirrer)

The **2mag** is offering special products for the just mentioned application combinations. More information for this can be found at http://www.2mag.de or at info@2mag.de

2.5 Combinations of vessels

Please use round, chemical resistant and where required heat-resistant vessels made of glass or non-magnetic metal. You can use vessels up to the maximum size stated in the spreadsheet 1.
The vessels should have a thin, even wall thickness. Flat glass bottoms (without any curve to the inside) and smooth surfaces will improve the operating characteristic of the magnetic stirring bar. Uneven surfaces would reduce the stirring power and would cause reaming up of the stirring bar's gliding surface.
In case you intend to stir large amount of liquids, please chose such stirring flasks that have a comparatively small diameter and thin bottom. The magnetic stirring bar can then be centred better.

Magnetic Stirrer	**Stirring vessels**	**Nominal content**	**Max. amount**
MIX 1	Erlenmeyer flasks Beaker glass Lab flasks	max. 10.000 ml	1
MIX 6	Erlenmeyer flasks und lab flasks	25 ml 50/100 ml 250/500 ml 1000 ml 2000 ml 3000 ml	6 6 6 6 3 2
	beaker glass(high design)	25 ml 50 ml 100/250 ml 600/1000 ml 3000 ml	6 6 6 6 2
MIX 15 MIX 15 eco	Erlenmeyer flasks und lab flasks	25 ml 50/100 ml 250/500 ml 1000 ml 2000 ml 3000 ml	15 15 8/6 6 3 2
	beaker glass(high design)	25 ml 50 ml 100/250 ml 600/1000 ml 3000 ml	15 15 15 8 2
MIX 8 XL	Erlenmeyer flasks und lab flasks	25 ml 50/100 ml 250/500 ml 1000 ml 2000 ml 3000 ml	8 8 8 4 4 2
	beaker glass(high design)	25 ml 50 ml 100/250 ml 600/1000 ml 3000 ml	8 8 8 8/4 2
MIX 12 XL	Erlenmeyer flasks und lab flasks	25 ml 50/100 ml	12 12

		250/500 ml 1000 ml 2000 ml 3000 ml	12/6 6 3 2
	beaker glass(high design)	25 ml 50 ml 100/250 ml 600/1000 ml 3000 ml	12 12 12 12/6 2

Spreadsheet 1: Combination examples for vessels



Please always place the flasks in the magnetic centre of the magnetic stirrer. This will ensure the optimum stirring effect!



Do never use any pressure-tight closed flasks.

RISK OF BURSTING!



Do only use temperature-resistant vessels.
Be careful with plastic flasks!

2.6 Stirring bars

In general, all stirring bars matching the length and diameter can be used. But we recommend using the commercial stirring bars with Samarium Cobalt magnetic core (SmCo). By using this highly energetic magnetic material the maximum stirring power of the magnetic stirrer can be achieved, especially when mixing viscose media.

ASTEROID Stirring Bars
We recommend using 2mag –ASTEROID stirring bars to increase the stirring performance at enhanced requirements.

ASTEROID stirring bars a newly developed, high-effective and ideal for:

- large mixing volumes
- viscous media
- stirring over wide distances
- at disadvantageous vessel bottoms.

2mag ASTEROID stirring bars transmit more than 4x higher torque. Therefore the bars creating an unbeatable increased mixing effect in comparison to conventional stirring bars. The high energetic and long-term stable magnetic field does not have any demagnetization effect. The

concave design is made for a minimum of bearing surface and reliable rotation. Significantly higher rotation speed reachable! 300% less PTFE abrasion than comparable round shape stirring bars. The triangular shape raises the powerful shear force and increases the mixing effect at lower rotation speed.

The high quality PTFE cover is even and sealing the magnet, FDA-conform and steam sterilizable at 121°C.

2.7 Tips and hints to the topic stirring

The mixing flasks should be filled max. up to the middle (high speed range) resp. up to ¾ (low speed range).

Place one magnetic stirring bar in each stirring flask.

Place the stirring flasks right in the centre of the stirring point on the Stirring Hotplate resp. in one borehole of the Stirring Drybath.

In case the magnetic stirring bar turns in an unsteady or jerky way or bounces:
The interaction between the alternating magnetic field and the magnetic stirring bar is too high.

- Increase the speed or
- Use a smaller magnetic stirring bar or
- Decrease the stirring power.

In case the magnetic stirring bar will not be centred or leaves the centre permanently:
The interaction between the alternating magnetic field and the magnetic stirring bar is too low.
Or the stirring bar has a bottom that is uneven or too thick-walled.

Move the flask slightly back and for and centre it again onto the stirring point of the stirrer surface.

- Reduce the speed or use a longer magnetic stirring bar or one with a larger diameter or
- Use a smaller flask with a thin-walled, even bottom or
- Reduce the filling amount in the flasks or
- Increase the stirring speed.

In case the stirring activity is too weak:

- Use commercial magnetic stirring bars with SamariumCobalt-core.
- Use a longer stirring bar or a stirring flask with smaller diameter.



We recommend using 2mag – ASTEROID stirring bars to increase the stirring performance.

3. Installation

3.1 Safety advice

Please ensure the following basic conditions prior to installation:



The wear-free inductive drive works with magnetism. **Cardiac pacemakers, data storage mediums, magnetic cards and other devices,** which can be affected by magnetic fields, have to be kept away from the fields of the stirring unit as well as from the stirring bars.



The device must not be used in explosive rooms.
The power supply unit and the magnetic stirrer must not be dipped in water or any cleaning solutions.



Your supply voltage has to comply with the label of the power supply unit.



To increase the operation safety, the power supply unit should be placed apart from chemical materials and reactions as well as away from thermal influences.
For special requirements please contact info@2mag.de.



ATTENTION!
The power supply unit has to be disconnected, BEFORE you connect or disconnect the unit plug.



Always disconnect the power supply unit first before handling the connection cables.

3.2 Power supply

The equipment shall be supplied by a power source in accordance to IEC/EN/UL/CSA 61010-1 with limited-energy circuit or equivalent (e.g. LPS / NEC Class 2).

3.3 Installation, connection to the magnetic stirrer

Step by step instruction (please also see image 2)

- Take the smaller wire (2) of the power supply unit (1) and connect the round plug (3) with the socket (4) at the backside of the magnetic stirrer (7).
- Connect the power cable (5) to the power supply unit (1) and afterwards to the power plug.
- The magnetic stirrer is now connected to the power supply unit and ready for operation.

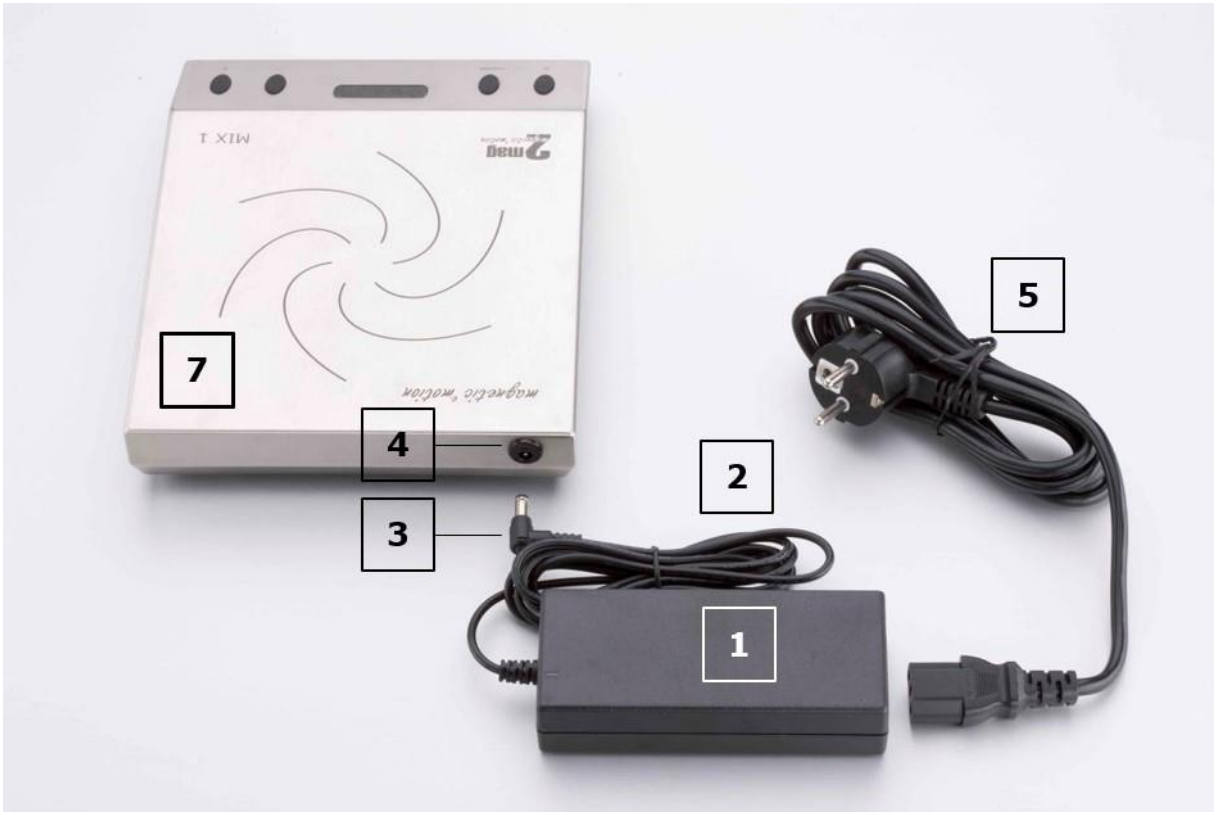


Image 2: Installation, rear side of the magnetic stirrer MIX 15

Description functional elements of control unit - backside

1 Power supply unit (100-240 volts)
2 Low voltage cable between power supply unit and magnetic stirrer
3 Low voltage plug
4 Low voltage socket at magnetic stirrer
5 Power cord

7 Magnetic stirrer

4. Operating of the magnetic stirrer MIX 1/6/15/15 eco

The operation of the stirrers **MIX1, MIX 6, MIX 15, MIX 15 eco, MIX 8 XL and MIX 12 XL** is identical!



Image 3: Operating elements, magnetic stirrer MIX 1/6/15/15 eco

4.1 Description operating elements

7 Magnetic stirrer MIX 15 (operation identical with MIX 1/6/15 eco/8 XL/12 XL)

Stirrer control

8 ON/OFF key for magnetic stirrer
9 MODE-key for power adjustment of the magnetic stirrer (not available at MIX 15 eco)
10 Display for speed indicator and power indicator
11 MINUS-key (-) for reduction of stirrer speed
12 PLUS-key (+) for increase of the stirrer speed

Operating of the magnetic stirrer

After the cables have been installed correctly according to **Installation, connection to the magnetic stirrer**, the magnetic stirrer **MIX 1/6/15/15 eco** will be ready for operation.

4.2 Stirring operation and stirrer control

Turning On and Off
Please press the ON/OFF-key (8) once. The magnetic stirrer will be switched on by that. The current stirring speed will be shown in the display (10).
By pressing the ON/OFF-key (8) once more, the magnetic stirrer will be switched off again. The display indicator (10) expires.

SoftStart
After the magnetic stirrer was switched on, the stirring bars in the flasks will first be caught, afterwards centred in the flask and then – to increase the operating safety – be smoothly accelerated to the set speed accurately.
The accelerating phase will be shown by the illumination of a dot at the right segment of the LED-display (10).

Stirrer speed adjustment
The speed of the magnetic stirrer can be adjusted by pressing the MINUS- (11) resp. the PLUS-key (12).
The adjusted speed will be shown in the display (10) when the magnetic stirrer is switched on. The speed range can be adjusted between 100 and 2000 rpm in steps by 10 for the magnetic stirrers MIX 1, MIX 6 and MIX 15. For the magnetic stirrers MIX 8 XL and MIX 12 XL it is adjustable between 100 and 1600 rpm and for magnetic stirrer MIX 1 eco between 100 and 1200 rpm.
By constantly pressing the MINUS- resp. the PLUS-keys, an accelerated adjustment of the speed can be achieved.

QuickSet
To enter the start- respectively maximum speed directly and quickly there is the Quickset-function available.
The use of the following described keys will be made with the stirrer turned on.
Setting the Start Speed
Press the MINUS-key (11) permanently and press shortly the ON/OFF-key (8) afterwards. The start speed “100” will be set.
Setting the Maximum Speed
Press the PLUS-key (12) permanently and press shortly the ON/OFF-key (8) afterwards. The maximum speed “2000” will be set.

Power adjustment (not available for MIX 15 eco)
A newly developed and extremely efficient magnetic stirrer will come into operation.
The inductive drive concept causes an operational heat output by the magnetic stirrer. To reduce the heat output the power of the magnetic stirrer can be adjusted.
A **high power** setting is necessary to mix viscose media and large amounts to be stirred in a strong and efficient way.
A **low power** setting guaranties a warming-free long-term use for example of aqueous probes at room temperature.

The stirring power can be adjusted in four steps by using the MODE-key (9). By pressing the MINUS-key (11) respectively the PLUS-key (12) just after pressing the MODE-key, the power can be adjusted between 25/50/75/100%.

The current value is now shown on the display (10). The display (10) will turn back to the current speed indicator after approx. 5 seconds.
The power adjustment is finished again at the time the speed range is shown.
The power adjustment can also be finished immediately by pressing the MODE-key (9) again.

Display, Magnetic Stirrer
The display (10) provides as described above a description of:

- Current stirring speed (always with switched on magnetic stirrer)
- Set power (after pressing the MODE-key (9))
- To check, whether the magnetic stirrer is switched on. The display will not be illuminated in case the stirrer is switched off.



The wear-free inductive drive works with magnetism. **Cardiac pacemakers, data storage mediums, magnetic cards and other devices,** which can be affected by magnetic fields, have to be kept away from the fields of the stirring unit as well as from the stirring bars.

4.3 Operation differences of MIX 15 eco

Please note following operation differences at **MIX 15 eco**:

The MODE-key (9) is not available. The stirring power of MIX 15 eco is not changeable.
The stirring power is fixed at 10 watts.

The start speed is 120 rpm.
The maximum speed is 1200 rpm.

All other functions are unlimited available.

4.4 Warning notices:



The magnetic stirrers MIX 1, MIX 6, MIX 15, MIX 15 eco, MIX 8 XL and MIX 12 XL are not suitable for using in water baths, incubators, ovens and humid atmosphere!

5. Accessories

ASTEROID stirring bars

To increase the stirring performance, we recommend the use of 2mag **ASTEROID** magnetic stirring bars.



Image 4: ASTEROID family

We recommend:

ASTEROID 25 (order no. 44025) for MIX 15 / MIX 15 eco / MIX 8 XL / MIX 12 XL.

ASTEROID 40 (order no. 44040) for MIX 1 / MIX 6.

B Maintenance, Cleaning and Care



Do not use any cleaning agent or cleaning rag that is based on chlorine with metallic components or ammoniac.
These agents may harm the surface.



The magnetic stirrer must not be dipped in water or any cleaning solutions.

2mag devices are generally maintenance-free.

Due to their construction the **2mag** devices are very robust and designed for the professional daily use.

We recommend cleaning the devices' surfaces with e.g. cleaning agents containing tensides or isopropyl alcohol regularly.

BEFORE cleaning the surfaces, switch off the device with the power switch and pull out the power cable afterwards.

C Protection against released gases and substances

The occupational exposure limit value (OEL) is the limit value for the time-weighted average concentration of a substance in the air at the workplace in relation to a given reference period.
It indicates the concentration of a substance up to which acute or chronic harmful effects on health are generally not to be expected.

Information on exposure limits and handling and storage regulations for substances can be found in OSHA publications. Local, national or regional regulations may also apply.

D Service case and customer service



During service, the device may only be opened by an authorized customer service.

In case of any defect on the device, please make sure to contact us first. We will be ready to offer help quickly and straightforward.

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Warranty:

Due to their construction, the **2mag** devices are very robust and designed for the professional daily use.

The magnetic drive works without any mechanically moved parts as e.g. belts, bearings or motors. Therefore a maximum of reliability within daily use is achieved.

Should in any case, despite our strict quality control, a system part not work without any fault, it can be repaired or exchanged by our customer service without any problems.

We guarantee 3 years warranty on all material and manufacturing defects.

E Errors

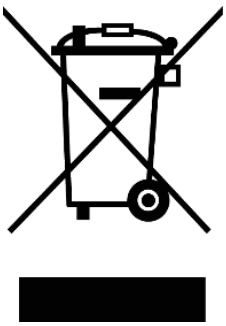
The magnetic stirring bar is turning in an unbalanced way:
There is no denying that magnetic stirring bars are aging in the course of time. This may happen by e.g. sterilizing, usage at high temperatures or causing stress (dropping down). The magnetism can be decreased by this. Separate out this stirring bar and exchange it by a new one.

The magnetic stirrer is not ready for operation despite the power connection has been made:
Please get into contact with us.

In general, we are ready to help you in case of problems.
For any enquiries, questions or suggestions please do not hesitate to contact us at info@2mag.de

F Disposal

The WEEE Directive 2012/19/EU regulates the sale, take-back and proper disposal of waste electrical and electronic equipment within the European Union.



The symbol for the separate collection of electrical and electronic equipment is a crossed-out wheeled garbage can.

Disposal with household waste / municipal waste is not permitted!

Packaging materials must be disposed of in accordance with current local regulations.

G Technical details

Magnetic stirrer MIX 1

	MIX 1
Order no.	30001
Stirring points	1
Stirring volume	1 – 10,000 ml
Speed range	100 – 2,000 rpm
Stirring power (max.)	20 watts
Power setting	4-steps (5/10/15/20W)
Material housing	stainless-steel
Material sealing	PUR
Measurements (WxDxH)	188 x 238 x 38 mm
Weight (gross)	approx. 4.2 kg
Permitted operation conditions	-10 up to +50 °C (at 80% humidity)
Permitted storage conditions	-40 °C up to +70 °C, 10–95 %, 500-1060 hPa
Protection category	IP65
Operating voltage (max.)	48 VDC
Electrical data	100-240 V / 50-60 Hz / 1.5 A

Magnetic stirrer **MIX 6** and **MIX 15**

	MIX 6	**MIX 15**
Order no.	30006	30015
Stirring points	6	15
Stirring point distance	130 mm	65 mm
Stirring volume/point	1 – 3,000 ml	1 – 3,000 ml
Speed range	100 – 2,000 rpm	
Stirring power (max.)	20 watts	
Power setting	4-steps (5/10/15/20W)	
Material housing	stainless-steel	
Material sealing	PUR	
Measurements (WxDxH)	245 x 425 x 38 mm	
Weight (gross)	approx. 9,0 kg	
Permitted operation conditions	-10 up to +50 °C (at 80% humidity)	
Permitted storage conditions	-40 °C up to +70 °C, 10–95 %, 500-1060 hPa	
Protection category	IP65	
Operating voltage (max.)	48 VDC	
Electrical data	100-240 V / 50-60 Hz / 1.5 A	

Magnetic stirrer MIX 15 eco

	MIX 15 eco
Order no.	30115
Stirring points	15
Stirring volume	1 – 1,500 ml
Speed range	120 – 1,200 rpm
Stirring power (max.)	10 watts
Power setting	none
Material housing	stainless-steel
Material sealing	PUR
Measurements (WxDxH)	245 x 425 x 38 mm
Weight (gross)	approx. 9,0 kg
Permitted operation conditions	-10 up to +50 °C (at 80% humidity)
Permitted storage conditions	-40 °C up to +70 °C, 10–95 %, 500-1060 hPa
Protection category	IP65
Operating voltage (max.)	48 VDC
Electrical data	100-240 V / 50-60 Hz / 1.5 A

Magnetic stirrer **MIX 8 XL** and **MIX 12 XL**

	MIX 8 XL	**MIX 12 XL**
Order no.	30208	30212
Stirring points	8	12
Stirring point distance	90 mm	
Stirring volume/point	1 – 3,000 ml	
Speed range	100 – 1,600 rpm	
Stirring power (max.)	20 watts	
Power setting	4-steps (5/10/15/20W)	
Material housing	stainless-steel	
Material sealing	PUR	
Measurements (WxDxH)	185 x 420 x 38 mm	275 x 420 x 38 mm
Weight (gross)	approx. 7.8 kg	approx. 10.2 kg
Permitted operation conditions	-10 up to +50 °C (at 80% humidity)	
Permitted storage conditions	-40 °C up to +70 °C, 10–95 %, 500-1060 hPa	
Protection category	IP65	
Operating voltage (max.)	48 VDC	
Electrical data	100-240 V / 50-60 Hz / 1.5 A	

Accessory Magnetic Stirring Bar ASTEROID

	ASTEROID 25	**ASTEROID 40**
Order no.	44025	44040
Shape	triangle, convex	triangle, convex
Material	PTFE	PTFE
Measurement (HxL, D)	14 x 25 mm, Ø 16 mm	28 x 40 mm, Ø 33 mm
Weight (gross)	approx. 0.07 kg	approx. 0.12 kg

H EU-Declaration of conformity for technical devices

(acc. to EU-guideline of the electromagnetic compatibility 2014/30/EU and the low voltage directive 2014/35/EU)

2mag AG
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Hereby declares that the product

MIX 1 / 6 / 15 / 15 eco / MIX 8 XL / MIX 12 XL

is conform to the appropriate regulations of the EU-guideline of the electromagnetic compatibility (EU-guideline 2014/30/EU) as well as the low voltage directive (2014/35/EU) incl. their changes and the laws for the realization of the guideline into national law.

The declaration is valid under the following conditions:
The ambient conditions being stated in the operation manuals have to be adhered to. This mainly applies to the supply with electric energy.

The following norms/standards were chosen to evaluate the finished products with regard to electromagnetic compatibility:

- DIN EN 61000-3-2:2014
- DIN EN 61000-3-3:2013
- DIN EN 61326:2013

The following norms/standards were chosen to evaluate the finished products with regard to low voltage directive:

- IEC 61010-1:2010
- EN 61010-1:2010