

# Operation Manual

English



**steriMIXdrive**  
**steriMIXcontrol**

with

**Order no.: 40700**  
**Order no.: 95200**

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## Includes:

Quick start  
Operation Manual  
Technical Documentation  
Specifications

## **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](mailto: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.

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# A Quick start

## 1. Overview of your product

### Magnetic stirrer steriMIXdrive with control unit steriMIXcontrol



Image 1: magnetic stirrer steriMIXdrive with control unit steriMIXcontrol

Your product contains at despatch:

- A modern magnetic stirring system (**steriMIXdrive**) consisting of a stainless steel stirring plate with 1 stirring point with fixed stirrer control cable (4-pin plug, with screw nut)
- Screwed easyMOUNT plug coupling for quick installation of the stirrer cable through a pressure and steam tight grommet
- An external control unit with one connector socket (**steriMIXcontrol**) for connection of the stirrer control cables as well as a pluggable power cable (country-specific).

## **2. Applications**

### **2.1 Operator**

The 100% maintenance- and wear-free magnetic stirrer **steriMIXdrive** 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 close and therefore immersible. The maximum ambient temperature is +150°C in air and +150°C in water immersed. Moreover, the magnetic stirrer steriMIXdrive is pressure, steam and steam resistant and therefore usable in steam sterilizers.

**When using the magnetic stirrer steriMIXdrive in sterilizers, a pressure and steam tight grommet is required for proper operation.**

**The pressure and steam tight grommet, located on the wall of the sterilizer, allows the steriMIXdrive cable to pass through into the pressurized autoclave chamber, while maintaining the pressure within the chamber.**

**In most cases, sterilizers are already equipped with blank flanges to lance cables or temperature sensors into the chamber. This flange can be used for the steriMIXdrive cable as well.**



**Please contact the service technician of your sterilizer manufacturer to ensure a safe and pressure tight operation!**

### **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
- Water baths
- Incubators
- Steam sterilizers

Please note: For using the stirrer in incubators please set the adjustable stirring power to the minimum usable power to reduce the additional heating effect caused by the magnetic stirring drive. Please see chapter "5 External heating operations in incubators and water baths".

## 2.4 Application not for the intended use

The magnetic stirrer **steriMIXdrive** is **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

The **2mag** is offering special products for the just mentioned application combinations. More information for this can be found at [www.2mag.de](http://www.2mag.de) or at [info@2mag.de](mailto: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
steriMIXdrive	Erlenmeyer flasks beaker glasses lab flasks	40.000 ml	1

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.

## **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  $\frac{3}{4}$  (low speed range).

Place one magnetic stirring bar in each stirring flask.

Place the stirring flasks right in the centre of the stirring point.

### **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 forth 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 control unit MIXcontrol must not be dipped in water or any cleaning solutions.



Your supply voltage has to comply with the label of the control unit. The **control unit** has to be **switched off** before any power connection or power disconnection.



To increase the operation safety, the control 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](mailto:info@2mag.de).



**ATTENTION!**  
**The control unit has to be switched off, BEFORE you connect or disconnect the plugs.**



**Always turn off the power switch first before handling the connection cables.**



**The installation into the sterilizer is allowed only by authorized and trained personal!**



**The stirrer cable has to be passed through a firmly installed steam and pressure tight grommet.**

**For a quick and safe installation through pressure and steam tight grommets, an easyMOUNT plug coupling is integrated in the cable.**

**After opening of the easyMOUNT housing, the part of the cable with the plug (length 50 cm) can be unplugged, the stirrer cable (150 cm) can be passed through the steam and pressure tight grommet and both cable parts can be reconnected.**

### **3.2 Installation into a steam sterilizer – easyMOUNT plug coupling**

The installation into the sterilizer is allowed only by authorized and trained personal!

The stirrer cable has to be passed through a firmly installed steam and pressure tight grommet.

For a quick and safe installation through pressure and steam tight grommets, an easyMOUNT plug coupling is integrated in the cable. After opening of the easyMOUNT housing, the part of the cable with the plug (length 50 cm) can be unplugged, the stirrer cable (150 cm) can be passed through the steam and pressure tight grommet and both cable parts can be reconnected.

#### **Installation steps of the easyMOUNT plug coupling**

- Unscrew the two cross-head screws of the easyMOUNT housing.
- Remove the housing cover and carefully lift out the cable.
- Pull apart the cable part with the plug from the cable part which is firmly fixed to the stirring drive by pull apart of the small plug-in connector.
- Positioning of the steriMIXdrive in the chamber of the sterilizer.
- Pass the stirrer cable through the pressure and steam tight grommet.
- Reconnect both parts of the cable on the small plug-in connector.
- Carefully place the cable into the easyMOUNT housing.
- Close the housing and screw the Phillips screws.



*Image 2: steriMIXdrive – Stirrer cable with easyMOUNT plug coupling*

### 3.3 Installation, connection to the control unit steriMIXcontrol

Step by step instruction (please also see image 3)



- **Switch off the control unit steriMIXcontrol BEFORE you handle the connection cables with the power switch (5) and disconnect the power cable (4)!**
- The stirrer control cable (1) of the magnetic stirrer steriMIXdrive has now to be connected to the 4-pin socket of the control unit (2).  
**Please secure this plug connection by turning the screw nut situated at the plug.** Only by this a trouble-free operation can be guaranteed.
- Connect the power cable (4) to the power input (3) rear-side and afterwards to the power socket.
- The control unit is now connected to the magnetic stirrer and ready for operation.

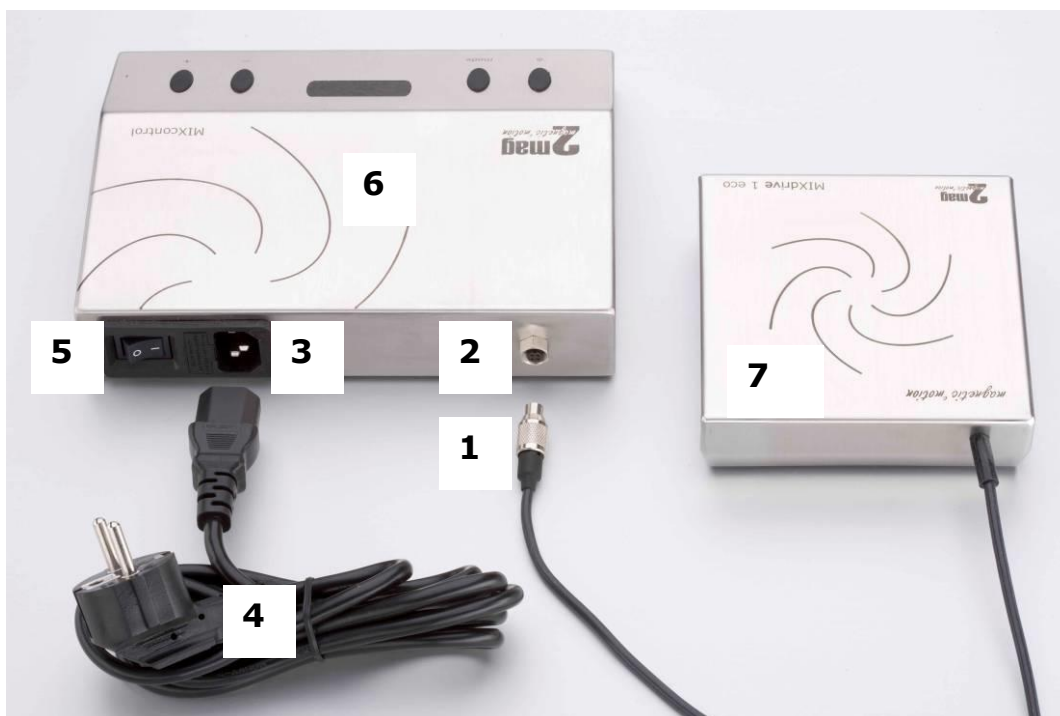


Image 3: Installation, rear side of the control unit MIXcontrol 20 (analogous to steriMIXdrive with steriMIXcontrol)

#### Description functional elements of control unit - backside

- 1 Connector of the stirrer control cable
- 2 Socket for the stirrer control cable
- 3 Power socket
- 4 Power cable
- 5 Power switch
- 6 Control unit 2mag steriMIXcontrol
- 7 Stirring drive unit 2mag steriMIXdrive

## 4. Operating of the control unit

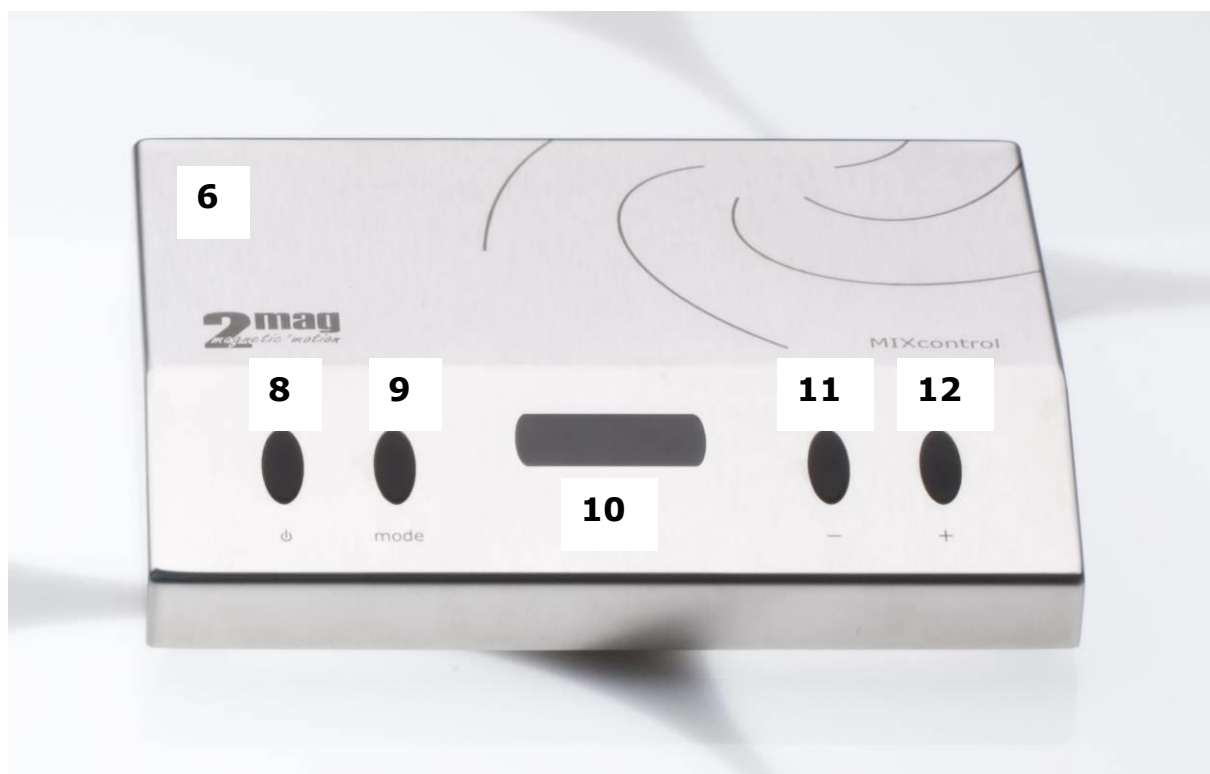


Image 4: Control unit steriMIXcontrol

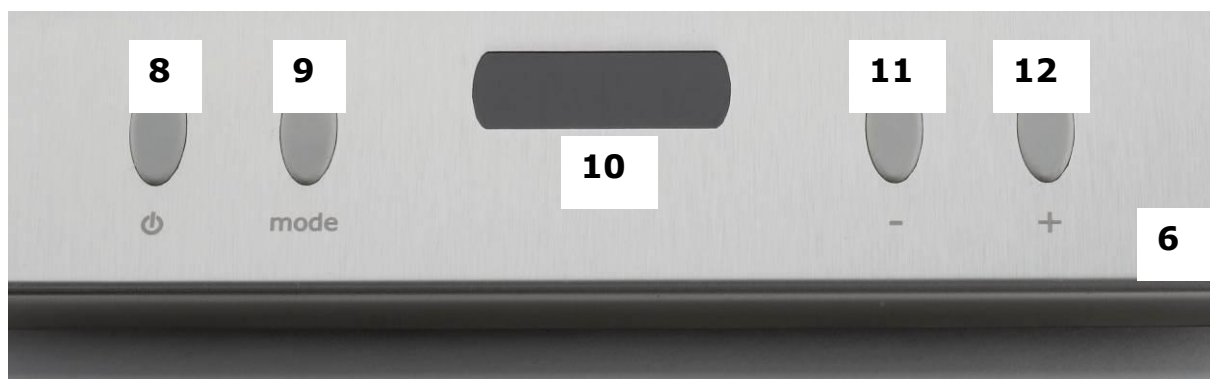


Image 5: Close-up, operating elements control unit steriMIXcontrol

### 4.1 Description operating elements steriMIXcontrol

#### Stirrer control

- 8 ON/OFF key for magnetic stirrer
- 9 MODE-key (M) for power adjustment of the magnetic stirrer
- 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 control unit**

After the cables have been installed correctly according to "**Installation, Connection to the control unit**", the magnetic stirrer system steriMIXdrive will be ready for operation.

### **4.2 Stirring operation and stirrer control steriMIXcontrol**

#### **Turning On and Off**

Please turn on the power switch (5) at the rear side of the control unit steriMIXcontrol.

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 1,200 rpm in steps by 10.

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 "1200" will be set.

## Interval

The interval function allows a defined restart of the stirrer after running a defined time. The interval time is adjustable in a range from 0 to 240 seconds in steps by 2.

The acceleration can be adjusted by using the MODE-key (9). Press the MODE-key until the letter "I" is shown in the display.

The acceleration can be set in steps by 2 from 0 to 240 seconds by pressing the MINUS- (11) resp. PLUS-key (12) afterwards.



**Note: „0“ = Interval OFF**

The current value is now shown on the display (10).

„I 0“ seconds means the interval function is OFF.

„I 6“ seconds is the shortest interval time.

„I240“ seconds is the longest interval time.

The display (10) will turn back to the current speed indicator after approx. 5 seconds. The interval adjustment is finished again at the time the speed range is shown.

The interval adjustment can also be finished immediately by repeated pressing the MODE-key (9) again.

## Acceleration adjustment – Variable SoftStart

A newly developed and extremely efficient magnetic stirrer will come into operation.

To raise the operation safety the acceleration of the magnetic stirrer can be set in 4 steps by seconds (20/30/60/120 seconds).

The indication of e.g. 20 sec. refers to the time period from the moment of switching on until the max. speed is reached.

A **fast acceleration** of the stirrer is recommended for small stirring amounts as well as aqueous media.

A **slow acceleration** is recommended for a safe increase of the stirrer's running with regard to large volume, highly viscous media and stirring over far distances. With this setting the possibility of a separation of the magnetic coupling during the acceleration phase is minimized.

The acceleration can be adjusted in four steps by using the MODE-key (9). Press the MODE-key until the letter "A" is shown in the display.

The acceleration can be set in 4 steps by seconds (20/30/60/120 seconds) by pressing the MINUS- (11) resp. PLUS-key (12) afterwards.

The current value is now shown on the display (10).

"A 20" is the quickest acceleration.

"A 120" is the slowest acceleration.

The display (10) will turn back to the current speed indicator after approx. 5 seconds. The acceleration adjustment is finished again at the time the speed range is shown.

The acceleration adjustment can also be finished immediately by repeated pressing the MODE-key (9) again.

### **mixWATCH – Stirring Bar Monitoring**

The Magnetic Stirrer steriMIXdrive is equipped as standard with a newly developed stirring bar control. In case of the magnetic coupling's separation between the magnetic stirrer and the stirring bar during the acceleration phase, the magnetic stirrer will be stopped and started again with the same stirring speed.



#### **Hint:**

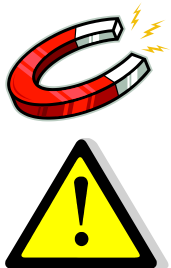
This function mixWATCH operates at  $\geq 600$  rpm.  
mixWATCH is always active and cannot be turned-off.

### **Display, Magnetic Stirrer**

The display (10) provides as described above a description of:

- Current stirring speed (always with switched on magnetic stirrer)
- Current interval time "I" (after pressing the MODE-key (9)) → Display shows the letter "I"
- To check, whether the magnetic stirrer is switched on. The display will not be illuminated in case the stirrer is switched off.

**Attention:** In case the set interval time is shorter than the set acceleration time, the stirrer might possibly NOT reach the set speed level.



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 fields of the stirring unit as well as from the stirring bars.



### **4.3 Accessory – Extension Cord for MIXdrive**

With the accessory **Extension Cord for MIXdrive series** (order no. 46100) the control wire of the stirrer can be extended by 3m.

Other lengths on request!

**Hint: The extension cord is only allowed to be used outside the steam chamber of the sterilizer!**

## **5. Maximum operation temperatures**



### ➤ **Incubator or steam sterilizer operation**

Please note the **maximum operation temperature +150 °C** in air for the steriMIXdrive.

Higher temperatures can cause damage of the stirring drive!

**If using a sterilizer with bottom heating, do not place the steriMIXdrive directly on the bottom plate of the sterilizer (minimal distance 5 mm)!**



### ➤ **Water or oil bath operation:**

Please note the **maximum operation temperature +150 °C** submersed in water or oil for the steriMIXdrive.

Higher temperatures can cause damage of the stirring drive!

## 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 control unit 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 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.

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 grant 3 years warranty on all material and manufacturing defects.**

## D 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 control unit is not ready for operation despite the power connection has been made and the power switch had been turned on:**

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](mailto:info@2mag.de)

## E Technical details

### Magnetic stirrer steriMIXdrive

	<b>steriMIXdrive</b>	<b>steriMIXcontrol</b>
Order no.	40700	95200
Stirring points	1	-
Stirring volume/point	1 - 40 Liter	-
Stirring power (max.)	-	20 Watt
Stirring power (max.)	-	100 - 1,200 rpm
Acceleration	-	variable, 20/30/60/120 s
Interval	-	variable, 0 - 240 s
Material Housing	PPSU, hermetically closed	stainless-steel
Cable length / diameter	2 m / 3.9 mm	-
Measurement (WxDxH)	140 x 140 x 32 mm	200 x 155 x 38 mm
Weight (gross)	approx 1.5 kg	approx. 1.9 kg
Permitted operation conditions (air)	-10 to +150 °C (at 100% humidity)	0 up to +40 °C (at 80% humidity)
Permitted pressure/steam	+ 3 bar / -1 bar	
Max. sterilizing temperature	+150°C	
steam conditions	saturated steam	
Permitted storage conditions	-40 °C bis +70 °C, 10 – 95 %, 500 - 1060 hPa	
Protection category	IP68	IP20
Operating voltage (max.) / Electrical date	24 VDC	100-240 V 50-60 Hz/1,5 A



Image 6: Magnetic stirrer steriMIXdrive with steriMIXcontrol

## Accessory Extension Cord for MIXdrive

	Extension Cord MIXdrive
Order no.	46100
Material	silicone cover, wires PTFE-covered
Length	3 m
Weight (gross)	approx. 0.15 kg

**Hint: The extension cord is only allowed to be used outside the steam chamber of the sterilizer!**

## Accessory Magnetic Stirring Bar ASTEROID 40

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

## Accessories – Magnetic stirring bar SATELLITE 70

	SATELLITE 70
Order no.	44700
Shape	Round, tripod
Material	PTFE
Dimensions D x L stirring bars	Ø 13 x 70 mm
Diameter tripod construction	Ø 99 mm
Weight (gross)	approx. 0.15 kg



Image 7: Stirring bar ASTEROID 40



Image 8: Stirring bar SATELLITE 70

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# 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**  
Schragenhofstraße 35 J  
DE-80992 Muenchen  
GERMANY

Hereby declares that the product

**steriMIXdrive**

incl.  
**steriMIXcontrol**

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
- DIN EN 61000-3-3
- DIN EN 61326-1
- DIN EN 60529

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

- DIN EN 61010-1
- DIN EN 61010-2-51

Muenchen, 20.04.2016

Signature: \_\_\_\_\_



Dr. Klaus Kaufmann (CTO)