

# Operation Manual

English



|                                       |                         |
|---------------------------------------|-------------------------|
| <b>cuvetteMIXdrive 1</b>              | <b>Order no.: 40400</b> |
| <b>MIXdrive 1 XS</b>                  | <b>Order no.: 40300</b> |
| <b>MIXdrive 1 eco</b>                 | <b>Order no.: 40101</b> |
| <b>MIXdrive 1</b>                     | <b>Order no.: 40001</b> |
| <b>MIXdrive 6</b>                     | <b>Order no.: 40006</b> |
| <b>MIXdrive 15</b>                    | <b>Order no.: 40015</b> |
| <b>MIXdrive 60</b>                    | <b>Order no.: 40060</b> |
| <b>MIXdrive OEM</b>                   | <b>Order no.: 4xxxx</b> |
| <br>                                  |                         |
| <b>MIXdrive 1 XS HT</b>               | <b>Order no.: 40303</b> |
| <b>MIXdrive 1 eco HT</b>              | <b>Order no.: 40301</b> |
| <b>MIXdrive 1 HT</b>                  | <b>Order no.: 40201</b> |
| <b>MIXdrive 6 HT</b>                  | <b>Order no.: 40206</b> |
| <b>MIXdrive 15 HT</b>                 | <b>Order no.: 40215</b> |
| <b>MIXdrive 60 HT</b>                 | <b>Order no.: 40260</b> |
| <b>MIXdrive OEM HT</b>                | <b>Order no.: 4xxxx</b> |
| <br>                                  |                         |
|                                       | with                    |
| <b>MIXcontrol eco</b>                 | <b>Order no.: 90100</b> |
| <b>MIXcontrol eco DINrail (Poti)</b>  | <b>Order no.: 90140</b> |
| <b>MIXcontrol eco DINrail (0-10V)</b> | <b>Order no.: 90150</b> |
| <b>MIXcontrol eco DINrail (RS232)</b> | <b>Order no.: 90160</b> |
| <b>MIXcontrol 20</b>                  | <b>Order no.: 90200</b> |
| <b>MIXcontrol 20 RS232</b>            | <b>Order no.: 90210</b> |
| <b>MIXcontrol 20 DINrail (0-10V)</b>  | <b>Order no.: 90220</b> |
| <b>MIXcontrol 20 DINrail (RS232)</b>  | <b>Order no.: 90221</b> |
| <b>MIXcontrol 40</b>                  | <b>Order no.: 90400</b> |
| <b>MIXcontrol 40 RS232</b>            | <b>Order no.: 90410</b> |
| <b>MIXcontrol 40 DINrail (0-10V)</b>  | <b>Order no.: 90420</b> |
| <b>MIXcontrol 40 DINrail (RS232)</b>  | <b>Order no.: 90421</b> |

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**Includes:**

Quick start  
Operation Manual  
Technical Documentation  
Specifications

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## **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 MIXdrive with control unit MIXcontrol



Image 1: 15-position magnetic stirrer MIXdrive 15 with control unit MIXcontrol 40

Your product contains at despatch:

- A modern inductive magnetic stirring system (**MIXdrive**) consisting of a stainless steel stirring plate with 1, 6, 15 or 60 stirring points with fixed stirrer control cable (4-pin plug, with screw nut)
- An external control unit with one connector socket (**MIXcontrol eco / MIXcontrol 20**) respectively two connector sockets (**MIXcontrol 40**) for connection of the stirrer control cables as well as a pluggable power cable (country-specific) and with RS232 PC-interface (option).

## 2. Applications

### 2.1 Operator

The 100% maintenance- and wear-free magnetic stirrers **MIXdrive** 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 +50°C in air and +50°C in water immersed.

The maximum ambient temperature of the high temperature versions (**MIXdrive HT-series**) is +200°C in air and +95°C in water immersed.

### 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

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" at page 23.

### 2.4 Application not for the intended use

The magnetic stirrers **MIXdrive** 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

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.

| <b>Magnetic Stirrer</b>             | <b>Stirring vessels</b>                           | <b>Nominal content</b>   | <b>Max. amount</b>             |
|-------------------------------------|---|--|--------------------------------|
| cuvetteMIXdrive 1                   | cuvettes  | up to 25 ml  | 1                              |
| MIXdrive 1 XS<br>MIXdrive 1 XS HT   | lab flasks<br>beaker glasses                      | 1,000 ml   | 1                              |
| MIXdrive 1 eco<br>MIXdrive 1 eco HT | Erlenmeyer flasks<br>lab flasks<br>beaker glasses | 3,000 ml   | 1                              |
| MIXdrive 1<br>MIXdrive 1HT          | Erlenmeyer flasks<br>lab flasks<br>beaker glasses | 10,000 ml  | 1                              |
| MIXdrive 6<br>MIXdrive 6 HT         | Erlenmeyer flasks<br>and lab flasks               | 25 ml<br>50/100 ml<br>250/500 ml<br>1,000 ml<br>2,000 ml<br>3,000 ml | 6<br>6<br>6<br>6<br>3<br>2     |
|                                     | beaker glasses<br>(high design)                   | 25 ml<br>50 ml<br>100/250 ml<br>600/1000 ml<br>3,000 ml              | 6<br>6<br>6<br>6<br>2          |
| MIXdrive 15<br>MIXdrive 15 HT       | Erlenmeyer flasks<br>and lab flasks               | 25 ml<br>50/100 ml<br>250/500 ml<br>1,000 ml<br>2,000 ml<br>3,000 ml | 15<br>15<br>8/6<br>6<br>3<br>2 |
|                                     | beaker glasses<br>(high design)                   | 25 ml<br>50 ml<br>100/250 ml<br>600/1000 ml<br>3,000 ml              | 15<br>15<br>15<br>8<br>2       |
| MIXdrive 60<br>MIXdrive 60 HT       | Reaction vessels<br>small volume glasses          | 50 ml  | 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  $\frac{3}{4}$  (low speed range).

Place one magnetic stirring bar in each stirring flask.

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

### 3.2 Installation, connection to the control unit MIXcontrol eco Step by step instruction (please also see image 2 and 3)



- **Switch off the control unit MIXcontrol eco BEFORE you handle the connection cables by disconnection of the power supply unit (1) and the low-voltage power cable (2)!**
- The stirrer control cable (8) of the magnetic stirrer MIXdrive has now to be connected to the 4-pin socket of the control unit (7). **Please secure this plug connection by turning the screw nut situated at the plug.** Only by this a trouble-free operation can be guaranteed.
- Take the low-voltage power cable (2) of the power supply unit (1) and connect the plug (3) to the power input socket (4) of the control unit (5).
- Connect the power supply unit (1) with power socket
- The control unit is now connected to the magnetic stirrer and ready for operation.

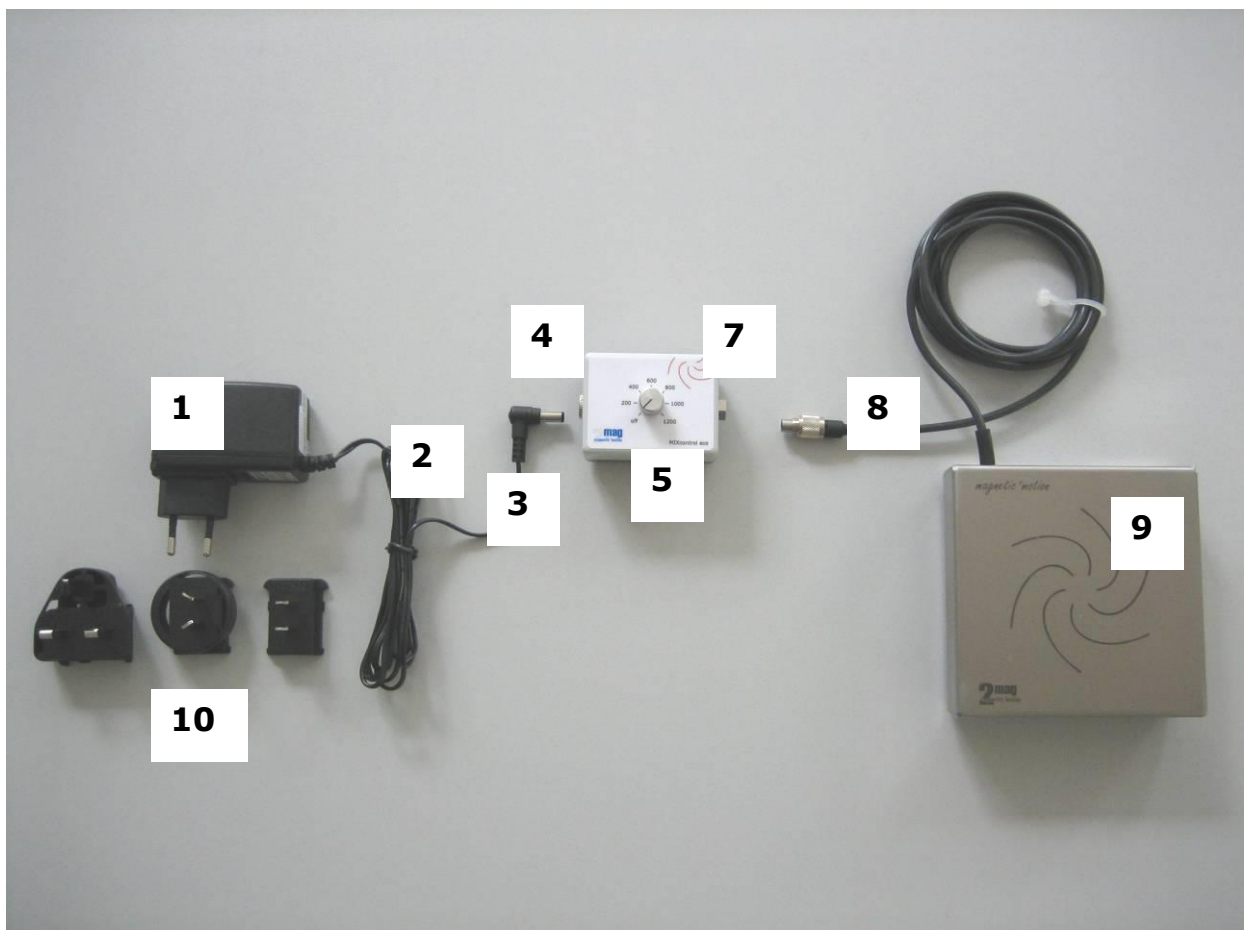


Image 2: Installation, magnetic stirrer MIXdrive with control unit MIXcontrol eco

## Description functional elements of control unit MIXcontrol eco

- 1 Power supply unit (Input 100-240 V / 50-60 Hz / 0.75 A;  
Output: 24 V /15 W)
- 2 Low-voltage cable between power supply unit and control unit
- 3 Low-voltage connector of the stirrer control cable
- 4 Low-voltage socket for the stirrer control cable
- 5 Control unit MIXcontrol eco
- 6 Speed control (rpm)
- 7 Socket for control cable for the magnetic stirrer
- 8 Control cable of the magnetic stirrer
- 9 Magnetic stirrer
- 10 Changeable country-specific power adapter  
(content of delivery)

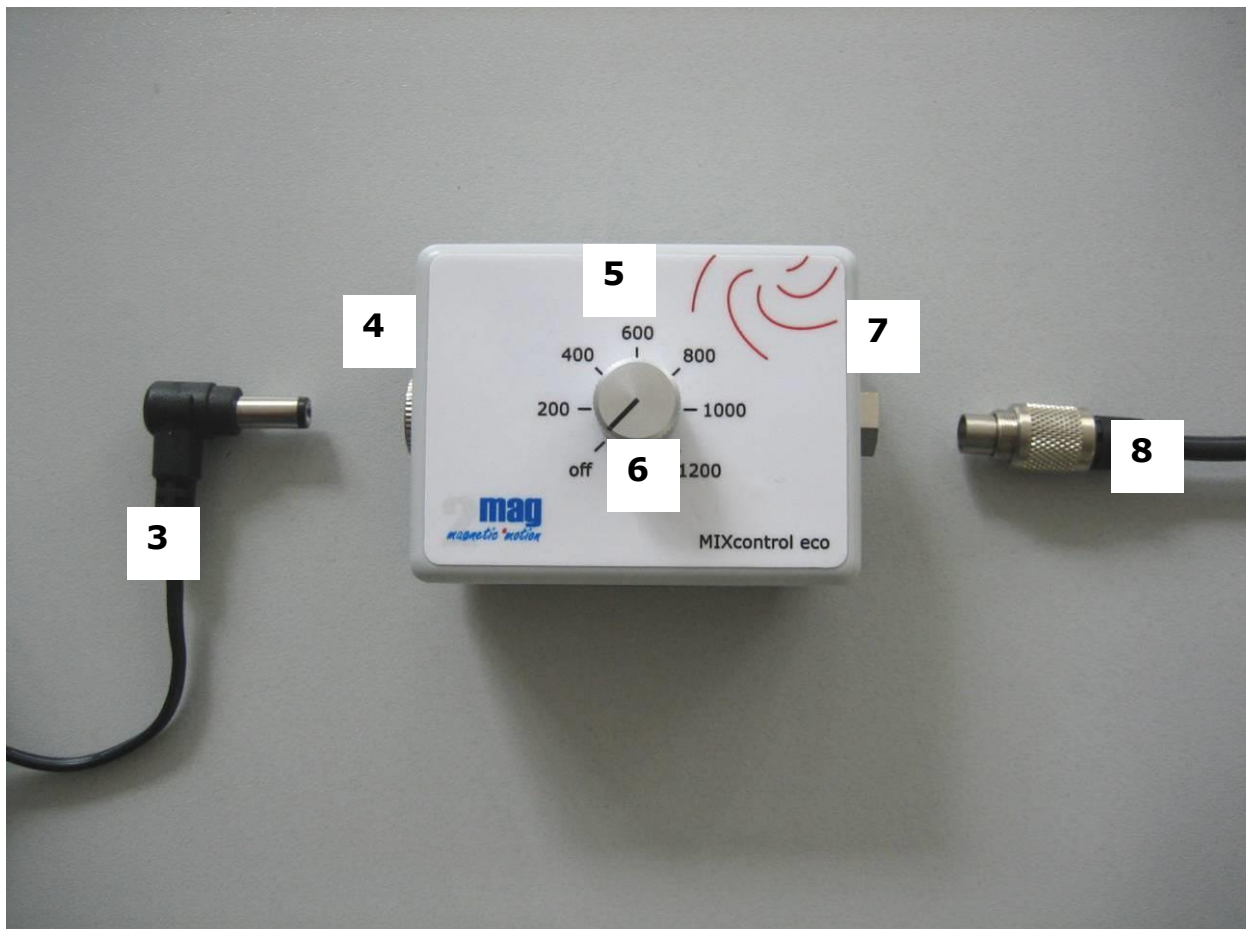


Image 3: Installation, close-up of control unit MIXcontrol eco

### 3.3 Installation, connection to the control unit MIXcontrol 20 Step by step instruction (please also see image 4a)



- **Switch off the control unit MIXcontrol 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 MIXdrive 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.

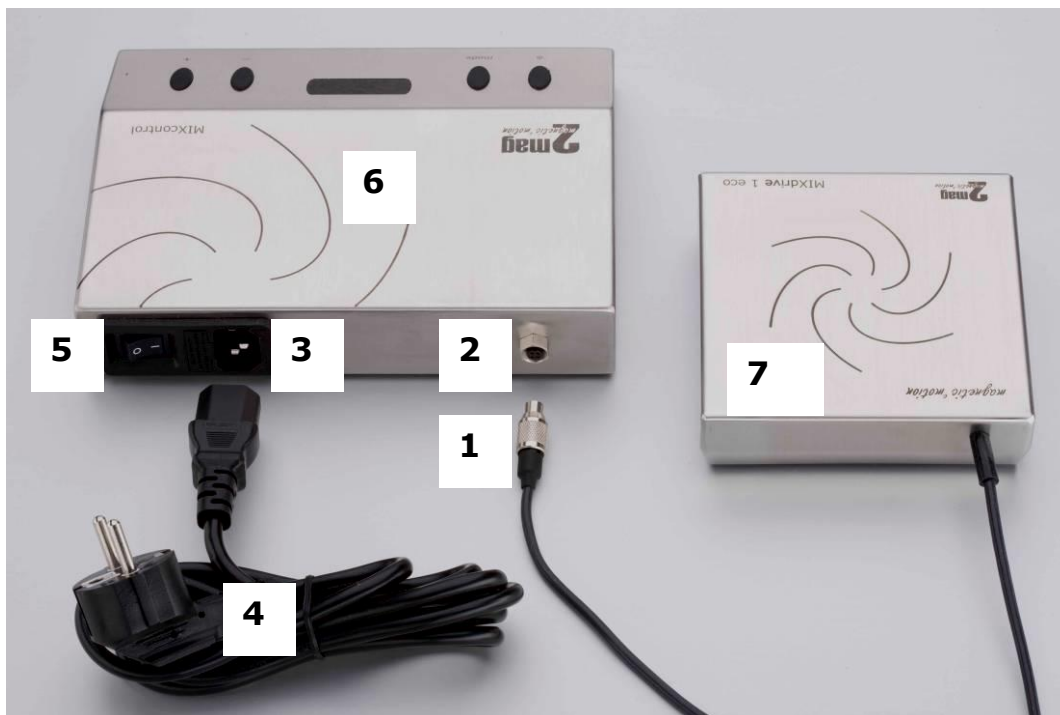


Image 4a: Installation, rear side of the control unit MIXcontrol 20

#### 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 – MIXcontrol 20
- 7 Stirring drive unit 2mag - MIXdrive

### 3.4 Installation, connection to the control unit MIXcontrol 40 Step by step instruction (please also see image 4b)



- **Switch off the control unit MIXcontrol 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 MIXdrive 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.  
It can be connected directly **up to two stirring drives MIXdrive of the identical type.**
- Connect the power cable (4) to the power input (3) rear-side and afterwards to the power plug.
- The control unit is now connected to the magnetic stirrer and ready for operation.

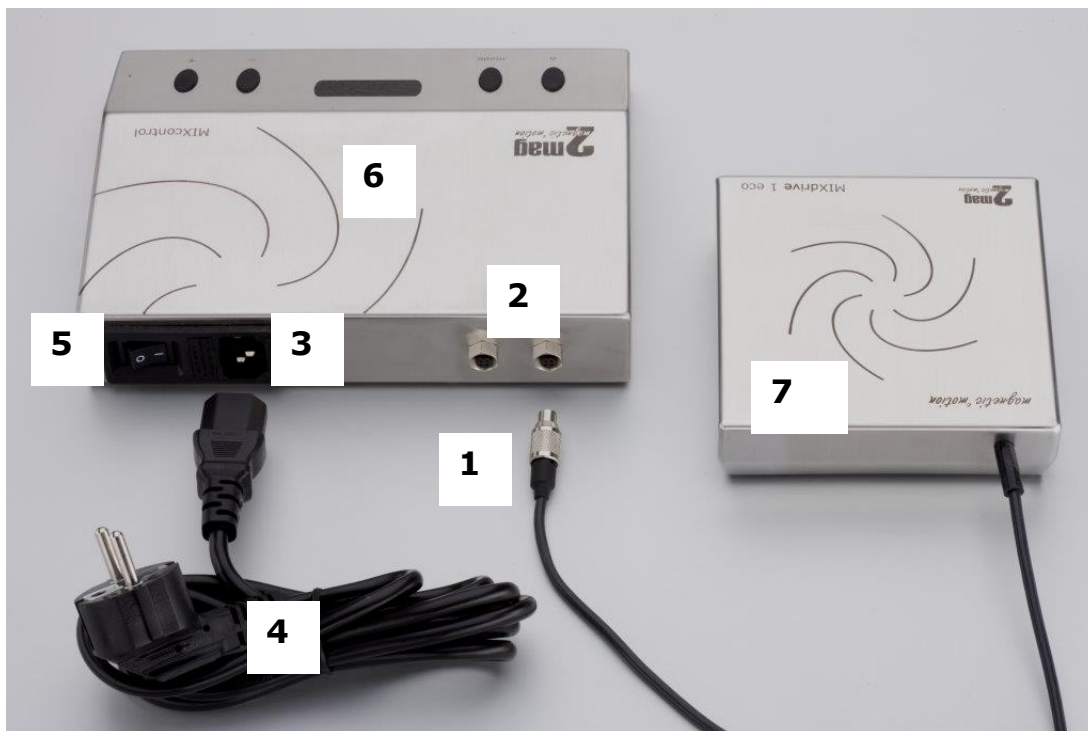


Image 4b: Installation, rear side of the control unit MIXcontrol 40

#### 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 - MIXcontrol 40
- 7 Stirring drive unit 2mag - MIXdrive

## 4. Operating of the control units

### 4.1. Operating of the control unit MIXcontrol eco



Image 5: Functional elements, control unit MIXcontrol eco

#### 4.1.1 Description functional elements MIXcontrol eco

- 5 Control unit 2mag - MIXcontrol eco
- 6 ON/OFF and SPEED-button



## Operating of the magnetic stirrer

After the cables have been installed correctly according to **Installation, connection to the magnetic stirrer**, the magnetic stirring system **MIXdrive** will be ready for operation.

### 4.1.2 Stirring operation and stirrer control MIXcontrol eco

#### Turning On

Turn the SPEED-button (6) clockwise. The magnetic stirrer will be turned on.

#### Turning Off

Turn the SPEED-button (6) counter-clockwise to the "OFF" sign until the left stop of the button. The magnetic stirrer will be turned off.

#### 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.

#### Stirrer speed adjustment

The speed of the magnetic stirrer can be adjusted by turning of the speed button.

Choose a speed which allows the stirring bar to work reliable and safe.



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.



## 4.2. Operating of the control unit MIXcontrol 20/40

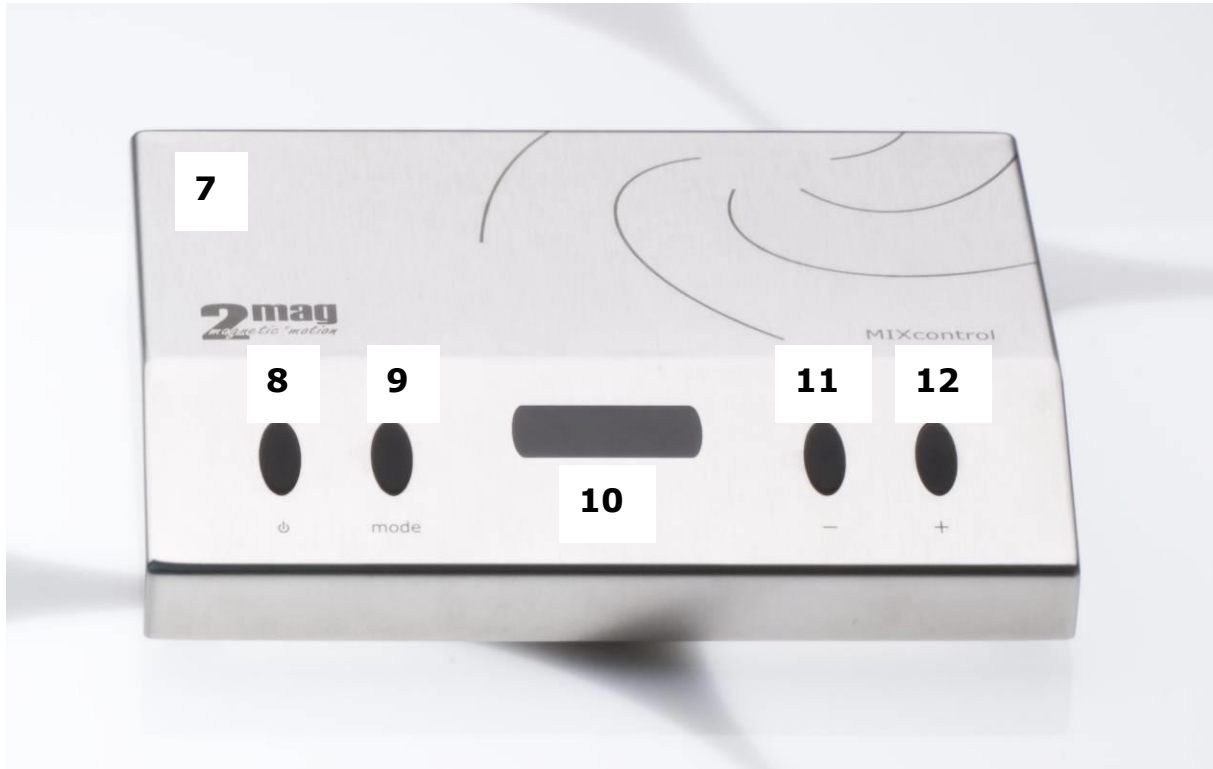


Image 6: Control unit MIXcontrol 20 / 40

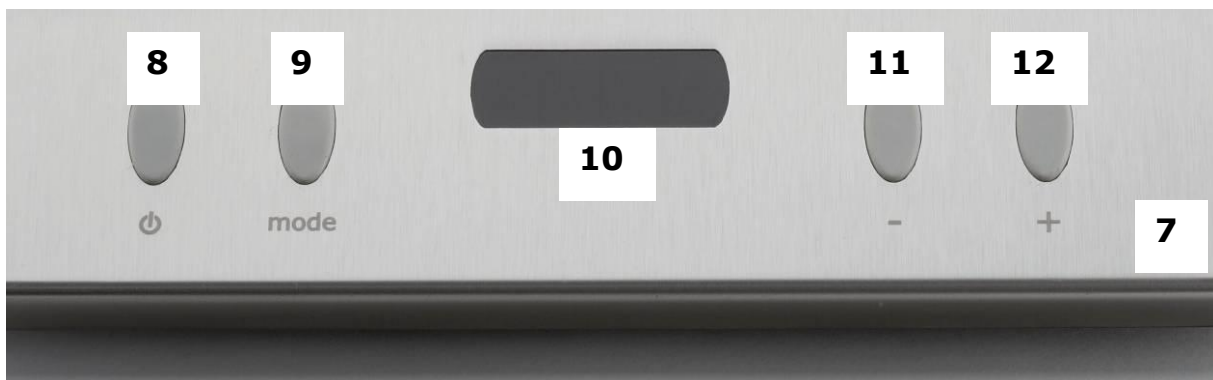


Image 7: Close-up, operating elements control unit MIXcontrol 20 / 40

### 4.2.1 Description operating elements MIXcontrol 20/40

7 Control unit 2mag - MIXcontrol 20 / 40

#### 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 MIXdrive will be ready for operation.

### **4.2.2 Stirring operation and stirrer control MIXcontrol 20/40**

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

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

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.

#### **AutoSave**

Automatic saving of the last functional status after disconnection from the mains power supply or after a power failure. All parameters for speed and power are restored.

#### **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 1,600 rpm (MIXcontrol 20) or 100 and 2000 rpm (MIXcontrol 40) 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 "2000" (MIXcontrol 20: "1600") will be set.

### Power adjustment

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 in 4 steps (25/50/75/100%; MIXcontrol 20) or in 10 steps (10-100%; MIXcontrol 40).

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 Interface (analog) – 0-10 volts

The control units MIXcontrol eco (as well as OEM-circuit versions) are available with an analog 0-10V interface.

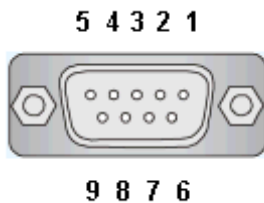
The speed and the ON-OFF function can be controlled via this interface. A special housing for a fast and easy installation on cap rails e.g. in control boxes is available, too.

#### 4.3.1 Pin-assignment 0-10 V interface, SUB-D connector

The circuit version of the control unit with 0-10 volts interface is in the most cases a custom-made version. Therefore please ask ALWAYS before installation and using for the valid pin assignment.

Support: [info@2mag.de](mailto:info@2mag.de)

#### D-Sub (9-pole) male connector, backside view:



5 – Ground

9 – 0 to 10 V control voltage

or

free wired cables (depending on version)

or

socket on request

### 4.3.2 Pin-assignment 0-10 V interface - MIXcontrol eco DINrail



Image 8: Pin-assignment of MIXcontrol eco DINrail 0-10 volts

### 4.3.3 Connections MIXcontrol 20/40 DINrail 0-10 volts

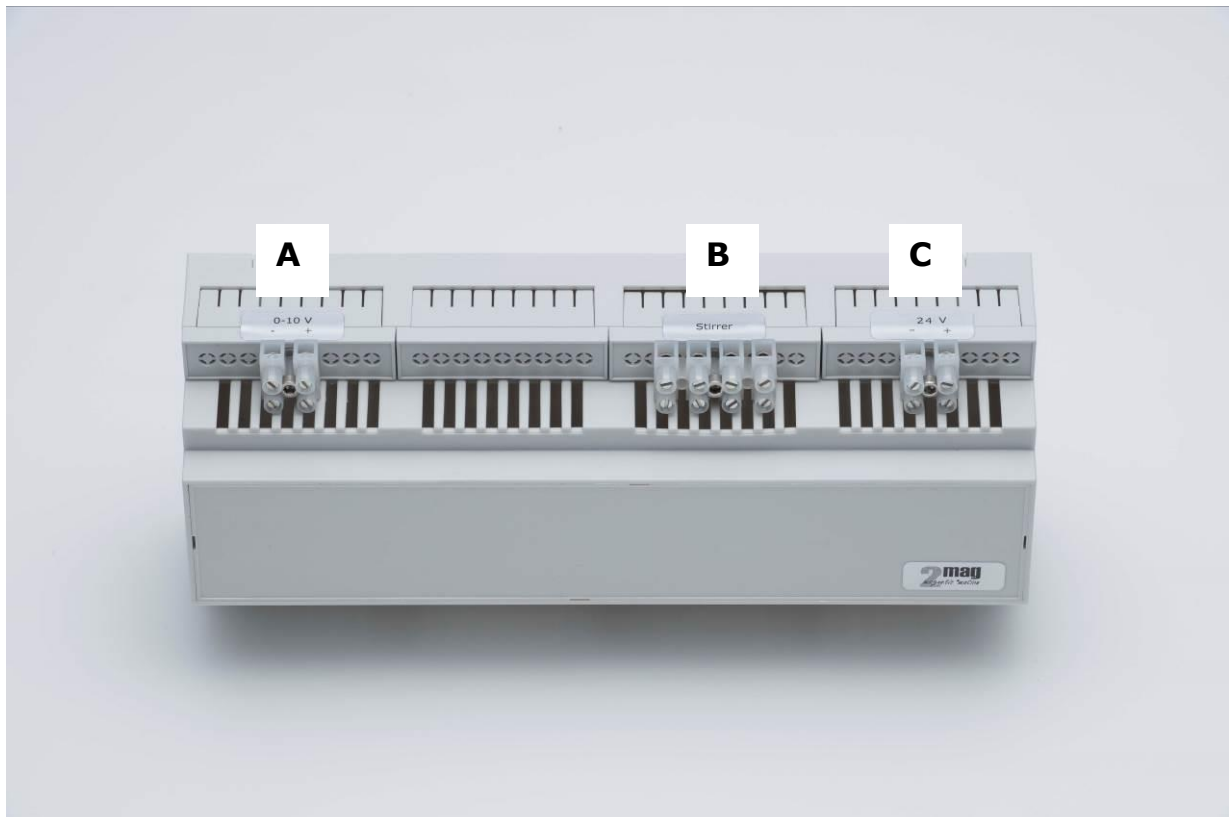


Image 9: Pin-assignment of MIXcontrol 20/40 DINrail

#### **Description functional elements of MIXcontrol 20/40 DINrail**

- A 0-10 V interface (lystre terminal)
- B Connection of the stirrer control cable (1x for MIXcontrol 20, 2x for MIXcontrol 40) (lystre terminal)
- C Power input 48 VDC (lystre terminal)

All connections (A-C) can be made as a luster terminal or socket.

### 4.3.4 Technical data 0-10 volts interface

#### **MIXcontrol eco**

|                 |                          |
|-----------------|--------------------------|
| Supply voltage: | 24V                      |
| Stirring power: | 10 watts, not adjustable |
| Speed range:    | 120–1200 rpm             |

Control voltage / rpm correlation: linear

|          |                                |
|----------|--------------------------------|
| OFF      | < 0,25V (ca. 0,03V hysteresis) |
| 120 rpm  | 0,25V – 0,28V                  |
| 1200 rpm | > 9,4V                         |

#### **MIXcontrol 20**

|                 |                          |
|-----------------|--------------------------|
| Supply voltage: | 48V                      |
| Stirring power: | 20 watts, not adjustable |
| Speed range:    | 100–1600 rpm             |

Control voltage / rpm correlation: linear

|          |                                |
|----------|--------------------------------|
| OFF      | < 0,25V (ca. 0,03V hysteresis) |
| 100 rpm  | 0,25V – 0,28V                  |
| 1600 rpm | > 9,4V                         |

#### **MIXcontrol 40**

|                 |                          |
|-----------------|--------------------------|
| Supply voltage: | 48V                      |
| Stirring power: | 20 watts, not adjustable |
| Speed range:    | 100–2000 rpm             |

Control voltage / rpm correlation: linear

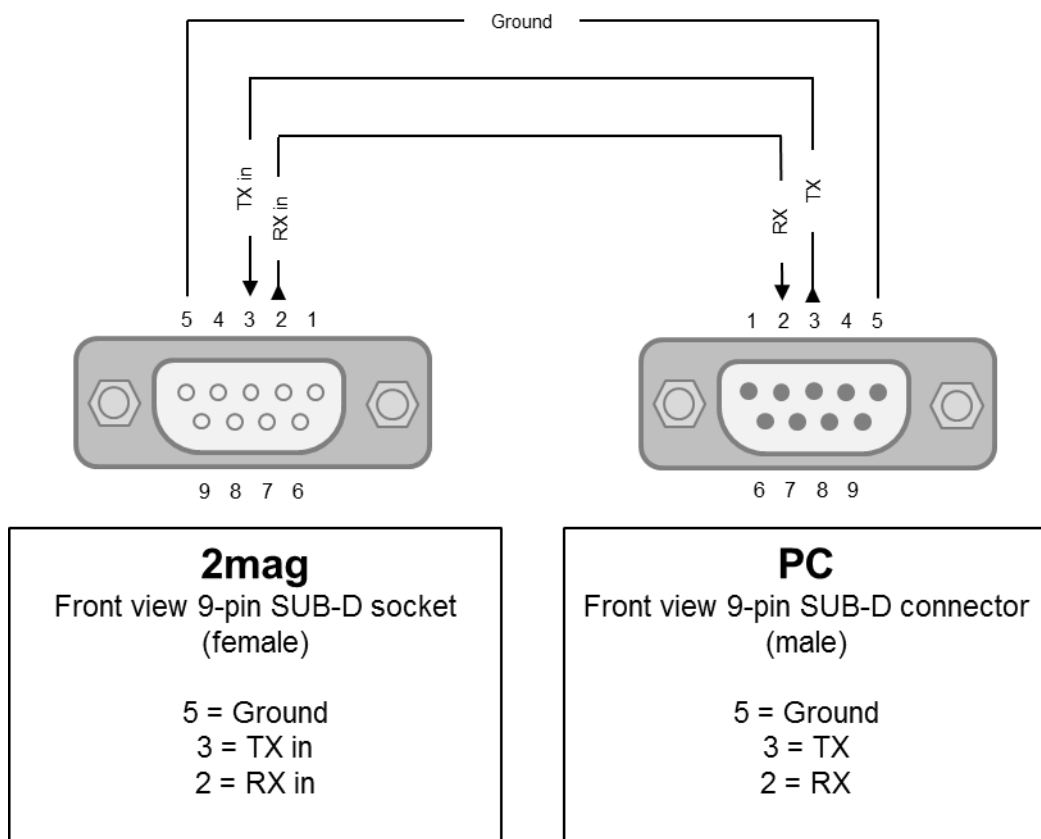
|          |                                |
|----------|--------------------------------|
| OFF      | < 0,25V (ca. 0,03V hysteresis) |
| 100 rpm  | 0,25V – 0,28V                  |
| 2000 rpm | > 9,4V                         |

## 4.4 PC-Interface – RS232

The control units MIXcontrol 20 RS232 (order no. 90210), MIXcontrol 20 DINrail RS232 (order no. 90221), MIXcontrol 40 RS232 (order no. 90410) and MIXcontrol 40 DINrail RS232 (order no. 90421) include an interface RS232 for external control by e.g. PC.

### 4.4.1 Pin-assignment RS232 interface, SUB-D connector

Pin assignment of the RS232 interface:



*Drawing 1:* Pin-assignment RS232 interface



### 4.4.2 Pin-assignment RS232 interface - MIXcontrol eco DINrail

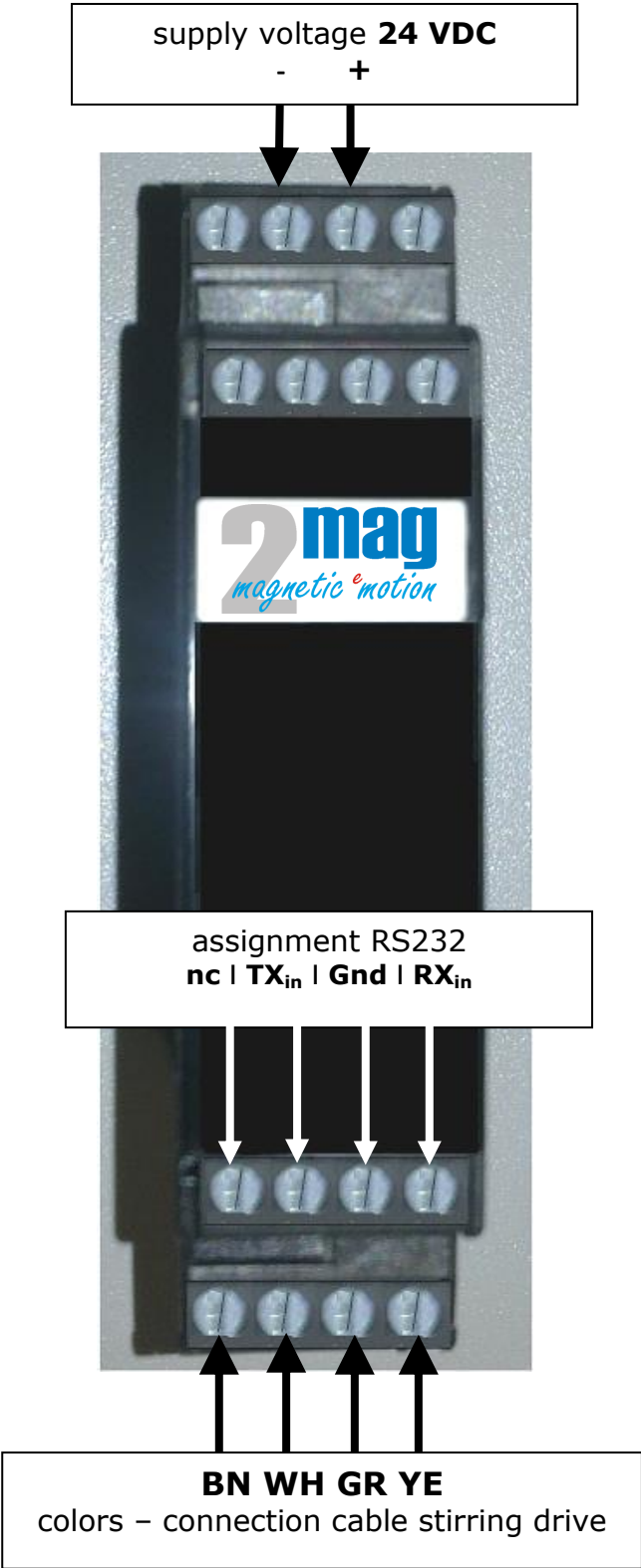


Image 10: Pin-assignment of MIXcontrol eco DINrail RS232

### 4.4.3 RS232 Commands – MIXcontrol eco DINrail

The RS232-commands are ASCII coded and can be sent to the **MIXcontrol eco DINrail RS232** with e.g. the program HyperTerminal which is coming with the Windows operation system.

Listing of commands and feedbacks (with comments):

| No. | Command           | Feedback      | Comment   |
|-----|-------------------|---------------|---|
| 1   | start/(_A)        | OK_START_A    |   |
| 2   | stop/(_A)         | OK_STOP_A     |   |
| 3   | setrpm_*RPM*/(_A) | OK_*RPM*RPM_A | *RPM*: 3 or 4 digits,<br>e.g. 120 or 1200, (3 digits optional<br>with leading zero e.g. 0120) |
| 4   | sendrpm/(_A)      | OK_*RPM*RPM_A | *RPM*: 4 digits,<br>values with only 3 digits with leading<br>zero e.g. 0120 or 1200          |

*Spread sheet 2: Commands – interface RS232*

Each entering of the complete command has to be finished with the ASCII code "Carriage Return (CR)".

There is no determination of small and capital letters.

#### 4.4.4 Connections MIXcontrol 20/40 DINrail RS232

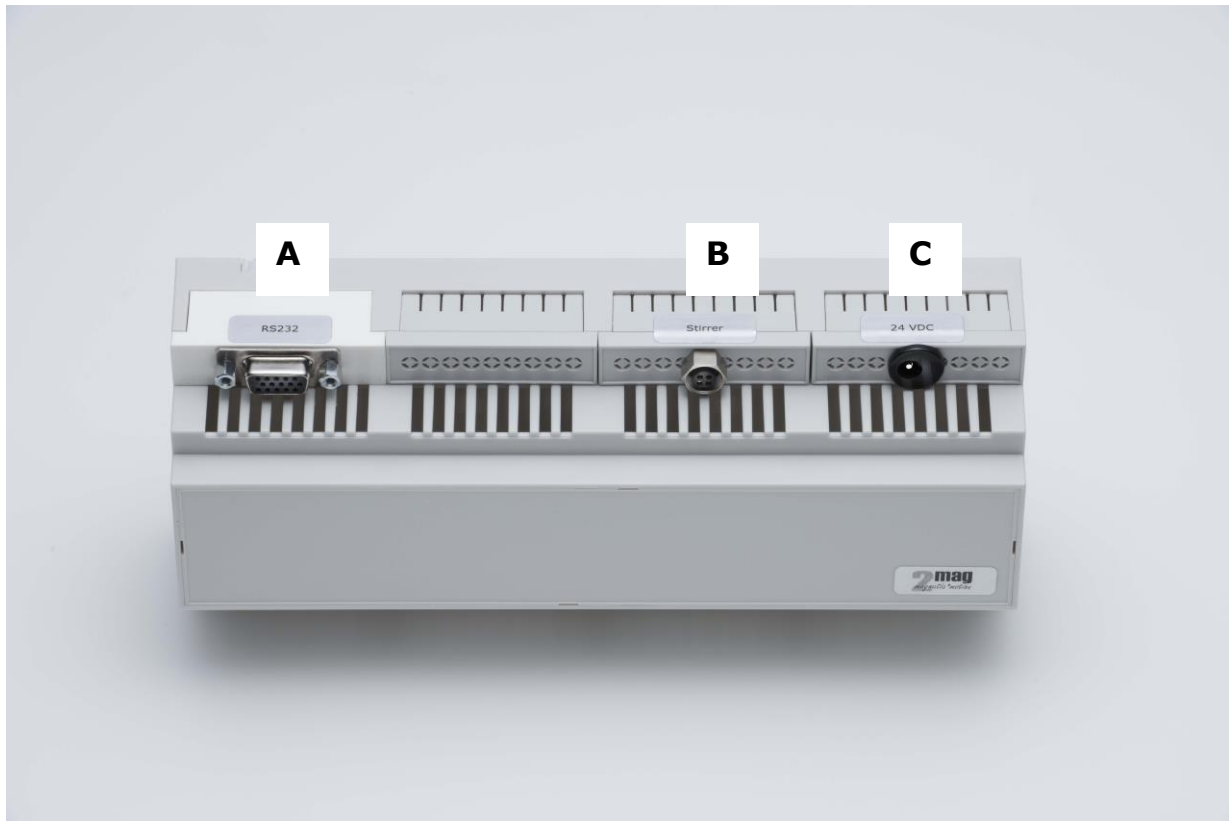


Image 11: Pin-assignment of MIXcontrol 20/40 DINrail

#### **Description functional elements of MIXcontrol 20/40 DINrail**

- A RS232 interface
- B Socket for the stirrer control cable (1x for MIXcontrol 20, 2x for MIXcontrol 40)
- C Power socket 48 VDC

All connections (A-C) can be made as a luster terminal or socket.

#### 4.4.5 RS232 Commands - MIXcontrol 20/40

The RS232-commands are ASCII coded and can be sent to the **MIXcontrol 20/40** with e.g. the program HyperTerminal which is coming with the Windows operation system.

Listing of commands and feedbacks (with comments):

| No. | Command             | Feedback        | Comment  |
|-----|---------------------|-----------------|--|
| 1   | start/(_A)          | OK_START_A      |  |
| 2   | stop/(_A)           | OK_STOP_A       |  |
| 3   | setrpm_*RPM*/(_A)   | OK_*RPM*RPM_A   | *RPM*: 3 or 4 digits, e.g. 100 or 2000, (3 digits optional with leading zero e.g. 0100)                            |
| 4   | sendrpm/(_A)        | OK_*RPM*RPM_A   | *RPM*: 3 or 4 digits, e.g. 100 or 2000, (3 digits (optional with leading zero e.g. 0100, depends on the set value) |
| 5   | setpower_*POW*/(_A) | OK_POWER*POW*_A | *POW*: 2 or 3 digits, e.g. 50 or 100, without leading zero   |
| 6   | sendpower/(_A)      | OK_POWER*POW*_A | *POW*: 3 digits, values with only 2 digits with leading zero, e.g. 050 or 100                                      |
| 7   | setadd_X_A          | OK_SETADD_A_X   | Change of unit address A to X  |
| 8   | setdefault/(_A)     | OK_SETDEFAULT_A | Reset to 350 rpm and 50% power   |
| 9   | sendstatus/(_A)     | OK_VXXXXX_REM_A | 1. ER or OK<br>2. SW versions no.<br>3. REM/MAN/OFF (remote/manual/offline)<br>4. Address                          |

*Spread sheet 3: Commands – interface RS232*

Each entering of the complete command has to be finished with the ASCII code "Carriage Return (CR)".

There is no determination of small and capital letters.

#### 4.4.6 Format – Command – Feedback

Control commands are defined with the command, (when indicated) parameters and (optional) the unit address attached with underscore.

##### **There are 4 kinds of addressing:**

1. Without any address, addressing one unit, feedback- see spreadsheet 2
2. Basic address with letter A to Y: `_C`, only one unit, feedback- see spreadsheet 2
3. Range address with letter A to Y: `_AK`, only one unit, feedback- see spreadsheet 2
4. Command to ALL connected units: `_Z`, feedback = command

##### **Feedback of commands**

The feedback of the addressed units is as follows:

1. OK or ER [code of error] – in the case of error
2. Command and parameter (when indicated)
3. Unit address (A-Y, Z = all units, default address is: A)

If a command is addressed with `_Z` or no unit is addressed, then the feedback will be identical to the command.

##### **Error codes**

Error 1: Unknown Command

Error 2: Manual Mode (Start, Stop not possible)

Error 3: Parameter out of range (set value not allowed)

#### 4.4.7 Hints to Parameter Operation

The control unit is saving two different sets of parameters independently – in each case for manual and remote operation.

By starting the control unit manually (by using the keys) or remotely (by using the RS232 interface) the control unit will be started in the manual or remote mode. It is NOT possible to switch from the manual to the remote mode or backwards. Furthermore it can be changed only the parameters of the actual running mode.

The mode can be changed by switching off the control unit by pressing the ON/OFF-key (11).

The **Set-commands** can only set the parameters of the remote mode.

The **Send-commands** are giving always back the parameters of the actual running mode.

**The manual parameters can be changed only by the keys during running in the manual mode and the remote parameter only by the RS232 interface during running in the remote mode!**

Via PC and RS232 interface remotely adjusted parameters cannot be changed manually by the keys.

Via the unit keys manually adjusted parameters cannot be changed via PC and RS232 interface. But the parameters of the actual running mode can be checked via the PC and RS232 interface.

The manually switched on control unit cannot be switched off or on via the RS232 interface.

During using the manual mode all parameters can be set via the RS232 interface. These remote parameters cannot be read out in the manual mode. In this case the answer is giving back the parameters of the manual mode.

The via RS232 interface adjusted remote parameters will be saved automatically and will be valid after starting the control unit in the remote mode.

The read out of the parameters are giving always back the parameters of the actual running mode.

Only by switching off the control unit by pressing the ON/OFF-key (11) the running mode can be stopped. That means the remotely started control unit can be switched off in this case manually (safety switching).

#### **4.4.8 Control of more than one units**

It can be connected more than one control unit with only one interface. All control units are connected with the help of a special needed 2mag adapter box with a standard RS232 cable to the PC and to the controllers.

The last (open) D-Sub-connector has to be closed with a bridge end connector which is connecting the Rx and Tx line.

All controllers are addressed with the address `_A` in the factory. To control the control units individually, each control unit has to be addressed with an own address with help of the command "SetAdd".

#### 4.4.9 Control with HyperTerminal

The commands which are shown in spreadsheet 2 and 3 can be sent from the PC to the controller with the Windows accessory program HyperTerminal.

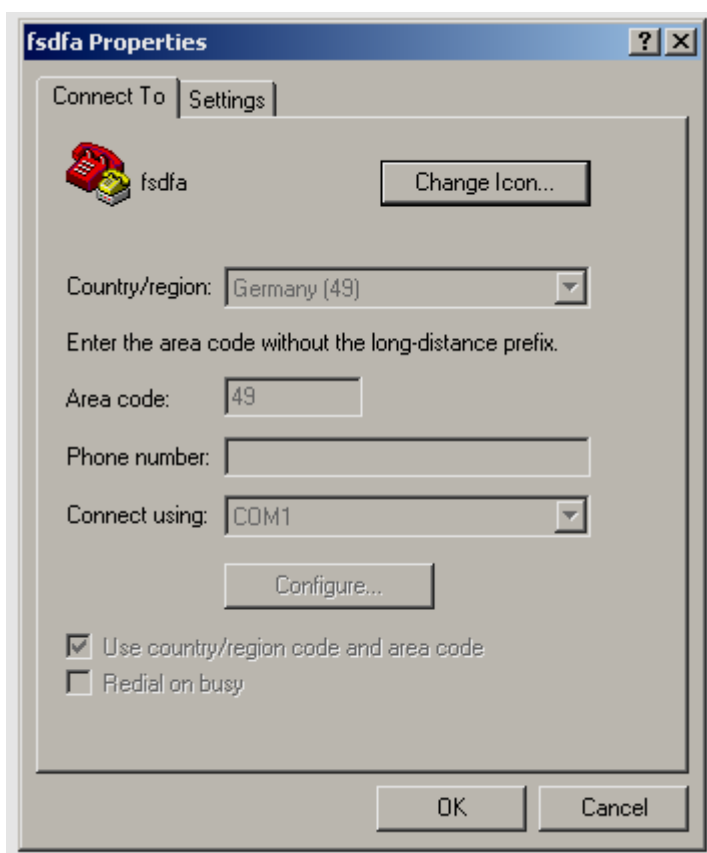
Following HyperTerminal preferences allow to control at least 3 control units and the summery of more than one command to a batch file.

- bits per second: 9600 Baud
  - 8 data bits, 1 stop bit, no parity bit
  - flow control: „XON / XOFF“ or „None“
- Note: Flow control via hardware handshake is not working!

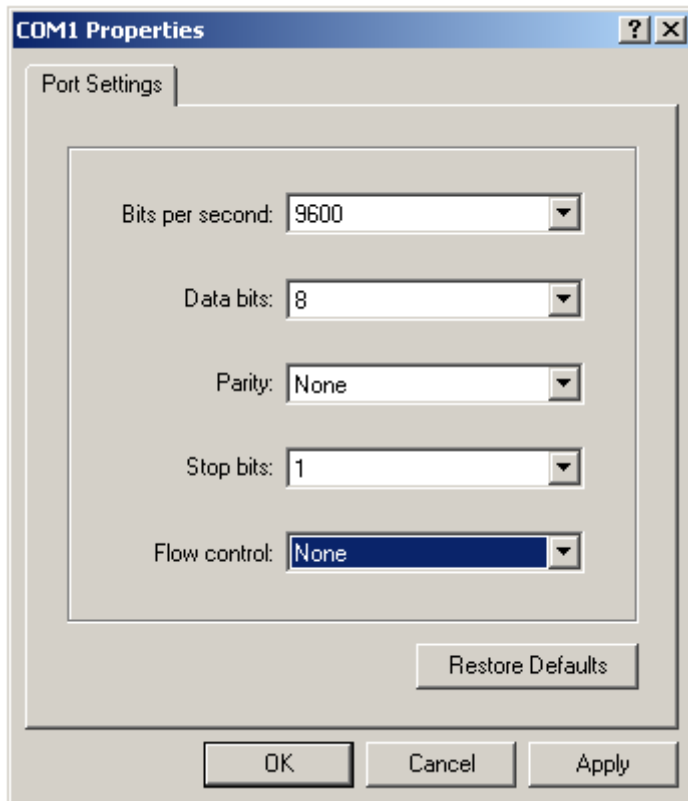
Minimum time distance between two commands: 40ms for one control unit, minimum time distance 80ms for 3 control units.

HyperTerminal allows the adjustment of the time between two commands via the line delay in the ASCII configuration.

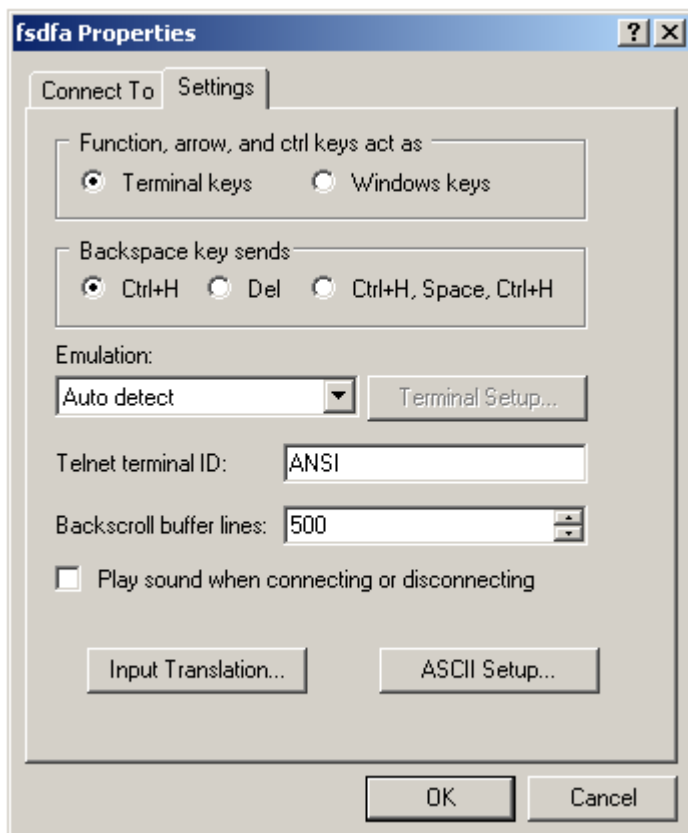
For manual sending of commands via HyperTerminal the ASCII configuration must be set which is shown in screenshot 4.



Screenshot 1

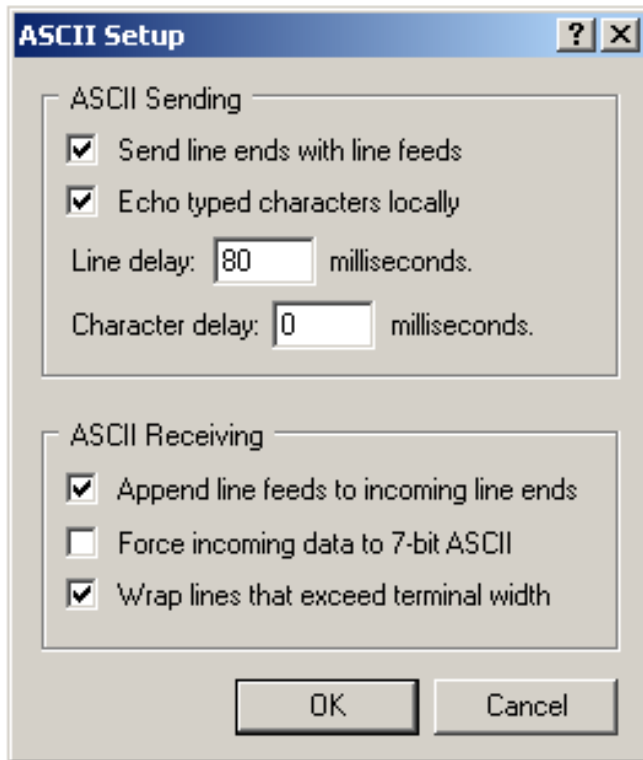


Screenshot 2



Screenshot 3





Screenshot 4

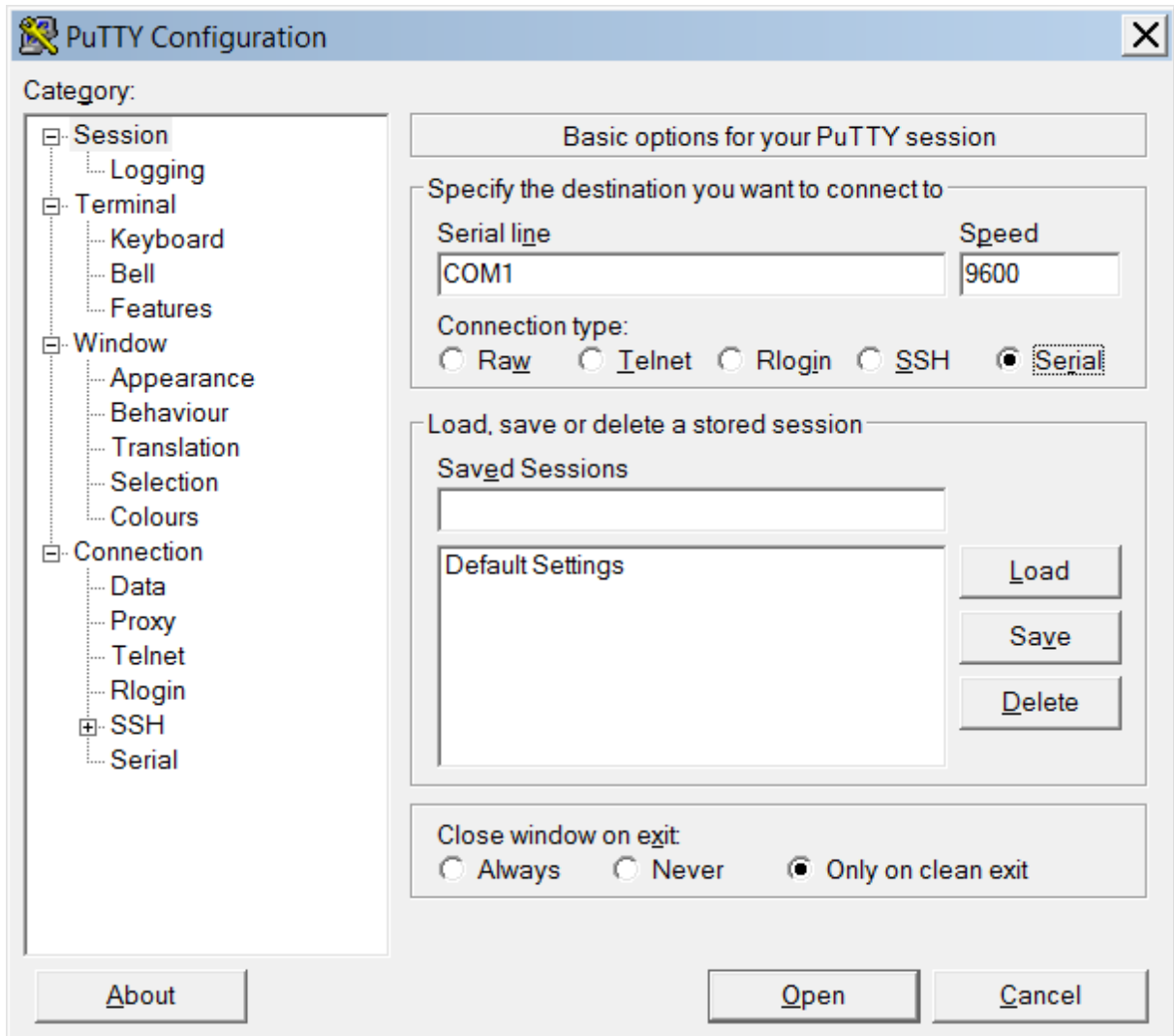
#### 4.4.10 Control with PuTTY

The commands which are shown in spreadsheet 2 and 3 can be sent from the PC to the controller with the Windows accessory program Putty.

Category: "Session" →  
Serial line: COM?  
Speed: 9600  
Connection type: Serial

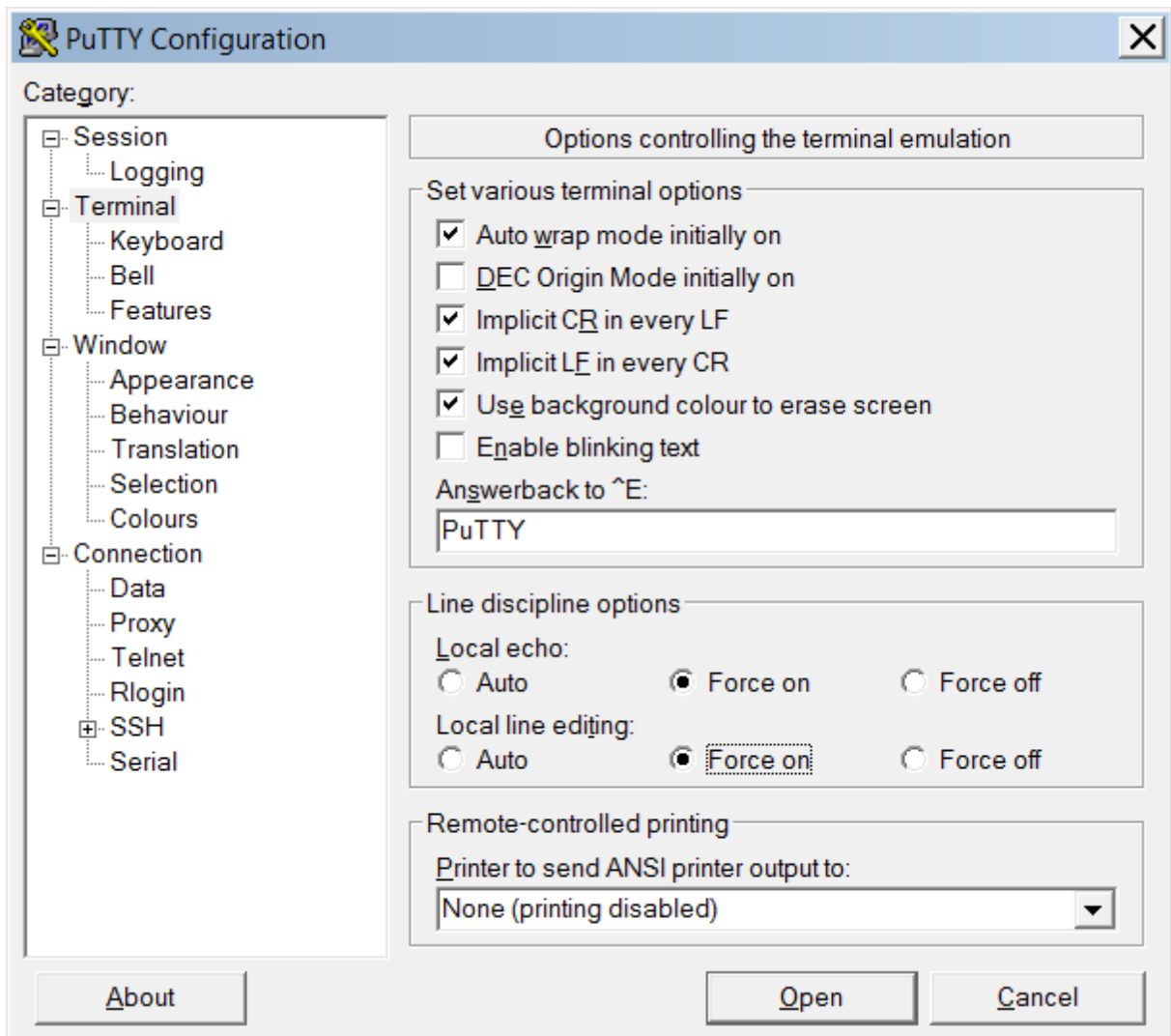
Category: "Terminal" →  
Implicit CR in every LF  
Implicit LF in every CR  
Local echo: Force on  
Local line editing: Force on

Category: "Connection" → "Serial" →  
Serial line to connect to: COM?  
Speed (baud): 9600  
Data bits: 8  
Stop bits: 1  
Parity: None  
Flow control: None



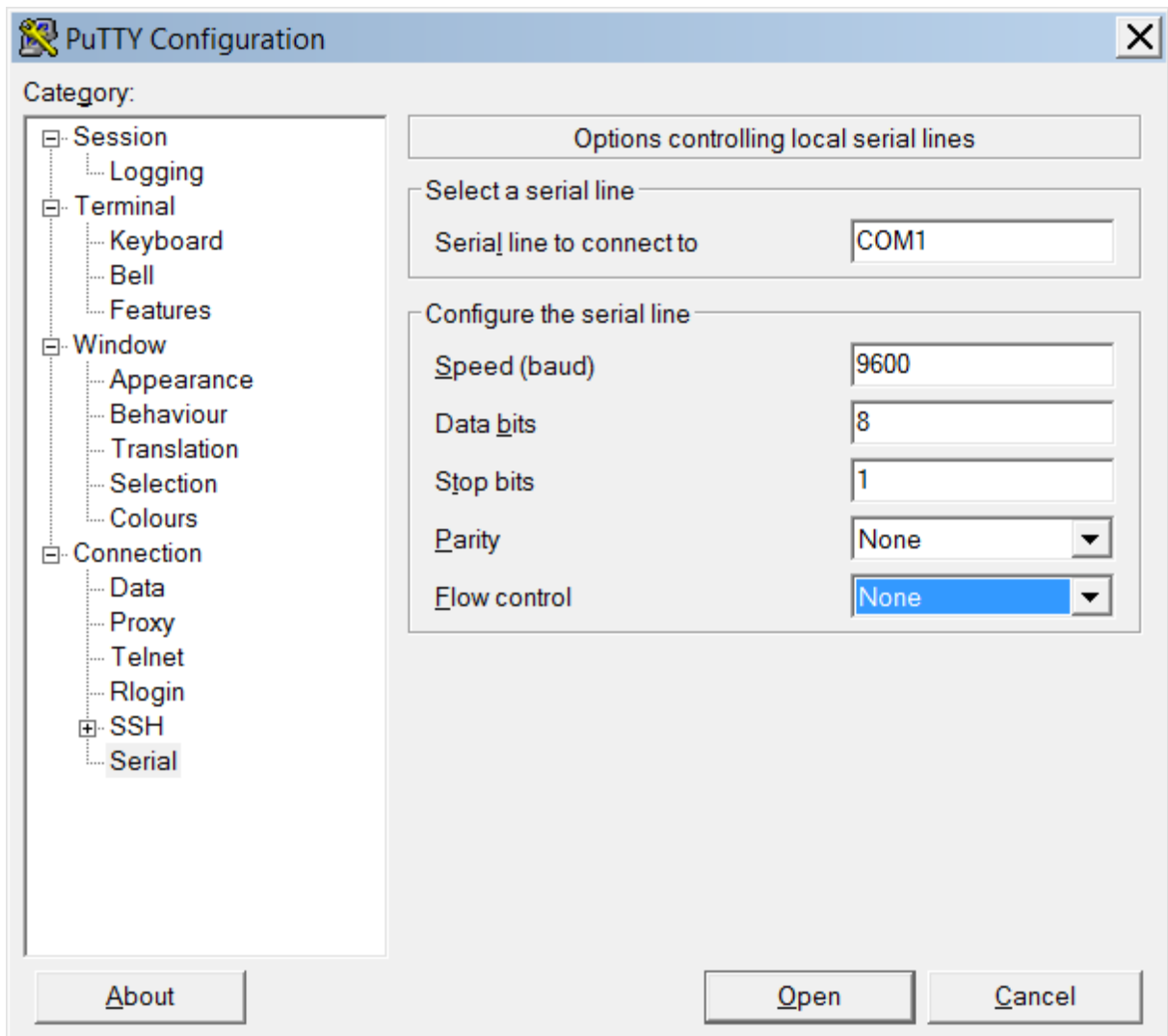
Screenshot 5:

Category: "Session" →  
Serial line: COM1  
Speed: 9600  
Connection type: Serial



Screenshot 6:

Category: "Terminal" →  
 Implicit CR in every LF  
 Implicit LF in every CR  
 Local echo: Force on  
 Local line editing: Force on



Screenshot 7:

Category: "Connection" → "Serial" →  
Serial line to connect to: COM?  
Speed (baud): 9600  
Data bits: 8  
Stop bits: 1  
Parity: None  
Flow control: None

## 4.5 Combinations Stirring Drives – Control Units

All stirring drives **MIXdrive** are, with regard to the inner life, technically identical. The control units **MIXcontrol** define thereby the performance of the stirrers and the operation comfort.

Please note following restrictions regarding the combination possibilities, which are depending on the size of the stirring drive:

|   | <b>Stirring Drive</b>                              | <b>Control Unit</b>                              |
|---|--|--|
| <b>MIXdrive (basic)</b><br>up to +50 °C<br>(in air and submersed)                                     | MIXdrive 60<br>MIXdrive 15<br>MIXdrive 6           | MIXcontrol 40<br>MIXcontrol 20<br>MIXcontrol eco |
|   | MIXdrive 1   | MIXcontrol 20<br>MIXcontrol eco                  |
|   | MIXdrive 1 eco<br>MIXdrive 1 XS<br>cuvetteMIXdrive | MIXcontrol eco                                   |
| <b>MIXdrive (HT)</b><br>(HT = High Temperature)<br>up to +200 °C (in air)<br>up to +95 °C (submersed) | MIXdrive 60 HT<br>MIXdrive 15 HT<br>MIXdrive 6 HT  | MIXcontrol 40<br>MIXcontrol 20<br>MIXcontrol eco |
|   | MIXdrive 1 HT                                      | MIXcontrol 20<br>MIXcontrol eco                  |
|   | MIXdrive 1 eco HT<br>MIXdrive 1 XS HT              | MIXcontrol eco                                   |

*Spreadsheet 2:* Combinations of stirring drives **MIXdrive** with control units **MIXcontrol**



**Forbidden stirring drive-control unit combinations (please see spreadsheet 2) can cause thermal overload and permanent damage of the stirring drives!**

## 4.6 Accessory – Distributor distriBOX 4 / distriBOX 8

With help of the accessory item **distriBOX 4/8** can be connected several stirring drives with only one control unit.

Therefore e.g. 4x MIXdrive 1 XS can be operated synchronous with the control unit MIXcontrol 40.

Please note that the stirring power will be divided by the connected number of stirring drives.

The stirring drives MIXdrive have to be connected in pairs only!  
In the not allowed cases that only 1/3/5/7 stirring drives are connected the control unit will be destroyed immediately.

The accessory item distriBOX is available as 4-fold (**distriBOX 4**, order no. 49004) and 8-fold distributor (**distriBOX 8**, order no. 49008).



**The stirring drives MIXdrive have to be connected with the distriBOX in pairs only!**

**In the not allowed cases that only 1/3/5/7 stirring drives are connected the control unit will be destroyed immediately.**

## 4.7 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!

## **5. External heating operation in incubators and water baths**

### **5.1 External heating**

The magnetic stirring drives of the MIXdrive series have been developed for operation in incubators and water baths.

Please always observe the following warnings for safe operation!



- **Do not heat up liquids whose flashpoint is lower than the set temperature.  
Explosion hazard! Fire hazard!**



- **Do never use any pressure-tight closed vessels  
RISK OF BURSTING!**



- **Please use only temperature-resistant vessels  
Beware of plastic vessels!**

### **5.2 Bath fluids**

If you use water as the bath fluid we recommended a water mixture of 70 % soft/decalcified water and 30 % tap water.

Please note the information given on the water quality:

- Hard water is not suitable for temperature control tasks due to its high lime content and will produce lime deposits.
- Ferrous water can cause corrosion, even on stainless steel.
- Chloric water can cause pitting corrosion.
- Distilled and deionized water is not suitable. Its specific properties cause corrosion on the stainless steel housing of the stirring drive.

The following must be observed when using other bath fluids: The basic version of the MIXdrive stirring drives is sealed with polyurethane, the high-temperature version with silicone.

Tempering agents used must not attack these sealing materials. Please always check the material resistance before immersing in a bath fluid.



- Never immerse the HT version of the stirring drives in silicone oils!



- Always check the resistance of the sealing materials with regard to the temperature control agents / bath fluids used.

### 5.3 Accessory – Stainless Steel Bath mixBATH

The accessory item **mixBATH** is available with order no.: 40950.

The durable and robust stainless-steel bath is made for stirring drives **MIXdrive 6/15/60** and fitting for immersion thermostats (heating /cooling). Perfectly welded bath construction, electro-polished inside, therefore easy to clean and care. The framed ridge is formed as handle.

For operation temperatures higher than the allowed operation temperatures (up to +95°C submersed - HT-Version) the stirring drive has to be placed below the mixBATH. The construction allows a perfect positioning of the stirrer below the bath and stirring centre marks inside the bath help to find the right stirring positions.



**Attention: The maximum allowed operation temperatures must be noted during using the stirrer below the bath too!**

The integrated left-/right body stop is optimized for exact thermostat positioning (pump flow) with using MIXdrive 6 resp. MIXdrive 15.



## 6. Maximum operation temperatures

### ➤ **Incubator operation**

Please note the **maximum operation temperature +50 °C** in air for the standard versions

and

**+200°C for the high temperature versions (HT).**

Operation in higher ambient temperatures can damage the stirring drive.



### ➤ **Water bath operation:**

Please note the **maximum operation temperature +50 °C** in water immersed for the standard versions

and

**+95°C for the high temperature versions (HT)** in water immersed.

Operation in higher ambient temperatures can damage 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.

### **2mag AG**

Schragenhofstr. 35 J  
DE-80992 Muenchen  
GERMANY

Fon: +49 89 38153110  
E-Mail: [info@2mag.de](mailto:info@2mag.de)  
Web: [www.2mag.de](http://www.2mag.de)

### **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 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 cuvetteMIXdrive 1 / MIXdrive 1 XS

|  | <b>cuvetteMIXdrive 1</b>                       | <b>MIXdrive 1 XS</b> |
|--|--|----------------------|
| Order no.                              | 40400  | 40300                |
| Stirring points                        | 1  | 1                    |
| Stirring volume/point                  | up to 25 ml                                    | 1,000 ml             |
| Stirring power (max.)                  | 10 watts                                       |                      |
| Material housing                       | stainless-steel                                |                      |
| Material sealing                       | PUR  |                      |
| Permitted operation conditions (air)   | -10 up to +50 °C (at 100% humidity)            |                      |
| Permitted operation Conditions (water) | +50 °C in water immersed                       |                      |
| Measurement (WxDxH)                    | 12.5 x 12.5 x 6 mm                             | 48 x 48 x 18 mm      |
| Weight (gross)                         | approx. 0.14 kg                                | approx. 0.36 kg      |
| Permitted storage conditions           | -40 °C up to +70 °C, 10 – 95 %, 500 - 1060 hPa |                      |
| Protection category                    | IP68   |                      |
| Operating voltage (max.)               | 24 VDC   | 48 VDC               |

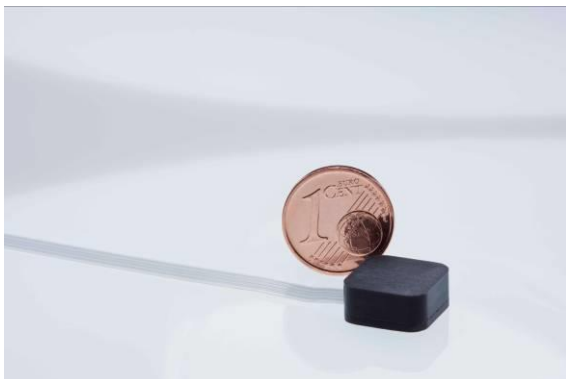


Image 11 and 12: Magnetic stirrer cuvetteMIXdrive (left) and MIXdrive 1 XS (right)

## Magnetic stirrer MIXdrive 1 eco / 1

|  | <b>MIXdrive 1 eco</b>                          | <b>MIXdrive 1</b> |
|--|--|-------------------|
| Order no.                              | 40101  | 40001             |
| Stirring points                        | 1  | 1                 |
| Stirring volume/point                  | 3,000 ml                                       | 10,000 ml         |
| Stirring power (max.)                  | 10 watts                                       | 20 watts          |
| Material housing                       | stainless-steel                                |                   |
| Material sealing                       | PUR  |                   |
| Permitted operation conditions (air)   | -10 up to +50 °C (at 100% humidity)            |                   |
| Permitted operation Conditions (water) | +50 °C in water immersed                       |                   |
| Measurement (WxDxH)                    | 120 x 120 x 35 mm                              | 180 x 180 x 38 mm |
| Weight (gross)                         | approx. 1.6 kg                                 | approx. 3.5 kg    |
| Permitted storage conditions           | -40 °C up to +70 °C, 10 - 95 %, 500 - 1060 hPa |                   |
| Protection category                    | IP68   |                   |
| Operating voltage (max.)               | 48 VDC   |                   |

## Magnetic stirrer MIXdrive 6 / 15 / 60

|  | <b>MIXdrive 6</b>                              | <b>MIXdrive 15</b> | <b>MIXdrive 60</b> |
|--|--|--------------------|--------------------|
| Order no.                              | 40006  | 40015              | 40060              |
| Stirring points                        | 6  | 15                 | 60                 |
| Stirring point distance                | 130 mm   | 65 mm              | 32,5 mm            |
| Stirring volume/point                  | 3,000 ml                                       | 3,000 ml           | 500 ml             |
| Stirring power (max.)                  | 40 watts                                       |                    |                    |
| Material housing                       | stainless-steel                                |                    |                    |
| Material sealing                       | PUR  |                    |                    |
| Permitted operation conditions (air)   | -10 up to +50 °C (at 100% humidity)            |                    |                    |
| Permitted operation Conditions (water) | +50 °C in water immersed                       |                    |                    |
| Measurement (WxDxH)                    | 245 x 375 x 38 mm                              |                    |                    |
| Weight (gross)                         | approx. 9.4 kg                                 | approx. 9.5 kg     | approx. 8.9 kg     |
| Permitted storage conditions.          | -40 °C up to +70 °C, 10 - 95 %, 500 - 1060 hPa |                    |                    |
| Protection category                    | IP68   |                    |                    |
| Operating voltage (max.)               | 48 VDC   |                    |                    |

## Magnetic stirrer MIXdrive 1 XS

|  | <b>MIXdrive 1 XS HT</b>                        |
|--|--|
| Order no.                              | 40303  |
| Stirring points                        | 1  |
| Stirring volume/point                  | 1.000 ml                                       |
| Stirring power (max.)                  | 10 watts                                       |
| Material housing                       | stainless-steel                                |
| Material sealing                       | silicone                                       |
| Permitted operation conditions (air)   | -30 up to +200 °C (at 100% humidity)           |
| Permitted operation Conditions (water) | +95 °C in water immersed                       |
| Measurement (WxDxH)                    | 48 x 48 x 18 mm                                |
| Weight (gross)                         | approx. 0.35 kg                                |
| Permitted storage conditions.          | -40 °C up to +70 °C, 10 – 95 %, 500 - 1060 hPa |
| Protection category                    | IP68   |
| Operating voltage (max.)               | 48 VDC   |

## Magnetic stirrer MIXdrive 1 eco HT / 1 HT

|  | <b>MIXdrive 1 eco HT</b>                       | <b>MIXdrive 1 HT</b> |
|--|--|----------------------|
| Order no.                              | 40301  | 40201                |
| Stirring points                        | 1  | 1                    |
| Stirring volume/point                  | 3,000 ml                                       | 10,000 ml            |
| Stirring power (max.)                  | 10 watts                                       | 20 watts             |
| Material housing                       | stainless-steel                                |                      |
| Material sealing                       | silicone                                       |                      |
| Permitted operation conditions (air)   | -30 up to +200 °C (at 100% humidity)           |                      |
| Permitted operation Conditions (water) | +95 °C in water immersed                       |                      |
| Measurement (WxDxH)                    | 120 x 120 x 35 mm                              | 180 x 180 x 38 mm    |
| Weight (gross)                         | approx. 1.5 kg                                 | approx. 3.3 kg       |
| Permitted storage conditions           | -40 °C up to +70 °C, 10 – 95 %, 500 - 1060 hPa |                      |
| Protection category                    | IP68   |                      |
| Operating voltage (max.)               | 48 VDC   |                      |

## Magnetic stirrer MIXdrive 6 HT / 15 HT / 60 HT

|  | <b>MIXdrive 6<br/>HT</b>                       | <b>MIXdrive 15<br/>HT</b> | <b>MIXdrive 60<br/>HT</b> |
|--|--|---------------------------|---------------------------|
| Order no.                              | 40206  | 40215                     | 40260                     |
| Stirring points                        | 6  | 15                        | 60                        |
| Stirring point distance                | 130 mm   | 65 mm                     | 32,5 mm                   |
| Stirring volume/point                  | 3,000 ml                                       | 3,000 ml                  | 500 ml                    |
| Stirring power (max.)                  | 40 watts                                       |                           |                           |
| Material housing                       | stainless-steel                                |                           |                           |
| Material sealing                       | PUR  |                           |                           |
| Permitted operation conditions (air)   | -10 up to +200 °C (at 100% humidity)           |                           |                           |
| Permitted operation Conditions (water) | +95 °C in water immersed                       |                           |                           |
| Measurement (WxDxH)                    | 245 x 375 x 38 mm                              |                           |                           |
| Weight (gross)                         | approx. 9.0 kg                                 | approx. 9.1 kg            | approx. 8.4 kg            |
| Permitted storage conditions.          | -40 °C up to +70 °C, 10 – 95 %, 500 - 1060 hPa |                           |                           |
| Protection category                    | IP68   |                           |                           |
| Operating voltage (max.)               | 48 VDC   |                           |                           |

## Magnetic stirrer MIXdrive OEM / OEM HT

The technical data of OEM version are depending on the individual specs.



## Control unit MIXcontrol eco

|                                | <b>MIXcontrol eco</b>                      |
|--------------------------------|--|
| Order no.                      | 90100                                      |
| Speed range                    | 120 – 1,200 rpm                            |
| Stirring power                 | 10 watts                                   |
| Stirring power steps           | -  |
| Housing material               | Plastics molding                           |
| Measurements (WxDxH)           | 65 x 50 x 45 mm                            |
| Weight (gross)                 | approx. 0.5 kg                             |
| Permitted operation conditions | 0 up to +40 °C (at 80% humidity)           |
| Electrical data                | 100-240 V / 50-60 Hz / 0.75 A              |
| Permitted storage conditions.  | -40 °C up to +70 °C, 10-95 %, 500-1060 hPa |
| Protection category            | IP20                                       |

## Control unit MIXcontrol eco DINrail with potentiometer, 0-10 V or RS232

|                                | <b>MIXcontrol eco<br/>DINrail mit Poti</b> | <b>MIXcontrol eco<br/>DINrail 0-10V</b> | <b>MIXcontrol eco<br/>DINrail RS232</b> |
|--------------------------------|--|---|---|
| Order no.                      | 90140                                      | 90150                                   | 90160                                   |
| Speed range                    | 120 – 1,200 rpm                            |   |   |
| Stirring power                 | 10 watts                                   |   |   |
| Stirring power steps           | -  |   |   |
| Housing material               | Plastics molding                           |   |   |
| Measurements (WxDxH)           | 24 x 100 x 120 mm                          |   |   |
| Weight (gross)                 | approx. 0.25 kg                            |   |   |
| Permitted operation conditions | 0 up to +40 °C (at 80% humidity)           |   |   |
| Operating voltage (max.)       | 24 VDC                                     |   |   |
| Permitted storage conditions.  | -40 °C up to +70 °C, 10-95 %, 500-1060 hPa |   |   |
| Protection category            | IP20                                       |   |   |

## Control unit MIXcontrol 20 / 40

|                                | <b>MIXcontrol 20</b>                       | <b>MIXcontrol 40</b>  |
|--------------------------------|--|-----------------------|
| Order no.                      | 90200                                      | 90400                 |
| Order no. with RS232 interface | 90210                                      | 90410                 |
| Speed range                    | 100 – 1,600 rpm                            | 100 – 2,000 rpm       |
| Stirring power                 | 20 watts                                   | 40 watts              |
| Stirring power steps           | 4-steps<br>(25/50/75/100%)                 | 10-steps<br>(10-100%) |
| Voltage output                 | 48 VDC                                     |                       |
| Housing material               | stainless-steel                            |                       |
| Measurements (WxDxH)           | 200 x 155 x 380 mm                         |                       |
| Weight (gross)                 | approx. 1.9 kg                             |                       |
| Permitted operation conditions | 0 up to +40 °C (at 80% humidity)           |                       |
| Permitted storage conditions   | -40 °C up to +70 °C, 10-95 %, 500-1060 hPa |                       |
| Protection category            | IP 20                                      |                       |
| Electrical data                | 100-240 V / 50-60 Hz / 1.5 A               |                       |

## Control unit MIXcontrol 20 / 40 DINrail

|                                | <b>MIXcontrol 20</b>                       | <b>MIXcontrol 40</b> |
|--------------------------------|--|----------------------|
| Order no.                      | on request                                 | on request           |
| Order no. with RS232 interface | on request                                 | on request           |
| Speed range                    | 100 – 1,600 rpm                            | 100 – 2,000 rpm      |
| Stirring power                 | 20 watts                                   | 40 watts             |
| Stirring power steps           | -  |                      |
| Operating voltage (max.)       | 48 VDC                                     |                      |
| Housing material               | plastic                                    |                      |
| Measurements (WxDxH)           | 210 x 90 x 58 mm                           |                      |
| Weight (gross)                 | approx. 0.75 kg                            |                      |
| Permitted operation conditions | 0 up to +40 °C (at 80% humidity)           |                      |
| Permitted storage conditions   | -40 °C up to +70 °C, 10-95 %, 500-1060 hPa |                      |
| Protection category            | IP20                                       |                      |

## Accessory distriBOX 4 / 8

|                                | <b>distriBOX 4</b>                             | <b>distriBOX 8</b> |
|--------------------------------|--|--------------------|
| Order no.                      | 49004  | 49008              |
| Connection sockets             | 4  | 8                  |
| Material housing               | stainless-steel                                |                    |
| Material sealing               | PUR  |                    |
| Measurements (BxTxH)           | 48 x 48 x 25 mm                                | 48 x 92 x 25 mm    |
| Weight (gross)                 | ca. 0.18 kg                                    | ca. 0.27           |
| Permitted operation conditions | 0 up to +40 °C (at 80% humidity)               |                    |
| Permitted storage conditions   | -40 °C up to +70 °C, 10 – 95 %, 500 - 1060 hPa |                    |
| Protection category            | IP20   |                    |



Image 13: Distributor distriBOX 4/8

## Accessory mixBATH

|                     | <b>mixBATH</b>               |
|---------------------|------------------------------|
| Order no.           | 40950                        |
| Material housing    | stainless-steel              |
| Measurement (BxTxH) | 277 x 537 x 175 mm (inside)  |
| Measurement (BxTxH) | 318 x 600 x 190 mm (outside) |
| Weight (gross)      | approx. 8.0 kg               |



Image 14: Stainless-steel bath mixBATH

## Accessory Extension Cord for MIXdrive

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

## Accessory Magnetic Stirring Bar ASTEROID 25

|                      | <b>ASTEROID 25</b>  |
|----------------------|---------------------|
| Order no.            | 44025               |
| Shape                | triangle, convex    |
| Material             | PTFE                |
| Measurement (HxL, D) | 14 x 25 mm, Ø 16 mm |
| Weight (gross)       | approx. 0.07 kg     |

## Accessory Magnetic Stirring Bar ASTEROID 40

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

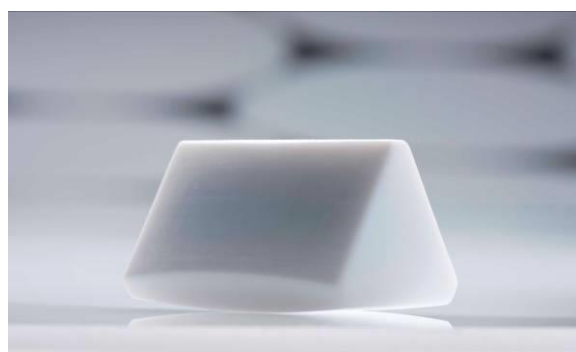


Image 15: Stirring bar ASTEROID 40

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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

**cuvetteMIXdrive 1 / MIXdrive 1 XS / 1 eco / 1 / 6 / 15 / 60 / OEM  
MIXdrive 1 XS HT / 1 eco HT / 1 HT / 6 HT / 15 HT / 60 HT / OEM HT**

incl.

**MIXcontrol eco / 20 / 40 / OEM**

Optional accessories

**distriBOX 4 / 8 / extension cords**

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, 20.10.2015

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



Dr. Klaus Kaufmann (CTO)