

# Operation Manual

English



**MIXdrive 6 MTP**  
**MIXdrive 12 MTP**  
**MIXdrive 24 MTP**  
**MIXdrive 96 MTP**  
**MIXdrive MTP OEM**

**MIXcontrol eco**  
**MIXcontrol MTP**  
**MIXcontrol MTP RS232**

**Order no.: 43006**  
**Order no.: 43012**  
**Order no.: 43024**  
**Order no.: 43096**  
**Order no.: 4xxxx**  
with  
**Order no.: 90100**  
**Order no.: 90250**  
**Order no.: 90252**

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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 MTP with control unit MIXcontrol MTP

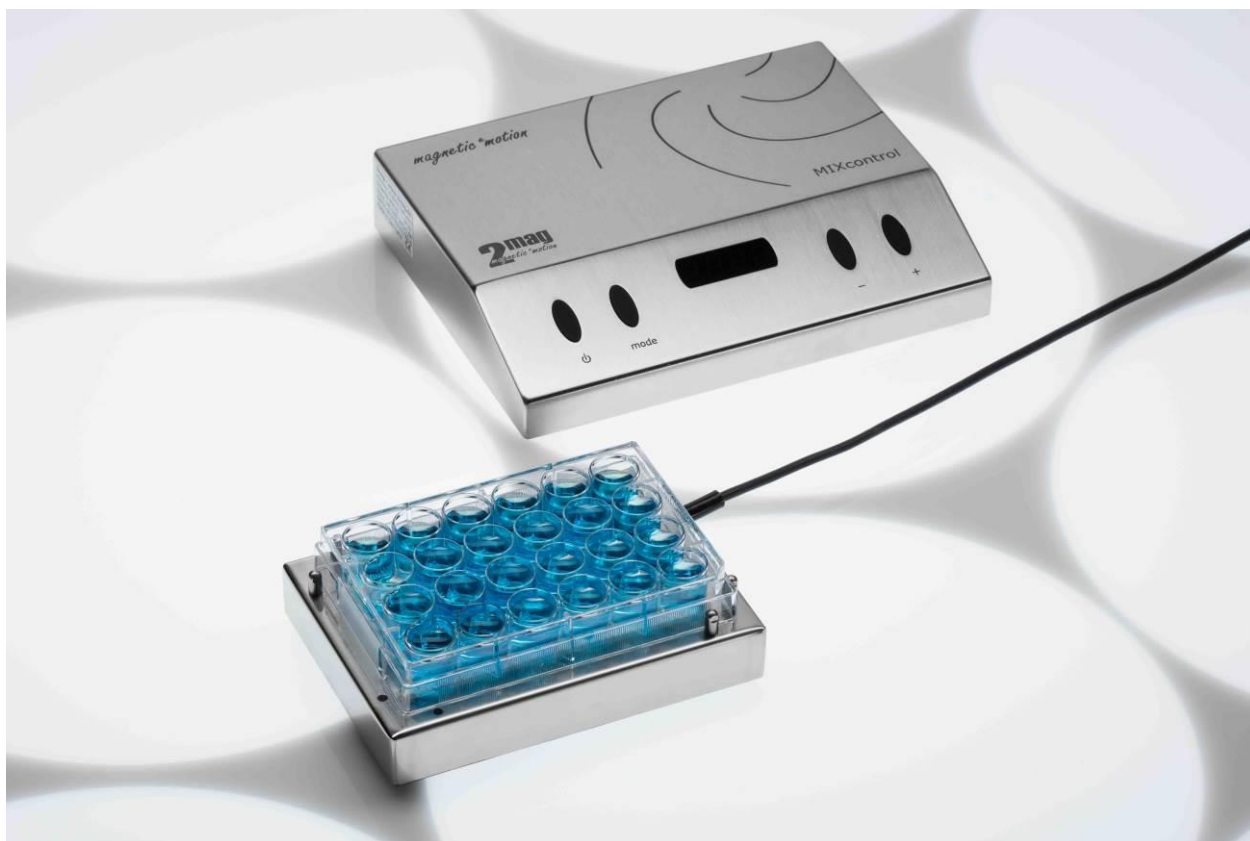


Image 1: 24-position magnetic stirrer MIXdrive 24 MTP with control unit MIXcontrol MTP

Your product contains at despatch:

- A modern inductive magnetic stirring system (**MIXdrive MTP**) consisting of a stainless steel stirring plate with 6, 12, 24 or 96 stirring points with fixed stirrer control cable (4-pin plug, with screw nut)
- An external control unit with one connector socket (**MIXcontrol eco / MIXcontrol MTP**) 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 MTP** 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 microtiter plates.

The stirrer housing is hermetically close and therefore immersible.

The maximum ambient temperature is +50°C in air and +50°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 MTP** 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 chemical resistant and where required heat-resistant microtiter plates made of plastic, glass or non-magnetic metal.

The microtiter plates should have a thin, even wall thickness and the bottoms of the wells should be thin and even.

You can use microtiter plates with the stirring point distance and maximum volume stated in the spreadsheet 1.

<b>Magnetic Stirrer</b>	<b>Stirring vessels</b>	<b>Nominal content</b>	<b>Max. amount</b>
MIXdrive 6 MTP	Microtiter plates, stirring point distance 39 mm	up to 20 ml	1
MIXdrive 12 MTP	Microtiter plates, stirring point distance 26 mm	up to 7 ml	1
MIXdrive 24 MTP	Microtiter plates, stirring point distance 19 mm	up to 3,5 ml	1
MIXdrive 96 MTP	Microtiter plates, stirring point distance 9 mm	up to 0,5 ml	1

*Spreadsheet 1:* Microtiter plates with optimal stirring point distance



**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. Please note that too long stirring bars can influence each other.

## 2.7 Tips and hints to the topic stirring

The wells 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 well.

### **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.



### 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 MTP 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.**



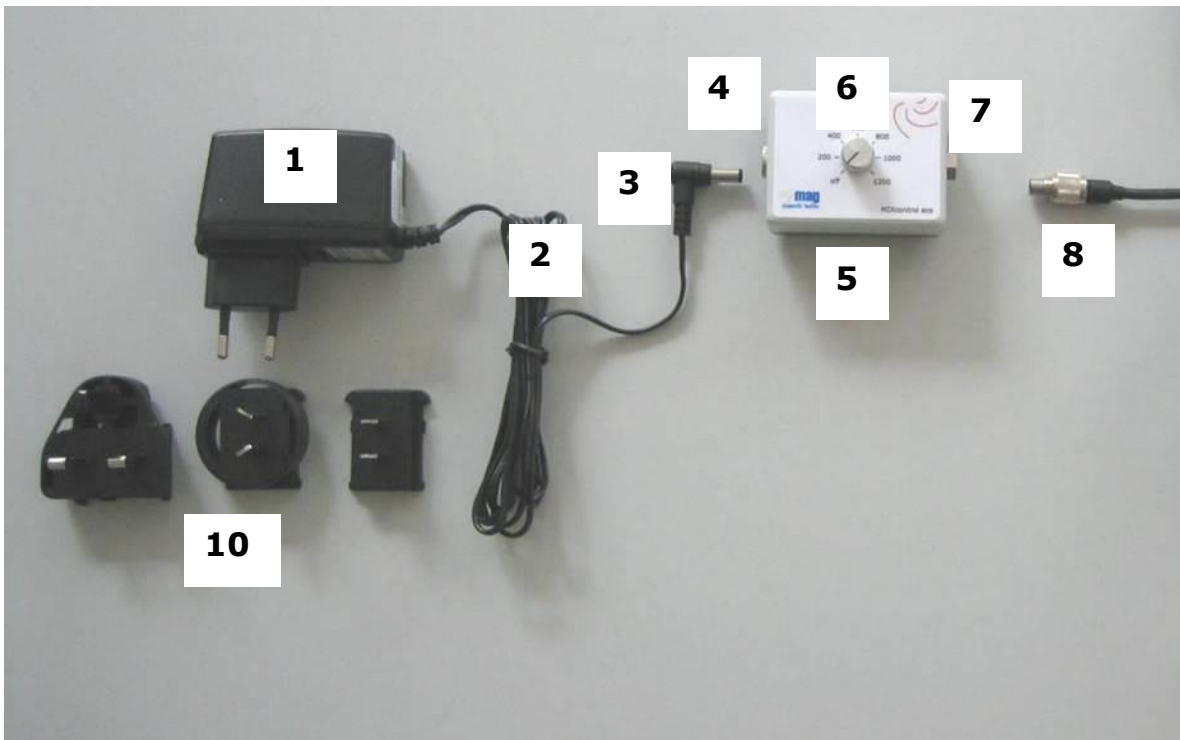
**Always turn off the power switch first before handling the connection cables.**

### 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 MTP 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 MTP 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 Changeable country-specific power adapter  
(content of delivery)

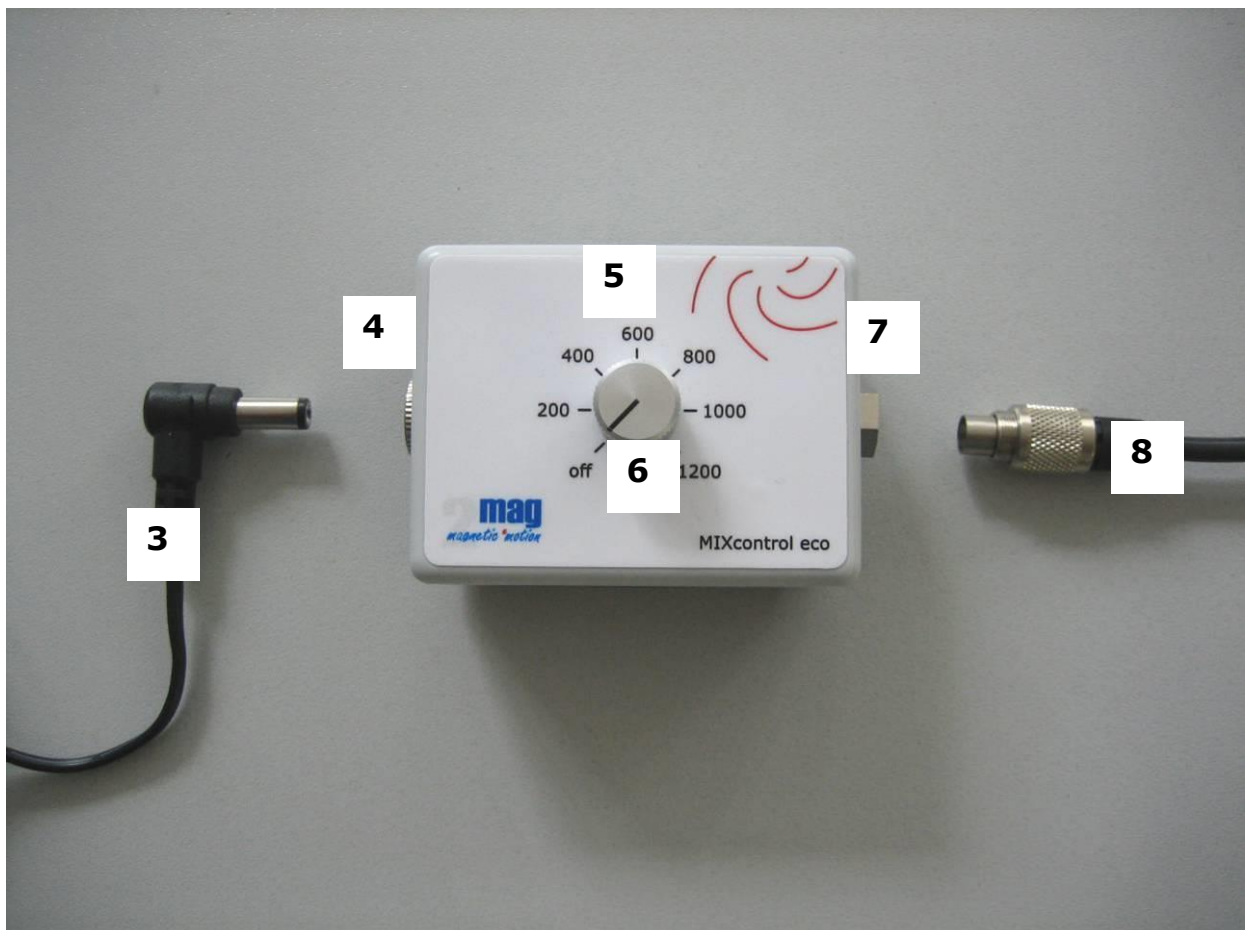


Image 3: Installation, close-up of control unit MIXcontrol eco

### 3.3 Installation, connection to control unit MIXcontrol MTP

Step by step instruction (please also see image 5)



- **Switch off the control unit MIXcontrol MTP 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 MTP 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.

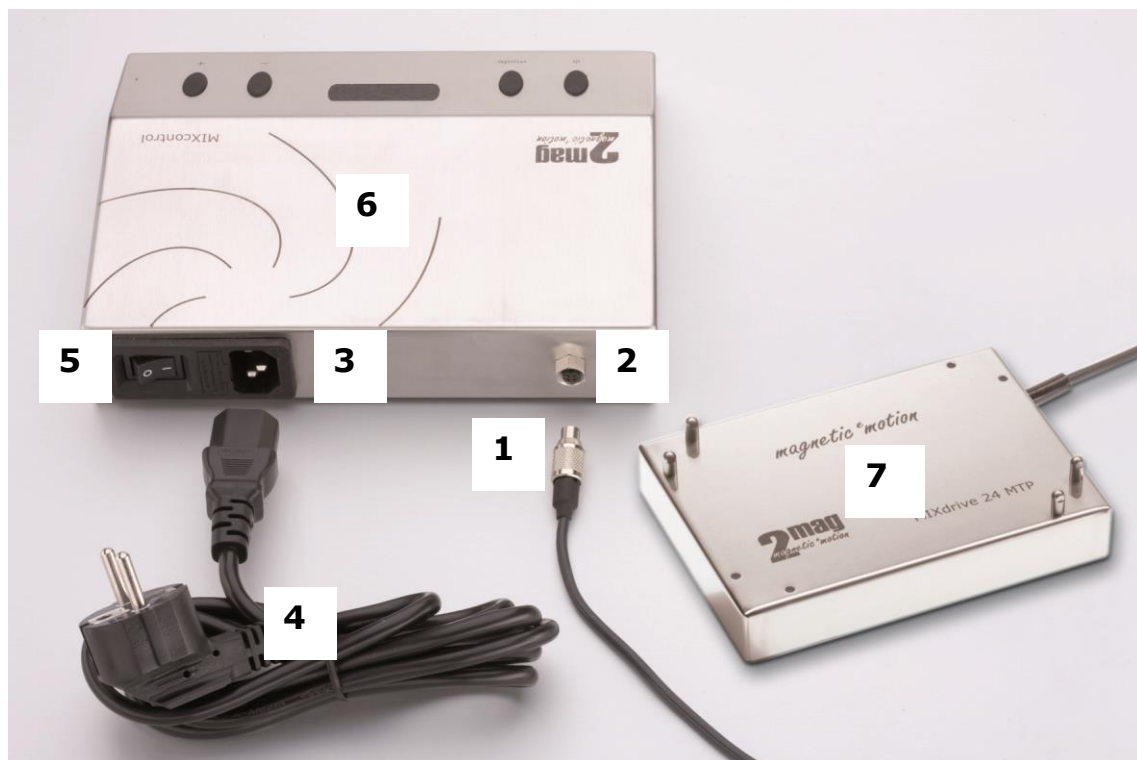


Image 4: Installation, rear side of the control unit MIXcontrol MTP

#### 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 MTP
- 7 Stirring drive unit 2mag – MIXdrive MTP

## **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.

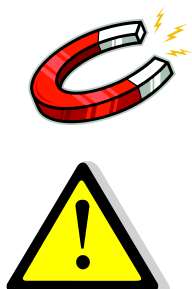
#### SoftStart

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 MTP

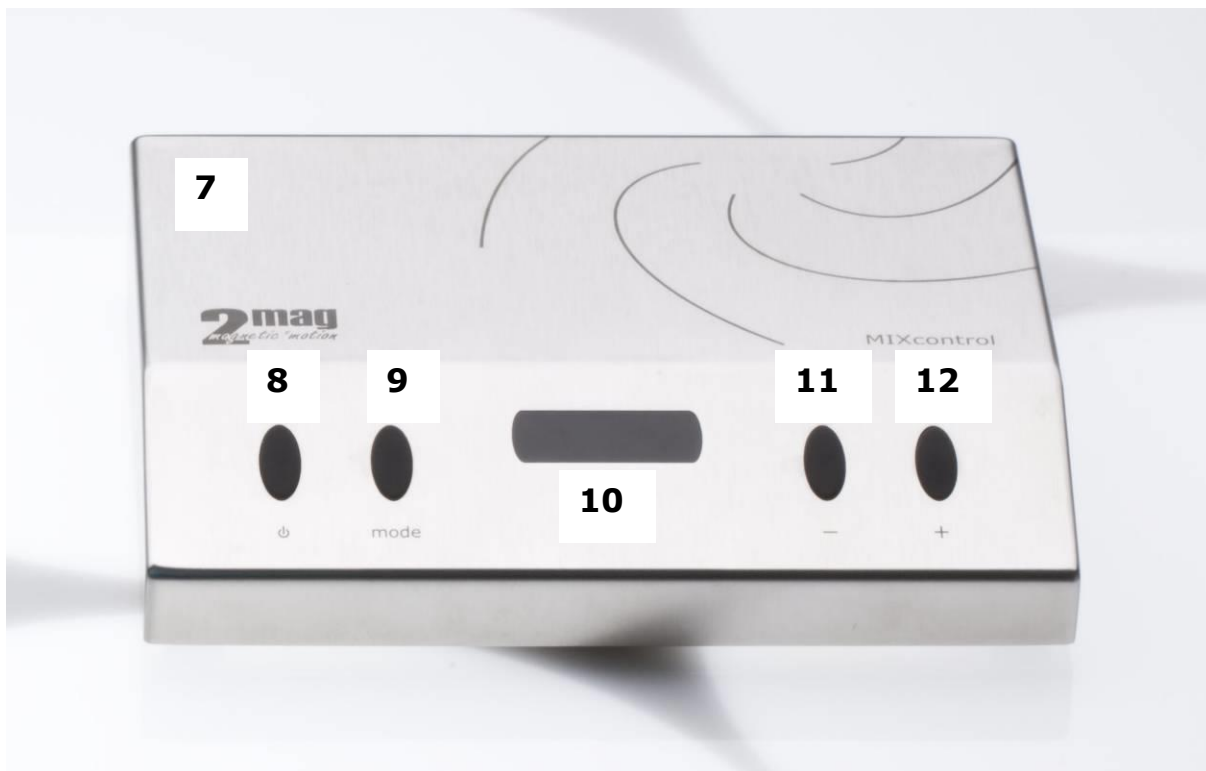


Image 6: Control unit MIXcontrol MTP

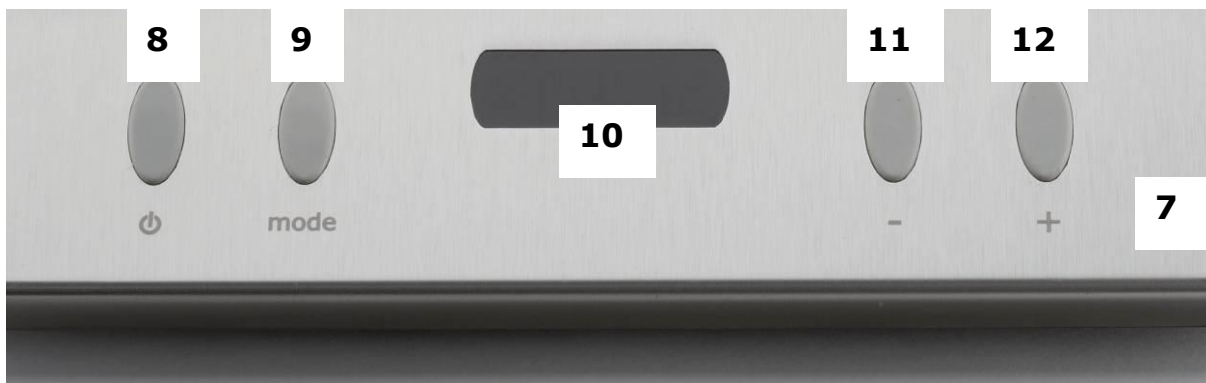


Image 7: Close-up, operating elements control unit MIXcontrol MTP

### 4.2.1 Description operating elements MIXcontrol MTP

7 Control unit 2mag - MIXcontrol MTP

#### **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 MTP will be ready for operation.

### **4.2.2 Stirring operation and stirrer control MIXcontrol MTP**

#### **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.

#### **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.

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. The optimal power setting are listed in spreadsheet 2.

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.

Optimal power setting for				
Stirring speed, rpm	MIXdrive 6 MTP	MIXdrive 12 MTP	MIXdrive 24 MTP	MIXdrive 96 MTP
100	25	25	25	-
200	25	25	25	-
300	25	25	25	-
400	25	25	25	-
500	25	25	25	100
600	25	25	25	100
700	25	25	25	100
800	25	25	25	100
900	25	25	25	100
1000	25	25	25	100
1100	25	25	25	100
1200	25	25	25	100
1300	25	25	25	100
1400	50	50	50	100
1500	50	50	50	100
1600	50	50	50	100
1700	50	50	50	100
1800	50	50	50	100
1900	50	50	50	100
2000	50	50	50	100

Spreadsheet 2: Optimal power setting depending on the stirring speed

## 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.

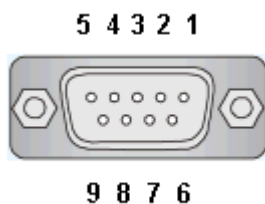
The speed and the ON-OFF function can be controlled via this interface. A special housing for a fast and easy installation on cap rails e.g. in control boxes is available, too.

#### 4.3.1 Pin-assignment, 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 Technical data

##### MIXcontrol eco

Supply voltage:	24V
Stirring power:	10 watts, not adjustable
Speed range:	100–1000 rpm

Control voltage / rpm correlation: linear

OFF	< 0,25V (ca. 0,03V hysteresis)
100 rpm	0,25V – 0,28V
1000 rpm	> 9,4V

### 4.3.3 Pin-assignment – MIXcontrol eco DINrail 0-10 volts



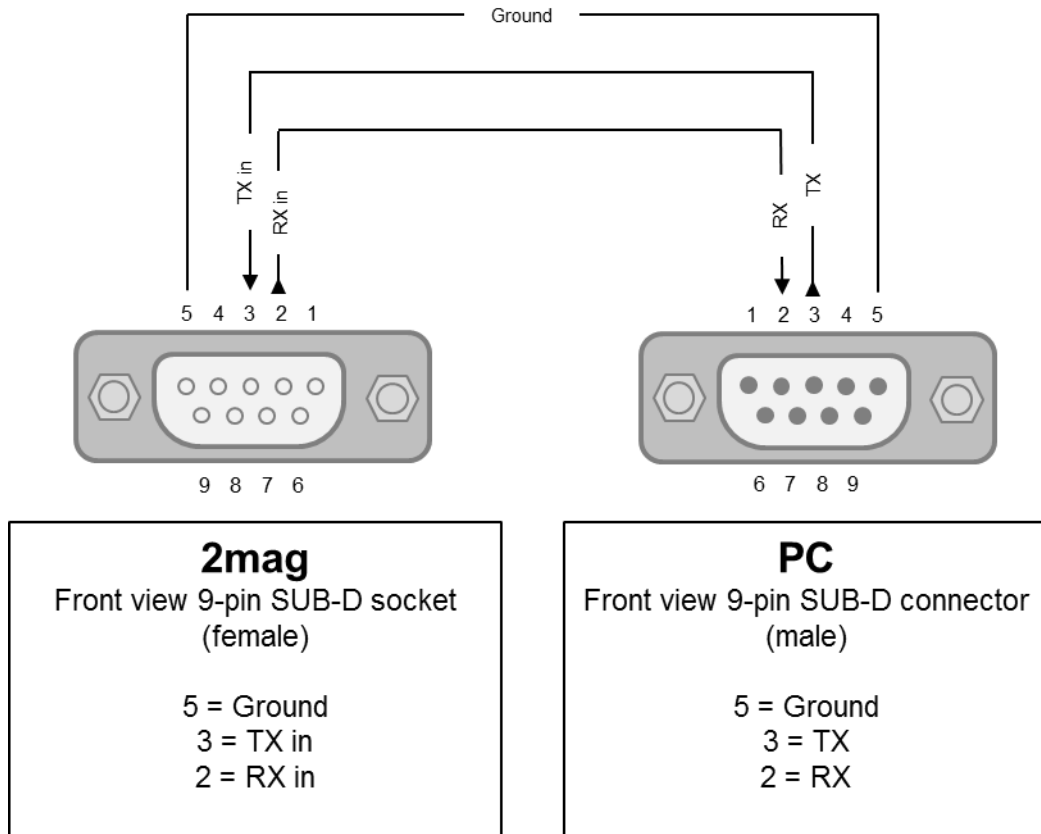
Image 8: Pin-assignment of MIXcontrol eco DINrail 0-10 volts

## 4.4 PC-Interface – RS232

The control units MIXcontrol MTP RS232 (order no. 90252) includes 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 – MIXcontrol eco DINrail RS232



Image 9: 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, e.g. 120 or 1200, (3 digits optional with leading zero e.g. 0120)
4	sendrpm/(_A)	OK_*RPM*RPM_A	*RPM*: 4 digits, values with only 3 digits with leading zero e.g. 0120 or 1200

*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.

#### 4.4.4 RS232 Commands – MIXcontrol MTP

The RS232-commands are ASCII coded and can be sent to the **MIXcontrol MTP 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, 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_VXXXX_REM_A	1. ER or OK 2. SW versions no. 3. REM/MAN/OFF (remote/manual/offline) 4. Address

*Spread sheet 4: 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.



#### 4.4.5 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)

#### 4.4.6 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 switched off in this case manually (safety switching).

#### **4.4.7 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".

#### 4.4.8 Control with HyperTerminal

The commands which are shown in spreadsheet 3 and 4 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.

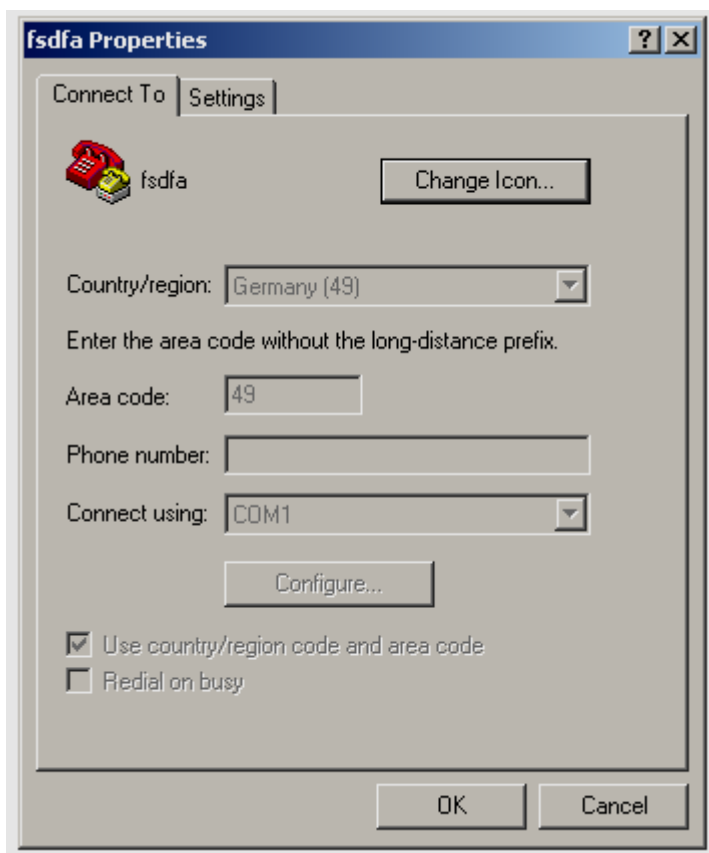
- bits per second: 9600 Baud
- 8 data bits, 1 stop bit, no parity bit
- flow control: „XON / XOFF“ or „None“

Note: Flow control via hardware handshake is not working!

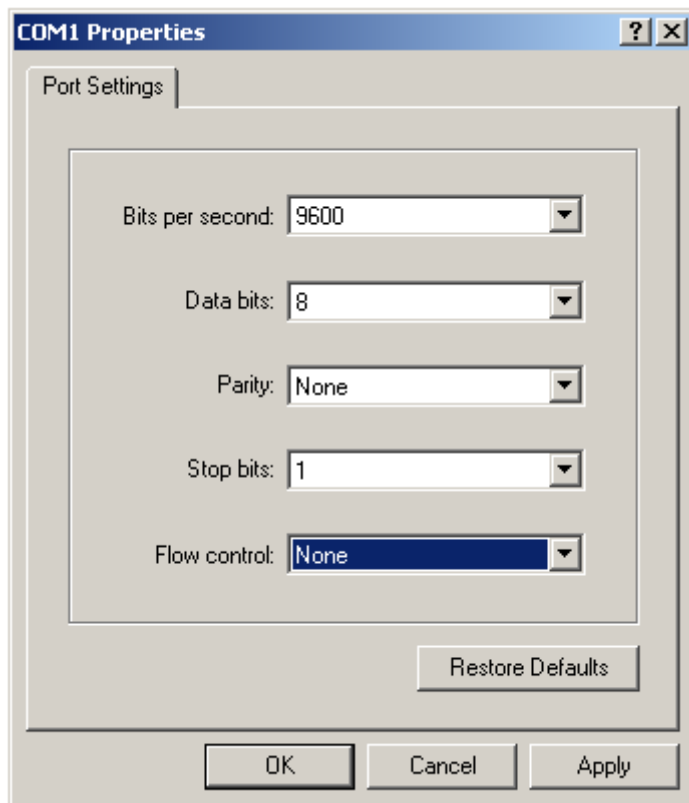
Minimum time distance between two commands: 40ms for one control unit, minimum time distance 80ms for 3 control units.

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

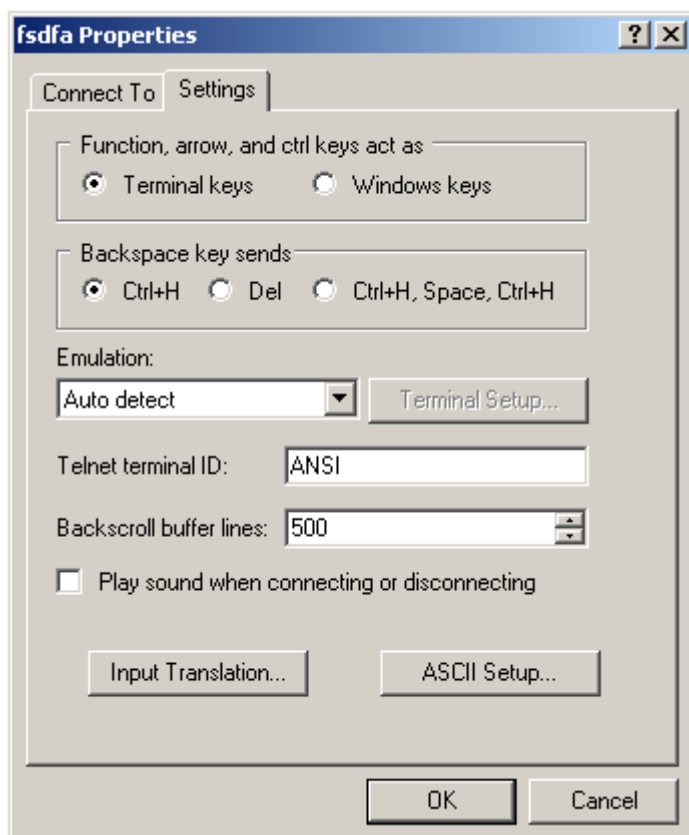
For manual sending of commands via HyperTerminal the ASCII configuration must be set which is shown in screenshot 4.



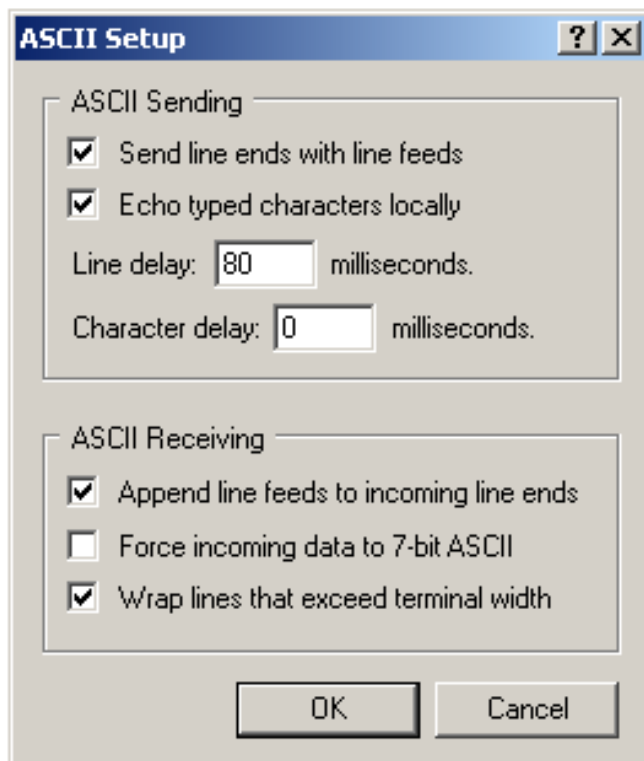
Screenshot 1



Screenshot 2



Screenshot 3



Screenshot 4

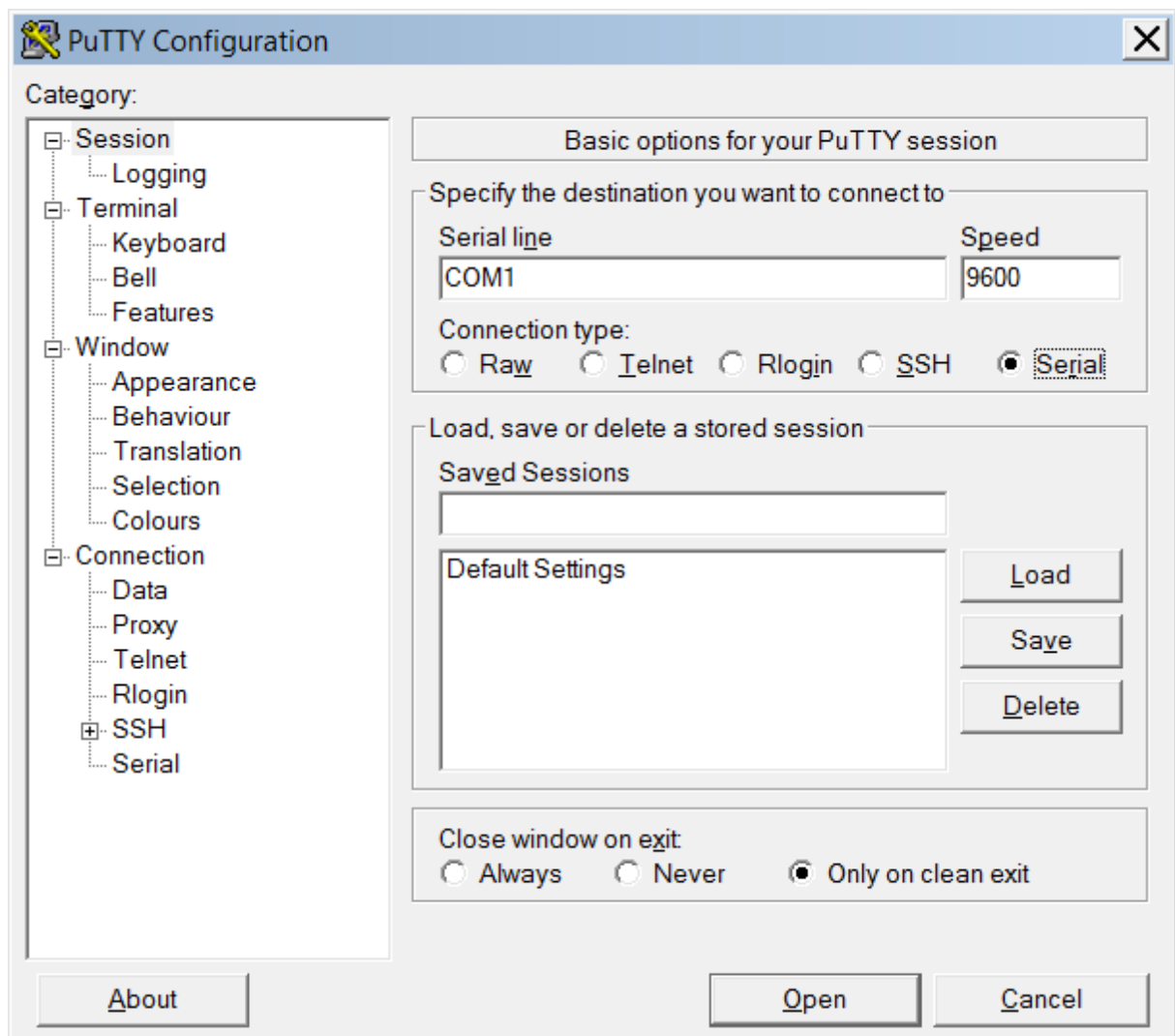
#### 4.4.9 Control with PuTTY

The commands which are shown in spreadsheet 3 and 4 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

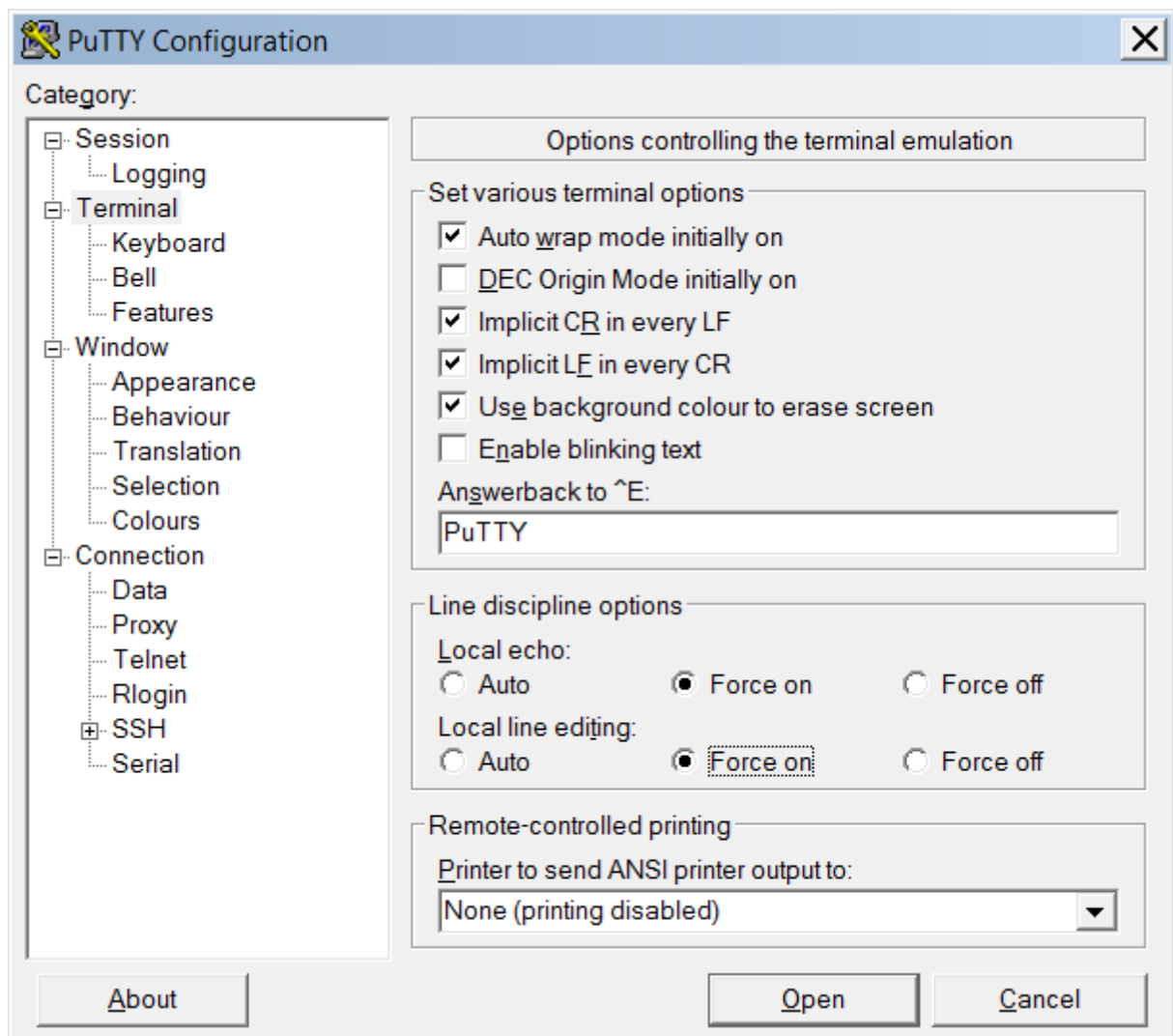
Category: "Terminal" →  
Implicit CR in every LF  
Implicit LF in every CR  
Local echo: Force on  
Local line editing: Force on

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



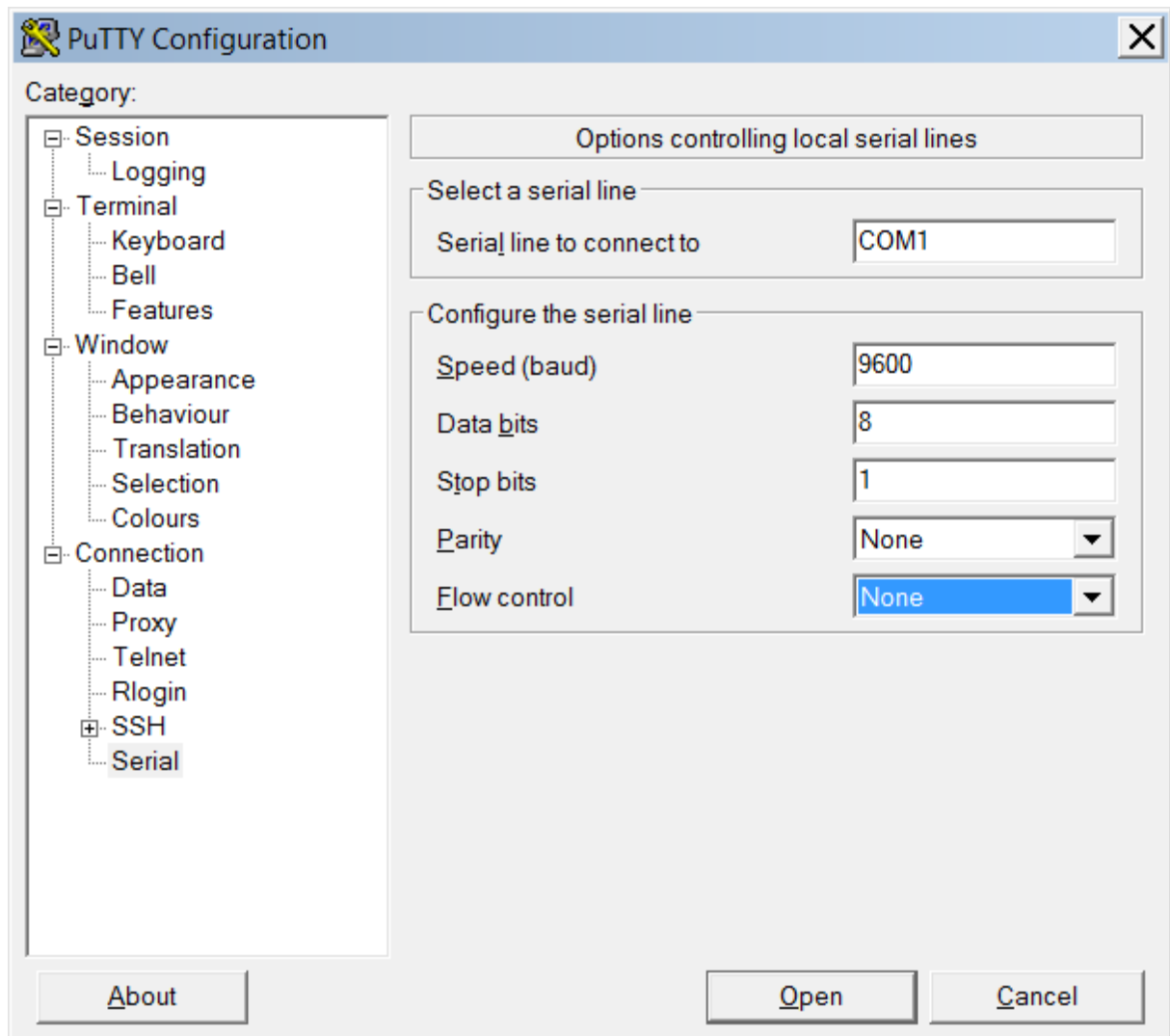
Screenshot 5:

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 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



- **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!**

## 6. Maximum operation temperatures



- **Incubator operation**  
Please note the **maximum operation temperature +50 °C** in air for the MIXdrive MTP.



- **Water bath operation:**  
Please note the **maximum operation temperature +50 °C** in water immersed for the MIXdrive MTP.

## 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.

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 MIXdrive 6 / 12 / 24 / 96 MTP

	<b>MIXdrive 6 MTP</b>	<b>MIXdrive 12 MTP</b>	<b>MIXdrive 24 MTP</b>	<b>MIXdrive 96 MTP</b>
Order no.	43006	43012	43024	43096
Stirring points	6	12	24	96
Stirring point distance	39 mm	26 mm	19 mm	9 mm
Stirring volume/point	20 ml	7 ml	3.5 ml	0.5 ml
Stirring power (max.)	10 Watt			
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)	140 x 102 x 26 mm			
Weight (gross)	approx. 1.3 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 OEM / OEM HT

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

### 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

## 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 DINrail mit Poti</b>	<b>MIXcontrol eco DINrail 0-10V</b>	<b>MIXcontrol eco 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 MTP

	<b>MIXcontrol MTP</b>
Order no.	90250
Order no. with RS232 interface	90252
Speed range	100 – 2,000 rpm
Stirring power	10 watts
Stirring power steps	4-steps (25/50/75/100%)
Voltage output	48 VDC
Housing material	stainless-steel
Measurements (WxDxH)	200 x 155 x 38 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	IP20
Electrical data	100-240 V / 50-60 Hz / 1.5 A

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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

**MIXdrive 6 / 12 / 24 / 96 MTP**

incl.  
**MIXcontrol eco / MTP**

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)