

FagronLab™ PRO-DMS

Digital magnetic hotplate stirrer

User Manual



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1. Introduction

Thank you for purchasing the digital magnetic hotplate stirrer FagronLab™ PRO-DMS. This manual contains important operating and safety information. You must carefully read and understand the contents of this manual prior to operating this device.

2. Service

In case of any problem, you can always contact the Service Department for technical support. Please provide the customer care representative with the following information:

- Serial number (on the rear panel).
- Certification.
- Description of problem.
- Methods and procedures adopted to resolve the problems.
- Your contact information.

3. Warranty

This device is under warranty and free from defects in materials and workmanship, under normal use and service, for a period of 24 months from the date of invoice. The warranty is extended only to the original purchaser. Warranty is not valid on device which has been damaged on account of improper installation, improper connections, misuse, accident or abnormal conditions of operation.

For claims under the warranty please contact your local supplier.

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4. Safety instructions



Warning!

- Read the operating instructions carefully before use.
- Ensure that only trained staff works with the device.



Risk of burn!

- Caution when touch the housing parts and the hotplate which can reach temperature of 340°C.
- Attention on the remaining high temperature after switching off.



Protective ground contact!

- Make sure that the power supply is grounded before use.

Always wear protective gloves, clothes, and glasses to avoid the risk of:

- Splashing and evaporation of liquids.
- Release of toxic or combustible gases.

Place the device in a spacious and on a stable, clean, non slip, dry and fireproof surface. Do not use the device in explosive atmospheres, with hazardous substances or under water.

Gradually increase the speed, reduce the speed if:

- Splashing, due to high speed of the stirring bar.
- The device is not running smoothly, or container moves on the base plate.

Temperature must always be set to at least 50°C lower than the ignition point.

Be aware of hazards due to:

- Flammable materials or utensil with a low boiling temperature.
- Overfilling of utensil.
- Unsafe container.

Process pathogenic materials only in closed vessels.

In case the stirrer bar is PTFE, please note:

- Elemental fluorine, three fluoride and alkali metals will corrode the PTFE and halogen alkanes make it expansion at room temperature.
- Molten alkali, alkaline earth metals or their solution, as well as the powder in second and third ethnic of the Periodic Table of Elements will have chemical reaction with PTFE when temperature reaches 300 - 400°C.
- Check the device and accessories prior to each use. Do not use damaged components. Safe operation is only guaranteed with the accessories described in the “Accessories” chapter. Accessories must be securely attached to the device and can not come off by themselves. Always disconnect the plug before fitting accessories.
- When the external temperature sensor needed, the tip of the measuring sensor must be at least 5-10mm from vessel bottom and wall.
- The device can only be disconnected from the main power supply by pulling out the main or the connector plug.
- The voltage stated on the label must correspond to the main power supply.
- Ensure that the main power supply cable does not touch the hotplate. Do not cover the device.
- The device can only be disassembled by experts.

Keep away from high magnetic field.

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5. Proper use

The device is specially designed for mixing and/or heating liquids in pharmacies, laboratories or factories.

- Observe the minimum distances between the devices, between the device and the wall and above the assembly (min. 100 mm).

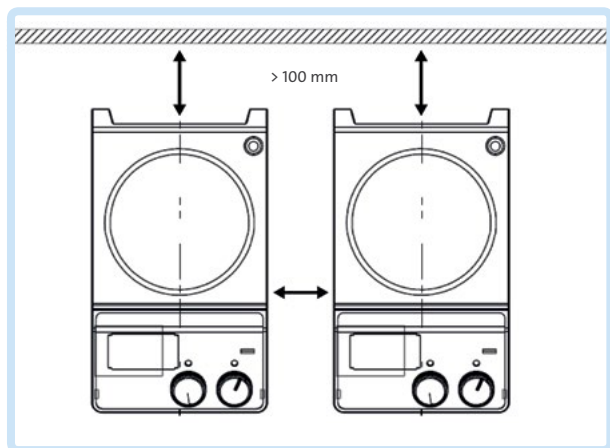


Figure 1. Minimum distance between the devices

6. Review

Unpacking

Unpack the equipment carefully and check for any damages may have arisen during transport. Please contact supplier for technical support.



Note:

- If there is any apparent damage to the system, please do not plug it into the power cable.

Listing of items

The package includes the following items:

Items	Qty
Main unit	1
Power cable	1
Magnetic stirrer	1
User manual	1

7. Trial and custom use

- Make sure that the required operating voltage matches with the power supply voltage.
- Ensure that the socket is properly grounded.
- Plug in the power cable, ensure the power is on and begin initializing.
- Add the medium into the vessel with an appropriate stirring bar.
- Place vessel on the work plate.
- Set the desirable stirring speed.
- Set the desirable temperature.
- Stop both heating and stirring functions. If these operations above are normal, the device is ready for use. If these operations are not normal, the device may be damaged during transportation, please contact supplier for technical support.
- Use a FagronLab™ magnetic rod to remove safely the stirring bar from the vessel.



Warning:

- Forbid to transfer the vessel when the device working.

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8. Control

Control elements



Figure 2. Device's control elements

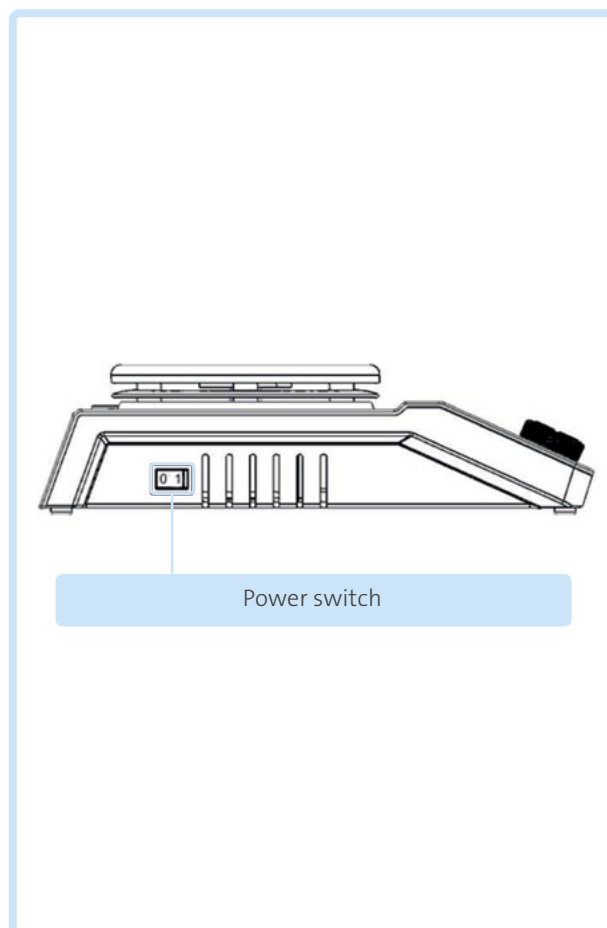


Figure 3. Power switch

Control panel

Items	Description
Stirring knob stir	Set the rated rotary speed. The function “stirring” is switched ON or OFF via pushing ON/OFF the knob
Heating knob heat	Set the rated temperature. The function “heating” is switched ON or OFF via pushing ON/OFF the knob
LCD display	LCD displays the real working state and all settings
LED heat	When the heating function is switched ON, the LED Heat is lit
LED stir	When the stirring function is switched ON, the LED Stir is lit
Power switch	Switch ON or OFF the device

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Display

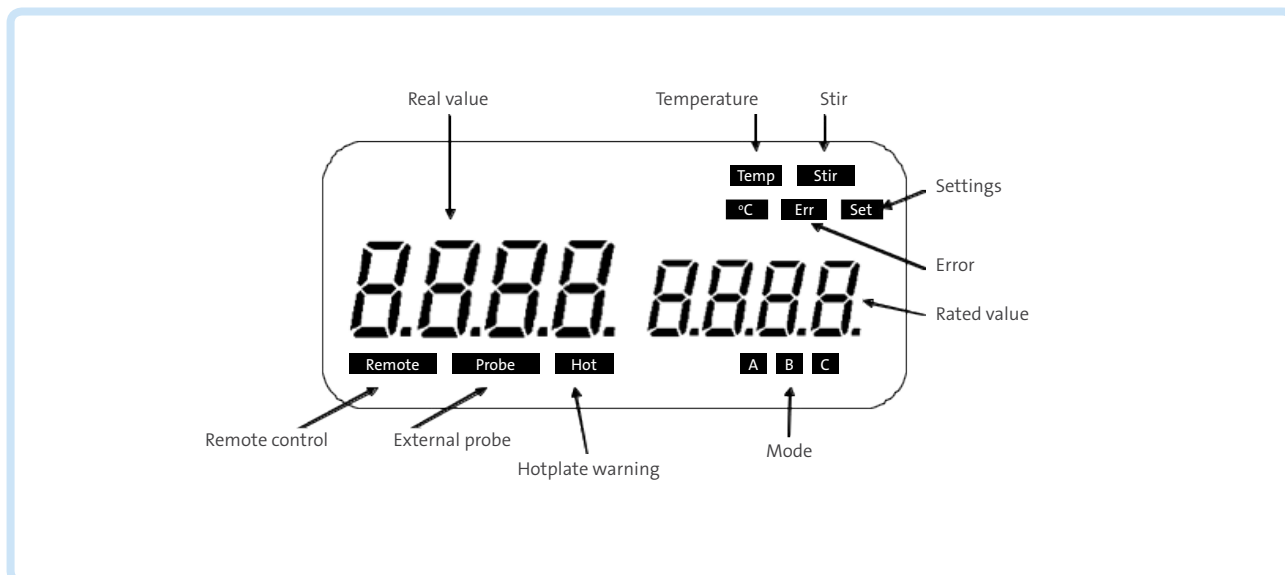


Figure 4. Device display

Characters	Description
Temp and °C	Display temperature when the heating function is switched ON
Stir	Display stirring state when the stirring function is switched ON
Hot	Display hot warning if the heating plate temperature is above 50°C after switching OFF the heating function
Probe	Display when using external probe
Remote	Display in case of remote control
Err	Display in case of an error
Rated value/Real value	Display the value of heating or stirring when function is ON



Note:

- If both heating and stirring functions have been started at the same time, heating function always has higher priority. If in this case speed is changed via the stirring knob, it displays stirring speed and reverses to temperature in the duration of 5 seconds.

9.Function

Heating

The device is controlled by digital temperature control technology, with two separate safe circuits. The hotplate is kept at a constant temperature by a digital control circuit. The hotplate temperature can also be monitored from a separate, adjustable safe circuit. The two temperature sensors (PT1000) internal for temperature control are built into the hotplate. The single external PT1000 can monitor the temperature of the sample.

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- Set the temperature via rotating the temperature control knob slowly to the target value.
- When the heating function is switched on, the LED “Heat” will light up and the LCD will display the real temperature.
- The rated temperature will be displayed on the right-hand side of the LCD as well as Temp and °C characters.
- The heating function is switched on or off by pushing heating knob.

When setting the temperature, be aware that the display temperature and the actual temperature may have the following differences:

- Hotplate center and outer edge.
- The sample container and the container.

In order to ensure the accuracy of the temperature inside the container, please use the external temperature sensor PT1000.

Working with external temperature sensor

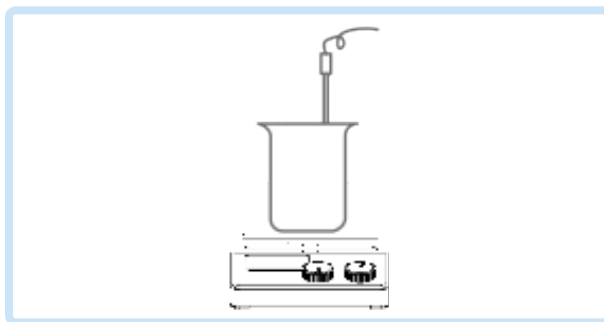


Figure 5. External temperature sensor

The external temperature sensor FagronLab™ PT1000 is the manufacture’s standard accessory. If the sensor is plugged in, “Probe” will be shown on the digital display to indicate that the sensor is operating. The value of external temperature sensor and the actual temperature are displayed. Safe circuit controls hotplate temperature. Comparing with the temperature control of the hotplate, the external temperature sensor can control the medium’s temperature more precisely.

To plug in the sensor's holder you have to remove the plastic cover.

- Turn off the device with power ON/OFF button.
- Plug in the external sensor PT1000 and follow the previous steps.



Note:

- Forbid to insert or remove the PT1000 sensor when device is switched ON!

Residual heat warning (HOT)

In order to prevent the risk of burns from the hotplate, digital hotplate has a residual heat warning function. When the heating function is switched off and the hotplate temperature is still above 50°C, “Hot” will flash on the display to warn that there is a hazard of burns from the hotplate. When the hotplate temperature drops to below 50°C, the unit will automatically switch off. If users want to turn off the LCD immediately, just unplug the power cable. When the power cable is pulled out, the residual heat warning function cannot be visual.

10. Stirring

The function “stirring” is switched on or off via pushing the stirring knob. The speed can be set by the knob (100 to 1500 rpm in steps of 10 rpm). When both of functions heating and stirring are switched on, the LCD will shift to the speed value and come back to the temperature value in about 5 seconds.

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11. Remote control

The unit can be controlled from an external PC (using the dedicated software) via the RS232C serial interface fitted to the unit. Data communication from laboratory device to computer is only possible on demand of the computer.

- The functions of the interface lines between laboratory device and automation system are selected from the specified signals of the EIA-standard RS232C, corresponding with DIN66020 Part 1. The allotment of the bushing can be taken from Figure 6.
- Transmission method: Asynchronous signal transmission in start-stop-operation.
- Mode of transmission: Fully Duplex. 1 start bit; 7 character bits; 1 parity bit [straight (even)]; 1 stop bit.
- Transmission speed: 9600 bit/s.
- Start remote control knob LCD display “ Remote ”.

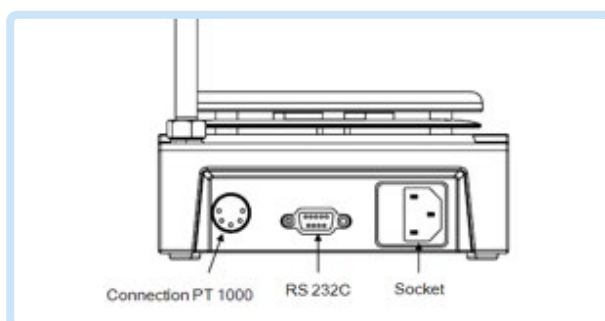


Figure 6. Connection and data communication



Note:

- Forbid to insert or remove the RS232C communication line when device is switched ON!

12. Faults

Device can not be switched ON.

- Check whether the power cable is unplugged.
- Check whether the fuse is broken or loose.

Fault in power on self test.

- Switch OFF the unit, then switch it ON again.

Stir speed cannot reach set point.

- Excessive medium viscosity may cause abnormal speed on the motor.

Heating or stirring function is not starting when knob is turning to ON.

- Switch the device OFF and then switch it ON again.
- Electronic problem, refer the problem to your supplier.

Device can not be switched OFF.

- Check if the residual heat warning function is still ON and hotplate temperature is above 50° (the LCD still work and “Hot” flash).

If the fault is still remaining, please contact supplier.

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13. Maintenance and cleaning

- Proper maintenance can keep the device working properly and lengthen its lifetime.
- Do not spray cleanser into the device when cleaning.
- Unplug the power cable when cleaning.
- Only use recommended cleansers to maximize the life of your FagronLab™ PRO-DMS device.

Substance	Cleaning agent
Dyes	Isopropyl alcohol
Construction materials	Water containing tenside / Isopropyl alcohol
Cosmetics	Water containing tenside / Isopropyl alcohol
Foodstuffs	Water containing tenside
Fuels	Water containing tenside

- Before using other method for cleaning or decontamination, the user must ascertain according to the manufacturer that this method will not harm the device. Wear the proper protective gloves during cleaning the device.



Note:

- Electronic device can not clean with cleanser.
- If you require maintenance service, the device must be cleaned in advance to avoid pollution, and be sent back into original packaging.
- If the device is going to be out of use for a long time, please switch the device off and place it in a stable, dry, room temperature and clean location.

14. Associated standards and regulations

Construction in accordance with the following safety standards:

EN 61010-1

UL 3101-1

CAN/CSA C22.2(1010-1)

EN 61010-2-10

Construction in accordance with the following EMC standards:

EN 61326-1

Associated EU guidelines:

EMC-guidelines: 89/336/EWG

Instrument guidelines: 73/023/EWG

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15. Specifications

Specifications	Measurements
Voltage [VAC]	100-120/200-240
Frequency [Hz]	50/60
Power [W]	*550 / 50
Stirring point position quantity	1
Max. stirring quantity (H ₂ O) [l]	20
Max. magnetic bar [L×Ø, mm]	80×10
Motor type	DC brushless motor
Max. power input of motor [W]	18
Max. power output of motor [W]	10
Speed range [rpm]	100-1500, increment: 10
Rotary speed display	LCD
Plate material	Stainless steel/Ceramic coated
Dimensions of workplate (mm)	Ø 135
*Heating power [W]	500
*Temperature range [°C]	RT-340, increment: 1
*Temperature display [°C]	LCD
*Temperature display accuracy [°C]	±0.1
*The safe temperature of hotplate [°C]	360
*Temperature sensor in medium	PT1000
*Control accuracy of heating temp with temp sensor [°C]	±0.2
*Residual heat warning	50°C
Dimensions (mm)	280×160×85
Weight [kg]	2.8
Permitted ambient temperature [°C]	5-40
Permitted relative humidity	80%
Protection class acc. to DIN 60529	IP42
RS232 interface	Yes

