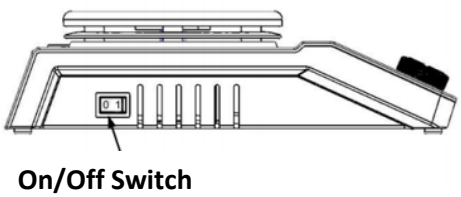
User manual M2-D Pro digital heating magnetic stirrer

Safety instruction

	• Read the instructions carefully before use • Make sure that only qualified personnel use this tool • Do not heat easily flammable or highly volatile substances
	• Be very careful when touching the heating plate. It can reach a temperature of 340 ° C. • Be careful even when the instrument has been turned off because the plate remains hot even for a long time.
	• Before use, make sure that the instrument is connected to an earthed socket

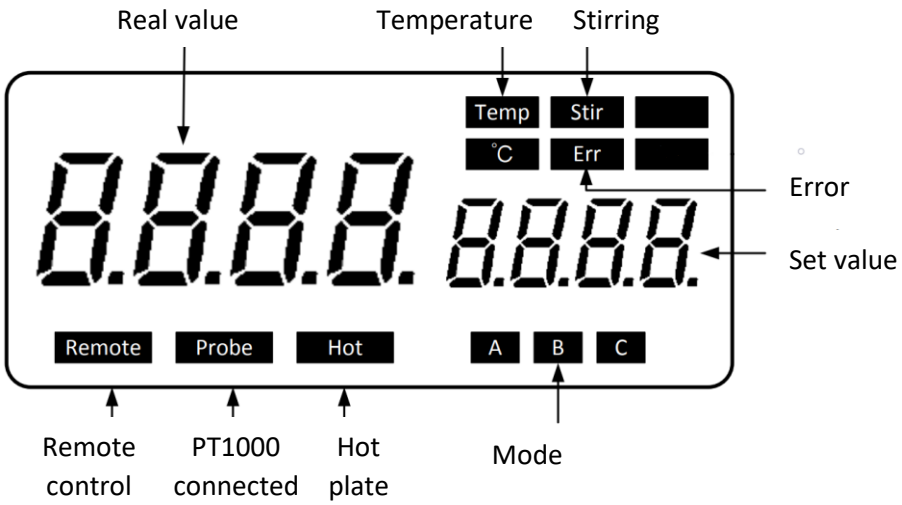
- During work, staff must prevent risks of:
  - Splashing and / or evaporation of liquids;
  - Emission of toxic or combustible gases.
- Place the instrument in a suitable area, on a stable, clean, non-slip, dry and fireproof surface;
- Do not use the instrument in explosive atmospheres, containing dangerous substances or under water;
- Gradually increase the stirring speed;
- The set heating temperature must always be at least 25 ° C lower than the combustion temperature of the heated substance used;
- Pay close attention to the risks due to:
  - Flammable materials or samples with low boiling temperature;
  - Excessive filling of samples;
  - Unsafe and / or unsuitable containers for heating;
- Use any pathogenic samples only in closed containers;
- Check that the instrument and accessories are in optimal condition before use. Never use damaged components. Optimal safety and operation are guaranteed only if the instrument and accessories described are in order. The accessories must also be firmly connected to the device;
- The instrument can be disconnected by disconnecting it from the power supply or by disconnecting the cable;
- The operating voltage indicated on the instrument label must correspond to that of the network to which it is connected;
- Make sure that the power cable does not touch the heating plate;
- The tool can only be opened by specialized technicians;
- Keep the instrument away from electromagnetic fields;
- Respect the minimum distance between the devices and between the device and the wall (minimum 10 cm).

Controls and lights



Control	Description
Stirring knob	Set the desired rotation speed between 0 and 1500 rpm. The stirring function is activated / deactivated by pressing the knob.
Stirring led	When the stirring function is active, the stirring LED is on.
Heating knob	Set the desired temperature between room temperature and 340 ° C. The heating function is activated / deactivated by pressing the knob.
Heating led	When the heating function is active, the heating LED is on.
On/Off switch	Turn the instrument on or off.
Display LCD	The LCD display shows the actual values and parameters set.

Display



Control	Description
Temp e °C	These icons appear when the function heating is active.
Stir	This icon appears when the stirring function is active.
Mode	View the working mode.
Hot	Warns of the possibility that the plate is still too much hot and therefore potentially dangerous. This function is also active when the function is deactivated heating if the plate temperature is above 50 ° C.
Probe	The external probe is connected to the instrument.
Remote	The instrument is controlled remotely.
Err	Displays an operating error.
Valore reale e valore impostato	Display of the heating and / or stirring parameters in progress.

Note: *If the heating and stirring function were started at the same time, the display of the "heating" function always has priority. If the speed is changed, the new value is displayed for 5 seconds.*

Operating modes

Operating mode A
The user can adjust the parameters via the front controls or via a PC connected to the RS232 port.
The residual temperature safety function, the safety temperature limit and the automatic braking function for detaching the magnetic anchor, can be changed.

Operating mode B
This mode is active only with an external probe connected.
The user can adjust the parameters via the front controls or via a PC connected to the RS232 port.
The residual temperature safety function, the safety temperature limit and the automatic braking function for detaching the magnetic anchor, can be changed.

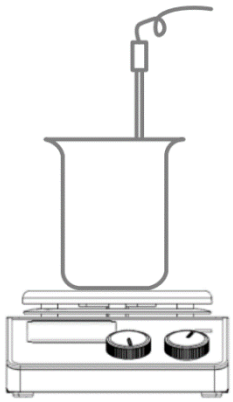
Operating mode C
The instrument keeps in memory the last speed and temperature settings set before the last shutdown.
PC remote control can be used but without the connection of the external probe.
The residual temperature safety function, the safety temperature limit and the automatic braking function for detaching the magnetic anchor, CANNOT be changed.

Heating function

The device control system is digital and the temperature control system in particular has two separate safety circuits. The plate is kept at a constant temperature by a digital control circuit. The plate temperature is monitored by two internal temperature sensors (Pt1000) integrated in the plate itself. The external Pt1000 probe is able to monitor the temperature of the heated sample.

If you need an external temperature probe, it is advisable to connect it before turning on the instrument.
Procedure:

- Make sure that any external probe is well connected to the instrument.
- Set the temperature using the adjustment knob and bring it to the desired value.
- When the heating function is active, the “Heat” LED lights up and the display indicates the real temperature.
- The set temperature will be displayed on the right side of the screen.
- The heating function is turned on / off by pressing the temperature adjustment knob.



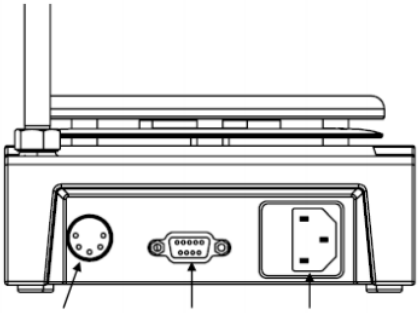
Operation with external temperature probe inserted

The word "Probe" will appear permanently on the display to indicate that the sensor is operating.

Basic stirring

The stirring function is activated or deactivated by pressing the stirring speed adjustment knob. The speed can be set between 100 and 1500 rpm in 10 rpm steps. When both functions are active and all speed adjustment operations have been performed, the display returns to the speed and temperature display in about 5 seconds.

Remote control



PT1000 connection RS232 Power connector

The instrument can be controlled from an external PC (through the appropriate software) through the RS232 serial port located on the back of the instrument.

The possible transmission of data to the PC is possible only at the request of the PC itself.

- *Transmission method: Asynchronous signal*
- *Transmission mode: Fully Duplex.*
- *Transmission speed: 9600 bit / s*

Malfunctions

• In case of instrument failure, it is recommended to turn it off;
• Turn off the main ON / OFF switch for a few seconds and turn the unit back on;
• The stirring function will continue to operate at the set speed before the fault occurs;
• The heating function will continue to operate at the set temperature before the fault occurred;
• If the problem is not resolved, contact technical support.

Cleaning and maintenance

• Proper maintenance of the instrument guarantees its good condition and extends its life;
• Disconnect the power supply cable during cleaning;
• During cleaning, be careful not to spray the detergent inside the instrument;
• Use only non-aggressive detergents that do not contain corrosive substances;
• Before proceeding with cleaning or with any decontamination, the user must ensure that the method adopted does not damage the instrument;
• Wear appropriate protections when cleaning with chemicals;
• If the instrument is to be sent to technical assistance, it is necessary to provide for proper cleaning and possible decontamination by pathogens of the same. It is also advisable to put the instrument back in its initial packaging to send it to the repair service.

Reference standards

The instrument was built in compliance with the following safety regulations:
EN 61010-1
UL 3101-1
CAN/CSA C22.2(1010-1) EN 61010-2-10

The instrument has been manufactured in compliance with the following EMC standards:
EN 61326-1

European guidelines:
EMC-guidelines: 89/336/EWG
Machine guidelines: 73/023/EWG

Technical features

Alimentation	220V – 50/60 Hz
Potenza assorbita	550 W
Maximum stirring quantity (water)	20 liters
Maximum size of the anchor	80 mm
Engine	Without brushes
Stirring speed	100 – 1500 rpm
Speed indication	LCD display
Material Working plate	Ceramic
Working plate diameter	135 mm
Heating power	500 W
Heating ramp	6 °C/min
Temperature range	From enviroment to 340 °C
Temperature indication	LCD display
Temperature resolution	0,1 °C
Temperatura accuracy	1 °C
External temperature probe	PT1000
Accuracy of temperature control with external sensor	0,2 °C
Dimensions (L x P x A)	280 x 160 x 65 mm
Weight	2,8 kg
Use temperature	5 – 40 °C
Max. Use humidity	80%
IP protection	IP42
RS232 interface	Present

Disposal of electronic devices

Electrical and electronic equipment marked with this symbol cannot be disposed of in public landfills. In accordance with EU directive 2002/96 / EC, European users of electrical and electronic equipment have the option of returning the used equipment to the Distributor or Manufacturer when purchasing a new one. Abusive disposal of electrical and electronic equipment is punished with a pecuniary administrative sanction.