

ARGO LAB M2-D Pro

Digital Hotplate Magnetic Stirrer



User Manual

ARGO LAB

Contents

1	Warranty	1
2	Safety instructions	1
3	Proper use	2
4	Inspection	2
4.1	Listing of items.....	2
5	Trial run.....	2
6	Control & Display	3
6.1	Control elements.....	3
6.2	Display.....	3
7	Initialization.....	4
7.1	Initializing sequence.....	4
7.2	Default settings.....	4
7.3	Resetting parameters to factory settings.....	4
8	Operating modes.....	4
9	Function heating	5
9.1	Work with external temperature probe	5
9.2	Residual heat warning (“HOT”).....	5
9.3	Setting the safety temperature	6
10	Function heating	6
10.1	Agitazione di base	6
10.2	Fun Stirring bar breakaway monitoring.....	6
11	Remote control	7
12	Faults	7
13	Maintenance and cleaning	7
14	Associated standards and regulations	8
16	Disposal.....	8




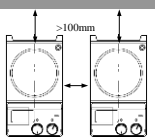
1 Warranty

Thank you for purchasing an instrument Argo Lab. This instrument is warranted under normal use for a period of 24 months from the date of purchase.

The warranty is valid only if the product is in original conditions. It does not apply to any product or parts of it that have been damaged due to incorrect installation, improper connections, improper use, accident or abnormal conditions of operation.

The manufacturer declines all responsibility for damage caused by failure to follow instructions, lack of maintenance and any unauthorized modification.

2 Safety instructions

	<ul style="list-style-type: none"> • Read the instructions carefully before use • Ensure that only qualified personnel using this tool • Do not heat flammable or highly volatile substances
	<ul style="list-style-type: none"> • Be very careful when you touch the heater plate. It can reach a temperature of 340 ° C. Pay attention even when the power has been turned off because the plate stays hot even longer.
	<ul style="list-style-type: none"> • Before use, make sure the instrument is connected to an outlet with a ground connection.
	<ul style="list-style-type: none"> • Observe the minimum distance between the instruments and between the device and the wall (minimum 10 cm).

• During the work, you must prevent the risk of:

- Sketches and / or the evaporation of liquids;
- Emission of toxic gases or combustible

• Place the instrument in a suitable area, on a stable, clean, non-slip, dry and fireproof. Do not use the equipment in explosive atmospheres, containing hazardous substances or under water

• Increase gradually the speed of agitation.

• The heating temperature must always be set to at least 25 ° C below the combustion temperature of the heated substance used

• Pay particular attention to the risks arising from:

- Flammable materials or samples with low boiling temperature
- The overfilling of samples
- Containers unsafe and / or unsuitable for heating

• The eventually use of pathogenic samples is recommended only in closed containers

• Check the instrument and accessories are in good condition before use. Never use damaged components. The safety and operating performance are guaranteed only if the instrument and accessories described are in order. Accessories must also be firmly connected to the device.

• Make sure the temperature external sensor is inserted in the sample to a depth of at least 20 mm.

• If you use a metal container, do not place the temperature sensor on the bottom of the container.

Such positioning may cause a temperature value too high to be measured especially if the sample has a low conductivity.

The tip of the sensor measurement must be at least 5 mm from the bottom of the tank, a distance of 10 mm is ideal

• The instrument can be switched off or disconnecting it from disconnecting the cable from the instrument itself ..

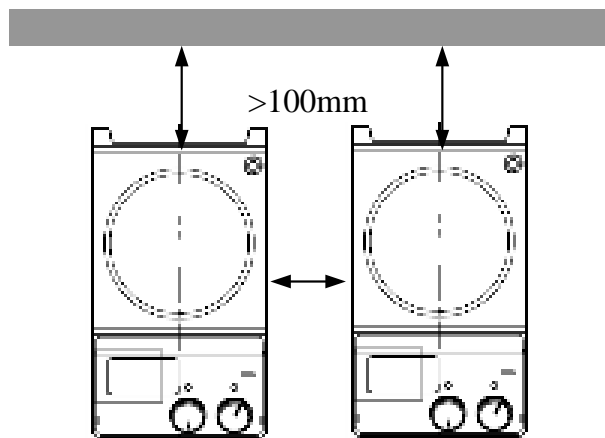
• The operating voltage indicated on the instrument must match the network to which it is connected.

• Make sure the power cord does not touch the hot plate.

• The instrument may only be opened by trained service technicians.

• Keep out of the instrument by electromagnetic fields.

• Observe the minimum distances indicated in the figure.



Picture 1

3 Proper use

The instrument has been designed to mix the liquid and / or heat them in school labs, chemical, pharmaceutical, industrial etc. This device is not suitable for use in domestic environments.

4 Inspection

Open the instrument and check that the instrument and accessories are all perfectly intact and show no signs of tampering or damage.



Note:

If there are signs of damage, do not connect and / or use the tool, but contact your dealer.

4.1 Listing of items

The instrument M2-D Pro contains:

Items	Quantity
Instrument	1
Power cable	1
Stirrer bar	2
User manual	1

Table 1

5 Trial run

- Ensure that the mains voltage corresponds to the supply required.
- Make sure the wall outlet have a proper grounding.
- Make sure the power switch is turned off.
- Connect the network cable.
- Place the solution you want to mix in a bowl with the bar magnet.
- Place the container on the plate of the instrument.
- Set the stirring speed and let it go.
- Observe the bar magnet and the LCD display.
- Set the desired temperature and start to heat.
- Observe the actual temperature on the LCD.
- Stop stirring and heating.

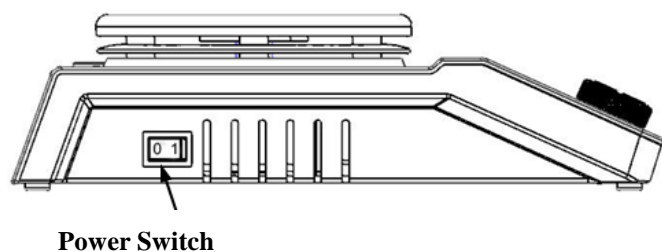
If the above operations were carried out in a normal way, the device is ready for operation. Otherwise, the device may have been damaged during transport, please contact the manufacturer for technical support.

6 Control & Display

6.1 Control elements



Picture 2

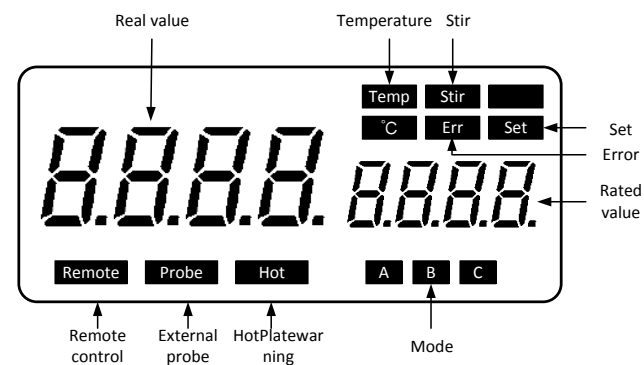


Picture 3

Items	Descriptions
Speed control knob Stir	Set the desired speed. The stirring function is activated / deactivated by pressing the knob.
Heating control knob Heat	Set the desired temperature. The heating function is activated / deactivated by pressing the knob.
“Mode” key Mode	Allows to set three different operating modes: A, B and C.
“Set” key Set	Allows you to set the various parameters of the instrument
LCD display	LCD displays the real working state and all settings.
Heating LED	When the heating function is activated, the heating LED is on.
Stirring LED	When the stirring function is activated, the stirring LED is on.
Power switch	Switch on or switch off the instrument

Table 2

6.2 Display



Picture 4

Characters	Descrizione
Temp & °C	These icons appear when the heating function is active.
Stir	These icons appear when the stirring function is active

Mode	Display mode set in the order A, B and C by pressing the "Mode" button.
Set	Press setting key to set function, and display Set characters.
Hot	Warns of the possibility that the plate is still too hot and therefore potentially dangerous. This function is active even when you turn off the heating if the plate temperature is above 50 ° C.
Probe	The external probe is connected to the instrument
Remote	The instrument is controlled by remote controller
Err	Display in case of error happening.
Rated value 、 Real value	Display value in case of heating or stirring function switching ON.

Table 3

**Nota:**

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

7 Initialization

7.1 Initializing sequence

- Turn on instrument by the power switch.
- The “Heat” and “Stir” LEDs and the LCD display flash about 3 times.
- LCD displays the workplate,s safe temperature limit in “SAFE xxx°C”.
- LCD displays residual heat warning “rES On/OFF”.
- LCD displays stirring bar breakaway monitoring “br On/OFF”.
- LCD displays operating modes(A、 B、 C).
- LCD displays the “Probe” characters in case of connecting with external temperature sensors.

7.2 Default settings

The instrument is supplied with the following default settings:

Items	Default settings
Operating mode	A
Setting temperature (°C)	25
SAFE (°C)	350
Setting rotary speed (rpm)	100
residual heat warning	On
Stirring bar breakaway monitoring	OFF

Table 4

7.3 Resetting parameters to factory settings

To reset the parameters to default settings:

- Turn off by the power switch ‘O/I’ to ‘O’
- Have the keys “Set” and “Mode” pressed down at the same time and switch on the main O/I switch. Release buttons after 5 seconds.
- The unit is now set to the factory default settings.

8 Operating modes

Stirrer M3-D can be operated in the following three operating modes:

Operation mode A

- MS-H-Pro has heating and stirring functions.
- Users can control on the front panel or by remote PC.
- Residual temperature warning, safe temperature limit and stirring bar breakaway monitoring can be set in this mode.

Operation mode B

- MS-H-Pro has heating and stirring functions, working with external temperature sensor.
- Users can control on the front panel or by remote PC.
- Residual temperature warning, safe temperature limit and stirring bar breakaway monitoring can be set in this mode.

Operation mode C

- MS-H-Pro maintains the state of the heating and stirring functions before the last switching off (mains OFF), as well as the data set last can be changed.
- Remote control can be used without supporting external temperature sensors.
- Residual temperature warning, safe temperature limit and stirring bar breakaway monitoring can't be set in this mode

9 Function heating

The control system of the device is of the digital type and the control of temperature in particular has two separate circuits of safety. The plate is kept at a constant temperature by a digital control circuit.

The temperature of the plate is monitored by two temperature sensors (Pt1000) internal integrated in the plate itself.

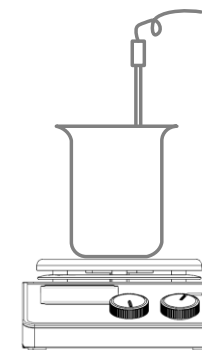
The external probe Pt1000 is able to monitor the temperature of the heated sample.

If you need the external temperature probe, you should connect it before turning the instrument.

Steps:

- Ensure that any external probe is properly connected to the instrument.
- Set the temperature using the knob and take it to the desired value.
- When the heating is on, the LED "Heat" indicator lights up and the display shows the actual temperature.
- The temperature set will be displayed on the right side of the screen.
- The power on / off of the heating function is performed by pressing the knob for adjusting the temperature

9.1 Work with external temperature probe



Picture 5

In the B mode, if the external temperature sensor is not plugged in, "Probe" will flash. If plugged in, "Probe" will be shown on the digital display to indicate that the sensor is operating. The external temperature sensors' value and actual temperature are displayed.

Compared with the temperature control of the hotplate, the external temperature sensor can control the medium's temperature more precisely.

9.2 Residual heat warning ("HOT")

In the operation mode A and B, the user can set the warning function of residual temperature too high as follows:

- Press the "Set" button until the display will flash the word "RES".

Press the knob to adjust the temperature to enable or disable the warning function of temperature is too high and the display shows "ON" or "OFF".

- Press and hold the "Set" button until the word "set" disappears.
- The warning temperature too high will be so turned on or off

This feature is designed to prevent the risk of burns and / or fire.

If the function is active when the heating is off the temperature of the plate is equal or superior to 50 ° C, the "Hot" will flash on the display to warn of possible danger. When the plate temperature drops below 50 ° C, this function will automatically turn off and the display turns off.

If the user wants to turn off the display completely from the beginning it is necessary to disconnect the main agitator, but this way of course, the warning function may not work.

9.3 Setting the safety temperature

In mode A and B, the user can set the temperature safety in this way:

- Press the "Set" button until the display will flash the word "SAFE".
- Adjust the temperature between 100 and 350 ° C by the knob for adjusting the temperature.
- Press and hold the "Set" button until the word "set" disappears.
- The safety temperature value is stored and set up properly.

10 Function heating

10.1 Agitazione di base

The stirring function can be activated or deactivated by pressing the control knob speed.

The speed can be set between 100 and 1500 rpm in steps of 10 rpm.

When both functions are active and all the operations for adjusting the speed have been performed, the display returns to the display of speed to that of the temperature in about 5 seconds.

10.2 Fun Stirring bar breakaway monitoring

In mode A and B, the user can activate the function for detecting the armature magnetic separation and automatic braking of the same as follows:

- Press the "Set" button until the display will flash the word "br".
- Press the "Set" button to enable or disable the monitoring function of the magnetic bar and the display shows "ON" or "OFF".
- Press the "Set" button until the word "set" disappears from the display.
- The automatic braking function of the jumper is set correctly.

The detachment of the armature can occur when magnetic stir solutions at too high a speed, when the solution agitated has a resistance greater than the force of the magnetic field between finger and piastrao even when the solution is too viscous.

With the agitator M2-D Pro is therefore possible to activate the automatic detection of detachment of the armature between 300 and 1500 rpm.

When the detachment occurs, the system will stop the agitation in order to recover the stir bar that may be on the edge of the beaker.

Then automatically returns the speed of the armature to the set.

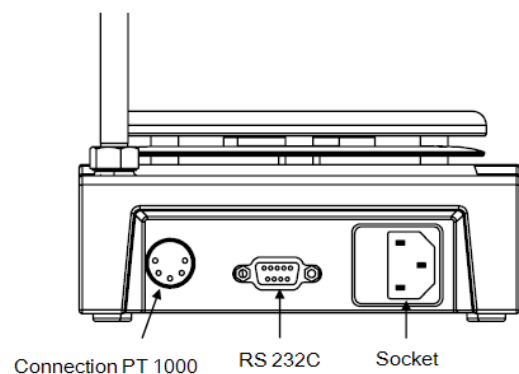
If a new detachment of the same takes place within 3 minutes dall'avvenuto reboot, the system stops the stirring again and this time the door magnetic stir bar at a speed lower than 100 rpm than the set.

The system repeats the cycle just described in an automatic lowering, if necessary, of 100 rpm each time (up to a minimum of 200 rpm), the speed of the armature until it does not rotate stably without detaching.

IMPORTANT:

You must calibrate and test the stirring bar breakaway monitoring function for your particular configuration taking into account the stirring bars, speed, vessel and medium you are using.

11 Remote control



Picture 6

The instrument can be controlled by an external PC (using the appropriate software) via the RS232 serial port on the back of the instrument.

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

• The functions of the interface lines between laboratory instrument and automation system are selected from the specified signals of the EIA-standard RS232 C, corresponding with DIN66020 Part 1. The allotment of the bushing can be taken from illustration.

• For the electrical properties of the interface lines and for the allotment of the signal status, standard RS232 C, corresponding with DIN66259 Part 1 applies.

• 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

12 Faults

• Instruments can't be power ON

- Check whether the power cable is plugged

- Check whether the fuse is broken or loose

• Fault in power on self test

- Switch OFF the unit, then switch ON and reset the instruments to factory default setting (see paragraph 7.3).

• Temperature cannot reach set point

- Check whether the safety temperature value is set too low.

• Stir speed cannot reach set point

- Check whether the stirring bar breakaway monitoring is ON

- Excessive medium viscosity may cause abnormal speed reduction of the motor.

• Heating cannot be started when push the temperature control knob, or stirring cannot be started when push the speed control knob.

- Check whether the unit is in the mode setting program,

- Exit from the mode setting and restart the heating/stirring functions.

• Unit cannot be powered off when switched off.

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

- Turn off residual heat warning function before powered OFF the unit.

If these faults are not resolved, please set the instruments to factory default setting, or take the unit to your technical service center.

13 Maintenance and cleaning

• A Proper maintenance of the instrument guarantees the condition and extend its life.

• Unplug the power cord before cleaning.

• When cleaning, be careful not to spray the cleaner inside the instrument.

• Use only mild detergent and do not contain abrasives.

• Before starting with any cleaning or decontamination, the user must ensure that the method used does not damage the instrument.

• Wear suitable protection when cleaning with chemicals

• If the instrument must be returned for service, it is necessary to provide for proper cleaning and possible decontamination by pathogens of the same. You should also put the instrument in its original packaging to send it to service center.

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

Machine guidelines: 73/023/EWG

15 Technical data

Voltage - Frequency	220V – 50/60Hz
Power	550W
Max stirring quantity (H ₂ O)	20 liters
Max magnetic bar	80 mm
Motor type	Brushless
Speed range	0... 1.500 rpm
Speed indication	Digital display LCD
Speed display accuracy	1 rpm
Hotplate material	Stainless steel
Hotplate diameter	Ø 135 mm
Heating power	500 W
Heating rate	6 [°C/min]
Temperature range	RT to 340 °C
Temperature indication	Digital display LCD
Temperature display accuracy	0,1 °C
Control accuracy of heating temperature	1 °C
Safety temperature range	100 ÷ 350 °C
External temperature probe	PT1000
Control accuracy of heating temperature with external temperature probe	0,2 °C

Dimensions (L x P x A)	280 x 160 x 85 mm
Weight	2,8 kg
Permitted ambient temperature	5 ÷ 40 °C
Permitted relative humidity	80%
Protection class IP	IP42
RS232 interface	Yes

Table 5

16 Disposal



Information regarding the disposal of electrical and electronic equipment European Union.

Electrical and electronic equipment marked with the symbol on the side cannot be disposed of in landfills.

In accordance with EU Directive 2002/96/EC, the European users of electrical and electronic equipment have the opportunity to give back to the distributor or manufacturer upon purchase of a new one.

The illegal disposal of electrical and electronic equipment is punished with an administrative fine.