

# Magnetic Stirrer with hot plate Intelli-Stirrer MSH-300i

*Operating instructions*

*For version V.2GD*





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# 1. Safety

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The following symbols mean:



**Caution!** Read these operating instructions fully before use and pay particular attention to sections containing this symbol.



**Caution!** Surfaces can become hot during use.



**Attention Magnetism!** Effects of a strong magnetic field on the biological systems have to be taken in to account. Magnetic fields can affect heart pacemakers, data carriers, etc.

## GENERAL SAFETY

- ☞ Use only as specified in the operating instructions provided.
- ☞ The unit should not be used if dropped or damaged.
- ☞ After transport or storage allow the unit to dry out (2-3 hrs) before connecting to the mains.
- ☞ Before using any cleaning or decontamination method except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- ☞ Do not attempt to modify the unit.

## ELECTRICAL SAFETY

- ☞ Connect only to the mains with a voltage corresponding to that on the serial number label.
- ☞ Do not plug the unit into the mains outlet without grounding, and do not use extension lead without grounding.
- ☞ Ensure that the mains switch and plug are easily accessible during use.
- ☞ Before moving, disconnect the power plug from the mains outlet.
- ☞ If liquid is spilled inside the unit, disconnect it from the mains and have it checked by a competent person.

## DURING OPERATION

- ☞ Do not start operation at maximum speed.
- ☞ Do not operate the unit in environments with aggressive or explosive chemical mixtures.
- ☞ Do not operate the unit if it is faulty or been incorrectly installed.
- ☞ Do not leave the operating unit unattended.
- ☞ For indoor use only.
- ☞ Do not use outside laboratory rooms.
- ☞ Do not allow alkaline liquid to get on an aluminum surface. Alkali can damage aluminum surfaces.
- ☞ If the display shows the reading "ERRORX" accompanied by the repetitive sound signal switch off the unit and have unit checked by a competent person.

## BIOLOGICAL SAFETY

- ☞ It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or inside the equipment.

## 2. General Information

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Magnetic Stirrer with hot plate Intelli-Stirrer MSH-300i is designed for effective stirring and heating of different reagents.

MSH-300i is a digital version of a magnetic stirrer with heating; it is designed for laboratories with higher requirements. It offers digital setting and control of temperature and rotation speed. A powerful magnet allows mixing solutions with glycerine viscosity level. Maximum volume of stirred liquid (water) is 20 litres. An external probe provides direct control of the stirred liquids temperature.

The unit is designed for operation with different size magnetic stirring elements (length from 20 to 70 mm). It provides liquid stirring with the rotating magnetic element up to 1250 RPM (max. speed depends on the magnetic element size, stirred volume, viscosity, glassware shape, etc.).

### FEATURES:

- Intelligent mixing (low acceleration);
- Integrated temperature control by external probe;
- Bushing K type miniature connector for connecting external probe;
- Easy set-up and control;
- Overtemperature protection and temperature sensor failure detection.

### APPLICATION FIELDS:

- CHEMISTRY: stirring reaction ingredients during the fine organic synthesis, research in the organic catalysis field, different viscosity chemical reagents dissolving.
- BIOCHEMISTRY: solutions preparation, dialyze, salt and alcohol sedimentation of macromolecules, gradient forming in the column chromatography, etc.
- SOIL SCIENCE: biological and chemical substances and samples extraction, research of the soil and ground chemical and biochemical compounds.
- BIOTECHNOLOGY: as a minireactor in the micro-organism cells cultivation, culture medium preparation, titration, etc.

# 3. Getting started

## 3.1. Unpacking.

Remove packaging carefully and retain for future shipment or storage of the unit.

## 3.2. Complete set. The unit set includes:

### Standard set

- Magnetic Stirrer with hot plate Intelli-Stirrer MSH-300i ..... 1 pce.
- Magnetic stirrer bar\* ..... 1 pce.
- Attachable retort stand SR-1 ..... 1 pce.
- Power cord..... 1 pce.
- Spare fuse (inside fuse holder) ..... 1 pce.
- Operating instructions, Declaration of conformity ..... 1 copy

### Optional accessories

- Clamp ❶ ..... on request
- Double clamp ❷ ..... on request
- External probe (K type thermocouple) ❸ ..... on request



\* Cylinder-shape Magnetic stirrer bar (6x25mm) for universal use, encapsulated in PTFE.

## 3.3. Set up:

- place the unit on an even horizontal non-flammable surface away from any flammable materials (not less than 30 cm);
- plug the mains cable into the socket on the rear, and position the unit so that there is easy access to the mains switch and plug.

## 4. Operation of MSH-300i

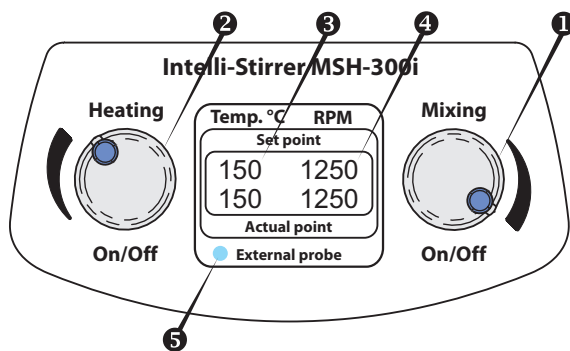


Fig.1 Control panel

### Recommendation during operation

Using the unit for the first time or after storage, set heating temperature to 100°C and preheat the plate during 30 min, it will help to reduce moisture inside the unit.

- 4.1. Connect the unit to the mains outlet which provides a safety earth (ground) terminal.
- 4.2. Switch on the **Power** switch (I position) located on the rear panel of the unit.
- 4.3. On the display shows the following readouts:
  - on the upper line Set point: temperature mode indication (OFF) or previously set temperature (fig.1/●) of a heating surface or liquid (if external probe is activated) and set speed of magnetic stirring element (fig.1/●) in the upper line;
  - on the lower line Actual point: current temperature of the surface or liquid (if the external probe is active) and current speed in the lower line.
- 4.4. Place a glass or another chemical vessel with liquid on the working plate and place magnetic stirrer element in it.





**Note!** Vessel must be with flat bottom, that tightly fits to the working surface of the magnetic stirrer.

#### **Plate temperature control**

- 4.5. Using the **Heating** knob (Fig. 1/②) switch On and adjust the temperature to the necessary level (in range from 30°C to 330 °C).

#### **External probe temperature control**

- 4.6. Connect the external probe to the unit via K type connector located on the rear side of the unit. External probe lamp indicator lights up on the control panel (fig.1/⑤), now the temperature control proceed via external probe.
- 4.7. Dip the external probe into the vessel with liquid.  
Using the **Heating** knob (Fig. 1/②) switch On and adjust necessary liquid temperature (in range from 20°C to 150 °C).  
Desired temperature maintaining will proceeds by an external thermoregulation probe.



**Caution!** The flashing lamp indicator (Fig.1/⑤) show that external probe is not dipped into the liquid and the plate temperature achieves and maintains 340°C temp. This can lead to an emergency situation, dip the external probe into liquid or switch off the unit.

- 4.8. Using the **Mixing** knob (Fig. 1/①) switch On and adjust the speed to the necessary level (100 - 1250 RPM).



**Caution!** Do not touch surfaces which becomes very hot during operation to avoid burns.

- 4.9. After work switch Off **Mixing** and **Heating** knobs, switch off the unit with power switch (O position) at the rear panel.
- 4.10. Disconnect the unit from the mains outlet.

## 5. Fault diagnosis

Symptom	Possible Cause	Action required
Unit does not operate	Unit not switched on	Switch on
	Unit not plugged to the mains	Plug in to the mains, switch on
	Mains failure	Check that other electrical appliances on the same circuit are working
	Fuse blown in the unit	Check and replace - see 7.3.
Operating with the external probe temperature does not rise when expected	Set temperature is lower than liquid temperature	Check set temperature
	Temperature control circuit fault	Have unit checked by a competent person
Display shows the reading "ERRORX" accompanied by the repetitive sound signal	Plate internal temperature sensor fault	Switch off the unit and have unit checked by a competent person
Operating with external probe, temperature rise when current temperature on the display stay the same	Thermal contact loose with heated liquid	Provide an external probe contact with heated liquid
	Temperature control circuit fault	Have unit checked by a competent person
Stirring element does not mix but breaks away	Set mixing speed is too high	Restart mixing and reduce the speed
	Stirring element magnetic properties decreasing	Return initial magnetic properties of the stirring element according to p. 7.4 or replace it.

# 6. Specifications

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## 6.1. Temperature specification

The product is designed for operation indoors in a laboratory at altitudes up to 2000 m, with ambient temperature from +4°C to +40°C and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

- Plate temperature setting range ..... +30°C ... +330°C (increment 1°C)
- Temp. setting range by external probe .....+20°C ... +150°C (increment 1°C)
- Working plate heating till max.....11 min

## 6.2. General specification

- Speed setting range .....100 - 1250 RPM (increment 10 RPM)  
(max. speed depends on the magnetic element size, stirred volume, viscosity, glassware shape, etc.)
- Maximal continuous stirring time .....168 hours (7 day nights)
- Max. stirring volume .....20 l
- Operation with magnetic stirring elements of length ..... 20 - 70 mm
- Max.viscosity of stirring liquid .....1170 mPa·s
- Plate material .....aluminium alloy
- Working plate size ..... Ø160 mm
- Attachable stand SR-1 height .....320 mm
- Dimensions .....270x190x100 mm
- Operating voltage / power consumption.....230V; 50/60Hz / 550W (2.4 A)  
or 120V; 50/60Hz / 550W (4.6 A)
- Weight, not more .....3.3 kg

<b>Optional accessories</b>	<b>Description</b>
Double clamp	for clamp securing
Clamp	for external probe securing
External probe	Connection type K. A cable is covered with Teflon, mechanically strong, elastic and chemically stable against oils, acids, aggressive reagents and liquids. Operation temperature range -50°C to +250°C, cable length 1 m.

<b>Replacement parts</b>	<b>Description</b>
SR-1	Attachable retort stand, height 320 mm
Magnetic stirrer bar	Cylinder-shape (6x25mm) for universal use, encapsulated in PTFE

Grant is committed to a continuous programme of improvement, specifications may be changed without notice.

# 7. Guarantee and Service

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## 7.1. Guarantee

When used in laboratory conditions and in accordance with the instructions provided, this product is guaranteed for TWO YEARS against faulty materials or workmanship.

## 7.2. Service

There are no user-serviceable parts inside the unit. For all maintenance and repairs (except as defined below) return to our service department in the UK or in other countries, our distributor.

## 7.3. Technical Maintenance

*Replacement of fuses.* Disconnect from the outlet.

Remove the power plug from the rear of the unit. Pull out the fuse holder by applying leverage in recess (Fig.2/A). Remove the fuse from the holder. Check and replace with the correct fuse if necessary (for 230 V - 3,15A or for 120 V - 6.3 A)

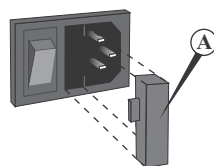


Fig.2 Fuse replacement

7.4. The MSH-300i can be used to restore the magnetic properties of other stirring magnets that are used in liquids. Reduction of magnetic properties can occur if magnets are stored together or used in temperatures above 200°C. To restore a magnet, place it at the centre of the MMS-300 working service and leave for 8 - 12 hours.

## 7.5. Cleaning

Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and disinfection of the unit.

# Declaration of Conformity

<b>Equipment name:</b>	<b>Intelli-Stirrer MSH-300i</b>
<b>Type of equipment:</b>	Magnetic Stirrer with Hot Plate
<b>Directive:</b>	EMC Directive 2014/30/EC Low Voltage Directive 2014/35/EC RoHS 2011/65/EC WEEE 2002/96/EC & 2012/19/EU
<b>Manufacturer:</b>	SIA BIOSAN Ratsupites 7, build.2, Riga, LV-1067, Latvia
<b>Applied Standards:</b>	<b>EN 61326-1:</b> Electrical equipment for measurement, control and laboratory use EMC requirements. General requirements. <b>EN 61010-1:</b> Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements. <b>EN 61010-2-010:</b> Particular requirements for laboratory equipment for the heating of materials. <b>EN 61010-2-051:</b> Particular requirements for laboratory equipment for mixing and stirring.

We declare that this product conforms to the requirements of the above Directive(s)

  
\_\_\_\_\_  
Signature  
Svetlana Bankovska  
Managing director

28.01.2015  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Signature  
Aleksandr Shevchik  
Engineer of R&D

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