



Medical–Biological
Research & Technologies

Intelli-Stirrer MSH-300i

Magnetic Stirrer with hot plate



**Operating Manual
Certificate**

for versions:
V.3AD
V.3AE

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1. Safety Precautions

The following symbols mean:



Caution!

Make sure you have fully read and understood the present Manual before using the equipment. Please pay special attention to sections marked by 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 pace - maker, data carriers, etc.

GENERAL SAFETY

- Use only as specified in the Operating Manual provided.
- The unit should be saved from shocks or falling.
- After transportation or storage keep the unit under room temperature for 2-3 hrs before connecting it to the electric circuit.
- Use only cleaning and decontamination methods recommended by the manufacturer.
- Do not make modifications to the design of the unit.

ELECTRICAL SAFETY

- Connect only to electric circuit with voltage corresponding to that on the serial number label.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.
- Ensure that power switch and plug are easily accessible during use.
- Disconnect the power cord plug from the power socket before moving.
- If liquid penetrates into the unit, disconnect it from the electric circuit and have it checked by a repair and maintenance technician.
- Do not operate the unit in premises where condensation can form. Operating conditions of the unit are defined in the Specifications section.

DURING OPERATION

- Do not start operation at maximum speed.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures. Please contact manufacturer for possible operation of the unit in specific atmospheres.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not leave the operating unit unattended.
- Do not use outside laboratory rooms.
- Avoid spilling alkaline solutions on an aluminum surface. Alkali can damage aluminum surfaces.
- If the display shows the "ERRORX" indication, accompanied by the repetitive sound signal, switch off the unit and have unit checked by a repair and maintenance technician.

BIOLOGICAL SAFETY

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

2. General Information

Intelli-Stirrer MSH-300i magnetic stirrer with hot plate is designed for simultaneous stirring and heating of different reagents.

MSH-300i is a digital version of magnetic stirrer with heating; it is designed for laboratories with high 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 (20-70 mm long). It provides liquid stirring with the magnetic element rotation speed 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;
- K type miniature connector for connecting external probe;
- Easy set-up and control;
- Overtemperature protection and temperature sensor failure detection.
- Software overtemperature protection function of the samples (over 30°C).

APPLICATION FIELDS:

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

3. Getting started

3.1. Unpacking.

Remove packing materials carefully and retain them for future shipment or storage of the unit.

Examine the unit carefully for any damage incurred during transit. The warranty does not cover in-transit damage.

3.2. Complete set. Package contents:

Standard set

- Intelli-Stirrer MSH-300i magnetic stirrer with hot plate 1 pce
- magnetic stirring element* 1 pce
- SR-1 attachable stand 1 pce
- power cord 1 pce
- spare fuse (inside fuse holder) 1 pce
- Operating manual, Certificate 1 copy

Optional accessories

- SKM2 clamp ❶ on request
- DPMD double clamp ❷ on request
- external probe (K type thermocouple) ❸ on request



* Multipurpose cylindrical magnetic stirring element (6x25 mm), encapsulated in PTFE.

3.3. Set up:

- place the unit upon even horizontal non-flammable surface at least 30 cm away from any flammable materials;
- remove protective film from the display;
- plug the power cord into the socket on the rear, and position the unit so that the power switch and the plug are easily accessible.

3.4. SR-1 stand installation

Remove the screw on the fixing socket at the stirrer back (fig.1/1) and retain for future. Screw the part of the stand with the counter-nut into the fixing socket and secure with the counter-nut. Screw in the second part of the stand into the attached first part.

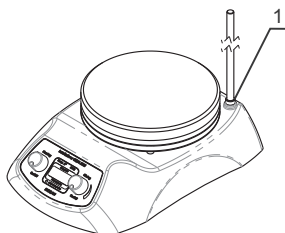


Fig. 1 Stand installation

4. Operation

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 a properly grounded power socket.
- 4.2. Switch on the power switch (I position) located on the rear panel of the unit.
- 4.3. The following readouts will be shown on the display:

on the upper line **Set point**: temperature mode indication (OFF) or previously set temperature (fig.2/3) of a heating surface or liquid (if external probe is activated) and set speed of magnetic stirring element (fig.2/4);

on the lower line **Actual point**: current temperature of the surface or liquid (if the external probe is active) and current speed.

- 4.4. Place a glass or another chemical vessel with liquid on the working plate and dip magnetic stirrer element in it.



Note!

Vessel must be flat-bottomed and fit tightly to the working surface of the magnetic stirrer.



Plate temperature control

- 4.5. Using the **Heating** knob (Fig. 2/2) switch the heating **On** and set the required temperature (in the 30 to 330°C range).



Note!

The heating will be switched off when the actual temperature exceeds the set temperature over 30°C. Actual temperature readings (Actual point) will start flashing until reaches the set temperature (Set point).

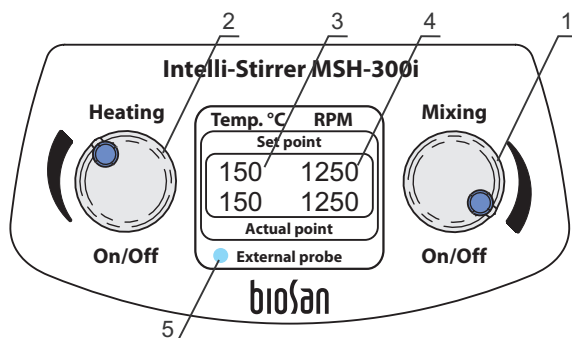


Fig. 2 Control panel

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. Fasten the external probe on the unit using the double clamp, secure the external probe on the stand SR-1.

The external probe indicator lamp will light up on the control panel (fig.2/5), showing that the temperature control is now performed via the external probe.

- 4.7. Dip the external probe into the vessel with liquid.

Using the **Heating** knob (Fig. 2/2) switch the heating **On** and set the required liquid temperature (in the 20°C to 150°C range).

The set temperature will be maintained by the external temperature control probe.



Caution!

The indicator lamp (Fig. 2/5) flashing shows that the external probe is not dipped into the liquid and the plate temperature has reached its maximum of 340°C. This can cause an emergency situation, so dip the external probe into liquid or switch off the unit.

- 4.8. Using the **Mixing** knob (Fig. 2/1) switch the mixing mode **On** and set the required speed (in the 100 to 1250 rpm range).



Caution!

Do not touch surfaces which become hot during operation to avoid burns.

- 4.9. After finishing the operation switch **Off** the **Mixing** and **Heating** knobs, switch the power switch at the rear panel to O position.
- 4.10. Disconnect the unit from electric circuit.

5. Fault diagnosis

Symptom	Possible Cause	Action required
The unit does not operate	The unit is not switched on	Switch on
	The unit is not plugged to electric circuit	Plug in to electric circuit, switch on
	Electric circuit failure	Check if the other electrical appliances on the same circuit are working
	The fuse in the unit has blown out	Check and replace - see 7.4.
The temperature does not rise when working with the external probe	The set temperature is lower than the liquid temperature	Check the 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 the unit checked by a repair and maintenance technician
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	Switch off the unit and have the unit checked by a repair and maintenance technician
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. 7.5 or replace it.

6. Specifications

The unit is designed for operation in cold rooms, incubators and closed laboratory rooms at ambient temperature from +4°C to +40°C in a non-condensing atmosphere and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

6.1. Temperature specification

- Setting range +30°C ... +330°C
- Setting range by external probe +20°C ... +150°C
- Setting resolution 1°C
- Working plate heating time until maximum. 11 min

6.2. General specification

- Speed setting range 100 - 1250 rpm
(max. speed depends on the magnetic element size, stirred volume, viscosity, glassware shape, etc.)
- Speed setting resolution 10 rpm
- Maximum continuous stirring time 168 hours (7 days)
- Maximum stirring volume 20 l
- Operation with magnetic stirring elements of length 20 - 70 mm
- Maximum viscosity of stirring liquid 1170 mPa·s
- Plate material aluminium alloy
- Working plate size Ø160 mm
- SR-1 attachable stand size Ø8x320 mm
- Dimensions 190x270x100 mm
- Maximum consumed power (heating mode) 550 W
- Maximum consumed power (mixing mode) 8.5 W
- Working voltage 230 V; 50/60 Hz / 120 V; 50/60 Hz
- Weight* 3.2 kg

* Accurate within ±10%.

Optional accessories	Description	Catalogue number
DPDM double clamp	for SKM2 clamp securing	BS-010309-AK
SKM2 clamp	for external probe securing	BS-010309-CK
External probe	Connection type K. Cable is covered with Teflon, mechanically strong, elastic and chemically stable against oils, acids, agressive reagents and liquids. Operation temperature range -50°C to +250°C, cable length 1 m.	BS-010309-BK

Replacement parts	Description	Catalogue number
SR-1 stand	detachable, height 320 mm	BS-010302-AK
Magnetic stirring element	cylinder-shaped (6x25 mm) incapsulated in PTFE	BS-010302-S12

Biosan is committed to a continuous programme of improvement and reserves the right to alter design and specifications of the equipment without additional notice.

7. Maintenance

- 7.1. If the unit requires maintenance, disconnect the unit from the electric circuit and contact Biosan or your local Biosan representative.
- 7.2. All maintenance and repair operations must be performed only by qualified and specially trained personnel.
- 7.3. Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and decontamination of the unit.

7.4. Fuse replacement

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

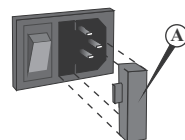


Fig.3 Fuse replacement

- 7.5. Improper magnetic stirring elements storage (storing several elements together, which causes unpredictable magnetic domain disorientation) is one of the reasons of the elements` magnetic properties deterioration. The other reason is working at temperatures close to Curie point temperature of these elements, which is 200°C. Place the element to the unit working surface exactly in the center and in conformity with the poles and leave for 8-12 hours to have it regained its initial characteristics.

8. Warranty and Claims

- 8.1. The Manufacturer guarantees the compliance of the unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.
- 8.2. The warranted service life of unit from date of delivery to the Customer is 24 months. Contact your local distributor to check availability of extended warranty.
- 8.3. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment claim shall be compiled, certified and sent to the local distributor address. Please visit www.biosan.lv, Technical support section to obtain the claim form.
- 8.4. The following information will be required in the event that warranty or post-warranty service comes necessary. Complete the table below and retain for your records.

Model	Intelli-Stirrer MSH-300i magnetic stirrer with hot plate
Serial number	
Date of sale	

9. Declaration of Conformity

Declaration of Conformity

Equipment name:	Intelli-Stirrer MSH-300i
Type of equipment:	Magnetic stirrer with hot plate
Directive:	EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC RoHS 2011/65/EC WEEE 2002/96/EC & 2012/19/EU
Manufacturer:	SIA BIOSAN Ratsupites 7, build.2, Riga, LV-1067, Latvia
Applied Standards:	EN 61326-1: Electrical equipment for measurement, control and laboratory use EMC requirements. General requirements EN 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements EN 61010-2-010: Particular requirements for laboratory equipment for the heating of materials EN 61010-2-051: 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

12.06.2013

Date



Signature
Aleksandr Shevchik
Engineer of R&D

12.06.2013

Date

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Version 3.03, January 2014