

TECHNICAL DATA SHEET

info@deffner-johann.de | +49 9723 9350-0

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3 Product description

3.1 Key features

The **MSH-D Hotplate Magnetic Stirrer** is designed for chemical, biological, medical and pharmaceutical high temperature stirring-applications. The device was developed for simplest usage and a very long life.

Key features are as follows:

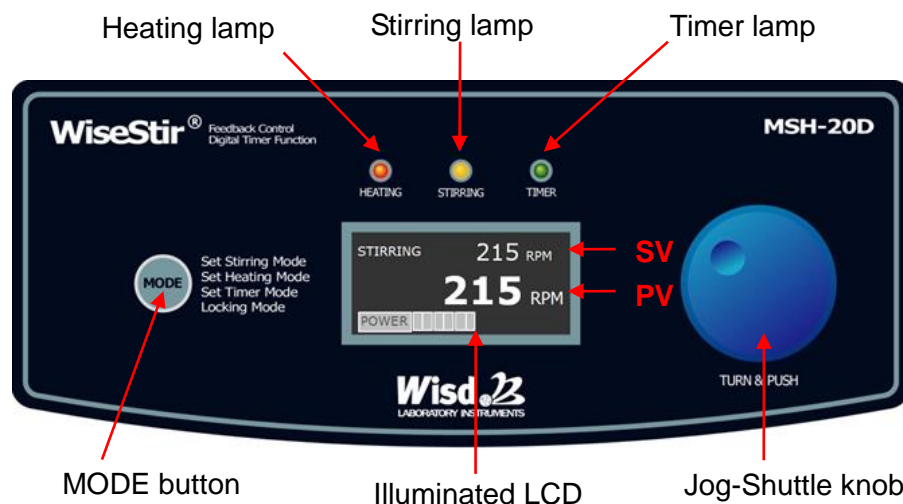
- Long life by simply and solid construction.
- Jog-Shuttle knob for easy and fast handling.
- Ceramic coated heating plate for high chemical resistance.
- Motor provided with overload and overheat protection.
- Power bar graph, speed, temperature and timer showed on illuminated LCD.
- Storage function for set time and speed values.
- Turn-off delay from one minute up to over 99 hours in one minute steps.
- Signal sound after end of turn-off delay.
- Smooth increase of speed.
- Key lock against inadvertent changing of set speed and timer values.
- Connection for external temperature sensor available to measure the liquid's temperature directly.
- Integrated socket for sensor stand.
- Easy to justify.

3.2 General survey

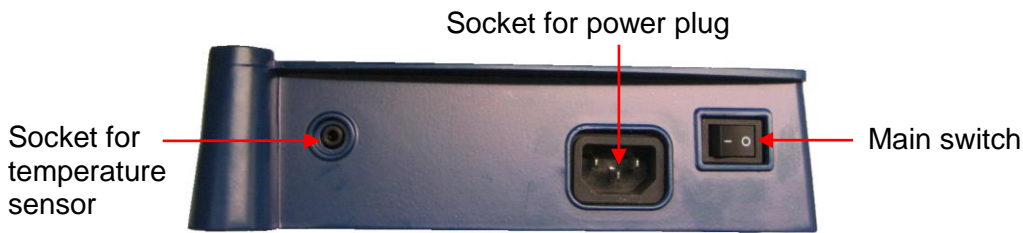
(MSH-20D is pictured, differences in look to the other MSH-D models have do not affect functionality)



3.3 Display



3.4 Reverse side



3.5 Term description

SV: set value (upper line in LCD)

PV: present value, measured by the device (lower line in LCD)

LCD: liquid crystal display

MODE button

- For keyboard shortcut and change between the menu items.

Jog-Shuttle knob

- Change SVs by turning.
- Push the knob for start and stop or probate and save set values.
- Also used for keyboard shortcut.

Main switch

- On / off switch.

Timer lamp

- Is blinking in menu items for timer modulation.

Stirring lamp

- Is blinking in menu items for speed modulation.

Heating lamp

- Shines if the heater is activated.

Keyboard shortcut

- For reaching the sub menu items.

4 Packing contents

4.1 Standard scope of delivery

Quantity	DH.WMH03021 DH.WMH03051	DH.WMH03020 DH.WMH03050
1	Power supply curt	
1	Operating manual	
1	Display scratch cover	
1	CL220 clamp + sensor holder	
1	SS500 PT100 temperature Sensor	
1	RD200 stand rod, Ø 12 mm, length 450 mm	

Quantity	DH.WMH03023	DH.WMH03022
1	Power supply curt	
1	Operating manual	
1	CL220 clamp + sensor holder	
1	SS500 PT100 temperature Sensor	
1	RD100 stand rod, Ø 12,7 mm, length 390 mm	

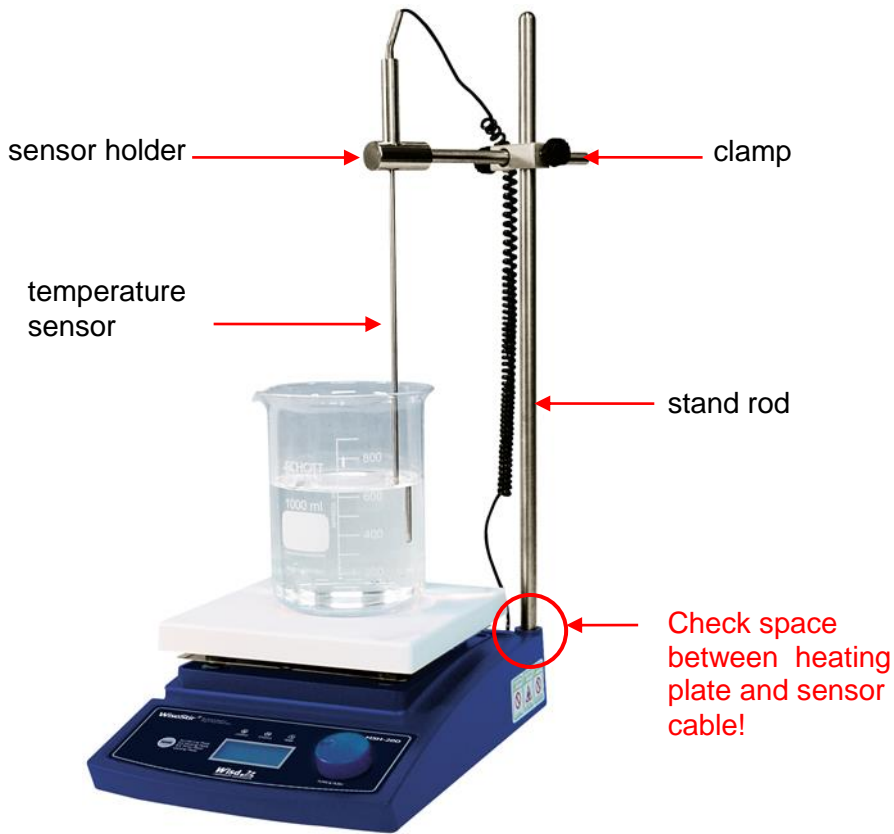
4.2 Additional accessories

order number	denomination
DH.WHP503060	SS500 Temperature sensor PT100 for MSH-20D/ -30D/ -50D/ -55D
DH.WHP503061	SS510 PTFE-coated temperature sensor PT100 for MSH-20D/ -30D/ -50D/ -55D
DH.WHP503011	RD100 Stainless steel stand rod, \varnothing 12,7mm, length 390 mm for MSH-30D
DH.WHP503012	CL200 Holder for temperature sensor + clamp for MSH-20D/ -30D/ -50D/ -55D
DH.WHP503036	RD200 Stainless steel stand rod, \varnothing 10mm, length 450 mm for MSH-20D/ -50D/ -55D

5 Positioning the device and commissioning

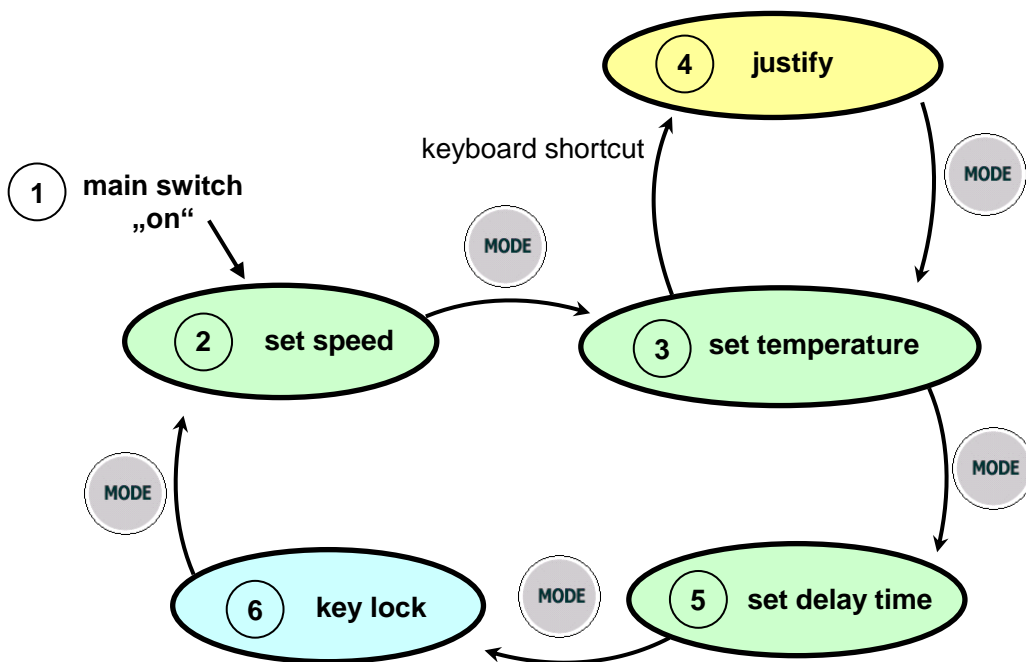


1. Follow especially the safety instructions marked with following symbol:
2. Remove the package carefully.
3. If there are any unexpected transport damages, please inform your forwarder and your customer service.
4. If you want to use the device without additional accessories jump to point 10 (next page), otherwise follow the next points.
5. Attach the stand rod to the socked.
6. Fix the clamp at the stand rod.
7. Attach the sensor holder to the clamp. Have a look at the next picture if you are unsure. Ensure that the bigger drill hole is upside.
8. Stick the sensor into the holder and connect the cable with the device's sensor socked backwards.
9. Check that each connection fits close.
10. Before you connect the device with the electrical outlet, please let some time laps until the device is acclimatised.
11. Make sure that you follow all safety instructions.
12. Connect the device with the power outlet.
13. Switch the device on.
14. Set your values and start the process (look at job description).



6 Job description

6.1 Menu structure



6.2 Set speed

- First menu item after switching the device on is the menu “set speed”. The stirring lamp is blinking. You can recognize the menu at “RPM“ behind SV and PV.
- Speed is from 80 rpm till 1500 rpm adjustable in 5 rpm-steps.
- If there is showed “O RPM” in the SV-line, there is no value stored and you can start the stirring process by turning the Jog-Shuttle knob clockwise.
- If “STIRRING” is blinking on the LCD there is a speed value stored. The saved value is showed in the SV you can start the stirring process by pushing the Jog-Shuttle knob.
- In both cases is the speed during the stirring process variable. To change the SV you only have to turn the Jog-Shuttle knob clockwise to increase the speed and counter-clockwise to reduce it.
- To stop the stirring process manually, you have to push the Jog-Shuttle knob again or decrease the speed till “0” by turning the Jog-Shuttle knob counter-clockwise.
- The set speed is increasing gradually, so it could takes some time till the SV is climaxed.

6.3 Set temperature

- When you push the MODE button in the menu item “set speed” you reach the menu item “set temperature”. You can recognize this menu at “°C“ behind the SV and PV.
- The temperature is adjustable from 25 °C till 380 °C in 0,5 °C-steps.
- Push the MODE button once again if you want to work without the heating function. Then you reach the next menu (see point 7.5) without collimated temperature value.
- Choose your desired temperature by turning the Jog-Shuttle and confirm the set value by pushing the Jog-Shuttle.
- For changing the confirmed value again, you first have to push the Jog-Shuttle knob again. “HEATING” starts to blink at the LCD and the temperature is adjustable again.
- When the heating lamp is shining, the heater is activated.

6.4 Justification

If the temperature measured by you differs from the temperature the device is showing (PV) you have the possibility to compensate the divergence by the offset. So you can balance differences of about ± 20 °C.

The Offset is calculated as follows:

Temperature measured by you – showed Temperature (PV) = Offset

- To reach this menu you have use the keyboard shortcut in the menu item “set temperature”.
- Set the calculated value by turning the Jog-Shuttle. The Offset will be added to the PV immediately.
- Save the offset by holding the Jog-Shuttle pushed until the values in PV and SV line starts blinking.
- Push the MODE button to leave the justify menu.

6.5 Set delay time

- The delay timer serves as automatically stop function. It turns off the stirring and heating process after elapsing of the timeframe you set.
 - To reach the timer menu you have to push the MODE button in the menu item “set temperature”. You can recognize this menu by the blinking timer lamp.
 - By renewed using of the MODE button you reach the key lock without setting delay time.
 - The delay time is adjustable from one minute till over 99 hours (00:01 - 99:59) in one minute steps.
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- Turn the Jog-Shuttle knob to set your delay time. Push the Jog-Shuttle if you reached the desired value to confirm it. With the confirmation the timeframe is elapsing.
- If you want to change the value after confirmation, you have to push the Jog-Shuttle once again. The PV initiates blinking and you can modify the value again.
- To confirm the value and start the delay time push the Jog-Shuttle yet again.

6.6 Key lock

- To avoid accidental changing of the set values, push the MODE button in the menu item "set delay time".
- In this menu item can you see the actually temperature in the SV-line and the speed in the PV-line. The function of the Jog-Shuttle knob is deactivated.
- Press the MODE button once more to leaf the key lock. Than you are in the menu item "set speed".

6.7 Storage function

The **MSH-D Hotplate Stirrer** includes a storage function for speed and delay values. That is practical if you want to work with the same parameters often. Then you need not to set them in every usage.

- For storing values you only need to hold the Jog-Shuttle knob pushed for two seconds. Successful storing is displayed by blinking of the SV for three times.
- If you saved a speed value, "STIRRING" is blinking and if you saved a temperature value "HEATING" is blinking after the device's restart.
- If you saved the delay time it is not showed at the LCD.
- Every stored parameter is erasable. Turn the value with the Jug-Shuttle till "0" and then hold the knob pressed for two seconds.
- If you want to store a new value it is not necessary to erase the old one.

7 Maintenance and cleaning

- Please read the whole safety instructions before you start to maintain or clean the device and pull the power plug out of the electrical outlet.
- Only use care cleaning agents and soft cleaning rags.
- Organic lotions, strong chemicals and rough cleaning rags can damage the device.
- If you not want to use the device for a long time, pull of the power plug and keep it dry in the package.
- Only use original spare parts.

8 Troubleshooting Guide

Situation	Confirmations and Solutions
Power Failure	<ul style="list-style-type: none"> ✓ Check the supplied voltage is present. ✓ Check the power connection and the power cord for proper connection and integrity. ✓ Check if the MAIN Power Switch is “ON”. ✓ Fuse is blown.
Unit Not Heating	<ul style="list-style-type: none"> ✓ Check if the MAIN Power Switch is “ON”. ✓ Check if the set temperature (SV) confirmed with the Jog-Dial knob (by turn the Jog-Dial knob cannot change the set temperature – see point 6.3).
Heating, but unit not reaching temperature or temperature is fluctuated	<ul style="list-style-type: none"> ✓ Problem at the sensor or main controller.
Unit Not Stirring	<ul style="list-style-type: none"> ✓ Check if the MAIN Power Switch is “ON”. ✓ Check the set RPM.
ERROR 1	<ul style="list-style-type: none"> ✓ Hotplate defect.
ERROR 2	<ul style="list-style-type: none"> ✓ Motor defect.

If other problems arise, or one of the above not solves problems, please contact your official agent or the manufacturer.

Reparations and amendments should only made by [supplier](#) authorized people. Contraventions exclude the warranty.

9 Technical data

Modell	MSH-20D (5763010, 5763020)	MSH-30D	MSH-50D
Dimension (w x d x h mm)	206x307x99	286x387x99	172x286x97
Plate Size (mm)	180x180	260x260	Ø 135
Material (Plate)	Ceramic Coated Aluminum (Chemical / Acid Resistance)		
Material (Body)	Powder Coated Aluminum	Powder Coated Steel	Powder Coated Aluminum
Speed Range (rpm)	80 - 1500		
Controller	Digital Feedback Controller with Jog Shuttle Switch (Turn + Push)		
Temp. range (°C)	25 - 380		25 - 400
Temp. Accuracy	±0,3°C (Over 70°C)		
Temp. Control Resolution	±0,5°C - Control		
Heating Power (W)	600	1200	350
Display	Digital LCD Display (Temp., Timer, RPM and Power bar-graph)		
Timer	99hr 59min, (Continuous function included)		
Weight (kg)	3,3	3,5	2,3
Others	Storage Function (Temp., RPM, Timer), Locking Mode (Jog-Shuttle Input disabled) User Self-compensation function Alarm (Error Status and Timer-end)		
Zubehör	<ul style="list-style-type: none"> - Stativ für Temperatursensoren - Temperatursensoren 		
Power Supply	AC 230 V, 1N~, 50/60 Hz		