Hot Plate and Magnetic Stirrer Instruction Manual

For Digital and Analog Models:
AP9801, AP9802, AP9804, AP9805,
AP9807, AP9808, AP9809

FLINN SCIENTIFIC

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Flinn Hot Plate and Magnetic Stirrer Instruction Manual

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Preface

Users are advised to carefully read this manual before using the device to understand related precautions and to operate it according to the instructions.

How to Acquire Help

If you have any questions or need assistance while installing or using the device, please contact Flinn Scientific with the following information:

- Product serial number (found on the device's name plate)
- Description of the problem
- Steps taken to resolve the problem
- Your contact information

Safety Notes

- Carefully read this manual before operating the product, and observe all laboratory safety guidelines.
- Check that the device is in proper working order before every operation.
- This product should be operated by experienced or specially trained staff only.
- Temperature should be set at least 50 °C lower than the fire point of the sample.
- Make sure that the hot plate temperature is less than 50 °C before touching the base as it can reach temperatures up to 540 °C.
- Do not touch the hot plate or the housing immediately after use as the temperature decreases slowly.
- Always use proper personal protective equipment. Danger may be caused by the splattering of stirred liquid or the release of steam or toxic or flammable gas.
- Use the device in a well-ventilated room on a clean, stable and skidproof surface.
- Do not operate the device in water.
- Adjust the rotation speed slowly. Reduce the rotation speed if the container moves unsteadily on the hot plate.
- Avoid stirring any flammable samples with low boiling point or overfilled samples.
- Use closed vessels when stirring pathogenic samples.
- Disconnect the power supply before assembling any accessories, and connect the accessories firmly before use.
- Keep the tip of the external temperature sensor at least 5–10 mm away from the bottom of the container on all sides.
- Ensure that the electrical outlet has been properly grounded before operation.
- Fully disconnect the power supply from the electrical outlet when not in use.
- Make sure that the power voltage meets the voltage requirement specified on the name plate.
- The power cable must be kept away from the hot plate rather than shield the device.
- The glass ceramic surface may break under heavy pressure. Never place any excessively hot liquids or solids on the glass ceramic disc plate as it may lead to glass plate breakage.
- Do not operate the instrument in an area with a strong magnetic field.
- Only use the standard accessories listed in the Accessories section of this manual.

Scope of Application

This device is intended for heating and stirring liquids in schools, laboratories and factories. The product is not intended for use in residential areas or under the restrictions specified in the *Safety Notes*.

Inspection

Upon opening, if you find any damage to the package, please specify the damage on the receipt. If you find any damage to the product after opening the package, please contact Flinn Scientific and do not connect the product to a power supply.

Package includes hot plate and magnetic stirrer, power cable and operating instructions.

Control and Display

Control

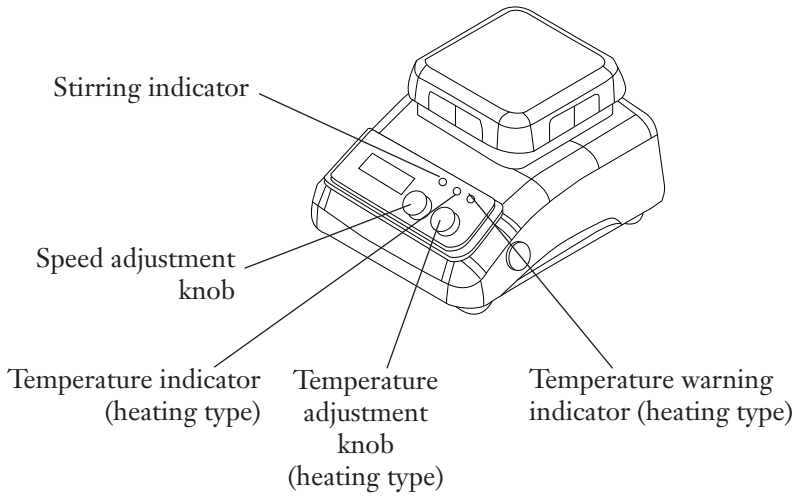


Figure 1. Digital Display Model

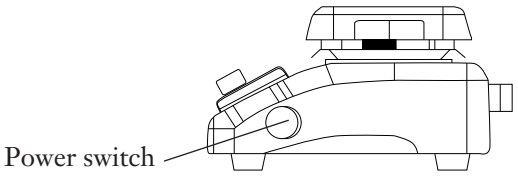
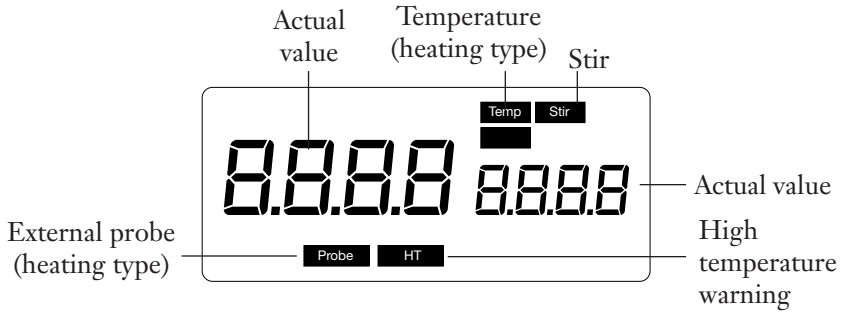


Figure 2. Side View

Table 1. Controls

	Feature	Description
Digital	Stir speed adjustment knob	Set the rotation speed within 300–2000 rpm, and press the adjustment knob to start/stop the stirring function.
	Temperature adjustment knob (heating type)	Set the temperature up to 540 °C, and press the temperature adjustment knob to enable/disable the heating function.
	LCD display	The LCD display indicates the actual and set temperatures and speed settings.
	Temperature indicator (heating type)	The “Heat” light is lit when the heating function is turned on.
	Stirring indicator	The “Stir” light is lit when the stirring function is turned on.
	Residual heat warning indicator	The red light is on when the temperature exceeds 50 °C.
	Power switch	Turn on/off the main power supply.
Analog	Stir speed adjustment knob	Set the rotation speed within 300–2000 rpm, and press the knob to turn on/off the stirring function
	Temperature adjustment knob (heating type)	Set the control temperature up to 540 °C, and press the knob to enable/disable the heating function.
	Temperature indicator (heating type)	The “Heat” light remains on during heating.
	Stirring indicator	The “Stir” light is on when the power is turned on.
	Residual heat warning indicator	The red light is on if the temperature is above 50 °C.
	Power switch	Turn on/off main power supply.

Display



Operation

- Before connecting the device to power supply, check the label for the correct voltage.
- Power outlet should be properly grounded.
- Switch the power on.
- Place a proper stirring bar the container, and add the samples to be stirred.
- Place the container on the plate.
- Set the stir speed and start stirring.
- Set the heating temperature and start heating (heating type).
- Disable the stirring function.
- Disable the heating function (heating type).

Table 2. Operation

Display	Description
Temp & °C	Displayed when the heating function is enabled
Stir	Displayed when the stirring function is enabled.
Hot	Displayed when the temperature of the hot plate is higher than 50 °C regardless of whether the heating function is enabled.
Probe	Displayed when an external probe is inserted.
Set value/Actual value	Numerical value is displayed when heating function and stirring functions are enabled.

If these operations are normal, the device is ready to operate. If these operations are not normal, the device may have been damaged during transport, please contact Flinn Scientific for technical support.

Note: The heating/stirring container can be moved from the hot plate during operation. The stirring function can be enabled again after the container is placed properly. Ensure that the heating/stirring function is switched off when no container is on the plate.

Residual Heat Warning

Digital

As a safety measure, the LCD displays the residual heat warning as “HOT” until the workplate temperature is below 50 °C, and the red light is on even if the power supply is switched off.

Analog

As a safety measure, the light indicates a residual heat warning as “HOT” until the workplate temperature is below 50 °C, and the red light is on even if the power supply is switched off.

External Temperature Sensor (Digital) Operation

The external temperature sensor PT1000 used on this instrument is a standard option from the manufacturer. When an external temperature sensor is connected, "Probe" is always displayed to show that the external temperature sensor is working. The set temperature and actual temperature of the external temperature sensor are displayed on LCD screen, and a safety detection circuit restricts the hot plate temperature. The external temperature sensor can control the temperature of the sample more accurately relative to the temperature control of hot plate.

An external temperature sensor placed in the heating sample container will automatically shut down in case of any malfunction. In this event, switch the power off, ensure that external temperature controller is immersed in the heating sample container then switch the power on, set the target temperature and enable the heating function. If the product does not resume normal working operations, contact the manufacturer.

Failure

- If the product fails to start up, check that the power cable is connected firmly and whether the power fuse is damaged or loose.
- If the power-on self-test of the product is abnormal, restart the device and check for any abnormality.
- If the rotation speed cannot reach the set value, the liquid sample's viscosity may be excessively high.
- If the instrument does not power down when it is turned off, note that the residual heat warning function is activated when the temperature of the hot plate exceeds 50 °C.

Please contact Flinn Scientific if any of these issues are not resolved.

Relevant Safety Standards

The product conforms to the following safety standards:

EN 61010-1

UL 3101-1

CAN/CSA C22.2(1010-1)

EN 61010-2-10

The product conforms to the following EMC standards:

EN 61326-1

The product conforms to the following EU standards:

EMC standard: 89/336/EWG

Mechanical design standard: 73/023/EWG

Product Information Summary

Hot Plates

Item No.	Description	Type	Size
AP9801	Hot Plate Only	Analog	4″ × 4″
AP9802		Analog	7″ × 7″
AP9806		Digital	4″ × 4″
AP9807		Digital	7″ × 7″

Magnetic Stirrer

Item No.	Description	Type	Size
AP9803	Magnetic Stirrer Only	Analog	7″ × 7″

Hot Plates/Magnetic Stirrers

Item No.	Description	Type	Size
AP9804	Hot Plate/Magnetic Stirrer Combination Unit	Analog	4″ × 4″
AP9805		Analog	7″ × 7″
AP9808		Digital	4″ × 4″
AP9809		Digital	7″ × 7″

Accessories

Item No.	Description	For Items
AP9810	Replacement Top, 4″ × 4″	AP9801, AP9806, AP9804, AP9808
AP9811	Replacement Top, 7″ × 7″	AP9802, AP9807, AP9803, AP9805, AP9809
AP9878	Temperature Sensor, 230 mm	Digital models: AP9806, AP9807, AP9808, AP9809
AP9879	Temperature Sensor, 230 mm, Glass-Coated	Digital models: AP9806, AP9807, AP9808, AP9809
AP9880	Temperature Sensor, 100 mm	Digital models: AP9806, AP9807, AP9808, AP9809
AP9881	Support Clamp for Temperature Sensor	AP9878, AP9879, AP9881
AP9882	Temperature Sensor and Support Clamp Set	Includes one each of AP9878 and AP9881

Maintenance and Cleaning

Operate and maintain the product in good working order to extend the life of the product. Keep the product dry and clean, remove any spilled liquids quickly, clean the outer surface with a non-grinding cleaner, and do not connect the power supply until all surfaces are dry. If liquids or moist solids enter the product, disconnect the power supply quickly, leave it off, and contact the Flinn Scientific for advice.

- Keep the product clean, and do not allow cleaning solution to flow into the machine.
- Disconnect the power supply for any maintenance or cleaning, and please use the recommended methods to clean the product:

Table 3. Cleaning

Material	Cleaning Agent
Dyes	Isopropanol
Building materials	Aqueous solution/isopropanol with active agent
Cosmetics	Aqueous solution/isopropanol with active agent
Foods	Aqueous solution with active agent
Fuel oils	Aqueous solution with active agent

- Consult the manufacturer about materials not listed. Before using other cleaning methods, confirm with the manufacturer that it will not damage the product. When cleaning the product, please wear proper personal protective equipment.
- When sending the product for repair, it must be cleaned of potentially dangerous substances and put back into its original packing box.
- When the product will not be used for a long time, switch the power off and store it in a dry, clean place at room temperature.

Technical Parameters

Table 4. Parameters

Item	Parameters	
	Digital	**Analog**
Voltage	120 VAC	
Frequency	60 Hz	
Power	1150 Watts	
Number of stirring points	1	
Maximum stirring capacity (H_2O)	20 L	
Maximum length of stirring bar (L × W)	80 × 10 mm	
Type of motor	DC brushless	
Input power of motor	18 Watts	
Output power of motor	10 Watts	
Speed range	300–2000 RPM	
Speed display	LCD	Scale
Rotation speed display resolution	1 RPM	—
Material of hotplate	Glass ceramics	
Size of hotplate	184 × 184 mm	
*Heating output power	1000 Watts	
*Heating temperature range	Room temperature to 540 °C	
*Temperature display	LCD	—
*Temperature display resolution	±0.1 °C	—
*Temperature control accuracy of working disc	±1 (below 100°) / ±1% (above 100°)	—
*External temperature sensor	PT1000	—
*Temperature control accuracy of external temperature sensor	±2 °C	—
*Residual heat warning function	50 °C alarming line mm	
External dimension (W x D x H)	215 × 360 × 112 mm	
Weight (kg)	*5.3 4.6	*4.5 3.8
Allowable ambient temperature	5–40 °C	
Allowable RH	80%	
DIN EN60529 Protective mode	IP21	

*Heating type