



Hotplate Stirrer

HPS RT2 Basic

Operation Manual 9240-11-011



Important Before using this product, read this entire operation manual carefully. Users should follow all of the operational guidelines contained in this manual and take all necessary safety precautions while using this product. Failure to follow these guidelines could result in potentially irreparable bodily harm and/or property damage. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

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MANUAL NUMBER 9240-11-011

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REV	ECR/ECN	DATE	DESCRIPTION	By

This manual contains important safety and operation information. You must carefully read, understand, and follow all the instructions in this manual prior to operating this instrument. Keep this manual in a safe place nearby for reference and make it easily available to all users.

- 1) This manual highlights DANGER/WARNING/CAUTION/NOTICE alerts to prevent injury or property damage and also to achieve optimum performance of your instrument.
- (2) These alerts are classified into four types in this manual depending on the importance and the risk levels as described below:

Symbols	Meaning
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Ignoring this warning could cause serious injury or even death.
	Ignoring this caution could cause injury or property damage.
	Ignoring this notice could cause operational problems.

- 3) The claim which is out of the quality guarantee published by the Manufacturer is out of Manufacturer's responsibility.
- 4) The damage which is from unexpected fault or damage of user by Acts of God is out of Manufacturer's responsibility.

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When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

Thermo Fisher Scientific
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International customers, please contact your local Thermo Scientific distributor.

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Section 1 Warnings and Cautions

WARNING

Ignoring the following warnings could cause serious injuries or even fatal accidents.

Always wear proper protective gear (such as goggles, gloves, masks or an apron) when using this instrument.

Never install or use this instrument in explosive atmospheres.

Never use the instrument to heat flammable liquids.

Never install this instrument near to hazardous or flammable substances.

Never immerse this instrument in water or operate it under water

Never reach for this instrument if it has fallen into water.

Check electrical requirements described in this operation manual or on the ID plate of this instrument before use. Connect this instrument to a dedicated power outlet nearby.

Make sure to connect this instrument only to properly grounded power outlets to protect you and your instrument. Do not ground to gas pipes or water pipes.

Do not install this instrument closer than 30 cm (12 inches) to a wall of combustible material. And observe the minimum distances (in general, 30 cm) from other devices.

If you observe a strange smoke, odor or noise from the instrument, unplug the power cord immediately and turn off the main power switch. After the smoke or odor disappears, contact your dealer or Thermo Scientific if any repair is required.

Do not disassemble, repair, or modify this instrument on your own. Doing so will void your warranty and may result in injuries or product damages.

 CAUTION

Ignoring the following cautions could cause injuries or property damages..

Do not touch the top plate or any object near it even when the heater is turned off. You may get burned due to residual heat.

After using this equipment, make sure to turn off the main power switch and also to disconnect the power cord from the power outlet for the safety of other users.

Do not place heavy objects, including this equipment, on top of the power cord and do not strip, scratch, bend, twist, pull, or heat the power cord. A damaged power cord is a fire and electrical shock hazard.

Do not allow moisture or water to get into the instrument. Fire or electrical shock may result.

Beware of the effects of the magnetic field generated by this instrument. Magnetic field can affect certain devices such as cardiac pacemaker, data storage media, and so on.

Make sure to set up your instrument on a flat, stable, clean, non-slip, dry, and fireproof surface inside a lab with proper safety measures.

Do not place any device which can be affected by the motor vibrations near this equipment.

Do not touch the power outlet, power socket, or power cord with wet hands. And make sure to connect the power cord directly and firmly to the power outlet and power socket.

Do not put or insert any objects (especially if conductive or flammable) inside this equipment.

Beware that mechanical shock or vibration can damage this equipment and pay extra attention while moving it. Damages caused by mechanical shock or vibration may result in injury or fire.

Do not impact the heat sink. You can damage the equipment or get injured.

Do not install this equipment near any device that generates high frequency noise such as high frequency welding machines, high frequency sewing machines, or SCR power controllers.

Before cleaning, make sure to unplug the power cord to avoid electric shock or fire.

Do not use chlorine bleach, ammonia-based cleaners, abrasives, ammonia, or metal scouring pads. Wipe with a soft damp cloth or a sponge soaked in water or diluted neutral detergent.

Section 2 General Description

Congratulations of your purchase of a Thermo Scientific hotplate which is specially designed to provide maximum benefit for your investment with respect to performance, safety, ease of use, and durability.

HPS RT2 Basic model boasts fast heat up time (with 600W heating capacity), fast and precise stirring speed (up to 2000 rpm), and big stirring capacity (up to 20 liter in case of water).

Item/Model	HP RT2 Basic
Dimension (W x D x H, mm)	161 x 290 x 100
Top plate dimension (Ø)	140 mm (5.5")
Maximum heating capacity	600W
Current consumption (230V)	3A
Current consumption (120V)	5A

Features

Performance Features

- **Virtually No Decoupling of Stir Bars** - By adopting a special magnet with exceptionally strong magnetic coupling power as well as smooth-start stirring mechanism, you will experience virtually no decoupling of magnetic stir bars even with viscous media or at high speeds.
- **Quick Heat Up Time** - High heat transfer rate of the tightly integrated structure of heater and ceramic-coated aluminum alloy top plate allows quick heat up (up to 350°C).
- **Fast and precise stirring speed** - Fast and precise stirring speed (up to 2,000 rpm) even at high temperatures is made possible thanks to the combination of a powerful and precise brushless DC (BLDC) motor and a special magnet with extremely strong magnetic coupling power.
- **Big Stirring Capacity** - The BLDC motor and the special magnet also provide big stirring capacity (up to 20 liter in case of water).
- **Constant Stirring Speed** - The feedback control design of this instrument allows you to have constant stirring speed even when the viscosity of the media changes during operation.
- **Instant Halt of the Stirring Operation** - Due to the exceptionally fast response characteristics of the BLDC motor, the stirring operation stops instantly when the stirrer is turned off.

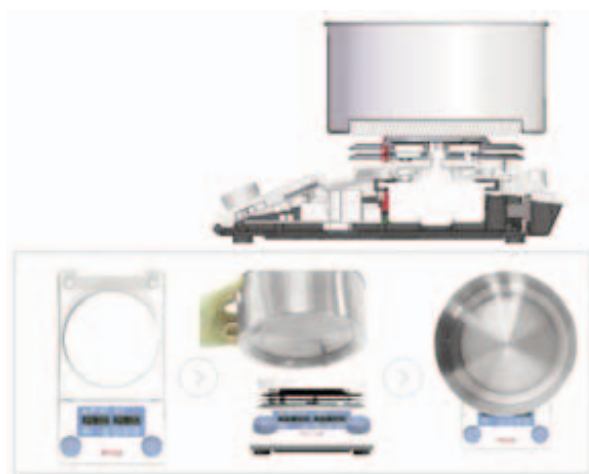
Safety Features

- **High Temperature Safety Limit of the Heating Plate** - The default setting of the temperature limit of the heating plate is 350°C to protect you and your media.
- **Multiple Overheat Prevention Measures** - Built-in overheat prevention circuit will turn off the heater if the top plate temperature reaches 450°C for any reason. In addition, if the temperature of the main body exceeds 85°C, the overheat prevention circuit stops heating to protect the motor and the PCB.
- **Hot Top Warning Indicator** - The top plate temperature can remain very hot for some time even after the heater is turned off. To prevent injury or fire under such circumstances, this instrument has a hot top warning indicator on the control panel. This indicator will illuminate if the top plate temperature is over 50°C. Even so, do not rely on this indicator alone for your safety.

Features (continued)

Safety Features (continued)

- Heating Bath (Patent Pending) (optional) - A specially designed non-slip heating bath shown below is available as an option. To prevent unintentional slips of the bath during operation, this bath has concavo-convex bottom shown below so that it fits snugly on top of the top plate.



- Transparent Shield (optional) - A transparent shield is also available to allow you to monitor your operations more safely by shielding you against decoupled stir bars or liquid splashes.

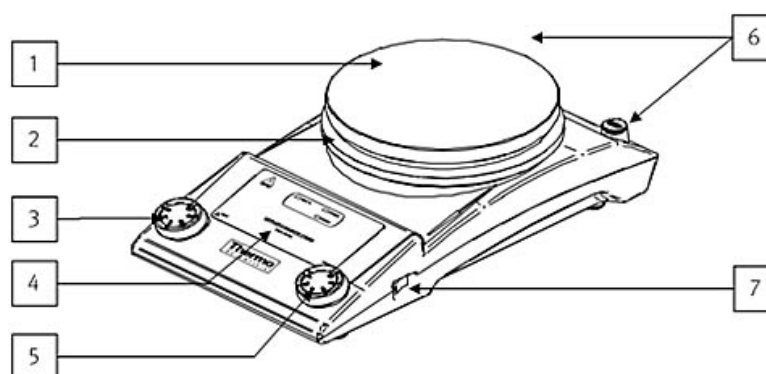
Ease of Use

- Two large digital displays show top plate temperature, heating level, stirring speed as well as the set time and the remaining time for the timer operation.
- When setting the timer, stirring time and heating time can be set independently or even together, if needed.
- With two separate knobs for heat and speed control, you can set heating level and/or stirring speed fast and with ease.
- You can easily set your own temperature limit at any value between 50 and 350°C.
- Up to two support rods (optional) can be attached to hold various kinds of devices such as temperature sensors, thermometers, laboratory glassware, and so on.

Durability

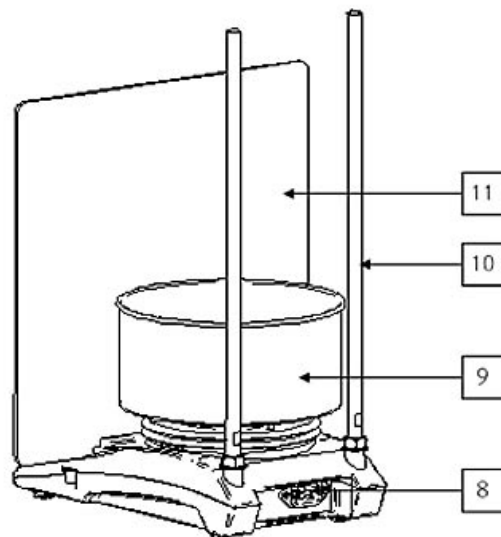
- The ceramic coated top plate boasts high heat and corrosion resistance and its white color is optimal for monitoring color changes of the media during operation.
- The BLDC motor inside this instrument has unusually long lifespan.
- Spill-proof design of the main body protects the inner parts of the instrument and the elevated control panel reduces the chances of contact with liquid spills or leakage.

Construction



- (1) Ceramic-coated Top plate
- (2) Heat Sink
- (3) Heater Knob
- (4) Control Panel (refer to Control Panel)
- (5) Stirrer Knob
- (6) Threaded Hole for Support Rod
- (7) Main Power Switch

Construction (continued)



- (8) Power Socket
- (9) Heating Bath (Optional)
- (10) Support Rod (Optional)
- (11) Transparent Shield (Optional)

Section 3 Unpacking and Installation

Upon receiving the instrument, check to ensure that no damage has occurred during shipment. It is important that any damage that occurred during shipment must be detected before unpacking. If such damage is found, notify the carrier immediately.

After unpacking, check to ensure that all the following parts and accessories are included in the package. If not, contact your dealer or Thermo Scientific immediately.

Item	Figure	Quantity	Description
Main body		1	--
Power cord		1	--
Operation Manual		1	--

Installation Environment

This instrument is designed for indoor use in laboratory environments and to be operated only by properly trained staff knowledgeable in safe laboratory practices. A suitable environment for installation is described below.



- Avoid direct sunlight.



- Room temperature should be 5°C ~ 40°C



- Relative Humidity (RH%) should be less than 80%.



- Altitude should be less than 2,000m.

Location Conditions

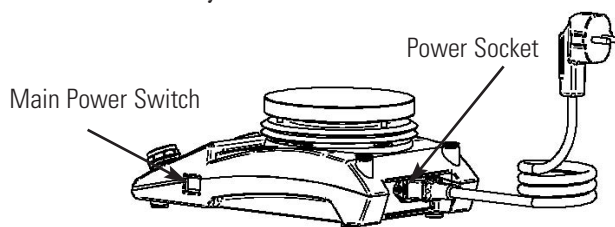
⚠ WARNING

- Never install or use this equipment in explosive atmospheres.
- Never install or use this equipment with or near to hazardous or flammable substances.
- Never operate this instrument under water, where water can get into the instrument, or in an excessively wet environment.
- Set up your instrument on a flat, stable, clean, non-slip, dry, and fireproof surface inside a lab with proper safety measures.
- Do not install this instrument closer than 20 cm (8 inches) to a wall of combustible material.
- Observe the minimum distances (in general, 30 cm or 12 inches) from other devices. In addition, any device which can be affected by the motor vibrations should not be placed near this instrument.
- Do not install this instrument near any device that generates high frequency noise.

Connecting to Main Power Supply

When connecting power, use only the power cord that came with your instrument. The power connection procedures are as follows:

- (1) Before connecting the power cord, make sure that the main power switch is turned off.
- (2) Plug the power cord into the power socket at the back of your instrument as shown in the diagram below.
- (3) Plug the other end into a properly grounded and dedicated power outlet nearby.

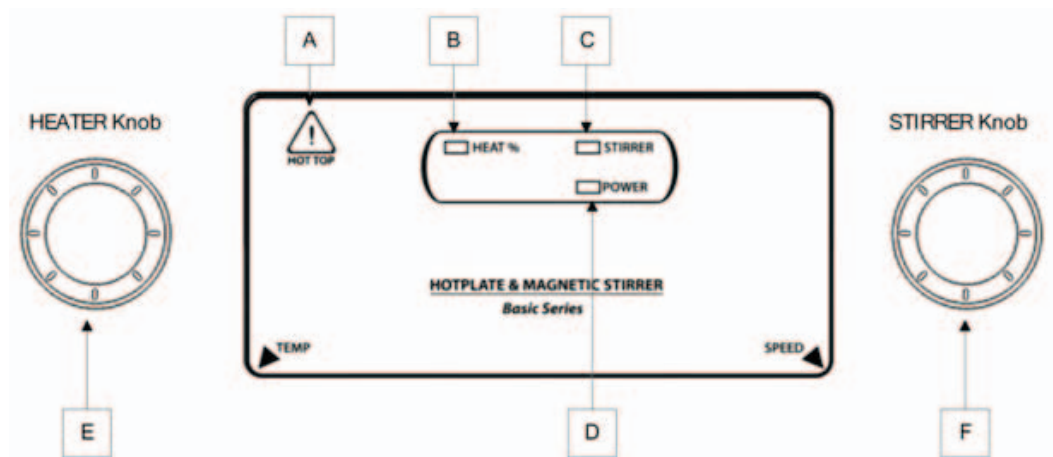


⚠ WARNING

- Check electrical requirements in the operation manual or on the ID plate attached to the bottom of this equipment before use.
- Make sure to connect this equipment only to properly grounded as well as dedicated power outlets to protect you and your equipment.
- In order to prevent fire or power cord damage due to overloading, do not use power strips or improper extension cords.

Section 4 Control Panel

Thermo Scientific's hotplate stirrers are equipped with a user-friendly control panel which has two big knobs, three operational status LEDs, and a hot top warning indicator.



- A. Hot Top Warning Indicator
- B. Heater LED
- C. Stirrer LED
- D. Power LED
- E. Heater Knob
- F. Stirrer Knob

Heater Operation

⚠ WARNING

- To avoid fires or injuries, make sure that the temperature is kept safely below the flash point of the media to be heated.

⚠ CAUTION

- Be sure to wear proper protective gear (such as goggles, gloves, masks or an apron) when using this instrument.
- This instrument can reach temperatures in excess of 350°C at the top plate surface. Touching such hot surface will cause severe burns.
- Even if the instrument is turned off, the surface of the top plate and the vessel on top of it will remain very hot for some time. Never leave your instrument accessible to others while it is hot and never touch it unless you are absolutely sure.
- Although this instrument has a hot top warning indicator, which is turned on when the top plate temperature is over 50°C, do not rely on this indicator alone for your safety.

EXTREME CAUTION IS REQUIRED AT ALL TIMES!

NOTICE

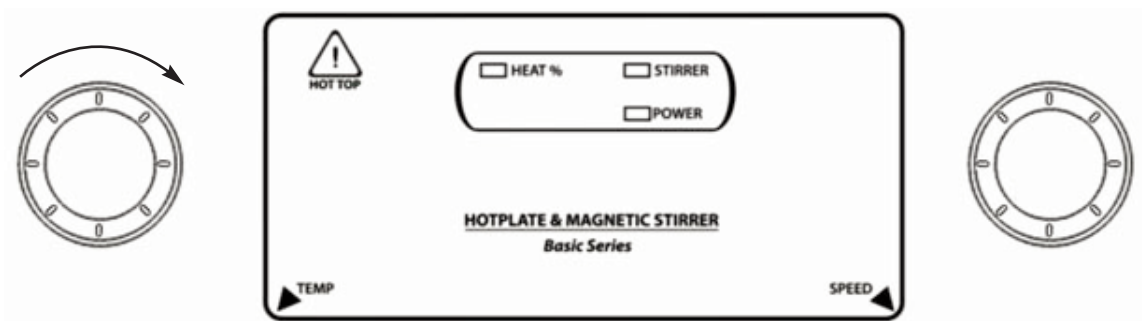
- To avoid overheating of the media, do not set the heating level too high from the beginning. Gradual increase of the heating level is always recommended.

The procedures of the heating operation are as follows:

- (1) To activate the heater, turn the heater knob clockwise. With a 'click' sound, the heating starts immediately. Set the heater knob at the desired position. (The heater LED will illuminate only when power is supplied to the heater. However, if you set the knob at its maximum position, then the heater LED will remain illuminated.)

Note that the hot top warning indicator will be turned on if the top plate temperature rises over 50°C.

- (2) If you want to turn off the heater, turn the heater knob counter-clockwise until you hear the 'click' sound.



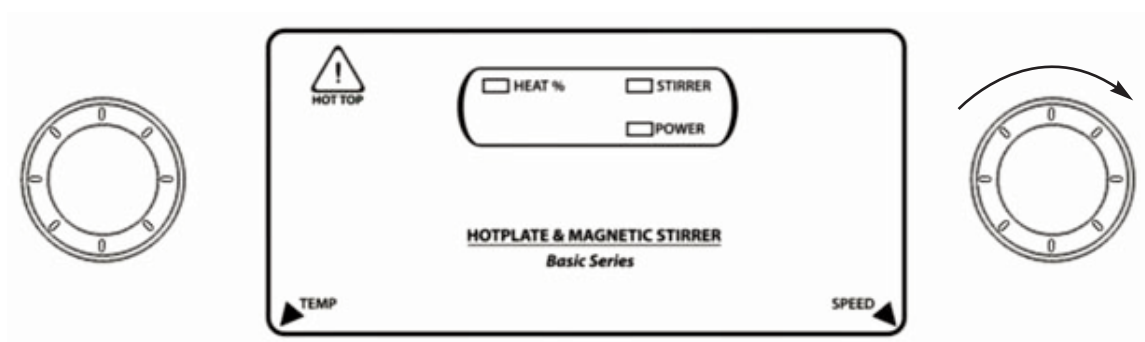
Stirrer Operation

⚠ CAUTION

- Never place a cold glass vessel onto a hot top plate.
- There is a danger of liquid spills if containers are over-filled and stirred at high speed. Always ramp up stirrer speed slowly and never stir more rapidly than necessary.

The procedures of the stirring operation are as follows:

- (1) Before activating the stirrer, check whether the stirrer knob is at the '0' position. If not at the '0' position, turn the stirrer knob counter-clockwise all the way until you hear the 'click' sound.



- (2) To activate the stirrer, turn the stirrer knob clockwise. With a 'click' sound, the stirring starts immediately. To set the stirring speed, turn the stirrer knob at the desired position. For your safety, it is highly recommended to increase the stirring speed in a gradual fashion.
- (3) If you want to turn off the stirrer, turn the stirrer knob counter-clockwise all the way to the '0' position until you hear the 'click' sound.

Section 5 Maintenance

Item	Inspection Interval	
	Daily	Weekly
Connection status of power cord or plug	•	
Damages in power cord or plug	•	
Damages or cleanliness of top plate	•	
Cleanliness of main body and accessories		•
Damages in switches, buttons, LED's, dial knobs	•	
Heating capability check (up to 350°C)	•	
Stirring capability check (up to 2000 rpm)	•	
Assembly status of all parts or accessories	•	

Cleaning Product

WARNING

- Never immerse this instrument in water or any other liquid!
- Do not allow any liquid or wet material to get inside the instrument when cleaning.
- Do not reconnect this instrument to power outlets until all cleaned surfaces have dried.

CAUTION

- Do not use chlorine bleach, ammonia-based cleaners, abrasives, ammonia, or metal scouring pads when cleaning.
- During cleaning and general operation take care not to scratch the surface of the ceramic coated top plate as this could result in subsequent thermal breakage.

Cleaning Product (continued)

Always make sure to keep top plate, main body, and accessories clean. Dirt and other foreign substances can cause fire or electric shock. Before attempting cleaning,

- (1) Disconnect the power cord from the power outlet and ensure that the instrument is cool enough,
- (2) Wipe with a soft dry cloth first to remove any foreign matter and, if not enough,
- (3) Wipe with a soft damp cloth or a sponge soaked in water or diluted neutral detergent when necessary.

Note that cleaning is made much easier if spills are attended to promptly.

Relocation

If you need to move the instrument to another place,

- (1) Disconnect the power cord from the power outlet,
- (2) Pack the instrument and its accessories into the original packaging or any other suitable container before moving.

CAUTION

- Pay attention to avoid mechanical shock or vibration while moving the instrument. Damages caused by mechanical shock or vibration may result in injury or fire.

Keeping Product

If you know you will not use this unit for an extended period of time,

- (1) Disconnect the power cord from the power outlet and
- (2) Clean the instrument with soft cloth.
- (3) Pack the instrument properly and make sure to store it in place.

Section 6 Troubleshooting

Electrical Trouble	Causes	Solution
No power	Unsuitable power supply	Meet the electrical requirements of this instrument before use.
	Power cut-off by a circuit breaker or power blackout	Find out why blackout or cut-off happened and restore power. If there is a short circuit or leakage, trace the source of the problem and fix it.
	Loose power connection	Reconnect the power cord firmly to the power outlet as well as to the power socket at the back of the instrument.
	Damages in power cords, power outlets, or plugs,	Replace the damaged part with a proper one
	Internal circuit failure	Contact Thermo Scientific for service.
Repetitive tripping of the circuit breaker	Electrical overload	Disconnect all the appliances connected to the breaker first and reconnect them one by one to find the reason for the overload.
	Internal circuit failure	Contact Thermo Scientific for service.
No operation with power on	Power cut-off by built-in overheat prevention circuit	If the temperature of the main body exceeds 75°C, the built-in overheat prevention circuit stops heating to protect the instrument. In such cases, let the instrument cool down for some time before power reconnection.
	Internal circuit failure	Contact Thermo Scientific for service.

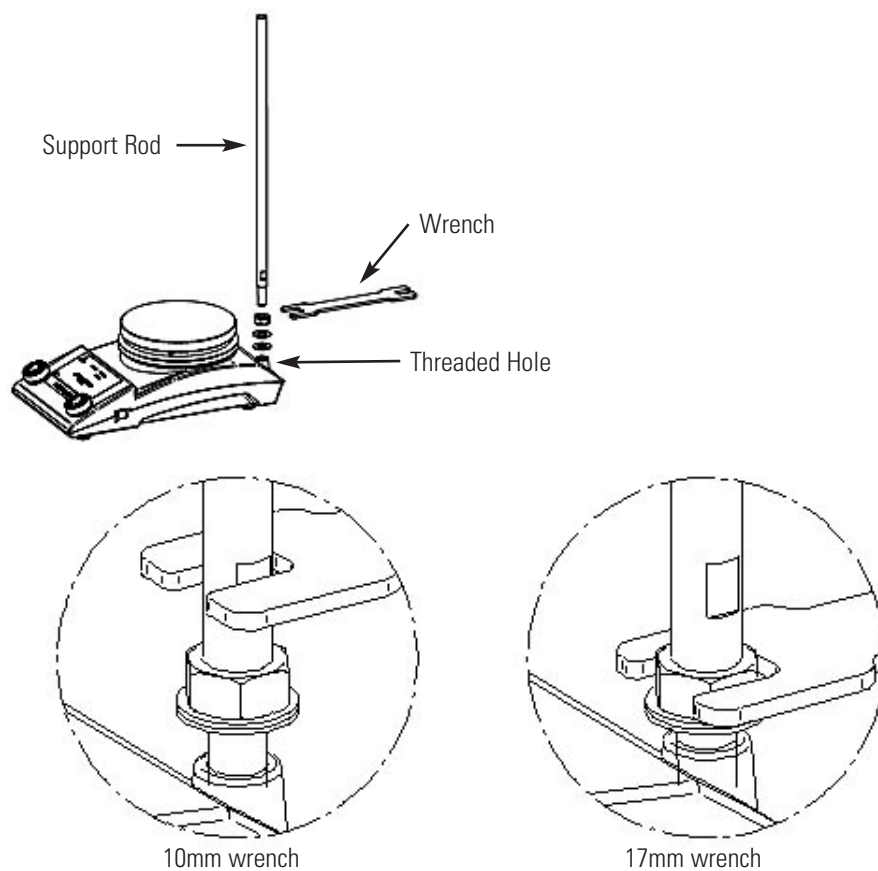
Problems During Operation	Cause	Corrective Action
No heat	Failure to push the heater ON/OFF button	After pushing the heater ON/OFF button, turn the heater knob.
	Power cut-off by built-in overheat prevention circuit	Turn off the main power switch and wait until the heater cools down. Then, turn on the main power switch.
	Internal circuit failure	Contact Thermo Scientific for service.
No or too slow temperature change during heating	Too low setting of the heating level	Turn the heater knob clockwise to increase the heating level
	Too much media	Reduce the media volume.
	Internal circuit failure	Contact Thermo Scientific for service.
Stir bar decoupling	Too much media	Reduce the media volume or increase the rpm more gradually.
	High viscosity of the media	Increase the rpm more gradually or replace the stir bar with a new one with less friction resistance (e.g., cone type).
	Decreased magnetic strength of the stir bar	Replace the old stir bar with a new one.
Knocking noise during stirring	Uneven bottom of the vessel	Use a vessel with thin and flat bottom.
	Loosened internal parts	Contact Thermo Scientific for service.
Abnormal speed control operation	Too much media	Reduce the media volume.
	Internal circuit failure or damaged motor	Contact Thermo Scientific for service.
Knob malfunction	Damaged knob	Contact Thermo Scientific for service.
LED display malfunction	Damage due to chemical spill or overheat	Contact Thermo Scientific for service.

Section 7 Accessories

Cat. No.	Description
88880141	Heating Bath
88880142	Transparent Shield (PC)
88880143	Support Rod (12Ø support, 400mm, M10)
88880148	C-5, Clamp Holder (PP body, Ø12mm)
88880149	3 Prong Clamp (60mm grip)

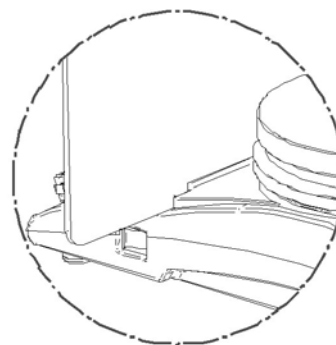
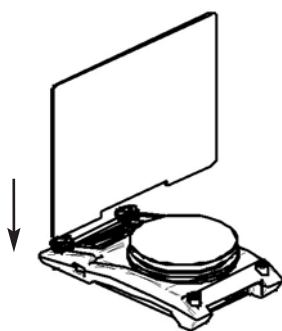
Support Rod Assembly

Hand screw the support rod(s) into the threaded hole(s) as shown in the diagram. To firmly tighten the rod, use a proper wrench.

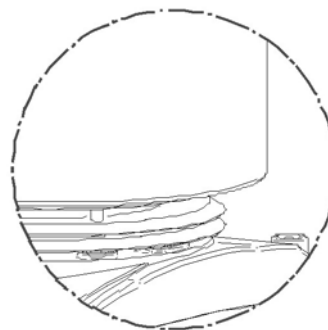
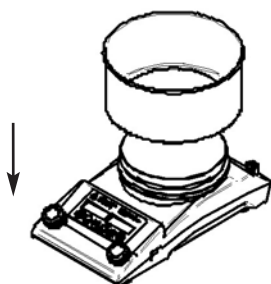


Transparent Shield & Heating Bath Assy

When necessary, the transparent shield and/or the heating bath can be easily assembled as shown below:



Transparent Shield



Heating Bath

Section 8 Technical Specifications

Item / Model		HPS RT2 Basic
Heater	Temperature Range (°C/°F)	50to 350 / 122 to 662
	Heating Control	Analog
	Maximum heater output	600W
Stirrer	Speed Range	Maximum 2,000 rpm
	Speed Control	Analog
	Maximum Stirring Capacity (L/ cu ft, H2O)	20 / 0.7
	Motor Type	Brushless DC (BLDC)
	Magnetic Stir Bar, Max. (Ø x L, mm/inch)	8 x 40 / 0.31 x 1.57)
Overheat Protection		Top plate, main body, PCB
Main Body		Aluminum
Top plate		Ceramic coated aluminum
Dimension of top plate (Ø, mm / inch)		140 /5.5
Overall Dimension (W x D x H, mm/ inch)		161 x 290 x 100 / 6.34 x 11.42 x 3.94
Weight (kg/lbs)		2.8 / 6.17
Electric Requirements (230V,50/60 Hz)		230V, 50/60Hz
Current Consumption		3A
Maximum load (kg/lbs)		25 / 55.1

✂ Unless otherwise specified, the above-mentioned data represent values at 25°C and 60% relative humidity.

✂ Thermo Fisher Scientific reserves the right to make changes in design and specification without prior notice.

Disposing of the Product

Disposing of your instrument must be done in an environmentally responsible way if it has been potentially exposed to bio-agents or radioactive samples. Failure to follow stringent requirements for instrument disposal may lead to actions against you and your organization.

- (1) First, check with your laboratory or organization to ensure that you are following all the policies and procedures for disposal of laboratory equipments.
- (2) If not possible, contact your local governing body for regulations regarding disposal of laboratory equipments. Thermo Scientific highly recommends you to find a local service provider that can properly dispose of your instrument.

THERMO FISHER SCIENTIFIC STANDARD PRODUCT WARRANTY

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows for shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the first year warranty period.

During the first two (2) years, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, labor included. Installation and calibration are not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of components parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any components or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo Fisher Scientific postage paid and replacement parts are shipped FOB destination.

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