



Operating Instructions

Standard and Advanced Series Hotplate/Stirrer/Hotplate-Stirrer

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PACKAGE CONTENTS

Hotplate, Stirrer or Hotplate-Stirrer
Power Cord
Support stand thumb knob
Stir Bar (stirring models)
Instruction Manual
Warranty Card

PLEASE NOTE: If you observed any damage to the carton or now see any shipping damage to the unit, contact the carrier immediately to file a claim.

INSPECTION

After unpacking your Thomas Scientific hotplate/stirrer/hotplate-stirrer, check immediately for shipping damages. It is important that any damage that occurred in transport is detected at the time of unpacking. If you do find such damage, the carrier must be notified immediately.

INSTALLATION

After unpacking, place your Thomas Scientific micro-processor controlled hotplate/stirrer/hotplate-stirrer on a level bench or table away from explosive vapors. Ensure that the surface on which the unit is placed will withstand typical heat produced by the unit. Place the unit a minimum of six (6) inches from vertical surfaces.

The Thomas Scientific micro-processor controlled hotplate/stirrer/hotplate-stirrer comes with a power cord. Insert this power cord into the IEC connector on the back of the unit first, then plug into a properly grounded outlet. The 120v unit plugs into a 120 volt, 50/60 Hz source.

WARRANTY INFORMATION

Manufacturer warrants this product to be free from defects in material and workmanship when used under normal conditions for two (2) years. Please complete and return the enclosed warranty card.

For your reference, make a note of the serial number, date of purchase and supplier here.

Serial No.: _____ Date Purchased: _____

Supplier: _____

ENVIRONMENTAL CONDITIONS

Non-operating storage:

Temperature: -20 to 65°C (-4 to 149°F)

Humidity: 20% to 80% relative humidity, non-condensing

Operating conditions: Indoor use only

Temperature: 5 to 40°C (41 to 104°F)

Humidity: 20% to 80% relative humidity, non-condensing

Altitude: 0 to 6,562 ft. (2000M) above sea level

Installation Category II and pollution degree 2 in accordance with IEC 664


MAINTENANCE & SERVICING

Your Thomas Scientific micro-processor controlled hotplate/stirrer/hotplate-stirrer is built for long, trouble-free, dependable service. It needs no user maintenance beyond keeping the surface of the top plate and the control panel clean. Spills should be removed promptly after the unit has cooled down. Do not use any cleaning agent or solvent which is abrasive or harmful to plastics, nor one which is flammable on the front panel or top plate. If the unit ever requires service, contact your Thomas Scientific sales office for repairs.

Cleaning ceramic tops


1. First remove any burnt-on deposits or spills from the top plate with a scraper (similar to scraping paint off of your windowpanes in your home). Hold the scraper at approximately a 30 degree angle to the top plate. For your safety, please wear an insulated mitt when using a metal scraper.
2. When the top plate has cooled down, apply a few dabs of non-abrasive cleaner on the surface with a damp paper towel as if you were cleaning a window.
3. As a final step, clean with clear water and wipe the surface with a clean, dry paper towel.

SAFETY INSTRUCTIONS

 **WARNING!** Do not use the hotplate/stirrer/hotplate-stirrer in a hazardous atmosphere or with hazardous materials for which the unit was not designed. Also, the user should be aware that the protection provided by the equipment might be impaired if it is used with accessories not provided or recommended by the manufacturer, or used in a manner not specified by the manufacturer.

Always operate the unit on a level surface for best performance and maximum safety.

DO NOT lift unit by the top plate

 **To avoid electrical shock:**


CAUTION! To completely cut off power to the unit, disconnect the power cord from the unit or un-plug from the wall outlet. The control knobs located on the front of the unit operate the specific heating/stirring functions.

Disconnect from the power supply prior to maintenance and servicing. Alkalis spills, hydrofluoric acid spills or phosphoric acid spills may damage the top and lead to thermal failure. Spills should be removed promptly after the unit has cooled down.

Keep the power cord away from the heater plate.

DO NOT immerse the unit for cleaning.

 **To avoid personal injury:**

 **CAUTION!** The top plate of the hotplate/hotplate-stirrer can reach 500°C. **DO NOT TOUCH** the heated surface. Use caution at all times. Keep the unit away from other objects. Place the unit a minimum of six (6) inches from vertical surfaces.

Keep the unit away from explosive vapors, and clear of papers, drapery, curtains and other flammable materials.

DO NOT operate the unit at high temperature without a vessel/sample on the top plate.

Replace the ceramic top plate immediately if damaged by etching, scratching or chipping. A damaged top plate can break in use.

SPECIFICATIONS - 4X4 HOTPLATE/STIRRER/HOTPLATE-STIRRER

Overall dimensions (L x W x H): 9.5" x 5.75" x 3.75"
 (24.13cm x 14.60cm x 9.53cm)

Top plate dimensions: 4" x 4"
 (10.16cm x 10.16cm)

Aluminum top electrical range:

	stirrer		hotplate		hotplate-stirrer	
120v	0.5 amps	50watts	1.70amps	200watts	2.0 amps	250watts
230v	0.25 amps	50watts	0.87 amps	200watts	1.1 amps	250watts

Ceramic top electrical range:

	stirrer		hotplate		hotplate-stirrer	
120v	0.5 amps	50watts	1.60 amps	190watts	2.0 amps	240watts
230v	0.25 amps	50watts	0.83amps	190watts	1.1 amps	240watts

Fuses: 120v/230v - 5mm x 20mm, 5amp quick acting

Capacity: 600ml, gross weight should not exceed 20 lbs

Speed range: aluminum: 60 to 1600rpm
 ceramic: 60 to 1600rpm

Speed stability: +/- 2%

Temperature range (hotplate/hotplate-stirrer):

Standard series	aluminum: 30°C to 400°C
	ceramic: 30°C to 500°C
Advanced series	aluminum: ambient +5° to 400°C
	ceramic: ambient +5° to 500°C

Temperature stability (hotplate/hotplate-stirrer):

aluminum: +/- 2% at 400°C
ceramic: +/- 3% at 500°C

Controls:

- heat knob with indicator light (available on hotplate and hotplate stirrers)
- stir knob with indicator light (available on stirrer and hotplate stirrers)
- digital heat display (available on advanced series only)
- recall last temperature button (available on advanced series only)
- hot top indicator light (all heating units)

Shipping weight: 5.55 lbs (2.52kg)

7 x 7

STANDARD SERIES

ADVANCED SERIES

SPECIFICATIONS - 7x7 HOTPLATE/STIRRER/HOTPLATE-STIRRER

Overall dimensions (L x W x H): 12.5" x 8.6" x 3.75"
(31.75cm x 21.84cm x 9.53cm)

Top plate dimensions: 7" x 7"
(17.78cm x 17.78cm)

Aluminum top plate electrical range:

	stirrer		hotplate		hotplate-stirrer
120v	0.5amps	50watts	5.2amps	625watts	5.4amps 650watts
230v	0.25amps	50watts	2.7amps	625watts	2.8amps 650watts

Ceramic top electrical range:

	stirrer		hotplate		hotplate-stirrer
120v	0.5amps	50watts	7.3amps	875watts	7.5amps 900watts
230v	0.25amps	50watts	3.8amps	875watts	3.9amps 900watts

Fuses 120v/230v: 5mm x 20mm, 5amp quick acting (stirrer only)
120v/230v: 5mm x 20mm, 10amp quick acting

Capacity 2.5 liters, gross weight should not exceed 40 lbs.

Speed range: aluminum: 60 to 1600rpm
ceramic: 60 to 1600rpm

Speed stability: +/- 2%

Temperature range (hotplate/hotplate-stirrer):

Standard series	aluminum:	30°C to 400°C
	ceramic:	30°C to 500°C
Advanced series	aluminum:	ambient +5° to 400°C
	ceramic:	ambient +5° to 500°C

Temperature stability (hotplate/hotplate-stirrer):

aluminum: +/- 2% at 400°C
ceramic: +/- 3% at 500°C

Controls:

- heat knob with indicator light (available on hotplate and hotplate stirrers)
- stir knob with indicator light (available on stirrer and hotplate stirrers)
- digital heat display (available on Advanced series only)
- recall last temperature button (available on Advanced series only)
- hot top indicator light (all heating units)

Shipping weight: 8.66 lbs (3.93kg)

SPECIFICATIONS - 10x10 HOTPLATE/STIRRER/HOTPLATE-STIRRER

Overall dimensions (L x W x H): 15.25" x 11.6" x 3.4"
(39.74cm x 29.85cm x 8.64cm)

Top plate dimension: 10" x 10"
(25.40cm x 25.40cm)

Aluminum top electrical range:

	stirrer		hotplate		hotplate-stirrer
120v	0.5amps	50watts	8.5amps	1025watts	8.75amps 1050watts
230v	0.25amps	50watts	4.5amps	1025watts	4.6amps 1050watts

Ceramic top electrical range:

	stirrer		hotplate		hotplate-stirrer
120v	0.5amps	50watts	8.5amps	1025watts	8.75amps 1050watts
230v	0.25amps	50watts	4.5amps	1025watts	4.6amps 1050watts

Fuses: 120v/230v: 3AB fast acting, 3amp (stirrer only)
120v/230v: 3AB fast acting, 15amp

Capacity: 6 liters, gross weight should not exceed 50 lbs

Speed range: aluminum 60 to 1200rpm
ceramic: 60 to 1600rpm

Speed stability: +/- 2%

Temperature range (hotplate/hotplate-stirrer):

Standard series	aluminum: 30°C to 400°C
	ceramic: 30°C to 500°C
Advanced series	aluminum: ambient +5° to 400°C
	ceramic: ambient +5° to 500°C

Temperature stability (hotplate/hotplate-stirrer):


aluminum:	+/- 2% at 400°C
ceramic:	+/- 3% at 500°C

Controls:

- heat knob with indicator light (available on hotplate and hotplate stirrers)
- stir knob with indicator light (available on stirrer and hotplate stirrers)
- digital heat display (available on advanced series only)
- recall last temperature button (available on advanced series only)
- hot top indicator light (all heating units)

Shipping weight: 14.60 lbs (6.63kg)

HEATING OPERATIONS

1. Get ready: Turn the heating knob to the off position. Plug power cord into a standard 3-prong grounded outlet. Place a vessel with the solution and the appropriate accessories in the **center of the top plate**. This is important because the vessel should be over the hottest part of the top plate.
2. Set temperature:
Advanced series hotplate/hotplate-stirrers - Turn the heat knob clockwise until the display reaches the desired heat setting. The micro-processor controlled heater is designed to bring samples to temperature quickly and accurately. The display will flash the setpoint temperature until the temperature is reached, at which time the display will stop flashing.
 Hotplate/hotplate stirrers overshoot protection: If the unit exceeds set temperature by 10°C, the unit will automatically stop heating.
3. Adjust temperature: Temperature adjustments can be made without interrupting heating by turning the indicator knob clockwise to increase heat and counter-clockwise to decrease heat.
4. Stop: To stop heating, turn the heat knob to the off position.



Hot top indicator:

The hot top indicator light warns that the top plate is too hot to touch. The hot top indicator light will illuminate when the heat is turned on and remain on until the top plate cools down.

Recall last temperature button:

Advanced series hotplate/hotplate stirrers - Built-in memory allows users to recall the last "set temperature" even after the unit has been turned off. (The temperature in memory is the last temperature that ran for more than 5 minutes.)

OPERATING TIPS:

The micro-processor controlled heater is designed to bring samples to temperature quickly, and accurately control the top plate temperature. Removing a sample or adding more to a sample content could cause the temperature to fluctuate. If this occurs, the display will again start to flash until the setpoint value is stabilized.

Overshoot:

The unit may overshoot the temperature up to 5°C before stabilizing at the setpoint. The two methods suggested to minimize overshoot are:

1. Metal containers minimize overshoot. However, when heating metal containers on a ceramic top it is recommended to use the lowest temperature setting possible to limit the thermal stress to the ceramic top.
2. If a glass vessel is used, anticipate overshoot. Start with a setting 5 - 10°C below the desired temperature. When the temperature stabilizes at this lower setting, turn the heat knob to the final temperature. Overshoot is then reduced to about 1°C.

The temperature display on the Advanced units show the actual temperature of the plate, the vessel contents being heated may be at a lower temperature depending on the size and insulating qualities of the vessel. It may be beneficial to monitor the temperature of the vessel contents and adjust the setpoint temperature accordingly.

Flashpoint:

WARNING: Hotplate/hotplate-stirrers are NOT explosion proof. Use caution when heating volatile materials.

1. Get ready: Turn stir knob to the off position. Plug power cord into a standard 3-prong grounded outlet. Place a vessel with the solution and the appropriate accessories in the **center of the top plate**.
2. Set speed: Turn the stir knob clockwise until the pointer reaches the desired set speed. The micro-processor controlled ramping feature slowly increases speed until the setpoint is reached. This feature helps to avoid splashing, improves magnetic coupling and provides excellent low end control. The micro-processor also monitors and regulates the stirring speed, sensing your requirements whether you're stirring an aqueous, viscous or semi-solid solution. The indicator light above the knob will be illuminated indicating the stirring feature is in use.

Speed adjustments can be made without interrupting stirring by turning the indicator knob clockwise to increase speed, or counter-clockwise to decrease speed.



Stir protection: If stirrer motor stops or fails, the unit will automatically shut down the heater (for hotplate-stirrer models).

3. Stop: To stop stirring, turn the stir knob to the off position. Your vessel can then be removed.

OPERATING TIPS:

The stirrer increases speed at a steady rate until the setpoint is reached, if the stir bar is too large or the liquid is too viscous, the stirrer may not reach its setpoint. The setpoint speed needs to be reduced.

Stirring vessels in oil baths:

When heating and stirring a reaction vessel within an oil bath or similar set-up, the stirring function will stir up to approximately 1 inch from the top plate. The stirring speed will vary according to liquid viscosity, stir bar length and distance from the top plate. Adjust one or all of these to achieve the desired stirring speed.

Example: The closer the reaction vessel is to the top plate the stronger the magnetic connection.

TROUBLESHOOTING (Advanced series only)

Error codes

The following errors SHOULD NOT be addressed by the user. If any of these errors appear, contact manufacturer for repairs.

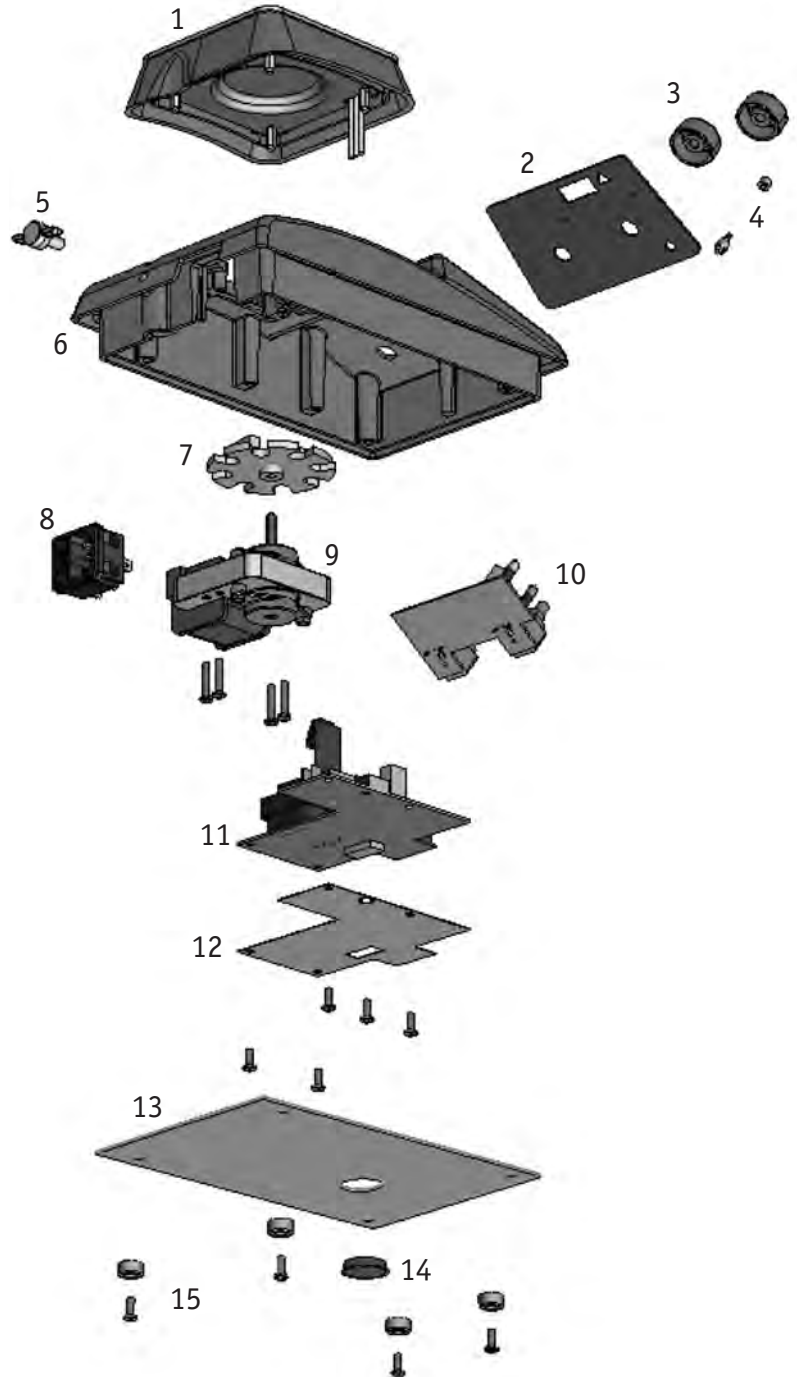
<u>Error code</u>	<u>Software test</u>	<u>Cause</u>
E01 *	System Failure	Thermocouple disconnected
E02 *	Heater system failure	Thermocouple failure Heating element failure
E03 **	Motor system failure	Magnetic material has been placed near or on the top plate surface Rotor locked Motor failure Motor sensor failure

* E01 and E02 are heating errors. These errors will cause heating function to cease. Stirring functions will be unaffected.

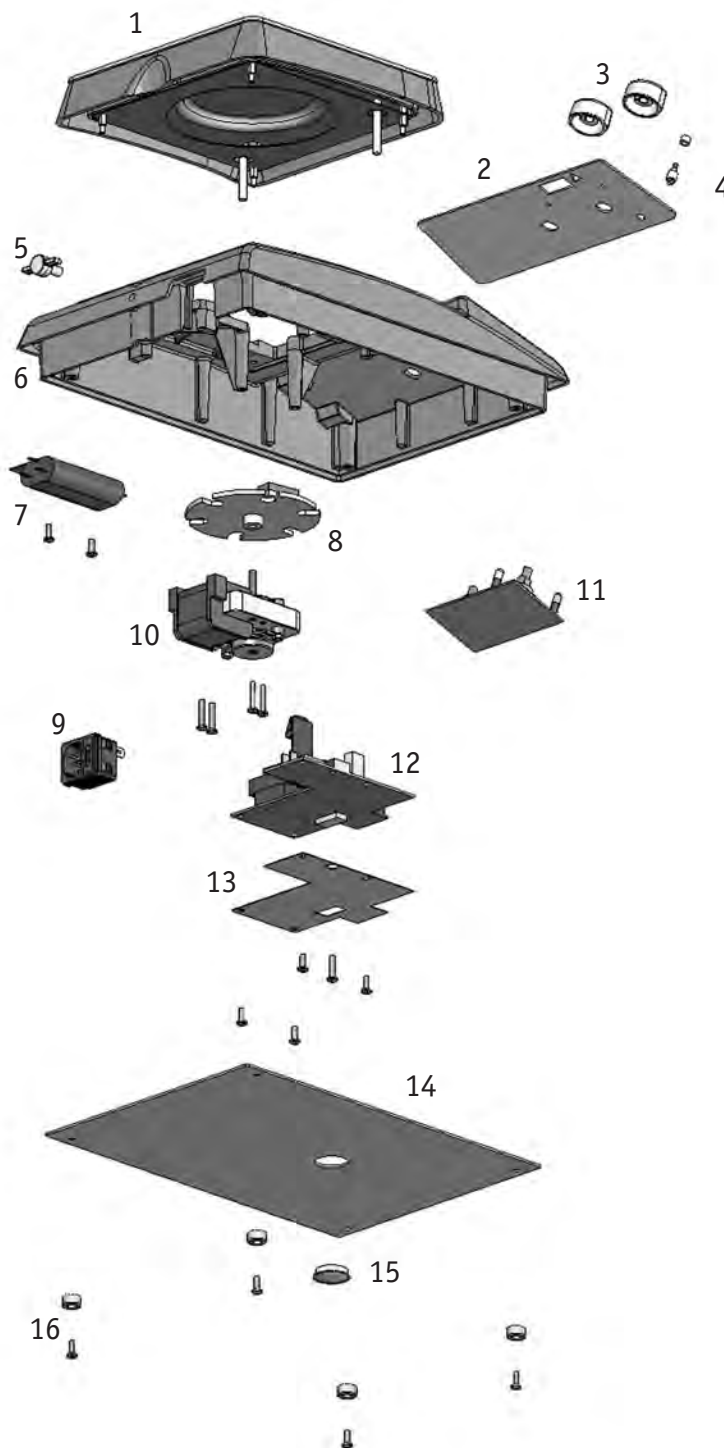
** E03 is a stirring error. This error will cause heating and stirring functions to cease.

4 x 4 EXPLODED VIEW

<u>Description</u>		<u>Part number</u>
1.	Top plate assembly - Ceramic 4x4 120v, hotplate, hotplate-stirrer 230v, hotplate, hotplate-stirrer stir only	886030-00 886031-00 886032-00
2.	Front panel overlay Standard series stirrers Advanced series, ceramic hotplate Advanced series, ceramic hotplate-stirrer Advanced series, aluminum hotplate Advanced series, aluminum hotplate-stirrer	386501-00 386536-00 386537-00 386538-00 386539-00
3.	Control knobs	all units 286116-00
4.	Last temperature (Advanced series only) switch button	386100-00 386101-00
5.	Support stand thumb knob	all units 586105-00
6.	Housing	all units 286150-00
7.	Magnet assembly	stirring models only 886036-00
8.	IEC module	4x4 units 386121-00
9.	Motor	120v 386860-00 230v 386037-00
10.	Control circuit board Standard series hotplate Standard series stirrer Standard series hotplate-stirrer Advanced series hotplate Advanced series hotplate-stirrer	386302-00 386303-00 386301-00 386306-00 386305-00
11.	Power circuit board	120V 386300-00 230V 386314-00
12.	Power board insulator	all units 386102-00
13.	Base plate	4x4 units 286152-00
14.	Bottom plate plug	all units 186109-00
15.	Feet	all units 530052-00

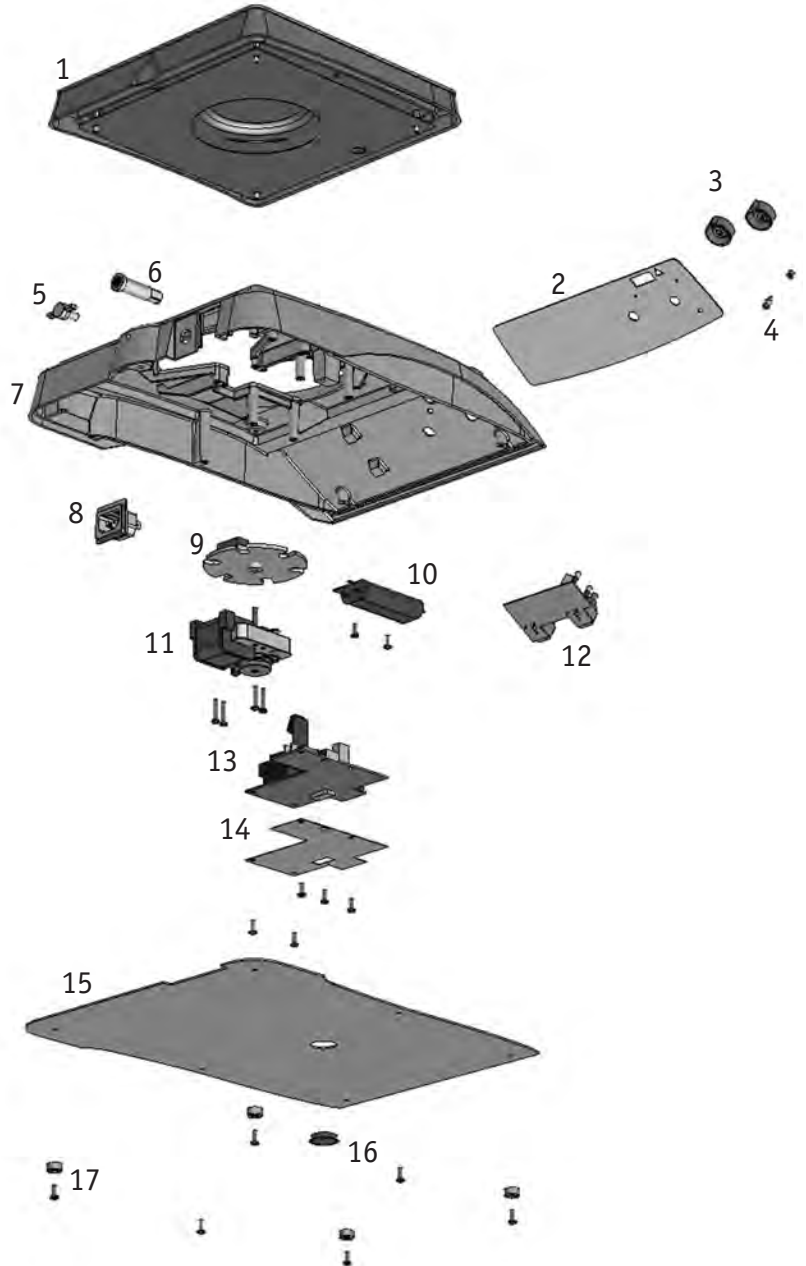


<u>Description</u>	<u>Part number</u>
1. Top plate assembly - Ceramic 7x7	
120v, hotplate, hotplate-stirrer	886037-00
230v, hotplate, hotplate-stirrer	886038-00
stir only	886039-00
2. Front panel overlay -	
Standard series	all stirrers 386513-00
Advanced series, ceramic	hotplate 386544-00
Advanced series, ceramic	hotplate-stirrer 386545-00
Advanced series, aluminum	hotplate 386546-00
Advanced series, aluminum	hotplate-stirrer 386547-00
3. Control knobs	all units 286116-00
4. Last temperature (700 series only)	switch 386100-00
	button 386101-00
5. Support stand thumb knob	all units 586105-00
6. Housing	all units 286151-00
7. Line Filter	230v units 387022-00
(hotplate/hotplate-stirrer)	
8. Magnet assembly	stirring models only 886043-00
9. IEC module	7x7 units 386122-00
10. Motor	120v 386860-00
	230v 386037-00
11. Control circuit board	Standard series hotplate 386302-00
	Standard series stirrer 386303-00
	Standard series hotplate-stirrer 386301-00
	Advanced series hotplate 386306-00
	Advanced series hotplate-stirrer 386305-00
12. Power circuit board	120v 386300-00
	230v 386310-00
	230v stirrer only 386314-00
13. Power board insulator	all units 386102-00
14. Base plate	7x7 units 286153-00
15. Bottom plate plug	all units 186109-00
16. Feet	all units 530052-00



10 x 10 EXPLODED VIEW

Description	Part number
1. Top plate assembly - Ceramic 10x10	
120v, hotplate, hotplate-stirrer	886044-00
230v, hotplate, hotplate-stirrer	886045-00
stir only	886046-00
2. Front panel overlay	
standard series	Ceramic stirrer 386525-00
standard series	Aluminum stirrer 386528-00
advanced series, ceramic	hotplate 386552-00
advanced series, ceramic	hotplate-stirrer 386553-00
advanced series, aluminum	hotplate 386554-00
advanced series, aluminum	hotplate-stirrer 386555-00
3. Control knobs	all units 286116-00
4. Last temperature (Advanced series only)switch	386100-00
button	386101-00
5. Support stand thumb knob	all units 586105-00
6. Fuse holder	all units 320001-00
7. Housing	all units 286087-00
8. IEC module	10x10 units 386123-00
9. Magnet assembly	ceramic top models 886050-00
10. Line Filter	230v units 387022-00
(hotplate/hotplate-stirrer)	
11. Motor	120v 386860-00
	230v 386037-00
12. Control circuit board	600 series hotplate 386302-00
	600 series stirrer 386303-00
	600 series hotplate-stirrer 386301-00
	700 series hotplate 386306-00
	700 series hotplate-stirrer 386305-00
13. Power circuit board	120v 386300-00
	230v 386310-00
	230v stirrer only 386314-00
14. Power board insulator	all units 386102-00
15. Base plate	10x10 units 286132-00
16. Bottom plate plug	all units 186109-00
17. Feet	all units 530052-00



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