Instruction Manual

For All Corning® Hot Plates, Stirrers, Stirrer/Hot Plates with Digital Displays, and External Temperature Controller (6795PR)

CORNING

			Corning Cat. No.			
Model No.	Product	Top Plate Size	120V	100V	230V (Non-Europe)	230V (Europe)
PC-400D	Hot Plate	5 x 7 in. (12.7 x 17.8 cm)	6795-400D	6797-400D	6798-400D	6796-400D
PC-410D	Stirrer	5 x 7 in. (12.7 x 17.8 cm)	6795-410D	6797-410D	6798-410D	6796-410D
PC-420D	Stirrer/ Hot Plate	5 x 7 in. (12.7 x 17.8 cm)	6795-420D	6797-420D	6798-420D	6796-420D
PC-600D	Hot Plate	10 x 10 in. (25.4 x 25.4 cm)	6795-600D	6797-600D	6798-600D	6796-600D
PC-610D	Stirrer	10 x 10 in. (25.4 x 25.4 cm)	6795-610D	6797-610D	6798-610D	6796-610D
PC-620D	Stirrer/ Hot Plate	10 x 10 in. (25.4 x 25.4 cm)	6795-620D	6797-620D	6798-620D	6796-620D
6795PR	External Temperature Controller	All Models	6795PR			

About This Manual

This manual is designed to assist you in the optimal usage of your Corning® hot plate, stirrer, stirrer/hot plate, or external temperature controller. The manual contains English, German, French, Italian, Spanish, and Polish

Product Voltages

Hot plates, stirrers, and stirrer/hot plates are available in different voltages. Before initial use, check that the unit you received is the correct voltage for your location.

Table of Contents

1.0 Safety Information

This instruction manual contains important operating and maintenance instructions that must be read, understood, and followed by the product user. Failure to use this product according to this instruction manual may degrade or defeat the protection normally provided by this product. Read this instruction manual prior to product use and keep this instruction manual for future reference.

Product Symbols

Caution – Risk of Danger: Cautions there is material in the instruction manual which must be read, understood, and followed in order to preserve product safety features.

Caution – Hot Surface: Cautions that the top plate is too hot to touch.

Indicates that the unit is plugged into power supply.

Indicates that the accessory external temperature controller is properly plugged into the unit.

Warnings

Personal Injury

- Do not use this product in a manner other than as stated in the Operating Conditions section as the protection provided by the equipment may be impaired.
- This product is designed for use in laboratory environments by persons knowledgeable in safe laboratory practices.
- Always wear safety glasses and other appropriate protective equipment when operating this product.

Electric Shock

- This product must be connected to a grounded power outlet for safe functioning.
- Use only the power cord supplied with the product.
- The power cord is the device available for full disconnect from mains input.
- Position the product for use so the power cord can be easily disconnected without having to move the product.
- Disconnect the power cord before moving or cleaning the unit.

Product Damage

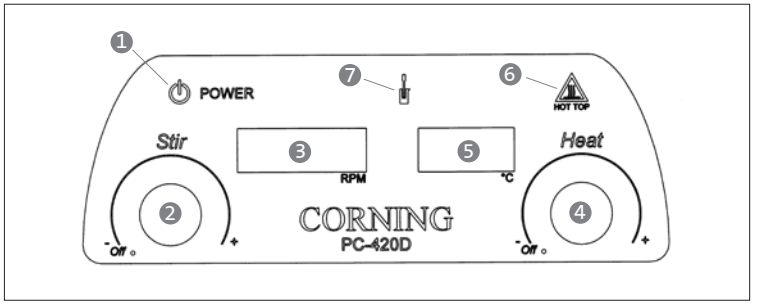
- Keep the product dry and clean.
- Do not immerse the product for cleaning.
- The ceramic top may break if impacted.
- The maximum gross weight placed on the top surface must not exceed 25 lbs. (11 kg).
- These units are not explosion- or spark-proof.
- Do not heat or stir volatile or flammable materials.
- Do not operate this product near volatile or flammable materials.
- Do not use this product with a metal vessel.

2.0 Operating Conditions

Corning hot plates, stirrers, and stirrer/hot plates are designed to provide safe functioning under the following conditions:

- Indoor use
- Altitude up to 6,500 feet (2,000 meters)
- Ambient temperatures of 0°C to 30°C
- Product should be placed on a flat surface at least 12 in. (30.5 cm) from walls, 48 in. (122 cm) from ceilings, and 12 in. (30.5 cm) from other hot plates if using multiple units.
- Maximum relative humidity of 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C.
- Pollution Degree 2: Any foreign matter that may accumulate on or within the product during normal use is not electrically conductive.
- Installation Category II: Product is designed for connection to an electrical branch circuit inside a building with main supply voltage fluctuations not exceeding ±10% of the nominal voltage.

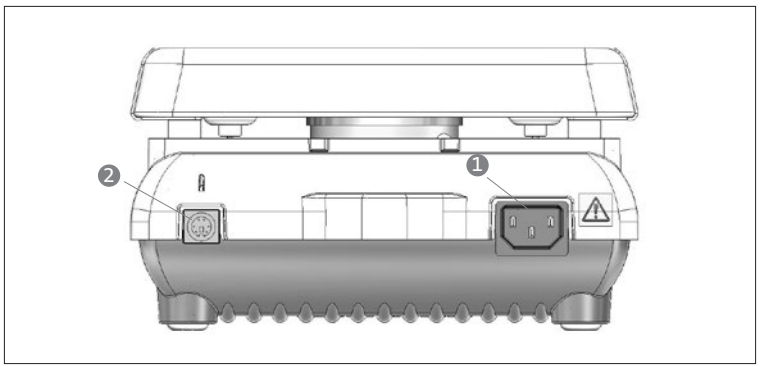
3.0 Product Controls and Indicators



1. Power Indicator: Illuminates at all times when the product is properly connected to input power.
2. Stir Control Knob: Turn the knob all the way counterclockwise to turn off stirring function. Turn the knob clockwise to set desired stirring speed.
3. Stirring Speed Display: Shows the speed set for stirring
4. Heat Control Knob: Turn the knob all the way counterclockwise to turn off heating function. Turn the knob clockwise to set the desired heating temperature.
5. Heating Temperature Display: Shows the temperature set for heating.
6. Hot Top Indicator: Illuminates when the temperature of the top is too hot to touch (greater than ~60°C).
7. Temperature Probe In-Use Indicator: Illuminates when the external temperature probe is connected to the unit.

4.0 Product Connections

1. Power Cord Input: Connect the supplied power cord into this connector.
2. External Temperature Controller Input: Connect the optional External Temperature Controller (Corning Cat. No. 6795PR) into this connector.



To Connect the External Temperature Controller

1. Turn the Stir Control Knob and Heat Control Knob to the **OFF** position.
2. Disconnect power cord.
3. Insert temperature controller connector into the input connector.
4. Reconnect power cord.
5. Product is now ready for use with the External Temperature Controller.

Repeat the above process when disconnecting the Temperature Controller.

5.0 Stirring Instructions for PC-410D, PC-420D, PC-610D, PC-620D Models

1. Fill the vessel with solution to be stirred.
2. Place the stir bar into the vessel.
3. Place the vessel in the center of the top surface.
4. Turn Stir Control Knob until the Stirring Speed Display shows the desired speed. The speed setting can be adjusted according to the table below.

Operating Range (rpm)	Adjustable Increment (rpm)
60 - 100	5
100 - 200	10
200 - 400	20
400 - 1,150	50

   - Flashing Display: The number will **FLASH** when the actual stirring speed is not at set speed.
   - Constant Display: The number will not flash when the actual stirring speed is at the set speed. The number will remain constantly **ON** when the actual stirring speed is at the set speed.
5. When desired stirring is complete, turn the Stir Control Knob to the **OFF** position. Allow stir bar to cease rotation before removing the vessel from the unit.
6. Heating and stirring can be performed simultaneously with the PC-420D and PC-620D models, which offer both heating and stirring functions.

NOTE: The viscosity of the stirred material will affect the ability of the stir bar to remain coupled to the rotating ring magnet. Materials of high viscosity must be stirred at slower speed settings.

6.0 Heating Instructions

Without External Temperature Controller for PC-400D, PC-420D, PC-600D, and PC-620D Models

1. Fill the vessel with solution to be heated.
2. If using a PC-420D or PC-620D model and the stirring function, place the stir bar into the vessel.
3. Place vessel in the center of the top surface.
4. Turn Heat Control Knob until the Heating Temperature Display shows the desired temperature. The temperature setting can be adjusted in 5°C increments.
   - Flashing Display: The number shown on the Heating Temperature Display will **FLASH** when the actual heating temperature is not at the set temperature.
   - Constant Display: The number shown on the Heating Temperature Display will remain constantly **ON** when the actual heating temperature is at the set temperature.
   - Hot Top Indicator: The Hot Top Indicator will be **ON** at all times when the temperature of the top surface is too hot to touch (greater than ~60°C).
   - The Hot Top Indicator will **FLASH** when the Heat Control Knob is turned **OFF** but the top surface is still too hot to touch.
   - The Hot Top Indicator will be **OFF** when the temperature of the top is less than ~60°C.

Caution: The Hot Top Indicator will turn **OFF** when the power cord is disconnected from the product even if the temperature of the top surface is still too hot to touch.

With External Temperature Controller, Corning Cat. No. 6795PR for PC-400D, PC-420D, PC-600D, PC-620D, and 6795PR Models

1. Connect the External Temperature Controller to the connector on the back of the unit.
   - Temperature Probe in Use Indicator: This will illuminate when the External Temperature Controller is properly connected.
2. Fill the vessel with solution to be heated.
3. If using a PC-420D or PC-620D model and the stirring function, place the stir bar into the vessel.
4. Place the vessel in the center of the top surface.
5. Insert the tip of the External Temperature Probe into the solution.
   - The tip should be located in the center of the vessel and at approximately one-half of the depth of the solution.
6. Secure the position of the External Temperature Controller by using a ring stand/support rod and clamp.
   - Ensure the cable of the External Temperature Controller does not come into contact with the heating surface.
7. Turn the Heat Control Knob until the Heating Temperature Display shows the desired heating temperature.
   - Flashing Display: The number shown on the Heating Temperature Display will **FLASH** when the actual heating temperature is not at the set temperature.
   - Constant Display: The number shown on the Heating Temperature Display will remain constantly **ON** when the actual heating temperature is at the set temperature.
   - Hot Top Indicator: The Hot Top Indicator will be **ON** at all times when the temperature of the top surface is too hot to touch (greater than ~60°C).
   - The Hot Top Indicator will **FLASH** when the Heat Control Knob is turned **OFF** but the top surface is still too hot to touch.
   - The Hot Top Indicator will be **OFF** when the temperature of the top is less than ~60°C.

Caution: The Hot Top Indicator will turn OFF when the power cord is disconnected from the product even if the temperature of the top surface is still too hot to touch.

7.0 Heating Operation

7.1 Principles

The heating element and a temperature sensor are located just beneath the ceramic top surface of the product. The microprocessor-controlled heat, generated by the heating element, is based upon the sensor temperature and the value set on the Heating Temperature Display. When the sensor temperature is not within range of the value set on the display, the display will **FLASH**. When the sensor temperature is within range, the value displayed will remain constantly **ON**.

The Heating Temperature Display does not indicate the actual temperature of materials placed on top of the product or the actual temperature of the ceramic top surface.

The following table shows a typical difference between the temperature set on the Heating Temperature Display and the actual temperature measurement of the ceramic top surface.

Temp. Set on Display (°C)	Actual Top Surface Temp. (°C)	Temp. Set on Display (°C)	Actual Top Surface Temp. (°C)
50	45	350	285
100	85	400	325
150	125	450	365
200	165	500	405
250	205	550	440
300	245		

(This information was taken using a 6795-420D with no top load in 20°C ambient conditions).

Using the External Temperature Controller (Corning Cat. No. 6795PR) enables precision temperature control of materials placed in vessels on top of the product.

When the External Temperature Controller is connected to the product, the closed loop control process is extended to include temperature input from the External Temperature Controller. The microprocessor-controlled heat, generated by the heating element, is based upon the sensor temperature located in the tip of the External Temperature Controller and the value set on the Heating Temperature Display. When the sensor temperature is not within range of the value set on the display, the display will **FLASH**. When the sensor temperature is within range, the value displayed will remain constantly **ON**.

To directly control the temperature of liquid in a vessel on the top surface, place the External Temperature Controller into the liquid and connect the Controller to the product. The Heating Temperature Display shows the temperature of the liquid and can be used to adjust the temperature of the liquid.

See Section 10.0 for ordering information.

Caution: The top surface and the vessel used may be at substantially higher temperatures than indicated by the setting on the Heating Temperature Display as the controller regulates the liquid temperature inside the vessel.

7.2 Safety

The microprocessor-controlled system has built-in error routines to detect product operation in some unfavorable conditions. The type of error routines which may be active in a product varies depending upon the functionality of the model and the operating software version.

A product shut down by an error routine must be disconnected and reconnected to mains input before it can be used again. Please contact Corning Life Sciences or a Corning authorized repair facility (visit **www.corning.com/lifesciences**) if a product does not reset from the error routine shut down or if it continues to shut down after resetting.

Caution: Error routines built into these products do not substitute the need

8.0 Repair

There are no direct user serviceable components inside this series of products. A list of available replacement parts are listed in Section 11.0.

Please contact Corning or a Corning authorized repair facility for repair or maintenance issues.

9.0 Maintenance

Power

Caution: Disconnect power to the product by unplugging the power cord before performing any maintenance or inspection procedures.

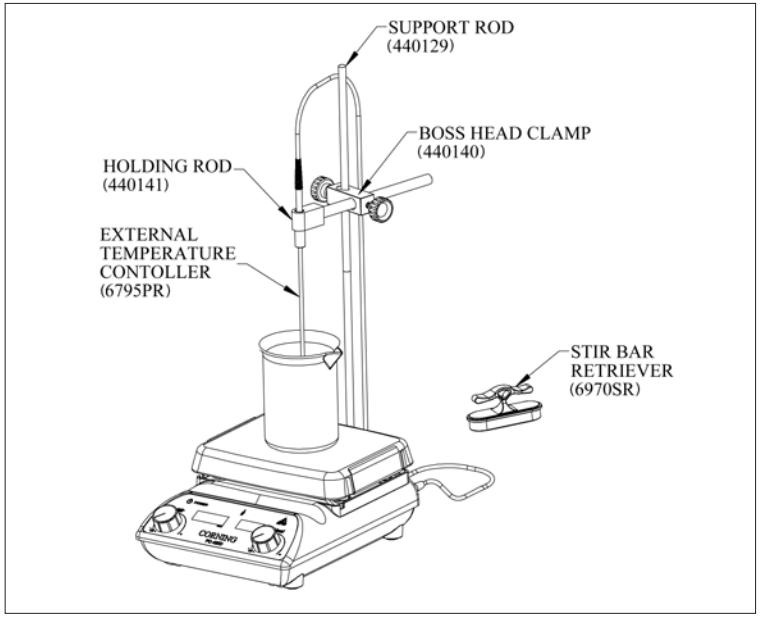
- Inspect the power cord regularly and replace if damaged. Use only replacement power cords available from Corning or Corning authorized product distributors.

Ceramic Top Plate

- These products are supplied with a Pyroceram® top that is easy to clean and highly resistant to scratches, corrosion, and chemical attack.
- The ceramic top may break during use if not properly maintained.
- Keep the ceramic top clean. A nonabrasive cleaner may be used to clean the ceramic top.
- Inspect the ceramic top for damage during cleaning.
- Discontinue product use if the ceramic top is chipped, etched, or shows excessive scratching. A replacement top can be ordered (Section 11.0).
- Contact Corning or a Corning authorized repair facility for a top replacement.

General

- It is important to keep this product dry and clean.
- Remove minor exterior liquid spills promptly.
- Clean exterior surfaces with a nonabrasive cleaner. Do not reconnect product to power input until all cleaned surfaces have dried.
- If liquid or wet solid material gets inside the product, immediately disconnect the power to the product and discontinue use. Contact Corning for additional instructions regarding interior spills.



Accessories (Shown with Corning Cat. No. 6795-420D)

10.0 Optional Accessories

Corning Cat. No.	Description
6795PR	External Temperature Controller for digital display Hot Plates and Hot Plate/Stirrers. Use with all PC-400D, 420D, 600D, and 620D models. FEP-coated stainless steel.
440129	Vertical Support Rod. Supplied as two 9 in. (22.86 cm) rods which can be screwed together. Use with all PC-XXXD series products. Stainless steel.
440140	Boss Head Clamp. Use for connecting the 440141 Holding Rod at a 90° angle to the 440129 Support Rod. Aluminum.
440141	Holding Rod. Use for holding the 6795PR External Temperature Controller in position. Aluminum.
6795KIT	Universal Accessories Kit includes: 6795PR, 6970SR, and 440129
6795-420KIT	Kit includes: 6795-420D Stirrer/Hot Plate, 6795PR, 6970SR, and 440129
6795-620KIT	Kit includes: 6795-620D Stirrer/Hot Plate, 6795PR, 6970SR, and 440129
400430	PTFE-coated magnetic stir bar, .39 x 2 in. (1 x 5.1 cm) – recommended size for all PC-610D and 620D models
401435	PTFE-coated magnetic stir bar, .39 x 1 in. (1 x 2.5 cm) – recommended size for all PC-410D and 420D models
6970SR	Stir bar retriever, polypropylene

11.0 Replacement Parts

Corning Cat. No.	Description	Model Usage
411007	Power cord	PC-400D/410D/420D, 120V
410956	Power cord	PC-600D/610D/620D, 120V
411021	Power cord	PC-400D/410D/420D and PC-600D/610D/620D, 100V
410942	Power cord	PC-400D/410D/420D and PC-600D/610D/620D, 230V (UK plug)
440124	Power cord	PC-400D/410D/420D and PC-600D/610D/620D, 230V (Euro Plug)
Contact Corning Customer Service	Ceramic top plate/ element assembly, 5 x 7 in.	PC-400D/410D/420D, All Voltages
Contact Corning Customer Service	Ceramic top plate/ element assembly, 10 x 10 in.	PC-600D/610D/620D, All Voltages
Contact Corning Customer Service	PC control board	—
440135	Control knob	All models

12.0 Technical Specifications

		Power						
Model No.	Type	120V/60Hz (6795 models)	100V/60Hz (6797 models)	230V/50Hz (6796 models)	230V/50Hz (6798 models)[1]	Temp. Range[2]	Stir Range (rpm)	Weight
PC-400D	Hot Plate	628W/ 5.3A	548W/ 5.5A	628W/ 2.7A	628W/ 2.7A	5°C-550°C (41°F-1,022°F)	—	6.0 lbs. (2.7 kg)
PC-600D	Hot Plate	1043W/ 8.7A	1043W/ 10.5A	1043W/ 4.5A	1043W/ 4.5A	5°C-550°C (41°F-1,022°F)	—	10.0 lbs. (4.5 kg)
PC-410D	Stirrer	73W/ 0.7A	78W/ 0.8A	73W/ 0.3A	73W/ 0.3A	—	60-1,150	7.0 lbs. (3.2 kg)
PC-610D	Stirrer	73W/ 0.7A	78W/ 0.8A	73W/ 0.3A	73W/ 0.3A	—	60-1,150	11.5 lbs. (5.2 kg)
PC-420D	Stirrer/ Hot Plate	698W/ 5.9A	623W/ 6.3A	698W/ 0.3A	698W/ 0.3A	5°C-550°C (41°F-1,022°F)	60-1,150	7.0 lbs. (3.2 kg)
PC-620D	Stirrer/ Hot Plate	1113W/ 9.3A	1113W/ 11.2A	1113W/ 4.8A	1113W/ 4.8A	5°C-550°C (41°F-1,022°F)	60-1,150	11.5 lbs. (5.2 kg)

[1] Cat. Nos. beginning with 6798 in 230V are non-European configuration models.
[2] The Temperature Range using the External Temperature Controller is 5°C - 200°C (41°F - 392°F).

13.0 Size and Dimensions

Model No.	Top Plate Size	Product Dimensions
PC-400D/410D/420D	5 x 7 in. (12.7 x 17.8 cm)	4.25 x 7.75 x 11 in. (10.8 x 19.7 x 28 cm)
PC-600D/610D/620D	10 x 10 in. (25.4 x 25.4 cm)	4.625 x 11 x 15.375 in. (11.75 x 19.7 x 39.05 cm)

14.0 Troubleshooting

- **I have a beaker of water on my hot plate and set the temperature for 550°C. Why does the display setting blink and not remain constant?**

  The display will blink at any time when the temperature sensor is not within range of the set temperature value. The temperature measured by the sensor is a composite of the temperature of the heating element located beneath the sensor, the ceramic top above the sensor, and the very small air space around the sensor. Water requires a substantial amount of heat in order to boil yet remains at a constant temperature of 100°C for the duration of the boiling process. Although the heating element is producing maximum heat at the 550°C setting, the water consumes this heat so quickly during the boiling process that the heat is unable to raise the temperature measured by the sensor to within the range of the 550°C set value.

- **How long does it take to bring a beaker of water to a boil?**

  Using a 600 mL PYREX® beaker with 400 mL of water at 25°C, it takes approximately 15 minutes to bring the water to a full, rolling boil.

- **Can I use a metal tray on top of my Corning® hot plate?**

  No. The metal will act as a heat sink, and have a high probability of creating an abnormal heating condition. If an abnormal condition is detected, the product will shut down. A metal vessel will also scratch the ceramic top plate.

- **The stir bar keeps decoupling. Why and what can I do to stop this?**

  These units are programmed to minimize decoupling. However, liquid viscosity, stir bar magnetic strength, vessel used, and speed changes can cause decoupling. High viscosity liquids must be stirred at slower speed settings. The magnetic strength of stir bars can weaken over time and may need to be replaced. The vessels used need to have thin, flat bottoms to insure optimal performance. Rapid decreases in stir speed can cause decoupling as the magnet slows down quicker than the stir bar and the liquid.

- **What size vessel should I use?**

  The vessels used on the top of a hot plate must not be larger than the top plate.