3-Gallon, Tabletop
AUTO-DUPLICATOR
w/Fully-Automatic, Digital Processing

- Solid-State, Digital Design
- Programmable Microprocessor Based Controller
- Fully-Automatic Processing
- Adjustable Cook-Down Hold Time
- Rapid Recycling (Approximately 3Hours)
- Display Temperature in °C or °F
- Large, Lighted Work Area
- Fan-Cooled • Easy Set-Up and Calibration
- Large 3 Gallon Capacity
- Clog-Free Dispensing Valve
- No Water or Drain Hook-Up Required
- Standard 115 V Electrical Requirement
- Esthetic Computer Putty Finish
- Powder-coated for Durability

Hydrocolloid duplicator specifications may be subject to change without notice as modifications & improvements are made.

Owner's Manual

Congratulations!

You have just purchased a quality piece of N*obilium* D*ental* L*aboratory* E*quipment*. It has been carefully quality-controlled and thoroughly tested at the factory for optimum performance and durability. Each piece of equipment must adhere to the same standards of quality and efficiency that have made all Nobilium laboratory equipment an outstanding value.

If you have any questions regarding Nobilium's quality line of dental laboratory equipment and supplies, please call toll-free: 800-833-2343 (Fax: 518-434-1288) between the hours of 8:00 AM and 4:30 PM Eastern Time. Or, if you prefer, visist us at our web site: www.nobilium.com . . . we will be pleased to assist you.

Unpacking

Carefully remove the duplicator from its shipping carton and check it for concealed damage. **If any damage is found, it must be reported to a representative of the carrier that delivered the duplicator.** The representative should come to your laboratory and fill out a damage report form. **Do not proceed until this has been done.** Notify us only *after* the above has been initiated.

If no damage has been found, lift the duplicator on to the bench where it will be utilized. It is best to have the unit adjacent to the place where the duplications will be cooled.

It is important to thoroughly review this manual and test your new duplicator prior to loading with duplicating material.

Electrical Connection

In most cases your new Auto-Duplicator requires only a standard 115V–60 Hz outlet to operate. Before plugging the duplicator in, be sure the identification plate's electrical specifications agree with the electrical provided at the outlet. A separate circuit should be utilized as 115 volt units draw about 12 amps. As with any electrical device, take extra care when handling liquids around electrical connections to avoid accidental shock.

It is important to read the next section prior to actually plugging the duplicator in.

Testing and Inspection

This is a very important step in the installation of your new Auto-Duplicator. Even though your unit was fully tested and inspected before leaving CMP Industries, we cannot control the handling of equipment en route to you. For this reason we feel the following checks are very important.

Note: The parts list located in the back of this manual will help in the proper identification of items.

1. Remove rear panel and inspect visually. Look for loose connections and parts.

2. Replace rear panel after inspection.

3. Remove top cover and check to see that nothing is inside to interfere with the stirrer.

4. Replace top cover making sure stirrer slips over bearing in the center of the bottom of the tank.

5. Plug cover lead into receptacle located in rear of duplicator.

6. Check to be sure Auto-Duplicator 's identification plate voltage agrees with electrical voltage. Plug duplicator into electrical outlet.

Note: 115 volt duplicators draw about 12 amps and should be on their own separate circuit.

7. If any lights come on, immediately push power switch to turn duplicator off.

8. Remove loading port cover and fill duplicator with two (2) gallons of water.

9. Turn duplicator on by pushing the power switch. The following will happen:

- **A.** Bottom heater light will come on.
- **B.** Temperature will show in the temperature box.
- **C.** The stirring motor will start.

10. Adjust water temperature to about 110°F (43°C) by adding hot or cold water. I*t may be necessary to remove water.* It will take about 1 minute for the temperature display to reflect the temperature changes that the water additions cause.

11. The bottom heater light will go out 1° above low temperature set point. Allow a ± 3° deviation from set point. Pressing the temp key on front panel will display the low set point or **SP1.**

12. Push cycle button to initiate the high heat, or cook-down cycle. The side heater and bottom heater lights will both come on. The high temperature set point, or **SP2**, will now be displayed when the temperature key on front panel is pressed.

13. The temperature will rise to the high temperature set point. When set point is reached, both high and low temperature red lights will go out. Again, allow a deviation of ±3° from set point.

14. The Auto-Duplicator will hold the high temperature set point according to the preset value in program (15 minutes is recommended). After the hold time expires, the fan will come on and cool the colloid down to the low temperature set point.

15. Empty Auto-Duplicator and you are now ready to fill with cut-up hydrocolloid.

Operation

GENERAL INFORMATION

Adjust Auto-Duplicator temperature settings to match those recommended by the duplicating material manufacturer. (*See "Entering the Program Mode" on Page 5*)

***Suggestions*:**

- **A.** Low Temperature – Since your new duplicator is *stirring continually*, a lower storage temperature is possible. For most duplicating materials, we have found 130°F (54°C) to be a good setting.

- **B.** High Temperature – Start with the recommended set points and gradually lower setting. Use the lowest possible setting that will produce usable material.

Your Auto-Duplicator stirring motor runs *continually*. It will also run very warm, about 140°F (60°C). This is warm enough so you will not be able to hold your hand on the motor. **For safety, do not remove the motor cover!** We keep the motor running because **(a)** we can lower the low temperature setting and **(b)** it has no adverse effect on motor life.

Your new Auto-Duplicator is never turned off *except* when changing duplicating material or cleaning.

COOK-DOWN

It is best to cook-down in late afternoon. This allows the cool-down to occur at night when it doesn't hold up your operation. The "cook-down" cycle to "fan-on" should be done while a trained technician is present – this is when a failure is most apt to occur. We do not anticipate any failures, but we always want to operate in the safest manner.

ENTERING THE PROGRAM MODE

The "Program Mode" is used to both ***view*** and ***edit*** the time and temperature set points. To enter the program, press and hold *both* the time and temp keys for approximately 5 seconds. Each step in the program will be announced prior to being displayed.

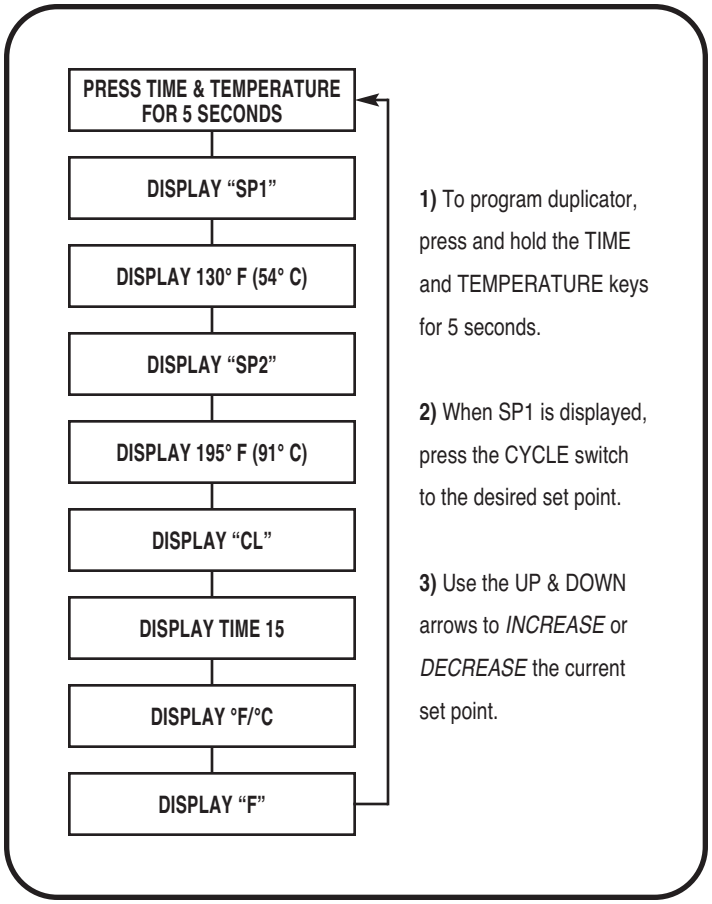
SP1 is the first item to be displayed upon entering the "Program Mode". The menu selections are advanced by pressing the cycle button.

The set points are changed by pressing the "temp key" to ***increase*** or the "time key" to ***decrease*** the current value.

If no keys are pressed for approximately 2 seconds, the tank temperature will again be displayed.

The illustration below shows the "Program Mode" in flow chart form.

Note: To advance to the next step, the "cycle" button must be pressed.



Loading Procedure

1. Remove small round loading port cover located just in front of the stirring motor by pulling up on black knob. Check inside of duplicator to be sure tank is ***clean*** and ***empty***.

2. Read manufacturer's duplicating material instructions for recommended cook-down. If material is solid, cut-up into chunks until approximately 1 cubic inch in size.

3. Turn Auto-Duplicator on by pushing the "power" switch.

- **A.** Motor will start.
- **B.** Temperature will appear in the temperature display.
- **C.** Bottom heater pilot light will come on.
- **D.** Bottom heater will come on.

4. Start loading cut-up pieces of colloid.

5. When about 2/3 full, push "cycle" switch to start cook-down. Finish loading colloid.

- **A.** Side heater pilot light will come on.
- **B.** Temperature will start to rise.

6. The red heater lights will go out 1° above the high temperature set point.

7. The red lights may cycle on and off to maintain the high temperature set point for a period of 15 to 20 minutes.

This time is adjustable from 0 to 30 minutes.

8. After 15 to 20 minutes, the fan will start and begin to cool the colloid down to low temperature set point. It will take about 2 hours to cool the duplicating material down to this level. We recommend you allow cool-down to occur at night.

Note: This time will vary according to temperature of air in room.

9. *It is normal for temperature to shoot up about 10° after fan shuts off.* This is due to the viscosity of the colloid. **Do not worry** – the colloid will settle down to the proper low temperature set point.

10. You may find the valve plugged due to packing of chunks above the valve ball. To free, **TURN POWER OFF** and remove loading port cover. Use a long, thin probe to poke packed colloid out of opened valve.

11. Once valve is freed from obstruction, cover loading port with lid and restart your Auto-Duplicator.

Note: If the cook-down cycle accidentally starts, it can be stopped by pushing the "start/stop" button.

Helpful Hints to Avoid Processing Trouble

1. DO NOT cycle Auto-Duplicator to cook-down mode when less than 3/4 full. This will prevent scorching and premature failure of the duplicating material.

2. Clean Auto-Duplicator approximately *once a month* or when new duplicating material is added. Your frequency of cleaning may vary with usage. Scrub inside wall of tank and cover assembly with a plastic pot scrubber. Coat inside of tank with silicone grease – CMP part number 61139.

3. When cleaning, **always check the black bearing in center of bottom of tank.** It should be *tight* and *not distorted*! Bearing should be replaced whenever damaged and/or yearly to insure optimum operation – CMP part number 40906P3.

4. Inspect stirrer for wear and distortion. Clean with plastic pot scrubber. Check bottom of stirrer for sharp edges. These should be ground off.

5. Excessive wear of the tank bearing and stirrer can be caused by the introduction of trash during the duplicating process. This means a more thorough cleaning of colloid is required.

6. What is the best possible cook-down temperature in my Auto-Duplicator?

The lowest temperature you can use and still have usable duplicating material.

We don't like to specify a temperature since it varies by manufacturer. Use their recommended temperature and slowly work down until you find the lowest point that yields satisfactory results.

7. *The lowest storage temperature will give the best results.* Our duplicators are continually stirring which allows a lower storage temperature and helps to prolong duplicating material life.

8. Be very careful not to spill liquids! Liquids can short and damage the control panel and circuit boards. If a spill occurs, unplug Auto-Duplicator immediately and clean thoroughly.

9. If the motor starts to get excessively noisy, call CMP for advice. We will tell you how to get the bearings changed. *We do not* ***repair*** *motors.*

Specifications

Item: Auto-Duplicator #407311
Capacity: 3 Gallons (11.4 Liters)
Electrical: 115 Volt, 60 Hz
(230 Volt Model Available)
Height: 29" (74 cm)
Width: 17 1/2" (44 cm)
Depth: 18 3/4" (48 cm)
Shipping Wt: 76 Lb (34.5 Kg)

Colloid Storage

1. Remove colloid from the duplicating flask.

2. *Rinse with water* to remove any foreign material clinging to colloid

3. Gently shake off excess water.

4. Store colloid in a ***clean, covered*** container.

5. Keep container ***covered*** so moisture is not lost.

6. When ready to cook-down, cut colloid into pieces ***less than 1 cubic inch*** in size.

7. Remove loading port cover and start loading Auto-Duplicator.

8. When Auto-Duplicator is **2/3 *full,*** push the "cycle" button.

9. After all the chunks have been added, ***make sure you add the liquid remaining in bottom of container.***

THIS IS IMPORTANT TO COLLOID LIFE!

The liquid contains chemicals which help preserve the colloid. Water in the liquid makes up for evaporation lost in the duplicating process.

Troubleshooting

1. Auto-Duplicator will not turn on.

- **A.** Check wall outlet for power.
- **B.** Check 15 amp circuit breaker on front panel. (P*ress to reset*)

2. Auto-Duplicator does not heat.

- **A.** Check heater connections on terminal board, relay & controller.

3. Motor will not run.

- **A.** Check 1 amp circuit breaker on front panel. (P*ress to reset*)
- **B.** Plug motor directly into an outlet to check if functioning.

4. Fan does not turn on.

- **A.** Check connections to fan, fan relay, controller & terminal board.
- **B.** Bad fan.
- **C.** Bad relay.

Calibration of 407311 Auto-Duplicator

1. Fill duplicator 3/4 full with water.

2. Turn unit on and set low temperature to 130°F (54°C).

3. Press cycle button and allow water to heat to 130°F (54°C). Press "cycle" button a second time to stop cook-down, then turn duplicator off.

4. Place a thermometer into tank and check reading. Remove thermometer and turn duplicator back on.

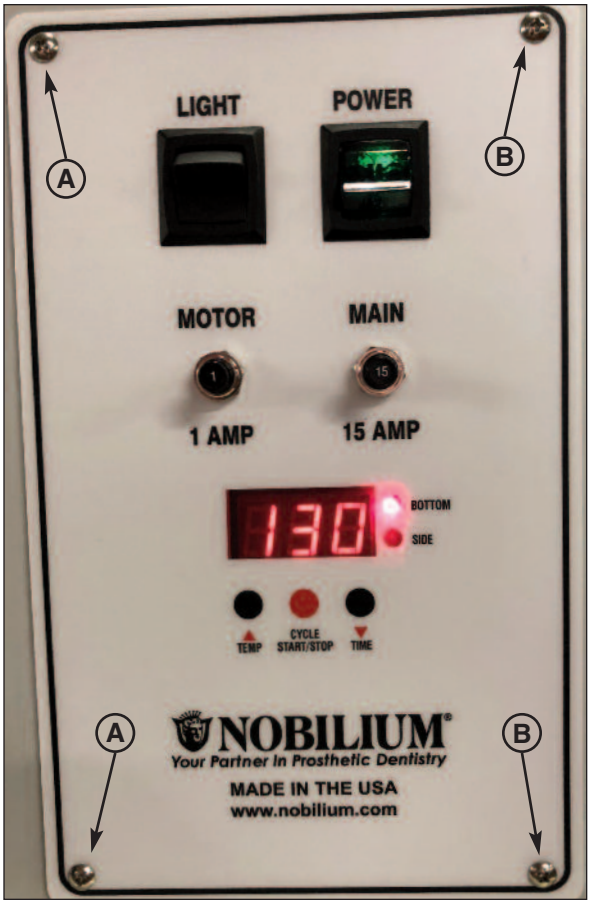
5. Remove 2 screws on left side of front panel. Loosen 2 screws on the right side but *do not remove*. Swing front panel away from duplicator cabinet enough to see the circuit board on back side.
(*See top photo to right.*)

6. Adjust **R42** on circuit board so the display matches the thermometer.
(*See bottom photo to right.*)

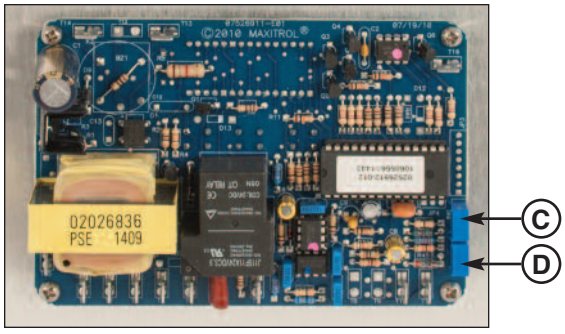
7. Set high temperature to 190°F (88°C) and press the "cycle" button.

8. Once the display reads 190°F (88°C), shut power off and check water with thermometer. Turn power back on. Adjust **R43** on circuit board until display matches reading of thermometer.
(*See bottom photo to right.*)

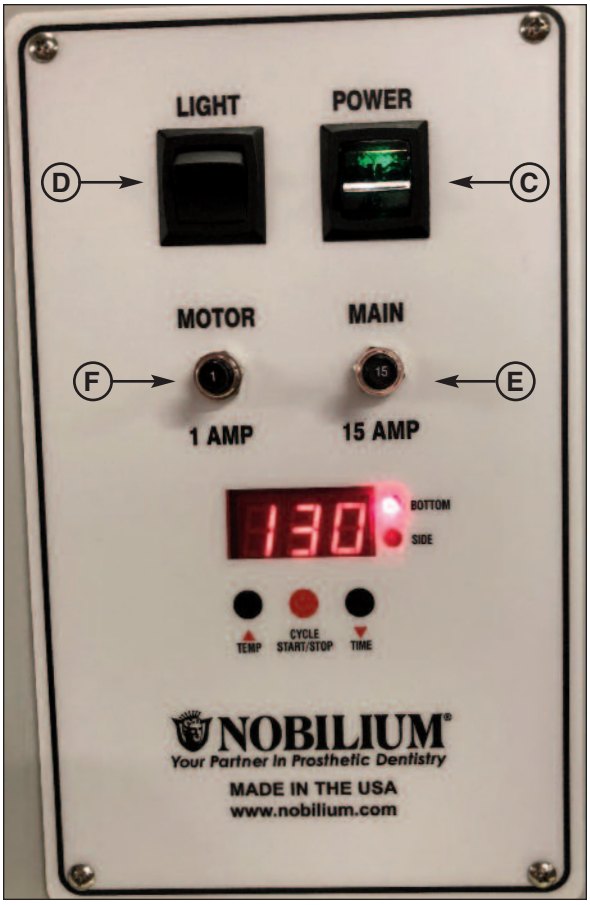
Note: Once the high temperature is set, cool the water down to the low set point and recheck. The calibration of either set point may affect the other set points.



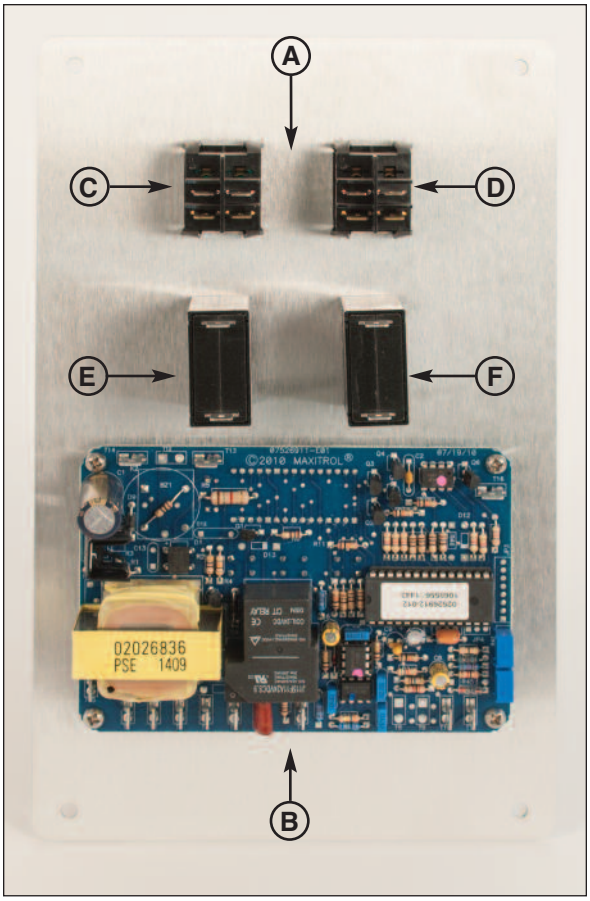
***Remove 2 left screws* (A).**
***Loosen 2 right screws* (B).**



LOW TEMPERATURE:
***Adjust* R42 *screw on side* (C).**
HIGH TEMPERATURE:
***Adjust* R43 *screw on side* (D).**



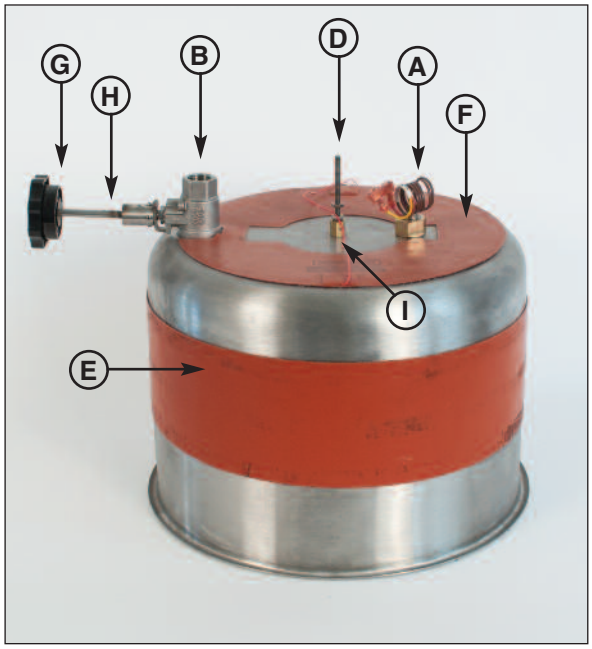
External View



Internal View

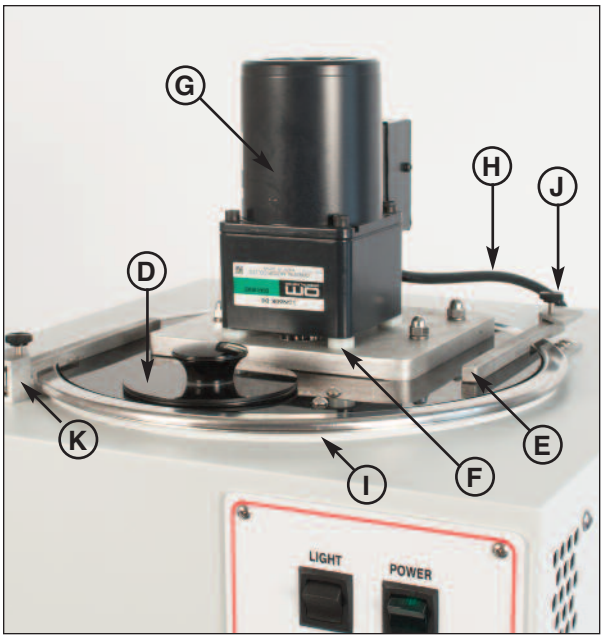
Front Panel Assembly Complete 65383

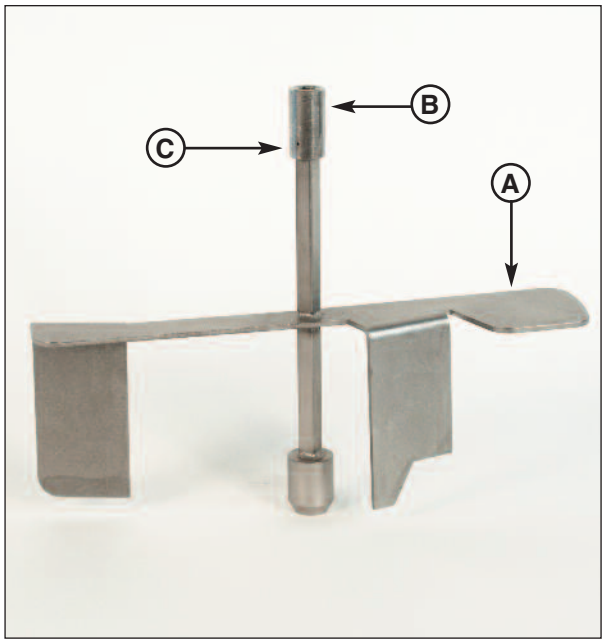
ITEM	DESCRIPTION	PART NUMBER
A	Front Panel with Overlay	65383P1
B	Micro Controller	65383P2
C	Power Switch	65383P3
D	Light Switch	65383P4
E	15 Amp Circuit Breaker	65383P6
F	1 Amp Circuit Breaker	65383P7



9Tank Assembly Complete 36249

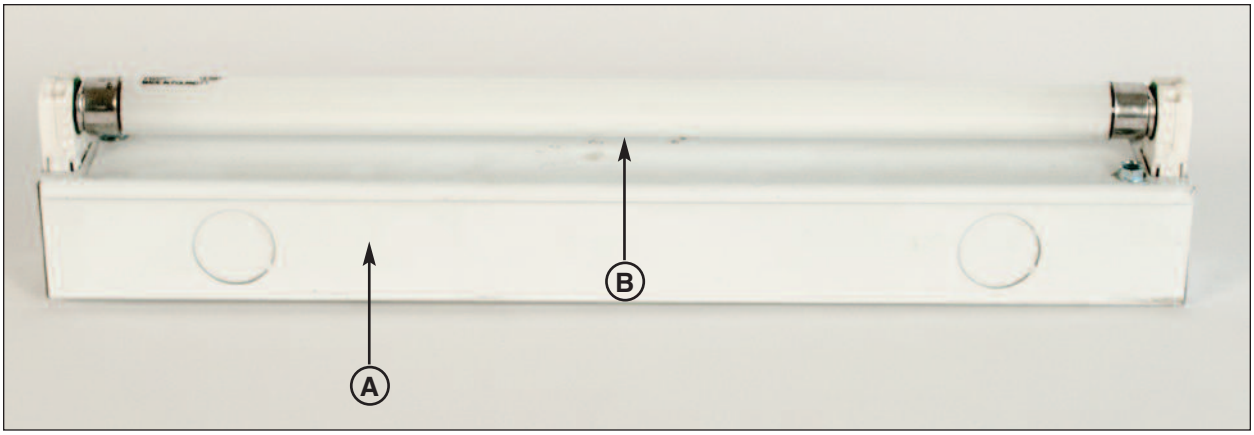
ITEM	DESCRIPTION	PART NUMBER
A	Thermo Couple	10980
B	Valve Assembly	65394
C	Bearing for Tank Bottom	40906P3
D	Threaded Rod	62051P2
E	Heating Pad	65280P1
F	Bottom Heating Pad	65280P2
G	Knob, Valve	62050
H	Rod Insert Assembly	36100G5
	RTV Silicone Cement (*Not Shown*)	62063
I	Brass Nut	65289P2





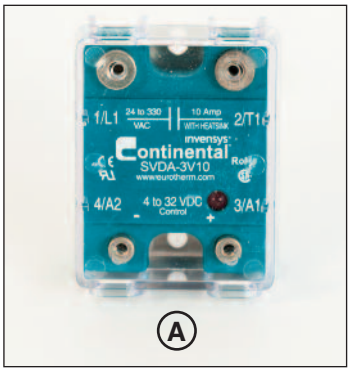
Cover Assembly 40917A

ITEM	DESCRIPTION	PART NUMBER
A	Mixing Blade Assembly	36241
B	Coupling	40915P7
C	Pin for Stirrer	Inquire
D	4" Cover, Complete	40903G3
	Knob for 4" Cover	40902P5
	Cover Disc, 4" Round	40903P3
	O'Ring for Cover	62066
E	Bracket	40903P15
F	Nylon Spacer	40916P1
G	Motor with Gear Box	65176
H	Power Cord for Motor	Spec1966-3
I	Cover Seal (4 *ft.*)	40917P15R
	Teflon seal *Between Motor and Cover* (Not *Shown*)	65175P1
J	Thumb Screw	61868
K	Cover Lock	10978
L	Power Cord (not shown)	spec2001



Lamp Assembly

ITEM	DESCRIPTION	PART NUMBER
A	Fluorescent Fixture, 12"	41984P8
B	Fluorescent Lamp, 12"	41984P9



Note: Relay may look different from photo

Relays

ITEM	DESCRIPTION	PART NUMBER
A	Solid State Relay (2)	41984P18 (*Two per unit*)

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