

# MULTI WAVE™

## *Pool & Spa Control System*



# *Installation Guide*

*For Software Version 3.4*



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## Important Safety and Service Information

### **⚠ WARNING** *Risk of Fire or Electric Shock*

#### • IMPORTANT SAFETY INSTRUCTIONS, READ AND FOLLOW ALL INSTRUCTIONS, SAVE THESE INSTRUCTIONS

- Disconnect power at the circuit breaker(s) or disconnect switch(es) before installing or servicing.
- This control must be installed according to the National Electrical Code (NEC) and local code requirements. For Canadian installations, section 10 & 68 of the CEC. **IMPORTANT:** This installation is subject to the approval by the local inspection authority.
- The control panel to be a minimum of 3m (in Canada) or 5ft (in USA) from the inside wall of the pool, spa, or pond, unless separated from the body of water by a fence, wall or other permanent barrier that will make the unit inaccessible to persons in the water.
- Use up to #8 AWG wires, rated at least 90°C - **COPPER Conductors ONLY**.
- The control is not provided with integral GFCI protection for the lighting circuit. When this control is used to power or switch an underwater luminaire, suitable GFCI protection shall be provided in the field.
- This control should not be connected to any equipment which would cause bodily injury or property damage should it be activated unexpectedly.
- For outdoor locations, raintight, or wet locations, conduit hubs that comply with requirements of the UL514B (standard for fitting for conduit and outlet boxes) are to be used.
- Bonding between conduit connections is not automatic and must be provided as part of the installation.
- If the power disconnect point is out of sight, lock it in the "OFF" position and tag it to prevent unexpected application of power.
- This unit is not a safety disconnect. A proper sized fused disconnect or breaker of no more than 125A capacity must be provided in the power supply circuit. Proper gauge wire should be based on local code requirements of amperage and wire length.
- Do NOT exceed the maximum current carrying capacity of this control.
- Receiver must be mounted in a vertical (upright) position on top of the enclosure.
- **KEEP DOOR CLOSED AT ALL TIMES** when not servicing and secure with lock or tie-wrap.

### **NOTICE**

- Do NOT touch circuit board components; contact can create a static discharge, which can damage the microprocessor.

## Informations importantes sur la sécurité et l'entretien

### **! AVERTISSEMENT** *Risque d'incendie ou de choc électrique*

#### • INSTRUCTIONS DE SÉCURITÉ IMPORTANTES, LIRE ET RESPECTER TOUTES LES INSTRUCTIONS, CONSERVER CES INSTRUCTIONS

- Débrancher l'alimentation au niveau des disjoncteurs ou des sectionneurs avant de procéder à l'installation ou à l'entretien.
- Ce panneau de commande doit être installé conformément aux codes de l'électricité en vigueur. Pour les installations au Canada, voir les sections 10 et 68 du CCE. **IMPORTANT** : Cette installation est soumise au contrôle et à l'acceptation par les autorités compétentes locales.
- Le panneau de commande doit être à un minimum de 3 m (au Canada) ou de 5 pi (aux États-Unis) de la paroi intérieure de la piscine, du spa ou du bassin, sauf s'il est séparé de l'eau par une clôture, un mur ou autre barrière permanente qui rend l'appareil inaccessible aux personnes se trouvant dans l'eau.
- Utiliser des fils jusqu'au n° 8 AWG, classés 90 °C minimum - **Conducteurs en CUIVRE UNIQUEMENT.**
- La commande n'est pas équipée d'un disjoncteur différentiel (GFCI) intégré pour la protection du circuit d'éclairage. Si la commande est utilisée pour alimenter ou commuter un luminaire immergé, une protection adaptée par GFCI devra être prévue dans l'installation.
- Cette commande ne doit être raccordée à aucun autre matériel susceptible de provoquer des blessures corporelles ou des dommages matériels en cas d'activation inattendue.
- Pour les installations extérieures, utiliser des embouts de raccordement de conduit anti-intempéries ou pour zone humide conformes aux exigences d'UL514B (norme sur les raccords de conduit et les boîtiers de prises).
- La liaison entre les raccordements de conduits n'est pas automatique et doit être prévue dans le cadre de l'installation.
- Si le point de coupure n'est pas visible, le condamner en position ARRÊT et l'étiqueter pour éviter toute remise sous tension imprévue.
- Cet appareil n'est pas un sectionneur de sûreté. Prévoir un sectionneur avec fusible ou un disjoncteur de calibre adapté d'une capacité de 125 A au maximum dans le circuit d'alimentation électrique. Le calibre de fil utilisé doit être conforme aux normes en vigueur concernant l'intensité de courant et la longueur de fil.
- Ne PAS dépasser la capacité maximale d'intensité de courant de cette commande.
- Le récepteur doit être montée en position verticale (debout) sur le dessus du boîtier.
- **GARDER LA PORTE FERMÉE EN PERMANENCE** en-dehors des opérations d'entretien et sécuriser avec un cadenas ou une attache autobloquante.

### **AVIS**

- Ne pas toucher les composants du circuit imprimé ; le contact peut provoquer une décharge d'électricité statique susceptible d'endommager le microprocesseur.



# Chapter 1: Overview

**IMPORTANT:** The installer must fill out the **MultiWave Pool & Spa Control System Worksheet for Programming** at the back of this guide so that the controller can be programmed.

The MultiWave Control System brings wireless control to a new level of simplicity. It features push button control and a clear, easy-to-read backlit display panel. This manual provides guidelines and instructions for installing the MultiWave Control System.

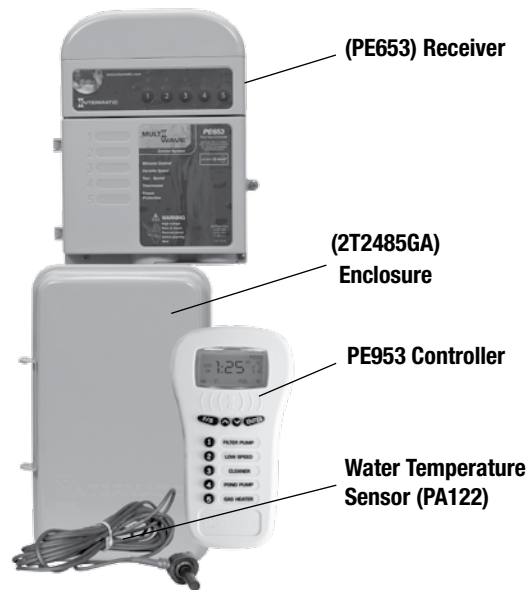


Figure 1-1. PE653RC MultiWave Control System.

## MultiWave Components

### (PE953) Controller



The hand-held controller transmits user commands to the PE653 Receiving Device, PE650 Receiving Device, or Z-Wave home control devices, and displays the status of the installed equipment.

The unit, which features a backlit display, is water resistant and shock resistant. It requires three (3) AA batteries with an expected battery life of one year.

When the components of a specific system are linked to a network, unique network ID codes supplied by the receiver prevent unauthorized use of the system by neighboring systems.

### (PE653) Receiver



The PE653 receiver is the central hub of the MultiWave. It receives commands from the PE953 controller to activate circuits. The receiver controls the ON/OFF operation of up to five circuits. It can also communicate with variable speed pumps. The receiver features an internal supercapacitor to maintain data up to 8 hours in case of power loss.

### (P5043ME) Expansion Module (Optional)



The P5043ME controls up to four 24 VAC water valve actuators. There are two dedicated actuators for the pool and spa, one for a water feature (i.e. waterfall, fountain, slide) and one for the solar heating/cooling feature.

In addition to the actuators, the P5043ME can control up to two heaters (1 heater dedicated to the pool and 1 dedicated to the spa), can control other variable speed pumps (limited to Jandy, Hayward, Century, Marathon or Speck), and can be controlled by a dry contact switch. The USB port allows for MultiWave system updates.

The P5043ME is ideal for those pool and spa combination applications with the additional possibility of a water feature, solar feature, variable speed pump, 1 or 2 heaters and/or a dry contact switch. The dry contact switch can be triggered by any switching device you may provide — light switch, spring wound AUTO/OFF, wireless switch, relay and more.

## (PA122) Water Temperature Sensor



The Intermatic Water Sensor (PA122) monitors both pool and spa water temperature, depending on the position of the diverter valves. Installation is necessary for the thermostatic control to work.

## (178PA28A) Freeze (Air Temperature) Sensor



The freeze/air temperature sensor measures air temperature. When the air temperature drops below a user-configured setpoint, the freeze sensor turns pumps ON to circulate water through the pipes to ensure they do not freeze or burst.

## (PA122) Solar (Air Temperature) Sensor (Optional)



The solar/air temperature sensor measures air temperature near the solar collector. It can be configured for either heating or cooling solar applications.

## (PE24VA) 24-Volt Valve Actuator (Optional)



Designed with quality in mind, Intermatic's 24-volt valve actuators provide reliable control of 2-way and 3-way diverter valves for pool/spa combinations and water features. The water flow can be altered for specific applications through the adjustable cam, which rotates diverter valves to multiple degree settings. The cam settings can be easily adjusted by simply removing the lid. These valve actuators are compatible with all pool/spa valves currently offered in the industry and will retrofit into all pool/spa control systems.

- 24 VAC Input Voltage
- Automates compatible diverter valves for pool/spa combos
- Adjustable cam rotates diverter valves to multiple degree settings
- Designed to operate most 2-way and 3-way diverter valves
- Shipping Weight - 3 lbs. (1.4 kg)
- Agency Approval - CSA/C-US

## (PE30000) Load Center (Optional)



The PE30000 load center provides a safe and efficient environment for the control components of MultiWave Pool/Spa Series Kits which include expansion module and/or relay modules.

The PE30000 Series panel includes an eight-position 80 Amp breaker base, two mechanism slots, and four décor knockouts for GFCIs and switches.

The panel provides a low voltage raceway for low voltage control lines (i.e. actuators, sensors, etc...) and a convenient side knockout for an outdoor receptacle.

The panel is rated for indoor/outdoor use and is suitable for pool equipment control and for direct connection to a wet-niche or no-niche luminaire.

## Chapter 2: Mounting

### Mounting the PE653RC System

Follow this procedure to mount the MultiWave enclosure and PE653 receiver.

1. Select a location to mount the receiver that is near the pool/spa equipment; at least 3m (in Canada) or 5 ft (in USA) from the inside wall of the pool, spa, or pond, unless separated from the body of water by a fence, wall, or other permanent barrier that will make the unit inaccessible to persons in the water. **NOTE:** The receiver must be mounted in a vertical (upright) position on top of the enclosure.
2. Select the knockouts to be used and insert a flathead screwdriver into the slot and carefully punch the 1/2" knockout loose and remove the slug.  
**NOTE:** If a 3/4" knockout is required, remove the outer ring with pliers after removing the 1/2" knockout. Smooth the edge with a file if required.  
**NOTE:** If a low voltage circuit or a heater control circuit is to be used, remove the low voltage knockout from the PE653 enclosure.
3. Install conduit hub to knockout rated for outdoor locations, raintight, or wet locations that complies with the requirements in UL 514B (standard for fitting for conduit and outlet box).
4. Place the metal enclosure in the desired mounting location and mark the three mounting holes. Install the top screw first and then hang the enclosure by the keyhole. Then install the bottom screws, tightening all screws for a secure mounting.
5. Install conduit as needed to comply with national and local electrical and safety codes.
6. Bond the enclosure in accordance with your state and local codes. Where required, connect a No. 8 AWG solid copper wire to the enclosure with a Bonding Lug (part number 156T11047A). Connect the bonding wire to an approved earth ground.
7. Identify and install all wires necessary to complete the installation. Allow a length of approximately 18" (46 cm) of each wire at the metal enclosure for required connections of junctions.
8. Connect wiring for circuits as required. Refer to the diagrams in Chapter 3 and Chapter 4 for wiring suggestions for specific equipment combinations. All splices and wire nut connections should be in the metal enclosure, not in the PE653 enclosure.
9. Check and tighten all connections and circuits.
10. Apply power.

## Mounting the PE30000 Load Center

Follow this procedure to mount the PE30000 load center.

1. Select a location to mount the load center that is near the pool/spa equipment; at least 3m (in Canada) or 5 ft (in USA) from the inside wall of the pool, spa, or pond, unless separated from the body of water by a fence, wall, or other permanent barrier that will make the unit inaccessible to persons in the water. **NOTE:** Choose a flat vertical surface or structure capable of supporting the load center and allow space above the load center so that the receiver can be mounted in a vertical (upright) position on top of the load center.
2. Remove the empty PE30000 enclosure from the kit.
3. Remove the #10 hex head screws from the outside **back** of the enclosure and attach the mounting brackets.
4. Using the mounting brackets and hardware capable of supporting the load center, mount the enclosure to the vertical surface or structure.

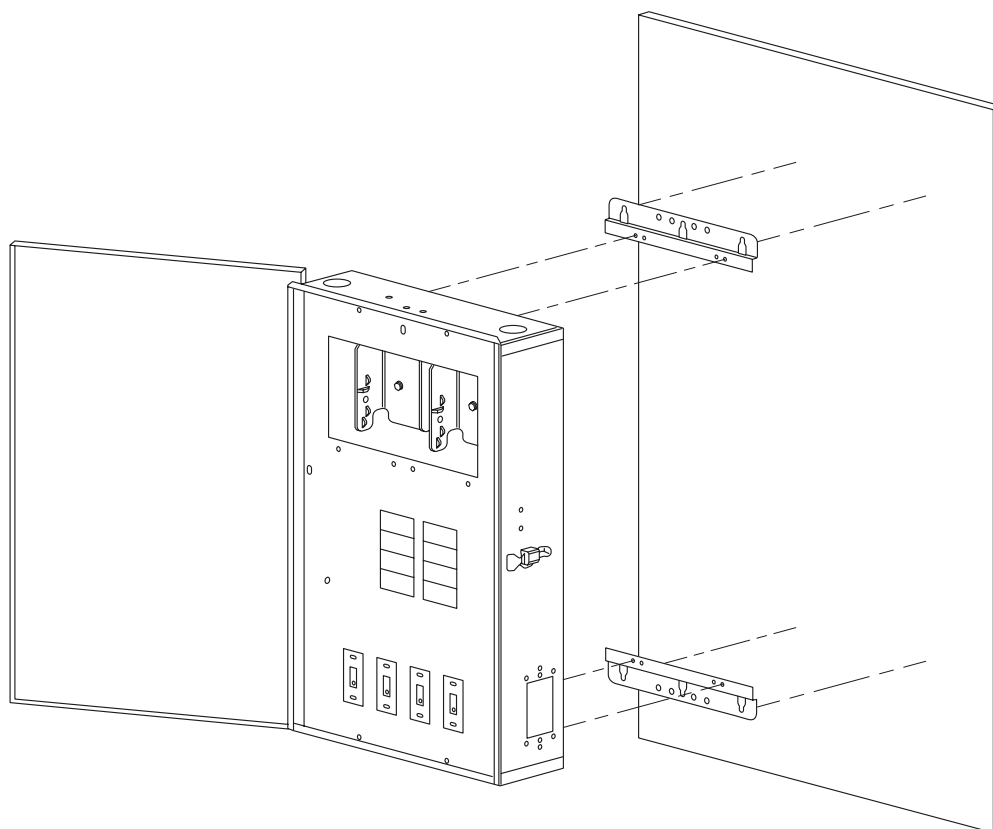


Figure 2-1. Mounting the load center.

## Mounting the PE653 Receiver on the Load Center

Follow this procedure to mount the PE653 Receiver on the load center.

1. Looking at the load center mounted on the supporting structure/surface, remove the knockout located on the top right side. If no knockout is present, there should be a dimple to use as a guide for drilling a 1-3/8" hole with a hole saw or punch. **NOTE:** DO NOT remove the left-side knockout, as this is used to gain access to the low voltage raceway.
2. Remove the PE653 Receiver from the top of its small beige steel standard enclosure by removing the plastic hub nut. Discard the standard enclosure and retain the plastic hub nut.
3. Use the plastic hub nut to mount the receiver to the top right of the load center. **NOTE:** Gasket is required for rain tight connection for outdoor enclosures.

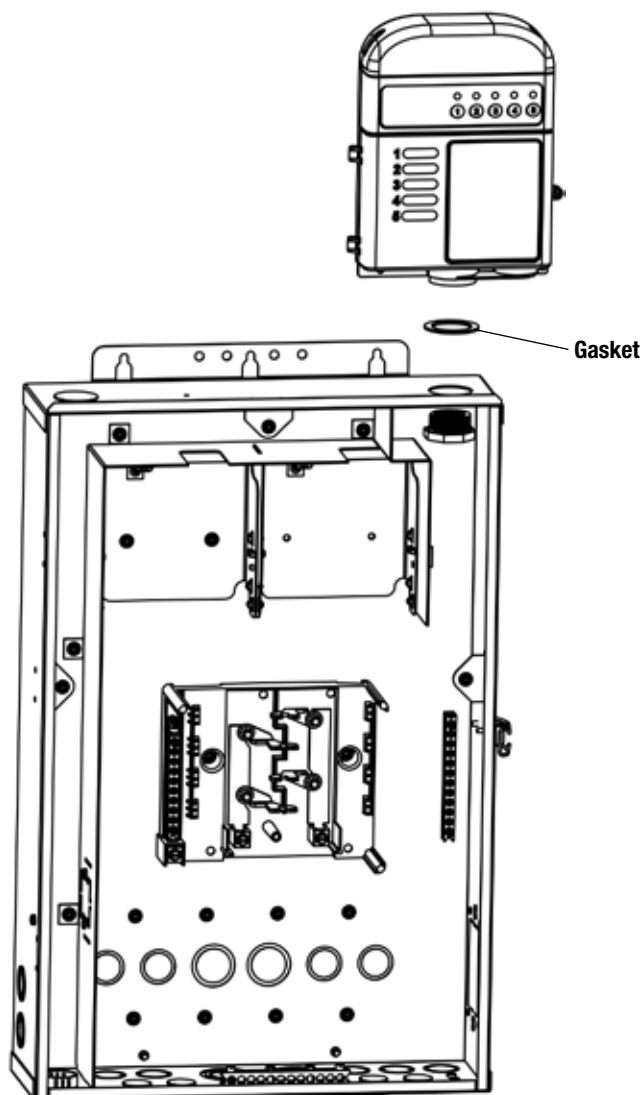


Figure 2-2. Mounting PE653 on load center.

# Chapter 3: Installing – Ratings, 120V/240V Wiring, Power In/Out

**IMPORTANT:** The installer must fill out the MultiWave Pool & Spa Control System Worksheet for Programming at the back of this guide so that the controller can be programmed.

## Ratings

### Controller Power In:

- 120/240 VAC, 50/60 Hz, 5 W max.

### Contact Ratings:

#### Load 1

- 120/240 VAC
- 20 A Resistive
- 17 Full Load A, 80 Lock Rotor A
- 5A Tungsten

#### Loads 2-5

- 120/240 VAC
- 15 A Resistive
- 10 Full Load A, 60 Lock Rotor A
- 5A Tungsten

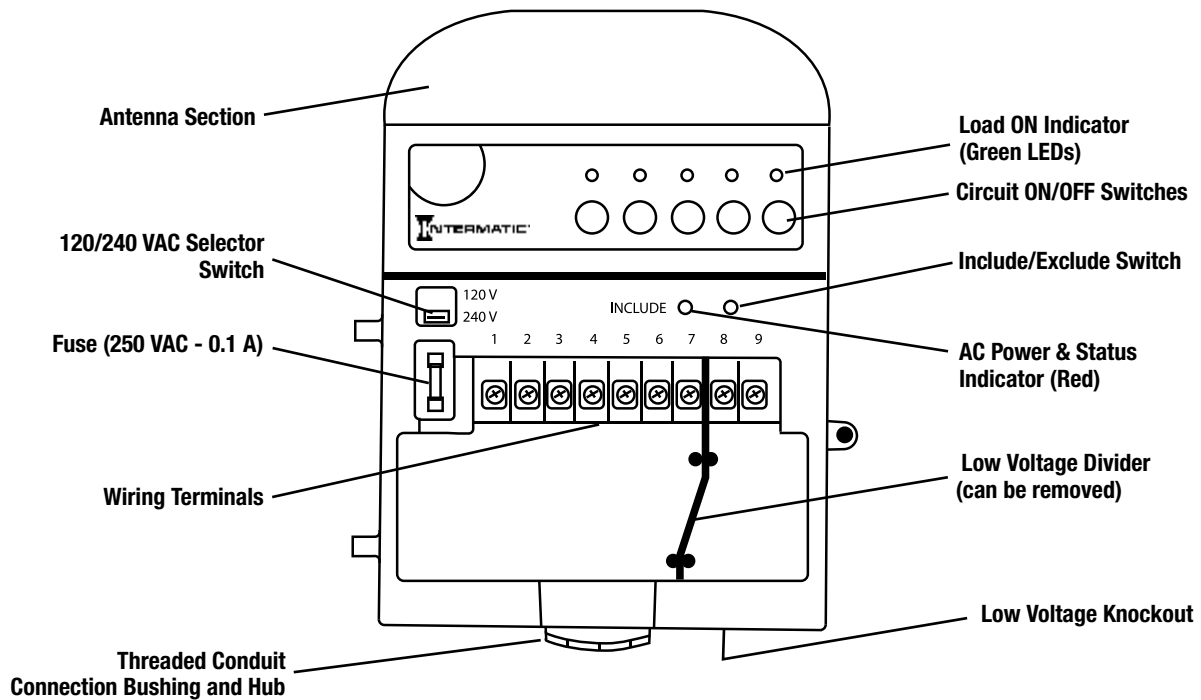


Figure 3-1. PE653 Receiver.



## 120V Wiring Applications

This Installation Guide covers most typical applications. If you need more instructions for 120V or specific applications (i.e. water feature, auxiliary devices), please go to <http://www.intermatic.com> to access the MultiWave Configurator for more wiring diagrams or call technical support for assistance.

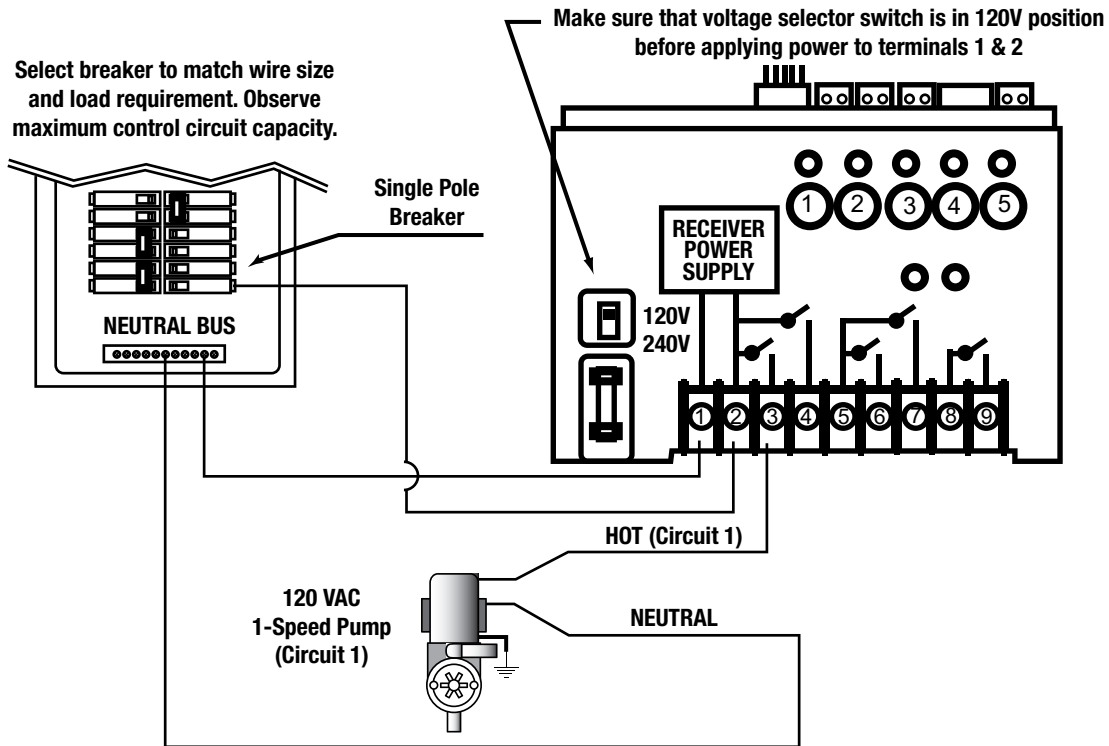


Figure 3-2. Wiring for 120V 1-Speed Pump

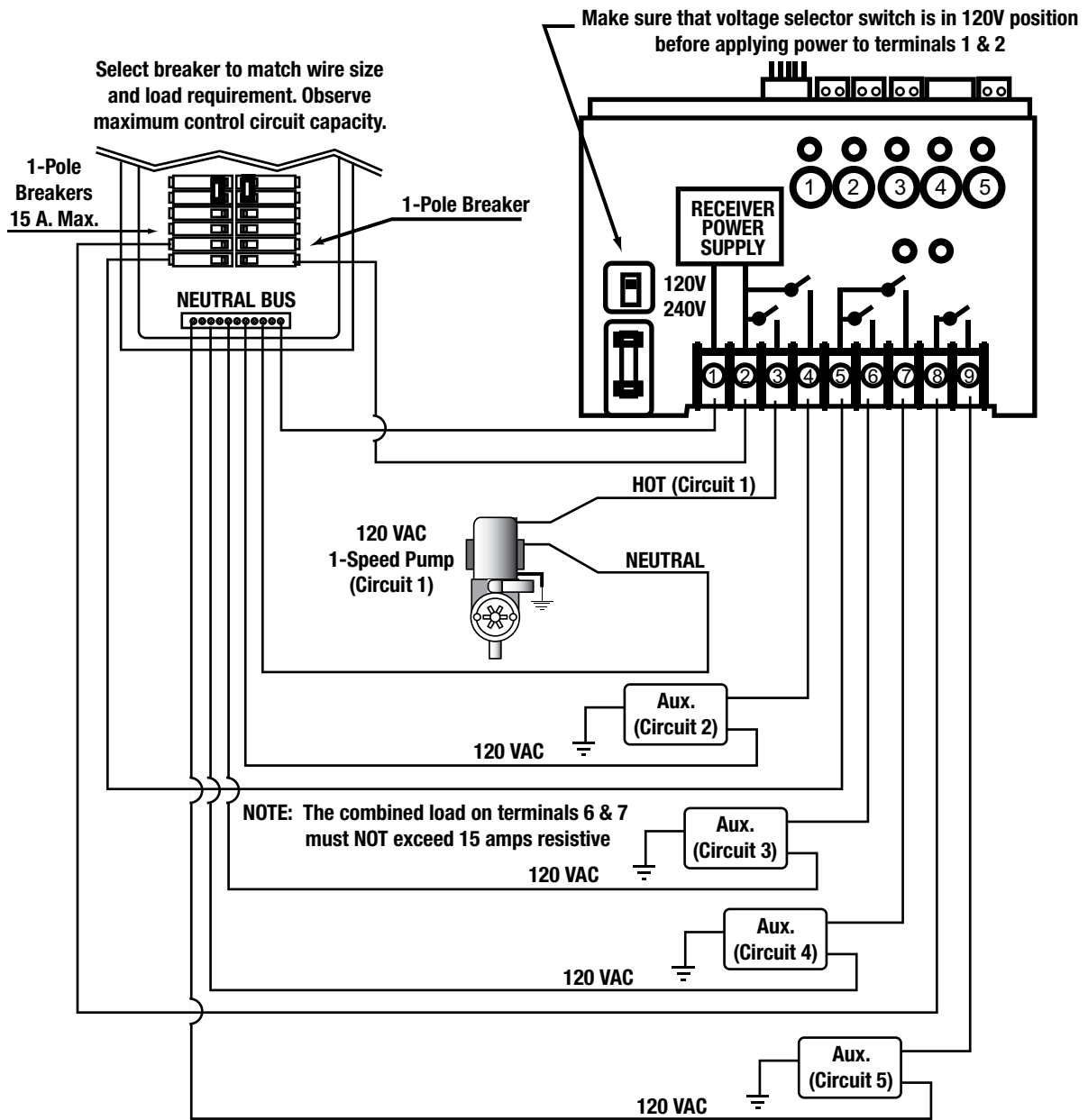


Figure 3-3. Wiring for 120V 1-Speed Pump + Any 4 120V Auxiliary Components

## 240V Wiring Applications

This Installation Guide covers most typical applications. If you need more instructions for 240V or specific applications (i.e. water feature, auxiliary devices), please go to <http://www.intermatic.com> to access the MultiWave Configurator for more wiring diagrams or call technical support for assistance.

### Power to/from PE653RC

**NOTE:** Contact Tech Support at Intermatic for additional diagrams.

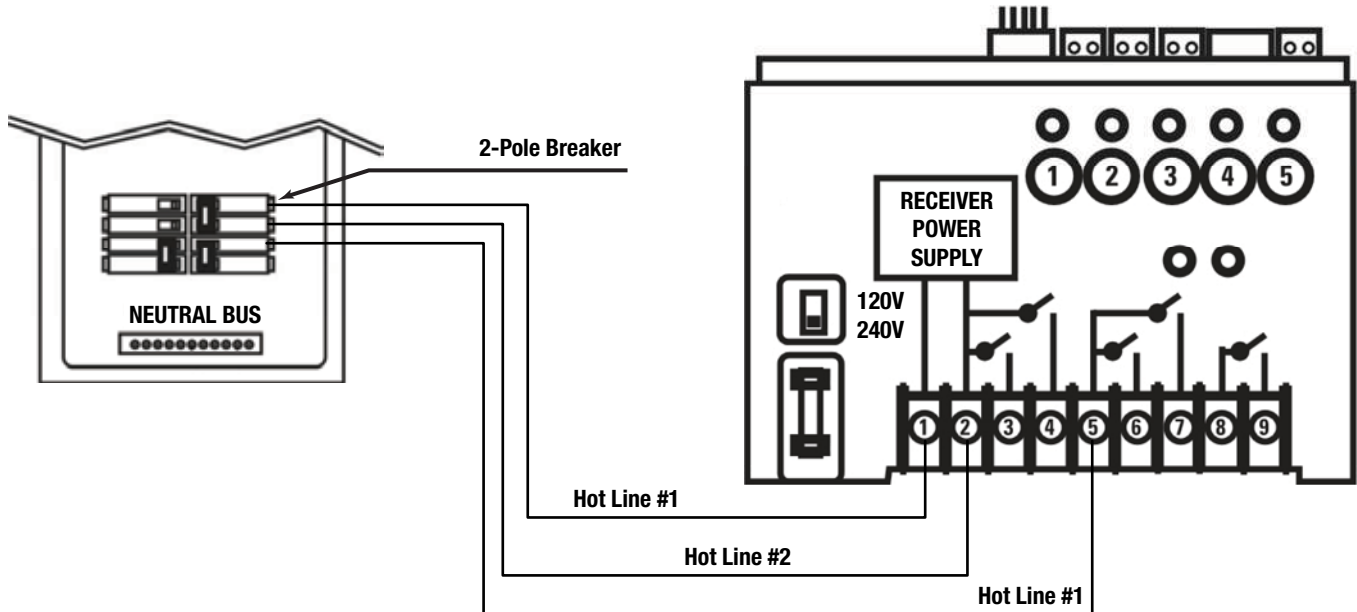


Figure 3-4. Wiring 240V incoming power to PE653RC.

## Connecting a P5043ME Expansion Module Communication Cable to Receiver

Follow this procedure to connect the P5043ME Expansion Module communication cable to the receiver.

**NOTE:** The expansion module connects to the same terminals as the AutoPilot Salt Chlorine Generator. Both can be installed in the terminals.

1. Make sure the power is off at the receiver.
2. Connect the communication cable to the proper terminals on the expansion module. See Figure 3-5.
3. Connect the green wire from the unattached end of the communication cable to the connector terminal next to the Cat 5 cable. See Figure 3-5.

**NOTE:** Be sure to observe polarity when connecting the expansion module wires.

4. Connect the yellow wire from the cable to the connector terminal next to the green wire.

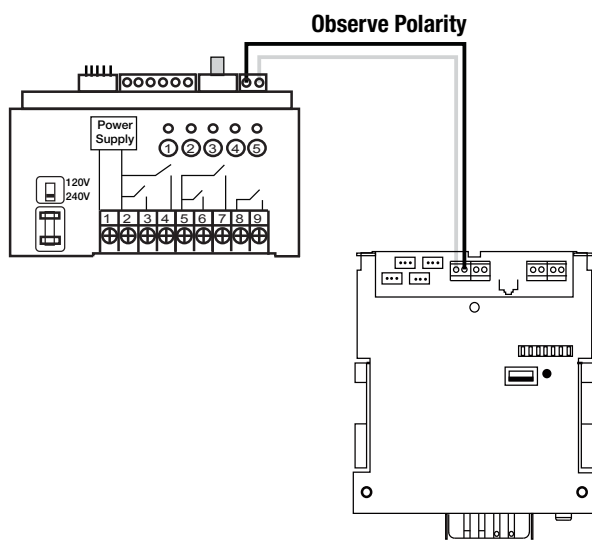


Figure 3-5. PE653 Receiver to P5043ME wiring connections.

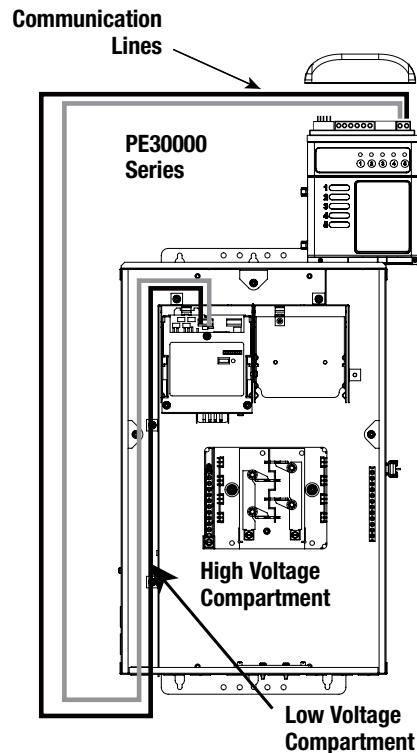


Figure 3-6. High and low voltage wire routing from PE653 Receiver to PE30000 Series Load Center.

## Power to/from PE653RC with P5043ME

**NOTE:** Contact Tech Support at Intermatic for additional diagrams.

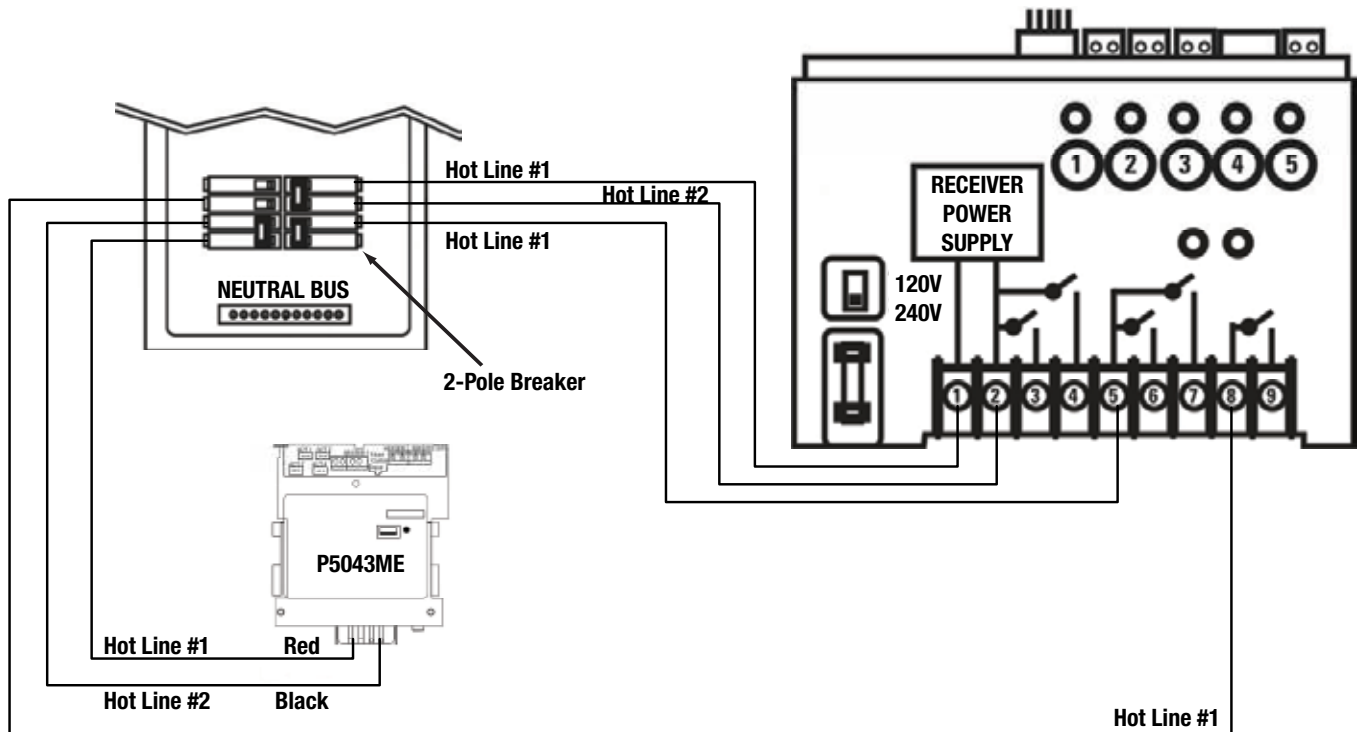


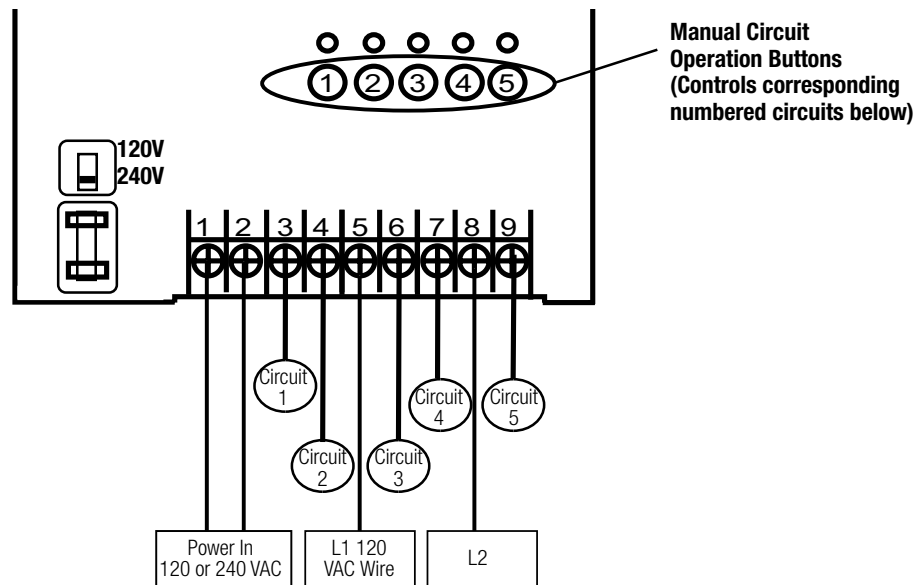
Figure 3-7. Wiring 240V incoming power to PE653RC and P5043ME.

## Chapter 4: Filter Pump Installations

This chapter includes diagrams for systems with 1-speed, 2-speed and variable speed pumps.

### Single Speed Pumps

#### 1-Speed Pump Terminal/Circuit Connections for PE653RC



**Figure 4-1. PE653 Receiver power terminal identification.**

Terminals 1, 2 and 5 – Power In

Terminal 3, Circuit 1 – 120/240 VAC 1-Speed Pump\*

Terminal 4, Circuit 2 – 120/240 VAC Blower

Terminal 6, Circuit 3 – 120/240 VAC Booster (Cleaner) Pump\*

Terminal 7, Circuit 4 – 120 VAC Light with GFCI\*

Terminal 8/9, Circuit 5 – Heater\*\*

\* To break both lines, use relay kit PE21RLY. Request document 158--01559.

\*\* See Chapter 6.

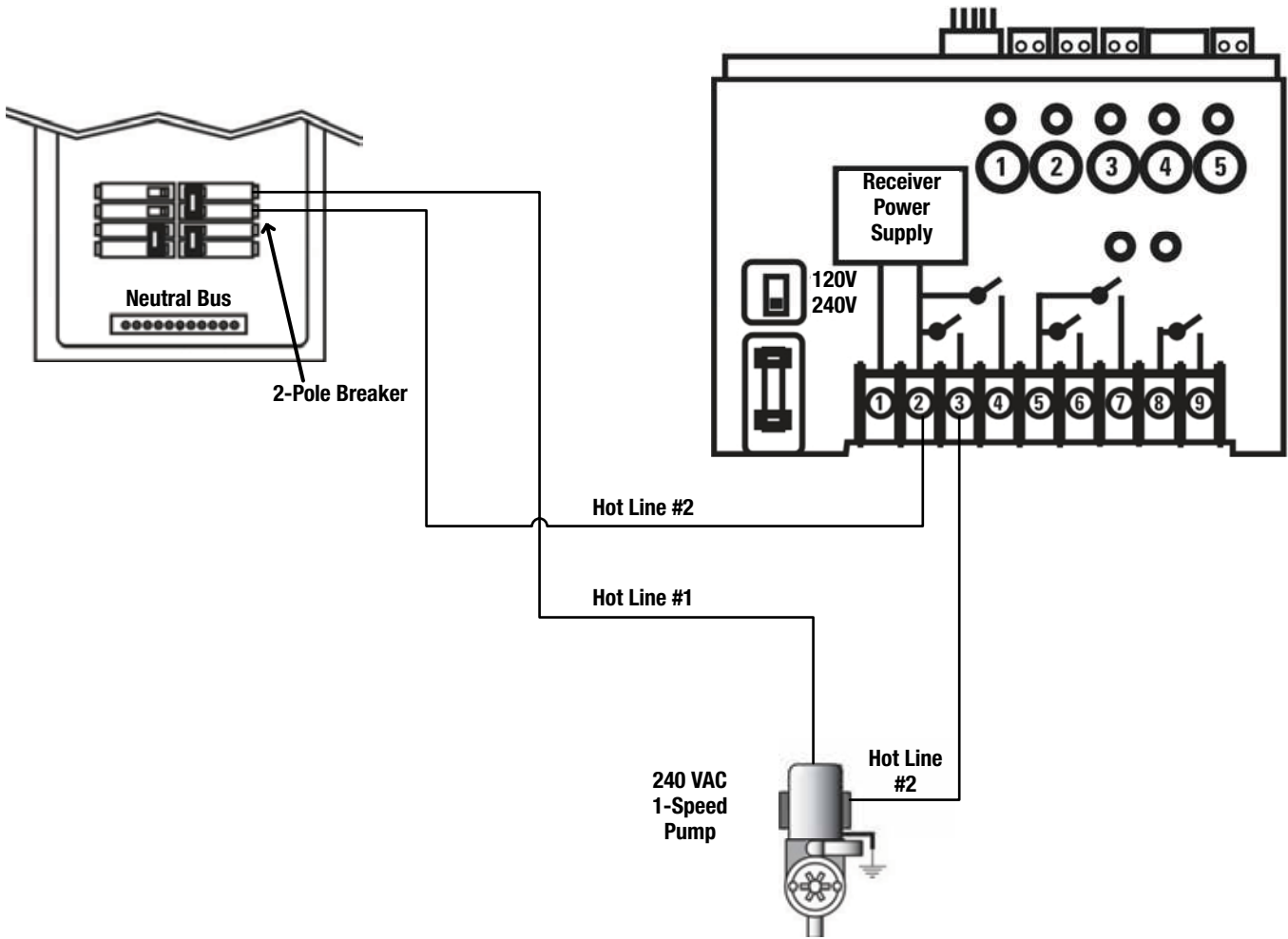


Figure 4-2. Wiring Circuit #1 to a 240 VAC 1-Speed Pump for PE653RC.

# 1-Speed Pump Terminal/Circuit Connections for PE653RC with P5043ME

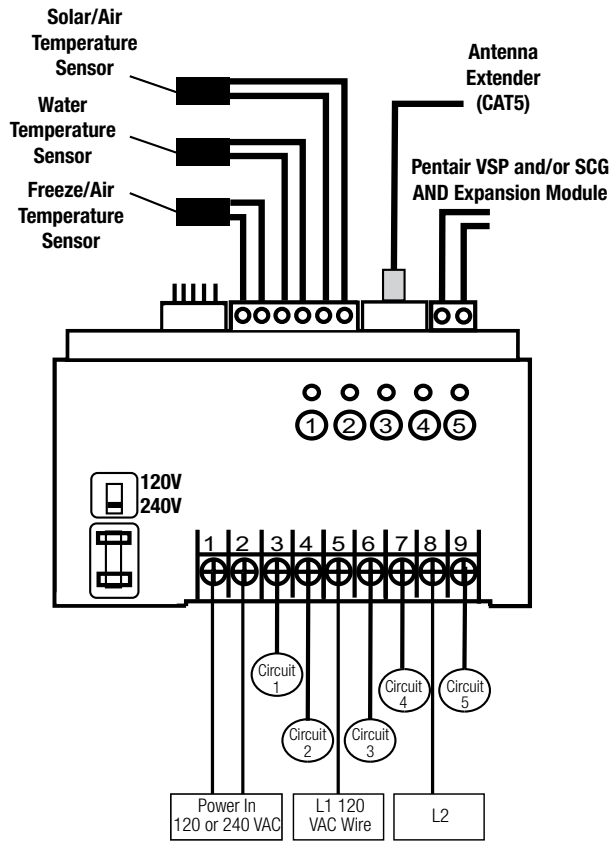


Figure 4-3. PE653 Receiver Connections.

## PE653 Receiver

Terminals 1, 2, 5 and 8 – Power In

Terminal 3, Circuit 1 – 120/240 VAC 1-Speed Pump\*

Terminal 4, Circuit 2 – 120/240 VAC Auxiliary

Terminal 6, Circuit 3 – 120/240 VAC Booster (Cleaner) Pump\*

Terminal 7, Circuit 4 – 120/240 VAC Blower\*

Terminal 9, Circuit 5 – 120 VAC Light with GFCI

\* To break both lines, use relay kit PE21RLY. Request document 158--01559.

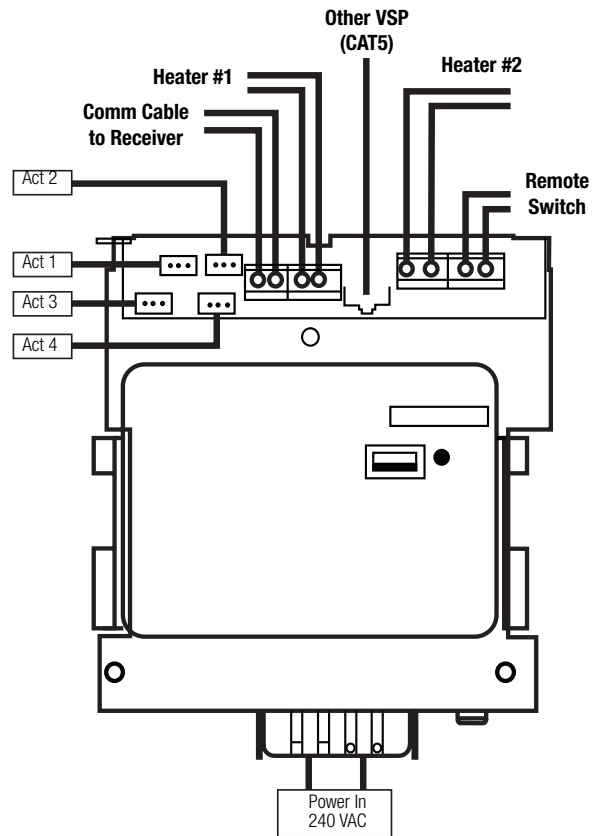


Figure 4-4. P5043ME Expansion Module Hookups.

## P5043ME Expansion Module

Power In

**NOTE:** Expansion module hookups are shown on page 21, page 37 and page 39.



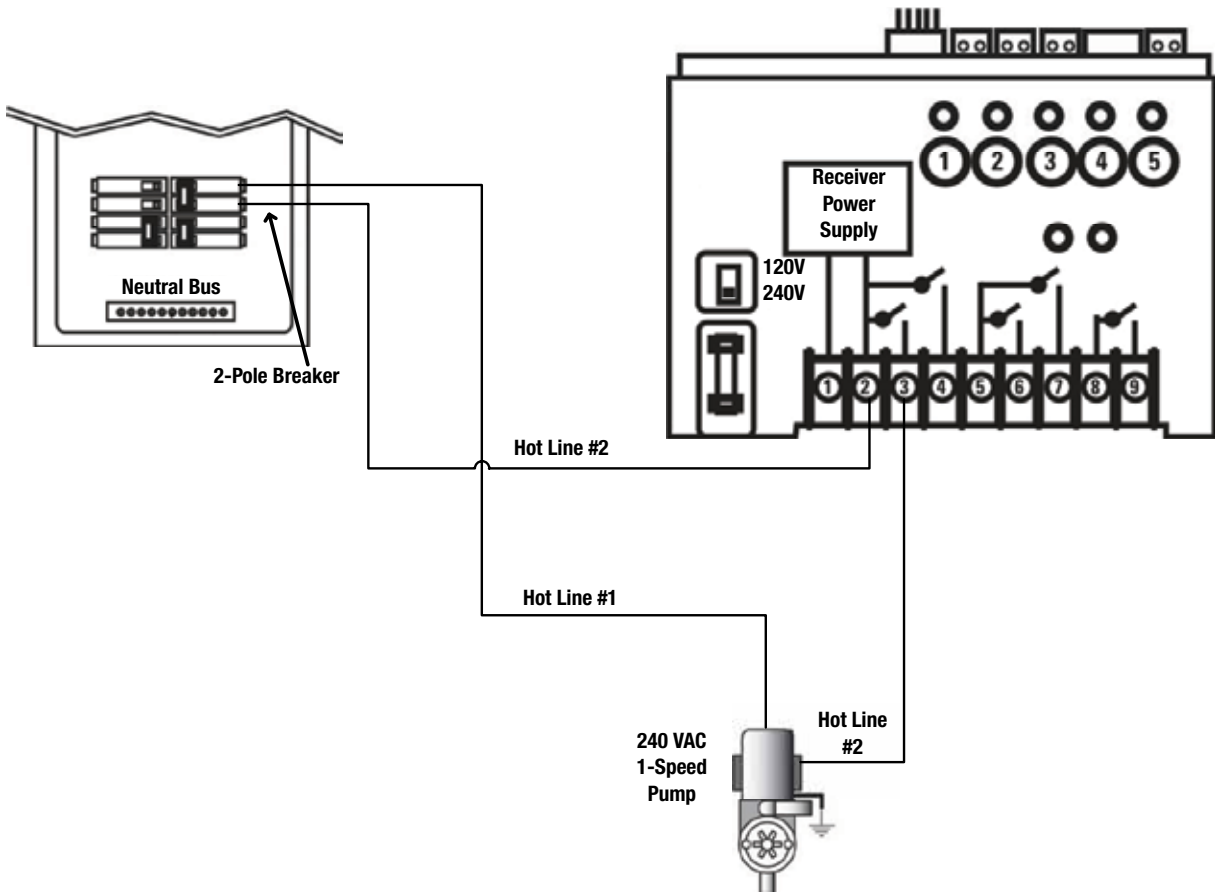
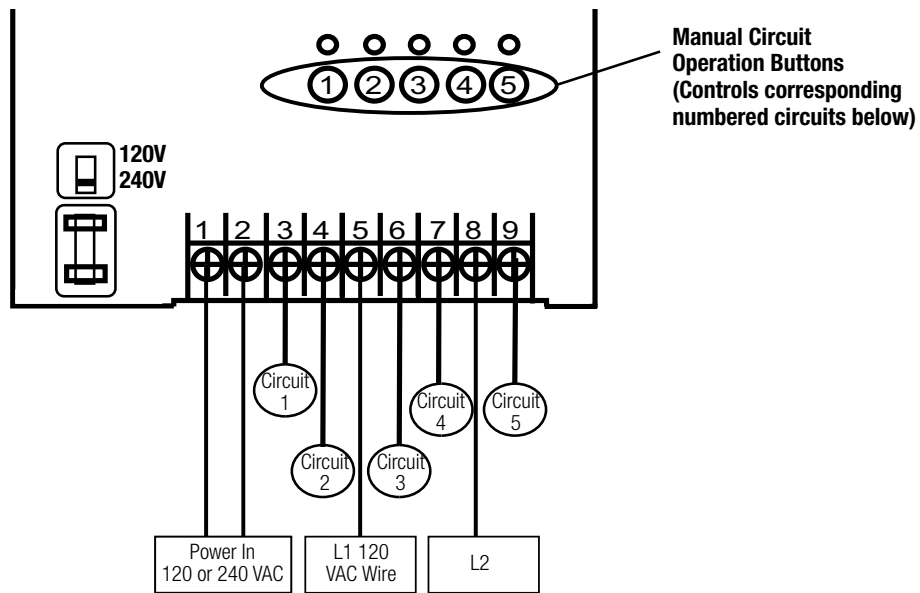


Figure 4-5. Wiring Circuit #1 to a 240 VAC 1-Speed Pump for PE653RC and P5043ME.

## 2-Speed Pumps

### 2-Speed Pump Terminal/Circuit Connections for PE653RC



**Figure 4-6. PE653 Receiver power terminal identification**

Terminals 1, 2 and 5 – Power In

Terminals 3 and 4, Circuits 1 and 2 – 240 VAC 2-Speed Pump\*

Terminal 6, Circuit 3 – 240 VAC Blower\*

Terminal 7, Circuit 4 – 120 VAC Light with GFCI\*

Terminal 8/9, Circuit 5 – Heater\*\*

\* To break both lines, use relay kit PE21RLY. Request document 158--01559.

\*\* See Chapter 6.

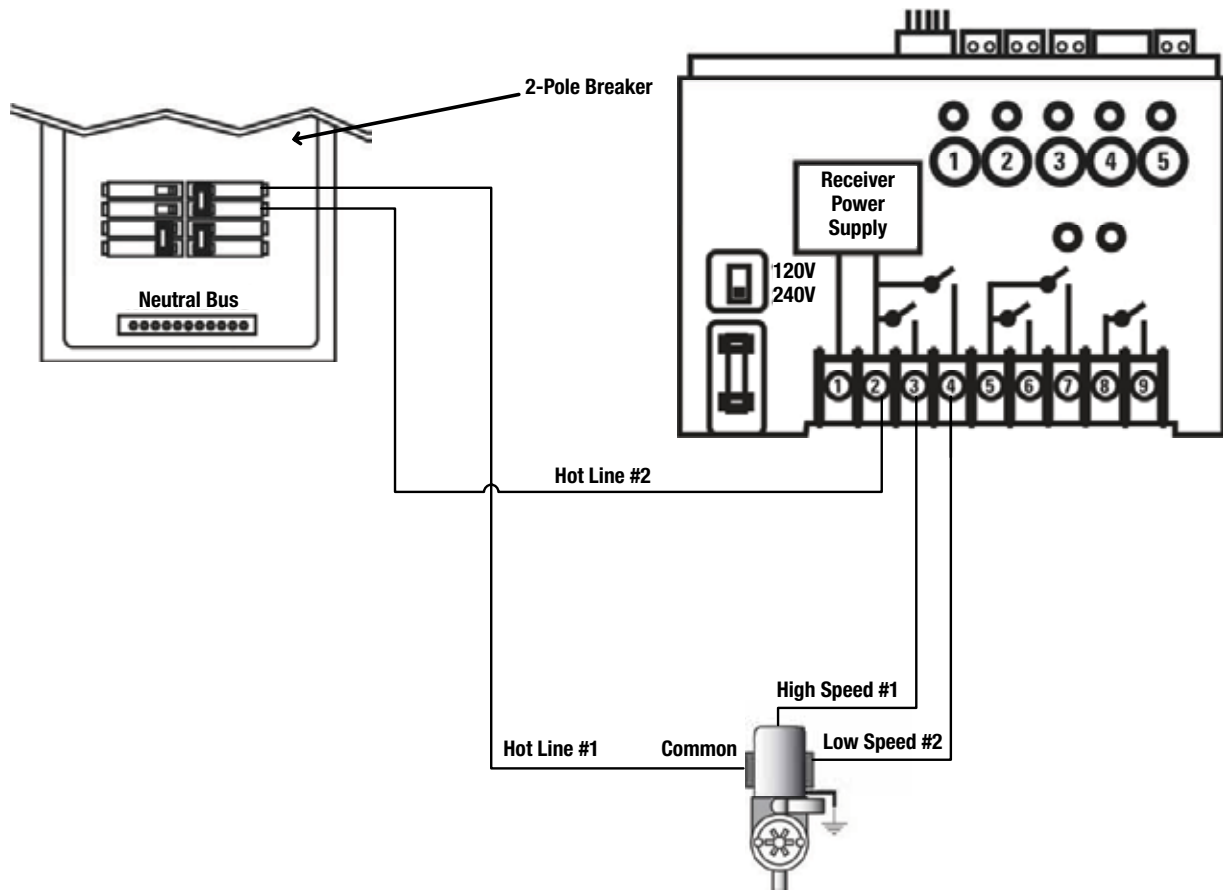


Figure 4-7. Wiring Circuits #1 & #2 to a 240 VAC 2-Speed Pump for PE653RC.

## 2-Speed Pump Terminal/Circuit Connections for PE653RC with P5043ME

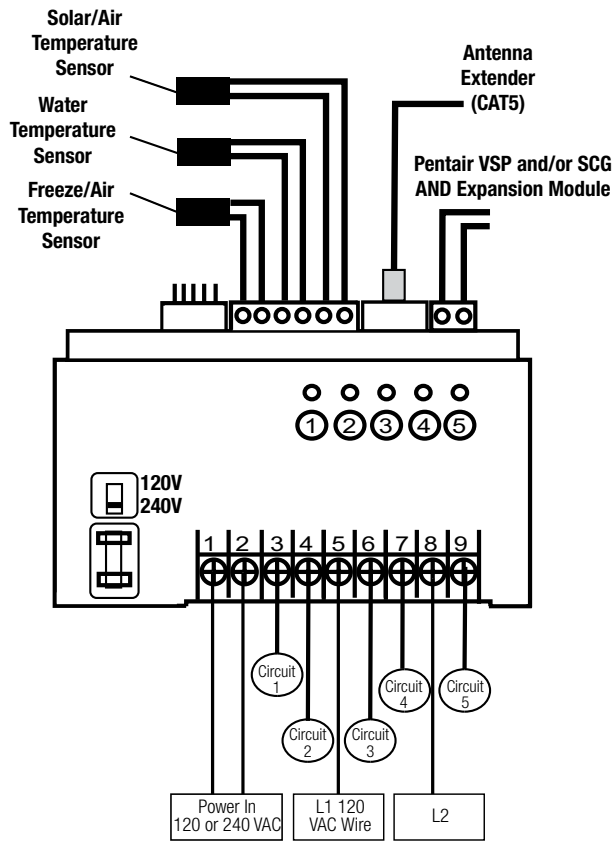


Figure 4-8. PE653 Receiver Connections.

### PE653 Receiver

Terminals 1, 2, 5 and 8 – Power In

Terminals 3 and 4, Circuits 1 and 2 – 240 VAC 2-Speed Pump\*

Terminal 6, Circuit 3 – 240 VAC Booster (Cleaner) Pump\*

Terminal 7, Circuit 4 – 240 VAC Blower\*

Terminal 9, Circuit 5 – 120 VAC Light with GFCI

\* To break both lines, use relay kit PE21RLY. Request document 158--01559.

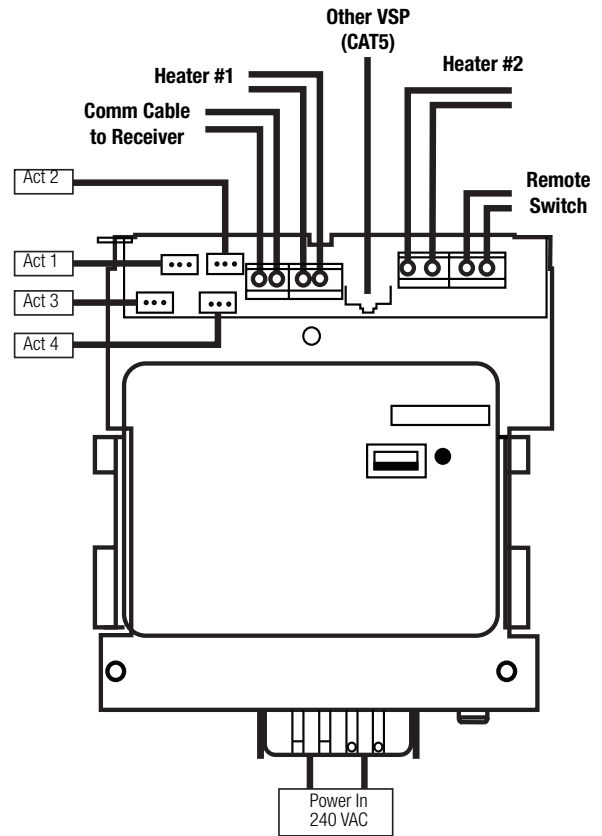


Figure 4-9. P5043ME Expansion Module Hookups.

### P5043ME Expansion Module

Power In

**NOTE:** Expansion module hookups are shown on page 21, page 37 and page 39.

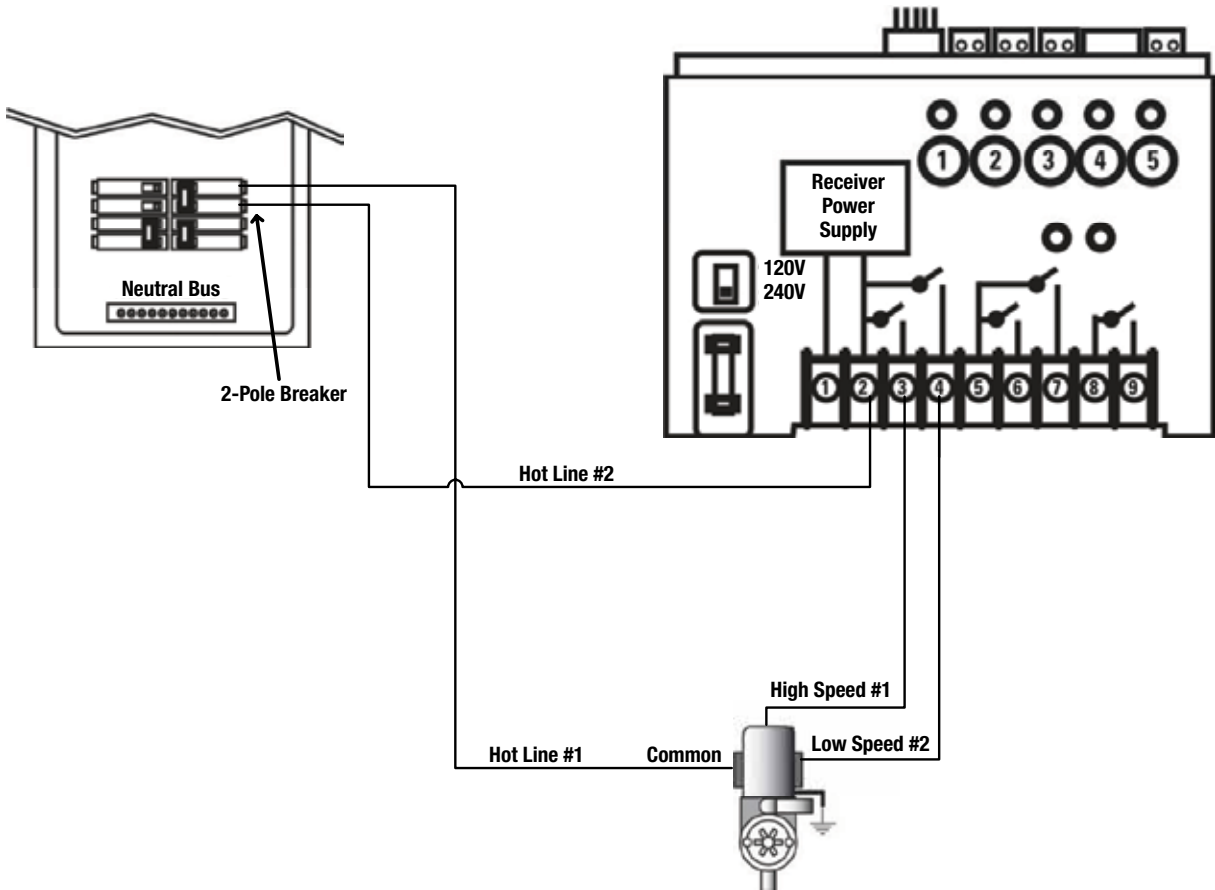


Figure 4-10. Wiring Circuits #1 & #2 to a 240 VAC 2-Speed Pump for PE653RC and P5043ME.

## Variable Speed Pumps

### Connecting a Pentair Variable Speed Pump Communication Cable to Receiver

If you have a Pentair Variable Speed Pump, follow this procedure to connect the variable speed pump communication cable to the receiver. This enables the pump to communicate with the receiver.

1. Make sure power is off at the receiver and variable speed pump.
2. Connect the twist-lock connector end of the communication cable to the variable speed pump.
3. Connect the green wire from the unattached end of the communication cable to the connector terminal next to the Cat 5 cable. See Figure 4-11.

**NOTE:** Be sure to observe polarity when connecting the variable speed pump cable wires.

4. Connect the yellow wire from the cable to the connector terminal next to the green wire. See Figure 4-11.

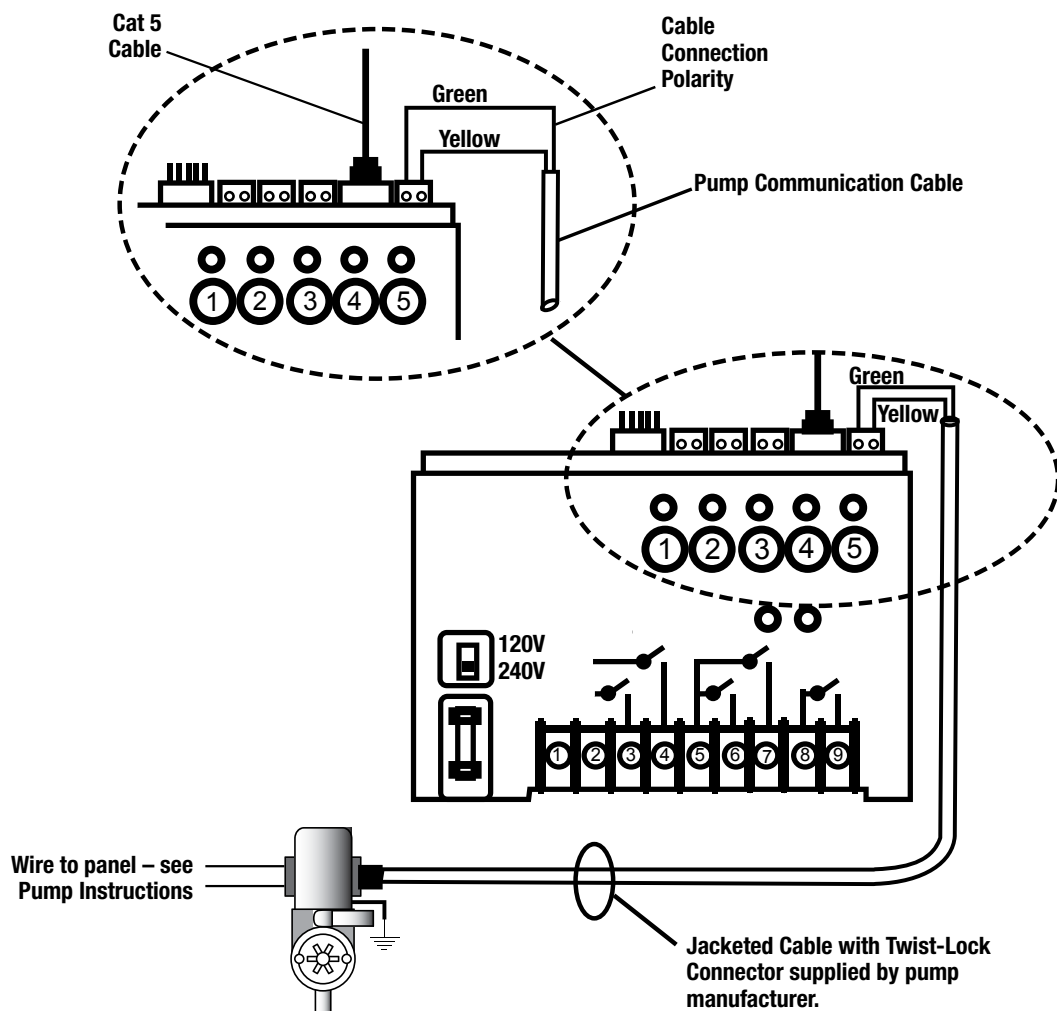


Figure 4-11. Connecting variable speed pump wiring.

## External Variable Speed Pump Hookup

Other variable speed pumps compatible with the MultiWave receiver include Jandy®, Hayward®, Marathon®, Century® and Speck®.

**NOTE:** A CAT5-568B network cable is required to route between the P5043ME Expansion Module and the variable speed pump.

1. Insert the network cable into the Motor Control Input as shown in Figure 5-4.
2. Cut off the second RJ45 connector from the other end of the cable and strip each connector wire.
3. Refer to the applicable figure for the variable speed pump manufacturer (Figure 4-12 to Figure 4-15) to connect the wires to the expansion module.

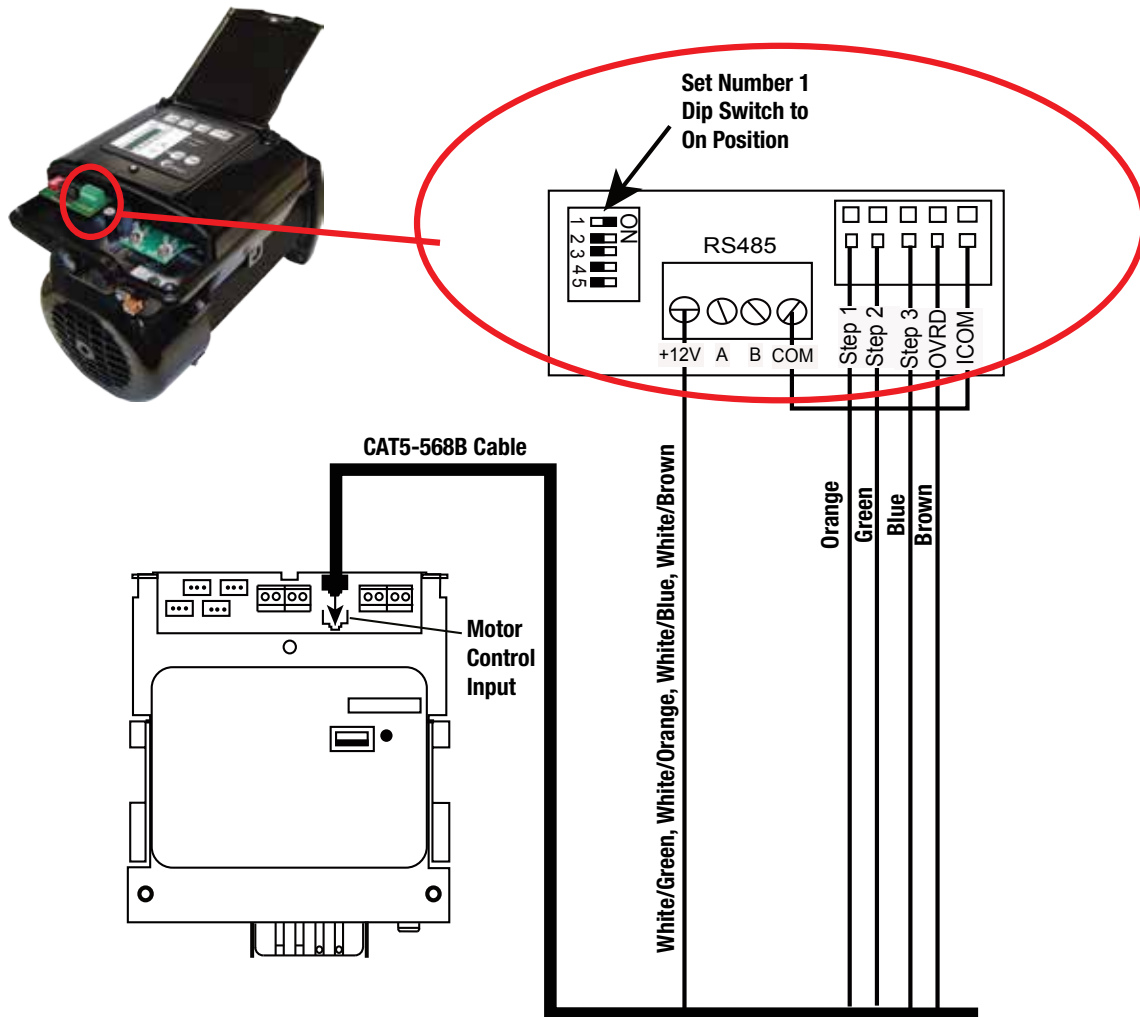


Figure 4-12. Connecting the Century® Variable Speed Pump to the P5043ME.

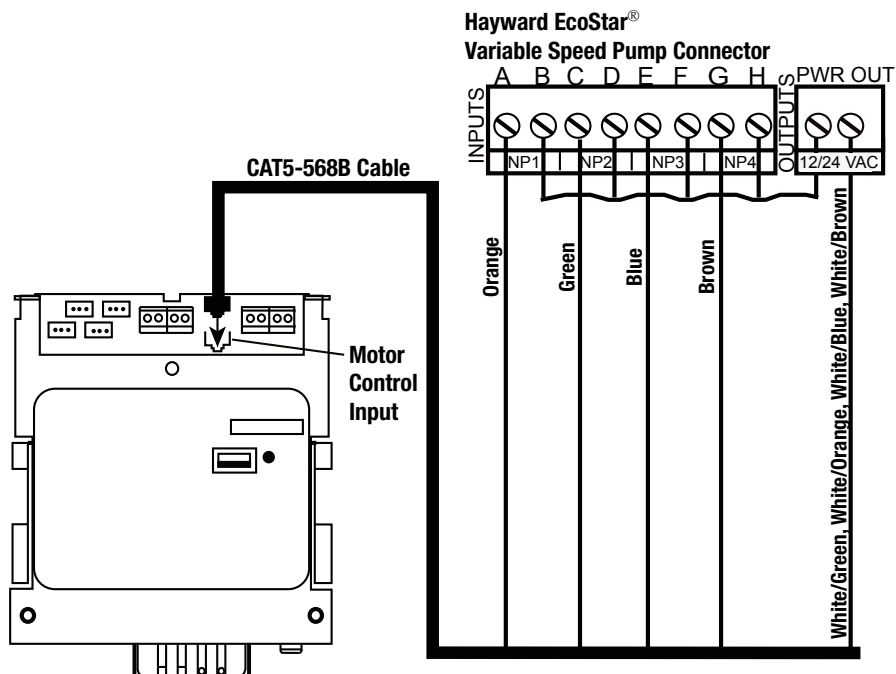


Figure 4-13. Connecting the Hayward EcoStar® Variable Speed Pump to the P5043ME.



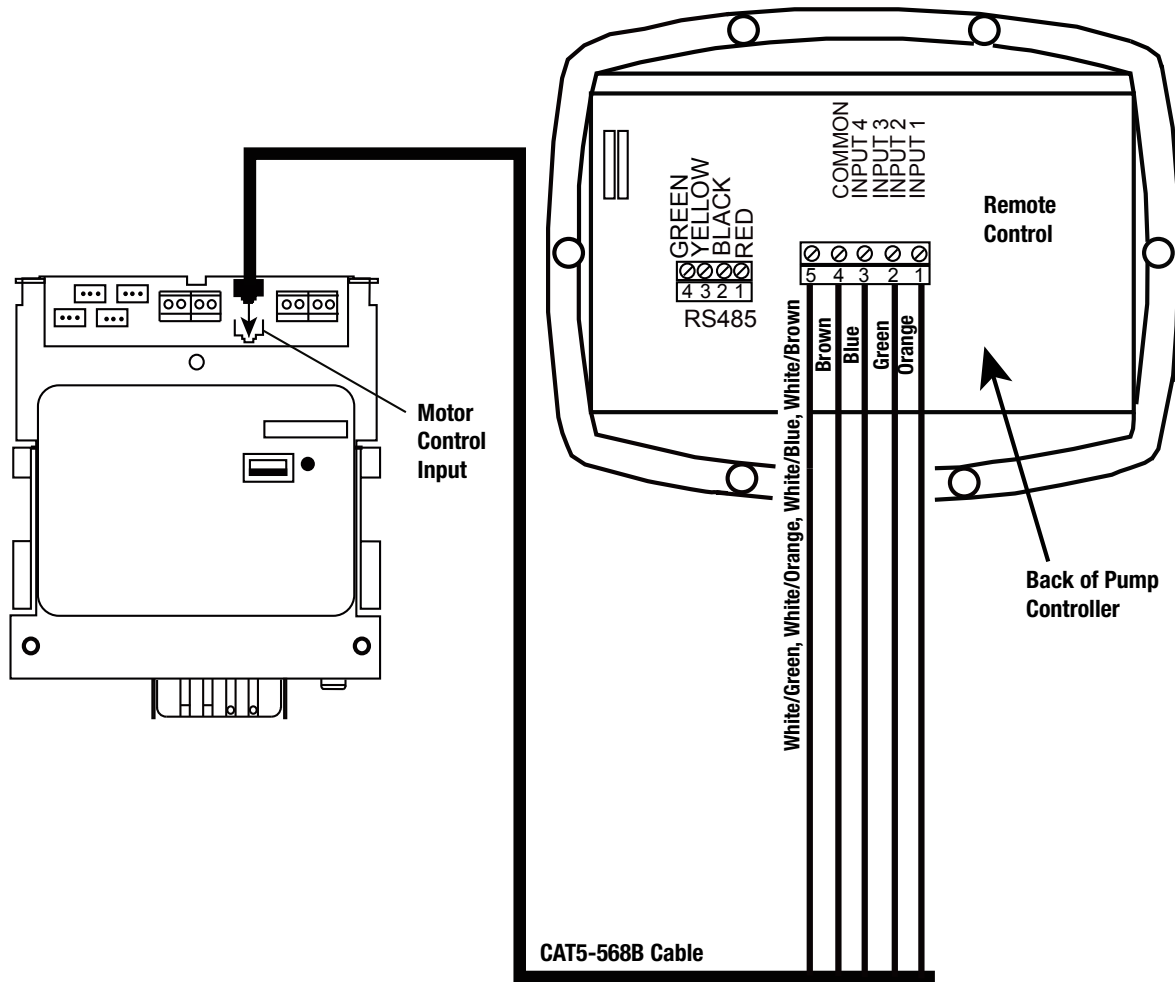


Figure 4-14. Connecting the Jandy® Variable Speed Pump to the P5043ME.

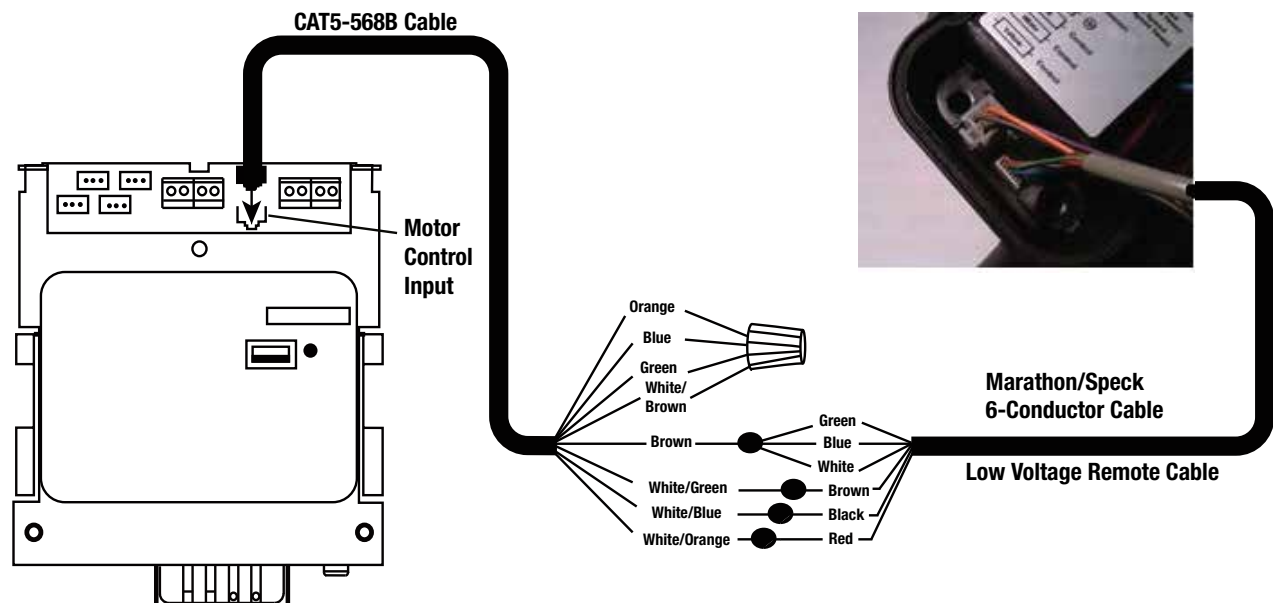


Figure 4-15. Connecting the Marathon® or Speck® Variable Speed Pump to the P5043ME.

# Chapter 5: Basic Wiring — 240V Cleaner/Lights/Actuators

## Cleaner

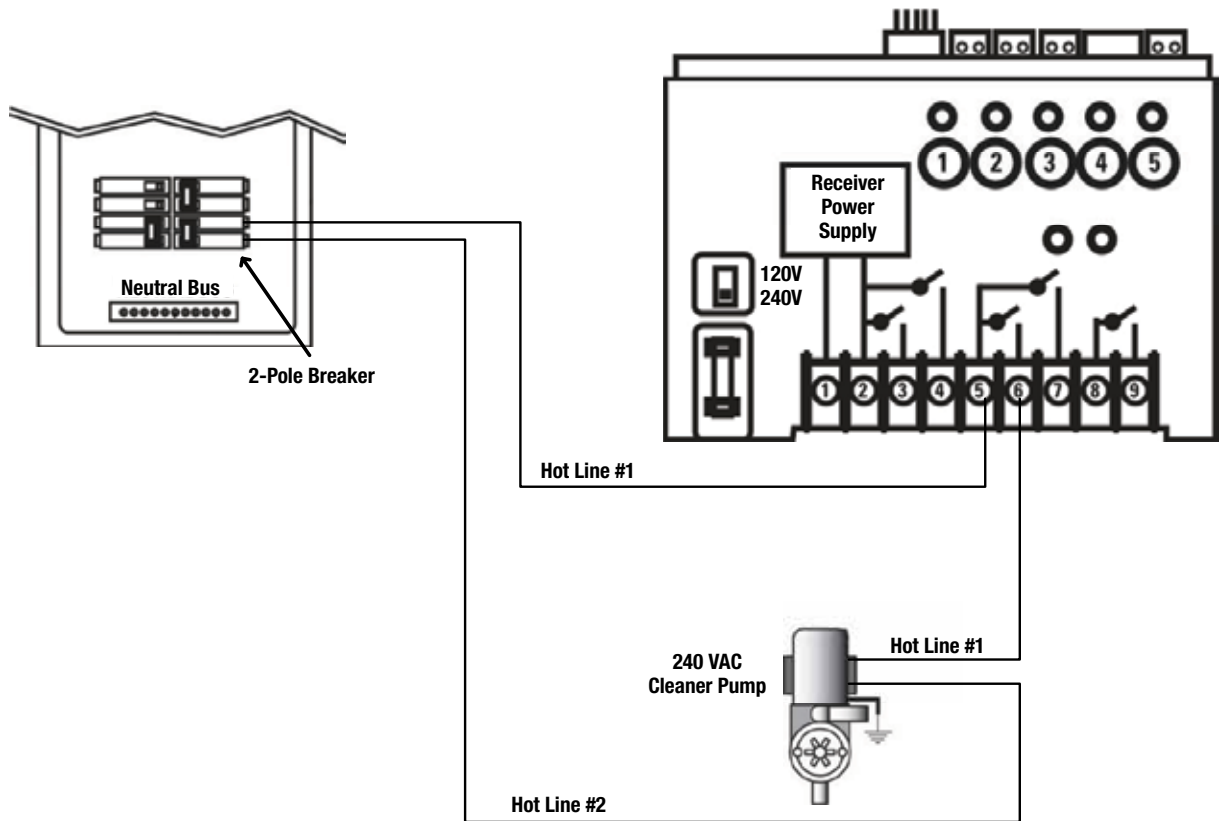


Figure 5-1. Wiring Circuit #3 to a 240 VAC Cleaner Pump for PE653RC.

# Lights

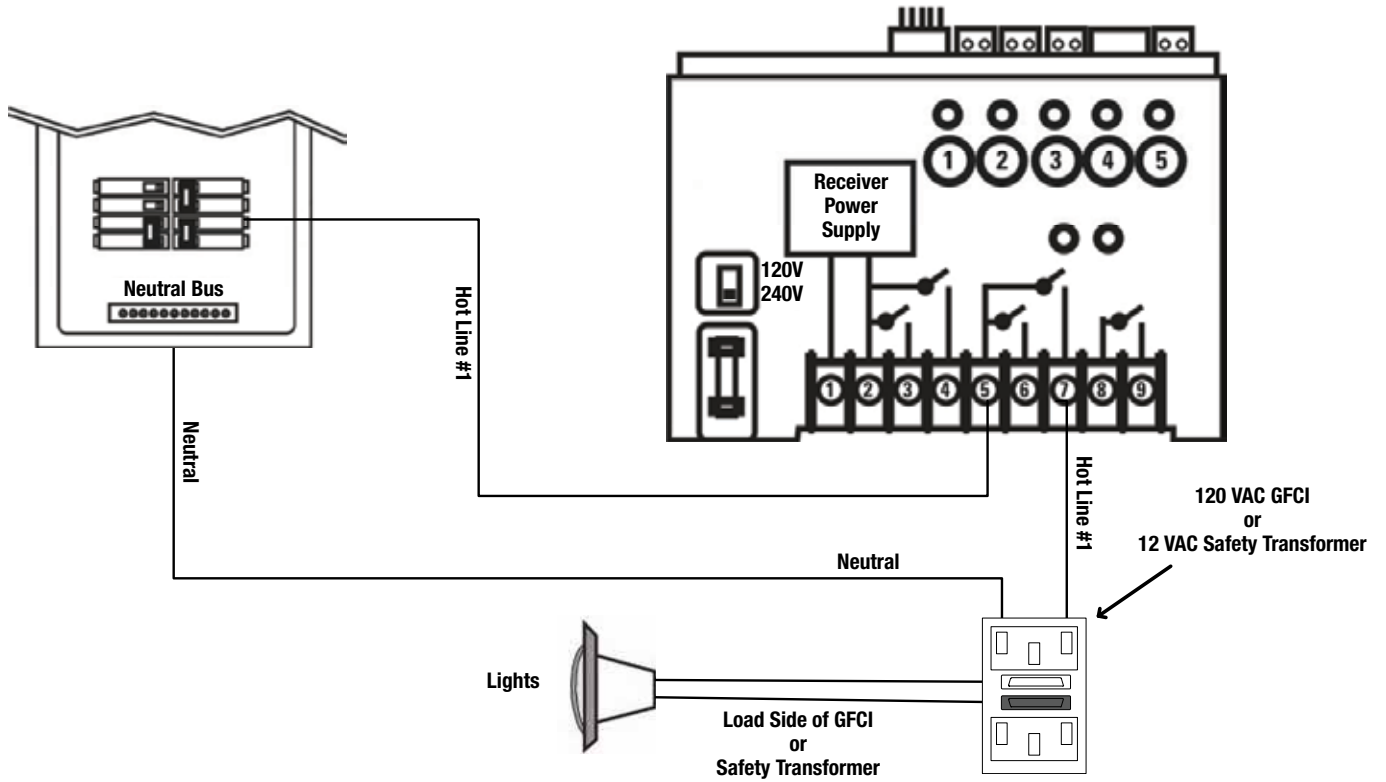


Figure 5-2. Wiring Circuit #4 to a 120 VAC Light with GFCI for PE653RC.

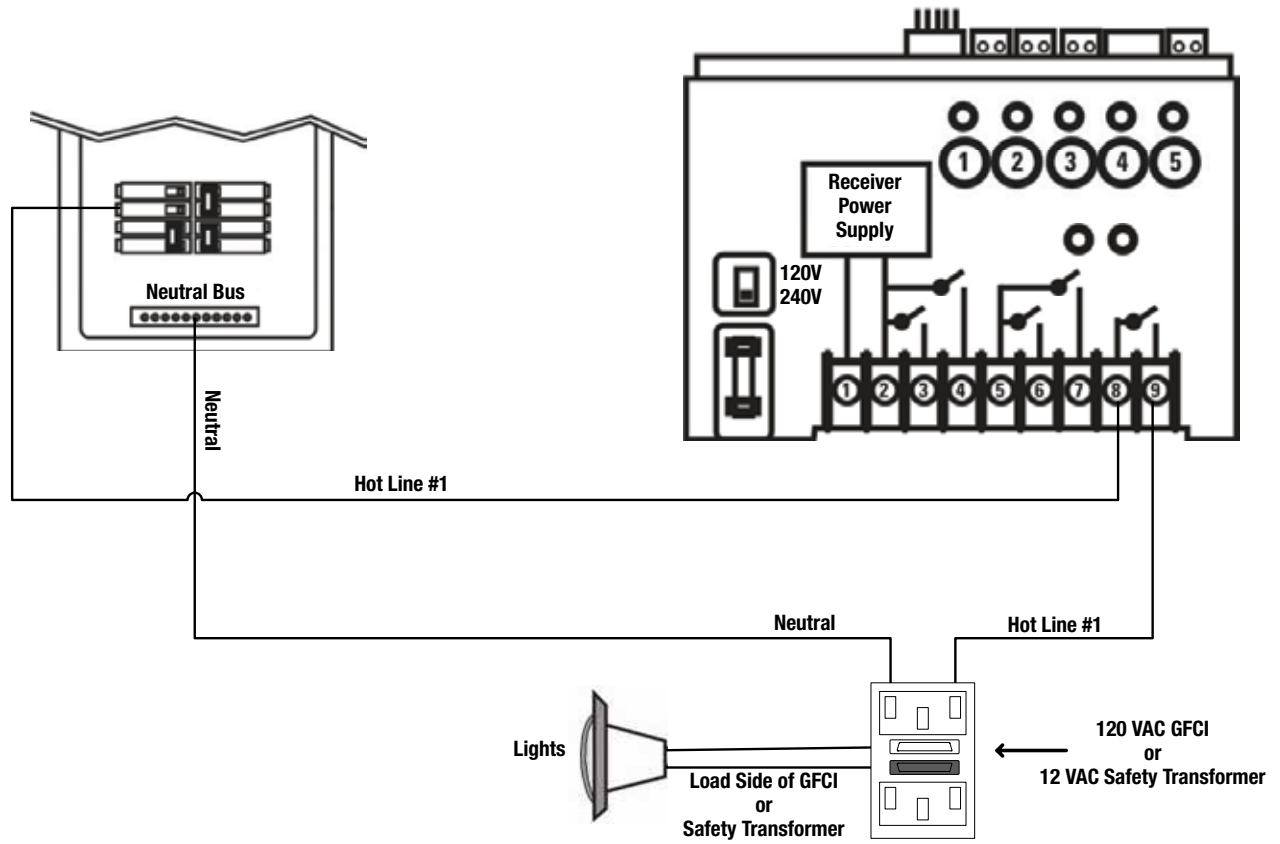


Figure 5-3. Wiring Circuit #5 to a 120 VAC Light with GFCI for PE653RC and P5043ME.

# Pool/Spa Actuators

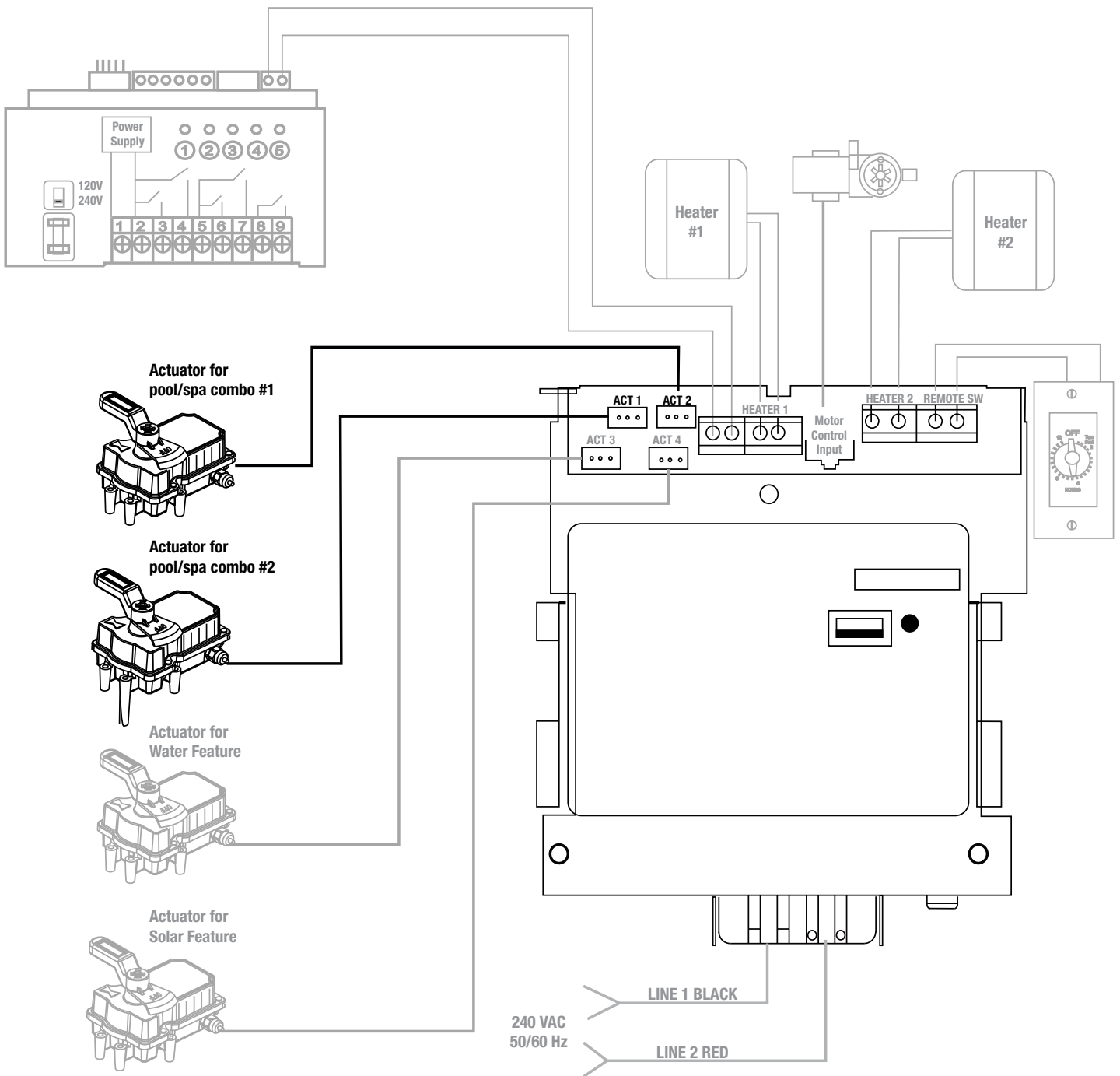


Figure 5-4. Connecting Equipment to P5043ME.

# Chapter 6: Heaters

## 1 Heater on PE653

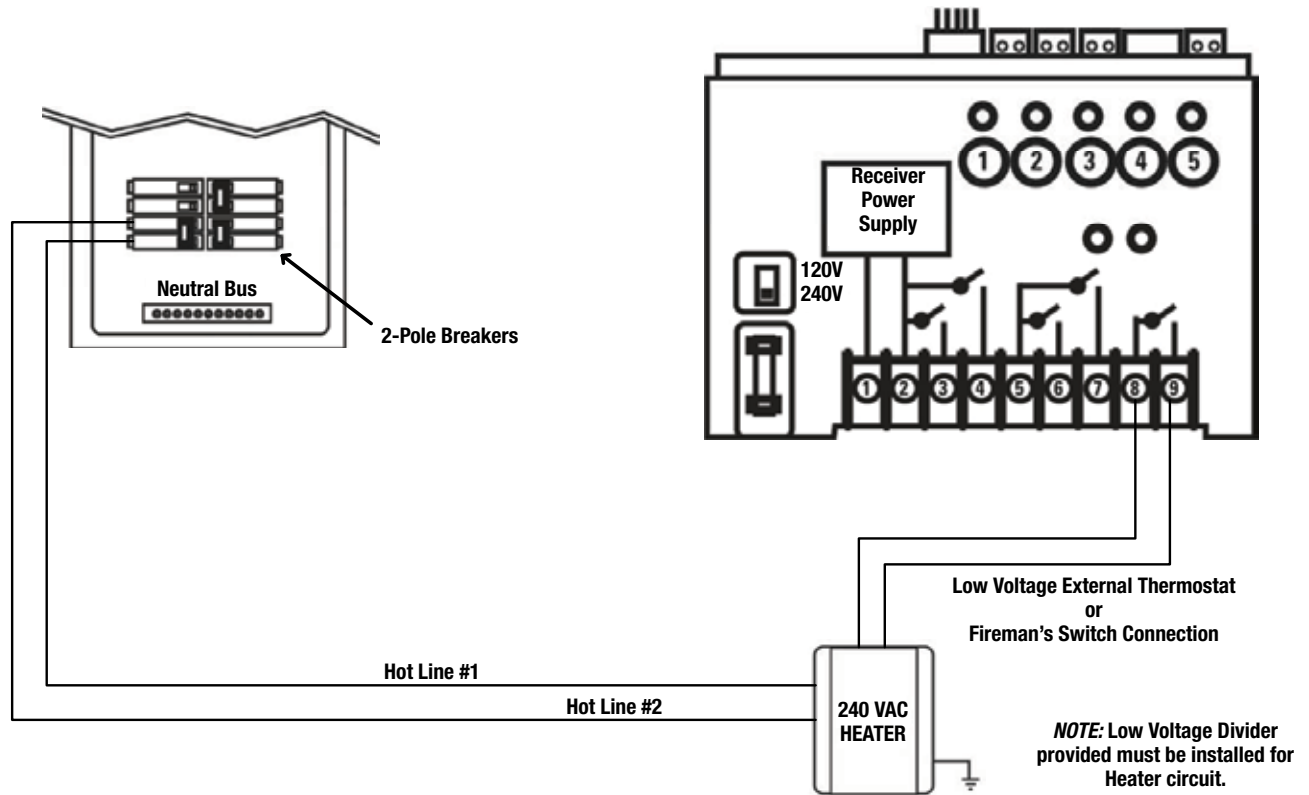


Figure 6-1. Wiring Circuit #5 to a 240 VAC Heater for PE653RC.

# 1 or 2 Heaters on P5043ME

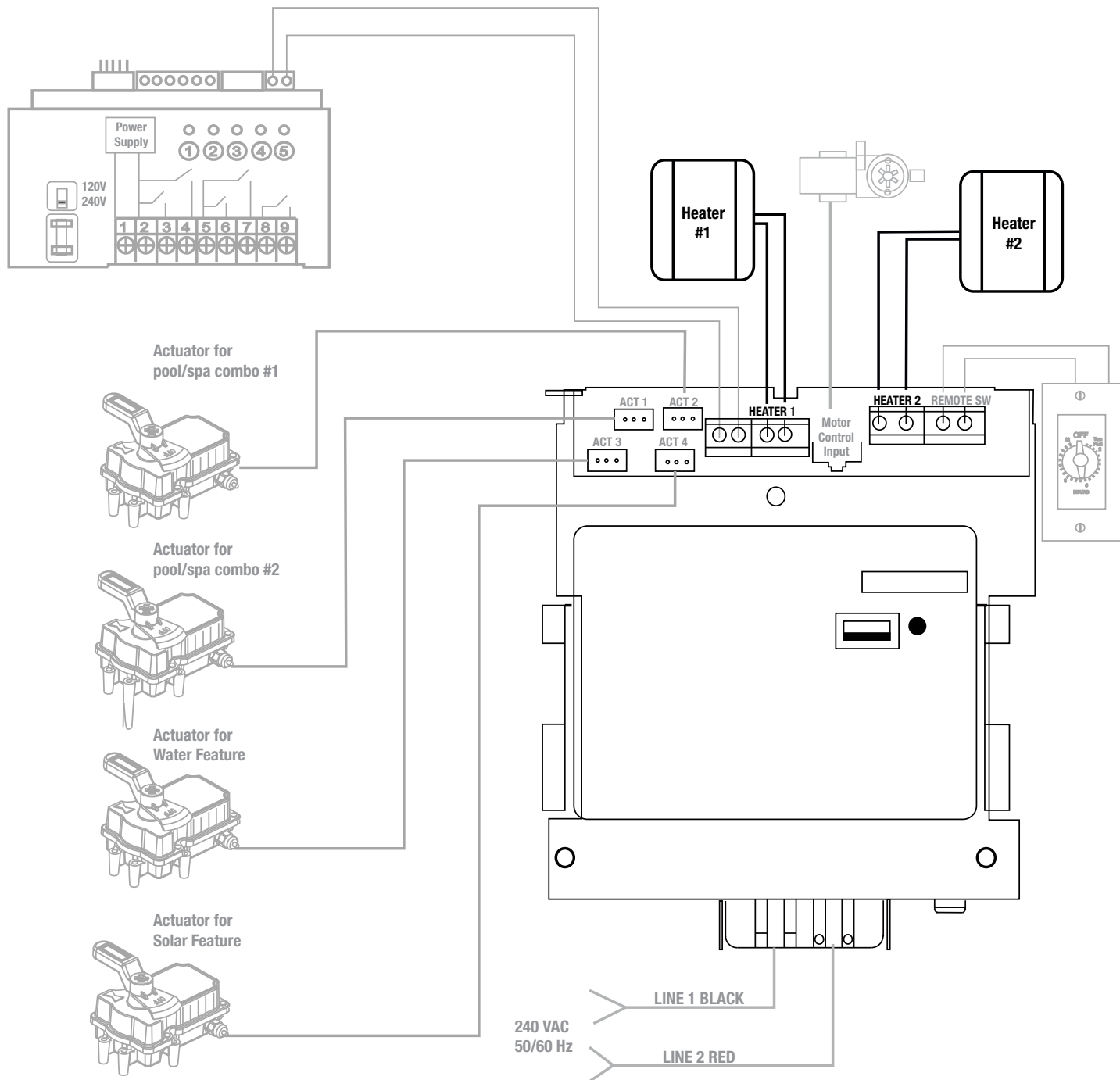


Figure 6-2. Connecting Heaters to P5043ME.

## Heater Connection

The Multiwave is designed as an external 2-wire heater controller for most heaters or heat pumps. Locate the applicable instructions for connecting the heater to external control for your heater pump manufacturer on the following pages. If you do not find information regarding your specific brand, refer to the heater manufacturer's instructions.

### Connection for Jandy® Heaters

1. Remove power.
2. Connect two #14 gauge wires minimum, with an insulation rating of 105°C, to terminals 8 and 9 on the PE653 (or to the Heater #1 or Heater #2 hookup when using P5043ME) and route them through the low voltage knockout.
3. Make sure that the low voltage divider is securely installed.
4. Locate the Fireman's Switch terminal in the control section of the heater.
5. Remove the factory-installed jumper wire.
6. Connect the other ends of the #14 gauge wires from Step 1 to the Fireman's Switch terminal bar in place of the factory-installed wire loop.
7. Do not disconnect heater's high limit or pressure switches.
8. Turn heater thermostat(s) to maximum setting.
9. Turn the heater switch to the ON position. Refer to the heater manufacturer instructions for programming the heater to be operated by an external control.
10. Re-apply power.

**NOTE:** For dual thermostat heaters, turn switch to Spa position.

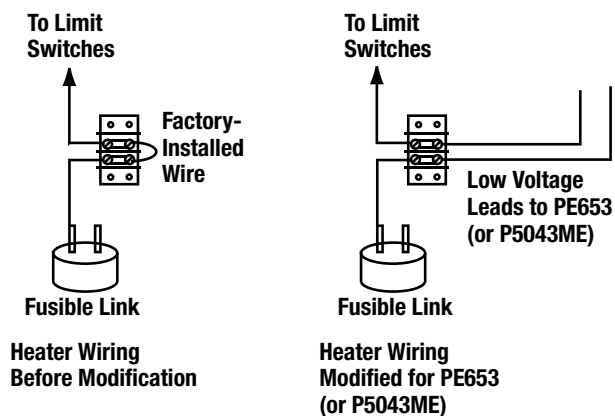


Figure 6-3. Typical wiring connections for Jandy Heaters.



## Connection for Raypak® Heaters

1. Remove power.
2. Connect two #14 gauge wires minimum, with an insulation rating of 105°C, to terminals 8 and 9 on the PE653 (or to the Heater #1 or Heater #2 hookup when using P5043ME).
3. Route the wires through the low voltage knockout in the PE653 (or P5043ME) enclosure.
4. Make sure that the Low Voltage Divider is in place.
5. Connect the orange/black wire and the black/orange wire to the wire from terminal 8 on the PE653 (or from the hookup on the P5043ME).
6. Connect the yellow/black wire to the wire from terminal 9 on the PE653 (or from the hookup on the P5043ME). See Figure 6-4.
7. Re-apply power.

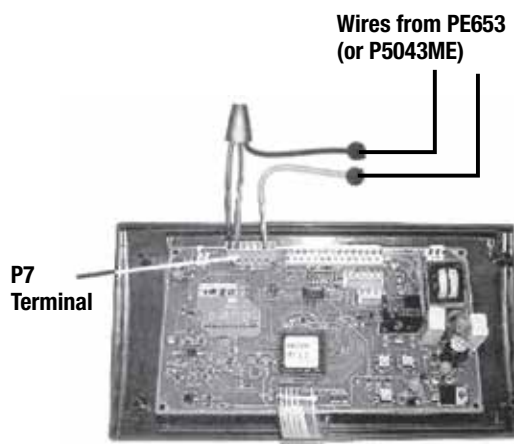


Figure 6-4. Typical wiring connections for Raypak Heaters.

## Connection for Hayward® Heaters

1. Remove power.
2. Connect two #14 gauge wires minimum, with an insulation rating of 105°C, to terminals 8 and 9 on the PE653 (or to the Heater #1 or Heater #2 hookup when using P5043ME).
3. Route the wires through the low voltage knockout in the PE653 (or P5043ME) enclosure.
4. Make sure that the Low Voltage Divider is in place.
5. Remove the heater service door.
6. Remove factory-installed wire nut between two red wires labeled "CONNECTION FOR FIELD INSTALLED CONTROL SWITCH."
7. Wire nut the two heater wires from receiver (or expansion module) to the two red wires of the heater. See Figure 6-5.
8. Do not disconnect heater's high limit or pressure switches.
9. Set the thermostat selector switch to ON, HIGH, or SPA.
10. Set the heater thermostat(s) to maximum.
11. Replace service door.
12. Re-apply power.

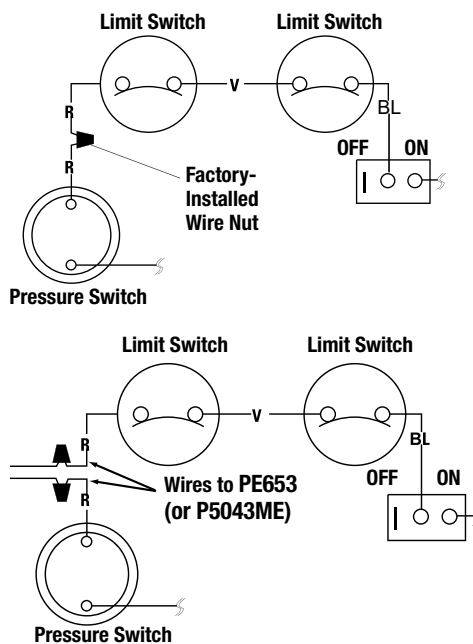


Figure 6-5. Typical wiring connections for Hayward® Heaters.

## Connection for Pentair® Heaters

1. Remove power.
2. Connect two #14 gauge wires minimum, with an insulation rating of 105°C, to terminals 8 and 9 on the PE653 (or to the Heater #1 or Heater #2 hookup when using P5043ME).
3. Route the wires through the low voltage knockout in the PE653 enclosure.
4. Make sure that the Low Voltage Divider is in place.
5. Remove the heater service door.
6. Separate the black wires (common) from each other.
7. Connect the wires from receiver (or expansion module) to the two black wires on the heater. See Figure 6-6.
8. Do not disconnect heater's high limit or pressure switches.
9. Turn the heater toggle switch on, and the heater thermostat(s) to max.
10. When connecting an Intermatic Control System to a Pentair Heater, Pentair requires that you install the low voltage thermostat wires in a conduit separate from ANY line voltage wires.
11. Replace service door.
12. Re-apply power.

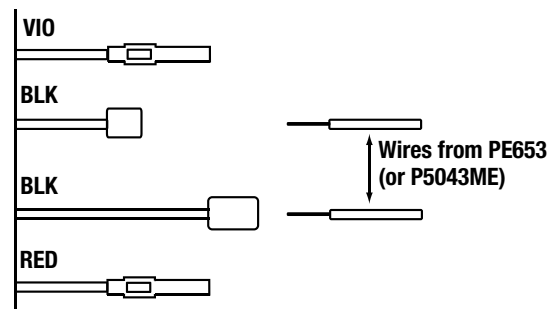
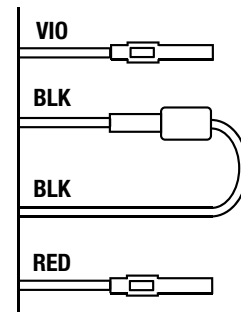


Figure 6-6. Typical wiring connections for Pentair Heaters.

## Connection for Sta-Rite/Pentair® Heater with DDTC

1. Remove power.
2. Connect two #14 gauge wires minimum, with an insulation rating of 105°C, to terminals 8 and 9 on the PE653 (or to the Heater #1 or Heater #2 hookup when using P5043ME).
3. Route the wires through the low voltage knockout in the PE653 (or P5043ME) enclosure.
4. Make sure that the Low Voltage Divider is in place.
5. Remove the heater service door.
6. Locate the DDTC circuit board. Refer to the manufacturer's instructions for location.
7. Connect the wire lead from PE653 terminal 8 (or P5043ME hookup) to the "COM" terminal on the DDTC board.
8. Connect the wire lead from PE653 terminal 9 (or P5043ME hookup) to the "POOL" terminal on the DDTC board.
9. Replace service door.
10. Re-apply power.
11. With the "POWER" and "PRESSURE" lights lit on the front panel, depress the remote button on the front display panel of the DDTC. The "REMOTE" light will come on and the remote system now has control.

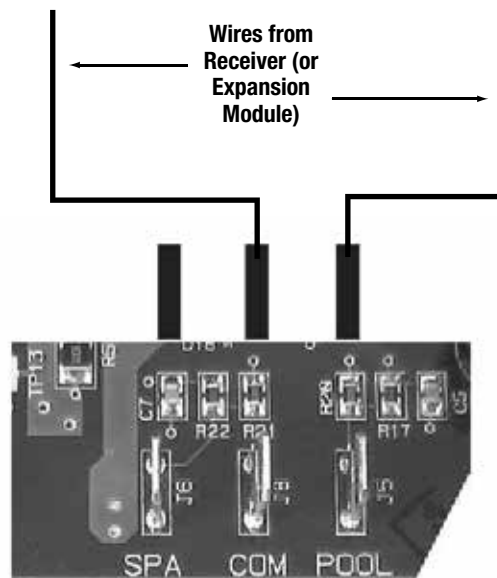


Figure 6-7. DDTC Control Board.

# Chapter 7: Blower/Chlorinator/Sensors

## PE653RC with Blower

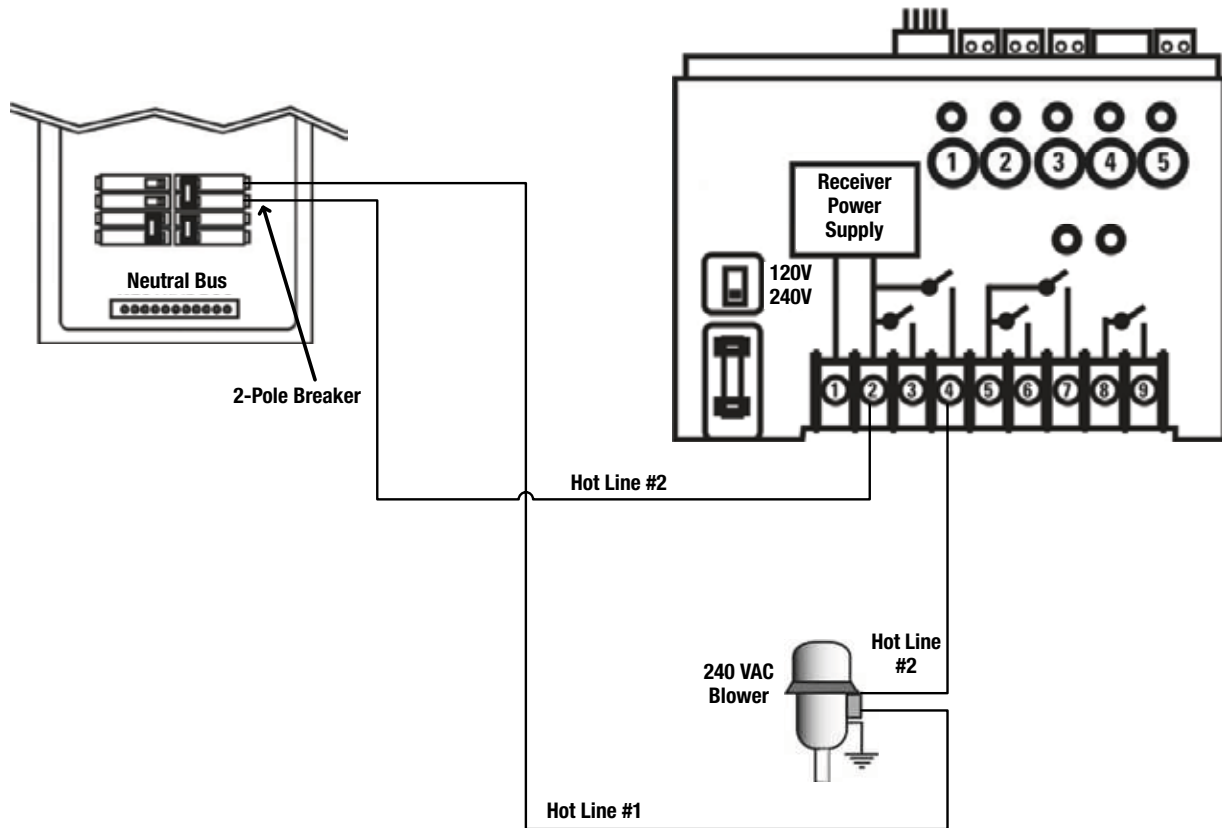


Figure 7-1. Wiring Circuit #2 to a 240 VAC Blower for PE653RC.

## PE653RC with Cleaner Pump or Blower

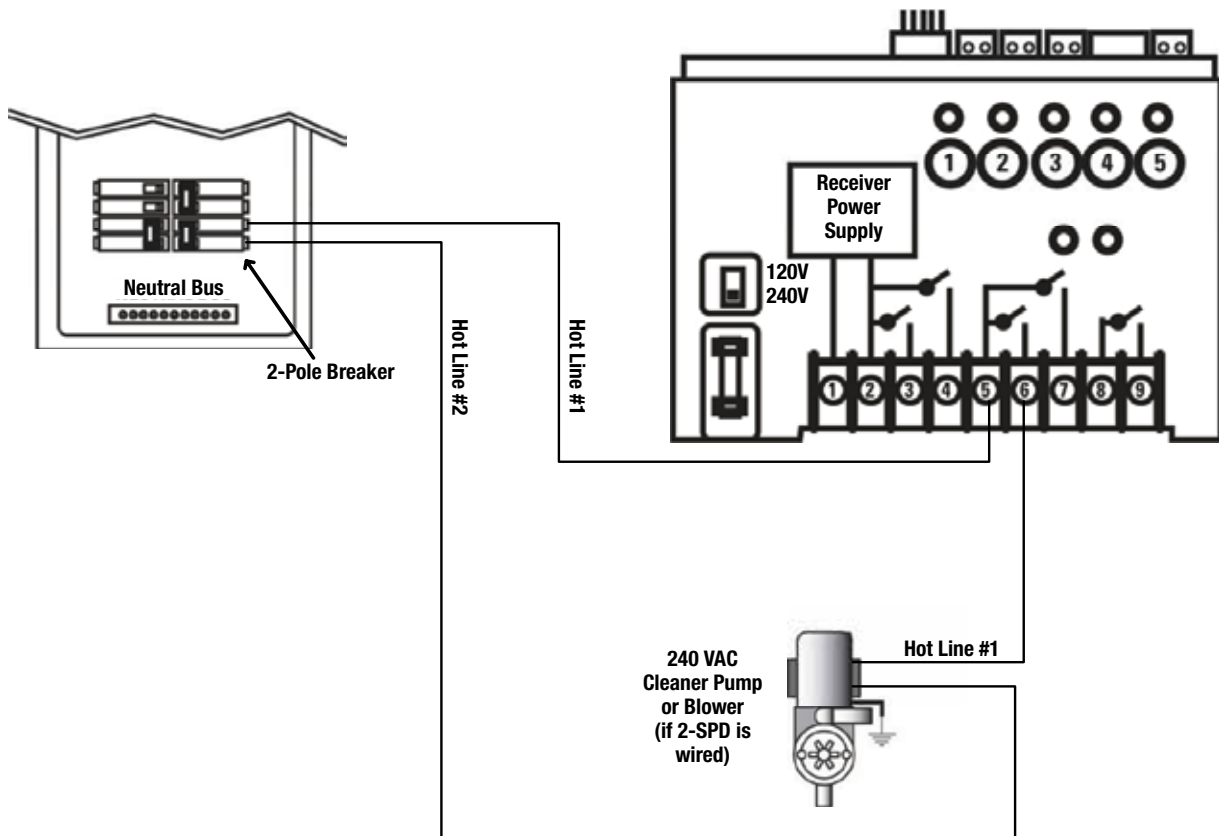


Figure 7-2. Wiring Circuit #3 to a 240 VAC Cleaner Pump or Blower for PE653RC.

## PE653RC and P5043ME with Blower

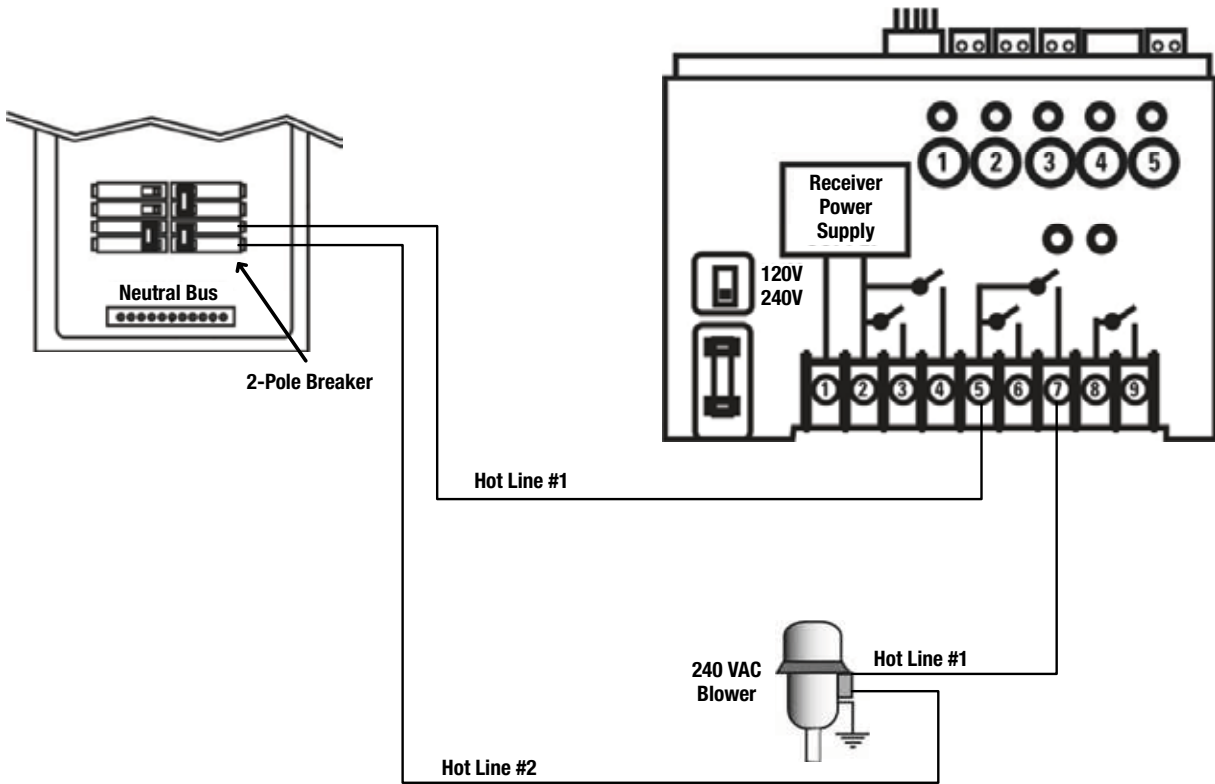


Figure 7-3. Wiring Circuit #4 to a 240 VAC Blower for PE653RC and P5043ME.

# Chlorinator

## Connecting AutoPilot Salt Chlorine Generator Control Cable to Receiver

Contact your local AutoPilot dealer to verify your chlorine generator has been updated for this feature. Follow this procedure to connect the generator control cable to the receiver. This enables the generator to communicate with the receiver.

**NOTE:** The chlorine generator connects to the same terminals as the Pentair Variable Speed Pump (or P5043ME Expansion Module communication cable). All three elements can be installed in the terminals.

1. Make sure power is off at the receiver and salt chlorine generator.
2. Connect the twist lock connector end of the communication cable to the proper terminals on the salt chlorine generator.
3. Connect the green wire from the unattached end of the communication cable to the connector terminal next to the Cat 5 cable. See Figure 7-4.

**NOTE:** Be sure to observe polarity when connecting the salt chlorine generator wires.

4. Connect the yellow wire from the cable to the connector terminal next to the green wire. See Figure 7-4.

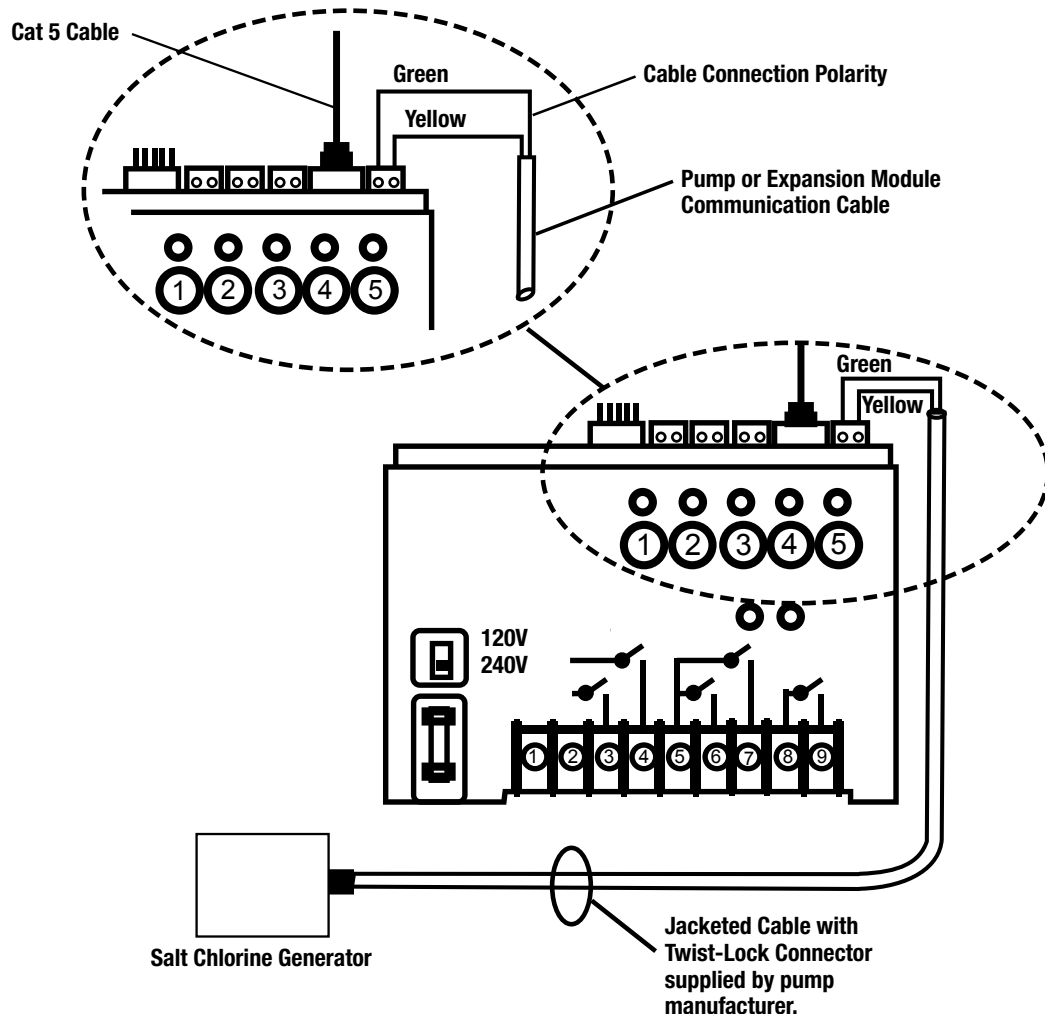


Figure 7-4. Connecting AutoPilot Salt Chlorine Generator wiring.

## Sensors

### Installing the Water Temperature Sensor

1. Make sure power is disconnected to the receiver.
2. Find a location to install the water temperature sensor. The sensor must be installed after the filter and before the input for the heater.
3. Drill a 3/8 inch hole in the pipe between the filter pump and the filter.
4. Install the water temperature sensor probe into the hole in the pipe and secure with a hose clamp. Make sure the probe o-ring is in place.
5. Run the sensor wires to the receiver and insert both wires into the middle terminals on the 6-pin terminal block at the top of the receiver. See Figure 7-5.

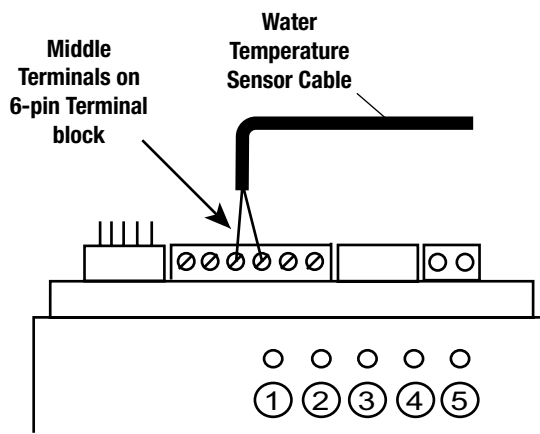


Figure 7-5. Connecting water temperature sensor cable wiring.

### Installing the Freeze (Air Temperature) Sensor

1. Make sure power is disconnected to the receiver.
  2. Install the sensor onto a piece of conduit.
 

**NOTE:** Be sure to mount the sensor in a location that enables it to accurately measure the air temperature.
  3. Run the sensor cable to the receiver.
  4. Cut the connector off the cable with a wire cutter.
  5. Strip the ends of the exposed cable wires and then insert the wires into the terminals to the left of the water temperature sensor wires. See Figure 7-6.
- NOTE:** You do not have to observe polarity when connecting the cable wires.

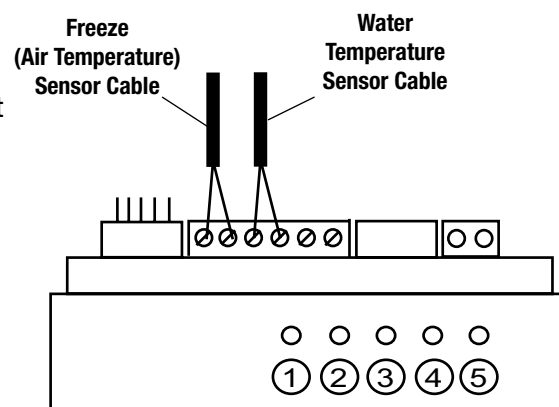


Figure 7-6. Connecting freeze (air temperature) sensor cable wiring.

### Installing the Solar (Air Temperature) Sensor

1. Make sure power is disconnected to the receiver.
  2. Install the sensor onto a piece of conduit.
 

**NOTE:** Be sure to mount the sensor in a location that enables it to accurately measure the air temperature near the solar collector.
  3. Run the sensor cable to the receiver.
  4. Cut the connector off the cable with a wire cutter.
  5. Strip the ends of the exposed cable wires and then insert the wires into the terminals to the right of the water temperature sensor wires. See Figure 7-7.
- NOTE:** You do not have to observe polarity when connecting the cable wires.

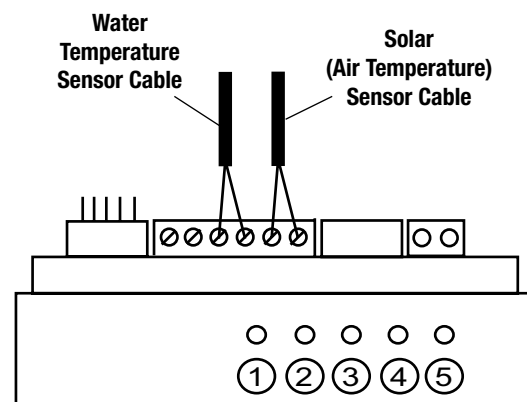
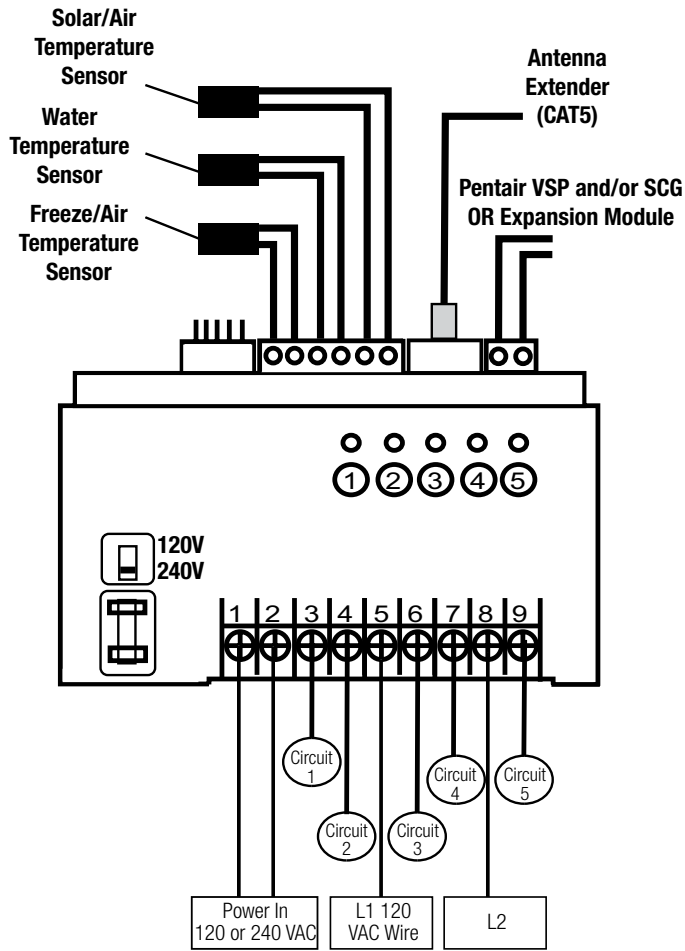


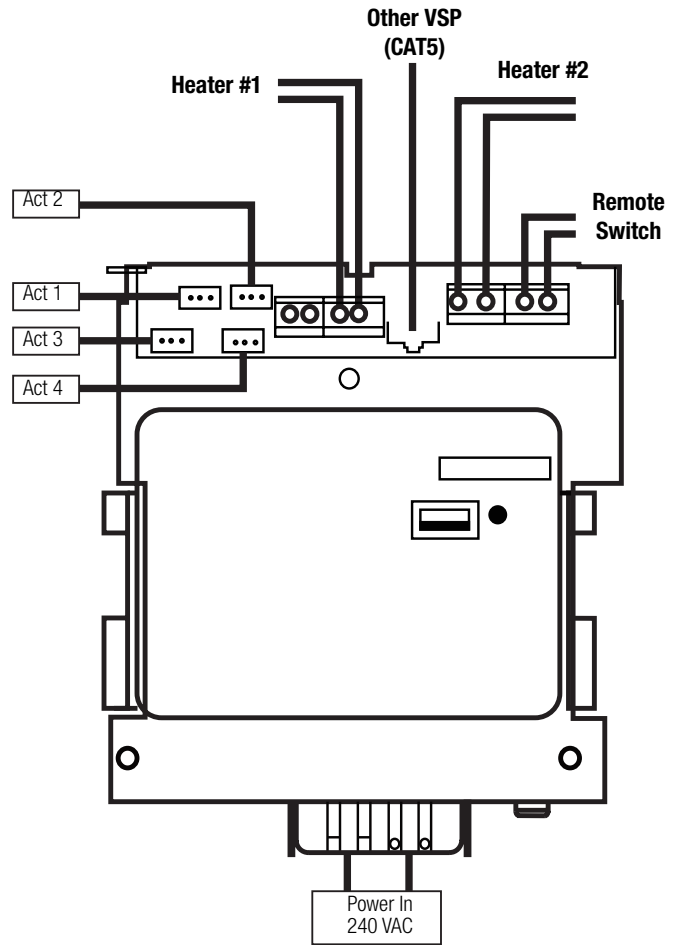
Figure 7-7. Connecting solar (air temperature) sensor cable wiring.



# MultiWave Pool & Spa Control System Worksheet for Programming



**PE653 Receiver**



**P5043ME Expansion Module**

**NOTE:** For circuit options, see Chapters 4 through 6. Put a dash in the circuits that are not used.

- Circuit 1 \_\_\_\_\_
- Circuit 2 \_\_\_\_\_
- Circuit 3 \_\_\_\_\_
- Circuit 4 \_\_\_\_\_
- Circuit 5 \_\_\_\_\_

**SYSTEM COMPONENTS:**

- Freeze (Air Temperature) Sensor
- Water Temperature Sensor
- Solar (Air Temperature) Sensor
- Antenna Extender
- Pentair Variable Speed Pump (VSP)
- AutoPilot Salt Chlorine Generator (SCG)

• **FREEZE OPTION IS DESIRED.**

• **OTHER Z-WAVE DEVICES ARE USED.**

**NOTE:** If this system does not include P5043ME, draw an "X" through the entire second column.

• **P5043ME Expansion Module**

- Water Feature (Act 3)
- Heater #1
- Heater #2
- Solar Temperature System (Act 4)
- Remote Switch
- Other Variable Speed Pump (VSP)

**Intermatic**

7777 Winn Road  
Spring Grove, IL 60081  
(815) 675-2321

Need Technical help?

Phone: 815-675-2321

Fax: 815-675-7001

(8:00 am through 4:30 pm CT, Monday through Friday)

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