



**AQ TSB #: E-1029, 2nd Release (RELEASE OF 3/2/07 REMAINS VALID)**  
**Connecting 3-Wire Controller to HP7R Microprocessor**

## Technical Service Bulletin

Date Prepared: 3/5/07 By: M. Mauro Effective Date: Immediate

Affects Following Models: All HP7R Equipped Heaters, All Brands, All Models

Requested by: S. Baxter  
AquaCal

Distribute: All AquaCal Service, Sales and Customer Support Staff, AQ Service Centers, Rec Warehouse, and Hayward

**Questions Concerning Bulletin Content- Contact Technical Support at: 800-786-7751**

**WARNING:** Electrical shock hazard—the following procedures are intended for use by experienced service personnel, only.

### Purpose of Bulletin:

To define the correct method of connecting 3-wire external controllers to AquaCal-produced heat pumps equipped with HP7R microprocessors.

Note: While this bulletin is written specifically for HP7R-equipped heat pumps, the FS-2 interface method is also the preferred method of connecting the earlier vintage HP7 microprocessor to a 3-wire controller. However, it is not necessary to FS-2 retro-connect a previously installed and correctly operating HP7 installation. Conversely, all HP7R-equipped heat pumps, connected to 3-wire controllers—both previously installed and new installations—must be connected (only) via the FS-2 method detailed in this bulletin.

### Explanation of Problem:

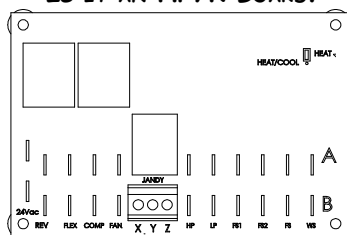
When connected to the “X-Y-Z” terminals of an HP7R microprocessor, when the 3-wire controller selects the Spa or Pool mode, the heat pump will start. However, the heat pump will continue to operate without regard to water temperature. Operation will continue until stopped by one of several internal safety devices (or pump shut down).

Factory Correction: with future production runs, the microprocessor “X” terminal will be removed, or fastened, effectively preventing field connection in an “X-Y-Z” configuration.

### Field Procedures for Checking - Connecting Digital Heat Pumps to 3-wire Controllers:

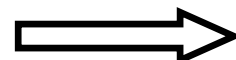
- 1) New installations (HP7 or HP7R): use only the FS-2 wiring method detailed in this bulletin (and as detailed in “Alternate Interface Method” or “3-Wire Digital Heat Pump Interface Method” of AquaCal document LTP0050).
- 2) When servicing a previously installed, externally controlled AquaCal manufactured heat pump, determine if the connection method is of the “X-Y-Z” method. If “X-Y-Z” is used, and the microprocessor is an HP7R, change the connection to the FS-2 wiring method detailed in this bulletin (and as detailed in “Alternate Interface Method” or “3-Wire Digital Heat Pump Interface Method” of AquaCal document LTP0050).

#### **IS IT AN HP7R BOARD?**



AN HP7R BOARD WILL HAVE A  
 “HEAT/COOL” MODE JUMPER IN  
 UPPER-RIGHT (THE HP7 WILL HAVE  
 NO SUCH JUMPER)

**SEE FS-2 CONNECTION  
 PROCEDURES NEXT PAGE**



## CAUTION !

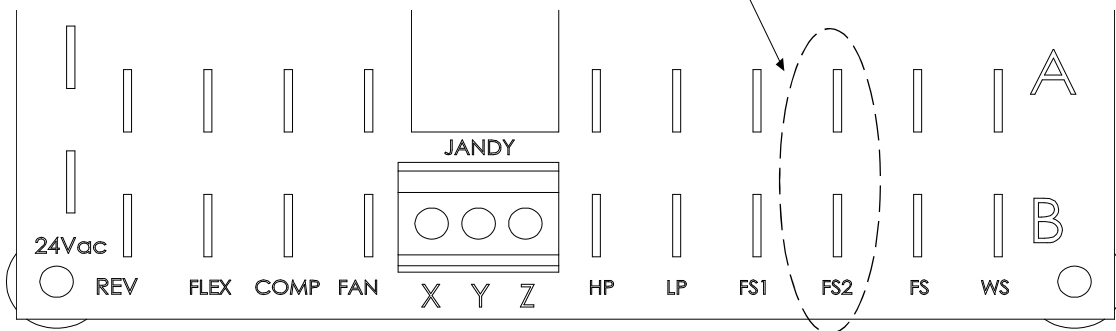
Failure to heed the following can result in damage to equipment.

Only non-powered circuits shall be connected to the microprocessor "FS-2" terminals; never connect outside power sources to the microprocessor. Connection of energized wiring may damage the heat pump controls. Damage to equipment, caused by incorrect wiring connections, is NOT covered under the equipment warranty. If uncertain of the correct wiring methods to follow, contact AquaCal Technical Support Group before continuing installation: (800) 786-7751.

### Connections Between Heater and Controller

1. Run low-voltage wires to the common (C) and spa connections (H) of controller/air switch.
2. Bring wires into the low-voltage side of the heat pump electrical enclosure.
3. Wires should be cut long enough to reach from controller/air switch to the heat pump electrical box microprocessor FS-2 terminals.
4. Connect wires at HP7(R) board, FS2 connections (use female spade connectors).
5. Third wire will not be needed from controller/air switch.

### FS-2 Connections, HP7 or HP7R Microprocessor



### Programming and Activation at Microprocessor

1. Make sure pool water pump is on.
2. Power to heat pump will need to be on.
3. Press and hold both "UP" and "DOWN" keys, simultaneously, until "CF1" displays.
4. At "Pool/Spa" key, toggle until "LOC" appears.
5. Press "UP" key; go to "50".
6. At "Pool/Spa" key, toggle until "FS2" appears.
7. Press "UP" key twice. The number "1" should display.
8. Press no further buttons; the display should revert to current water temperature within approximately 25-seconds.
9. External controller-to-heater interface is ready to test and use.

### Operation

1. The heat pump's Pool/Spa temperature controls will govern water temperature settings.
2. With the external controller selecting "Pool," the heat pump controls will default to the pool water temperature setting. When "Spa" is selected at the external controller, making the circuit across the FS-2 terminals of the HP7R microprocessor, the spa water temperature setting will be selected. In either case, should the actual water temperature be below the temperature programmed at the heat pump (and with all other controls in the "ready" mode), the heat pump will operate in an attempt to satisfy the temperature setting. Heat pump operation will terminate on satisfaction of the temperature set point, opening of any safety control, or upon circulation pump shut down.