Walchem 400 Series ph/ORP Controller Troubleshooting Guide

Serial Number Guide:

For serial numbers prior to the end of 1999, there is a 6 digit format. The first two numbers are the month (06 is June, 10 is October), the third digit is the year (8 is 1998), and the last three digits are sequential (308 is the three hundred and eighth controller built in that month). Certain cooling tower and boiler controllers begin with a letter V to indicate that they were built with a new style enclosure. This is important to know so that if we send a replacement front panel it will fit correctly. Starting at the end of 1999, we went to a 10 digit format, such as 991109xxxx, where the first two digits are the year, the next two are the month, the next two are the day, and the last four are sequential.

Unit won't power up:

CAUSE: F1 fuse is blown, due to a power surge or lightning strike.
Verify that the fuse is blown by removing fuse and checking for continuity from end to end using an ohmmeter. Replace F1 fuse, part number 102369. If the unit is still dead, and the fuse is still intact then other components have been damaged. The most common components to be damaged by a power surge are MOV 1 and 2. If the problem occurs repeatedly, install a surge suppressor on the power source, or locate a cleaner source of power to use.
CAUSE: F1 fuse is blown, due to a faulty component in the controller. Fuse immediately blows when replaced.
Remove all option boards and sensors. If the fuse blows, the problem is within the controller, most likely the front panel assembly. Try replacing it. If the fuse survives, add option boards one at a time, restore power, and see if the fuse still survives. The part which when connected causes the fuse to blow is faulty, and should be replaced.

Controller fails pH/ORP self-test:

CAUSE: Short on front panel between circuit common and earth ground (the front panel itself). If the bezel of the display is touching the front panel, or legs of any components, then the self test will fail. In older units, accumulations of dust between the processor board or display and the aluminum front panel can cause this problem.
Eliminate the cause of the short, or replace the front panel assembly.
CAUSE: Failure of the electrode. Leakage of water inside the pH/ORP housing can cause the self test to be very low or fail. Inside the electrode, a short between circuit common and earth ground is developed. Verify this by repeating the self test with the electrode wires disconnected from the controller. If the self test now passes, then the electrode or its cable is causing the problem.

Replace the pH/ORP electrode housing (not cartridge).
CAUSE: Interference from AC coupling on water meter cable. We have seen instances where the water meter cable is routed through the same conduit as AC voltage. If the water meter cable is unshielded (and sometimes even if it is shielded) it can pick up a voltage from the nearby AC wires. This can cause false contacts, set points changing, or self test failure.
Disconnect the water meter cable, and try the self test again. If the self test now passes, route the water meter cable separated from any wires carrying AC voltage.
CAUSE: Poor connection of option board to processor board. If the problem is with Sensor B of a dual input model, check the connection between the option board and the processor board.
Remove power to the controller. Remove the three screws that attach the option board. If the board seems loose on the connector, the only way to tighten it up is to put a small ball of solder on each of the pins on the connector. The other option is to replace the option board.
CAUSE: Faulty circuit board. If the problem is with a single input controller, or with Sensor A of a dual input controller, the processor board is faulty. If the problem is with Sensor B of a dual input model, the input option board is faulty. Component level rework of these circuit boards is not recommended.
Replace faulty circuit board.

Relay Troublshooting:

Start at the device (pump, valve, etc.) and work back towards the relay. With the output in question activated:
1. Manually cycle the output on and off. If you not hear the relay click open and closed (assuming you are in a quiet location!) skip to 9 below, otherwise:
2. Check F2 fuse (if present; not needed for WPH320, WDP320 or WDP340 controllers) by measuring voltage between Neutral and both ends of the fuse. If voltage is present at the bottom of the fuse, but not present at the top of the fuse, it is blown and needs to be replaced. Look for any obviously burned circuits or components. If a fuse continuously blows, then a device attached is drawing too much amperage. Note that motors draw 3-4 times more current at startup than the rated current. The limit for motors is 1/8 HP.
3. Check for voltage at the device. If present, the device is defective. If not present:
4. Check for voltage at the terminal strip (between Neutral terminal and the NO terminal of the active output). If present, the wiring between the terminal strip and the device is defective. If not present:
5. Check that the terminal strip is installed in the correct location as compared to the instruction manual. If correct:
6. Check to see if the Neutral wire of the device is connected correctly. If correct:
7. Check to see if the relay is internally powered or dry contact. A powered relay will be labeled NO (or both NO and NC for the one furthest to the right) while a dry contact will be NO and COM. If it is a dry contact, verify that voltage is supplied to the COM terminal. If OK:

8. Remove the terminal block and check for voltage between Neutral and the pin that the terminal block connects to. If present, the terminal block connection is poor or the terminal block is defective. If not present:
9. Measure DC voltage on IC U2 between pin 8 (ground) and pin 1 (for K1 relay), or pin 2 (for K2 relay) …or pin 5 (for K5 relay). The IC may be partially hidden by the 4-20 mA option board. Remove the option board before taking measurements. You should see 5 VDC when the output is active, and 0 VDC when output is off. If not, the ribbon cable is probably defective. If OK:
10. Measure DC voltage on IC U2 between pin 8 and pin 16 (for K1 relay) or pin 15 (for K2 relay) … or pin 12 (for K5 relay). This should be 0.7 VDC when the output is active, and 9 VDC when output is off. If not, then the IC U2 is defective. If OK:
11. Relay is defective.