



Aquagation

**Commercial
Reverse Osmosis
Water Filtration System**

CE3 Controller

Technical Manual

CE3 Notes & Operations

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Specifications

Enclosure

8" x 6" x 6" Nema 4x

Power:

85-265 VAC, 50/60HZ, 6 Watts

Inputs:

32F (0C) to 140F(60C) 0-95% RH, Noncondensing

Inputs:

Low Pressure – Closed to run

Pretreat – Closed to run

Tank Full High – Closed to run

Tank Full Low – Closed to run

Pump Temperature:

35F (2C) to 125F (52C)

Outputs:

RO Pump – 1HP/120V, 3HP/240V

Inlet Solenoid – 120/240V, 5A

Flush Solenoid – 120/240V, 5A

Divert Solenoid – 120/240V, 5A

Alarm Relay – Dry Contact

Time Delays:

Ro Start – 8 seconds

Tank Full – 5 seconds

Tank Full Restart – 2 seconds

Low Pressure – 4 seconds

Auto Reset – 5 minutes

Flush Interval -10 hours

Flush Time – 5 minutes

TDS Shutdown Delay -10 minutes

Pump Temperature – 30 seconds CE3



Installation & Wiring

Power Wiring

The controller has a universal power supply and will operate on 120VAC or 240VAC

Power with no jumper changes required. The RO pump, inlet and Flush outputs will

Supply what ever voltage is supplied to the controller.

Input Wiring

Connect the low pressure, pretreat and level switches to the corresponding terminals on P3.

The unit is configured for normally closed inputs. **All inputs must be closed for the controller to run. If any input is unused, a jumper wire must be installed for that input before the unit will run.** **Note:** These inputs are for dry contact switches only. Applying voltage to these inputs will damage the controller,



The permeate TDS cell connects to P6 and the wiring is color coded. The feed TDS cell connects to P2 of the TDS expander board and is also color coded.

Relay Expander Board

With the relay expander board installed, 2 additional relay outputs are provided. Ac power for the relays is connected to the L1 and L2 power terminals of P1. Relay 1 is connected to this power input and will supply the same voltage. This relay is rated for 120/240VAC at 1hp maximum. Relay 1 can be configured to supply a dry contact by connecting a jumper wire between the L1 and L2 power terminals of P1. NOTE: if relay 1 is configured as a dry contact, Relay 2 can be configured as a dry contact also. If relay 1 is configured to supply voltage, 120/240, 5A maximum, or as a dry contact output. Jumpers J1- J4 are used to select the relay 2 output type. To output voltage, a wire jumper is installed between J1 and J4 and a second wire jumper is installed between J2 and J3. For contact closure output, a single wire jumper is installed between J3 and J4. Relay 1 is programmed to operate as a divert output and relay 2 is programmed as an alarm output.

Example: Relay Expander Board

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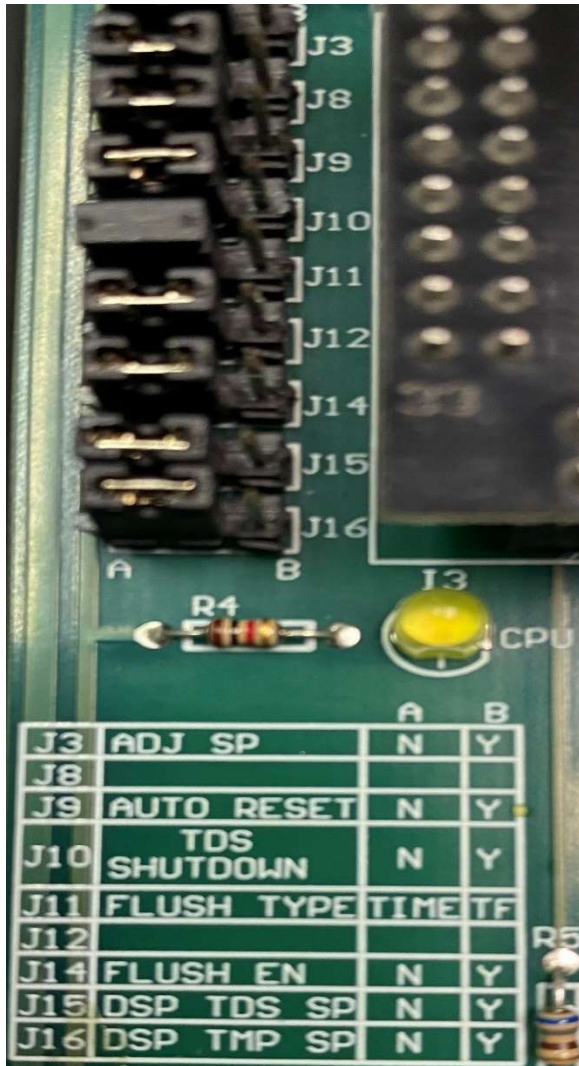
Operation

When power is first applied to the unit, the display will momentarily show a screen that shows the firmware version of the unit. The unit will be in standby, and all relay outputs are off. Pressing the Power key will turn on the unit. The inlet relay will operate and after the RO start delay, the RO pump relay will operate. During the delay, the remaining delay time will be shown on the screen.

Once the RO pump starts, the 1st line of the display will show RO ON, and the permeate TDS. The second line will alternate between the feed tds, the feed temperature and the pump temperature. Any alarm conditions will be shown on the first line of the display and the remainder of the display will be blank.

Low pressure

If a low pressure condition occurs and the low pressure switch opens for low pressure delay time, the controller will shut down for a low pressure fault. The display will show LOW PRESSURE and the alarm lamp will light. If the auto reset jumper(J9) is in the **A** position, the controller will remain in low pressure until reset by cycling the power.



Auto Reset

If the auto reset jumper(J9) is in the **B** position when a low pressure shut down occurs, the unit will attempt to restart after the auto reset delay. If the low pressure condition has cleared, the unit will continue to run. Otherwise, the unit will again shut down and the auto restart will continue as long as the low pressure condition is active.

Pretreat

If the pretreat lockout switch opens for the pretreat delay, time the unit will shut down for a pretreat condition. PRETREAT will be shown on the display. The unit will remain shut down until the pretreat switch closes. The unit will then restart.

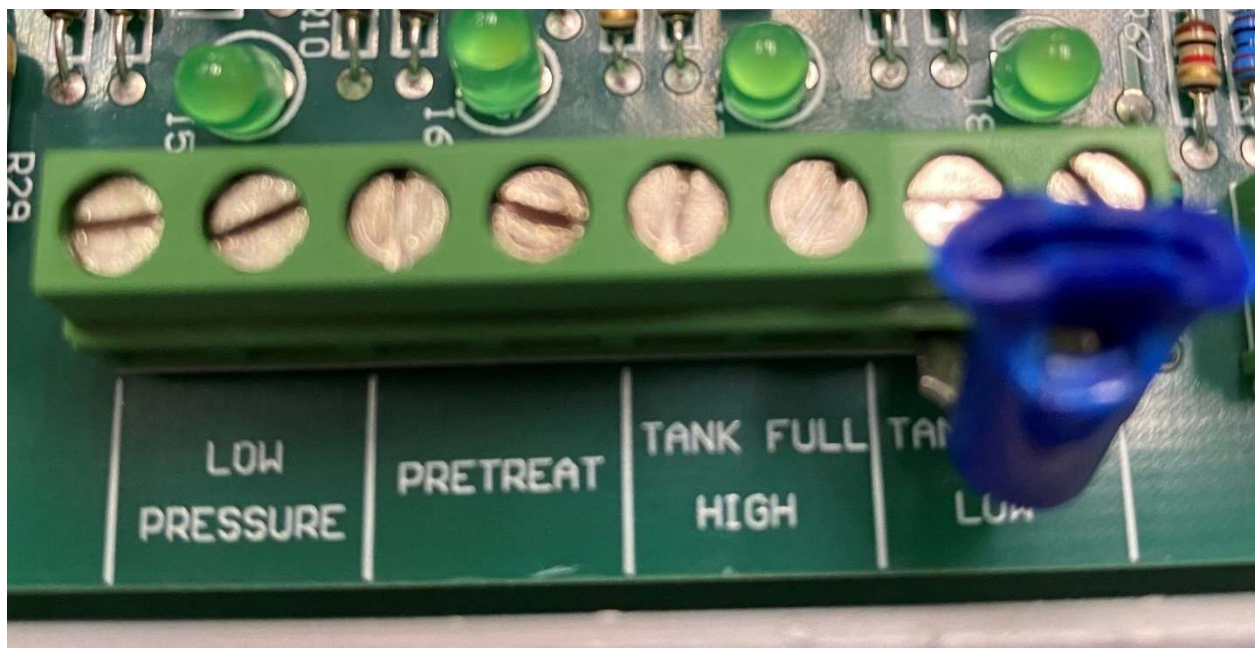
Tank Full

The controller is designed to operate with either 1 or 2 tank level switches. When a tank full conditions occurs, the unit will shut down and **Tank Full** is shown on the display. When the tank full condition clears, the unit will restart after the tank full restart delay.

If the unit is operated with only 1 level switch, the TANK FULL Low input must remain jumpered. In this mode the tank full high switch opens for the tank full delay time the unit will shut down. When the tank full condition clears, the unit will restart. If the unit is operated with 2 level switches, the unit will run when both switches are closed. When the water level rises and the tank full low switch opens, the unit will continue to run. Whenever the water level rises and the tank full high switch opens, after the tank full delay, the unit will shut down for tank full. As the tank level drops and the tank full high switch closes, the unit will remain shut down.

When the level drops and the tank full low switch closes, the unit will restart.

JUMPERED CONTACTS EXAMPLE



Flush

If the flush option is enabled using J14, either of two modes of flush may be selected using Jumper J11. If J11 is in the **A** position, the unit will enter flush mode every 10 hours. This flush will occur whether the unit is running or not. When the flush occurs, the inlet and flush solenoids will open, and the RO pump will start. The display will show flush and time remaining. The flush will last for 5 minutes. **NOTE:** A low pressure or pretreat condition will cancel the flush operation. Also note that if a unit is shut down for long periods of time due to a tank full condition. **NOTE** there is a possibility of tank overflow, because of small amounts of permeate produced during flush. If jumper J11 is in the B position, the unit will enter a 5 minute flush each time a tank full condition occurs. After the flush time has expired, the unit will shut down for the tank full condition.

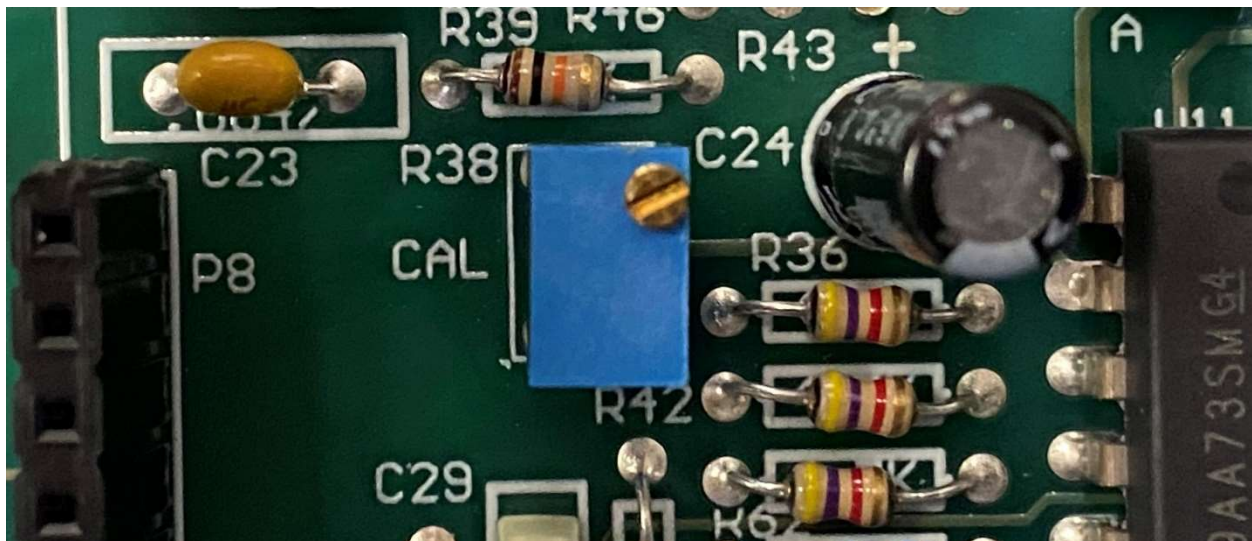
To **disable flush** remove jumper J14 from the board.

Feed/Permeate TDS

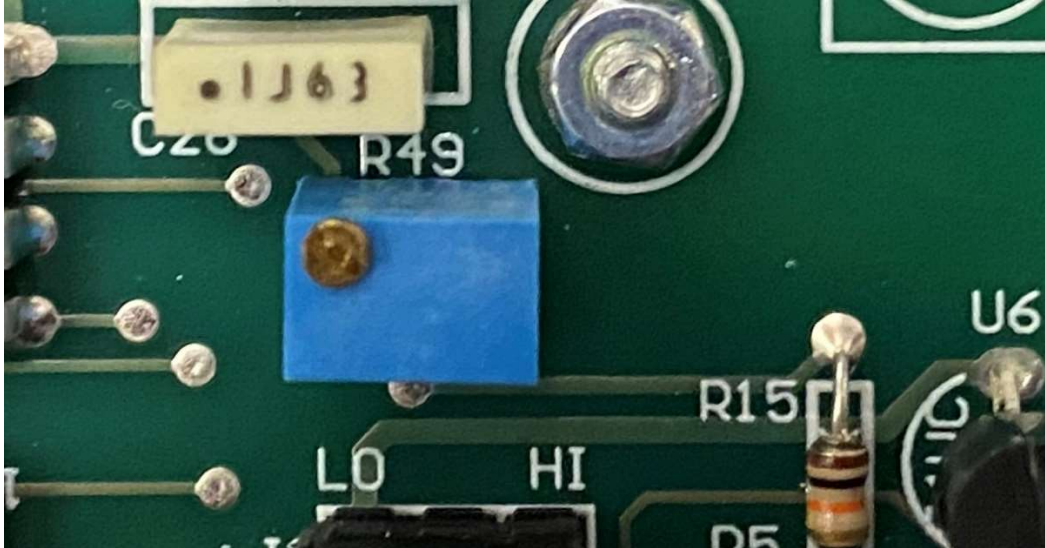
The feed and permeate TDS display can be configured for either low or high range. For the permeate, the ranges 0-250 or 0-2000PPM. For the feed, the ranges are 0-2000 or 0-10000.

Jumpers J1 and J4 are used to select the proper range. Both jumpers must be in either the LO or HI position for proper operation. **NOTE:** The unit is shipped calibrated for the low range. If the TDS exceeds the selected range, the display will show '^^^' to indicate a over range condition.

The unit may be calibrated with the on board calibration resistor or using standard solutions. Standard solutions offer the best accuracy. To calibrate with a standard solution, place the cell in the standard and adjust the CAL Adjustment, R38 for the correct reading on the permeate and R11 on the expander feed.



A permeate TDS limit can be enabled using SETPOINT adjustment R49 the limit, move jumper J3 to B position. The display will now show PERM LIMIT and the current setting for the setpoint adjustment. Turn R49 to get the desired setpoint value. If the adjustment is turned to a value above the current range, the setpoint limit is disabled.



A HIGH tds shutdown can be enabled by moving J10 to the B position. When the shutdown is enabled the tds exceeds the limit, a 10 minute delay is started. If the TDS remains above the setpoint for this delay, the unit will shut down. The display will show HIGH TDS. The unit will remain shutdown even if the TDS drops below the limit. The shut down can be rest by cycling the power.

DIVERT

When the permeate TDS is above the setpoint, the divert relay will operate. Once the permeate TDS drops below the setpoint, the relay will remain operating for 5 seconds and will then turn off.

PUMP TEMPERATURE

The pump water temperature is monitored and if it exceeds 120F for more than 30 seconds, the unit will shutdown and the display will show HIGH TEMP. The unit will remain shut down until the power is cycled.

ALARM OUTPUT

When any shut down occurs, the alarm relay will activate, the relay will remain on until the fault is set.

REPLACEMENT ITEMS

Item# 34448, CE3 Circuit Board and Door. Replacement upgrade for CE2 controller.

Item# 34567, 80TDS150R1-10 tds, pump, temperature sensor, for CE3, S150, S200, 3/4"MPT 15' CABLE

Item# 46095 Relay Expander board

Item # 34426 Complete CE3 controller with electrical box prewired 120/240 volts includes low pressure switch. Expander board optional

Jumper Assignments

Selecting version 1.3C using J8 or version 1.6PF using J15 or version 1.6PFID using J16 enables this type of flush

J3 Placing J3 to B position displays the current TDS set point. R49 adjusts the value of the set point.

J4 Changes water quality range. A-low range, B-high range

J5 In A position, TDS circuit is set for run. In B position, TDS circuit is set to calibrate.

J8 Selects version 1.3C

J9 Auto Reset A-Disabled, B-Enabled

J10 TDS Shutdown A-Disabled, B-Enabled

J11 Flush Type A-Time, B-Tank Full

J12 Selects version 1.6

J14 Flush Enable A-Disabled, B-Enabled

J15 Selects version 1.6PF

J16 Selects version 1.6PFID

Instructions to change the door from CE2 to CE3

- 1) Push the metal hinge rod out from one end, far enough where you can grab onto it with a pair of pliers.



- 3) Line up the hinges from the new door and the old box, then slide the hinge rod in to where it is flush on both ends of the hinges.



