Triton

Relay Expansion Box (REB)
Installation Guide

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1 Unpacking and Mounting

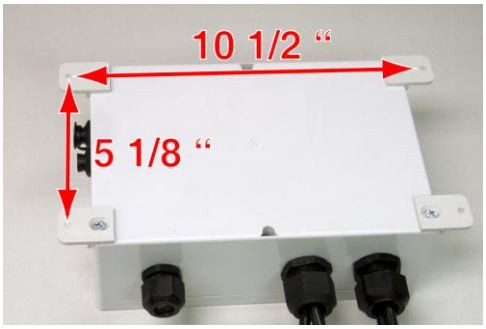
Unpack the Relay Expansion Box

Carefully open the shipping carton and inspect its contents. Notify the carrier immediately if there are any signs of damage to the enclosure or other parts. If any parts are missing, contact Hydro Systems.

The minimum configuration would include the Relay Expansion Box enclosure and this Installation Guide. A Modbus communications cable would also be needed, but they are sold separately. The "Triton Reference Manual" is available online at http://www.hydro-watertreatment.com/water-treatment-controllers/triton-controller.html.

Prepare to Mount the Enclosure

The enclosure has four attached mounting plates, which are ten and a half inches (10.5") apart horizontally, and five and one eighth inches (5.125") apart vertically. Please use all four attachment points to secure the Relay Expansion Box.



General Safety Requirements

This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1 2nd edition, and EN 61010-1 Part 1, or a later version of the same standards incorporating the same level of testing requirements. We recommend the enclosure be mounted with the control overlay at eye-level, on a vibration-free surface, near a grounded 120V AC power supply (230V AC where applicable), within 150 feet of any devices intended to be connected to the digital inputs. The following clearances are required for safe operation: Top: 2 inches

Left Side: 2 inches Right Side: 4 inches

Bottom: 8 inches

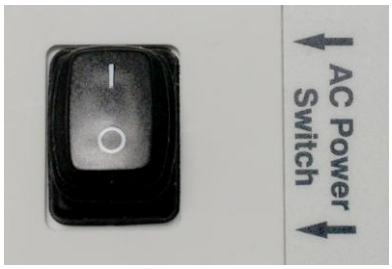
Do not install controller near sources of electrical noise such as voltage transformers, variable speed motors, radio transmitters and so forth. Environmental requirements are an ambient temperature of 0 to 49° C (32 to 120°F) with storage temperatures from -29 to 80°C (-20 to 176°F). Do not install controller where it will be subjected to corrosive fumes, excessive moisture or humidity.

Electrical Requirements

This expansion box requires an electrical supply of 110-230 VAC ±10 % (230VAC where applicable) at 50-60 Hz, and up to 8 amperes of current. This circuit should be dedicated to the Relay Expansion Box and protected with a 10 ampere fuse or circuit breaker, nearby to facilitate safe maintenance practices. All field wiring should be rated to 120 Volts or better (230 Volts or better where applicable), and to 75°C (167°F). For Cord Connected, Outdoor use, use an approved receptacle suitable for its intended use, and install according to CEC, NEC and/or local codes by qualified personnel. For Permanently connected units, please wire Line (L1) to the Black Wire, Neutral (N/L2) to the White Wire, and Earth Ground (EGND) to the Green Wire.

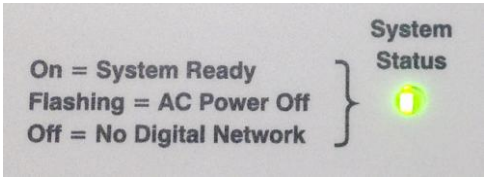
CAUTION! There are live electrical circuits inside the enclosure, even when the front panel power switch is in the OFF position! The access door to the inside of the enclosure should never be opened until power to the controller is removed! The electrical installation must only be performed by trained professionals in conformance to all national, state and local codes!

Front Panel - Power Switch



The Power Switch controls a double AC line break to the relays. During normal operation, the power must be in the on (|) position to ensure power to the relays.

Front Panel - Systems Status Lamp



The System Status LED indicates whether the Relay Expansion Box is ready to use.

If the LED is green and constant, the REB is ready to use. The AC power switch is in the On (|) position and the REB is connected to an active Triton controller.

If the LED is green but blinking, that indicates the AC power switch is in the Off position.

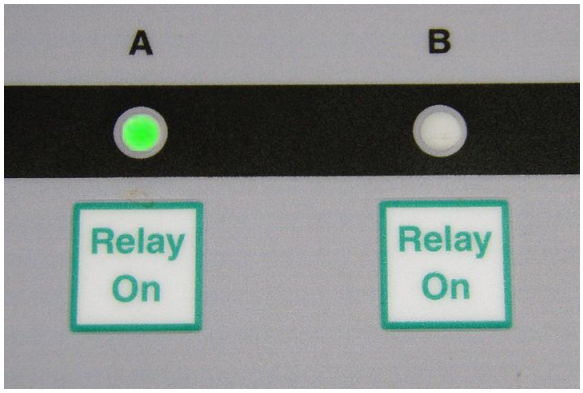
If the LED is off, that indicates the REB is not connected to an active Triton controller. Either the Modbus cable is not connected or the Triton is powered down.

WARNING! The state of the Relays in the Relay Expansion Box is NOT evident until the Modbus cable is connected to an active* Triton Controller.

We recommend you keep the AC Power switch in the Off (O) position, until you have connected the Relay Expansion Box to an active* Triton Controller (*powered on and fully booted up to the menus).

Front Panel - Relay Buttons

To test the outputs after wiring, simply press the appropriate relay button on the overlay of the REB. This momentary switch will manually turn on the relay to ensure proper wiring, but the Relay Activity LED will NOT illuminate. Pressing the relay button will NOT affect any operation mode. Remember that for AC power to pass through an activated Relay, the AC Power Switch must be in the On (|) position.



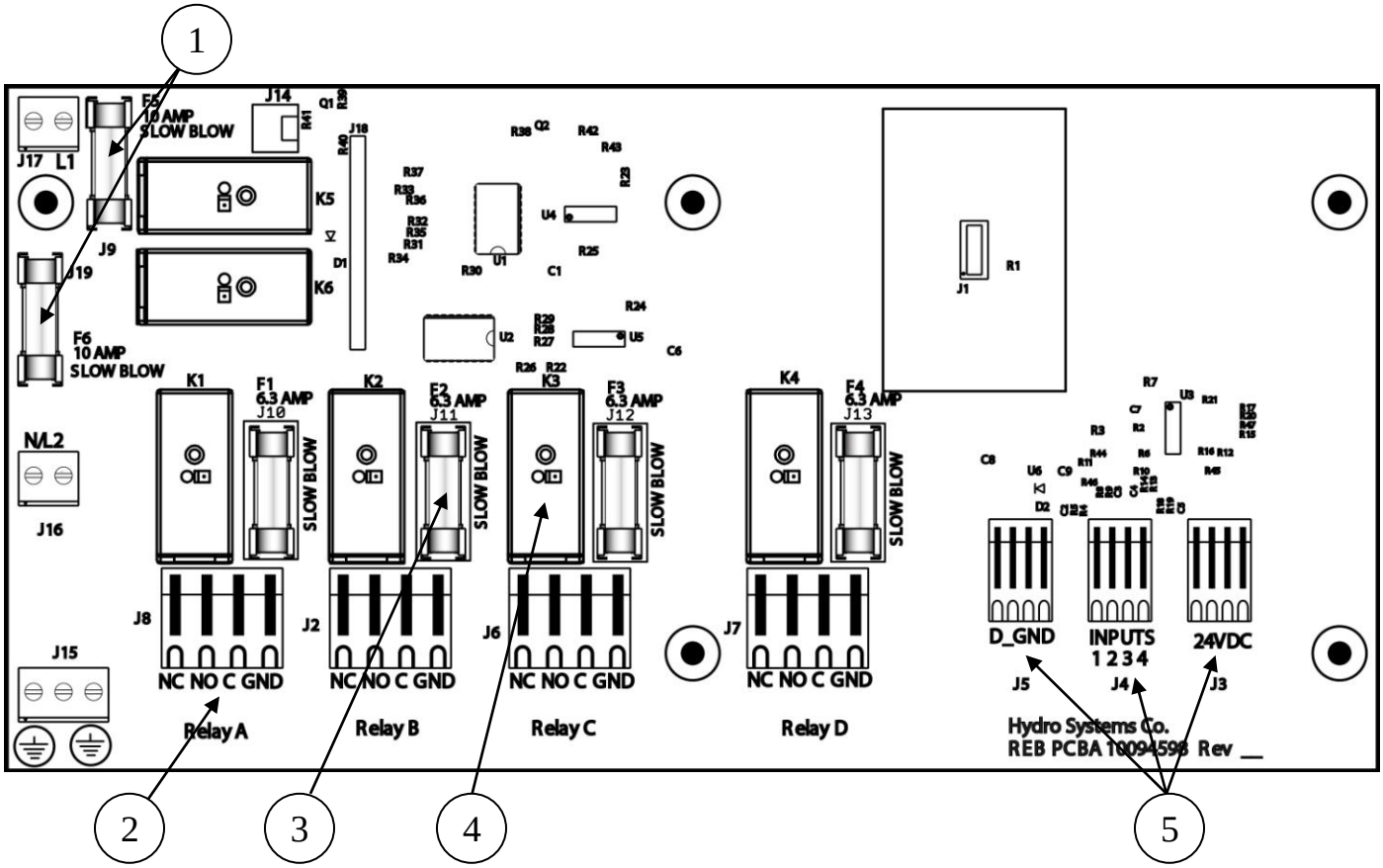
Front Panel - Relay Activity LEDs

The Relay Activity LEDs follow the same method as described in the Triton operations manual. This is to say they turn green when the relay has been activated by the controller, are un-illuminated when the relay is deactivated normally and turn red when the relay is in alarm. The Triton controls the LEDs through the Modbus digital network. The Triton will keep the state of the relay stored, in conjunction with these operations.

2 Installation

As well as mounting the enclosure, you also need to connect output devices to the electro-mechanical relays, and any input devices to the digital inputs, as well as connect the Relay Expansion Box to a Triton controller over the Modbus network.

Triton Relay Expansion Box Connection Diagram

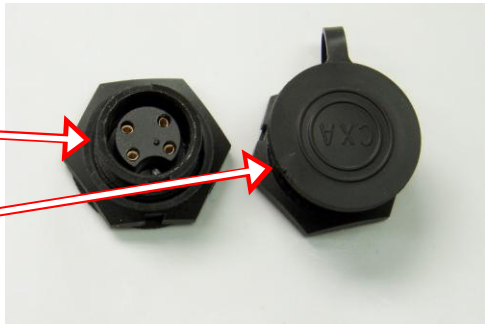


1. Main Power Fuses - 10 Amp (2)
2. Relay Connection Block (1 of 4)
3. Relay Fuse - 6.3 Amp (1 of 4)
4. Electro-Mechanical Relay (1 of 4)
5. Digital Input Connections (3 x 4)

Input Connections

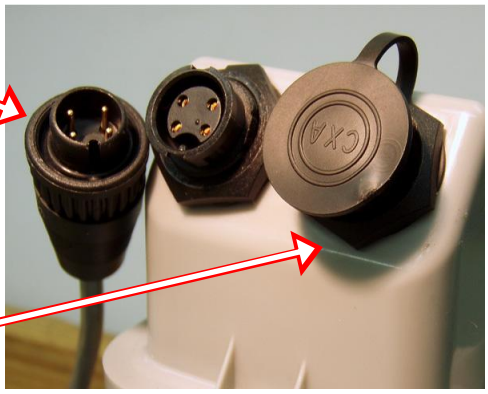
Modbus Digital Network

The Relay Expansion cannot be used independently. It will only activate relays and respond to the Digital Inputs or other Modbus devices, when it is connected to a Triton controller over the Modbus digital network.



Make sure any unused device connection has its cover tightly secured, to prevent water ingress, and corrosion and debris from damaging the connector.

The Modbus cables use a ‘keyed’ four-pin, locking connector. Push the plug cable connector, with the ‘key’ at the bottom, into the connector and turn the locking collar until you feel it secure the connection.



The Modbus cables are orderable in 1 to 150 foot lengths.

Additional Modbus sensors or additional Relay Expansion Boxes can be “daisy-chained” to the any unused Modbus connector.

<u>Installing Multiple Modbus Devices:</u>

There are five “families” of Modbus digital devices:

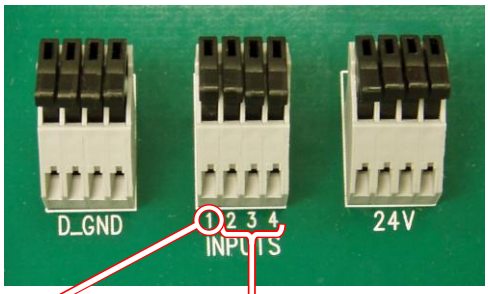
1) Conductivity Probes
2) Boiler Conductivity Probes
3) pH Probes
4) ORP Probes
5) Relay Expansion Boxes

The controller automatically searches for any new devices when it powers up, and there is also an item in the “NetwrkConfig” menu that lets you search manually for new devices. If you have only one device from each family connected to the controller, just power up the controller, and they will automatically be found during the automatic search and put in the proper menus, ready for you to use.

If you are going to install more than one device in any of the families, leave the second one (third, and so forth) un-connected during the initial power up and password entry. After checking that the first group of Modbus devices have been properly indentified, you can connect the second member of any family and use the “NetwrkConfig > Plug’n’Play > SearchForNew” menu to find the second device(s). After you see the second device(s) has been found, you can plug in the third member of any family, and so forth. If you add a Modbus device in the future, it will be automatically detected during power up, and you will not need to use the manual search method.

Digital Inputs

Each REB comes with four multi-purpose digital inputs. Only the first digital input supports the 2000 Hz signal rate, which may be needed for very high frequency Hall Effect (or Paddlewheel) water meters. The remaining three digital inputs support signal rates up to 5 Hz, for slower Hall Effect water meters, Reed Switch (or Dry Contact) water meters, the Digital Counter usage and "two-state" devices, like a float-style Flow Switch or Drum Level sensor.



2000 Hz support 5 Hz support

As shown, the digital inputs connections start with "1" on the left of the Inputs connector block and go to "4" on the right. These inputs will be added to the Tritons menus right below the eight standard Digital Inputs, numbered in sequence, for example: "Digital In 9" through "Digital In12".

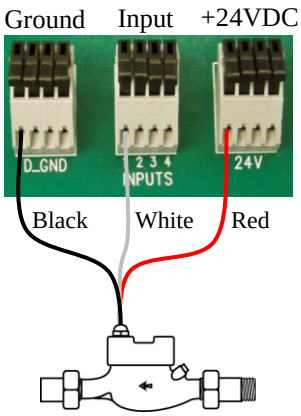
For the simpler digital inputs like Reed Switch water meters and the "two-state" devices you would connect them to the right (+24 VDC) and the center (Inputs) connectors. For Hall Effect water meters you may also need to connect to the left ground (GND) connector.

WARNING! There are live electrical circuits inside the enclosure even when the front panel power switch is in the OFF position. The power shall be removed from the controller before accessing the inside of the enclosure.

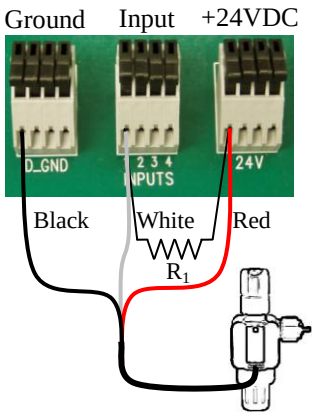
- Do not exceed 0.5 A of current (as the sum of all contacts) on the 24 VDC supply.
- 20-26 AWG wire is recommended for Digital Input connections.
- Extended wire runs should not exceed 300 feet (100 meters). Twisted pair is optional.
- Recommended to route signal wires in separate conduit, at least 6 inches from any AC voltage.

After you have connected your digital devices to these digital inputs, you need to go to the Triton Controller menu for each of them, and indicate their "Digital Usage"; whether you have connected a Flow Switch, Reed Switch water meter, Hall Effect water meter, Drum level sensor and so forth.

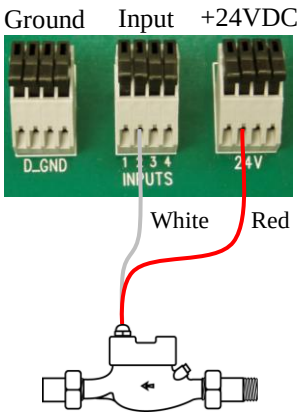
Digital Input Wiring Examples



Powered Digital Input
(Hall Effect-Paddlewheel)



Open Collector* Digital Input
R_1 = 47k - 120k Ω for 24VDC
(* Attach "pull up" resistor R_1 between power and input.)

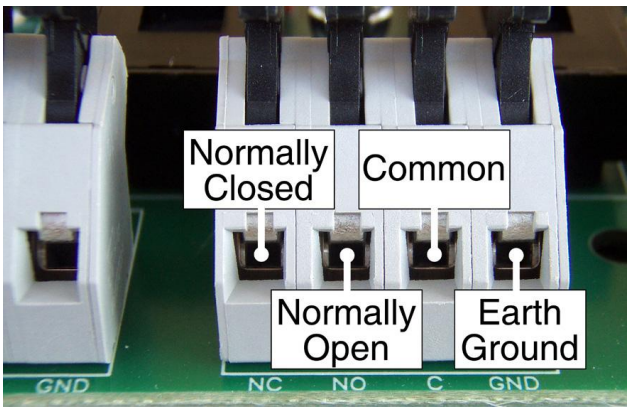


Unpowered Digital Input
Connected to 5Hz Support
(Reed Switch, Drum Level)

Output Connections

Relay Outputs

Every REB controller comes with four (4) additional relays added by connecting a Relay Expansion Box to the controller's Modbus digital network.



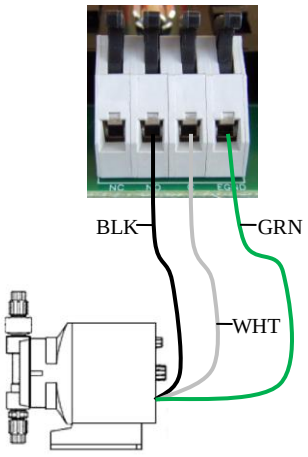
As shown in the wiring guide to the right, the relay connection blocks allow you to wire your output device using "normally open" or "normally closed" circuits. Relay Expansion Boxes with pre-installed relay receptacles (or "pigtails") are wired normally open from the factory.

Note: Unlike the Relay Outputs inside the Triton Controller the Relay Outputs in a Relay Expansion Box are always powered (wet) if the AC Power is on. To use them as unpowered (dry) relays, disconnect the AC Power cord (and remove the AC Power cord).

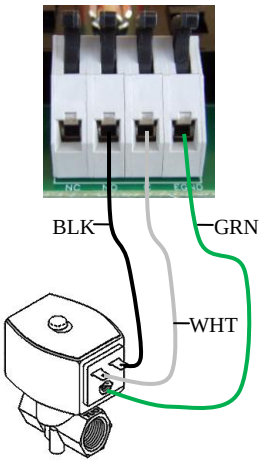
WARNING! There are live electrical circuits inside the enclosure even when the front panel power switch is in the OFF position. The power shall be removed from the controller before accessing the front door to the inside of the enclosure.

- Do not exceed 5 amperes of current through any single relay; they are fused at 6.3 amperes.
- Do not exceed 8 amperes of current as the sum of all relays; they are fused at 10 amperes.
- Recommended is 0.25 inches of exposed conductor for relay block connections.
- Recommended maximum wire run is 100 ft, to maintain 5 amperes using 18 AWG wire.
- Relays rated for continuous activation, the control software limit is 24 hours (1440 minutes).

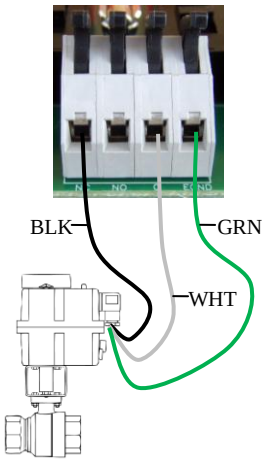
Relay Output Wiring Examples



Metering Pump
(Wired to Normally Open)



Solenoid Valve
(Wired to Normally Open)



Motorized Ball Valve
(Wired to Normally Closed)

3 Accessories and Replacement Parts

Modbus Cables

• Single Modbus communication cables (Female-Female to connect two devices.)

Modbus cable (1) - One foot in length (1’)	Part Number 10094693
Modbus cable (1) - Four feet in length (4’)	Part Number 10094694
Modbus cable (1) - Ten feet in length (10’)	Part Number 10094646
Modbus cable (1) - Twenty-five feet in length (25’)	Part Number 10096235
Modbus cable (1) - Fifty feet in length (50’)	Part Number 10096236
Modbus cable (1) - One hundred feet in length (100’)	Part Number 10096237

Main Board and Relay Fuses

Main: Two (2) 10 ampere (Schurter # 0034.3127), Relay: Four (4) 6.3 ampere (Schurter # 0034.3125).