

BB-4®/B2X™ DIESEL Dual Control Panels

Overview:

These instructions will provide the necessary information needed to complete a two panel set up with either the **WATERAX BB-4-D902** or the **B2X-D902** diesel series unit. One panel should always be installed near the pumping unit while the other at any alternate location on the apparatus to meet the desired pump apparatus specification (usually from within the truck cab). It will also serve to outline the control panel and its related components that will be compatible with the **WATERAX** unit's pre-wired **FastWire** engine harness. An installation and wiring section will provide instructions for the physical installation of the listed parts.

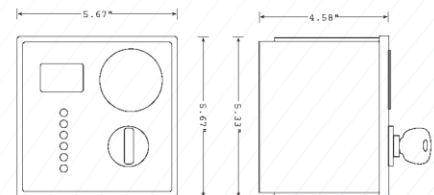
The **WATERAX** unit's pre-wired **FastWire** engine harness does provide 3 feet of extra length for the control panel being placed near the pump. Should extra length be needed for this panel and/or if extension harnesses are needed for connecting to the second panel placed away from the pump, the **WATERAX FastWire** system does provide for a 3 foot extension harness that can be ordered separately under part number 600584. For those wanting to make their own harness run from the "Y" harness connection to the second panel, adapter kits can be ordered as well: 801215 for Male Connector Kit and 801216 for Female Connector Kit. One of each kit will be needed to place at either end of the harness run. The kits include the terminals, seals, and housing components. Delphi Packard crimping tools would be needed for crimping the seals and terminals to the wire leads.

This panel offering does not include a throttle control system as some installers may choose to install only one Vernier throttle at the panel location near the pump. For those needing the throttle controlled at both panel locations, **WATERAX** offers an electric throttle actuator kit that includes two switches and the proper wiring logic to operate either switch at either location at any time to increase or decrease the engines speed.

Panel Description and Contents:

WATERAX EL240 Panel

- Engine Off/Run/Start Rotary Switch
- Battery Low Voltage Warning LED Indicator
- Tachometer Analog Gage
- Low Oil Pressure Warning LED Indicator
- High Coolant Temperature Warning LED Indicator
- Hourmeter
- Glow Plug On LED Indicator



USER INSTRUCTIONS

Included Components:

DESCRIPTION	PART NUMBER	QUANTITY
CONTROL PANEL DIESEL G1	250287	2
HARNESS "Y" FOR DUAL CONTROL PANELS	600608	1

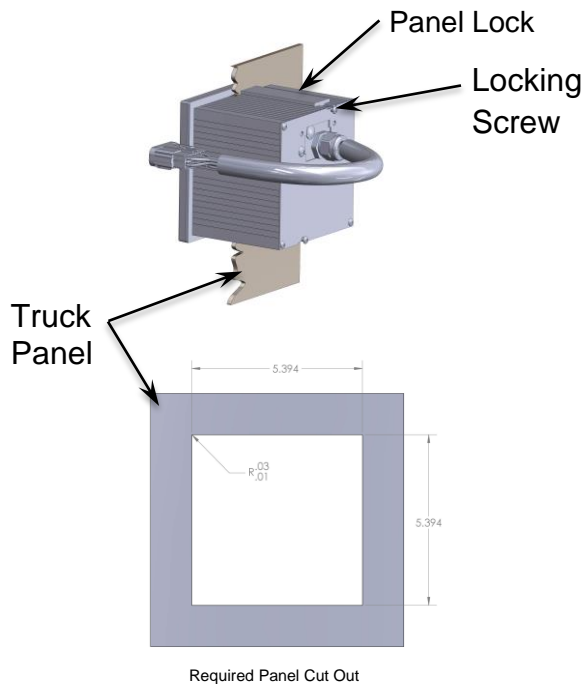


"Y" Control Harness

Installation:

Panel:

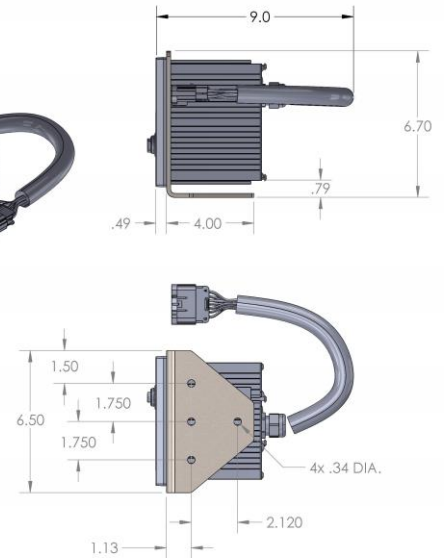
The panel is installed through a panel cut out or by an optional mounting bracket which can be purchased separately.



OR



Note: Panel bracket may be mounted at 90° increments and may also be reversed on the panel with the flange forward.



USER INSTRUCTIONS

One panel should be located in an area that will be easily accessible by the pump operator and away from moving equipment and hose lines. The second panel should be placed in a location providing ease of operation for the operator working from the second location. Both panels should be installed in such a manner as to prevent them from vibrating; remaining stable during the pumping units operation and the travel of the apparatus from one location to another.

Once the panels are mounted, determine the best routing of the panel connecting harness from the panel to the engine harness. Bends should be avoided within 3 inches of any connector in order to avoid connector seal distortion allowing moisture to enter the connector. If the 3 feet of harness run off the engine harness is not long enough, **WATERAX** offers a 3 foot extension harness (P/N: 600584) that may be connected to itself to offer the installer the needed harness length to make a proper connection.

WARNING: Keep the harness clear of high temperature surfaces and sharp edges. Contact with high temperature components such as the engines exhaust will melt the insulation off the wires creating short circuits. Sharp edges can cut through the wire insulation short circuiting the panel as well.

Once the harnesses have been laid out, they should be secured with cable ties and/or mounting clips as needed. The connectors from the panel to the extension or engine harness should then be connected.

NOTE: No sealant or lubricant should be used on these sealed connectors.

The power leads for the panel installed pump side are the 18 AWG black and red wires located as part of the engine harness. These wires will need to either run straight to the battery or connect straight to the battery cable connection points on the engine. The secondary panel (ie. cab panel) should be connected to the connector on the "Y" harness that has the additional red power lead wire. The red power lead needs to connect to a positive battery connection.

NOTE: A bad grounding point will cause the panels not to work or not work correctly. Remove paint from grounding location if it is painted to ensure a good connection.

The panel does provide for switched positive battery protection utilizing a 15 Amp fuse. Consequently, protection for the unswitched battery positive circuit is dependent on specific equipment configuration. The overload protection should not exceed 125% of the sum of all the outputs currents plus 5 Amps for the panel. Powering the panel through dedicated circuits with appropriate protection reduces the possibility of panel damage. Circuit breakers are preferred over in-line fuses for the circuit protection.

Once the power leads have been connected to the battery along with the engine and the power lead coming off the "Y" harness; and the harness connections have been made, the panels are ready to operate.

NOTE: The tachometer on the panel will require calibration. Please see the tachometer calibration section following the operation section of this document.

USER INSTRUCTIONS

Operation:

1. Rotate ON/OFF/START rotary switch from the desired panel to the right halfway between OFF and START to turn on the panel power. NOTE: All indicators will light initially as an indicator check. If any do not light at the start, that indicator is faulty.
2. Prime the pump by opening the 3/4" priming ball valve (located between pump and primer) and following one of the procedures below:
 - a. **Hand Primer** – If equipped with a hand primer, follow the hand pump manufacturer's operation instructions.
 - b. **WATERAX Electric Primer** – Push up on the momentary toggle labeled "PRIMER" on the panel until water is seen coming from the discharge of the piston pump.
3. Close the 3/4" priming ball valve once water flow is seen coming from the priming device and stop priming.
4. The glow plugs will automatically heat up for 10 seconds once the panel is turned on. The engine should be started after the pump is primed and the glow plug indicator has shut off.

Note: By priming the pump after turning the panel ON, the unit will most likely be ready to start once the pump has been primed.

5. Turn and hold the ON/OFF/START rotary switch to the right until the engine starts (release the switch once the engine starts). Engine will start and pressure will increase on the pump discharge pressure gauge. If the pressure gauge does not show any positive pressure or very little, the pump may not be fully primed (re-prime and/or check pump end manual DOCUMPE for possible checks and corrections).

Note: If the weather is cold and the engine does not start, turn the panel off and then on again, wait until the glow plug indicator goes out and then restart. This re-sets the glow plugs allowing them to heat up again.

6. Once started, adjust the engine throttle and discharge valve until the desired pump performance is obtained. Pump performance can be changed by either increasing or decreasing the pumps drive unit speed (throttling the engine up or down) or gating the discharge valves (opening or closing valves at various positions) or any combination of the two.

Note: If the engine throttle is increased and the engine RPM increases without an increase in pump pressure, the pump may be cavitating. Refer to the pump manual for troubleshooting solutions.

CAUTION: Leaving the pump running with all the discharge valves closed is called **deadheading** the pump. The pump should not be left in this mode for more than a minute. Leaving in this condition for any length of time will cause the pump to overheat and damage the pump. To avoid overheating the pump, a re-circulation line (if provided) should be opened or a discharge line left slightly open to allow fresh water to continue to enter the pump.

7. When shutting down the pump, slowly decrease the engine speed and run at low idle for around 5 minutes.
8. Turn the ON/OFF/START rotary switch off to shut the engine down and the panel off. If the other panel was turned on, make sure that panel has been turned off as well.

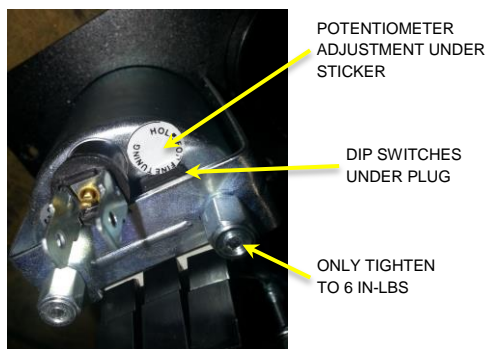
USER INSTRUCTIONS

Tachometer Calibration:

The tachometer supplied on the panel connects to the alternator signal. The tachometer has four range selections for rough calibration and an adjustment potentiometer for fine adjustment.

In order to calibrate the electronic tachometer correctly, a mechanical master tach should be used. Calibrating the tachometer will take two people; one to measure the speed of the engine with the master tach and one to adjust the tachometer until the panel tachometer reading matches that of the master tach.

The front panel of the LOFA enclosure containing the gages will need to be removed. Do not unplug any of the components as the panel will need to be turned on to calibrate the tachometer.



Pulses/Rev	SW1	SW2	SW3
6 to 11	↓	↓	↓
12 to 17	↓	↓	↑
18 to 24	↓	↑	↓

Table 1 Switch Settings



Figure 2 Detail

Back of Tachometer

The dip switches should already be pre-set for the engine. Only the potentiometer should need to be adjusted. Therefore, remove the sticker placed over the potentiometer adjustment hole and place on the side of the tach (**DO NOT throw it out as you will need to put it back over the hole**). Either remove the pump from the speed increaser or hook the pump/engine unit up to pump water. The pump **should not** be run dry for setting the tach as this could damage the pump's mechanical seal.

Once the unit is set up to run, start the engine and increase the throttle to around 2000 rpm's (using the master tach). Once the engine has reached 2000 rpm's, with a thin screw driver (1/16" or 3/32"), adjust the potentiometer left or right until the tach reads 2000 rpms to match the master tach. Once the tach is set, run the speed up and down checking the tach reading to the master tach reading and making adjustments as necessary. Once complete, shut the engine off, replace the sticker over the tach adjustment hole, and re-assemble the panel.

Should for some reason the potentiometer does not adjust the tach to accurately reflect the master tach, then the dip switches will need to be changed. The bracket holding the tach on place will need to be removed and the rubber plug removed to expose the dip switches. Adjust the dip switches to reflect 6 to 11 pulses per rev. Next, replace the plug and the tachometer bracket. Do not tighten nuts any tighter than 6 in-lbs or damage to the bracket and or gage may result. Go back and follow the directions above for adjusting the tachometer.

USER INSTRUCTIONS

Trouble Shooting:

Panel does not perform self-test:

Possible Cause	Possible Solution
Tripped Overcurrent Protection	Correct fault, replace or reset overcurrent protection.
Faulty Connection to Battery	Correct battery connections. They should run straight to the battery.

Panel performs normal self-test, engine cranks, runs, and then shuts down:

Possible Cause	Possible Solution
Only Battery LED Illuminated	Battery charge failure. Check for proper power to panel and connections to battery.
Only Oil Pressure LED Illuminated	Correct low oil pressure condition or faulty sender. If neither condition, correct wiring fault.
Only Temperature LED Illuminated	Correct overheating condition or faulty sender. If neither condition, correct wiring fault.
Only Aux LED Illuminated	Correct faulty low pump pressure switch or faulty wiring. Make sure panel switch is not installed backwards.

Panel Wiring Schematic:

The panel only includes in the wiring those items listed in the panel contents and found on the physical control panel itself.

