

# IQ Control Box

## Installation and Owner's Manual

Model: 880-051-1

880-052-1

880-058-1

880-059-1







## INTRODUCTION

RED JACKET'S IQ Control unit raises the standard for typical relay control boxes. Incorporating a microprocessor on board that continuously monitors the submersible pump provides insurance against conditions that can permanently damage the pump. In addition, the increasing number of dispensers at a station has demanded more than one pump per tank. Red Jacket's IQ Control unit can be connected to additional control boxes to allow up to four pumps per tank with demand driven sequencing. This function can be set to alternate between pumps that initiate next dispensing events to average the wear on all of the pumps in the system. The pump control circuit features non-volatile memory retention eliminating the need to recalibrate if power is lost.

## BEFORE INSTALLATION

The following defined terms are used throughout this instruction manual to indicate the presence of hazards and identify important information concerning the proper use of the product.

**DANGER** Indicates the presence of a hazard that will cause severe personal injury, death, or substantial property damage if ignored.

**WARNING** Indicates the presence of a hazard that can cause severe personal injury, death, or substantial property damage if ignored.

**NOTICE** Indicates special instructions on installation, operation, or maintenance that are important but not related to personal injury hazards.

Carefully read this entire manual along with all applicable local codes. Follow the guidelines stated in NFPA 30, 30A and 70 from the National Electric Code to safeguard the installation and operation of this equipment as well as the entire system. **Failure to follow these instructions may result in personal injury, death, or severe property damage.**

Retain this instruction manual with the equipment after installation for future use.

## INSTALLATION AND WIRING INSTRUCTIONS

**NOTICE** This equipment must be installed in a non-hazardous location.

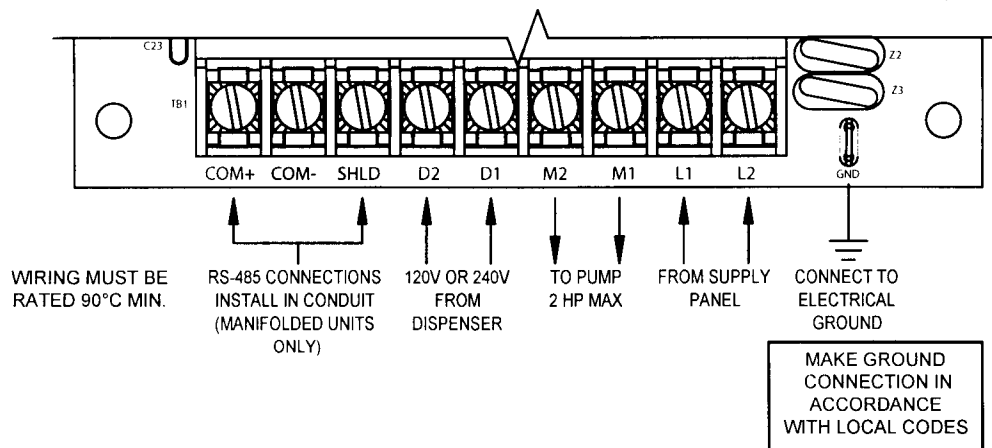
1. Locate an area that allows all of the wiring to enter through the bottom knockouts of the control box. Consider the ability to view the indicator on the side of the base and access to the reset button when choosing a location.
2. Remove the cover of the enclosure and mount the base.
3. While viewing the wiring diagram (Figure 1) or inside the enclosure lid, connect the input power L1 and L2 wires to the terminal block labeled TB1. This control box is designed to operate from 200 to 250Vac. Since the submersible turbine pump is powered by M1, M2 (and M3 terminals -058, -059 models) on the circuit board, refer to the installation and instruction manual that was supplied with the pump for correct supply voltage. Typical pump ratings are 208 to 240Vac.
4. Locate the grounding lug on the enclosure base and make an electrical ground connection to this point.
5. Motor leads M1 and M2 should be terminated to the M1 and M2 terminals on TB1. The M3 lead for models -058 and -059 should terminate to the splice provided lead from the capacitor in the lid.



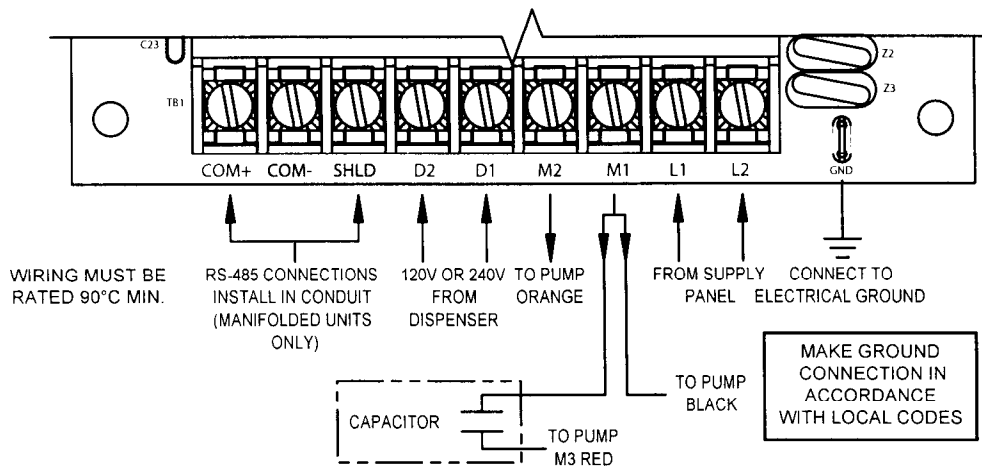
6. The D1 and D2 terminals are reserved for the dispenser signal. These terminals are not polarity sensitive and can accept 120V or 240V signals. For tandem installations it is important to wire the dispenser signal to all of the controllers.
7. Verify that Jumper J2 is in the position matching the dispenser signal voltage. J2 is factory set.
8. Jumper J3 should be in the Normal position. Use the Bypass position only if temporarily controlling pump directly from dispenser. **Pump protection monitoring is not available in this position.**
9. Installations that will operate pumps in a manifolded configuration require a two conductor, twisted pair with shield (min. 22 AWG) connected to the COM+, COM-, and SHIELD terminals of TB1. Daisy chain the communication cable to all of the controllers as shown in Figure 2. Red Jacket P/N RE400-680, Belden 9462, or equivalent cable is acceptable. The RS-485 link between pump controllers is not intended to be connected to other Red Jacket electronic equipment such as Prolink, CPT, or other ATG devices. However, it may be necessary to break communications in PLLD applications as shown in figure 4. This cable must be installed in conduit.

**Note: Approved component only. Total systems installed shall comply with all local codes.**

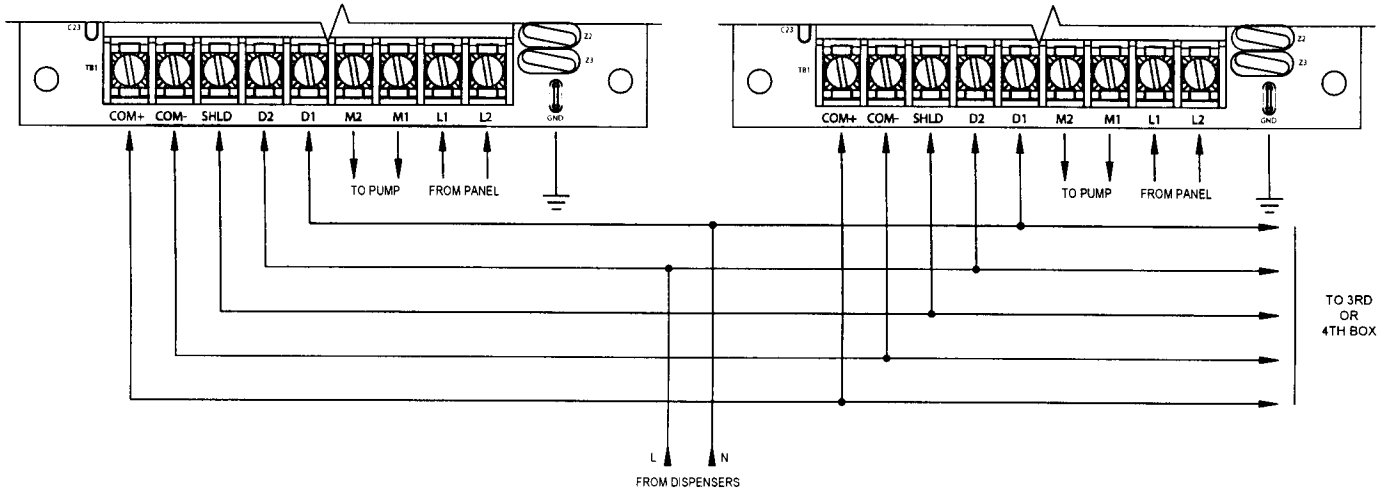
**Figure 1a -051,-052**



**Figure 1b -058,-059**



**Figure 2: Wiring Diagram for Manifolded Systems**



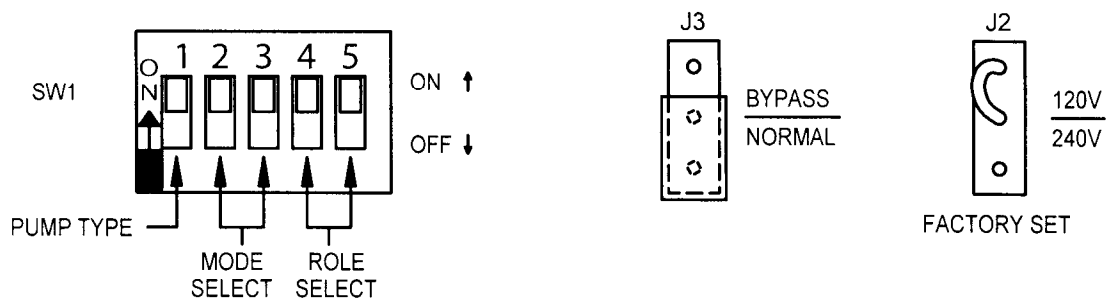
## SETUP SWITCH CHART

Each controller must have its duty established through the dip switch bank labeled SW1 on the circuit board (Figure 3). Follow the chart below to properly set each of five switches for the controller.

Pump Type	SWITCH		Mode Select	SWITCH		Role Select	SWITCH	
	1			2	3		4	5
Standard	on		Stand Alone	on	on	Unit 1	on	on
X Series	off		Manifolded PLLD	on	off	Unit 2	on	off
			Manifolded Alternating	off	on	Unit 3	off	on
			Manifolded Direct	off	off	Unit 4	off	off

**Manifolded PLLD mode allows interfacing with an ATG console. This mode has special communication wiring requirements. Refer to figure 4 for IQ with manifolded PLLD systems.**

**Manifolded Direct mode allows for a primary pump to initiate all dispensing events and secondary pumps to help when required. The control box set as Unit 1 (switch 4 & 5 on) is the Primary.**



**Figure 3**

## INITIAL CALIBRATION

Once all of the wiring is complete and the dip switch and jumpers are set the cover can be attached to the enclosure. Every controller in the system must be calibrated at this time.

**WARNING** Power to the controller should only be applied when all wiring is connected and the cover is installed.

Energize the supply voltage to the control box. At this time the indicator on the side of the enclosure should illuminate green acknowledging circuits are energized. A single red flash from the indicator signals that the controller has not been calibrated. Press and hold the button on the side of the enclosure until the indicator alternates between red and green. Release the momentary switch button. The controller will automatically start the pump and perform a calibration procedure. Once the procedure is complete the pump will shut off and the indicator will display solid green. Should a dispenser handle be lifted during the calibration procedure the controller will suspend the calibration and dispense fuel as long as the handle remains lifted. A suspended calibration procedure is indicated by alternating red and green indication through the duration of the dispense event. Once the dispensing event is over the controller will perform the calibration procedure. Anytime that the pump or dispensing equipment has been replaced perform a new calibration to update the stored information in memory.

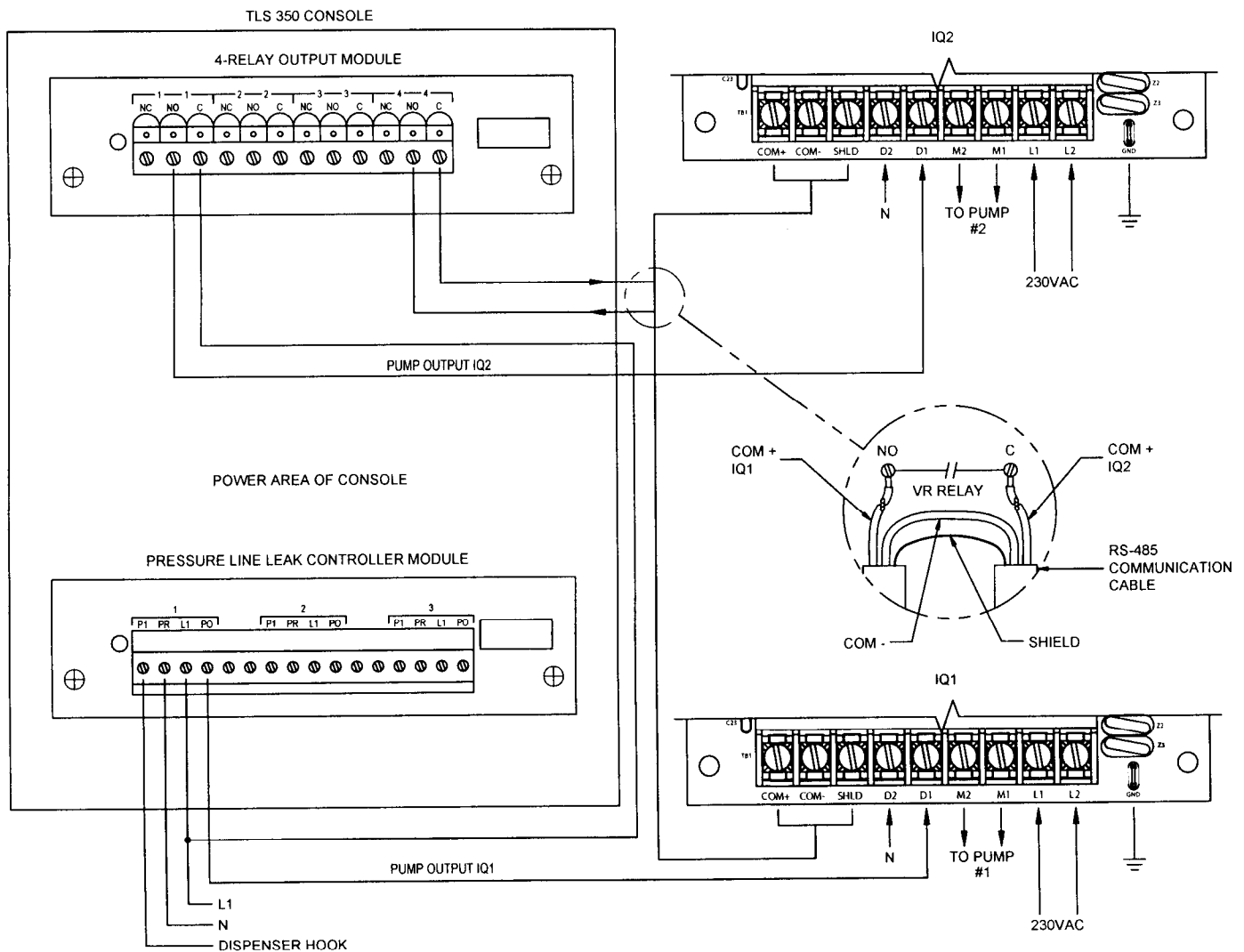


FIGURE 4: WIRING DIAGRAM FOR IQ WITH TLS350 MANIFOLDED PLLD SYSTEMS



## TROUBLESHOOTING GUIDE

### **WARNING**

If at any time during a troubleshooting procedure the enclosure must be opened, disconnect controller power prior to removal of the cover. The input terminals D1 and D2 are powered from the dispenser which is on a different circuit and may be energized even with the control box power disconnected. Remember to remove power to dispenser circuits that energize the D1 and D2 terminals of TB1 whenever removing power to service the unit.

### **Basic indicator functions:**

Solid green – controller circuit is energized  
Flashing green – pump is running

### **Description of Fault Conditions:**

The indicator on the side of the enclosure flashes the following alarms in red:

# of Flashes	Condition
1	Uncalibrated Controller
2	Overcurrent Condition – Pump Shutoff
3	Dry Run Detected – Pump Shutoff
4	Low AC Current
5	Communication/Network Error
6	Low Line Voltage < 200Vac
7	Bypass Mode
8	Extended Run Condition

**Uncalibrated Controller** - This indicates that the controller has not been ran through an initial calibration to setup all critical points for pump protection. The device will operate the pump if a dispenser signal is detected but cannot correctly monitor pump until initialized. See Calibration Section.

**Overcurrent Condition** - This fault indicates that the device detected a high current in the pump's wiring which could be either a short in the wiring between the M1 and M2 terminals to ground or a locked rotor in the pump. The following procedure will determine if wiring must be replaced or the pump must be removed and replaced.

### **DANGER**

Before starting this troubleshooting procedure disconnect all electrical power to the controller including the dispenser inputs. Failure to do so may result in severe personal injury, death, or substantial property damage.

Using an ohmmeter measure the resistance between the M1 and M2 terminals to ground. Ground can be found at the screw on the enclosure base. Both measurements should be greater than 1Meg ohm. Any measurement less may indicate a short in wiring between the control box and the submersible pump. The location of the short can be determined by breaking the wiring connections in the junction box at the pump's packer/manifold and taking ohmmeter readings on both sides of the circuit.

Refer to the manual for the extractable pump on instructions for its wiring, servicing, or replacement. Reset the controller by pressing the reset button momentarily and verify operation once condition is resolved, all wiring reconnected, and after power is reapplied.

**Dry Run** - This fault will shut off the pump since the level of the product has fallen below the suction end of the pump. The controller will automatically reset and start the pump when the next dispenser signal is received. Add fuel to the tank to restore operation.

**Low AC Current** - This fault indicates that the submersible pump will not operate. One of the following conditions are present: wire disconnected resulting in open circuit, thermal switch in motor has opened due to overheating, or the control relay has failed and the contacts will not close.

**Communication/Network Error** - 6 red flashes indicates that the controller has detected an improper dip switch setup or a missing connection on the RS 485 communication cable when set to manifolded operation. Verify that each controller has a unique unit number setting on the SW1 dip switch. Insure that all controllers have a communication cable connection unless in standalone mode.

**Low Line Voltage** - This fault will not shut off the pump but will indicate if at any time the line falls below 200V which is the minimum specified operating voltage.

**Bypass Mode** - If jumper J3 is set to bypass this mode will be displayed. Use this only to verify operation between dispenser and pump since **controller cannot provide pump protection in this mode.** Return the jumper to the normal condition to reset this alarm and have the controller monitor the pump.

**Extended Run** - Use this indicator to signal any pump that has ran for more than 6 hours continuously. This may also indicate a nozzle that has not been properly stowed after dispensing.

**Contact Red Jacket Technical Support for additional  
troubleshooting information at 1-800-777-2480**



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