

# Environment One Quad T-260 Panel Operation and Setup Instructions

The Quad T-260 Panel is an Environment One Alarm/Control panel that will control 4 individual grinder pumps. The panel consists of two independent time based alternating (T-260) controller printed circuit (PC) boards, each controlling two of the 4 pumps. Operation is similar to that of a standard T-260 system.

**Only people trained in electrical safety and on Environment One equipment should work on these controls.**

**Anytime the panel or pump is serviced, ALL power must be turned off, including any generator input or power used on the dry contact (which is a separate power supply in many cases). Never make any changes on the alarm/alternating PC boards unless power is off. Failure to turn off power could cause personal harm as well as damage to the equipment.**

## 1. NORMAL PANEL OPERATION

Only two pumps will have full line voltage applied at any time, one from each PC Board. These are referred to as the lead pumps and will be either pump 1 or pump 2, and either pump 3 or pump 4. Each PC Board will cover one lead and one lag pump. Each lead pump operates independently by its own ON/OFF pressure switch level control, allowing at any given time either no pumps, one pump, or two pumps to be operating. Each lead pump remains lead for a set amount of time (~24 hours is the factory default). Per the factory default, the panel will alternate power from the lead to the lag pumps every ~24 hours. Assuming pumps 1 and 3 are initially the lead pumps, after the alternating time this switches to pumps 2 and 4, and then back to pump 1 or 3, and so on. Refer to section 6 for information on changing the alternating time.

## 2. POWER CONNECTIONS

Make external source and pump connections per the wiring diagram attached to the panel door.

## 3. HIGH LEVEL ALARM OPERATION

In addition to the ON/OFF pressure switch, each pump also has a high-level ALARM pressure switch. At any time, any switch can detect an alarm regardless if that pump is lead or not. If any alarm switch closes due to high liquid level in the tank, the PC Board associated with that pump will cause the panel to go into alarm mode. That board will enable power to its lag pump, allowing now three pumps to operate. The alarm light and buzzer will then be delayed 3.5 minutes to prevent nuisance alarms in the event of an anticipated high flow. If the station is still in high-level alarm after the delay, the light and buzzer will activate. To silence the buzzer, push the button located on the outside of the lower left corner of the panel enclosure. If the level in the tank continues to rise and an ALARM switch on one of the pumps associated with the other PC Board closes, that board too will enable its lag pump, allowing now four pumps to operate. The alarm will clear once the liquid level in the tank subsides and the alarm switches in all pumps open (or clears). The alarm delay may be eliminated by moving the jumper on each PC boards J2 jumper to the two right pins (refer to PC board image at the end of this document). NO DELAY will cause the alarm lamp and buzzer to activate immediately upon closure of any pumps alarm pressure switch, and is typically not used for normal system operation.



## 4. MANUAL RUN OPERATION

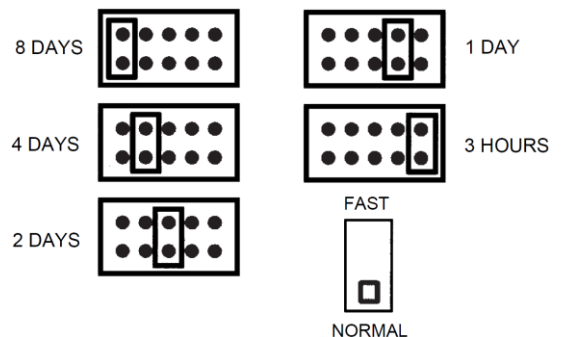
Two manual-run rocker switches are located on each PC board above the lower terminal blocks. The lead, or powered pump will run while its rocker switch is depressed. Two yellow LED's, located near the middle left of each PC board, indicate which pump currently has power (refer to PC board image at the end of this document).

## 5. BOTH PUMP OPERATION (AUTO / BOTH SWITCH)

Each PC Board has an AUTO / BOTH switch located near the middle of the board that will allow simultaneous operation of both pumps under that PC board's control (refer to PC board image at the end of this document). To enable both pumps simultaneously, slide the switch to the BOTH position. This will energize both pump contactors and supply power to both pumps. The pumps will continue to operate automatically and independently as the water level in the tank rises. In addition, both yellow LED's will be on and each manual-run switch will run its corresponding pump. **To return the panel to normal operation, slide the switch back to the AUTO position.**

This feature is also used if either pump is to be taken out of service. With the switch in the BOTH position, both contactors will be energized. If either of the pump breakers are then turned off, that pump will become de-energized.

**6. ALTERNATING TIME** (factory default is 1d, ~24 hours)  
**Always remove all power (including power to dry contact) before servicing or making any changes on the PC board.** Each PC Board determines the alternating time between the two pumps under that board's control. A series of jumper pins (J1) and a NORMAL/FAST slide switch located in the top left corner of each board can be set to achieve various alternating times (refer to PC board image at the end of this document). The jumpers can be set to select 8, 4, 2, or 1 day(s) as well as 3 hours.



In addition, a NORMAL / FAST switch can be used to test proper alternation between the two pumps; with the J1 jumper

set to the 3 HOUR position, moving this switch to FAST will cause the pumps to alternate roughly 3 minutes after power is applied at the pump and alarm breakers (~60 times faster than NORMAL). During this time the alarm lamp will light and the buzzer will sound to indicate that the panel is in a test mode and should not be left that way. The buzzer can be silenced as needed during this time. **When verification is complete, turn off all breakers, restore the switch to NORMAL and jumpers to the desired alternating time.**

### 7. SYSTEM STATUS LEDS

Six LED's for indicating various states of the system are located on each controller PC board (refer to PC board image at the end of this document). In general, the left most LED is for Pump 1 and the right most LED is for Pump 2:

**RED:** Two red LED's are located near the right-center of the PC board to indicate the alarm status of each pump.

**GREEN:** Two green LED's are located just above right-center on the PC board to indicate the running status of each pump.

**YELLOW:** Two yellow LED's are located just below left-center on the PC board to indicate the lead / lag status of the pumps. The lag pump LED will be dimly lit relative to the lead pump.

### 8. ALARM DRY CONTACTS (N.O.)

A High Level Alarm dry contact terminal block (TB4) is located in the lower left corner of the PC board (refer to PC board image at the end of this document). This connection is used when an auxiliary alarm is needed. Power is fed to one terminal, with the other terminal being the return that connects to an external device to be energized when the station goes into alarm.

There is an option to have these contacts also operate as a Power Loss High Level Alarm. In this case, even if the power fails and the station fills to the high level, the contact will still close to indicate a high level. This feature requires an external, battery operated device to function, and is intended to be used with 24-volt E/One Remote Sentry unit.

**WARNING: Power must be disconnected from the dry contact when any service work is performed on the panel, the pump or the station. The breakers within the panel have no control over the power to the dry contact.**

### 9. STARTUP PROCEDURES

The control panel should be operationally tested once the installation is complete and before the station is to go online. Failure to do so could cause damage to the product, or cause a malfunction of the system.

1. Verify all wire connections in the panel, including the incoming power to the breakers and the pump leads. Refer to the wiring information on the panel door for proper placement of all wires.

**NOTE: All panels may not be wired the same due to additional options and/or factory changes. Always refer to wiring diagram inside of panel door for correct wiring.**

2. Verify incoming power to ensure that the phases at the breakers match the panel wiring pictorial on the panel door. Also verify that the pump leads are grouped together as shown.
3. Verify incoming power voltage. The voltage must be within 10 percent of the voltage listed on the panel nameplate. If the voltage is low, a transformer must be installed to adjust it to within these limits, or the station will not run properly and may cause equipment damage.
4. With water in the station below the normal OFF level,

perform continuity tests to each core per standard T-260 service manual startup procedures. The table below shows the expected resistance values between the wires coming from each core, for both an OFF level and a High Level within the tank (high level readings are performed below). Use a multi-meter set to the 2000k (2M) Ω scale. If readings do not match those shown, troubleshooting the supply cable and pump core is required.

Extreme Pump Wiring			
Wire 1	Wire 2	Station is dry, below Turn-On	Station is full, above Alarm level
Red	Brown	OL, 1 or Open	0 (on/off closed)
Black	Brown	0.001–0.002	0.001–0.002
Yellow	Blue	OL, 1 or Open	0 (alarm closed)
Green	Red, Black, Brown	OL, 1 or Open	OL, 1 or Open

5. Open all system discharge valves.
6. Turn on all 4 Pump Breakers and the single-pole control/alarm circuit breaker, located on the right side of the group of breakers. One yellow LED should illuminate on each control PC board indicating the two lead pumps. If not, check the voltage between the top of the breaker and the incoming Neutral terminal; voltage should read within 10 percent of 1 leg of power (120V).
7. Turn off all 4 pump breakers, leaving on only the single-pole control/alarm breaker, located on the right side of the group of breakers. Both yellow LED's should turn off.
8. Fill the tank with water to the ALARM level, until ALL 4 red LED's on both PC boards turning on. **NOTE: Each RED LED will turn on independently in response to its respective alarm pressure switch in the pump. Wait for all 4 red LED's to turn on before proceeding to the next step.**
9. The panel should indicate an alarm approximately 3.5 minutes after the first alarm pressure switch / red LED activates, due to the inherent alarm delay. Verify the lamp and buzzer are both on, then push the silence button located on the outside of the lower left-hand corner of the panel enclosure to silence the buzzer.
10. Repeat the continuity tests to each core and refer to the table above for the expected resistance values.
11. Attach a clip-on amp probe to the Pump L2 wire for Pump 1. Measure the current by turning on only the Pump 1 breaker. Verify the green LED for Pump 1 illuminates, and that the amperage is between 5 and 8 amps.
12. Repeat step 10 for pumps 2-4. It may be necessary to add water to the tank to get each pump to turn on, or use the Manual Run switch as long as there is no risk of the pump running dry. Log this information as each pumps initial running parameters below for future reference.
13. Turn on all breakers.

Pump 1: S/N \_\_\_\_\_ Volts \_\_\_\_\_ Amps \_\_\_\_\_

Pump 2: S/N \_\_\_\_\_ Volts \_\_\_\_\_ Amps \_\_\_\_\_

Pump 3: S/N \_\_\_\_\_ Volts \_\_\_\_\_ Amps \_\_\_\_\_

Pump 4: S/N \_\_\_\_\_ Volts \_\_\_\_\_ Amps \_\_\_\_\_

## 10. BASIC TROUBLESHOOTING

### **DANGER, HIGH VOLTAGE!**

**Always turn off all power, including external generator and power to the dry contacts, while working in the control panel. Only personnel trained in electrical safety and on Environment One equipment should work on these controls.**

**NOTE:** Verify all wire connections within the panel before proceeding.

The following scenarios assume that the system is powered, all breakers are on, and normal operation is otherwise expected, when each of the conditions is first observed.

#### **1. No yellow LED's on either controller PC board are on.**

- a) For each pump breaker, verify the voltage between both L1 and L2 on the output of the breakers is within 10 percent of the voltage listed on the panel nameplate. If not, repair check proper breaker operation and repair as needed, or repair incoming power source.
- b) Verify the voltage between the following locations is within 10 percent of the voltage listed on the panel nameplate:  
Left PC Board - WP9 (L1) and Pump 1 Breaker L2  
Left PC Board - WP12 (L1) and Pump 2 Breaker L2  
Right PC Board - WP9 (L1) and Pump 3 Breaker L2  
Right PC Board - WP12 (L1) and Pump 4 Breaker L2

If not, verify all wires are connected as needed.

- c) Place the AUTO / BOTH switch on each PC board in the BOTH position, and verify that the voltage across each contactor coil (A1, A2) is within 10 percent of the voltage listed on the panel nameplate. If not, verify all contactor wires are connected as needed. Return the switch to the AUTO position.

#### **2. The red LED(s) illuminate, but pump(s) will not run.**

- a) For each pump contactor, verify the voltage on the 'input' side between terminals 1L1 and 5L3 is within 10 percent of the voltage listed on the panel nameplate. If not, check the wiring and power in and out of the breakers.
- b) Verify that the voltage on the 'output' of the contactors, between terminals 2T1 and 6T3 is the same as the reading taken from the input side above. If voltages do not match, replace the contactor.
- c) If the contactor is not energized, ensure the voltage is getting to the coil on the contactors by checking terminals A1 and A2, as in section 10.1.c above.

#### **3. The voltage coming to the station is lower than the voltage listed on the panel nameplate.**

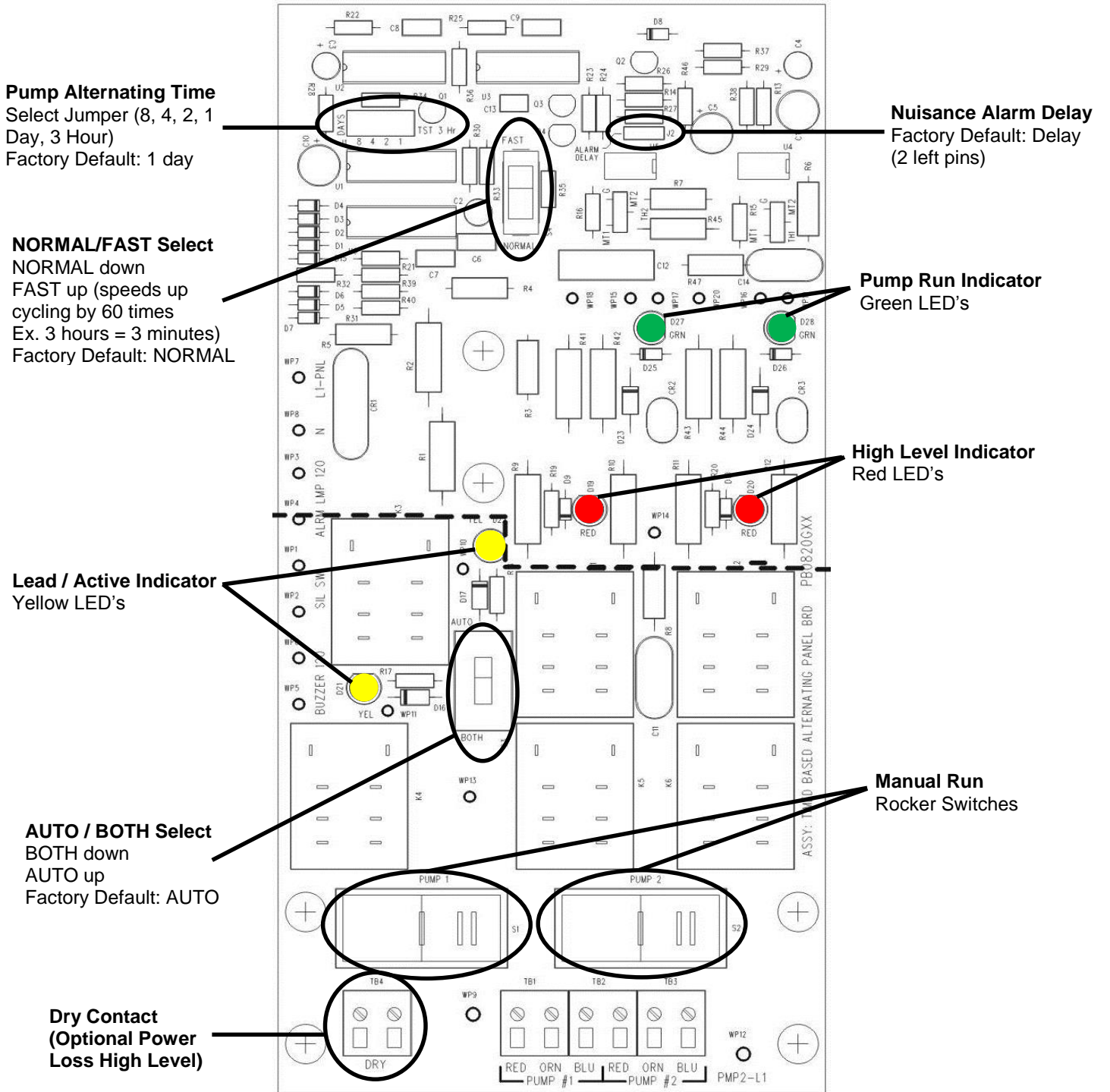
The pump will when supply voltage is 10 percent less than the voltage listed on the pump and panel nameplates. During peak usage times, voltage may drop below this, causing the pumps to not start or operate reliably. Low voltage can cause damage to the pump, panel and/or controls. It is recommended that a transformer be installed to boost the incoming supply voltage when the source is too low.

#### **4. When the alarm breaker is turned on, the buzzer sounds but there is no light. (When Silence button is pushed, the volume may decrease, but the buzzer remains on).**

Verify that the alarm lamp is not loose, or does not have a broken or blown filament or a loose electrical connection to the lamp itself.

#### **5. No pumps are in alarm, but the alarm light and buzzer are on.**

Verify that the NORMAL / FAST switch on either PC Board is in the NORMAL position. As a precaution, the panel will indicate an alarm while in FAST mode, to warn that it should not be left this way for normal operation.



*PC Board Feature Location*