FTI Air Batch Controller

Assembly, Installation, & Operation Manual

P/N 109868

EU Declaration of Conformity

CE

FTI Air hereby declares that the following machine(s) fully comply with the applicable health and safety requirements as specified by the EU Directives listed. The complete product complies with the provisions of the EU Directive on machinery safety.

This declaration is valid provided that the devices are fully assembled and no modifications are made to these devices.

Type of Device:
FTI Air Batch Controller

Model:
109852-1 and 109852-2

EU Directives:
Low Voltage Directive (2014/35/EU)
Electromagnetic Compatibility (2014/30/EU)

Applied Harmonized Standards:
EN 61000-3-2, EN 61000-3-3
EN 61010-1
EN 61326-1

Manufacturer:
FTI Air, A Division of Finish Thompson, Inc.
921 Greengarden Road
Erie, Pennsylvania 16501-1591 U.S.A

Signed,

Corey D Bowers

President

28 Dec 2018

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Table of Contents

Description

The FTI Air Batch Controller is an electronic device that controls batches of pump cycles by controlling output to a solenoid that is to be installed on the pump's air supply. The controller counts pump cycles and changes the output to the solenoid based on a user setting for number of cycles in a batch. It has the ability to control 2 pumps. There are two modes available - Batch and Run.

In Batch mode, three batch configurations can be saved for each pump. Each batch consists of 3 parameters. The parameters are number of pump cycles, repeat delay and batch count. A pump cycle is defined as one complete motion of the diaphragm from a starting point until it returns to that point, i.e. pumping of both chambers. One cycle is two strokes.

Parameter Description:

- Pump Cycles - Number of complete pump cycles the controller must count before de-energizing the solenoid located on the pump's air supply.
- Repeat Delay - Amount of time in seconds the controller will delay after the pump cycle count is reached before repeating that count. Only active if the batch count parameter below is greater than 1.
- Batch Count - Number of times the controller will repeat the above parameters. Minimum setting is 1.

In Run mode the pump can be turned on and off with the press of a button. The unit's cycle count can be used for preventative maintenance and will continue to totalize cycle counts until it is reset or reaches 1 million cycles.

Two versions are available. Both are 88-264VAC 50/60Hz input power. One version supplies output to solenoids which matches incoming power supply to the controller. The second supplies 24VDC output to the solenoids. It is important to select the correct solenoids for both the appropriate power supply and pump size. All units accept 88-264VAC 50/60Hz.

Batch or amount pumped estimates can be made using the published displacement per stroke value for each pump. Consult the pump's manual for published displacement per stroke values. NOTE: Displacement is shown per stroke, controller counts in cycles. 1 Cycle is 2 strokes. These values will serve as a starting point but variations in the installation can alter the results. Common things that affect pump output include but are not limited to inlet head, outlet head, viscosity, cavitation, suction lift, pump's prime condition, temperatures and air supply pressure and flow. It is recommended to fine tune the number of cycles setting for each application.

How the Controller Counts Cycles:

The unit counts pump cycles by detecting the presence of the carrier inside the air valve. The carrier is detected by a sensor that can be factory mounted in all FTI Air air valve end caps. For metallic air valves it senses the presence of the aluminum valve carrier. For non-metallic air valves it senses the presence of a metallic pin installed in the end of the plastic valve carrier. The counter senses the presence of the carrier and counts one cycle when the carrier moves away from the sensor and to the original end of the air valve.

When ordering pump model select letter "B" for metallic or "Q" for non-metallic for Air Valve Material. This will be a pump fitted with the required air valve components to use with the counter. Complete sensor mounted air valve assembles are available and can be installed onto existing pumps.

Safety Precautions

⚠ **WARNING**: Not for use in hazardous environments.

⚠ **WARNING**: Consult pump manual before conducting maintenance on pump or batch controller. Pump should not be operating when controller maintenance is conducted.

⚠ **WARNING**: Power source to device should be disconnected before opening enclosure cover or conducting any batch controller maintenance.

⚠ **WARNING**: Do not alter enclosure, cover, or connections. This will negate the NEMA 4X/IP65 rating. Locate unit where leaks or spray that result in wetting the enclosure are unlikely.

⚠ **WARNING**: Power cord, sensor cable, and solenoid cable from pump to counter can pose tripping hazard. Provide proper safeguards or locate equipment to eliminate risk.

⚠ **WARNING**: Solenoids valves supplied with the unit are normally closed. If pump is not running because solenoid is closed there may still be compressed air pressure on the incoming side of the solenoid valve.

⚠ **WARNING**: Pump will stop if deadheaded. If deadheaded the air supply line between the solenoid valve and pump will remain pressurized. The pump and discharge piping will also remain pressurized.

⚠ **CAUTION**: Install an emergency stop button near each pump's location to open the circuit supplying power to the controller enclosure. This will de-energize the solenoid and stop the pump after air between the solenoid valve and pump's air valve is depleted. Alternatively the power supply to each pump's solenoid can be opened by an emergency stop.

Specifications

- Operating Environment Temperature Limits: 32° - 122°F (0° - 50°C)
- Operating Environment Humidity Limit - 85% RH Max Non-Condensing
- Product Weights, including standard length power, sensor, and solenoid cables:
  - 109852 and 109852-1: 6.5lbs (3.0kg)
  - 109852-2 and 109852-3: 7lbs (3.2kg)
- Enclosure Dimensions:
  - 109852 and 109852-1: 7" x 7" x 5" (17.8cm x 17.8cm x 12.7cm)
  - 109852-2 and 109852-3: 11" x 7.5" x 5" (28cm x 19cm x 12.7cm)
- Enclosure Material: Polycarbonate or Polyester/Fiberglass
- Enclosure Rating: NEMA 4X/IP65
- 110V or 230V, 1-phase, 50/60 Hz

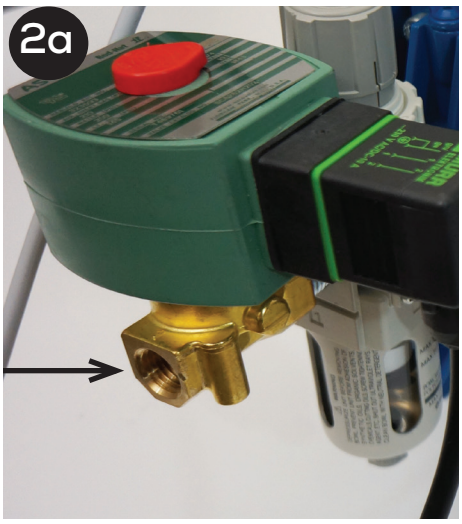
Installation

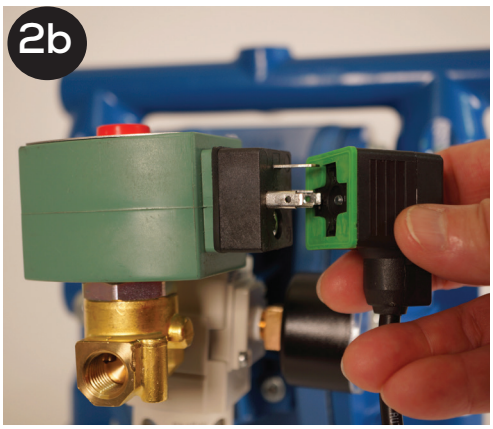
The AODD pump requires a couple unique components to use all functions of the batch controller. These can be ordered with the correct designations in the pump model number or separately allowing the controller to be used on an existing pump. Metallic air valves require a cap with sensor installed. Non-metallic air valves require a cap with sensor and carrier with metallic pin. All pumps require a solenoid on the pump's air supply. For the best functionality locate the solenoid as close as possible to the pump's air valve. The solenoid pipe size should match or be larger than the pump's air valve inlet air pipe size.

Pumps ordered with the cycle counter from the factory:

1. Thread the plug end of the sensor cable into the sensor mounted in air valve cap installed on the pump. See picture 1a & 1b.

2. Install solenoid valve on pump's air supply, note flow direction marked on solenoid valve body, picture 2a. Connect air supply to incoming side of solenoid valve. Connect solenoid DIN connector to solenoid, picture 2b. Connect the M8 connector on the other end of the solenoid cable to the receptacle on the bottom of the enclosure, picture 2c.





3. Plug controller into power source. Follow on screen prompts to begin using controller. See detailed screen explanation in the next part of this manual for complete programming instructions.

Retrofitting existing pumps to be used with the cycle counter:

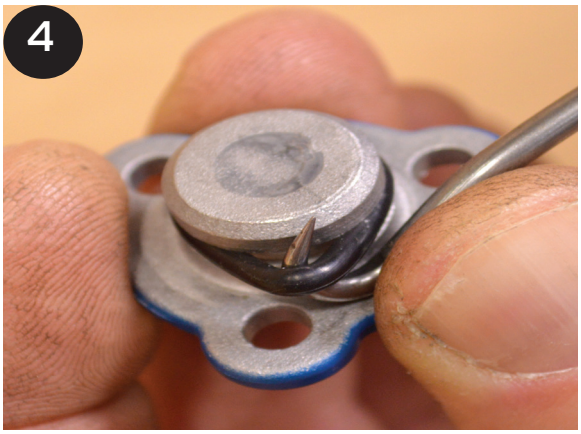
The easiest way to retrofit an existing pump is to order a new air valve (item 5 in Part Number diagram) with a proximity sensor already installed and replace the existing air valve. See replacement air valve kit installation instructions in the current pump manual.

Retrofitting existing pumps to be used with the cycle counter:

Retrofitting an existing aluminum air valve:

Order a new valve cap (item 2 in Part Number diagram) with proximity sensor installed.

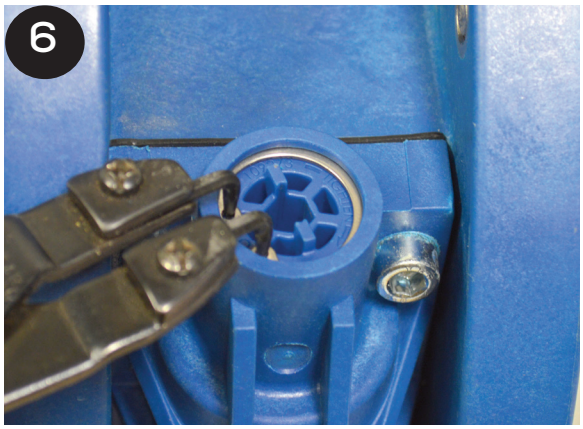
1. To replace the valve cap (item 2), remove the (3) button head cap screws using a 3 or 5 mm hex wrench. See picture 3.
2. Remove the valve cap o-ring and install on the new valve cap with sensor. See picture 4.
3. Install the valve cap with o-ring sensor onto the air valve, tighten and torque the valve cap screws. See pump assembly, installation & operation manual for torque settings.

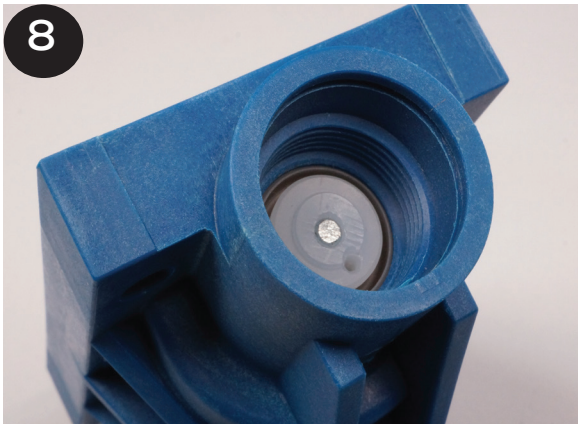


Retrofitting an existing non-metallic air valve:

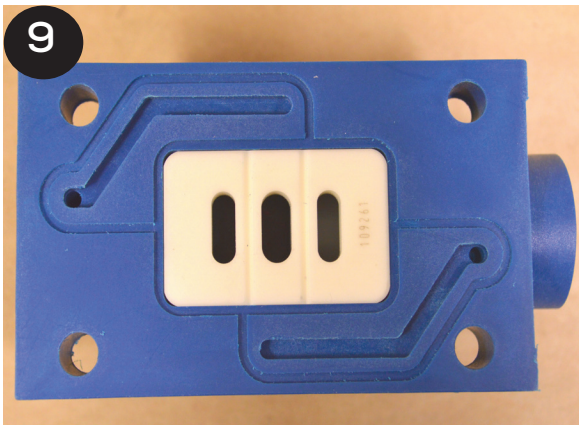
Order a new valve cap (item 2 in Part Number diagram) with proximity sensor installed & new valve carrier (item 3 in Part Number diagram) with metallic pin or Valve cap and carrier kit (item 4 Part Number diagram).

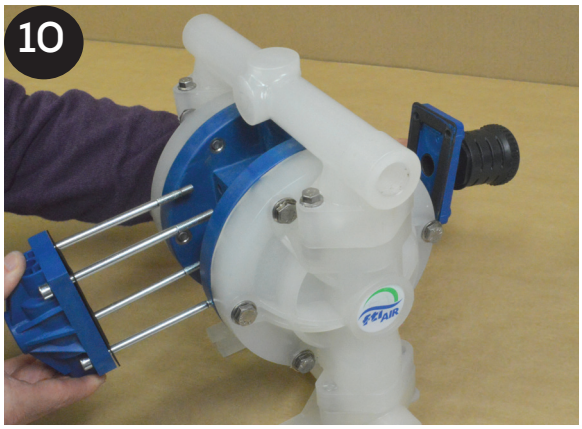
1. To replace the valve cap and carrier (items 2 & 3) remove the air valve assembly (item 5) by removing the (4) socket head cap screws that attach the valve body to the muffler plate with a 5 or 6 mm hex wrench. Pull the valve body and gasket off the front of the center section and the muffler plate gasket, muffler plate and muffler off the back. See picture 5.
2. Remove the valve cap (item 2) from the air valve assembly (item 5) by removing the retaining ring with a snap ring pliers and then unthread the valve cap using an 8mm hex wrench. See picture 6. Remove the valve cap o-ring and install on the new valve cap with sensor. See picture 7.
3. Remove the valve carrier (item 3) from the air valve assembly (item 5) by removing the air valve gasket, white valve plate and black slide valve from the air valve assembly. Push the valve carrier out by hand.

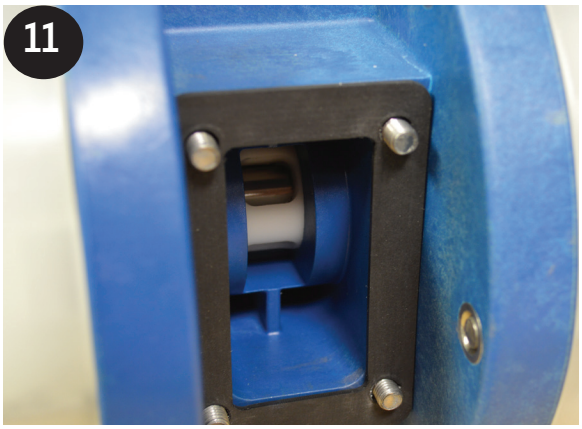


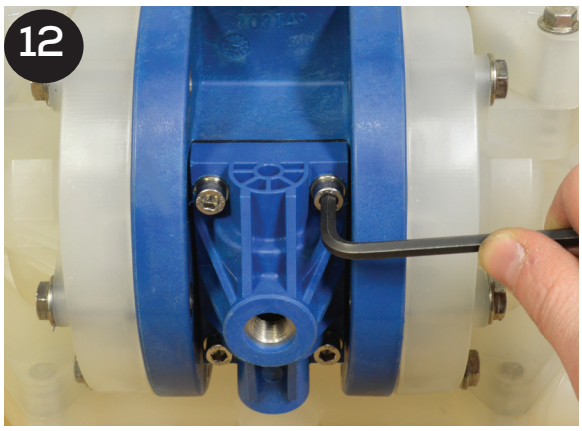


4. Install the new valve carrier with metal pin into the air valve assembly making sure the metal pin faces the valve cap with sensor. See picture 8. Install the flat face of the black slide valve into the pocket of the valve carrier (item 3) so that the square cut out on the slide valve faces the smooth polished side of the white valve plate. See picture 9.
5. Insert the (4) cap screws & washers through the valve body and gasket and place onto the center section. Ensure the black slide valve and white valve plate are in place and the valve sits flat on the center section. See picture 10.
6. Place the muffler gasket over the (4) cap screws on the back side of the center section followed by the muffler plate and muffler. Tighten and torque the (4) cap screws into the muffler plate. See pump assembly, installation & operation manual for torque settings. See picture 11 & 12.



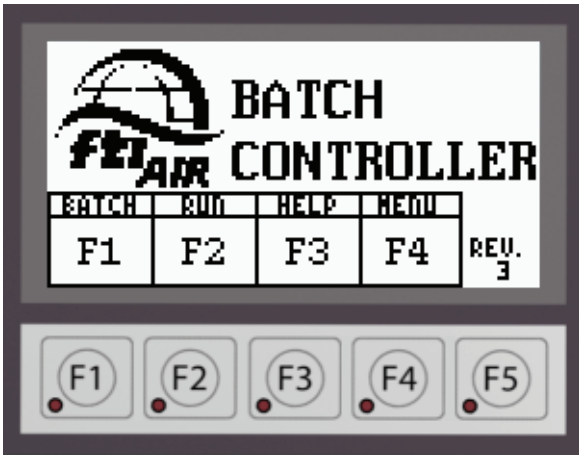






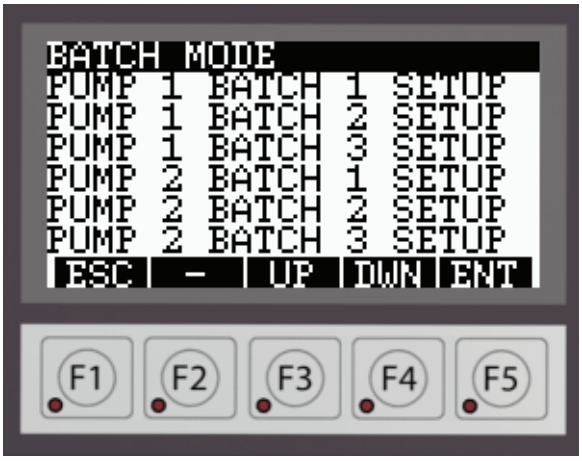
Operation

The F1 through F5 buttons will be used to execute the commands displayed above each key. The image to the right is the main menu. It is the first screen displayed when power is supplied to the unit.

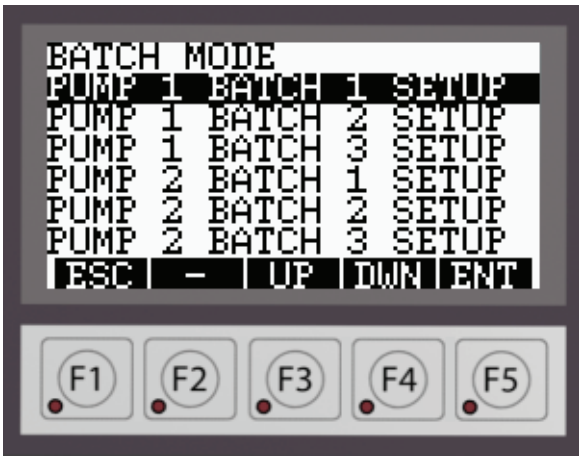


Batch Mode:

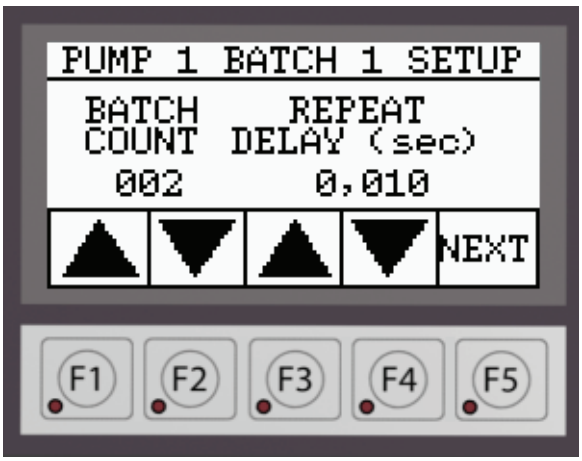
To set up batch mode select F1 from the main menu. A list of all batch options will appear. The first item, "BATCH MODE", will take you to the screen to control start/stop of pre-programed batches. The remaining options are to program batch parameters.



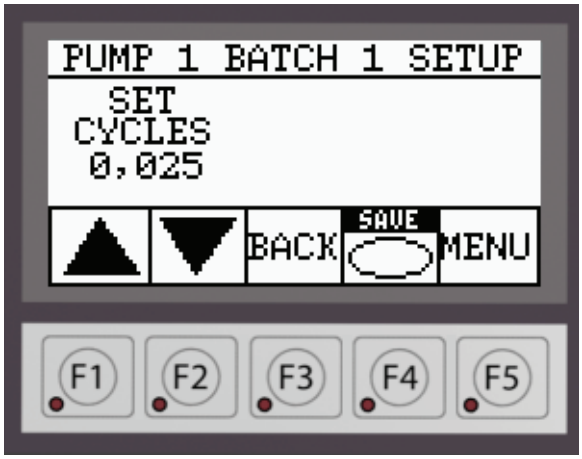
To program a batch. Navigate down to "PUMP 1 BATCH 1 SETUP" by pressing F4 then F5 for enter.



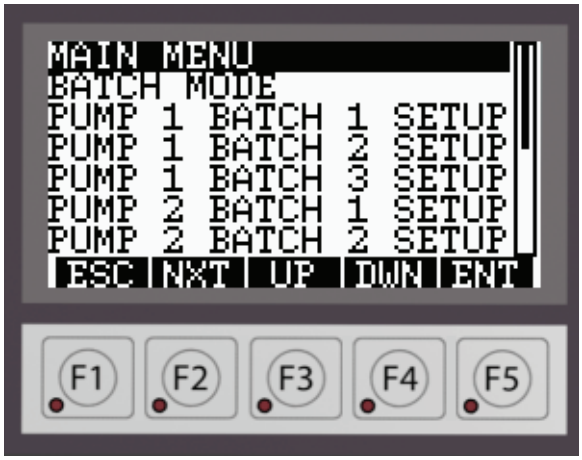
To set the batch count and repeat delay use the F1 through F4 keys to raise and lower each setting until the desired number is set. "BATCH COUNT" is the number of times the program will repeat the number of pump cycles which is set on the next screen. The minimum setting is 1. "REPEAT DELAY (sec)" is the length of time in seconds that the controller will delay before energizing the solenoid valve to start the next batch count if the setting is greater than 1. When desired values are set press F5 to go to the next settings screen.



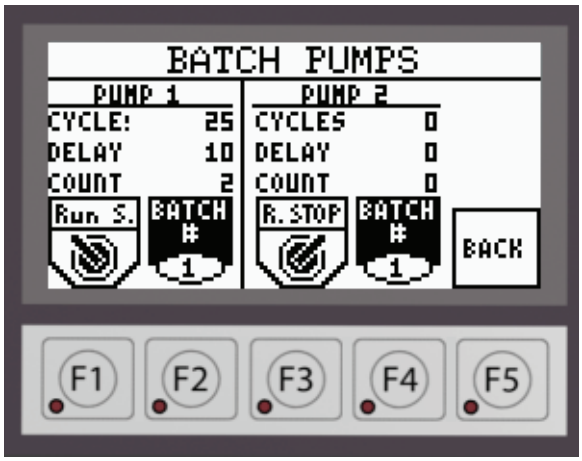
Repeat the setting procedure to set the number of pump cycles in each batch. When desired value is displayed press F4 to save setting. Pressing F3 will navigate to the previous screen to change the batch count or repeat delay. Press F5 when finished setting up "PUMP 1 BATCH 1".



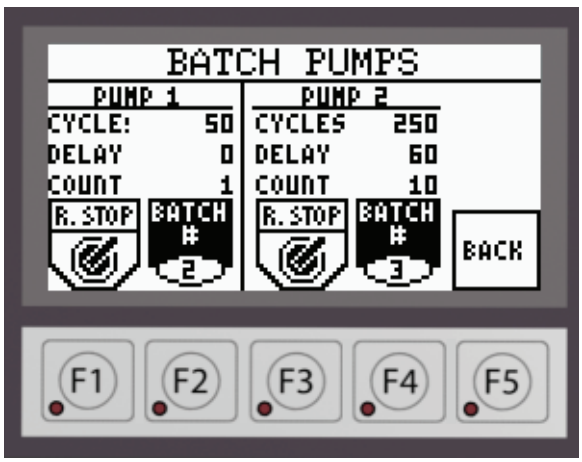
The remaining batches can be set by following the procedure above. When the desired batches are programed navigate to "BATCH MODE" to control on/off of a batch.



Pressing F1 will energize the solenoid for Pump 1. As the pump runs the cycles will count down to zero. When at zero the solenoid will de-energize which shuts the air supply to the pump and the delay counter will begin to count down if more than one batch count is set. When the timer reaches zero the solenoid will energize and the pump will run again counting down until the cycles is zero. This process will repeat until the batch count reaches zero.

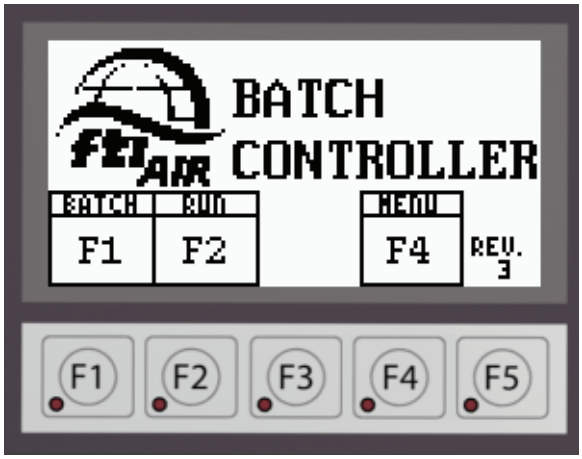


Pressing F1 or F3 at any time will stop the batch for the respective pump. Pressing F2 or F4 will toggle through all the saved batches allowing you to set the active batch from this screen.

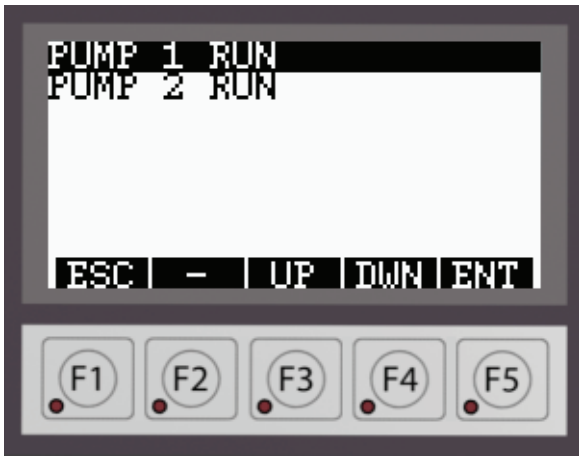


Run Mode:

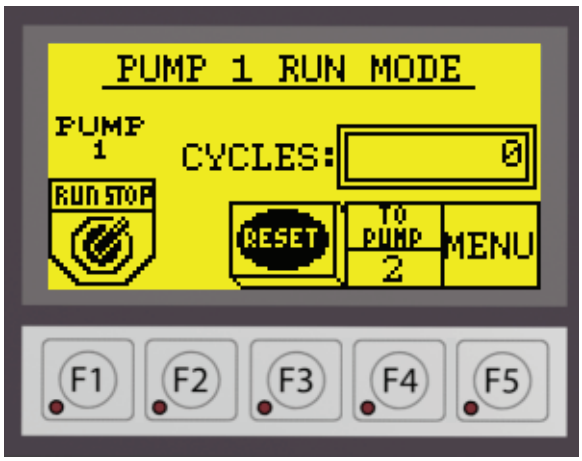
To enter “Run Mode” press F2 at the main menu.



Navigate up or down using F3 or F4 to highlight the pump you wish to start/stop. Press F5 when highlighted.



At each pump’s Run Mode screen you can start/stop the pump by pressing F1, reset the cycle count by pressing F3, toggle to Pump 2’s Run Mode screen by pressing F4 or go back the Run Mode or Main Menu by pressing F5.



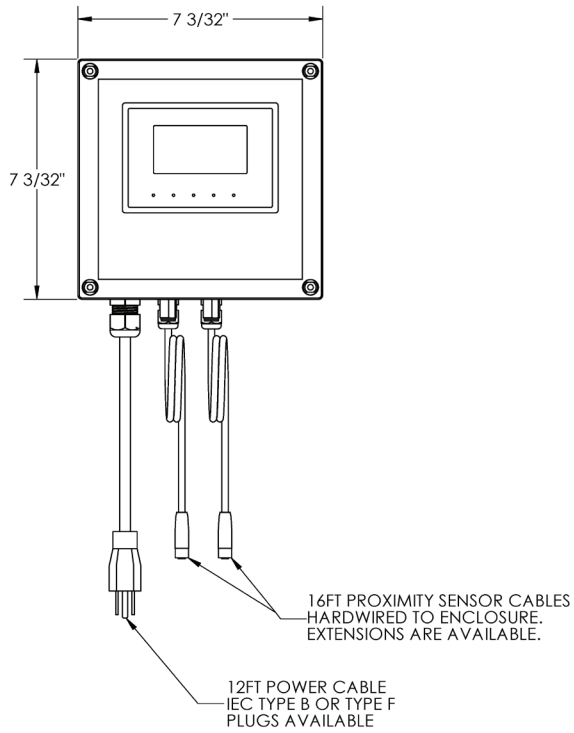
Functionality Notes

1. If a pump is currently running in batch or run mode and the pump is selected to start in another mode the pump will switch to the latest selected mode shutting off the previously started mode.
2. If a batch is running and the batch number selector is pressed to change the batch number the pump will begin running the new batch that is displayed but the cycle count is not reset. If the new batch has a set value less than what the old batch reached the batch will be considered complete and the solenoid will be deenergized. If the values are greater the solenoid will remain energized until the values of the new batch are met.
3. Negative cycle counts will be displayed if the pump cycles after the solenoid is de-energized. This can occur if the solenoid is not located directly on the air inlet of the pump or will occur depending on where the pump is running on its curve and how much air is between the solenoid and air valve. This number can be subtracted off the cycle count setting for accurate batching.

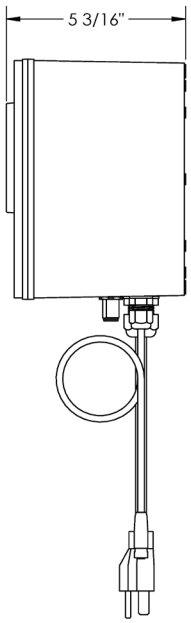
Dimensions

AC IN/AC OUT (for part numbers 109852 & 109852-1)

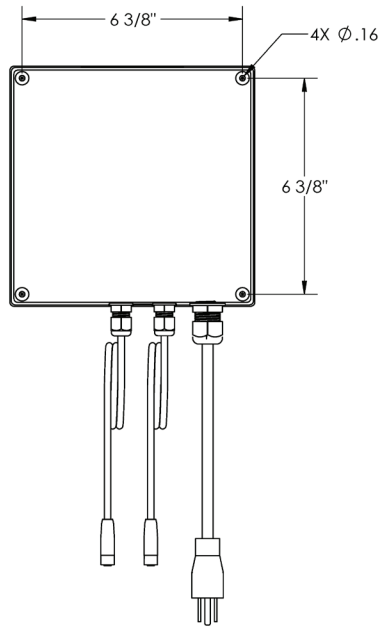
FRONT



SIDE

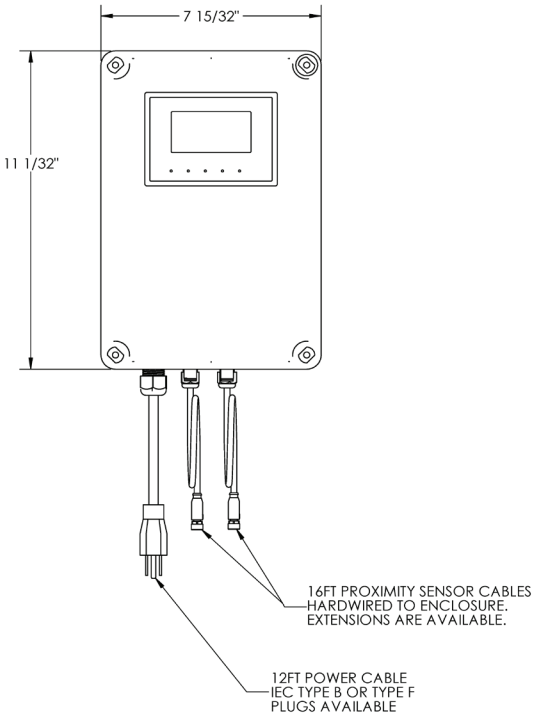


BACK

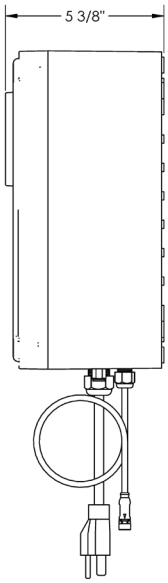


AC IN/DC OUT (for part numbers 109852-2 & 109852-3)

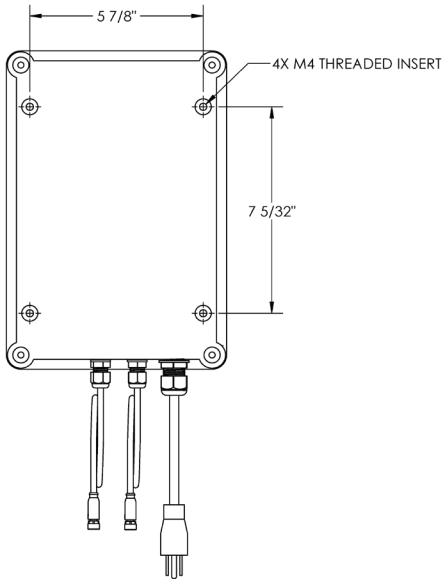
FRONT



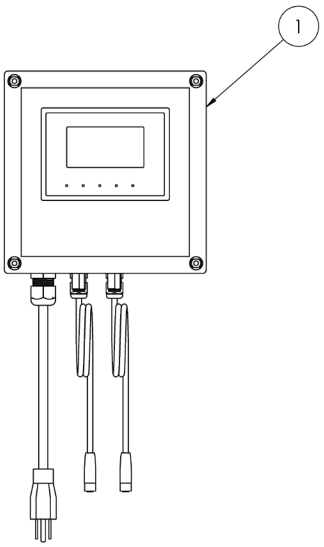
SIDE



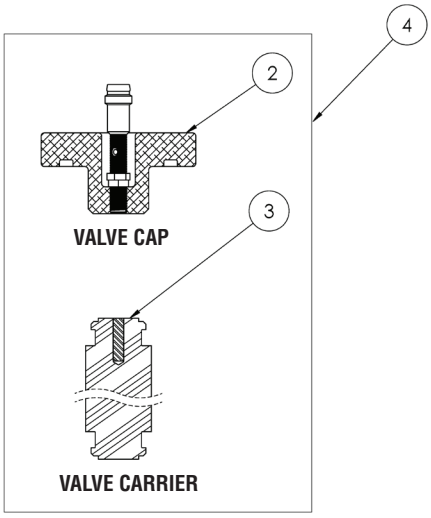
BACK



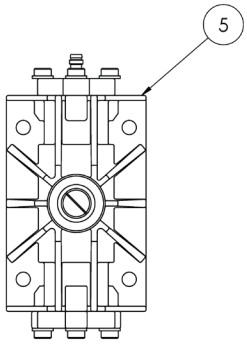
Part Number Diagram & Matrix



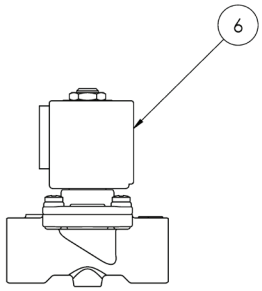
BATCH CONTROLLER



VALVE CAP & VALVE CARRIER



COMPLETE AIR VALVE ASSEMBLY



SOLENOID KIT

ITEM	PART NUMBER	DESCRIPTION
1	109852	BATCH CONTROLLER AC-AC, IEC TYPE B PLUG
	109852-1	BATCH CONTROLLER AC-AC, IEC TYPE F PLUG
	109852-2	BATCH CONTROLLER, AC-DC, IEC TYPE F PLUG
	109852-3	BATCH CONTROLLER, AC-DC, IEC TYPE B PLUG
2	109798	VALVE CAP, FT05 ALUMINUM W/ SENSOR
	109798-1	VALVE CAP, FT10 ALUMINUM W/ SENSOR
	109798-2	VALVE CAP, FT15/20/30 ALUMINUM W/ SENSOR
	109798-3	VALVE CAP, FT05 PLASTIC W/ SENSOR
	109798-4	VALVE CAP, FT10 PLASTIC W/ SENSOR
	109798-5	VALVE CAP, FT15/20/30 PLASTIC W/ SENSOR
3*	109808	VALVE CARRIER, FT05 PLASTIC FOR COUNTER/BATCH
	109808-1	VALVE CARRIER, FT10 PLASTIC FOR COUNTER/BATCH
	109808-2	VALVE CARRIER, FT15/20/30 PLASTIC FOR COUNTER/BATCH
	109808-3	VALVE CARRIER, FT025 PLASTIC FOR COUNTER/BATCH
4*	109809	VALVE CAP AND CARRIER, FT05 PLASTIC FOR COUNTER/BATCH
	109809-1	VALVE CAP AND CARRIER, FT10 PLASTIC FOR COUNTER/BATCH
	109809-2	VALVE CAP AND CARRIER, FT15/20/30 PLASTIC FOR COUNTER/BATCH
	109809-3	VALVE CAP AND CARRIER, FT025 PLASTIC FOR COUNTER/BATCH
5	109838	AIR VALVE W/ SENSOR, FT05 ALUMINUM
	109838-1	AIR VALVE W/ SENSOR, FT10 ALUMINUM
	109838-2	AIR VALVE W/ SENSOR, FT15/20/30 ALUMINUM
	109838-3	AIR VALVE W/ SENSOR, FT05 PLASTIC
	109838-4	AIR VALVE W/ SENSOR, FT10 PLASTIC
	109838-5	AIR VALVE W/ SENSOR, FT15/20/30 PLASTIC
	109838-6	AIR VALVE W/ SENSOR, FT025 PLASTIC

ITEM	PART NUMBER	DESCRIPTION
6	109796-10	SOLENOID KIT, 1/4" 120VAC/60HZ, DIN CONNECT
	109796-11	SOLENOID KIT, 1/4" 220VAC/50HZ, DIN CONNECT
	109796-12	SOLENOID KIT, 1/4" 24VDC, DIN CONNECT
	109796-13	SOLENOID KIT, 1/2" 120VAC/60HZ, DIN CONNECT
	109796-14	SOLENOID KIT, 1/2" 220VAC/50HZ, DIN CONNECT
	109796-15	SOLENOID KIT, 1/2" 24VDC, DIN CONNECT
	109796-16	SOLENOID KIT, 3/4" 120VAC/60HZ, DIN CONNECT
	109796-17	SOLENOID KIT, 3/4" 220VAC/50HZ, DIN CONNECT
	109796-18	SOLENOID KIT, 3/4" 24VDC, DIN CONNECT
* FOR NON-METALLIC VALVES ONLY, METALLIC VALVES USE STANDARD CARRIERS.		

Troubleshooting

1. Count displays negative cycles or actual pump cycles does not match setting:
   - This is normal and will occur if solenoid is not located directly on pump's air inlet. It may still occur if solenoid is properly located depending on where the pump is running on the pump curve.
   - Take into account the extra (negative) cycles and subtract off cycle settings if desired.
2. Pump is running but controller is not counting:
   - Ensure sensor or sensor cable has not become loose or damaged. The face of the sensor must be flush to .020" (0.5mm) maximum from face of end cap.
3. Pump is not running:
   - Check batch or run settings to ensure solenoid is to be energized.
   - Check solenoid for failure.
   - Consult pump assembly, installation, and operation manual.
4. Batched parameters reset:
   - This is a normal occurrence if power is removed from the controller for more than 72 hours. Programs are retained on internal capacitor.