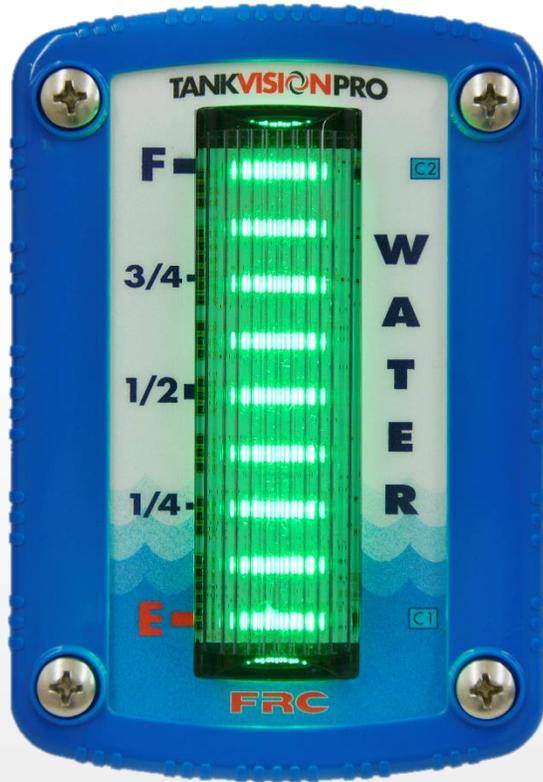


UBEC 1AT AUTO TANK Fill System

08899155

Installation, Operation, & Setup Instructions



Rev170906-EB-FRC

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PRODUCT SAFETY INFORMATION

- All personnel who may be expected to operate this equipment must be thoroughly trained in its safe and proper use.
- Become thoroughly familiar with the hydraulic characteristics of this equipment.
- Always open and close valves slowly to avoid water hammer.
- After each use, and on a scheduled basis, inspect equipment per instructions in the maintenance section.
- Keep fingers and hands clear of moving parts.
- Disconnect power before servicing and electric valve or electric valve controller.
- Use only mild dish soap to clean the controller.
- Any modifications to the electrical will destroy the NEMA 4 rating and void warranty coverage of the enclosure and all components within.



Important: Before installing and operating this equipment, read this manual thoroughly. Proper installation is essential to safe operation.

SYSTEM INFORMATION:

SERIAL NUMBERS: _____

KIT DETAILS:

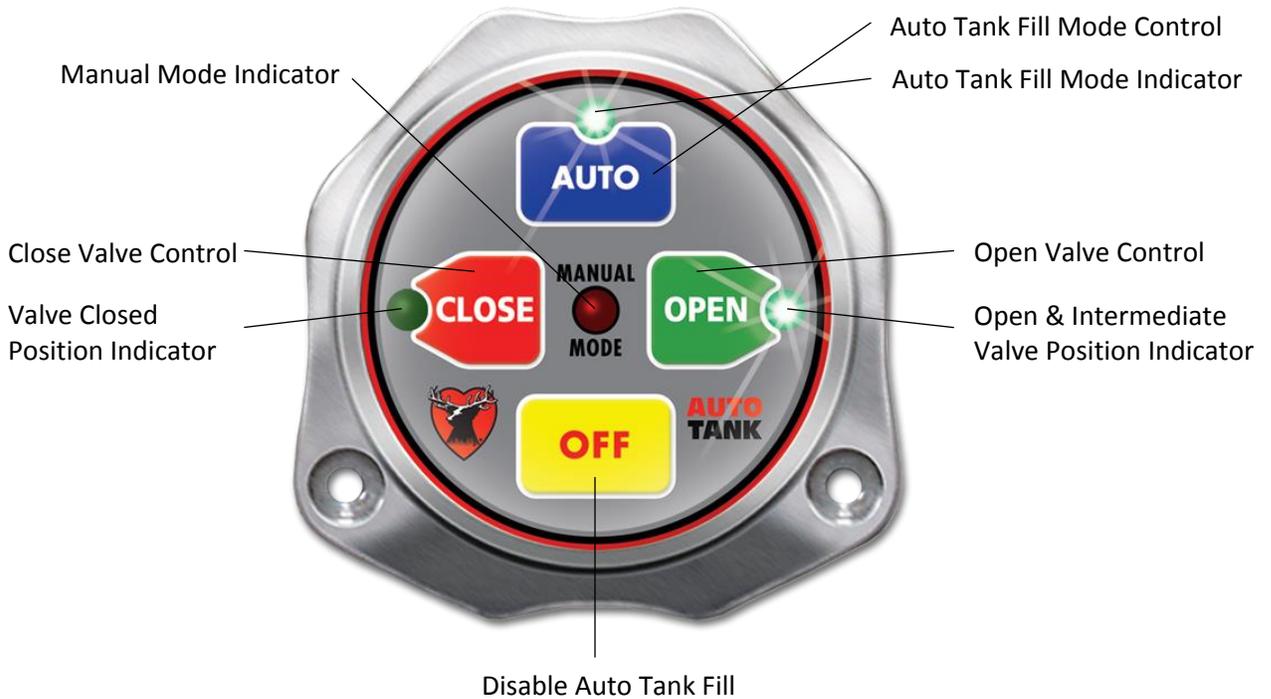
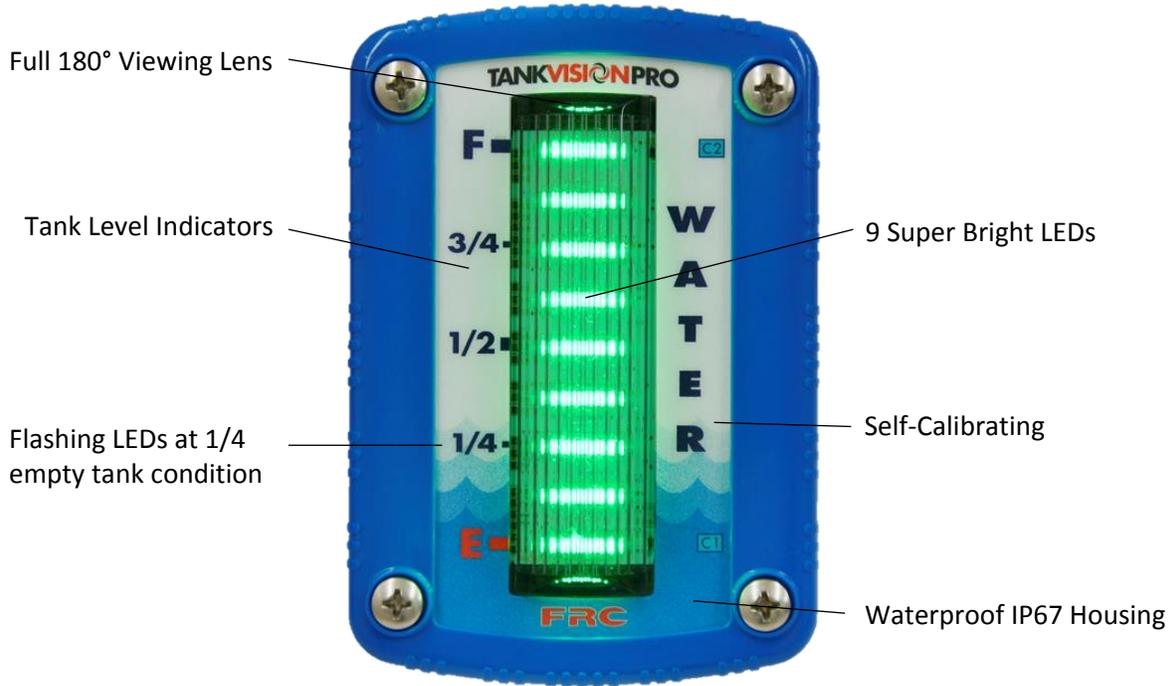


Figure 1: AUTO TANK System Display & Control Modules

OVERVIEW

The AUTO TANK System is designed to work with around-the-pump foam systems where there is a need to fill the water tank and maintain low pressure at the pump intake while pumping foam.

Normal operations would require pressurized water from a hydrant or pumper in relay to be connected to the input of the pump. During foam operations excessive pressure at the input side of the pump can cause the foam system to operate at partial capacity or fail to inject foam. This limits foam system operations to the amount of water in the tank. When pressurized supply water flow is controlled the AUTO TANK system, the water volume in the tank of a pumper is automatically maintained. Low pressure water is available at the input side of the pump continuously to extend foam system operational capabilities

Features

- Maintains tank water volume between 50% and 95% full (P/N 08899155)
- Controls water flow for any GPM rate
- For use with tanks over a 500 GPM capacity
- Self-Calibrating for any shape or size tank
- Automatic or manual control

Components

- TankVision Display Module
- AUTO TANK Control Module
- Pressure Sensor
- Elkhart E3F Unibody Control Valve (Sold Separately)
- All necessary component harnesses

TankVision Display Module

The tank volume display module is waterproof and has dimensions of 4.69 inches high by 3.25 inches wide. An output signal from a pressure sensor mounted on the tank is input to the display module. It is processed and the volume of liquid in the tank is shown on the 9 LED display. An output from the display module controls the opening and closing of the control valve when the automatic mode is selected.

AUTO TANK Control Module

The control module provides an interface between the TankVision display module and the valve. It has four push buttons that allow the operator to select the mode of operation. The control module also has automatic tank fill and manual valve control indicators. The open and close LEDs provide valve position feedback.

The controller for P/N 08899155 stays in manual mode, automatic mode, or off until changed.

Pressure Sensor

The pressure sensor is mounted on a side of the tank near the bottom. It provides a signal that is proportional to the volume of liquid in the tank to the input of the primary display module. The electrical connector is waterproof and molded into the pressure sensor housing.

The pressure sensor is used on tanks between 1 and 10 feet in vertical height.

Control Valve

The E3F electric actuator is utilized for control of the tank fill valve. The AUTO TANK control module communicates to the E3F electric actuator via the J1939 data bus. It can be mounted on any standard sized Unibody valve.

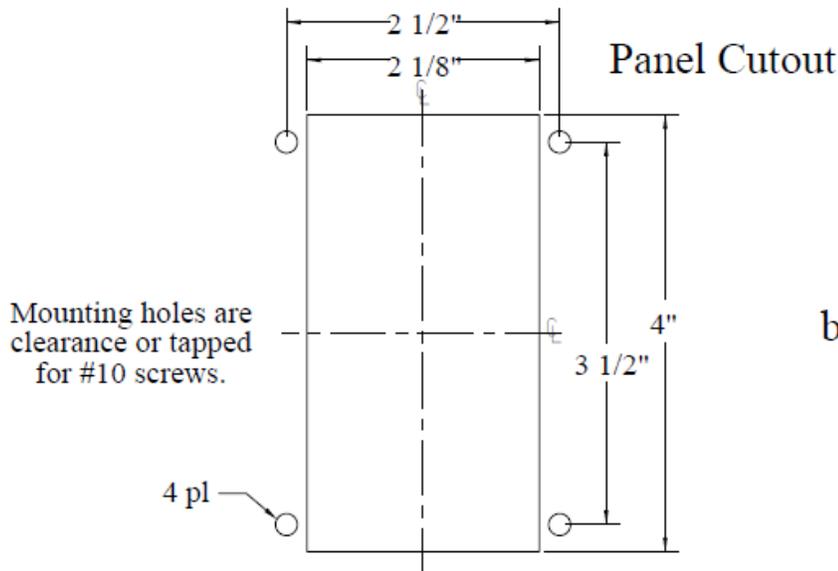
NOTE: An Elkhart control valve is not included with the AUTO TANK Fill System, and must be purchased separately.

INSTALLATION INSTRUCTIONS

TankVision Display Module

Note: It is recommended to mount the display at eye level for accurate tank level readings.

1. Measure and mark mounting location for display module panel cutout and mounting screw holes. Make sure there is a clearance behind the panel for the display and cables before cutting holes. Refer to Figure 2 below.
2. Cut out a 4" by 2 1/8" hole and drill four (4) holes (clearance or tapped) for 10-32 mounting screws.
3. Place Display Module in position and secure with four (4) screws.
4. Connect the Display Module cables and wires. (Please refer to Wiring Section on page 17)



Note: Do not use Loctite on any screws near the Lexan lens. Lexan lenses can become brittle and prone to cracking when exposed to Loctite compounds.

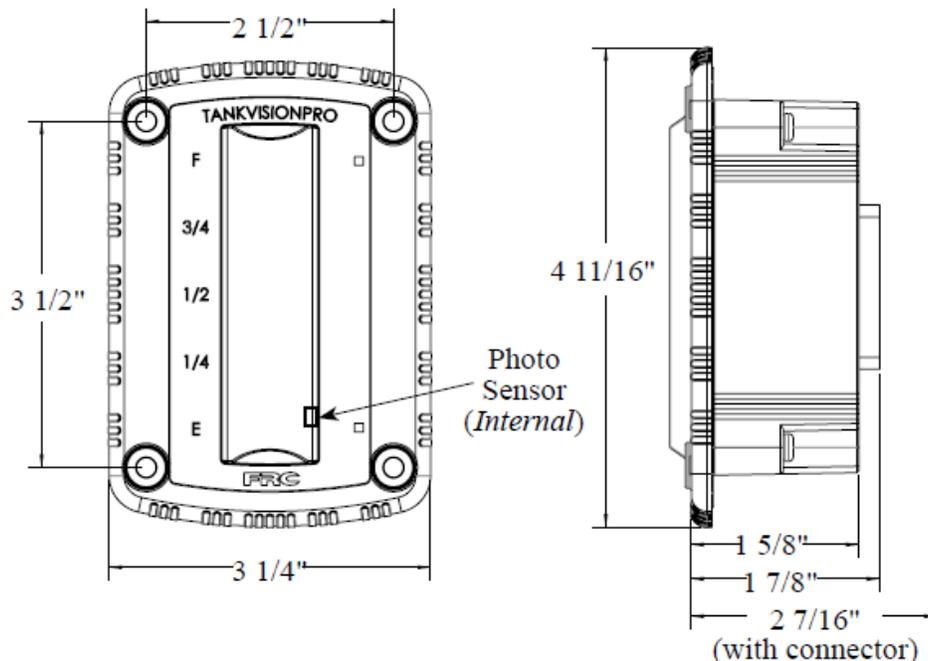


Figure 2: Display Module Dimensions

AUTO TANK Control Module

1. Measure and mark mounting location for cutout and mounting screw holes. Make sure there is clearance for the module and cables before cutting hole. Refer to Figure 3 below.
2. Cut out a $2\frac{3}{4}$ " diameter hole and drill two (2) holes (clearance or tapped) for 10-32 mounting screws.
3. Place control module in position and secure with two (2) screws.
4. Connect the cables and wires. (Please refer to Wiring Section on page 18)

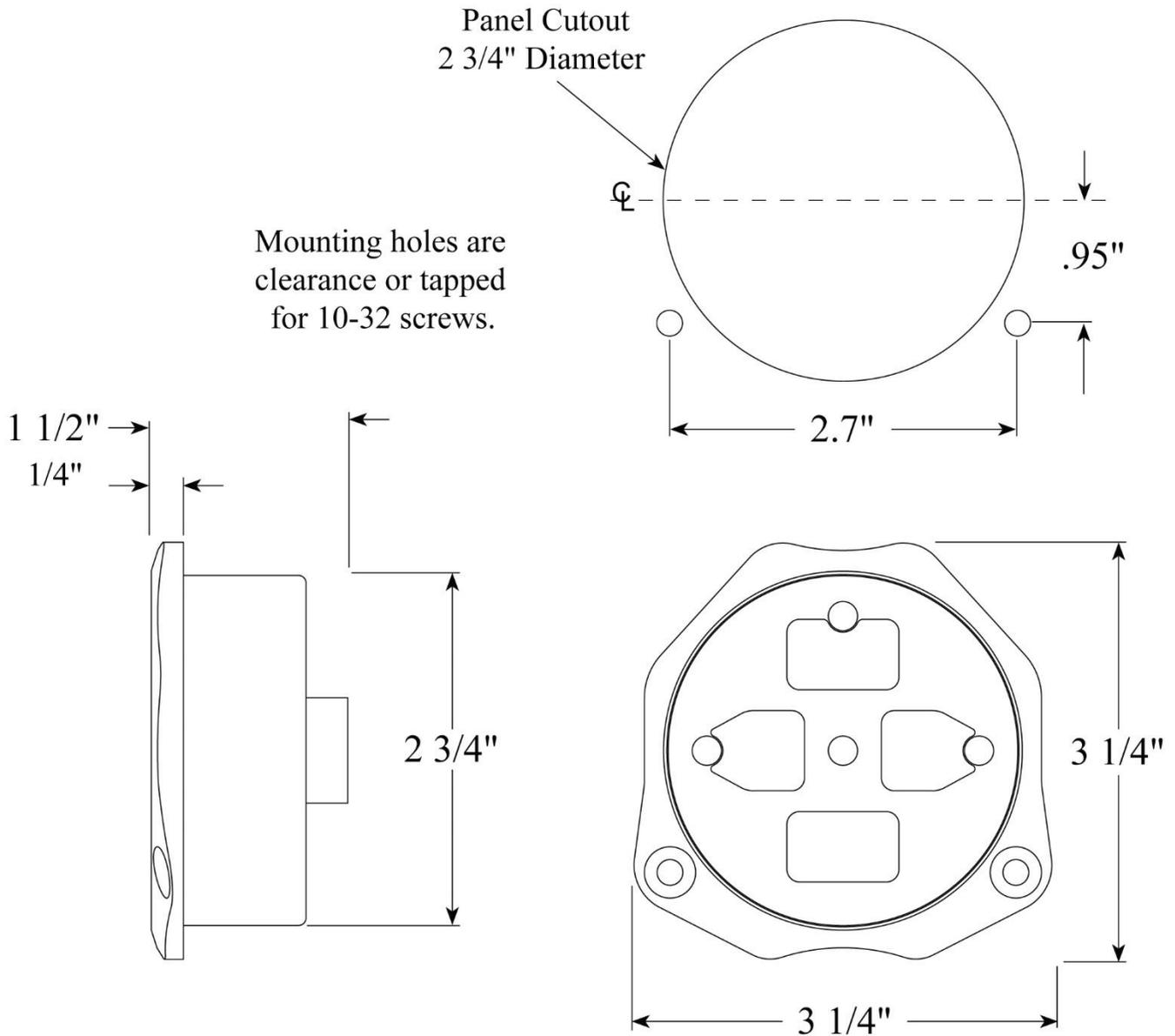


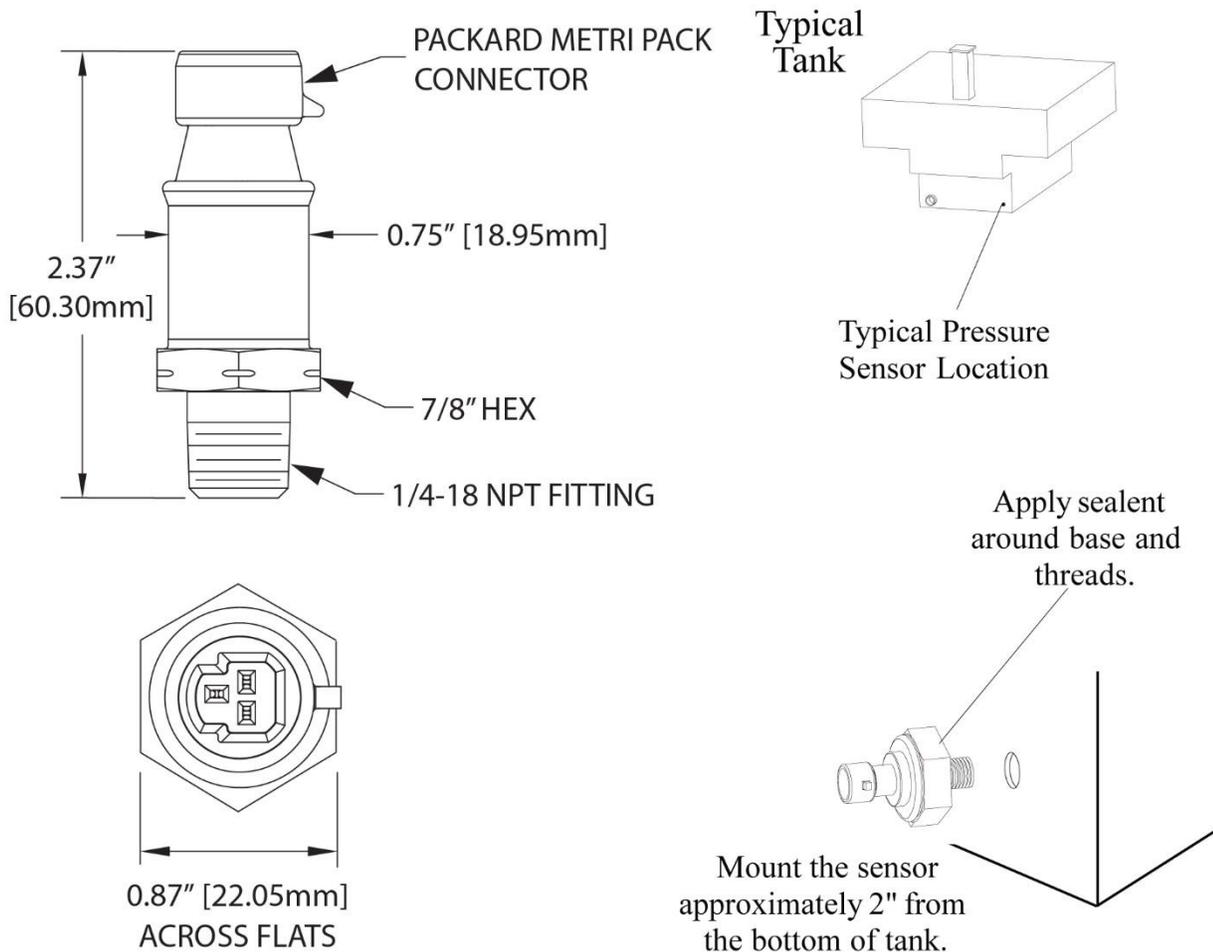
Figure 3: Control Module Dimensions

Pressure Sensor

The pressure sensor is mounted on one of the tank sides approximately 2 inches from the bottom. The pressure sensor can only be utilized for tanks between 1 and 10 feet in vertical height. Installation of the pressure sensor in tanks larger than these limits could result in permanent damage to the sensor.

Note: When mounting the pressure sensor on a tank with thin walls (less than 3/8"), it is recommended that the tank wall be reinforced at the sensor mounting location.

1. Measure and mark mounting location for sensor (Mounting hole should be approximately 2" from bottom of tank). Make sure there is clearance for sensor and cable before drilling hole. Refer to Figure 4 below.
2. Drill and tap a 1/4-18 NPT hole.
3. Apply sealant around base and threads of pressure sensor.
4. Screw sensor into hole.
5. Connect sensor cable. (Please refer to Wiring Section on page 17)



Note: The sensor can be mounted on a 90° fitting in cold areas to help prevent water freezing in the sensor.

Figure 4: Pressure Sensor Dimensions

Control Valve

Installation instructions for the control valve can be found in the Unibody Valve and Controller Manual (Document P/N 98311000). After installing the control valve, connect the AUTO TANK Control Module to the control valve using the supplied harness. Please see Wiring section on page 19.

Note: Be sure to perform an automatic position calibration on the control valve after installation. This procedure can be found on page 13.

Note: The AUTO TANK Fill Controller is intended to be used only with Elkhart Unibody control valves that utilize an E3F electric actuator. Do not attempt to use with any other control valve, doing so could result in damage to the Controller and will void the warranty.

CALIBRATION

The TankVision has unique calibration programs that enable it to be used on tanks of all shapes and sizes. The term 'swipe' stated in the following instructions means to move the magnet up to and then away from the C1 and C2 sensors located on the front of the TankVision display.

Note: The standard pressure sensor is limited to a max tank height of ten (10) feet.

OVERVIEW

Magnet Sensor

The calibration programs are accessed by activating the C1 and C2 magnet sensor that is located on the front of the display module. The sensor is activated by placing the north pole of a small magnet in close proximity of the sensor. (The sensor will not respond to the south pole of the magnet). The magnet is then moved about 1" away, this will produce an electronic signal that is similar to a button being released. If the LEDs in the display do not change try moving the magnet farther away from the sensor.

In these procedures the term 'swipe' will mean to move the magnet up to and then away from the magnetic sensor at the bottom of the display.

Non-Linear Calibration

The first program is a non-linear calibration procedure that can be used for any shape or size tank. This procedure must to be used for irregular shape tanks (e.g.: T-shape, oval, elliptical, tank with through hole, etc.). The program compares the pressure in the tank, as the tank fills at a steady rate, to time. This provides for very accurate displays.

Linear Calibration

The second program is a linear calibration procedure that can only be used when the tank volume is proportional to the height. This would include square or rectangular shape tanks with no irregularities. It is quick way of calibrating a tank, but is not as accurate as the non-linear procedure. The program compares a full tank to an empty tank, takes the difference and divides it into eight equal volume displays.

Full Tank Correction

This program is for use to fine tune the tank display after a non-linear or linear calibration procedure has been completed. It would only be needed in cases where one type of liquid is used for calibration when a different liquid would normally be in the tank. For example, this would allow the basic calibration of a foam tank to be done using water and then the calibration would be fine tuned when the tank is filled with foam concentrate.

Control Valve Position Calibration

This calibration will automatically adjust the AUTO TANK Control Module to the E3F control valve position. This process must be done in order for the AUTO TANK Controller to function properly.

PROGRAMMING CODES

Code Entry

Swipe the magnet across C1 or C2 to input calibration codes. C1 for first digit and C2 for the second. For example, to enter Code 32 swipe the magnet at C1 three times, and then swipe the magnet at C2 twice. If the code is accepted, the display will flash with the corresponding number of top and bottom LEDs as the entered count; three bottom row and two top row.

1. Swipe the magnet at C1. Each of the bottom row of LEDs turns on one at a time.
2. Swipe the magnet at C2. Each of the top row of LEDs turns on one at a time.
3. The process times out after 6 seconds of inactivity, or if no additional codes are entered (except for the non-linear calibration).
4. Save the new setting or enable new data entry by holding the magnet at C2 for 5 seconds.

Calibration and Tank Level Correction

Linear Tank Calibration

1. Start this process with a full tank.
2. Enter **Code 44** to activate the Linear tank calibration.

Non-linear Tank Calibration

1. Start this process with an empty tank.
2. Enter **Code 33** to activate the Non-linear tank calibration.

Level Correction

1. Enter **Code 55** to start full level correction. Ensure the tank is greater than 90% full.

CALIBRATION STEPS

Non-Linear Calibration (Code 33)

This non-linear calibration procedure can be used for any shape or size tank. The calibration process requires that the tank be empty at the start of the procedure and the filled at a steady rate of flow.

1. Empty the tank.
2. Apply power to the display module.
3. Swipe the magnet three (3) times at C1 and three (3) times at C2 to enter calibration mode (Non-Linear). Hold the magnet at C2 for five seconds to activate the calibration.

Result: Top three (3) and bottom three (3) display LEDs flash on and off.

4. Fill the tank at a steady rate of flow.

Note: once the calibration process is activated, the flow rate of liquid into the tank must remain constant for the procedure to be accurate.

5. When the tank is full stop the flow.
6. Hold the magnet at C2 for five seconds to set the calibration into memory.

7. After six (6) seconds the calibration process will terminate and all the LEDs will be lit to show that the tank is full.

Linear Calibration (Code 44)

This linear calibration procedure can only be used for square or rectangular shape tanks with no irregularities. The calibration process requires that the tank be full at the start of the procedure.

1. Fill the tank. (Do not fill up into the fill tower)
2. Apply power to the Display Module.

Note: Once the calibration process is activated, there is a six (6) second timeout. Do not wait more than six (6) seconds to move from step 3 to step 4.

3. Swipe the magnet four (4) times at C1 and four (4) times at C2 to enter calibration mode. (Do not wait more than six seconds in between swipes or the session will time out)

Result: Top four (4) and bottom four (4) display LEDs alternatively flash on and off.

4. While the LEDs are still flashing, hold the magnet at C2 for five (5) seconds to set the calibration into memory.
5. After a few seconds the calibration process will terminate and all the LEDs will be lit to show that the tank is full.

Full Tank Correction (Code 55)

This fine calibration procedure is used to fine tune the tank display after a non-linear or linear calibration has been completed. The calibration process requires that the tank be full at the start of the procedure and the display shows 75% or more.

1. Fill the tank. (Do not fill up into the fill tower)
2. Apply power to the Display Module.

Note: Once the calibration process is activated, there is a six (6) second timeout. Do not wait more than six (6) seconds to move from step 3 to step 4.

3. Swipe the magnet five (5) times at C1 and five (5) times at C2 to enter calibration mode.

Result: The top five (5) and bottom five (5) display LEDs flash on and off.

4. After three (3) seconds, hold the magnet at C2 for five (5) seconds to set the calibration into memory.
5. After six (6) seconds the calibration process will terminate and all the LEDs will be lit to show that the tank is full.

Control Valve Position Calibration

A valve position calibration must be performed prior to operation. This calibration can be initiated through the AUTO TANK Control Module by making use of the following steps:

1. Press the OFF button to place the controller in off mode. The auto & manual mode LED's should be off.

2. Hold the OPEN and CLOSE buttons for ten (10) seconds until the AUTO LED begins to flash at a 2 second interval.
3. Hold the AUTO button for five (5) seconds to initiate the automatic valve position calibration. The valve will close then open and then close. During this process the AUTO mode LED will flash.
4. When the calibration process is complete, the CLOSE LED will turn on and stay lit. The auto LED will continue to flash.
5. Turn power to the controller off and back on. Only the CLOSED should now be on.

OPERATING INSTRUCTIONS

The AUTO TANK system is designed to automatically maintain the water volume in the tank of a pumper. It is more specifically designed to be used on tanks that supply water to around-the-pump foam systems.

System Operating Parameters

- The minimum size of the pumper tank is 500 gallons. There is no maximum tank size.
- There is no minimum pump discharge flow rate. The maximum discharge flow rate is 500 GPM.
- An Elkhart E3F electrically actuated ball valve is required.
- The supply water flow rate at the input to the tank must be at least 20% above the pump discharge flow rate.
- The supply water must enter the tank through the fill tower to avoid potential over pressurization of the tank, or pressure surges through the tank as the valve is opened and closed. **Plumb from the valve to the tank fill tower.**

With all the system parameters met and operating in the automatic mode, the AUTO TANK system P/N 08899155 will keep the tank between 50% and 95% full.

THEORY

For efficient operation around-the-pump foam proportioning systems should be operated with low pump intake pressure, less than 20 PSI. During normal operations pressurized water from a hydrant or pumper in relay would be connected to the input of the pump. This excessive pressure at the input side of the pump can cause the foam system to operate at partial capacity, fail to inject foam, or allow water to enter the foam tank. The UBEC-1AT system continuously fills the tank as required so that low pressure water is available at the input side of the pump.

During operations a supply line from a pressurized source of water (hydrant or pump in relay) is connected to the input side of the control valve. A dedicated line connected from the output side of the valve to the fill tower feed water to the tank. The TankVision display monitors the water in the tank. It sends a signal to the control module to indicate a low or full level. In auto mode the control module then sets the position of the valve as needed.

The control module allows the operator to select the automatic, manual, or off mode of operation.

MODES

On power-up the controller for system P/N 08899155 initializes to the same mode of operation it was in when power went off.

No operator input is required for the TankVision to be operational. When power is on, the display will be operating. The signal from the pressure sensor is processed and the volume of liquid in the tank shows on the display.

During all modes of operation the TankVision display functions normally and the volume of water in the tank is shown on the 9 LED display.

- All 9 LEDs are Green when the tank is full. Each LED goes off starting at the top and working down as the liquid in the tank decreases. At 3/4 full the LEDs change to Blue, at 1/2 they change to orange, and at 1/4 they change to red.
- The bottom two (2) LEDs flash Red when the tank is less than 1/4 full.
- All 9 LEDs rapidly down-chase Red when the tank is almost empty.

Automatic Mode

Pressing and holding the AUTO button until the green LED comes on puts the system in the automatic mode. The opening and closing of the valve is controlled by the control module on the control valve. The valve stays closed until the tank water level goes below 50%. The valve then opens fully and allows supply water to flow into the tank. When the tank is refilled to approximately 95% the valve will close. *The valve takes approximately 7 seconds to move from fully closed to fully open or from fully open to fully closed.* The valve cycles as needed during operations to maintain the water volume in the tank.

Manual Mode

Pressing and holding the OPEN or CLOSE buttons until the manual mode LED comes on puts the system into the manual mode. Once in manual mode, the opening and closing of the valve is controlled by the OPEN and CLOSE buttons.

Off (Valve Shut) Mode

Pressing the OFF button closes the valve and exits manual or auto mode. Only the red CLOSE LED will be on once the valve is closed.

The TankVision display functions normally and the volume of water in the tank is shown on the 9 LED display.

VALVE POSITION INDICATORS

Solid Close – Red CLOSED LED is lit when valve is fully closed.

Solid Open – Green OPEN LED is lit when valve is fully opened.

Flashing Open – Green OPEN LED is flashing when valve is anywhere between fully open and fully closed.

OPERATIONAL CHECK

Note: For this check, the input to the AUTO TANK system control valve does not have to be connected to a water source. The tank can be filled at the fill tower by any method that is convenient. (This will check the operation of the AUTO TANK system, but it will not verify the plumbing between the valve and tank)

1. Fill the tank with water and apply power to the AUTO TANK system.
2. Press the OPEN or CLOSE button until the manual mode LED comes on to enter manual mode.
3. Press the OPEN button to open the valve. Press the CLOSE button to close the valve.

Result: The valve will move and the position indicating LEDs will operate as described above.

4. Press the AUTO button until the auto LED comes on to enter auto mode.

Result: The system is put into automatic mode, the green auto LED comes on.

5. Drain water from the tank.

Result: The display shows tank volume. When it reaches 50% the valve opens.

6. Stop draining water and refill tank.

Result: The display shows tank volume. When it reaches 95% the valve closes.

SPECIFICATIONS

System Requirements

- Tank Size:
 - Min 500 Gallons
 - Max No Maximum (Less than 10 vertical feet tall)
- Total Discharge flow rate:
 - Min 0 GPM
 - Max 500 GPM
- Supply Water flow rate into tank:
 - Min 20% above discharge flow rate
 - Max No Maximum

TankVision Display Module

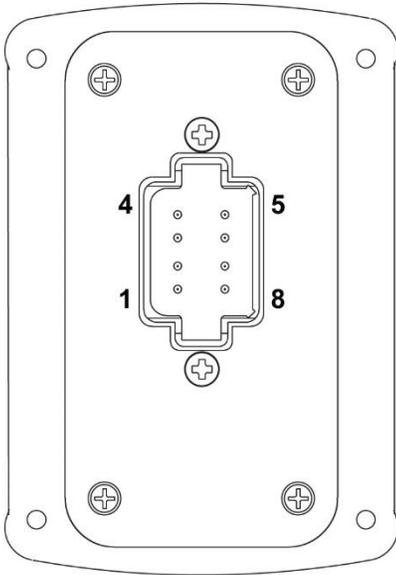
- Input Power: 9-30 VDC
- Electrical Load: 0.25 AMP Max
- Fuse Rating: 1 AMP (12V) / 0.5 AMP (24V)
- Dimensions: 4.4" x 3.0"
- Housing: Waterproof Housing
- Indicators: 9 Super Bright LEDs
- Viewing Angle: 180°

AUTO TANK Control Module

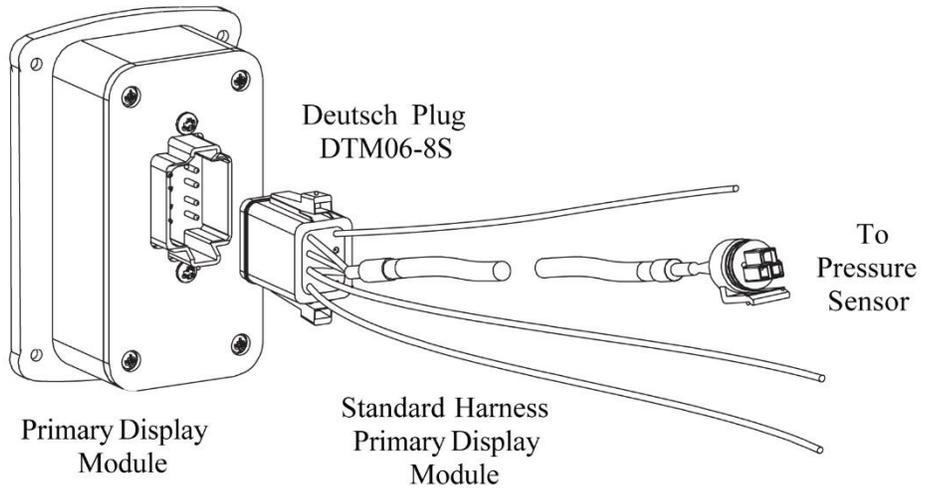
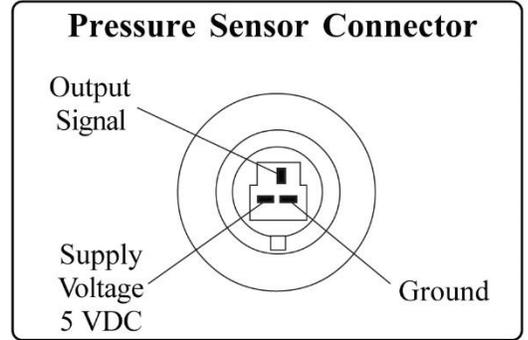
- Input Power: 9-30 VDC
- Electrical Load: 0.25 AMP Max
- Fuse Rating: 1 AMP (12V) / 0.5 AMP (24V)
- Dimensions: 3.25" x 3.25"

Pressure Sensor

- Housing: Stainless steel with 1/4-18 NPT for mounting
- Sensor: Ceramic Diaphragm
- Pressure Range: 1-5 PSI (Maximum tank height: 10 feet)
- Excitation Voltage: 5 VDC



Primary Display Connector	
Pin	Description
1	Power 9-30 VDC
2	Ground
3	Sensor 5 VDC
4	Sensor Signal
5	Auto Tank Control Signal
6	Display Signal Out
7	Datalink (+)
8	Datalink (-)



Typical System Configuration

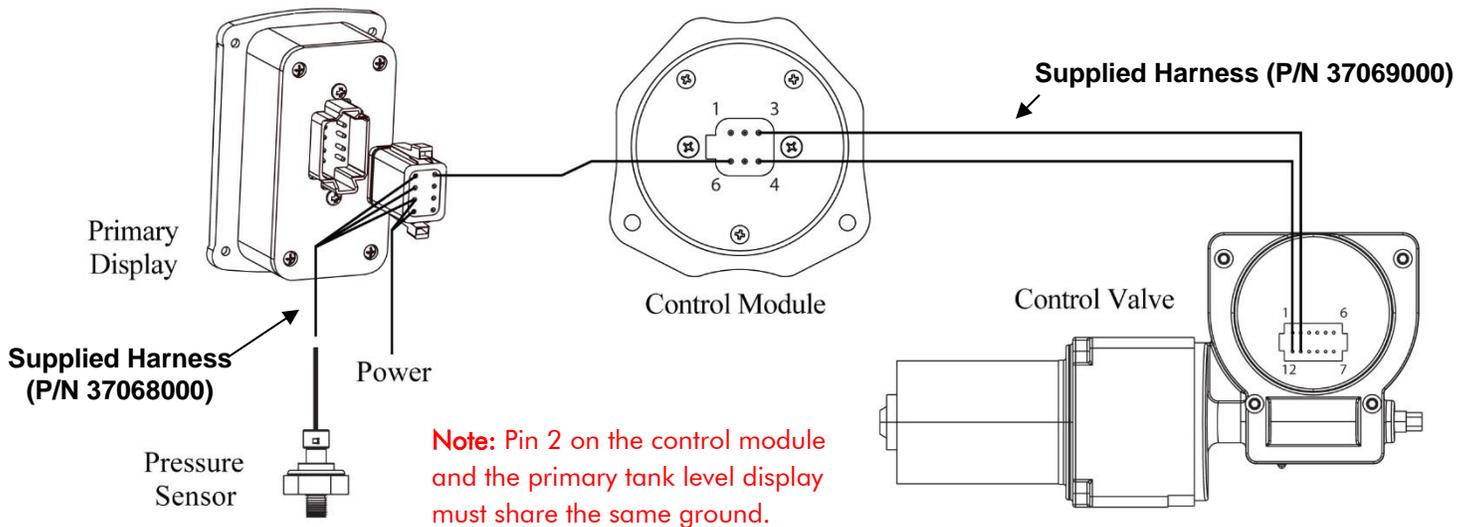
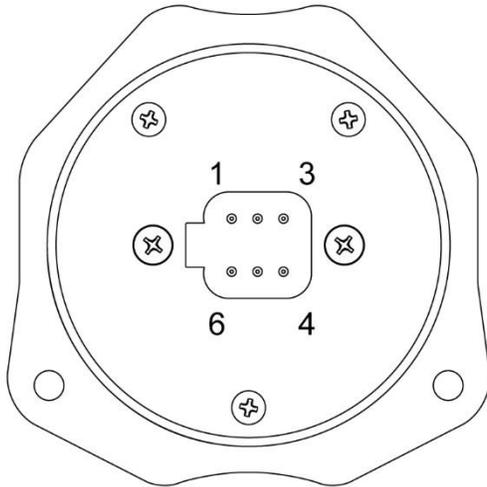
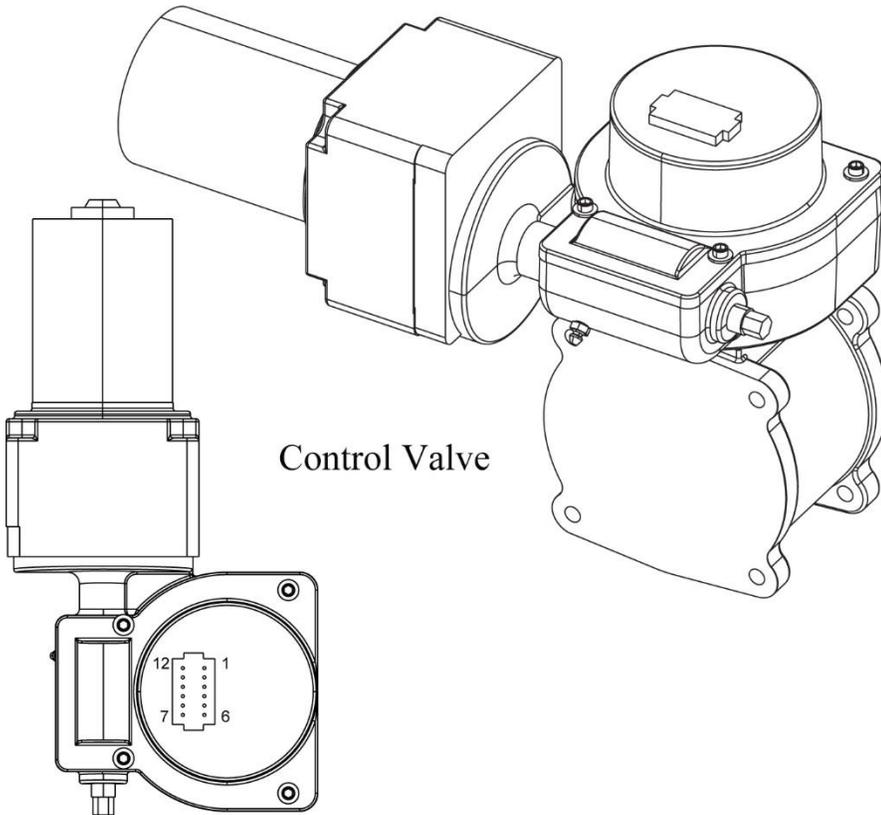


Figure 5: Display Module Wiring Diagram
(See Page 18 for fuse requirements)



Control Module

Control Module Connector	
<u>Pin</u>	<u>Description</u>
1	Power 9-30 VDC
2	Ground
3	Datalink (+) (to E3F Valve Pin 11)
4	Datalink (-) (to E3F Valve Pin 12)
5	N/C
6	Control Signal (from TankVision display Pin 5)



Control Valve

Control Valve Connector	
<u>Pin</u>	<u>Description</u>
1	Power 12/24 VDC
2	Ground
3	N/C
4	N/C
5	N/C
6	Motor Control (-)
7	Motor Control (+)
8	N/C
9	N/C
10	N/C
11	Datalink (+) (from Control Module Pin 3)
12	Datalink (-) (from Control Module Pin 4)

Figure 6: Control Module Wiring Diagram



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UBEC 1AT AUTO TANK FILL SYSTEM
08899155
INSTALLATION, OPERATION, & SETUP INSTRUCTIONS
98330000 REV. D



NOTES

NOTES



DANGER

PERSONAL RESPONSIBILITY CODE

The member companies of FEMSA that provide emergency response equipment and services want responders to know and understand the following:

1. Firefighting and Emergency Response are inherently dangerous activities requiring proper training in their hazards and the use of extreme caution at all times.
2. It is your responsibility to read and understand any user's instructions, including purpose and limitations, provided with any piece of equipment you may be called upon to use.
3. It is your responsibility to know that you have been properly trained in Firefighting and/or Emergency Response and in the use, precautions, and care of any equipment you may be called upon to use.
4. It is your responsibility to be in proper physical condition and to maintain the personal skill level required to operate any equipment you may be called upon to use.
5. It is your responsibility to know that your equipment is in operable condition and has been maintained in accordance with the manufacturer's instructions.
6. Failure to follow these guidelines may result in death, burns or other severe injury.



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