Installation and Operation Manual

Tank Fill & Alarm Level Control System

ELITE

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Safety Instructions

Read this manual carefully to learn how to safely install and operate your pump. Throughout this manual there are a number of SAFETY HAZARDS that must be read and adhered to in order to prevent possible personal injury and/or damage to the equipment.

Three keywords, “DANGER” ,“WARNING”, and “CAUTION”, are used to indicate the potential severity of the hazard, and are preceded by a SAFETY ALERT SYMBOL. Failure to follow the safety-related instructions may result in a safety hazard.

DANGER Indicates an imminently hazardous situation which, if not avoided, WILL result in serious injury or death.

WARNING Indicates a potentially hazardous situation which, if not avoided,

Could result in serious injury or death.

CAUTION Indicates a potentially hazardous situation which, if not avoided,

May result in minor or moderate injury.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

Introduction:

Because panel installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the responsibility and the duty of all personnel involved in the installation, operation and maintenance of the equipment to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor panel integrity are compromised by the installation.

Pre-Installation Check:

Open all cartons and inspect for shipping damage. Report any damage to your supplier or shipping carrier immediately. Always verify that the panel nameplate Voltage, Phase, and HP ratings as well as Amps rating on panel match your pumps and power supply. Warranty does not cover damage caused by connecting panels to an incorrect power source (i.e., voltage and phase).

Installation:

Electrical connections are to be made by a qualified electrician in accordance with the National Electrical Code (NEC) or the Canadian Electrical Code, as well all national, state and local codes. Code questions should be directed to your local electrical inspector. Failure to follow electrical codes and OSHA safety standards may result in personal injury or equipment damage. Failure to follow manufacturer’s installation instructions may result in electrical shock, fire hazard, personal injury or death, damaged equipment, provide unsatisfactory performance, and may void the manufacturer’s warranty.

Motor must have a properly sized starter with a properly sized heater to provide overload and under voltage protection unless motor meets following two conditions: single phase and motor horsepower is 1HP or less. Motors that satisfy these two conditions have built-in thermal overload protection.

Operating personnel should be trained in the operation of the pump and any associated system.

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System Installation

Power Wiring
Mount the control panel vertically on a wall or other solid structure. Connect 120 VAC supply to "L1" and "N".

Electrode Wiring - Panel
Wiring from the control panel to the electrode fitting should be either MTW or THHN, #14 or #16 AWG and should be installed in a separate dry metallic conduit. Do not run electrode wires together in a conduit with power supply wires! Connect the electrode wires to the control panel as follows:

- Terminal 4 - Domestic Tank Back-up High Level Alarm On
- Terminal 5 - Domestic Tank Back-up High Level Alarm Off
- Terminal 22 - Domestic Tank Back-up High Level Ground Reference Electrode

Note: The ground reference electrodes are system references, not earth grounds, and are **not** to be wired to the ground lug in the control panel.

Domestic Tank Valve Wiring
Wire the power circuit of the Valve as follows:

- Terminals 9 & 27 - Fill Valve #1
- Terminal 10 & 28 - Fill Valve #2

Block Valve Wiring
Wire the Valve as follows:

- Terminal 8 & 26 – Block Valve Power
- Terminal 7 – MOV Open
- Terminal 25 – MOV Closed

Auxiliary Alarm Wiring
Connect the auxiliary alarm wires as follows:

- Terminals 13 & 31 - Domestic Tank High Level Remote Alarm
- Terminals 14 & 32 - Domestic Tank Low Level Remote Alarm
  Please note that these are normally open dry contacts that **close** in the event of an alarm condition.

Domestic Tank Low Level Pump Cut-Off Wiring
Wire the control circuit of the pump to be cut-off on low level as follows:

- Terminals 33 & 15 - If the pump cut-off logic requires a contact “closure” on low level
- Terminals 15 & 34 - If the pump cut-off logic requires a contact “opening” on low level

Electrode Wiring - Tank
Wiring used in the tank to suspend the electrodes should be Warrick 3Z1A electrode suspension wire. Using the hardware supplied, attached the 3W2 electrodes to the 3Z1A suspension wire. The stainless electrode piece must be fully engaged into to the plastic housing to ensure the o-ring seals. The electrodes are suspended in the tank using the flanged electrode fitting. Route the wires through the bushings in the flange of the fitting, allowing enough spare wire for electrode adjustment. Typically, the High Level Alarm Electrode is set 3” to 6” below the tank overflow, and the Low Level Alarm Electrode is set 12” to 18” above the pump suction connection. Once the proper electrode levels are attained, secure the wires in the fitting by tightening the bushings with a wrench or a pair of pliers. Take care not to over tighten the bushings. Trim the excess electrode wire and connect each wire to the proper wire from the control panel using wire nuts. Seal the connection with electrician’s tape.

All wiring shall be in accordance with the national electrical code.

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System Overview

The level control system for each tank consists of a system control panel, a set of level sensors in each tank compartment, electronic fill valves and a motor operated block valve. A submersible level transmitter suspended in the tank compartment provides a 4-20 mA input to the PLC in the system control panel for tank water level indication. The tank level is displayed in inches on the touch-screen of the control panel. In addition to the primary submersible level transmitter, conductance type level sensors are installed in the tank to provide backup high level indication in the event of a failure of the primary level sensor or primary level controls. The fill station consist of ___ solenoid pilot Cla-val Fill valves and an electrically actuated butterfly block valve for city water supply shut down in the event of a tank high level condition. The fill valves and the the block valve are operated by the system control panel. All level set points are selected using the display touchscreen. The Lead Fill Valve can also be manually selected using the touchscreen. Normal Lead Fill Valve selection is “AUTO,” which will alternate the lead fill valve after each fill cycle. The system control panel includes illuminated HOA (HAND-Off-AUTO) switches for each fill valve and the block valve, allowing each valve to be manually operated as well as to be turned off. The normal position for all HOA switches is the “Auto” position.

Sequence Of Operation

Fill Valves Operation
When the level in the tank recedes below the Lead Fill Valve set point, the following panel functions will occur:

- The Lead Fill Valve Pilot Solenoid circuit will be energized, opening the lead valve.
- The Lead Valve Green On Light Will Be Illuminated. The lead fill valve will remain open until the level in the tank rises to the Valves Off set point. With the Lead Fill Valve selector in “Auto,” the lead fill valve will be alternated after each fill cycle.

Should the level in the tank recede below the Lag Fill Valve set point, the following panel functions will occur:
- The Lag Fill Valve Pilot Solenoid circuit will be energized, opening the lag fill valve.
- The Lag Fill Valve Green On Light Will Be Illuminated. The lead and lag fill valves will remain open until the level in the tank rises to the Valves Off set point.

High Level Alarm
Should the level in the tank rise to the High Level Alarm set point, the following control functions will occur:
- Alarm buzzer will sound
- Red LED General Alarm Beacon will be illuminated
- Motor Operated Block Valve will close and the Red HOA Light will be illuminated
- The BAS High Level Alarm Contact will close

The alarm buzzer can be silenced by using the Touch Screen “Alarm Silence”, however, the General Alarm Beacon will remain illuminated, the block valves will remain closed, and the BAS alarm contact will remain active until the level in the tank has receded below the High Level Alarm reset set point.

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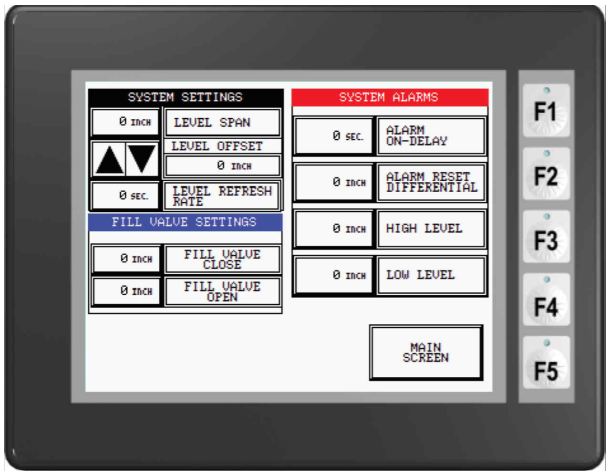
Main Screen

The controller Main Screen Provides the level in the tank level and System Alarms.

Setting Screen Options



To make any necessary setting adjustments, press the desired button.

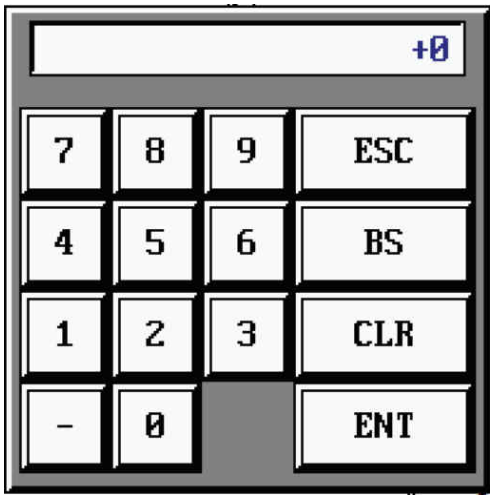
Sensor Operating Range of level/Pressure Sensor.
Refresh Level Allows Electronic Dampening of Input Signal.
Fill Valve Fill Valve Open/ Fill Valve Close Settings.
Alarms High/Low Alarm Setpoints.

Press the **MAIN** button to return to Main Screen.

Level Sensor Setting

Level Sensor Max

Press the Sensor Max button to access a data entry box that will allow the input on the Transmitter Level in the Feet at 100% Output – 20mA of the sensor.



Enter the desired set points and press **ENT** to save the setting. The new setting will be displayed on the button.

Level Sensor Offset

Press the UP/DOWN buttons as necessary to adjust the Tank Level Display to match the actual measured tank level. The setting is used to adjust for sensor installation heights that may be above the bottom of the tank.

Level Sensor Refresh Rate

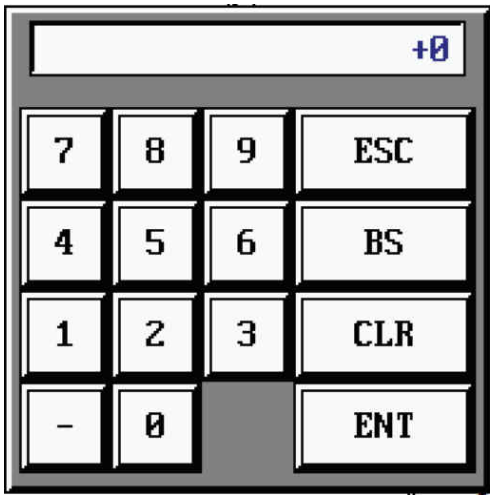
Press the Sensor Span button to access a data entry box that will allow an adjustment of the level sensor refresh rate in seconds to correct any potential signal bounce. If a required setting exceeds 5 seconds it is recommended to check the sensor or wiring for issues.

Enter the desired set points and press **ENT** to save the setting. The new setting will be displayed on the button.

Fill Valve Settings

Fill Valve Close Level

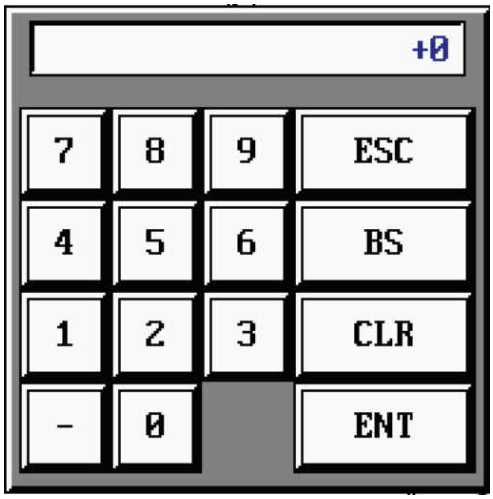
Press the Fill Valve Close to adjust the require max normal tank level that will close the Fill Valve. The level setting should be below the High Level Alarm Setpoint.



Enter the desired set point and press **ENT** to save the setting. The new setting will be displayed on the button.

Fill Valve Open Level

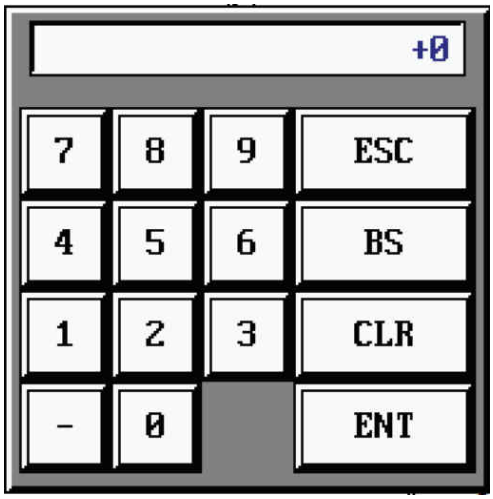
Press the Fill Valve Open to adjust the require tank level that the Fill Valve will start. The level setting should be less than the Fill Valve Close setting.



Enter the desired set point and press **ENT** to save the setting. The new setting will be displayed on the button.

Alarm Level Settings

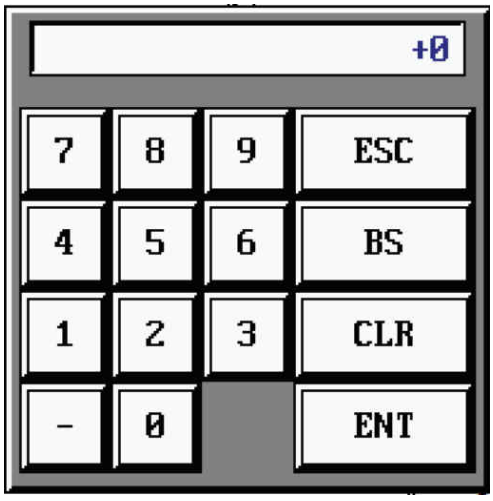
Press the Alarm On – Delay button to adjust the require time delay in seconds for any alarms after an alarm set point has been exceeded.



Enter the desired set points and press **ENT** to save the setting. The new setting will be displayed on the button.

Alarm Reset Differential

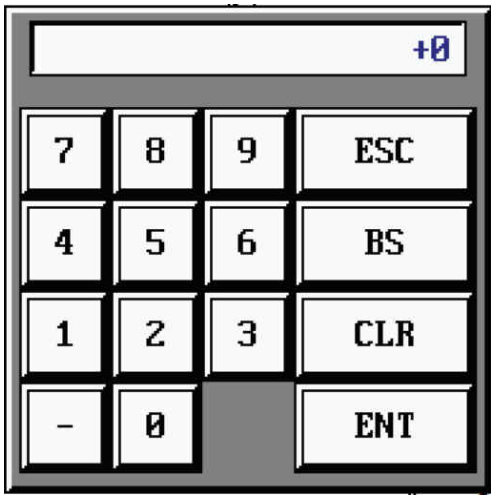
Press the Alarm Reset Differential button to adjust the level change in inches below the High Level Alarm or above the Low Level Alarm set points that are the alarm clear.



Enter the desired set point and press **ENT** to save the setting. The new setting will be displayed on the button.

High Level Alarm

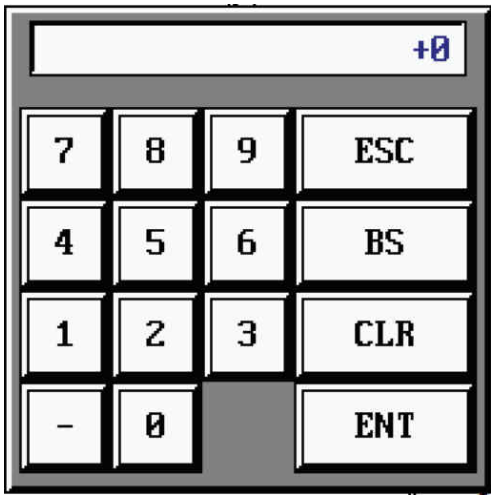
Press the High Level button to adjust the setpoint for the tank level in inches that a High Level Alarm will be indicted. This should be above the Fill Valve Close setpoints.



Enter the desired setpoint and press **ENT** to save the setting. The new setting will be displayed on the button.

Low Level Alarm

Press the Low Level button to adjust the setpoint for the tank level in inches that a Low Level Alarm will be indicted. This setting should be below the Fill Valve Open setpoint.



Enter the desired setpoint and press **ENT** to save the setting. The new setting will be displayed on the button.

SENSOR DETAIL

- Standard Level Sensor Assembly consists of a Type 4X Polycarbonate Junction Box, standard 3"Sch. 80 150# PVC flange, Submersible pressure stainless steel transmitter, and stainless steel wire suspended electrodes. Figure 2.1 shows assembly design in detail.

Figure 2.1

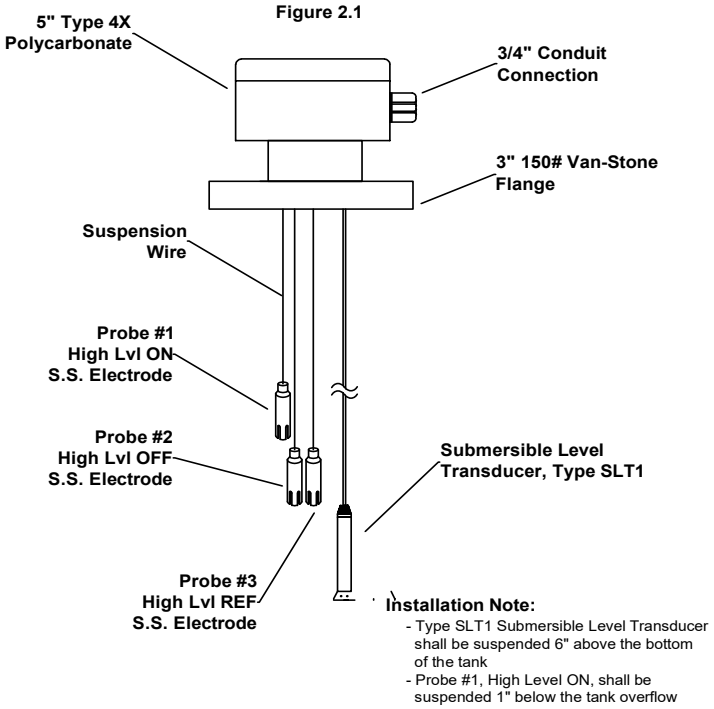
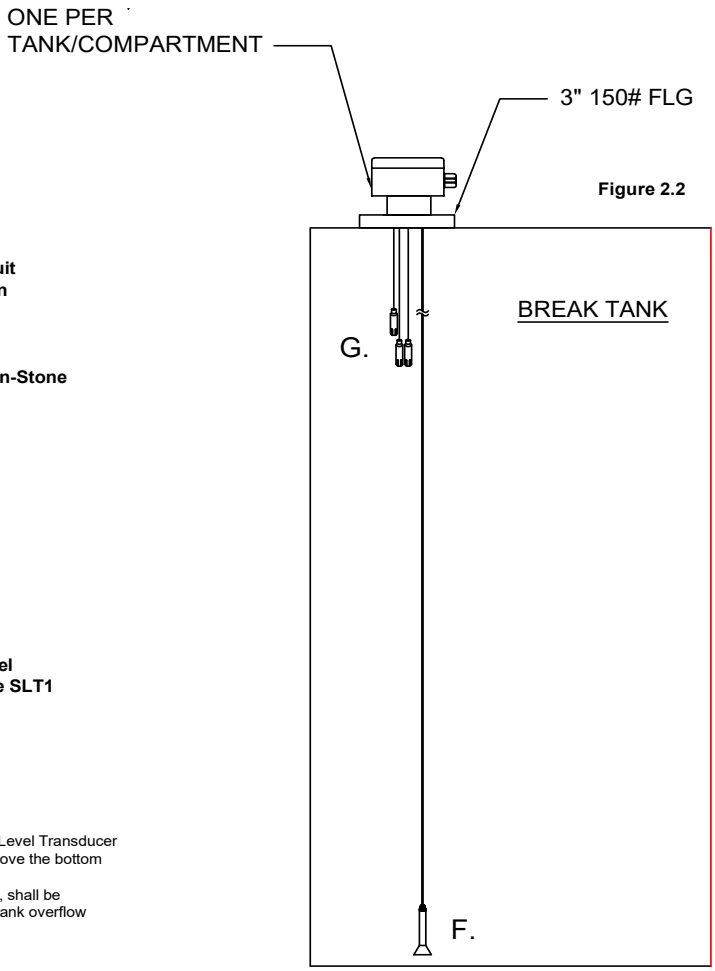
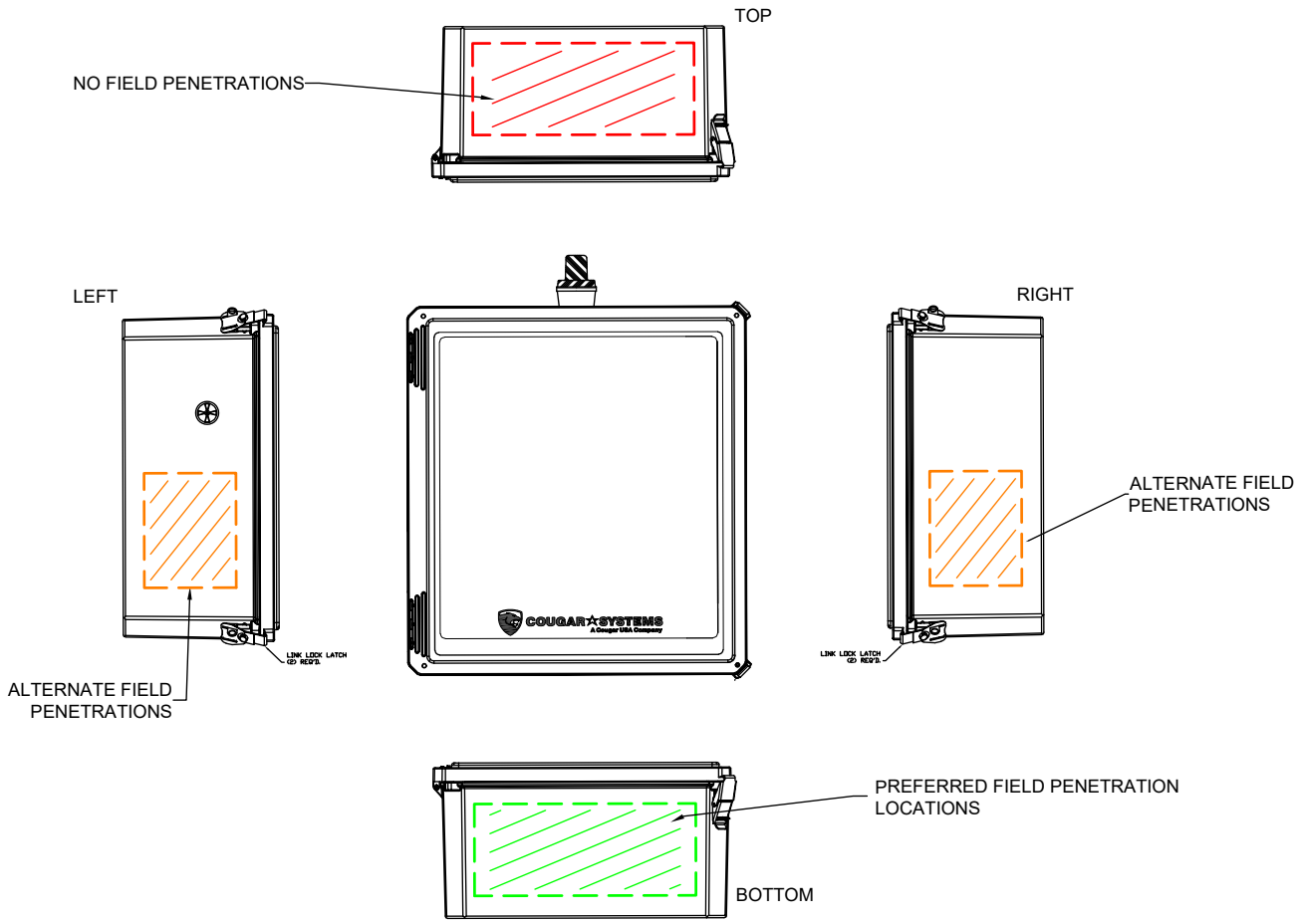


Figure 2.2



Field Penetration

*** URGENT ***
ANY FIELD PENETRATIONS IN LOCATIONS OTHER THEN FACTORY AUTHORIZED AREAS WILL ***VOID MANUFACTURERS WARRANTY*** OF ALL INTERNAL COMPONENTS.



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