



# COUGAR★SYSTEMS

A Cougar USA Company

## Storage Tank Level & Alarm Control System Bills of Materials

### **LEVEL ALARM CONTROL PANEL**

1 – Cougar Controls Custom Level Control and Alarm Panel with the following Features and Bills of Materials:

- 18" x 16" NEMA 4X Enclosure
- 7AMP 120V Circuit Breaker
- PLC Control Panel Mount Digital Display/Touch Screen
  - Digital Readout
    - High Level & Low Level Alarm Indication
    - Back-Up High Level Alarm
    - Tank Level Read-out
  - Touch Screen Function
    - Level Alarm Set-points
    - Fill Valve Operation Set-points
    - Alarm Silencing
    - Alarm Reset
- Alarm buzzer
- General Alarm LED Beacon
- High level audible and visual alarm with block valve closure
- Low level audible and visual alarm
- High Level Block Valve Circuit with Red Illuminated HOA Switch
- Duplex Solenoid valve fill circuit with separate valve open and close levels
- Two Green Illuminated Solenoid Valve HOA Switches
- "Form C", SPDT, Low Level Pump Cut-Off Contacts
- High level & Low Level Auxiliary alarm contacts for remote indication of alarm condition
- Back-Up High Level Alarm indication and BAS dry contacts

### **LEVEL SENSORS – 3" Flange Required per Compartment**

- 1- Cougar Controls Level Control Sensor Assembly. Provide one 3" 150# flange Tank, total of [ 1 ] sensor. Sensor assembly consists of a Type 4X

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Polycarbonate Junction Box and 3" Sch. 80 150# PVC Flange. The Level control devices consist of:

- a. Submersible Pressure Transmitter: Prosense model SLT1 continuous pressure sensor, Stainless Steel material.
- b. High Level Backup Probes – Similar to Warrick 3W2 stainless steel wire suspended electrodes. Provide three electrodes; one for High Level Indication, one for High Level Reset, and one for Reference.

# ENGINEERING SPECIFICATION

## 1.10 General

- A. Specifications for a Series ET11F2B1T1 Level Control Panel as manufactured by Cougar Controls, a business unit of Cougar Systems, LLC., Houston, TX, or approved equal. The contractor shall furnish and install the ET11 Series Level Control Panel as specified herein.
- B. Incoming pump power shall be Single Phase, 60 Hz., 115/120 VAC (Specify site voltage).

## 2.10 Certification

- A. The panel shall be built by a UL 508A approved control systems manufacturer (Cougar Controls, a business unit of Cougar Systems, LLC or approved equal) and 100% tested at the factory prior to shipping.
- B. Panels containing intrinsically safe circuits shall be built by a UL 698A approved control systems manufacturer (Cougar Controls, a business unit of Cougar Systems, LLC or approved equal) and 100% tested at the factory prior to shipping.

## 3.10 Warranty

- A. The Single Phase Level Control Panel shall be warranted in writing against defects in materials and workmanship under normal use and service for a period of two (2) years from the date of shipment when installed and used in accordance with the manufacturer recommendations.

## 4.10 Construction

- A. The enclosure shall be at a minimum Type 4X rated with lockable latches approved for indoor and outdoor environments.
- B. LED Red Day light visible, flashing alarm beacon, mounted on the top of the enclosure
- C. Alarm Buzzer
- D. For Outdoor applications the enclosure shall have dead-front swing panel construction.
- E. UL489 Single Pole Main Disconnect, 7 amp
- F. Conductivity Critical High Level Relay
  - Redundant relay operation protects against PLC or sensor failure system upset.
- G. The front panel indicators shall include:
  - 1. Fill Valve 3-position selector switch, Open-Close-Auto, Green illuminated LED.
    - 120vac power to open
    - Solenoid operation
  - 2. Block Valve 3-position selector switch, Close-Open-Auto, Red illuminated LED.
    - 120vac power to close
    - 120vac power to open
    - L1 and neutral for enclosure heater
    - Motor operated Valve
  - 3. (1) Critical High Level Alarm Red LED Indicator
  - 4. LED backlit Digital Touchscreen
- H. Touchscreen HMI functions as follows:
  - 1. Lead Fill Valve Selection
  - 2. Alarm Silence Button
  - 3. "High Level Alarm" Indication
  - 4. "Low Level Alarm" Indication

5. Continuous Level Readout, in inches. (other scales available upon request)
6. Level Settings including:
  - Level sensor span
  - Level Read-out offset
  - Level Display refresh rate
  - Alarm reset differential
  - Alarm on-delay timer, seconds (range 0-9999)
  - High Level Alarm set point
  - Low Level Alarm set point
  - Fill Valve(s) close
  - Fill Valve Lead open
  - Fill Valve Lag open
- I. The panel shall be equipped with a remote monitoring dry contact for General Alarm. The General alarm contact shall be normally closed to indicate a power failure or loss of system control.
- J. (1) BAS Dry contact for High Level Alarm
- K. (1) BAS Dry contact for Low Level Alarm
- L. (1) Form C Dry contact for Low Level Pump Cut-off
- M. All field terminations located in one location, segregated by voltage.
- N. Adjacent labeling, sensors, BAS interface, incoming power, valve wiring.
- O. Heat shrink wire markers with circuit voltage indication
- P. Supply one set of Spare fuses
- Q. Panel nameplate shall be permanently affixed inside the enclosure displaying panel model number, serial number, voltage, phase, and SCCR ratings. There shall be a schematic drawing located on the inside the enclosure for field personnel.
- R. Control panel shall be a ET11F2B1T1 as manufactured by Cougar Controls, a business unit of Cougar Systems, LLC., Houston, TX, or approved equal.



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## Storage Tank Level & Alarm Control System Sequence of Operation

### **SYSTEM OPERATION**

#### ***High Level Alarm***

Should the level in the tank rise to the *High Level* set point, the following panel functions will occur:

- Alarm buzzer will sound
- RED LED General Alarm Beacon will be illuminated
- Display will Flash RED and Display “HIGH LEVEL” Alarm Condition
- Block valve will close.
- Remote 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 valve will remain closed, and the remote alarm contact will remain closed until the level in the tank has receded below the *High Level* set point.

#### ***Back-Up High Level Alarm***

Should the level in the tank rise to the *Back-Up HLA Probe*, the following panel functions will occur:

- Alarm buzzer will sound
- RED LED General Alarm Beacon will be illuminated
- Display will Flash RED and Display “BACK-UP HIGH LEVEL” Alarm Condition
- Block valve will close
- Remote Back-Up High Level Alarm Contact will close

Continued.....

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The alarm buzzer can be silenced by using the Touch Screen “Alarm Silence”, however, the General Alarm Beacon will remain illuminated, the block valve will remain closed, and the remote alarm contact will remain closed until the level in the tank has receded below the *Back-Up HLA Reset*.

### ***Fill Valve Operation***

Should the level in the tank recede below the *Fill Valve 1* set point, the following panel functions will occur:

- The Fill Valve #1 Pilot Solenoid circuit will be Energized.
- The Fill Valve #1 Green On Light Will Be Illuminated. The lead fill valve will remain open until the level in the tank rises to the *Fill Valve* off set point.

Should the level in the tank recede below the *Fill Valve 2* set point, the following panel functions will occur:

- The Fill Valve #2 Pilot Solenoid circuit will be Energized.
- The Fill Valve #2 Green On Light Will Be Illuminated. The lag fill valve will remain open until the level in the tank rises to the *Fill Valve* off set point.

### ***Low Level Alarm***

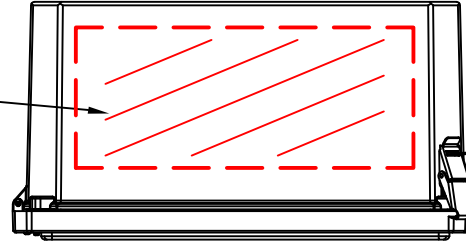
Should the level in the tank recede below the Low Level set point, the panel functions will occur:

- Alarm buzzer will sound
- RED LED General Alarm Beacon will be illuminated
- Display will Flash RED and Display “LOW LEVEL” Alarm Condition
- Remote Low Level Alarm Contact will close
- To DW Pumps, Low Level Cut-Off Dry Contacts will close/ open.

The alarm buzzer can be silenced by using the Touch Screen “Alarm Silence”, however, the General Alarm Beacon will remain illuminated, the low level pump cut-off dry contacts will remain open/ closed, and the low level remote alarm contact will remain closed until the level in the tank has risen to the Low Level reset point.

TOP

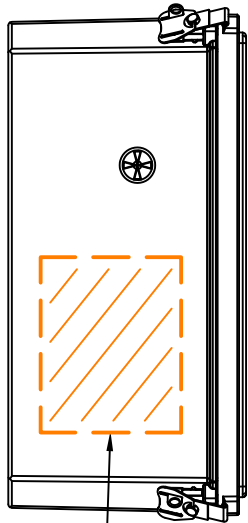
NO FIELD PENETRATIONS



\*\*\* URGENT \*\*\*

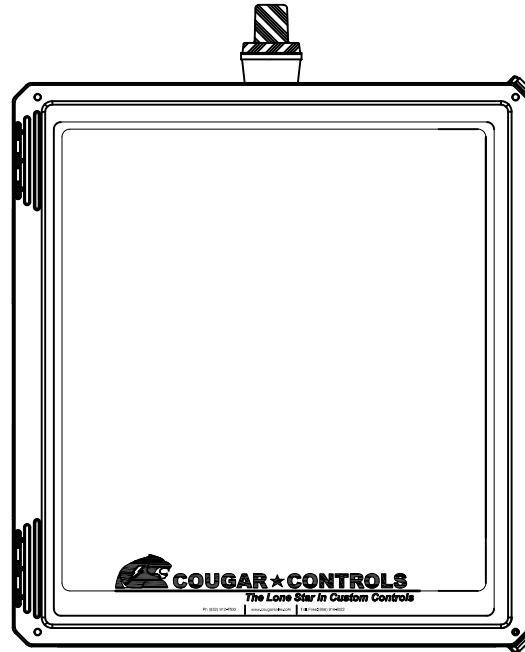
ANY FIELD PENETRATIONS IN LOCATIONS OTHER THEN FACTORY AUTHORIZED AREAS WILL **VOID MANUFACTURERS WARRANTY** OF ALL INTERNAL COMPONENTS.

LEFT

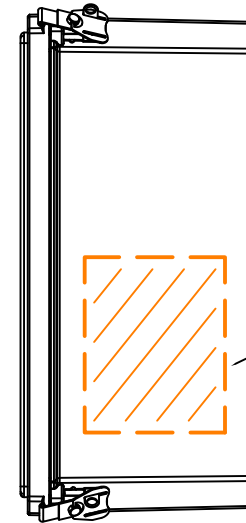


LINK LOCK LATCH  
(2) REQ'D.

ALTERNATE FIELD  
PENETRATIONS



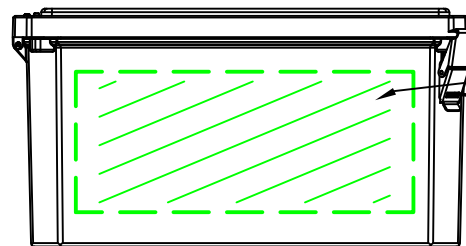
RIGHT



LINK LOCK LATCH  
(2) REQ'D.

ALTERNATE FIELD  
PENETRATIONS

PREFERRED FIELD PENETRATION  
LOCATIONS



BOTTOM

# REVISIONS

REV.	DESCRIPTION	BY	DATE

## NOTICE

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Project:

DRAWING DESC.

**FIELD PENETRATION**

CUSTOMER:

DRAWN BY:

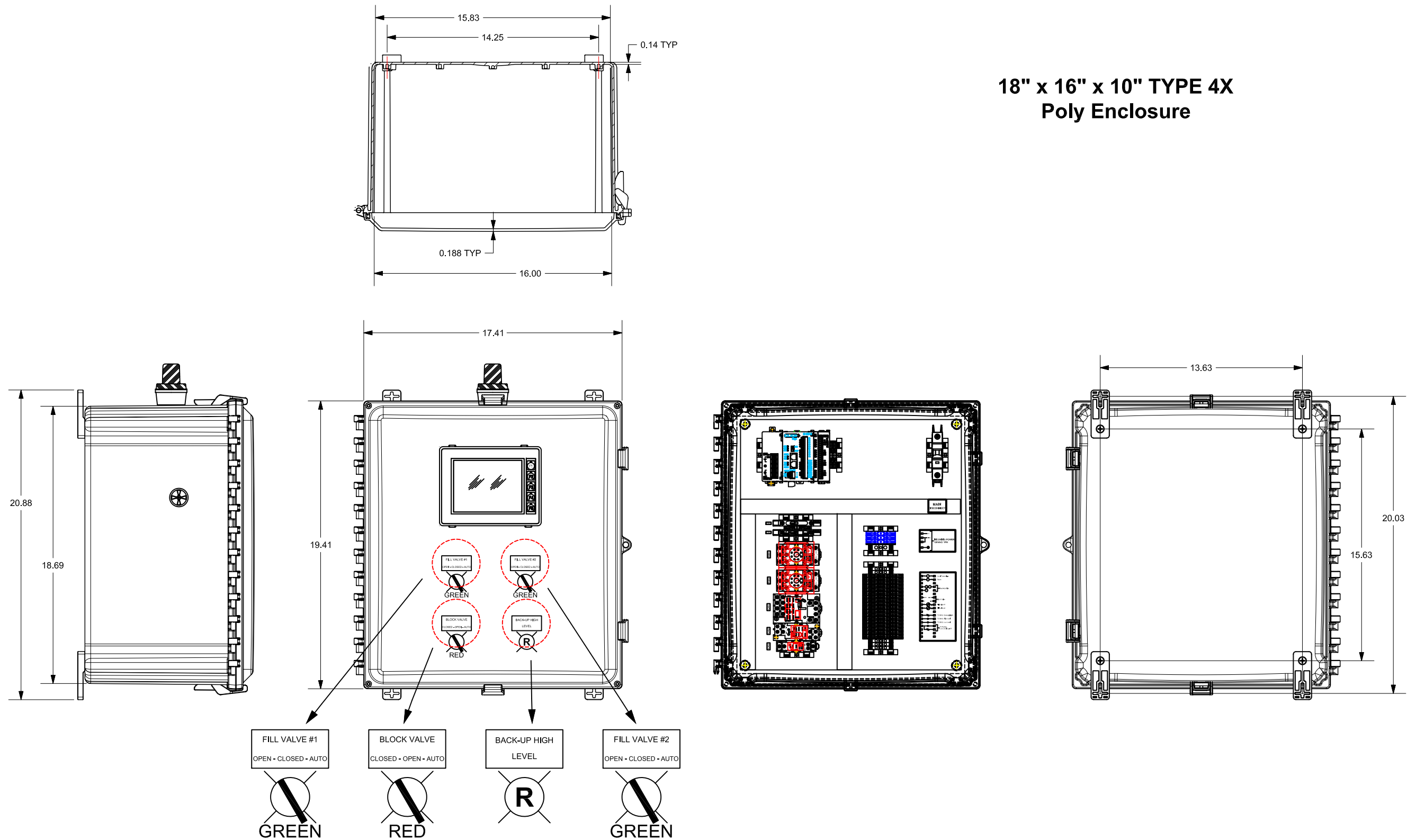
DCT

DWG. NO.:

DATE:

5-31-16

18" x 16" x 10" TYPE 4X  
Poly Enclosure



REVISIONS			
REV.	DESCRIPTION	BY	DATE

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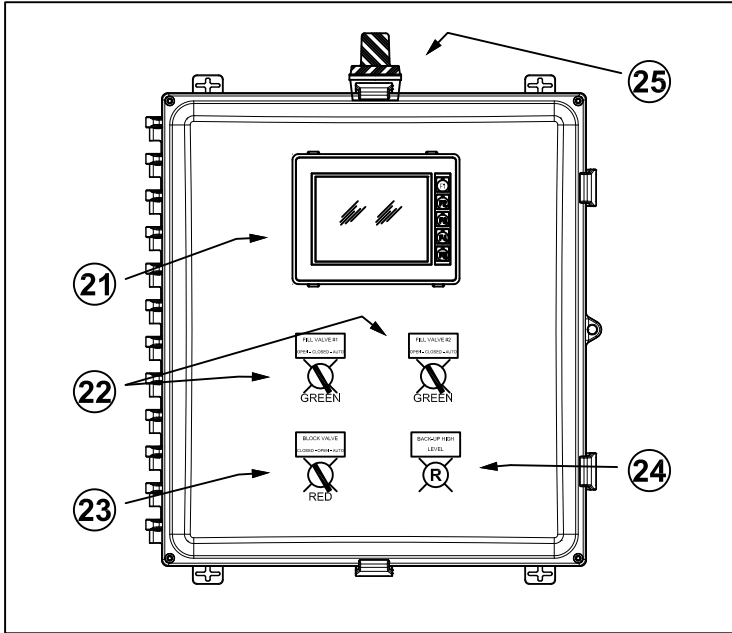


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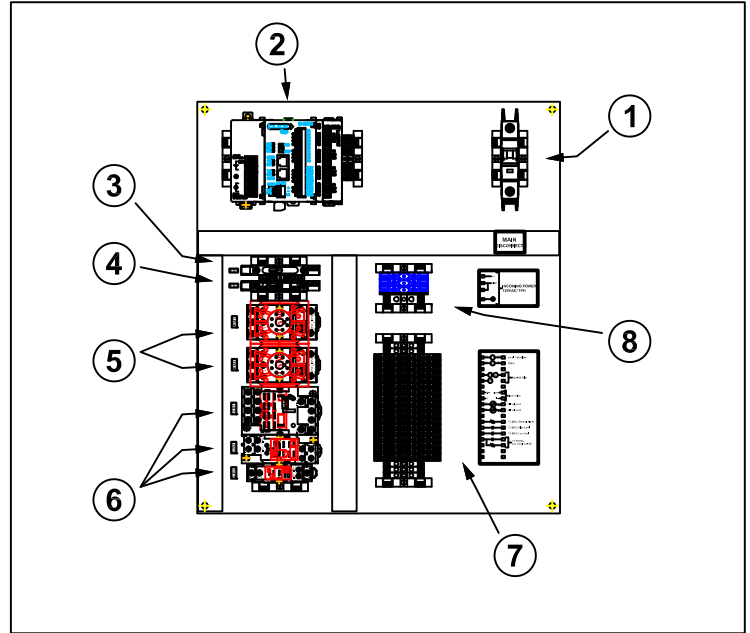
Project:		
DRAWING DESC.		
ENCLOSURE DETAIL		
CUSTOMER:		
DRAWN BY:	DWG. NO.:	DATE:
DCT	ET11F2B1T1	4-10-19



# PANEL LAYOUT



- 21: Touch Screen HMI, 6in TFT LCD  
 22: 3 Position GREEN HOA switch. Green LED "RUN" indicator.  
 23: 3 Position RED HOA switch. Red LED "RUN" indicator.  
 24: Red LED Back up High Level indicator.  
 25: Alarm Beacon 120vac bulb.



- 1: 1-Pole Non fused Main Disconnect Circuit Breaker 7A "D".  
 2: Programmable Logic Controller.  
 3: 120vac Fused Terminal block. 2A Fuse.  
 4: 24vac/dc Fused Terminal block. 2A Fuse.  
 5: 120/240vac Conductivity Relay.  
 6: 2-Pole, 4-Pole, 1-Pole 120vac control relay.  
 7: Terminal Wiring for Fill Valve, Level Transmitter, BAS dry contacts and alarms.  
 8: Terminal Wiring for Incoming service power.



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Project:

DRAWING DESC.

CUSTOMER:

DRAWN BY:

DWG. NO.:

DATE:

## NOTICE

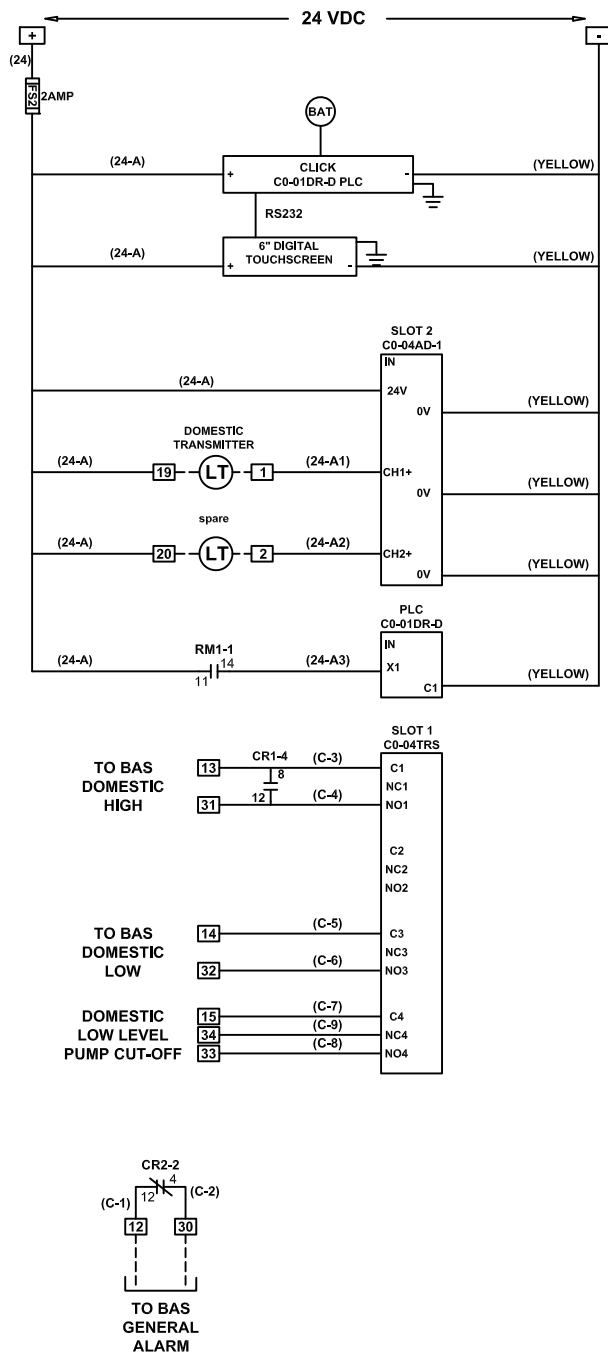
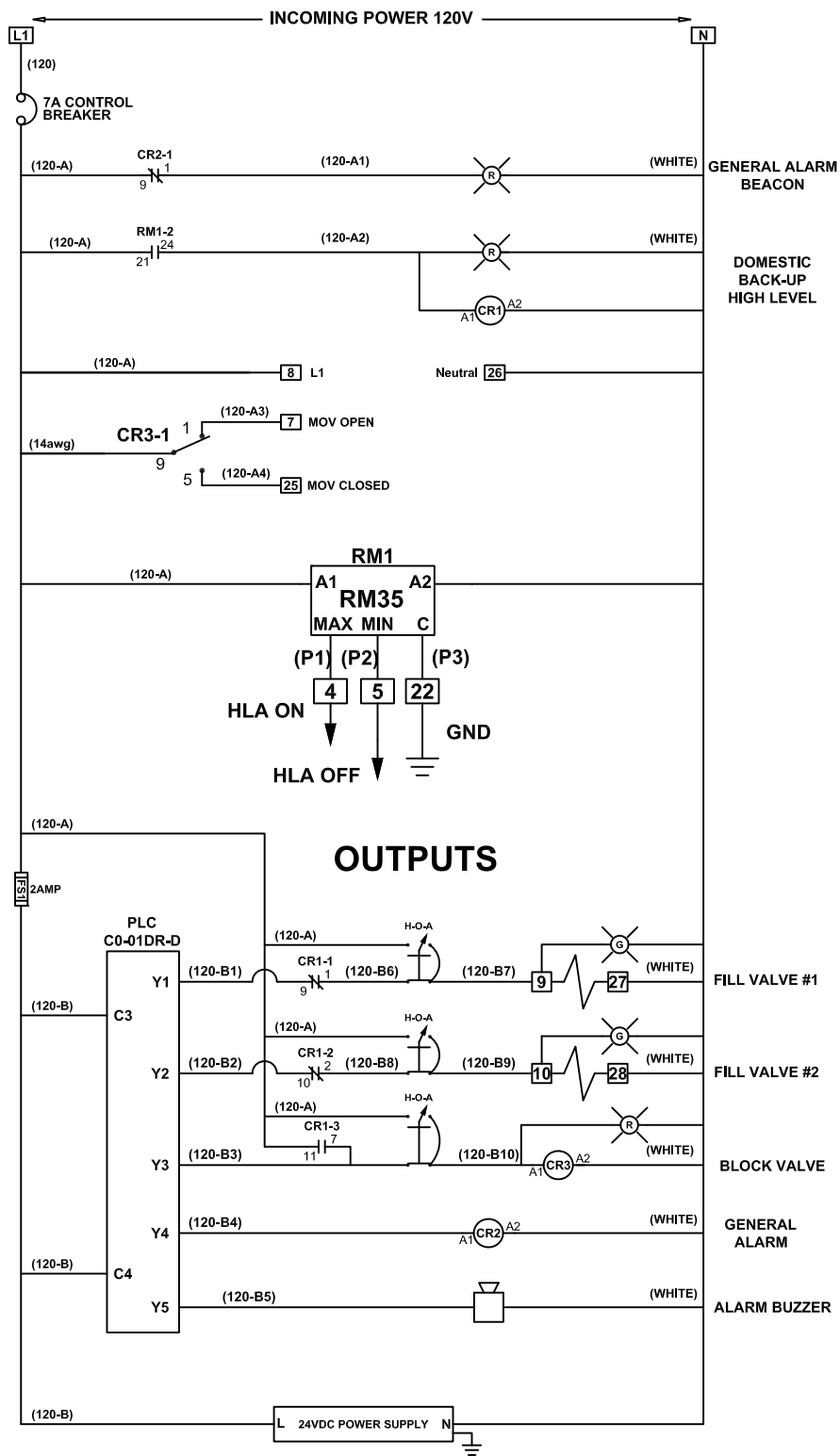
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## REVISIONS

REV.	DESCRIPTION	BY	DATE



**INCOMING SERVICE:**

**Volt: 120**

**Phase: 1**

**Hertz: 60**



Project:

DRAWING DESC.

**DOMESTIC TANK LEVEL**

CUSTOMER:

DRAWN BY:

DCT

DWG. NO.:

ET11F2B1T1

DATE:

4-10-19

## NOTICE

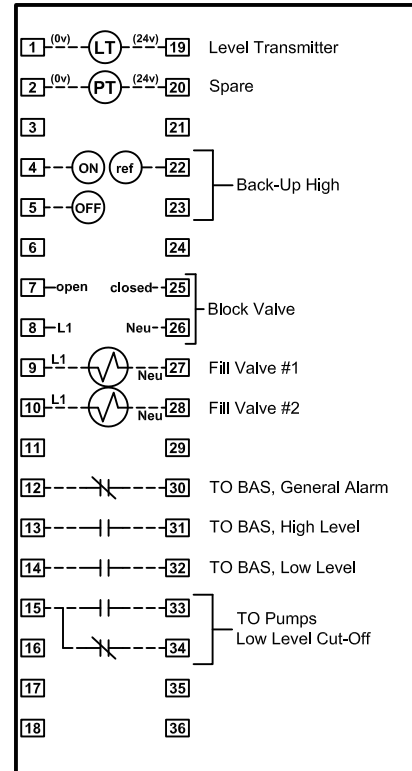
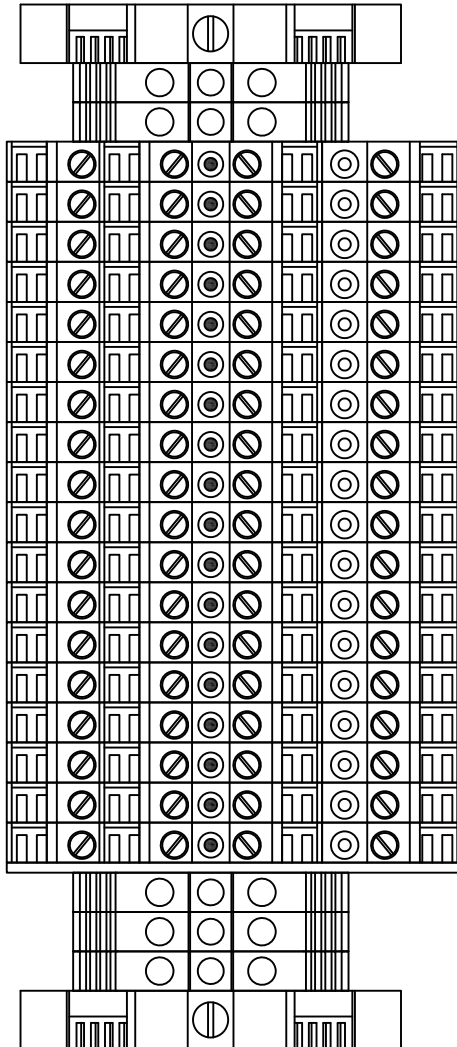
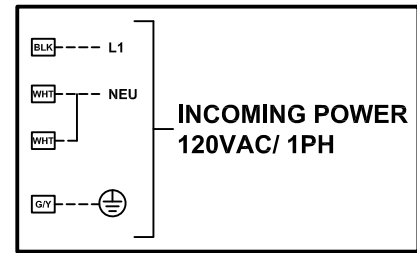
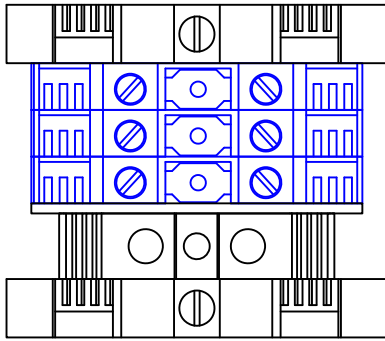
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## REVISIONS

REV.	DESCRIPTION	BY	DATE



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Project:

DRAWING DESC.

## FIELD TERMINALS

CUSTOMER:

DRAWN BY:

DCT

DWG. NO.:

ET11F2B1T1

DATE:

1-31-19

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### REVISIONS

REV.	DESCRIPTION	BY	DATE

5" Type 4X  
Polycarbonate

3" 150# Van-Stone  
Flange

Suspension  
Wire

Probe #1  
Critical High Level  
S.S. Electrode

Probe #2  
Critical High Reset  
S.S. Electrode

Submersible Level  
Transducer, Type SBLT

Probe #3  
Critical High REF  
S.S. Electrode

**Installation Note:**

- Type SBLT Submersible Level Transducer shall be suspended 6" above the bottom of the tank
- Probe #1, High Level ON, shall be suspended 3" below the tank overflow



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Project:

DRAWING DESC.

**SENSOR ASSEMBLY**

CUSTOMER:

DRAWN BY:

DWG. NO.:

CCS42011033

DATE:

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