



USFilter

**A1000 SUBMERSIBLE
LEVEL TRANSDUCER:
PROVEN PERFORMANCE
IN HIGH-SOLIDS
ENVIRONMENTS.**

A1000 SUBMERSIBLE LEVEL TRANSDUCER



A1000 Features In Brief

- 316 stainless steel construction with PVC and Buna-N isolation rings and 2-5/8" Teflon®-coated or Viton® coated Buna-N diaphragm.
- Easy-to-run 1/2" cable with integral breather tube.
- Sealed breather system.
- Analog output.
- Provides 1-5 VDC or 4-20 mADC outputs.
- Pressure range: 0-1, 0-5, 0-15, 0-30, 0-75, 0-150, 0-300 PSI.
- Factory-calibrated, with field recalibration available.
- Available in several standard cable lengths. Custom lengths up to 1000' available by special order.
- Intrinsically safe when used with optional IS1 Intrinsic Safety Barrier.
- Electronics are electrically isolated from sensed media.

Teflon is a registered trademark of DuPont.

The A1000/157GSC Submersible Level Transducer/Transmitter is a proven performer in high-solids environments, including sewage lift station wet wells and sludge sumps. It is equally effective in clean water level monitoring applications. The submersible system's rugged simplicity eliminates the cost, clogging and complexity of other types of level sensing.

The A1000 senses liquid level excursions over a factory-calibrated, customer-specified range. It provides a signal to telemeter or record liquid level, or to sense flow rate in flumes, weirs and rivers.

Calibrated to the specific gravity of the liquid in which it operates, the transducer measures the head-pressure imposed on its bottom diaphragm face by the height of the liquid above it and translates the information into an electronic signal.

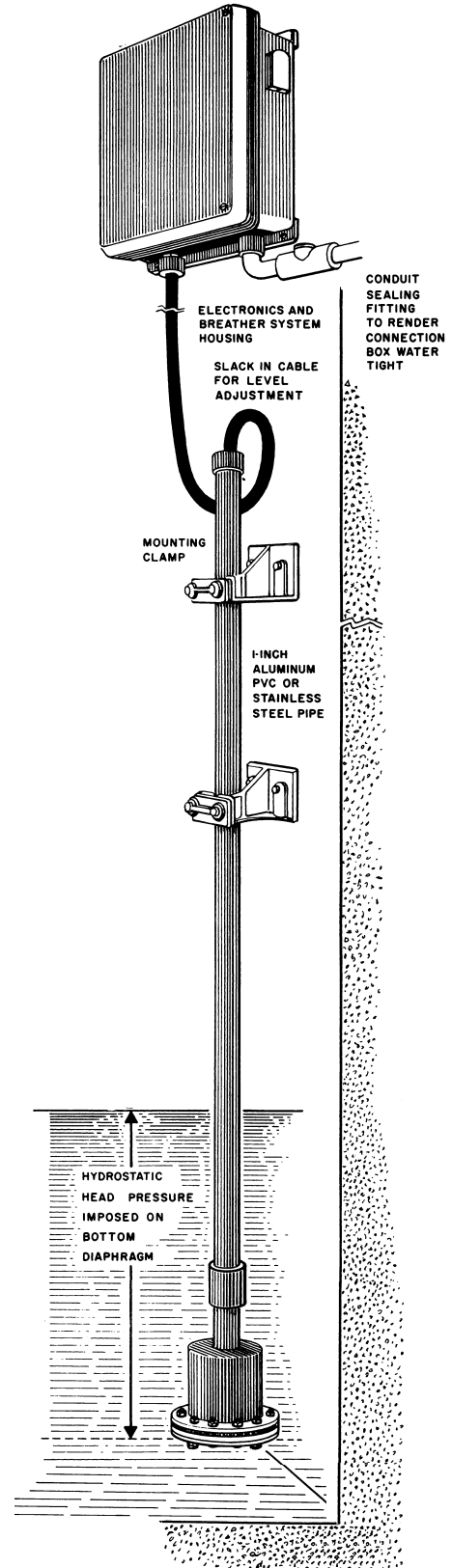
The 2-5/8" diameter Teflon-faced or Viton-faced diaphragm and state-of-the-art precision pressure transducer mechanism are located in the lower assembly. Mounted at a fixed, submerged level, the lower assembly has a type 316 stainless steel body.

The enclosed upper assembly houses system signal conditioning, protective electronics, the job connections terminal block, and the expansion bag of the sealed breathing system, a vital system which negates the effects of changes in atmospheric pressure and protects the sensor from environmental contaminants.

The connecting cable between the upper and lower assemblies has a 1/2" polyurethane jacket, a 3-conductor shielded AWG #16 cable, and an integral rigid breather tube that is part of the sealed breathing system.

Advantages of the system include:

- Solid-state electronics for accuracy, reliability and economy.
- Little or no maintenance required.
- Sealed breathing system that protects electronics from corrosive gases.
- Rigid breather tube that cannot be pinched as a result of installation, assuring barometric compensation.
- Integral transient protection.
- High proof pressure that allows system to withstand inadvertently excessive pressures on the sensing element.
- Seven pressure ranges (spannable down to 15% of element range).
- Easy field repair with stock parts.
- Field calibration possible in most applications.
- Many options are available, including level indication, special housing and environmental conditioning equipment.

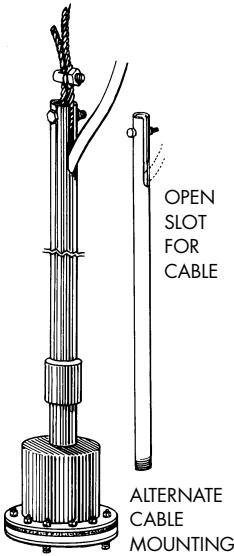


The lower assembly is generally either pipe-mounted (1" NPT) or suspended with a stainless steel cable in a vertical position in the sump or reservoir to be sensed. Although it can be specified and furnished for any other mounting attitude, cable mounting is recommended

for easiest serviceability.

The sensed media can be any type compatible with the lower assembly and cable materials (316 stainless steel, Teflon, PVC, Nitrile and urethane), but it must be of a constant specific gravity.

CABLE SUSPENSION MOUNTING KIT

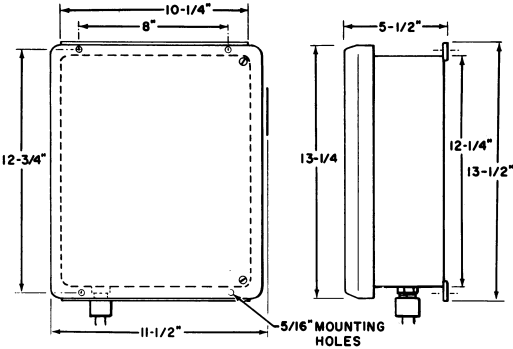


Kit includes 2' long 1-inch NPT Type 316 SS pipe with coupling, bolt, cable clamps and other hardware shown
P/N 601418-01

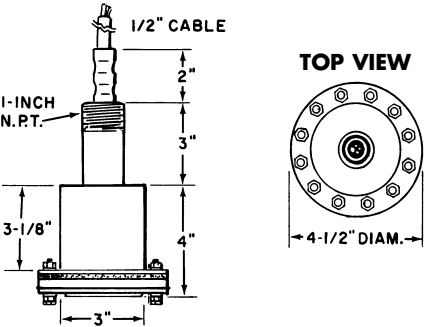
1/8-inch diameter, 7x19 SS cable; order the desired number of feet. Clamps are in Kit
P/N 601440-XX

Cable mounting is the preferred method for ease of serviceability.

UPPER ASSEMBLY DIMENSIONS



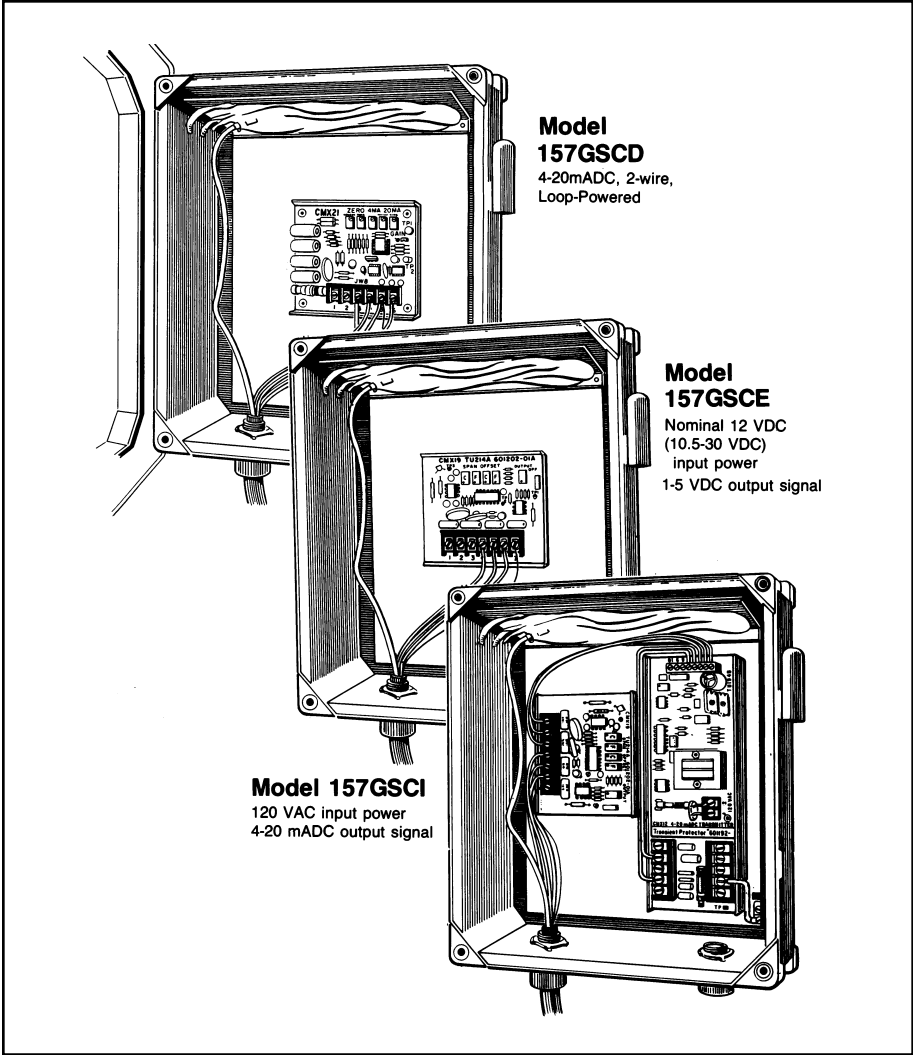
LOWER ASSEMBLY DIMENSIONS



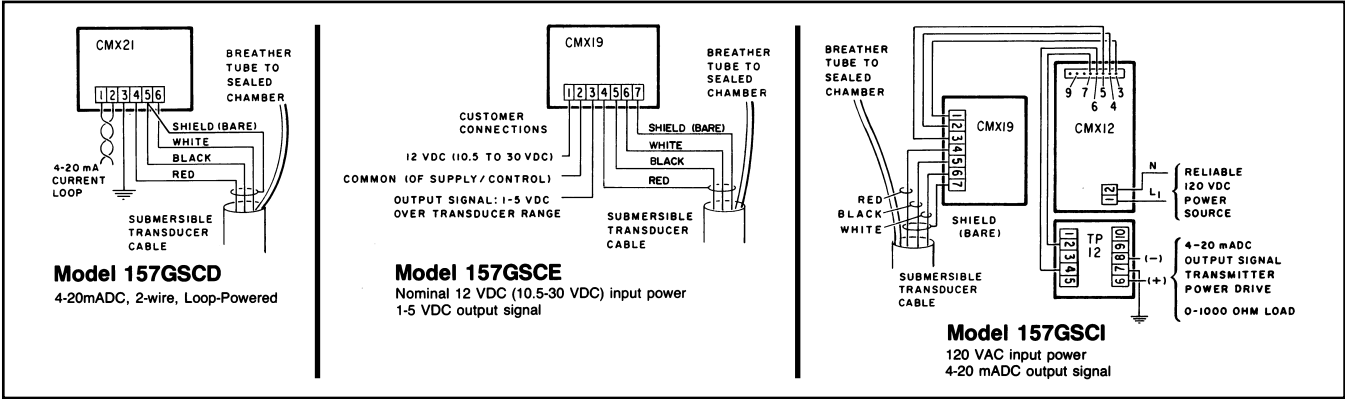
PRESSURE RANGE TABLE				
PRESSURE RANGE	RANGES PSIG	PRESSURE/LEVELS		MAX. PRESS. PSIG
		FT./WATER	IN./WATER	
1.0	0 to 1	2.31	27.72	20
5.0	0 to 5	11.55	138.6	50
15.0	0 to 15	34.65	416.0	150
30.0	0 to 30	69.3	832.0	150
75.0	0 to 75	173.25	2079.0	150
150.0	0 to 150	346.5	4158.0	225

The Pressure Range Table shows maximum full-scale ratings of the six standard elements. Note the high proof pressures shown. Each range can be furnished with a "Feet-of-Water" calibration to any desired value from the maximum shown to as little as 15% of that figure.

THREE MODELS TO MATCH YOUR
ELECTRICAL SPECIFICATIONS



ELECTRICAL CONNECTIONS



Model 157GSCD

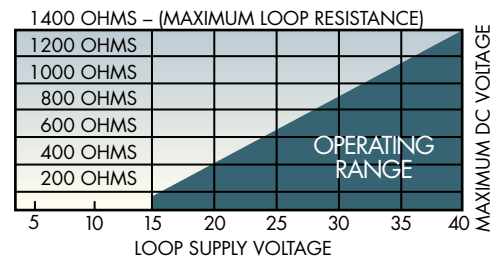
Loop-powered, 4-20 mADC, 2-wire. Requires from 16 to 40 VDC loop power to drive up to a 0-1400 ohm resistive load (meter, controller, circuit resistance, etc.). See the Table for loop power/load driving relationships. Transient protection is provided, including a 3-element gas tube arrestor.

Model 157GSCE

12 VDC-powered unit provides a precise 1-5 VDC output signal capable of driving a 100 ohm or higher resistance load. Supply voltage variations are accommodated over a 10.5 to 30 VDC

Model 157GSCI

120 VAC-powered with a 10 VA current draw. Provides a 4-20 mADC output signal to drive a 0 to 1000 ohm resistive load. Signal output loop is powered by this unit at approximately 33 VDC. This model includes a Manual Mode Switch



range; with a 30 mADC maximum current draw. This model is well-suited to battery operation. Varistor/resistor/diode transient protection is provided.

and Pot as well as a 0-1 mA or 0-1.999 VDC attenuable drive circuit for an optional digital panel meter or related control. Transient protection is provided on both the 120 VAC power and the 4-20 mADC output signal circuits.

STANDARD OPTIONS

USFilter Control Systems products can be customized to meet your requirements. Many options are available. Please talk to your USF Control Systems representative for recommendations and price quotes.

Choose A Stainless Steel Upper Assembly.

The housing of the upper assembly is furnished in Type 304 welded stainless steel under this option. The front door is hinged and gasketed. Nominal dimensions are generally similar to the basic molded polyester housing.

Directly Connect The A1000 To A Pipe Or Vessel By Converting It To An A3000.

Convert the A1000 submersible level transducer into a submersible pressure transducer that can be mounted on a pipe or vessel, giving the application the convenience of a standard gauge-type pressure transducer with the survivability of a submersible. Used extensively in valve vaults that may occasionally be flooded due to environmental conditions. Standard

connections include $\frac{3}{4}$ " and 2" female NPT.

Increase Safety To Your System By Adding An Intrinsic Safety Barrier.

The A1000 submersible level transducer system is rendered intrinsically safe through the use of an IS1 barrier. See page 9 of this brochure for further information regarding the use of IS1 barriers.

Add Convenience And Serviceability With A Digital Panel Meter.

The A1000 submersible level transducer upper electronics assembly is provided with a 3.5 digit LCD level readout.

Improve Reliability In Damp Environments With Thermostatically Controlled Condensation Protection.

The A1000 submersible level transducer upper electronics assembly is provided with an integral heater and high temperature cut-out thermostwitch to protect internal electronics from damage due to condensation.

SUGGESTED SPECIFICATIONS

For Model 157GSCD

The liquid level of the _____ shall be sensed by a USFilter Control Systems Bulletin A1000, Model 157GSCD Submersible Level Transducer. The transducer shall be a 4-20 mADC, 2-wire, 16 to 40 VDC loop-powered type with its output signal directly proportional to the measured level excursion over a factory-calibrated range of zero to ____ feet of water.

For Model 157GSCE

The liquid level of the _____ shall be sensed by a USFilter Control Systems Bulletin A1000, Model 157GSCE Submersible Level Transducer. The transducer shall be a 3-wire type to operate from a supply voltage of

10.5 to 30 VDC and produce a 1-5 VDC instrumentation signal in direct proportion to the measured level excursion over a factory-calibrated range of zero to ____ feet of water.

For Model 157GSCI

The liquid level of the _____ shall be sensed by a USFilter Control Systems Bulletin A1000, Model 157GSCI Submersible Level Transducer. The transducer shall be a 4-wire type to operate on 120 VAC incoming power and produce a 4-20 mADC instrumentation signal into a 0-1,000 ohm load in direct proportion to the measured level excursion over a factory-calibrated range of zero to ____ feet of water.

For All Models

The Transducer shall be of the solid-state head-pressure sensing type, suitable for continuous submergence and operation and shall be installed in accordance with manufacturer's instructions. The bottom diaphragm face of the sensor shall be installed (recommend 6") _____ inches above the floor at elevation _____. The sensor shall be mounted in a location and as shown on the job plans.

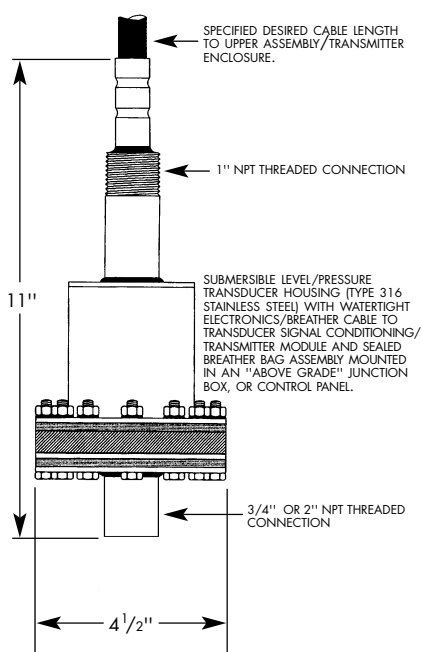
The transducer housing shall be fabricated of type 316 stainless steel with a bottom diaphragm 2-5/8" diameter of heavy-duty, limp, foul-free, molded Teflon bonded to a synthetic rubber back/seal.

A hydraulic fill liquid behind the diaphragm shall transmit the sensed pressure to a solid-state variable-capacitance transducer element to convert the sensed pressure to a corresponding electrical value. The sensed media shall exert its pressure against the diaphragm which flexes minutely so as to vary the proximity between an internal ceramic diaphragm and a ceramic substrate to vary the capacitance of an electrical field

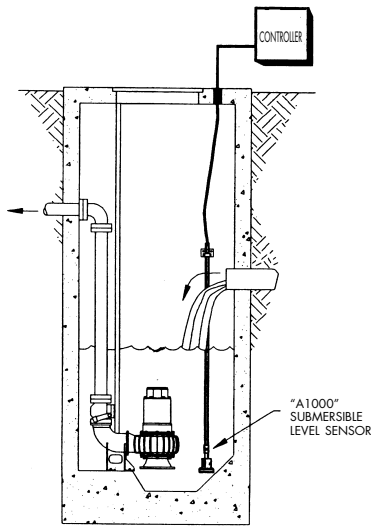
created between the two surfaces. A stable, hybrid, operational amplifier assembly shall be incorporated in the transducer to excite and demodulate the sensing mechanism. The transducer shall incorporate laser-trimmed temperature compensation and high-quality components and construction to provide a precise, reliable, stable output signal directly proportional to the sensed pressure over a factory-calibrated range.

The transducer element shall incorporate high over-pressure protection and be designed to withstand intermittent over-pressures five times the full scale range being sensed. Metallic diaphragms shall not be acceptable in that they are subject to damage or distortion. Sensing principles employing LVDTs, resistive or pneumatic elements shall not be acceptable.

The transducer/transmitter shall include easily accessible offset and span adjustments in the upper assembly. Span shall be adjustable from 100% down to 15% of the sensor range. Fine and coarse adjustments for both span and offset shall be



A3000



Sewage or Stormwater Wet Well

provided, using 25-turn potentiometers. Offset and span adjustments shall be non-interactive, for ease of calibration.

The internal pressure of the lower transducer assembly shall be relieved to atmospheric pressure through a heavy-duty urethane jacketed hose/cable assembly with rigid breather tube and a slack PVC bellows mounted in the NEMA 3X fiberglass upper assembly. The sealed breather system shall compensate for variations in barometric pressure and expansion and contraction of air due to

temperature changes and altitude as well as prevent fouling from moisture and other corrosive elements.

The transducer assembly shall be installed where directed by the Engineer and connected with other system elements and placed in successful operation. It shall be provided with input power and output signal transient protection, associated control elements as specified herein and in accordance with manufacturer's instructions.

SUGGESTED SPECIFICATIONS (CONTINUED)

- MOUNTING METHODS (SELECT ONE)

A. 1" Pipe Mounting Clamps

The sensor shall be mounted using a vertical 1" pipe (supplied by the contractor) and secured in place by USFilter Control Systems Model 9GCL3 Type 304 stainless steel mounting clamps or equivalent.

B. Cable Suspension Mounting Kit

The sensor shall be suspension-mounted using a USFilter Control Systems cable suspension mounting kit or equivalent, consisting of a 2' long 1-inch NPT Type 316 stainless steel pipe with coupling, bolt, cable clamps and hardware along with the required length of 1/8 inch diameter 7 x 19 stainless steel cable.

SUGGESTED SPECIFICATIONS (CONTINUED)

- OPTIONS

Safe Wiring Barrier

Provide an intrinsically safe barrier between the upper and lower assemblies (or ahead of the entire transducer in the case of the 157GSCD). The barrier shall render the level sensing system suitable for use in Class 1, Division 1, Groups A, B, C and D, Class 2, Division 1, Groups E, F and G, and Class 3, Division 1 hazardous locations.

Digital Indicating Meter (LCD)

Furnish a 3.5 digit digital panel meter with a .5" high numeric LCD display calibrated in "feet and tenths of a foot," "inches of water" or other engineering

units as desired. The meter shall provide a 0-1999 count range produced by a 4-20 mADC signal. Lesser values shall be produced by an attenuated signal. Mount on the front hinged door of the upper assembly with a weatherproof clear polycarbonate cover over the meter.

Condensation-Protective Heater/Thermostat

Furnish a 120 VAC powered resistor heater element and a sealed thermostat to keep the internal temperature of the upper assembly above the dew point to prevent problems associated with condensation.

Type of Transducer

Hydrostatic head-pressure-sensing type mounted at a fixed elevation in an open (vented to atmosphere) sump or tank.

The height of water above the bottom diaphragm imposes a pressure on the bottom limp interface diaphragm. This pressure is transmitted by an internal oil fill to a gauge pressure type variable-capacitance transducer which converts the pressure to a directly proportional electrical signal. The power supply to the transducer is supplied and regulated by an electronics assembly in the upper housing which also accepts the output signal of the lower assembly transducer and provides spanning and offsetting as well as transient protection and job connections.

Basic Function

Converts water level excursions over a calibrated range to corresponding proportional electronic process control signal.

Pressure Ranges

See Pressure Range Table, page 3.

Pressure Overload

See Pressure Range Table, page 3.

Span Adjustments

Coarse and fine. From 100% to 15% of range. Non-interactive with offset adjustments. NOTE: Span is the algebraic difference between zero level and the full-scale calibrated range of the transducer.

Offset Adjustments

Coarse and fine. From 0 to 75% of range. Non-interactive with span adjustments.

Accuracy

±0.3% best straight line of full span. This typical value includes combined effects of linearity, hysteresis and repeatability.

Temperature Range

Storage: -20 to +80 degrees C (-4 to +176 degrees F). Operation: 0 to +70 degrees C (+32 to +158 degrees F).

Temperature Error

Less than 1/2 of 1% span over a 0 to 50 degrees C (+32 to +122 degrees F) range.

Relative Humidity

0-95%, non-condensing.

Stability over 1 year (typical)

±1/2 of 1% of full span.

Job Connections

Clamp type barriers terminals for AWG #14-22.

Media Compatibility

Any media compatible with #316 SS, PVC, Teflon, synthetic rubber and urethane and with a specific gravity of 1.0 or other constant. Refer special requirements to the factory.

Mounting Attitude

The A1000 is factory-calibrated as a standard for use in the vertical position. It can be furnished calibrated for operation in any other desired attitude.

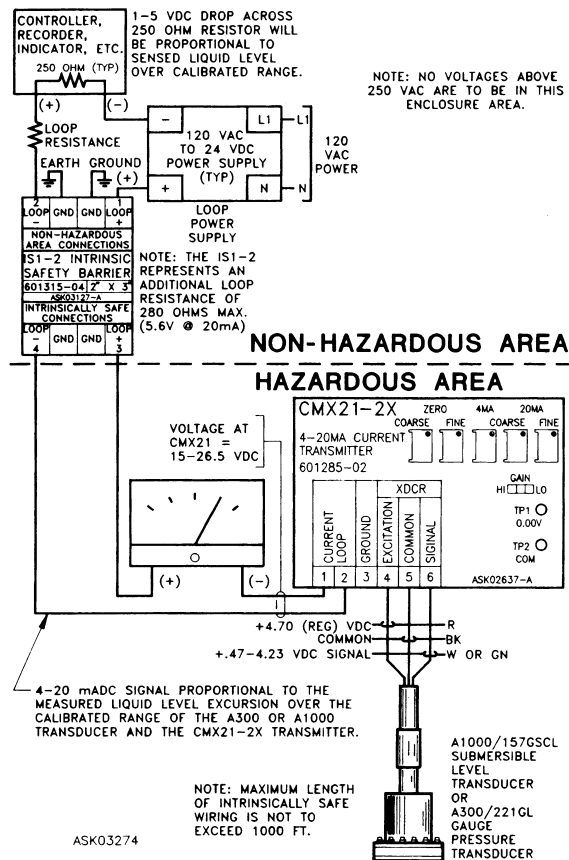
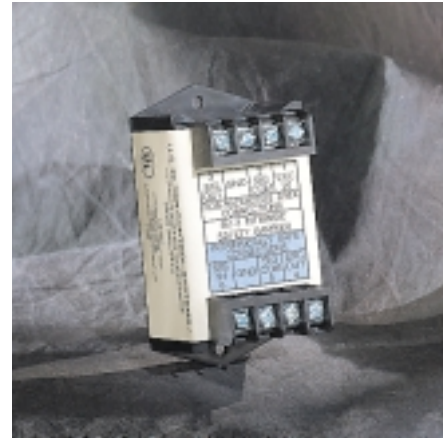
Repairable

All key parts of this transducer/transmitter can be repaired or replaced at the Factory. Easily field repaired.

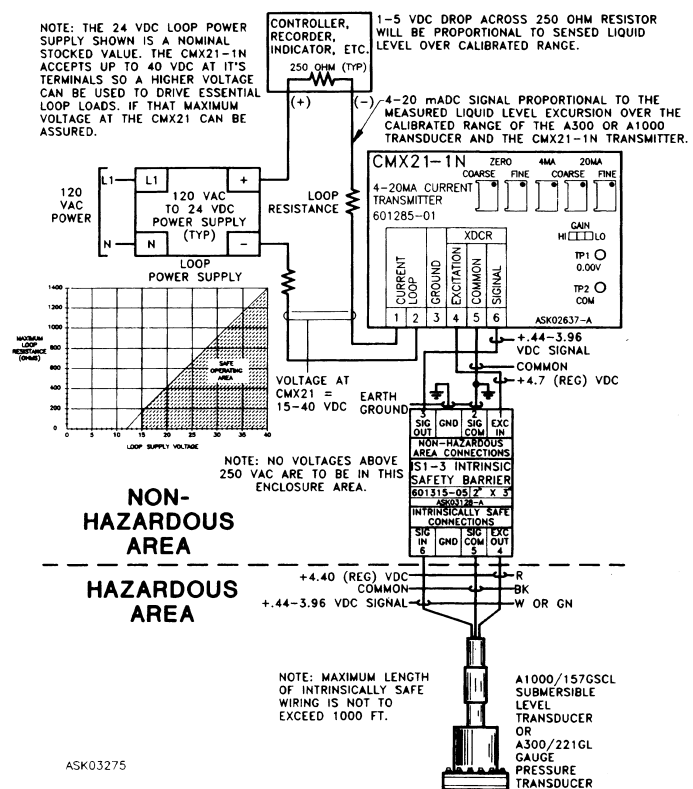
IS1 Features In Brief

- Analog signal Zener shunt-diode barrier.
- UL-recognized, Class 1, Division 1, Group D barrier.

The IS1-2 (2-wire) and IS1-3 (3-wire) Intrinsic Safety Barriers are used to provide isolation between a single analog transmitter located in a hazardous environment and the control panel, which is mounted in a non-hazardous area. The safety barrier provides "intrinsically safe" characteristics for the remotely mounted transducer equipment and associated circuitry installed in the defined hazardous location. The IS1 barriers are ideally suited for use in UL #913 applications. Part numbers for the safety barriers are listed with the mounting hardware options.



Drawing A – The IS1-2 Barrier is used to provide intrinsically-safe characteristics for an A1000 (Model 157GSCD), CMX21-2X Current Transmitter, and Analog Meter. In this case, the entire system is U.L.-listed for operation within hazardous locations.



Drawing B – The IS1-3 is used to provide intrinsically-safe characteristics for the lower portion of the A1000 (Models 157GSCE and 157GSCI) when they use the CMX21-1N Current Transmitter in the non-hazardous area.

A _____ - 157 GSC _____ - _____ - _____ - _____ - _____ (____)-(____)-(____)
 Bulletin # Model # Specific Press. Calibration Cable Opt. 1 Opt. 2 Opt. 3
 Upper Assembly Gravity Range Range (Ft.) Length

NOTES:

1. *Breather Kit option required. Also requires regulated 6.25 VDC source. Output not scaled.*
2. *Contact factory for chemical compatibility of materials.*
3. *Must fall within selected Pressure Range. Confirm that cable length is consistent with calibration range.*
4. *Greater than 60 feet, consult factory.*
5. *Requires 120 VAC service.*
6. *Used when upper assembly mounted in hazardous area. Devices shipped loose for mounting in monitoring panel. CMX21 analog signal conditioner module is potted.*
7. *Mounted in upper assembly and used when upper assembly mounted in non-hazardous area.*

PART NUMBERS

DESCRIPTION	PART NUMBER
Sensors	
A1000 1# sensor, up to 2.31'/2.72" (20# proof pressure)	601295-01
A1000 5# sensor, up to 11.55'/138.6" (50# proof pressure)	601295-02
A1000 15# sensor, up to 34.65'/416,0" (75" proof pressure)	601295-03
A1000 30# sensor, up to 69.3'/832.0" (150# proof pressure)	601295-04
A1000 75# sensor, up to 173.25' (375# proof pressure)	601295-05
A1000 150# sensor, up to 346.5'	601295-06
A1000 300# sensor, up to 693'	601295-07
Cables	
A1000 20' cable	601264-02
A1000 30' cable	601264-03
A1000 40' cable	601264-04
A1000 60' cable (<i>For cable lengths greater than 60 feet consult factory</i>)	601264-06
Upper Assemblies	
A1000 GSCE (1-5V output), weatherproof fiberglass enclosure	601265-11
A1000 GSCE (4-20 mA output), weatherproof fiberglass enclosure	601294-01
A1000 GSCE (4-20mA), enclosure, 3-1/2 digit LCD digital meter w/viewing window	601294-03
A1000 GSCE (4-20mA), enclosure, heater and thermoswitch	601294-04
A1000 GSCE (4-20mA), enclosure, heater and thermoswitch, 24 VDC loop power	601317-01
A1000 GSCE (120 VAC pwr, 4-20 mA output), weatherproof fiberglass enclosure)	601265-12
A1000 GSCI (120 VAC pwr, 4-20 mA), encl, heater & thermoswitch	601265-14
A1000 GSCI (120 VAC pwr, 4-20 mA), encl, digital meter w/window, htr, thermo	601265-16
A1000 GSCI (120 VAC pwr, 4-20 mA), encl, digital meter w/viewing window	601265-17
A1000 GSCL (no upper assembly; for use with D15x controllers) breather kit	601288-01
<i>For upper assembly options not shown (intrinsically safe, UL), consult the factory.</i>	
Mounting Hardware and Accessories	
B100 9G CL3 stainless steel pipe mount clamps (transducer or float mount)	601134-01
A1000 Cable suspension mount fixture (without SS cable; see next item)	601418-01
A1000 Cable suspension mount stainless steel cable; each additional 10' (XX=length)	601440-XX
A1000 Model TCB terminal connection (junction) box w/breather	601291-02
A1000 Model CMX12 120 VAC powered power supply/4-20 mA transmitter	601119-01
A1000 Model CMX19 signal conditioner/1-5 VDC transmitter	601202-02
A1000 Model CMX21 signal conditioner/4-20 mA transmitter	601285-01
A1000 Model CMX21 signal conditioner/4-20 mA transmitter; intrinsically safe (potted)	601285-02
A1000 Model IS1-2 intrinsic safety barrier; 4-20 mA output (use w/potted CMX21)	601315-04
A1000 Model IS1-3 intrinsic safety barrier; 1-5 V output (standard)	601315-05

COMPLETE CONTROL CAPABILITIES

USFilter Control Systems offers a single, high-quality source for everything from simple level sensors to telemetry systems to complex system control engineering and software. Based in St. Paul, MN, USFilter Control Systems is part of United States Filter Corporation, the leading global provider of industrial, municipal and residential water and wastewater treatment systems, products and services.

As a major manufacturer/integrator with an extensive selection of specialized product lines in the areas of SCADA and telemetry, power equipment integration, automation and measurement, USFilter Control Systems is uniquely positioned to provide cost-effective, comprehensive solutions for water, wastewater, and process control and telemetry applications. Our products and services encompass the following:

- Complete design and engineering services
- Field services, including training and troubleshooting
- Autocon SCADA systems
- Consolidated Electric SCADA systems
- Microcat control and telemetry products
- Remote terminal units and central control units
- Control and monitoring software
- Process control and communications computers
- I/O boards, modems and power supplies
- Power equipment integration
- Programmable logic controller systems
- Programmable process controllers
- Controllers and controller/alternators
- Tank pump control systems
- Pressure/level controllers
- Pump flow and performance monitoring
- Flow switches and float switches
- Intrinsic safety barriers
- Level transducers and level sensors
- Pressure transducers

To find out more about how to put
USFilter to work for you,
contact us at



Control Systems
1239 Willow Lake Boulevard
Vadnais Heights, MN 55110
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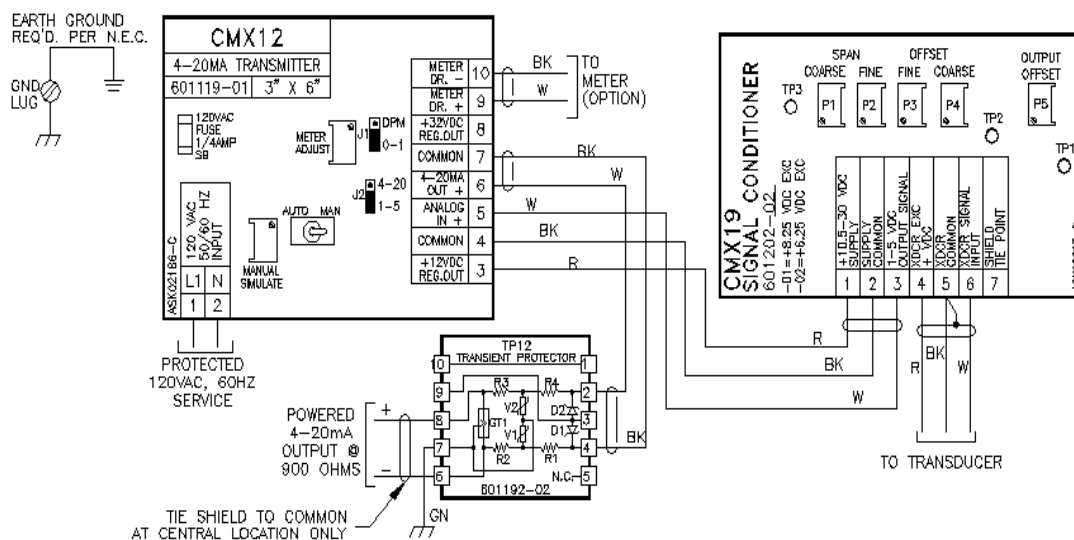
For more information,
visit our web site at

www.controlsystems.usfilter.com
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The CMX12 Power Supply /V-I Converter Module is designed to interface with A300 and A1000 pressure transducers. It supplies power to the transducer and as the pressure varies with the liquid level the CMX12 receives a voltage signal and converts it to a powered 4-20mA signal. The CMX12 also can be connected to 0-1mA analog panel meter or a 0-1.999 VDC digital panel meter. The CMX12 has an Auto/Manual switch and a Manual simulate adjustment potentiometer, which can be used to simulate a voltage input, for calibrating and testing the current loop and related equipment.

Part Number	Description	Application	Notes
6011190001	CMX12 Power Supply/V-I Transmitter	157GCSI Upper Assembly	



Specifications

Physical

Dimensions: 3"x 3 1/2" x 1 3/4"
Mounting: 3" Snaptrack

Electrical

Power Requirements:
120 VAC (+/- 10%)
Onboard Transient protection provided.

Environmental

Temperature Range
Storage: -20 to 80 C (-4 to 176 degrees F)
Operation: 0 to 70 C (32 to 158 degrees F)

Temperature Error:
Less than 1/2 of 1% span over a 0 to 50 C (32 to 122 degrees F) range.

Relative Humidity: 0 – 95%, non-condensing.

Electrical

Output Accuracy:

+/-0.3% best straight line of full span. This typical value includes combined effects of linearity, hysteresis and repeatability

32 VDC Power Supply Out Typically used as a Current Loop Supply with maximum current loop impedance of 1000 ohms.

12 VDC Power Supply Out. Typically used to power a CMX19 signal conditioner.
@ 150mA max

Terminal Description and Normal Operation

Terminals Clamp Type. 14 - 22 AWG

Terminal 1 L1 120VAC; 1/4 Amp Slo-Blo Onboard fuse
Transient protection: 130VAC Varistor surge arrestor

Terminal 2 N Neutral.

Terminal 3 12 VDC Regulated output power

Terminal 4 12 VDC Common.

Terminal 5 1 -5VDC Analog input signal

Terminal 6 Plus (+) output for a 4-20mA output (32VDC Loop Supply Voltage)

Terminal 7 (-) 4 -20mA Loop Common

Terminal 8 32 VDC output to supply.z

Terminal 9 & 10 Meter output for 0-1mA or 0 -1.999 VDC. Selectable by a jumper. (J1)

J1 Jumper Meter Output Selection: 0-1 mA analog or 0-1.999 VDC digital meter

J2 Jumper Input Selection: 1 -5VDC or 4-20mA.
When using the CMX19 the jumper is set for 1-5VDC.

Auto/ Manual Switch In the Auto position the incoming signal comes from the transducer on Terminal 5.
In the Manual position, the Manual Simulate Pot can be turned to simulate a signal.
In either position, the output signal can be measured between Terminals 9 and 10.

Testing Procedures**Level/Pressure Simulation**

When the CMX12 is used with an A1000 transducer, flipping Auto/Manual (A/M) switch to the Manual position (M) and turning the Manual Simulate potentiometer with a small screwdriver can simulate the input signal (level/pressure). Rotating it clockwise will increase the output level. Ensure that the Auto/Manual switch is returned to the Auto (A) position when simulation is complete.

The CMX19 is a 12VDC powered signal conditioner module that supplies 6.25 VDC to a submersible transducer. It monitors the transducer output as the head-pressure varies with the changes in the liquid level. The CMX19 provides a scaled 1-5 VDC proportional analog output signal capable of driving a 100 ohm load such as controller or recorder. This module is well suited for battery operation and transient protection is provided which include varistors, resistors and diodes.

Part Number	Description	Application	Notes
60120220001	CMX19 1-5 VDC out, Transducer Excitation 8.25 VDC	Obsolete –Replacement Part Only	
60120220002	CMX19 1-5 VDC out, Transducer Excitation 6.25 VDC	Used in USFCS 157GSCE and 157GSCI Upper Assembly	

Specifications

Environmental

Temperature Range

Storage: -20 to 80 C (-4 to 176 degrees F)

Operation: 0 to 70 C (32 to 158 degrees F)

Temperature Error

Less than 1/2 of 1% span over a 0 to 50 C
(32 to 122 degrees F) range.

Relative Humidity

0 – 95%, non-condensing.

Physical

Dimensions: 3" x 3 1/2" x 1"

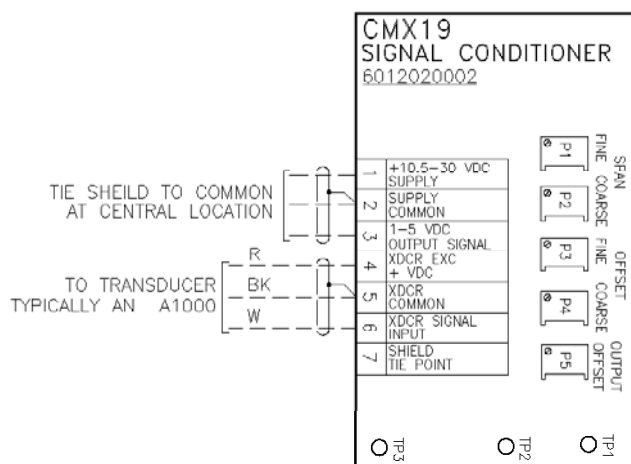
Mounting: 3" Snaptrack

Electrical

Output Accuracy:

+/-0.3% best straight line of full span. This typical value includes combined effects of linearity, hysteresis and repeatability

Power Requirements: 10.5 to 30.0 VDC



Terminal Description and Normal Operation

Terminals Clamp Type. 14 - 22 AWG wire

Terminal 1 10.5 to 30.0 VDC Input Power

Terminal 2 Power Supply Common
This is the same point on the board as Terminal 5 and the test point TP1.

Terminal 3 1 to 5 VDC Output to Control Equipment
1 VDC is the zero pressure output voltage and 5 VDC is the full-scale span output voltage.

Terminal 4 Pressure Element Excitation Voltage Output (Red wire)
This is 6.25 \pm 0.2 VDC.

Terminal 5 Pressure Element Voltage Common (Black wire)
This is the same as Terminal 2 and test point TP1.

Terminal 6 Pressure Element Input Signal (White wire)
This should be approximately 0.5 VDC at zero.

Terminal 7 Shield tie point.
No connection.

Calibration/Testing Procedures

The transducer is factory calibrated per customer specifications. Therefore user adjustments are normally not required. However, if re-calibration is necessary, the transducer can be re-calibrated within its range with a voltmeter and a small screwdriver. All adjustments and measurements are made on the CMX19 module.

If the CMX19 is being calibrated in the field place the controls in “hand” or “off” position to eliminate unwanted pump start/stops and alarms.

Locate test points TP1, TP2, TP3 and adjustment pots - SPAN (fine and coarse), OFFSET (fine and coarse) and OUTPUT offset on the CMX19 board. Note: Clockwise rotation of the adjustments will increase the voltage.

1. Verify supply voltage between Terminal 1 (+) and Terminal 2 (common). It should be between 10.5 VDC and 30VDC.
2. Apply minimum pressure or level to the transducer.
3. Measure voltage between TP1 (common) and TP2 (+). Voltage should be 0.00 VDC. If not, adjust the coarse and fine OFFSET pots.

4. Measure voltage between TP1 (common) and TP3 (+). It should read 1.00 VDC. If not, adjust the OUTPUT offset pot.
5. Apply maximum pressure or level to the transducer.
6. Measure voltage between TP1 (common) and TP3 (+). Voltage should be 5.00 VDC. If not, adjust the course and fine SPAN pots.
7. To verify proper calibration repeat steps 3 through 6. If the voltages are correct then no further adjustments are required and the transducer is calibrated.

The CMX21 is a loop powered, 4 - 20mA, 2-wire, DC signal conditioner module that supplies 4.5 VDC to a transducer. It monitors the transducer output as the head-pressure varies with the liquid level and provides a 4-20mA output signal to a 0 – 1400 ohm resistive load; such as a Controller, Recorder and/or Meter.

Part Number	Description	Application	Notes
6012850001	CMX21 Signal Conditioner/ 4-20mA Transmitter	Used in USFCS 157GSCD	1
6012850002	CMX21 Signal Conditioner/ 4-20mA Transmitter	Intrinsically Safe (potted) UL Rating File #E138857 YNE Class	2

Notes:

- Requires 15-40 VDC power and provides transient protection, which includes a three-element gas tube.
- Requires 15-26.5 VDC power and Terminal 3 is not connected.

Specifications

Environmental

Temperature Range

Storage: -20 to 80 C (-4 to 176 degrees F)

Operation: 0 to 70 C (32 to 158 degrees F)

Temperature Error

Less than 1/2 of 1% span over a 0 to 50 C
(32 to 122 degrees F) range.

Relative Humidity

0 – 95%, non-condensing.

Physical

Dimensions: 3"x 3 1/2" x 1"

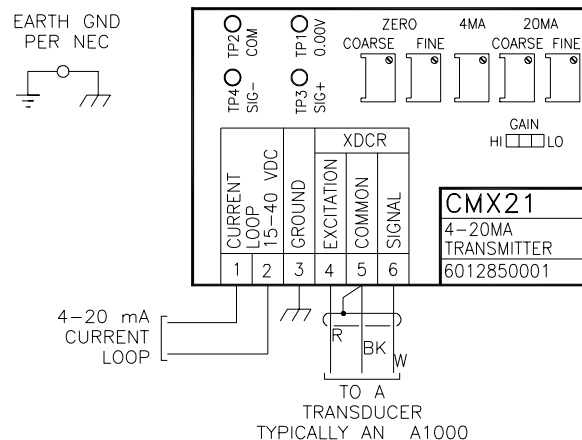
Mounting: PN 6012850001 CMX21 Signal Conditioner is mounted on a 3" Snaptrack.

PN 6012850002 is Intrinsically Safe and potted. It is mounted directly to a panel with 6-32 screws.

Electrical

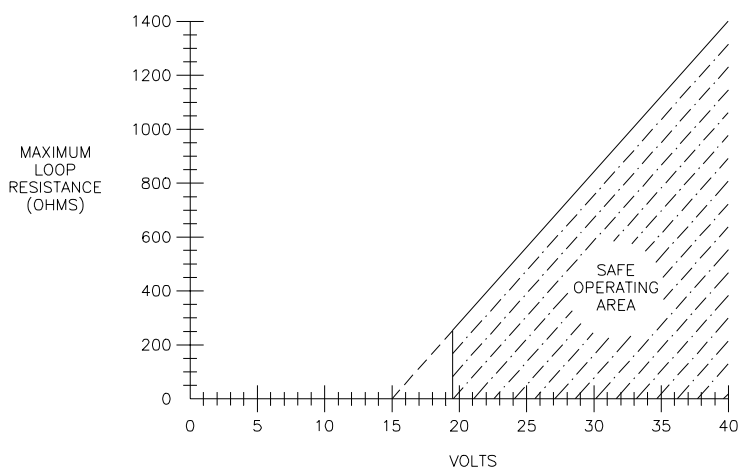
Output Accuracy:

+/-0.3% best straight line of full span. This typical value includes combined effects of linearity, hysteresis and repeatability



Power Requirements: 15 to 40.0 VDC for CMX-21 Part Number 6012850001

The loop resistance determines the power requirements. 40 VDC is the maximum loop voltage and the maximum loop resistance is 1400 ohms. The greater the loop resistance the more voltage is needed.



Terminal Description and Normal Operation

Terminals Clamp Type: 14 - 22 AWG wire.

- | | |
|------------|---|
| Terminal 1 | 15 to 40.0 VDC Input Power
15 to 26.5 VDC Input Power for Intrinsically Safe CMX-21. See Note 2 |
| Terminal 2 | Power Loop Return
Power Loop Return for the 4 to 20mA signal. Polarization not required. |
| Terminal 3 | Ground
Connect to a good earth ground for lightning protection.
If using an Intrinsically Safe Barrier. Do not connect to ground. |
| Terminal 4 | Pressure Element Excitation Voltage Output (Red wire)
This should be approximately 4.5 +/-0.2 VDC. |
| Terminal 5 | Pressure Element Voltage Common (Black wire)
This is the same as Test Point TP2. |
| Terminal 6 | Pressure Element Input Signal (White wire)
This should be approximately 0.4 VDC at zero pressure |

Calibration/Testing Procedures

The transducer is factory calibrated per the customer specifications. Therefore user adjustments are normally not required. However, if re-calibration is necessary, the transducer can be re-calibrated within its range with a voltmeter and a small screwdriver. All adjustments and measurements are made on the CMX21 module.

If the CMX21 is being calibrated in the field, place the controls in “hand” or “off” position to eliminate unwanted pump start/stops and alarms.

Locate test points TP1, TP2, TP3, TP4 and adjustment pots - 4mA pot, 20mA (fine and coarse), and ZERO (fine and coarse) on the CMX21 board.

1. Apply minimum pressure or level to the transducer.
2. Measure voltage between TP1 (common) and TP2 (+). Voltage should be 0.00 VDC. If not, adjust the course and fine ZERO pots.

Insert an ammeter in the current loop. (+TP3 and -TP4 on newer boards) Turn the 4mA adjustment pot until the meter reads 4.00mA.

1. Apply maximum pressure or level to the transducer.
2. With the ammeter in the current loop, turn the 20mA pots (fine and coarse) until the meter reads 20mA.
3. Repeat the steps to verify proper calibration.

Note: If a system is to be adjusted over a small portion of the transducer range, the GAIN jumper may need to be placed in the HI position.

Trouble Shooting**Loop Resistance Check**

The loop resistance can be measured with an ohmmeter.

1. Disconnect the power supply from the loop and jumper the two wires together.
2. Disconnect the loop wires from the CMX21.
3. With the ohm meter measure the resistance between the loop wires.

When the test is complete, reconnect the power supply wires and the CMX21 wires.

Part Number	Description	Application	Notes
6011920001	TP11 Unpowered Voice-Grade Phone Line	Suppresses line transients on unpowered voice-grade telephone circuits.	
6011920002	TP12 Transient Protector 2-Wire 4-20mA Current Loop	Suppresses line transients on 2-wire current loop circuits.	
6011920004	TP14 Transient Protector 3-Wire or Potentiometric	Suppresses line transients on 3-wire circuits or potentiometric sensors.	
6011920005	TP15 Transient Protector 4-20mA, 2-Wire DC Circuit	Suppresses line transients on 2-wire current loop circuits with external power supply.	

Specifications

Physical: All Models

Dimensions: 3"x 2.75"x 1"

Mounting: 3" Snaptrack

Environmental: All Models

Temperature Range

Storage: -20 to 80 C (-4 to 176 degrees F)

Operation: 0 to 70 C (32 to 158 degrees F)

Electrical: All Models

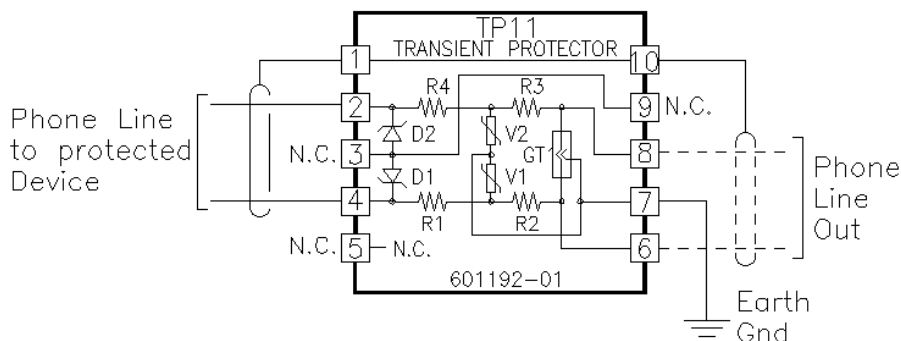
Power Requirements:

No power required.

Relative Humidity: 0 – 95%, non-condensing.

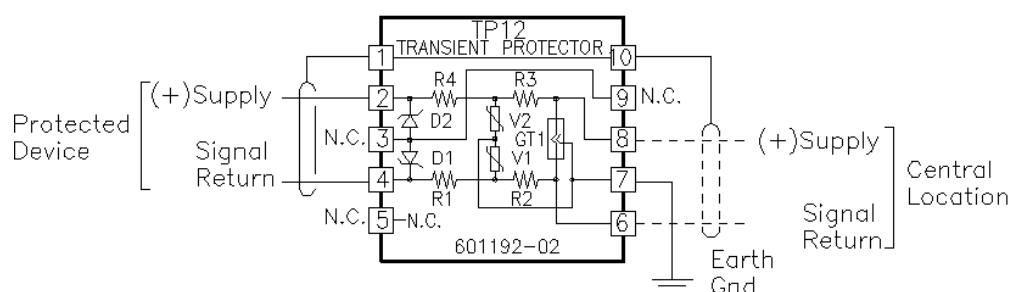
TP11 Transient Protector Unpowered Voice-Grade Phone Line

The TP11 Transient Protector is a three-stage surge suppression device, which can effectively attenuate most transients. It is designed for use in unpowered voice-grade telephone circuits. The first stage consists of a rugged gas tube arrestor connected across the signal lines and ground. This stage is designed to suppress transients greater than 150 to 300 volts. The second stage consists of two varistors each connected between a signal line and ground. This stage is designed to suppress any transients less than 150 to 300 volts and clamp them to 22 VDC. The third stage consists of two special purpose, high-speed zener diodes, which suppress any remaining transients to 12 VDC. Four 25 ohm, 5-watt resistors, are connected between the stages to dissipate the potential energy of the transients.



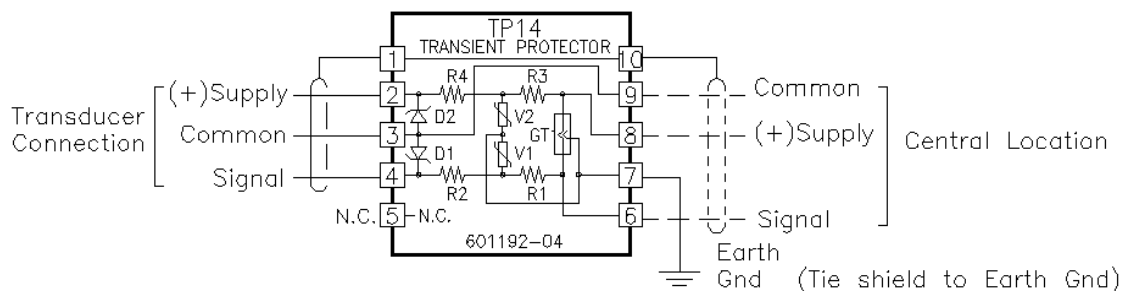
TP12 Transient Protector 2-Wire 4-20mA Current Loop

The TP12 Transient Protector is a three-stage surge suppression device, which can effectively attenuate most transients. It is designed for use on 4-20mA current loop circuits. The first stage consists of a rugged gas tube arrestor connected across the signal lines and ground. This stage is designed to suppress transients greater than 150 to 300 volts. The second stage consists of two varistors each connected between a signal line and ground. This stage is designed to suppress any transients less than 150 to 300 VDC and clamp them to 56 VDC. The third stage consists of two special purpose, high-speed zener diodes that suppress any remaining transient to 51 VDC. Four 25 ohm, 5 watt resistors are connected between the stages to dissipate the potential energy of the transients.



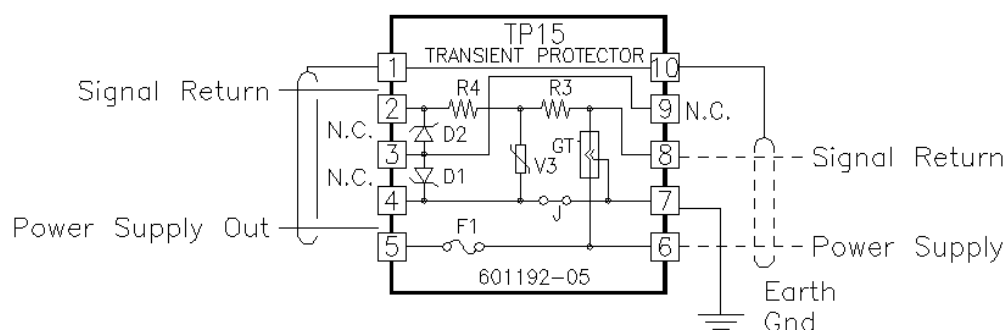
TP14 Transient Protector 3-Wire or Potentiometric

The TP14 Transient Protector is a three-stage surge suppression device, which can effectively attenuate most transients. It is designed for use in potentiometric or 3-wire circuits. In either case, the circuit would consist of a power supply, signal and signal return (common) connections. The first stage consists of a rugged gas tube arrestor connected across the signal and power lines to ground. This stage is designed to suppress transients greater than 150 to 300 volts. The second stage consists of two varistors connected from the signal line and power supply line to ground. This stage is designed to suppress any transients less than 150 to 300 volts and clamp them to 39 VDC. The third stage consists of two special purpose, high speed zener diodes. These diodes suppress any remaining transients on the signal line to 12 VDC and to 30 VDC on the power supply line. Four 25 ohm, 5 watt resistors are connected between the stages to dissipate the potential energy of the transients.

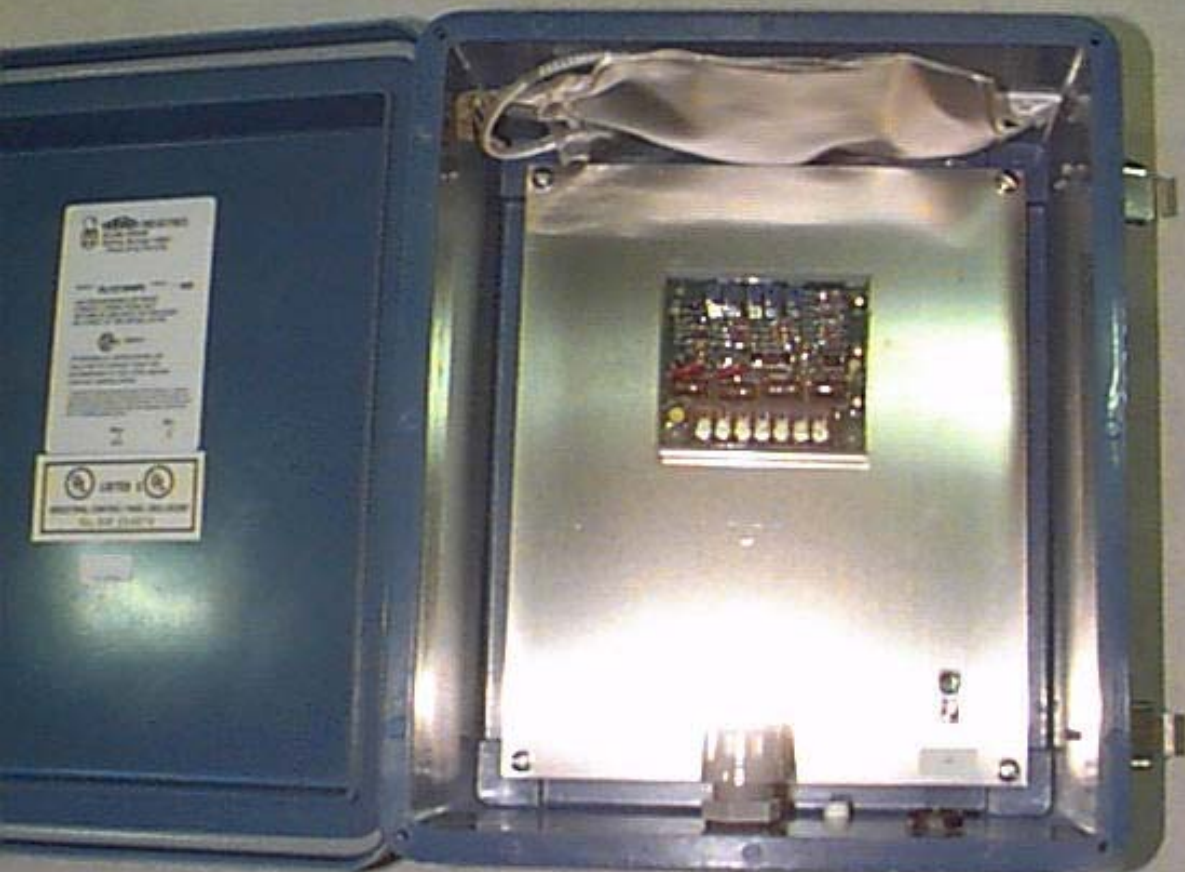


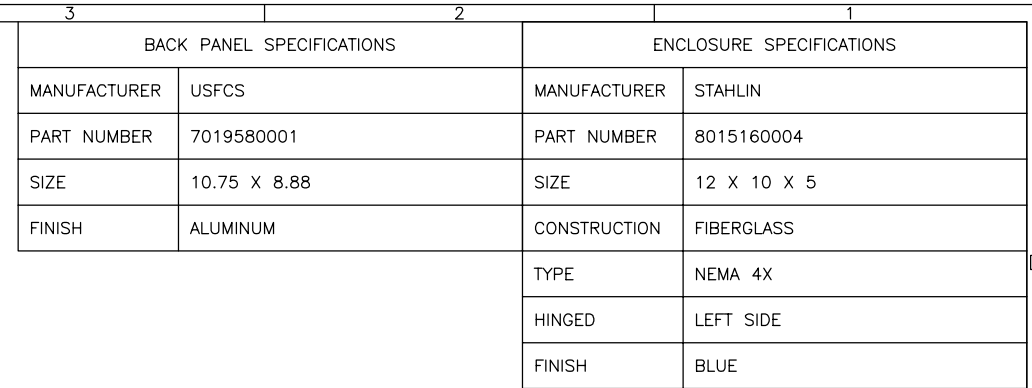
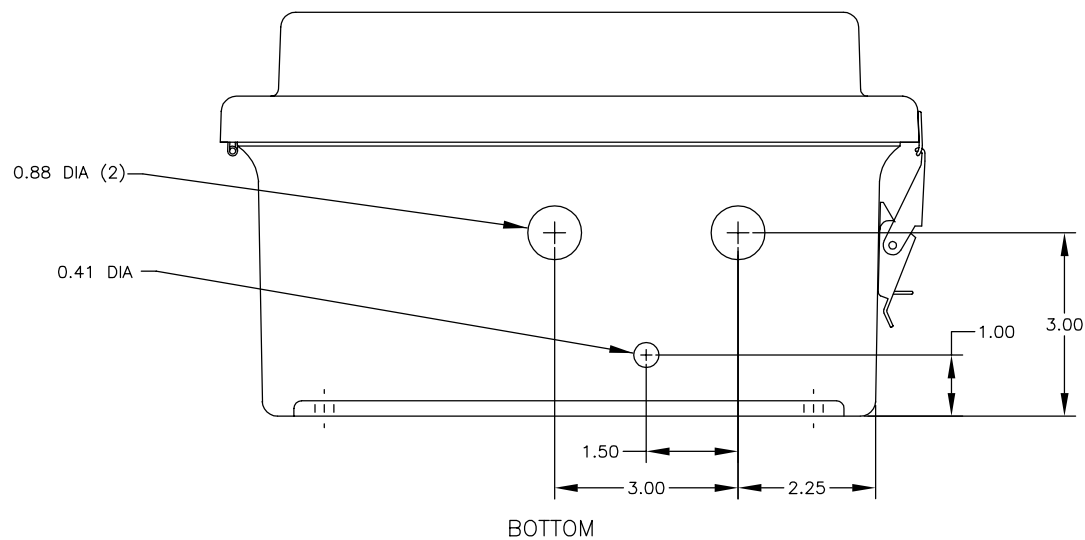
TP15 Transient Protector 4-20mA, 2-Wire DC Circuit

The TP15 Transient Protector is a three-stage surge suppression device, which can effectively attenuate most transients. It is designed for use in 4-20mA loops with a local power supply. The first stage consists of a rugged gas tube arrestor connected across the signal lines and ground. This stage is designed to suppress any transients greater than 150 to 300 volts. The second stage consists of a varistor connected between the signal return and ground. This stage is designed to suppress any transients less than 150 to 300 volts and clamp them to 22 volts. The third stage consists of two special purpose, high-speed zener diodes that suppress any remaining transient to 12 volts. Four 25 ohm, 5 watt resistors are connected between stages to dissipate the potential energy of the transients. A 1 amp fuse is also included to protect the power supply.



A1000 GSCD or GSCE Upper Assembly





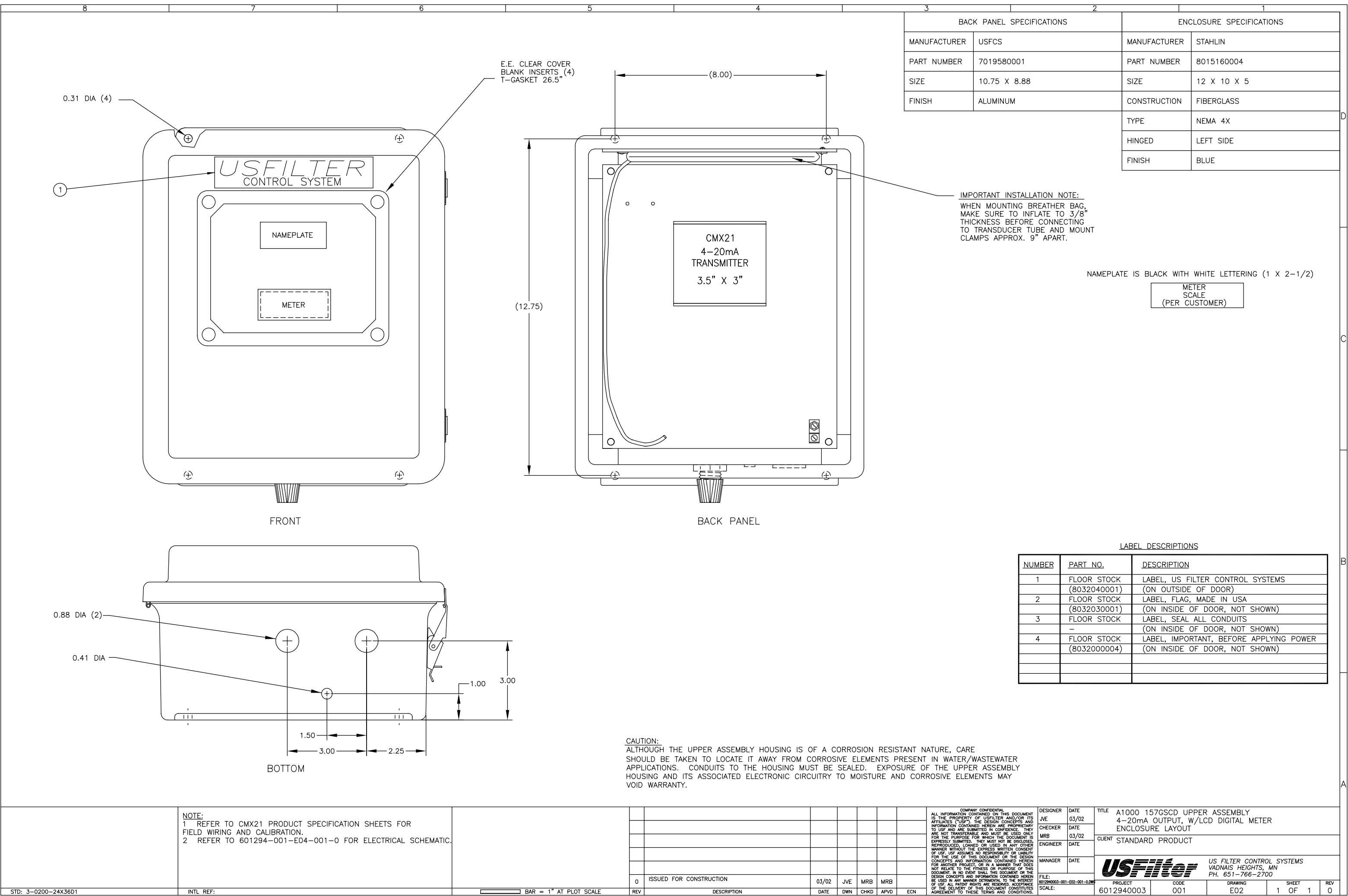
IMPORTANT INSTALLATION NOTE:
WHEN MOUNTING BREATHER BAG,
MAKE SURE TO INFLATE TO 3/8"
THICKNESS BEFORE CONNECTING
TO TRANSDUCER TUBE AND MOUNT
CLAMPS APPROX. 9" APART.

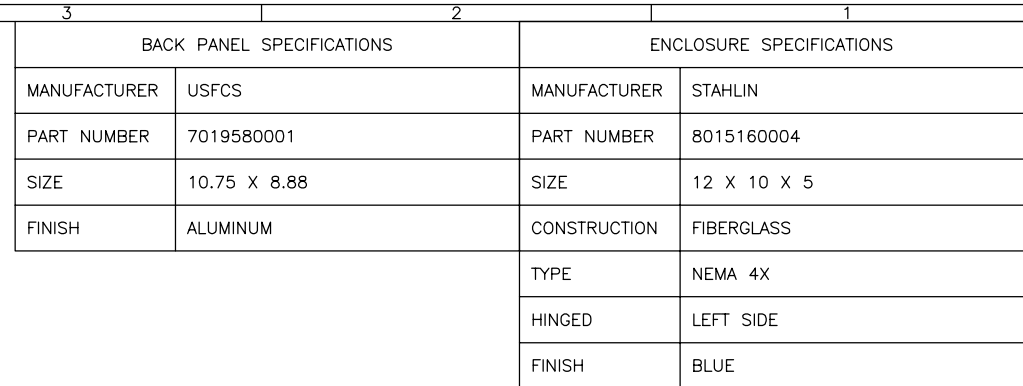
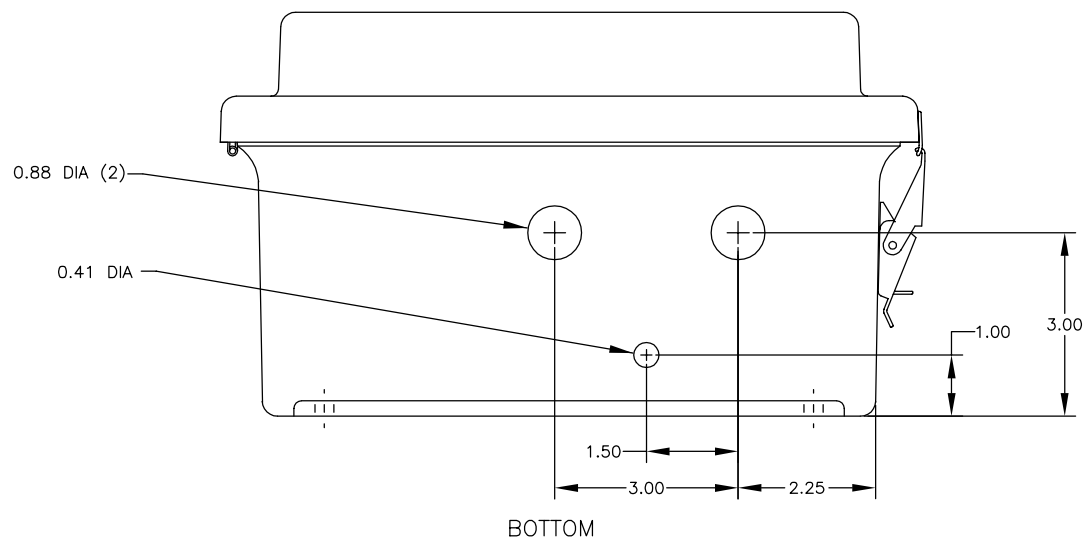
LABEL DESCRIPTIONS

<u>NUMBER</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	FLOOR STOCK (8032040001)	LABEL, US FILTER CONTROL SYSTEMS (ON OUTSIDE OF DOOR)
2	FLOOR STOCK (8032030001)	LABEL, FLAG, MADE IN USA (ON INSIDE OF DOOR, NOT SHOWN)
3	FLOOR STOCK —	LABEL, SEAL ALL CONDUITS (ON INSIDE OF DOOR, NOT SHOWN)
4	FLOOR STOCK (8032000004)	LABEL, IMPORTANT, BEFORE APPLYING POWER (ON INSIDE OF DOOR, NOT SHOWN)

CAUTION:
ALTHOUGH THE UPPER ASSEMBLY HOUSING IS OF A CORROSION RESISTANT NATURE, CARE SHOULD BE TAKEN TO LOCATE IT AWAY FROM CORROSIVE ELEMENTS PRESENT IN WATER/WASTEWATER APPLICATIONS. CONDUITS TO THE HOUSING MUST BE SEALED. EXPOSURE OF THE UPPER ASSEMBLY HOUSING AND ITS ASSOCIATED ELECTRONIC CIRCUITRY TO MOISTURE AND CORROSIVE ELEMENTS MAY VOID WARRANTY.

<p>COMPANY CONFIDENTIAL</p> <p>ALL INFORMATION CONTAINED ON THIS DOCUMENT IS THE PROPERTY OF US FILTER AND/OR ITS AFFILIATES ("USF"). THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN ARE PROPRIETARY TO USF AND ARE SUBMITTED IN CONFIDENCE. THEY ARE NOT TRANSFERABLE AND MUST BE USED ONLY FOR THE PURPOSE FOR WHICH THE DOCUMENT IS EXPRESSLY SUBMITTED. THE INFORMATION CANNOT BE REPRODUCED, LOANED OR USED IN ANY OTHER MANNER WITHOUT THE WRITTEN CONSENT OF USF. USF ASSUMES NO RESPONSIBILITY OR LIABILITY FOR THE USE OF THIS DOCUMENT OR THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN FOR ANOTHER PROJECT, OR IN A MANNER THAT DOES NOT RELATE TO THE FIT, FORM OR PURPOSE OF THIS DOCUMENT. IN NO EVENT SHALL THIS DOCUMENT OR THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN BE USED IN ANY MANNER DETRIMENTAL TO THE INTEREST OF USF. IF ANY INFRINGEMENT OR VIOLATION OF THE DELIVERY OF THIS DOCUMENT CONSTITUTES BREACH OF THESE TERMS AND CONDITIONS.</p>		<p>DESIGNER DATE TITLE</p> <p>JVE 03/02 A1000 157GSCD UPPER ASSEMBLY</p> <p>CHECKER DATE 4-20mA OUTPUT</p> <p>MRB 03/02 ENCLOSURE LAYOUT</p> <p>ENGINEER DATE CLIENT STANDARD PRODUCT (NO OPTIONS)</p>
<p>MANAGER DATE</p>	<p>US Filter</p> <p>US FILTER CONTROL SYSTEMS VADNAIS HEIGHTS, MN PH. 651-766-2700</p>	
<p>FILE: 6012940001-001-E02-001-0-00W</p>	<p>PROJECT 6012940001</p>	<p>CODE 001</p>
<p>SCALE: 1</p>	<p>DRAWING E02</p>	<p>SHEET 1 OF 1</p>
<p>REVISION 0</p>	<p>1</p>	<p>0</p>





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MAKE SURE TO INFLATE TO 3/8"
THICKNESS BEFORE CONNECTING
TO TRANSDUCER TUBE AND MOUNT
CLAMPS APPROX. 9" APART.

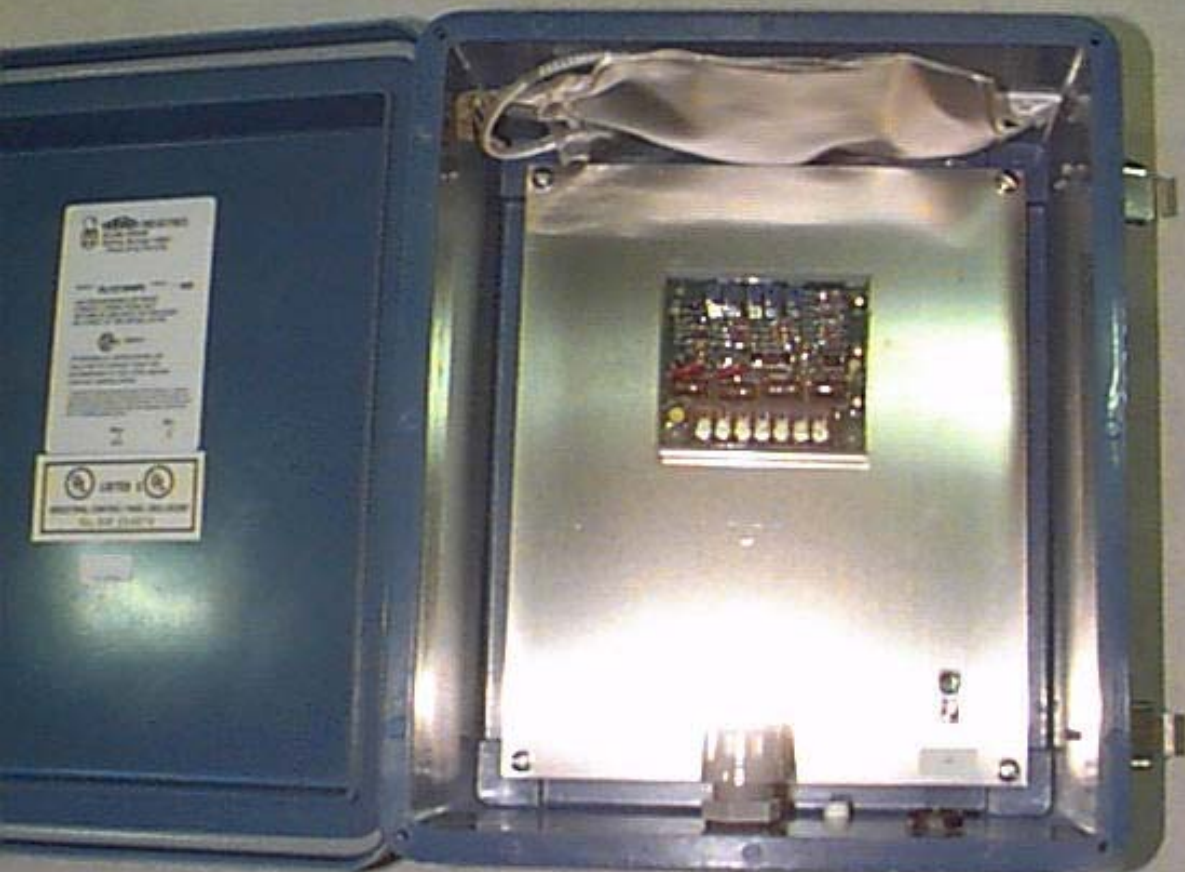
LABEL DESCRIPTIONS

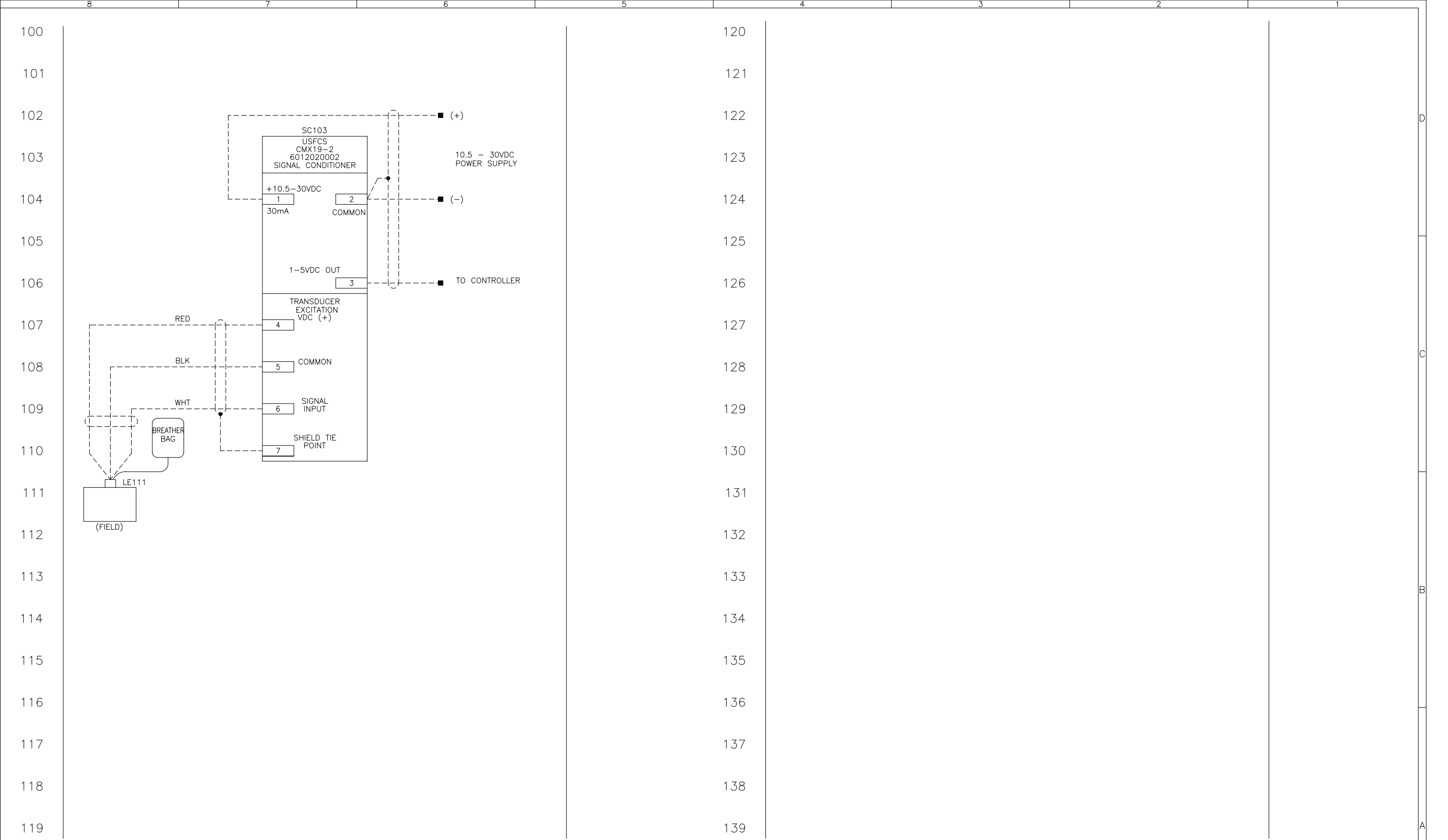
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	—	(ON INSIDE OF DOOR, NOT SHOWN)
4	FLOOR STOCK (8032000004)	LABEL, IMPORTANT, BEFORE APPLYING POWER (ON INSIDE OF DOOR, NOT SHOWN)

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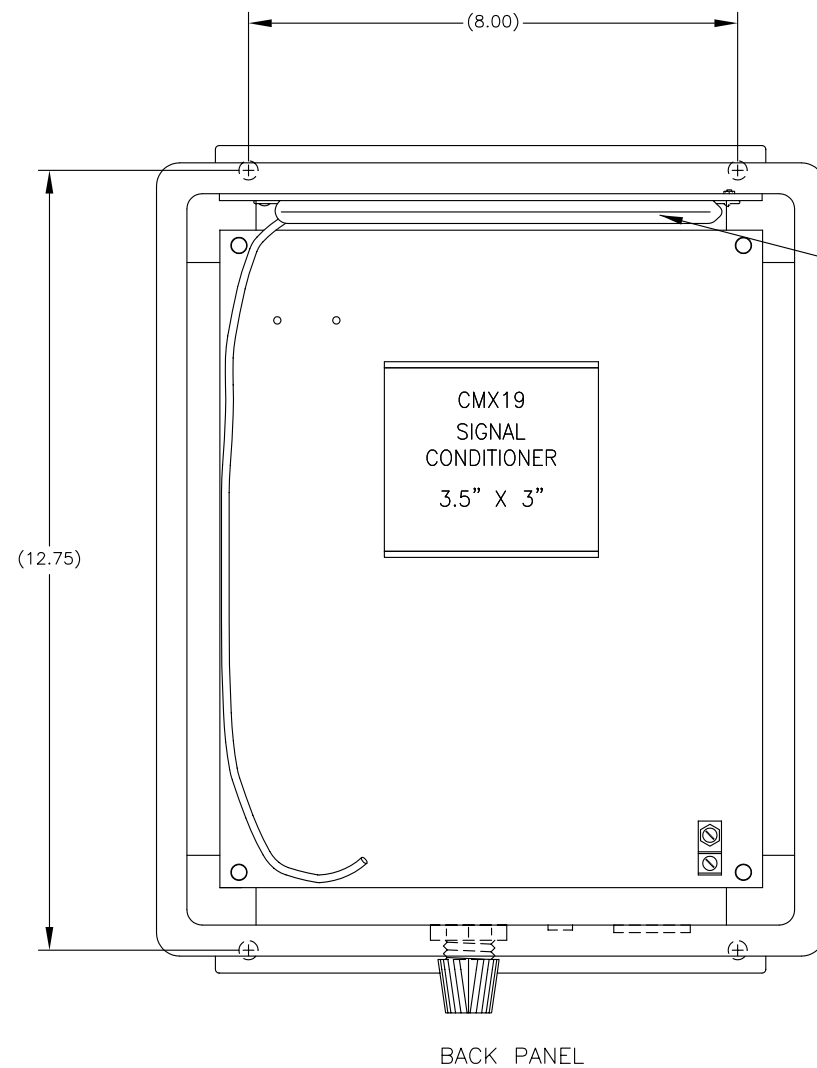
[illegible]

A1000 GSCD or GSCE Upper Assembly



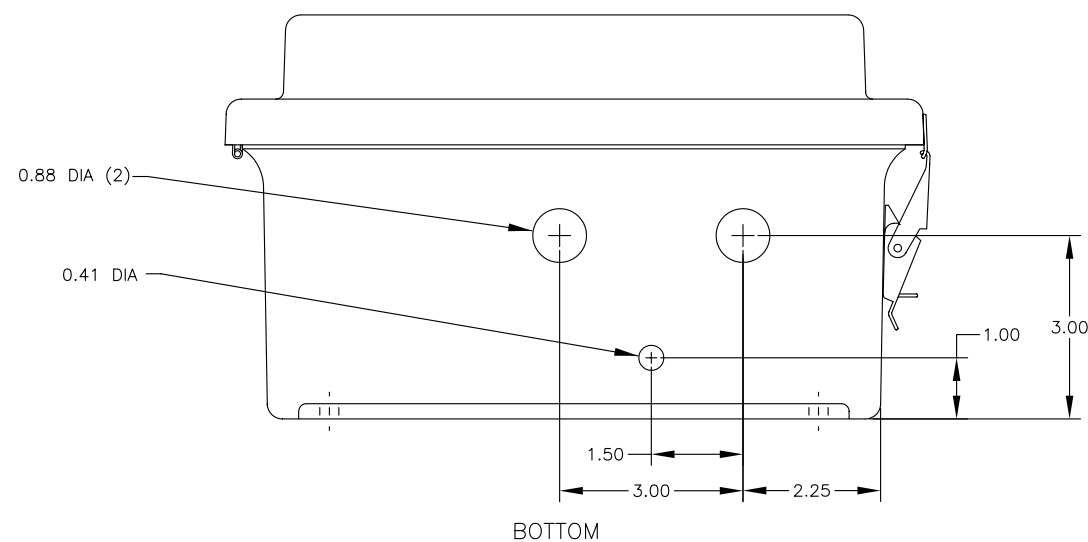


STD: 3-0200-24X36D1	INTL REF:	<div><div></div></div> BAR = 1" AT PLOT SCALE	1	UPDATED CMX19-2	08/03	JVE	MRB	MRB	11077	<div>COMPANY CONFIDENTIAL</div> <div>ALL INFORMATION CONTAINED ON THIS DOCUMENT IS THE PROPERTY OF USFILTER AND/OR ITS AFFILIATES ("USF"). THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN ARE PROPRIETARY TO USF AND ARE SUBMITTED IN CONFIDENCE. THEY ARE NOT TRANSFERABLE AND MUST BE USED ONLY FOR THE PURPOSE FOR WHICH THE DOCUMENT IS EXPRESSLY SUBMITTED. THEY MUST NOT BE DISCLOSED, REPRODUCED, LOANED OR USED IN ANY OTHER MANNER WITHOUT THE EXPRESS WRITTEN CONSENT OF USF. USF ASSUMES NO RESPONSIBILITY OR LIABILITY FOR THE USE OF THIS DOCUMENT OR THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN FOR ANOTHER PROJECT, OR IN A MANNER THAT DOES NOT RELATE TO THE FITNESS OR PURPOSE OF THIS DOCUMENT. IN NO EVENT SHALL THIS DOCUMENT OR THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN BE USED IN ANY MANNER DETRIMENTAL TO THE INTEREST OF USF. ALL PATENT RIGHTS ARE RESERVED. ACCEPTANCE OF THE DELIVERY OF THIS DOCUMENT CONSTITUTES AGREEMENT TO THESE TERMS AND CONDITIONS.</div>	DESIGNER	DATE	TITLE	<div><div>USFilter</div><div>US FILTER CONTROL SYSTEMS VADNAIS HEIGHTS, MN PH. 651-766-2700</div></div>				
			0	ISSUED FOR CONSTRUCTION	03/02	JVE	MRB	MRB	CHECKER		DATE	CLIENT						
									ENGINEER		DATE							
									MANAGER		DATE							
									FILE:									
			REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN	SCALE:	PROJECT	CODE	DRAWING	SHEET	REV			
											6012650011	001	E04	1 OF 2	1			



3		2		1	
BACK PANEL SPECIFICATIONS		ENCLOSURE SPECIFICATIONS			
MANUFACTURER	USFCS	MANUFACTURER	STAHLIN		
PART NUMBER	7019580001	PART NUMBER	8015160004		
SIZE	10.75 X 8.88	SIZE	12 X 10 X 5		
FINISH	ALUMINUM	CONSTRUCTION	FIBERGLASS		
		TYPE	NEMA 4X		
		HINGED	LEFT SIDE		
		FINISH	BLUE		

IMPORTANT INSTALLATION NOTE:
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MAKE SURE TO INFLATE TO 3/8"
THICKNESS BEFORE CONNECTING
TO TRANSDUCER TUBE AND MOUNT
CLAMPS APPROX. 9" APART.



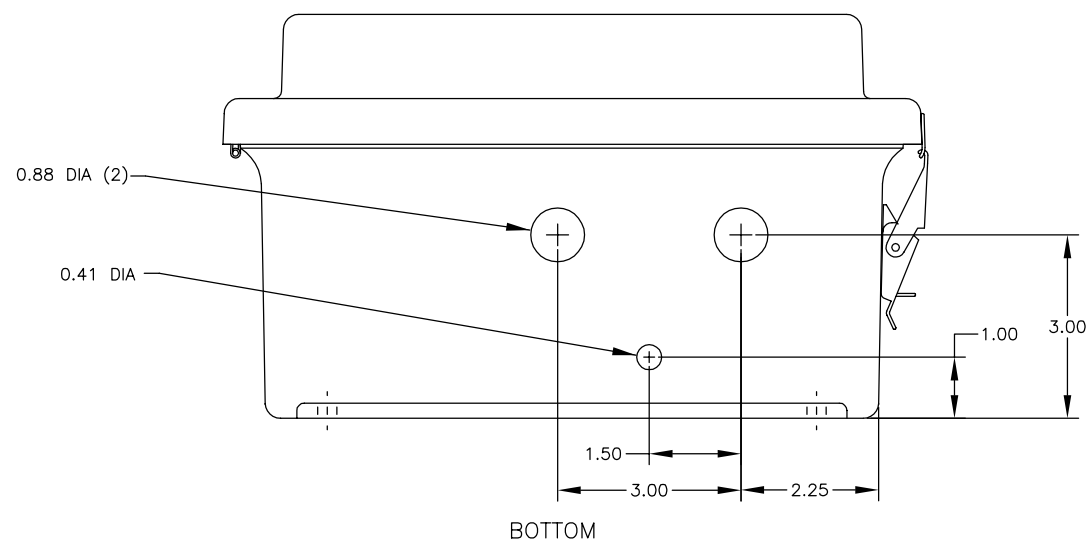
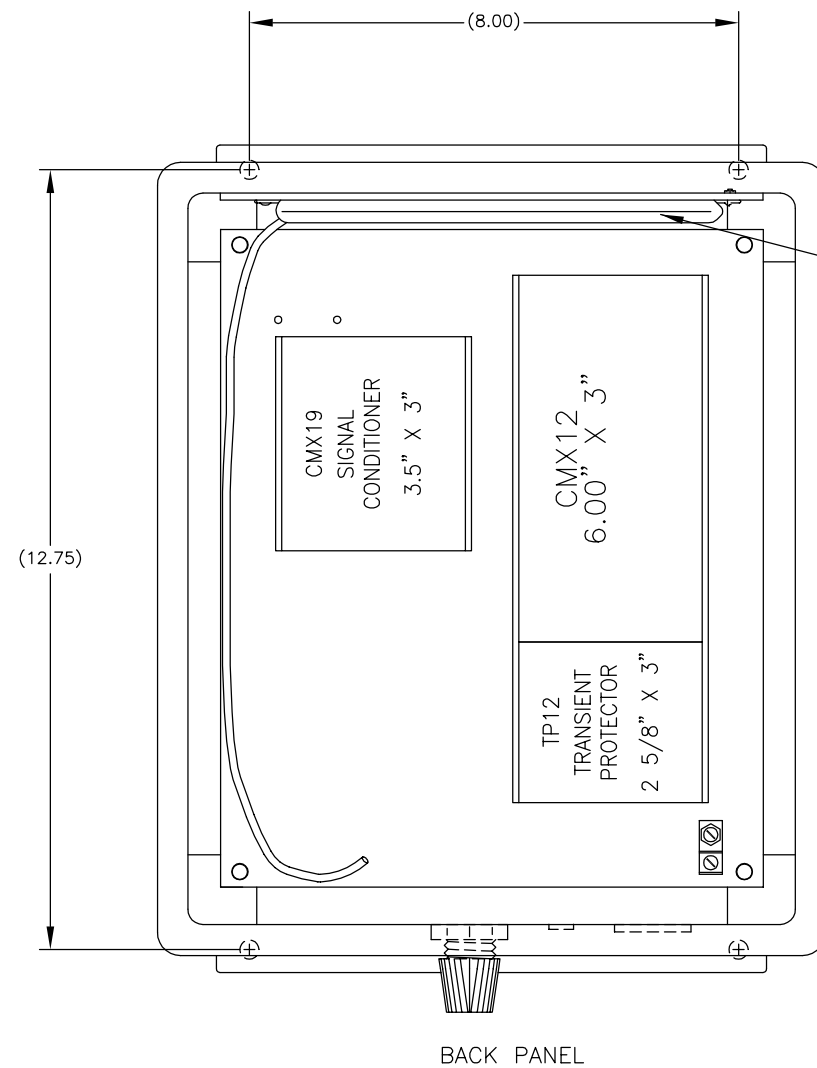
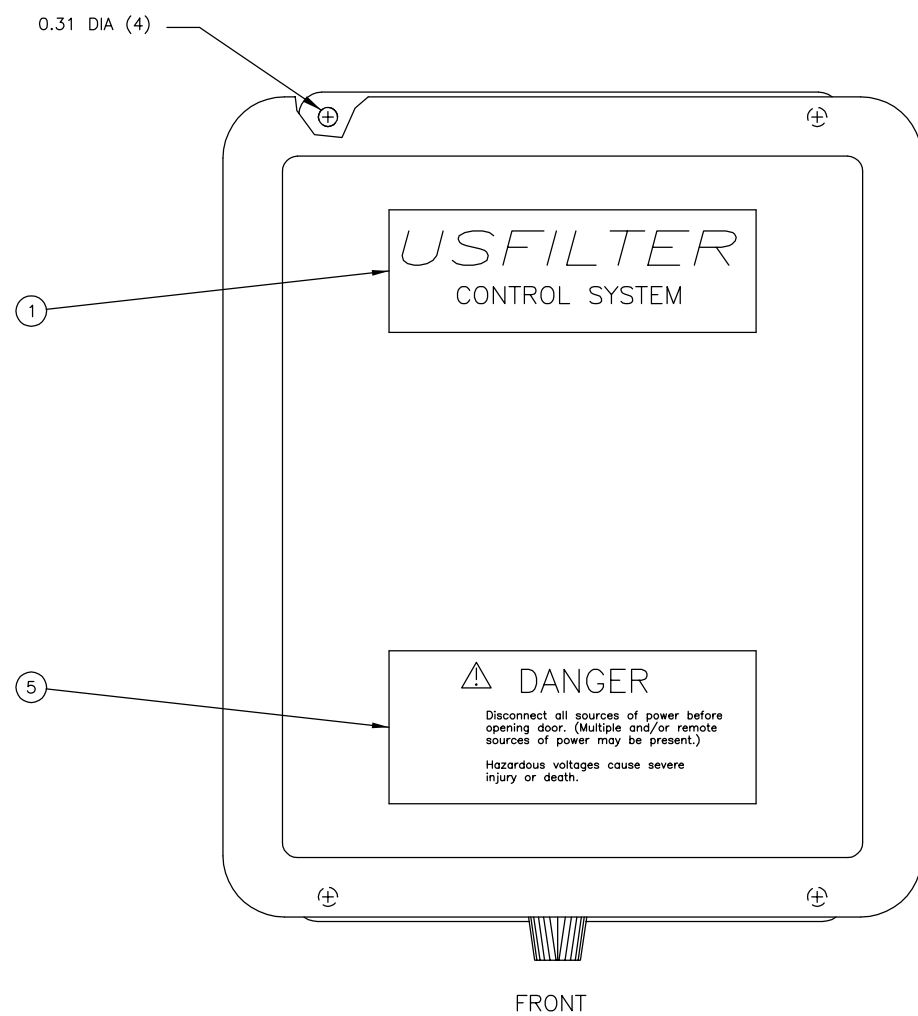
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[illegible]

A1000 GSCI Upper Assembly





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4	FLOOR STOCK (8032000004)	LABEL, IMPORTANT, BEFORE APPLYING POWER (ON INSIDE OF DOOR, NOT SHOWN)
5	FLOOR STOCK (003862)	LABEL, DANGER, DISCONNECT ALL SOURCES (ON OUTSIDE OF DOOR)

A1000 GSCL Transducer open



A3000 sub assy

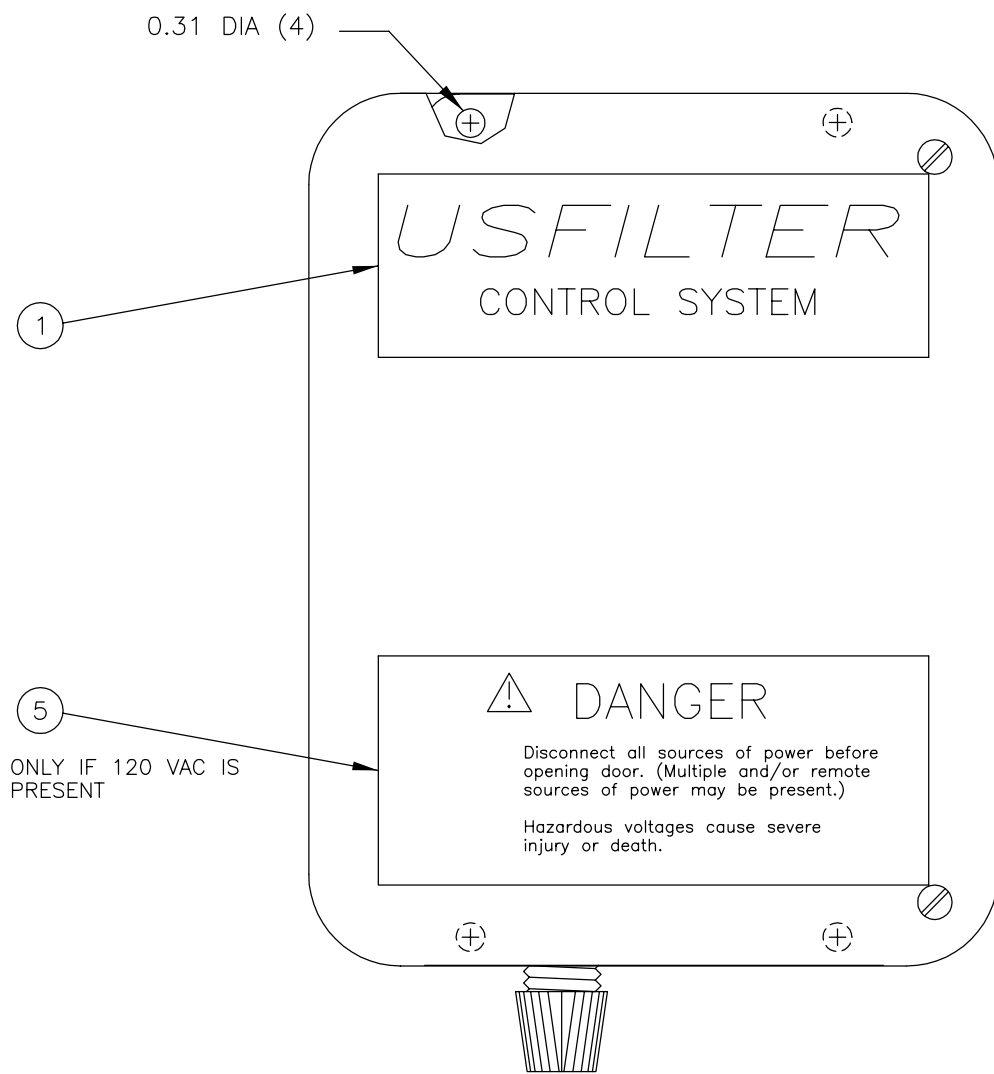
3/4 in.

2 in.

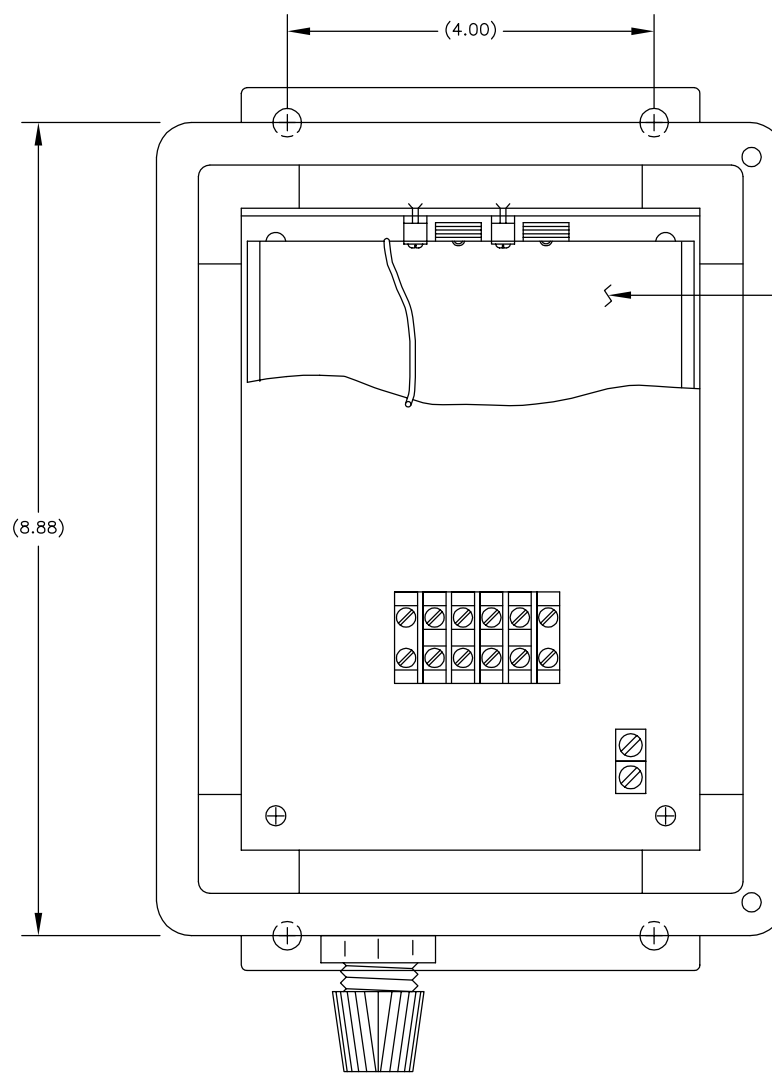
A1200
sub assy



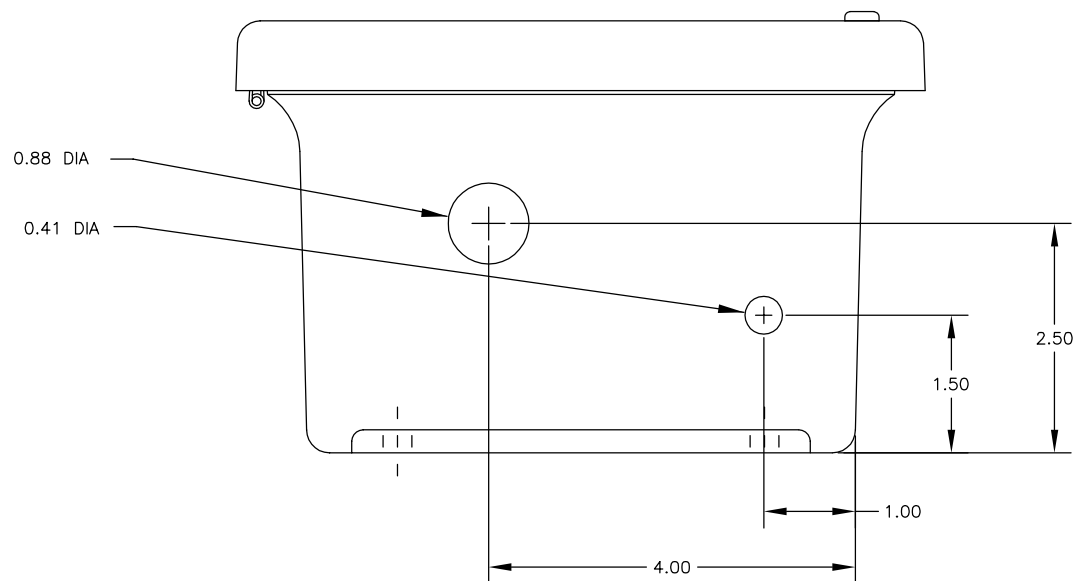
A1000 sub assy



FRONT



BACK PANEL



BOTTOM

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MAKE SURE TO INFLATE TO 3/8"
THICKNESS BEFORE CONNECTING
TO TRANSDUCER TUBE AND MOUNT
CLAMPS APPROX. 9" APART.

ENCLOSURE SPECIFICATIONS

MANUFACTURER	STAHLIN
PART NUMBER	J806HW
SIZE	8 x 6 x 5
CONSTRUCTION	FIBERGLASS
TYPE	NEMA 4X
HINGED	LEFT
FINISH	GRAY


BACK PANEL SPECIFICATIONS

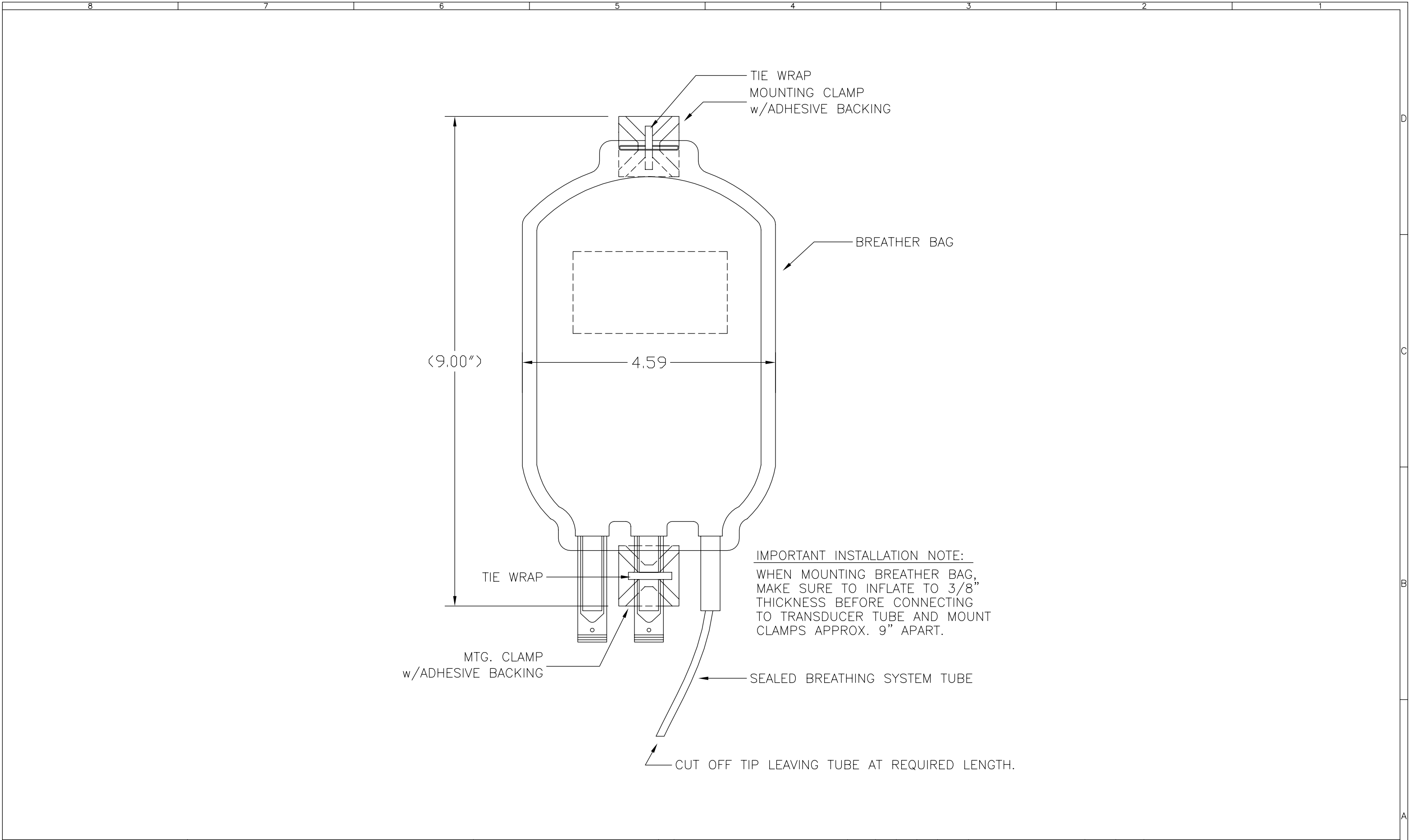
MANUFACTURER	ELECTROMATE
PART NUMBER	7021180002
SIZE	5 x 7
FINISH	ALUMINUM

LABEL DESCRIPTIONS

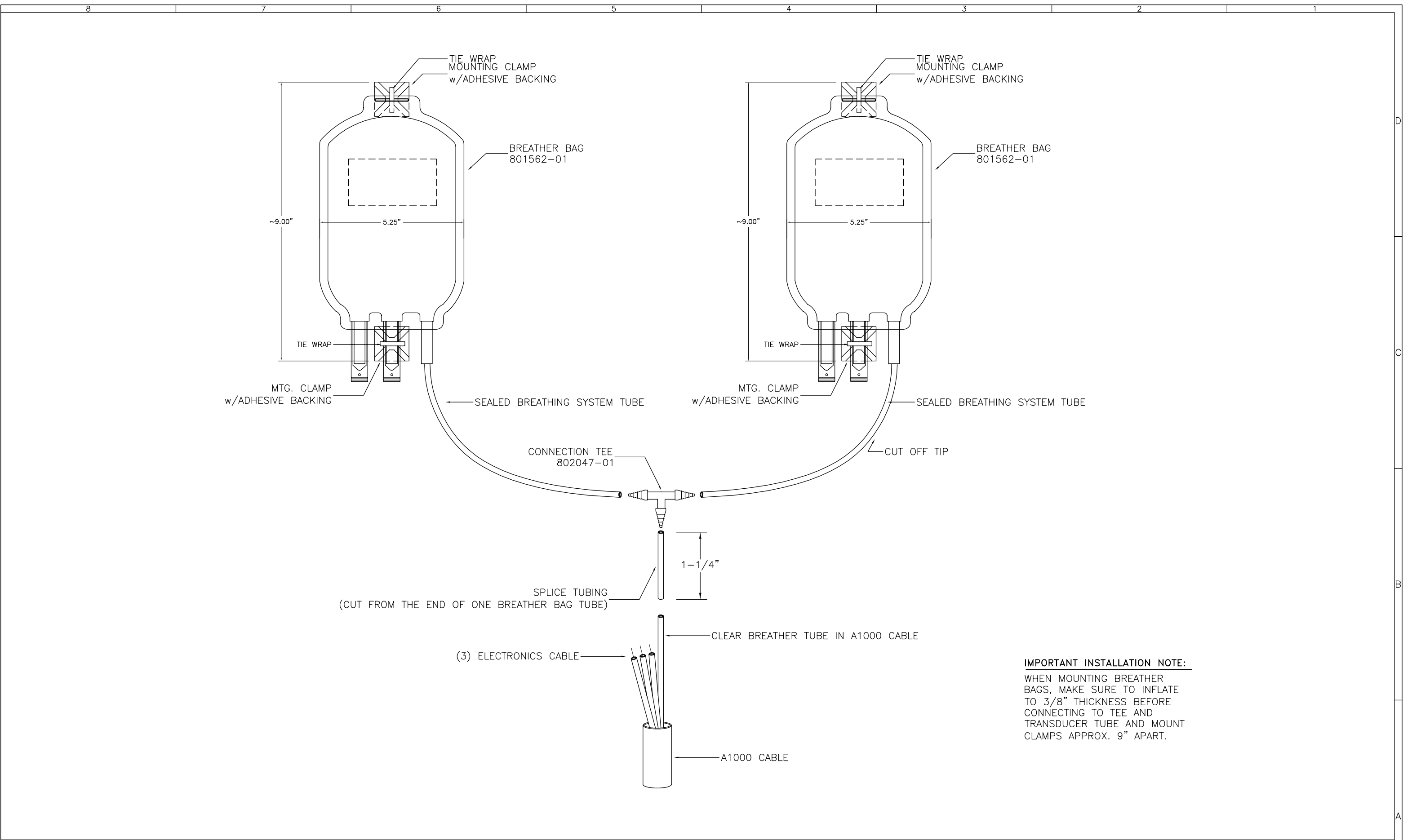
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		CHECKER	DATE							
		MRB	03/02	CLIENT						
		ENGINEER	DATE							
		MANAGER	DATE	 US FILTER CONTROL SYSTEMS VADNAIS HEIGHTS, MN PH. 651-766-2700						
		FILE:	6012910002-001-002-001-010		PROJECT	CODE	DRAWING	SHEET	REV	
		SCALE:	6012910002		001	E02	1	OF	1	



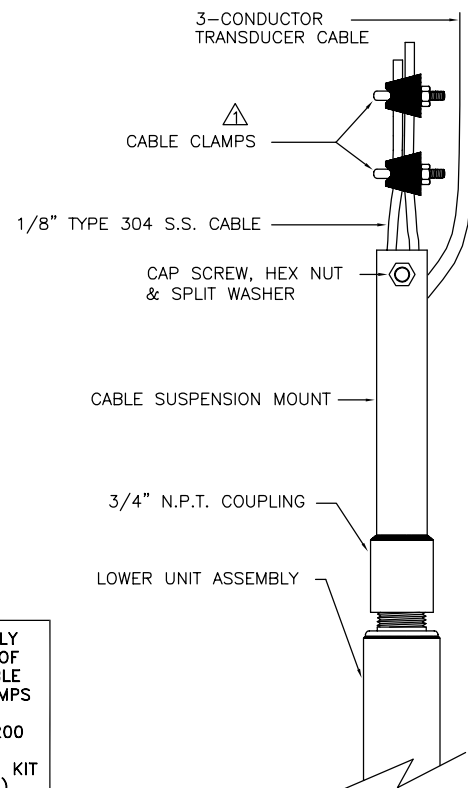
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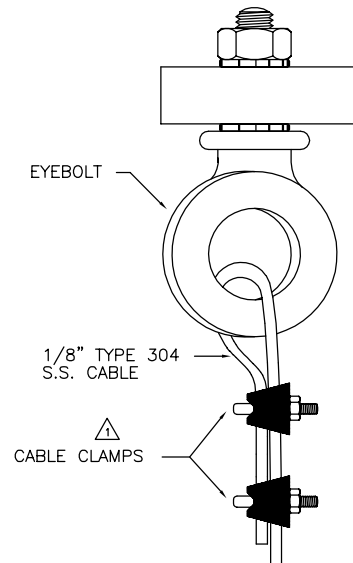
IMPORTANT INSTALLATION NOTE:


WHEN MOUNTING BREATHER BAGS, MAKE SURE TO INFLATE TO 3/8" THICKNESS BEFORE CONNECTING TO TEE AND TRANSDUCER TUBE AND MOUNT CLAMPS APPROX. 9" APART.

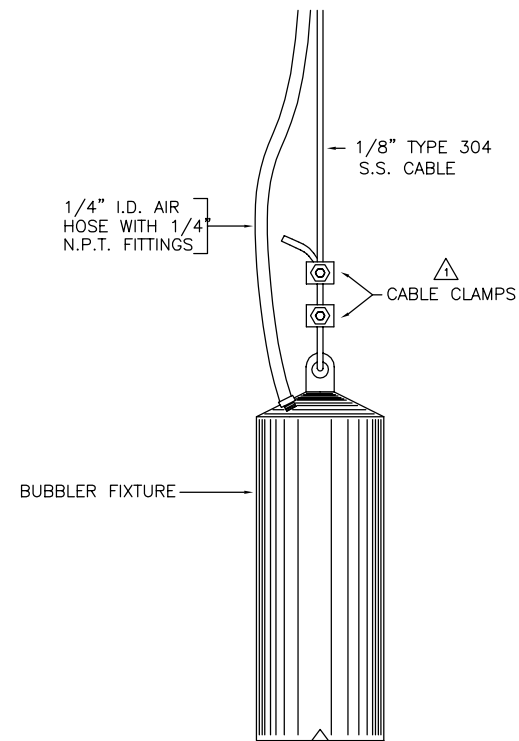
STD: 3-0200-24X36D1	INTL REF:	<div><div></div></div> BAR = 1" AT PLOT SCALE	REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN	COMPANY CONFIDENTIAL ALL INFORMATION CONTAINED ON THIS DOCUMENT IS THE PROPERTY OF USFILTER AND/OR ITS AFFILIATES ("USF"). THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN ARE PROPRIETARY TO USF AND ARE SUBMITTED IN CONFIDENCE. THEY ARE NOT TRANSFERABLE AND MUST BE USED ONLY FOR THE PURPOSE FOR WHICH THE DOCUMENT IS EXPRESSLY SUBMITTED. THEY MUST NOT BE DISCLOSED, REPRODUCED, LOANED OR USED IN ANY OTHER MANNER WITHOUT THE EXPRESS WRITTEN CONSENT OF USF. USF ASSUMES NO RESPONSIBILITY OR LIABILITY FOR THE USE OF THIS DOCUMENT OR THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN FOR ANOTHER PROJECT, OR IN A MANNER THAT DOES NOT RELATE TO THE FITNESS OR PURPOSE OF THIS DOCUMENT. IN NO EVENT SHALL THIS DOCUMENT OR THE DESIGN CONCEPTS AND INFORMATION CONTAINED HEREIN BE USED IN ANY MANNER DETRIMENTAL TO THE INTEREST OF USF. ALL PATENT RIGHTS ARE RESERVED. ACCEPTANCE OF THE DELIVERY OF THIS DOCUMENT CONSTITUTES AGREEMENT TO THESE TERMS AND CONDITIONS.	DESIGNER	DATE	TITLE BREATHER BAG ASSEMBLY						
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											CHECKER	DATE							
											MRB	03/02							
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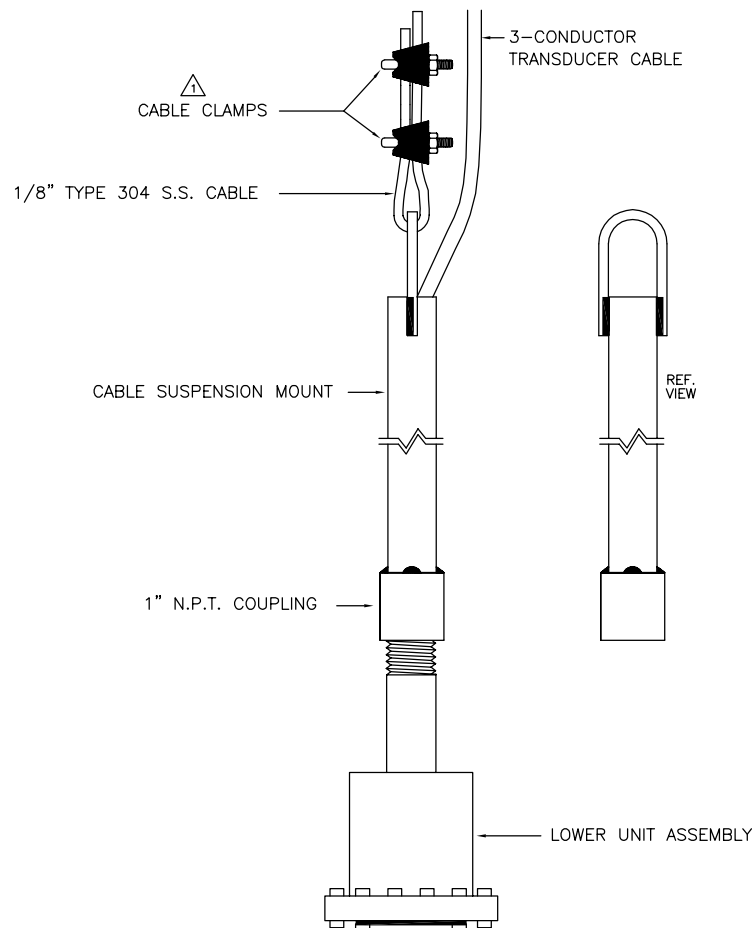
TYPICAL ASSEMBLY
OF LOWER END OF
SUSPENSION CABLE
AND U-BOLT CLAMPS
(60144000XX)
TO BULLETIN A1200
MODEL 241G
LOWER UNIT SUSP. KIT
(601360-LTS12)



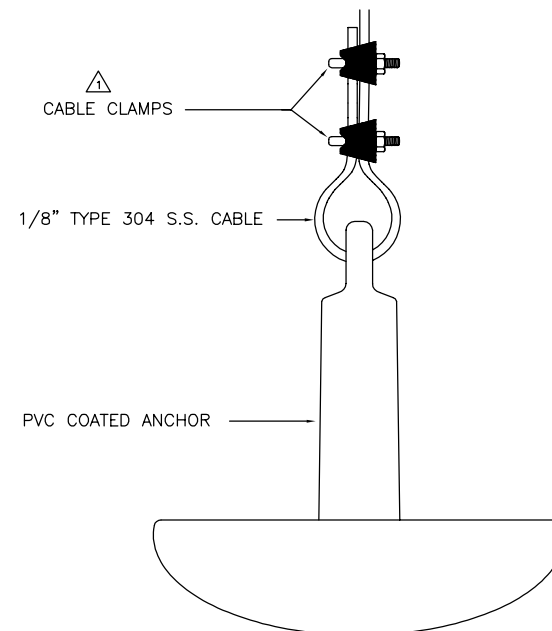
TYPICAL ASSEMBLY
OF UPPER END OF
SUSPENSION CABLE
AND U-BOLT CLAMPS
(60144000XX) 




TYPICAL ASSEMBLY
OF LOWER END OF
SUSPENSION CABLE
AND U-BOLT CLAMPS
(60144000XX)
TO BULLETIN A700
MODEL 2304GS BUBBLER
SUSPENSION KIT
(6013600BUB)



TYPICAL ASSEMBLY
OF LOWER END OF
SUSPENSION CABLE
AND U-BOLT CLAMPS
(60144000XX)
TO BULLETIN A1000
MODEL 157GSC
LOWER UNIT SUSP. KIT
(6014180001)



TYPICAL ASSEMBLY
OF LOWER END OF
SUSPENSION CABLE
AND U-BOLT CLAMPS
(60144000XX)
TO BULLETIN B100
MODEL CBM WEIGHT/
CABLE ASSEMBLY
(6013600ANC)

NOTES:  THE CABLE AND (4) CABLE CLAMPS ARE PART OF 60144000XX (XX DENOTES THE CABLE LENGTH).
STANDARD CABLE LENGTHS ARE 30 & 60 FEET.

WARNING!!!

THE CABLE CLAMP U-BOLTS MUST BE INSTALLED CORRECTLY TO OBTAIN MAXIMUM HOLDING POWER. INSTALL U-BOLT SECTION OF CLIP ON DEAD OR SHORT END OF CABLE, AND SADDLE ON LIVE OR LONG END OF CABLE. WRONG INSTALLATION OF EVEN ONE CLIP REDUCES EFFICIENCY OF CONNECTION AS MUCH AS 40%. FOR MAXIMUM HOLDING POWER, CLIPS SHOULD BE INSTALLED 6 OR 7 CABLE DIAMETERS APART. NEVER USE CLIPS TO CONNECT TWO STRAIGHT LENGTHS OF CABLE.

2. UPPER CONNECTION OF THE CABLE CLAMPS ARE THE SAME AS THE LOWER CONNECTIONS SHOWN.
3. THIS DRAWING IS NOT DRAWN TO SCALE.
4. CUSTOM CABLE LENGTHS ARE AVAILABLE.

[illegible]

IS1 INTRINSIC SAFETY BARRIER

NEC DEFINITION OF HAZARDOUS LOCATIONS

The NEC Handbook defines hazardous locations by Class, Division and Group as follows:

Class I Locations – Are those in which flammable gasses or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class II Locations – Are those which are hazardous because of the presence of combustible dust.

Class III Locations – Are those which are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in air in quantities sufficient to produce ignitable mixtures.

Division 1 – Locations in which hazardous concentrations in the air exist continuously, intermittently, or periodically under normal operating conditions.

Division 2 – Locations in which hazardous concentrations are handled, processed, or used but are normally confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown.

Group A – Atmospheres containing acetylene.

Group B – Atmospheres containing hydrogen, or gasses or vapors of equivalent hazard, such as manufactured gas.

Group C – Atmospheres containing ethyl-ether vapors, ethylene, or cyclopropane.

Group D – Atmospheres containing gasoline, hexane, naphtha, benzene, butane, propane, alcohol, acetone, benzol, lacquer solvent vapors, or natural gas.

Group E – Atmospheres containing metal dust, including aluminum, magnesium, and their commercial alloys, and other metals of similarly hazardous characteristics.

Group F – Atmospheres containing carbon black, coal, or coke dust.

Group G – Atmospheres containing flour, starch, or grain dusts.

The IS1 Intrinsic Safety Barrier is a specially engineered analog signal Zener shunt-diode barrier that is used between a single USFilter analog transmitter (such as our A1000, A1200 or A3000) located in a hazardous environment and its associated pump controllers, signal conditioners or other equipment.

The IS1 Barrier provides “intrinsically safe” characteristics within the transducer equipment and associated circuitry installed in the defined hazardous location, thus making the transducers suitable for operation within sewage lift station wet wells, stormwater-handling pump stations (which might inadvertently receive combustible liquids or produce combustible gasses), and many process applications.

The IS1 is made in 2-wire (IS1-2) and 3-wire (IS1-3) versions to be used in 4-20 mADC, 2-wire and 1-5 VDC, 3-wire transducer systems, respectively. It has been tested and is listed by Underwriters Laboratory, Inc., as Process Control Equipment (QUZW). The transducer and signal conditioning system elements for use with the IS1 Barriers are UL-listed under Intrinsically Safe Equipment and Systems (OERX).

IS1 PRODUCT SPECIFICATIONS

Cable Lengths: Interconnecting cable in the hazardous area is not to exceed 1000 ft.

Maximum Safe Area Voltage: 250 VAC

Maximum Operating Voltage (IS1-2): 26.5 VDC

Maximum Operating Voltage (IS1-3): 6.5 VDC

Outside Dimensions: 4" H x 2" W x 2-1/4" D



The IS1-2 Barrier is designed to make its associated transducers and circuitry suited for Class 1, Division 1 or 2, Groups C and D; Class II, Division 1 or 2, Groups E, F and G; and Class III hazardous locations as defined by the National Electrical Code (NEC). The IS1-3 Barrier is suited for use with those locations, as well as Class I, Division 1 or 2, Groups A and B.

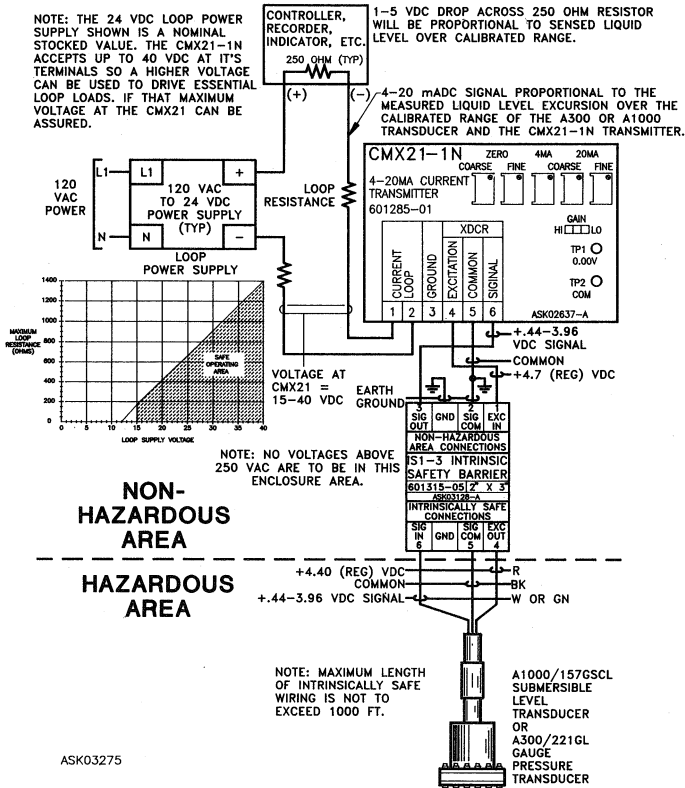
The IS1 barriers are ideally suited for applications requiring compliance with UL 913 procedures pertaining to electrical control panels with intrinsically safe extensions to hazardous areas.

IS1 TYPICAL SPECIFICATIONS

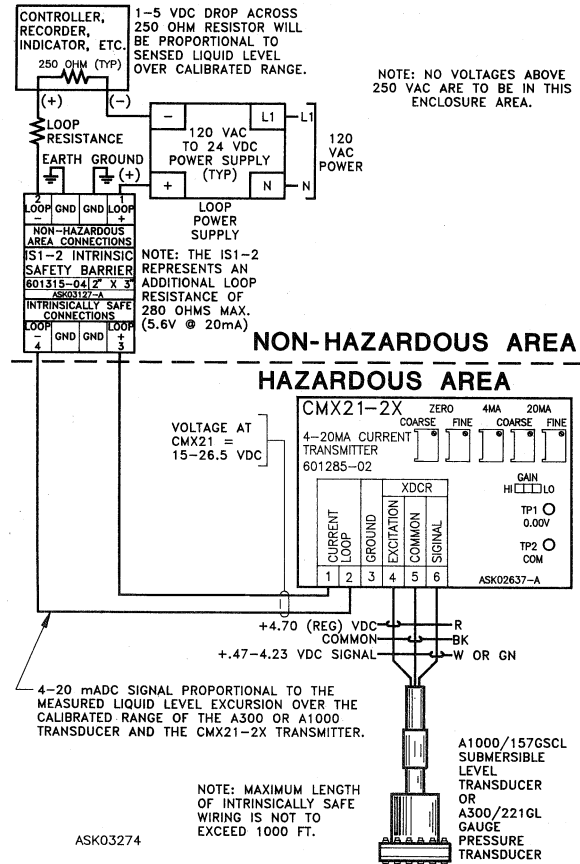
The transducers shall interface to the control circuitry via an intrinsically safe barrier. The barrier shall provide an intrinsically safe interface for analog-signal-producing devices located in a hazardous area rated Class I, Group A, B, C, and D, and Class II, Groups E, F, and G. The intrinsic safety barrier, the level/pressure transducer, and all relevant circuit elements shall be UL-listed.

DESCRIPTION	PART NO.
Model IS1-2 intrinsic safety barrier; 4-20 mA output (use w/potted CMX21)	601315-04
Model IS1-3 intrinsic safety barrier; 1-5 V output (standard)	601315-05

IS1 INTRINSIC SAFETY BARRIER



The IS1-3 is used to provide intrinsically safe characteristics for the lower portion of the A1000 (Models 157GSCD and 157GSCI) when they use the CMX21-1N Current Transmitter in the non-hazardous area.



The IS1-2 Barrier is used to provide intrinsically safe characteristics for an A1000 (Model 157GSCD), CMX21-2X Current Transmitter. In this case, the entire system is U.L.-listed for operation within hazardous locations.

COMPLETE CONTROL CAPABILITIES

USFilter Control Systems offers a single, high-quality source for everything from simple level sensors to telemetry systems to complex system control engineering and software. Based in St. Paul, Minnesota, USFilter Control Systems is part of United States Filter Corporation, the leading global provider of industrial, municipal and residential water and wastewater treatment systems, products and services. As a major manufacturer/integrator with an extensive selection of specialized product lines in the areas of SCADA and telemetry, power equipment integration, automation and measurement, USFilter Control Systems is uniquely positioned to provide cost-effective, comprehensive solutions for water, wastewater, and process control and telemetry applications.

USFilter

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651.766.2701 fax

www.controlsystems.usfilter.com
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