



Installation & Maintenance Instructions

ThePoint™ Series

Two Wire Point Level Switch

Auto-Calibration or Manual Calibration Selectable

DREXELBROOK®

A Leader In Level Measurement Solutions

AMETEK®



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Leader in
Level Measurement

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Installation and Operating Instructions

ThePoint™ Series
Two Wire Point Level Switch
Auto-Calibration or Manual Calibration
Selectable

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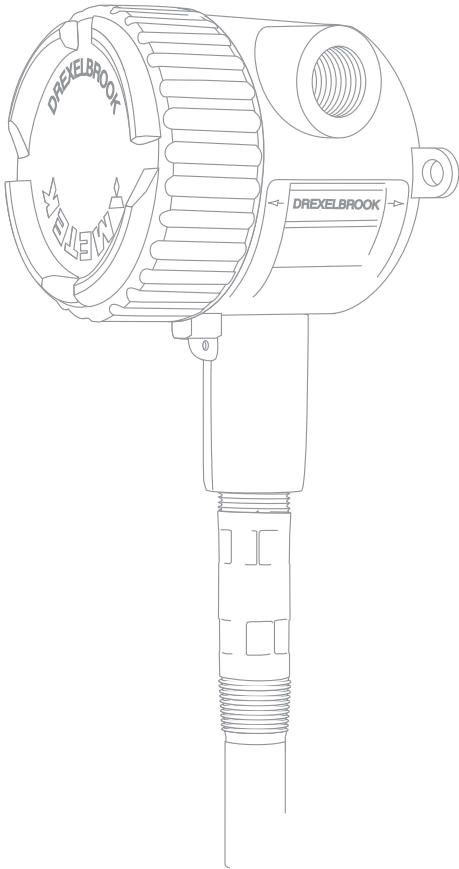
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Section 1

Section 1: Introduction

1.1 System Description

The AMETEK Drexelbrook ThePoint™ Series uses No-Cal™ technology to detect the presence or absence of material without calibration or initiation via setpoint adjustments, push-buttons, or magnets.



The sensing element must be uncovered before applying power.

Installation is simple and easy. Simply apply power and ThePoint system is ready to detect the presence or absence of material. Since ThePoint instrument does not require calibration or setpoint adjustments, it is capable of operating in non-dedicated tanks regardless of the material being measured.

1.2 Technology

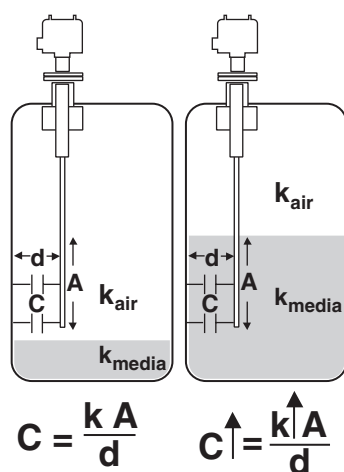


Figure 1-1
Simple Capacitance Probe

In a simple capacitance probe type sensing element, when the level rises and material covers the probe, the capacitance within the circuit between the probe and the media (conductive applications) or the probe and the vessel wall (insulating applications) increases. This is due to the dielectric constant (k) of the material which causes a bridge misbalance. The signal is demodulated (rectified), amplified, and the output is increased. There are drawbacks, however, especially when there is coating of the probe.

An RF Admittance level transmitter is the next generation. Although similar to the capacitance concept, ThePoint employs a radio frequency signal and adds the Cote-Shield™ circuitry within the Electronics Unit.

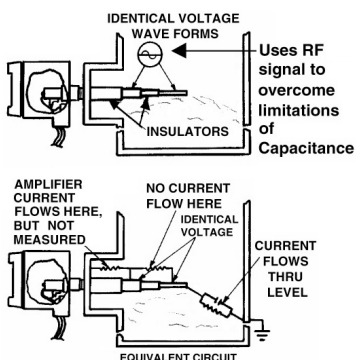


Figure 1-2
RF Admittance Probe with Cote-Shield

This patented Cote-Shield™ circuitry is designed into ThePoint series and enables the instrument to ignore the effect of buildup or material coating on the sensing element. The sensing element is mounted in the vessel and provides a change in RF admittance indicating presence or absence of material. The Cote-Shield element of the sensing element prevents the transmission of RF current through the coating on the sensing element. The only path to ground available for the RF current is through the material being measured.

The result is an accurate measurement regardless of the amount of coating on the probe, making it by far the most versatile technology, good for very wide range conditions from cryogenics to high temperature, from vacuum to 10,000 psi pressure, and works with all types of materials.

1.3 Model Number

Technology					
P	RF Admittance				
Measurement Type					
N	Std Auto Cal	H	Hi Sense .5 pF Auto Cal		
L	Std 2 pF Fixed	P	Hi Sense .5 pF Fixed		
T	10 pF Auto Cal	G	Hi Sense Manual		
V	10 pF Fixed	M	Std Sense Manual		
Input					
T	Two Wire Power Supply 13 to 30 Vdc				
Output					
0	8-16 mA				
Housing					
0	No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries				
1	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries				
2	ATEX / Testsafe Approved, NEMA 4X/IP66, M20 X 1.5 conduit entries				
3	FM / FMc / Testsafe approved, NEMA 4X/IP66, ¾" NPT conduit entries				
5	No Approvals, NEMA 4X/IP66, M20 conduit entries, Dual Seal, Perm-a-Seal sensors – only				
6	No approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only				
7	FM / FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only				
9	No approvals, NEMA 4X/IP66, M20 conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
A	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
B	FM / FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
Electronics					
0	Integral	7	Rmt. w/ (25 ft.) Tri-Ax Cable	E	Rmt. w/ (75 ft.) 1st 10ft Hi-Temp. Cbl.
1	Remote, no cable	8	Rmt. w/ (50 ft.) Tri-Ax Cable	F	Rmt. w/ (5 ft.) G.P. Cable
2	Rmt. w/ 3 m (10 ft.) G.P. cable	9	Rmt. w/ (75 ft.) Tri-Ax Cable	G	Rmt. w/ (5 ft.) Tri-Ax Cable
3	Rmt. w/ 7.6 m (25 ft.) G.P. cable	A	Rmt. w/ (10 ft.) Hi-Temp. Cable	H	Rmt. w/ (10 ft.) Tri-Ax Cable
4	Rmt. w/ 10.6 m (35 ft.) G.P. cable	B	Rmt. w/ (25 ft.) 1st 10ft Hi-Temp. Cbl.	J	Rmt. w/ (35 ft.) Tri-Ax Cable
5	Rmt. w/ 15.2 m (50 ft.) G.P. cable	C	Rmt. w/ (35 ft.) 1st 10ft Hi-Temp. Cbl.	K	Rmt. w/ (5 ft.) Hi-Temp. Cable
6	Rmt. w/ 23 m (75 ft.) G.P. cable	D	Rmt. w/ (50 ft.) 1st 10ft Hi-Temp. Cbl.		
Sensing Element					
	Application	Sensing Element	Pressure/Temperature	Wetted Parts	
00	General purpose	700-1202-001 remote 700-1202-021 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK	
01	Floating roof with cable attachment and brass bottom weight	700-1202-012 remote 700-1202-022 integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316SS, Brass, and PEEK	
02	General purpose, longer insertion lengths with cable attachment and 316SS bottom weight	700-1202-014 remote 700-1202-024 integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316SS and PEEK	
03	Proximity	700-1202-018 remote 700-1202-028 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 76 mm (3) 316SS proximity plate 316SS and PEEK	
04	General purpose, high temperature and pressure	700-1202-041 remote 700-1202-042 integral	69 bar @ 121°C (1000 PSI @ 250°F) 20.7 bar @ 232°C (300 PSI @ 450°F)	316SS and PEEK	
06	General purpose with FDA approved materials of construction	700-1202-031 remote 700-1202-032 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK	
07	General purpose Granular materials	700-1202-010 remote 700-1202-020 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 7/8 inch dia. 316SS collar	
09	General purpose Granular materials with FDA approved materials of construction	700-1202-033 remote 700-1202-034 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK with 7/8 inch dia. 316SS collar	
10	Corrosive liquids (2)(4)(9)	700-0001-018 remote	3.4 bar @ 149°C (50 PSI @ 300°F)	PFA	
11	General purpose, higher pressure TFE compatibility required	700-0201-005 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and TFE	
12	Corrosive material, higher pressure	700-0201-005 int/rem Hastelloy C	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	Hastelloy C and TFE	
13	Sanitary (3)	700-0201-036 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 300°F)	316/316L SS and TFE	
14	General Purpose, low pressure	700-0202-002 int/rem	3.4 bar @ 149°C (50 PSI @ 300°F) 1.4 bar @ 232°C (20 PSI @ 450°F)	316SS and TFE	
15	Heavy duty, agitated tanks or material with high bulk density (1)	700-0202-043 remote	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and TFE	
16	High Integrity Seal for Hazardous Materials	700-0002-360 int/rem	34.5 bar @ 149°C (500 PSI @ 300°F)	PFA	
17	Sanitary (3) lowpressure	700-0202-036 int/rem	3.4 bar @ 149°C (50 PSI @ 300°F)	316SS and TFE	
18	Corrosive material, higher pressure with waterlike viscosity (4)	700-0001-022 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	TFE	



All Calibration modes are built into the standard unit. Modes can be changed in the field as required (See Section 2.8.9)

Continued on Next Page

1.3 Model Number (continued)

(Continued from previous page)

							19	Interface Measurement	700-0002-023 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	316SS and TFE
							20	Miniature Pilot Plant Sensor (1)(7)	700-0209-002 remote	6.9 bar @ 121°C (100 PSI @ 250°F) 0 bar @ 232°C (0 PSI @ 450°F)	316 SS and TFE
Fly Ash Precipitators, Baghouse, and Economizers (1) (6)											
							31	No hopper Installation	700-0029-001 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE
							32	Hopper Installation up to 200mm (8 inches)	700-0029-002 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE
							33	Hopper Installation up to 406mm (16 inches)	700-0029-003 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE
							34	Hopper Installation up to 521mm (20.5 inches)	700-0029-004 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE
							35	Hopper Installation up to 635mm (25 inches)	700-0029-005 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE
Plugged Chute Detection (1) (5)											
							50	Flush Mount Sensor 305mm ² (12 inches ²) heavy duty	700-0207-001 remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304 SS and Polyurethane
							51	Flush Mount Sensor 305mm ² (12 inches ²) higher temperature	700-0207-002 remote	0.1 bar @ 149°C (1 PSI @ 300°F)	304 SS and TFE
							52	Flush Mount Sensor 305mm ² (12 inches ²) with curved radius 153, 229, 305 mm (6, 9, or 12 inches)	700-0207-003 remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304 SS and Neoprene
							53	Flush Mount Sensor 305mm ² (12 inches ²) extra heavy duty	700-0207-004 remote	0.1 bar @ 82°C (1 PSI @ 180°F)	410 SS and UHMW Polyethylene
							55	Flush Mount Sensor 203mm ² (8 inches ²) heavy duty	700-0207-006 remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304 SS and Polyurethane
High Pressure / High Temperature											
							60	High Pressure & Temp.	700-0204-038 remote	137.9 bar @ 93°C (2000 PSI @ 200°F) 68.9 bar @ 260°C (1000 PSI @ 500°F)	316SS and Ceramic
							61	High Temperature	700-0204-002 remote	0 bar @ 816°C (0 PSI @ 1500°F)	316SS and Ceramic
							62	High Pressure & Temp.	700-0204-048 remote	275.8 bar @ 316°C (4000 PSI @ 600°F)	316SS
ZZ Sensing Element Not Listed											

● **Mounting Type** (See separate Mounting Chart for first three digits)

	IL	CSL		IL	CSL
xxx1	457 mm (18")	152 mm (6")	xxxG	457 mm (18")	0 mm (0")
xxx2	305 mm (12")	152 mm (6")	xxxH	914 mm (36")	254 mm (10")
xxxA	152 mm (6")	51 mm (2")	xxxJ	914 mm (36")	0 mm (0")
xxxB	305 mm (12")	51 mm (2")	xxxK	1219 mm (48")	254 mm (10")
xxxC	305 mm (12")	89 mm (3.5")	xxxL	1524 mm (60")	254 mm (10")
xxxD	457 mm (18")	51 mm (2")	P00X	IL/CSL Other	
xxxE	457 mm (18")	89 mm (3.5")	A1BX	IL/CSL factory set for Fly Ash	
xxxF	457 mm (18")	254 mm (10")	xxxZ	Other	



Notes: CSL (Cote-Shield Length) should extend through Nozzle + Typical "Wall Buildup" + 2 Inches

- (1) Available with remote electronics only
- (2) Use A1P mounting option
- (3) Choose only sanitary mounting options
- (4) Available with 0-inch CSL only
- (5) Use P00X mounting option
- (6) Use A1B mounting option
- (7) Use A8B mounting option (¼-inch NPT)
- (8) Choose from flange mounting only
- (9) FM approved with remote electronics only

NPT Threads		
A1B	¾"NPT	316SS
A1C	¾"NPT	Hastelloy C
A1P	¾"NPT	PFA

A2B		
A2B	1"NPT	316SS
A2C	1"NPT	Hastelloy C

Sanitary TriClamps			
C2B	1"TriClamp	316SS	C4B 2"TriClamp 316SS
C3B	1½"TriClamp	316SS	

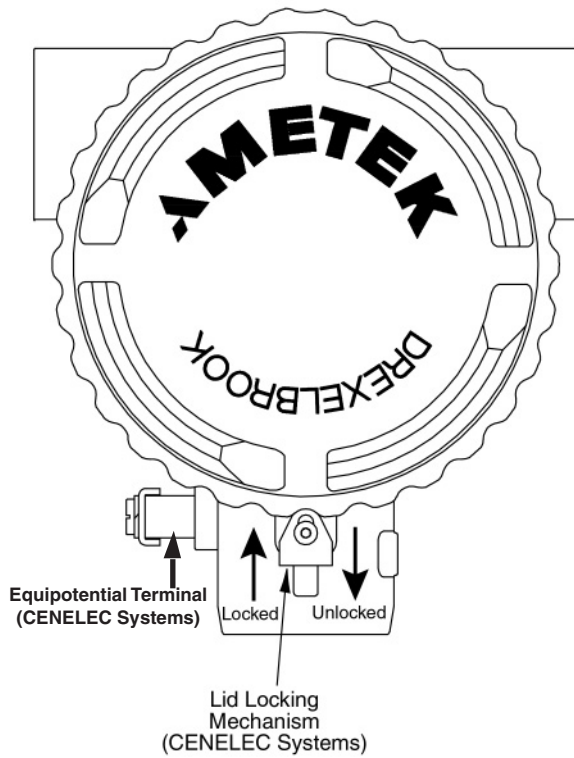
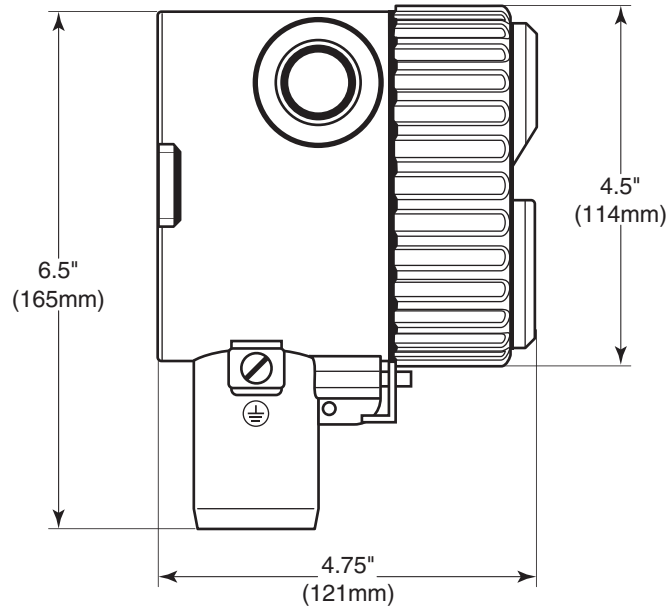
DIN Flanges			
E01	25 mm	16 bar	RF 316/316L SS
EP1	25 mm	40 bar	RF 316/316L SS
EQ1	50 mm	16 bar	RF 316/316L SS
ER1	50 mm	40 bar	RF 316/316L SS
ES1	80 mm	16 bar	RF 316/316L SS
ET1	80 mm	40 bar	RF 316/316L SS
EU1	100 mm	16 bar	RF 316/316L SS
EV1	100 mm	40 bar	RF 316/316L SS
EW1	150 mm	16 bar	RF 316/316L SS
EX1	150 mm	40 bar	RF 316/316L SS

E02			
E02	25 mm	16 bar	RF CS
EP2	25 mm	40 bar	RF CS
EQ2	50 mm	16 bar	RF CS
ER2	50 mm	40 bar	RF CS
ES2	80 mm	16 bar	RF CS
ET2	80 mm	40 bar	RF CS
EU2	100 mm	16 bar	RF CS
EV2	100 mm	40 bar	RF CS
EW2	150 mm	16 bar	RF CS
EX2	150 mm	40 bar	RF CS

ANSI Flanges			
DA1	1"	150#	RF 316/316L SS
DB1	1½"	150#	RF 316/316L SS
DC1	2"	150#	RF 316/316L SS
DD1	2½"	150#	RF 316/316L SS
DE1	1"	300#	RF 316/316L SS
DF1	1½"	300#	RF 316/316L SS
DG1	2"	300#	RF 316/316L SS
DH1	2½"	300#	RF 316/316L SS
DI1	3"	150#	RF 316/316L SS
DJ1	3"	300#	RF 316/316L SS
DK1	4"	150#	RF 316/316L SS
DL1	4"	300#	RF 316/316L SS
DM1	6"	150#	RF 316/316L SS
DN1	6"	300#	RF 316/316L SS

DA2			
DA2	1"	150#	RF CS
DB2	1½"	150#	RF CS
DC2	2"	150#	RF CS
DD2	2½"	150#	RF CS
DE2	1"	300#	RF CS
DF2	1½"	300#	RF CS
DG2	2"	300#	RF CS
DH2	2½"	300#	RF CS
DI2	3"	150#	RF CS
DJ2	3"	300#	RF CS
DK2	4"	150#	RF CS
DL2	4"	300#	RF CS
DM2	6"	150#	RF CS
DN2	6"	300#	RF CS

1.4 Housing Dimensions



*Figure 1-3
Compartment Housing Detail*

Section 2: Installation

2.1 Unpacking

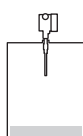
Carefully remove the contents of the shipping carton and check each item against the packing list before destroying any packing material. If there is any shortage or damage, immediately report it to the factory at 1-800-527-6297 (US and Canada) or + 215-674-1234 (International).

2.2 Mounting and Installation Guidelines



WARNING:

ThePoint equipment is rated explosion-proof. When installing in explosion hazardous areas [rated “potential hazardous” (EU) or “hazardous classified” (USA)] observe all national and local regulations as well as specifications in the certificate.



CAUTION:

ThePoint instrument must be powered *after* it is installed in the application and with material *below* the sensing element.

ThePoint instrument can be mounted vertically, horizontally, or at an angle. Mounting location should be as free as possible from vibration, corrosive atmospheres, and any possibility of mechanical damage. Ambient temperatures at electronics should be between -30 to 70°C (-22 to 158°F).



NOTE:

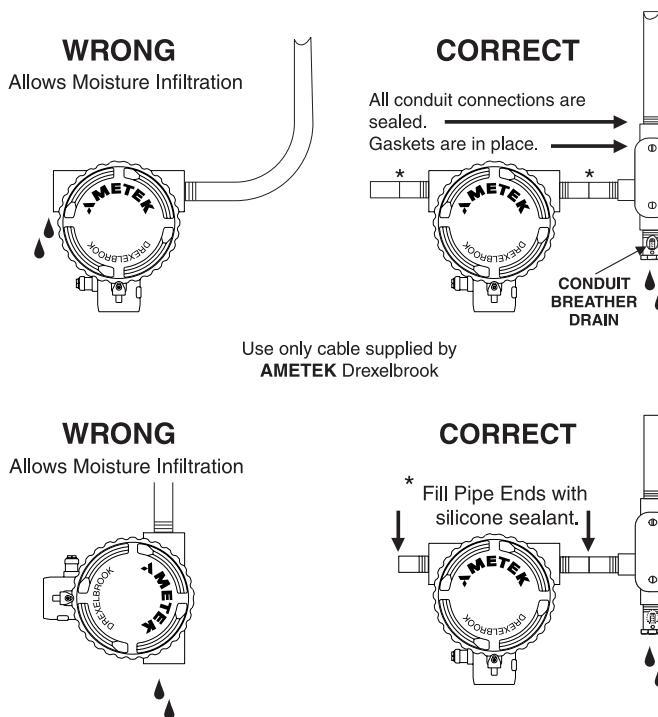
To reduce possibility of damage caused by water in conduit, install drip loop and breather drain in conduit to purge any accumulating moisture as shown in *Figure 2-1*.

*Figure 2-1
Recommended
Conduit Connection*



Cable fittings supplied are weather-resistant.

They are NOT certified as explosionproof (XP) or flameproof (d) unless they are specifically marked.



Use only cable supplied by AMETEK Drexelbrook

2.2 Mounting and Installation Guidelines (continued)



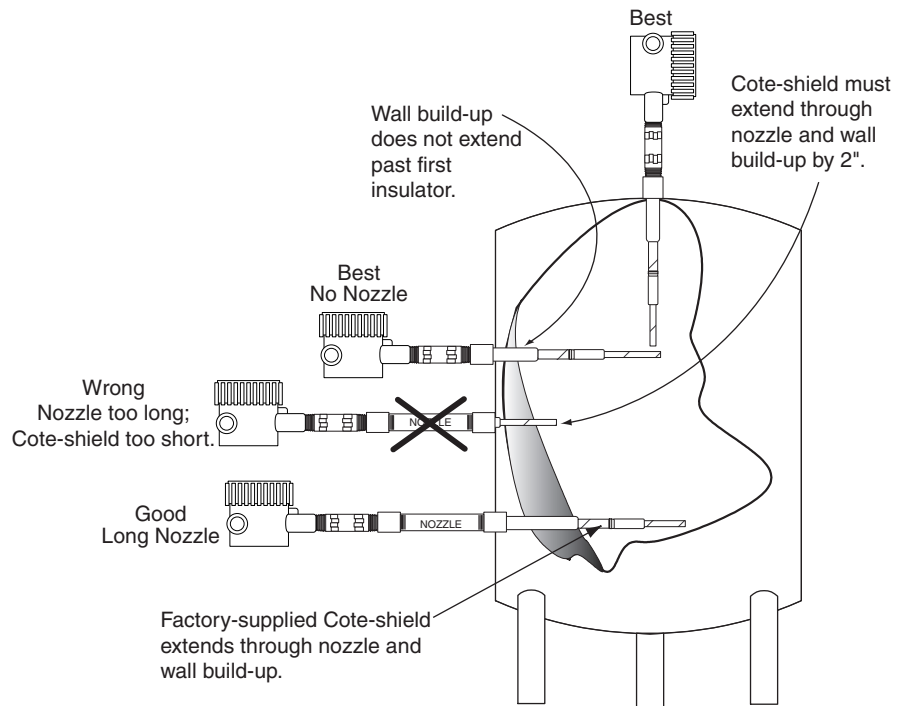
The Point RF instrument is rated Intrinsically Safe (I.S.) when power is provided from and I.S. supply.

After system is installed and level is below sensing element, apply power. ThePoint series instrument does not require any calibration or setpoint adjustments and is ready to detect change in level.

If properly installed, the green LED will light when power is applied. Neither the green nor red LED should be flashing. If either of the LEDs are flashing, refer to, Section 3, Troubleshooting,

Mount sensing element per guidelines in **Figure 2-2**.

**Figure 2-2
Installation
Considerations**



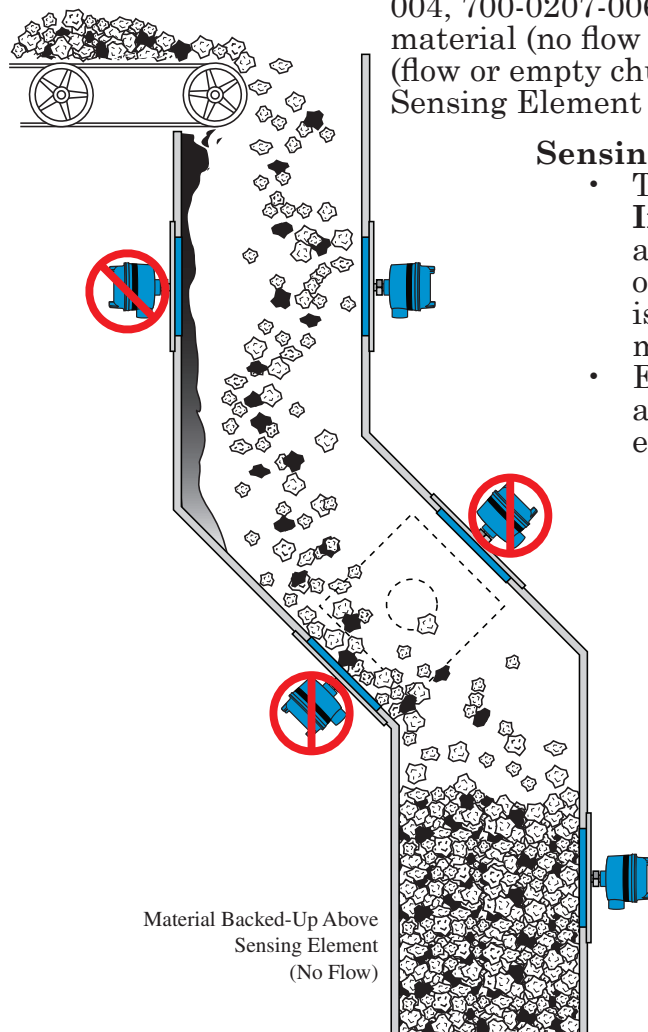
- When installing ThePoint instrument, ambient temperature at electronics must not exceed 70°C (158°F).
- When installing flange-mounted sensing elements, keep mating surfaces and bolts free of paint and corrosion to ensure proper electrical contact with vessel. Avoid using excessive amounts of Teflon™ tape when installing threaded sensing elements.
- Install systems with threaded NPT connection via wrench flats on the process connection ONLY.
- Locate sensing element to avoid enhancing electrostatic discharge from process medium, as is good practice with any thermowell, displacer, or sampler. This includes correct bonding to tank or silo wall.

2.2 Mounting and Installation Guidelines (continued)

- If installation area is rated explosion-proof and requires conduit seal fittings, they should be used in accordance with company standards and local codes.
- Mounting sensing element inside a pipe is not recommended.
- Do not mount a Cote-Shield sensing element through a nozzle that exceeds length of first insulator.
- Ensure that there are no obstructions or agitator blades to interfere with sensing element.
- Rigid sensing elements can be mounted at any angle.

2.2.1 Installation of Flush-Mounted Sensing Elements

These instructions apply to all flush on/off sensing elements, models 700-0207-001, 700-0207-002, 700-0207-003, 700-0207-004, 700-0207-006. These systems will sense presence of material (no flow or plugged chute) and absence of material (flow or empty chute) at the sensing element. The Flush Sensing Element will ignore free falling material.



Sensing Element at the Top of a Chute.

- The flush sensing element should be mounted **In The Flow Stream**. These sensing elements are designed and built to withstand the impact of coal, rock, wood, chips, etc. This location is important to prevent excessive build up of material on the face of the sensing element.
- Excessive build up, typically consisting of wet and/or sticky fines, can occur if the sensing element is protected from falling material.

Sensing Element in an angle chute.

- Do not mount on the top or bottom.
- Best mounted on either side

Sensing Element at the Bottom

- Mount on any side.
- Low-Level sensors can be used to detect a plug or to insure that a seal is present (chute is full at this point).

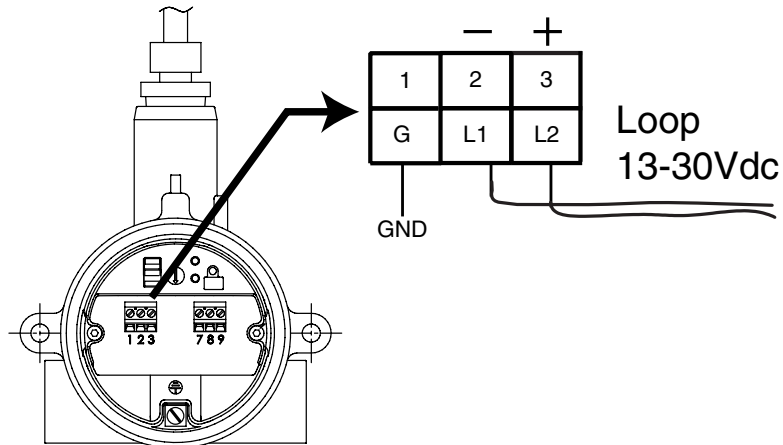
2.3 Input Wiring



WARNING:

If ThePoint instrument is located in a hazardous environment, do not open enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure that wiring, electrical fittings, and conduit connections conform to electrical codes for the specific location and hazard level.

*Figure 2-3
Input Wiring*



2.4 Output and LED Status

There are two status LEDs located on top of the Electronic Unit. The green LED is used to indicate that the unit has power. The red LED is used to indicate the output condition. See Figure 2-4.

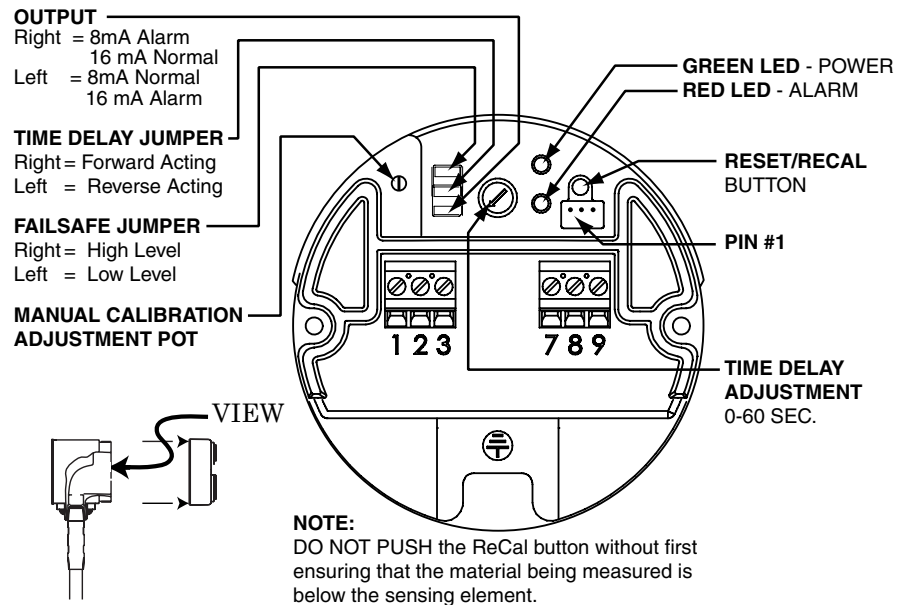
Tank Condition	LED Output Status	Tank Condition	LED Output Status
 High Level FailSafe Tank Empty	Power GREEN LED On RED LED Off	 Low Level FailSafe Tank Empty	Power GREEN LED On RED LED On
 High Level FailSafe Tank Full	Power GREEN LED On RED LED On	 Low Level FailSafe Tank Full	Power GREEN LED On RED LED Off

*Figure 2-4
Output/LED Status*

2.5 Electronic Unit

Remove housing lid to access status LEDs, time delay adjustment, and configuration jumpers. *See Figure 2-5.*

*Figure 2-5
Electronic Unit
Adjustments*



2.5.1 Time Delay

Time delay adjustment is used to avoid an oscillating output due to agitation or waves in the vessel. The time delay adjustment can be field adjusted from 0 to 60 seconds. Unit is shipped with time delay setting at zero seconds.



The Time Delay adjustment is a 270-Degree turn pot and is at zero seconds when in the full counter-clockwise position. Do not force the pot past the stop or damage will occur.

2.5.2 Time Delay Action

Time delay action describes whether the output is delayed from going into the alarm state or recovering from an alarm state.

- FWD: Delays system from coming out of alarm.
- REV: Delays system from going into alarm.
- The instrument is supplied with time delay action set in forward mode (FWD) position.
- Time delay action is field-selectable using a jumper located on top of Electronic Unit. *See Figure 2-5.*

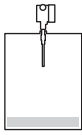
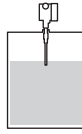
2.5.3 Current Output Assignment

The output current can be configured using the jumpers as follows:

- Jumper on pin #1 and #2 creates:
8mA - Normal
16mA - Alarm
- Jumper on pin #2 and #3 creates:
8mA - Alarm
16mA - Normal

2.5.4 Failsafe

Failsafe describes the level condition that causes the transmitter to go into alarm.



- **High Level FailSafe (HLFS)** is the condition when the probe is covered, the unit goes into alarm.
- **Low Level FailSafe (LLFS)** is the condition when the probe is uncovered, the unit goes into alarm.
- Instrument is supplied with failsafe jumper set in high level (HLFS) position.
- Failsafe is field-selectable using a jumper located on top of the Electronic Unit. *See Figure 2-5.*

2.5.5 RECAL



CAUTION:

ThePoint instrument must be powered after it is installed in the application and with material below the sensing element.

If system is powered on the bench prior to installation, or moved from one tank to another, RECAL is necessary to allow software to capture the air capacitance generated by sensing element in tank.

Merely press and hold the RECAL button (See Figure 2-5) for at least five seconds. Both LED's flash for 60 seconds before reset occurs. [Remove power from the system while the LED's are flashing and recalibration will occur immediately].



NOTE:

Do Not Push the Recal Button without first ensuring that the material being measured is below the sensing element.

The system is now ready for installation.

2.6 Spark Protection



Applications involving insulating granulars and insulating liquids may produce a static discharge that can damage the electronics. The RF series instrument is supplied with integral heavy-duty spark protection to prevent static discharges from damaging the electronic circuits.

2.7 Sensing Element Connection

Sensing element connects to the rear side of the circuit board and is factory-installed.



The sensing element is sealed to the housing and cannot be removed without permanent damage.

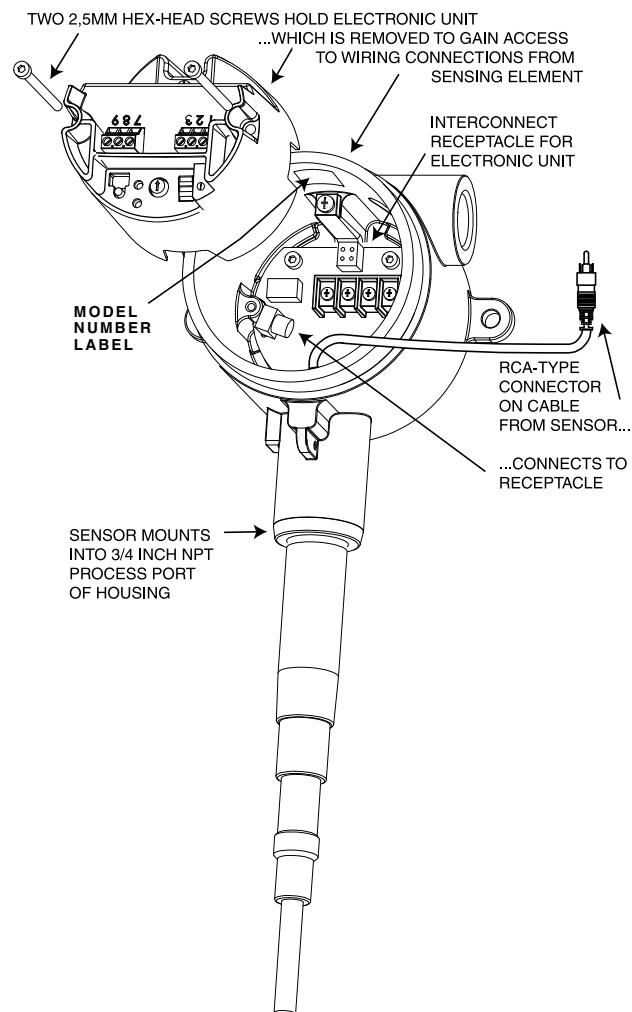
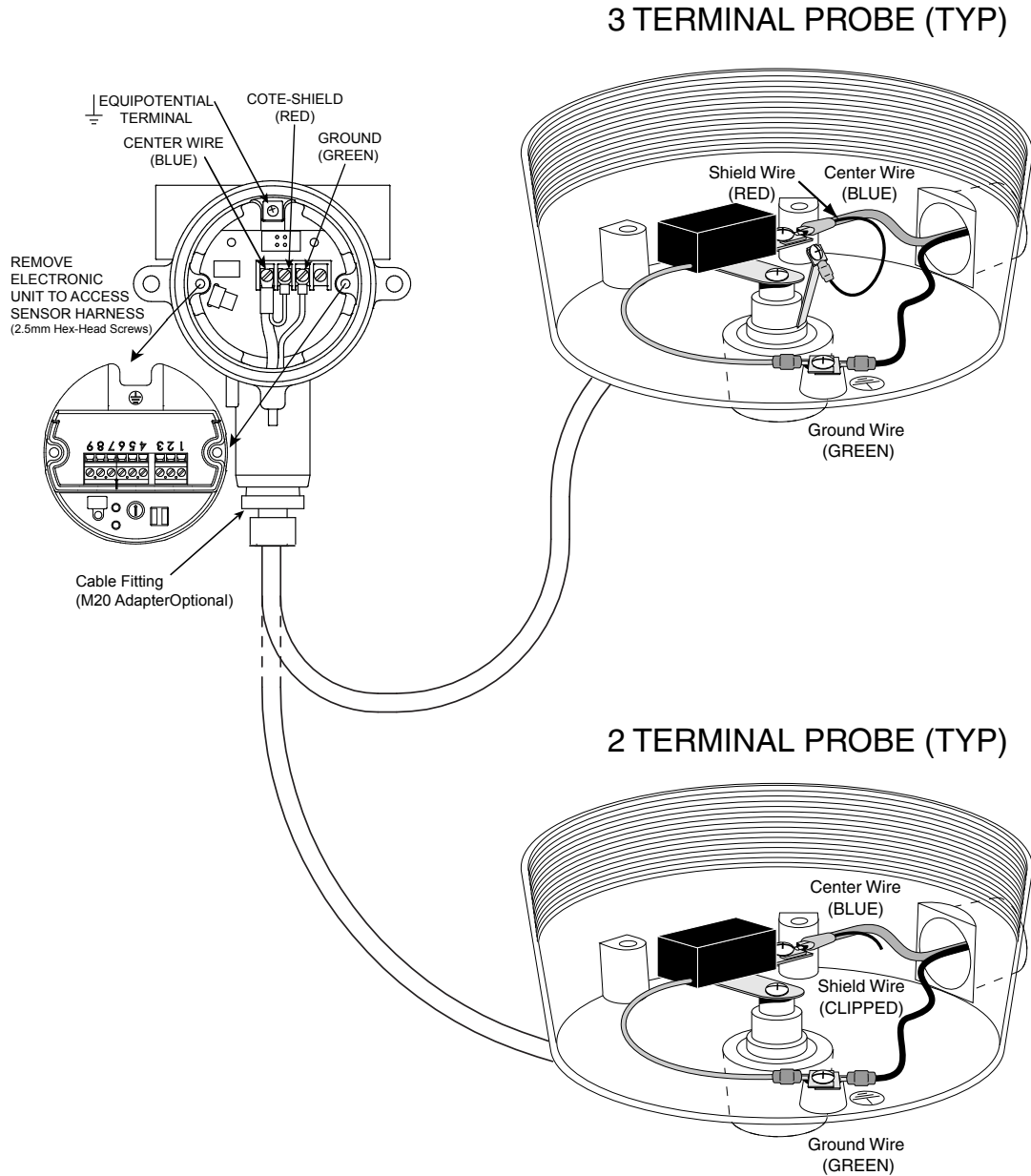


Figure 2-6
Sensing Element
Connection
(Integral Housing)

2.7 Sensing Element Connection (Continued)

For ThePoint instruments mounted remotely from sensing element, cable connections from sensing element to Electronic Unit are made to terminals beneath the Electronic Unit. *See Figure 2-7.*



SHIELD WIRE MUST BE CLIPPED BY USER
CLIPPED SHIELD WIRE MUST NOT TOUCH CONDULET HOUSING

Figure 2-7
Sensing Element Connection
(Remote Housing)

2.8 Calibration

ThePoint™ level measurement switch features both Auto-Cal and manual calibration. The standard Auto-Calibration mode is applicable to most liquids and granular point level measurements. If preferred, the manual calibration can be used and is recommended for some application. ThePoint electronic unit has auto and manual calibration modes built into the standard unit and can be accessed through a simple routine (see section 2.8.5). The inclusion of these calibration modes allows the Drexelbrook RF Point Level Products application flexibility that is far greater than any other point level product on the market. This RF Point Level switch can be used in Liquids, Solids, Slurries, and Interface applications.

2.8.1 Selecting the Calibration Mode for your application.

The following table is a list of measurement types and the recommended calibration mode for each of these applications. ThePoint has eight calibration modes however; only four are used on the majority of applications.



ThePoint will be shipped in the standard Auto-Cal mode #2 unless pre-ordered in a specific mode. To determine if the ThePoint has been shipped in a mode other than #2, look at the label on the inside of the unit housing. The model number will start with PXL1. The “X” indicates the pre-set mode typically an “L” for mode #2.

Common Calibration Modes

- Mode 2 = L - Fixed Cal 2pF: 2pF differential, set point locked 2pF above starting capacitance
- Mode 6 = P - Fixed Cal 0.5pF: 0.5pF differential, set point locked 0.5pF above starting capacitance
- Mode 7 = M - Manual calibration standard sensitivity – pots adjusts from 0 to 65pF
- Mode 8 = G - Manual calibration High sensitivity – pot adjusts from 0 to 27 pF

Additional calibration modes for specialty applications (consult factory)

- Mode # 1 = N
- Mode # 3 = T
- Mode # 4 = V
- Mode # 5 = H

For explanation of mode See Section 2.8.5

2.8.1 Selecting the Calibration Mode for your application (Continued)

Application Guide

(For instructions on how to access alternate modes see 2.8.4)

Application	Calibration Mode
Liquids and Slurries	Auto-Cal Mode #2
Granular /Solids with Bulk Density greater than 20#s per cubic foot	Manual Cal Mode #7
Granular/Solids with Bulk Density Under 20#s per cubic foot	Manual Cal Mode #8 (high sensitivity)
Interface Measurement	Manual calibration Mode #7
Plugged Chute Indication for Solids (Bulk density greater than 20 #s per cubic foot)	Manual calibration Mode #7
Plugged Chute Indication for Solids (Bulk density under 20 #s per cubic foot)	Manual calibration Mode #8 (high sensitivity)

2.8.2 Using ThePoint with Auto-Calibration mode #2

After ThePoint is installed in the vessel, simply apply power. ThePoint electronic unit will auto calibrate.



Caution

The material being measured must be below the sensing element when power is applied (Sensing element uncovered).

Calibration is complete.

If power has been applied to ThePoint prior to installation (on a test bench) or, if ThePoint is moved from one vessel to another, **RECAL** is necessary for the unit to capture the new air value.

Merely press and hold the RECAL button (shown in Figure 2-8) for five (5) seconds. After five seconds, the two LED's flash for sixty seconds before reset occurs. [Remove power from ThePoint while the LED's are flashing and reset will occur immediately upon next power up].

The Point is now ready for installation.

2.8.3 Using ThePoint with Manual Calibration modes #7, and 8

**Warning!**

Before removing the explosion-proof housing cover in a potentially hazardous area, make certain that the area is safe. When calibration is complete, the cover must be replaced.

Make sure that ThePoint is set to either mode #7 (standard Sensitivity) or mode #8 (high sensitivity). See section 2.8.5 for mode selection procedure. Locate the manual calibration pot on the top of ThePoint electronic unit (see figure 2-8).

The adjustment pot located on the top of the unit controls the point at which the relay operates. A red LED indicates that the relay is de-energized.

Full range of the pot is 25 turns. Each rotation of the pot changes the operating point by 4pF (Mode #7 standard Sensitivity) or 1pF (mode #8 high sensitivity).

Turning adjustment clockwise will raise level at which relay operates. Turning the adjustment counterclockwise will lower the level at which the relay operates.

Calibration Procedures



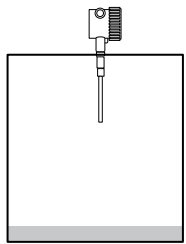


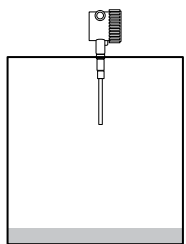

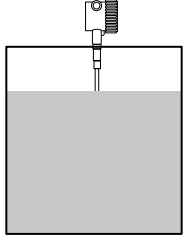


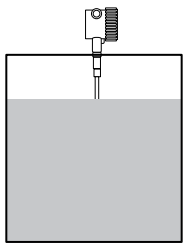


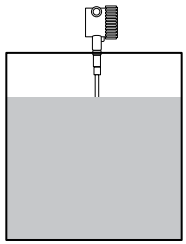
For water-based conducting applications using bare metal sensing elements, turn the adjustment point full clockwise. No other adjustment is required.

2.8.3 Manual Calibration modes #7, and 8 (Continued)

Manual Calibration

When material level **can** be moved

Make certain that ThePoint is in manual calibration mode #7 or 8 See Section 2.8.5



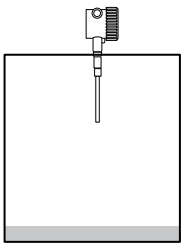


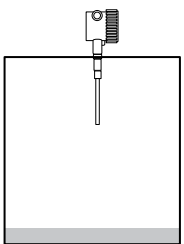


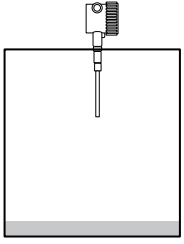
Configuration Settings	Adjustment Potentiometer	RED LED	Notes	
Fail Safe = High Level Time delay set to zero (full counter clockwise – DO NOT FORCE PAST STOP) Time delay action = either	Turn counter clockwise until RED LED is ON 	RED LED ON 	Material being measured must be below sensor at least twelve inches	
	Turn clockwise until RED LED just goes OFF 	RED LED OFF 		
		RED LED will come ON 	Raise material level in vessel until sensor is covered	
	Turn clockwise counting the number of turns until the RED LED goes OFF (or 25 turns whichever comes first) 	RED LED OFF (Or 25 turns whichever comes first) 		
	Turn counter clockwise one half the number of turns counted 	RED LED will come ON 		
	Calibration is Complete			

2.8.3 Manual Calibration modes #7, and 8 (Continued)

Manual Calibration

When material level **can not** be moved

Make certain that ThePoint is in manual calibration mode #7 or 8 See Section 2.8.5

Configuration Settings	Adjustment Potentiometer	RED LED	Notes	
Fail Safe = High Level Time delay set to zero (full counter clockwise – DO NOT FORCE PAST STOP) Time delay action = either	Turn counter clockwise until RED LED is ON 	RED LED ON 	Material being measured must be below sensor at least twelve inches	
	Turn clockwise until RED LED just goes OFF 	RED LED OFF 		
Turn Adjustment Potentiometer Clockwise the number of turns indicated in the table below for your material type		RED LED OFF 		

Material Being Measured	Mode #7 (Standard Sensitivity)	Mode # 8 (High Sensitivity)
Conductive Materials (Water-Based) see note #1	15 Turns(Note 2)	20 Turns
Insulating Liquids, Organics, Oil, Plastics	1/2 Turn	2 Turns
Granular/Solid materials above 50#/ft3	1/2 Turn	2 Turns
Granular/Solid materials 25-50#/ft3	1/2 Turn	1 Turn
Granular/Solid materials less than 20#/ ft3	Use High Sensitivity Mode #8	3/4 Turn
Moist Granular Plugged Chute Applications using flush mount 700-0207 series sensing element (See Note 3)	1 turn	4 turns
Dry Granular Plugged Chute Applications using flush mount 700-0207 series sensing element	Use High Sensitivity Mode #8	½ turn

Calibration is Complete

2.8.3 Manual Calibration modes #7, and 8 (Continued)

- Note 1:** Most water based materials can be considered conductive, such as acids, bases, salt solutions, water based slurries, and very wet granular materials. Carbon black and powdered metals conduct even without water.
- Note 2:** With conducting materials, if heavy build up is anticipated, calibration adjustment can be turned to its clockwise limit.
- Note 3:** Some Wet Granular materials can be extremely conductive and may require special calibration or different electronic units. If the standard calibration in the table does not provide satisfactory results, please contact the field service department at 1-800-527-6297 (North America) or 215-674-1234 (outside North America)

Nonvolatile Memory

ThePoint has Nonvolatile memory which allows the unit to re-start after power outages without recalibrating.

When ThePoint is powered for the first time the internal microprocessor records and stores the “Air” value. This is the uncovered capacitance value of the sensor mounted in the vessel. ThePoint will also store the last covered value and the last uncovered value.

Whenever ThePoint is powered it uses these values as a reference point to determine its current condition (normal or alarm).

2.8.4 Accessing the Calibration Modes

1. On the top side of ThePoint, temporarily remove the shunt from the “Time Delay Selection Jumper” (see Fig. 2-8) and place it on pins 1 & 2 of the 3-pin connector. The green LED will go out and the red LED will begin to flash. The number of flashes indicates which mode the unit is in(1 through 8).
2. To switch modes, press and hold the ReCal button next to the 3-pin connector. The unit will cycle through the modes: first it will flash one time indicating mode 1. Then it will flash twice-indicating mode 2. Then mode 3, etc. Release the button when it reaches the desired mode. The Red LED will now flash indicating which mode the unit is in.
3. Remove the shunt from pins 1 & 2 on the 3-pin connector and replace the shunt on the “Time Delay Selection Jumper”. The unit will remain in the selected mode.

Write the new mode # on the inside of the lid label for future reference



4. After setting the mode follow procedure in section 2.6.6 for mode 2. For modes 7 and 8, follow the appropriate manual calibration procedure as described in section 2.8.3.

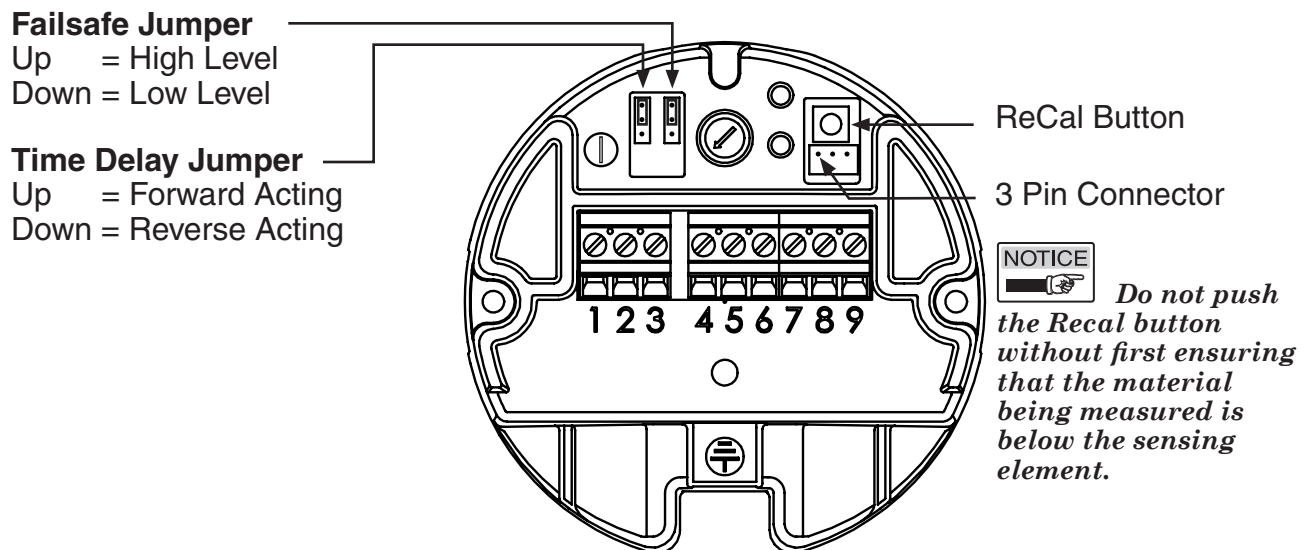


Figure 2-8
Electronic Unit Adjustments

2.8.4 Accessing the Calibration Modes (Continued)

Definition of Modes

- Mode 2:** Fixed Cal 2pF: 2pF differential, set point locked 2pF above starting capacitance
- Mode 7:** Manual calibration standard sensitivity – pots adjusts from 0 to 65pF
- Mode 8:** Manual calibration High sensitivity – pot adjusts from 0 to 27 pF
- Mode 6:** Fixed Cal 0.5pF: 0.5pF differential, set point locked 0.5pF above starting capacitance

Other Calibration Modes

- Mode 1:** Auto-Cal 2pF: 2pF differential, set point varies depending on material
- Mode 3:** Auto-Cal 10pF: 10pF differential, set point varies depending on material
- Mode 4:** Fixed Cal 10pF: 10pF differential, set point locked 10pF above starting capacitance
- Mode 5:** Auto-Cal 0.5pF: 0.5pF differential, set point varies depending on material

Determining which mode the unit is in

ThePoint will be shipped in the Auto-Cal mode #2 unless pre-ordered in a specific mode. To determine if the ThePoint has been shipped in a mode other than #2, look at the label on the blue electronic unit. The model number will be 385-0051-012-0X. The “X” indicates the pre-set mode typically a “2” for mode #2

If the Mode has been changed after receiving the unit, the person changing the mode should have made a note of the new mode on the label inside the lid of the housing.

If there is no note on the lid or if there is a question as to what the current mode is, the following procedure can be used:

On the topside of ThePoint, temporarily remove the shunt from the “Time Delay Selection Jumper” (see Fig. 2-8) and place it on pins 1 & 2 of the 3-pin connector. The green LED will go out and the red LED will begin to flash. The number of flashes indicates which mode the unit is in (1 through 8).

After determining the current mode, replace the shunt on the “Time Delay Selection Jumper”.

Section 3: Troubleshooting



WARNING:

If ThePoint instrument is located in a hazardous environment, do not open enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure that wiring, electrical fittings, and conduit connections conform to electrical codes for the specific location and hazard level.

3.1 Testing Sensing Element

To test the sensing element, first disconnect the integral cable as shown in *Figure 3-1*.

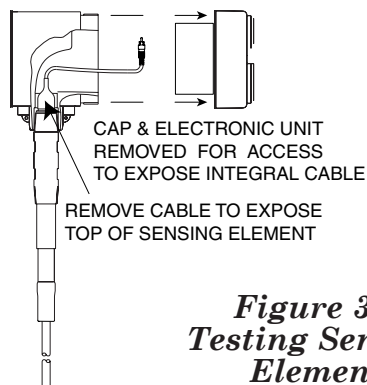
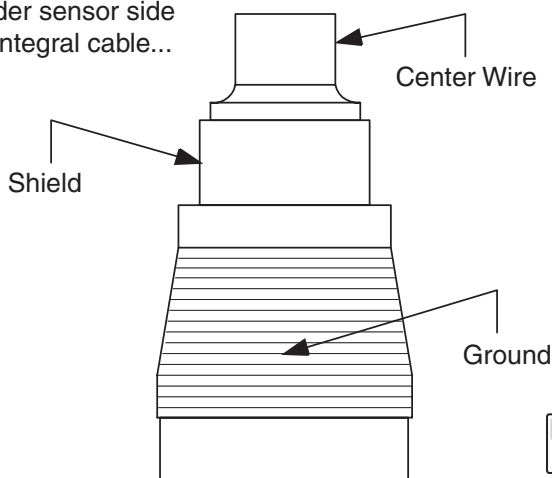


Figure 3-1
Testing Sensing Element

Expect the following measurements:

For Three-terminal Probes:

under sensor side of integral cable...



Measured Resistance (Sensor dry and clean):

Center Wire - Ground	∞ Ohms
Center Wire - Shield	∞ Ohms
Shield - Ground	∞ Ohms

Resistance readings must be taken using an analog ohmmeter set to Rx1000 scale.

When tank level is known to be below the sensor, minimum acceptable values are:

	Center Wire - Ground	1000 Ohms.
	Center Wire - Shield	600 Ohms.
	Shield - Ground	300 Ohms.

If the readings are less than the minimum acceptable values:

1. **Check** to see if tank is full, or if a severe coating is present.
2. **Clean sensor** and re-measure the sensor resistances.



Note:

Low resistance readings are acceptable if the sensor is covered with a conductive liquid. Also, low resistance readings can be the result of material lodging in a long mounting nozzle. Refer to Figure 2-2.



Note:

A reading of zero (0) Ohms usually indicates a metal-to-metal short circuit. Check for contact with tank wall, mounting nozzle, or other tank structure.

3.2 Testing Electronic Unit



Use the following steps to test the electronic unit:

1. Be sure environment is safe before removing lid from housing.
2. Observe failsafe jumper on circuit board on top of electronic unit (shown in **Figure 2-5**). Move jumper from current setting to alternate setting [HLFS to LLFS or vice versa]. Output should change state.
3. If it is possible to access sensing element (*with material below sensing element*), or remove ThePoint from vessel, touch tip of sensing element with your finger, while holding any bare metal portion of instrument housing with other hand. Output should change state.
4. If ThePoint changes state while moving jumper, but not while touching sensing element, in most cases, integral cable is faulty.
Refer to Section 3.5 Testing Integral Cable.
5. If ThePoint is stuck in one state:
 - a. Remove power.
 - b. Disconnect coax cable that joins sensing element to electronic unit.
Refer to Section 2.7 Sensing Element Connection.
 - c. Apply power.
 - d. Repeat step 2.
 - e. If ThePoint changes state with sensing element disconnected, in most cases, sensing element is faulty.
Refer to Section 3.1 Testing Sensing Element.
6. If there was no Change of state in either step 2 or step 3 and unit appears dead:
 - a. Remove and then reapply power.
 - b. Press and hold ReCal for 5 Sec. (shown in **Figure 2-5**).
 - c. Observe the two LEDs flashing for about 60 seconds.
 - d. Green LED should be lit after 60 seconds.
 - e. Touch sensing element with your finger.
 - f. Output should change state. If so, circuit board is working properly.
 - g. Reinstall instrument and hold ReCal for 5 Sec.
7. If ThePoint fails all of above tests, in most cases instrument is faulty. Use replacement electronic unit to determine the fault. Consult factory.

3.3 Over Range

If the Green LED is flashing, the instrument has detected the uncovered sensing element capacitance exceeds the limits of the transmitter. **Consult factory instructions.**

3.4 Under Range

If the Red LED is flashing, the instrument has detected the sensing element capacitance is too small. **Consult factory for sensing element capacitor values.**

3.5 Testing Integral Cable

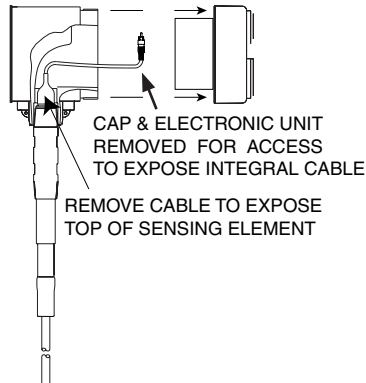
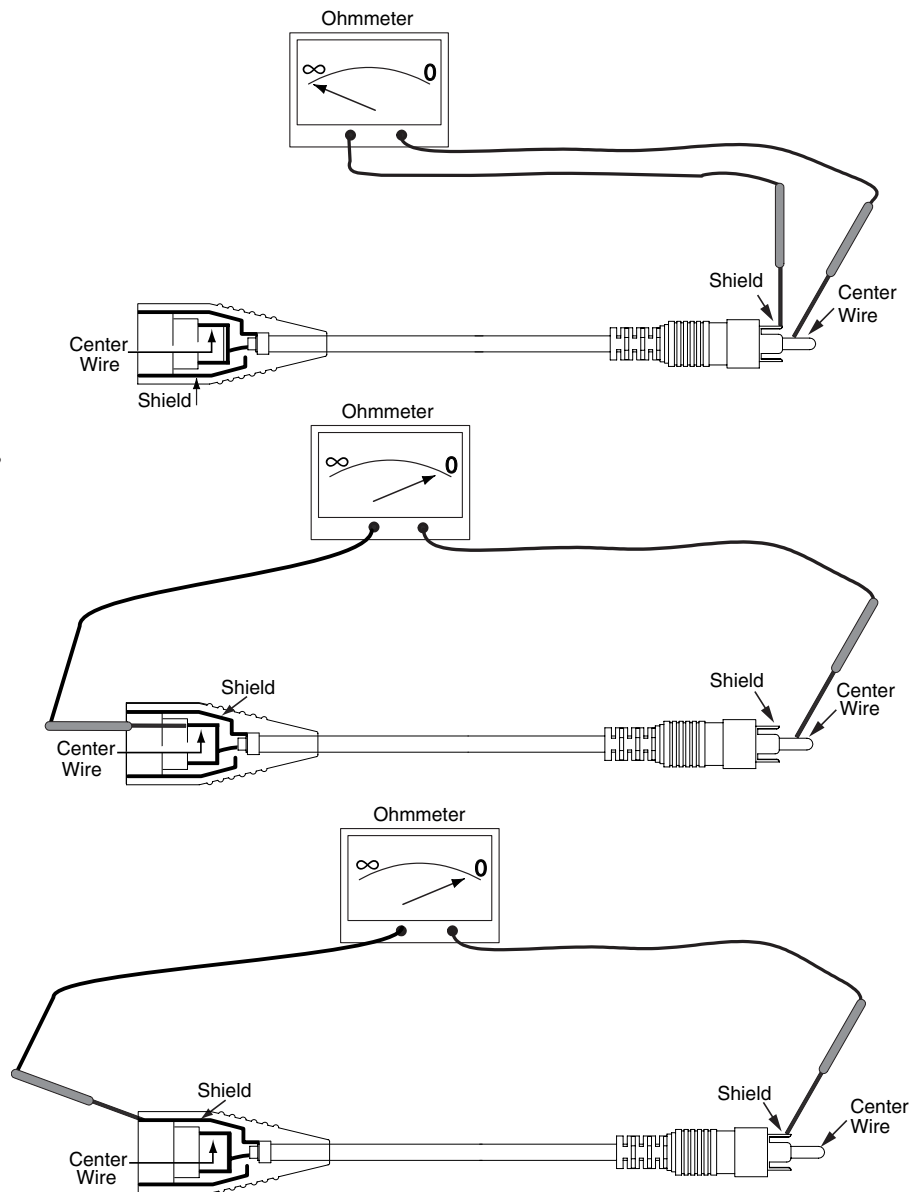
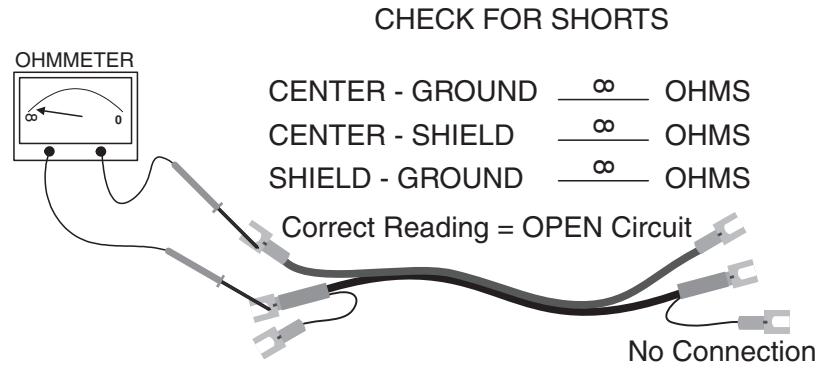


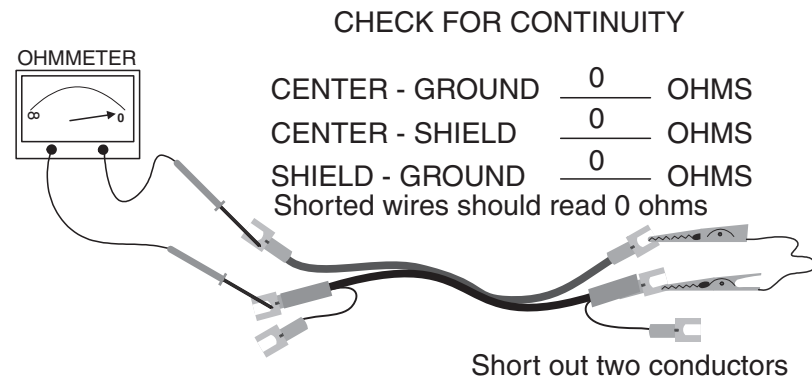
Figure 3-2
Testing Integral Cable



3.6 Testing Remote Cable



*Figure 3-3
Testing Remote Cable*



3.7 Factory Assistance



AMETEK Drexelbrook can answer any questions about ThePoint series instrument. Call Customer Service at 1-800-553-9092 (US and Canada) or +1- 215-674-1234 (International).

If you require assistance and attempts to locate the problem have failed:

- Contact your local Drexelbrook representative,
- Call the Service department toll-free at 1-800-527-6297 US and Canada) or +1-215-674-1234 (International),
- FAX the Service department at 215-443-5117, or
- E-Mail to drexelbrook.service@ametek.com

Please provide the following information:

- Instrument Model Number
- Sensing Element Model Number and Length
- Original Purchase Order Number
- Material being measured
- Temperature
- Pressure
- Agitation
- Brief description of the problem
- Checkout procedures that have failed

3.8 Field Service

Trained field servicemen are available on a time-plus-expense basis to assist in start-ups, diagnosing difficult application problems, or in-plant training of personnel. Contact the service department for further details.

3.9 Customer Training

Periodically, AMETEK Drexelbrook instrument training seminars for customers are held at the factory. These sessions are guided by Drexelbrook engineers and specialists, and provide detailed information on all aspects of level measurement, including theory and practice of instrument operation. For more information write to: AMETEK Drexelbrook, Communications/ Training Group or call 215-674-1234.

3.10 Equipment Return

In order to provide the best service, any equipment being returned for repair or credit must be pre-approved by the factory.

In many applications, sensing elements are exposed to hazardous materials.

- **OSHA mandates** that our employees be informed and protected from hazardous chemicals.
- **Material Safety Data Sheets (MSDS)** listing the hazardous materials to which the sensing element has been exposed **MUST** accompany any repair.
- It is your responsibility to fully disclose all chemicals and decontaminate the sensing element.



To obtain a return authorization (RA#), contact the Service department at 1-800-527-6297 (US and Canada) or +1-215-674-1234 (International).

Please provide the following information:

- Model Number of Return Equipment
- Serial Number
- Original Purchase Order Number
- Process Materials to which equipment has been exposed
- MSDS sheets for any hazardous materials
- Billing Address
- Shipping Address
- Purchase Order Number for Repairs

Please include a purchase order even if the repair is under warranty. If repair is covered under warranty, you will not be charged.

Ship equipment freight prepaid to:
Ametek-drexelbrook.
205 Keith Valley Road
Horsham, Pa 19044-1499
COD shipments will not be accepted.

3.11 RF Point Level Troubleshooting Guide

Symptom	Possible Cause	Solution	See Section
Switch is in alarm and will not clear	Sensor is coated by a conductive material and the Cote-Shield™ element does not extend far enough into the vessel	Need a sensor with a longer Cote-Shield element. Rule of thumb is nozzle length + expected wall coating + 2 inches.	Section 2.2
	Fail Safe switch is set to the wrong setting	Check to make sure the fail safe switch is in the correct position	Section 2.5.4
	Active section of sensor is touching an internal structure or material is bridging active to ground.	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 3.5
	Flexible sensor is swaying and active is touching vessel or structure	Add 1 or 2 seconds of reverse acting time delay.	Section 2.5.1
Switch stays in alarm for extended period after level falls below sensor	Material bridging from active to tank structure	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A
	Time delay may be active	Make sure time delay pot is full counterclockwise.	Section 2.5.1
Switch does not respond to material	There may not be enough active to “see” an insulating material	Try changing to high sensitivity or adding active length to sensor	Section 2.8.5 Appendix A
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 2.8
	Granular material – Active section is not getting enough coverage due to angle of repose	Relocate sensor to get more coverage or lengthen active. Changing to high sensitivity may also help.	Section 2.8.5 Appendix A
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 3.5
Switch delays in responding to material	Reverse acting time delay may be active	Check time delay settings to make sure they are correct	Section 2.5.1
LED's are Flashing	Flashing LED's indicate one of two things. Over Range / Under Range	Consult instruction manual to determine which of the three symptoms are experienced.	Section 3.3 Section 3.4
Over Range indicates that the standing capacitance of the sensing element in the vessel is too large to allow calibration	A long sensing element may generate too much standing capacitance to calibrate out	Padding is required – consult factory	Section 3.4
	The sensor could be touching an internal tank structure	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 2.8
	Improper wiring connection (Remote Switches)	Check remote cable connections to confirm they are correct.	Section 3.5
Under Range indicates that the electronic unit is not seeing enough capacitance.	ThePoint™ - Electronic unit is not attached to back board	Remove electronic unit and make certain that connection pins are not damaged. Re inset electronic unit making sure it is connected to back board.	Section 3.4
	Unit is damaged	Consult factory	Section 3.7
Green Power LED is out	Electronic unit is not getting power	Check power source to make sure proper power is supplied and connections are correct	Section 2.3
	Electronic unit is damaged	Consult factory	Section 3.7
Unit does not respond when pressing the Calibration Button	Cal button only operates when switch is set to Auto-Cal mode	Check to make sure switch is in Auto-Cal	Section 2.8.5
	Electronic Unit is damaged	Consult Factory	Section 3.7

Section 4: Specifications

Technology:	RF/ Capacitance
Calibration:	Dependant Upon Mode
Modes of Operation:	High and Low level
Repeatability:	2mm (0.08 inch) conductive liquids
Response Time:	less than 1 second
Time Delay:	0 to 60 seconds forward and reverse acting
Ambient Electronics:	-40 to 70°C (-40 to 158°F)
Storage Temperature:	-40 to 85°C (-40 to 185°F)
Indicators:	LEDs Green Power Red Alarm
Power supply:	13 to 30 Vdc
Power consumption:	1 watt maximum
Loop Current:	8mA Alarm, 16 mA Normal or (Field-Selectable) 8mA Normal, 16 mA Alarm
Housing (electronics):	Powder-coated aluminum with two cable entries
Cable entry:	M20 x 1.5 or ¾-inch NPT
Ingress Protection:	IP66 NEMA 4X
Approvals:	ATEX, FM, FMc, Test Safe

Section 5

Section 5: Approvals Available

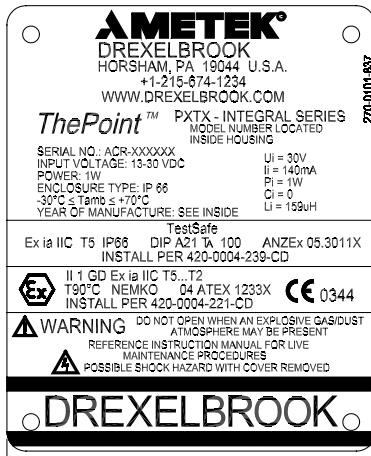


Equipment Ratings

Intrinsically Safe for use in Class I, II, and III, Division 1, Groups A, B, C, D, E, F and G in accordance with Entity requirements and Control Drawing 420-0004-220-CD; Nonincendive for use in Class I, Division 2, Groups A, B, C, and D; Suitable for use in Class II and III, Division 2, Groups F and G; Explosionproof for use in Class I, Division 1, Groups A, B, C, and D; Dust-Ignition proof for Class II and III, Division 1, Groups E, F, and G; Indoor and Outdoor, (Type 4, 4X, IP66) Hazardous (Classified) locations with Intrinsically Safe Connections to Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (Classified) Locations in accordance with Entity requirements and Control Drawing 420-0004-220-CD.

$U_i = 30V$ $C_i = 0$
 $I_i = 140mA$ $L_i = 159\mu H$
 $P_i = 1w$

ATEX - NEMKO 04ATEX1233X



II 1 GD Ex ia IIC
 T90°C
 T5...T2



Tamb: -30°C to +70°C

Install Per 420-0004-221-CD

$U_i = 30V$
 $I_i = 140mA$
 $P_i = 1w$
 $C_i = 0$
 $L_i = 159\mu H$

Test Safe

Ex ia IIC T5 (Ta = -40° C to 70° C) IP66
 DIP A21 Ta 100
 ANZEx 05.3011X

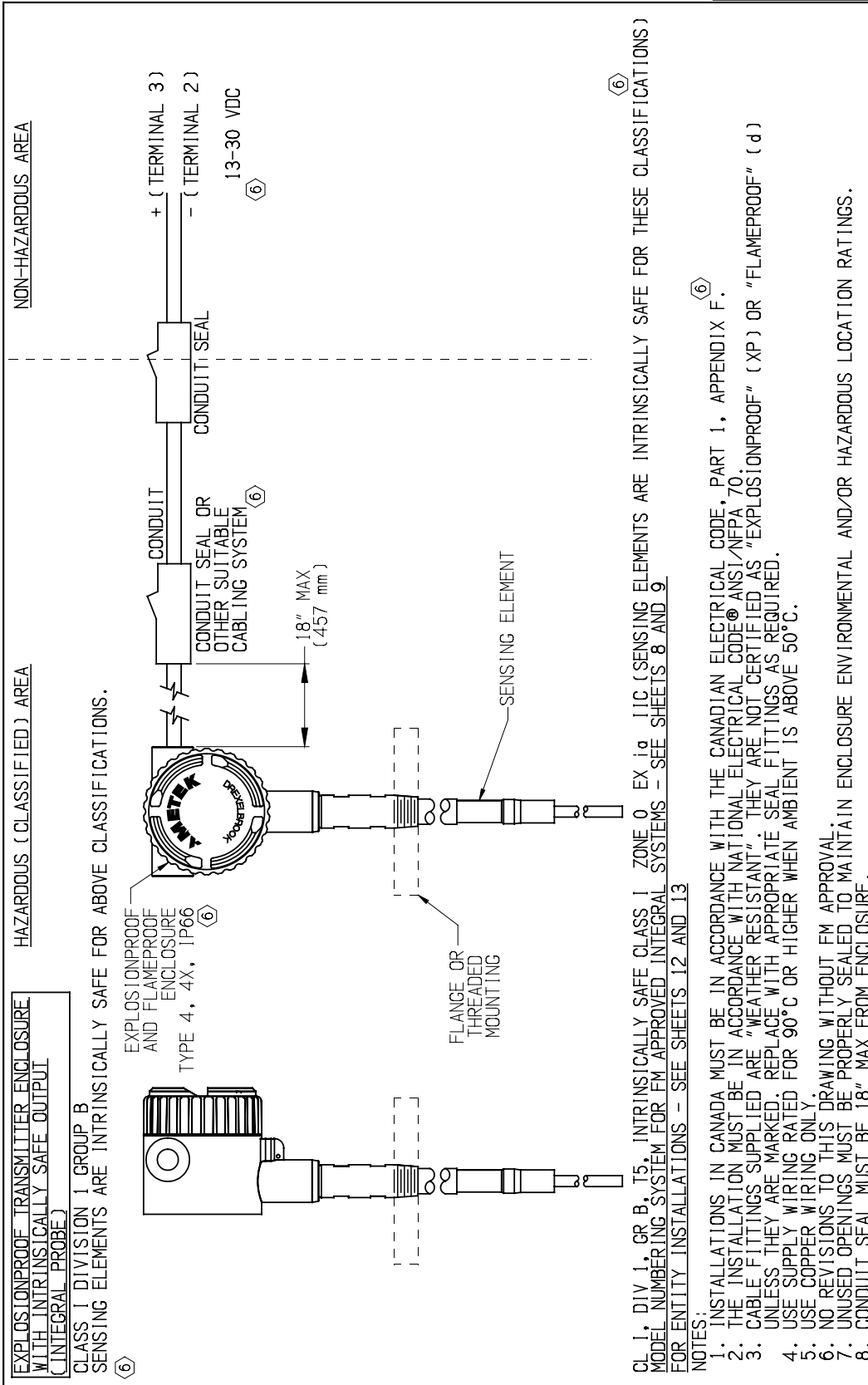
Section 6

Section 6: Control Drawings

6.1 FM / FMc Control Drawings

№. 420-0004-220-CD

SHT. 1 OF 13



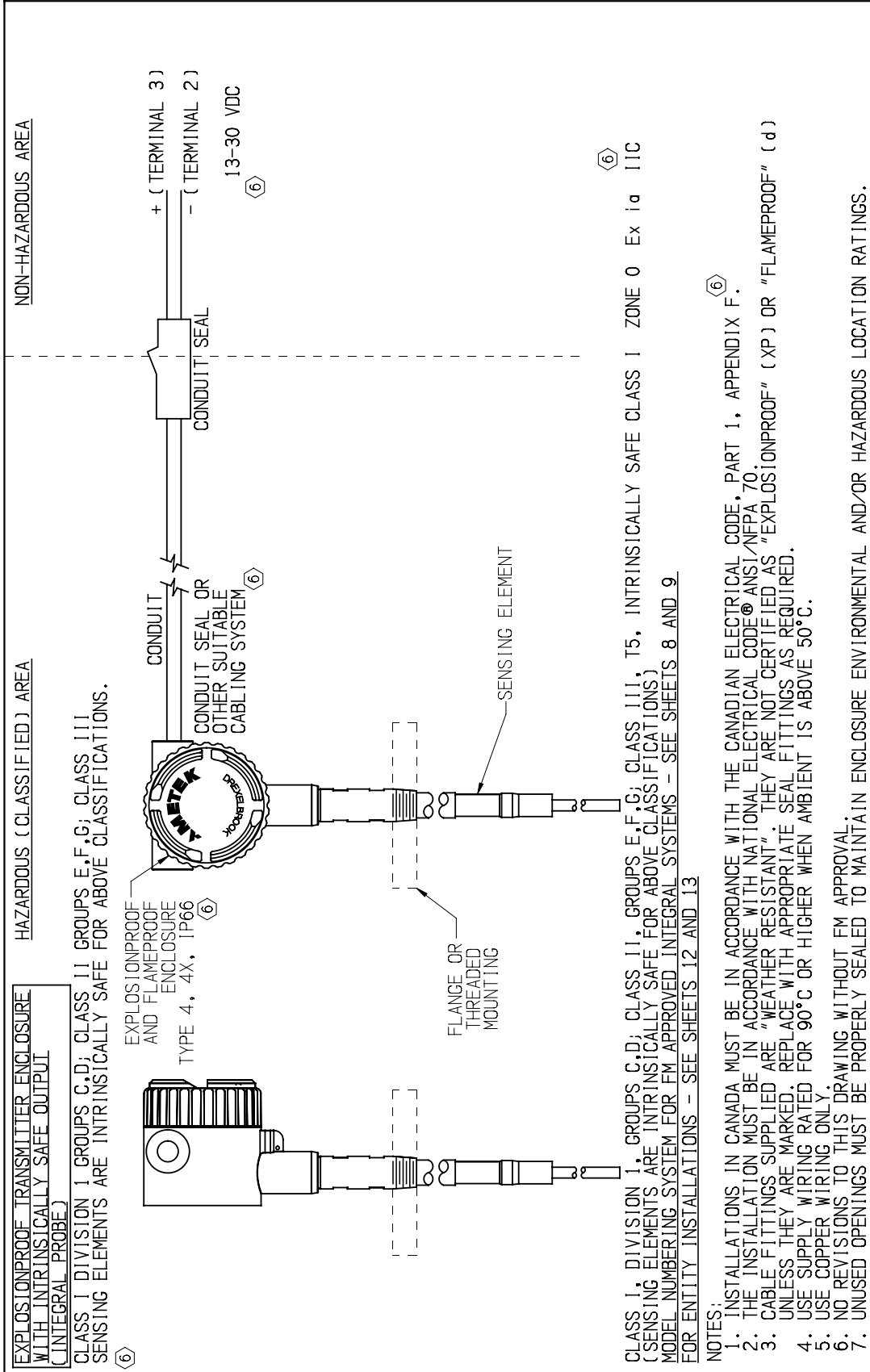
CL. I, DIV. 1, GR. B, T5, INTRINSICALLY SAFE CLASS I ZONE 0 EX. Ia IIC (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR THESE CLASSIFICATIONS) MODEL NUMBERING SYSTEM FOR FM APPROVED INTEGRAL SYSTEMS - SEE SHEETS 8 AND 9

NOTES:
 1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.
 8. CONDUIT SEAL MUST BE 18" MAX FROM ENCLOSURE.

CERTIFIED					AMETEK® DREXELBROOK 205 KEITH VALLEY RD. HOBBSHAM, PA 19044-9986 215-674-1234 FAX 215-674-2731				ISS: 1 OF 13
PO #	6	3-10-103	THP	2-17-11	FM/FMC CONTROL DRAWING FOR "ThePoint" 2-WIRE CLASS I, DIVISION 1, GROUP B (INTEGRAL) PXTX SERIES XP INSTALLATION				SHT. 1 OF 13
ENG	5	8-09-107	SCA	8-24-09					420-0004-220-CD
USER	4	5-07-113	THP	5-14-07	SCALE NONE ALL DIMENSIONS IN INCHES (MM)				
	3	1-06-216	THP	1-11-07	DR. JJS 2-16-11 CK. LEP 2-17-11				
ISS	2	6-04-212	THP	6-11-04					
DATE									

6.1 FM / FMc Control Drawings (Continued)

NO. 420-0004-220-CD SHT 2 OF 13



EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (INTEGRAL PROBE)
 CLASS I DIVISION 1 GROUPS C,D; CLASS II GROUPS E,F,G; CLASS III SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

EXPLOSIONPROOF AND FLAMEPROOF ENCLOSURE TYPE 4, 4X, 1P66

CONDUIT SEAL OR OTHER SUITABLE CABLING SYSTEM

CONDUIT

CONDUIT SEAL

SENSING ELEMENT

FLANGE OR THREADED MOUNTING

NON-HAZARDOUS AREA

HAZARDOUS (CLASSIFIED) AREA

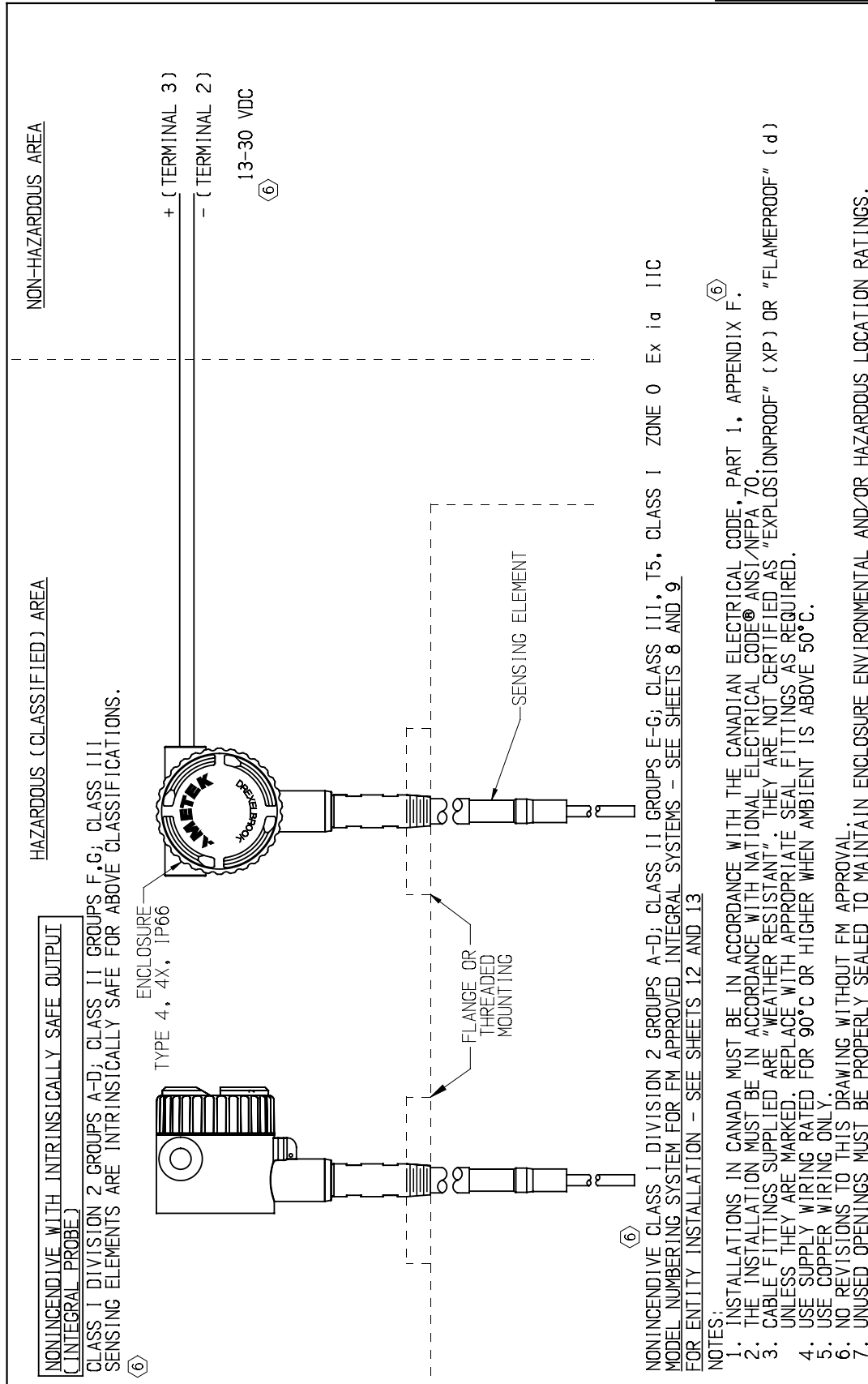
+ (TERMINAL 3)
- (TERMINAL 2)
13-30 VDC

CLASS I, DIVISION 1, GROUPS C,D; CLASS II, GROUPS E,F,G; CLASS III, INTRINSICALLY SAFE CLASS I ZONE 0 Ex ia IIC

NOTES:
 1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED	6	3-10-103	THP	2-17-11	COPYRIGHT - 2010	AMETEK® DREXELBROOK 205 KEITH VALLEY RD. HORSHPAN, PA 19044-9986 215-674-1234 FAX 215-674-2731	FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE CLASS I, II, III DIVISION 1, GROUPS C-G (INTEGRAL) PXTX SERIES XP INSTALLATION
PO #	5	8-09-107	SGA	8-24-09	AMETEK DREXELBROOK		SHT. 2 OF 13 OF 13 6
ENG	4	5-07-113	THP	5-14-07	SCALE - NONE UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)		
USER	3	1-06-216	THP	1-11-07			
ISS.	2	6-04-212	THP	6-11-04	DR. JUS 2-16-11	420-0004-220-CD	
DE #					CK. LEP 2-17-11		

6.1 FM / FMc Control Drawings (Continued)



NON-INCENDIVE CLASS I DIVISION 2 GROUPS A-D; CLASS II GROUPS E-G; CLASS III, T5, CLASS I ZONE 0 Ex ia IIC MODEL NUMBERING SYSTEM FOR FM APPROVED INTEGRAL SYSTEMS - SEE SHEETS 8 AND 9 FOR ENTITY INSTALLATION - SEE SHEETS 12 AND 13

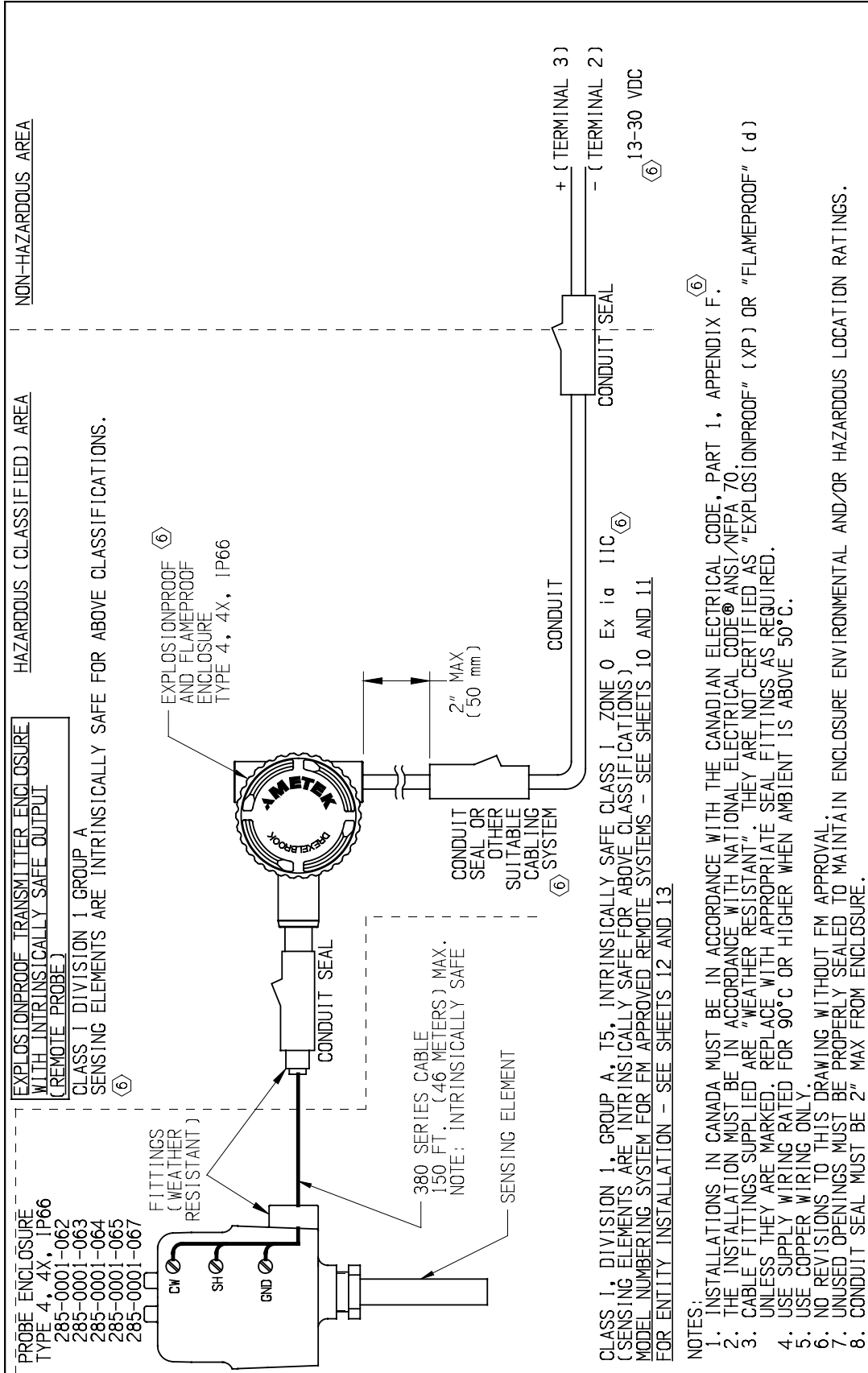
- NOTES:
1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED		6	3-10-103	THP	2-17-11	COPYRIGHT	2010
PO #	by	5	8-09-107	SGA	8-24-09	AMETEK DREXELBROOK	
ENG		4	5-07-113	THP	5-14-07	SCALE	NONE
USER		3	1-06-216	THP	1-11-07	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)	
ISS. #	EDD/DSR NO.	2	6-04-212	THP	6-11-04	DR.	JUS 2-16-11
DATE	APP'D					CK.	LEP 2-17-11
FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE NON-INCENDIVE DIVISION 2, (INTEGRAL) PXTX SERIES							
420-0004-220-CD							
205 KEITH VALLEY RD. HORSHAM, PA 19044-9886							
215-674-1234 FAX 215-674-2731							
SHEET 3 OF 13							

NO. 420-0004-220-CD

6.1 FM / FMc Control Drawings (Continued)

NO. 420-0004-220-CD SHEET 4 OF 13



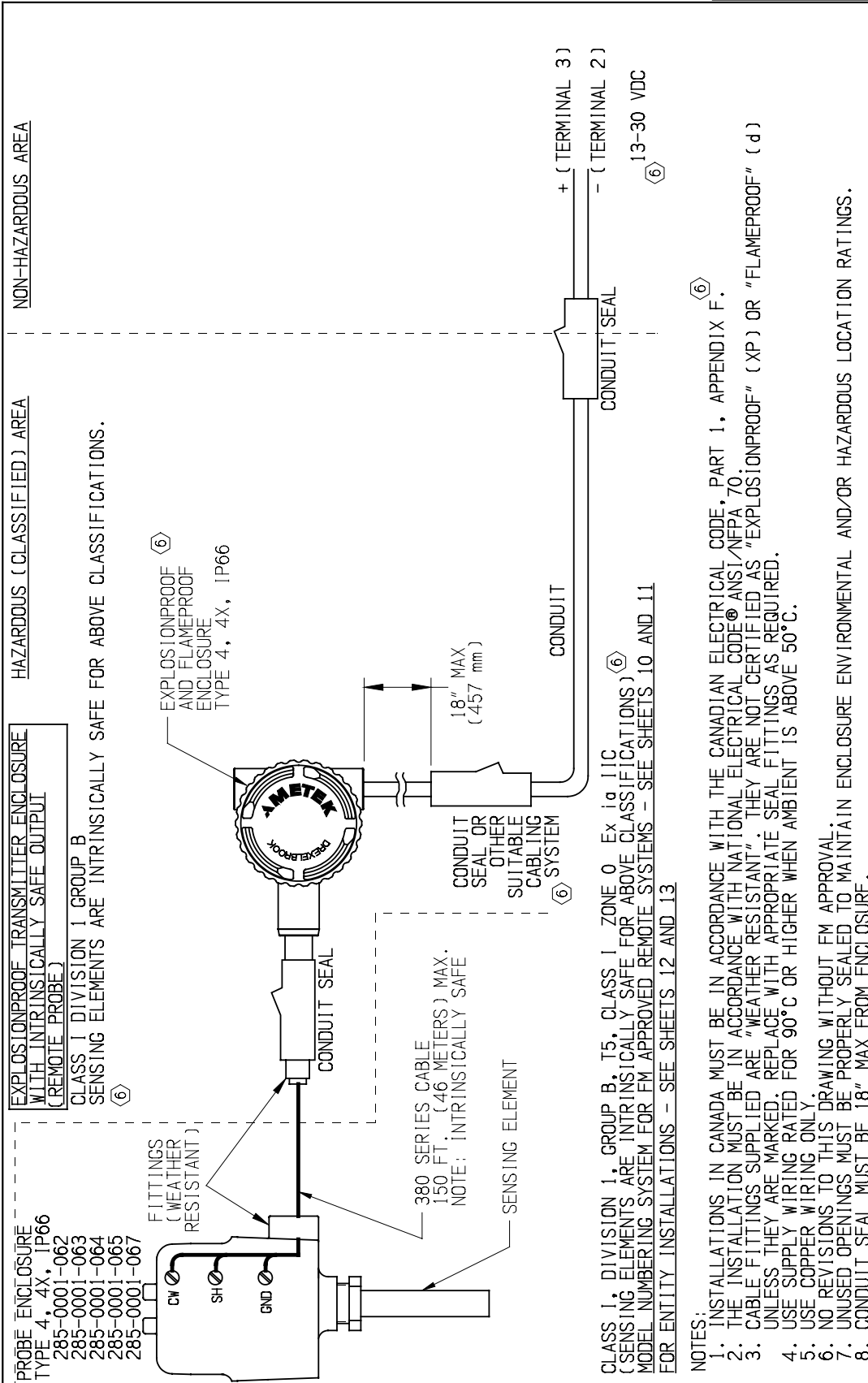
CLASS 1, DIVISION 1, GROUP A, T5, INTRINSICALLY SAFE CLASS 1 ZONE 0 Ex ia IIC
 (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS)
 MODEL NUMBERING SYSTEM FOR FM APPROVED REMOTE SYSTEMS - SEE SHEETS 10 AND 11
 FOR ENTIRE INSTALLATION - SEE SHEETS 12 AND 13

- NOTES:
1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.
 8. CONDUIT SEAL MUST BE 2" MAX FROM ENCLOSURE.

CERTIFIED		6	3-10-103	THP	2-17-11	COPYRIGHT 2010	AMETEK® DREXELBROOK	FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE CLASS 1, DIVISION 1 GROUP A (REMOTE) PXTX SERIES XP INSTALLATIONS
PO #	by	5	8-09-107	SGA	8-24-09	AMETEK DREXELBROOK		
ENG		4	5-07-113	THP	5-14-07	SCALE NONE		
USER		3	1-06-216	THP	1-11-07	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)		
ISS.	EDD/DSR NO.	APP'D	DATE	DR.	JUS 2-16-11	205 KETH VALLEY RD HORSHAM, PA 19044-9986	420-0004-220-CD	SHT. 4 OF 13
DE #				CK.	LEP 2-17-11			ISS. 6

6.1 FM / FMc Control Drawings (Continued)

NO. 420-0004-220-CD SHT 5 OF 13



CLASS I, DIVISION 1, GROUP B, T5, CLASS I, ZONE 0 Ex ia IIC (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS) MODEL NUMBERING SYSTEM FOR FM APPROVED REMOTE SYSTEMS - SEE SHEETS 10 AND 11 FOR ENTRY INSTALLATIONS - SEE SHEETS 12 AND 13

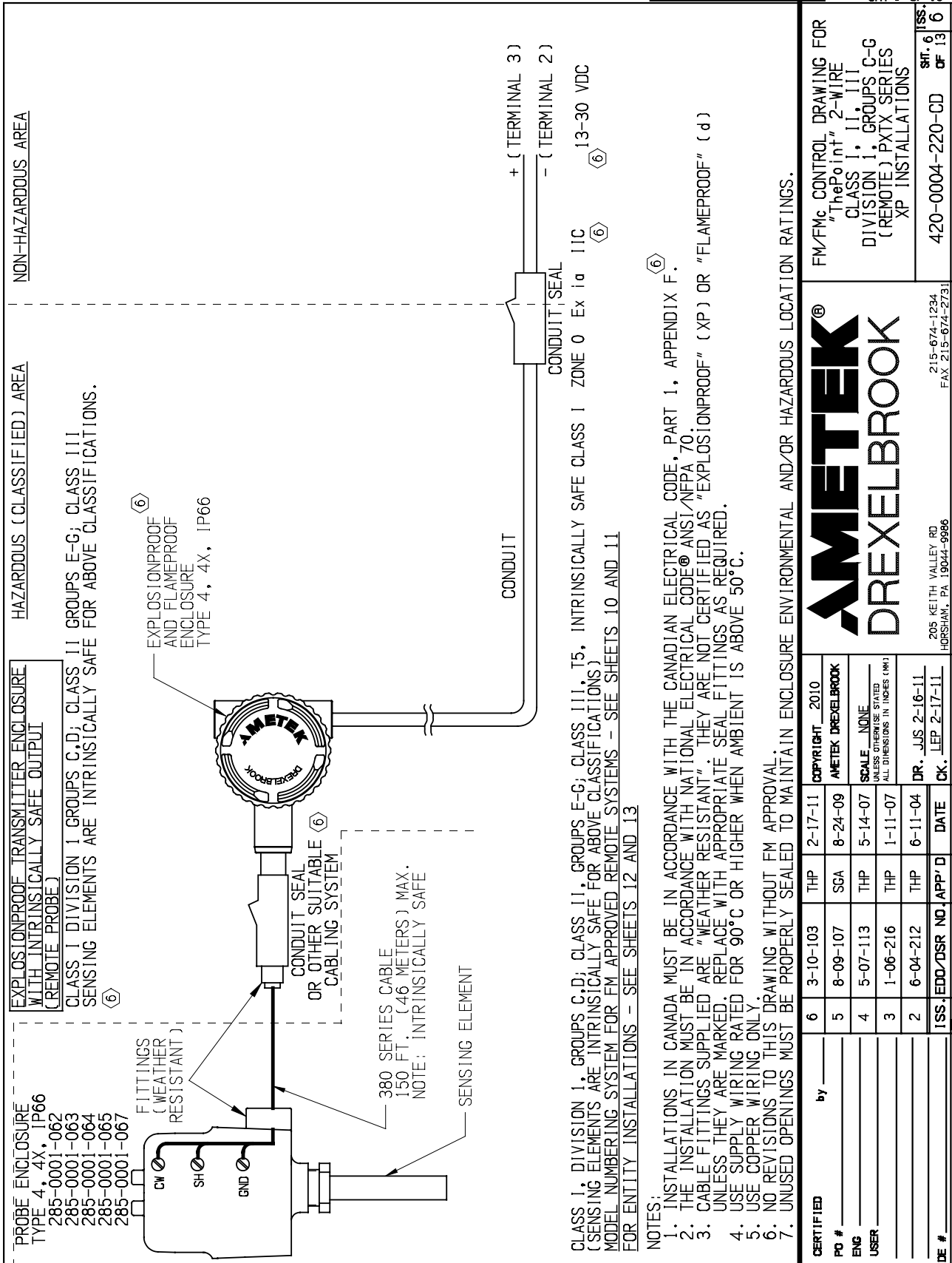
NOTES:

1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.
8. CONDUIT SEAL MUST BE 18" MAX FROM ENCLOSURE.

CERTIFIED by		THP	2-17-11	COPYRIGHT	2010	FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE CLASS I, DIVISION 1 GROUP B (REMOTE) PXTX SERIES XP INSTALLATIONS	
PO #		THP	2-17-11	AMETEK	DREXELBROOK	420-0004-220-CD	
ENG		THP	2-17-11	SCALE NONE		SHT. 5 OF 13	
USER		THP	2-17-11	ALL DIMENSIONS IN INCHES (IN)		OF 13	
ISS.	EDD/DSR	NO.	APP'D	DATE	DR.	JUS	2-16-11
DE #					CK.	LEP	2-17-11
				205 KEITH VALLEY RD HORSHAN, PA 19044-9986		215-674-1234 FAX 215-674-2731	

6.1 FM / FMc Control Drawings (Continued)

NO. 420-0004-220-CD SHT 6 OF 13



EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (REMOTE PROBE)
 CLASS I DIVISION 1 GROUPS C,D; CLASS II GROUPS E-G; CLASS III SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

EXPLOSIONPROOF AND FLAMEPROOF ENCLOSURE TYPE 4, 4X, IP66

CONDUIT SEAL OR OTHER SUITABLE CABLING SYSTEM

380 SERIES CABLE 150 FT. (46 METERS) MAX. NOTE: INTRINSICALLY SAFE

SENSING ELEMENT

CONDUIT

CONDUIT SEAL

EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (REMOTE PROBE)

CLASS I, DIVISION 1, GROUPS C,D; CLASS II, GROUPS E-G; CLASS III, T5, INTRINSICALLY SAFE CLASS I ZONE 0 Ex ia IIC 13-30 VDC

+ (TERMINAL 3)

- (TERMINAL 2)

NOTES:

1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT TS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED	by	6	3-10-103	THP	2-17-11	COPYRIGHT	2010
PO #		5	8-09-107	SGA	8-24-09	AMETEK	DREXELBROOK
ENG		4	5-07-113	THP	5-14-07	SCALE	NONE
USER		3	1-06-216	THP	1-11-07	ALL DIMENSIONS IN INCHES (MM)	
ISS. EDD/DSR NO. APP'D	DATE	2	6-04-212	THP	6-11-04	DR.	JUS 2-16-11
DE #		CK.	LEP 2-17-11				

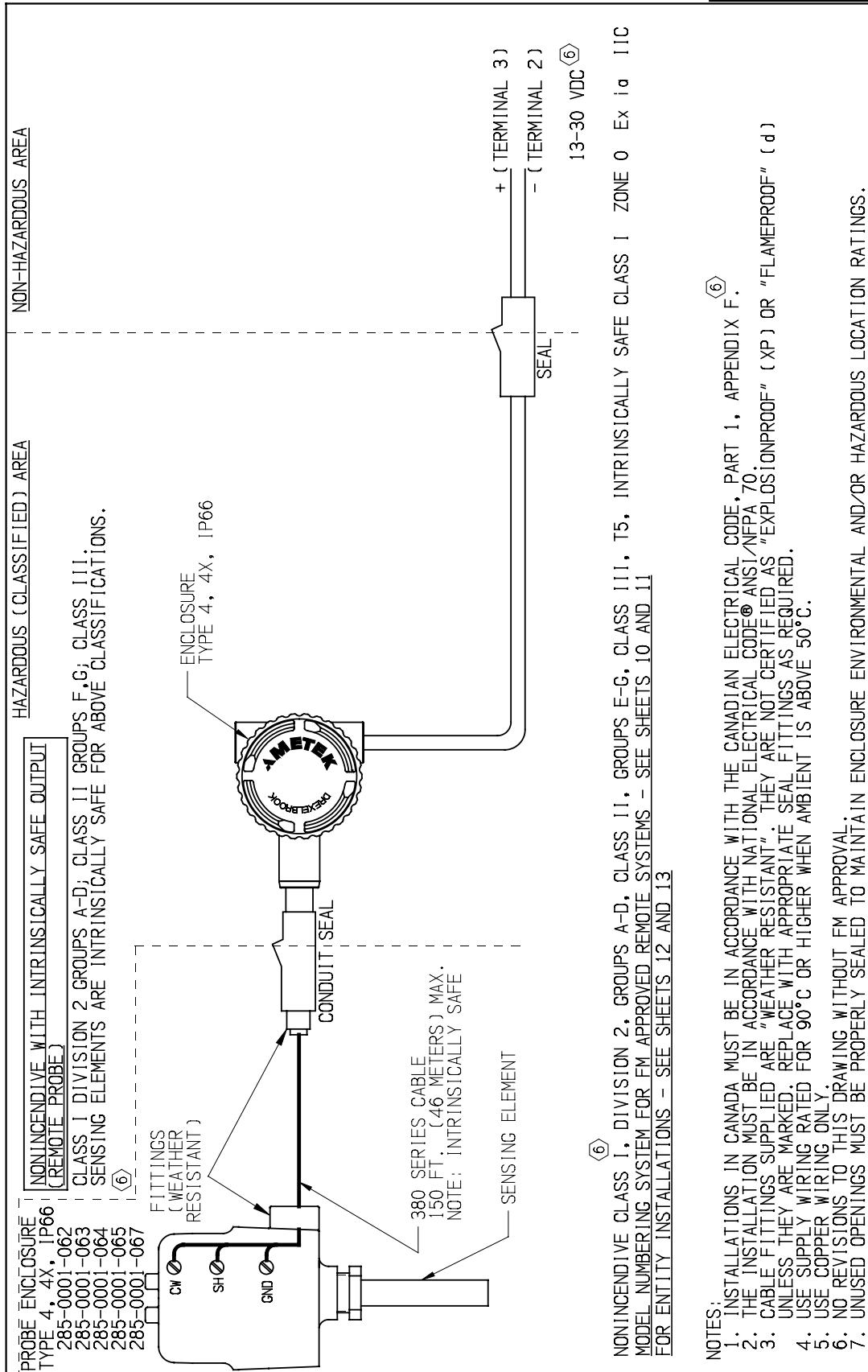
FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE CLASS I, II, III DIVISION 1, GROUPS C-G (REMOTE) PXTX SERIES XP INSTALLATIONS

205 KEITH VALLEY RD
 HOBBSHAW, PA 19044-9986
 215-674-1234
 FAX 215-674-2731

420-0004-220-CD SHT. 6 OF 13

6.1 FM / FMc Control Drawings (Continued)

No. 420-0004-220-CD SHEET 7 OF 13



NON-INTRINSICALLY SAFE OUTPUT
(REMOTE PROBE)

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

- PROBE ENCLOSURE TYPE 4, 4X, IP66
- 285-0001-062
- 285-0001-063
- 285-0001-064
- 285-0001-065
- 285-0001-067

CLASS I DIVISION 2 GROUPS A-D; CLASS II GROUPS F,G; CLASS III, SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

FITTINGS (WEATHER RESISTANT)

ENCLOSURE TYPE 4, 4X, IP66

CONDUIT SEAL



380 SERIES CABLE 150 FT. (46 METERS) MAX. NOTE: INTRINSICALLY SAFE

SENSING ELEMENT

+ (TERMINAL 3)
- (TERMINAL 2)
13-30 VDC

NONINTRINSICALLY SAFE CLASS I ZONE 0 Ex ia IIC MODEL NUMBERING SYSTEM FOR FM APPROVED REMOTE SYSTEMS - SEE SHEETS 10 AND 11 FOR ENTITY INSTALLATIONS - SEE SHEETS 12 AND 13

- NOTES:
1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED	by	THP	2-17-11	COPYRIGHT	2010
PO #		SGA	8-24-09	AMETEK DREXELBROOK	
ENG		THP	5-07-113	SCALE	NONE
USER		THP	1-06-216	UNLESS OTHERWISE STATED	ALL DIMENSIONS IN INCHES (MM)
ISS.	EDD/DSR	NO.	APP'D	DATE	
DR. J.S. 2-16-11				6-11-04	
CK. LEP 2-17-11					
<p>205 KEITH VALLEY RD. HORSHAM, PA 19044-9986 215-674-1234 FAX 215-674-2713</p>					
<p>AMETEK® DREXELBROOK</p>					
<p>FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE SERIES NONINCENDITIVE DIVISION 2, (REMOTE) PXTX SERIES</p>					
<p>420-0004-220-CD SHEET 7 OF 13</p>					

6.1 FM / FMc Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY												
1	2	3	4	5	6	7	8	9	10	11	12	
P	a	T	0	b	0	c	d	*	*	*	*	
	a											a = MODE N = STD. AUTO CAL L = STD. 2pf FIXED T = 10pf AUTO CAL (6) V = 10pf FIXED H = HI SENSE .5pf AUTO CAL P = HI SENSE .5pf FIXED G = HI SENSE MANUAL M = STD. SENSE MANUAL
				b								b = 3 (STANDARD MOUNTING...7,B (DUAL SEAL OPTIONS)
					c							c = 0, 1 OR Z SENSING ELEMENTS
						d						d = 0-4, 6,7,8,9 OR Z SENSING ELEMENTS
							Z	Z				SPECIAL.....SEE LIST OF APPROVED SENSORS ON SHEET 9
							0	0				700-1202-021
								1				700-1202-022
								2				700-1202-024
								3				700-1202-028
								4				700-1202-042
								6				700-1202-032
								7				700-1202-020
								9				700-1202-034
						1	1					700-0201-005
								2				700-0201-005...HAST-C
								3				700-0201-036
								4				700-0202-002
								6				700-0002-360
								7				700-0202-036
								8				700-0001-022
									N	N		RETRO-FIT KIT

No. 420-0004-220-00

COPYRIGHT 2010	CERTIFIED by _____
AMETEK DREXELBROOK	PO # _____
SCALE NONE	ENG _____
UNLESS OTHERWISE STATED	USER _____
ALL DIMENSIONS IN INCHES (MM)	_____
DR. JJS 2-16-11	_____
CK. LEP 2-17-11	DE # _____

6	3-10-103	THP	2-17-11
5	8-09-107	SGA	8-24-09
4	5-07-113	THP	5-14-07
3	1-06-216	THP	1-11-07
ISS.	EDQ/DSR NO.	APP'D	DATE

AMETEK®
DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-2733

FM/FMc APPROVED INTEGRAL
"ThePoint" 2-WIRE
MODEL NUMBERING SYSTEM
PXTX SERIES

420-0004-220-CD SHT. 8 OF 13 ISS. 6

6.1 FM / FMc Control Drawings (Continued)

700-0001-001	700-0002-053	700-0018-124
700-0001-002	700-0002-054	700-0018-126
700-0001-004	700-0002-055	700-0018-134
700-0001-005	700-0002-056	700-0018-144
700-0001-007	700-0002-057	700-0018-222
700-0001-012	700-0002-059	700-0018-226
700-0001-013	700-0002-060	700-0018-234
700-0001-014	700-0002-061	700-0018-242
700-0001-016	700-0002-062	700-0018-243
700-0001-022	700-0002-063	700-0018-245
700-0001-023	700-0002-064	700-0018-246
700-0001-024	700-0002-321	700-0018-262
700-0001-026	700-0002-360	700-0021-001
700-0001-029	700-0003-009	700-0021-002
700-0001-034	700-0004-038	700-0021-003
700-0001-035	700-0004-045	700-0021-007
700-0001-038	700-0004-050	700-0021-008
700-0001-039	700-0005-012	700-0201-005
700-0001-042	700-0005-014	700-0201-008
700-0001-044	700-0005-018	700-0201-009
700-0001-045	700-0005-028	700-0201-010
700-0001-051	700-0005-035	700-0201-015
700-0001-052	700-0005-038	700-0201-016
700-0001-053	700-0005-045	700-0201-018
700-0001-054	700-0005-048	700-0201-025
700-0001-061	700-0005-054	700-0201-026
700-0001-062	700-0005-114	700-0201-035
700-0001-063	700-0005-148	700-0201-036
700-0001-064	700-0005-214	700-0201-105
700-0001-324	700-0005-314	700-0201-108
700-0001-344	700-0005-348	700-0201-109
700-0002-012	700-0005-354	700-0201-118
700-0002-018	700-0008-122	700-0201-135
700-0002-021	700-0008-123	700-0202-002
700-0002-022	700-0008-124	700-0202-004
700-0002-023	700-0008-126	700-0202-019
700-0002-024	700-0008-134	700-0202-023
700-0002-025	700-0008-144	700-0202-024
700-0002-027	700-0008-222	700-0202-033
700-0002-028	700-0008-226	700-0202-036
700-0002-029	700-0008-234	700-0202-043
700-0002-033	700-0008-242	700-0202-102
700-0002-035	700-0008-243	700-0204-038
700-0002-036	700-0008-245	700-0204-045
700-0002-037	700-0008-246	700-0204-048
700-0002-039	700-0008-262	700-0221-002
700-0002-041	700-0009-002	700-1202-001
700-0002-042	700-0009-024	700-1202-018
700-0002-043	700-0011-001	700-1202-021
700-0002-044	700-0011-003	700-1202-022
700-0002-047	700-0011-004	700-1202-024
700-0002-051	700-0011-015	700-1202-028
700-0002-052	700-0018-122	700-1202-041
	700-0018-123	700-1202-042

COPYRIGHT 2010	CERTIFIED by _____
AMETEK DREXELBROOK	PO # _____
SCALE NONE	ENG _____
UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)	USER _____
DR. JJS 2-16-11	_____
CK. LEP 2-17-11	DE # _____

6	3-10-103	THP	2-17-11
5	8-09-107	SGA	8-24-09
4	5-07-113	THP	5-14-07
3	1-06-216	THP	1-11-07
ISS.	EDD/DSR NO.	APP'D	DATE




205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-2731

"ThePoint" 2-WIRE FM/FMc APPROVED ADDITIONAL INTEGRAL SENSING ELEMENTS PXTX SERIES	420-0004-220-CD SHT. 9 OF 13 ISS. 6
--	---

No. 420-0004-220-CD
SHT. 9 OF 13

6.1 FM / FMc Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY												
1	2	3	4	5	6	7	8	9	10	11	12	
P	a	T	0	b	c	d	e	*	*	*	*	
a												a = MODE N = STD. AUTO CAL L = STD. 2pf FIXED T = 10pf AUTO CAL V = 10pf FIXED H = HI SENSE .5pf AUTO CAL P = HI SENSE .5pf FIXED G = HI SENSE MANUAL M = STD. SENSE MANUAL
				b								b = 3 (STANDARD MOUNTING)...7,B (DUAL SEAL OPTIONS)
					c							c = CABLE LENGTHS 1-9, A-K
						d						d = 0-3, 5, 6 OR Z SENSING ELEMENTS
							e					e = 0-9 OR Z SENSING ELEMENTS
												SENSING ELEMENTS
						Z	Z					SEE SHEET 11 FOR ADDITIONAL APPROVED SENSING ELEMENTS
						0	0					700-1202-001
							1					700-1202-012
							2					700-1202-014
							3					700-1202-018
							4					700-1202-041
							6					700-1202-031
							7					700-1202-010
							9					700-1202-033
						1	0					700-0001-018
							1					700-0201-005
							2					700-0201-005...HAST-C
							3					700-0201-036
							4					700-0202-002
							5					700-0202-043
							6					700-0002-360
							7					700-0202-036
							8					700-0001-022
						2	0					700-0209-022
						3	1					700-0029-001
							2					700-0029-002
							3					700-0029-003
							4					700-0029-004
							5					700-0029-005
						5	0					700-0207-001
							1					700-0207-002
							2					700-0207-003
							3					700-0207-004
							5					700-0207-006
						6	0					700-0204-038
							1					700-0204-002
							2					700-0204-048
CERTIFIED _____ by _____ PO # _____ ENG _____ USER _____ DE # _____												
6	3-10-103	THP	2-17-11					FM/FMc APPROVED REMOTE "ThePoint" 2-WIRE MODEL NUMBERING SYSTEM PXTX SERIES				
5	8-09-107	SGA	8-24-09									
4	5-07-113	THP	5-14-07									
3	1-06-216	THP	1-11-07									
ISS.	EDC/DSR NO.	APP'D	DATE									
205 KEITH VALLEY RD HORSHAM, PA 19044-9986				215-674-1234 FAX 215-674-2731				420-0004-220-CD SH1.10 OF 13 ISS. 6				

No. 420-0004-220-CD
 SH1.10 OF 13

6.1 FM / FMc Control Drawings (Continued)

MODEL NUMBERS OF APPROVED REMOTE SENSING ELEMENTS

70l-mnop-qrst LEVEL PROBE

- l = FAMILY NO. 0, 4
- m = FAMILY NO. 0 THROUGH 9, BLANK
- n = FAMILY NO. 0 THROUGH 9, BLANK
- o = 0 THROUGH 9, BLANK
- p = 0 THROUGH 9
- q = FAMILY NO. 0 THROUGH 9, BLANK
- r = FAMILY NO. 0 THROUGH 9, BLANK
- s = FAMILY NO. 0 THROUGH 9
- t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

COPYRIGHT 2010	CERTIFIED	by _____
AMETEK DREXELBROOK	PO # _____	
SCALE NONE	ENG _____	
<small>UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)</small>	USER _____	
DR. JJS 2-16-11		
CK. LEP 2-17-11	DE # _____	

6	3-10-103	THP	2-17-11
5	8-09-107	SGA	8-24-09
4	5-07-113	THP	5-14-07
3	1-06-216	THP	1-11-07
ISS.	EDD/DSR NO.	APP'D	DATE



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HORSHAM, PA 19044-9986

215-674-1234
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"ThePoint" 2-WIRE
FM/FMc APPROVED
ADDITIONAL REMOTE
SENSING ELEMENTS
PXTX SERIES

420-0004-220-CD

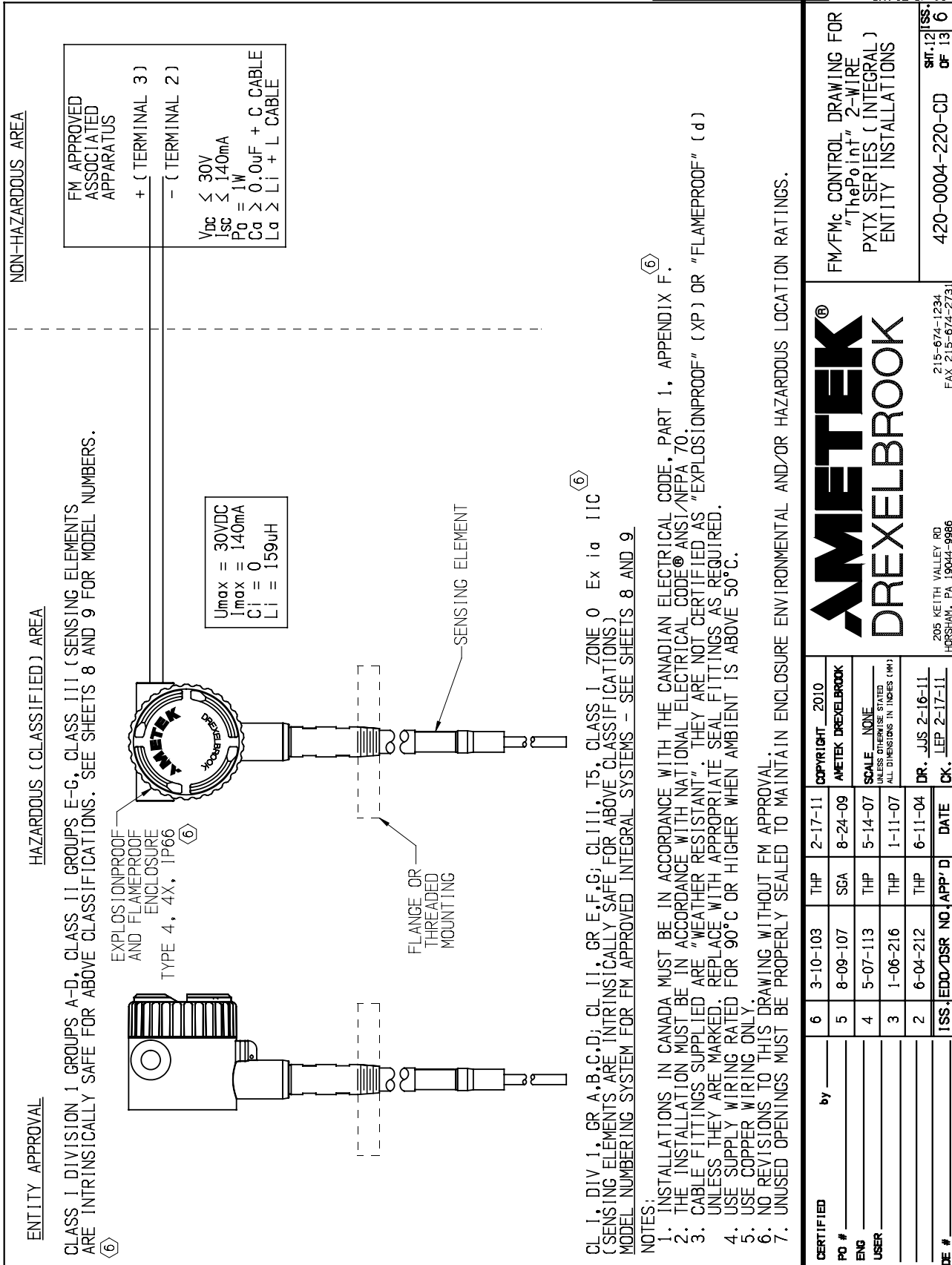
SHT. 11 OF 13
ISS. 6

NO. 420-0004-220-CD

SHT. 11 OF 13

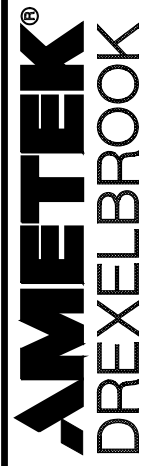
6.1 FM / FMc Control Drawings (Continued)

NO. 420-0004-220-CD SHT.12 OF 13



FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE PXTX SERIES (INTEGRAL) ENTITY INSTALLATIONS

420-0004-220-CD SHT.12 OF 13



205 KEITH VALLEY RD. HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

ENTITY APPROVAL CLASS I DIVISION 1 GROUPS A-D, CLASS II GROUPS E-G, CLASS III (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEETS 8 AND 9 FOR MODEL NUMBERS. (6)

HAZARDOUS (CLASSIFIED) AREA EXPLOSIONPROOF AND FLAMEPROOF ENCLOSURE TYPE 4, 4X, IP66 (6)

NON-HAZARDOUS AREA FM APPROVED ASSOCIATED APPARATUS + (TERMINAL 3) - (TERMINAL 2)

Vdc <= 30V
Isc <= 140mA
Po = 1W
Ca >= 0.0uF + C. CABLE
La >= Li + L CABLE

Umax = 30VDC
Imax = 140mA
Ci = 0
Li = 159uH

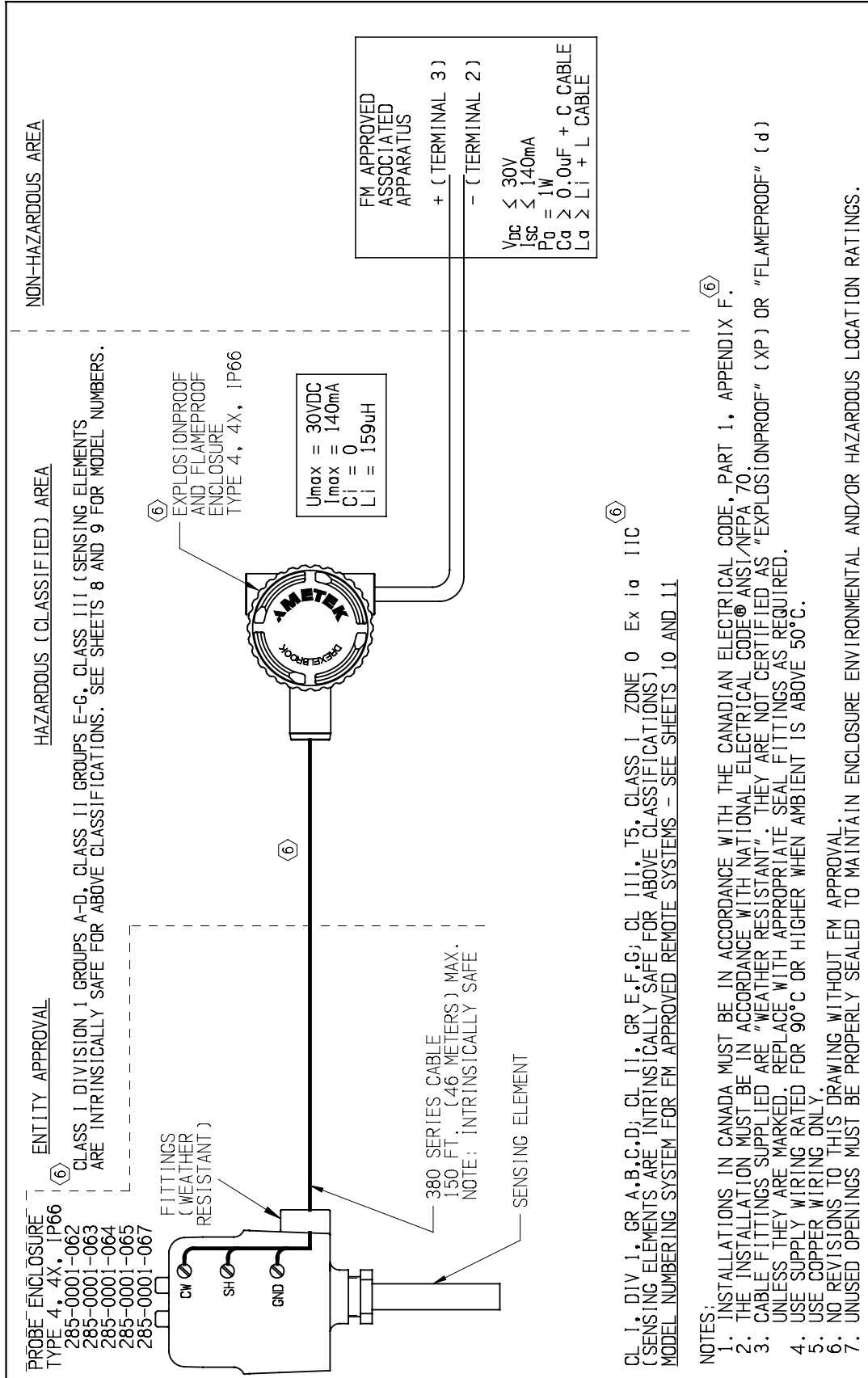
CL I, DIV 1, GR A,B,C,D; CL II, GR E,F,G; CL III, T5, CLASS I ZONE 0 Ex ia IIC (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS) MODEL NUMBERING SYSTEM FOR FM APPROVED INTEGRAL SYSTEMS - SEE SHEETS 8 AND 9 (6)

- NOTES:
1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED	by	THP	2-17-11	COPYRIGHT	2010
PO #		SGA	8-24-09	AMETEK	DREXELBROOK
ENG		THP	5-14-07	SCALE	NONE
USER		THP	1-11-07	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)	
ISS.	EDD/DSR NO.	APP'D	DATE	DR.	JUS 2-16-11
DE #		CK.	LEP 2-17-11		

6.1 FM / FMc Control Drawings (Continued)

NO. 420-0004-220-CD SHT 13 OF 13



NON-HAZARDOUS AREA

HAZARDOUS (CLASSIFIED) AREA

ENTITY APPROVAL

PROBE ENCLOSURE TYPE 4, 4X, IP66

CLASS I DIVISION 1 GROUPS A-D, CLASS II GROUPS E-G, CLASS III (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEETS 8 AND 9 FOR MODEL NUMBERS.

FITTINGS (WEATHER RESISTANT)

380 SERIES CABLE 150 FT. (46 METERS) MAX. NOTE: INTRINSICALLY SAFE

SENSING ELEMENT

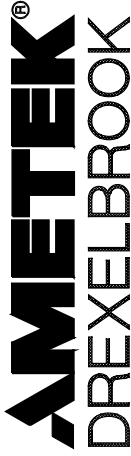
U_{max} = 30VDC
I_{max} = 140mA
C_i = 0
L_i = 159uH

FM APPROVED ASSOCIATED APPARATUS
+ (TERMINAL 3)
- (TERMINAL 2)
V_{dc} ≤ 30V
I_{sc} ≤ 140mA
P_o = 1W
C_a ≥ 0.0uF + C CABLE
L_a ≥ L_i + L CABLE

CL I, DIV 1, GR A, B, C, D; CL II, GR E, F, G; CL III, T5, CLASS I, ZONE 0 Ex ia IIC (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS) MODEL NUMBERING SYSTEM FOR FM APPROVED REMOTE SYSTEMS - SEE SHEETS 10 AND 11

NOTES:
1. INSTALLATIONS IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART 1, APPENDIX F.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

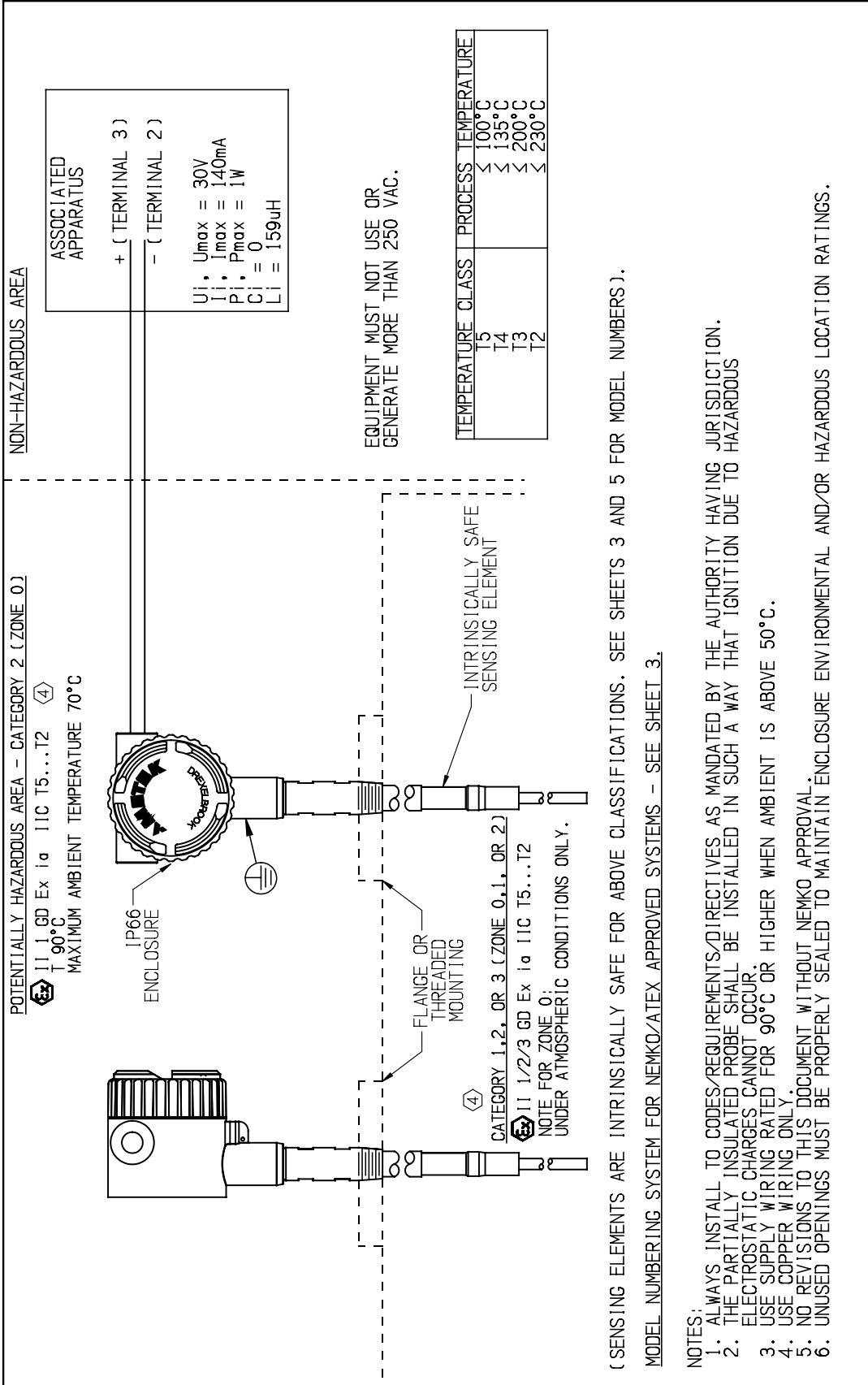
CERTIFIED		by		COPYRIGHT 2010	
PO #		THP	2-17-11	AMETEK DREXELBROOK	
ENG		SGA	8-24-09	SCALE NONE	
USER		THP	5-14-07	UNLESS OTHERWISE STATED	
		THP	1-11-07	ALL DIMENSIONS IN INCHES (IN)	
		THP	6-11-04	DR. JUS 2-16-11	
ISS	EDD/DSR	NO	APP'D	DATE	CK.
				2-17-11	
DE #					
FM/FMc CONTROL DRAWING FOR "ThePoint" 2-WIRE (REMOTE) PXTX SERIES ENTITY INSTALLATIONS					
				420-0004-220-CD	SHT. 13 OF 13



205 KEITH VALLEY RD
HORSBURG, PA 19044-9986
215-674-1234
FAX 215-674-2731

6.2 ATEX Control Drawings

NO. 420-0004-221-CD SHT 1 OF 5



(SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEETS 3 AND 5 FOR MODEL NUMBERS).

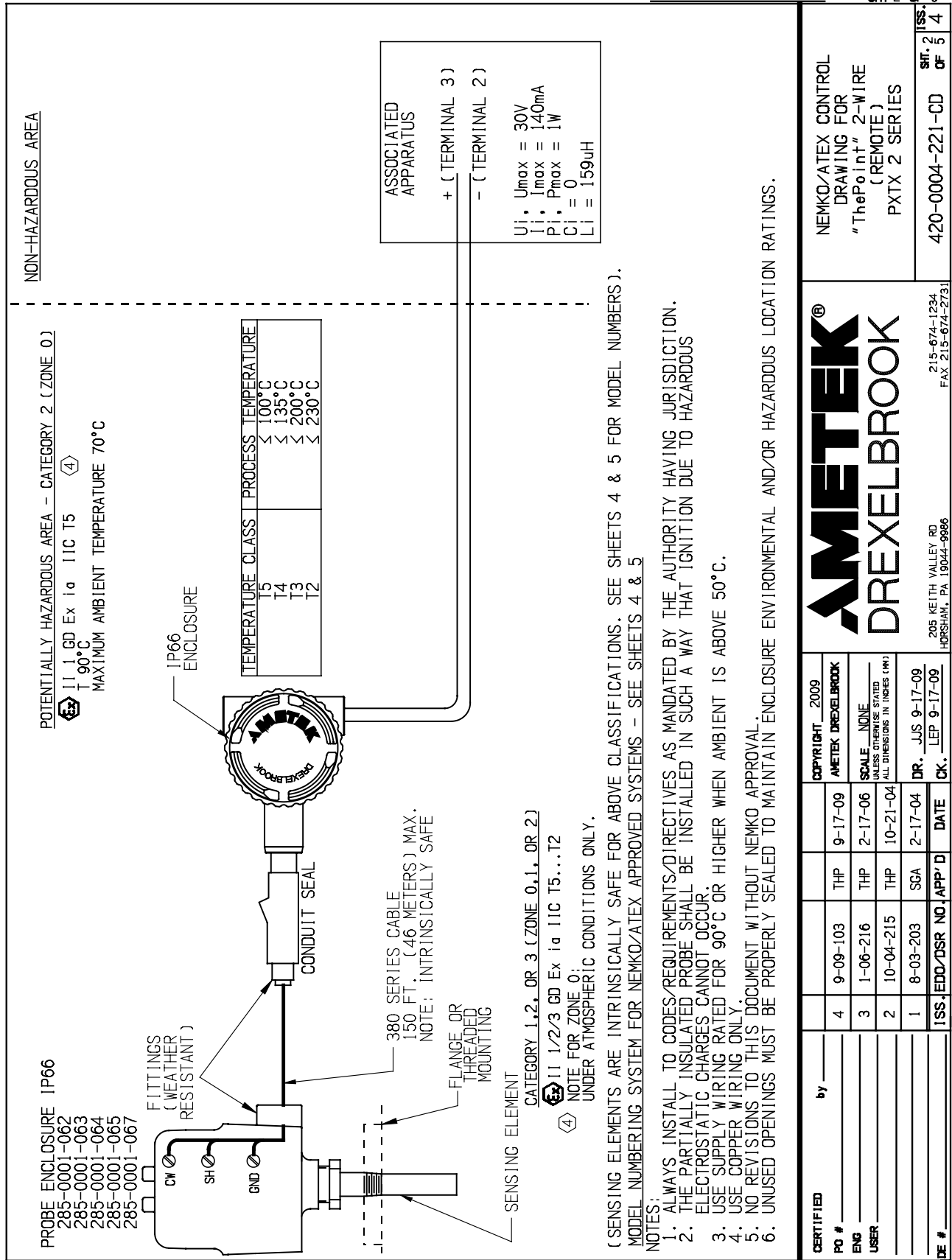
MODEL NUMBERING SYSTEM FOR NEMKO/ATEX APPROVED SYSTEMS - SEE SHEET 3.

NOTES:

1. ALWAYS INSTALL TO CODES/REQUIREMENTS/DIRECTIVES AS MANDATED BY THE AUTHORITY HAVING JURISDICTION.
2. THE PARTIALLY INSULATED PROBE SHALL BE INSTALLED IN SUCH A WAY THAT IGNITION DUE TO HAZARDOUS ELECTROSTATIC CHARGES CANNOT OCCUR.
3. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
4. USE COPPER WIRING ONLY.
5. NO REVISIONS TO THIS DOCUMENT WITHOUT NEMKO APPROVAL.
6. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED	by _____	DATE	APP'D	ISS. EDO/DSR NO.	DATE
PO #	4	9-09-103	THP	9-17-09	AMETEK DREXELBROOK
ENG	3	1-06-216	THP	2-17-06	SCALE NONE
USER	2	10-04-215	THP	10-21-04	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)
DE #	1	8-03-203	SGA	2-17-04	DR. JJS 9-17-09 CK. LEP 9-17-09
205 KEITH VALLEY RD. HOBBSHAVEN, PA 19044-9986 215-674-1234 FAX 215-674-2731					
NEMKO/ATEX CONTROL DRAWING FOR "ThePoint" 2-WIRE (INTEGRAL) PXTX 2 SERIES					420-0004-221-CD SHT. 1 OF 5

6.2 ATEX Control Drawings (Continued)



6.2 ATEX Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY											
1	2	3	4	5	6	7	8	9	10	11	12
P	a	T	0	2	0	b	c	*	*	*	*
	a										
											a = MODE
											N = STANDARD AUTO CAL
											L = STANDARD 2pf FIXED
											T = 10pf AUTO CAL
											V = 10pf FIXED
											H = HI SENSE .5pf AUTO CAL
											P = HI SENSE .5pf FIXED
											G = HI SENSE MANUAL
											M = STANDARD SENSE MANUAL
						b					b = 0, 1 OR Z SENSING ELEMENTS
							c				c = 0-4, 6,7,8,9 OR Z SENSING ELEMENTS
											SENSING ELEMENTS
						Z	Z				SPECIAL....SEE LIST OF APPROVED SENSORS ON SHEET 5
						0	0				700-1202-021
							1				700-1202-022
							2				700-1202-024
							3				700-1202-028
							4				700-1202-042
							6				700-1202-032
							7				700-1202-020
							9				700-1202-034
						1	1				700-0201-005
							2				700-0201-005...HAST-C
							3				700-0201-036
							4				700-0202-002
							6				700-0002-360
							7				700-0202-036
							8				700-0001-022
							N	N			RETRO-FIT KIT

COPYRIGHT 2009	CERTIFIED by _____
AMETEK DREXELBROOK	PO # _____
SCALE NONE <small>UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)</small>	ENG _____
DR. JJS 9-17-09	USER _____
CK. LEP 9-17-09	_____
	DE # _____

No. 420-0004-221-CD

SHT 3 OF 5

4	9-09-103	THP	9-17-09
3	1-06-216	THP	2-17-06
2	10-04-215	THP	10-21-04
1	8-03-203	SGA	2-17-04
ISS.	EDO/DSR NO.	APP'D	DATE



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FAX 215-674-2731

NEMKO ATEX APPROVED (INTEGRAL) "ThePoint" 2-WIRE MODEL NUMBERING SYSTEM PXTX 2 SERIES	
420-0004-221-CD	SHT. 3 OF 5 ISS. 4

6.2 ATEX Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY												
1	2	3	4	5	6	7	8	9	10	11	12	
P	a	T	0	2	b	c	d	*	*	*	*	
	a											a = MODE N = STANDARD AUTO CAL L = STANDARD 2pf FIXED T = 10pf AUTO CAL V = 10pf FIXED H = HI SENSE .5pf AUTO CAL P = HI SENSE .5pf FIXED G = HI SENSE MANUAL M = STANDARD SENSE MANUAL
					b							b = CABLE LENGTHS 1-9, A-K SENSING ELEMENTS
						c						c = 0-3, 5, 6 OR Z SENSING ELEMENTS
							d					d = 0-9 OR Z SENSING ELEMENTS
						Z	Z					SEE SHEET 5 FOR ADDITIONAL APPROVED SENSING ELEMENTS
					0	0						700-1202-001
						1						700-1202-012
						2						700-1202-014
						3						700-1202-018
						4						700-1202-041
						6						700-1202-031
						7						700-1202-010
						9						700-1202-033
					1	0						700-0001-018
						1						700-0201-005
						2						700-0201-005...HAST-C
						3						700-0201-036
						4						700-0202-002
						5						700-0202-043
						6						700-0002-360
						7						700-0202-036
						8						700-0001-022
					2	0						700-0209-022
					3	1						700-0029-001
						2						700-0029-002
						3						700-0029-003
						4						700-0029-004
						5						700-0029-005
					5	0						700-0207-001
						1						700-0207-002
						2						700-0207-003
						3						700-0207-004
						5						700-0207-006
					6	0						700-0204-038
						1						700-0204-002
						2						700-0204-048

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 AMETEK DREXELBROOK
 SCALE NONE
UNLESS OTHERWISE STATED
 ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 9-17-09
 CK. LEP 9-17-09

CERTIFIED _____ by _____
 PO # _____
 ENG _____
 USER _____
 DE # _____

4	9-09-103	THP	9-17-09
3	1-06-216	THP	2-17-06
2	10-04-215	THP	10-21-04
1	8-03-203	SGA	2-17-04
ISS.	EDO/DSR NO.	APP'D	DATE



NEMKO ATEX APPROVED
 (REMOTE)
 "ThePoint" 2-WIRE
 MODEL NUMBERING SYSTEM
 PXTX 2 SERIES
 420-0004-221-CD SHT. 4 OF 5
 ISS. 4 OF 4

NO. 420-0004-221-CD

6.2 ATEX Control Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

- m = FAMILY NO. 0 THROUGH 9, BLANK
- n = FAMILY NO. 0 THROUGH 9, BLANK
- o = 0 THROUGH 9, BLANK
- p = 0 THROUGH 9
- q = FAMILY NO. 0 THROUGH 9, BLANK
- r = FAMILY NO. 0 THROUGH 9, BLANK
- s = FAMILY NO. 0 THROUGH 9
- t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

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 SCALE NONE
UNLESS OTHERWISE STATED
 ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 9-17-09
 CK. JEP 9-17-09

CERTIFIED by _____
 PO # _____
 ENG _____
 USER _____

 DE # _____

No. 420-0004-221-CD

4	9-09-103	THP	9-17-09
3	1-06-216	THP	2-17-06
2	10-04-215	THP	10-21-04
1	8-03-203	SGA	2-17-04
ISS.	EDD/DSR NO.	APP'D	DATE

AMETEK®
DREXELBROOK

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NEMKO/ATEX APPROVED
 ADDITIONAL INTRINSICALLY
 SAFE SENSING ELEMENTS
 "ThePoint" 2-WIRE
 PXTX 2 SERIES

420-0004-221-CD

SHT. 5 OF 5
 ISS. 4

SHT. 5 OF 5

6.3 TestSafe Control Drawings

NO. 420-0004-239-CD
SHT. 1 OF 5

POTENTIALLY HAZARDOUS AREA - CATEGORY 2 (ZONE 0)
NON-HAZARDOUS AREA

Ex ia IIC T5T IP66
DIP A21 Ta 100
ANZEX 05.3011X

ASSOCIATED APPARATUS

+ (TERMINAL 3)
 - (TERMINAL 2)

U_i = 30V
 I_i = 140mA
 P_i = 1W
 C_i = 0
 L_i = 159uH

EQUIPMENT MUST NOT USE OR GENERATE MORE THAN 250 VAC.

TEMPERATURE CLASS	PROCESS TEMPERATURE
T5	≤ 100°C
T4	≤ 135°C
T3	≤ 200°C
T2	≤ 230°C

CATEGORY 1, 2, OR 3 (ZONE 0, 1, OR 2)

ExEEEx ia IIC T5...T2

NOTE FOR ZONE 0:
 UNDER ATMOSPHERIC CONDITIONS ONLY.

(SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEETS 3 AND 5 FOR MODEL NUMBERS).

MODEL NUMBERING SYSTEM FOR NEMKO/ATEX APPROVED SYSTEMS - SEE SHEET 3.

NOTES:

1. ALWAYS INSTALL TO CODES/REQUIREMENTS/DIRECTIVES AS MANDATED BY THE AUTHORITY HAVING JURISDICTION.
2. THE PARTIALLY INSULATED PROBE SHALL BE INSTALLED IN SUCH A WAY THAT IGNITION DUE TO HAZARDOUS ELECTROSTATIC CHARGES CANNOT OCCUR.
3. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
4. USE COPPER WIRING ONLY.
5. NO REVISIONS TO THIS DOCUMENT WITHOUT NEMKO APPROVAL.
6. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

***APPROVED DRAWING**
 CHANGES TO THIS DRAWING
 REQUIRE AGENCY APPROVAL
 PER 440-0015-003

FM ICSA KEMA

420-0004-147

205 WEITH VALLEY RD
 HORSHAM, PA 19044-9986

215-674-1234
 FAX 215-674-2731

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DREXELBROOK

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 AMETEK DREXELBROOK

SCALE NONE
 UNLESS OTHERWISE STATED
 ALL DIMENSIONS IN INCHES (MM)

DR. JJS 4-28-05
 DR. 4/29/05

ISS. EDO/DSR NO. APP'D DATE

1 2-04-215 5/6 4/29/05

CERTIFIED by _____

PO # _____

ENG _____

USER _____

DE # _____

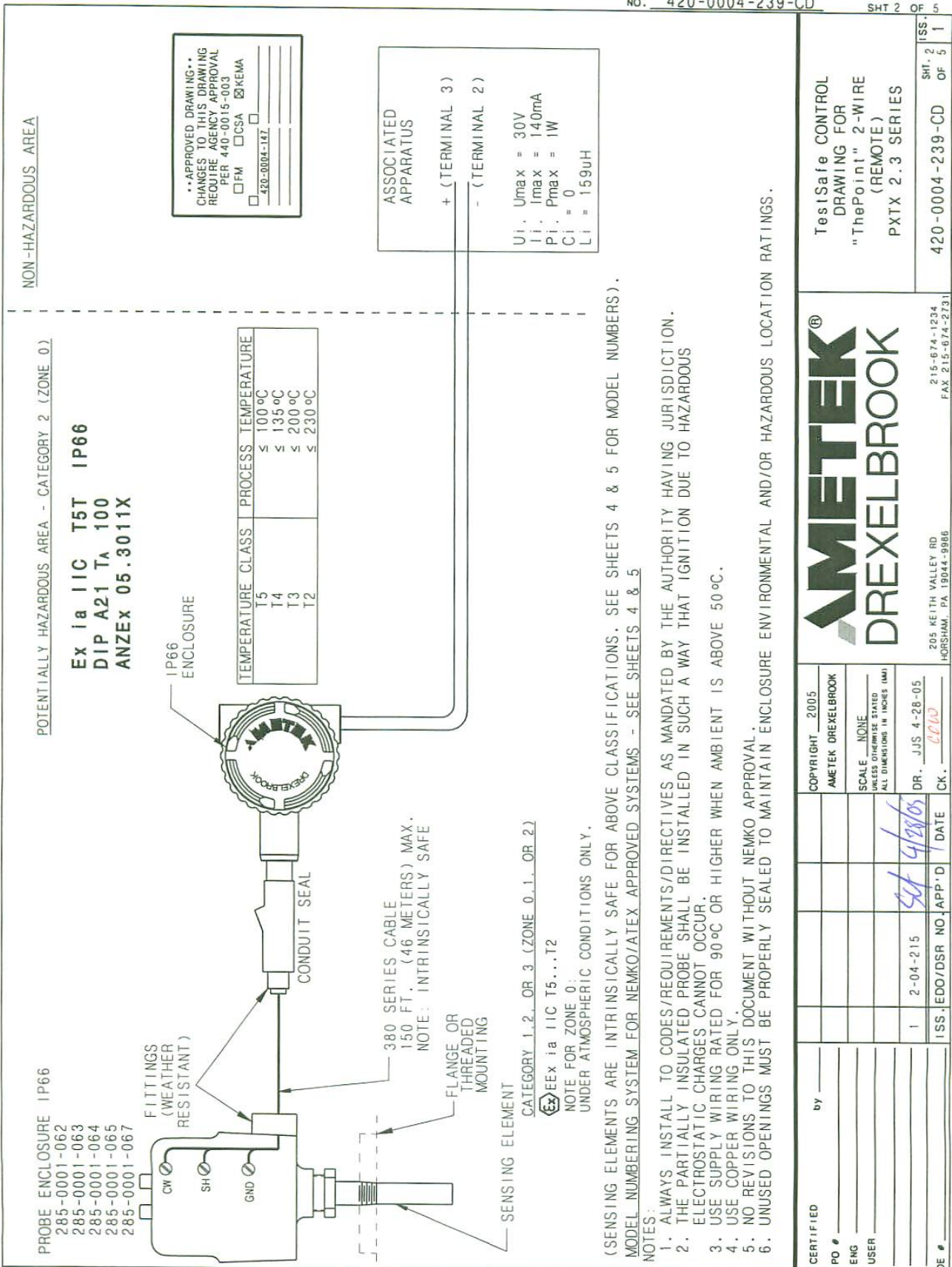
TestSafe CONTROL
 DRAWING FOR
 "ThePoint" 2-WIRE
 (INTEGRAL)
 PXTX 2.3 SERIES

420-0004-239-CD


SHT. 1 OF 5

6.3 TestSafe Control Drawings (Continued)

NO. 420-0004-239-CD SHT 2 OF 5



6.3 TestSafe Control Drawings (Continued)


COLUMNS 9 AND UP DO NOT AFFECT SAFETY																			
1	2	3	4	5	6	7	8	9	10	11	12								
P	a	T	0	b	0	c	c	*	*	*	*								
a																			
								a =	MODE	N =	STANDARD AUTO CAL								
										L =	STANDARD 2pf FIXED								
										T =	10pf AUTO CAL								
										V =	10pf FIXED								
										H =	HI SENSE .5pf AUTO CAL								
										P =	HI SENSE .5pf FIXED								
										G =	HI SENSE MANUAL								
										M =	STANDARD SENSE MANUAL								
				b				b =	ENCLOSURE TYPE	2=M20,	3=3/4" NPT								
					c	c		c =	00, 01, 02, 03, 04, 06, 07, 09, 11, 12, 13, 14, 16, 17,										
										18, 19	SENSING ELEMENTS								
											SENSING ELEMENTS								
					Z	Z		SPECIAL.....	SEE LIST OF APPROVED SENSORS ON SHEET 5										
					0	0				700-1202-021									
						1				700-1202-022									
						2				700-1202-024									
						3				700-1202-028									
						4				700-1202-042									
						6				700-1202-032									
						7				700-1202-020									
						9				700-1202-034									
					1	1				700-0201-005									
						2				700-0201-005...HAST-C									
						3				700-0201-036									
						4				700-0202-002									
						6				700-0002-360									
						7				700-0202-036									
						8				700-0001-022									
							N	N		RETRO-FIT KIT									
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; vertical-align: top;"> COPYRIGHT 2005 AMETEK DREXELBROOK SCALE NONE <small>UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)</small> DR. JJS 4-28-05 CK. <i>CDW</i> </td> <td style="width:50%; vertical-align: top;"> CERTIFIED by _____ PO # _____ ENG _____ USER _____ DE # _____ </td> </tr> </table>												COPYRIGHT 2005 AMETEK DREXELBROOK SCALE NONE <small>UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)</small> DR. JJS 4-28-05 CK. <i>CDW</i>	CERTIFIED by _____ PO # _____ ENG _____ USER _____ DE # _____						
COPYRIGHT 2005 AMETEK DREXELBROOK SCALE NONE <small>UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)</small> DR. JJS 4-28-05 CK. <i>CDW</i>	CERTIFIED by _____ PO # _____ ENG _____ USER _____ DE # _____																		
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">1</td> <td style="width:25%;">2-04-215</td> <td style="width:25%;"><i>SCA</i></td> <td style="width:25%;"><i>4/28/05</i></td> </tr> <tr> <td>ISS.</td> <td>EDO/DSR NO.</td> <td>APP'D</td> <td>DATE</td> </tr> </table>				1	2-04-215	<i>SCA</i>	<i>4/28/05</i>	ISS.	EDO/DSR NO.	APP'D	DATE					TestSafe APPROVED (INTEGRAL) "ThePoint" 2-WIRE MODEL NUMBERING SYSTEM PXTX 2.3 SERIES			
1	2-04-215	<i>SCA</i>	<i>4/28/05</i>																
ISS.	EDO/DSR NO.	APP'D	DATE																
205 KEITH VALLEY RD HORSHAM, PA 19044-9986				215-674-1234 FAX 215-674-2731				420-0004-239-CD											
				SHT. 3 OF 5 OF 5				NO. 420-0004-239-CD SHT 3 OF 5											

6.3 TestSafe Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY												
1	2	3	4	5	6	7	8	9	10	11	12	
P	a	T	0	b	c	d	d	*	*	*	*	
	a											a = MODE N = STANDARD AUTO CAL L = STANDARD 2pf FIXED T = 10pf AUTO CAL V = 10pf FIXED H = HI SENSE .5pf AUTO CAL P = HI SENSE .5pf FIXED G = HI SENSE MANUAL M = STANDARD SENSE MANUAL
				b								b = ENCLOSURE TYPE 2=M20, 3=3/4" NPT
					c							c = CABLE LENGTHS 1-9, A-E SENSING ELEMENTS
						d	d					d = 00, 01, 02, 03, 04, 06, 07, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 31, 32, 34, 35, 50, 52, 53, 55, 60, 61, 62 SENSING ELEMENTS
					Z	Z						SEE SHEET 5 FOR ADDITIONAL APPROVED SENSING ELEMENTS
					0	0						700-1202-001
						1						700-1202-012
						2						700-1202-014
						3						700-1202-018
						4						700-1202-041
						6						700-1202-031
						7						700-1202-010
						9						700-1202-033
					1	0						700-0001-018
						1						700-0201-005
						2						700-0201-005...HAST-C
						3						700-0201-036
						4						700-0202-002
						5						700-0202-043
						6						700-0002-360
						7						700-0202-036
						8						700-0001-022
					2	0						700-0209-022
					3	1						700-0029-001
						2						700-0029-002
						3						700-0029-003
						4						700-0029-004
						5						700-0029-005
					5	0						700-0207-001
						1						700-0207-002
						2						700-0207-003
						3						700-0207-004
						5						700-0207-006
					6	0						700-0204-038
						1						700-0204-002
						2						700-0204-048

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SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (MM)
DR. JJS 4-28-05
CK. *cpw*

CERTIFIED by _____
PO # _____
ENG _____
USER _____
DE # _____



205 KEITH VALLEY RD
HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

TestSafe APPROVED (REMOTE)
"ThePoint" 2-WIRE
MODEL NUMBERING SYSTEM
PXTX 2.3 SERIES
420-0004-239-CD
SHT. 4 OF 5
ISS. 1

1 2-04-215 *GA* *4/28/05*

ISS. EDO/DSR NO. APP'D DATE

NO. 420-0004-239-CD

SHT. 4 OF 5

6.3 TestSafe Control Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

- m = FAMILY NO. 0 THROUGH 9, BLANK
- n = FAMILY NO. 0 THROUGH 9, BLANK
- o = 0 THROUGH 9, BLANK
- p = 0 THROUGH 9
- q = FAMILY NO. 0 THROUGH 9, BLANK
- r = FAMILY NO. 0 THROUGH 9, BLANK
- s = FAMILY NO. 0 THROUGH 9
- t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

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 SCALE NONE
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 ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 4-28-05
 CK. *MPW*

CERTIFIED by _____
 PO # _____
 ENG _____
 USER _____

 DE # _____

NO. 420-0004-239-CD

1	2-04-215	<i>SCJ</i>	<i>4/28/05</i>
ISS.	EDO/DSR NO.	APP'D	DATE



205 KEITH VALLEY RD
 HORSHAM, PA 19044-9986
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TestSafe APPROVED
 ADDITIONAL INTRINSICALLY
 SAFE SENSING ELEMENTS
 "ThePoint" 2-WIRE
 PXTX 2.3 SERIES
 420-0004-239-CD
 SHT. 5 OF 5
 ISS. 1

SHT 5 OF 5

6.4 Heavy Duty Spark Protection

NO. 377-0001-019

SHT 1 OF 2

TYPICAL INSTALLATION OF SPARK PROTECTORS

FIGURE -A- : CONNECTION OF THREE CONDUCTOR COTE SHIELD CABLE TO FLEXIBLE 2-TERMINAL ELEMENTS: 700-0005-XXX.

FIGURE -B- : CONNECTION OF THREE CONDUCTOR COTE SHIELD CABLE TO RIGID 2-TERMINAL SENSING ELEMENTS 700-0001-XXX & 700-0002-XXX.

FIGURE -C- : CONNECTION OF THREE CONDUCTOR COTE SHIELD CABLE TO RIGID 3-TERMINAL SENSING ELEMENTS: 700-0200-XXX & 700-0202-017.

FIGURE -D- : CONNECTION OF THREE CONDUCTOR COTE SHIELD CABLE ON FLEXIBLE 3-TERMINAL SENSING ELEMENT 700-0205-XXX.

FOR HI. TEMP APPLICATIONS REFER TO 377-0001-016-CD.

APPROVED DRAWING...
CHANGES TO THIS DRAWING REQUIRE AGENCY APPROVAL PER 440-0015-003
 CFM CSA KEMA
420-0004-017

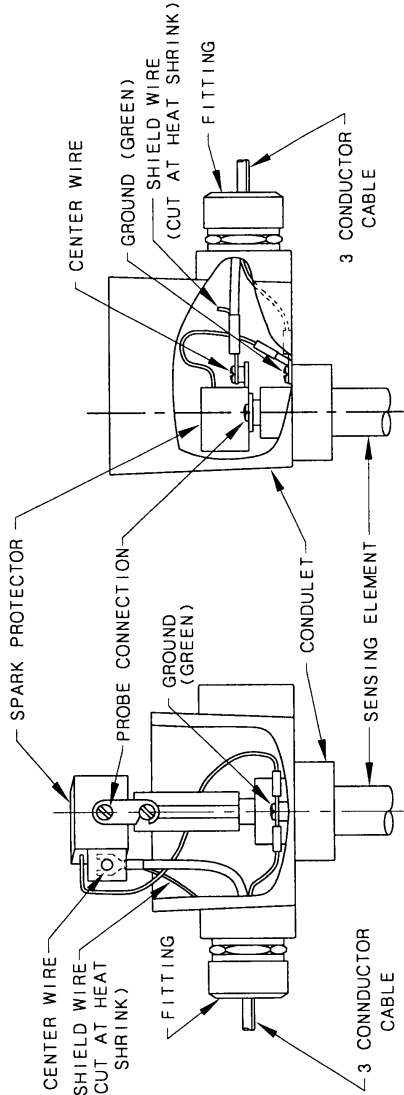


FIGURE -A-

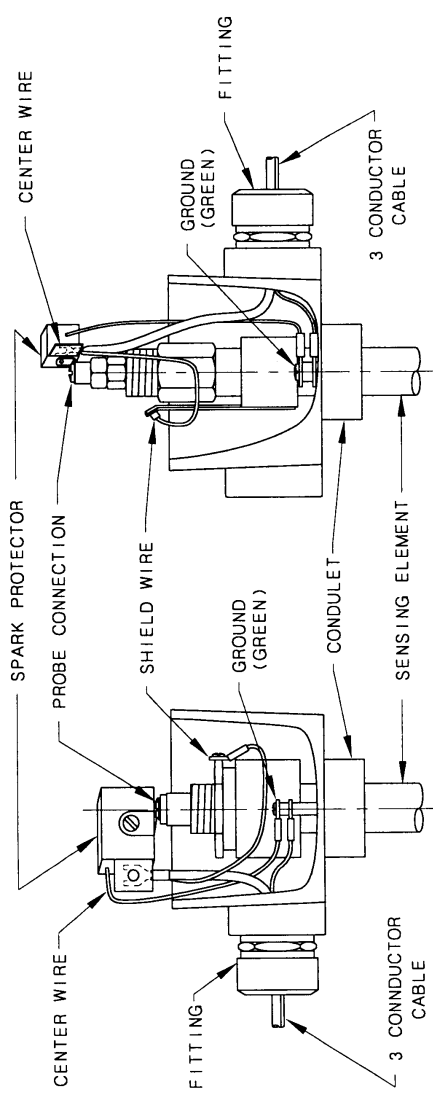


FIGURE -B-

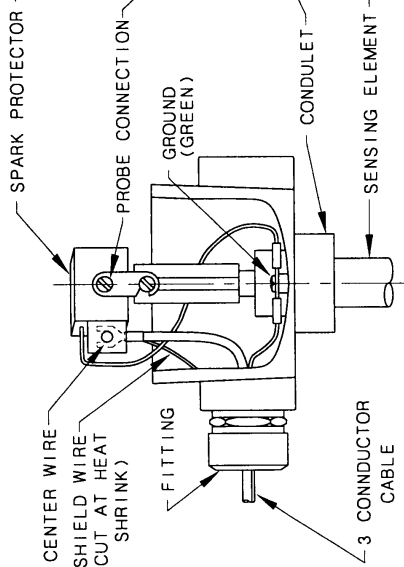


FIGURE -C-

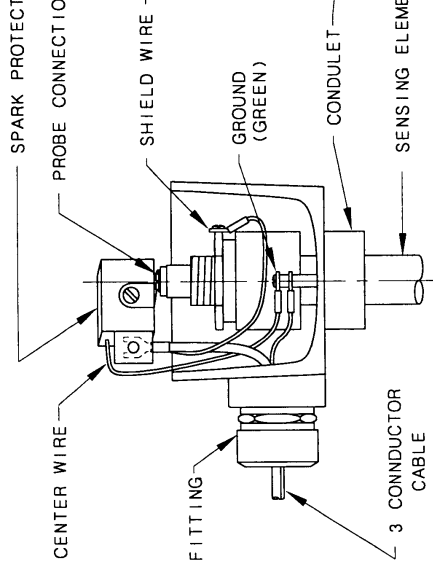


FIGURE -D-

377-0001-019 HEAVY DUTY SPARK PROTECTOR CUSTOMER CONNECTION MOUNTING & WIRING

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DREXELBROOK

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HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-2731

CERTIFIED	by _____	ISS. EDO/DSR. NO	APP'D	DATE	DR.	CDW
PO #	5	2-04-336				
ENG						
USER						
ISS.	5	7-93-303	JET	5-25-93		
SCALE	NONE		UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)			
COPYRIGHT	2004 AMETEK DREXELBROOK					

377-0001-019-CD SHT. 1 OF 2

6.4 Heavy Duty Spark Protection (Continued)

NO. 377-0001-019

SHT 2 OF 2

TYPICAL INSTALLATION OF SPARK PROTECTORS

FIGURE -E- : CONNECTION OF THREE CONDUCTOR COTE SHIELD CABLE IN PARALLEL WITH REMOTE VERIFY SWITCH.

FOR HI. TEMP APPLICATIONS REFER TO 377-0001-016-CD.

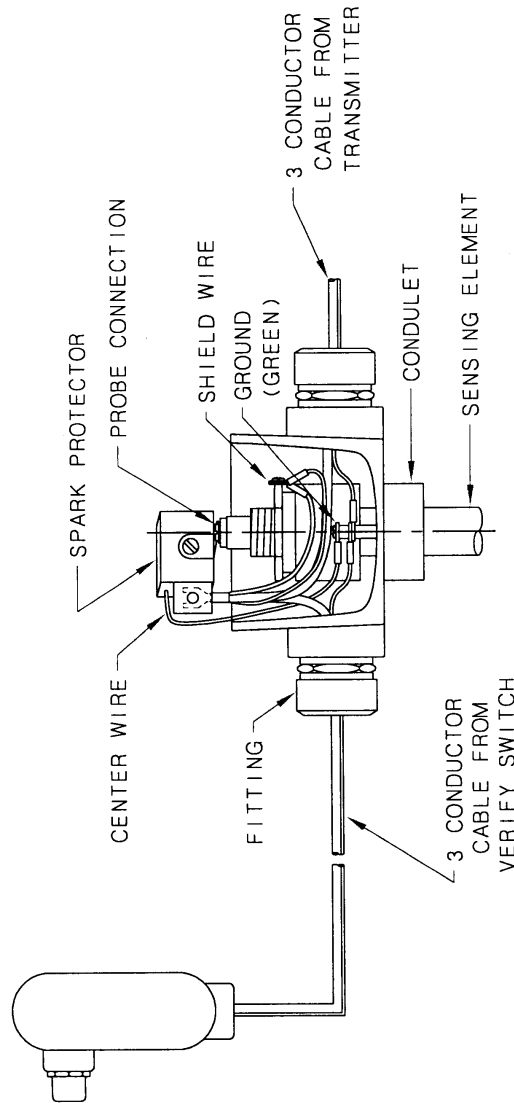


FIGURE -E-

CERTIFIED		by _____		COPYRIGHT 2004		AMETEK DREXELBROOK		377-0001-019 HEAVY DUTY SPARK PROTECTOR CUSTOMER CONNECTION MOUNTING & WIRING		ISS. OF 2	
PO #	5	2-04-336	2.2504	SCALE	NONE	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)		205 KEITH VALLEY RD HORSHAM, PA 19044-9986		SHT. 2 OF 2	
ENG	4	7-93-303	JET	5-25-93	DR.	CDW	215-674-1234 FAX 215-674-2731		377-0001-019-CD		ISS. OF 2
USER	3	8-92-83	MPG	8-31-92	DR.	CDW			377-0001-019-CD		SHT. 2 OF 2
DE #	ISS.	EDO/DSR NO.	APP'D	DATE	CK.	JDS			377-0001-019-CD		ISS. OF 2

6.5 Adding a Padded Capacitor

NO. 330-0009-022-CD

SHT 1 OF 3

ADDING A PADDED CAPACITOR:
 THE TUNING RANGE OF EACH POINT LEVEL SWITCH IS LIMITED. LONG INSERTION LENGTH SENSING ELEMENTS OR SENSING ELEMENTS MOUNTED IN PIPES OR NEAR METAL OBJECTS MAY GENERATE ENOUGH STANDING CAPACITANCE TO EXCEED THE TUNING RANGE OF THE SWITCH.

THE ADDITION OF AN EXTERNAL PADDING CAPACITOR WILL INCREASE THE TUNING RANGE OF THE UNIT. TUNING RANGES AND EXAMPLES OF INCREASES CAN BE FOUND FOR EACH TYPE OF POINT LEVEL ELECTRONIC SWITCH ON SHEET THREE.

WHEN A PADDING CAPACITOR IS REQUIRED, AN NPO CAPACITOR SHOULD BE ADDED TO THE PADDING TERMINALS AS INDICATED ON SHEET 2. ADDITIONAL PADS CAN BE ADDED IN PARALLEL UNIT A SATISFACTORY TUNING RANGE IS REACHED. IF A TUNING RANGE CANNOT BE REACHED, OR, IF PADDING IS IN EXCESS OF THE MAXIMUM RECOMMENDED TUNING RANGE AS INDICATED IN THE TABLE ON SHEET 3, PLEASE CONTACT THE FACTORY SERVICE DEPARTMENT.

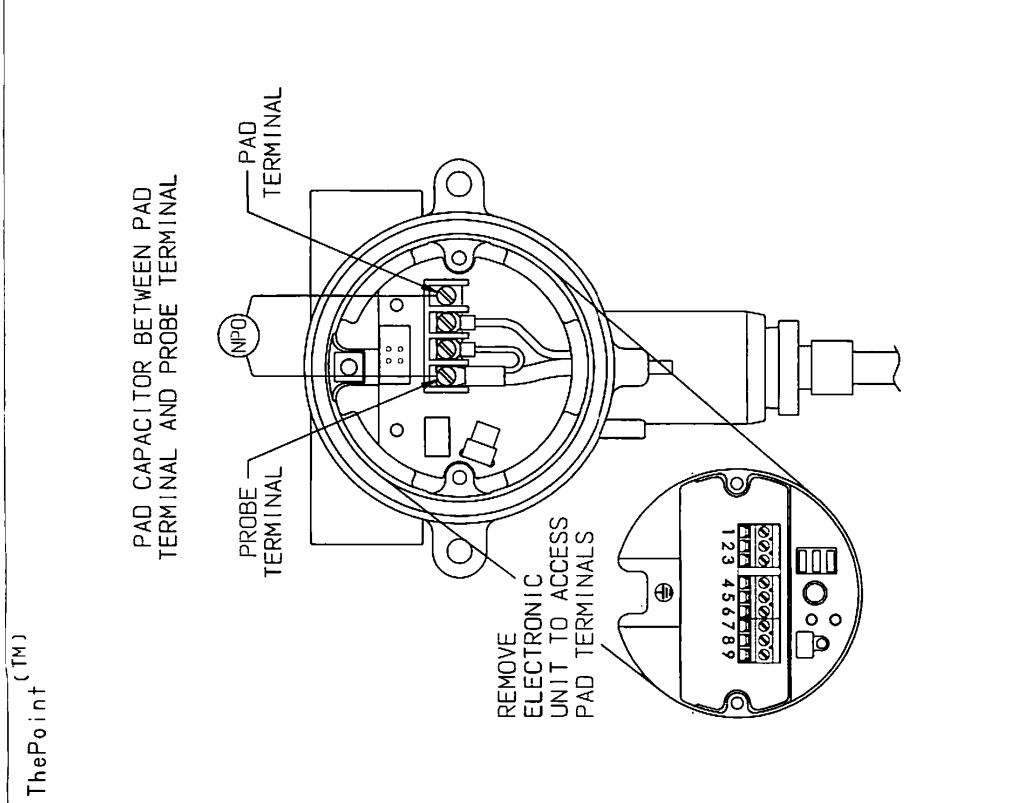
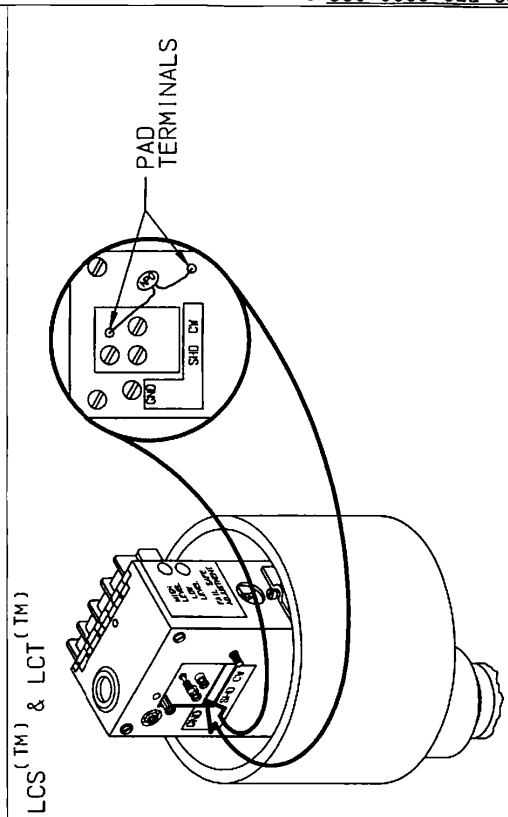
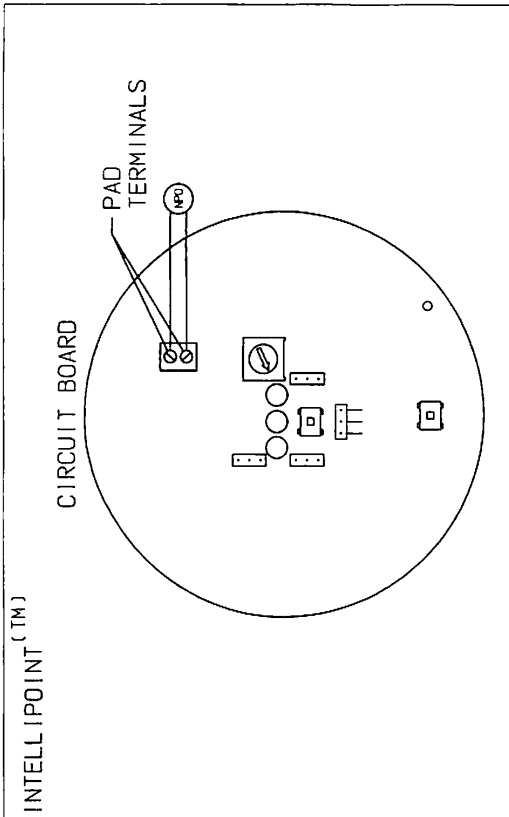
NOTE: ON SOME TRANSMITTERS, THE PAD CAPACITOR IS SOLDERED TO TURRETS. OTHER TRANSMITTERS ATTACH THE LEADS UNDER SCREWS.

CERTIFIED		COPYRIGHT 2005		METEK DREXELBROOK		PAD CAPACITOR KIT		ISS. 1	
PO #		SCALE NONE		ALL DIMENSIONS IN INCHES (IN)		FOR POINT LEVEL SWITCHES		SHI. 1	
ENG		DR. CDW		DATE 8-9-01		330-0009-022-CD		OF 3	
USER		ISS. EDO/USR NO. APP'D		JET 7-6-05		205 KEITH VALLEY RD.		2	
DE #		1 7-01-303		7-6-05		DREXELBROOK		3	
						215-674-1234			
						FAX 215-674-2731			
						HONSHAM, PA 19064-9906			

6.5 Adding a Padded Capacitor (Continued)

NO. 330-0009-022-CD

SHT 2 OF 3



PAD CAPACITOR KIT
FOR POINT LEVEL SWITCHES

ISS. OF 2
SHT. 2 OF 3

330-0009-022-CD

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205 KEITH VALLEY RD
HORSBURGH, PA 19044-9906

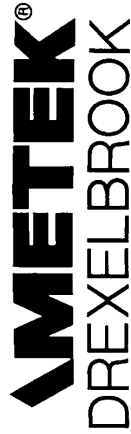
215-674-1234
FAX 215-674-2731

CERTIFIED	by	COPYRIGHT	2005
PO #		METEK DREXELBROOK	
ENG.		SCALE	NONE
USER		UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)	
DE #		DR.	DDW
		CK.	JIS 7-6-05
		DATE	8-9-01
		APP'D	JET
		EDD/DSR NO.	7-01-303
		ISS.	1
			2
			7-6-05

6.5 Adding a Padded Capacitor (Continued)

no. 330-0009-022-CD SH 3 OF 3

PRODUCT	Sensitivity	Model Numbers	Un-padded Tuning Range	Padding Ratio	Padding Example	Max recommended tuning range
ThePoint™ Line Powered	High	PHL, PPL, PGL	0 to 25pF	1:3	Adding a 10pF cap will change the range to 3pF to 28pF	50 to 75pF
ThePoint™ Line Powered	Standard	PNL, PLL, PTL, PVL, PML	0 to 60pF	1:3	Adding a 10pF cap will change the range to 3pF to 63pF	120 to 180pF
ThePoint™ Two Wire	High	PHT, PPT, PGT	0 to 25pF	1:1	Adding a 10pF cap will change the range to 10 to 35pF	50 to 75pF
ThePoint™ Two Wire	Standard	PNT, PLT, PTT, PVT, PMT	0 to 60pF	1:1	Adding a 10pF cap will change the range to 10 to 70pF	120 to 180pF
Intellipoint™ (Line Powered and Two Wire)	High	RHL, RPL, RGL RHT, RPT, RGT	0 to 25pF	4.33:1	Adding a 10pF cap will change the range to 43pF to 68pF	50 to 75pF
Intellipoint™ (Line Powered and Two Wire)	Standard	RNL, RLL, RTL, RVL, RML RNT, RLT, RTT, RVT, RMT	0 to 100pF	4.33:1	Adding a 10pF cap will change the range to 43pF to 143pF	200 to 300pF
LCS	High	406-6020, 406-6022	0 to 8pF	1:1	Adding a 10pF cap will change the range to 10 to 18pF	16 to 24pF
LCS	Standard	406-6000, 406-6002	0 to 90pF	3:1	Adding a 10pF cap will change the range to 30 to 120pF	180 to 270pF
LCT	High	406-6220, 406-6222	0 to 8pF	1:1	Adding a 10pF cap will change the range to 10 to 18pF	16 to 24pF
LCT	Standard	406-6200, 406-6202	0 to 90 pF	3:1	Adding a 10pF cap will change the range to 30 to 120pF	180 to 270pF



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330-0009-022-CD SH. 3 OF 3

PAD CAPACITOR KIT
FOR POINT LEVEL SWITCHES

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SCALE NONE
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ALL DIMENSIONS IN INCHES (IN)

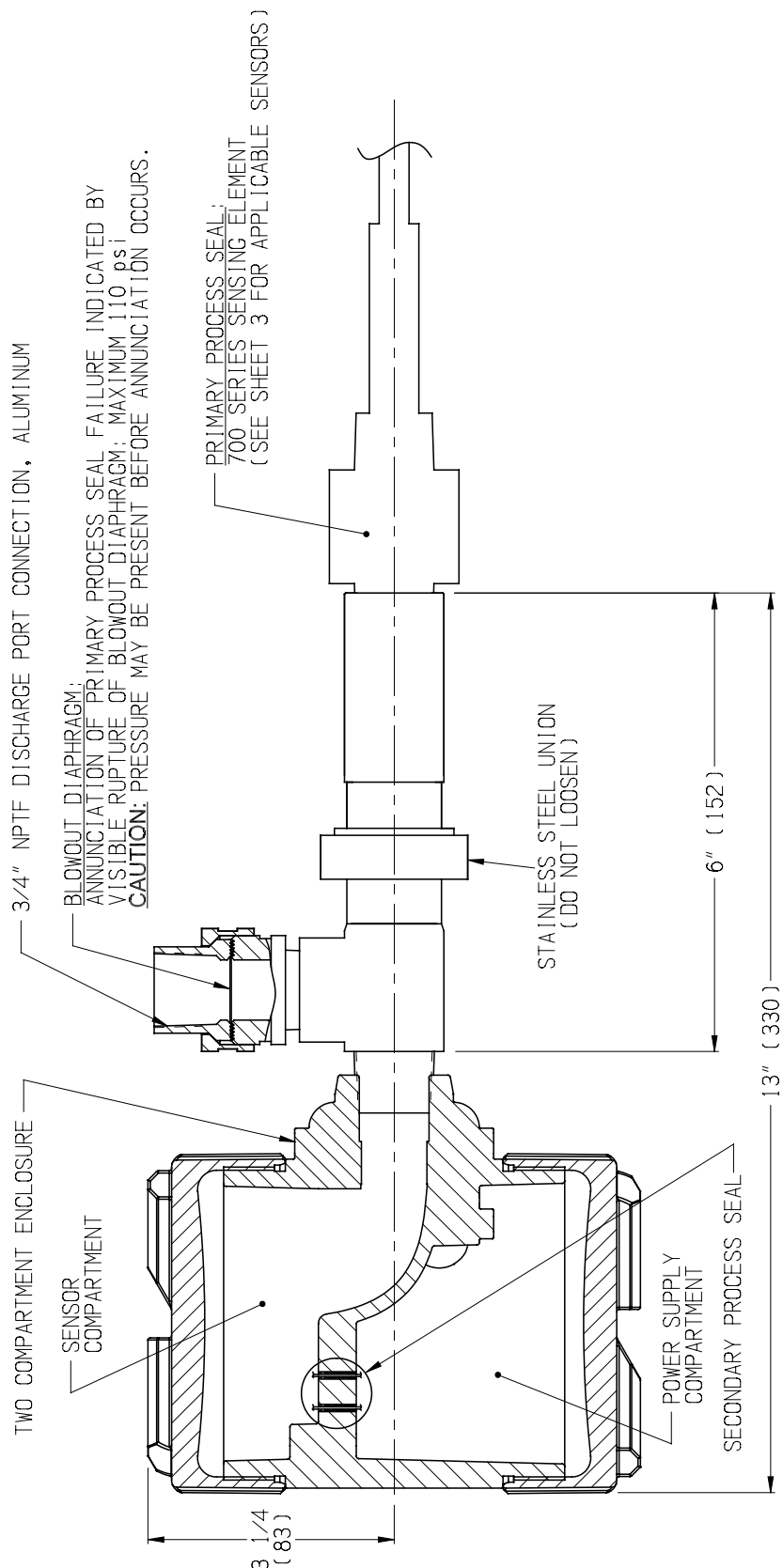
ISS. 2 6-05-243
ENG. 1 7-01-303
USER

DATE 8-9-01
APP'D JET
DR. DDW
CHK. JUS 1-6-05

6.6 Dual Seal Assembly for 700 Series Sensing Elements

No. 285-0003-OXX-CD SHT 1 OF 3

285-0003-01X DUAL SEAL CONFIGURATION FOR TWO COMPARTMENT ENCLOSURE



NOTES:

1. ANSI / ISA 12.27.01-2003 FM CERTIFIED "DUAL SEAL" WHEN USED WITH AMETEK DREXELBROOK 700 SERIES SENSING ELEMENTS
2. SEE SHEET 3 FOR 700 SERIES PRIMARY SEAL PROCESS WETTED MATERIALS
3. REFER TO SENSING ELEMENT TAG FOR PROCESS TEMPERATURE AND PRESSURE RATINGS.

CERTIFIED	by	COPYRIGHT 2012	CONTROL DRAWING, DUAL SEAL ASSEMBLY FOR USE WITH 700 SERIES SENSING ELEMENTS	
PO #		AMETEK DREXELBROOK	ISS. OF	
ENG		SCALE NONE	SHT. 1 OF 3	
USER		UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)	285-0003-OXX-CD	
		DR. JJS 1-19-12		
		DATE 9-10-08		
ISS. EDO/DSR NO. APP. D		CK. SGA 1-20-12		
DE #				

AMETEK®
DREXELBROOK

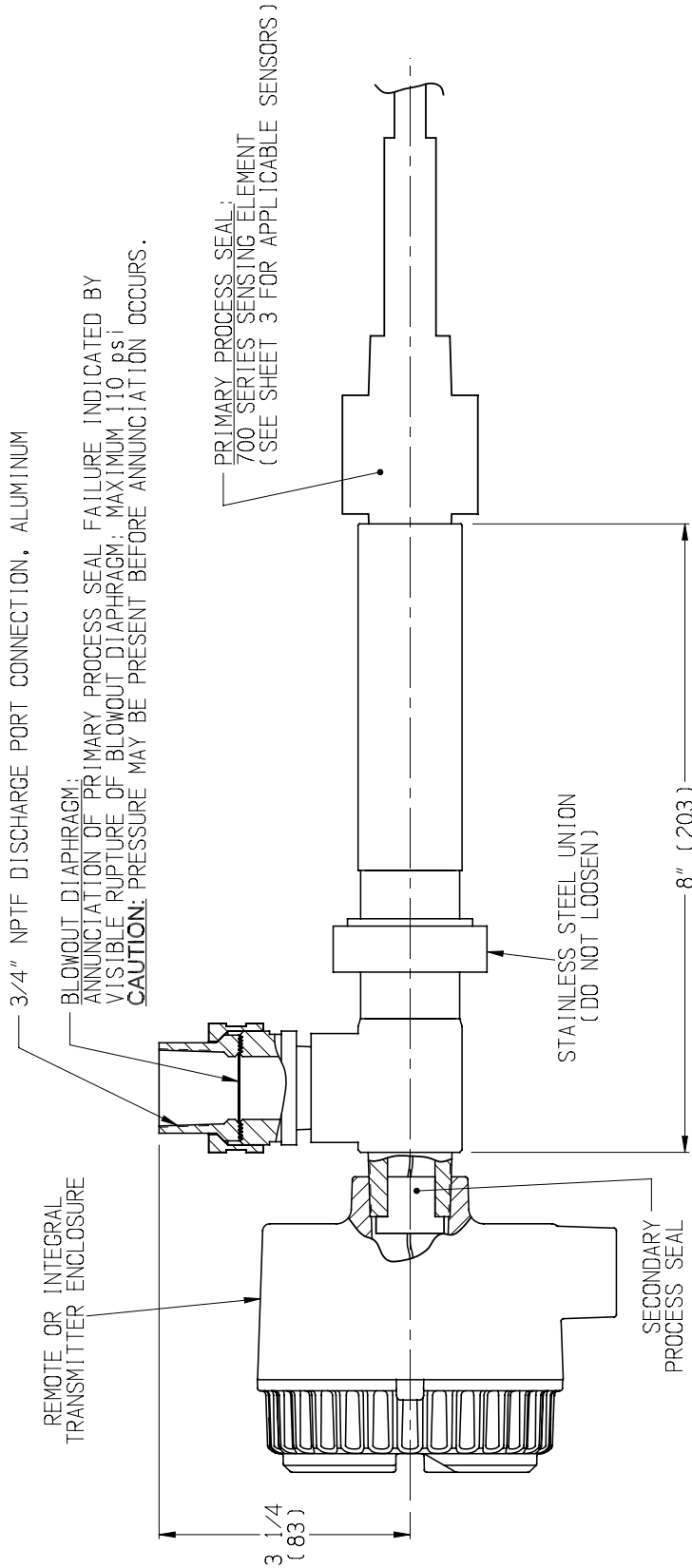
205 KEITH VALLEY RD.
HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-2731

6.6 Dual Seal Assembly (Continued)

NO. 285-0003-OXX-CD SHT 2 OF 3

285-0003-02X DUAL SEAL CONFIGURATION FOR SINGLE COMPARTMENT ENCLOSURE



NOTES:

1. ANSI / ISA 12.27.01-2003 FM CERTIFIED "DUAL SEAL" WHEN USED WITH AMETEK DREXELBROOK 700 SERIES SENSING ELEMENTS
2. SEE SHEET 3 FOR 700 SERIES PRIMARY SEAL PROCESS WETTED MATERIALS
3. REFER TO SENSING ELEMENT TAG FOR PROCESS TEMPERATURE AND PRESSURE RATINGS.

CERTIFIED	by	COPYRIGHT	2012	<p>AMETEK® DREXELBROOK</p> <p>205 KEITH VALLEY RD HORSBAM, PA 19044-9986 215-674-1234 FAX 215-674-2731</p>	<p>CONTROL DRAWING. DUAL SEAL ASSEMBLY FOR USE WITH 700 SERIES SENSING ELEMENTS</p>	<p>ISS. SHT. 2 OF 3</p>
PO #		AMETEK DREXELBROOK	285-0003-OXX-CD			
ENG		SCALE	NONE			
USER		UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)				
				DR.	JJS 1-19-12	
				CK.	SEA 1-20-12	
				ISS. EDO/DSR NO.	APP' D	DATE

6.6 Dual Seal Assembly (Continued)

No. 285-0003-OXX-CD SHT 3 OF 3

SENSING ELEMENTS AVAILABLE

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS	SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS	SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0001-022	TFE/316SS	700-0002-054	FEP/TFE/316SS	700-0202-053	TFE/316SS
700-0001-024	TFE/316SS	700-0002-057	PVDF/TFE/316SS	700-0202-054	TFE/316SS
700-0001-026	TFE/316SS	700-0002-064	PVDF/TFE/316SS	700-0202-056	TFE/316SS
700-0001-034	TFE/CS	700-0002-224	TFE/316SS	700-1202-001	PEEK/316SS
700-0001-040	POLYETHYLENE/316SS	700-0002-321	FEP/TFE/316SS	700-1202-010	PEEK/316SS
700-0001-044	PFA/316SS	700-0002-360	PFA/TFE/316SS	700-1202-014	PEEK/316SS
700-0001-054	TFE/316SS	700-0005-054	PFA/TFE/316SS	700-1202-015	PEEK/316SS
700-0001-064	TFE/316SS	700-0201-005	TFE/316SS	700-1202-018	PEEK/316SS
700-0001-074	TFE/316SS	700-0201-025	TFE/316SS	700-1202-031	PEEK/316SS
700-0001-344	PFA/316SS	700-0201-026	TFE/316SS	700-1202-033	PEEK/316SS
700-0002-023	TFE/316SS	700-0201-027	TFE/316SS	700-1202-041	PEEK/316SS
700-0002-024	TFE/316SS	700-0201-028	TFE/316SS	700-1202-045	PEEK/316SS
700-0002-027	FEP/TFE/316SS	700-0201-035	TFE/316SS	700-1202-051	PEEK/316SS
700-0002-028	TFE/316SS	700-0201-051	TFE/316SS	700-1202-055	PEEK/316SS
700-0002-033	TFE/316SS	700-0201-052	TFE/316SS	700-1202-061	PEEK/316SS
700-0002-037	PVDF/TFE/316SS	700-0201-058	TFE/316SS	700-1202-081	PEEK/316SS
700-0002-040	UHMW PE/SILICONE/316SS	700-0201-059	TFE/316SS	700-9100-403	PEEK/316SS
700-0002-044	PVDF/TFE/316SS	700-0202-002	TFE/316SS	700-9100-404	PEEK/316SS

CERTIFIED		by _____	
PO # _____			
ENG _____			
USER _____			
ISS: _____	EDD/DSR NO. _____	APP'D _____	DATE _____
DE # _____			
COPYRIGHT 2012 AMETEK DREXELBROOK SCALE: NONE UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES (MM)			
DR. JJS 1-19-12 CK. SGA 1-20-12			
205 KEITH VALLEY RD HORSHAM, PA 19044-9886 215-674-1234 FAX 215-674-2731			
AMETEK® DREXELBROOK			
CONTROL DRAWING, DUAL SEAL ASSEMBLY FOR USE WITH 700 SERIES SENSING ELEMENTS			
285-0003-OXX-CD			ISS: SHT. 3 OF 3

Appendix A

Shortening or Lengthening Sensing Element



CAUTION:

The insulation length of either Flush Sensing Elements or Insulated Sensing Elements can **Not** be changed.

Cable Sensing Elements can only be shortened. Instructions are included with each unit.

The Need

Sometimes your application calls for probe lengths other than the standard 18-inch or longer insertion lengths supplied. Shortening the sensing element is quite simple and can be done in the field. Lengthening the sensing element, however, is more difficult because the metal rod, typically 304SS or 316SS, must be welded.

Before making any Adjustments:

1. Read the following instructions thoroughly.
2. Remove power.
3. Disconnect the electronics.
4. Protect electronics from any static discharge.
5. Protect electronics from any heat.

Shortening

The bare metal center rod of the sensing element can be shortened with a hacksaw. Be careful not to cut either of the two insulators. *See Figure* on this page.

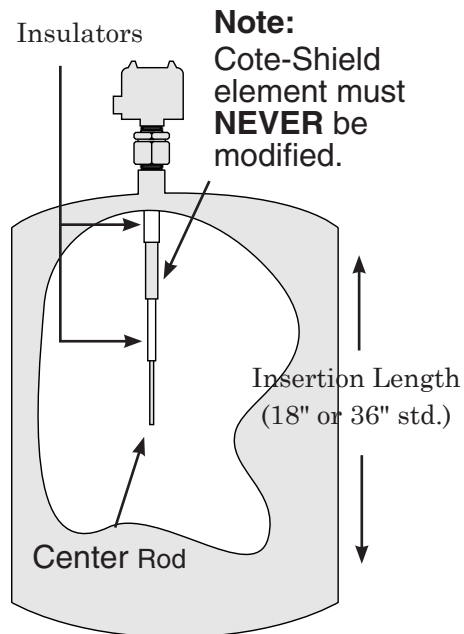
In applications using conductive or water-based materials, shortening is not a problem. Leave a minimum bare metal center rod length of two (2) inches.

For dry granular materials, such as powder, sand, corn, clinker, etc., you must leave a minimum bare metal center rod length of eight (8) inches. Consult the factory before shortening beyond this point.

Lengthening

To lengthen the sensing element, an extension rod can be welded onto the end of the bare metal center rod. Make sure that the extension rod is the same metal as the sensing element.

An alternate option is to add a pipe coupling and a section of metal pipe after threading the tip of the sensing element. In this case, the metal pipe need not be identical to the metal of the sensing element.



Note:
Cote-Shield element must **NEVER** be modified.

Note:
Any changes to probe length after calibration requires recalibration to ensure proper operation.

TERMS AND CONDITIONS OF SALE

GENERAL: ALL ORDERS ARE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS. ANY ACCEPTANCE OF ANY OFFER OF BUYER FOR ANY GOODS OR SERVICES IS CONDITIONED UPON THESE TERMS AND CONDITIONS, AND SELLER OBJECTS TO ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER IN ANY DOCUMENT, WHICH SHALL NOT BE BINDING UPON SELLER. No salesman or other party is authorized to bind the AMETEK DREXELBROOK Division of AMETEK, Inc. (hereinafter "Seller") by any agreement, warranty, statement, promise, or understanding not herein expressed, and no modifications shall be binding on Seller unless the same are in writing and signed by an executive officer of Seller or his or her duly authorized representative. Verbal orders shall not be executed until written notification has been received and acknowledged by Seller.

QUOTATIONS: Written quotations are valid for thirty (30) days unless otherwise stated. Verbal quotations expire the same day they are made.

PRICES: All prices and terms are subject to change without notice. Buyer-requested changes to its order ("Orders"), including those affecting the identity, scope and delivery of the goods or services, must be documented in writing and are subject to Seller's prior approval and adjustments in price, schedule and other affected terms and conditions. Orders requiring certified test data in excess of commercial requirements, are subject to a special charge.

ORDER ACCEPTANCE: All Orders are subject to final approval and acceptance by Seller at its office located at 205 Keith Valley Road, Horsham, Pennsylvania 19044.

TERMS OF PAYMENT: Seller's standard terms of payment for Buyers who qualify for credit are net thirty (30) days from date of invoice. All invoices must be paid in United States dollars.

CREDIT: Seller reserves the right at any time to revoke any credit extended to Buyer or otherwise modify terms of payment if Buyer fails to pay for any shipments when due or if in Seller's opinion there is a material adverse change in Buyer's financial condition. Seller may, at its option, cancel any accepted Order if Buyer fails to pay any invoices when due.

DELIVERY: Shipments are F.O.B place of manufacture ("Shipping Point") and the Buyer shall pay all freight, transportation, shipping, duties, fees, handling, insurance, storage, demurrage, or similar charges from Shipping Point. Delivery of goods to common carrier shall constitute delivery and passing of title to the Buyer, and all risk of loss or damage in transit shall be borne by Buyer. Any claims or losses for damage or destruction after such delivery shall be the responsibility of Buyer.

Seller reserves the right to make delivery in installments which shall be separately invoiced and paid for when due, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve Buyer of its obligation to accept remaining deliveries.

Acknowledged shipping dates are approximate only and based on prompt receipt of all necessary information from Buyer and Buyer's compliance with terms of payment.

TAXES: All sales, excise and similar taxes which Seller may be required to pay or collect with respect to the goods and/or services covered by any Order, shall be for the account of the Buyer except as otherwise provided by law or unless specifically stated otherwise by Seller in writing.

TERMINATION AND HOLD ORDERS: No Order may be terminated by Buyer except upon written request by Buyer and approval by Seller, and if said request is approved by Seller, under the following conditions: (1) Buyer agrees to accept delivery of all of the units completed by Seller through the workday on which Seller receives the written termination request; (2) Buyer agrees to pay to Seller all direct costs and expenses applicable to the portion of the Order that is incomplete.

WARRANTY:

A. **Hardware:** Seller warrants its goods against defects in materials and workmanship under normal use and service for one (1) year from the date of invoice.

B. **Software and Firmware:** Unless otherwise specified, Seller warrants for a period of one (1) year from date of invoice that standard software or firmware, when used with Seller specified hardware, shall perform in accordance with Seller's published specifications. Seller makes no representation or warranty, expressed or implied, that the operation of the software or firmware shall be uninterrupted or error-free, or that functions contained therein shall meet or satisfy the Buyer's intended use or requirements.

C. **Services:** Seller warrants that services, including engineering and custom application, whether provided on a fixed cost or time and material basis, shall be performed in accordance with generally accepted industry practices.

D. **Remedies:** Seller's liability under this section is restricted to replacing, repairing, or issuing credit (at Seller's option) for any returned goods and only under the following conditions: (1) Seller must be promptly notified, in writing, as soon as possible after the defects have been noted by the Buyer, but not later than (1) year from date of invoice from Seller; (2) The defective goods are to be returned to the place of manufacture, shipping charges prepaid by the Buyer; (3) Seller's inspection shall disclose to its satisfaction that the goods were defective in materials or workmanship at the time of shipment; (4) Any warranty service (consisting of time, travel and expenses related to such services) performed other than at Seller's factory, shall be at Buyer's expense.

E. **Repaired/Reconditioned Goods:** As to out-of-warranty goods which Seller has repaired or reconditioned, Seller warrants for a period of sixty (60) days from date of its invoice only new components replaced in the most recent repair/reconditioning.

F. **Returns and Adjustments:** No goods may be returned unless authorized in advance by Seller and then only upon such conditions to which Seller may agree. Buyer must obtain an RMA (Return Material Authorization) number from Seller prior to any return shipment and such RMA number must appear on the shipping label and packing slip. Buyer shall be responsible for the returned goods until such time as Seller receives the same at its plant and for all charges for packing, inspection, shipping, transportation, or insurance associated with returned goods. In the event that credit for returned goods is granted, it shall be at the lesser of the then current prices or the original purchase price. Claims for shortage or incorrect material must be made within five (5) days after receipt of shipment.

ALL OTHER WARRANTIES, FOR ANY OF SELLER'S GOODS OR SERVICES, WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE ARE EXCLUDED.

INTELLECTUAL PROPERTY: Seller's sale of goods or provision of related documentation or other materials to Buyer shall not transfer any intellectual property rights to Buyer unless Seller specifically agrees to do so in writing. Seller shall retain ownership of all applicable patents, trademarks, copyrights and other intellectual property rights. Buyer shall not use, copy or transfer any such items in violation of Seller's intellectual property rights or applicable law, or for any purposes other than that for which the items were furnished.

Seller shall defend any lawsuit brought against the Buyer based on a claim that the design or construction of the goods sold hereunder by Seller infringe any United States or Canadian Patent, Copyright or Mask Work Registration, provided that Buyer promptly notifies Seller of such claim in writing and further provided that, at Seller's expense, (1) Buyer gives Seller the sole right to defend or control the defense of the suit or proceeding, including settlement, and (2) Buyer provides all necessary information and assistance for that defense. In the event of a charge of infringement, Seller's obligation under the agreement shall be fulfilled if Seller, at its option and expense, either (i) settles such claim; (ii) procures for Buyer the right to continue using such goods; (iii) replaces or modifies goods to avoid infringement; or (iv) accepts the return of any infringing goods and refunds their purchase price; or (iv) defends against such claim.

If Buyer furnishes specifications or designs to Seller, the obligations of Seller set forth above shall not apply to goods made by Seller using such specifications or designs, and Buyer shall defend, indemnify and hold Seller harmless against any third party claims for infringement which arise out of Seller's use of specifications or designs furnished by Buyer.

SOFTWARE LICENSE: If goods purchased hereunder include software ("Software"), Buyer may use the Software only as part of the goods. Buyer may not use, copy, or transfer any of the Software except as may be permitted under the applicable License Agreement provided with the goods. Buyer's right to use, copy or transfer the Software shall terminate upon termination of Buyer's right to use the goods.

PACKAGING/WEIGHTS AND DIMENSIONS: Buyer specified packing or marking may be subject to additional charges not otherwise included in the price of the goods. Published weights and dimensions are estimates or approximate only and are not warranted.

FORCE MAJEURE: Seller shall not be responsible for delays in delivery or any failure to deliver due to causes beyond Seller's control, including but not limited to the following items: acts of God, war, terrorism, mobilization, civil commotion, riots, embargoes, domestic or foreign governmental regulations or orders, governmental priorities, port congestion, acts of the Buyer, its agents or employees, fires, floods, strikes, lockouts and other labor difficulties, shortages of or inability to obtain shipping space or transportation, inability to secure fuel, supplies or power at current prices or on account of shortages thereof, or due to limitations imposed by the extent of availability of Seller's normal manufacturing facilities.

If a delay excused per the above extends for more than ninety (90) days and the parties have not agreed upon a revised basis for continuing providing the goods or services at the end of the delay, including adjustment of the price, then Buyer, upon thirty (30) days' prior written notice to Seller may terminate the Order with respect to the unexecuted portion of the goods or services, whereupon Buyer shall promptly pay Seller its reasonable termination charges upon submission of Seller's invoices thereof.

LIMITATION OF LIABILITY: Seller's liability for any claim of any kind, except infringement of intellectual property rights, shall not exceed the purchase price of any goods or services which give rise to the claim. **SELLER SHALL IN NO EVENT BE LIABLE FOR BUYER'S MANUFACTURING COSTS, LOST PROFITS, LOSS OF USE OF THE GOODS OR SERVICES, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS, CLAIMS OF BUYER'S CUSTOMERS FOR DAMAGES, OR OTHER SPECIAL, PROXIMATE, INCIDENTAL, INDIRECT, EXEMPLARY OR CONSEQUENTIAL DAMAGES.** Any action against Seller must be brought within eighteen (18) months after the cause of action accrues. These disclaimers and limitations of liability shall apply regardless of the form of action, whether in contract, tort or otherwise, and further shall extend to the benefit of Seller's vendors, appointed distributors and other authorized resellers as third-party beneficiaries.

PROHIBITION FOR HAZARDOUS USE: Goods sold hereunder generally are not intended for application in and shall not be used by Buyer in the construction or operation of a nuclear installation or in connection with the use or handling of nuclear material, or for any hazardous activity or critical application, where failure of a single component could cause substantial harm to persons or property, unless the goods have been specifically approved for such a use or application. Seller disclaims all liability for any loss or damage resulting from such unauthorized use and Buyer shall defend, indemnify and hold harmless the Seller against any such liability, whether as a result of breach of contract, warranty, tort (regardless of the degree of fault or negligence), strict liability or otherwise.

EXPORT CONTROL: Buyer shall comply with all export control laws and regulations of the United States, and all sales hereunder are subject to those laws and regulations. Seller shall not be named as shipper or exporter of record for any goods sold hereunder unless specifically agreed to in writing by Seller. At Seller's request, Buyer shall furnish Seller with end-use and end-user information to determine export license applicability. Buyer warrants, in accordance with U.S. Export Law, that goods sold hereunder shall not be destined for facilities or activities involving nuclear, chemical or biological weapons, or related missile delivery systems in named prohibited regions or countries.

GOVERNING LAW: Seller intends to comply with all laws applicable to its performance under any order. All matters relating to interpretation and effect of these terms and any authorized changes, modifications or amendments thereto shall be governed by the laws of the Commonwealth of Pennsylvania. No government contract regulations or clauses shall apply to the goods or services, this agreement, or act to bind Seller unless specifically agreed to by Seller in writing.

NON-WAIVER BY SELLER: Waiver by Seller of a breach of any of these terms and conditions shall not be construed as a waiver of any other breach.

SEVERABILITY AND ENTIRE AGREEMENT: If any provision of these terms and conditions is unenforceable, the remaining terms shall nonetheless continue in full force and effect. This writing, together with any other terms and conditions Seller specifically agrees to in writing, constitutes the entire terms and conditions of sale between Buyer and Seller and supercedes any and all prior discussions, and negotiations on its subject matter.

AMETEK[®]
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