



Leader in  
Level Measurement

# Installation and Operating Instructions

## IntelliPoint RF™ RNL Series Point Level Switch

**NOTICE:** *The AutoVerify™ feature in The IntelliPoint™ switch is shipped DISABLED. For critical High Level applications we recommend enabling the AutoVerify™ feature.*

Telephone: +1 215-674-1234  
Fax: +1 215-674-2731  
E-mail: [drexelbrook.sales@ametek.com](mailto:drexelbrook.sales@ametek.com)  
Website: [www.drexelbrook.com](http://www.drexelbrook.com)

AMETEK Drexelbrook makes no warranty of any kind with regard to the material contained in this manual, including, but not limited to, implied warranties or fitness for a particular purpose. Drexelbrook shall not be liable for errors contained herein or for incidental or consequential damages in connection with the performance or use of material.

© AMETEK Drexelbrook

RNLXX1-LM  
Issue# 25

# IntelliPoint RF Series Point Level Switch



**AMETEK®**  
**DREXELBROOK**  
*An ISO 9001 Certified Company*

205 Keith Valley Road, Horsham, PA 19044  
Telephone: +1 215-674-1234  
Fax: +1 215-674-2731  
E-mail: [drexelbrook.sales@ametek.com](mailto:drexelbrook.sales@ametek.com)  
Website: [www.drexelbrook.com](http://www.drexelbrook.com)

# Contents

# Contents

<b>Section 1: Introduction</b>	
1.1	System Description .....1
1.2	Technology .....1
1.3	Model Number .....2
1.4	Sensing Element List .....3
1.5	Dual Compartment Housing .....4
1.6	Spare Parts List .....5
<b>Section 2: Installation</b>	
2.1	Unpacking .....7
2.2	Mounting and Installation Guidelines .....7
2.3	Input Wiring .....9
2.4	Output Wiring - Relay Version .....10
2.5	Spark Protection .....10
2.6	Circuit Board .....11
2.7	Output and LED Status .....14
2.8	Sensing Element Connection.....15
<b>Section 3: Calibration</b>	
3.1	Calibration .....17
3.2	Re Calibration .....18
3.3	IntelliPoint Calibration Mode Change.....19
<b>Section 4: Troubleshooting</b>	
4.1	RF Point Level Troubleshooting Guide .....21
4.2	Testing Electronic Unit .....22
4.3	Over Range.....23
4.4	Under Range.....23
4.5	Testing The Relay Circuits .....23
4.6	Testing The Sensing Element .....24
4.7	Testing the Integral Cable .....27
4.8	Testing the Remote Cable.....27
4.9	Testing the Power Supply.....30
4.10	Factory Assistance.....31
4.11	Field Service .....31
4.12	Customer Training .....31
4.13	Equipment Return .....32
<b>Section 5: Specifications</b>	
5.1	Specifications.....32
5.2	Approvals Available:.....33
<b>Section 6 : Control Drawings / Certificates</b>	
6.1	FM / FMc Control Drawings .....34
6.2	ATEX Control Drawings.....48
6.3	CE Declaration of Conformity .....57
6.4	IECEX Control Drawings.....58
6.5	Mounting and Wiring for Spark Protector Drawings .....67
6.6	Adding a Padded Capacitor .....70
6.7	Dual Seal Assembly for 700 Series Sensing Elements.....73
<b>Appendix A:</b>	
Shortening or Lengthening the Sensing Element.....	<b>A-1</b>
CE Installation Supplement.....	<b>A-2</b>
CE Installation Supplement (Continued) .....	<b>A-3</b>

## **Section 1**

## Section 1: Introduction

### 1.1 System Description

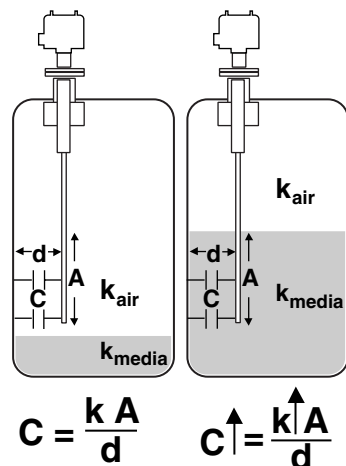


Figure 1-1

Simple Capacitance Probe  
(Insulating Media Shown)

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

**Notice: Material to be Measured Must Be Below Sensor when Power is Applied.**

The **AutoVerify™** self-testing function continuously monitors the entire system to ensure proper operation. **Manual Certify™** changes the outputs in order to test the loop current and ensure proper operation of the control systems.

### 1.2 Technology

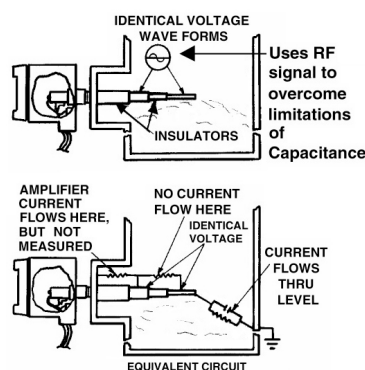


Figure 1-2

RF Admittance Probe  
with Cote-Shield

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 mis-balance. 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, IntelliPoint employs a radio frequency signal and adds the Cote-Shield™ circuitry within the Electronics Unit.

This patented Cote-Shield™ circuitry is designed into the IntelliPoint 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 sensor 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. It is suitable for very wide range conditions and materials from cryogenics to high temperature, from vacuum to 10,000psi pressure.

## 1.3 Model Number

### IntelliPoint RF™

#### Technology

**R** RF Admittance

#### Measurement Type

**L** 2pf Fixed Calibration

**H** Auto Calibration (0.5pf)

**N** Auto Calibration (2pf)

**P** 0.5pf Fixed Calibration

**T** Auto Calibration (10pf)

**V** 10pf Fixed Calibration

#### Input

**L** Universal Power Supply 21-100 VDC, 85-250 VAC, 0-400 Hz

#### 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 / IECEx Approved, NEMA 4X/IP66, M20 X 1.5 conduit entries
- 3** FM / FMC Approved, NEMA 4X/IP66, ¾" NPT conduit entries
- 5** No Approvals, NEMA 4X/IP66, M20 X 1.5 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 X 1.5 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
- 1** Remote, no cable
- 2** Remote w/ 3 m (10 ft.) G.P. Cable
- 3** Remote w/ 7.6 m (25 ft.) G.P. Cable
- 4** Remote w/ 10.6 m (35 ft.) G.P. Cable
- 5** Remote w/ 15.2 m (50 ft.) G.P. Cable
- 6** Remote w/ 23 m (75 ft.) G.P. Cable
- 7** Remote w/ (25 ft.) Tri-Ax Cable
- 8** Remote w/ (50 ft.) Tri-Ax Cable
- 9** Remote w/ (75 ft.) Tri-Ax Cable
- A** Remote w/ (10 ft.) Hi-Temp. Cable
- B** Remote w/ (25 ft.) 1st 10ft Hi-Temp. Cbl.
- C** Remote w/ (35 ft.) 1st 10ft Hi-Temp. Cbl.
- D** Remote w/ (50 ft.) 1st 10ft Hi-Temp. Cbl.
- E** Remote w/ (75 ft.) 1st 10ft Hi-Temp. Cbl.
- F** Remote w/ (5 ft.) G.P. Cable
- G** Remote w/ (5 ft.) Tri-Ax Cable
- H** Remote w/ (10 ft.) Tri-Ax Cable
- J** Remote w/ (35 ft.) Tri-Ax Cable
- K** Remote w/ (5 ft.) Hi-Temp. Cbl.

#### Output

- 1** Two SPDT Relays, relay #2 configured as alarm or fault (Min=100 mA / 12 VDC)
- 2** Two SPDT Relay, gold plated contacts (Max 200 mA / 12 VDC)

#### Sensing Element (Reference Section 1.4 for Probe Selections)

#### 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** 1"NPT 316SS  
**A2C** 1"NPT Hastelloy C

#### Sanitary TriClamps

**C2B** 1"TriClamp 316SS  
**C3B** 1½"TriClamp 316SS  
**C4B** 2"TriClamp 316SS  
**C5B** 2-1/2"TriClamp 316SS  
**C6B** 3"TriClamp 316SS  
**C7B** 3"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** 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

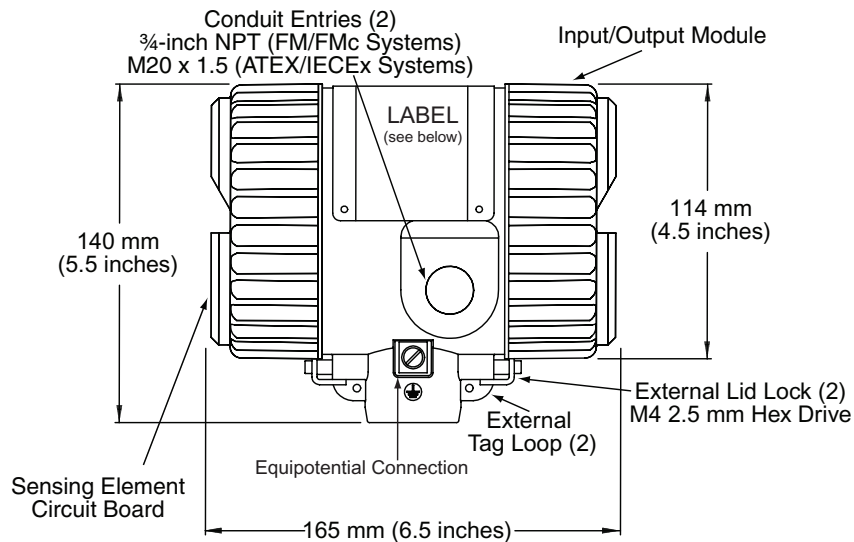
**DA1** 1" 150# RF 316/316L SS  
**DB1** 1½" 150# RF 316/316L SS  
**DC1** 2" 150# RF 316/316L SS  
**DD1** 2½" 150# RF 316/316L SS  
**DE1** 1" 300# RF 316/316L SS  
**DF1** 1½" 300# RF 316/316L SS  
**DG1** 2" 300# RF 316/316L SS  
**DH1** 2½" 300# RF 316/316L SS  
**DI1** 3" 150# RF 316/316L SS  
**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** 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



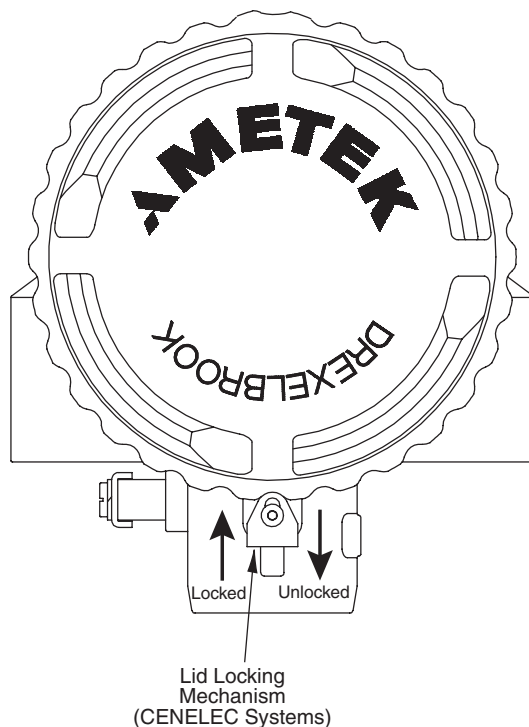
# 1.4 Sensing Element List

	#	Application	Sensing Element Part Number	Pressure/Temperature	Wetted Parts
General & Application Specific Sensing Elements	00	General purpose	700-1202-001 Remote & 700-1202-021 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and PEEK
	02	General purpose, longer insertion lengths w/cable attachment and 316/316L SS bottom weight	700-1202-014 Remote & 700-1202-024 Integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316/316L SS and PEEK
	03	Proximity	700-1202-018 Remote & 700-1202-028 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and PEEK with 76mm (3) 216SS proximity plate
	04	General purpose, high temperature and pressure	700-1202-041 Remote	69 bar @ 121°C (1000 PSI @ 250°F)	316/316L SS and PEEK
	06	General purpose with FDA approved materials of construction	700-1202-042 Integral	20.7 bar @ 232°C (300 PSI @ 450°F)	316/316L SS and PEEK
	07	General purpose for granular materials	700-1202-031 Remote & 700-1202-032 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and FDA grade PEEK
	09	General purpose for granular materials w/FDA approved materials of construction	700-1202-010 Remote & 700-1202-020 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and PEEK with 7/8 inch dia. 316/316L SS collar
	10	Corrosive liquids	700-1202-033 Remote & 700-1202-034 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and FDA grade PEEK with 7/8 inch dia. 316/316L SS collar
	11	General purpose, higher pressure, TFE compatibility required	700-0001-018 Remote	3.4 bar @ 149°C (50 PSI @ 300°F)	PFA
	12	Corrosive material, higher pressure	700-0201-005 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
	13	Sanitary (Non- 3A Approved)	700-0201-005 Integral or Remote (Hastelloy C)	13.8 bar @ 232°C (200 PSI @ 450°F)	Hastelloy C and TFE
	14	General purpose, low pressure	700-0201-019 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
	15	Heavy Duty agitated tanks or material w/bulk density	700-0202-002 Integral or Remote	3.4 bar @ 149°C (50 PSI @ 300°F)	316/316L SS and TFE
	16	High integrity seal for hazardous materials	700-0202-002 Integral or Remote	1.4 bar @ 232°C (20 PSI @ 450°F)	316/316L SS and TFE
	17	Sanitary low pressure	700-0202-043 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
	18	Corrosive material, higher pressure with water like viscosity	700-0002-360 Integral or Remote	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and TFE
	19	Interface Measurement	700-0202-029 Integral or Remote	34.5 bar @ 149°C (500 PSI @ 300°F)	PFA
	20	Miniature Pilot Plant Sensor	700-0202-029 Integral or Remote	34.5 bar @ 149°C (500 PSI @ 300°F)	316/316L SS and TFE
	21	Heavy Duty agitated tanks or material w/bulk density and corrosive	700-0001-022 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	TFE
	22	700-0202-043 with proximity plate	700-0002-023 Integral or Remote	34.5 bar @ 149°C (500 PSI @ 300°F)	316/316L SS and TFE
	24	Inactive cable probe with active weight - liquids only	700-0202-023 Integral or Remote	34.5 bar @ 149°C (500 PSI @ 300°F)	316/316L SS and TFE
	25	Inactive cable probe with active weight - corrosive liquids	700-0202-043 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	Hastelloy C and TFE
	26	Extra heavy duty rear mount	700-0002-043 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
	27	Extra heavy duty	700-0005-285 Remote & 700-0005-485 Integral	200 psi @ 200°F	316/316L SS and FEP
	28	General purpose very high pressure	700-0005-285 Remote & 700-0005-485 Integral	200 psi @ 200°F	Hastelloy C and FEP
Fly Ash Precipitators, Baghouse, and Economizers	31	No Hopper Installation	700-0220-001 Remote	20 psi @ 180°F	316/316L SS and FEP
	32	Hopper Installation up to 200mm (8")	700-0221-002 Remote	50 psi @ 300°F	316/316L SS and FEP
	33	Hopper Installation up to 406mm (16")	700-1202-051 Remote	1500 PSI @ 250°F	316/316L SS and PEEK
	34	Hopper Installation up to 521mm (20.5")	700-1202-052 Integral	500 psi @ 450°F	316/316L SS and PEEK
	35	Hopper Installation up to 635mm (25")	700-0029-001 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	36	Mounting directly on hopper, insulation 2" max.	700-0029-002 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	37	Max recommended nozzle length 9.5"	700-0029-003 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	38	Max recommended nozzle length 19"	700-0029-004 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	39	Max recommended nozzle length 22"	700-0029-005 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	40	Max recommended nozzle length 25"	700-0029-102 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
Plugged Chute Detection	50	Flush Mount Sensor, 305mm <sup>2</sup> (12 inches <sup>2</sup> ), Heavy Duty	700-0029-103 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	51	Flush Mount Sensor, 305mm <sup>2</sup> (12 inches <sup>2</sup> ), Higher Temp	700-0029-104 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	52	Flush Mount Sensor, 305mm <sup>2</sup> (12 inches <sup>2</sup> ), w/Curved radius 153, 229, 305mm (6,9 or 12")	700-0029-105 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	53	Flush Mount Sensor, 305mm <sup>2</sup> (12 inches <sup>2</sup> ), Extra Heavy Duty	700-0029-106 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	55	Flush Mount Sensor, 203mm <sup>2</sup> (18 inches <sup>2</sup> ), Heavy Duty	700-0207-001 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304SS and Polyurethane
High Pressure/Temperature	60	High Pressure and High Temperature	700-0207-002 Remote	0.1 bar @ 149°C (1 PSI @ 300°F)	304SS and TFE
	61	High Temperature	700-0207-003 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304SS and Neoprene
	62	Very high pressure - not for steam	700-0207-004 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	410SS and UHMW Polyethylene
	64	High pressure and high temperature	700-0207-006 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304SS and Polyurethane
	66	700-0204-002 with secondary seal - vertical only in liquids	700-0204-038 Remote	137.9 bar @ 93°C (2000 PSI @ 200°F) 68.9 bar @ 260°C (1000 PSI @ 500°F)	316/316L SS and Ceramic
3A	67	700-0204-002 Remote	700-0204-002 Remote	1 psi @ 700°F 0 bar @ 816°C (0 PSI @ 1500°F)	316/316L SS and Ceramic
	72	Retractable, bare center rod	700-0204-048 Remote	4000 psi @ 600°F	316/316L SS, Vespel and Ceramic
	73	Retractable, insulated center rod	700-0204-024 Remote	1000 psi @ 750°F	316/316L SS, Monel 400 and Alumina Ceramic
	80	2" Clear line	700-0204-022 Remote	1000 psi @ 100°F 200 psi @ 800°F	316/316L SS and Ceramic
	81	3" Clear line	700-3201-001 Remote & 700-3201-002 Integral	13.8 bar @ 121°C (200 psi @ 250°F)	316/316L SS and PEEK
Retractable	72	Retractable, bare center rod	700-0201-027 Integral or Remote	150 psi @ 300°F	316/316L SS and TFE
	73	Retractable, insulated center rod	700-0201-028 Integral or Remote	150 psi @ 300°F	316/316L SS and TFE
	80	2" Clear line	700-4200-020 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
	81	3" Clear line	700-4200-030 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
Clear Line (In-Line Style)	82	4" Clear line	700-4200-040 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
	83	6" Clear line	700-4200-060 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
	85	Leak detection	700-9000-494 Remote	0 psi @ 185°F	316/316L SS and TFE
	87	SIL floating roof and hydrocarbon liquids - 1.5"	700-0005-595 Integral	0 psi @ 185°F	Brass Polyolefin and FEP - 1.5 inch diameter probe
Specialty	90	Perforated concentric shield	700-0201-059 Integral or Remote	300 psi @ 300°F	316/316L SS and TFE
	91	General purpose with perforated concentric shield	700-1202-015 Remote	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and PEEK
	92	General purpose higher pressure with perforated concentric shield	700-1202-016 Integral	1000 PSI @ 250°F	316/316L SS and PEEK
	93	General purpose very high pressure with perforated concentric shield	700-1202-045 Remote	300 psi @ 450°F	316/316L SS and PEEK
	94	Miniature Pilot Plant Sensor with concentric shield	700-1202-046 Integral	1500 PSI @ 250°F	316/316L SS and PEEK
	99	General purpose with perforated concentric shield	700-1202-055 Remote	500 psi @ 450°F	316/316L SS and PEEK
	99	General purpose higher pressure with perforated concentric shield	700-1202-056 Integral	500 psi @ 450°F	316/316L SS and PEEK
	99	General purpose very high pressure with perforated concentric shield	700-0209-024 Remote	69 bar @ 121°C (1000 PSI @ 250°F) 0 bar @ 232°C (0 PSI @ 450°F)	316/316L SS and TFE
Integrated Ground Reference	NN	Retrofit Kit			
	ZZ	Sensing Element Not Listed			

## 1.5 Dual Compartment Housing



**Figure 1-3**  
**Dual Compartment Housing Detail**



**The Input/ Output Module (IOM) is located on Customer Connection side; sensing element/ circuit board are on opposite side.**

## 1.6 Spare Parts List

O-ring .....	250-1-75
Housing ¾-Inch NPT Conduit Entry .....	260-2-540
Housing M20 Conduit Entry .....	260-2-542
Input/ Output Module.....	385-48-6
Input/ Output Module, Gold Relay .....	385-48-18
Circuit Board	
RLL - 2pf Fixed Calibration .....	385-48-003-FL2
RHL - Auto Calibration (0.5pf).....	385-48-19-HL1
RNL - Auto Calibration (2pf).....	385-48-19-003-NL1
RPL - 0.5pf Fixed Calibration .....	385-48-19-PL2
RTL - Auto Calibration (10pf) .....	385-48-3-QL3
RVL - 10pf Fixed Calibration .....	385-48-3-VL4
Integral Sensing Element Cable (PEEK Probes) .....	380-9000-97
Integral Sensing Element Cable (All Other Probes).....	380-9000-99

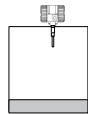
## **Section 2**

## 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, report it to the factory immediately.

### 2.2 Mounting and Installation Guidelines



#### CAUTION:

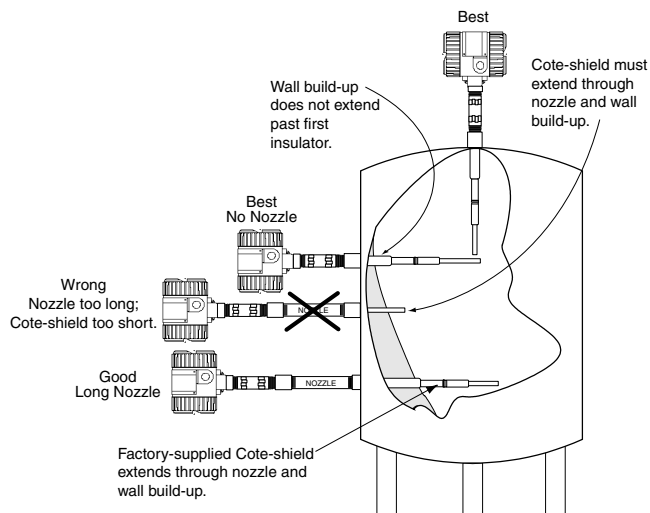
**The IntelliPoint RF instrument must NOT be powered BEFORE it is installed in an application and material must be BELOW sensing element.**

The IntelliPoint RF 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 limits as specified by control drawings in section 6.

The IntelliPoint RF instrument utilizes a dual compartment housing and a completely encapsulated input/ output module to reduce possibility that damage may occur from water migrating into housing through conduit. To further reduce possibility of damage caused by water in the conduit, install a drip loop and breather drain to purge any accumulating moisture, *See Figure 2.1.*



**Cable fittings supplied are weather-resistant. They are NOT certified as explosionproof (XP) or flameproof (d) unless they are specifically marked.**



**Figure 2-1**  
**Recommended Conduit Connection**

## 2.2 Mounting and Installation Guidelines (continued)

After the system is installed and the level is **below** the sensing element, apply power. The RF series instrument will automatically calibrate and is ready to detect change in level.

If properly installed, the Green LED will illuminate when power is applied. The two Red LEDs should not be flashing. If either of the Red LEDs are flashing, refer to **Section 4: Troubleshooting**.



***The Sensing Element / Circuit Board side of the IntelliPoint RF instrument is rated Intrinsically Safe (I.S.)***



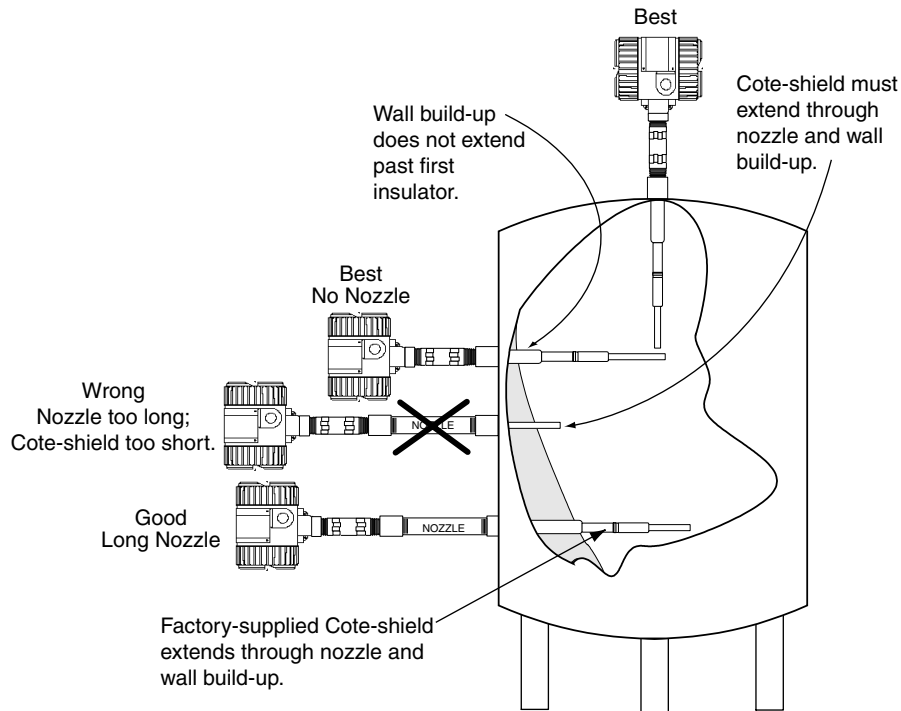
**WARNING:**

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

Mount sensing element using the following installation guidelines. **Refer to Figure 2-2.**

- When installing the IntelliPoint RF instrument, ambient temperature at the 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 the tank or silo wall.
- If the installation area is rated explosion-proof and requires conduit seal fittings, they should be used in accordance with company standards and local codes.
- Do not mount a Cote-Shield sensing element through a nozzle that exceeds the length of the first insulator.
- Ensure that there are no obstructions or agitator blades to interfere with sensing element.
- Rigid sensing elements can be mounted either vertically or horizontally.

## 2.2 Mounting and Installation Guidelines (continued)

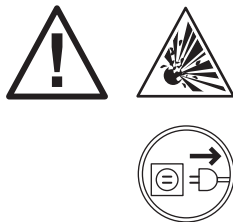


**Figure 2-2**

Installation Considerations

## 2.3 Input Wiring

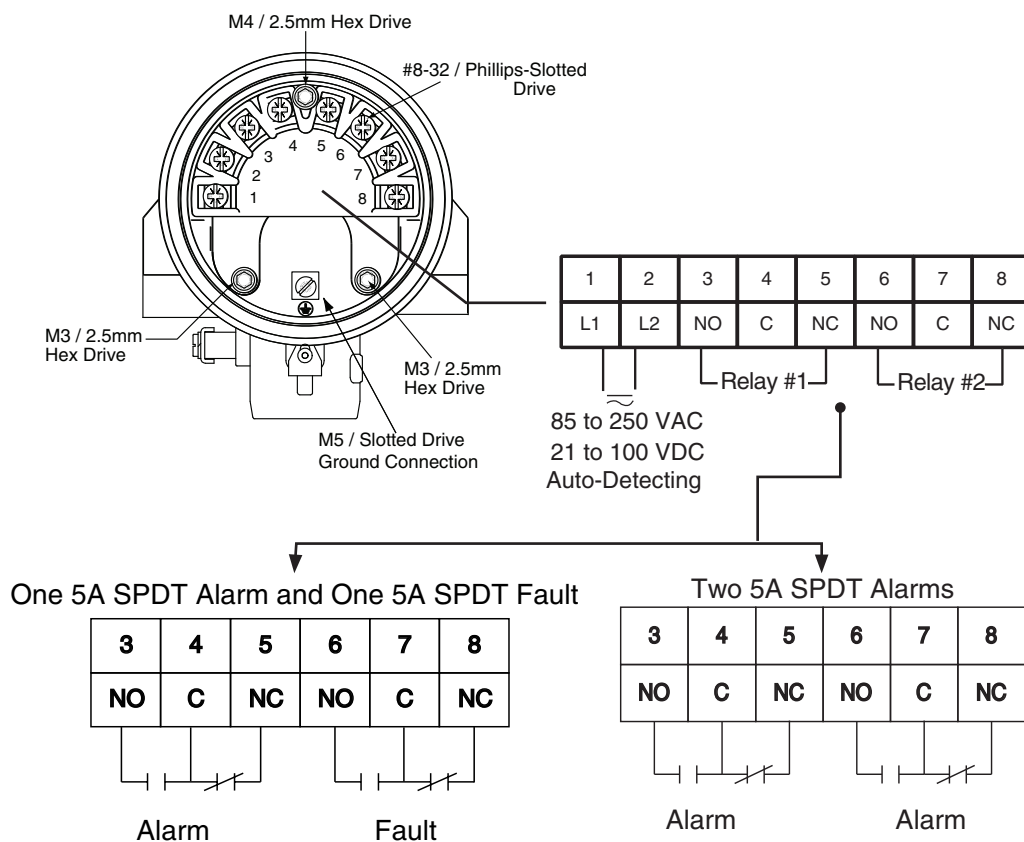
The IntelliPoint RF instrument utilizes a universal power supply and can be operated from any source between 85 to 250 VAC or 21 to 100 VDC. The universal power supply automatically detects the input voltage regardless of polarity and does not require jumper changes. To access, remove the housing lid on the **CUSTOMER CONNECTIONS** side to reveal the **INPUT/ OUTPUT MODULE (IOM)**. The IOM is an encapsulated assembly that contains the power supply, outputs and eight wiring terminals. The IOM is held in place with three screws. See Figure 2-3.



### **WARNING:**

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

## 2.3 Input Wiring (Continued)



**Figure 2-3**

Input and Relay Wiring / Customer Connections Side



### IMPORTANT

Ground Must be Connected for Proper Operation and Safety.

## 2.4 Output Wiring - Relay Version

The IntelliPoint RF series instrument is supplied with two sets of contacts. The relay contacts can be used as one of the following configurations depending on the RELAY #2 jumper configuration (*see Figure 2-3 and 2-4*)

- One 5A SPDT alarm relay and one 5A SPDT fault relay.
- Two 5A SPDT alarm relays.

## 2.5 Spark Protection

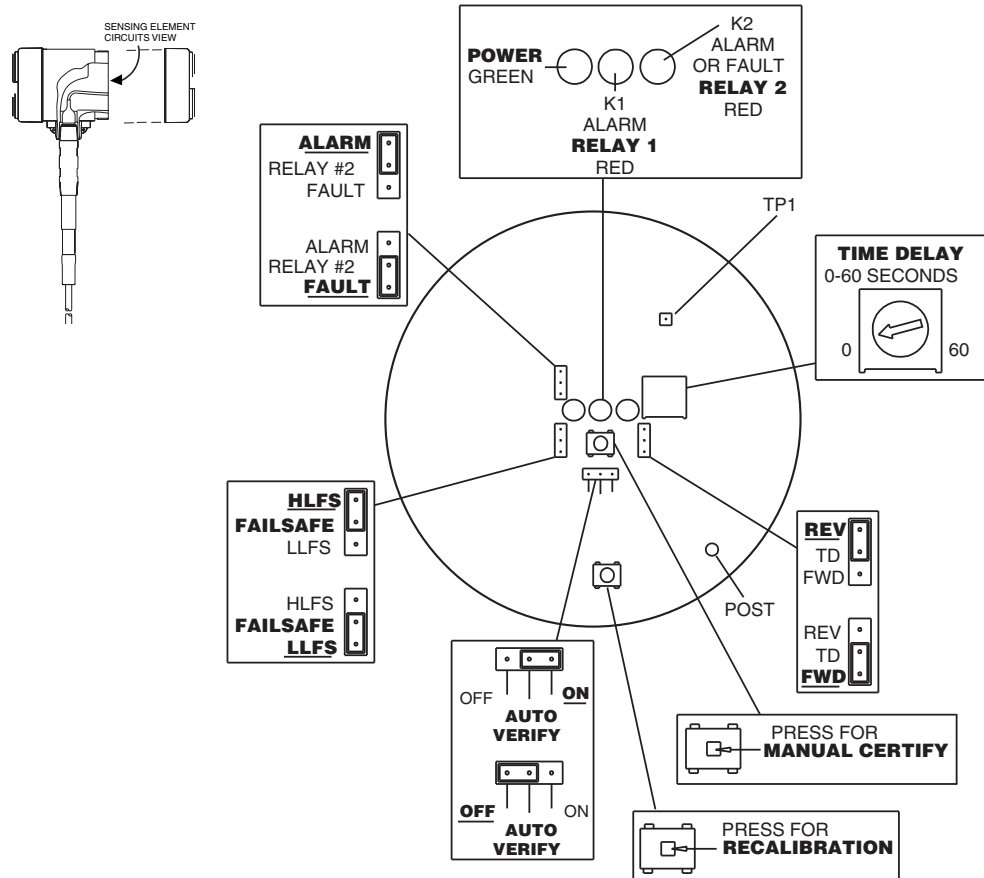


Applications involving insulating granulars and insulating liquids may produce a static discharge that can damage the electronics. The RF series instrument is supplied with integral heavy-duty spark protection to prevent static discharges from damaging the electronic circuits.



## 2.6 Circuit Board

The circuit board is located on the sensing element/ circuit side of the housing (marked on label). Remove the housing lid to access the status LEDs, time delay adjustment, and configuration jumpers. *See Figure 2-4.*



**Figure 2-4**

Circuit Board (shown in detail)



**Do NOT push the Recal button without first ensuring that the material being measured is below the sensing element.**

### 2.6.1 Time Delay

The **TIME DELAY** adjustment is located on the sensing element/ circuit board side of the housing. It is used to help stop an oscillating relay output due to agitation or waves in the vessel. The time delay adjustment can be field-adjusted from 0 to 60 seconds. The unit is shipped with the **TIME DELAY** setting at zero (0) 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.

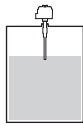
## 2.6.2 Time Delay Action

**TIME DELAY ACTION** describes whether the relay contacts are delayed from going into the alarm state or recovering from an alarm state.

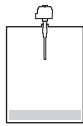
- **FWD:** delays system from coming out of alarm.
- **REV:** delays system from going into alarm.
- Instrument is supplied with **TIME DELAY** action set in forward mode (**FWD**) position.
- Time delay action is field-selectable using jumper located on sensing element/ circuit board side of housing.

## 2.6.3 Failsafe

**FAILSAFE** describes the level condition that causes the output relay to de-energize, and also the state of the relay upon loss of power.



- **High Level Failsafe (HLFS)** is the alarmed condition when probe is covered. Relay will de-energize when level is high, indicating high level upon loss of power. (N.O. contacts open and N.C. contacts closed).



- **Low Level Failsafe (LLFS)** is the alarmed condition when probe is uncovered. Relay will de-energize when level is low, indicating low level upon loss of power. (N.O. contacts open and N.C. contacts closed).
- Instrument is supplied with failsafe jumper set in high level (**HLFS**) position.
- Failsafe is field-selectable using a jumper located on sensing element/ circuit board side of housing.

## 2.6.4 Relay #2 Assignment

**RELAY #2** assignment refers to operation of **RELAY #2**, and configures relays as (1) SPDT alarm and (1) SPDT fault relay or (2) SPDT alarm relays. **RELAY #1** is always an alarm relay.

- Alarm: **RELAY #2** will follow **RELAY #1**, providing a second SPDT alarm relay.
- Fault: **RELAY #2** will de-energize under a fault condition when **AutoVerify™** self-test function is enabled. *See Section 2.6.6*
- Instrument is supplied with **RELAY #2** jumper set in alarm position.
- **RELAY #2** assignment is field-selectable using a jumper located on sensing element/ circuit board side of housing.

### 2.6.5 Manual Certify

The **Manual Certify™** test feature performs a confidence test of the system by duplicating the same signal as a high-level alarm condition without requiring the system to be removed from the tank.

- Simulating a high level with the Manual Certify feature:
- Checks AutoVerify™ and system circuits to ensure proper operation.
- Checks integrity and continuity of the wiring connections.
- Verifies that sensing element is working properly.
- Checks relay connections to other control devices.

The Manual Certify test is initiated with the press of the **Manual Certify Button** located on the sensing element/ circuit side of the housing. After pressing the button, the Green LED flashes for 5 seconds and the two Red LEDs illuminate. The relay contacts are moved to the alarm condition for 2 seconds. If the two Red LEDs do not light, and the relay contacts do not move to the alarm condition, the Manual Certify test has detected a fault. Consult the troubleshooting section of this Instruction Manual. Manual Certify is available when system is configured for **HLFS**.

### 2.6.6 AutoVerify



The AutoVerify™ feature in the IntelliPoint™ switch is shipped DISABLED. For critical High Level applications we recommend enabling the AutoVerify™ feature.

**AutoVerify™** is a self-test function that continuously checks the system for proper operation when the unit is in the High Level FailSafe (**HLFS**) mode and in normal condition.

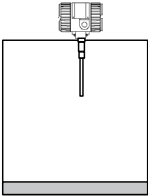
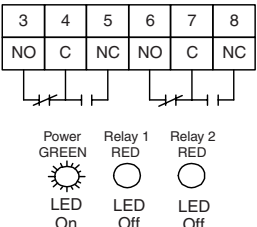
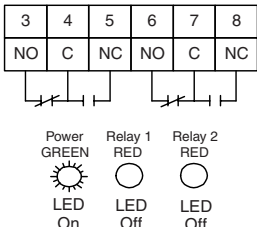
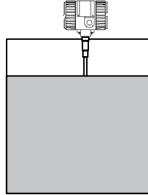
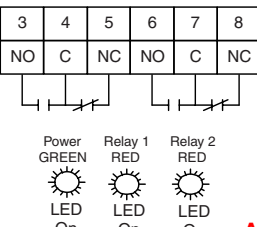
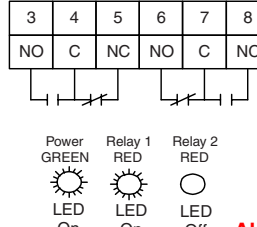
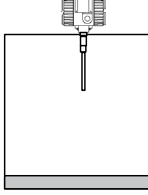
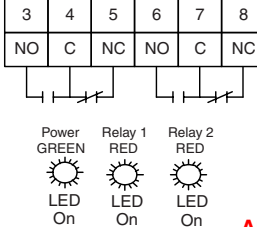
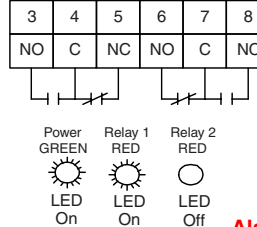
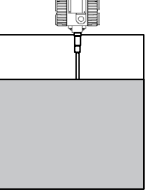
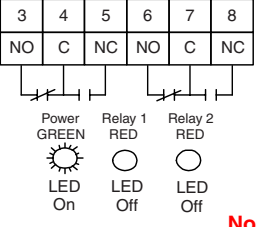
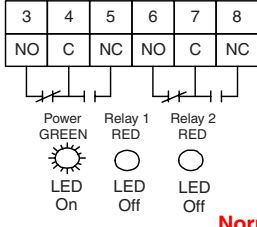
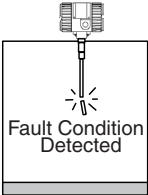
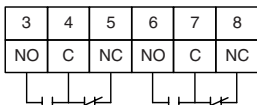
- **ON:** If fault is detected during AUTOVERIFY cycle, both relays will de-energize regardless of how relay #2 is assigned. If relay #2 is assigned to fault, user can distinguish between fault alarm and alarm caused by a high level in the tank.
- **OFF:** The AUTOVERIFY self-test function is not active.
- Instrument is supplied with AUTOVERIFY jumper set in OFF position.
- **AutoVerify™** is field-selectable using a jumper located on sensing element/ circuit board side of housing.
- When a fault is detected, both Red LEDs flash and the relays de-energize.

### 2.6.7 AutoVerify Criteria

1. AutoVerify feature must be enabled.
2. In order for the IntelliPoint to correctly detect a disconnected sensor the active sensor length (active length = insertion length – cote shield length) must be greater than 24 inches (610 mm).
3. Consult Factory for specialty sensors that may be available for shorter length requirements.
4. Sensors that do not meet the above requirement can perform reliably for level measurement detection, and will pass AutoVerify / Manual Certify tests, but **will not** be able to detect a sensor that is, or has become, electrically disconnected from the transmitter.

## 2.7 Output and LED Status

There are three status LEDs located on the sensing element/circuit board side of the housing. One is used to indicate that the unit has power. The remaining two LEDs are used to indicate the condition of **RELAY #1** and **RELAY #2**. For an illustration, See Figure 2-5.

Tank Condition	Relay #2 = Alarm AutoVerify = disabled	Relay #2 = Fault AutoVerify = disabled
 <p>High Level FailSafe Tank Empty</p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED Off</p> <p>Relay 2 RED LED Off</p> <p><b>Normal</b></p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED Off</p> <p>Relay 2 RED LED Off</p> <p><b>Normal</b></p>
 <p>High Level FailSafe Tank Full</p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED On</p> <p>Relay 2 RED LED On</p> <p><b>Alarm</b></p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED On</p> <p>Relay 2 RED LED Off</p> <p><b>Alarm</b></p>
 <p>Low Level FailSafe Tank Empty</p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED On</p> <p>Relay 2 RED LED On</p> <p><b>Alarm</b></p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED On</p> <p>Relay 2 RED LED Off</p> <p><b>Alarm</b></p>
 <p>Low Level FailSafe Tank Full</p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED Off</p> <p>Relay 2 RED LED Off</p> <p><b>Normal</b></p>	 <p>Power GREEN LED On</p> <p>Relay 1 RED LED Off</p> <p>Relay 2 RED LED Off</p> <p><b>Normal</b></p>
 <p>Fault Condition Detected</p> <p>High Level FailSafe Tank Empty</p>	<p>Relay and LED Output Status Relay #2 = Fault and AutoVerify = enabled</p>  <p>Power GREEN LED On</p> <p>Relay 1 RED LED Flashes</p> <p>Relay 2 RED LED Flashes</p> <p>High Level Failsafe only</p>	

**Figure 2-5**  
Output and LED Status

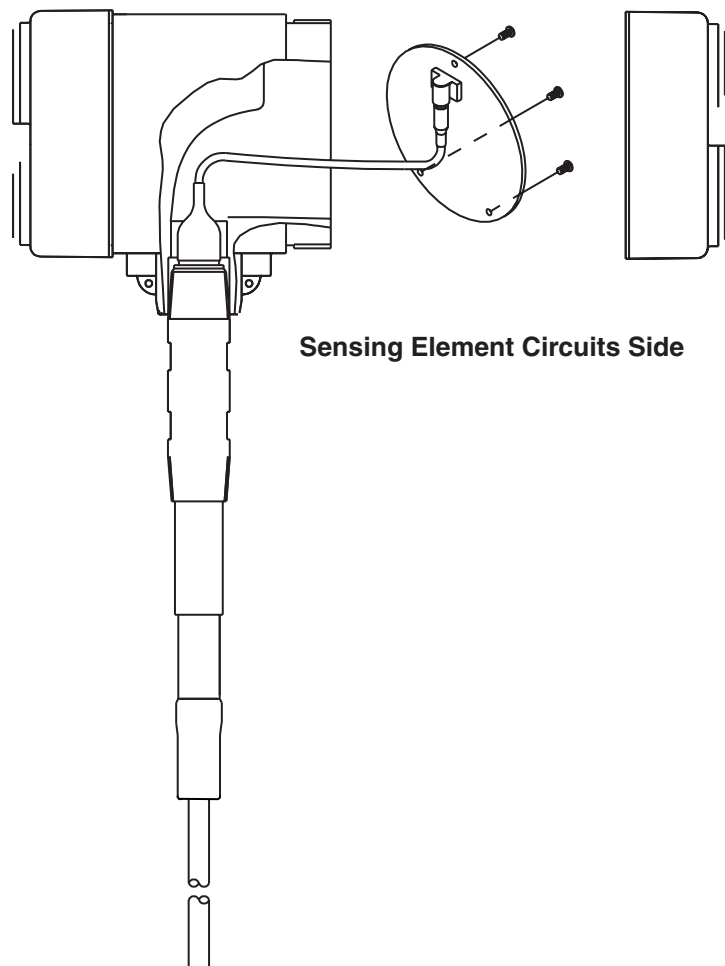
## 2.8 Sensing Element Connection

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



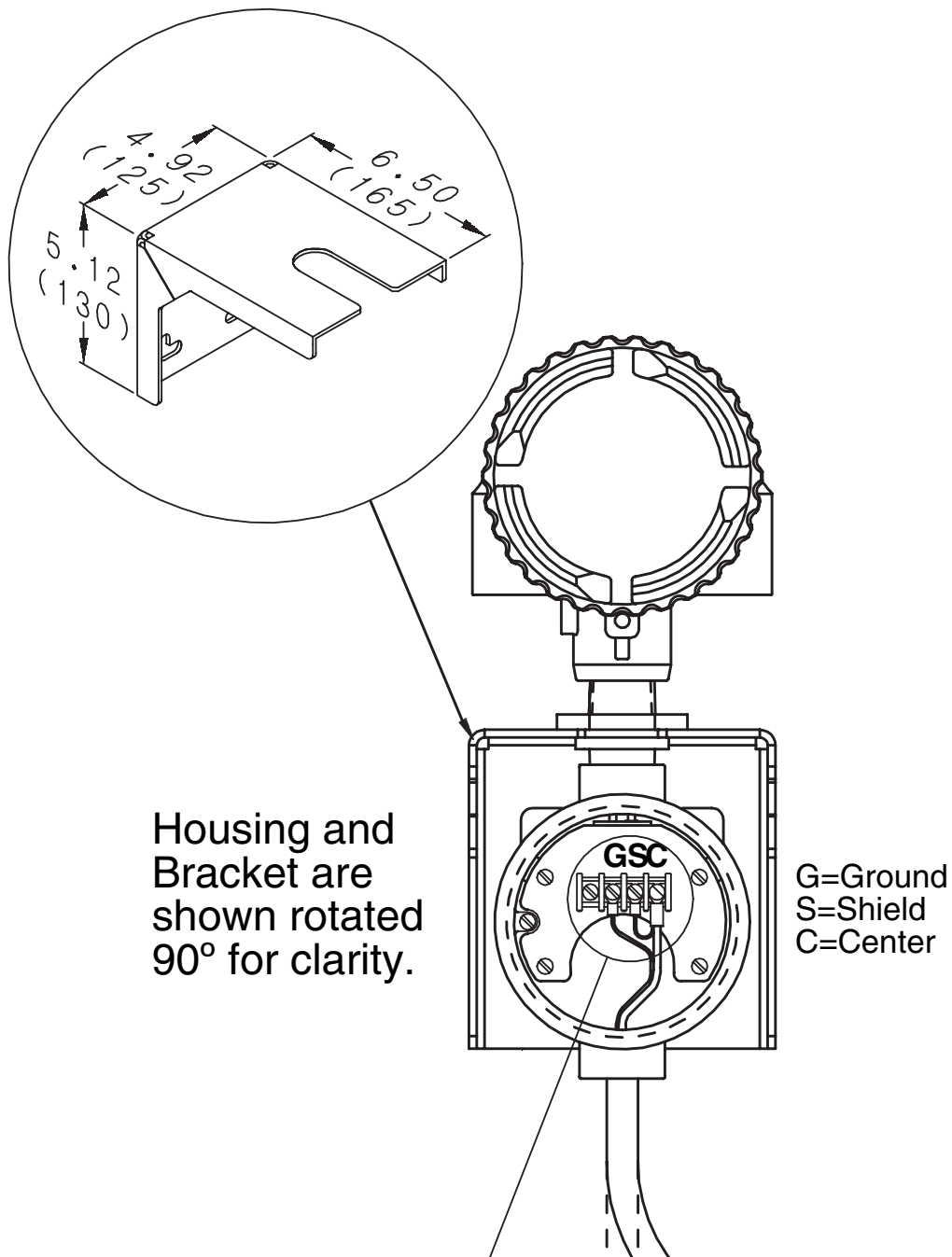
The sensing element is sealed to the housing and cannot be removed without permanent damage.

For IntelliPoint RF instruments that are mounted remotely from the sensing element, an additional housing with terminals is provided to connect the cable from the sensing element. This housing is factory wired to the Intellipoint circuit board. **See Figure 2-7.** Connect Green (Ground) wire to green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.



**Figure 2-6**  
Sensing Element Connection  
(Integral Housing)

## 2.8 Sensing Element Connection (continued)



**Figure 2-7**  
Sensing Element Connection  
(Remote Housing)

## Section 3: Calibration

### 3.1 Calibration

The Intellipoint™ model RLL (Standard Sensitivity) and RPL (High Sensitivity) feature Auto-Cal calibration. Auto-Calibration is suitable for liquid and slurry applications. For applications such as granular materials, interface measurement of two liquids, and plugged chute installations, a Manual Calibration IntelliPoint is recommended.



If you purchased an "Auto-Calibration" IntelliPoint and have determined you require a "Manual Calibration" IntelliPoint based on the Application Guide, please contact the AMETEK Drexelbrook Service Department.

#### 3.1.2 Using The IntelliPoint with Auto-Calibration

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



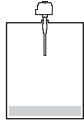
**Caution** – The material being measured must be below the sensing element when power is applied (Sensing element uncovered).

Calibration is complete.



For sensing elements with active lengths over 6 feet (2 meters) a manual calibration mode (#8 standard sensitivity) is recommended.

## 3.2 Re Calibration



### CAUTION:

The IntelliPoint RF instrument must be powered **AFTER** it is installed in application and with material **BELOW** sensing element.



***Do NOT push the Recal button without first ensuring that the material being measured is below the sensing element.***

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

After the Intellipoint is installed and with the with the measured product press and hold **RECAL** for 5 seconds (See Figure 2-8). The Green and Red LED's flash for 60 seconds before reset occurs. [Remove power from the system while the LED's are flashing and reset will occur immediately].

The system is now ready for installation.

## Nonvolatile Memory

The IntelliPoint has nonvolatile memory which allows the unit to re-start after power outages without recalibrating.

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

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

The IntelliPoint has nonvolatile memory which retains the recorded values even if power is lost for months. When the IntelliPoint regains power after a power outage, the microprocessor compares the stored values to the current measured value. It will then determine its current status based on this.



### 3.3 IntelliPoint Calibration Mode Change

The IntelliPoint was shipped in a calibration mode that was determined to meet the needs of the application for which it was originally sold. If the IntelliPoint is used on a different application, or it is determined that a different calibration mode should be used, use the following procedure to make a calibration mode change.

Each IntelliPoint (except for manual calibration units) has 4 different Calibration Modes that are available, dependant on the model purchased.

#### 3.3.1 Available IntelliPoint calibration modes:

##### **Standard Sensitivity systems (RL, RN, RT, RV model series prefix):**

**Mode 1:** Auto-Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint varies depending on material and coating deposit changes.

**Mode 2:** Fixed Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

**Mode 3:** Auto-Cal 10 pF.

This mode provides a 10 pF preload; alarm setpoint varies depending on material and coating deposit changes.

**Mode 4:** Fixed Cal 10 pF.

This mode provides a 10 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

##### **High Sensitivity systems (RH, RP model series prefix):**

**Mode 1:** Auto-Cal 0.5 pF.

This mode provides a 0.5 pF preload; alarm setpoint varies depending on material and coating deposit changes.

**Mode 2:** Fixed Cal 0.5 pF.

This mode provides a 0.5 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

**Mode 3:** Auto-Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint varies depending on material and coating deposit changes.

**Mode 4:** Fixed Cal 2 pF.

This mode provides a 2 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

### 3.3.1 Available IntelliPoint calibration modes (Continued)

#### Calibration Mode changes



Mode Selection change must be performed with the sensing element in air (Material below sensing element).

1. On the RF circuit board (Figure 3-1), temporarily remove the shunt jumper from the “Time Delay Selection Jumper” and place it on pins 1 & 2 of JP5. The green LED will go out, and the red LED’s will begin to flash. The number of flashes indicates which mode the unit is in: 1, 2, 3, or 4.
2. To switch modes, press and hold the ReCal button next to the JP5 3-pin connector. The unit will cycle through the modes.

First it will flash the current mode setting, then progress through all of the settings.

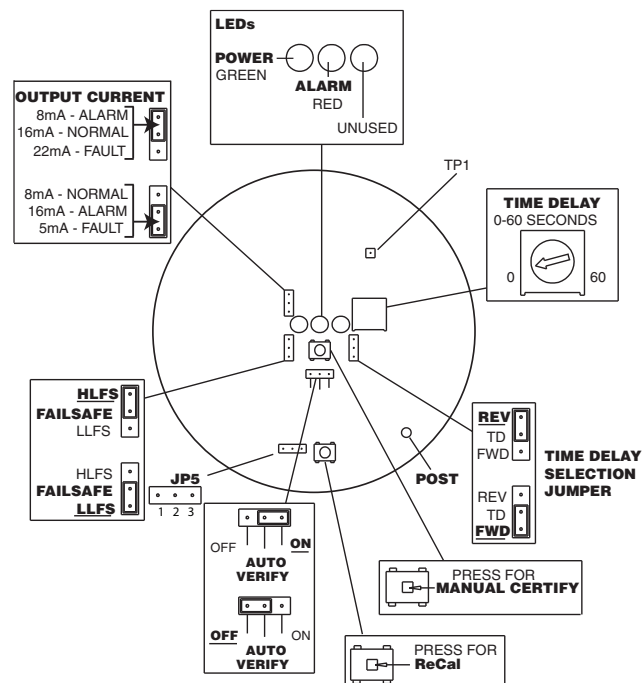
#### For Example:

The red LED will flash once 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 the current mode.

3. Remove the shunt from JP5 and replace it on the “Time Delay Selection Jumper” pins from which it was removed. The unit will remain in the new selected calibration mode. Put the lid back on the housing securely.

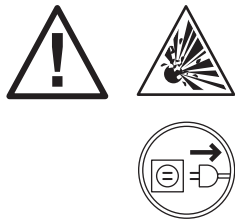
**Figure 3-1**  
Circuit Board



## Section 4: Troubleshooting

### 4.1 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, 4.5
	Fail Safe switch is set to the wrong setting	Check to make sure the fail safe switch is in the correct position	Section 2.6.3
	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 Section 2.2, 4.5
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 4.5, 4.6
	Flexible sensor is swaying and active is touching vessel or structure	Add 1 or 2 seconds of reverse acting time delay.	Section 2.6.1
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 Section 2.2, 4.5
	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 detect an insulating material	Change to high sensitivity or add active length to sensor	Consult Factory Section 4.9
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 3.2
	Granular material – Active section is not getting enough coverage due to angle of repose	Relocate sensor to get more coverage or lengthen active. Change to high sensitivity.	Appendix A
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 4.6, 4.7
Switch delays in responding to material	Reverse acting time delay may be active	Check time delay settings to make sure they are correct	Section 2.6.1
LED's are Flashing	Flashing LED's indicate one of three things. Over Range / Under Range / fault	Consult instruction manual to determine which of the three symptoms are experienced.	Section 4.3, 4.4, 2.7
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.	Additional capacitance must be added to the calibration range (padding)	Consult Factory Section 4.9
	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 3.2
	Improper wiring connection (Remote Switches)	Check remote cable connections to confirm they are correct.	Section 2.8
Under Range indicates that the electronic unit is not seeing enough capacitance.	Sensing Element is Disconnected	Verify sensing element cable connections. Test cable continuity.	Section 4.6, 4.7
	Center wire to Cote Shield short	Check cable and sensor	Section 4.5, 4.6, 4.7
	Unit is damaged	Consult factory	Section 4.9
Fault Indicates the Auto-Verify feature has detected a problem.	Sensing Element is Damaged	Check Sensing Element for Damage	Section 4.5
	Connecting Cable is Damaged	Check connection cable for damage, shorts, and proper termination	Section 4.6, 4.7
	Electronic Unit is damaged	Consult factory	Section 4.9
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 4.9



**WARNING:**

If the IntelliPoint 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.

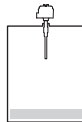
## 4.2 Testing Electronic Unit



This test is only a test of the electronic unit for troubleshooting purposes, and does not serve as a Verify or Certify test of the complete system.

Use the following steps to test the electronic unit:

1. Be sure the environment is safe before removing the lid from the housing.



2. If possible to access the sensing element with the material below the sensor, or remove the IntelliPoint from the vessel, use your finger to touch TP1 (*Shown in Figure 2-4*) while holding any bare metal portion of the instrument housing with the other hand. The system should go to its high level state.

3. Again with no material touching the sensing element, touch the tip of the sensing element with your finger, while holding any bare metal portion of the instrument housing with the other hand. The system should go to its high level state.

4. If the IntelliPoint changes to the alarm state while touching test point TP 1, but not when touching the tip of the sensor, in most cases, the interconnecting cable is faulty. **See Section 4.7: Testing Integral Cable, or Section 4.8 Testing Remote Cable.**



5. If the IntelliPoint is stuck in one state:

- A. Remove power.
- B. Disconnect coax cable that joins sensing element to electronic unit.



- C. Apply power.

- D. Repeat steps 3 and 4.

- E. If the IntelliPoint changes state with sensing element disconnected, in most cases, sensing element is faulty.

**See Section 4.6: Testing Sensing Element.**

6. If there was no action in any of steps 2, 3, or 4:

- A. Remove and then reapply power.

- B. Press **ReCal** Button (*Shown in Figure 2-4*).

- C. Observe that green LED flashes for about 60 seconds.

- D. Green LED should be lit after 60 seconds.

- E. Touch test point (*Shown in Figure 2-4*) with your finger.

- F. Alarm & Relay should change state. If so, circuit board is working properly.

- G. Reinstall instrument and press **ReCal** Button.

7. If the IntelliPoint fails all of above tests, in most cases instrument is faulty. Use a replacement Input/Output Module (**IOM**) or circuit board to determine fault. **Consult factory.**

### 4.3 Over Range

If the Red LED is flashing quickly (4 times/second), the IntelliPoint has detected that uncovered sensing element capacitance exceeds limits of transmitter. Consult factory for pad capacitor values and instructions.

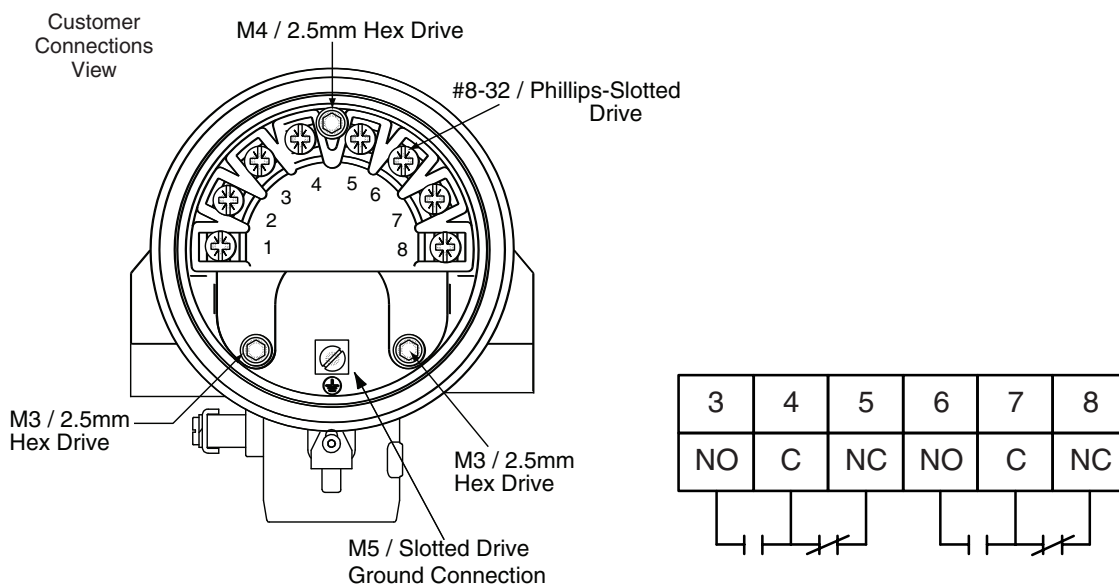
### 4.4 Under Range

If the Red LED is flashing slowly (once per second), the IntelliPoint has detected that pad capacitor value is too large or a center wire to Cote Shieldshort. Consult factory for pad capacitor values.

### 4.5 Testing the Relay Circuits

Use the following steps to check out the relay circuits:

- A. Relay circuits consist of a single-pole double-throw relay contacts brought out to terminal strips for external switching. See **Figure 4-1**.
- B. Relay operation may generally be heard as an audible click when background noise is not too high. Connect ohmmeter to relay contacts to determine if they are switching.
- C. Move the fail safe jumper to the opposite position. The red LED will change and relay contacts should also change. If the contacts do not change, the relay is not functioning properly.



**Figure 4-1**  
**Relay Circuit Operation**

## 4.6 Testing The Sensing Element

Integral electronics, *See figure 2-6*

Remove Sensing Element Circuit Board and disconnect cable from circuit board

Remote electronics, *See figure 2-7*

Disconnect remote cable at the sensing element.

1. With the sensing element in the vessel, verify level is below the sensing element
2. Use an analog ohmmeter<sup>1</sup> that is set to the R x 1K ohm scale, measure the resistances between each pair of sensing element connections. *See Figure 4-2 & 4-3*. Record values in Table 4.1
  - a. If the process material is conductive, it is normal to measure some resistance between sensing element connections. The lowest permissible resistance values are:

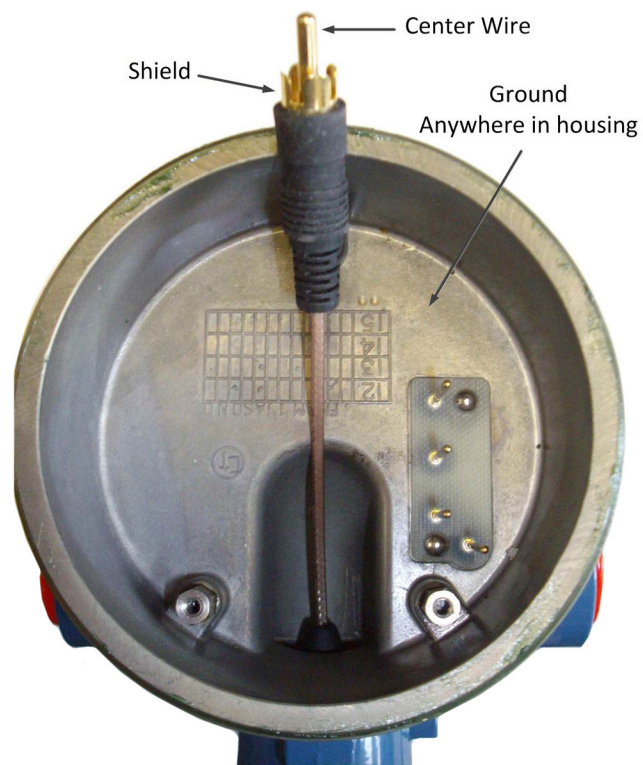
Center Wire to Ground	1000 ohms.
Center Wire to Shield	600 ohms.
Cote Shield to Ground	300 ohms.
  - b. If all measurements are open circuit the sensing element has passed the test. If lower resistance was measured continue with testing.
3. Clean sensing element and repeat resistance measurements with the sensing element external to the vessel.
  - a. A clean sensing element should measure an open circuit on all resistance tests.
  - b. If resistance values increase to an open circuit the resistance was installation or coating related. The most common causes are:
    - i. Cote Shield element does not extend sufficiently into the vessel. Verify the CoteShield element extends at least 2" into the vessel and past wall build-up.
    - ii. Extremely conductive coating on the sensing element. This may require changing the sensing element or electronics. Contact the factory for recommendations.
    - iii. Sensing element is touching vessel. A resistance reading of less than 10 ohms to ground (sensing element housing or tank) is usually due to a metal-to-metal short circuit. Verify that the sensing element is not touching any vessel structure.

## 4.6 Testing The Sensing Element (Continued)

- c. If the sensing element still shows resistance between terminals of less than 10K ohms, it is possible that moisture is present internal to the sensing element. It may be possible to dry the sensing element until the resistance increases to a value in excess of 10K ohms. However this is an indication the integrity of the sensing element has been compromised. Contact the factory for recommendations.

<sup>1</sup> A digital ohmmeter will often produce a resistance measurement that is higher than the actual value.

Relay and LED Output Status									
Tank Condition	Relay #2 = Alarm AutoVerify = disabled					Relay #2 = Fault AutoVerify = disabled			
	3	4	5	6	7	8	3	4	5
High Level FailSafe Tank Empty	NO	C	NC	NO	C	NC	NO	C	NC
	Power GREEN LED On	Relay 1 RED LED Off	Relay 2 RED LED Off				Power GREEN LED On	Relay 1 RED LED Off	Relay 2 RED LED Off
High Level FailSafe Tank Full	NO	C	NC	NO	C	NC	NO	C	NC
	Power GREEN LED On	Relay 1 RED LED On	Relay 2 RED LED On				Power GREEN LED On	Relay 1 RED LED On	Relay 2 RED LED Off
	3	4	5	6	7	8	3	4	5
	NO	C	NC	NO	C	NC	NO	C	NC



**Figure 4-2**  
**Checking the Sensing Element**



4.6 Testing The Sensing Element (Continued)

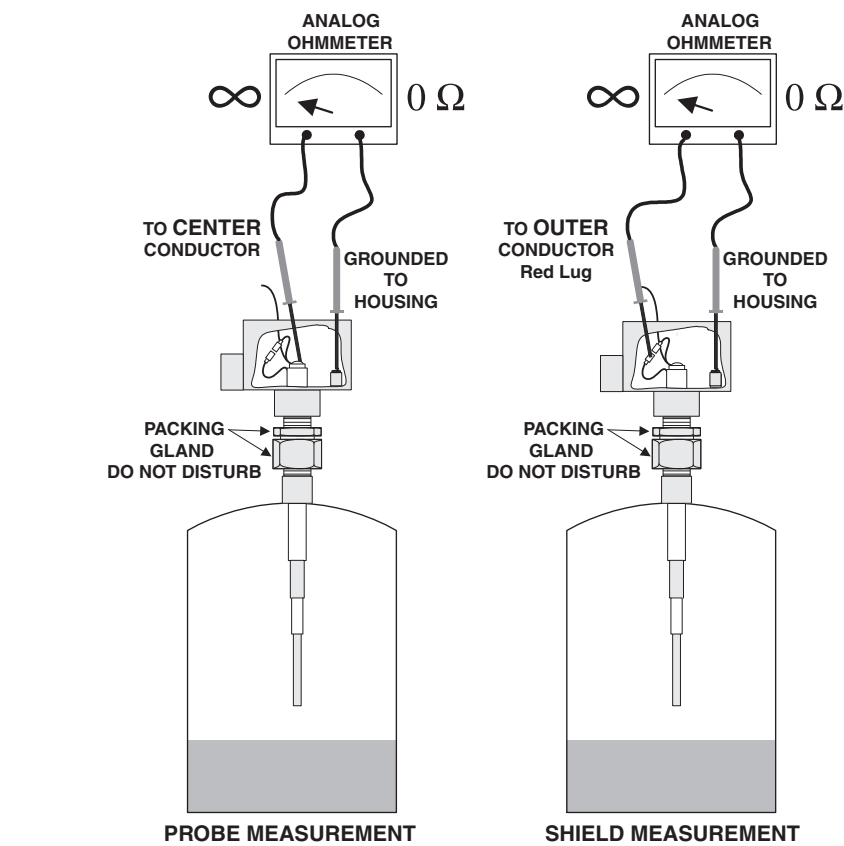


Figure 4-3  
Checking the Sensing Element  
Center = Probe  
Outer = Shield  
Housing = Ground

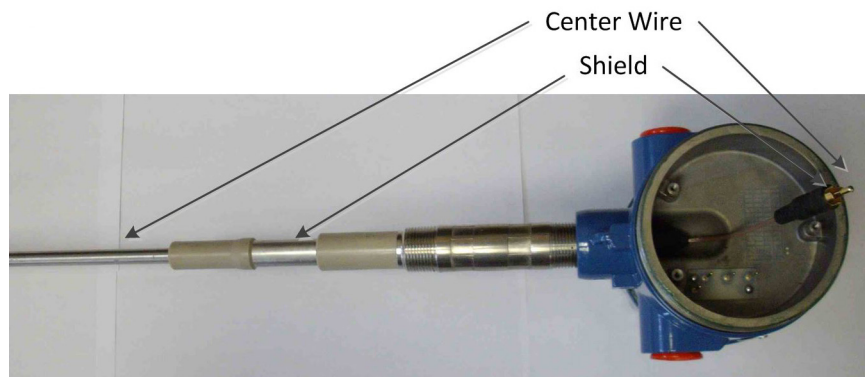
<b>Sensing Element in Vessel</b>		
Center Conductor to Housing	_____	Ohms
Center Conductor to Cote Shield	_____	Ohms
Cote Shield to Housing	_____	Ohms
<b>Sensing Element Cleaned</b>		
Center Conductor to Housing	_____	Ohms
Center Conductor to Cote Shield	_____	Ohms
Cote Shield to Housing	_____	Ohms

Table 4-1



## 4.7 Testing the Integral Cable

1. Disconnect integral cable from electronic.
2. Check for continuity.
  - a. Using an ohmmeter measure the resistances.
    - i. From the center wire connection on the RCA plug to the sensing element active section (center wire)
    - ii. From the shield connection on the RCA plug to the sensing element shield.
    - iii. If resistance is greater than  $5\Omega$  the cable has failed.
3. Check for shorts.
  - a. The integral cable is tested as part of sensing element test, **section 4.6**.

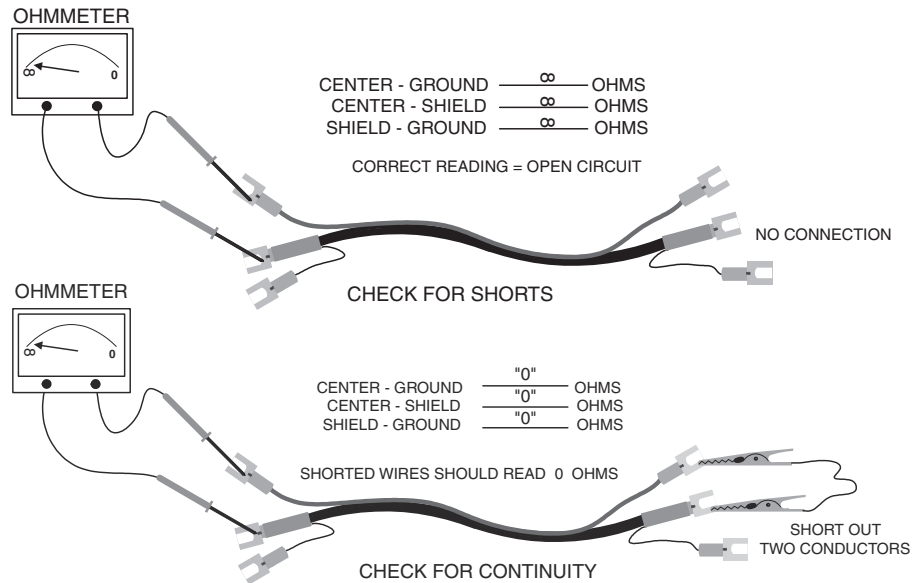


**Figure 4-4**  
Testing Integral Cable

## 4.8 Testing the Remote Cable

1. Disconnect remote cable from electronic unit and sensing element.
2. Using an ohmmeter measure the resistances as **shown in Figure 4.5**
  - a. Check for shorts.
    - i. Connect ohmmeter to cable center wire and ground wire. Measure resistance as shown.
    - ii. Move ohmmeter leads and repeat for all measurements shown.
    - iii. If resistance is less than 100 k-ohms cable has failed
  - b. Check for continuity.
    - i. Short center wire to ground wire and measure resistance as shown. Should be close to 0 ohms
    - ii. Short center wire to shield and repeat.
    - iii. If resistance is greater than 10 ohms cable has failed

## 4.8 Testing the Remote Cable (Continued)

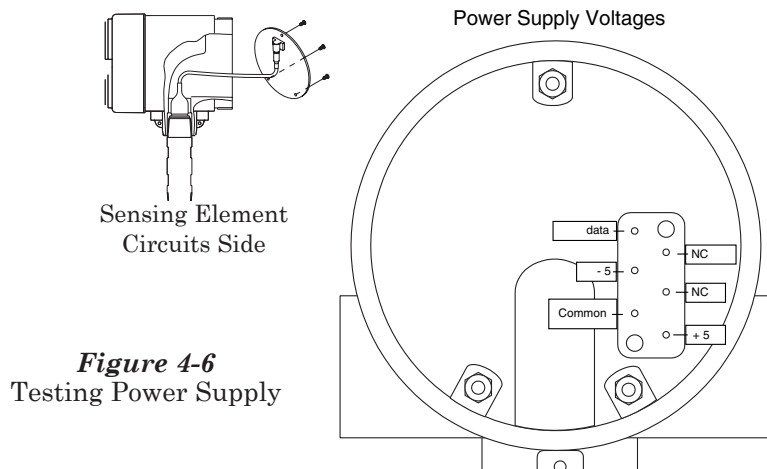


**Figure 4-5**  
Testing Remote Cable

## 4.9 Testing the Power Supply

Power supply can be tested separately as follows:

1. Remove power from electronic unit.
2. Remove three screws holding circuit board into housing.
3. Disconnect sensing element connection. **See to Section 2.8 Sensing Element Connection.**
4. Reapply power.
5. Using a DC voltmeter, measure voltage from -5 to Common and +5 to Common. Correct readings are -5 to -6 and +5 to +6 Vdc. **See Figure 4-6**



**Figure 4-6**  
Testing Power Supply

## 4.10 Factory Assistance

AMETEK Drexelbrook can answer any questions about your level measurement system. Call Customer Service at + 215-674-1234.

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

- **Contact** your local Drexelbrook representative,
- **Call** the Service department at + 215-674-1234
- **FAX** the Service department at + 215-443-5117, or
- **E-Mail** to [drexelbrook.service@ametek.com](mailto: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 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 4.11 Field Service

Trained field Engineers 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.

## 4.12 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 about these valuable workshops, write to AMETEK Drexelbrook, attention: Customer Service, or call direct + 215-674-1234.

## 4.13 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 + 215-674-1234

**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.

## Section 5

## Section 5: Specifications

### 5.1 Specifications

<b>Technology:</b>	RF/ Capacitance
<b>Calibration:</b>	None
<b>Modes of Operation:</b>	High and Low Level
<b>Repeatability:</b>	2mm (0.08 inch) Conductive Liquids
<b>Response Time:</b>	Less than 1 Second
<b>Time Delay:</b>	0 to 60 Seconds Forward & Reverse Acting
<b>Ambient Electronics:</b>	-30 to 70°C (-22 to 158°F) ATEX -30 to 58°C (-22 to 136°F) IECEX -40 to 70°C (-40 to 158°F) FM
<b>Storage Temperature:</b>	-40 to 85°C (-40 to 185°F)
<b>Indicators:</b>	LEDs: Green=Power, Red= Relay 1, Red= Relay 2
<b>Self-Check:</b>	Continuous AutoVerify and Manual Certify
<b>Power Supply:</b>	Universal Supply 85 to 250 VAC 21 to 100 VDC Auto-Detecting w/o Jumper Changes DC to 400 Hz
<b>Power Consumption:</b>	2 Watts Maximum
<b>Relay Contacts:</b>	(2) SPDT
Maximum Contact Load:	5A/30 VDC/ 5A/250 VAC - Environmentally Sealed
Minimum Contact Load (DC):	100 mA/12 VDC 0 to 200 mA / 12 VDC Optional
<b>Housing (Electronics):</b>	Dual Compartment, Powder-Coated Aluminum with Two Cable Entries
<b>Cable Entry:</b>	M20 x 1.5 ATEX/IECEX/ ¾-Inch NPT FM/FMc
<b>Ingress Protection:</b>	IP66 NEMA 4X

## Section 5: Specifications (Continued)

### 5.2 Approvals Available:



Explosionproof for Class I, Division 1, Groups A, B, C and D; Dust-Ignition proof for Class II, III, Division 1, Groups E, F and G; Non-incendive for Class I, Division 2, Groups A, B, C & D; Suitable for Class II, III, Division 2, Groups F & G hazardous outdoor Type 4, 4X, IP66 (classified) locations with Intrinsically Safe connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F and G hazardous (classified) locations in accordance with Control Drawing 420-0004-144-CD.



#### Integral or Remote Sensor

II 2 (1) G Ex d [ia] IIC T5... T2 -30°C < TAMB < +70°C; IP66  
II 2 (1) D Ex tb [ia] IIIC T90°C -30°C < TAMB < +70°C; IP66

#### Temperature Class Process Temps (Integral Sensor)

T5	100°C
T4	135°C
T3	200°C
T2	230°C

#### IECEX (FTZU 18.0007X)

**System** Ex db ia [ia Ga] IIC T5 Gb/Ga  
Ex tb ia [ia Da] IIIC T90°C Db/Da  
-30°C ≤ Ta ≤ 58°C

**Sensor** Ex ia IIC T5 Ga  
Ex ia IIIC T90°C Da  
-30°C ≤ Ta ≤ 58°C



Reference control drawing 420-0004-563-CD for entity and installation requirements

#### Special Condition for Safe Use

1. THE EQUIPMENT SHALL NOT BE APPLIED IN AN EXPLOSIVE DUST ATMOSPHERE WHERE HIGH ELECTROSTATIC CHARGING PROCESSES ARE PRESENT THAT COULD RESULT IN PROPAGATING BRUSH DISCHARGES.

2. CONSULT THE MANUFACTURER IF DIMENSIONAL INFORMATION ON THE FLAMEPROOF JOINTS IS NECESSARY.

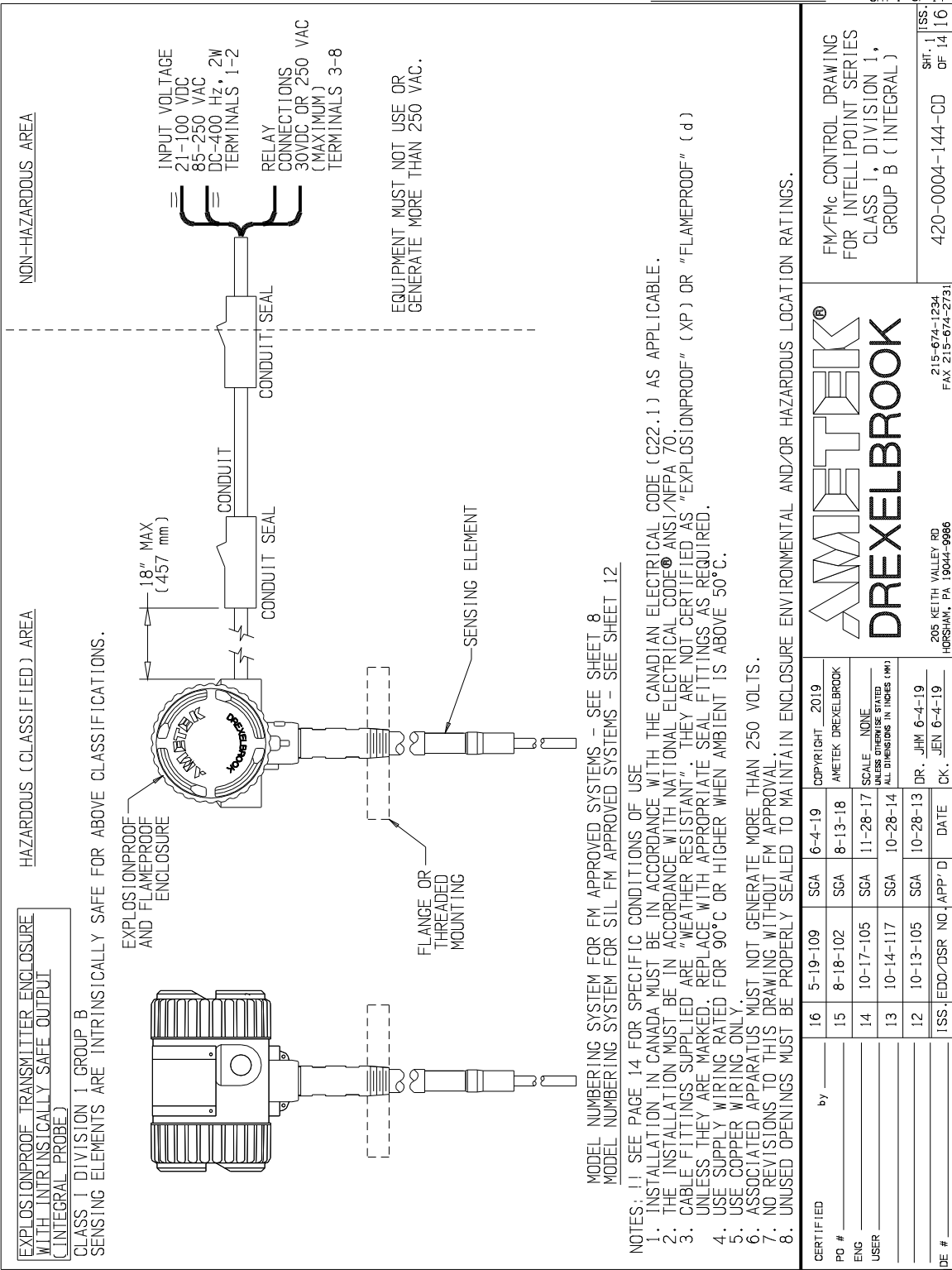
3. AMBIENT TEMPERATURE RANGE:

-30°C TO +58°C FOR RXLX/SXRXTX INTELLIPOINT RF LEVEL SYSTEM

-30°C TO +70°C FOR RXTX/SXRXTX INTELLIPOINT RF TWO-WIRE POINT LEVEL SYSTEM

Section 6 : Control Drawings / Certificates

6.1 FM / FMc Control Drawings



No. 420-0004-144-CD SHT 1 OF 14



6.1 FM / FMc Control Drawings (Continued)

EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (INTEGRAL PROBE)

HAZARDOUS (CLASSIFIED) AREA

EXPLOSIONPROOF AND FLAMEPROOF ENCLOSURE

EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (INTEGRAL PROBE)

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

CONDUIT

CONDUIT SEAL

FLANGE OR THREADED MOUNTING

SENSING ELEMENT

INPUT VOLTAGE  
21-100 VDC  
85-250 VAC  
DC-400 Hz, 2W  
TERMINALS 1-2

RELAY CONNECTIONS  
30VDC OR 250 VAC (MAXIMUM)  
TERMINALS 3-8

EQUIPMENT MUST NOT USE OR GENERATE MORE THAN 250 VAC.

MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 8

MODEL NUMBERING SYSTEM FOR SIL FM APPROVED SYSTEMS - SEE SHEET 12

NOTES: 1. SEE PAGE 14 FOR SPECIFIC CONDITIONS OF USE

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.

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. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.

7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.

8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED by

PO #

ENG

USER

DATE

ISS. EDO/DSR NO.

APP'D

DATE

CK.

16 5-19-109 SGA 6-4-19 COPYRIGHT 2019

15 8-18-102 SGA 8-13-18 AMETEK DREXELBROOK

14 10-17-105 SGA 11-28-17 SCALE NONE

13 10-14-117 SGA 10-28-14 ALL DIMENSIONS IN INCHES (MM)

12 10-13-105 SGA 10-28-13 DR. JHM 6-4-19

ISS. EDO/DSR NO. APP'D DATE CK.

AMETEK®

DREXELBROOK

205 KEITH VALLEY RD

HORSHAM, PA 19044-9966

215-674-1234

FAX 215-674-2731

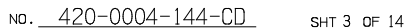
FM/FMc CONTROL DRAWING FOR INTELLIPOINT SERIES CLASS 1, II, III, DIVISION 1, GROUPS C-G (INTEGRAL)

420-0004-144-CD

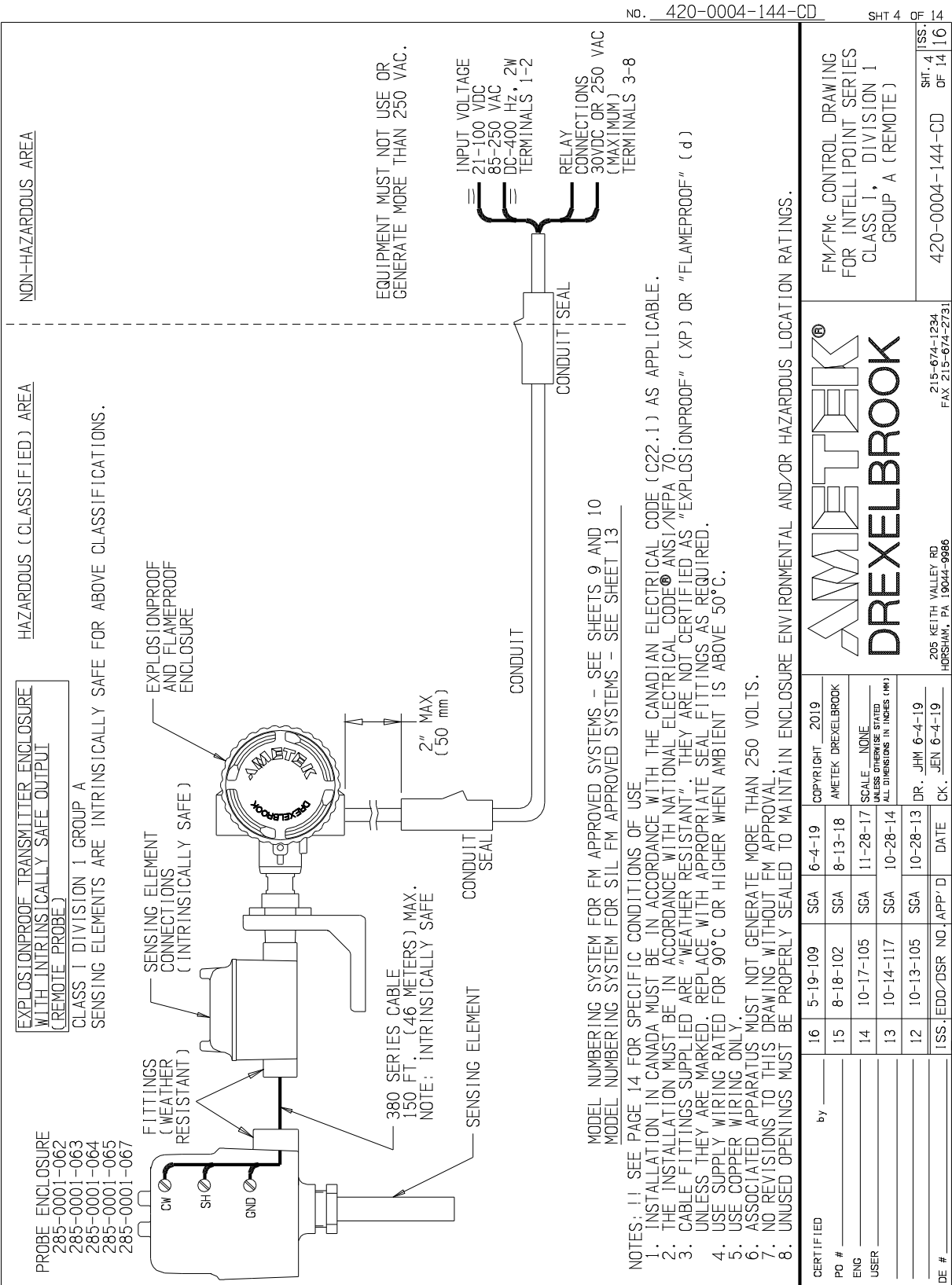
SHT. 2 OF 14

ISS. OF 14

35



6.1 FM / FMc Control Drawings (Continued)



6.1 FM / FMc Control Drawings (Continued)

EXPLOSIONPROOF TRANSMITTER ENCLOSURE  
WITH INTRINSICALLY SAFE OUTPUT  
(REMOTE PROBE)  
CLASS 1 DIVISION 1 GROUP B  
SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

PROBE ENCLOSURE  
285-0001-062  
285-0001-063  
285-0001-064  
285-0001-065  
285-0001-067

FITTINGS  
(WEATHER  
RESISTANT)

CW

SH

GND

SENSING ELEMENT  
CONNECTIONS  
(INTRINSICALLY SAFE)

EXPLOSIONPROOF  
AND FLAMEPROOF  
ENCLOSURE

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

SENSING ELEMENT

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

18" MAX  
(457 mm)

CONDUIT SEAL

CONDUIT

CONDUIT SEAL

CONDUIT

INPUT VOLTAGE  
21-100 VDC  
85-250 VAC  
DC-400 Hz, 2W  
TERMINALS 1-2

RELAY  
CONNECTIONS  
30VDC OR 250 VAC  
(MAXIMUM)  
TERMINALS 3-8

EQUIPMENT MUST NOT USE OR  
GENERATE MORE THAN 250 VAC.

MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEETS 9 AND 10  
MODEL NUMBERING SYSTEM FOR SIL FM APPROVED SYSTEMS - SEE SHEET 13

NOTES: 1. SEE PAGE 14 FOR SPECIFIC CONDITIONS OF USE  
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.  
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE®/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. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.  
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.  
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED

PO #

ENG

USER

DE #

by

16

15

14

13

12

5-19-109

8-18-102

10-17-105

10-14-117

10-13-105

SGA

SGA

SGA

SGA

SGA

6-4-19

8-13-18

11-28-17

10-28-14

10-28-13

COPYRIGHT 2019

AMETEK DREXELBROOK

SCALE NONE

ALL DIMENSIONS IN INCHES (MM)

DR. JHM 6-4-19

CK. JEN 6-4-19

DATE

FM/FMc CONTROL DRAWING  
FOR INTELLIPOINT SERIES  
CLASS 1, DIVISION 1  
GROUP B (REMOTE)

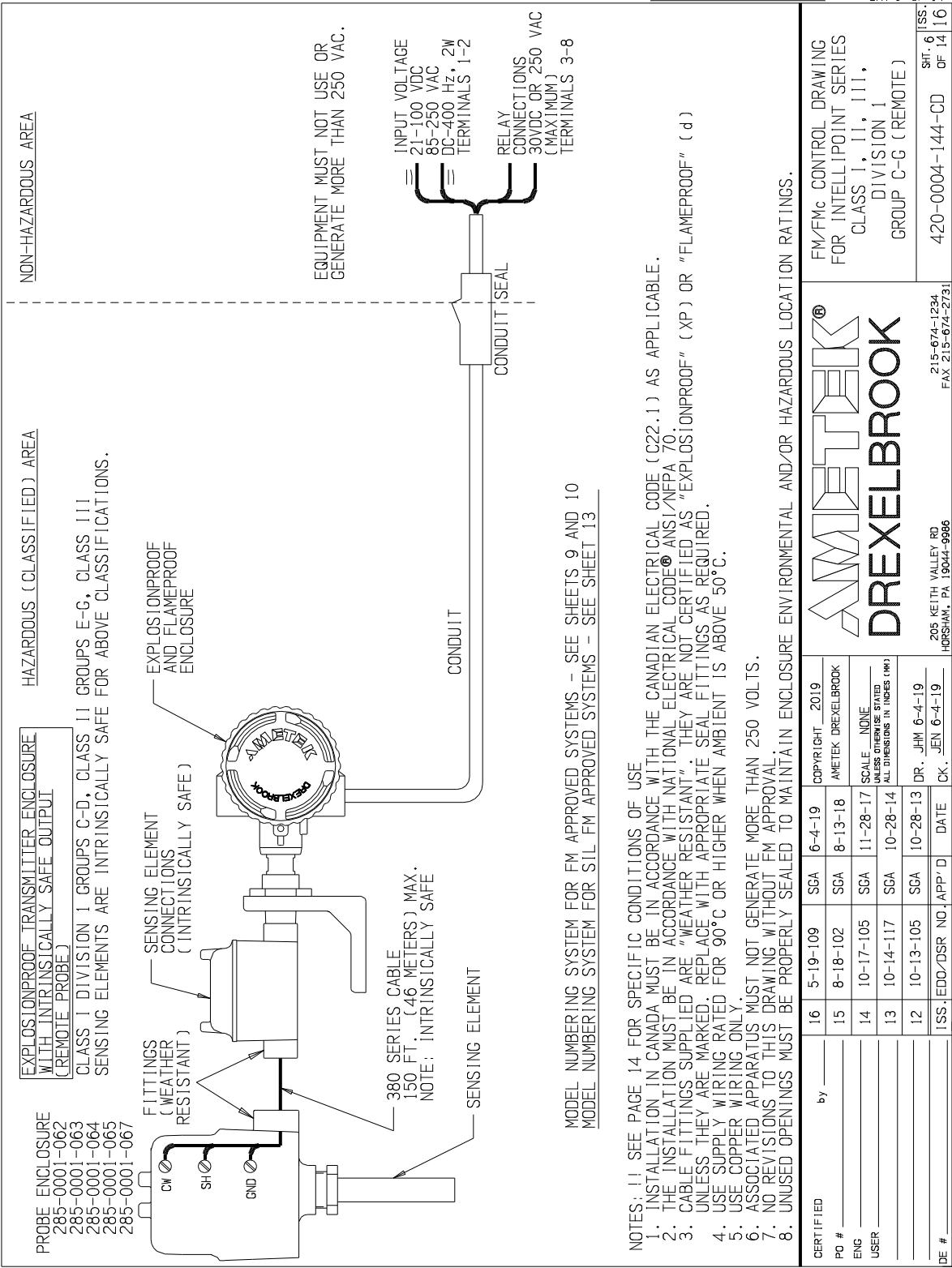
215-674-1234  
FAX 215-674-2731  
205 KEITH VALLEY RD  
HORSHAM, PA 19044-9986

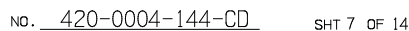
420-0004-144-CD

ISS. 5  
OF 14

38

6.1 FM / FMc Control Drawings (Continued)





## 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
R	a	L	b	-	0	c	d	e	-	*	*	*	*
	a												a = MEASUREMENT OPTIONS:
													N = 2 pF AUTO-CAL
													M = MANUAL-CAL (STANDARD SENSITIVITY)
													H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
													G = MANUAL-CAL (HIGH SENSITIVITY)
													L = 2 pF FIXED
													T = 10 pF AUTO-CAL
													V = 10 pF FIXED
													P = 0.5 pF FIXED (HIGH SENSITIVITY)
			b										b = OPTIONS
													3 = FM/FMc APPROVAL, 3/4 NPT HOUSING
													7 = FM/FMc APPROVAL, DUAL SEAL
													B = FM/FMc APPROVAL, DUAL SEAL
						c							c = RELAYS
													1 = STANDARD RELAY
													2 = GOLD CONTACTS
							d	e					d, e = SENSING ELEMENTS: 00, 02-04, 06, 07, 09, 11-19,
													21, 22, 24, 25, 28, 72, 73, 86, 87, 90-93, NN, or ZZ.
							0	0					700-1202-021
								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					700-0201-019
								4					700-0202-002
								5					700-0202-043
								6					700-0002-360
								7					700-0202-029
								8					700-0001-022
								9					700-0002-023
							2	1					700-0202-043 (HAST-C)
								2					700-0202-044
								4					700-0005-485
								5					700-0005-485 (HAST-C)
								8					700-1202-052
							6	7				(16)	700-3201-002
							7	2					700-0201-027
								3					700-0201-028
							8	6					700-0005-594
								7					700-0005-595
							9	0					700-0201-059
								1					700-1202-016
								2					700-1202-046
								3					700-1202-056
						N	N						RETROFIT KIT 285-0001-671
						Z	Z						SEE SHEET 11 FOR LIST OF OTHER APPROVED SENSING ELEMENTS
FM/FMc APPROVED INTEGRAL, LINE POWERED, INTELLIPOINT MODEL NUMBERING SYSTEM SHT 8 OF 14 420-0004-144-CD ISS. 16													

**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
R	a	L	b	-	c	d	e	f	-	*	*	*	*
	a												
													a = MEASUREMENT OPTIONS:
													N = 2 pF AUTO-CAL
													M = MANUAL-CAL (STANDARD SENSITIVITY)
													H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
													G = MANUAL-CAL (HIGH SENSITIVITY)
													L = 2 pF FIXED
													T = 10 pF AUTO-CAL
													V = 10 pF FIXED
													P = 0.5 pF FIXED (HIGH SENSITIVITY)
			b										b = OPTIONS
													3 = FM/FMc APPROVAL, 3/4 NPT HOUSING
													7 = FM/FMc APPROVAL, DUAL SEAL
													B = FM/FMc APPROVAL, DUAL SEAL
					c								c = 1-9, A-K CABLE LENGTHS
						d							d = RELAYS
													1 = STANDARD RELAY
													2 = GOLD CONTACTS
							e	f					e, f = SENSING ELEMENTS: 00, 02-04, 06, 07, 09-22, 24-28, 31-40,
								f					50-53, 55, 60-62, 64, 66, 72, 73, 80-83, 85, 90-94, NN, or ZZ.
							0	0					700-1202-001
								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					700-0201-019
								4					700-0202-002
								5					700-0202-043
								6					700-0002-360
								7					700-0202-029
								8					700-0001-022
								9					700-0002-023
							2	0					700-0209-002
								1					700-0202-043 (HAST-C)
								2					700-0202-044
								4					700-0005-285
								5					700-0005-285 (HAST-C)
SENSING ELEMENT LIST CONTINUED ON NEXT PAGE								FM/FMc APPROVED REMOTE, LINE POWERED, INTELLIPOINT MODEL NUMBERING SYSTEM SHT 9 OF 14 420-0004-144-CD ISS. 15					



## 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
R	a	L	b	-	c	d	e	f	-	*	*	*	*
							2	6					700-0220-001
								7					700-0221-002
								8					700-1202-051
							3	1					700-0029-001
								2					700-0029-002
								3					700-0029-003
								4					700-0029-004
								5					700-0029-005
								6					700-0029-102
								7					700-0029-103
								8					700-0029-104
								9					700-0029-105
							4	0					700-0029-106
							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
								4					700-0204-024
								6					700-0204-022
								7					700-3201-001 
							7	2					700-0201-027
								3					700-0201-028
							8	0					700-4200-020
								1					700-4200-030
								2					700-4200-040
								3					700-4200-060
								5					700-9000-494
							9	0					700-0201-059
								1					700-1202-015
								2					700-1202-045
								3					700-1202-055
								4					700-0209-024
							N	N					RXXX-1XNN-NN-CD
							Z	Z					SEE SHEET 11 FOR LIST OF OTHER APPROVED SENSING ELEMENTS

FM/FMc APPROVED  
REMOTE, LINE POWERED, INTELLIPOINT  
MODEL NUMBERING SYSTEM  
SHT 10 OF 14  
420-0004-144-CD ISS. 16

## 6.1 FM / FMc Control Drawings (Continued)

### MODEL NUMBERS OF APPROVED SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

m = FAMILY NUMBER: 0 THROUGH 9, BLANK

n = FAMILY NUMBER: 0 THROUGH 9, BLANK

o = 0 THROUGH 9, BLANK

p = 0 THROUGH 9

q = FAMILY NUMBER: 0 THROUGH 9, BLANK

r = FAMILY NUMBER: 0 THROUGH 9, BLANK

s = FAMILY NUMBER: 0 THROUGH 9

t = 24 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

#### NOTES:

1. MAXIMUM PROCESS TEMPERATURE 290°C.
2. MAXIMUM SENSOR CAPACITANCE < 1μF.
3. MAXIMUM INSERTION LENGTH **RIGID SENSOR** 30 FEET (9.14 METERS).
4. MAXIMUM INSERTION LENGTH **FLEXIBLE SENSOR** 2000 FEET (609.6 METERS).
5. SENSING ELEMENT ENCLOSURE IP66 ( IP RATING DOES NOT APPLY TO SPECIAL SENSORS SUPPLIED WITHOUT A 285- SERIES SENSING ELEMENT ENCLOSURE ).

!! SEE PAGE 14 FOR SPECIFIC CONDITIONS OF USE

FM APPROVED  
ADDITIONAL  
SENSING ELEMENTS

SHT 11 OF 14  
420-0004-144-CD ISS.16

## 6.1 FM / FMc Control Drawings (Continued)

										COLUMNS 11 AND UP, DO NOT AFFECT SAFETY				
1	2	3	4	5	6	7	8	9	10	-	11	12	13	14
S	a	R	b	L	c	-	0	d	e	f	-	*	*	*
	a													a = 2 SIL LEVEL 2
			b											b = MEASUREMENT OPTIONS:
														N = 2 pF AUTO-CAL
														H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
														L = 2 pF FIXED
														T = 10 pF AUTO-CAL
														V = 10 pF FIXED
														P = 0.5 pF FIXED (HIGH SENSITIVITY)
					c									c = OPTIONS
														3 = FM/FMc APPROVAL, 3/4 NPT HOUSING
														7 = FM/FMc APPROVAL, DUAL SEAL
														B = FM/FMc APPROVAL, DUAL SEAL
							d							d = RELAYS
														1 = STANDARD RELAY
														2 = GOLD CONTACTS
								e	f					e, f = SENSING ELEMENTS: 00, 02, 04, 06, 07, 09, 11-19,
								0	0					21, 24, 25, 28, 72, 73, 86, 87, 90-93.
									2					700-1202-021
									4					700-1202-024
									6					700-1202-042
									7					700-1202-032
									9					700-1202-020
									1	1				700-1202-034
									2					700-0201-005
									3					700-0201-005 (HAST C)
									4					700-0201-019
									5					700-0202-002
									6					700-0202-043
									7					700-0002-360
									8					700-0202-029
									9					700-0001-022
									2	1				700-0002-023
									4					700-0202-043 (HAST-C)
									5					700-0005-485
									8					700-0005-485 (HAST-C)
									6	7				700-1202-052
									7	2				700-3201-002 (16)
									3					700-0201-027
									8	6				700-0201-028
									7					700-0005-594
									9	0				700-0005-595
									1					700-0201-059
									2					700-1202-016
									3					700-1202-046
														700-1202-056

SIL, FM/FMc APPROVED  
INTEGRAL, LINE POWERED, INTELLIPOINT  
MODEL NUMBERING SYSTEM  
SHT 12 OF 14  
420-0004-144-CD ISS. 16

**Reference SIL Manual (SXRNL) For Ordering Detail**

**6.1 FM / FMc Control Drawings (Continued)**

										COLUMNS 11 AND UP, DO NOT AFFECT SAFETY				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
S	a	R	b	L	c	-	d	e	f	g	-	*	*	*
	a													a = 2 SIL LEVEL 2
			b											b = MEASUREMENT OPTIONS:
														N = 2 pF AUTO-CAL
														H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
														L = 2 pF FIXED
														T = 10 pF AUTO-CAL
														V = 10 pF FIXED
														P = 0.5 pF FIXED (HIGH SENSITIVITY)
					c									c = OPTIONS
														3 = FM/FMc APPROVAL, 3/4 NPT HOUSING
														7 = FM/FMc APPROVAL, DUAL SEAL
														B = FM/FMc APPROVAL, DUAL SEAL
						d								d = 1-9, A-K CABLE LENGTHS
							e							e = RELAYS
														1 = STANDARD RELAY
														2 = GOLD CONTACTS
								f	g					f, g = SENSING ELEMENTS: 00, 02, 04, 06, 07, 09, 11-21, 24-28,
														60-62, 64, 66, 72, 73, 85, 90-94.
								0	0					700-1202-001
									2					700-1202-014
									4					700-1202-041
									6					700-1202-031
									7					700-1202-010
									9					700-1202-033
								1	1					700-0201-005
									2					700-0201-005 (HAST C)
									3					700-0201-019
									4					700-0202-002
									5					700-0202-043
									6					700-0002-360
									7					700-0202-029
									8					700-0001-022
									9					700-0002-023
								2	0					700-0209-002
									1					700-0202-043 (HAST-C)
									4					700-0005-285
									5					700-0005-285 (HAST-C)
									6					700-0220-001
									7					700-0221-002
									8					700-1202-051
								6	0					700-0204-038
									1					700-0204-002
									2					700-0204-048
									4					700-0204-024
									6					700-0204-022
									7					700-3201-001 <sup>(16)</sup>
								7	2					700-0201-027
									3					700-0201-028
								8	5					700-9000-494
									9	0				700-0201-059
									1					700-1202-015
									2					700-1202-045
									3					700-1202-055
									4					700-0209-024

**Reference SIL Manual (SXRNL) For Ordering Detail**

SIL, FM/FMc APPROVED  
 REMOTE, LINE POWERED, INTELLIPOINT  
 MODEL NUMBERING SYSTEM  
 SHT 13 OF 14  
 420-0004-144-CD ISS. 16

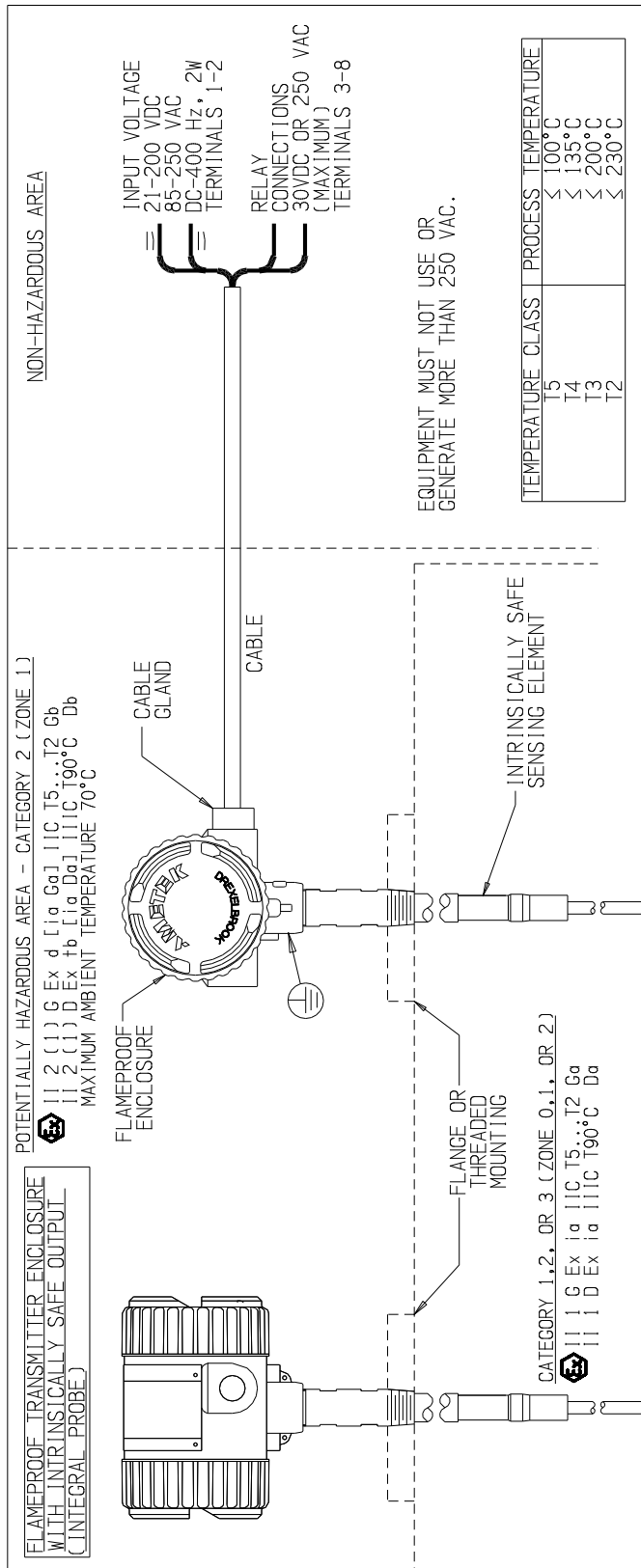
## 6.1 FM / FMc Control Drawings (Continued)

### SPECIFIC CONDITIONS OF USE

1. *"The equipment shall not be applied in an explosive dust atmosphere where high electrostatic charging processes are present that could result in propagating brush discharges. See IEC TS60079-32-1 for additional guidance."*
2. *Consult the manufacturer if dimensional information on the flameproof joints is necessary.*

SPECIFIC CONDITIONS OF USE  
SHT 14 OF 14  
420-0004-144-CD ISS. 16

## 6.2 ATEX Control Drawings



SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

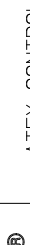
MODEL NUMBERING SYSTEM FOR ATEX APPROVED SYSTEMS - SEE SHEET 3.

MODEL NUMBERING SYSTEM FOR ATEX APPROVED SYSTEMS - SEE SHEET 7.

NOTES: !! SEE PAGE 9 FOR SPECIFIC CONDITIONS OF USE

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. ASSOCIATED APPARATUS MUST NOT USE OR GENERATE MORE THAN 250 VOLTS.
6. NO REVISIONS TO THIS DOCUMENT WITHOUT FM APPROVAL.
7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCALIZATION.

CERTIFIED	by	9	8-18-102	SCA	8-13-18	COPYRIGHT 2018
PO #		8	10-17-105	SCA	11-28-17	AMETEK DREXELBROOK
ENG		7	1-14-129	THP	11-4-14	SCALE NONE
USER		6	1-06-216	THP	2-22-07	ALL DIMENSIONS IN INCHES (MM)
		5	1-06-216	NOT RELEASED		DR. JHM 8-13-18
ISS. #		ISS. EDO/DSR NO.	APP' D	DATE		CK.



# DREXELBROOK

ATEX CONTROL DRAWING  
FOR LINE POWERED  
INTELLIPOINT SERIES  
ZONE [0] 1 OR 2 (INTEGRAL)

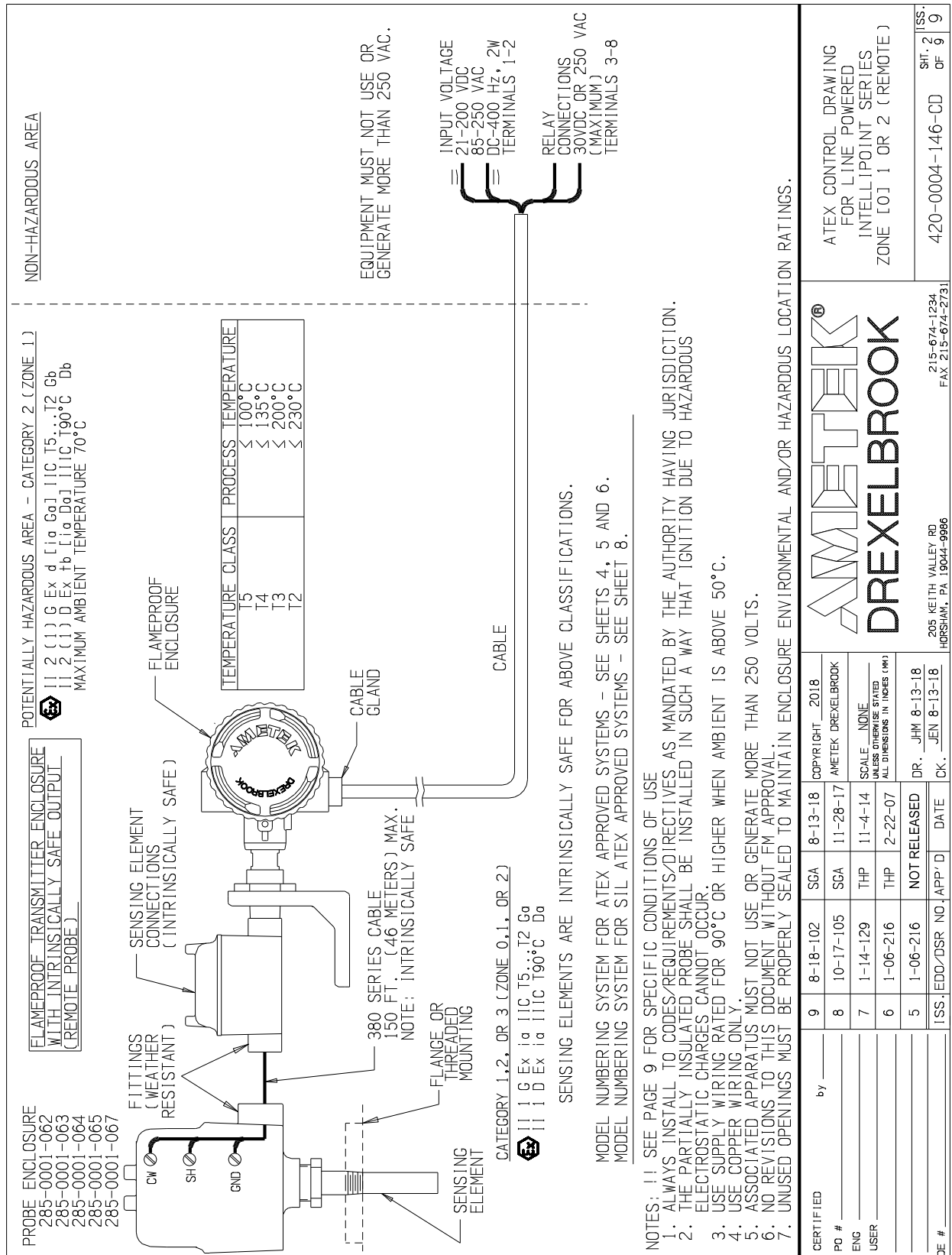
205 KEITH VALLEY RD  
HOBBSHAW, PA 19044-9986

215-674-1234  
FAX 215-674-2731

420-0004-146-CD

SHT. 1 OF 9

## 6.2 ATEX Drawings (Continued)



## 6.2 ATEX Drawings (Continued)

								COLUMNS 9 AND UP, DO NOT AFFECT SAFETY						
1	2	3	4	-	5	6	7	8	-	9	10	11	12	
R	a	L	2	-	0	b	c	d	-	*	*	*	*	
	a													a = MEASUREMENT OPTIONS:
														N = 2 pF AUTO-CAL
														M = MANUAL-CAL (STANDARD SENSITIVITY)
														H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
														G = MANUAL-CAL (HIGH SENSITIVITY)
														L = 2 pF FIXED
														T = 10 pF AUTO-CAL
														V = 10 pF FIXED
														P = 0.5 pF FIXED (HIGH SENSITIVITY)
			2											2 = ATEX APPROVAL, M20 HOUSING
						b								b = RELAYS
														1 = STANDARD RELAY
														2 = GOLD CONTACTS
							c	d						c, d = SENSING ELEMENTS: 00, 02-04, 07, 28, 91-93.
							0	0						700-1202-021 KEMA 10ATEX0009 U
								2						700-1202-024 KEMA 10ATEX0009 U
								3						700-1202-028 KEMA 10ATEX0009 U
								4						700-1202-042 KEMA 10ATEX0009 U
								7						700-1202-020 KEMA 10ATEX0009 U
							2	8						700-1202-052 KEMA 10ATEX0009 U
							9	1						700-1202-016 KEMA 10ATEX0009 U
								2						700-1202-046 KEMA 10ATEX0009 U
								3						700-1202-056 KEMA 10ATEX0009 U

ATEX APPROVED  
INTEGRAL, LINE POWERED, INTELLIPOINT  
MODEL NUMBERING SYSTEM  
SHT 3 OF 9  
420-0004-146-CD ISS. 9



## 6.2 ATEX Drawings (Continued)

								COLUMNS 9 AND UP, DO NOT AFFECT SAFETY					
1	2	3	4	-	5	6	7	8	-	9	10	11	12
R	a	L	2	-	b	c	d	e	-	*	*	*	*
	a												a = MEASUREMENT OPTIONS:
													N = 2 pF AUTO-CAL
													M = MANUAL-CAL (STANDARD SENSITIVITY)
													H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
													G = MANUAL-CAL (HIGH SENSITIVITY)
													L = 2 pF FIXED
													T = 10 pF AUTO-CAL
													V = 10 pF FIXED
													P = 0.5 pF FIXED (HIGH SENSITIVITY)
			2										2 = ATEX APPROVAL, M20 HOUSING
					b								b = 1-9, A-K CABLE LENGTHS
						c							c = RELAYS
													1 = STANDARD RELAY
													2 = GOLD CONTACTS
							d	e					d, e = SENSING ELEMENTS: 00, 02-04, 06, 07, 09-22, 24-28,
													31-40, 50-53, 55, 60-62, 64, 66, 72, 73, 80-83, 85, 90-94, or ZZ.
							0	0					700-1202-001 KEMA 10ATEX0009 U
								2					700-1202-014 KEMA 10ATEX0009 U
								3					700-1202-018 KEMA 10ATEX0009 U
								4					700-1202-041 KEMA 10ATEX0009 U
								6					700-1202-031
								7					700-1202-010 KEMA 10ATEX0009 U
								9					700-1202-033
							1	0					700-0001-018
								1					700-0201-005
								2					700-0201-005 (HAST C)
								3					700-0201-019
								4					700-0202-002
								5					700-0202-043
								6					700-0002-360
								7					700-0202-029
								8					700-0001-022
								9					700-0002-023
							2	0					700-0209-002
								1					700-0202-043 (HAST-C)
								2					700-0202-044
								4					700-0005-285
								5					700-0005-285 (HAST-C)
								6					700-0220-001
								7					700-0221-002
								8					700-1202-051 KEMA 10ATEX0009 U
SENSING ELEMENT LIST CONTINUED ON NEXT PAGE								ATEX APPROVED REMOTE, LINE POWERED, INTELLIPOINT MODEL NUMBERING SYSTEM SHT 4 OF 9 420-0004-146-CD ISS.					

## 6.2 ATEX Drawings (Continued)

								COLUMNS 9 AND UP, DO NOT AFFECT SAFETY				
1	2	3	4	5	6	7	8	9	10	11	12	
R	a	L	2	-	b	c	d	e	-	*	*	*
												SENSING ELEMENTS: CONTINUED...
							3	1				700-0029-001
								2				700-0029-002
								3				700-0029-003
								4				700-0029-004
								5				700-0029-005
								6				700-0029-102
								7				700-0029-103
								8				700-0029-104
								9				700-0029-105
							4	0				700-0029-106
							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
								4				700-0204-024
								6				700-0204-022
							7	2				700-0201-027
								3				700-0201-028
							8	0				700-4200-020
								1				700-4200-030
								2				700-4200-040
								3				700-4200-060
								5				700-9000-494
							9	0				700-0201-059
								1				700-1202-015 KEMA 10ATEX0009 U
								2				700-1202-045 KEMA 10ATEX0009 U
								3				700-1202-055 KEMA 10ATEX0009 U
								4				700-0209-024
						Z	Z					OTHER SENSING ELEMENTS
<div> <div>ATEX APPROVED</div> <div>REMOTE, LINE POWERED, INTELLIPOINT</div> <div>MODEL NUMBERING SYSTEM</div> <div>SHT 5 OF 9</div> <div>420-0004-146-CD ISS. 9</div> </div>												

## 6.2 ATEX Drawings (Continued)

### MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

m = FAMILY NUMBER: 0 THROUGH 9, BLANK

n = FAMILY NUMBER: 0 THROUGH 9, BLANK

o = 0 THROUGH 9, BLANK

p = 0 THROUGH 9

q = FAMILY NUMBER: 0 THROUGH 9, BLANK

r = FAMILY NUMBER: 0 THROUGH 9, BLANK

s = FAMILY NUMBER: 0 THROUGH 9

t = 24 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

#### NOTES:

1. MAXIMUM PROCESS TEMPERATURE 290°C.
2. MAXIMUM SENSOR CAPACITANCE < 1μF.
3. MAXIMUM INSERTION LENGTH **RIGID SENSOR** 30 FEET (9.14 METERS).
4. MAXIMUM INSERTION LENGTH **FLEXIBLE SENSOR** 2000 FEET (609.6 METERS).
5. SENSING ELEMENT ENCLOSURE IP66 ( IP RATING DOES NOT APPLY TO SPECIAL SENSORS SUPPLIED WITHOUT A 285- SERIES SENSING ELEMENT ENCLOSURE ).

!! SEE PAGE 9 FOR SPECIFIC CONDITIONS OF USE

ATEX APPROVED  
ADDITIONAL INTRINSICALLY  
SAFE SENSING ELEMENTS

SHT 6 OF 9  
420-0004-146-CD ISS.9

## 6.2 ATEX Drawings (Continued)

											COLUMNS 11 AND UP, DO NOT AFFECT SAFETY					
1	2	3	4	5	6	-	7	8	9	10	-	11	12	13	14	
S	a	R	b	L	2	-	0	c	d	e	-	*	*	*	*	
	a															a = 2 SIL LEVEL 2
			b													b = MEASUREMENT OPTIONS:
																N = 2 pF AUTO-CAL
																H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
																L = 2 pF FIXED
																T = 10 pF AUTO-CAL
																V = 10 pF FIXED
																P = 0.5 pF FIXED (HIGH SENSITIVITY)
					2											2 = ATEX APPROVAL, M20 HOUSING
								c								c = RELAYS
																1 = STANDARD RELAY
																2 = GOLD CONTACTS
									d	e						d, e = SENSING ELEMENTS: 00, 02, 04, 07, 28, 91-93.
									0	0						700-1202-021 KEMA 10ATEX0009 U
										2						700-1202-024 KEMA 10ATEX0009 U
										4						700-1202-042 KEMA 10ATEX0009 U
										7						700-1202-020 KEMA 10ATEX0009 U
									2	8						700-1202-052 KEMA 10ATEX0009 U
									9	1						700-1202-016 KEMA 10ATEX0009 U
										2						700-1202-046 KEMA 10ATEX0009 U
										3						700-1202-056 KEMA 10ATEX0009 U

**Reference SIL Manual (SXRNL) For Ordering Detail**

SIL, ATEX APPROVED  
INTEGRAL, LINE POWERED, INTELLIPOINT  
MODEL NUMBERING SYSTEM

SHT 7 OF 9  
420-0004-146-CD ISS. 9

## 6.2 ATEX Drawings (Continued)

										COLUMNS 11 AND UP, DO NOT AFFECT SAFETY					
1	2	3	4	5	6	-	7	8	9	10	-	11	12	13	14
S	a	R	b	L	2	-	c	d	e	f	-	*	*	*	*
	a														a = 2 SIL LEVEL 2
			b												b = MEASUREMENT OPTIONS:
															N = 2 pF AUTO-CAL
															H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
															L = 2 pF FIXED
															T = 10 pF AUTO-CAL
															V = 10 pF FIXED
															P = 0.5 pF FIXED (HIGH SENSITIVITY)
					2										2 = ATEX APPROVAL, M20 HOUSING
							c								d = 1-9, A-K CABLE LENGTHS
								d							e = RELAYS
															1 = STANDARD RELAY
															2 = GOLD CONTACTS
									e	f					e, f = SENSING ELEMENTS: 00, 02, 04, 06, 07, 09, 11-21, 24-28, 60-62, 64, 66, 72, 73, 85, 90-94.
										0	0				700-1202-001 KEMA 10ATEX0009 U
											2				700-1202-014 KEMA 10ATEX0009 U
											4				700-1202-041 KEMA 10ATEX0009 U
											6				700-1202-031
											7				700-1202-010 KEMA 10ATEX0009 U
											9				700-1202-033
									1	1					700-0201-005
										2					700-0201-005 (HAST C)
										3					700-0201-019
										4					700-0202-002
										5					700-0202-043
										6					700-0002-360
										7					700-0202-029
										8					700-0001-022
										9					700-0002-023
									2	0					700-0209-002
										1					700-0202-043 (HAST-C)
										4					700-0005-285
										5					700-0005-285 (HAST-C)
										6					700-0220-001
										7					700-0221-002
										8					700-1202-051 KEMA 10ATEX0009 U
									6	0					700-0204-038
										1					700-0204-002
										2					700-0204-048
										4					700-0204-024
										6					700-0204-022
									7	2					700-0201-027
										3					700-0201-028
									8	5					700-9000-494
									9	0					700-0201-059
										1					700-1202-015 KEMA 10ATEX0009 U
										2					700-1202-045 KEMA 10ATEX0009 U
										3					700-1202-055 KEMA 10ATEX0009 U
										4					700-0209-024

SIL, ATEX APPROVED  
REMOTE, LINE POWERED, INTELLIPOINT  
MODEL NUMBERING SYSTEM  
SHT 8 OF 9  
420-0004-146-CD ISS. 9

**Reference SIL Manual (SXRNL) For Ordering Detail**

## 6.2 ATEX Drawings (Continued)

### **SPECIFIC CONDITIONS OF USE**

- 1. The equipment shall not be applied in an explosive dust atmosphere where high electrostatic charging processes are present that could result in propagating brush discharges.  
See CLC/TR 60079-32-1 for additional guidance.*
- 2. Consult the manufacturer if dimensional information on the flameproof joints is necessary.*

SPECIFIC CONDITIONS OF USE  
SHT 9 OF 9  
420-0004-146-CD ISS. 9

## 6.3 CE Declaration of Conformity



205 Keith Valley Road, Horsham, PA 19044  
Telephone: 215-674-1234 Fax: 215-674-2731  
www.ametek.com www.drexelbrook.com



<b>420-0004-176</b>		Sht. 1 of 1	APP'D BY SGA
ISSUE	EDO NO.	APP'D	DATE
6	9-18-102	SGA	9-13-18
7	10-18-106	SGA	11-2-18

### Declaration of Conformity

**AMETEK DREXELBROOK  
205 KEITH VALLEY ROAD  
HORSHAM, PENNSYLVANIA  
USA, 19044**

We declare under our sole responsibility that the product **IntelliPoint Point Level**  
Measurement Systems Model Number RXLX Series which this declaration relates is in conformity  
with the following  
standards and entitled to carry the CE Mark:

**Product Type: Measurement, Control Equipment and Laboratory Use**

**Following the provisions of 2014/30/EU Directive,**

**Conforms to the requirements of:**

EN 61326-1:2013	Clause 7.2 Emissions Class A and Class B
EN 61326-1:2013	Table 2 Immunity Group 1, Class B Industrial Area

**Following the provisions of 2014/34/EU ATEX Directive, Harmonized Standards**

**Conforms to the requirements of:**

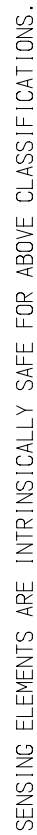
EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-11:2012, EN 60079-26:2015, EN  
60079-31:2013, EN 60529+A1:2000+A2:2013

QAN Notified Body Number 2460

EC-Type Examination Certificate Number FM14ATEX0049  
FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK SL4 1RS

Steven G. Arnold  
Quality Assurance & Product Safety Manager

Issue Date:



MODEL NUMBERING SYSTEM FOR ICEX APPROVED SYSTEMS - SEE SHEET 3.

NUMBERING SYSTEM FOR SIL IECEX APPROVED SYSTEMS - SEE SHEET 7.

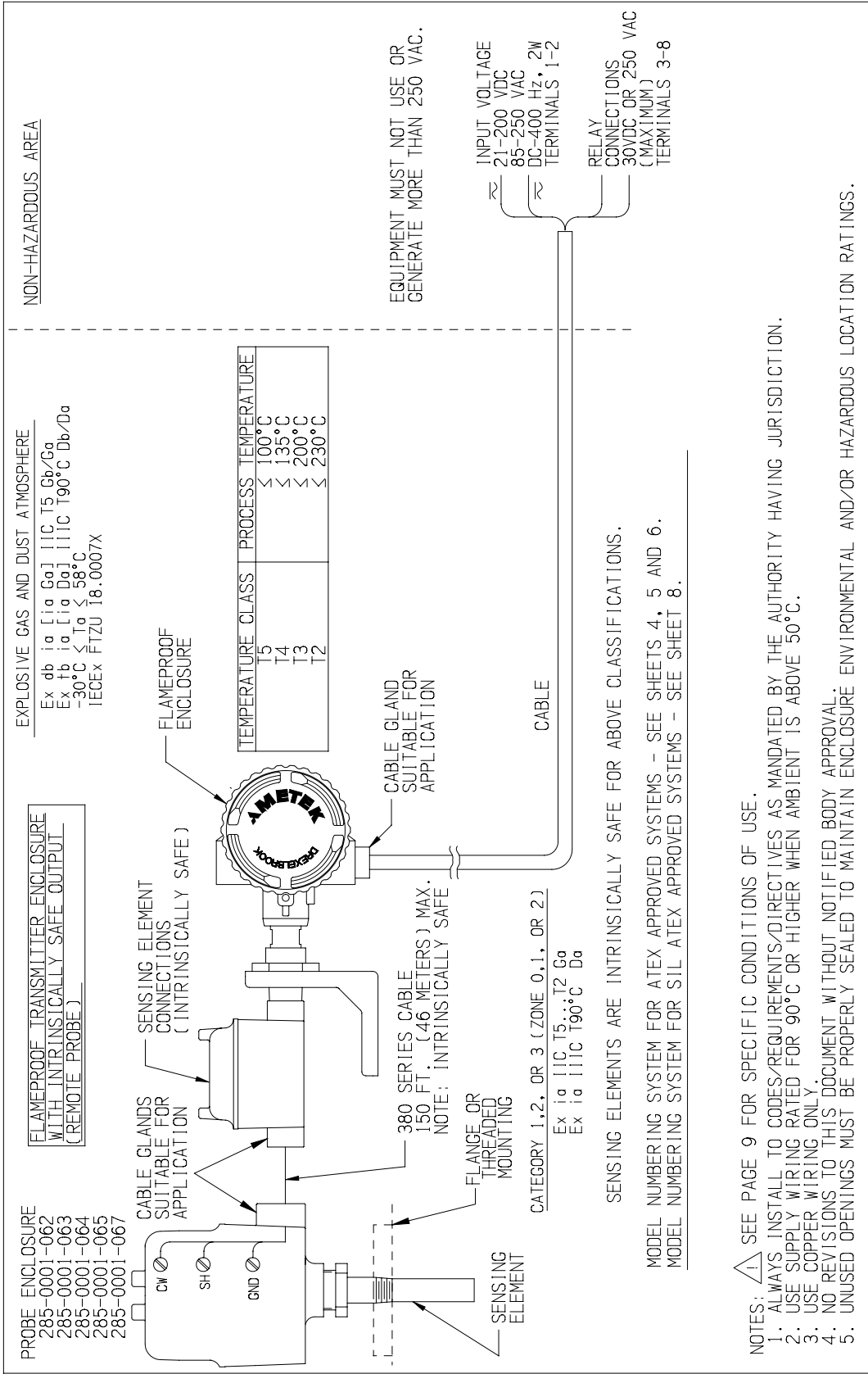
NOTES. ^1 SEE PAGE 9 FOR SPECIFIC CONDITIONS OF USE.

- NOTES:
1. ALWAYS INSTALL TO CODES/REQUIREMENTS/DIRECTIVES AS MANDATED BY THE AUTHORITY HAVING JURISDICTION.
  2. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
  3. USE COPPER WIRING ONLY.
  4. NO REVISIONS TO THIS DOCUMENT WITHOUT NOTIFIED BODY APPROVAL.
  5. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

[illegible]



6.4 IECEx Control Drawings (Continued)



NOTES: 1. SEE PAGE 9 FOR SPECIFIC CONDITIONS OF USE.

- 1. ALWAYS INSTALL TO CODES/REQUIREMENTS/DIRECTIVES AS MANDATED BY THE AUTHORITY HAVING JURISDICTION.
- 2. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
- 3. USE COPPER WIRING ONLY.
- 4. NO REVISIONS TO THIS DOCUMENT WITHOUT NOTIFIED BODY APPROVAL.
- 5. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED		by		COPYRIGHT 2018		AMETEK® DREXELBROOK		IECEx CONTROL DRAWING FOR LINE POWERED INTELLIPOINT SERIES ZONE 1 OR 2 (REMOTE)	
PO #								420-0004-563-CD	SHT. 2 OF 9
ENG									
USER									
DE #									
ISS. EDD/DSR NO.	1	7-18-110	SGA	8-27-18	DR. JEN 8-27-18	CK. IDH 8-27-18			
							215-674-1234 FAX 215-674-2731		
							205 KEITH VALLEY RD HORSNAY, PA 19044-9986		

## 6.4 IECEx Control Drawings (Continued)

									COLUMNS 9 AND UP, DO NOT AFFECT SAFETY				
1	2	3	4	-	5	6	7	8	-	9	10	11	12
R	a	L	b	-	0	c	d	e	-	*	*	*	*
	a												a = MEASUREMENT OPTIONS:
													N = 2 pF AUTO-CAL
													M = MANUAL-CAL (STANDARD SENSITIVITY)
													H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
													G = MANUAL-CAL (HIGH SENSITIVITY)
													L = 2 pF FIXED
													T = 10 pF AUTO-CAL
													V = 10 pF FIXED
													P = 0.5 pF FIXED (HIGH SENSITIVITY)
			b										b = OPTIONS
													2 = IECEx APPROVAL, M20 HOUSING
						c							c = RELAYS
													1 = STANDARD RELAY
													2 = GOLD CONTACTS
							d						d = 0, 2, 9, SENSING ELEMENTS
								e					e = 0-4, 7, 8 SENSING ELEMENTS
							0	0					700-1202-021
								2					700-1202-024
								3					700-1202-028
								4					700-1202-042
								7					700-1202-020
							2	8					700-1202-052
							9	1					700-1202-016
								2					700-1202-046
								3					700-1202-056

IECEx APPROVED  
 INTEGRAL, LINE POWERED, INTELLIPOINT  
 MODEL NUMBERING SYSTEM  
 SHT 3 OF 9  
 420-0004-563-CD ISS. 1

## 6.4 IECEx Control Drawings (Continued)

								COLUMNS 9 AND UP, DO NOT AFFECT SAFETY					
1	2	3	4	-	5	6	7	8	-	9	10	11	12
R	a	L	b	-	c	d	e	f	-	*	*	*	*
	a												a = MEASUREMENT OPTIONS:
													N = 2 pF AUTO-CAL
													M = MANUAL-CAL (STANDARD SENSITIVITY)
													H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
													G = MANUAL-CAL (HIGH SENSITIVITY)
													L = 2 pF FIXED
													T = 10 pF AUTO-CAL
													V = 10 pF FIXED
													P = 0.5 pF FIXED (HIGH SENSITIVITY)
			b										b = OPTIONS
													2 = IECEx APPROVAL, M20 HOUSING
					c								c = 1-9, A-K CABLE LENGTHS
						d							d = RELAYS
													1 = STANDARD RELAY
													2 = GOLD CONTACTS
							e						e = 0-9, Z SENSING ELEMENTS
								f					f = 0-9, Z SENSING ELEMENTS
							0	0					700-1202-001
								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					700-0201-019
								4					700-0202-002
								5					700-0202-043
								6					700-0002-360
								7					700-0202-029
								8					700-0001-022
								9					700-0002-023
							2	0					700-0209-002
								1					700-0202-043 (HAST-C)
								2					700-0202-044
								4					700-0005-285
								5					700-0005-285 (HAST-C)
								6					700-0220-001
								7					700-0221-002
								8					700-1202-051

SENSING ELEMENT LIST  
CONTINUED ON NEXT PAGE

IECEx APPROVED  
REMOTE, LINE POWERED, INTELLIPOINT  
MODEL NUMBERING SYSTEM  
SHT 4 OF 9  
420-0004-563-CD ISS.

## 6.4 IECEx Control Drawings (Continued)

									COLUMNS 9 AND UP, DO NOT AFFECT SAFETY				
1	2	3	4	-	5	6	7	8	-	9	10	11	12
R	a	L	b	-	c	d	e	f	-	*	*	*	*
									SENSING ELEMENTS: CONTINUED...				
							3	1					700-0029-001
								2					700-0029-002
								3					700-0029-003
								4					700-0029-004
								5					700-0029-005
								6					700-0029-102
								7					700-0029-103
								8					700-0029-104
								9					700-0029-105
							4	0					700-0029-106
							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
								4					700-0204-024
								6					700-0204-022
							7	2					700-0201-027
								3					700-0201-028
							8	0					700-4200-020
								1					700-4200-030
								2					700-4200-040
								3					700-4200-060
								5					700-9000-494
							9	0					700-0201-059
								1					700-1202-015
								2					700-1202-045
								3					700-1202-055
								4					700-0209-024
							Z	Z					OTHER SENSING ELEMENTS

IECEx APPROVED  
REMOTE, LINE POWERED, INTELLIPOINT  
MODEL NUMBERING SYSTEM  
SHT 5 OF 9  
420-0004-563-CD ISS. 1

## 6.4 IECEx Control Drawings (Continued)

### MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

m = FAMILY NUMBER: 0 THROUGH 9, BLANK

m = FAMILY NUMBER: 0 THROUGH 9, BLANK

o = 0 THROUGH 9, BLANK

p = 0 THROUGH 9

q = FAMILY NUMBER: 0 THROUGH 9, BLANK

r = FAMILY NUMBER: 0 THROUGH 9, BLANK

s = FAMILY NUMBER: 0 THROUGH 9

t = 24 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

#### NOTES:

1. MAXIMUM PROCESS TEMPERATURE 290°C.
2. MAXIMUM SENSOR CAPACITANCE < 1μF.
3. MAXIMUM INSERTION LENGTH **RIGID SENSOR** 30 FEET (9.14 METERS).
4. MAXIMUM INSERTION LENGTH **FLEXIBLE SENSOR** 2000 FEET (609.6 METERS).
5. SENSING ELEMENT ENCLOSURE IP66 ( IP RATING DOES NOT APPLY TO SPECIAL SENSORS SUPPLIED WITHOUT A 285- SERIES SENSING ELEMENT ENCLOSURE ).

IECEx APPROVED  
ADDITIONAL INTRINSICALLY  
SAFE SENSING ELEMENTS

SHT 6 OF 9  
420-0004-563-CD ISS. 1

## 6.4 IECEx Control Drawings (Continued)

										COLUMNS 11 AND UP, DO NOT AFFECT SAFETY						
1	2	3	4	5	6	-	7	8	9	10	-	11	12	13	14	
S	a	R	b	L	c	-	0	d	e	f	-	*	*	*	*	
	a															a = 2 SIL LEVEL 2
			b													b = MEASUREMENT OPTIONS:
																N = 2 pF AUTO-CAL
																H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
																L = 2 pF FIXED
																T = 10 pF AUTO-CAL
																V = 10 pF FIXED
																P = 0.5 pF FIXED (HIGH SENSITIVITY)
					c											c = OPTIONS
																2 = IECEx APPROVAL, M20 HOUSING
								d								d = RELAYS
																1 = STANDARD RELAY
																2 = GOLD CONTACTS
									e							e = 0, 2, 9, SENSING ELEMENTS
										f						f = 0-4, 7, 8 SENSING ELEMENTS
									0	0						700-1202-021
										2						700-1202-024
										4						700-1202-042
										7						700-1202-020
									2	8						700-1202-052
									9	1						700-1202-016
										2						700-1202-046
										3						700-1202-056

Reference SIL Manual (SXRNL) For Ordering Detail

SIL, IECEx APPROVED

INTEGRAL, LINE POWERED, INTELLIPOINT

MODEL NUMBERING SYSTEM

SHT 7 OF 9

420-0004-563-CD ISS. 1

## 6.4 IECEx Control Drawings (Continued)

										COLUMNS 11 AND UP, DO NOT AFFECT SAFETY					
1	2	3	4	5	6	-	7	8	9	10	-	11	12	13	14
S	a	R	b	L	c	-	d	e	f	g	-	*	*	*	*
	a														a = 2 SIL LEVEL 2
			b												b = MEASUREMENT OPTIONS:
															N = 2 pF AUTO-CAL
															H = 0.5 pF AUTO-CAL (HIGH SENSITIVITY)
															L = 2 pF FIXED
															T = 10 pF AUTO-CAL
															V = 10 pF FIXED
															P = 0.5 pF FIXED (HIGH SENSITIVITY)
					c										c = OPTIONS
															2 = IECEx APPROVAL, M20 HOUSING
							d								d = 1-9, A-K CABLE LENGTHS
								e							e = RELAYS
															1 = STANDARD RELAY
															2 = GOLD CONTACTS
									f						f = 0, 1, 2, 6, 7, 8, 9 SENSING ELEMENTS
										g					g = 0-9 SENSING ELEMENTS
									0	0					700-1202-001
										2					700-1202-014
										4					700-1202-041
										6					700-1202-031
										7					700-1202-010
										9					700-1202-033
									1	1					700-0201-005
										2					700-0201-005 (HAST C)
										3					700-0201-019
										4					700-0202-002
										5					700-0202-043
										6					700-0002-360
										7					700-0202-029
										8					700-0001-022
										9					700-0002-023
									2	0					700-0209-002
										1					700-0202-043 (HAST-C)
										4					700-0005-285
										5					700-0005-285 (HAST-C)
										6					700-0220-001
										7					700-0221-002
										8					700-1202-051
									6	0					700-0204-038
										1					700-0204-002
										2					700-0204-048
										4					700-0204-024
										6					700-0204-022
									7	2					700-0201-027
										3					700-0201-028
									8	5					700-9000-494
									9	0					700-0201-059
										1					700-1202-015
										2					700-1202-045
										3					700-1202-055
										4					700-0209-024
Reference SIL Manual (SXRNL) For Ordering Detail										SIL, IECEx APPROVED					
										REMOTE, LINE POWERED, INTELLIPOINT					
										MODEL NUMBERING SYSTEM					
										SHT 8 OF 9					
										420-0004-563-CD ISS.					

## 6.4 IECEx Control Drawings (Continued)

SPECIFIC CONDITIONS OF USE:

- 1 THE EQUIPMENT SHALL NOT BE APPLIED IN AN EXPLOSIVE DUST ATMOSPHERE WHERE HIGH ELECTROSTATIC CHARGING PROCESSES ARE PRESENT THAT COULD RESULT IN PROPAGATING BRUSH DISCHARGES.
- 2 CONSULT THE MANUFACTURER IF DIMENSIONAL INFORMATION ON THE FLAMEPROOF JOINTS IS NECESSARY.
- 3 AMBIENT TEMPERATURE RANGE:  
-30°C TO +58°C FOR RXLX/SXRXTX INTELLIPOINT RF LEVEL SYSTEM  
-30°C TO +70°C FOR RXTX/SXRXTX INTELLIPOINT RF TWO-WIRE POINT LEVEL SYSTEM

IECEx APPROVED  
LINE POWERED, INTELLIPOINT  
SPECIFIC CONDITIONS OF USE

SHT 9 OF 9  
420-0004-563-CD ISS. 1



## 6.5 Mounting and Wiring for Spark Protector Drawings

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.**

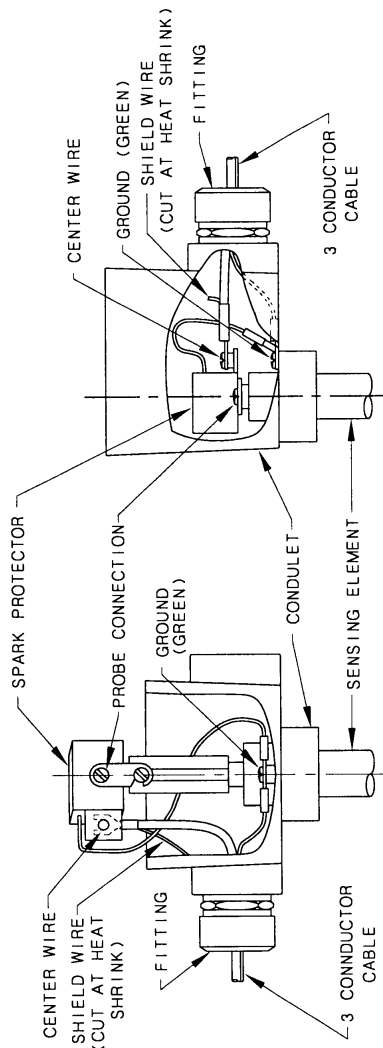
FIGURE -B- :CONNECTION OF THREE CONDUCTOR  
COTE SHIELD CABLE TO RIGID  
2-TERMINAL SENSING ELEMENTS  
700-0001-XXX & 700-0002-XXX.

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

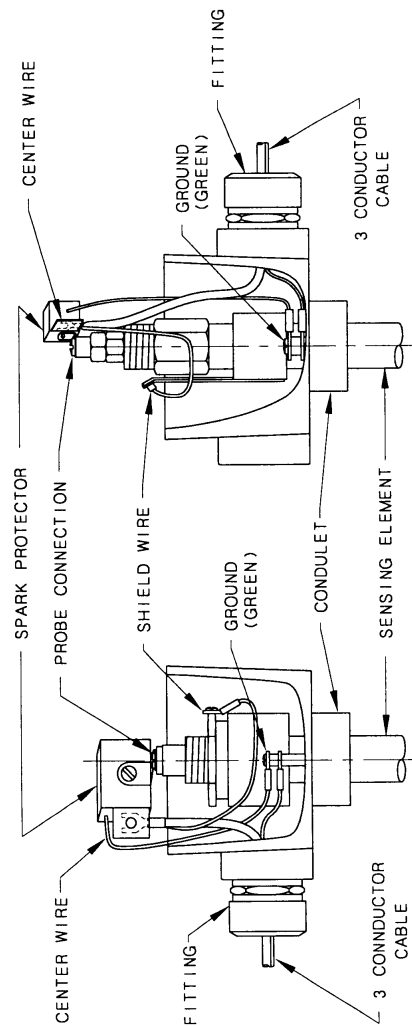
FIGURE -D- : CONNECTION OF THREE CONDUCTOR  
COTE SHIELD CABLE ON FLEXIBLE  
3-TERMINAL SENSING ELEMENT  
700-0205-XXX.

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

\*\*APPROVED DRAWING\*\*  
 CHANGES TO THIS DRAWING  
 REQUIRE AGENCY APPROVAL  
 PER 440-0015-003  
☐ FM ☐ CSA ☒ KEMA



**FIGURE -B-**



**FIGURE -D-**

**FIGURE -C-**

**AMETEK®**  
**DREXEL BROOK**

215-674-1234  
FAX 215-674-2731

205 KEITH VALLEY RD  
HORSHAM, PA 19044-9986

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

SHT. 1	ISS
377-0001-019-CD	5

[illegible]

6.5 Mounting and Wiring for Spark Protector (Continued)

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.

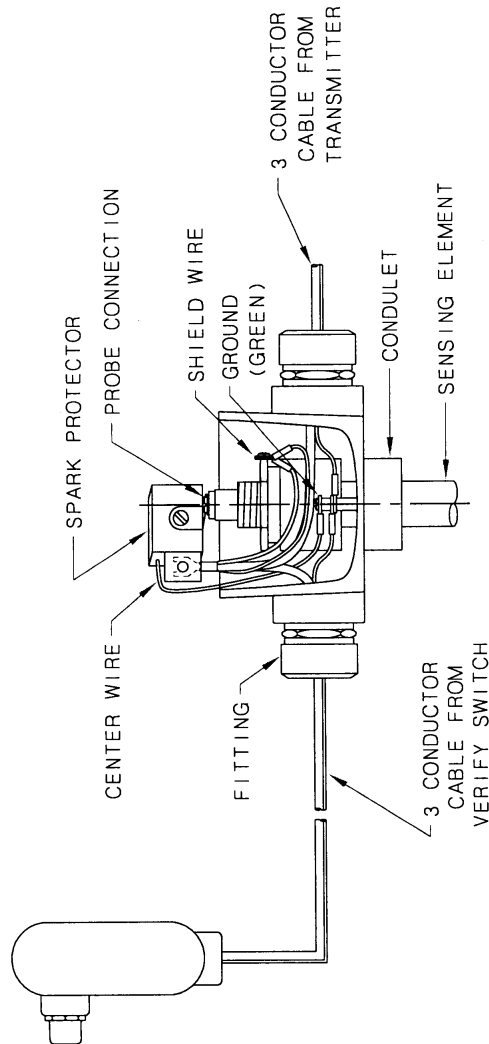


FIGURE -E-

NO. 377-0001-019

SHT 2 OF 2

**AMETEK®**  
**DREXELBROOK**

215-874-1234  
FAX 215-874-2731

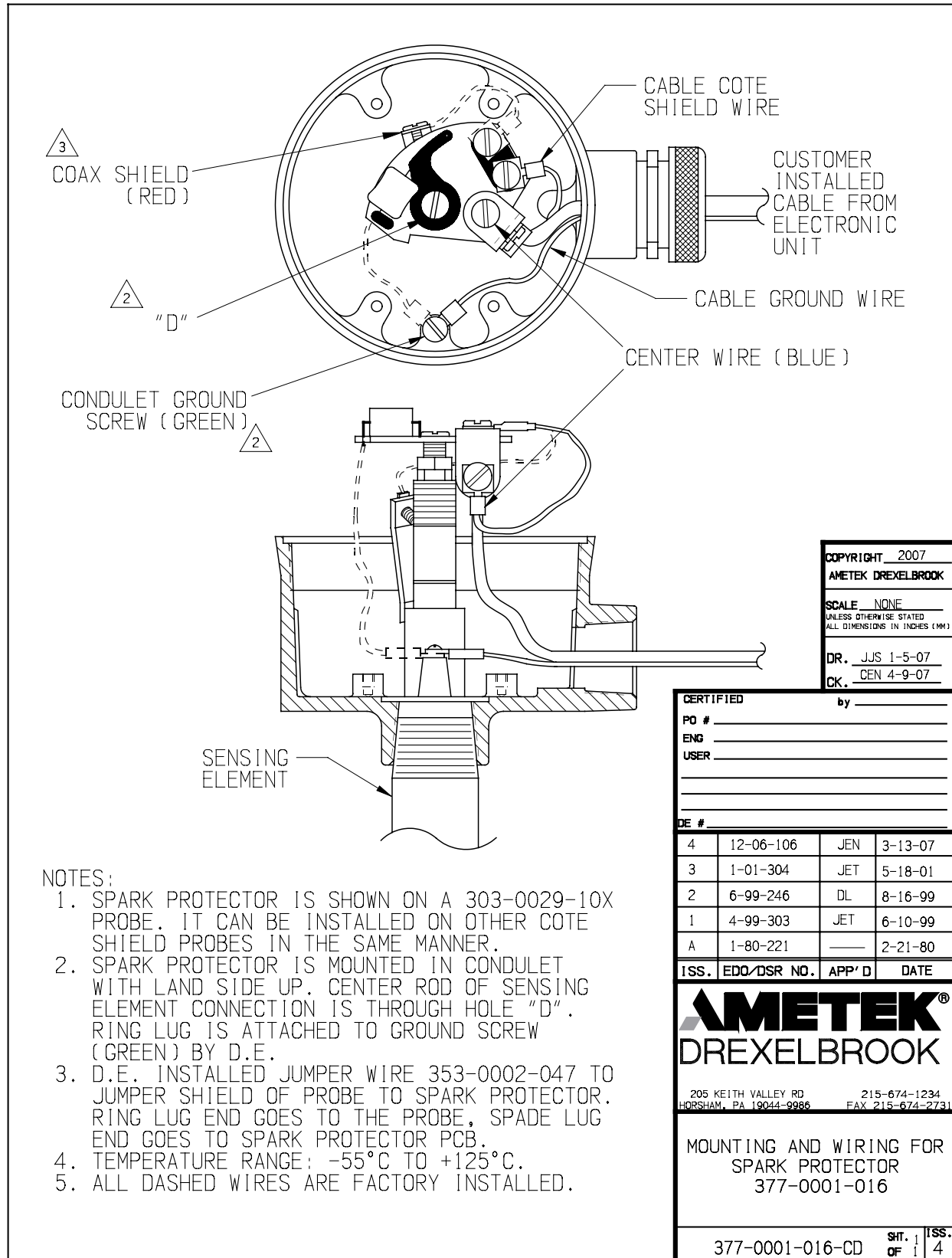
205 KEITH VALLEY RD.  
HORSHAM, PA 19044-9988

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

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

CERTIFIED		by		COPYRIGHT 2004		AMETEK DREXELBROOK	
PO #	5	2-04-336	CS	2-25-04	SCALE	NONE	UNLESS OTHERWISE STATED
ENG	4	7-93-303	JET	5-25-93	ALL DIMENSIONS IN INCHES (MM)		
USER	3	8-92-83	MPG	8-31-92	DR.	CDW	CK. JTS 3-3-01
ISS.	EDO/DSR	NO.	APP'D	DATE			
DE #							

## 6.5 Mounting and Wiring for Spark Protector (Continued)



## 6.6 Adding a Padded Capacitor

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.

NO. 330-0009-022-CD

SHEET 1 OF 3

CERTIFIED		by _____		COPYRIGHT 2013		AMETEK DREXELBROOK		PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES		ISS. 330-0009-022-CD		SHEET 1 OF 3	
PO #													
ENO													
USER													
DE #													

**AMETEK®**  
**DREXELBROOK**

215-674-1234  
FAX 215-674-2731

205 KEITH VALLEY RD  
HORSBURG, PA 19044-9986

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

DR. JUS 9-20-13  
CK 9-25-13

DATE 8-9-01

APP'D JET

EDD/DSR NO. 330-0009-022-CD

ISS. 330-0009-022-CD

3

3

3

## 6.6 Adding a Padded Capacitor (Continued)

NO. 330-0009-022-CD SHT 2 OF 3

**ThePoint (TM)**

**INTELLIPoint (TM)**

**LCS (TM) & LCT (TM)**

**AMETEK® DREXELBROOK**

205 KEITH VALLEY RD  
HERSHAN, PA 19044-9966

215-674-1234  
FAX 215-674-2731

CERTIFIED		by		COPYRIGHT 2013		AMETEK DREXELBROOK	
PO #		3	9-13-101	9-23-13	SCALE	NONE	UNLESS OTHERWISE STATED
ENG		2	6-05-243	WS	7-6-05	ALL DIMENSIONS IN INCHES (MM)	
USER		1	7-01-303	JET	8-9-01	DR. JJS 9-20-13	
ISS		EDD/DSR NO.	APP'D	DATE	CK <i>[Signature]</i> 9-25-13		
DE #							

**PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES**

330-0009-022-CD

SHT. 2 OF 3

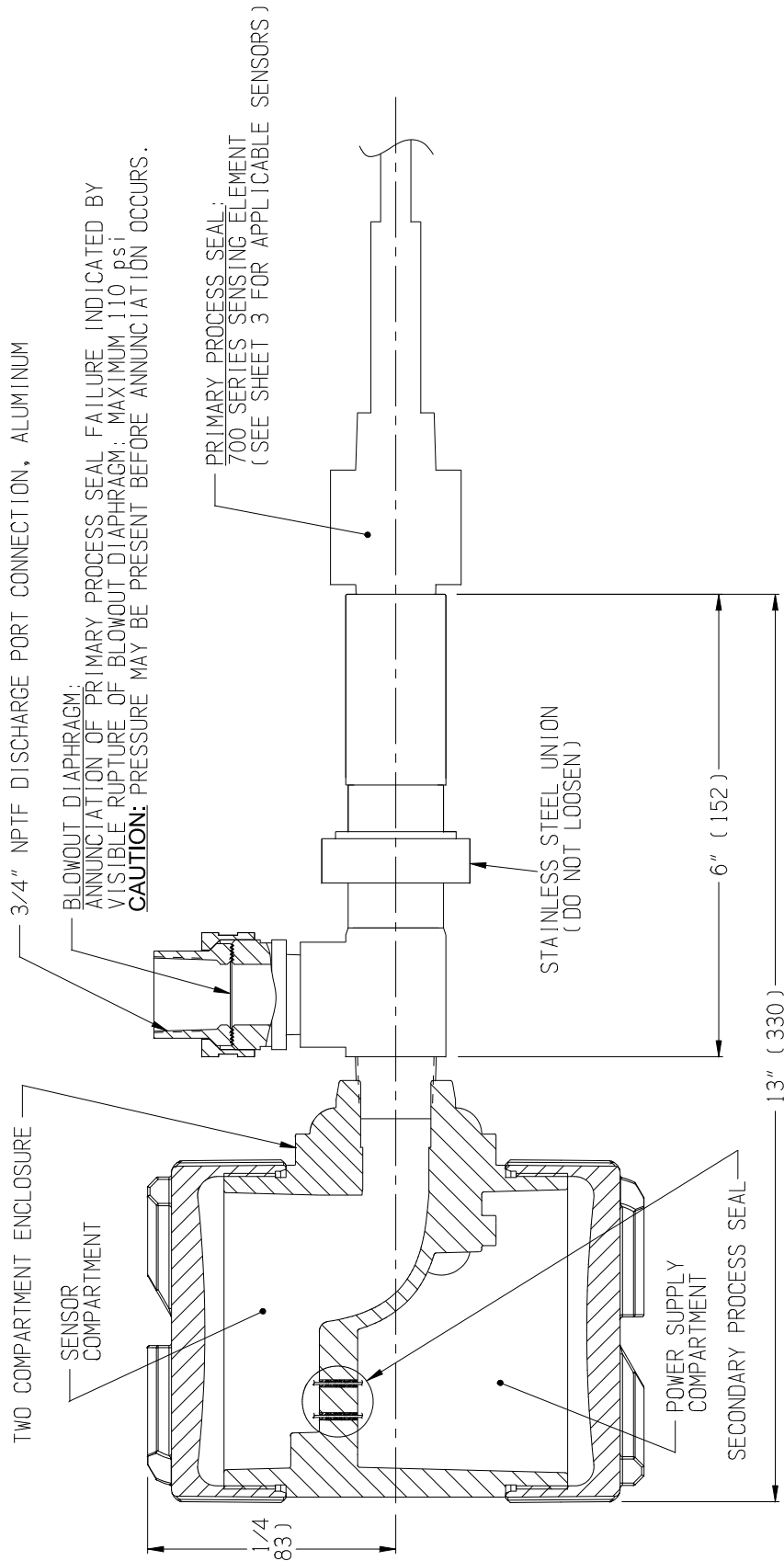
ISS. 3

SHT 3 OF 3

72


## 6.7 Dual Seal Assembly for 700 Series Sensing Elements

2023-2024 VIA SEAL VINIFICATION FOR THE VINTAGE



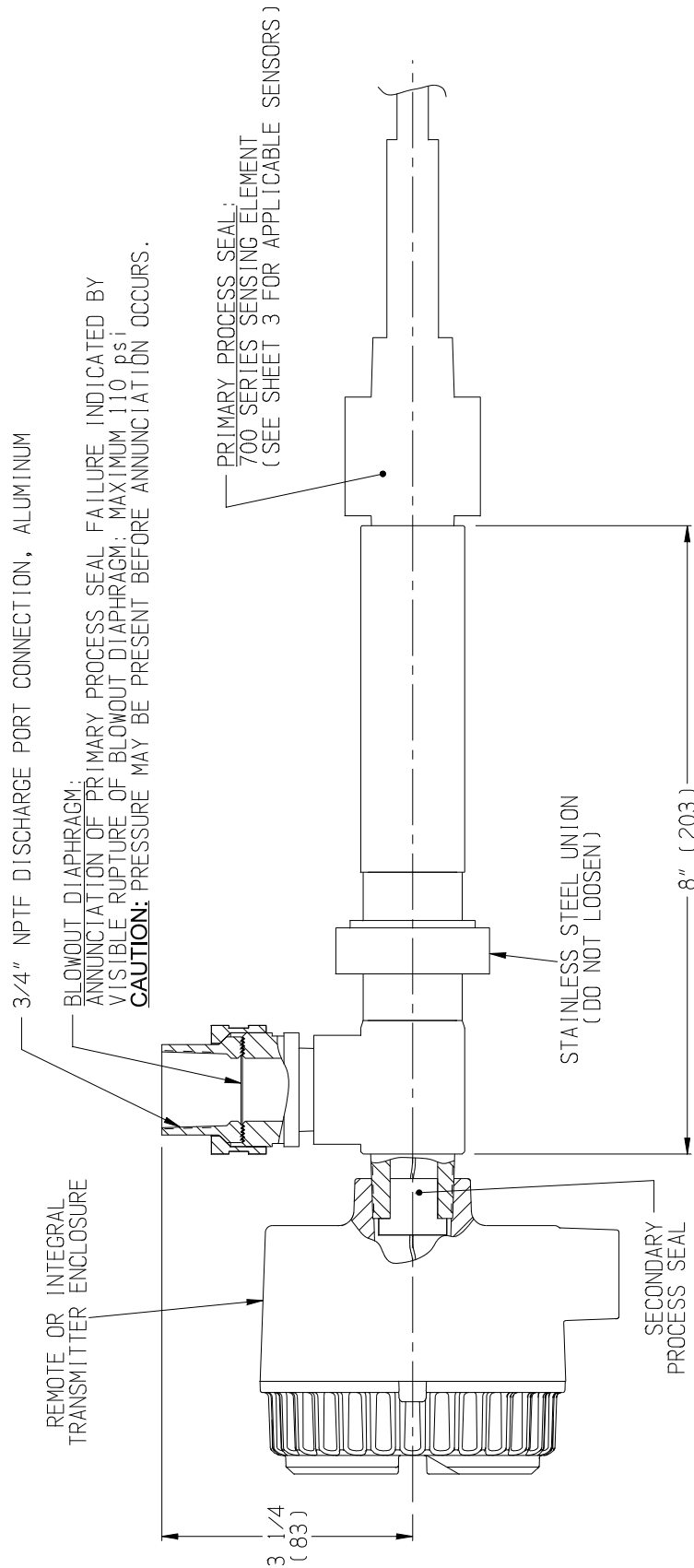
TES:

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

CONTROL DRAWING, DUAL SEAL ASSEMBLY FOR USE WITH 700 SERIES SENSING ELEMENTS			215-674-1234 FAX 215-674-2731		205 KEITH VALLEY RD HORSHAM, PA 19044-9986		285-0003-0XX-CD SHT. 1 OF 3	
TITLED # R _____ _____ _____	b y _____ _____ _____		_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____
COPYRIGHT 2015			AMETEK DREXELBROOK					
SCALE NONE			UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)					
3	2-15-111	THP	3-11-15	1-20-12	JEN	9-10-08	DR.	JEN 3-11-15
2	1-12-114	JEN	1-20-12	9-10-08	TDH	9-10-08	CK.	TDH 3-11-15
1	4-08-106	TDH	9-10-08	DATE	APP'D	NO.	EDD/DSR	ISS.
_____ _____ _____								

6.7 Dual Seal Assembly (Continued)

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



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

TITLED	by	COPYRIGHT	2015	CONTROL DRAWING, DUAL SEAL ASSEMBLY FOR USE WITH 700 SERIES SENSING ELEMENT	
#		AMETEK DREXELBROOK		SHT. 2 OF 3	
R	3	2-15-111	THP	3-11-15	
	2	1-12-114	JEN	1-20-12	
	1	4-08-106	TDH	9-10-08	
ISS.	EDO/DSR	NO.	APP'D	DATE	
			CK.	TDH	3-11-15

**AMETEK®**  
**DREXELBROOK**

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

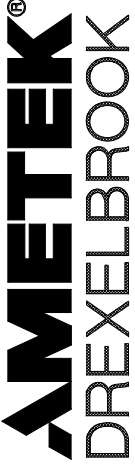


## 6.7 Dual Seal Assembly (Continued)

SENSING ELEMENT IS 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
				700-1230-XXX-XX-XXX	PEEK/CS/316SS

③

TITLED by _____		COPYRIGHT 2015 AMETEK DREXELBROOK		CONTROL DRAWING, DUAL SEAL ASSEMBLY FOR USE WITH 700 SERIES SENSING ELEMENT	
3	2-15-111	THP	3-11-15	 <p>205 KEITH VALLEY RD. HORSNASH, PA 19044-9986</p> <p>215-674-1234 FAX 215-674-2731</p> <p>285-0003-OXX-CD</p> <p>SHT. 3 OF 3</p>	
2	1-12-114	JEN	1-20-12		
1	4-08-106	TDH	9-10-08		
ISS. EDO/DSR NO. APP. D		DATE			
_____		_____		_____	

## **Appendix: A**

## Appendix A: Shortening or Lengthening the Sensing Element



### CAUTION:

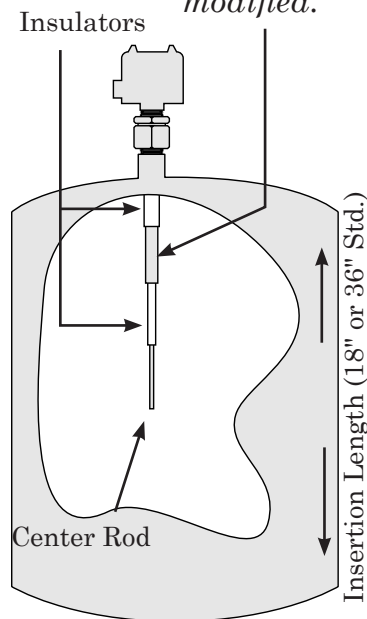
The insulation length of either **Flush Sensing Elements** or **Insulated Sensing Elements** can **NOT** be changed. **Cable Sensing Elements** can only be shortened. Instructions are included with each unit.

### 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 304 SS or 316 SS, must be welded.

### NOTE:

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



### 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.



**Any changes to probe length after calibration requires re calibration to ensure proper operation.**

## CE Installation Supplement

### EMC Installation Supplement

- A. **Purpose:** To provide additional information that is required to be in compliance with the CE mark of conformity and 2014/30/EU Directive.
- B. **Definitions:**
1. I/O Sensor/Measurement/Control Port -- Any port which provides level measurement, control, and/or DC power.
  2. I/O AC Power -- Any port which provides AC main power to the instrument.
  3. Housing -- Any enclosure where the sensor and transmitter can be located.
  4. Non-metallic applications -- any application where the sensor is not surrounded by a metallic surface.
- C. **Installation Specifics:**

#### 1. I/O Sensor/Measurement/Control Ports

- Wiring must be twisted pair and run in conduit or an equivalent shielded environment (i.e. shielded braid, cable, etc.).
- The shield terminations must be grounded at the source and destination ports.
- Wiring must be run separate from AC main power and/or any signal exceeding 75 volts DC or 50 volts AC.

#### 2. I/O AC Power Port

- Wiring must be run either in conduit or an equivalent shielded environment (i.e. shielded braid, cable, etc.).
- The shield terminations must be grounded at the source and destination ports.

## **CE Installation Supplement (Continued)**

### **3. Remote Installations**

- Sensor port must be connected to the transmitter port by one of the following means:
  - 401-16 Probe Filter
  - Coaxial cable run in conduit.
  - Triaxial cable.

### **4. Housings**

- All installations require the sensor and transmitter to be located in a closed shielded/metal housing (i.e. typically explosion-proof or weatherproof housings meet this requirement)

### **5. Sensor Type/Mounting**

- In all non-metallic applications the sensor must have a full concentric shield (i.e. needs to be considered when ordering).
- The sensor/sensor conduit must be grounded locally either to a metal support structure or an equivalent earth ground.

#### **Comments:**

- Any deviation from these installation requirements should be reviewed with factory, prior to implementation
- These instructions are essential to insure conformity with specified EC directives.

## AMETEK, Inc.

### TERMS AND CONDITIONS OF SALE

THE FOLLOWING TERMS/CONDITIONS, TOGETHER WITH ANY OTHER TERMS/CONDITIONS SPECIFICALLY AGREED TO IN WRITING BY SELLER, SHALL APPLY TO ALL ORDERS ("Order(s)") FROM, AND SALES OF PRODUCTS ("Products") OR SERVICES ("Services") TO BUYER. ANY ACCEPTANCE OF ANY ORDER OF BUYER IS CONDITIONED UPON THESE TERMS/CONDITIONS. ANY ADDITIONAL OR DIFFERENT TERMS/CONDITIONS PROPOSED BY BUYER IN ANY DOCUMENT ARE OBJECTED TO AND SHALL NOT BE BINDING UPON SELLER. No salesperson is authorized to bind Seller to any promise or understanding not expressed herein.

**I. PRICES** All prices are subject to change without notice in the event of any changes in cost of materials or labor, specifications, quantities, delivery schedules, customs duties, other factors beyond Seller's control, or in the event of delays caused by instructions of the Buyer, or failure of the Buyer to give Seller adequate information. Further, prices payable by the Buyer shall be subject to immediate increase, should the Seller as a result of governmental action or regulation including, without limitation, those contemplated by an investigation under Section 232 of the Trade Expansion Act of 1962 (19 U.S.C. §1862), incur additional duties, tariffs or restrictions on products sold hereunder, or on the raw materials that are used in making such products. In no event shall prices include any amounts imposed on the Buyer in connection with Buyer's purchases from Seller, such as taxes, including but not limited to Value Added Tax (VAT) or excise taxes, duties, tariffs, or any other costs assessed against the Buyer by a governmental authority.

**II. DELIVERY** Delivery dates are approximate and are dependent on prompt receipt by Seller of all necessary information. Seller may deliver all or any part of Products/ Services as early as 30 days in advance of agreed schedule. The point of delivery shall be "Ex-works" Seller's premises, unless otherwise specified by Seller. Upon delivery, title to Products and all risk of loss or damage thereto shall pass to Buyer. Where Buyer notifies Seller that it cannot take timely delivery of the Products, Seller may place such Products in storage, at the risk of Buyer, and Buyer shall reimburse Seller for all expenses incurred in connection with such storage. Buyer shall dispose of the packing materials for Products at its own expense, and shall defend, indemnify and hold harmless Seller from any legal obligations in connection with such packing waste.

**III. PAYMENT** A. The term of payment shall be net 30 days from date of Seller's invoice, unless otherwise specified. Payments shall be made by Buyer without any deduction or set-off. Unless otherwise agreed, payment shall be made in U.S. dollars. Seller may charge late payment fees at the rate of 1.5% per month, or the highest rate permitted by law, whichever is less, accruing daily.

B. If the financial condition of Buyer is unsatisfactory to Seller, Seller may require full or partial payment in advance, or satisfactory security, in the form of a letter of credit or otherwise. In the event of bankruptcy or insolvency of Buyer, Seller may immediately cancel any Order then outstanding.

C. Buyer grants Seller a purchase money security interest in Products located in the United States, or Services, as well as any proceeds, for the purpose of securing the obligations of Buyer hereunder. Buyer authorizes Seller to execute on Buyer's behalf and file such financing statements as Seller deems appropriate to perfect and notify Buyer's creditors of Seller's security interest.

**IV. VARIATIONS IN QUANTITY; CHANGES.** Buyer shall accept delivery of quantities greater or smaller than the quantity specified in Order(s), provided that any such variation shall not exceed 5% of the quantity originally specified, or 2 units, whichever is greater. Seller shall not be required to give notice of any such variations other than in the applicable shipping notice and invoice. Seller reserves the option to make changes to Products or Services which do not affect form, fit, or function, and shall deliver Products to the latest configuration part number at the time of delivery.

**V. EXPORT CONTROLS; FCPA; ANTI-BOYCOTT**

A. Buyer shall not make any disposition of the Products, by way of transshipment, re-export, diversion or otherwise, except as applicable U.S. export laws and regulations may expressly permit, and other than in and to the ultimate country of destination specified on Order(s) or declared as the country of ultimate destination on Seller's invoices or in the End Use Statement that Buyer supplies Seller. Seller shall not be named as shipper or exporter of record or U.S. principal party-in-interest

(USPPI) unless specifically agreed to in writing by Seller in which case, Buyer shall provide Seller with a copy of the documents filed by Buyer for Export clearance purposes. At Seller's request, Buyer shall supply end-use and end-user information to determine export license applicability. Failure of Buyer to comply with this section shall constitute a material default allowing Seller to cancel related Order(s) without liability.

B. Buyer warrants that it shall not violate or cause the Seller to violate the U.S. Foreign Corrupt Practices Act of 1977 (FCPA), as amended, the United Kingdom Bribery Act (UKBA) of 2010, as amended, or their respective implementing regulations in connection with Buyer's sale or distribution of the Products and/or Services, and that Buyer does not know or have reason to believe that any consultant, agent, representative or other person retained by Buyer in connection with the sale and/or distribution of Products/Services has violated, nor caused Seller to violate the FCPA and/or the UKBA. Where Buyer learns of or has reason to know of any violation of FCPA and/or or UKBA in connection with the sale or distribution of Products/Services, Buyer shall immediately advise Seller.

C. Buyer further warrants that Buyer shall not violate or cause Seller to violate the U.S. Antiboycott Provisions of the U.S. Export Administration Regulations issued pursuant to the U.S. Export Administration Act of 1979, as amended, in connection with Buyer's purchase of Products/Services and that Buyer shall not request or require Seller to make statements or certifications against countries that are not subject to boycott by the U.S.

**VI. WARRANTIES** A. Seller warrants that Products manufactured by Seller, when delivered, shall be free from defects in material/workmanship. Seller warrants that Services shall be performed in accordance with generally accepted industry practice. Seller's obligations under this warranty shall be limited exclusively to repairing or replacing, at Seller's option, any part of Products which, if properly installed, used and maintained, proved to have been defective in material or workmanship within 1 year from the date of shipment, or re-performing the Services. Seller warrants for a period of 1 year from the date of shipment that software or firmware, when used with Products, shall perform in accordance with Seller's published specifications. Seller makes no warranty, express or implied, that the operations 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/requirements. Buyer shall notify Seller of any defect in the quality or condition of Products (including software/firmware) or Services within 7 days of the date of delivery or performance, unless the defect was not apparent on reasonable inspection, in which case, within 7 days after discovery of the defect. If Buyer does not provide such timely notification, it shall not be entitled to reject Products (including software/firmware) or Services, and Seller shall have no liability for such defect.

B. Seller's warranty obligations shall not apply to Products which (1) have been altered or repaired by someone other than Seller, or (2) have been subjected to misuse, neglect, or improper use or application, or (3) are normally consumed in operation, or (4) have a normal life inherently shorter than the warranty period stated therein.

C. No Products may be returned unless authorized in advance by Seller, and then only upon such conditions to which Seller may agree. Buyer must obtain a Return Material Authorization (RMA) 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 returned Products until such time as Seller receives the same at its facility, and for all charges for packing, inspection, shipping, transportation or insurance associated with returned Products.

D. This section VI sets forth the exclusive remedies and obligations for claims based upon defects in or nonconformity of Products/Services, whether the claim is in contract, warranty, tort (including negligence of any degree or strict liability) or otherwise. **THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES,**

**WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED OR STATUTORY. NO IMPLIED OR STATUTORY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.**

**VII. PATENTS/INDEMNITY** If Buyer receives a claim that Products, or part thereof manufactured by Seller infringes a patent, Buyer shall notify Seller promptly in writing and give Seller information, assistance and exclusive authority to evaluate, defend and settle such claim. Where Buyer has furnished specifications/designs for the manufacture of the allegedly- infringing Products, Buyer shall defend, indemnify and hold harmless Seller against third-party claims for infringement arising out of Seller's use of such specifications/designs.

**VIII. LIMITATION OF LIABILITY** The total liability of Seller on any claim, whether in contract, tort (including negligence of any degree and strict liability) or otherwise arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any Products/Services, shall not exceed the price allocable to the Products/Services or part thereof which gives rise to the claim. **IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT, WARRANTY, TORT, (INCLUDING NEGLIGENCE OF ANY DEGREE, STRICT LIABILITY OR PATENT INFRINGEMENT) OR OTHERWISE, SHALL SELLER, ITS AFFILIATES, SUBCONTRACTORS, OR SUPPLIERS BE LIABLE FOR ANY LOSS OF PROFIT OR REVENUES, LOSS OF USE OF THE PRODUCTS OR SERVICES, OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS OR CLAIMS OF BUYER'S CUSTOMERS FOR DAMAGES OR FOR ANY SPECIAL, PROXIMATE, CONSEQUENTIAL, INCIDENTAL, INDIRECT OR EXEMPLARY DAMAGES.** If Buyer transfers title to, or leases Products sold hereunder to, or otherwise permits or suffers use by, any third party, Buyer shall obtain from such third party a provision affording Seller and its subcontractors/suppliers the protection of the preceding sentence. Any action against Seller must be brought within 18 months after cause of action accrues.

**IX. EXCUSABLE DELAYS** A. Seller shall not be liable for delays in delivery or failure to perform due directly or indirectly to causes beyond Seller's reasonable control including but not limited to: acts of God; war; terrorism; civil commotion; riots; embargoes; government regulations, orders, instructions or priorities; port congestion; acts of or failure to act on the part of Buyer or its agents/employees; fires; floods; sabotage; nuclear incidents; earthquakes; storms; epidemics; strikes; lockouts or other labor difficulties; shortages of or inability to timely obtain proper labor, materials, components, shipping space or transportation, fuel, supplies or power at current prices; or due to limitations imposed by the extent of availability of Seller's normal manufacturing facilities. B. If a delay excused per the above extends for more than 90 days and the parties have not agreed upon a revised basis for continuing providing Products/Services at the end of the delay, including adjustment of the price, then either party (except where delay is caused by Buyer, in which event only Seller) upon thirty (30) days' notice may terminate the Order with respect to the unexecuted portion of the Products/Services, whereupon Buyer shall promptly pay Seller its reasonable termination charges upon submission of Seller's invoices thereof.

**X. SOFTWARE/TECHNICAL/PROPRIETARY INFORMATION** A. Buyer shall not acquire any rights to any software which may be delivered with Products, except as granted in Seller's standard software license. Any software license granted in connection with Products shall be an interim license, which may be withdrawn, pending payment for Products in full. B. The purchase of Products shall not include any right to supply of technical information such as drawings or specifications. C. Proprietary information, including drawings, documents, technical data, reports, software, designs, inventions and other technical information supplied by Seller in connection herewith (hereinafter called "Data"), shall remain Seller's sole property and shall be held in confidence by Buyer. Data shall not be reproduced, used or disclosed to others by Buyer without

May 2018

Seller's prior written consent. Upon completion of Order, Buyer shall promptly return all Data to Seller together with all copies or reprints thereof then in Buyer's possession or control, and Buyer shall thereafter make no future use, either directly or indirectly, of any Data or any information derived therefrom without Seller's prior written consent. The foregoing shall in no way obligate Seller to provide or supply Data.

**XI. DIES, TOOLS, PATTERNS** Seller's charges for dies, molds, patterns and the like represent the Buyer's proportionate cost thereof, it being expressly understood that they remain the property of Seller. Modifications made to dies, molds, patterns and the like in order to manufacture Products shall be at the discretion of Seller.

**XII. GENERAL** A. The rights and obligations of the Buyer and Seller hereunder shall be governed in all respects by the law of the Commonwealth of Pennsylvania, U.S.A. The exclusive forum for adjudication of any disputes shall be the federal or state courts of the Commonwealth of Pennsylvania, and Buyer/Seller hereby consent to personal jurisdiction and venue in such courts in any proceeding. The United Nations Convention on the International Sale of Goods shall not apply. B. These Terms and Conditions of Sale together with any other terms specifically agreed to in writing by Seller constitute the entire agreement between Buyer and Seller and supersede any prior or contemporaneous representations, agreements, proposals, warranties, or understandings, oral or written, express or implied. No waiver, modification, amendment, rescission or other change to these Terms and Conditions of Sale shall be binding unless specifically agreed to in writing by an authorized representative of Seller. C. The invalidity, of any part hereof shall not affect the validity of the remainder. The failure of Seller to assert any right at any time hereunder shall not prevent Seller's subsequent assertion of the same or different rights. D. Buyer may not assign this contract without the prior written approval of the Seller.

**XIII. PROHIBITION FOR HAZARDOUS USE** Products sold hereunder are not intended for application in, and shall not be used by Buyer in construction or application of a nuclear installation or in connection with 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 Products have been specifically approved for such activity or application. Seller disclaims all liability for loss or damage resulting from such unauthorized use and Buyer shall defend, hold harmless and indemnify Seller against any such liability, whether arising under breach of contract, warranty, tort (regardless of the degree of fault or negligence), strict liability or otherwise.

Where Seller approves the application of the Products in a nuclear facility, the Buyer shall, before such use or provision, arrange for insurance or governmental indemnity protecting the Seller against liability and hereby releases and agrees to indemnify the Seller and its suppliers for any nuclear damage, including loss of use, in any manner arising out of a nuclear incident, whether alleged to be due, in whole or in part to the negligence or otherwise of the Seller or its suppliers.

**XIV. STATUTORY REQUIREMENTS** Seller reserves the right to make any changes in the general specifications of the Products which are required for the Products to conform to any statutory requirement.

**XV. GOVERNMENT CONTRACTS** Only Federal Acquisition Regulation ("FAR") supplement clauses expressly accepted in writing by Seller shall be included or incorporated by reference herein. Seller shall not be bound by and makes no representation of compliance with any FAR or FAR supplement clauses that Seller shall not have expressly accepted in writing.







RNLXX1-LM Issue 25  
EDO# 05-19-110

205 Keith Valley Road, Horsham, PA 19044  
Telephone: +1 215-674-1234  
Fax: +1 215-674-2731  
E-mail: [drexelbrook.sales@ametek.com](mailto:drexelbrook.sales@ametek.com)  
Website: [www.drexelbrook.com](http://www.drexelbrook.com)