AMETEK®
DREXELBROOK

Leader in
Level Measurement

Installation and Operating Instructions

SIL IntelliPoint RF™ SXRXL Series
Line Powered Point Level Safety Switch

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SXRXLXX1-LM
Issue# 04

SIL IntelliPoint RF™ SXRXL Series
Line Powered Point Level Safety Switch

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Contents

Contents

Section 1: Introduction

1.1 System Description 1
1.2 Technology 1
1.3 Model Number 2
1.4 SIL Sensing Element List 3
1.5 Dual Compartment Housing Detail 4

Section 2: Installation

2.1 Unpacking 5
2.2 Mounting and Installation Guidelines 5
2.3 Input Wiring 8
2.4 Spark Protection 8
2.5 Output Wiring - Relay Version 8
2.6 Circuit Board 9
2.7 Output & Status LEDs 13
2.8 Sensing Element Connection 13
2.9 Calibration 16

Section 3: Spare Parts List 20

Section 4: Troubleshooting

4.1 RF Point Level Troubleshooting Guide 22
4.2 Testing Electronic Unit 23
4.3 Over Range 24
4.4 Under Range 24
4.5 Testing the Relay Circuits 24
4.6 Testing The Sensing Element 25
4.7 Testing the Integral Cable 28
4.8 Testing the Remote Cable 28
4.9 Testing the Power Supply 29
4.10 Factory Assistance 30
4.11 Field Service 30
4.12 Customer Training 30
4.13 Equipment Return 31

Section 5: Specifications

5.1 Approvals 34

Section 6: Control Drawings

6.1 FM / FMc Control Drawings 36
6.2 ATEX Control Drawings 50
6.3 CE Mark Declaration of Conformity 59
6.4 IECEx Control Drawings 60
6.5 Mounting and Wiring for Spark Protector Drawings 69
6.6 Adding a Padded Capacitor 72
6.7 Dual Seal Assembly for 700 Series Sensing Elements 75

Appendix A:

Shortening or Lengthening the Sensing Element A-1
CE Installation Supplement A-2
CE Installation Supplement (Continued) A-3

Appendix B: SIL Certification Information

EXIDA Management Summary B-1
EXIDA Report Results B-2

Section 1

Section 1: Introduction

1.1 System Description

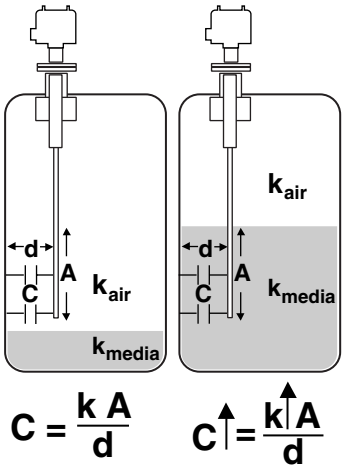


Figure 1-1

Simple Capacitance Probe (Insulating Media Shown)

Installation is simple and easy on the AMETEK Drexelbrook **IntelliPoint™** Series products. Simply apply power and the IntelliPoint system is ready to detect the presence or absence of material. Since the 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

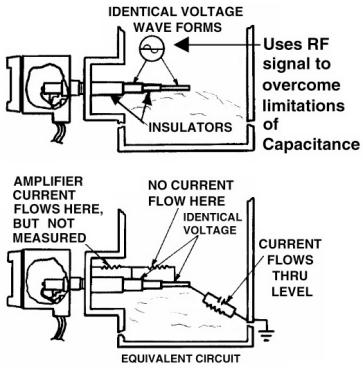


Figure 1-2

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, The 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, good for very wide range conditions from cryogenics to high temperature, from vacuum to 10,000psi pressure, and works with all types of materials.

1.3 Model Number

Safety IntelliPoint RF ™

Safety Switch

S

SIL

2 SIL2

Technology

R RF Admittance

Measurement Type

N	Auto Calibration (2pf)	**T**	Auto Calibration (10pf)
H	Auto Calibration (0.5pf)	**V**	10pf Fixed Calibration
L	2pf Fixed Calibration	**P**	0.5pf Fixed Calibration

Input

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

Housing

2 ATEX / IECEx Approved, NEMA 4X/IP66, M20 X 1.5 conduit entries
3 FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries
7 FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only
B FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only

Electronics

0	Integral	**7**	Rmt. w/ (25 ft.) Tri-Ax Cable	**E**	Rmt. w/ (75 ft.) 1st 10ft Hi-Temp. Cbl.
1	Remote, no cable	**8**	Rmt. w/ (50 ft.) Tri-Ax Cable	**F**	Rmt. w/ (5 ft.) G.P. Cable
2	Rmt. w/ 3 m (10 ft.) G.P. Cable	**9**	Rmt. w/ (75 ft.) Tri-Ax Cable	**G**	Rmt. w/ (5 ft.) Tri-Ax Cable
3	Rmt. w/ 7.6 m (25 ft.) G.P. Cable	**A**	Rmt. w/ (10 ft.) Hi-Temp. Cable	**H**	Rmt. w/ (10 ft.) Tri-Ax Cable
4	Rmt. w/ 10.6 m (35 ft.) G.P. Cable	**B**	Rmt. w/ (25 ft.) 1st 10ft Hi-Temp. Cbl.	**J**	Rmt. w/ (35 ft.) Tri-Ax Cable
5	Rmt. w/ 15.2 m (50 ft.) G.P. Cable	**C**	Rmt. w/ (35 ft.) 1st 10ft Hi-Temp. Cbl.	**K**	Rmt. w/ (5 ft.) Hi-Temp. Cable
6	Rmt. w/ 23 m (75 ft.) G.P. Cable	**D**	Rmt. w/ (50 ft.) 1st 10ft Hi-Temp. Cbl.		

Output

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

Sensing Element (Reference Section 1.4 for Probe Selections)

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

	IL	CSL
xxxH	914 mm (36")	254 mm (10")
xxxJ	914 mm (36")	0 mm (0")
xxxK	1219 mm (48")	254 mm (10")
xxxL	1524 mm (60")	254 mm (10")
P00X	IL/CSL Other	
xxxZ	Other	

S		R		T			0		

IMPORTANT:
Minimum Active Length for SIL Compliance is 24" (610mm)
Consult Factory for Shorter Lengths

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

Not all mounting options are available with all sensing elements

NPT Threads

A1B	¾"NPT	316SS	**A2B**	1"NPT	316SS
A1C	¾"NPT	Hastelloy C	**A2C**	1"NPT	Hastelloy C
A1P	¾"NPT	PFA			

DIN Flanges

E01	25 mm	16 bar	RF 316/316L SS	**E02**	25 mm	16 bar	RF CS
EP1	25 mm	40 bar	RF 316/316L SS	**EP2**	25 mm	40 bar	RF CS
EQ1	50 mm	16 bar	RF 316/316L SS	**EQ2**	50 mm	16 bar	RF CS
ER1	50 mm	40 bar	RF 316/316L SS	**ER2**	50 mm	40 bar	RF CS
ES1	80 mm	16 bar	RF 316/316L SS	**ES2**	80 mm	16 bar	RF CS
ET1	80 mm	40 bar	RF 316/316L SS	**ET2**	80 mm	40 bar	RF CS
EU1	100 mm	16 bar	RF 316/316L SS	**EU2**	100 mm	16 bar	RF CS
EV1	100 mm	40 bar	RF 316/316L SS	**EV2**	100 mm	40 bar	RF CS
EW1	150 mm	16 bar	RF 316/316L SS	**EW2**	150 mm	16 bar	RF CS
EX1	150 mm	40 bar	RF 316/316L SS	**EX2**	150 mm	40 bar	RF CS

Sanitary TriClamps

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

ANSI Flanges

DA1	1"	150#	RF 316/316L SS	**DA2**	1"	150#	RF CS
DB1	1½"	150#	RF 316/316L SS	**DB2**	1½"	150#	RF CS
DC1	2"	150#	RF 316/316L SS	**DC2**	2"	150#	RF CS
DD1	2½"	150#	RF 316/316L SS	**DD2**	2½"	150#	RF CS
DE1	1"	300#	RF 316/316L SS	**DE2**	1"	300#	RF CS
DF1	1½"	300#	RF 316/316L SS	**DF2**	1½"	300#	RF CS
DG1	2"	300#	RF 316/316L SS	**DG2**	2"	300#	RF CS
DH1	2½"	300#	RF 316/316L SS	**DH2**	2½"	300#	RF CS
DI1	3"	150#	RF 316/316L SS	**DI2**	3"	150#	RF CS
DJ1	3"	300#	RF 316/316L SS	**DJ2**	3"	300#	RF CS
DK1	4"	150#	RF 316/316L SS	**DK2**	4"	150#	RF CS
DL1	4"	300#	RF 316/316L SS	**DL2**	4"	300#	RF CS
DM1	6"	150#	RF 316/316L SS	**DM2**	6"	150#	RF CS
DN1	6"	300#	RF 316/316L SS	**DN2**	6"	300#	RF CS

1.4 SIL 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
			700-1202-042 Integral	20.7 bar @ 232°C (300 PSI @ 450°F)	
	06	General purpose with FDA approved materials of construction	700-1202-031 Remote & 700-1202-032 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and FDA grade PEEK
	07	General purpose for granular materials	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
	09	General purpose for granular materials w/FDA approved materials of construction	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
	10	Corrosive liquids	700-0001-018 Remote	3.4 bar @ 149°C (50 PSI @ 300°F)	PFA
	11	General purpose, higher pressure, TFE compatibility required	700-0201-005 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
				13.8 bar @ 232°C (200 PSI @ 450°F)	
	12	Corrosive material, higher pressure	700-0201-005 Integral or Remote (Hastelloy C)	69 bar @ 38°C (1000 PSI @ 100°F)	Hastelloy C and TFE
				13.8 bar @ 232°C (200 PSI @ 450°F)	
	13	Sanitary (Non- 3A Approved)	700-0201-019 Integral or Remote	13.8 bar @ 149°C (200 psi @ 300°F)	316/316L SS and TFE
	14	General purpose, low pressure	700-0202-002 Integral or Remote	3.4 bar @ 149°C (50 PSI @ 300°F)	316/316L SS and TFE
				1.4 bar @ 232°C (20 PSI @ 450°F)	
	15	Heavy Duty agitated tanks or material w/bulk density	700-0202-043 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
				13.8 bar @ 232°C (200 PSI @ 450°F)	
	16	High integrity seal for hazardous materials	700-0002-360 Integral or Remote	34.5 bar @ 149°C (500 PSI @ 300°F)	PFA
	17	Sanitary low pressure	700-0202-029 Integral or Remote	34.5 bar @ 149°C (50 PSI @ 300°F)	316/316L SS and TFE
	18	Corrosive material, higher pressure with water like viscosity	700-0001-022 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	TFE
				34.5 bar @ 149°C (500 PSI @ 300°F)	
	19	Interface Measurement	700-0002-023 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
				34.5 bar @ 149°C (500 PSI @ 300°F)	
	20	Miniature Pilot Plant Sensor	700-0209-002 Remote	69 bar @ 121°C (1000 PSI @ 250°F)	316/316L SS and TFE
				0 bar @ 232°C (0 PSI @ 450°F)	
	21	Heavy Duty agitated tanks or material w/bulk density and corrosive	700-0202-043 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	Hastelloy C and TFE
				13.8 bar @ 232°C (200 PSI @ 450°F)	
	22	700-0202-043 with proximity plate	700-0202-044 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F)	316/316L SS and TFE
				13.8 bar @ 232°C (200 PSI @ 450°F)	
	24	Inactive cable probe with active weight - liquids only	700-0005-485 Integral & 700-0005-285 Remote	200 psi @ 200°F	316/316L SS and FEP
	25	Inactive cable probe with active weight - corrosive liquids	700-0005-485 Integral & 700-0005-285 Remote	200 psi @ 200°F	Hastelloy C and FEP
	26	Extra heavy duty rearmount	700-0220-001 Remote	20 psi @ 180°F	316/316L SS and FEP
	27	Extra heavy duty	700-0221-002 Remote	50 psi @ 300°F	316/316L SS and FEP
				20 psi @ 450°F	
	28	General purpose very high pressure	700-1202-051 Remote	1500 PSI @ 250°F	316/316L SS and PEEK
			700-1202-052 Integral	500 psi @ 450°F	
High Pressure/Temperature	60	High Pressure and High Temperature	700-0204-038 Remote	137.9 bar @ 93°C (2000 PSI @ 200°F)	316/316L SS and Ceramic
				68.9 bar @ 260°C (1000 PSI @ 500°F)	
	61	High Temperature	700-0204-002 Remote	1 psi @ 700°F	316/316L SS and Ceramic
				0 bar @ 816°C (0 PSI @ 1500°F)	
	62	Very high pressure - not for steam	700-0204-048 Remote	4000 psi @ 600°F	316/316L SS, Vespel and Ceramic
	64	High pressure and high temperature	700-0204-024 Remote	1000 psi @ 750°F	316/316L SS, Monel 400 and Alumina Ceramic
	66	700-0204-002 with secondary seal - vertical only in liquids	700-0204-022 Remote	1000 psi @ 100°F	316/316L SS and Ceramic
				200 psi @ 800°F	
3A	67	700-3201 Series 3A Sanitary Probe	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, insulated center rod	700-0201-027 Integral or Remote	150 psi @ 300°F	316/316L SS and TFE
	73	Retractable, bare center rod	700-0201-028 Integral or Remote	150 psi @ 300°F	316/316L SS and TFE
Specialty	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
Integrated Ground Refewrence	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 & 700-1202-016 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and PEEK
	92	General purpose higher pressure with perforated concentric shield	700-1202-045 Remote	1000 PSI @ 250°F	316/316L SS and PEEK
			700-1202-046 Integral	300 psi @ 450°F	
	93	General purpose very high pressure with perforated concentric shield	700-1202-055 Remote	1500 PSI @ 250°F	316/316L SS and PEEK
			700-1202-056 Integral	500 psi @ 450°F	
	94	Miniature Pilot Plant Sensor with concentric shield	700-0209-024 Remote	69 bar @ 121°C (1000 PSI @ 250°F)	316/316L SS and TFE
				0 bar @ 232°C (0 PSI @ 450°F)	

1.5 Dual Compartment Housing Detail

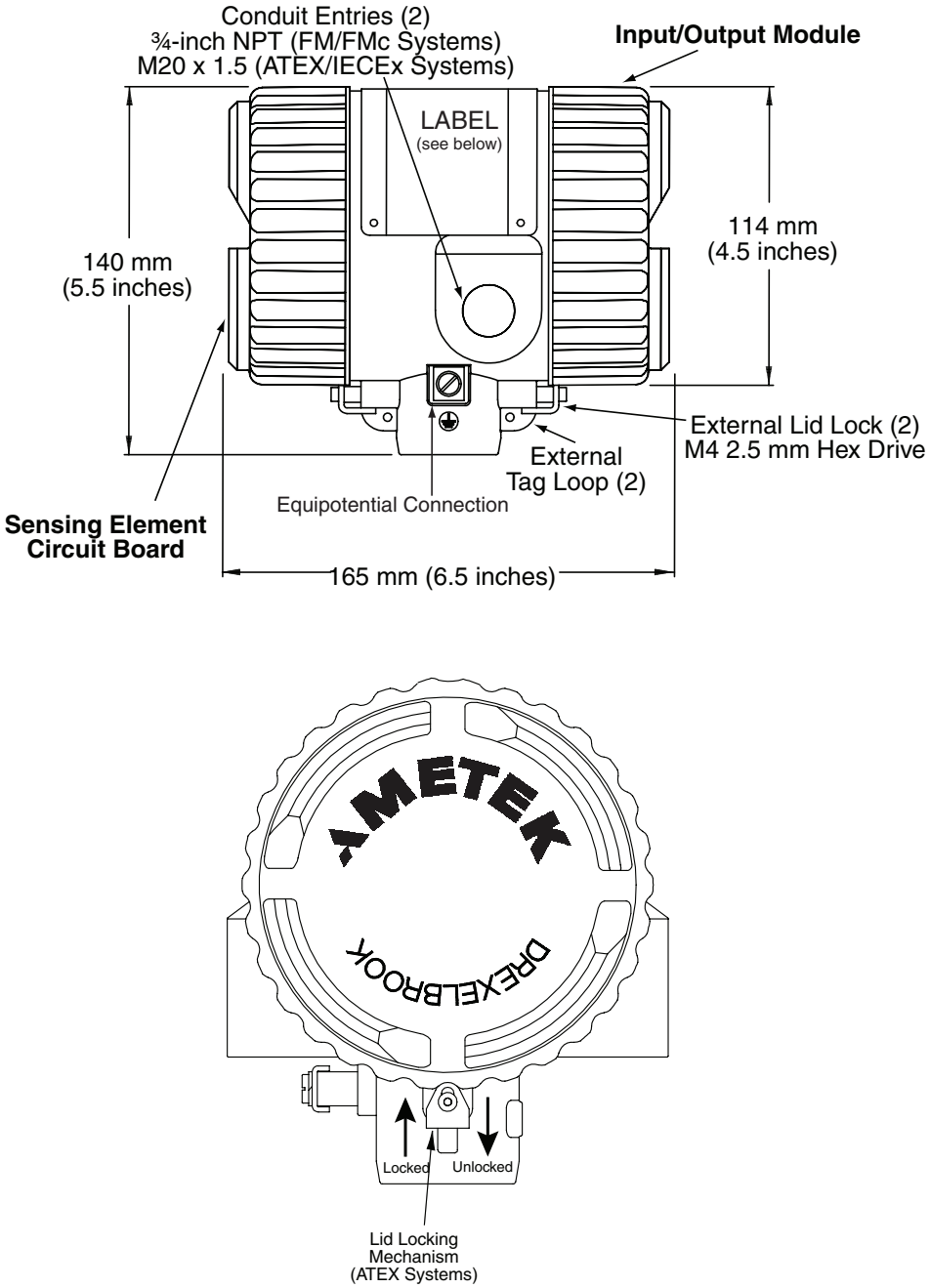


Figure 1-3
Dual Compartment Housing Detail

NOTICE

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

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 be powered AFTER it is installed in the application and with material BELOW the sensing element.

The IntelliPoint RF instrument can be mounted vertically or horizontally at any angle. The 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 uses a dual compartment housing and a completely encapsulated input/output module to reduce the possibility that damage may occur from water migrating into the housing through the conduit. To further reduce the possibility of damage caused by water in the conduit, install a drip loop and breather drain to purge any accumulating moisture. ***Refer to Figure 2-1***.

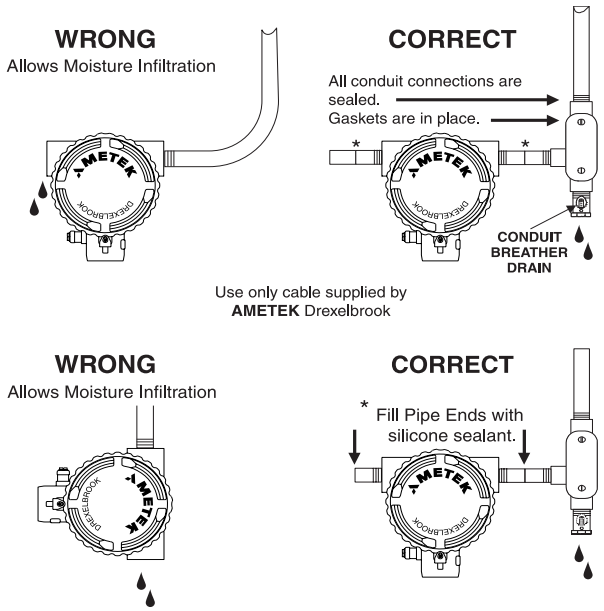


Figure 2-1
Recommended Conduit Connection

2.2 Mounting and Installation Guidelines (Continued)

After system is installed and level is **below** the sensing element, apply power. The RF Series instrument automatically calibrates and is ready to detect change in level. If properly installed, the Green LED lights when power is applied. The Red LED should not be flashing. If the Red LED is flashing, refer to ***Section 4: Troubleshooting.***

NOTICE

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

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

WARNING:
IntelliPoint RF equipment is rated explosion-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. ***See Figure 2-2.***

When installing IntelliPoint RF instrument, ambient temperature at electronics must not exceed 70°C (158°F).

When installing flange-mounted sensing elements, keep mating surfaces and bolts free of paint and corrosion to ensure proper electrical contact with vessel. Avoid using excessive amounts of Teflon™ tape when installing threaded sensing elements.

Install systems with threaded NPT connection via wrench flats on the process connection ONLY.

Locate sensing element to avoid enhancing electrostatic discharge from process medium, as is good practice with any thermowell, displacer, or sampler. This includes correct bonding to the tank or silo wall.

If installation area is rated explosion-proof and requires conduit seal fittings, they should be used in accordance with company standards and local codes.

2.2 Mounting and Installation Guidelines (Continued)

Mounting sensing element inside a pipe is not recommended.

Do not mount a Cote-Shield sensing element through a nozzle that exceeds length of first insulator.

Ensure that there are no obstructions or agitator blades to interfere with sensing element.

Rigid sensing elements can be mounted either vertically or horizontally.

NOTICE

Do Not Shorten the sensing element without checking with the factory. 215-674-1234.

After the system has been installed, a proof test must be performed (See Section 4.2).

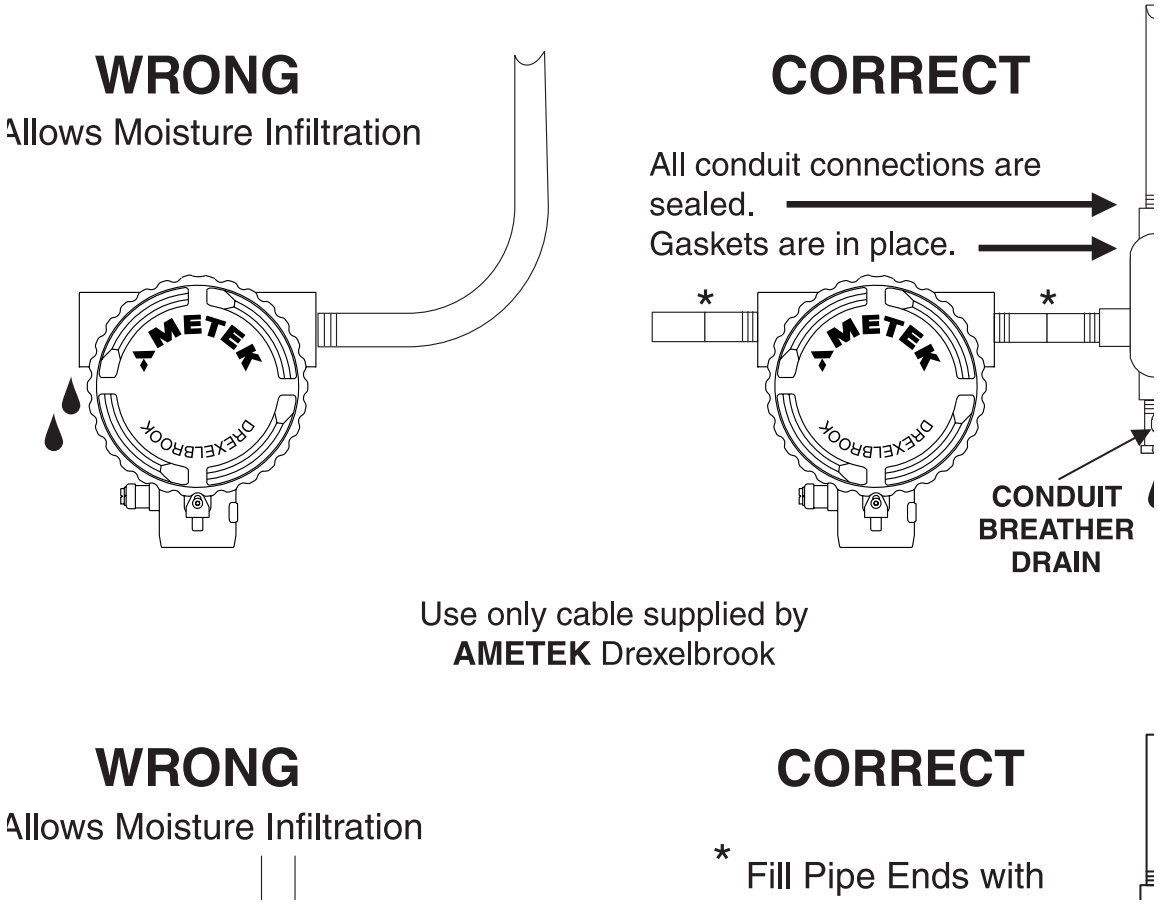


Figure 2-2
Installation Considerations

2.3 Input Wiring

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.

The IntelliPoint RF instrument utilizes a universal power supply and can be operated from any source between 85-250 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. IOM is held in place with three screws. ***See Figure 2-3***.

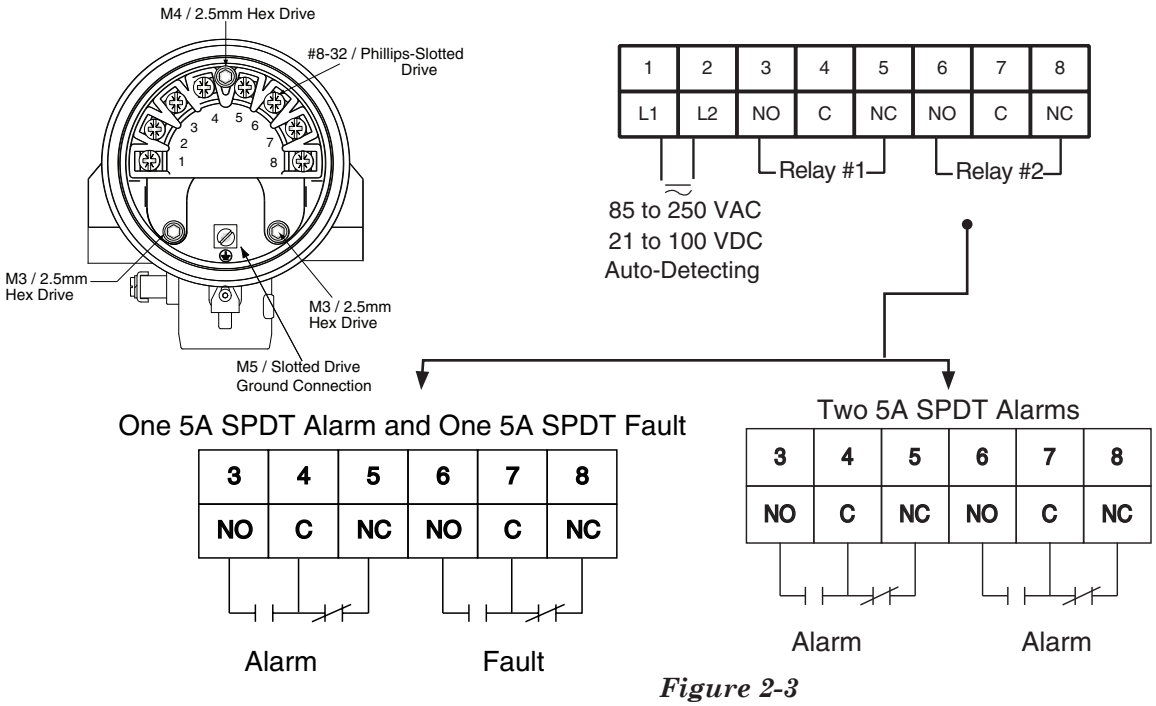


Figure 2-3

Input and Relay Wiring / Customer Connections Side

2.4 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.

2.5 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.

2.6 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***.

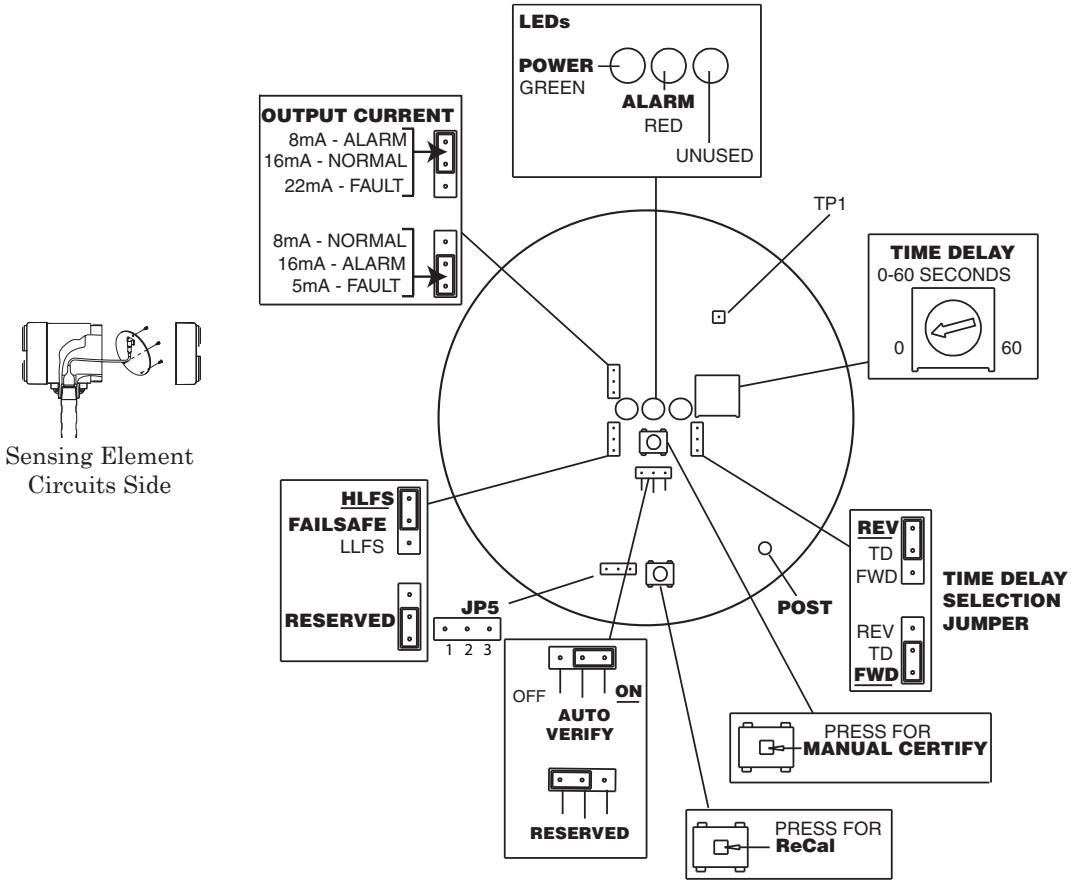


Figure 2-4
Circuit Board

NOTICE

Do NOT push the ReCal button without first ensuring 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 (marked on label). It is used to help stop an oscillating current 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 set to zero (0) seconds.

NOTICE

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 if loop current is delayed from going into alarm state or recovering after an alarm state.

- The Time Delay Action is field-selectable using the TD jumper on sensing element side of the housing.
- **FWD**: delays system from coming out of alarm.
- **REV**: delays system from going in alarm.
- The instrument is supplied with time delay action set in forward mode (**FWD**) position.

2.6.3 Failsafe

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

- Safety Switches are only applicable to High Level Fail Safe (HLFS) applications. Fail Safe is factory pre-set and tamper proof sealed. This mode cannot be changed.

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 / Remote Certify™

The "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/Remote Certify feature:

- Checks the AutoVerify™ and system circuits to ensure proper operation.
- Checks the integrity of the wiring connections.
- Verifies that the sensing element is working properly.

The "**Manual Certify**" test is initiated with the press of the Manual Certify Button located on the sensing element / circuit side of the housing.

The "**Remote Certify**" test is initiated by creating a momentary short between contacts 7 and 8 located on the power supply side of the housing. This can be done with a push button or relay closure.

After initializing the Certify test, the green LED flashes for 5 seconds and the red LED will illuminate. The current moves to the alarm condition for 2 seconds. If the red LED does not turn on, and the current does not move to the alarm condition, the Certify has detected a fault. ***Consult Section 4: Troubleshooting***.

2.6.6 AutoVerify™

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

The Safety IntelliPoint switch is shipped with AutoVerify Enabled and tamper sealed.

AutoVerify Can Not be Disabled on the Safety IntelliPoint.

If a fault is detected during the AutoVerify cycle, both LEDs will flash and the relays will de-energize.

2.6.7 AutoVerify™ Criteria

1.. In order for the Safety 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).

2. Consult Factory for specialty sensors that may be available for shorter length requirements.

2.6.8 Periodic Testing Requirement

The intent of periodic testing is to ensure the SIS continues to function according to design requirements. Periodic testing intervals should be calculated during the SIF design verification. This time interval must be made part of the maintenance procedure for this process.

2.6.9 Re-Calibration

Do not push the "ReCal" Button without first ensuring the IntelliPoint is properly installed and is below the sensing element.

If reset is unsuccessful a red LED will flash**.** The system is now ready for installation.

A full system proof test must be performed when:
- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

Nonvolatile Memory

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

When unit 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 unit will also store the last covered value and the last uncovered value.

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

The nonvolatile memory will retain the recorded values even if power is lost for months. When the unit regains power, the microprocessor compares the stored values to the current measured value. Then determines its current status.

The setpoint is stored in memory to indicate the last status of the switch. So, when the unit regains power the microprocessor reads the current value of the sensor and determines the status based on the stored values. It will only re-calibrate if the re-call button is pressed.

2.7 Output and LED Status

NOTICE

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.

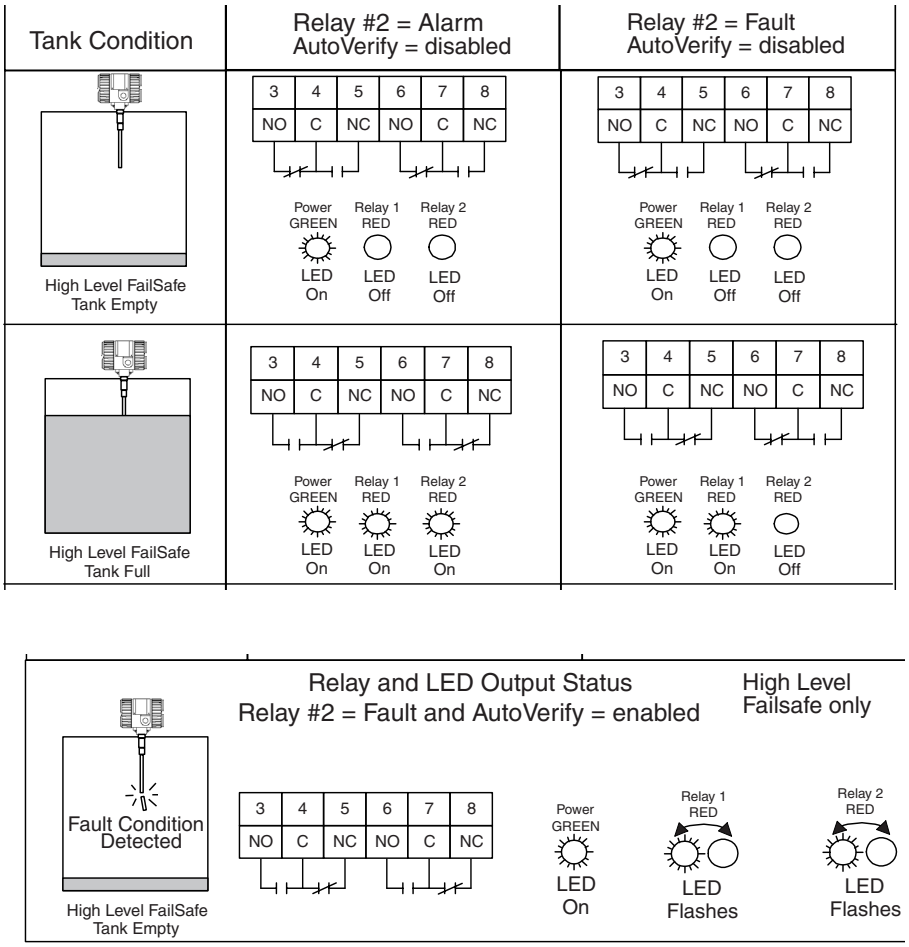


Figure 2-5

Output and LED Status

2.8 Sensing Element Connection

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

NOTICE

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.

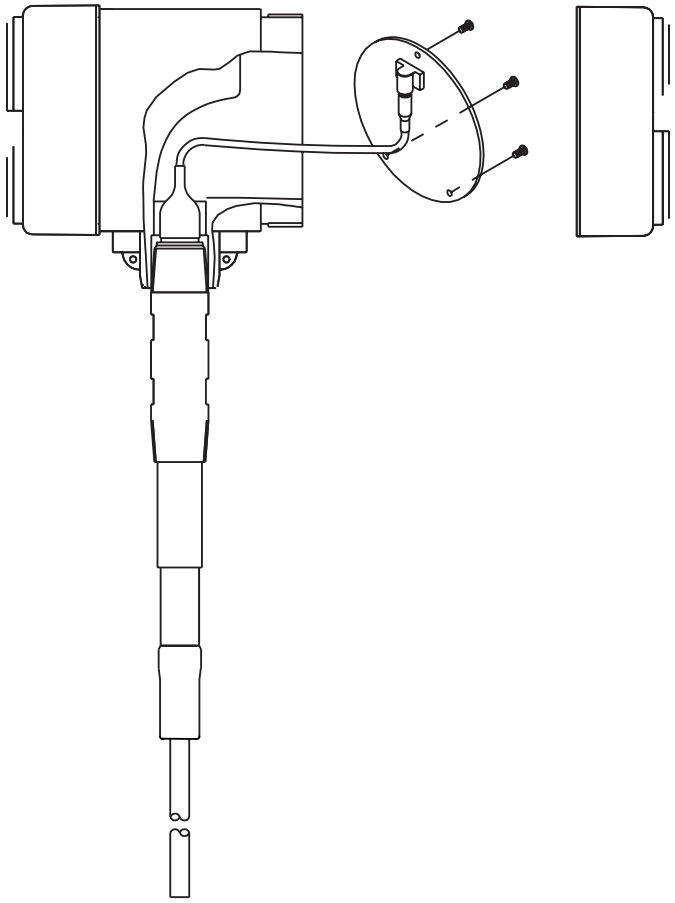
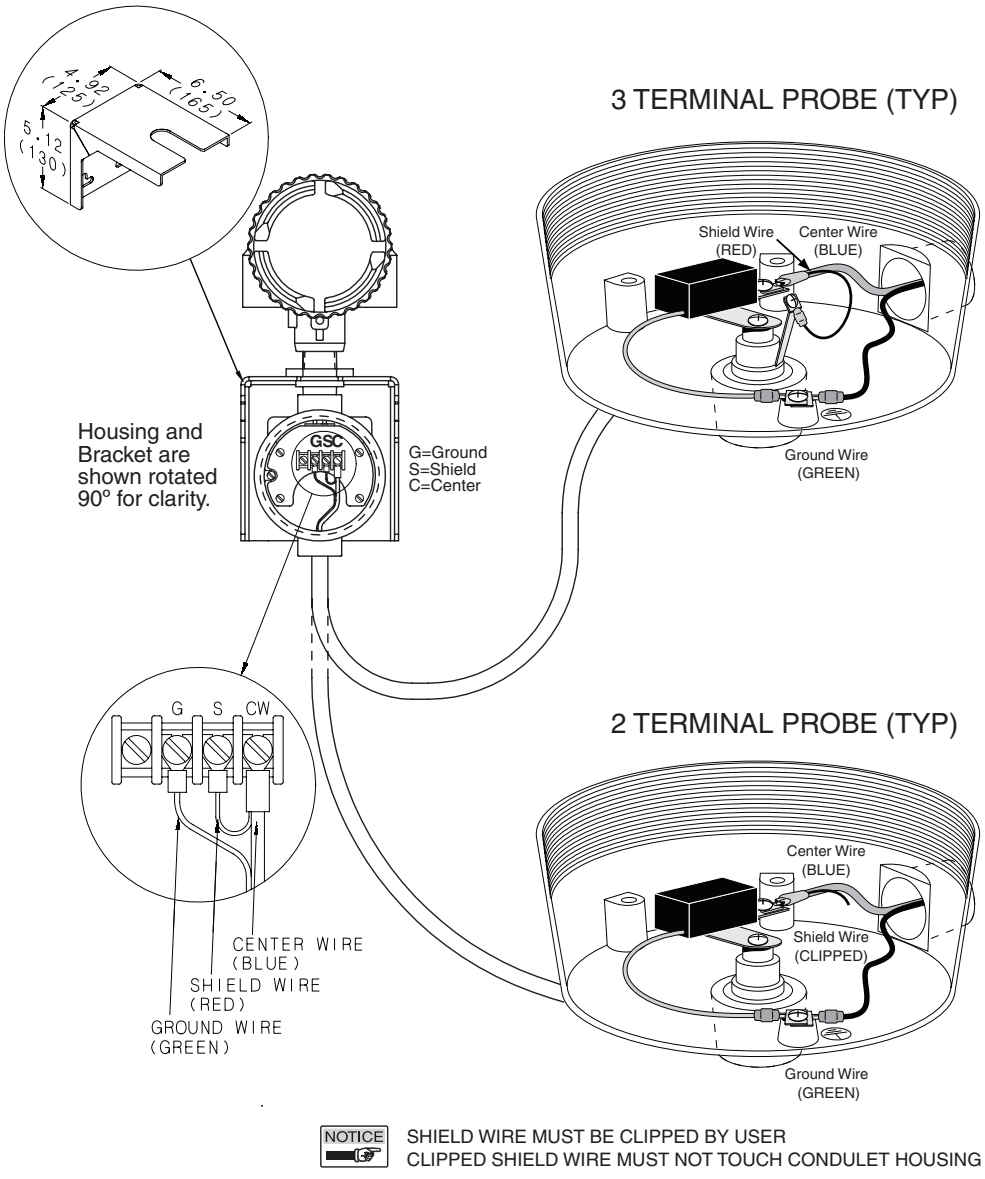


Figure 2-6
Sensing Element Connection (Integral Mounting)

2.8 Sensing Element Connection (Continued)

NOTICE

See Section 6.5 for Spark Protection, Mounting and Wiring



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

NOTICE

After the system has been installed, a proof test must be performed (See Section 4.2).

A full system proof test must be performed when:

- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

Figure 2-7
Sensing Element Connection (Remote Mounting)

2.9 Calibration

NOTICE

The Intellipoint™ model RNT (Standard Sensitivity) and RHT (High Sensitivity) feature Auto-Cal calibration. Auto-Calibration is suitable for liquid and slurry applications.

A full system proof test must be performed when:
- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

2.9.1 Using the Intellipoint with Auto-Calibration

After the Intellipoint is installed in the vessel with material below the sensing element, simply apply power. The Intellipoint electronic unit will auto calibrate.

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

Calibration is complete.

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

After the IntelliPoint has been installed with the measured material below the sensing element, press and hold the "**ReCal**" button (shown in ***Figure 2-4***) for five (5) seconds. After five seconds, the two LED's flash for sixty seconds before reset occurs.

2.9.2 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, for some reason, the IntelliPoint is used on a different application, or for other reasons it is determined that a different calibration mode should be used, use the following procedure to make a calibration mode change.

2.9.2 IntelliPoint Calibration Mode Change (Continued)

Each IntelliPoint has 4 different Calibration Modes that are available, dependant on the model purchased.

A full system proof test must be performed when:
- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

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.

A full system proof test must be performed when:
- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

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.

2.9.2 IntelliPoint Calibration Mode Change (Continued)

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.

A full system proof test must be performed when:
- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

Calibration Mode changes

NOTICE

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

1. On the RF circuit board (***Figure 2-8***), 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 change modes, press and hold the ReCal button (next to JP 5). The unit will cycle through the modes: first it will flash one time – then pause, this indicates mode #1. It will then flash twice then pause, indicating mode #2, then mode #3, etc. It will scroll through all 4 modes then start over again at mode #1. Release the button when it reaches the desired mode. The LED's will now flash the number of times indicating which mode has been selected.
3. Remove the shunt from pins 1 & 2 of 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.

A full system proof test must be performed when:
- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

2.9.2 IntelliPoint Calibration Mode Change (Continued)

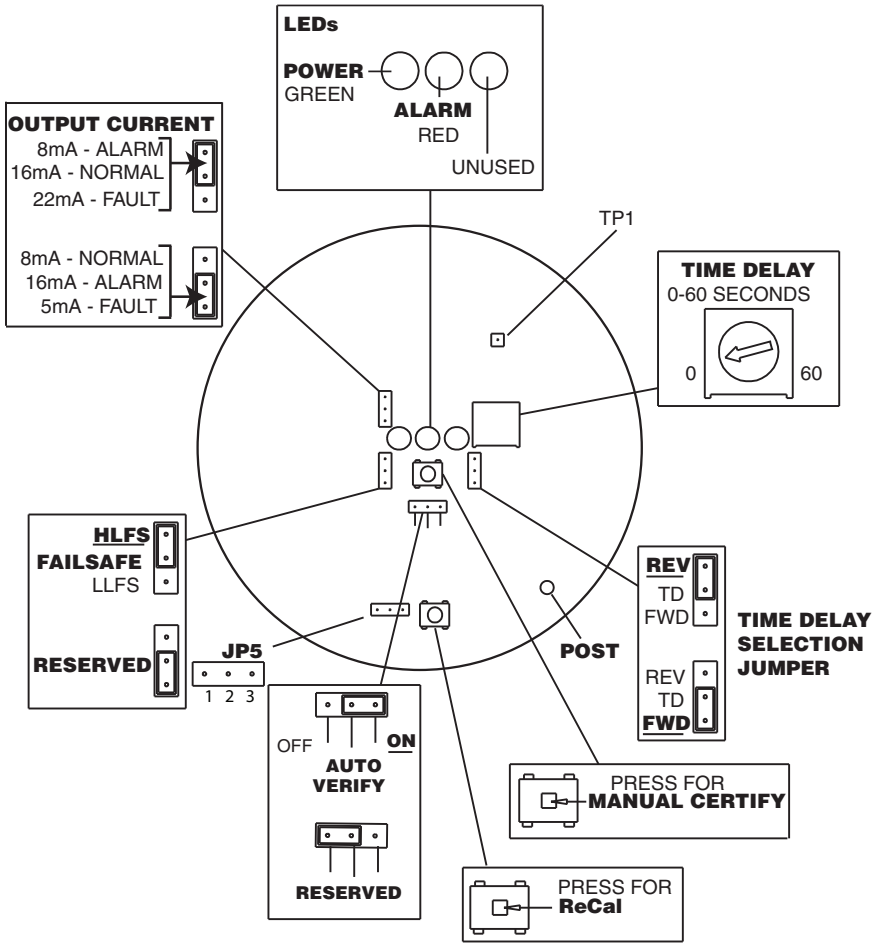


Figure 2-8
Circuit Board

Section 3: 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

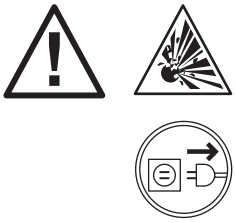
Circuit Board

- 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 4: Troubleshooting



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.

4.1 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 4.7, 4.6
	Flexible sensor is swaying and active is touching vessel or structure	Add 1 or 2 seconds of reverse acting time delay.	Section 2.6.2
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 2.6.2
Switch does not respond to material	There may not be enough active to detect an insulating material	Change to high sensitivity or adding active length to sensor	Consult Factory Section 4.9, App. A
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 2.6.7
	Granular material – Active section is not getting enough coverage due to angle of repose	Relocate sensor to get more coverage or lengthen active. Changing to high sensitivity may also help.	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 2.6.2
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 to 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)	Section 4.9 Consult Factory
	The sensor could be touching an internal tank structure	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 2.6.7
	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
	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 Damaged	Section 2.6.6
	Center wire to shield short	Check cable & sensor	Section 4.5, 4.6, 4.7
	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 2.4
	Electronic Unit is damaged	Consult factory	Section 4.9

4.2 Testing Electronic Unit

NOTICE

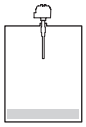
This test is only a test of the electronic unit for troubleshooting purposes, and does not serve as a Verify or Certify test of the complete system.

Proof test must be performed to certify proper operation for SIL perfromance. Reference Appendix B in the EXIDA Failure Modes, Effects and Diagnostic Analysis located on the Drexelbrook.com website under support/ documentation.

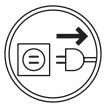
A full system proof test must be performed when:

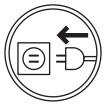
- Any system component is changed or replaced by the user.
- Any system component or setting is modified by the user.

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 high level 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 4.6: Testing Integral Cable, or Section 4.7 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 4.5: 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 & Loop Current 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), 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), IntelliPoint has detected that pad capacitor value is too large or a center wire to Cote Shield short. 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 th eopposite position. The red LED will change and relay contacts should also change. If the contacts do not change, the relay is not functioning properly.

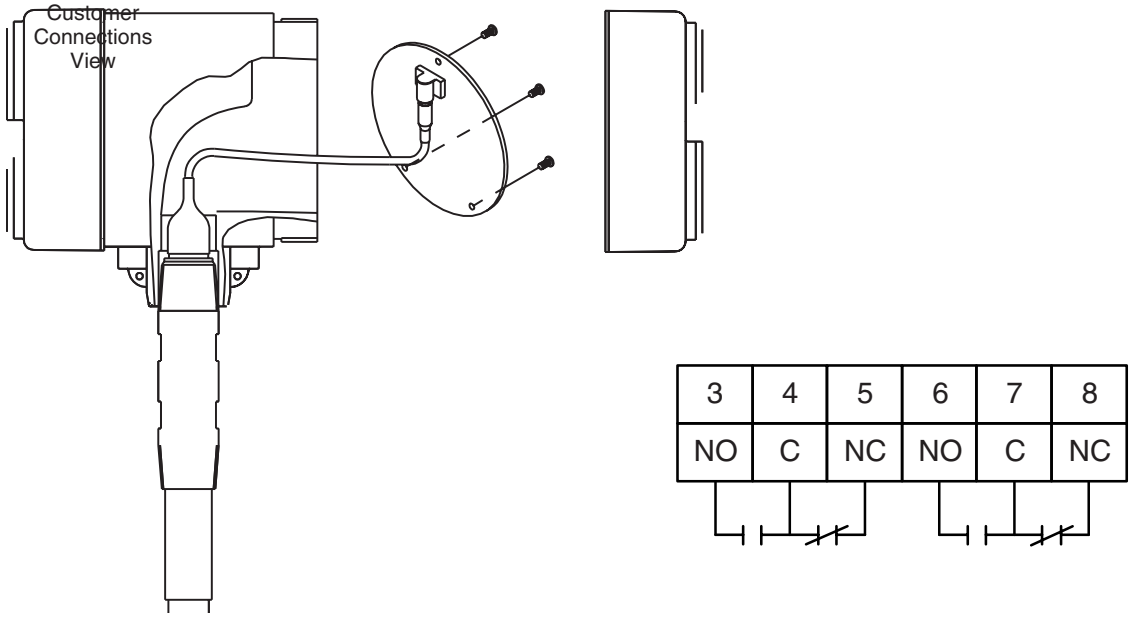


Figure 4-1
Relay Circuit Operation

4.6 Testing The Sensing Element

Integral electronics, ***Ref figure 4-1:***
Remove Sensing Element Circuit Board and disconnect cable from circuit board

Remote electronics, ***Ref figure 4-2***
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[1] that is set to the R x 1K ohm scale, measure the resistances between each pair of sensing element connections. ***Ref Figure 4-1 & 4-2***. 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 the 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.

4.5 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.

[1] A digital ohmmeter will often produce a resistance measurement that is higher than the actual value.

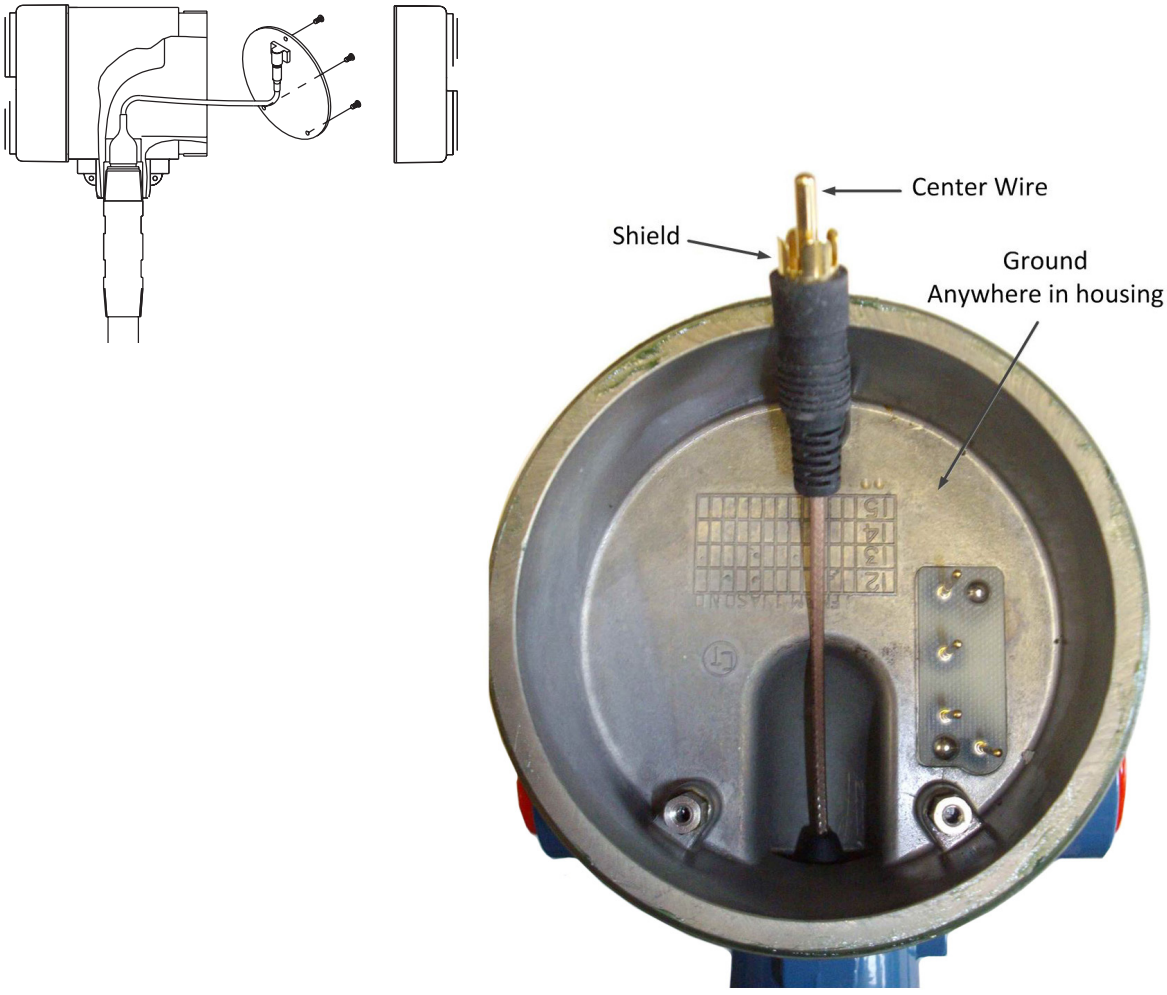


Figure 4-1
Checking the Sensing Element

4.5 Testing The Sensing Element (Continued)

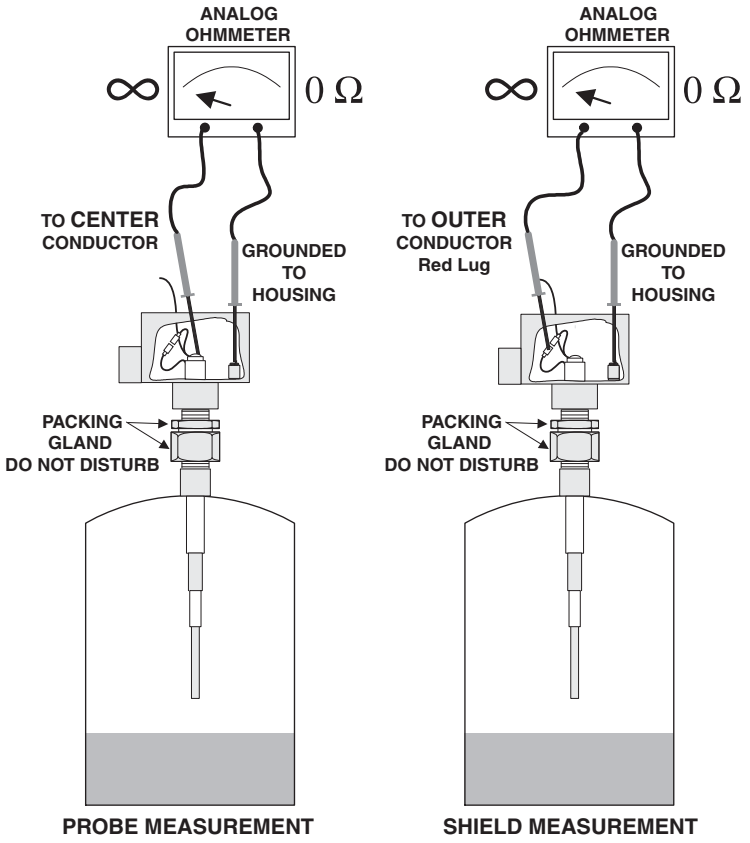


Figure 4-2
Checking the Sensing Element
Center = Probe
Outer = Shield
Housing = Ground

Sensing Element in Vessel		
Center Conductor to Housing	_____	Ohms
Center Conductor to Cote Shield	_____	Ohms
Cote Shield to Housing	_____	Ohms
Sensing Element Cleaned		
Center Conductor to Housing	_____	Ohms
Center Conductor to Cote Shield	_____	Ohms
Cote Shield to Housing	_____	Ohms

Table 4-1

4.6 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 the resistance is greater than 5Ω the cable has failed.

3. Check for shorts.
   a. The integral cable is tested as part of sensing element test, section 4.5.

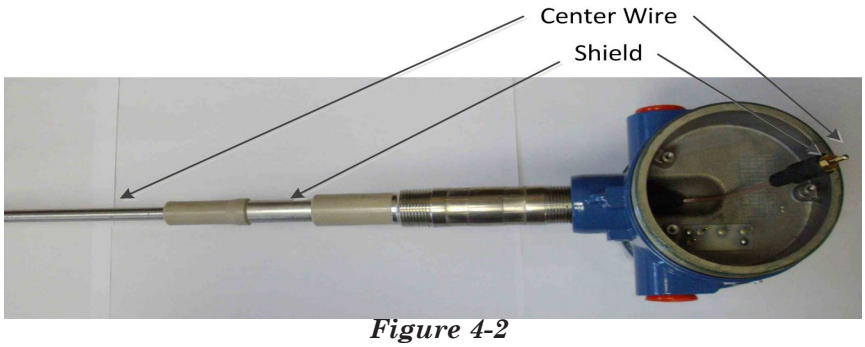


Figure 4-2
Testing Integral Cable

4.7 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 4-3
   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 the 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 the resistance is greater than 10 ohms cable has failed

4.7 Testing the Remote Cable (Continued)

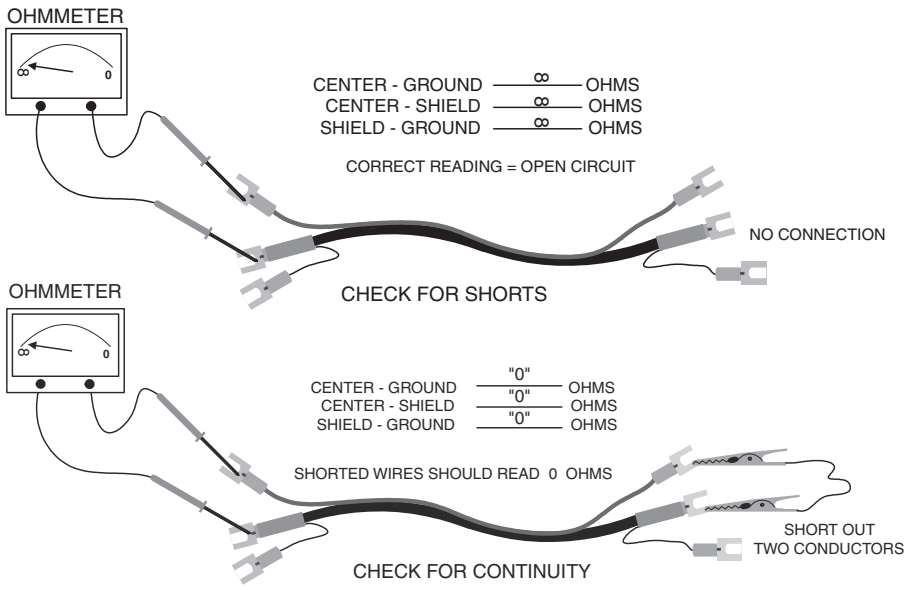
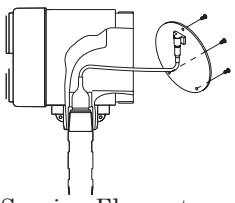


Figure 4-3
Testing Remote Cable

4.8 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 4-4***



Sensing Element
Circuits Side

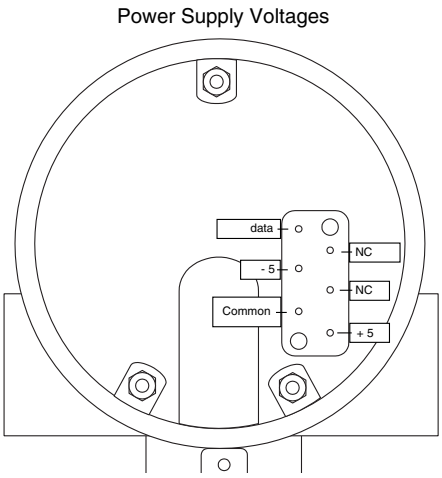


Figure 4-4
Testing Power Supply

4.9 Factory Assistance

AMETEK Drexelbrook can answer any questions about The Intellipoint series instrument. Call Customer Service at +1 215 674-1234.

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

Contact your local Drexelbrook representative,

Telephone the Service department: +1 215 674-1234
FAX: Service Department + 215-443-5117
E-Mail: 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

4.10 Field Service

Trained Field Service 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.

4.11 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 call AMETEK Drexelbrook, Customer Service at 215-674-1234.

4.12 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 the 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

Technology: RF/ Capacitance

Calibration: None

Modes of Operation: High Level Fail Safe

Repeatability: 2mm (0.08 inch) Conductive Liquids

Response Time: Less than 1 Second

Time Delay: 0 to 60 Seconds Forward & Reverse Acting

Ambient Electronics: -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/FMc

Storage Temperature: -40 to 85°C (-40 to 185°F)

Indicators: LEDs: Green=Power, Red= Relay 1, Red= Relay 2

Self-Check: Continuous AutoVerify and Manual Certify

Power Supply (Universal Supply):
85 to 250 VAC
21 to 100 VDC Auto-Detecting w/o Jumper Changes
DC to 400 Hz

Power Consumption: 2 Watts Maximum

Relay Contacts: (2) SPDT

Max Contact Load: 5A/30 VDC/ 5A/250 VAC - Environmentally Sealed

Min Contact Load (DC): 100 mA/12 VDC
0 to 200 mA / 12 VDC Optional

Housing (Electronics): Dual Compartment, Powder-Coated Aluminum with Two Cable Entries

Cable Entry: M20 x 1.5 ATEX/IECEx, ¾-Inch NPT FM/FMc

Ingress Protection: IP66 NEMA 4X

5.1 Approvals

The IntelliPoint RF Point Level System Transmitter has been evaluated as Explosion-proof for use in Class I, Division 1, Groups A, B, C, and D, Dust-Ignition proof for use in Class II and III, Division 1, Groups E, F, and G; Non-incendive for use in Class I, Division 2, Groups A, B, C, and D; Suitable for use in Class II and III, Division 2, Groups F and G Hazardous (Classified) Indoor and Outdoor (Type 4, 4X, IP66) Locations with Intrinsically Safe connections to Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (Classified) locations in accordance with control drawing 420-0004-144-CD for the RxLx and SxRxL Series and Control Drawing 420-0004-173-CD for the RxTx and SxRxT Series; Intrinsically Safe for use in Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G hazardous (Classified) locations in accordance with entity requirements and control drawing 420-0004-173-CD.

ATEX (FM14ATEX0049X)

Integral

II 1 G Ex ia IIC T5... T2 -30°C ≤ TAMB ≤ +70°C; IP66
II 1 D Ex ia IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

Temperature Class	Process Temperature
T5	100°C
T4	135°C
T3	200°C
T2	230°C

Remote

II 1 G Ex ia IIC T5... T2 -30°C ≤ TAMB ≤ +70°C; IP66
II 1 D Ex ia IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

IECEX (FTZU 18.0007X)

System

Ex db ia [ia Ga] IIC T5 Gb/Ga
Ex tb ia [ia Da] IIIC T90ºC Db/Da
-30ºC ≤ Ta ≤ 58ºC

CE 2460

Sensor

Ex ia IIC T5 Ga
Ex ia IIIC T90ºC Da
-30ºC ≤ Ta ≤ 58ºC

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:

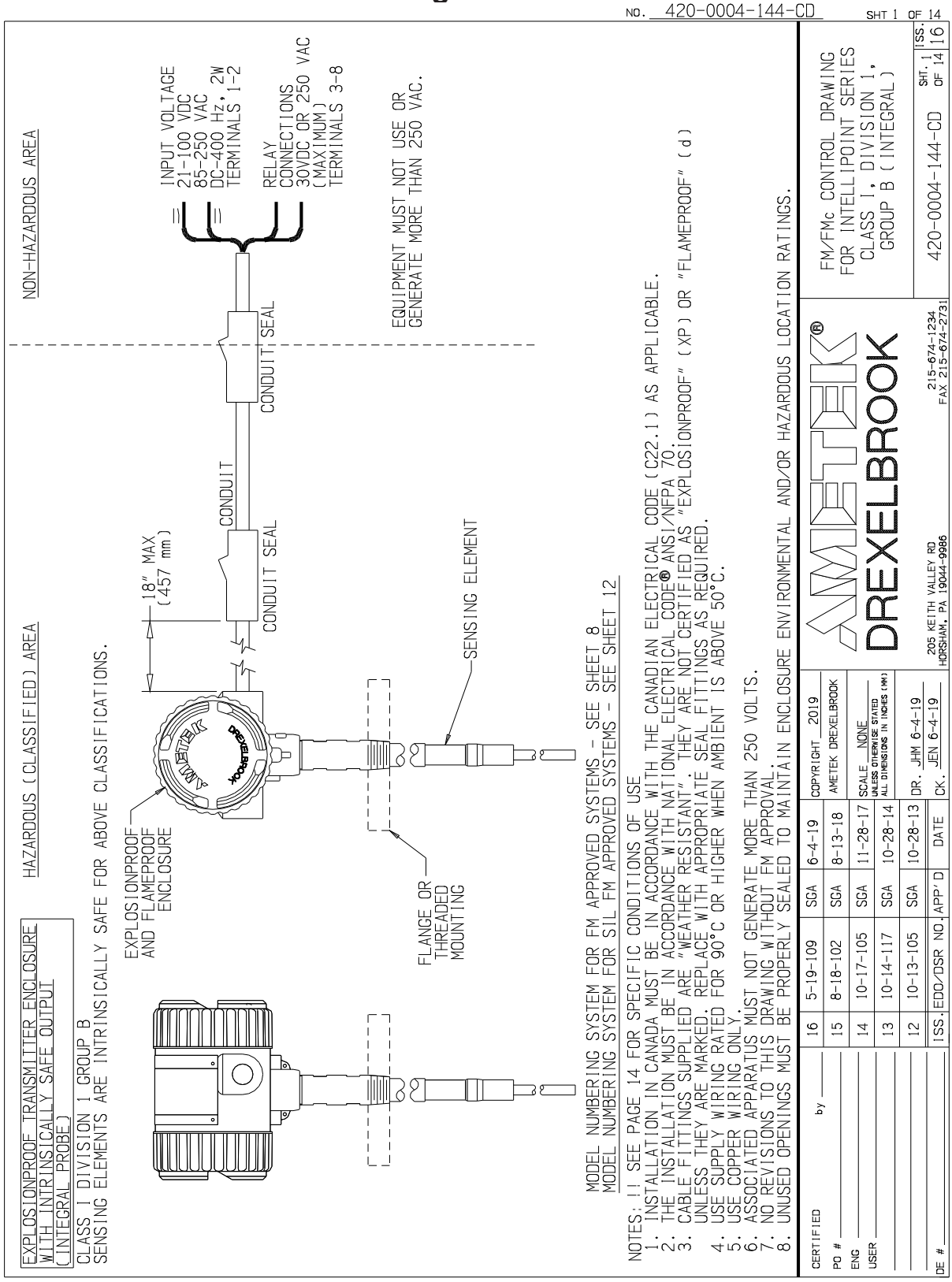
-30°C TO +58°C FOR RXLX/SXRXTX INTELLIPOINT RF LEVEL SYSTEM

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

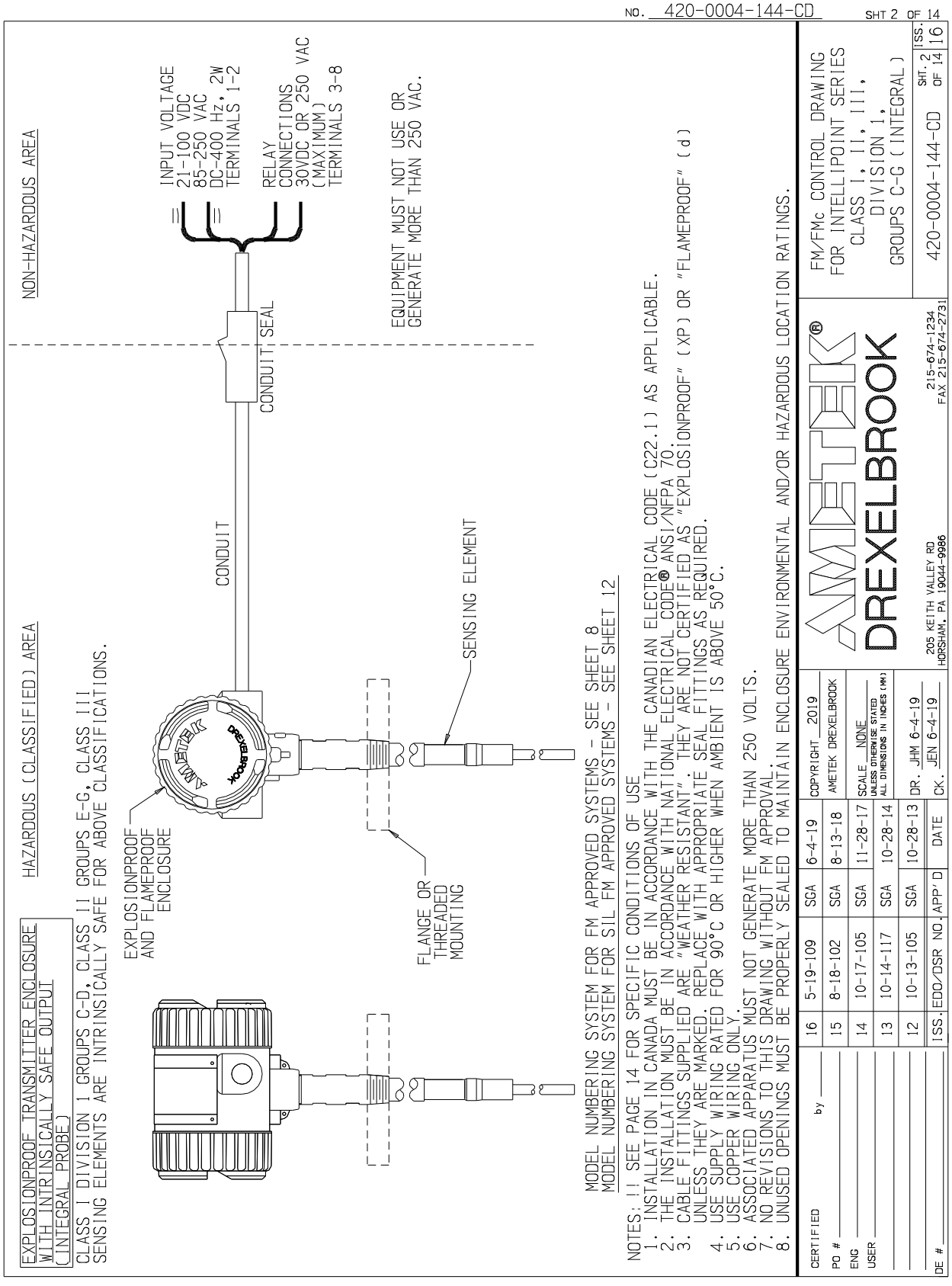
Section 6

Section 6: Control Drawings

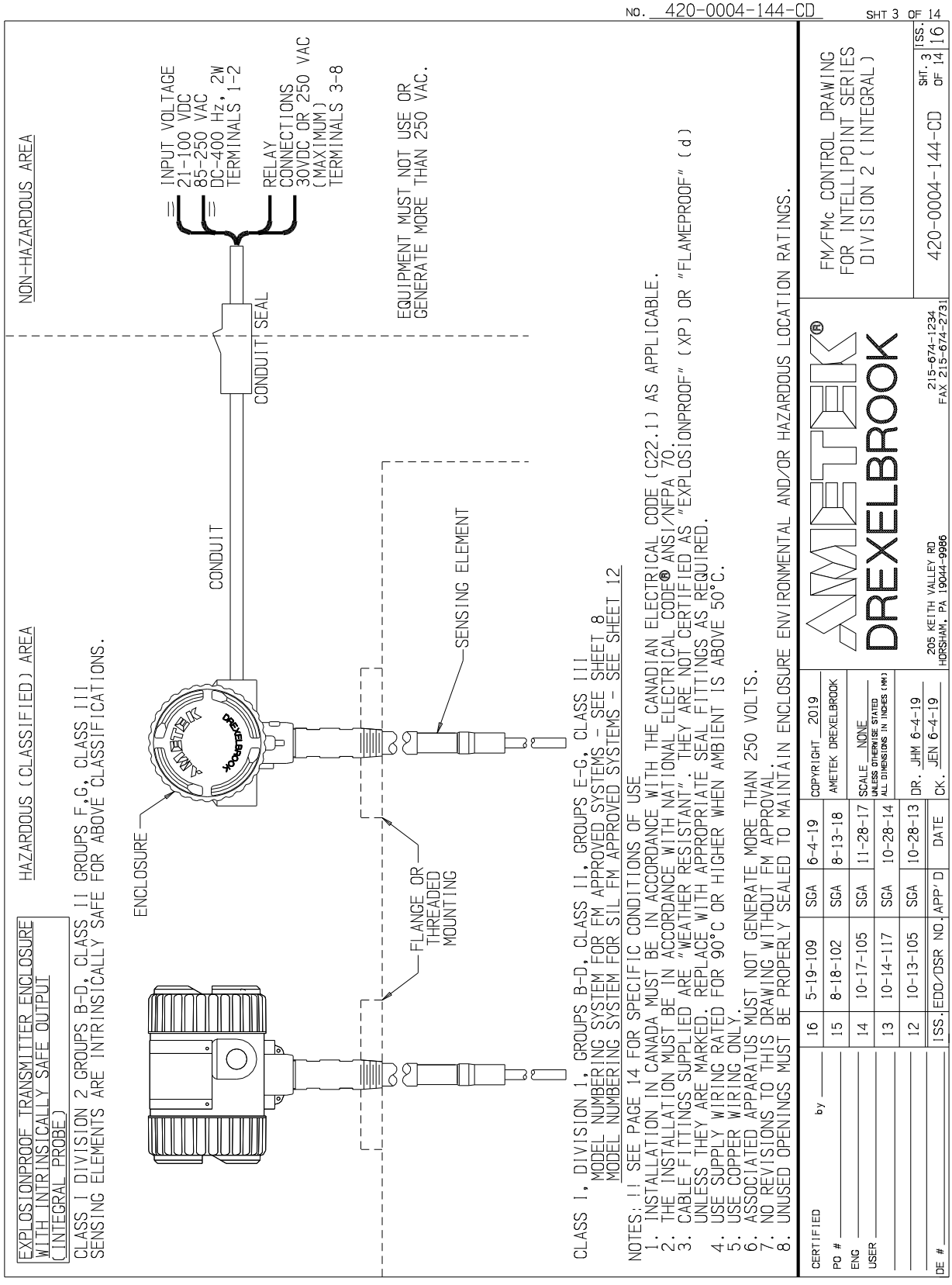
6.1 FM / FMc Control Drawings



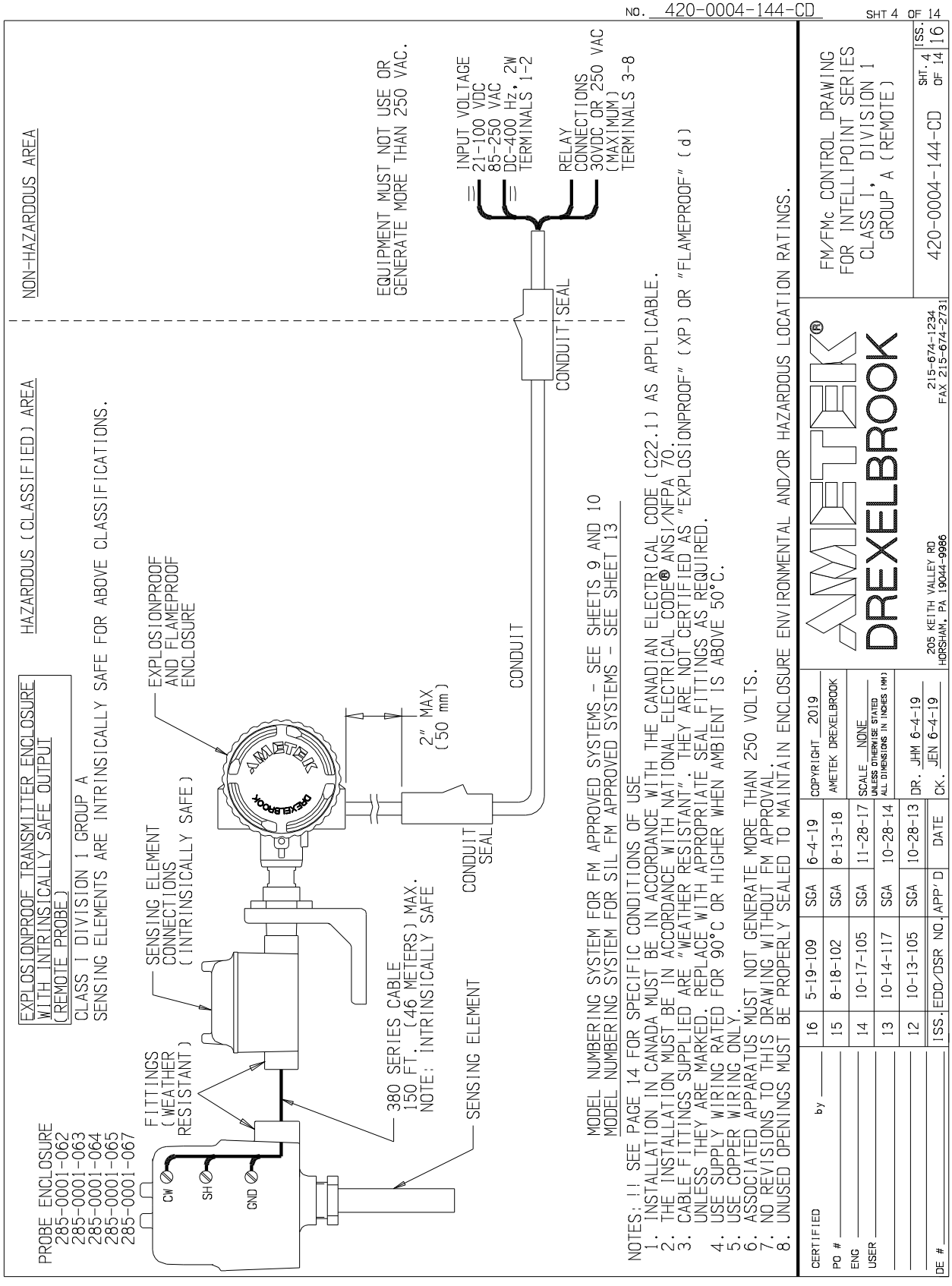
6.1 FM / FMc Control Drawings (Continued)



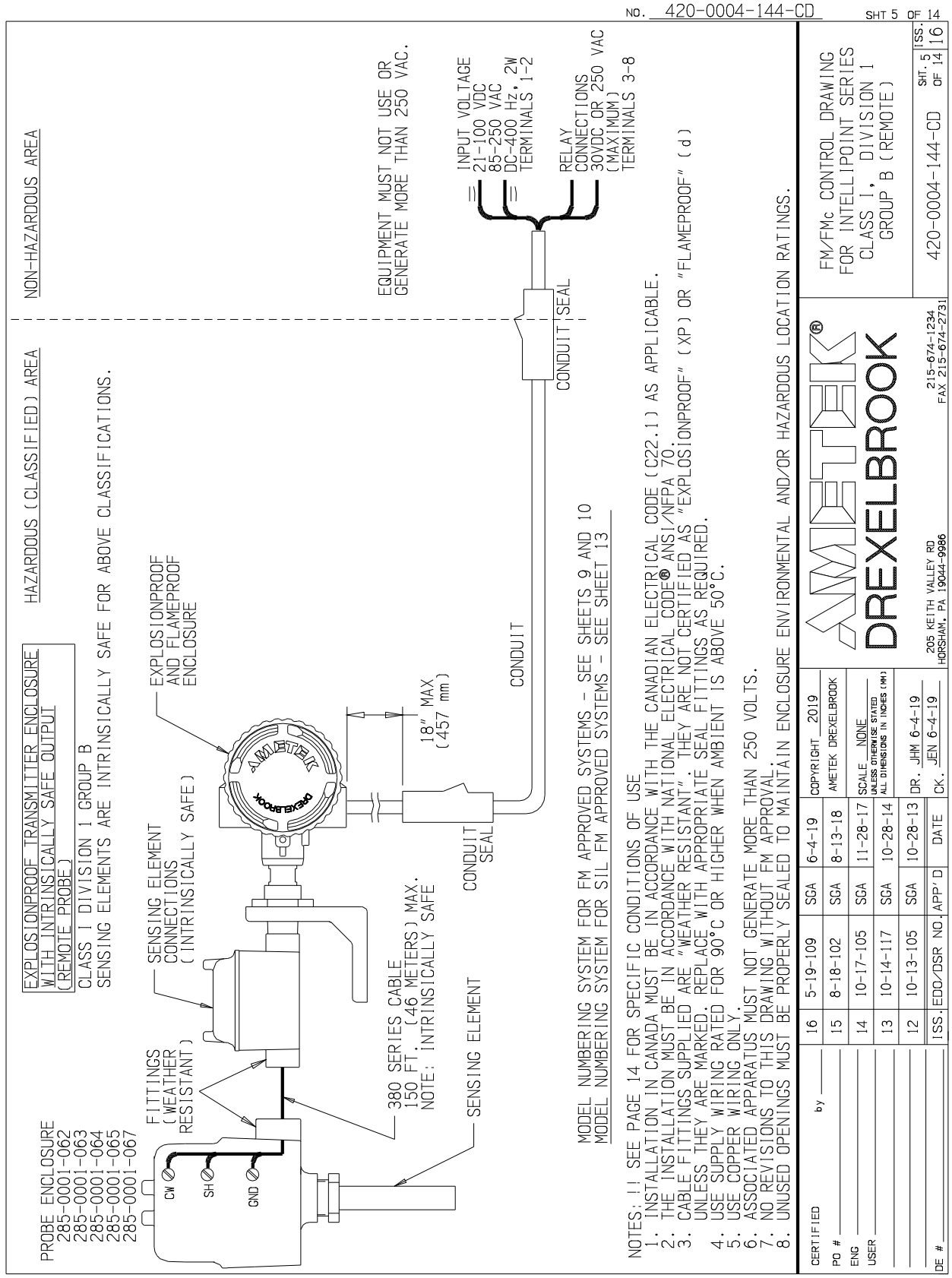
6.1 FM / FMc Control Drawings (Continued)



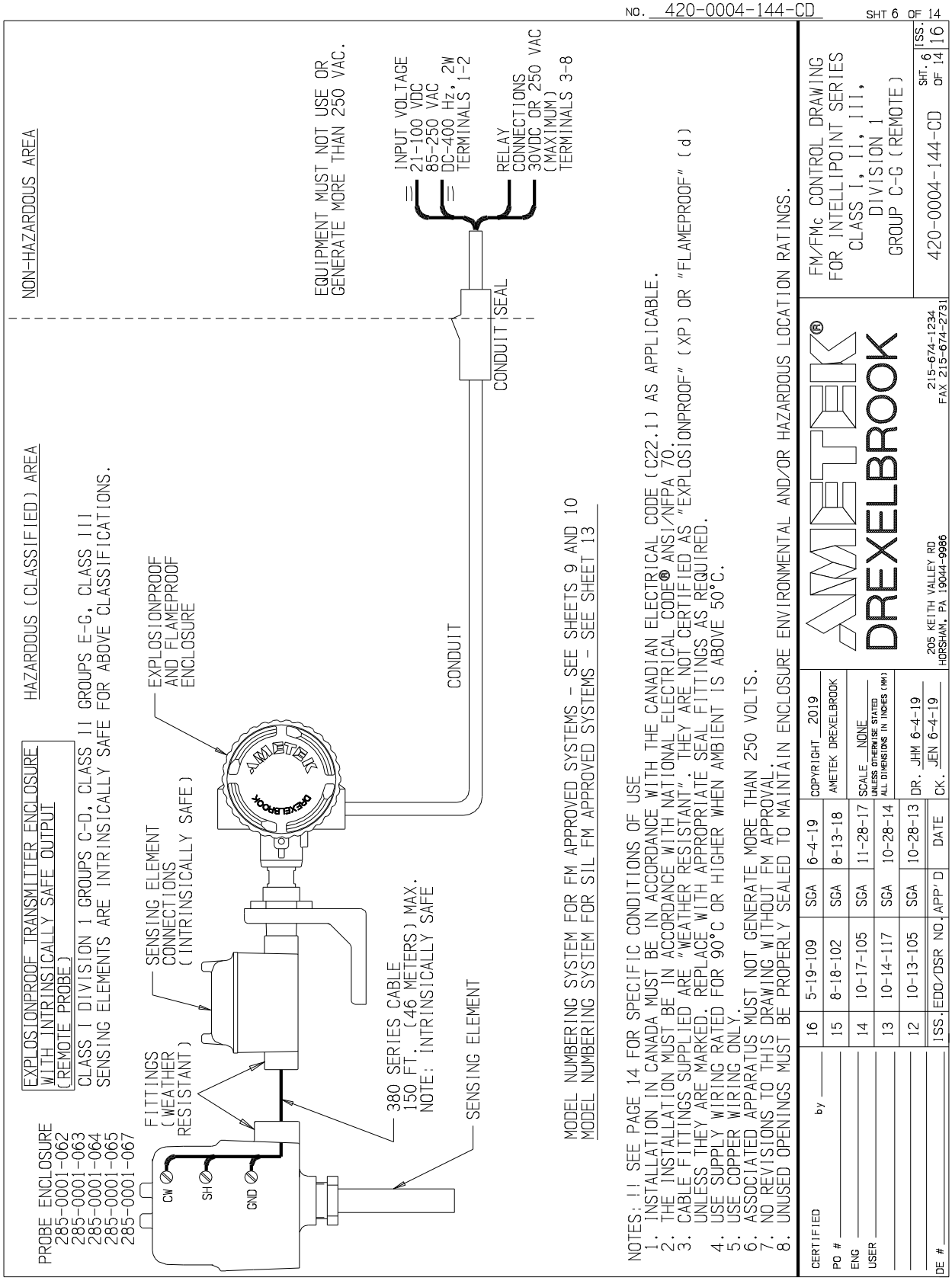
6.1 FM / FMc Control Drawings (Continued)



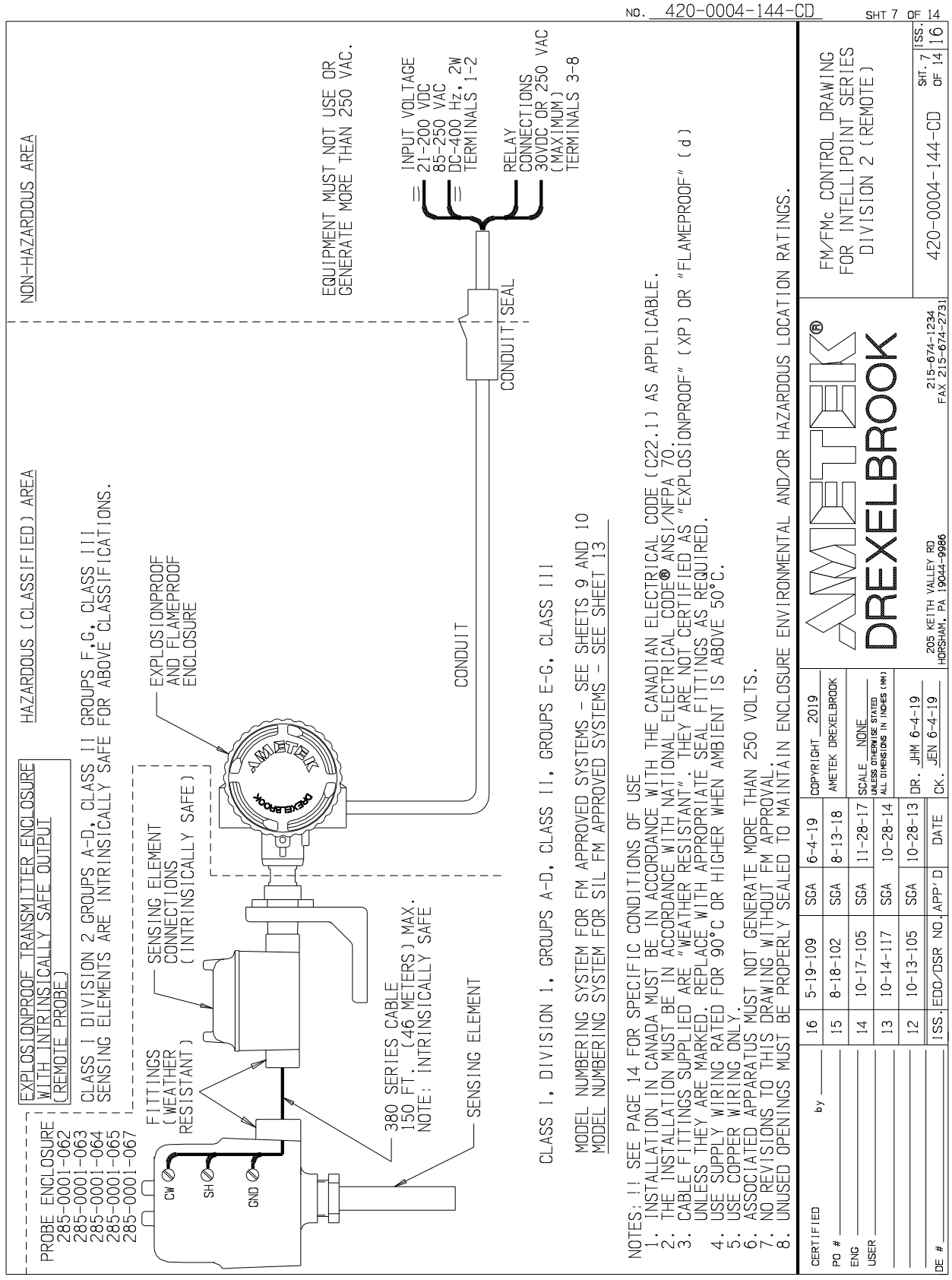
6.1 FM / FMc Control Drawings (Continued)



6.1 FM / FMc Control Drawings (Continued)



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						700-3201-002 ⟨16⟩
							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	-	*	*	*	*	
														SENSING ELEMENTS: CONTINUED…
							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 ⟨16⟩
							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
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 TEMPERTURE 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,
																21, 24, 25, 28, 72, 73, 86, 87, 90-93.
									0	0						700-1202-021
										2						700-1202-024
										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)
										4						700-0005-485
										5						700-0005-485 (HAST-C)
										8						700-1202-052
									6	7						700-3201-002 ⟨16⟩
									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

SIL, FM/FMc APPROVED
INTEGRAL, LINE POWERED, INTELLIPOINT
MODEL NUMBERING SYSTEM
SHT 12 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	-	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 (16)
									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

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

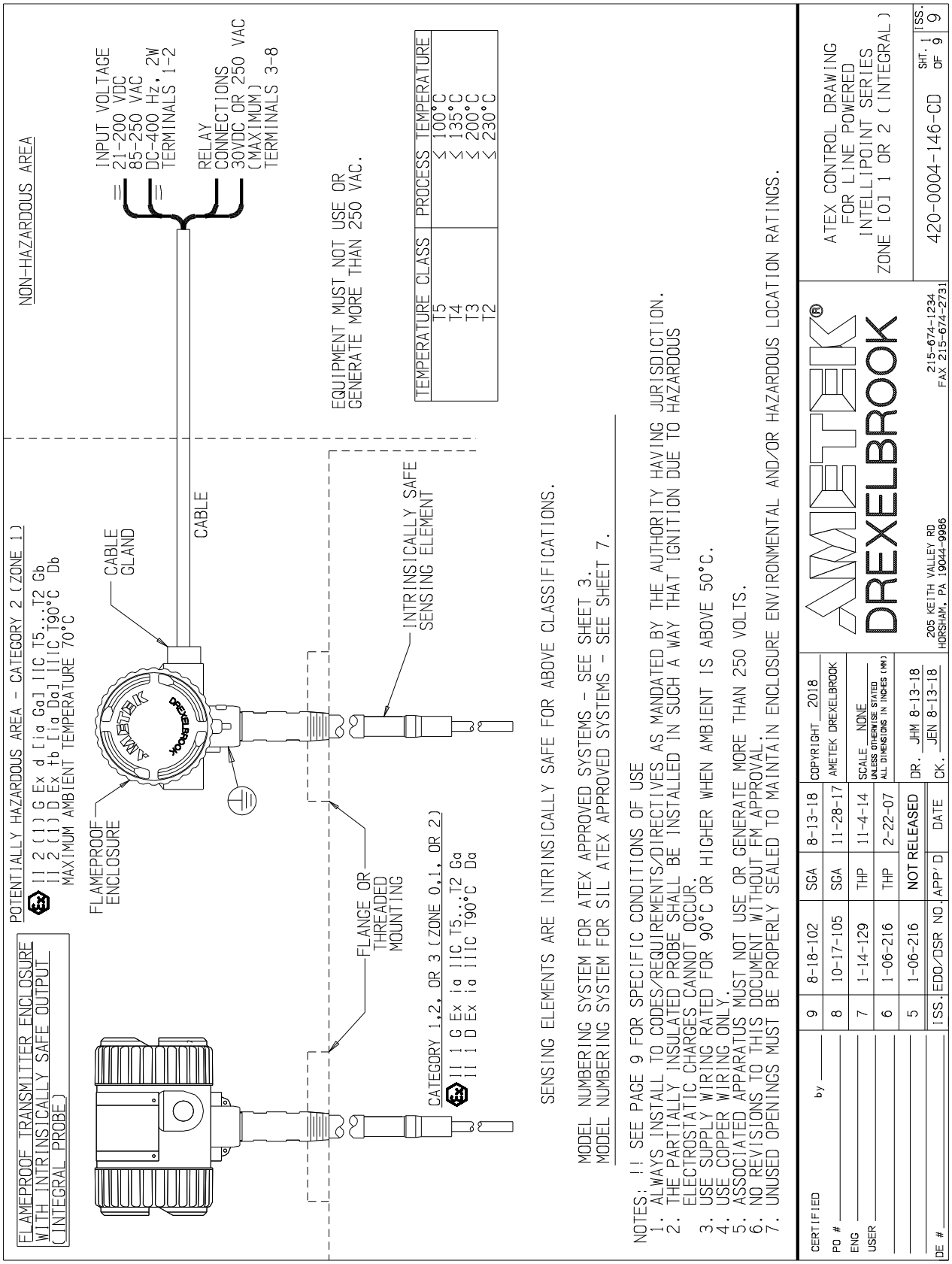
6.1 FM / FMc Control Drawings (Continued)

SPECIFIC CONDITIONS OF USE

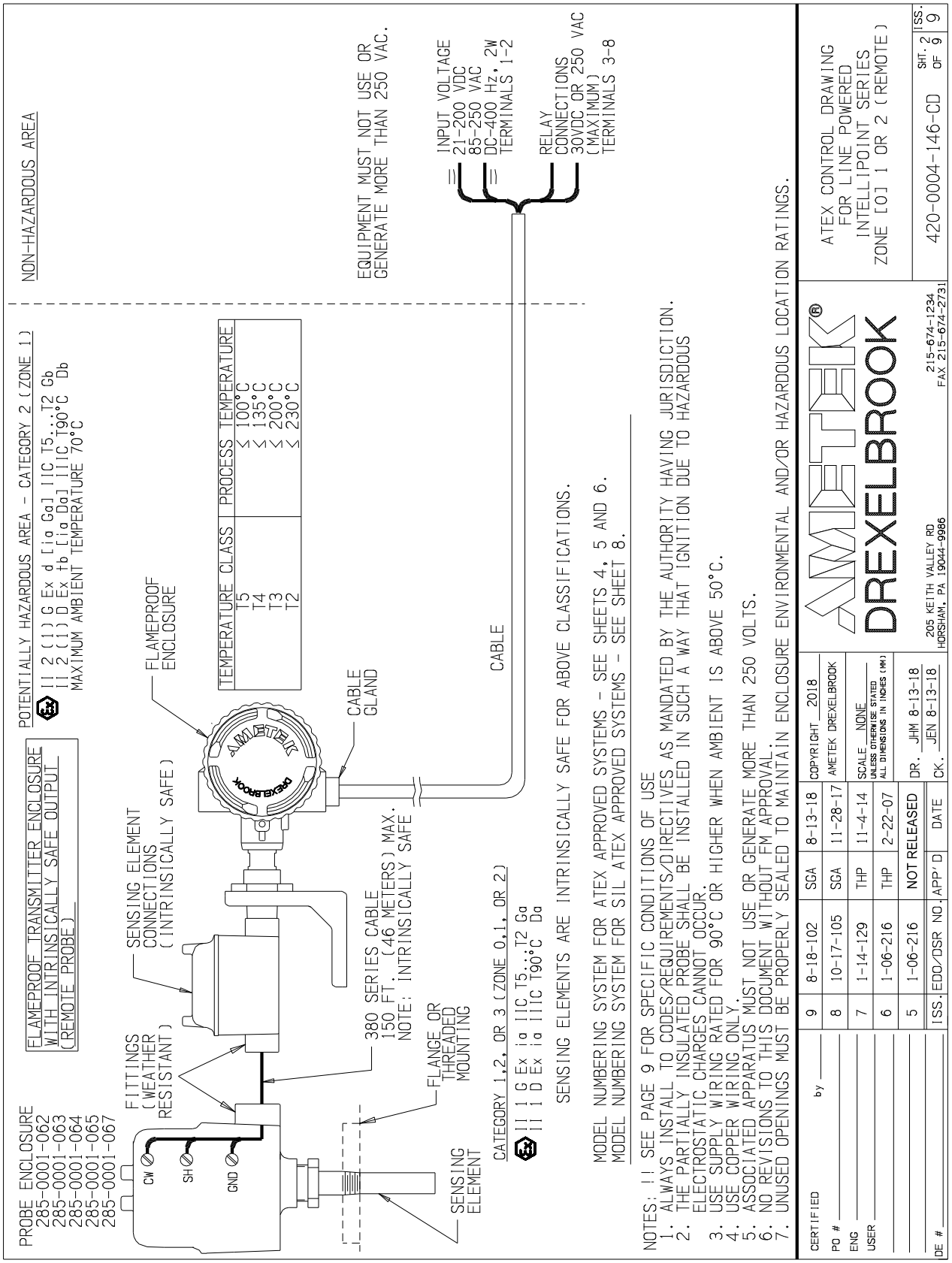
1. *"The equipment shall not be applied in an explosive dust atmosphere where high electrostatic charging processes are present that could result in propagating brush discharges. See IEC TS60079-32-1 for additional guidance."*
2. *Consult the manufacturer if dimensional information on the flameproof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

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

6.2 ATEX Control Drawings



6.2 ATEX Control Drawings (Continued)



6.2 ATEX Control Drawings (Continued)

									COLUMNS 9 AND UP, DO NOT AFFECT SAFETY					
1	2	3	4	-	5	6	7	8	-	9	10	11	12	
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 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	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. 9

6.2 ATEX Control Drawings (Continued)

									COLUMNS 9 AND UP, DO NOT AFFECT SAFETY					
1	2	3	4	-	5	6	7	8	-	9	10	11	12	
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

ATEX APPROVED
REMOTE, LINE POWERED, INTELLIPOINT
MODEL NUMBERING SYSTEM
SHT 5 OF 9
420-0004-146-CD ISS. 9

6.2 ATEX 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 TEMPERTURE 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 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	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

SIL, ATEX APPROVED
INTEGRAL, LINE POWERED, INTELLIPOINT
MODEL NUMBERING SYSTEM
SHT 7 OF 9
420-0004-146-CD ISS. 9

6.2 ATEX 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	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

6.2 ATEX 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 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 Mark Declaration of Conformity

DREXELBROOK

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

AMETEK

420-0004-176		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	Sgf	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

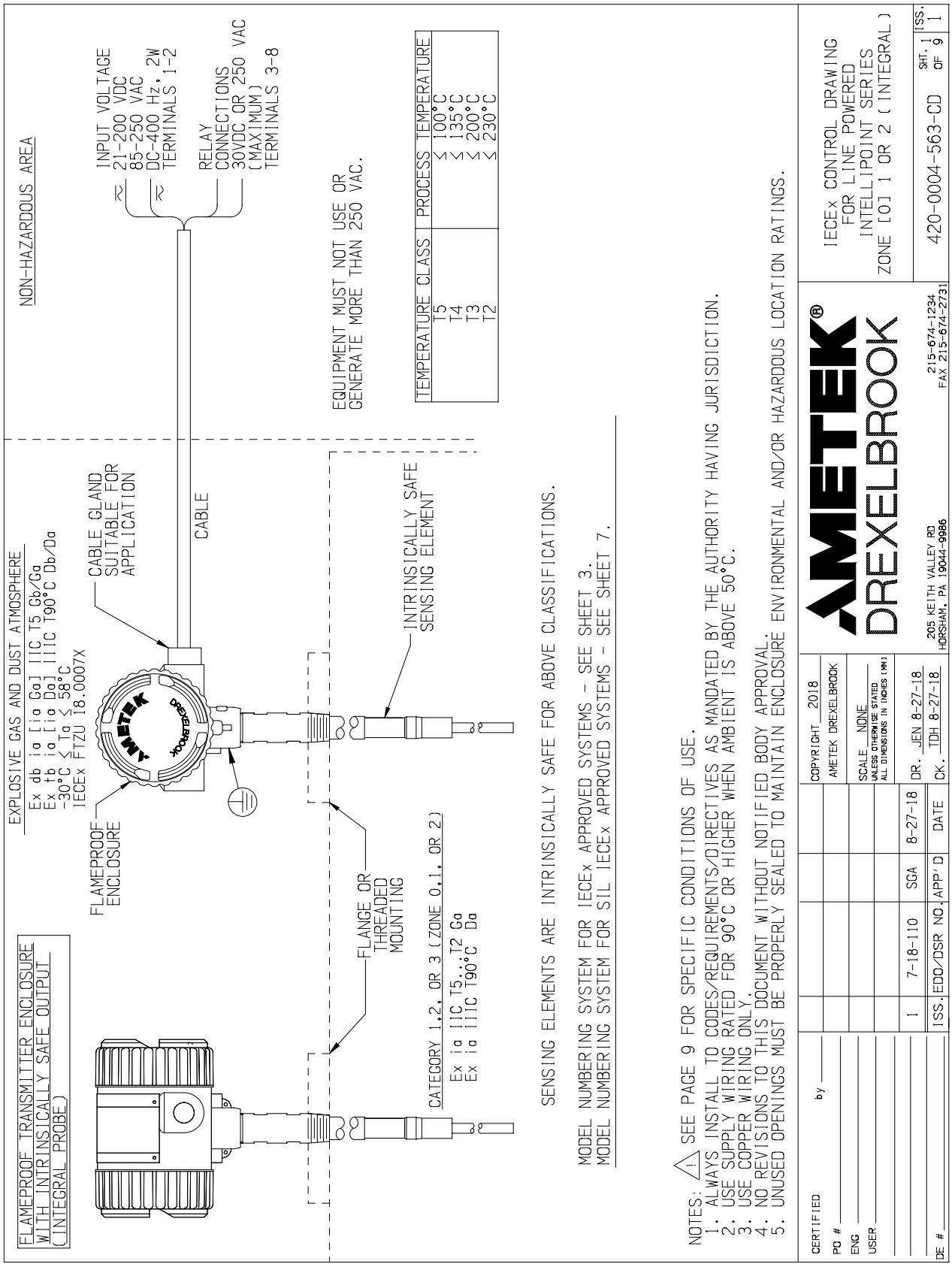
EC-Type Examination Certificate Number FM14ATEX0049
FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK SL4 1RS

Steven G. Arnold

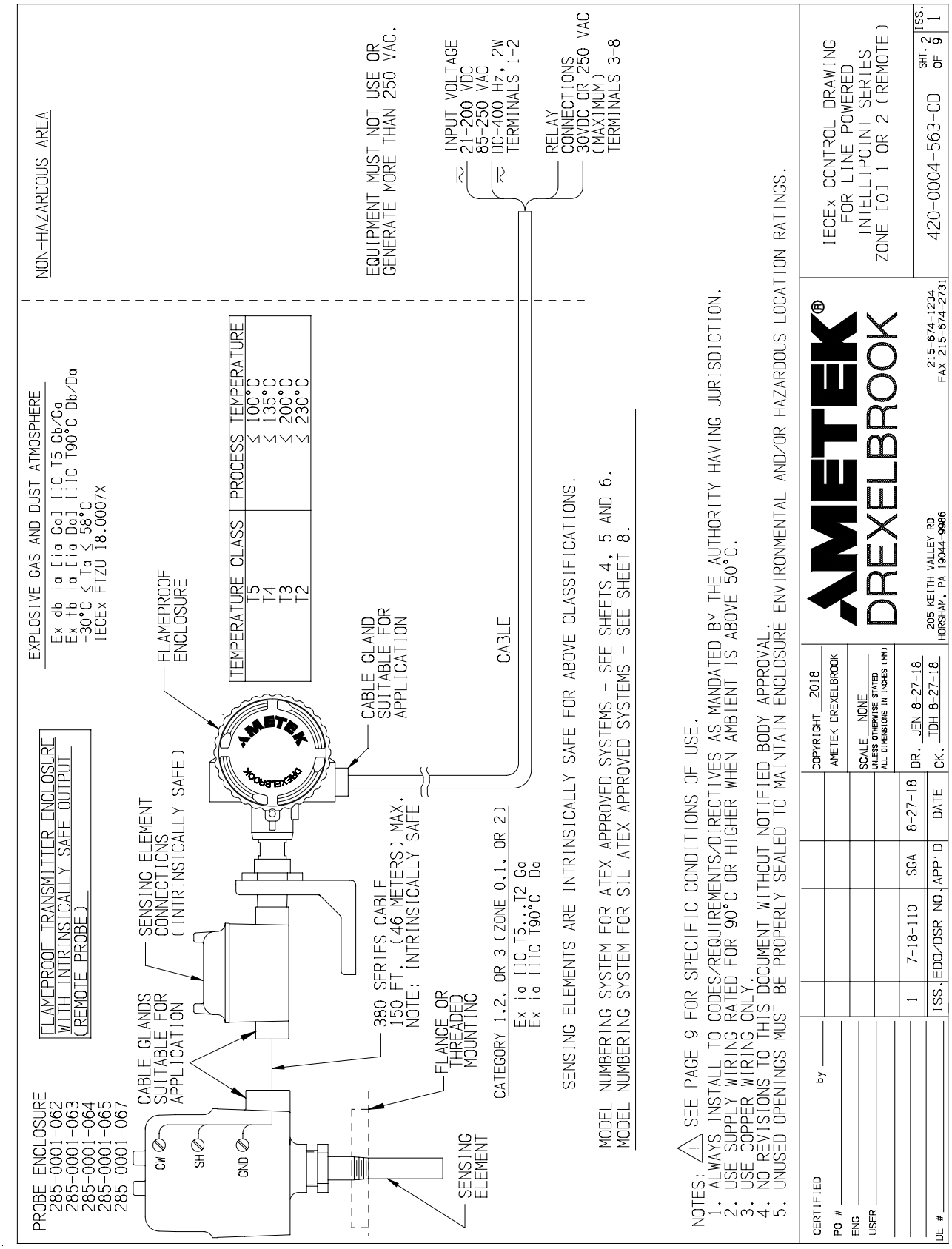
Steven G. Arnold
Quality Assurance & Product Safety Manager

Issue Date:

6.4 IECEx Control Drawings



6.4 IECEx Control Drawings (Continued)



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. 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	-	*	*	*	*	
														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 TEMPERTURE 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

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

SIL, IECEx APPROVED
REMOTE, LINE POWERED, INTELLIPOINT
MODEL NUMBERING SYSTEM
SHT 8 OF 9
420-0004-563-CD ISS. 1

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.

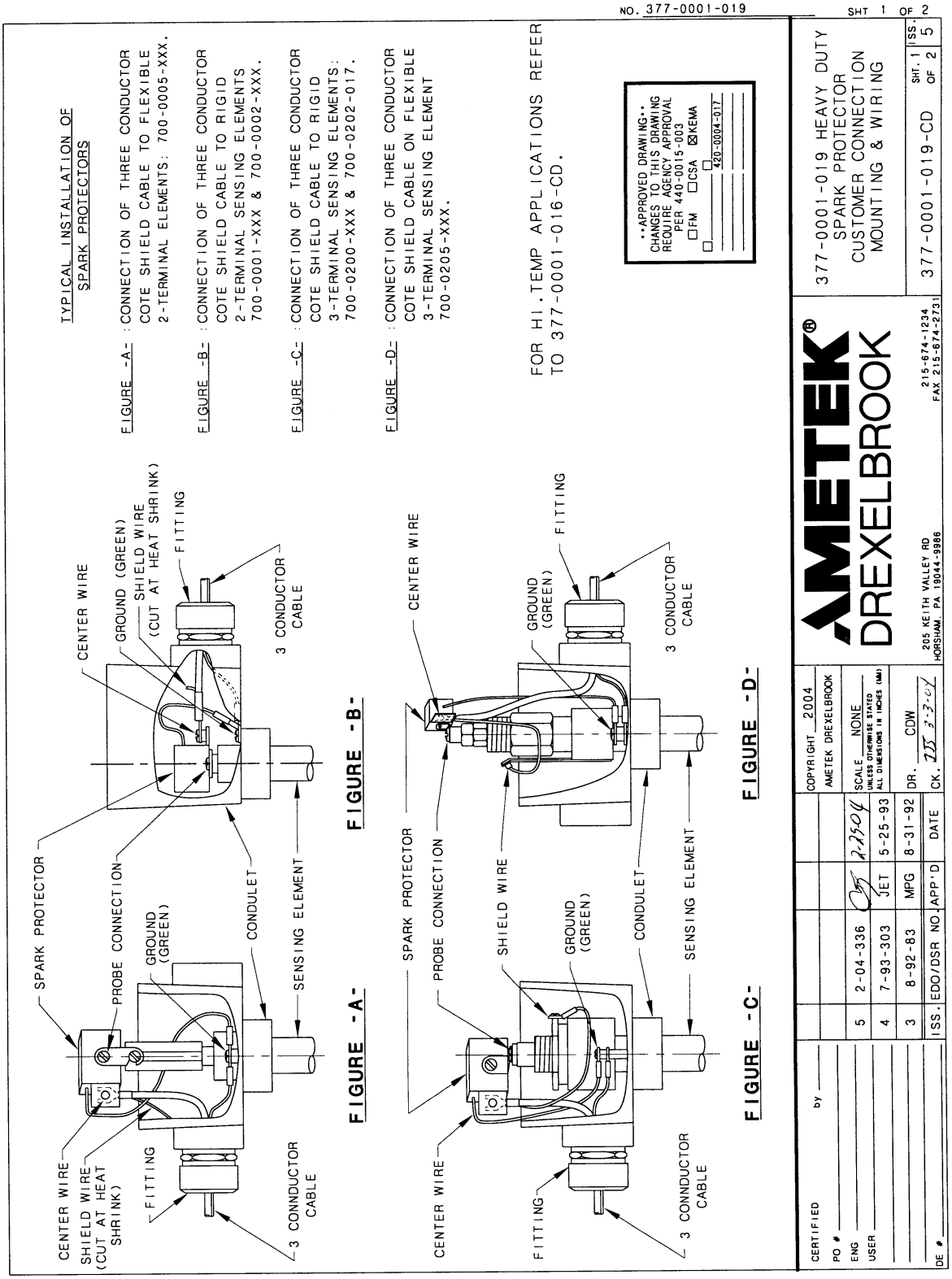
2 CONSULT THE MANUFACTURER IF DIMENSIONAL INFORMATION ON THE FLAMEPROOF JOINTS IS NECESSARY.

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

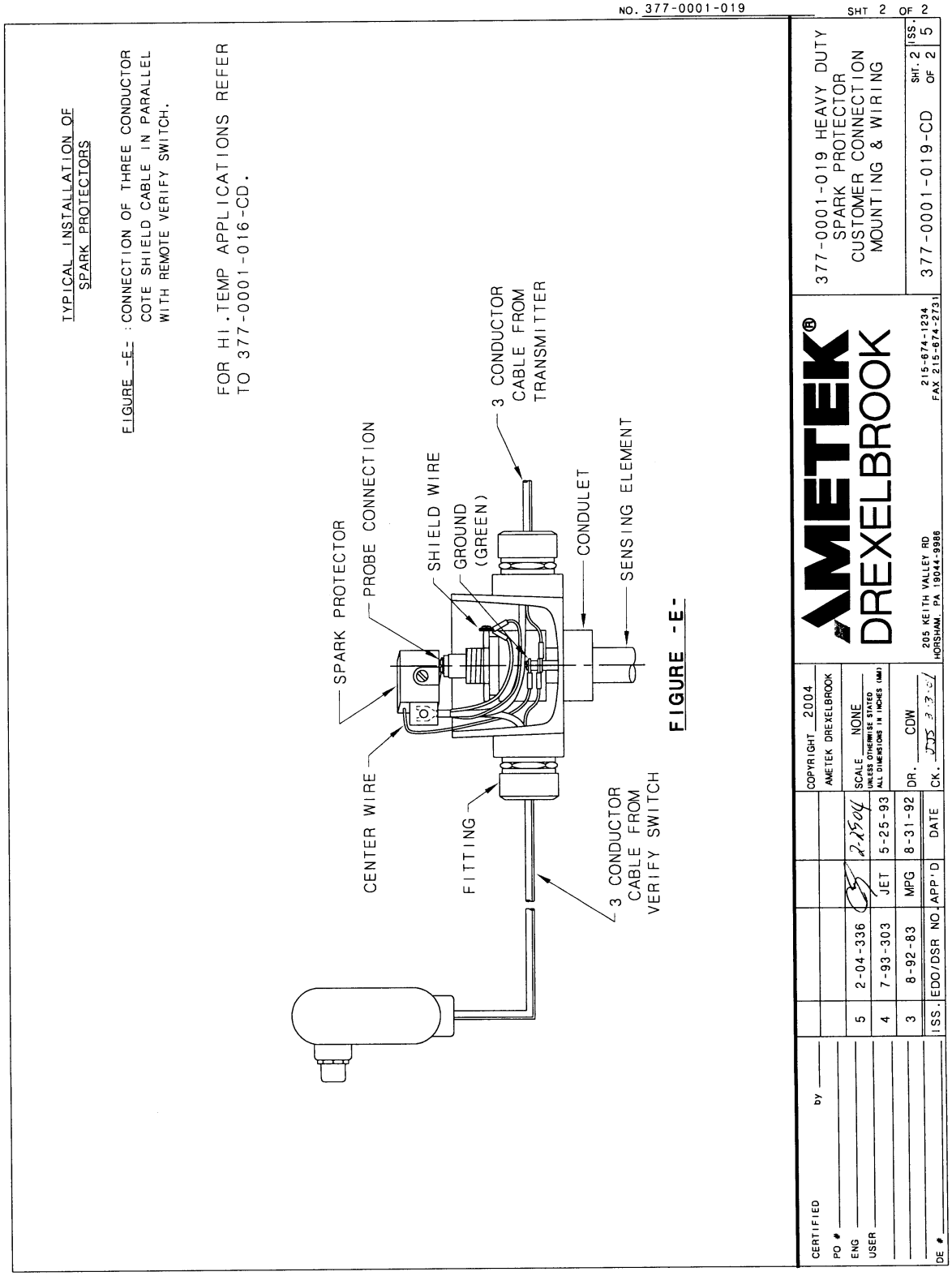
IECEx APPROVED
LINE POWERED, INTELLIPOINT
SPECIFIC CONDITIONS OF USE

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

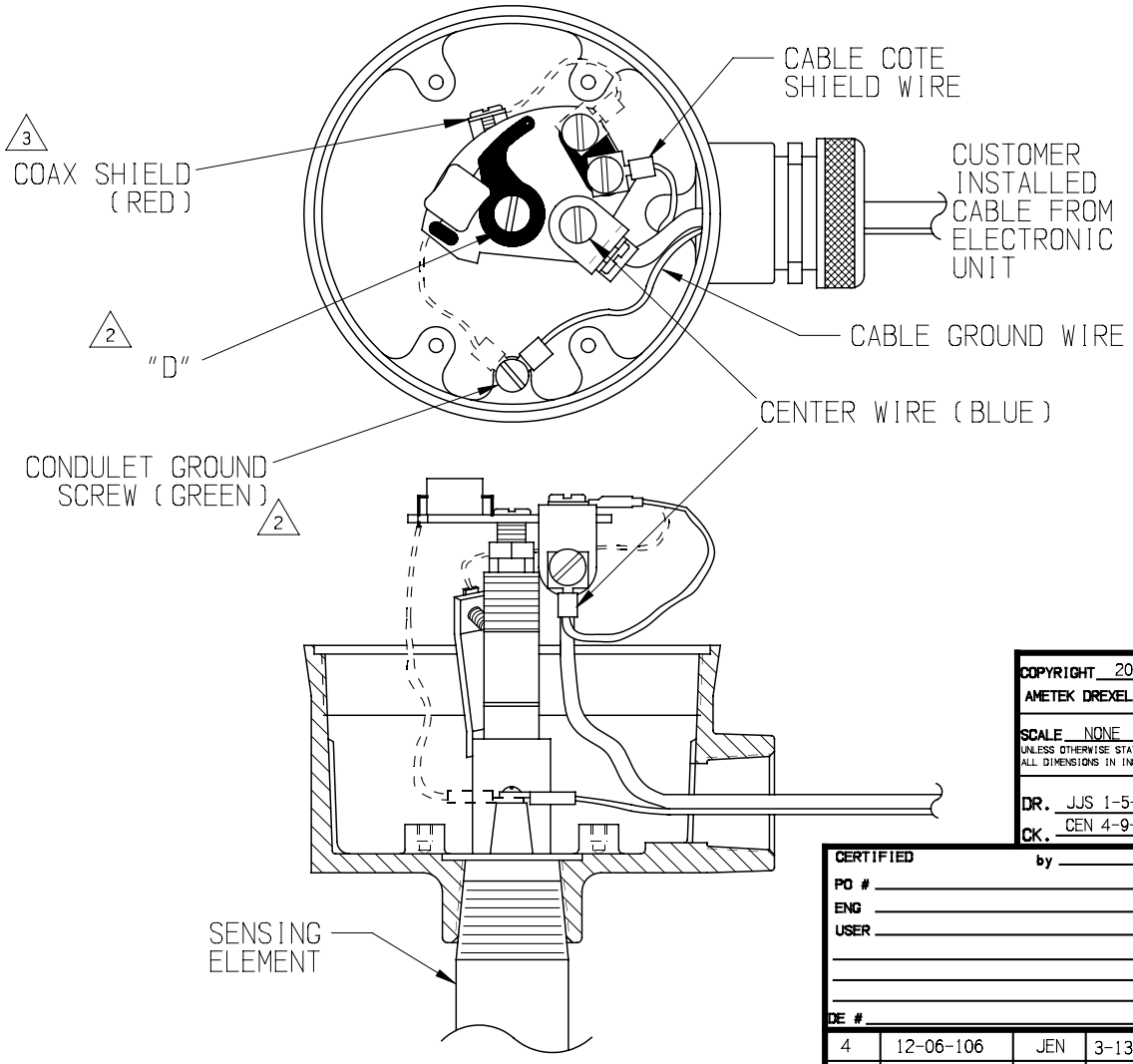
6.5 Mounting and Wiring for Spark Protector Drawings



6.5 Mounting and Wiring for Spark Protector (Continued)



6.5 Mounting and Wiring for Spark Protector (Continued)



NOTES:
1. SPARK PROTECTOR IS SHOWN ON A 303-0029-10X PROBE. IT CAN BE INSTALLED ON OTHER COTE SHIELD PROBES IN THE SAME MANNER.
2. SPARK PROTECTOR IS MOUNTED IN CONDULET WITH LAND SIDE UP. CENTER ROD OF SENSING ELEMENT CONNECTION IS THROUGH HOLE "D". RING LUG IS ATTACHED TO GROUND SCREW (GREEN) BY D.E.
3. D.E. INSTALLED JUMPER WIRE 353-0002-047 TO JUMPER SHIELD OF PROBE TO SPARK PROTECTOR. RING LUG END GOES TO THE PROBE, SPADE LUG END GOES TO SPARK PROTECTOR PCB.
4. TEMPERATURE RANGE: -55°C TO +125°C.
5. ALL DASHED WIRES ARE FACTORY INSTALLED.

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CK. CEN 4-9-07

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USER
DE #

ISS.	EDO/DSR NO.	APP'D	DATE
4	12-06-106	JEN	3-13-07
3	1-01-304	JET	5-18-01
2	6-99-246	DL	8-16-99
1	4-99-303	JET	6-10-99
A	1-80-221	——	2-21-80

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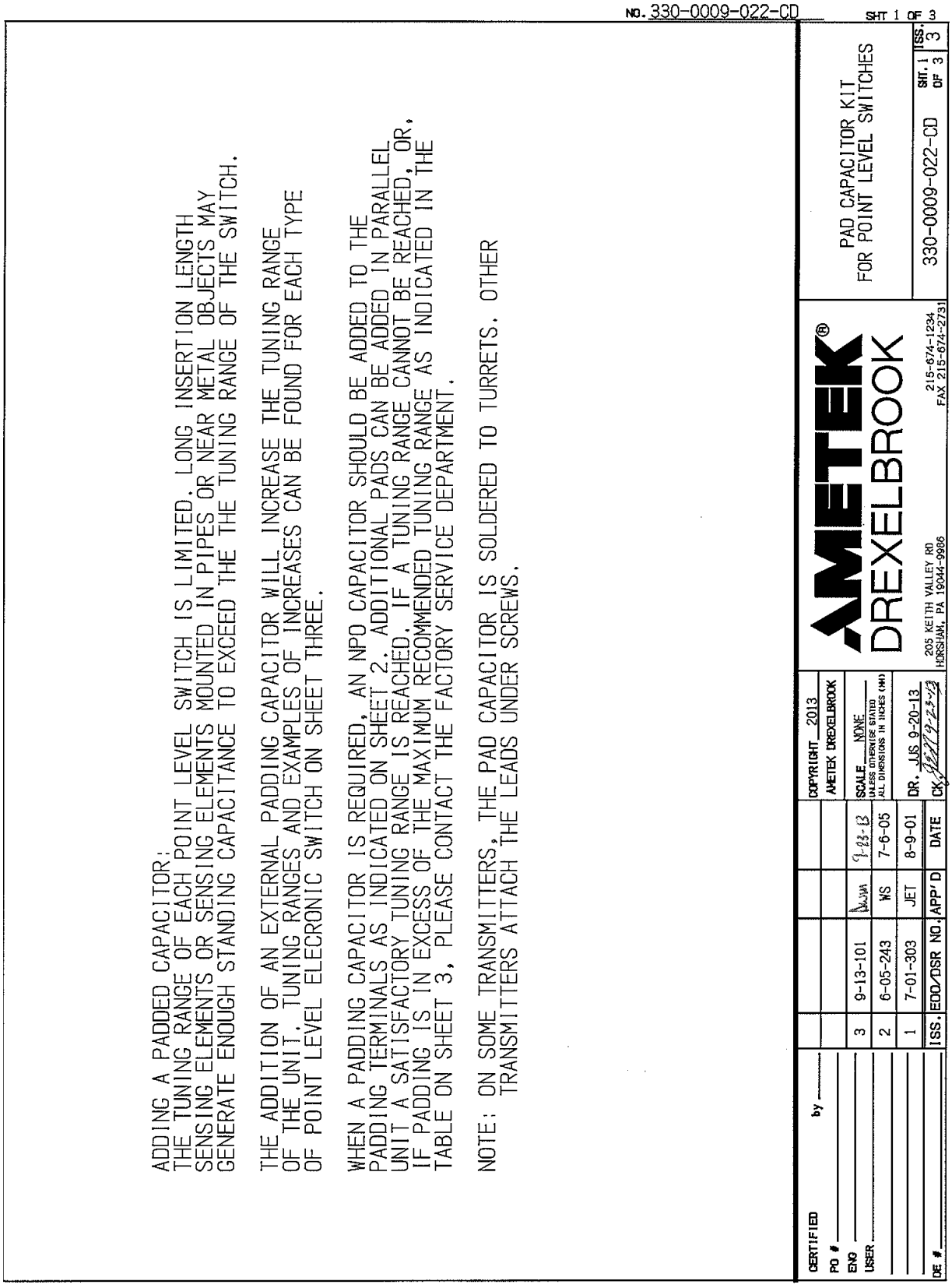
MOUNTING AND WIRING FOR SPARK PROTECTOR
377-0001-016

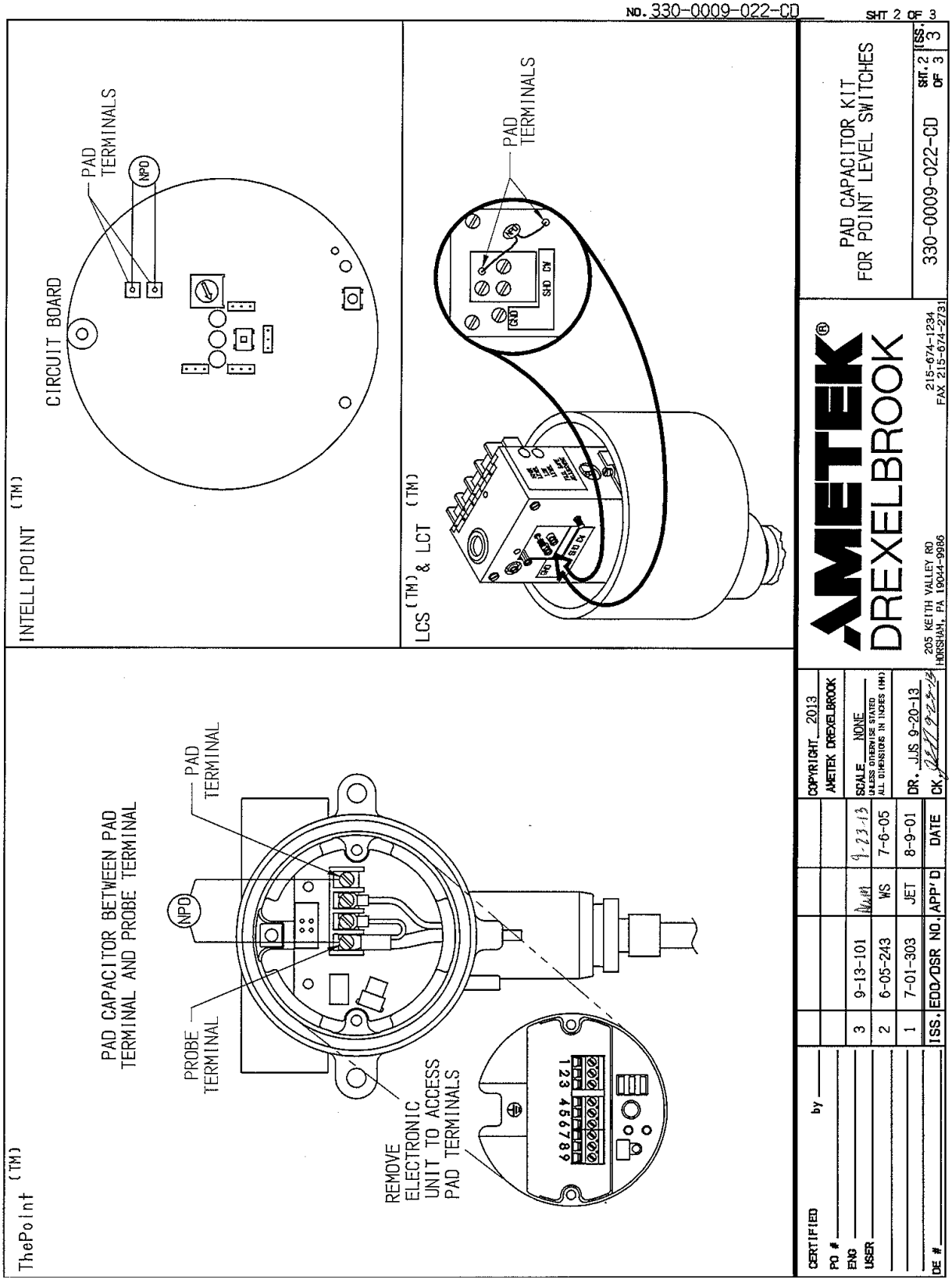
377-0001-016-CD SHT. 1 OF 1 ISS. 4

NO. 377-0001-016-CD

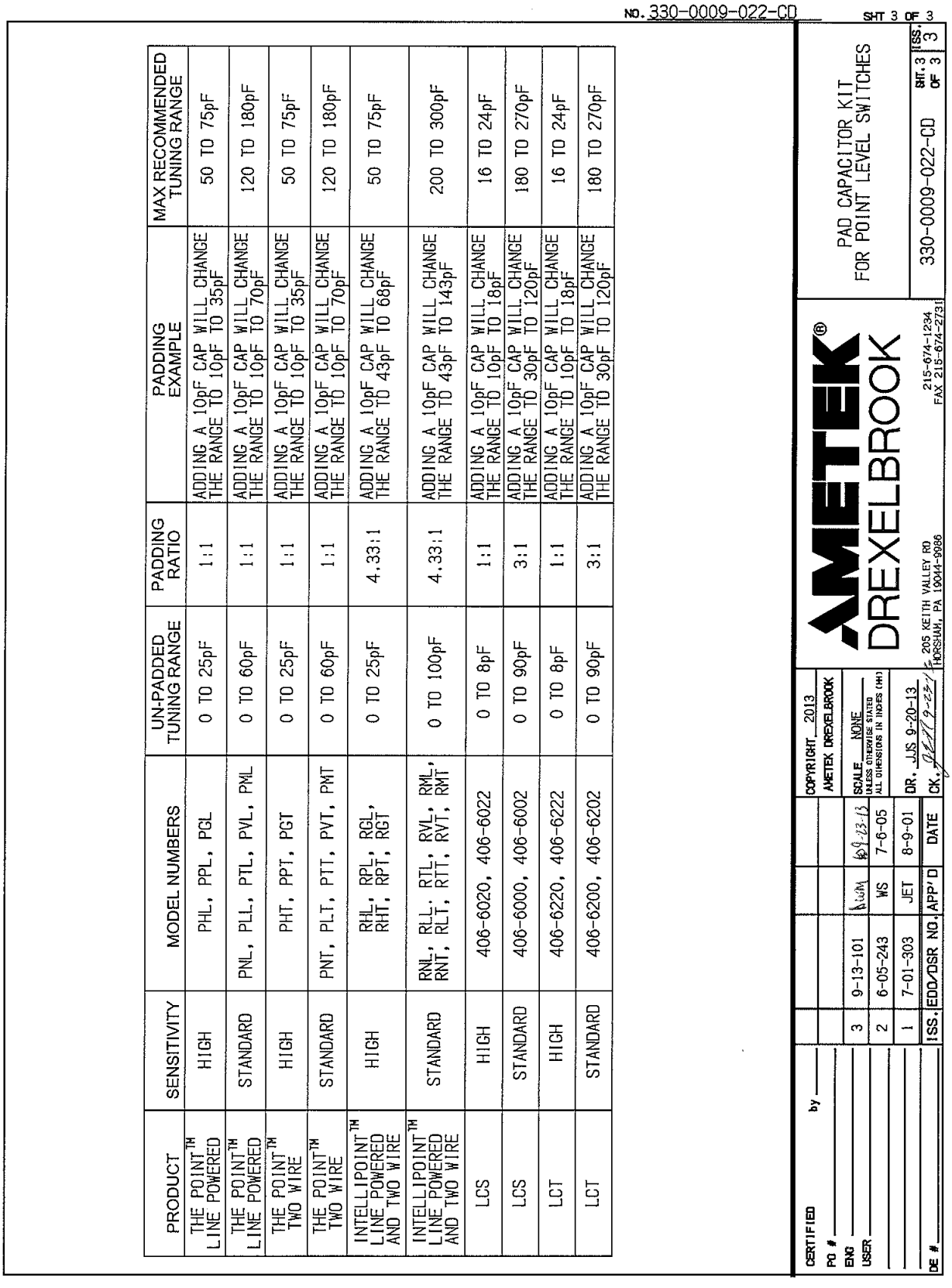
6.6 Adding a Padded Capacitor



6.6 Adding a Padded Capacitor (Continued)



6.6 Adding a Padded Capacitor (Continued)



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

PRODUCT	SENSITIVITY	MODEL NUMBERS	UN-PADDED TUNING RANGE	PADDING RATIO	PADDING EXAMPLE	MAX RECOMMENDED TUNING RANGE
THE POINT™ LINE POWERED	HIGH	PHL, PPL, PGL	0 TO 25pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 35pF	50 TO 75pF
THE POINT™ LINE POWERED	STANDARD	PNL, PLL, PTL, PVL, PML	0 TO 60pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 70pF	120 TO 180pF
THE POINT™ TWO WIRE	HIGH	PHT, PPT, PGT	0 TO 25pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 35pF	50 TO 75pF
THE POINT™ TWO WIRE	STANDARD	PNT, PLT, PTT, PVT, PMT	0 TO 60pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 70pF	120 TO 180pF
INTELLIPOINT™ LINE POWERED AND TWO WIRE	HIGH	RHL, RPL, RGL, RHT, RPT, RGT	0 TO 25pF	4.33:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 43pF TO 68pF	50 TO 75pF
INTELLIPOINT™ LINE POWERED AND TWO WIRE	STANDARD	RNL, RLL, RTL, RVL, RML, RNT, RLT, RTT, RVT, RMT	0 TO 100pF	4.33:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 43pF TO 143pF	200 TO 300pF
LCS	HIGH	406-6020, 406-6022	0 TO 8pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 18pF	16 TO 24pF
LCS	STANDARD	406-6000, 406-6002	0 TO 90pF	3:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 30pF TO 120pF	180 TO 270pF
LCT	HIGH	406-6220, 406-6222	0 TO 8pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 18pF	16 TO 24pF
LCT	STANDARD	406-6200, 406-6202	0 TO 90pF	3:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 30pF TO 120pF	180 TO 270pF

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ISS.	EDD/DSR NO.	APP'D	DATE
3	9-13-101		
2	6-05-243	WS	7-6-05
1	7-01-303	JET	8-9-01

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DR. JJS 9-20-13 CK.

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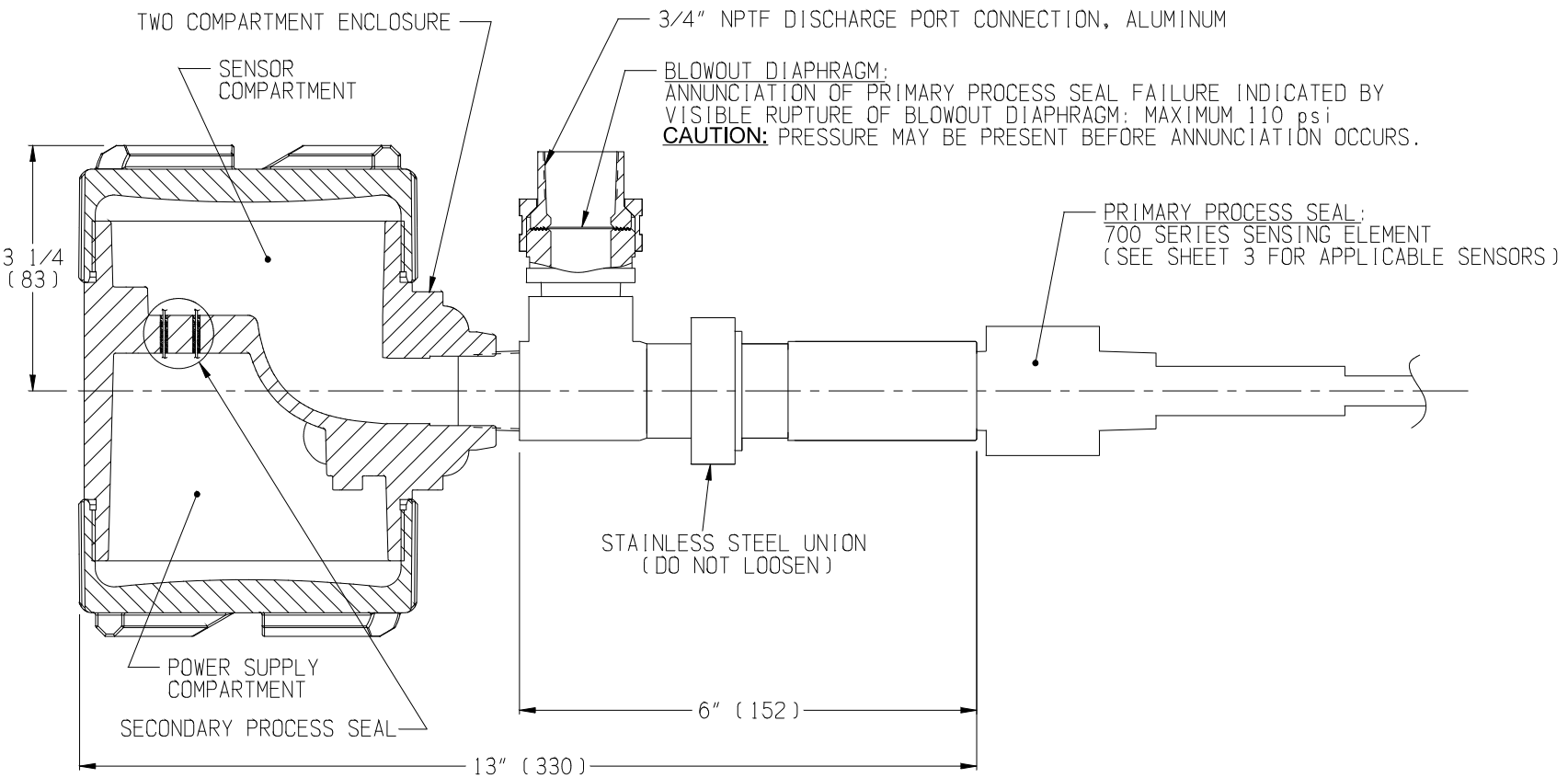
PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES

330-0009-022-CD SHT. 3 OF 3 ISS. 3

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



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

ERTIFIED by
) #
NG
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#

ISS.	EDO/DSR NO.	APP'D	DATE
3	2-15-111	THP	3-11-15
2	1-12-114	JEN	1-20-12
1	4-08-106	TDH	9-10-08

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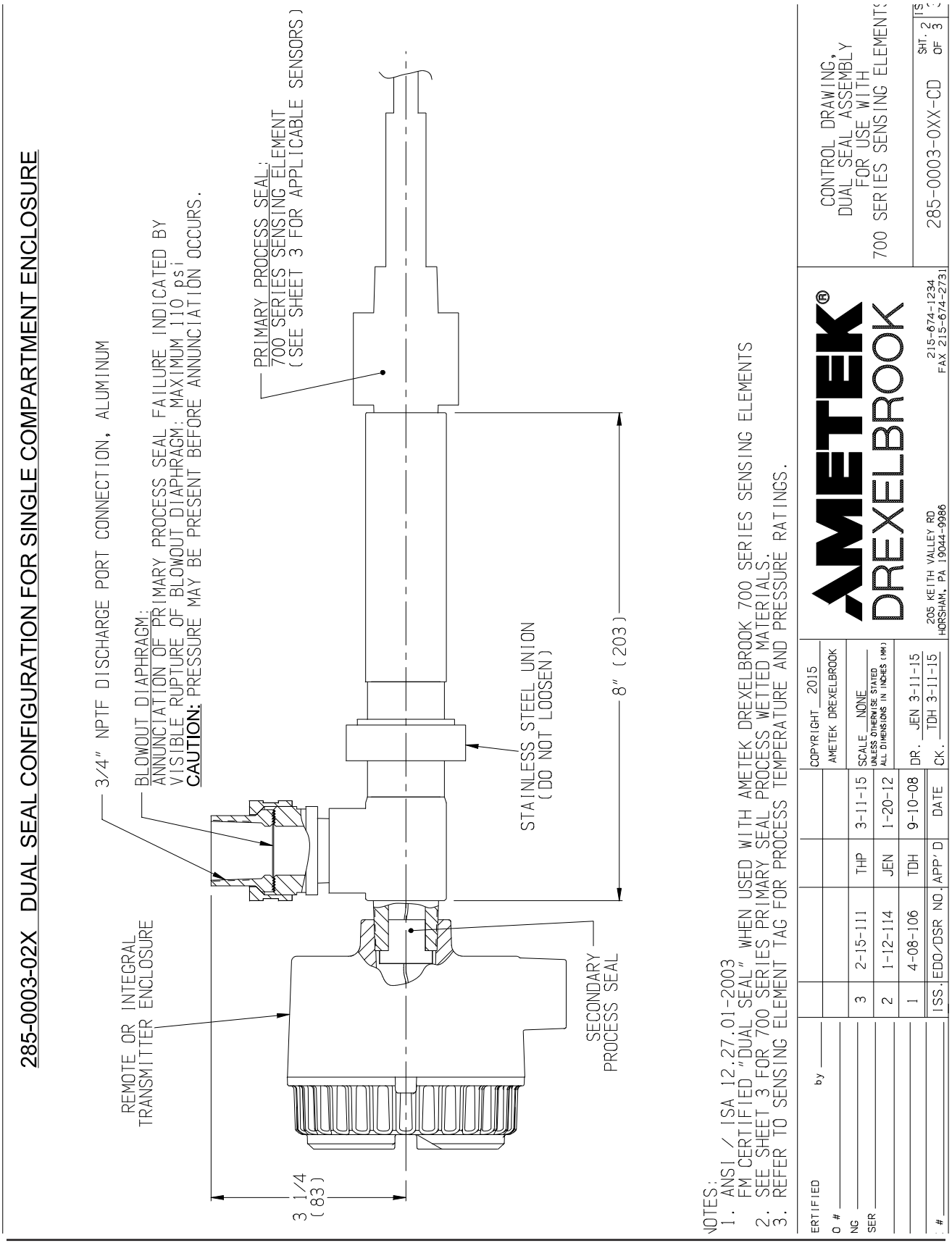
CONTROL DRAWING,
DUAL SEAL ASSEMBLY
FOR USE WITH
700 SERIES SENSING ELEMENTS

285-0003-0XX-CD SHT. 1 OF 3

6.7 Dual Seal Assembly (Continued)



6.7 Dual Seal Assembly (Continued)

NO. 285-0003-0XX-CD SHT 3 OF 3

SENSING ELEMENTS AVAILABLE

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0001-022	TFE/316SS
700-0001-024	TFE/316SS
700-0001-026	TFE/316SS
700-0001-034	TFE/CS
700-0001-040	POLYETHYLENE/316SS
700-0001-044	PFA/316SS
700-0001-054	TFE/316SS
700-0001-064	TFE/316SS
700-0001-074	TFE/316SS
700-0001-344	PFA/316SS
700-0002-023	TFE/316SS
700-0002-024	TFE/316SS
700-0002-027	FEP/TFE/316SS
700-0002-028	TFE/316SS
700-0002-033	TFE/316SS
700-0002-037	PVDF/TFE/316SS
700-0002-040	UHMW PE/SILICONE/316SS
700-0002-044	PVDF/TFE/316SS

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0002-054	FEP/TFE/316SS
700-0002-057	PVDF/TFE/316SS
700-0002-064	PVDF/TFE/316SS
700-0002-224	TFE/316SS
700-0002-321	FEP/TFE/316SS
700-0002-360	PFA/TFE/316SS
700-0005-054	PFA/TFE/316SS
700-0201-005	TFE/316SS
700-0201-025	TFE/316SS
700-0201-026	TFE/316SS
700-0201-027	TFE/316SS
700-0201-028	TFE/316SS
700-0201-035	TFE/316SS
700-0201-051	TFE/316SS
700-0201-052	TFE/316SS
700-0201-058	TFE/316SS
700-0201-059	TFE/316SS
700-0202-002	TFE/316SS

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0202-053	TFE/316SS
700-0202-054	TFE/316SS
700-0202-056	TFE/316SS
700-1202-001	PEEK/316SS
700-1202-010	PEEK/316SS
700-1202-014	PEEK/316SS
700-1202-015	PEEK/316SS
700-1202-018	PEEK/316SS
700-1202-031	PEEK/316SS
700-1202-033	PEEK/316SS
700-1202-041	PEEK/316SS
700-1202-045	PEEK/316SS
700-1202-051	PEEK/316SS
700-1202-055	PEEK/316SS
700-1202-061	PEEK/316SS
700-1202-081	PEEK/316SS
700-9100-403	PEEK/316SS
700-9100-404	PEEK/316SS
700-1230-XXX-XX-XXX	PEEK/CS/316SS ③

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

ISS.	DESCRIPTION	BY	CHK	APP'D	DATE
3	EDO/DSR NO. 2-15-111	THP			3-11-15
2	1-12-114	JEN			1-20-12
1	4-08-106	TDH			9-10-08

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CONTROL DRAWING,
DUAL SEAL ASSEMBLY
FOR USE WITH
700 SERIES SENSING ELEMENTS

285-0003-0XX-CD

SHT. 3 OF 3 | ISS. 3

Appendix: A

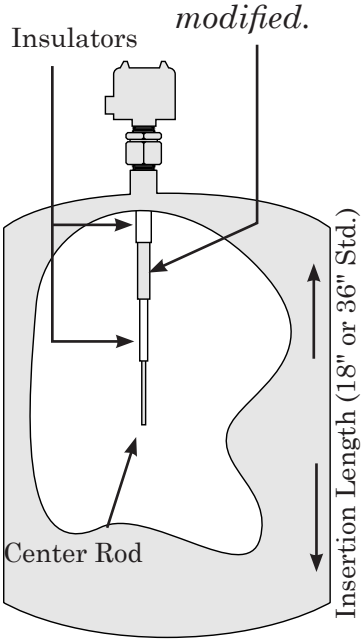
Appendix A: Shortening or Lengthening the Sensing Element

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.

NOTICE

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

CE Installation Supplement

Purpose: To provide additional information that is required to be in compliance with the CE mark of conformity and 2014/30/EU Directive.

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.

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 condulet 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.

Appendix: B

EXIDA Management Summary

Proof test must be performed to certify proper operation for SIL perfromance. Reference Appendix B in the EXIDA Failure Modes, Effects and Diagnostic Analysis located on the Drexelbrook.com website under support/ documentation.

Management Summary

This report summarizes the results of the hardware assessment in the form of a Failure Modes, Effects, and Diagnostic Analysis (FMEDA) of the IntelliPoint RF Series Point Level Switch, hardware and software revision per Section 2.5.1. A Failure Modes, Effects, and Diagnostic Analysis is one of the steps to be taken to achieve functional safety certification per IEC 61508 of a device. From the FMEDA, failure rates are determined. The FMEDA that is described in this report concerns only the hardware of the Intellipoint. For full functional safety certification purposes all requirements of IEC 61508 must be considered.

The Ametek Drexelbrook Intellipoint detects the presence of material in a vessel by sensing the change in capacitance when the material contacts the Intellipoint sensing element. The Intellipoint is designed to ignore the effect of buildup or material coating on the sensing element.

Table 1 gives an overview of the different versions that were considered in the FMEDA of the Intellipoint.

Table 1 Version Overview

Loop	Intellipoint with 4-20mA loop power and output – model SxRNTx-x0xx-xxxx
Relay	Intellipoint with 18-200VDC or 85-250VAC power and dual relay output – model SxRNLx-x1xx-xxxx or SxRNLx-x2xx-xxxx

The Intellipoint is classified as a Type B[1] element according to IEC 61508, having a hardware fault tolerance of 0.

The failure rate data used for this analysis meets the *exida* criteria for Route 2_H (see Section 5.2). Therefore, the Intellipoint meets the hardware architectural constraints for up to SIL 2 at HFT=0 (or SIL 3 @ HFT=1) when the listed failure rates are used.

Based on the assumptions listed in 4.3, the failure rates for the Intellipoint are listed in section 4.5.

These failure rates are valid for the useful lifetime of the product, see Appendix A.

The failure rates listed in this report are based on over 250 billion unit operating hours of process industry field failure data. The failure rate predictions reflect realistic failures and include site specific failures due to human events for the specified Site Safety Index (SSI), see section 4.2.2.

A user of the Intellipoint can utilize these failure rates in a probabilistic model of a safety instrumented function (SIF) to determine suitability in part for safety instrumented system (SIS) usage in a particular safety integrity level (SIL).

EXIDA Report Results

4.5 Results

Using reliability data extracted from the *exida* Electrical and Mechanical Component Reliability Handbook the following failure rates resulted from the Intellipoint FMEDA.

Table 3 Failure rates Intellipoint (Loop)

Failure Category	Failure Rate (FIT)	
Fail Safe Undetected		28
Fail Dangerous Detected		399
Fail Detected (detected by internal diagnostics)	250	
Fail High (detected by logic solver)	77	
Fail Low (detected by logic solver)	72	
Fail Dangerous Undetected		103
No Effect		312
Annunciation Undetected		38

Table 4 Failure rates Intellipoint (Relay)

Failure Category	Failure Rate (FIT)
Fail Safe Detected	92
Fail Safe Undetected	189
Fail Dangerous Detected	175
Fail Dangerous Undetected	142
No Effect	252
Annunciation Detected	51
Annunciation Undetected	48

Table 5 Failure rates according to IEC 61508 in FIT

Device	λ_{SD}	λ_{SU}[3]	λ_{DD}	λ_{DU}
Intellipoint (Loop)	0	28	399	103
Intellipoint (Relay)	92	189	226	142

Table 9 Proof Test Coverage – Intellipoint

Device	λ_{DU}PT (FIT)	Proof Test Coverage
Intellipoint (Loop), without process material	45	57%
Intellipoint (Relay), without process material	38	73%
Intellipoint (Loop), using process material	20	81%
Intellipoint (Relay), using process material	18	87%

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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 FPCA 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 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.

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DREXELBROOK
An ISO 9001 Certified Company

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