



Leader in
Level Measurement

Installation and Operating Instructions

IntelliPoint RF™ RML Series Point Level Switch with Manual Calibration/Set Point

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Section 1

Section 1: Introduction

1.1 System Description

The AMETEK Drexelbrook, **IntelliPoint RML and RGL Series** point level switches detect the presence or absence of material and provide a relay output for control functions. The RML and RGL IntelliPoint switches are calibrated through a simple potentiometer adjustment.

1.2 Technology

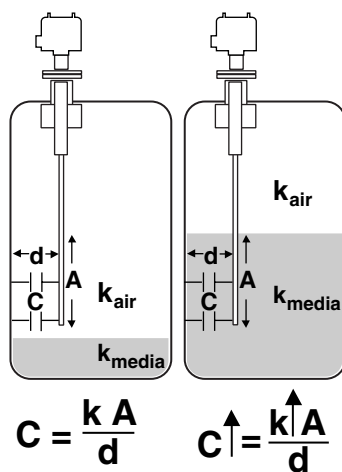


Figure 1-1
Simple Capacitance Probe

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

An RF Admittance level transmitter is the next generation. Although similar to the capacitance concept, IntelliPoint employs a radio frequency signal and adds the Cote-Shield circuitry within the Electronics Unit. This patented Cote-Shield circuitry is designed into the IntelliPoint series and enables the instrument to ignore the effect of buildup, that is, material coating on the sensing element. The sensing element is mounted in the vessel and provides a change in RF admittance indicating the presence or absence of material.

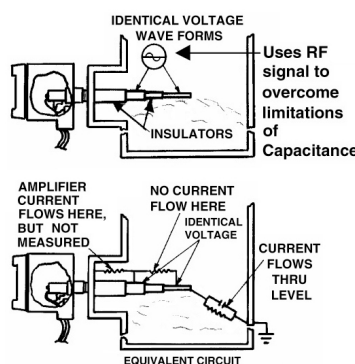


Figure 1-2
RF Admittance Probe with Cote-Shield

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 the most versatile technology available by far. Not only does it work with all types of materials, it's well suited to a very broad range of conditions, from cryogenics to high temperature, from vacuum all the way to 10,000psi pressure.

1.3 Model Number

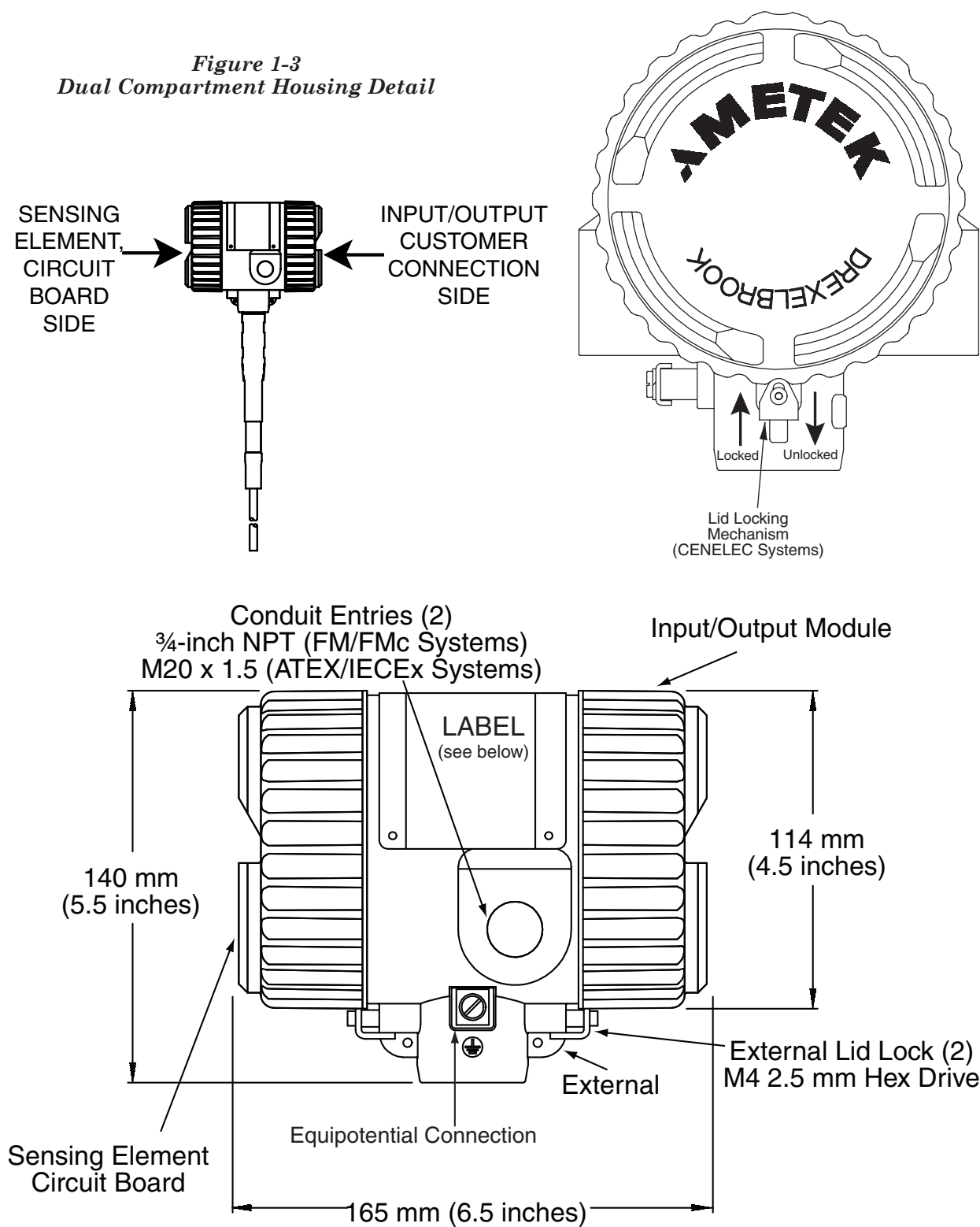
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1.4 Sensing Element List

	#	Application	Sensing Element Part Number	Pressure/Temperature	Wetted Parts
General & Application Specific Sensing Elements	00	General purpose	700-1202-001 Remote & 700-1202-021 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and PEEK
	02	General purpose, longer insertion lengths w/cable attachment and 316/316L SS bottom weight	700-1202-014 Remote & 700-1202-024 Integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316/316L SS and PEEK
	03	Proximity	700-1202-018 Remote & 700-1202-028 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and PEEK with 76mm (3) 216SS proximity plate
	04	General purpose, high temperature and pressure	700-1202-041 Remote 700-1202-042 Integral	69 bar @ 121°C (1000 PSI @ 250°F) 20.7 bar @ 232°C (300 PSI @ 450°F)	316/316L SS and PEEK
	06	General purpose with FDA approved materials of construction	700-1202-031 Remote & 700-1202-032 Integral	13.8 bar @ 232°C (200 PSI @ 450°F)	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) 13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and TFE
	12	Corrosive material, higher pressure	700-0201-005 Integral or Remote (Hastelloy C)	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	Hastelloy C and TFE
	13	Sanitary (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) 1.4 bar @ 232°C (20 PSI @ 450°F)	316/316L SS and TFE
	15	Heavy Duty agitated tanks or material w/bulk density	700-0202-043 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and TFE
	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) 34.5 bar @ 149°C (500 PSI @ 300°F)	TFE
	19	Interface Measurement	700-0002-023 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	316/316L SS and TFE
	20	Miniature Pilot Plant Sensor	700-0209-002 Remote	69 bar @ 121°C (1000 PSI @ 250°F) 0 bar @ 232°C (0 PSI @ 450°F)	316/316L SS and TFE
	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) 13.8 bar @ 232°C (200 PSI @ 450°F)	Hastelloy C and TFE
	22	700-0202-043 with proximity plate	700-0202-044 Integral or Remote	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316/316L SS and TFE
	24	Inactive cable probe with active weight - liquids only	700-0005-285 Remote & 700-0005-485 Integral	200 psi @ 200°F	316/316L SS and FEP
	25	Inactive cable probe with active weight - corrosive liquids	700-0005-285 Remote & 700-0005-485 Integral	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 20 psi @ 450°F	316/316L SS and FEP
	28	General purpose very high pressure	700-1202-051 Remote 700-1202-052 Integral	1500 PSI @ 250°F 500 psi @ 450°F	316/316L SS and PEEK
Fly Ash Precipitators, Baghouse, and Economizers	31	No Hopper Installation	700-0029-001 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	32	Hopper Installation up to 200mm (8")	700-0029-002 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	33	Hopper Installation up to 406mm (16")	700-0029-003 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	34	Hopper Installation up to 521mm (20.5")	700-0029-004 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	35	Hopper Installation up to 635mm (25")	700-0029-005 Remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316/316L SS and TFE
	36	Mounting directly on hopper, insulation 2" max.	700-0029-102 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	37	Max recommended nozzle length 9.5"	700-0029-103 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	38	Max recommended nozzle length 19"	700-0029-104 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	39	Max recommended nozzle length 22"	700-0029-105 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
	40	Max recommended nozzle length 25"	700-0029-106 Remote	2 psi @ 1500°F	316/316L SS and Ceramic
Plugged Chute Detection	50	Flush Mount Sensor, 305mm ² (12 inches ²), Heavy Duty	700-0207-001 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304SS and Polyurethane
	51	Flush Mount Sensor, 305mm ² (12 inches ²), Higher Temp	700-0207-002 Remote	0.1 bar @ 149°C (1 PSI @ 300°F)	304SS and TFE
	52	Flush Mount Sensor, 305mm ² (12 inches ²), w/Curved radius 153, 229, 305mm (6.9 or 12")	700-0207-003 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304SS and Neoprene
	53	Flush Mount Sensor, 305mm ² (12 inches ²), Extra Heavy Duty	700-0207-004 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	410SS and UHMW Polyethylene
	55	Flush Mount Sensor, 203mm ² (18 inches ²), Heavy Duty	700-0207-006 Remote	0.1 bar @ 82°C (1 PSI @ 180°F)	304SS and Polyurethane
High Pressure/Temperature	60	High Pressure and High Temperature	700-0204-038 Remote	137.9 bar @ 93°C (2000 PSI @ 200°F) 68.9 bar @ 260°C (1000 PSI @ 500°F)	316/316L SS and Ceramic
	61	High Temperature	700-0204-002 Remote	1 psi @ 700°F 0 bar @ 816°C (0 PSI @ 1500°F)	316/316L SS and Ceramic
	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 200 psi @ 800°F	316/316L SS and Ceramic
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, bare center rod	700-0201-027 Integral or Remote	150 psi @ 300°F	316/316L SS and TFE
	73	Retractable, insulated center rod	700-0201-028 Integral or Remote	150 psi @ 300°F	316/316L SS and TFE
Clear Line (In-Line Style)	80	2" Clear line	700-4200-020 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
	81	3" Clear line	700-4200-030 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
	82	4" Clear line	700-4200-040 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
	83	6" Clear line	700-4200-060 Remote	7 bar @ 121°C (100 psi @ 250°F)	316/316L SS and PEEK
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 Reference	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 700-1202-046 Integral	1000 PSI @ 250°F 300 psi @ 450°F	316/316L SS and PEEK
	93	General purpose very high pressure with perforated concentric shield	700-1202-055 Remote 700-1202-056 Integral	1500 PSI @ 250°F 500 psi @ 450°F	316/316L SS and PEEK
	94	Miniature Pilot Plant Sensor with concentric shield	700-0209-024 Remote	69 bar @ 121°C (1000 PSI @ 250°F) 0 bar @ 232°C (0 PSI @ 450°F)	316/316L SS and TFE
	NN	Retrofit Kit			
	ZZ	Sensing Element Not Listed			

1.5 Dual Compartment Housing

Figure 1-3
Dual Compartment Housing Detail



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

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.

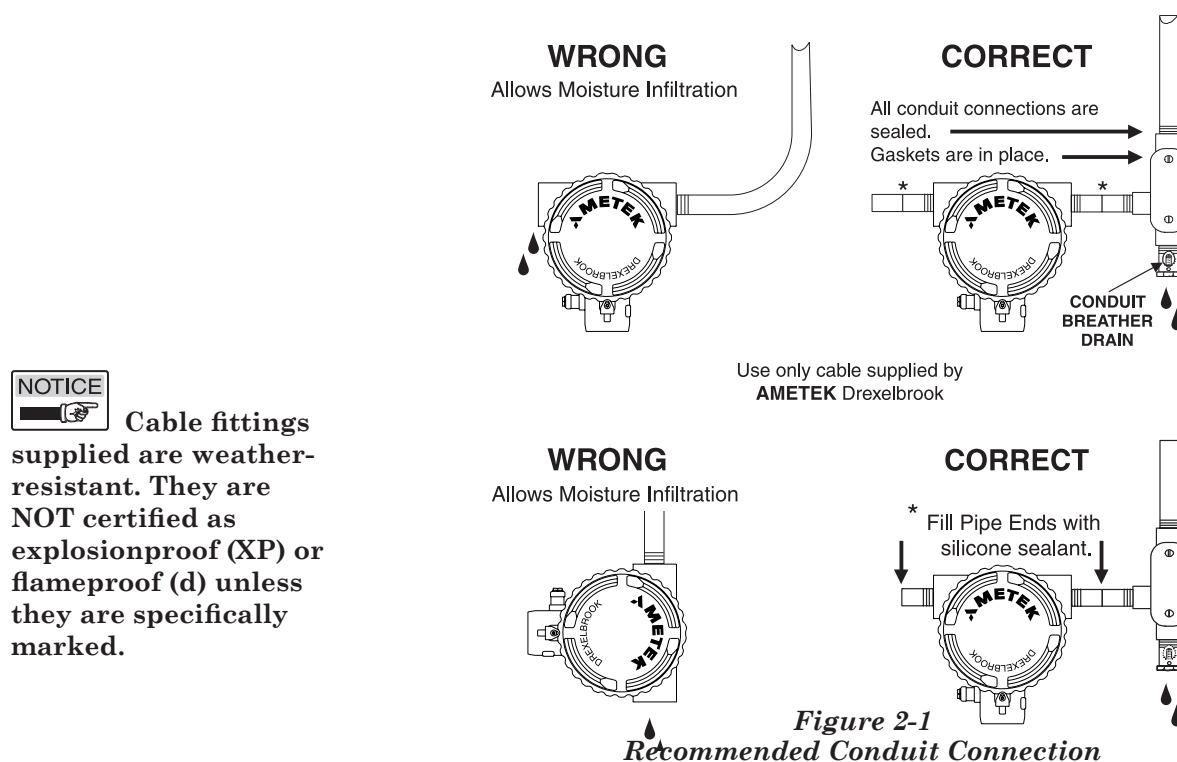
2.2 Mounting and Installation Guidelines

The IntelliPoint RF instrument can be mounted vertically, horizontally, or at an angle. The mounting location should be as free as possible from vibration, corrosive atmospheres, and the possibility of mechanical damage. Ambient temperatures at electronics should be between limits as specified by control drawings in section 7.

The IntelliPoint RF utilizes a dual compartment housing and a completely encapsulated input/output module, to reduce the possibility of damage occurring 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**.

When properly installed, the GREEN LED will illuminate when power is applied.



2.2 Mounting and Installation Guidelines (continued)



WARNING:

IntelliPoint RF equipment is rated explosion-proof.

When installing in areas where explosion is a concern [rated “potentially hazardous” (EU) or “hazardous classified” (USA)] observe all national and local regulations as well as specifications in the certificate.

Mount the sensing element using the installation guidelines in **Figure 2-2**.

When installing the 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 TFE tape when installing threaded sensing elements.



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

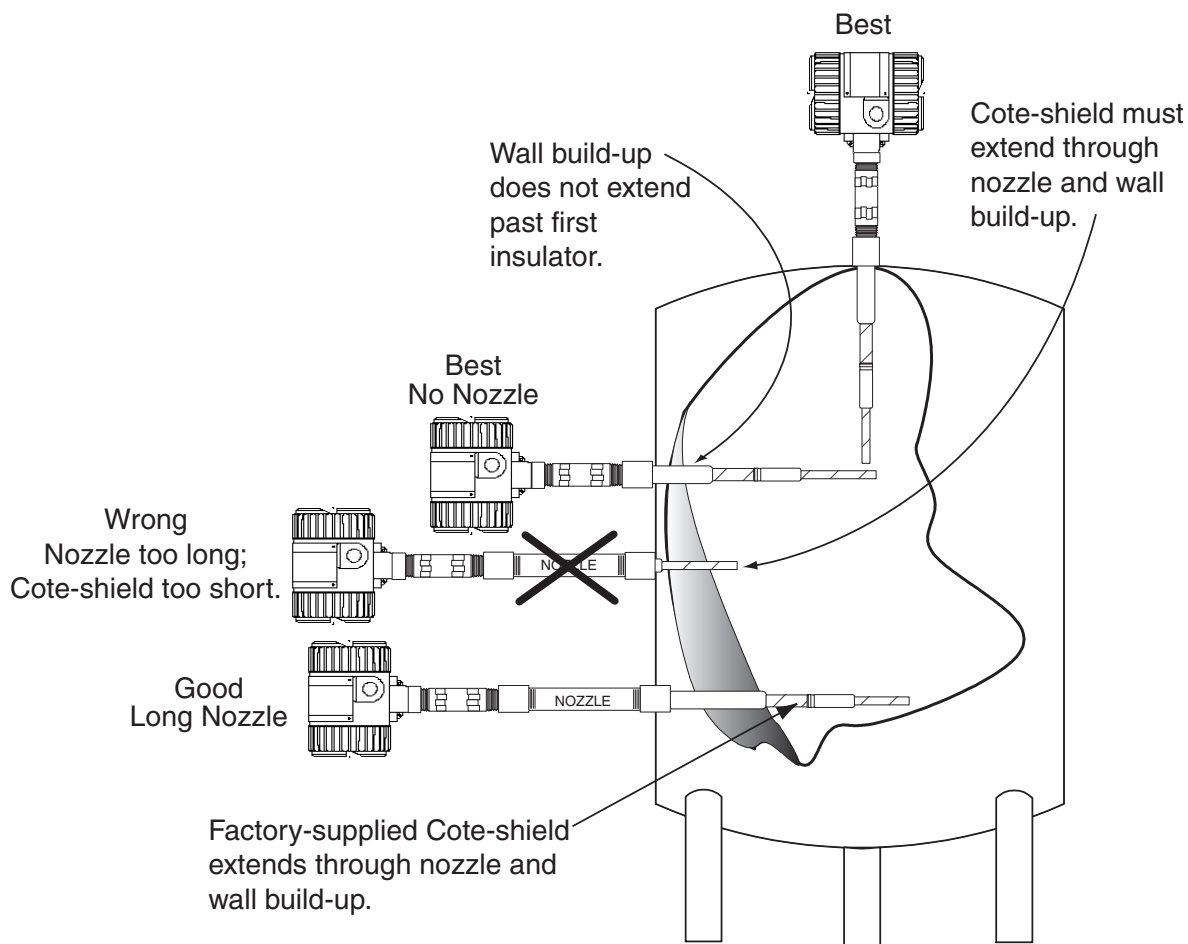


Figure 2-2
Installation Considerations

2.2 Mounting and Installation Guidelines (continued)

Mount the sensing element as to avoid enhancing electrostatic discharge from the 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.

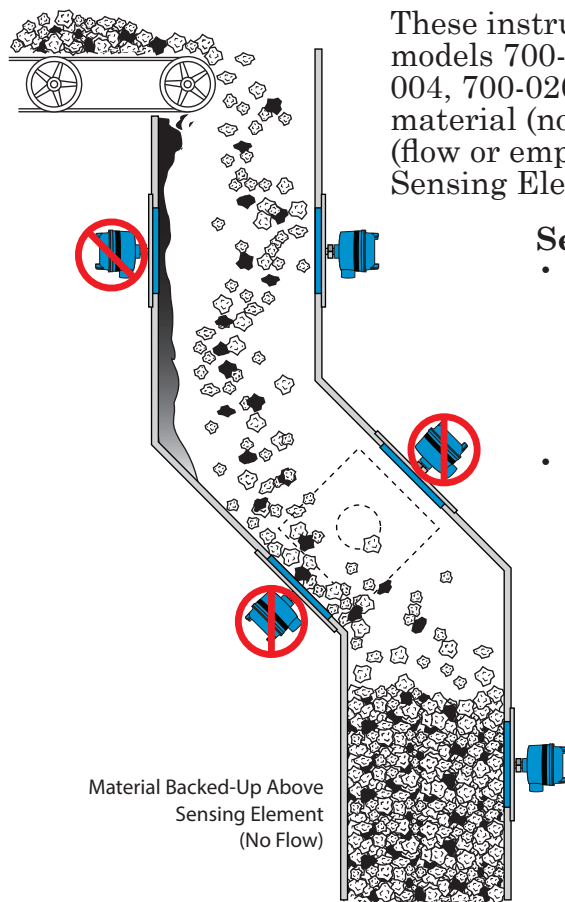
Mounting the sensing element inside a pipe is not recommended.

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

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

Rigid sensing elements can be mounted either vertically or horizontally.

2.2.1 Installation of Flush-Mounted Sensing Elements



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

Sensing Element at the Top of a Chute.

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

Sensing Element in an angle chute.

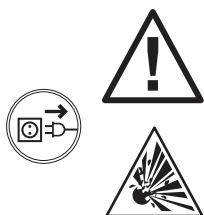
- Do not mount on the top or bottom.
- Best mounted on either side

Sensing Element at the Bottom

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

2.3 Input Wiring

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



WARNING:

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

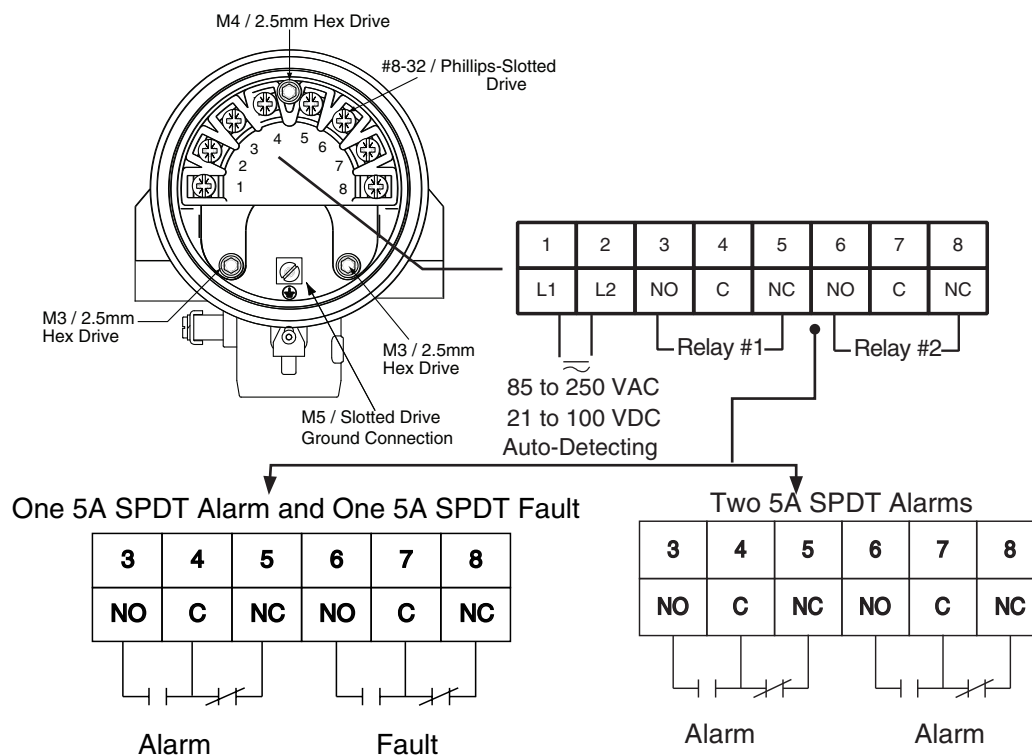


Figure 2-3

Input and Relay Wiring / Customer Connections Side



Important: Ground Must be Provided for Proper Operation and Safety.

2.4 Output Wiring - Relay Version

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

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

2.5 Spark Protection



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

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 setpoint adjustments status LEDs, time delay adjustment, and configuration jumpers. *See Figure 2-4.*

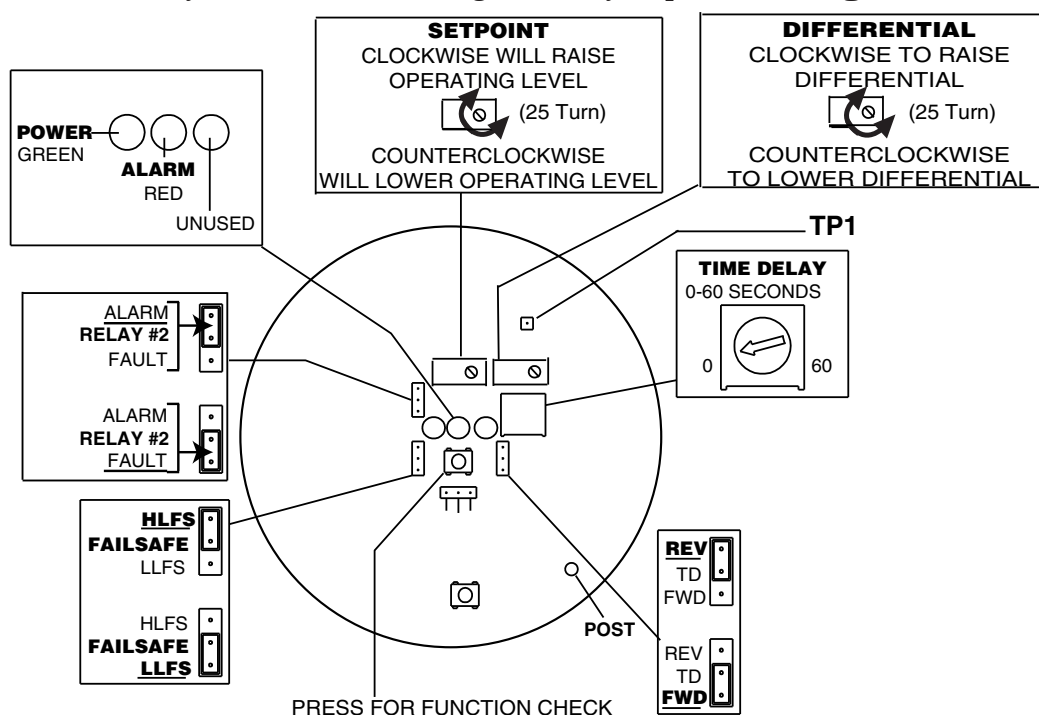


Figure 2-4 Circuit Board (Sensing Element Circuits View)

2.6.1 Time Delay

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



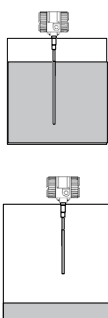
The Time Delay adjustment is a 270-Degree turn pot and is at zero seconds when in the full counter-clockwise position. **Do not force** the pot past the stop or damage will occur.

2.6.2 Time Delay Action

Time delay action describes whether the relay contacts are delayed from going into the alarm state or recovering from an alarm state.

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

2.6.3 Failsafe



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

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

2.6.4 Relay #2 Assignment

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

- **Alarm:** **RELAY #2** will follow **RELAY #1**, providing a second SPDT alarm relay.
- **Fault:** **RELAY #2** will de-energize under a fault condition.
- 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 Function Check - Manual Certify

The **Manual Certify (High Level Fail Safe Only)** 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 **Function Check** feature:

- Checks the relay connections to other control devices.

The **Manual Certify** test is initiated with the press of the **Manual Certify** button located on the sensing element/

2.6.5 Function Check - Manual Certify (Continued)

circuit side of the housing. After pressing the button, the green LED flashes for 5 seconds and the two red LEDs light. The relay contacts are moved to the alarm condition for 2 seconds. If the two red LEDs do not light, and the relay contacts do not move to the alarm condition, the Manual Certify test has detected a fault. Consult the troubleshooting section of this Instruction Manual.

2.6.6 Setpoint and Differential Controls

See Calibration Section 3.0.

2.7 Output and LED Status

There are three status LEDs located on the sensing element/circuit board side of the housing. The green LED is used to indicate that the unit has power. The remaining two red LEDs are used to indicate the condition of relay #1 and relay #2. *See Figure 2-5.*

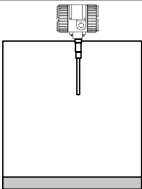
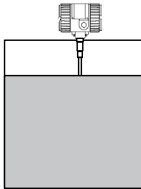
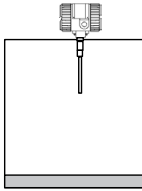
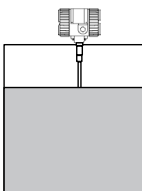
Tank Condition	Relay and LED Output Status												
 High Level FailSafe Tank Empty	<table border="1"><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN  LED On Relay 1 RED  LED Off Relay 2 RED  LED Off Normal	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								
 High Level FailSafe Tank Full	<table border="1"><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN  LED On Relay 1 RED  LED On Relay 2 RED  LED On Alarm	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								
 Low Level FailSafe Tank Empty	<table border="1"><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN  LED On Relay 1 RED  LED On Relay 2 RED  LED On Alarm	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								
 Low Level FailSafe Tank Full	<table border="1"><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN  LED On Relay 1 RED  LED Off Relay 2 RED  LED Off Normal	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								

Figure 2-5
Output and LED Status

2.8 Sensing Element Connection

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



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

For IntelliPoint RF instruments that are mounted remotely from the sensing element, an additional housing with terminals is provided to connect the cable from the sensing element. This housing is factory wired to the Intellipoint circuit board. **See Figure 2-8.** Connect Green (Ground) wire to green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

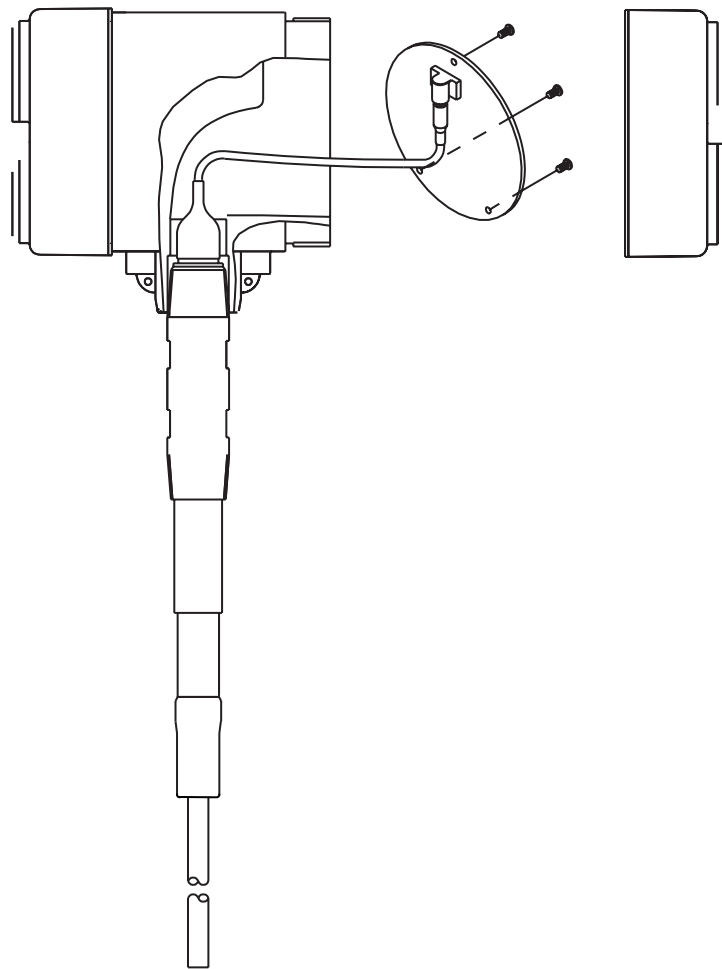


Figure 2-7
Sensing Element Connection
(Integral Housing)

2.8 Sensing Element Connection (continued)

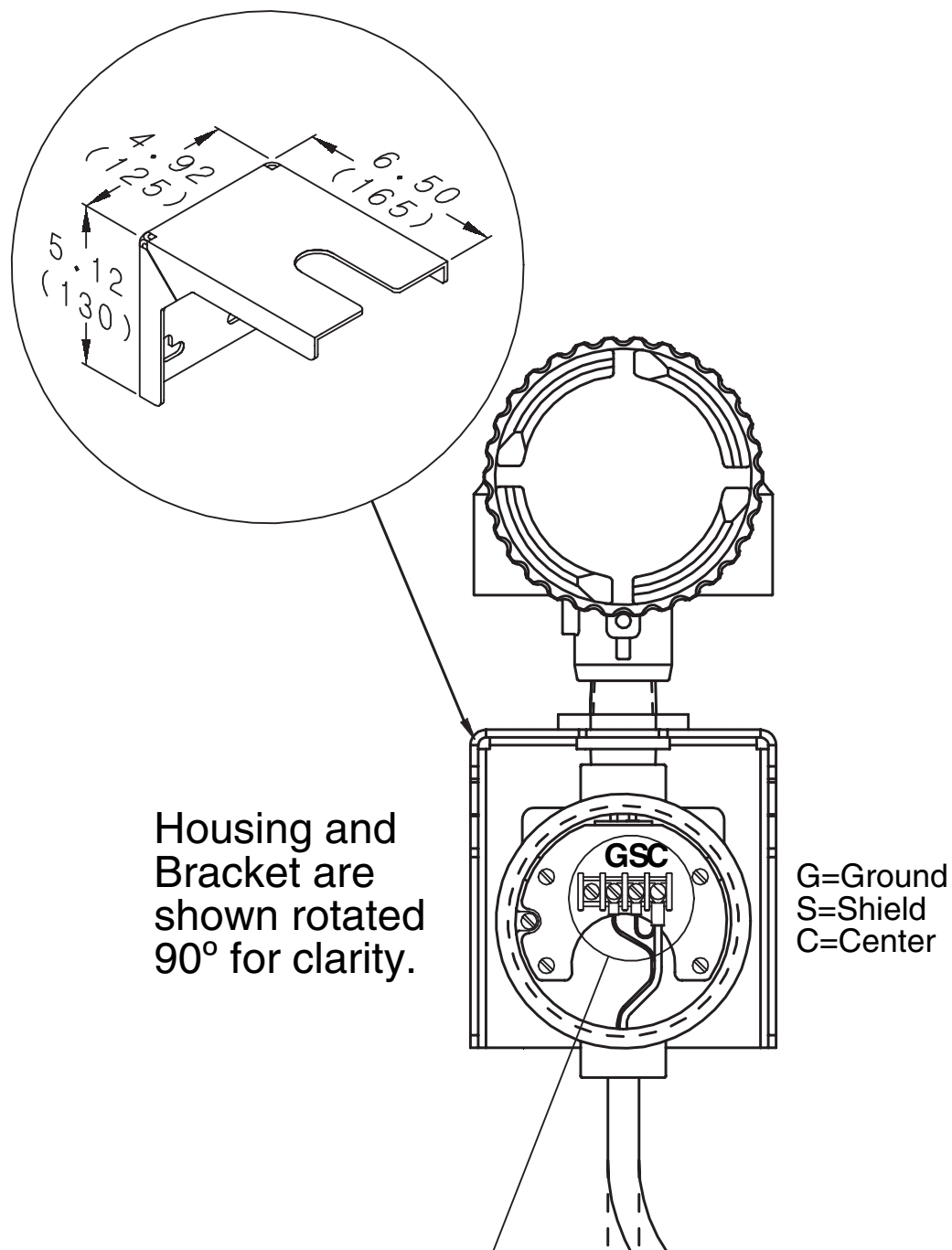


Figure 2-8
*Sensing Element Connection
(Remote Housing)*

Section 3

Section 3: Calibration



WARNING:

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

3.1 Setpoint Control

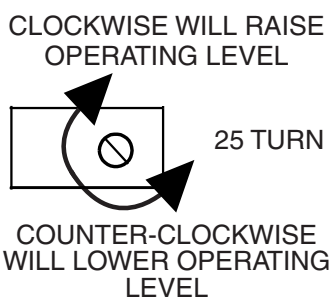


Figure 3-1
Set point Adjustment

There is a single adjustment located on top of the instrument that controls the point at which the relay operates. A red LED indicates that relay is de-energized.

Each revolution of the control changes the operating point approximately 4 pF. (For high-sensitivity models, each revolution will change operating point approximately 1 pF.)

Turning adjustment clockwise will raise level at which relay operates, turning it counterclockwise will lower level at which relay operates. **Refer to Figure 2-4 and Section 3.3.**

3.2 Adjustable Differential Controls

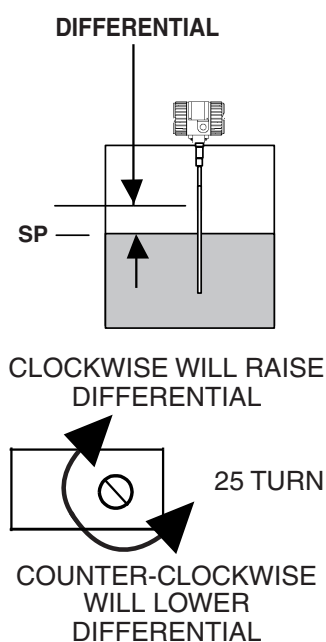


Figure 3-2
Differential Adjustment

Differential is the hysteresis (dead band), or change in level, necessary to switch electronic unit from one state to another. It is useful to prevent oscillation "chatter" on those occasions when level happens to be right at switching point or when surface is agitated.

RML Series level control with adjustable differential allows user to determine amount of capacitance change (hence level) between control point and recovery point. User can select two points on a vertical sensing element where relay contacts will open at one point and close at the other.

Range of operation is 3 to 100pF.

Low point range is that range of capacitance over which lower switching point may be adjusted.

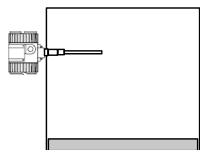
Differential range corresponds to differential in level on sensing element and depends on both the capacitance of the element itself and the properties of the material being measured. **See Figure 2-4** for location of adjustments. For calibration of adjustable differential units, **see Section 3.3.5**

3.3 Calibration Procedures



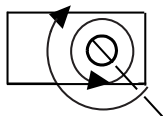
All RML Series controls with bare metal sensing elements are factory-set to switch in all water-based conducting materials. NO calibration adjustment is needed when measuring non-conductive medias.

3.3.1 Quick Calibration

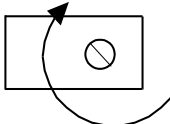


Quick Calibration method is **ONLY** recommended for horizontally mounted, bare metal, Cote-Shield sensing elements. In all cases it is necessary to have material level **below** the probe (sensing element in air).

Red LED OFF = relay energized = normal condition



**FROM FULL CCW COUNT,
CW UNTIL LED CHANGES**



CONTINUE per TABLE 3-1

1. Turn the differential adjustment to the full counter-clockwise position.
2. For either High Level Fail Safe (HLFS) or Low Level Fail Safe (LLFS) begin with sensing element totally uncovered.
3. Starting with calibration adjustor in full counter clockwise (ccw) position, slowly turn clockwise (cw) until relay just operates. [Red LED will turn OFF in HLFS and turn ON in LLFS].
4. Note position of adjustor. Turn it clockwise (cw) from this point the additional number of turns indicated in **Quick Calibration Table 3-1**, below.

Calibration is Complete



1. Most water-based materials can be considered conductive, such as water, acids, bases, salt solutions, water-based slurries, and very wet granular materials. Carbon black and powdered metals conduct even without any water.

2. With conducting materials, if heavy build-up is anticipated, calibration adjustment can be turned to its clockwise limit.

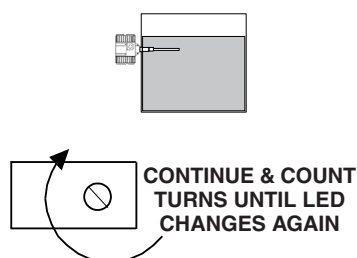
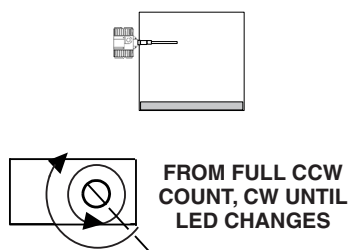
Table 3-1 Quick Calibration Chart

Material Being Measured	Number of Clockwise Adjustment Turns from Operate Position	
	RML Series (Standard Sensitivity)	RGL Series (High Sensitivity)
Conductive Materials - (Water-Based) - See Note 1	10 Turns (Note 2)	20 Turns (Note 2)
Insulating Liquids – Organics, Oil, Plastics	1/2 Turn (180°)	2 Turns
Granular above 50#/ft ³	1/2 Turn (180°)	2 Turns
Granular 30-60#/ft ³	1/2 Turn (180°)	1 Turn
Granular 25-50#/ft ³	1/2 Turn (180°)	1 Turn
Granular 20-40#/ft ³	High Sensitivity Recommended	1 Turn
Granular 10-20#/ft ³	High Sensitivity Recommended	3/4 Turn
Granular 5-15#/ft ³	High Sensitivity Recommended	3/4 Turn

3.3.2 Calibration of Horizontal Insulated Sensing Elements or Horizontal Sensing Elements in Insulating Materials



Red LED OFF = relay energized = normal condition



- A. Begin with sensing element totally uncovered.
 - B. Turn the differential adjustment to the full counter-clockwise position.
 - C. Starting with calibration adjustment in full counter clockwise (ccw) position, slowly turn clockwise (cw) until relay just operates. [Red LED will turn **OFF** in HLFS, and turn **ON** in LLFS].
 - D. Note position of adjustor.
 - E. Increase material level well above sensing element.
 - F. Turn adjustor clockwise from this point, counting the additional number of turns until relay & LED, once again, changes state.
- Note: Pot continues to spin even at the end of its adjustment (no mechanical stop).
- G. Turn adjustor counter clockwise half the number of turns that were counted in step E.
 - H. Record that half number of turns as "PRELOAD" for use later in recalibration. **See Section 3.3.4.**

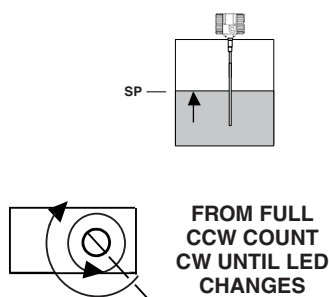
Calibration is Complete

If less than 1/4 turn of adjustment is observed between point where sensing element was uncovered and when covered, consult factory.

3.3.3 Calibration of Vertical Insulated Sensing Elements or Vertical Sensing Elements in Insulating Materials



Red LED OFF = relay energized = normal condition



- A. Turn the differential adjustment to the full counter-clockwise position.
- B. Set level to where control is desired. [Minimum of 3 inches should cover sensing element.]
- C. Starting from full counter clockwise position, turn setpoint adjustor clockwise, counting the turns until relay just operates [LED changes state].
- D. Record that number of turns as "PRELOAD" for use later in recalibration. **See Section 3.3.4.**

Calibration is Complete

3.3.4 Recalibration

If amount of preloading was recorded at time of initial calibration, it is possible to replace instrument without experimentally determining proper amount of preload.



- A. For recalibration using procedure in **Section 3.3.2**, follow Steps a, b, and c, then turn adjustor further clockwise amount of preload.
- B. For recalibration using procedure in **Section 3.3.3**, turn adjustor clockwise, from full counter-clockwise position, by amount of preload.
- C. When recalibrating for bare sensing elements in conductive materials (factory set), turn tuning adjustor to full clockwise position. No other adjustment is necessary. (Minimum of 25 turns.)

Nonvolatile Memory

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

When the IntelliPoint is powered for the first time the internal microprocessor records and stores the “Air” value.

This is the uncovered value of the sensor mounted in the vessel. The IntelliPoint will also store the last covered value and the last uncovered value.

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

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

3.3.5 Calibration of Adjustable Differential Units (HLFS and LLFS)



FULL CCW

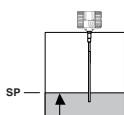
- A. Put Fail-Safe switch in **HLFS** position.
See Section 2.6.3.



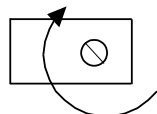
FULL CCW

- B. Turn Set Point adjustor to full counter clockwise position.

- C. Turn Differential adjustor to full counter clockwise position as well. *See Figure 2-4.*



- D. Adjust material level to lower point of desired control band.

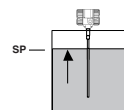
UNTIL LED
CHANGES

- E. Slowly turn Set Point adjustor clockwise until instrument just operates (LED changes state).



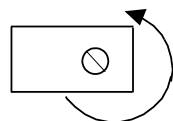
FULL CW

- F. Turn Differential adjustor to full clockwise position (maximum differential).



- G. Raise material level to upper point of desired control band.

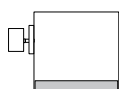
- H. Slowly turn the Differential adjustor counter-clockwise until the LED changes state.

UNTIL LED
CHANGES

- I. Select desired Fail-Safe position.

Calibration is Complete

3.3.6 High Level Fail Safe Blind Calibration of Control w/Flush Sensing Element (Alarm when chute is full at sensor)



- A. Start with sensing element uncovered, (no material at sensing element), and tuning adjustment full counter-clockwise (ccw). At this point red LED will be ON.

RED LED
OFF

- B. Turn adjustor clockwise (cw) until LED just turns OFF.

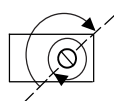
RED LED
ON

- C. If above operation is satisfactory, then continue turning adjustor clockwise (cw):

- One (1) turn for granulars containing moisture. (1 = 4PF)
- One half (1/2) turn for dry insulating powders.

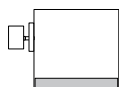
DRY INSULATING
POWDERS

Calibration is Complete

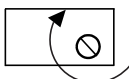


MOIST
GRANULARS

3.3.7 Low Level Fail Safe Blind Calibration of Control w/Flush Sensing Element (Alarm when chute is empty at sensor)



● RED LED
ON



○ RED LED
OFF

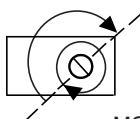
A. Start with sensing element uncovered, (no material at sensing element), and tuning adjustor full counter clockwise (ccw). Red LED will be OFF.

B. Turn adjustor clockwise (cw) until LED just turns ON.

C. If above operation is satisfactory, then continue turning adjustor clockwise (cw):

- One (1) turn for granulars containing moisture. (1 = 4PF)
- One half (1/2) turn for dry insulating powders.

DRY INSULATING
POWDERS



MOIST
GRANULARS

Calibration is Complete

When excessive build-up on sensor occurs, turning adjustor clockwise will generally eliminate a false high-level signal. Build-up may continue to form, or, it may drop off.



Section 4: Spare Parts List

4.1 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	
RML - Manual Calibration (Std Sensitivity).....	385-48-10-ML1
RGL - Manual Calibration (High Sensitivity).....	385-48-20-GL1
Integral Sensing Element Cable (PEEK Probes)	380-9000-97
Integral Sensing Element Cable (All Other Probes).....	380-9000-99

Section 5

Section 5: Troubleshooting

5.1 RF Point Level Troubleshooting Guide

Symptom	Possible Cause	Solution	See Section
Switch is in alarm and will not clear	Calibration incorrect	Recalibrate	Section 3
	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, 5.4
	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, 5.4
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 5.4, 5.5, 5.6
	Flexible sensor is swaying and active is touching vessel or structure	Add 1 or 2 seconds of reverse acting time delay.	Section 2.6.1
Switch stays in alarm for extended period after level falls below sensor	Material bridging from active to tank structure	May be able to shorten sensor (consult factory) or relocate sensor.	Appendix A Section 2.2, 5.4
	Time delay may be active	Make sure time delay pot is full counterclockwise.	Section 2.5.1
Switch does not respond to material	Calibration incorrect	Recalibrate	Section 3
	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
	Switch was calibrated with sensor covered by material	Make sure material level is below sensor and re-calibrate	Section 3.2
	Granular material – Active section is not getting enough coverage due to angle of repose	Relocate sensor to get more coverage or lengthen active. Change to high sensitivity.	Appendix A
	Connection cable or harness between unit and sensor is damaged	Check connection cable for shorts, opens, or damage and proper termination	Section 5.5, 5.6
Switch delays in responding to material	Reverse acting time delay may be active	Check time delay settings to make sure they are correct	Section 2.6.1
Green Power LED is out	Electronic unit is not getting power	Check power source to make sure proper power is supplied and connections are correct	Section 2.3
	Electronic Unit is damaged	Consult factory	Section 5.8

5.2 Testing Electronic Unit



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.



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

Use the following steps to test the electronic unit:

1. Be sure the environment is safe before removing the lid from the housing.
2. If possible to access the sensing element with the material below the sensor, or remove the IntelliPoint from the vessel, use your finger to touch TP1 (***Shown in Figure 2-4***) while holding any bare metal portion of the instrument housing with the other hand. The system should go to its alarm 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 alarm state.
4. If the IntelliPoint changes to the alarm state while touching test point TP 1, but not when touching the tip of the sensor, in most cases, the interconnecting cable is faulty. ***See Section 5.5: Testing Integral Cable, or Section 5.6 Testing Remote Cable.***
5. If the IntelliPoint changes state while touching test point, but not when touching tip of sensor, in most cases, integral cable is faulty. Refer to ***Section 5.5 Testing Integral Cable.***
6. 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 IntelliPoint changes state with sensing element disconnected, in most cases, sensing element is faulty. Refer to ***Section 5.4 Testing Sensing Element.***
7. Disconnect probe cable from Circuit board.
8. Set time delay calibration deadband adjustment to full counter-clockwise position.
9. Turn calibration adjustment clockwise until the red LED changes.



5.2 Testing Electronic Unit (Continued)

10. Turn calibration adjustment counter-clockwise until the Red LED changes again. If more than 1/3 turn is required then the unit is faulty.
11. If the IntelliPoint fails all of the above tests, in most cases the instrument is faulty. Use a replacement Input/Output Module (IOM) or circuit board to determine fault. Consult factory.

5.3 Testing 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 5-1**.
- 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 fail safe jumper to the opposite position. The red LED will change and relay contacts should also change. If relay contacts do not change then the relay is not functioning properly.

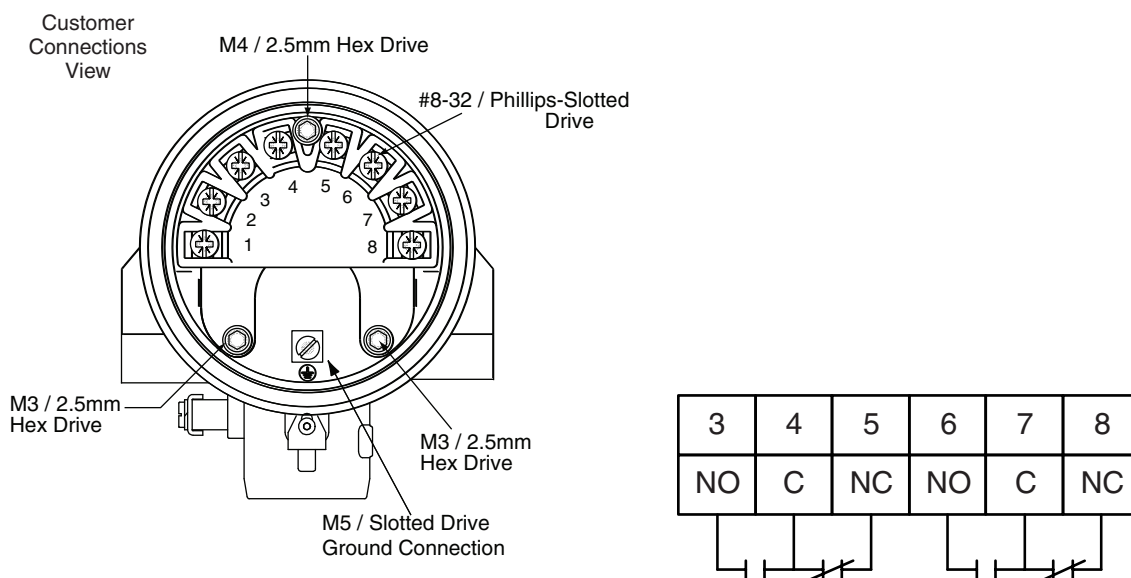


Figure 5-1
Relay Circuit Operation

5.4 Testing The Sensing Element

Integral electronics, *See figure 2-7*

Remove Sensing Element Circuit Board and disconnect cable from circuit board

Remote electronics, *See figure 2-8*

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 ohmmeter¹ that is set to the R x 1K ohm scale, measure the resistances between each pair of sensing element connections. *See Figure 5-2 & 5-3.* Record values in Table 4.1
 - a. If the process material is conductive, it is normal to measure some resistance between sensing element connections. The lowest permissible resistance values are:

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

5.4 Testing The Sensing Element (Continued)

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

Relay and LED Output Status																												
Tank Condition	Relay #2 = Alarm AutoVerify = disabled			Relay #2 = Fault AutoVerify = disabled																								
 High Level FailSafe Tank Empty	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off			3	4	5	6	7	8	NO	C	NC	NO	C	NC
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 High Level FailSafe Tank Full	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED On	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED Off			3	4	5	6	7	8	NO	C	NC	NO	C	NC
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 Low Level FailSafe Tank Empty	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED On	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED On Relay 2 RED LED Off			3	4	5	6	7	8	NO	C	NC	NO	C	NC
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 Low Level FailSafe Tank Full	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off	3	4	5	6	7	8	NO	C	NC	NO	C	NC	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED Off Relay 2 RED LED Off			3	4	5	6	7	8	NO	C	NC	NO	C	NC
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NO	C	NC	NO	C	NC																							
 Fault Condition Detected High Level FailSafe Tank Empty	Relay and LED Output Status Relay #2 = Fault and AutoVerify = enabled High Level Failsafe only																											
	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> Power GREEN LED On Relay 1 RED LED Flashes Relay 2 RED LED Flashes	3	4	5	6	7	8	NO	C	NC	NO	C	NC															
3	4	5	6	7	8																							
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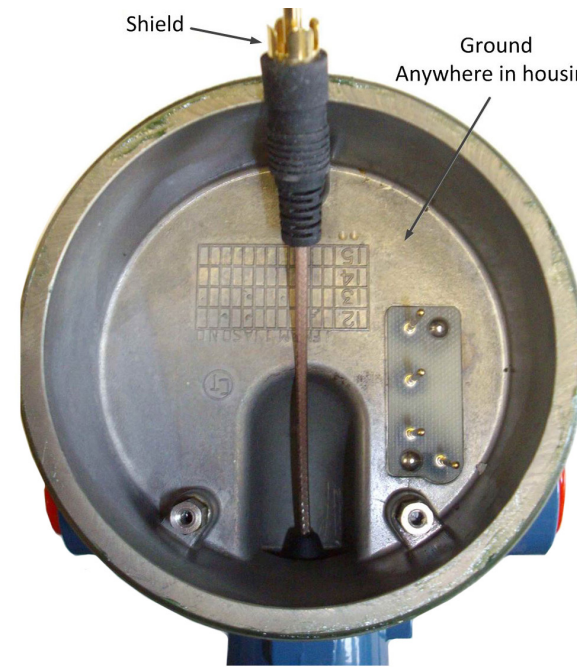


Figure 5-2
Testing the Sensing Element

5.4 Testing The Sensing Element (Continued)

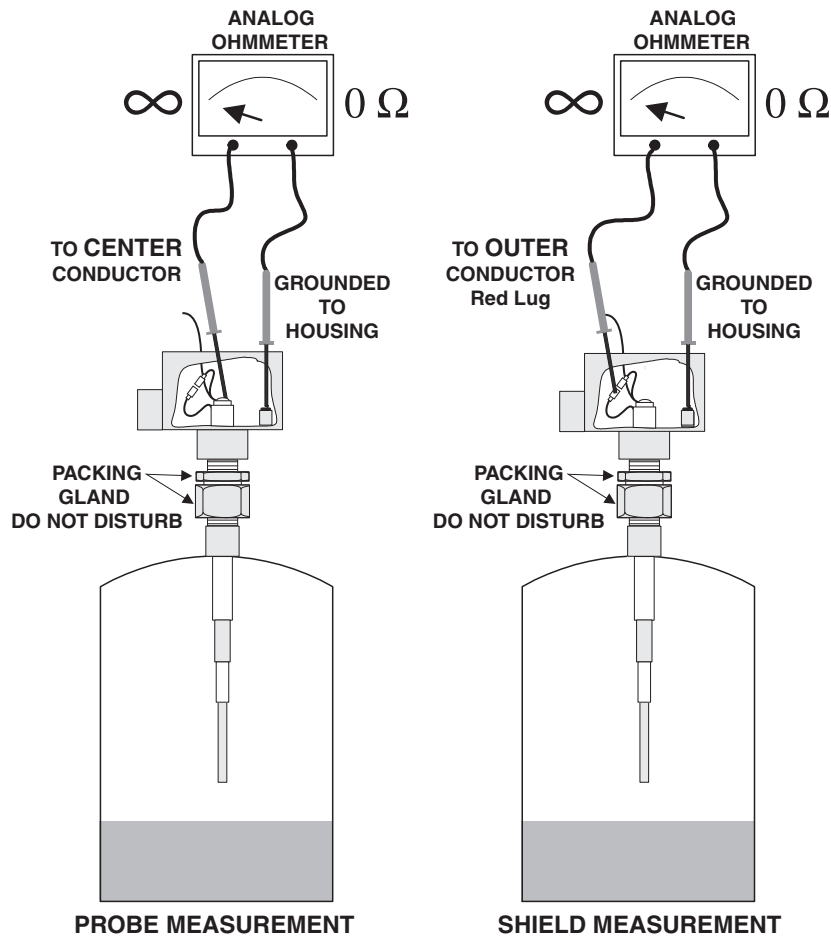


Figure 5-3
Checking the Sensing Element
Center = Probe
Outer = Shield
Housing = Ground

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

5.5 Testing the Integral Cable

1. Disconnect integral cable from electronic.
2. Check for continuity.
 - a. Using an ohmmeter measure the resistances.
 - i. From the center wire connection on the RCA plug to the sensing element active section (center wire)
 - ii. From the shield connection on the RCA plug to the sensing element shield.
 - iii. If resistance is greater than 5Ω the cable has failed.
3. Check for shorts.
 - a. The integral cable is tested as part of sensing element test, **section 5.4**.

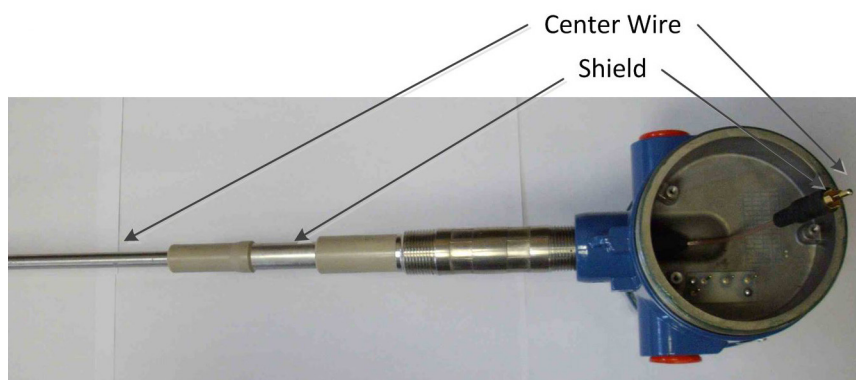


Figure 5-4
Testing the Integral Cable

5.6 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 5-3**.
 - 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 resistance is less than 100 k-ohms cable has failed
 - b. Check for continuity.
 - i. Short center wire to ground wire and measure resistance as shown. Should be close to 0 ohms
 - ii. Short center wire to shield and repeat.
 - iii. If resistance is greater than 10 ohms cable has failed

5.6 Testing the Remote Cable (Continued)

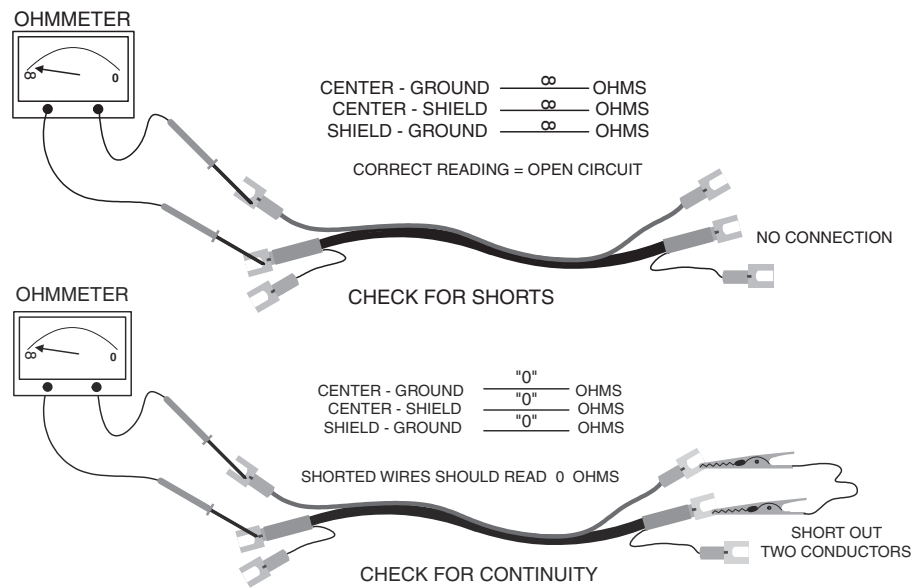


Figure 5-5
Testing Remote Cable

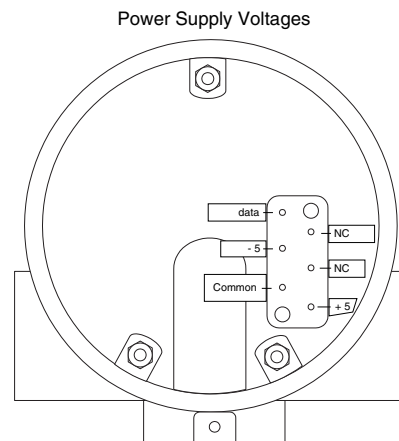
5.7 Testing Power Supply

Power supply can be tested separately as follows:

- A. Remove power from electronic unit.
- B. Remove three screws holding circuit board into housing.
- C. Disconnect sensing element connection. Refer to **Figure 2-7 or 2-8**.
- D. Reapply power.
- E. 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 5-6**.

Figure 5-6
Testing Power Supply

VIEW INTO CUSTOMER
CONNECTIONS SIDE



5.8 Factory Assistance

AMETEK Drexelbrook can answer any questions about your level measurement system. 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
- **Call** the Service department at +1-215-674-1234
- **FAX** the Service department at +1-215-443-5117
- **E-Mail** to drexelbrook.service@ametek.com

Please provide the following information:

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

5.9 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.

5.10 Customer Training

Periodically AMETEK Drexelbrook holds customer training seminars at the factory where the instruments are made. Guided by Drexelbrook engineers and specialists these sessions provide detailed information on all aspects of level measurement, from theory to the practice of instrument operation. For more information about these valuable workshops, write to AMETEK Drexelbrook, attention: Customer Service, or call direct +1-215-674-1234.

5.11 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 Number (RA#), contact the Service department at +1-215-674-1234.

Please provide the following information:

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

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

Ship equipment freight prepaid to:
AMETEK-DREXELBROOK.
205 KEITH VALLEY ROADzz
HORSHAM, PA 19044-1499

COD shipments will not be accepted.

Section 6: Specifications

Technology:	RF/Capacitance
Calibration:	None
Modes of Operation:	High and Low level
Repeatability	2mm (0.08 inch) conductive liquids
Response Time:	Less than 1 second
Time Delay:	0 to 60 seconds forward and reverse acting.
Ambient Electronics:	-30 to 70°C (-22 to 158°F) ATEX -30 to 58°C (-22 to 136°F) IECEEx -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
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
Maximum Contact Load:	5A/30 VDC, 5A/250 VAC - Environmentally Sealed
Minimum Contact Load (DC):	100 mA/12 VDC 0 to 200 mA / 12 VDC Optional
Housing (Electronics):	Dual Compartment, powder-coated aluminum with two cable entries
Cable entry:	M20 x 1.5 ATEX/IECEEx ¾-inch NPT FM/FMc
Ingress Protection:	IP66 NEMA 4X

Section 7: Specifications (Continued)

7.1 Approvals Available:

FM / FMc



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

ATEX (FM14ATEX0049X)



Integral or Remote Sensor

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

Temperature Class Process Temps (Integral Sensor)

T5	100°C
T4	135°C
T3	200°C
T2	230°C

IECEX (FTZU 18.0007X)

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



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

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

Special Condition for Safe Use

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

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

3. AMBIENT TEMPERATURE RANGE:

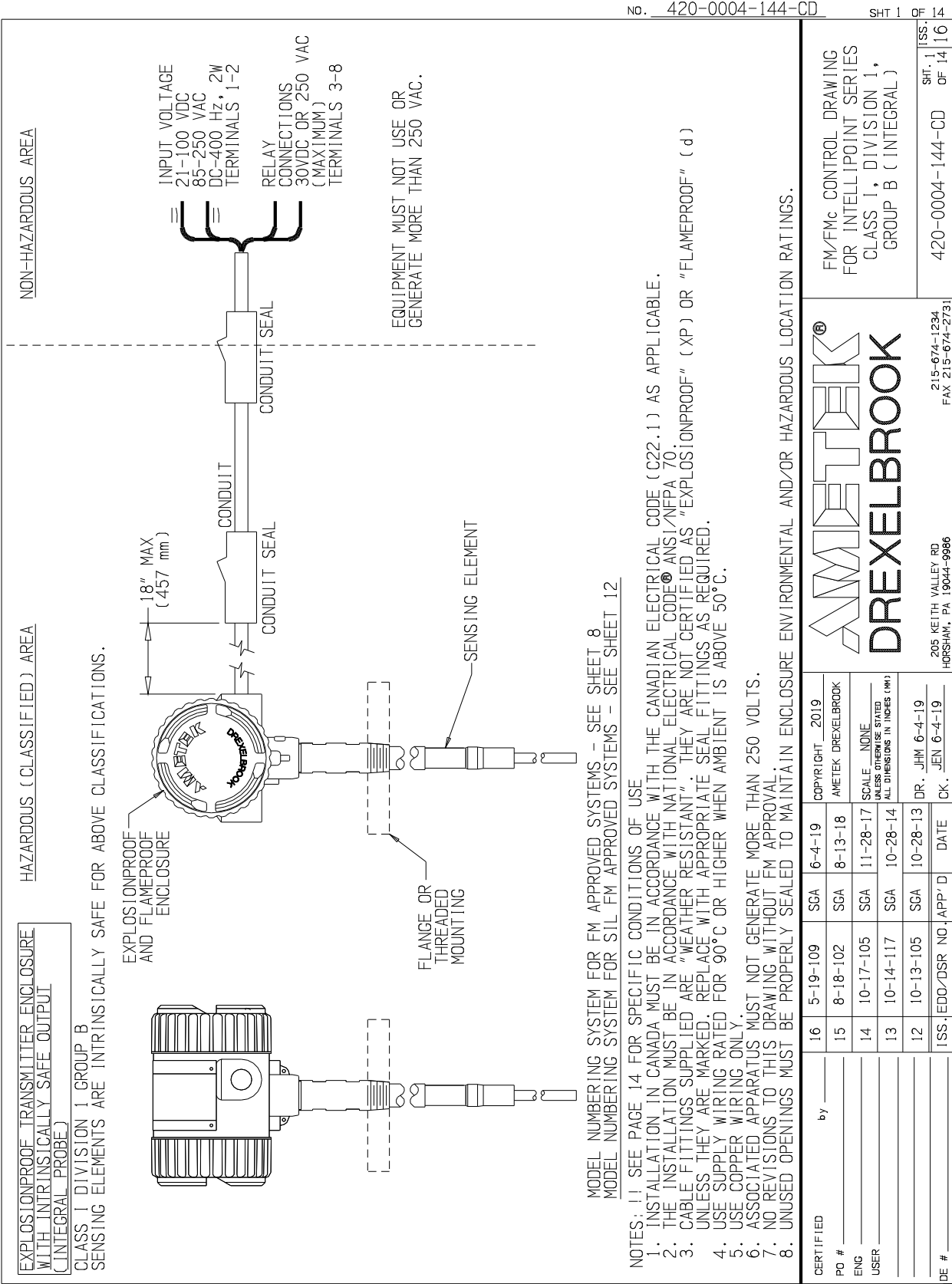
-30°C TO +58°C FOR RXLX/SXRXTX INTELLIPOINT RF LEVEL SYSTEM

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

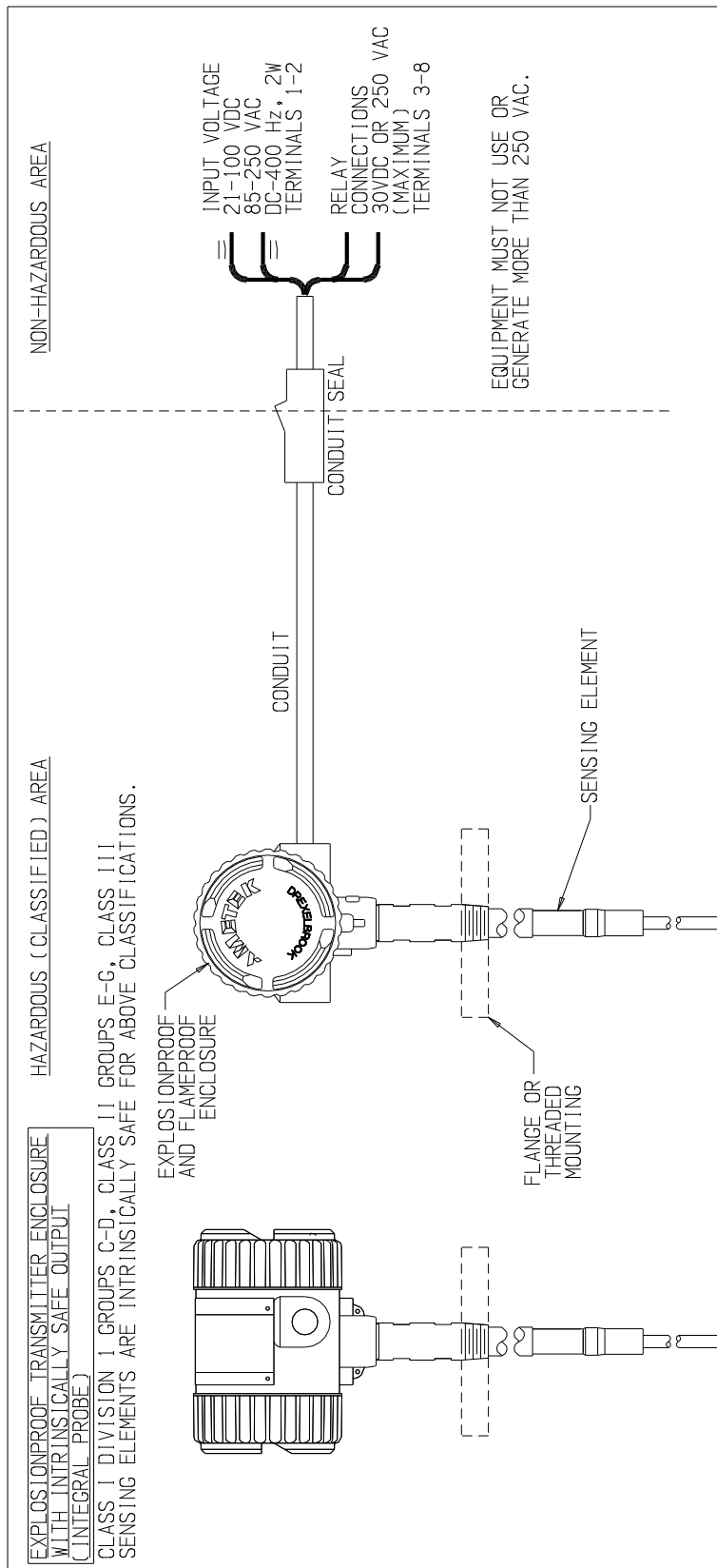
Section 7

Section 7: Control Drawings

7.1 FM/FMc Control Drawings



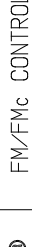
7.1 FM/FMc Control Drawings (Continued)



MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 8
MODEL NUMBERING SYSTEM FOR SIL FM APPROVED SYSTEMS - SEE SHEET 12

NOTES: !! SEE PAGE 14 FOR SPECIFIC CONDITIONS OF USE

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (NEC) AND NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED		b y _____		16		5-19-109	SGA	6-4-19	COPYRIGHT 2019		 DREXELBROOK	FM/FM _c CONTROL DRAWING FOR INTELLIPPOINT SERIES CLASS 1, 11, 111, DIVISION 1, GROUPS C-G (INTEGRAL)
PO # _____		15		8-18-102	SGA	8-13-18	AMETEK DREXELBROOK					
ENG _____		14		10-17-105	SGA	11-28-17	SCALE NONE					
USER _____		13		10-14-117	SGA	10-28-14	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)					
_____		12		10-13-105	SGA	10-28-13	DR. JHM 6-4-19					

# _____		ISS.		EDO/DSR NO.	APP' D	DATE	CK.		JEN 6-4-19	205 KEITH VALLEY RD HORSHAM, PA 19044-9986 215-674-1234 FAX 215-674-2731		420-0004-144-CD SHF. 2 OF 14 16

7.1 FM/FMc Control Drawings (Continued)

EXPLOSIONPROOF TRANSMITTER ENCLOSURE
WITH INTRINSICALLY SAFE OUTPUT
(INTEGRAL PROBE)

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

CLASS 1, DIVISION 1, GROUPS B-D, CLASS II, GROUPS E-G, CLASS III
MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 8
MODEL NUMBERING SYSTEM FOR SIL FM APPROVED SYSTEMS - SEE SHEET 12

NOTES: !! SEE PAGE 14 FOR SPECIFIC CONDITIONS OF USE

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
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4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED
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ENG
USER
DE #

by

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10-17-105
10-14-117
10-13-105

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2019
AMETEK DREXELBROOK
SCALE NONE
UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (IN)

AMETEK®
DREXELBROOK

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

FM/FMc CONTROL DRAWING
FOR INTELLIPOINT SERIES
DIVISION 2 (INTEGRAL)

420-0004-144-CD

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OF 14

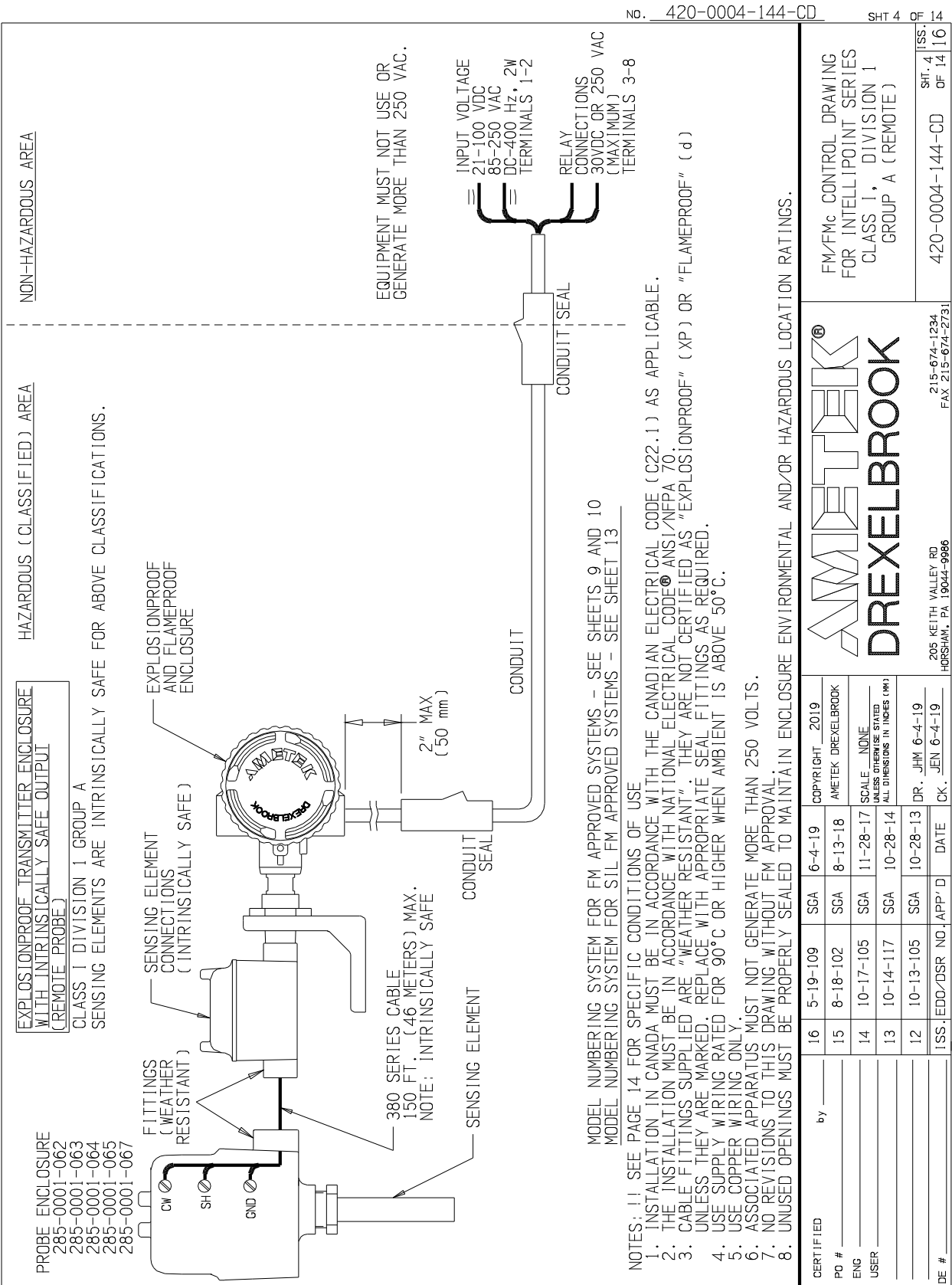
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OF 14

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OF 14

No. 420-0004-144-CD SHT 3 OF 14

38

7.1 FM/FMc Control Drawings (Continued)



7.1 FM/FMc Control Drawings (Continued)

EXPLOSIONPROOF TRANSMITTER ENCLOSURE
WITH INTRINSICALLY SAFE OUTPUT
(REMOTE PROBE)

CLASS 1 DIVISION 1 GROUP B
SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

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

FITTINGS
(WEATHER
RESISTANT)

SENSING ELEMENT
CONNECTIONS
(INTRINSICALLY SAFE)

EXPLOSIONPROOF
AND FLAMEPROOF
ENCLOSURE

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

SENSING ELEMENT

CONDUIT SEAL

CONDUIT

CONDUIT SEAL

CONDUIT

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

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

EQUIPMENT MUST NOT USE OR
GENERATE MORE THAN 250 VAC.

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

NOTES: !! SEE PAGE 14 FOR SPECIFIC CONDITIONS OF USE
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d)
UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

AMETEK®
DREXELBROOK

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

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

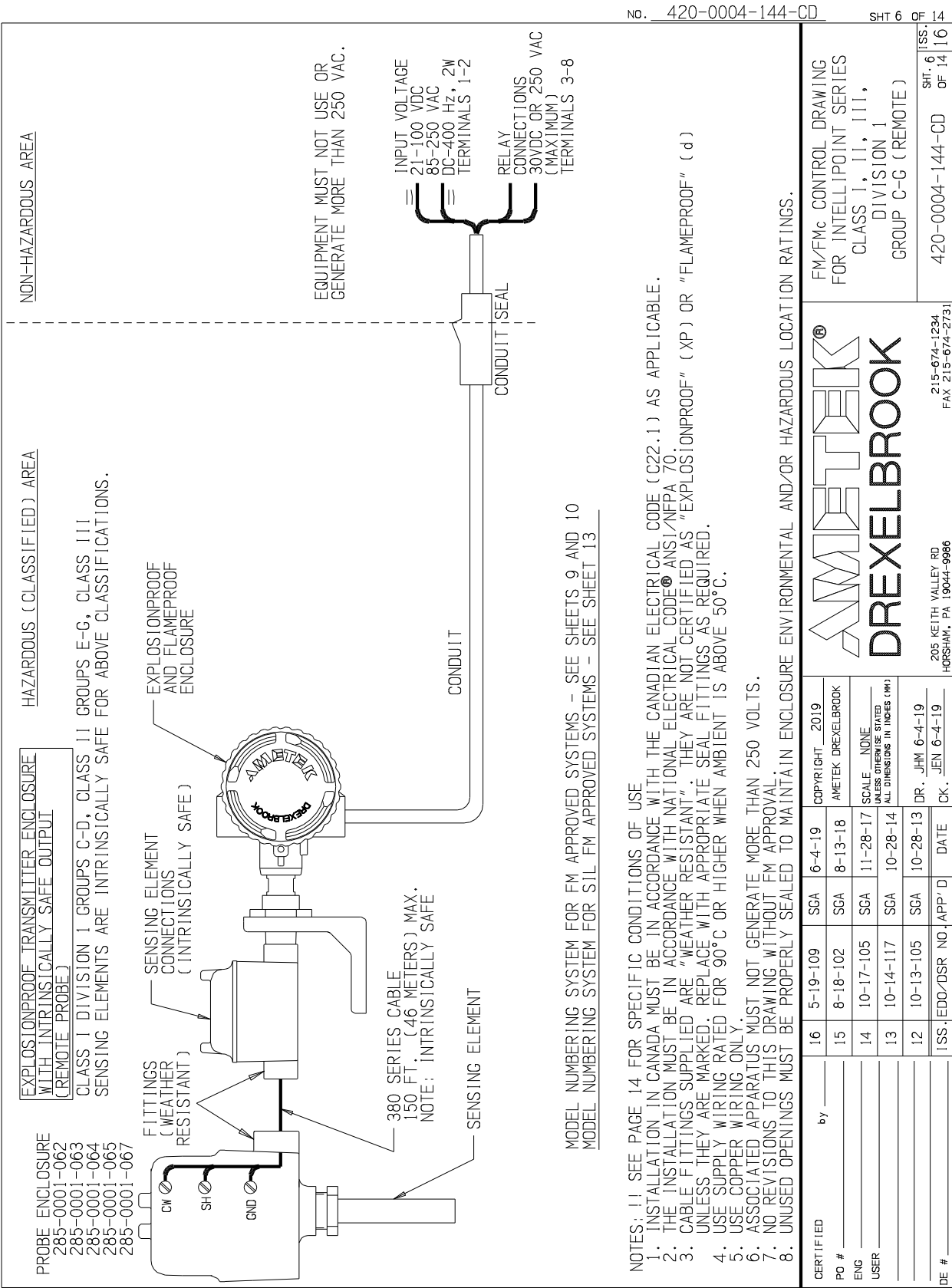
420-0004-144-CD

SHIT. 5 OF 14

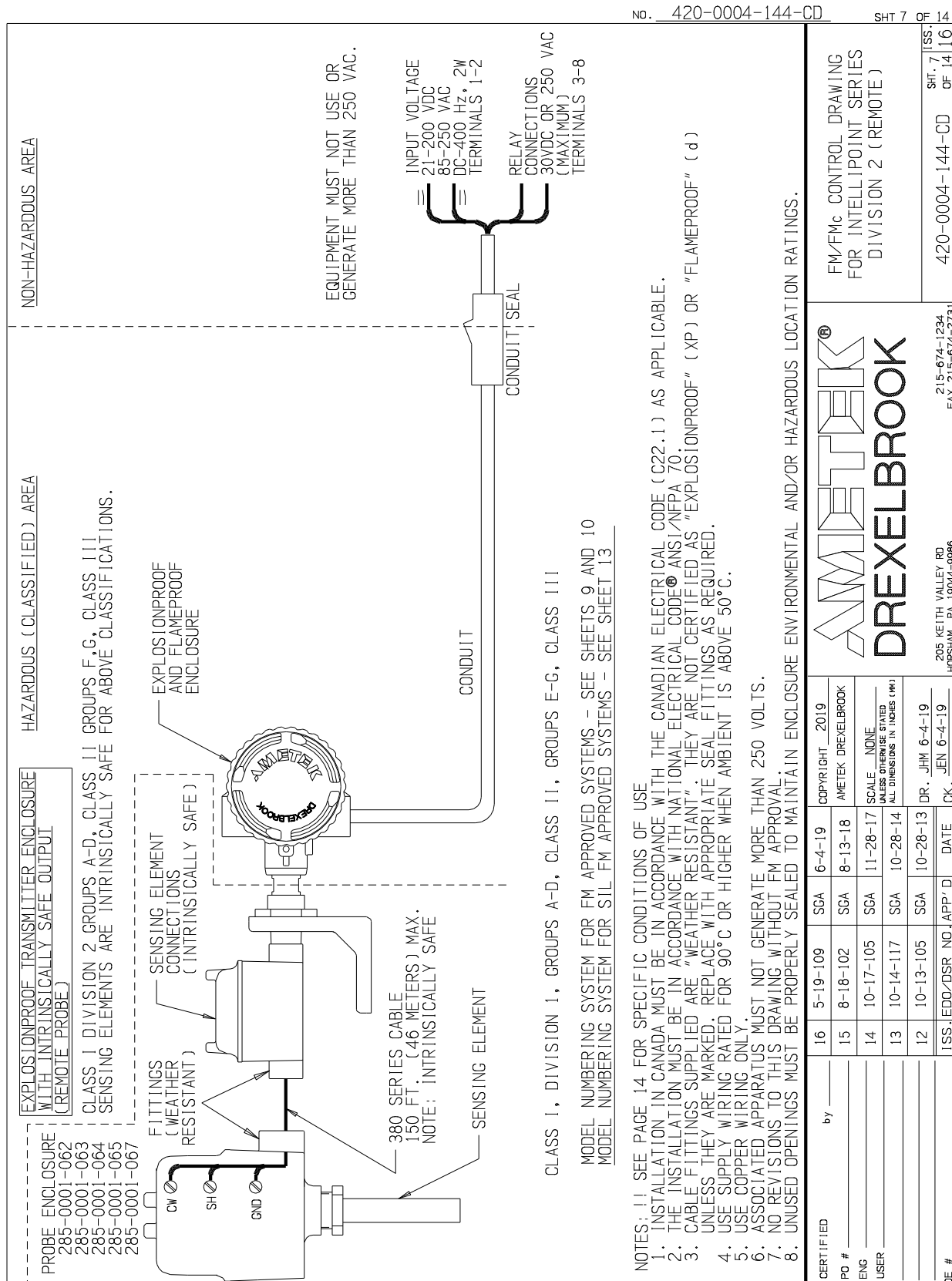
CERTIFIED	by	16	5-19-109	SGA	6-4-19	SGA	8-13-18	AMETEK DREXELBROOK	2019	COPYRIGHT
PO #		15	8-18-102	SGA	11-28-17	SCALE	NONE	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)		
ENG		14	10-17-105	SGA	10-28-14	SGA	10-28-13	DR. JHM 6-4-19		
USER		13	10-14-117	SGA	10-28-13	SGA	10-28-13	CK. JEN 6-4-19		
ISS.		12	10-13-105	SGA	10-28-13	SGA	10-28-13	DATE		
DE #			EDO/DSR NO.	APP'D						

40

7.1 FM/FMc Control Drawings (Continued)



7.1 FM/FMc Control Drawings (Continued)



7.1 FM/FMc Control Drawings (Continued)

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 
							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													

7.1 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					

7.1 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 
							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													

7.1 FM/FMc Control Drawings (Continued)

MODEL NUMBERS OF APPROVED SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

m = FAMILY NUMBER: 0 THROUGH 9, BLANK

n = FAMILY NUMBER: 0 THROUGH 9, BLANK

o = 0 THROUGH 9, BLANK

p = 0 THROUGH 9

q = FAMILY NUMBER: 0 THROUGH 9, BLANK

r = FAMILY NUMBER: 0 THROUGH 9, BLANK

s = FAMILY NUMBER: 0 THROUGH 9

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

NOTES:

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

!! SEE PAGE 14 FOR SPECIFIC CONDITIONS OF USE

FM APPROVED
ADDITIONAL
SENSING ELEMENTS

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

7.1 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 
										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

Reference SIL Manual (SXRML) For Ordering Detail

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

Reference SIL Manual (SXRML) For Ordering Detail

7.1 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

Reference SIL Manual (SXRML) For Ordering Detail

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

7.1 FM/FMc Control Drawings (Continued)

SPECIFIC CONDITIONS OF USE

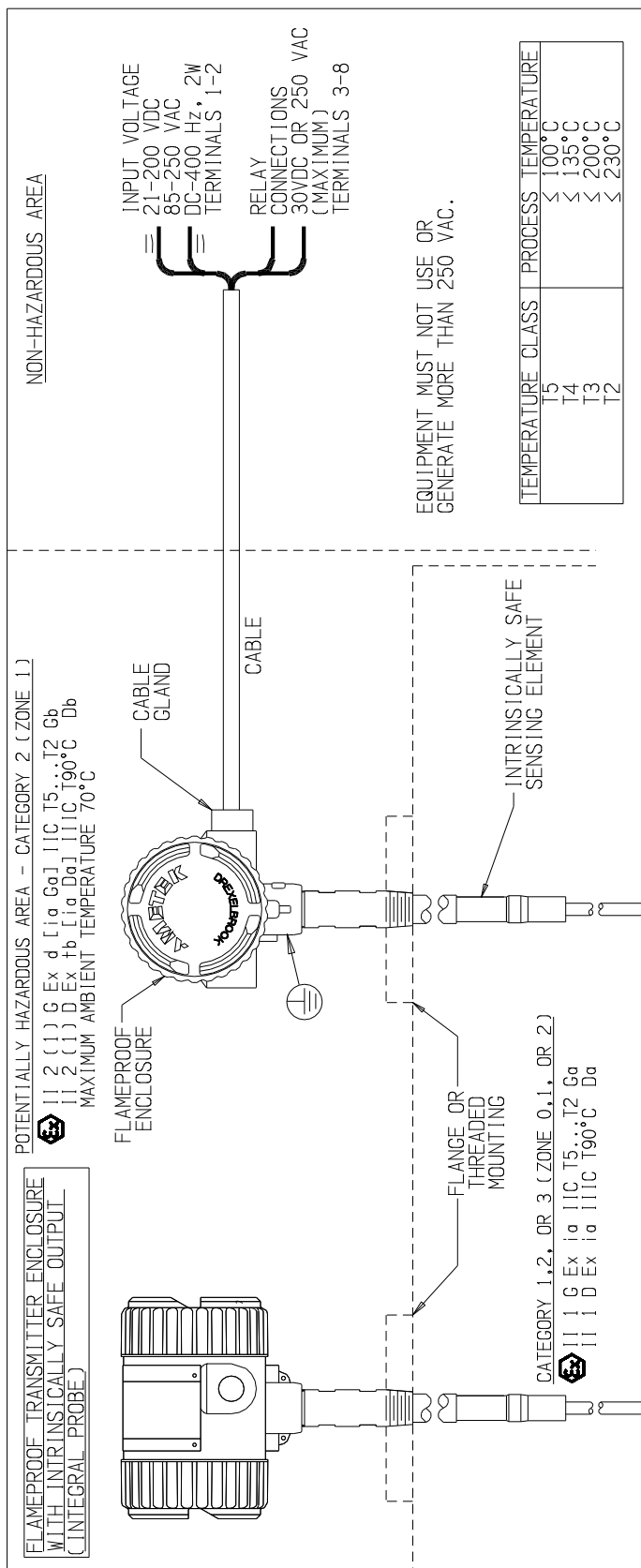
1. *"The equipment shall not be applied in an explosive dust atmosphere where high electrostatic charging processes are present that could result in propagating brush discharges. See IEC TS60079-32-1 for additional guidance."*
2. *Consult the manufacturer if dimensional information on the flameproof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

SPECIFIC CONDITIONS OF USE

SHT 14 OF 14

420-0004-144-CD ISS. 16

7.2 ATEX Control Drawings



SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

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

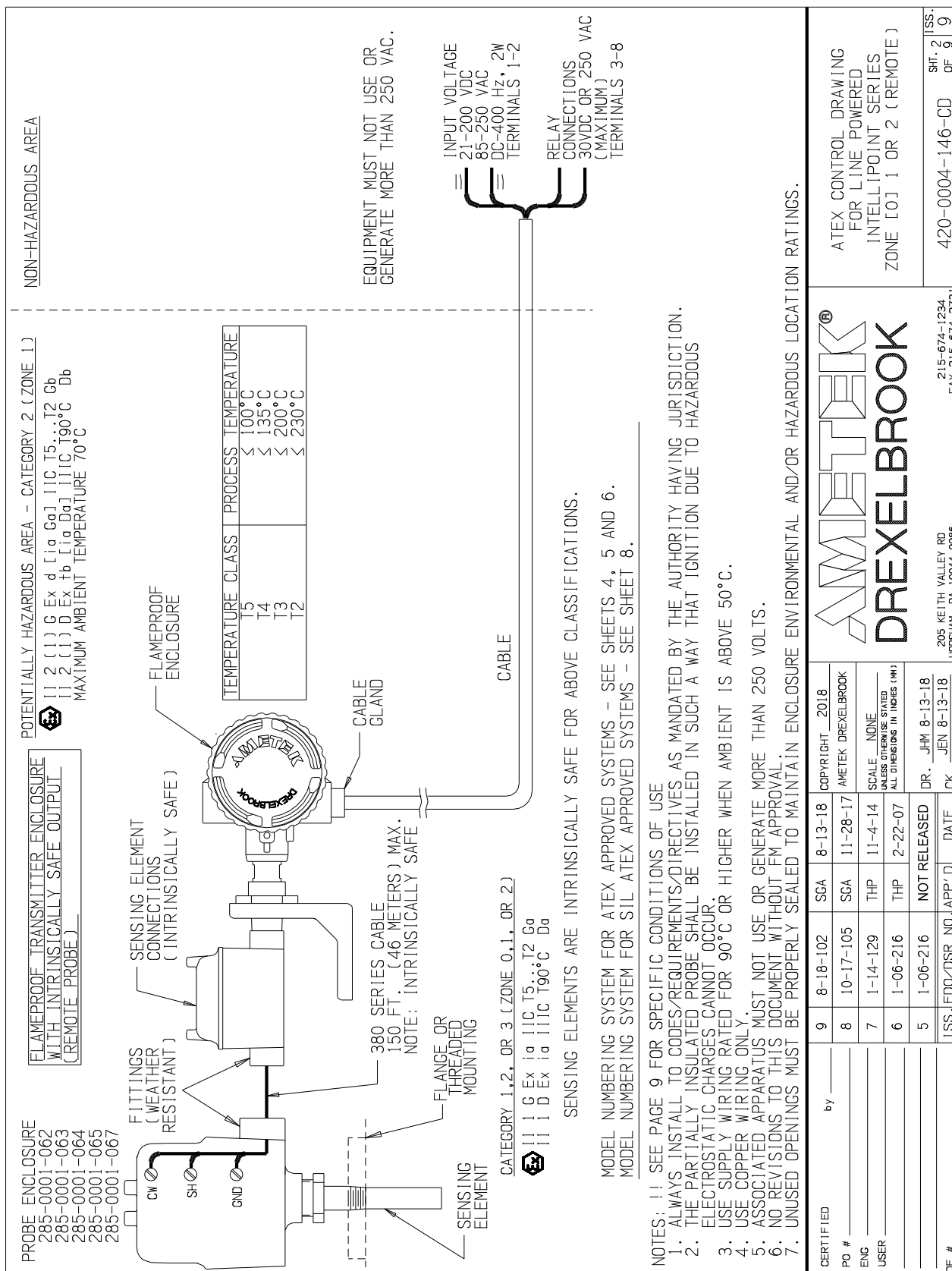
MODEL NUMBERING SYSTEM FOR SIL ATEX APPROVED SYSTEMS - SEE SHEET 7.

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

1. ALWAYS INSTALL TO CODES/REQUIREMENTS/DIRECTIVES AS MANDATED BY THE AUTHORITY HAVING JURISDICTION.
2. THE PARTIALLY INSULATED PROBE SHALL BE INSTALLED IN SUCH A WAY THAT IGNITION DUE TO HAZARDOUS ELECTROSTATIC CHARGES CANNOT OCCUR.
3. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
4. USE COPPER WIRING ONLY.
5. ASSOCIATED APPARATUS MUST NOT USE OR GENERATE MORE THAN 250 VOLTS.
6. NO REVISIONS TO THIS DOCUMENT WITHOUT FM APPROVAL.
7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCAL

[illegible]

7.2 ATEX Control Drawings (Continued)



7.2 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

7.2 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.													

7.2 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

7.2 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

n = FAMILY NUMBER: 0 THROUGH 9, BLANK

o = 0 THROUGH 9, BLANK

p = 0 THROUGH 9

q = FAMILY NUMBER: 0 THROUGH 9, BLANK

r = FAMILY NUMBER: 0 THROUGH 9, BLANK

s = FAMILY NUMBER: 0 THROUGH 9

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

NOTES:

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

!! SEE PAGE 9 FOR SPECIFIC CONDITIONS OF USE

ATEX APPROVED
ADDITIONAL INTRINSICALLY
SAFE SENSING ELEMENTS

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

7.2 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

Reference SIL Manual (SXRML) For Ordering Detail

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

7.2 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

Reference SIL Manual (SXRML) For Ordering Detail

7.2 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
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7.3 CE Mark Declaration of Conformity



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



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	SGA	11-2-18

Declaration of Conformity

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

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

Product Type: Measurement, Control Equipment and Laboratory Use

Following the provisions of 2014/30/EU Directive,

Conforms to the requirements of:

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

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

Conforms to the requirements of:

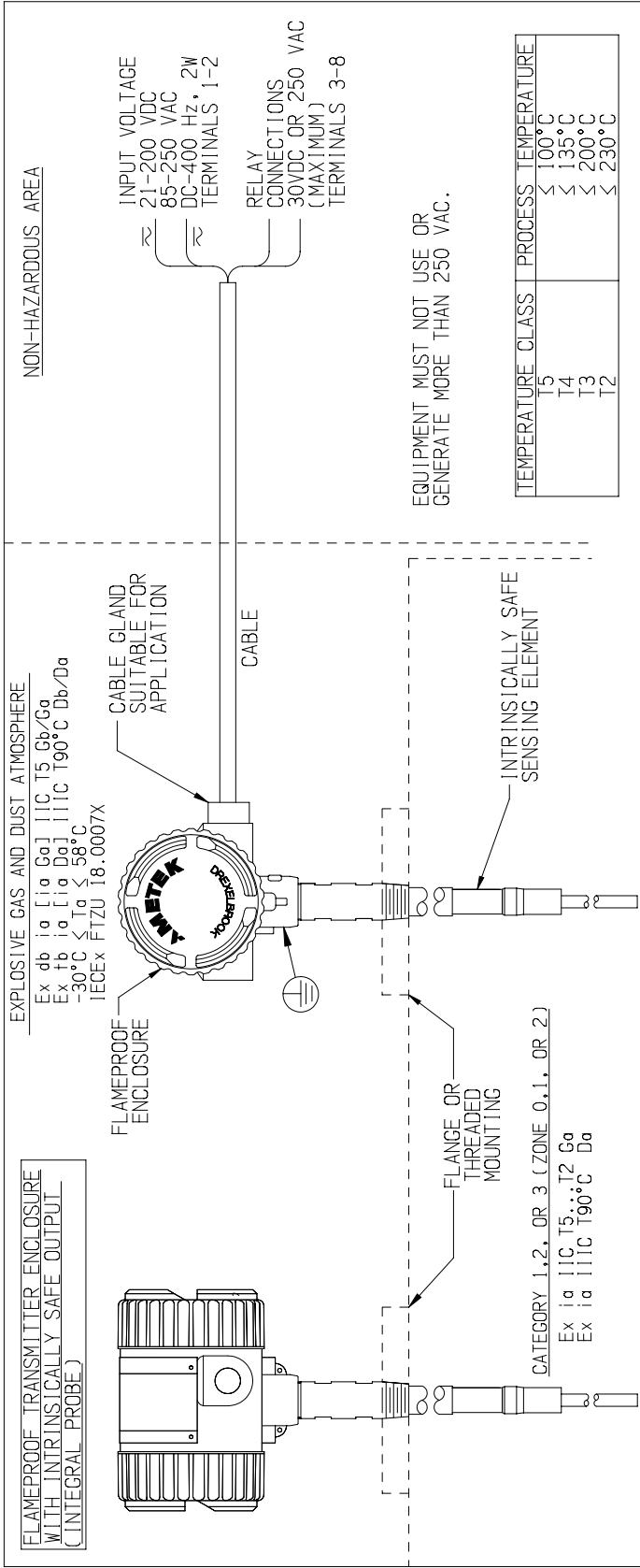
EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-11:2012, EN 60079-26:2015, EN
 60079-31:2013, EN 60529+A1:2000+A2:2013

QAN Notified Body Number 2460

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

Steven G. Arnold
 Quality Assurance & Product Safety Manager

Issue Date:



SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.

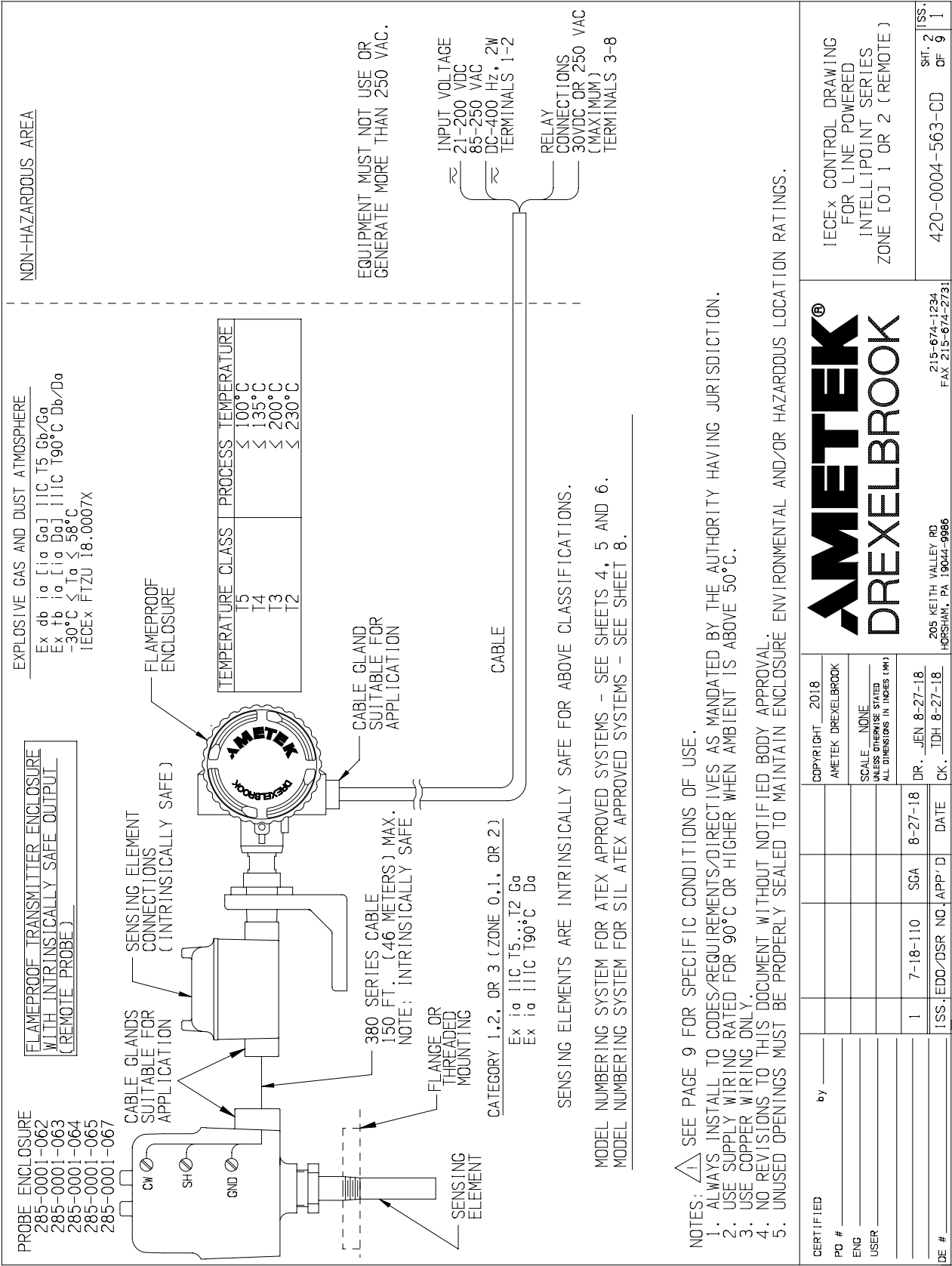
MODEL NUMBERING SYSTEM FOR IECEx APPROVED SYSTEMS - SEE SHEET 3.
MODEL NUMBERING SYSTEM FOR SIL IECEx APPROVED SYSTEMS - SEE SHEET 7.

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

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

CERTIFIED		by		COPYRIGHT 2018		AMETEK®		IECEx CONTROL DRAWING FOR LINE POWERED INTELLIPOINT SERIES	
PO #									ZONE [0] 1 OR 2 (INTEGRAL)
ENG									
USER									
ISS. EDO/DSR NO.		APP'D		DATE		DR. JEN 8-27-18		420-0004-563-CD	
DE #		1		7-18-110		SGA		SHT. 1 OF 9	
								ISS.	
								215-674-1234	
								FAX 215-674-2731	
								205 KEITH VALLEY RD	
								HORSNAY, PA 19044-9986	

7.4 IECEx Control Drawings (Continued)



7.4 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
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7.4 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.													

7.4 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

7.4 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

n = FAMILY NUMBER: 0 THROUGH 9, BLANK

o = 0 THROUGH 9, BLANK

p = 0 THROUGH 9

q = FAMILY NUMBER: 0 THROUGH 9, BLANK

r = FAMILY NUMBER: 0 THROUGH 9, BLANK

s = FAMILY NUMBER: 0 THROUGH 9

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

NOTES:

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

IECEx APPROVED
ADDITIONAL INTRINSICALLY
SAFE SENSING ELEMENTS

SHT 6 OF 9
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7.4 IECEx Control Drawings (Continued)

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

Reference SIL Manual (SXRML) For Ordering Detail

SIL, IECEx APPROVED
 INTEGRAL, LINE POWERED, INTELLIPOINT
 MODEL NUMBERING SYSTEM
 SHT 7 OF 9
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7.4 IECEx Control Drawings (Continued)

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

Reference SIL Manual (SXRML) For Ordering Detail

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

7.4 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

7.5 Mounting and Wiring for Spark Protector Drawings

NO. 377-0001-019

SHT 1 OF 2

TYPICAL INSTALLATION OF SPARK PROTECTORS

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

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

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

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

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

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

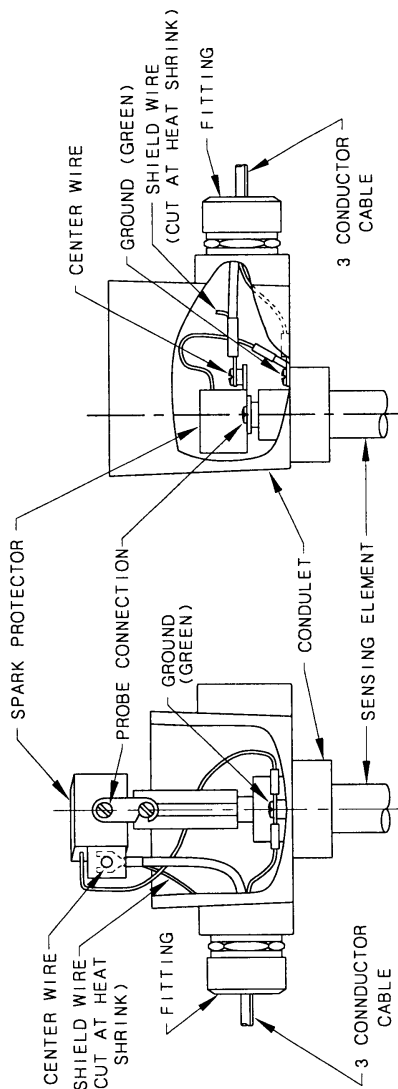


FIGURE -B-

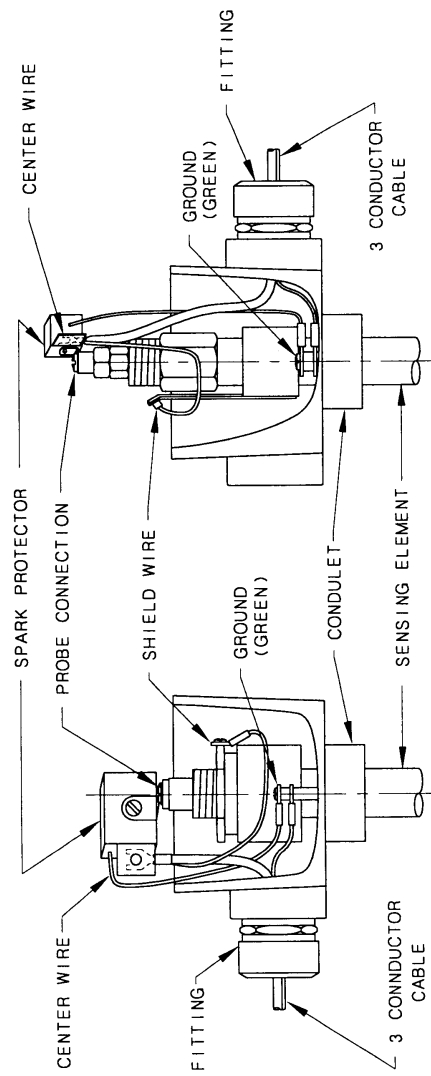


FIGURE -D-



METEK®
DREXELBROOK

215-674-1234
FAX 215-674-2731

205 KEITH VALLEY RD
HORSHAM. PA 19044-9986

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

377-0001-019-CD

CERTIFIED		by		COPYRIGHT 2004	
PO #				AMETEK DREXELBROOK	
ENG					
USER		5	2-04-336	SCALE	NONE
		4	7-93-303	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)	
		3	8-92-83	JET	5-25-93
				MPG	8-31-92
		ISS.	EDO/DSR NO.	DR.	CDW
			APP'D	CK.	253-3-01

7.5 Mounting and Wiring for Spark Protector (Continued)

NO. 377-0001-019

SHT 2 OF 2

TYPICAL INSTALLATION OF SPARK PROTECTORS

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

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

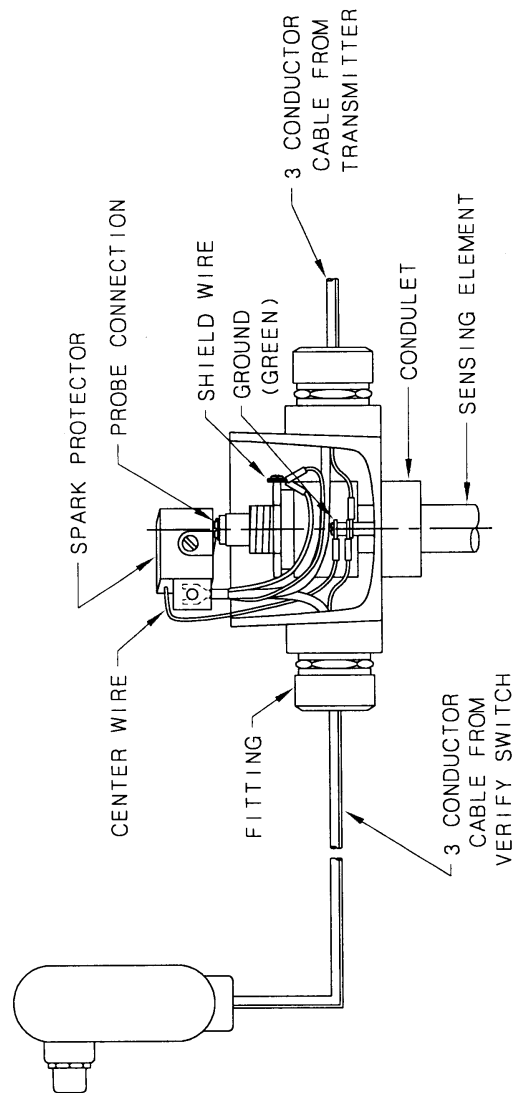


FIGURE -E-

METEK®
DREXELBROOK

215-674-1234
FAX 215-674-273

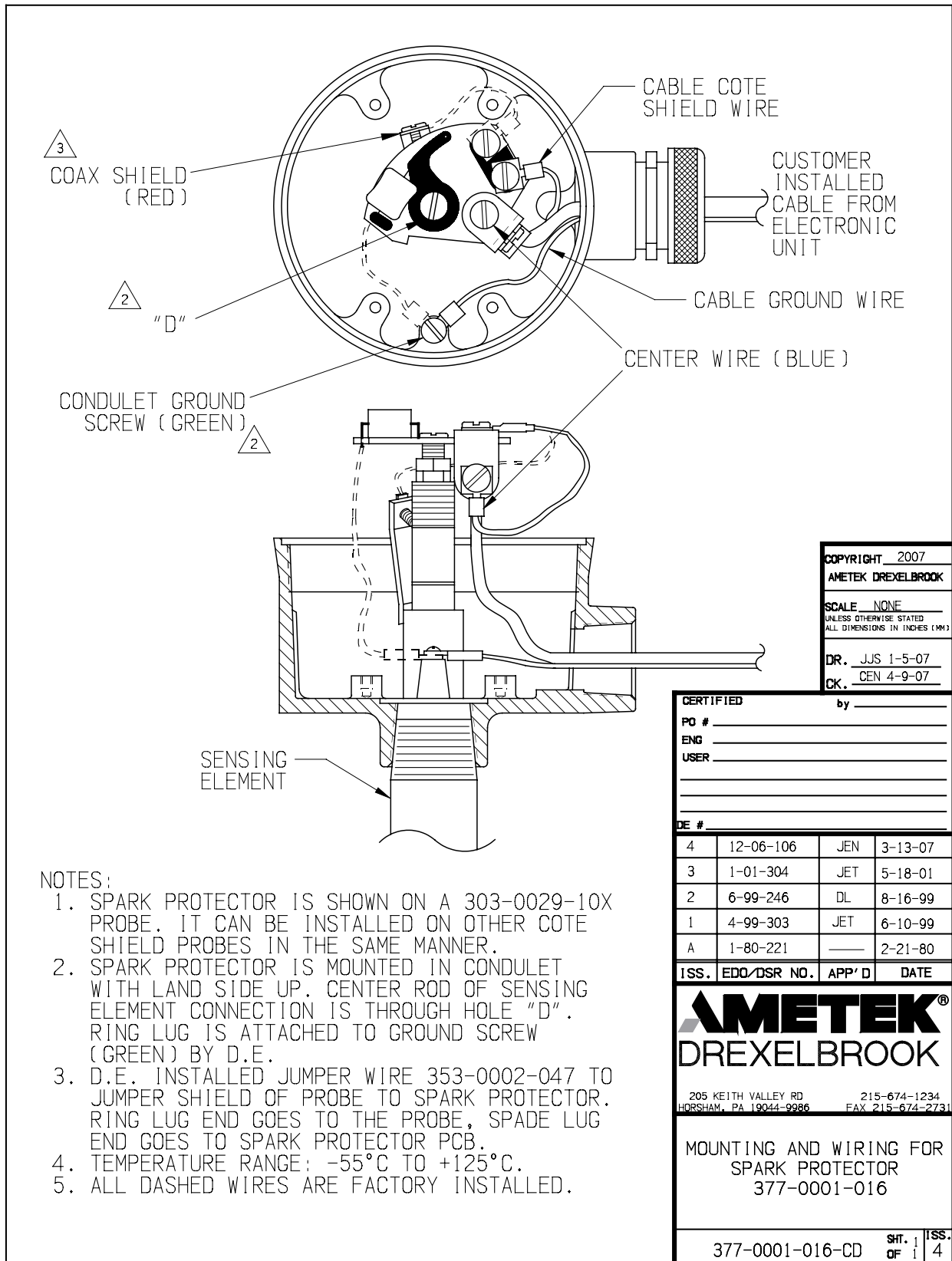
205 KEITH VALLEY RD
HORSHAM. PA 19044-9986

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

377-0001-019-CD
SHT. 2 OF 2
ISS 5

[illegible]

7.5 Mounting and Wiring for Spark Protector (Continued)



7.6 Adding a Padded Capacitor

NO. 330-0009-022-CD

SHT 1 OF 3

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

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

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

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

CERTIFIED		by		COPYRIGHT 2013		AMETEK DREXELBROOK		PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES		ISS.	
PO #											SHT. 1 OF 3
ENG											OF 3
USER											
DE #											
3		9-13-101		1-23-13		SCALE NONE		215-674-1234		330-0009-022-CD	
2		6-05-243		WS 7-6-05		UNLESS OTHERWISE STATED		215-674-1234		330-0009-022-CD	
1		7-01-303		JET 8-9-01		ALL DIMENSIONS IN INCHES (M)		FAX 215-674-2731		330-0009-022-CD	
ISS.		EDD/DSR NO.		APP'D		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE		HORSBACH, PA 19044-9986		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE		HORSBACH, PA 19044-9986		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE		HORSBACH, PA 19044-9986		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
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1		7-01-303		JET 8-9-01		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
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1		7-01-303		JET 8-9-01		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
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1		7-01-303		JET 8-9-01		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
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1		7-01-303		JET 8-9-01		DATE		205 KEITH VALLEY RD		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE		HORSBACH, PA 19044-9986		330-0009-022-CD	
1		7-01-303		JET 8-9-01		DATE</					

7.6 Adding a Padded Capacitor (Continued)

NO. 330-0009-022-CD

SHT 2 OF 3

ThePoint (TM)

INTELLIPOINT (TM)

LCS (TM) & LCT (TM)

PAD CAPACITOR KIT
FOR POINT LEVEL SWITCHES

330-0009-022-CD

SHT. 2 OF 3

AMETEK®
DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-2731

COPYRIGHT 2013
AMETEK DREXELBROOK

SCALE NONE

UNLESS OTHERWISE STATED
ALL DIMENSIONS IN INCHES (IN)

DR. JLS 9-20-13
CK. JLS 9-20-13

CERTIFIED	by	DATE	ISS. EDD/DSR NO.	APP'D
PO #			3	9-13-101
END			2	6-05-243
USER			1	7-01-303
DE #				

7.6 Adding a Padded Capacitor (Continued)

NO. 330-0009-022-CD

SHEET 3 OF 3

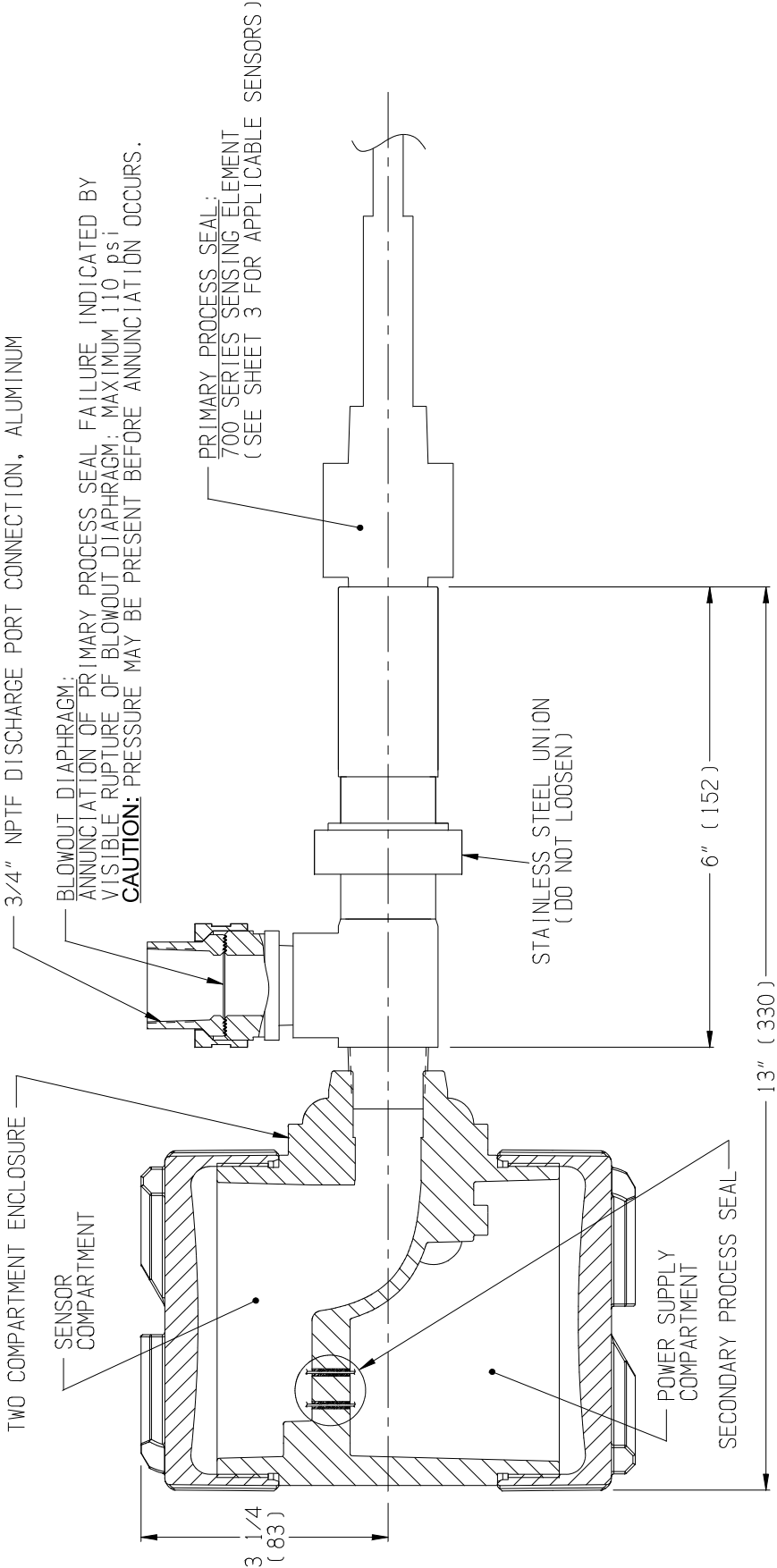
PRODUCT	SENSITIVITY	MODEL NUMBERS	UN-PADDED TUNING RANGE	PADDING RATIO	PADDING EXAMPLE	MAX RECOMMENDED TUNING RANGE
THE POINT™ LINE POWERED	HIGH	PHL, PPL, PGL	0 TO 25pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 35pF	50 TO 75pF
THE POINT™ LINE POWERED	STANDARD	PNL, PLL, PTL, PVL, PML	0 TO 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

CERTIFIED by _____		COPYRIGHT 2013 AMETEK DREXELBROOK		PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES	
PO # _____	3 9-13-101	DATE 9-13-13	SCALE NONE	ISS. 3 OF 3	330-0009-022-CD
ENG _____	2 6-05-243	DATE 7-6-05	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)	OF 3	
USER _____	1 7-01-303	DATE 8-9-01	DR. JUS 9-20-13	OF 3	
DE # _____	ISS. 1	EDD/DSR NO. APP'D	OK. JUS 9-23-13	OF 3	

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

7.7 Dual Seal Assembly for 700 Series Sensing Elements

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



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

CERTIFIED
PO #
ENG
USER
DE #

by

ISS. EDO/DSR NO. APP'D DATE

COPYRIGHT 2015
AMETEK DREXELBROOK

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

DR. JEN 3-11-15
CK. TDH 3-11-15

AMETEK®
DREXELBROOK

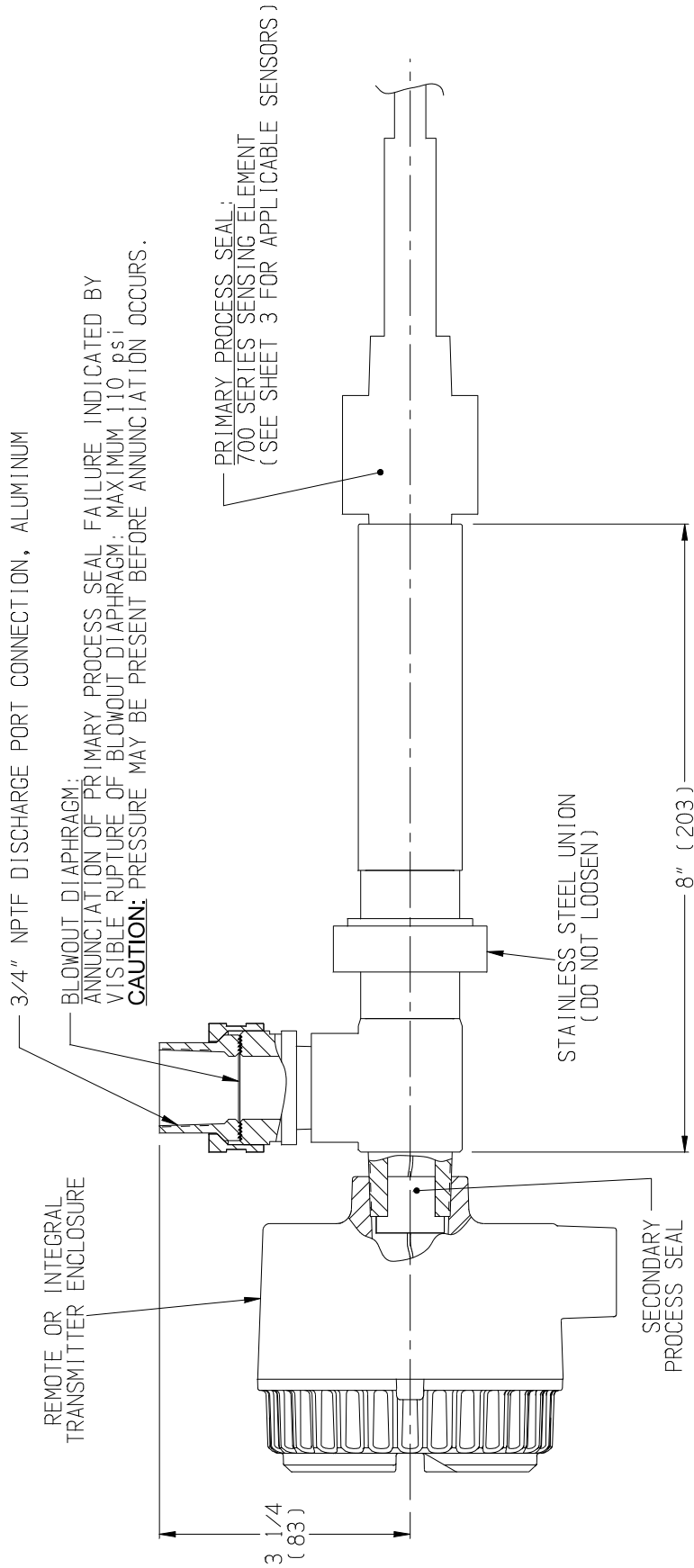
205 KEITH VALLEY RD.
HORSHAM, PA 19044-9986
215-674-1234
FAX 215-674-2731

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

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

7.7 Dual Seal Assembly (Continued)

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



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

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

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

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



METEK®
DREXEL BROOK

205 KEITH VALLEY RD
 SPRINGSHAM, PA 19044-0086
 215-674-1234
 FAX 215-674-2731

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

285-0003-0XX-CD

[illegible]

Appendix: A

Shortening or Lengthening Sensing Element



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

The Need

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

Before making any Adjustments:

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

Shortening

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

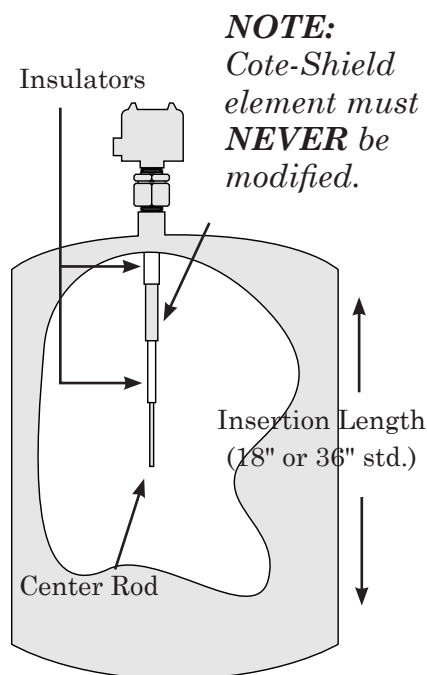
In applications using conductive or water-based materials, shortening is not a problem. Leave a minimum bare metal center rod length of two (2) inches.

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

Lengthening

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

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



Note:
Any changes to probe length after calibration requires recalibration 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 conduit must be grounded locally either to a metal support structure or an equivalent earth ground.

Comments:

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

AMETEK, Inc.
TERMS AND CONDITIONS OF SALE

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

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

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

III. PAYMENT A. The term of payment shall be net 30 days from date of Seller's invoice, unless otherwise specified. Payments shall be made by Buyer without any deduction or set-off. Unless otherwise agreed, payment shall be made in U.S. dollars. Seller may charge late payment fees at the rate of 1.5% per month, or the highest rate permitted by law, whichever is less, accruing daily.
B. If the financial condition of Buyer is unsatisfactory to Seller, Seller may require full or partial payment in advance, or satisfactory security, in the form of a letter of credit or otherwise. In the event of bankruptcy or insolvency of Buyer, Seller may immediately cancel any Order then outstanding.
C. Buyer grants Seller a purchase money security interest in Products located in the United States, or Services, as well as any proceeds, for the purpose of securing the obligations of Buyer hereunder. Buyer authorizes Seller to execute on Buyer's behalf and file such financing statements as Seller deems appropriate to perfect and notify Buyer's creditors of Seller's security interest.

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

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

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

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

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

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

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

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

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

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

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

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

IX. EXCUSABLE DELAYS A. Seller shall not be liable for delays in delivery or failure to perform due directly or indirectly to causes beyond Seller's reasonable control including but not limited to: acts of God; war; terrorism; civil commotion; riots; embargoes; government regulations, orders, instructions or priorities; port congestion; acts of or failure to act on the part of Buyer or its agents/employees; fires; floods; sabotage; nuclear incidents; earthquakes; storms; epidemics; strikes; lockouts or other labor difficulties; shortages of or inability to timely obtain proper labor, materials, components, shipping space or transportation, fuel, supplies or power at current prices; or due to limitations imposed by the extent of availability of Seller's normal manufacturing facilities.

B. If a delay excused per the above extends for more than 90 days and the parties have not agreed upon a revised basis for continuing providing Products/Services at the end of the delay, including adjustment of the price, then either party (except where delay is caused by Buyer, in which event only Seller) upon thirty (30) days' notice may terminate the Order with respect to the unexecuted portion of the Products/Services, whereupon Buyer shall promptly pay Seller its reasonable termination charges upon submission of Seller's invoices thereof.

X. SOFTWARE/TECHNICAL/PROPRIETARY INFORMATION

A. Buyer shall not acquire any rights to any software which may be delivered with Products, except as granted in Seller's standard software license. Any software license granted in connection with Products shall be an interim license, which may be withdrawn, pending payment for Products in full.

B. The purchase of Products shall not include any right to supply of technical information such as drawings or specifications.

C. Proprietary information, including drawings, documents, technical data, reports, software, designs, inventions and other technical information supplied by Seller in connection herewith (hereinafter called "Data"), shall remain Seller's sole property and shall be held in confidence by Buyer. Data shall not be reproduced, used or disclosed to others by Buyer without

May 2018

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

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

XII. GENERAL A. The rights and obligations of the Buyer and Seller hereunder shall be governed in all respects by the law of the Commonwealth of Pennsylvania, U.S.A. The exclusive forum for adjudication of any disputes shall be the federal or state courts of the Commonwealth of Pennsylvania, and Buyer/Seller hereby consent to personal jurisdiction and venue in such courts in any proceeding. The United Nations Convention on the International Sale of Goods shall not apply.

B. These Terms and Conditions of Sale together with any other terms specifically agreed to in writing by Seller constitute the entire agreement between Buyer and Seller and supersede any prior or contemporaneous representations, agreements, proposals, warranties, or understandings, oral or written, express or implied. No waiver, modification, amendment, rescission or other change to these Terms and Conditions of Sale shall be binding unless specifically agreed to in writing by an authorized representative of Seller.

C. The invalidity, of any part hereof shall not affect the validity of the remainder. The failure of Seller to assert any right at any time hereunder shall not prevent Seller's subsequent assertion of the same or different rights.

D. Buyer may not assign this contract without the prior written approval of the Seller.

XIII. PROHIBITION FOR HAZARDOUS USE

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

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

XIV. STATUTORY REQUIREMENTS

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

XV. GOVERNMENT CONTRACTS

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



An ISO 9001 Certified Company

RMLXX1-LM Issue 18
EDO# 05-19-110

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