Installation & Maintenance Instructions

# IntelliPoint RF™ Series

## Two-Wire Point Level Switch

DREXELBROOK®
A Leader In Level Measurement Solutions
AMETEK®


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Leader in
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# Installation and Operating Instructions

## IntelliPoint RF Series
## Two-Wire Point Level Switch

***NOTICE:*** *The AutoVerify™ feature in The IntelliPoint™ switch is shipped DISABLED. For critical High Level applications we recommend enabling the AutoVerify™ feature. See Section 2.5.6*


U.S. and Canada: 1-800-553-9092
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RNTXX-LM
Issue# 15

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# Two-Wire Point Level Switch


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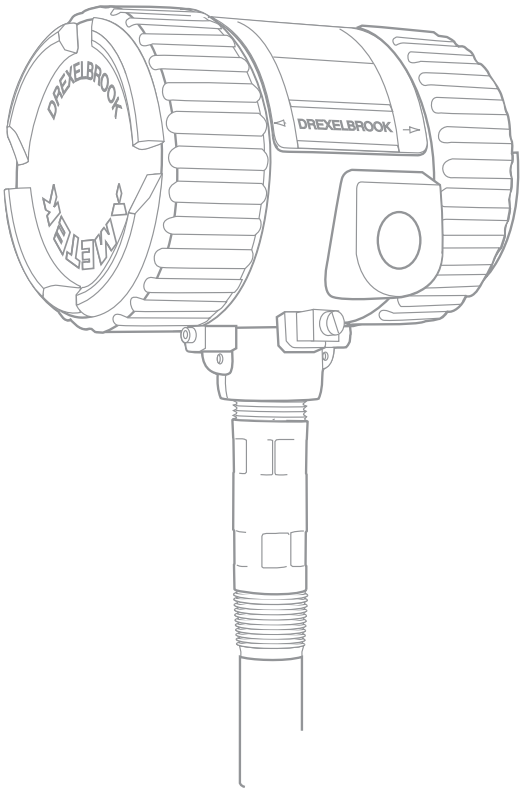


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# Contents

# Contents

# Section 1

# Section 1: Introduction

## 1.1 System Description

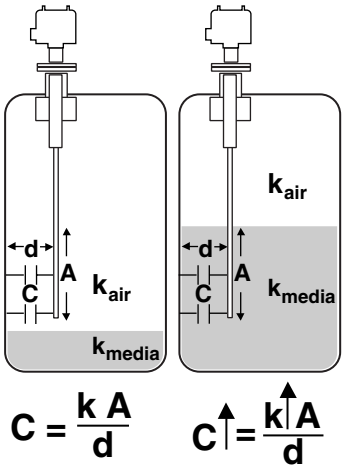



***Figure 1-1***

*Simple Capacitance Probe (Insulating Media Shown)*

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

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

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

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

## 1.2 Technology

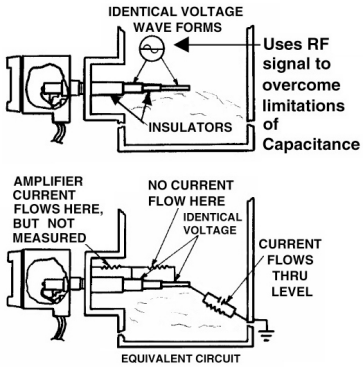



***Figure 1-2***

RF Admittance Probe with Cote-Shield

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

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

This patented Cote-Shield™ circuitry is designed into the IntelliPoint series and enables the instrument to ignore the effect of buildup or material coating on the sensing element. The sensing element is mounted in the vessel and provides a change in RF admittance indicating presence or absence of material.

The Cote-Shield element of the sensor prevents the transmission of RF current through the coating on the sensing element. The only path to ground available for the RF current is through the material being measured.

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

# 1.3 Model Number

**Technology**

**R** RF Admittance

**Measurement Type**

**L** No Calib., 2 pF Fixed Preload
**P** No Calib., 0.5 pF Fixed Preload (Hi. Sens.)
**M** Manual Calib.
**G** Manual Calib. (Hi. Sens.)
**V** No Calib., 10 pF Fixed Preload

**Input**

**T** Two wire Power Supply, 13-30 Vdc

**Housing**

**0** No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries
**1** No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries
**2** ATEX Approved, NEMA 4X/IP66, M20 X 1.5 conduit entries
**3** FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries
**4** CSA Approved, NEMA 4X/IP66, ¾" NPT conduit entries
**5** No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Perm-a-Seal sensors – only
**6** No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only
**7** FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only
**8** CSA Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only
**9** No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Non Perm-a-Seal sensors – only
**A** No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only
**B** FM Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only
**C** CSA Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only

**Electronics**

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

**Output**

**0** 8-16 mA Output

**Sensing Element**

| | Application | Sensing Element | Pressure/Temperature | Wetted Parts |
|---|---|---|---|---|
| **00** | General purpose | 700-1202-001 remote<br>700-1202-021 integral | 13.8 bar @ 232°C (200 PSI @ 450°F) | 316SS and PEEK |
| **01** | Floating roof with cable attachment and brass bottom weight | 700-1202-012 remote<br>700-1202-022 integral | 13.8 bar @ 177°C (200 PSI @ 350°F) | 316SS, Brass, and PEEK |
| **02** | General purpose, longer insertion lengths with cable attachment and 316SS bottom weight | 700-1202-014 remote<br>700-1202-024 integral | 13.8 bar @ 177°C (200 PSI @ 350°F) | 316SS and PEEK |
| **03** | Proximity | 700-1202-018 remote<br>700-1202-028 integral | 13.8 bar @ 232°C (200 PSI @ 450°F) | 316SS and PEEK with 76 mm (3) 316SS proximity plate |
| **04** | General purpose, high temperature and pressure | 700-1202-041 remote<br>700-1202-042 integral | 69 bar @ 121°C (1000 PSI @ 250°F)<br>20.7 bar @ 232°C (300 PSI @ 450°F) | 316SS and PEEK |
| **06** | General purpose with FDA approved materials of construction | 700-1202-031 remote<br>700-1202-032 integral | 13.8 bar @ 232°C (200 PSI @ 450°F) | 316SS and FDA grade PEEK |
| **07** | General purpose Granular materials | 700-1202-010 remote<br>700-1202-020 integral | 13.8 bar @ 232°C (200 PSI @ 450°F) | 316SS and PEEK with 7/8 inch dia. 316SS collar |
| **09** | General purpose Granular materials with FDA approved materials of construction | 700-1202-033 remote<br>700-1202-034 integral | 13.8 bar @ 232°C (200 PSI @ 450°F) | 316SS and FDA grade PEEK with 7/8 inch dia. 316SS collar |
| **10** | Corrosive liquids (2)(4)(9) | 700-0001-018 remote | 3.4 bar @ 149°C (50 PSI @ 300°F) | PFA |
| **11** | General purpose, higher pressure TFE compatibility required | 700-0201-005 int/rem | 69 bar @ 38°C (1000 PSI @ 100°F)<br>13.8 bar @ 232°C (200 PSI @ 450°F) | 316SS and TFE |
| **12** | Corrosive material, higher pressure | 700-0201-005 int/rem Hastelloy C | 69 bar @ 38°C (1000 PSI @ 100°F)<br>13.8 bar @ 232°C (200 PSI @ 450°F) | Hastelloy C and TFE |
| **13** | Sanitary (3) | 700-0201-036 int/rem | 69 bar @ 38°C (1000 PSI @ 100°F)<br>13.8 bar @ 232°C (200 PSI @ 300°F) | 316/316L SS and TFE |
| **14** | General Purpose, low pressure | 700-0202-002 int/rem | 3.4 bar @ 149°C (50 PSI @ 300°F)<br>1.4 bar @ 232°C (20 PSI @ 450°F) | 316SS and TFE |
| **15** | Heavy duty, agitated tanks or material with high bulk density (1) | 700-0202-043 remote | 69 bar @ 38°C (1000 PSI @ 100°F)<br>13.8 bar @ 232°C (200 PSI @ 450°F) | 316SS and TFE |
| **16** | High Integrity Seal for Hazardous Materials | 700-0002-360 int/rem | 34.5 bar @ 149°C (500 PSI @ 300°F) | PFA |
| **17** | Sanitary (3) lowpressure | 700-0202-036 int/rem | 3.4 bar @ 149°C (50 PSI @ 300°F) | 316SS and TFE |
| **18** | Corrosive material, higher pressure with waterlike viscosity (4) | 700-0001-022 int/rem | 69 bar @ 38°C (1000 PSI @ 100°F)<br>34.5 bar @ 149°C (500 PSI @ 300°F) | TFE |
| **19** | Interface Measurement | 700-0002-023 int/rem | 69 bar @ 38°C (1000 PSI @ 100°F)<br>34.5 bar @ 149°C (500 PSI @ 300°F) | 316SS and TFE |
| **20** | Miniature Pilot Plant Sensor (1)(7) | 700-0209-002 remote | 6.9 bar @ 121°C (100 PSI @ 250°F)<br>0 bar @ 232°C (0 PSI @ 450°F) | 316 SS and TFE |

*Continued on Following Page*

# 1.3 Model Number (Continued)

*Continued from Previous Page*

**Fly Ash Precipitators, Baghouse, and Economizers (1) (6)**

| | Application | Sensing Element | Pressure/Temperature | Wetted Parts |
|---|---|---|---|---|
| **31** | No hopper Installation | 700-0029-001 remote | 0.1 bar @ 260°C (2 PSI @ 500°F) | 316SS and TFE |
| **32** | Hopper Installation up to 200mm (8 inches) | 700-0029-002 remote | 0.1 bar @ 260°C (2 PSI @ 500°F) | 316SS and TFE |
| **33** | Hopper Installation up to 406mm (16 inches) | 700-0029-003 remote | 0.1 bar @ 260°C (2 PSI @ 500°F) | 316SS and TFE |
| **34** | Hopper Instalation up to 521mm (20.5 inches) | 700-0029-004 remote | 0.1 bar @ 260°C (2 PSI @ 500°F) | 316SS and TFE |
| **35** | Hopper Installation up to 635mm (25 inches) | 700-0029-005 remote | 0.1 bar @ 260°C (2 PSI @ 500°F) | 316SS and TFE |

**Plugged Chute Detection (1) (5)**

| | Application | Sensing Element | Pressure/Temperature | Wetted Parts |
|---|---|---|---|---|
| **50** | Flush Mount Sensor 305mm$^2$ (12 inches$^2$) heavy duty | 700-0207-001 remote | 0.1 bar @ 82°C (1 PSI @ 180°F) | 304 SS and Polyurethane |
| **51** | Flush Mount Sensor 305mm$^2$ (12 inches$^2$) higher temperature | 700-0207-002 remote | 0.1 bar @ 149°C (1 PSI @ 300°F) | 304 SS and TFE |
| **52** | Flush Mount Sensor 305mm$^2$ (12 inches$^2$) with curved radius 153, 229, 305 mm (6, 9, or 12 inches) | 700-0207-003 remote | 0.1 bar @ 82°C (1 PSI @ 180°F) | 304 SS and Neoprene |
| **53** | Flush Mount Sensor 305mm$^2$ (12 inches$^2$) extra heavy duty | 700-0207-004 remote | 0.1 bar @ 82°C (1 PSI @ 180°F) | 410 SS and UHMW Polyethylene |
| **55** | Flush Mount Sensor 203mm$^2$ (8 inches$^2$) heavy duty | 700-0207-006 remote | 0.1 bar @ 82°C (1 PSI @ 180°F) | 304 SS and Polyurethane |

**High Pressure / High Temperature**

| | | | | |
|---|---|---|---|---|
| **60** | High Pressure & Temp. | 700-0204-038 remote | 137.9 bar @ 93°C (2000 PSI @ 200°F)<br>68.9 bar @ 260°C (1000 PSI @ 500°F) | 316SS and Ceramic |
| **61** | High Temperature | 700-0204-002 remote | 0 bar @ 816°C (0 PSI @ 1500°F) | 316SS and Ceramic |
| **62** | High Pressure & Temp. | 700-0204-048 remote | 275.8 bar @316°C (4000 PSI @ 600°F) | 316SS |
| **ZZ** | Sensing Element **Not Listed** | | | |

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

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


Not all mounting options available with all sensing elements

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

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

**NPT Threads**

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

**DIN Flanges**

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

**Sanitary TriClamps**

| | | | | | | |
|---|---|---|---|---|---|---|
| **C2B** | 1"TriClamp | 316SS | | **C4B** | 2"TriClamp | 316SS |
| **C3B** | 1½"TriClamp | 316SS | | | | |

**ANSI Flanges**

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

## 1.4 Dual Compartment Housing Detail

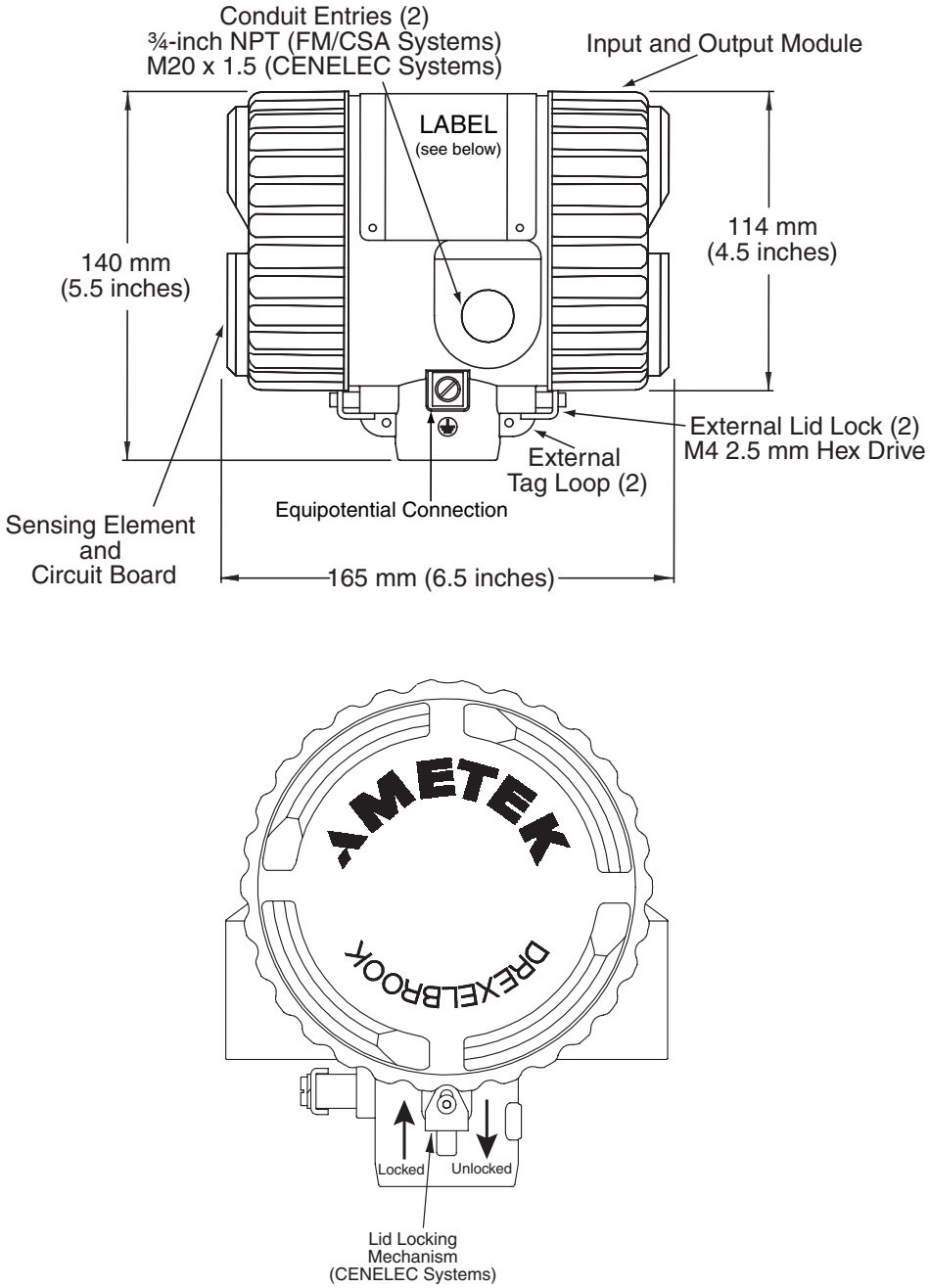



***Figure 1-3***
Dual Compartment Housing Detail

NOTICE

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

# Section 2: Installation

## 2.1 Unpacking

Carefully remove the contents of the shipping carton and check each item against the packing list before destroying any packing material. If there is any shortage or damage, report it to the factory immediately.

## 2.2 Mounting and Installation Guidelines

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

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

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

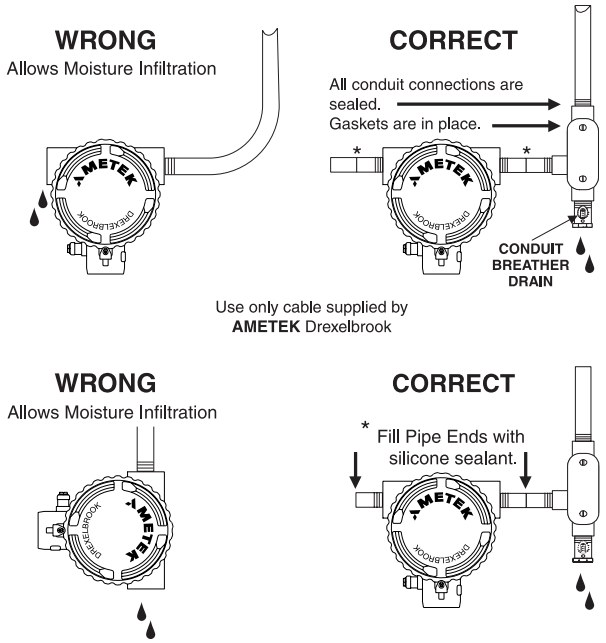



***Figure 2-1***
Recommended Conduit Connection

## 2.2 Mounting and Installation Guidelines (Continued)

After system is installed and level is **below** sensing element, apply power. The RF Series instrument does not require any calibration or setpoint adjustments and is ready to detect change in level. If properly installed, the green LED lights when power is applied. The Red LED should not be flashing. If the Red LED is flashing, refer to ***Section 4: Troubleshooting.***

NOTICE

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

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

**WARNING:**

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

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

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

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

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

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

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

## 2.2 Mounting and Installation Guidelines (Continued)

Mounting sensing element inside a pipe is not recommended.

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

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

Rigid sensing elements can be mounted either vertically or horizontally.

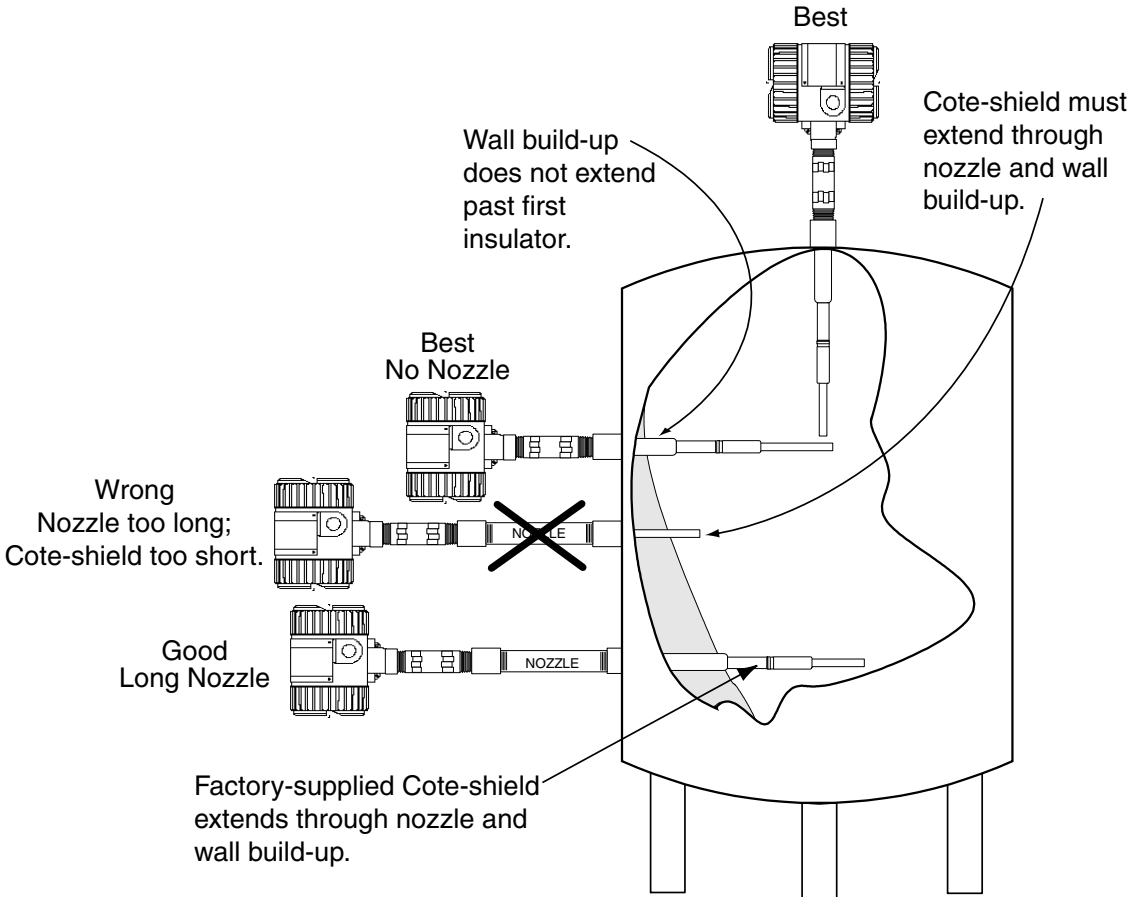
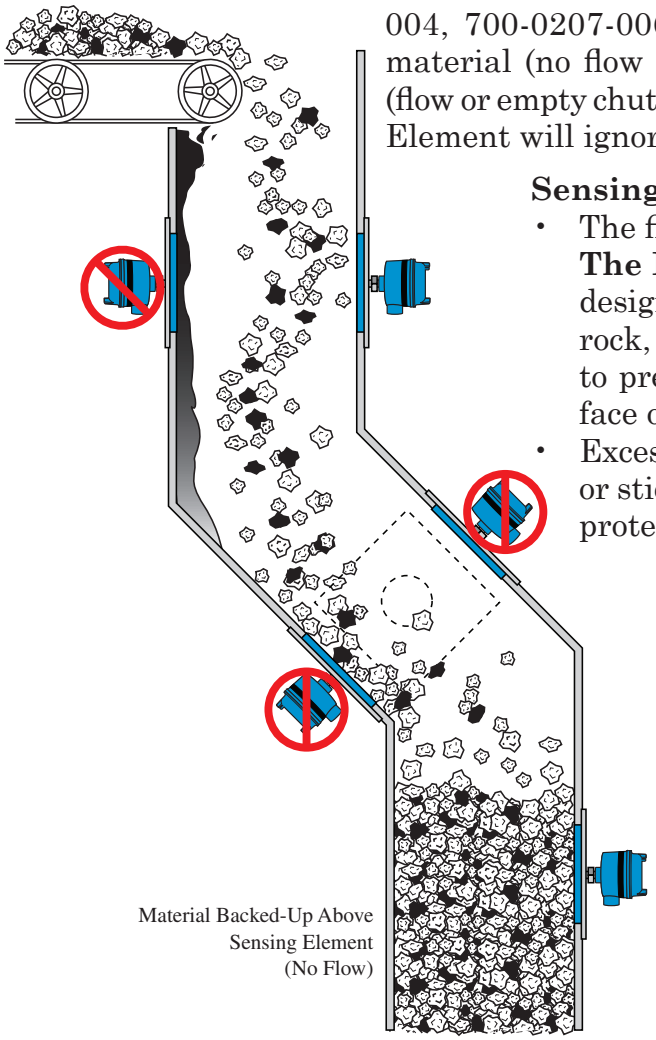



***Figure 2-2***
Installation Considerations

## 2.3 Installation of Flush-Mounted Sensing Elements



Material Backed-Up Above Sensing Element (No Flow)

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).

## 2.4 Input Wiring

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

The IntelliPoint RF instrument requires a 13-30 Vdc supply to operate. To access, remove the housing lid on the customer connections side to reveal the Input/Output Module **(IOM)**. The IOM is an encapsulated assembly that contains the power supply, outputs and eight wiring terminals. IOM is held in place with three screws. ***See Figure 2-3***.

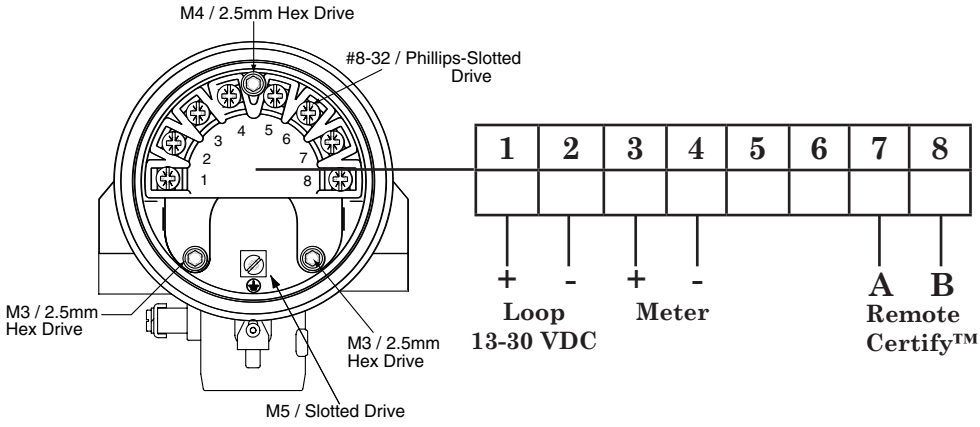



***Figure 2-3***
Input Wiring

## 2.5 Spark Protection

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

## 2.6 Circuit Board

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

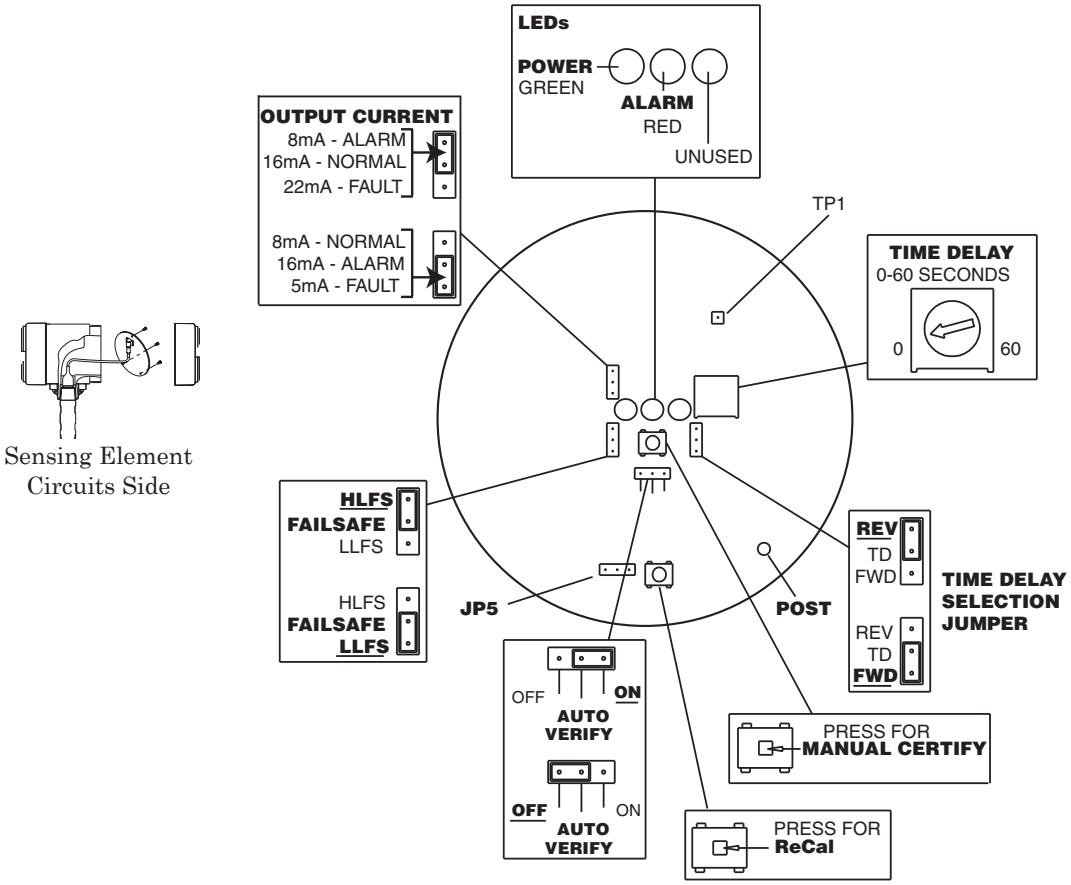



***Figure 2-4***
Circuit Board

NOTICE

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

### 2.6.1 Time Delay

The "Time Delay" adjustment is located on the sensing element/ circuit board side of the housing (marked on label). It is used to help stop an oscillating current output due to agitation or waves in the vessel. The time delay adjustment can be field adjusted from 0 to 60 seconds. The unit is shipped with the Time Delay set to zero (0) seconds.


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

### 2.6.2 Time Delay Action

"Time Delay Action" describes if loop current is delayed from going into alarm state or recovering after an alarm state.

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

### 2.6.3 Failsafe

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

- The Failsafe is field-selectable using a jumper located on the sensing element/circuit board side of the housing.
- High Level Failsafe (**HLFS**) is the condition when the probe is covered, the unit goes into alarm.
- Low Level Failsafe (**LLFS**) is the condition when the probe is uncovered, the unit goes into alarm.
- The instrument is supplied with the failsafe jumper set in high level (**HLFS**) position.

### 2.6.4 Current Output Assignment

The Output Current can be configured using the jumpers as follows:

- Jumper on pin #1 and #2 creates:
  8mA - Alarm, 16mA - Normal, 22mA - Fault
- Jumper on pin #2 and #3 creates:
  8mA - Normal, 16mA - Alarm, 5mA - Fault

### 2.6.5 Manual / Remote Certify™

The "Certify" test feature performs a confidence test of the system by duplicating the same signal as a high-level alarm condition without requiring the system to be removed from the tank. Simulating a high level with the Manual/Remote Certify feature:

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

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

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

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


***Certify feature operates when system is configured for HLFS.***

**CAUTION:**
Unlike the previous AMETEK Drexelbrook Two Wire Point level Product (LCT), the IntelliPoint Two Wire Point Level Switch is designed with on board "AutoVerify" integrity testing. As such, it requires special instructions to be used with previous versions of AMETEK Drexelbrook receivers and cannot be used with some receiver versions. ***Please refer to Table 2-1.***

## 2.6.5 Manual / Remote Certify™ (Continued)

| Receiver Model Number | Description | Use with IntelliPoint | Comments |
|---|---|---|---|
| 401-4X0-001 Series | Single Channel Receiver | **OK** | |
| 401-4X1-001 Series | Single Channel Receiver with Manual Verify Push Button | **OK** - Conditional:<br>Activating Manual Verify on receiver will have NO effect. | To initiate Manual Certify, operator must press manual certify button on IntelliPoint circuit board or, by customer-supplied contact closure attached to terminals 7 & 8. |
| 401-4X3-001 Series | Single Channel Receiver with Manual Verify Magnetic Key | **OK** - Conditional:<br>Activating Manual Verify on receiver will have NO effect. | To initiate Manual Certify, operator must press manual certify button on IntelliPoint circuit board or, by customer-supplied contact closure attached to terminals 7 & 8. |
| 401-4X4-001 Series | Single Channel Receiver with AutoVerify | **Can Not Be Used With Intellipoint.** | Consult Factory |
| 401-3100 Series<br>401-3800 Series | 6 Channel Receiver | **OK** - Conditional:<br>Activating Manual Verify on receiver will have NO effect. | To initiate Manual Certify, operator must press manual certify button on IntelliPoint circuit board or, by customer-supplied contact closure attached to terminals 7 & 8. |
| 401-3400 Series | 6 to 24 Channel Receiver | **OK** - Conditional:<br>Activating Manual Verify on receiver will have NO effect. | To initiate Manual Certify, operator must press manual certify button on IntelliPoint circuit board or, by customer-supplied contact closure attached to terminals 7 & 8. |
| LCR-3200 Series Models 601-30XX-XXX | 8-32 point receiver | **OK** | |
| LCR-3200 Series Models 601-31XX-XXX | 8-32 point receiver | **OK** - Conditional:<br>If with optional Manual Verify buttons, activating Manual Verify on receiver will have NO effect. | To initiate Manual Certify, operator must press manual certify button on IntelliPoint circuit board or, by customer-supplied contact closure attached to terminals 7 & 8. |
| LCR-3200 Series Models 601-320X-XXX | 8-32 point receiver | **OK** - Conditional:<br>Activating Manual Verify on receiver will have NO effect. | To initiate Manual Certify, operator must press manual certify button on IntelliPoint circuit board or, by customer-supplied contact closure attached to terminals 7 & 8. |
| LCR-3200 Series Models 601-321X-XXX | 8-32 point receiver | **OK** - Conditional:<br>Turn off AutoVerify feature. Activating Manual Verify on receiver will have NO effect. | To initiate Manual Certify, operator must press manual certify button on IntelliPoint circuit board or, by customer-supplied contact closure attached to terminals 7 & 8. |

***Table 2-1***
Receiver Versions

### 2.6.6 AutoVerify™

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

- AutoVerify is field-selectable using a jumper located on the sensing element side of the housing.
- **On**: If a fault is detected during the AutoVerify cycle, both LEDs will flash alternately, and the current will go to the fault output of 5mA or 22mA. ***See Section 2.5.4***
- **Off**: The AutoVerify self-testing function is not active.
- The instrument is supplied with the AutoVerify jumper set in the off position.

NOTICE

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

#### AutoVerify Criteria

1. AutoVerify feature must be enabled.

2. The sensor must generate an uncovered capacitance value greater than 2 pF. Typically, the active sensor length (active length = insertion length – cote shield length) must be greater than 8 inches (200 mm).

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

4. Sensors that do not meet the above requirement can perform reliably for level measurement detection, and will pass AutoVerify / Manual Certify tests, but will not be able to detect a sensor that is, or has become, electrically disconnected from the transmitter.

### 2.6.7 Re-Calibration

NOTICE

Do not push the "ReCal" Button without first ensuring the material being measured is below the sensing element.

If system is powered on the bench prior to installation, or moved from one tank to another, Re-Calibration is necessary to allow software to capture the air capacitance generated by sensing element in the tank. Merely press and hold the "ReCal" Button for 5 seconds (***Shown in Figure 2-4***). Green LED flashes for 60 seconds before reset occurs. [*Remove power from the system while the green LED is flashing and reset will occur immediately*]. If reset is unsuccessful, see section: 4 Troubleshooting.

The system is now ready for installation.

#### Nonvolatile Memory

The IntelliPoint has nonvolatile memory, allowing the unit to re-start after power outages without recalibrating.
When unit is powered for the first time the internal microprocessor records and stores the “Air” value. This is the uncovered value of the sensor mounted in the vessel. The unit will also store the last covered value and the last uncovered value.
Whenever The unit is powered it uses these values as a reference point to determine its current condition (normal or alarm).
The nonvolatile memory will retain the recorded values even if power is lost for months. When the unit regains power, the microprocessor compares the stored values to the current measured value. Then determines its current status.

## 2.6.7 Re-Calibration (Continued)

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

## 2.7 Output & Status LEDs

There are two status LEDs located on the sensing element/ circuit board side of the housing. One is used to indicate that the unit has power. The second LED is used to indicate the status of the unit: **Normal** or **Alarm**. ***See Figure 2-5***.

NOTICE

Second Red LED is not used on the two wire transmitter.

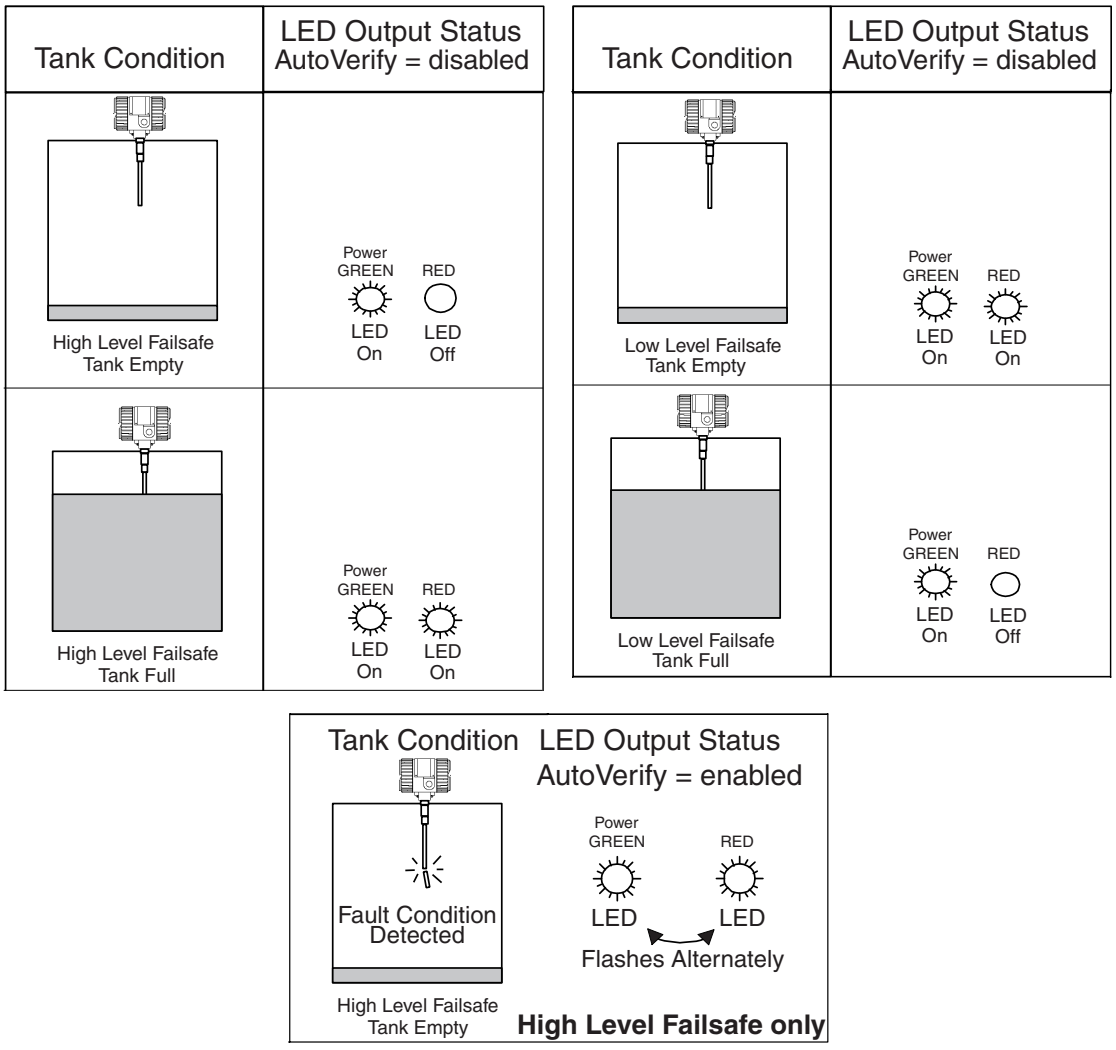



***Figure 2-5***
Output and LED Status

## 2.8 Sensing Element Connection

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

NOTICE

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

For IntelliPoint RF instruments that are mounted remotely from the sensing element, the cable connections from the sensing element to the electronic unit are made to the terminals on the sensing element side of the housing. See Figure 2-7. Connect Green (Ground) wire to green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

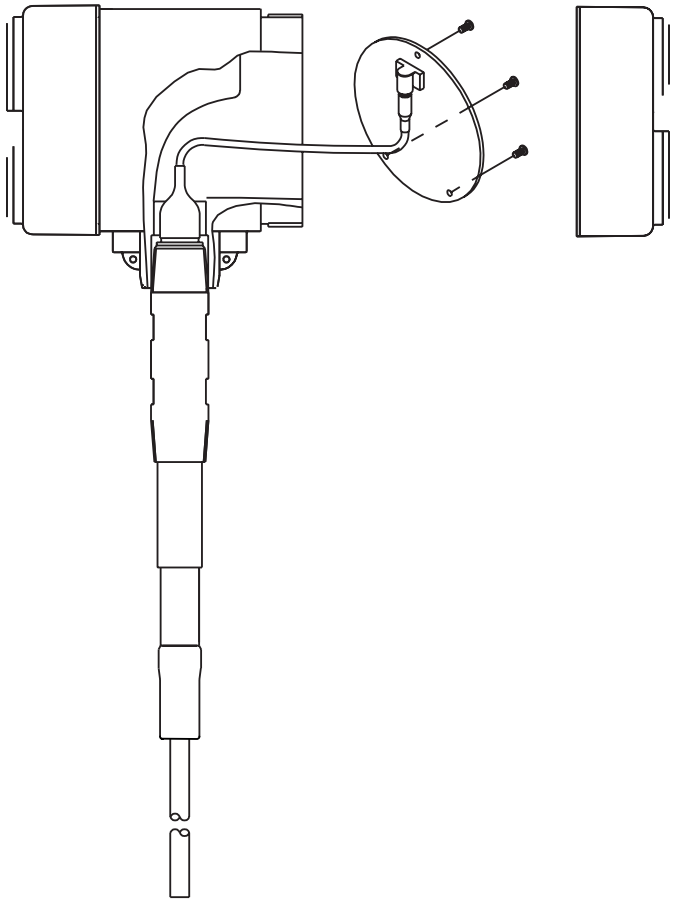


***Figure 2-6***
Sensing Element Connection (Integral Mounting)

## 2.8 Sensing Element Connection (Continued)

For IntelliPoint RF instruments that are mounted remotely from the sensing element, the cable connections from the sensing element to the electronic unit are made to the terminals on the sensing element side of the housing (marked on label). ***See Figure 2-7***. Connect Green (Ground) wire to Green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

NOTICE See Section 6.4 for Spark Protection, Mounting and Wiring

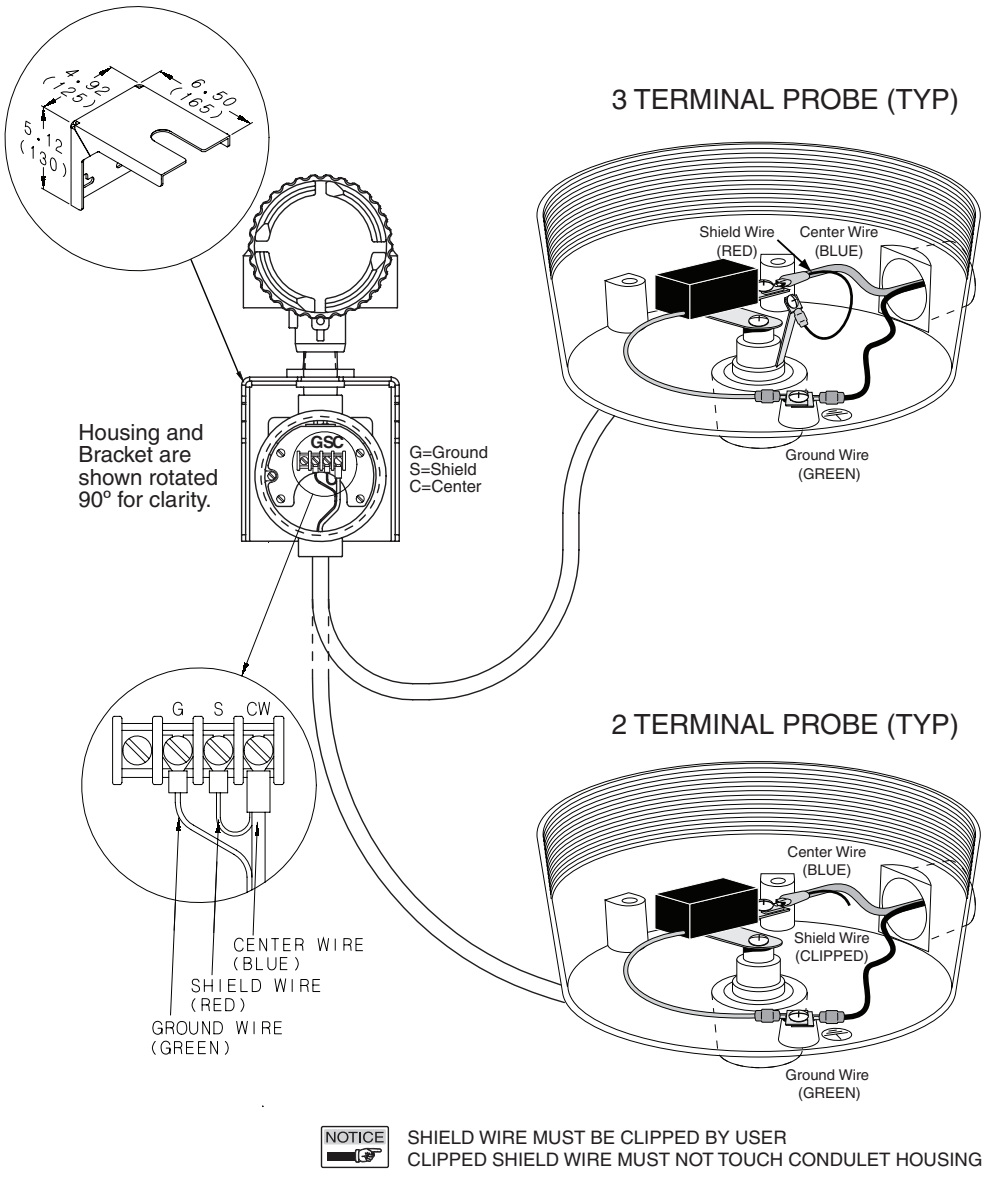



***Figure 2-7***
Sensing Element Connection (Remote Mounting)

## 2.9 Calibration

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


If you purchased an Auto-Cal Intellipoint and have determined that you require a Manual Calibration Intellipoint based on the Application Guide, please contact our field service department at 1-800-527-6297 (US and Canada) or 215-674-1234 (International Customers).

### 2.9.1 Using the Intellipoint with Auto-Calibration

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

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

Calibration is complete.

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

Merely press and hold the "**ReCal**" button (shown in Figure 2-4) for five (5) seconds. After five seconds, the two LED's flash for sixty seconds before reset occurs. [Remove power from the Intellipoint while the LED's are flashing and reset will occur immediately].

The Intellipoint is now ready for installation.

### 2.9.2 IntelliPoint Calibration Mode change

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

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

### 2.9.3 Available IntelliPoint calibration modes:

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

**Mode 1:** Auto-Cal 2 pF.
This mode provides a 2 pF preload; alarm setpoint varies depending on material and coating deposit changes.

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

**Mode 3:** Auto-Cal 10 pF.
This mode provides a 10 pF preload; alarm setpoint varies depending on material and coating deposit changes.

**Mode 4:** Fixed Cal 10 pF.
This mode provides a 10 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

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

**Mode 1:** Auto-Cal 0.5 pF.
This mode provides a 0.5 pF preload; alarm setpoint varies depending on material and coating deposit changes.

**Mode 2:** Fixed Cal 0.5 pF.
This mode provides a 0.5 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

**Mode 3:** Auto-Cal 2 pF.
This mode provides a 2 pF preload; alarm setpoint varies depending on material and coating deposit changes.

**Mode 4:** Fixed Cal 2 pF.
This mode provides a 2 pF preload; alarm setpoint is locked to starting capacitance value recorded at system start-up.

## Calibration Mode changes

NOTICE

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

1. On the RF circuit board (Figure 2-8), temporarily remove the shunt jumper from the "Time Delay Selection Jumper" and place it on pins 1 & 2 of JP5. The green LED will go out, and the red LED's will begin to flash. The number of flashes indicates which mode the unit is in: 1, 2, 3, or 4.

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

3. Remove the shunt from pins 1 & 2 of JP5 and replace it on the "Time Delay Selection Jumper" pins from which it was removed. The unit will remain in the new selected calibration mode. Put the lid back on the housing securely.

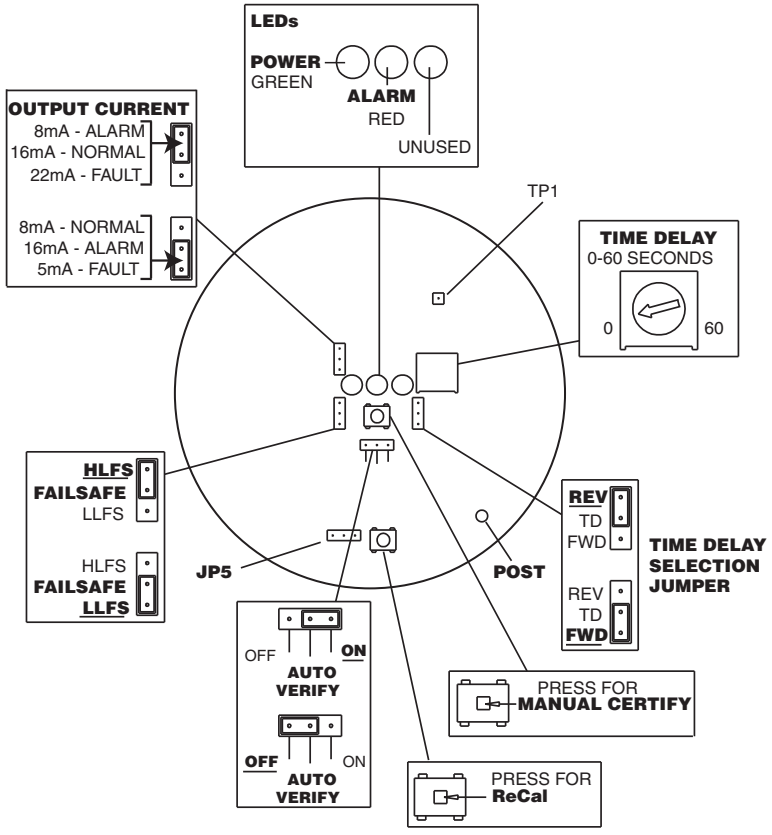



***Figure 2-8***
Circuit Board

# Section 3: Spare Parts List

O-ring ..... 250-1-75

Housing ¾-inch NPT Conduit Entry ..... 260-2-540

Housing M20 Conduit Entry ..... 260-2-542

Input/Output Module..... 385-48-15

Circuit Board
- RLT - Standard Sensitivity Auto Cal... 385-48-3-2
- RPT - High Sensitivity Auto Cal ..... 385-48-19-2
- RMT - Standard Sensitivity Manual Cal 385-48-10-2
- RGT - High Sensitivity Manual Cal..... 385-48-20-2

Integral Sensing Element Cable ..... 380-9000-97

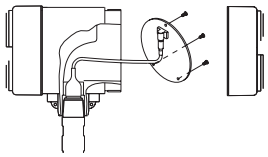
# Section 4

# Section 4: Troubleshooting

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

## 4.1 Testing Sensing Element

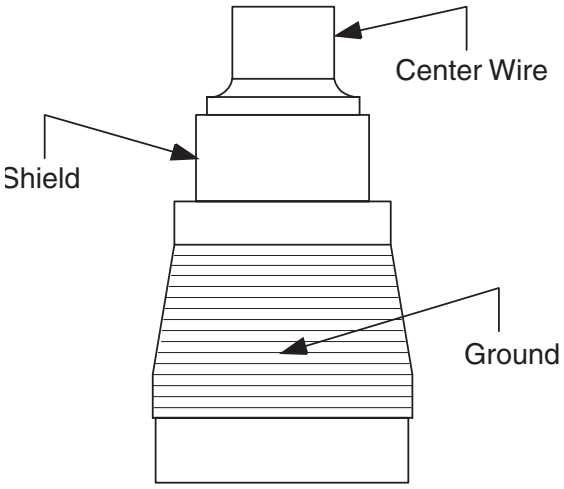
To test the sensing element, disconnect the integral cable. ***See Figure 4.1.***



***Sensing Element Circuits Side***

Expect the following measurements:

Three Terminal Probes without Shield Tab

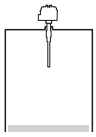



Measured Resistance (Sensor dry and clean):

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

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

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



CW-G 1000 ohms.
CW-S 600 ohms.
S-G 300 ohms.

If the readings are less than the minimum acceptable values:

1. Check to see if tank is full, or if a severe coating is present.

2. Clean sensor and re-measure the sensor resistances.

NOTICE

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

NOTICE

Note: A reading of zero ohms usually indicates a metal-to-metal short circuit. Check for contact with tank wall, mounting nozzle, or other tank structure.

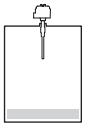
***Figure 4.1***
Testing Sensing Element

## 4.2 Testing Electronic Unit


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

Use the following steps to test the electronic unit:

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



2. If possible to access the sensing element with the material below the sensor, or remove the IntelliPoint from the vessel, use your finger to touch TP1 (Shown in Figure 2-4) while holding any bare metal portion of the instrument housing with the other hand. The system should go to its 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 4.5: Testing Integral Cable, or Section 4.6 Testing Remote Cable.

5. If IntelliPoint changes state while touching test point, but not when touching tip of sensor, in most cases, integral cable is faulty. ***See Section 4.5: Testing Integral Cable***.

6. If 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. ***See Section 4.1: Testing Sensing Element.***

7. If there was no action in any of steps 2, 3, or 4 and unit appears dead:
   A. Remove and then reapply power.
   B. Press **ReCal** Button (***Shown in Figure 2-4***).
   C. Observe that green LED flashes for about 60 seconds.
   D. Green LED should be lit after 60 seconds.
   E. Touch test point (***Shown in Figure 2-4***) with your finger.
   F. Alarm & Relay should change state. If so, circuit board is working properly.
   G. Reinstall instrument and press **ReCal** Button.

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

## 4.3 Over Range

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

## 4.4 Under Range

If Red LED is flashing slowly (once per second), IntelliPoint has detected that pad capacitor value is too large. Consult factory for pad capacitor values.

## 4.5 Testing Integral Cable

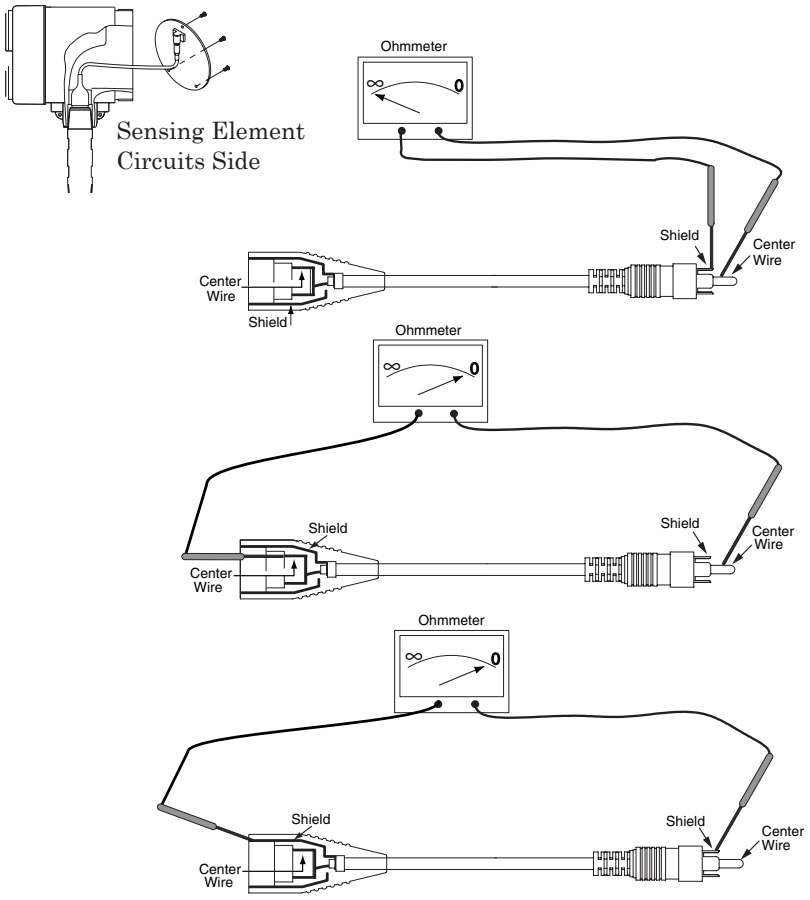



***Figure 4-2***
Testing Integral Cable

## 4.6 Testing Remote Cable

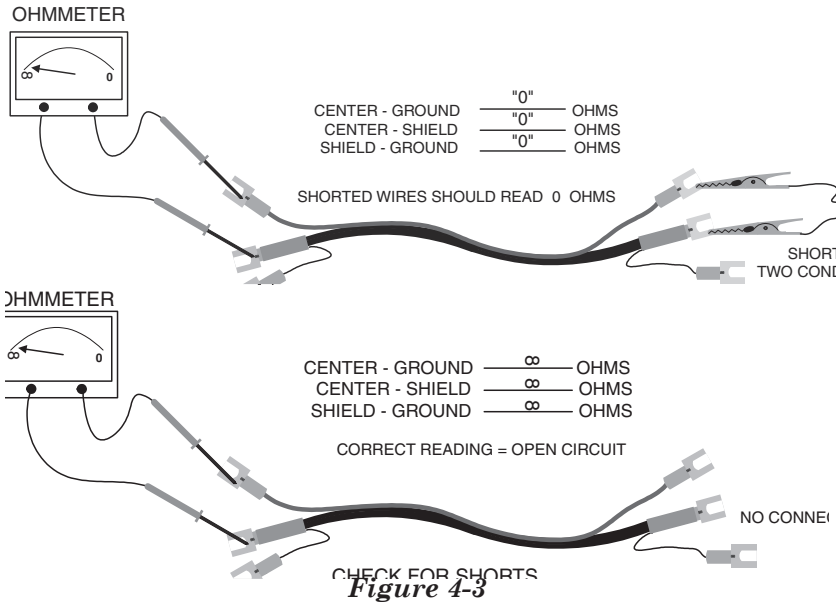



***Figure 4-3***
Testing Remote Cable

## 4.7 Testing Power Supply

Power supply can be tested separately as follows:

1. Remove power from electronic unit.
2. Remove three screws holding circuit board into housing.
3. Disconnect sensing element connection. ***See to Section 2.7 Sensing Element Connection***.
4. Reapply power.
5. Using a DC voltmeter, measure voltage from -5 to Common and +5 to Common. Correct readings are -5 to -6 and +5 to +6 Vdc. ***See Figure 4-4***.

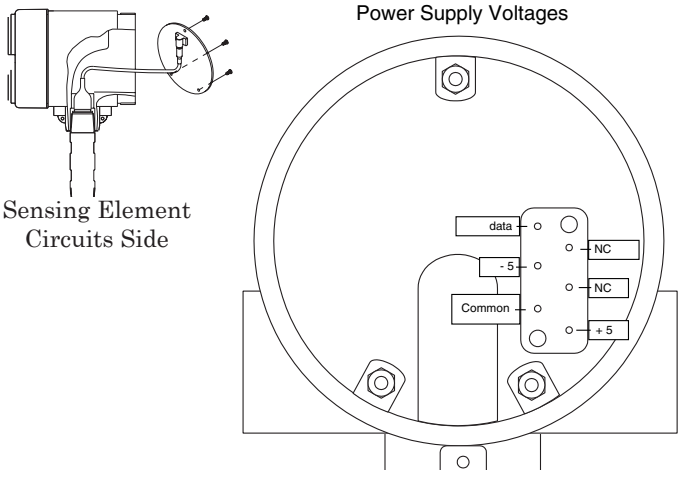



***Figure 4-4***
Testing Power Supply

## 4.8 Factory Assistance

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

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

Contact your local Drexelbrook representative,

**Telephone** the Service department toll-free:
- 1-800-527-6297 (US and Canada)
- +1 215 674-1234 (International)

**FAX:** Service Department + 215-443-5117
**E-Mail:** drexelbrook.service@ametek.com

Please provide the following information:

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

## 4.9 Field Service

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

## 4.10 Customer Training

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

## 4.11 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** (RA#), contact the Service department at 1-800-527-6297 (US and Canada) or + 215-674-1234 (International).

- Please provide the following information:
- Model Number of Return Equipment
- Serial Number
- Original Purchase Order Number
- Process Materials to which the equipment has been exposed.
- MSDS sheets for any hazardous materials
- Billing Address
- Shipping Address
- Purchase Order Number for Repairs
- Please include a purchase order even if the repair is under warranty. If repair is covered under warranty, you will not be charged.

Ship equipment freight prepaid to:

AMETEK-DREXELBROOK.
205 KEITH VALLEY ROAD
HORSHAM, PA 19044-1499
COD shipments will not be accepted

## 4.12 RF Point Level Troubleshooting Guide

| Symptom | Possible Cause | Solution | See Section |
|---|---|---|---|
| Switch is in alarm and will not clear | Sensor is coated by a conductive material and the Cote-Shield™ element does not extend far enough into the vessel | Need a sensor with a longer Cote-Shield element. Rule of thumb is nozzle length + expected wall coating + 2 inches. | Section 2.2 |
| | Fail Safe switch is set to the wrong setting | Check to make sure the fail safe switch is in the correct position | Section 2.5.3 |
| | 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 |
| | Connection cable or harness between unit and sensor is damaged | Check connection cable for shorts, opens, or damage and proper termination | Section 4.5, 4.6 |
| | Flexible sensor is swaying and active is touching vessel or structure | Add 1 or 2 seconds of reverse acting time delay. | Section 2.5.1 |
| Switch stays in alarm for extended period after level falls below sensor | Material bridging from active to tank structure | May be able to shorten sensor (consult factory) or relocate sensor. | Appendix A |
| | Time delay may be active | Make sure time delay pot is full counterclockwise. | Section 2.5.1 |
| Switch does not respond to material | There may not be enough active to “see” an insulating material | Try changing to high sensitivity or adding active length to sensor | Appendix A |
| | Switch was calibrated with sensor covered by material | Make sure material level is below sensor and re-calibrate | Section 2.8.2 |
| | Granular material – Active section is not getting enough coverage due to angle of repose | Relocate sensor to get more coverage or lengthen active. Changing to high sensitivity may also help. | Appendix A |
| | Connection cable or harness between unit and sensor is damaged | Check connection cable for shorts, opens, or damage and proper termination | Section 4.5, 4.6 |
| Switch delays in responding to material | Reverse acting time delay may be active | Check time delay settings to make sure they are correct | Section 2.5.1 |
| LED’s are Flashing | Flashing LED’s indicate one of two things. Over Range / Under Range | Consult instruction manual to determine which of the three symptoms are experienced. | Section 4.3, 4.4, 2.5.6 |
| Over Range indicates that the standing capacitance of the sensing element in the vessel is to large to allow calibration | A long sensing element may generate too much standing capacitance to calibrate out | Padding is required – consult factory | Section 4.3 |
| | The sensor could be touching an internal tank structure | May be able to shorten sensor (consult factory) or relocate sensor. | Appendix A |
| | Switch was calibrated with sensor covered by material | Make sure material level is below sensor and re-calibrate | Section 2.8.2 |
| | Improper wiring connection (Remote Switches) | Check remote cable connections to confirm they are correct. | Section 2.7 |
| Under Range indicates that the electronic unit is not seeing enough capacitance. | ThePoint ™ - Electronic unit is not attached to back board | Remove electronic unit and make certain that connection pins are not damaged. Re inset electronic unit making sure it is connected to back board. | Section 4.3 |
| | Unit is damaged | Consult factory | Section 4.8 |
| Fault Indicates the Auto-Verify feature has detected a problem. | Sensing Element is Damaged | Check Sensing Element for Damaged | Section 2.5.6 |
| | Connecting Cable is Damaged | Check connection cable for damage, shorts, and proper termination | Section 4.5, 4.6 |
| | Electronic Unit is damaged | Consult factory | Section 4.8 |
| Green Power LED is out | Electronic unit is not getting power | Check power source to make sure proper power is supplied and connections are correct | Section 2.3 |
| | Electronic Unit is damaged | Consult factory | Section 4.8 |

# Section 5

# Section 5: Specifications

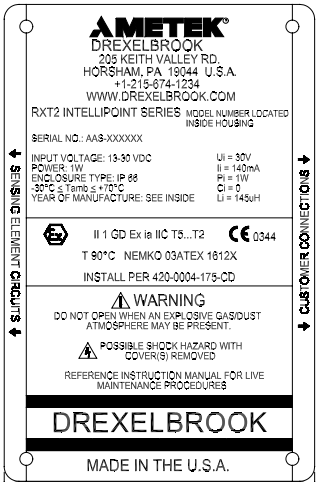
| | |
|---|---|
| **Technology:** | RF/Capacitance |
| **Calibration:** | None |
| **Modes of Operation:** | High and Low level |
| **Repeatability:** | 2mm (0.08 inch) conductive liquids |
| **Response Time:** | Less than 1 second |
| **Time Delay:** | 0 to 60 seconds forward and reverse acting |
| **Ambient Electronics:** | -30 to 70°C (-22 to 158°F) ATEX<br>-40 to 70°C (-40 to 158°F) FM |
| **Storage Temperature:** | -40 to 85°C (-40 to 185°F) |
| **Indicators:** | LEDs: Green Power, Red Alarm Status |
| **Self-Check:** | Continuous AutoVerify and Manual Certify |
| **Power Supply:** | 13 to 30 VDC<br>*Note: The minimum supply voltage at the transmitter terminal is:*<br>13 VDC at 22mA (Fault)<br>19 VDC at 5mA (Fault) |
| **Power Consumption:** | 1 watt maximum |
| **Output:** | 8 mA - Alarm<br>16 mA - Normal<br>22 mA - Fault<br>(or field-selectable)<br>8 mA - Normal<br>16 mA - Alarm<br>5 mA - Fault |
| **Housing (Electronics):** | Dual Compartment, powder-coated aluminum with two cable entries |
| **Cable Entry:** | M20 x 1.5 ATEX<br>¾-inch NPT FM/CSA |
| **Ingress Protection:** | IP66 NEMA 4X |

## 5.1 Approvals

FM APPROVED

Explosion-proof for use in Class I, Division 1, Groups A, B, C, and D, Dust-Ignition proof for use in Class II and III, Division 1, Groups E, F, and G; Non-incendiary for use in Class I, Division 2, Groups A, B, C, and D; Suitable for use in Class II and III, Division 2, Groups F and G Hazardous (Classified) Indoor and Outdoor (Type 4, 4X, IP66) Locations with Intrinsically Safe connections to Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (Classified) locations in accordance with control drawing 420-0004-173-CD; Intrinsically Safe for use in Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G hazardous (Classified) locations in accordance with entity requirements and control drawing 420-0004-173-CD.

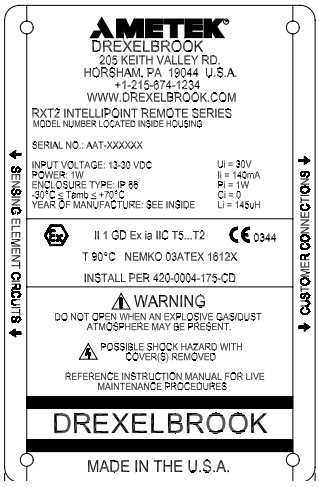
### ATEX




**Integral**

Ex II 1 GD EX ia IIC T5...T2
T 90°C NEMKO 03 ATEX 1612X CE 0344

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




**Remote**

Ex II 1 GD EX ia IICT5...T2
T90°C NEMKO 03 ATEX 1612X CE 0344

**Special Condition for Safe Use**

**Impact and friction hazards shall be considered when the transmitter is used in category II 1 G according to EN50284 clause 4.3.1**

## 5.1 Approvals (Continued)

Class I, Groups A,B,C, and D with Intrinsically Safe Probe; ClassII, Groups E, F, and G; Class III

IntelliPoint RF Point Level System RXL4 Series; Rated supply: 18...200Vdc or 85...250Vac max.; 400Hz, 2W Relay: 250V, 5A with or without optional remote sensing element connection box; Temperature Code T5; Maximum Ambient Temperature +70C; CSA Enclosure Type 4X.

IntelliPoint RF Two-Wire Point Level System RXT4 Series; Rated 30Vdc max., 140mA max. with or without optional remote sensing element connection box; Temperature Code T4; Maximum Ambient Temperature +70C; CSA Enclosure Type 4X.

**Note:** The Intrinsically Safe Circuits remain internal to the device.

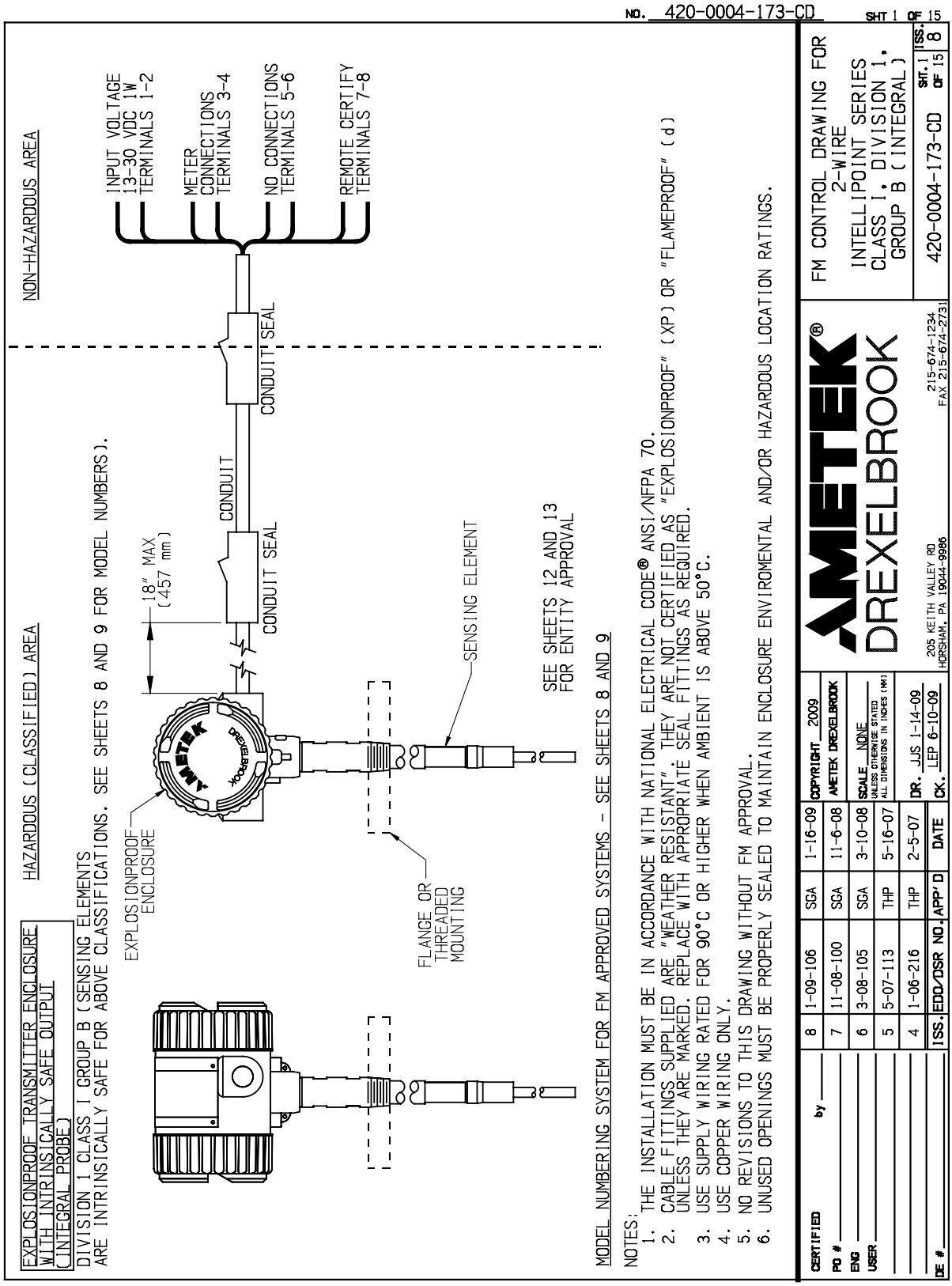
Class I, Div 2, Groups A, B, C, and D; Class II, Groups E, F, and G; Class III

IntelliPoint RF Two-Wire Point Level System RXT4 Series; Rated 30Vdc max., 140mA max.; Temperature Code T4; Maximum Ambient Temperature +70C; CSA Enclosure Type 4X.

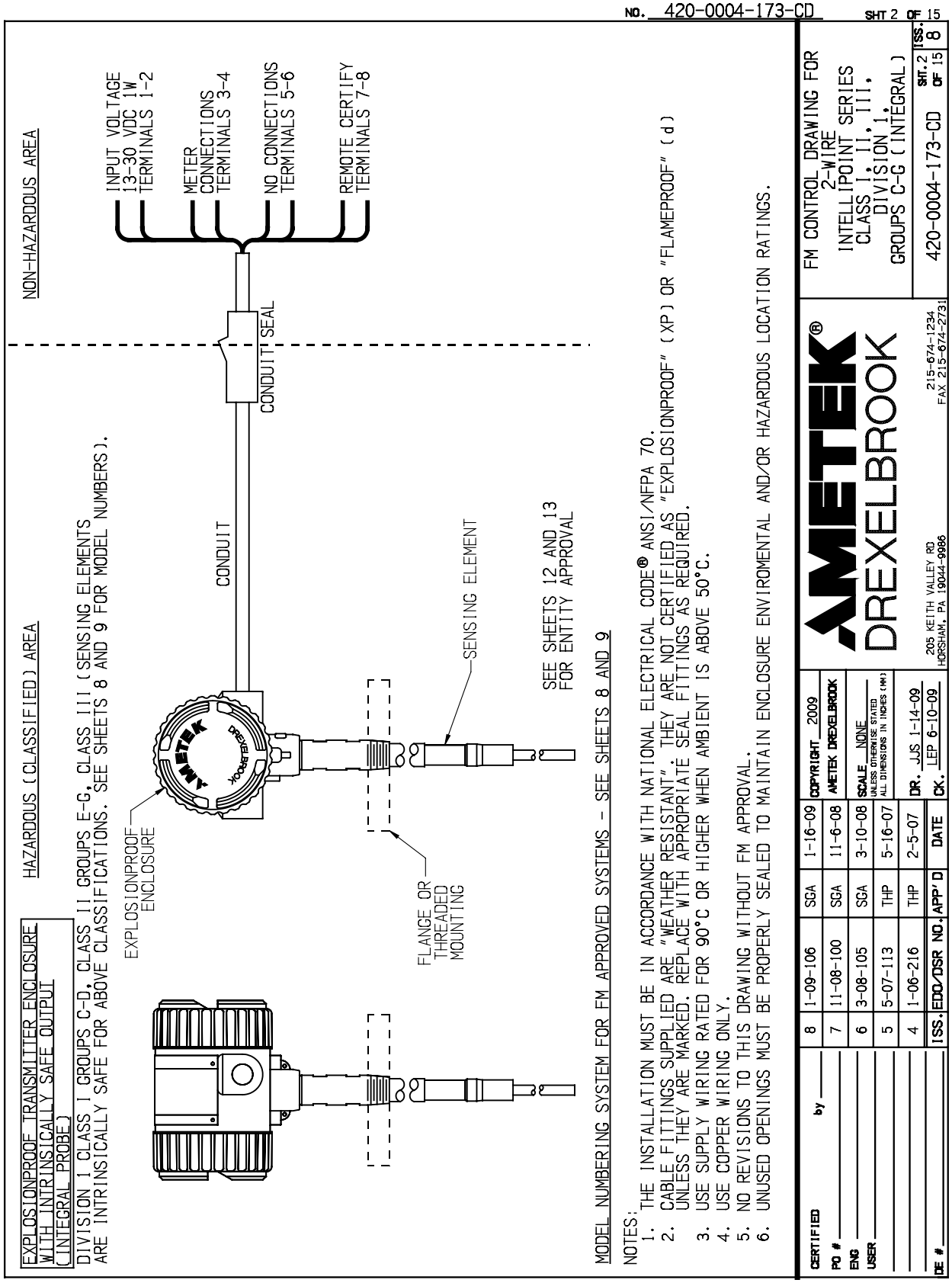
# Section 6

# Section 6: Control Drawings

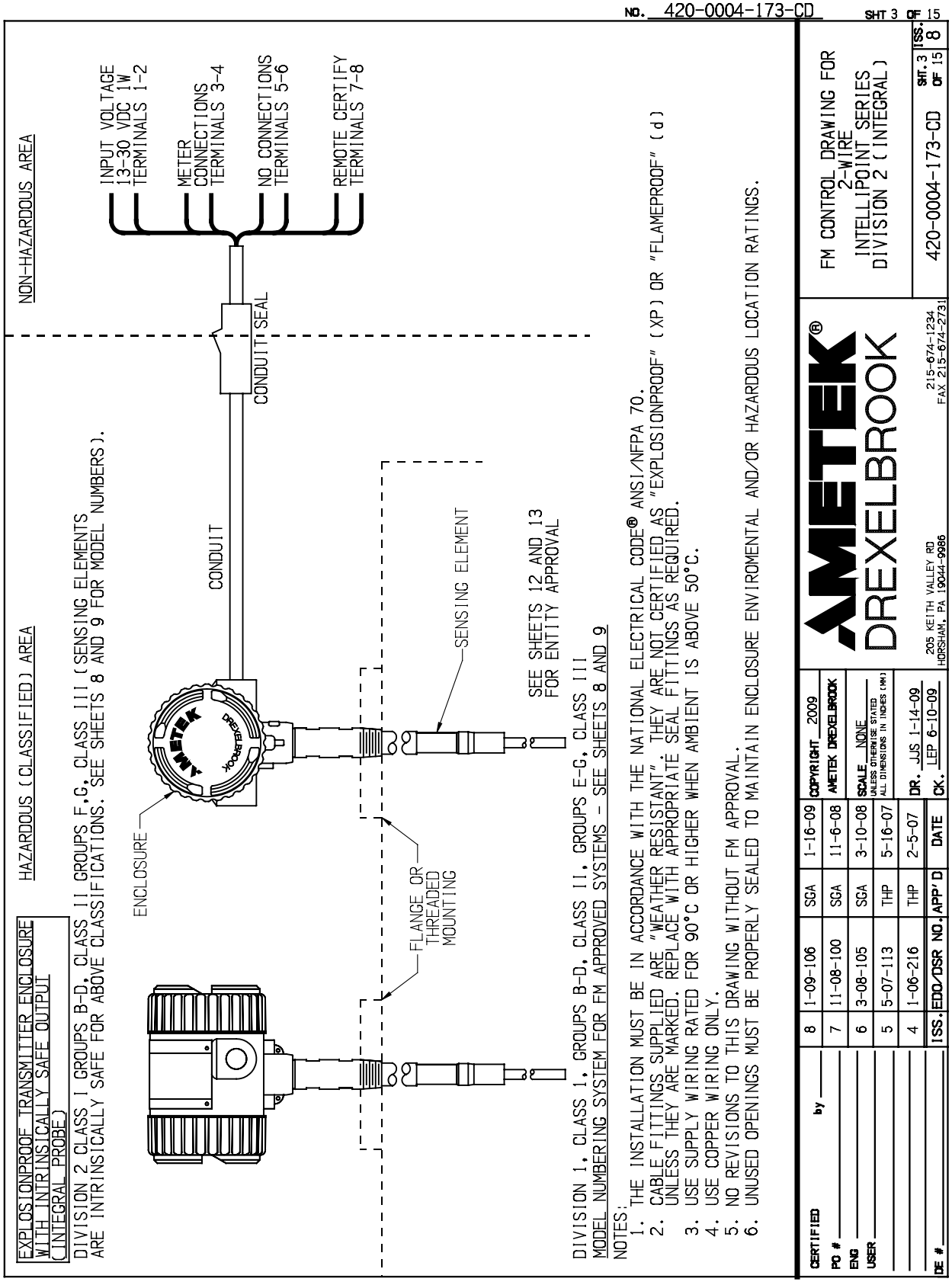
## 6.1 FM Control Drawings



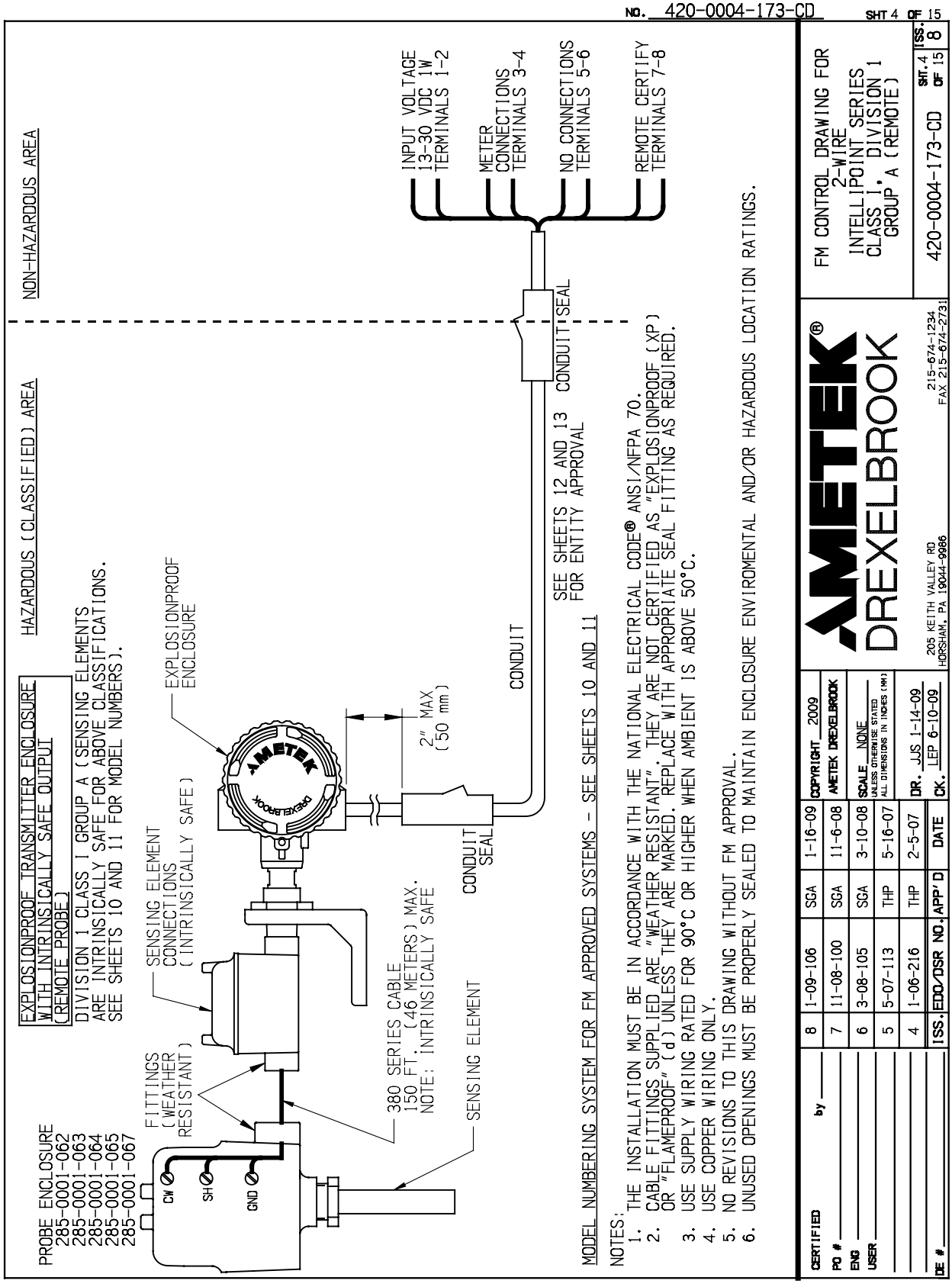
## 6.1 FM Control Drawings (Continued)



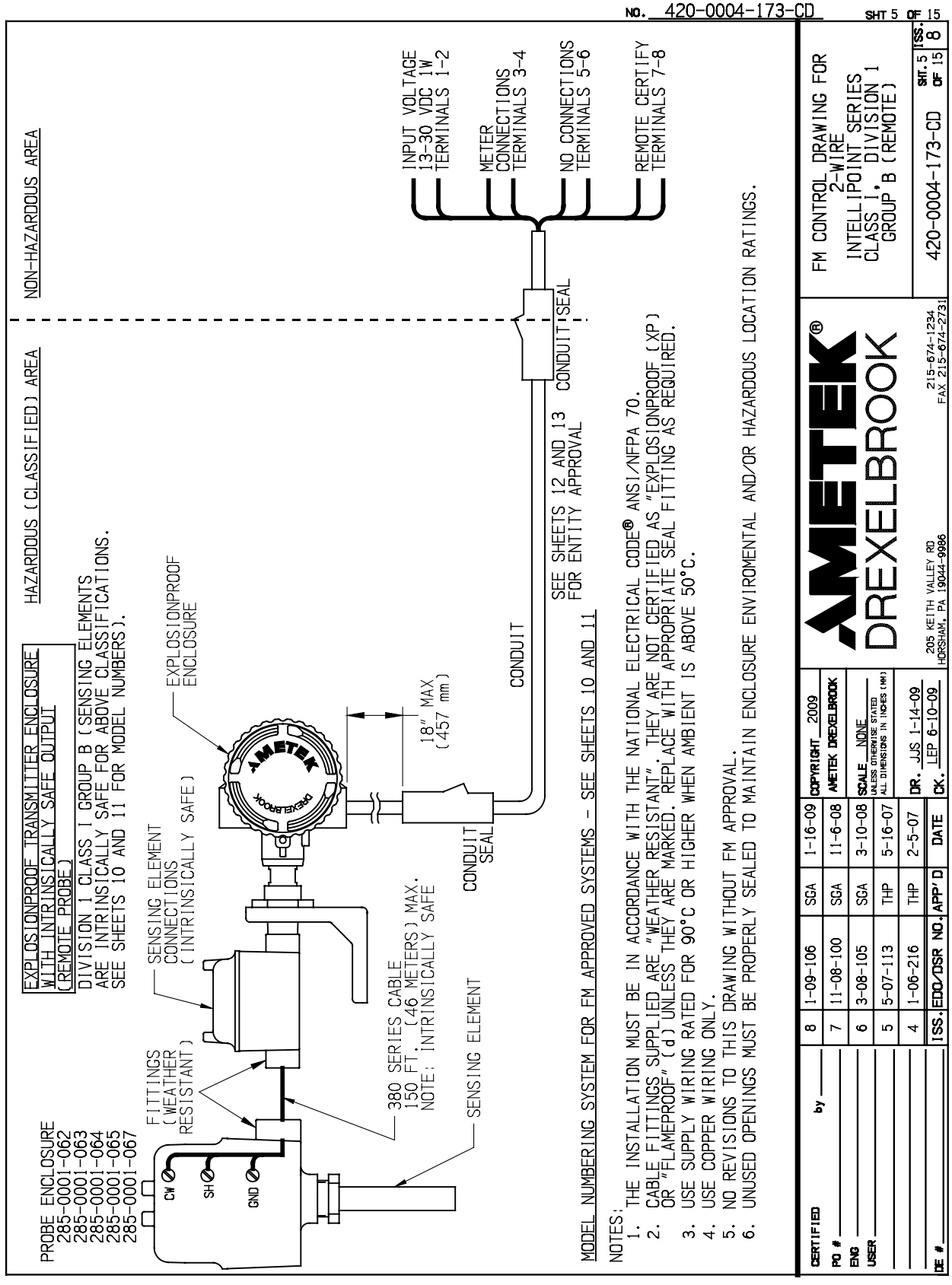
## 6.1 FM Control Drawings (Continued)



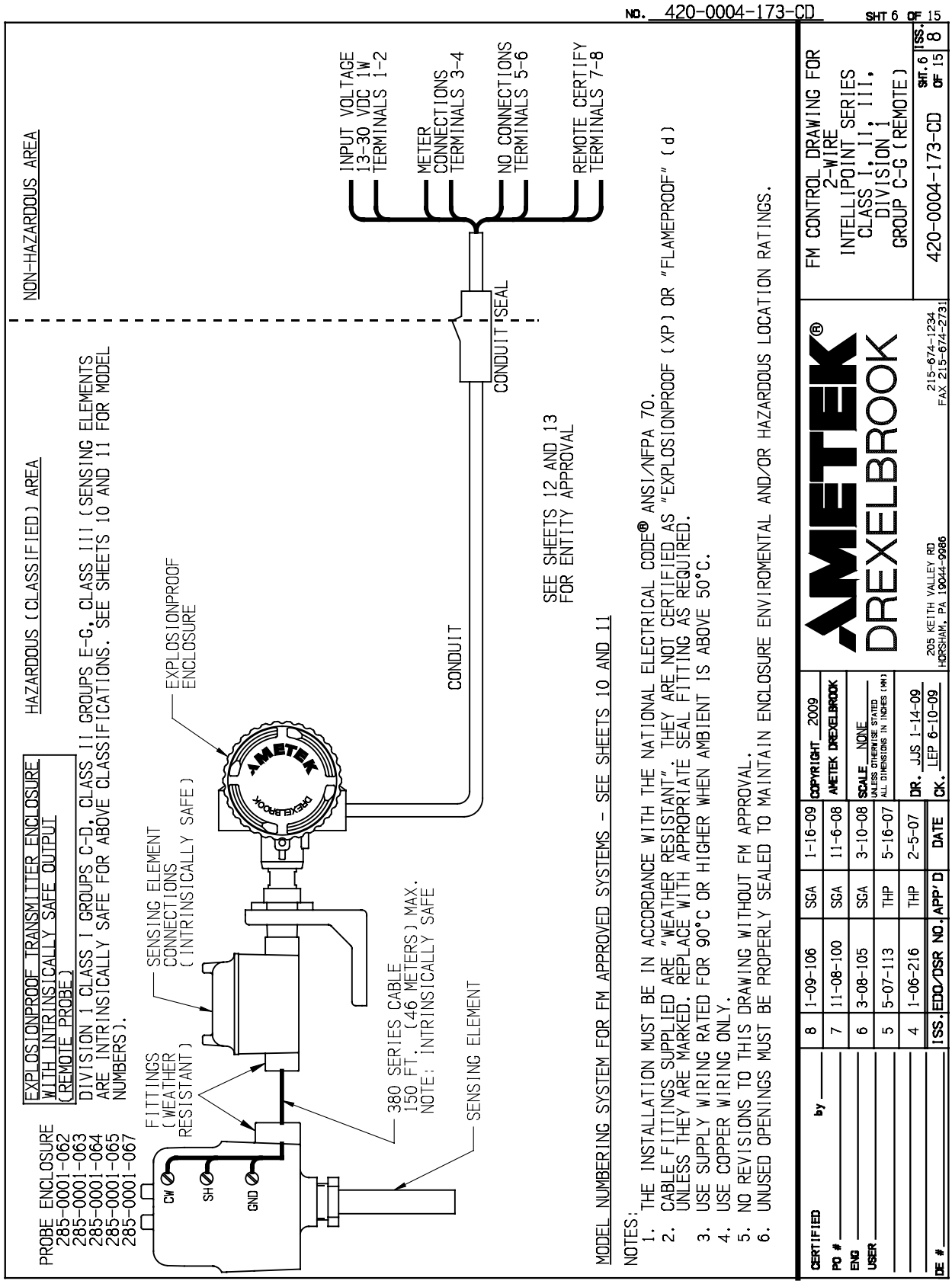
## 6.1 FM Control Drawings (Continued)



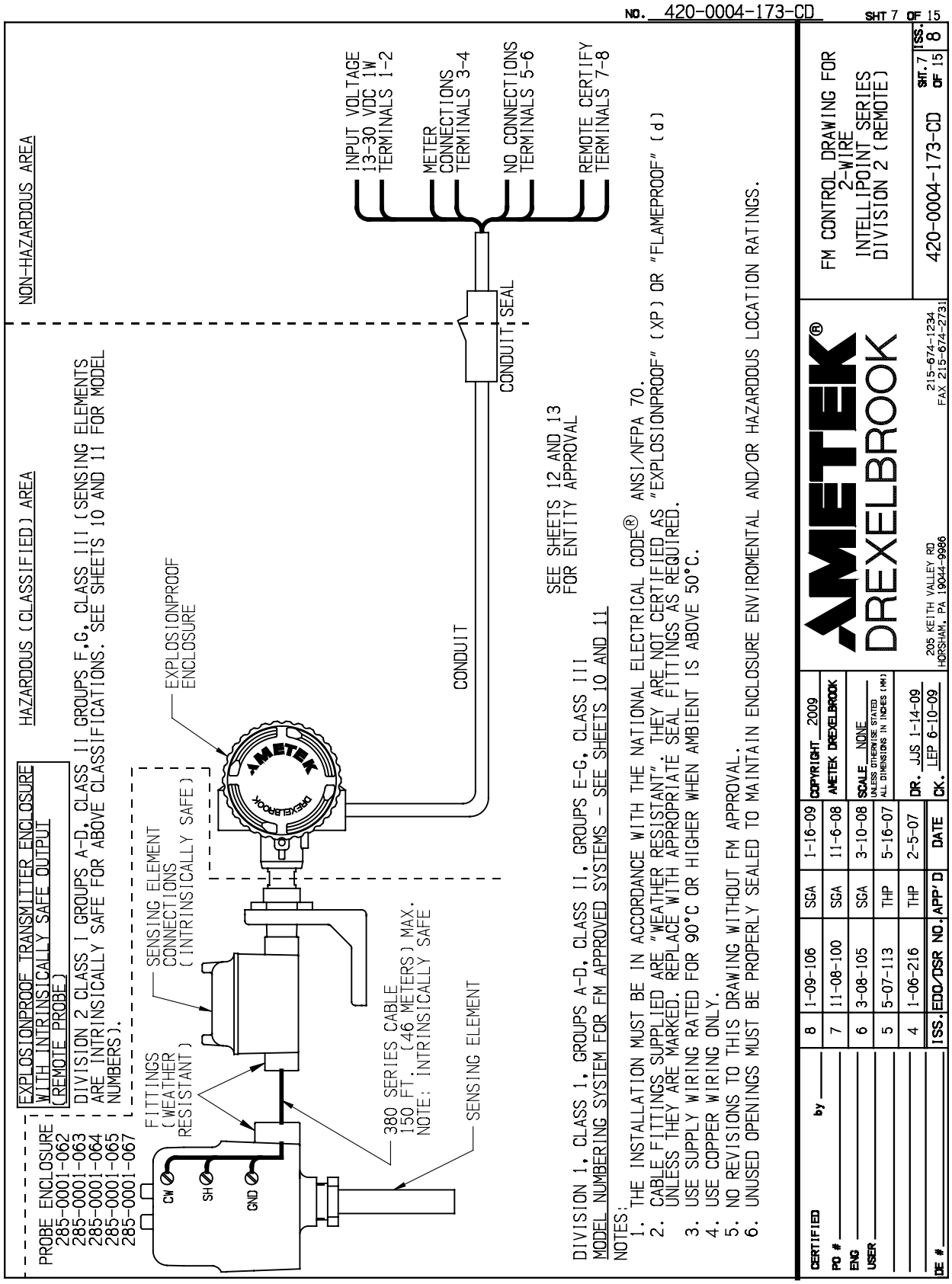
## 6.1 FM Control Drawings (Continued)



## 6.1 FM Control Drawings (Continued)



## 6.1 FM Control Drawings (Continued)



## 6.1 FM 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 | T | b | 0 | 0 | c | d | * | * | * | e | a = OPTIONS |
| | a | | | | | | | | | | | N = NO-CAL (STD) L = STANDARD AUTO CAL |
| | | | | | | | | | | | | M = MANUAL SET POINT ADJUSTMENT T = 10pf AUTO CAL |
| | | | | | | | | | | | | H = HI SENSITIVITY V = 10pf FIXED |
| | | | | | | | | | | | | G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT P = HI SENSITIVITY .5pf FIXED |
| | | | b | | | | | | | | | b = OPTIONS ⑧ |
| | | | 3 | | | | | | | | | (STD) |
| | | | 7 | | | | | | | | | DUAL SEAL |
| | | | B | | | | | | | | | DUAL SEAL |
| | | | | | | c | | | | | | c = 0, 1 OR Z SENSING ELEMENTS |
| | | | | | | | d | | | | | d = 0-4, 6-9, Z SENSING ELEMENTS |
| | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | 0 | 0 | | | | | 700-1202-021 |
| | | | | | | | 1 | | | | | 700-1202-022 |
| | | | | | | | 2 | | | | | 700-1202-024 |
| | | | | | | | 3 | | | | | 700-1202-028 |
| | | | | | | | 4 | | | | | 700-1202-042 |
| | | | | | | | 6 | | | | | 700-1202-032 |
| | | | | | | | 7 | | | | | 700-1202-020 |
| | | | | | | | 9 | | | | | 700-1202-034 |
| | | | | | | 1 | 1 | | | | | 700-0201-005 |
| | | | | | | | 2 | | | | | 700-0201-005 HAST C |
| | | | | | | | 3 | | | | | 700-0201-036 |
| | | | | | | | 6 | | | | | 700-0002-360 |
| | | | | | | | 7 | | | | | 700-0202-036 |
| | | | | | | | 8 | | | | | 700-0001-022 |
| | | | | | | | 9 | | | | | 700-0002-023 |
| | | | | | | Z | Z | | | | | SEE SHEET 9 FOR A LIST OF OTHER APPROVED INTEGRAL SENSING ELEMENTS |
| | | | | | | | | | | | | |
| | | | | | | | | | | | e | e = A-F, G, H, J, K, L OR Z |
| | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | A | 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | | B | 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | | C | 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | | D | 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | | E | 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | | F | 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | | G | 18"/NO CSL & 457.2mm/NO CSL |
| | | | | | | | | | | | H | 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | | J | 36"/NO CSL & 914.4mm/NO CSL |
| | | | | | | | | | | | K | 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | | L | 60"/10" & 1524mm/254mm |
| | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | 1 | 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | | 2 | 12"/6" & 304.8mm/152.4mm |



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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
CK. LEP 6-10-09

CERTIFIED by
PO #
ENG
USER
DE #

NO. 420-0004-173-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 8 | 1-09-106 | SGA | 1-16-09 |
| 7 | 11-08-100 | SGA | 3-10-08 |
| 6 | 3-08-105 | SGA | 3-10-08 |
| 5 | 5-07-113 | THP | 5-16-07 |

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MODEL NUMBERING SYSTEM

420-0004-173-CD

SHT. 8 OF 15 ISS. 8

SHT 8 OF 15

## 6.1 FM Control Drawings (Continued)

| | | |
|---|---|---|
| 700-0001-001 | 700-0002-055 | 700-0018-126 |
| 700-0001-002 | 700-0002-056 | 700-0018-134 |
| 700-0001-004 | 700-0002-057 | 700-0018-144 |
| 700-0001-005 | 700-0002-059 | 700-0018-222 |
| 700-0001-007 | 700-0002-060 | 700-0018-226 |
| 700-0001-012 | 700-0002-061 | 700-0018-234 |
| 700-0001-013 | 700-0002-062 | 700-0018-242 |
| 700-0001-014 | 700-0002-063 | 700-0018-243 |
| 700-0001-016 | 700-0002-064 | 700-0018-245 |
| 700-0001-022 | 700-0002-321 | 700-0018-246 |
| 700-0001-023 | 700-0002-360 | 700-0018-262 |
| 700-0001-024 | 700-0003-009 | 700-0021-001 |
| 700-0001-026 | 700-0004-038 | 700-0021-002 |
| 700-0001-029 | 700-0004-045 | 700-0021-003 |
| 700-0001-034 | 700-0004-050 | 700-0021-007 |
| 700-0001-035 | 700-0005-012 | 700-0021-008 |
| 700-0001-038 | 700-0005-014 | 700-0201-005 |
| 700-0001-039 | 700-0005-018 | 700-0201-008 |
| 700-0001-042 | 700-0005-028 | 700-0201-009 |
| 700-0001-044 | 700-0005-035 | 700-0201-010 |
| 700-0001-045 | 700-0005-038 | 700-0201-015 |
| 700-0001-051 | 700-0005-045 | 700-0201-016 |
| 700-0001-052 | 700-0005-048 | 700-0201-018 |
| 700-0001-053 | 700-0005-054 | 700-0201-025 |
| 700-0001-054 | 700-0005-114 | 700-0201-026 |
| 700-0001-061 | 700-0005-148 | 700-0201-035 |
| 700-0001-062 | 700-0005-214 | 700-0201-036 |
| 700-0001-063 | 700-0005-314 | 700-0201-105 |
| 700-0001-064 | 700-0005-348 | 700-0201-108 |
| 700-0001-324 | 700-0005-354 | 700-0201-109 |
| 700-0001-344 | 700-0005-494 | 700-0201-118 |
| 700-0002-012 | 700-0005-594 | 700-0201-135 |
| 700-0002-018 | 700-0008-122 | 700-0202-002 |
| 700-0002-021 | 700-0008-123 | 700-0202-004 |
| 700-0002-022 | 700-0008-124 | 700-0202-019 |
| 700-0002-023 | 700-0008-126 | 700-0202-023 |
| 700-0002-024 | 700-0008-134 | 700-0202-024 |
| 700-0002-025 | 700-0008-144 | 700-0202-033 |
| 700-0002-027 | 700-0008-222 | 700-0202-036 |
| 700-0002-028 | 700-0008-226 | 700-0202-043 |
| 700-0002-029 | 700-0008-234 | 700-0202-102 |
| 700-0002-033 | 700-0008-242 | 700-0204-038 |
| 700-0002-035 | 700-0008-243 | 700-0204-045 |
| 700-0002-036 | 700-0008-245 | 700-0204-048 |
| 700-0002-037 | 700-0008-246 | 700-0221-002 |
| 700-0002-039 | 700-0008-262 | 700-1202-001 |
| 700-0002-041 | 700-0009-002 | 700-1202-018 |
| 700-0002-042 | 700-0009-024 | 700-1202-020 |
| 700-0002-043 | 700-0011-001 | 700-1202-021 |
| 700-0002-044 | 700-0011-003 | 700-1202-022 |
| 700-0002-047 | 700-0011-004 | 700-1202-024 |
| 700-0002-051 | 700-0011-015 | 700-1202-028 |
| 700-0002-052 | 700-0018-122 | 700-1202-032 |
| 700-0002-053 | 700-0018-123 | 700-1202-034 |
| 700-0002-054 | 700-0018-124 | 700-1202-041 |
| | | 700-1202-042 |



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| 8 | 1-09-106 | SGA | 1-16-09 |
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SHT. 9 OF 15

ISS. 8

SHT 9 OF 15

## 6.1 FM 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 | T | b | c | 0 | d | e | * | * | * | f | a = OPTIONS |
| | a | | | | | | | | | | | N = NO-CAL (STD) L = STANDARD AUTO CAL |
| | | | | | | | | | | | | M = MANUAL SET POINT ADJUSTMENT T = 10pf AUTO CAL |
| | | | | | | | | | | | | H = HI SENSITIVITY V = 10pf FIXED |
| | | | | | | | | | | | | G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT P = HI SENSITIVITY .5pf FIXED |
| | | | b | | | | | | | | | b = OPTIONS ⑧ |
| | | | 3 | | | | | | | | | (STD) |
| | | | 7 | | | | | | | | | DUAL SEAL |
| | | | | c | | | | | | | | c = 1-9, A-K CABLE LENGTHS |
| | | | | | | d | | | | | | d = 0-3, 5, 6, OR Z SENSING ELEMENTS |
| | | | | | | | e | | | | | e = 0-9, OR Z SENSING ELEMENTS |
| | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | 0 | 0 | | | | | 700-1202-001 |
| | | | | | | | 1 | | | | | 700-1202-012 |
| | | | | | | | 2 | | | | | 700-1202-014 |
| | | | | | | | 3 | | | | | 700-1202-018 |
| | | | | | | | 4 | | | | | 700-1202-041 |
| | | | | | | | 6 | | | | | 700-1202-031 |
| | | | | | | | 7 | | | | | 700-1202-010 |
| | | | | | | | 9 | | | | | 700-1202-033 |
| | | | | | | 1 | 0 | | | | | 700-0001-018 |
| | | | | | | | 1 | | | | | 700-0201-005 |
| | | | | | | | 2 | | | | | 700-0201-005 HAST C |
| | | | | | | | 3 | | | | | 700-0201-036 |
| | | | | | | | 4 | | | | | 700-0202-002 |
| | | | | | | | 5 | | | | | 700-0202-043 |
| | | | | | | | 6 | | | | | 700-0002-360 |
| | | | | | | | 7 | | | | | 700-0202-036 |
| | | | | | | | 8 | | | | | 700-0001-022 |
| | | | | | | | 9 | | | | | 700-0002-023 |
| | | | | | | 2 | 0 | | | | | 700-0209-002 |
| | | | | | | 3 | 1 | | | | | 700-0029-001 |
| | | | | | | | 2 | | | | | 700-0029-002 |
| | | | | | | | 3 | | | | | 700-0029-003 |
| | | | | | | | 4 | | | | | 700-0029-004 |
| | | | | | | | 5 | | | | | 700-0029-005 |
| | | | | | | 5 | 0 | | | | | 700-0207-001 |
| | | | | | | | 1 | | | | | 700-0207-002 |
| | | | | | | | 2 | | | | | 700-0207-003 |
| | | | | | | | 3 | | | | | 700-0207-004 |
| | | | | | | | 4 | | | | | 700-0207-005 |
| | | | | | | | 5 | | | | | 700-0207-006 |
| | | | | | | 6 | 0 | | | | | 700-0204-038 |
| | | | | | | | 1 | | | | | 700-0204-002 |
| | | | | | | | 2 | | | | | 700-0204-048 |
| | | | | | | Z | Z | | | | | SEE SHEET 11 FOR ADDITIONAL APPROVED REMOTE SENSING ELEMENTS |

| | |
|---|---|
| f | f = A-F, G, H, J, K, L OR Z |
| | INSERTION LENGTH/COTE SHIELD LENGTH |
| A | 6"/2" & 152.4mm/50.8mm |
| B | 12"/2" & 304.8mm/50.8mm |
| C | 12"/3.5" & 304.8mm/88.9mm |
| D | 18"/2" & 457.2mm/50.8mm |
| E | 18"/3.5" & 457.2mm/88.9mm |
| F | 18"/10" & 457.2mm/254mm |
| G | 18"/NO CSL & 457.2mm/NO CSL |
| H | 36"/10" & 914.4mm/254mm |
| J | 36"/NO CSL & 914.4mm/NO CSL |
| K | 48"/10" & 1219.2mm/254mm |
| L | 60"/10" & 1524mm/254mm |
| Z | OTHER |
| 1 | 18"/6" & 457.2mm/152.4mm |
| 2 | 12"/6" & 304.8mm/152.4mm |



SCALE NONE
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ALL DIMENSIONS IN INCHES (MM)

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| 5 | 5-07-113 | THP | 5-16-07 |

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FM APPROVED REMOTE
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM

420-0004-173-CD SHT. 10 OF 15 ISS. 8

SHT 10 OF 15

## 6.1 FM Control Drawings (Continued)

MODEL NUMBERS OF APPROVED REMOTE SENSING ELEMENTS

701-mnop-qrs-t LEVEL PROBE

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



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

DR. JJS 1-14-09
CK. LEP 6-10-09

CERTIFIED by
PO #
ENG
USER
DE #

NO. 420-0004-173-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 8 | 1-09-106 | SGA | 1-16-09 |
| 7 | 11-08-100 | SGA | 3-10-08 |
| 6 | 3-08-105 | SGA | 3-10-08 |
| 5 | 5-07-113 | THP | 5-16-07 |

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FM APPROVED
ADDITIONAL REMOTE
SENSING ELEMENTS

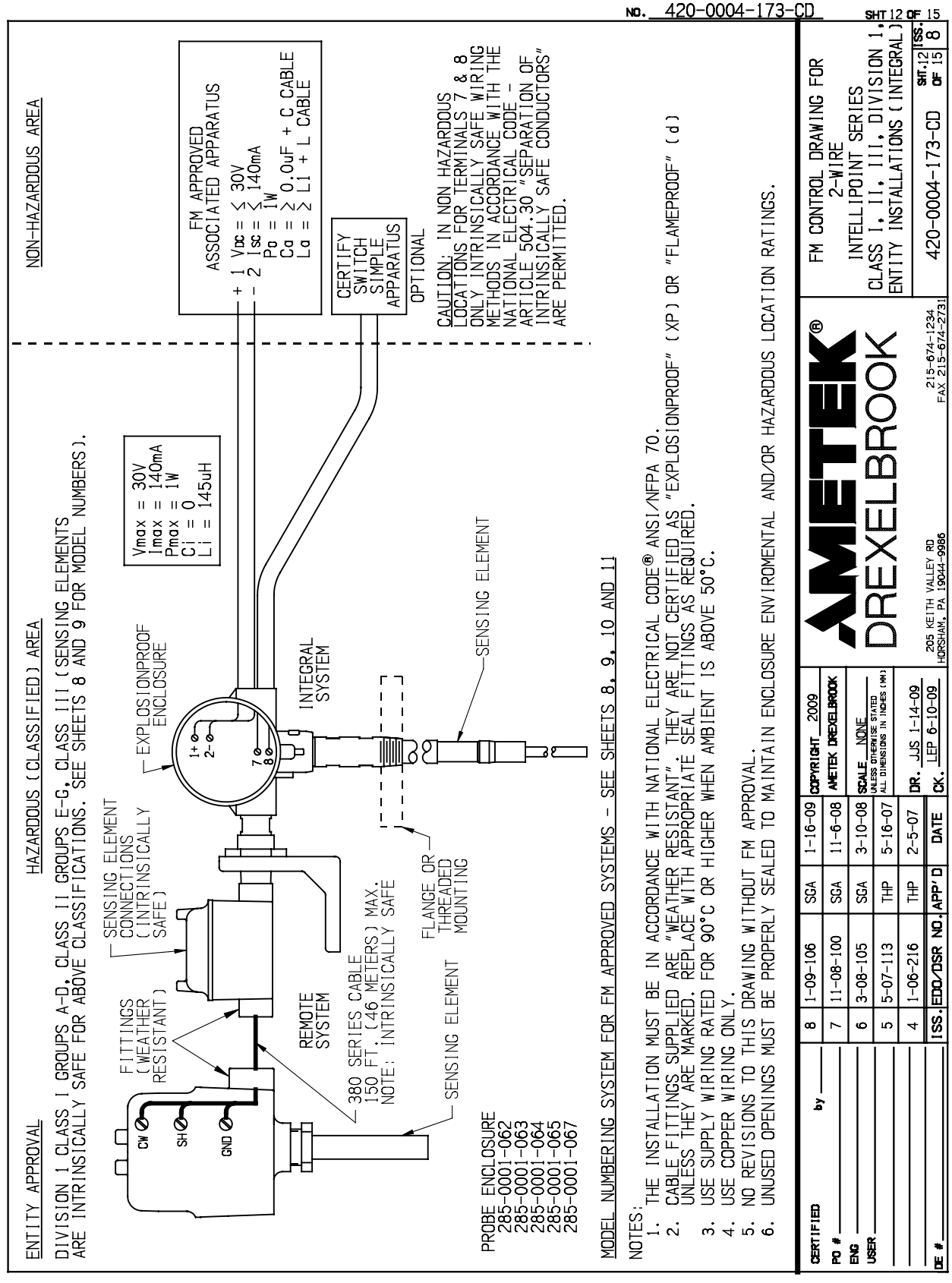
420-0004-173-CD

SHT. 11 OF 15

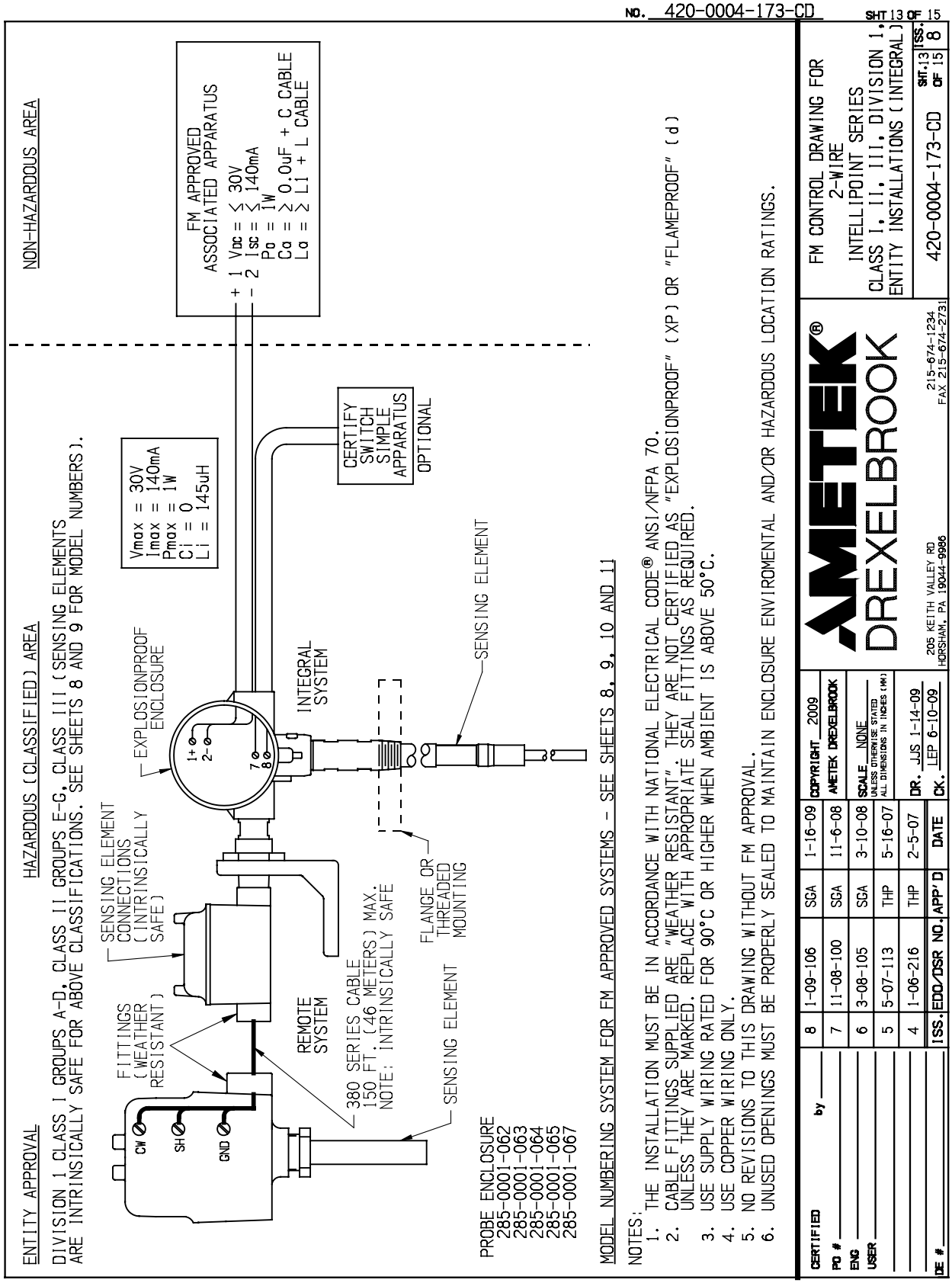
ISS. 8

SHT 11 OF 15

## 6.1 FM Control Drawings (Continued)



## 6.1 FM Control Drawings (Continued)



## 6.1 FM 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 | T | c | 0 | 0 | d | e | * | * | * | f | |
| | a | | | | | | | | | | | | | a = SIL LEVEL 1 OR 2 |
| | | | b | | | | | | | | | | | b = OPTIONS |
| | | | | | | | | | | | | | | N = NO-CAL (STD) 2pF FIXED L = STANDARD AUTO CAL 2pF AUTO |
| | | | | | c | | | | | | | | | c = OPTIONS ⑧ |
| | | | | | | | | | | | | | | 3 = (STD) |
| | | | | | | | | | | | | | | 7 = DUAL SEAL |
| | | | | | | | | | | | | | | C = DUAL SEAL |
| | | | | | | | | d | | | | | | d = 0, 1 OR Z SENSING ELEMENTS |
| | | | | | | | | | e | | | | | e = 0-4, 6-9, Z SENSING ELEMENTS |
| | | | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | | | 0 | 0 | | | | | 700-1202-021 |
| | | | | | | | | | 1 | | | | | 700-1202-022 |
| | | | | | | | | | 2 | | | | | 700-1202-024 |
| | | | | | | | | | 3 | | | | | 700-1202-028 |
| | | | | | | | | | 4 | | | | | 700-1202-042 |
| | | | | | | | | | 6 | | | | | 700-1202-032 |
| | | | | | | | | | 7 | | | | | 700-1202-020 |
| | | | | | | | | | 9 | | | | | 700-1202-034 |
| | | | | | | | | 1 | 1 | | | | | 700-0201-005 |
| | | | | | | | | | 2 | | | | | 700-0201-005 HAST C |
| | | | | | | | | | 3 | | | | | 700-0201-036 |
| | | | | | | | | | 6 | | | | | 700-0002-360 |
| | | | | | | | | | 7 | | | | | 700-0202-036 |
| | | | | | | | | | 8 | | | | | 700-0001-022 |
| | | | | | | | | | 9 | | | | | 700-0002-023 |
| | | | | | | | | Z | Z | | | | | SEE SHEET 9 FOR A LIST OF OTHER APPROVED INTEGRAL SENSING ELEMENTS |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | f | f = A-F, G, H, J, K, L OR Z |
| | | | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | | | A | 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | | | | B | 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | | | | C | 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | | | | D | 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | | | | E | 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | | | | F | 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | | | | G | 18"/NO CSL & 457.2mm/NO CSL |
| | | | | | | | | | | | | | H | 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | | | | J | 36"/NO CSL & 914.4mm/NO CSL |
| | | | | | | | | | | | | | K | 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | | | | L | 60"/10" & 1524mm/254mm |
| | | | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | | | 1 | 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | | | | 2 | 12"/6" & 304.8mm/152.4mm |



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

DR. JJS 1-14-09
CK. LEP 6-10-09

CERTIFIED by
PO #
ENG
USER
DE #

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 8 | 1-09-106 | SGA | 1-16-09 |
| 7 | 11-08-100 | SGA | 3-10-08 |
| 6 | 3-08-105 | SGA | 3-10-08 |
| 5 | 5-07-113 | THP | 5-16-07 |

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FM APPROVED INTEGRAL
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
SIL SYSTEMS

420-0004-173-CD SHT. 14 OF 15 ISS. 8

NO. 420-0004-173-CD

SHT 14 OF 15

## 6.1 FM 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 | T | c | d | 0 | e | f | * | * | * | g | |
| | a | | | | | | | | | | | | | a = SIL LEVEL 1 OR 2 |
| | | | b | | | | | | | | | | | b = OPTIONS |
| | | | | | | | | | | | | | | N = NO-CAL (STD) 2pF FIXED L = STANDARD AUTO CAL 2pF AUTO |
| | | | | | c | | | | | | | | | c = OPTIONS ⑧ |
| | | | | | | | | | | | | | | 3 = (STD) |
| | | | | | | | | | | | | | | 7 = DUAL SEAL |
| | | | | | | d | | | | | | | | d = 1-9, A-K CABLE LENGTHS |
| | | | | | | | | e | | | | | | e = 0-3, 5, 6, OR Z SENSING ELEMENTS |
| | | | | | | | | | f | | | | | f = 0-9, OR Z SENSING ELEMENTS |
| | | | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | | | 0 | 0 | | | | | 700-1202-001 |
| | | | | | | | | | 1 | | | | | 700-1202-012 |
| | | | | | | | | | 2 | | | | | 700-1202-014 |
| | | | | | | | | | 3 | | | | | 700-1202-018 |
| | | | | | | | | | 4 | | | | | 700-1202-041 |
| | | | | | | | | | 6 | | | | | 700-1202-031 |
| | | | | | | | | | 7 | | | | | 700-1202-010 |
| | | | | | | | | | 9 | | | | | 700-1202-033 |
| | | | | | | | | 1 | 0 | | | | | 700-0001-018 |
| | | | | | | | | | 1 | | | | | 700-0201-005 |
| | | | | | | | | | 2 | | | | | 700-0201-005 HAST C |
| | | | | | | | | | 3 | | | | | 700-0201-036 |
| | | | | | | | | | 4 | | | | | 700-0202-002 |
| | | | | | | | | | 5 | | | | | 700-0202-043 |
| | | | | | | | | | 6 | | | | | 700-0002-360 |
| | | | | | | | | | 7 | | | | | 700-0202-036 |
| | | | | | | | | | 8 | | | | | 700-0001-022 |
| | | | | | | | | | 9 | | | | | 700-0002-023 |
| | | | | | | | | 2 | 0 | | | | | 700-0209-002 |
| | | | | | | | | 3 | 1 | | | | | 700-0029-001 |
| | | | | | | | | | 2 | | | | | 700-0029-002 |
| | | | | | | | | | 3 | | | | | 700-0029-003 |
| | | | | | | | | | 4 | | | | | 700-0029-004 |
| | | | | | | | | | 5 | | | | | 700-0029-005 |
| | | | | | | | | 5 | 0 | | | | | 700-0207-001 |
| | | | | | | | | | 1 | | | | | 700-0207-002 |
| | | | | | | | | | 2 | | | | | 700-0207-003 |
| | | | | | | | | | 3 | | | | | 700-0207-004 |
| | | | | | | | | | 4 | | | | | 700-0207-005 |
| | | | | | | | | | 5 | | | | | 700-0207-006 |
| | | | | | | | | 6 | 0 | | | | | 700-0204-038 |
| | | | | | | | | | 1 | | | | | 700-0204-002 |
| | | | | | | | | | 2 | | | | | 700-0204-048 |
| | | | | | | | | Z | Z | | | | | SEE SHEET 11 FOR ADDITIONAL APPROVED REMOTE SENSING ELEMENTS |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | g | g = A-F, G, H, J, K, L OR Z |
| | | | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | | | A | 6″/2″ & 152.4mm/50.8mm |
| | | | | | | | | | | | | | B | 12″/2″ & 304.8mm/50.8mm |
| | | | | | | | | | | | | | C | 12″/3.5″ & 304.8mm/88.9mm |
| | | | | | | | | | | | | | D | 18″/2″ & 457.2mm/50.8mm |
| | | | | | | | | | | | | | E | 18″/3.5″ & 457.2mm/88.9mm |
| | | | | | | | | | | | | | F | 18″/10″ & 457.2mm/254mm |
| | | | | | | | | | | | | | G | 18″/NO CSL & 457.2mm/NO CSL |
| | | | | | | | | | | | | | H | 36″/10″ & 914.4mm/254mm |
| | | | | | | | | | | | | | J | 36″/NO CSL & 914.4mm/NO CSL |
| | | | | | | | | | | | | | K | 48″/10″ & 1219.2mm/254mm |
| | | | | | | | | | | | | | L | 60″/10″ & 1524mm/254mm |
| | | | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | | | 1 | 18″/6″ & 457.2mm/152.4mm |
| | | | | | | | | | | | | | 2 | 12″/6″ & 304.8mm/152.4mm |



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

DR. JJS 1-14-09
CK. LEP 6-10-09

CERTIFIED by
PO #
ENG
USER
DE #

NO. 420-0004-173-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 8 | 1-09-106 | SGA | 1-16-09 |
| 7 | 11-08-100 | SGA | 3-10-08 |
| 6 | 3-08-105 | SGA | 3-10-08 |
| 5 | 5-07-113 | THP | 5-16-07 |

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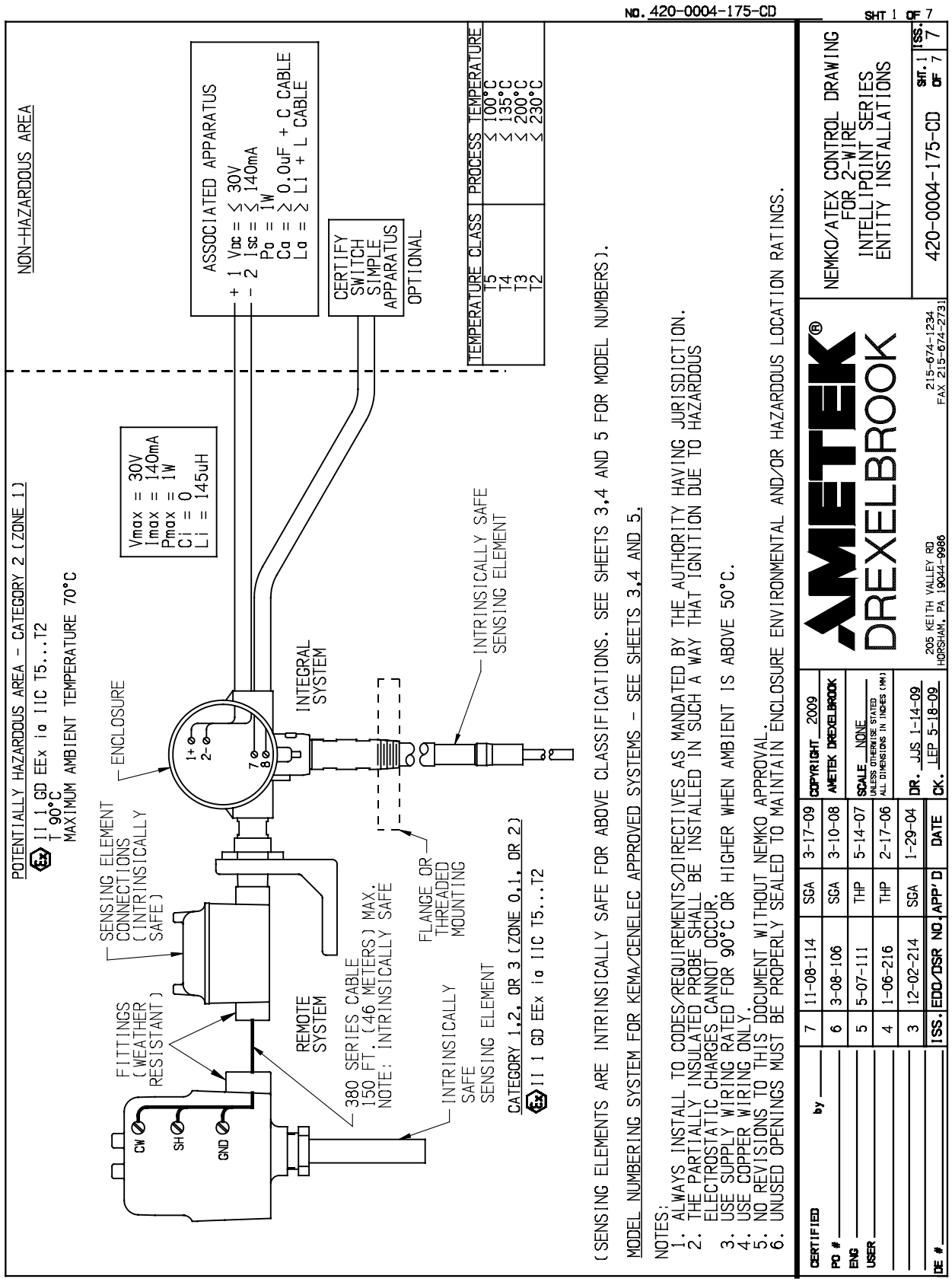
FM APPROVED REMOTE
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
SIL SYSTEMS

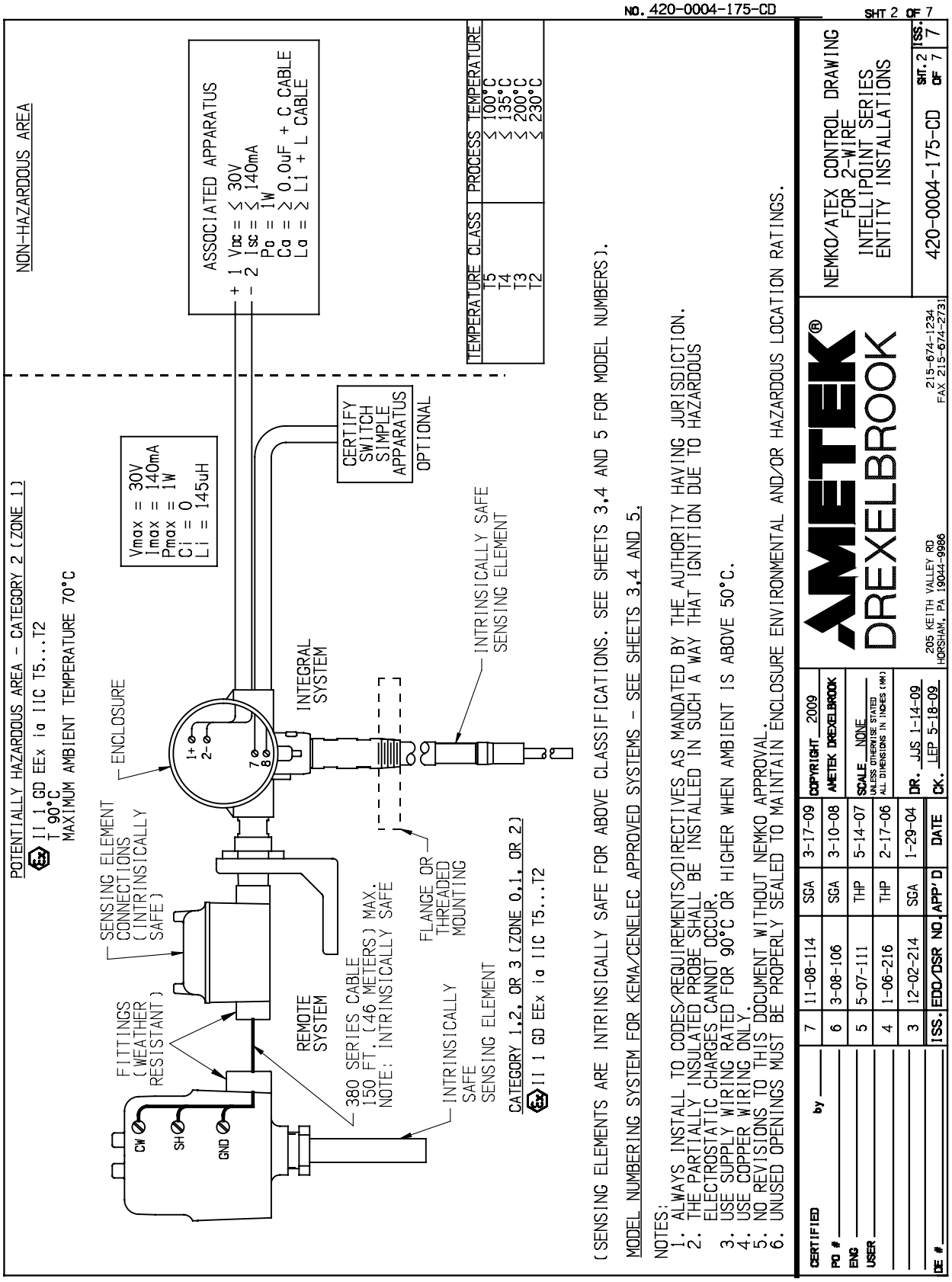
420-0004-173-CD SHT. 15 OF 15 ISS. 8

SHT 15 OF 15

## 6.2 ATEX Control Drawings



## 6.2 ATEX Control Drawings (Continued)



## 6.2 ATEX Control Drawings (Continued)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | a | T | b | 0 | 0 | 0 | c | * | * | * | d | |
| | a | | | | | | | | | | | a = OPTIONS |
| | | | | | | | | | | | | N = NO CALIBRATION POINT LEVEL L = STANDARD AUTO CAL |
| | | | | | | | | | | | | M = MANUAL SET POINT T = 10pf AUTO CAL |
| | | | | | | | | | | | | H = HI SENSITIVITY V = 10pf FIXED |
| | | | | | | | | | | | | G = MANUAL SET POINT HI SENSITIVITY P = HI SENSITIVITY .5pf FIXED |
| | | | b | | | | | | | | | b = 2 |
| | | | 2 | | | | | | | | | M20 KEMA/CENELEC SYSTEMS |
| | | | | | | | c | | | | | c = 0-4 |
| | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | 0 | 0 | | | | | 700-1202-001 |
| | | | | | | | 1 | | | | | 700-1202-012 |
| | | | | | | | 2 | | | | | 700-1202-014 |
| | | | | | | | 3 | | | | | 700-1202-018 |
| | | | | | | | 4 | | | | | 700-1202-041 |
| | | | | | | | 6 | | | | | 700-1202-032 |
| | | | | | | | 7 | | | | | 700-1202-020 |
| | | | | | | | 9 | | | | | 700-1202-034 |
| | | | | | | 1 | 1 | | | | | 700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 3 | | | | | 700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 6 | | | | | 700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 7 | | | | | 700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 8 | | | | | 700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 9 | | | | | 700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | Z | Z | | | | | SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS |
| | | | | | | | | | * | * | * | SEE MOUNTING CHART |
| | | | | | | | | | | | d | d = A-F, G, H, J, K, L OR Z |
| | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | A | 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | | B | 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | | C | 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | | D | 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | | E | 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | | F | 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | | G | 18"/NO CSL & 457.2mm |
| | | | | | | | | | | | H | 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | | J | 36"/NO CSL & 914.4mm |
| | | | | | | | | | | | K | 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | | L | 60"/10" & 1524mm/254mm |
| | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | 1 | 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | | 2 | 12"/6" & 304.8mm/152.4mm |



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

DR. JJS 1-14-09
LEP 5-18-09

CERTIFIED
PO #
ENG
USER
DE #

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 7 | 11-08-114 | SGA | 3-17-09 |
| 6 | 3-08-106 | SGA | 3-10-08 |
| 5 | 5-07-111 | THP | 5-14-07 |
| 4 | 1-06-216 | THP | 2-17-06 |

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NEMKO/ATEX APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(INTEGRAL)

420-0004-175-CD SHT. 3 OF 7 ISS. 7

NO. 420-0004-175-CD SHT 3 OF 7

## 6.2 ATEX Control Drawings (Continued)

| | | | | | | | | COLUMNS 9 AND UP DO NOT AFFECT SAFETY | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| R | a | T | 2 | b | 0 | c | d | * | * | * | e | |
| | a | | | | | | | | | | | a = OPTIONS |
| | | | | | | | | | | | | N = NO CALIBRATION POINT LEVEL L = STANDARD AUTO CAL |
| | | | | | | | | | | | | M = MANUAL SET POINT T = 10pf AUTO CAL |
| | | | | | | | | | | | | H = HI SENSITIVITY V = 10pf FIXED |
| | | | | | | | | | | | | G = MANUAL SET POINT HI SENSITIVITY P = HI SENSITIVITY .5pf FIXED |
| | | | | b | | | | | | | | b = 1-9, A-K CABLE OPTIONS (REMOTE) |
| | | | | | | c | | | | | | c = 0-3, 5, 6, OR Z SENSING ELEMENTS |
| | | | | | | | d | | | | | d = 0-6, & 8, OR Z SENSING ELEMENTS |
| | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | 0 | 0 | | | | | 700-1202-001 |
| | | | | | | | 1 | | | | | 700-1202-012 |
| | | | | | | | 2 | | | | | 700-1202-014 |
| | | | | | | | 3 | | | | | 700-1202-018 |
| | | | | | | | 4 | | | | | 700-1202-041 |
| | | | | | | | 6 | | | | | 700-1202-031 |
| | | | | | | | 7 | | | | | 700-1202-010 |
| | | | | | | | 9 | | | | | 700-1202-033 |
| | | | | | | 1 | 0 | | | | | 700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 1 | | | | | 700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 3 | | | | | 700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 4 | | | | | 700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 5 | | | | | 700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 6 | | | | | 700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 7 | | | | | 700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 8 | | | | | 700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 9 | | | | | 700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 2 | 0 | | | | | 700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 3 | 1 | | | | | 700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 3 | | | | | 700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 4 | | | | | 700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 5 | | | | | 700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 5 | 0 | | | | | 700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 1 | | | | | 700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 3 | | | | | 700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 4 | | | | | 700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 5 | | | | | 700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 6 | 0 | | | | | 700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 6 | 1 | | | | | 700-0204-002 |
| | | | | | | 6 | 2 | | | | | 700-0204-048 |
| | | | | | | Z | Z | | | | | SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS |
| | | | | | | | | | | | e | e = A-F, G, H, J, K, L OR Z |
| | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | A | 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | | B | 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | | C | 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | | D | 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | | E | 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | | F | 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | | G | 18"/NO CSL & 457.2mm |
| | | | | | | | | | | | H | 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | | J | 36"/NO CSL & 914.4mm |
| | | | | | | | | | | | K | 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | | L | 60"/10" & 1524mm/254mm |
| | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | 1 | 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | | 2 | 12"/6" & 304.8mm/152.4mm |

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

DR. JJS 1-14-09
LEP 5-18-09

CERTIFIED
PO #
ENG
USER
DE #

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 7 | 11-08-114 | SGA | 3-17-09 |
| 6 | 3-08-106 | SGA | 3-10-08 |
| 5 | 5-07-111 | THP | 5-14-07 |
| 4 | 1-06-216 | THP | 2-17-06 |

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NEMKO/ATEX APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)

420-0004-175-CD SHT. 4 OF 7 ISS. 7

NO. 420-0004-175-CD SHT 4 OF 7

## 6.2 ATEX Control Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-t LEVEL PROBE

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



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

DR. JJS 1-14-09
LEP 5-18-09

CERTIFIED
PO #
ENG
USER
DE #

NO. 420-0004-175-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 7 | 11-08-114 | SGA | 3-17-09 |
| 6 | 3-08-106 | SGA | 3-10-08 |
| 5 | 5-07-111 | THP | 5-14-07 |
| 4 | 1-06-216 | THP | 2-17-06 |

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NEMKO/ATEX APPROVED
ADDITIONAL INTRINSICALLY
SAFE SENSING ELEMENTS
(REMOTE)

420-0004-175-CD SHT. 5 OF 7 ISS. 7

SHT 5 OF 7

## 6.2 ATEX Control Drawings (Continued)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | a | R | b | T | c | 0 | 0 | 0 | d | * | * | * | e | |
| | a | | | | | | | | | | | | | a = SIL LEVEL 1 OR 2 |
| | | | b | | | | | | | | | | | b = OPTIONS ⑦ |
| | | | | | | | | | | | | | | N = NO CALIBRATION POINT LEVEL 2pF FIXED |
| | | | | | | | | | | | | | | L = STANDARD AUTO CAL 2pF AUTO |
| | | | | | c | | | | | | | | | c = 2 |
| | | | | | 2 | | | | | | | | | M20 KEMA/CENELEC SYSTEMS |
| | | | | | | | | | d | | | | | d = 0-4 |
| | | | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | | | 0 | 0 | | | | | 700-1202-001 |
| | | | | | | | | | 1 | | | | | 700-1202-012 |
| | | | | | | | | | 2 | | | | | 700-1202-014 |
| | | | | | | | | | 3 | | | | | 700-1202-018 |
| | | | | | | | | | 4 | | | | | 700-1202-041 |
| | | | | | | | | | 6 | | | | | 700-1202-032 |
| | | | | | | | | | 7 | | | | | 700-1202-020 |
| | | | | | | | | | 9 | | | | | 700-1202-034 |
| | | | | | | | | 1 | 1 | | | | | 700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | | | | | 700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 3 | | | | | 700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 6 | | | | | 700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 7 | | | | | 700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 8 | | | | | 700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 9 | | | | | 700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | Z | Z | | | | | SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS |
| | | | | | | | | | | | * | * | * | SEE MOUNTING CHART |
| | | | | | | | | | | | | | e | e = A-F, G, H, J, K, L OR Z |
| | | | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | | | A | 6″/2″ & 152.4mm/50.8mm |
| | | | | | | | | | | | | | B | 12″/2″ & 304.8mm/50.8mm |
| | | | | | | | | | | | | | C | 12″/3.5″ & 304.8mm/88.9mm |
| | | | | | | | | | | | | | D | 18″/2″ & 457.2mm/50.8mm |
| | | | | | | | | | | | | | E | 18″/3.5″ & 457.2mm/88.9mm |
| | | | | | | | | | | | | | F | 18″/10″ & 457.2mm/254mm |
| | | | | | | | | | | | | | G | 18″/NO CSL & 457.2mm |
| | | | | | | | | | | | | | H | 36″/10″ & 914.4mm/254mm |
| | | | | | | | | | | | | | J | 36″/NO CSL & 914.4mm |
| | | | | | | | | | | | | | K | 48″/10″ & 1219.2mm/254mm |
| | | | | | | | | | | | | | L | 60″/10″ & 1524mm/254mm |
| | | | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | | | 1 | 18″/6″ & 457.2mm/152.4mm |
| | | | | | | | | | | | | | 2 | 12″/6″ & 304.8mm/152.4mm |



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

DR. JJS 1-14-09
LEP 5-18-09

CERTIFIED
PO #
ENG
USER
DE #

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 7 | 11-08-114 | SGA | 3-17-09 |
| 6 | 3-08-106 | SGA | 3-10-08 |
| 5 | 5-07-111 | THP | 5-14-07 |
| 4 | 1-06-216 | THP | 2-17-06 |

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NEMKO/ATEX APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(INTEGRAL)
SIL SYSTEMS

420-0004-175-CD SHT. 6 OF 7 ISS. 7

NO. 420-0004-175-CD

SHT 6 OF 7

## 6.2 ATEX Control Drawings (Continued)

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | COLUMNS 11 AND UP DO NOT AFFECT SAFETY | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
| S | a | R | b | T | 2 | c | 0 | d | e | * | * | * | f | |
| | a | | | | | | | | | | | | | a = SIL LEVEL 1 OR 2 |
| | | | b | | | | | | | | | | | b = OPTIONS ⑦ |
| | | | | | | | | | | | | | | N = NO CALIBRATION POINT LEVEL 2pF FIXED |
| | | | | | | | | | | | | | | L = STANDARD AUTO CAL 2pF AUTO |
| | | | | | | c | | | | | | | | c = 1-9, A-K CABLE OPTIONS (REMOTE) |
| | | | | | | | | d | | | | | | d = 0-3, 5, 6, OR Z SENSING ELEMENTS |
| | | | | | | | | | e | | | | | e = 0-6, & 8, OR Z SENSING ELEMENTS |
| | | | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | | | 0 | 0 | | | | | 700-1202-001 |
| | | | | | | | | | 1 | | | | | 700-1202-012 |
| | | | | | | | | | 2 | | | | | 700-1202-014 |
| | | | | | | | | | 3 | | | | | 700-1202-018 |
| | | | | | | | | | 4 | | | | | 700-1202-041 |
| | | | | | | | | | 6 | | | | | 700-1202-031 |
| | | | | | | | | | 7 | | | | | 700-1202-010 |
| | | | | | | | | | 9 | | | | | 700-1202-033 |
| | | | | | | | | 1 | 0 | | | | | 700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 1 | | | | | 700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | | | | | 700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 3 | | | | | 700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 4 | | | | | 700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 5 | | | | | 700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 6 | | | | | 700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 7 | | | | | 700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 8 | | | | | 700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 9 | | | | | 700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 2 | 0 | | | | | 700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 3 | 1 | | | | | 700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | | | | | 700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 3 | | | | | 700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 4 | | | | | 700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 5 | | | | | 700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 5 | 0 | | | | | 700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 1 | | | | | 700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | | | | | 700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 3 | | | | | 700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 4 | | | | | 700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 5 | | | | | 700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 6 | 0 | | | | | 700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 6 | 1 | | | | | 700-0204-002 |
| | | | | | | | | 6 | 2 | | | | | 700-0204-048 |
| | | | | | | | | Z | Z | | | | | SEE SHEET 5 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS |
| | | | | | | | | | | | | | f | f = A-F, G, H, J, K, L OR Z |
| | | | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | | | A | 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | | | | B | 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | | | | C | 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | | | | D | 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | | | | E | 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | | | | F | 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | | | | G | 18"/NO CSL & 457.2mm |
| | | | | | | | | | | | | | H | 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | | | | J | 36"/NO CSL & 914.4mm |
| | | | | | | | | | | | | | K | 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | | | | L | 60"/10" & 1524mm/254mm |
| | | | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | | | 1 | 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | | | | 2 | 12"/6" & 304.8mm/152.4mm |



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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-14-09
LEP 5-18-09

CERTIFIED
PO #
ENG
USER
DE #

NO. 420-0004-175-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 7 | 11-08-114 | SGA | 3-17-09 |
| 6 | 3-08-106 | SGA | 3-10-08 |
| 5 | 5-07-111 | THP | 5-14-07 |
| 4 | 1-06-216 | THP | 2-17-06 |

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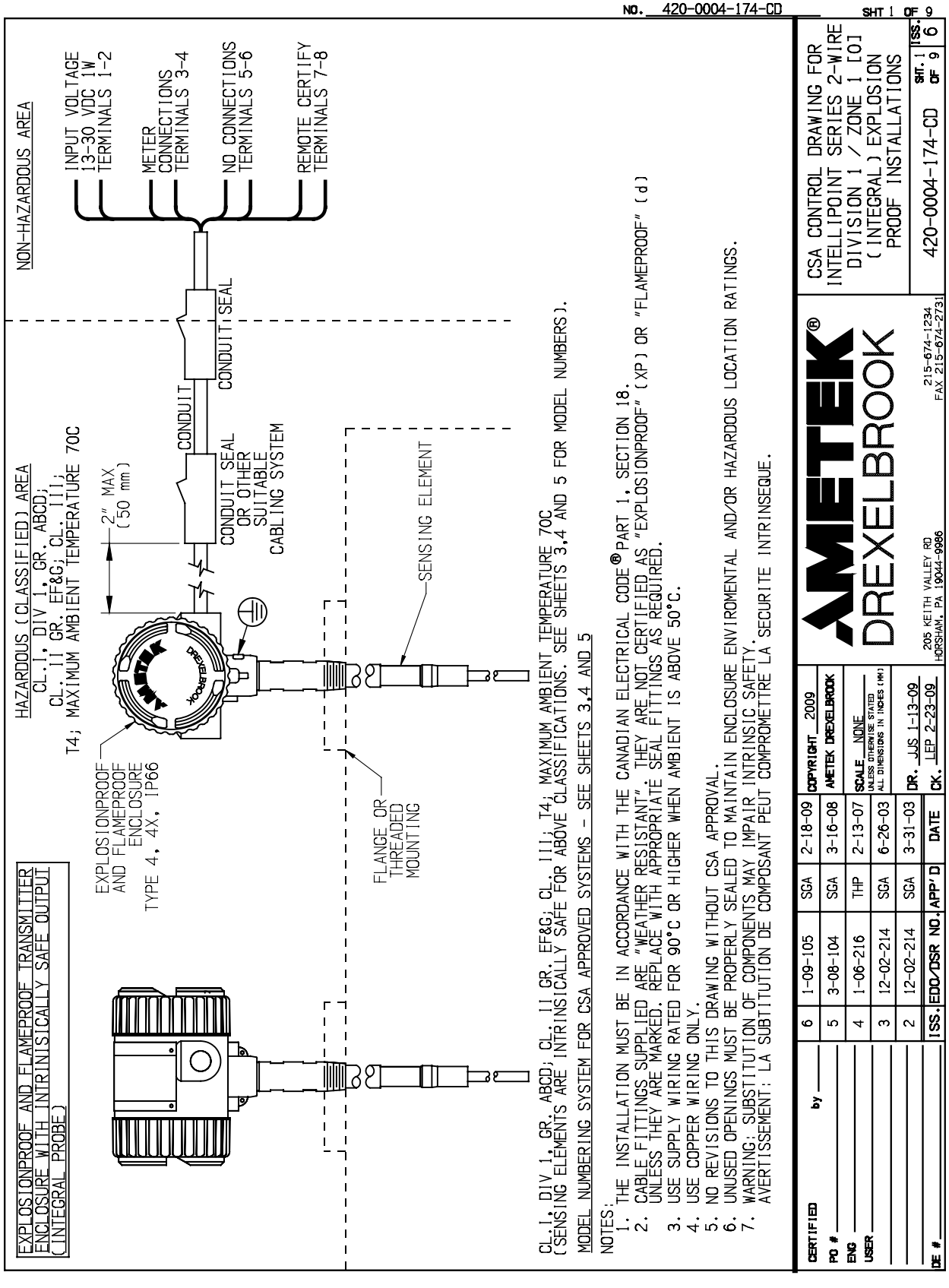
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)
SIL SYSTEMS

420-0004-175-CD

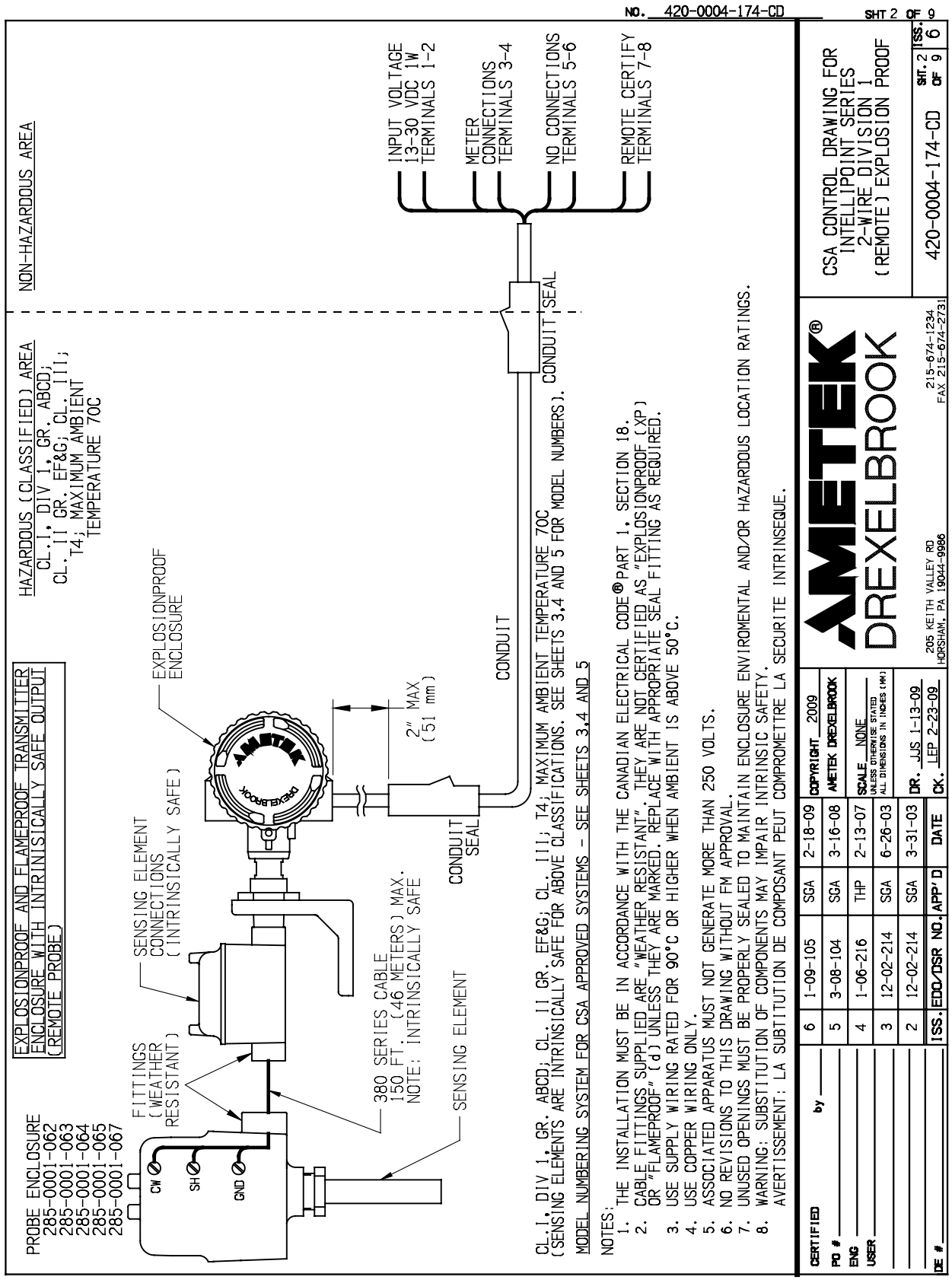
SHT. 7 OF 7 | ISS. 7

SHT 7 OF 7

## 6.3 CSA Control Drawings



## 6.3 CSA Control Drawings (Continued)



## 6.3 CSA Control Drawings (Continued)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | a | T | b | 0 | 0 | 0 | c | * | * | * | d | |
| | | | | | | | | | | | | |
| | a | | | | | | | | | | | a = OPTIONS |
| | N | | | | | | | | | | | NO CALIBRATION POINT LEVEL |
| | M | | | | | | | | | | | MANUAL SETPOINT ADJUSTMENT |
| | H | | | | | | | | | | | HI SENSITIVITY |
| | G | | | | | | | | | | | HI SENSITIVITY MANUAL SETPOINT ADJUSTMENT |
| | L | | | | | | | | | | | STANDARD AUTO CAL |
| | T | | | | | | | | | | | 10pf AUTO CAL |
| | V | | | | | | | | | | | 10pf FIXED |
| | P | | | | | | | | | | | HI SENSITIVITY .5pf FIXED |
| | | | b | | | | | | | | | b = OPTIONS ⟨6⟩ |
| | | | 4 | | | | | | | | | (STD) |
| | | | 8 | | | | | | | | | DUAL SEAL |
| | | | C | | | | | | | | | DUAL SEAL |
| | | | | | | | c | | | | | c = 0-3 |
| | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | | 0 | | | | | 700-1202-021 |
| | | | | | | | 1 | | | | | 700-1202-022 |
| | | | | | | | 2 | | | | | 700-1202-024 |
| | | | | | | | 3 | | | | | 700-1202-028 |
| | | | | | | | | * | * | * | | SEE MOUNTING CHART |
| | | | | | | | | | | | d | d = A-F, H, K, L OR Z |
| | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | A | 6″/2″ & 152.4mm/50.8mm |
| | | | | | | | | | | | B | 12″/2″ & 304.8mm/50.8mm |
| | | | | | | | | | | | C | 12″/3.5″ & 304.8mm/88.9mm |
| | | | | | | | | | | | D | 18″/2″ & 457.2mm/50.8mm |
| | | | | | | | | | | | E | 18″/3.5″ & 457.2mm/88.9mm |
| | | | | | | | | | | | F | 18″/10″ & 457.2mm/254mm |
| | | | | | | | | | | | G | 18″/NO CSL & 457.2mm/NO CSL |
| | | | | | | | | | | | H | 36″/10″ & 914.4mm/254mm |
| | | | | | | | | | | | J | 36″/NO CSL & 914.4mm/NO CSL |
| | | | | | | | | | | | K | 48″/10″ & 1219.2mm/254mm |
| | | | | | | | | | | | L | 60″/10″ & 1524mm/254mm |
| | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | 1 | 18″/6″ & 457.2mm/152.4mm |
| | | | | | | | | | | | 2 | 12″/6″ & 304.8mm/152.4mm |



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

DR. JJS 1-13-09
CK. LEP 2-23-09

CERTIFIED by
PO #
ENG
USER
DE #

NO. 420-0004-174-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 6 | 1-09-105 | SGA | 2-18-09 |
| 5 | 3-08-104 | SGA | 3-16-08 |
| 4 | 1-06-216 | THP | 2-13-07 |
| 3 | 12-02-214 | SGA | 6-26-03 |

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CSA APPROVED
INTELLIPOINT 2-WIRE
MODEL NUMBERING SYSTEM
INTEGRAL SYSTEMS

420-0004-174-CD SHT. 3 OF 9 ISS. 6

SHT 3 OF 9

## 6.3 CSA 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 | T | b | c | 4 | d | e | * | * | * | f | |
| | a | | | | | | | | | | | a = OPTIONS |
| | N | | | | | | | | | | | NO CALIBRATION |
| | M | | | | | | | | | | | MANUAL SETPOINT |
| | H | | | | | | | | | | | HI SENSITIVITY |
| | G | | | | | | | | | | | HI SENSITIVITY MANUAL SETPOINT |
| | L | | | | | | | | | | | STANDARD AUTO CAL |
| | T | | | | | | | | | | | 10pf AUTO CAL |
| | V | | | | | | | | | | | 10pf FIXED |
| | P | | | | | | | | | | | HI SENSITIVITY .5pf FIXED |
| | | | b | | | | | | | | | b = OPTIONS ⑥ |
| | | | 4 | | | | | | | | | (STD) |
| | | | 8 | | | | | | | | | DUAL SEAL |
| | | | | c | | | | | | | | c = 1-9, A-K - CABLE OPTIONS (REMOTE) |
| | | | | | | d | | | | | | d = 0-3, 5, 6, OR Z SENSING ELEMENTS |
| | | | | | | | e | | | | | e = 0-6, & 8, OR Z SENSING ELEMENTS |
| | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | 0 | 0 | | | | | 700-1202-001 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | 1 | | | | | 700-1202-012 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | 2 | | | | | 700-1202-014 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | 3 | | | | | 700-1202-018 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | 4 | | | | | 700-1202-041 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | 6 | | | | | 700-1202-031 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | 7 | | | | | 700-1202-010 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | 9 | | | | | 700-1202-033 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | 1 | 0 | | | | | 700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 1 | | | | | 700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 3 | | | | | 700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 4 | | | | | 700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 5 | | | | | 700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 6 | | | | | 700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 7 | | | | | 700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 8 | | | | | 700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 9 | | | | | 700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 2 | 0 | | | | | 700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 3 | 1 | | | | | 700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 3 | | | | | 700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 4 | | | | | 700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 5 | | | | | 700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 5 | 0 | | | | | 700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 1 | | | | | 700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 3 | | | | | 700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 4 | | | | | 700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 5 | | | | | 700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | 6 | 0 | | | | | 700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 1 | | | | | 700-0204-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | 2 | | | | | 700-0204-048 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | Z | Z | | | | | SEE SHEET 4 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS |
| | | | | | | | | | | | f | f = A-F, H, K, L OR Z |
| | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | A | 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | | B | 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | | C | 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | | D | 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | | E | 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | | F | 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | | G | 18"/NO CSL & 457.2mm/NO CSL |
| | | | | | | | | | | | H | 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | | J | 36"/NO CSL & 914.4mm/NO CSL |
| | | | | | | | | | | | K | 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | | L | 60"/10" & 1524mm/254mm |
| | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | 1 | 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | | 2 | 12"/6" & 304.8mm/152.4mm |

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 6 | 1-09-105 | SGA | 2-18-09 |
| 5 | 3-08-104 | SGA | 3-16-08 |
| 4 | 1-06-216 | THP | 2-13-07 |
| 3 | 12-02-214 | SGA | 6-26-03 |

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CK. LEP 2-23-09

CERTIFIED by
PO #
ENG
USER
DE #

CSA APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)

420-0004-174-CD SHT. 4 OF 9 ISS. 6

NO. 420-0004-174-CD SHT 4 OF 9

## 6.3 CSA Control Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-qrs-† LEVEL PROBE

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



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

DR. JJS 1-13-09
CK. LEP 2-23-09

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PO #
ENG
USER
DE #

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 6 | 1-09-105 | SGA | 2-18-09 |
| 5 | 3-08-104 | SGA | 3-16-08 |
| 4 | 1-06-216 | THP | 2-13-07 |
| 3 | 12-02-214 | SGA | 6-26-03 |

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CSA APPROVED
ADDITIONAL INTRINSICALLY
SAFE SENSING ELEMENTS
(REMOTE)

420-0004-174-CD

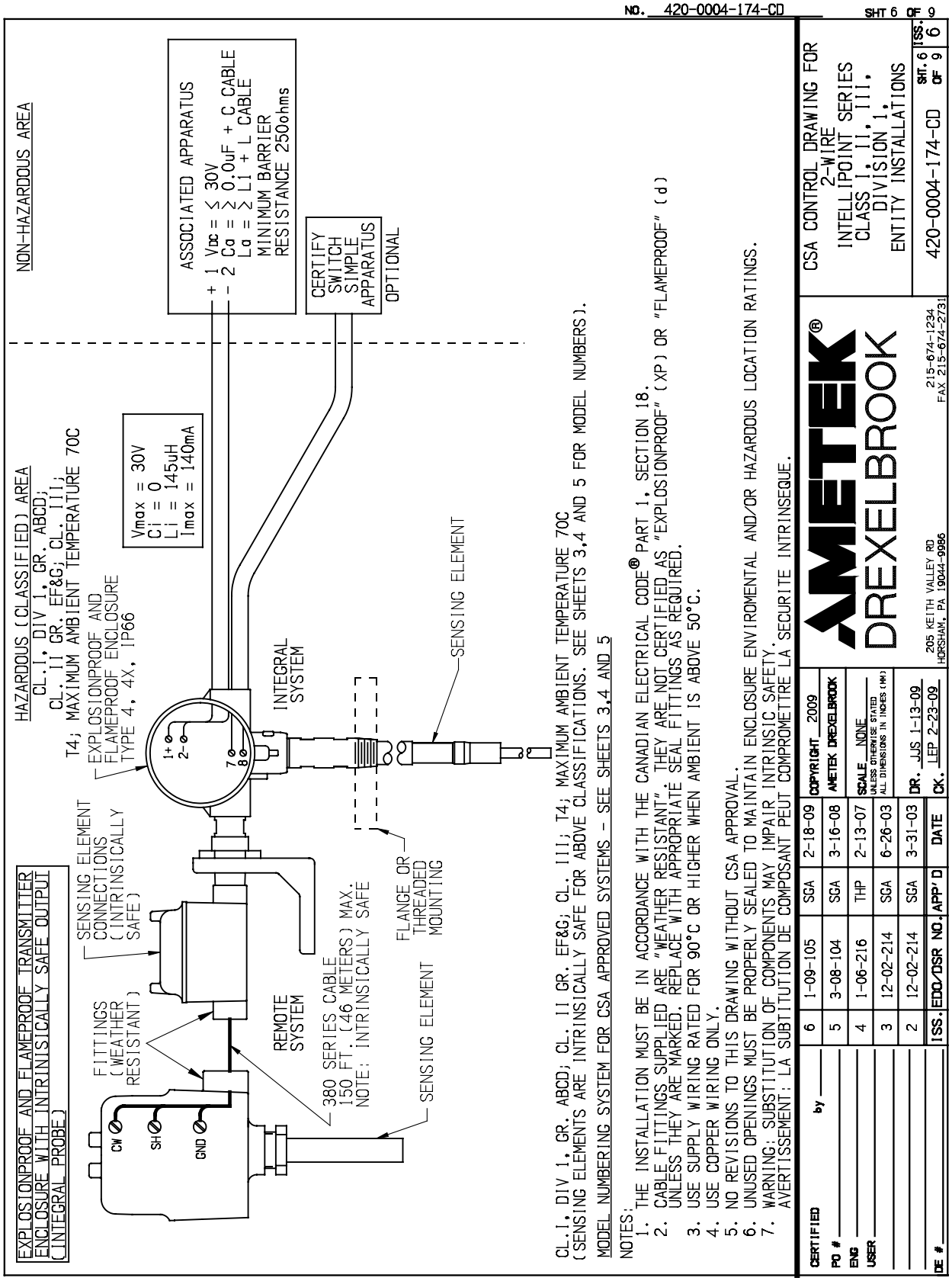
SHT. 5 OF 9

ISS. 6

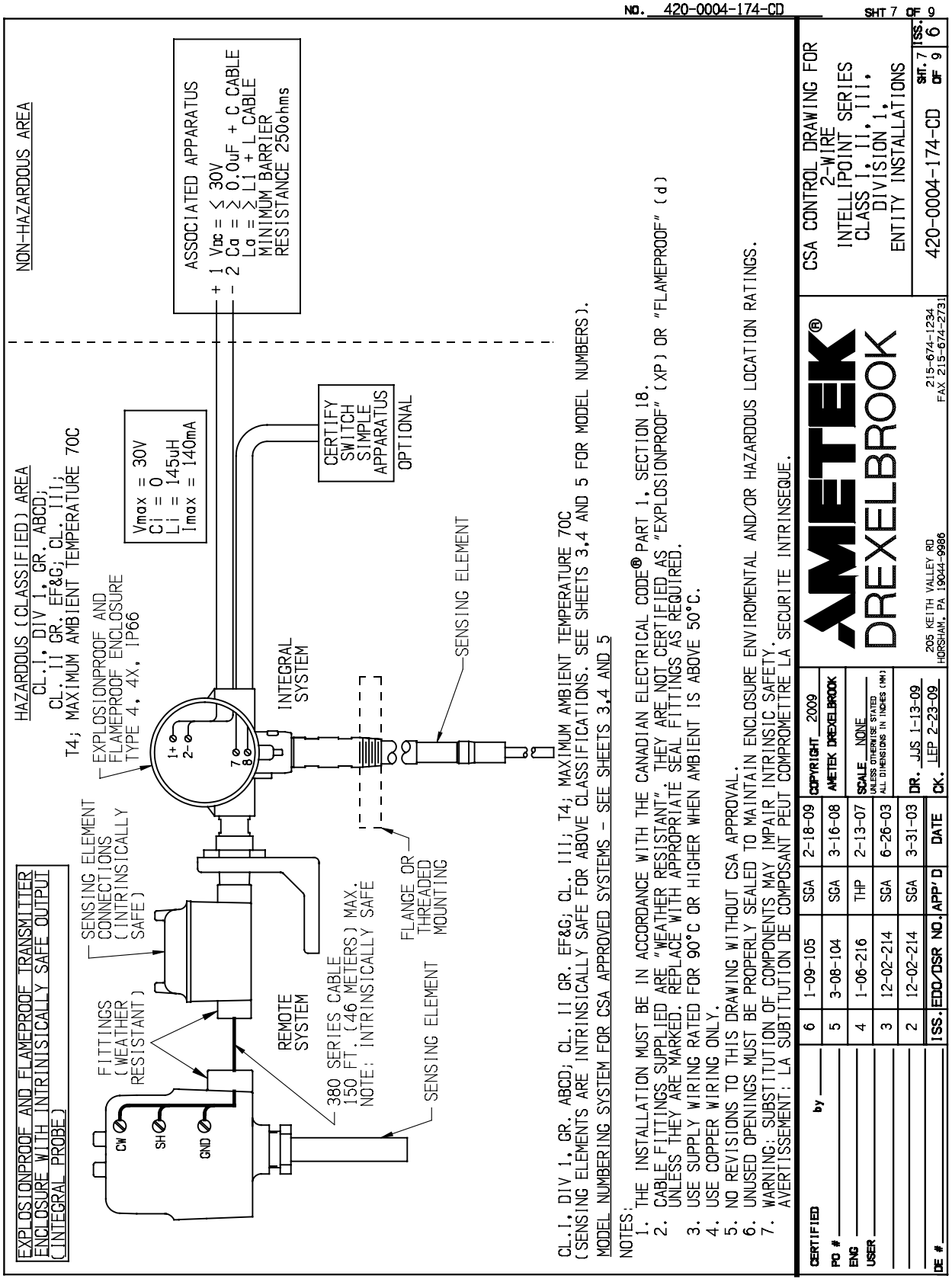
DWG. NO. 420-0004-174-CD

SHT 5 OF 9

## 6.3 CSA Control Drawings (Continued)



## 6.3 CSA Control Drawings (Continued)



## 6.3 CSA Control Drawings (Continued)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | a | R | b | T | c | 0 | 0 | 0 | d | * | * | * | e | |
| | a | | | | | | | | | | | | | a = SIL LEVEL 1 OR 2 |
| | | | b | | | | | | | | | | | b = OPTIONS |
| | | | N | | | | | | | | | | | NO CALIBRATION POINT LEVEL 2pF FIXED |
| | | | L | | | | | | | | | | | STANDARD AUTO CAL 2pF AUTO |
| | | | | | c | | | | | | | | | c = OPTIONS ⟨6⟩ |
| | | | | | 4 | | | | | | | | | (STD) |
| | | | | | 8 | | | | | | | | | DUAL SEAL |
| | | | | | C | | | | | | | | | DUAL SEAL |
| | | | | | | | | | | | | | | 3/4" NPT CSA SYSTEMS |
| | | | | | | | | | d | | | | | d = 0-3 |
| | | | | | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | | | | 0 | | | | | 700-1202-021 |
| | | | | | | | | | 1 | | | | | 700-1202-022 |
| | | | | | | | | | 2 | | | | | 700-1202-024 |
| | | | | | | | | | 3 | | | | | 700-1202-028 |
| | | | | | | | | | | * | * | * | | SEE MOUNTING CHART |
| | | | | | | | | | | | | | e | e = A-F, H, K, L OR Z |
| | | | | | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | | | | A | 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | | | | B | 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | | | | C | 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | | | | D | 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | | | | E | 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | | | | F | 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | | | | G | 18"/NO CSL & 457.2mm/NO CSL |
| | | | | | | | | | | | | | H | 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | | | | J | 36"/NO CSL & 914.4mm/NO CSL |
| | | | | | | | | | | | | | K | 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | | | | L | 60"/10" & 1524mm/254mm |
| | | | | | | | | | | | | | Z | OTHER |
| | | | | | | | | | | | | | 1 | 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | | | | 2 | 12"/6" & 304.8mm/152.4mm |



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CK. LEP 2-23-09

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PO #
ENG
USER
DE #

NO. 420-0004-174-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 6 | 1-09-105 | SGA | 2-18-09 |
| 5 | 3-08-104 | SGA | 3-16-08 |
| 4 | 1-06-216 | THP | 2-13-07 |
| 3 | 12-02-214 | SGA | 6-26-03 |

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CSA APPROVED
INTELLIPOINT 2-WIRE
MODEL NUMBERING SYSTEM
INTEGRAL SYSTEMS
SIL SYSTEM

420-0004-174-CD SHT. 8 OF 9 ISS. 6

SHT 8 OF 9

## 6.3 CSA 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 | T | c | d | 4 | e | f | * * * g |
| | a | | | | | | | | | a = SIL LEVEL 1 OR 2 |
| | | | b | | | | | | | b = OPTIONS |
| | | | N | | | | | | | NO CALIBRATION 2pF FIXED |
| | | | L | | | | | | | STANDARD AUTO CAL 2pF AUTO |
| | | | | c | | | | | | c = OPTIONS ⑥ |
| | | | | 4 | | | | | | (STD) |
| | | | | 8 | | | | | | DUAL SEAL |
| | | | | | | d | | | | d = 1-9, A-K - CABLE OPTIONS (REMOTE) |
| | | | | | | | | e | | e = 0-3, 5, 6, OR Z SENSING ELEMENTS |
| | | | | | | | | | f | f = 0-6, & 8, OR Z SENSING ELEMENTS |
| | | | | | | | | | | *SENSING ELEMENTS* |
| | | | | | | | | 0 | 0 | 700-1202-001 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | | 1 | 700-1202-012 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | | 2 | 700-1202-014 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | | 3 | 700-1202-018 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | | 4 | 700-1202-041 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | | 6 | 700-1202-031 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | | 7 | 700-1202-010 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | | 9 | 700-1202-033 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U |
| | | | | | | | | 1 | 0 | 700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 1 | 700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | 700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 3 | 700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 4 | 700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 5 | 700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 6 | 700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 7 | 700-0202-036 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 8 | 700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 9 | 700-0002-023 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 2 | 0 | 700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 3 | 1 | 700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | 700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 3 | 700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 4 | 700-0029-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 5 | 700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 5 | 0 | 700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 1 | 700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | 700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 3 | 700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 4 | 700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 5 | 700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | 6 | 0 | 700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 1 | 700-0204-002 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | | 2 | 700-0204-048 INTRINSICALLY SAFE SENSING ELEMENT |
| | | | | | | | | Z | Z | SEE SHEET 4 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS |
| | | | | | | | | | | g = A-F, H, K, L OR Z |
| | | | | | | | | | | INSERTION LENGTH/COTE SHIELD LENGTH |
| | | | | | | | | | | A 6"/2" & 152.4mm/50.8mm |
| | | | | | | | | | | B 12"/2" & 304.8mm/50.8mm |
| | | | | | | | | | | C 12"/3.5" & 304.8mm/88.9mm |
| | | | | | | | | | | D 18"/2" & 457.2mm/50.8mm |
| | | | | | | | | | | E 18"/3.5" & 457.2mm/88.9mm |
| | | | | | | | | | | F 18"/10" & 457.2mm/254mm |
| | | | | | | | | | | G 18"/NO CSL & 457.2mm/NO CSL |
| | | | | | | | | | | H 36"/10" & 914.4mm/254mm |
| | | | | | | | | | | J 36"/NO CSL & 914.4mm/NO CSL |
| | | | | | | | | | | K 48"/10" & 1219.2mm/254mm |
| | | | | | | | | | | L 60"/10" & 1524mm/254mm |
| | | | | | | | | | | Z OTHER |
| | | | | | | | | | | 1 18"/6" & 457.2mm/152.4mm |
| | | | | | | | | | | 2 12"/6" & 304.8mm/152.4mm |



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

DR. JJS 1-13-09
CK. LEP 2-23-09

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PO #
ENG
USER
DE #

NO. 420-0004-174-CD

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 6 | 1-09-105 | SGA | 2-18-09 |
| 5 | 3-08-104 | SGA | 3-16-08 |
| 4 | 1-06-216 | THP | 2-13-07 |
| 3 | 12-02-214 | SGA | 6-26-03 |

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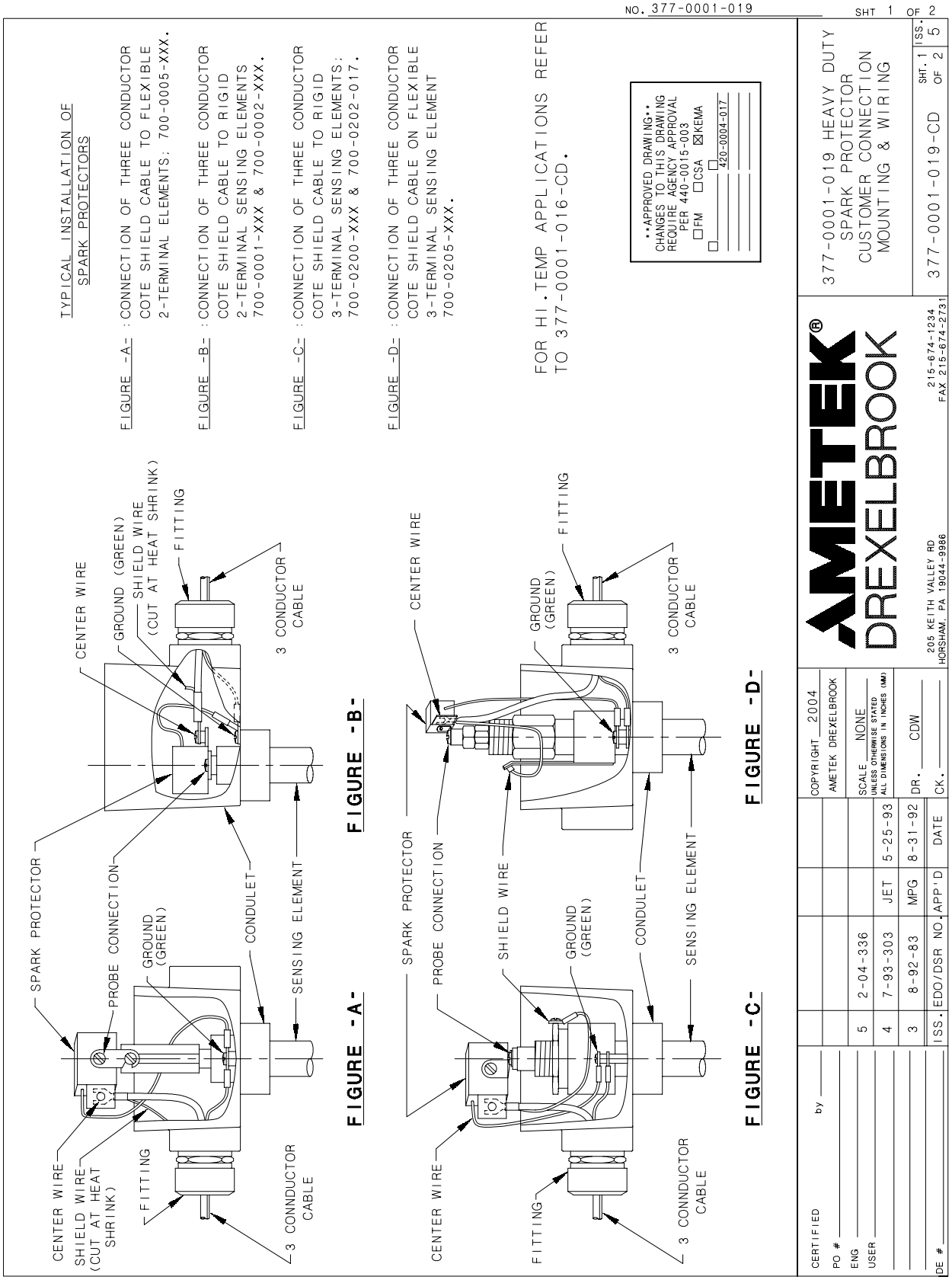
CSA APPROVED
2-WIRE INTELLIPOINT
MODEL NUMBERING SYSTEM
(REMOTE)
SIL SYSTEMS

420-0004-174-CD

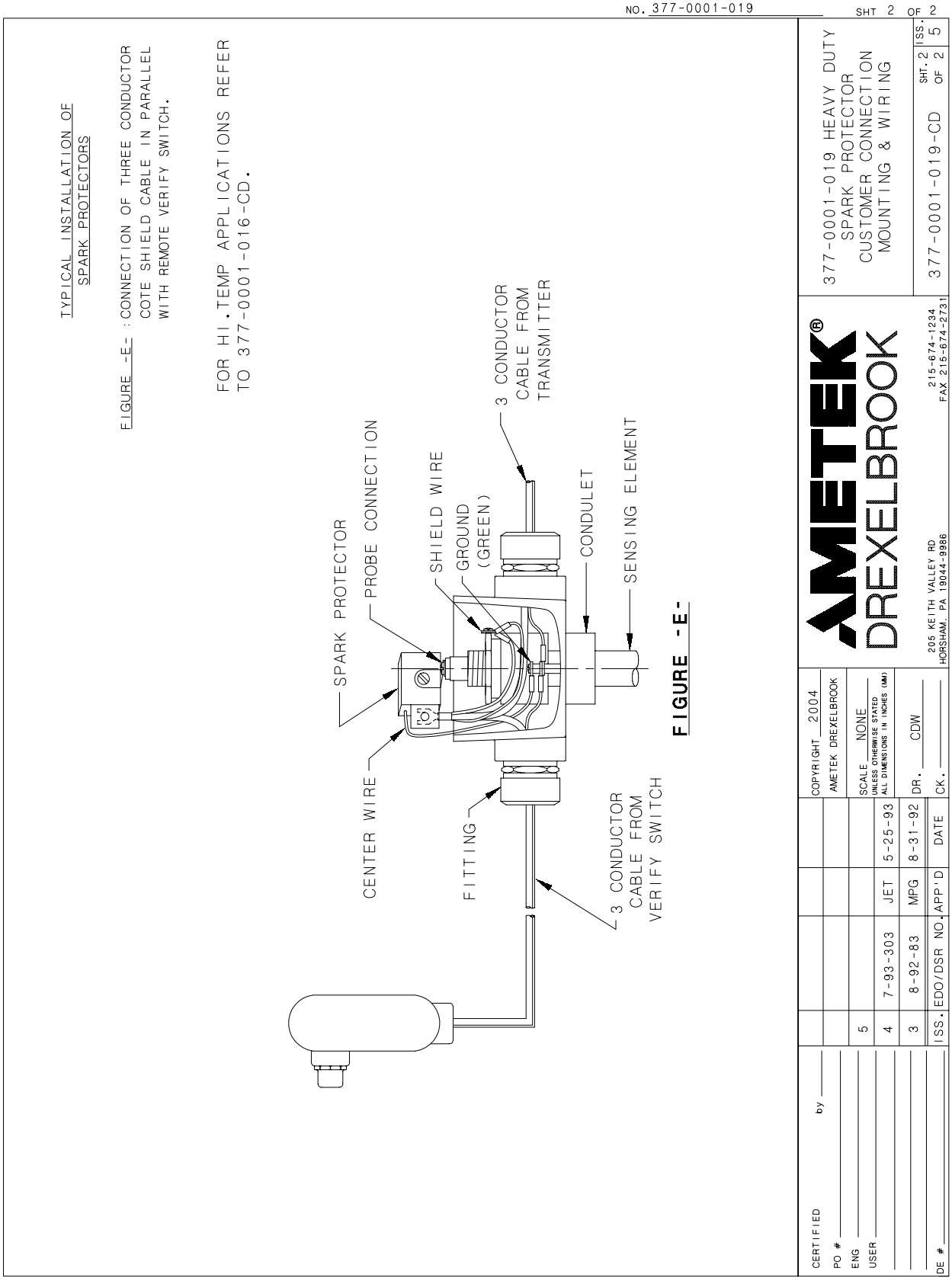
SHT. 9 OF 9 | ISS. 6

SHT 9 OF 9

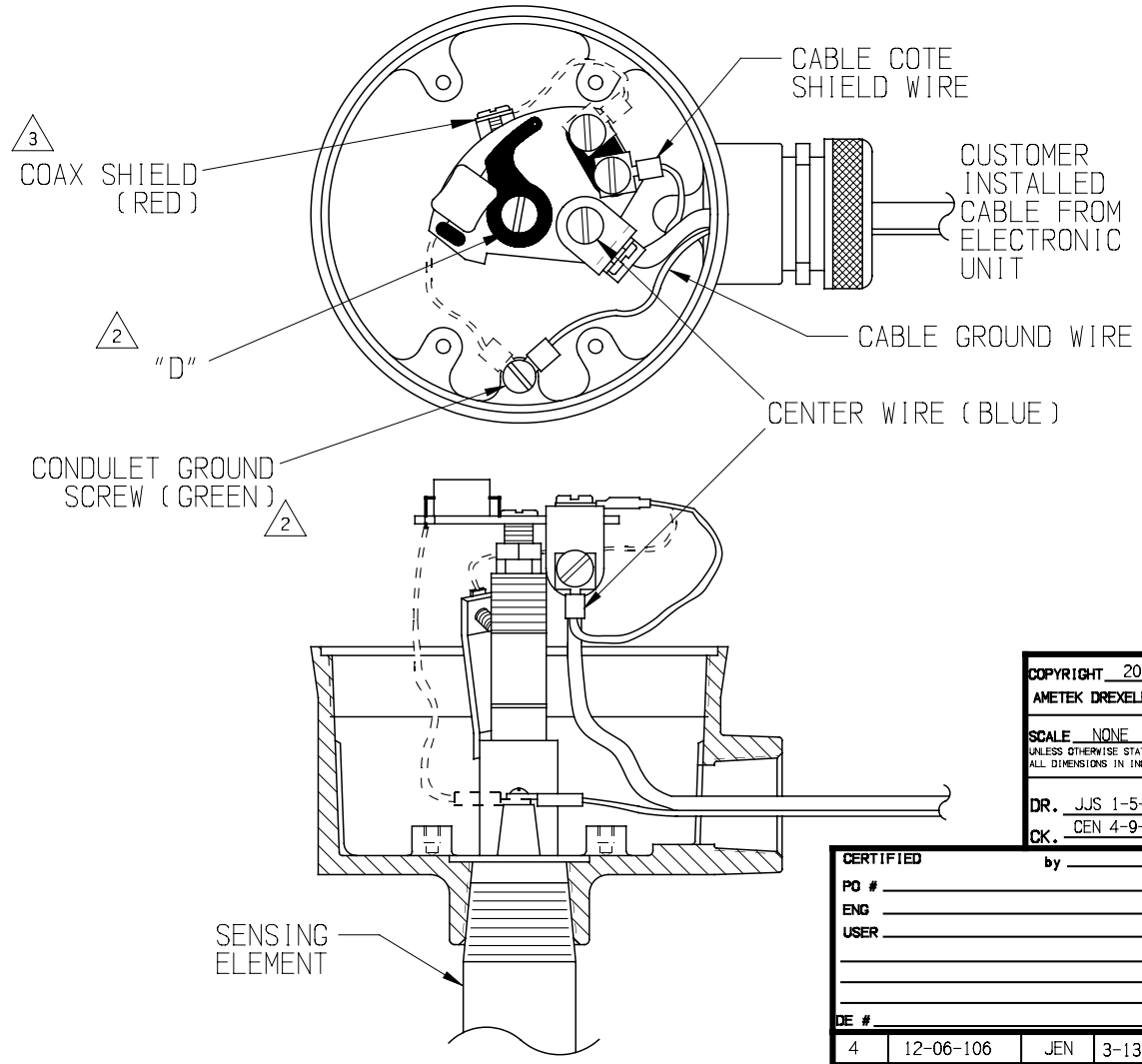
## 6.4 Mounting and Wiring for Spark Protector Drawings



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



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




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



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ALL DIMENSIONS IN INCHES (MM)

DR. JJS 1-5-07
CK. CEN 4-9-07

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PO #
ENG
USER
DE #

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

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MOUNTING AND WIRING FOR SPARK PROTECTOR
377-0001-016

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

NO. 377-0001-016-CD SHT 1 OF 1

## 6.5 Adding a Padded Capacitor

NO. 330-0009-022-CD SHT 1 OF 3

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

| ISS. | EDO/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 2 | 6-05-243 | | 7-6-05 |
| 1 | 7-01-303 | JET | 8-9-01 |

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DR. CDW
CK. JJS 7-6-05

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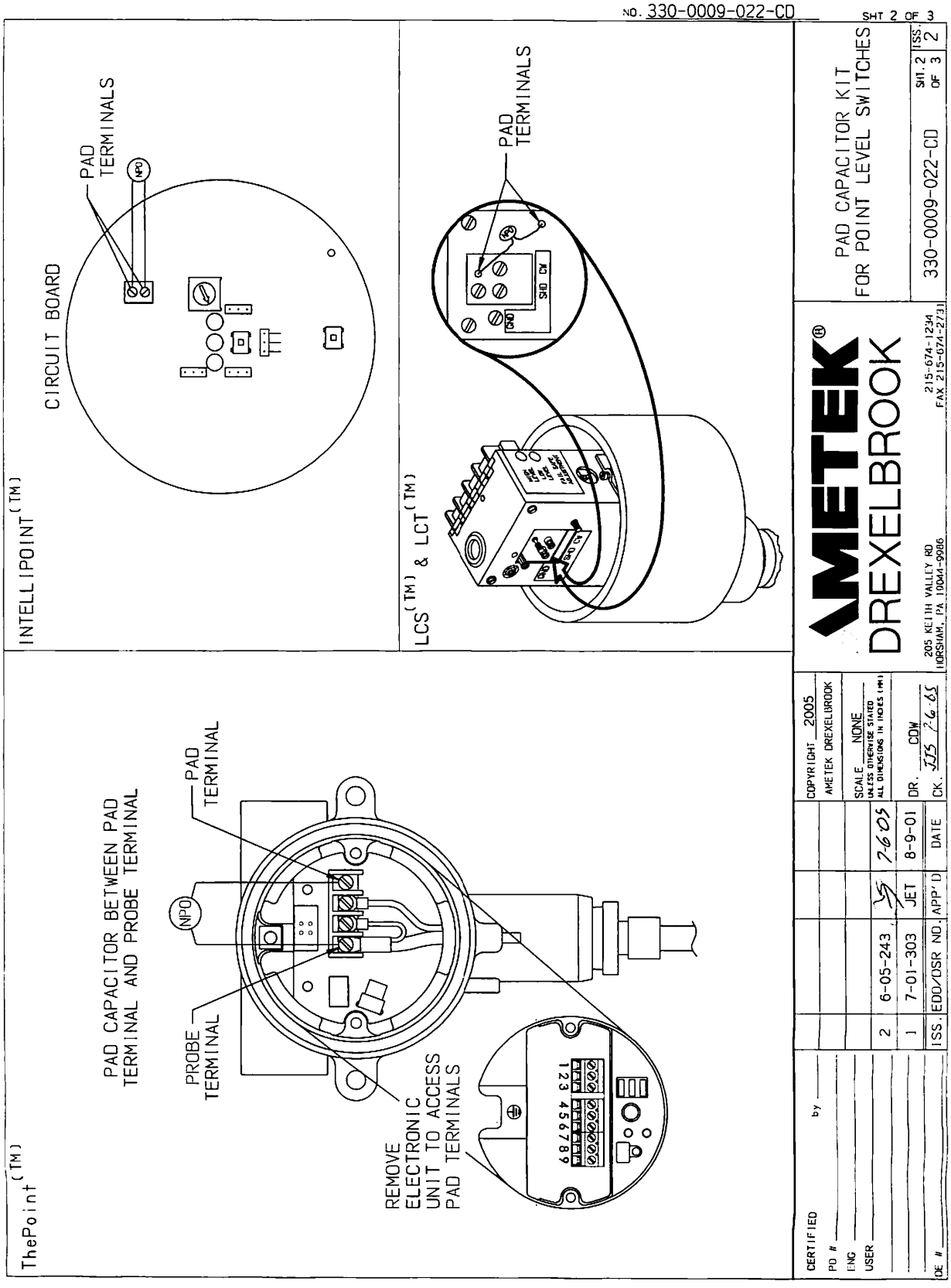
FAX 215-674-2731

PAD CAPACITOR KIT
FOR POINT LEVEL SWITCHES

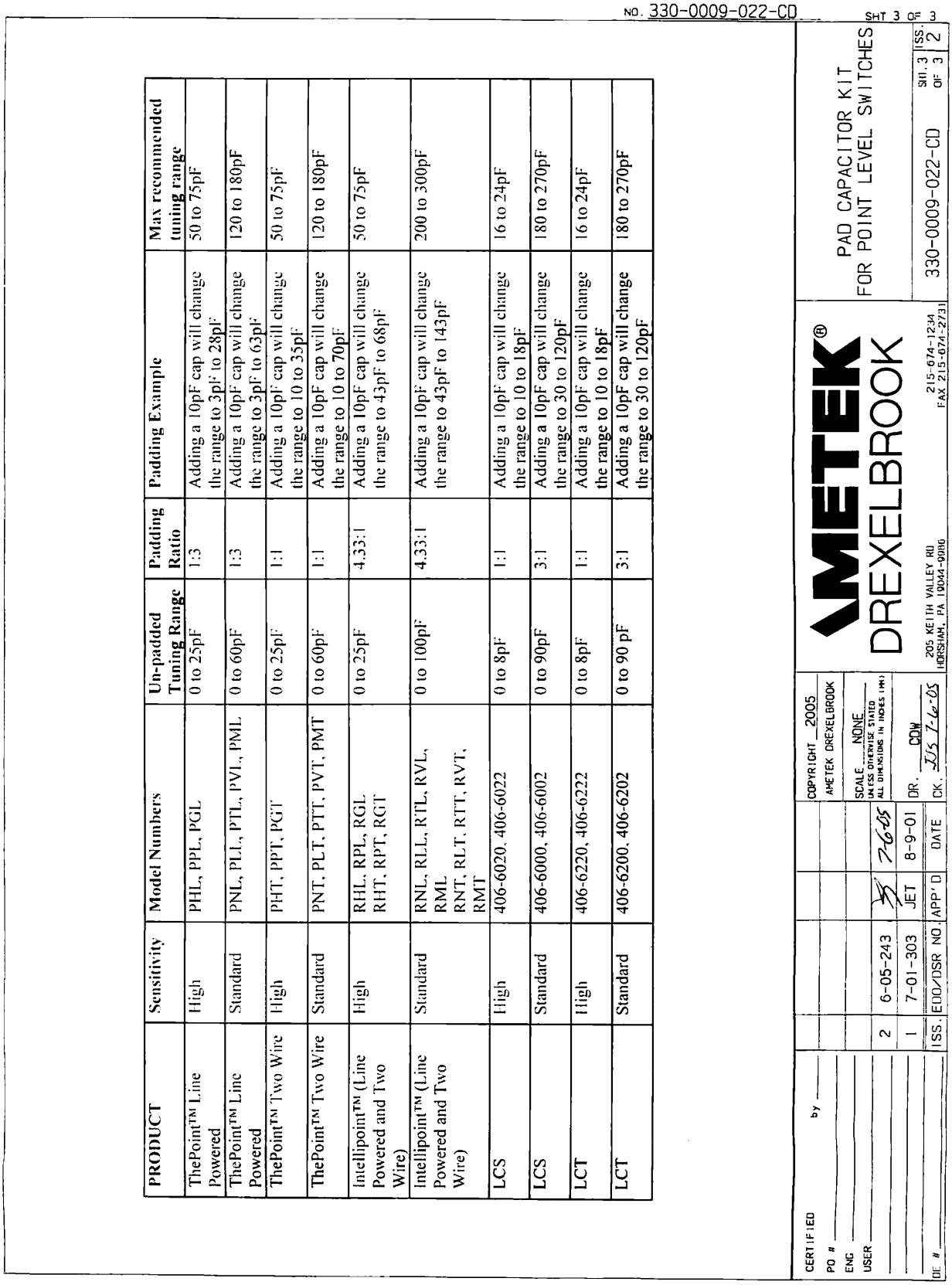
330-0009-022-CD

SHT. 1 OF 3 | ISS. 2

## 6.5 Adding a Padded Capacitor (Continued)



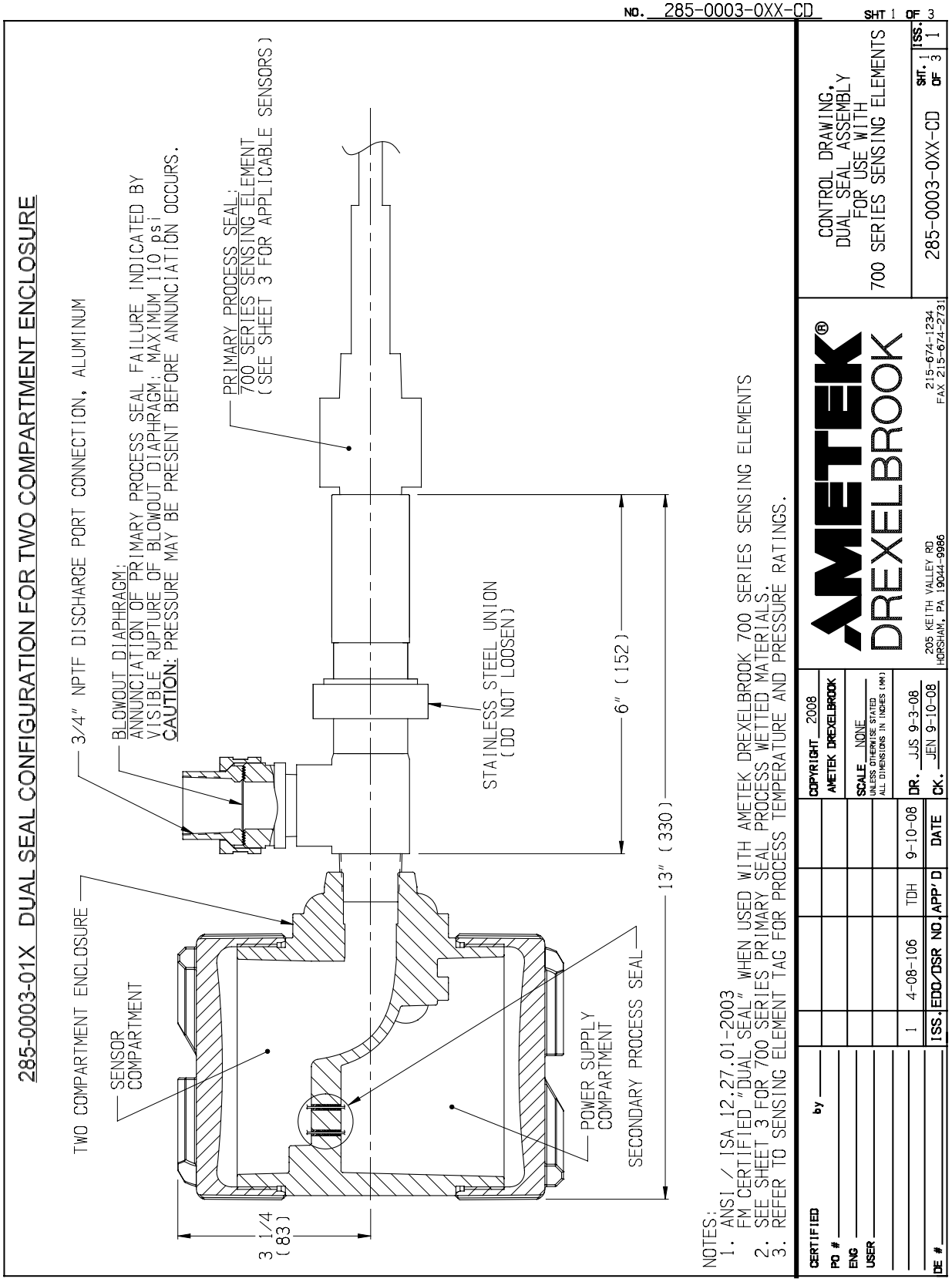
## 6.5 Adding a Padded Capacitor (Continued)



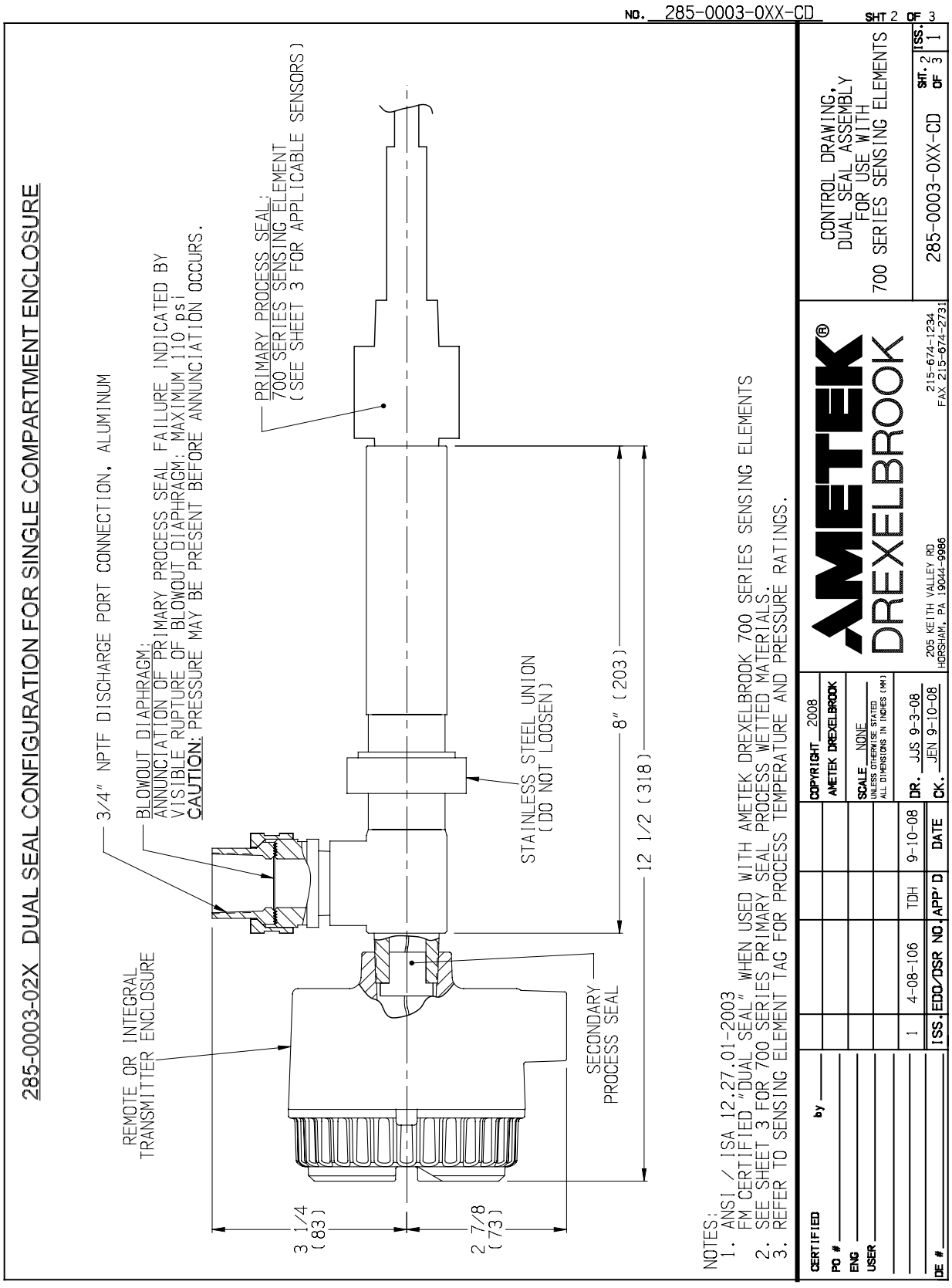
NO. 330-0009-022-CD SHT 3 OF 3

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

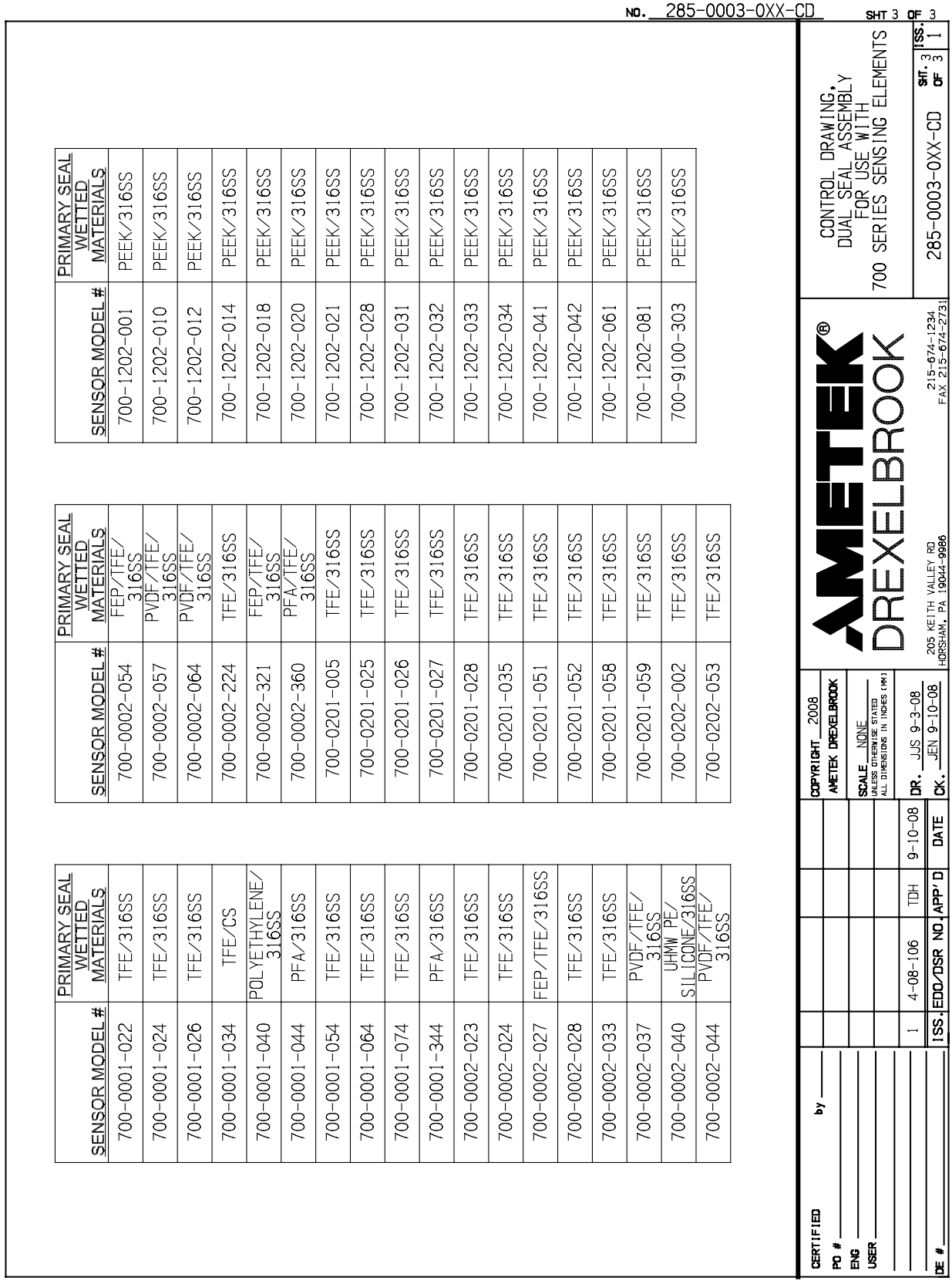
## 6.6 Dual Seal Assembly for 700 Series Sensing Elements



## 6.6 Dual Seal Assembly (Continued)



## 6.6 Dual Seal Assembly (Continued)



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 |
| 700-0201-005 | 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 |
| 700-0202-053 | TFE/316SS |

| SENSOR MODEL # | PRIMARY SEAL WETTED MATERIALS |
|---|---|
| 700-1202-001 | PEEK/316SS |
| 700-1202-010 | PEEK/316SS |
| 700-1202-012 | PEEK/316SS |
| 700-1202-014 | PEEK/316SS |
| 700-1202-018 | PEEK/316SS |
| 700-1202-020 | PEEK/316SS |
| 700-1202-021 | PEEK/316SS |
| 700-1202-028 | PEEK/316SS |
| 700-1202-031 | PEEK/316SS |
| 700-1202-032 | PEEK/316SS |
| 700-1202-033 | PEEK/316SS |
| 700-1202-034 | PEEK/316SS |
| 700-1202-041 | PEEK/316SS |
| 700-1202-042 | PEEK/316SS |
| 700-1202-061 | PEEK/316SS |
| 700-1202-081 | PEEK/316SS |
| 700-9100-303 | PEEK/316SS |

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

| ISS. | EDD/DSR NO. | APP'D | DATE |
|---|---|---|---|
| 1 | 4-08-106 | TDH | 9-10-08 |

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SCALE NONE UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)
DR. JJS 9-3-08
CK. JEN 9-10-08

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. 3 OF 3 ISS. 1

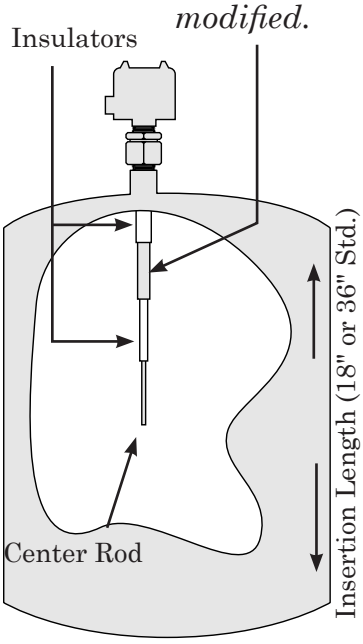
# Appendix A: Shortening or Lengthening the Sensing Element

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

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

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

**Before making any Adjustments**:
1) Read the following instructions thoroughly.
2) Remove power.
3) Disconnect the electronics.
4) Protect electronics from any static discharge.
5) Protect electronics from any heat.




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

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

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

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

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

NOTICE

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

Form 440-0001-001 3/1/2006

# TERMS AND CONDITIONS OF SALE

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

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

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

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

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

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

**WARRANTY:**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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