

## CM-3™

### Cut Monitor with HART® Communication



#### Go for the smart choice.

The Drexelbrook CM-3 transmitter is a two-wire instrument that employs the HART® protocol for communication and calibration. The unique PC interface features Realtyme-Vue™ for diagnosis and One-Shot™ calibration. Highly conductive water cannot cause a “low water”(unsafe failure) indication.

- Digital, local indication

#### Enjoy longterm stability.

No insulation on 316 S.S. sensor to blister, peel, or abrade. Measurement not affected by ambient temperature changes. All solid-state design reduces repair, recalibration and downtime.

#### Reduce maintenance and cleaning costs.

Transmitter design minimizes the effect of paraffin build-up on the sensing element. Simplifies and reduces cleaning requirements. No need to drain lines to remove or clean the sensing element. Simple mounting requirements results in a low installation cost. Full-Flo™ geometry includes the entire volume in the measurement.

#### Don't Be a Guinea-Pig

Transmitter combines the basic capacitance principles used in this application for the past 50 years, with modern RF technology that has been proven successful at major industrial facilities for over three decades. The addition of digital processing and memory allows for linear ranges of 0-30% and 0-50% water-in-oil.

### “Smart”electronics add new dimensions to Drexelbrook’s legendary Cut Monitor

The CM-3 Cut Monitor can be used to indicate the effectiveness of your well testers, freewater knockouts, heater treaters and other separation vessels with a precise digital readout of water percentage from 0 to 50%.

This information can also be used on a “LACT” unit to divert “wet ” oil for additional processing/ separation, with ranges as low as one percent.

The transmitter is factory-calibrated for each application and can be adjusted for seasonal product and temperature changes using proprietary One-Shot calibration trim. The sensing element is designed for easy installation through a tee in a vertical section of pipe, which allows for simple removal without having to drain the lines.

For higher utility and reliability at a lower installed cost, look to the CM-3 Cut Monitor for indication of the water content (or “B.S.&W.”) in crude oil or refined products.



## CM-3 Cut Monitor

### Sensing Element

#### Models

Rod-type sensors with Cote-Shield™ element, for mounting in standard pipe sizes (1,2,3,4,6, and 8-inch or larger pipes).

#### Process Temperature

60° to 300°F

#### Process Pressure

300 psig maximum

#### Process Wetted Parts

316 S.S. and TFE

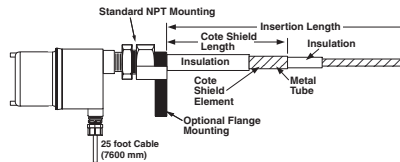
#### Measuring Cable

(Sensing element to electronic unit)  
25 feet standard 5, 10, 15, and 20 feet optional.

#### Hazard Classification

Intrinsically safe for Groups C, D,  
Div. 1 and 2.

### Standard Sensing Element



## Design Considerations

The sensing element must be mounted at an existing or created 90° bend in the pipe. It can be installed through a tee or a weld-o-let®<sup>1</sup> welded to a 90° elbow. The vertically-downward mounting attitude is preferred for ease of inspection or cleaning, since draining of the pipe is not required. Regardless, the probe will function in any attitude, as long as the pipe is completely full in the active probe area. The probe is active from its tip to the end of the Cote-Shield™ element. In the area of the Cote-Shield, it is completely inactive. The Full-Flo™ geometry assures that no fluid is excluded from the measurement.<sup>3</sup>

In all cases, the presence of gas bubbles, whether from air, petroleum vapor, steam, or natural gas, will destroy accuracy completely, producing negative readings in the worst case. One of the most common causes of gas bubbles is abrupt pressure drops in high temperature streams, which can allow water and light ends to flash.

An in-line mixer just upstream of the Cut Monitor is highly recommended for streams which go above 10% water. Accuracy is based on a uniform, oil-continuous emulsion, so any unplanned separation will cause avoidable errors.

All instruments are factory calibrated. If calibration trimming is required, it should be done with the AMETEK Drexelbrook PC software. The proprietary software allows One-Shot™ calibration trimming with one reading and sample. The Realtyme-View™ window is useful for observing transmitter function and troubleshooting.

*Note:* Consult factory for: higher pressure and temperatures; Honeywell™ protocol; or analog transmitters.

®<sup>1</sup> Registered trademark of Crouse-Hinds Corp.

®<sup>2</sup> Registered trademark of the HART® Foundation.

<sup>3</sup> Full-Flo™ is not available on 8-inch or larger pipes.

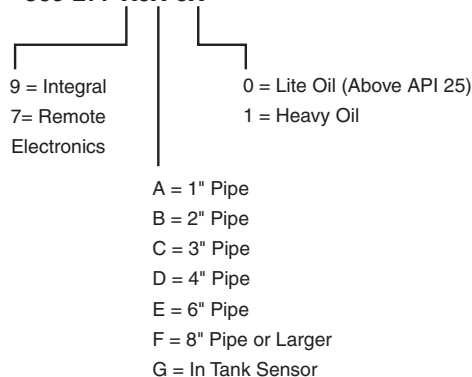
## How to Order

(For all models)

- |                                  |                                   |
|----------------------------------|-----------------------------------|
| 1. Pipe size                     | 5. Maximum pressure               |
| 2. API or specific gravity       | 6. Integral or remote electronics |
| 3. % water range                 | 7. Cable length                   |
| 4. Operating process temperature | (For remote electronics)          |

#### Model #

**509-277-X0X-0X**

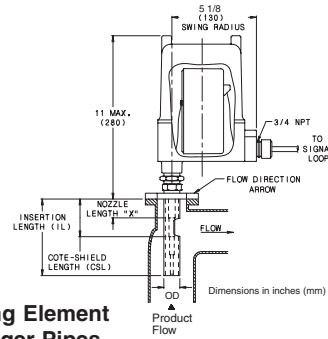


## CM-3 Cut Monitor

Schedule 40 Pipe Size	Insertion Length	Cote-Shield Length	Mounting	OD
1 inch	18.7 inches	4 inches	3/4 inch NPT	1/4 inch
2 inch	28.1 inches	6 inches	3/4 inch NPT	1/4 inch
3 inch	29 inches	10 inches	1 inch NPT	1/2 inch
4 inch	32.1 inches	10 inches	1 inch NPT	1/2 inch
6 inch	38.4 inches	12 inches	1 inch NPT	1/2 inch
8 inch <sup>2</sup> or larger	37 inches <sup>1</sup>	18 inches <sup>1</sup>	4 inch 150# flange <sup>1</sup>	1.7 inch
In-tank <sup>2</sup>	27 inches <sup>1</sup>	8 inches <sup>1</sup>	2 inch 150# flange <sup>1</sup>	1.7 inch

<sup>1</sup>Standard Dimensions (can vary)

<sup>2</sup>not Full-Flo™



**Sensing Element for Larger Pipes**

## Specifications

### Two-Wire Transmitter

**Power Requirement**  
20 to 50 Vdc (two wire)

**Output**  
4-20 mA<sub>dc</sub>

**Measurement Range**  
0-1% water, 0-5% water, 0-10% water,  
0-30% water, 0-50% water

**Ambient Temperature**  
-30° to +140° F

**Housing Seal Rating**  
Nema 4X

**Accuracy**  
± 0.1% water for 1% and 5% ranges.  
± 5% of span for 10, 30, and 50% ranges  
(at standard conditions)

**Digital Indicator (Remote electronics only)**  
3+ digit liquid crystal display; 1/2" height  
(factory calibrated for %water.)

**Step Response**  
Less than 4 sec. to 90% of final output

**Repeatability**  
± 0.5% span

**Resolution**  
0.2% span

**Hysteresis**  
0.2% span

**Ambient Temp. Error**  
±0.01% span/°F

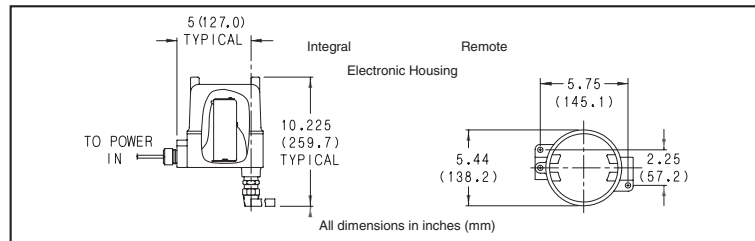
**Software**  
Version 3.1 with factory-loaded calibration

**Process Temperature Error**  
±0.02% Water/°F (uncompensated)

**Probe-to-Electronics Spacing**  
25 feet maximum cable length

**Load Regulation**  
0.1% span maximum

**Hazard Classification**  
*Sensing element:* Intrinsically safe for all hazards.  
*Electronics:* Intrinsically safe for Groups C & D (Div. 1 & 2) when supplied from an intrinsically safe power source, and explosion proof housing for Groups C & D (Div. 1&2) (Approvals worldwide)



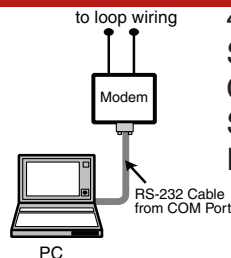
## Options and Spare Parts

- Blind, remote electronic unit.
- 409-1000-001: Spare electronic unit.
- 700-201-51: Spare probe for 1-inch pipe.
- 700-201-52: Spare probe for 2-inch pipe.
- 700-202-53: Spare probe for 3-inch pipe.
- 700-202-54: Spare probe for 4-inch pipe.
- 700-202-56: Spare probe for 6-inch pipe.
- 700-201-58: Spare probe for large pipe.
- 700-201-59 for In-tank.

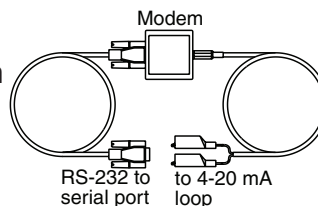
## Drexelbrook Calibration Software

Includes: modem, software, and test leads.

Requires: PC with MS Windows®  
Includes: One-Shot™ calibration and Realtyme-Vue™ for diagnosis.



## 401-700 Series Calibration Software Package



Modem/cable appearance varies with model.

## CM-3 Cut Monitor

### Model Number of Electronics

409 - 1 0 0 0 - **F** 0 **8** - 0 - - - - - Electronic Unit

**Agency Approvals**

C = CSA  
F = FM

**Housing Options**

4 = Remote Nema 4X Explosionproof and Indicating  
8 = Integral Nema 4X Explosionproof with Drexelcote  
9 = Integral Nema 4X Explosionproof

**Range and Gravity Spec**

Light Oil (>API 25)	Heavy Oil (<API 25)
A = 0-1% Water	F = 0-1% Water
B = 0-5% Water	G = 0-5% Water
C = 0-10% Water	H = 0-10% Water
D = 0-30% Water	I = 0-30% Water
E = 0-50% Water	J = 0-50% Water

**Digital Integral Meter Option**

Mounted in Dome with Viewport  
Not available with Housing Option 8  
M0037 = For remote housings

Denotes default value

U.S.A. Sales: 800-553-9092 • 24-Hour Service: 800-527-6297 • International Support: 215-674-1234 • Fax: 215-674-2731

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