Long term stability of stated accuracy using DC magnetic field technology

Absolute Zero point stability

Integrally mounted microprocessor signal converter

Two line liquid crystal display with background illumination

Display flow in % or engineering units and totalization in engineering units

Communications using HART® protocol, or serial interface RS-232C / RS-485

Flow rate measurement is independent of viscosity, density, and temperature

Obstructionless; no additional pressure loss when the meter tube and pipe are the same diameter.

After manual data input of density, flow rate and totalization can be displayed in mass units (lbs, ton, etc.)
**Series 3000**

**Magnetic Flowmeter**

**COPA-X™ (Sizes 1/2” to 12”)**

All liquids, even those containing solids, with a minimum electrical conductivity of 5μS/cm can be measured accurately with the COPA-X™ magnetic flowmeter.

The basis of the measurement is Faraday's law of induction. A conductive fluid flows through an insulated pipe and intersects a magnetic field. A voltage is induced within the fluid that is proportional to the average flow velocity and is measured by electrodes mounted on each side of the pipe. The induced voltage is processed by the signal converter to produce analog and digital output signals linearly proportional to the actual flow.

The 10DX3311 utilizes an integrally mounted 50XM1000 Converter. For remote mounted converter applications, see 10DX3111 specifications.

### Engineering Specifications

**Minimum Liquid Conductivity:** 5 μS/cm

**Pressure Limits:**
- All liners:
  - @ 104°F (40°C)
  - 740 psi (5.1 MPa)
  - (Limited by flange rating)

**Vacuum Limits:**
- Teflon® and Tefzel® Liners:
  - 1/2” to 4” - Full Vacuum to 266°F (130°C)
  - 6” to 12” - 3.0 psia @ 68°F (20°C)
  - 5.8 psia @ 212°F (100°C)
  - 6.7 psia @ 266°F (130°C)
- Neoprene, Polyurethane, Rubber:
  - Full Vacuum to 190°F (88°C)

### System Accuracy

![Figure 1. System Accuracy](image)

**Optional Accuracies:** For higher accuracies than those in Figure 1, consult factory for details.

**Meter Capacity Table:** Full scale (20 mA) can be set to any value between the minimum and maximum values shown in Table 1.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>METER CAPACITY</th>
<th>MINIMUM RANGE</th>
<th>MAXIMUM RANGE</th>
</tr>
</thead>
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<tr>
<td>in.</td>
<td>gpm L/min</td>
<td>gpm L/min</td>
<td>gpm L/min</td>
</tr>
<tr>
<td>1/2</td>
<td>26.4</td>
<td>0.53</td>
<td>26.4</td>
</tr>
<tr>
<td>1</td>
<td>52.8</td>
<td>1.06</td>
<td>52.8</td>
</tr>
<tr>
<td>1.5</td>
<td>158.5</td>
<td>3.17</td>
<td>158</td>
</tr>
<tr>
<td>2</td>
<td>264.1</td>
<td>5.28</td>
<td>264</td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>4</td>
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<td>1056</td>
</tr>
<tr>
<td>6</td>
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<tr>
<td>12</td>
<td>10,567</td>
<td>212</td>
<td>10567</td>
</tr>
</tbody>
</table>

*Meter Capacity = Volumetric flowrate @ 32.81 ft/sec.*

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**HART™** is a registered trademark of Haynes International, Inc.

**TEFLO®** is a registered trademark of E.I. DuPont de Nemours & Co.

**TEFZEL®** is a registered trademark of E.I. DuPont de Nemours & Co.

**HASTELLOY®** is a registered trademark of Haynes International, Inc.
**Temperature Limits:**
- **Process:** -15°F (-26°C) to 266°F (130°C) for TEFLO® & TEFZEL®
- -15°F (-26°C) to 190°F (88°C) for Polyurethane & Neoprene

- **Ambient:** -15°F (-26°C) to 131°F (55°C) for all liners.

Any combination of process and ambient temperature adding up to 262°F (110°C) will require remote electronics; use Model 10DX3111E.

**Temperature Effect:** 0.15% of range setting for 18°F (10°C) temperature change within ambient limits.

**Display:** Back lit liquid crystal, 5x7 dot matrix display with two lines of 16 alphanumeric characters per line. Flow rate and total can be displayed in several user defined configurations.

**Power Consumption:** ≤ 23 VA

**Power Requirements:**
- 100/110/115/120/200/220/230/240 Vac + 10%-15%, 50/60 Hz ±6% is standard. 24 Vdc ±30% is optional.
- For other power requirements, consult the factory.

**Data Entry:** Input of configuration data is by means of three push buttons.

**Configuration Language:** Configuration data can be displayed in English, Spanish and others upon request.

**Configuration Protection:** Software and/or hardware protection to restrict unauthorized adjustments of configuration data.

**Bi-directional Flow:** Indication and totalization in both forward and reverse direction. Flow direction for analog output is indicated by contact closure. The active pulse output option provides an output for each flow direction.

**Output Signal:** Analog current of 4-20 mA dc, 0-20 mA dc, configurable into 0-750 ohms load resistance.

Isolation: Inputs and outputs are fully isolated.

Optional Pulse Output: Pulse widths for the active and passive pulse output is configurable from 0.1 ms to 2000 ms. Scale factors and from 0.001 to 1000 pulses per selected units.

- Active pulse is 24 Vdc ≥150 ohm load.
- Passive pulse is Opto coupled: Rated for <25 Vdc, <7.5 mA dc.

Standard pulse output is active 24 Vdc. When both pulse output and serial interface options are selected, the pulse must be passive.

**Contact Output:** Opto coupled: <25 Vdc, < 7.5 mA (N/A for bi-directional flow)

**Damping:** 1 to 99 seconds software configurable

**Optional Serial Interface for Remote Communications:**
- RS-232 @ 110 to 9600 Baud up to 45 ft. (15m).
- Number of Nodes: 1 instrument
- RS-485 @ 110 to 28.8k Baud up to 4000 ft (1219m).
- Number of Nodes: 32 instruments

**Optional HART® Interface:** 1200 bits/s (transmitting/receiving) using frequency shift key (FSK) as defined by Bell 202 Standard, 5000 ft. (1500m) limit.

**Low Flow Cut-off:** 0 to 10% of range software configurable.

**Response Time:** 0.5 second minimum.

**Alarm Mode:** Current output can be configured to go low (0%) or high (130%) when alarm condition is detected. Alarm contact opens to provide external indication of failure.

**Zero Return:** Provides constant zero output signal during conditions when false flow signals are possible. Activated by external non-powered contact.

**Remote Totalizer Reset:** Resets both forward and reverse totalizers from a remote location. Zero return feature is not available when remote totalizer reset option is selected. Activated by external non-powered contact.

**Enclosure Classification:**
- **Standard:** Accidental Submergence in water to 33 feet (10m) for 48 hours; IEC529/IP67 and IP65 NEMA 4X

**Certification:**
- **Standard:** FM Approved CII, Div. 2, Groups A, B, C, & D with intrinsically safety electrodes.
Vibration Limit: Maximum 1.5g (10-150 Hz)

Radio Frequency Interface Susceptibility (RFI):
Equivalent to SAMA Class 2 - abc - 0.1% (10 V/m - 20 to 1000 MHz).

Connections:
Process Flanges: ANSI Class 150 or 300.
Electrical Connections: 1/2" NPT

Materials of Construction

Meter Spool (pipe): 304 Stainless Steel

Flanges: Carbon Steel or 304 Stainless Steel

Liners: TEFLON® PTFE & TEFZEL®: Available in sizes 1/2" to 12". Neoprene or Polyurethane: Available in sizes 2" to 12".


Housing & Customer Connection Box:
Epoxy Coated Cast Aluminum

Liner Protectors & Grounding Rings:
316 / 304 Stainless Steel or Hastelloy®C

Approximate Shipping Weights

<table>
<thead>
<tr>
<th>Meter Size</th>
<th>ANSI Class 150</th>
<th>ANSI Class 300</th>
</tr>
</thead>
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<tr>
<td>in.</td>
<td>lbs</td>
<td>kg</td>
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<tr>
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<td>12</td>
<td>5.5</td>
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<td>12</td>
<td>300</td>
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## Model Number Designation for the 10DX3311

<table>
<thead>
<tr>
<th>Model</th>
<th>1 0 D X 3 3 1 1</th>
</tr>
</thead>
</table>

### Design Level

- 1/2" to 12" Size ....................................... E

### Meter Lay Length

- Standard Short Form .................................. D
- Match for 10D1419 or 10D1465 F-F ................ E

### Liner

- Polyurethane ........................................... D
- PTFE Teflon® ........................................... E
- Neoprene ............................................... L
- Tefzel® (Sizes 1/2" - 1 1/2" Must Select D in Character 10) ...... N

### Size

- 1/2" (15mm) Teflon or Tefzel only .................... 07
- 1" (25mm) Teflon or Tefzel only ....................... 09
- 1-1/2" (40mm) Teflon or Tefzel only ................ 11
- 2" (50mm) ................................................ 12
- 3" (80mm) .............................................. 14
- 4" (100mm) .............................................. 15
- 6" (150mm) .............................................. 17
- 8" (200mm) .............................................. 18
- 10" (250mm) ............................................ 19
- 12" (300mm) ............................................ 20

### Flange Standard and Pressure Rating

- ANSI Class 150 ........................................... P
- ANSI Class 300 ......................................... Q

### Flange Material

- Carbon Steel ........................................... 1
- 304 Stainless Steel ................................... 2

### Protector Plate (Teflon liners only)

- None Required ........................................... A
- 316 Stainless Steel ................................... B
- Hastelloy C ............................................. E

### Electrode Design

- Flush ..................................................... 2
- Bullet Nose ............................................. 3
- Slurry Service - with Hastelloy C Electrodes (Polyurethane or Neoprene liners only) ................................................. 7
Model Number Designation for the 10DX3311

Model: 10D X 3311 E

Electrode Material
- 316 Stainless Steel: B
- Hastelloy C: D
- Titanium: E
- Tantalum (Teflon or Tefzel only): F
- Platinum/Iridium (Teflon or Tefzel only): H

Certification
- FM Approved - Nonincendive for Cl I, Div. 2, Groups A, B, C, & D w/intrinsically safe electrodes: K

Enclosure Classification
- IEC 529 IP 65/67, Accidental Submergence:
- NEMA 4X (33 ft of water for 48 hrs): 2

Fluid Temperature Range
- Standard: 1

Coil Frequency
- 6-1/4 HZ / 50 HZ Line Frequency: 1
- 12-1/2 Hz / 50 Hz Line Frequency: 2
- 7-1/2 HZ / 60 HZ Line Frequency - Standard: 3
- 15 Hz / 60 Hz: 4
- 12-1/2 Hz (DC): 6
- 15 Hz (DC): 8

Customer Information Language
- English w/Riveted SS Tag: 2

Software Level
- English w/Riveted SS Tag: 2

Pulse Output/Data Link
- None/None: 0
- Active Scaled Pulse Fwd & Rev: 1
- None/RS-485 Port (not available with HART): 4
- None/RS-232 Port (not available with HART): 5

Measuring Mode
- Continuous flow measurement: A

Optional Terminals
- None: A
- External Zero Return: F
- External Totalizer Reset: G

Accessories
- None: A
- HART Protocol (not available with RS232 or RS485): C

Power Supply
- 230/240 Vac, 50/60 HZ: A
- 110/115/120 Vac, 50/60 HZ: C
- 24 VDC: H

Converter
- Required: 1
- Not Required (Primary only): 2
OUTLINE DIMENSIONS

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</tr>
</tbody>
</table>

NOTES:
1) All dimensions are in inches. Dimensions in bracket [ ] are in millimeters (mm).
2) Dimensions are guaranteed only if this print is certified.
3) This drawing is third angle projection as shown.
4) Flange bolts straddle centerlines.
5) Flow must be in same direction as flow arrow.
6) Meter must be completely filled with liquid to insure accuracy.
7) All dimensions subject to manufacturing tolerances of +/- 1/8 (3).
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