Municipal Water & Waste Instrument Catalog

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The following chapter contains Product Specifications of the Instruments:

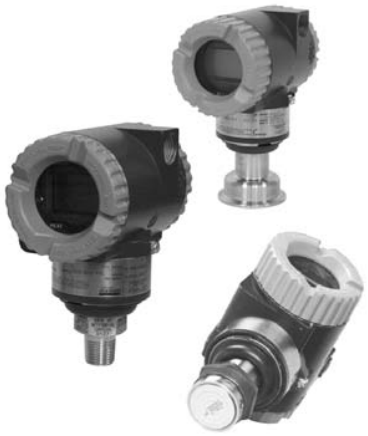
IAP10 Absolute Pressure Transmitters — Direct Mount

IGP10 Gauge Pressure transmitters — Direct Mount

IGP20 Gauge Pressure transmitters — Bracket Mount

IDP10 Differential Pressure

IAP10 I/A Series® Intelligent Absolute Pressure Transmitters



- Choice of Mounting Styles
  - ✔ *IAP10 for compact light weight and direct-to-process mounting (bracket optionally available)*
- Rugged & Dependable
  - ✔ *Field-proven silicon strain gauge technology*
  - ✔ *Corrosion-resistant epoxy finish*
- Superior Performance
  - ✔ *Accuracy to ±0.05% of span*
  - ✔ *Ambient temperature effects to ±(0.03% URL+0.06%) span per 28°C (50°F)*
- Choice of Electronics Modules
  - ✔ *Intelligent HART, Foundation Fieldbus, Profibus, FoxCom, and 4-20 mA versions*
  - ✔ *Economical 4-20 mA and 1 to 5 Vdc versions*
- LCD Indicator/Pushbutton Configurator
  - ✔ *Optional on Foundation Fieldbus, Profibus, FoxCom/ 4-20 mA, and HART/4-20 versions; Standard on 4-20 mA and 1 to 5 Vdc versions*

Functional Specifications

Sensor Temperature Limits:
DC200: -46 & +121°C (-50° + 250°F)
FC77: -29 & +85°C (-20 & +185°F)

Ambient Temperature Limits:
DC200: -40 +85°C (-40 & +185°F)
FC77: -29 & +85°C (-20 & +185°F)

Electrical Classification: Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.

This transmitter measures absolute pressure and transmits a 4-20 mA, 1 to 5 Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C13 A, B, C, D, E, J, K, and L.

Output signal and configuration:

Version	Output Choices	Configure From
-D	✔ FoxCom Digital ✔ FoxCom/4 to 20 mA	✔ I/A Series Workstation ✔ Hand-Held Terminal ✔ Personal Computer ✔ Optional Pushbuttons
-T	✔ Hart/ 4 to 20mA	✔ HART Communicator ✔ Workstation ✔ Personal Computer
-F	✔ Foundation Fieldbus	✔ Workstation
-P	✔ Profibus	✔ Workstation
-A,	✔ 4 to 20mA	✔ Standard Pushbuttons
-V	✔ 1-5 Vdc	✔ Standard Pushbuttons

Span, range and overrange limits:
Direct Connected Absolute Press. IAP10

Span Limits Code	Span Limits		
C	0.007 & 0.21 MPa	1 & 30 psi	0.07 & 2.1 bar or kg/cm^2
D	0.07 & 2.1 MPa	10 & 300 psi	0.70 & 21 bar or kg/cm^2
E	0.70 & 21 MPa	100 & 3000 psi	7.0 & 210 bar or kg/cm^2

Range Limits (absolute)			
C	0 & 0.21 MPa	0 & 30 psi	0 & 2.1 bar or kg/cm^2
D	0 & 2.1 MPa	0 & 300 psi	0 & 21 bar orkg/cm^2
E	0 & 21 MPa	0 & 3000 psi	0 & 210 bar or kg/cm^2

Maximum Overrange (absolute)			
C	0.31 MPa	45 psi	3.15 bar or kg/cm^2
D	3.1 MPa	450 psi	31.5 bar orkg/cm^2
E	31 MPa	4500 psi	315 bar or kg/cm^2

Performance Specifications

Accuracy (Includes Linearity, Hysteresis, and Repeatability):

Version	Output	Signal Accuracy in % of Calib. Span
-D or T	Digital	±0.05
	4 to 20 mA	±0.075
-F or -P	Digital	±0.05
-A	4 to 20 mA	±0.20
-V	1 to 5 Vdc	±0.10
Refer to PSS's for accuracies at small spans (less than 10% of URL).		

Physical Specifications

Material Combinations and Value Package: Refer to "How to Order" for material versions available. For exceptional value and corrosion resistance, the standard material combination with the lowest price is 316L ss Process Connection with 316L ss Sensor.

Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC77), as specified.

Enclosure Classification: Meets IEC IP66 & NEMA Type 4X.

How to Order — Specify model number IAP10

Electronic Versions and Output Signals

4-20 mA/FoxCom . . . . . D
4 to 20 mA/HART . . . . . T
Foundation Fieldbus . . . . . F
Profibus . . . . . P
4 to 20 mA . . . . . A
1 to 5 V dc V

Structure Code — Select from one of the following eight groups:

1. Transmitter Only (no seals)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	Co-Ni-Cr	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.20
316L ss	Co-Ni-Cr	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.21
316L ss	316L ss	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.22
316L ss	316L ss	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.23
316L ss	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.30
316L ss	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.31
Hastelloy C	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.32
Hastelloy C	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.33

2. Flameproof Transmitter Only (no seals)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	316L ss	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.52
316L ss	316L ss	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.53
316L ss	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.60
316L ss	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.61
Hastelloy C	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.62
Hastelloy C	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.63

3. Transmitter with Sanitary Connection(1)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	316L ss	NEOBEE M-20	1.5 in Tri-Clamp	.TA
316L ss	316L ss	NEOBEE M-20	2.0 in Tri-Clamp	.T2
316L ss	316L ss	NEOBEE M-20	3.0 in Tri-Clamp	.T3
316L ss	Hastelloy C276	NEOBEE M-20	1.5 in Tri-Clamp	.TB
316L ss	Hastelloy C276	NEOBEE M-20	2.0 in Tri-Clamp	.T4
316L ss	Hastelloy C276	NEOBEE M-20	3.0 in Tri-Clamp	.T5
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Type, 1½ in extension	.M1
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Type, 6 in extension	.M6
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Type, 9 in extension	.M9
316L ss	316L ss	NEOBEE M-20	1 in Threaded Spud Type	.PX
316L ss	316L ss	NEOBEE M-20	1.5 in Threaded Spud Type	.PZ

4. Transmitter with Pulp & Paper Connection(1)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	316L ss	Silicone	Sleeve Type, 1 inch nominal	.PA
316L ss	316L ss	Silicone	Threaded Type, 1 inch nominal	.PB
316L ss	316L ss	Silicone	Sleeve Type, 1½ inch nominal	.PC
316L ss	316L ss	Silicone	Threaded Type, 1½ inch nominal	.PD
316L ss	Hastelloy C276	Silicone	Sleeve Type, 1 inch nominal	.PE
316L ss	Hastelloy C276	Silicone	Threaded Type, 1 inch nominal	.PF
316L ss	Hastelloy C276	Silicone	Sleeve Type, 1½ inch nominal	.PG
316L ss	Hastelloy C276	Silicone	Threaded Type, 1½ inch nominal	.PH
316L ss	Hastelloy C276	Silicone	Threaded Type, 1½ inch nominal (fits Ametek spud)	.PJ

5. Transmitter Prepared for Foxboro Model Coded Seals(2)

Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor(3) D1
Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor(3) S3

6. Transmitters Prepared for non-Foxboro Seals

Transmitter Prepared for Remote Seal; Silicone Fill in Sensor . . . .SC
Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor . . . .SD

7. Flameproof Transmitter Prepared for Foxboro Model Coded Seals(2)

Flameproof Transmitter Prepared for Direct Connect Seal; Silicone Fill in Sensor(3) D5
Flameproof Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor(4) S5

8. Flameproof Transmitter Prepared for non-Foxboro Seals

Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor . . . .SH
Flameproof Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor . . . .SJ

Span Limits

MPa	psi	bar or kg/cm^2	
0.007 and 0.21	1 and 30	0.07 and 2.1	.C
0.07 and 2.1	10 and 300	0.70 and 21	.D
0.7 and 21	100 and 3000	7.0 and 210	.E

Conduit Connection and Housing Material

½ NPT Conduit Connections, Aluminum Housing 1
PG 13.5 Conduit Connections, Aluminum Housing 2
½ NPT Conduit Connections, 316 ss Housing 3
PG 13.5 Conduit Connections, 316 ss Housing 4
M20 Conduit Connection, Both Sides, Aluminum Housing 5
M20 Conduit Connection, Both Sides, 316 ss Housing 6

Electrical Safety (See PSS for Description and Restrictions)

ATEX II GD, EEx ia IIC, or II 1/2 GD, EEx ib IIC . . . .E
ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1 . . . .D
ATEX II 3 GD, EEx nL IIC . . . .N
ATEX Multiple Certifications (E and N) . . . .M
ATEX Multiple Certifications (E, D, and N) . . . .P
CSA Certified C
CSA Certified (including Flameproof Zones) . . . .B
FM Approved . . . .F
FM Approved (including Flameproof Zones) . . . .G
SAA Certified Flameproof . . . .A
SAA Certified Intrinsically Safe . . . .H
SAA Certified Nonincendive . . . .K

Optional Selections

Mounting Bracket Set — Specify Only One

Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 1 and 3) . . . .-M1
Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 1 and 3) . . . .-M2
Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 2 and 4) . . . .-M3
Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 2 and 4) . . . .-M4
Painted Steel Bracket with Plated Steel Bolts for use withM20 (for Conduit Connection Codes 5 & 6) . . . .-M5
Stainless Steel Bracket with Stainless Steel Bolts for use with M20 (for Conduit Connection Codes 5 and 6) . . . .-M6

Digital Indicator with Pushbuttons — Specify Only One

- Digital Indicator, Pushbuttons, and Window Cover for IAP10-D, -T, -P, and -F only[5] . . . -L1
- Blind (solid) cover over the std. LCD on -A, or -V . . . -L2

Conduit Thread Adapters — Specify Only One

- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 . . . -A1
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 . . . -A2
- M20 Connector for use with Conduit Connection Codes 1 & 3 . . . -A3
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 . . . -A4

Vent Screw and Block & Bleed Valve — Specify Only One

- Vent screw in process connection . . . -V1
- Block and Bleed Valve -carbon steel . . . -V2
- Block and Bleed Valve -316 ss . . . -V3
- Block and Bleed Valve -316 ss body w/Monel trim . . . -V4

Electronic Housing Features

- External Zero Adjustment . . . -Z1
- Custody Transfer Lock and Seal . . . -Z2
- External Zero Adjustment and Custody Transfer Lock & Seal . . . -Z3

Factory Configuration—Specify Only One

- Digital Output (FoxCom only) . . . -C1
- Full Factory Configuration (Requires configuration form) . . . -C2

Instruction Book Options

- Without Instruction Book & CD . . . -K1

Cleaning and Preparation

- Unit Degreased — for Silicone Filled Sensors Only
  - Not for Oxygen/Chlorine Service, Option -V1, or Pressure Seals . . . -X1
- Cleaned and Prepared for Oxygen Service — for Fluorinert Filled Sensors Only
  - Not with Option -V1, or Pressure Seals . . . -X2

Cleaned and Prepared for Chlorine Service — with Structure Code 33 or 63 Only

- Not with Option -V1, or Pressure Seals . . . -X3

Miscellaneous Optional Selections

- G ½ B Manometer Process Connection . . . -G
- R ½ Process Connection (½ NPT to R ½ Adapter) . . . -R
- Five Year Warranty . . . -W
- Supplemental Customer Tag . . . -T
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter . . . -J

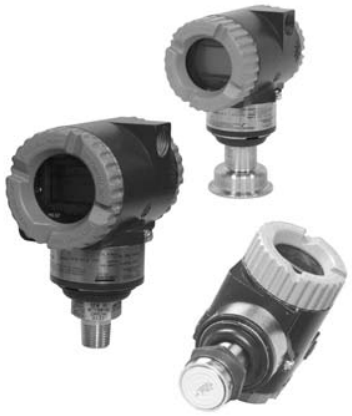
Specify calibrated range

Specify information for instrument tag

Notes

1 Refer to Section "Pressure Seals and Industry-Specific Connections" for additional information.
2 Both transmitter and pressure seal model codes are required.
3 Direct Connect Seal models that may be specified are PSTAD, PSFAD, and PSISD.
5 Remote Mount Seal models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR and PSSSR.
4 Standard equipment on IAP10, -A, and -V.

IGP10 I/A Series® Intelligent Gauge Pressure Transmitters



This transmitter measures gauge pressure and transmits a 4-20 mA, 1 to 5 Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C13 A, B, C, D, E, F, K, and L.

- Choice of Mounting Styles
  - *IAP10 for compact light weight and direct-to-process mounting (bracket optionally available)*
- Rugged & Dependable
  - *Field-proven silicon strain gauge technology*
  - *Corrosion-resistant epoxy finish*
- Superior Performance
  - *Accuracy to ±0.05% of span*
  - *Ambient temperature effects to ±(0.03% URL+0.06%) span per 28°C (50°F)*
- Choice of Electronics Modules
  - *Intelligent HART, Foundation Fieldbus, Profibus, FoxCom, and 4-20 mA versions*
  - *Economical 4-20 mA and 1 to 5 Vdc versions*
- LCD Indicator/Pushbutton Configurator
  - *Optional on Foundation Fieldbus, Profibus, FoxCom/ 4-20 mA, and HART/4-20 versions; Standard on 4-20 mA and 1 to 5 Vdc versions*

Functional Specifications

Sensor Temperature Limits:
DC200: -46 & +121°C (-50° + 250°F)
FC77: -29 & +85°C (-20 & +185°F)

Ambient Temperature Limits:
DC200: -40 +85°C (-40 & +185°F)
FC77: -29 & +85°C (-20 & +185°F)

Electrical Classification: Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.

Output Signal and Configuration:

Version	Output Choices	Configure From
-D	✔ FoxCom Digital ✔ FoxCom/4 to 20 mA	✔ I/A Series Workstation ✔ Hand-Held Terminal ✔ Personal Computer ✔ Optional Pushbuttons
-T	✔ Hart/ 4 to 20mA	✔ HART Communicator ✔ Workstation ✔ Personal Computer
-F	✔ Foundation Fieldbus	✔ Workstation
-P	✔ Profibus	✔ Workstation
-A,	✔ 4 to 20mA	✔ Standard Pushbuttons
-V	✔ 1-5 Vdc	✔ Standard Pushbuttons

Span, Range and Overrange Limits:

Span Limits Code	Span Limits		
B	0.87 & 50 kPa	3.5 & 200 in H_2O	8.7 & 500 mbar
C	0.007 & 0.21 MPa	1 & 30 psi	0.07 & 2.1 bar or kg/cm^2
D	0.07 & 2.1 MPa	10 & 300 psi	0.70 & 21 bar or kg/cm^2
E	0.70 & 21 MPa	100 & 3000 psi	7.0 & 210 bar or kg/cm^2
F	14 & 42 MPa	2000 & 6000 psi	140 & 420 bar or kg/cm^2
K	17 & 52	2500 & 7500 psi	175 & 525 bar or kg/cm^2
G	35 & 105	5000 & 15000 psi	350 & 1050 bar or kg/cm^2
H	70 & 210	10000 & 30000 psi	700 & 2100 bar or kg/cm^2

	Range Limits		
C	0 & 0.21 MPa	0 & 30 psi	0 & 2.1 bar or kg/cm^2
D	0 & 2.1 MPa	0 & 300 psi	0 & 21 bar orkg/cm^2
E	0 & 210 MPa	0 & 3000 psi	0 & 210 bar or kg/cm^2
F	0 & 42 MPa	0 & 6000 psi	0 & 420 bar or kg/cm^2
K	0 & 52 MPa	0 & 7500 psi	0 & 525 bar or kg/cm^2
G	0 & 105 MPa	0 & 15000 psi	0 & 1050 bar or kg/cm^2
H	0 & 210 MPa	0 & 30000 psi	0 & 2100 bar or kg/cm^2

	Maximum Overrange		
C	0.31 MPa	45 psi	3.15 bar or kg/cm^2
D	3.1 MPa	450 psi	31.5 bar orkg/cm^2
E	31 MPa	4500 psi	315 bar or kg/cm^2
F	63 MPa	9000 psi	630 bar or kg/cm^2
K	79 MPa	11250 psi	775 bar or kg/cm^2
G	137 MPa	19500 psi	1365 bar or kg/cm^2
H	231 MPa	33000 psi	2310 bar or kg/cm^2

Note: Span Limit Code B only available with Sanitary and Pulp and Paper Structures.

Performance Specifications

Accuracy (Includes Linearity, Hysteresis, and Repeatability)[3]:

Version	Output	Signal Accuracy in % of Calib. Span
-D or -T	Digital	±0.05
	4 to 20 mA	±0.075
-F or -P	Digital	±0.05
-A	4 to 20 mA	±0.20
-V	1 to 5 Vdc	±0.10

3 Refer to PSS's for accuracies at small spans (less than 10% of URL) and Span Codes K, G, and H.

Physical Specifications

Material Combinations and Value Package: Refer to "How to Order" for material versions available. For exceptional value and corrosion resistance, standard material combination with the lowest price is 316 ss Process Connection and 316L ss or Sensor.

Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC77), as specified.

Enclosure Classification: Meets IEC IP66 & NEMA Type 4X.

How to Order — Specify Model IGP10

Electronics Versions and Output Signal

4-20 mA/FoxCom . . . . . D
4 to 20 mA/HART . . . . . T
Foundation Fieldbus . . . . . F
Profibus . . . . . P
4 to 20 mA . . . . . A
1 to 5 V dc V

Structure Code — Select from one of the following eight groups:

1. Transmitter Only (no seals)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	Co-Ni-C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.20
316L ss	Co-Ni-Cr	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.21
316L ss	316L ss	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.22
316L ss	316L ss	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.23
316L ss	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.30
316L ss	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.31
Hastelloy C	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.32
Hastelloy C	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.33
15-5 ss	15-5 ss	None	¼ NPT, Internal (available with Span Limit Code G & K only)	.24
Inconel X-750	Inconel X-750	None	¼ NPT, Internal (available with Span Limit Code G & K only)	.26
13-8 Mo ss	13-8 Mo ss	None	Autoclave F-250-C (c) Available with Span Limit Code H only)	.28

2. Flameproof Transmitter Only (no seals)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	316L ss	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.52
316L ss	316L ss	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.53
316L ss	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.60
316L ss	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.61
Hastelloy C	Hastelloy C	Silicone	½ NPT External Thread, ¼ NPT Internal Thread	.62
Hastelloy C	Hastelloy C	Fluorinert	½ NPT External Thread, ¼ NPT Internal Thread	.63

3. Transmitter with Sanitary Connection(1)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	316L ss	NEOBEE M-20	1.5-in Tri-Clamp	.TA
316L ss	316L ss	NEOBEE M-20	2.0-in Tri-Clamp	.T2
316L ss	316L ss	NEOBEE M-20	3.0-in Tri-Clamp	.T3
316L ss	Hastelloy C276	NEOBEE M-20	1.5-in Tri-Clamp	.TB
316L ss	Hastelloy C276	NEOBEE M-20	2.0-in Tri-Clamp	.T4
316L ss	Hastelloy C276	NEOBEE M-20	3.0-in Tri-Clamp	.T5
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Type, 1½ in extension	.M1
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Type, 6-in extension	.M6
316L ss	316L ss	NEOBEE M-20	Mini Tank Spud Type, 9-in extension	.M9
316L ss	316L ss	NEOBEE M-20	1-in Threaded Spud Type	.PX
316L ss	316L ss	NEOBEE M-20	1.5-in Threaded Spud Type	.PZ

4. Transmitter with Pulp & Paper Connection(1)

Process Connection	Sensor	Sensor Fill Fluid	Connection Type	
316L ss	316L ss	Silicone	Sleeve Type, 1 inch nominal	.PA
316L ss	316L ss	Silicone	Threaded Type, 1 inch nominal	.PB
316L ss	316L ss	Silicone	Sleeve Type, 1½ inch nominal	.PC
316L ss	316L ss	Silicone	Threaded Type, 1½ inch nominal	.PD
316L ss	Hastelloy C276	Silicone	Sleeve Type, 1 inch nominal	.PE
316L ss	Hastelloy C276	Silicone	Threaded Type, 1 inch nominal	.PF
316L ss	Hastelloy C276	Silicone	Sleeve Type, 1½ inch nominal	.PG
316L ss	Hastelloy C276	Silicone	Threaded Type, 1½ inch nominal	.PH
316L ss	Hastelloy C276	Silicone	Threaded Type, 1½ inch nominal (fits Ametek spud)	.PJ

5. Transmitter Prepared for Foxboro Model Coded Seals(2)

Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor(3) D1
Transmitter Prepared for Foxboro Direct Connect Seal; Fluorinert Fill in Sensor(3) D2
Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor(4) S3
Transmitter Prepared for Foxboro Remote Mount Seal; Fluorinert Fill in Sensor(4) S4

6. Transmitters Prepared for non-Foxboro Seals

Transmitter Prepared for Remote Seal; Silicone Fill in Sensor . . . .SC
Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor . . . .SD

7. Flameproof Transmitter Prepared for Foxboro Model Coded Seals(2)

Flameproof Transmitter Prepared for Direct Connect Seal; Silicone Fill in Sensor(3) D5
Flameproof Transmitter Prepared for Direct Connect Seal; Fluorinert Fill in Sensor(3) D6
Flameproof Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor(4) S5
Flameproof Transmitter Prepared for Remote Mount Seal; Fluorinert Fill in Sensor(4) S6

8. Flameproof Transmitter Prepared for non-Foxboro Seals

Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor . . . .SH
Flameproof Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor . . . .SJ

Span Limits

KPa	inH_2O	mbar	
0.87 and 50	3.5 and 200	8.7 and 500 (available with Sanitary and Pulp & Paper Stucture Codes)	.B
Mpa	**psi**	**bar or kg/cm²**	
0.007 and 0.21	1 and 30	0.07 and 2.1	.C
0.07 and 2.1	10 and 300	0.7 and 21	.D
0.7 and 21	100 and 3000	7 and 210	.E
14 and 42	2000 and 6000	140 and 420	.F
17 and 52	2500 and 7500	175 and 525 (available with Structure Codes 24 and 26 only)	.K
35 and 105	5000 and 15 000	350 and 1050 (available with Structure Codes 24 and 26 only)	.G
70 and 210	10 000 and 30 000	700 and 2100 (available with Structure Code 28 only)	.H

Conduit Connection and Housing Material

1/2 NPT Conduit Connections, Aluminum Housing 1
PG 13.5 Conduit Connections, Aluminum Housing 2
1/2 NPT Conduit Connections, 316 ss Housing 3
PG 13.5 Conduit Connections, 316 ss Housing 4
M20 Conduit Connection, Both Sides, Aluminum Housing 5
M20 Conduit Connection, Both Sides, 316 ss Housing 6

Electrical Safety (See PSS for Description and Restrictions)

ATEX II GD, EEx ia IIC, or II ½ GD, EEx ib IIC . . . .E
ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1 . . . .D
ATEX II 3 GD, EEx nL IIC . . . .N
ATEX Multiple Certifications (E and N) . . . .M
ATEX Multiple Certifications (E, D, and N) . . . .P
CSA Certified C
CSA Certified (including Flameproof Zones) . . . .B
FM Approved . . . .F
FM Approved (including Flameproof Zones) . . . .G

SAA Certified Flameproof . . . . . .A
SAA Certified Intrinsically Safe . . . . . .H
SAA Certified Nonincendive . . . . . .K

Optional Selections

Mounting Bracket Set—Specify Only One

Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 1 and 3) . . . . . -M1
Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 1 and 3) . . . . . -M2
Painted Steel Bracket with Plated Steel Bolts (for Conduit Connection Codes 2 and 4) . . . . . -M3
Stainless Steel Bracket with Stainless Steel Bolts (for Conduit Connection Codes 2 and 4) . . . . . -M4
Painted Steel Bracket with Plated Steel Bolts for use with M20 (for Conduit Connection Codes 5 & 6) . . . . . -M5
Stainless Steel Bracket with Stainless Steel Bolts for use with M20 (for Conduit Connection Codes 5 and 6) . . . . . -M6

Digital Indicator with Pushbuttons—Specify Only One

Digital Indicator, Pushbuttons, and Window Cover for IGP10-D, -T, -P, and -F only[5] . . . . . -L1
Blind (solid) cover over the std. LCD on -A or -V . . . . . -L2

Conduit Thread Adapters — Specify Only One

Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 . . . . . -A1
Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 . . . . . -A2
M20 Connector for use with Conduit Connection Codes 1 & 3 . . . . . -A3
Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 . . . . . -A4

Vent Screw and Block & Bleed Valve — Specify Only One

Vent screw in process connection . . . . . -V1
Block and Bleed Valve—carbon steel . . . . . -V2
Block and Bleed Valve—316 ss . . . . . -V3
Block and Bleed Valve—316 ss body w/Monel trim . . . . . -V4

Electronic Housing Features — Specify Only One

External Zero Adjustment . . . . . -Z1
Custody Transfer Lock & Seal . . . . . -Z2
External Zero Adjustment and Custody Transfer Lock & Seal . . . . . -Z3

Factory Configuration — Specify Only One

Digital Output (FoxCom only) . . . . . -C1
Full Factory Configuration (Requires configuration form) . . . . . -C2

Instruction Book Options

Without Instruction Book & CD . . . . . -K1

Process Connection

G ½ Form B, External Thread[6] . . . . . -G
Autoclave F-250-C (with Span Limit Codes G & K only, standard with Span Code H) . . . . . -G1
½ NPT External Thread (with Span Codes G & K) . . . . . -G2

Cleaning and Preparation

Unit Degreased — for Silicone Filled Sensors Only
Not for Oxygen/Chlorine Service, Option -V1, or Pressure Seals . . . . . -X1
Cleaned and Prepared for Oxygen Service — for Fluorinert Filled Sensors Only
Not with Option -V1, or Pressure Seals . . . . . -X2
Cleaned and Prepared for Chlorine Service — with Structure Code 33 or 63 Only
Not with Option -V1, or Pressure Seals . . . . . -X3

Miscellaneous Optional Selections

G ½ B Manometer Process Connection . . . . . -G
R ½ Process Connection (½ NPT to R ½ Adapter) . . . . . -R
Five Year Warranty . . . . . -W
Supplemental Customer Tag . . . . . -T
Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter . . . . . -J

Specify calibrated range.

Specify information for instrument tag.

Notes: 1 Refer to Section "Pressure Seals and Industry-Specific Connections" for additional information.
2 Both transmitters and pressure seal model codes are required.
3 Direct connect seal models that may be specified are PSTAD, PSFAD, and PSISD.
4 Remote mount seal models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
5 Standard equipment in IGP10, -A, and -V.
6 Not available with Span Code H.

IGP20 I/A Series® Intelligent Gauge Pressure Transmitters

This transmitter measures gauge pressure and transmits a 4-20 mA, 1 to 5 Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheets PSS 2A-1C13 A, B, C, D, E, and J.

- Choice of Mounting Styles
  - ✔ *IGP20, bracket mounted, for lower ranges, more material options, vacuum measurement.*
- Rugged & Dependable
  - ✔ *Field-proven silicon strain gauge technology*
  - ✔ *Corrosion-resistant epoxy finish*
- Superior Performance
  - ✔ *Accuracy to ±0.05% of span*
  - ✔ *Ambient temperature effects to ±(0.03% URL+0.06%) span per 28°C (50°F)*
- Choice of Electronics Modules
  - ✔ *Intelligent HART, Foundation Fieldbus, Profibus, FoxCom, and 4-20 mA versions*
  - ✔ *Economical 4-20 mA and 1 to 5 Vdc versions*
- LCD Indicator/Pushbutton Configurator
  - ✔ *Optional on Foundation Fieldbus, Profibus, FoxCom/4-20 mA, and HART/4-20 versions; Standard on 4-20 mA and 1 to 5 Vdc versions*

Functional Specifications

Sensor Temperature Limits:
DC200: -46 & +121°C (-50° + 250°F)
FC77: -29 & +85°C (-20 & +185°F)

Ambient Temperature Limits:
DC200: -40 +85°C (-40 & +185°F)
FC77: -29 & +85°C (-20 & +185°F)

Electrical Classification: Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.

Output signal and configuration:

Version	Output Choices	Configure From
-D	✔ FoxCom Digital ✔ FoxCom/4 to 20 mA	✔ I/A Series Workstation ✔ Hand-Held Terminal ✔ Personal Computer ✔ Optional Pushbuttons
-T	✔ Hart/4 to 20mA	✔ Communicator ✔ Workstation ✔ Personal Computer
-F	✔ Foundation Fieldbus	✔ Workstation
-P	✔ Profibus	✔ Workstation
-A,	✔ 4 to 20mA	✔ Standard Pushbuttons
-V	✔ 1-5 Vdc	✔ Standard Pushbuttons

Span, Range and Overrange Limits:
Bracket Mounted Gauge Pressure IGP20

Span Limits Code		Span Limits	
A	0.12 & 7.5 kPa	0.5 & 30 H_20	1.2 & 7.5 mbar
B	0.87 & 50 kPa	0.125 & 7 psi	8.7 & 500 mbar
C	7.0 & 210 kPa	1.0 & 30 psi	70 & 2100 mbar
D	0.07 & 2.1 MPa	10 & 300 psi	0.7 & 21 mbar
E	0.70 & 21 MPa	100 & 3000 psi	7 & 210 mbar

Span Limits Code		Range Limits(1)	
A	-7.5 & +7.5 kPa	-30 & +30 H_20	-75 & +75 bar or kg/cm^2
B	-50 & +50 kPa	-7 & +7 psi	-0.5 & +0.5 bar or kg/cm^2
C	-100 & +210 kPa	-14.7 & +30 psi	-1 & +2.1 bar or kg/cm^2
D	-0.1 & 2.1 kPa	-14.7 & +300 psi	-1 & +21 bar or kg/cm^2
E	-0.1 & 21 kPa	-14.7 & +3000 psi	-1 & +210 bar or kg/cm^2

Maximum Overrange (absolute)			
Transmitter Configuration (See Model Code for Description of Options)	Overrange Pressure Rating		
	MPa	psi	bar or kg/cm2
Standard or with Option -B2, -D3, or -D7	25	3625	250
With Option -B3	20	2900	200
With Option -D1	16	2320	160
With Option -B1 or -D5	15	2175	150
With Option -D2, -D4, -D6, or -D8	10	1500	100
With Structure Codes 78 and 79 (pvdf insert)	2.1	300	21

Performance Specifications

Accuracy (Includes Linearity, Hysteresis, and Repeatability):

Version	Output	Signal Accuracy in % of Calib. Span
-D or -T	Digital	±0.05
	4 to 20 mA	±0.075
-F or -P	Digital	±0.05
-A	4 to 20 mA	±0.20
-V	1 to 5 Vdc	±0.10
Refer to PSSs for accuracies at small spans (less than 10% of URL).		

Physical Specifications

Material Combination & Value Package: Refer to "How To Order" for material versions available. For exceptional value and corrosion resistance, the standard material combination with the lowest price is 316 ss Hi-Side Process Cover with 316L ss Sensor.

Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC77), as specified.

Enclosure Classification: Meets IEC IP66 & NEMA Type 4X.

How to Order — Specify Model IGP20

Electronics Versions and Output Signal

4-20 mA/FoxCom . . . D
4 to 20 mA/HART . . . T
Foundation Fieldbus . . . F
Profibus . . . P
4 to 20 mA . . . A
1 to 5 V dc . . . V

Structure Code — Select from one of the following three groups

1. Transmitter

Hi-Side Process Cover	Sensor	Sensor Fill Fluid	
Steel	Co-Ni-Cr	Silicone	10
Steel	Co-Ni-Cr	Fluorinert	11
Steel	316L ss	Silicone	12
Steel	316L ss	Fluorinert	13
Steel	Hastelloy C	Silicone	16
Steel	Hastelloy C	Fluorinert	17
316 ss	Co-Ni-Cr	Silicone	20
316 ss	Co-Ni-Cr	Fluorinert	21
316 ss	316L ss	Silicone	22
316 ss	316L ss	Fluorinert	23
316 ss	316L ss, Gold Plated	Silicone	2G
316 ss	Monel	Silicone	24
316 ss	Monel	Fluorinert	25
316 ss	Hastelloy C	Silicone	26
316 ss	Hastelloy C	Fluorinert	27
Monel	Monel	Silicone	34
Monel	Monel	Fluorinert	35
Hastelloy C	Hastelloy C	Silicone	46
Hastelloy C	Hastelloy C	Fluorinert	47
Hastelloy C	Tantalum	Silicone	48
Hastelloy C	Tantalum	Fluorinert	49
pvdf Insert (Kynar®)	Tantalum	Silicone (used with Process Connector Type 7 below)	78
pvdf Insert (Kynar)	Tantalum	Fluorinert (used with Process Connector Type 7 below)	79

2. Transmitter Prepared for Foxboro Model Coded Seals[2]

Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor[3] . . . F1
Transmitter Prepared for Foxboro Direct Connect Seal; Fluorinert Fill in Sensor[3] . . . F2
Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor[4] . . . S3
Transmitter Prepared for Foxboro Remote Mount Seal; Fluorinert Fill in Sensor[4] . . . S4

3. Transmitter Prepared for non-Foxboro Seals

Transmitter Prepared for Remote Seal; Silicone Fill in Sensor . . . SC
Transmitter Prepared for Remote Seal; Fluorinert Fill in Sensor . . . SD

Span Limits

kPa	psi	mbar	inH_2O	
0.12 and 7.5	—	1.2 and 7.5	0.5 and 30	A
0.87 and 50	0.125 and 7	8.7 and 500	3.5 and 200	B
7 and 210	1 and 30	70 and 2100	28 and 840	C
MPa	**psi**	**bar or kg/cm²**		
0.07 and 2.1	10 and 300	0.70 and 21		D
0.70 and 21	100 and 3000	7.0 and 210 (not with Structure Code 78/79 above)		E

Process Connector Type (Material Same as Process Cover Material)

None, Covers Tapped for 1/4 NPT	0
¼ NPT	1
½ NPT	2
Rc ¼	3
Rc ½	4
½ Schedule 80 Welding Neck	6
None, pvdf (Kynar) insert tapped for ½ NPT (used with Structure Codes 78 & 79)	7

Conduit Connection and Housing Material

½ NPT Conduit Connections, Aluminum Housing	1
PG 13.5 Conduit Connections, Aluminum Housing	2
½ NPT Conduit Connections, 316 ss Housing	3
PG 13.5 Conduit Connections, 316 ss Housing	4
M20 Conduit Connection, Both Sides, Aluminum Housing	5
M20 Conduit Connection, Both Sides, 316 ss Housing	6

Electrical Safety (See PSS for Description and Restrictions)

ATEX II GD, EEx ia IIC, or II 1/2 GD, EEx ib IIC	E
ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1	D
ATEX II 3 GD, EEx nL IIC	N
ATEX Multiple Certifications (E, D, and N)	M
CSA Certified	C
CSA Certified (including Flameproof Zones)	B
FM approved	F
FM approved (including Flameproof Zones)	G
SAA Certified Flameproof	A
SAA Certified Intrinsically Safe	H
SAA Certified Nonincendive	K

Optional Selections

Mounting Bracket Set—Specify Only One

Painted Steel Bracket with Plated Steel Bolts	-M1
Stainless Steel Bracket with Stainless Steel Bolts	-M2
Universal Stainless Steel Bracket with Stainless Steel Bolts	-M3

Indicator with Internal Pushbuttons

Digital Indicator, Pushbuttons, and Window Cover for IGP20-D, -T, -P, and -F only[5]	-L1
Blind (solid) cover over the std. LCD on -A, or -V	-L2

DIN 19213 Construction—Specify Only One and Specify Process Connector Code 0

Single Ended Process Cover with M10 Bolting	-D1
Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back)	-D2
Single Ended Process Cover with 7/16 inch Bolting	-D3
Double Ended Process Cover with 7/16 inch Bolting (Blind Kidney Flange on Back)	-D4
Single Ended Process Covers with 316 ss 7/16 inch Bolting	-D5
Double Ended Process Covers with 316 ss 7/16 inch Bolting (Blind Kidney Flange on Back)	-D6
Single Ended Process Covers with 17-4 ss 7/16 inch Bolting	-D7
Double Ended Process Covers with 17-4 ss 7/16 inch Bolting (Blind Kidney Flange on Back)	-D8

Cleaning and Preparation—Specify Only One

Unit Degreased (not for Oxygen/Chlorine Service)[6]	-X1
Cleaned and Prepared for Oxygen Service[7]	-X2
Cleaned and Prepared for Chlorine Service[7]	-X3

Bolting for Process Covers and Process Connectors — Specify Only One
- 316 ss Bolts and Nuts (Maximum Static Pressure 150 bar or kg/cm^2, 2175psi) . . . -B1
- 17-4 ss Bolts and Nuts . . . -B2
- B7M Bolts and Nuts (NACE) (Pressure de-rated, refer to table) . . . -B3

Conduit Thread Adapters — Specify Only One
- Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3 . . . -A1
- Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4 . . . -A2
- M20 Connector for use with Conduit Connection Codes 1 & 3 . . . -A3
- Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4 . . . -A4

Electronic Housing Features—Specify Only One
- External Zero Adjustment . . . -Z1
- Custody Transfer Lock & Seal . . . -Z2
- External Zero Adjustment and Custody Transfer Lock & Seal . . . -Z3

Ermeto Connectors—Specify Only One
- Steel, Connecting 6 mm Tubing to ¼ NPT Process Connector . . . -E1
- Steel, Connecting 12 mm Tubing to ½ NPT Process Connector . . . -E2
- 316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector . . . -E3
- 316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector . . . -E4

Factory Configuration—Specify Only One
- Digital Output (FoxCom only) . . . -C1
- Full Factory Configuration (Requires Configuration Form) . . . -C2

Instruction Book Options
- Without Instruction Book & CD . . . -K1

Miscellaneous Optional Selections
- Vent Screw In Side of Process Cover . . . -V
- Five Year Warranty . . . -W
- Supplemental Customer Tag . . . -T
- Low Temperature Operative Limit of -50°C (-58°F) for Entire Transmitter . . . -J
- Gasket for Vacuum Service with Pressure Seals[8] . . . -G1

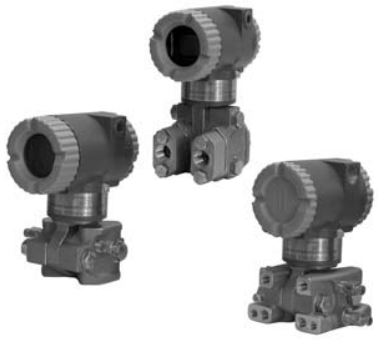
Specify calibrated range

Specify information for instrument tag

Notes

1 Upper Range Limit is the lower of the values in this table and in the Maximum Overrange Table, which lists the de-rated pressures associated with various options.
2 Refer to Section "Pressure Seals and Industry-Specific Connections" for additional information.
3 Direct Mount seals that may be specified are models PSFLT, PSSCT, and PSSST.
4 Remote Mount seals that may be specified are models PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
5 Standard equipment on IGP20-A, and -V.
6 Available only with Structure Codes having Silicone Fill Fluid.
7 Available only with Structure Codes having Fluorinert Fill Fluid and not available with carbon steel Process Cover.
8 Option -G1 is required when pressure seal (Structure Codes S3, S4, F1, F2, SC, or SD) will be used on vacuum applications. This option substitutes a vacuum service gasket for the standard ptfe Process Cover gasket.

IDP10 I/A Series® Intelligent d/p cell® Transmitters



This transmitter measures the difference between two pressures and transmits a proportional or square root (flow) 4-20mA, 1-5Vdc, or digital output signal over a pair of wires.

For complete specifications, refer to Product Specification Sheet PSS 2A-1C14 A, B, & C, and PSS 2A-1C13 D, E, and J.

- Application Versatility
  - *316 ss Process Covers and 316L ss Sensor materials standard*
  - *Choice of Traditional or Low Profile Process Cover/Sensor Structures*
  - *Static Pressure Rating of 25 MPa, 3625 psi, 250 bar or kg/cm^2; Options to 40 MPa, 5800 psi, 400 bar or kg/cm^2*
- Installation Versatility
  - *Traditional "right angle" structure with process connections in horizontal plane*
  - *Low Profile "in line" structures with process connections in verticle plane*
- Two Low Profile Structures
  - *LP1 Structure — economical, small, light weight for direct manifold mounting in vertical or horizontal positions*
  - *LP2 Structure — designed for bracket or manifold mounting in vertical position*
- Superior Performance
  - *Accuracy to ±0.05% of span*
- Choice of Electronics Modules
  - *Intelligent HART, Foundation Fieldbus, Profibus, FoxCom and 4 to 20 mA versions*
  - *Economical 4 to 20 mA and 1 to 5 Vdc versions*
- LCD Indicator/Pushbutton Configurator
  - *Optional on Foundation Fieldbus, Profibus, FoxCom/4-20 mA, and HART/4-20 mA versions*
  - *Standard on 4-20 mA and 1-5 Vdc versio*
- Electrical Clasification:
  - *Various agency certifications for Zone and Division hazardous locations. Refer to Product Specification sheets for complete specifications.*

Output signal and configuration:

Version	Output Choices	Configure From
-D	✔ FoxCom Digital ✔ FoxCom/4 to 20 mA	✔ I/A Series Workstation ✔ Hand-Held Terminal ✔ Personal Computer ✔ Optional Pushbuttons
-T	✔ Hart/ 4 to 20mA	✔ Communicator ✔ Workstation ✔ Personal Computer
-F	✔ Foundation Fieldbus	✔ Workstation
-P	✔ Profibus	✔ Workstation
-A,	✔ 4 to 20mA	✔ Standard Pushbuttons
-V	✔ 1-5 Vdc	✔ Standard Pushbuttons

Span and Range Limits:

Span Limits Code	Span Limits		
A	0.12 & 7.5 kPa	0.5 & 30 inH_2O	1.2 & 75 mbar
B	0.87 & 50 kPa	3.5 & 200 inH_2O	8.7 & 500 mbar
C	7 & 210 kPa	28 & 840 inH_2O	70 & 2100 mbar
D	0.07 & 2.1 MPa	10 & 300 psi	0.7 & 21 bar or kg/cm^2
E	0.7 & 21 MPa	100 & 3000 psi	7 & 210 bar or kg/cm^2

	Range Limits(1)		
A	-7.5 & +7.5 kPa	-30 & +30 inH_2O	-75 & +75 mbar
B	-50 & +50 kPa	-200 & +200 inH_2O	-500 & +500 mbar
C	-210 & +210 kPa	-840 & +840 inH_2O	-2100 & +2100 mbar
D	-0.21 & +2.1 MPa	-30 & +300 psi	-2.1 & +21 bar or kg/cm^2
E	-0.21 & +21 MPa	-30 & 3000 psi	-2.1 & +210 bar or kg/cm^2

Maximum Static and Overrange Pressures

Transmitter Configuration (See Model Code for Description of Options)	Pressure Rating		
	MPa	psi	bar or kg/cm2
Standard or with Option -B2, -D3, or -D7	25	3625	250
With Option -B3	20	2900	200
With Option -D1	16	2320	160
With Option -B1 or -D5	15	2175	150
With Option -D2, -D4, -D6, or -D8	10	1500	100
With Structure Codes 78 and 79 (pvdf insert)	2.1	300	21
With Option -D9 or -Y	40	5800	400

Performance Specifications

Accuracy (Includes Linearity, Hysteresis, and Repeatability):

Version	Output	Signal Accuracy in % of Calib. Span
-D or -T	Digital	±0.05
	4 to 20 mA	±0.075
-F or -P	Digital	±0.05
-A	4 to 20 mA	±0.20
-V	1 to 5 Vdc	±0.10
Refer to PSSs for accuracies at small spans (less than 10% of URL) and with square root output		

Physical Specifications

Material Combination & Value Package: Refer to How To Order for material versions available. For exceptional value and corrosion resistance, the standard material combination with the lowest price is 316 ss Process Covers with 316L ss Sensor.

Enclosure Classification: Meets IEC IP66 and NEMA Type 4X.

Sensor Fill Fluid: Dow Corning dimethylsiloxane (DC 200) or fluorinated hydrocarbon (3M Fluorinert FC 77), as specified.

How to Order — Specify Model Number IDP10

Electronic Versions and Output Signals

4-20 mA/FoxCom . . . . D
4 to 20 mA/HART . . . . T
Foundation Fieldbus . . . . F
Profibus . . . . P
4 to 20 mA . . . . A
1 to 5 V dc V

Structure Code — Select from one of the following eight groups:

1. Transmitter With Traditional Structure

Process Covers	Sensor	Fill Fluid	
Steel	Co-Ni-Cr	Silicone	10
Steel	Co-Ni-Cr	Fluorinert	11
Steel	316L ss	Silicone	12
Steel	316L ss	Fluorinert	13
Steel	Hastelloy C	Silicone	16
Steel	Hastelloy C	Fluorinert	17
316 ss	Co-Ni-Cr	Silicone	20
316 ss	Co-Ni-Cr	Fluorinert	21
316 ss	316L ss	Silicone	22
316 ss	316L ss	Fluorinert	23
316 ss	316L ss, Gold Plated	Silicone	2G
316 ss	Monel	Silicone	24
316 ss	Monel	Fluorinert	25
316 ss	Hastelloy C	Silicone	26
316 ss	Hastelloy C	Fluorinert	27
Monel	Monel	Silicone	34
Monel	Monel	Fluorinert	35
Hastelloy C	Hastelloy C	Silicone	46
Hastelloy C	Hastelloy C	Fluorinert	47
Hastelloy C	Tantalum	Silicone	48
Hastelloy C	Tantalum	Fluorinert	49
pvsf Insert (Kynar)	Tantalum	Silicone (Used w/Process Connector Type 7)	78
pvsf Insert (Kynar)	Tantalum	Fluorinert (Used w/Process Connector Type 7)	79

2. Transmitter With Low Profile Structure LP1 (No Seals)

Process Covers	Sensor	Fill Fluid	
316 ss	316L ss	Silicone	LL
316 ss	316L ss	Fluorinert	LM
316 ss	Hastelloy C	Silicone	LC
316 ss	Hastelloy C	Fluorinert	LD

3. Transmitter With Low Profile Structure LP2 (No Seals)

Process Covers	Sensor	Fill Fluid	
316 ss	316L ss	Silicone	.52
316 ss	316L ss	Fluorinert	.53
316 ss	Hastelloy C	Silicone	.56
316 ss	Hastelloy C	Fluorinert	.57

4. Transmitter (Traditional Structure) Prepared for Foxboro Model Coded Seals(2)

Direct Connect Seal on HI Side; 1/2 NPT Process Connector LO Side; Silicone Fill in Sensor(3)	.F1
Direct Connect Seal on HI Side; 1/2 NPT Process Connector LO Side; Fluorinert Fill in Sensor(3)	.F2
Direct Connect Seal on HI Side; Remote Seal with Capilary LO Side; Silicone Fill in Sensor(3)	.F3
Direct Connect Seal on HI Side; Remote Seal with Capilary LO Side; Fluorinert Fill in Sensor(3)	.F4
Remote Seals on Both HI and LO Sides, Silicone Fill in Sensor(4)	.S1
Remote Seals on Both HI and LO Sides, Fluorinert Fill in Sensor(4)	.S2
Remote Seal HI Side, ½ NPT Connector LO Side, Silicone Fill in Sensor(4)	.S3
Remote Seal HI Side, ½ NPT Connector LO Side, Fluorinert Fill in Sensor(4)	.S4
Remote Seal LO Side, ½ NPT Connector HI Side, Silicone Fill in Sensor(4)	.S5
Remote Seal LO Side, ½ NPT Connector HI Side, Fluorinert Fill in Sensor(4)	.S6

5. Transmitter (Traditional Structure) Prepared for non-Foxboro Seals

Remote Seal on High and Low Sides; Silicone Fill in Sensor	.SA
Remote Seal on High and Low Sides; Inert Fill in Sensor	.SB
Remote Seal on High Side and ½ NPT Connector on Low Side, Silicone Fill in Sensor	.SC
Remote Seal on High Side and ½ NPT Connector on Low Side, Inert Fill in Sensor	.SD
Remote Seal on Low Side and ½ NPT Connector on High Side, Silicone Fill in Sensor	.SE
Remote Seal on Low Side and ½ NPT Connector on High Side, Inert Fill in Sensor	.SF

Span Limits — Differential Pressure Units

kPa	inH_2O	mbar	
0.12 and 7.5	0.5 and 30	1.2 and 75	.A
0.87 and 50	3.5 and 200	8.7 and 500	.B
7 and 210	28 and 840	70 and 2100	.C
MPa	**psi**	**bar or kg/cm^2**	
0.07 and 2.1	10 and 300	0.7 and 21	.D
0.7 and 21	100 and 3000	7 and 210	.E

Process Connector Type (Material Same as Process Cover Material)

None, Covers Tapped for 1/4 NPT	0
¼ NPT	1
½ NPT	2
Rc ¼	3
Rc ½	4
½ Schedule 80 Welding Neck	6
None, pvdf (Kynar) insert tapped for ½ NPT (used with Structure Codes 78 & 79)	7

Conduit Connection and Housing Material

½ NPT Conduit Connections, Aluminum Housing	.1
PG 13.5 Conduit Connections, Aluminum Housing	2
½ NPT Conduit Connections, 316 ss Housing	.3
PG 13.5 Conduit Connections, 316 ss Housing	4
M20 Conduit Connection, Both Sides, Aluminum Housing	5
M20 Conduit Connection, Both Sides, 316 ss Housing	6

Electrical Safety (See PSS for Description and Restrictions)

ATEX II GD, EEx ia IIC, or II ½ GD, EEx ib IIC	.E
ATEX Flameproof; II 2 GD, EEx d IIC, Zone 1	.D
ATEX II 3 GD, EEx nL IIC	.N
ATEX Multiple Certifications (E, D, and N)	.M
CSA Certified	.C
CSA Certified (including Flameproof Zones)	.B
FM approved	.F
FM approved (including Flameproof Zones)	.G
SAA Certified Flameproof	.A
SAA Certified Intrinsically Safe	.H
SAA Certified Nonincendive	.K

Optional Selections

Mounting Bracket Set—Specify Only One

Painted Steel Bracket with Plated Steel Bolts	-M1
Stainless Steel Bracket with Stainless Steel Bolts	-M2
Universal Stainless Steel Bracket with Stainless Steel Bolts	-M3

Indicator with Internal Pushbuttons

Digital Indicator, Pushbuttons, and Window Cover for IGP20-D, -T, -P, and -F only[5]	-L1
Blind (solid) cover over the std. LCD on -A, or -V	-L2

DIN 19213 Construction — Specify Only One and Specify Process Connector Code 0

Single Ended Process Cover with M10 Bolting	-D1
Double Ended Process Cover with M10 Bolting (Blind Kidney Range on Back)	-D2
Single Ended Process Cover with 7/16 inch Bolting	-D3
Double Ended Process Cover with 7/16 inch Bolting (Blind Kidney Flange on Back)	-D4
Single Ended Process Covers with 316 ss 7/16 inch Bolting	-D5
Double Ended Process Covers with 316 ss 7/16 inch Bolting (Blind Kidney Flange on Back)	-D6
Single Ended Process Covers with 17-4 ss 7/16 inch Bolting	-D7
Double Ended Process Covers with 17-4 ss 7/16 inch Bolting (Blind Kidney Flange on Back)	-D8
Single Ended Process Covers with 17-4 ss 7/16 inch Bolting an 40 MPa (400 bar or kg/cm2, 5800 psi) static pressure rating	-D9

Cleaning and Preparation—Specify Only One

Unit Degreased (not for Oxygen/Chlorine Service)[6]	-X1
Cleaned and Prepared for Oxygen Service[7]	-X2
Cleaned and Prepared for Chlorine Service[7]	-X3

Bolting for Process Covers and Process Connectors — Specify Only One

316 ss Bolts and Nuts (Maximum Static Pressure 150 bar or kg/cm^2, 2175psi)	-B1
17-4 ss Bolts and Nuts	-B2
B7M Bolts and Nuts (NACE) (Pressure de-rated, refer to table)	-B3

Conduit Thread Adapters — Specify Only One

Hawk-Type ½ NPT Cable Gland for use with Conduit Connection Codes 1 & 3	-A1
Plastic PG 13.5 Connector for use with Conduit Connection Codes 2 & 4	-A2
M20 Connector for use with Conduit Connection Codes 1 & 3	-A3
Trumpet shaped PG 13.5 Cable Gland (Nickel Plated Brass) for use with Conduit Connection Codes 2 & 4	-A4

Electronic Housing Features—Specify Only One

External Zero Adjustment	-Z1
Custody Transfer Lock & Seal	-Z2
External Zero Adjustment and Custody Transfer Lock & Seal	-Z3

Ermeto Connectors—Specify Only One

Steel, Connecting 6 mm Tubing to ¼ NPT Process Connector	-E1
Steel, Connecting 12 mm Tubing to ½ NPT Process Connector	-E2
316 ss, Connecting 6 mm Tubing to ¼ NPT Process Connector	-E3
316 ss, Connecting 12 mm Tubing to ½ NPT Process Connector	-E4

Factory Configuration—Specify Only One
- Digital Output (FoxCom only) . . . -C1
- Full Factory Configuration (Requires Configuration Form) . . . -C2

Instruction Book Options
- Without Instruction Book & CD . . . -K1

Vent Screw in Process Cover
- Supply Vent Screw in Side of Each Process Cover
  (Available only on Traditional Process Cover Structure Codes 22 to 47) . . . -V
- Omit Vent Screw in Side of Each Process Cover
  (Available only on Type LP1 Low Profile Process Cover Structures Codes LL, LM, LC, and LD) . . . -V1

Adapters for Direct Mount to Competitive Manifolds (See Product Specification Sheet for manifold compatibility)
- Adapter plate, Bolts, and Gaskets for Coplanar Manifolds . . . -P1
  Not available with:
  Bolting Options -B1, -B2, and -B3;
  DIN 19213 Construction Options -D1, -D2, -D4, -D5, -D6, -D7, and -D8

Miscellaneous Optional Selections
- Five Year Warranty . . . -W
- Supplemental Customer Tag . . . -T
- High Static Pressure Rating (40 MPa, 5800 psi, 400 bar or kg/cm^2) . . . -Y
- Low Temperature Operative Limit of -50C (-58F) for Entire Transmitter . . . -J
- Gasket for Vacuum Service with Pressure Seals[8] . . . -G1

Specify calibrated differential pressure range

Specify information for instrument tag

Notes
1. Upper Range Limit is the lower of the values in this table and in the Maximum static and Overrange Table, which lists the derated pressures associated with various options.
2. Refer to Section "Pressure Seals and Industry-Specific Sonnection" for additional information
3. Direct Mount seals that may be specified are models PSFLT, PSSCT, and PSSST.
4. Remote Mount seals that may be specified are models PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
5. Standard equipment on IGP20-A, and –V.
6. Available only with Structure Codes having Silicone Fill Fluid.
7. Available only with Structure Codes having Fluorinert Fill Fluid and not available with carbon steel Process Cover.
8. Option -G1 is required when pressure seal (Structure Codes F1-F4, S1-S6, or SA-SF) will be used on vacuum applications. This option substitutes vacuum service metal gaskets for the standard ptfe Process Cover Gasket.

The following chapter contains Product Specifications of the Instruments:

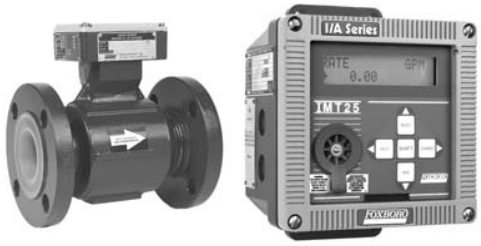
I/A Series® Pulse DC Magnetic FlowMeters:

8000A Series Wafer Body

9300A, 9200A, and 9100A Series Flanged Body Flowtubes

IMT25 Series Intelligent Magnetic Flow Transmitters

I/A Series® Pulse DC Magnetic Flowmeters: 8000A Series Wafer Body, 9300A, 9200A, 9100A Series Flanged Body Flowtubes, and IMT25 Series Intelligent Magnetic Flow Transmitters



A Magnetic Flowmeter consisting of a flowtube, signal cable, and Transmitter measures flow rate of conductive liquids (usually water based) and transmits a proportional electrical signal.

Refer to Product Specifications sheet PSS 1-6F2 A (8000A Series), 1-6F4 A (9300A Series), 1-6F9A (9100A Series) 1-6F10A (9200A Series), 1-6F5 A (IMT25) for complete description and specifications.

- 8000A — Wafer Design Flowtubes
  - *Available in 15 to 150 mm (1/16 to 6 in.) sizes*
  - *Ceramic and Retained PFA liner options*
  - *Sanitary design 25 to 80 mm (1/2 to 3 in.)*
- 9300A — Compact Lay Length Flanged Design Flowtubes
  - *Available in 25 to 400 mm (1/2 to 16 in.) sizes*
  - *PTFE or PFA Liner*
  - *Meets ISO/CD Standard 13359*
- I/A Series Intelligent Transmitter (IMT25)
  - *Digital, analog, pulse output signals*
  - *Relay outputs for alarms (IMT25 only)*
- Remote Communications
  - *Transmitters can be interrogated or configured via Hand-Held Terminal, PC, or I/A Series Workstation*
- 9200A — Large Flanged Flowtubes for General Process Industries
  - *Available in 200 to 1200 mm (8-48 in.)*
  - *Neoprene, EPDM, PTFE, Ebonite and Linatex Liners*
  - *Built in grounding (reference) electrodes standard, no need for grounding rings*
  - *Meets ISO lengths for applicable sizes*
- 9200A — Flanged Flowtubes for the Municipal Water and Water & Waste
  - *Available in 25 t0 2000 mm (1-78 in.)*
  - *Neoprene or EPDM liners*
  - *Available with Din, ANSI, AWWA flanges*

Functional Specifications

Minimum Conductivity of Process Fluid: 5 µhm/cm (5mS/cm)

Ambient Temperature Limits:
8000A/9300A: -40 and 70°C (-40 and 158°F)
IMT25: -30 and 70°C (-22 and 158°F)

Process Temperature Limits(Remote Mounted Transmitter):
8000A (Ceramic): -40 and 204°C (-40 and 400°F). Maximum allowable step change in temperature is an increase of 125°C (225°F) and a decrease of 75°C (135°F)
8000A/9300A (PFA): -40 and 180°C (-40 and 250°F)
½" - 6", 8" - 12"

Process Temperature Limits:
8000A (Ceramic): Full vacuum and 740 psi @ 100°F (1/16 to 2 in.) Full vacuum and 675 psi @ 100°F (3 to 6 in.)
8000A/9300A (PFA): Full vacuum and 740 psi @ 100°F

For 9300A PTFE and Polyurethane refer to PSS 1-6F4 A

Process Temperature Limits:
9200A -40 and +100°C (-40 and +212°F) with ptfe High Temperature Liner: -20 and 180°C (-4 and +356°F) with ptfe Liner: -20 and +120°C (-4 and +248°F) with EPDM[(a)] Liner: -10 and +95°C (14 and 203°F) with Neoprene Liner: 0 and 95°C (32 and 203°F) with Ebonite Liner: 0 and +95°C (32 and 203°F) with Linatex Rubber Liner: -40 and +70°C (-40 and +158°F)

Process Pressure Limits:
9200A with High Temperature ptfe Liner: Limits are No Vacuum and Flange Rating; but not exceeding 40 bar guage (580psig)
with Lower Temperature ptfe Liner: Limits are No Vacuum and Flange Rating; but not exceeding 40 bar guage (580psig)
with EPDM, Neoprene, Ebonite, or Linatex Liner: Full Vacuum and Flange Rating

Process Temperature Limits:
9100A -40 and +100°C (-40 and +212°F) with Neoprene Liner: 0 and 95°C (32 and 203°F) with EPDM Liner: -10 and +95°C (14 and 203°F)

Process Pressure Limits:
9100A with Neoprene or EPDM Liners: Full Vacuum and Flange Rating

Flow Rates:

Size		Flow Units	Minimum And Maximum Upper Range Values	
mm	**in**		**8000A**	**9300A, 9200A, 9100A**
1.6	1/16	Lpm	0.11 and 1.1	
		gpm	0.03 and 0.3	
3	1/8	Lpm	0.26 and 4.92	
		gpm	0.07 and 1.3	
6	1/4	Lpm	0.68 and 13.6	
		gpm	0.18 and 3.6	
15	1/2	Lpm	3.8 and 76	3.8 and 76
		gpm	1 and 20	1 and 20

25	1	Lpm	13.2 and 265	13.2 and 265
		gpm	3.5 and 70	3.5 and 70
40	1-1/2	Lpm	34.1 and 644	34.1 and 644
		gpm	9.0 and 170	9.0 and 170
50	2	Lpm	49 and 946	49 and 946
		gpm	13 and 250	13 and 250
80	3	Lpm	117 and 2366	117 and 2366
		gpm	117 and 2366	117 and 2366
100	4	Lpm	208 and 4164	208 and 4164
		gpm	55 and 1100	55 and 1100
150	6	Lpm	426 and 9236	426 and 9236
		gpm	122 and 2440	122 and 2440
200	8	Lpm		965 and 19303
		gpm		255 and 5100
250	10	Lpm		1552 and 31037
		gpm		410 and 8200
300	12	Lpm		2215 and 44285
		gpm		585 and 11700
350	14	Lpm		2763 and 55260
		gpm		730 and 14600
400	16	Lpm		3634 and 72670
		gpm		960 and 19200
450	18	Lpm		4668 and 93350
		gpm		1200 and 24000
500	20	Lpm		5668 and 113400
		gpm		1500 and 30000
600	24	Lpm		8168 and 163400
		gpm		2150 and 43000
700	28	Lpm		11500 and 230000
		gpm		3000 and 60000
	30	Lpm		—
		gpm		3400 and 68000
800	32	Lpm		15000 and 300000
		gpm		3900 and 78000
900	36	Lpm		19170 and 383400
		gpm		5000 and 100000
1000	40	Lpm		23340 and 466800
		gpm		6200 and 124000
	42	Lpm		—
		gpm		6800 and 136000
	44	Lpm		—
		gpm		7500 and 150000
1200	48	Lpm		34170 and 683500
		gpm		9000 and 180000
1400	54	Lpm		46680 and 933500
		gpm		12000 and 240000
	60	Lpm		—
		gpm		14000 and 280000
1600	66	Lpm		66680 and 133400
		gpm		175000 and 350000
1800	72	Lpm		80020 and 1600000
		gpm		21000 and 420000
2000	78	Lpm		93350 and 1867000
		gpm		25000 and 500000

Performance Specifications

Accuracy - Pulse and Digital Output:

8000A	9300A	System Accuracy
1/2 - 6 in (15 - 150mm)	1/2 - 6 in (25 - 150 mm)	±0.25% of Reading ±0.005 ft/s (±0.0015 m/s)
1/16 - 1/4 in (1.16 - 6 mm)	8 - 16 in (200 - 400 mm)	±0.50% of Reading ±0.010 ft/s (±0.00305 m/s)

IMT 25 Transmitters:

Electrical Outputs:
4 to 20 mA current, digital, pulse
2 relays outputs for alarms (IMT25 only)

Electrical Classification: FM, CSA, CENELEC certified versions available for ordinary location and hazardous locations. Refer to Foxboro for complete specifications and availability

Display Options: 32 alphanumeric character, 2-line, back-lighted LCD display. Indicate ± total, net total, net inventory total & ±mn; rate in desired engineering units.

Optional Features

Grounding (Protective) Rings: Two grounding (protective) rings are required, one on each end of flowube, if mating piping is nonmetallic or lined metallic piping.

Signal Cable: Part Number R0101ZS (if ordered feet) or Part Number B4017TE (if ordered in meters). Maximum length 300 m (1000 ft).

Physical Specifications

Enclosure Classification: Meets the requirements of IEC IP66 and provides the environmental protection of NEMA Type 4X

Enclosure Finish: High-build epoxy paint

Lining Material:
Ceramic: 1.6 to 150 mm (1/16 to 6 in) sizes.
PTFE: 15 to 600 mm (1/2 to 16 in) sizes.
PFA: 15 to 400 mm (1/2 to 16 in) sizes.
Poly: 200 to 400 mm (8 to 16 in) sizes

Electrode Material: Platinum and Tantalum for ceramic flowtubes. Assorted materials for PTFE and PFA flowtubes

Mounting:
Flowtube: By process connection flanges. See How to Order.
Transmitters:
Pipe: Bracket for mounting to DN 50 or 2 in pipe.
Surface: Plate permits mounting to surface such as a wall.
Flowtube: Bolted directly to any 15 to 400 mm (1/2 to 16 in) 8000A and 9300 Series Flowtube (except sanitary)

How to Order

8000A Series Flowtube
Specify 8000A Series Flowtube:

Model Number									
1.6 mm (1/16 in) Line Size	801SA								
3 mm (1/8 in) Line Size	801EA								
6 mm (1/4 in) Line Size	801QA								
15 mm (1/2 in) Line Size	800HA								
25 mm (1 in) Line Size	8001A								
40 mm (1 1/2 in) Line Size	801HA								
50 mm (2 in) Line Size	8002A								
80 mm (3 in) Line Size	8003A								
100 mm (4 in) Line Size	8004A								
150 mm (6 in) Line Size	8006A								
Tube Construction/End Connection									
Wafer Body (Mounts between ANSI Class 150 or 300, or Metric PN 10 or PN 16 Flanges)		W							
Lining Material									
Ceramic			C						
PFA (800HA to 8006A only)			P						
Transmitter Mounting									
Remote (Pipe or Surface) Mounting				R					
Flowtube Mounting (800HA to 8006A) to IMT25				I					
Electrodes									
Tantalum (801SA to 801QA only) ceramic lined or Tantulam-Tungsten (800HA to 8006A) PFA lined					B				
Conical 316 ss (8001A to 8006A) PFA lined only					C				
Hastelloy C (800HA to 8006A) PFA lined only					H				
Conical Hastelloy C (8001A to 8006A) PFA lined only					K				
Platinum (801SA to 8006A) ceramic lined or platinum-iridium (800HA to 8006A) PFA lined					P				
316 ss (800HA to 8006A) PFA lined only					S				
Titanium (800HA to 8006A) PFA lined only					T				
Coil Drive/Supply									
Pulsed dc (From Intelligent I/A Series Magnetic Flow Transmitters)						J			
Housing Construction									
NEMA 4X Enclosure							G		
Accidental Submergence (Remote Mounted Transmitter Only)							H		
Electrical Certification									
CSA, Ordinary Locations								CGZ	
CSA, Class 1, Division 2 Locations								CNZ	
European, non-sparking								KNZ	
FM, Ordinary Locations								FGZ	
FM, n, i a Connections								FNA	
No Certification								ZZZ	
Optional Selection(s)									
Mounting Hardware for ANSI Class 150 Flanges									A
Mounting Hardware for ANSI Class 300 Flanges									B
Mounting Hardware Metric PN 10 Flanges									C
Mounting Hardware Metric PN 16 Flanges									D
Cable Glands (non-conduit applications)									G

9300A Series Flowtube
Specify 9300A Series Flowtube Model Number

Nominal Flowtube Size									
15 mm (1/2 in)[1]	930HA								
25 mm (1 in)	9301A								
40 mm (1 1/2 in)	931HA								
50 mm (2 in)	9302A								
80 mm (3 in)	9303A								
100 mm (4 in)	9304A								
150 mm (6 in)	9306A								
Tube Construction									
AISI Type 304 ss or 305 ss flowtube; Face-to-Face dimensions conform to ISO/DIS 13359		-SI							
End Connections									
ANSI Class 150, Carbon Steel flange			BA						
ANSI Class 150, 316 ss flange			BB						
ANSI Class 300, Carbon Steel flange[2]			BD						
ANSI Class 300, 316 ss flange[2]			BC						
Metric PN 10, Carbon Steel flange			ZD						
Metric PN 16, Carbon Steel flange			ZE						
Metric PN 25, Carbon Steel flange[2]			ZF						
Metric PN 40, Carbon Steel flange[2]			ZG						
Metric PN 10, 316 ss flange			ZL						
Metric PN 16, 316 ss flange			ZM						
Metric PN 25, 316 ss flange[2]			ZN						
Metric PN 40, 316 ss flange[2]			ZP						
Lining Material									
ptfe (Polytetrafluoroethylene)				-T					
pfa (Perfluoroalkoxy) (9301A to 9306A only)				-P					
Electrodes									
Tantalum-Tungsten					B				
Hastelloy C					H				
Conical Hastelloy C (9301A to 9306A only)					K				
Platinum-Iridium					P				
316L ss					S				
Conical 316L ss (9301A to 9306A only)					C				
Titanium					T				
Coil Drive/Supply									
Pulsed dc						J			
Housing/Transmitter Mounting									
NEMA 4 (ptfe)/NEMA 4X (pfa), Remote mounted transmitter							-G		
Total/accidental submergence (Remote mounted transmitter)[3]							-N		
NEMA 4 (ptfe)/NEMA 4X (pfa), IMT25 or IMT25L Integrally mounted							-I		
Electrical Classification									
CSA, Ordinary location								K	
CSA, Class I, Div. 2[4]								L	
FM, Ordinary location								M	
CENELEC, e, ia (environment and pipeline Zone 1)								S	
FM, Class I, Div. 2, Nonincendive[4]								N	
European, nonincendive, Zone 2								U	
No certification								Z	
Options									
Heyco Glands (not available with Housing -T or -I)[5, 6]									-G
Teflon lining protector[7]									-T

Specify:

- **Flow range (normal and maximum)**
- **Liquid composition**
- **Liquid conductivity**
- **Operating temperature (normal and maximum)**
- **Operating pressure (normal and maximum)**

Specify other Optional Features

Specify information for instrument tag

Notes

1 Available with -T (ptfe) lining only
2 Available with -P (pfa) lining only
3 Sealed for accidental or continuous operation under water up to 9 m (30 ft) deep. Supplied with kit for sealing
4 Must be used with transmitter certified for Class I, Groups B, C, and D, Division 2 locations
5 For flowtubes with integrally mounted transmitter, cable glands may be specified with the transmitter options
6 Cable glands are assembled to flowtube junction box and are specified for nonconduit applications. (not for Electrical Classification Code L & N)
7 Not available with Metric Flange Connections ZD & ZE

9300A Series Flowtube
Specify 9300A Series Flowtube Model Number

Nominal Flowtube Size					
200 mm (8 in)	9308A				
250 mm (10 in)	9310A				
300 mm (12 in)	9312A				
450 mm (14 in)	9314A				
400 mm (16 in)	9316A				
Tube Construction					
AISI Type 304 ss;					
Face-to-Face dimensions conform to to ISO/DIS 13359		-SI			
End Connections					
ANSI Class 150, Carbon Steel flange			BA		
ANSI Class 150, 316 ss flange			BB		
ANSI Class 300, Carbon Steel flange[8]			BD		
ANSI Class 300, 316 ss flange[8]			BC		
Metric PN 10, Carbon Steel flange			ZD		
Metric PN 16, Carbon Steel flange			ZE		
Metric PN 25, Carbon Steel flange[8, 9]			ZF		
Metric PN 40, Carbon Steel flange[8, 9]			ZG		
Metric PN 10, 316 ss flange[2]			ZL		
Metric PN 16, 316 ss flange[2]			ZM		
Metric PN 25, 316 ss flange[8, 9]			ZN		
Metric PN 40, 316 ss flange[8, 9]			ZP		
Lining Material					
Polyurethane				-A	
pfa (Perfluoroalkoxy) (8 inch,10 inch, 12 inch)				-P	
ptfe (Polytetrafluoroethylene)				-T	
Electrodes					
Tantalum-Tungsten[10]					B
Hastelloy C[10]					H
Conical Hastelloy C (9301A to 9306A only)[10]					K
Platinum-Iridium[10]					P
316L ss					S
Conical 316L ss (9301A to 9306A only)[10]					C
Titanium[10]					T

Coil Drive/Supply
- Pulsed dc ..... J

Housing/Transmitter Mounting
- NEMA 4X, Remote mounted transmitter ..... -G
- Total/accidental submergence (Remote mounted transmitter)[11] ..... -N
- NEMA 4X, Integrally mounted IMT25 and IMT25L ..... -I

Electrical Safety
- CSA, Ordinary location ..... K
- CSA, Class I, Div. 2[12] L
- FM, Ordinary location ..... M
- FM, Class I, Div. 2, Nonincendive[12] ..... N
- CENELEC, e, ib (environment and pipeline Zone 1) ..... S
- European, nonincendive, Zone 2 ..... U
- No certification ..... Z

Options
- Cable glands (not with -T or -I housing)[13] ..... -G
- Grounding Electrodes[10] ..... -E
- Lining protector (8 inch, 10 inch, 12 inch, 14 inch, 16 inch)[9,10] ..... -G

Specify:
- **Flow range (normal and maximum)**
- **Liquid composition**
- **Liquid conductivity**
- **Operating temperature (normal and maximum)**
- **Operating pressure (normal and maximum)**

Specify other Optional Features
Specify information for instrument tag

Notes
8. Available with -P (pfa) lining only
9. The -T option not available with metric End Connection Options
10. Available with pfa (-P lining) and ptfe (-T lining) only
11. Sealed for accidental or continuous operation under water up to 9 m (30 ft) deep. Supplied with kit for sealing
12. Must be used with transmitter certified for Class I, Groups B, C, and D, Division 2 locations
13. The cable glands provide a sealed cable entry for field wiring to the flowtube junction box, and are generally specified in non-conduit applications (not for Electrical Classification Codes L or N). For flowtubes with integrally mounted transmitters (-I or -T housing) cable glands may be specified with the transmitter options

9100A Series Magnetic Flowtubes

Specify 9100A Series Magnetic Flowtube Model Number

Nominal Flowtube Size (a)

DN Flange Size	Inch Flange Size	Model
25 mm	1 in	9101A
40 mm	1 1/2 in	911HA
50 mm	2 in	9102A
65 mm	2 1/2 in	912HA
80 mm	3 in	9103A
100 mm	4 in	9104A
125 mm	5 in	9105A
150 mm	6 in	9106A
200 mm	8 in	9108A

250 mm	10 in	9110A
300 mm	12 in	9112A
350 mm	14 in	9114A
400 mm	16 in	9116A
450 mm	18 in	9118A
500 mm	20 in	9120A
600 mm	24 in	9124A
700 mm	28 in	9128A
-	30 in	9130A
800 mm	32 in	9132A
900 mm	36 in	9136A
1000 mm	40 in	9140A
-	42 in	9142A
-	44 in	9144A
1200 mm	48 in	9148A
1400 mm	54 in	9154A
-	60 in	9160A
1600 mm	66 in	9166A
1800 mm	72 in	9172A
2000 mm	78 in	9178A

Tube Construction

AISI Type 304 Stainless Steel Tube (304 ss) . . . . . –SI

End Connections

ANSI Class 150, Carbon Steel Flange — 1 to 24 in Line Sizes . . . . . BA
AWWA C-207, Class D, Carbon Steel Flange — 28 to 78 in Line Sizes . . . . . WB
PN 6, BS 4504 (DIN 2501), Carbon Steel Flange — 1400 to 2000 mm Line Sizes . . . . . ZZ
PN10, BS 4504 (DIN 2501), Carbon Steel Flange — 200 to 2000 mm Line Sizes . . . . . ZD
PN 16, BS 4504 (DIN 2501), Carbon Steel Flange — 65 to 2000 mm Line Sizes . . . . . ZE
PN 40, BS 4504 (DIN 2501), Carbon Steel Flange — 25 to 50 mm Line Sizes . . . . . ZG

(a) See "End Connection" selections further in Code to determine ANSI, AWWA, and BS (DIN) flanges applicable to each flowtube size.

Liner Material

Neoprene . . . . . –N
EPDM (an Ethylene Propylene Terpolymer) . . . . . –E

Electrodes

AISI Type 316Ti Stainless Steel (316Ti ss) — Fluid Reference Electrode Included . . . . . S

Coil Drive

Pulsed dc . . . . . J

Housing Construction/Transmitter Mounting

Coated Carbon Steel Housing with Aluminum Terminal Box . . . . . –G
- Terminal Box has 1/2 inch Conduit Threads
- Remote Mounted Transmitter

Coated Carbon Steel Housing with Polyamide Terminal Box . . . . . –P
- Terminal Box has PG13.5 Conduit Threads with Cable Glands
- Remote Mounted Transmitter

Electrial Safety (Also see Electrical Safety Specifications section)

CSA, General Purpose (Ordinary) Locations . . . . . K
FM, General Purpose (Ordinary) Locations . . . . . M
No Approvals — Flowtube Marked with "CE" Logo . . . . . Z

Example: 9116A-SIBA-ESJ-PM

9200A Series Magnetic Flowtubes

Specify 9200A Series Magnetic Flowtube Model Number

Nominal Flowtube Size[a]

DN Flange Size	Inch Flange Size	Model
200 mm	8 in	9208A
250 mm	10 in	9210A
300 mm	12 in	9212A
350 mm	14 in	9214A
400 mm	16 in	9216A
450 mm	18 in	9218A
500 mm	20 in	9220A
600 mm	24 in	9224A
700 mm	28 in	9228A
-	30 in	9230A
800 mm	32 in	9232A
900 mm	36 in	9236A
1000 mm	40 in	9240A
-	42 in	9242A
-	44 in	9244A
1200	48 in	9248A

Tube Construction

AISI Type 304 Stainless Steel Tube (304 ss . . . . . –SI

End Connections

ANSI Class 150, Carbon Steel Flange — 8 to 24 in Line Sizes . . . . . BA
ANSI Class 150, Stainless Steel Flange — 8 to 24 in Line Sizes . . . . . BB
ANSI Class 300, Carbon Steel Flange — 8 to 24 in Line Sizes . . . . . BD
AWWA C-207, Class D Carbon Steel Flange — 28 to 48 in Line Sizes . . . . . WB
AS 2129, Table E, Carbon Steel Flange — 200 to 1200 mm Line Sizes . . . . . YA
BS 4505 (DIN 2501, PN 6, Carbon Steel Flange — 200 to 1200 mm Line Sizes . . . . . ZZ
BS 4505 (DIN 2501, PN 6, Stainless Steel Flange — 200 to 600 mm Line Sizes . . . . . ZK
BS 4505 (DIN 2501, PN 10, Carbon Steel Flange — 200 to 1200 mm Line Sizes . . . . . ZD
BS 4505 (DIN 2501, PN 10, Stainless Steel Flange — 200 to 600 mm Line Sizes . . . . . ZL
BS 4505 (DIN 2501, PN 16, Carbon Steel Flange — 200 to 1200 mm Line Sizes . . . . . ZE
BS 4505 (DIN 2501, PN 16, Stainless Steel Flange — 200 to 600 mm Line Sizes . . . . . FM
BS 4505 (DIN 2501, PN 25, Carbon Steel Flange — 200 to 600 mm Line Sizes . . . . . ZF
BS 4505 (DIN 2501, PN 40, Carbon Steel Flange — 200 to 600 mm Line Sizes . . . . . ZG

Liner Material

Neoprene . . . . . –N
EPDM (an Ethylene Propylene Terpolymer) . . . . . –E
ptfe High Temperature - 180˚C (350˚F) Limit; Includes Two Type "E" Liner Protection Rings . . . . . –H
ptfe - 120˚C (250˚F) Limit . . . . . -T
Ebonite . . . . . -B
Linatex . . . . . -L

(a) See "End Connection" selections further in Code for ANSI, AWWA, AS, and DIN flanges applicable to each flowtube size.

9200A Series Magnetic Flowtubes (Continued)

Electrodes(a)

- AISI Type 316Ti Stainless Steel (316Ti ss) . . . . . S
- 316 ss, Ceramic Coated . . . . . G
- Hastelloy C-276 . . . . . H
- Platinum-Iridium . . . . . P
- Titanium . . . . . T
- Monel . . . . . M
- Tantalum . . . . . B

Coil Drive

- Pulsed dc . . . . . J

Housing Construction/Transmitter Mounting

- Coated Carbon Steel Housing with Aluminum Terminal Box . . . . . –G
  - Terminal Box has 1/2 inch Conduit Threads
  - Remote Mounted Transmitter
- Coated Carbon Steel Housing with Polyamide Terminal Box . . . . . –P
  - Terminal Box has PG13.5 Conduit Threads with Cable Glands
  - Remote Mounted Transmitter

Electrial Safety (Also see Electrical Safety Specifications section)

- CSA, General Purpose (Ordinary) Locations . . . . . K
- CSA, Class 1, division 2 L
- FM, General Purpose (Ordinary) Locations . . . . . M
- FM, Nonincendive, Class 1, Division 2 . . . . . N
- CENELEC, EEx e ia, IIC . . . . . S
- No Approvals or Certifications– Flowtube Marked with "CE" Logo . . . . . Z

Example: 9216A-SIBA-NSJ-PM

(a) Fluid reference electrode included, except for flowtubes with a ptfe liner.

IMT 25 Transmitter

Specify IMT 25 Transmitter Model Number

Transmitter Housing

- Pipe Mounting . . . . . -P
- Surface Mounting . . . . . -S
- Flowtube Mounting[14,15] . . . . . -I

Language

- English/German (Available only with FoxCom Protocol Selection "D") . . . . . D
- English Only (Available only with HART Protocol Selection "T") . . . . . E

Nominal Supply Voltage and Frequency

- 85 to 264 V ac, 47 to 63 Hz 24 V dc . . . . . A
- 24 V dc[16] . . . . . B

Digital Communications Protocol
- Digital FOXCOM Protocol ..... D
- Digital HART Protocol ..... T

Integral Display/Keypad
- No Display/Keypad ..... A
- Wide Angle LCD Display/Keypad(16) ..... B

Transmission Output Signal(17)
- Internally Powered, 4-20 mA and Superimposed Digital (600 Baud FoxCom or 1200 Baud HART) 1
- Externally Powered, 4-20 mA and Superimposed Digital (600 Baud FoxCom or 1200 Baud HART) 2
- Internally Powered, 4800 Baud (FoxCom Digital Communication Protocol Code-D only) 3
- Externally Powered 4800 Baud (FoxCom Digital Communication Protocol Code - D only) 4

Pulse Output Signal (Field Selectable)(17, 18)
- Off 0
- On, Internally powered 1
- On, Externally powered 2

Electrical Classification(19)
- CSA, ordinary locations ..... K
- CSA, Class 1, Division 2, Class II, Division 2; Class III, Division 2 L
- FM, ordinary location ..... M
- FM, Class 1, Division 2 ..... N
- European Zone 2, Intrinsically Safe, ib Connection(20) ..... S
- European, Zone 2, Nonincendive, Ex N ..... U
- No Certification required ..... Z

Optional Selections
- I/O Access Port ..... A
- Display/Keypad Protective Cover ..... B
- Dual compartment enclosure with top insertion terminal block C
- Dual compartment enclosure with lug type terminal block ..... D
- Cable glands (non-conduit applications) (Not for Elec. Class -L or -N) ..... G

Specify signal cable (part number R0101ZS) length, transmitter to flowtube (part number R0101ZS for feet, or part number B4017TE for meters)

Specify other Optional Features

Specify information for instrument tag

Notes

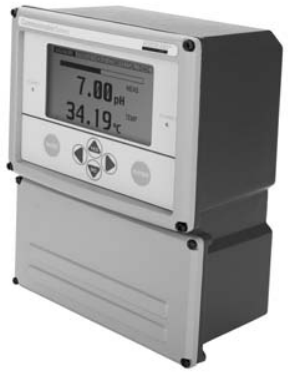
14 Flowtube mounted transmitter may only be used with process temperatures not exceeding 120°C (250°F)
15 IMT25 can only be integrally mounted to 8000A and 9300A Series Flowtubes
16 The 24 V dc selection requires greater than 1.5 amperes
17 Internal versus external power can be changed in field by switch selection
18 Pulse output can be configured as scaled or frequency pulse
19 These transmitters have been designed to meet the specified electrical safety descriptions. For status of testing laboratory approvals or certifications, contact Foxboro. Also see "Electrical Safety Specifications" section
20 Not available with the "-I" Flowtube Mounting selection

This product and its components are protected by one of the following U.S. patents: 4,773,275; 5,224,394; 5,773,723; 5,895,864 and others pending.

The following chapter contains Product Specifications of the Instruments:

875	Series Intelligent Electrochemical Line-Powered Analyzer for pH/ORP, Contacting Conductivity/Resistivity, or Electrodeless Conductivity
873	Series Electrochemical Analyzers for pH/ORP, Contacting Conductivity, Electrodeless Conductivity, Dissolved Oxygen, and Resistivity Measurement
870IT	Series Intelligent Electrochemical Two-Wire Transmitters for pH/ORP and Electrodeless Conductivity and Contacting Conductivity Measurement
871DO	Series Dissolved Oxygen Sensors
PH10, ORP10	DolpHin Series pH and ORP Sensors
871PH	Series pH and ORP Sensors

875 Series Intelligent Electrochemical Line-Powered Analyzer for pH/ORP, Contacting Conductivity/Resistivity, or Electrodeless Conductivity



These Microprocessor-based, line-powered intelligent analyzers, when used with compatible Foxboro sensors, provide high accuracy measurement indication, output and alarming capability for pH, ORP, conductivity or resistivity. A human interface guides the user through intuitive, menu-driven configuration, calibration, status, and diagnostic procedures. A history log provides a report for up to 100 time and date stamped events.

- Easy to Use
- Sensor and analyzer diagnostics
- Self-prompting Calibration Routines
- Dual 4 to 20 mA outputs and dual alarms
- Digital HART Communication
- RS-232 port and Windows-based configuration utility
- NEMA 4X field enclosure or panel mount with NEMA 4X front display
- pH/ORP/ISE Version
  - *Compatible with Preamplified or Unamplified pH/ORP sensors*
- EC Version
  - *Conductivity or Concentration Measurement*
  - *Up to three distinct applications, either standard or custom, may be programmed and autoswitched*
- CR Version
  - *Dual sensor inputs*
  - *Resistivity and/or conductivity measurement*

Functional Specifications

Analyzer Type	Measurement Range	Minimum Output Span Limit	Temperature Inputs	Power Requirements
pH/ORP	pH: -2 to 16pH ORP: -2000 to +2000mV ISE: 0-9999ppm	5% of scale chosen	100 ohm PT RTD 1000 ohm Pt RTD 3K ohm Balco RTD	24, 100, 120, 220, 240 Vac. 50 or 60 Hz
EC	0 to 50 µS/cm min 2000 mS/cm max	5% of scale chosen	100 ohm PT RTD 1000 ohm Pt RTD	24, 100, 120, 220, 240 Vac. 50 or 60 Hz
CR	Resistivity 0, 1 to 20Mohm.cm Conductivity 0-1 µS/cm to 0-20 mS/cm	5% of scale chosen	100 ohm PT RTD 1000 ohm Pt RTD 100K Thermistor	24, 100, 120, 220, 240 Vac. 50 or 60 Hz

Accuracy	Repeatability	Temperature	Electromagnetic Compatibility
Digital: pH ± .1% full scale Analog: pH ± .15% full scale	pH: ± .1% full scale	**Temp Limits:** -10 to 65°C **Ambient Temp effect /°C :** Digital: ± 0.05% of full scale Analog: ±0.05% of full scale	Compliant with EMC Directive 89-336-EEC When used as specified
Digital: EC ± .5% full scale Analog: EC ± .55% full scale	EC: ± .1% full scale		
Digital: CR ± .1% full scale Analog: CR ± .15% full scale	CR: ± .1% full scale		

How to Order—Specify model number 875 followed by order code for each selection

Specify Model Number					
For pH, ORP, or ISE	PH				
For Electrodeless Conductivity Measurement	EC				
For Contacting Conductivity or Resistivity	CR				
Supply Voltage or Frequency					
120V ac, 50 or 60 Hz		-A			
220V ac, 50 or 60 Hz		-B			
240V ac, 50 or 60 Hz		-C			
24V ac, 50 or 60 Hz		-E			
100Vac, 50 or 60 Hz		-J			
Enclosure Mounting					
Panel Mounting			1		
Field Mounting to a DN50 or 2 inch pipe			2		
Field mounting to a surface			3		
Pipe, Reinforced (3)			4		
Electrical Safety[1]					
Factory Mutual certified for ordinary & Div 2 Locations, n[2]				F	
CSA certified for ordinary & Div 2 Locations, n[2]				C	
UL Ordinary locations				U	
ATEX Protection "n" for Zone 2; II, 3, G; EEx nc IIC				N	
Options					
Storm Door					-A
Digital HART Communication and 4 to 20 mA output					-C
Configurator utility (IBM/PC-AT Software)					-F
Rugged Costruction, passed shock + vibration testing, and provides 4-20 mA outputs (4,5,6)					N
Rugged Costruction, passed shock + vibration testing, and provides 0 to 10 V dc outputs (4,5,6)					P

Specify Sensor Type:

pH: glass or antimony, ORP or ISE

EC (SP, HP, LB, UT, RE, BW, PP, PT, NL, TF, EV or 871FT flow through model

CR /Sensor cell factor/0.1cm^{-1}, 10cm^{-1} or other (both channels)

Specify Measurement Range and Units of Measurement (CR; both channels)

Analog Output Range (two outputs)

Specify Temperature Compensation Element:

875PH: 100 ohm PT RTD (2 or 3 wire), 1000 ohm Pt RTD (2 or 3 wire), 3K ohm Balco RTD

875EC: 100 ohm PT RTD (2 or 3 wire), 1000 ohm Pt RTD (2 or 3 wire), 100K Thermistor

875CR: 100 ohm PT RTD (2 or 3 wire), 1000 ohm Pt RTD (2 or 3 wire), 100K Thermistor

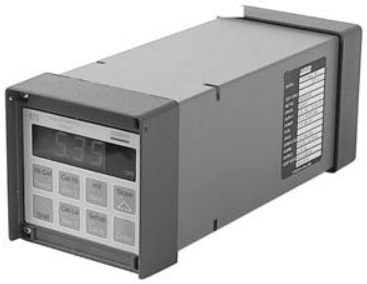
Specify Temperature Compensation

User Tag and Application

Notes

1 The 875 has been designed to meet the electrical safety descriptions listed above. For detailed information, or status of testing laboratory approvals or certifications, contact Foxboro.
2 Panel Mounted unit must be installed as follows: For Ordinary, Class I, Division 2 location; install in a protective enclosure to prevent accessibility to live parts. For Class II, and Class iii, Division 2 locations; install in a dust-tight enclosure.
3 Typically selected with 'N' option
4 Only available with supply volyage 'A'
5 Only available with mounting configuration '4'
6 Only available with safety configuration 'F'
7 Contact Foxboro

873 Series Electrochemical Analyzers for pH/ORP, Contacting Conductivity, Electrodeless Conductivity, Dissolved Oxygen, and Resistivity Measurement



- Dual Sensor Input
  - *contacting conductivity, resistivity, DPX, and dissolved oxygen versions can accept either one or two sensor signals*
  - *pH and EC versions accept one sensor*
  - *allows for ratio and "% rejection" measurements*
  - *both sensor measurements may be retransmitted*
- Low-Cost Analyzer
  - *molded Noryl enclosure provides a compact, full function, panel-mounted package*
  - *wide range capability built in*
  - *ideal for OEM applications*
  - *low-cost pH, contacting conductivity, electrodeless conductivity, resistivity, and dissolved oxygen versions are available*
- 1/4 DIN NEMA 4X Housing
  - *cast aluminum enclosure is epoxy coated and suitable for either panel, pipe, or surface mounting*
  - *the 92 x 92 mm (3.6 x 3.6 in) panel cutout uses minimal panel space*

Performance Specifications:

Accuracy: [1]
pH/ORP: ±0.1%
All others: ±0.5% of calibrated range

Repeatability: ±0.1%

Note
1 Reported as % of full scale used.

The 873 Series Electrochemical Analyzers, when coupled with 871 Series and PH10 Series Sensors, measure pH, ORP, conductivity, resistivity, or dissolved oxygen. For complete specifications, refer to Product Specification Sheet 6-1C1 E.

Functional Specifications

Output signal: Isolated, 4 to 20 mA dc, 0 to 20 mA dc, or 0 to 10 V dc, as specified.

Measurement Ranges and Span Limits:

Analyzer Type	Measurement Ranges	Minimum Output Span Limits
pH/ORP	pH -2 to +16 ORP -999 to +1400 mV	
DPX	-2 to +16 pH ORP -999 to 1400 mV ISE 0-2.000 ppm to 0-2000 ppm	
Resistivity	0 to 2 Mohm-cm minimum 0 to 20 Mohm-cm maximum	10% of Upper Measurement Range Value
Contacting Conductivity	0 to 1 µS/cm minimum 0 to 20,000 µS/cm maximum	10% of Upper Measurement Range Value
Electrodeless Conductivity	0 to 50 µS/cm minimum 0 to 2000 mS/cm maximum	10% of Upper Measurement Range Value
Dissolved Oxygen	0 to 100 ppm 0 to 100% saturation	10% of Upper Measurement Range Value

Light Emitting Diode (LED) Readout: 4 digits. Measurement Value: pH, mV, ppm, Mohm-cm, µS/cm, mS/cm, % (as applicable)

Temperature: Celsius (C°) or Fahrenheit (F°), depending on configuration

Alarms: Standard dual, setpoint adjustable zero to full scale; adjustable hysteresis is 0 to 99% of maximum upper measurement range value or dual feed, delay and trigger timers adjustable 0.00 to 99.99 minutes.Contacts rated 5A noninductive at 125 V ac, 30 V dc

Physical Specifications

Mounting:
General Purpose Enclosure: Panel Mounting only.
Field: (NEMA 4X) enclosure.
Panel, pipe, surface, or movable surface mounting

Housing:
General Purpose Enclosure: Molded, glass filled Noryl with NEMA 12 front panel.
Field: (NEMA 4X enclosure)—cast and extruded aluminum, coated with epoxy-based paint

***** Actual measurement range 0-20.0 ppm with 871D0 sensor

How to Order—Specify model number 873 followed by order code for each selection

Analyzer
- pH and ORP . . . PH
- Resistivity . . . RS
- Contacting Conductivity . . . CC
- Electrodeless Conductivity . . . EC
- Dissolved Oxygen . . . DO
- Dual pH/ORP/ISE . . . DPX

Supply Voltage and Frequency: 50/60 Hz
- 120 V ac . . . A
- *220 V ac . . . B
- *240 V ac . . . C
- 24 V ac . . . E
- 100 V ac . . . J

Measurement Output: Isolated
- 4 to 20 mA dc . . . I
- 0 to 10 V dc . . . T
- 0 to 20 mA dc . . . E

Enclosure
- General Purpose (Molded Noryl) Panel Mount . . . P
- Field-Mounted (Metal) Panel Mount . . . W
- Field-Mounted (Metal) Surface Mount . . . X
- Field-Mounted (Metal) Pipe Mount . . . Y
- Field-Mounted (Metal) Movable Surface Mount . . . Z

Electrical Certification
- CSA Certified for Ordinary Locations (Supply Voltage A, E, and J only) . . . CGZ
- CSA, Division 2 A, E, and J only. Not available with Enclosure P . . . CNZ
- Factory Mutual Certified for General Purpose Locations . . . FGZ
- Factory Mutual Certified Nonincendive for Class I, Division 2, Groups A, B, C, and D; and suitable for Class II, Division 2 Groups F and G hazardous locations. Not available with Enclosure P . . . FNZ

Optionsi
- Curve Generation Program (EC & CC versions only) . . . 5
- Storm Door . . . 7

Specify Sensor Type:

pH: pH, ORP, antimony

DPX: pH, ORP, ISE (both channels)

EC: SP, HP, LB, UT, RE, BW, PP, PT, NL, TF, EV, or Complete FT Model

CC: 0.1/cm CF or 10/cm CF

Specify Measurement Range (Full Scale) with Measurement Units

Specify Temeperature Element:

EC: 100 K Thermistor or 100 ohm RTD

CC: 100 Kohm Thermistor or 100 ohm RTD

RS: 100 Kohm Thermistor or 100 ohm RTD

Specify Temerature Compensation (EC only)

Specify User Tag and Application

*220 and 240 V ac have CE certification.

870IT Series Intelligent Electrochemical Two-Wire Transmitters for pH/ORP Contacting Conductivity/Resistivity and Electrodeless Conductivity Measurement

These 2-wire intelligent transmitters, when coupled with 871 Series and PH10 Series Sensors, provide measurement indication and a choice of analog or digital outputs for recording or control of pH/ORP, contacting conductivity/resistivity, or electrodeless conductivity. Their human interfaces and on-line diagnostics provide local configuration, calibration, status and troubleshooting.

- Sensor and Transmitter Diagnostics
- Self-prompting Calibration Routines
- 4 to 20 mA and/or Digital Communications
- Intrinsically Safe Construction
- Remote Configuration Via Personal Computer and Foxboro PC10/PC20/PC50 Software
- pH/ORP Version
  - ✔ *Compatible with Preamplified or Unamplified pH/ORP Sensors*
  - ✔ *Compatible with most Ion Selective Electrodes (ISE)*
- EC Version
  - ✔ *Conductivity or Concentration Measurement*
  - ✔ *Up to Three Distinct Applications, either standard or custom, May be Programmed and Autoswitched*
- CR Version
  - ✔ *Conductivity and/or Resistivity Measurement*

Physical Specifications

Enclosure Classification: NEMA 4X and IEC IP65
Mounting: Panel, pipe or surface.

Functional Specifications

Measurement Range:
pH: -2 to +16
ORP: -2000 to +2000 mV
ISE: 0 to 9999 ppm
EC:17 selectable ranges from 50 µS/cm to 2000 mS/cm
CR: 44 selectable ranges for Mohm-cm, kohm-cm, mS/m, µS/cm, S/m, mS/cm

Sensor Diagnostics:
pH: Broken glass electrode, aging glass electrode, liquid leakage, preamp failure, temperature compensator failure, fouled reference junction.
CR + EC: Open temperature compensator, short temperature compensator, liquid leakage into sensor body

Display:
4-digit liquid crystal (LCD) with legends for: pH: pH, ORP (mV), ISE (ppm), temperature (C,F), and milliamps (mA)
EC: conductivity (µS/cm, mS/cm, concentration (%, g/L, oz/gal, ppm, ppt), temperature (C,F) and milliamps (mA)
CR: conductivity (µS/cm, mS/cm, mS/m,and S/m), resistivity (Mohm-cm & kohm-cm) and concentration (%, g/L, oz/gal, ppm, ppt), temperature (C, F) and milliamp (mA)

Input Impedance (pH unit): 10^{12}ohm minimum on measurement and reference inputs.

Power Requirements: 12.5 to 42 V dc.

Performance Specifications

Digital			**Accuracy and Repeatability**
pH:			±0.009pH
ORP:			±0.5mV
EC:			±0.3% of full scale
CR:			
Sensor Cell Factor	Full Scale Values	Up To Full Scale Value	Above Full Scale Value
0.1	20, 15, 10, 5 Mohm-cm; 1, 2, 5 10 µS/cm	±0.1% of full scale	±0.1% of reading
0.1	2,1 Mohm-cm; 100, 50 kohm-cm; 20, 50, 100, 200 µS/cm	±0.3 % of full scale	±0.3% of full scale
10	0.2, 0.5, 1, 2 5, 10, 20 mS/cm	±0.3% of full scale	±0.3% of reading

Analog
pH: Digital Accuracy ±.04% of Full Scale
EC: Digital Acurracy ± .03% of Full Scale
CR: Digital Accuracy ± .03% of Full Scale

How to Order—Specify model number 870IT followed by order code for each selection

Transmitter Type					
For pH, ORP, or ISE Measurement	PH				
For Electrodeless Conductivity Measurement	EC				
For Contacting Conductivity/Resitivity Measurement	CR				
Communications and Measurement Output					
No Digital Communication, 4 to 20 mA Analog Output only		A			
I/A Series Communication, Software Configurable to:		F			
IT1 Mode: 4 to 20mA Output and Low Speed Digital Communications					
IT2 Mode: High speed Digital Communications only, 4800 Baud					
Enclosure Mounting					
Panel Mounting			W		
Surface Mounting			X		
Pipe Mounting (DN 50 or 2-in Pipe)			Y		
Electrical Safety					
CSA certified for Class I, II, and III, Division 2, Groups A, B, C, D, F, and G, hazardous locations[1]				CNZ	
CSA certified intrinsically safe for Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G, hazardous locations[1,2]				CAA	
Factory Mutual Certified Nonincendive for Class I, II, and III, Groups A, B, C, D, F and G, Division 2 hazardous locations				FNZ	
Factory Mutual Certified intrinsically safe for Class I, II, and III, Groups A, B, C, D, E, F, and G, Division 1 hazardous locations[2,3]				FAA	
CENELEC certified intrinsically safe for Gas Groups II C, Zone 0, ia connectivity[2,3,5]				EAA	
European nonsparking for Gas Group II, Zone [2,4,5]				KNZ	
Optional Selections					
Special per Engineering Order					1
Storm Door					7

Specify measurement range and units

Specify measuring electrode type (for 870ITPH series only). Glass pH, antimony pH, ORP, or ISE (specify type)

Specify sensor type (for 870ITEC series only). SP, HP, LB, UT, RE, BW, PP, PT, NL, TF, EV or 871FT (complete model)

Specify Sensor Cell factor (for 870ITCR only) Specify 0.1cm^{-1}, 10cm^{-1} or other

Specify temperature compensation choice: (EC and CR only)

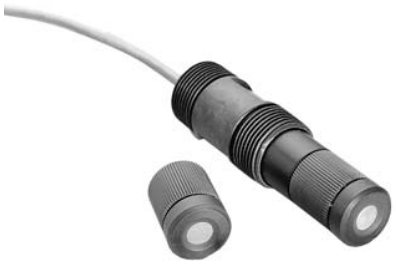
Specify temperature compensation input. For 870ITPH: 100 ohm RTD, 1000 ohm RTD, or Balco 3K RTD. For 870ITCR or 870ITEC: 100 ohm RTD, 1000 ohm RTD, or 100 Kohm thermistor

Specify information for instrument tag

Notes

1 When used with Sensor Types 871PH, 871A or PH10
2 When used with Sensor Types 871EC-SP, HP, LB, UT, RE, BW, PP, PT, NL, TF, EV, or 871FT
3 When used with Sensor Types 871PH-3, 4, 5, 6, or 871A-1, 3, 4, or PH10
4 When used with any nonincendive sensor type
5 Contact Foxboro

871DO Series Dissolved Oxygen Sensors



- Advanced Diagnostics
  - *membrane fouling detection*
  - *membrane breakage detection*
  - *electrolyte bubble detection*
- Easy Installation and Maintenance
  - *one piece field replaceable membrane cap*
  - *optional automatic mechanical membrane cleaner*
  - *multiple mounting accessories, including ballfloat*
- Durable Sensor Design
  - *process resistant PVDF and Noryl construction*
  - *stainless steel reinforced composite membrane*

The 871DO Sensor, when used in conjunction with DO Accessories, and the 873DO Electrochemical Analyzer, provides a reliable and accurate measurement of dissolved oxygen in aeration basins, aqueous streams, ponds, and industrial processes.
For complete specifications, refer to Product Specification Sheet PSS 6-9B1 A.

Specifications

Sensor Type: Polarographic Clark Cell with composite membrane enclosing four electrodes in KCl electrolyte
Measuring Electrode: Gold
Isolated Reference Electrode: Silver/Silver Chloride (Ag/AgCl)
Auxiliary (Counter) Electrode: Silver
Test Electrode: Gold

Membrane: Composite Stainless Steel reinforced membrane on replaceable cap

Process Wetted Parts Materials:
Body: PVDF (Upper Housing), Noryl (Lower Housing)
Membrane: Silicone Rubber
Membrane Cap Holder: Noryl
O Ring: Silicone Rubber, Viton,and EPR
Vent Cap: Acetal
Vent Seal Gasket:Silicone Rubber
Automatic Temperature Compensation: Achieved using 100 k ohm thermistor within sensor to provide compensation between 0 and 50°C (32 and 122°F)

Process Pressure-Temperature Limits: 0 and 210 kPa gauge (0 and 30 psig) 0 and 50°C (32 and 122°F)

Sensor Mounting: 1-in external MNPT on both ends, with a 1.125-in wrench flat on body. For in-situ or in-line mounting, as required.

Cable Length:
Integral Cable, Standard: 9 m (30 ft)
Integral Cable Maximum: 150 m (500 ft)

Integral Cable Terminations:
Standard Terminations: Seven connections #22 AWG, stripped and tinned.
Optional Terminations: Male connector to mate with patch cable from 873DO Analyzer.

Approximate Mass: 0.34 kg (0.75 lb)

How to Order—Specify model number 871DO followed by order code for each selection

Membrane

Composite membrane C

Optional Features

Nonstandard length integral cable, terminated in stripped and tinned leads, 150 m (500 ft) maximum. Specify length . . . 3
Nonstandard length integral cable, terminated in male connector, 150 m (500 ft) maximum. Specify length[1] 5
Standard length 9 m (30 ft) integral cable, terminated in male connector[1] 7

Specify cable length, if nonstandard

Specify mounting hardware, junction box, and extension cable, if required (Refer to PSS 6-9B1 A for details)

Specify information for instrument tag

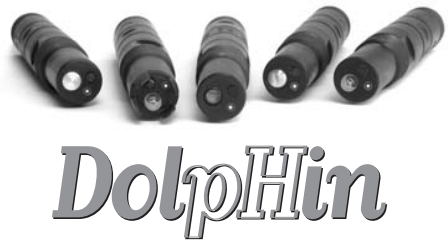
This product and its components are protected by U.S. patent 5,326,447. Corresponding patents have been issued or are pending in other countries.

Notes

1 Requires patch cord. Specify either P/N BS806JY (10 ft) or P/N BS806JT (special length per sales order).

DolpHin™ Series pH Sensors

The DolpHin™ Series pH sensor provides highly accurate and stable pH measurements in process applications. Sensors address process applications from routine to the most severe pressure, temperature, and chemical conditions. A comprehensive suite of mounting and wiring accessories make the DolpHin™ Series the easiest to install, calibrate, and service. The sensors are compatible with older analyzers and are fully compatible with the Intelligent Models 875PH and 87OITPH Transmitters. DolpHin™ Series delivers breakthrough performance in a rugged easy-to-use design.



Ordering Information — Specify

- Model Number from Page 4
- User Tag Information
- Order Separate Items, as needed (see Price Book Sections, as noted)
  - *pH Analyzer/Transmitter (see section 6-1)*
  - *Accessories and mounting hardware (see section 6-1ZI, page 5 and 6)*
  - Calibration Buffers (see section 6-11A1, page 3)
- Certifications as needed

Performance (at Reference Conditions)

Accuracy: ± 0.02 pH Domed High Temp Glass Electrode
Repeatability: ± 0.02 pH Domed High Temp Glass Electrode
Stability: ± 0.02 pH/24 Hours Domed High Temp Glass Electrode

Model Description

Model PH10 DolpHin Series are a family of high performance pH sensors with extensive features and accessories. Breakthrough performance in stability, accuracy, and long life makes DolpHin the premier pH sensor for on-line process application.

Laboratory testing and extensive field trials have proven DolpHin's superior performance. It outlasts other sensors in high temperature and temperature cycling applications up to 121°C (250°F). It remains fast and accurate, while conventional pH sensors lose sensitivity and are slow to respond to pH changes. Foxboro engineers have formulated a unique pH glass formulation which makes DolpHin exceptionally stable, accurate, and long lasting, even in the harshest process applications. Every component of the DolpHin sensor has been designed to maximize ease-of-use, long life, and accuracy, including: the precision reference junction, high temperature electrolyte, reference electrode with Nafion ion barrier, ultra fast automatic temperature compensation, and a single rugged body that fits the widest variety of mounting accessories. The elegance of the DolpHin design delivers a single, easy-to-use sensor with unmatched pH measurement performance.

Standard Specifications

Measuring Electrode:
Domed High Temperature Glass pH with and without protective guard
Flat Glass pH
Antimony pH

Reference Electrode:
Precision double junction with ceramic external process wetted junction and ion-barrier internal junction high temperature Gel Electrolyte. Ag/AgCl half cell.

Measurement Range:
Domed High Temperature Glass pH electrode: 0 - 14 pH
Flat Glass pH electrode: 2,& 12 pH
Antimony pH electrode: 1 - 11 pH

Preamplifier:
Available with Model Code Selection -P
Integral, encapsulated, differential high impedance

Automatic Temperature Compensation:
For use with Model 873PH and older Analyzers
2-wire platinum RTD, 100 ohm
For use with 87OITPH and 875PH Analyzers
3-wire platinum RTD, 1000 ohm
For use with non-Foxboro Analyzers that require 2-wire. 3K Balco RTD. 3000 ohm
Enhanced response: Both l00 ohm and 1000 ohm Pt RTD selections are available in an enhanced speed of response configuration, response, for applications requiring fast temperature response.

Wetted Parts:
Body: PVDF (Kynar)
Measuring Electrode: Glass or Antimony as specified in Model Code
Reference Junction: Ceramic
O-Rings: Viton is standard; Chemraz or EPDM are optional selections
Solution Ground: Conductive PVDF

Sensor Mounting:
3/4 inch NPT on both ends of sensor for direct process connection or submersion.
Split-ring grooves located in two places on the sensor allow for adapter mounting at two different insertion depths.

A comprehensive suite of mounting accessories is available for DolpHin™ Series pH sensors, see Product Specification Sheet and Auxiliary Specifications.

Cable Length:

Model Code Selection -Q does not include cable

Standard cable length is 10 feet for Model Code Selections -A and -B

Longer cable lengths are available in increments of 10 feet up to 50 feet maximum length may be optionally selected. Junction box and extension cable are available for longer than 50 feet cable requirements.

Sensor Termination:

Model Code Selection -A provides 10' integral cable with individual leads terminated with straight-pin, crimped-on lugs.

Model Code Selection -B provides 10' integral cable terminated with a threaded "quick" connector. This selection requires an extension cable with mating connector.

Model Code Selection -Q provides a threaded "quick" connector integral to the sensor. This selection requires an extension cable with mating connector.

Analyzer/Transmitter Compatibility:

875PH: all DolpHin™ pH Sensors

87OITPH: all DolpHin™ pH Sensors

873PH: all DolpHin™ pH Sensors, except Temp Comp Types –2, 4, and 5

873APH: all DolpHin™ pH Sensors, except Antimony electrodes and temp comp types -2, 4 and 5

873DPX: all DolpHin™ pH Sensors, except Temp Comp types -2, 4 and 5

870PH and other older transmitters: Contact Foxboro

Temperature/Pressure Rating:

121°C / 100 psi Domed High Temperature Electrode (Electrode Type 1, 2,4)

85°C / 100 psi Flat Glass Electrode (Electrode Type 3)

NOTE: Preamplifier Selection "P" will derate temperature specification to 85°C when sensor is mounted in submersion or insertion type installation. For in-line installation, no derating applies.

Consult "Model Code Selection Guide" in PSS 6-1C3 A for help making sensor selections

How to Order—Specify model number PH10 followed by order code for each selection

pH Electrode Type:				
Domed Glass High Temperature Bulb with Protective Guard	.1			
Domed Glass High Temperature Bulb without Protective Guard	.2			
Flat Ruggedized Glass	.3			
Antimony	.4			
Preamplifier:				
None		N		
Internal Preamplifier[1]		P		
Temperature Coninensation:				
2-Wire, 100 Ω Platinum RTD			1	
3-Wire, 1000 Ω Platinum RTD			2	
2-Wire, 100 Ω Platinum RTD, Enhanced Response Speed			3	
3-Wire, 1000 Ω Platinum RTD, Enchanced Response Speed			4	
2-Wire, 3 kΩ Balco RTD			5	
Sensor Termination:				
10 ft (3.05 m) Integral Cable Terminated w/Crimped-on Straight Pin Lugs				A
10 ft (3.05 m) Integral Cable Terminated w/ Variopin "Quick" Connector[2, 3]				B
Variopin "Quick" Connector integral to Sensor[2, 3]				Q
Optional Selections:				
Specify One				
EPDM O-Rings[4]				-E
Chemraz O-Rings[4]				-C
Specify One				
Integral Sensor Cable, 20 ft (6.1 m) long[5]				-2
Integral Sensor Cable, 30 ft (9.1 m) long[5]				-3
Integral Sensor Cable, 40 ft (12.2 m) long[5]				-4
Integral Sensor Cable, 50 ft (15.2 m) long[5]				-5
Integral High-Temp Sensor Cable. 10 ft (3.05 m) long[1, 5]				-1H
Integral High-Temp Sensor Cable, 20 ft (6.1 m) long[1, 5]				-2H
Integral High-Temp Sensor Cable, 30 ft (9.1 m) long[1, 5]				-3H
Integral High-Temp Sensor Cable, 40 ft (12.2 m) long[1, 5]				-4H
Integral High-Temp Sensor Cable. 50 ft (15.2 m) long[1, 5]				-5H

Notes

1 High Temperature cable not available with Preamplifier Code "P

2 Not valid with combination of Preamplifier Code "P" and Temperature Compensation Codes 2 or 4

3 Requires mating patch cord with integral Variopin connector, if not customer supplied

4 Standard 0-Ring material is Viton

5 Cable Options applicable to Sensor Termination Codes "A" and "B" only

EPDM is Ethylene-Propylene Terpolymer, also known as EPR (Ethylene-Propylene Rubber)
Chemraz is a Perfluoro Elastomer

871 PH Series pH, ORP (including DolpHin technology)

The 871PH Series pH and ORP Sensors, when coupled with 873PH and 875PH Series Analyzers or 870ITPH Series Transmitters, provide pH or ORP measurements of process solutions.

For complete specifications, refer to Product Specification Sheet PSS 6-1C2 A.

- Rebuildable Sensor Design
  - *replaceable plug-in electrodes provide extended sensor life*
  - *low-cost electrode and reference junction kits help control replacement costs*
  - *one probe fits all applications*
  - *changeable mounting minimizes spare parts*
- Versatile Mounting
  - *twist lock*
  - *easy installation and removal*
  - *for submersion, insertion, and flowthrough applications*
- Choice of Electrodes
  - *pH: spherical, flat, or domed glass, antimony*
  - *ORP: gold, platinum*

New Feature Highlights

Many new measuring electrodes, reference junctions, options, and accessories have been added to the 871PH sensor family. These include:

- High temperature electrode featuring unique DolpHin™ Series high temperature glass
- Patented double junction reference with integral Nafion ion barrier
- Variopin Quick cable connector
- Optional selections for high temperature cable and O-Ring material
- A ptfe collar, which improves self cleaning, and also minimizes coating buildup.

Physical Specifications:

Materials: Ryton or CPVC housing; Viton O-rings. See How to Order table for electrodes and metallic wetted parts.

Mounting: Refer to Product Specification Sheet PSS 6-1C2 A for mounting options

Functional Specifications

Pressure/Temperature Ratings:

Ryton Body

Measuring Electrode Type	Ball Valve or Submersible Installation		In-Line Installation	
	Maximum Pressure	Temperature Range	Maximum Pressure	Temperature Range
Spherical Glass pH	0.7 MPa (100 psi)	-5 to + 80°C (20 to 175°F)	0.7 MPa (100 psi)	-5 to + 100°C (20 to 212°F)
Flat Glass pH	1 MPa (150 psi)	-5 to + 80°C (20 to 175°F)	1 MPa (150 psi)	-5 to + 85°C (20 to 185°F)
Domed DolpHin Glass pH	0.7 MPa (100 psi)	0 to + 80°C (32 to 175°F)	0.7 MPa (100 psi)	0 to + 121°C (32 to 250°F)
Antimony pH	1 MPa (150 psi)	-5 to + 80°C (20 to 175°F)	1 MPa (150 psi)	-5 to + 125°C (20 to 255°F)
ORP	1 MPa (150 psi)	-5 to + 80°C (20 to 175°F)	1 MPa (150 psi)	-5 to + 125°C (20 to 255°F)

CPVC Body

Measuring Electrode Type	Ball Valve or Submersible Installation			In-Line Installation		
	Maximum Pressure at Operating Temperature			Maximum Pressure at Operating Temperature		
Spherical Glass pH(a)	0.9 MPa (125 psi) at -5°C (20°F)	0.6 MPa (90 psi) at 50°C (120°F)	0.3 MPa (50 psi) at 80°C (175°F)	0.9 MPa (125 psi) at -5°C (20°F)	0.3 MPa (50 psi) at 80°C (175°F)	0.1 MPa (15 psi) at 100°C (212°F)
Flat Glass pH						
Domed DolpHin Glass pH						
Antimony pH						
ORP						

(a) Maximum Pressure at -5°C (20°F) for Spherical Glass pH electrode is 0.7 MPa (100 psi).

Temperature Compensation: Sensor includes encapsulated automatic temperature compensator which covers range -5 to + 125°C (20 to 255°F).

Analyzer/Transmitter Compatibility:
873PH: 871PH-1, -2
870ITPH: 871PH-3, -4, -5, -6
Note: 871PH-1,2 are compatible but some diagnostics are not available.
875PH:871PH-3, -4, -5, -6
Note: 871PH-1,2 are compatible but some diagnostics are not available.

Measuring Electrodes: Plug-in interchangeable electrodes; glass pH electrodes employ high stability silver, silver chloride (Ag, AgCl) internals. Ryton, ptfe, or ctfe as specified and now available with DolpHin High Temperature Glass.

Reference Electrode: Non flowing,with Ag,AgCl internals and potassium chloride (KCl) saturated with AgCl electrolyte. Process junction is ceramic and now available with patented double junction with Nafion ion barrier.

How to Order—Specify model number 871PH followed by order code for each selection.

Sensor Body Material and Diagnostic Configuration					
Ryton, Standard Configuration, Integral Preamp[1]	-1				
CPVC, Standard Configuration, Integral Preamp[1]	-2				
Ryton, Intelligent Configuration, Integral Preamp[2]	-3				
CPVC, Intelligent Configuration, Integral Preamp[2]	-4				
Ryton, Intelligent Configuration, No Preamp[2]	-5				
CPVC, Intelligent Configuration, No Preamp[2]	-6				
Measuring Electrode and Body Material					
Spherical Glass pH, Ryton		A			
Antimony pH, Ryton		B			
Platinum ORP, Ryton		D			
Gold ORP, Ryton		E			
Flat Ruggedized Glass pH, Ryton[3]		F			
Domed High Temperature Glass pH, Ryton		G			
Spherical Glass pH, ptfe		P			
Antimony pH, ctfe		Q			
Platinum ORP, ctfe		R			
Gold ORP, ctfe		S			
Flat Ruggedized Glass pH, ptfe[3]		T			
Domed High Temperature Glass pH, ptfe		U			
None		X			
Sensor Wetted Metallic Parts Material					
Titanium			1		
Carpenter 20 Cb			2		
AISI Type 316L stainless steel			3		
Monel			5		
Tantalum			6		
Reference Junction and Body Material					
Ceramic, Ryton				A	
Ceramic, ptfe				B	
Ceramic, Double Junction, Ion Barrier, pvdf				D	
Optional Features[4]					
Nonstandard Cable Length (not available with Option -Q)[4]					-3
Nonstandard length integral cable, terminated in male connector. Specify length. (not available with Option -4, -B, -Q, -H)[4, 5, 6, 7]					-5
Standard length 6 m (20 ft) integral cable, terminated in male connector. (not available with Option -4, -B, -Q, -H)[5, 6, 7]					-7
Integral High Temperature Cable (With Sensor Body -5, -6; not avail. with Options -5, -7, -Q)					-H
Integral Cable Terminated with Variopin Quick Connector (not avail. with Options -4, -5, -7)[7, 10]					-B
Variopin Quick Connector Integral to Sensor (not avail. with Options -3, -4, -5, -7)[7, 10]					-Q
EPDM O-Rings (standard o-rings are Viton)					-E
Chemraz O-Rings (standard o-rings are Viton)					-C
No spade lug terminals attached to end of cable (not avail. with Options -5, -7, -B, -Q)[8]					-4
Teflon Collar, ptfe					-T

Specify cable length, if nonstandard.
Specify information for instrument tag
Specify sensor mounting option
Specify replacement electrodes, if desired

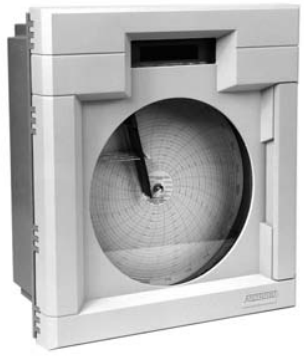
Notes

1 Does not support the sensor diagnostic features of 870ITPH Transmitter and 875PH Analyzer.
2 Compatible with 870ITPH Transmitter and 875PH Analyzer only.
3 Optimum accuracy is in the range of 2 to 12 pH. It can be used with pH instruments that are ranged from 0 to 14 pH.
4 Standard cable length if not specified = 6 m (20 ft).
Maximum integral cable length = 33 m (100 ft) for 870PH pH/ORP transmitters.
150m (500 ft) for 870ITPH Transmitters and the 873PH, 873APH, and 873DPX Electrochemical Analyzers and 875PH Analyzers.
5 Requires Patch Cable from 6-1Z1.
6 Not compatible with ball valve assembly mountings.
7 Compatible with 871PH-1 and 871PH-2 only, this option is NOT a Variopin style connector.
8 All cables that do not have connectors, have leads terminated with straight pin lugs, and are now compatible with all Foxboro Analyzers and Transmitters. Option -4 is no longer required for compatibility with 873 Series. Option -4 is included for customers who automatically order it.
10 When used with 871PH-3, 4, the standard 3-Wire 1000 Ω RTD is supplied as 2-Wire, 1000 Ω RTD.

The following chapter contains Product Specifications of the Instrument:

740R Series Digital Circular Chart Recorders

740R Series Digital Circular Chart Recorder



- Brilliant, 40-character dot matrix display
- Wide range of standard inputs including mA, mV, Thermocouple, and RTD
- Completely watertight and dusttight. Conforms to NEMA Type 4 requirements.
- Completely self-contained. Separate configurators are not required.
- Compatible with Model 40 Series mechanical recorders
- Fully isolated inputs and outputs
- Four independent timers for logic or event-driven activities

The 740R Digital Circular Chart Recorder indicates and continuously records up to four electronic analog signals on a 12-inch circular chart. This microprocessor-based unit also offers a wide variety of user-configurable process supporting functions such as alarms, totalizers, calculations, and curve characterizers.

Refer to Product Specifications sheet PSS 2C-1A8 A for complete description and specifications.

Physical Specifications

Environmental Protection: Completely watertight and dust-tight, reinforced polyester enclosure. Conforms to the stringent requirements of NEMA Type 4.

Dimensions: Nominal 15.6 in wide by 17.3 in high by 7.9 in deep

Mounting: Surface, panel, or pipe

Display Format: Blue-green, fluorescent panel with 40 dot matrix characters

Functional Specifications

Pens: 1, 2, 3, or 4 as specified. Pen 1 (inner position) is red, pen 2 is violet, pen 3 is green, pen 4 (outer position) is blue.

Supply Power: 90 to 132 V or 180 to 264 V ac, as specified, 45 and 65 Hz, 30 watts (90 watts with optional enclosure heater coded)

Ambient Temperature Limits: 0 to 50°C (32 to 122°F)

Relative Humidity Limits: 5 and 95%, noncondensing

Input Signals: 0 to 20 mV through 0 to 100 V dc; RTD, ANSI, or IEC 100 ohm platinum, 10 ohm copper, 120 ohm nickel; thermocouple, ISA or ANSI Types T, J, E, C, L, K, N, R, S, and B. All inputs are fully isolated from line power, ground, and each other.

Signal Conditioning: Square root, 3/2 and 5/2 power; log 10

Chart Speed: Configurable from 1 to 4096 hours for each revolution

Charts: Approximately 10 complimentary, 24-hour charts with 0 to 100% graduations are supplied with the recorder. Order quantity and range of charts desired separately

Sample Rate: Two samples per second on each channel

Alarms: Up to 4 alarms with individual set points on each channel. Configurable for high, low, deadband, and rate-of-change alarm action.

Optional Features

- *Transmitter Power Supply:* 29 V dc for up to four 2-wire transmitters
- *Totalizer:* Up to four fully scalable totalizers. Configurable reset and preload functions
- *Calculations and Characterizer:* Standard arithmetic functions plus preconfigured specialized applications
- *Enclosure Heater:* Extends low temperature limits from standard 0°C (32°F) down to -20°C (-4°F).
- *Contact Outputs:* Dry relay contacts for alarm status and remote counter drivers
- *NEMA 4X:* Provides additional corrosion resistance in conformance with NEMA Type 4X requirements

How to Order—Specify model number 740RA followed by order code for each selection

Nominal Supply Voltage and Frequency						
V ac, 50/60 Hz	A					
240 V ac, 50/60 Hz	C					
Input Channel One						
0 to 20 mV through 0 to 5V, RTD and TC		1				
0 to 5 V through 0 to 100 V		2				
4 to 20 mA		3				
Same as 1 above, without pen		6				
Same as 2 above, without pen		7				
Same as 3 above, without pen		8				
Input Channel Two						
None			0			
0 to 20 mV through 0 to 5 V, RTD and TC			1			
0 to 5 V through 0 to 100 V			2			
4 to 20 mA			3			
Same as 1 above, without pen.			6			
Same as 2 above, without pen.			7			
Same as 3 above, without pen.			8			
Input Channel Three						
None				0		
0 to 20 mV through 0 to 5 V, RTD and TC				1		
0 to 5 V through 0 to 100 V				2		
4 to 20 mA				3		
Same as 1 above, without pen				6		
Same as 2 above, without pen				7		
Same as 3 above, without pen				8		
Input Channel Four						
None					0	
0 to 20 mV through 0 to 5 V, RTD and TC					1	
0 to 5 V through 0 to 100 V					2	
4 to 20 mA.					3	
Same as 1 above, without pen					6	
Same as 2 above, without pen					7	
Same as 3 above, without pen					8	
Optional Selections						
28 V Transmitter Power Supply						A
Calculated Variables and Custom Curve						B
One Totalizer						C
Two Totalizers						D
Three Totalizers						E
Four Totalizers						F
Dual Ramp Generator						G
Tamper-Evident Feature						K
NEMA 4X Enclosure						L
Polycarbonate Door Windows						M
Pipe Mounting						N
Enclosure Heater						P
Two Relay Outputs						Q
Four Relay Outputs						R
Six Relay Outputs						S
Eight Relay Outputs						T
Eight Contact Inputs						U
Sixteen Contact Inputs						V

The following chapter contains Product Specifications of the Instruments:

731C Series Digital Process Controller

740C Series Digital Circular Chart Recording Controller

731C Series Digital Process Controller

- Accuracy better than ±0.25% of Span
- Small ¼ DIN Size, 96 x 96 x 150 mm
- Light Weight, approximately 0.45 kg (1 lb)
- Two, Bright, easily Read Measurement and Set Point Displays, and one Bar graph Display to Continuously Indicate Output Signal
- Integral 6-Tactile Push Button Keypad
- Ten Status Message and Mode LED Displays
- Universal Power Supply, 88 to 265 V ac, 50 or 60 Hz
- Pre-Tuning and Auto-Tuning
- IEC/IP65 Front Panel Prevents Ingress of Dust and Water

The 731C is a general purpose process controller which accepts thermocouple and RTD temperature inputs directly as well as normal 4 to 20 mA signals from transmitters.

The display has 2-lines with four large, 7-segment characters in each line for continuous indication of both the set-point and the process variable. Automatic tuning of the PID control modes is a standard feature.

Refer to Product Specifications sheet PSS 2C-1A10 A for complete description and specifications.

Physical Specifications

Enclosure: Extruded aluminum case and molded, flame retardant Noryl front panel, rear panel, and rear terminal cover

Environmental Protection: The gasketed front panel protects the instrument from ingress of dust and water in conformance with the requirements of IEC IP65

Approximate Mass: 0.45 kg (1 lb)

Mounting: The controller is a ¼ DIN size instrument that mounts in a panel

Functional Specifications

Input Signal Types (Software Selectable): Thermocouple,Resistance Temperature Detector Milliamp, Millivolt, or Volt

Sample Rate: Four times per second

Relay Output (Form C): Single pole, double throw (SPDT) or Alarm 1, as specified. Optionally available for Alarm 2

Power Consumption: Less than 15 VA

Output Signals:

Output 1: Time proportioned or Alarm 1 Relay
Output 2: 0 to 20 or 4 to 20 mA, or Alarm 1 Relay
None: Output 1 and/or Output 2 function as an indictor

Optional Features

- ✔ 30 Volt Transmitter Power Supply RS-485
- ✔ 2-Wire Serial Communication
- ✔ One SPDT Relay Output for Alarm 1 or 2
- ✔ 4 to 20 mA Retransmission Output
- ✔ Remote Set Point

5

How to Order — Specify model number 731CA for digital process controller, followed by order code for each selection

Input Signal[1, 2]			
Thermocouple, Type J	1		
RTD, DIN, 100 ohm Platinum	2		
4 to 20 mA dc	3		
Output Signal[1]			
None (Indicator Only)		0	
4 to 20 mA dc		1	
4 to 20 mA dc and One SPDT Relay for Alarm[1]		2	
Time Proportioned Relay Output		3	
Time Proportioned Relay Output and One SPDT Relay for Alarm[1]		4	
One SPDT Relay Output for Alarm[1]		5	
Two SPDT Relay Outputs for Alarm[1]		6	
Optional Features			
30 V dc Transmitter Power Supply			A
Remote Setpoint[3]			B
4 to 20 mA Retransmission Output[3]			C
One SPDT Relay Output for Alarm 1 or 2[3]			D
RS-485, 2-wire Serial Communications[3, 4]			E
RS-422, 4-wire Serial Communications[3, 5]			F

Notes

1 Select only one
2 Input signal shown is standard as shipped. Other ranges and types are field selectable as described in PSS 2C-1A10 A
3 This option automatically includes Option -A power supply
4 Not available with Option -F
5 Not available with Option -E

740C Series Digital Circular Chart Recording Controller

- Brilliant, 40-character dot matrix display
- Wide range of standard inputs including mA, mV, Thermocouple, and RTD
- Completely watertight and dust-tight. Conforms to NEMA Type 4 requirements
- One or two completely independent controllers with or without EXACT self-tuning
- Dual multifunction ramp generators
- Four independent timers for logic or event-driven activities

The 740C Digital Circular Chart Recording Controller controls up to two variables and continuously records up to four electronic analog signals on a 12-inch circular chart. This microprocessor-based unit also offers a wide variety of user-configurable process supporting functions such as alarms, totalizers, calculations, and curve characterizers.

Refer to Product Specifications sheet PSS 2C-1A7 A for complete description and specifications.

Physical Specifications

Environmental Protection: Completely water-tight and dust-tight, reinforced polyester enclosure. Conforms to the stringent requirements of NEMA Type 4

Dimensions: Nominal 15.6 in wide by 17.3 in high by 7.9 in deep

Mounting: Surface, panel, or pipe

Display Format: Blue-green, fluorescent panel with 40 dot matrix characters

Functional Specifications

Pens: 1, 2, 3, or 4 as specified. Pen 1 (inner position) is red, pen 2 is violet, pen 3 is green, pen 4 (outer position) is blue.

Supply Power: 90 to 132 V or 180 to 264 V ac, as specified, 45 and 65 Hz, 30 watts (90 watts with optional enclosure heater coded).

Ambient Temperature Limits: 0 to 50°C (32 to 122°F).

Relative Humidity Limits: 5 and 95%, noncondensing.

Input Signals: 0 to 20 mV through 0 to 100 V dc; RTD, ANSI, or IEC 100 ohm platinum, 10 ohm copper, 120 ohm nickel; thermocouple, ISA or ANSI Types T, J, E, C, L, K, N, R, S, and B. All inputs are fully isolated from line power, ground, and each other.

Signal Conditioning: Square root, 3/2 and 5/2 power; log 10

Chart Speed: Configurable from 1 to 4096 hours for each revolution.

Charts: Approximately 10 complimentary, 24-hour charts with 0 to 100% graduations are supplied with the recorder. Order quantity and range of charts desired separately.

Sample Rate: Two samples per second on each channel.

Alarms: Up to 4 alarms with individual set points on each channel. Configurable for high, low, deadband, and rate-of-change alarm action.

Optional Features

Transmitter Power Supply: 29 V dc for up to four 2-wire transmitters.

Totalizer: Up to four fully scalable totalizers. Configurable reset and preread functions.

Calculations and Characterizer: Standard arithmetic functions plus preconfigured specialized applications.

Contact Inputs: Up to 16 contact inputs for manipulating controller functions from external events.

Contact Outputs: Dry relay contacts for alarm status and remote counter drivers.

NEMA 4X: Provides additional corrosion resistance in conformance with NEMA Type 4X requirements.

Enclosure Heater: Extends low temperature limits from standard

How to Order — Specify model number 740CA followed by order code for each selection

Nominal Supply Voltage and Frequency
- 120 V ac, 50/60 Hz . . . A
- 240 V ac, 50/60 Hz . . . C

Input Channel One
- 0 to 20 mV through 0 to 5V, RTD and TC[1] . . . 1
- 0 to 5 V through 0 to 100 V[1] . . . 2
- 4 to 20 mA[1] . . . 3
- Same as 1 above, without pen . . . 6
- Same as 2 above, without pen . . . 7
- Same as 3 above, without pen . . . 8

Input Channel Two
- None . . . 0
- 0 to 20 mV through 0 to 5 V, RTD and TC[1] . . . 1
- 0 to 5 V through 0 to 100 V[1] . . . 2
- 4 to 20 mA[1] . . . 3
- Same as 1 above, without pen . . . 6
- Same as 2 above, without pen . . . 7
- Same as 3 above, without pen . . . 8

Input Channel Three
- None . . . 0
- 0 to 20 mV through 0 to 5 V, RTD and TC[1] . . . 1
- 0 to 5 V through 0 to 100 V[1] . . . 2
- 4 to 20 mA[1] . . . 3
- Same as 1 above, without pen . . . 6
- Same as 2 above, without pen . . . 7
- Same as 3 above, without pen . . . 8

Input Channel Four
- None . . . 0
- 0 to 20 mV through 0 to 5 V, RTD and TC[1] . . . 1
- 0 to 5 V through 0 to 100 V[1] . . . 2
- 4 to 20 mA[1] . . . 3
- Same as 1 above, without pen . . . 6
- Same as 2 above, without pen . . . 7
- Same as 3 above, without pen . . . 8

Control Type
- One PID without EXACT Tuning . . . A
- One PID with EXACT Tuning . . . B
- Two PIDs without EXACT Tuning . . . C
- Two PIDs, one with EXACT Tuning . . . D
- Two PIDs, both with EXACT Tuning . . . E

Output Type
- Single 4 to 20 mA Output for one Controller . . . A
- Duplex 4 to 20 mA Outputs for one Controller . . . B
- Two Single 4 to 20 mA Outputs for two Controllers . . . C
- Two Duplex 4 to 20 mA Outputs for two Controllers . . . D
- Single 4 to 20 mA Output for one Controller, and Duplex 4 to 20 mA Output for second Controller . . . E
- Single Time Duration, Relay Output for one Controller . . . F
- Duplex Time Duration. Relay Outputs for one Controller . . . G
- Two Single Time Duration, Relay Outputs for two Controllers . . . H
- Two Duplex Time Duration, Relay Outputs for two Controllers . . . I
- Single Time Duration, Relay Output for one Controller, and Duplex Time Duration, Relay Output for second Controller . . . J

Optional Selections

Nominal 28 V dc Transmitter Power Supply	A
Calculated Variables and Custom Curve	B
One Integral Totalizer	C
Two Integral Totalizers	D
Three Integral Totalizers	E
Four Integral Totalizers	F
Dual Ramp Generator	G
Tamper-Evident Feature	K
NEMA 4X Enclosure(2)	L
Polycarbonate Chart and User Interface Windows	M
Pipe Mounting(2)	N
Enclosure Heater for Temperatures from -20 to 0°C (-4 to +32°F)	P
Two Relay Outputs(3)	Q
Four Relay Outputs(3)	R
Six Relay Outputs(3)	S
Eight Relay Outputs	T
Eight Contact Inputs(3)	U
Sixteen Contact Inputs(3)	V

Optional Remote Totalizer and Retransmission Outputs

One Remote Totalizer Output(4)	1
Two Remote Totalizer Outputs(4)	2
Three Remote Totalizer Outputs(4)	3
Four Remote Totalizer Outputs(4)	4
One 4 to 20 mA Retransmission Output(5, 6)	5
Two 4 to 20 mA Retransmission Outputs(5, 6)	6
Three 4 to 20 mA Retransmission Outputs(5, 6)	7
Four 4 to 20 mA Retransmission Outputs(5, 6)	8

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Notes

1 Operating ranges are field-configurable
2 NEMA 4X is standard with pipe mounting code N
3 The available of Relay Output, Contact Input, and Retransmission Output Options is space-dependent and therefore contingent upon previously selected functions. The instrument will accommodate a maximum of three function PWAs, with each PWA loaded as shown in Table 1
4 A totalizer and at least one relay output must be selected for each totalizer output selected
5 The available of Relay Output, Contact Input, and Retransmission Output Options is space-dependent and therefore contingent upon previously selected functions. The instrument will accommodate a maximum of three function PWAs, with each PWA loaded as shown in Table 1
6 The total number of 4 to 20 mA outputs is limited to four including controller outputs. The number of Retransmission Outputs available therefore depends on the Output Type previously specified as shown in Table 2

Table 1 PWA Functions and Capability

Number of PWAs Required	Selected Function
1	One or Two Single 4 to 20 mA Control Outputs
1	One or Two 4 to 20 mA Retransmission Outputs
1	Each Duplex 4 to 20 mA Control Output
1	Two or Four Relay Outputs
1	Eight contact Inputs Plus One or Two Single 4 to 20 mA Control or Retransmission Outputs
1	Eight Contact Inputs Plus One Duplex 4 to 20 mA Control Output

Table 2 4 to 20 mA outputs

Output Type Code	Max. Number of Retransmission Outputs
A	3
B	2
C	2
D	0
E	1
F through J	4

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