

# 'S' series I/A pressure transmitters for non-safety applications



## Overview

Considered the one transmitter that can do it all, the IAP10S, IGP10S, and IDP10S pressure transmitters cover most of your application needs within a single range. These transmitters offer embedded FoxCal™ technology and multiple points of calibration, which allow you to benefit from wide rangeability and one of the best reference accuracy turndowns on the market.

## Key features

Provide absolute pressure (AP), gauge pressure (GP), and differential pressure (DP) measurement with an accuracy of up to  $\pm 0.05\%$  of reading and HART transmitters are SIL 2 certified. Absolute and gauge transmitters are used in a wide variety of oil, gas, water and industrial applications, with absolute transmitters measuring pressure relative to vacuum, gauge transmitters measuring pressure relative to ambient air pressure and differential transmitters measuring the difference between two pressures applied to opposite sides of the sensor. The output signal is proportional to either the differential pressure or its square root. Differential pressure transmitters are often used for measuring fluid flow rates across a primary device such as an orifice plate but are also used for other types of differential pressure measurements such as liquid level, interface level, or density measurements. Transmitters can be connected in series to instruments such as recorders, controllers, and indicators.

# Technical specifications

## Further features

- HART digital outputs, FOUNDATION Fieldbus digital outputs, 4 to 20 mA outputs
- TÜV SIL 2 certification for HART transmitters
- 5-year proof test interval for pressure transmitters installed in SIL 2 Safety loops
- Accuracy up to  $\pm 0.05\%$  of reading
- Response time of 100 ms for AP/GP transmitters and 125 ms for DP transmitters
- Innovative and dynamic FoxCal™ technology allows the transmitter to store multiple factory-preset calibration ranges up to 30:1 turndown, while maintaining published accuracy without the need for field calibration
- Time in Service meter features cumulative power-up time and time powered since last user reset for HART and FOUNDATION Fieldbus transmitters
- High Turndown Capabilities<sup>2</sup> (up to 400:1)
- Ability to locally configure the device with pushbuttons on the optional local display
- Ability to remotely communicate with and configure the device using the device descriptor (DD), Device Type Manager (DTM), or the Field Device Integration (FDI) package
- Optional External Zero Adjustment
- Field-proven piezoresistive silicon microsensors help ensure excellent measurement performance
- Simple, elegant sensor design with very few parts achieves exceptional reliability
- Durable aluminum or 316 ss housing options are available; both meet NEMA Type
- 4X and IEC IP66/67 ratings
- Absolute and Gauge Pressure transmitters are available with a Direct Connect or BiPlaner structures
- Depending on transmitter structure, sensor diaphragm materials include 316L ss, nickel alloy<sup>3</sup>, Co-Ni-Cr, Monel™, or Tantalum™
- ½ NPT male, ½ NPT female, or M20 male process connections
- Numerous mounting bracket set options
- Process venting and bleeding options
- Special degreasing and cleaning options
- Low-temperature options
- Custody transfer lock and seal options
- Many configurations of direct connect or capillary connected seals
- Dual Seal certified by CSA to meet ANSI/ISA 12.27.01-2003 requirements
- Complies with electromagnetic compatibility requirements of European EMC
- Directive 2014/30/EU by conforming to following EN and IEC Standard: EN 61326-1:2013
- NACE MR0175 and MR0103 compliant for all process wetted parts; optional NACE approved bolt material available
- Optional certification options allow transmitters to meet numerous requirements for hazardous and non-hazardous locations
- CE marked; meets the requirements of applicable EMC, ATEX, RoHS, and PED European Union Directives

## Technical data

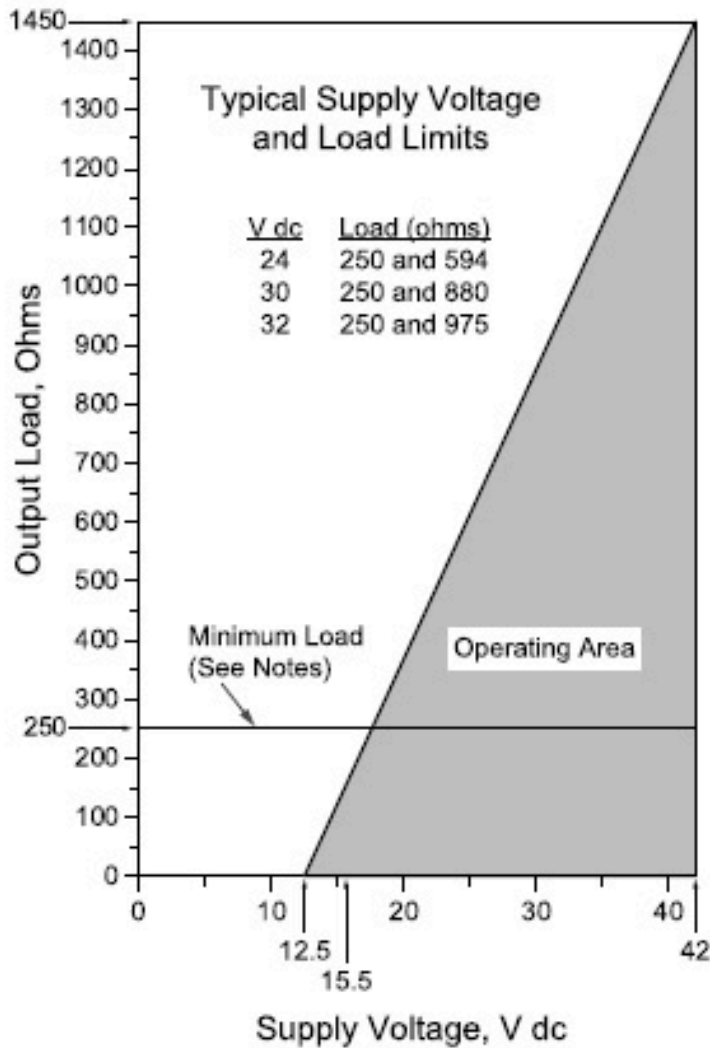
Feature	Description
Process covers and connections	Direct Connect AP/GP: 316L ss or nickel alloy; Biplanar AP/GP: 316 ss, carbon steel, Monel, PVDF, or nickel alloy; DP: 316 ss, carbon steel, Monel, nickel alloy CW2M or PVDF (Kynar™) inserts in 316 ss covers for transmitters with traditional structures; and 316 ss for transmitters with low profile structures
Process cover nuts and bolts	Biplanar AP/GP and DP: ASTM A193, Grade B7 high strength alloy steel for bolts, and ASTM A194 Grade 2H high strength alloy steel for nuts are standard. Options include NACE Class B7M bolting, 17-4 ss bolting, and 316 ss bolting.
Sensor diaphragm	Biplanar AP/GP: 316 ss, gold-plated 316L ss, Co-Ni-Cr, Monel, tantalum, or nickel alloy ; Direct Connect AP/GP: 316L ss, Co-Ni-Cr, or nickel alloy; DP: 316L ss, gold-plated 316L ss, Co-Ni-Cr, Monel, tantalum, or nickel alloy <sup>21</sup> for transmitters with traditional structures; and 316L ss or nickel alloy <sup>21</sup> for transmitters with low profile structures
Gaskets	Direct Connect AP/GP Biplanar AP/GP: Glass-filled PTFE or Viton; DP: Glass filled PTFE or Viton™ when Structure Codes 78/79 (PVDF inserts) are used
Sensor fill fluid	Silicone fluid — dodecamethylpentasiloxane; 3M™ Fluorinert™ Electronic Liquid FC-43 — perfluorotributylamine; NEOBEE® M-20 — propylene glycol di(octanoate/decanoate)
Environmental protection	The transmitter's enclosure has the weatherproof, dust-tight, and water-tight rating of IP66/67 as defined by IEC 60529, and provides the environmental and corrosion resistant protection rating of NEMA Type 4X.
Approximate mass	Direct Connect AP or GP, Aluminum Housing: 1.4 kg (3.1 lb); Biplanar or Traditional DP Structure, Aluminum, without Process Connectors: 3.5 kg (7.8 lb); Biplanar or Traditional DP Structure, Aluminum, with Process Connectors: 4.2 kg (9.2 lb); Optional Display add 0.2 kg (.4 lb); 316 ss Housing: Add 1.1 kg (2.4 lb)

## Technical data

Feature	Description
Output signal	For HART transmitters, 4 to 20 mA dc square root (for DP only) or 4 to 20 mA dc linear with digital HART communication. The output is software-selectable and remotely configurable from the HART Communicator, and locally configurable with the pushbuttons on the optional display. For FOUNDATION Fieldbus transmitters, square root (for DP only) or linear. The digital output is software-selectable and remotely configurable from a FOUNDATION Fieldbus host computer or a console equipped with a FOUNDATION Fieldbus Interface Module. It is also locally configurable with the pushbuttons on the optional display.
Minimum allowable absolute pressure vs. process temperature	With silicone fill fluid: up to 121°C (250°F) at full vacuum; With inert fill fluid: refer to the graph
FOUNDATION Fieldbus transmitters	The power supply (a FOUNDATION Fieldbus Power Supply Module) must be capable of providing at least 17 mA for each transmitter connected. Minimum Supply Voltage 9 Vdc, Recommended Supply Voltage: 24 Vdc; Maximum Supply Voltage 32 Vdc.
Adjustable damping	Hart (-T) Transmitters: Damping is user-selectable to values of 0, 0.25, 0.5, 1, 2, 4, 8, 16, or 32 seconds. FOUNDATION Fieldbus (-F) Transmitters: Damping is user-selectable to values of 0.25, 0.5, 1, 2, 4, 8, 16, or 32 seconds.
Stability	Long term drift for Advanced Performance Pressure transmitters is <math>\pm 0.03\%/yr</math>.
Turndown Ratio	400:1
Electrical certification	Multiple certification, types of protection and area classification are available.

## Technical specifications

### 4-20 mA output supply voltage to output load



#### NOTES:

1. The minimum voltage for HART communication is 15,5 V dc.
2. The minimum load for the HART Communicator is 250 ohms.
3. The transmitter can function with an output load less than the minimum, but using a remote configurator while operating in this area will result in output and/or communication disturbances.

	HART Communication	No HART Communication
Minimum Resistance	250 Ω	0 Ω
Minimum Supply Voltage	15.5 V dc	12.5 V dc
Maximum Supply Voltage	42 V dc	

## Technical specifications

### 'S' series accuracies

#### IGP10S Direct Connect Accuracy

Span Code	Reference Accuracy (% of Reading)	% of Reading Range	Reference Accuracy for Spans Less than URL
D	±0.05% of reading	> 4% URL	±0.05% of span For turndowns greater than 30:1, accuracy = ±[0.001667 (URL/Span)]%
E			±0.05% of span For turndowns greater than 80:1 <sup>46</sup> , accuracy = ±[0.000625 (URL/Span)]%
F		> 33% URL	±0.05% of span For turndowns greater than 5:1, accuracy = ±[0.01 (URL/Span)]%

#### IGP10S Biplanar Accuracy

Span Code	Reference Accuracy (% of Reading)	% of Reading Range	Reference Accuracy for Spans Less than URL
B	±0.05% of reading	> 33% URL	±0.05% of span For turndowns greater than 10:1, accuracy = ±[0.005 (URL/Span)]%
C			±0.05% of span For turndowns greater than 20:1, accuracy = ±[0.0025 (URL/Span)]%
D		> 4% URL	±0.05% of span For turndowns greater than 30:1, accuracy = ±[0.001667 (URL/Span)]%
E		> 33% URL	±0.05% of span For turndowns greater than 3:1, accuracy = ±[0.01667 (URL/Span)]%
F			±0.05% of span For turndowns greater than 5:1, accuracy = ±[0.01 (URL/Span)]%

#### IAP10S Direct Connect Accuracy

Span Code	Reference Accuracy (% of Reading)	% of Reading Range	Reference Accuracy for Spans Less than URL
D	±0.05% of reading	> 4% URL	±0.05% of span For turndowns greater than 30:1, accuracy = ±[0.001667 (URL/Span)]%
E			±0.05% of span For turndowns greater than 80:1 <sup>46</sup> , accuracy = ±[0.000625 (URL/Span)]%

#### IAP10S Biplanar Accuracy

Span Code	Reference Accuracy (% of Reading)	% of Reading Range	Reference Accuracy for Spans Less than URL
B	±0.05% of reading	> 33% URL	±0.05% of span For turndowns greater than 8:1, accuracy = ±[0.00625 (URL/Span)]%
C			±0.05% of span For turndowns greater than 20:1, accuracy = ±[0.0025 (URL/Span)]%
D		> 4% URL	±0.05% of span For turndowns greater than 30:1, accuracy = ±[0.001667 (URL/Span)]%
E			±0.05% of span For turndowns greater than 10:1, accuracy = ±[0.005 (URL/Span)]%

#### IDP10S Accuracy

Span Code	Reference Accuracy (% of Reading)	% of Reading Range	Reference Accuracy for Spans Less than URL
B	±0.05% of reading	> 33% URL	±0.05% of span For turndowns greater than 10:1, accuracy = ±[0.005 (URL/Span)]%
C			±0.05% of span For turndowns greater than 20:1, accuracy = ±[0.0025 (URL/Span)]%
D		> 10% URL	±0.05% of span For turndowns greater than 30:1, accuracy = ±[0.001667 (URL/Span)]%
E			±0.05% of span For turndowns greater than 10:1, accuracy = ±[0.005 (URL/Span)]%

# Technical specifications

## BiPlanar AP/GP range and span limits

### Span Limits for Biplanar Transmitters with HART Communication (Electronics Version -T)

Code	Span Limits <sup>26</sup>
B	0.12 and 50 kPa (0.5 and 200 inH <sub>2</sub> O)
C	0.62 and 250 kPa (2.49 and 1000 inH <sub>2</sub> O)
D	26 and 2070 kPa (3.75 and 300 psi) <sup>29</sup>
E	0.26 and 20.7 MPa (37.5 and 3000 psi) <sup>29</sup>
F	1.1 and 34.5 MPa (165 and 5000 psi) <sup>27 29</sup>

### Span Limits for Biplanar Transmitters with FOUNDATION Fieldbus Communication (Electronics Version -F)

Code	Span Limits <sup>30</sup>
B	0.12 and 50 kPa (0.5 and 200 inH <sub>2</sub> O)
C	0.62 and 250 kPa (2.49 and 1000 inH <sub>2</sub> O)
D	26 and 2070 kPa (3.75 and 300 psi) <sup>31</sup>
E	0.26 and 20.7 MPa (37.5 and 3000 psi) <sup>31</sup>
F	1.1 and 34.5 MPa (165 and 5000 psi) <sup>32 31</sup>

### Range Limits for Biplanar Transmitters with HART or FOUNDATION Fieldbus Communication (Electronics Versions -T or -F)

Code	Range Limits — AP	Range Limits — GP
B	0 and 50 kPaa (0 and 200 inH <sub>2</sub> Oa)	-50 and +50 kPag (-200 and +200 inH <sub>2</sub> Og)
C	0 and 250 kPaa (0 and 1000 inH <sub>2</sub> Oa)	-100 and +250 kPag (-401 and +1000 inH <sub>2</sub> Og)
D	0 and 2070 kPaa (0 and 300 psia) <sup>31</sup>	-100 and +2100 kPag (-14.7 and +300 psig) <sup>31</sup>
E	0 and 20.7 MPaa (0 and 3000 psia) <sup>31</sup>	-0.1 and +21 MPag (-14.7 and +3000 psig) <sup>31</sup>
F	n/a	-0.1 and +35 MPag (-14.7 and +5000 psig) <sup>31</sup>

# Technical specifications

## Direct connect AP/GP range and span limits

### Span Limits for Direct Connect Transmitters with HART Communication (Electronics Version -T)

Code	Span Limits <sup>26</sup>
D	3.4 and 1380 kPa (0.5 and 200 psi)
E	0.034 and 13.8 MPa (5 and 2000 psi)
F	0.52 and 41.4 MPa (75 and 6000 psi) <sup>27</sup>

### Span Limits for Direct Connect Transmitters with FOUNDATION Fieldbus Communication (Electronics Version -F)

Code	Span Limits <sup>26</sup>
D	3.4 and 1380 kPa (0.5 and 200 psi)
E	0.034 and 13.8 MPa (5 and 2000 psi)
F	0.52 and 41.4 MPa (75 and 6000 psi) <sup>27</sup>

### Range Limits for Direct Connect Transmitters with HART or FOUNDATION Fieldbus Communication (Electronics Versions -T or -F)

Code	Range Limits — AP	Range Limits — GP
D	0 and 1400 kPaa (0 and 200 psia)	0 and 1400 kPag (0 and 200 psig)
E	0 and 14 MPaa (0 and 2000 psia)	0 and 14 MPag (0 and 2000 psig) <sup>28</sup>
F	n/a	0 and 42 MPag (0 and 6000 psig) <sup>28</sup>



# Technical specifications

## DP range and span limits

### Span Limits for DP Transmitters with HART Communication (Electronics Version -T)

Code	Span Limits
B	0.12 and 50 kPa; 0.5 and 200 inH <sub>2</sub> O; 1.2 and 500 mbar
C	0.62 and 250 kPa; 2.5 and 1000 inH <sub>2</sub> O; 6.2 and 2500 mbar
D	0.026 and 2.07 MPa; 3.75 and 300 psi; 0.26 and 20.7 bar
E	0.26 and 20.7 MPa; 37.5 and 3000 psi; 2.6 and 207 bar

### Span Limits for DP Transmitters with FOUNDATION Fieldbus Communication (Electronics Version -F)

Code	Span Limits
B	0.12 and 50 kPa; 0.5 and 200 inH <sub>2</sub> O; 1.2 and 500 mbar
C	0.62 and 250 kPa; 2.5 and 1000 inH <sub>2</sub> O; 6.2 and 2500 mbar
D	0.026 and 2.07 MPa; 3.75 and 300 psi; 0.26 and 20.7 bar
E	0.26 and 20.7 MPa; 37.5 and 3000 psi; 2.6 and 207 bar

### Range Limits for DP Transmitters with HART or FOUNDATION Fieldbus Communication (Electronics Versions -T or -F)

Code	Range Limits
B	-50 and +50 kPa (-200 and +200 inH <sub>2</sub> O)
C	-250 and +250 kPa (-1000 and +1000 inH <sub>2</sub> O)
D	-0.10 and +2.07 MPa (-14.7 and +300 psi)
E	0 and 21 MPa (0 and 3000 psi)

## About Ultra Energy

Organizations working with nuclear and industrial technologies must deliver reliable production at the same time as safeguarding people, the environment and infrastructure. We develop and manufacture measurement and control solutions that give our customers complete, long-term control over systems operating in harsh environments, helping them operate safely and increasing the value derived from their investments over their total lifespan.

Part of Curtiss-Wright, Ultra Energy has worked with nuclear and industrial customers for over 60 years. We support customers across the world from facilities located in the US and UK. Our solutions are embedded in strategic national infrastructure and our people are active partners in customer programs that are focused on delivering advanced future nuclear and industrial capabilities.

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