DS-PR-SolidSenseII-ATEX-PT-eng
May, 2017

Data Sheet

SolidSense II® (ATEX) Pressure Transmitters

Pressure Transmitters

SolidSense II® ATEX Pressure Transmitter

Superior stability and reliability for demanding pressure measurement applications

Overview

The Brooks® SolidSense II® pressure transmitters are designed for stable, accurate, and reliable pressure monitoring in high purity and ultra-high purity (UHP) applications. A combination of optimum design and materials improves both signal stability and reliability in numerous pressure measurement applications.

Pressure transmitters are widely used in high purity and ultra-high purity fluid storage and delivery systems in many industries. Unfortunately, a number of current transducers rely on technologies that have problems with zero and span drift, thermal shift, and case stress. Adjusting the transmitter to rectify errors requires ongoing maintenance that increases downtime and cost of ownership.

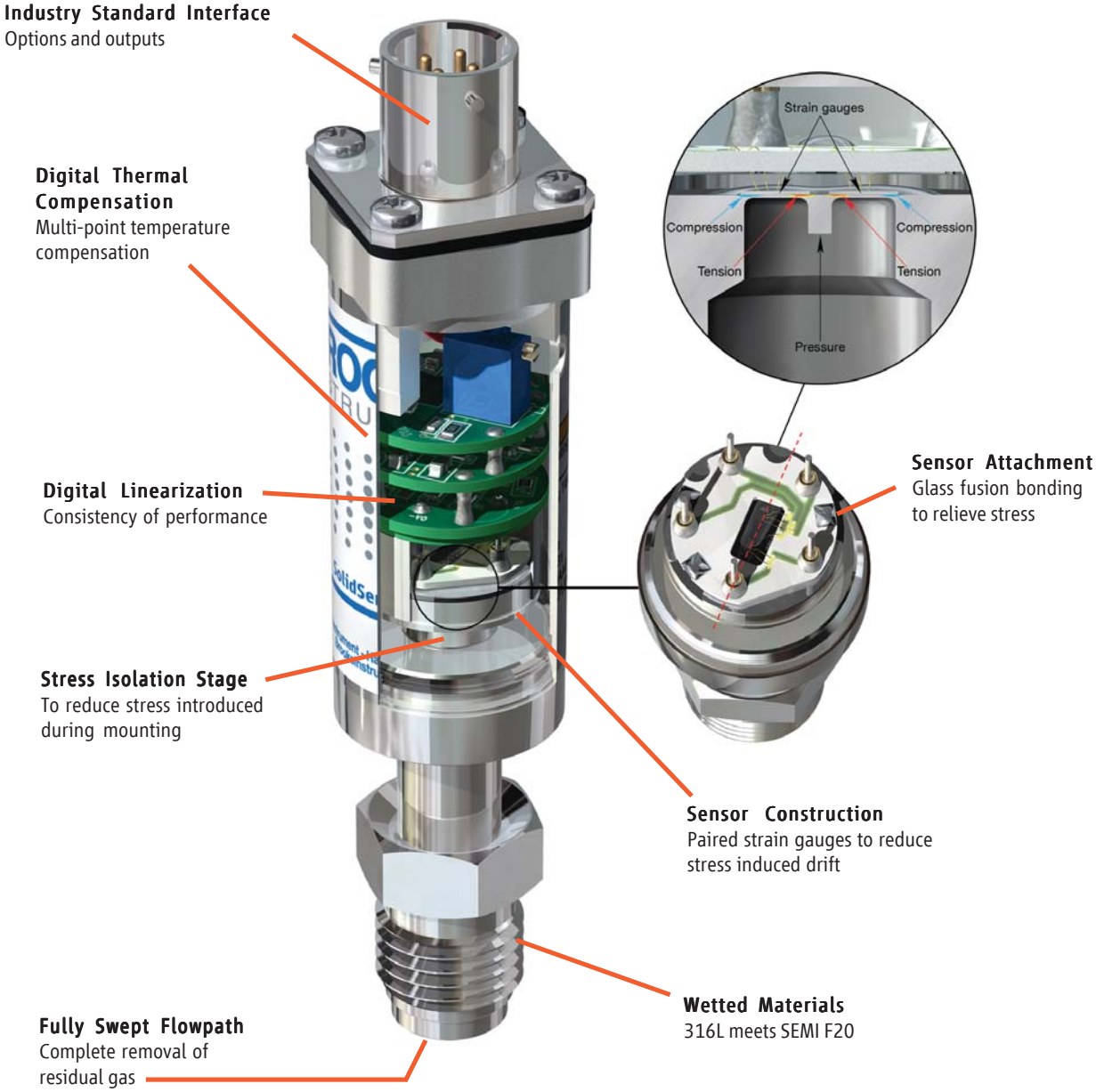
The third generation SolidSense II pressure transmitters by Brooks Instrument utilize glass-fused strain gauge technology enabling a new level of performance for micro electronics and industrial applications.

SolidSense II pressure transmitters employ ultra stable, micro machined silicon strain gauges that are matched and fused to the metal diaphragm at high temperature to relieve manufacturing induced stress. The process reduces drift or lack of zero stability commonly associated with competitive products. Consequently, down time for zero adjustment to compensate for drift is significantly reduced. In addition, the unique mechanical design eliminates torque effects during installation.

SolidSense II digital architecture enables automated software driven calibration and a wide range of thermal compensation routines, unlike the passive compensation used in competitive devices. This enhances measurement repeatability regardless of changes to the operational environment.

SolidSense II devices feature 316L stainless steel wetted surfaces electropolished to 5- and 10-micro in. (5- and 10-Ra) to maintain the purity of the measured fluid.

Product Description



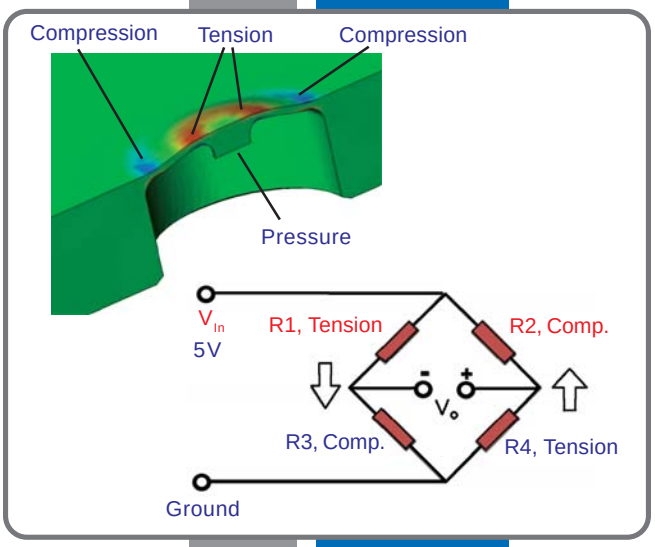
Features	Benefits
Two pairs of strain gauge sensors	Precision matched sensors for improved performance
Glass fusion process to bond strain gauge	High temperature glass bonding drives off any mechanically induced build up of stress from sensor manufacturing process
Stress isolation stage	Minimizes stress introduced during installation of the transducer
Digital temperature compensation	Improved thermal stability over entire range of temperature
Digital linearization and calibration	Consistency of performance, improved reproducibility
Fully swept flowpath	Ensures contamination-free pressure measurement

Product Description

Sensor Construction

SolidSense II utilizes proprietary micro machined silicon strain gauges that are ultra stable and suitable for high purity and ultra-high purity requirements.

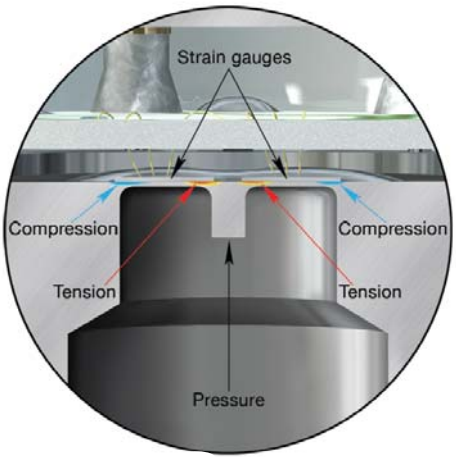
A design feature for controlling stress is the use of dual paired gauges. By using two paired gauges in Wheatstone bridge circuitry, pressure signal is maximized enhancing stability.



Sensor Attachment

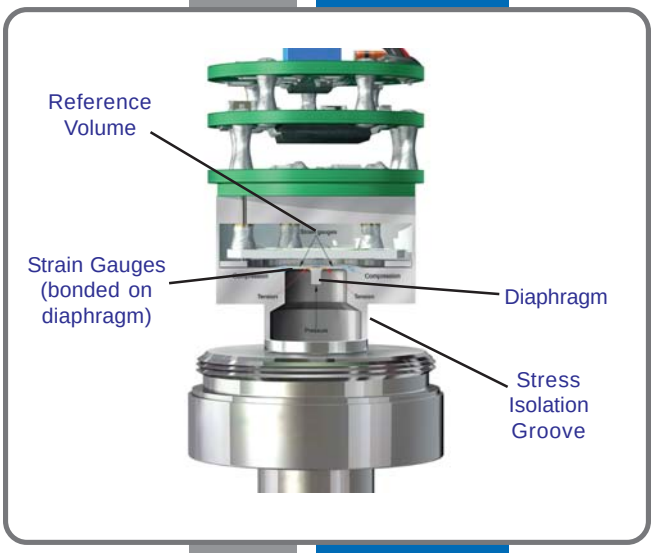
A key step for eliminating machining stress in the diaphragm is the glass fusion process used to bond the strain gauges to the sensor diaphragm. This process occurs at 600°C and drives off any mechanically induced build up of stress resulting in a highly stable and accurate sensor.

By using silicon strain gauge technology and the glass fusion bonding method for SolidSense II, there is no stress induced from thermal gradients between structural materials. In some competitive designs, different thermal expansion coefficients between the metal casing and ceramic electrode (upon which the sensor is mounted) allow for flexing of the sensor which is interpreted as a false pressure change.



Stress Isolation Stage

SolidSense II incorporates an isolation stage shown at right that minimizes stress from: (1) thermal heating during any adjacent welding and (2) torque during installation in gas panels, gas interface boxes, valve manifold boxes, etc. By preventing stress during these two scenarios, creep (drift) is eliminated during subsequent usage.



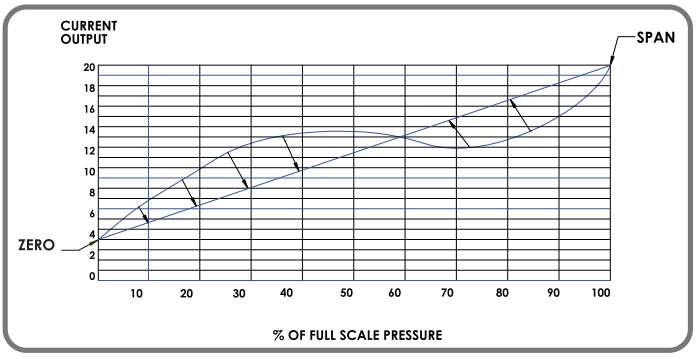
Wetted Materials

Made from 316L that meets SEMI F20. Surface finish complies with SEMI F19. Product is assembled in clean environment compliant with ASTM F1374-92 - meets requirement for ultra-high purity application.

Product Description

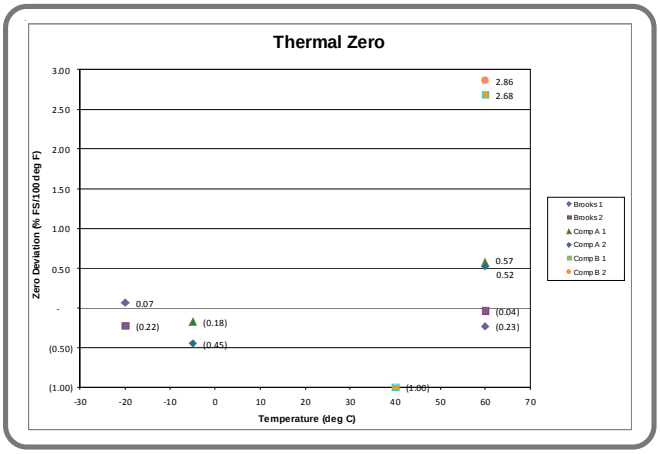
Digital Linearization and Calibration

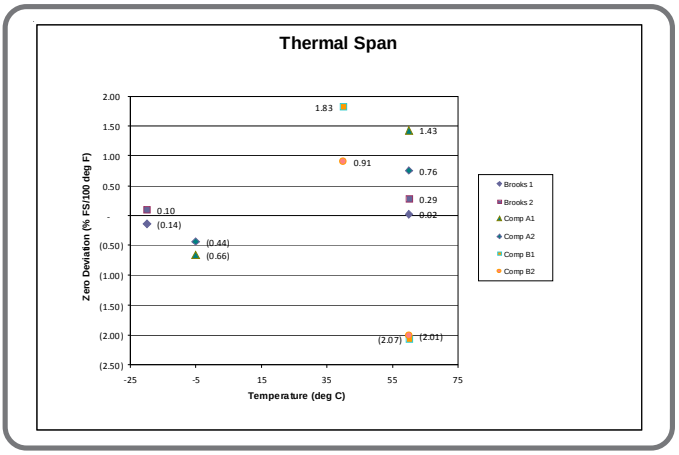
SolidSense II is calibrated with automated software which uses about 200 linearization points compared with 2 for some competing units. This results in consistency of performance from one transducer to the next (reproducibility). Due to automation, operator induced differences are eliminated.



Digital Thermal Compensation

SolidSense II uses multi-point digital temperature compensation. Some competitive devices rely on single or two point compensation to optimize device performance over the operating temperature range. For example, device performance might be checked at -10°C and 60°C to determine the dZ/dT and dS/dT (rate of zero/span change per temperature change) with the temperature compensation interpolated for other values. SolidSense II can incorporate five separate data points, which are typically taken at -10°C, -5°C, 20°C, 40°C and 60°C, giving the temperature compensation algorithm far better resolution.

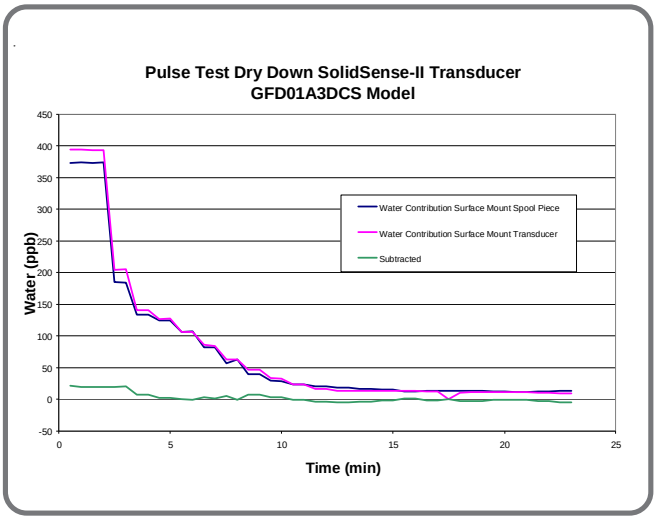


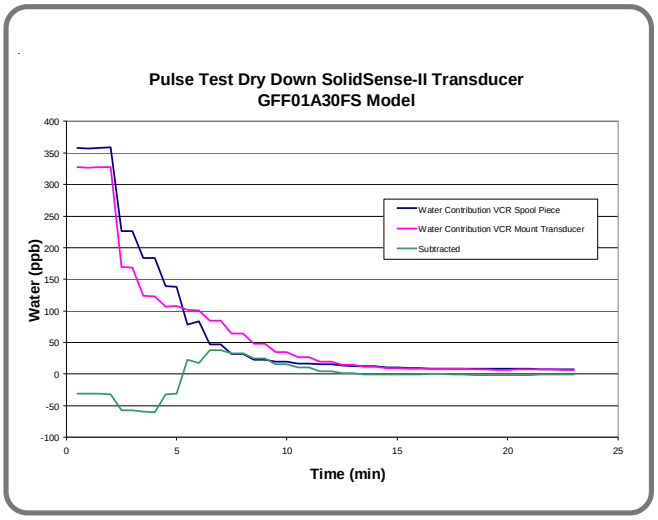


Fully swept flowpath

The SolidSense II incorporates an all-swept flowpath and very small internal volume allowing complete removal of residual fluid during the purge cycle. As a result inert, dry and clean surfaces are available at the end of the purge cycle.

ASTM F1397 establishes a dry-down requirement to 20 ppbv H20 within 30 minutes. As accompanying data shows, the dead end configuration of the SolidSense II recovered to desired level within 11.5 minutes and the flow thru configuration recovered in 9.5 minutes, both well below the requirement indicated in standard.



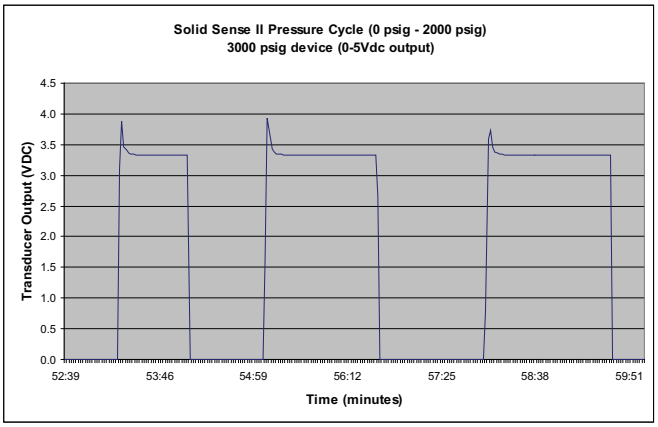


Product Description

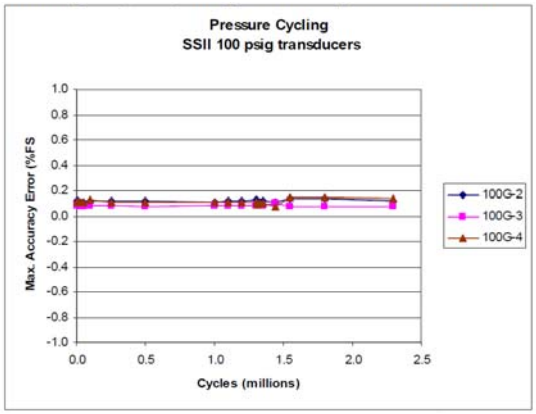
Robustness

The SolidSense II design incorporates a stress isolation stage. This prevents stresses built up during installation of transducers from being transmitted to diaphragm. As a result, SolidSense II will not require frequent resetting of zero after installation and in operation.

A number of applications involve subjecting the pressure transducer to rapid pressure cycling in a purge cycle. As shown in test results, SolidSense II will not temporarily indicate inaccurate pressure readings due to the Joule-Thompson effect. In some competitive devices this may cause false alarms and shut down the gas distribution system.



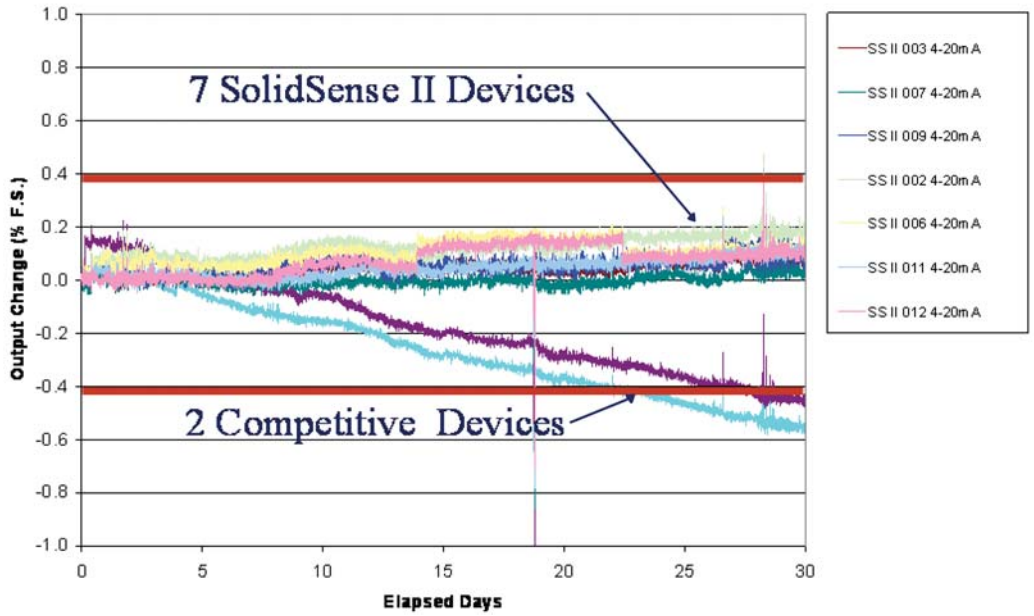
Accurate pressure readings during purge cycle



Stabilty - 2,000,000 pressure cycles without failure

Zero Stability

Minimal drift, creep and shifts during installation and service life.



Metrology

Calibration system that is traceable to international primary standards with minimal uncertainty - precise dependable pressure measurements.

Product Specifications

Performance

Operating Temperature:	
Storage:	-20°F to 180°F (-29°C to 82°C)
Compensated:	-4°F to 140°F (-20°C to 60°C)
Burst Pressure:	400% full scale
Proof Pressure:	200% full scale up to 1,000 psi, 150% full scale for higher ranges
Accuracy:	±0.25% full scale (BFSL)
Response Time:	< 5 msec
Zero and Span Temperature Coefficient (each):	
≥100 PSI Ranges Full Scale:	±0.02% full scale/°F (-40°F to 140°F, -20°C to 60°C)
<100 PSI Ranges Full Scale:	±0.04% full scale/°F (-40°F to 140°F, -20°C to 60°C)

Mechanical

Housing:	Stainless steel, polymer plastics
Wetted Parts:	316L stainless steel, SEMI F20
Surface Finish:	Compliant with SEMI F19
Cleanliness:	Compliant to ASTM F1374-92 (2005)
Internal Volume:	1.79cc
Process Connections:	(See Model Code for available options)
Approximate Shipping Weight:	0.70 lb. (0.32 kg)

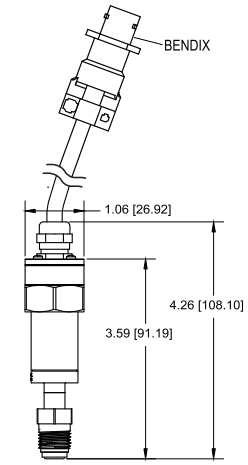
Electrical

Supply Current:	Maximum 10 mA for 0.05 to 5.05 Vdc output
Power Requirements:	10 to 30 Vdc for 4 to 20 mA output 11 to 30 Vdc for 0.05 to 5.05 Vdc output
Electrical Connections:	(See Model Code for available options)
Electrical Protection:	Reverse polarity for power connections

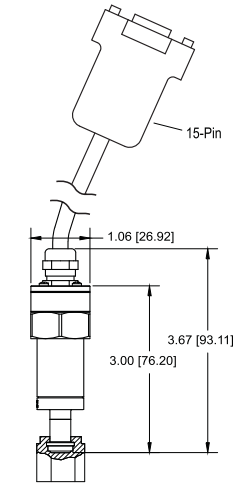
SolidSense II (ATEX) Approvals and Compliance

ATEX (for ATEX compliant units only):	II 3 G Ex nA IIC T4 Gc DEKRA 12ATEX 0043X
IECEx (for ATEX/IECEx compliant units only)	II 3 G Ex nA IIC T4 Gc IECEx DEK 12.0011X
EMC:	Compliant to EU Directive 2004/108/EC
RoHS:	Compliant to EU Directive 2011/65/EU
FM Approval:	Non-Incendive for use in Class I, Div II Groups A, B, C and D Hazardous Applications Excludes 15-pin HD D-Sub connector configurations
NEMA	Enclosure complies to NEMA 4X
KOSHA	Ex nA IIC T4 14-AV4BO-0492
NEPSI	Ex nA IIC T4 Gc GYJ13.1329X

Product Dimensions (ATEX Compliant)



VCR SWIVEL MALE
FITTING A333124001
ME131193



VCR SWIVEL FEMALE
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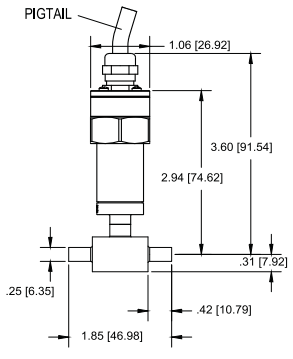

TUBE STUB/TUBE STUB
THRUTUBE
FITTING A333125001

Note: Bendix, 15-pin and pigtail available on all ATEX process fittings. Limited examples are shown above.
For all electrical connection and fitting options see the Model Code Table
Additional dimensional drawings are available on request.

Model Code

Code	Description	Code Option	Option Description
I.	Base Model Code	GF	Pressure Transducer
II.	Body Type	D	Dead End
		F	Flow Through
III.	PSI	00	30
		01	100
		02	250
		05	500
		10	1000
		25	2500
		30	3000
		15	1500 Torr
IV.	Pressure Reference	A	Absolute, psi
		C	Compound, psi
		G	Gauge, psi
		B	Absolute, Bar
		P	Compound, Bar
		S	Gauge, Bar
		T	Torr
V.	Output	4	4 to 20 mA
		5	0.05 to 5.05 Vdc
VI.	Electrical Connection	P	2m Pigtail
		L	3m Pigtail
		E	9 inch Pigtail w/15-pin (standard) D-sub Connectors
		N	16.5 foot cable with Bendix® Type (Bayonet)
VII.	Fittings	4S	Tube Weld Stub 1/4" O.D. (GFD Only)*
		CS	Surface Mount, 1.125" C-Seal, Standard (GFD Only)
		CH	Surface Mount, 1.5" C-Seal, High Flow K1H (GFD Only)
		SC	Surface Mount, 1.5" C-Seal (GFD Only)
		NT	1/4" NPT (GFD only)
		VM	Face Seal, fixed male (x2 on Duncan T for GFF)
		VS	Face Seal, fixed male/swivel female on Duncan T (GFF Only)
		SM	Face Seal, swivel male (x2 on Duncan T for GFF)
		SF	Face Seal, swivel female (x2 on Duncan T for GFF)
		4T	Duncan T, 1/4" Tube Weld Stub (GFF Only)*
VIII.	Explosion Proof	A	FM and ATEX approved

* Tube stubs (4S, 4T, 3T and 2T) are not suitable for compression joint.

Sample Model Code

I	II	III	IV	V	VI	VII	VIII
GF	F	02	C	4	P	SF	A

Brooks Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users, and maintenance persons.

Please contact your nearest sales representative for more details.

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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