Pressure Transmitters and Transducers

ESI Technology Ltd

THE WORLDWIDE SPECIALIST FOR CUSTOMISED HIGH PRECISION PRESSURE TRANSDUCERS & TRANSMITTERS

For decades, ESI Technology with headquarters in Wrexham, UK, has served its customers with consistent product development, special engineered solutions and outstanding technical service and sales support.

In 2009 ESI Technology Ltd was acquired by SUCO. By forming part of a bigger organisation, yet keeping its own independence, ESI has gained the strength to expand its sales efforts and services world-wide.

ESI Technology has become one of the leading suppliers for specialised pressure sensors by offering bespoke solutions for specific applications.

With a dedicated manufacturing and engineering facility in Wrexham, ESI serves an extensive range of major industries such as Oil and Gas, Subsea, Aerospace, Marine, Process, Test and Calibration.

Being a key supplier to these industries requires high performance, not only in terms of products, but also from design and sourcing through to shipment and customer service.
ESI's Management System is approved to ISO 9001:2015, and ATEX, IECEx and DNV-GL approval is available on a wide range of products.

Throughout the product range, ESI uses a variety of state of the art sensor technologies to make each product a perfect fit to the desired application. The jewel of ESI's sensor technologies is Silicon on Sapphire, which has redefined the performance capability of pressure monitoring products.

Additional services, such as tailoring of the existing product range to suit application requirements, product conditioning such as ESS (Environmental Stress Screening) and product documentation packaging, make ESI the perfect partner for customers who need a bespoke service.

With a wide sales network, ESI Technology is able to deliver its special services globally. If you can't find the suitable solution on the following pages, please do not hesitate to contact the sales team or one of its partners who are always close by.

We are looking forward to supporting you!

Contents

Technical Explanation for ESI Pressure Sensors page 07
ATEX/ IECEx Information page 09
DNV-GL Approval Information page 11
Product Selection Matrix - Help in choosing the correct transmitter page 13

S.01 Customised Solutions page 17

Application specific design solutions
Customised housing design
Choice of output signals and pressure ranges
Specialised process connections
Various electrical connectors
Special housing materials

S.02 Oil & Gas and Subsea Solutions page 19

Dual redundancy (Pressure sensors and electronics)
Downhole
Hyperbaric testing to 3,300 m Depth
Environmental Stress Screening (ESS)
Bespoke process connections
Extended service life
Special housing materials
Comprehensive documentation package and certification

S.03 USB-Transducer page 21

Pressure Ranges:	From Vac up to 5,000 bar
Sensor Technology:	Silicon-on-Sapphire (SoS)
Accuracy:	≤ ±0.15 % of span BFSL
Output Signal:	USB-Interface power supply and data transfer via USB
Wetted Parts:	Titanium
Process Connection:	¼" BSP male (G ¼); ¼" NPT male or Autoclave F250-C female;
Electrical Connection:	USB Mini B
Types:	GS4200-USB; GD4200-USB

S.04 General Purpose Pressure Transmitter page 25

Pressure Ranges:	From Vac up to 1,500 bar
Sensor Technology:	Silicon-on-Sapphire (SoS)
Accuracy:	≤ ±0.25 % of span BFSL
Output Signal:	10 mV/V or 0–5 V or 0–10 V or 4–20 mA
Wetted Parts:	Titanium
Process Connection:	1/4" BSP (G ¼) or 1/4" NPT Male (others options available)
Options:	ATEX/IECEx (available only for 4–20 mA), includes mining areas (Group I M1) DNV-GL Approved
Types:	GS4200; GS4201; GS4202; GS4212; GS4203; GS4213

S.05 High Pressure Transmitter

page 29

Pressure Ranges:	From 0 – 600 bar up to 5,000 bar
Sensor Technology:	Silicon-on-Sapphire (SoS)
Accuracy:	≤ ±0.25 % of span BFSL
Output Signal:	10 mV/V or 0–5 V or 0–10 V or 4–20 mA
Wetted Parts:	All Titanium, machined from a single piece (≥1,000 bar)
Process Connection:	Autoclave F250-C female; M16 x 1.5 female
Options:	ATEX/IECEx (available only for 4–20 mA), includes mining areas (Group I M1) ; DNV GL Approved
Types:	HP1000; HP1001; HP1002; HP1003; HP1011; HP1012; HP1100; HP1101; HP1102; HP1103; HP1111; HP1112

S.06 Low Pressure Transmitter

page 33

Pressure Ranges:	From 0–50 mbar up to 1,000 mbar
Sensor Technology:	Piezoresistive Silicon Sensor
Accuracy:	≤ ±0.5 % of span BFSL
Output Signal:	10 mV/V (typ.) or 0–5 V or 0–10 V or 4–20 mA
Wetted Parts:	SAE 316 stainless steel
Process Connection:	¼" BSP male (G ¼); ½" BSP male (G1/2); ¼" NPT male; ½" NPT male (others on request)
Types:	LP1000; LP1001; LP1011; LP1002; LP1012; LP1003;

S.07 High Precision Pressure Transducer

page 37

Pressure Ranges:	0–1 bar to 1,500 bar
Sensor Technology:	Silicon-on-Sapphire (SoS)
Accuracy:	≤ ±0.1 % of span BFSL
Temperature Effects:	±1.0 % FS max. thermal error band over -20 °C to +70 °C
Output Signal:	10 mV/V (typ.) or 0–5 V or 0–10 V
Wetted Parts:	All Titanium Process Connection: ¼" BSP male (G ¼) or ¼" NPT male
Electrical Connection :	MIL-C-26482 6 pin Bayonet or 1 m PTFE cable
Options:	ATEX/IECEx (available only for mV output), includes mining areas (Group I M1)
Types:	HI2000; HI2001; HI2002 HI2010; HI2011; HI2012

Contents

S.08 Intrinsically Safe Pressure Transmitter page 41

Certification:	ATEX and IECEx approved for explosion protection for flam mable gases (zone 0), dusts (zone 20) and mining areas (group I M1).
Pressure Ranges:	0-100 mbar up to 1,500 bar
Output Signal:	4-20 mA ; DNV GL Approved
Process Connection:	1/4" NPT female standard or 1/2" BSP male (G1/2); other options available
Types:	PR3900; PR3110EX

S.09 High Temperature Pressure Transmitter page 47

Temperature Ranges:	Media temperature up to 250 °C
Pressure Ranges: :	From Vac up to 1,500 bar
Output Signal:	mV, 0-5 V, 0-10 V or 4–20 mA
Process Connection:	¼" BSP male (G ¼); ¼" NPT male or ½" BSP flush diaphragm
Electrical Connection:	MIL-C-26482 6 pin Bayonet; 1 m PTFE cable; DIN EN 175301
Option:	ATEX/IECEx (available only for 4–20 mA), includes mining areas (Group I M1)
Types:	HI2200; HI2210; HI2300; HI2310; HI6000;HI6001; HI6002; HI6003; HI6301; HI6302; HI6010; HI6011; HI6012; HI6013; HI6311; HI6312; PR3860; PR3861; PR3862

S.10 Submersible Depth / Level Pressure Transmitter page 55

Pressure Ranges:	0–1 mWG up to 500 mWG
Accuracy:	≤ ±0.3 % of span BFSL
Output Signal:	4–20 mA (other options on request)
Electrical Connection:	Vented Cable
Option:	ATEX/IECEx (available only for 4-20 mA), includes mining areas (Group I M1) DNV-GL Approved
Types:	PR3420; PR3441; PR3442

S.11 Flush Diaphragm Pressure Transmitter page 59

Pressure Ranges:	From Vac up to 400 bar
Sensor Technology:	Thick Film Ceramic Sensor
Accuracy:	≤ ±0.3 % of span BFSL
Output Signal:	4–20 mA (other options on request)
Wetted Parts:	Stainless steel 316 Process Connection: ½" BSP (G1/2); Pipe-clamp; DIN 11851 (other options on request)
Options:	ATEX/IECEx (available only for 4–20 mA), includes mining areas (Group I M1) ;
Types:	PR3800; PR3801; PR3802; PR3820; PR3821; PR3822; PR3850; PR3851; PR3852; PR3860; PR3861; PR3862

S.12 Differential Pressure Transmitter

page 65

Pressure Ranges:	0–5 mbar up to 200 bar
Accuracy:	≤ ±0.3 % of span BFSL
Output Signal:	4 – 20 mA (other options on request)
Wetted Parts:	Suitable for liquids or gases
Options:	ATEX/IECEx (available only for 4–20 mA), includes mining areas (Group I M1)
Types:	PR3200; PR3210; PR3220; PR3230; PR3240; PR3202; PR3203; PR3204

S.13 Standard Industrial Pressure Transmitter

page 71

Pressure Ranges:	From Vac to 1,000 bar
Output Signal:	2 mV/V typical, 0-5 V, 0-10 V or 4-20 mA
Process Connection:	1/4" BSP (G1/4); 1/2" BSP male (G1/2) or 1/4" NPT Male (other options available)
Option:	ATEX/IECEx (available only for 4–20 mA), includes mining areas (Group I M1) ; DNV GL Approved
Types:	GS4000; GS4001; GS4011; GS4002; GS4012; GS4003; GS4100; GS4101; GS4111; GS4102; GS4112; GS4103; PR3101; PR3102; PR3103

S.14 Heavy Duty/ Wireless Pressure Transmitter

page 77

Pressure Ranges:	From Vac up to 1,500 bar
Sensor Technology:	Silicon-on-Sapphire (SoS)
Output Signal:	4-20 mA or radio transmission
Process Connection:	1/2" BSP male (G1/2); other options available
Options:	ATEX/IECEx (available only for 4–20 mA), includes mining areas (Group I M1) or Wireless UHF radio transmitter (non-ATEX/IECEx)
Types:	PR9000; PR9500; RX9500

S.15 Accessories

page 83

High Temperature Pressure Adapter
Plug-in Display
Panel Meter

Technical Explanation

SENSOR TECHNOLOGIES

Technical Explanation

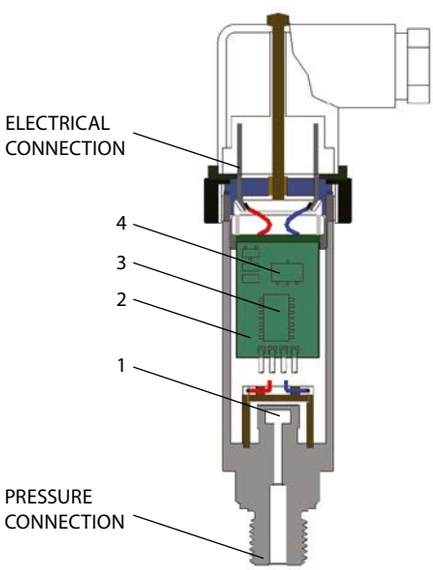
What is a pressure transmitter?

A pressure transmitter (also called pressure transducer or pressure converter) is a component used to convert a pneumatic or hydraulic pressure to an electrical (usually analogue and linear) output signal, such as a current or voltage.

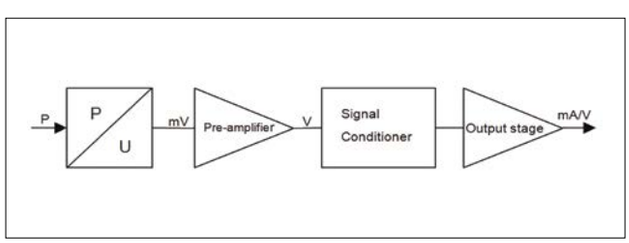
How does a pressure transmitter work?

The pressure measuring cell has a membrane (1) that is exposed to the pressure to be measured. Affixed on this membrane is a bridge circuit consisting of four ohmic resistors in the form of a Wheatstone bridge. The values of these resistors change proportionally to the pressure load present at the measuring cell or membrane. The bridge voltage of the measuring cell is amplified in the evaluation electronics (2) and a calibrated signal is established in the signal conditioner / microcontroller (3).

The downstream output stage (4) converts this signal to the output signal required (such as 4-20 mA, 0-5 V, or 0-10 V).



Block diagram



Silicon-on-Sapphire (SoS) Technology

In silicon-on-sapphire technology, the substrate of the thin film measuring cell is synthetic sapphire. This has excellent mechanical and temperature-stable properties, and prevents undesired parasitic effects, thereby having a positive effect on accuracy and stability. When combined with a titanium membrane, the result is a unique coaction between the temperature coefficients of sapphire and titanium. This is because, unlike silicon and high-grade steel, they are more closely matched and so only require a low level of compensation overhead. This also has a favourable effect on long-term stability.

"Oil-filled" High-grade Steel Measuring Cell (Isolated Piezo-resistive)

In this sensor technology, the piezo-resistive measuring cell is packaged within a metallic housing filled with fluorine or silicone oil. This means the measuring cell is virtually free of external mechanical stresses. Fluorine oil has excellent characteristics as regards temperature and ageing behaviour, and is not flammable and so lends itself perfectly to deployment in oxygen applications, although it is not recommended for food applications.

Ceramic Measuring Cell (Thick Film Technology)

Ceramic thick film pressure measuring cells are made up of a sintered ceramic body. The ceramic body sleeve already has the key geometries for the subsequent pressure range, so the pressure range required is established with grinding and lapping. The resistors are imprinted with thick film technology and inter-connect to form a measuring bridge.

Bonded Foil Measuring Cell

Bonded foil pressure measuring cells are based on the same principle as a strain gauge. Four foil gauges, made from constantan, are backed with flexible polyimide, and are bonded to a high-grade steel diaphragm in the form of a Wheatstone bridge circuit. The diaphragm flexes and strains in response to an applied pressure and causes an electrical resistance change to the strain gauges, producing a sensitivity of 2 mV/V.

Piezo-resistive Silicon Silicon

The measuring cell consists of a Piezo-resistive silicon sensing element without a protective membrane. The cell is packaged in a plastic housing for direct mounting to a printed circuit board. It is suitable for air and non-corrosive/ non-ionising gases, and is typically used for very low pressure air differential pressure measurement.

Standard Signals

Output signals 4-20 mA, 0-5 V and 0-10 V in particular are established in the industry. Unamplified millivolt (mV) output signals are available for some variants. Also offered are transmitters with digital USB output or customer-specific output signals (such as 1-5 V).

Output Configuration $_V$

The output configuration for a 4-20 mA signal is a 2 wire connection. For 0-5 V and 0-10 V signals, the configuration is either 3 wire or 4 wire connection depending on the model variant. All mV outputs are 4 wire.

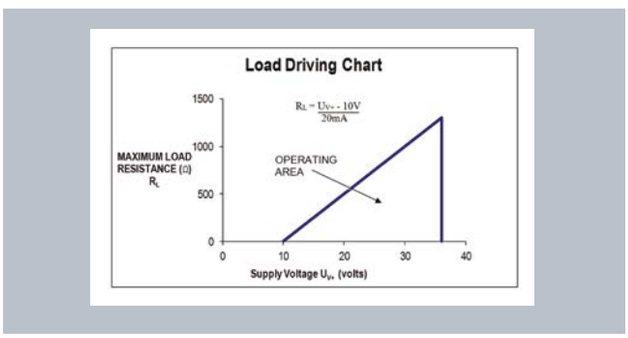
Load / Apparent Ohmic Resistance for Pressure Transmitters

An appropriate ohmic load must be connected to guarantee perfect functioning of a pressure transmitter.
The load resistance for transmitters with a voltage output; 0 – 5 V should be at greater than 5 kΩ, and for 0-10 V should be greater than 10 kΩ For mV output the measuring instrument input impedance should be as high as possible to reduce loading errors and should be no lower than 1 MΩ

For transmitters with a current output (4 - 20 mA), the maximum load is calculated using the following formula:

$$R_L = \frac{U_{V+} - U_{V+(min)}}{20mA}$$

Where U_(v+) (UB) is the actual supply voltage and Uv+ (min) is the minimum supply voltage to be taken from the data sheet. For example with a supply voltage range 10 – 36 VDC and thus Uv+ (min) = 10 V, this gives the following operating range for example:

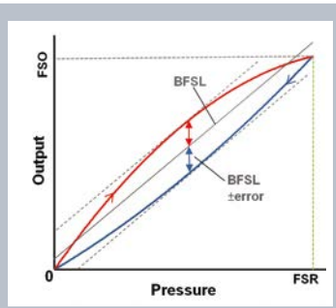


Operating/Supply Voltage

All pressure transmitters work with DC voltage and have no galvanic isolation. Within the thresholds specified in the relevant data sheets, the supply voltage may change without it having a bearing on the output signal. In order to guarantee the functionality of a transmitter, the supply voltage should not fall below the minimum operating voltage. The maximum operating voltage may not be exceeded to ensure the electronics are not damaged beyond repair.

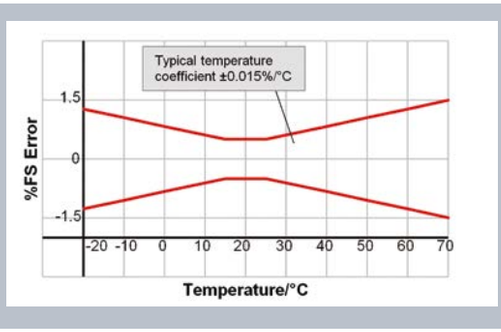
Accuracy

ESI defines accuracy as the combined error due Non-linearity, Hysteresis and Repeatability (NLHR), defined at room temperature and condition as new. The maximum deviation from an ideal characteristic curve is defined in accordance with Best Fit Straight Line (BFSL) method. Other factors that have a bearing on accuracy, such as zero and span tolerance and temperature error, are specified separately.



Temperature Errors and Ranges

The temperature (for both ambient and medium) generally has a significant bearing on the accuracy of a pressure transmitter. Pressure transmitters are temperature compensated over a particular range corresponding to the typical application. This means that temperature errors within this temperature range are minimised by means of circuitry design and algorithms. The temperature error is added to the accuracy and is shown in the total error band of the pressure transmitter, also called "butterfly graph". The maximum error is not defined outside the compensated temperature range, but the transmitter will still function however. To prevent mechanical and electrical damage, pressure transmitters may not be deployed beyond the threshold temperature ranges specified in the data sheet.



Ex Certification

ATEX & IECEX

Our Ex Certification

ESI technology has an extensive range of intrinsically safe pressure transmitters, all ATEX and IECEx approved for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group M1)

II 1 G Ex ia IIC T4 Ga
II 1 D Ex ia IIIC T135°C Da
I M 1 Ex ia I Ma

Putting safety first in explosive environments…..

Our range of Ex certified pressure transmitters have both ATEX and IECEx approval.

ATEX is an EU Directive (2014/34/EU) that ensures products are safe to use in explosive environments.

The **IECEx** scheme certifies worldwide conformity to international standards and provides assurance that equipment for use in explosive atmospheres are manufactured and operated according to the highest International Standards of safety.

The most common protection method for process instrumentation is Intrinsic Safety (IS) and this is the protection method used in ESI transmitters. With these instruments the low voltage electronics is designed in such a way that it is incapable of releasing enough energy, thermally or electrically, to cause an ignition of flammable gases or liquids. To achieve this, there are limitations set on levels of voltage, current, capacitance and inductance, such that the available energy at a sparking device is below the minimum ignition energy of the potentially explosive atmosphere.

Intrinsic safety equipment must undergo Type Examination by an approved third party. It involves a detailed process of examination, testing and assessment of equipment, confirming and demonstrating that the product is safe to use within potentially explosive atmospheres. The certification process must be undertaken by a Notified Body.

Hazardous Zone Classification

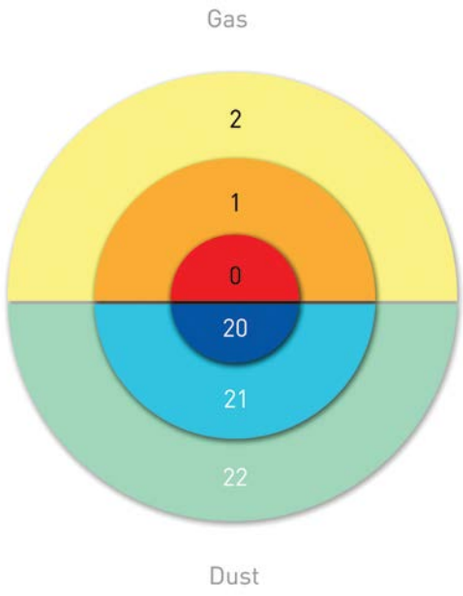
Hazardous areas are classified into zones (0, 1, 2 for gas-vapour-mist and 20, 21, 22 for dust)

The zones are determined by the type of combustible material present, the length of time it is present, and the physical construction, of the area where such material is present.

Zone 0 or 20 locations are those areas where ignitable or flammable concentrations of combustible gases or dusts exist continuously or for long periods of time.

Zone 1 or 21 locations are those areas where ignitable or flammable concentrations of combustible gases or dusts are likely to, or frequently exist, during normal operations.

Zone 2 or 22 locations are those areas where ignitable or flammable concentrations of combustible gases or dusts are not likely to occur during normal operations or will exist for only a brief period of time.



Zone 0 and 20 require Category 1 marked equipment, Zone 1 and 21 require Category 1 or 2 marked equipment and Zone 2 and 22 require Category 1, 2, or 3 marked equipment. Zone 0 and 20 are the zones with the highest risk of an explosive atmosphere being present.

Using an Intrinsically Safe Barrier

The essential concept behind intrinsic safety is the restriction of electrical energy to apparatus, and the interconnecting wiring exposed to the potentially explosive atmosphere, to a level that will not cause ignition by either sparking or heating effects. It is therefore a low-energy signalling technique that prevents explosions from occurring by ensuring that the energy transferred to a hazardous area is well below the energy required to initiate an explosion.
This is achieved by limiting the electrical energy transferred to a hazardous area through the use of an Intrinsic Safety Barrier situated in a safe area.
Intrinsic Safety Barriers provide both power and signal isolation. A safety barrier is used between the "safe area" and the "hazardous area" so that any fault that generates a high energy level would not get carried over to the hazardous area.

Contact the sales team for more information sales@esi-tec.com

DNV GL APPROVAL

FOR MARINE APPLICATIONS

ESI marine products have DNV GL classification for ships, high speed & light craft and DNV GL offshore standards.

It is becoming increasingly important that the components and equipment used in the marine industry are tested and certified as suitable for use in harsh environments. ESI Technology have recognised the demand, and have classified a range of products from vacuum to 5000 bar, which cover most eventualities in the Marine workspace.

DNV GL approval confirms that ESI Technology pressure sensors are compliant to their manufacturing rules, and have demonstrated that they are fit for purpose and meet the required environment and performance criteria during the approval process. A rigorous testing schedule is involved during the approval process to prove the how durable and rugged the products are.

DNV GL approved pressure sensors offer distinct advantages and applications for ships, barges, offshore oil platforms and desalination. Having equipment that has been certified can reduce the risk of major incidents and can give piece of mind that failures will not be down to poor design of the equipment. It can be a requirement from insurance companies and even some areas may restrict movement of vessels that do not have appropriate certification. There are various levels of marine approval ranging from the very basic for use in cabins and locker spaces, through engine room and bilges, to on deck and even up mast mountings. These are classified by DNV GL as location classes and it is important that the equipment used is suitable and certified for use in each location, in relation to temperature, humidity, vibration, EMC, and enclosure. The location classes are defined on the equipment certificate, but further guidance can be found from DNV GL. ESI have aimed for the highest level in each class so that the products can be used in the most diverse range of applications on-board.

The influence of the ambient environment on instrumentation and automation equipment will depend upon the field of application on board. Environmental testing therefore implies tests being directly related to intended location on board as well as general tests, which are not directly related to location.

Location Classes

Temperature, humidity, vibration, enclosure and EMC classes define the different areas of location.

Upon installation on-board, it is mandatory that each of the five location classes stated for the equipment in question, meets the minimum location class required for the actual location.

ESI has five product ranges with DNV GL certification- GS4200, HP1000, PR3110, PR3441 and PR3900 and they are classed as follows;

Parameters	Class	Location	Minimum Equipment Specification	ESI Product
Temperature	A	Machinery spaces, control rooms, accommodation, bridge	Ambient temperatures: +5°C to +55°C	
	B	Inside cubicles, desks, etc. with temperature rise of 5° C or more	Ambient temperatures: +5° C to +70°C	
	C	Pump rooms, holds, rooms with no heating	Ambient temperatures: -25°C to +55°C	
	D	Open deck, masts	Ambient temperatures: -25°C to +70°C	GS4200 HP1000 PR3110 PR3441 PR3900
Humidity	A	Locations where special precautions are taken to avoid condensation	Relative humidity up to 96 % at all relevant temperatures.	
	B	All other locations	Relative humidity up to 100 % at all relevant temperatures	GS4200 HP1000 PR3110 PR3441 PR3900
Vibration	A	On bulkheads, beams, deck, bridge	Frequency range: 3-13.2 Hz, Amplitude: 1.0 mm (peak value) Frequency range: 13.2-100 Hz, Acceleration amplitude: 0.7 g	
	B	On machinery such as internal combustion engines, compressors, pumps, including piping on such machinery	Frequency range: 3-25 Hz, Amplitude: 1.6 mm (peak value) Frequency range: 25-100 Hz, acceleration amplitude: 4.0 g	GS4200 HP1000 PR3110 PR3441 PR3900
	C	Masts	Frequency range: 3-13.2 Hz, Amplitude: 3.0 mm (peak value) Frequency range: 13.2-50 Hz, Acceleration amplitude: 2.1 g	
EMC	A	All locations except Bridge and Open Deck	Immunity: Lower test level Emission: Lower test level	
	B	All locations including Bridge and Open Deck	Immunity: Higher test level Emission: Higher test level	GS4200 HP1000 PR3110 PR3441 PR3900
Electrical Connections:	A	Control rooms, accommodation, bridge	IP 22	
	B	Engine room	IP 44	GS4200 HP1000 PR3110 PR3900
	C	Open deck, masts, below floor plates in engine room	IP 56	
	D	Submerged application,bilges	IP 68	PR3441

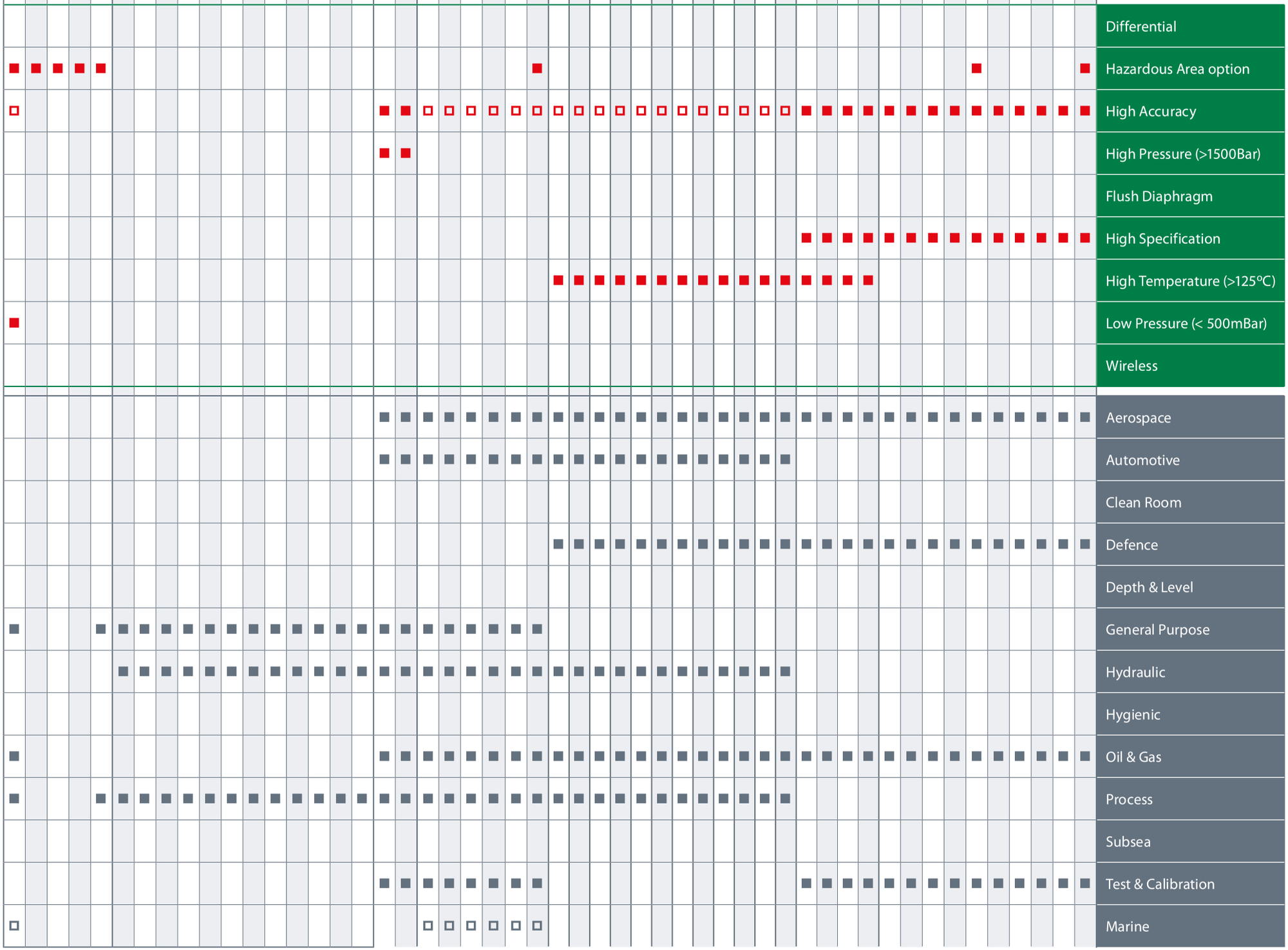
Who are DNV GL?

DNV GL (Det Norske Veritas Germanscher Lloyd) is the industry leader in Marine Accreditation and is accepted as suitable across the globe. With headquarters in Høvik, Norway, it was created in 2013 as the result of a merger between two leading organisations in the field - Det Norske Veritas (Norway) and Germanischer Lloyd (Germany). In addition to providing technical assessment, certification, risk management and software development, DNV GL also invests heavily in research.

Selection Matrix

■■■ Standard
□□□ Option

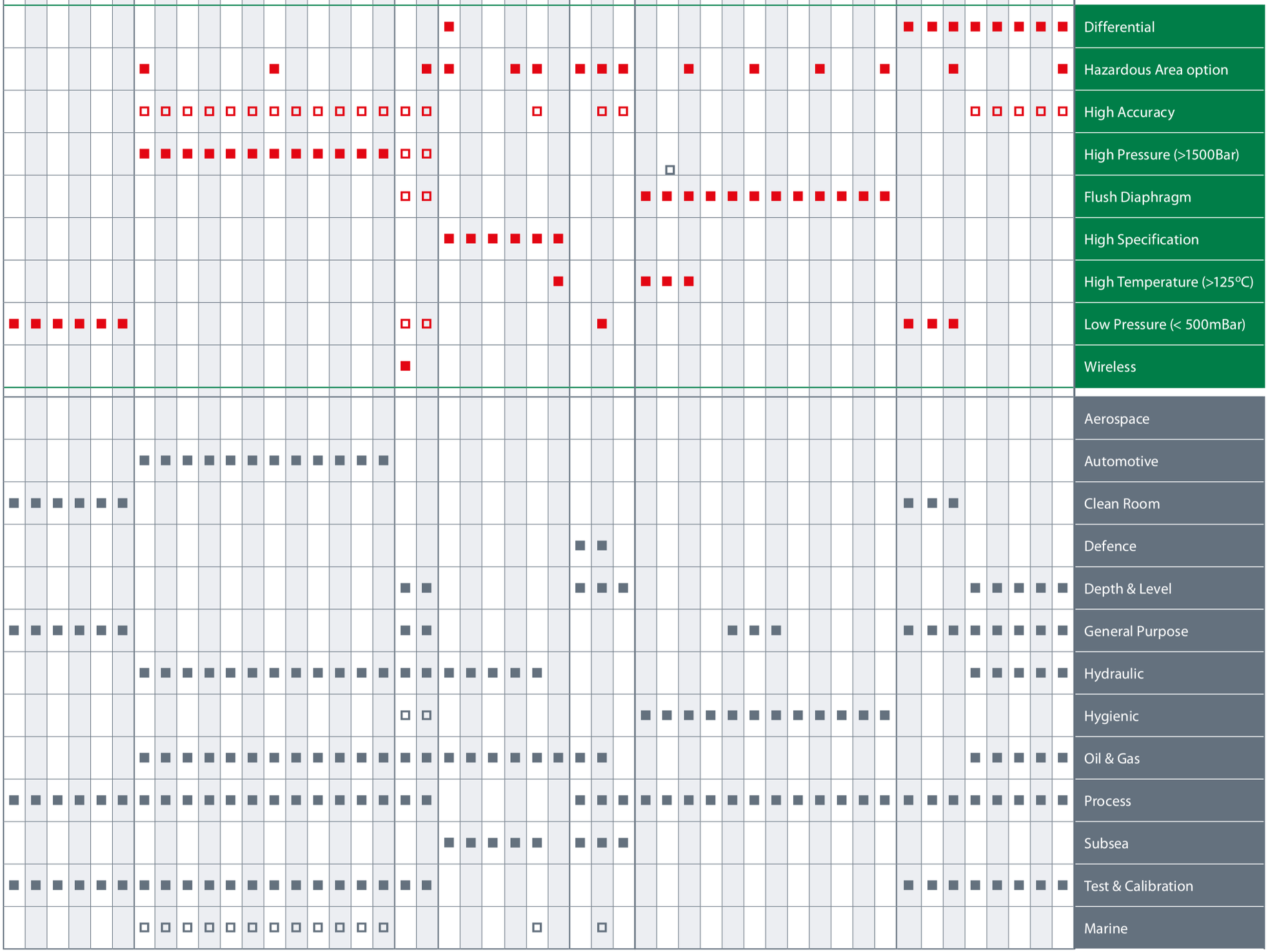
			Page Number	Output	No. of wires	Silicon-on-Sapphire	Bonded Foil Strain Gauge	Ceramic Thick Film	Isolated Piezoresistive Silicon	Piezoresistive Silicon
Hispec High Specification	**HI2000**	Cable Outlet	39	10mV/V	4	■				
	HI2001	Cable Outlet	39	0-5 V	4	■				
	HI2004	Cable Outlet	39	0-5 V	3	■				
	HI2002	Cable Outlet	39	0-10 V	4	■				
	HI2005	Cable Outlet	39	0-10 V	3	■				
	HI2010	MIL-C-26482	39	10mV/V	4	■				
	HI2011	MIL-C-26482	39	0-5 V	4	■				
	HI2014	MIL-C-26482	39	0-5 V	3	■				
	HI2012	MIL-C-26482	39	0-10 V	4	■				
	HI2015	MIL-C-26482	39	0-10 V	3	■				
Hispec High Temperature	**HI2200**	Unrationalised, Cable Outlet, 200°C	49	10-20mV/V	4	■				
	HI2210	Unrationalised, MIL-C-26482, max. 200°C	49	10-20mV/V	4	■				
	HI2300	Compensated, Cable Outlet, max. 200°C	49	10mV/V	4	■				
	HI2310	Compensated, MIL-C-26482, max. 200°C	49	10mV/V	4	■				
	HI6000	Max. 150°C, Cable Outlet	51	0.5-4.5 V Ratiometric	4	■				
	HI6001	Max. 150°C, Cable Outlet	51	0-5 V	4	■				
	HI6002	Max. 150°C, Cable Outlet	51	0-10 V	4	■				
	HI6003	Max. 150°C, Cable Outlet	51	4-20 mA	2	■				
	HI6301	Max. 150°C, Cable Outlet	51	0-5 V	3	■				
	HI6302	Max. 150°C, Cable Outlet	51	0-10 V	3	■				
	HI6010	Max. 150°C, D38999 6 pin connector	51	0.5-4.5 V Ratiometric	4	■				
	HI6011	Max. 150°C, D38999 6 pin connector	51	0-5 V	4	■				
	HI6012	Max. 150°C, D38999 6 pin connector	51	0-10 V	4	■				
	HI6013	Max. 150°C, D38999 6 pin connector	51	4-20 mA	2	■				
	HI6311	Max. 150°C, D38999 6 pin connector	51	0-5 V	3	■				
	HI6312	Max. 150°C, D38999 6 pin connector	51	0-10 V	3	■				
Genspec General Purpose	**GS4200**	High quality, multi-purpose	27	4-20mA	2	■				
	GS4201	High quality, multi-purpose	27	10mV/V	4	■				
	GS4202	High quality, multi-purpose	27	0-5 V	4	■				
	GS4212	High quality, multi-purpose	27	0-5 V	3	■				
	GS4203	High quality, multi-purposev	27	0-10 V	4	■				
	GS4213	High quality, multi-purpose	27	0-10 V	3	■				
Genspec USB	**GS4200-USB**	Digital USB Interface	23	USB	n/a	■				
	GD4200-USB	Fast Response, Digital USB Interface	23	USB	n/a	■				
Genspec Standard Industrial	**GS4000**	Compact, Micro DIN connector	73	2mV/V	4		■			
	GS4001	Compact, Micro DIN connector	73	0-5 V	4		■			
	GS4011	Compact, Micro DIN connector	73	0-5 V	3		■			
	GS4002	Compact, Micro DIN connector	73	0-10 V	4		■			
	GS4012	Compact, Micro DIN connector	73	0-10 V	3		■			
	GS4003	Compact, Micro DIN connector	73	4-20mA	2		■			
	GS4100	Compact, Micro DIN connector	73	2mV/V	4			■		
	GS4101	Compact, Micro DIN connector	73	0-5 V	4			■		
	GS4111	Compact, Micro DIN connector	73	0-5 V	3			■		
	GS4102	Compact, Micro DIN connector	73	0-10 V	4			■		
	GS4112	Compact, Micro DIN connector	73	0-10 V	3			■		
	GS4103	Compact, Micro DIN connector	73	4-20mA	2			■		
Protran Process	**PR3100**	Standard Industrial	75	4-20mA	2		■	■		
	PR3101	Standard Industrial	75	2mV/V	4		■	■		
	PR3102	Standard Industrial	75	0-5 V	4		■	■		
	PR3103	Standard Industrial	75	0-10 V	4		■	■		
	PR3110EX	ATEX/IECEx Certified Low Pressure Transmitter	75	4-20mA	2				■	


Differential
Hazardous Area option
High Accuracy
High Pressure (>1500Bar)
Flush Diaphragm
High Specification
High Temperature (>125ºC)
Low Pressure (< 500mBar)
Wireless
Aerospace
Automotive
Clean Room
Defence
Depth & Level
General Purpose
Hydraulic
Hygienic
Oil & Gas
Process
Subsea
Test & Calibration
Marine

Selection Matrix

■ Standard
□ Option

			Page Number	Output	No. of wires	Silicon-on-Sapphire	Bonded Foil Strain Gauge	Ceramic Thick Film	Isolated Piezoresistive Silicon	Piezoresistive Silicon
Protran Differential	**PR3200**	High Pressure up to 200 bar, liquid media	67	4-20mA	2	■				
	PR3210	High Pressure up to 200 bar, liquid media	67	0-5 V	4	■				
	PR3230	High Pressure up to 200 bar, liquid media	67	0-5 V	3	■				
	PR3220	High Pressure up to 200 bar, liquid media	67	0-10 V	4	■				
	PR3240	High Pressure up to 200 bar, liquid media	67	0-10 V	3	■				
	PR3202	Air/Non-corrosive Gas Pressure Transmitter	69	4-20mA	2					■
	PR3203	Air/Non-corrosive Gas Pressure Transducer	69	0-5 V	3					■
	PR3204	Air/Non-corrosive Gas Pressure Transducer	69	0-10 V	3					■
Protran Flush Diaphragm	**PR3800**	Pipe Clamp	61	4-20mA	2			■	■	
	PR3801	Pipe Clamp	61	0-5 V	4			■	■	
	PR3802	Pipe Clamp	61	0-10 V	4			■	■	
	PR3820	DIN11851 / SMS / RJT	61	4-20mA	2			■	■	
	PR3821	DIN11851 / SMS / RJT	61	0-5 V	4			■	■	
	PR3822	DIN11851 / SMS / RJT	61	0-10 V	4			■	■	
	PR3850	1/2" BSP (G1/2)	63	4-20mA	2			■		
	PR3851	1/2" BSP (G1/2)	63	0-5 V	4			■		
	PR3852	1/2" BSP (G1/2)	63	0-10 V	4			■		
	PR3860	High Temperature	53/63	4-20mA	2			■		
	PR3861	High Temperature	53/63	0-5 V	4			■		
	PR3862	High Temperature	53/63	0-10 V	4			■		
Protran Submersible Depth/Level	**PR3420**	Sludge Platform	57	4-20 mA	2				■	
	PR3441	25 mm diameter	57	4-20 mA	2				■	
	PR3442	16 mm diameter	57	4-20 mA	2				■	
Protran Oil & Gas	**HI5000**	Downhole Pressure Transmitter	19	4-20mA	2	■				
	PR3900	Hazardous Area Pressure Transmitter	19	4-20mA	2	■				
	PR3913	Control Valve Pressure Transmitter	19	4-20mA	2	■				
	PR3914	Subsea Pressure Transmitter	19	4-20mA	2	■				
	PR3915	Subsea Dual Redundant Pressure Transmitter	19	4-20mA	2	■				
	PR3920	Subsea DP Control Valve Pressure Transmitter	19	4-20mA	2	■				
Protran Heavy Duty	**PR9000**	Process Pressure Transmitter	79	4-20mA	2	■			■	
	PR9500	Wireless Pressure Transmitter	80	4-20mA	2	■			■	
Hipres High Pressure	**HP1000**	Up to 2,000 bar	31	10 mV/V	4	■				
	HP1001	Up to 2,000 bar	31	0-5 V	4	■				
	HP1011	Up to 2,000 bar	31	0-5 V	3	■				
	HP1002	Up to 2,000 bar	31	0-10 V	4	■				
	HP1012	Up to 2,000 bar	31	0-10 V	3	■				
	HP1003	Up to 2,000 bar	31	4-20mA	2	■				
	HP1100	From 2500 bar to 5,000 bar	31	10mV/V	4	■				
	HP1101	From 2500 bar to 5,000 bar	31	0-5 V	4	■				
	HP1111	From 2500 bar to 5,000 bar	31	0-5 V	3	■				
	HP1102	From 2500 bar to 5,000 bar	31	0-10 V	4	■				
	HP1112	From 2500 bar to 5,000 bar	31	0-10 V	3	■				
	HP1103	From 2500 bar to 5,000 bar	31	4-20mA	2	■				
Lopres Low Pressure	**LP1000**	Standard, Air and Liquid	35	10mV/V	4				■	■
	LP1001	Standard, Air and Liquid	35	0-5 V	4				■	■
	LP1011	Standard, Air and Liquid	35	0-5 V	3				■	■
	LP1002	Standard, Air and Liquid	35	0-10 V	4				■	■
	LP1012	Standard, Air and Liquid	35	0-10 V	3				■	■
	LP1003	Standard, Air and Liquid	35	4-20mA	2				■	■


Differential
Hazardous Area option
High Accuracy
High Pressure (>1500Bar)
Flush Diaphragm
High Specification
High Temperature (>125°C)
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Wireless
Aerospace
Automotive
Clean Room
Defence
Depth & Level
General Purpose
Hydraulic
Hygienic
Oil & Gas
Process
Subsea
Test & Calibration
Marine

S.01

Customised Solutions

- Application specific design solutions
- Customised housing design
- Choice of output signals and pressure ranges
- Specialised process connections
- Various electrical connector options
- Special housing materials

From Conception to Completion… The custom design service from ESI.

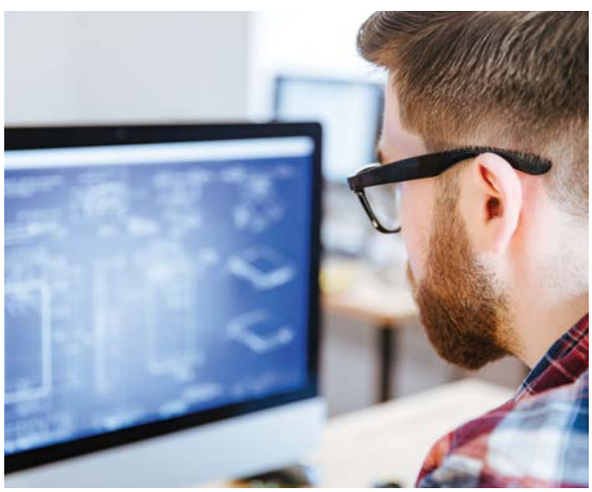
Whatever your application may be, there are times when your requirements are not straightforward and you need a tailor-made pressure measurement solution to your unique specifications.

ESI Technology specialise in the design, right through to manufacture, of pressure transducers and transmitters for a wide range of industries.

In addition to the standard range of instruments, a team of qualified engineers, with extensive experience in electronic, software and mechanical instrumentation, offer a complete design service using the latest technologies. The team are able to analyse and interpret customers' specific requirements and create a product that meets, and often exceeds, the exact needs of the application in order to eradicate any compromise from the customer.

The ability to design bespoke solutions, often just minor adjustments to standard products, is a major benefit to customers for many applications. In addition, ESI have the capabilities to take on major design projects and, using extensive in-house pressure and environmental test equipment, create prototype sensors complete with qualification and first article test reports.

Sensor technology, output signals, pressure ranges, electrical connections and specialised process connections can be adapted to customer requirements. Stringent quality control and inspection is exercised at every stage of the manufacturing process to ensure our customers complete satisfaction with the end product, backed up with technical advice and support. Customer focus and high quality is maintained, regardless of whether the project is small, mid or high volume.



S.02

Oil, Gas & Subsea

PR3914

PR3915

HI5000

PR3920

- Dual Redundant pressure sensors and electronics
- Compact Downhole
- Hyperbaric testing to 3,300 metres depth
- Environmental Stress Screening (ESS)
- Specialised process connections
- Extended service life
- Range of housing materials
- Comprehensive documentation package and certification

Oil, Gas & Subsea

Oil, gas & subsea applications have become a speciality of ESI. The ability to meet exacting requirements for these markets can be illustrated by the evolution of the field proven oil & gas and subsea product range which includes dual redundant, downhole and subsea differential designs.

Pressure measurement plays an important role in the oil & gas industry. With the necessity to find oil in less accessible places, the systems utilised in exploration become more complex and the use of pressure transducers and transmitters is increasing.

New and more challenging applications require specifically designed solutions to cope with higher static pressures, aggressive processes and environmental conditions. One of our particular areas of expertise is in deep-water subsea applications where we provide specialist transmitters, often for control valve operation and for immersion up to 6,000 metres with an expected service life of 25 years.

More recently the HI5000 Downhole transmitter has been developed. It is highly compact, with a maximum length of 58mm. The tough, corrosion-resistant design, using NACE certified materials, makes installation easy in challenging environments. The sensor is designed to withstand high shock and vibration inputs in high temperature applications which require accuracy, stability and long term performance of downhole pressure monitoring.

Pressure port threads, output signals, pressure ranges, electrical connections and wetted parts can be tailored to adapt to the harsh and unforgiving environments synonymous with the oil, gas and subsea industries. At the heart of the design is ESI's unique Silicon-on-Sapphire sensor technology; a sensor not only with high sensitivity and stability, but also rugged and resilient against high overload pressures and transients.

Optional ATEX and IECEx approved versions of this product range are available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

Product Conditioning

Pre-conditioning and testing is fundamental to the success of our oil, gas and subsea range. Our investment in hyperbaric test facilities means that each and every unit we supply has already been subjected to 3,300 metres of submersion before leaving the factory and the customer can rest assured that there is no concern about leakage or integrity when deploying these pressure transmitters in deep water subsea applications.

Investment in vibration test equipment and automated thermal chambers means that transmitters can be environmentally screened at ESI before shipment, confirming that the units are fit and reliable for a long service life on the seabed. This is a major benefit to the customer as the cost of valve retrieval from a subsea process is extreme.

This investment and commitment means that every customer receives a material requirement package with each transmitter confirming calibration, accuracy, material conformity, hyperbaric test and ESS test certificates

Documentation Support

The provision of documentation to support products is usually beyond the scope of most quality systems, but we have adapted our procedures to offer full and comprehensive document support including certificates of conformity, calibration certificates and material certificates for traceability. Document packages have become a standard requirement in the competitive oil and gas market and ESI are ready to support any new requirements that arise.

S.03

Genspec Standard GS4200-USB and **Genspec** DYNAMIC GD4200-USB

Digital Pressure Transducer

- Sample rate software selection up to 1,000 Hz
- Silicon-on-Sapphire pressure sensor technology
- Choice of pressure ranges from vacuum to 5,000 bar
- Accuracy (NLHR) ±0.15% of span BFSL
- ESI-USB© downloadable software with auto update
- Measure & record up to 16 pressure inputs together
- Create customised test certificate
- Automatic temperature compensation
- Support for easy integration with applications created by C#, VB, Labview and Excel VBA (api dll library)
- 2m lead & carry case included

DESCRIPTION

The GS4200-USB and GD4200-USB Digital Pressure Transducers have been designed to measure, analyse and record pressure directly on your computer without the need for costly I/O interface boards.

The transducer is powered by the computer's USB port, data is then presented on the PC via the ESI-USB© configurable Windows Interface software. It has instant connection with auto-detection, and will configure automatically with your desktop, laptop or Windows tablet via USB protocol.

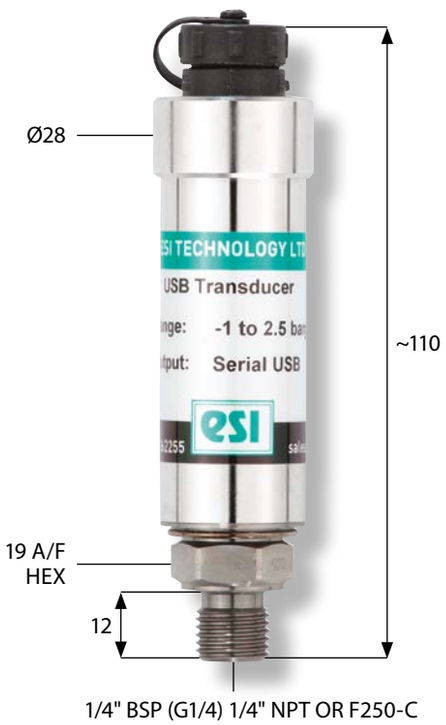
The GD4200-USB sample rate enables dynamic pressures to be measured with up to 21 bit resolution at user selectable speeds up to 1,000 Hz. For real-time analysis, data transferred to the PC is achieved without loss of accuracy or bandwidth. This pressure transducer is USB 2.0 compatible, the ESI-USB© interface configuration and analysis software is compatible exclusively with Windows© 8, 8.1 and 10. The ESI-USB software has many advanced, yet easy to use, features such as leak testing, alarm settings, differential pressure measurement, customisable reports and the ability to measure and record up to 16 pressure inputs simultaneously. Data can be displayed in graphical or tabular form, with a choice of pressure units and fully adjustable scales, and can be saved to a file or exported to Excel/ PDF or as .csv file.

The unique Silicon-on-Sapphire sensor technology provides outstanding performance and gives excellent stability over a wide temperature range. Excellent measurement accuracy provides high resolution with a precision greater than 1 in 10,000. Nine pressure ranges have been carefully selected to enable the user to cover any pressure that the application requires, from vacuum up to 5,000 bar, via the use of the ESI-USB© digitally self-scaling software.

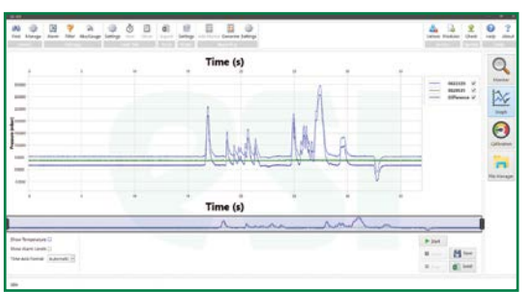
Each unit requires free download of the ESI-USB© software and is supplied with 2m USB lead, rated to IP68, and a convenient carry case.

GS4200-USB

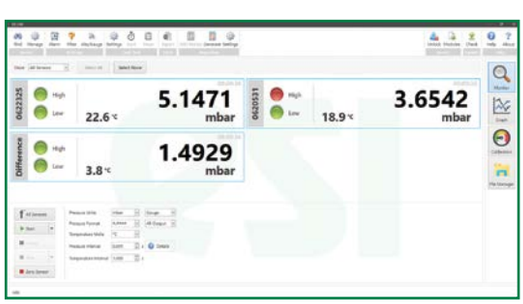
DIMENSIONS (in mm)



ESI-USB Software



GRAPH SCREEN



MONITOR SCREEN

TECHNICAL DATA

Type	GS4200–USB	GD4200–USB
Sensor Technology:	Silicon-on-Sapphire (SoS)	
Output Signal:	USB 2.0 compatible	
Supply Voltage:	5 VDC via USB bus	
Pressure Reference:	Gauge (default); Absolute reference input by user	
Standard Pressure Ranges:	-1 to 2.5 bar; 0 – 16 bar; 0 – 100 bar; 0 – 400 bar; 0 – 1,000 bar; 0 – 1,500 bar; 0 – 2,000 bar; 0 – 4,000 bar	-1 to 2.5 bar; 0 – 16 bar; 0 – 100 bar; 0 – 400 bar; 0 – 1,000 bar; 0 – 1,500 bar; 0 – 2,000 bar; 0 – 4,000 bar, 0 – 5,000 bar
Standard Pressure Ranges (other):	User selectable for psi and other measurement units	
Overpressure Safety:	2x up to 400 bar; 1.5x for 1,000 bar; 1.1x for 1,500 bar; 1.5x for 2,000 bar; 1.25x for 4,000 bar	2x up to 400 bar; 1.5x for 1,000 bar; 1.1x for 1,500 bar; 1.5x for 2,000 bar; 1.25x for 4,000 bar; 1.2x for 5,000 bar;
Accuracy NLHR:	≤ ±0.15 % of span BFSL	
Sample Rate:	User selectable to 5 readings per second (5Hz); resolution [3] 21 bits	User selectable to 1,000 samples per second (1,000 Hz) Resolution: 21 bits for ≤5 Hz; 16 bits for >5 - 1,000 Hz
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)	
Operating Media Temperature:	-50 °C to +125 °C (-58 °F to +257 °F)	
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104 °F) Recommended Best Practice	
Temperature Effects:	±1.5 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.015 %FS/ °C	±1.5 %FS total error band for -10 °C to +80 °C. Typical thermal zero and span coefficients ±0.015 %FS/ °C
Electromagnetic Compatibility:	EN61326-1, EN61326-2-3 (Laboratory equipment)	
Wetted Parts:	Titanium alloy	
Pressure Media:	All fluids compatible with titanium alloy	
Pressure Connection:	1/4" BSP male (G1/4); 1/4" NPT male or F250-C (Autoclave)	
Electrical Connection:	Mating to USB mini B socket for cable connection to PC. Supplied with 2m USB lead rated to IP68 as standard.	
Software compatibility	Windows 7, Windows 8, Windows 8.1 and Windows 10	

PRODUCT CODING

Output	Type	Electrical Connection/ Option	Pressure Range	Process Connection
Standard (5 Hz)	GS4200-USB			
Dynamic (1,000 Hz)	GD4200-USB			

Electrical Connection/ Option	
Mating to USB mini B socket	-

Pressure Range in bar	
-1 to 2.5 bar	02.5
0-16 bar	0016
0-100 bar	0100
0-400 bar	0400
0-1,000 bar	1000
0-1,500 bar	1500
0-2,000 bar	2000
0-4,000 bar	4000
0-5,000 bar (GD4200 only)	5000

Process Connection	
1/4" BSP male (G1/4)	AB
1/4" NPT male	AM
Autoclave F-250-C female (for pressures above 1,500bar)	DE

Order Number Example	GD4200-USB1500AB

For options not listed please contact the sales team

GS4200-USB

GD4200-USB

DISCLAIMER : ESI Technology Ltd operates a policy of continuous product development. We reserve the right to change specification without prior notice.All products manufactured by ESI Technology Ltd are calibrated using precision calibration equipment, traceable to national measurement standards.

S.04

Genspec GS4200 Series

General Purpose Pressure Transmitter

- Silicon-on-Sapphire sensor technology for outstanding performance
- Pressure ranges to 1,500 bar
- High accuracy option
- Unblemished track record of reliability
- Excellent corrosion resistance
- High strength titanium pressure port
- High resistance to overpressure and pressure transients
- ATEX/IECEx option available (includes M1 for mining applications)
- DNV GL certification available

DESCRIPTION

The GENSPEC GS4200 pressure transmitter is designed to meet the operational requirements of demanding pressure measurement applications where good quality, quick delivery and value for money are of the highest priority.

The unique Silicon-on-Sapphire sensor technology provides outstanding performance and gives excellent stability over a wide temperature range. Standard accuracy is ± 0.25% with a typical over pressure limit of twice the rated pressure range, this together with a selection of outputs and easy access for re-calibration affirm the excellent design. All models are supplied with integral 1/4" BSP or alternative pressure connections. The all titanium alloy wetted parts offer unbeatable corrosion resistance. Versions are also available offering IP67 sealing for installations requiring high levels of environmental protection.

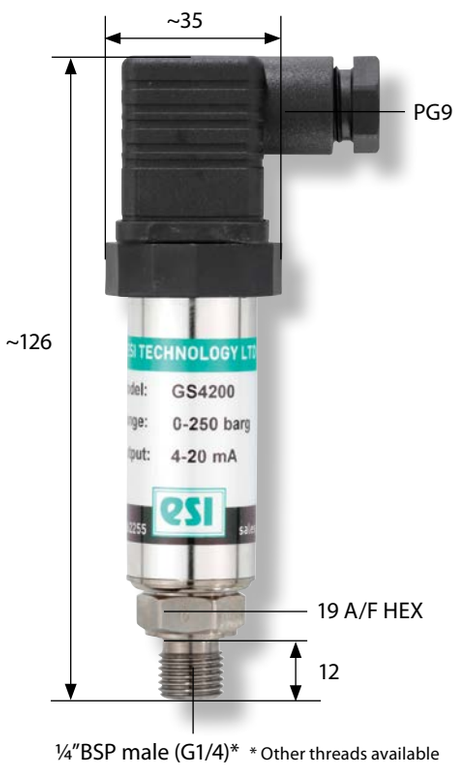
Applications for the GS4200 include the continuous monitoring of hydraulic systems with oil, gas, water and other process liquids, industrial, medical and aerospace industries. Also ideal for the measurement and control of pressure in refrigeration, pneumatic, compressor, HVAC and engine monitoring systems.

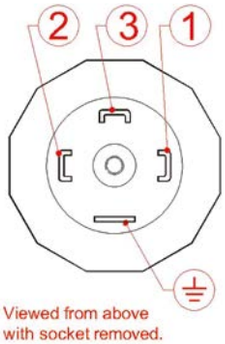
An optional ATEX and IECEx approved version of this product is available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

DNV GL rules for classification of ships, high speed & light craft and DNV GL offshore standards.

GS4200

DIMENSIONS (in mm)





ELECTRICAL CONNECTION (mA)

Pin. No.	2 wire
1	+ supply
2	4-20 mA signal
3	not fitted
⏚	to case

ELECTRICAL CONNECTION (V)

Pin. No.	4 wire	3 wire
1	- supply	common
2	+ supply	+ supply
3	+ output	+ output
⏚	- output	to case

TECHNICAL DATA

Type	GS4200	GS4201	GS4202/GS4212	GS4203/GS4213
Sensor Technology:	Silicon-on-Sapphire (SoS)			
Output Signal:	4 – 20 mA (2 wire)	0 – 10 mV/V (4 wire)	0 – 5 V (4 or 3 wire)	0 – 10 V (4 or 3 wire)
Supply Voltage:	10 – 36 VDC	10 VDC (5 – 15 V)	13 – 30 VDC	13 – 30 VDC
Pressure Reference:	Gauge			
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V (amplified versions)			
Standard Pressure Ranges (bar):	0 – 1 bar Vac; 0 – 0.5 bar; 0 – 1 bar; 0-2.5 bar; 0-6 bar; 0 – 10 bar; 0-16 bar; 0 – 25 bar; 0 – 100 bar; 0 – 250 bar; 0-400 bar; 0 – 600 bar; 0-1,000 bar; 0 – 1,500 bar (other ranges available)			
Standard Pressure Ranges (psi):	0-30 in Hg; 0-7.5 psi; 0-15 psi; 0-30 psi; 0-100 psi; 0-150 psi; 0-200 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-6,000 psi; 0-8,700 psi; 0-15,000 psi; 0-20,000 psi (other ranges available)			
Overpressure Safety:	4x for 0.5 bar range; 2x for ranges -1 bar to 600 bar; 1.5x for 1,000 bar range; 1.1x for 1,500 bar range			
Load Driving Capability:	4 – 20 mA: RL < [UB - 10 V] / 20 mA (e.g. with supply voltage (UB) of 36 V, max. load (RL) is 1300 Ω) 10 mV/V: n/a; 0 – 5 V: max. load RL > 5 KΩ; 0 – 10 V: max. load RL > 10 KΩ			
Accuracy NLHR:	≤ ±0.25 % of span BFSL (Optional higher accuracy version of ≤ ±0.1 % of span BFSL available)			
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature (GS4201: ±1 mV); ±5 %FS (approx.) adjustment with easy access trimming potentiometers on amplified versions only			
Operating Ambient Temperature:	-40 °C to +85 °C (-40 °F to +185 °F)			
Operating Media Temperature:	-50 °C to +125 °C (-58 °F to +257 °F)			
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice			
Temperature Effects:	±1.5 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.015 %FS /°C			
ATEX/IECEx Approval Option (4-20 mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)	n/a	n/a	n/a
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 74 nF Temperature Range = -20 °C to +70 °C Max. cable length = 45 m	n/a	n/a	n/a
DNV GL Approval Class:	Temperature: D; Humidity: B; Vibration: B; EMC: B; Enclosure: C (contact sales for more information)			
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked			
Insulation Resistance:	> 100 MΩ @ 50 VDC			
Response time 10-90 %:	1 mS			
Wetted Parts:	Titanium alloy (1/4" BSP male (G1/4) and 1/4" NPT male thread); other thread options typically Titanium alloy/316L stainless steel			
Pressure Media:	All fluids compatible with Titanium alloy (1/4" BSP male (G1/4) and 1/4" NPT male); other threads typically Titanium alloy/316L stainless steel			
Pressure Connection:	1/4" BSP male (G1/4); 1/4" NPT male; 1/2" BSP male (G1/2); 1/2" NPT male and 1/4" BSP female (others options available)			
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)			

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Proccess Conection
4-20 mA	2	GS4200			
10 mV/V	4	GS4201			
0-5 V	4	GS4202			
	3	GS4212			
0-10 V	4	GS4203			
	3	GS4213			

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C
ATEX/ IECEx certified with DIN EN175301 plug and socket	EX
DNV GL Approval	M
DNV GL Approval plus ATEX/IECEx certified	EXM

Pressure Range in bar	
0-1 bar Vac	V001
0-0.5 bar	00.5
0-1 bar	0001
0- 2.5 bar	02.5
0-6 bar	0006
0-10 bar	0010
0- 16 bar	0016
0-25 bar	0025
0-100 bar	0100
0-250 bar	0250
0-400 bar	0400
0-600 bar	0600
0-1,000 bar	1000
0-1,500 bar	1500

Process Connection	
1/4" BSP male (G1/4)	AB
1/2" BSP male (G1/2)	AC
1/4" NPT male	AM
1/2" NPT male	AN

Order Number Example	GS4200B1500AB

For options not listed please contact the sales team

GS4200

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S.05

Hipres HP1000 Series

High Pressure Transmitter

- Pressure ranges to 5,000bar
- High pressure integrity for safe use due to unique sensor design.
- Pressure diaphragm and process connection is machined from one piece of Titanium with no seals or welds.
- High accuracy option
- High resistance to overpressure and pressure transients
- Silicon-on-Sapphire (SoS) sensor technology for outstanding performance and reliability
- ATEX/IECEx option available (includes M1 for mining applications) for 4-20mA versions
- DNV GL Certification available

DESCRIPTION

The HP1000 series extends the Silicon-on-Sapphire pressure sensor technology into very high pressure applications, with operating ranges up to 5,000 bar and still maintaining an extremely high performance level.

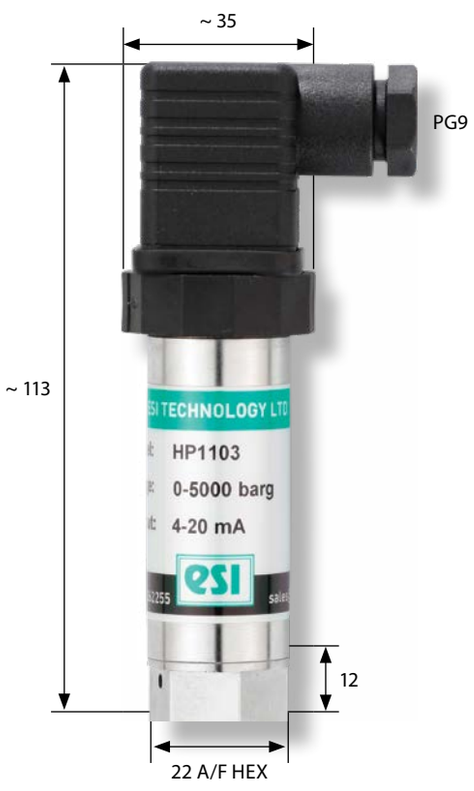
The unique Silicon-on-Sapphire sensor provides outstanding performance and gives excellent stability over a wide temperature range. The wetted parts and diaphragm are machined from a single piece of titanium alloy which means no weld joints and therefore high pressure integrity and overload capacity. Available in pressure ranges from 0-600 bar to 0-5,000 bar and with electrical outputs of 0-10 mV/V, 0-5 V, 0-10 V and 4-20 mA. Applications include aerospace, laboratory and test, oil and gas monitoring equipment and general industrial.

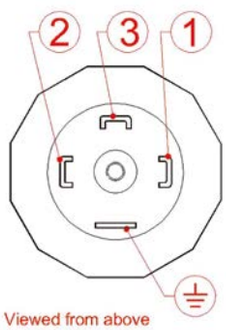
An optional ATEX and IECEx approved version of this product is available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

DNV GL rules for classification of ships, high speed & light craft and DNV GL offshore standards.

HP1103

DIMENSIONS (in mm)





ELECTRICAL CONNECTION (mA)

Pin. No.	2 wire
1	+ supply
2	4-20 mA signal
3	N\C
⏚	to case

ELECTRICAL CONNECTION (V)

Pin. No.	4 wire	3 wire
1	- supply	common
2	+ supply	+ supply
3	+ output	+ output
⏚	- output	to case

TECHNICAL DATA

Type	HP1000/HP110	HP1xx1	HP1xx2	HP1003/HP1103
Sensor Technology:	Silicon-on-Sapphire (SoS)			
Output Signal:	10 mV/V (4 wire)	0 – 5 V (4 or 3 wire)	0 – 10 V (4 or 3 wire)	4 – 20 mA (2 wire)
Supply Voltage:	10 VDC (5 – 15V)	13 – 30 VDC	13 – 30 VDC	10 – 36 VDC
Pressure Reference:	Gauge			
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V (amplified versions)			
Standard Pressure Ranges (bar):	HP10xx: 0 – 600 bar; 0 – 700 bar; 0 – 1,000 bar; 0 – 1,500 bar; 0-2,000 bar. HP11xx: 0 – 2,500 bar; 0 – 4,000 bar; 0 – 5,000 bar (other ranges available)			
Standard Pressure Ranges (psi):	0-10,000 psi; 0-15,000 psi; 0-20,000 psi; 0-30,000 psi; 0-40,000 psi; 0-60,000 psi; 0-72,000 psi (other ranges available)			
Overpressure Safety:	1.5x for ranges 0 – 600 bar to 0 – 3,000 bar; 1.25x for 4,000 bar; 1.2x for 5,000 bar			
Load Driving Capability:	4 – 20 mA: RL < [UB - 10 V] / 20 mA (e.g. with supply voltage (UB) of 36 V, max. load (RL) is 1300 Ω); 10 mV/V: n/a; 0 – 5 V: max. load RL > 5 KΩ; 0 – 10 V: max. load RL > 10 KΩ			
Accuracy NLHR:	≤ ±0.25 % of span BFSL (Optional higher accuracy version of ≤ ±0.1 % of span BFSL available)			
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature (HP1000/HP1100: ±1 mV); ±5 %FS (approx.) adjustment with easy access trimming potentiometers on amplified versions only			
Operating Ambient Temperature:	-40 °C to +85 °C (-40 °F to +185 °F)			
Operating Media Temperature:	-50 °C to +125 °C (-58 °F to +257 °F)			
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice			
Temperature Effects:	±1.5 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.015 %FS/ °C			
ATEX/IECEx Approval Option (4-20 mA version only):	n/a	n/a	n/a	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 2) Ex I M 1 Ex ia I Ma (group 1 M1)
ATEX/IECEx Safety Values:	n/a	n/a	n/a	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 74 nF Temperature Range = -20 °C to +70 °C Max. cable length = 45 m
DNV GL Approval Class:	Temperature: D; Humidity: B; Vibration: B; EMC: B; Enclosure: C (contact sales for more information)			
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked			
Insulation Resistance:	> 100 MΩ @ 50 VDC			
Response time 10-90 %:	1 mS			
Wetted Parts:	Titanium alloy machined from a single piece (≥1,000 bar); Titanium alloy and SAE 316 stainless steel (<1,000 bar)			
Pressure Media:	All fluids compatible with Titanium alloy (≥1,000 bar); All fluids compatible with Titanium alloy and SAE 316 stainless steel (<1,000 bar)			
Pressure Connection:	F250-C Autoclave fitting; thread type 9/16-18UNF-2B female or M16 x 1.5 female cone seal			
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)			

PRODUCT CODING

Output		Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
10 mV/V	Model to 2,000 bar (incl. 30,000 psi)	4	HP1000			
	Model above 2,000 bar	4	HP1100			
0-5 V	Model to 2,000 bar (incl. 30,000 psi)	4	HP1001			
	Model above 2,000 bar	4	HP1101			
	Model to 2,000 bar (incl. 30,000 psi)	3	HP1011			
	Model above 2,000 bar	3	HP1111			
0-10 V	Model to 2,000 bar (incl. 30,000 psi)	4	HP1002			
	Model above 2,000 bar	4	HP1102			
	Model to 2,000 bar (incl. 30,000 psi)	3	HP1012			
	Model above 2,000 bar	3	HP1112			
4-20 mA	Model to 2,000 bar (incl. 30,000 psi)	2	HP1003			
	Model above 2,000 bar	2	HP1103			

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C
ATEX/ IECEx certified with DIN EN175301 plug and socket	EX
DNV GL Approval	M
DNV GL Approval plus ATEX/IECEx certified	EXM

Pressure Range in bar	
0-600 bar	0600
0-1000 bar	1000
0-1,500 bar	1500
0-2,000 bar	2000
0-3,000 bar	3000
0-4,000 bar	4000
0-5,000 bar	5000

Process Connection	
Autoclave F-250-C female	DE
M16 x 1.5 female cone seal	FK

Order Number Example	HP1100A1000DE

For options not listed please contact the sales team

HP1103

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S.06

Lopres LP1000 Series

Low Pressure Transmitter

- Piezoresistive sensor technology for high performance
- Low pressure measurement from 50 mbar
- Robust stainless steel construction for durability
- Low hysteresis and excellent long term stability
- Wide operating temperature
- On-site zero and span adjustment

DESCRIPTION

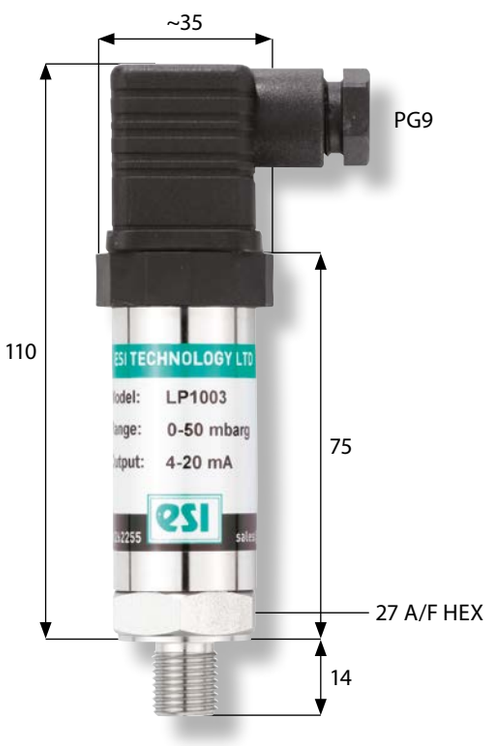
LP1000 series transmitters are designed for very low-pressure applications, with operating ranges down to 0-50 mbar whilst still maintaining high performance. The advanced sensor design provides very low hysteresis and excellent long-term stability not normally achievable when measuring very low pressure.

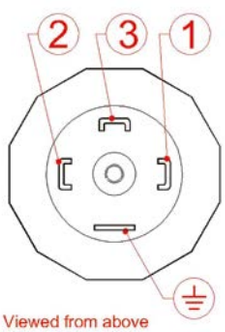
The LP1000 is suitable for use with most liquids in pressure ranges 0-100 mbar or above. For pressure ranges below 100 mbar, LP1000 can be used with air, non-corrosive gases and various liquids
compatible with silicon. The stainless steel housing, fluorosilicone seals and silicon sensing element enables the product to maintain accurate performance and provide extremely good durability. Available in pressure ranges from 0-50 mbar to 0-1,000 mbar and with electrical outputs of 0-100 mV, 0-5 V, 0-10 V and 4-20 mA.

Applications include laboratory and test, air and gas pressure monitoring, leak detection, low pressure liquid and hydrostatic pressure measurements.

LP1003

DIMENSIONS (in mm)





ELECTRICAL CONNECTION (mA)

Pin. No.	2 wire
1	+ supply
2	4-20 mA signal
3	N/C
⏚	to case

ELECTRICAL CONNECTION (V)

Pin. No.	4 wire	3 wire
1	- supply	common
2	+ supply	+ supply
3	+ output	+ output
⏚	- output	to case

CE

TECHNICAL DATA

Type	LP1000	LP10x1/LP11x1	LP10x2/LP11x2	LP1003
Sensor Technology:	Piezoresistive Silicon or Isolated Piezoresistive Silicon			
Output Signal:	10 mV/V typical (4 wire)	0 – 5 V (4 or 3 wire)	0 – 10 V (4 or 3 wire)	4 – 20 mA (2 wire)
Supply Voltage:	10 VDC	13 – 30 VDC	13 – 30 VDC	13 – 36 VDC
Pressure Reference:	Gauge or Absolute (limited ranges)			
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V (amplified versions)			
Standard Pressure Ranges (bar):	0 – 50 mbar; 0 – 100 mbar; 0 – 250 mbar; 0 – 500 mbar; 0 – 1,000 mbar (other ranges available); Absolute ranges from 0-500 mbar			
Standard Pressure Ranges (psi):	0-0.75 psi; 0-1.5 psi; 0-3 psi; 0-4 psi; 0-5 psi; 0-6 psi; 0-7.5 psi; 0-10 psi; 0-15 psi (other ranges available)			
Overpressure Safety:	4x for ranges 50 mbar to 250 mbar; 3x for ranges 500 mbar to 1,000 mbar			
Load Driving Capability:	4 – 20 mA: RL < [UB - 13 V] / 20 mA; (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω; 10 mV/V: n/a; 0 – 5 V: max. load RL > 5 KΩ; 0 – 10 V: max. load RL > 10 KΩ			
Accuracy NLHR:	≤ ±0.5 % of span BFSL			
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature (LP1000: ±1 mV); ±5 %FS (approx.) adjustment with easy access trimming potentiometers on amplified versions only			
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)			
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)			
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice			
Temperature Effects:	±3.0 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.05 %FS/ °C			
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked			
Insulation Resistance:	> 100 MΩ @ 50 VDC			
Response time 10-90 %:	1 mS			
Wetted Parts:	≥100mbar: SAE 316 stainless steel and Nitrile NBR O-ring; <100mbar: SAE 3de			
Pressure Media:	≥100mbar: All fluids compatible with SAE 316 stainless steel and Nitrile NBR; <100mbar: Non-corrosive, non-ionic fluids, air & dry gases			
Pressure Connection:	1/4" BSP male (G1/4); 1/4" NPT male; 1/2" BSP male (G1/2); 1/2" NPT male (other options available)			
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)			

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
10 mV/V	4	LP1000			
0-5 V	4	LP1001			
	3	LP1011			
0-10 V	4	LP1002			
	3	LP1012			
4-20 mA	2	LP1003			

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C

Pressure Range in bar	
0-50 mbar (Gauge only)	0050
0-100 mbar (Gauge only)	0100
0-250 mbar (Gauge only)	0250
0-500 mbar	0500
0-500 mbar Absolute	500A

Process Connection	
1/4" BSP male (G1/4)	AB
1/2" BSP male (G1/2)	AC
1/4" NPT male	AM
1/2" NPT male	AN

Order Number Example	LP1003-0050AC

For options not listed please contact the sales team

LP1003

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S.07

Hispec HI2000 Series

High Precision Pressure Transducer

- High accuracy and performance
- Silicon-on-Sapphire sensor technology for outstanding stability
- Pressure ranges to 1,500 bar
- Titanium wetted parts for excellent chemical compatibility
- High thermal stability over wide operating temperature
- ATEX/IECEx option available (includes M1 for mining applications)
- TEDS version on request

DESCRIPTION

The HISPEC HI2000 series of pressure transducers, with Silicon-on-Sapphire sensor technology, offer high levels of accuracy and performance

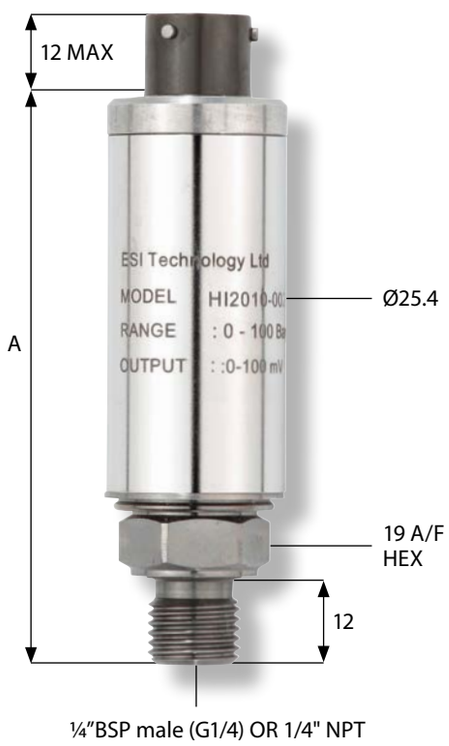
The unique Silicon-on-Sapphire sensor provides outstanding stability and accuracy over a wide temperature range. The wetted parts and diaphragm are machined from a single piece of titanium alloy which provides excellent chemical compatibility. Applications include aerospace, laboratory and test, oil and gas monitoring equipment (down-hole) and subsea. Available in pressure ranges from 0-500 mbar to 0-1,500 bar and with electrical outputs of 10 mV/V, 0-5 V and 0-10 V.

An optional ATEX and IECEx approved version of this product with mV/V output is available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

A TEDS (Transducer Electronic Data Sheet) version is available. A TEDS contains the critical information needed by an instrument or measurement system to identify, characterize, interface, and properly use the signal from an analog sensor. IEEE 1451.4 defines the method of encoding TEDS information for a broad range of senor types and applications. Please contact the sales team for more information. Please contact sales.

HI2010

DIMENSIONS (in mm)



ELECTRICAL CONNECTION MIL-C-26482

Pin.	Designation
A	+supply
B	+output
C	-output
D	-supply
E	N/C
F	N/C

ELECTRICAL CONNECTION CABLE OUTLET

WIRE COLOUR	Designation
RED	+supply
GREEN	+output
YELLOW	-output
BLUE	-supply

	Dim. A
HI2000	80
HI2001/2	95
HI2010	80
HI2011/12	95

TECHNICAL DATA

Type	HI2000/HI2010	HI2xx1/ HI2xx4	HI2xx2/ HI2xx5
Sensor Technology:	Silicon-on-Sapphire (SoS)		
Output Signal:	10 mV/V (4 wire)	0 – 5 V (4 or 3 wire)	0 – 10 V (4 or 3 wire)
Supply Voltage:	10 VDC (5 – 15V)	13 – 30 VDC	13 – 30 VDC
Pressure Reference:	Gauge		
Protection of Supply Voltage:	n/a	Protected against supply voltage reversal up to 50 V (amplified versions)	
Standard Pressure Ranges (bar):	0 – 1 bar Vac; 0 – 1 bar; 0 – 10 bar; 0 – 25 bar; 0 – 100 bar; 0 – 250 bar; 0 – 400 bar; 0 – 600 bar; 0 – 1,000 bar; 0 – 1,500 bar (other ranges available)		
Standard Pressure Ranges (psi):	0-30 in Hg; 0-15 psi; 0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-6,000 psi; 0-10,000 psi; 0-15,000 psi; 0-20,000 psi (other ranges available)		
Overpressure Safety:	4x for 0.5 bar range; 2 x for ranges 1 bar to 600 bar; 1.5x for 1,000 bar range; 1.1x for 1,500 bar range		
Load Driving Capability:	10 mV/V: n/a; 0 – 5 V: max. load RL > 5 KΩ; 0 – 10 V: max. load RL > 10 KΩ		
Accuracy NLHR:	≤ ±0.1 % of span BFSL		
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature (HI2000/HI2010: ±1 mV)		
Operating Ambient Temperature:	-40 °C to +85 °C (-40 °F to +185 °F)		
Operating Media Temperature:	-50 °C to +125 °C (-58 °F to +257 °F)		
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice		
Temperature Effects:	±1.0 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.005 %FS/ °C		
ATEX/IECEx Approval Option (mV/V version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)	n/a	n/a
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 0 Temperature Range = -20 °C to +70 °C Max. cable length = 50 m	n/a	n/a
Electromagnetic Compatibility:	Emissions: EN61000-6-4; Immunity: EN61000-6-2; Certification: CE Marked		
Insulation Resistance:	> 100 MΩ @ 50 VDC		
Response time 10-90 %:	1 mS		
Wetted Parts:	Titanium alloy		
Pressure Media:	All fluids compatible with Titanium alloy		
Pressure Connection:	1/4" BSP male (G1/4) or 1/4" NPT male (others options available)		
Electrical Connection:	HI200x: PTFE insulated flying lead, conductor size 7/0.1 mm. HI201x: MIL-C-26482 6 pin bayonet connector (Accessory not included: mating connector type MS3116F10-6S).		

PRODUCT CODING

Output		Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
10mV/V	Cable outlet 1m PTFE	4	HI2000			
	MIL-C-26482 6 pin bayonet	4	HI2010			
0-5 V	Cable outlet 1m PTFE	4	HI2001			
		3	HI2004			
	MIL-C-26482 6 pin bayonet	4	HI2011			
		3	HI2014			
0-10 V	Cable outlet 1m PTFE	4	HI2002			
		3	HI2005			
	MIL-C-26482 6 pin bayonet	4	HI2012			
		3	HI2015			

Option	
No special option required	-
ATEX/ IECEx certified (HI2000 & HI2010 only)	EX

Pressure Range in bar	
0-1 barVac	V001
0-1 bar	0001
0-10 bar	0010
0-25 bar	0025
0-100 bar	0100
0-250 bar	0250
0-400 bar	0400
0-600 bar	0600
0-1,000 bar	1000
0-1,500 bar	1500

Process Connection	
1/4" BSP male (G1/4)	AB
1/4" NPT male	AM

Order Number Example	HI2000EX0020AB

For options not listed please contact the sales team

HI2010

HI2000

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S.08

Protran PR3900 and **Protran** PR3110EX

Intrinsically Safe Pressure Transmitter

- ATEX and IECEx certified
- Designed for operation in zone 0, zone 20 and M1 mining
- Wide choice of low and high pressure ranges
- Rugged, weatherproof design option
- DNV GL certification available

DESCRIPTION

Our PR3900 and PR3110EX are made exclusively for hazardous areas intended for installation and operation in zone 0, gas group IIC, temperature class T4 and zone 20 dust and M1 mining. Both have ATEX and IECEx approval and protection is by intrinsic safety when used with a safety or isolation barrier.

The PR3900 provides a stable and accurate intrinsically safe two wire output signal of 4-20mA. Pressure ranges available from 0-10 bar to 0-1,500 bar. The unique Silicon-on-Sapphire sensor provides outstanding performance, stability and accuracy over a wide temperature range and provides excellent chemical compatibility. Electrical connection is via a ½" NPT M conduit with strong and durable polyurethane cable, featuring integral vent tube for effective gauge venting to atmosphere. Various process connections are available. Applications include any above ground explosive / hazardous environment installations, oil and gas industries and volatile chemical processing and storage.

The PR3110EX pressure transmitter is designed to meet the requirements of the majority of hazardous applications where accurate low pressure measurement is required. Robustly constructed from stainless steel this range of pressure transmitters incorporates the latest silicon strain gauge technology together with a custom IC amplifier offering excellent stability and accuracy over a long service life. Electrical connection is via a detachable DIN connector allowing easy access to zero and span adjustment. Standard pressure connection is 1/2" BSP, but other options are available. Pressure ranges are available from 0-100 mbar to 0-900 mbar. Suitable for use with low pressure fluid and gas applications

The PR3900 and PR3110EX have DNV GL classification for ships, high speed & light craft and DNV GL offshore standards.

PR3900

DIMENSIONS (in mm)

PR3110EX

DIMENSIONS (in mm)

TECHNICAL DATA

Type	PR3900
Sensor Technology:	Silicon-on-Sapphire (SoS)
Output Signal:	4 – 20 mA (2 wire)
Supply Voltage:	10 – 36 VDC
Pressure Reference:	Gauge
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V
Standard Pressure Ranges (bar):	0 – 10 bar; 0 – 25 bar; 0 – 60 bar; 0 – 100 bar; 0 – 250 bar; 0 – 600 bar; 0 – 1,000 bar; 0 – 1,500 bar (other options available)
Standard Pressure Ranges (psi):	0-150 psi; 0-300 psi; 0-1,000 psi; 0-1,500 psi; 0-3,000 psi; 0-8,700 psi; 0-15,000 psi; 0-20,000 psi (other options available)
Overpressure Safety:	2x for ranges up to 600 bar; 1.5x for 1000 bar; 1.1x for 1,500 bar
Load Driving Capability:	4 – 20 mA: RL < [UB - 10 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1300 Ω)
Accuracy NLHR:	≤ ±0.3 % of span BFSL (Optional higher accuracy version of ≤ ±0.15 % of span BFSL available)
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice
Temperature Effects:	±1.5 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.015 %FS/ °C
ATEX/IECEx Approval:	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 74 nF Temperature Range = -20 °C to +70 °C Max. cable length = 45 m
DNV GL Approval Class:	Temperature: D; Humidity: B; Vibration: B; EMC: B; Enclosure: C (contact sales for more information)
Ingress Protection:	Fully welded housing. Rated IP67 when correctly installed to conduit connection.
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked
Insulation Resistance:	> 100 MΩ @ 50 VDC
Response time 10-90 %:	1 mS
Wetted Parts:	SAE 316 stainless steel with titanium alloy measurement cell
Pressure Media:	All fluids compatible with SAE 316 stainless steel and titanium alloy
Pressure Connection:	1/4" BSP male (G1/4); 1/4" NPT male; 1/2" BSP male (G1/2) and 1/2" NPT male (others options available)
Electrical Connection:	1/2" NPT M conduit fitting with 1m polyurethane cable with integral screen, Kevlar strain cord and vent tube. Conductor size 7/0.20 mm (24 AWG)

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
4-20 mA	2	PR3900			

Electrical Connection/ Option	
1/2" NPT M conduit fitting with 1m submersible polyurethane cable with integral screen	EX
DNV GL Approval plus ATEX/IECEx certified	EXM

Pressure Range in bar	
0-10 bar	0010
0-25 bar	0025
0-60 bar	0060
0-100 bar	0100
0-250 bar	0250
0-600 bar	0600
0-1,000 bar	1000
0-1,500 bar	1500

Process Connection	
1/4" NPT female	AS
1/4" BSP male (G1/4)	AB
1/4" NPT male	AM
1/2" BSP male (G1/2)	AC
1/2" NPT male	AN

Order Number Example	PR3900EXM1000AS

For options not listed please contact the sales team

PR3900

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TECHNICAL DATA

Type	PR3110EX
Sensor Technology:	Isolated Piezoresistive Silicon
Output Signal:	4 – 20 mA (2 wire)
Supply Voltage:	13 – 36 VDC
Pressure Reference:	Gauge or Absolute
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V
Standard Pressure Ranges (bar):	0 – 100 mbar, 0-200 mbar, 0 – 250 mbar; 0 – 300 mbar; 0 – 400 mbar, 0 – 500 mbar, 0 – 600 mbar, 0 – 750 mbar, 0 – 900 mbar (other ranges available; absolute ranges from 0 - 500mbar)
Standard Pressure Ranges (psi):	0-1.5 psi; 0-3 psi; 0-4 psi: 0-7.5 psi; 0-15 psi (other ranges available; absolute ranges from 0 - 7.5 psi)
Overpressure Safety:	6x for 100 mbar range; 3x for ranges 200 mbar to 900 mbar
Load Driving Capability:	4 – 20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150Ω)
Accuracy NLHR:	≤ ±0.3 % of span BFSL
Zero Offset and Span Tolerance:	±0.5%FS at room temperature; ±5 %FS (approx.) adjustment with easy access trimming potentiometers
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice
Temperature Effects:	±2 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.03 %FS/ °C
ATEX/IECEx Approval (4-20 mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 74 nF Temperature Range = -20 °C to +70 °C Max. cable length = 45 m
DNV GL Approval Class:	Temperature: D; Humidity: B; Vibration: B; EMC: B; Enclosure: C (contact sales for more information)
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked
Insulation Resistance:	> 100 MΩ @ 50 VDC
Response time 10-90 %:	1 mS
Wetted Parts:	SAE 316 stainless steel and nitrile (NBR) seal
Pressure Media:	All fluids compatible with SAE 316 stainless steel and nitrile (NBR)
Pressure Connection:	1/4" BSP male (G1/4); 1/4" NPT male; 1/4" BSP male (G1/2); 1/2" NPT male (other options available)
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
4-20 mA, ATEX/ IECEx certified	2	PR3110EX			

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
ATEX/ IECEx certified	EX
DNV GL Approval	M
DNV GL Approval plus ATEX/IECEx certified	EXM

Pressure Range in bar	
0-100 mbar	00.1
0-200 mbar	00.2
0-250 mbar	0.25
0-300 mbar	00.3
0-400 mbar	00.4
0-500 mbar	00.5
0- 500 mbar Absolute	0.5A
0-600 mbar	00.6
0-750 mbar	0.75
0-900 mbar	00.9
0- 900 bar Absolute	0.9A

Process Connection	
1/4" BSP male (G1/4)	AB
1/4" NPT male	AM
1/2" BSP male (G1/2)	AC
1/2" NPT male	AN

Order Number Example	PR3110EX0.9AAC

For options not listed please contact the sales team

PR3110EX

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S.09

Hispec HI2200/2300, HI6000 and **Protran** PR3860 Series

High Temperature Transmitter

- High operating temperatures of up to 250 °C
- High ambient temperatures of up to 200 °C
- Pressure ranges to 1,500 bar
- Temperature compensated option
- Higher accuracy versions
- Good chemical compatibility for a range of applications
- ATEX/IECEx option available
  (includes M1 for mining applications)

DESCRIPTION

Our high temperature pressure transducers and transmitters are designed to operate at constant high media and ambient temperatures, at pressure ranges of up to 1,500 bar.

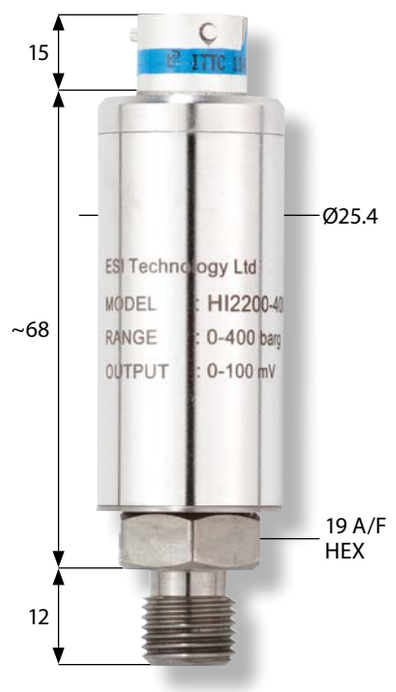
The HI2200/HI2300 model takes advantage of the advanced Silicon-on-Sapphire sensors' outstanding insulation properties which allows the sensor to operate over a very wide temperature range without loss of performance. The HI2200/ HI2300 offers compensated and un-compensated output options and not only does it perform effectively at high media temperatures, but can also be used in environments where there are elevated ambient temperatures of up to 200°C, inside a furnace or thermal chamber for example.

The HI6000 pressure transmitter series performs at constant media and ambient temperatures of up to 135°C and for limited periods up to 150°C. The compensated temperature range is from -25°C to +135°C. Available in a range of outputs, and pressure ranges, and with a high accuracy option, it is our most flexible high temperature product.

The PR3860 high temperature pressure transmitter has been designed to meet the requirements of the majority of industrial pressure measurement applications where a hygienic flush diaphragm connection is required. Robustly constructed from stainless steel, the PR3860 pressure transmitter permits accurate pressure measurement at elevated temperatures up to 250ºC. The flush membrane can be easily cleaned for long term reliability and performance. An optional weldable boss is available to ensure flush-face installation of transmitter to tanks and pipe-work. An optional ATEX and IECEx approved version is available.

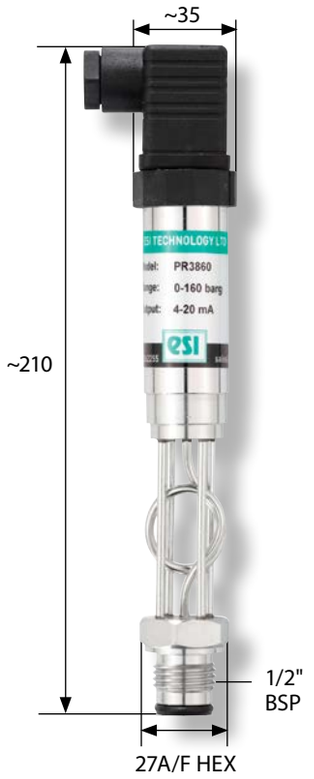
HI2200

DIMENSIONS (in mm)



PR3860

DIMENSIONS (in mm)



HI6000

DIMENSIONS (in mm)

TECHNICAL DATA

Type	HI2200/HI2210	HI2300/HI2310
Sensor Technology:	Silicon-on-Sapphire (SoS)	
Output Signal:	10 to 20 mV/V (Un-rationalised and un-compensated)	10 mV/V (Rationalised and compensated)
Supply Voltage:	10 VDC (5 – 15V)	
Pressure Reference:	Gauge	
Standard Pressure Ranges (bar):	0 – 1 bar Vac; 0 – 1 bar; 0 – 10 bar; 0 – 25 bar; 0 – 100 bar; 0 – 250 bar; 0 – 700 bar; 0 – 1,500 bar (other ranges available)	
Standard Pressure Ranges (psi):	0-30 in Hg; 0-15 psi; 0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-10,000 psi; 0-20,000 psi (other ranges available)	
Overpressure Safety:	2x for ranges 1 bar Vac to 600 bar; 1.5x for 1,000 bar range; 1.1x for 1,500 bar range	
Load Driving Capability:	n/a	
Accuracy NLHR:	≤ ±0.1 % of span BFSL	
Zero Offset and Span Tolerance:	Zero offset: ±1 mV/V; Span Tolerance: 10-20 mV/V	Zero offset: ±1 mV; Span Tolerance: ±1% FS
Operating Ambient Temperature:	-40 °C to +200 °C (-40 °F to +392 °F)	
Operating Media Temperature:	-50 °C to +200 °C (-58 °F to +392 °F)	
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice	
Temperature Effects:	Typical thermal zero and span coefficients compensated ±0.05 %FS/ °C	±2.0 %FS Total error band -20 °C to +150 °C, typical thermal zero and span coefficients ±0.005 %FS/ °C
Electromagnetic Compatibility:	Emissions: EN61000-6-4; Immunity: EN61000-6-2; Certification: CE Marked	
Insulation Resistance:	> 100 MΩ @ 50 VDC	
Response time 10-90 %:	1 mS	
Wetted Parts:	Titanium alloy	
Pressure Media:	All fluids compatible with Titanium alloy	
Pressure Connection:	1/4" BSP male (G1/4) or 1/4" NPT male (others options available)	
Electrical Connection:	HI2x00: PTFE insulated flying lead, conductor size 7/0.1 mm. HI2x10: MIL-C-26482 6 pin bayonet connector (Accessory not included: mating connector type MS3116F10-6S).	

PRODUCT CODING

Output		Wires	Type	Options	Pressure Range	Process Connection
10-20 mV/V	1m PTFE insulated flying lead	4	HI2200			
	MIL-C-26482 6 pin bayonet	4	HI2210			
10 mV/V	1m PTFE insulated flying lead	4	HI2300			
	MIL-C-26482 6 pin bayonet	4	HI2310			

Options	
No special options	-

Pressure Range in bar	
0-1 barVac	V001
0-1 bar	0001
0-10 bar	0010
0-25 bar	0025
0-100 bar	0100
0-250 bar	0250
0-700 bar	0700
0-1,500 bar	1500

Process Connection	
1/4" BSP male (G1/4)	AB
1/4" NPT male	AM

Order Number Example	HI2200-0700AB

For options not listed please contact the sales team

HI2200

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TECHNICAL DATA

Type	HI6xx0	HI6xx1	HI6xx2	HI6xx3
Sensor Technology:	Silicon-on-Sapphire (SoS)			
Output Signal:	0.5 - 4.5 V ratiometric	0 - 5 V (4 or 3 wire)	0 - 10 V (4 or 3 wire)	4-20 mA
Supply Voltage:	4.8 - 5.5 VDC	10 - 32 VDC	12 - 32 VDC	10 - 36 VDC
Pressure Reference:	Gauge			
Protection of Supply Voltage:	Reverse polarity, overvoltage up to 36VDC			
Standard Pressure Ranges (bar):	0 - 1 bar Vac; 0 - 0.5 bar; 0 - 1 bar; 0-2.5 bar; 0-6 bar; 0 - 10 bar; 0-16 bar; 0 - 25 bar; 0 - 100 bar; 0 - 250 bar; 0-400 bar; 0 - 600 bar; 0-1,000 bar; 0 - 1,500 bar (other ranges available)			
Standard Pressure Ranges (psi):	0-30 in Hg; 0-7.5 psi; 0-15 psi; 0-30 psi; 0-100 psi; 0-150 psi; 0-200 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-6,000 psi; 0-8,700 psi; 0-15,000 psi; 0-20,000 psi (other ranges available)			
Overpressure Safety:	2x for up to 600bar ranges, 1.5 for up to 1000bar, 1.1 for 1500bar range			
Load Driving Capability:	≥ 4.5k	≥ 5k	≥ 10k	RL < [UB - 10 V] / 20 mA (e.g. with supply voltage (UB) of 36 V, max. load (RL) is 1300 Ω)
Accuracy NLHR:	≤ ±0.25 % of span BFSL (Optional higher accuracy version of ≤ ±0.1 % of span BFSL available*)			
Zero Offset and Span Tolerance:	±0.02 V at room temperature			
Operating Ambient Temperature:	-40°C - +135°C, up to +150°C for 10 mintes in rare occasions. Compensated temperature range -25 - 135°C			
Operating Media Temperature:	-40 °C - 135 °C (-40 °F to +275 °F)			
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104 °F) Recommended Best Practice			
Temperature Effects:	Cumulative error < ±0.5%FS (TEB)			
Electromagnetic Compatibility:	EN61000-6-2; EN61000-4-2: Electrostatic discharge: contact ±4kV, air ± 8kV; EN61000-4-4: Fast Transients ± 4kV signal port; EN61000-4-5: Surges ±0.5kV Line to Line; EN 61000-4-6: Disturbances 10V eff 0.15MHz - 80MHz. Certification: CE marked			
Insulation Resistance:	> 100 MΩ @ 50 VDC			
Wetted Parts:	Titanium alloy measurement cell and wetted parts			
Pressure Media:	All fluids compatible with titanium alloy All fluids compatible with Titanium alloy			
Pressure Connection:	AS4395B-E04 (7/16-20 UNJF- 3A) other options available			
Electrical Connection:	D38999; shell size 9, 6 pin, pattern 35 or PTFE insulated flying lead, conductor size 7/0.1 mm (other options available)			

PRODUCT CODING

Output	Electrical Connection	Wires	Type	Options	Pressure Range	Process Connection
0.5-4.5 V ratiometric	Cable outlet 1m screened IP67 protection	4	HI6000			
	D38999 6 pin connector	4	HI6010			
0-5 V	Cable outlet 1m screened IP67 protection	4	HI6001			
	D38999 6 pin connector	4	HI6011			
	Cable outlet 1m screened IP67 protection	3	HI6301			
	D38999 6 pin connector	3	HI6311			
0-10 V	Cable outlet 1m screened IP67 protection	4	HI6002			
	D38999 6 pin connector	4	HI6012			
	Cable outlet 1m screened IP67 protection	3	HI6302			
	D38999 6 pin connector	3	HI6312			
4-20 mA	Cable outlet 1m screened IP67 protection	2	HI6003			
	D38999 6 pin connector	2	HI6013			

Options	
No special options	-

Pressure Range in bar	
0-1 bar Vac	V001
0-0.5 bar	00.5
0-1 bar	0001
0- 2.5 bar	02.5
0-6 bar	0006
0-10 bar	0010
0- 16 bar	0016
0-25 bar	0025
0-100 bar	0100
0-250 bar	0250
0-400 bar	0400
0-600 bar	0600
0-1,000 bar	1000
0-1,500 bar	1500

Process Connection	
AS4395B-E04 (7/16-20 UNJF- 3A)	FN

Order Number Example	HI6000-1500FN

For options not listed please contact the sales team

HI6000

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TECHNICAL DATA

Type:	PR3860	PR3861	PR3862
Sensor Technology:	Ceramic Thick Film		
Output Signal:	4 – 20 mA (2 wire)	0 – 5 V (4 wire)	0 – 10 V (4 wire)
Supply Voltage:	13 – 36 VDC	13 – 30 VDC	13 – 30 VDC
Pressure Reference:	Gauge		
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V		
Standard Pressure Ranges (bar):	0 – 10 bar; 0 – 25 bar; 0 – 60 bar; 0 – 100 bar; 0 – 250 bar; 0 – 400 bar (other options available)		
Standard Pressure Ranges (psi):	0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-6,000 psi (other options available)		
Overpressure Safety:	1.5x all ranges		
Load Driving Capability:	4 – 20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω); 0 – 5 V: max load RL > 5 KΩ; 0 – 10 V: max load RL > 10 KΩ		
Accuracy NLHR:	≤ ±0.3 % of span BFSL		
Zero Offset and Span Tolerance:	±1.0 %FS at room temperature; ±5 %FS (approx.) adjustment with easy access trimming potentiometers on amplified versions only		
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)		
Operating Media Temperature:	0 °C to +205 °C (+32 °F to 185°F) with standard o-ring ; 0 °C to +250 °C (+32 °F to +482 °F) with optional o-ring (sensor and electronics thermally insulated from media temperature)		
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice		
Temperature Effects:	±2.5% FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.04 %FS/ °C		
ATEX/IECEx Approval Option (4-20mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)	n/a	n/a
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 62 nF Temperature Range = -20 °C to +70 °C Max. cable length = 105 m	n/a	n/a
Electromagnetic Compatibility:	Emissions: EN61000-6-4; Immunity: EN61000-6-2; Certification: CE Marked		
Insulation Resistance:	> 100 MΩ @ 50 VDC		
Wetted Parts:	SAE 316L stainless steel		
Pressure Media:	All fluids compatible with SAE 316L stainless steel		
Pressure Connection:	1/2" BSP male (G1/2) with standard integral viton (FKM) o-ring seal and flush SAE 316L stainless steel diaphragm. O-ring seal is for service temperature up to max. 205 °C. An alternative o-ring material can be provided for service up to 250 °C (charged accessory)		
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)		

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection	Options
4-20 mA	2	PR3860				
0-5 V	4	PR3861				
0-10 V	4	PR3862				

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C
ATEX/ IECEx certified with DIN EN175301 plug and socket	EX

Pressure Range in bar	
0-10 bar	0010
0-25 bar	0025
0-60 bar	0060
0-100 bar	0100
0-250 bar	0250
0-400 bar	0400

Process Connection	
1/2" BSP flush diaphragm male	BA

Options	
250ºC rated o-ring, fitted	HT

Order Number Example	PR3860-0400BA

For options not listed please contact the sales team

PR3860

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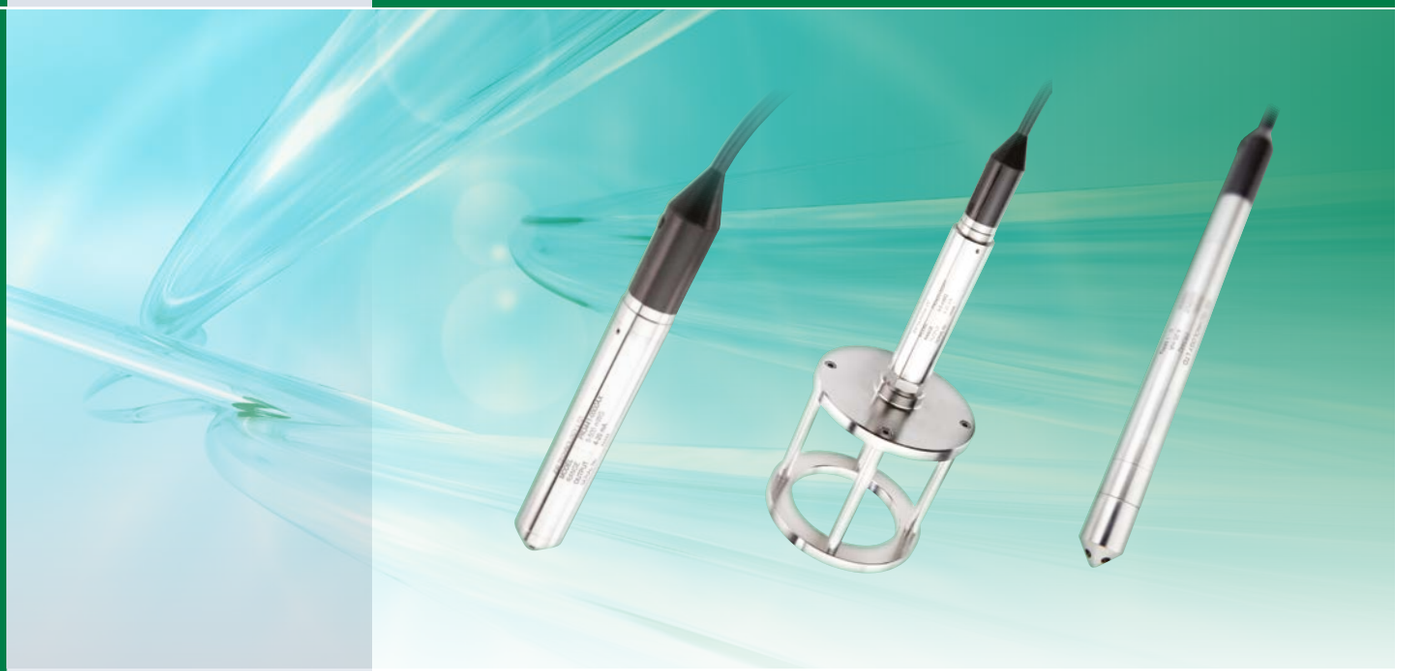
S.10

Protran PR3441/PR3420/PR3442

Submersible Depth/Level Pressure Transmitter



- Piezoresistive sensor technology for excellent stability and repeatability
- Robust stainless steel construction
- Pressure ranges available from 1 mWG
- High strength, moulded cable for protection against ingress
- Ultra slim option for borehole applications
- Sludge Platform option to raise sensor above sediment level
- ATEX/IECEx option available (includes M1 for mining applications)
- DNV GL certification available

DESCRIPTION

The submersible range of pressure transmitters has been designed for the accurate measurement of the depth and level of liquids in many applications. Standard output signal is 4-20 mA, and electrical connection is via a high strength moulded cable with integral tube for trouble-free venting to the surface atmosphere.

The PR3441 transmitter has a 25 mm diameter, suitable for depth and level measurement in boreholes, while the PR3442 model has a slim-line 16mm diameter suitable for boreholes from 19 mm wide. Applications include borehole level and reservoir level monitoring, water mains pressure, power level and outlet pressure measurement on submersible pumps.

The PR3420 submersible depth and level transmitter has been designed for accurate level measurement where sediment is present. The integral sludge platform ensures that the sensing element is elevated above the sediment level.

An optional ATEX and IECEx approved version of this product is available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

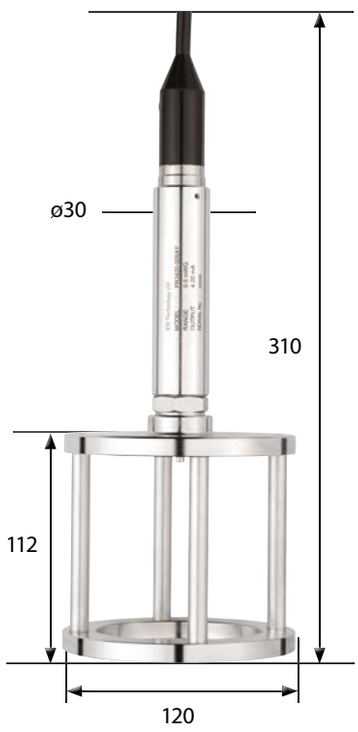
DNV GL rules for classification of ships, high speed & light craft and DNV GL offshore standards (PR3441 only).

PR3441

DIMENSIONS (in mm)

PR3420

DIMENSIONS (in mm)



PR3442

DIMENSIONS (in mm)

TECHNICAL DATA

Type:	PR3441	PR3420	PR3442
Sensor Technology:	Isolated Piezoresistive Silicon		
Output Signal:	4-20 mA (2 wire) Other options on request		4-20 mA (2 wire)
Supply Voltage:	13 -36 VDC		
Pressure Reference:	Vented Gauge		Vented or Sealed Gauge
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V		
Lightening Protection	On Request		
Standard Pressure Ranges (mWG):	0-1 mWG; 0-10 mWG; 0-20 mWG; 0-50 mWG; 0-100 mWG; 0-250 mWG; 0-500 mWG (other options available)		0 - 30 mWG; 0 - 50 mWG; 0 - 80 mWG; 0 - 100 mWG; 0 - 150 mWG; 0 - 250 mWG; 0 - 500 mWG (other options available)
Standard Pressure Ranges (psi):	0-3 psi; 0-5 psi; 0-7.5 psi; 0-10 psi; 0-15 psi; 0-30 psi; 0-50 psi; 0-100 psi; 0-200 psi; 0-300 psi (other options available)		0-50 psi; 0-75 psi; 0-100 psi; 0-150 psi; 0-200 psi; 0-300 psi; 0-750 psi (other options available)
Overpressure Safety:	2x all ranges		
Load Driving Capability:	4 - 20 mA: RL < [UB - 13 V] / 20 mA; (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω; 10 mV/V: n/a; 0 - 5 V: max. load RL > 5 KΩ; 0 - 10 V: max. load RL > 10 KΩ		4-20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω)
Accuracy NLHR:	≤ ±0.3 % of span BFSL (optional higher accuracy version of ≤ ±0.15 % of span BFSL available)	≤ ±0.3 % of span BFSL	
Zero Offset and Span Tolerance:	±0.5% FS at room temperature		
Operating Ambient Temperature:	-20 °C to +60 °C (-4 °F to +140 °F)		
Operating Media Temperature:	Media must not freeze around the sensor		
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice		
Temperature Effects:	±2.0% FS total error band for -20 °C – +60 °C. Typical thermal zero and span coefficients +/0.03%FS/°C		
ATEX/IECEx Approval Option (4-20mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135°C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)		
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 62 nF Temperature Range = -20 °C to +70 °C Max. cable length = 105 m		
DNV GL Approval Class (PR3441 only):	Temperature: D; Humidity: B; Vibration: B; EMC: B; Enclosure: D (contact sales for more information)		
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked		
Insulation Resistance:	> 100 MΩ @ 50 VDC		
Wetted Parts:	SAE 316L stainless steel housing and diaphragm, polyurethane cable and nitrile (NBR) o-ring seal (PR3420 platform 303 stainless steel)e		
Pressure Media:	All fluids compatible with SAE 316L stainless steel, 303 stainless steel (PR3420 only), polyurethane and nitrile (NBR)		
Pressure Connection:	Stainless steel nose cone with radial pressure inlets or 1/4" BSP male (G1/4)	Sludge Platform	Stainless steel nose cone with radial pressure inlets
Electrical Connection:	Submersible black polyurethane cable moulded to housing. With integral screen, Kevlar strain cord and vent tube. Conductor size 7/0.20 mm (24 AWG), resistance 8.9 Ω / 100 m (x2)		

PRODUCT CODING

Output		Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
4-20 mA	25mm diameter	2	PR3441			
	120mm diameter	2	PR3420			
	16mm diameter	2	PR3442			

Electrical Connection/ Option	
No special option required	-
ATEX/ IECEx certified (PR3420 and PR3441 only)	EX
DNV GL Approval (PR3441 only)	M
DNV GL Approval plus ATEX/IECEx certified (PR3441 only)	EXM
Higher accuracy option (PR3441 only)	H

Pressure Range in mWG (Metres Water Gauge)	
0-1 mWG (PR3420 and PR3441 only)	0001
0-5 mWG (PR3420 and PR3441 only)	0005
0-10 mWG (PR3420 and PR3441 only)	0010
0-50 mWG	0050
0-100 mWG	0100
0-250 mWG	0250
0-500 mWG	0500

Process Connection	
Protective nose cone	AX
1/4" BSP (PR3441 only)	AB
Sludge platform (PR3420 only)	AY

Cable
Cable length is specified by adding a 3 digit numeric code as a suffix to the part number. Example -010 = 10 metres. Max cable length 500 metres

Order Number Example	PR3441-0010AX-010

For options not listed please contact the sales team

PR3441

PR3420

PR3442

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S.11

Protran PR3800/PR3850/ PR3860 Series

Flush Diaphragm Pressure Transmitter

- Easy clean flush membrane to prevent clogging
- Thick film sensor technology for long service life
- Pressure ranges to 400 bar
- Range of sanitary grade pressure fittings
- Up to 250 °C media temperature option
- Models available with integral O-ring seal option to ensure flush pressure seal
- ATEX/IECEx option available (includes M1 for mining applications)

DESCRIPTION

The range of flush diaphragm pressure transmitters have been designed to meet the requirements of the majority of industrial pressure measurement applications where a hygienic flush diaphragm or remote barrier seal connection is required.

Robustly constructed from stainless steel, this range of pressure transmitters incorporates the latest strain gauge technology together with a custom IC amplifier offering excellent stability and accuracy over a long service life. The range offers a stable and accurate output signal of 4-20 mA with options for 0-5 V and 0-10 V.

Typical applications include food processing, pharmaceutical, petrochemical, waste water and slurry handling. In these installations the process media may corrode the sensing diaphragm or clog the narrow pressure inlet on a standard transmitter. The flush membrane can be easily cleaned for long term reliability and outstanding performance.

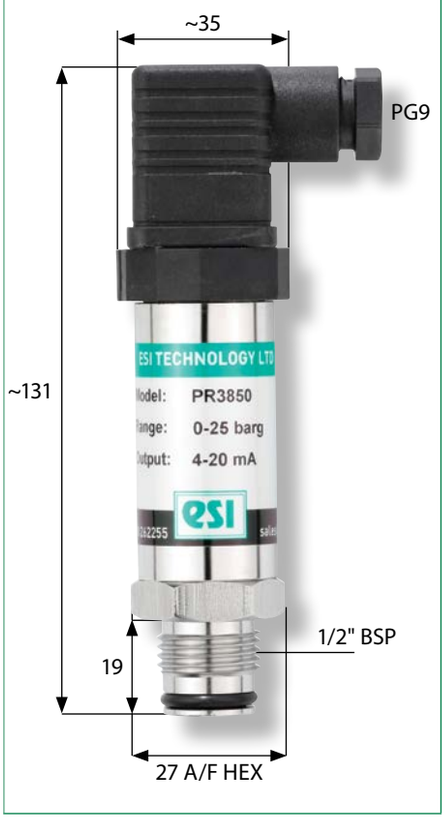
For hygienic applications the PR3800 and PR3850 series provides a sanitary grade pressure fitting. Seals are available in a variety of forms and materials for a wide range of applications and can be directly attached to the proposed connection or remotely via stainless steel capillary.

For food processing, pharmaceutical and petrochemical applications the PR3860 is suitable for use at media temperature up to 250 ºC. Pressure ranges available from 0-200 mbar to 0-400 bar.

An optional ATEX and IECEx approved versions of this range are available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

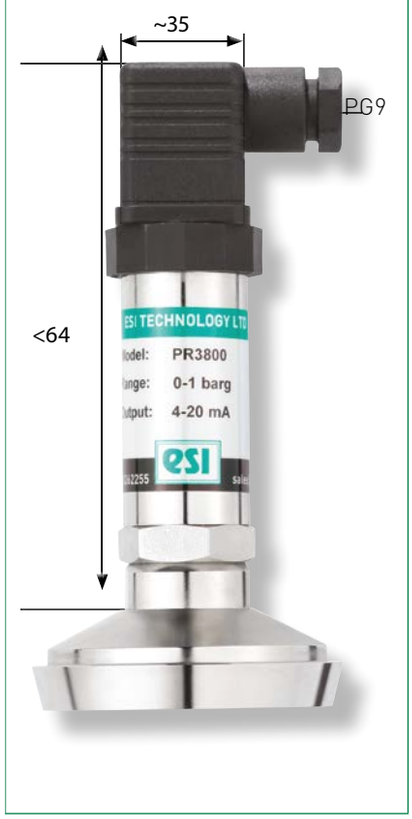
PR3850

DIMENSIONS (in mm)



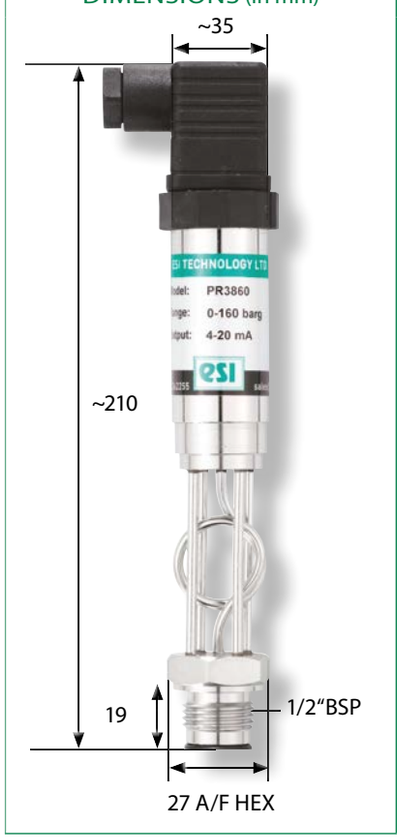
PR3800

DIMENSIONS (in mm)



PR3860

DIMENSIONS (in mm)



TECHNICAL DATA

Type	PR3800	PR3801	PR3802	PR3820	PR3821	PR3822
Sensor Technology:	Ceramic Thick Film or Isolated Piezoresistive Silicon					
Output Signal:	4-20 mA (2 wire)	0-5 V (4 wire)	0-10 V (4 wire)	4-20 mA (2 wire)	0-5 V (4 wire)	0-10 V (4 wire)
Supply Voltage:	13 to 36 VDC	13-30 VDC	13-30 VDC	13 to 36 VDC	13-30 VDC	13-30 VDC
Pressure Reference:	Gauge					
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V					
Standard Pressure Ranges (bar):	0-1 bar Vac; 0-200mbar, 0-1 bar; 0-2.5 bar; 0-6 bar; 0-10 bar; 0-16 bar; 0-25 bar; 0-40 bar (other options available)					
Standard Pressure Ranges (psi):	0-30 in Hg; 0-1.5psi; 0-15 psi; 0-30 psi; 0-100psi; 0-150 psi; 0-200 psi; 0-300 psi; 0-600 psi (other options available)					
Overpressure Safety:	1.5x for all ranges					
Load Driving Capability:	4-20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω)					
Accuracy NLHR:	≤ ±0.3 % of span BFSL					
Zero Offset and Span Tolerance:	±1.0% FS at room temperature; ±5% FS (approx.) adjustment with easy access trimming potentiometers on amplified versions only					
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)					
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)					
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice					
Temperature Effects:	±2.5% FS total error band for -20°C to +70°C. Typical thermal zero and span coefficients ±0.04% FS/ °C					
ATEX/IECEx Approval Option (4-20mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135°C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)					
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 62 nF Temperature Range = -20°C to +70°C Max. cable length = 105 m					
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked					
Insulation Resistance:	> 100 MΩ @ 50 VDC					
Response time 10-90 %:	Ranges < 6 bar 1mS; Ranges ≥ 6 bar 10 mS					
Wetted Parts:	Ranges <6 bar: SAE 316 stainless steel and nitrile (NBR); Ranges ≥ 6 bar: SAE 316L stainless steel					
Pressure Media:	Ranges <6 bar: all fluids compatible with SAE 316L stainless steel and nitrile (NBR); Ranges ≥ 6 bar: all fluids compatible with SAE 316L stainless steel					
Pressure Connection:	Pipe clamp (Tri-clover) 1.5" 316L Stainless steel (Other options available)			DIN 11851 female 316L Stainless steel (Other options available)		
	Ranges ≥0-6 bar; Flush diaphragm SAE 316L stainless steel hygienic diaphragm seal; Ranges <6 bar: Semi-flush SAE 316L diaphragm seal					
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)					

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
4-20 mA	2	PR3800			
	2	PR3820			
0-5 V	4	PR3801			
	4	PR3821			
0-10 V	4	PR3802			
	4	PR3822			

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C
ATEX/ IECEx certified with DIN EN175301 plug and socket	EX

Pressure Range in bar	
0-1 bar vac	V001
0-1 bar	0001
0-2.5 bar	02.5
0-10 bar	0010
0-16 bar	0016
0-25 bar	0025
0-40 bar	0040

Process Connection	
Pipe clamp (Tri-clover) 1.5" 316L Stainless steel (PR3800 only)	BG
Pipe clamp (Tri-clover) 2" 316L Stainless steel (PR3800 only)	BH
RJT 38mm female 316L Stainless steel (PR3820 only)	BJ
DIN11851 female 32mm Stainless steel (PR3820 only)	BR
SMS 40mm female 316 Stainless steel (PR3820 only)	BV

Order Number Example	PR3800-0010BG

For options not listed please contact the sales team

PR3800

DISCLAIMER : ESI Technology Ltd operates a policy of continuous product development. We reserve the right to change specification without prior notice.All products manufactured by ESI Technology Ltd are calibrated using precision calibration equipment, traceable to national measurement standards.

TECHNICAL DATA

Type:	PR3850	PR3851	PR3852	PR3860	PR3861	PR3862
Sensor Technology:	Ceramic Thick Film					
Output Signal:	4-20 mA (2 wire)	0-5 V (4 wire)	0-10 V (4 wire)	4 – 20 mA (2 wire)	0 – 5 V (4 wire)	0 – 10 V (4 wire)
Supply Voltage:	13 -36 VDC	13-30 VDC		13 – 36 VDC	13 – 30 VDC	
Pressure Reference:	Gauge					
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V					
Standard Pressure Ranges (bar):	0-100 mbar; 0 – 4 bar; 0 – 10 bar; 0 – 25 bar; 0 – 100 bar; 0 – 250 bar; 0 – 400 bar (other options available)			0 – 10 bar; 0 – 25 bar; 0 – 60 bar; 0 – 100 bar; 0 – 250 bar; 0 – 400 bar (other options available)		
Standard Pressure Ranges (psi):	0-60 psi; 0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-6,000 psi (other options available)			0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-6,000 psi (other options available)		
Overpressure Safety:	1.5x all ranges					
Load Driving Capability:	4-20 mA: RL < [UB - 13 V] / 20 mA; (e.g. with supply voltage (UB) of 36V max. load (RL) is 1150 Ω); 0-5 V: max load RL > 5 KΩ; 0-10 V: max load RL > 10 KΩ					
Accuracy NLHR:	≤ ±0.3 % of span BFSL					
Zero Offset and Span Tolerance:	±1.0% FS at room temperature; ±5% FS (approx.) adjustment with easy access trimming potentiometers on amplified versions only					
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)					
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)			0 °C to +205 °C (+32 °F to 185°F) with standard o-ring ; 0 °C to +250 °C (+32 °F to +482 °F) with optional o-ring (sensor and electronics thermally insulated from media temperature)		
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice					
Temperature Effects:	±2.5% FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.04% FS/ °C					
ATEX/IECEx Approval Option (4-20mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135°C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)					
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 62 nF Temperature Range = -20 °C to +70 °C Max. cable length = 105 m					
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked					
Insulation Resistance:	> 100 MΩ @ 50 VDC					
Response time 10-90 %:	10 mS					
Wetted Parts:	SAE 316L stainless steel					
Pressure Media:	All fluids compatible with SAE 316L stainless steel					
Pressure Connection:	1/2" BSP male (G1/2) with standard integral Viton o-ring seal and flush SAE 316L stainless steel diaphragm or 1" BSP male with semi-flush SAE 316L Stainless steel diaphragm (from 100 mbar up to 4 bar only)			1/2" BSP male (G1/2) with standard integral Viton o-ring seal and flush SAE 316L stainless steel diaphragm		
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)					

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection	Options
4-20 mA	2	PR3850				
	2	PR3860				
0-5 V	4	PR3851				
	4	PR3861				
0-10 V	4	PR3852				
	4	PR3862				

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C
ATEX/ IECEx certified with DIN EN175301 plug and socket	EX

Pressure Range in bar	
0-100 mbar (PR385x only)	0.01
0-4 bar (PR385x only)	0004
0-10 bar	0010
0-25 bar	0025
0-100 bar	0100
0-250 bar	0250
0-400 bar	0400

Process Connection	
1/2" BSP male with flush membrane	BA
1" BSP male with semi-flush membrane (PR385x only)	BC

Options	
250°C rated o-ring, fitted (PR3860 only)	HT

Order Number Example	PR3860-0400BA

For options not listed please contact the sales team

PR3850

PR3860

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S.12

Protran PR3200/PR3202 Series

Differential Pressure Transmitter

- Wide range of pressure ranges from ultra-low to 200 barDP
- SoS Sensor Technology for higher pressures
- WET/WET or DRY/DRY operation
- Available for gauge reference or bi-directional measurement
- Durable designs for industrial and commercial installations
- R.F.I. shielded for protection against electromagnetic radiation
- ATEX/IECEx option available (includes M1 for mining applications)

DESCRIPTION

Differential pressure measurement has a wide number of applications from measuring a few millibar in clean-rooms up hundreds of bar in industrial process environments. ESI Technology has a range of differential pressure transmitters with pressure ranges available from 0-5 mbar to 0-200 bar in DP, gauge reference or bi-directional.

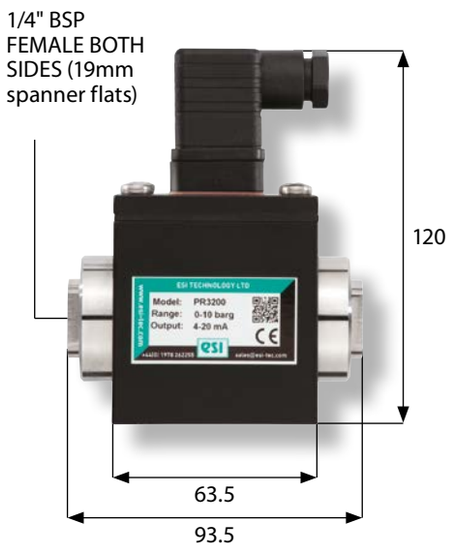
The PR3200 differential pressure transmitter uses two matched Silicon-on-Sapphire pressure sensors, offering high stability and performance with true wet/wet operation, suitable for use with all liquids and gases compatible with stainless steel and titanium.

The PR3202 air differential pressure transmitter provides an accurate solution for low pressure sensing, and is fully temperature compensated for unrivalled stability at very low pressures. Housed in an RFI shielded wall mountable box for EMC protection, the PR3202 combines precise measurement with the robustness and flexibility for industrial and commercial installations. An optional heavy-duty aluminium die-cast housing is available for the harshest environments.

Optional ATEX and IECEx approved versions are available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

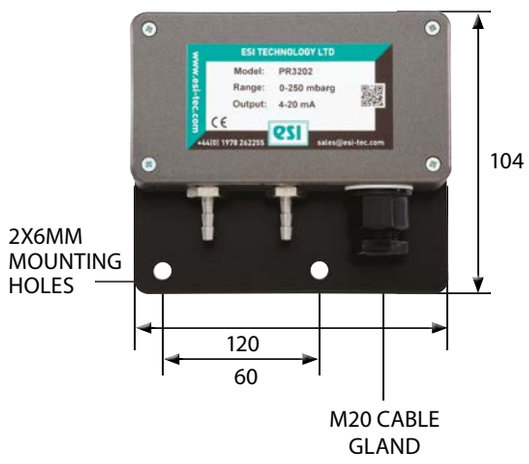
PR3200

DIMENSIONS (in mm)



PR3202

DIMENSIONS (in mm)



TECHNICAL DATA

Type	PR3200	PR3210/PR3230	PR3220/PR3240
Sensor Technology:	Silicon-on-Sapphire (SoS)		
Output Signal:	4-20 mA (2 wire)	0-5 V (4 or 3 wire)	0-10 V (4 or 3 wire)
Supply Voltage:	10-36 VDC	10-36 VDC	13 – 30 VDC
Pressure Reference:	Differential		
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V		
Standard Pressure Ranges (bar):	0-0.5 bar; 0-1 bar; 0-10 bar; 0-20 bar; 0-40 bar; 0-100 bar; 0-200 bar (other options available)		
Standard Pressure Ranges (psi):	0-7.5 psi; 0-15 psi; 0-150 psi; 0-750 psi; 0-1,500 psi; 0-3,000 psi (other ranges available)		
Overpressure Safety:	1.5x maximum static line pressure for all ranges		
Common Mode (Static line pressure):	2.5 bar for 0-0.5 bar range; 4 bar for 0-1 bar range; 40 bar for 0-10 bar range; 60 bar for 0-20 bar range; 160 bar for 0-40 bar range; 400 bar for 0-100 bar range; 600 bar for 0-200 bar range		
Load Driving Capability:	4-20mA: RL < [UB - 10 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1300 Ω)		
Accuracy NLHR:	≤ ±0.3 % of span BFSL (Optional higher accuracy version of ≤ ±0.1 % of span BFSL available)		
Zero Offset and Span Tolerance:	±1.0% FS at room temperature ±5% FS (approx.) adjustment with easy access trimming potentiometers		
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)		
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)		
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice		
Temperature Effects:	±3.0% FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.05% FS/ °C		
ATEX/IECEx Approval Option (4-20 mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135°C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)	N/A	
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA, Pi = 0.65 W Li = 0.1 µH, Ci = 74 nF Temperature Range = -20 °C to +70 °C Max. cable length = 45 m	N/A	
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked		
Insulation Resistance:	> 100 MΩ @ 50 VDC		
Response time 10-90 %:	1 mS		
Wetted Parts:	SAE 304 stainless steel and titanium alloy		
Pressure Media:	All fluids compatible with SAE 304 stainless steel and titanium alloy		
Pressure Connection:	1/4" BSP female (other options available)		
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)		

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
4-20 mA	2	PR3200			
0-5 V	4	PR3210			
0-5 V	3	PR3230			
0-10 V	4	PR3220			
0-10 V	3	PR3240			

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
ATEX/ IECEx certified	EX

Pressure Range in mbar/ bar	
0-500 mbar	0.05
0-1 bar	0001
0-10 bar	0010
0-50 bar	0050
0-100 bar	0100
0-200 bar	0200

Process Connection	
1/4" BSP female	AR
1/4" NPT female	AS

Order Number Example	PR3200-0200AR

For options not listed please contact the sales team

PR3200

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TECHNICAL DATA

Type:	PR3202	PR3203	PR3204
Sensor Technology:	Piezoresistive Silicon		
Output Signal:	4-20 mA (2 wire)	0-5 V (3 wire)	0-10 V (3 wire)
Supply Voltage:	10-36 VDC	13 – 30 VDC	13 – 30 VDC
Pressure Reference:	Differential		
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V		
Standard Pressure Ranges (bar):	0-5 mbar; 0-10 mbar; 0-20 mbar; 0-50 mbar; 0-100 mbar; 0-250 mbar; 0-500 mbar; 0-1,000 mbar (other options available)		
Standard Pressure Ranges (psi):	0-2 inH2O; 0-4 inH2O; 0-8 inH2O; 0-10 inH2O; 0-12 inH2O; 0-20 inH2O; 0-1 psi; 0-1.5 psi; 0-3 psi; 0-4 psi; 0-7.5 psi; 0-15 psi (other options avialable)		
Overpressure Safety:	25 mbar max. for ranges 0-5 mbar to 0-10 mbar; 200 mbar max. for ranges 0-20 mbar to 0-100 mbar; 1,200 mbar max. for ranges 0-150 mbar to 0-1,000 mbar		
Common Mode (Static line pressure):	375 mbar equal to both ports for ranges 0-5 to 0-10 mbar; 2 bar max. equal to both ports for ranges 0-20 mbar to 0-1,000 mbar		
Load Driving Capability:	4-20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36 V, max. load (RL) is 1150 Ω)		
Accuracy NLHR:	≤ ±0.3 % of span BFSL		
Zero Offset and Span Tolerance:	±1.0% FS at room temperature ±5% FS (approx.) adjustment via trimming potentiometers located beneath the enclosure lid		
Operating Ambient Temperature:	-20 °C to +70 °C (-4 °F to +158 °F)		
Operating Media Temperature:	-20 °C to +70 °C (-4 °F to +158 °F)		
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice		
Temperature Effects:	±2.0% FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.04% FS/ °C		
ATEX/IECEx Approval Option (4-20 mA version only):	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)	N/A	
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 74 nF Temperature Range = -20 °C to +70 °C Max. cable length = 45 m	N/A	
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked		
Insulation Resistance:	> 100 MΩ @ 50 VDC		
Response time 10-90 %:	1 mS		
Wetted Parts:	Nickel plated brass, silicone tubing, silicon diaphragm, glass filled polyamide		
Pressure Media:	Non-corrosive media such as non-ionic fluids, air and dry gases		
Pressure Connection:	4 mm I.D. hose (other options available)		
Electrical Connection:	Screw terminals for conductor sizes 0.2-2 mm2 are located beneath the enclosure lid. Cable entry is via IP66 cable gland with compression seal for cable sizes 7-10.5 mm		

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
4-20mA	2	PR3202			
0-5 V	3	PR3203			
0-10 V	3	PR3204			

Electrical Connection/ Option	
M20 Cable Gland (PR3202 only)	-
ATEX/ IECEx certified	EX
Alluminium Enclosure	AL

Pressure Range in mbar/ bar	
0-5 mbar	0005
0-50 mbar	0050
0-100 mbar	0100
0-500 mbar	0500

Process Connection	
4.8mm tube connection (push-on stem)	AW
1/4" BSP male (G1/4)	AB

Order Number Example	PR3202EX0005AW

For options not listed please contact the sales team

PR3202

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S.13

Genspec GS4000 and **Protran** PR3100 Series

Standard Pressure Transmitter

- Suitable for the majority of industrial applications
- Pressure ranges available from 0-500 mbar to 0-700 bar
- Reliable pressure measurement
- Long service life
- Robust yet compact designs
- ATEX/IECEx option available, including M1 for mining applications (PR3100 only).

DESCRIPTION

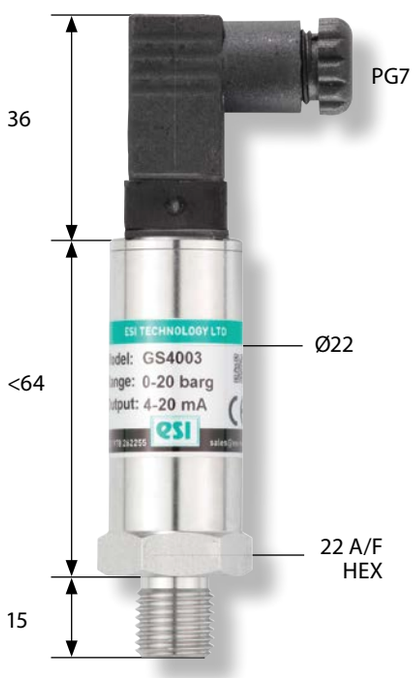
Our standard industrial pressure transmitters are designed to cover the majority of industrial applications.

The Genspec GS4000 series is designed for applications where economical price and reliable pressure measurement is required. Incorporating bonded foil strain gauge technology, with 17/4PH stainless steel diaphragm for ranges above 20 bar, and a ceramic diaphragm for lower ranges, the GS4000 series of transmitters and transducers offer a robust yet compact design ideal for use in OEM applications.

The PR3100 series is robustly constructed from stainless steel incorporating thick film, ceramic and bonded strain gauge technology offering excellent stability and accuracy over a long service life. PR3100 is available in corrosion resistant materials on request. Pressure ranges are available from 0-1 bar to 0-600 bar. An optional ATEX and IECEx approved versions of the PR3100 is available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

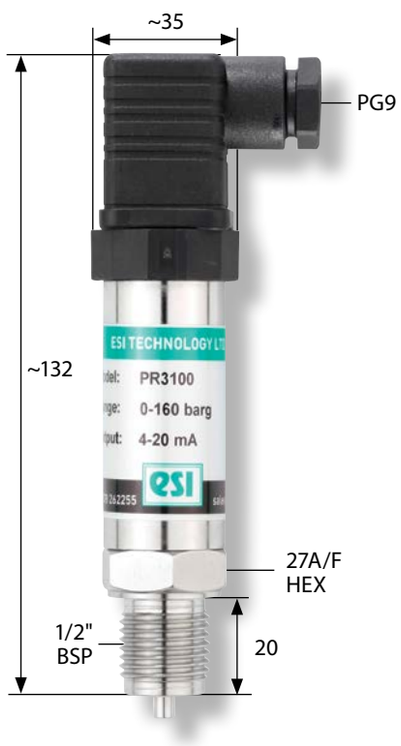
GS4003

DIMENSIONS (in mm)



PR3100

DIMENSIONS (in mm)



TECHNICAL DATA

Type	GS4000/GS4100	GS4xx1	GS4xx2	GS4003/GS4103
Sensor Technology:	Ceramic Thick Film or Bonded Foil Strain Gauge			
Output Signal:	2 mV/V typical (4 wire)	0 – 5 V (3 or 4 wire)	0 – 10 V (3 or 4 wire)	4 – 20 mA (2 wire)
Supply Voltage:	10 VDC (5 – 15 V)	13 – 30 VDC	13 – 30 VDC	13 – 36 VDC
Pressure Reference:	Gauge (up to 700 bar) or Absolute (up to 400 bar)			
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V (amplified versions)			
Standard Pressure Ranges (bar):	0 – 1 bar Vac; 0 – 0.5 bar; 0 – 1 bar; 0 – 10 bar; 0 – 25 bar; 0 – 100 bar; 0 – 250 bar; 0 – 700 bar (other ranges available)			
Standard Pressure Ranges (psi):	0-30 in Hg; 0-7.5 psi; 0-15 psi; 0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-10,000 psi (other ranges available)			
Overpressure Safety:	1.6x from ranges -1 bar to 20 bar; 2x for ranges 25 bar to 250 bar; 1.5 for ranges 400 bar (6,000 psi) to 700 bar (10,000 psi)			
Load Driving Capability:	4 – 20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω); 2 mV/V: n/a; 0 – 5 V: max. load RL > 5 KΩ; 0 – 10 V: max. load RL > 10 KΩ			
Accuracy NLHR:	≤ ±0.4 % of span BFSL			
Zero Offset and Span Tolerance:	±1.0 %FS at room temperature (GS4000/GS4100: ±0.2 mV)			
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)			
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)			
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice			
Temperature Effects:	±2% FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.03 %FS/°C			
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked			
Insulation Resistance:	> 100 MΩ @ 50 VDC			
Response time 10-90 %:	1 mS			
Wetted Parts:	SAE 303 stainless steel, alumina and nitrile (NBR) seal for ranges up to 20 bar gauge and 400 bar absolute. 17/4PH and SAE 303 stainless steel for ranges above 20 bar gauge			
Pressure Media:	All fluids compatible with SAE 303 stainless steel, alumina and nitrile (NBR) seal for ranges up to 20 bar, and 17/4PH stainless steel for ranges above 20 bar			
Pressure Connection:	1/4" BSP male (G1/4) or 1/4" NPT male (others options available)			
Electrical Connection:	Mating micro DIN socket EN175301-803 Form C (ex DIN43650), a screw terminal connector rated IP65 (other options available)			

PRODUCT CODING

Output		Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
2 mV/V	Model above 20 bar	4	GS4000			
	Model up to 20 bar		GS4100			
0-5 Vdc	Model above 20 bar	4	GS4001			
		3	GS4011			
	Model up to 20 bar	4	GS4101			
		3	GS4111			
0-10 Vdc	Model above 20 bar	4	GS4002			
		3	GS4012			
	Model up to 20 bar	4	GS4102			
		3	GS4112			
4-20 mA	Model above 20 bar	2	GS4003			
	Model up to 20 bar		GS4103			

Electrical Connection/ Option	
DIN plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C

Pressure Range in bar	
0-1 bar Vac	V001
0-0.5 bar	0.05
0-1 bar	0001
0-10 bar	0010
0-25 bar	0025
0-100 bar	0100
0-250 bar	0250
0-700 bar	0700

Process Connection	
1/4" BSP male (G1/4)	AB
1/4" NPT Male	AM

Order Number Example	GS4003-V001AB

For options not listed please contact the sales team

GS4003

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TECHNICAL DATA

Type	PR3100	PR3101	PR3102	PR3103
Sensor Technology:	Ceramic Thick Film or Bonded Foil Strain Gauge			
Output Signal:	4 – 20 mA (2 wire)	2 mV/V typical (4 wire)	0 – 5 V (4 wire)	0 – 10 V (4 wire)
Supply Voltage:	13 – 36 VDC	10 VDC (5 – 15V)	13 – 30 VDC	13 – 30 VDC
Pressure Reference:	Gauge or Absolute			
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V (amplified versions)			
Standard Pressure Ranges (bar):	0 – 1 bar Vac; 0 – 2.5 bar; 0 – 10 bar; 0 – 100 bar; 0 – 250 bar; 0 – 600 bar; 0 – 1,000 bar (other ranges available; absolute to 0 – 400 bar)			
Standard Pressure Ranges (psi):	0-30 in Hg; 0-30 psi; 0-150 psi; 0-1,500 psi; 0-3,000 psi; 0-10,000 psi; 0-15,000 psi (other ranges available; absolute to 0 – 5,800 psi)			
Overpressure Safety:	2x for ranges 1 bar to 400 bar; 1.5x for 600 bar range; 1.2x 1,000 bar range			
Load Driving Capability:	4 – 20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω); 2mV/V: n/a; 0 – 5 V: max load RL > 5 KΩ; 0 – 10 V: max load RL > 10 KΩ			
Accuracy NLHR:	≤ ±0.3 % of span BFSL			
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature (PR3101: ±0.2 mV); 5 %FS (approx.) adjustment with easy access trimming potentiometers on amplified versions only			
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)			
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185 °F)			
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice			
Temperature Effects:	±1.5 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.015 %FS/ °C			
ATEX/IECEx Approval (4-20 mA version only):	Ex II 1 G Ex ia IIC T4 Ga (Zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (Zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)	n/a	n/a	n/a
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 74 nF Temperature Range = -20*C to +70*C Max. cable length = 45 m	n/a	n/a	n/a
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked			
Insulation Resistance:	> 100 MΩ @ 50 VDC			
Response time 10-90 %:	1 mS			
Wetted Parts:	SAE 316 stainless steel, alumina and nitrile (NBR) seal for ranges up to 20 bar, and 17/4PH and SAE 316 stainless steel for ranges above 20 bar			
Pressure Media:	All fluids compatible with SAE 316 stainless steel, alumina and nitrile (NBR) seal for ranges up to 20 bar, and 17/4PH stainless steel for ranges above 20 bar			
Pressure Connection:	1/4" BSP male (G1/4); 1/4" NPT male; 1/2" BSP male (G1/2); 1/2" NPT male (other options available)			
Electrical Connection:	Mating socket EN175301-803 Form A (ex DIN43650) rated IP65 with PG9 cable entry (other options available)			

PRODUCT CODING

Output	Wires	Type	Electrical Connection/ Option	Pressure Range	Process Connection
4-20 mA	2	PR3100			
2 mV/V	4	PR3101			
0-5 V	4	PR3102			
0-10 V	4	PR3103			

Electrical Connection/ Option	
DIN EN175301 plug and socket	-
Cable outlet 1m screened	A
M12 connector	B
Cable outlet 1m screened IP67 protection	C
ATEX/ IECEx certified with DIN EN175301 plug and socket	EX

Pressure Range in bar	
0-1 bar Vac	V001
0-2.5 bar	02.5
0-10 bar	0010
0-100 bar	0100
0-250 bar	0250
0-600 bar	0600
0-1,000 bar	1000

Process Connection	
1/4" BSP male (G1/4)	AB
1/4" NPT male	AM
1/2" BSP male (G1/2)	AC
1/2" NPT male	AN

Order Number Example	PR3100-0100AC

For options not listed please contact the sales team

PR3100

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S.14

Protran PR9000 and **Protran** PR9500

Heavy Duty and Wireless Pressure Transmitter

- Silicon-on-Sapphire sensor technology for outstanding performance and reliability
- Pressure ranges up to 1,500 bar
- All stainless steel, robust construction for harsh environments
- Wireless version with receiver for lower installation cost and maintenance
- Wetted parts in various materials
- ATEX/IECEx option available, including M1 for mining applications (PR9000 only)

DESCRIPTION

Developed for use in pressure applications that involve measurement of media in harsh environments, the PR9000 and wireless PR9500 are designed with robust stainless steel housing construction and Silicon-on-Sapphire strain gauge technology, together with a custom design amplifier offering excellent stability and accuracy over a long service life.

The PR9000 has easily accessible screw terminal connections and the conveniently positioned zero/span potentiometers inside the screw cover head for simplified on-site adjustment and installation. Cable entry to the transmitter head is through a PG9 gland or an optional M20 conduit fitting. Pressure ranges are from vacuum to 1,500 bar. An optional ATEX and IECEx approved versions of the PR9000 is available for explosion protection for flammable gases (zone 0), dusts (zone 20) and mining areas (group I M1).

The PR9500 wireless pressure transmitter, used in conjunction with the RX9500 receiver, provides a wireless solution for safe operation in tough industrial and process applications eliminating the need for hard wiring. The transmitter can be situated in inaccessible areas, allowing the operator to monitor at safe distances on site.

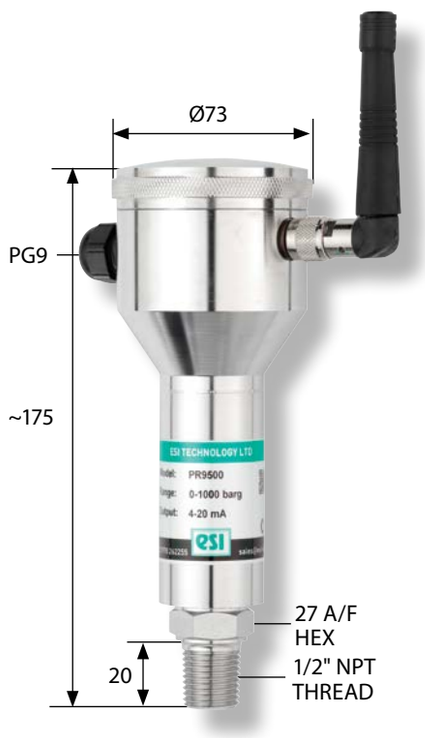
No hard wiring means lower installation cost and maintenance. The PR9500 transmitter operates by sending data signals by radio telemetry to a RX9500 receiver which provides a 4-20 mA output signal. Powered by an internal battery or 8-30 Vdc supply, the transmitter is capable of sending data signals at distances of up to 200 metres. Pressure ranges are from vacuum to 1,500 bar.

PR9000

DIMENSIONS (in mm)

PR9500

DIMENSIONS (in mm)



TECHNICAL DATA

Type	PR9000
Sensor Technology:	Silicon-on-Sapphire (ranges >1 bar)/ Isolated Piezoresistive Silicon (ranges ≤1 bar)
Output Signal:	4 – 20 mA (2 wire)
Supply Voltage:	13 – 36 VDC
Pressure Reference:	Gauge
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V
Standard Pressure Ranges (bar):	0 – 1 bar Vac; 0 – 500 mbar; 0 – 1 bar; 0 – 10 bar; 0 – 25 bar; 0 – 100 bar; 0 – 250 bar; 0 – 700 bar; 0 – 1,500 bar (Other options available)
Standard Pressure Ranges (psi):	0-30 in Hg; 0-7.5 psi; 0-15 psi; 0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-10,000 psi; 0-20,000 psi (other options available)
Overpressure Safety:	2x for ranges 1 bar to 600 bar; 1.5x for 1000 bar range; 1.1x for 1,500 bar range
Load Driving Capability:	4 – 20 mA: RL < [UB - 13 V] / 20 mA (e.g. with supply voltage (UB) of 36V, max. load (RL) is 1150 Ω)
Accuracy NLHR:	≤ ±0.2 % of span BFSL
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature; ±5 %FS (approx.) adjustment with easy access trimming potentiometers
Operating Ambient Temperature:	-20 °C to +85 °C (-4 °F to +185°F)
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185°F)
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice
Temperature Effects:	±1.5 %FS total error band for -20 °C to +70 °C. Typical thermal zero and span coefficients ±0.02 %FS/ °C
ATEX/IECEx Approval Option:	Ex II 1 G Ex ia IIC T4 Ga (zone 0) Ex II 1 D Ex ia IIIC T135 °C Da (zone 20) Ex I M 1 Ex ia I Ma (group 1 M1)
ATEX/IECEx Safety Values:	Ui = 28 V Ii = 119 mA Pi = 0.65 W Li = 0.1 µH Ci = 66 nF Temperature Range = -20 °C to +70 °C Max. cable length = 85 m
Electromagnetic Compatibility:	Emissions: EN61000-6-3; Immunity: EN61000-6-2; Certification: CE Marked
Insulation Resistance:	> 100 MΩ @ 50 VDC
Response time 10-90 %:	1 mS
Wetted Parts:	Ranges >1 bar; SAE 316 stainless steel and titanium alloy; Ranges ≤1 bar; SAE 316 stainless steel and Nitrile NBR O-ring
Pressure Media:	Ranges >1 bar; all fluids compatible with SAE 316 stainless steel and titanium alloy; Ranges ≤1 bar; all fluids compatible with SAE 316 stainless steel and Nitrile NBR O-ring
Pressure Connection:	1/2" BSP male (G1/2); 1/2" NPT male (other options available)
Electrical Connection:	Screw terminals for conductor sizes 0.2 – 2.0 mm2 are located beneath the screw lid. Cable entry to head is through an IP68 cable gland with compression seal for cable sizes 4 – 8 mm. Optional M20 Conduit fitting is available.

TECHNICAL DATA

Type	PR9500
Sensor Technology:	Silicon-on-Sapphire (ranges >1 bar)/ Isolated Piezoresistive Silicon (ranges ≤1 bar)
Output Signal:	Radio transmission
Power Supply:	Replaceable 3.2 Vdc (1/2AA) Lithium Thionyl Chloride battery or 8 - 30 Vdc supply
Pressure Reference:	Gauge
Protection of Supply Voltage:	Protected against supply voltage reversal up to 50 V
Standard Pressure Ranges (bar):	0 -1 bar Vac; 0 - 500 mbar; 0 - 1 bar; 0 - 10 bar; 0 - 25 bar; 0 - 100 bar; 0 - 250 bar; 0 - 700 bar; 0 - 1,500 bar (other options available)
Standard Pressure Ranges (psi):	0-30 in Hg; 0-7.5 psi; 0-15 psi; 0-150 psi; 0-300 psi; 0-1,500 psi; 0-3,000 psi; 0-10,000 psi; 0-20,000 psi (other options available)
Overpressure Safety:	2x for ranges 1 bar to 600 bar; 1.5x for 1,000 bar range; 1.1x for 1,500 bar range
UHF Radio Transmitter:	Low power (license free), transmission frequency 433.92 MHz or 418 MHz (depending on geographical frequency)
Wireless Receiver:	RX9500 radio receiver station (contact sales team for more information)
Transmission Range:	Point-to-point radio transmission up to 500m line-of-sight
Data Transmission Rate:	Serial radio packet at 4800/9600 baud (up to 4 samples per second)
Resolution:	> ±0.05 %FS (12 bit ADC)
Load Driving Capability:	n/a
Accuracy NLHR:	≤ ±0.3 % of span BFSL
Zero Offset and Span Tolerance:	±0.5 %FS at room temperature; ±5 %FS (approx.) adjustment with easy access trimming potentiometers
Operating Ambient Temperature:	-10 °C to +55 °C (+14 °F to +131 °F)
Operating Media Temperature:	-20 °C to +85 °C (-4 °F to +185°F)
Storage Temperature:	+5 °C to +40 °C (+41 °F to +104°F) Recommended Best Practice
Temperature Effects:	±1.5 %FS total error band for -10 °C to +55 °C. Typical thermal zero and span coefficients ±0.02 %FS/ °C
Electromagnetic Compatibility:	ETSI EN 301 489; Certification: CE Marked
Radio Type Approvals:	ETSI EN 300 220
Insulation Resistance:	> 100 MΩ @ 50 VDC
Wetted Parts:	Ranges >1 bar; SAE 316 stainless steel and titanium alloy; Ranges ≤1 bar; SAE 316 stainless steel and Nitrile NBR O-ring
Pressure Media:	Ranges >1 bar; all fluids compatible with SAE 316 stainless steel and titanium alloy; Ranges ≤1 bar; all fluids compatible with SAE 316 stainless steel and Nitrile NBR O-ring
Pressure Connection:	1/2" BSP male (G1/2); 1/2" NPT male (other options available)
Electrical Connection:	Screw terminals for conductor sizes 0.2 - 2.0 mm2 are located beneath the screw lid. Cable entry to head is through an IP68 cable gland with compression seal for cable sizes 4 - 8 mm. Optional M20 Conduit fitting is available.

TECHNICAL DATA

Type	RX9500
Radio Type:	FM Receiver
Sensitivity:	-107 dBm (range of 200m line of sight)
Identification Address:	8 bit, 256 selectable combinations
Communication Watchdog:	128 seconds before alarm output is activated
Alarm Output:	Open drain switch, max. current 250 mA
Analogue Output:	4-20 mA (2 wire)
Output Compliance:	8.5 Vdc
Resolution:	> ±0.05 %FS (12 bit ADC)
Power Requirements:	110/240 V, 50-60 Hz or 10.5-30 VDC
Current Requirements:	32 mADC
Housing:	High impact polycarbonate, rated to IP65
Dimensions:	200 x 120 x 75 mm
Weight:	~ 1 Kg
Operating Temperature:	-10 °C to +55 °C (+14 °F to 131 °F)
Storage Temperature:	-20 °C to +65 °C (-4 °F to +149 °F)
Antenna:	1/4 wave helical in plastic moulding
RF Connector:	External BNC
Cable Entry:	IP65 nylon cable gland for cable diameter 4 - 8 mm
Electrical Connections:	Screw terminal plug & socket. Wire size from 0.5 - 1.5 mm2

PRODUCT CODING

Output		Type	Electrical Connection/ Option	Pressure Range	Process Connection	Options
4-20 mA (2 wire)	Standard	PR9000				
Radio Transmission	Wireless	PR9500				
Radio Receiver to be used with PR9500 Wireless Transmitter, 433.92 MHz		RX9500-433				
Radio Receiver to be used with PR9500 Wireless Transmitter, 418 MHz		RX9500-418				

Electrical Connection/ Option	
Cable gland IP68	-
ATEX/ IECEx certified with DIN EN175301 plug and socket (PR9000 only)	EX

Pressure Range in bar	
0-1 bar Vac	V001
0-0.5 bar	00.5
0-1 bar	0001
0-10 bar	0010
0-25 bar	0025
0-100 bar	0100
0-250 bar	0250
0-700 bar	0700
0-1,500 bar	1500

Process Connection	
1/2" BSP male (G1/2)	AC
1/2" NPT male	AN

Options	
M20 Conduit	M20

Order Number Example	PR9000EX0700AC

For options not listed please contact the sales team

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S.15

Accessories

- High temperature pressure adapter
- Panel meter
- Plug-in display
- Desiccant housing & refills
- USB leads

DESCRIPTION

The ESI product range includes high quality accessories in order to grant users the optimal installation solution in all applications.

ADHT

The ADHT Cooling Coil Adaptor provides thermal isolation for a pressure sensor from hot liquid or gas media. It can be used with media up to 200°C and with pressure ranges up to 400bar. Constructed entirely from 316L stainless steel, and available with ¼" BSP male process connection as standard, it offers a simple yet effective solution to high temperature applications when used with ESI pressure sensors.

PM1000

The PM1000 series is a 4 digit LED plug-on display for which connects directly to the pressure transmitter via a DIN43650 connector. Powered from the 4-20mA current loop signal of the transmitter, there is no need for an additional power source. It provides a local display for a multitude of applications. Model PM1001 offers an integral open-drain switch output.

PM8005/ PM8006

The PM8000 Series digital panel meters offer extremely high precision and long term reliability. The menu-free calibration system makes set-up of operating parameters very straightforward, and radically simplifies the process, compared with the usual menu arrangement used on most digital meters. Available with AC and DC supply options.

Desiccant Housing and Refills

The DH3400 Desiccant Housing is for use with submersible pressure transmitters and is designed to keep air in the vent tube dry, protecting the transducer from condensation. The internal desiccant chamber is protected from weather in a vented enclosure. The life of the desiccant depends on the environment, but it should be replaced regularly. Desiccant refills are also available.

USB Cables

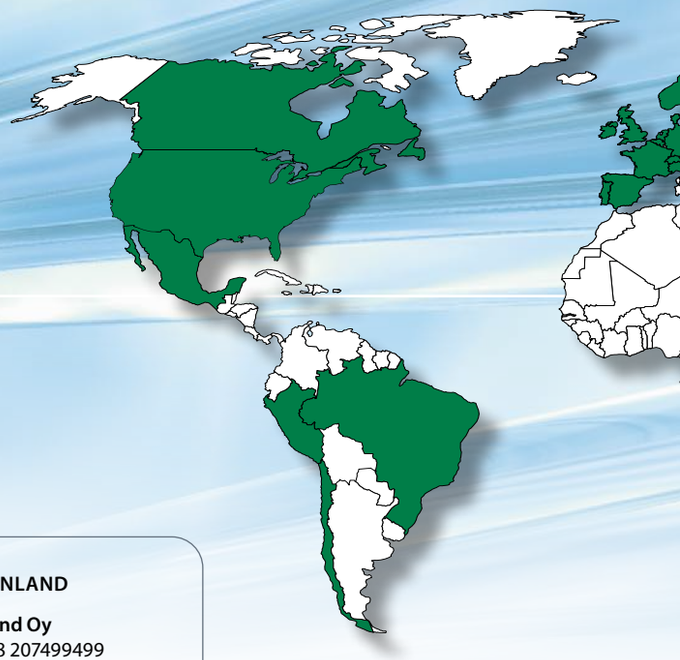
For use with the GS4200-USB and GD4200-USB, the ESI-USB cables are available to buy separately in 2 m or 4.5 m lengths.

PM1000

PM8005/8006

ADHT

ESI wordwide:
International sales partners



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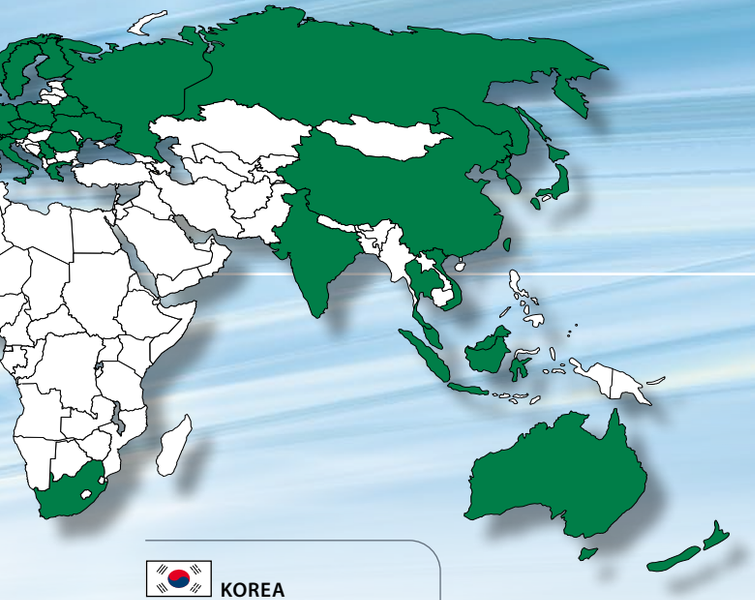

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