

KDG

4291 Intelligent Gauge Pressure Transmitter

Data sheet
0082

4290 Gauge Pressure Transmitter

Application Flexibility

- Ranges from 0-12.5mbar to 0-250bar
- 40 : 1 rangeability
- 4-20mA plus HART digital communication
- Conventional or multi-drop operation
- CENELEC certified EExd & EExia
- IP67 electronics housing
- Aluminum or stainless steel electronics housing
- Optional multi-function LCD display
- Compact and lightweight - less than 2Kg
- Full local configuration via magnetic tool
- Configurable output function
- Flow totalisation

For absolute and differential pressure and high accuracy gauge pressure measurement ask about our 4301 transmitter.

Performance

- 0.1% accuracy

Reliability

- Simple, external non-interactive zero and span
- Simple configuration
- Password protection
- Single electronics board covers complete range
- Continuous self-diagnostics

Introduction

The 4291 and 4290 Series pressure transmitters use, as their measuring principle, the well known and field proven technique of capacitance sensing, enhanced by microprocessor based electronics.

Designed for process measurement and control applications, these 2-wire gauge pressure transmitters generate a 4-20mA signal which is either characterised or directly proportional to the pressure applied. The HART communications protocol is standard for 4291 versions.

Both the 4291 and 4290 offer simple local zero and span adjustment. Full local configuration can also be made if required without the need of a separate hand held configurator (when fitted with the optional display).

Manufactured to ISO9001 quality standards, every unit is certified EExia and EExd (ATEX) and offers full process wetted material traceability to 3.1b requirements.



The 4290 & 4291 offer an unmatched combination of simple calibration and maintenance with high performance and low cost of ownership

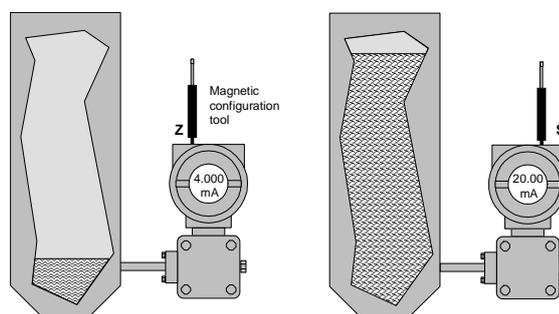
Configuration

The 4291 offers three levels of adjustment. Simple, local zero and span adjustment, local configuration or remote configuration. The 4290 has local zero and span adjustment and local configuration.

Local calibration

Zero pressure is applied to the instrument, the magnetic configuration tool is inserted into the zero port of the transmitter and a zero condition is achieved (4mA). 100% pressure is then applied, the tool is inserted into the span port and the unit is calibrated. Zero and span are totally non-interactive.

Local adjustment



Zero pressure is applied, magnetic tool inserted into 'Z' hole, transmitter is zeroed.

Span pressure is applied, magnetic tool inserted into 'S' hole, transmitter is now calibrated.

If a zero or span condition cannot be achieved, the unit can still be calibrated by simply expressing percent above or below zero and span points. For example, vessel can only be emptied to 10% level and filled to 95% level. Simply set zero to 10% and span to 95% and the unit is calibrated.

Local configuration

With the multifunction indicator fitted, local configuration is available. This allows alteration of most configurable functions, for example: damping time, output type, re-ranging.

Local configuration is simple to perform with each parameter displayed in plain English. Local adjustment may be disabled for increased security.

Remote configuration - available on 4291 only

This is carried out via a hand held communicator or personal computer featuring Hart protocol. This allows easy storage and manipulation of all operational and Hart parameters.

Neither local calibration or configuration require removal of housing covers therefore maintaining IP67 integrity.

Benefits

The magnetic calibration/configuration tool avoids the use of analogue rotary potentiometer adjustments (as with conventional transmitters) which can suffer from drift and reduce the IP rating of the instrument. By avoiding the use of tactile membrane push buttons, phenomena such as cracking after prolonged use are avoided.

Calibration via the magnetic tool ensures total integrity of the IP67 rating, simplifies calibration and reduces the potential for unauthorised adjustment.

Sensor

The units use differential capacitance sensing as their measurement principle. The sensor incorporates a small surface mount circuit board mounted in the 'neck' of the sensor assembly.

During manufacture, each assembly undergoes temperature cycles covering the operating range. Data from these tests is written to the circuit board and used to correct for unwanted temperature effects whilst in operation.

Electronics

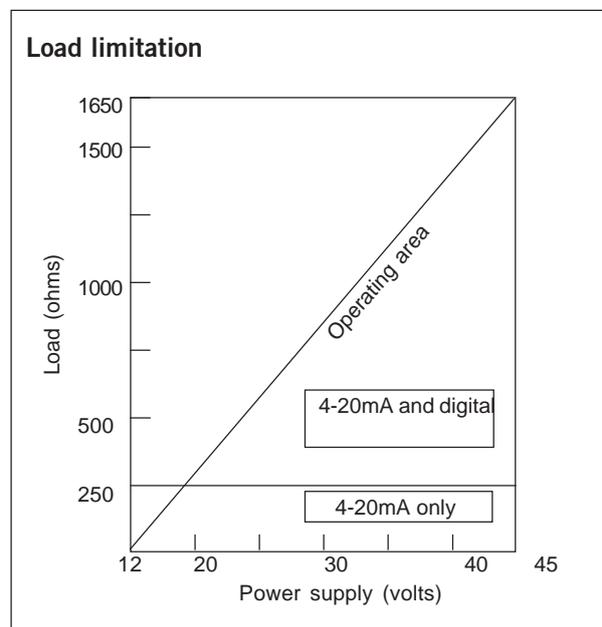
Due to the benefits of surface mount electronics, a single electronics board (module) covers the entire range, thus simplifying maintenance and reducing spares inventory.

Local Indication

The multi-function LCD indicator displays either one or two variables (display alternates), these are:-

- Output %
- Output mA
- Scaled output and unit (eg. 0-150 mbar)
- Integrated Total (8 digit)
- Sensor temperature

The LCD indicator can also be used, in conjunction with the magnetic configuration tool for local transmitter configuration. The indicator can be rotated through 90° steps and is field retrofittable.



Ordering Information

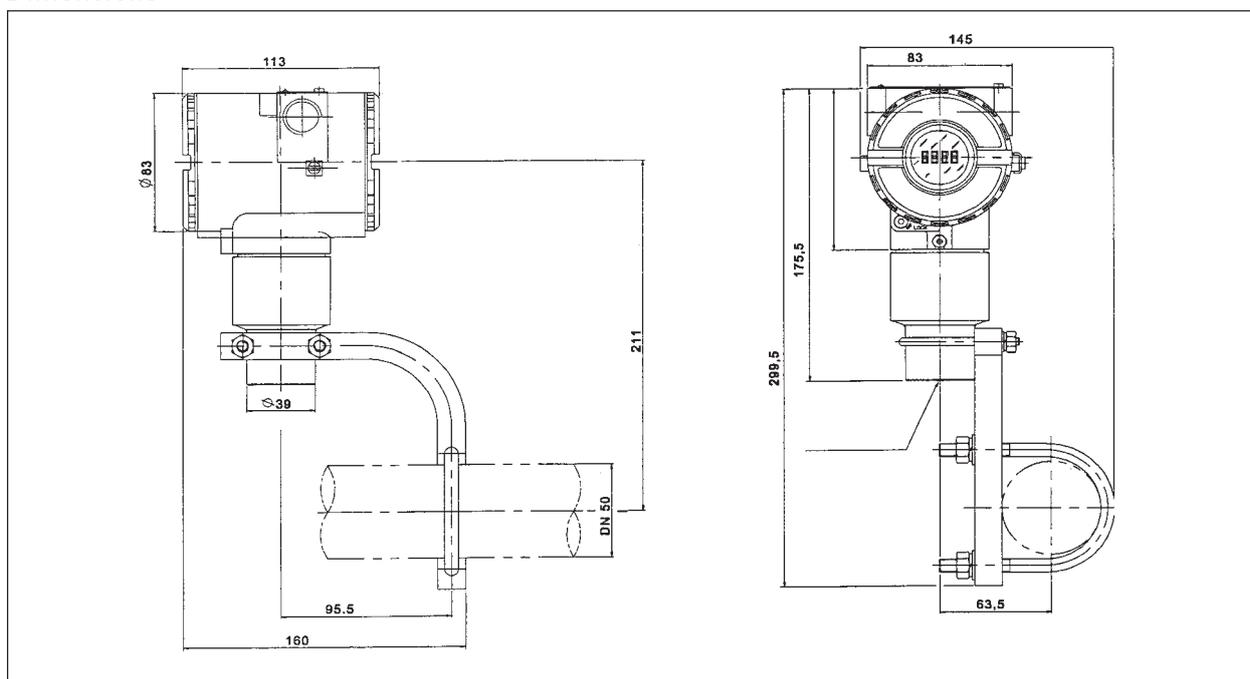
4290	Gauge pressure transmitters		
4291	Intelligent gauge pressure transmitters (SMART)		
Code	Span limits (Note 1)		Overrange limit
M2	Gauge 12.5 to 500mbar	(0.125 to 5 metres H ₂ O)	140 bar
M3	Gauge 62.25 to 2500mbar	(0.625 to 25 metres H ₂ O)	140 bar
M4	Gauge 0.625 to 25bar	(6.25 to 250 metres H ₂ O)	140 bar
M5	Gauge 6.25 to 250bar	(62.5 to 2500 metres H ₂ O)	310 bar
Code	Diaphragm material	fill fluid	Process connection material
1I	316Lss	Silicone oil	316L stainless steel
2I	316Lss	Fluorolube oil	316L stainless steel
3H	Hastelloy C276	Silicone oil	Hastelloy C276 <i>Note 2</i>
4H	Hastelloy C276	Fluorolube oil	Hastelloy C276 <i>Note 2</i>
Code	Local indicator		
0	Without indicator		
1	With digital indicator		
Code	Process connection		
1	½" -14 NPT Female		
G	G½" A (½"BSP)		
M	½" - 14 NPT Male		
Z	Others - specify		
Code	Electrical connection		
A	M20 x 1.5		
B	PG 13.5 DIN		
O	½" - 14 NPT		
Code	Mounting bracket		
0	Without mounting bracket		
1	Carbon steel mounting bracket with carbon steel accessories		
2	316SS Mounting bracket with 316SS accessories		
7	Carbon steel mounting bracket with 316SS accessories		
Z	Others - specify		
Code	Options		
H1	316SS Housing		
ZZ	Special options - specify		

4291 - M2 1I 1 1 A 2 H1 Typical ordering information

Notes:

1. Ranges shown are max. & min. span limits
2. Meets NACE material recommendations as per MR-01-75

Dimensions



Specifications

Functional

Process:	Liquid, gas and vapour
Output signal:	Two-wire, 4-20mA (with super imposed digital communication on 4291)
Power supply:	12 to 45 V dc
Indicator:	Optional 4½-digit numerical and 5 digit alpha numeric.
Hazardous area certifications:	ATEX II 1 GD, EExia IIC T4 ATEX II 2G EExd IIC T6 dual certified
Zero and span adjustment:	Non-interactive, external local adjustment or HART interface
Temperature limits:	Ambient: -40 to +85°C (-20°C to +40°C for hazardous areas) Process: -40 to +100°C (silicone oil) 0 to +85°C (fluorolube oil) Storage: -40 to +100°C
Digital display:	-10 to +75°C (operation) -40 to 85°C (without damage)
Turn-on time:	Performs within specifications in less than 10 seconds after power up
Volumetric displacement:	Less than 0.15cm ³
Over pressure limits:	14 MPa(140bar, 2000 psi) for ranges 2,3&4. 31 MPa (310 bar, 4500 psi) for range 5 These over pressures will not damage the transmitter, but re-calibration may be necessary.
Humidity limits:	0 to 100% RH Electronics housing complies with IEC IP67

Performance

Accuracy:	
Ranges 2 to 4	± 0.1% of span for span ≥ 10% of URL ± 0.05 (1+(0.1 URL/span)) % of span for span < 10 % of URL
Range 5	± 0.2% of span for span ≥ 10% of URL ± 0.1 (1+(0.1 URL/span)) % of span for span < 10 % of URL Includes the effects of linearity, hysteresis and repeatability.
Stability:	± 0.2% of URL for 12 months
Temperature effect:	± (0.18% URL + 0.18% span) per 20°C
Power supply effect:	± 0.005% of calibrated span per volt
Mounting position effect:	Zero shift of up to 2.5 mbar which can be calibrated out. No span effect.
Electro-magnetic interference effect:	Designed to comply with IEC 61326:2002

Reference conditions : range starting at zero, temperature 4°C, atmospheric pressure, power supply of 24 v DC, silicone oil fill fluid, isolating diaphragms in 316L SS and digital trim equal to lower and upper range values.

Physical

Connections:	
Electrical connection:	Conduit entry: M20 x 1.5 metric, Pg 13.5 or ½" 14NPT
Process connection:	½" -14 NPT female, G½" (½" BSP) or ½" - 14 NPT male
Wetted parts:	
Isolating diaphragms & process connection:	316L SS, Hastelloy C276, others on request
Non wetted parts:	
Electronic housing:	Injected low copper aluminum, polyester painted or 316SS, encl. IP67, NEMA 4X
Fill fluid:	Silicone or Fluorolube oil
Cover 'O' rings:	Buna N
Mounting bracket mats:	Painted carbon steel or 316 SS. Optional mounting bracket for surface or vertical/horizontal 2" pipe in 316SS or painted carbon steel. Bolts, nuts, washers & U-clamp in carbon steel or 316SS
Identification plate:	316 SS
Approximate weight:	Less than 2Kg with aluminium housing without bracket

KDG INSTRUMENTS

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