LD291

SMART PRESSURE TRANSMITTERS

4 to 20 mA + HART® Digital Communication

DESCRIPTION

The series **LD29X** is the economical alternative in routine gage pressure measurement. This lightweight design eliminates the need for mounting brackets and transmitter supports in many applications.

The model LD291 offers digital HART® based communication simplifying calibration and providing remote diagnostics.

Its microprocessor-based electronics allow for total interchangeability with SMAR capacitive sensors. It automatically corrects sensor characteristic changes caused by temperature fluctuations.

All members of the LD29X series use SMAR's field proven capacitive sensors. Its special design allows a direct process connection and an optional LCD indicator can be added to provide additional operations and local indication.

Basiles the LD291 was developed according to the international safety standards to attend the functional safety requirements in plants that need safety and reability to protect people, ambient and assents, etc.

The LD291 has FMEDA analyses allowing it to work in safety areas according to SIL requirements and making easier to the user the calculation fo Safety Integrity Level (SIL).

MTBF is a basic measure of product and it is calculated adding the MTTR and MTTF. MTTR is the mean time to execute maintenance on all of the removable items in a product. It is the most common measure of maintainability. MTTF is the mean time expected until the first failure of a piece of equipament. It is the inverse of the failure note.

NEW

- ✓ 0 ~ 1.25 kPa to 0 ~ 25 MPa (0 ~ 5 in$H_2$0 to 0 ~ 3600 psi)
- ✓ ±0.1% accuracy of the calibrated range
- ✓ Updating time of output current in 100ms
- ✓ Output current resolution of 0.75µA/bit
- ✓ With high performance mathematical co-processor
- ✓ One single eletronic board for all models
- ✓ Accepts calibration from URL to URL/40
- ✓ Wetted parts in 316 SST or Hastelloy
- ✓ Digital display (optional)
- ✓ Zero, span and damping adjustment through HART® local switches (only if fitted with display)
- ✓ Digital electronics, sensor and communication
- ✓ Self diagnostics
- ✓ Weather proof, explosion proof and intrinsically safe
- ✓ FMEDA (Failure Modes, Effects and Diagnostic) Analysis
- ✓ MTBF (Mean Time Between Failures) of 239 years
- ✓ MTTR (Mean Time to Repair) of 18 minutes
- ✓ MTTF (Mean Time to Failure) of 239 years
- ✓ Applicable in safety areas according to SIL (Safety Integrity Level) requirements
- ✓ Write protection by hardware
- ✓ Easy upgrade for Foundation Fieldbus and Profibus PA technologies
- ✓ Designed and manufactured according to ISO 9001 standards

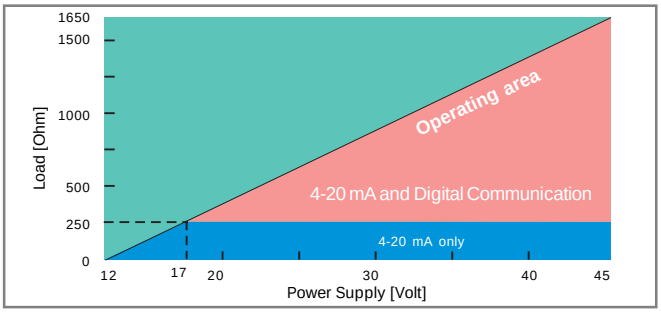
Functional Specifications

Service
Liquid, gas or vapor application

Output
Two wire, 4-20 mA with HART® superimposed digital communication signal. Output current according to NAMUR-NE 43 standard.

Power Supply
12 - 45 Vdc

Load Limitation



Indicator
Optional 4½-digit numerical and 5-character alphanumerical LCD indicator.

Hazardous Area Certifications
Explosion proof, weather proof and intrinsically safe (CENELEC, CSA and FM standards).

Zero and Span Adjustment
By Configurator or Local Adjustment from 0 to 0.975 URL, URL = Upper Range Limit.

Temperature Limits
Ambient: -40 to 85 °C (-40 to 185 °F).
Process: -40 to 100 °C (-40 to 212 °F) (Silicone Oil).
0 to 85 °C (-32 to 185 °F) (Fluorolube Oil).
Storage: -40 to 100 °C (-40 to 212 °F).
Display: -10 to 60 °C (14 to 140 °F) operation.
-40 to 85 °C (-40 to 185 °F) without damage.

Failure Alarm
In case of sensor or circuit failure, the self diagnostics drives the output to 3.6 or 21.0 mA and according to user's choice.

Turn-on Time
Performs within specifications in less than 10 seconds after power is applied to the transmitter.

Overpressure Limits
14 MPa (2000 psi) for ranges 2, 3 and 4
31 MPa (4500 psi) for range 5

These overpressures will not damage the transmitter, but a new calibration may be necessary.

Humidity Limits
0 to 100% RH.

Damping Adjustment
User configurable, from any value higher than 0 seconds plus intrinsic sensor response time (0.2s).

Configuration
By digital communication (HART® protocol) using the Configuration Interface CONF301 or the Hart Pocket Configurator HPC301. Can be done partially, through local adjustment.

Performance Specifications

NEW

Accuracy
± 0.1% of span (for span ≥ 0.1 URL).
± 0.05 (1 +(0.1 URL/span))% of span (for span < 0.1 URL).

For Ranges 5:
± 0.2% of span (for span ≥ 0.1 URL).
± 0.1 (1 +(0.1 URL/span))% of span (for span < 0.1 URL).

Stability
±0.2% of URL for 1 year.

Temperature Effect
±(0.18% URL + 0.18% span) per 20 °C (36 °F).

Power Supply Effect
0.005% of calibrated span per volt.

Mounting Position Effect
Zero shift of up to 250 Pa (1 in$H_2$0) which can be calibrated out. No span effect.

Electro-Magnetic Effect
Designed to comply with IEC IEC61000-6-2:1999, IEC61000-6-4:1997 and IEC61326:2002 standards.

Physical Specifications

Electrical Connection
½ -14 NPT, Pg 13,5 or M20 x 1,5

Process Connection
See ordering code.

Wetted Parts
- Isolating Diaphragms and Process Connection
  316L SST, Hastelloy C276.

Nonwetted Parts
- Electronic Housing
  Injected aluminum with polyester painting or 316 SST (NEMA 4X, IP67).
- Fill Fluid
  Silicone or Fluorolube Oil.
- Cover O-Rings
  Buna N.
- Mounting Bracket
  Optional universal mounting bracket for surface or verti cal/horizontal 2"-pipe (DN 50) carbon steel with polyester painting or 316 SST. Accessories (bolts, nuts, washers and U-clamp) in carbon steel or 316 SST.
- Identification Plate
  316 SST.

Approximate Weights
< 2.0 kg (4lb): aluminum housing without mounting bracket.

Smar Pressure Transmitters are protect by USA patent number 6,433,791

ORDERING CODE

MODEL LD291	SMART PRESSURE TRANSMITTERS - 4 to 20 mA + HART Digital Communication

CODE	Range									
M2	Gage	1.25	to	50	kPa	5	to	200	inH_2O	**Note:** The range can be extend up to 1.2 URL with small degradation of accuracy.
M3	Gage	6.25	to	250	kPa	25	to	1000	inH_2O	
M4	Gage	62.50	to	2500	kPa	9	to	360	psi	
M5	Gage	0.625	to	25	MPa	90	to	3600	psi	

CODE	Diaphragm Material	Fill Fluid (Low Side)	Process Connection Material
1I	316L SST	Silicone Oil	316L SST
2I	316L SST	Fluorolube Oil	316L SST
3H	Hastelloy C276	Silicone Oil*	Hastelloy C276*
4H	Hastelloy C276	Fluorolube Oil*	Hastelloy C276*
Z	Others - Specify		

CODE	Local Indicator
0	Without Indicator
1	With Digital Indicator

CODE	Process Connections
1	½ - 14 NPT- Female
G	G ½ A DIN 16288 Form B - Male
H	G ½ A DIN 16288 Form D - Male
M	½ - 14 NPT - Male
V	Valve Manifold integrated to the transmitter
Z	Others - Specify

CODE	Electrical Connections
0	½ - 14 NPT
A	M20 x 1,5
B	Pg 13,5 DIN

CODE	Mounting Bracket
0	Without Mounting Bracket
1	Carbon Steel Mounting Bracket with Carbon Steel accessories
2	316 SST Mounting Bracket with 316 SST accessories
7	Carbon Steel Mounting Bracket with 316 SST accessories
Z	Others - Specify

CODE	Optional Items **
H1	316 SST Housing
ZZ	Special Options - Specify

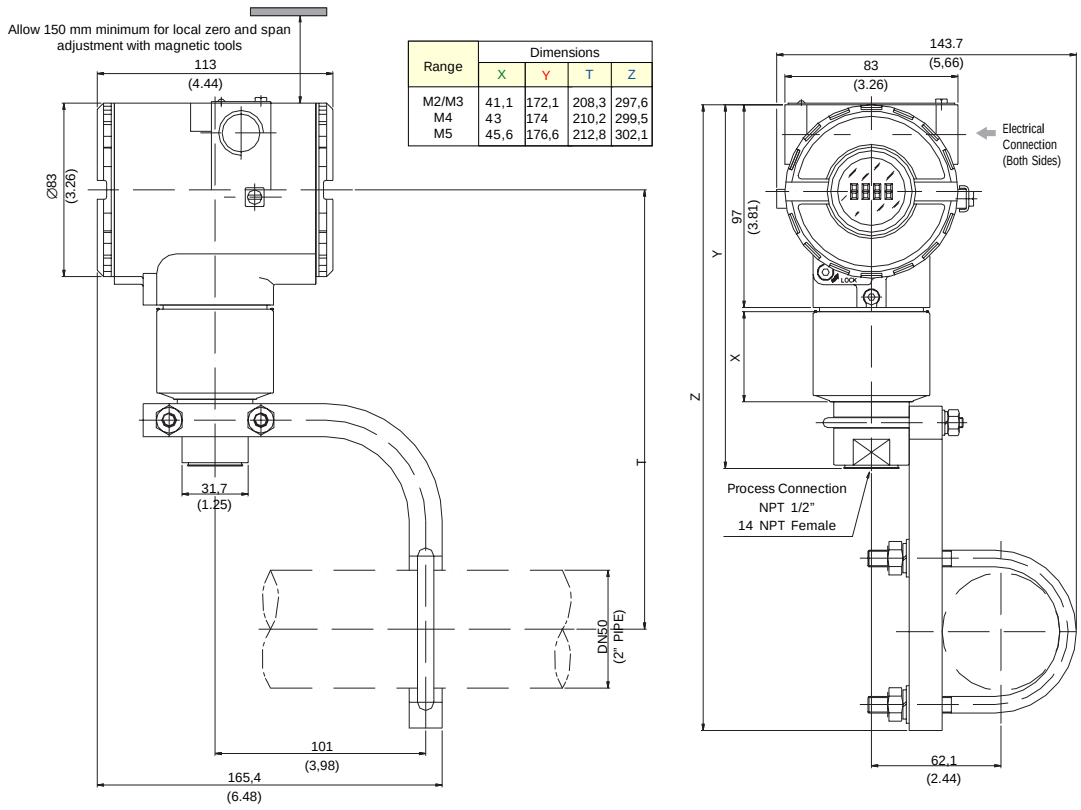
LD291 - M2 | 1I | 0 - 1 | A - 0 / ** ← TYPICAL MODEL NUMBER

* Meets NACE material recommendations per MR-01-75.
** Leave it blank for no optional items.

Hastelloy is a trademark of the Cabot Corp.
Fluorolube is a trademark of Hooker Chemical Corp.
HART is a trademark of Hart Communication Foundation.

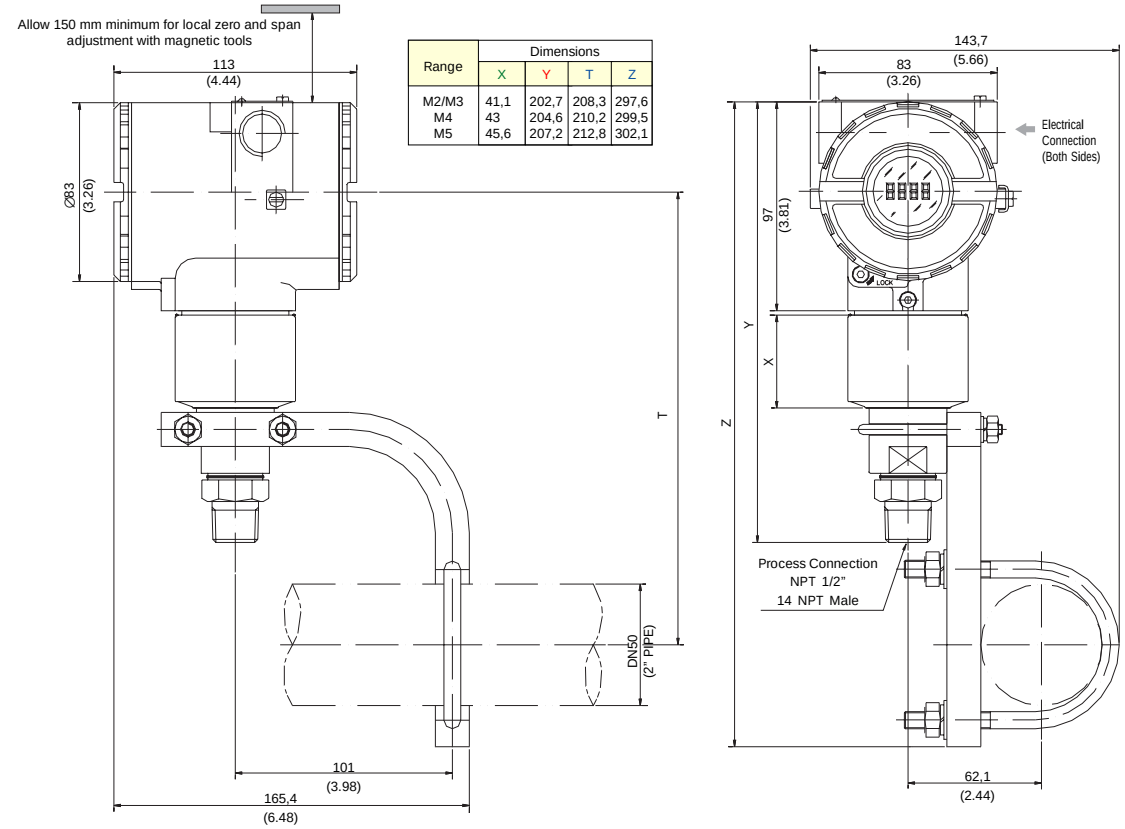
Dimensions are mm (in)

PROCESS CONNECTION ½" 14 NPT FEMALE



Range	Dimensions			
	X	Y	T	Z
M2/M3	41,1	172,1	208,3	297,6
M4	43	174	210,2	299,5
M5	45,6	176,6	212,8	302,1

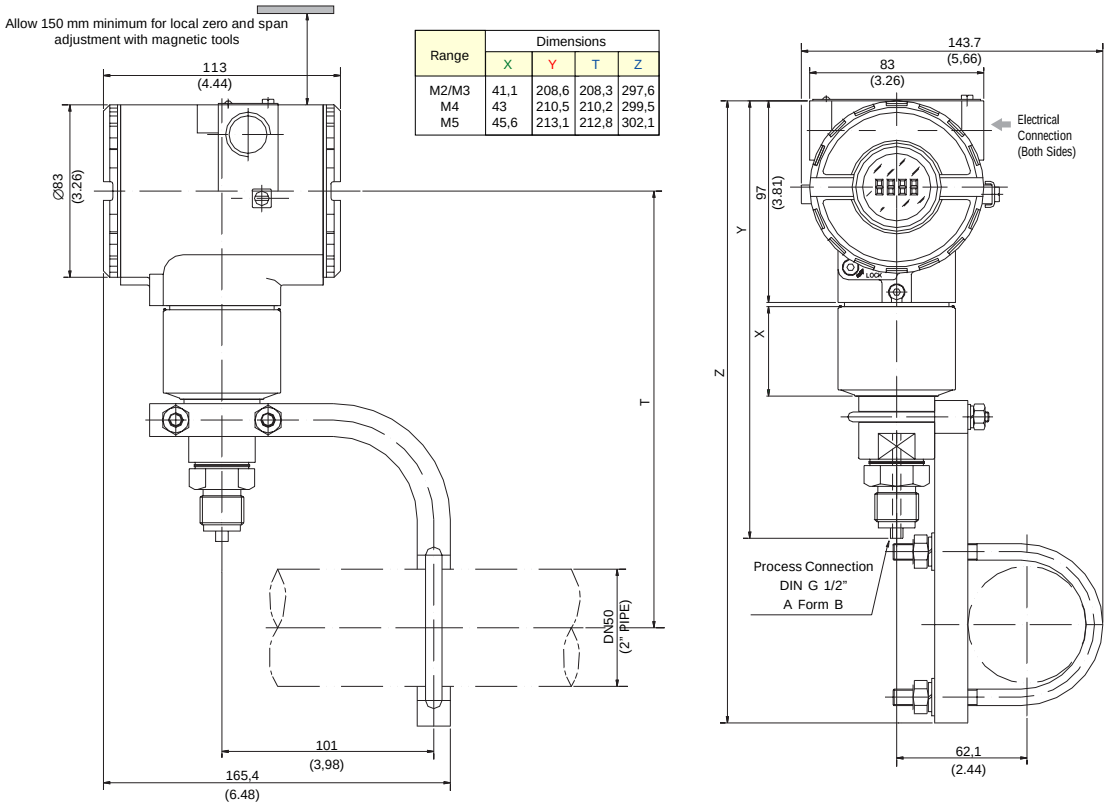
PROCESS CONNECTION ½" 14 NPT MALE



Range	Dimensions			
	X	Y	T	Z
M2/M3	41,1	202,7	208,3	297,6
M4	43	204,6	210,2	299,5
M5	45,6	207,2	212,8	302,1

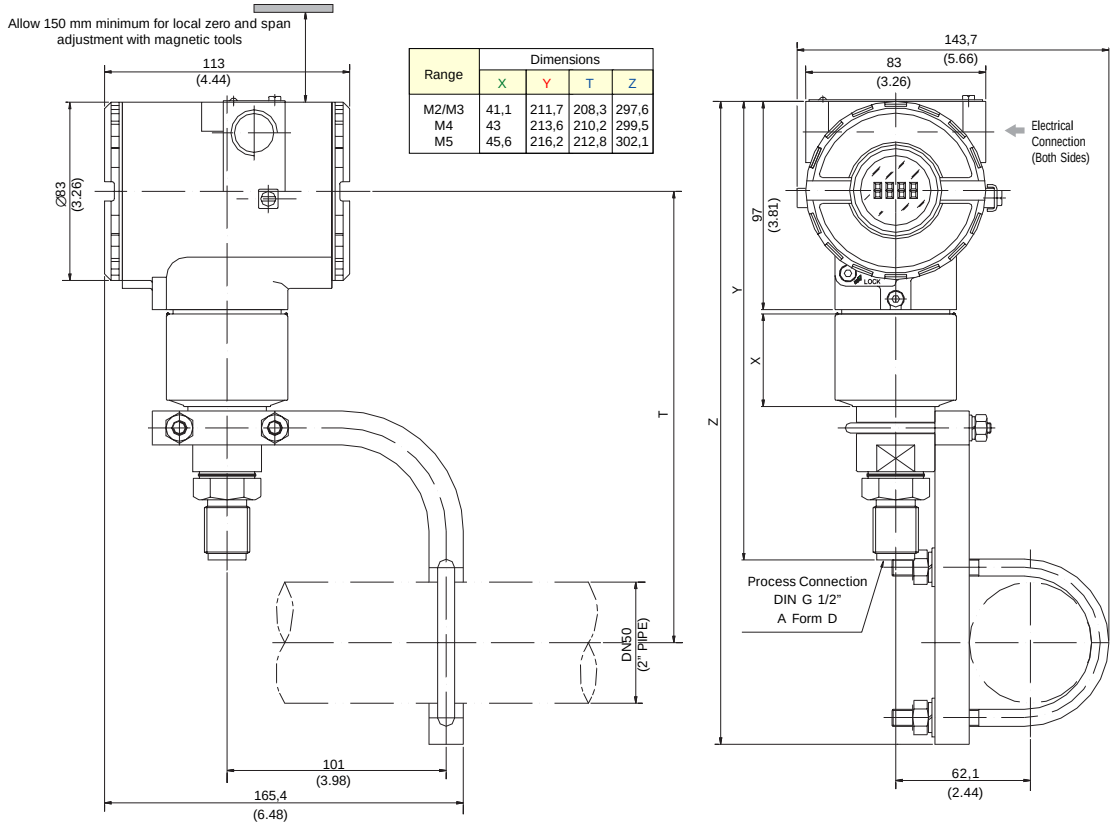
Dimensions are mm (in)

PROCESS CONNECTION DIN G ½" A FORM B



Range	Dimensions			
	X	Y	T	Z
M2/M3	41,1	208,6	208,3	297,6
M4	43	210,5	210,2	299,5
M5	45,6	213,1	212,8	302,1

PROCESS CONNECTION DIN G ½" A FORM D



Range	Dimensions			
	X	Y	T	Z
M2/M3	41,1	211,7	208,3	297,6
M4	43	213,6	210,2	299,5
M5	45,6	216,2	212,8	302,1

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