LD300 series

301 - 302 - 303

PRESSURE TRANSMITTERS

FOR PRESSURE, LEVEL AND FLOW APPLICATIONS

- ± 0.04% High Accuracy
- ± 0.2% of URL Stability Guarantee for 12 Years
- 120:1 Rangeability
- Non-volatile Flow Totalizer
- Tank Linearization
- 100 ms Total Response Time
- PID Control Capability
- Bi-directional Flow Measurement
- Advanced Diagnostics
- Largest Library of Function Block Execution Capacity
- Instantiable Function Blocks
- Supported by DD, EDDL and FDT/DTM
- Three Technology Options

smar

Features

- ± 0.04% high performance option;
- ± 0.2% of URL stability guarantee for 12 Years;
- 120:1 rangeability;
- Span as small as 50 Pa (0.2 inH_2O) up to a range limit of 40 MPa (5800 psi);
- Up to 52 MPa static pressure (7500 psi);
- Direct digital capacitance sensing (no A/D conversion);
- True non-interactive zero and span;
- Local zero and span adjustment;
- Remote calibration and parameterization;
- Transfer functions: linear, $V\overline{x}$, $V\overline{x^3}$ and $V\overline{x^5}$;
- Tank linearization;
- Alphanumerical LCD indication;
- Small and lightweight;
- Explosion proof and weather proof housing approved (IP67);
- Intrinsically safe certification;
- Signal simulation for loop tests;
- Non-volatile flow totalization;
- Configurable user unit;
- Configurable local adjustment;
- EMC (Electromagnetic Compatibility) according to IEC 61000-6-2:1999, IEC 61000-6-4:1997 and IEC 61326:2002;
- Write protection function;
- Three technology options: HART®, FOUNDATION fieldbus™, PROFIBUS PA.

HART® - 4 to 20 mA

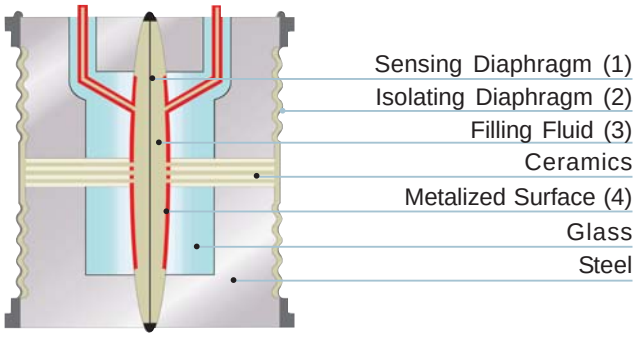
- Update output current in 100 ms with 0.075 µA/bit resolution;
- Improved performance due to dedicated math co-processor;
- Multi-drop operation mode;
- PID control function;
- Supports DTM and EDDL;
- Bi-directional flow measurement;
- With FMEDA analysis and MTBF of 244 years.

FOUNDATION Fieldbus™

- 17 different types of function blocks for control strategies and advanced diagnostics;
- Up to 20 function blocks;
- Execution of up to 29 external links;
- 12 mA consumption;
- Dynamic block instantiation improves interchangeability;
- Fieldbus Foundation™ registered and ITK approved;
- MVC (Multivariable Container) enabled;
- MTBF of 186 years.

PROFIBUS PA

- 12mA consumption;
- Function blocks for analog input and totalization;
- Integrated to Simatic PDM;
- Supports DTM and EDDL;
- Profile 3.0 improves interchangeability;
- MTBF of 186 years.



LD300 Series offers:

- ± 0.04% accuracy for high performance option;
- ± 0.2% of URL stability guarantee for 12 Years;
- 120:1 rangeability;
- Compact and lightweight ;
- Interchangeable protocols.

LD300 Series uses the field-proven technique of capacitance cell sensor measurement.

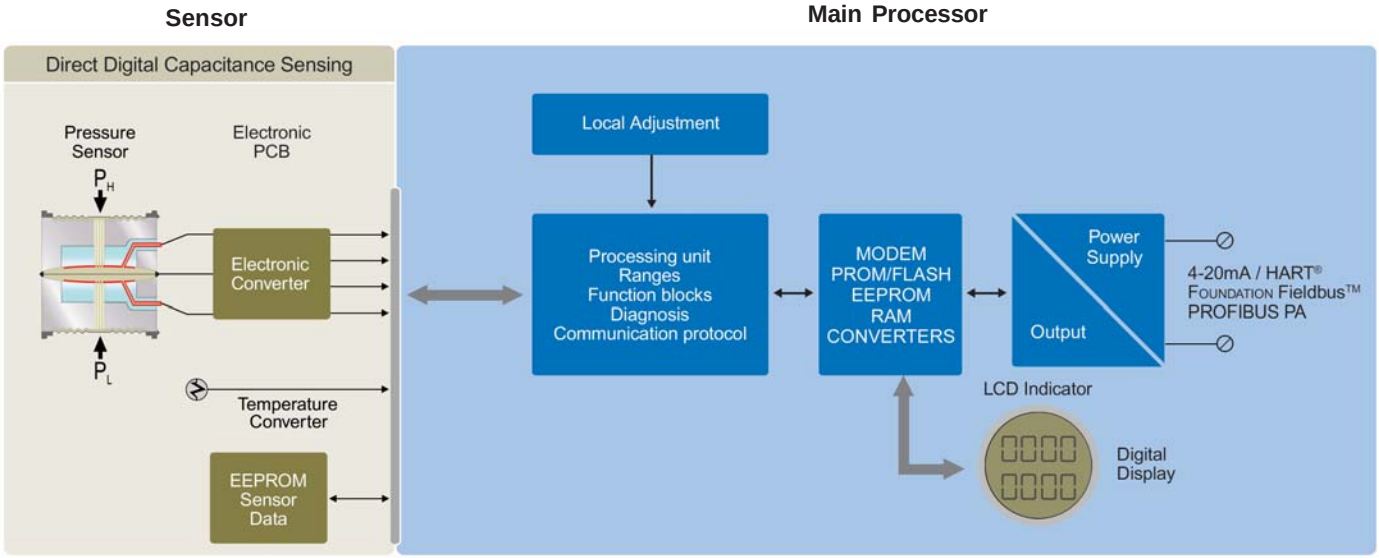
The sensor is shown in the picture above. The sensing diaphragm **(1)** is shown at the cell center. The diaphragm deflects as a result of the difference between the pressures applied to the left and right sides of the sensor. Pressure is directly applied to the isolating diaphragms **(2)**, which provide resistance against process fluid corrosion. The pressure is transmitted to the sensing diaphragm through the filling fluid **(3)**.

The sensing diaphragm is a moving capacitor plate while the two metallized surfaces **(4)** are fixed plates. The sensing diaphragm deflection results in capacitance variations between the moving and fixed plates.

The electronic circuit reads capacitance variation between the moving and fixed plates and generates a digital communication output according to the transmitter protocol. As there is no A/D conversion, errors and drifts during conversions are eliminated. A temperature sensor provides temperature compensations, which combined with the sensor precision, results in high accuracy and rangeability for the **LD300 Series**.

The process variable, as well as monitoring and diagnostics information, are provided by digital communication protocol. The available protocol options are: HART®, FOUNDATION fieldbus™ and PROFIBUS PA.

These protocols are easily changed by either replacing the internal electronic board or downloading the firmware. A HART® transmitter can be changed into a FOUNDATION fieldbus™ / PROFIBUS PA device by replacing the internal card, and vice-versa. A FOUNDATION fieldbus™ device can be changed into a PROFIBUS PA device and vice-versa, by simply downloading a new firmware.



Transmitter Types

Differential Pressure - LD300D and LD300H

Pressure is applied to high and low sides and differential pressure is measured. High static pressure is supported by LD300H models.

Flow - LD300D and LD300H

The differential pressure is generated by a primary flow element and the square root function supplies the flow measurement.

Absolute Pressure - LD300A

The pressure is measured at the high side of the transmitter and the low side is at zero absolute reference due to a sealed chamber with vacuum applied.

Gage Pressure - LD300M

The pressure is measured at the high side of the transmitter and the low side is open to the atmosphere, providing true local atmospheric reference.

Level - LD300L

The transmitter has a flange mounted unit with a flush diaphragm for direct installation on vessels. Extended diaphragms are also available.

Remote Seals

SR301 is a remote seal designed for chemical and thermal isolation. **LD300 Series** can be assembled with separate diaphragm seals in either one or both sides of the sensor. SR301 options include: flanged "T", flush connection, threaded, sanitary and flanged with extension. The flush connection enables deposits removal without disconnecting the seal.
Typical applications for **LD300 Series** with remote seals:

- Corrosive process fluid;
- Suspended solids or viscous process fluid;
- Process fluids that may freeze or solidify;
- Process temperatures higher than supported by transmitters;
- Replaces impulse lines and condensate legs;
- Bubble system.

See the Smar SR301 Series catalog for further information regarding application and specification.

Sanitary Transmitter

LD300S Series are specially designed for food and other applications where sanitary connections are required. With threaded or "tri-clamp" connections, it allows for easy and quick maintenance and cleaning. Tri-clamp and other connections are compliant to 3A (74-02) standard for food grade applications.
For further information, see the Smar SR301 Series Catalog.

Manifold Valves

Smar manifold valves provide all of the necessary safety for field maintenance of **LD300 Series** transmitters. Working at pressures up to 6,000 psi, they are easy to handle and lighter than others in the market. For further information, please see the Smar Manifold Valves Catalog.

LD300 Series are available in three different technologies: HART® (LD301), FOUNDATION fieldbus™ (LD302) and PROFIBUS PA (LD303).
These instruments can be configured with Smar software and other manufacturer configuration tools.
Local adjustment is available in all **LD300 Series**. It is possible to configure zero and span, totalization, set point and other control functions using the magnetic screwdriver.

Smar has developed Asset View, which is a user-friendly Web Tool that can be accessed anywhere and anytime using an Internet browser. It is designed for management and diagnostics of field devices to ensure reactive, preventive, predictive and proactive maintenance.


Local Adjustment

HART® - LD301

LD301 (HART® protocol) can be configured by:

- Smar CONF401 for Windows and UNIX;
- Smar DDCON100 for Windows and UNIX;
- Smar HPC301 and HPC401 for several models of Palms*;
- Other manufacturers' configuration tools based on DD (Device Description) or DTM (Device Type Manager), such as AMS™, FieldCare™, PACTware™, HHT275 and HHT375, PRM Device Viewer.

For LD301 management and diagnostics, Asset View ensures continuous information monitoring.

** Requires HPI311.*


DDCON - Configuration Software


HPC301

FOUNDATION Fieldbus™ - LD302

LD302 utilizes the FOUNDATION fieldbus™ H1 protocol, an open technology that allows any H1 enabled configuration tool to configure this device.

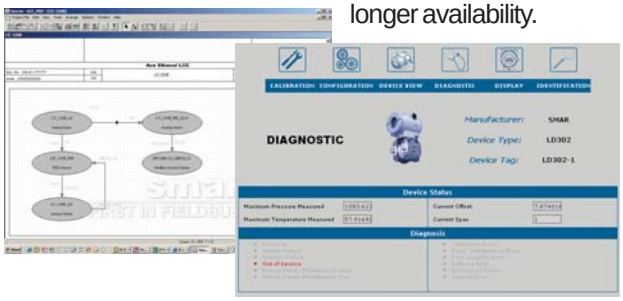
Syscon302 (System Configuration Tool) is a software tool used to configure, maintain and operate the field devices. Syscon offers efficient and friendly interaction with the user, using Windows NT version 4.0 or later, Windows 2000 and Windows XP.

Configuration tools such as AMS™, FieldCare™ and HHT375 can configure LD302 devices. DD (Device Description) and CF (Capability File) files can be downloaded at either the Smar or Fieldbus Foundation™ website.

LD302 supports complex strategies configurations due to the high capacity and variety of dynamic instantiable function blocks.

Seventeen different types of function blocks are supported, and up to 20 function blocks can be running simultaneously.

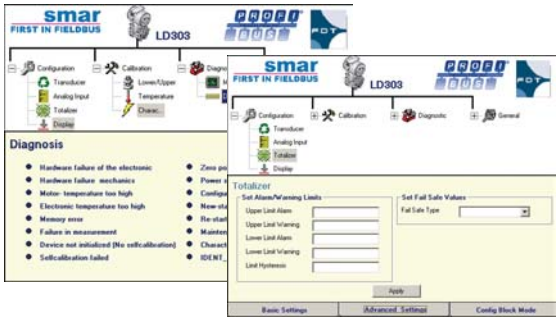
Maintenance procedures with Asset View diagnostics and status information from FOUNDATION fieldbus™ result in a safer plant with longer availability.



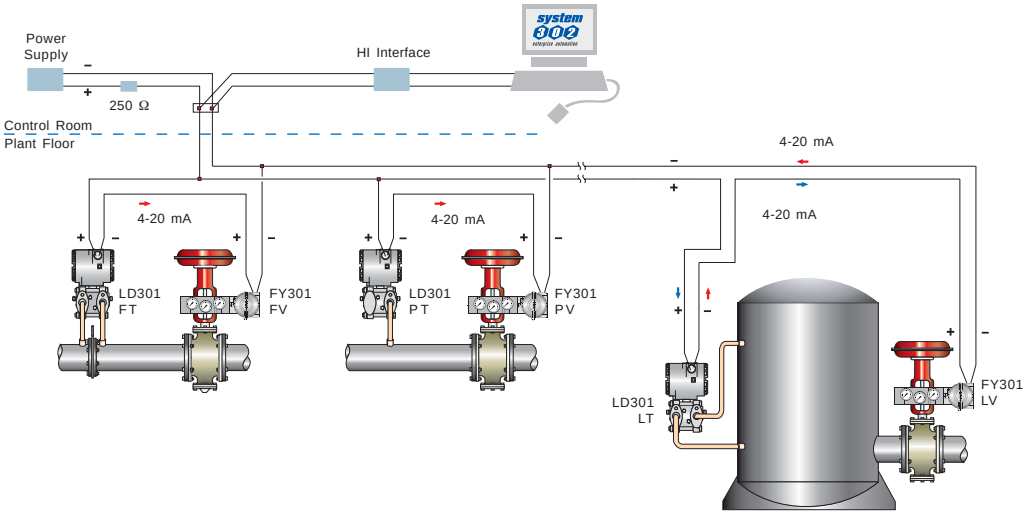
PROFIBUS PA - LD303

LD303 (PROFIBUS PA protocol) can be configured using Simatic PDM and by the FDT (Field Device Tool) and DTM (Device Type Manager) concept tools, such as FieldCare™ and PACTware™. It can also be integrated by any PROFIBUS System using the GSD file.

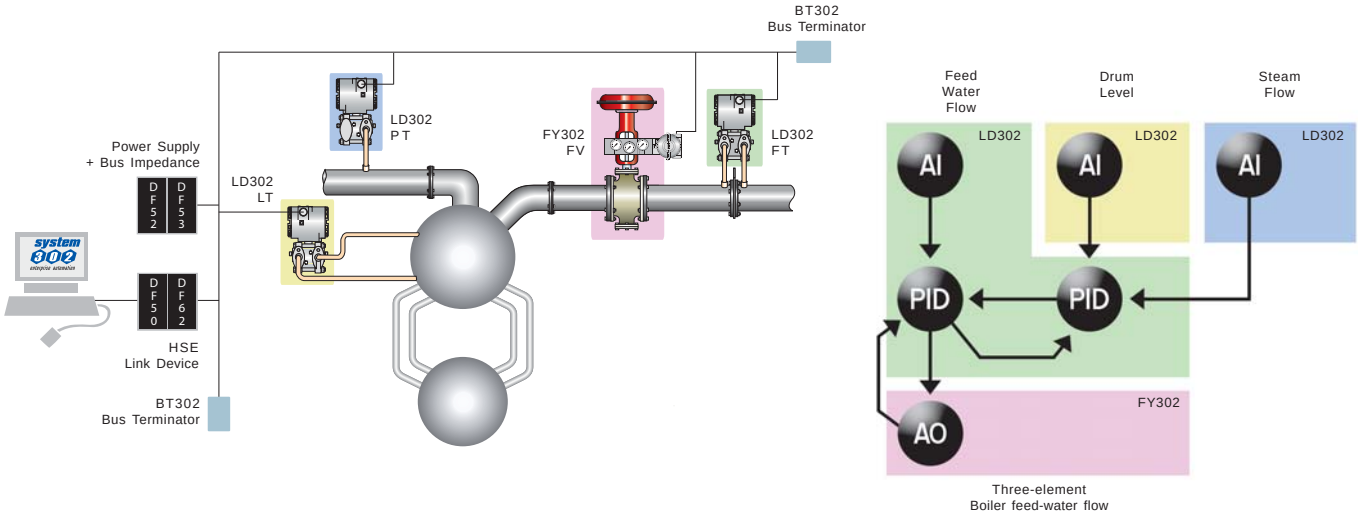
PROFIBUS PA also has quality and diagnostic information, improving plant management and maintenance.



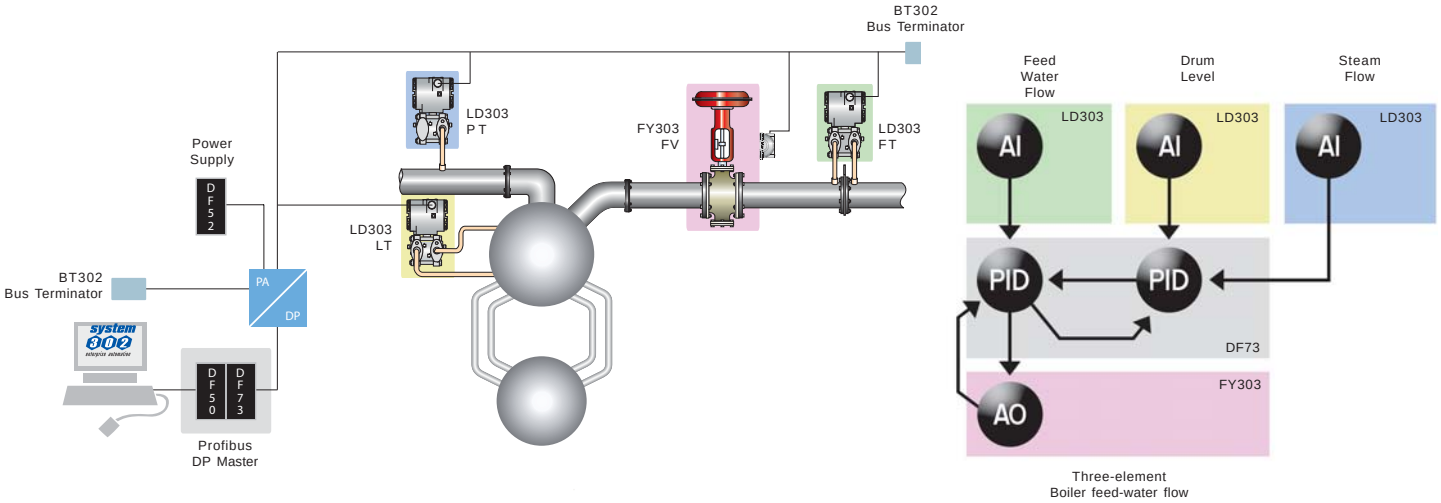
HART® - LD301



FOUNDATION Fieldbus™ - LD302



PROFIBUS - LD303



Functional Specifications

Process Fluid	Liquid, gas or vapor.
Output and Communication Protocol	**HART®:** Two-wire, 4-20 mA according to NAMUR NE43 specification, with super-imposed digital communication (HART® Protocol). **FOUNDATION Fieldbus™ and PROFIBUS PA:** Digital only. Complies with IEC 61158-2:2000 (H1): 31.25 kbit/s voltage mode, bus powered.
Power Supply / Current Consumption	**HART®:** 12 to 45 Vdc. **FOUNDATION Fieldbus™ and PROFIBUS PA:** Bus powered: 9 - 32 Vdc. Quiescent current consumption: 12 mA.
Indicator	4½-digit numerical and 5-character alphanumerical LCD indicator (optional).
Hazardous Area Certifications	**HART®, FOUNDATION Fieldbus™ and PROFIBUS PA:** Explosion proof, weather proof, intrinsically safe (CENELEC, NBR, CSA and FM standards), dust ignition proof for Class II and III, non incendive (CSA and FM) and coal mines (CENELEC). **FOUNDATION Fieldbus™ and PROFIBUS PA:** Complies with FISCO (PTB-W-53e report).
European Directive Information	**PED Directive (97/23/EC) - Pressure Equipment Directive** This product is in compliance with the directive and was designed and manufactured in accordance with sound engineering practice using several standards from ANSI, ASTM, DIN and JIS. Quality management system certified by BVQI (Bureau Veritas Quality International). **EMC Directive (89/336/EEC) - Electromagnetic Compatibility** The EMC test was performed according to standard IEC 61326:2002. **ATEX Directive (94/9/EC) – Explosive Atmosphere, Hazardous Location** This product was certified according to NEMKO and EXAM (old DMT) European Standards. The EC declarations of conformity for all applicable European directives for this product can be found at www.smar.com.
Zero and Span Adjustments	Noninteractive, via digital communication.
Failure Alarm (Diagnostics)	Detailed diagnostics through communication for all protocols. **HART®:** In case of sensor or circuit failure, the self diagnostics drives the output to 3.6 or 21.0 mA, according to the user's choice and NAMUR NE43 specification. **FOUNDATION Fieldbus™:** For sensor circuit failures, events are generated and status is sent to link outputs. Detailed diagnostics are available in the contained parameters. **PROFIBUS PA:** For sensor or circuit failures, status is sent to output parameters. Detailed diagnostics are available in the contained parameters.

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) (Halocarbon and Fluorolube Oil) -20 to 85 °C (-4 to 185 °F) (Krytox Oil and Fomblim Oil) -25 to 85 °C (-13 to 185 °F) (Viton O'Ring) -40 to 150 °C (-40 to 302 °F) (LD301L) Storage: -40 to 100 °C (-40 to 212 °F) Digital Display: -20 to 80 °C (-4 to 176 °F) -40 to 85 °C (-40 to 185 °F) (without damage)
Turn-on Time	**HART®:** Performs within specifications in less than 5 seconds after power is applied to the transmitter. **FOUNDATION Fieldbus™ and PROFIBUS PA:** Performs within specifications in less than 10 seconds after power is applied to the transmitter.
Configuration	**HART®:** By digital communication (HART® protocol) using the configuration software CONF401, DDCON (for windows), HPC301 or HPC401 (for Palms). It can also be configured using DD and FDT/DTM tools, and can be partially configured through local adjustment. **FOUNDATION Fieldbus™ and PROFIBUS PA:** Basic configuration may be done using the local adjustment magnetic tool if device is fitted with display. Complete configuration is possible using configuration tools.
Volumetric Displacement	Less than 0.15 cm^3 (0.01 in^3)
Overpressure and Static Pressure Limits	From 3.45 kPa abs. (0.5 psia)* to: 0.5 MPa (72.52 psi) for range 0 8 MPa (1150 psi) for range 1 16 MPa (2300 psi) for ranges 2, 3 & 4 32 MPa (4600 psi) for models H & A5 40 MPa (5800 psi) for model M5 52 MPa (7500 psi) for model M6 ** except the LD300A model* Flange Test Pressure: 60 MPa (8570 psi) For ANSI/DIN Level flanges (LD300L models): 150lb: 6 psia to 230 psi (-0.6 to 16 bar) at 38 °C (100.8 ºF) 300lb: 6 psia to 600 psi (-0.6 to 41 bar) at 38 °C (100.8 ºF) 600lb: 6 psia to 1200 psi (-0.6 to 83 bar) at 38 °C (100.8 ºF) PN10/16: -60 kPa to 1.4 MPa at 120 °C (248 °F) PN25/40: -60 kPa to 4 MPa at 120 °C (248 °F) The above pressures will not damage the transmitter, but a new calibration may be necessary.
Humidity Limits	0 to 100% RH
Damping Adjustment	User configurable from 0 to 128 seconds (via digital communication).

Performance Specifications

Reference Conditions	Span starting at zero, temperature of 25 °C (77 °F), atmospheric pressure, power supply of 24 Vdc, silicone oil fill fluid, isolating diaphragms in 316L SST and digital trim equal to lower and upper range values.

Accuracy	**For differential and gage transmitters, ranges 1, 2, 3 and 4:** **0.1 URL ≤ span ≤ URL:** ± 0.075% of span **0.025 URL ≤ span < 0.1 URL:** ± [0.0375 + 0.00375 URL/span]% of span **0.0085 URL ≤ span < 0.025 URL:** ± [0.0015 + 0.00465 URL/span]% of span **For differential and gage transmitters ranges 5 and 6, absolute transmitters ranges 2, 3, 4, 5 and 6, diaphragms in Tantalum or Monel or fill fluid in Fluorolube:** **0.1 URL ≤ span ≤ URL:** ± 0.1% of span **0.025 URL ≤ span < 0.1 URL:** ± [0.05 + 0.005 URL/span]% of span **0.0085 URL ≤ span < 0.025 URL:** ± [0.01 + 0.006 URL/span]% of span **For differential and gage transmitters, range 0, diaphragms in 316L SST and fill fluid in Silicone or Halocarbon:** **0.2 URL ≤ span ≤ URL:** ± 0.1% of span **0.05 URL ≤ span < 0.2 URL:** ± [0.025 + 0.015 URL/span]% of span **For absolute range 1:** 0.2% of span Linearity, hysteresis and repeatability effects are included.
Stability	**For ranges 2, 3, 4, 5 and 6:** ± 0.15% of URL for 5 years at 20 °C temperature change and up to 7 MPa (1000 psi) of static pressure **For ranges 0 and 1:** ± 0.2% of URL for 12 months at 20 °C temperature change and up to 100 kPa (1 bar) of static pressure **For Level transmitters:** ± 0.2% of URL for 12 months at 20 °C temperature change
Temperature Effect	**For ranges 2, 3, 4, 5 and 6:** **0.2 URL ≤ span ≤ URL:** ± [0.02% URL + 0.06% span] per 20 °C (36 °F) **0.0085 URL ≤ span < 0.2 URL:** ± [0.023% URL + 0.045% span] per 20 °C (36 °F) **For range 1:** **0.2 URL ≤ span ≤ URL:** ± [0.08% URL + 0.05% span] per 20 °C (36 °F) **0.025 URL ≤ span < 0.2 URL:** ± [0.06% URL + 0.15% span] per 20 °C (36 °F) **For range 0:** **0.2 URL ≤ span ≤ URL:** ± [0.15% URL + 0.05% span] per 20 °C (36 °F) **0.05 URL ≤ span < 0.2 URL:** ± [0.1% URL + 0.3% span] per 20 °C (36 °F) **For LD300L:** 6 mmH_2O per 20 °C for 4" and DN100 17 mmH_2O per 20 °C for 3" and DN80 Consult for other flange dimensions and fill fluid.
Static Pressure Effect	**Zero error:** **For ranges 2, 3, 4, 5 and 6:** ± 0.033% URL per 7MPa (1000 psi) **For range 1:** ± 0.05% URL per 1.7 MPa (250 psi) **For range 0:** ± 0.1% URL per 0.5 MPa (5 bar) **For Level transmitters:** ± 0.1% URL per 3.5 MPa (500 psi) The zero error is a systematic error that can be eliminated by calibrating at the operating static pressure. **Span error:** **For ranges 2,3,4, 5 and 6:** correctable to ± 0.2% of reading per 7MPa (1000 psi) **For range 1 and level transmitters:** correctable to ± 0.2% of reading per 3.5 MPa (500 psi) **For range 0:** correctable to ± 0.2% of reading per 0.5 MPa (5 bar)
Power Supply Effect	± 0.005% of calibrated span per volt
Mounting Position Effect	Zero shift of up to 250 Pa (1 inH2O) which can be calibrated out. No span effect.
Electro-Magnetic Interference Effect	Approved according to IEC 61000-6-2:1999, IEC 61000-6-4:1997 and IEC 61326:2002.

Physical Specifications

Electrical Connection	1/2 - 14 NPT M20 X 1.5 PG 13.5 DIN	3/4 – 14 NPT (with 316 SST adapter for 1/2 - 14 NPT) 3/4 – 14 BSP (with 316 SST adapter for 1/2 - 14 NPT) 1/2 – 14 BSP (with 316 SST adapter for 1/2 - 14 NPT) Note: Explosion Proof approvals do not apply to adapter, only to transmitter
Process Connection	1/4 - 18 NPT or 1/2 -14 NPT (with adapter) For L models see Ordering Code. See Ordering Code for more options.	
Wetted Parts	**Isolating Diaphragms:** 316L SST, Hastelloy C276, Monel 400 or Tantalum **Drain/Vent Valves and Plug:** 316 SST, Hastelloy C276 or Monel 400 **Flanges:** Plated Carbon Steel, 316 SST CF8M (ASTM - A351), Hastelloy C276 - CW-12MW, (ASTM - A494) or Monel 400 **Wetted O-Rings (For Flanges and Adapters):** Buna N, Viton™, PTFE or Ethylene-Propylene. The LD300 is available in NACE MR-01-75/ISO 15156 compliant materials.	
Nonwetted Parts	**Electronic Housing:** Injected aluminum with polyester painting, epoxy painting or 316 SST - CF8M (ASTM - A351) housing. Complies with NEMA 4X/6P, IP67, IP68*. **Not applicable for explosion proof.* **Blank Flange:** When flange adapter and Drain/Vent material is carbon steel, blank flange is in carbon steel, otherwise blank flange is in 316 SST CF8M (ASTM - A351) **Level Flange (LD300L):** 316 L **Fill Fluid:** Silicone, Fluorolube, Krytox, Halocarbon 4.2 or Fomblim oils **Cover O-Rings:** Buna N **Mounting Bracket:** Plated carbon steel or 316 SST Accessories (bolts, nuts, washers and U-clamps) in carbon steel or 316 SST **Flange Bolts and Nuts:** Plated carbon steel, Grade 8 or 316 SST For NACE applications: carbon steel ASTM A193 B7M or UNS S17400 SST **Identification Plate:** 316 SST	
Mounting	a) Flange mounted for Level models. b) Optional universal mounting bracket for surface or vertical/horizontal 2"-pipe (DN 50). c) Manifold Valve integrated to the transmitter. d) Directly on piping for closely coupled transmitter/orifice flange combinations.	
Approximate Weights	3.15 kg (7 lb): all models, except L models. 5.85 to 9.0 kg (13 lb to 20 lb): L models depending on the flanges, extension and materials.	
Control Functions Characteristics (Optional)	**HART®:** PID and TOT **FOUNDATION fieldbus™ Function Blocks:** RES, TRD, DSP, DIAG, AI, PID, APID, ARTH, INTG, ISEL, CHAR, AALM, TIME, LLAG, OSLD, CT and DENS **PROFIBUS PA Function Blocks:** PHY, TRD, DSP, AI and TOT.	

High Performance option (code L1) is available under the following conditions only:

Application	Differential Gage								
Range	D2: D3: D4: M2: M3: M4:	-50 -250 -2500 -50 -100 -100	to to to to to to	50 250 2500 50 250 2500	kPa kPa kPa kPa kPa kPa	-200 -36 -360 -200 -14.5 -14.5	to to to to to to	200 36 360 200 36 360	inH_2O psi psi inH_2O psi psi
Diaphragm Material	316L SST Hastelloy C276								
Fill fluid	Silicone								

Performance Specifications

Reference Conditions	Span starting at zero, temperature of 25 °C (77 °F), atmospheric pressure, power supply of 24 Vdc, silicone oil fill fluid, isolating diaphragms in 316L SST and digital trim equal to lower and upper range values.
Accuracy	**Range 2:** **0.2 URL ≤ span ≤ URL:** ± 0.04% of span **0.05 URL ≤ span < 0.2 URL:** ± [0.021667 + 0.003667 URL/span]% of span **0.0085 URL ≤ span < 0.05 URL:** ± [0.0021 + 0.004645 URL/span]% of span **Ranges 3 and 4:** **0.1 URL ≤ span ≤ URL:** ± 0.05% of span **0.05 URL ≤ span < 0.1 URL:** ± [0.005 + 0.0045 URL/span]% of span **0.0085 URL ≤ span < 0.05 URL:** ± [0.0021 + 0.004645 URL/span]% of span
Stability	**For range 2:** ± 0.05% of URL for 6 months **For range 3:** ± 0.075% of URL for 12 months **For range 4:** ± 0.1% of URL for 24 months ± 0.2% of URL for 12 years, at 20 °C temperature change and up to 7 MPa (1000 psi) {70 bar} of static pressure, environment free of hydrogen migration.
Temperature Effect	**From -10 °C to 50 °C, protected from direct sun radiation:** **0.2 URL ≤ span ≤ URL:** ± [0.018% URL + 0.012% span] per 20 °C (36 °F) **0.0085 URL ≤ span < 0.2 URL:** ± [0.02% URL + 0.002% span] per 20 °C (36 °F)
Static Pressure Effect	**Zero error:** ± 0.025% URL per 7MPa (1000 psi) The zero error is a systematic error that can be eliminated by calibrating at the operating static pressure. **Span error:** Correctable to ± 0.2% of reading per 7MPa (1000 psi)

Ordering Code

MODEL	DIFFERENTIAL, FLOW, GAGE, ABSOLUTE AND HIGH STATIC PRESSURE TRANSMITTERS
LD301	HART®
LD302	FOUNDATION fieldbus™
LD303	PROFIBUS PA

COD.	Type	Range Limits Min	Range Limits Max	Min. Span	Unit	Range Limits Min	Range Limits Max	Min. Span	Unit
D0	Differential and Flow	-1	1	0.05	kPa	-4	4	0.2	inH_2O
D1	Differential and Flow	-5	5	0.13	kPa	-20	20	0.5	inH_2O
D2	Differential and Flow	-50	50	0.42	kPa	-200	200	1.67	inH_2O
D3	Differential and Flow	-250	250	2.08	kPa	-36	36	0.3	psi
D4	Differential and Flow	-2500	2500	20.83	kPa	-360	360	3	psi
M0	Gage	-1	1	0.05	kPa	-4	4	0.2	inH_2O
M1	Gage	-5	5	0.13	kPa	-20	20	0.5	inH_2O
M2	Gage	-50	50	0.42	kPa	-200	200	1.67	inH_2O
M3	Gage	-100	250	2.08	kPa	- 14.50	36	0.3	psi
M4	Gage	-100	2500	20.83	kPa	- 14.50	360	3	psi
M5	Gage	-0.1	25	0.21	MPa	- 14.50	3600	30	psi
M6	Gage	-0.1	40	0.33	MPa	- 14.50	5800	48.3	psi
A1	Absolute	0	5	2.00	kPa	0	37	14.8	mmHga
A2	Absolute	0	50	2.50	kPa	0	7.2	0.36	psia
A3	Absolute	0	250	5.00	kPa	0	36	0.3	psia
A4	Absolute	0	2500	20.83	kPa	0	360	3	psia
A5	Absolute	0	25	0.21	MPa	0	3600	30	psia
A6	Absolute	0	40	0.33	MPa	0	5800	48.3	psia
H2	Differential - High Static Pressure	-50	50	0.42	kPa	- 200	200	1.67	inH_2O
H3	Differential - High Static Pressure	-250	250	2.08	kPa	- 36	36	0.3	psi
H4	Differential - High Static Pressure	-2500	2500	20.83	kPa	- 360	360	3	psi
H5	Differential - High Static Pressure	-25	25	0.21	MPa	- 3600	3600	30	psi

Note: The range can be extended up to 0.75 LRL and 1.2 URL with small degradation of accuracy.

COD. — Diaphragm Material and Fill Fluid

1	316L SST	Silicone Oil **(9)**	8	Tantalum	Fluorolube Oil **(2) (3)**	K	Monel 400	Krytox Oil **(1) (3)**
2	316L SST	Fluorolube Oil **(2)**	9	316L SST	Fomblim Oil	M	Monel 400 Gold Plated	Silicone Oil **(1) (3) (9)**
3	Hastelloy C276	Silicone Oil **(1) (9)**	A	Monel 400	Fomblim Oil **(1) (3)**	P	Monel 400 Gold Plated	Krytox Oil **(1) (3)**
4	Hastelloy C276	Fluorolube Oil **(1) (2)**	D	316 L SST	Krytox Oil **(3)**	Q	316 L SST	Halocarbon 4.2 Oil **(2) (3)**
5	Monel 400	Silicone Oil **(1) (3) (9)**	E	Hastelloy C276	Krytox Oil **(1) (3)**	R	Hastelloy C276	Halocarbon 4.2 Oil **(2) (3)**
7	Tantalum	Silicone Oil **(3) (9)**	G	Tantalum	Krytox Oil **(3)**	S	Tantalum	Halocarbon 4.2 Oil **(2) (3)**

COD. — Flange(s), Adapter(s) and Drain/Vent Valves Material

C	Plated CS (Drain/Vent In Stainless Steel)	M	Monel 400 **(1)**
H	Hastelloy C276 (CW-12MW, ASTM - A494) **(1)**	N	316 SST - CF8M (ASTM A351) (Drain/Vent In Hastelloy C276) **(1)**
I	316 SST - CF8M (ASTM A351)	P	316 SST - CF8M (ASTM A351) Flange with PVDF (Kynar) Insert **(4) (5) (7) (11)**

COD. — Wetted 0-Rings Materials

0	Without O'Rings	K	Kalrez **(12)**
B	Buna N	T	Teflon
E	Ethylene - Propylene **(12)**	V	Viton

Note: O'Rings are not available on the sides with Remote Seals.

COD. — Drain/Vent Position

0	Without Drain/Vent	D	Bottom
A	Drain/Vent (Opposite to Process Connection)	U	Top

Note: For better drain/vent operation, vent valves are strongly recommended. Drain/vent valve not available on the sides with remote seals.

COD. — Local Indicator

0	Without Indicator	1	With Digital Indicator

COD. — Process Connection

0	1/4 - 18 NPT (Without Adapter)	B	High Side: 1/2 – 14 NPT and Low Side: Remote Seal (With Plug) **(10) (12)**
1	1/2 - 14 NPT (With Adapter) **(6)**	D	High Side: Remote Seal (With Plug) and Low Side - 1/2 - 14 NPT **(10) (12)**
3	Remote Seal (With Plug) **(3) (8)**	F	High Side: 1/2 – 14 NPT and Low Side: Remote Seal (Low Volume Flange) **(10) (12)**
5	1/2 - 14 NPT Axial with PVDF Insert **(4) (5) (7)**	H	High Side: Remote Seal (Low Volume Flange) and Low Side: 1/2 - 14 NPT **(10) (12)**
9	Remote Seal (Low Volume Flange) **(3) (4) (8)**	Q	8 mm hole without thread (According to DIN19213) **(13)**
T	1/2 – 14 BSP (With Adapter) **(6)**	Z	User's specification
V	Manifold Valve integrated to the transmitter		

COD. — Electrical Connection

0	1/2 - 14 NPT	A	M20 X 1.5
1	3/4 – 14 NPT (with 316 SST adapter for 1/2 - 14 NPT) **(6)**	B	PG 13.5 DIN
2	3/4 – 14 BSP (with 316 SST adapter for 1/2 - 14 NPT) **(6)**	Z	User's specification
3	1/2 – 14 BSP (With 316 SST adapter for 1/2 - 14 NPT) **(6)**		

COD. — Set this code as "1" for LD301 and exclude for the others

COD. — Mounting Bracket for 2" Pipe or Surface Mounting

0	Without bracket	6	L type, 316 SST bracket and accessories
1	Carbon steel bracket and accessories	7	Carbon steel bracket. Accessories: 316 SST
2	316 SST bracket and accessories	9	L type, carbon steel bracket. Accessories: 316 SST
5	L type, carbon steel bracket and accessories	Z	User's specification

COD. — Continues next page**

LD301	-	D2	1	I	-	B	U	1	0	-	0	1	2	/	**
LD302	-	D2	1	I	-	B	U	1	0	-	0		2	/	**
LD303	-	D2	1	I	-	B	U	1	0	-	0		2	/	**

TYPICAL MODEL NUMBER (CONTINUES NEXT PAGE)

Notes:

(1) Meets NACE MR-01-75/ISO 15156 recommendations
(2) Not available for absolute models nor for vacuum applications
(3) Not available for range 0 and 1
(4) Not recommended for vacuum service
(5) Maximum pressure 24 bar
(6) Explosion Proof approvals do not apply to adapter, only to transmitter
(7) Drain/Vent not applicable
(8) For remote seal only 316 SST - CF8M (ASTM A351) flange is available (thread M12)
(9) Silicone Oil is not recommended for oxygen (O_2) or Chlorine service
(10) Only available for differential pressure transmitters
(11) O-ring should be Viton or Kalrez
(12) Not available for range 0
(13) Only available for differential pressure transmitters, range 4, 7/16" UNF or M10 x 1.5 thread for fixing accessories

MODEL	DIFFERENTIAL, FLOW, GAGE, ABSOLUTE AND HIGH STATIC PRESSURE TRANSMITTERS (CONT.)

COD. — Flanges Bolts and Nuts Material

A0	Plated Carbon Steel (Default)	A3	UNS S17400 SST **(1)**
A1	316 SST	A5	Hastelloy C276
A2	Carbon Steel (ASTM A193 B7M) **(1)**		

COD. — Flange Thread for fixing acessories (adapters, manifolds, mounting brackets, etc)

D0	7/16" UNF (Default)	D2	M12 X 1.75
D1	M10 X 1.5		

COD. — Output Signal (Only available for LD301)

G0	4 - 20 mA (Default)
G1	0 - 20 mA (4-wire) **(2)**

COD. — Housing Material

H0	Aluminum (Default)
H1	316 SST - CF8M (ASTM - A351)

COD. — Tag Plate

J0	With tag, when specified (Default)
J1	Blank
J2	According to user's notes

COD. — PID Configuration - (Only available for LD301)

M0	With PID (Default)
M1	Without PID

COD. — LCD1 Indication (Only available for LD301)

Y0	LCD1: Percentage (Default)	Y3	LCD1: Temperature (Engineering Unit)
Y1	LCD1: Current - I (mA)	YU	LCD1: According to user notes **(4)**
Y2	LCD1: Pressure (Engineering Unit)		

COD. — LCD2 Indication (Only available for LD301)

Y0	LCD2: Percentage (Default)	Y6	LCD2: Temperature (Engineering Unit)
Y4	LCD2: Current - I (mA)	YU	LCD2: According to user notes **(4)**
Y5	LCD2: Pressure (Engineering Unit)		

COD. — Identification Plate

I1	FM: XP, IS, NI, DI, IP	I6	Without Certification
I2	NEMKO: EEx-d, EEx-ia, IP	I7	EXAM (DMT): Group I, M1 EEx-ia
I3	CSA: XP, IS, NI, DI, IP	I8	0 to 20 mA: LD301 **(2)**
I4	EXAM (DMT): EEx-ia, IP	IF	CEPEL: Ex-d, IP **(7)**
I5	CEPEL: EEx-d, Ex-ia, IP	IE	NEPSI: Ex-i **(6)**

COD. — Painting

P0	Gray Munsell N 6,5 Polyester	P8	Without Painting
P3	Black Polyester	P9	Safety Blue Epoxy - Electrostatic Painting
P4	White Epoxy	PC	Safety Blue Polyester - Electrostatic Painting
P5	Yellow Polyester		

LD301-D21I-BU10-012 /	A0	D0	G0	H0	J0	M0	Y0	Y0	I1	P0	*
LD302-D21I-BU10-02 /	A0	D0		H0	J0				I1	P0	*
LD303-D21I-BU10-02 /	A0	D0		H0	J0				I1	P0	*

← TYPICAL MODEL NUMBER

* Leave blank for no optional items

Burn-out (Only available for LD301)	BD - Down Scale (According to NAMUR NE43 specification) BU - Up Scale (According to NAMUR NE43 specification)
Special Applications	C1 - Degrease Cleaning (Oxygen or Chlorine Service) **(5)**
High Performance	L1- 0.04% accuracy **(3)**
Square Root Extraction (Only available for LD301D)	M3 - Configured with Square Root Extraction
Special Features	ZZ - User's specification

Notes:

(1) Meets NACE MR-01-75/ISO 15156 recommendations
(2) Without Explosion Proof or Intrinsic Safety approvals
(3) Only available for differential and gage pressure models
(4) Values limited to 4 1/2 digits; unit limited to 5 characters
(5) Degrease cleaning not available for carbon steel flanges
(6) Only available for LD302 and LD303 models
(7) Only available for LD301

MODEL	LEVEL TRANSMITTERS
LD301	HART®
LD302	FOUNDATION fieldbus™
LD303	PROFIBUS PA

COD.	Range Limits Min	Range Limits Max	Min. Span	Unit	Range Limits Min	Range Limits Max	Min. Span	Unit
L2	-50	50	1.25	kPa	-200	200	5	inH_2O
L3	-250	250	2.08	kPa	-36	36	0.3	psi
L4	-2500	2500	20.83	kPa	-360	360	3	psi

Note: The range can be extended up to 0.75 LRL and 1.2 URL with small degradation of accuracy. The upper range value must be limited to the flange rating.

Diaphragm Material and Fill Fluid (Low Side)

COD.			COD.			COD.			COD.		
1	316L SST	Silicone Oil **(2)**	7	Tantalum	Silicone Oil **(2)**	E	Hastelloy C276	Krytox Oil **(1)**	Q	316 L SST	Halocarbon 4.2 Oil
2	316L SST	Fluorolube Oil **(3)**	8	Tantalum	Fluorolube Oil **(3)**	G	Tantalum	Krytox Oil	R	Hastelloy C276	Halocarbon 4.2 Oil **(1)**
3	Hastelloy C276	Silicone Oil **(1) (2)**	9	316L SST	Fomblim Oil	K	Monel 400	Krytox Oil **(1)**	S	Tantalum	Halocarbon 4.2 Oil
4	Hastelloy C276	Fluorolube Oil **(1) (3)**	A	Monel 400	Fomblim Oil **(1)**	M	Monel 400 Gold Plated	Silicone Oil **(1) (2)**			
5	Monel 400	Silicone Oil **(1) (2)**	D	316 L SST	Krytox Oil	P	Monel 400 Gold Plated	Krytox Oil **(1)**			

Flange, Adapter and Drain/Vent Valves Material (Low Side)

COD.		COD.	
C	Plated CS (Drain/Vent in Stainless Steel)	M	Monel 400 **(1)**
H	Hastelloy C276 (CW-12MW, ASTM - A494) **(1)**	N	316 SST - CF8M (ASTM - A351) (Drain/Vent in Hastelloy C276) **(1)**
I	316 SST - CF8M (ASTM - A351)	P	316 SST - CF8M (ASTM - A351) Flange with PVDF (Kynar) insert **(3) (4) (5)**

Wetted O-Rings Material (Low Side)

COD.		COD.	
0	Without O'rings	K	Kalrez
B	Buna N	T	Teflon
E	Ethylene - Propylene	V	Viton

Note: O'rings are not available on the sides with remote seals.

Drain/Vent Position (Low Side)

COD.		COD.		
0	Without Drain/Vent	D	Bottom	**Note:** For better drain/vent operation, vent valves are strongly recommended.
A	Drain/Vent (Opposite to Process Connection)	U	Top	Drain/vent valve not available on the sides with remote seals.

Local Indicator

COD.		COD.	
0	Without Indicator	1	With Digital Indicator

Process Connection (Low Side)

COD.		COD.	
0	1/4 - 18 NPT (Without Adapter)	5	1/2 - 14 NPT Axial with PVDF Insert **(3) (4) (6)**
1	1/2 - 14 NPT (With Adapter) **(9)**	9	Remote Seal (Low Volume Flange) **(3) (7)**
3	Remote Seal (With Plug) **(7)**	T	1/2-14 BSP (With Adapter) **(9)**

Electrical Connection

COD.		COD.	
0	1/2 - 14 NPT	A	M20 X 1.5
1	3/4 - 14 NPT (with 316 SST adapter for 1/2 - 14 NPT) **(9)**	B	PG 13.5 Din
2	3/4 - 14 BSP (with 316 SST adapter for 1/2 - 14 NPT) **(9)**	Z	User's specification
3	1/2 - 14 BSP (with 316 SST adapter for 1/2 - 14 NPT) **(9)**		

Set this code as "1" for LD301 and exclude for the others

Process Connection (Level Tap)

COD.		COD.		COD.	
1	3" 150 # (ANSI B16.5)	A	2" 300 # (ANSI B16.5)	K	JIS 20K 50A
2	3" 300 # (ANSI B16.5)	B	2" 600 # (ANSI B16.5)	L	JIS 20K 80A
3	4" 150 # (ANSI B16.5)	C	3" 600 # (ANSI B16.5)	M	JIS 20K 100A
4	4" 300 # (ANSI B16.5)	D	4" 600 # (ANSI B16.5)	N	3" 600 # (ANSI B16.5 RTJ)
6	DN 80 PN 10/40	E	DN 50 PN 10/40	Z	User's specification
7	DN 100 PN 10/16	F	JIS 10K 50A		
8	DN 100 PN 25/40	G	JIS 10K 80A		
9	2" 150 # (ANSI B16.5)	H	JIS 10K 100A		

Flange Material (Level Tap)

COD.	
2	316 SST
Z	User's specification

Extension Length

COD.		COD.		
0	0 mm (0")	3	150 mm (6")	**Note:** Extension Material: 316L SST
1	50 mm (2")	4	200 mm (8")	
2	100 mm (4")	Z	User's specification	

Diaphragm Material (Level Tap)

COD.		COD.	
1	316 L SST	5	Titanium **(10)**
2	Hastelloy C276	6	316 L SST with Teflon Lining (For 2" and 3")
3	Monel 400	7	316 L SST Gold Plated
4	Tantalum **(10)**	B	Tantalum with Teflon Lining

Fill Fluid (Level Tap)

COD.		COD.	
1	DC-200/20 Silicone Oil	N	Neobee M20 Propylene Glycol Oil
2	MO-10 Fluorolube Oil **(8)**	T	Sytherm 800 Oil
3	DC704 Silicone Oil	Z	User's specification
4	Krytox Oil		

COD. Continues next page**

LD301	-	L2	1	I	-	B	U	1	0	-	0	1	-	1	2	2	1	1	/	**
LD302	-	L2	1	I	-	B	U	1	0	-	0	-		1	-	2	1	1	/	**
LD303	-	L2	1	I	-	B	U	1	0	-	0	-		1	-	2	1	1	/	**

TYPICAL MODEL NUMBER (CONTINUES NEXT PAGE)

Notes:

(1) Meets NACE MR-01-75/ISO 15156 recommendations
(2) Silicone Oil is not recommended for Oxygen (O_2) or Chlorine service
(3) Not applicable for vacuum service
(4) Drain/Vent not applicable
(5) O-ring should be Viton or Kalrez
(6) Maximum pressure 24 bar
(7) For Remote Seal only 316 SST CF8M (ASTM A351) flange is available (thread M12)
(8) Fluorolube fill fluid is not available for Monel diaphragm
(9) Explosion Proof approvals do not apply to adapter, only to transmitter
(10) Not recommended with extension

MODEL	LEVEL TRANSMITTERS (CONT.)

COD. Flanges Bolts and Nuts Material

A0	Plated Carbon Steel (Default)	A3	UNS S17400 SST **(1)**
A1	316 SST	A5	Hastelloy C276
A2	Carbon Steel (ASTM A193 B7M) **(1)**		

COD. Flange Thread for fixing accessories (adapters, manifolds, etc)

D0	7/16" UNF (Default)	D2	M12 X 1.75
D1	M10 X 1.5		

COD. Flange Facing Finish

F0	Raised Face - RF (Default)	F3	Tongue Face
F1	Flat Face - FF	F4	Grooved Face
F2	Ring Joint Face (RTJ) - **Only available for ANSI B standard flanges**		

COD. Output Signal (Only available for LD301)

G0	4 - 20 mA (Default)
G1	0 - 20 mA (4-wire) **(2)**

COD. Housing Material

H0	Aluminum (Default)
H1	316 SST - CF8M (ASTM - A351)

COD. Tag Plate

J0	With tag, when specified (Default)
J1	Blank
J2	According to user's notes

COD. PID Configuration - (Only available for LD301)

M0	With PID (Default)
M1	Without PID

COD. LCD1 Indication (Only available for LD301)

Y0	LCD1: Percentage (Default)	Y3	LCD1: Temperature (Engineering Unit)
Y1	LCD1: Current - I (mA)	YU	LCD1: According to user notes **(3)**
Y2	LCD1: Pressure (Engineering Unit)		

COD. LCD2 Indication (Only available for LD301)

Y0	LCD2: Percentage (Default)	Y6	LCD2: Temperature (Engineering Unit)
Y4	LCD2: Current - I (mA)	YU	LCD2: According to user notes **(3)**
Y5	LCD2: Pressure (Engineering Unit)		

COD. Identification Plate

I1	FM: XP, IS, NI, DI, IP	I6	Without Certification
I2	NEMKO: EEx-d, EEx-ia, IP	I7	EXAM (DMT): Group I, M1 EEx-ia
I3	CSA: XP, IS, NI, DI, IP	I8	0 to 20 mA: LD301 **(2)**
I4	EXAM (DMT): EEx-ia, IP	IF	CEPEL: Ex-d, IP **(6)**
I5	CEPEL: EEx-d, Ex-ia, IP	IE	NEPSI: Ex-i **(5)**

COD. Painting

P0	Gray Munsell N 6,5 Polyester	P8	Without Painting
P3	Black Polyester	P9	Safety Blue Epoxy - Electrostatic Painting
P4	White Epoxy	PC	Safety Blue Polyester - Electrostatic Painting
P5	Yellow Polyester		

LD301-L2I-BU10-01-12211	/	A0	D0	F0	G0	H0	J0	M0	Y0	Y0	I1	P0	*
LD302-L2I-BU10-0-1211	/	A0	D0	F0		H0					I1	P0	*
LD303-L2I-BU10-0-1211	/	A0	D0	F0		H0					I1	P0	*

TYPICAL MODEL NUMBER

*Optional Items

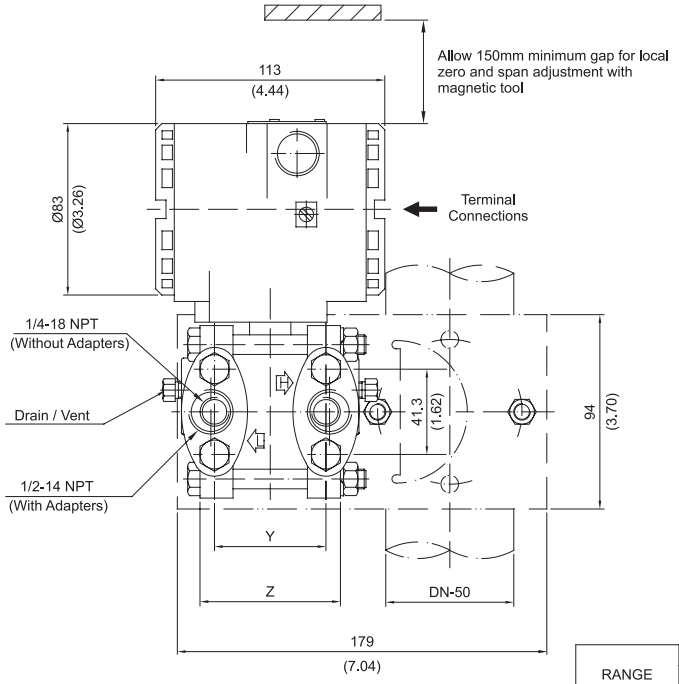
* Leave blank for no optional items

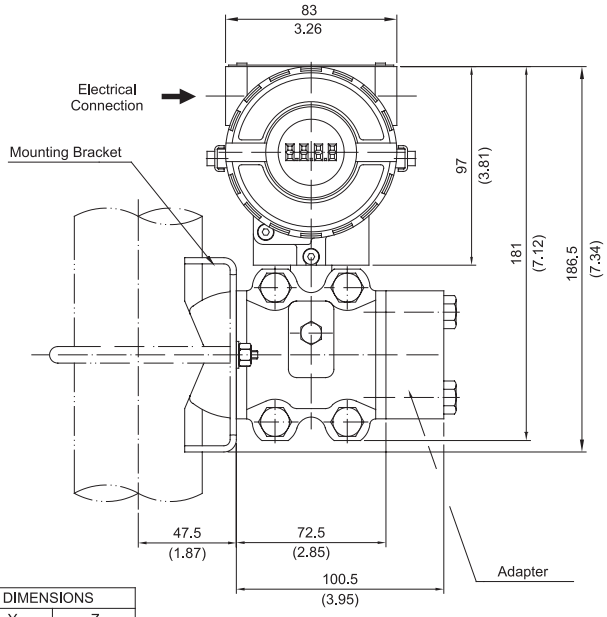
Burn-out (Only available for LD301)	BD - Down Scale (According to NAMUR NE43 specification) BU - Up Scale (According to NAMUR NE43 specification)
Special Applications	C1 - Degrease Cleaning (Oxygen or Chlorine Service) **(4)** C2 – For vacuum application
Special Features	ZZ - User's specification

Notes:

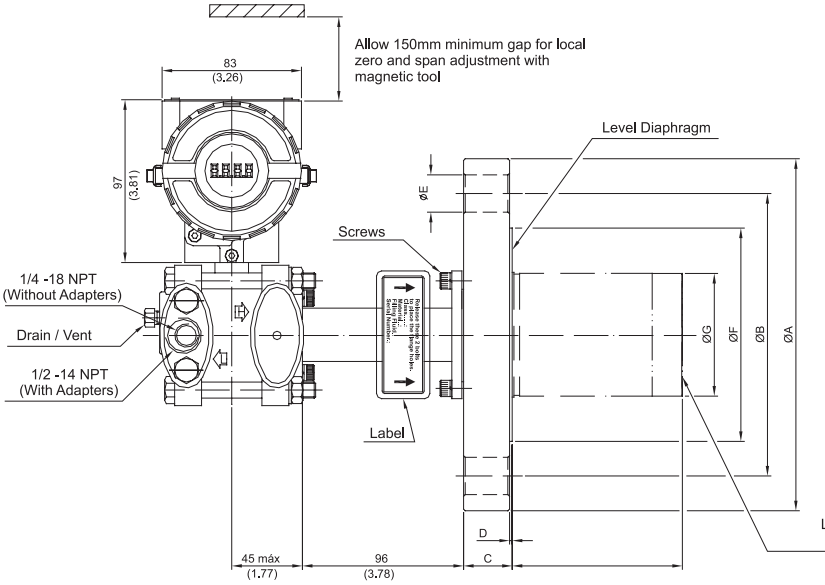
(1) Meets NACE MR-01-75/ISO 15156 recommendations
(2) Without Explosion Proof or Intrinsic Safety approvals
(3) Values limited to 4 1/2 digits; unit limited to 5 characters
(4) Degrease cleaning not available for carbon steel flanges
(5) Only available for LD302 and LD303 models
(6) Only available for LD301

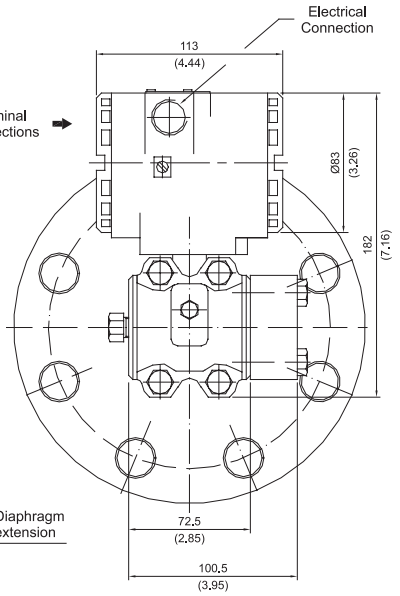
Dimensions are mm (in)





RANGE	DIMENSIONS			
	Y		Z	
	mm	in	mm	in
0, 1, 2, 3	54.0	2.13	68.6	2.70
4	56.0	2.20	70.6	2.78
5	58.3	2.30	72.9	2.87
6	58.7	2.31	73.3	2.89

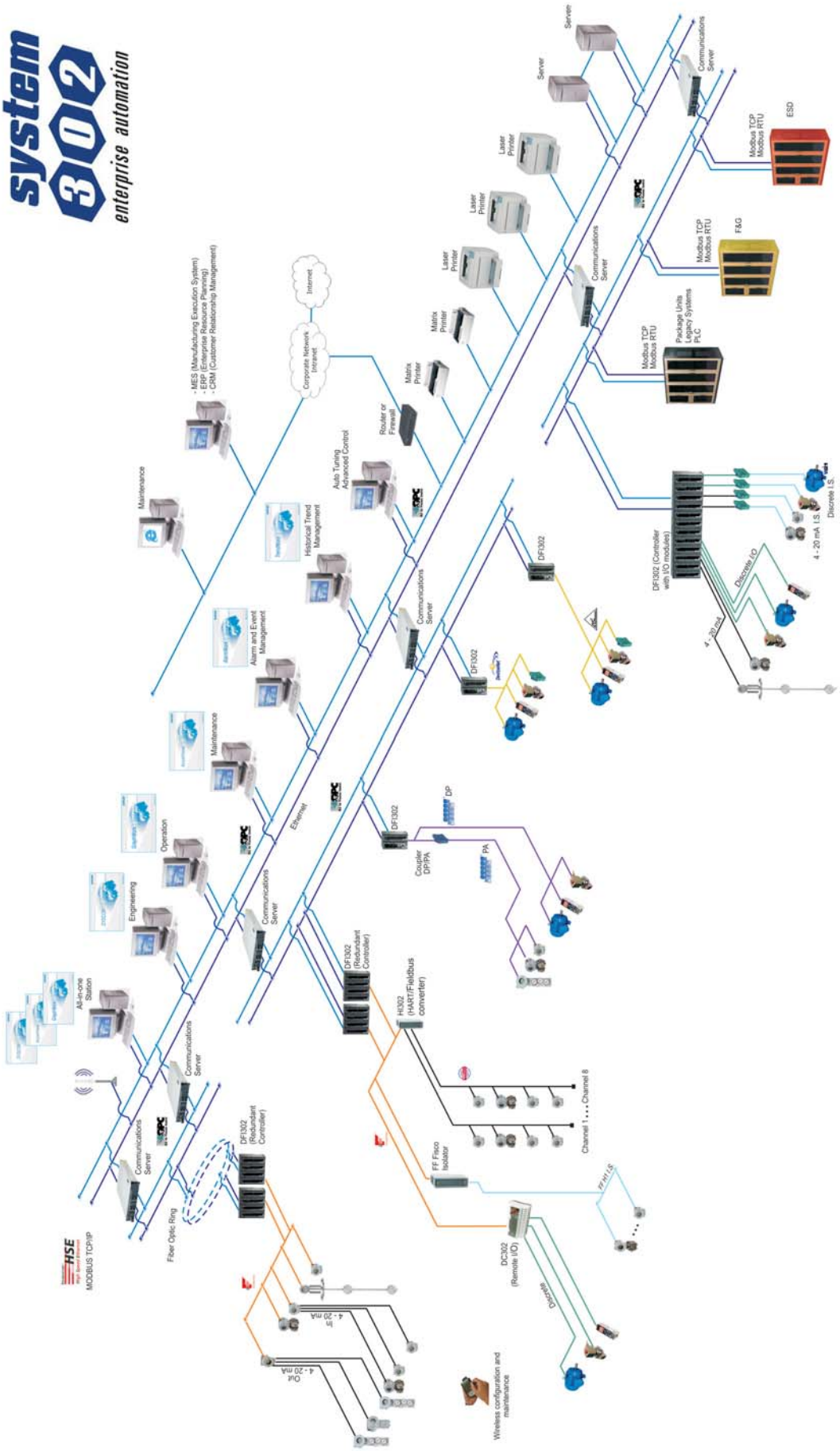




ANSI-B 16.5 DIMENSIONS									
DN	CLASS	A	B	C	D	E	F	G	# HOLES
2"	150	152.4	120.7	22	1.6	19.1	91.9	48	4
	300	165.1	127	22.8	1.6	19.1	91.9	48	8
	600	165.1	127	32.3	6.4	19.1	91.9	48	8
3"	150	190.5	152.4	24.4	1.6	19.1	127	73	4
	300	209.5	168.1	29	1.6	22.2	127	73	8
	600	209.5	168.1	38.7	6.4	22.2	127	73	8
4"	150	228.6	190.5	24.4	1.6	19.1	158	96	8
	300	254	200	32.2	1.6	22.3	158	96	8
	600	273	215,9	45	6,4	25,4	158	96	8
DIN2501/2526 FORMA D DIMENSIONS									
DN	PN	A	B	C	D	E	F	G	# HOLES
50	10/40	165	125	20	3	18	102	48	4
80	10/40	200	160	24	3	18	138	73	8
100	10/16	220	180	20	3	18	158	96	8
	25/40	235	190	24	3	22	162	96	8

smar
First in Fieldbus

system 302
enterprise automation



Pressure

4 to 20 mA LD290

LD291

LD292

LD293

Pressure Transmitter

Position

FY301

FY302

FY303

Valve Positioner

TP301

TP302

TP303

Position Transmitter

Density/Concentration

DT301

DT302

DT303

Intelligent Density/ Concentration Transmitter

Temperature

TT301

TT302

TT303

Temperature Transmitter

TT411

TT411 Panel Mounting Temperature Transmitter

TT421

TT421 Head Mounting Temperature Transmitter

Configurators

HART® Configurator Interface CONF401

HART® Configurator Interface DDCON

HART® Configurator for Palm HPC301

Controllers

DeviceNet

Programmable Logical Controller LC700

Digital Controller CD600Plus

Discrete

Foundation Fieldbus™ Relay FR302

Foundation Fieldbus™ Remote I/O DC302

Accessories

RP302 DF48
H1 Fieldbus Repeaters

SB312 DF47
Isolated Intrinsic Safety Barrier

4-20 mA

3 Ways Junction Box
JM1

4-20 mA

4 Ways Junction Box
JM400

Converters

FP302
FP303

Fieldbus to Pneumatic Signal Converter

IF302
IF303

Current to Fieldbus Converter

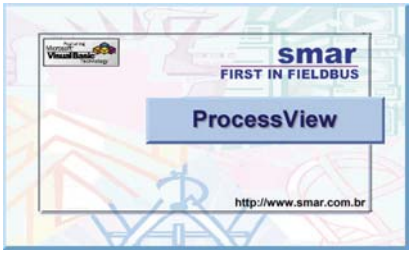
FI302
FI303

Fieldbus to Current Converter

HART® / Fieldbus Interface HI302

HART® /Current Converter HCC301

Systems



Process Visualization Interface
Process View

Control System
System302

On Line Plant Asset Management Tool
Asset View

Foundation Fieldbus™ Universal Interface DFI302

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