



LD300 series

301-302-303

PRESSURE TRANSMITTERS

FOR PRESSURE, LEVEL AND FLOW APPLICATIONS

- $\pm 0.04\%$ High Accuracy
- $\pm 0.2\%$ 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

- $\pm 0.04\%$ high performance option;
- $\pm 0.2\%$ of URL stability guarantee for 12 years;
- 120:1 rangeability;
- Span as small as 50 Pa (0.2 inH₂O) 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, $\sqrt{x}$, $\sqrt{x}^{-3}$ and $\sqrt{x}^{-5}$;
- 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

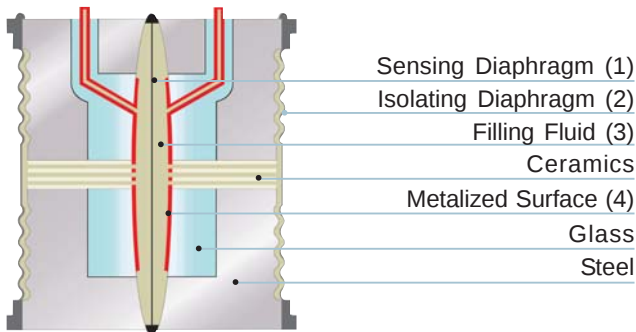
- Update output current in 100 ms with 0.75 μ A resolution;
- Improved performance due to dedicated math co-processor;
- Multi-drop operation mode;
- PID control function;
- Supports DTM and EDDL;
- Bi-directional flow measurement;
- With FMEDA analysis and MTBF of 244 years.

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:

- $\pm 0.04\%$ accuracy for high performance option;
- $\pm 0.2\%$ of URL stability guarantee for 12 Years;
- 120:1 rangeability;
- Compact and lightweight ;
- Multiple Protocol Options.

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

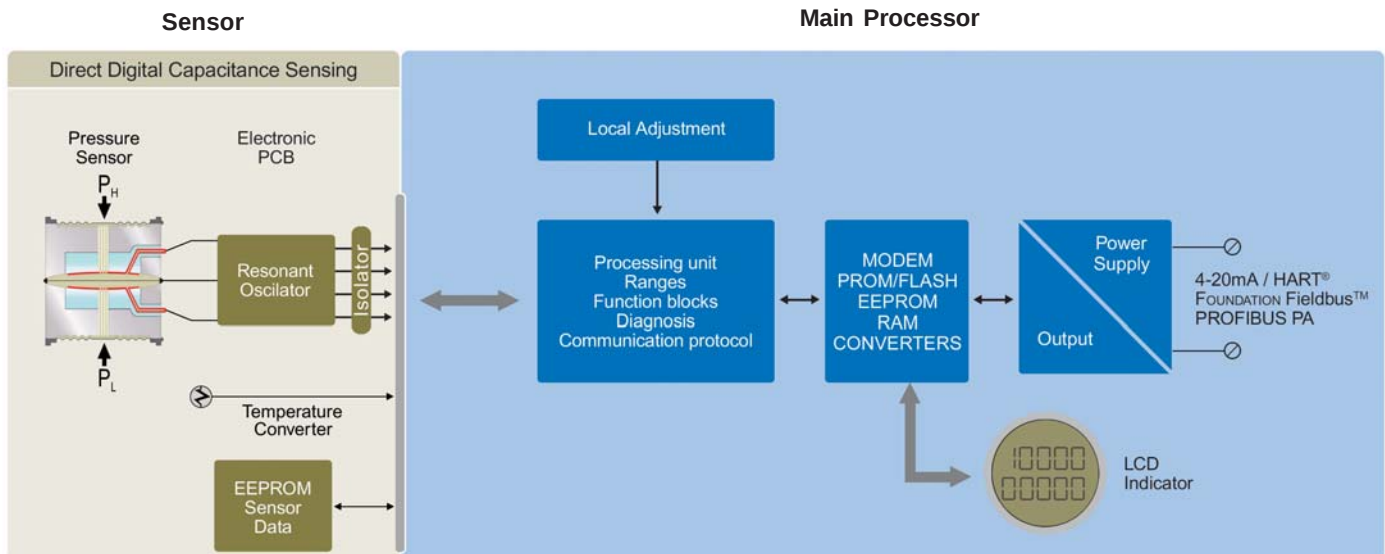
The sensor is shown in the picture above. The sensing diaphragm (1) is at the cell center. The diaphragm deflects as a result of the difference between the pressures applied to the left and right sides of the sensor. Pressure is directly applied to the isolating diaphragms (2), which provide resistance 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 resonance circuit reads capacitance variation between the moving and fixed plates. The CPU conditions the measurement and communicates according to 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.



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 computes 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 to a sealed chamber with vacuum.

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 for direct installation on vessels. Extended diaphragms are also available. For closed tank low side can compensate for ullage pressure.

**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. Pressure and leakage tests carried out in 100% of the valves, also for models mounted on the transmitter. 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 manufacturers' 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.



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.



Universal HART® Configuration Software



HPC401

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 higher availability.

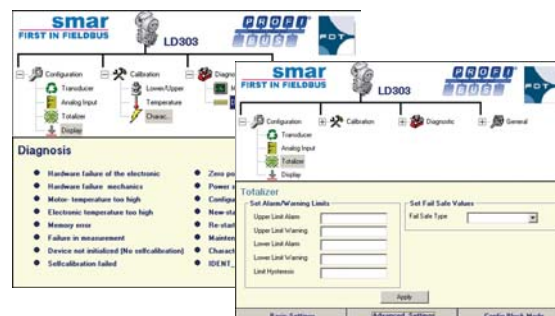


PROFIBUS PA - LD303

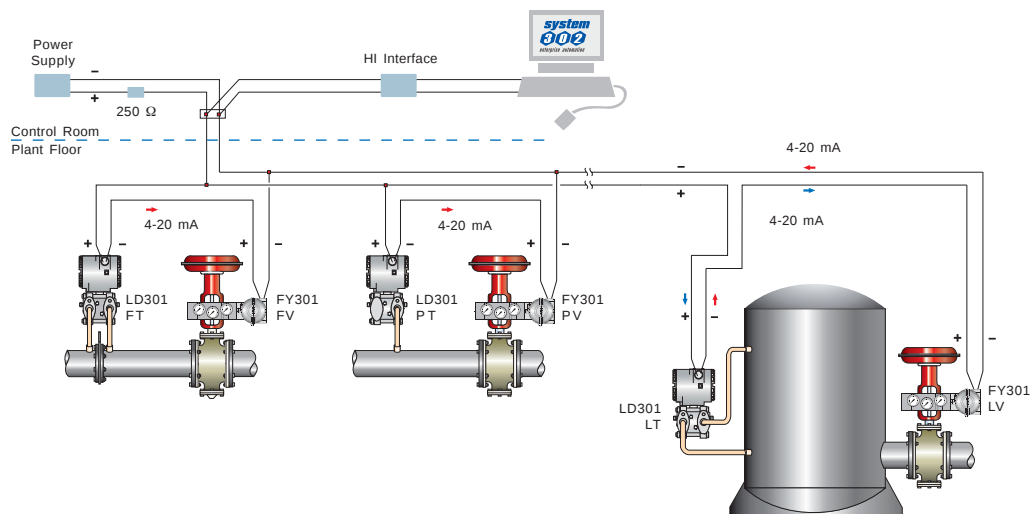
LD303 (PROFIBUS PA protocol) can be configured using Simatic PDM and by the FDT (Field Device Tool) and DTM (Device Type Manager) concept tools, such as FieldCare™ and PACTware™. It can also be integrated by any PROFIBUS System using the GSD file.

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

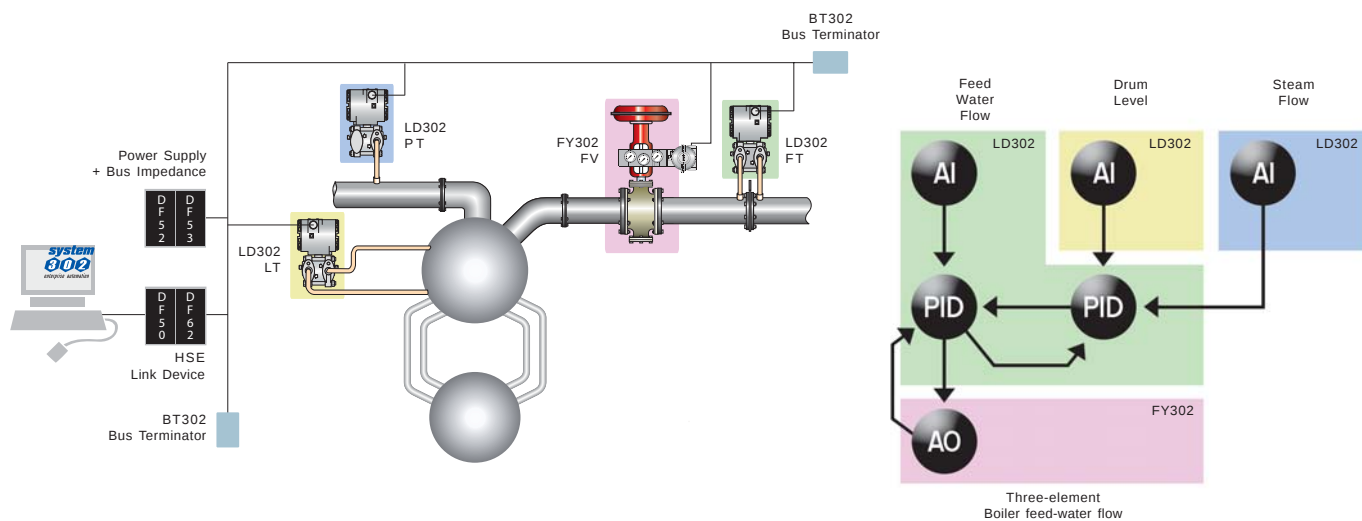
Conforms to profile 3.0.



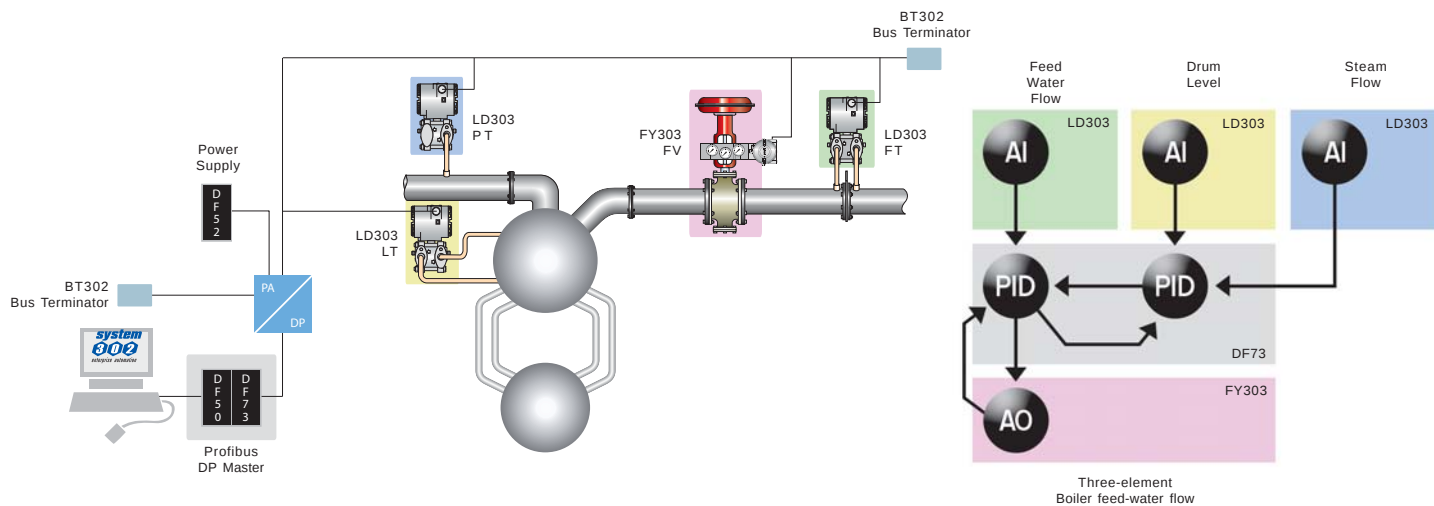
HART® - LD301



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 superimposed 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 to 32 Vdc. Quiescent current consumption: 12 mA.
Indicator	4½-digit numerical and 5-character alphanumeric 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 or local adjustment.
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) -40 to 85 °C (-40 to 185 °F) (Halocarbon Oil) 0 to 85 °C (32 to 185 °F) (Fluorolube Oil) -20 to 85 °C (-4 to 185 °F) (Krytox Oil and Fomblim Oil) -40 to 100 °C (-40 to 212 °F) (Viton or Buna N 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 <i>* except the LD300A model</i> Flange Test Pressure: 60 MPa (8570 psi) For ANSI/DIN Level flanges (LD300L models): 150 #: 6 psia to 235 psi (-0.6 to 16 bar) at 199.4 °F (93 °C) 300 #: 6 psia to 620 psi (-0.6 to 43 bar) at 199.4 °F (93 °C) 600 #: 6 psia to 1240 psi (-0.6 to 85 bar) at 199.4 °F (93 °C) PN10/16: -60 kPa to 1.02 MPa at 212 °F (100 °C) PN25/40: -60 kPa to 2.55 MPa at 212 °F (100 °C) 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.
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Accuracy	For differential and gage transmitters, ranges 1, 2, 3 and 4: 0.1 URL $\leq$ span $\leq$ URL: $\pm 0.075\%$ of span 0.025 URL $\leq$ span $<$ 0.1 URL: $\pm [0.0375 + 0.00375 \text{ URL/span}]\%$ of span 0.0085 URL $\leq$ span $<$ 0.025 URL: $\pm [0.0015 + 0.00465 \text{ URL/span}]\%$ 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 $\leq$ span $\leq$ URL: $\pm 0.1\%$ of span 0.025 URL $\leq$ span $<$ 0.1 URL: $\pm [0.05 + 0.005 \text{ URL/span}]\%$ of span 0.0085 URL $\leq$ span $<$ 0.025 URL: $\pm [0.01 + 0.006 \text{ URL/span}]\%$ of span For differential and gage transmitters, range 0, diaphragms in 316L SST and fill fluid in Silicone or Halocarbon: 0.2 URL $\leq$ span $\leq$ URL: $\pm 0.1\%$ of span 0.05 URL $\leq$ span $<$ 0.2 URL: $\pm [0.025 + 0.015 \text{ URL/span}]\%$ 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: $\pm 0.15\%$ 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: $\pm 0.2\%$ of URL for 12 months at 20 °C temperature change and up to 100 kPa (1 bar) of static pressure For Level transmitters: $\pm 0.2\%$ of URL for 12 months at 20 °C temperature change
Temperature Effect	For ranges 2, 3, 4, 5 and 6: 0.2 URL $\leq$ span $\leq$ URL: $\pm [0.02\% \text{ URL} + 0.06\% \text{ span}]$ per 20 °C (36 °F) 0.0085 URL $\leq$ span $<$ 0.2 URL: $\pm [0.023\% \text{ URL} + 0.045\% \text{ span}]$ per 20 °C (36 °F) For range 1: 0.2 URL $\leq$ span $\leq$ URL: $\pm [0.08\% \text{ URL} + 0.05\% \text{ span}]$ per 20 °C (36 °F) 0.025 URL $\leq$ span $<$ 0.2 URL: $\pm [0.06\% \text{ URL} + 0.15\% \text{ span}]$ per 20 °C (36 °F) For range 0: 0.2 URL $\leq$ span $\leq$ URL: $\pm [0.15\% \text{ URL} + 0.05\% \text{ span}]$ per 20 °C (36 °F) 0.05 URL $\leq$ span $<$ 0.2 URL: $\pm [0.1\% \text{ URL} + 0.3\% \text{ span}]$ per 20 °C (36 °F) For LD300L: 6 mmH₂O per 20 °C for 4" and DN100 17 mmH₂O 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: $\pm 0.033\%$ URL per 7 MPa (1000 psi) For range 1: $\pm 0.05\%$ URL per 1.7 MPa (250 psi) For range 0: $\pm 0.1\%$ URL per 0.5 MPa (5 bar) For Level transmitters: $\pm 0.1\%$ 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 $\pm 0.2\%$ of reading per 7 MPa (1000 psi) For range 1 and level transmitters: correctable to $\pm 0.2\%$ of reading per 3.5 MPa (500 psi) For range 0: correctable to $\pm 0.2\%$ of reading per 0.5 MPa (5 bar)
Power Supply Effect	$\pm 0.005\%$ of calibrated span per volt.
Mounting Position Effect	Zero shift of up to 250 Pa (1 inH ₂ O) 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*. <i>*Not applicable for explosion proof.</i> 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:	-50	to	50	kPa	-200 to 200 inH ₂ O
	D3:	-250	to	250	kPa	-36 to 36 psi
	D4:	-2500	to	2500	kPa	-360 to 360 psi
	M2:	-50	to	50	kPa	-200 to 200 inH ₂ O
	M3:	-100	to	250	kPa	-14.5 to 36 psi
	M4:	-100	to	2500	kPa	-14.5 to 360 psi
Diaphragm Material	316L SST Hastelloy C276					
Fill fluid	Silicone					

Performance Specifications (Code L1)

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 7 MPa (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 7 MPa (1000 psi).

Hastelloy is a trademark of the Cabot Corp.
 Monel is a trademark of International Nickel Co.
 Viton and Teflon are trademarks of E. I. DuPont de Nemours & Co.

Fluorolube is a trademark of Hooker Chemical Corp.
 Halocarbon is a trademark of Halocarbon.
 HART® is a trademark of HART® Communication Foundation.

Foundation is a trademark of Fieldbus Foundation.
 Profibus is a trademark of Profibus International.
 Smar Pressure Transmitters are protected by US patent number 6,433,791

MODEL	DIFFERENTIAL, FLOW, GAGE, ABSOLUTE AND HIGH STATIC PRESSURE TRANSMITTERS										
LD301	HART® & 4-20 mA										
LD302	FOUNDATION fieldbus™										
LD303	PROFIBUS PA										
	COD.	Type	Range Limits		Min. Span	Unit	Range Limits		Min. Span	Unit	
			Min	Max			Min	Max			
D0		Differential and Flow	-1	1	0.05	kPa	-4	4	0.2	inH ₂ O	Note: The range can be extended up to 0.75 LRL and 1.2 URL with small degradation of accuracy.
D1		Differential and Flow	-5	5	0.13	kPa	-20	20	0.5	inH ₂ O	
D2		Differential and Flow	-50	50	0.42	kPa	-200	200	1.67	inH ₂ O	
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 ₂ O	
M1		Gage	-5	5	0.13	kPa	-20	20	0.5	inH ₂ O	
M2		Gage	-50	50	0.42	kPa	-200	200	1.67	inH ₂ O	
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	0.73	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 ₂ O	
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	
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 (5) (7) (11)				
COD. Wetted O-Rings Materials											
0	Without O'Rings	E	Ethylene - Propylene (12)			T	Teflon	Note: O'Rings are not available on the sides with Remote Seals.			
B	Buna N	K	Kalrez (12)			V	Viton				
COD. Drain/Vent Position											
0	Without Drain/Vent	D	Bottom			Note: For better drain/vent operation, vent valves are strongly recommended. Drain/vent valve not available on the sides with remote seals.					
A	Drain/Vent (Opposite to Process Connection)	U	Top								
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 (5) (7) (14)					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 7/16 UNF.
 (9) Silicone Oil is not recommended for oxygen (O₂) 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) Available for differential pressure transmitters, range 4, 7/16 UNF or M10 x 1.5 thread and for high static pressure transmitters, range 4, 7/16 UNF thread.
 (14) Only available for flange with PVDF (Kynar) insert

MODEL	DIFFERENTIAL, FLOW, GAGE, ABSOLUTE AND HIGH STATIC PRESSURE TRANSMITTERS (CONT.)														
	COD. Flanges Bolts and Nuts Material														
	A0 A1 A2	Plated Carbon Steel (Default) 316 SST Carbon Steel (ASTM A193 B7M) (1)										A3 A5	UNS S17400 SST (1) Hastelloy C276		
	COD. Flange Thread for fixing accessories (adapters, manifolds, mounting brackets, etc)														
	D0 D1	7/16 UNF (Default) M10 X 1.5										D2	M12 X 1.75		
	COD. Output Signal (Only available for LD301)														
	G0 G1	4 - 20 mA (Default) 0 - 20 mA (4-wire) (2)													
	COD. Housing Material														
	H0 H1	Aluminum (Default) 316 SST - CF8M (ASTM - A351)													
	COD. Tag Plate														
	J0 J1 J2	With tag, when specified (Default) Blank According to user's notes													
	COD. PID Configuration - (Only available for LD301)														
	M0 M1	With PID (Default) Without PID													
	COD. LCD1 Indication (Only available for LD301)														
	Y0 Y1 Y2	LCD1: Percentage (Default) LCD1: Current - I (mA) LCD1: Pressure (Engineering Unit)										Y3 YU	LCD1: Temperature (Engineering Unit) LCD1: According to user notes (4)		
	COD. LCD2 Indication (Only available for LD301)														
	Y0 Y4 Y5	LCD2: Percentage (Default) LCD2: Current - I (mA) LCD2: Pressure (Engineering Unit)										Y6 YU	LCD2: Temperature (Engineering Unit) LCD2: According to user notes (4)		
	COD. Identification Plate														
	I1 I2 I3 I4	FM: XP, IS, NI, DI, IP NEMKO: EEx-d, EEx-ia, IP CSA: XP, IS, NI, DI, IP EXAM (DMT): EEx-ia, IP					I5 I6 I7 I8	CEPEL: EEx-d, Ex-ia, IP Without Certification EXAM (DMT): Group I, M1 EEx-ia 0 to 20 mA: LD301 (2)					IF IE IH	CEPEL: Ex-d, IP (7) NEPSI: Ex-ia (6) CEPEL + IP68	
	COD. Painting														
	P0 P3 P4 P5	Gray Munsell N 6,5 Polyester Black Polyester White Epoxy Yellow Polyester										P8 P9 PC	Without Painting Safety Blue Epoxy - Electrostatic Painting Safety Blue Polyester - Electrostatic Painting		
	LD301-D211-BU10-012 /	A0	D0	G0	H0	J0	M0	Y0	Y0	I1	P0	*	← TYPICAL MODEL NUMBER		
	LD302-D211-BU10-02 /	A0	D0		H0	J0				I1	P0	*			
	LD303-D211-BU10-02 /	A0	D0		H0	J0				I1	P0	*			

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

*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) (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® & 4-20 mA															
LD302	FOUNDATION fieldbus™															
LD303	PROFIBUS PA															
COD.		Range Limits		Min. Span	Unit		Range Limits		Min. Span	Unit						
		Min	Max				Min	Max								
L2		-50	50	1.25	kPa		-200	200	5	inH ₂ O	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.					
L3		-250	250	2.08	kPa		-36	36	0.3	psi						
L4		-2500	2500	20.83	kPa		-360	360	3	psi						
COD.	Diaphragm Material and Fill Fluid (Low Side)															
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)								
COD.	Flange, Adapter and Drain/Vent Valves Material (Low Side)															
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)									
COD.	Wetted O-Rings Material (Low Side)															
O	Without O'rings					K	Kalrez									Note: O'rings are not available on the sides with remote seals.
B	Buna N					T	Teflon									
E	Ethylene - Propylene					V	Viton									
COD.	Drain/Vent Position (Low Side)															
0	Without Drain/Vent					D	Bottom					Note: For better drain/vent operation, vent valves are strongly recommended. Drain/vent valve not available on the sides with remote seals.				
A	Drain/Vent (Opposite to Process Connection)					U	Top									
COD.	Local Indicator															
0	Without Indicator					1	With Digital Indicator									
COD.	Process Connection (Low Side)															
0	1/4 - 18 NPT (Without Adapter)					5	1/2 - 14 NPT Axial with PVDF Insert (4) (6) (11)									
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)									
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) (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)															
COD.	Set this code as "1" for LD301 and exclude for the others															
COD.	Process Connection (Level Tap)															
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)					Z	User's specification			
6	DN 80 PN 10/40					E	DN 50 PN 10/40									
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									
COD.	Flange Material (Level Tap)															
2	316 SST															
Z	User's specification															
COD.	Extension Length															
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									
COD.	Diaphragm Material (Level Tap)															
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									
COD.	Fill Fluid (Level Tap)															
1	DC-200/20 Silicone Oil					N	Neobee M20 Propylene Glycol Oil									
2	MO-10 Fluorolube Oil (8)					T	Syltherm 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 (O₂) 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 (7/16 UNF).
- (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.
- (11) Only available for flange with PVDF (Kynar) insert.

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					I5	CEPEL: EEx-d, Ex-ia, IP					IF	CEPEL: Ex-d, IP (6)						
	I2	NEMKO: EEx-d, EEx-ia, IP					I6	Without Certification					IE	NEPSI: Ex-ia (5)						
	I3	CSA: XP, IS, NI, DI, IP					I7	EXAM (DMT): Group I, M1 EEx-ia					IP	CEPEL + IP68						
	I4	EXAM (DMT): EEx-ia, IP														I8	0 to 20 mA: LD301 (2)			
	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	*	← TYPICAL MODEL NUMBER							
LD302-L2I-BU10-0-1211 /	A0	D0	F0		H0	J0				I1	P0	*								
LD303-L2I-BU10-0-1211 /	A0	D0	F0		H0	J0				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.

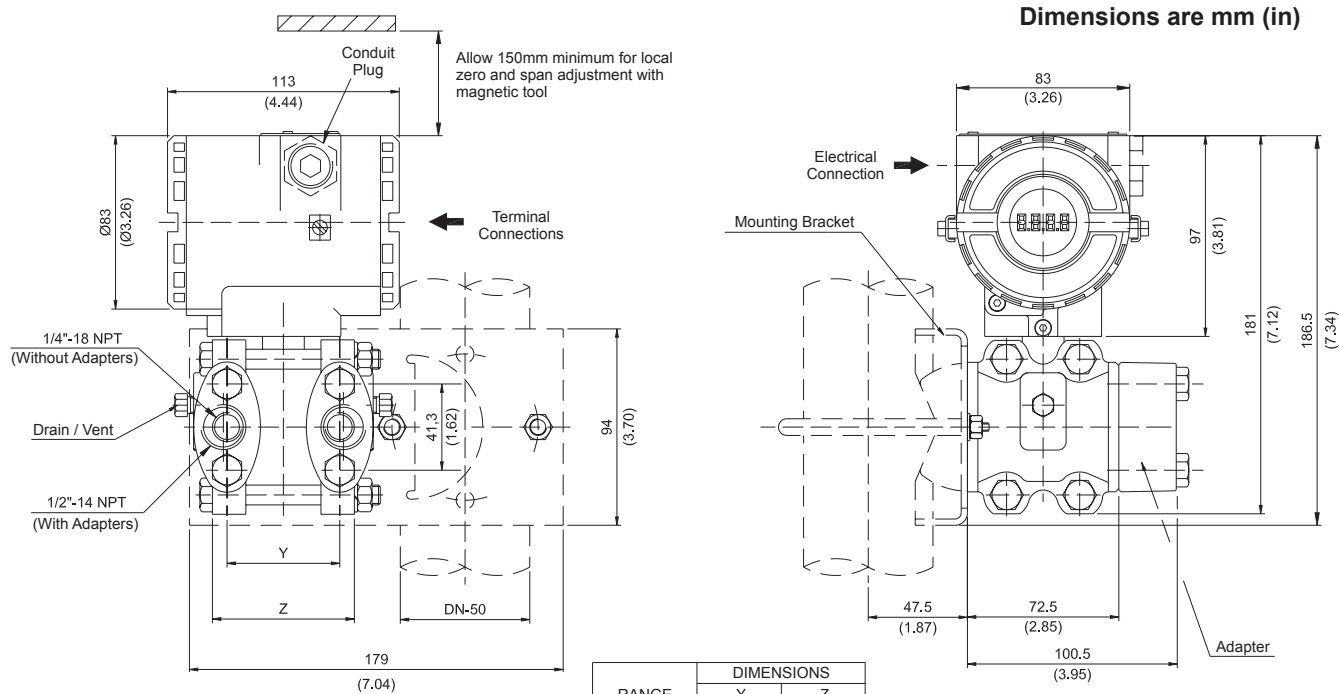
(3) Values limited to 4 1/2 digits; unit limited to 5 characters.

(4) Degrease cleaning not available for carbon steel flanges.

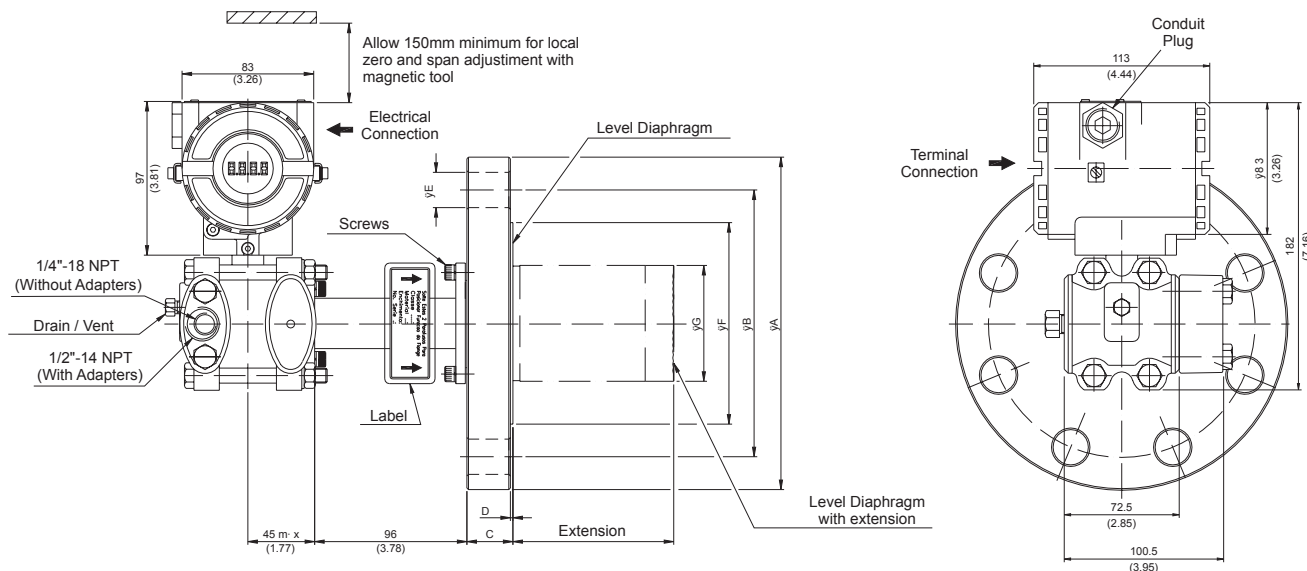
(5) Only available for LD302 and LD303 models.

(6) Only available for LD301.

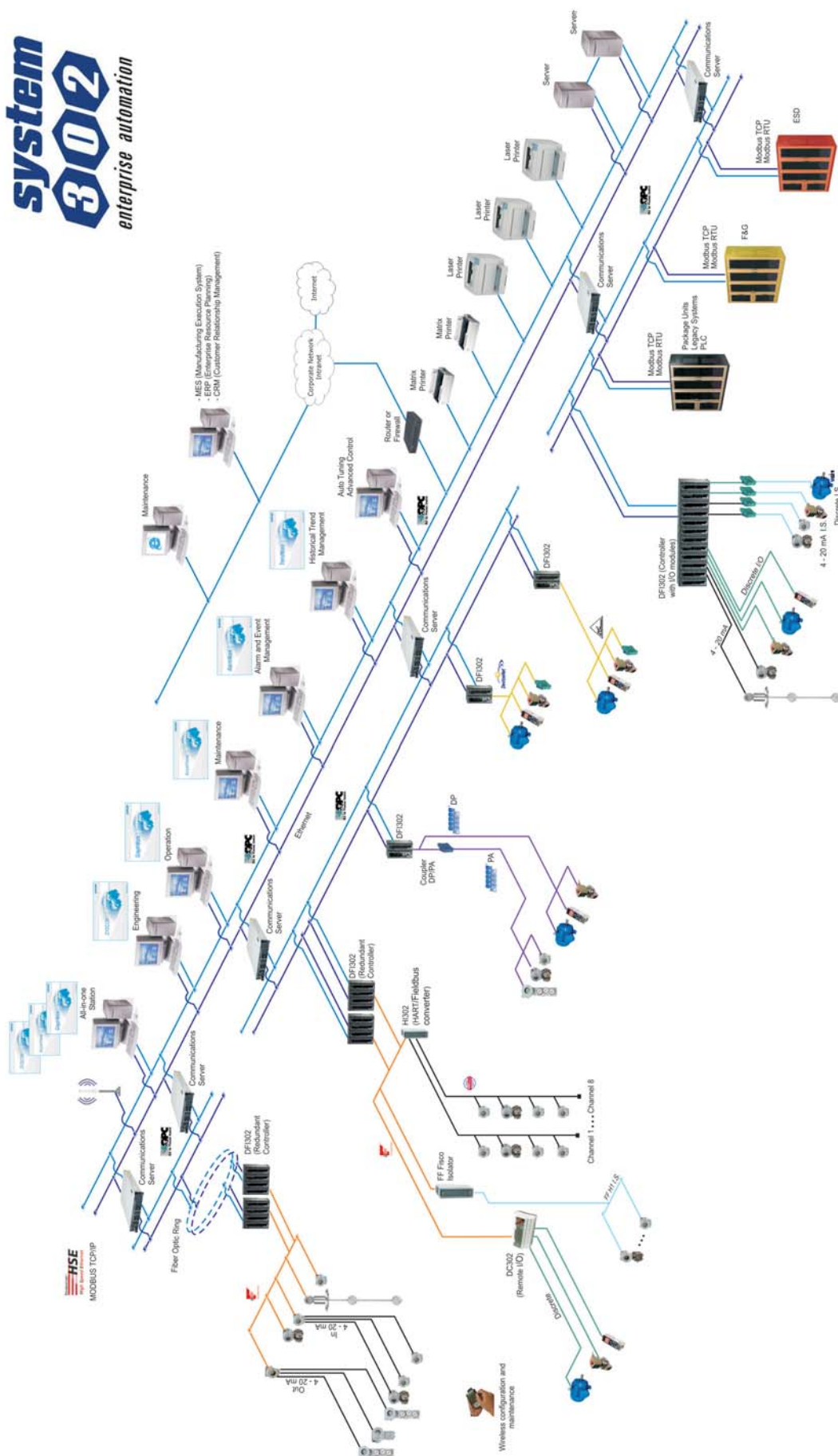
Dimensions are mm (in)



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
	300	165.1	127	22.8	1.6	19.1	91.9	48
	600	165.1	127	32.3	6.4	19.1	91.9	48
3"	150	190.5	152.4	24.4	1.6	19.1	127	73
	300	209.5	168.1	29	1.6	22.2	127	73
	600	209.5	168.1	38.7	6.4	22.2	127	73
4"	150	228.6	190.5	24.4	1.6	19.1	158	96
	300	254	200	32.2	1.6	22.3	158	96
	600	273	215.9	45	6.4	25.4	158	96
DIN2501/2526 FORM D DIMENSIONS								
DN	PN	A	B	C	D	E	F	G # HOLES
50	10/40	165	125	20	3	18	102	48
80	10/40	200	160	24	3	18	138	73
100	10/16	220	180	20	3	18	158	96
	25/40	235	190	24	3	22	162	96



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

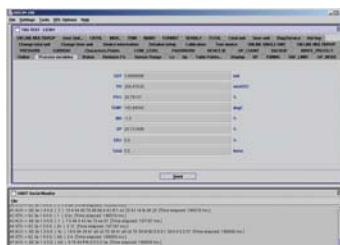


**TT421
Head Mounting
Temperature Transmitter**

Configurators



**HART® Configurator
Interface CONF401**



**HART® Configurator Interface
DDCON**



**HART® Pocket Configurator
HPC401**

Controllers



**Programmable Logical
Controller LC700**



**Digital Controller
CD600Plus**



**Foundation Fieldbus™
Relay FR302**



**Foundation Fieldbus™
Remote I/O DC302**

Accessories



RP302
H1 Fieldbus
Repeaters



SB312
Isolated Intrinsic Safety
Barrier



3 Ways Junction Box
JM1

4-20 mA



4 Ways Junction Box
JM400

4-20 mA



Converters



Fieldbus to Pneumatic
Signal Converter



Current to Fieldbus
Converter



Fieldbus to Current
Converter



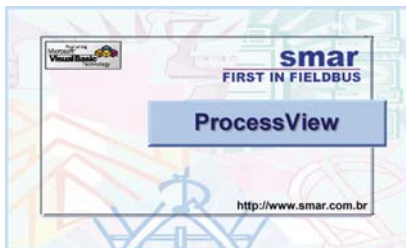
HART® / Fieldbus
Interface HI302



HART®/Current
Converter HCC301



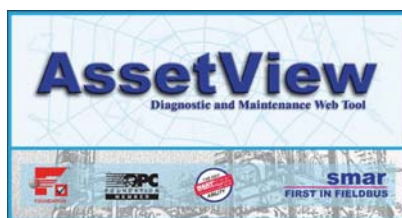
Systems



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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