High installed base accuracy: ± 0.10%

Reliable inductive sensing system coupled with the very latest digital technologies - ensures high performance at all process conditions

Specific design for low pressure

Wide selection of materials - meet virtually all process requirements

HART 4-20 mA, Profibus PA, FF versions with plug-and-play electronics replacement - provides interchangeability for upgrading transmitter

Local snap calibration and full management via hand terminal or PC-running software

HART®, Profibus PA, FF communications - allows integration with standard process bus

CoMeter display option - offers HART Configuration capabilities combined with local indication

Ecoefficient life cycle - ensures low environmental impact in compliance with LCA assessment to ISO 14040 standard

The all new 600T Series transmitter
The first choice pressure transmitter is now an even bigger choice
GENERAL DESCRIPTION

Model 621EM is a specific application transmitter using a differential design for liquid level interface and density measurements, typically for two non mixable liquids (one upon the other) of different specific gravity, in a tank.

The transmitter has a defined structure with two seals:
- one direct mount flanged flush diaphragm seal is on the high pressure side.
- one remote seal, selectable wafer or flanged flush diaphragm, is fitted via capillary to the low pressure side.

The seals should have the same physical characteristics (size, materials, etc.) for the two sides; these are suitable to interface tank nozzle of 2in/3in to ANSI or DN50/DN80 to DIN.

FUNCTIONAL SPECIFICATIONS

Range and span limits

<table>
<thead>
<tr>
<th>Sensor code</th>
<th>Upper Range Limit (URL)</th>
<th>Lower Range Limit (LRL)</th>
<th>Minimum Span</th>
<th>Compatibility (allowed seal types)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>621EM Liquid level interface, density</td>
<td></td>
<td></td>
<td>Direct mount and one remote seal (max length in m)</td>
</tr>
<tr>
<td>A</td>
<td>2.5 kPa 25 mbar 10 inH2O</td>
<td>- 2.5 kPa - 25 mbar - 10 inH2O</td>
<td>0.25 kPa 2.5 mbar 1 inH2O</td>
<td>3in/DN80 wafer or flanged flush diaphragm seal (2)</td>
</tr>
<tr>
<td>B</td>
<td>10 kPa 100 mbar 40.1 inH2O</td>
<td>- 10 kPa - 100 mbar - 40.1 inH2O</td>
<td>1 kPa 10 mbar 4 inH2O</td>
<td>2in/DN50 wafer or flanged flush diaphragm seal (2)(•)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3in/DN80 wafer or flanged flush diaphragm seal (4)</td>
</tr>
</tbody>
</table>

The combinations sensor code/seal type marked (+) modify the base accuracy rating and static pressure effect; refer to performance specifications.

Turndown ratio (TD):
up to 10:1

Span limits
Maximum span = URL
Minimum span = URL/TD

Zero suppression and elevation
Zero and span can be adjusted to any value within the range limits detailed in the table as long as:
- calibrated span ≥ minimum span

Damping
Selectable time constant: 0, 0.25, 0.5, 1, 2, 4, 8 or 16 sec.

Electromagnetic compatibility (EMC)
Comply with EN 50081-2 for emission and EN 50082-2 for immunity requirements and test; CE marking.

Turn on time
Operation within specification in less than 2 sec. with minimum damping.

Insulation resistance
> 100 MΩ @ 1000 Vdc (terminals to earth)

Temperature limits °C (°F)

• Process
The following table shows characteristics of fill fluid used in the seals on the two sides of transmitter model 621EM.

<table>
<thead>
<tr>
<th>FILL FLUIDS (APPLICATION)</th>
<th>OPERATING CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T&lt;sub&gt;max&lt;/sub&gt; @ P &lt;of</td>
</tr>
<tr>
<td>Silicone oil DC 200</td>
<td>150 (302) @ 35 mbar abs</td>
</tr>
<tr>
<td>(General purpose)</td>
<td></td>
</tr>
<tr>
<td>Inert (Galden)</td>
<td>100 (212) @ 75 mbar abs</td>
</tr>
<tr>
<td>(Oxygen Service)</td>
<td></td>
</tr>
</tbody>
</table>

• Ambient (is the operating temperature)
Silicone oil: -20 and +85°C (-4 and +185°F)
Inert: -10 and +85°C (+14 and +185°F)
Upper ambient limit for CoMeter: +70°C (+158°F)

• Storage
Lower limit: -50°C (-58°F); -40°C (-40°F) for LCD indicators
Upper limit: +120°C (+248°F); +85°C (+185°F) for LCD indicators

Time response
The time response of a transmitter/seal system is function of some characteristics which define relevant coefficients as follows:

Configuration coefficient (K1)
- 2in/DN50 seal: 9.2 x L
- 3in/DN80 seal: 9.2 x L

"L" is the capillary length of the remote seal; if present
The seal(s) constant time is calculated by the following formula:

\[ T_{S6} = [K1 \times (K2 + K3 \times K4) \times K5] \]

The total constant time of the transmitter/seal system is the combination of relevant response times by the following formula:

\[ T_{TX} = T_{TR} + T_{S6} \times 1.2 + 0.1 \]

The following table details the transmitter time values \( T_{TR} \) in sec. for the transducers with specific filling fluids @25°C (77°F):

<table>
<thead>
<tr>
<th>Sensor Code</th>
<th>Fill Fluid</th>
<th>K2</th>
<th>K3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Silicone oil DC 200</td>
<td>1</td>
<td>0.12</td>
</tr>
<tr>
<td>B</td>
<td>Inert (Galden)</td>
<td>1.9</td>
<td>0.37</td>
</tr>
</tbody>
</table>

Operating temperature coefficient (K4)

to be considered only for operating temperature less than 25°C (77°F)

\[ K4 = |T - 25| \] (absolute value)

Coefficient K4 should be considered = 0 for temperatures above 25°C (77°F)

Sensor (URL) coefficient K5

<table>
<thead>
<tr>
<th>Sensor Code</th>
<th>K5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.4</td>
</tr>
<tr>
<td>B</td>
<td>0.2</td>
</tr>
</tbody>
</table>

The seal(s) constant time is calculated by the following formula:

\[ T_{S6} = [K1 \times (K2 + K3 \times K4) \times K5] \]

The total constant time of the transmitter/seal system is the combination of relevant response times by the following formula:

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<tr>
<td>A</td>
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<td>1</td>
<td>0.12</td>
</tr>
<tr>
<td>B</td>
<td>Inert (Galden)</td>
<td>1.9</td>
<td>0.37</td>
</tr>
</tbody>
</table>

Overpressure limits (without damage to the transmitter)

- Lower : 0.067 kPa abs, 0.67 mbar abs, 0.01 psia
- Upper (transmitter sensor limit or flange / fitting rating of the seal, whichever is less)
- model 621EM
  - sensor code A : 1 MPa, 10 bar, 145 psi
  - sensor code B : 5 MPa, 50 bar, 725 psi
- flanged seals (S6F)
  - ANSI CL 150 : 2 MPa, 20 bar, 290 psi
  - ANSI CL 300 : 5 MPa, 50 bar, 725 psi
  - DIN ND 16 : 1.6 MPa, 16 bar, 230 psi
  - DIN ND 40 : 4 MPa, 40 bar, 580 psi

Static pressure

Transmitters model 621EM operate within specifications between the following limits

- Lower
  - atmosphere (the two sides are wetted)
- Upper
  - same of overpressure limit

Proof pressure

The transmitter meets SAMA PMC 27.1 requirements and can be exposed without leaking to line pressure of up to 10 MPa, 100 bar, 1450 psi (2 MPa, 20 bar, 290 psi for sensor A) or two times the flange/fitting rating of the seal, whichever is less.

**ELECTRICAL CHARACTERISTICS AND OPTIONS**

- **HART digital communication and 4 to 20 mA output**

**Power Supply**

The transmitter operates from 10.5 to 42 Vdc with no load and is protected against reverse polarity connection (additional load allows operations over 42 Vdc).

For EEx ia and intrinsically safe (FM, CSA and SAA) approval power supply must not exceed 30 Vdc.

**MINIMUM OPERATING VOLTAGES**

<table>
<thead>
<tr>
<th>Supply voltage (Vdc)</th>
<th>10.5</th>
<th>10.7</th>
<th>12.1</th>
<th>12.5</th>
<th>13.1</th>
<th>13.7</th>
<th>14.1</th>
<th>14.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>with CoMeter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with optional output LCD indicator</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>with optional output analog indicator</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with integral display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with optional surge protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no link on output indicator plugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Load limitations - 4-20 mA and HART total loop resistance**

\[ R(k\Omega) = \frac{Supply voltage - min. operating voltage (Vdc)}{22} \]

**Static pressure**

Transmitters model 621EM operate within specifications between the following limits

- Lower
  - atmosphere (the two sides are wetted)
- Upper
  - same of overpressure limit

Proof pressure

The transmitter meets SAMA PMC 27.1 requirements and can be exposed without leaking to line pressure of up to 10 MPa, 100 bar, 1450 psi (2 MPa, 20 bar, 290 psi for sensor A) or two times the flange/fitting rating of the seal, whichever is less.

**Overpressure limits**

- Lower : 0.067 kPa abs, 0.67 mbar abs, 0.01 psia
- Upper (transmitter sensor limit or flange / fitting rating of the seal, whichever is less)
- model 621EM
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Transmitters model 621EM operate within specifications between the following limits

- Lower
  - atmosphere (the two sides are wetted)
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  - same of overpressure limit

Proof pressure

The transmitter meets SAMA PMC 27.1 requirements and can be exposed without leaking to line pressure of up to 10 MPa, 100 bar, 1450 psi (2 MPa, 20 bar, 290 psi for sensor A) or two times the flange/fitting rating of the seal, whichever is less.
**Optional surge protection**
Up to 2.5 kV (5 kA discharge current) of 8 µs rise time/20 µs decay.

**Output signal**
Two-wire 4 to 20 mA dc, user-selectable for linear or square root output, power of 3/2 or 5/2, 5th order or two 2nd order switching point selectable programmable polynomial output.
HART® communication provides digital process variable (% mA or engineering units) superimposed on 4 to 20 mA signal, with protocol based on Bell 202 FSK standard.

**Output current limits (to NAMUR standard)**
- Overload condition
  - Lower limit : 3.8 mA dc
  - Upper limit : 20.8 mA dc

**Transmitter failure mode (to NAMUR standard)**
The output signal can be user-selected to a value of 3.6 or 21.6 mA on gross transmitter failure condition, detected by self-diagnostics.
In case of CPU failure the output is driven <3.6 mA or >21.6 mA.

- **Profibus PA output**

**Power supply**
The transmitter operates from 10.5 to 32 Vdc with no polarity.
For EEx ia approval power supply must not exceed 15 Vdc.
Intrinsic safety installation according to FISCO model.

**Current consumption**
- operating (quiescent) : 10.5 mA
- communicating : 20.5 mA
- fault current limiting : 16 mA max.

**Output signal**

**Output current limits (to NAMUR standard)**
- Overload condition
  - Lower limit : 3.8 mA dc
  - Upper limit : 20.8 mA dc

**Transmitter failure mode (to NAMUR standard)**
The output signal can be user-selected to a value of 3.6 or 21.6 mA on gross transmitter failure condition, detected by self-diagnostics.
In case of CPU failure the output is driven <3.6 mA or >21.6 mA.

- **Profibus PA output**

**Power supply**
The transmitter operates from 10.5 to 32 Vdc with no polarity.
For EEx ia approval power supply must not exceed 15 Vdc.
Intrinsic safety installation according to FISCO model.

**Current consumption**
- operating (quiescent) : 10.5 mA
- communicating : 20.5 mA
- fault current limiting : 16 mA max.

**Output signal**

**Function blocks/execution period**
- 2 standard Analog Input blocks / 25 msec. max (each)
- 1 standard PID block / 70 msec. max.

**Additional blocks**
- Transducer block, 1 standard Resource block,
  1 custom Pressure with calibration block

**Number of link objects : 25**

**Number of VCRs : 24**

**Output interface**
FOUNDATION fieldbus digital communication protocol to standard H1, compliant to specification V. 1.4; FF registration IT011000.

**Optional indicator**
Integral display
- LCD : 4 digit characters, displaying process variable in engineering units or as percentage value.
Display also indicates diagnostic messages.

**Transmitter failure mode**
The output signal is "frozen" to the last valid value on gross transmitter failure condition, detected by self-diagnostics which also indicate a BAD conditions. If electronic failure or short circuit occur the transmitter consumption is electronically limited at a defined value (16 mA approx), for safety of the network.

**PERFORMANCE SPECIFICATIONS**
Stated at ambient temperature of 23°C ± 3K (75°F ± 5), relative humidity of 50% ±20%, atmospheric pressure, mounting position with vertical diaphragm and zero based range for transmitter with seal isolating diaphragms in AISI 316 L ss and silicone oil fill and HART digital trim values equal to 4-20 mA span end points, in linear mode.
Unless otherwise specified, errors are quoted as % of span.
Some performance data are affected by the actual turndown (TD) as ratio between Upper Range Limit (URL) and calibrated span.
IT IS RECOMMENDED TO SELECT THE TRANSMITTER SENSOR CODE PROVIDING THE TURNDOWN VALUE AS LOWEST AS POSSIBLE TO OPTIMIZE PERFORMANCE CHARACTERISTICS.

**Accuracy rating**
% of calibrated span, including combined effects of terminal based linearity, hysteresis and repeatability.
For fieldbus versions SPAN refer to analog input function block outscale range
- ± 0.10% for TD from 1:1 to 5:1
- ± 0.02 x URL/ span for TD from 5:1 to 10:1
Multiply the values by 2 for sensor/seal combination marked (+)
Optional indicators accuracy
- integral display (microprocessor driven): no error
- analog output meter: ±2% full scale deflection
- LCD output meter: ±0.1% of calibrated span ±1 unit
- CoMeter
  - digital: ±0.10% of max span (16 mA) ±1 digit
  - analog ( bargraph): 10%

Operating influences

Temperature effects
Total effect per 20 K (36°F) ambient temperature change on transmitter sensor between the limits of -20°C to +65°C (-4 to +150°F) and per 20 K (36°F) process temperature change on seals diaphragm between the process operating temperature limits
- sensor A with 3in/DN80 seals: 0.01 kPa, 0.1 mbar, 0.04 in H2O
- sensor B with 2in/DN50 seals: 0.03 kPa, 0.3 mbar, 0.12 in H2O
- sensor B with 3in/DN80 seals: 0.02 kPa, 0.2 mbar, 0.08 in H2O

Optional LCD output meter ambient temperature
per 1 K (1.8°F) change between the limits of -20 and +80°C (-4 and +176°F)
Total effect: ±(0.0002 x span units + 0.1) of reading.

Optional CoMeter ambient temperature
Total reading error per 20K (36°F) change between the ambient limits of -20 and +70°C (-4 and +158°F):
±0.15% of max span (16 mA).

Static pressure (zero errors can be calibrated out at line pressure)
per 1 MPa, 10 bar or 145 psi
- sensor code A
  - zero error: ±0.15% of URL
  - span error: ±0.15% of reading
- sensor code B
  - zero error: ±0.08% of URL
  - span error: ±0.08% of reading
Multiply by 1.5 the errors for sensor/seal combinations marked (*)

Supply voltage
Within voltage/load specified limits the total effect is less than 0.005% of URL per volt.

Load
Within load/voltage specified limits the total effect is negligible.

Radio frequency interference
Total effect: less than 0.10% of span from 20 to 1000 MHz and for field strengths up to 30 V/m when tested with shielded conduit and grounding, with or without meter. Meets IEC 801.

Common mode interference
No effect from 100 V rms @ 50 Hz, or 50 Vdc.

Series mode interference
No effect from 1 V rms @ 50 Hz.

PHYSICAL SPECIFICATIONS
(Refer to ordering information sheets for variant availability related to specific model or versions code)

Materials

Process seal isolating diaphragms (*)
AISI 316 L ss, Hastelloy C276 ◊;

Fill fluids
Silicone oil (DC200) or inert fill (perfluorinated polyethers - Galden ◊)

Mounting flanges
Carbon steel; AISI 316 ss

Sensor housing: AISI 316 L ss

Bolts and nuts
- Plated carbon steel bolts class 8.8 per UNI 5737 (ISO 4014) and nuts class 6.S per UNI 3740/4 (ISO 898/2).
- AISI 316 ss bolts and nuts Class A4-50 per UNI 7323 (ISO 3506), in compliance with NACE MR0175 Class II.

Electronic housing and covers
Barrel version
- Low-copper content aluminium alloy with baked epoxy finish;
- AISI 316 L ss.
DIN version
- Low-copper content aluminium alloy with baked epoxy finish

Covers O-ring: Buna N.

Local zero and span adjustments:
Glass filled polycarbonate plastic (removable)

Tagging
AISI 316 ss data plate attached to the electronics housing.

Calibration
- Standard: at maximum span, zero based range, ambient temperature and pressure
- Optional: at specified range and ambient conditions; or at operating temperature.

Optional extras
Output indicator:
plug-in rotatable type, LCD or analog.
Standard LCD output meter scale is 0 to 100% linear; special linear scale to specified range and engineering unit is available. Standard analog output meter scale is 0 to 100% linear; special graduation is available.

Supplemental customer tag
AISI 316 ss tag screwed/fastened to the transmitter for customer’s tag data up to a maximum of 20 characters and spaces on one line for tag number and tag name, and up to a maximum of 3 spaced strings of 10 characters each for calibration details (lower and upper values plus unit). Special typing evaluated on request for charges.

Surge protection (not available with Profinet PA and FF output)
Material traceability
Environmental protection

Wet and dust-laden atmospheres

The transmitter is dust and sand tight and protected against immersion effects as defined by IEC 529 (1989) to IP 67 (IP 68 on request) or by NEMA to 4X or by JIS to C0920.

Hazardous atmospheres

With or without output meter/integral display

INTRINSIC SAFETY/EUROPE:

- ATEX/BASEEFA approval
  - EC-Type Examination Certificate no. BAS 99ATEX 1180
    - (HART)
      - II 1 GD T50°C, EEix ia IIC T6/T5 (-40°C ≤ Ta ≤ +40°C)
      - T95°C, EEix ia IIC T4 (-40°C ≤ Ta ≤ +85°C)
    - (FOUNDATION Fieldbus)
      - II 1 GD T70°C, EEix ia IIC T4 (-40°C ≤ Ta ≤ +60°C)
  - EC-Type Examination Certificate no. BAS 00ATEX 1241
    - (PROFIBUS-PA)
      - II 1 GD T70°C, EEix ia IIB T4 (-40°C ≤ Ta ≤ +60°C)

TYPE "N"/EUROPE:

- Design compliance by Certificate no. BAS 01ATEX 3380X
  - (HART)
    - II 3 GD T50°C, EEinx nL IIC T5 (-40°C ≤ Ta ≤ +40°C)
    - T95°C, EEinx nL IIC T4 (-40°C ≤ Ta ≤ +85°C)
  - (FOUNDATION Fieldbus)
    - II 3 GD T70°C, EEinx nL IIC T4 (-40°C ≤ Ta ≤ +60°C)
  - Design compliance by Certificate no. BAS 01ATEX 3384X
    - (PROFIBUS-PA)
      - II 3 GD T70°C, EEex nL IIB T4 (-40°C ≤ Ta ≤ +60°C)

FLAMEPROOF/EUROPE:

- ATEX/CESI approval;
  - EC-Type Examination Certificate no. CESI 00 ATEX 035
    - II 1/2 GD T80°C, EEex d IIC T6 (-40°C ≤ Ta ≤ +70°C)
    - T95°C, EEex d IIC T5 (-40°C ≤ Ta ≤ +85°C)

CANADIAN STANDARDS ASSOCIATION and FACTORY MUTUAL:

- Explosionproof: Class I, Div. 1, Groups A, B, C, D
- Dust ignitionproof: Class II, Div. 1, Groups E, F, G
- Suitable for: Class II, Div. 2, Groups F, G; Class III, Div. 1, 2
- Nonincendive: Class I, Div. 2, Groups A, B, C, D
- Intrinsically safe: Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G

STANDARDS AUSTRALIA (SAA)

TS/WCA Approval (HART only)

- Conformity Certificate no. AUS Ex 3117X
  - Ex d IIC T5 (Tamb +85°C)/T6 (Tamb +70°C) Class 1 Zone 1;
  - Ex ia IIC T4 (Tamb +85°C)/T5 (Tamb +55°C) T6 Class 1 Zone 0

Process connections

Flush diaphragm flanged seal (**): 2in or 3in ANSI 150 to 300 RF
DN50 or DN80 DIN ND 16-40 Form C
Wafer seal (backup flange not supplied)
2in, 3in to ANSI; DN50, DN80 to DIN.

Electrical connections

Two 1/2 NPT or M20x1.5 or PG 13.5 or 1/2 GK threaded conduit entries, direct on housing; straight or angle Harting HAN connector and one plug, on request.

Terminal block

- HART version
  - Three terminals for signal/external meter wiring up to 2.5 mm² (14 AWG) and three connection points for test and communication purposes.
- Fieldbus versions
  - Two terminals for signal wiring (bus connection) up to 2.5 mm² (14 AWG)

Grounding

Internal and external 6 mm² (10 AWG) ground termination points are provided.

Mounting position

Transmitter can be mounted in any position but with a maximum ±1° from vertical.
Electronics housing may be rotated to any position. A positive stop prevents over travel.

Mass (without options)

9 to 12 kg approx (20 to 27 lb); add 1.5 kg (3.4 lb) for AISI housing.
Add 650 g (1.5 lb) for packing.

Packing

Carton

◊ Hastelloy is a Cabot Corporation trademark
◊ Galden is a Montefluos trademark

(*) Wetted parts of the transmitter.
(**) Bolts and nuts, gasket and mating flange supplied by Customer
CONFIGURATION

- **Transmitter with HART communication and 4 to 20 mA**

  **Standard configuration**
  Transmitters are factory calibrated to customer's specified range. Calibrated range and tag number are stamped on the tag plate. If a calibration range and tag data are not specified, the transmitter will be supplied with the plate left blank and configured as follows:
  - **Engineering Unit:** Specify code option
  - **4 mA:** Zero
  - **20 mA:** Upper Range Limit (URL)
  - **Output:** Linear
  - **Damping:** 1 sec.
  - **Transmitter failure mode:** Upscale
  - **Software tag characters:** Blank
  - **Optional LCD output indicator:** 0 to 100.0% linear

  Any or all the above configurable parameters, including Lower range-value and Upper range-value which must be the same unit of measure, can be easily changed using the HART hand-held communicator. The transmitter database is customized with specified flange type and material, O-ring and drain/vent materials and meter code option.

  **Custom configuration (option)**
  The following data may be specified in addition to the standard configuration parameters:
  - Descriptor: 16 alphanumeric characters
  - Message: 32 alphanumeric characters
  - Date: Day, month, year
  - Damping: Seconds

- **Transmitter with Profinet PA communication**

  Transmitters are factory calibrated to customer’s specified range. Calibrated range and tag number are stamped on the tag plate. If a calibration range and tag data are not specified, the transmitter will be supplied with the plate left blank and configured as follows:
  - **Measure Profile:** Pressure
  - **Engineering Unit:** kPa
  - **Output scale 0%:** Lower Range Limit (LRL)
  - **Output scale 100%:** Upper Range Limit (URL)
  - **Output:** Linear
  - **Hi-Hi Limit:** Upper Range Limit (URL)
  - **Hi Limit:** Upper Range Limit (URL)
  - **Low Limit:** Lower Range Limit (LRL)
  - **Low-Low Limit:** Lower Range Limit (LRL)
  - **Limits hysteresis:** 0.5% of output scale
  - **PV filter time:** 0 sec.
  - **Tag:** 32 alphanumeric characters

  Any or all the above configurable parameters, including Lower range-value and Upper range-value which must be the same unit of measure, can be easily changed by a PC running the configuration software Smart Vision with DTM for 600T or 600T template for Siemens Simatic PDM System. The transmitter database is customized with specified flange type and material, O-ring and drain/vent materials and meter code option.

  **Custom configuration (option)**
  The following data may be specified in addition to the standard configuration parameters:
  - Descriptor: 32 alphanumeric characters
  - Message: 32 alphanumeric characters
  - Date: Day, month, year
  - Air filter: Seconds

- **Transmitter with FOUNDATION fieldbus communication**

  Transmitters are factory calibrated to customer’s specified range. Calibrated range and tag number are stamped on the tag plate. If a calibration range and tag data are not specified, the transmitter will be supplied with the plate left blank and configured as follows:
  - **Measure Profile:** Pressure
  - **Engineering Unit:** kPa
  - **Output scale 0%:** Lower Range Limit (LRL)
  - **Output scale 100%:** Upper Range Limit (URL)
  - **Output:** Linear
  - **Hi-Hi Limit:** Upper Range Limit (URL)
  - **Hi Limit:** Upper Range Limit (URL)
  - **Low Limit:** Lower Range Limit (LRL)
  - **Low-Low Limit:** Lower Range Limit (LRL)
  - **Limits hysteresis:** 0.5% of output scale
  - **PV filter time:** 0 sec.
  - **Tag:** 32 alphanumeric characters

  Any or all the above configurable parameters, including the range values, can be changed using any host compliant to FOUNDATION fieldbus. The transmitter database is customized with specified flange type and material, O-ring and drain/vent materials and meter code option.

  **Available engineering units of pressure measure are:**
  - Pa, kPa, MPa
  - inH₂O@4°C, mmH₂O@4°C, psi
  - inH₂O@20°C, ftH₂O@20°C, mmH₂O@20°C
  - inHg, mmHg, Torr
  - g/cm², kg/cm², atm
  - mbar, bar
MOUNTING DIMENSIONS
(not for construction unless certified)

- Transmitter with barrel housing

- Transmitter with DIN housing
• Wafer type seal

<table>
<thead>
<tr>
<th>SIZE</th>
<th>DIMENSIONS mm (in)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A (dia)</td>
<td>B (dia)</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>2 in</td>
<td>60 (2.36)</td>
<td>92.1 (3.62)</td>
<td>23 (0.9)</td>
<td>139.7 (5.5)</td>
</tr>
<tr>
<td>3 in</td>
<td>89 (3.5)</td>
<td>127 (5)</td>
<td>23 (0.9)</td>
<td>139.7 (5.5)</td>
</tr>
<tr>
<td>DN 50</td>
<td>60 (2.36)</td>
<td>102 (4.02)</td>
<td>23 (0.9)</td>
<td>139.7 (5.5)</td>
</tr>
<tr>
<td>DN 80</td>
<td>89 (3.5)</td>
<td>138 (5.43)</td>
<td>23 (0.9)</td>
<td>139.7 (5.5)</td>
</tr>
</tbody>
</table>

• Flanged flush diaphragm seal

<table>
<thead>
<tr>
<th>SIZE/RATING</th>
<th>DIMENSIONS mm (in)</th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>A (dia)</td>
<td>B (dia)</td>
<td>C (dia)</td>
<td>D (dia)</td>
<td>E (dia)</td>
</tr>
<tr>
<td>2 in ANSI CL 150</td>
<td>60 (2.36)</td>
<td>92.1 (3.62)</td>
<td>120.5 (4.74)</td>
<td>152.5 (6)</td>
<td>20 (0.79)</td>
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<tr>
<td>2 in ANSI CL 300</td>
<td>60 (2.36)</td>
<td>92.1 (3.62)</td>
<td>120.5 (4.74)</td>
<td>152.5 (6)</td>
<td>20 (0.79)</td>
</tr>
<tr>
<td>3 in ANSI CL 150</td>
<td>89 (3.5)</td>
<td>127 (5)</td>
<td>168.5 (6.63)</td>
<td>210 (8.26)</td>
<td>22 (0.86)</td>
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<tr>
<td>3 in ANSI CL 300</td>
<td>89 (3.5)</td>
<td>127 (5)</td>
<td>168.5 (6.63)</td>
<td>210 (8.26)</td>
<td>22 (0.86)</td>
</tr>
<tr>
<td>DN50 DIN ND16</td>
<td>60 (2.36)</td>
<td>102 (4.02)</td>
<td>125 (4.92)</td>
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<td>18 (0.71)</td>
</tr>
<tr>
<td>DN50 DIN ND40</td>
<td>60 (2.36)</td>
<td>102 (4.02)</td>
<td>125 (4.92)</td>
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<td>18 (0.71)</td>
</tr>
<tr>
<td>DN80 DIN ND16</td>
<td>89 (3.5)</td>
<td>138 (5.43)</td>
<td>160 (6.3)</td>
<td>200 (7.87)</td>
<td>18 (0.71)</td>
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<tr>
<td>DN80 DIN ND40</td>
<td>89 (3.5)</td>
<td>138 (5.43)</td>
<td>160 (6.3)</td>
<td>200 (7.87)</td>
<td>18 (0.71)</td>
</tr>
</tbody>
</table>

**ELECTRICAL CONNECTIONS**

- **HART Version**
  
- **FIELDBUS Versions**

HART hand-held communicator may be connected at any wiring termination point in the loop, providing the minimum resistance is 250 ohm. If this is less than 250 ohm, additional resistance should be added to allow communications.
ORDERING INFORMATION model 621EM Liquid level interface and density transmitter

Select one character or set of characters from each category and specify complete catalog number. Refer to supplementary code and specify another number for each transmitter if additional options are required.

PRODUCT CODE  

<table>
<thead>
<tr>
<th>abcde</th>
<th>f</th>
<th>g</th>
<th>hijk</th>
<th>l</th>
<th>m</th>
<th>n</th>
<th>op</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE MODEL</td>
<td>SENSOR</td>
<td>PROCESS CONNECTIONS</td>
<td>SEALS SYSTEM</td>
<td>OUTPUT</td>
<td>ELECTRICAL CERTIFICATION</td>
<td>TOP WORKS</td>
<td>ELECTRICAL OPTIONS</td>
</tr>
</tbody>
</table>

**PRODUCT CODE**

- **abcde**: BASE MODEL - 1st to 5th characters
  - Liquid level, interface and density transmitter

- **f**: Span limits - 6th character
  - 0.25 and 2.5 kPa 2.5 and 25 mbar 1 and 10 inH2O (Note) 1 and 10 kPa 10 and 100 mbar 4 and 40.1 inH2O
  - Note: only available with 3in/DN80 seal size

- **g**: PROCESS CONNECTIONS - TYPE OF SEALS (*) - 7th character
  - High pressure side: All-welded direct mount flanged flush diaphragm seal
  - Low pressure side: All-welded remote flanged flush diaphragm seal

- **h**: FLANGED CONNECTION(S) TYPE (SEAL SIZE) AND RATING (High and Low Pressure Sides) - 8th character
  - Material: Carbon steel, AISI 316 ss
  - Rating/size: ANSI 150 RF - 2in, ANSI 150 RF - 3in, ANSI 300 RF - 2in, ANSI 300 RF - 3in, DIN ND 16 Form C-DN 50, DIN ND 16 Form C-DN 80, DIN ND 40 Form C-DN 50, DIN ND 40 Form C-DN 80

- **i**: Seal diaphragm material (*)
  - Seal diaphragm material: AISI 316 L ss, Hastelloy C276 o
  - Fill fluid: Silicone oil, Inert fluid

- **j**: CAPILLARY LENGTH (low pressure side) - 10th character
  - Length: 0.5 m, 1 m, 1.5 m, 2 m, 2.5 m, 3 m, 3.5 m (Note), 4 m (Note)
  - Note: not available with 2in or DN50 seals code 1, 3, 7, A, J, L, Q, S at position "h"

Compliance to NACE class II bolting, according to specification MR0175, latest revision

(*) Process wetted-parts

◊ Hastelloy is a Cabot Corporation trademark
ORDERING INFORMATION model 621EM Liquid level interface and density transmitter

11th character
- **k** Bolts
  - Carbon steel
  - AISI 316 ss (NACE)

12th character
- **i** OUTPUT
  - Hart digital communication and 4 to 20 mA
  - Proibus PA communication
  - FOUNDATION Fieldbus Communication

m ELECTRICAL CERTIFICATION - 13th character
- General Purpose
- ATEX Group II Category 1/2 GD - Flameproof Ex d CESI approval
- ATEX Group II Category 1 GD - Intrinsic Safety Ex ia BASEEFA approval
- ATEX Group II Category 3 GD - Type of protection "N" Ex e NL design compliance
- Factory Mutual (FM) and Canadian Standard Association (CSA) approvals (only with 1/2" NPT and M20 electrical connection)
- Intrinsic Safety and Flameproof to Standards Australia SAA approval Ex ia IIC T6/T5/T4 + Ex d IIC T6/T5 (Note)

Note: not available with output code P and F at position "i"

TOP WORKS - 14th character
- **n** Housing material
  - Aluminium alloy (Barrel version)
    - 1/2" NPT
    - M20 x 1.5 (CM 20)
    - Pg 13.5
  - 1/2" GK
  - Harting HAN connector - straight entry (Note 1, 2)
  - Harting HAN connector - angle entry (Note 1, 2)
  - AISI 316 L ss (Barrel version)
    - 1/2" NPT
    - M20 x 1.5 (CM 20)
    - Pg 13.5
  - 1/2" GK
  - Aluminum alloy (DIN version)
    - Pg 13.5 (Note 1)
    - M20 x 1.5 (CM 20) (Note 1)
    - Harting HAN connector - straight entry (Note 1, 2)

Note 1: requires certification code 1 at position "m"
Note 2: not available with output code P and F at position "i"

ELECTRICAL OPTIONS - 15th character
- **o** Internal meter type
  - None
  - Digital LCD output indicator linear 0-100%, user scalable (Note)
  - Digital LCD output indicator linear scale (specify range and engineering units) (Note)
  - Analog output indicator linear 0-100% scale (Note)
  - Analog output indicator, special graduation (to be specified for linear or square root scale) (Note)
  - Digital LCD integral display
  - Digital LCD integral display and digital LCD output indicator linear 4-20 mA (Note)
  - Digital LCD integral display and analog output indicator linear 0-100% scale (Note)
  - Programmable signal meter and HART configurator (CoMeter) (Note)
  - Programmable signal meter and HART configurator (CoMeter) and digital LCD integral display (Note)

Note: not available with output code P and F at position "i"

16th character
- **p** Electrical options
  - Standard terminal block
  - Surge protector (Note)
  - Terminal block for external meter (Note)

Labels language
- English
- German
- Italian

Note: not available with output code P and F at position "i"
ORDERING INFORMATION
Select one character or set of characters from each category and specify complete catalog number in addition to each transmitter code, if required.

## PRODUCT CODE

<table>
<thead>
<tr>
<th>ab</th>
<th>BASE MODEL - 1st to 2nd characters</th>
<th>Code</th>
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<td>Supplementary code</td>
<td>SC</td>
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</table>

<table>
<thead>
<tr>
<th>c</th>
<th>CONFIGURATION - 3rd character</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard - Pressure = kPa; Temperature = deg. C</td>
</tr>
<tr>
<td>2</td>
<td>Standard - Pressure = inH2O/psi (@ 20° C); Temperature = deg. F</td>
</tr>
<tr>
<td>3</td>
<td>Standard - Pressure = inH2O/psi (@ 4° C); Temperature = deg. F</td>
</tr>
<tr>
<td>4</td>
<td>Standard - Pressure = inH2O/psi (@ 20° C); Temperature = deg. C</td>
</tr>
<tr>
<td>5</td>
<td>Custom</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>Reference temperature</td>
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<tr>
<td>2</td>
<td>Operating temperature</td>
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<td>Reference temperature</td>
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<tr>
<td>4</td>
<td>Operating temperature</td>
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<table>
<thead>
<tr>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>f</th>
<th>INTEGRAL MOUNTING OF ASSOCIATED INSTRUMENTATION - 6th character</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
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</tbody>
</table>