DATA SHEET

The ProcessX level transmitter accurately measures liquid level and transmits a proportional 4 to 20 mA signal. The transmitter utilizes a unique micromachined capacitance silicon sensor with state-of-the-art microprocessor technology to provide exceptional performance and functionality.

FEATURES

1. HIGH ACCURACY
0.165% accuracy for all calibrated spans is a standard feature. The micro-capacitance silicon sensor assures this accuracy for all elevated or suppressed calibration ranges without additional adjustment.
0.1% accuracy is available as option.

2. MINIMUM INVENTORY AND DESIGN
Electronics unit, local indicators and electronics housing are interchangeable among all ProcessX transmitters.

3. MINIMUM ENVIRONMENTAL INFLUENCE
The “Advanced Floating Cell” design which protects the pressure sensor against changes in temperature, static pressure, and overpressure substantially reduces total measurement error in actual field applications.

4. GEORGIN/HART® BILINGUAL COMMUNICATIONS PROTOCOL
ProcessX series transmitter offers bilingual communications to speak both Georgin proprietary protocol and HART®. Any HART® compatible devices can communicate with ProcessX.

5. APPLICATION FLEXIBILITY
Various options that render the ProcessX suitable for almost any process applications include:
• Full range of hazardous area approvals,
• Built-in RFI filter and lightning arrester,
• 5-digit LCD meter with engineering unit,
• Stainless steel electronics housing,
• Wide selection of materials.

6. PROGRAMMABLE OUTPUT LINEARIZATION FUNCTION
Output signal can be freely programmable. (Up to 14 compensated points at approximation).

7. BURNOUT CURRENT FLEXIBILITY (UNDER SCALE: 3.2 to 4.0 mA, OVER SCALE: 20.0 to 22.5 mA)
Burnout signal level is adjustable using Model FXW or Hand Held Communicator (HHC) to comply with NAMUR NE43.

8. DRY CALIBRATION WITHOUT REFERENCE PRESSURE
Thanks to the best combination of unique construction of mechanical parts (Sensor unit) and high performance electronics circuit (Electronics unit), reliability of dry calibration without reference pressure is at equal level as wet calibration.

FUNCTIONAL SPECIFICATIONS

Type:
FKE: Smart, 4-20 mA DC + Georgin/Hart® digital signal

Service:
Liquid, gas or vapour

Static pressure, span, and range limit:

<table>
<thead>
<tr>
<th>Type</th>
<th>Static pressure</th>
<th>Span limit (mmH₂O)</th>
<th>Range limit (mmH₂O)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>FKE2</td>
<td>Up to flange</td>
<td>10</td>
<td>600±600</td>
</tr>
<tr>
<td>FKE3</td>
<td>32</td>
<td>3200±3200</td>
<td></td>
</tr>
<tr>
<td>FKE5</td>
<td>130</td>
<td>13000±13000</td>
<td></td>
</tr>
<tr>
<td>FKE6</td>
<td>500</td>
<td>50000±50000</td>
<td></td>
</tr>
<tr>
<td>FKE8</td>
<td>3000</td>
<td>300000±300000</td>
<td></td>
</tr>
</tbody>
</table>

Remark:
To minimize environmental influence, span should be greater than 1/40 of the max. span in most applications.

Lower limit of static pressure (vacuum limit):
Silicone fill sensor: See Fig.1
Fluorinated fill sensor: 66 kPa abs (500 mmHg abs) at temperature below 60 °C. See fig.2

Overrange limit:
To maximum static pressure limit.

Output signal:
4 to 20 mA DC with digital signal superimposed on the analogic signal.

Power supply:
Transmitter operates on 10.5 V to 45 V DC at transmitter terminals. 10.5 V to 32 V DC for the units with optional arrester.
**LOAD LIMITATIONS**

When the upper limit of the saturation current (I_max) is 21.6 mA

Note: The load resistance varies with the upper limit of the saturation current (I_max)

\[
R([\Omega]) = \frac{E([V])}{I([mA]) \times 0.9 \times 10^{-3}}
\]

Note: For communication with HHC, min. of 250 Ω required.

**HAZARDOUS LOCATIONS**

- **ATEX X**
  - Attestation DEKRA 14ATEX0015X
  - Ex d IIC T5/T6 Gb
  - Ex tb IIC T85°C/T100°C Db
  - Ta= -40<+85°C - T5/T100°C
  - Ta= -40<+65°C - T6/T85°C
  - IP66/67
  - Ex II 2 GD : Group II (Surface) - Category 2GD
  - The temperature of the cable can be Ta + 5 °C

  - Installation areas: Zones 1-2
  - Zones 21-22

- **IECEX R**
  - Attestation IECEX CSA 16.0048X
  - Ex d IIC T5/T6 Gb
  - Ex tb IIC T85°C/T100°C Db
  - Ta= -40<+85°C - T5/T100°C
  - Ta= -40<+65°C - T6/T85°C
  - IP66/67

**Intrinsic safety**

- **ATEX K**
  - Attestation DEKRA 14ATEX0016X
  - Ex ia IIC T4/T5 Gb
  - Ex ia IIC T100°C/T135°C Da
  - Ta= -40<+70°C - T4/T135°C
  - Ta= -40<+50°C - T5/T100°C
  - Ex I I GD : Group I (Surface) - Category 1GD

  - Installation areas: Zones 0-1-2
  - Zones 20-21-22

- **IECEX H**
  - Attestation IECEX CSA 16.0049X
  - Ex ia IIC T4/T5 Gb
  - Ex ia IIC T100°C/T135°C Da
  - Ta= -40<+70°C - T4/T135°C
  - Ta= -40<+50°C - T5/T100°C
  - IP66/67

**“n” Type**

- **ATEX P**
  - Ex nA IIC T5 Gc
  - Ex tc IIC T100°C Dc
  - Ta= -40<+70°C - T5/T100°C
  - Ex II 3 GD : Group II (Surface) - Category 3GD

  - Installation areas: Zones 2
  - Zones 22

- **IECEX Q**
  - Ex nA IIC T5 Gc
  - Ex tc IIC T100°C Dc
  - Ta= -40<+70°C - T5/T100°C
  - IP66/67

Refer to the package insert for safe use.
**FKE-5**  Level transmitter

- **Zero/Span Adjustment**: Zero and span are adjustable from the HHC<sup>(1)</sup>. Zero and span are also adjustable externally from the adjustment screw.
- **Damping**: Adjustable from HHC<sup>(1)</sup> or local adjustment unit with LCD display.
  The time constant is adjustable between 0.12 to 32 sec.
- **Zero Elevation/Suppression**: -100% to +100% of URL.
- **Normal/Reverse Action**: Selectable from HHC<sup>(1)</sup>
- **Indication**: Analog indicator or 5-digit LCD meter.
- **Burnout Direction**: Selectable from HHC<sup>(1)</sup>
  If self-diagnostic detect transmitter failure, the analog signal will be driven to either "Output Hold", "Output Overscale" or "Output Underscale" modes.
  - **Output Hold**: Output signal is held as the value just before failure happens.
  - **Output Overscale**: Adjustable within the range 20.0 mA to 22.5 mA from HHC<sup>(1)</sup>.
  - **Output Underscale**: Adjustable within the range 3.2 mA to 4.0 mA from HHC<sup>(1)</sup>.

- **Loop-Check Output**: Transmitter can be configured to provide constant signal 3.2 mA through 22.5 mA by HHC<sup>(1)</sup>.
- **Temperature Limit**:
  - Ambient: -40 à +85°C
  - -20 à +80°C (for LCD indicator)
  - -40 à +60°C (for arrester option)
  - -10 à +60°C (for fluorinated oil fill transmitter)
  For explosion proof units (flameproof or intrinsic safety), ambient temperature must be within the limits specified in each standard.

- **Process**: Code in the 13th digit of "Code symbols"; Process temperature; Lower limit of static pressure.

- **Storage**: -40 à +90°C
- **Humidity**: 0 to 100% RH (Relative Humidity)

- **Communication**:
  - With HHC<sup>(1)</sup> (model FXW, consult DS_EDS8-47), following items can be remotely displayed or configured.
  - Note: HHC’s version must be higher than 7.0 (or FXW 1–4), for ProcessX for supporting these items: “Saturate current”, “Write protect”, and “History”.

- **Performance Specifications**
  - Reference conditions, silicone oil fill, SS 316L isolating diaphragms, 4-20 mA analog output.
  - **Accuracy Rating**: (including linearity, hysteresis, and repeatability) (Standard)
    - For spans greater than 1/10 of URL: ±0.165% of span
    - For spans below 1/10 of URL:
      - ±(0.1 + 0.1 · \(\frac{0.1 \times URL}{Span}\)) % of span
      - (Option)
    - For span greater than 1/10 of URL: 0.1% of span
    - For span below 1/10 of URL:
      - ±(0.05 + 0.05 · \(\frac{0.1 \times URL}{Span}\)) % of span
  - **Stability**: ±0.2% of upper range limit (URL) for 10 years.
Level transmitter

**Temperature effect:**
Effects per 28°C change between the limits of -40°C and +85°C
- Zero shift (transmitter only) : ±0,3 of URL
- Zero shift (level kit only) : +0,3 mbar/28°C
- Total effect (level kit and transmitter) : ± 0,3% of URL

**Note:** The indicated values are for temperature compensation made on transmitter only, without level kit. Zero shift is improved (2 to 3 times) by an additional temperature compensation of the complete level transmitter (level kit and transmitter).

**Static pressure effect:**
- Zero shift: ±0.2% of URL / 1MPa
- Span shift: ±0.2% of calibrated span / 1MPa
- Double the effects for material code (7th digit in codes symbols) "H", "M", "T", "B", "P" and "R".

**Overrange effect:**
- Zero shift: ±0.15% of URL (160bar max)
- Double the effects for material code (7th digit in codes symbols) "H", "M", "T", "B", "P" and "R"

**Supply voltage effect:**
Less than 0.005% of calibrated span per 1 V.

**Update rate:**
60 msec

**RFI effect:**
- < 0.2% of URL for the frequencies of 20 to 1000 MHz and field strength of 10 V/m when electronic housing covers are on (Classification : 2-abc : 0.2% of span according SAMA PMC 33.1)

**Response time:**
(At 63.3% of output signal without damping)

<table>
<thead>
<tr>
<th>Range code</th>
<th>Time constant (at 23°C)</th>
<th>Dead time</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;3&quot;</td>
<td>550 msec</td>
<td>120 msec approx.</td>
</tr>
<tr>
<td>&quot;5&quot; &amp; &quot;8&quot;</td>
<td>300 msec</td>
<td>120 msec approx.</td>
</tr>
</tbody>
</table>

Response time = time constant + dead time

**Mounting position effect:**
Zero shift, less than 30 mmH2O for a 10° tilt in any plane (no extension). This error can be corrected by adjusting zero. (Double the effect for fluorinated fill sensor). No effect on span.

**Vibration effect:**
< ±0.25% of span for spans greater than 1/10 of URL. Frequency 10 to 150 Hz, acceleration 39.2 m/sec².

**Material fatigue:**
Please consult Georgin

**Dielectric strength:**
500 V AC, 50/60Hz 1 min., between circuit and earth.

**Insulation resistance:**
More than 100 MΩ at 500 V DC.

**Turn-on time:**
4 seconds

**Internal resistance for external field indicator:**
12 Ω Max (connected to test terminal CK+ and CK-)

**Pressure equipment directive (PED) 97/23/EC:**
According to Article 3.3

**Physical specifications**

**Electrical connections:**
- 1/2"-14 NPT, Pg 13,5 or M20 x 1.5

**Process connections:**
- LP side: Standard
- HP side: ANSI or DIN raised face flange

**Process-wetted parts material:**

<table>
<thead>
<tr>
<th>Material code (7th digit in &quot;Code symbols&quot;)</th>
<th>Process cover</th>
<th>Diaphragm</th>
<th>Wetted sensor body</th>
<th>Diaphragm &amp; flange face</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
</tr>
<tr>
<td>W</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
</tr>
<tr>
<td>H</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
</tr>
<tr>
<td>M</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L Monel</td>
</tr>
<tr>
<td>T</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L Tantalum</td>
</tr>
<tr>
<td>A</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L + FEP</td>
</tr>
<tr>
<td>B</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L + Gold coating</td>
</tr>
<tr>
<td>P</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L Titanium</td>
</tr>
<tr>
<td>R</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L</td>
<td>SS 316L Zirconium</td>
</tr>
</tbody>
</table>

**Environmental protection:**
IP66/IP67 and NEMA 4X

**Mass (weight):**
- Transmitter: Approx. 10.2 to 19.2 kg without options
- Add: 0.3 kg for indicator
- 0.5 kg for mounting bracket
- 2.0 kg for stainless steel housing (option)
- 1.0 kg per 50mm extension of diaphragm

**Accessories**

**Oval flanges:**
Converts process connection to 1/2-14 NPT

**Handheld communicator:**
(Model FXW, refer to data sheet (EDS8-47)

**Optional features**

**Indicator:**
A plug-in analog indicator (2.5% accuracy) can be housed in the electronics compartment or in the terminal box of the housing. An optional 5 digit LCD meter with engineering unit is also available.

**Local configurator with LCD display:**
An optional 5 digits LCD meter with 3 push buttons can support items as using communication with HHC.

**Arrester:**
A built-in arrester protects the electronics from lightning surges. Lightning surge immunity: 4 kV (1.2 × 50μs)

**Oxygen service:**
Special cleaning procedures are followed throughout the rocess to maintain all process wetted parts oil-free. The fill fluid is fluorinated oil.

**Chlorine service:**
Oil free procedures as above. Includes fluorinated oil for fill.
**DEGREASING:**
Process-wetted parts are cleaned, but the fill fluid is standard silicone oil. Not for use on oxygen or chlorine measurement.

**NACE SPECIFICATION:**
Metallic materials for all pressure bound ary parts comply with NACE MR 0175/ISO 15156. SS 660 bolts and nuts comply with NACE MR 0175/ISO 15156.

**Optional Tag Plate:**
An extra stainless steel tag with customer tag data is wired to the transmitter.

**Vacuum Service:**
Special silicone oil and filling procedure are applied. See Fig.1 and Fig.2 below.

---

**Silicone (Code Y,G)**

**Degreasing:**
Process-wetted parts are cleaned, but the fill fluid is standard silicone oil. Not for use on oxygen or chlorine measurement.

**NACE Specification:**
Metallic materials for all pressure bound ary parts comply with NACE MR 0175/ISO 15156. SS 660 bolts and nuts comply with NACE MR 0175/ISO 15156.

**Optional Tag Plate:**
An extra stainless steel tag with customer tag data is wired to the transmitter.

**Vacuum Service:**
Special silicone oil and filling procedure are applied. See Fig.1 and Fig.2 below.

---

**Fig. 1:** Relation between process temperature and operating pressure

**Fig. 2:** Relation between process temperature and operating pressure

---

All models of ProcessX series transmitters are in accordance with:

- the harmonized standards:
  - EN 61326-1 : 2006 (Electrical equipment for measurement, control and laboratory use - EMC requirement).

**Emission Limits : EN 61326-1 : 2006**

<table>
<thead>
<tr>
<th>Frequency range (MHz)</th>
<th>Limits</th>
<th>Basics standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 to 230</td>
<td>40 dB (µV/m) quasi peak, measured at 10 m distance</td>
<td>EN 55011 / CISPR 11 Group 1 Class A</td>
</tr>
<tr>
<td>230 to 1000</td>
<td>47 dB (µV/m) quasi peak, measured at 10 m distance</td>
<td></td>
</tr>
</tbody>
</table>

**Immunity Requirements : EN 61326-1 : 2006 (Table 2)**

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Test value</th>
<th>Basic standard</th>
<th>Performance Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (EDS)</td>
<td>4 kV (Contact) 8 kV (Air)</td>
<td>EN 61000-4-2 IEC 61000-4-2</td>
<td>B</td>
</tr>
<tr>
<td>Electromagnetic field</td>
<td>10 V/m (80 to 1000 MHz) 3 V/m (1.4 to 2.0 GHz) 1 V/m (2.0 to 2.7 GHz)</td>
<td>EN 61000-4-3 IEC 61000-4-3</td>
<td>A</td>
</tr>
<tr>
<td>Rated power frequency magnetic field</td>
<td>30 A/m</td>
<td>EN 61000-4-8 IEC 61000-4-8</td>
<td>A</td>
</tr>
<tr>
<td>Burst</td>
<td>2 kV (5/50 NS, 5 kHz)</td>
<td>EN 61000-4-4 IEC 61000-4-4</td>
<td>B</td>
</tr>
<tr>
<td>Surge</td>
<td>1 kV line to line 2 kV line to line</td>
<td>EN 61000-4-5 IEC61000-4-5</td>
<td>B</td>
</tr>
<tr>
<td>Conducted RF</td>
<td>3 V (150 kHz to 80 MHz)</td>
<td>EN 61000-4-6 IEC61000-4-6</td>
<td>A</td>
</tr>
</tbody>
</table>

**Performance Criteria:**

A: During testing, normal performance within the specification limits.

B: During testing, temporary degradation or less of function or performance which is selfrecovering.

---

**Safety for Industrial Processes**

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## CODE SYMBOLS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| F      | Field |}

### Notes:
1. Turn down of 100 : 1 is possible, but it should be used at a span greater than 1/40 of the maximum span for better performance.
2. Add values for material options are for EN86 PN40 or ANSI-150 LB3* flange rate, DN100 or 4" add values are available upon request, LP side wetted cell body diaphragm in exotic materials are available upon request.
3. All wetted parts in the same material (diaphragm, extension, flange gasket area).
4. When no code can be found in the current code symbols, place an asterisk in concerned code digit(s) & add* in 16th digit.
5. Our stainless steel bolts/nuts in SS 660 are in conformity with the NACE MR 0175/ISO 15156 requirements and must be used for NACE MR 0175/ISO 15156 service.
6. Code “D & V” FM approval only possible with electrical connection 1/2”-14 NPT.
7. Please consult Georgin with your application conditions.
FKE-95 Level transmitter

**OUTLINE DIAGRAM FOR SHORT DESIGN** (unit : mm)

![Diagram](image)

Table:

<table>
<thead>
<tr>
<th>Code</th>
<th>Electrical connection</th>
<th>Oval flange screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>M5x1.5</td>
<td>10 x 7/16-20 UNF</td>
</tr>
<tr>
<td>T</td>
<td>7/16-20 UNF</td>
<td>7/16-20 UNF</td>
</tr>
<tr>
<td>V</td>
<td>Pg1/2</td>
<td>10 x 7/16-20 UNF</td>
</tr>
<tr>
<td>W</td>
<td>M5x1.5</td>
<td>7/16-20 UNF</td>
</tr>
<tr>
<td>X</td>
<td>Pg1/2</td>
<td>7/16-20 UNF</td>
</tr>
</tbody>
</table>

**FLUSHING RINGS DIMENSIONS**

<table>
<thead>
<tr>
<th>En.1092-1</th>
<th>En.1759-1</th>
<th>ØEN</th>
<th>Øh</th>
<th>Øp</th>
<th>Øq</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>ØDN 15</td>
<td>15/18</td>
<td>20</td>
<td>9</td>
<td>10.5</td>
<td>10</td>
<td>25.3</td>
</tr>
<tr>
<td>ØDN 20</td>
<td>20/24</td>
<td>21</td>
<td>12.5</td>
<td>12</td>
<td>16.5</td>
<td>34.5</td>
</tr>
<tr>
<td>ØDN 25</td>
<td>25/30</td>
<td>24</td>
<td>16</td>
<td>15</td>
<td>18</td>
<td>43.5</td>
</tr>
<tr>
<td>ØDN 30</td>
<td>30/35</td>
<td>27</td>
<td>18</td>
<td>17.5</td>
<td>20</td>
<td>52</td>
</tr>
<tr>
<td>ØDN 35</td>
<td>35/40</td>
<td>30</td>
<td>20</td>
<td>19</td>
<td>22</td>
<td>61</td>
</tr>
<tr>
<td>ØDN 40</td>
<td>40/45</td>
<td>32</td>
<td>22</td>
<td>20.5</td>
<td>25</td>
<td>70</td>
</tr>
</tbody>
</table>

Weight: 10.2 to 19.2 kg (without option)

Add:
- Flange's weight (see table)
- 1 kg per 50 mm of extension
- 0.3 kg for indicator (option)
- 2 kg for SS mounting bracket (option)
- 0.5 kg for mounting bracket

**SPAN LIMIT**

<table>
<thead>
<tr>
<th>X11</th>
<th>Y</th>
<th>E</th>
<th>F</th>
<th>K</th>
<th>M</th>
<th>L</th>
<th>P</th>
<th>R</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>X11</td>
<td>Y</td>
<td>E</td>
<td>F</td>
<td>K</td>
<td>M</td>
<td>L</td>
<td>P</td>
<td>R</td>
<td>S</td>
</tr>
</tbody>
</table>

**OUTLINE DIAGRAM**

![Diagram](image)