

PRESSURE TRANSMITTER (DIRECT MOUNT TYPE)

DATA SHEET

FKP...5

The FCX-AIII pressure transmitter accurately measures gauge pressure and transmits proportional 4 to 20mA signal.

The transmitter utilizes the unique micromachined capacitive silicon sensor with state-of-the-art microprocessor technology to provide exceptional performance and functionality.

FEATURES

- High accuracy $\pm 0.1\%$**
0.1% accuracy is a standard feature. Fuji's micro-capacitance silicon sensor assures this accuracy for all elevated or suppressed calibration ranges without additional adjustment.
- Minimum environmental influence**
The "Advance Floating Cell" design which protects the pressure sensor against changes in temperature, and overpressure substantially reduces total measurement error in actual field applications.
- Fuji/HART® bilingual communications protocol and FOUNDATION™ fieldbus and Profibus™ compatibility**
FCX-AIII series transmitter offers bilingual communications to speak both Fuji proprietary protocol and HART®. Any HART® compatible devices can communicate with FCX-AIII. Further, by upgrading electronics FOUNDATION™ fieldbus and Profibus™ are also available.
- Application flexibility**
Various options that render the FCX-AIII 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
- Burnout current flexibility (Under Scale: 3.2 to 4.0mA, Over Scale: 20.0 to 21.6mA)**
Burnout signal level is adjustable using Model FXW Hand Held Communicator (HHC) to comply with NAMUR NE43.
- 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.



SPECIFICATIONS

Functional specifications

Service: Liquid, gas, or vapour
Span, range and overrange limit:

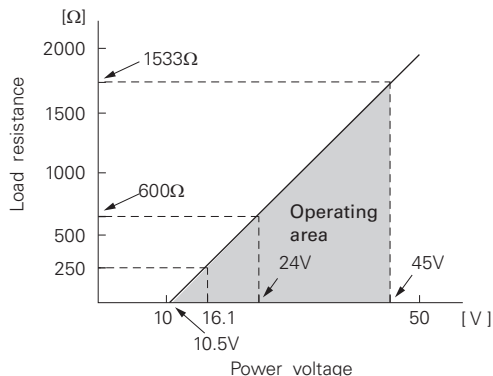
| Type | Span limit [kPa] {bar} | | Range limit [kPa] {bar} | Overrange limit [MPa] {bar} |
|----------|------------------------|----------------|--------------------------------|-----------------------------|
| | Min. | Max. | | |
| FKP □ 01 | 8.125 {0.08125} | 130 {1.3} | -100 to +130 {-1 to +1.3} | 1 {10} |
| FKP □ 02 | 31.25 {0.3125} | 500 {5} | -100 to +500 {-1 to +5} | 1.5 {15} |
| FKP □ 03 | 187.5 {1.875} | 3000 {30} | -100 to +3000 {-1 to +30} | 9 {90} |
| FKP □ 04 | 625 {6.25} | 10000 {100} | -100 to +10000 {-1 to +100} | 15 {150} |

— Lower range limit (vacuum limit) is;
Silicone fill sensor: See Fig. 1
Fluorinated fill sensor: 66kPa abs (500mmHg abs) at below 60°C

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

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

Load limitations: see figure below



Note: For communication with HHC⁽¹⁾ (Model: FXW), min. of 250 Ω required.

Hazardous locations: SEE TABLE3

Zero/span adjustment:

Zero and span are adjustable from the HHC⁽¹⁾. Zero and span are also adjustable externally from the adjustment screw (span adjustment not available with 9th digit code "L, P, Q, S").

Damping: Adjustable from HHC or local adjustment unit with LCD display.
The time constant is adjustable between 0 to 32 seconds.

Zero elevation/suppression:

Zero can be elevated or suppressed within the specified range limit of each sensor model.

Normal/reverse action:

Selectable from HHC⁽¹⁾.

Indication: Analog indicator or 5-digit LCD meter, as specified.

Burnout direction: Selectable from HHC⁽¹⁾

If self-diagnostic detect transmitter failure, the analog signal will be driven to either "Output Hold", "Output Overscale" or "Output Underscale" modes.

"Output Hold":

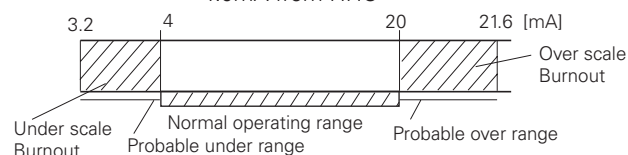
Output signal is hold as the value just before failure happens.

"Output Overscale":

Adjustable within the range 20.0mA to 21.6mA from HHC⁽¹⁾

"Output Underscale":

Adjustable within the range 3.2mA to 4.0mA from HHC



Output limits conforming to NAMUR NE43 by order.

Loop-check output:

Transmitter can be configured to provide constant signal 3.2mA through 21.6mA by HHC.

Temperature limit:

Ambient: -40 to +85°C

(-20 to +80°C for LCD indicator)

(-40 to +60°C for arrester option)

(-10 to +60°C for fluorinated oil fill transmitter)

For explosionproof units (flameproof or intrinsic safety), ambient temperature must be within the limits specified by each standard.

Process: -40 to +100°C for silicone fill sensor

-20 to +80°C for fluorinated oil fill sensor

Storage: -40 to +90°C

Humidity limit: 0 to 100% RH

Communication: With HHC⁽¹⁾ (Model FXW, consult Data Sheet No. EDS8-47), following items can be remotely displayed or configured.

Note: HHC's version must be higher than 6.0 (or FXW □□□□1-□3), for FCX-AIII.

For supporting "Saturate current", "Write protect", and "History", HHC's version 6.3 or higher is necessary.

Local configurator with LCD display (option):

Local configurator with 3 push button and LCD display can support following items.

| Items | By communication with FXW | | By local configurator (with 3 push button) | |
|--|---------------------------|-----|--|-----|
| | Display | Set | Display | Set |
| Tag No. | ✓ | ✓ | ✓ | ✓ |
| Model No. | ✓ | ✓ | ✓ | ✓ |
| Serial No. & Software Version | ✓ | — | ✓ | — |
| Engineering unit | ✓ | ✓ | ✓ | ✓ |
| Range limit | ✓ | — | ✓ | — |
| Measuring range | ✓ | ✓ | ✓ | ✓ |
| Damping | ✓ | ✓ | ✓ | ✓ |
| Output mode | ✓ | — | ✓ | — |
| Burnout direction | ✓ | ✓ | ✓ | ✓ |
| Calibration | ✓ | ✓ | ✓ | ✓ |
| Output adjust | — | ✓ | — | ✓ |
| Data | ✓ | — | ✓ | — |
| Self diagnoses | ✓ | — | ✓ | — |
| Printer (In case of FXW with printer option) | ✓ | — | — | — |
| External switch lock | ✓ | ✓ | ✓ | ✓ |
| Transmitter display | ✓ | ✓ | ✓ | ✓ |
| Linearize | ✓ | ✓ | — | — |
| Rerange | ✓ | ✓ | ✓ | ✓ |
| Saturate current | ✓ | ✓ | ✓ | ✓ |
| Write protect | ✓ | ✓ | ✓ | ✓ |
| History | | | | |
| - Calibration history | ✓ | ✓ | ✓ | ✓ |
| - Ambient temperature history | ✓ | — | ✓ | — |

(Note) (1) HHC: Hand Held Communicator

Performance specifications

- Accuracy rating:** (including linearity, hysteresis, and repeatability)
 For spans greater than 1/10 of URL:
 $\pm 0.1\%$ of span
 For spans below 1/10 of URL :
 $\pm (0.05 + 0.05 \frac{0.1 \times \text{URL}}{\text{span}}) \% \text{ of span}$
- Stability:** $\pm 0.2\%$ of upper range limit (URL) for 10 years (In case of 6th digit code "2", "3", "4")
- Temperature effect:**
 Effects per 55°C change between the limits of - 40°C and +85°C
 Zero shift :
 $\pm (0.4 + 0.1 \frac{\text{URL}}{\text{span}}) \% / 28^\circ\text{C}$
 Total effect:
 $\pm (0.475 + 0.1 \frac{\text{URL}}{\text{span}}) \% / 28^\circ\text{C}$
- Overrange effect:** Zero shift, 0.3% of URL for any overrange to maximum limit
- Supply voltage effect:**
 Less than 0.05% fo calibrated span per 10V
- Update rate:** 60 msec
- Step response:** Time constant: 0.08s (at 23°C)
 Dead time: about 0.12s
 (without electrical damping)
- Mounting position effect:**
 Zero shift, less than 0.1kPa {1mbar} for a 10° tilt in any plane.
 No effect on span. This error can be corrected by adjusting zero.
 (Double the effect for fluorinated fill sensors)
- Dielectric strength:**
 500V AC, 50/60Hz 1 min., between circuit and earth
- Insulation resistance:**
 More than 100MΩ at 500V DC
- Internal resistance for external field indicator:**
 12Ω or less.

Physical specifications

Electrical connections:
 G1/2, 1/2-14 NPT, Pg13.5, or M20×1.5 conduit, as specified.

Process connections:
 1/2-14NPT, Rc1/2, Rc1/4 or 1/4-18NPT, as specified.

Process-wetted parts material:

| Material code (7th digit in Code symbols) | Process cover | Diaphragm | Wetted sensor body |
|---|---------------------|----------------------|---------------------|
| V | 316 stainless steel | 316L stainless steel | 316 stainless steel |

Non-wetted parts material:

- Electronics housing: Low copper die-cast aluminum alloy (standard), finished with polyester coating.
 Fill fluid: Silicone oil (standard) or fluorinated oil (Daifloil)
 Mounting bracket: 304 stainless steel
- Environmental protection:**
 IEC IP67 and NEMA 6/6P
- Mounting:**
 On 60.5mm (JIS 50A or 2B) pipe using mounting bracket, direct wall mounting, or direct process mounting.
- Mass(weight):**
 Transmitter approximately 2.2kg without options.
 Add; 0.5kg for mounting bracket

Optional features

- Indicator:** A plug-in turnable analog indicator (2.5% accuracy)
An optional 5digits 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 FXW.
- Arrester:** A built-in arrester protects the electronics from lightning surges.
Lightning surge immunity:
4kV (1.2 x 50 μ s)
- Oxygen service:** Special cleaning procedures are followed throughout the process to maintain all process wetted parts oil-free.
The fill fluid is fluorinated oil.
- Degreasing:** Process-wetted parts are cleaned, but the fill fluid is standard silicone oil. Not for use for oxygen or chlorine measurement.
- NACE specification:**
Metallic materials for all pressure boundary parts comply with NACE MR-01-75.
- Optional tag plate:**
An extra stainless steel tag with customer tag data is wired to the transmitter.

ACCESSORIES

- Hand-held communicator:**
(Model FXW, refer to Data Sheet No. EDS8-47)

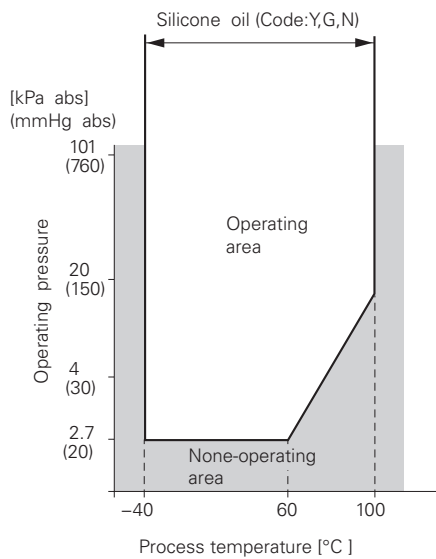
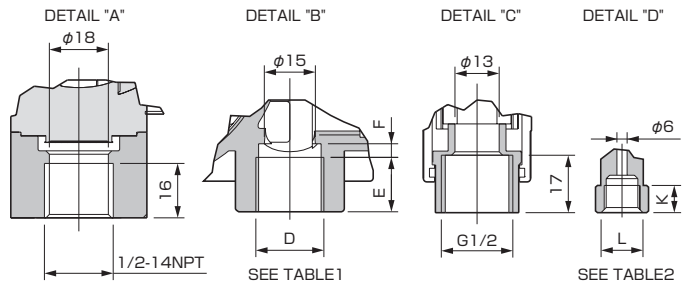
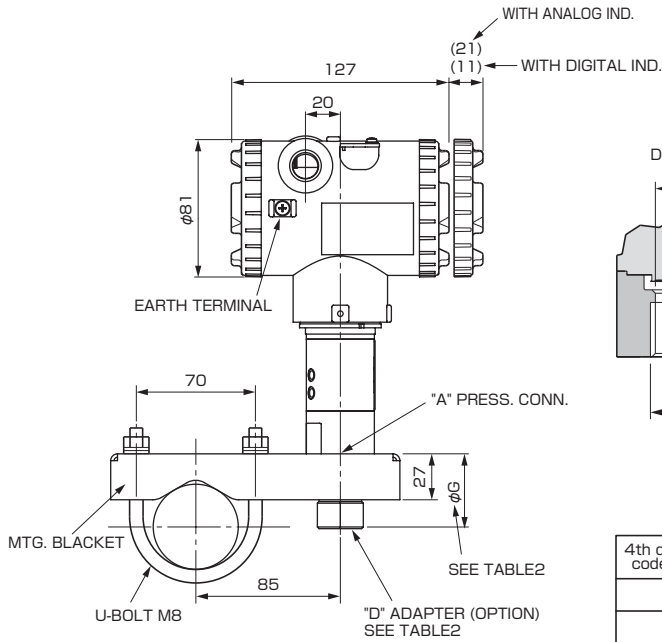
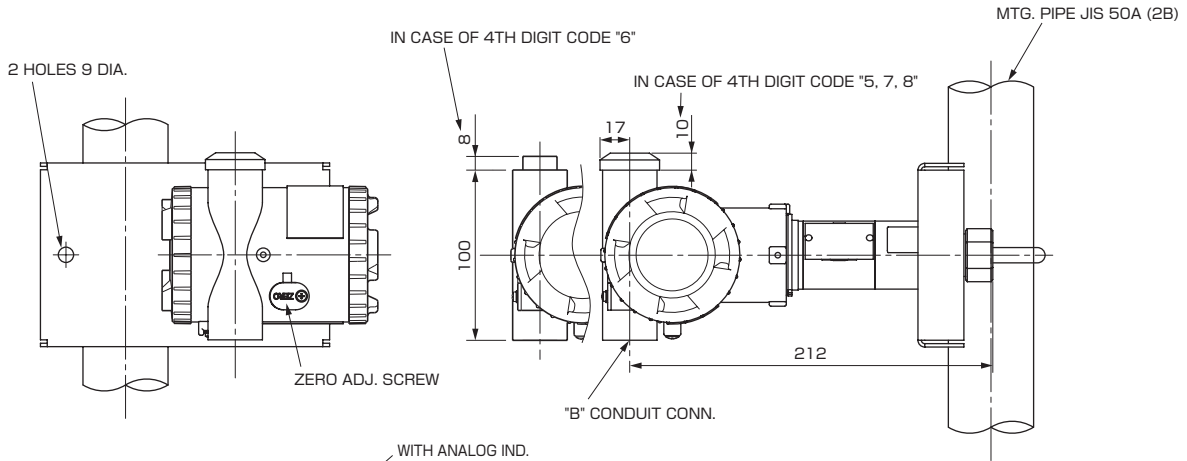
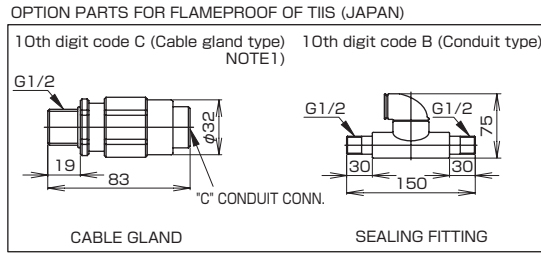


Fig. 1 Relation between process temperature and operating pressure

OUTLINE DIAGRAM (Unit:mm)



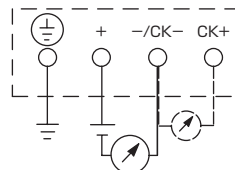
| 4th digit of the code symbols | Conduit conn. | | |
|-------------------------------|---------------|------|-----|
| | D | E | F |
| 5 | G 1/2 | 18 | 2 |
| 6 | 1/2-14NPT | 16 | 4 |
| 7 | Pg13.5 | 10.5 | 4.5 |
| 8 | M20×1.5 | 16 | 4 |

TABLE 1

| ADAPTER | | | | |
|---------|----|----|----|----|
| CONN.L | G | H | J | K |
| Rc 1/2 | 38 | 31 | 27 | 16 |
| NPT 1/4 | 18 | 25 | 22 | 8 |
| Rc 1/4 | | | | |

TABLE 2

CONNECTION DIAGRAM



NOTE1) IN CASE OF 10TH CODE "C", $\phi 11$ CABLE IS SUITBLE.

TABLE 3

| Authorities | Intrinsic safety | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---|----------------|--|------|-----------|------------|-------|-------|----------------|---------|-------|----------------|---------|-------|----------------|-------|-------|----------------|---|---|----------------|
| ATEX (pending) | <p>Ex II 1 GD EEx ia IIC T5 Tamb = -40°C to +50°C EEx ia IIC T4 Tamb = -40°C to +70°C</p> <p>Entity Parameters: U_i=28V, I_i=93.3mA, P_i=0.66W, C_i=25.18nF (Without Arrester), C_i=35.98nF (With Arrester), L_i=0.694mH</p> | | | | | | | | | | | | | | | | | | | | |
| Factory Mutual (pending) | <p>Class I II III Div.1 Groups A, B, C, D, E, F, G T4 Entity Type 4X</p> <table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th rowspan="2">Tamb</th> </tr> <tr> <th>9th digit</th> <th>13th digit</th> </tr> </thead> <tbody> <tr> <td>A,B,D</td> <td>Y,G,N</td> <td>-40°C to +85°C</td> </tr> <tr> <td>L,P,1,2</td> <td>Y,G,N</td> <td>-20°C to +80°C</td> </tr> <tr> <td>Q,S,4,5</td> <td>Y,G,N</td> <td>-20°C to +60°C</td> </tr> <tr> <td>E,F,H</td> <td>Y,G,N</td> <td>-40°C to +60°C</td> </tr> <tr> <td>-</td> <td>A</td> <td>-10°C to +60°C</td> </tr> </tbody> </table> <p>Entity Parameters: V_{max}=42.4V, I_{max}=113mA, P_i=1W, C_i=35.98nF, L_i=0.694mH</p> | Model code | | Tamb | 9th digit | 13th digit | A,B,D | Y,G,N | -40°C to +85°C | L,P,1,2 | Y,G,N | -20°C to +80°C | Q,S,4,5 | Y,G,N | -20°C to +60°C | E,F,H | Y,G,N | -40°C to +60°C | - | A | -10°C to +60°C |
| Model code | | Tamb | | | | | | | | | | | | | | | | | | | |
| 9th digit | 13th digit | | | | | | | | | | | | | | | | | | | | |
| A,B,D | Y,G,N | -40°C to +85°C | | | | | | | | | | | | | | | | | | | |
| L,P,1,2 | Y,G,N | -20°C to +80°C | | | | | | | | | | | | | | | | | | | |
| Q,S,4,5 | Y,G,N | -20°C to +60°C | | | | | | | | | | | | | | | | | | | |
| E,F,H | Y,G,N | -40°C to +60°C | | | | | | | | | | | | | | | | | | | |
| - | A | -10°C to +60°C | | | | | | | | | | | | | | | | | | | |
| CSA (pending) | <p>Class I Div.1 Groups A, B, C, D Class II Div.1 Groups E, F, G Class III Div.1</p> <p>Temp Code T5 Tamb max = +50°C Temp Code T4 Tamb max = +70°C</p> <p>Entity Parameters: V_{max}=28V, I_{max}=93mA, C_i=25.18nF (Without Arrester), C_i=35.98nF (With Arrester), L_i=0.694mH</p> | | | | | | | | | | | | | | | | | | | | |
| IECEX Scheme (pending) | <p>Ex ia IIC T4 IP66/67 Tamb = -40°C to +70°C Ex ia IIC T5 IP66/67 Tamb = -40°C to +50°C</p> <p>Entity Parameter: U_i=28V, I_i=93.3mA, P_i=0.66W, C_i=35.98nF, L_i=0.694mH</p> | | | | | | | | | | | | | | | | | | | | |
| TIIS (pending) | <p>Ex ia IIC T4 Tamb max = +60°C</p> <p>Entity Parameters: U_i=28V, I_i=94.3mA, P_i=0.66W, C_i=35.98nF, L_i=0.694mH</p> | | | | | | | | | | | | | | | | | | | | |
| NEPSI (pending) | <p>Ex ia IIC T4</p> <table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th rowspan="2">Tamb</th> </tr> <tr> <th>9th digit</th> <th>13th digit</th> </tr> </thead> <tbody> <tr> <td>A,B,D</td> <td>Y,G</td> <td>-40°C to +85°C</td> </tr> <tr> <td>L,P,1,2</td> <td>Y,G</td> <td>-20°C to +80°C</td> </tr> <tr> <td>Q,S,4,5</td> <td>Y,G</td> <td>-20°C to +60°C</td> </tr> <tr> <td>E,F,H</td> <td>Y,G</td> <td>-40°C to +60°C</td> </tr> <tr> <td>-</td> <td>A</td> <td>-10°C to +60°C</td> </tr> </tbody> </table> <p>Entity Parameters: U_i=42.4V, I_i=113mA, P_i=1W, C_i=35.98nF, L_i=0.694mH</p> | Model code | | Tamb | 9th digit | 13th digit | A,B,D | Y,G | -40°C to +85°C | L,P,1,2 | Y,G | -20°C to +80°C | Q,S,4,5 | Y,G | -20°C to +60°C | E,F,H | Y,G | -40°C to +60°C | - | A | -10°C to +60°C |
| Model code | | Tamb | | | | | | | | | | | | | | | | | | | |
| 9th digit | 13th digit | | | | | | | | | | | | | | | | | | | | |
| A,B,D | Y,G | -40°C to +85°C | | | | | | | | | | | | | | | | | | | |
| L,P,1,2 | Y,G | -20°C to +80°C | | | | | | | | | | | | | | | | | | | |
| Q,S,4,5 | Y,G | -20°C to +60°C | | | | | | | | | | | | | | | | | | | |
| E,F,H | Y,G | -40°C to +60°C | | | | | | | | | | | | | | | | | | | |
| - | A | -10°C to +60°C | | | | | | | | | | | | | | | | | | | |

| Authorities | Flameproof | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---|----------------|--|------|-----------|------------|-------|-------|----------------|---------|-------|----------------|---------|-------|----------------|-------|-------|----------------|---|---|----------------|
| ATEX (pending) | <p>Ex II 2 GD EEx d IIC T6 IP66/67 T85°C Tamb = -40°C to +65°C EEx d IIC T5 IP66/67 T100°C Tamb = -40°C to +85°C</p> | | | | | | | | | | | | | | | | | | | | |
| Factory Mutual (pending) | <p>Class I Div.1 Groups B, C, D T6 Type 4X Class II III Div.1 Groups E, F, G T6 Type 4X Tamb max = +60°C</p> | | | | | | | | | | | | | | | | | | | | |
| CSA | <p>Class I Div.1 Groups C, D Class II Div.1 Groups E, F, G Class III Div.1</p> <p>Note) "Seal Not Required" enclosure is allowed.</p> | | | | | | | | | | | | | | | | | | | | |
| IECEX Scheme (pending) | <p>Ex d IIC T5 IP66/67 Tamb = -40°C to +85°C Ex d IIC T6 IP66/67 Tamb = -40°C to +65°C</p> | | | | | | | | | | | | | | | | | | | | |
| TIIS | <p>Ex do IIB+H₂ T4 Tamb max = +60°C Maximum process temp. = +120°C</p> | | | | | | | | | | | | | | | | | | | | |
| NEPSI | <p>Ex d IIB+H₂ T6 Tamb = -40°C to +60°C</p> | | | | | | | | | | | | | | | | | | | | |
| Authorities | Type n Nonincendive | | | | | | | | | | | | | | | | | | | | |
| ATEX (pending) | <p>Ex II 3 GD EEx nL IIC T5 Tamb = -40°C to +50°C EEx nL IIC T4 Tamb = -40°C to +70°C</p> <p>Specific Parameters: Model without arrester: U_i=42.4V, I_i=113mA, P_i=1W, C_i=25.18nF, L_i=0.694mH Model with arrester: U_i=32V, I_i=113mA, P_i=1W, C_i=35.98nF, L_i=0.694mH</p> <p>EEx nAL IIC T5 Tamb = -40°C to +50°C EEx nAL IIC T4 Tamb = -40°C to +70°C</p> <p>Specific Parameters: Model without arrester: U_{max}=42.4V, I_{max}=113mA, P_{max}=1W, Model with arrester: U_{max}=32V, I_{max}=113mA, P_{max}=1W</p> | | | | | | | | | | | | | | | | | | | | |
| Factory Mutual (pending) | <p>Class I II III Div.2 Groups A, B, C, D, F, G T4 Entity Type 4X</p> <table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th rowspan="2">Tamb</th> </tr> <tr> <th>9th digit</th> <th>13th digit</th> </tr> </thead> <tbody> <tr> <td>A,B,D</td> <td>Y,G,N</td> <td>-40°C to +85°C</td> </tr> <tr> <td>L,P,1,2</td> <td>Y,G,N</td> <td>-20°C to +80°C</td> </tr> <tr> <td>Q,S,4,5</td> <td>Y,G,N</td> <td>-20°C to +60°C</td> </tr> <tr> <td>E,F,H</td> <td>Y,G,N</td> <td>-40°C to +60°C</td> </tr> <tr> <td>-</td> <td>A</td> <td>-10°C to +60°C</td> </tr> </tbody> </table> | Model code | | Tamb | 9th digit | 13th digit | A,B,D | Y,G,N | -40°C to +85°C | L,P,1,2 | Y,G,N | -20°C to +80°C | Q,S,4,5 | Y,G,N | -20°C to +60°C | E,F,H | Y,G,N | -40°C to +60°C | - | A | -10°C to +60°C |
| Model code | | Tamb | | | | | | | | | | | | | | | | | | | |
| 9th digit | 13th digit | | | | | | | | | | | | | | | | | | | | |
| A,B,D | Y,G,N | -40°C to +85°C | | | | | | | | | | | | | | | | | | | |
| L,P,1,2 | Y,G,N | -20°C to +80°C | | | | | | | | | | | | | | | | | | | |
| Q,S,4,5 | Y,G,N | -20°C to +60°C | | | | | | | | | | | | | | | | | | | |
| E,F,H | Y,G,N | -40°C to +60°C | | | | | | | | | | | | | | | | | | | |
| - | A | -10°C to +60°C | | | | | | | | | | | | | | | | | | | |
| CSA (pending) | <p>Class I Div.2 Groups A, B, C, D Class II Div.2 Groups E, F, G Class III Div.2</p> <p>Temp Code T5 Tamb max = +50°C Temp Code T4 Tamb max = +70°C</p> <p>Entity Parameters: V_{max}=28V, C_i=25.18nF (Without Arrester), C_i=35.98nF (With Arrester), L_i=0.694mH</p> | | | | | | | | | | | | | | | | | | | | |

⚠ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

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