

PRESSURE TRANSMITTER

DATA SHEET

FKG, FDG...5

The FCX-AII pressure transmitter accurately measures gauge pressure and transmits a proportional 4 to 20mA 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 up to ±0.04%

0.065% accuracy as standard, 0.04% accuracy as option. Fuji's micro-capacitance silicon sensor assures this accuracy for all elevated or suppressed calibration ranges without additional adjustment.

2. 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.

3. Fuji/HART® bilingual communications protocol and FOUNDATION™ fieldbus and Profibus™ compatibility

FCX-AII series transmitter offers bilingual communications to speak both Fuji proprietary protocol and HART®. Any HART® compatible devices can communicate with FCX-AII. Further, by upgrading electronics FOUNDATION™ fieldbus and Profibus™ are also available.

4. Application flexibility

Various options that render the FCX-AII 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

5. Burnout current flexibility (Under Scale: 3.2 to 4.0mA, Over Scale: 20.0 to 22.5mA)

Burnout signal level is adjustable using Model FXW Hand Held Communicator (HHC) to comply with NAMUR NE43.

6. 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: FKG : SMART, 4-20mA cc + Fuji/Hart® digital signal
 FDG : Fieldbus FOUNDATION™ and Profibus™

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. | Lower limit | Upper limit | |
| FKG□01 | 1.3 {0.013} | 130 {1.3} | -100 {-1} | 130 {1.3} | 1 {10} |
| FKG□02 | 5 {0.05} | 500 {5} | -100 {-1} | 500 {5} | 1.5 {15} |
| FKG□03 | 30 {0.3} | 3000 {30} | -100 {-1} | 3000 {30} | 9 {90} |
| FKG□04 | 100 {1} | 10000 {100} | -100 {-1} | 10000 {100} | 15 {150} |
| FKG□05 | 500 {5} | 50000 {500} | -100 {-1} | 50000 {500} | 75 {750} |

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

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

- Conversion factors to different units;
 1 MPa=10³ kPa=10bar=10.19716kgf/cm²= 145.0377psi
 1kPa=10mbar=101.9716mmH₂O =4.01463inH₂O

Output signal:

4 to 20mA DC with digital signal super- imposed on the 4 to 20mA signal.

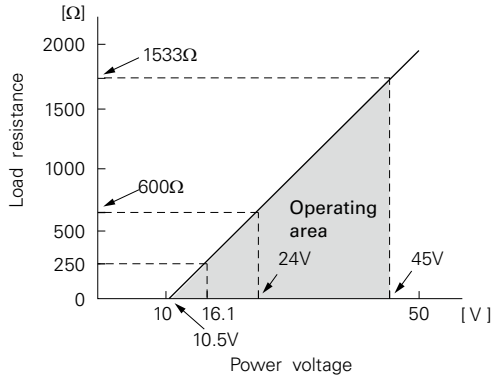
Digital signal based on fieldbus FOUNDATION™ and Profibus™

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:

| Authorities | Intrinsic safety | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---|----------------|--|------|-----------|------------|--|-----------|---------------|----------------|-------------|---------------|----------------|-------------|---------------|----------------|-----------|---------------|----------------|---|-------|----------------|
| ATEX (pending) | Ex II 1 GD Ex ia IIC T5 Tamb = -40°C to +50°C Ex ia IIC T4 Tamb = -40°C to +70°C Entity Parameters: Ui=28V, li=93.3mA, Pi=0.66W, Ci=25.18nF (Without Arrester), Ci=35.98nF (With Arrester), Li=0.694mH | | | | | | | | | | | | | | | | | | | | | |
| Factory Mutual (pending) | Class I II III Div.1 Groups A, B, C, D, E, F, G T4 Entity Type 4X <table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Tamb</th> </tr> <tr> <th>9th digit</th> <th>13th digit</th> <th></th> </tr> </thead> <tbody> <tr> <td>A,B,C,D,J</td> <td>Y,G,N</td> <td>-40°C to +85°C</td> </tr> <tr> <td>L,P,M,1,2,3</td> <td>Y,G,N</td> <td>-20°C to +80°C</td> </tr> <tr> <td>Q,S,N,4,5,6</td> <td>Y,G,N</td> <td>-20°C to +60°C</td> </tr> <tr> <td>E,F,G,H,K</td> <td>Y,G,N</td> <td>-40°C to +60°C</td> </tr> <tr> <td>-</td> <td>W,A,D</td> <td>-10°C to +60°C</td> </tr> </tbody> </table> Entity Parameters: Vmax=42.4V, Imax=113mA, Pi=1W, Ci=35.98nF, Li=0.694mH | Model code | | Tamb | 9th digit | 13th digit | | A,B,C,D,J | Y,G,N | -40°C to +85°C | L,P,M,1,2,3 | Y,G,N | -20°C to +80°C | Q,S,N,4,5,6 | Y,G,N | -20°C to +60°C | E,F,G,H,K | Y,G,N | -40°C to +60°C | - | W,A,D | -10°C to +60°C |
| Model code | | Tamb | | | | | | | | | | | | | | | | | | | | |
| 9th digit | 13th digit | | | | | | | | | | | | | | | | | | | | | |
| A,B,C,D,J | Y,G,N | -40°C to +85°C | | | | | | | | | | | | | | | | | | | | |
| L,P,M,1,2,3 | Y,G,N | -20°C to +80°C | | | | | | | | | | | | | | | | | | | | |
| Q,S,N,4,5,6 | Y,G,N | -20°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| E,F,G,H,K | Y,G,N | -40°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| - | W,A,D | -10°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| CSA (pending) | Class I Div.1 Groups A, B, C, D Class II Div.1 Groups E, F, G Class III Div.1 Temp Code T5 Tamb max = +50°C Temp Code T4 Tamb max = +70°C Entity Parameters: Vmax=28V, Imax=93mA, Ci=25.18nF (Without Arrester), Ci=35.98nF (With Arrester), Li=0.694mH | | | | | | | | | | | | | | | | | | | | | |
| TIIS (pending) | Ex ia IIC T4 Tamb max = +60°C Entity Parameters: Ui=28V, li=94.3mA, Pi=0.66W, Ci=38.4nF, Li=0.694mH | | | | | | | | | | | | | | | | | | | | | |
| IECEX Scheme (pending) | Ex ia IIC T4 IP66/67 Tamb = -40°C to +70°C Ex ia IIC T5 IP66/67 Tamb = -40°C to +50°C Entity Parameters: Ui=28V, li=93.3mA, Pi=0.66W, Ci=35.98nF, Li=0.694mH | | | | | | | | | | | | | | | | | | | | | |
| NEPSI (pending) | Ex ia IIC T4 Ex d IIB+H ₂ T6 / Ex ia IIC T4 <table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Tamb</th> </tr> <tr> <th>9th digit</th> <th>13th digit</th> <th></th> </tr> </thead> <tbody> <tr> <td>A,B,D,J</td> <td>Y,G,H,J,S,T,K</td> <td>-40°C to +85°C</td> </tr> <tr> <td>L,P,1,2</td> <td>Y,G,H,J,S,T,K</td> <td>-20°C to +80°C</td> </tr> <tr> <td>Q,S,4,5</td> <td>Y,G,H,J,S,T,K</td> <td>-20°C to +60°C</td> </tr> <tr> <td>E,F,H,K</td> <td>Y,G,H,J,S,T,K</td> <td>-40°C to +60°C</td> </tr> <tr> <td>-</td> <td>W,A,D</td> <td>-10°C to +60°C</td> </tr> </tbody> </table> Entity Parameters: Ui=42.4V, li=113mA, Pi=1W, Ci=35.98nF, Li=0.694mH | Model code | | Tamb | 9th digit | 13th digit | | A,B,D,J | Y,G,H,J,S,T,K | -40°C to +85°C | L,P,1,2 | Y,G,H,J,S,T,K | -20°C to +80°C | Q,S,4,5 | Y,G,H,J,S,T,K | -20°C to +60°C | E,F,H,K | Y,G,H,J,S,T,K | -40°C to +60°C | - | W,A,D | -10°C to +60°C |
| Model code | | Tamb | | | | | | | | | | | | | | | | | | | | |
| 9th digit | 13th digit | | | | | | | | | | | | | | | | | | | | | |
| A,B,D,J | Y,G,H,J,S,T,K | -40°C to +85°C | | | | | | | | | | | | | | | | | | | | |
| L,P,1,2 | Y,G,H,J,S,T,K | -20°C to +80°C | | | | | | | | | | | | | | | | | | | | |
| Q,S,4,5 | Y,G,H,J,S,T,K | -20°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| E,F,H,K | Y,G,H,J,S,T,K | -40°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| - | W,A,D | -10°C to +60°C | | | | | | | | | | | | | | | | | | | | |

| Authorities | Flameproof |
|--------------------------|---|
| ATEX (pending) | Ex II 2 GD Ex d IIC T6 IP66/67 T85°C Tamb = -40°C to +65°C Ex d IIC T5 IP66/67 T100°C Tamb = -40°C to +85°C |
| Factory Mutual (pending) | 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 |
| CSA | Class I Div.1 Groups C, D Class II Div.1 Groups E, F, G Class III Div.1 Note) "Seal Not Required" enclosure is allowed. |
| TIIS | Ex do IIB+H ₂ T4 Tamb max = +60°C Maximum process temp. = +120°C |
| IECEX Scheme (pending) | Ex d IIC T5 IP66/67 Tamb = -40°C to +85°C Ex d IIC T6 IP66/67 Tamb = -40°C to +65°C |
| NEPSI | Ex d IIB+H ₂ T6 Tamb = -40°C to +60°C |

| Authorities | Type n Nonincendive | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|---|----------------|--|------|-----------|------------|--|-----------|-------|----------------|-------------|-------|----------------|-------------|-------|----------------|-----------|-------|----------------|---|-------|----------------|
| ATEX (pending) | Ex II 3 GD Ex nL IIC T5 Tamb = -40°C to +50°C Ex nL IIC T4 Tamb = -40°C to +70°C Specific Parameters: Model without arrester: Ui=42.4V, li=113mA, Pi=1W, Ci=25.18nF, Li=0.694mH Model with arrester: Ui=32V, li=113mA, Pi=1W, Ci=35.98nF, Li=0.694mH Ex nA IIC T5 Tamb = -40°C to +50°C Ex nA IIC T4 Tamb = -40°C to +70°C Specific Parameters: Model without arrester: Umax=42.4V, Imax=113mA, Pmax=1W Model with arrester: Umax=32V, Imax=113mA, Pmax=1W | | | | | | | | | | | | | | | | | | | | | |
| Factory Mutual (pending) | Class I II III Div.2 Groups A, B, C, D, F, G T4 Entity Type 4X <table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Tamb</th> </tr> <tr> <th>9th digit</th> <th>13th digit</th> <th></th> </tr> </thead> <tbody> <tr> <td>A,B,C,D,J</td> <td>Y,G,N</td> <td>-40°C to +85°C</td> </tr> <tr> <td>L,P,M,1,2,3</td> <td>Y,G,N</td> <td>-20°C to +80°C</td> </tr> <tr> <td>Q,S,N,4,5,6</td> <td>Y,G,N</td> <td>-20°C to +60°C</td> </tr> <tr> <td>E,F,G,H,K</td> <td>Y,G,N</td> <td>-40°C to +60°C</td> </tr> <tr> <td>-</td> <td>W,A,D</td> <td>-10°C to +60°C</td> </tr> </tbody> </table> | Model code | | Tamb | 9th digit | 13th digit | | A,B,C,D,J | Y,G,N | -40°C to +85°C | L,P,M,1,2,3 | Y,G,N | -20°C to +80°C | Q,S,N,4,5,6 | Y,G,N | -20°C to +60°C | E,F,G,H,K | Y,G,N | -40°C to +60°C | - | W,A,D | -10°C to +60°C |
| Model code | | Tamb | | | | | | | | | | | | | | | | | | | | |
| 9th digit | 13th digit | | | | | | | | | | | | | | | | | | | | | |
| A,B,C,D,J | Y,G,N | -40°C to +85°C | | | | | | | | | | | | | | | | | | | | |
| L,P,M,1,2,3 | Y,G,N | -20°C to +80°C | | | | | | | | | | | | | | | | | | | | |
| Q,S,N,4,5,6 | Y,G,N | -20°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| E,F,G,H,K | Y,G,N | -40°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| - | W,A,D | -10°C to +60°C | | | | | | | | | | | | | | | | | | | | |
| CSA (pending) | Class I Div.2 Groups A, B, C, D Class II Div.2 Groups E, F, G Class III Div.2 Temp Code T5 Tamb max = +50°C Temp Code T4 Tamb max = +70°C Entity Parameters: Vmax=28V, Ci=25.18nF (Without Arrester), Ci=35.98nF (With Arrester), Li=0.694mH | | | | | | | | | | | | | | | | | | | | | |

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 is 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":

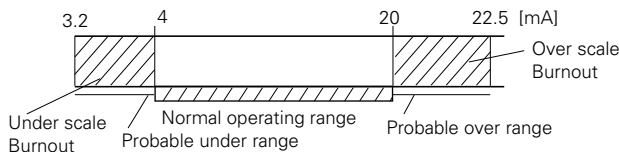
Output signal is hold as the value just before failure happens.

"Output Overscale":

Adjustable within the range 20.0mA to 22.5mA from HHC⁽¹⁾

"Output Underscale":

Adjustable within the range 3.2mA to 4.0mA from HHC⁽¹⁾



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⁽¹⁾.

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 -AII

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

| Items | Fuji Protocol with FXW | | Hart Protocol | |
|-------------------------------|------------------------|-----|---------------|-----|
| | 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

***Local configurator with LCD display (option):**

Local configurator with 3 push button and LCD display can support all items (Fuji Protocol list) except "Linearize" function.

Programmable output linearization function:

Output signal can be characterized with "14 points linear approximation function" from HHC⁽¹⁾.

Fieldbus units:

- Digital signal
- Transmission technique: according to IEC61158-2
- Power supply: 9VDC...32VDC
- Base current: 16±2mA
- Transmission rate: 31,25 kbits/sec
- Profibus-PA: DPV1 version 3.0
- Fieldbus Foundation: FF-890/891

Performance specifications

Reference conditions, silicone oil fill, 316SS isolating diaphragms, 4 to 20mA analog output in linear mode.

Accuracy rating:

(including linearity, hysteresis, and repeatability)

Max span below 10000kPa model:

- For spans greater than 1/10 of URL: ±0.065% of span or ±0.04% of span (21th digit: H)
- For spans below 1/10 of URL: ± (0.015+0.05 $\frac{0.1 \times \text{URL}}{\text{Span}}$) % of span

Max span 50000kPa model:

- For spans greater than 1/10 of URL: ±0.1% of span
- For spans below 1/10 of URL: ± (0.05+0.05 $\frac{0.1 \times \text{URL}}{\text{Span}}$) % of span

Stability:

±0.1% of upper range limit (URL) for 10 years.

Temperature effect:

Effects per 28°C change between the limits of - 40°C and +85°C

Zero shift: ±(0.075+0.0125 $\frac{\text{URL}}{\text{span}}$) %

Total effect: ±(0.095+0.0125 $\frac{\text{URL}}{\text{span}}$) %

Overrange effect:

Zero shift: 0.2% of URL for any overrange to maximum limit

Supply voltage effect:

Less than 0.005% of calibrated span per 1V

Update rate: 60 msec

Step response:

Time constant: 0.08s (at 23°C)

Dead time: approximately 0.12s
(without electrical damping)

Mounting position effect:

Zero shift, less than 0.1kPa {1m bar} for a 10° tilt in any plane.

No effect on span. This error can be corrected by adjusting Zero.

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 max (connected to test terminal CK+ and CK-)

Physical specifications

Electrical connections:

1/2-14 NPT, Pg13.5, or M20 × 1.5

Process connections:

1/4-18 NPT or Rc1/4 on 54mm centers, as specified.

Meet DIN 19213

Process-wetted parts material:

| Material code (7th digit in Code symbols) | Process cover | Diaphragm | Wetted sensor body | Vent/drain |
|--|-------------------------|-------------------------------------|---------------------|---------------------|
| V | 316 stainless steel(*1) | 316L stainless steel | 316 stainless steel | 316 stainless steel |
| W | 316 stainless steel(*1) | Hastelloy-C | 316 stainless steel | 316 stainless steel |
| J | 316 stainless steel(*1) | 316L stainless steel +Au coating | 316 stainless steel | 316 stainless steel |
| H | 316 stainless steel(*1) | Hastelloy-C | Hastelloy-C lining | 316 stainless steel |
| M | 316 stainless steel(*1) | Monel | Monel lining | 316 stainless steel |
| T | 316 stainless steel(*1) | Tantalum | Tantalum lining | 316 stainless steel |
| B | Hastelloy-C lining | Hastelloy-C | Hastelloy-C lining | Hastelloy-C |
| L | Monel lining | Monel | Monel lining | Monel |
| U | Tantalum lining | Tantalum | Tantalum lining | Hastelloy-C |

Note: *(1) ASTM CF8M

Remark: Sensor gasket :Viton o-ring or PTFE square section gasket.
Availability of above material design depends on ranges and static pressure.Refer to "Code symbols".

Non-wetted parts material:

Electronics housing:

Low copper die-cast aluminum alloy finished with polyester coating (standard), or 316 SS, as specified.

Bolts and nuts:

Cr-Mo alloy (standard), or 316 SS (630 or 660 SS for 50MPa unit).

Fill fluid:

Silicone oil (standard) or fluorinated oil

Mounting bracket: 304 SS

Environmental protection:

IEC IP67 and NEMA 6/6P

Mounting:

Without mounting bracket : direct mounting on mani-fold (optional)

With optional mounting bracket : for 50mm (2") pipe or direct wall mounting.

Mass {weight}:

Transmitter approximately 2.9 to 3.4kg without options.

Add: 0.5kg for mounting bracket

4.5kg for stainless steel housing (option)

Optional features

Indicator:

A plug-in analog indicator (2.5% accuracy)

An optional 5-digit LCD meter with enginee-ring 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 ⁽¹⁾.

Arrester:

A built-in arrester protects the electronics from lightning surges.

Lightning surge immunity: 4kV (1.2 × 50µs)

Oxygen service:

Special cleaning procedures are followed throughout the process to maintain all process wetted parts oil free.

The fill fluid is fluorinated oil.

Chlorine service:

The fill fluid is fluorinated oil.

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-01-75. 630/304 or 660/660 stain-less steel bolts and nuts comply with NACE.

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.

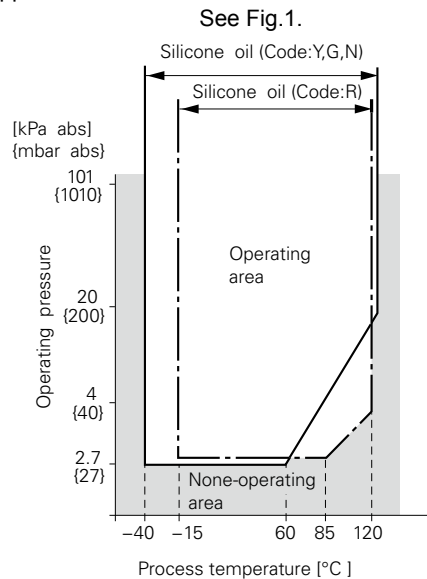


Fig.1 Relation between process temperature and operating pressure

ACCESSORIES

Oval flanges:

Converts process connection to 1/2-14 NPT in 316 stainless steel.

Hand-held communicator:

(FXW Model, refer to Data Sheet N° EDS8-47)

The product conforms to the requirements of the Electro-magnetic compatibility Directive 89/336/EEC as detailed within the technical construction file number TN513035. The applicable standards used to demonstrate compliance are :

EMI (Emission) EN61326 : 1997

Class A (std for Industrial Location)

| Frequency range MHz | Limits | Reference Standard |
|---------------------|--|-------------------------|
| 3 to 230 | 40dB (µV/m) quasi peak measured at 10m distance | CISPR16-1 and CISPR16-2 |
| 230 to 1000 | 47dB (µV/m) quasi peak, measured at 10m distance | |

Note) Definition of performance criteria

A : During testing, normal performance within the specification limits

B : During testing, temporary degradation, or loss of function or performance which is self-recovering.







EMS (Immunity) EN61326 : 1997

Annex A (standard for Industrial Location)



| Phenomenon | Test value | Basic Standard | Performance criteria |
|--------------------------------------|--|----------------|----------------------|
| Electrostatic discharge | 4kV (Contact) 8kV (Air) | IEC61000-4-2 | B |
| Electromagnetic field | 80 to 1000MHz 10V/m 80%AM (1kHz) | IEC61000-4-3 | A |
| Rated power frequency magnetic field | 30A/m 50Hz | IEC61000-4-8 | A |
| Burst | 2kV 5kHz | IEC61000-4-4 | B |
| Surge | 1.2µs/50µs 1kV (Line to line) 2kV (line to ground) | IEC61000-4-5 | B |
| Conducted RF | 0.15 to 80MHz 3V , 80%AM (1kHz) | IEC61000-4-6 | A |

CODE SYMBOLS

| | | | | | | | | | | | | | | | | DESCRIPTION |
|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|
| F K G | | | | | | | | | | | | | | | | Type |
| F D G | | | | | | | | | | | | | | | | Smart, 4-20 mA+ Fuji/Hart™ digital signal |
| R | | | | | | | | | | | | | | | | Fieldbus Foundation™ & Profibus™ |
| T | | | | | | | | | | | | | | | | Connections |
| V | | | | | | | | | | | | | | | | Process connections |
| W | | | | | | | | | | | | | | | | Oval flange connection |
| X | | | | | | | | | | | | | | | | Electrical connection |
| 0 1 V | | | | | | | | | | | | | | | | 1/4-18 NPT |
| 0 1 W | | | | | | | | | | | | | | | | 1/4-18 NPT |
| 0 1 H | | | | | | | | | | | | | | | | 7/16-20 UNF |
| 0 1 M | | | | | | | | | | | | | | | | 7/16-20 UNF |
| 0 1 J | | | | | | | | | | | | | | | | M10 or M12 (*1) |
| 0 1 T | | | | | | | | | | | | | | | | Pg 13.5 |
| 9 1 H | | | | | | | | | | | | | | | | M10 or M12 (*1) |
| 9 1 M | | | | | | | | | | | | | | | | M 20 x 1.5 |
| 9 1 T | | | | | | | | | | | | | | | | Pg 13.5 |
| 0 1 B | | | | | | | | | | | | | | | | 1/4-18 NPT |
| 0 1 L | | | | | | | | | | | | | | | | 1/4-18 NPT |
| 0 1 U | | | | | | | | | | | | | | | | 7/16-20 UNF |
| 0 2 V | | | | | | | | | | | | | | | | Range & wetted parts material |
| 0 2 W | | | | | | | | | | | | | | | | Spans (*2) |
| 0 2 H | | | | | | | | | | | | | | | | Process cover |
| 0 2 M | | | | | | | | | | | | | | | | Measuring diaphragm |
| 0 2 J | | | | | | | | | | | | | | | | Wetted cell body |
| 0 2 T | | | | | | | | | | | | | | | | 316L SS |
| 9 2 H | | | | | | | | | | | | | | | | 316L SS |
| 9 2 M | | | | | | | | | | | | | | | | Hast. C |
| 9 2 T | | | | | | | | | | | | | | | | Hast. C |
| 0 2 B | | | | | | | | | | | | | | | | Monel |
| 0 2 L | | | | | | | | | | | | | | | | Monel |
| 0 2 U | | | | | | | | | | | | | | | | Gold coat |
| 0 3 V | | | | | | | | | | | | | | | | 316L SS |
| 0 3 W | | | | | | | | | | | | | | | | 316L SS |
| 0 3 H | | | | | | | | | | | | | | | | Hast. C |
| 0 3 M | | | | | | | | | | | | | | | | Hast. C |
| 0 3 J | | | | | | | | | | | | | | | | Monel |
| 0 3 T | | | | | | | | | | | | | | | | Monel |
| 9 3 H | | | | | | | | | | | | | | | | Tantalum |
| 9 3 M | | | | | | | | | | | | | | | | Tantalum |
| 9 3 T | | | | | | | | | | | | | | | | Tantalum |
| 0 3 B | | | | | | | | | | | | | | | | Hast. C |
| 0 3 L | | | | | | | | | | | | | | | | Hast. C |
| 0 3 U | | | | | | | | | | | | | | | | Hast. C |
| 0 4 V | | | | | | | | | | | | | | | | Monel lining |
| 0 4 W | | | | | | | | | | | | | | | | Monel lining |
| 0 4 H | | | | | | | | | | | | | | | | Monel lining |
| 0 4 M | | | | | | | | | | | | | | | | Monel lining |
| 0 4 J | | | | | | | | | | | | | | | | Monel lining |
| 0 4 T | | | | | | | | | | | | | | | | Monel lining |
| 0 4 B | | | | | | | | | | | | | | | | Monel lining |
| 0 4 L | | | | | | | | | | | | | | | | Monel lining |
| 0 4 U | | | | | | | | | | | | | | | | Monel lining |
| 0 5 V | | | | | | | | | | | | | | | | Tantalum lining |
| 0 5 W | | | | | | | | | | | | | | | | Tantalum lining |
| 0 5 H | | | | | | | | | | | | | | | | Tantalum lining |
| 0 5 J | | | | | | | | | | | | | | | | Tantalum lining |

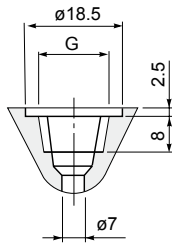
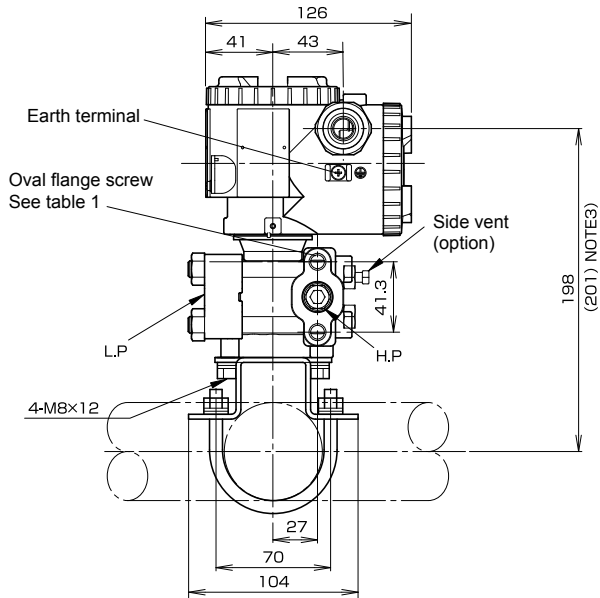
| 1 2 3 4 5 6 7 8 | | | | | | | | 9 10 11 12 13 14 15 | | | | | | | | 16 | |
|--|---|---|--|--|--|--|--|---------------------|--|--|--|-----------------|--|--|---|--|----------------------|
| | | | | | | | | | | | | | | | | DESCRIPTION | |
| Indicator & Arrester (next) | | | | | | | | | | | | | | | | | |
| Indicator | | | | | | | | Arrester | | | | Initial setting | | | | | |
| 5 | - | A | | | | | | | | | | | | | None | None | |
| 5 | - | B | | | | | | | | | | | | | Analog, 0-100% linear scale | None | |
| 5 | - | D | | | | | | | | | | | | | Analog, Custom scale | None | |
| 5 | - | J | | | | | | | | | | | | | Analog, double scale | None | 4-20mA DC |
| 5 | - | E | | | | | | | | | | | | | None | Yes | + |
| 5 | - | F | | | | | | | | | | | | | Analog, 0-100% linear scale | Yes | Hart™/Fuji |
| 5 | - | H | | | | | | | | | | | | | Analog, Custom scale | Yes | digital signal |
| 5 | - | K | | | | | | | | | | | | | Analog, double scale | Yes | "SMART" |
| 5 | - | 1 | | | | | | | | | | | | | digital, 0-100% | None | |
| 5 | - | 2 | | | | | | | | | | | | | digital, Custom scale | None | |
| 5 | - | 4 | | | | | | | | | | | | | digital, 0-100% | Yes | |
| 5 | - | 5 | | | | | | | | | | | | | digital, Custom scale | Yes | |
| Fieldbus Foundation™ | | | | | | | | | | | | | | | | | |
| 5 | - | A | | | | | | | | | | | | | None | No | Fieldbus Foundation™ |
| 5 | - | E | | | | | | | | | | | | | None | Yes | Fieldbus Foundation™ |
| 5 | - | P | | | | | | | | | | | | | digital | No | Fieldbus Foundation™ |
| 5 | - | S | | | | | | | | | | | | | digital | Yes | Fieldbus Foundation™ |
| Profibus | | | | | | | | | | | | | | | | | |
| 5 | - | R | | | | | | | | | | | | | None | No | Profibus |
| 5 | - | T | | | | | | | | | | | | | None | Yes | Profibus |
| 5 | - | V | | | | | | | | | | | | | digital | No | Profibus |
| 5 | - | W | | | | | | | | | | | | | digital | Yes | Profibus |
| Approvals for hazardous locations (consult FUJI for availability) | | | | | | | | | | | | | | | | | |
| A | | | | | | | | | | | | | | | None (standard) | | |
| X | | | | | | | | | | | | | | | Flameproof housing ATEX  II 2 GD - Ex d IIC T5/T6 (code 4 = "M, P, R, T" & "W" only) | | |
| K | | | | | | | | | | | | | | | Intrinsic Safety ATEX  II 1 GD - Ex ia IIC T4/T5 | | |
| D | | | | | | | | | | | | | | | FM - Flameproof housing Class I, Division 1, Groups B,C,D; T6 | | |
| E | | | | | | | | | | | | | | | Dust ignitionproof Class III/II, Division 1, Groups E,F,G; T6; Type 4x - (code 4 = "P" & "T" only) | | |
| H | | | | | | | | | | | | | | | CSA - Flameproof housing Class I, Groups C,D - Class II, Group E,F,G Class III - (code 4 = "P" & "T" only) | | |
| J | | | | | | | | | | | | | | | FM - Intrinsic safety Class I, II, III, Division 1, Group A,B,C,D,E,F,G; T4 | | |
| P | | | | | | | | | | | | | | | Non-Incendive Class I,II,III, Division 2, Groups A,B,C,D,F,G; T4; Type 4x | | |
| Q | | | | | | | | | | | | | | | CSA - Intrinsic safety & Non-Incendive Class I, Groups A,B,C,D - Class II, Groups E,F,G - Class III | | |
| R | | | | | | | | | | | | | | | Type n ATEX  II 3 GD - Ex nA / Ex nL IIC T4/T5 | | |
| T | | | | | | | | | | | | | | | IECEX Type n | | |
| L | | | | | | | | | | | | | | | IECEX Flameproof housing Ex d IIC T5/T6 (code 4 = "M, P, R, T" & "W" only) | | |
| M | | | | | | | | | | | | | | | IECEX Intrinsic safety Ex ia T4/T5 | | |
| N | | | | | | | | | | | | | | | Combined CSA approval for flameproof and intrinsic safety (code 4 = "P" & "T" only) | | |
| V | | | | | | | | | | | | | | | Combined ATEX approval for flameproof and intrinsic safety (code 4 = "M, P, R, T" & "W" only) | | |
| 4 | | | | | | | | | | | | | | | Combined IECEX approval for flameproof and intrinsic safety (code 4 = "M, P, R, T" & "W" only) | | |
| 4 | | | | | | | | | | | | | | | Combined FM approval for flameproof and intrinsic safety (code 4 = "P" & "T" only) | | |
| Fieldbus Foundation™ & Profibus™ | | | | | | | | | | | | | | | | | |
| A | | | | | | | | | | | | | | | None (standard) | | |
| X | | | | | | | | | | | | | | | Flameproof housing ATEX  II 2 GD - Ex d IIC T5/T6 | | |
| K | | | | | | | | | | | | | | | Intrinsic Safety ATEX  II 1 GD - Ex ia IIC T4 | | |
| 4 | | | | | | | | | | | | | | | ATEX - FISCO  II 1 GD - Ex ia IIC T4 | | |
| Side vent/drain & mounting bracket | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Side Vent/drain | Mounting bracket | |
| A | | | | | | | | | | | | | | | None | None | |
| C | | | | | | | | | | | | | | | None | Yes, SS | |
| D | | | | | | | | | | | | | | | Yes (*6) | None | |
| F | | | | | | | | | | | | | | | Yes (*6) | Yes, SS | |
| SS parts | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | SS tag plate | SS housing | |
| Y | | | | | | | | | | | | | | | None | None | |
| B | | | | | | | | | | | | | | | Yes | None | |
| C | | | | | | | | | | | | | | | None | Yes | |
| E | | | | | | | | | | | | | | | Yes | Yes | |
| Special applications & fill fluid | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Treatment | Fill fluid | |
| Y | | | | | | | | | | | | | | | None (std) | Silicone oil | |
| W | | | | | | | | | | | | | | | None (std) | Fluorinated oil | |
| G | | | | | | | | | | | | | | | Degreasing | Silicone oil | |
| A | | | | | | | | | | | | | | | Oxygen service | Fluorinated oil (only w/digit7=V) | |
| D | | | | | | | | | | | | | | | Chlorine service | Fluorinated oil (only w/digit 7=H,T,B,U) | |
| N | | | | | | | | | | | | | | | NACE | Silicone oil (not available w/digit6=5) | |
| R | | | | | | | | | | | | | | | Vacuum service | Silicone oil | |
| Process cover gasket | | | | | | | | | | | | | | | | | |
| - | A | | | | | | | | | | | | | | Viton | | |
| - | C | | | | | | | | | | | | | | PTFE square section gasket in SS flange | | |
| - | D | | | | | | | | | | | | | | PTFE square section gasket in PVDF insert | | |
| Bolts/screws material | | | | | | | | | | | | | | | | | |
| A | | | | | | | | | | | | | | | Carbon steel Cr-Mo (standard) M10 | | |
| U | | | | | | | | | | | | | | | SS 316/316 (bolt/nuts) M10 | | |
| F | | | | | | | | | | | | | | | SS 630/304 (bolt/nuts) M10 | | |
| V | | | | | | | | | | | | | | | (*9) Carbon steel Cr-Mo (standard) M12 for static pressure > 160 bar | | |
| X | | | | | | | | | | | | | | | (*9) SS 630/304 (bolt/nuts) M12 for static pressure > 160 bar | | |
| W | | | | | | | | | | | | | | | (*9, 11) SS 660/660 (bolt/nuts) M12 for static pressure > 160 bar | | |
| Special options or design | | | | | | | | | | | | | | | | | |
| (*6) | - | * | | | | | | | | | | | | | Special, no code available | | |

Notes :

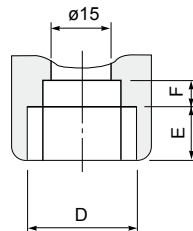
- *1 M12 oval flange screw required for 500 bar units
- *2 Turn down of 100 : 1 is possible, but it should be used at a span greater than 1/40 of the maximum span for better performance.
- *3 Gold coating on wetted measuring cell parts for Hydrogen service - Hydroseal version - gold/ceramic coating is available upon request.
- *4 Process cover with linings has no vent-drain
- *5 Process cover with PVDF insert with 1/2-18 NPT side process connection/no vent drain, other upon request - square section PTFE gasket
- *6 When no code can be found in the current code symbols, place * in concerned code digit(s) & add * in 16 th digit
- *7 Our stainless steel bolts/nuts in SS630 and SS660 are in conformity with the NACE requirements and must be used for NACE service
- *8 Code "D & V" FM approval only possible with electrical connection 1/2" NPT.
- *9 M 12 bolting must be used for 500 bar transmitter
- *10 For FKG transmitter, please use approval ATEX  II 1 GD - EEx ia IIC T4/T5 and for FDG transmitter ATEX  II 1 GD - EEx ia IIC T4
- *11 SS660 bolts/nuts have to be used for oil & gas applications

OUTLINE DIAGRAM (Unit:mm)

<7th digit code: V, H, M, T>



Details of "A"

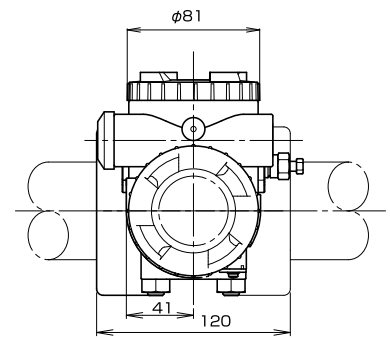
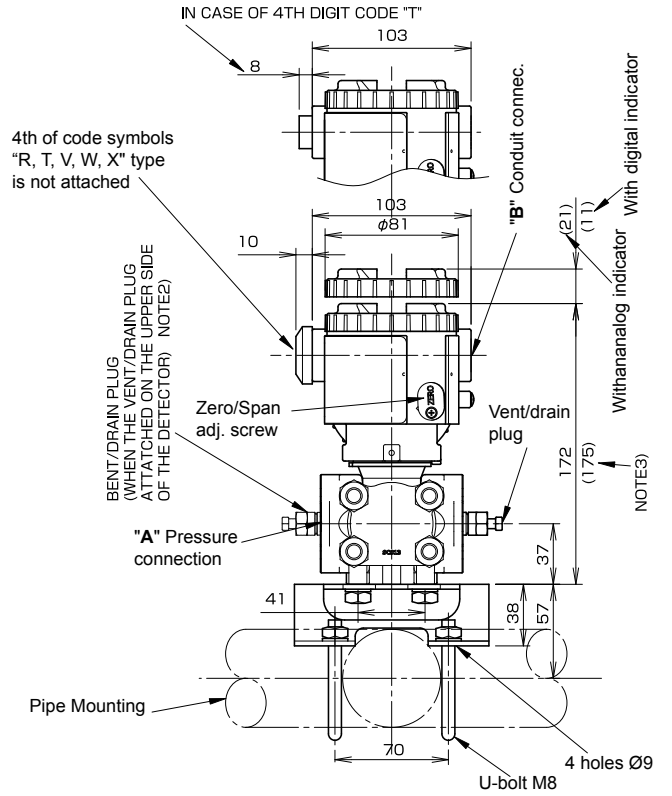


Details of "B"

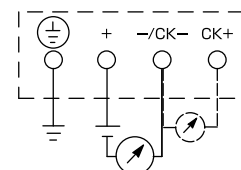
| 4th digit of the code symbols | Conduit conn. | | | Press. conn. | Oval frange screw |
|-------------------------------|---------------|----|-----|--------------|-------------------|
| | D | E | F | G | |
| R | M20x1.5 | 16 | 5 | 1/4-14NPT | 7/16-20UNF |
| T | 1/2-14NPT | 16 | 5 | 1/4-14NPT | 7/16-20UNF |
| V | Pg13.5 | 8 | 4.5 | 1/4-14NPT | M10 or M12 |
| W | M20x1.5 | 16 | 5 | 1/4-14NPT | M10 or M12 |
| X | Pg13.5 | 8 | 4.5 | 1/4-14NPT | 7/16-20UNF |

TABLE 1

NOTE1) IN CASE OF 10TH CODE "C", $\phi 11$ CABLE IS SUITBLE.
 NOTE2) THE PRESSURE CONNECTOR IS LOCATED ON THE DOWN SIDE SURFACE OF THE DETECTOR, WHEN THE VENT/DRAINPLUG IS ATTACHED ON THE UPPER SIDE OF THE DETECTOR (WHEN THE 21TH DIGIT OF THE CODE SYMBOLS : C).
 NOTE3) WHEN THE 7TH DIGIT OF THE CODE SYMBOLS "C,H,M,T"

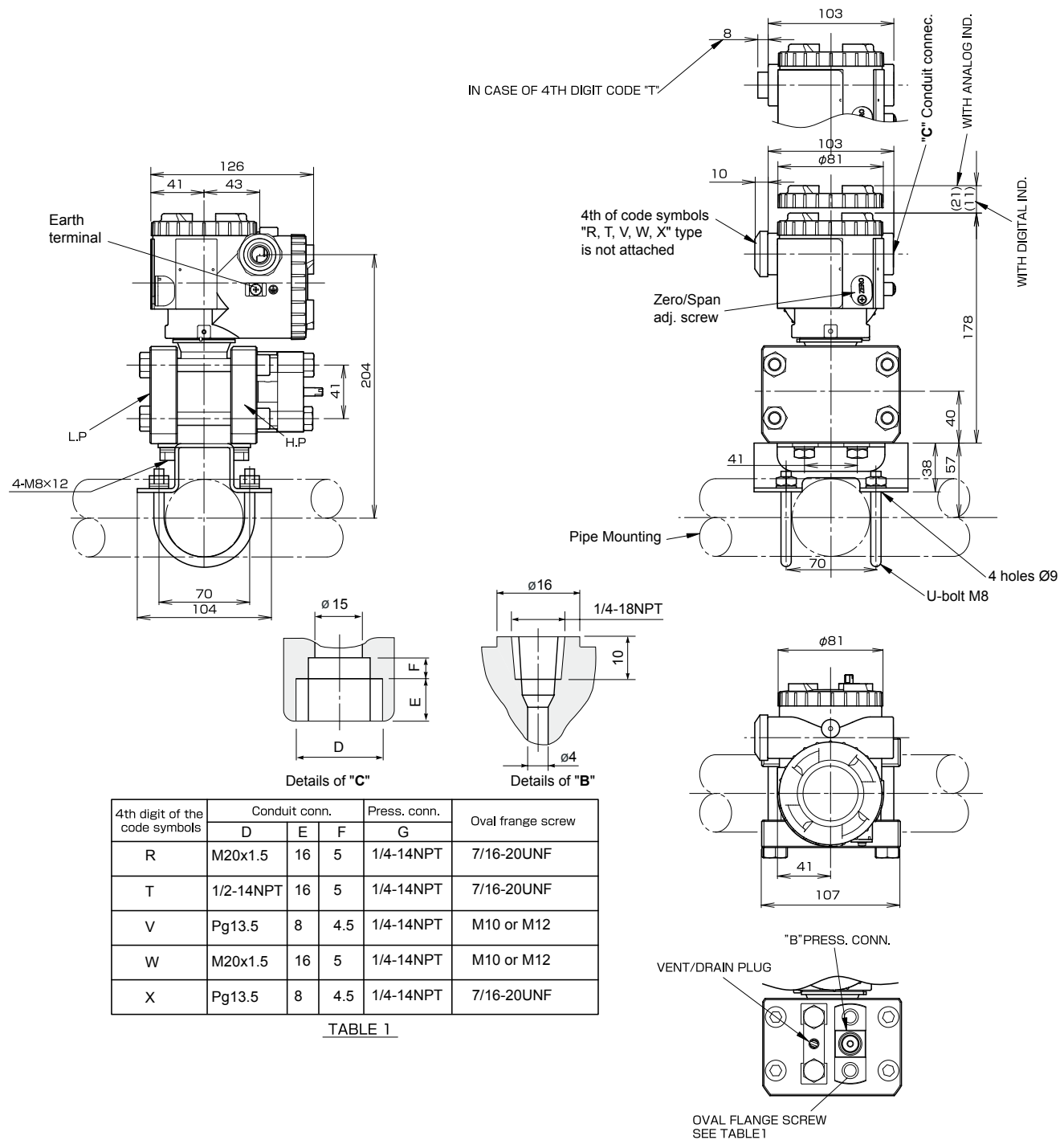


CONNECTION DIAGRAM



OUTLINE DIAGRAM (Unit:mm)

<7th digit code: B, L, U>



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