ABSOLUTE PRESSURE TRANSMITTER (DIRECT MOUNT TYPE)

DATA SHEET FKH···5

The FCX–AIII absolute pressure transmitter (Direct mount type) accurately measures absolute 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

1. High accuracy
   0.2% accuracy for all calibrated spans is the standard feature for all AP models covering 8.125 to 3000kPa {0.13 to 30bar} high pressure range. Fuji's micro-capacitance silicon sensor assures this feature for all suppressed calibration ranges without additional adjustment.
2. Minimum inventory
   Electronics unit, communication module, local indicators and electronics housing are interchangeable among all FCX–AIII models.
3. Replaceable Communication Module
   Fuji micro-electronics manufacturing technology offers replaceable communication module that makes FCX–AIII transmitter very unique design. In case of change in communication protocol all that needs to be done is just replace the module and the transmitter gets upgraded to the new version.
4. Fuji/HART bilingual communication module
   The communication module is "bilingual" to speak both Fuji proprietary protocol and HART. Any HART compatible devices can communicate with FCX–AIII series transmitters.
5. Application flexibility
   Example features that render the FCX–AIII suitable for almost any process applications includes:
   - Full range of hazardous location approvals
   - Built-in RFI filter and lightning arrester
   - 5-digits LCD meter
   - The maximum span of each sensor can be converted to in different units using below factors.

SPECIFICATIONS

Functional specifications

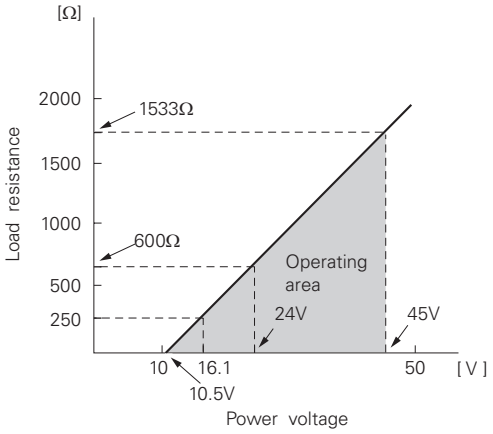
Type: 4 to 20mA with digital signal
Service: Liquid, gas, or vapour
Span, range, and overrange limit:

Type	Span limit [kPa abs] {bar abs}		Range limit [kPa abs] {bar abs}	Overrange limit [MPa] {bar}
	Min.	Max.		
FKH□02	8.125 {0.08125}	130 {1.3}	0 to 130 {0 to 1.3}	0.5 {5}
FKH□03	31.25 {0.3125}	500 {5}	0 to 500 {0 to 5}	1.5 {15}
FKH□04	187.5 {1.875}	3000 {30}	0 to 3000 {0 to 30}	9 {90}

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 FXW, min. of 250 Ω required.

Hazardous locations: SEE TABLE 3

Zero/span adjustment:
Zero and span are adjustable either from the HHC(1). Zero is also adjustable externally from the adjustable screw.

Damping: Adjustable electrical damping
The time constant is adjustable between 0 to 32.0 seconds.

Zero elevation/suppression:
Zero may be elevated within the specified range limit of each sensor model.

Normal/reverse action:
Configurable from HHC(1).

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

Burnout direction:
Output hold
Output 20.0 to 21.6mA } selectable
Output 3.2 to 4.0mA
Selectable from HHC.

Temperature limit: Ambient: –40 to +85°C
(–20 to +80°C for LCD indicator)
(–40 to +60°C for arrester option)
For explosionproof units (flameproof or intrinsic safety), ambient temperature must be within the limits specified by each standard.
Process: –40 to +85°C for silicone fill sensor
Storage: –40 to +90°C

Humidity limit: O 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.	*v*	*v*	*v*	*v*
Model No.	*v*	*v*	*v*	*v*
Serial No. & Software Version	*v*	—	*v*	—
Engineering unit	*v*	*v*	*v*	*v*
Range limit	*v*	—	*v*	—
Measuring range	*v*	*v*	*v*	*v*
Damping	*v*	*v*	*v*	*v*
Output mode	*v*	—	*v*	—
Burnout direction	*v*	*v*	*v*	*v*
Calibration	*v*	*v*	*v*	*v*
Output adjust	—	*v*	—	*v*
Data	*v*	—	*v*	—
Self diagnoses	*v*	—	*v*	—
Printer (In case of FXW with printer option)	*v*	—	—	—
External switch lock	*v*	*v*	*v*	*v*
Transmitter display	*v*	*v*	*v*	*v*
Linearize	*v*	*v*	—	—
Rerange	*v*	*v*	*v*	*v*
Saturate current	*v*	*v*	*v*	*v*
Write protect	*v*	*v*	*v*	*v*
History – Calibration history – Ambient temperature history	 *v* *v*	 *v* —	 *v* *v*	 *v* —

(Note) (1) HHC: Hand Held Communicator

Performance specifications

Accuracy rating: (including linearity, hysteresis, and repeatability).

For spans greater than 1/10 of URL: ±0.2% of span

For spans below 1/10 of URL:

$$\pm (0.1 + 0.1 \frac{0.1 \times URL}{span}) \text{ \% of span}$$

Stability: ±0.2% of upper range limit (URL) for 10 years
(In case of 6th digit code "3", "4")

Temperature effect:
Effect per 28°C change between the limits of –40°C and +85°C

Zero shift: $\pm (0.4 + 0.2 \frac{URL}{span})$%/28°C

Total effect: $\pm (0.475 + 0.2 \frac{URL}{span})$%/28°C

Overrange effect: Zero shift, 0.3% of URL for any overrange to maximum limit

Update rate: 60 msec

Step response: Time constant. 0.08 s (at 23°C)
Dead time: about 0.12 s
(without electrical damping)

Mounting position effect:
Zero shift, less than 0.1kPa 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 or less

Physical specifications

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

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

Process-wetted parts material:

Material code (7th digit in "Code symbols")	Process cover	Diaphragm	Wetted sensor body	Vent/drain
V	316 stainless steel	316L stainless steel	316 stainless steel	316 stainless steel

Non-wetted parts material:
Electronics housing: Low copper die-cast aluminum alloy (standard), finished with polyester coating, as specified.
Fill fluid: Silicone oil
Mounting bracket: 304 stainless steel

Environmental protection:
IEC IP67 and NEMA 4X

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 5 digits LCD meter 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 (1.2×50μs)

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

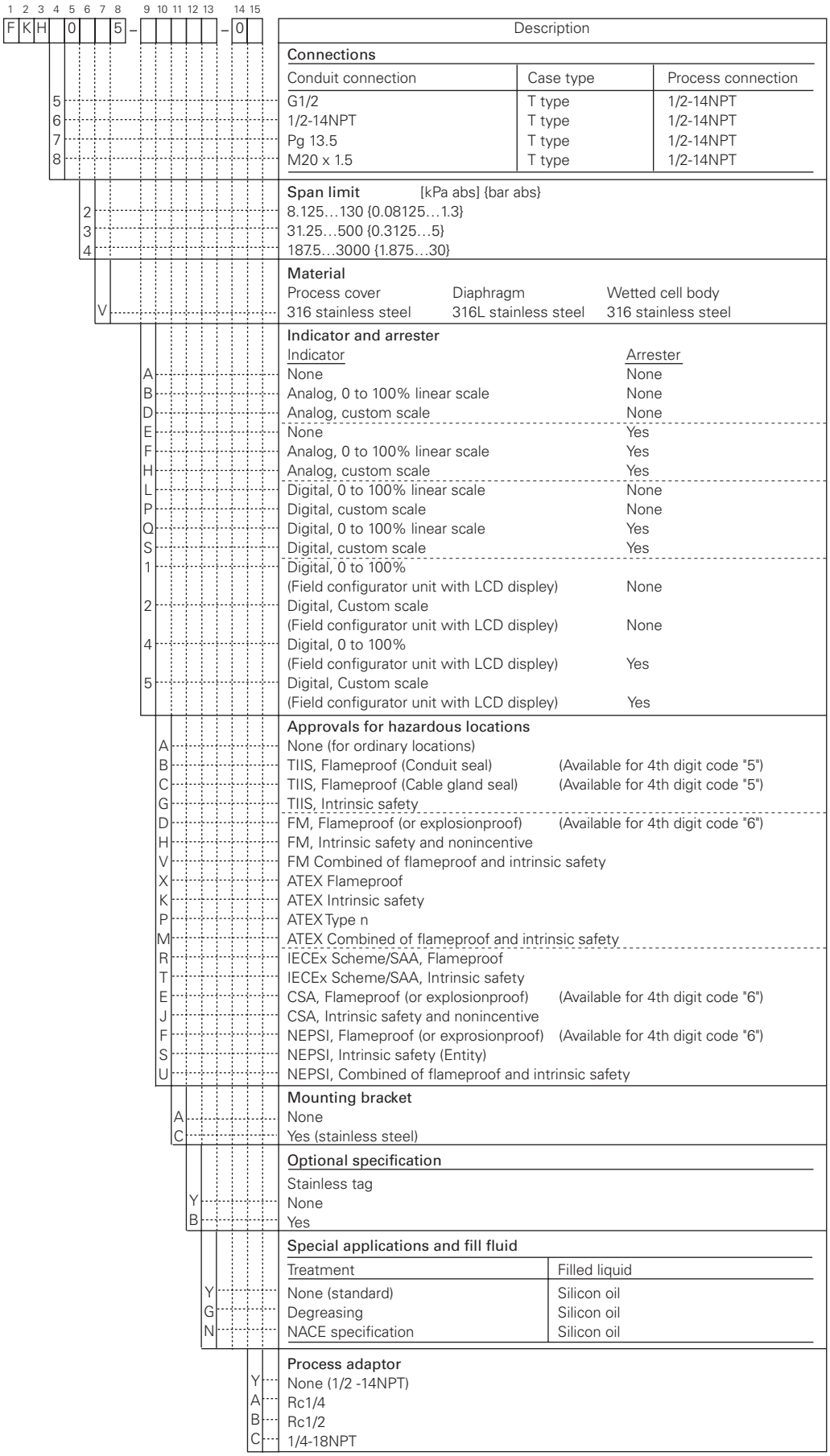
NACE specification:
Metallic materials for all pressure boundary parts comply with NACE MR-01-75.

Customer tag: A stainless steel tag for customer tag data is wired to the transmitter.

ACCESSORIES

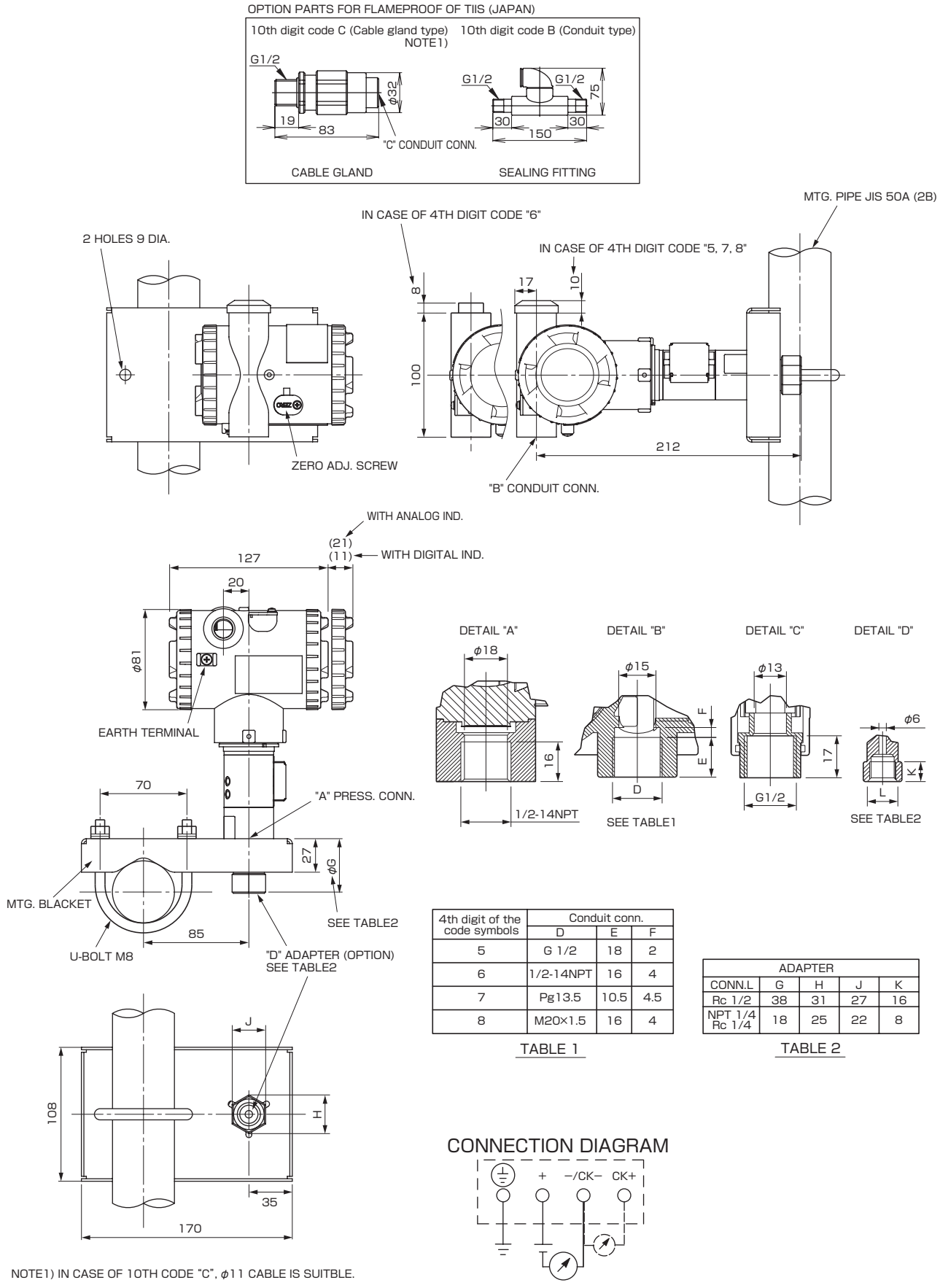
Hand held communicator:
(Model FXW, refer to Data Sheet No.EDS 8-47)

CODE SYMBOLS



Description			
Connections			
	Conduit connection	Case type	Process connection
5	G1/2	T type	1/2-14NPT
6	1/2-14NPT	T type	1/2-14NPT
7	Pg 13.5	T type	1/2-14NPT
8	M20 x 1.5	T type	1/2-14NPT
Span limit [kPa abs] {bar abs}			
2	8.125…130 {0.08125…1.3}		
3	31.25…500 {0.3125…5}		
4	187.5…3000 {1.875…30}		
Material			
	Process cover	Diaphragm	Wetted cell body
V	316 stainless steel	316L stainless steel	316 stainless steel
Indicator and arrester			
	Indicator		Arrester
A	None		None
B	Analog, 0 to 100% linear scale		None
D	Analog, custom scale		None
E	None		Yes
F	Analog, 0 to 100% linear scale		Yes
H	Analog, custom scale		Yes
L	Digital, 0 to 100% linear scale		None
P	Digital, custom scale		None
Q	Digital, 0 to 100% linear scale		Yes
S	Digital, custom scale		Yes
1	Digital, 0 to 100% (Field configurator unit with LCD displey)		None
2	Digital, Custom scale (Field configurator unit with LCD displey)		None
4	Digital, 0 to 100% (Field configurator unit with LCD displey)		Yes
5	Digital, Custom scale (Field configurator unit with LCD displey)		Yes
Approvals for hazardous locations			
A	None (for ordinary locations)		
B	TIIS, Flameproof (Conduit seal)		(Available for 4th digit code "5")
C	TIIS, Flameproof (Cable gland seal)		(Available for 4th digit code "5")
G	TIIS, Intrinsic safety		
D	FM, Flameproof (or explosionproof)		(Available for 4th digit code "6")
H	FM, Intrinsic safety and nonincentive		
V	FM Combined of flameproof and intrinsic safety		
X	ATEX Flameproof		
K	ATEX Intrinsic safety		
P	ATEX Type n		
M	ATEX Combined of flameproof and intrinsic safety		
R	IECEx Scheme/SAA, Flameproof		
T	IECEx Scheme/SAA, Intrinsic safety		
E	CSA, Flameproof (or explosionproof)		(Available for 4th digit code "6")
J	CSA, Intrinsic safety and nonincentive		
F	NEPSI, Flameproof (or exprosionproof)		(Available for 4th digit code "6")
S	NEPSI, Intrinsic safety (Entity)		
U	NEPSI, Combined of flameproof and intrinsic safety		
Mounting bracket			
A	None		
C	Yes (stainless steel)		
Optional specification			
	Stainless tag		
Y	None		
B	Yes		
Special applications and fill fluid			
	Treatment		Filled liquid
Y	None (standard)		Silicon oil
G	Degreasing		Silicon oil
N	NACE specification		Silicon oil
Process adaptor			
Y	None (1/2 -14NPT)		
A	Rc1/4		
B	Rc1/2		
C	1/4-18NPT		

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 Rc 1/4	18	25	22	8

TABLE 2

CONNECTION DIAGRAM

TABLE 3

Authorities	Intrinsic safety
ATEX (pending)	Ex II 1 GD EEx ia IIC T5 Tamb = −40°C to +50°C EEx ia IIC T4 Tamb = −40°C to +70°C Entity Parameters: Ui=28V, Ii=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 Model code: 9th digit / 13th digit; Tamb 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 Entity Parameters: Vmax=42.4V, Imax=113mA, Pi=1W, Ci=35.98nF, Li=0.694mH
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
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 Parameter: Ui=28V, Ii=93.3mA, Pi=0.66W, Ci=35.98nF, Li=0.694mH
TIIS (pending)	Ex ia IIC T4 Tamb max = +60°C Entity Parameters: Ui=28V, Ii=94.3mA, Pi=0.66W, Ci=35.98nF, Li=0.694mH
NEPSI (pending)	Ex ia IIC T4 Model code: 9th digit / 13th digit; Tamb 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 Entity Parameters: Ui=42.4V, Ii=113mA, Pi=1W, Ci=35.98nF, Li=0.694mH

Authorities	Flameproof
ATEX (pending)	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
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.
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
TIIS	Ex do IIB+H_2 T4 Tamb max = +60°C Maximum process temp. = +120°C
NEPSI	Ex d IIB+H_2 T6 Tamb = −40°C to +60°C

Authorities	Type n Nonincendive
ATEX (pending)	Ex II 3 GD EEx nL IIC T5 Tamb = −40°C to +50°C EEx nL IIC T4 Tamb = −40°C to +70°C Specific Parameters: Model without arrester: Ui=42.4V, Ii=113mA, Pi=1W, Ci=25.18nF, Li=0.694mH Model with arrester: Ui=32V, Ii=113mA, Pi=1W, Ci=35.98nF, Li=0.694mH EEx nAL IIC T5 Tamb = −40°C to +50°C EEx nAL 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 Model code: 9th digit / 13th digit; Tamb 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
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

⚠ Caution on Safety

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

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