Fuji Electric

FCX-A II series

NUCLEAR QUALIFIED ANALOG ABSOLUTE PRESSURE TRANSMITTER

DATA SHEET FYA...K, L

FYA nuclear qualified analog pressure transmitters accurately measure an absolute pressure and convert it into a directly proportional 4-20mA output signal.

The main measuring element consists of a silicon micro-capacitive sensor highly proven in the continuous process industries.

The FYA series of FCX analog transmitters are specifically designed for safety in nuclear applications requiring high reliability and long lifetime in harsh environments (up to 55 kGy Total Integrated Dose).



FEATURES

1. High accuracy
The silicon micro-capacitive sensor provides exceptional precision over different measurement ranges.

2. Minimum environmental influence
The concept of a “floating measuring cell” makes it possible to minimize errors due to variations in parameters such as temperature and overpressure.

3. Flexibility of use
The available options allow to address most applications encountered in the continuous process industry, such as:
- Built-in RFI filter.
- Stainless steel transmitter housing.

4. Full analog design
The 100% analog design of the electronics ensures the highest level of reliability in nuclear applications.

FUNCTIONAL SPECIFICATIONS

Type :
FYA : Analog absolute pressure transmitter.

Service :
Liquid, gas or vapour.

Span, range and overrange limit :

Model	Span limits kPa abs {bar abs}		Range limits kPa abs {bar abs}	Overrange limit MPa {bar}
	Min.	Max.		
FYA□02	21.7 {0.217}	130 {1.3}	0 to +130 {0 to +1.3}	0.5 {5}
FYA□03	83.3 {0.833}	500 {5}	0 to +500 {0 to +5}	1.5 {15}
FYA□04	500 {5}	3 000 {30}	0 to +3000 {0 to +30}	9 {90}

Output signal:
4 to 20 mA.

Power supply:
13 to 53 V DC at transmitter terminals.

Load limitations:
Mini: 0 Ω @ 13Vdc or 200 Ω @ 17 Vdc.
Typic: 250 Ω @ 24Vdc.
Maxi: 600 Ω.

Zero/span adjustment:
Zero is adjustable with the external adjustment screw located on the electronics enclosure and the measuring scale from an internal adjustment screw.

Damping:
Possible settings : 0.4, 1.2, 3.2 sec.

Zero elevation / suppression:
Adjustable with the external screw on the electronic housing between 0 kPa abs. to +84% of URL.

Temperature limit:
Ambient: -35 to 70°C.
Process: -40 to +85°C (Silicone oil).
Storage: -40 to +90°C.

Ambiant pressure limit:
6 bar abs.

Humidity:
0 to 100% RH.

PERFORMANCE SPECIFICATIONS

(Reference conditions 23 °C, SS 316L measuring diaphragm, silicone oil filled measuring cell).
URL = Upper Range Limit, G = Gain.

Accuracy ratings:
(Including linearity, hysteresis, and repeatability).
For span between 1/6 URL & URL:
$\pm (0.1 \times \frac{URL}{Span})$ % of span.
For span 1/6 of URL:
Fuji Electric doesn't guaranty the measurement accuracy.

Stability:
± 0.4% of upper range limit (URL) for 1 year.

Temperature effect:
Effects per 28°C change from reference conditions (23°C+/-1°C) at atmospheric pressure on -35°C to 70°C range.
Total effect:
$\pm (0.5 \times \frac{URL}{Span})$ % of span.

Overrange effect:
Total effect:
± 0.2 % of URL up to maximum limit.

Supply voltage effect:
± 0.005%/V.

Response time: (At 63% of the output signal)
200 msec. This value is for calibrated span set at URL; otherwise, this value has to multiplied by G.

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 the zero.

Vibration effect:
Lower than < ±1.5% of span.
Frequency 10 to 500Hz, acceleration 9.8m/sec².

Seismic resistance:
Digit 4 = 3, 8: Seismic integrity and operability acccording to RCC-E "UK components" S1 & S2 spectrums (0x-0z, 0y-0z: S1 17.5g / S2 35 g).
Digit 4 = W, 6, 7: Seismic integrity and operability according to RCC-E "Components" (0x-0z, 0y-0z: S1 15 g/S2 30 g).

Dielectric strength:
500Vrms, 50/60Hz during 1 min. between terminals + & - on the one hand, and transmitter body on the other hand. Leak current less than 3 mA.

Insulation resistance:
More than 100MΩ at 500V DC during 1min. between terminals + & - on the one hand, and transmitter body on the other hand.

Turn-on time:
4 seconds.

Irradiation effect:
±2.5% of URL at Total Integrated Dose (55 kGy).
Integrity after 55 kGy TID.

Pressure equipment Directive (PED) 2014/68/UE:
According to Article 4.3.

PHYSICAL SPECIFICATIONS

Electrical connections:
M20 x 1,5 or
Souriau 8N35 socket, or
Souriau 8N45S socket, or
Souriau 8N45 socket, or
SAIB NU25 ref. 251-103-401 / M20 x 1,5 socket.
(Compatible with 8N45 installed base)

Process connections:
Standard:
1/4 - 18 NPT.
Option:
1/2 - 14 NPT with oval flange.

Process wetted parts materials:

Material code (7th digit)	Process cover	Diaphragm	Wetted sensor body	Vent/Drain
V	SS 316L			
A	Hast.C 276			
J	SS 316L	SS 316L + Gold coat	SS 316L	

Process gasket:
EPDM O-ring (mandatory for K3 version).
FKM (Viton) O-ring high irradiation (digit 8 = L only).

Non-wetted parts material:
Electronics housing:
SS 316L.
Bolts and nuts:
SS 316L.
Fill fluid:
Silicon oil.
Mounting bracket:
SS 304L.

Environmental protection:
IP66/IP67.

Mounting:
Without mounting bracket:
Direct mounting on manifold.
With optional mounting bracket:
For 50 mm (2”) pipe or direct wall mounting.

Mass {weight}:
Transmitter only: 7 kg.
Add: Mounting bracket: 0.5 kg.

OPTIONAL FEATURES

Degreasing:
Process wetted parts are cleaned.

Customer tag plate (75 x 20 mm):
A stainless steel tag with customer tag data is wired to the transmitter.

OPTIONAL ACCESSORIES

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

MODEL CODE SYMBOLS - FYA

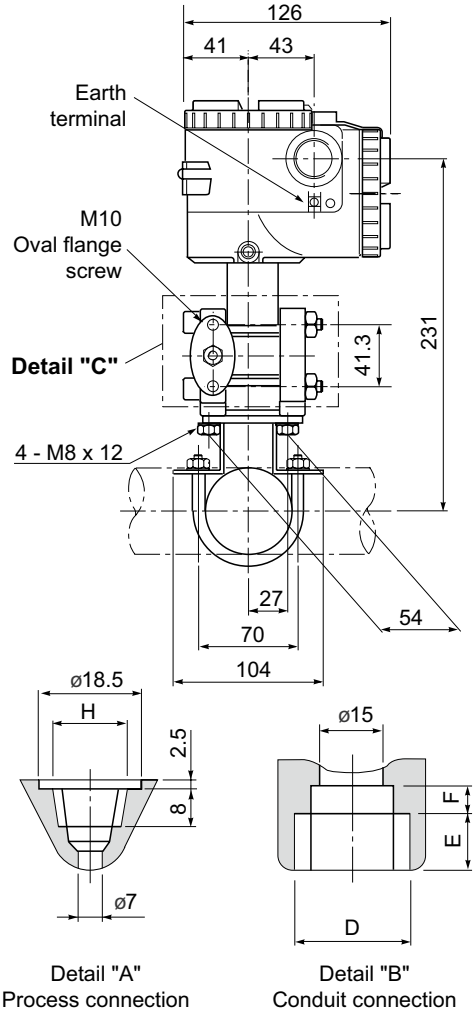
1	2	3	4	5	6	7	8	-	9	10	11	12	13	-	14	15	16		Description
F	Y	A		0				-	A					-					**Analog absolute pressure transmitter** Output 4-20 mA
			W															(4)	**Connections** Process: 1/4-18 NPT – Ovale flange: M10 – Conduit: M20 x 1,5
			3															(1)	Process: 1/4-18 NPT – Ovale flange: M10 – Conduit: Souriau 8N45S socket
			6															(2)	Process: 1/4-18 NPT – Ovale flange: M10 – Conduit: Souriau 8N45 socket (not for EPR reactors)
			7															(2)	Process: 1/4-18 NPT – Ovale flange: M10 – Conduit: Souriau 8N35 socket (not for EPR reactors)
			8															(1)	Process: 1/4-18 NPT – Ovale flange: M10 – Conduit: SAIB NU25, ref 251-103-401 / M20 x 1,5 socket (compatible with 8N45 installed equipment)
				0	2	V													**Ranges & materials** Measuring ranges: 0.217 / 1.3 bar abs. – Process cover: SS 316L – Diaphragm: SS 316L – Welted cell body: SS 316L
				0	2	J													Measuring ranges: 0.217 / 1.3 bar abs. – Process cover: SS 316L – Diaphragm: SS 316L + Au – Welted cell body: SS 316L
				0	2	A													Measuring ranges: 0.217 / 1.3 bar abs. – Process cover: Alloy C276 – Diaphragm: Alloy C276 – Welted cell body: Alloy C276
				0	3	V													Measuring ranges: 0.833 / 5 bar abs. – Process cover: SS 316L – Diaphragm: SS 316L – Welted cell body: SS 316L
				0	3	J													Measuring ranges: 0.833 / 5 bar abs. – Process cover: SS 316L – Diaphragm: SS 316L + Au – Welted cell body: SS 316L
				0	3	A													Measuring ranges: 0.833 / 5 bar abs. – Process cover: Alloy C276 – Diaphragm: Alloy C276 – Welted cell body: Alloy C276
				0	4	V													Measuring ranges: 5 / 30 bar abs. – Process cover: SS 316L – Diaphragm: SS 316L – Welted cell body: SS 316L
				0	4	J													Measuring ranges: 5 / 30 bar abs. – Process cover: SS 316L – Diaphragm: SS 316L + Au – Welted cell body: SS 316L
				0	4	A													Measuring ranges: 5 / 30 bar abs. – Process cover: Alloy C276 – Diaphragm: Alloy C276 – Welted cell body: Alloy C276
							K												**Transmitter version** EDF "K3AD Classification"
							L											(3)	EDF "Not Classified"
								-	A										
										A									**Approvals for hazardous locations** None (Standard)
											G								**Vent / Drain**: Universal, direct mounting – **Mounting bracket (SS 304L)**: None
											H								Vent / Drain: Universal, direct mounting – Mounting bracket (SS 304L): Without
												C							**Customer tag plate (option)**: Without – **Electronics housing**: SS 316 L
												E							Customer tag plate (option): SS 316L – Electronics housing: SS 316 L
													Y						**Treatment**: None – **Fill fluids**: Silicone Oil
													G						Treatment: Degreasing – Fill fluids: Silicone Oil
														-	A			(4)	**Process cover gasket** Viton
														-	E			(5)	EPDM
																E			**Bolts and nuts material** SS 316L/316L (Bolts/nuts) - M10
																	0		**Accessories (optional)** None
																	1	(4)	Cable gland

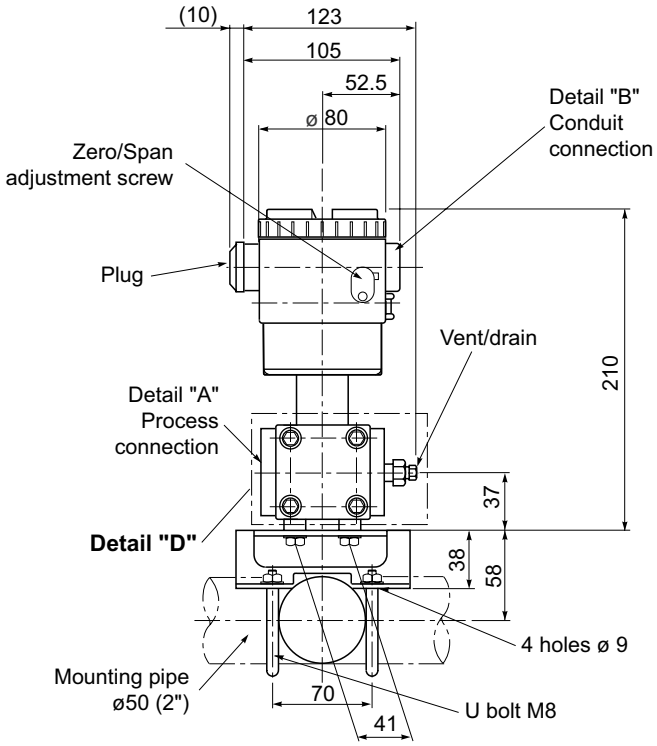
Notes:

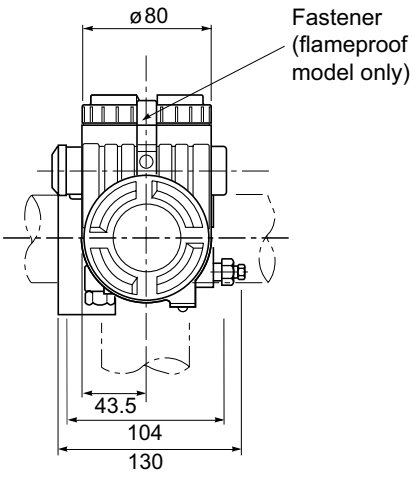
1. These transmitters can be used in existing power plants and EPR.
2. These transmitters can be used in existing power plants (not EPR).
3. Transmitters' design is similar to K3ad but with standard Quality Acceptance (ISO 9001) assembling process.
4. Only with 8th digit = L.
5. With 8th digit = K or L.

OUTLINE DIAGRAM (Unit: mm)

CONDUIT CONNECTION M20 X 1,5 (4TH DIGIT = W)

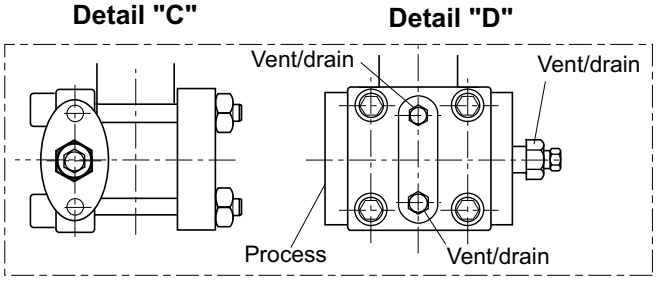






4th	Conduit connection			Process connection
Digit	D	E	F	G
W	M20 x 1,5	16	5	1/4"-18 NPT

"Universal vent/drain, direct mounting" configuration (11th digit : G & H)

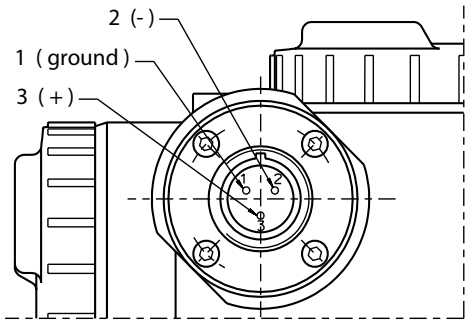


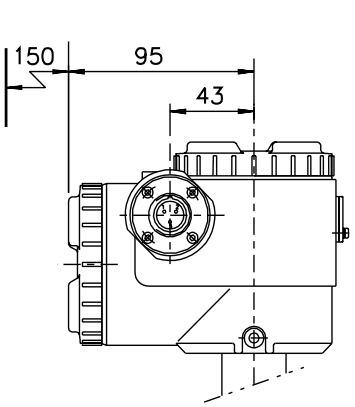
With this configuration, vent/drain function on the external side of the process flanges is achieved by way of vent screws directly attached to the flange (sealing is of metal to metal type).
There is no more conventional screwed vent seat screwed in the flange and sealed with "PMUC Loctite" type compound.

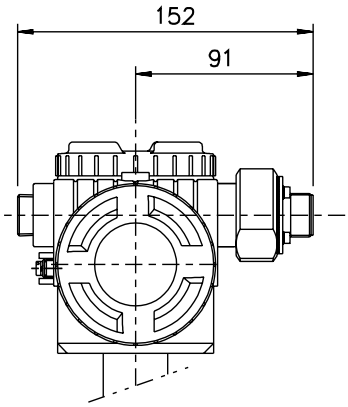
OUTLINE DIAGRAM (Unit : mm)

CONDUIT CONNECTION FOR SOCKETS (4TH DIGIT = CODE 3, 6, 7 OR 8)

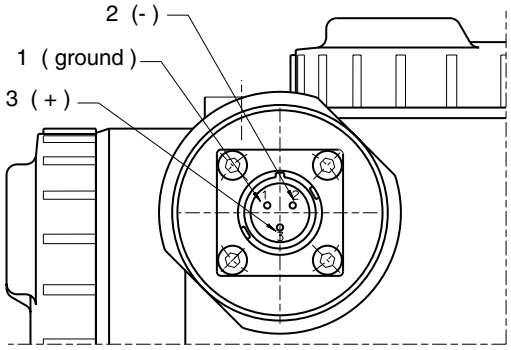
FOR SOURIAU 8N35 SOCKET (DIGIT 4 = 7)

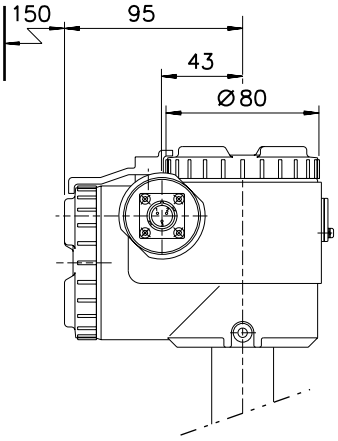


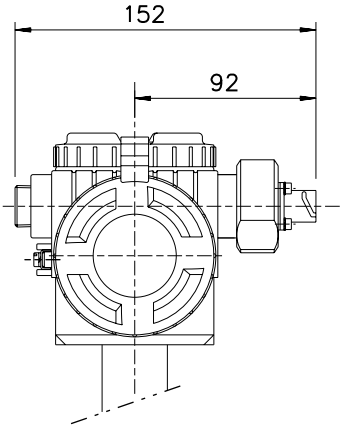




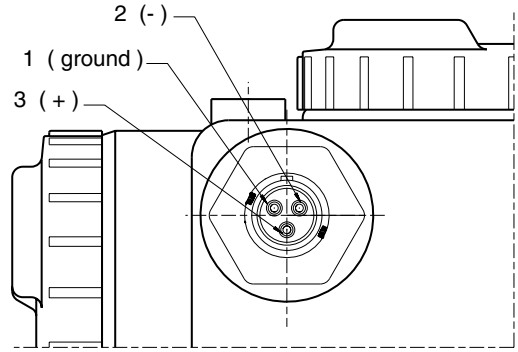
FOR SOURIAU 8N45 / 8N45S SOCKETS (DIGIT 4 = 3, 6)

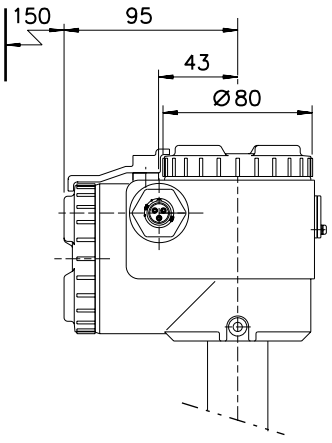


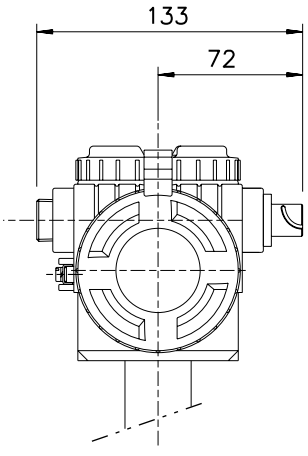




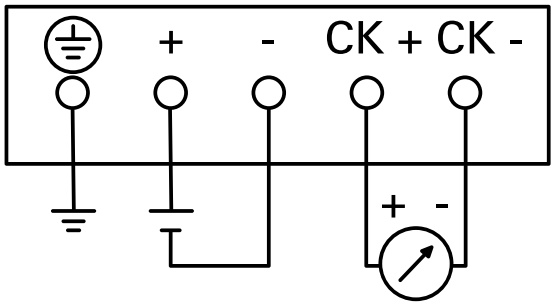
CONDUIT CONNECTION FOR SAIB SOCKET (DIGIT 4 = CODE 8)





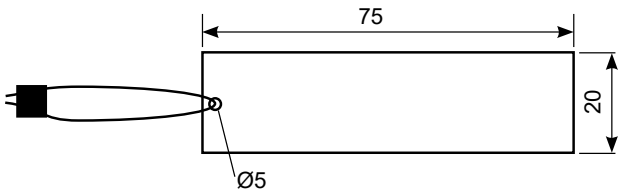


CONNECTION DIAGRAM



Connection of current 4/20mA loop test milliampmeter.
(max impedance = 12Ω)

OPTIONAL CUSTOMER TAG PLATE



Attached to transmitter with SS 304 wire

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