FKH···5 Absolute pressure transmitter

DATA SHEET

The ProcessX absolute pressure transmitter (direct mount type) accurately measures absolute pressure and transmits proportional 4 to 20 mA 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. Georgin'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 ProcessX models.
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 :
   - Analog indicator at either the electronics side or terminal side,
   - 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. **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.
7. **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 :
FKH : Smart, 4-20 mA DC + Georgin/Hart® 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 à 1.3}	0.5 {5}
FKH□03	31.25 {0.3125}	500 {5}	0 to 500 {0 à 5}	1.5 {15}
FKH□04	187.5 {1.875}	3000 {30}	0 to 3000 {0 à 30}	9 {90}

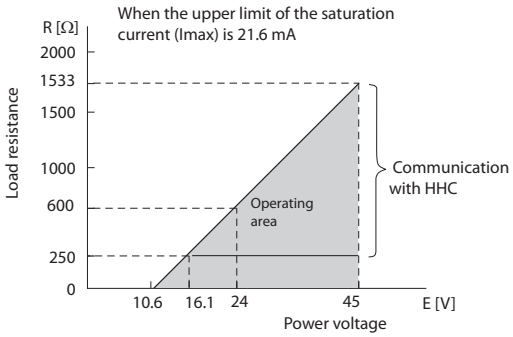
Output signal :
4 to 20 mA DC with digital signal superimposed on the analogic signal.

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.

GEORGIN France : Tel : +33 (0)1 46 12 60 00 - Fax : +33 (0)1 47 35 93 98 - regulateurs@georgin.com
GEORGIN Belgium : Tel : 02 735 54 75 - Fax : 02 735 16 79 - info@georgin.be
www.georgin.com

Safety for Industrial Process

- LOAD LIMITATIONS : see figure below



Note) The load resistance varies with the upper limit of the saturation current [I max]

$$R\,[\Omega] = \frac{E\,[V] - 10.5}{(I\,max\,[mA] + 0.9) \times 10^{-3}}$$

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

- HAZARDOUS LOCATIONS :

	digit 10	Explosion Proof	Installation areas	ATEX and IECEx parameters
ATEX	X	Attestation DEKRA 14ATEX0015X Ex d IIC T5/T6 Gb Ex tb IIIC 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	Zones 1-2 Zones 21-22	Model without surge arrester Ui≤45Vdc Pi≤1.0125W Model with surge protector Ui≤32Vdc Pi≤1.0125W
IECEx	R	Attestation IECEx CSA 16.0048X Ex d IIC T5/T6 Gb Ex tb IIIC T85°C/T100°C Db Ta= -40<+85°C) - T5/T100°C Ta= -40<+65°C) - T6/T85°C IP66/67		

	digit 10	Intrinsic safety	Installation areas	ATEX and IECEx parameters
ATEX	K	Attestation DEKRA 14ATEX0016X Ex ia IIC T4/T5 Ga Ex ia IIIC T100°C/T135°C Da Ta= -40<+70°C) - T4/T135°C Ta= -40<+50°C) - T5/T100°C IP66/67 Ex II 1 GD : Group II (Surface) - Category 1GD	Zones 0-1-2 Zones 20-21-22	Ui≤28Vdc Ii≤94.3mA Pi≤0.66W Model with / without surge arrester Ci=36nF / Ci=26nF Model with / without analogue indicator Li=0.7mH / Li=0.6mH
IECEx	H	Attestation IECEx CSA 16.0049X Ex ia IIC T4/T5 Ga Ex ia IIIC T100°C/T135°C Da Ta= -40<+70°C) - T4/T135°C Ta= -40<+50°C) - T5/T100°C IP66/67		

	digit 10	"n" Type	Installation areas	ATEX and IECEx parameters
ATEX	P	Ex nA IIC T5 Gc Ex tc IIIC T100°C Dc Ta= -40°C<+70°C - T5/T100°C IP66/67 Ex II 3 GD : Group II (Surface) - Category 3GD	Zones 2 Zones 22	Model without surge arrester Ui≤45Vdc Pi≤1.0125W Model with Surge Protector Ui≤32Vdc Pi≤1.0125W
IECEx	Q	Ex nA IIC T5 Gc Ex tc IIIC T100°C Dc Ta= -40°C<+70°C - T5/T100°C IP66/67		

Refer to the package insert for safe use.

GEORGIN France : Tel : +33 (0)1 46 12 60 00 - Fax : +33 (0)1 47 35 93 98 - regulateurs@georgin.com
GEORGIN Belgium : Tel : 02 735 54 75 - Fax : 02 735 16 79 - info@georgin.be

FKH···5 Absolute pressure transmitter

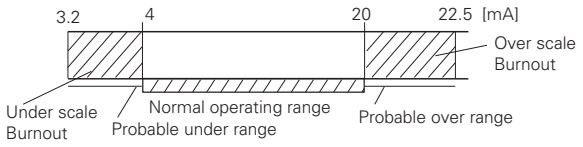
Safety for Industrial Process

- **Zero/span adjustment :**
  Zero and span are adjustable either from the HHC(1) in Hart® or Georgin protocol. Zero is also adjustable externally from the adjustable screw.
- **Damping :**
  Adjustable from HHC(1) or local adjustment unit with LCD display. The time constant is adjustable between 0.06 to 32 sec.
- **Zero elevation/suppression :**
  0 kPa abs to +100% of URL.
- **Normal/reverse action :**
  Selectable from HHC(1)
- **Indication :**
  Analog indicator or 5 digit LCD meter, as specified.
  An analog display may be mounted at the location of one or the other of the housing.
- **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 20.0 mA to 22.5 mA from HHC(1).

"Output Underscale" :
Adjustable within the range 3.2 mA to 4.0 mA from HHC(1).
Output limits conforming to NAMUR NE43 by order.



- **Loop-check output :**
  Transmitter can be configured to provide constant signal 3.2 mA through 22.5 mA by HHC(1).
- **Temperature limit :**

Ambient : -40 to +85°C
-20 to +80°C (for LCD indicator)
-40 to +60°C (for arrester option)

For explosion proof 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 :** 0 to 100% RH (Relative humidity)
- **Communication :**
  With HHC(1) (model FXW, consult DS N°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".

Items		Georgin Protocol with le FXW		Hart® Protocol		By local configurator (with 3 push button), (LCD indicator)	
		Affich.	Régl.	Affich.	Régl.	Affich.	Régl.
Tag No.		v	v	v	v	v	v
Model No.		v	v	v	v	v	v
Serial No. & Software Version		v	—	v	—	v	—
Engineering unit		v	v	v	v	v	v
Range limit		v	—	v	—	v	—
Measuring range		v	v	v	v	v	v
Damping		v	v	v	v	v	v
Output mode	Linear	v	v	v	v	v	v
	Square root	v	v	v	v	v	v
Burnout direction		v	v	v	v	v	v
Calibration		v	v	v	v	v	v
Output adjust		—	v	—	v	—	v
Data		v	—	v	—	v	—
Self diagnoses		v	—	v	—	v	—
Printer (In case of FXW with printer option)		v	—	—	—	—	—
External switch lock		v	v	v	v	v	—
Transmitter display		v	v	v	v	v	—
Linearize*		v	v	—	—	—	—
Rerange		v	v	v	v	v	v
Saturate current		v	v	v	v	v	v
Write protect		v	v	v	v	v	v
History – Calibration history – Ambient temperature history		 v v	 v —	 v v	 v —	 v v	 v —

(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 (Georgin Protocol list) except "Linearize" function.
- **Programmable output linearization function :**
  Output signal can be characterized with "14 points linear approximation function" from HHC(1).

Performance specifications

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

- **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 :

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

- **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 :

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

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

GEORGIN France : Tel : +33 (0)1 46 12 60 00 - Fax : +33 (0)1 47 35 93 98 - regulateurs@georgin.com
GEORGIN Belgium : Tel : 02 735 54 75 - Fax : 02 735 16 79 - info@georgin.be
www.georgin.com

FKH···5 Absolute pressure transmitter

- **Overrange effect :**
  Zero shift, 0.3% of URL for any overrange to maximum limit.
- **Supply voltage effect :**
  Less than 0.05% of calibrated span per 10 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 :** (63,3% of output signal without damping)
  Time constant. 0.08 seconds (at 23°C)
  Dead time: about 0.12 seconds
  Response time = time constant + dead time
- **Mounting position effect :**
  Zero shift, less than 0.1 kPa for a 10° tilt in any plane.
  This error can be corrected by adjusting Zero.
  No effect on span.
- **Vibration effect :**
  < ±0,25% Of spans for spans greater than 1/10 of URL.
  Frequency 10 to 150 Hz, acceleration 39,2 m/sec^2.
- **Material fatigue :** Please consult Georgin
- **Dielectric strength :**
  500 V AC, 50/60 Hz 1 min., between circuit and earth.
- **Insulation resistance :**
  More than 100 MΩ at 500 V DC.
- **Internal resistance for external field indicator :**
  12Ω 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, Pg13.5 or M20 × 1.5
- **Process connections :**
  1/2-14 NPT, 1/4-18 NPT, Rc 1/2, G1/2 A manometer fitting, M20 x 1,5.
- **Process-wetted parts material :**

Material code (7th digit in "Code symbols")	Process cover	Diaphragm	Wetted sensor body	Vent/drain
J	SS 316L	SS 316L+ gold coat	SS 316L	SS 316L
V	SS 316L	SS 316L	SS 316L	SS 316L

- **Non-wetted parts material :**

Electronics housing : Low copper die cast aluminum alloy finished with polyester coating (standard), or SS 316(L) as option en option.
Fill fluid : Silicone oil
Mounting bracket : SS 304L

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

Without mounting bracket : direct mounting on manifold (optional)
With optional mounting bracket : for 50 mm (2") pipe or direct wall mounting.

- **Mass{weight} :**

Transmitter approximately 1,7 kg without options
Add : 0.3 kg for indicator
0.5 kg for mounting bracket
2 kg for stainless steel housing (option)

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 communication with HHC.
- **Arrester :**
  A built-in arrester protects the electronics from lightning surges.
  Lightning surge immunity: 4 KV (1.2×50 µs)
- **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 0175 / ISO 15156.
  SS 660 or SS 660/660 bolts and nuts comply with NACE MR 0175 / ISO 15156.
- **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 (EDS8-47).
- **Two valve Manifold :**
  Available in SS 316 and pressure rating 10 MPa (100 bar).

GEORGIN France : Tel : +33 (0)1 46 12 60 00 - Fax : +33 (0)1 47 35 93 98 - regulateurs@georgin.com
GEORGIN Belgium : Tel : 02 735 54 75 - Fax : 02 735 16 79 - info@georgin.be

FKH···5 Absolute pressure transmitter

CODE SYMBOLS

9	10	11	12	13	14	15	DESCRIPTION
					0		**Type**
							Smart, 4-20 mAdc + Georgin/Hart® digital signal
							Connections

Process connection	Electrical connection
See digit 15	1/2-14 NPT
See digit 15	Pg 13,5
See digit 15	M 20 x 1,5

Range & wetted parts material

Span (bar abs)	Diaphragm material	Wetted parts
0,08125/1,3	SS 316L	SS 316L
0,08125/1,3	SS 316L / gold coat	SS 316L
0,3125/5	SS 316L	SS 316L
0,3125/5	SS 316L / gold coat	SS 316L
1,875/30	SS 316L	SS 316L
1,875/30	SS 316L / gold coat	SS 316L

Indicator & Arrester

9	Indicator	Arrester	Initial setting
A	None	None	4-20 mA DC + Hart® / Georgin digital signal "SMART"
B	Analog, 0-100% linear scale	None	
D	Analog, Custom scale	None	
J	Analog, double scale	None	
E	None	Yes	
F	Analog, 0-100% linear scale	Yes	
H	Analog, Custom scale	Yes	
K	Analog, double scale	Yes	
L	Digital, 0-100%	None	
P	Digital, Custom scale	None	
Q	Digital, 0-100%	Yes	
S	Digital, Custom scale	Yes	
1	Digital, 0-100% with push button	None	
2	Digital, Custom scale with push button	None	
4	Digital, 0-100% with push button	Yes	
5	Digital, Custom scale with push button	Yes	

10	13	DESCRIPTION
		Approvals for hazardous locations (consult Georgin for availability)
A		None (Standard)
X		ATEX - Flameproof enclosures (digit 4 = "T" & "W" only)
K		ATEX - Intrinsic Safety
D	(*1)	FM - Explosion-Proof (digit 4 = "T" only)
E		CSA - Explosion-Proof (digit 4 = "T" only)
H		FM - Intrinsic Safety and Non Incendive
J		CSA - Intrinsic Safety
P		ATEX - Type "n" (digit 9 = A, E, 1, 2, 3, 4 & 5 only)
Q		IECEx - Type "n" (digit 9 = A, E, 1, 2, 3, 4 & 5 only)
R		IECEx - Flameproof enclosures (digit 4 = "T" & "W" only)
T		IECEx - Intrinsic Safety
L		CSA - Explosion-Proof & Intrinsic Safety combined approval (digit 4 = "T" only)
M		ATEX - Flameproof enclosures & Intrinsic Safety combined approval (digit 4 = "T" & "W" only)
N		IECEx - Flameproof enclosures & Intrinsic Safety combined approval (digit 4 = "T" & "W" only)
V		FM - Explosion-Proof & Intrinsic Safety combined approval (digit 4 = "T" only)

11	DESCRIPTION
	Mounting bracket (stainless steel)
A	None
C	Yes

12	SS tag plate	SS housing
	Stainless steel parts	
Y	None	None
B	Yes	None
C	None	Yes
E	Yes	Yes

14	Treatment	Fill fluid
	Special applications & fill fluid	
Y	None (std)	Silicone oil
G	Degreasing	Silicone oil
N	NACE	Silicone oil

14	15	DESCRIPTION
		Processconnection (welded) adaptor - all stainless steel parts
0	Y	1/2 - 14 NPTI
0	B	Rc 1/2 I
0	C	1/4 - 18 NPTI
0	D	1/2 - 14 NPTE
0	E	G 1/2"A manometer fitting
0	F	M20 x 1,5

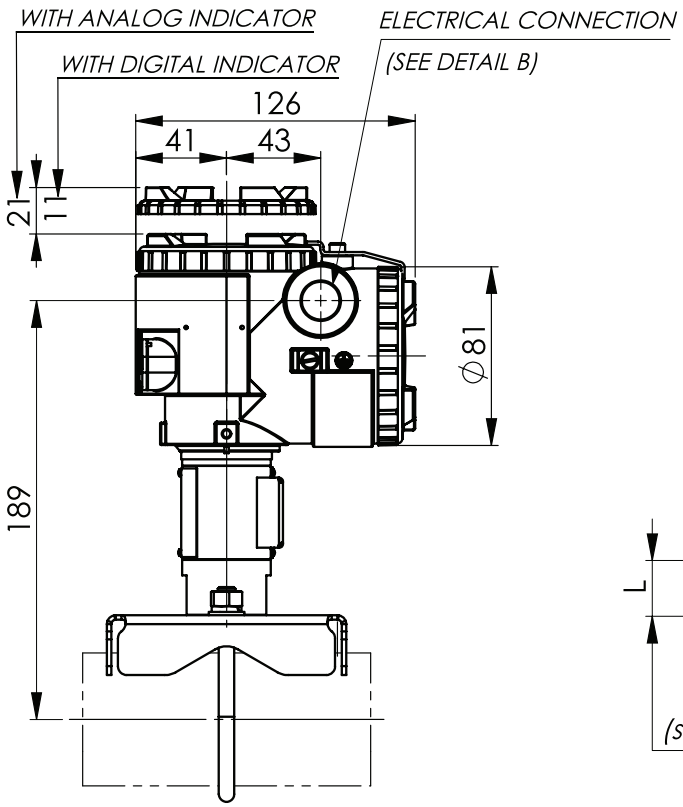
Note* :

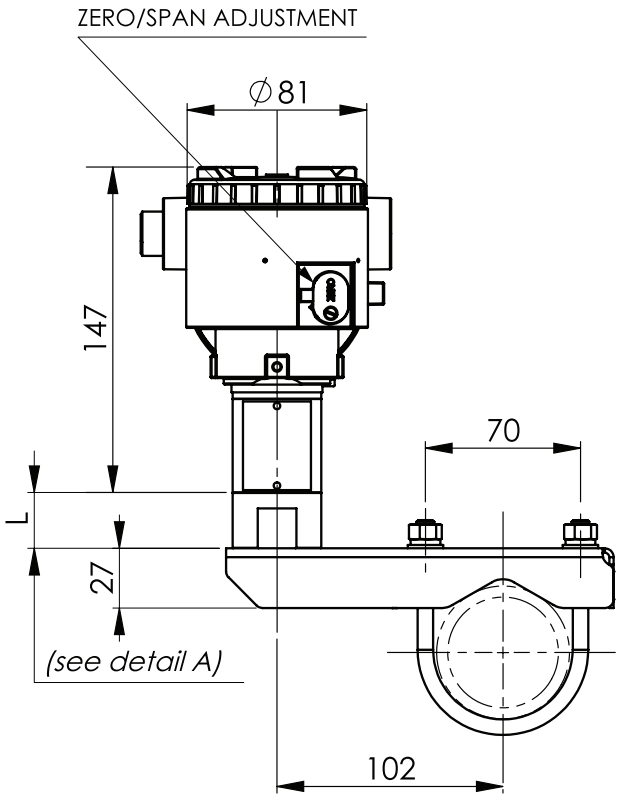
1- Code "D" & "V" FM approval only possible with electrical connection 1/2-14 NPT.

FKH···5 Absolute pressure transmitter

GEORGIN
Safety for Industrial Process

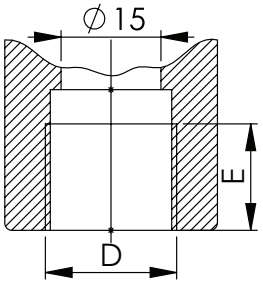
OUTLINE DIAGRAM (unit : mm)



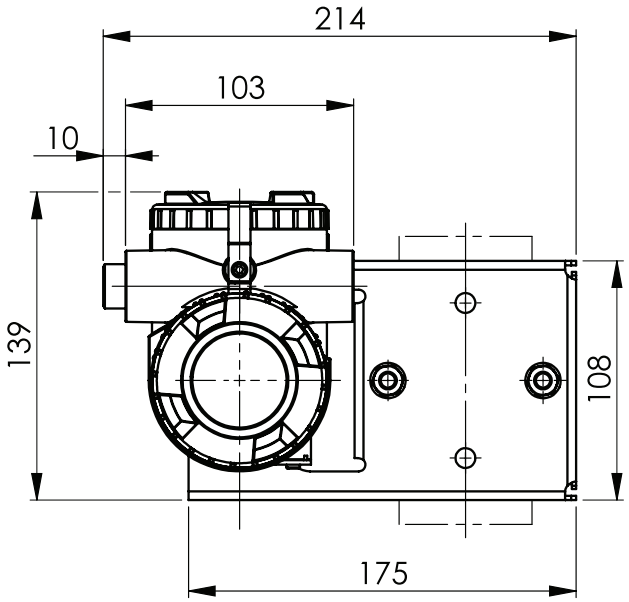


DETAIL "B"

ELECTRICAL CONNECTION



Code X4=	D	E
T	1/2-14 NPT	16
V	Pg 13.5	8
W	M20 x 1.5	16



WEIGHT :

1,7 kg (*WITHOUT OPTION*)

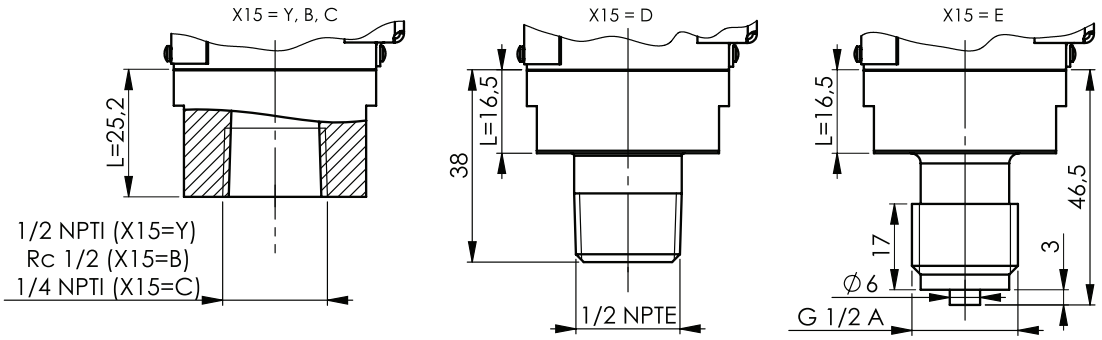
ADD : - **0,4 kg** *FOR MOUNTING BRACKET*

- **1,5 kg** *FOR STAINLESS STEEL HOUSING OPTION*

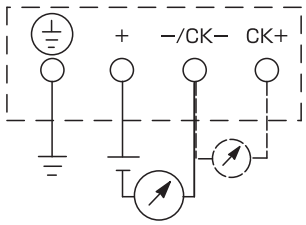
X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 - X_9 X_{10} X_{11} X_{12} X_{13} - X_{14} X_{15}

F K H ☐ 0 ☐ ☐ 5 - ☐ ☐ ☐ ☐ ☐ - 0 ☐

	SPAN LIMIT	
	Min.	Max.
FKH☐02	8,125 KPa (81,25 mbar)	130 KPa (1300 mbar)
FKH☐03	31,25 KPa (0,3125 mbar)	500 KPa (5 bar)
FKH☐04	187,5 KPa (1,875 mbar)	3000 KPa (30 bar)


X15 = Y, B, C
L=25,2
1/2 NPTI (X15=Y)
Rc 1/2 (X15=B)
1/4 NPTI (X15=C)
X15 = D
38
L=16,5
1/2 NPTE
X15 = E
L=16,5
46,5
17
3
⌀6
G 1/2 A

CONNECTION DIAGRAM



EMC Directive (2004/108/EC)

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).
- EN 61326-2-3 : 2006 (Part 2-3 : Particular requirement - Test configurations, operational conditions and performance criteria for tranducers with integrated or remote signal conditioning).

Emission limits : EN 61326-1 : 2006

Frequency range (MHz)	Limits	Basics standard
30 to 230	40 dB (µV/m) quasi peack, measured at 10 m distance	EN 55011 / CISPR 11 Group 1 Class A
230 to 1000	47 dB (µV/m) quasi peack, measured at 10 m distance	

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

Phenomenon	Test value	Basic standard	Performance criteria
Electrostatic discharge (EDS)	4 kV (Contact) 8 kV (Air)	EN 61000-4-2 IEC 61000-4-2	**B**
Electromagnetic field	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)	EN 61000-4-3 IEC 61000-4-3	**A**
Rated power frequency magnetic field	30 A/m	EN 61000-4-8 IEC 61000-4-8	**A**
Burst	2 kV (5/50 NS, 5 kHz	EN 61000-4-4 IEC 61000-4-4	**B**
Surge	1 kV line to line 2 kV line to line	EN 61000-4-5 IEC61000-4-5	**B**
Conducted RF	3 V (150 kHz to 80 MHz)	EN 61000-4-6 IEC61000-4-6	**A**

Performance criteria :

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

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