

■ DATA SHEET

The ProcessX level transmitter 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

0.165% accuracy for all calibrated spans is a standard feature. The micro-capacitance silicon sensor assures this accuracy for all elevated or suppressed calibration ranges without additional adjustment. 0.1% accuracy is available as option

2. 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.

3. GEORGIN/HART™ BILINGUAL COMMUNICATION MODULE

The communication module is "bilingual" to speak both Georgin proprietary protocol and HART®. Any HART® compatible devices can communicate with ProcessX series transmitters.

4. APPLICATION FLEXIBILITY

Example features that render the ProcessX suitable for almost any process applications includes:

- Full range of hazardous location approvals.
- Built-in RFI filter and lightning arrester.
- 5-digits LCD meter with engineering unit.
- Stainless steel electronics housing
- Wide selection of materials
- High temperature, high vacuum service

5. PROGRAMMABLE OUTPUT LINEARIZATION FUNCTION

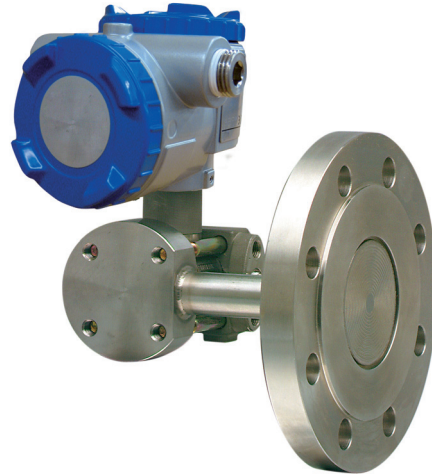
Output signal can be freely programmable. (Up to 14 compensated points at approximation.

6. 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 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



■ SPECIFICATIONS

■ FUNCTIONAL SPECIFICATIONS

Type:

FKE: Smart, 4 to 20mA DC + Georgin/Hart® digital signal

Service:

Liquid, gas or vapor

Static pressure, span and range limit:

Type	Static pressure	Span limit (mmH ₂ O)		Range limit (mmH ₂ O)
		Minimum	Maximum	
FKE□2	Up to flange rating	10	600	± 600
FKE□3		32	3200	± 3200
FKE□5		130	13000	± 13000
FKE□6		500	50000	± 50000
FKE□8		3000	300000	±300000

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

■ LOWER LIMIT OF STATIC PRESSURE (vacuum limit):

Silicone fill sensor: See Fig.1

Fluorinated fill sensor: 66kPa abs (500mmHg abs) at temperature below 60 °C

■ OVERRANGE LIMIT:

To maximum static pressure limit



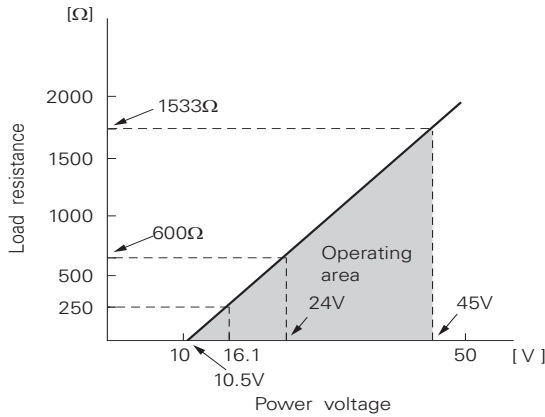
FKE...F Level transmitter



Safety for Industrial Process



- 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⁾ min. of 250Ω required.

HAZARDOUS LOCATION:

Authority (Digit 10 =)	Intrinsic safety																					
ATEX	Ex II 1 G Ex ia IIC T5 (-40°C ≤ Ta ≤ +50 °C) Ex ia IIC T4 (-40°C ≤ Ta ≤ +70 °C) IP66/67 Entity Parameters: Ui ≤ 28 Vdc, Ii ≤ 94.3 mA, Pi ≤ 0.66 W Ci = 36 nF/25 nF for models with/without Arrester Li = 0.7 mH/0.6 mH for models with/without Analog Indicator																					
Factory Mutual	Class I II III Div.1 Groups A, B, C, D, E, F, G T4 Entity Type 4X																					
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(Q)																						
Authority	Flameproof																					
ATEX	Ex II 2 GD Ex d IIC T6 (-40°C ≤ Ta ≤ +65 °C) Ex d IIC T5 (-40°C ≤ Ta ≤ +85 °C) Ex tD A21 IP66/67 T 85°C Ex tD A21 IP66/67 T 100°C Electrical ratings Model Without arrester: Ui ≤ 45 Vdc, 4-20 mA loop powered, Pi ≤ 1.0125 W Model With arrester: Ui ≤ 32 Vdc, 4-20 mA loop powered, Pi ≤ 1.0125 W																					
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(D)																						
CSA	Class I, Groups C and D; Class II, Groups E, F and G ; Class III Maximum ambient temperature 85°C Maximum working pressure 50 Mpa																					
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Safety for Industrial Process

FKE...F Level transmitter



ZERO/SPAN ADJUSTMENT:

Zero and span are adjustable either from the HHC⁽¹⁾ in Hart® or externally from the adjustment screw.

DAMPING:

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

ZERO ELEVATION/SUPPRESSION: -100% to +100% of URL.

NORMAL/REVERSE ACTION: Configurable from HHC⁽¹⁾.

INDICATION :

Analog Indicator or 5-digit LCD meter.

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" :

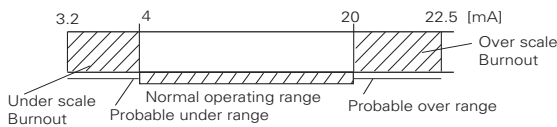
Adjustable within the range 20.0mA to 22.5mA from HHC⁽¹⁾.

"Output Underscale" :

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

LOOP-CHECK OUTPUT:

Transmitter can be configured to provide constant signal



3.2mA through 22.5mA 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:

	Code in the 13th digit of "Code symbols"	Process temperature	Lower limit of static pressure
Fluorinated oil	W, A	-20 to 120°C	Atmospheric
Silicone oil	Y, G	-40 to 150°C	20 torr

Note: For higher process temperature, please consult Georgin

Storage : -40 to +90°C

HUMIDITY LIMIT : 0 to 100% RH

COMMUNICATION:

With HHC⁽¹⁾, following items can be remotely displayed or configured

Note: HHC's version must be higher than 7.0 for supporting these items: "Saturate current", "Write protect", and "History".

Items	Georgin protocol with HHC ⁽¹⁾		Hart Protocol	
	Display	Set	Display	Set
Tag No.	v	v	v	v
Model No.	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 (as 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	v	v	v	v
- Ambient temperature history	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, 316SS isolating diaphragms, 4 to 20mA analog output)

ACCURACY RATING:

(Including linearity, hysteresis, and repeatability)
Standard

For span > than 1/10 of URL:

$$\pm 0.165\% \text{ of span}$$

For span < than 1/10 of URL:

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

Option (Code 21st digit H, K):

For span > than 1/10 of URL:

$$\pm 0.1\% \text{ of span}$$

For span < than 1/10 of URL:

$$\pm (0.05 + 0.05 \frac{0.1 \times \text{URL}}{\text{span}}) \% \text{ of span}$$

STABILITY:

±0.2% 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 (transmitter only): ±0,30 Of URL

Zero shift (level kit only): ±0,30 Of URL

Total effect (level kit and transmitter): ±0,30% Of URL

Note : The indicated values are for temperature compensation made on transmitter only, without level kit. Zero shift is improved (2 to 3 times) by an additional temperature compensation of the complete level transmitter (level kit and transmitter)

STATIC PRESSURE EFFECT:

Zero shift: ±0.2% of URL / 1MPa

Span shift: -0.2% of calibrated span/1MPa

Double the effects for material code (7th digit in codes symbols) "H", "M", "T", "B", "P" and "R"



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■ **OVERRANGE EFFECT:**

Zero shift: ± 0.1% of URL for flange rating pressure
 Double the effects for material code (7th digit in codes symbols) "H", "M", "T", "B", "P" and "R"

■ **SUPPLY VOLTAGE EFFECT:**

Less than 0.005% of calibrated span per 1V.

■ **UPDATE RATE:**

60 msec

■ **RESPONSE TIME: (at 63.2% of output signal)**

Range code	Time constant (at 23°C)	Dead time
"3"	550 msec	≈120 msec.
"5" à "8"	300 msec	

Response time = time constant + dead time

■ **MOUNTING POSITION EFFECT:**

Zero shift, less than 30 mmH₂O for a 10° tilt in any plane (no extension). No effect on span.
 This error can be corrected by adjusting zero.

■ **VIBRATION EFFECT:**

< ±0.25% of span for spans greater than 1/10 of URL.
 Frequency 10 to 150Hz, acceleration 39.2m/sec²

■ **MATERIAL FATIGUE:**

Consult GeorGIN.

■ **DIELECTRIC STRENGTH:**

500 V AC 50/60Hz 1 min., between circuit and earth.

■ **INSULATION RESISTANCE:**

> than 100 MΩ at 500 V DC.

■ **TURN-ON TIME:**

4 seconds

■ **INTERNAL RESISTANCE FOR EXTERNAL FIELD INDICATOR:**

12 Ω max. (connected to test terminal CK+ and CK-).

■ **PHYSICAL SPECIFICATIONS**

■ **ELECTRICAL CONNECTIONS:**

1/2 -14 NPT, Pg13.5 or M20 x 1.5

■ **PROCESS CONNECTIONS:**

LP side: 1/4-18 NPT
 HP side: ANSI or DIN raised face flange.
 Refer to "Code symbols"
 Raised face flange machining:
 Stockfinish - 316L SS diaphragm
 Smooth finish - other diaphragm materials

■ **PROCESS-WETTED PARTS MATERIAL:**

Code (digit 7)	LP side			HP side
	Process cover	Diaphragm	Wetted sensor body	Diaphragm and flange face
V	SS 316L	SS 316L	SS 316	SS 316L
W	SS 316L	Hastelloy-C		Hastelloy-C
H	SS 316L	SS 316L	SS 316	Hastelloy-C
M	SS 316L	SS 316L	SS 316	Monel
T	SS 316L	SS 316L	SS 316	Tantalum
A	SS 316L	SS 316L	SS 316	SS 316 + FEP lining
K	SS 316L	SS 316L		SS 316L + glued. PTFE diaphragm
B	SS 316L	SS 316L	SS 316	SS 316 + gold coating
P	SS 316L	SS 316L	SS 316	Titanium
R	SS 316L	SS 316L	SS 316	Zirconium

Note: Process cover gasket: Viton O-ring or PTFE/15% graphite square section gasket.

■ **NON-WETTED PARTS MATERIAL:**

Electronics housing:

Low copper die cast aluminum finished with polyester coating (standard), or 316 stainless steel as specified.

Bolts and nut:

Cr-Mo alloy (standard), or 316 stainless steel

Fill fluid:

Silicone oil (standard) for the measuring cell and level kit
 Silicone oil (standard) for the measuring cell and fluorinated oil (or specific oils upon request) for the level kit.

Mounting flange:

316L SS

■ **ENVIRONMENTAL PROTECTION:**

IEC IP67 and NEMA 6/6P

■ **FLANGE MOUNTING:**

See drawings

■ **MASS {WEIGHT}:**

Transmitter: Approximately 10.2kg to 19.2kg without options.

Add: 0.5kg for mounting bracket

4.5 kg for stainless steel housing (option)

1.0kg per 50mm extension of diaphragm

■ **ACCESSORIES**

■ **OVAL FLANGES:**

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

■ **HAND HELD COMMUNICATOR (HHC)**

■ **OPTIONAL FEATURES**

■ **INDICATOR:**

A plug-in analog indicator.

An optional 5 digits 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 HHC.

■ **ARRESTER:**

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

Lightning surge immunity: 4KV (1.2x50µs).

■ **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:**

Oil-free procedures as above. Includes fluorinated oil for fill.

■ **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 boundary parts comply with NACE MR-01-75.

660 stainless steel bolts and nuts comply with NACE

■ **CUSTOMER TAG:**

An extra stainless steel tag for customer tag data is wired to the transmitter.

VACUUM SERVICE:

Special silicone oil and filling procedure are applied
See Fig.1 and Fig.2 below

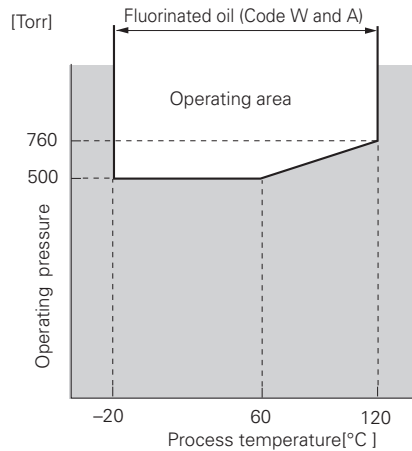
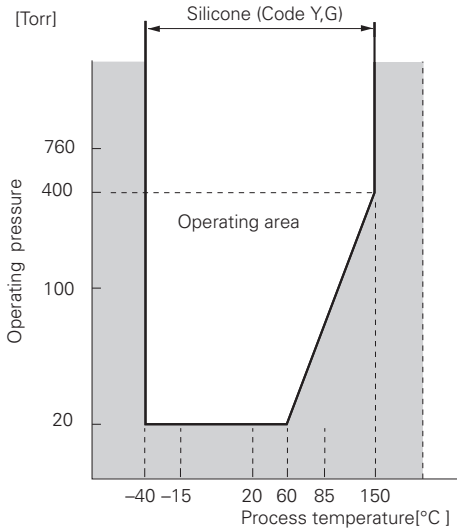


Fig. 1 Relation between process temperature and operating pressure

Fig. 2 Relation between process temperature and operating pressure

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

Emission limits : EN 61326-1 : 2006

Frequency range (MHz)	Limits	Basic standard
30 to 230	40dB (µV/m) quasi peak, measured at 10m distance	EN 55011 / CISPR 11 Group 1 Class A
230 to 1000	47dB (µV/m) quasi peak, measured at 10m 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	10V/m (80-1000MHz) 3 V/m (1.4-2.0 GHz) 1V/m (2.0-2.7 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	2kV (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 IEC 61000-4-5	B
Conducted RF	3 V (150 kHz to 80 MHz)	EN 61000-4-6 IEC 61000-4-6	A

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.



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CODE SYMBOLS

DESCRIPTION																																																											
Type Smart, 4-20 mAdc + Georjin/Hart® digital signal																																																											
Connections																																																											
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Electric. housing																																																											
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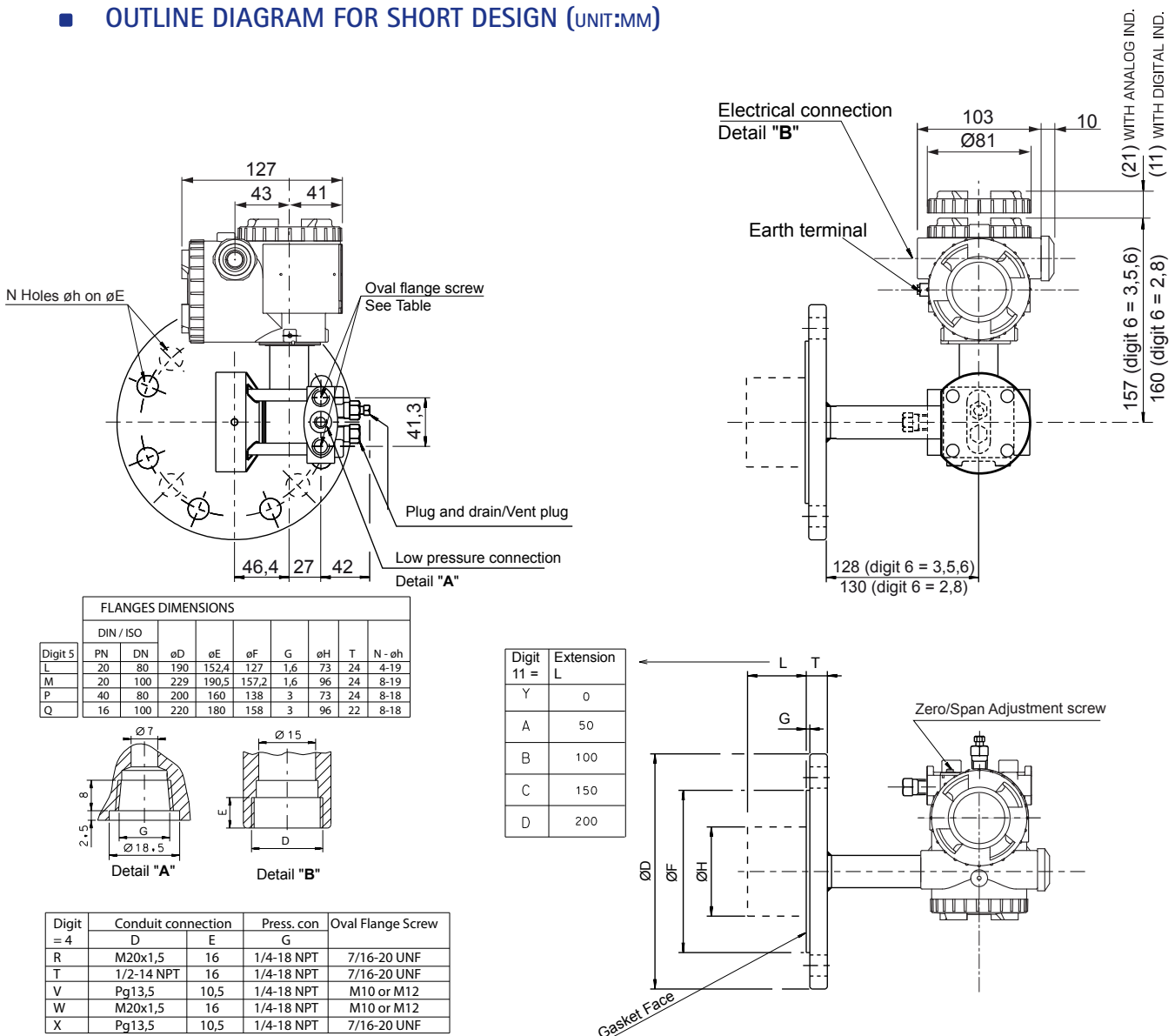
Notes*:

- 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.
- Add values for material options are for DN80 PN40 or ANSI-150 LB3" flange rate, DN100 or 4" add values are available upon request, LP side writed cell body diaphragm in exotic materials are available upon request.
- All wetted parts in the same material (diaphragm, extension, flange gasket area)
- When no code can be found in the current code symbols, place* in concerned code digit(s) & add* in 16 th digit
- Our stainless steel bolts/nuts in SS660 are in conformity with the NACE requirements and must be used for NACE service
- Code "D & V" FM approval only possible with electrical connection 1/2" NPT.
- Please consult Georjin with you application conditions

CODE SYMBOLS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	DESCRIPTION																				
F	K	E					F																													
Y																<table border="1"> <tr><td colspan="2">SS parts</td></tr> <tr><td>SS tag plate</td><td>SS housing</td></tr> <tr><td>None</td><td>None</td></tr> <tr><td>Yes</td><td>None</td></tr> <tr><td>None</td><td>Yes</td></tr> <tr><td>Yes</td><td>Yes</td></tr> </table>	SS parts		SS tag plate	SS housing	None	None	Yes	None	None	Yes	Yes	Yes								
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OUTLINE DIAGRAM FOR SHORT DESIGN (UNIT:MM)





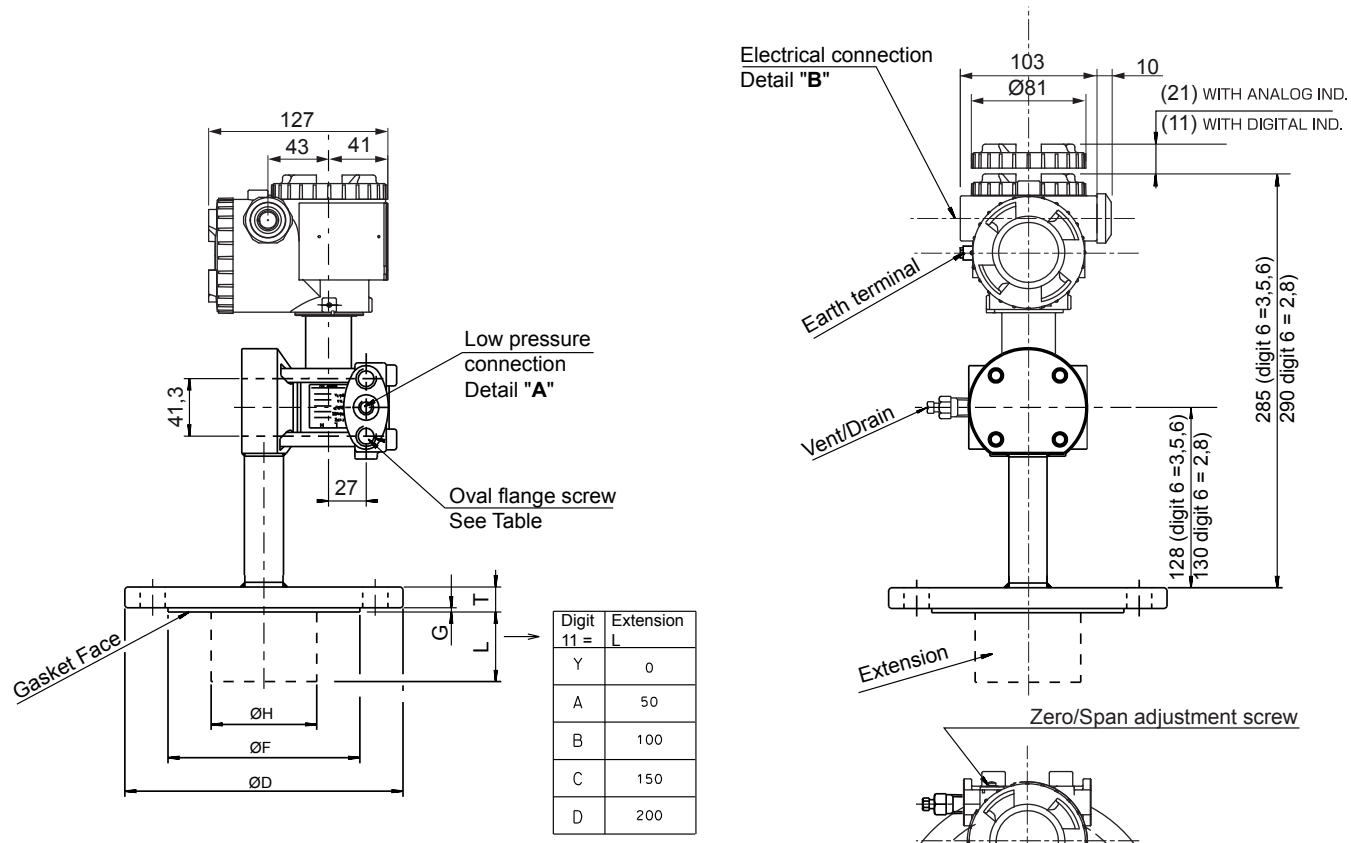
FKE...F Level transmitter



Safety for Industrial Process

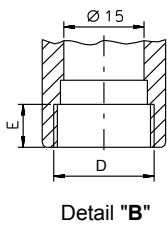
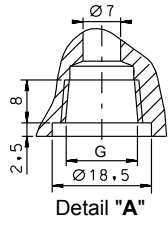
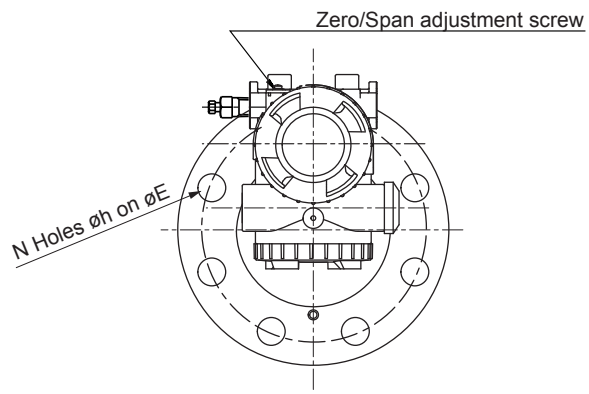


■ OUTLINE DIAGRAM FOR SHORT DESIGN (UNIT:MM)



Digit 11 =	Extension L
Y	0
A	50
B	100
C	150
D	200

FLANGES DIMENSIONS									
Digit 5	DIN / ISO		øD	øE	øF	G	øH	T	N - øh
	PN	DN							
8	40	80	200	160	138	3	73	24	8-18
9	16	100	220	180	158	3	96	20	8-18
4	20	80	190	152,5	127	1,6	73	24	4-20
5	20	100	230	190,5	158	1,6	96	24	8-20



Digit = 4	Conduit connection		Press. con	Oval Flange Screw
	D	G		
R	M20x1,5	16	1/4-18NPT	7/16-20 UNF
T	1/2-14NPT	16	1/4-18NPT	7/16-20 UNF
V	Pg13,5	10,5	1/4-18NPT	M10 or M12
W	M20x1,5	16	1/4-18NPT	M10 or M12
X	Pg13,5	10,5	1/4-18NPT	7/16-20 UNF

■ CONNECTION DIAGRAM

