OBSOLETE

Replacement product:
Model IS-3

Electronic
Pressure Measurement

Intrinsically Safe Pressure Transmitter for applications in hazardous environments and shipbuilding industry Model IS-20-S, IS-21-S, IS-20-F, IS-21-F

Applications

- Monitoring of tanks, gears, pumps, transmissions and filters
- Hydraulic and pneumatic control systems

Special Features

- Pressure ranges from 0 ... 0.1 bar to 0 ... 1,000 bar
- GL-ship approval:
- Environment category D, F, EMC1, H (Vibration)
- Ex-protection Ex ia I/II C T6 in complianc with ATEX:
  Gases and vapours: Zone 0, Zone 1 and Zone 2
  Dust: Zone 20, Zone 21 and Zone 22
- FM, CSA approval for
  - Intrinsic safe Class I, II and III Division 1, Group A, B, C, D, E, F, G
  - Dust Class II and III Division 1, Group E, F, G
  - Class I, Zone 0, AEx ia II C

Fig. left: Pressure transmitter IS-21-S
Fig. right: Pressure transmitter IS-20-F

Description

To meet highest standards
The intrinsically safe pressure transmitters have been specially designed to comply with the most difficult requirements of the shipbuilding industry and represent an ideal solution for almost any task in hazardous environments.

These pressure transmitters meet approvals such as ATEX, FM, CSA, which are relevant throughout the world, as well as the approval of the German Lloyd. All data required in connection with the approval is included on the product label. The globality of the product is thus given special emphasis.

A stock program ensures short delivery times.

Structure
All wetted parts are made of stainless steel and are completely welded. Therefore there are no restrictions of the sealing material based on the pressure medium.

The compact case is also made of stainless steel and provides at least IP 65 ingress protection (special versions up to IP 68).

The models IS-21-S and IS-21-F with flush diaphragm are particularly suitable for the measurement of viscous fluids or media containing particulates that may clog the pressure connection of standard industrial transmitters. Thus, a trouble-free pressure measurement is ensured.

Type IS-2X-F features a field case connection, which enables use in aggravated operating conditions and/or enables direct wiring of the cables.

The transmitters are supplied via appropriate intrinsically safe line transformers, or via typical zener diode barriers with an input power of 10 ... 30 V. The output signal is 4 ... 20 mA, 2-wire.

Data Sheets for related models:
Pressure Transmitter for Shipbuilding and Off-Shore; model S-10; see data sheet PE 81.17
Intrinsically Safe Level Probe for applications in hazardous environments; model IL-10; see data sheet PE 81.23

Specifications Model IS-20-S, IS-21-S, IS-20-F, IS-21-F

Specifications without model designation apply for all models.

Pressure ranges	bar	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Over pressure safety	bar	1	1.5	2	2	4	5	10	10	17	35	35
Burst pressure	bar	2	2	2.4	2.4	4.8	6	12	12	20.5	42	42
Pressure ranges	bar	16	25	40	60	100	160	250	400	600	1000[1]	
Over pressure safety	bar	80	50	80	120	200	320	500	800	1200	1500	
Burst pressure	bar	96	96	400	550	800	1000	1200	1700[2]	2400[2]	3000	
	{Vacuum, gauge pressure, compound range, absolute pressure are available}											
	[1] Only model IS-20.											
	[2] For model IS-21: the value specified in the table applies only when sealing is realised with the sealing ring underneath the hex. Otherwise max. 1500 bar applies.											

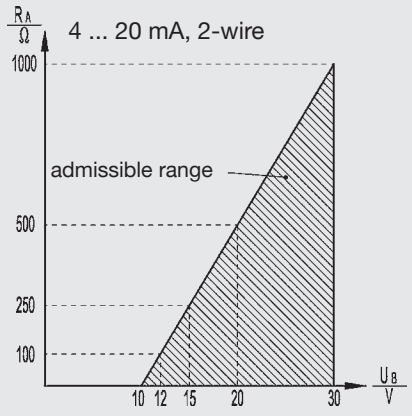
Materials			
■ Wetted part			
» Model IS-20		Stainless steel	
» Model IS-21		Stainless steel {Hastelloy}	O-Ring: NBR {FPM/FKM or EPDM}
■ Case		Stainless steel	
■ Internal transmission fluid [3]		Synthetic oil	
	[3] Not for IS-20 with pressure ranges > 25 bar.		
Power supply U_B	U_B in VDC		
» Model IS-2X-S		$10 < U_B \leq 30$	
» Model IS-2X-F		$11 < U_B \leq 30$	
Signal output and		4 ... 20 mA, 2-wire	
maximum ohmic load R_A	R_A in Ohm		
» Model IS-2X-S		$R_A \leq (U_B - 10\ V) / 0.02\ A$ - (length of flying leads in m x 0.14 Ohm)	
» Model IS-2X-F		$R_A \leq (U_B - 11\ V) / 0.02\ A$	
Test circuit signal / max. load		$R_A \leq 15$ Ohm (only model IS-2X-F)	
Adjustability zero/span	%	± 5 using potentiometers inside the instrument	
Response time (10 ... 90 %)	ms	≤ 1	
Power Pi	W	1 (750 mW with approval for Category 1D)	
Insulation voltage		Insulation complies with EN 60079-11	
Accuracy	% of span	≤ 0.25 {0.125} [4] (BFSL)	
	% of span	≤ 0.5 {0.25} [4] [5]	
	[4] Accuracy { } for pressure ranges ≥ 0.25 bar		
	[5] Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2)		
	Adjusted in vertical mounting position with lower pressure connection		
Non-linearity	% of span	≤ 0.2 (BFSL) according to IEC 61298-2	
Non-repeatability	% of span	≤ 0.1	
1-year stability	% of span	≤ 0.2 (at reference conditions)	
Permissible temperature of			
■ Medium [6] [9]		-20 ... +80 °C [7]	-4 ... +176 °F [7]
■ Ambience [6] [9]		-20 ... +80 °C [7]	-4 ... +176 °F [7]
■ Storage [6]		-30 ... +105 °C	-22 ... +221 °F
	[6] Also complies with EN 50178, Tab. 7, Operation (C) 4K4H, Storage (D) 1K4, Transport (E) 2K3		
	[7] Other temperature ranges are possible, depending on the electrical connection; see EC-type examination certificate, e.g. -30 … +105 °C / -22 … +221 °F and table page 5.		
Rated temperature range		0 ... +80 °C	32 ... +176 °F
Temperature coefficients within rated temperature range			
■ Mean TC of zero	% of span	≤ 0.2 / 10 K (< 0.4 for pressure ranges ≤ 0.25 bar)	
■ Mean TC of range	% of span	≤ 0.2 / 10 K	
Installation position	mbar	< 2 at +/- 30° tilted position with model IS-21-S and IS-21-F	
CE-conformity			
■ Pressure equipment directive		97/23/EC	
■ EMC directive		2004/108/EC, EN 61 326 Emission (Group 1, Class B) and	
		Immunity (industrial locations)	
■ Directive ATEX of equipment intended for use in potentially explosive atmospheres		94/9/EC	

Specifications		Model IS-20-S, IS-21-S, IS-20-F, IS-21-F	
Ex-protection	ATEX	Category [9] 1/2G, 2G, 1/2D, 1D, 2D	
Ignition protection type		Ex ia I/II C T4, Ex ia I/II C T5, Ex ia I/II C T6	
	[9] **Read** the operating conditions and **safety-relevant data in** the **EC-type examination certificate in any case** (BVS 04 ATEX E 068 X		
Ex-protection	FM, CSA	Class I, II and III	
Ignition protection type		Intrinsic safe Class I, II, III Division 1,	
		Group A, B, C, D, E, F, G and Class I, Zone 0 AEx ia II C	
Approval German Lloyd GL		Environmental Category D, F, EMC 1	
HF-immunity	V/m	10	
Burst	kV	2	
Vibration resistance		Category H	
» Model IS-2X-S	g	20 to 2 kKHz according to IEC 60068-2-6	(vibration under resonance)
» Model IS-2X-F	g	10 to 2 kHz according to IEC 60068-2-6	(vibration under resonance)
Wiring protection			
■ Short-circuit proofness		Sig+ towards UB-	
■ Reverse polarity protection		UB+ towards UB-	
Weight			
» Model IS-2X-S	kg	Approx. 0:2	
» Model IS-2X-F	kg	Approx. 0.35	

{ } Items in curved brackets are optional extras for additional price.

Output signal and admissible load

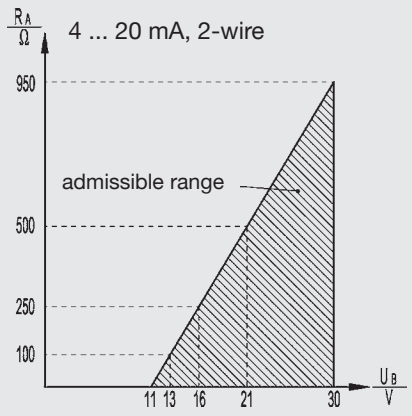
Model IS-2X-S



Output current (2-wire)

4 ... 20 mA: $R_A \leq (U_B - 10\ V) / 0.02\ A$

Model IS-2X-F



Output current (2-wire)

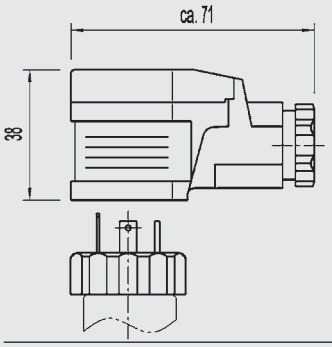
4 ... 20 mA: $R_A \leq (U_B - 11\ V) / 0.02\ A$

Dimensions in mm

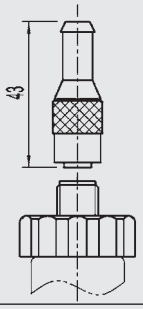
Permissible temperature ranges depending on electrical connections; see table page 5.

Electrical connections IS-2X-S

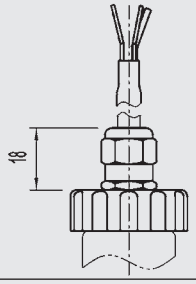
DIN 175301-803 A, L-connector
PUR,
Order code: A4 and S (GL approval)
ATEX: 1/2 G



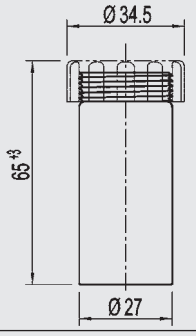
M 12x1
Circular connector
Order code: M4
ATEX: 1/2 G
*)



Flying leads
for conductor cross section
0.5 mm ^{2}, AWG 20 with end splices,
conductor outer diameter 6.8 mm,
PUR
IP 67
Order code: DL
ATEX: 1/2 G

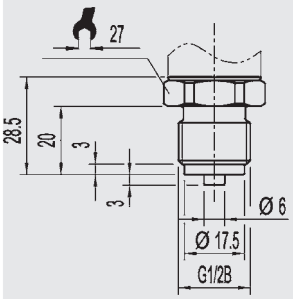


Case

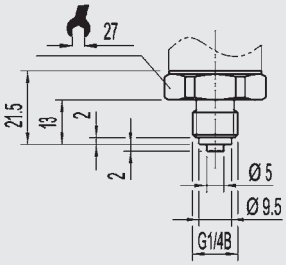


Pressure connections IS-20-S and IS-20-F

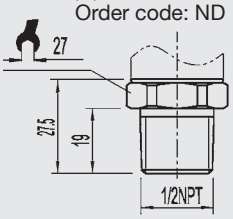
G 1/2
EN 837
Order code: GD



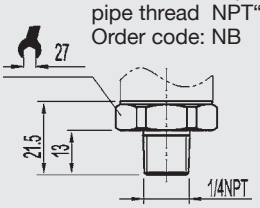
G 1/4
EN 837
Order code: GB



1/ 2 NPT
per „Nominal size for US standard tapered pipe thread NPT“
Order code: ND

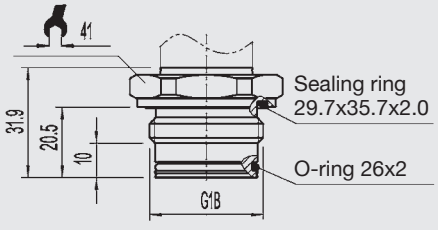


1/4 NPT
per „Nominal size for US standard tapered pipe thread NPT“
Order code: NB

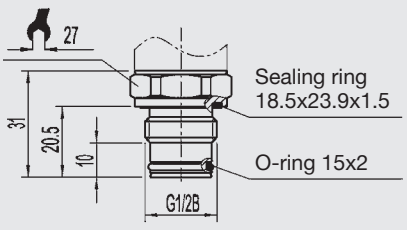


Pressure connections IS-21-S and IS-21-F, flush diaphragm

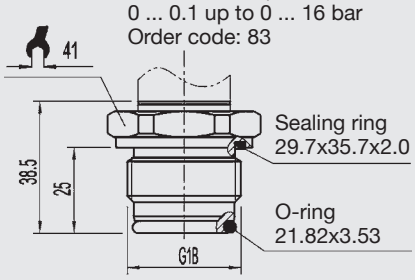
G 1
0 ... 0.1 up to 0 ... 1.6 bar
Order code: 85



G 1/2
0 ... 2.5 up to 0 ... 600 bar
Order code: 86



G 1
acc. EHEDG **)
0 ... 0.1 up to 0 ... 16 bar
Order code: 83



For installation and safety instructions see the operating instructions for this product.
For tapped holes and welding sockets please see Technical Information IN 00.14 for download at www.wika.de

*) Connectors are not included in delivery.

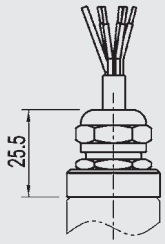
Dimensions in mm

Permissible temperature ranges depending on electrical connections; see table page 5.

Electrical connection

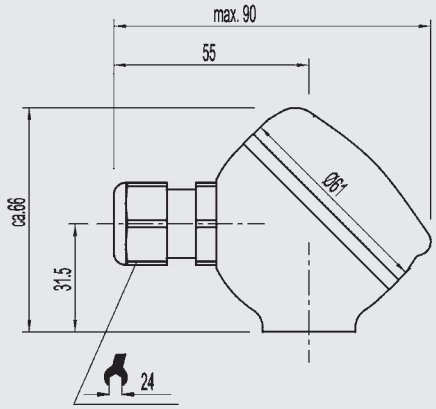
IS-2X-S

Flying leads
zero/span not adjustable,
for conductor cross section up to max. 0.5 mm ^{2}, AWG 20 with end splices, conductor outer diameter 6.8 mm,
PUR
IP 68
Order code: EM
ATEX: 1/2 G



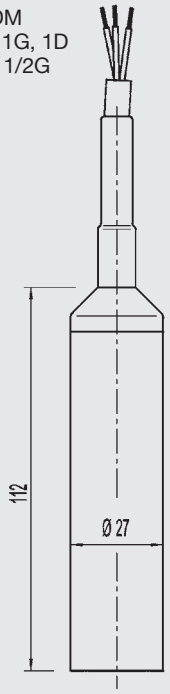
IS-2X-F

Fieldcase with internal spring clip terminals,
Order code:
FH (threaded connection brass nickel-plated)
FC (threaded connection stainless steel)
ATEX: 1/2 G

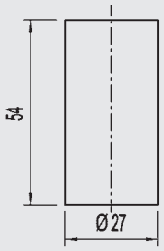


IS-2X-S

Flying leads,
zero/span not adjustable,
conductor outer diameter 7.5 mm,
PUR {FEP}
IP 68
Order code: DM
ATEX: II A 1G, 1D
II C 1/2G



Case



For installation and safety instructions see the operating instructions for this product.

**) European Hygienic Equipment Design Group
{ } Items in curved brackets are optional extras for additional price.

Permissible temperature ranges depending on electrical connections

Electrical connections	Order-code	Category	Ambience-/ Medium temperature range	
DIN 175301-803 A L-Connector	A4	1/2 G (IIC)	-40 ... +60 °C (T6) -40 ... +80 °C (T5) -40 ... +105 °C (T4)	-40 ... +140 °F (T6) -40 ... +176 °F (T5) -40 ... +221 °F (T4)
M 12x1 Circular connector	M4	1/2 G (IIC)	-25 ... +60 °C (T6) -25 ... +80 °C (T5) -25 ... +90 °C (T4)	-13 ... +140 °F (T6) -13 ... +176 °F (T5) -13 ... +194 °F (T4)
Flying leads	DL	1/2 G (IIC)	-20 ... +60 °C (T6) -20 ... +80 °C (T5) -20 ... +80 °C (T4)	-4 ... +140 °F (T6) -4 ... +176 °F (T5) -4 ... +176 °F (T4)
Bayonet connector (not with mining)	C6	1/2 G (IIC)	-50 ... +60 °C (T6) -50 ... +80 °C (T5) -50 ... +105 °C (T4)	-58 ... +140 °F (T6) -58 ... +176 °F (T5) -58 ... +221 °F (T4)
Flying leads zero/span not adjustable	EM	1/2 G (IIC)	-20 ... +60 °C (T6) -20 ... +80 °C (T5) -20 ... +80 °C (T4)	-4 ... +140 °F (T6) -4 ... +176 °F (T5) -4 ... +176 °F (T4)
Fieldcase	FH, FC	1/2 G (IIC)	-50 ... +60 °C (T6) -50 ... +80 °C (T5) -50 ... +105 °C (T4	-58 ... +140 °F (T6) -58 ... +176 °F (T5) -58 ... +221 °F (T4
Flying leads PUR zero/span not adjustable	DM	1 G (IIA), 1/2 G (IIC)	-10 ... +60 °C (T6) -10 ... +60 °C (T5) -10 ... +60 °C (T4)	14 ... +140 °F (T6) 14 ... +140 °F (T5) 14 ... +140 °F (T4)
		1D	-10 ... +60 °C	14 ... +140 °F
Flying leads FEP zero/span not adjustable	DM	1 G (IIA), 1/2 G (IIC)	-30 ... +60 °C (T6) -30 ... +80 °C (T5) -30 ... +105 °C (T4)	-22 ... +140 °F (T6) -22 ... +176 °F (T5) -22 ... +221 °F (T4)
		1D	-30 ... +60 °C	-22 ... +221 °F

Electrical connections

	L-connector DIN 175301-803 A	Circular connector M12x1, 4-pin	Flying leads, 1.5 m	Field case (with internal spring clip terminals)
				
2-wire	UB = 1 | 0V = 2	UB = 1 | 0V = 3	UB = braun | 0V = grün	UB = 1 | 0V = 2 | Test+ = 3
			scrren / case	Test- = 4 | screen = 5
Wire gauge	up to max. 1.5 mm²	-	0.5 mm² (AWG 20)	
Cable diameter	10-14 mm	-	6.8 mm (Order code: DL / EM) 7.5 mm (Order code DM)	7-13 mm
Ingress protection per IEC 60 529	IP 65	IP 67	IP 67 - Order code: DL IP 68 zero/span not adjustable - Order code: EM / DM	IP 67
	The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection.			

Hazardous areas (zone classification according to ATEX)

Group II: **Electrical equipment for use in all areas (except mines) which are endangered by an explosive atmosphere.**

Zone	Category	Occurrence of explosive atmosphere
Zone 0	Category 1G (gas)	Continuous
Mounting to Zone 0	Category 1/2 G	
Zone 20	Category 1D (dust)	
Mounting to Zone 20	Category 1/2 D	
Zone 1	Category 2G	Intermittent
Zone 21	Category 2D	
Zone 2	Category 3G	Hazard under abnormal conditions
Zone 22	Category 3D	

Hazardous areas (ATEX in comparison with FM, CSA)

		ATEX Group	FM / CSA Class	Group
Above ground	Gases and Vapours	IIA / IIB / IIC	I	A / B / C / D / E / F / G
	Dusts		II	
	Fibres		III	

	Flammable material present continuously	Flammable material present intermittently	Flammable material normally not present
ATEX	Zone 0 (Zone 20 Dust)	Zone 1 (Zone 21 Dust)	Zone 2 (Zone 22 Dust)
FM /CSA	Zone 0	Zone 1	Zone 2
	Division 1		Division 2
FM (NEC505)	Zone 0	Zone 1	Zone 2

Further information

You can obtain further information (data sheets, instructions, etc.) via our internet address www.wika.de

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