

Intrinsically Safe Pressure Transmitter for applications in hazardous environments

Models IS-20-S, IS-21-S, IS-20-F, IS-21-F

WIKA Data Sheet PE 81.50



Applications

- Chemical, Petrochemical
- Oil and gas refining
- Food & Beverage
- Mechanical engineering

Special Features

- Pressure ranges from 0 ... 0.1 bar to 0 ... 1,000 bar
- Ex- protection EEx ia I/II C T6 according to ATEX for:
 - Gases, vapours and mist: Connection to Zone 0, Zone 1 and Zone 2
 - Dust: Connection to Zone 20, Zone 21 and Zone 22
 - Mining: Category M1 and M2
- FM, CSA approval for
 - Intrinsically safe Class I, II und III Division 1, Group A, B, C, D, E, F, G
 - Dust Class II und III Division 1, Group E, F, G
 - Class I, Zone 0, AEx ia II C

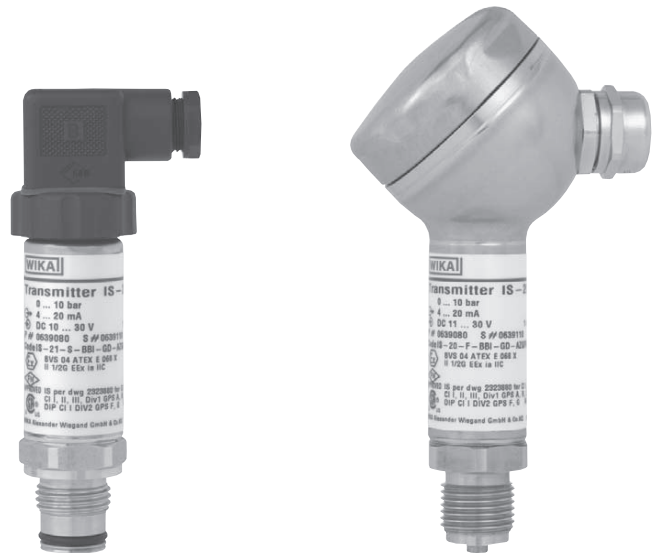


Fig. left: Pressure transmitter IS-21-S
Fig. right: Pressure transmitter IS-20-F

Description

To meet highest standards

The intrinsically safe pressure transmitters have been specially designed to comply with the most difficult requirements of industrial applications 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. 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 media. The

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

The model IS-21-S and IS-21-F with flush diaphragm is 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.

Model IS-2*-F features a field case connection, which enables use in aggravated operating conditions and 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.

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		(other materials see WIKA diaphragm seal program)										
■ Wetted parts		Stainless steel										
> Models IS-20-S, IS-20-F ^{*)}		Stainless steel {Hastelloy C4}										
> Models IS-21-S, IS-21-F		O-ring: NBR {FPM/FKM or EPDM}										
■ Case		Stainless steel										
Internal transmission fluid ³⁾		Synthetic oil {Halocarbon oil for oxygen applications}										
		{Listed by FDA for Food & Beverage}										
		³⁾ Not for Model IS-20 with pressure ranges > 25 bar.										
Power supply U _B	DC V	10 < U _B ≤ 30 (11 < U _B ≤ 30 with Model IS-2*-F)										
Signal output and		4 ... 20 mA, 2-wire										
Maximum load R _A		R _A ≤ (U _B - 10 V) / 0.02 A – (length of flying leads in m x 0.14 Ohm)										
> Model IS-2*-S		R _A ≤ (U _B - 11 V) / 0.02 A										
> Model IS-2*-F		with R _A in Ohm and U _B in Volt										
Test circuit signal / max. load R _A		R _A < 15 Ohm (only for Model IS-2 *-F)										
Adjustability zero/span	%	± 10 using potentiometers inside instrument										
Response time (10 ... 90 %)	ms	≤ 1										
Dielectric strength		Insulation complies with EN 50020, 6.4, 12										
Accuracy	% of span	≤ 0.25 {0.125} ⁴⁾ (BFSL)										
	% of span	≤ 0.5 {0.25} ^{4) 5)}										
		⁴⁾ For pressure ranges beyond 0 ... 0.25 bar.										
		⁵⁾ Including non-linearity, hysteresis, non-repeatability, 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										
1-year stability	% of span	≤ 0.2 (at reference conditions)										
Permissible temperature												
■ Medium ^{6) 9) *)}		-20 ... +80 °C ⁷⁾					-4 ... +176 °F ⁷⁾ {extended temperature ranges see Page 6} ⁸⁾					
■ 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										
		⁸⁾ Response time IS-20: ≤ 10 ms at medium temp. below < -30 °C (-22 °F) for pressure ranges up to 25 bar Response time IS-21: ≤ 10 ms at medium temp. below < -30 °C (-22 °F).										
Compensated temperature range		0 ... +80°C					32 ... +176°F					
Temperature coefficients within compensated temp range												
■ Mean TC of zero	% of span	≤ 0.2 / 10 K (< 0.4 for pressure range ≤ 250 mbar)										
■ Mean TC of range	% of span	≤ 0.2 / 10 K										
⊕ -protection	ATEX	Categories ⁹⁾ 1G, 1/2G, 2G, 1D, 1/2D, 2D, M1, M2										
Ignition protection type		EEx ia I/II C T4, EEx ia I/II C T5, EEx ia I/II C T6										
Ex -protection	FM, CSA	Class I, II und III										
Ignition protection type		Intrinsically safe Class I, II, III Division 1, Group A, B, C, D, E, F, G und Class I, Zone 0 AEx ia II C										
		⁹⁾ Read the operating conditions and safety-relevant data in the EC-type examination certificate in any case (BVS 04 ATEX E 068 X)										

Specifications

Models IS-20-S, IS-21-S, IS-20-F, IS-21-F

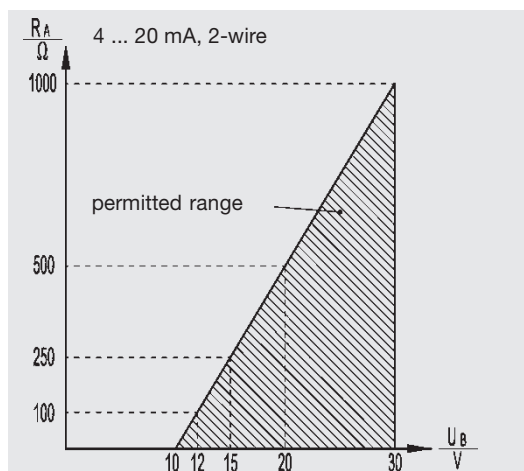
CE- conformity		89/336/EEC interference emission and immunity see EN 61 326, interference emission limit class A and B EN 50 014 (general part), EN 50 020 (intrinsic safety), {EN 50 284 (Zone 0)}, {EN 50 281-1 (dust-Ex)}, {EN 50 303 (mining industry)}
FM, CSA		FM standards according to FMRC 3600, 3610, 3611 (including supplement #1), ISA-S12.0.01, IEC 60 529 (including amendment #1) CSA standard C22.2 No. 0-M1991 / 142-M1987 / 157-M1992 UL 50, Eleventh Edition / UL 508, Seventeenth Edition / UL 913, Sixth Edition
HF-immunity	V/m	10
BURST	KV	2
Shock resistance		
> Model IS-2*-S	g	1000 according to IEC 60068-2-27 (mechanical shock)
> Model IS-2*-F	g	600 according to IEC 60068-2-27 (mechanical shock)
Vibration resistance		
> Model IS-2*-S	g	20 according to IEC 60068-2-6 (vibration under resonance)
> Model IS-2*-F	g	10 according to IEC 60068-2-6 (vibration under resonance)
Wiring protection		Protected against reverse polarity and short circuiting on the instrument side
Mass		
> Model IS-2*-S	kg	Approx. 0.2
> Model IS-2*-F	kg	Approx. 0.35

*) In an oxygen version model IS-21 is not available. In an oxygen version model IS-20 is only available in gauge pressure ranges ≥ 0.25 bar with media temperatures between $-20 \dots +60$ °C / $-4 \dots +140$ °F and using stainless steel or Elgiloy[®] wetted parts.

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

Output signal and admissible load

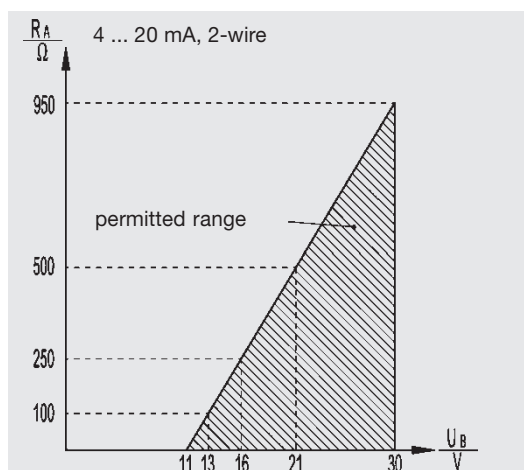
Model IS-2*-S



Output current (2-wire)

$$4 \dots 20 \text{ mA: } R_A \leq (U_B - 10 \text{ V}) / 0.02 \text{ A}$$

Model IS-2*-F



Output current (2-wire)

$$4 \dots 20 \text{ mA: } R_A \leq (U_B - 11 \text{ V}) / 0.02 \text{ A}$$

Dimensions in mm

Electrical connections IS-2*-S

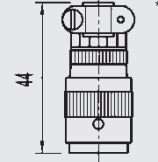
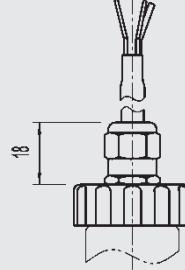
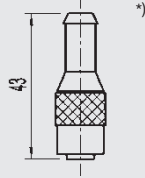
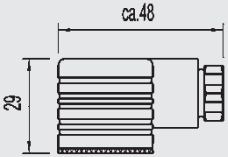
Ingress Protection IP per IEC 60 529

L-connector
DIN EN 175301-803,
Form A
conductor outer diameter
6 - 8 mm
IP 65
Order code: A4
ATEX: 1/2 G, M1

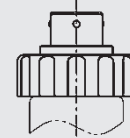
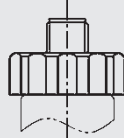
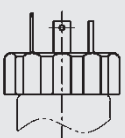
Circular connector,
M 12x1, 4-pin
IP 67
Order code: M4
ATEX: 1/2 G, M1

Flying leads
conductor outer
diameter 6.8 mm, PUR
IP 67
Order code: DL
ATEX: 1/2 G, M1

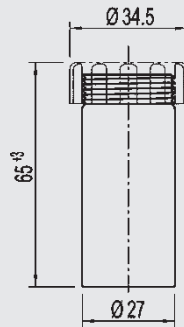
Bayonet connector
6-pin
IP 67
Order code: C6
ATEX: 1/2 G
(not with mining)



Others on request



Case



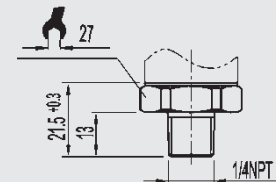
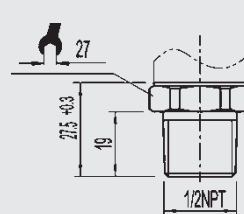
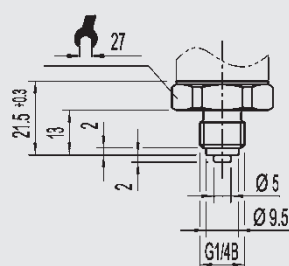
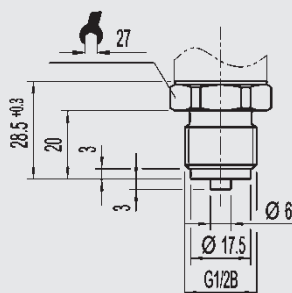
Pressure connections IS-20-S and IS-20-F

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



Others on request

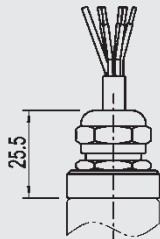
For installation and safety instructions see the operating instructions for this product.

For tapped holes and welding sockets please see Technical Information IN 00.14 for download at www.wika.de -Service

*) Connectors are not included in delivery.

Electrical connections IS-2*-S

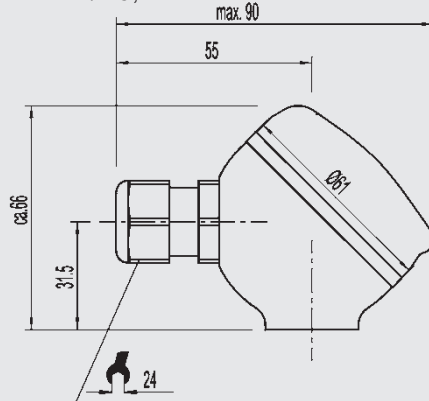
Flying leads, zero/span not adjustable, conductor outer diameter 6.8 mm, PUR IP 68
Order code: EM
ATEX: 1/2 G, M1



Others on request

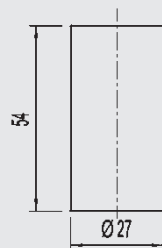
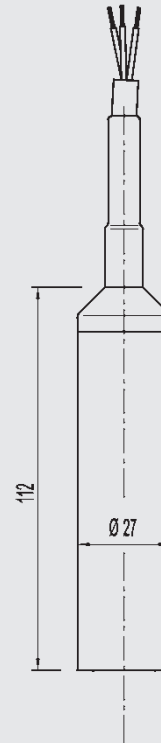
Electrical connections IS-2*-F

Field case with internal spring clip terminals, conductor outer diameter 7 - 13 mm, IP 68
Order code:
FH (threaded connection brass nickel-plated)
FC (threaded connection stainless steel)
ATEX: 1/2 G, M1



Electrical connections IS-2*-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, M1

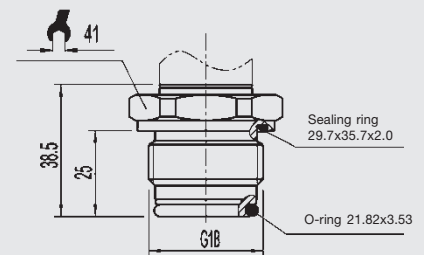
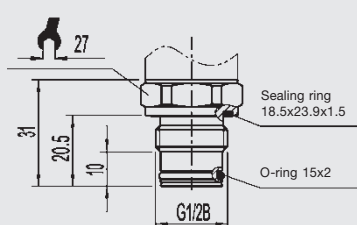
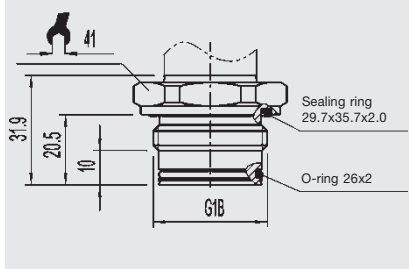


Pressure connections IS-21-S and IS-21-F, flush diaphragm

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
according to EHEDG **)
0 ... 0.1 up to 0 ... 16 bar
Order code: 83



Others on request

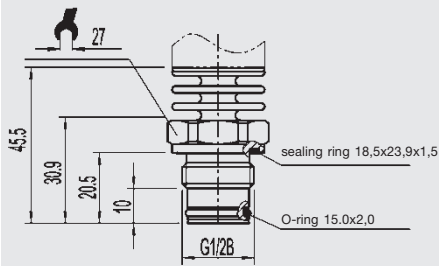
**) European Hygienic Equipment Design Group

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

Pressure connections high temperature

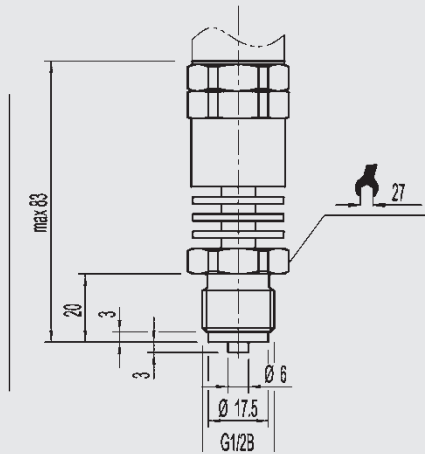
IS-21-S and IS-21-F, flush diaphragm
-20 ... 150 °C

G 1/2
with 2 cooling fins (version **(A)**)
0 ... 2.5 up to 0 ... 600 bar
Order code: 86 and C



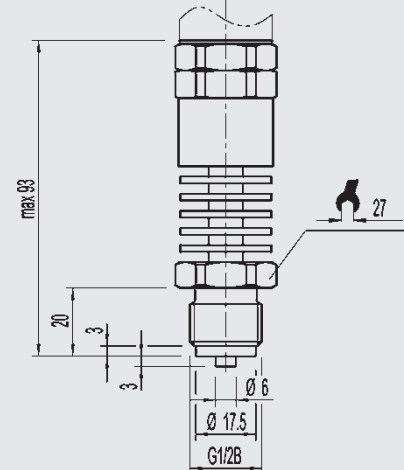
IS-20-S and IS-20-F
-40 ... 150 °C

G 1/2
with 3 cooling fins (version **(B)**)
0 ... 1000 bar
Order code: GD and 8

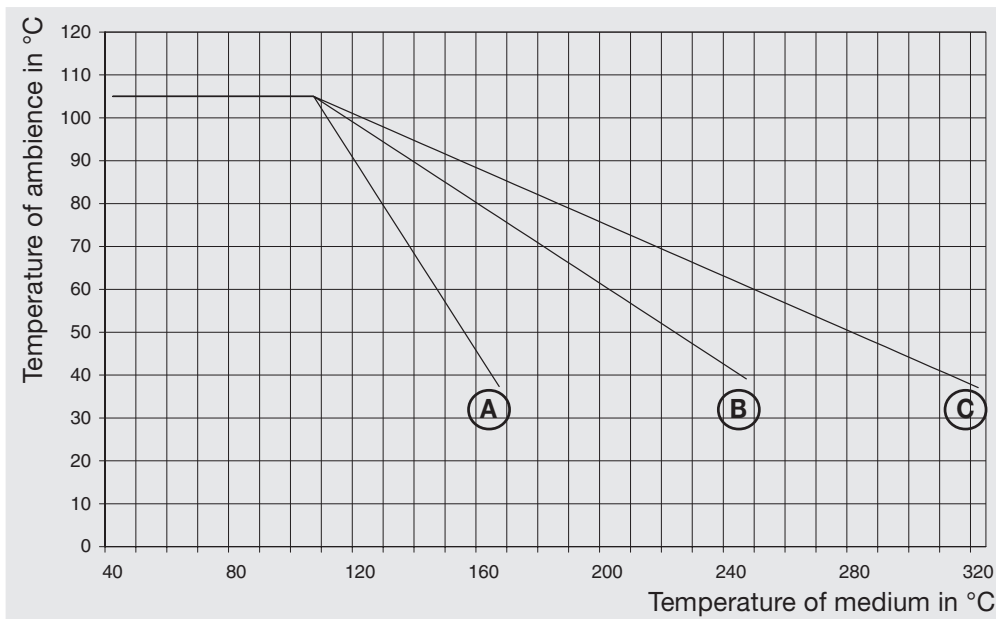


IS-20-S and IS-20-F
-40 ... 200 °C

G 1/2
with 5 cooling fins (version **(C)**)
0 ... 1000 bar
Order code: GD and 9



Relation of medium temperature to ambient temperature



Version	(A)	(B)	(C)
Cooling fin	2	3	5
Constant K	0.47	0.68	0.76

Calculation of cooling element:

$$T_B = T_{med} - (T_{med} - T_{amb}) \times K$$

T_B = Operation temperature of transmitter

T_{med} = max. temperature of process medium

T_{amb} = max. temperature of ambience

K = Constant of cooling element

Max. permitted temperature of ambience:

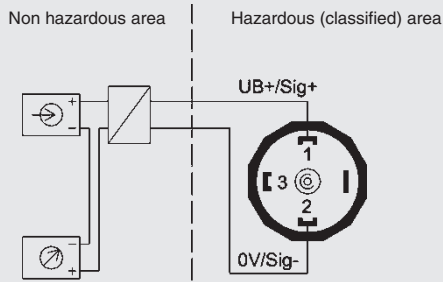
$$T_{amb} = T_{med} + (T_B - T_{med}) / K$$

Wiring

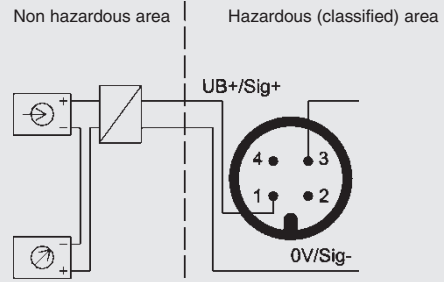
Model IS-2*-S

2-wire

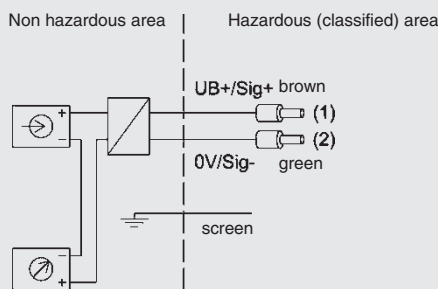
L-connector



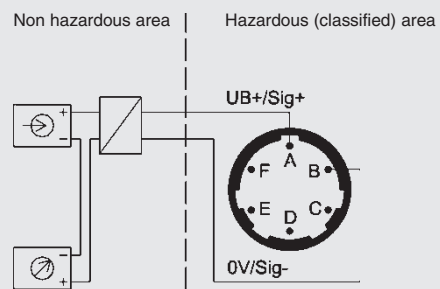
Circular connector M 12x1



Flying leads with 1.5 m of cable



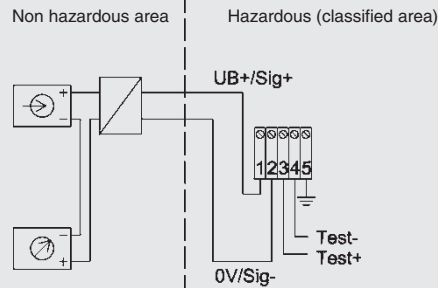
Bayonet connector



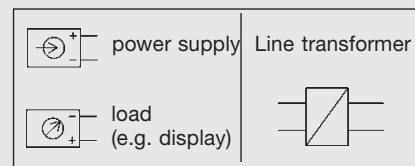
Model IS-2*-F

2-wire

Field case (internal spring clip terminal)



Legend



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)	Intermittent
Mounting to zone 20	Category 1/2 D	
Zone 1	Category 2G	Hazard under abnormal conditions
Zone 21	Category 2D	
Zone 2	Category 3G	
Zone 22	Category 3D	

Group I: Electrical equipment for use in mines (hazard due to mine gas)

Zone	Category	Requirements
	Category M1	Very high degree of safety
	Category M2	High degree of safety (instruments have to be turned off if they are exposed to an explosive atmosphere)

Hazardous areas (ATEX in comparison with FM, CSA)

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

	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 Internet address www.wika.de

The image shows a screenshot of the Wika website. On the left, there is a 'Product News' section with several articles: 'WIATORSHART® modems - available', 'WIKA joins Fieldbus Foundation', 'New solution for O2B applications', 'New process calibrator', and '2 in 1 - The new Twin-Temp from WIKA'. On the right, there is a technical drawing of a pressure transmitter (model IS-20-S, IS-21-S, IS-20-F, IS-21-F) with the text 'Operating Instructions' and 'Druckmessumformer / Transmetteur de pression'. The drawing shows the transmitter and its components, including the sensor and the housing.

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.



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Intrinsically Safe Pressure Transmitter for highest pressure applications in hazardous environments Model IS-20-H

WIKA Data Sheet PE 81.51



Applications

- Chemical and petro chemical industry
- Polyethylene production plants

Special Features

- Pressure ranges from 0 ... 1600 bar to 0 ... 8000 bar
- Sensor stayed via sealing cone
- Ex- protection EEx ia I/II C T6 in compliance with ATEX:

Gases, vapours and mist:	Mounting to Zone 0,
	Zone 1 and Zone 2
- FM, CSA approval for
 - Intrinsic safe Class I, II und III Division 1, Group A, B, C, D, E, F, G
 - Dust Class II und III Division 1, Group E, F, G
 - Class I, Zone 0, AEx ia II C



Fig. left: IS-20-H with L-connector
Fig. right: IS-20-H with field case

Description

Global explosion protection

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

Structure

All wetted parts materials are specially suited for extremely high pressure ranges. The rugged case is made of stainless steel and provides at least IP 65 ingress protection (special versions up to IP 68).

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.

High permanent load stability

Due to the specially clamped sensor element a high stability to permanent load cycles is achieved even in highly dynamic processes. Furthermore, the well-proven WIKA technology guarantees high accuracy and longterm stability of the pressure transmitters.

As several pressure and electrical connections are possible, the user can find the optimal solution for his measuring task.

This product is a combination of the excellent approval-relevant features of the intrinsically safe pressure transmitter and superior high pressure characteristics.

Specifications

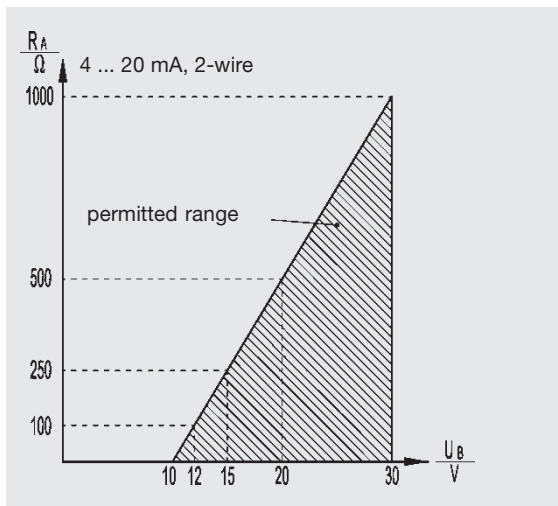
Model IS-20-H

Pressure ranges	bar	1600	2500	4000	5000	6000	8000
Over pressure safety	bar	2300	3500	5000	6000	7000	10000
Burst pressure	bar	4000	6000	8000	10000	11000	12000
Materials		Stainless steel					
■ Wetted parts		Stainless steel					
■ Case		Stainless steel					
Power supply U_B	DC V	$10 < U_B \leq 30$ ($11 < U_B \leq 30$ with field case)					
Signal output and		4 ... 20 mA, 2-wire					
Maximum load R_A		$R_A \leq (U_B - 10 \text{ V}) / 0.02 \text{ A}$ – (Length of cable version in m x 0.14 Ohm)					
		With field case: $R_A \leq (U_B - 11 \text{ V}) / 0.02 \text{ A}$					
		with R_A in Ohm and U_B in Volt					
Test circuit signal / max. load R_A		$R_A < 15 \text{ Ohm}$ (only with field case)					
Response time (10 ... 90 %)	Ms	≤ 1					
Dielectric strength		Insulation complies with EN 50020, 6.4, 12					
Accuracy	% of span	≤ 0.25 (BFSL)					
	% of span	≤ 0.5 ¹⁾					
		¹⁾ Including non-linearity, hysteresis, non-repeatability, 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					
1-year stability	% of span	≤ 0.2 (at reference conditions)					
Permissible temperature of							
■ Medium ^{2) 4)}		$-20 \dots +80 \text{ °C}$ ³⁾		$-4 \dots +176 \text{ °F}$ ³⁾			
		(extended temperature ranges see chapter: „Relation of medium temperature to ambient temperature“)					
■ Ambience ^{2) 4)}		$-20 \dots +80 \text{ °C}$ ³⁾		$-4 \dots +176 \text{ °F}$ ³⁾			
■ Storage ²⁾		$-30 \dots +105 \text{ °C}$		$-22 \dots +221 \text{ °F}$			
		²⁾ Also complies with EN 50178, Tab. 7, Operation (C) 4K4H, Storage (D) 1K4, Transport (E) 2K3					
		³⁾ Other temperature ranges are possible, depending on the electrical connection; see EC-type examination certificate, e.g. $-30 \dots +105 \text{ °C} / -22 \dots +221 \text{ °F}$					
Compensated temp. range		$0 \dots +80 \text{ °C}$		$+32 \dots +176 \text{ °F}$			
Temperature coefficients within compensated temp range							
■ Mean TC of zero	% of span	$\leq 0.2 / 10 \text{ K}$					
■ Mean TC of range	% of span	$\leq 0.2 / 10 \text{ K}$					
Ⓔ -protection	ATEX	Categories ⁴⁾ 1/2G, 2G, M1, M2					
Type of protection		Ex ia I/II C T4, Ex ia I/II C T5, Ex ia I/II C T6					
Ex-protection	FM, CSA	Class I, II und III					
Type of protection		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					
		⁴⁾ Read the operating conditions and safety-relevant data in the EC-type examination certificate in any case (BVS 04 ATEX E 068 X)					
Ⓒ -conformity		89/336/EWG interference emission and immunity see EN 61 326, interference emission limit class A and B					
		EN 50 014 (general part), EN 50 020 (intrinsic safety), {EN 50 284 (Zone 0)}, {EN 50 303 (mining industry)}					
FM, CSA		FM standards according to FMRC 3600, 3610, 3611 (including supplement #1), ISA-S12.0.01, IEC 60 529 (including amendment #1)					
		CSA standard C22.2 No. 0-M1991 / 142-M1987 / 157-M1992					
		UL 50, Eleventh Edition / UL 508, Seventeenth Edition / UL 913, Sixth Edition					
HF-immunity	V/m	10					
BURST	KV	2					
Wiring protection		Protected against reverse polarity and short circuiting on the instrument side					
Mass	kg	Approx. 0.3 (approx. 0.45 with field casing)					

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

Output signal and admissible load

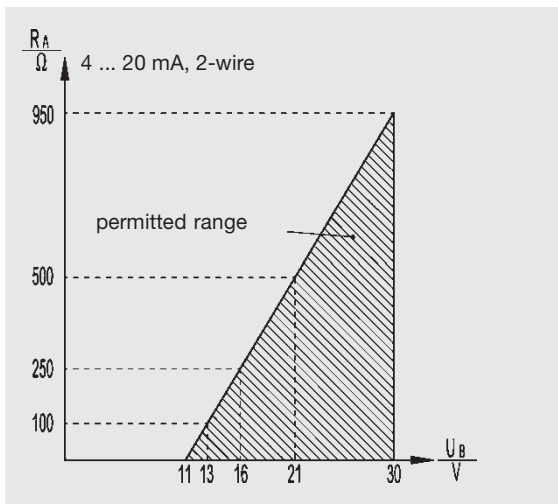
Model IS-20-H



Output current (2-wire)

$$4 \dots 20 \text{ mA: } R_A \leq (U_B - 10 \text{ V}) / 0.02 \text{ A}$$

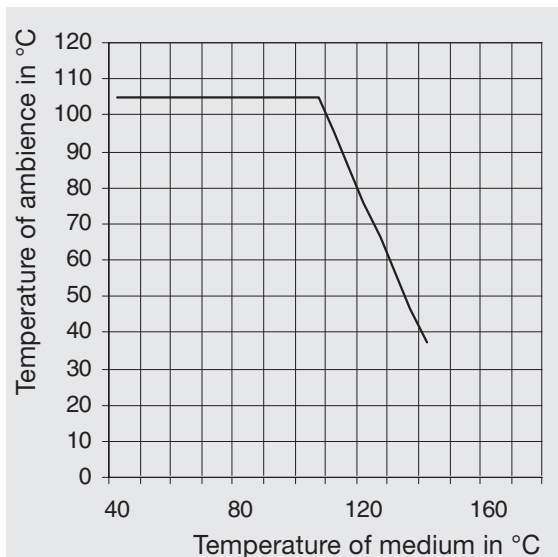
Model IS-20-H with field case



Output current (2-wire)

$$4 \dots 20 \text{ mA: } R_A \leq (U_B - 11 \text{ V}) / 0.02 \text{ A}$$

Relation of medium temperature to ambient temperature



Calculation of operation temperature:

$$T_B = T_{med} - (T_{med} - T_{amb}) \times 0.34$$

T_B = Operation temperature of transmitter
 T_{med} = max. temperature of process medium
 T_{amb} = max. temperature of ambience

Max. permitted temperature of ambience:

$$T_{amb} = T_{med} + (T_B - T_{med}) / 0.34$$

Dimensions in mm

Electrical connections

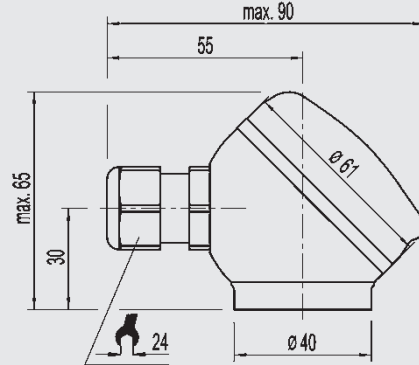
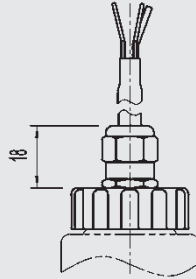
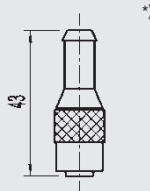
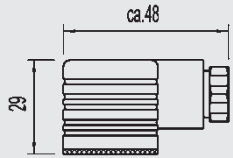
Ingress Protection per IEC 60 529

L-connector,
DIN EN 175301-803, Form A
conductor outer diameter
6 - 8 mm
IP 65
Order code: A4
ATEX: 1/2 G, M1

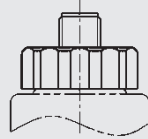
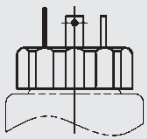
Circular connector,
M 12x1, 4-pin
IP 67
Order code: M4
ATEX: 1/2 G, M1

Flying leads,
conductor outer
diameter 6.8 mm, PUR
IP 67
Order code: DL
ATEX: 1/2 G, M1

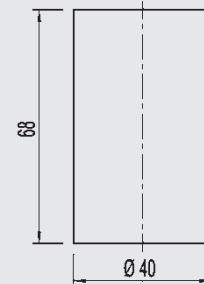
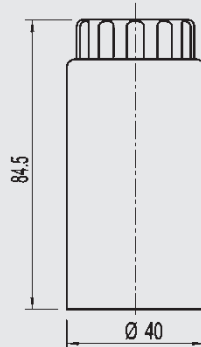
Field case with internal spring clip terminals,
conductor outer diameter 7 - 13 mm
IP 68
Order code:
FH (threaded connection brass nickel-plated)
FC (threaded connection stainless steel)
ATEX: 1/2 G, M1



Others on request



Case

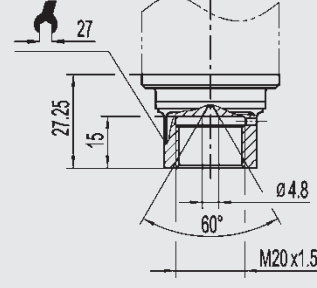
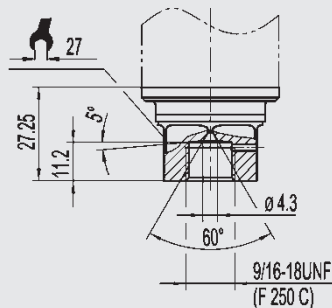
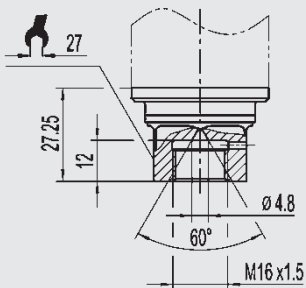


Pressure connections

M 16x1.5 female ^{*)}
Order code: ML

9/16 - 18 UNF
female F 250-C ^{**)}
Order code: VZ

M 20x1.5 female ^{*)}
Order code: MP



Others on request

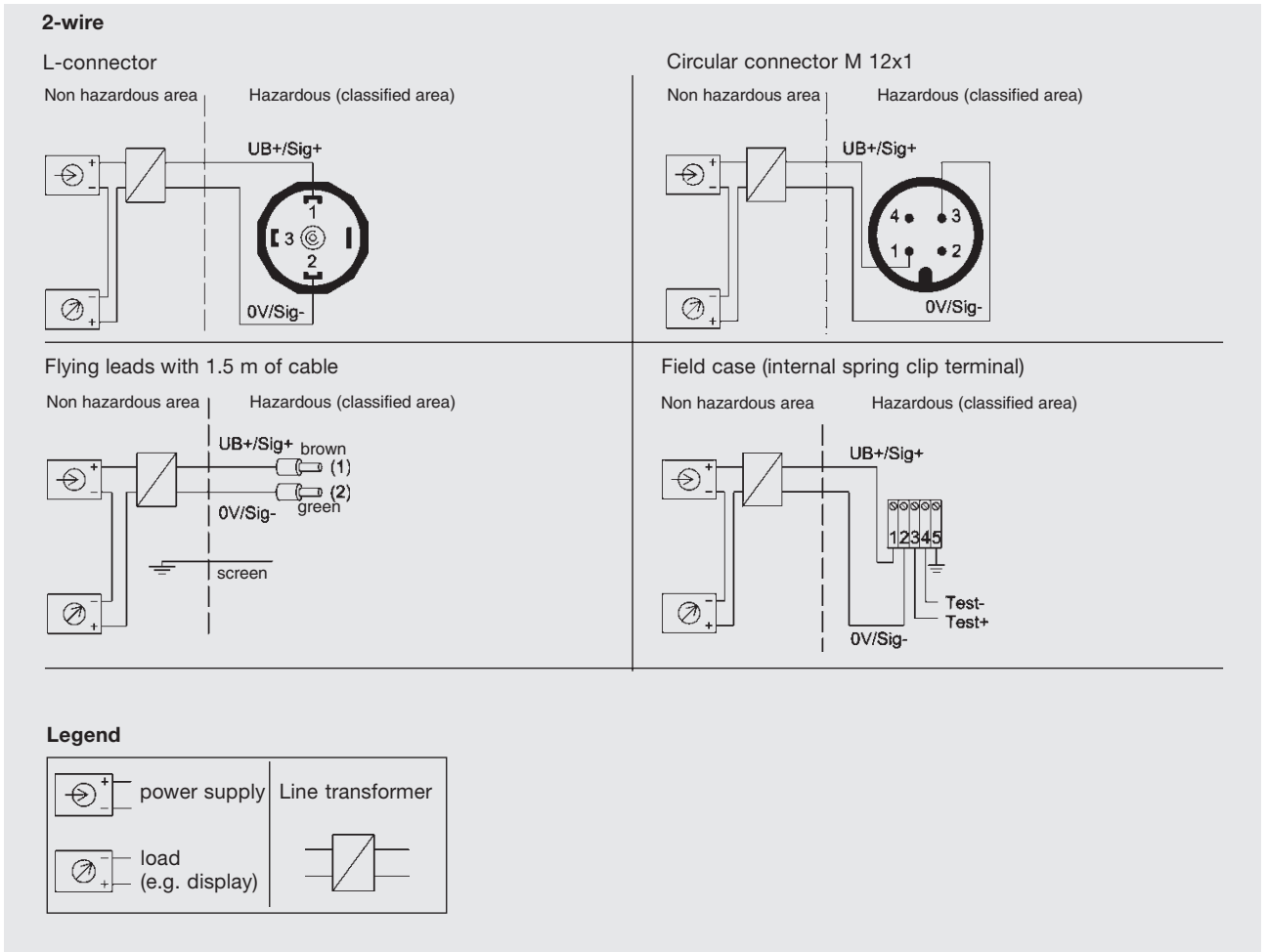
For installation and safety instructions see the operating instructions for this product.

For tapped holes and welding sockets please see Technical Information IN 00.14 for download at www.wika.de -Service

^{*)} Connectors are not included in delivery.

^{**)} The respective values for your mounting position please find in the documentation of your high-pressure equipment supplier.

Wiring



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 1	Category 2G	Intermittent
Zone 2	Category 3G	Hazard under abnormal conditions

Group I: Electrical equipment for use in mines (hazard due to mine gas)

Zone	Category	Requirements
	Category M1	Very high degree of safety
	Category M2	High degree of safety (instruments have to be turned off if they are exposed to an explosive atmosphere)

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	
Mining	Gas / Dusts	I	ID / IIF	

	Flammable material present continuously	Flammable material present intermittently	Flammable material normally not present
ATEX	Zone 0	Zone 1	Zone 2
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 internet address www.wika.de

The screenshot shows the Wika website interface. On the left, there's a navigation menu with 'Product News' selected. The main content area displays several news items with small images and text snippets. On the right, there's a detailed view of a 'Pressure Transmitter' (model IS-20-H) with an 'Operating instructions' document. The document includes technical specifications, safety symbols (CE, ATEX, etc.), and a 'Part of your business' logo. Below the document, there are sections for 'Order' and 'Quick links'.

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.



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www.wika.de

Intrinsically Safe Pressure Transmitter for applications in hazardous environments and shipbuilding industry

Models IS-20-S, IS-21-S, IS-20-F, IS-21-F

WIKA Data Sheet PE 81.52



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 EEx ia I/II C T6 in compliance with ATEX:
Gases and vapours: Mounting to Zone 0,
Zone 1 and Zone 2
Dust: Mounting to 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

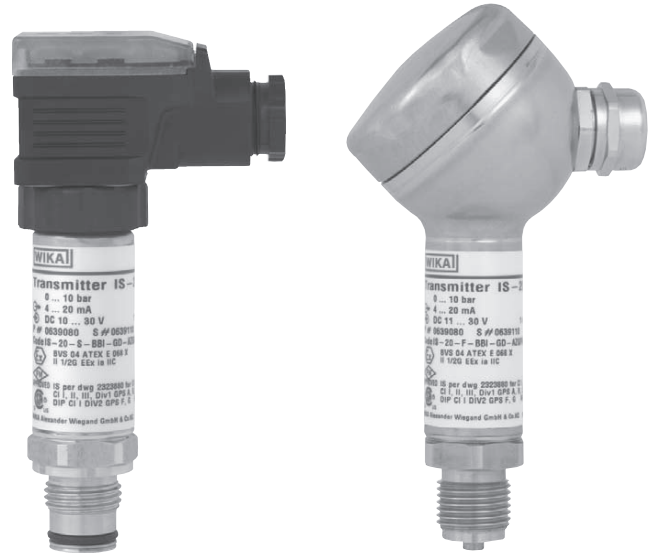


Fig. left: Pressure transmitter IS-21-S
Fig. right: Pressure transmitter IS-20-F

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-2*-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.

Specifications

Models 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		(other materials see WIKA diaphragm seal program)										
■ Wetted parts		stainless steel										
➢ Models IS-20-S, IS-20-F		stainless steel {Hastelloy C4}										
➢ Models IS-21-S, IS-21-F		O-ring: NBR {FPM/FKM or EPDM}										
■ Case		stainless steel										
Internal transmission fluid ³⁾		Synthetic oil {Listed by FDA for Food & Beverage}										
³⁾ Not for Model IS-20 with pressure ranges > 25 bar												
Power supply U _B	DC V	10 < U _B ≤ 30 (11 < U _B ≤ 30 by Model IS-2*-F)										
Signal output and		4 ... 20 mA, 2-wire										
Maximum load R _A		R _A ≤ (U _B - 10 V) / 0.02 A – (Length of cable version in m x 0.14 Ohm)										
➢ Model IS-2*-S		R _A ≤ (U _B - 11 V) / 0.02 A										
➢ Model IS-2*-F		with R _A in Ohm and U _B in Volt										
Test circuit signal / max. load R _A		R _A < 15 Ohm (for Model IS-2*-F)										
Adjustability zero/span	%	± 10 via potentiometers in the instrument										
Response time (10 ... 90 %)	ms	≤ 1										
Dielectric strength		Insulation complies with EN 50020, 6.4, 12										
Accuracy	% of span	≤ 0.25 {0.125} ⁵⁾ (BFSL)										
	% of span	≤ 0.5 {0.25} ^{5) 6)}										
⁵⁾ Accuracy { } for pressure ranges ≥ 0.25 bar												
⁶⁾ Including non-linearity, hysteresis, non-repeatability, 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										
1-year stability	% of span	≤ 0.2 (at reference conditions)										
Permissible temperature of												
■ Medium ^{6) 8)}		-20 ... +80 °C ⁷⁾					-4 ... +176 °F ⁷⁾					
■ Ambience ^{6) 8)}		-20 ... +80 °C ⁷⁾					-4 ... +176 °F ⁷⁾					
■ Storage ⁶⁾		-30 ... +105 °C					-22 ... +221 °F					
Compensated temperature range		0 ... +80 °C					32 ... +176 °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												
Temperature coefficients within compensated temp range												
■ Mean TC of zero	% of span	≤ 0.2 / 10 K (< 0.4 for pressure range ≤ 250 mbar)										
■ Mean TC of range	% of span	≤ 0.2 / 10 K										
Installation position	mbar	< 2 at +/- 30° tilted position with model IS-21										
Ⓢ -protection	ATEX	Categories ⁸⁾ 1/2G, 2G, 1/2D, 2D										
Ignition protection type		EEx ia I/II C T4, EEx ia I/II C T5, EEx ia I/II C T6										
⁸⁾ 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 und III										
Ignition protection type		Intrinsic safe Class I, II, III Division 1, Group A, B, C, D, E, F, G und Class I, Zone 0 AEx ia II C										

Specifications

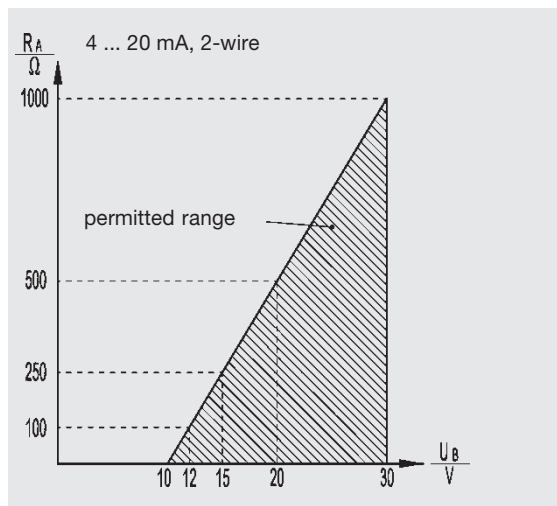
Models IS-20-S, IS-21-S, IS-20-F, IS-21-F

CE- conformity		89/336/EWG interference emission and immunity see EN 61 326, interference emission limit class A and B
		EN 50 014 (general part), EN 50 020 (intrinsic safety), {EN 50 284 (Zone 0)}, {EN 50 281-1 (dust-Ex)}
Approval German Lloyd GL		Environmental Category D, F, EMC 1
FM, CSA		FM standards according to FMRC 3600, 3610, 3611 (including supplement #1), ISA-S12.0.01, IEC 60 529 (including amendment #1)
		CSA standard C22.2 No. 0-M1991 / 142-M1987 / 157-M1992
		UL 50, Eleventh Edition / UL 508, Seventeenth Edition / UL 913, Sixth Edition
HF-immunity	V/m	10
BURST	KV	2
Vibration resistance		Category H
➤ Model IS-2*-S	g	20 up to 2 kHz according to IEC 60068-2-6 (vibration under resonance)
➤ Model IS-2*-F	g	10 up to 2 kHz according to IEC 60068-2-6 (vibration under resonance)
Wiring protection		Protected against reverse polarity and short circuiting on the instrument side
Mass	kg	Approx. 0.2
➤ Model IS-2*-F	kg	Approx. 0.35

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

Output signal and admissible load

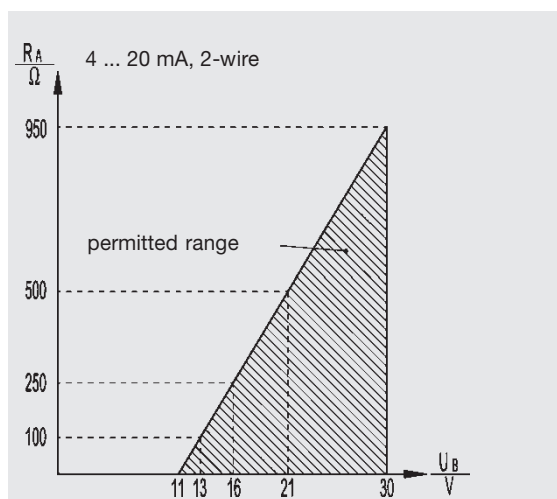
Model IS-2*-S



Output current (2-wire)

$$4 \dots 20 \text{ mA: } R_A \leq (U_B - 10 \text{ V}) / 0.02 \text{ A}$$

Model IS-2*-F



Output current (2-wire)

$$4 \dots 20 \text{ mA: } R_A \leq (U_B - 11 \text{ V}) / 0.02 \text{ A}$$

Dimensions in mm

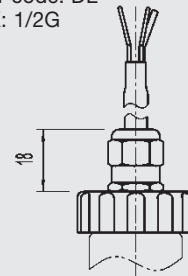
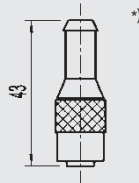
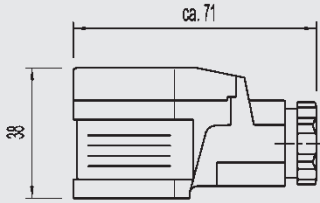
Electrical connections IS-2*-S

Ingress protection per IEC 60529

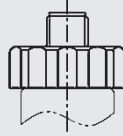
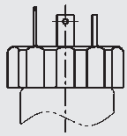
L-connector (ship approval)
DIN EN 175301-803, Form A
conductor outer diameter 10 - 14 mm, PUR
IP 65
Order code: A4 and S (GL-approval)
ATEX: 1/2 G

Circular connector
M 12x1, 4-pin
IP 67
Order code: M4
ATEX: 1/2 G

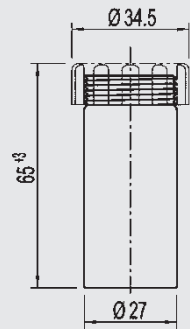
Flying leads
conductor outer diameter 6.8 mm, PUR
IP 67
Order code: DL
ATEX: 1/2 G



Others on request



Case



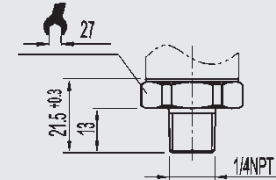
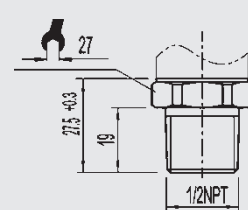
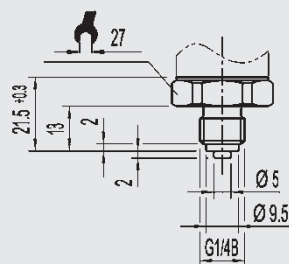
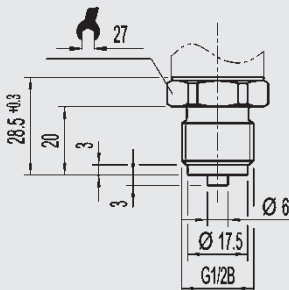
Pressure connections IS-20-S / IS-20-F

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



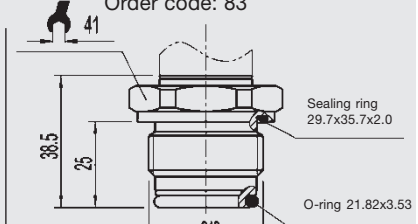
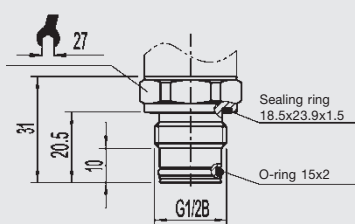
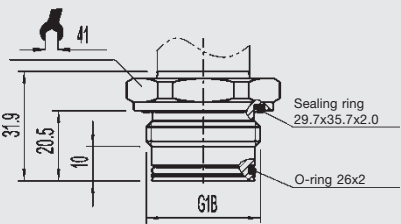
Others on request

Pressure connections IS-21-S / 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
according to EHEDG **)
0 ... 0.1 up to 0 ... 16 bar
Order code: 83



Others on request

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

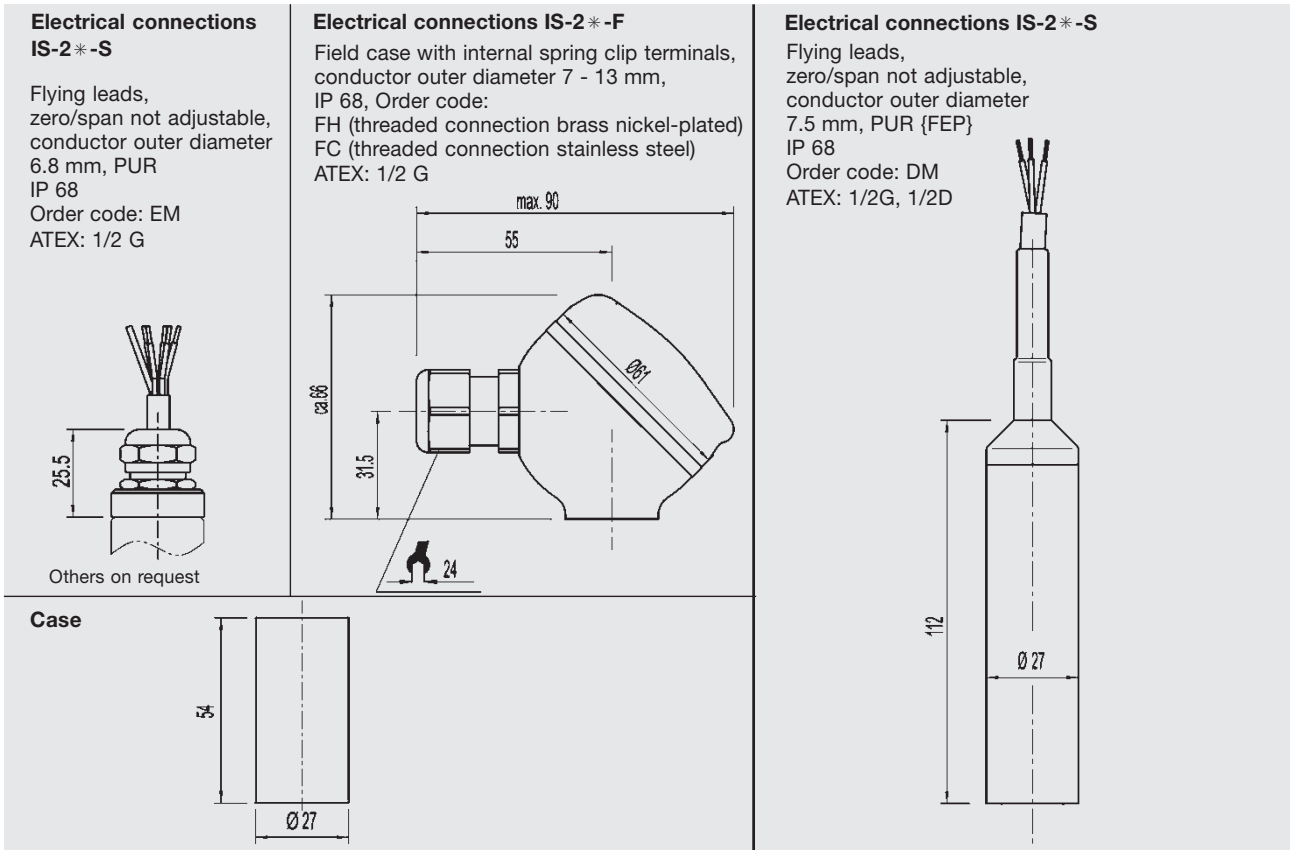
For tapped holes and welding sockets please see Technical Information IN 00.14 for download at

www.wika.de -Service

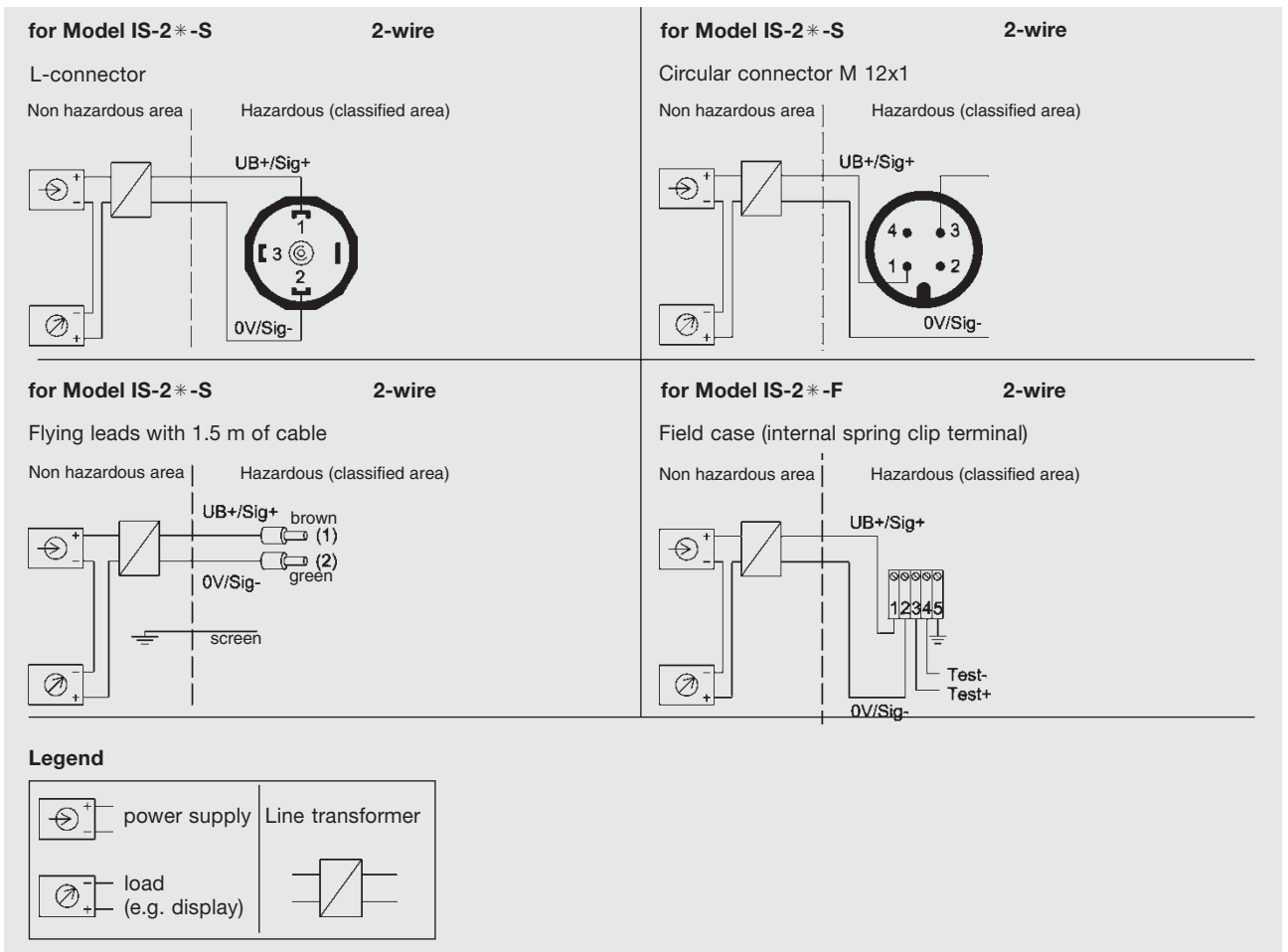
*) Connectors are not included in delivery.

**) European Hygienic Equipment Design Group

Dimensions in mm



Wiring



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

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

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.

