

Type F-20, F-21 General Purpose Pressure Transmitters with NEMA 4X Integral Junction Box

Applications

- Chemical industry
- Food industry
- Pharmaceutical industry
- Corrosive environments
- Mechanical engineering

Special Features

- Pressure ranges from 50 InWC to 15,000 psi
- 4-20mA and voltage signal outputs available
- Compact size and rugged construction
- All stainless steel design
- Integral electrical connection



Left: F-20 with standard NPT connection
Right: F-21 with flush diaphragm

Description

Compact, rugged design

The F-2X series of pressure transmitters are designed for installation in difficult, corrosive environments. The smooth exterior surfaces reduce areas where contaminants may collect and make it ideal for use in the food and pharmaceutical industries where wash-down procedures for cleanliness are required.

The all stainless steel case meets NEMA 4X requirements for wash-down and corrosion resistance and ingress protection is available up to IP 67.

Easily accessible electrical connection

The sophisticated design of this transmitter provides for fast, easy installation. The junction box cover unscrews for access to the internal spring clip terminal block.

Additional features

Transmitters with the 4-20mA output signal include an internal test circuit connection that permits the transmitter to be tested without disconnecting the primary 4-20 mA circuit. The model F-20 features an all-welded stainless steel measuring cell for improved media compatibility. There are no internal soft sealing materials that may react with the media or deteriorate over time.

The model F-21 features a flush diaphragm process connection. This flat sensing surface is specifically designed for the measurement of viscous fluids or media containing solids that may clog the NPT process connection.

Specifications Model F-20, F-21

Pressure range	50 InWC	5 psi	10 psi	25 psi	30 psi	60 psi	100 psi	160 psi	200 psi
Maximum pressure*	15 psi	29 psi	58 psi	145 psi	145 psi	240 psi	500 psi	1,160 psi	1,160 psi
Burst pressure**	29 psi	35 psi	69 psi	170 psi	170 psi	290 psi	600 psi	1,390 psi	1,390 psi
Pressure range	300 psi	500 psi	1,000 psi	2,000 psi	3,000 psi	5,000 psi	8,000 psi	10,000 psi ¹	15,000 psi ¹
Maximum pressure*	1,160 psi	1,160 psi	1,740 psi	4,600 psi	7,200 psi	11,600 psi	17,400 psi	17,400 psi	21,750 psi
Burst pressure**	1,390 psi	5,800 psi	7,970 psi	14,500 psi	17,400 psi	24,650 psi	34,800 psi	34,800 psi	43,500 psi

{vacuum, gauge pressure, compound ranges, and absolute pressure references are available}

¹ Ranges only available with type F-20

² For type F-21 the burst pressure is limited to 21,000psi unless the pressure seal is accomplished by using the sealing ring underneath the hex.

*Pressure applied up to the maximum rating will cause no permanent change in specifications but may lead to zero and span shifts

**Exceeding the burst pressure may result in destruction of the transmitter and possible loss of media

Materials

■ Wetted parts

➤ type F-20

➤ type F-21

■ Case

Internal transmission fluid ³⁾

{for other materials see WIKA diaphragm seal program}

Stainless steel

Stainless steel; O-ring: NBR {Viton® or EPDM}

Stainless steel

Synthetic oil {Halocarbon® oil for oxygen applications} ⁴⁾

{Listed by FDA for food applications}

³⁾ Not available with F-20 on pressure ranges >300 psi

⁴⁾ Media temperature for oxygen version: -4 ... +140 °F / -20 ... +60 °C

Not available in vacuum and absolute pressure ranges or with type F-21 flush diaphragm version > 500 psi

Power supply U _B	DC V	10 < U _B ≤ 30 (11 ... 30 with signal output 4 ... 20 mA, 14 ... 30 with signal output 0 ... 10 V)
Signal output and maximum load R _A		4 ... 20 mA, 2-wire R _A ≤ (U _B - 11 V) / 0.02 A with R _A in Ohm and U _B in Volt 0 ... 20 mA, 3-wire R _A ≤ (U _B - 3 V) / 0.02 A with R _A in Ohm and U _B in Volt {0 ... 5 V, 3-wire} R _A > 5 kOhm, {0 ... 10 V, 3-wire} R _A > 10 kOhm
Test circuit signal / max. load R _A		Only for instruments with 4 ... 20 mA signal output. R _A < 15 Ohm
Adjustability zero/span	%	± 5 using potentiometers inside the instrument
Response time (10 ... 90 %) ⁷⁾	ms	≤ 1
Isolation voltage	DC V	500
Accuracy ⁵⁾	% of span	≤ 0.25 {0.125} ⁶⁾ (BFSL)
	% of span	≤ 0.5 {0.25} ⁶⁾ (limit point calibration)

⁵⁾ Including linearity, hysteresis and repeatability. Limit point calibration performed in vertical mounting position with pressure connection facing down.

⁶⁾ For pressure ranges above 100 InWC

Non-linearity	% of span	≤ 0.2 (BFSL) according to IEC 61-298-2
Non-repeatability	% of span	≤ 0.1
1-year stability	% of span	≤ 0.2 (at reference conditions)
Permissible temperature of		
■ Medium		-22 ... +212 °F {-40 ... +257 °F} ⁷⁾ -30 ... +100 °C {-40 ... +125 °C} ⁷⁾
■ Ambient		-4 ... +176 °F {-22 ... +221 °F} -20 ... +80 °C {-30 ... +105 °C}
■ Storage		-40 ... +212 °F -40 ... +100 °C
Compensated temperature range		32 ... +176 °F 0 ... +80 °C

Also complies with EN 50178, Tab. 7, Type C, Class 4KH Operation, 1K4 Storage, 1K3 Transport

⁷⁾ Response time F-20: ≤ 10 ms at medium temperatures below -30 °C (-22 °F) for pressure ranges up to 300 psi

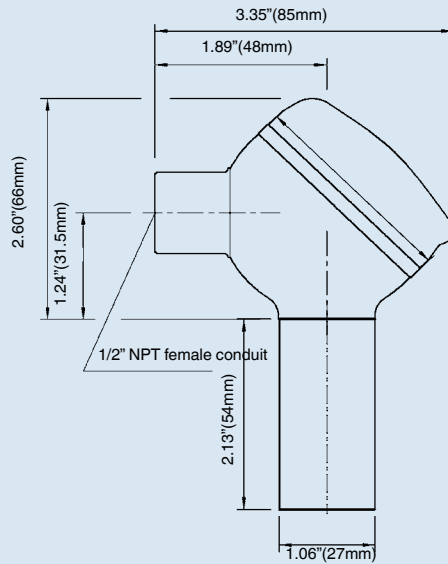
Response time F-21: ≤ 10 ms at medium temperatures below -30 °C (-22 °F)

Temperature coefficients (TC) within compensated temperature range:		
■ Mean TC of zero	% of span	≤ 0.2 / 10 K (<0.4 for pressure range ≤ 100 InWC)
■ Mean TC of range	% of span	≤ 0.2 / 10 K
CE- conformity		
■ Pressure equipment directive		97/23/EC
■ EMC directive		89/336/EEC emission (class B) and immunity according to EN 61 326
Shock resistance	g	600 according to IEC 60028-2-27 (mechanical shock)
Vibration resistance	g	10 according to IEC 60068-2-6 (vibration under resonance)
Wiring protection		Protected against reverse polarity, overvoltage and short circuiting
Electrical connection		Internal spring clip terminals; wire cross section 2.5 mm ² max, internal ground Terminal for brass nickel-plated or {stainless steel} threaded connection {additional external ground terminal for stainless steel threaded conduit connection}
Weight	lb	Approx. 0.75

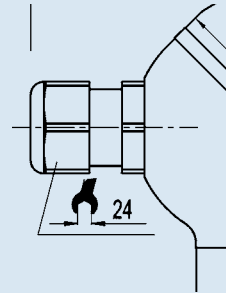
{ } Items in curved brackets are optional extras at additional cost.

Dimensions in inches (mm)

**1/2 NPT female conduit:
Ingress protection
NEMA 4X / IP 67**

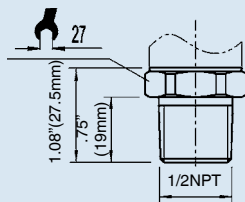


**Optional cable gland:
Ingress protection
IP 67 NEMA 4**

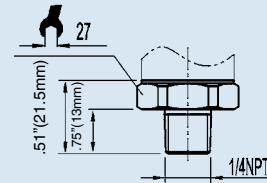


F-20 pressure connections

**1/2 NPT male
Order code: ND**

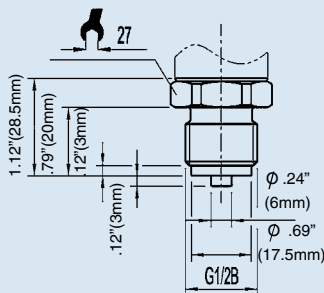


**1/4 NPT male
Order code: NB**

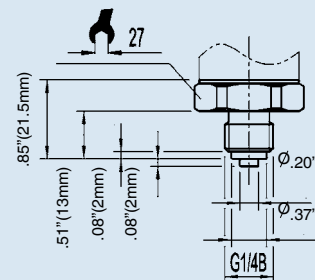


Other connections available

**G 1/2 male
EN 837
Order code: GD**

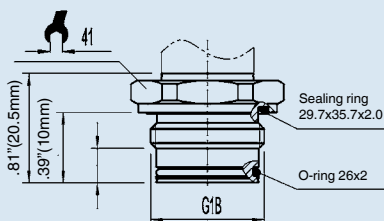


**G1/4B male
Order code: GB**

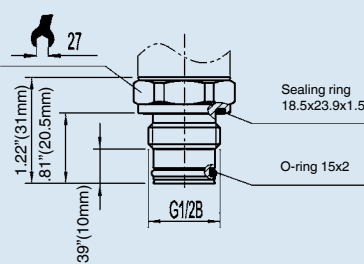


F-21 flush diaphragm pressure connections

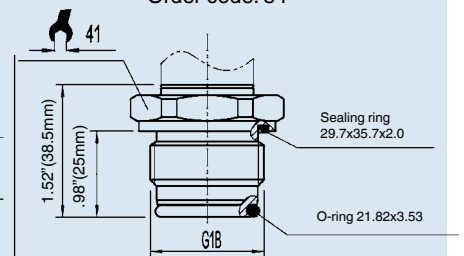
**G 1B
50 InWC to 25 psi
Order code: 85**



**G 1/2B
30 psi to 8,000 psi
Order code: 86**

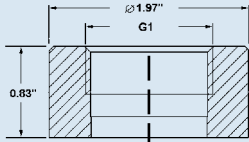


**G 1
according to EHEDG *)
100 InWC to 250 psi
Order code: 84**

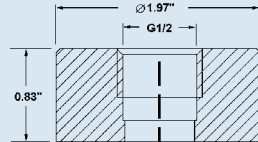


*) European Hygienic Equipment Design Group

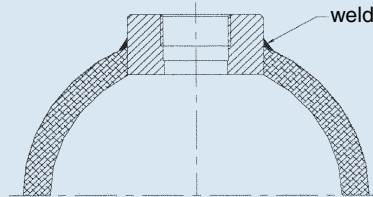
Matching P-1 weld insert adapters for F-21 flush diaphragm transmitters



P-1 G1 weld insert adapter
Part # 1206974
for pressure ranges ≤ 25 psi



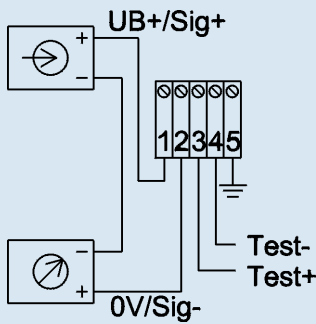
P-1 G1/2 weld insert adapter
Part # 1097008
for pressure ranges ≥ 30 psi



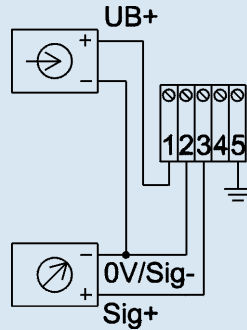
Cross section view of P-1 adapter installed in pipe.

Wiring

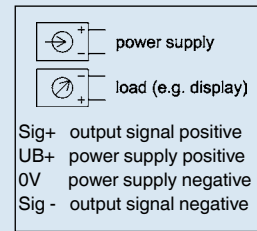
2-wire system



3-wire system

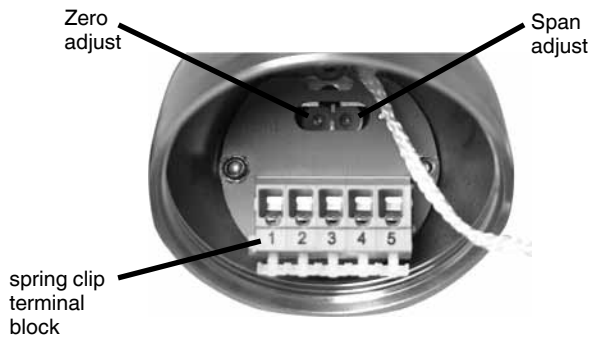


Legend:



Calibration

Remove the junction box cover. Attach a meter and power supply to the electrical connector. For gauge ranges the zero potentiometer can be adjusted to produce a null output when no pressure is applied. Span adjustment requires the use of a reference pressure source. Compound and absolute ranges require a vacuum and pressure source. When calibration is complete, reinstall the junction box cover hand tight.



Related products:

IS-20-F integral junction box version for installation in hazardous environments



Types IS-20-F, IS-21-F
see datasheet IS-20

Type F-20 General Purpose Pressure Transmitters with NEMA 4X Integral Junction Box

Standard Features

- **Signal output:** 4-20 mA 2-wire
- **Supply voltage:** 10-30 DC
- **Process connection:** 1/2 NPT male
- **Electrical connection:** Field case with 1/2" NPT female conduit



Gauge Ranges	
Description	
Range	Part #
0-50InWC	12127469
0-100InWC	12127477
0-5 psi	12127493
0-10 psi	12127507
0-15 psi	12127523
0-25 psi	12127531
0-30 psi	12127540
0-50 psi	12127558
0-60 psi	12127566
0-100 psi	12128873
0-160 psi	12127574
0-200 psi	12127582
0-300 psi	12127591
0-500 psi	12127639
0-1,000 psi	12127671
0-2,000 psi	12127681
0-3,000 psi	12127699
0-5,000 psi	12127701

Vacuum & Compound Ranges	
Description	
Range	Part #
30INHG VAC	12127400
30INHG/30 psi	12127418
30INHG/60 psi	12127426
30INHG/100 psi	12127434
30INHG/200 psi	12127451

NOTE: Standard part numbers shown in **bold, blue** print.

F-20 Smart Codes for Custom Order Configurations

Field no.	Code	Feature
1	Signal output	
	A	4 ... 20 mA, 2-wire
	B	0 ... 20 mA, 3-wire
	F	0 ... 10 V, 3-wire (Supply 14-30 V)
	G	0 ... 5 V, 3-wire
	?	Other - please specify
2	Unit	
	P	psi
	N	InWC
	3	psi absolute
	?	Other - please specify
3	Pressure range	
	CA	-30 inHg ... 0
	CD	-30 inHg ... 30 psi
	CF	-30 inHg ... 60 psi
	CH	-30 inHg ... 100 psi
	CK	-30 inHg ... 160 psi
	CL	-30 inHg ... 200 psi
	GG	0 InWC ... 50 InWC
	GU	0 InWC ... 100 InWC
	CN	0 psi ... 5 psi
	CP	0 psi ... 10 psi
	BC	0 psi ... 15 psi (0 psi ... 15 psi absolute)
	CQ	0 psi ... 25 psi (0 psi ... 25 psi absolute)
	BD	0 psi ... 30 psi
	DA	0 psi ... 50 psi (0 psi ... 50 psi absolute)
	BE	0 psi ... 60 psi
	BF	0 psi ... 100 psi (0 psi ... 100 psi absolute)
	BG	0 psi ... 160 psi
	BH	0 psi ... 200 psi
	DG	0 psi ... 250 psi (0 psi ... 250 psi absolute)
	BI	0 psi ... 300 psi
	BK	0 psi ... 400 psi
	DI	0 psi ... 500 psi
	BL	0 psi ... 600 psi
	DJ	0 psi ... 750 psi
	BN	0 psi ... 1,000 psi
	BO	0 psi ... 1,500 psi
	BP	0 psi ... 2,000 psi
	BQ	0 psi ... 3,000 psi
	BS	0 psi ... 5,000 psi
DS	0 psi ... 8,000 psi	

F-20 Smart Codes for Custom Order Configurations (cont'd)

Field no.	Code	Feature
Pressure range continued		
3	BT	0 psi ... 10,000 psi
	BU	0 psi ... 15,000 psi
	??	Other - please specify
Process connection		
4	ND	1/2" NPT
	NB	1/4" NPT
	GD	G 1/2 B
	GB	G 1/4 B
	CS	Diaphragm seal
	??	Other - please specify
Special design features		
5	Z	Without
	G	Suitable for food
	A	Oxygen, oil and grease free ¹⁾
	??	Other - please specify
Accuracy		
6	G	+/- 0.25% B.F.S.L.
	K	+/- 0.125% B.F.S.L.
Electrical connection		
7	FE	1/2" NPT female conduit (IP67)
	FH	Nickel plated brass cable gland (IP68)
	FC	Stainless steel cable gland (IP68)
	??	Other - please specify
Temperature range of medium		
8	A	-30 ... +100 °C (-22 ... +212 °F)
	B	-40 ... +125 °C (-40 ... +257 °F)
	X	Changed because of diaphragm seal attachment
Quality certificates		
9	Z	Without
	I	NIST Certificate of Calibration (always with 0.125% accuracy)
Digital display		
10	Z	Without
	1	Digital display (order separately)
Additional order details		
11	Z	Without
	T	Additional order details

1) Maximum media temperature is -4 ... +140° F (-20 ... +60° C) for pressure ranges 100 InWC to 300 psi.

Order Code:

F-20 - ¹ - ² ³ - ⁴ - ⁵ ⁶ ⁷ ⁸ - ⁹ ¹⁰ ^{11*}

*Additional order details _____

Type F-21 Flush Diaphragm Pressure Transmitters with NEMA 4X Integral Junction Box

Standard Features

- **Signal output:** 4-20 mA 2-wire
- **Supply voltage:** 10-30 DC
- **Process connection:** G1/2B or G1B flush diaphragm depending upon pressure range
- **Electrical connection:** Field case with 1/2" NPT female conduit



Gauge Ranges	
Description	
Range	Part #
0-50 InWC ¹	12126331
0-5 psi ¹	12127728
0-10 psi ¹	12127736
0-100 psi	12127744

NOTE: ¹Pressure ranges from 50 InWC to 30 psi are supplied with G1B flush process connections; see datasheet for details.

Standard part numbers shown in **bold, blue** print.

F-21 Smart Codes for Custom Order Configurations

Field no.	Code	Feature
1	Signal output	
	A	4 ... 20 mA, 2-wire
	B	0 ... 20 mA, 3-wire
	F	0 ... 10 V, 3-wire (Supply 14-30 V)
	G	0 ... 5 V, 3-wire
	?	Other - please specify
2	Unit	
	P	psi
	N	InWC
	3	psi absolute
	?	Other - please specify
3	Pressure range	
	CA	-30 inHg ... 0
	CD	-30 inHg ... 30 psi
	CF	-30 inHg ... 60 psi
	CH	-30 inHg ... 100 psi
	CK	-30 inHg ... 160 psi
	CL	-30 inHg ... 200 psi
	GG	0 InWC ... 50 InWC
	GU	0 InWC ... 100 InWC
	CN	0 psi ... 5 psi
	CP	0 psi ... 10 psi
	BC	0 psi ... 15 psi (0 psi ... 15 psi absolute)
	CQ	0 psi ... 25 psi (0 psi ... 25 psi absolute)
	BD	0 psi ... 30 psi
	DA	0 psi ... 50 psi (0 psi ... 50 psi absolute)
	BE	0 psi ... 60 psi
	BF	0 psi ... 100 psi (0 psi ... 100 psi absolute)
	BG	0 psi ... 160 psi
	BH	0 psi ... 200 psi
	DG	0 psi ... 250 psi (0 psi ... 250 psi absolute)
	BI	0 psi ... 300 psi
	BK	0 psi ... 400 psi
	BL	0 psi ... 600 psi
	DJ	0 psi ... 750 psi
	BN	0 psi ... 1,000 psi
	BO	0 psi ... 1,500 psi
	BP	0 psi ... 2,000 psi
	BQ	0 psi ... 3,000 psi
	BS	0 psi ... 5,000 psi
	DS	0 psi ... 8,000 psi
??	Other - please specify	

F-21 Smart Codes for Custom Order Configurations (cont'd)

Field no.	Code	Feature
Process connection		
4	85	G 1 B, flush diaphragm with O-ring (up to 25 psi)
	86	G 1/2 B, flush diaphragm with O-ring (≥ 30 psi)
	??	Other - please specify
Material of wetted parts		
5	1	Stainless steel, NBR O-Ring ¹⁾
	L	Stainless steel, Viton [®] O-Ring
	?	Other - please specify
Special design features		
6	Z	Without
	G	Suitable for food
	A	Oxygen, oil and grease free (max. 140° F, ≥ 100 InWC) ²⁾
	?	Other - please specify
Accuracy		
7	G	+/- 0.25% B.F.S.L.
	K	+/- 0.125% B.F.S.L.
Electrical connection		
8	FE	1/2" NPT female conduit (IP67)
	FH	Nickel plated brass cable gland (IP68)
	FC	Stainless steel cable gland (IP68)
	??	Other - please specify
Temperature range of medium		
9	A	-30 ... +100° C (-22 ... +212° F)
	B	-40 ... +125° C (-40 ... +257° F)
	C	-20 ... +150° C (-4 ... +302° F) with cooling element
	X	Changed because of diaphragm seal attachment
Quality certificates		
10	Z	Without
	I	NIST Certificate of Calibration (always with 0.125% accuracy)
Digital display		
11	Z	Without
	1	Digital display (order separately)
Additional order details		
12	Z	Without
	T	Additional order details

1) Not available with cooling element option (Field 9, Code C)

2) Maximum media temperature is -4 ... +140° F (-20 ... +60° C) for pressure ranges 100 InWC to 500 psi (Field 6, Code A)

Order Code: 1 2 3 4 5 6 7 8 9 10 11 12*

F-21 - - - - -

*Additional order details _____