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

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

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

<table>
<thead>
<tr>
<th>Model F-20 / F-21</th>
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<tbody>
<tr>
<td><strong>Pressure range</strong></td>
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<tr>
<td><strong>Maximum pressure</strong></td>
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<tr>
<td><strong>Burst pressure</strong></td>
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(vacuum, gauge pressure, compound ranges, and absolute pressure references are available)

1 Ranges only available with Type F-20
2 For Model F-21 the burst pressure is limited to 21,000 psi unless the pressure seal is accomplished by using the sealing ring underneath the hex.

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

Materials

- Wetted parts (for other materials see WIKA diaphragm seal program)
  - Models F-20 Stainless steel
  - Models F-21 Stainless steel; O-ring: NBR (Viton® or EPDM)
- Case Stainless steel

Internal transmission fluid

- Synthetic oil (Halocarbon® oil for oxygen applications)
- Listed by FDA for food applications

Power supply $U_b$

<table>
<thead>
<tr>
<th>DC V</th>
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<tbody>
<tr>
<td>10 $&lt; U_b \leq 30$ (11 ... 30 with signal output 4 ... 20 mA, 14 ... 30 with signal output 0 ... 10 V)</td>
</tr>
</tbody>
</table>

Signal output and maximum load $R_x$

| 4 ... 20 mA, 2-wire $R_x \leq (U_b - 11 \mathrm{~V}) / 0.02 \Omega$ with $R_x$ in Ohm and $U_b$ in Volt |
| 0 ... 20 mA, 3-wire $R_x \leq (U_b - 3 \mathrm{~V}) / 0.02 \Omega$ with $R_x$ in Ohm and $U_b$ in Volt |

Test circuit signal / max. load $R_x$

| Only for instruments with 4 ... 20 mA signal output, $R_x < 15 \Omega$ |

Adjustability zero/span % ± 5 using potentiometers inside the instrument

Response time (10 ... 90 %) ms ≤ 1

Isolation voltage DC V 500

Accuracy % of span

| ≤ 0.25 (0.125) (BFSL) |

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 (-20 ... +80 °C) 7)
- Storage -40 ... +212 °F (-40 ... +100 °C) 7)

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

Temperature coefficients (TC) within compensated temperature range:

- Mean TC of zero % of span ≤ 0.2 / 10 K (<0.4 for pressure ranges up to 100 lnWC) 7) Response time F-20 ≤ 10 ms at medium temperatures below -30 °C (-22 °F) for pressure ranges up to 300 psi
- Mean TC of range % of span ≤ 0.2 / 10 K (at reference conditions) 7) Response time F-21: ≤ 10 ms at medium temperatures below -30 °C (-22 °F)

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 60068-2-27 (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 mm² 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

[1] 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

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**F-20 Pressure connections**

1/2 NPT male  
Order code: ND

1/4 NPT male  
Order code: NB

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G 1/2 male  
EN 837  
Order code: GD

G1/4B male  
Order code: GB

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**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

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*) 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 \( \leq 25 \) psi

P-1 G1/2 weld insert adapter
Part # 1097008
for pressure ranges \( \geq 30 \) psi

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

**Wiring**

<table>
<thead>
<tr>
<th>2-wire system</th>
<th>3-wire system</th>
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<tbody>
<tr>
<td><strong>UB+/Sig+</strong></td>
<td><strong>UB+</strong></td>
</tr>
<tr>
<td><strong>0V/Sig-</strong></td>
<td><strong>0V/Sig-</strong></td>
</tr>
<tr>
<td><strong>Test-</strong></td>
<td><strong>Sig+</strong></td>
</tr>
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**Legend:**
- UB+ power supply positive
- UB- power supply negative
- Sig+ output signal positive
- Sig- output signal negative
- 0V power supply negative
- Test- load (e.g., display)

**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:**
Integral junction box version for installation in hazardous environments

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