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 Model F-20 / F-21

<table>
<thead>
<tr>
<th>Pressure range</th>
<th>50 lnWC</th>
<th>5 psi</th>
<th>10 psi</th>
<th>25 psi</th>
<th>30 psi</th>
<th>60 psi</th>
<th>100 psi</th>
<th>160 psi</th>
<th>200 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum pressure*</td>
<td>15 psi</td>
<td>29 psi</td>
<td>58 psi</td>
<td>145 psi</td>
<td>145 psi</td>
<td>240 psi</td>
<td>500 psi</td>
<td>1,160 psi</td>
<td>1,160 psi</td>
</tr>
<tr>
<td>Burst pressure**</td>
<td>29 psi</td>
<td>35 psi</td>
<td>69 psi</td>
<td>170 psi</td>
<td>170 psi</td>
<td>290 psi</td>
<td>600 psi</td>
<td>1,390 psi</td>
<td>1,390 psi</td>
</tr>
<tr>
<td>Pressure range</td>
<td>300 psi</td>
<td>500 psi</td>
<td>1,000 psi</td>
<td>2,000 psi</td>
<td>3,000 psi</td>
<td>5,000 psi</td>
<td>8,000 psi</td>
<td>10,000 psi</td>
<td>15,000 psi</td>
</tr>
<tr>
<td>Maximum pressure*</td>
<td>1,160 psi</td>
<td>1,160 psi</td>
<td>4,600 psi</td>
<td>7,200 psi</td>
<td>11,600 psi</td>
<td>17,400 psi</td>
<td>17,400 psi</td>
<td>21,750 psi</td>
<td></td>
</tr>
<tr>
<td>Burst pressure**</td>
<td>1,390 psi</td>
<td>5,800 psi</td>
<td>14,500 psi</td>
<td>24,650 psi</td>
<td>34,800 psi</td>
<td>34,800 psi</td>
<td>43,500 psi</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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.

*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 (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 3) Synthetic oil {Halocarbon® oil for oxygen applications} 4)

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 Model 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 $R_x$

| 4 ... 20 mA, 2-wire $R_x$ ≤ ($U_b$ - 11 V) / 0.02 A with $R_x$ in Ohm and $U_b$ in Volt |
| 0 ... 20 mA, 3-wire $R_x$ ≤ ($U_b$ - 3 V) / 0.02 A 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 Ohm |

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

### Response time (10 ... 90 %) 7)

| ms | ≤ 1 |

### 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 lnWC

### 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

| Mean TC of zero % of span | ≤ 0.2 / 10 K (<0.4 for pressure range ≤ 100 lnWC) |
| Mean TC of range % of span | ≤ 0.2 / 10 K |

### Compensated temperature range

| 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 ... +121 °F | -40 ... +100 °C |

### Temperature coefficients (TC) within compensated temperature range:

| Mean TC of zero % of span | ≤ 0.2 / 10 K |
| 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 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

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

G 1/4B male
Order code: GB

F-21 flush diaphragm pressure connections

G 1B
50 lnWC to 25 psi
Order code: 85

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

G 1
according to EHEDG *)
100 lnWC 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:

- power supply
- load (e.g. display)
- output signal positive
- power supply positive
- output signal negative
- power supply negative

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