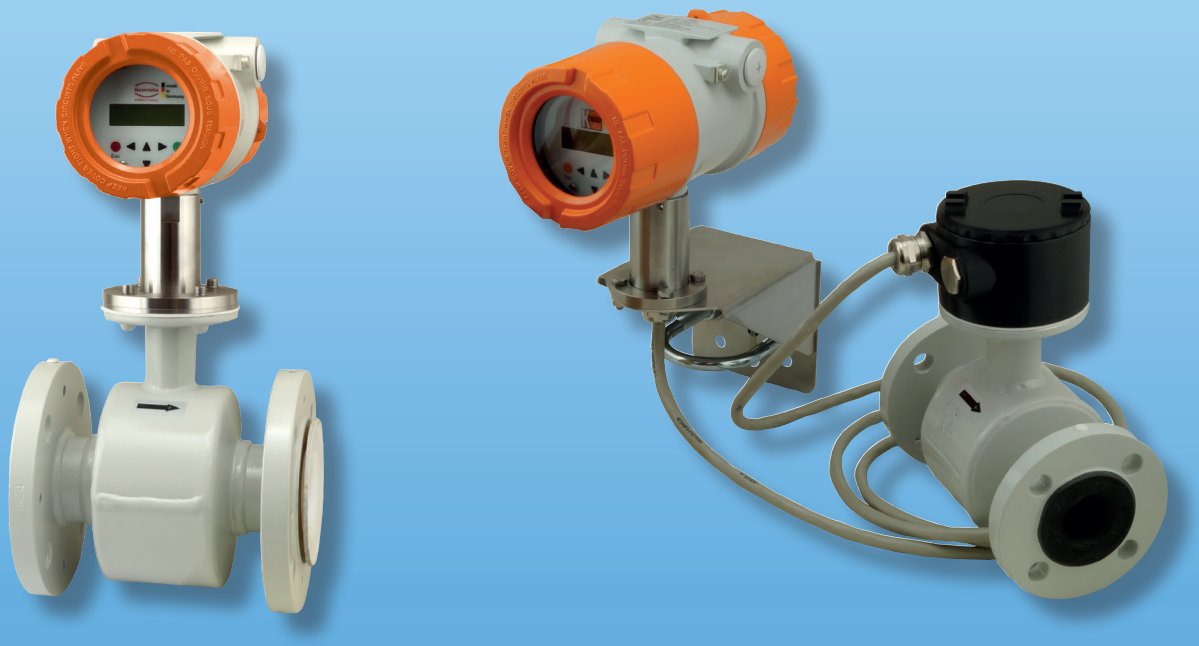
# Magnetic Inductive Flowmeter

for Conductive Liquids, Slurries, or Pastes

KOBOLD

measuring • monitoring • analyzing

## EPM



- High Accuracy:
  0.5 % of Measured Value (1 m/s to 10 m/s)
- Maintenance-free
- Negligible Pressure Drop
- PTFE or Hard Rubber Lining Options
- Wide Variety Electrode Materials

KOBOLD companies worldwide:

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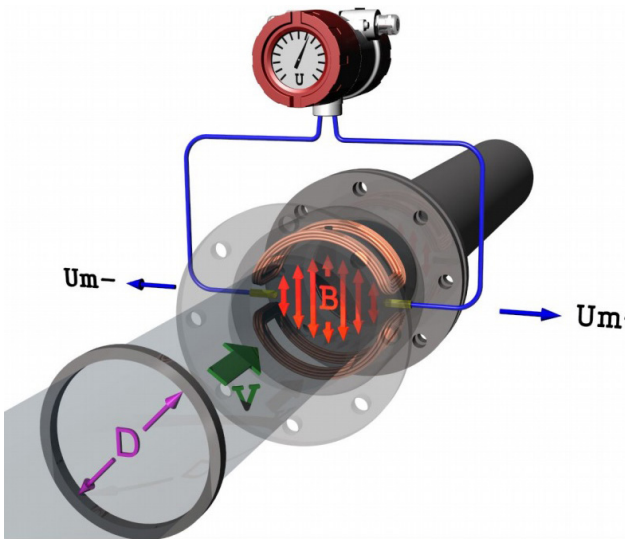
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## Description

The EPM magnetic-inductive flow sensor is used to measure the volumetric flow of liquids, slurries, pastes and other electrically conductive media with a negligible pressure drop. Pressure, temperature, density and viscosity do not affect the measurement. High amounts of solid particles or gas bubbles should be avoided. The EPM sensor is used in combination with the KOBOLD UMF2 transmitter. The transmitter is available in a compact version or a remote version.

## Operation

An electrically conductive media flowing through a magnetic field, in accordance with Faraday's law of induction, will induce a voltage proportional to the mean flow velocity and hence the volumetric flow rate. A magnetic inductive flowmeter consists of a lined flow body, through which a conductive liquid flows, a magnetic field coil and two electrodes. The electrode voltage is detected by a transmitter and converted into a standardized electrical signal such as 4-20 mA or pulse output.




## Advantages

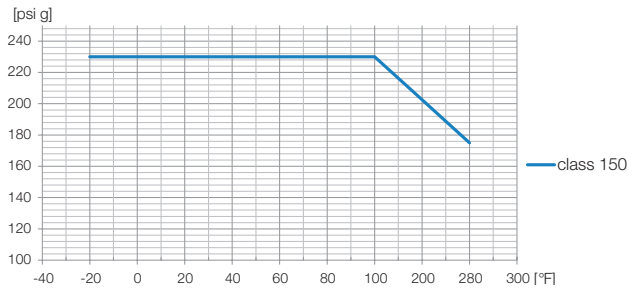
- Lining Materials in PTFE or Hard Rubber
- Electrodes in 316L Stainless Steel, Hastelloy® C276, Tantalum, Platinum-Iridium, or Titanium
- Large Selection of Process Connections
- For Use in Harsh Environments

## Technical Details for EPM Sensor



| | |
|---|---|
| **Nominal Sizes:** | ANSI ½"...24"<br>DN15...DN600 on Request |
| **Connection Flanges:** | Painted Steel (1.0460 / 1.0570),<br>Stainless Steel (316L / 316-Ti)<br>(ASME B16.5 or EN 1092-1) |
| **Lining Material:** | Hard Rubber, PTFE |
| **Electrode Material:** | 316L Stainless Steel, Hastelloy® C276,<br>Titanium, Tantalum, or Platinum-Iridium |
| **Nominal Pressure:** | ASME B16.5 Class 150 (ASME B16.5<br>Class 300, EN 1092-1 PN10, PN16, &<br>PN40 on Request) |
| **Process Temperature:** | |
| **PTFE Lining:** | max. 266 °F (at 362 psig) |
| **PTFE Lining:** | max. 212 °F (at 580 psig) |
| **Hard Rubber:** | max. 194 °F |
| **Steel Flange:** | min 14ºF |
| **SS Flange:** | min -4ºF |
| **Ambient Temperature:** | -4...140 °F |
| **Conductivity:** | ≥ 20 µS/cm |
| **Straight Piping Requirement:** | 5x Upstream, 2x Downstream |
| **Measuring Ranges:** | 0.25 m/s ... 10 m/s (0.82 ft/s... 32.8 ft/s) |
| **Accuracy:** | |
| **1...10 m/s:** | ± 0.5 % of Measured Value |
| **0.25...1 m/s:** | ±(0.4% of Measured Value + 1 mm/s) |
| **Repeatability:** | ± [0.15 % of Measured Value<br>+ 0.005 % * (Q at 10 m/s)] |
| **Protection:** | IP67 / IP68 (EN60529) |

### Material Load Curve




For stainless steel flanges (1.4404 / 316L) according to ASME B16.5





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subject to change without prior notice.

### Technical Details for UMF2 Transmitter

| | |
|---|---|
| **Mounting Options:** | Compact or Remote |
| **Housing:** | Die Cast Aluminum, Painted |
| **Power Supply:** | 115/230 $V_{AC}$ (+10%, -15%), 50/60 Hz, 10 VA<br>24 $V_{DC}$ (±20%), 10 W |
| **Indication:** | LCD, 2-lines, 16 Digits, Back-lit |
| **Interface Language:** | English, German |
| **Output** | |
| **Analog:** | 4-20 mA, Active, Galvanically Isolated |
| **Pulse:** | Passive, Galvanically Isolated<br>24 V, 60 mA<br>Configurable as Frequency Output, Max 1 kHz |
| **Status:** | Passive, Galvanically Isolated<br>Optocoupler<br>24 V, 60 mA |
| **Ambient Temp:** | -4...140 °F (-20...60 °C), Depending on Process Temperature |
| **Protection:** | IP67 or IP68 (EN60529) |
| **Communication:** | HART® |
| **Diagnostics:** | Empty Pipe Detection, Coil Current Monitoring |
| **Electromagnetic Tolerance:** | EMC-Directive 2014/30/EU (EMC) |



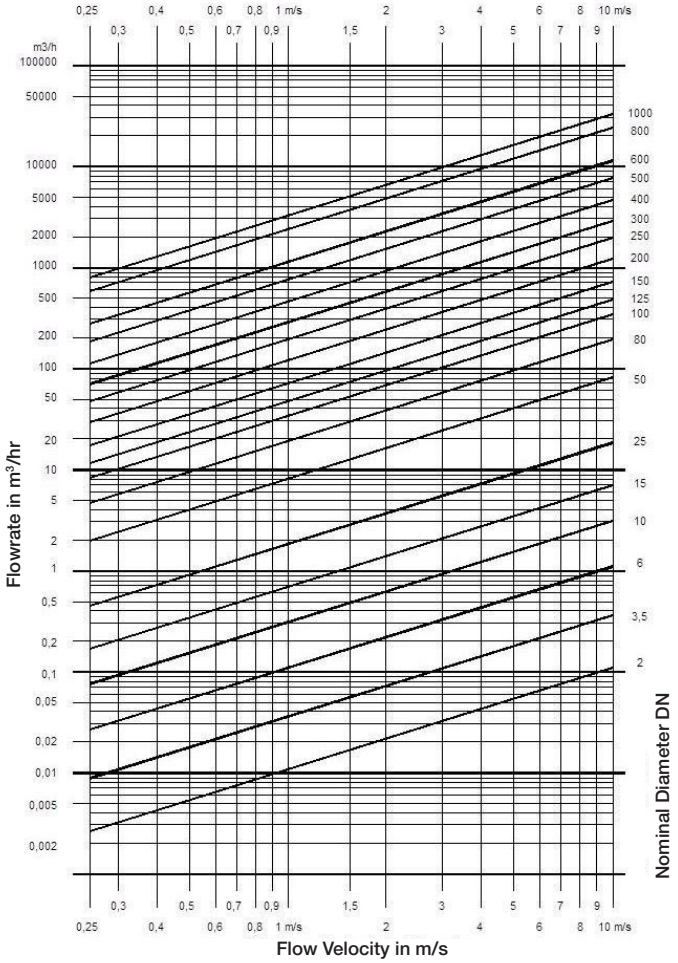


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## Measuring Ranges

The volumetric flow rate depends on the flow velocity and the nominal size of the flowmeter. The below table shows the standard factory setting and the maximum possible full scale flow value for each nominal size in both GPM and m³/hr.

The electromagnetic flowmeter is designed to operate within the range of flow velocities typically encountered in practical applications. The full-scale flow velocity can be set between 0.25 m/s and 10 m/s (0.82 ft/s to 32.8 ft/s). The flow nomogram shows the volumetric flow rate in m³/h and the flow velocity in m/s as a function of the nominal size DN of the sensor.




## Flow Ranges

| Nominal Size | $Q_{max}$ (GPM) | | $Q_{max}$ (m³/hr) | |
|---|---|---|---|---|
| | Factory Setting | Maximum (at 10 m/s)* | Factory Setting | Maximum (at 10 m/s)* |
| 1/2" | 13.2 | 28.0 | 3 | 6.36 |
| 1" | 44 | 77.8 | 10 | 17.67 |
| 1-1/4" | 44 | 127.5 | 10 | 28.95 |
| 1-1/2" | 44 | 199 | 10 | 45.24 |
| 2" | 88 | 311 | 20 | 70.69 |
| 2-1/2" | 220 | 526 | 50 | 119.5 |
| 3" | 220 | 797 | 50 | 181.0 |
| 4" | 308 | 1,245 | 70 | 282.7 |
| 6" | 660 | 2,801 | 150 | 636.2 |
| 8" | 1,100 | 4,980 | 250 | 1,131 |
| 10" | 1,761 | 7,781 | 400 | 1,767 |
| 12" | 2,201 | 11,205 | 500 | 2,545 |
| 14" | 3,082 | 15,250 | 700 | 3,464 |
| 16" | 5,283 | 19,918 | 1,200 | 4,524 |
| 18" | 5,283 | 25,202 | 1,200 | 5,726 |
| 20" | 5,283 | 31,114 | 1,200 | 7,069 |
| 24" | 5,283 | 37,657 | 1,200 | 8,553 |

*Flowmeters are set to the factory $Q_{max}$ setting as standard. Flowmeters can be ordered with a $Q_{max}$ at 10 m/s (32.8 ft/s). Please state this in plain text on your order.



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## Order Details for Model EPM-H: Sensor with Hard Rubber (Ebonite) Lining

| Model Liner Material | Connections[1] | Process Connection Material | Electrode Material | Grounding Electrode | Transmitter Mounting | Certificates[4] | Transmitter |
|---|---|---|---|---|---|---|---|
| **EPM-H..** = Hard Rubber | **..201R..** = ½" ANSI Class 150<br>**..203R..** = 1" ANSI Class 150<br>**..204R..** = 1-¼" ANSI Class 150<br>**..205R..** = 1-½" ANSI Class 150<br>**..206R..** = 2" ANSI Class 150<br>**..207R..** = 2-½" ANSI Class 150<br>**..208R..** = 3" ANSI Class 150<br>**..210R..** = 4" ANSI Class 150<br>**..212R..** = 6" ANSI Class 150<br>**..213R..** = 8" ANSI Class 150<br>**..214R..** = 10" ANSI Class 150<br>**..215R..** = 12" ANSI Class 150<br>**..216R..** = 14" ANSI Class 150<br>**..217R..** = 16" ANSI Class 150<br>**..218R..** = 18" ANSI Class 150<br>**..219R..** = 20" ANSI Class 150<br>**..220R..** = 24" ANSI Class 150 | **..1..** = Flange, Steel, Painted<br>**..2[2]..** = Flange, SS | **..S..** = 316L Stainless Steel<br>**..H..** = Hastelloy® C276<br>**..T..** = Tantalum<br>**..M..** = Titanium<br>**..N[3]..** = Platinum/ Iridium | **..0..** = Without<br>**..S..** = 316L Stainless Steel<br>**..H..** = Hastelloy® C276<br>**..T..** = Tantalum<br>**..M..** = Titanium<br>**..N[3]..** = Platinum/ Iridium | **..1..** = Integrated Transmitter, IP 67<br>**..2..** = Remote Transmitter, IP 67, Terminal Box via M20x1.5, (Cable >10 m, add Junction Box at Transmitter)<br>**..3..** = Remote Transmitter, IP 68, Terminal Box via M20x1.5, Encapsulated (Add Junction Box at Transmitter) | **..0** = without<br>**..1** = Certificate of Compliance with Order 2.1<br>**..2** = Test Report 2.2<br>**..B** = Inspection/ Material Certificate 3.1 DIN/ EN10204:2004 | To Complete the Order, Refer to the Order Table on Page Six to Order Transmitter UMF2 |

[1] 300 LB ANSI and EN 1092-1 Flanges available upon request
[2] Stainless Steel Flanges available on request
[3] Platinum/Iridium electrodes available on request
[4] If more than one certificate is required include only one code in the part number and order the others as separate line items



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## Order Details for Model EPM-P: Sensor with PTFE Lining

| Model Liner Material | Connections[1] | Process Connection Material | Electrode Material | Grounding Electrode | Transmitter Mounting | Certificates[3] | Transmitter |
|---|---|---|---|---|---|---|---|
| **EPM-P..** = PTFE | **..201R..** = ½" ANSI Class 150<br>**..203R..** = 1" ANSI Class 150<br>**..204R..** = 1-¼" ANSI Class 150<br>**..205R..** = 1-½" ANSI Class 150<br>**..206R..** = 2" ANSI Class 150<br>**..207R..** = 2-½" ANSI Class 150<br>**..208R..** = 3" ANSI Class 150<br>**..210R..** = 4" ANSI Class 150<br>**..212R..** = 6" ANSI Class 150<br>**..213R..** = 8" ANSI Class 150<br>**..214R..** = 10" ANSI Class 150<br>**..215R..** = 12" ANSI Class 150<br>**..216R..** = 14" ANSI Class 150<br>**..217R..** = 16" ANSI Class 150<br>**..218R..** = 18" ANSI Class 150<br>**..219R..** = 20" ANSI Class 150<br>**..220R..** = 24" ANSI Class 150 | **..1..** = Flange, Steel, Painted<br>**..2..** = Flange, SS | **..S..** = 316L Stainless Steel<br>**..H..** = Hastelloy® C276<br>**..T..** = Tantalum<br>**..M..** = Titanium<br>**..N[2]..** = Platinum/ Iridium | **..0..** = Without<br>**..S..** = 316L Stainless Steel<br>**..H..** = Hastelloy® C276<br>**..T..** = Tantalum<br>**..M..** = Titanium<br>**..N[2]..** = Platinum/ Iridium | **..1..** = Integrated Transmitter, IP 67<br>**..2..** = Remote Transmitter, IP67, Terminal Box via M20x1.5, (Cable >10 m, add Junction Box at Transmitter)<br>**..3..** = Remote Transmitter, IP68, Terminal Box via M20x1.5, Encapsulated (Add Junction Box at Transmitter) | **..0** = without<br>**..1** = Certificate of Compliance with Order 2.1<br>**..2** = Test Report 2.2<br>**..B** = Inspection/ Material Certificate 3.1 DIN/ EN10204:2004 | To Complete the Order, Refer to the Order Table on Page Six to Order Transmitter UMF2 |

[1] 300 LB ANSI and EN 1092-1 Flanges available upon request
[2] Platinum/Iridium electrodes available on request
[3] If more than one certificate is required include only one in the part number and order the others as separate line items



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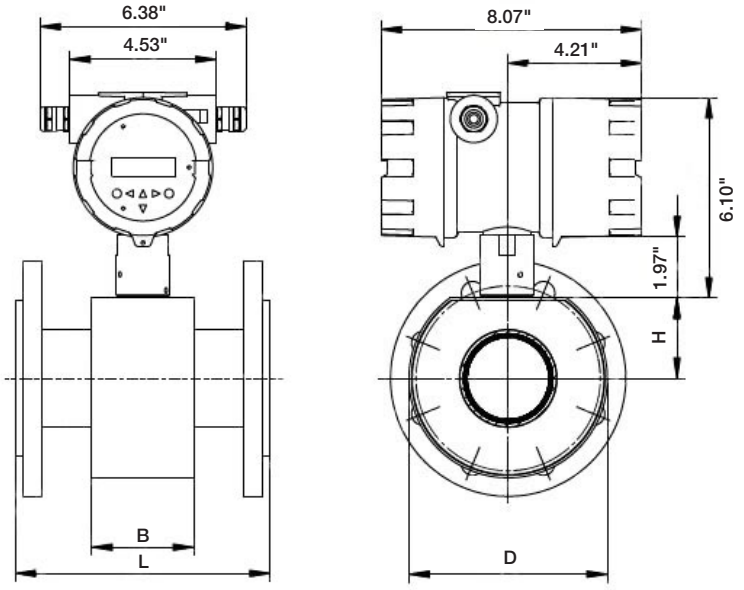
## Order Details for UMF2 Transmitter

| Model | Mounting and Connections | LCD Display | Power Supply | Output Signal | Optional Longer Cable Length (Junction Box) |
|---|---|---|---|---|---|
| **UMF2-** | **..A..** = IP 67, Integral Transmitter, 1/2" NPT<br><br>**..B..** = IP67, Integral Transmitter, M20x1.5<br><br>**..C..** = IP67, Remote Transmitter, Includes 2.5 m Cable and Pipe/Wall Mounting Bracket, (Cable > 10 m Add Junction Box at Transmitter), 1/2" NPT<br><br>**..D..** = IP67, Remote Transmitter, Includes 2.5 m Cable and Pipe/Wall Mounting Bracket, (Cable > 10 m Add Junction Box at Transmitter), M20x1.5 | **..1..** = with | **..1..** = 230 $V_{AC}$ (+10%, -15%) 50/60 Hz<br><br>**..2..** = 115 $V_{AC}$ (+10%, -15%) 50/60 Hz<br><br>**..4..** = 24 $V_{DC}$ (± 20%) | **..F0BK** = Current Output of 4-20 mA, Pulse Output Passive $U_m$ = 24 $V_{DC}$, Status Output Passive $U_m$ = 24 $V_{DC}$<br><br>**..G0BK** = Current Output of 4-20 mA with HART® Protocol, Pulse Output Passive $U_m$ = 24 $V_{DC}$, Status Output Passive $U_m$ = 24 $V_{DC}$ | **..0 =** 8' (2.5m), IP67 (standard for remote version)<br>**..1** = 16' (5m), IP67<br>**..2** = 32' (10m), IP67<br>**..3** = 49' (15m), IP67<br>**..4** = 65' (20m), IP67<br>**..5** = 98' (30m), IP67<br>**..6** = 130' (40m), IP67<br>**..7** = 164' (50m), IP67 |



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## EPM Intergrally Mounted Transmitter Dimensions

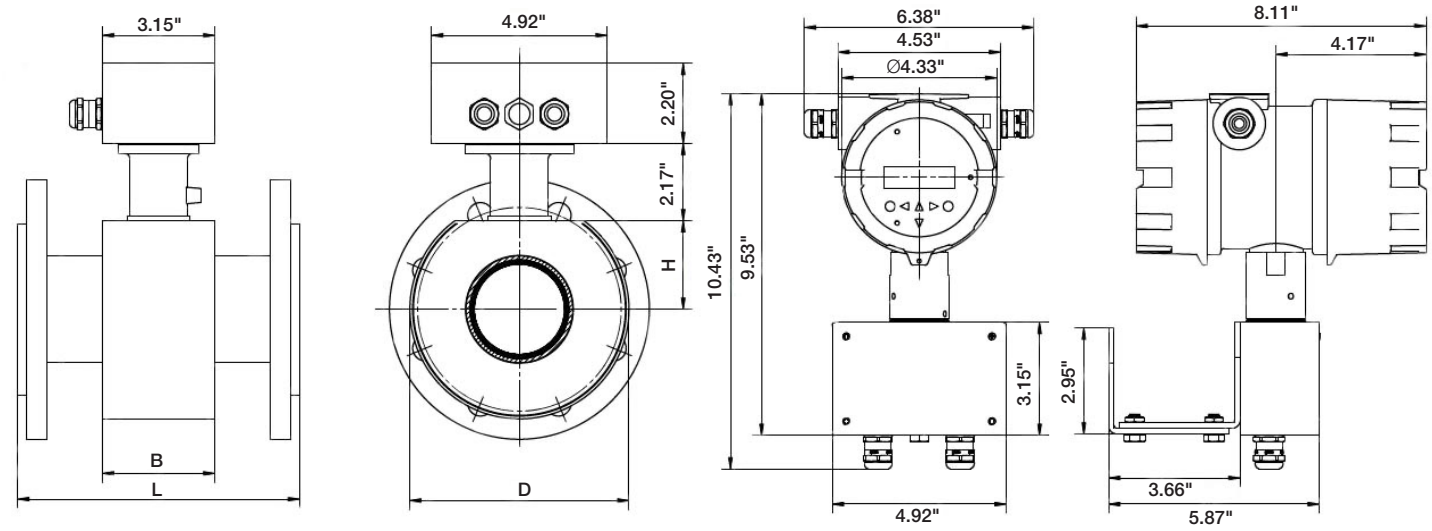



| ANSI | Installation Length L (in) | | | Tolerance | B | D | H | Approx. Weight (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Hard Rubber | PTFE without Protective Shield | PTFE with Protective Shield | | | | | |
| 1/2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 11.0 |
| 1" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 13.2 |
| 1-1/4" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 15.4 |
| 1-1/2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 16.5 |
| 2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.51" | 2.24" | 19.8 |
| 2-1/2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 6.10" | 2.48" | 22.0 |
| 3" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 6.69" | 2.76" | 28.7 |
| 4" 150 RF | 9.84" | 9.84" | 10.08" | 0 / -0.12" | 4.72" | 8.27" | 3.39" | 33.1 |
| 6" 150 RF | 11.81" | 11.81" | 12.05" | 0 / -0.12" | 4.72" | 11.22" | 4.61" | 50.7 |
| 8" 150 RF | 13.78" | 13.78" | 14.17" | 0 / -0.12" | 7.87" | 13.78" | 5.63" | 79.4 |
| 10" 150 RF | 17.72" | 17.72" | 18.11" | 0 / -0.16" | 7.87" | 17.32" | 7.09" | 114.6 |
| 12" 150 RF | 19.69" | 19.69" | 20.08"" | 0 / -0.16" | 7.87" | 20.47" | 8.39" | 136.7 |
| 14" 150 RF | 21.65" | 21.65" | 22.05 | 0 / -0.20" | 8.86" | 18.66" | 9.33" | 209.4 |
| 16" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 9.84" | 20.63" | 10.32" | 253.5 |
| 18" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 10.63" | 22.99" | 11.50" | 297.6 |
| 20" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 11.81" | 24.76" | 12.40" | 330.7 |
| 24" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 14.17" | 28.90" | 14.45" | 401.2 |



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## EPM Sensor Remote Design Dimensions




| ANSI | Installation Length L (in) | | | Tolerance | B | D | H | Approx. Weight (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Hard Rubber | PTFE without Protective Shield | PTFE with Protective Shield | | | | | |
| 1/2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 11.0 |
| 1" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 13.2 |
| 1-1/4" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 15.4 |
| 1-1/2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.12" | 2.09" | 16.5 |
| 2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 5.51" | 2.24" | 19.8 |
| 2-1/2" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 6.10" | 2.48" | 22.0 |
| 3" 150 RF | 7.87" | 7.87" | 8.11" | 0 / -0.12" | 3.15" | 6.69" | 2.76" | 28.7 |
| 4" 150 RF | 9.84" | 9.84" | 10.08" | 0 / -0.12" | 4.72" | 8.27" | 3.39" | 33.1 |
| 6" 150 RF | 11.81" | 11.81" | 12.05" | 0 / -0.12" | 4.72" | 11.22" | 4.61" | 50.7 |
| 8" 150 RF | 13.78" | 13.78" | 14.17" | 0 / -0.12" | 7.87" | 13.78" | 5.63" | 79.4 |
| 10" 150 RF | 17.72" | 17.72" | 18.11" | 0 / -0.16" | 7.87" | 17.32" | 7.09" | 114.6 |
| 12" 150 RF | 19.69" | 19.69" | 20.08"" | 0 / -0.16" | 7.87" | 20.47" | 8.39" | 136.7 |
| 14" 150 RF | 21.65" | 21.65" | 22.05 | 0 / -0.20" | 8.86" | 18.66" | 9.33" | 209.4 |
| 16" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 9.84" | 20.63" | 10.32" | 253.5 |
| 18" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 10.63" | 22.99" | 11.50" | 297.6 |
| 20" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 11.81" | 24.76" | 12.40" | 330.7 |
| 24" 150 RF | 23.62" | 23.62" | 24.02" | 0 / -0.20" | 14.17" | 28.90" | 14.45" | 401.2 |



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