



## Wing Union/Hammer Union Pressure Sensors

### Models 435/437

0 psi to 5000 psi; 0 psi to 6000 psi; 0 psi to 10000 psi;  
0 psi to 15000 psi; 0 psi to 20000 psi; 0 bar to 350 bar;  
0 bar to 400 bar; 0 bar to 700 bar; 0 bar to 1000 bar; 0 bar to 1350 bar



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## Models 435/437

Honeywell's Models 435/437 Wing Union/Hammer Union Pressure Sensors are rugged devices designed for use with Weco® 1502 fittings for both offshore and land-based oil and gas applications.

Available in two accuracy levels ( $\pm 0.1$  %FSS BFSL or  $\pm 0.2$  %FSS BFSL), Models 435/437 are typically used in demanding applications such as well stimulation and circulation systems. The higher accuracy option (available on Model 435 only) at  $\pm 0.1$  % full scale provides more confidence in the actual measured pressure value, particularly for smaller changes in pressure, allowing drilling operation adjustments as needed.

Models 435/437 are constructed as an all-welded, stainless steel assembly with the sensor diaphragm and wing union fitting machined as one part. This helps provide hermetic integrity, which reduces the chance of media leakage vs. multi-piece parts, and increases reliability. The isolated pressure sensing diaphragm minimizes zero-shift during hammer up and eliminates long-term signal drift in the field. The Weco® 1502 (50,8 mm [2 in]) Wing Union-compatible fittings are machined of Inconel® X-750, which provides additional durability with highly abrasive and corrosive media, while the Honeywell proprietary stainless steel electrical connection provides enhanced secondary pressure containment.

Each sensor undergoes special assembly processes to survive high shock and vibration for more reliable performance in the field.

### Features

- High accuracy  $\pm 0.1$  %FSS BFSL (Model 435); standard accuracy  $\pm 0.2$  %FSS BFSL (Models 435/437) (see Table 1)
- All-welded one-piece, hermetically sealed, stainless-steel construction
- Standard aperture (Model 435) and wide aperture (Model 437) pressure ports available to support media blends with high viscosities
- Inconel® X-750 wetted parts provide additional durability with abrasive or corrosive media
- Multiple electrical connectors supported
- High accuracy shunt calibration option allows users the ability to validate the offset signal in the field, ensuring the sensor is actively plugged into the system; one-wire and two-wire options available (see Table 3 for additional information)
- Protective cage option provides extra electrical connection protection and increases durability
- RFI/EMI protected
- Intrinsically safe:  $c$ FM<sub>US</sub>/ATEX/IEC Ex certification
- CE approved

### Potential Applications

- Acidizing
- Choke manifold
- Fracturing and cementing
- Mud pumps / mud logging
- New well development and extraction
- Oil and gas drilling
- Service and cement trucks
- Standpipe
- Stimulation
- Well head measurement



ACCURATE • DURABLE • CONFIGURABLE

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**Table 1. Performance Specifications**

Characteristic	Measure
Pressure ranges	0 psi to 5000 psi; 0 psi to 6000 psi; 0 psi to 10000 psi; 0 psi to 15000 psi; 0 psi to 20000 psi <sup>2</sup> ; 0 bar to 350 bar; 0 bar to 400 bar; 0 bar to 700 bar; 0 bar to 1000 bar; 0 bar to 1350 bar <sup>2</sup>
Accuracy <sup>1</sup>	High accuracy: $\pm 0.1$ %FSS (Model 435) Standard accuracy: $\pm 0.2$ %FSS (Model 435/Model 437)
Calibration	Standard 5-point calibration: 0 %, 50 %, and 100 % of full scale Special 10 point and 20 point calibration options available
Output	4 mA to 20 mA, two-wire
Resolution	Infinite

<sup>1</sup>Accuracies stated are with respect to best fit straight line (BFSL) for all errors including linearity, hysteresis, and non-repeatability through zero.

<sup>2</sup>Working pressure and approval limited to 15000 psi [1000 bar]. Amplifier enhancement options 3H and 3HJ will allow overpressure reading to 20000 psi [1350 bar].

**Table 2. Environmental Specifications**

Characteristic	Measure
Temperature, operating	-40 °C to 125 °C [-40 °F to 257 °F]
Temperature, compensating	-40 °C to 85 °C [-40 °F to 185 °F]
Temperature effect, zero	$< \pm 0.018$ %FSS/°C [0.01 %FSS/°F]
Temperature effect, span	$< \pm 0.018$ % reading/°C [0.01 % reading/°F]
Temperature effect, sealing	IP68 / NEMA 6P

**Table 3. Mechanical Specifications**

Characteristic	Measure
Media	Corrosive and abrasive service, Inconel® X-750
Overload, safe	150 % rated full scale pressure or limit of Weco® 1502 fitting
Overload, burst	250 % rated full scale pressure or limit of Weco® 1502 fitting
Pressure port	Weco® 1502 wing union, 51 mm [2 in] pipe, male sub end
Wetted parts material	Inconel® X-750
Weight (approx.)	4.85 lb [2.2 kg]
Housing material	316L stainless steel (with laser engraved labels)
Protective cage (optional)	316L stainless steel

# Model 435/437

**Table 4. Electrical Specifications**

Characteristic	Measure
Supply voltage	9 Vdc to 28 Vdc
Output signal	4 mA to 20 mA
Output at null pressure	4 mA $\pm$ 0.2 %FSS
Full Scale Span (FSS)	16 mA $\pm$ 0.5 %FSS
Insulation resistance	>100 MOhm at 20 Vdc
Max. loop resistance	950 ohm @ 28 V decreasing linearly to 0 ohm @ 9 V
Circuit protection	Reverse polarity protection of supply leads
RFI/EMI protection	Noise immunity up to 2.7 GHz
Frequency response	2500 Hz
Zero and span adjustment	Digital adjustment at non-hazardous locations using factory supplied communication kit. Consult factory for more information.
Electrical termination	MS series compatible 4-pin (32A-14S-2P-10-M2); Bendix PT, 6-pin (PTIH-10-6P); Jupiter M-series 4-pin; Jupiter M-series 7-pin; Rota B-Series 4-pin
Shunt calibration wiring options	None / One-wire / Two-wire
Shunt calibration signal range	100 %FSS
Shunt calibration accuracy	< $\pm$ 0.2 %FSS

**NOTE: High Accuracy Shunt Calibration** - Shunt calibration option provides a pre-determined change in electrical output as per shunt calibration signal range without the need for a calibrated pressure source. Example: If sensor output = 4 mA, FSS = 16 mA and shunt calibration signal range = 100 %FSS (i.e. 16 mA), then sensor output while shunt calibration is engaged = 4 mA + 16 mA = 20 mA.

**Shunt Calibration Activation/Engaging Mechanisms** - Models 435/437 Wing Union Pressure Sensors support either one of the following two types of shunt calibration activation/engaging mechanisms:

- 1-wire shunt calibration: Shunt calibration is engaged while the electrical terminal “Shunt Cal” provided on the sensor is shorted with the “Return” terminal. Sensor output returns to previous value as soon as the short is removed.
- 2-wire shunt calibration: Shunt calibration is engaged while a potential in the range of 9 Vdc to 28 Vdc is applied between two electrical terminals “+ Shunt Cal” and “- Shunt Cal” provided on the sensor. Sensor output returns to previous value as soon as the potential is removed.

Refer to installation instruction manual 008-0691-00 for wiring diagrams.

**Table 5. Intrinsically Safe Approvals**

(See Honeywell’s Web site (<http://measurementsensors.honeywell.com>) for up-to-date information regarding intrinsically safe approvals, ref. #008-0691-00.)

Agency	Approvals
cFMus	Class 1, Div 1, Groups A, B, C, D Class 1, Zone 0, AEx / Ex ia IIC T4/T5 Ga (T4 at Ta $\leq$ 85°C, T5 at Ta $\leq$ 40°C); Install per 008-0691-00
ATEX	II 1 G Ex ia IIC T4/T5 Ga (T4 at Ta $\leq$ 85°C, T5 at Ta $\leq$ 40°C)
IEC Ex	Ex ia IIC T4/T5 Ga (T4 at Ta $\leq$ 85°C, T5 at Ta $\leq$ 40°C)

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## DIMENSIONS (for reference only)

Figure 1. Model 435

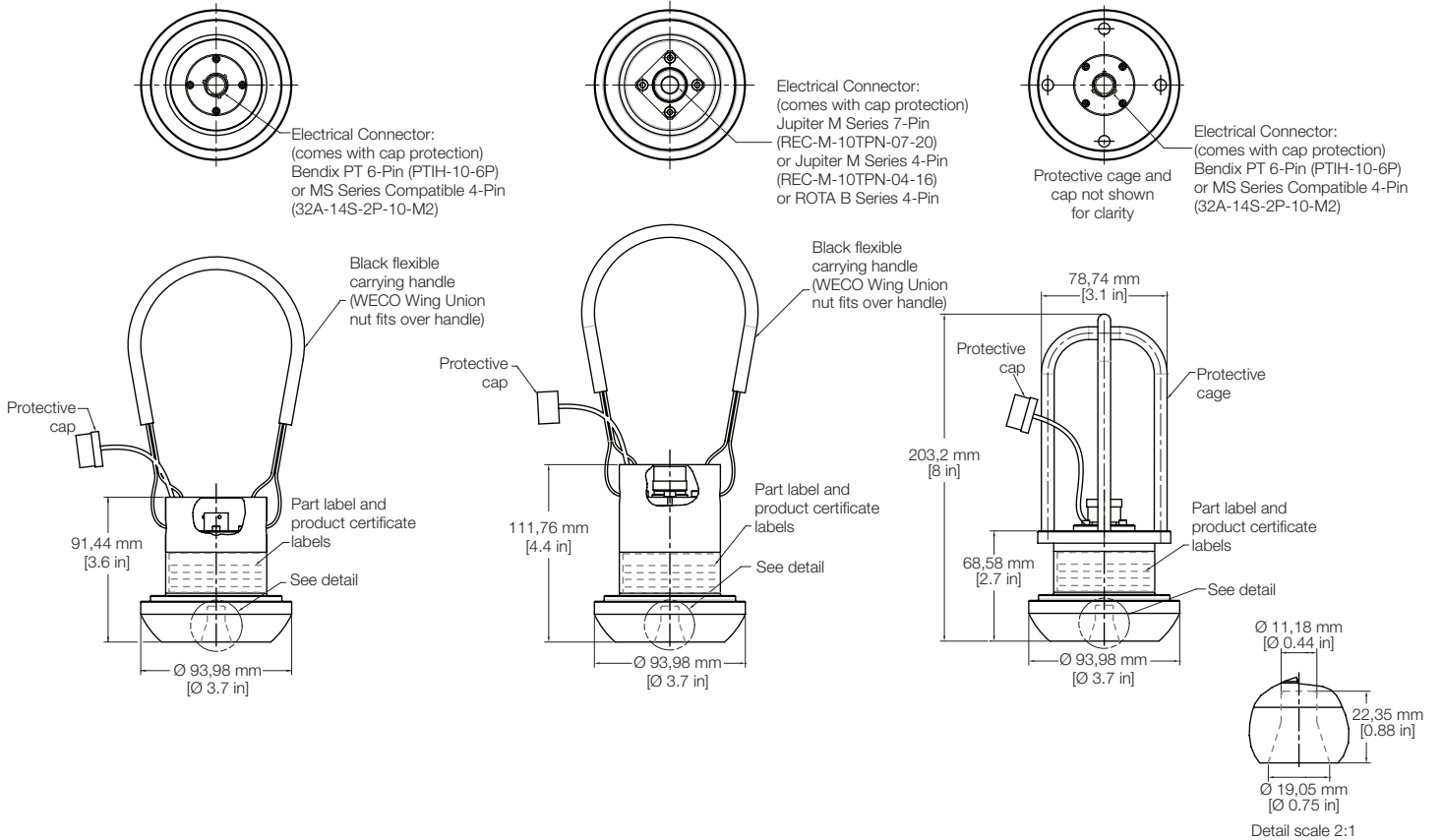
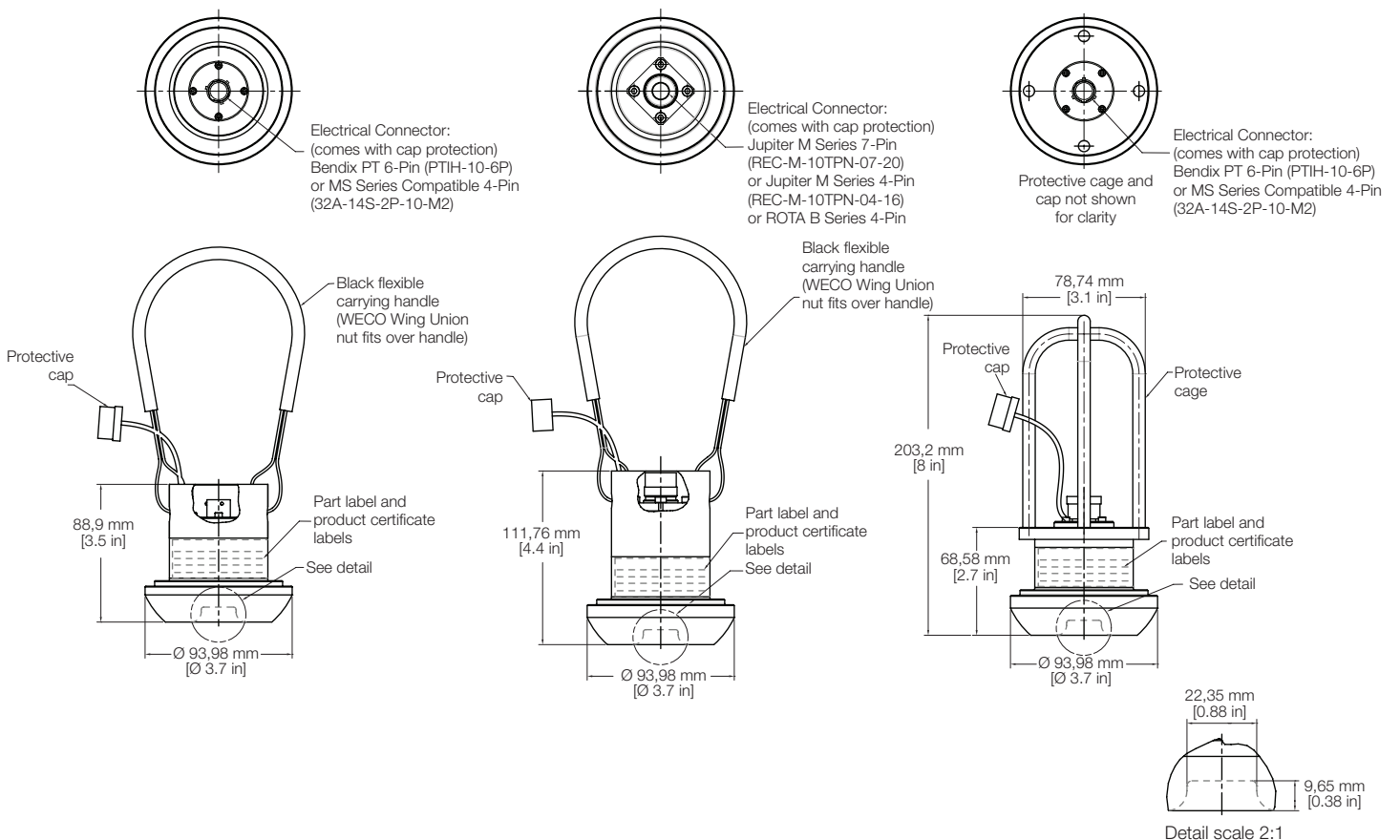


Figure 2. Model 437



# Model 435/437

## NOMENCLATURE

BP435	EJ	6	1AC	2AK	3D	6Z	7AD		10E	
Pressure Type	Pressure Range (Gauge)	Accuracy	Temperature Compensation	Internal Amplifiers	Amplifier Enhancements <sup>3</sup>	Electrical Termination	Wiring Options <sup>4</sup>	Calibration Options	Material Type	Protective Cage
<b>BP435</b>	<b>DR</b> 5000 psi	<b>5</b> ±0.1 % FSS <sup>2</sup>	<b>1AC</b> -40 °C to 85 °C [-40 °F to 185 °F]	<b>2AK</b> 4 mA to 20 mA, two wire, intrinsically safe	None	<b>6A</b> Bendix PT, 6-pin, PTIH-10-6P	<b>7AD</b> <b>4-Pin Standard</b> A: N/C or Shunt Cal.; B: + Output C: - Supply; D: Case Ground	5-point calibration	<b>10E</b> Inconel® X-750 wetted diaphragm	None
<b>BP437</b>	<b>DS</b> 6000 psi	<b>6</b> ±0.2 % FSS			<b>3D</b> One-wire shunt calibration	<b>6Z</b> MS Series compatible 4-pin, 32A-14S-2P-10-M2	<b>7AE</b> <b>4-Pin Jupiter</b> 1: N/C or Shunt Cal. 2: Case Ground; 3: + Output 4: - Supply	<b>9A</b> Special cal., 10 point		<b>45E</b> Protective cage <sup>5</sup>
	<b>DV</b> 10000 psi				<b>3J</b> Two-wire shunt calibration	<b>6BF</b> Jupiter M Series 4-pin	<b>7AF</b> <b>6-Pin Standard</b> A: + Supply; B: + Output C: N/C; D: Case Ground E: N/C; F: N/C or Shunt Cal.	<b>9B</b> Special cal., 20 point		
	<b>EJ</b> 15000 psi				<b>3H</b> 4 mA to 16 mA for 0 to 15000 psi (EL) or 0 to 1012 bar (NU) with over-range up to 20 mA, no shunt calibration	<b>6BG</b> Jupiter M Series, 7-pin	<b>7AG</b> <b>7-Pin Jupiter</b> 1: N/C; 2: Case Ground; 3: N/C 4: + Supply; 5: + Output 6: N/C; 7: N/C or Shunt Cal.			
	<b>EL</b> 20000 psi <sup>1</sup>				<b>3HJ</b> 4 mA to 16 mA for 0 to 15000 psi (EL) or 0 to 1012 bar (NU) with over-range up to 20 mA, two-wire shunt calibration	<b>6BH</b> Rota B-Series, 4-pin	<b>7AH</b> <b>6-Pin w/2-wire shunt</b> A: + Supply; B: + Output; C: N/C D: Case Ground; E: + Shunt Cal. F: - Shunt Cal.			
	<b>NG</b> 350 bar						<b>7AN</b> <b>4-Pin Rota</b> B: N/C or Shunt Cal. C: Case Ground; E: + Output F: + Supply			
	<b>NN</b> 400 bar						<b>7AP</b> <b>7-Pin Jupiter w/2-wire shunt</b> 1: N/C; 2: Case Ground; 3: N/C 4: + Supply; 5: + Output 6: + Shunt Cal.; G: - Shunt Cal.			
	<b>NH</b> 700 bar									
	<b>MN</b> 1000 bar									
	<b>NU</b> 1350 bar <sup>1</sup>									

**Notes:**

<sup>1</sup> Working pressure and approval limited to 15000 psi. Amplifier will allow overpressure readings to 20000 psi.

<sup>2</sup> ±0.1 % FSS accuracy available on Model 435 only.

<sup>3</sup> 3D and 3J are available with all pressure ranges except EL and NU. 3H and 3HJ are available only with pressure ranges EL and NU.

<sup>4</sup> Wiring option availability varies with electrical termination.

Option 7AD available only with Option 6Z

Option 7AE available only with Option 6BF

Option 7AF and 7AH available only with Option 6A

Option 7AG and 7AP available only with Option 6BG

Option 7AN available only with Option 6BH

Other wiring options available upon request.

<sup>5</sup> Protective cage available only with electrical terminations 6A and 6Z.

**Table 6. Order Guide (Sample Listings)**

Order Code	Description
BP435EJ,6,1AC,2AK,3D,6Z, 7AD,10E	Model 435, 15000 psi, ±0.2 %FSS accuracy, -40 °C to 85 °C [-40 °F to 185 °F] temperature compensation, 4 mA to 20 mA two-wire intrinsically safe, one-wire shunt calibration, MS compatible, 4-pin connector, Inconel® X-750 wetted diaphragm
BP435DS,5,1AC,2AK, 3J, 6A, 7AH,10E	Model 435, 6000 psi, ±0.1 %FSS accuracy, -40 °C to 85 °C [-40 °F to 185 °F] temperature compensation, 4 mA to 20 mA two-wire intrinsically safe, two-wire shunt calibration, Bendix PT 6-pin connector, Inconel® X-750 wetted diaphragm
BP435NU,6,1AC,2AK,3H,6Z, 7AD,10E, 45E	Model 435, 1350 bar, ±0.2 %FSS accuracy, -40 °C to 85 °C [-40 °F to 185 °F] temperature compensation, intrinsically safe, 4 mA to 16 mA at 1012 bar with over-range up to 20 mA at 1350 bar, no shunt calibration, MS compatible 4-pin connector, Inconel® X-750 wetted diaphragm, with protective cage
BP437DR,6,1AC,2AK,6BF, 7AE,10E	Model 437, 5000 psi, ±0.2 %FSS accuracy, -40 °C to 85 °C [-40 °F to 185 °F] temperature compensation, 4 mA to 20 mA two-wire intrinsically safe, no shunt calibration, Jupiter M series 4-pin connector, Inconel® X-750 wetted diaphragm

## ADDITIONAL INFORMATION

The following associated literature is available on the Sensing and Control web site at [measurementsensors.honeywell.com](http://measurementsensors.honeywell.com):

- Product installation instructions
- Product range guide
- Product application-specific information

### **WARNING** **PERSONAL INJURY**

**DO NOT USE** these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

### **WARNING** **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

### Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

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