

## Model DPS

### Digital Pressure Sensor with CANopen®



#### DESCRIPTION

Honeywell's Digital Pressure Sensors with CANopen®, Model DPS, are an addition to Honeywell's general purpose pressure sensors that are configured with a variety of features and options for use in a wide range of demanding applications. Model DPS pressure sensors are rugged, stainless steel, all-welded devices designed to work with a variety of media, and are built to provide consistent performance in harsh environments. CANopen® protocol communication allows customers to:

- Connect to longer cable distances without sacrificing accuracy
- Reduce the amount of wires that need to be connected to the system, simplifying installation
- Mitigate data corruption

#### FEATURES AND BENEFITS (★ = competitive differentiator)

- Wide pressure range [from 10 psi to 10K psi or 1 bar to 700 bar or 70 kPa to 70000 kPa]: Provides support for many unique applications
- ★ Multiple pressure engineering units (psi, bar and kPa): Eliminates the customer having to make mathematical conversions, increasing flexibility and simplifying use
- Rugged design: All-welded, 300 series stainless steel and Hastelloy® design allow for use in a wide range of harsh environments
- Accuracy options [ $\leq 30$  psi,  $\pm 0.25$  %FS or  $>30$  psi,  $\pm 0.1$  %FS or  $\pm 0.25$  %FS]: Allow customers to select the accuracy level required for their application
- Output: CANbus with CANopen protocol
- Total Error Band [ $\pm 2$  % FS]: Honeywell specifies Total Error Band (TEB), the most comprehensive, clear and meaningful measurement that includes nonlinearity, repeatability and hysteresis as well as temperature error
- Designed for configurability: A selection of pressure types, accuracy levels, pressure ranges, pressure connections and electrical terminations allows customers the ability to configure the devices to meet their specific application needs

- Simplify tracking each networked pressure sensor by using unique serial numbers
- Configure the update rate between 10 Hz to 250 Hz, easing configurability

Configurations for digital measurements are fully temperature compensated and calibrated for pressure ranges from 10 psi to 10K psi or 1 bar to 700 bar or 70 kPa to 70000 kPa. Customers can choose from two different accuracies to meet their specific application requirements:

- $\leq 30$  psi,  $\pm 0.25$  %FS
- $> 30$  psi,  $\pm 0.1$  %FS or  $\pm 0.25$  %FS

- ★ Connectors: 5-pin M12, which can be used in industrial applications, and 6-pin Bendix, which can be used in transportation applications
- Mechanical shock 100 G/11 ms: Allows the device to withstand harsh environments
- IP65 rated: Provides protection when used in harsh environments
- CiA (CAN in Automation) certified

#### POTENTIAL APPLICATIONS

- Transportation
  - Construction equipment
  - Rail equipment testing
  - Automotive test benches
- Industrial
  - General industrial process control
  - Factory automation/industrial equipment
- Medical
  - Medical equipment systems (i.e., X-ray collimator, MRI scanning, etc.)
- Aerospace (non-ITAR)
  - Test and research labs

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**Table 1. Pressure Ranges and Range Codes**

Gage/Absolute (Order Codes HPG, HPA)						Differential (Order Codes HDW, HDD)					
psi	Range Code	kPa	Range Code	bar	Range Code	psi	Range Code	kPa	Range Code	bar	Range Code
10	AV	70	KE	1	ME	10	AV	70	KE	1	ME
15	BJ	100	KF	2	MF	15	BJ	100	KF	2	MF
25	BL	200	KG	3.5	NA	25	BL	200	KG	3.5	NA
30	BM	300	KH	5	MG	30	BM	300	KH	5	MG
50	BN	700	KJ	7	NB	50	BN	700	KJ	7	NB
75	BP	1000	KL	10	MH	75	BP	1000	KL	10	MH
100	BR	1500	KM	20	MI	100	BR	1500	KM	20	MI
150	CJ	1700	KN	30	MJ	150	CJ	1700	KN	30	MJ
200	CL	2000	KP	35	NC	200	CL	2000	KP	35	NC
250	CN	3000	KQ	50	MK	250	CN	3000	KQ	50	MK
300	CP	5000	KR	70	ND	300	CP	5000	KR	70	ND
400	CQ	7000	KS	100	ML	400	CQ	7000	KS		
500	CR	10000	KT	135	NE	500	CR	10000	KT		
600	CS	15000	KU	350	NG	600	CS	15000	KU		
750	CT	20000	KV	500	MM	750	CT	20000	KV		
1000	CV	35000	KW	700	NH	1000	CV	35000	KW		
1500	DJ	50000	KY					50000	KY		
2000	DL	70000	KZ								
2500	DM										
3000	DN										
5000	DR										
6000	DS										
7500	DT										
10000	DV										

NOTE: For ranges greater than 1000 psi and 100 bar; end users should take appropriate steps to ensure safety with respect to pressure port attachment.

**Table 2. Pressure Connection**

Range Code	Pressure Connection
5A	1/4 in-18 NPT female
5B	1/4 in-18 NPT male
5C	7/16 in-20 UNF female
5D	7/16 in-20 UNF male
5F	G 1/4 B female
5G	G 1/4 B male
5H	1/8 in-27 female
5I	1/8 in-27 male
5P	M12-1.5 male
5Q	M12-1.5 female
5R	9/16 in-18 SAE male
5S	9/16 in-18 SAE female

**Table 3. Electrical Termination**

Range Code	Pressure Connection
6A	Bendix PTIH-10-6P electrical connector
6BJ	5-pin M12 connector

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**Table 4. Physical and Environmental Specifications**

Characteristic	Parameter
<b>Weight</b> <i>(representative of HPG &amp; HPA)</i>	100 psi: 234 g [8.25 oz] (1/4-18 NPT port with Bendix) 100 psi: 236 g [8.32 oz] (1/4-18 NPT port with M12)
<b>Shock</b>	100 g [11 ms] peak
<b>Vibration</b>	MIL-STD-810C, Figure 514.2-5, Curve AK, Table 514.2-V, Random Vibration Test [overall g rms = 20.7 min.]
<b>Compensated temperature range</b>	4 °C to 60 °C [40 °F to 140 °F]
<b>Operating and storage temperature range</b>	-25 °C to 85 °C [-13 °F to 185 °F]
<b>Approvals</b>	CiA (CAN in Automation), CE marked, Declaration of Conformity on request

**Table 5. Mechanical Specifications**

Characteristic	Parameter
<b>Media<sup>1</sup></b>	gas, liquid
<b>Overload (safe), positive direction</b>	1000 psi and below: 4X full scale or 3000 psi, whichever is less 1500 psi and above: 4X full scale or 15000 psi, whichever is less
<b>Overload (safe), negative direction</b>	4X full scale or 250 psi, whichever is less
<b>Overload (burst), positive direction</b>	1000psi and below: 3000 psi
<b>Overload (burst), negative direction</b>	1500 psi and above: 15000 psi
<b>Pressure port</b>	200% over capacity
<b>Wetted parts material</b>	Ha C276 & 316L stainless steel

**Table 6. Electrical Specifications @ 25 °C [77 °F] and a rated excitation unless otherwise noted**

Characteristic	Parameter
<b>Excitation</b>	9 Vdc to 28 Vdc

**Table 7. Performance Specifications @ 25 °C [77 °F] and a rated excitation unless otherwise noted**

Characteristic	Parameter
<b>Accuracy<sup>2,3</sup></b>	≤30 psi: ± 0.25 %FS >30 psi: ± 0.1 %FS
<b>ADC resolution</b>	12 bit
<b>Total Error Band<sup>4</sup></b>	±2 %FS
<b>User-configurable update rate</b>	250 Hz (max.); 10 Hz (default)
<b>Baud rate</b>	125 kbps (default)

**NOTES:**

1. The wet/wet differential pressure sensor has two separate, welded Hastelloy diaphragms. In the wet/dry unit, the wet port (high port) has all-welded stainless steel and Hastelloy construction. The dry port (low port) has no isolation diaphragm.
2. Includes pressure non-linearity (BFSL), pressure hysteresis and non-repeatability. Thermal errors are not included.
3. Differential sensors are calibrated in positive direction and accuracy specification is valid in positive direction only.
4. Includes zero error, span error, thermal effect on zero, thermal effect on span, thermal hysteresis, pressure-non-linearity, pressure hysteresis and non-repeatability.

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**Table 8. Product Listings**

These are examples of common configurations that are available. Please refer to the “Nomenclature and Order Code Guide” on page 5 for all possible product configurations. Order via Test and Measurement’s web site <http://measurementsensors.honeywell.com> or call our Inside Sales Team +1 614-850-5000 or 1-800-848-6564.

Part number/ Order codes	Description
<b>HPG1 BR,1AK, 2AF, 5F, 6A</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 100 psi, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, Bendix PTIH-10-6P electrical connector
<b>HPG1 CN,1AK, 2AF, 5F, 6A</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 250 psi, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, Bendix PTIH-10-6P electrical connector
<b>HPG1 BR,1AK, 2AF, 5F, 6BJ</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 100 psi, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, M12 connector
<b>HPG1 CN,1AK, 2AF, 5F, 6BJ</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 250 psi, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, M12 connector
<b>HPG1 NB, 1AK, 2AF, 5F, 6A</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 7 bar, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, Bendix PTIH-10-6P electrical connector
<b>HPG1 NY, 1AK, 2AF, 5F, 6A</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 16 bar, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, Bendix PTIH-10-6P electrical connector
<b>HPG1 NB, 1AK, 2AF, 5F, 6BJ</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 7 bar, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, M12 connector
<b>HPG1 NY, 1AK, 2AF, 5F, 6BJ</b>	Digital Pressure Sensor with CANopen®, Model DPS, 0.1 % accuracy, 16 bar, 4 °C to 60 °C [40 °F to 140 °F] CANopen® protocol communication, 1/4 B female, M12 connector

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### Nomenclature and Order Code Guide

For example, a **HPG1BR 1AK,2AF,5A,6A** part number would define a gage pressure digital pressure sensor with 0.1 % accuracy, 100 psi pressure range, temperature compensated 4 °C to 60 °C, standard CANopen® protocol, 1/4 in-18 NPT pressure connection, and a Bendix 6-pin electrical termination.

<b>HPG</b> Pressure Type	<b>1</b> Accuracy	<b>BR</b> Pressure Range		<b>1AK</b> Temperature Compensation	<b>2AF</b> Electrical Output	<b>5A</b> Pressure Connection	<b>6A</b> Electrical Termination
<b>HPG</b> Gage	<b>1</b> 0.1 %	<b>AV</b> 10 psi	<b>CR</b> 500 psi	<b>1AK</b> 4 °C to 60 °C [40 °F to 140 °F]	<b>2AF</b> Standard, CANopen® Protocol	<b>5A</b> 1/4 in-18 NPT female	<b>6A</b> Bendix 6-pin
<b>HPA</b> Absolute	<b>2</b> 0.25 %	<b>BJ</b> 15 psi	<b>CT</b> 750 psi			<b>5B</b> 1/4 in-18 NPT male	<b>6BJ</b> 5-pin M12 connector
<b>HDW</b> Wet/wet differential		<b>BL</b> 25 psi	<b>CV</b> 1000 psi			<b>5C</b> 7/16 in-20 UNF female	
<b>HDD</b> Wet/dry differential		<b>BM</b> 30 psi	<b>DJ</b> 1500 psi			<b>5D</b> 7/16 in-20 UNF male	
		<b>BN</b> 50 psi	<b>DL</b> 2000 psi			<b>5F</b> G 1/4 B female	
		<b>BP</b> 75 psi	<b>DN</b> 3000 psi			<b>5G</b> G 1/4 B male	
		<b>BR</b> 100 psi	<b>DR</b> 5000 psi			<b>5H</b> 1/8 in-27 female	
		<b>CJ</b> 150 psi	<b>DT</b> 7500 psi			<b>5I</b> 1/8 in-27 male	
		<b>CL</b> 200 psi	<b>DV</b> 10000 psi			<b>5P</b> M12-1.5 male	
		<b>CN</b> 250 psi				<b>5Q</b> M12-1.5 female	
						<b>5R</b> 9/16 in-18 SAE male	
						<b>5S</b> 9/16 in-18 SAE female	

NOTE 1: Accuracy option availability: ≤30 psi (±0.25 %FS), >30 psi (±0.25 %FS or ±0.1 %FS).

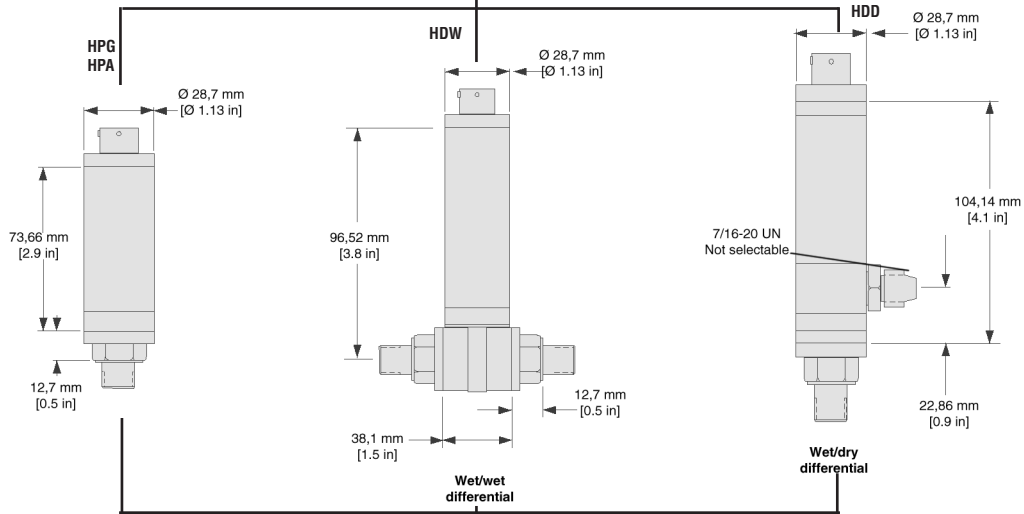
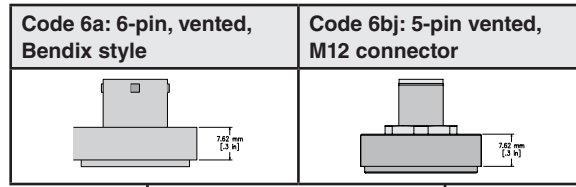
NOTE 2: Sensors selected with the HDD configuration will be supplied with a 7/16-20 Male reference port.

NOTE 3: PSI order codes shown as an example for order code string construction.

For range availability, by pressure type, refer to Table 1 in product sheet.

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## MOUNTING DIMENSIONS Electrical termination



## Pressure ports

	Code 5a 1/4-18 NPT female	Code 5b 1/4-18 NPT male	Code 5c 7/16-20 UNF female	Code 5d 7/16-20 UNF male	Code 5f G 1/4 B female	Code 5g G 1/4 B male
<b>Less than 1000 psi</b>	12.7 mm [0.5 in]	28.0 mm [1.1 in]	15.24 mm [0.6 in]	25.4 mm [1.0 in]	17.78 mm [0.7 in]	30.48 mm [1.2 in]
<b>Greater than 1500 psi</b>	25.4 mm [1.0 in]	33.02 mm [1.3 in]	25.4 mm [1.0 in]	33.02 mm [1.3 in]	25.4 mm [1.0 in]	30.48 mm [1.2 in]
	Code 5h 1/8-27 NPT female	Code 5i 1/8-27 NPT male	Code 5p M12-1.5 male	Code 5q M12-1.5 female	Code 5r 9/16-18 SAE male	Code 5s 9/16-18 SAE female
<b>Less than 1000 psi</b>	13.34 mm [0.525 in]	22.99 mm [0.905 in]	26.04 mm [1.025 in]	12.7 mm [0.5 in]	27.31 mm [1.075 in]	15.88 mm [0.625 in]
<b>Greater than 1500 psi</b>	26.67 mm [1.05 in]	28.45 mm [1.12 in]	33.53 mm [1.32 in]	26.67 mm [1.05 in]	34.37 mm [1.353 in]	26.67 mm [1.05 in]

## PINOUTS: Bendix PTIH-10-6P electrical connector

Connector	Pin	Assignment
	A	CAN_SHLD
	B	CAN_V+
	C	CAN_GND
	D	CAN_H
	E	CAN_L
	F	NC

## M12 electrical connector

Connector	Pin	Assignment
	1	CAN_SHLD
	2	CAN_V+
	3	CAN_GND
	4	CAN_H
	5	CAN_L

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## WARNING

### MISUSE OF DOCUMENTATION

- The information presented in this datasheet is for reference only. DO NOT USE this document as product installation information.
- 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.**

## PERSONAL INJURY WARNING

**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

Honeywell does not recommend using devices for critical control applications where there is, or may be, a single point of failure or where single points of failure may result in an unsafe condition. It is up to the end-user to weigh the risks and benefits to determine if the products are appropriate for the application based on security, safety and performance. Additionally, it is up to the end-user to ensure that the control strategy results in a safe operating condition if any crucial segment of the control solution fails. Honeywell customers assume full responsibility for learning and meeting the required Declaration of Conformity, Regulations, Guidelines, etc. for each country in their distribution market.

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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