

Digital Pressure Sensor with CANopen® Model DPS

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Issue 1

Datasheet



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

VALUE TO CUSTOMERS

- **Configurable:** Customers can choose pressure type, accuracy level, pressure range, pressure connection, and electrical termination to meet their specific application needs
- **Durable:** Rugged, all-welded, 300 series stainless steel and Hastelloy® design, mechanical shock rating, and IP65 rating allow for use in a variety of harsh environments
- **Accurate:**
 - Two accuracy options allow customers the ability to select the level required for their application
 - Honeywell specifies Total Error Band (TEB), the most comprehensive, clear and meaningful measurement that includes nonlinearity, repeatability and hysteresis as well as temperature error
- **Product availability and support:** Dedicated teams and manufacturing processes provide a fast response to configuration design; global, experienced application engineers understand the solution to meet the most exacting application needs

FEATURES

- Pressure range: 10 psi to 10K psi or 1 bar to 700 bar or 70 kPa to 70000 kPa
- All-welded, 300 series stainless steel and Hastelloy® design
- Fully temperature compensated and calibrated
- Accuracy: ≤ 30 psi, ± 0.25 %FS or >30 psi, ± 0.1 %FS or ± 0.25 %FS
- Total Error Band: ± 2 %FS
- Connector options: 5-pin M12 and 6-pin Bendix
- Mechanical shock: 100 G/11 ms
- IP65 rated
- CANbus with CANopen® protocol
- CiA (CAN in Automation) certified

POTENTIAL APPLICATIONS

Transportation

- Agricultural equipment
- Automotive test benches
- Construction equipment
- Rail equipment testing
- Train communication network

Industrial

- General industrial process control and factory automation/ industrial equipment
- HVAC
- Injection/blow molding machines
- Packaging machines
- Semiconductor manufacturing

Medical

- Blood dialysis equipment
- Medical equipment systems (i.e., X-ray collimator, MRI scanning, etc.)

Aerospace

- Test and research labs

DIFFERENTIATION

- Multiple pressure engineering units eliminate customers having to make mathematical conversions, simplifying use
- Choice of connectors such as 5-pin M12, for use in industrial applications, or 6-pin Bendix, for use in transportation applications

PORTFOLIO

Honeywell offers a broad range of pressure transducers for test and measurement applications, including general process, precision/technical grade, compact/miniature, flush, industrial, high pressure, oil & gas, process-hazardous location capable, aerospace, sanitary, and submersible-liquid level.

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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 Connections

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 Terminations

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
Weight (representative of HPG & HPA)	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)
Shock	100 g [11 ms] peak
Vibration	MIL-STD-810C, Figure 514.2-5, Curve AK, Table 514.2-V, Random Vibration Test [overall g rms = 20.7 min.]
Compensated temperature range	4 °C to 60 °C [40 °F to 140 °F]
Operating & storage temp. range	-25 °C to 85 °C [-13 °F to 185 °F]
Approvals	CiA (CAN in Automation), CE marked, Declaration of Conformity on request

Table 5. Mechanical Specifications

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

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

Characteristic	Parameter
Excitation	9 Vdc to 28 Vdc

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

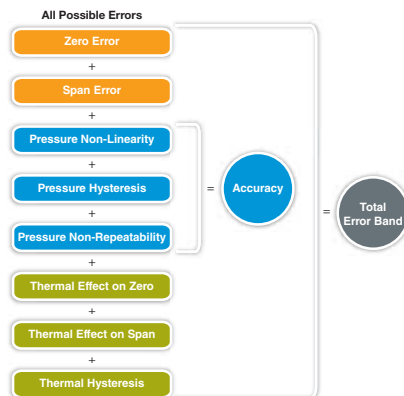
Characteristic	Parameter
Accuracy ^{2,3}	≤30 psi: ± 0.25 %FS; >30 psi: ± 0.1 %FS
ADC resolution	12 bit
Total Error Band ⁴	±2 %FS
User-configurable update rate	250 Hz (max.); 10 Hz (default)
Baud rate	125 kbps (default)

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.

Figure 1. Total Error Band

Total Error Band (TEB) is a single specification that includes all possible sources of error. TEB should not be confused with Accuracy, which is actually a component of TEB. TEB is the worst error that the sensor could experience. The TEB specification on a datasheet may be confusing. Honeywell uses the TEB specification in its datasheet because it is the most comprehensive measurement of a sensor's true Accuracy. Honeywell also provides the Accuracy specification in order to provide a common comparison with competitors' literature that does not use the TEB specification. Many competitors do not use TEB—they simply specify the Accuracy of their device. Their Accuracy specification, however, may exclude certain parameters. On their datasheet, the errors are listed individually. When combined, the total error (or what would be TEB) can be significant.



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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
HPG1 BR,1AK, 2AF, 5F, 6A	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
HPG1 CN,1AK, 2AF, 5F, 6A	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
HPG1 BR,1AK, 2AF, 5F, 6BJ	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
HPG1 CN,1AK, 2AF, 5F, 6BJ	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
HPG1 NB, 1AK, 2AF, 5F, 6A	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
HPG1 NY, 1AK, 2AF, 5F, 6A	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
HPG1 NB, 1AK, 2AF, 5F, 6BJ	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
HPG1 NY, 1AK, 2AF, 5F, 6BJ	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

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.

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

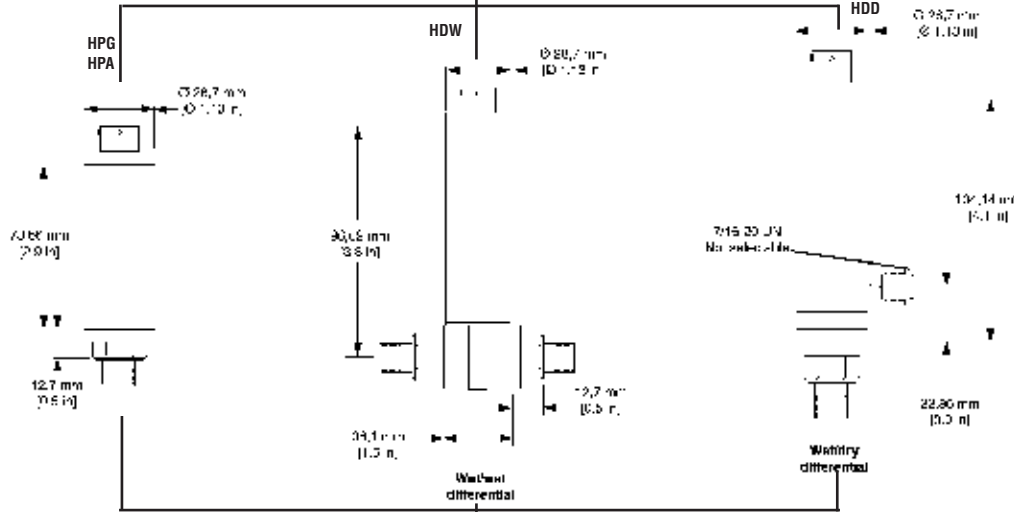
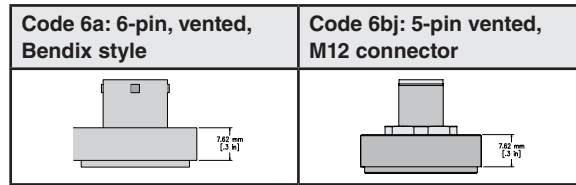
NOTE 2: Sensors selected with the HDD configuration will be supplied with a 7/16-20 Male reference port.

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
Less than 1000 psi						
Greater than 1500 psi						
	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
Less than 1000 psi						
Greater than 1500 psi						

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

ADDITIONAL MATERIALS

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Installation instructions
- Product part listing/nomenclature tree
- Application note

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

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Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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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