DP7000 - DP2500 – DP0250

Field adjustable, multi-range differential pressure transmitters

Product Bulletin

The Delta Pressure transmitter series of Johnson Controls, with its models DP7000, DP2500 and DP2050, offers an accurate and cost-effective solution to monitor the pressure of the air, or non-aggressive gases, in the HVAC applications.

The DP series devices can measure pressure from -150 Pa up to 7000 Pa. For the best accuracy, each DP device has field selectable pressure setting within its full range. The pressure measured by the device, either in differential or static mode, can be transmitted to the HVAC controller through a proportional output signal.

A number of options make Commissioning and Servicing flexible and easy. Each DP model includes:

- *Eight field selectable measurement range settings*
- *Optional display, with field selectable units*
- *Two Proportional output signals, in voltage (0–10 V) or current (4–20 mA).*
- *Zero calibration, manual or automatic*
- *Response time setting*

The low pressure DP0250 can be field calibrated, all other models, on request, can be provided with a Factory Calibration Certificate.

The DP transmitters are typically used in HVAC applications to control: fan, blower, dampers, filter condition, monitoring air flow in the distribution system and pressure in cleanrooms.

- **Eight field selectable measurement ranges in one device**
  Allow the selection of best measurement range for the application during the commissioning and servicing.
- **Optional backlit display with field selectable pressure units**
  Shows measured pressure for clear local indication in Pa, kPa, mbar, inWC, mmWC or psi.
- **AZ option for automatic zero point calibration**
  Ensure long term accuracy eliminating the need for periodic manual zeroing.
- **Response time selectable**
  Covers customer applications where fast response is required.
- **Easy mounting and service**
  No expertise required, the accessory mounting kits and the field selectable options reduce time and cost.
- **High protection grade**
  IP54 make it suitable for several environments
- **Span Point Adjustment**
  Available on the low pressure sensors DP0250-R8-AZ-DS and DP0250-R8-AZS, helps on compensate the output drift through a manual adjustment.

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Ordering Codes

Single Pack with Standard Accessories

DP7000

Codes	Description	Auto Zero	Display	Selectable Range in Pa							
				0...1000	0...1500	0...2000	0...2500	0...3000	0...4000	0...5000	0...7000
DP7000-R8	Differential Pressure Sensor, with 8 Ranges	--	--	X	X	X	X	X	X	X	X
DP7000-R8-AZ	Differential Pressure Sensor, with 8 Ranges and AutoZero feature	X	--	X	X	X	X	X	X	X	X
DP7000-R8-D	Differential Pressure Sensor, with 8 Ranges and Display	--	X	X	X	X	X	X	X	X	X
DP7000-R8-AZ-D	Differential Pressure Sensor, with 8 Ranges and AutoZero feature and Display	X	X	X	X	X	X	X	X	X	X

DP2500

Codes	Description	Span Point	Auto Zero	Display	Selectable Range in Pa							
					-100...+100	0...100	0...250	0...500	0...1000	0...1500	0...2000	0...2500
DP2500-R8	Differential Pressure Sensor, with 8 Ranges - Single Pack	--	--	--	X	X	X	X	X	X	X	X
DP2500-R8-AZ	Differential Pressure Sensor, with 8 Ranges and AutoZero feature - Single Pack	--	X	--	X	X	X	X	X	X	X	X
DP2500-R8-D	Differential Pressure Sensor, with 8 Ranges and Display - Single Pack	--	--	X	X	X	X	X	X	X	X	X
DP2500-R8-AZ-D	Differential Pressure Sensor, with 8 Ranges, AutoZero feature and Display - Single Pack	--	X	X	X	X	X	X	X	X	X	X

DP0250

Codes	Description	Span Point	Auto Zero	Display	Selectable Range in Pa							
					0...25 Pa	0...50 Pa	0...100 Pa	0...250 Pa	-25...+25 Pa	-50...+50 Pa	-100...+100 Pa	-150...+150 Pa
DP0250-R8-AZ	Differential Pressure Sensor, with 8 Ranges and AutoZero feature - Single Pack	--	X	--	X	X	X	X	X	X	X	X
DP0250-R8-AZ-D	Differential Pressure Sensor, with 8 Ranges, AutoZero feature and Display - Single Pack	--	X	X	X	X	X	X	X	X	X	X
DP0250-R8-AZS	Differential Pressure Sensor, with 8 Ranges, AutoZero feature and Span point adjustment - Single Pack	--	X	--	X	X	X	X	X	X	X	X
DP0250-R8-AZ-DS	Differential Pressure Sensor, with 8 Ranges, AutoZero feature, Display and Span point adjustment - Single Pack	--	X	X	X	X	X	X	X	X	X	X

Standard accessories:

- 2 fixing screws
- 2 plastic tube connectors
- 2 m tube Ø 4 / 7 mm

Bulk Pack without Standard Accessories

DP7000

Codes	Description	Auto Zero	Display	Selectable Range in Pa							
				0...1000 Pa	0...1500 Pa	0...2000 Pa	0...2500 Pa	0...3000 Pa	0...4000 Pa	0...5000 Pa	0...7000 Pa
DP7000-R8-01	Differential Pressure Sensor, with 8 Ranges - Bulk Pack - 46 pcs	--	--	X	X	X	X	X	X	X	X
DP7000-R8-AZ-01	Differential Pressure Sensor, with 8 Ranges and AutoZero feature - Bulk Pack - 46 pcs	X	--	X	X	X	X	X	X	X	X

DP2500

Codes	Description	Span Point	Auto Zero	Display	Selectable Range in Pa							
					-100...+100	0...100	0...250	0...500	0...1000	0...1500	0...2000	0...2500
DP2500-R8-01	Differential Pressure Sensor, with 8 Ranges - Bulk Pack - 46 pcs	--	--	--	X	X	X	X	X	X	X	X
DP2500-R8-AZ-01	Differential Pressure Sensor, with 8 Ranges and AutoZero feature - Bulk Pack - 46 pcs	--	X	--	X	X	X	X	X	X	X	X

DP0250

Code	Description	Span Point	Auto Zero	Display	Selectable Range in Pa							
					0...25 Pa	0...50 Pa	0...100 Pa	0...250 Pa	-25...+25 Pa	-50...+50 Pa	-100...+100 Pa	-150...+150 Pa
DP0250-R8-AZ-01	Differential Pressure Sensor, with 8 Ranges and AutoZero feature - Bulk Pack - 46 pcs	--	X	--	X	X	X	X	X	X	X	X

Accessory Kit

Codes	Description
T00199	DP Transmitter accessory kit, 2 fixing screws, 2 plastic tube connectors and 2 m tube Ø 4 / 7 mm

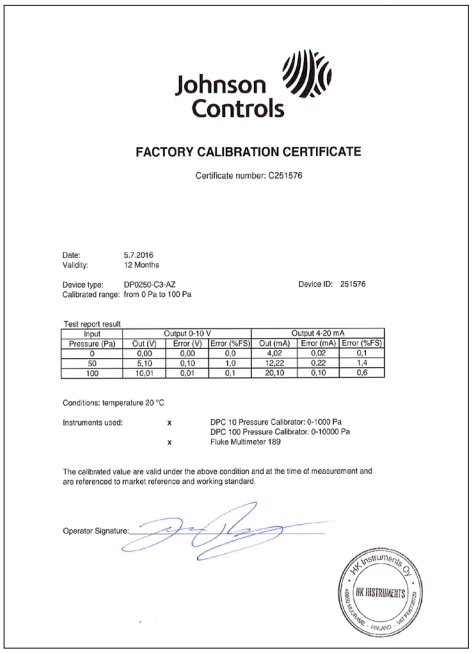
Factory Calibration Certificates

On request, the DP7000, DP2500 and DP0250 transmitter can be provided with the Factory calibration certificate for a specific pressure range setting.

The certificate will report:

- Date and validity
- Device type and calibration range
- Device ID
- Test report on 3 measurement points

The calibration test performed in the factory ensures the accuracy of the pressure readings measured by the sensor. A calibration certificate is provided with any error measured in the test declared. This error value can be used when configuring the analog input channel for the sensor. Select the error at the nearest value the pressure sensors is expected to be typically measuring, this should normally be mid-range, and use this as the offset when setting up the analog input channel. This will ensure the sensor provides the greatest accuracy possible at the normal operating condition.



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FACTORY CALIBRATION CERTIFICATE

Certificate number: C251576

Date: 5.7.2016
Validity: 12 Months

Device type: DP0250-C3-AZ
Calibrated range: from 0 Pa to 100 Pa

Device ID: 251576

Test report result

Input	Output 0-10 V			Output 4-20 mA		
Pressure (Pa)	Out (V)	Error (V)	Error (%FS)	Out (mA)	Error (mA)	Error (%FS)
0	0,00	0,00	0,0	4,02	0,02	0,1
50	5,10	0,10	1,0	12,22	0,22	1,4
100	10,01	0,01	0,1	20,10	0,10	0,6

Conditions: temperature 20 °C

Instruments used:
x DPC 10 Pressure Calibrator: 0-1000 Pa
DPC 100 Pressure Calibrator: 0-10000 Pa
x Fluke Multimeter 189

The calibrated value are valid under the above condition and at the time of measurement and are referenced to market reference and working standard.

Operator Signature:

HK Instruments Oy, HK INSTRUMENTS

How to order a DP with Calibration certificate

The calibration certificate performed in the factory can be provided for a specific pressure range only. To determine the ordering code please select the Certificate required from the table below. Take into consideration that pressure range changes from one model to another.

		DP7000	DP2500	DP0250	
DPxxxx-	C1	0…1000 Pa	-100…+100 Pa	0…25 Pa	For Display or Autozero options then add: **- D** Display **- AZ** Autozero Option **- AZ-D** Autozero and Display
	C2	0…1500 Pa	0…100 Pa	0…50 Pa	
	C3	0…2000 Pa	0…250 Pa	0…100 Pa	
	C4	0…2500 Pa	0…500 Pa	0…250 Pa	
	C5	0…3000 Pa	0…1000 Pa	-25…+25 Pa	
	C6	0…4000 Pa	0…1500 Pa	-50…+50 Pa	
	C7	0…5000 Pa	0…2000 Pa	-100…+100 Pa	
	C8	0…7000 Pa	0…2500 Pa	-150…+150 Pa	

i.e. **DP0250-C3-AZ** DP0250 with autozero with Calibration certified for 0…100 Pa range setting

DP2500-C3-AZ-D DP2500 with autozero and Display with Calibration certified for 0…250 Pa range setting

DP7000-C3 DP7000 Calibration certified for 0…2000 Pa range setting

Application

This product converts the differential pressure between the + / - pressure ports to an analog output signal.

The DP differential pressure transmitter contains a micro-machine, single-crystal silicon, piezoresistive pressure sensor with strain gauges to change resistance as a function of applied pressure.

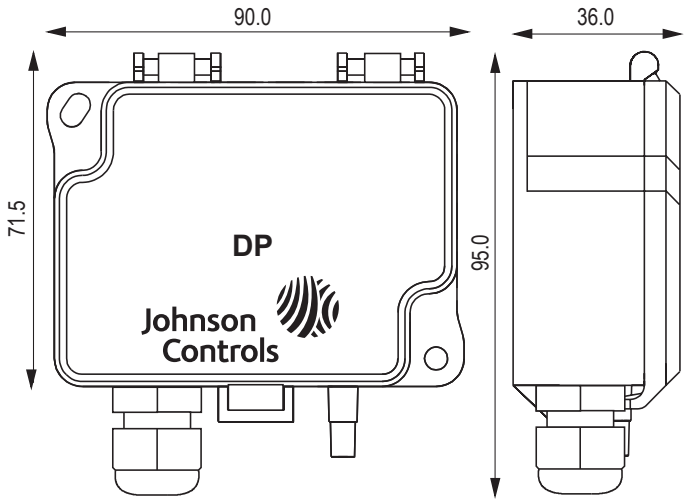
Installation

The installation of electrical wiring must conform to local codes and should be carried out by authorized personnel only. Users should ensure that all Johnson Controls products are used safely and without risk to health or property.

The DP series differential pressure transmitter are intended to provide input to equipment under normal operating conditions.

Where failure or malfunction of an DP series differential pressure transmitter could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn of, or protect against, failure or malfunction of the DP series must be incorporated into and maintained as part of the control system.

Dimensions



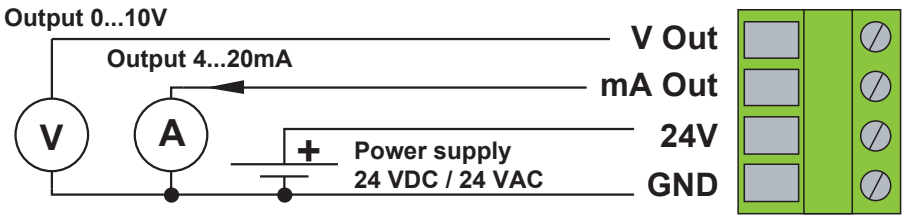
Wirings

Before connecting or disconnecting any wires, ensure that all power supplies have been switched off and all wires are potential-free to prevent equipment damage and avoid electrical shock.

Terminations are made on the terminal blocks in the base of the module, which accept up to 1.5 mm^2 wires.

Follow the wiring diagrams shown in the figure below.
All wiring to the module is at extra low (safe) voltage and must be separated from power line voltage wiring.
Do not run wiring close to transformers or high frequency generating equipment.

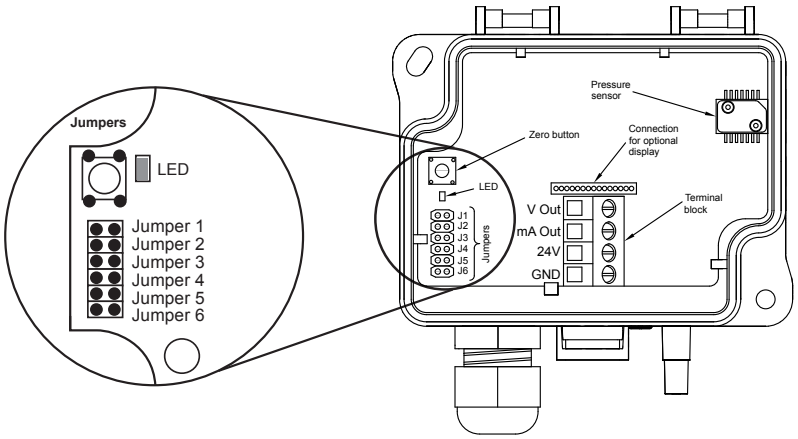
Complete and verify all wiring connections before applying power to the controller to which the module is connected.



Operation

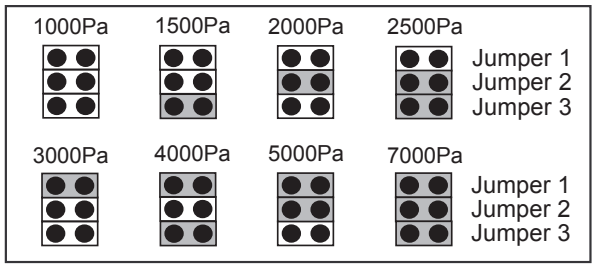
Selecting Pressure Range

To adjust the pressure range, set the jumpers as shown.

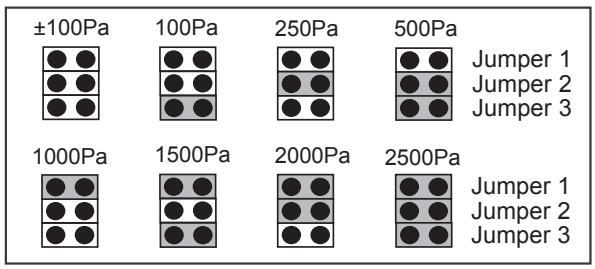


The pressure values on the sticker depends on the model

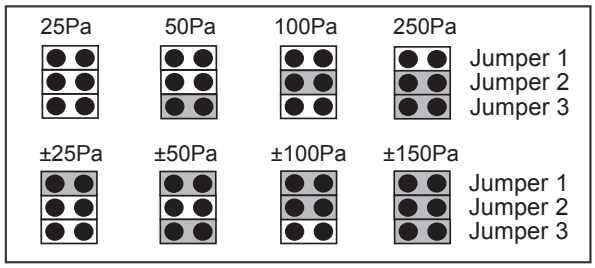
DP7000



DP2500



DP0250



Zeroing

It is recommended to adjust the zero point every 12 months during normal operation.

How to do:

Note! Supply voltage must be connected one hour before the 0-point adjustment is carried out.

1) Loose both tubes from the pressure inlets + and –.

2) Push zero button >4 seconds and the red led turns ON.

3) Wait until LED turns off and then install tubes again to the pressure inlets.

AutoZero (-AZ) option

Optional auto zero function makes the DP transmitter maintenance free for periodical zero point adjustment. Element automatically adjusts the transmitters zero point from time to time, this eliminates the zero point long term drift of the piezoresistive sensing element.
Zero point adjustment is carried out every 10 minutes. During zero point adjustment the output and display values will freeze to the latest measured value.
The automatic zero point adjustment takes 4 seconds. During this time power consumption can be up to 1,7 W.

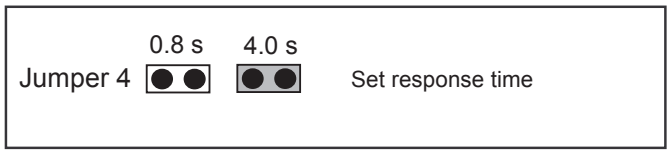
Span Point Adjustment

The span point can be adjusted ±5% by the span trimmer. This enables an end user to reach the best accuracy.

1. Connect the input pressure.
2. Read the actual pressure from a reference meter.
3. Adjust the DP display (or output signal) to showing the same as the value of reference meter.

Response time selection

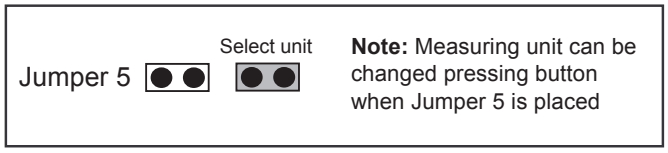
All models are equipped with a jumper for response time selection (0.8 or 4 sec).



Display (-D) option

For local differential pressure visualization there are optional models (-D versions) with a 2 rows x 12 characters digit display.

The measuring unit can be changed pressing button when jumper 5 is placed.



Units available are: Pa, kPa, mbar, inchwc, mmwc, psi.

Technical Specification

Pressure Ranges	DP7000	DP2500	DP0250
	0...1000 Pa	-100...+100 Pa	0...25 Pa
	0...1500 Pa	0...100 Pa	0...50 Pa
	0...2000 Pa	0...250 Pa	0...100 Pa
	0...2500 Pa	0...500 Pa	0...250 Pa
	0...3000 Pa	0...1000 Pa	-25...+25 Pa
	0...4000 Pa	0...1500 Pa	-50...+50 Pa
	0...5000 Pa	0...2000 Pa	-100...+100 Pa
	0...7000 Pa	0...2500 Pa	-150...+150 Pa

Accuracy	±1,5% +1Pa from applied pressure (including: general accuracy, temperature drift, linearity, hysteresis, long term stability and repetition error)
Response Time	0.8 / 4s selectable by jumper
Proof / Burst pressure	25 kPa / 35 kPa
Suitable media	Air and non-aggressive gases
Measuring element	Microelectromechanical (MEMS) element
Electrical interface (3-wire)	
Supply Voltage	24 VAC or VDC
Max. Tolerance	±10%
Power Consumption	<1.0 W (<1.5 W @ Out 20 mA)
Output Signal	0…10 VDC, Load R minimum 1kΩ or 4…20 mA, maximum load 500Ω
Materials	
Housing	ABS
Cover	PC
Pressure Connections	ABS
Duct Connectors	ABS
Tubing	PVC, soft
Connections	
Electrical Connections	4 screw terminals, max 1.5 mm^2
Cable Entry	M16
Pressure Connections	Male ∅ 5,0 mm and 6,3 mm
Weight	150 grams, with accessories 290 grams
Dimensions	90,0 x 71,5 x 36,0 mm
General Ambient Condition	
Temperature Range Operation	-10…+50 °C (-5…+50 °C for –AZ model)
Storage	-20…+70 °C
Ambient Humidity	0 to 95% RH
Protection Class	IP54
CE **Compliance**	Johnson Controls, Inc., declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Rohs Directive

Building Efficiency

Headquarters: Milwaukee, Wisconsin, USA
Branch Officies: Principal Cities World-wide