

DIFFERENTIAL PRESSURE TRANSMITTERS

DPT±500-R1-40C



Field adjustable differential pressure transmitters for air

DPT±500-R1-40C differential pressure transmitters are engineered for building automation in the HVAC/R industry. The most technologically advanced transmitters on the market, measuring static and differential pressure, with field selectable units and output, all in a single device.

DPT±500-R1-40C devices include:

- Multiple measuring units, field selectable via jumper, including: Pa, kPa, mbar, inchWC, mmWC, psi.
- Proportional output options including: voltage (0-10 V) and current (4-20 mA).
- -40C cold resistant model



SIMILAR PRODUCTS

- DPT-2W series differential pressure transmitters with 4-20 mA 2-wire configuration
- DPT-MOD series differential pressure transmitters with Modbus configuration
- DPI series electronic differential pressure switches
- PS series mechanical differential pressure switches
- DPT-Flow series air flow transmitters

APPLICATIONS

DPT±500-R1-40C series devices are commonly used in HVAC/R systems for:

- fan, blower and filter monitoring
- pressure and flow monitoring
- valve and damper control
- pressure monitoring in cleanrooms

MODEL SUMMARY

Measurement range (Pa) (For optional units, see Specifications)	DPT±500-R1-40C ±500	
Description	Model	Product code
Differential pressure transmitter -40C	DPT±500-R1-40C	103.018.008

DIFFERENTIAL PRESSURE TRANSMITTERS

DPT±500-R1-40C

SPECIFICATIONS

Performance

Accuracy (from applied pressure):

Pressure < 125 Pa = 1.5 % + ±2 Pa

Pressure > 125 Pa = 1.5 % + ±1 Pa

(including: general accuracy, temperature drift, linearity, hysteresis, long term stability, and repetition error)

Thermal effects:

Temperature compensated across the full spectrum of capability

Overpressure:

Proof pressure: 25 kPa

Burst pressure: 30 kPa

Zero point calibration:

Automatic autozero or manual pushbutton

Response time:

8.0 s or 0.8 s, selectable via jumper

Technical Specifications

Media compatibility:

Dry air or non-aggressive gases

Measuring units:

Pa, kPa, mbar, inchWC, mmWC, psi, selectable via jumper

Measuring element:

MEMS

Environment:

Operating temperature: -40...50 °C

Storage temperature: -40...70 °C

Humidity: 0 to 95 % rH, non condensing

Physical

Dimensions:

Case: 90.0 x 95.0 x 36.0 mm

Weight:

150 g

Mounting:

2 each 4.3 mm screw holes, one slotted

Materials:

Case: ABS

Lid: PC

Duct connectors: ABS

Tubing: PVC

Protection standard:

IP54

Display (Optional)

2-line display (12 characters/line)

Line 1: active measurement

Line 2: units

Electrical connections:

4-screw terminal block

Wire: 0.2-1.5 mm² (12-24 AWG)

Cable entry: M16

Pressure fittings:

Male ø 5,0 mm and 6,3 mm

+ High pressure

- Low pressure

Electrical

Voltage:

Circuit: 3-wire (V Out, 24 V, GND)

Input: 24 VAC or VDC, ±10 %

Output: 0-10V

Power consumption: <1.0 W, <4.0 W when <0 °C

Resistance minimum: 1 kΩ

Current:

Circuit: 3-wire (mA Out, 24 V, GND)

Input: 24 VAC or VDC, ±10 %

Output: 4-20 mA

Power consumption: <1.2 W, <4.2 W when <0 °C

Maximum load: 500 Ω

Minimum load: 20 Ω

Conformance

Meets the requirements for CE marking:

EMC Directive 2014/30/EU

RoHS Directive 2011/65/EU

WEEE Directive 2012/19/EU

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INTRODUCTION

Thank you for choosing an HK Instruments DPT series differential pressure transmitter. The DPT series is intended for use in commercial environments. It is designed with six unit selections (Pa, kPa, mbar, inchWC, mmWC, psi) and eight field selectable measurement ranges (unidirectional and bi-directional) to meet your application requirements. The DPT-R8 series is comprised of the DPT250-R8 with ranges from 25 Pa to 250 Pa, the DPT2500-R8 with ranges from 100 Pa to 2500 Pa, and the DPT7000-R8 with ranges from 1000 Pa to 7000 Pa.

All DPT-R8 series differential pressure transmitters are available with display and autozero calibration.

APPLICATIONS

DPT-R8 series devices are commonly used in HVAC/R systems for:

- fan, blower and filter monitoring
- pressure and flow monitoring
- valve and damper control
- pressure monitoring in cleanrooms

SPECIFICATIONS

Performance

Accuracy (from applied pressure):

Models 250 and 2500:

Pressure < 125 Pa = 1 % + ± 2 Pa

Pressure > 125 Pa = 1 % + ± 1 Pa

Model 7000:

Pressure < 125 Pa = 1.5 % + ± 2 Pa

Pressure > 125 Pa = 1.5 % + ± 1 Pa

(including: general accuracy, temperature drift, linearity, hysteresis, long term stability, and repetition error)

Thermal effects:

Temperature compensated across the full spectrum of capability

Overpressure:

Proof pressure: 25 kPa

Burst pressure: 30 kPa

Zero point calibration:

Automatic autozero or manual pushbutton

Response time:

8.0 s or 0.8 s, selectable via jumper

Technical Specifications

Media compatibility:

Dry air or non-aggressive gases

Measuring units:

Pa, kPa, mbar, inchWC, mmWC, psi, selectable via jumper

Measuring element:

MEMS

Environment:

Operating temperature: -10...50 °C,

-40C model: -40...50 °C

Storage temperature: -20...70 °C,

-40C model: -40...70 °C

Humidity: 0 to 95 % rH, non condensing

Physical

Dimensions:

Case: 90.0 x 95.0 x 36.0 mm

Weight:

150 g

Mounting:

2 each 4.3 mm screw holes, one slotted

Materials:

Case: ABS

Lid: PC

Duct connectors: ABS

Tubing: PVC

Protection standard:

IP54

Display (Optional)

2-line display (12 characters/line)

Line 1: active measurement

Line 2: units

Electrical connections:

4-screw terminal block

Wire: 0.2-1.5 mm² (12-24 AWG)

Cable entry: M16

Pressure fittings:

Male \varnothing 5,0 mm and 6,3 mm

+ High pressure

- Low pressure

WARNING

- READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS DEVICE.
- Failure to observe safety information and comply with instructions can result in PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.
- To avoid electrical shock or damage to equipment, disconnect power before installing or servicing and use only wiring with insulation rated for full device operating voltage.
- To avoid potential fire and/or explosion do not use in potentially flammable or explosive atmospheres.
- Retain these instructions for future reference.
- This product, when installed, will be part of an engineered system whose specifications and performance characteristics are not designed or controlled by HK Instruments. Review applications and national and local codes to assure that the installation will be functional and safe. Use only experienced and knowledgeable technicians to install this device.

Electrical

Voltage:

Circuit: 3-wire (V Out, 24 V, GND)

Input: 24 VAC or VDC, ± 10 %

Output: 0-10V

Power consumption: <1.0 W,

-40C model: <4.0 W when <0 °C

Resistance minimum: 1 k Ω

Current:

Circuit: 3-wire (mA Out, 24 V, GND)

Input: 24 VAC or VDC, ± 10 %

Output: 4-20 mA

Power consumption: <1.2 W,

-40C model: <4.2 W when <0 °C

Maximum load: 500 Ω

Minimum load: 20 Ω

Conformance

Meets the requirements for CE marking:

EMC Directive 2014/30/EU

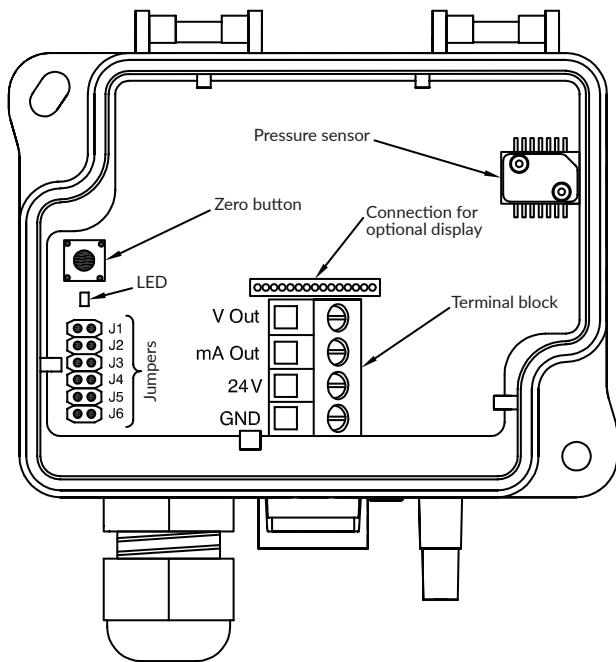
RoHS Directive 2011/65/EU

WEEE Directive 2012/19/EU

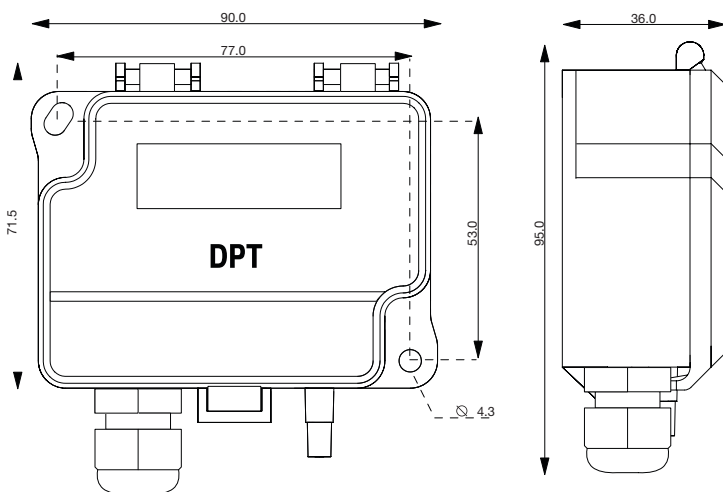
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SCHEMATICS



DIMENSIONAL DRAWINGS



INSTALLATION

- 1) Mount the device in the desired location (see step 1).
- 2) Open the lid and route the cable through the strain relief and connect the wires to the terminal block(s) (see step 2).
- 3) The device is now ready for configuration.

⚠ WARNING! Apply power only after the device is properly wired.

STEP 1: MOUNTING THE DEVICE

- 1) Select the mounting location (duct, wall, panel).
- 2) Use the device as a template and mark the screw holes.
- 3) Mount with appropriate screws.

Figure 1a - Mounting orientation

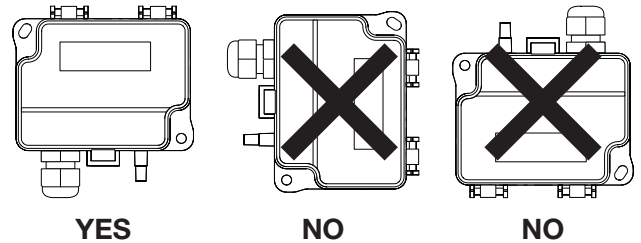
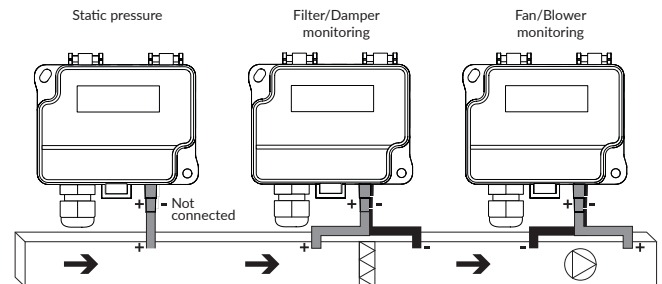


Figure 1b - Application connections



STEP 2: WIRING DIAGRAMS

For CE compliance, a properly grounded shielding cable is required.

- 1) Unscrew the strain relief and route the cable(s).
- 2) Connect the wires as shown in figure 2a and 2b.
- 3) Tighten the strain relief.

Figure 2a - Wiring diagram 0-10 V output

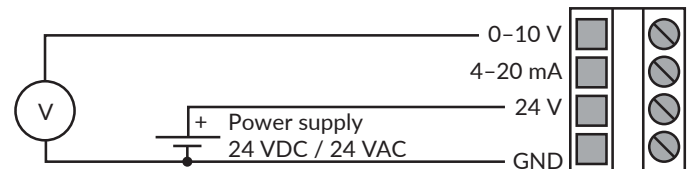
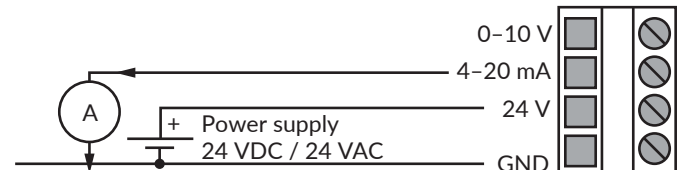


Figure 2b - Wiring diagram 4-20 mA output

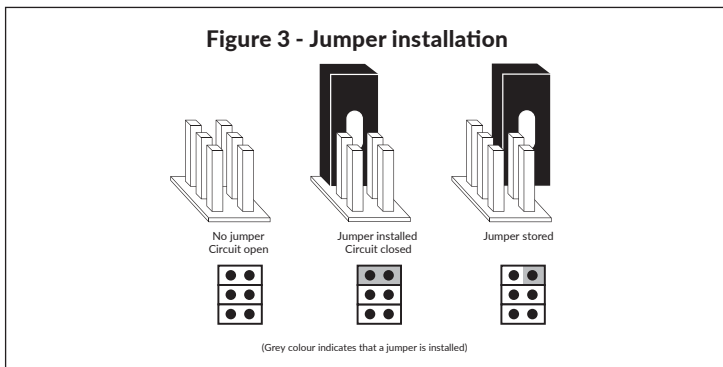


STEP 3: CONFIGURATION

- 1) Select the desired measurement unit. (see step 4)
- 2) Select the desired measurement range. (see step 5)
- 3) Select the desired response time. (see step 6)
- 4) Zero the device. (see step 7)
- 5) Connect the pressure tubes. Connect positive pressure to port labeled "+" and negative pressure to port "-".
- 6) Close the lid. The device is now ready to be used.

STEP 4: SELECTING THE MEASUREMENT UNIT

- 1) To change the measurement unit appearing on the display, install a jumper to both pins of J5 (see Figure 3).
- 2) Push down the zero button and the measurement unit options (Pa, kPa, mbar, inchWC, mmWC, psi) will cycle on the display.
- 3) To select a unit option to display, remove the jumper from J5 while the measurement unit is visible on the display.



STEP 5: SELECTING THE MEASUREMENT RANGE

- 1) Determine the range number
 - a. Find the model in Chart 1.
 - b. Find the measurement unit (selected in step 4).
 - c. Find the required measurement range on the same line as the measurement unit (b above) and determine the range number in the header.

SELECTING THE MEASUREMENT RANGE CONTINUED

- 2) Install jumpers on J1, J2 and J3 as required.
 - a. Using the range number from 1c above, find the corresponding range number in Chart 2.
 - b. Install jumpers on J1, J2 and J3 on device, as shown under the range number in Chart 2. (Grey colour indicates that a jumper is installed. Reference figure 3 for jumper installation.)

Chart 2

	Range 1	Range 2	Range 3	Range 4	Range 5	Range 6	Range 7	Range 8
Jumper J1	●●	●●	●●	●●	●●	●●	●●	●●
Jumper J2	●●	●●	●●	●●	●●	●●	●●	●●
Jumper J3	●●	●●	●●	●●	●●	●●	●●	●●

(Grey colour indicates that a jumper is installed. Reference Figure 3 and Schematics for jumper installation.)

STEP 6: SELECTING THE RESPONSE TIME

The response time affects how fast the transmitter reacts to changes in the system. The response time is the time the device takes to reach 63 % of the measured value. To smooth out unstable pressure fluctuations in airflow applications, select a longer response time.

Example:

Selected response time: 8.0 seconds

Result: Output signal achieves a new value in 20 seconds (Response time*5)

To change response time, install or remove jumper on J4. (see Figure 3)

- 1) Install jumper on J4 for 8.0 second response time.
- 2) Remove jumper from J4 for 0.8 second response time.

Chart 1

Model DPT250-R8

	Range 1	Range 2	Range 3	Range 4	Range 5	Range 6	Range 7	Range 8
Pa	0-25	0-50	0-100	0-250	-25-25	-50-50	-100-100	-150-150
kPa	0-0.025	0-0.05	0-0.1	0-0.25	-0.025-0.025	-0.05-0.05	-0.1-0.1	-0.15-0.15
mbar	0-0.25	0-0.50	0-1.00	0-2.50	-0.25-0.25	-0.50-0.50	-1.0-1.00	-1.50-1.50
inchWC	0-0.10	0-0.20	0-0.40	0-1.00	-0.10-0.10	-0.20-0.20	-0.40-0.40	-0.60-0.60
mmWC	0-2.6	0-5.1	0-10.2	0-25.5	-2.6-2.6	-5.1-5.1	-10.2-10.2	-15.3-15.3
psi	0-0.0036	0-0.0073	0-0.0145	0-0.0363	-0.0036-0.0036	-0.0073-0.0073	-0.0145-0.0145	-0.0363-0.0363

Model DPT2500-R8

	Range 1	Range 2	Range 3	Range 4	Range 5	Range 6	Range 7	Range 8
Pa	-100-100	0-100	0-250	0-500	0-1000	0-1500	0-2000	0-2500
kPa	-0.10-0.10	0-0.10	0-0.25	0-0.50	0-1.00	0-1.50	0-2.00	0-2.50
mbar	-1.00-1.00	0-1.00	0-2.50	0-5.00	0-10.0	0-15.0	0-20.0	0-25.0
inchWC	-0.40-0.40	0-0.40	0-1.00	0-2.00	0-4.00	0-6.00	0-8.00	0-10.00
mmWC	-10.2-10.2	0-10.2	0-25.5	0-51.0	0-102.0	0-153.0	0-204.0	0-255.0
psi	-0.0145-0.0145	0-0.0145	0-0.0363	0-0.0725	0-0.1450	0-0.21725	0-0.2900	0-0.3625

Model DPT7000-R8

	Range 1	Range 2	Range 3	Range 4	Range 5	Range 6	Range 7	Range 8
Pa	0-1000	0-1500	0-2000	0-2500	0-3000	0-4000	0-5000	0-7000
kPa	0-1.00	0-1.50	0-2.0	0-2.50	0-3.00	0-4.00	0-5.00	0-7.00
mbar	0-10.0	0-15.0	0-20.0	0-25.0	0-30.0	0-40.0	0-50.0	0-70.0
inchWC	0-4.00	0-6.00	0-8.00	0-10.0	0-12.00	0-16.00	0-20.00	0-28.00
mmWC	0-102.0	0-153.0	0-204.0	0-255.0	0-306.0	0-408.0	0-510.0	0-714.0
psi	0-0.1450	0-0.21725	0-0.2900	0-0.3625	0-0.4350	0-0.5800	0-0.7250	0-1.0150

STEP 7: ZEROING THE DEVICE

NOTE! Always zero the device before use.

To zero the device two options are available:

- 1) Manual Pushbutton zero point calibration
- 2) Autozero calibration

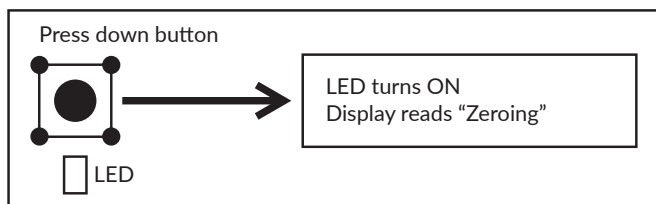
Does my transmitter have an autozero calibration? See the product label. If it shows -AZ in the model number, then you have the autozero calibration.

- 1) Manual Pushbutton zero point calibration

NOTE: Supply voltage must be connected at least one hour prior to zero point adjustment.

- a) Disconnect both pressure tubes from the pressure ports labeled + and -.
- b) Push down the zero button until the LED light (red) turns on and the display reads "zeroing" (display option only). (see Figure 4)
- c) The zeroing of the device will proceed automatically. Zeroing is complete when the LED turns off, and the display reads 0 (display option only).
- d) Reinstall the pressure tubes ensuring that the High pressure tube is connected to the port labeled +, and the Low pressure tube is connected to the port labeled -.

Figure 4



- 2) Autozero calibration

If the device includes the optional autozero circuit, no action is required.

Autozero calibration (-AZ) is an autozero function in the form of an automatic zeroing circuit built into the PCB board. The autozero calibration electronically adjusts the transmitter zero at predetermined time intervals (every 10 minutes). The function eliminates all output signal drift due to thermal, electronic or mechanical effects, as well as the need for technicians to remove high and low pressure tubes when performing initial or periodic transmitter zero point calibration. The autozero adjustment takes 4 seconds after which the device returns to its normal measuring mode. During the 4 second adjustment period, the output and display values will freeze to the latest measured value.

Transmitters equipped with the autozero calibration are virtually maintenance free.

-40C MODEL: OPERATION IN COLD ENVIRONMENT

The lid of the device has to be closed when the operation temperature is below 0 °C. The display needs 15 minutes to warm up if the device is started in temperature below 0 °C.

NOTE! The power consumption rises when the operation temperature is below 0 °C.

RECYCLING/DISPOSAL

The parts left over from installation should be recycled according to your local instructions. Decommissioned devices should be taken to a recycling site that specializes in electronic waste.



WARRANTY POLICY

The seller is obligated to provide a warranty of five years for the delivered goods regarding material and manufacturing. The warranty period is considered to start on the delivery date of the product. If a defect in raw materials or a production flaw is found, the seller is obligated, when the product is sent to the seller without delay or before expiration of the warranty, to amend the mistake at his/her discretion either by repairing the defective product or by delivering free of charge to the buyer a new flawless product and sending it to the buyer. Delivery costs for the repair under warranty will be paid by the buyer and the return costs by the seller. The warranty does not comprise damages caused by accident, lightning, flood or other natural phenomenon, normal wear and tear, improper or careless handling, abnormal use, overloading, improper storage, incorrect care or reconstruction, or changes and installation work not done by the seller or his/her authorized representative. The selection of materials for devices prone to corrosion is the buyer's responsibility, unless otherwise is legally agreed upon. Should the manufacturer alter the structure of the device, the seller is not obligated to make comparable changes to devices already purchased. Appealing for warranty requires that the buyer has correctly fulfilled his/her duties arisen from the delivery and stated in the contract. The seller will give a new warranty for goods that have been replaced or repaired within the warranty, however only to the expiration of the original product's warranty time. The warranty includes the repair of a defective part or device, or if needed, a new part or device, but not installation or exchange costs. Under no circumstance is the seller liable for damages compensation for indirect damage.