



HK Instruments DPT-Ctrl AIR HANDLING CONTROLLER Instructions

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HK INSTRUMENTS

USER-FRIENDLY MEASURING DEVICES
DPT-Ctrl AIR HANDLING CONTROLLER
Instructions



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INTRODUCTION

Thank you for choosing an HK Instruments DPT-Ctrl series air handling controller with differential pressure or airflow transmitter. The DPT-Ctrl series PID controllers are engineered for building automation in the HVAC/R industry. With the built-in controller of the DPTCtrl, it is possible to control the constant pressure or flow of fans, VAV systems or dampers. When controlling airflow, it is possible to select a fan manufacturer or a common measuring probe that has a K-value.

APPLICATIONS

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

- Controlling differential pressure or airflow in air handling systems
- VAV applications
- Controlling parking garage exhaust fans



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.

SPECIFICATIONS

Performance

Accuracy (from applied pressure):

Model 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 (Accuracy specifications include: general accuracy, linearity, hysteresis, long-term stability, and repetition error)

Overpressure:

Proof pressure: 25 kPa

Burst pressure: 30 kPa

Zero point calibration:

Automatic autozero or manual pushbutton

Response time: 1.0-20 s, selectable via menu

Technical Specifications

Media compatibility:

Dry air or non-aggressive gases

Controller parameter (selectable via menu):

Pa, kPa, bar, inWC, mmWC, psi

Flow units (select via menu):

Volume: m³ /s, m³ /hr, cfm, l/s

Velocity: m/s, ft/min

Measuring element:

MEMS, no flow-through

Environment:

Operating temperature: -20...50 °C, -40C model: -40...50 °C

Models with autozero calibration -5...50 °C

Temperature-compensated range 0...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

Protection standard: IP54 Display 2-line display (12 characters/line)

Line 1: Direction of control output

Line 2: Pressure or air flow measurement, selectable via menu

Size: 46.0 x 14.5 mm Electrical connections: 4-screw terminal block

Wire: 0.21.5 mm² (1624 AWG)

Cable entry:

Strain relief: M16

Knockout: 16 mm

Pressure fittings 5.2 mm barbed brass + High pressure – Low pressure

Electrical

Voltage:

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

Input: 24 VAC or VDC, $\pm 10\%$

Output: 0-10 V, selectable via jumper

Power consumption: $<1.0\text{ W}$, -40°C

model: $<4.0\text{ W}$ when $<0^\circ\text{C}$

Resistance minimum: 1 k Current:

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

Input: 24 VAC or VDC, $\pm 10\%$

Output: 4-20 mA, selectable via jumper

Power consumption: $<1.2\text{ W}$ -40°C

model: $<4.2\text{ W}$ when $<0^\circ\text{C}$

Maximum load: 500 Minimum load: 20

Conformance

Meets the requirements for:

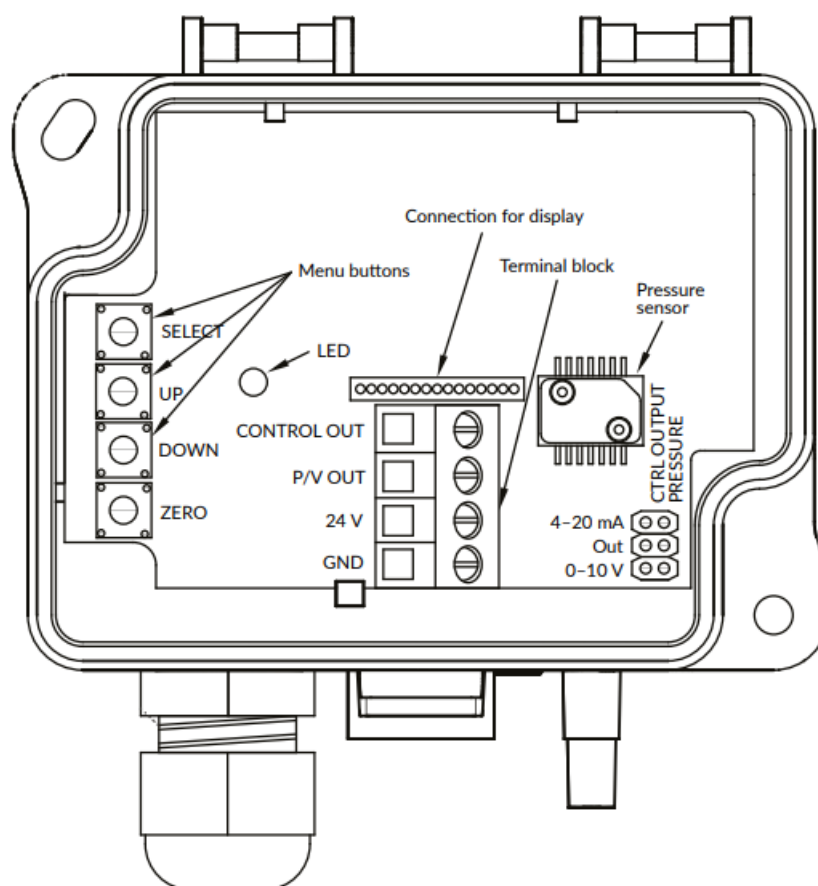
.....CE:.....UKCA

EMC: 2014/30/EU.....S.I. 2016/1091

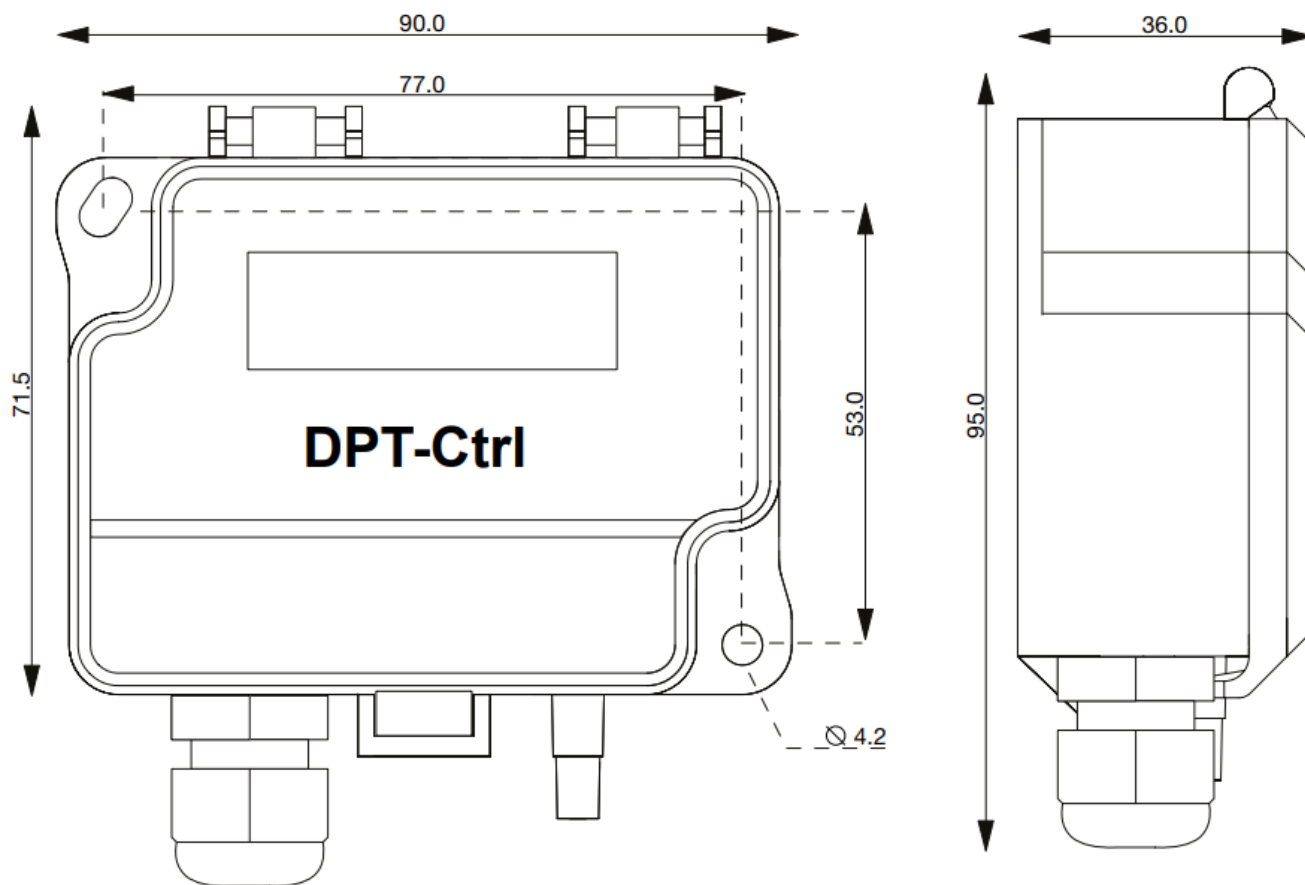
RoHS: 2011/65/EU.....S.I. 2012/3032

WEEK: 2012/19/EU.....S.I. 2013/3113

SCHEMATICS



DIMENSIONAL DRAWINGS



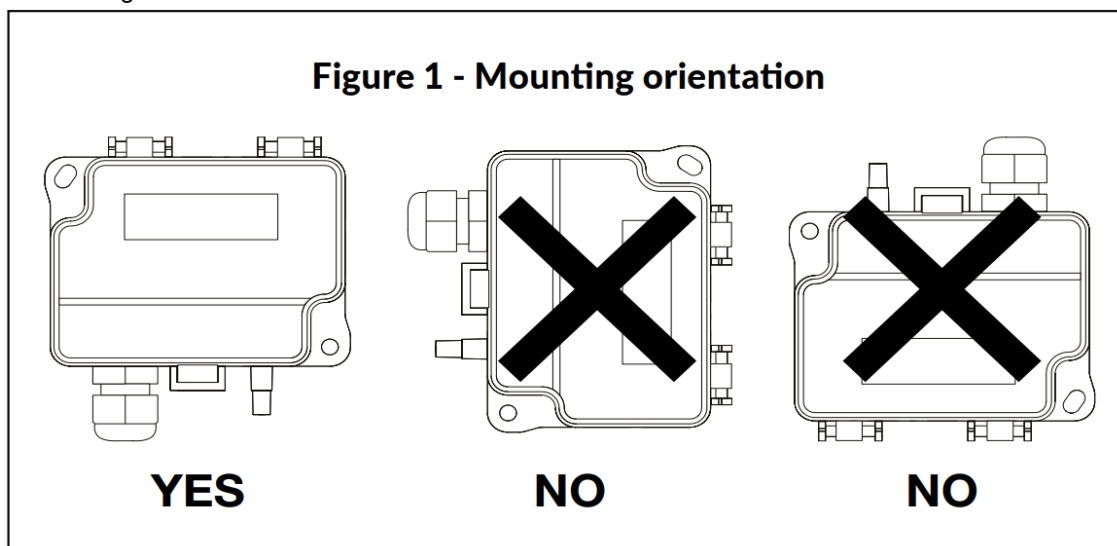
INSTALLATION

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.

MOUNTING THE DEVICE CONTINUED

Figure 1 – Mounting orientation



STEP 2: WIRING DIAGRAMS

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

1. Unscrew the strain relief and route the cable.
2. Connect the wires as shown in figure 2.
3. Tighten the strain relief.

Figure 2a – Wiring diagram

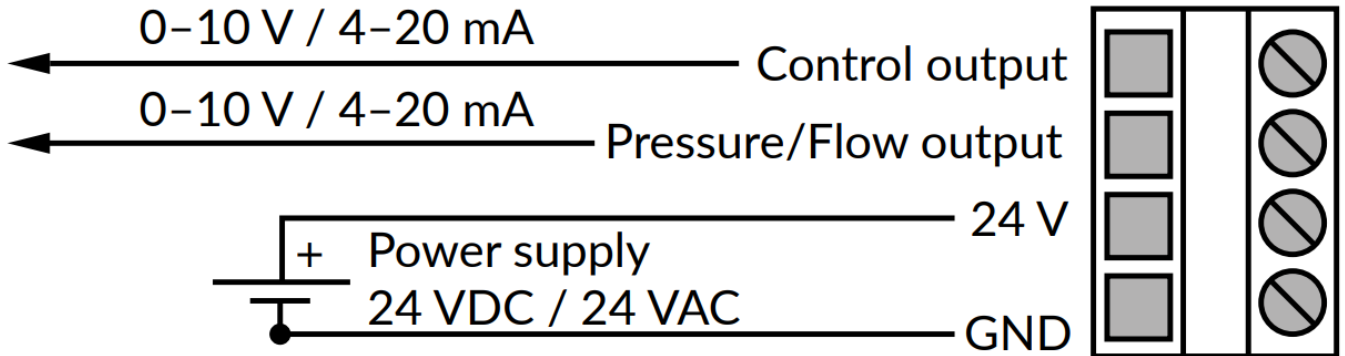
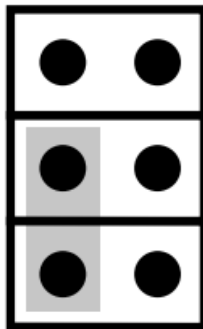
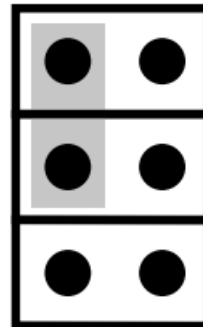


Figure 2b – Output mode selection: Default selection 010 V for both

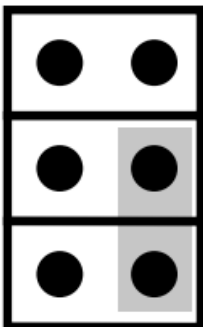
Ctrl output Pressure



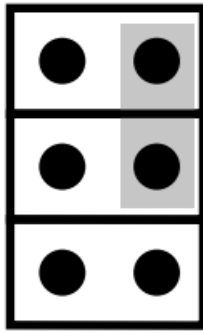
Jumper installed to the two lower pins on the left side: 010 V output selected for control output



Jumper installed to the two upper pins on the left side: 420 mA output selected for control output



Jumper installed to the two lower pins on the right side: 010 V output selected for pressure

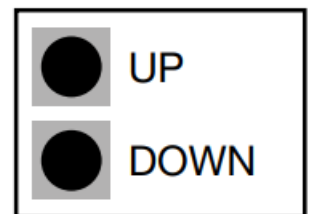
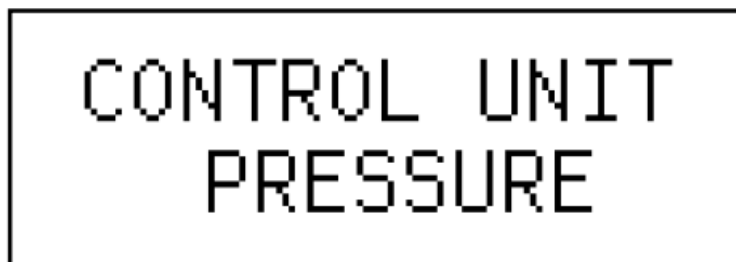


Jumper installed to the two upper pins on the right side: 420 mA output selected for pressure

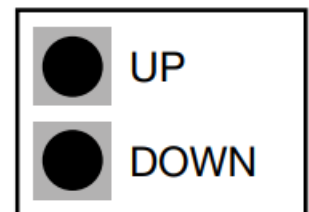
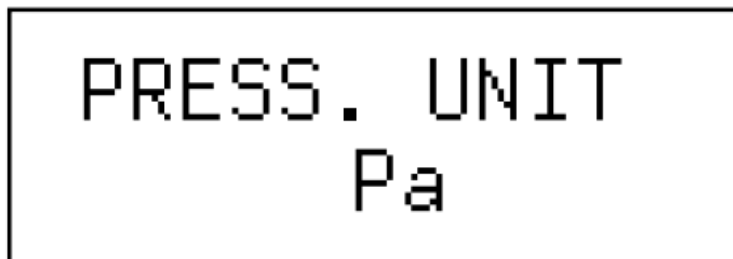
Step 3: CONFIGURATION

1. Activate the device Menu by pushing the select button for 2 seconds.
2. Select the functioning mode of the controller: PRESSURE or FLOW.

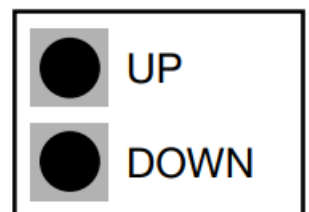
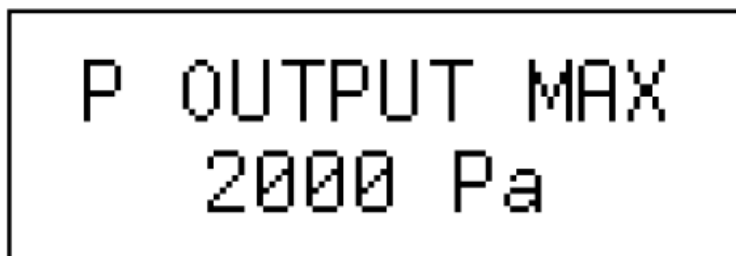
Select PRESSURE when controlling a differential pressure.



3. Select pressure unit for display and output: Pa, kPa, bar, WC or WC.



4. Pressure output scale (P OUT). Select pressure output scale to improve output resolution.



5. Response time: Select response time between 1.0-20 s.

RESPONSE TIME
4 s

 SELECT

 UP
 DOWN

6. Select the setpoint of the controller.

REF PRESSURE
100 Pa

 SELECT

 UP
 DOWN

7. Select a proportional band according to your application specifications.

P-VALUE
206

 SELECT

 UP
 DOWN

8. Select integral gain according to your application specifications.

I-VALUE
4.00

 SELECT

 UP
 DOWN

9. Select derivation time according to your application specifications.

D-VALUE
1.00

 SELECT

 UP
 DOWN

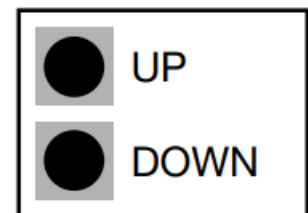
10. Push the select button to exit the menu and to save changes.

SELECT
EXIT MENU



Select FLOW when controlling an airflow.

CONTROL UNIT
FLOW



CONFIGURATION CONTINUED

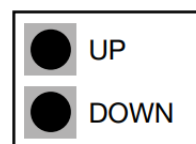
1) Select the functioning mode of the controller

– Select Manufacturer when connecting DPT-Ctrl to a fan with pressure measurement taps

– Select a Common probe when using DPT-Ctrl with a common measurement probe that follows the formula: $q = k P$ (i.e. FloXact)

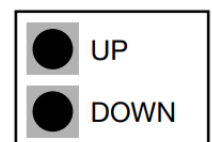
$$q = k \cdot \sqrt{\Delta P} \text{ (i.e. FloXact)}$$

MANUFACTURER
Common probe



Common probe

Fläkt Woods



2) If a Common probe is selected: select measurement units used in the formula (aka Formula unit) (i.e. l/s)

FORMULA UNIT
l/s

☐ SELECT

☐ UP

☐ DOWN

3) Select K-value a. If manufacturer selected in step

1: Each fan has a specific K-value. Select the K-value from the fan manufacturer's specifications.

b. If the Common probe is selected in step 1: Each common probe has a specific K-value.

Select the K-value from the common probe manufacturer's specifications.

Available K-value range: 0.001...9999.000

K-VALUE
9000.000

☐ SELECT

☐ UP

☐ DOWN

4) Select flow unit for display and output:

Flow volume: m³/s, m³/h, cfm, l/s

Velocity: m/s, f/min

FLOW UNIT
m³/s

☐ SELECT

☐ UP

☐ DOWN

5) Flow output scale (V OUT): Select the flow output scale to improve output resolution.

V OUTPUT MAX
50.000 m³/s

☐ SELECT

☐ UP

☐ DOWN

6) Response time: Select response time between 1.020 s.

RESPONSE TIME
4 s

☐ SELECT

☐ UP
☐ DOWN

7) Select a setpoint of the controller.

REF FLOW
0.025 m³/s

☐ SELECT

☐ UP
☐ DOWN

8) Select a proportional band according to your application specifications.

P-VALUE
206

☐ SELECT

☐ UP
☐ DOWN

9) Select integral gain according to your application specifications.

I-VALUE
4.00

☐ SELECT

☐ UP
☐ DOWN

10) Select derivation time according to your application specifications.

D-VALUE
1.00

☐ SELECT

☐ UP
☐ DOWN

11) Push the select button to exit the menu.



STEP 4: 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

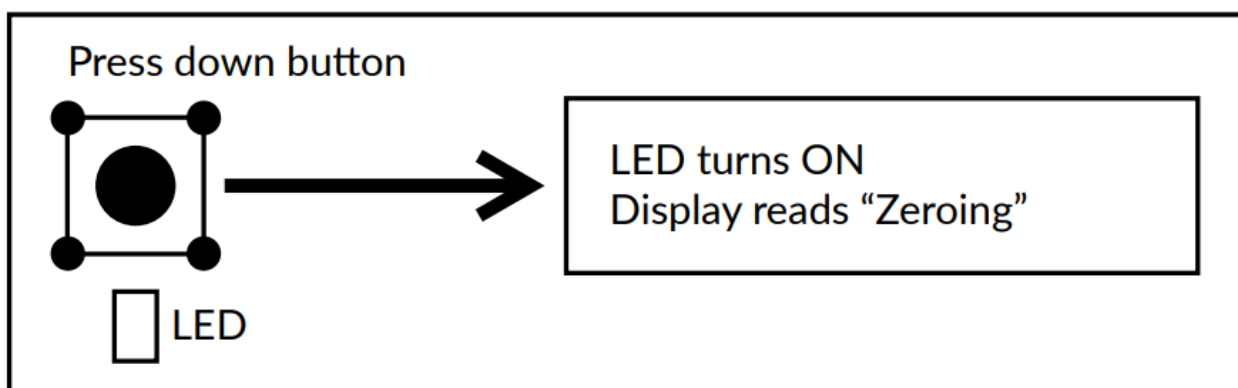
Does my transmitter have an autozero calibration? See the product label. If it shows -AZ in the model number, then you have the autozero calibration.

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



ZEROING THE DEVICE CONTINUED

2) Auto zero 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 autozero calibration are virtually maintenance-free.

-40C MODEL: OPERATION IN A 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 and there can be an additional error of 0,015 volts 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

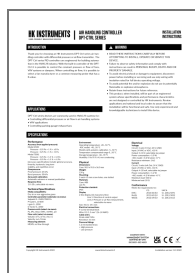
The seller is obligated to provide a warranty of five years for the delivered goods regarding material and manufacturing. The warranty period is considered to start on the delivery date of the product. If a defect in raw materials or a production flaw is found, the seller is obligated, when the product is sent to the seller without delay or before the 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 another 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. 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 a warranty requires that the buyer has correctly fulfilled his/her duties arising 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.

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Documents / Resources



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