HK INSTRUMENTS DPT-Dual-MOD-AHU Differential Pressure Transmitters Instruction Manual

HK INSTRUMENTS

USER-FRIENDLY MEASURING DEVICES

DIFFERENTIAL PRESSURE TRANSMITTERS
DPT-Dual-MOD-AHU
INSTALLATION INSTRUCTIONS

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INTRODUCTION

Thank you for choosing an HK Instruments DPT-Dual-MOD-AHU series differential pressure transmitter. DPT-Dual-MOD-AHU is especially designed for air handling units, combining two differential pressure transmitters into one device. It offers a possibility to measure pressure from two different points. One of the measurements can be set to show the air flow rate. DPT-Dual-MOD-AHU has a Modbus interface and an Input terminal.
The Input terminal enables reading of multiple other signals such as temperature or control relays over Modbus. The Input terminal has two input channels designed to accept 0-10 V, NTC10k, Pt1000, Ni1000/(-LG), and BIN IN (potential free contact) signals.

APPLICATIONS

DPT-Dual-MOD-AHU series devices are commonly used in HVAC/R systems for:

- air flow monitoring across centrifugal fans and blowers
- in-duct air flow monitoring
- VAV applications
- fan, blower and filter monitoring
- pressure and flow monitoring
- valve and damper control
- pressure monitoring in cleanrooms

 **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):
Sensor A (-700…7000 Pa):
Pressure < 125 Pa = 1.5 % + ±2 Pa
Pressure > 125 Pa = 1.5 % + ±1 Pa

Sensor B (-250…2500 Pa):
Pressure < 125 Pa = 1 % + ±2 Pa
Pressure > 125 Pa = 1 % + ±1 Pa
(Including: general accuracy, linearity, hysteresis, long term stability and repetition error)

Input accuracy: <0.5%
Response time: 1…20 s selectable via menu

Overpressure:
Proof pressure: 25 kPa
Burst pressure: 30 kPa

Communication
Protocol: MODBUS over Serial Line
Transmission Mode: RTU
Interface: RS485
Byte format (11 bits) in RTU mode:
Coding System: 8-bit binary
Bits per Byte:
1 start bit
8 data bits, least significant bit sent first
1 bit for parity
1 stop bit
Baud rate: selectable in configuration
Modbus address: 1-247 addresses selectable in configuration menu

Zero point calibration options:

- Manual pushbutton
- Via Modbus write coil

Technical Specifications
Media compatibility: Dry air or non-aggressive gases
Measuring units on display (Selectable via menu):
Pressure: Pa, kPa, mbar, inchWC, mmWC, psi
Flow: m3/s, m3/hr, cfm, l/s, m/s, ft/min

Measuring element: MEMS, no flow-through
Environment:
Operating temperature: -20…50 °C
Temperature compensated range 0…50°C
Storage temperature: -40…70 °C
Humidity: 0 to 95 % rH, non-condensing

Physical
Dimensions:
Case: 102.0 x 71.5 x 36.0 mm
Weight: 150 g
Mounting: 2 each 4.3 mm screw holes, one slotted
Materials:
Case: ABS
Lid: PC
Pressure inlets: Brass
Tubing: Silicone
Protection standard: IP54
Display:
2-line display (12 characters/line)
Line 1: active measurement, inlet A
Line 2: active measurement, inlet B
If inputs are selected, the lines show also input information (for example temperature)

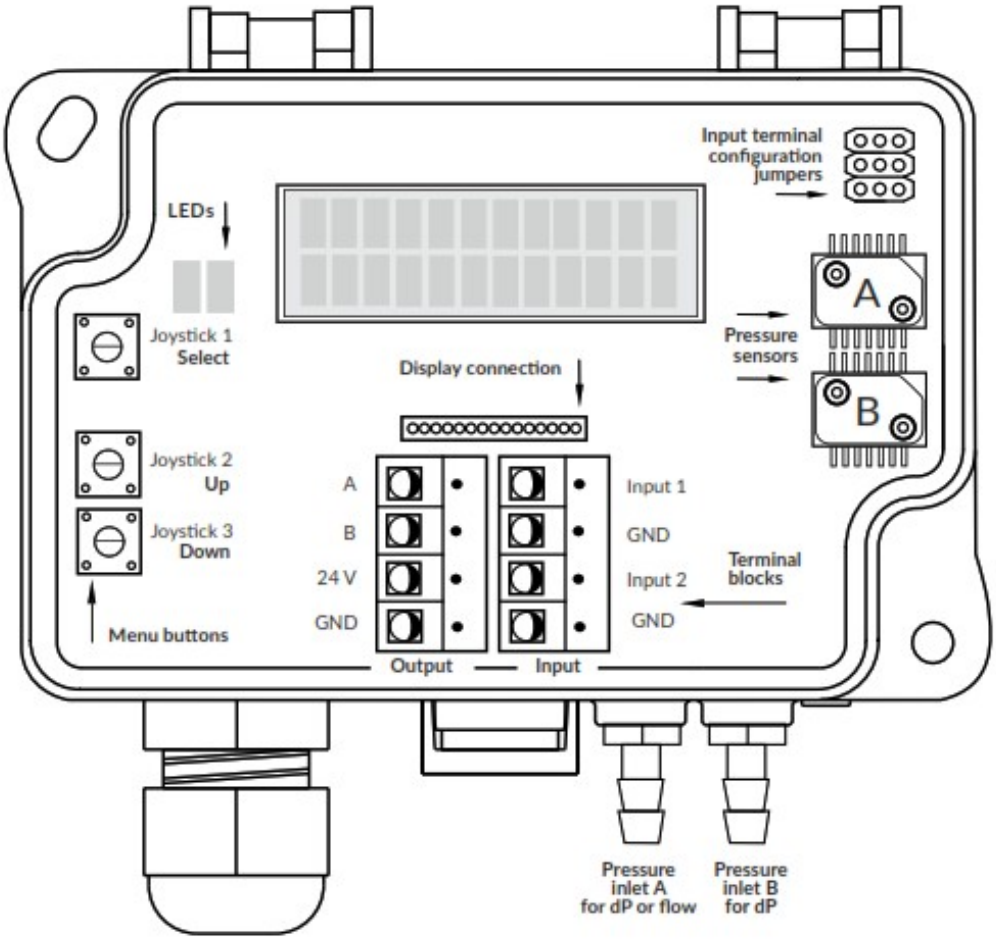
Electrical Connections:
4+4 spring load terminals, max 1.5 mm2
Cable Entry: M20
Pressure fittings:
Male ∅5.2 mm
+ High pressure
– Low pressure

Electrical
Supply voltage: 24 VAC or VDC ± 10 %
Power consumption: < 1.3 W
Output signal: via Modbus
Input signals: 2 x input (0…10 V, NTC10k, Pt1000, NI1000/(-LG), or BIN IN)

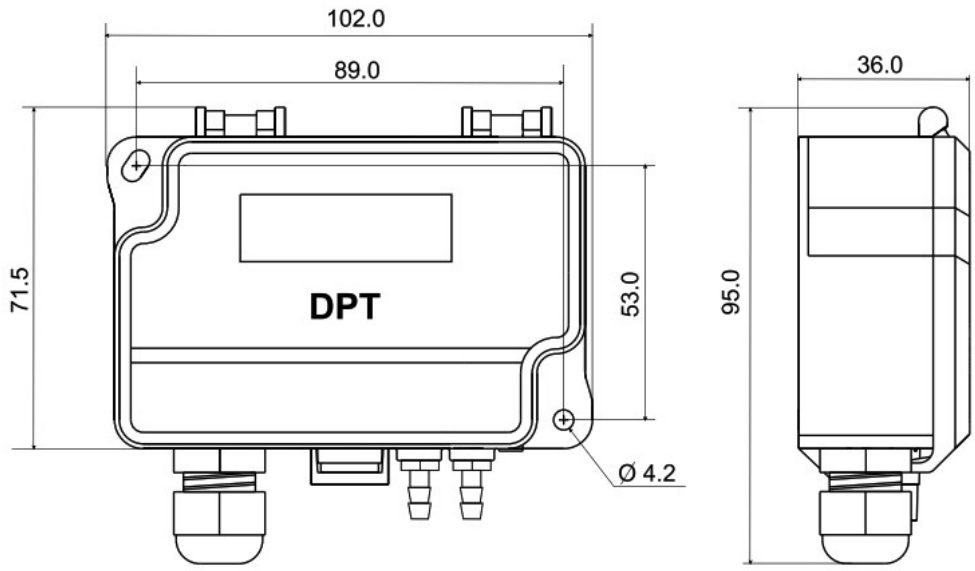
Conformance
Meets requirements for:

EMC: RoHS: WEEE:	CE: 2014/30/EU 2011/65/EU 2012/19/EU	UKCA: S.I. 2016/1091 S.I. 2012/3032 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.

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

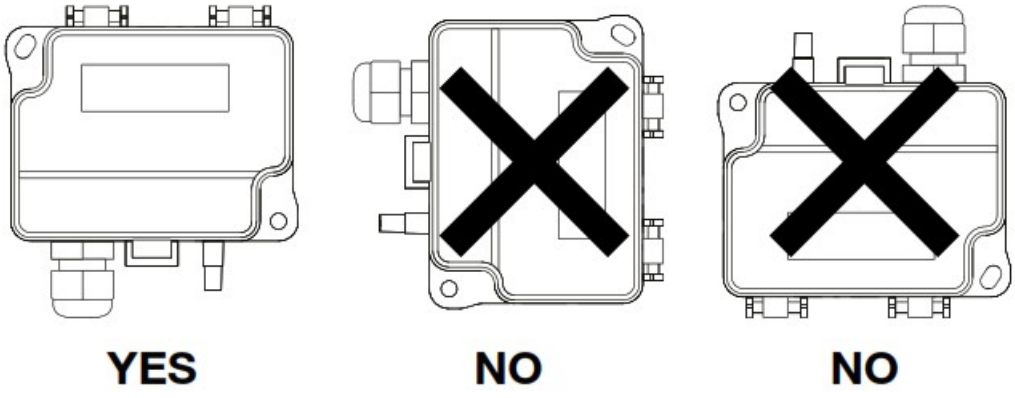
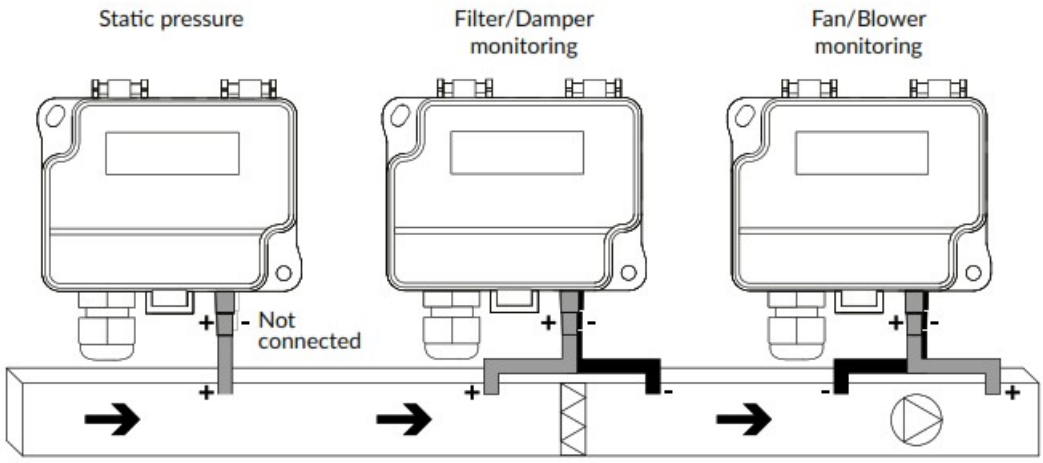


Figure 1b - Application connections

Pressure



Flow

The pressure tubes are connected to a flow measurement probe (i.e. FloXact), or to the measurement ports specified by the fan manufacturer. Please see the FloXact installation guide or the fan manufacturer's technical specifications for more information.

Air handling unit

In a typical Air Handling Unit application, connect the pressure inlet A to measure air flow and pressure inlet B to measure the differential pressure across the filter.
Pressure inlet A can be used for pressure or flow measurement.
Pressure inlet B can be used only for pressure measurement.

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

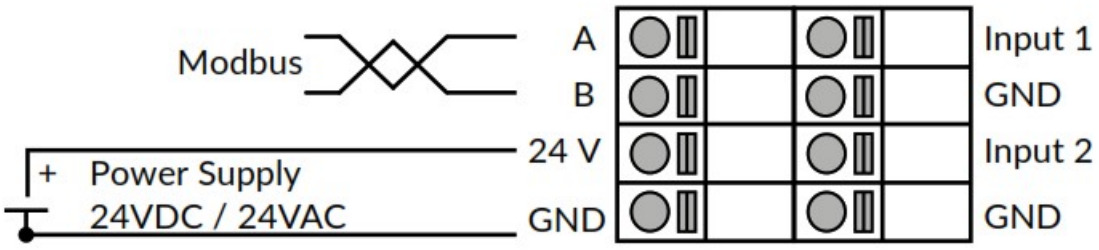
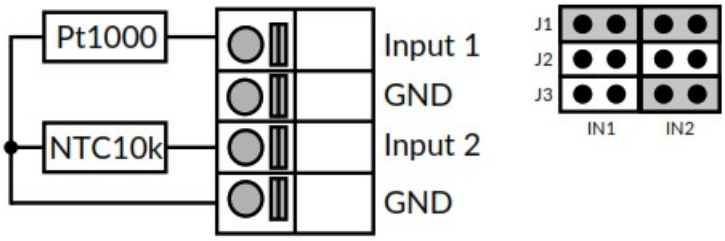


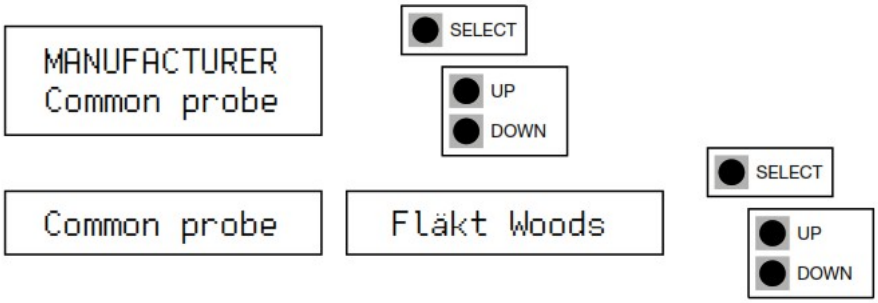
Figure 2b – Wiring diagram example for input signals



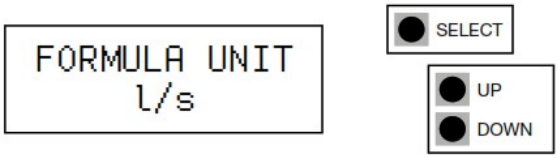
Input 1 Pt1000 temperature:
Function 04 – Read input register 3×0005
Input 2 NTC10k temperature:
Function 04 – Read input register 3×0013

STEP 3: CONFIGURATION

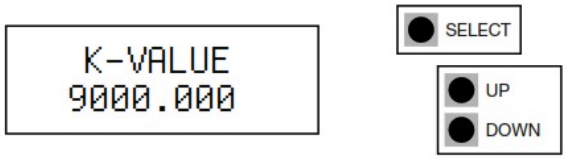
1. Activate the device Menu by pushing the the select button for 1 second.
2. Select the functioning mode of the device:
   • Select Manufacturer when connecting DPT-Dual-MOD-AHU to a fan with pressure measurement points
   • Select Common probe when using DPT-Dual-MOD-AHU with a common measurement probe that follows the formula:
   $q = k \cdot \sqrt{\Delta P}$ (i.e. FloXact)



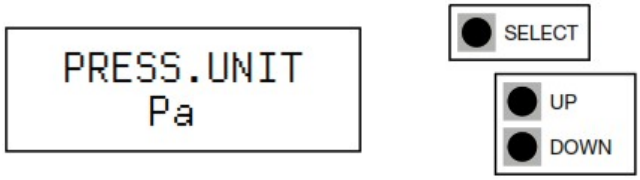
3. If common probe is selected, select measurement unit used in the formula: m3/s, m3/h, cfm, l/s, m/s or f/min.
   Note: When using the FloXact probe, select the formula unit l/s.
   For other probe models, check the manufacturer's datasheet for the correct unit.



4. Select K-value
   Each application has a specific K-value. Select the K-value from the manufacturer's specifications.
   Available K-value range: 0.001…9999.000



5. Select pressure unit for display:
   Pa, kPa, mbar, mmWC, inWC or psi

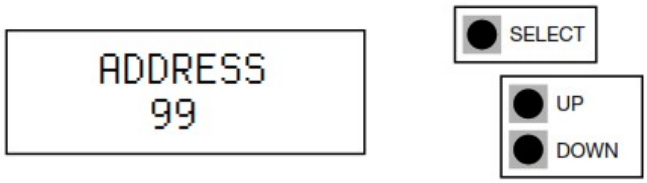


6. Select flow unit for display:

   Flow volume: m3/s, m3/h, cfm, l/s

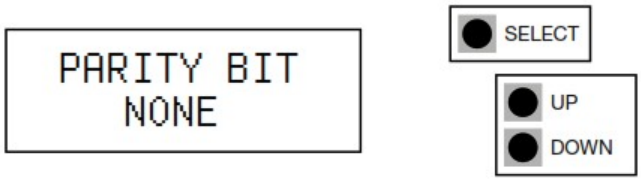
   Velocity: m/s, f/min (selectable only if a common probe is used withm/s or f/min unit)

7. Select the address for Modbus: 1*…247.

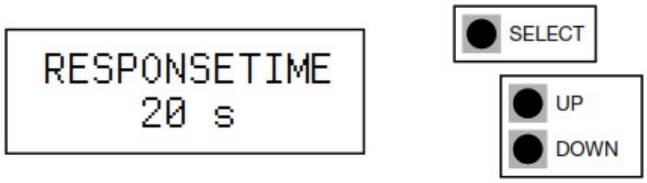


8. Select the baud rate: 9600*/19200/38400.

9. Select the parity bit: None*/Even/Odd.



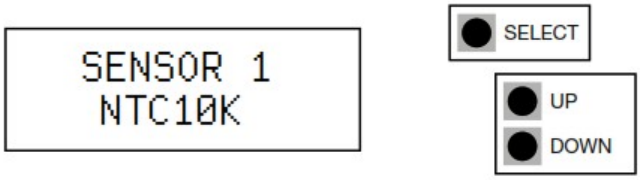
10. Select the response time: 1…20 s (factory setup 4 s)



11. Select the the type of sensor for input 1:

    NTC10k, Ni1000-LG, Ni1000, Pt1000,

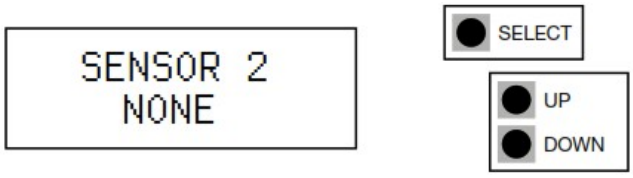
    VINPUT (voltage 0–10 V), none



12. Select the the type of sensor for input 2:

    NTC10k, Ni1000-LG, Ni1000, Pt1000,

    VINPUT (voltage 0–10 V), none



13. Push the select button to save settings and exit menu.

* Factory setup

STEP 4: ZERO POINT ADJUSTMENT

NOTE! Always zero the device before use.
Supply voltage must be connected one hour before the zero point adjustment is carried out. Access via Modbus or by pushbutton.

1. Loose both tubes from the pressure inlets + and -.
2. Press the select button for 1 sec to enter the menu and select zero sensors. 

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

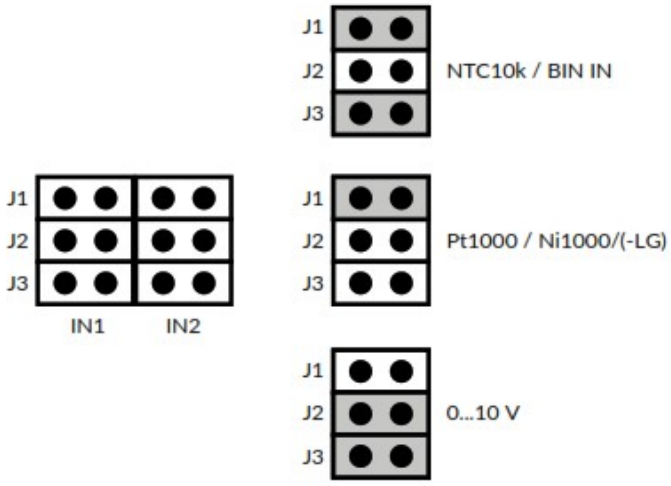
STEP 5: INPUT SIGNAL CONFIGURATION

Input signals can be read over Modbus via DPT-MOD RS485 interface.

Signals	Accuracy for measurement	Resolution
0…10V	< 0,5 %	0,1%
NTC10k	< 0,5 %	0,1%
Pt1000	< 0,5 %	0,1%
Ni1000/(-LG)	< 0,5 %	0,1%
BIN IN (potential free contact)		

The jumpers should be set according to the instructions below and the value should be read from the right register. Both inputs can be configured independently.

Figure 3 – Input signal configuration



STEP 6: MODBUS REGISTERS

Function code 04 – Read input register

Register	Parameter description	Data Type	Value	Range
3×0001	Program version	16 bit	0…1000	0,00…99,00
3×0002	Pressure reading A	16 bit	-700…7000	-700…7000 (Pa)
3×0003	Pressure reading B	16 bit	-250…2500	-250…2500 (Pa)
3×0004	Input 1: 0…10 V	16 bit	0…1000	0…100 %
3×0005	Input 1: Pt1000	16 bit	-500…500	-50…+50 °C
3×0006	Input 1: Ni1000	16 bit	-500…500	-50…+50 °C
3×0007	Input 1: Ni1000-LG	16 bit	-500…500	-50…+50 °C
3×0008	Input 1: NTC10k	16 bit	-500…500	-50…+50 °C
3×0009	Input 2: 0…10 V	16 bit	0…1000	0…100 %
3×0010	Input 2: Pt1000	16 bit	-500…500	-50…+50 °C
3×0011	Input 2: N i1000	16 bit	-500…500	-50…+50 °C
3×0012	Input 2: Ni1000-LG	16 bit	-500…500	-50…+50 °C
3×0013	Input 2: NTC10k	16 bit	-500…500	-50…+50 °C
3×0014	Flow m3/s	16 bit	0…10000	0…100 m3/s
3×0015	Flow m3/h	16 bit	0…30000	0…30000 m3/h
3×0016	Flow cfm	16 bit	0…30000	0…30000 cfm
3×0017	Flow l/s	16 bit	0…3000	0…3000 l/s
3×0018	Velocity m/s	16 bit	0…1000	0…100 m/s
3×0019	Velocity f/min	16 bit	0…5000	0…5000 f/min

Function code 03 – Read input holding register

Register	Parameter description	Data Type	Value	Range
4×0001	Manufacturer	16 bit	0…8	0=Flakt Woods, 1=Rosenberg, 2=Nicotra-Gebhardt, 3=Comefri, 4=Ziehl, 5=ebm-papst 6=Gebhardt, 7=Nicotra. 8=Common probe
4×0002	Formula unit (Manufac- turer=8)	16 bit	0…5	0=m3/s. 1=f/min, 2=m/s, 3=1/s. 4=cfm. 5=m3/h
4×0003	K-Factor Integer	16 bit	0…9999	0…9999
4×0004	K-Factor Decimal	16 bit	0…999	0…999
4×0005	Response Time	16 bit	0…20	0…20 s

Function code 02 – Read input status

Register	Parameter description	Data Type	Value	Range
1×0001	Input 1: BIN IN	Bit 0	0…1	0 = On, 1 = Off
1×0002	Input 2: BIN IN	Bit 0	0…1	0 = On, 1 = Off

Function 05 – Write single coil

Register	Parameter description	Data Type	Value	Range
Ox0001	Zeroing function	Bit 0	0…1	0 = On, 1 = Off

Function code 06 – Write single register

Register	Parameter description	Data Type	Value	Range
4×0001	Manufacturer	16 bit	0…8	O=Flakt Woods. 1=Rosenberg. 2=Nicotra-Gebhardt. 3=Comefri, 4=Ziehl, 5=ebm-papst 6=Gebhardt. 7=Nicotra, 8=Common probe
4×0002	Formula unit (Manufac-turer =8)	16 bit	0…5	0=m3/s, 1=f/min, 2=m/s. 3=1/s. 4=cfm. 5=m3/h
4×0003	K-Factor Integer	16 bit	0…9999	0…9999
4×0004	K-Factor Decimal	16 bit	0…999	0…999
4×0005	Response Time	16 bit	0…20	0…20 s

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. 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.

COMPANY WITH MANAGEMENT SYSTEM
CERTIFIED BY DNV ISO 9001.1SO 14001

www.hkinstruments.fi
Installation version 1.0 2023

Documents / Resources

	HK INSTRUMENTS DPT-Dual-MOD-AHU Differential Pressure Transmitters [pdf] Instruction Manual DPT-Dual-MOD-AHU, Differential Pressure Transmitters, DPT-Dual-MOD-AHU Differential Pressure Transmitters, Pressure Transmitters, Transmitters