HK INSTRUMENTS DPT-CR-MOD Series Differential Pressure Transmitters Instruction Manual

Contents

HK INSTRUMENTS
USER-FRIENDLY MEASURING DEVICES

HK INSTRUMENTS DPT-CR-MOD Series Differential Pressure Transmitters

INTRODUCTION

Thank you for choosing an HK Instruments DPT-CR-MOD series dif-ferential pressure transmitter. DPT-CR-MOD series is designed spe-cially for cleanroom monitoring. In addition to differential pressure, the device enables monitoring temperature and relative humidity.
A 0…10 V voltage input of an external humidity and temperature transmitter can be connected to the input terminal of the device. In this case, all three measured values (differential pressure, relative humidity, temperature) will be shown simultaneously on the display. Alternatively, a passive temperature sensor can be connected to the input terminal.
DPT-CR-MOD is compatible with Modbus serial communication protocol.

APPLICATIONS

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

- pressure, temperature and humidity 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

Measurement range:

- 250…2500 Pa

Accuracy (from applied pressure):

- 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:

- Temperature: ±0.25 °C typical @ 25 °C + accuracy of external transmitter
- Humidity: ±0.5 % rH typical @ 25 °C + accuracy of external transmitter

Overpressure:

- Proof pressure: 25 kPa
- Burst pressure: 30 kPa

Zero point calibration:
Manual pushbutton or via Modbus

Response time:
1…20 s selectable via menu

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

Technical Specifications

Media compatibility:
Dry air or non-aggressive gases

Measuring units:
Selectable via menu
(Pa, kPa, mbar, inchWC, mmWC, psi)

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 x 71.5 x 36 mm

Weight:
150 g

Mounting:
2 each 4.3 mm screw holes, one slotted

Materials:
Case: ABS
Lid: PC
Pressure inlets: Brass

Protection standard:
IP54

Display:

- 2-line display (12 characters/line)
- Line 1: pressure measurement
- Line 2: relative humidity and temperature (if external measurements are connected)

Electrical Connections:
4+4 spring load terminals, max 1.5 mm2
Cable entry: M20

Pressure fittings:
Male ø 5.2 mm
+ High pressure
– Low pressure

Electrical

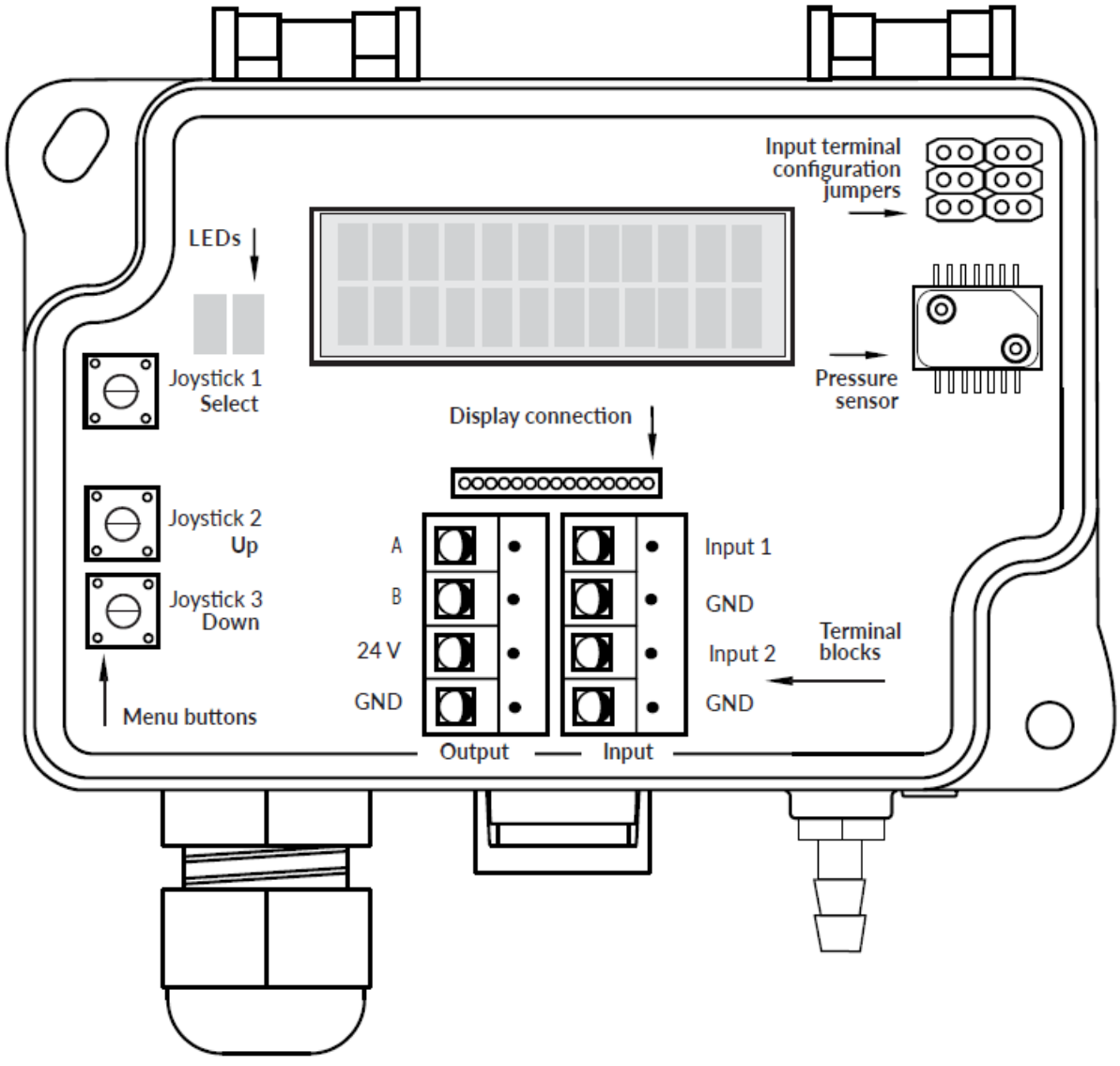
Supply voltage:
24 VAC or VDC ± 10 %
Power consumption:
< 1.3 W
Output signal:
via Modbus
Input signals:
Temperature input: 0–10 V or NTC10k, Pt1000, Ni1000/(-LG)
RH input: 0–10 V

Conformance

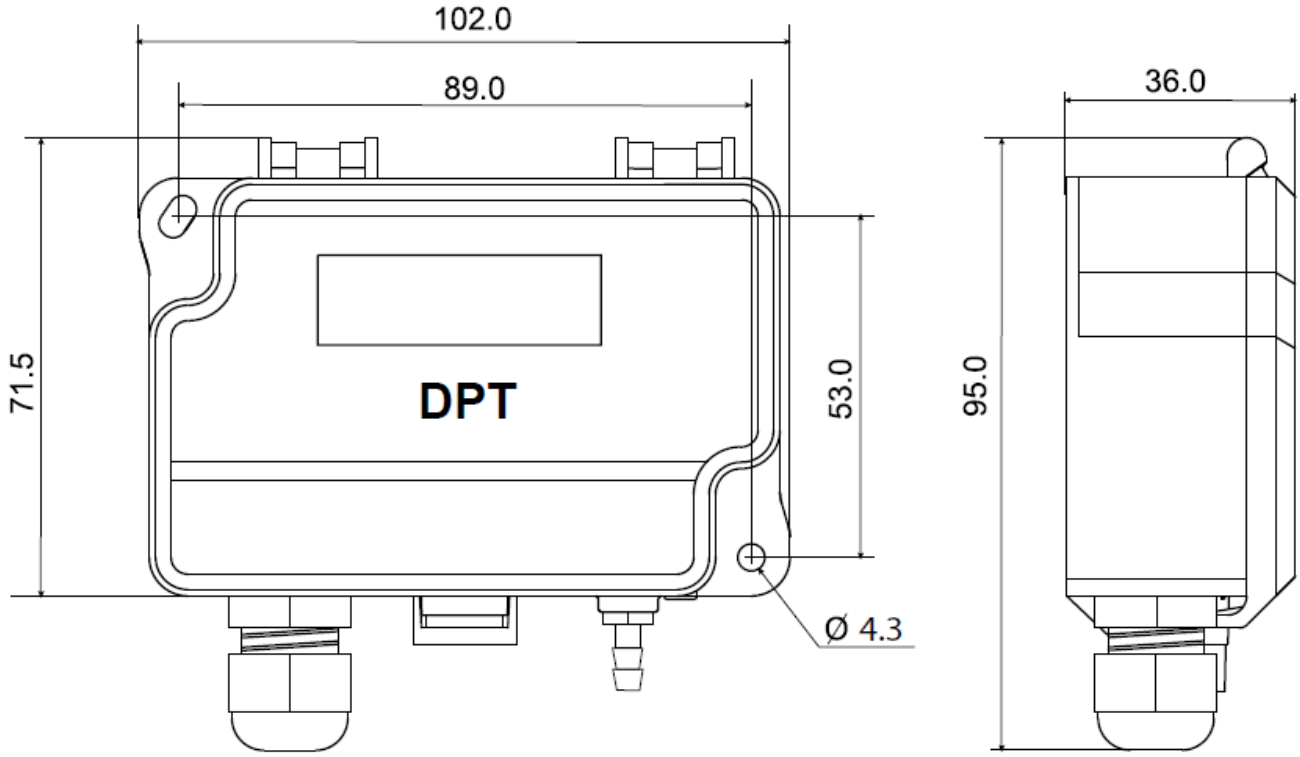
Meets requirements for:

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

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 - Surface mounting

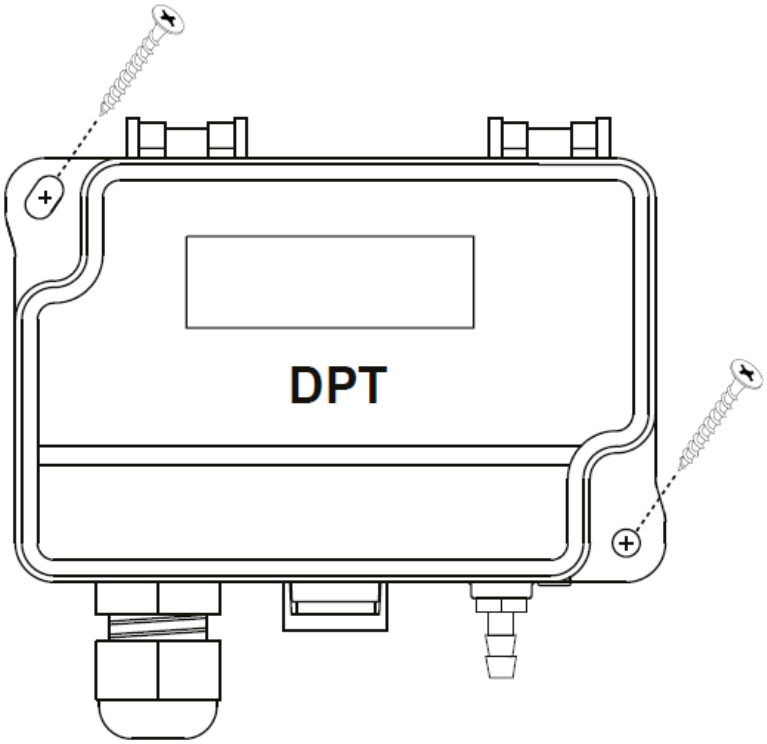


Figure 1b - Mounting orientation

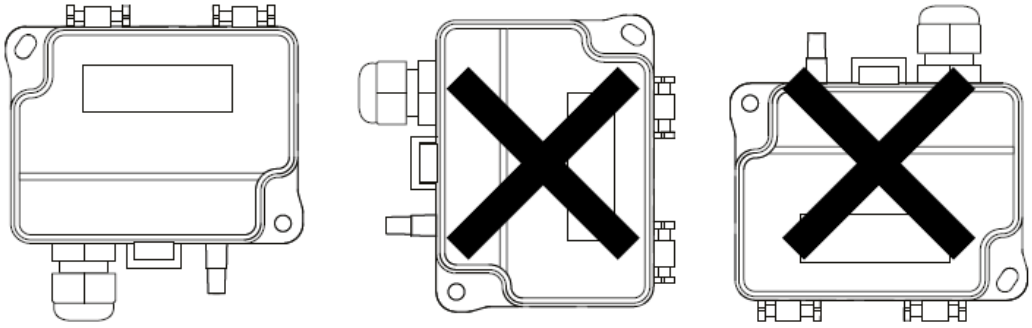
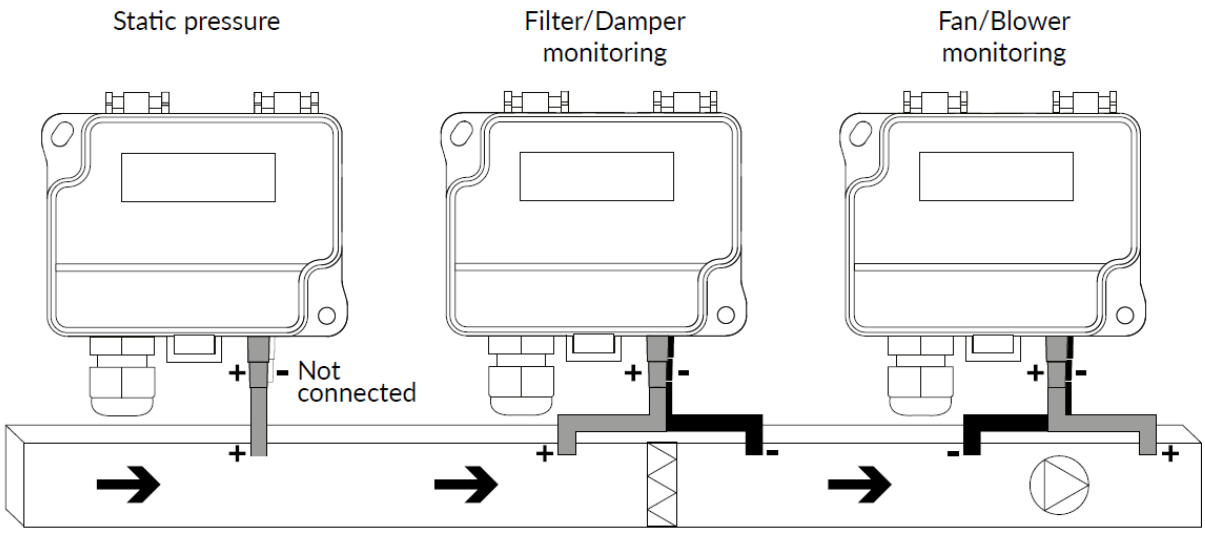


Figure 1c - Application connections



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

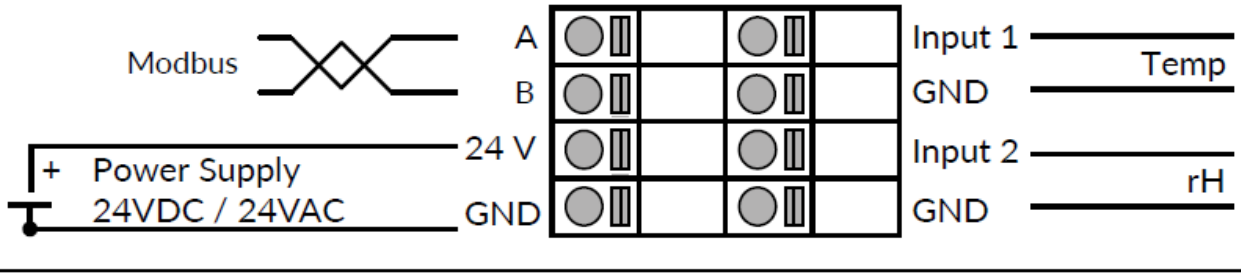
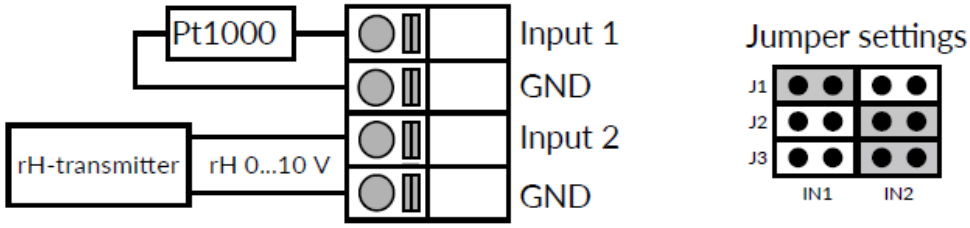


Figure 2b - Wiring diagram example for input signals

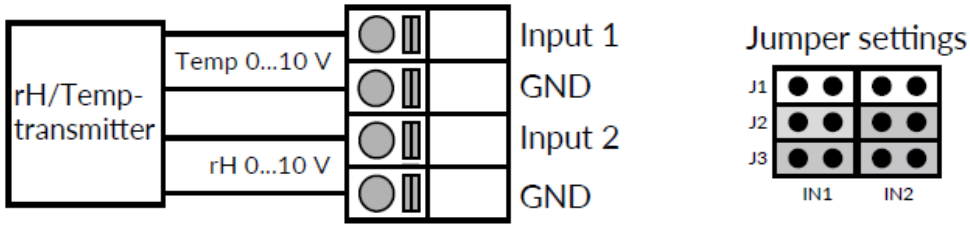
Example 1:
Temperature sensor and rH-transmitter connected to DPT-CR-MOD



Input 1: Pt1000 temperature sensor
Function 04 - Read input register 3x0005

Input 2: Relative humidity 0...10 V
Function 04 - Read input register 3x0026

Example 2:
rH/Temp-transmitter connected to DPT-CR-MOD

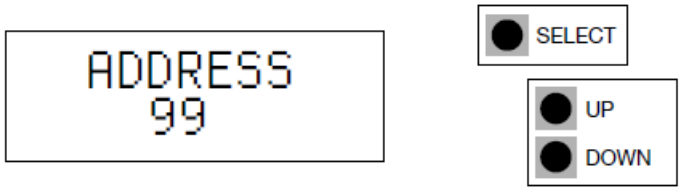


Input 1: Temperature 0...10 V
Function 04 - Read input register 3x0020

Input 2: Relative humidity 0...10 V
Function 04 - Read input register 3x0026

STEP 3: CONFIGURATION

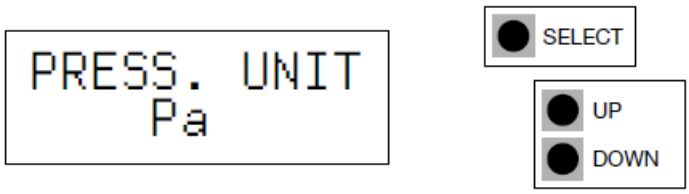
1. Activate the device Menu by pushing the the select button for 2 seconds.
2. Select the address for Modbus: 1…247



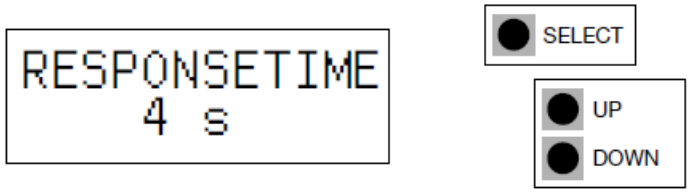
3. Select the baud rate: 9600/19200/38400.

4. Select the parity bit: None/Even/Odd

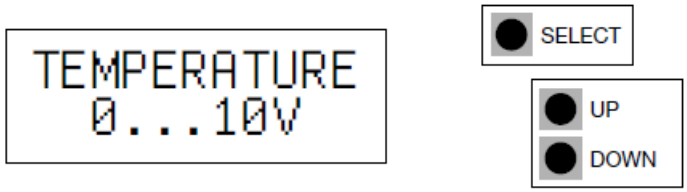
5. Select the pressure unit for display: Pa/kPa/mbar/mmWC/inchWC/psi



6. Select the response time: 1…20 s

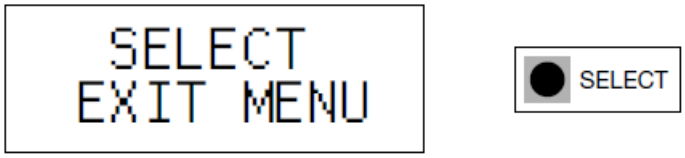


7. Select the temperature measurement type: 0…10V/NTC10K/NI1000LG/NI1000/PT1000



8. Select the temperature unit for display: Celsius/Fahrenheit

9. Push the select button to exit menu.



STEP 4: ZERO POINT ADJUSTMENT

N**OTE!** 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 push button.

1. Loose both tubes from the pressure inlets + and -.
2. Press the select button briefly. 

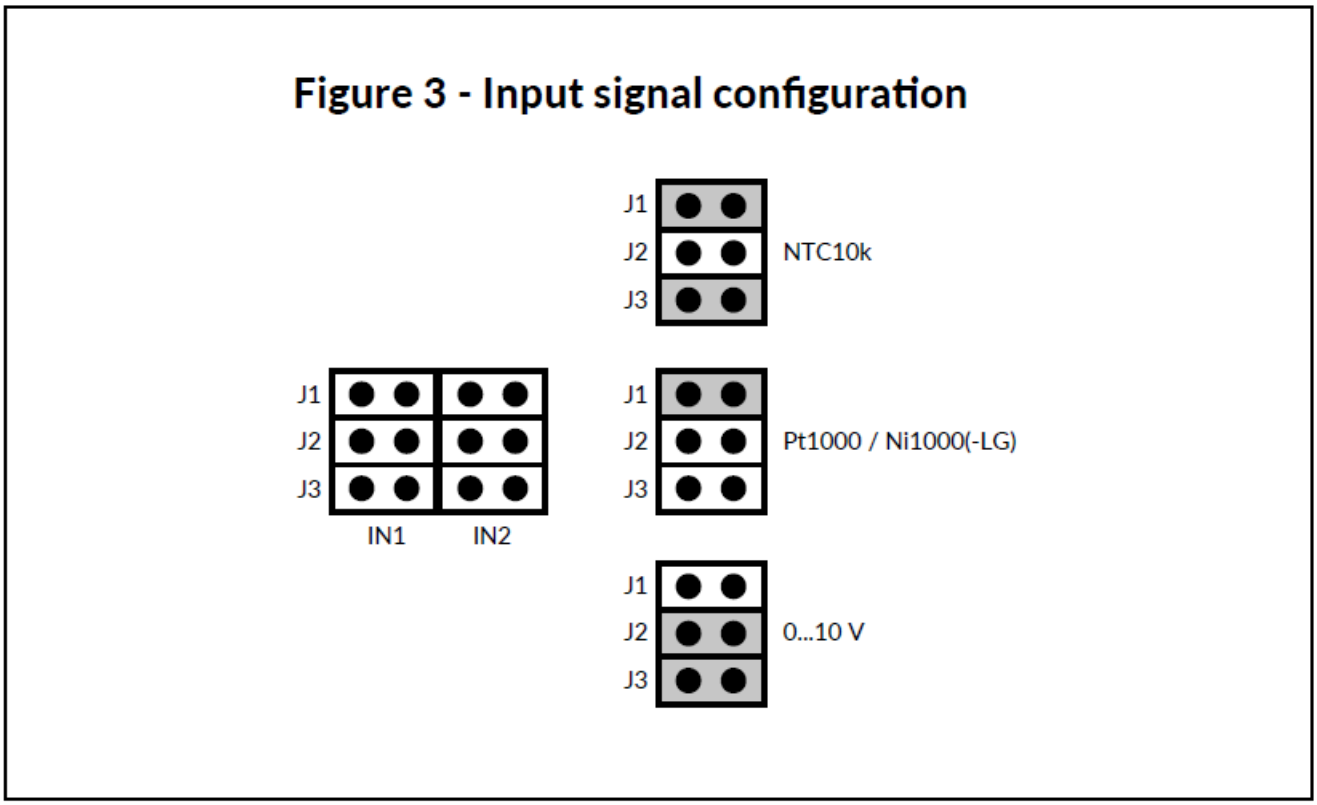
3. Wait until the LED turns off and then install tubes again for the pressure inlets.

STEP 5: INPUT SIGNAL CONFIGURATION

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

Signals	Accuracy for measurement	Resolution
0…10 V	< 0.5 % typical	0.1 %
NTC10k	< 0.5 % typical	0.1 %
Pt1000	< 0.5 % typical	0.1 %
Ni1000/(-LG)	< 0.5 % typical	0.1 %

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.



STEP 6: MODBUS REGISTERS

Function 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…0004	Not in use			
3×0005	Temperature Celsius: Pt1000	16 bit	-500…500	-50.0…+50.0 °C
3×0006	Temperature Celsius: Ni1000	16 bit	-500…500	-50.0…+50.0 °C
3×0007	Temperature Celsius: Ni1000-LG	16 bit	-500…500	-50.0…+50.0 °C
3×0008	Temperature Celsius: NTC10k	16 bit	-500…500	-50.0…+50.0 °C
3×0009…0013	Not in use			
3×0014	Pressure reading Pa	16 bit	-2500…25000	-250.0. 2500.0 Pa
3×0015	Pressure reading kPa	16 bit	-2500…25000	-0.2500.. 2.5000 kPa
3×0016	Pressure reading mbar	16 bit	-2500…25000	-2.500. 25.000 mbar
3×0017	Pressure reading inWC	16 bit	-1003…10030	-1.003. 10.030 inWC
3×0018	Pressure reading mmWC	16 bit	-2549…25490	-25.49. 254.90 mmWC
3×0019	Pressure reading psi	16 bit	-362…3625	-0.0362…….. psi
3×0020	Temperature 0…10 V at 0…50 °C	16 bit	0…500	0.0. 50.0 °C

3×0021	Temperature Fahrenheit: 0…10 V at 0…50 °C	16 bit	32…1220	32.0. 122.0 °F
3×0022	Temperature Fahrenheit: Pt1000	16 bit	-580…1220	-58.0. 122.0 °F
3×0023	Temperature Fahrenheit: Ni1000	16 bit	-580…1220	-58.0. 122.0 °F
3×0024	Temperature Fahrenheit: Ni1000-LG	16 bit	-580…1220	-58.0. 122.0 °F
3×0025	Temperature Fahrenheit: NTC10k	16 bit	-580…1220	-58.0. 122.0 °F
3×0026	Relative humidity 0…10 V at 0…100 %	16 bit	0…1000	0.0. 100.0 % rH

Function 05 – Write single coil

Register	Parameter description	Data Type	Value	Range
0x0001	Zeroing function	Bit 0	0…1	On – Off

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, lightening, flood or another natural phenomenon, normal wear and tear, improper or careless handling, abnormal use, over-loading, 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 de-livery 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.

www.hkinstruments.fi

Documents / Resources

	**HK INSTRUMENTS DPT-CR-MOD Series Differential Pressure Transmitters** [pdf] Instruction Manual DPT-CR-MOD Series Differential Pressure Transmitters, DPT-CR-MOD Series, Differential Pressure Transmitters