

PRODUCT CATALOGUE

2019



**MADE IN
FINLAND**

30 YEARS OF
EXPERIENCE

**DESIGN
FROM
FINLAND**

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HIGH-QUALITY MEASURING DEVICES FOR CLEAN INDOOR AIR

HK Instruments is a family-owned Finnish company that helps its customers to keep the quality of indoor air and the functionality of buildings high, resulting in wellbeing and energy savings. We design highly accurate and easy to-use measuring devices for HVAC applications in ventilation and building automation systems.

Having lived in the clean Finnish climate, we know what it is like to breath in good-quality fresh air. This is why we have been leading the way, in Finland and abroad, for 30 years, allowing everyone to enjoy good-quality indoor air.

Our advanced measuring devices produce highly accurate real-time information about indoor air to the building management system. This leads to high functionality of the building, which supports the wellbeing of people while keeping energy costs down. Our products are known for their ease of use. Applications for our devices range from highly demanding laboratory conditions to regular residential buildings.

We understand that there are different needs in different parts of the world and in different applications. This is why we work with you to customize our solutions for your needs. Using the information our devices produce, we help you to make smart decisions to support the wellbeing of your people and the functionality of your building. Our decades of experience and our broad product range allow us to offer our services to market areas at highly different levels of development.

WE SPEND NEARLY 90% OF OUR TIME INDOORS. THE QUALITY OF INDOOR AIR IS NOT INSIGNIFICANT. CLEAN INDOOR AIR THAT MAINTAINS WELLBEING – HEALTH, ENERGY LEVELS AND COMFORT - IS ONE OF THE PRECONDITIONS FOR LIFE. GOOD INDOOR AIR QUALITY SAVES COSTS IN HEALTHCARE AND BUILDING MAINTENANCE.



VALUES

FAMILY | FRIENDSHIP | BASIC NEEDS OF PEOPLE

We respect Family and Friendship. Every person sharing our journey is welcomed to our HK Instruments Family. HK Instruments Family cares about people's wellbeing - including their right to breathe clean air.



VISION

Our vision is to contribute towards nature and the wellbeing of people by growing the HK Instruments Family.



MISSION

Our mission is to provide clean indoor air and energy savings by manufacturing user-friendly measuring devices for HVAC.

OEM

Many of our customers are OEMs, in particular companies manufacturing air handling units. They need solutions tailored to their individual needs. We excel at unique, customer-focused implementations.

HK Instruments has cooperated closely with OEMs for more than 30 years. We have gained broad and varied experience in unique device solutions, and we have always found a functional solution for the customer's specific needs. Our expert team is attuned to your needs and knows how to meet them. We stand out from the competition by being flexible and efficient. We stay on schedule and within budget - while also listening to our customer's needs at all times. Our OEM customers are actively involved throughout the manufacturing process, as we are convinced that continuous interaction produces the best results.

We are always open to new challenges and opportunities and would like to hear from you. You can start by contacting Jarkko Nygård, our Product Manager. We will find a solution that meets your and your company's needs.



Jarkko Nygård
Product manager

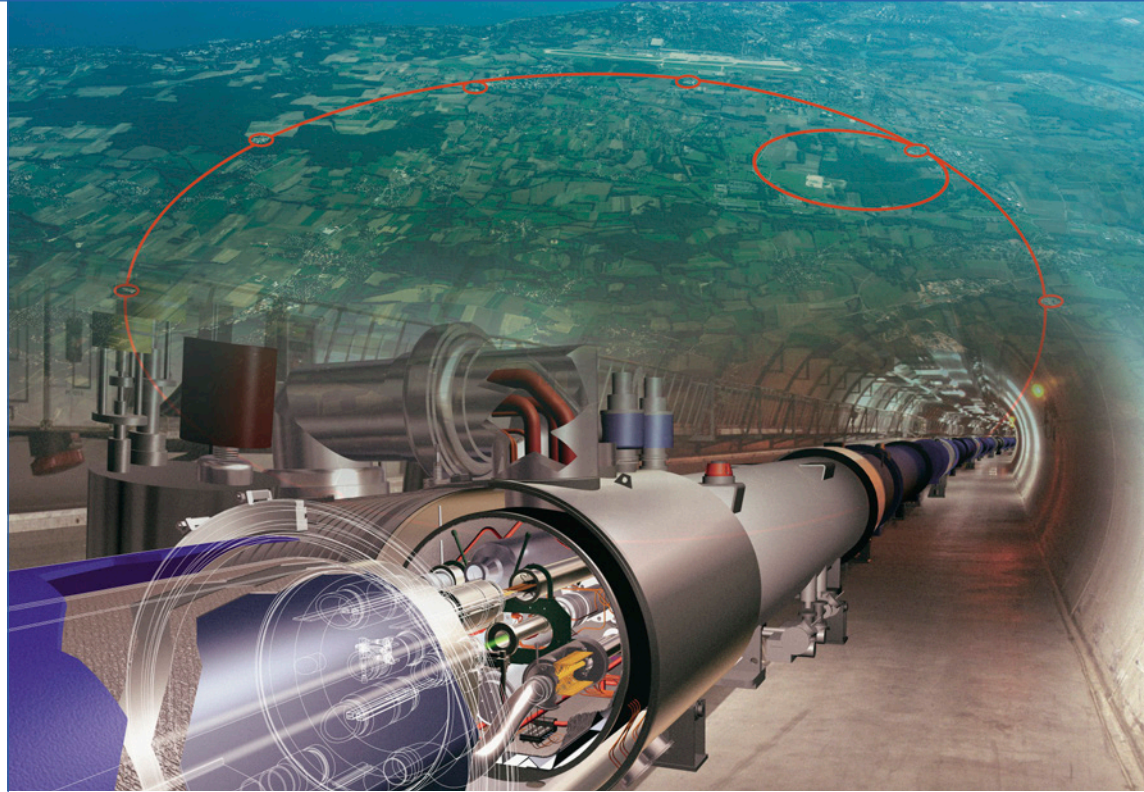


Image: CERN

HK INSTRUMENTS EXPERTISE IN CERN

CERN, the European Laboratory for Particle Physics, is carrying out a large project to monitor and regulate the air conditioning inside the LHC (Large Hadron Collider), the particle accelerator that led to the discovery of the Higgs Boson. For the differential pressure measurements, CERN has selected the DPT250-R8 sensor from HK Instruments to meet the Organization's stringent requirements in terms of precision, reliability and ease of integration. A total of 50 DPT transmitters have been installed in the underground areas such as experimental caverns, across galleries and pressurized modules. In addition, air quality transmitters of type CDT2000 are used for the control of air conditioning in control rooms of the LHC experiments.

CERN HAS SELECTED THE DPT250-R8 SENSOR FROM HK INSTRUMENTS TO MEET THE ORGANIZATION'S STRINGENT REQUIREMENTS IN TERMS OF PRECISION.



ARBORVITAE

Arborvitae d.o.o. is a Slovenian family-owned company, covering and operating in the Adriatic region. Our clients come from the food, chemical, power and pharmaceuticals industries, as well as HVAC system manufacturers, health and the agricultural sectors. We provide advanced measuring equipment, and offer a verified control of the measurements where required. This is how we help control risks, which means our clients can maintain their trustworthy position in the marketplace. Our core values are progress, honesty and respect.

Our cooperation with HK Instruments is very direct. We value our involvement with their development area, and the ability to use our experience for raising and solving new questions. This open dialogue helps us provide solutions for our clients, as they constantly encounter new technological or developmental challenges.

We share very similar values when it comes to ways of working and communication. Fast responses, immediate addressing of open queries and accomplished commercial support, count for everything. Having these principles in place, we can sustain a trustworthy relationship with HK Instruments.

Being connected and included as a partner within their inner circle gives our quality of work a special positive boost, which we believe is further appreciated and felt by our clients.



Janez Mulej
Managing director

“BEING CONNECTED AND INCLUDED AS A PARTNER WITHIN THEIR INNER CIRCLE GIVES OUR QUALITY OF WORK A SPECIAL POSITIVE BOOST.”

JOIN OUR HK INSTRUMENTS FAMILY OF DISTRIBUTORS

We are constantly looking for new distributors to join our HK Instruments family. Our distributors are long-term partners, and we put in work to nurture a relationship built on trust, service and true friendship. In our 30 years' experience, this has been the key to our company's steady growth and strength. Through our success, we've been able to continually develop and create outstanding products for HVAC and building automation.

1. SALES SUPPORT

We will provide you with an HK Instruments account manager, dedicated to assist you in formulating your business strategy and tactics and to choose the suitable products for your customers.

2. LEAD GENERATION

We understand the importance of more leads for your business to grow. We are skilled in developing a sales pipeline and will offer you valuable leads to utilize in networking and sales.

3. MARKETING SUPPORT

Building your brand equity will help us both win. HK Instruments is a well-known and trusted brand in Europe, and we are generous in sharing our brand equity with your business. You will receive access to our extensive media

library, where you will find all marketing support materials ready to use. This includes our brand book, catalogues in several languages, posters, photos, images for ads, PR articles, presentations etc.

4. TECHNICAL SUPPORT

We guarantee friendly and immediate technical support between the hours of 8 a.m. and 4 p.m. GMT+2. We are here to help you.

5. FREE SALES AND TECHNICAL TRAINING

We offer our distributors sales and technical training free of charge. In some cases, we can provide you with personal technical training in Finland or in your premises. Contact your personal account manager for more information.

6. NFR SAMPLES

We are happy to send you Not for Resale (NFR) samples of HK Instruments products for use in testing, demonstrations and training.

7. SHARING BEST PRACTICES

We encourage you to share your success stories and feedback with our community. Connect with us and your fellow HK Instrument partners around the world.

8. PAYMENT TERMS

In some cases we can help you finance your business by offering you exclusive longer payment terms. We will always evaluate these cases individually and offer these terms solely to companies of solid credit standing and financial strength.

9. STOCK ROTATION

To our long term distributors we offer a possibility to return purchased products back to HK Instruments if you didn't manage to sell these items, considerably lowering your risk of holding larger stock. Upon agreement, we can reimburse you up to 70 % of the returned goods.

10. IMMEDIATE REPLACEMENT

In some cases, we offer immediate replacement of the products for our long standing partners, within our 5 year warranty period. No waiting for repair – instead, you will be instantly sent a fully functional product after sending us the defective piece.

11. PROJECT PRICING OPTION

When you are competing against a strong offer from a competitor for a substantial project, you can always ask for project price.

MOST IMPORTANTLY, WE OFFER PRODUCTS THAT SELL.

In the HVAC and building automation industry, HK Instruments is known for:

- constant product development efforts to meet the highest standards of the HVAC industry
- competitive pricing and high quality products
- high-end Finnish design and quality awarded with the Design From Finland-mark

- 5 year warranty
- customized OEM-products and private labeling
- its strong Nordic brand that is trusted globally by a wide scope of OEMs, system integrators, distributors and well-know multinational corporations
- 30 years of experience in manufacturing measuring devices for HVAC and building automation.

Contact our export sales managers Timo, Akseli or Tatjana for a chat and let's discuss more opportunities!

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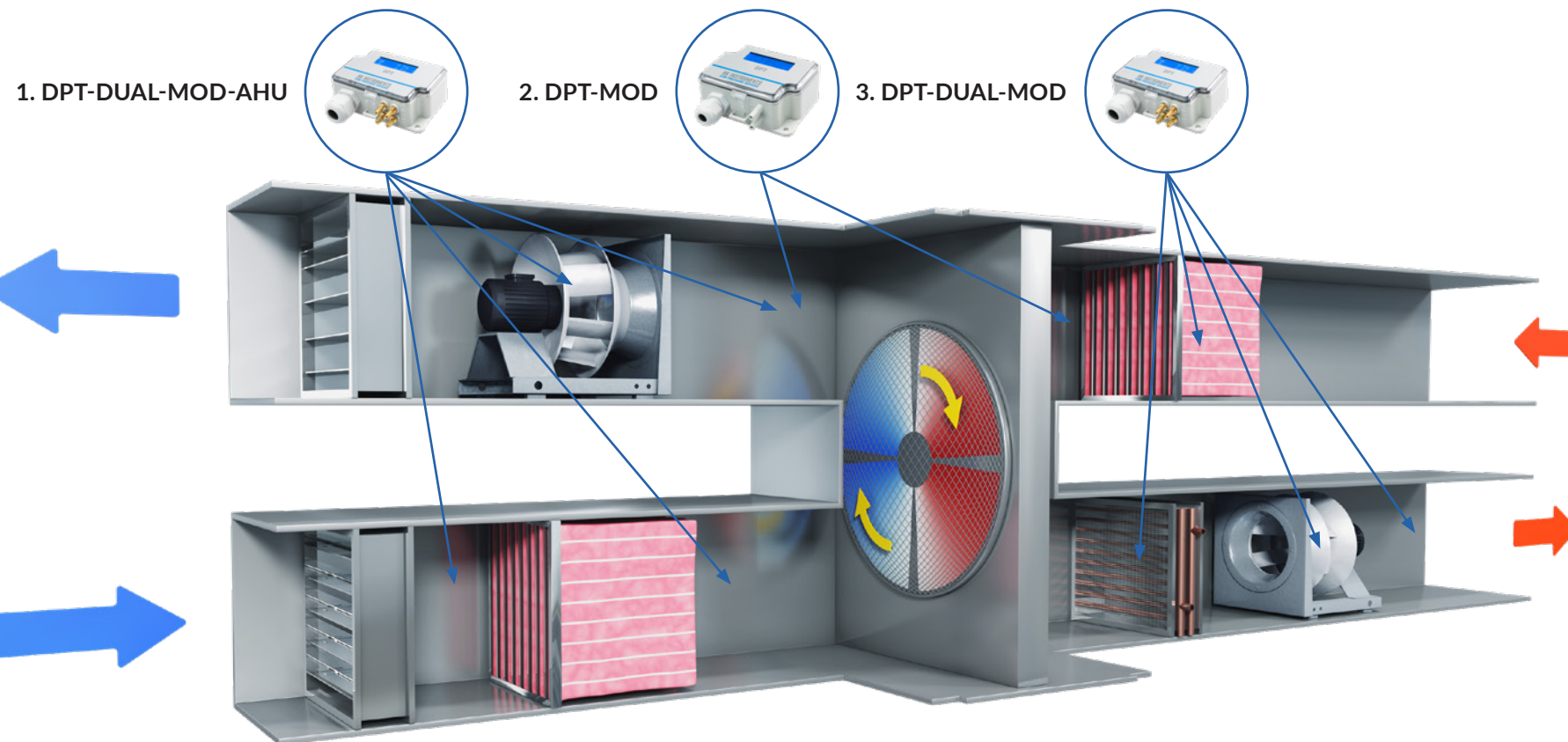
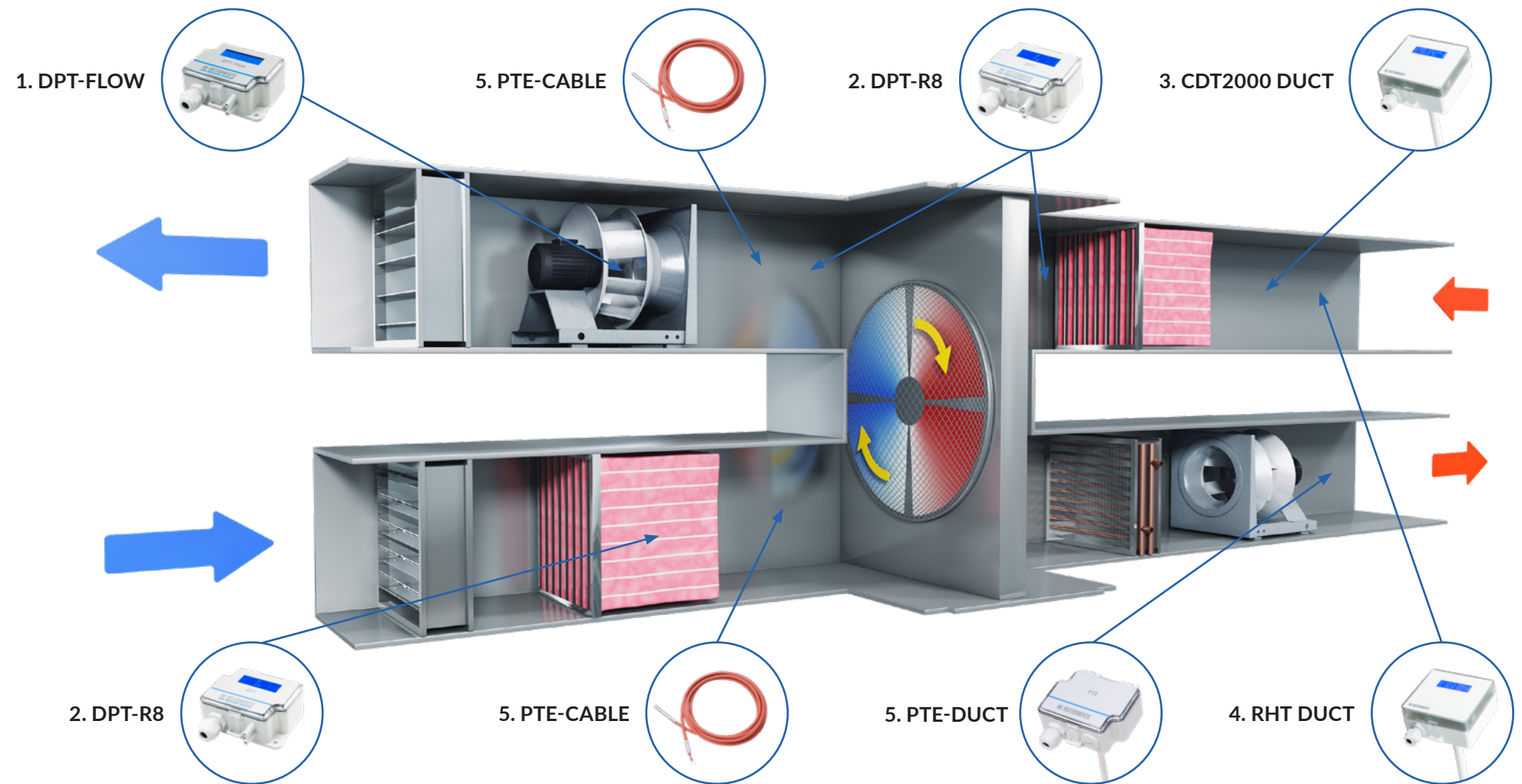
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AIR HANDLING UNITS (AHU) – MEASUREMENTS AND CONTROLS

TRADITIONAL SOLUTION

Air handling units are used in nearly all new and renovated buildings to ensure high-quality indoor air. In addition to providing clean indoor air, HK Instruments' easy-to-use devices enable cost-efficiency and the effortless installation and monitoring of air handling units. In comparison with analogue devices, modern Modbus devices require less wiring, which reduces the cost of cabling work. Designed specifically for AHUs, the DPT-Dual-MOD-AHU combination is the only one of its kind on the market.

DPT-Flow (1) enables accurate air volume flow adjustment and control for supply and extracted air. DPT-R8 (2) monitors filter cleanliness and frosting in the heat recovery unit. The CDT (3), RHT (4) and PTE (5) sensors ensure demand-controlled ventilation.



MODBUS SOLUTION

Our main products are also available with Modbus communication. When using a bus solution, you need less wires in cables and fewer input points in the controller. As a result, you will save in costs of the devices and installation.

DPT-DUAL-MOD combines two differential pressure transmitters into one device. When using the Input terminal, temperature transmitters can be replaced with temperature sensors. This makes it possible to measure four different types of data.

With the Modbus solution you only need 4 wires as opposed to 23 wires when using the traditional solution.

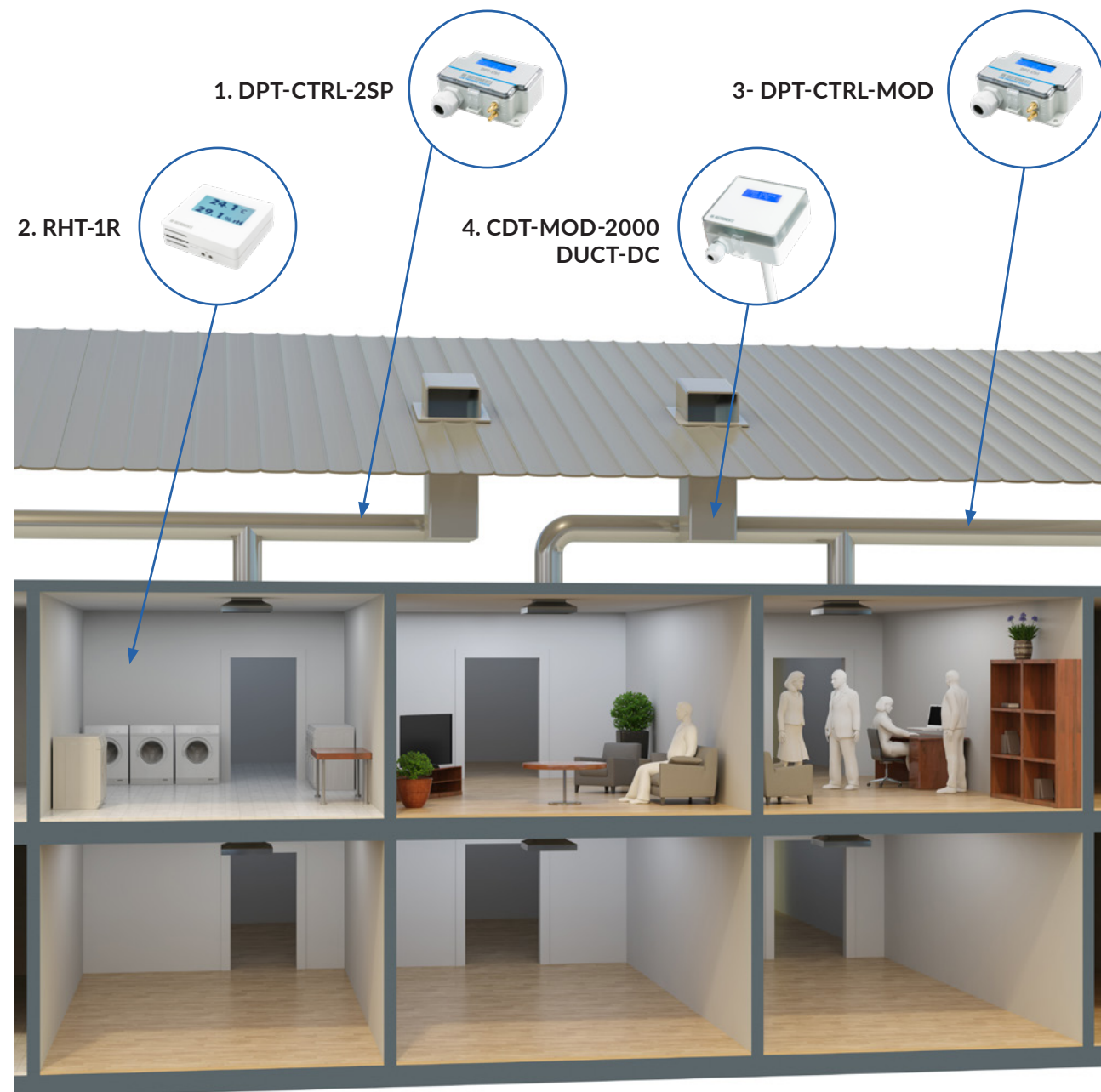
In a Modbus solution, DPT-Dual-MOD-AHU (1) monitors and controls air volumes. It also functions as a filter alert, replacing two separate measuring devices: air flow transmitter and differential pressure transmitter. DPT-Dual-MOD (3) is the right choice when you want to monitor and control duct pressure instead of air volumes. Two temperature sensors are connected to both DPT-Dual-MOD models. These sensors are essential for the functioning of the air handling unit. DPT-MOD (2) prevents frosting in the heat recovery unit.



ROOF EXTRACTION UNIT

In apartment buildings, roof extraction units are often necessary to ensure clean, high-quality indoor air. Ventilation in apartment buildings is often set at a default level, even though the load varies. This results in a significant loss of energy. Ventilation applications in apartment buildings are easy to implement by using HK Instruments' measurement devices. Our cost-efficient solutions do not need to be supported by an expensive building automation system.

DPT-Ctrl-2SP (1) keeps the air volume in the laundry facility at the desired standard value by controlling the EC exhaust fan. RHT-1R (2) monitors the air humidity and causes DPT-Ctrl-2SP to increase capacity when air humidity increases. CDT-MOD-2000 Duct-DC (4) monitors the air quality in apartments, and DPT-Ctrl-MOD (3) actively adjusts the exhaust fan. Both devices communicate seamlessly with the building management system through the Modbus interface.



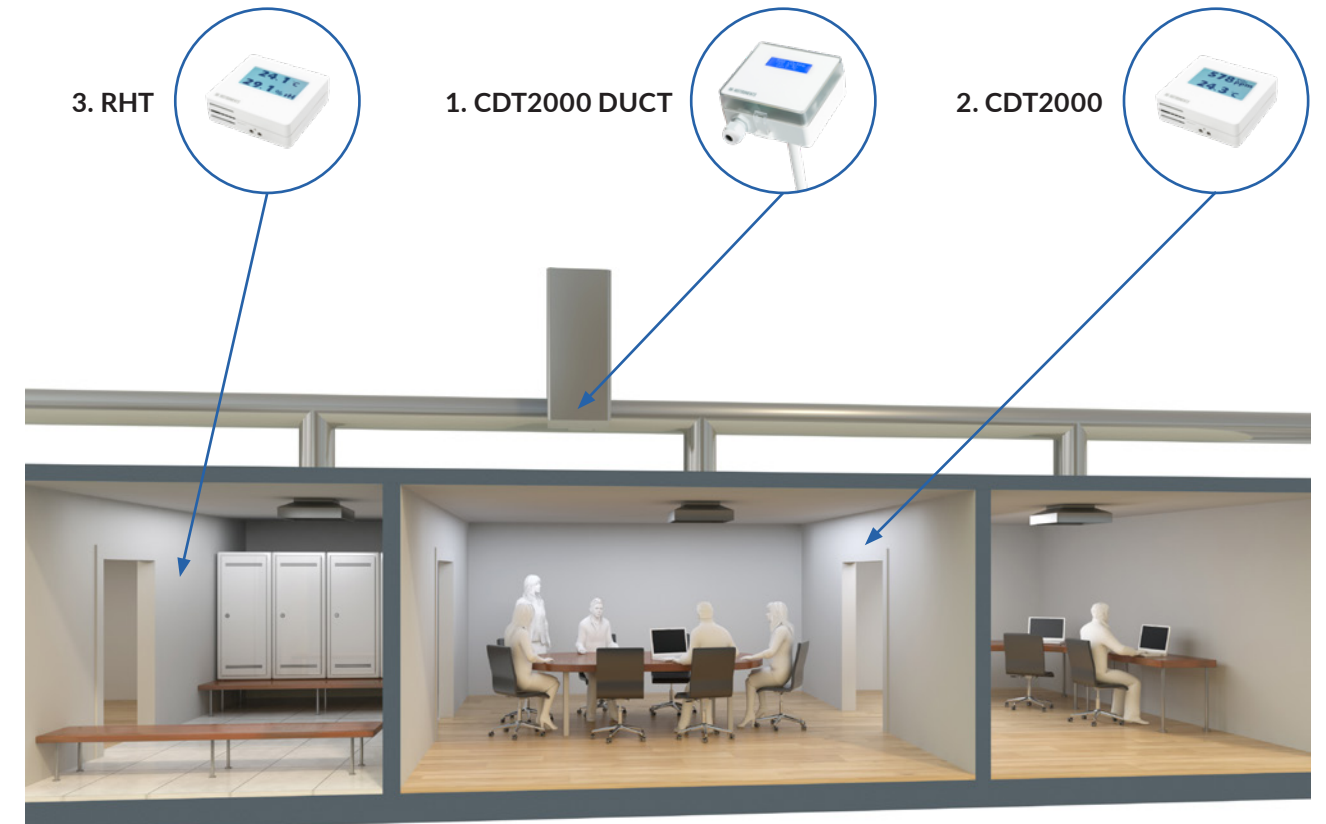
DEMAND-CONTROLLED VENTILATION (DCV)

HK INSTRUMENTS' MULTIFUNCTIONAL MEASURING DEVICES ARE USED AS A PART OF DEMAND-CONTROLLED VENTILATION.

Ventilation is boosted when a large number of people are in the building. Ventilation solutions of this type are needed in schools, offices, sports halls and hotels – that is, in all locations where it is important to maintain good air quality, even if utilisation rates vary greatly. In addition to ensuring good air quality, demand-controlled ventilation reduces energy consumption in buildings.

As a result of technical innovations, our devices are even more versatile than before. CDT2000-DC, a CO₂ transmitter using Dual Channel technology, is maintenance-free and can also be used in hospitals, nursing homes and other environments that would be challenging for ordinary CO₂ transmitters. The large display on a CDT device is informative and easy to read, which also creates added value for the users of the building.

RHT (3) and CDT (2) monitor the air quality in individual rooms and communicate any needs for added capacity to the building management system. CDT2000 duct (1) monitors the extracted air across the area, enabling demand-controlled ventilation in the entire office.

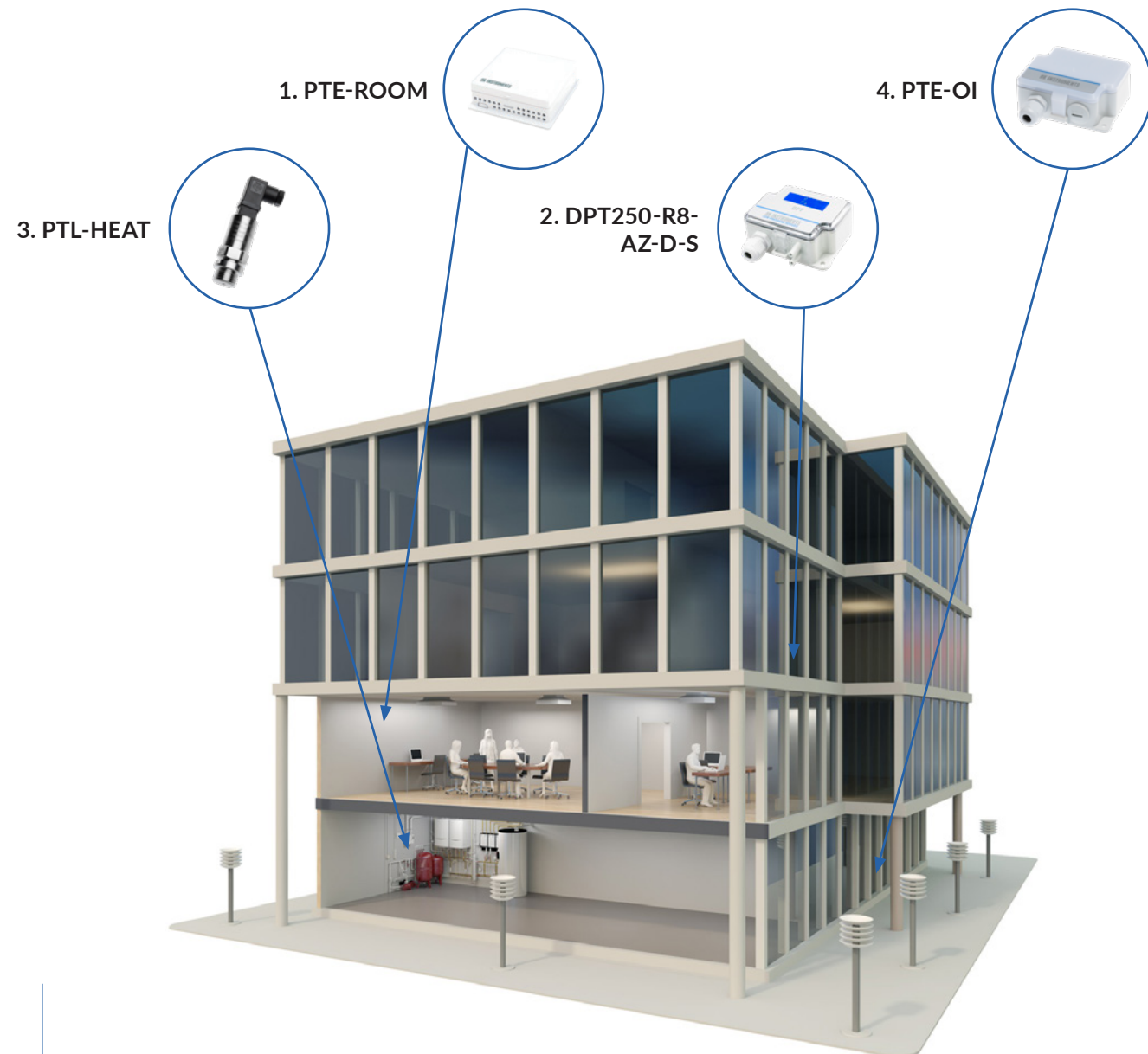


COMMERCIAL BUILDING SOLUTIONS

HK INSTRUMENTS PRODUCES USER-FRIENDLY MEASUREMENT DEVICES FOR INDOOR AND OUTDOOR FACILITIES.

Passive outdoor temperature and light sensors are reliable in use and reduce the need for cabling. These sensors predict the need for heating in a building and control outdoor lighting sensibly and energy-efficiently. Liquid pressure transmitters can be used to monitor district heating and cooling, as well as detecting any leaks and preventing water damage. Surveillance of the differential pressure across the building envelope takes care of the health of the building and prevents serious structural problems.

PTE-OI (4) measures outdoor temperatures and the level of outdoor light. Together with PTE-Room (1), which measures room temperatures, the sensors enable the proactive control of the heating network. PTL-Heat (3) monitors pressure in the heating network and provides alerts about leaks when pressure decreases. PTE-OI carries out light measurements to determine when outdoor lighting should be switched on and off. DPT250-R8-AZ-D-S (2) measures the differential pressure over building envelope, maintaining the desired pressure balance.

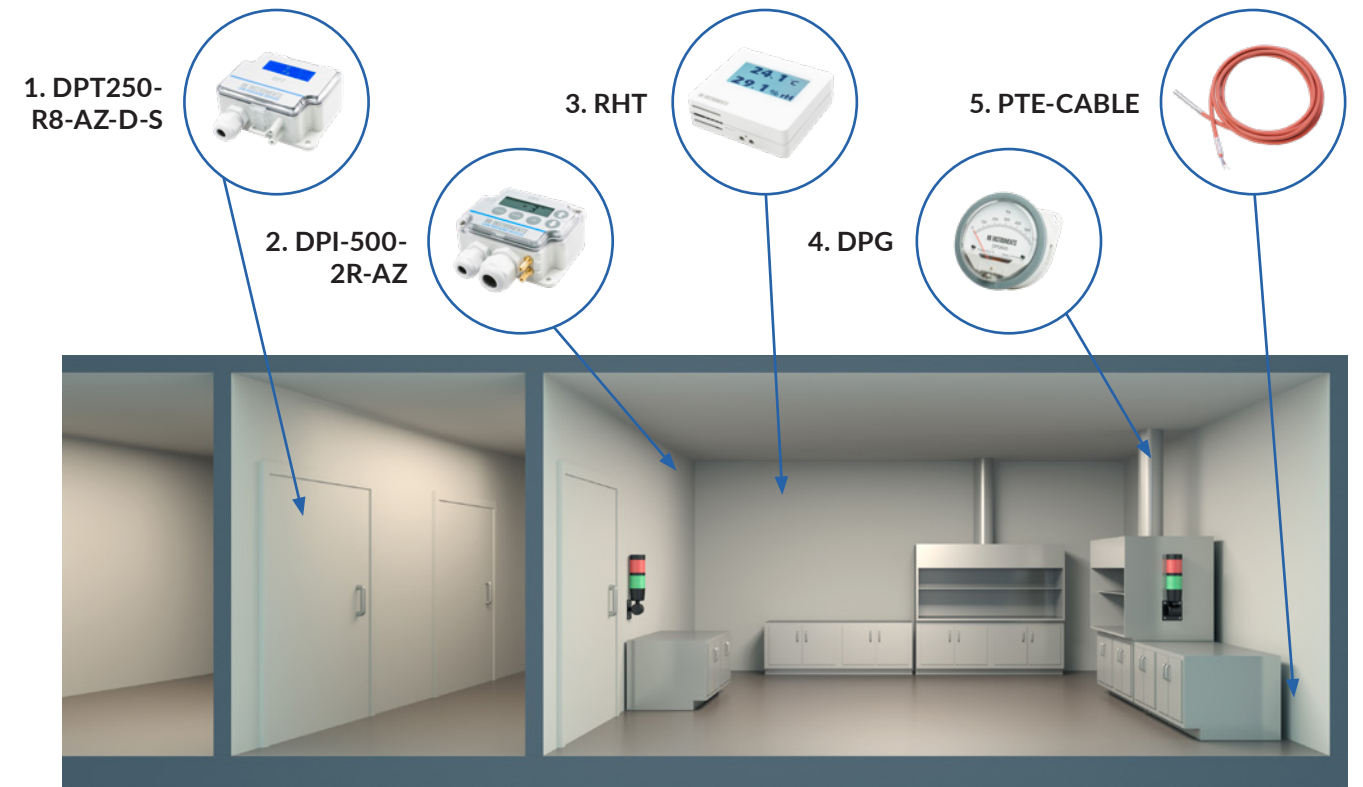


CLEANROOM APPLICATION

PRESSURE DIFFERENCES BETWEEN ROOMS IN HOSPITALS, LABORATORIES AND OTHER DEMANDING ENVIRONMENTS CAN BE CONTROLLED THROUGH PRESSURISATION AND DEPRESSURISATION TO ENSURE FAVOURABLE WORKING CONDITIONS AND THE CLEANLINESS OF PRODUCTS.

Designed to monitor pressure differences between rooms, differential pressure transmitters measure the difference in pressure between the cleanroom and the outdoor air. DPT250-R8-AZ-D-S, which measures even the smallest pressure differences, is an excellent choice when the pressurisation of facilities requires high precision and operational reliability. In addition to measuring pressure differences, it is important to measure the temperature and humidity in cleanrooms. The RHT humidity and temperature transmitter is the perfect choice for such measurements. All our Cleanroom devices include field calibration and are available with the calibration certificate. Our devices ensure uninterrupted production in cleanrooms, which require reliable, continuous monitoring.

The DPT250-R8-AZ-D-S (1) high-precision differential pressure transmitter monitors overpressure in laboratory facilities. Electronic differential pressure switch and transmitter (2) activates the beacon alarm light with a relay output if the pressure in the facility exceeds the threshold value. RHT (3) communicates the room temperature and humidity to the automation system. The DPG analogue gauge (4) is easy to read, which makes it suitable for indicating the exact pressure in the laminar flow cabinet. PTE-Cable (5) measures the temperature in a refrigerated cabinet, making it possible to collect historical data over the long term.

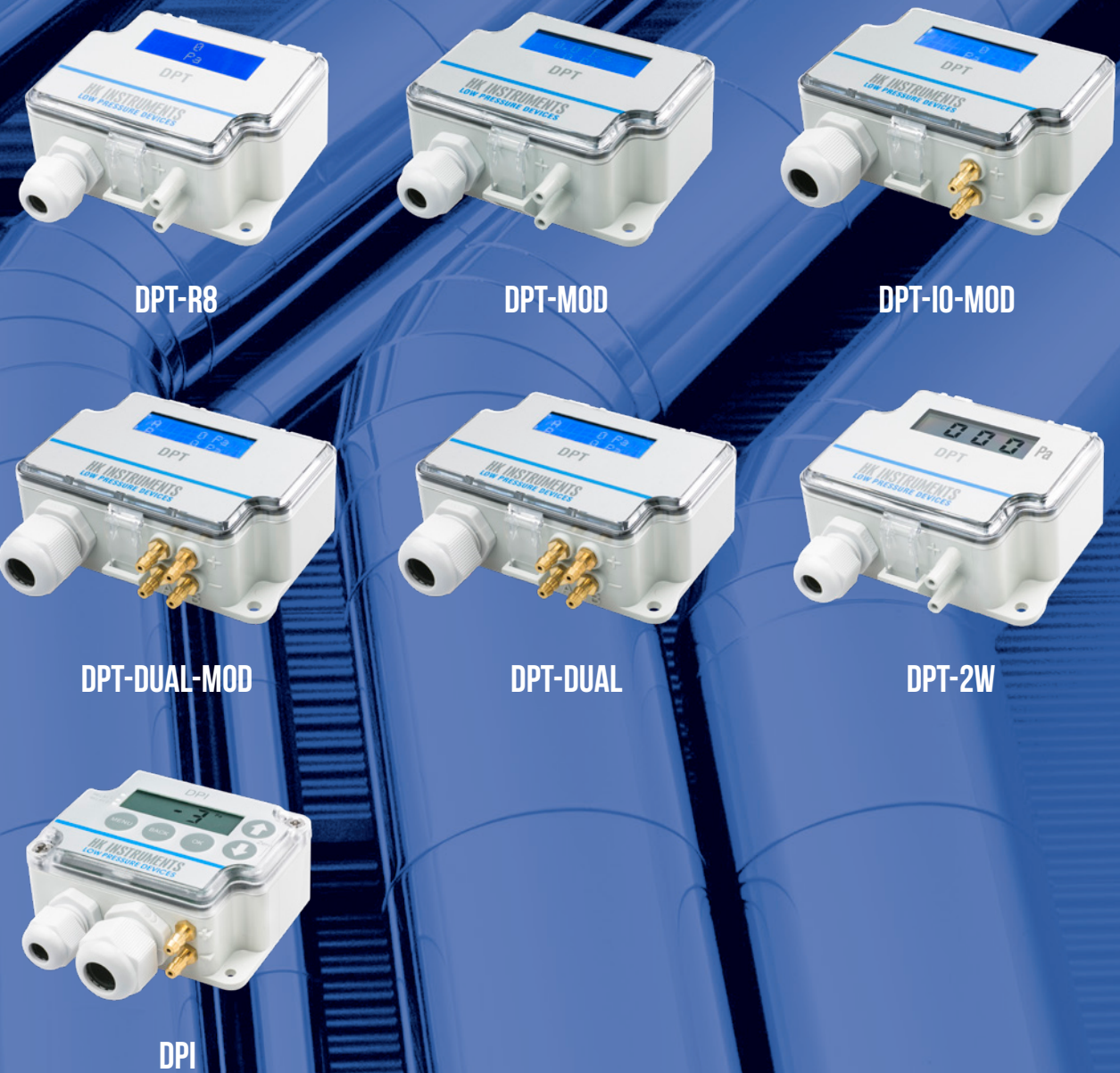


DIFFERENTIAL PRESSURE TRANSMITTERS

DPT series pressure transmitters are accurate and user-friendly devices with a stylish and modern design. Fully automated zero point calibration, AZ-calibration, offers reliability in the most sensitive of applications. In addition, the AZ-calibration provides cost savings over the lifetime of a building, as it makes the device completely maintenance-free.

The excellent usability of DPT-R8 series is widely known among electricians and installers all over the world. DPT-MOD and DPT-IO-MOD series Modbus transmitters can be connected on serial line and therefore require less wiring than traditional transmitters. Modbus communication is a modern and distortion-free way to transmit measurement data.

The DPT-DUAL-MOD with Modbus communication offers savings in the device and installation costs due to its two pressure sensors and Input terminal.



DPT-R8

DPT-MOD

DPT-IO-MOD

DPT-DUAL-MOD

DPT-DUAL

DPT-2W

DPI

DPT-R8 DIFFERENTIAL PRESSURE TRANSMITTERS

THREE-WIRE

User-friendly devices with an exceptional design



TECHNICAL DETAILS

Accuracy (from applied pressure): (models 250 and 2500)	Pressure < 125 Pa = 1 % + ±2 Pa Pressure > 125 Pa = 1 % + ±1 Pa
Accuracy (from applied pressure): (model 7000)	Pressure < 125 Pa = 1.5 % + ±2 Pa Pressure > 125 Pa = 1.5 % + ±1 Pa
Zero point calibration:	automatic with autozero element (-AZ) or by pushbutton
Measuring units:	Pa, kPa, mbar, inchWC, mmWC, psi
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	< 1.0 W (< 1.2 W with output current 20 mA) -40 °C model: <4.0 W when <0 °C
Output signals (3-wire):	0...10 VDC, Load R minimum 1 kΩ 4...20 mA, maximum load 500 Ω
Operating temperature:	-20...+50 °C (with autozero calibration -5...+50 °C) -40...+50 °C (-40C model)
Response time:	0.8 / 8 s
Protection standard:	IP54



DPT-R8

Example: DPT2500-R8-AZ-D	Product series DPT Differential pressure transmitter
	Measuring ranges (Pa)
	250 -150...+150 / -100...+100 / -50...+50 / -25...+25 / 0...25 / 0...50 / 0...100 / 0...250
	2500 -100...+100 / 0...100 / 0...250 / 0...500 / 0...1000 / 0...1500 / 0...2000 / 0...2500
	7000 0...1000 / 0...1500 / 0...2000 / 0...2500 / 0...3000 / 0...4000 / 0...5000 / 0...7000
	Model type
	-R8 Eight measuring ranges
	Zero point calibration
	-AZ With autozero calibration
	Standard with pushbutton manual zero point calibration
	Display
	-D With display
	Without display
	Span point calibration
	-S Span point calibration
	Without span point calibration
	Cold resistance
	-40C -40 °C cold resistant (not available with autozero calibration)
	Without -40 °C cold resistance
Model	DPT 2500 -R8 -AZ -D

DPT-R8

The DPT-R8 series includes electronic differential pressure transmitters that offer exceptional performance, high quality and competitive pricing. Because of the high accuracy of the devices, it is usually not necessary to narrow down the range to get precise measurements. DPT-R8 devices are easily customizable, and also available for private labeling.

USAGE & APPLICATIONS

The differential pressure transmitter is used for measuring low pressures of air and non-combustible gases in order to monitor and control building automation, HVAC and cleanroom systems.

OPTIONS

AZ: autozero element D: display S: span point calibration for high accuracy applications -40C: cold-resistant model

DPT-MOD DIFFERENTIAL PRESSURE TRANSMITTERS

WITH AIR FLOW MEASUREMENT AND MODBUS COMMUNICATION

All-in-one transmitter: measure volume flow, velocity and differential pressure



TECHNICAL DETAILS

Communication:	RS-485 Modbus (RTU)
Accuracy (from applied pressure): (model 2500)	Pressure < 125 Pa = 1 % + ±2 Pa Pressure > 125 Pa = 1 % + ±1 Pa
Accuracy (from applied pressure): (model 7000)	Pressure < 125 Pa = 1.5 % + ±2 Pa Pressure > 125 Pa = 1.5 % + ±1 Pa
Zero point calibration:	automatic with autozero element (-AZ), by pushbutton or via Modbus
Measuring units:	Pressure: Pa, kPa, mbar, inchWC, mmWC, psi Flow: m ³ /s, m ³ /h, cfm, l/s, m/s, fta/min
Supply voltage:	24 VAC ±10 % / 24 VDC ±10 %
Power consumption:	< 1.3 W
Output signal:	via Modbus
Response time:	1.0–20 s, selectable via menu or via Modbus register
Operating temperature:	-20...+50 °C (with autozero calibration -5...+50 °C)
Protection standard:	IP54



DPT-MOD

Example: DPT-MOD-2500-AZ-D	Product series		DPT	Differential pressure transmitter	
	Model type		-MOD	Modbus communication	
	Measuring ranges (Pa)		-2500	-250...2500	
			-7000	-250...7000	
	Zero point calibration		-AZ	With autozero calibration	
				Standard with pushbutton manual zero point calibration	
	Display		-D	With display	
	Cold resistance		-40C	-40 °C cold resistant (not available with autozero calibration)	
				Without -40 °C cold resistance	
	Model	DPT	-MOD	-2500	-AZ

DPT-MOD

DPT-MOD is a multifunctional transmitter for measuring volume flow, velocity, and static and differential pressure. The measurements can be read and the configuration done via Modbus communication. DPT-MOD requires less wiring than the traditional 3-wire transmitters because multiple devices can be connected on serial line.

USAGE & APPLICATIONS

The DPT-MOD is used for measuring air flow or low pressures of air and non-combustible gases in order to monitor and control building automation, HVAC and cleanroom systems. It can also be used with several different measurement probes such as FloXact™ or pitot tube, and air dampers.



NOW AVAILABLE WITH AIR FLOW
MEASUREMENT AND AUTOZERO
CALIBRATION

DPT-IO-MOD DIFFERENTIAL PRESSURE TRANSMITTERS

WITH MODBUS COMMUNICATION AND INPUT TERMINAL

Save in costs of the devices and in the installation costs



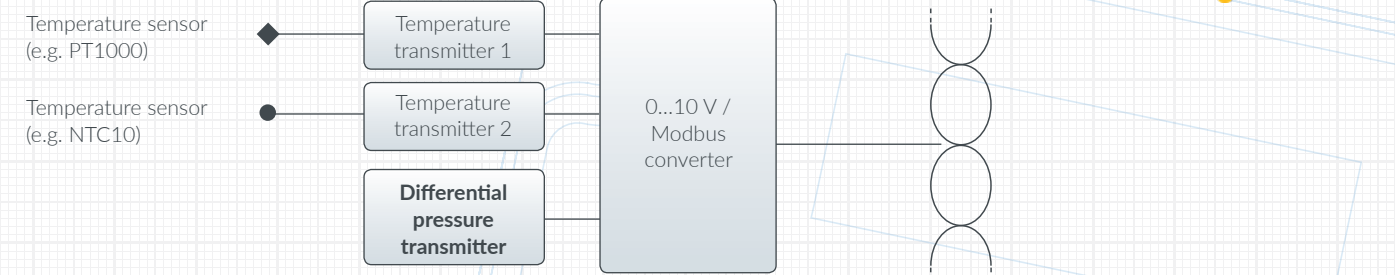
TECHNICAL DETAILS

Communication:	RS-485 Modbus (RTU)
Accuracy (from applied pressure):	Pressure < 125 Pa = 1 % + ±2 Pa
(model 2500)	Pressure > 125 Pa = 1 % + ±1 Pa
Accuracy (from applied pressure):	Pressure < 125 Pa = 1.5 % + ±2 Pa
(model 7000)	Pressure > 125 Pa = 1.5 % + ±1 Pa
Zero point calibration options:	Manual pushbutton autozero Via Modbus write coil
Measuring units:	Pa, kPa, mbar, inchWC, mmWC, psi
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	< 1.3 W
Output signal:	via Modbus
Operating temperature:	-20...+50 °C
Response time:	1...20 s selectable via menu
Protection standard:	IP54

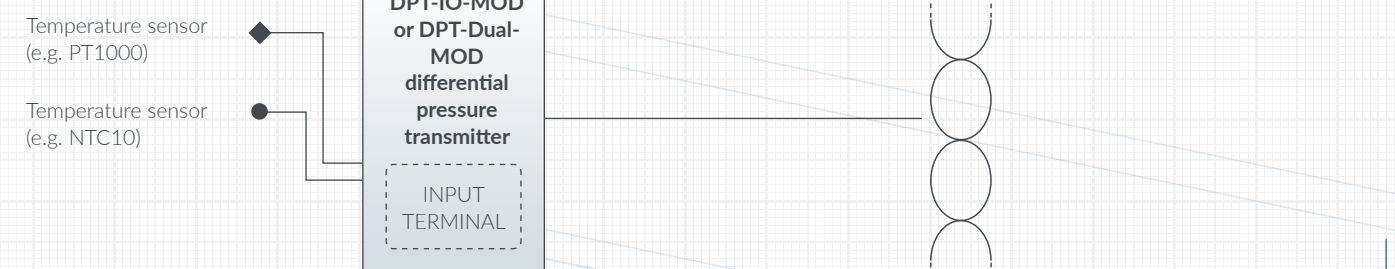
DPT-IO-MOD

Example:	Product series			
DPT-IO-MOD-2500-D	DPT	Differential pressure transmitter		
		Model type		
	-IO-MOD	Input terminal and Modbus communication		
		Measuring ranges (Pa)		
		-2500	-250...2500	
		-7000	-250...7000	
		Display		
		-D	With display	
Model	DPT	-IO-MOD	-2500	-D

Traditional system:



New system with DPT-IO-MOD or DPT-Dual-MOD



DPT-IO-MOD

DPT-IO-MOD differential pressure transmitter for air is designed for Modbus (RTU) communication network. The DPT-IO-MOD has an input terminal that turns it into a multifunction transmitter. When using the input terminal, temperature transmitters can be replaced with temperature sensors. Very precise pressure sensor and easily operated interface make the device reliable and user-friendly.

USAGE & APPLICATIONS

The DPT-IO-MOD is used for measuring low pressures of air and non-combustible gases in order to monitor and control building automation, HVAC and cleanroom systems.

DPT-DUAL-MOD DIFFERENTIAL PRESSURE TRANSMITTERS

WITH TWO PRESSURE SENSORS

AHU model includes an air flow transmitter

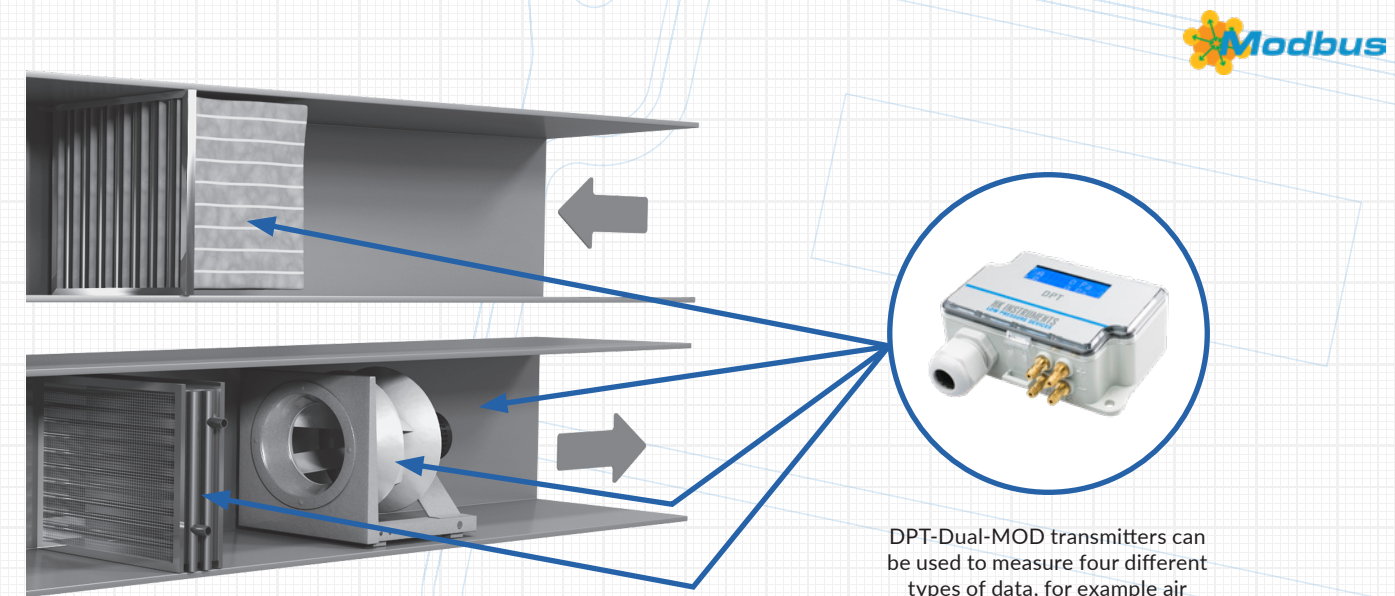


TECHNICAL DETAILS

Communication:	RS-485 Modbus (RTU)
Accuracy (from applied pressure): (model 2500)	Pressure < 125 Pa = 1 % + ±2 Pa Pressure > 125 Pa = 1 % + ±1 Pa
Accuracy (from applied pressure): (model 7000)	Pressure < 125 Pa = 1.5 % + ±2 Pa Pressure > 125 Pa = 1.5 % + ±1 Pa
Zero point calibration:	Manual pushbutton autozero Via Modbus write coil
Measuring units:	Pressure: Pa, kPa, mbar, inchWC, mmWC, psi Flow: (AHU model) m³/s, m³/h, cfm, l/s, m/s, ft/min
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	< 1.3 W
Output signal:	via Modbus
Operating temperature:	-20...+50 °C
Response time:	1...20 s selectable via menu
Protection standard:	IP54

DPT-DUAL-MOD

Example: DPT-Dual-MOD-2500-D	Product series	DPT	Differential pressure transmitter
	Model type	-Dual-MOD	Two pressure sensors and Modbus communication
	Measuring ranges (Pa)	-2500	-250...2500
		-7000	-250...7000
	-AHU	both 2500 and 7000 sensors, with flow measurement	
	Display	-D	With display
Model	DPT	-Dual-MOD	-2500 -D



DPT-Dual-MOD transmitters can be used to measure four different types of data, for example air flow, filter condition, heating coil and air temperature.

DPT-DUAL-MOD

DPT-Dual-MOD combines 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 has a Modbus interface and an Input terminal. When using the Input terminal, temperature transmitters can be replaced with temperature sensors. As a result, you will save in costs of the devices and in the installation costs. The AHU model that includes an air flow transmitter has been designed especially for ventilation units.

USAGE & APPLICATIONS

DPT-Dual-MOD can be used in all applications where you need to measure two different pressures. With the AHU model one of the measurements can be air flow. The devices are suitable for air and non-combustible gases.

DPT-DUAL DIFFERENTIAL PRESSURE TRANSMITTERS

FIELD ADJUSTABLE, MULTI-RANGE DIFFERENTIAL PRESSURE TRANSMITTER WITH TWO PRESSURE SENSORS FOR AIR



TECHNICAL DETAILS

Accuracy (from applied pressure):	Pressure < 125 Pa = 1 % + ±2 Pa
(model 2500)	Pressure > 125 Pa = 1 % + ±1 Pa
Accuracy (from applied pressure):	Pressure < 125 Pa = 1.5 % + ±2 Pa
(model 7000)	Pressure > 125 Pa = 1.5 % + ±1 Pa
Zero point calibration:	by pushbutton
Measuring units:	Pressure: Pa, kPa, mbar, inchWC, mmWC, psi
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	< 1.0 W
Output signals (3-wire):	2 x 0...10 VDC or 2 x 0...5 VDC (selectable by jumper), minimum 1kΩ
Operating temperature:	-20...+50 °C
Response time:	0,8 / 4 s
Protection standard:	IP54

DPT-DUAL

Example:	Product series		
	DPT-Dual-2500-D	DPT-Dual	Differential pressure transmitter with two pressure sensors
		Measuring ranges (Pa)	
		-2500 -100...+100 / 0...100 / 0...250 / 0...500 / 0...1000 / 0...1500 / 0...2000 / 0...2500	
		-7000 0...1000 / 0...1500 / 0...2000 / 0...2500 / 0...3000 / 0...4000 / 0...5000 / 0...7000	
		Display	
		-D With display	
		Without display	
Model	DPT-Dual	-2500	-D

DPT-DUAL

DPT-Dual series differential pressure transmitters are engineered for building automation in the HVAC/R industry. DPT-Dual is a technologically advanced transmitter measuring static and differential pressure from two different points, with field selectable units, range and output, all in a single device. Measuring static and differential pressure from two different points, with field selectable units, range and output, all in a single device.

USAGE

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

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

DPT-2W

DIFFERENTIAL PRESSURE TRANSMITTERS

TWO WIRE



TECHNICAL DETAILS

Accuracy (from FS):	±1.5 %
Long term stability, typical 1 year:	≤ ± 8 Pa; model 2500
Measuring unit:	Pa
Zero point calibration:	by pushbutton
Supply voltage:	10...35 VDC
Output signal:	4...20 mA
Operating temperature:	-10...+50 °C
Response time:	0.8 / 4 s
Protection standard:	IP54

DPT-2W

Example: DPT-2W-2500-R8-D	Product series			
	DPT-2W	Differential pressure transmitter with 2-wire configuration		
	Measuring ranges (Pa)			
	-2500 / -100...+100 / 0...100 / 0...250 / 0...500 / 0...1000 / 0...1500 / 0...2000 / 0...2500			
Model	Model type			
	-R8	Eight measuring ranges		
	Display			
DPT-2W	-2500	-R8	-D	With display
				Without display

DPT-2W

The DPT-2W is a differential pressure transmitter with two-wire connection.

USAGE & APPLICATIONS

The differential pressure transmitter is used for measuring low pressures of air and non-combustible gases in order to monitor and control building automation, HVAC and cleanroom systems.

LOOP-POWERED 4-20mA
TRANSMITTER

DPI ELECTRONIC DIFFERENTIAL PRESSURE TRANSMITTER WITH RELAY OUTPUT

THE RIGHT CHOICE WHEN YOU NEED AN AIR PRESSURE ALARM



TECHNICAL DETAILS

Accuracy (from FS):	±1.5 % (±0.7 % with span point calibration) (including: general accuracy, temperature drift, linearity, hysteresis, and repetition error)
Long term stability, typical 1 year:	±1 Pa (±8 Pa without autozero element -AZ)
Zero point calibration:	automatic with autozero element (-AZ) or by using the buttons on the lid
Supply voltage:	21-35 VDC / 24 VAC ±10 % (without -AZ option) 24 VDC ±10 % / 24 VAC ±10 % (with -AZ option)
Current consumption:	35 mA + relays (7 mA each) + AZ (20 mA) + 0...10 V output (10 mA)
Output signals:	0...10 V, L min 1 kΩ Relay output 1 (250 VAC / 30 VDC / 6 A) Optional relay output 2 (250 VAC / 30 VDC / 6 A)
Operating temperature:	-10...+50 °C (with autozero calibration -5...+50 °C)
Response time:	0.5...10 s
Protection standard:	IP54

DPI

Example: DPI±500-2R-D	Product series			
	DPI	Differential pressure indicator		
	Measuring ranges (Pa)			
	±500	±100 / ±250 / ±300 / ±500		
	2500	100 / 250 / 1000 / 2500		
	Number of relays			
	-1R	One relay		
	-2R	Two relays		
	Zero point calibration			
	-AZ	With autozero calibration		
		Standard with manual zero point calibration		
	Display			
	-D	With display		
Model	DPI	±500	-1R	-D

DPI
The DPI is an electronic differential pressure transmitter with up to two relay outputs.

USAGE & APPLICATIONS
The differential pressure indicator is used for measuring and indicating low pressures of air and non-combustible gases in order to monitor and control building automation, HVAC and cleanroom systems.

AIR FLOW AND VELOCITY TRANSMITTERS

DPT-FLOW transmitters are unique devices that make measuring air flow and air velocity easier than ever before. Together with FLOXACT™ measurement probes the same devices are the right option when measuring flow in a duct. Again, if you wish to measure air velocity, your selection would be AVT which offers multiple measuring ranges in a single device together with relay and temperature output signals.



DPT-FLOW



FLOXACT™



DPT-FLOW-BATT



AVT

FLOXACT™

AVERAGING AIR FLOW MEASUREMENT PROBE

INSTALLING FLOXACT

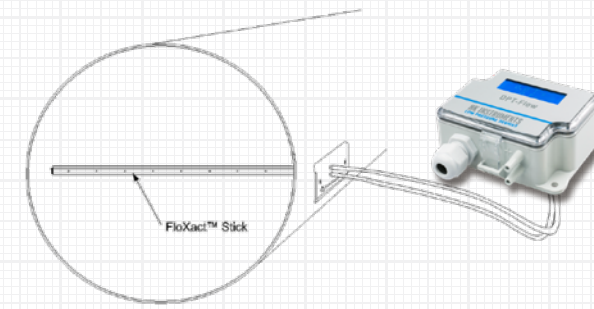


Figure 1. FloXact™ -R mounting.

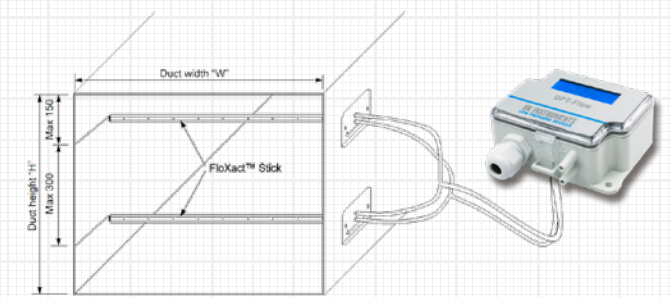
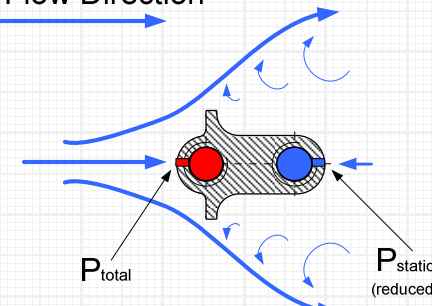


Figure 2. FloXact™ -L mounting.



HOW IT WORKS

Air Flow Direction

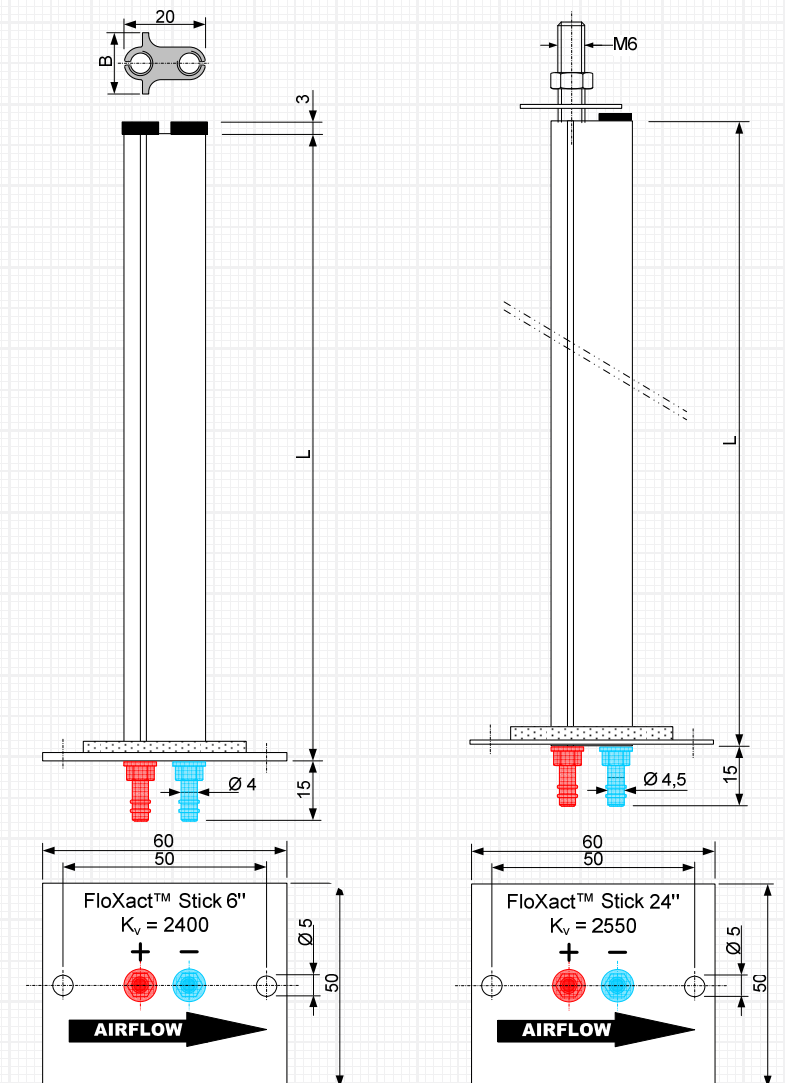


Operation of the FloXact™

Dimensions

FloXact™-R available models :
All standard round duct sizes up to 1500 m

FloXact™-L available models :
250, 300, ... 1500 (50 mm steps)



APPLICATION

The FloXact™ probe is a differential air pressure device designed to measure air volume flow in a duct. It includes multiple sensing points to measure total and static pressures. The FloXact™ probe incorporates a unique design to amplify the differential pressure by 2.5 times for accurate measurement of lower air velocities down to 1.0 m/s (200 fpm). It is easy to install and cost-effective.

DESIGN FEATURES

- Multiple sensing points for greater accuracy
- Easy installation
- Chamfered sensing points for consistent readings
- 2 % accuracy
- 2.5 X signal amplification
- Accepts 1/4" OD tubing

DPT-FLOW-BATT

BATTERY POWERED DIFFERENTIAL PRESSURE AND AIR FLOW METER

Measure the air flow in environments where electricity is not available



TECHNICAL DETAILS

Accuracy (from FS):	±1.5 % (Including: general accuracy, temperature drift, linearity, hysteresis, long term stability, and repetition error)
Zero point calibration:	by pushbutton
Measuring units:	Pressure: Pa, kPa, mbar, inchWC, mmWC, psi Flow: m³/s, m³/h, cfm, l/s, m/s, ft/min
Supply voltage:	9 V battery
Current consumption:	~20 mA on active mode
Operating temperature:	-20...+50 °C
Response time:	1.0-10 s, selectable via menu
Protection standard:	IP54

DPT-FLOW-BATT

Example: DPT-Flow-Batt-7000-D	Product series	
	DPT-Flow-Batt	Battery powered air flow meter
	Measuring ranges (Pa)	
	-7000	0...7000
Model	Display	
	DPT-Flow-Batt	-7000 -D With display

DPT-FLOW-BATT

DPT-Flow-Batt is a user-friendly on-site display for air flow designed for environments and applications where electricity is not available. One device is suitable for a range of different fan types. It also provides an easy way to measure flow rate in a duct system for example together with a FloXact™ averaging measurement probe.

USAGE & APPLICATIONS

The DPT-Flow-Batt is an on-site display designed for air handling units to measure the air flow on centrifugal fans. The DPT-Flow-Batt can also be used in the duct system as an on-site display for flow. The device can be used with several different measurement probes such as FloXact™ or pitot tube, and air dampers. The requirement is that the K-value of the measurement probe or damper is known.

AVT AIR VELOCITY AND TEMPERATURE TRANSMITTER

WITH RELAY OUTPUT



TECHNICAL DETAILS

Accuracy (from reading):	< 0.2 m/s + 5 % (Range 0...2 m/s) < 0.5 m/s + 5 % (Range 0...10 m/s) < 1.0 m/s + 5 % (Range 0...20 m/s)
Measuring units:	m/s, °C
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	35 mA (50 mA with relay) + 40 mA with mA outputs
Output signal 1:	0...10 V (linear to °C), L min 1 kΩ or 4...20 mA (linear to °C), L max 400 Ω
Output signal 2:	0...10 V (linear to m/s), L min 1 kΩ or 4...20 mA (linear to m/s), L max 400 Ω
Optional relay output:	Potential free SPDT 250 VAC, 6 A / 30 VDC, 6 A with adjustable switching point and hysteresis
Operating temperature:	0...+50 °C
Probe:	Adjustable immersion length 50...180 mm, mounting flange included
Protection standard:	IP54

AVT

Example: AVT-D-R	Product series		
	AVT	Air velocity transmitter, measuring ranges 0...2 / 0...10 / 0...20 m/s	
	Display		
	-D	With display	
		Without display	
	Relay		
	-R	With relay	
		Without relay	
Model	AVT	-D	-R

AVT

The AVT is an electronic air velocity and temperature transmitter for air and non-combustible gases with optional relay output.

USAGE

AVT is used in HVAC and building automation systems.

APPLICATIONS

Monitoring air velocity and temperature in ducts and laminar flow cabinets, and at ventilators and dampers.

PRESSURE AND FLOW CONTROLLERS

The DPT-CTRL series PID controllers are engineered for stand-alone building automation in the HVAC/R industry. With the built-in controller it is possible to control the constant pressure or flow of fans, VAV systems or dampers. DPT-CTRL series offers various models for energy-efficient control of modern EC fans in all sizes of systems.

The DPT-CTRL-MOD can be used as a pressure or flow controller in modular building automation systems. Setpoints and other parameters can be adjusted remotely via bus. With the temperature compensation feature, the fan speed can be adjusted according to temperature. This saves energy by exhausting the right amount of air in cold environments.

DPT-CTRL-2SP is a perfect choice for small independent systems where the user can choose the desired air flow from two separate setpoints by using for example occupancy sensor or key card switch.



DPT-CTRL



DPT-CTRL-MOD



DPT-CTRL-2SP

DPT-CTRL PID CONTROLLERS

WITH DIFFERENTIAL PRESSURE OR AIR FLOW TRANSMITTER



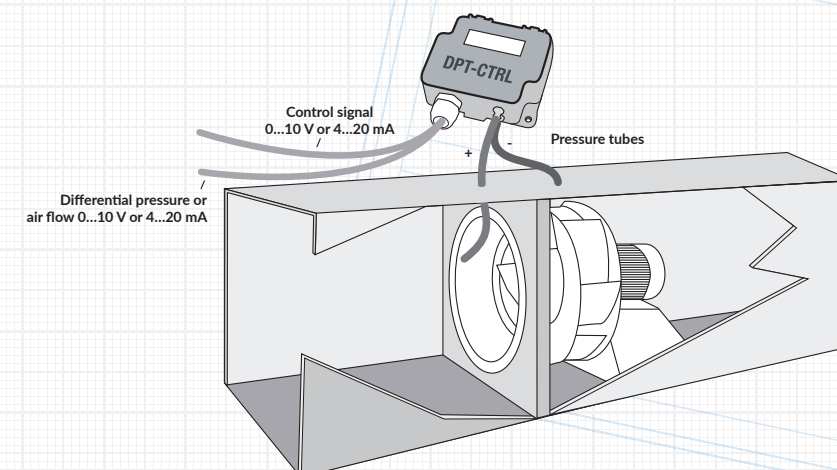
TECHNICAL DETAILS

Accuracy (from applied pressure): (model 2500)	Pressure < 125 Pa = 1 % + ±2 Pa Pressure > 125 Pa = 1 % + ±1 Pa
Accuracy (from applied pressure): (model 7000)	Pressure < 125 Pa = 1.5 % + ±2 Pa Pressure > 125 Pa = 1.5 % + ±1 Pa
Measuring units:	Pressure: Pa, kPa, mbar, inchWC, mmWC, psi Flow: m³/s, m³/h, cfm, l/s, m/s, ft/min
Control signal:	0...10 V or 4...20 mA (selectable by jumper)
Output signal for pressure or air flow (selectable via menu):	0...10 VDC, Load R minimum 1 kΩ or 4...20 mA, maximum load 500 Ω (selectable by jumper)
PID-parameters:	Adjustable via menu
Zero point calibration:	Automatic with autozero element (-AZ) or by pushbutton
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	< 1.2 W
Operating temperature:	-20...+50 °C with autozero (-AZ) calibration -5...+50 °C
Protection standard:	IP54



DPT-CTRL

Example: DPT-CTRL-2500-AZ-D	Product series DPT-CTRL	Pressure and flow controller				
	Model type	Analog outputs				
	Measuring ranges (Pa)	<table border="0"> <tr> <td>-2500</td> <td>0...2500</td> </tr> <tr> <td>-7000</td> <td>0...7000</td> </tr> </table>	-2500	0...2500	-7000	0...7000
-2500	0...2500					
-7000	0...7000					
	Zero point calibration	<table border="0"> <tr> <td>-AZ</td> <td>With autozero calibration</td> </tr> <tr> <td></td> <td>Standard with pushbutton manual zero point calibration</td> </tr> </table>	-AZ	With autozero calibration		Standard with pushbutton manual zero point calibration
-AZ	With autozero calibration					
	Standard with pushbutton manual zero point calibration					
	Display	<table border="0"> <tr> <td>-D</td> <td>With display</td> </tr> </table>	-D	With display		
-D	With display					
	Cold resistance	<table border="0"> <tr> <td>-40C</td> <td>-40 °C cold resistant (not available with autozero calibration)</td> </tr> <tr> <td></td> <td>Without -40 °C cold resistance</td> </tr> </table>	-40C	-40 °C cold resistant (not available with autozero calibration)		Without -40 °C cold resistance
-40C	-40 °C cold resistant (not available with autozero calibration)					
	Without -40 °C cold resistance					
Model	DPT-CTRL	-2500 -AZ -D				



DPT-CTRL

DPT-CTRL is a multifunctional PID controller with differential pressure or air flow transmitter. It enables controlling constant pressure or flow of fans, VAV systems or dampers. When controlling flow, it is possible to select a fan manufacturer or a common measuring probe that has a K-value.

USAGE & APPLICATIONS

DPT-CTRL can be used to control air flow or constant pressure in applications where it is important to keep a constant vacuum or a steady air flow, such as vacuuming units in renovation sites that keep a constant negative pressure so that impurities do not spread to other spaces.

DPT-CTRL-MOD PID CONTROLLERS

WITH DIFFERENTIAL PRESSURE OR AIR FLOW TRANSMITTER
AND MODBUS COMMUNICATION



TECHNICAL DETAILS

Communication:	RS-485 Modbus (RTU)
Accuracy (from applied pressure):	Pressure < 125 Pa = 1 % + ±2 Pa Pressure > 125 Pa = 1 % + ±1 Pa
Measuring units:	Pressure: Pa, kPa, mbar, inchWC, mmWC, psi Flow: m³/s, m³/h, cfm, l/s, m/s, ft/min
Control signal:	0...10 V
PID-parameters:	Selectable via menu and Modbus
Zero point calibration:	via Modbus or by pushbutton
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	< 1.0 W
Output signal:	via Modbus
Operating temperature:	-20...+50 °C
Protection standard:	IP54

DPT-CTRL-MOD

Example: DPT-Ctrl-MOD- 2500-D	Product series		DPT-Ctrl	Pressure and flow controller
	Model type		-MOD	Modbus communication
	Measuring ranges (Pa)		-2500	-250...2500
	Display		-D	With display
	Model	DPT-Ctrl	-MOD	-2500



OUTSIDE AIR TEMPERATURE
COMPENSATION FUNCTION AND
FIXED OUTPUT FUNCTION VIA MENU
AND MODBUS

DPT-CTRL-MOD

The DPT-CTRL-MOD controller is engineered for building automation in the HVAC industry. With the built-in controller of the DPT-CTRL-MOD it is possible to control the constant pressure or flow of fans, VAV systems or dampers. When controlling air flow, it is possible to select a fan manufacturer or a common measuring probe that has a K-value. Modbus communication enables remote adjustment of the setpoint and other parameters, so it can be used as a part of building management systems (BMS).

USAGE & APPLICATIONS

DPT-CTRL-MOD is designed to be used in buildings with a BMS to control air flow or constant pressure of an individual zone. A building operator can easily monitor and adjust the parameters via Modbus. The outdoor temperature compensation feature brings energy savings in cold areas automatically by decreasing extract air flow rates to preserve warm air.

DPT-CTRL-2SP PID CONTROLLERS

WITH TWO SETPOINTS

DPT-Ctrl-2SP may be used as a means of saving energy when a room is not occupied



TECHNICAL DETAILS

Accuracy (from applied pressure):	Pressure < 125 Pa = 1 % + ±2 Pa (model 2500) Pressure > 125 Pa = 1 % + ±1 Pa
Measuring units:	Pressure: Pa, kPa, mbar, inchWC, mmWC, psi Flow: m³/s, m³/h, cfm, l/s, m/s, ft/min
Control signal:	0...10V
Output signal:	None
PID-parameters:	Adjustable via menu
Zero point calibration:	by pushbutton
Supply voltage:	24 VDC ±10 % / 24 VAC ±10 %
Power consumption:	< 1.0 W
Operating temperature:	-20...+50 °C
Protection standard:	IP54

DPT-CTRL-2SP

Example: DPT-Ctrl-2SP- 2500-D	Product series	
	DPT-Ctrl	Pressure and flow controller
	Model type	
	-2SP Two setpoints (switchable via binary input), only control output	
Measuring ranges (Pa)		
-2500 -250...2500		
Display		
-D With display		
Model	DPT-Ctrl	-2SP -2500 -D

DPT-CTRL-2SP

DPT-CTRL-2SP is designed for simple systems to control constant pressure or air flow of fans, VAV systems or dampers. The device has a binary input to select between two user-adjustable setpoints. When controlling air flow, it is possible to select a fan manufacturer or a common measuring probe that has a K-value. The device also includes a temperature sensor input which enables compensation of flow or pressure according to for example outside temperature.

USAGE & APPLICATIONS

DPT-CTRL-2SP can be used to control air flow or constant pressure in applications where it is important to keep a constant vacuum or steady air flow. Energy savings and optimal indoor air quality can be achieved because of the two setpoints and the outdoor temperature compensation feature of the device. The desired setpoint can be selected, for example, with weekly clock, turn switch or key card switch.

CARBON DIOXIDE TRANSMITTERS

CDT2000 series products are economical and versatile devices that measure CO₂ concentration and temperature (T). These devices are available for duct or wall mounting. CDT2000 is the first device measuring CO₂ with a large touchscreen display enabling easy configuration and adjustment. CDT2000 Duct is a cost-effective solution for measuring the total concentration of CO₂ in duct systems.



CDT2000



CDT2000 DUCT

CDT2000 CARBON DIOXIDE TRANSMITTERS

WALL MOUNTED

Touchscreen display for easy adjustment



CDT2000

CDT2000 combines CO₂ concentration, temperature and optional relative humidity measurements into one easy-to-use device with a touchscreen display. It offers easy installation and adjustment, several different model options and various output signals that are configurable separately for each measurement parameter. CDT2000 utilizes the industry standard NDIR measurement principle with self-calibrating ABC logic™ for CO₂ measurement. CDT2000-DC is a dual channel model with a measuring channel and a reference channel that makes a continuous comparison and the necessary adjustment accordingly. CDT2000-DC is also suitable for buildings that are continuously occupied.

USAGE & APPLICATIONS

CDT2000 wall mount model is used to monitor and control CO₂ and humidity levels in offices, public spaces, meeting rooms and classrooms. CDT2000-DC series devices can also be used in applications where there is a constant source of carbon dioxide present (for example hospitals and greenhouses).

TECHNICAL DETAILS

Accuracy:	CO ₂ : ±40 ppm + 2 % of reading, DC model: 75 ppm or 10 % of reading (whichever is greater) Temperature: <0.5 °C Relative humidity: ±2...3 % rH at 0...50 °C and 10...90 % rH Total error band includes accuracy, hysteresis and temperature effect over 5...50 °C and 10-90 % rH
Measuring units:	ppm, °C, % rH
Calibration:	Automatic self-calibration, ABC Logic™ or continuous comparison (DC)
Supply voltage:	24 VDC/VAC ±10 %
Output signal 1:	0/2...10 V (linear to CO ₂), L min 1 kΩ or 4...20 mA (linear to CO ₂), L max 500 Ω
Output signal 2:	0/2...10 V (linear to rH), L min 1 kΩ or 4...20 mA (linear to rH), L max 500 Ω
Output signal 3:	0/2...10 V (linear to Temp), L min 1 kΩ or 4...20 mA (linear to Temp), L max 500 Ω
Optional relay output:	Potential free SPDT 250 VAC, 6 A / 30 VDC, 6 A with adjustable switching point and hysteresis
Operating temperature:	0...+50 °C
Protection standard:	IP20

CDT

Example:	Product series		
	CDT2000-1R-D	CDT2000	Carbon dioxide transmitter, analog outputs
	CDT-MOD-2000	Carbon dioxide transmitter, Modbus communication	
	Calibration		
		ABC logic™, Automatic Background Calibration	
	-DC	Dual channel, for continuously occupied space	
	Mounting		
		Wall mount	
	Relay		
	-1R	With relay	
		Without relay	
	Relative humidity sensor		
	-rH	With relative humidity sensor	
		Without relative humidity sensor	
	Display		
	-D	With display	
		Without display	
Model	CDT2000	-1R	-D



CDT2000-DC IS ALSO SUITABLE FOR BUILDINGS THAT ARE CONTINUOUSLY OCCUPIED

CDT2000 DUCT CARBON DIOXIDE TRANSMITTERS

DUCT MOUNTED

Measure the total concentration of CO₂ where room measurement is not possible



CDT2000 DUCT

CDT2000 Duct combines CO₂ and temperature measurements into one device installed in a ventilation duct. Illuminated display ensures easy readability also from a distance. The CDT2000 Duct has a screwless lid and an easily adjustable mounting flange that make installing the device easy. CDT2000 utilizes the industry standard NDIR measurement principle with self-calibrating ABC logic™ for CO₂ measurement. CDT2000-DC is a dual channel model with a measuring channel and a reference channel that makes a continuous comparison and the necessary adjustment accordingly. CDT2000-DC is also suitable for buildings that are continuously occupied.

USAGE & APPLICATIONS

CDT2000 Duct is used to monitor and control CO₂ concentration of incoming and return air in a ventilation system. CDT2000-DC Duct series devices can also be used in applications where there is a constant source of carbon dioxide present (for example hospitals and greenhouses).

TECHNICAL DETAILS

Accuracy:	CO ₂ : ±40 ppm + 2 % of reading, DC model: 75 ppm or 10 % of reading (whichever is greater) Temperature: <0.5 °C
Measuring units:	ppm, °C
Calibration:	Automatic self-calibration, ABC Logic™ or continuous comparison (DC)
Supply voltage:	24 VDC/VAC ±10 %
Output signal 1:	0/2...5/10 V (linear to CO ₂), L min 1 kΩ
Output signal 2:	0/2...5/10 V (linear to T), L min 1 kΩ
Operating temperature:	0...+50 °C
Protection standard:	IP54

CDT DUCT

Example:	Product series		
	CDT2000 Duct-D	CDT2000	Carbon dioxide transmitter, analog outputs
	CDT-MOD-2000	Carbon dioxide transmitter, Modbus communication	
	Calibration		
		ABC logic™, Automatic Background Calibration	
	-DC	Dual channel, for continuously occupied space	
	Mounting		
	Duct	Duct mount	
	Display		
	-D	With display	
		Without display	
Model	CDT2000	Duct	-D



ALSO AVAILABLE WITH MODBUS COMMUNICATION

HUMIDITY TRANSMITTERS

RHT series devices measure relative humidity (rH) and temperature. They are available for duct or wall mounting. The configuration and adjustment of the RHT is quick and easy because of the large touchscreen display. RHT Duct is a user-friendly solution for measuring relative humidity in air ducts.



RHT



RHT DUCT

RHT HUMIDITY TRANSMITTERS

WALL MOUNTED

Touchscreen display for easy adjustment



TECHNICAL DETAILS

Accuracy:	Temperature: <0.5 °C Relative humidity: ±2...3 % rH at 0...50 °C and 10...90 % rH Total error band includes accuracy, hysteresis and temperature effect over 5...50 °C and 10-90 % rH
Measuring units:	°C, % rH
Supply voltage:	24 VDC/VAC ±10 %
Output signal 1:	0/2...10 V (linear to rH), L min 1 kΩ or 4...20 mA (linear to rH), L max 500 Ω
Output signal 2:	0/2...10 V (linear to Temp), L min 1 kΩ or 4...20 mA (linear to Temp), L max 500 Ω
Optional relay output:	Potential free SPDT 250 VAC, 6 A / 30 VDC, 6 A with adjustable switching point and hysteresis
Operating temperature:	0...+50 °C
Protection standard:	IP20

RHT

Example: RHT-1R-D	Product series		
	RHT	Relative humidity transmitter, analog outputs	
	RHT-MOD	Relative humidity transmitter, Modbus communication	
	Mounting		
	Wall mount		
	Relay		
	-1R	With relay	
		Without relay	
	Display		
	-D	With display	
		Without display	
Model	RHT	-1R	-D



ALSO AVAILABLE WITH MODBUS
COMMUNICATION

RHT

RHT is a wall mounted relative humidity and temperature transmitter that offers several different model options for easy customizability.

USAGE & APPLICATIONS

RHT wall mount model is used to monitor and control relative humidity levels in offices, public spaces, hospitals, meeting rooms and classrooms.

RHT DUCT HUMIDITY TRANSMITTERS

DUCT MOUNTED



RHT DUCT

RHT DUCT is a duct mounted humidity and temperature transmitter available also with an illuminated display.

USAGE & APPLICATIONS

RHT DUCT is used to monitor and control relative humidity of incoming and return air in ventilation system.

TECHNICAL DETAILS

Accuracy:	Temperature: <0.5 °C Relative humidity: ±2...3 % rH at 0...50 °C and 10...90 % rH Total error band includes accuracy, hysteresis and temperature effect over 5...50 °C and 10-90 % rH
Measuring units:	°C, % rH
Supply voltage:	24 VDC/VAC ±10 %
Output signal 1:	0/2...5/10 V (linear to rH), L min 1 kΩ
Output signal 2:	0/2...5/10 V (linear to T), L min 1 kΩ
Operating temperature:	0...+50 °C
Protection standard:	IP54

RHT DUCT

Example:	Product series		
	RHT	Relative humidity transmitter, analog outputs	
RHT-MOD	Relative humidity transmitter, Modbus communication		
	Mounting		
	Duct	Duct mount	
	Display		
	-D	With display	
		Without display	
Model	RHT	Duct	-D



ALSO AVAILABLE WITH MODBUS COMMUNICATION

CMT CARBON MONOXIDE TRANSMITTER

Screw fixing makes replacing the sensor easy. This is particularly useful when the device needs calibrating.



CMT

The CMT is an easy-to-use, reliable transmitter for detecting CO gas. It is commonly used in places where air includes CO gas, such as parking garages.

TECHNICAL DETAILS

Measuring unit:	ppm
Measuring range:	0...300 ppm CO
Measuring element:	Electro-chemical
Linearity:	≤2 % on 300 ppm CO
Cross sensitivity:	≤2 % on 300 ppm CO
Response time t90:	<60 s
Supply voltage:	14...28 VDC
Output signal:	4-20 mA (2-wire)
Operating temperature:	-10...+40 °C
Protection standard:	IP54

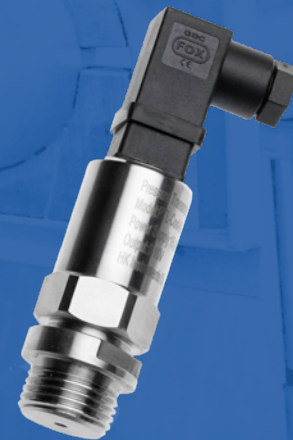
PRESSURE TRANSMITTERS FOR LIQUIDS

Pressure detection in liquids in heating and cooling systems, also suitable for refrigerants and non-aggressive gases.



PTL-HEAT

PTL-Heat is used for pressure detection in non-condensing applications such as district heating or heat recovery systems



PTL-COOL

PTL-Cool is designed for extreme conditions where condensation is a common problem. PTL-Cool has a two-layer protection for electronics. This is why the possible condensation does not harm the product. Suitable for plants that use refrigerants.



DPTL

The DPTL is made for differential pressure detection in liquids for air-conditioning, heating and water systems. The equipment can withstand mildly corrosive substances and liquids.

TECHNICAL DETAILS PTL-HEAT

Accuracy (from FS):	±1.0 %
Power:	15...24 VDC/VAC
Output:	0...10 V or 4...20 mA (2-wire)
Protection standard:	IP65 one-layer protection
Pressure connector:	inside thread G1/4"
Ambient temperature:	0...+105 °C, non-condensing
Temperature of medium:	0...+125 °C

TECHNICAL DETAILS PTL-COOL

Accuracy (from FS):	±1.0 %
Power:	15...24 VDC/VAC
Output:	0...10 V or 4...20 mA (2-wire)
Protection standard:	IP65 two-layer protection against condensation
Pressure connector:	inside thread G1/4"
Ambient temperature:	-40...+60 °C
Temperature of medium:	-40...+50 °C

PTL

Example: PTL-Heat-4-V	Product series			
	PTL	Pressure transmitter for liquids		
		Application		
		- Heat	For heating applications	
		- Cool	For cooling applications	
		Measuring range (bar)		
		-4	0...4 (PTL-Cool only on request)	
		-6	0...6	
		-10	0...10	
		-16	0...16 (PTL-Cool only on request)	
		-25	0...25 (PTL-Cool only on request)	
		Output		
		-V	Voltage	
		-A	Current (2-wire)	
Model	PTL	-Heat	-4	-V

PTL-COOL HAS A TWO-LAYER PROTECTION FOR ELECTRONICS. THIS IS WHY THE POSSIBLE CONDENSATION DOES NOT HARM THE PRODUCT.

TECHNICAL DETAILS

Accuracy (from FS):	±1.0 %
Power:	15...24 VDC/VAC
Output:	0...10 V or 4...20 mA (3-wire)
Protection standard:	IP65
Pressure connector:	inside thread G1/4"
Operating temperature:	-10...+80 °C

DPTL

Example: DPTL-2,5-V	Product series			
	DPTL	Differential pressure transmitter for liquids		
		Measuring range (bar)		
		-1	0...1	
		-2,5	0...2.5	
		-4	0...4	
		-6	0...6	
		Output		
		-V	Voltage	
		-A	Current (3-wire)	
Model	DPTL	-2,5	-V	

PASSIVE TEMPERATURE SENSORS

PTE series passive temperature sensors are engineered for HVAC applications. The design approach has been to offer user-friendly and premium quality products with competitive pricing.

PTE products are available with the following sensor types:

- NTC10k
- NTC20k
- Pt1000
- Ni1000
- Ni1000-LG



PTE-DUCT



PTE-ROOM



PTE-CABLE



PTE-O



PTE-O1

PTE-DUCT PASSIVE TEMPERATURE SENSORS

DUCT TEMPERATURE SENSOR FOR HVAC APPLICATIONS



PTE-DUCT

PTE-DUCT is a passive temperature sensor engineered for HVAC applications. PTE-DUCT is used to sense air temperature inside a ventilation duct. The temperature sensor is housed inside a stainless steel tube that protects it from the environment and condensation, ensuring long service life.

USAGE & APPLICATIONS

PTE-DUCT is commonly used in HVAC systems for measuring air temperature in ventilation ducts in offices, hospitals, schools etc.

TECHNICAL DETAILS

Accuracy:	NTC10k ± 0.25 °C @ 25 °C NTC20k ± 0.25 °C @ 25 °C Pt1000 ± 0.3 °C @ 0 °C Ni1000 ± 0.4 °C @ 0 °C Ni1000-LG ± 0.4 °C @ 0 °C
Operating temperature:	-50 ... +100 °C
Sensor tube length:	190 mm
Sensor tube outer diameter:	7 mm
Protection class:	IP54

PTE-DUCT

Example: PTE-Duct-NTC10	Product series		
	PTE	Passive temperature sensor for gas	
	Installation type		
	-Duct	Duct	
Model	Sensor element		
	PTE	-Duct	-NTC10 10 KΩ @ 25 °C
			-NTC20 20 KΩ @ 25 °C
			-Pt1000 1000 Ω @ 0 °C
			-Ni1000 1000 Ω @ 0 °C
			-Ni1000-LG 1000 Ω @ 0 °C

PTE-ROOM PASSIVE TEMPERATURE SENSORS

New housing



TECHNICAL DETAILS

Accuracy:	NTC10k ± 0.25 °C @ 25 °C NTC20k ± 0.25 °C @ 25 °C Pt1000 ± 0.3 °C @ 0 °C Ni1000 ± 0.4 °C @ 0 °C Ni1000-LG ± 0.4 °C @ 0 °C
Operating temperature:	-10 ... +50 °C
Housing material:	ABS
Housing dimensions:	85 x 85 x 27,5 mm
Protection class:	IP20

PTE-ROOM

Example: PTE-Room-NTC10	Product series		
	PTE	Passive temperature sensor for gas	
	Installation type		
	-Room	Room	
	Sensor element		
	-NTC10	10 KΩ @ 25 °C	
	-NTC20	20 KΩ @ 25 °C	
	-Pt1000	1000 Ω @ 0 °C	
	-Ni1000	1000 Ω @ 0 °C	
	-Ni1000-LG	1000 Ω @ 0 °C	
Model	PTE	-Room	-NTC10

PTE-ROOM

PTE-ROOM is a passive temperature sensor engineered for HVAC applications. PTE-ROOM is used to sense air temperature indoors. The temperature sensor is housed in a modern white plastic housing. PTE-ROOM is particularly easy to install. The cover can be opened without tools and the cable can be routed from behind or above/below the installation surface. PTE-ROOM can be installed on top of a standard electrical switch box.

USAGE & APPLICATIONS

PTE-ROOM is commonly used in HVAC systems for measuring indoor air temperature in offices, hospitals, schools etc.

PTE-CABLE PASSIVE TEMPERATURE SENSORS

CABLE SENSOR FOR HVAC APPLICATIONS

PTE-Cable has a high protection rating of IP67



TECHNICAL DETAILS

Accuracy:	NTC10k ± 0.25 °C @ 25 °C NTC20k ± 0.25 °C @ 25 °C Pt1000 ± 0.3 °C @ 0 °C Ni1000 ± 0.4 °C @ 0 °C Ni1000-LG ± 0.4 °C @ 0 °C
Operating temperature:	-60 ... +180 °C
Short-term temperature:	up to +250 °C
Materials:	Sleeve: Stainless steel Cable: Silicone rubber
Sleeve dimensions:	Outer diameter: 6 mm Length: 50 mm
Cable length:	2.0 m (Custom lengths available upon request)
Protection class:	IP67

PTE-CABLE

Example: PTE-Cable-NTC10	Product series	
	PTE	Passive temperature sensor for gas
	Installation type	
	-Cable	Cable
		Sensor element
		-NTC10 10 KΩ @ 25 °C
		-NTC20 20 KΩ @ 25 °C
		-Pt1000 1000 Ω @ 0 °C
		-Ni1000 1000 Ω @ 0 °C
		-Ni1000-LG 1000 Ω @ 0 °C
Model	PTE	-Cable -NTC10

PTE-CABLE

PTE-CABLE is a passive temperature sensor engineered for HVAC applications. PTE-CABLE senses temperatures in a wide range. It is well protected from the environment by its stainless steel sleeve which is crimped on to premium quality silicone rubber cable. Inside the sleeve, the temperature sensor is protected against condensation, ensuring long service life. The cable is halogen-free and oil resistant. PTE-CABLE has a high protection rating of IP67.

USAGE & APPLICATIONS

PTE-CABLE is commonly used in HVAC systems for measuring temperature in ventilation units, hard-to-reach places or harsh environments.

PTE-O/OI PASSIVE TEMPERATURE SENSORS

OUTSIDE AIR TEMPERATURE/ILLUMINANCE SENSOR
FOR HVAC APPLICATIONS

The illuminance sensor is hermetically sealed for protection



TECHNICAL DETAILS

Accuracy:	NTC10k ± 0.25 °C @ 25 °C NTC20k ± 0.25 °C @ 25 °C Pt1000 ± 0.3 °C @ 0 °C Ni1000 ± 0.4 °C @ 0 °C Ni1000-LG ± 0.4 °C @ 0 °C
Operating temperature:	-50 ... +50 °C
Measuring range (OI only):	0...1000 lx
Protection class:	IP54

PTE-O/OI

Example: PTE-O-NTC10	Product series		
	PTE	Passive temperature sensor for gas	
	Installation type		
	-O	Outside	
	-OI	Outside with illuminance	
	Sensor element		
	-NTC10	10 KΩ @ 25 °C	
	-NTC20	20 KΩ @ 25 °C	
	-Pt1000	1000 Ω @ 0 °C	
	-Ni1000	1000 Ω @ 0 °C	
	-Ni1000-LG	1000 Ω @ 0 °C	
Model	PTE	-O	-NTC10

PTE-O/OI

PTE-O is a passive temperature sensor engineered for HVAC applications. PTE-O is used to sense outside air temperature.

PTE-OI is a combination of a passive temperature and an illuminance sensor engineered for HVAC applications. It is used to sense outside air temperature and ambient lighting conditions. In addition to the outside air temperature, the PTE-OI includes an ambient illuminance sensor. The illuminance sensor is hermetically sealed for protection.

USAGE & APPLICATIONS

PTE-O is commonly used in HVAC systems for measuring outside air temperature and temperature in cold storages. PTE-OI is commonly used in HVAC systems for measuring outside air temperature and controlling the outside lighting of buildings.

DPG DIFFERENTIAL PRESSURE GAUGE

MAINTENANCE-FREE DIFFERENTIAL PRESSURE
GAUGE FOR FILTER ALERT



TECHNICAL DETAILS

Accuracy (from FS):	< ±2 % (DPG60 < ±4 % ; DPG100 < ±3 %)
Operating temperature:	-5...+60 °C
Zero point adjustment screw:	external in the plastic cover
Mounting:	surface mounting or flush mounting
Mounting position:	vertical
Measuring air flow:	special flow scales available separately, easy to install on site

Product description

- DPG60
- DPG100
- DPG120
- DPG200
- DPG250
- DPG300
- DPG400
- DPG500
- DPG600
- DPG800
- DPG1K
- DPG1.5K
- DPG2K
- DPG3K
- DPG5K

Measuring range

- 0-60 Pa
- 0-100 Pa
- 0-120 Pa
- 0-200 Pa
- 0-250 Pa
- 0-300 Pa
- 0-400 Pa
- 0-500 Pa
- 0-600 Pa
- 0-800 Pa
- 0-1 kPa
- 0-1.5 kPa
- 0-2 kPa
- 0-3 kPa
- 0-5 kPa

INTERCHANGEABLE FLOW SCALES



Snap!



Install!



Go!

DPG

The DPG is a standard pressure gauge for measuring overpressure and differential pressure.

USAGE

The DPG is used to measure low pressures of air and non-combustible gases mainly in HVAC systems.

APPLICATIONS

- monitoring filters and ventilators
- monitoring overpressure and pressure difference in air ducts, air handling units, cleanrooms and laminar flow cabinets
- monitoring air flow on ventilators and in air ducts (special flow scales available separately)

LIQUID COLUMN MANOMETERS

MM, MMU & MMK



RELIABLE INCLINED COLUMN MANOMETER WITH LEAKAGE PROTECTION SYSTEM



TRADITIONAL U-TUBE MANOMETER WITH EASY ZERO POINT CALIBRATION

EXTREMELY ROBUST MANOMETERS USED E.G. IN VESSELS



Liquid column manometers are reliable and inexpensive traditional pressure meters. The manometers are good for measuring and indicating small overpressure, vacuum and differential pressure of air and non-aggressive gases in low pressure ranges.

Liquid column manometers are ideal for general-purpose work in air-conditioning and ventilation, monitoring of air filters for contamination and monitoring of air flow and air velocity.

MM

Product	Measuring range	Accuracy
MM±50 *)	-50...0...50 Pa	1 Pa
MM100 *)	-20...0...100 Pa	1 Pa
MM±100500	-100...100...500 Pa	5 Pa/25 Pa
MM200600	0...200...600 Pa	5 Pa/25 Pa

MMK

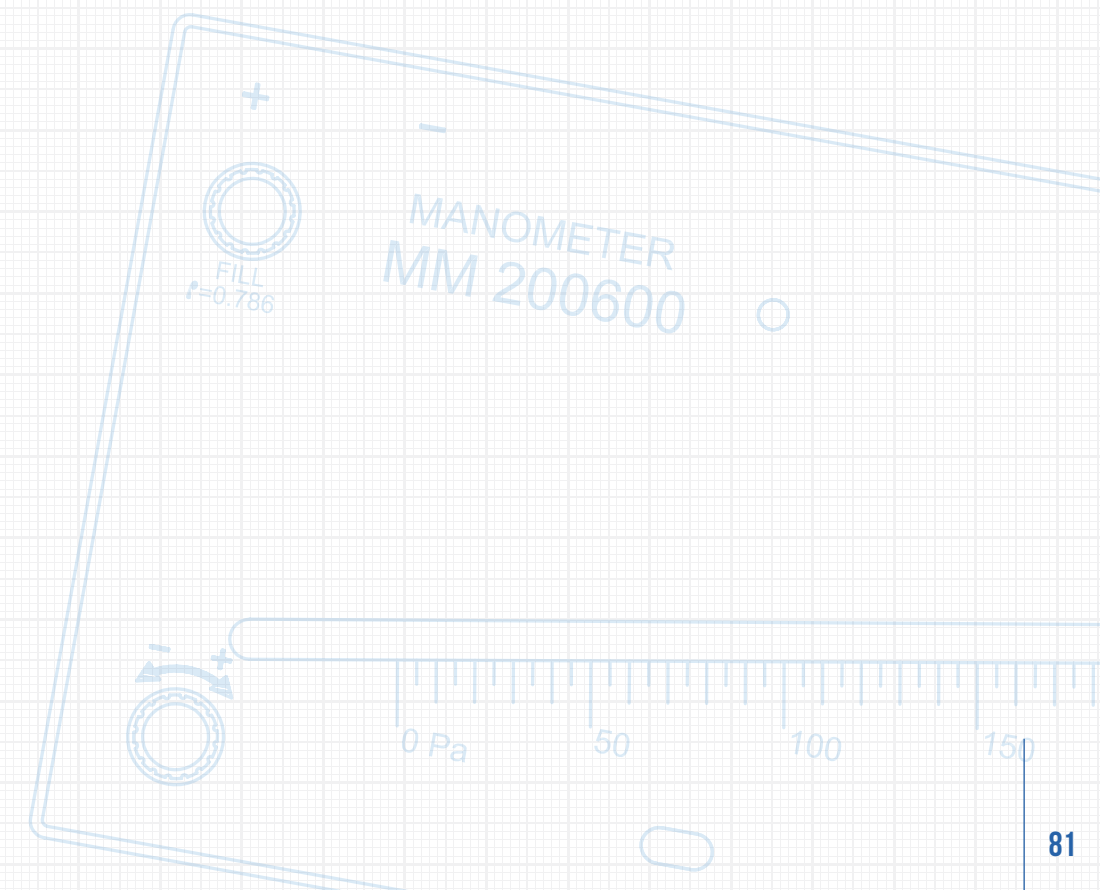
Product	Measuring range	Accuracy
MM1K	0...1 000 Pa	10 Pa
MM1,5K	0...1 500 Pa	10 Pa
MM2K	0...2 000 Pa	10 Pa
MM3K	0...3 000 Pa	10 Pa
MM5K	0...5 000 Pa	10 Pa
MM7K	0...7 000 Pa	10 Pa
MM10K	0...10 000 Pa	10 Pa

*) The types delivered with level bubble

Optional level bubble is available to all models on request!

MMU

Product	Measuring range	Accuracy
MMU±500	±500 Pa	10 Pa



YM-3 OVERPRESSURE METER FOR CIVIL DEFENCE AND MILITARY SHELTERS

PROTECTED AGAINST BLAST SHOCK AND STATIC PRESSURE LOADS



TECHNICAL DETAILS

Accuracy:	MM±100500 -100...100 Pa ±5 Pa 100...500 Pa ±25 Pa
Overpressure:	Static pressure -20...300 kPa
Measurement Ranges:	-100...100...500 Pa
Safety:	Withstands rapid change in velocity 2.5m/s, 30 g Withstands vibration with acceleration of 2.5m/s, 30 g Protected against blast shock and static pressure loads Certificate VTT-C-12329-18 granted by VTT/ Technical Research Centre of Finland

YM-3

The YM-3 overpressure meter is designed and tested to withstand strong blast loadings exerted on the meter through its connection pipe. YM-3 is type tested and approved by Technical Research centre of Finland/VTT that performs type inspecting mandated by the Finnish Ministry of Interior.

USAGE & APPLICATIONS

measures and monitors overpressure in civil defence and military shelters.



CERTIFIED BY VTT/ TECHNICAL
RESEARCH CENTRE OF FINLAND

PS

DIFFERENTIAL PRESSURE SWITCH



TECHNICAL DETAILS

Accuracy of switching point (low limit typ.):	±5 Pa (PS1500: ±20 Pa, PS4500: ±100 Pa)
Accuracy of switching point (high limit typ.):	PS200: ±20 Pa, PS300 & PS500: ±30 Pa, PS600 & PS1500: ±50 Pa, PS4500: ±200 Pa
Service life:	over 1 000 000 switching operations
Electrical rating (resistive load):	3 A / 250 VAC (PS200: 0.1 A / 250 VAC)
Electrical rating (inductive load):	2 A / 250 VAC (PS200: --)
Operating temperature:	-20...+60 °C
Protection standard:	IP54

Product	Measuring range
PS200	20...200 Pa
PS300	30...300 Pa
PS500	30...500 Pa
PS600	40...600 Pa
PS1500	100...1500 Pa
PS4500	500...4500 Pa

PS

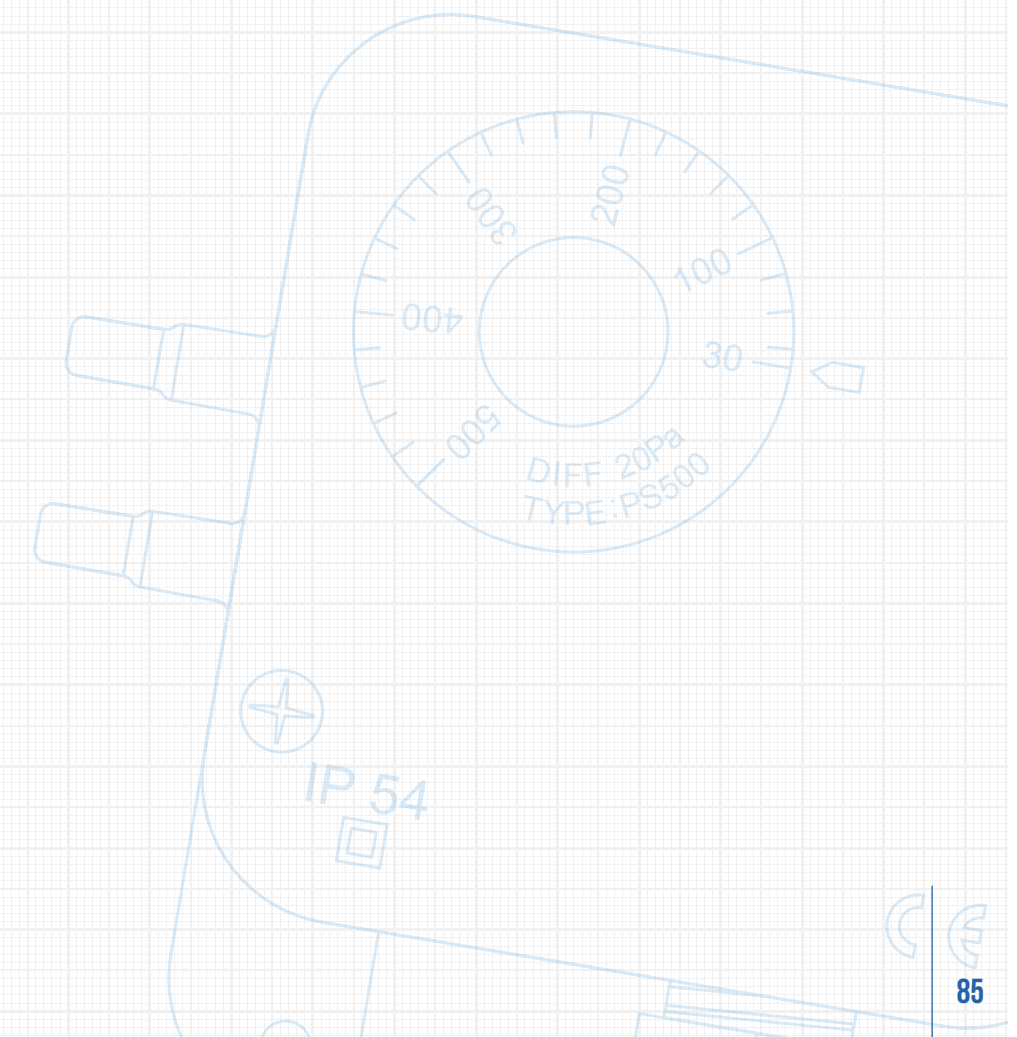
The PS is a robust, easy-to-use differential pressure switch for air and non-combustible gases.

USAGE

The pressure switches are used in ventilation and air-conditioning systems to monitor changes in overpressure, vacuum and differential pressure.

APPLICATIONS

- monitoring filters and fans
- monitoring vacuum and overpressure in air ducts
- controlling defrosting functions



MM/PS | DPG/PS FILTER ALERTS



The filter alerts are a solution for systems requiring visual indication of pressure on site, together with switching point signal. The filter alerts are ideal for general-purpose work in air-conditioning and ventilation, especially in monitoring of air filters for contamination.

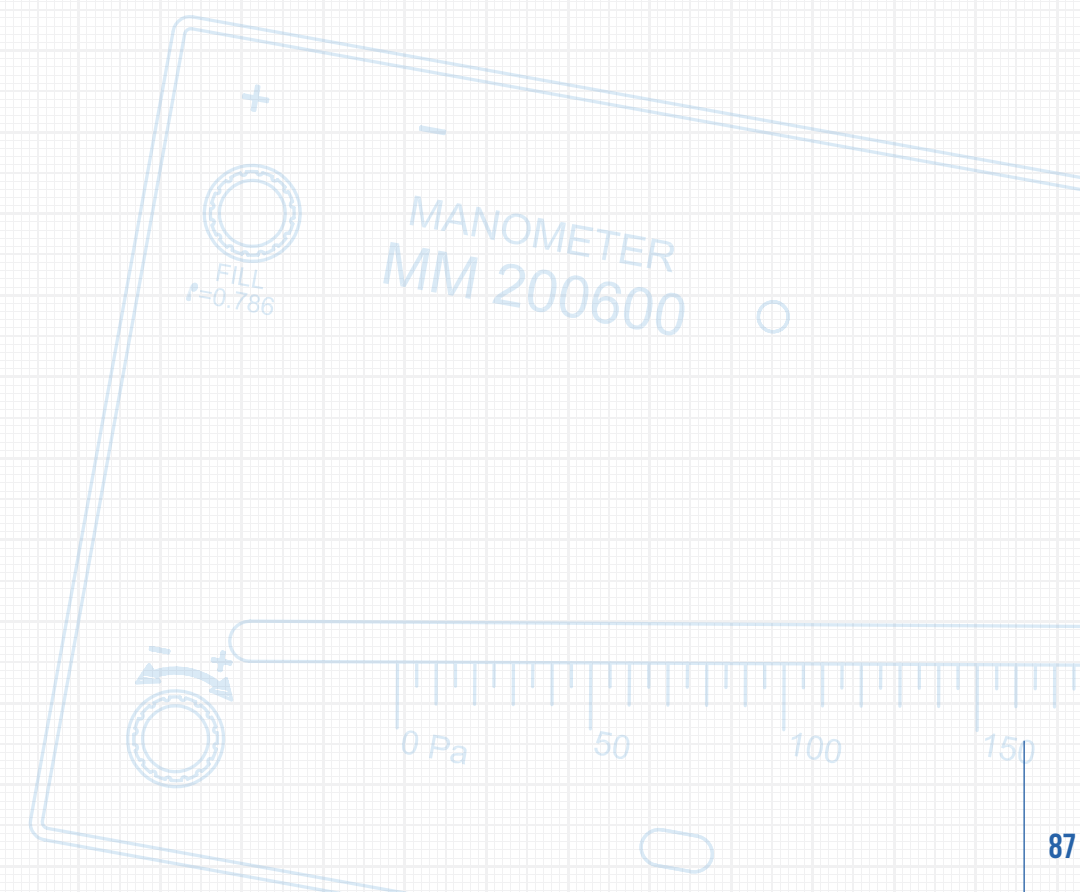
The available combinations include pressure gauge and pressure switch combination (DPG/PS), and inclined tube manometer and pressure switch combination (MM/PS).

MM/PS

Product	MM range	PS range
MM200600/PS600	0... 600 Pa	40...600 Pa

DPG/PS

Product	DPG range	PS range
DPG200/PS200	0... 200Pa	20...200 Pa
DPG600/PS600	0... 600 Pa	40...600 Pa
DPG1,5K/PS1500	0...1500 Pa	100...1500 Pa



PHM-V1 MICROMANOMETER

COMPLETE FIELD INSTRUMENT FOR HVAC VENTILATION
BALANCING AND DIAGNOSTICS



PHM-V1

PHM-V1 micromanometer is a handheld instrument for measuring air pressure and air flow. Its patented technology includes over 1000 preprogrammed ventilation valve and diffuser K-factor databases. This feature allows measuring without manual calculations or knowing the manufacturer's K-factors. Over 500 measuring results can be saved and then downloaded to PHM-V1 Manager computer software for documentations.

APPLICATIONS

- Air flow and pressure measurements from air diffusers, ventilation valves, dampers and grilles
- Measuring room-to-room pressures or across the building envelope
- In-duct measurements with pitot tube
- Measuring pressure drop across the filter
- Fan flow measurement
- Cleanroom air flow measurements

TECHNICAL DETAILS

Range:	-250...2550 Pa
Maximum overpressure:	30 kPa
Accuracy:	± 1.4 % from applied pressure
USB:	Mini B
Units on display:	Pressure: Pa, mmH ₂ O, inchWC, mbar Volume flow: l/s, m ³ /h, m ³ /s
Operating temp. range:	-10 ... +50 °C
Can be used with pitot tube	

Preprogrammed valve manufacturers include for example:

- EH-Muovi
- Fläkt Woods
- Halton
- Lindab
- Climecon
- Swegon
- Uponor

SAVE TIME AND REDUCE HUMAN ERROR WITH A PREPROGRAMMED K-FACTOR DATABASE

PHM-V1 MANAGER SOFTWARE ALLOWS YOU TO UPLOAD MEASURING RESULTS,
ADD NEW VENTILATION VALVE DATA AND CREATE DOCUMENTATIONS EFFICIENTLY
ON YOUR COMPUTER

PHM-V1 IS DELIVERED IN A HANDY CASE CONTAINING A CALIBRATION CERTIFICATE,
VENTILATION VALVE MEASUREMENT KIT, PHM-V1 MANAGER SOFTWARE ETC.

ACCESSORIES

	DPT (all models except 2W)	DPT-2W	DPT-FLOW	AVT	CDT / RHT	CDT / RHT DUCT	CMT	DPG	MM	MMU	MMK	DPI	PS	MM/PS	DPG/PS	DPTL	PTL-HEAT & PTL-COOL	PTE-DUCT	PTE-ROOM	PTE-CABLE	PTE-O	YM-3
STANDARD ACCESSORIES																						
Product description																						
Mounting screw	x	x	x		x			x	x		x	x	x	x	x				x		x	
PVC tube 2 m	x	x	x					x	x	x	x	x	x	x	x							
PVC/NBR tube 38 mm																						x
Duct connector, plastic for d=4 mm tube (80 mm)	x	x	x					x				x	x		x							
Gauge fluid 30 ml									x	x	x			x								
Attention stickers	x								x					x	x							
Adaptor G 1/4" to G1/2"																		x				
Mounting flange				x		x													x			
OPTIONAL ACCESSORIES																						
Product description																						
Calibration certificate	x	x	x	x	x	x		x				x	x					x	x	x	x	
Display 4-digit		x		x															x	x	x	x
Display 2-line backlit (blue)	x		x			x																
PVC tube 4/7 2 m	x	x	x					x	x	x	x	x	x	x	x							
PVC tube 4/7 matt (100 m)	x	x	x					x	x		x	x	x	x	x							
Accessory pack (tube, duct connectors)	x	x	x					x	x	x	x	x	x	x	x							
Accessory pack for DPG flush mounting								x														
Gauge fluid 0,786; 30 ml (red)									x	x	x			x								
Gauge fluid 0,786; 250 ml (red)									x	x	x			x								
Gauge fluid 1,870; 30 ml (blue)									x					x								
Duct connector, plastic for d=4 mm tube (80 mm)	x	x	x					x	x	x	x	x	x	x	x							
Duct connector, metallic for d=4 mm tube (40 mm)	x	x	x					x	x		x	x	x	x	x							
Duct connector, metallic for d=4 mm tube (100 mm)	x	x	x					x	x		x	x	x	x	x							
T-connector for d=4 mm tube	x	x	x					x	x	x	x	x	x									
Mounting screw for PS/DPG/DPT ZN M4x20 (1000 pcs)	x	x	x	x		x	x	x		x		x	x		x	x						
Flow scale								x							x							
Mounting plate																		x				
Junction box (including wiring work)	x																					
Adhesive backed mounting base and cable tie																					x	

1. Applicability of the Terms and Conditions. These terms and conditions shall be applied to trade in devices, components and accessories between HK Instruments Oy and the customer, unless the parties have otherwise mutually agreed in writing. These conditions do not apply to trade by agents, to which the manufacturer's conditions of sale shall be applied.

2. Price. The prices in effect at the time the offer is made form the basis of pricing. All prices exclude VAT. If changes occur in customs, freight, VAT or other general payments related to the delivery before the date of delivery, the seller has the right to change the price of the goods in the same proportion that said changed prices or payments affected the price of the goods.

3. Offer. The seller's offer is binding and it is valid for 30 days unless otherwise agreed. Provided the seller's offer is tendered under intermediary terms and conditions of sale, an immediate in storage offer is denoted whereby the goods may be sold to a third party during the period the offer is valid and the seller does not guarantee the inventory is sufficient.

4. Contract. A contract between the seller and the buyer is deemed to have been established when

- the parties have signed a written contract (purchase agreement)
- the buyer has approved a binding offer in writing (order) or
- the seller has confirmed in writing as such an order other than one based on an offer or an order different from the offer (order confirmation)

5. Drawings and Descriptions. The information on prices, measurements, weights and performances given in descriptions, photos, memos, drawings, directories and price lists and other information containing technical and other details have been given without obligations, unless specifically referred to in the offer. All technical drawings and documents needed for the manufacture of the product or its component, which one party has provided to the other party prior to, or after the signing of the contract, shall remain the property of the provider. The receiving party may not, without the provider's consent, use, copy, surrender or divulge by other means information regarding them to a third party.

6. Condition of Delivery. The condition of delivery is free seller's storage (re: Incoterms 2010 EXW) unless otherwise agreed.

7. Packaging. The prices stated in price lists and directories apply to unpacked products.

8. Time of Delivery. Unless the time of delivery is agreed, the seller shall stipulate the time of delivery. The goods are considered to have been delivered when handed over to a freight carrier for forwarding to the purchaser. When, according to the terms of the contract, the buyer has to collect the goods from the seller or from a place designated by the seller, the goods are deemed conveyed when the seller has notified the buyer that the goods are ready for delivery.

9. Conveyance and Examination of the Goods. On acceptance of the goods, the customer must make sure that the delivered goods correspond with the packing list and are externally undamaged. Before using, connecting, or installing the goods, the customer must again examine the goods to ensure their flawless condition. Complaints regarding errors or deficiencies must be made to the seller without delay, at the latest within 8 days of the conveyance of the goods.

10. Force Majeure. The seller is not liable to fulfill the contract if an obstacle the seller is unable to overcome exists regarding the contract, or if fulfilling the contract would require sacrifices

that are unreasonable compared to the advantage for the buyer should the seller fulfill the contract. If said obstacle or disparity ceases to exist within a reasonable period of time, the buyer has the right to demand that the seller fulfill the contract. When the manufacturer or the party from which the seller obtains the goods has not fulfilled the terms of his contract thus causing the seller's delivery to be delayed or not completed, the seller is not obligated to compensate the buyer for any potential losses. The buyer does not have the right to request a new delivery to replace a flawed product if an obstacle as noted in this section exists for the seller. When completion of the contract within a reasonable period of time becomes impossible due to factors noted in this section, both parties are entitled to cancel the contract with no liability to compensate by notifying the other party of their intentions in writing.

11. Payment. The payment period starts from the invoice date. In case of a delay in payment, the buyer is liable for compensating the seller according to his/her rate of interest and paying the expenses arising from the collection of payment.

12. Warranty. The seller is obligated to provide a warranty of five (5) 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 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.

13. Returns. The sale made is binding and irrevocable and the seller is not liable to accept the return of a product. Products delivered according to contract are taken back and products reimbursed up to 70% provided the seller has, prior to the return of the product, agreed to it. Returned products may be taken back and credited provided they are in the original package and in original condition.

14. Notifications. The sender is responsible for ensuring the arrival of notifications sent to the other party.

15. Ownership. Ownership of the product is passed to the buyer when the price is paid in full.

16. Disagreements. Disagreements concerning contracts and related stipulations should be settled primarily by the parties to the contract. In case a settlement cannot be reached, the dispute shall be resolved in Finland in the lower court at the domicile of the seller.

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