INSTALLATION INSTRUCTION

QBM2030-30

Differential pressure sensor

CONTENTS

Safety requirements 2
Purpose 3
Pressure measurement ranges of models 3
Delivery set 3
Technical data 3
Sensor design 5
Installation procedure 6
Wiring 7
Setup and commissioning 7
Using the sensor to create VAV and CAV systems 8
Storage and transportation regulations 8
Manufacturer's warranty 9
Certificate of acceptance 10
Seller information 10
Installation certificate 10
Warranty card 10

SAFETY REQUIREMENTS

Connection to the mains must be made through a disconnecting device, which is integrated into the fixed wiring system in accordance with the wiring rules for design of electrical units, and has a contact separation in all poles that allows for full disconnection under overvoltage category III conditions.

Ensure that the unit is switched off from the supply mains before removing the guard.

All operations described in this manual must be performed by qualified personnel only, properly trained and qualified to install, make electrical connections and maintain ventilation units.
Do not attempt to install the product, connect it to the mains, or perform maintenance yourself.
This is unsafe and impossible without special knowledge.
Disconnect the power supply prior to any operations with the unit.
All user's manual requirements as well as the provisions of all the applicable local and national construction, electrical, and technical norms and standards must be observed when installing and operating the unit.
Disconnect the unit from the power supply prior to any connection, servicing, maintenance, and repair operations.
Connection of the unit to power mains is allowed by a qualified electrician with a work permit for the electric units up to 1000 V after careful reading of the present user's manual.
Check the unit for any visible damage of the impeller, the casing, and the grille before starting installation. The casing internals must be free of any foreign objects that can damage the impeller blades.
While mounting the unit, avoid compression of the casing! Deformation of the casing may result in motor jam and excessive noise.
Misuse of the unit and any unauthorised modifications are not allowed.
Transported air must not contain any dust or other solid impurities, sticky substances, or fibrous materials.
Do not use the unit in a hazardous or explosive environment containing spirits, gasoline, insecticides, etc.
Do not close or block the intake or extract vents in order to ensure the efficient air flow.
Do not sit on the unit and do not put objects on it.
The information in this user's manual was correct at the time of the document's preparation.
The Company reserves the right to modify the technical characteristics, design, or configuration of its products at any time in order to incorporate the latest technological developments.
Never touch the unit with wet or damp hands.
Never touch the unit when barefoot.
Do not install or use the product until all construction and finishing work has been completed in the room where it is to be installed.
BEFORE INSTALLING ADDITIONAL EXTERNAL DEVICES, READ THE RELEVANT USER MANUALS.

THE PRODUCT MUST BE DISPOSED SEPARATELY AT THE END OF ITS SERVICE LIFE.

DO NOT DISPOSE THE UNIT AS UNSORTED DOMESTIC WASTE.

PURPOSE

The primary function of the transducer is to measure the pressure differential.

The QBM2030-30 is designed for use in automated control systems for ventilation equipment. It allows for maintaining a constant pressure or airflow in fans, in variable airflow systems, or in humidifiers.

The QBM2030-30 is a component part and is not designed for independent operation.

PRESSURE MEASUREMENT RANGES OF MODELS

Sensor model	Pressure measurement ranges			Output signal
	1	2	3	
QBM2030-1U	±50 Pa	±100 Pa	0…100 Pa	0…10 V DC
QBM2030-5	0…200 Pa	0…250 Pa	0…500 Pa	0…10 V DC
QBM2030-30	0…1000 Pa	0…1500 Pa	0…3000 Pa	0…10 V DC

DELIVERY SET

The differential pressure sensor is supplied with a connection kit:

- two-meter-long plastic tube,
- 2 air duct probes (ABS)
- 4 mounting screws.

Additional accessories can be ordered separately.

TECHNICAL DATA

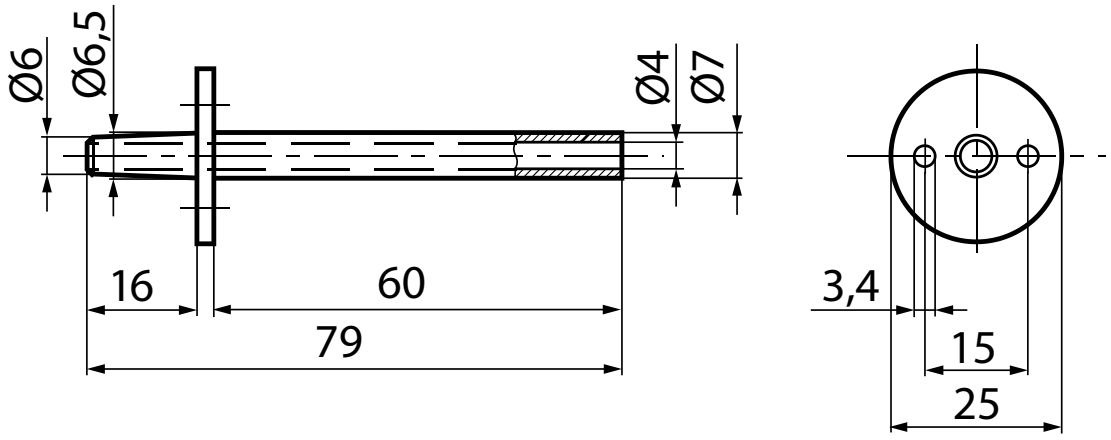
Wiring	Power supply	Safety Extra-Low Voltage (SELV/PELV)
	Supply voltage	AC 24 V ±15 %, 50/60 Hz or DC 13.5…33 V
	Power consumption	<0.5 VA
	Current	<10 mA
	External power line protection	Slow fuse, max. 10 A, or Circuit breaker, max. 13 A, Class B, C, or D in accordance with EN 60898, or Current-limited power supply, max. 10 A
	Output voltage	DC 0…10 V
	Load	>10 kΩ
	Output signa	No galvanic isolation, 3-wire connection, short-circuit protection, reverse polarity protection
Functional parameters	Sensing element	Piezoresistive
	Measurement accuracy in the recommended mounting position and at an ambient temperature of 20 °C	
	Total error	<±3 % FS (FS = Full Scale)
	Zero point	<±0.1 % FS/°C
	Sensitivity	<±0.06 % FS/°C
	Response time	1 sec..
	Safe overload on one side	
	On P1	5,000 Pa (10,000 Pa for types QBM2030-5, -30)
	On P2	400 Pa
	Failure pressure	
	0…70 °C	1.5 × safe overload
	at room temperature	2 × safe overload
	Operating medium	Air or non-corrosive gases
	Acceptable operating medium temperature	0…70 °C
	Maintenance	Maintenance-free

Connections	Wiring	
	Screw terminals for	max. 1.5 mm² (solid or stranded wire)
	Cable gland	Pg 11 cable entry (without strain relief cable)
	Pressure feed	PVC nipples Ø 6.2 mm
Protection rating	Casing ingress protection rating in the recommended mounting position	IP42 according to EN 60529
	Protection class	III according to EN 60730-1
Ambient conditions:	Acceptable ambient temperature	
	Operating temp.	0...70 °C
	Transport/ storage temp.	-25…+70 °C
	Acceptable relative humidity	<90 % (no condensation)
Directives, standards	Product standard	EN 61326-1 Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
	EU Conformity (CE)	CE1T1910xx_01 *)
	RCM Conformity	CE1T1910en_C1 *)
Environmental Compatibility	The Environmental Product Declaration CE1E1910*) contains information on the product's eco-design and assessments (RoHS compliance, material composition, packaging, environmental benefits, disposal).	
Packaged weight		0.183 kg

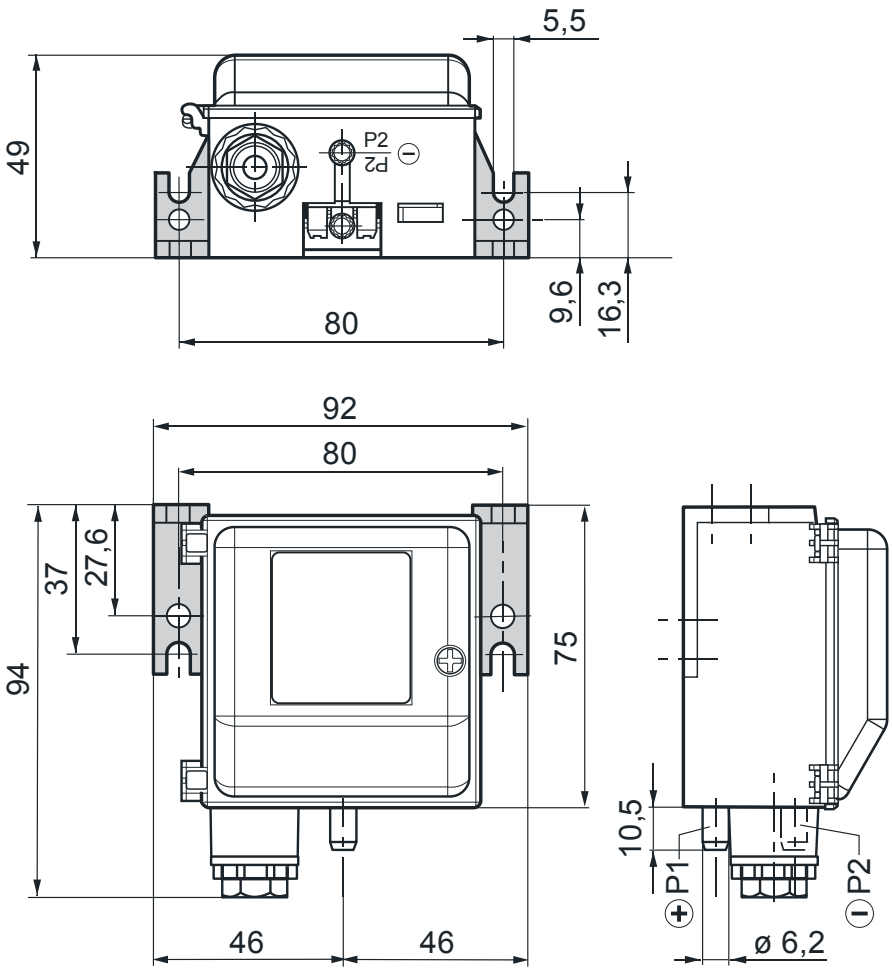
*) The document can be downloaded at http://siemens.com/bt/download.

Overall and connecting dimensions

Probe for inline mounting

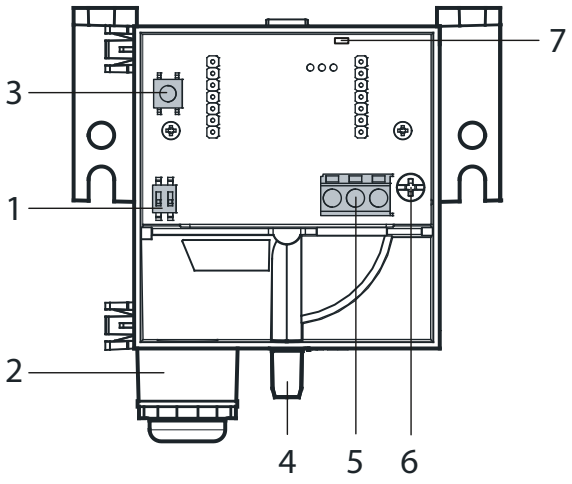


QBM2030-30



SENSOR DESIGN

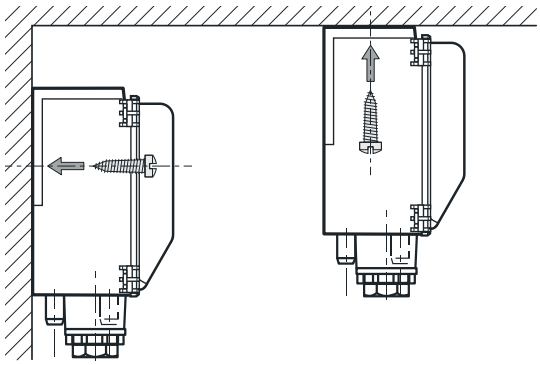
The differential pressure sensor is housed in a casing equipped with a mounting bracket, a cable entry, and two nipple fittings for connecting hoses. The casing has a cover with a safety screw. Inside the casing is a printed circuit board with connection terminals, a DIP switch for selecting the measurement range, and a zero-point adjustment button.



1 Two DIP switches for selecting the measurement range
2 Pg 11 cable entry (without strain relief cable)
3 Zero-point adjustment button
4 Connection (pressure) nipples
5 Connection terminals
6 Locking screw for the hinged cover
7 LED for indicating zero-point adjustment

INSTALLATION PROCEDURE

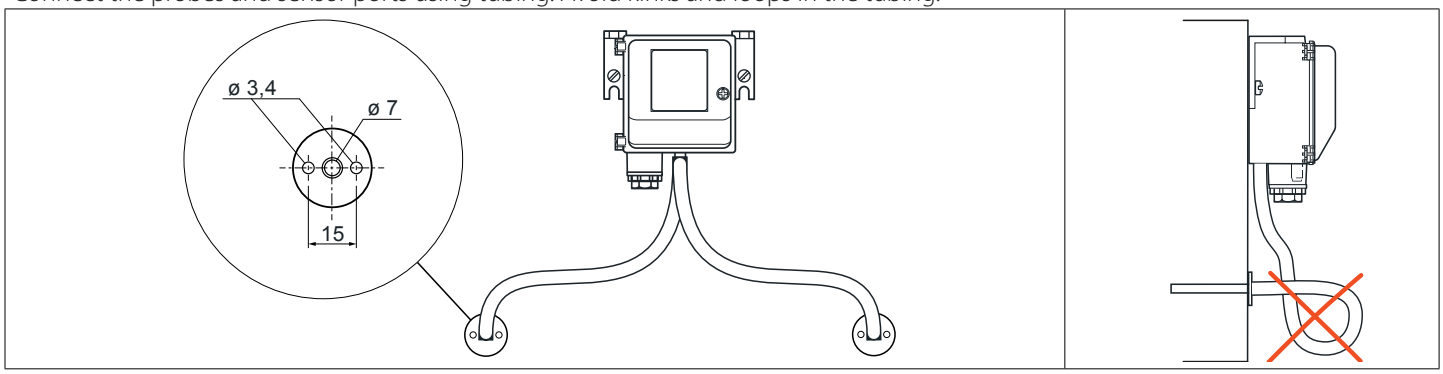
The differential pressure sensor is designed to be mounted directly on air ducts, walls, ceilings, or in control panels.



To achieve the casing protection class specified in the "Technical data" section, the sensor casing must be installed so that the nipples point downward. They must also be positioned above the probes in the air ducts.

If the pressure connection ports are facing upward or are located below the air duct probes, condensate may accumulate inside the sensor, causing damage to the device.

Connect the probes and sensor ports using tubing. Avoid kinks and loops in the tubing.



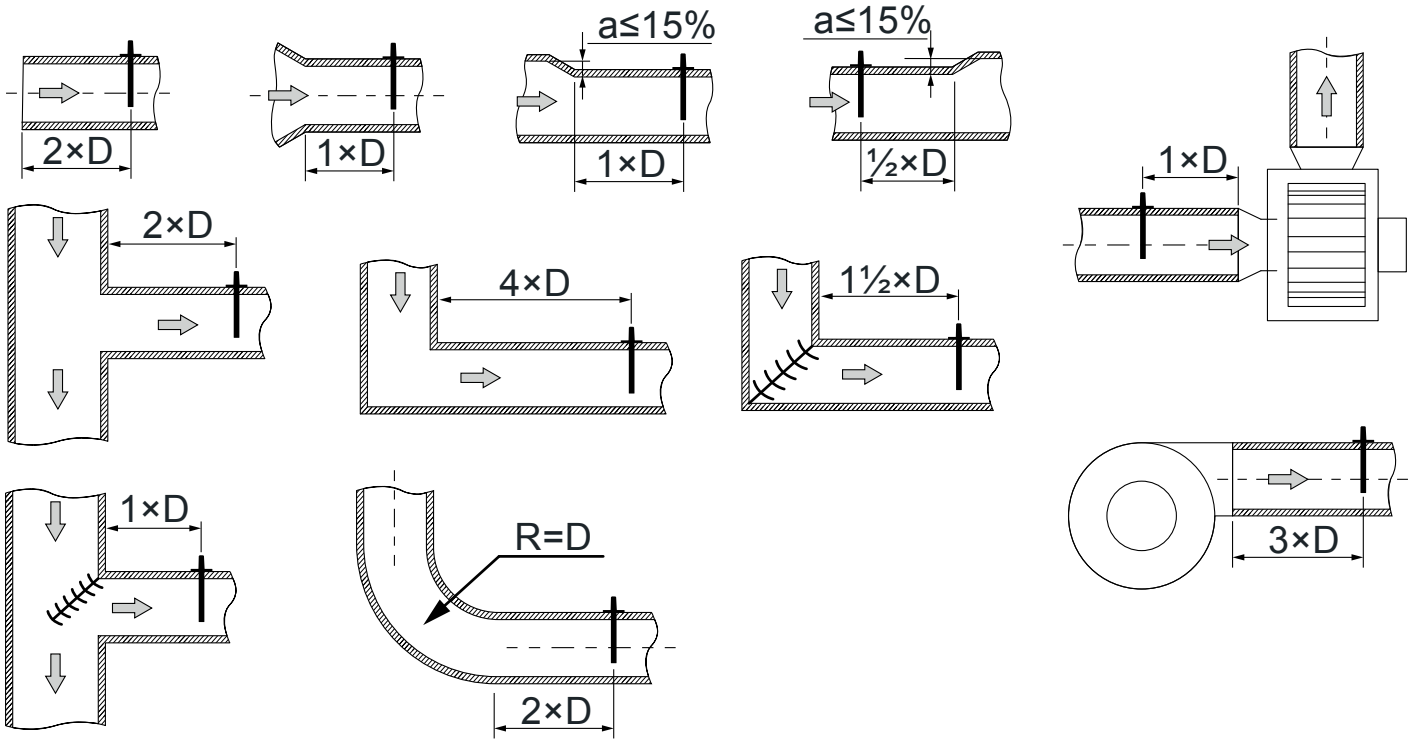
The pressure transmission lines are connected to the pressure differential sensor's ports as follows:

On the probe side	On the pressure sensor side
High-pressure line (lower vacuum)	Connect to the pressure nipple "P1" or "+"
Low-pressure line (higher vacuum)	Connect to the pressure nipple "P2" or "–"

The measurement accuracy of the probes decreases significantly as flow turbulence increases.

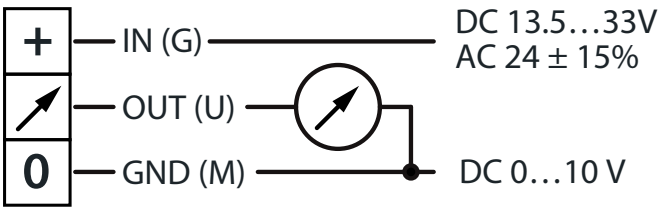
The figures below illustrate the minimum distances from ventilation system components that increase turbulence to the probe locations.

The unit of distance is defined as the diameter of a circular air duct **D**, or the equivalent diameter for rectangular ducts, which is calculated by the formula **Deq = (2×A×B) / (A + B)**, where **A** and **B** are the width and height of the cross-section, respectively.



WIRING

1. Use a properly grounded shielded cable
Loosen the cable gland clamp and feed the cable through. Connect the wires as shown in the diagram below.

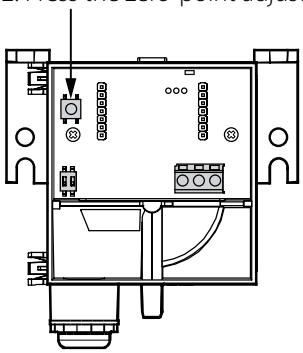


Tighten the cable gland clamp.

SETUP AND COMMISSIONING

Setting the zero point

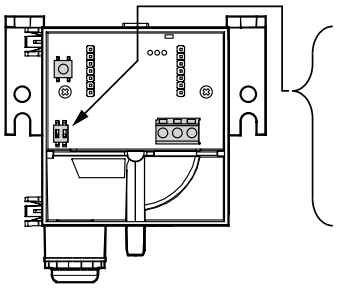
1. Perform this procedure with the pressure tubes disconnected.
2. Press the zero-point adjustment button and hold it for more than 2 seconds until the LED flashes briefly



3. Connect the pressure tubes

Setting the measurement range

A DIP switch is used to individually set the pressure measurement range.
The different DIP switch positions descriptions are on the inside of the hinged cover.



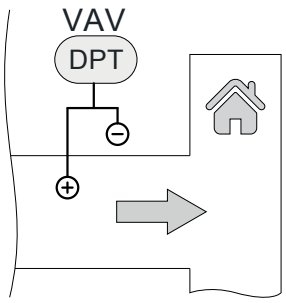
DIP switch positions	Range	QBM2030-1U	QBM2030-5	QBM2030-30
*	1	0…100 Pa	0…500 Pa	0…3000 Pa
	2	+/- 100 Pa	0…250 Pa	0…1500 Pa
	3	+/- 50 Pa	0…200 Pa	0…1000 Pa

*Factory settings

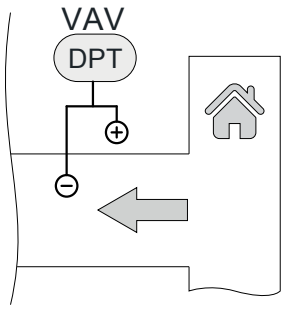
USING THE SENSOR TO CREATE VAV AND CAV SYSTEMS

VAV Control Mode (Constant Pressure, Variable Airflow)

To achieve VAV control mode in the supply air duct of a ventilation system, the high-pressure sensor is installed in the duct, whereas the low-pressure sensor remains in the surrounding space.



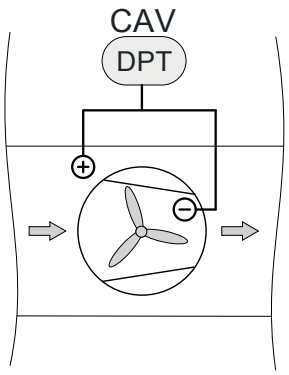
To achieve VAV control mode in the exhaust air duct, the low-pressure sensor is installed in the duct, whereas the high-pressure sensor remains in the surrounding space.



The control system regulates fan speed to maintain a set positive or negative pressure relative to the ambient space despite varying system resistance.

CAV Control Mode (Constant Airflow, Variable Pressure)

To achieve CAV control mode, the pressure drop is measured at a constriction in the air duct, such as at a fan diffuser.
The high-pressure sensor is installed at the widest part of the diffuser, and the low-pressure sensor at its narrowest part.
The sensor outputs a signal proportional to the pressure difference, from which the volumetric air flow rate can be calculated using the diffuser coefficient.



The control system regulates the fan speed to maintain the set pressure difference and stabilizes the volumetric air flow rate despite varying system resistance.

STORAGE AND TRANSPORTATION REGULATIONS

- Store the unit in the manufacturer's original packaging box in a dry closed ventilated premise with temperature range +5...+40 ˚C and relative humidity up to 70 %.
- Storage environment must not contain aggressive vapors and chemical mixtures provoking corrosion, insulation, and sealing deformation.
- Use suitable hoist machinery for handling and storage operations to prevent possible damage to the unit.
- Follow the handling requirements applicable for the particular type of cargo.
- The unit can be carried in the original packaging by any mode of transport provided proper protection against precipitation and mechanical damage. The unit must be transported only in the working position.
- Avoid sharp blows, scratches, or rough handling during loading and unloading.
- Prior to the initial power-up after transportation at low temperatures, allow the unit to warm up at operating temperature for at least 3-4 hours.

MANUFACTURER'S WARRANTY

The product is in compliance with EU norms and standards on low voltage guidelines and electromagnetic compatibility. We hereby declare that the product complies with the provisions of Electromagnetic Compatibility (EMC) Directive 2014/30/EU of the European Parliament and of the Council, Low Voltage Directive (LVD) 2014/35/EU of the European Parliament and of the Council and CE-marking Council Directive 93/68/EEC. This certificate is issued following test carried out on samples of the product referred to above.
The manufacturer hereby warrants normal operation of the unit for 24 months after the retail sale date provided the user's observance of the transportation, storage, installation, and operation regulations. Should any malfunctions occur in the course of the unit operation through the Manufacturer's fault during the guaranteed period of operation, the user is entitled to get all the faults eliminated by the manufacturer by means of warranty repair at the factory free of charge. The warranty repair includes work specific to elimination of faults in the unit operation to ensure its intended use by the user within the guaranteed period of operation. The faults are eliminated by means of replacement or repair of the unit components or a specific part of such unit component.

The warranty repair does not include:

- routine technical maintenance
- unit installation/dismantling
- unit setup

To benefit from warranty repair, the user must provide the unit, the user's manual with the purchase date stamp, and the payment paperwork certifying the purchase. The unit model must comply with the one stated in the user's manual. Contact the Seller for warranty service.

The manufacturer's warranty does not apply to the following cases:

- User's failure to submit the unit with the entire delivery package as stated in the user's manual including submission with missing component parts previously dismounted by the user.
- Mismatch of the unit model and the brand name with the information stated on the unit packaging and in the user's manual.
- User's failure to ensure timely technical maintenance of the unit.
- Damage to the unit casing and internal components caused by the user.
- Redesign or engineering changes to the unit.
- Replacement and use of any assemblies, parts and components not approved by the manufacturer.
- Unit misuse.
- Violation of the unit installation regulations by the user.
- Violation of the unit control regulations by the user.
- Unit connection to power mains with a voltage different from the one stated in the user's manual.
- Unit breakdown due to voltage surges in power mains.
- Discretionary repair of the unit by the user.
- Unit repair by any persons without the manufacturer's authorization.
- Expiration of the unit warranty period.
- Violation of the unit transportation regulations by the user.
- Violation of the unit storage regulations by the user.
- Wrongful actions against the unit committed by third parties.
- Unit breakdown due to circumstances of insuperable force (fire, flood, earthquake, war, hostilities of any kind, blockades).
- Missing seals if provided by the user's manual.
- Failure to submit the user's manual with the unit purchase date stamp.
- Missing payment paperwork certifying the unit purchase.

FOLLOWING THE REGULATIONS STIPULATED HEREIN WILL ENSURE A LONG AND TROUBLE-FREE OPERATION OF THE UNIT

USER'S WARRANTY CLAIMS SHALL BE SUBJECT TO REVIEW ONLY UPON PRESENTATION OF THE UNIT, THE PAYMENT DOCUMENT AND THE USER'S MANUAL WITH THE PURCHASE DATE STAMP

CERTIFICATE OF ACCEPTANCE

Unit Type	Differential pressure sensor
Model	
Serial Number	
Manufacture Date	
Quality Inspector's Stamp	

SELLER INFORMATION

Seller	
Address	
Phone Number	
E-mail	
Purchase Date	
This is to certify acceptance of the complete unit delivery with the user's manual. The warranty terms are acknowledged and accepted.	
Customer's Signature	

Seller's Stamp

INSTALLATION CERTIFICATE

The _____ unit is installed pursuant to the requirements stated in the present user's manual.		
Company name		
Address		
Phone Number		
Installation Technician's Full Name		
Installation Date:	**Signature:**	
The unit has been installed in accordance with the provisions of all the applicable local and national construction, electrical and technical codes and standards. The unit operates normally as intended by the manufacturer.		
Signature:		

Installation Stamp

WARRANTY CARD

Unit Type	Differential pressure sensor
Model	
Serial Number	
Manufacture Date	
Purchase Date	
Warranty Period	
Seller	

Seller's Stamp

Manufacturer: Ventilation Systems LLC,
Ukraine, Kyiv, 1 M. Kotsyubynskoho Street
Address of production facilities:
Ukraine, Kyiv Region, Fastiv District, Boyarka, 36 Sobornosti Street

V234-5EN-01