

SPM

MANUAL



CONTENT

1. APPLICATION 4

2. SENSOR TYPES..... 4

3. MECHANICAL INSTALLATION 4

4. ELECTRICAL INSTALLATION 5

5. CONFIGURATION 5

6. OPERATION 8

 6.1. Relay output..... 8

 6.2. PID control 8

 6.3. Air volume measurement..... 8

 6.4. Modbus interface 9

7. TECHNICAL DATA 12

1. APPLICATION

SPM is designed for differential pressure measurement and maintain. SPM is suitable for applications in HVAC systems. Simultaneous measurement of pressure parameter is provided through relay, analog or digital interfaces.

PID control, if enabled, will maintain user set differential pressure level in the premises by directly controlling air damper position, fan intensity or air heater level by the relay or analog signal.

2. SENSOR TYPES

There are 2 sensor types depending on pressure sensors amount. List of the sensor types described in the table below:

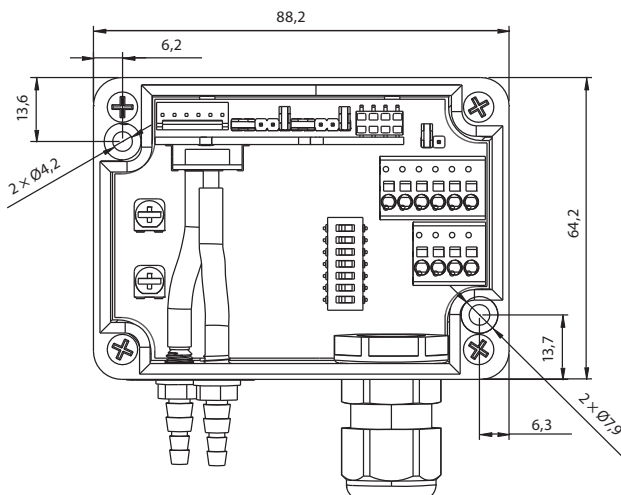
Sensor type	1 × 5000 Pa	2 × 5000 Pa
SPM-50	+	-
SPM-55	-	+

3. MECHANICAL INSTALLATION

Ambient conditions, where sensor is installed, must ensure environmental requirements:

- ambient temperature: -25°C..50°C;
- relative humidity: 0%..100%, non-condensing;
- protection against vertically dripping water;
- no excessive vibrations.

The sensor can be mounted on a duct or in any other place screwing two holes on the fastening surface. Cable connection is provided through a cable gland on the down side of the box. Pressure connection is made by pushing silicon tube over the pressure pipe behind the cable gland. Sensor mounting diagram showed below:

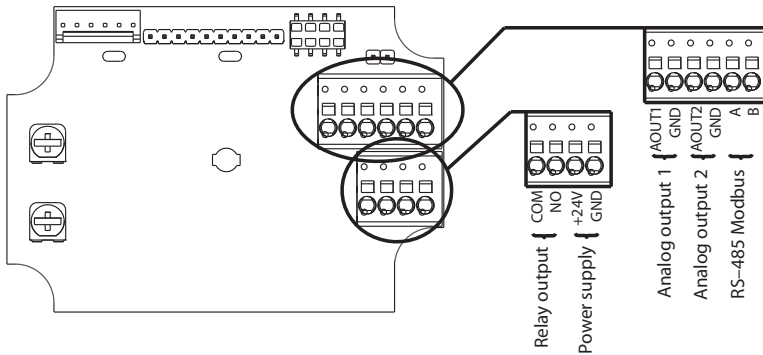




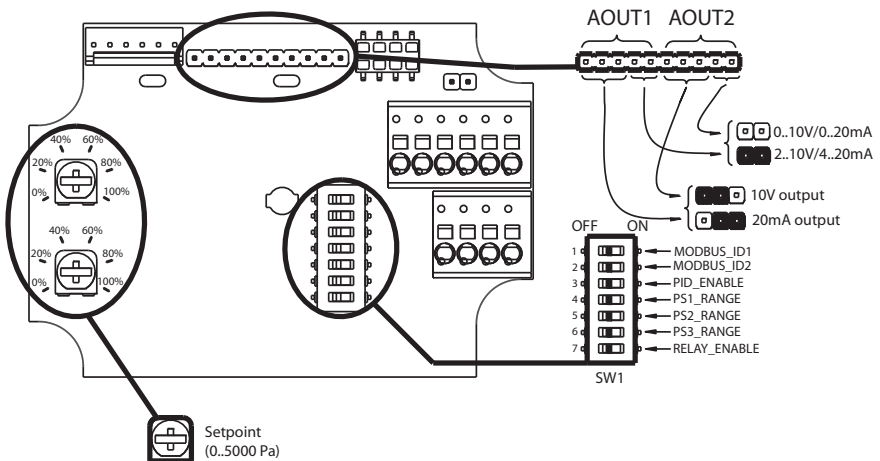
For sensor mounting use 2xM4 mm diameter screw. The diameter of the screw head must not be greater than 7 mm. Silicon tube diameter 3–5 mm. Cable diameter 4–8 mm.

4. ELECTRICAL INSTALLATION

Wire in accordance with connection diagram and local requirements on electrical installations. Power supply for the sensor is 24Vac or +24Vdc.



5. CONFIGURATION



Switch **SW1.1 (MODBUS_ID1)** and **SW1.2 (MODBUS_ID2)** selects Modbus ID slave address:

Modbus ID	SW1.1 (MODBUS_ID1)	SW1.2 (MODBUS_ID2)
90	OFF	OFF
91	ON	OFF
92	OFF	ON
93	ON	ON

Switch **SW1.3 (PID_ENABLE)** selects all outputs signal type:

Signal type	SW1.3 (PID_ENABLE)
Normal measurement	OFF
PID control	ON

Switch **SW1.4 (PS1_RANGE)**, **SW1.5 (PS2_RANGE)** and **SW1.6 (PS3_RANGE)** selects range of the differential pressure measurement using analog control:

Range	SW1.4 (PS1_RANGE)	SW1.5 (PS2_RANGE)	SW1.6 (PS3_RANGE)
0...100	OFF	OFF	OFF
0...200	ON	OFF	OFF
0...300	OFF	ON	OFF
0...500	OFF	OFF	ON
0...1000	OFF	ON	ON
0...2000	ON	OFF	ON
0...3000	ON	ON	OFF
0...5000	ON	ON	ON

Switches **SW1.7 (RELAY_ENABLE)** allows internal relay to operate:

Relay	SW1.7 (RELAY_ENABLE)
Disabled	OFF
Enabled	ON

Changes to configuration switches will apply after sensor power supply restart.

Configuration set by switches can be overridden by using RS-485 Modbus configuration. Sensor will use settings set via Modbus interface if configuration switches will not be changed after that. Changing to configuration switches settings will override corresponding value in Modbus register.

Analog outputs type selection

Configuration jumpers for AOUT1 and AOUT2 are identical and selects analog signal types.

3 position AOUT1 and AOUT2 jumpers selects voltage or current signal types:

Signal types	Jumper position
Voltage: 0..10 V or 2..10 V	"V"
Current: 0..20 mA or 4..20 mA	"mA"

2 position AOUT1 and AOUT2 jumpers selects offset for the signals:

Offset	Jumper
No offset: 0..10 V or 0..20 mA	Opened
With offset: 2..10 V or 4..20 mA	Shorted

Typical configurations are:

- For 0..10V signals – “V” with no offset.
- For 4..20mA signals – “mA” with offset enabled.

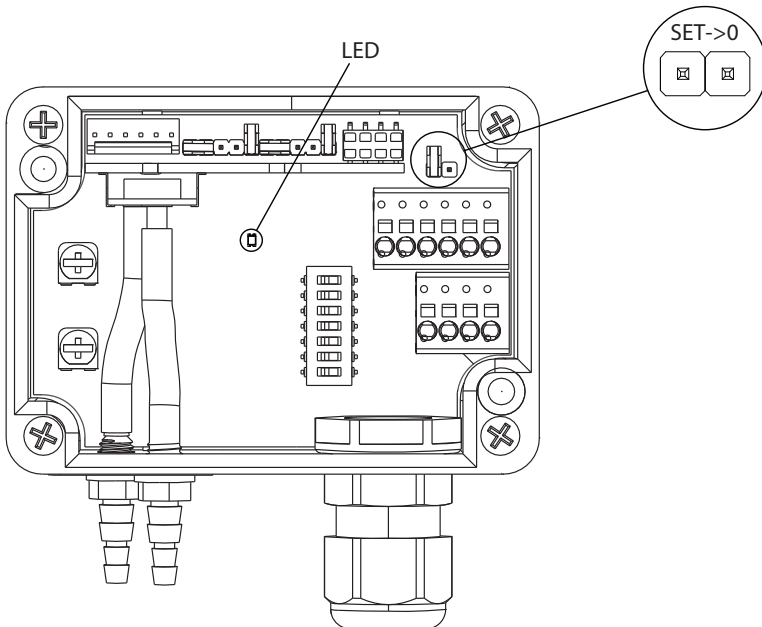
Setpoint setting

Potentiometer on the board selects setting point for the PID control to maintain. At the same time this setting defines relay on/off switching point. For sensor type SPM-55, two potentiometers can be adjusted for desired setting points. In this case the first potentiometer is related to relay on/off switching point. PID control operation described in 6.2 section.

Zero-point offset calibration

It is recommended to perform a zero-point calibration every 6 months.

To initiate the zero-point calibration, place a jumper on SET->0 contacts. When the LED begins to blink rapidly (once every 0.5 seconds), it indicates that the calibration process has started, and jumper can be removed. Once the LED starts blinking at a normal pace (every 2 seconds), it indicates that the calibration is complete.



6. OPERATION

Simultaneously, sensor is providing 3 types of reading which can be monitored using different types of interfaces:

- Analog outputs – 0..10V or 4..20mA.
- Relay output.
- RS-485 Modbus.

6.1. Relay output

Relay control is tied to one of the analog outputs, which control relay to switch on and off. Analog output level to trigger relay switch is selected using setpoint potentiometer (1) on the board.

Hysteresis is provided to not let the relay rapid switching on and off near the setting point.

Modbus interface allows to configure the relay for inverted signal control type.



Relay will not be controlled if it is disabled by configuration. Activate relay control by configuration switch SW1 (RELAY_ENABLE) or Modbus interface.

6.2. PID control

The PID functionality of SPM sensor can create feedback for Variable Air Volume (VAV) dampers to maintain indoor flow.

When the PID and the relay are enabled, the relay operates based on the AOUT signal. If there is a demand in the AOUT (control signal), the relay is activated in parallel. When there is no demand and no control signal, the relay is deactivated.

6.3. Air volume measurement

The SPM sensor possesses the capability to measure air volume. Pressure readings are converted into air volume units (m^3/h , m^3/s , or l/s) utilizing specific K-factor constants assigned to each sensor. The air volume is both displayed and configured using Modbus.

6.4. Modbus interface

The sensor is Modbus RTU (RS-485) slave device. Modbus RTU interface allows user to read and write sensor data using the following three function codes:

- Read holding registers (0x03).
- Write single register (0x06).
- Write multiple registers (0x10).

RS-485 interface communication options

Baud rate	Data bits	Parity check	Stop bits
1200..115200, 19200 1	81	Even1, Odd, None	2, ¹

Control and operating data registers

Register	Access	Values	Default	Function	Description
1	R/W	0, 9	9	Control type	0 – Modbus 9 – Analog
2	R/W	0..10'000	0	AOUT1 Modbus setpoint	Out 1 set point, ×100%
3	R/W	0..10'000	0	AOUT2 Modbus setpoint	Out 2 set point, ×100%
4	R/W	0..2	0	Relay control	0 – Auto 1 – Open 2 – Short
10	R			Firmware version	Sensor's firmware version
11	R	-32768; 0..5'000		Sensor 1 value	Sensor 1 actual pressure, Pa (-32768 no sensor or fault)
12	R	-32768; 0..5'000		Sensor 2 value ²	Sensor 2 actual pressure, Pa (-32768 no sensor or fault)
13	R	0..5'000		Sensor 1 range	Sensor 1 pressure range, Pa
14	R	0..5'000		Sensor 2 range ²	Sensor 2 pressure range, Pa
15–16	R	–		Sensor 1 air volume	Sensor 1 calculated air volume, m ³ /h, m ³ /s ×1000, l/s (0 if R308=0)
17–18	R	–		Sensor 2 air volume ²	Sensor 2 calculated air volume, m ³ /h, m ³ /s ×1000, l/s (0 if R309=0)
19	R	0..10'000		AOUT1 actual value	Out 1 actual point, ×100 %
20	R	0..10'000		AOUT2 actual value	Out 2 actual point, ×100 %
21	R	0..10'000		Potentiometer 1 setpoint	Potentiometer 1 set point, ×100 %
22	R	0..10'000		Potentiometer 2 setpoint	Potentiometer 2 set point, ×100 %
23	R	0..1		Relay status	0 – Open 1 – Short
24	R	0..1		Product type	0 – SPM-50 1 – SPM-55
25	R	-550..550		Sensor 1 offset value	Pressure offset value, Pa
26	R	-550..550		Sensor 2 offset value ²	Pressure offset value, Pa

¹ Default values.

² Available only with SPM-55.

Configuration registers

Register	Access	Values	Default	Function	Description
300	R/W	1..247	90	Modbus ID	RS-485 Modbus ID (changes after power on, if DIP switch ID1 .. ID2 changed)
301	R/W	1..8	5	Modbus baud rate	1 – 1200 baud 2 – 2400 baud 3 – 4800 baud 4 – 9600 baud 5 – 19200 baud 6 – 38400 baud 7 – 57600 baud 8 – 115200 baud Changes will apply after power supply restart
302	R/W	1..6	2	Modbus data format	1 – 8N1 (8 data bits, Parity: none, 1 stop bit) 2 – 8E1 3 – 8O1 4 – 8N2 5 – 8E2 6 – 8O2 Changes will apply after power supply restart
303	R/W	0..7	4	Sensor 1 pressure range	0 – 100pa 1 – 200pa 2 – 300pa 3 – 500pa 4 – 1000pa 5 – 2000pa 6 – 3000pa 7 – 5000pa
304	R/W	0..7	4	Sensor 2 pressure range ¹	0 – 100 Pa 1 – 200 Pa 2 – 300 Pa 3 – 500 Pa 4 – 1000 Pa 5 – 2000 Pa 6 – 3000 Pa 7 – 5000 Pa
305	R/W	0..5	0	AOUT1 output	0 – Sensor 1: pressure 1 – Sensor 1: PID control 2 – Sensor 1: PID control inverted 3 – Sensor 2: pressure 4 – Sensor 2: PID control 5 – Sensor 2: PID control inverted
306	R/W	0..5	3	AOUT2 output	0 – Sensor 1: pressure 1 – Sensor 1: PID control 2 – Sensor 1: PID control inverted 3 – Sensor 2: pressure ¹ 4 – Sensor 2: PID control ¹ 5 – Sensor 2: PID control inverted ¹

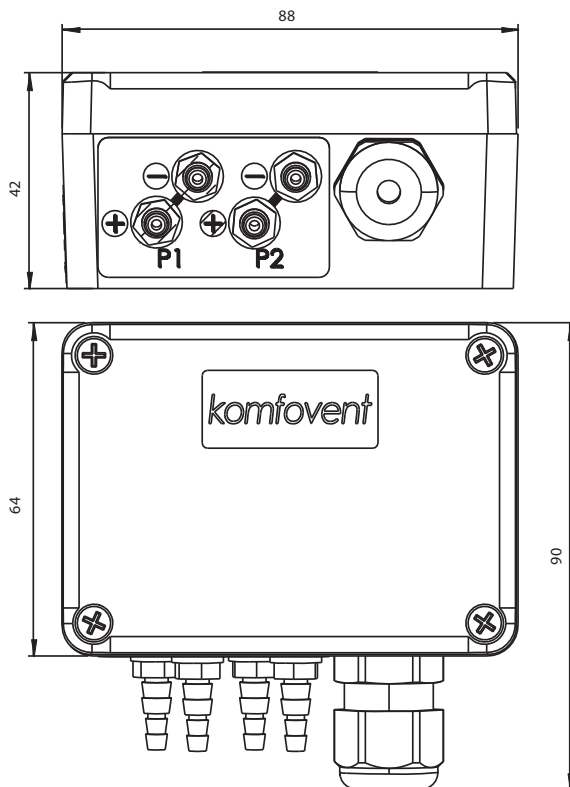
¹ Available only with SPM-55.

Register	Access	Values	Default	Function	Description
307	R/W	0..4	0	Relay control	0 – Disabled 1 – AOUT1 controls the relay 2 – AOUT1 controls the relay inverted 3 – AOUT2 controls the relay 4 – AOUT2 controls the relay inverted
308	R/W	0..65535	0	Sensor 1 K-factor	Sensor 1 K- factor input (K-factor = 0, no air volume measurement)
309	R/W	0..65535	0	Sensor 2 K-factor ¹	Sensor 2 K- factor input (K-factor = 0, no air volume measurement)
310	R/W	0..2	0	Volume units	0 – m ³ /h 1 – m ³ /s 2 – l/s
311	R/W	0..65535	1'000	PID AOUT1 Kp	PID control 1 Kp factor
312	R/W	0..65535	300	PID AOUT1 Ki	PID control 1 Ki factor
313	R/W	0..65535	1'000	PID AOUT2 Kp	PID control 2 Kp factor
314	R/W	0..65535	300	PID AOUT2 Ki	PID control 2 Ki factor
315	W	0		Activate sensor 1 calibration	
316	W	0		Activate sensor 2 calibration ¹	
390	R/W		0	Reset to default settings	Write 0x64DF value to reset

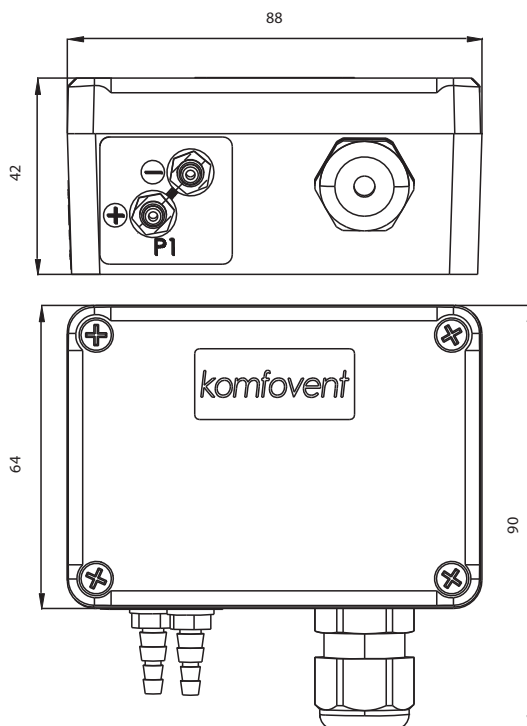
7. TECHNICAL DATA

Dimensions

SPM-55



SPM-50



Case and environment data

Material	Protection class	Dimensions	Weight	Ambient operating temp.	Storage temperature	Ambient humidity
ABS plastic	IP65	90×88×42 mm	230 g	-25..+50 °C	-40..+70 °C	0..100 %RH, non-condensing

Electrical data

Supply voltage	Power consumption
24 Vac / 24 Vdc ±20 %	<0.4 W (<20 mA)

Outputs

Measuring range	Analog outputs	Relay output	Response time
0..5000 Pa	2x 0..10V / 2..10V / 0..20mA / 4..20mA with up to 20mA output current	1 × 230Vac 1A	<6 sec



SPM sensor conforms to the requirements of the EMC directive through standard EN 61326-1.



Recycling of equipment and packaging should be taken into consideration and disposed in accordance with local and national regulations.



SERVICE AND SUPPORT

LITHUANIA

UAB KOMFOVENT

Phone: +370 5 200 8000
service@komfovent.com
www.komfovent.com

FINLAND

Komfovent Oy

Muuntotie 1 C1
FI-01 510 Vantaa, Finland
Phone: +358 20 730 6190
toimisto@komfovent.com
www.komfovent.com

GERMANY

Komfovent GmbH

Konrad-Zuse-Str. 2a,
42551 Velbert, Deutschland
Phone: +49 0 2051 6051180
info@komfovent.de
www.komfovent.de

LATVIA

SIA Komfovent

Bukaišu iela 1, LV-1004 Riga, Latvia
Phone: +371 24 66 4433
info.lv@komfovent.com
www.komfovent.com

SWEDEN

Komfovent AB

Ögärdesvägen 12A
433 30 Partille, Sverige
Phone: +46 31 487 752
info_se@komfovent.com
www.komfovent.se

UNITED KINGDOM

Komfovent Ltd

Unit C1 The Waterfront
Newburn Riverside
Newcastle upon Tyne NE15 8NZ, UK
Phone: +447983 299 165
steve.mulholland@komfovent.com
www.komfovent.com

PARTNERS

AT	J. PICHLER Gesellschaft m. b. H.	www.pichlerluft.at
BE	Ventilair group ACB Airconditioning	www.ventilairgroup.com www.acbairco.be
CZ	REKUVENT s.r.o.	www.rekuvent.cz
CH	WESCO AG SUDCLIMATAIR SA CLIMAIR GmbH	www.wesco.ch www.sudclimatair.ch www.climair.ch
DK	Øland A/S	www.oeland.dk
EE	BVT Partners	www.bvtpartners.ee
FR	ATIB	www.atib.fr
HR	Microclima	www.microclima.hr
HU	AIRVENT Légtechnikai Zrt. Gevent Magyarorszáig Kft. Merkapt	www.airvent.hu www.gevent.hu www.merkapt.hu
IE	Lindab	www.lindab.ie
IR	Fantech Ventilation Ltd	www.fantech.ie
IS	Blikk & Tækniþjónustan ehf Hitataekni ehf	www.bogt.is www.hitataekni.is
IT	ICARIA	www.icaria.srl
NL	Ventilair group DECIPOL-Vortvent CLIMA DIRECT BV	www.ventilairgroup.com www.vortvent.nl www.climadirect.com
NO	Ventilution AS Ventistål AS Thermo Control AS	www.ventilution.no www.ventistal.no www.thermocontrol.no
PL	Ventia Sp. z o.o.	www.ventia.pl
SE	Nordisk Ventilator AB	www.nordiskventilator.se
SI	Agregat d.o.o	www.agregat.si
SK	TZB produkt, s.r.o.	www.tzbprodukt.sk
UA	TD VECON LLC	www.vecon.ua