

# SPD

DUAL DIFFERENTIAL  
PRESSURE  
TRANSMITTER

Mounting and operating instructions



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## SAFETY AND PRECAUTIONS

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Read all the information, the datasheet, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using, or maintaining this product.



For safety and licensing (CE) reasons, unauthorised conversion and /or modifications of the product are inadmissible.



The product should not be exposed to abnormal conditions, such as: extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation.



All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and safety precautions.



Avoid contacts with energised electrical parts. Always disconnect the power supply before connecting, servicing or repairing the product.



Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well.



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



In case there are any questions that are not answered, please contact your technical support or consult a professional.

## PRODUCT DESCRIPTION

The SPD series are compact dual multi-range differential pressure transmitters providing analogue / digital output for each sensor and Modbus RTU communication. The transmitters have two built-in state-of-the-art silicon pressure sensors with eight switchable measuring ranges. The SPD piezoresistive transducers are temperature and pressure compensated thus providing high degree of accuracy and reliability. Each sensor features a push-button for manual zero point calibration and adjustable offset.

## ARTICLE CODES

Code	Power supply	Enclosure
SPD-G-2K0	15–24 VAC ±10 % / 18–34 VDC	3-wire*
SPD-F-2K0	18–34 VDC	4-wire
SPD-G-6K0	15–24 VAC ±10 % / 18–34 VDC	3-wire*
SPD-F-6K0	18–34 VDC	4-wire

## INTENDED AREA OF USE

- Differential pressure measurement in HVAC applications
- Air flow volume measurement\*\* in HVAC applications
- Differential pressure / airflow monitoring in clean rooms
- Clean air and non-aggressive, non-combustible gases

## TECHNICAL DATA

- Wide power supply range
- Maximum power consumption:
  - ▶ SPD-F-2K0: 1,44 W
  - ▶ SPD-G-2K0, SPD-G-6K0: 2,16 W
- Nominal or average power consumption in normal operation:
  - ▶ SPD-F-2K0: 1,08 W
  - ▶ SPD-G-2K0, SPD-G-6K0: 1,62 W
- I<sub>max</sub>:
  - ▶ SPD-F-2K0: 60 mA
  - ▶ SPD-G-2K0, SPD-G-6K0: 90 mA
- Long-term stability and accuracy
- 2 analogue / digital (PWM, open collector) outputs
- 8 selectable operating ranges
- Modbus RTU (RS485) communication
- Modbus registers reset function (to factory preset values) for each sensor
- Implemented K-factor (for air volume measurement)
- Independent calibration of the sensors
- Differential pressure, air volume\*\* readout via Modbus RTU

\* In case of 3-wire connection, the analogue output GND signal is internally connected with the GND of the power supply. Therefore, G and F-type devices cannot be used together in the same network. G and F-type devices must be supplied with separate power supplies. Do not connect the GND terminals of G and F-type devices together!

\*\* Only when K-factor of fan / drive is known. If K-factor is unknown, air volume flow can be calculated via multiplying the duct cross-sectional area (A) by the air flow velocity (V) using the formula:  $Q = A * V$

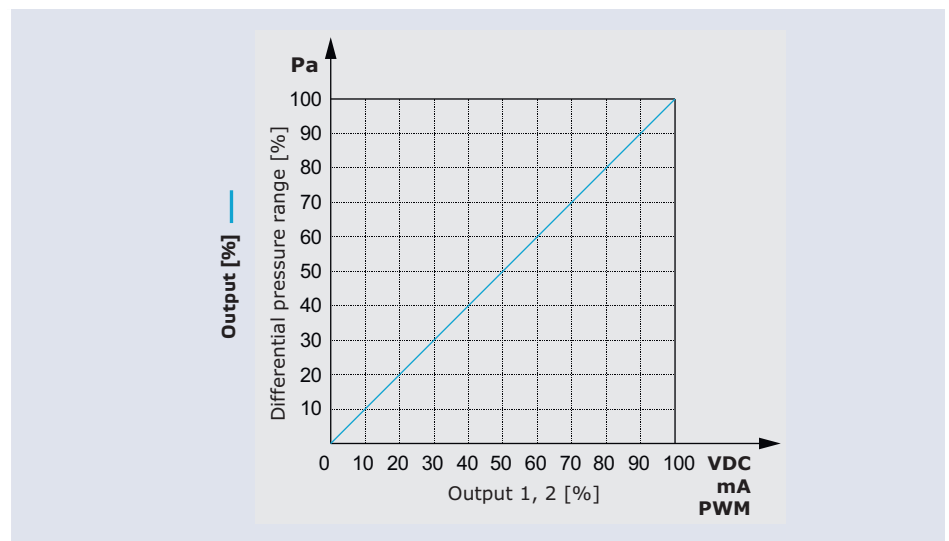
- Terminal blocks with 0,75 mm<sup>2</sup> connector
- Selectable response time: 0,5 / 1 / 2 / 5 s
- Accuracy: ±3 %
- Long-term stability: ±1 % per year
- Housing: reinforced ABS, colour grey RAL 7035
- Operating ambient conditions:
  - ▶ Temperature: 10–60 °C
  - ▶ Rel. humidity: < 95 % rH (non-condensing)
- Storage temperature: – 20–70 °C

## STANDARDS

- Low Voltage Directive 2006/ 95/EC
- WEEE Directive 2002/96/EC
- RoHS Directive 2002/95/EC
- EMC Directive 2004/108/EC (EN 61326)



## OPERATIONAL DIAGRAM



## WIRING AND CONNECTIONS

<b>Vin</b>	Supply voltage
<b>GND</b>	Ground / AC ~
<b>A</b>	Modbus RTU (RS485), signal A
<b>/B</b>	Modbus RTU (RS485), signal /B
<b>AO1</b>	Analogue / digital output 1
<b>GND</b>	Ground
<b>AO2</b>	Analogue / digital output 2
<b>Connections</b>	Cable cross section 1,5 mm <sup>2</sup> Cable gland clamping range 3,5 mm Connecting tube diameter 6–7 mm

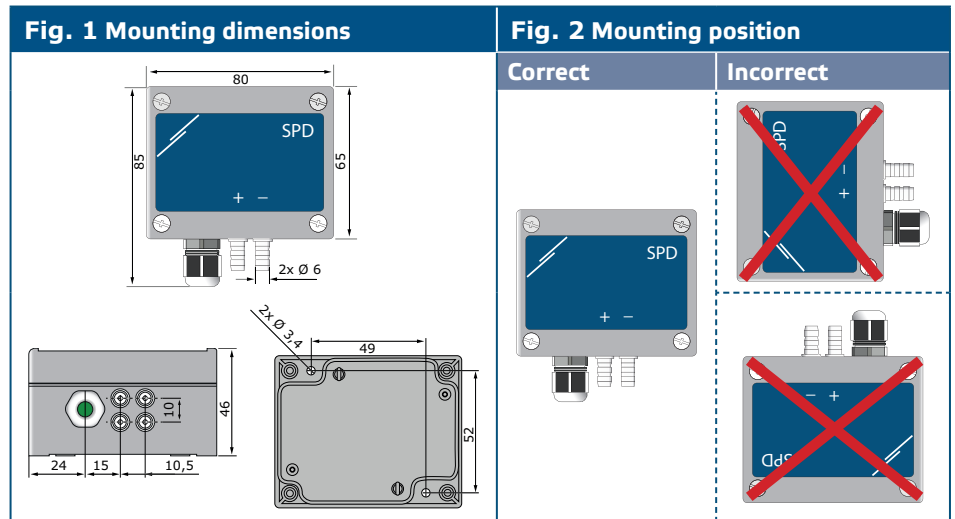
**ATTENTION**

*G and F-types devices cannot be used together in the same network. G and F-type devices must be supplied by separate power supplies. Do not connect the GND terminals of G and F-type devices together.*

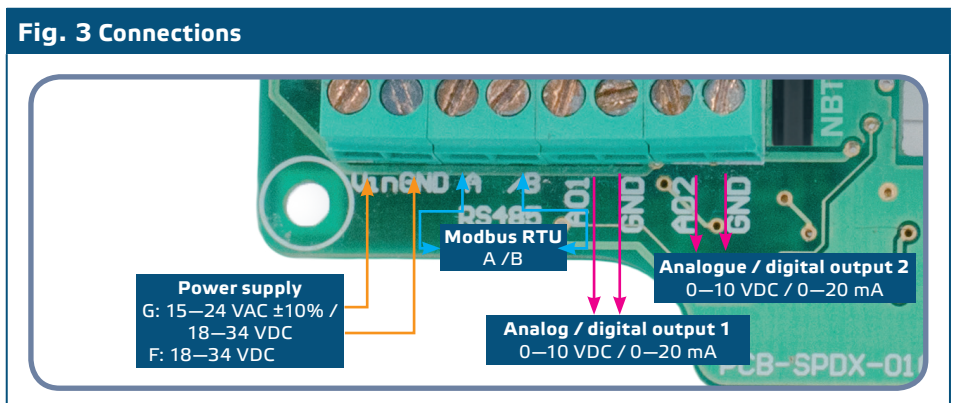
**MOUNTING INSTRUCTIONS IN STEPS**

Before you start mounting the SPD dual differential pressure transmitter, read carefully **“Safety and Precautions”**. Choose a smooth surface for installation location (a wall, panel, etc.) and follow these steps:

1. Unscrew the front cover of the housing to remove it.
2. Fix the housing onto the surface by means of suitable fasteners while adhering to the mounting dimensions shown in **Fig. 1 Mounting dimensions** and the correct mounting position shown in **Fig. 2 Mounting position**.

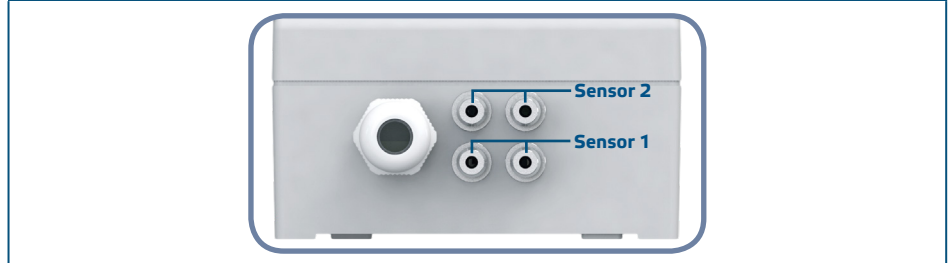


3. Insert the cable through the cable gland.
4. Connect as shown in **Fig. 3 Connections** adhering to the information in section **“Wiring and connections”**.



5. Connect the nozzles with the tubing. See the positions of the nozzles in **Fig. 4** *Nozzles positions* below:

**Fig. 4 Nozzles**



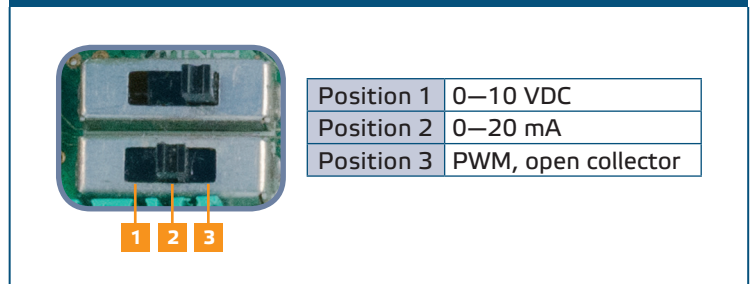
**NOTE**

*For sensor calibration and Modbus register reset procedures, refer to section "Operating instructions".*

**Analogue / digital output AO1 and AO2 selection**

- Use the three-position switches 1 and 2 (SW1 and SW2) to select the output mode of sensor 1 and sensor 2 respectively. See **Fig. 5** *Analogue / digital output selection* for the appropriate positions.

**Fig. 5 Analogue / digital output selection**



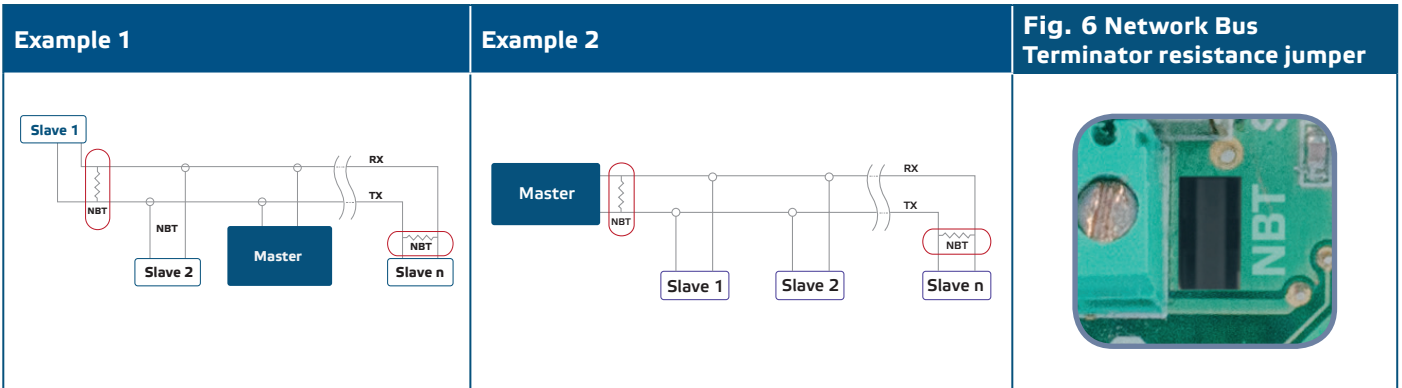
**Sensor calibration and Modbus registers reset**

- Use the two tact switches – SW3 and SW4 for calibration and Modbus registers reset (to their default values) for sensor 1 and sensor 2 respectively.
- Press both switches (SW3 and SW4) simultaneously for 4 seconds until blue LED2 and LED3 on the printed circuit board blink three times and realise them. After 2 seconds the LEDs will blink three times once again to indicate that the Modbus holding registers have been reset to their default values.

**Optional settings**

If your unit starts or terminates the network, make sure the NBT jumper is placed onto the pins as indicated in **Examples 1** and **2** below. In all other cases, the jumper must not be connected. By default, the NBT jumper is disconnected – see **Fig. 6** *Network Bus Terminator resistance jumper*.

- Put back the cover and fix it.
- Switch on the power supply.

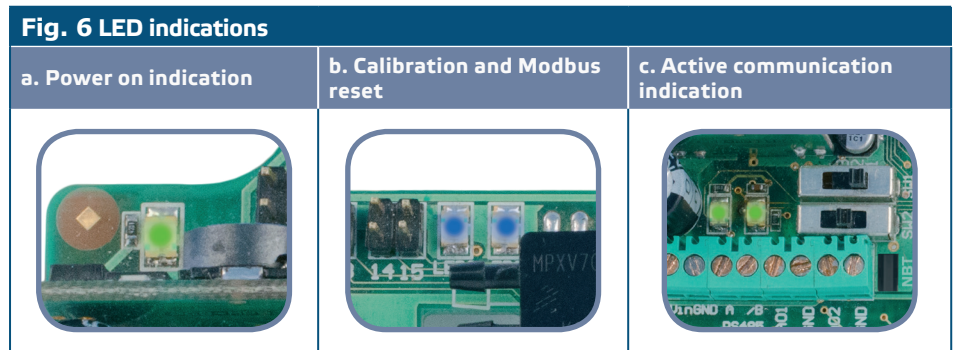


**NOTE**

Connect the NBT terminator only in the two most distant units on the network line!

## VERIFICATION OF THE INSTALLATION INSTRUCTIONS

- Continuous green LED indication as shown in **Fig. 6 LED indications – a. Power on indications** means the unit is supplied. If the LED is not on, check the connections again.
- Blinking blue LED2 and LED3 indication as shown in **Fig. 6 LED indications – b. Calibration and Modbus reset** means that sensor 1 and sensor 2 respectively are calibrated and the Modbus holding registers are set to their default values.
- Blinking green LED on the left-hand side indicates active that the signal is transmitted on the RS485 line.
- Blinking green LED on the right-hand side indicates that the signal is received on the RS485 line. See **Fig. 6 LED indications – c. Active communication indication**.



**NOTE**

For further information on how to set the transmitter, refer to its data sheet, section "Settings and indications".

**ATTENTION**

The status of the LEDs can be checked only when the unit is energised. Take the relevant safety measures!



## OPERATING INSTRUCTIONS

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### Calibration procedure Sensor 1:

1. Disconnect the nozzles of Sensor 1.
2. Press button SW3 for 4 seconds until the blue LED3 blinks twice, then realise it.
3. After 2 seconds the blue LED3 will blink two times once again to indicate that the calibration procedure has finished.

### Calibration procedure Sensor 2:

1. Disconnect the nozzles of Sensor 2.
2. Press button SW4 for 4 seconds until the blue LED2 blinks twice, then realise it.
3. After 2 seconds the blue LED2 will blink two times once again to indicate that the calibration procedure has finished.

### Modbus registers reset procedure for Sensor 1:

- Press button SW3 for 4 seconds until the blue LED3 blinks twice and hold it until the blue LED3 blinks three times. The holding registers have been reset to their default values.

### Modbus registers reset procedure for Sensor 2:

- Press button SW4 for 4 seconds until the blue LED2 blinks twice and hold it until the blue LED2 blinks three times. The holding registers have been reset to their default values.



## NOTE

*Press and hold the button until both LEDs on the PCB blink twice and hold it until the LED blinks again three times. If the button is released before the LED has blinked again three times, the sensor will have carried out a calibration procedure instead of Modbus registers reset procedure.*

### Communication holding registers reset procedure:

- Press both switches (SW3 and SW4) simultaneously for 4 seconds until blue LED2 and LED3 on the printed circuit board blink three times and realise them. After 2 seconds the LEDs will blink three times once again to indicate that the Modbus holding registers have been reset to their default values.



## ATTENTION

*Make sure that the nozzles are free and not connected.*

## MODBUS REGISTER MAPS

INPUT REGISTERS – SPD-X-2K0					
		Data type	Description	Data	Values
1	Differential pressure Sensor 1	signed int.	Measured differential pressure Sensor 1	-100–2.000	1.000 = 1.000 Pa
2	Output Sensor 1	unsigned int.	Analogue / digital output value Sensor 1	0–1.000	100 = 10.0 %
3	Max. pressure limit flag Sensor 1	unsigned int.	Flag indicates that the pressure is out of the max. limit range for Sensor 1		0 = Below the limit 1 = Above the limit
4	Min. pressure limit flag Sensor 1	unsigned int.	Flag indicates that the pressure is out of the min. limit range for Sensor 1		0 = Below the limit 1 = Above the limit
5	Volume flow rate Sensor 1	unsigned int.	Air Volume flow rate in m <sup>3</sup> /h from Sensor 1	0–44.000	1.000 = 1.000 m <sup>3</sup>
6	Differential pressure range Sensor 1	unsigned int.	Flag indicates the current differential pressure range of Sensor 1	0 = 0–100 Pa 1 = 0–250 Pa 2 = 0–500 Pa 3 = 0–750 Pa 4 = 0–1.000 Pa 5 = 0–2.000 Pa 6 = -50–50 Pa 7 = -100–100 Pa	2.000 = 2.000 Pa
7	Diff. pressure response time – Sensor 1	unsigned int.	Flag indicates the current response time of Sensor 1	0 = 0,5 s 1 = 1 s 2 = 2 s 3 = 5 s	
8-10			Reserved, return 0		
11	Differential pressure Sensor 2	signed int.	Measured differential pressure Sensor 2	-100–2.000	1.000 = 1.000 Pa
12	Output Sensor 2	unsigned int.	Analogue / digital output value Sensor 2	0–1.000	100 = 10.0 %
13	Max. pressure limit flag Sensor 2	unsigned int.	Flag indicates that the pressure is out of the max. limit range for Sensor 2		0 = Below the limit 1 = Above the limit
14	Min. pressure limit flag Sensor 2	unsigned int.	Flag indicates that the pressure is out of the min. limit range for Sensor 2		0 = Below the limit 1 = Above the limit
15	Volume flow rate Sensor 2	unsigned int.	Air Volume flow rate in m <sup>3</sup> /h from Sensor 2	0–44.000	1.000 = 1.000 m <sup>3</sup>
16	Differential pressure range Sensor 2	unsigned int.	Flag indicates the current differential pressure range of Sensor 2	0 = 0–100 Pa 1 = 0–250 Pa 2 = 0–500 Pa 3 = 0–750 Pa 4 = 0–1.000 Pa 5 = 0–2.000 Pa 6 = -50–50 Pa 7 = -100–100 Pa	2.000 = 2.000 Pa
17	Diff. pressure response time – Sensor 2	unsigned int.	Flag indicates the current response time of Sensor 2	0 = 0,5 s 1 = 1 s 2 = 2 s 3 = 5 s	
18-20			Reserved, return 0		

INPUT REGISTERS – SPD-X-6K0					
		Data type	Description	Data	Values
1	Differential pressure Sensor 1	signed int.	Measured differential pressure Sensor 1	0–6.000	1.000 = 1.000 Pa
2	Output Sensor 1	unsigned int.	Analogue / digital output value Sensor 1	0–1.000	100 = 10.0 %
3	Max. pressure limit flag Sensor 1	unsigned int.	Flag indicates that the pressure is out of the max. limit range for Sensor 1		0 = Below the limit 1 = Above the limit
4	Min. pressure limit flag Sensor 1	unsigned int.	Flag indicates that the pressure is out of the min. limit range for Sensor 1		0 = Below the limit 1 = Above the limit
5	Volume flow rate high word Sensor 1	unsigned int.	Air Volume flow rate high word in m <sup>3</sup> /h of Sensor 1	0–77.000	1.000 = 1.000 m <sup>3</sup> /h
6	Volume flow rate low word Sensor 1	unsigned int.	Air Volume flow rate low word in m <sup>3</sup> /h of Sensor 1		
7	Differential pressure range Sensor 1	unsigned int.	Flag indicates the current differential pressure range of Sensor 1	0 = 0–1.000 Pa 1 = 0–1.500 Pa 2 = 0–2.000 Pa 3 = 0–2.500 Pa 4 = 0–3.000 Pa 5 = 0–4.000 Pa 6 = 0–5.000 Pa 7 = 0–6.000 Pa	2.000 = 2.000 Pa
8	Diff. pressure response time – Sensor 1	unsigned int.	Flag indicates the current response time of Sensor 1	0 = 0,5 s 1 = 1 s 2 = 2 s 3 = 5 s	
9-10			Reserved, return 0		
11	Differential pressure Sensor 2	signed int.	Measured differential pressure Sensor 2	0–6.000	1.000 = 1.000 Pa
12	Output Sensor 2	unsigned int.	Analogue / digital output value Sensor 2	0–1.000	100 = 10.0 %
13	Max. pressure limit flag Sensor 2	unsigned int.	Flag indicates that the pressure is out of the max. limit range for Sensor 2		0 = Below the limit 1 = Above the limit
14	Min. pressure limit flag Sensor 2	unsigned int.	Flag indicates that the pressure is out of the min. limit range for Sensor 2		0 = Below the limit 1 = Above the limit
15	Volume flow rate high word Sensor 2	unsigned int.	Air Volume flow rate high word in m <sup>3</sup> /h of Sensor 2	0–77.000	10.000 = 10.000 m <sup>3</sup> /h
16	Volume flow rate low word Sensor 2	unsigned int.	Air Volume flow rate low word in m <sup>3</sup> /h of Sensor 2		
17	Differential pressure range Sensor 2	unsigned int.	Flag indicates the current differential pressure range of Sensor 2	0 = 0–1.000 Pa 1 = 0–1.500 Pa 2 = 0–2.000 Pa 3 = 0–2.500 Pa 4 = 0–3.000 Pa 5 = 0–4.000 Pa 6 = 0–5.000 Pa 7 = 0–6.000 Pa	2.000 = 2.000 Pa
18	Diff. pressure response time – Sensor 2	unsigned int.	Flag indicates the current response time of Sensor 2	0 = 0,5 s 1 = 1 s 2 = 2 s 3 = 5 s	
19-20			Reserved, return 0		

**HOLDING REGISTERS – SPD-X-2K0 and SPD-X-6K0**

Address	Data type	Description	Data	Default	Values
1	Address	Device address	1–247		1
2	RS485 baud rate	Modbus communication baud rate	1 = 9.600 2 = 19.200 3 = 38.400		2
3	RS485 Parity mode	Parity check mode	0 = 8N1 1 = 8E1 2 = 8O1		1 0 = 8N1 1 = 8E1 2 = 8O1
4	Device type	Device type (Read only)	SPD-X-2K0 = 1020 SPD-X-6K0 = 1052		
5	HW version	Hardware version of the device (Read only)	XXX		100 = HW version 1.00
6	FW version	Firmware version of the device (Read only)	XXX		100 = FW version 1.00
7-10		Reserved, return 0			
11	Mode – Sensor 1	Operating mode of Sensor 1	1 = Standalone mode 2 = Modbus mode		1
12	Range Sensor 1	Range selection for Sensor 1	SPD-X-2K0		4
			SPD-X-6K0		
			0 = 0–100 Pa	0 = 0–1.000 Pa	
			1 = 0–250 Pa	1 = 0–1.500 Pa	
			2 = 0–500 Pa	2 = 0–2.000 Pa	
			3 = 0–750 Pa	3 = 0–2.500 Pa	
			4 = 0–1.000 Pa	4 = 0–3.000 Pa	
			5 = 0–2.000 Pa	5 = 0–4.000 Pa	
6 = -50–50 Pa	6 = 0–5.000 Pa				
7 = -100–100 Pa	7 = 0–6.000 Pa				
13	Response Time Sensor 1	Response time selection for Sensor 1	0 = 0,5 s 1 = 1 s 2 = 2 s 3 = 5 s		1
14	Max. pressure limit – Sensor 1	Max. pressure limit selection for Sensor 1	SPD-X-2K0 = -100–2.000 SPD-X-6K0 = 0–6.000	SPD-X-2K0 = 1.000 SPD-X-6K0 = 3.000	1.000 = 1.000 Pa
15	Min. pressure limit – Sensor 1	Min. pressure limit selection for Sensor 1	SPD-X-2K0 = -100–2.000 SPD-X-6K0 = 0–6.000	SPD-X-2K0 = 0 SPD-X-6K0 = 0	1.000 = 1.000 Pa
16	Power-up timer – Sensor 1	Power up timer before measuring the lower limit for Sensor 1	0–1.000 s	60 s	100 = 100 s
17	K-factor Sensor 1	K-factor selection according to the fan / drive type for Sensor 1	0–1.000		0
18-20		Reserved, return 0			
21	Mode – Sensor 2	Operating mode of Sensor 2	1 = Standalone mode 2 = Modbus mode		1
22	Range Sensor 2	Range selection for Sensor 2	SPD-X-2K0		4
			SPD-X-6K0		
			0 = 0–100 Pa	0 = 0–1.000 Pa	
			1 = 0–250 Pa	1 = 0–1.500 Pa	
			2 = 0–500 Pa	2 = 0–2.000 Pa	
			3 = 0–750 Pa	3 = 0–2.500 Pa	
			4 = 0–1.000 Pa	4 = 0–3.000 Pa	
			5 = 0–2.000 Pa	5 = 0–4.000 Pa	
6 = -50–50 Pa	6 = 0–5.000 Pa				
7 = -100–100 Pa	7 = 0–6.000 Pa				
23	Response Time Sensor 2	Response time selection – Sensor 2	0 = 0,5 s 1 = 1 s 2 = 2 s 3 = 5 s		1
24	Max. pressure limit – Sensor 2	Max. pressure limit selection for Sensor 2	SPD-X-2K0 = -100–2.000 SPD-X-6K0 = 0–6.000	SPD-X-2K0 = 1.000 SPD-X-6K0 = 3.000	1.000 = 1.000 Pa
25	Min. pressure limit – Sensor 2	Min. pressure limit selection for Sensor 2	SPD-X-2K0 = -100–2.000 SPD-X-6K0 = 0–6.000	SPD-X-2K0 = 0 SPD-X-6K0 = 0	1.000 = 1.000 Pa
26	Power-up timer – Sensor 2	Power up timer before measuring the lower limit for Sensor 2	0–1.000 s	60 s	100 = 100 s
27	K-factor Sensor 2	K-factor selection according to the fan / drive type for Sensor 2	0–1.000		0
28-30		Reserved, return 0			

If you want to find out more about Modbus over serial line, please visit: [http://www.modbus.org/docs/Modbus\\_over\\_serial\\_line\\_V1\\_02.pdf](http://www.modbus.org/docs/Modbus_over_serial_line_V1_02.pdf)

### INPUT REGISTERS (see Tables *Input registers* above)

The input registers are read-only. All data can be read using the 'Read Input Registers' command. The input registers of the SPD-X-2K0 and SPD-X-6K0 are different, that is why they are divided into two Input registers tables. The **two Input registers** tables above show the returned data type and the way it should be interpreted. If a register is not in use it is defined as "reserved" and returns "0" when addressed.

### HOLDING REGISTERS (see Table *Holding registers* above)

These registers are read / write registers and they can be managed via "Read Holding Registers", "Write Single Register" and "Write Multiple Registers" commands. The registers that are not used are read-only and, therefore, writing in these registers neither returns a Modbus error exception, nor makes any changes.

- **Holding register 1** contains the sensor address at which the sensor replies in a Modbus network to the master device. The default address is '1'. It can be changed in two ways:
  1. Send command "Write Single Register" with address '1' and write the new value.
  2. Connect only your unit to a master controller, the 3SModbus free PC application or the Sensistant tool, send the command "Write Single Register" to address '0' (Modbus broadcast address) and write a new address value.
- **The next two holding registers 2 and 3** also contain Modbus settings. Changing these registers changes the communication settings. The default Modbus settings are as stated in the *Modbus Protocol Specification*.
- **The next three holding registers 4, 5 and 6** are read-only. They return information about the sensor hardware and firmware versions.
- **The next four holding registers 7, 8, 9 and 10** are not used. They are read-only.



## NOTE

*Writing in these registers neither returns a Modbus error exception, nor makes any changes!*

- **Holding registers 11** determines the mode for Sensor 1. Sending command "Write Single Register" with address '11' and data '2' sets the Sensor 1 of SPD to Modbus Mode. In Modbus Mode the range and response time settings are controlled via Modbus only (in Standalone mode these settings are controlled by the on-board jumpers). To change to Standalone Mode, it is necessary to send command "Write Single Register" with address '11' and data '1'. Once the user has set Sensor 1 of SPD to Modbus Mode, it automatically sets the default range to 0–1.000 Pa for SPD-X-2K0 and to 0–3.000 Pa for SPD-X-6K0 (value '4' in holding register 12) and response time to 1 s (value '1' in holding register 13).
- **Holding register 12** sets the current range in Modbus Mode for Sensor 1. The default value is "4". i.e. 0–1.000 Pa for SPD-X-2K0 and 0–3.000 Pa for SPD-X-6K0
- **Holding register 13** defines the current response time for Sensor 1. The default is "1", i.e. 1 second.
- **Holding register 14** contains the maximum differential pressure limit value. When the measured pressure is higher or equal to this value, input register 3 (Max Pressure Limit Flag for Sensor 1) will be set to '1', otherwise it is '0'. This register accepts values between '100' and '2.000' for SPD-X-2K0 and between '0' and '6.000' for SPD-X-6K0. If a value out of this range is written, the register returns to its default value. The maximum limit also depends on the current range. If the maximum limit in holding register 14 is higher than the maximum of the current range, it automatically becomes equal to the maximum of the range set.



## NOTE

- **Holding register 15** defines the minimum limit for the pressure for Sensor 1. The default value is the minimum of the set range. When the measured pressure is below this value, input register 4 (Min. Pressure Limit Flag for Sensor 1) is set to '0', otherwise it is '1'. This register accepts values between '-100' and '2.000' for SPD-X-2K0 and between '0' and '6.000' for SPD-X-6K0. If a value out of this range is written, the registers returns to its default value. The minimum limit also depends on the current range. If the minimum limit in holding register 15 is lower than the minimum of the current range, it automatically becomes equal to the minimum of the range set.



**NOTE**

*The minimum value cannot be higher than the maximum value. When a value higher than the defined maximum is written inside a register, it automatically becomes equal to the predefined maximum value.*

- **Holding register 16** defines the power up timer value for Sensor 1. The default value is '60 s'. During this time the Minimum limit for the pressure is not compared with the current measured pressure values and Min. Pressure Limit Flag register will remain '0' for this period.



**NOTE**

*If a value written in a holding register is lower than the predefined minimum value, the unit automatically adjusts the minimum limit to the new maximum limit value. (For example: when min. = 200 and max. = 1.000, if the max. value is changed to 150, i.e. is lower than the min. value, the unit will automatically set the min. value to 150 because the min. cannot be higher than the max.)*

- **Holding register 17** holds the K-factor. Enter the K-factor of the used fan / drive, if it is known (check the data sheets of the selected fan / drive). The default value is '0', and you are allowed to write values in the range of 0—1.000. Writing values out of this range does not change anything in this register.
- **Holding registers 18, 19 and 20** are not used. When addressed, they return "0".
- **Holding register 21—30** set Sensor 2. They duplicate the functionalities of holding registers 11—20 , but for Sensor 2.

## TRANSPORT AND STORAGE

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Avoid shocks and extreme conditions; stock in original packing.

## WARRANTY AND RESTRICTIONS

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Two years from the delivery date against defects in manufacturing. Any modifications or alterations to the product after the date of publication relieve the manufacturer of any responsibilities. The manufacturer bears no responsibility for any misprints or mistakes in this data.

## MAINTENANCE

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In normal conditions this product is maintenance-free. If soiled, clean with a dry or damp cloth. In case of heavy pollution, clean with a non-aggressive product. In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.