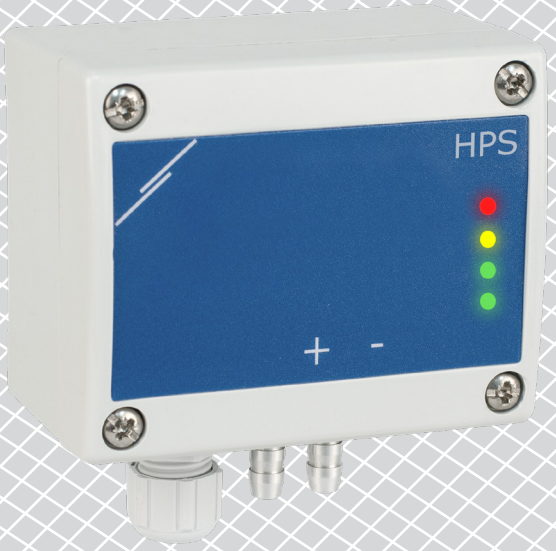
HPSPX -2 | DIFFERENTIAL PRESSURE PI CONTROLLER

Modbus register map



MODBUS REGISTER MAP

INPUT REGISTERS

		Data type	Description	Raw data range	Values	
1	Differential Pressure Level	signed integer	Measured differential pressure	HPSPX-1K0 -2 = 0—1.000 HPSPX-2K0 -2 = 0—2.000 HPSPX-4K0 -2 = 0—4.000 HPSPX-10K -2 = 0—10.000	100 =	100 Pa
2	Volume Flow Rate (High)*	unsigned integer	Air Volume flow rate in m³/h. Input register 2 contains high significant word, while Input register 3 contains low significant word of Volume flow rate. The value in this registers is equal to the K-factor (holding register 62) of the motor / fan multiplied by square root of measured differential pressure. If K-factor is not known, volume flow rate is calculated from a duct cross sectional area (holding register 63) multiplied by air flow velocity (Pitot air velocity (holding register 64) should be enabled and Pitot tube connected) **Volume flow rate (high) register only available for 4K0 and 10K series*	HPSPX-1K0 -2 = 0—25.000 HPSPX-2K0 -2 = 0—40.000 HPSPX-4K0 -2 = 0—100.000* HPSPX-10K -2 = 0—180.000*	1.000 =	1.000 m³/h
3	Volume Flow Rate (Low)	unsigned integer				
4	Air velocity	unsigned integer	Measured air velocity. **Active only if holding register 64 is set to 1**	0—300	100 =	10,0 m/s
5	Analogue/ Modulating Output Value	unsigned integer	Output value in percentage	0—1.000	100 =	10,0 %
6	Calculated Maximum of Volume Flow Rate (High)*	unsigned integer	The maximum possible volume flow rate calculated from according to selected K factor or a duct cross sectional area **Calculated Maximum Volume Flow Rate (High) register only available for 4K0 and 10K series*	HPSPX-1K0 -2 = 0—25.000 HPSPX-2K0 -2 = 0—40.000 HPSPX-4K0 -2 = 0—100.000* HPSPX-10K -2 = 0—180.000*	1.000 =	1.000 m³/h
7	Calculated maximum of volume flow rate	unsigned integer				
8	Air pressure/ volume/velocity span flag	unsigned integer	Flag indicates that measured air pressure, volume or velocity is outside set span values. Set to '1' when the measured value is outside the pressure, volume or velocity span values set defined by holding registers 13, 14, 20, 21, 22, 23, 28 and 29. Inactive during Auto-Tune function is in progress	0, 1	0 = 1 =	OK Alarm
9	Air pressure/ volume/velocity alert flag	unsigned integer	Flag indicates that measured air pressure, volume or velocity is outside set alert values. Set to '1' when the measured value is outside the pressure, volume or velocity alert values set defined by holding registers 11, 12, 16, 17, 18, 19, 26 and 27. Inactive during Auto-Tune function is in progress	0, 1	0 = 1 =	OK Alert
10	Feedback lost	unsigned integer	Indicates differential pressure feedback lost	0, 1	0 = 1 =	OK Feedback Lost (Red LED flashing)
11	Differential Pressure Sensor State	unsigned integer	Indicates a failure in pressure sensor element	0, 1	0 = 1 =	OK Fault (Red LED flashing)

INPUT REGISTERS

		Data type	Description	Raw data range	Values
12—20			Reserved, return 0		

Note: The input registers can be read via the Modbus command: “Read input registers”.

HOLDING REGISTERS

		Data type	Description	Raw data range	Values	Factory default values
1	Device slave address	unsigned integer	Modbus device address	1—247		1
2	Modbus baud rate	unsigned integer	Modbus communication baud rate	0—6	0 = 4.800 1 = 9.600 2 = 19.200 3 = 38.400 4 = 57.600 5 = 115.200 6 = 230.400	2
3	Modbus parity	unsigned integer	Parity check mode	0 = 8N1 1 = 8E1 2 = 8O1	0 = None 1 = Even 2 = Odd	1
4	Device type	unsigned integer	Device type. Read only	1.689—1.696	HPSPG-1K0 -2 = 1.689 HPSPG-2K0 -2 = 1.690 HPSPG-4K0 -2 = 1.691 HPSPG-10K -2 = 1.692 HPSPF-1K0 -2 = 1.693 HPSPF-2K0 -2 = 1.694 HPSPF-4K0 -2 = 1.695 HPSPF-10K -2 = 1.696	
5	HW version	unsigned integer	Hardware version of the device. Read only	XXXX	0x0100 = HW version 1.00	
6	FW version	unsigned integer	Firmware version of the device. Read only	XXXX	0x0220 = FW version 2.20	
7			Reserved, returns 0			
8	Modbus safety timeout	unsigned integer	After time with no Modbus communication, outputs are set to 0	0—60	0 = no timeout 60 = 60 minutes	0

HOLDING REGISTERS

		Data type	Description	Raw data range	Values		Factory default values
9	Modbus network resistor termination (NBT)	unsigned integer	Sets device as end device of the line / or not by connecting NBT	0, 1	0 = 1 =	NBT disconnected NBT connected	0
10	Modbus registers reset	unsigned integer	Resets Modbus holding registers to default values. When finished this register is automatically reset to '0'	0, 1	0 = 1 =	Idle Reset	0
11	Minimum Differential Pressure Alert	unsigned integer	Minimum differential pressure alert, cannot be set higher than differential pressure setpoint	0—(Maximum pressure range —50 Pa)	100 =	100 Pa	0
12	Maximum Differential Pressure Alert	unsigned integer	Maximum differential pressure alert, cannot be set lower than differential pressure setpoint	(Minimum pressure range + 50 Pa) - default	100 =	100 Pa	HPSPX-1K0 -2 = 1.000 HPSPX-2K0 -2 = 2.000 HPSPX-4K0 -2 = 4.000 HPSPX-10K -2 = 10.000
13	Minimum Differential Pressure Span	unsigned integer	Minimum differential pressure span, cannot be set higher than differential pressure setpoint	Min. pressure range—Max. pressure alarm	100 =	100 Pa	0
14	Maximum Differential Pressure Span	unsigned integer	Maximum differential pressure span, cannot be set lower than differential pressure setpoint	Differential Pressure Setpoint—Maximum Differential Pressure Max = default	100 =	100 Pa	HPSPX-1K0 -2 = 1.000 HPSPX-2K0 -2 = 2.000 HPSPX-4K0 -2 = 4.000 HPSPX-10K -2 = 10.000
15	Differential Pressure Setpoint	unsigned integer	Setpoint - Desired differential pressure	0—Maximum Differential Pressure Max.: HPSPX-1K0 -2 = 1.000 HPSPX-2K0 -2 = 2.000 HPSPX-4K0 -2 = 4.000 HPSPX-10K -2 = 10.000	100 =	100 Pa	0
16	Minimum Volume Flow Rate Alert (High)*	unsigned integer	Minimum volume flow rate alert, cannot be set higher than volume flow rate setpoint. Holding register 16 contains high significant word, while holding register 17 contains low significant word of minimum volume flow rate alert **Minimum volume flow rate alert (high) register only available for 4K0 and 10K series*	0—Minimum Volume Flow Span	10.000 =	10.000 m³/h	0
17	Minimum Volume Flow Rate Alert (Low)	unsigned integer					
18	Maximum Volume Flow Rate Setpoint Alert (High)*	unsigned integer	Maximum volume flow alert, cannot be set lower than Volume flow setpoint. Holding register 18 contains high significant word, while holding register 19 contains low significant word of Volume flow alert maximum **Maximum Volume Flow Rate alert (High) register only available for 4K0 and 10K series*	Maximum Volume Flow Span—Maximum Volume Flow Rate, Max = default	10.000 =	10.000 m³/h	HPSPX-1K0 -2 = 25.000 HPSPX-2K0 -2 = 40.000 HPSPX-4K0 -2 = 100.000* HPSPX-10K -2 = 180.000*
19	Maximum Volume Flow Rate Setpoint Alert (Low)*	unsigned integer					

HOLDING REGISTERS

		Data type	Description	Raw data range	Values		Factory default values
20	Minimum Volume Flow Rate Span (High)*	unsigned integer	Minimum volume flow rate span, cannot be set higher than volume flow rate setpoint. Holding register 20 contains high significant word, while holding register 21 contains low significant word of minimum volume flow rate span **Minimum volume flow rate span (high) register only available for 4K0 and 10K series*	Min. volume flow range—Max. volume flow alarm	10.000 =	10.000 m³/h	0
21	Minimum Volume Flow Rate Span (Low)	unsigned integer					
22	*Maximum Volume Flow Rate Span (High)	unsigned integer	Maximum volume flow rate span, cannot be set lower than volume flow rate setpoint. Holding register 22 contains high significant word, while holding register 23 contains low significant word of maximum volume flow rates span **Maximum volume flow rate span (high) register only available for 4K0 and 10K series*	Volume Flow Rate Setpoint—Maximum Volume Flow Rate, Max = default	10.000 =	10.000 m³/h	HPSPX-1K0 -2 = 25.000 HPSPX-2K0 -2 = 40.000 HPSPX-4K0 -2 = 100.000* HPSPX-10K -2 = 180.000*
23	Maximum Volume Flow Rate Span (Low)	unsigned integer					
24	*Volume Flow Rate SetPoint (High)	unsigned integer	Set Point - Desired volume flow rate. Holding register 24 contains high significant word, while holding register 25 contains low significant word of volume flow rate setpoint **Volume Flow Rate Setpoint (high) register only available for 4K0 and 10K series*	0—Maximum Volume Flow Rate Max: HPSPX-1K0 -2 = 25.000 HPSPX-2K0 -2 = 40.000 HPSPX-4K0 -2 = 100.000* HPSPX-10K -2 = 180.000*	10.000 =	10.000 m³/h	0
25	Volume Flow Rate SetPoint (Low)	unsigned integer					
26	Minimum Air Velocity Alert	unsigned integer	Minimum air velocity alert, cannot be set higher than air velocity setpoint	0—(Minimum Air Velocity Span)	100 =	10,0 m/s	0
27	Maximum Air Velocity Alert	unsigned integer	Maximum air velocity alert, cannot be set lower than air velocity setpoint	Maximum Air Velocity Span -300	100 =	10,0 m/s	300
28	Minimum Air Velocity Span	unsigned integer	Minimum air velocity span, cannot be set higher than air velocity setpoint	0—Air Velocity Setpoint	100 =	10,0 m/s	0
29	Maximum Air Velocity Span	unsigned integer	Maximum air velocity span, cannot be set lower than Air Velocity setpoint	Air Velocity Setpoint -300	100 =	10,0 m/s	300
30	Air Velocity Setpoint	unsigned integer	SetPoint - desired Air velocity	0—300	100 =	10,0 m/s	0
31—50			Reserved, return 0				

HOLDING REGISTERS

		Data type	Description	Raw data range	Values		Factory default values
51	Output type	unsigned integer	Select analogue/modulating output type	1—3	1 = 2 = 3 =	0—10 VDC 0—20 mA PWM	1
52	Overwrite enable	unsigned integer	Enables the direct control over output 1	0, 1	0 = 1 =	Disabled Enabled	0
53	Overwrite value	unsigned integer	Overwrite value for output 1. **Active only if Holding register 52 is set to 1**	0—1.000	0 = 1.000 =	0 % 100 %	0
54	Internal Voltage Source Selection	unsigned integer	Selection of internal voltage source for PWM output	0, 1	0 = 1 =	3,3 VDC 12,0 VDC	0
55	Minimum Output Value	unsigned integer	Minimum output value of the motor (between 10 and 50 %)	100—500	100 =	10 %	200
56	Maximum Output Value	unsigned integer	Maximum output value of the motor (between 50 and 100 %)	500—1.000	500 =	50 %	1.000
57	Kp	unsigned integer	Proportional Gain	1—30			10
58	Ti	unsigned integer	Integration Period	0—1.000	10 =	10*100 ms = 1s	40
59	Auto-Tune Function Start	unsigned integer	Starting auto-tune function. **Once started cannot be aborted**	0, 1	0 = 1 =	Function is not active Function is in progress	0
60			Reserved, returns 0				
61	Operating Mode Selection	unsigned integer	Selection of differential pressure controller operating mode	0—3	0 = 1 = 2 = 3 =	OFF Pressure Volume flow Air velocity	1
62	K-factor	unsigned integer	K factor according to the motor / fan specification	0—1.000			0
63	Duct Cross Sectional Area [cm²]	unsigned integer	Used for calculation of the Volume Flow Rate when K-factor is not known	0—32.000	0 = 1—32.000 =	not used 100 = 100 cm²	0

HOLDING REGISTERS

		Data type	Description	Raw data range	Values		Factory default values
64	Pitot Air Velocity	unsigned integer	Enables air velocity readout. If '0' air velocity readout is disabled, If '1' air velocity readout is enabled and it is accessible in input register 4. Pitot tube needed (PSET-PTX-200)	0, 1	0 = 1 =	Disabled Enabled	0
65—69			Reserved, return 0				
70	Auto-zeroing	unsigned integer	Put sensor to 0 Pa	0, 1	0 = 1 =	Inactive Active	0
71—91			Reserved, return 0				
92	Altitude	unsigned integer	Current altitude	0—5.000	1.000 =	1.000 m	0
93	Start-up Timer	unsigned integer	Start-up period before setting alert and span flags. During this period the alert and span limits are not compared with the measured pressure/volume/velocity and alert flag and span limit flag registers will remain `0` for this period. Feedback lost function also remains inactive during this period. Timer is reloaded when operating setpoint is set to 0, Operating mode is set to 'OFF' or Auto-tune function is performed	0—1.000	100 =	100 s	60 s
94			Reserved, returns 0				
95	LED Brightness	unsigned integer	LED intensity (incrementing with step of 10 %)	0—10	0 = 1 = 10 =	OFF 10 % 100 %	5
96	Feedback Lost Output Value	unsigned integer	Value for output 1 when feedback is lost	0—1.000	0 = 1.000 =	0 % 100 %	0
97	Feedback Lost Timer	unsigned integer	Output is equal to feedback lost output value when feedback is lost and feedback lost timer expired	0—600	10 =	1 s	30
98—100			Reserved, return 0				

Note: The holding registers can be managed via the following Modbus commands: “Read Holding Registers”, “Write Single Register” or “Write Multiple Registers”.

The free Sentera configuration and monitoring software 3SModbus can be downloaded via: https://www.sentera.eu/en/3SMCenter