HPSPX -2 | DIFFERENTIAL PRESSURE PI CONTROLLER

Modbus register map

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SENTERA CONTROLS
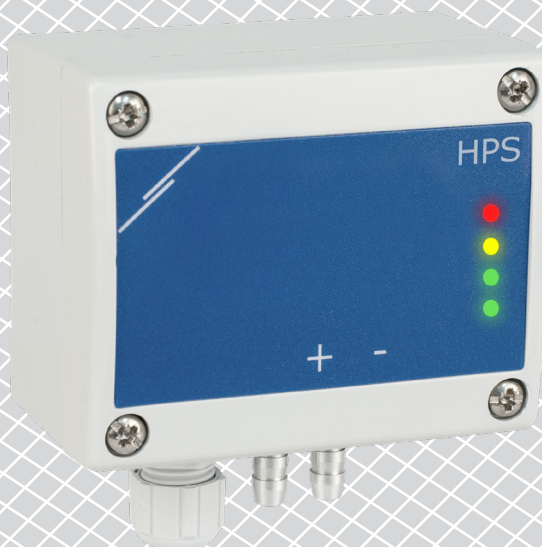
MODBUS REGISTER MAP

INPUT REGISTERS

		Data type	Description	Raw data range		Values
1	Differential pressure	signed integer	Measured differential pressure	HPS-X-1K0-2 = 0—1.000 HPS-X-2K0-2 = 0—2.000 HPS-X-4K0-2 = 0—4.000 HPS-X-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*	HPS-X-1K0-2 = 0—25.000 HPS-X-2K0-2 = 0—40.000 HPS-X-4K0-2 = 0—100.000* HPS-X-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	Output	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*	HPS-X-1K0-2 = 0—25.000 HPS-X-2K0-2 = 0—40.000 HPS-X-4K0-2 = 0—100.000* HPS-X-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 setpoint span values. Set to '1' when the measured value is outside the pressure, volume or velocity setpoint 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 Out of Range
9	Air pressure/ volume/velocity alarm flag	unsigned integer	Flag indicates that measured air pressure, volume or velocity is outside set setpoint alarm values. Set to '1' when the measured value is outside the pressure, volume or velocity setpoint alarm 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	Sensor fault	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 check	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 Modbus Registers		0
11	Minimum pressure setpoint alarm	signed integer	Minimum pressure setpoint alarm, cannot be set higher than differential Pressure setpoint	0—(Maximum pressure range —50 Pa)	100 =	100 Pa		0
12	Maximum pressure setpoint alarm	signed integer	Maximum pressure setpoint alarm, cannot be set lower than differential pressure setpoint	(Minimum pressure range + 50 Pa) - default	100 =	100 Pa	HPSPX-1K0 -2 = HPSPX-2K0 -2 = HPSPX-4K0 -2 = HPSPX-10K -2 =	1.000 2.000 4.000 10.000
13	Minimum pressure setpoint span	signed integer	Minimum pressure setpoint span, cannot be set higher than differential pressure setpoint	Min. pressure range—Max. pressure alarm	100 =	100 Pa		0
14	Maximum pressure setpoint span	signed integer	Maximum pressure setpoint span, cannot be set lower than differential pressure setpoint	Min. pressure alarm—Max. pressure range	100 =	100 Pa	HPSPX-1K0 -2 = HPSPX-2K0 -2 = HPSPX-4K0 -2 = HPSPX-10K -2 =	1.000 2.000 4.000 10.000
15	Differential Pressure setpoint	signed integer	Setpoint - desired differential pressure	0—Maximum Differential Pressure	100 =	100 Pa	HPSPX-1K0 -2 = HPSPX-2K0 -2 = HPSPX-4K0 -2 = HPSPX-10K -2 =	1.000 2.000 4.000 10.000
16	Minimum Volume Flow Rate Setpoint Alert (High)*	unsigned integer	MMinimum volume flow setpoint alarm, cannot be set higher than Volume flow setpoint. Holding register 16 contains high significant word, while holding register 17 contains low significant word of Volume flow setpoint alarm minimum *Minimum volume flow rate setpoint alert (high) register only available for 4K0 and 10K series	0—(Maximum volume flow range - 10 m³/h)	10.000 =	10.000 m³/h		0
17	Minimum Volume Flow Rate Setpoint Alert (Low)	unsigned integer						
18	Maximum Volume Flow Rate Setpoint Alert (High)*	unsigned integer	Maximum volume flow setpoint alarm, 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 setpoint alarm maximum *Maximum Volume Flow Rate Setpoint alert (High) register only available for 4K0 and 10K series	(Minimum volume flow range + 10 m³/h) - default	10.000 =	10.000 m³/h	HPSPX-1K0 -2 = HPSPX-2K0 -2 = HPSPX-4K0 -2 = HPSPX-10K -2 =	25.000 40.000 100.000* 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 Setpoint Span (High)*	unsigned integer	Minimum volume flow setpoint span, cannot be set higher than Volume flow setpoint. Holding register 20 contains high significant word, while holding register 21 contains low significant word of Volume flow setpoint span minimum *Minimum volume flow rate setpoint 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 Setpoint Span (Low)	unsigned integer					
22	*Maximum Volume Flow Rate Setpoint Span (High)	unsigned integer	Maximum volume flow setpoint span, cannot be set lower than Volume flow setpoint. Holding register 22 contains high significant word, while holding register 23 contains low significant word of Volume flow setpoint span maximum *Maximum Volume Flow Rate Setpoint span (High) register only available for 4K0 and 10K series	Min. volume flow alarm - Max. volume flow range	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 Setpoint 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 *Maximum Volume Flow Rate Setpoint (High) register only available for 4K0 and 10K series	0—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*
25	Volume Flow Rate SetPoint (Low)	unsigned integer					
26	Minimum air velocity setpoint alarm	unsigned integer	Minimum pressure setpoint alarm, cannot be set higher than Air Velocity setpoint	0—(Maximum air velocity range — 1 m/s)	100 =	10,0 m/s	0
27	Maximum air velocity setpoint alarm	unsigned integer	Maximum pressure setpoint alarm, cannot be set lower than Air Velocity setpoint	(Minimum air velocity range + 1 m/s)—300	100 =	10,0 m/s	300
28	Minimum air velocity setpoint span	unsigned integer	Minimum pressure setpoint span, cannot be set higher than Air Velocity setpoint	Min. air velocity range—Max. air velocity alarm	100 =	10,0 m/s	0
29	Maximum air velocity setpoint span	unsigned integer	Maximum pressure setpoint span, cannot be set lower than Air Velocity setpoint	Min. velocity alarm—Max. air velocity range	100 =	10,0 m/s	300
30	Air Velocity setpoint	unsigned integer	Set Point - desired air velocity	0—300	100 =	10,0 m/s	0
31—50			Reserved, return 0				

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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 / disable	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 speed of the motor (between 10 and 50 %)	100—500	100 =	10 %	200
56	Maximum Output Value	unsigned integer	Maximum speed 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 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 alarm and span flags. During this period the alarm and span limits are not compared with the measured pressure/volume/velocity and alarm flag and span limit flag registers will remain '0' for this period. Timer is reloaded when operating setpoint is set to 0 or auto-tune function is performed	0—1.000	100 =	100 s	60 s
94			Reserved, returns 0				
95	LED intensity / brightness	unsigned integer	LED intensity (incrementing with a 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