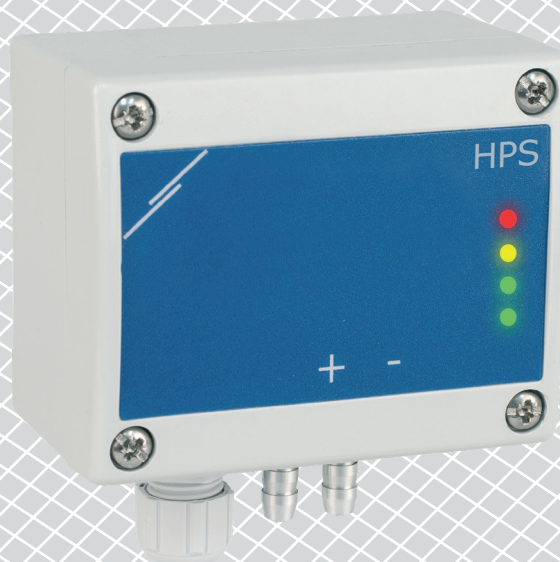


HPSA -2 | DIFFERENTIAL PRESSURE CONTROLLER FOR DAMPER ACTUATOR

Modbus register map



MODBUS REGISTER MAP

INPUT REGISTERS		Data type	Description	Raw data range	Values
1	Differential pressure	unsigned integer	Measured differential pressure	HPSAX-1K0-2 0—1.000 HPSAX-2K0-2 0—2.000	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 Kfactor (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)	HPSAX-1K0-2 0—25.000 HPSAX-2K0-2 0—40.000	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	HPSAX-1K0-2 0—25.000 HPSAX-2K0-2 0—40.000	1.000= 1.000 m³/h
7	Calculated maximum of volume flow rate low	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 = Pressure/Volume /Velocity measurement OK 1 = Pressure/Volume /Velocity measurement too low/high
9	Air pressure/volume/velocity range limit flag	unsigned integer	Flag indicates that measured air pressure, volume or velocity is outside set range limit values. Set to '1' when the measured pressure is outside the pressure, volume or velocity limit range values set defined by holding registers 11, 12, 16, 17, 18, 19, 26 and 27. Inactive during start-up (power-up) period defined by holding register 93	0, 1	0 = Pressure/Volume /Velocity range OK 1 = Pressure/Volume /Velocity range too low/high
10			Reserved, returns 0		

INPUT REGISTERS

		Data type	Description	Raw data range	Values
11	Sensor fault	unsigned integer	Indicates a failure in pressure sensor element	0, 1	0 = Sensor OK 1 = Sensor Fault (Red LED flashing)
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 3 = 38.400 6 = 230.400 1 = 9.600 4 = 57.600 2 = 19.200 5 = 115.200	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	1.739–1.742	HPSAG-1K0 -2 = 1.739 HPSAG-2K0 -2 = 1.740 HPSAF-1K0 -2 = 1.741 HPSAF-2K0 -2 = 1.742	
5	HW version	unsigned integer	Hardware version, read only	XXXX	0x0100 = HW version 1.00	
6	FW version	unsigned integer	Firmware version, read only	XXXX	0x0210 = FW version 2.10	
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 min	0
9	Modbus network resistor termination (NBT)	unsigned integer	Set device as end device of the line / or not by connecting NBT	0, 1	0 = NBT disconnected 1 = NBT connected	0

HOLDING REGISTERS

		Data type	Description	Raw data range	Values	Factory default values
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 = Idle 1 = Reset Modbus Registers	0
11	Minimum pressure setpoint alarm	unsigned integer	Minimum pressure setpoint alarm, cannot be set higher than Differential Pressure setpoint	0—Differential pressure span minimum	100 = 100 Pa	0
12	Maximum pressure setpoint alarm	unsigned integer	Maximum pressure setpoint alarm, cannot be set lower than Differential Pressure setpoint	Differential pressure span maximum—default	100 = 100 Pa	HPSAX-1K0-2: 1.000 HPSAX-2K0-2: 2.000
13	Minimum pressure setpoint span	unsigned integer	Minimum pressure setpoint span, cannot be set higher than Differential Pressure setpoint	0—Differential pressure setpoint	100 = 100 Pa	0
14	Maximum pressure setpoint span	unsigned integer	Maximum pressure setpoint span, cannot be set lower than Differential Pressure setpoint	Differential pressure setpoint—default	100 = 100 Pa	HPSAX-1K0-2: 1.000 HPSAX-2K0-2: 2.000
15	Differential Pressure setpoint	unsigned integer	Setpoint - Desired differential pressure	0—max max: 1.000 (HPSAX-1K0 -2) 2.000 (HPSAX-2K0 -2)	100 = 100 Pa	0
16	Minimum volume flow range high	unsigned integer	Minimum 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	0—Volume flow span minimum	10.000 = 10.000 m³/h	0
17	Minimum volume flow range low	unsigned integer				
18	Maximum volume flow range 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 minimum	Volume flow span maximum—default	10.000 = 10.000 m³/h	HPSAX-1K0-2: 25.000 HPSAX-2K0-2: 40.000
19	Maximum volume flow range 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	0—Volume flow setpoint	1.000 = 1.000 m ³ /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 minimum	Volume flow setpoint—default	10.000 = 10.000 m ³ /h	HPSAX-1K0-2: 25.000 HPSAX-2K0-2: 40.000
23	Maximum Volume Flow Rate setpoint span low	unsigned integer				
24	Volume Flow Rate Set Point 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	0—default	10.000 = 10.000 m ³ /h	HPSAX-1K0-2: 25.000 HPSAX-2K0-2: 40.000
25	Volume Flow Rate Set Point low	unsigned integer				
26	Minimum air velocity setpoint alarm	unsigned integer	Minimum pressure setpoint alarm, cannot be set higher than Air Velocity setpoint	0—Air Velocity span minimum	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	Air Velocity span maximum—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	0—Air Velocity setpoint	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	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, returns 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 = 0–10 VDC 2 = 0–20 mA 3 = PWM	1
52	Overwrite enable / disable	unsigned integer	Enables the direct control over output 1	0, 1	0 = Disabled 1 = 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 = 0 % 1.000 = 100 %	0
54	Internal voltage source selection	unsigned integer	Selection of internal voltage source for PWM output	0, 1	0 = 3,3 VDC 1 = 12 VDC	0
55	Minimum output value	unsigned integer	Minimum output value of the motor (between 0 and 50 %)	0–500	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	1–1.000	10 = 10*100 ms = 1s	40
59–60			Reserved, return 0			
61	Operating Mode Selection	unsigned integer	Selection of Operating Mode	0–3	0 = OFF 1 = Differential Pressure 2 = Volume Flow Rate 3 = 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 [cm ²]	unsigned integer	Used for calculation of the Volume Flow Rate when K-factor is not known	0–32.000	0 = not used 100 = 100 cm ² (1–32.000)	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 = Disabled 1 = Enabled	0
65–69			Reserved, return 0			
70	Recalibrate sensor	unsigned integer	Recalibrate sensor	0, 1	0 = Inactive 1 = 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. 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 intensity / brightness	unsigned integer	LED intensity (incrementing with a step of 10 %)	0–10	0 = OFF 1 = 10 % 10 = 100 %	5
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>