

# HPS-X-2 | DIFFERENTIAL PRESSURE TRANSMITTER

## Modbus register map



### MODBUS REGISTER MAP

INPUT REGISTERS		Data type	Description	Raw data range	Values
1	Differential pressure	unsigned 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)	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 %
6–7			Reserved, return 0		
8	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 13, 14, 20, 21, 22, 23, 28 and 29. Inactive during start-up (power-up) period defined by holding register 93	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		
11	Sensor fault	unsigned integer	Indicates a failure in pressure sensor	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 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	1.665–1.672	HPS-G-1K0 -2 = 1.665 HPS-G-2K0 -2 = 1.666 HPS-G-4K0 -2 = 1.667 HPS-G-10K -2 = 1.668 HPS-F-1K0 -2 = 1.669 HPS-F-2K0 -2 = 1.670 HPS-F-4K0 -2 = 1.671 HPS-F-10K -2 = 1.672	
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	60 = 60 minutes	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
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 range	unsigned integer	Minimum pressure range, cannot be set higher than maximum pressure range - (minus) minimum pressure range span (50 Pa)	0–(Maximum pressure range –50 Pa)	10 = 10 Pa	0

HOLDING REGISTERS						
		Data type	Description	Raw data range	Values	Factory default values
12	Maximum pressure range	unsigned integer	Maximum pressure range, cannot be set less than minimum pressure range + (plus) minimum pressure range span (50 Pa)	(Minimum pressure range + 50 Pa) - default	100 = 100 Pa	HPS-X-1K0-2 = 1.000 HPS-X-2K0-2 = 2.000 HPS-X-4K0-2 = 4.000 HPS-X-10K-2 = 10.000
13	Min. pressure alert	unsigned integer	Minimum differential pressure alarm value	Min. pressure range—Max. pressure alarm	10 = 10 Pa	0
14	Max. pressure alert	unsigned integer	Maximum differential pressure alarm value	Min. pressure alarm—Max. pressure range	100 = 100 Pa	HPS-X-1K0-2 = 1.000 HPS-X-2K0-2 = 2.000 HPS-X-4K0-2 = 4.000 HPS-X-10K-2 = 10.000
15			Reserved, returns 0			
16	Minimum volume flow range high	unsigned integer	Minimum volume flow range, cannot be set higher than maximum volume flow range - (minus) minimum volume flow range span (10 m <sup>3</sup> /h). Air volume flow rate in m <sup>3</sup> /h, holding register 16 contains high significant word, while holding register 17 contains low significant word of minimum volume flow rate range	0—(Maximum volume flow range - 10 m <sup>3</sup> /h)	10 = 10 m <sup>3</sup> /h	0
17	Minimum volume flow range low	unsigned integer				
18	Maximum volume flow range high	unsigned integer	Maximum volume flow range, cannot be set less than minimum volume flow range + (plus) minimum volume flow range span (10 m <sup>3</sup> /h). Air volume flow rate in m <sup>3</sup> /h, holding register 18 contains high significant word, while holding register 19 contains low significant word of maximum volume flow rate range	(Minimum volume flow range + 10 m <sup>3</sup> /h) - default	20.000 = 20.000 m <sup>3</sup> /h	HPS-X-1K0-2 = 25.000 HPS-X-2K0-2 = 40.000 HPS-X-4K0-2 = 100.000 HPS-X-10K-2 = 180.000
19	Maximum volume flow range low	unsigned integer				
20	Min. volume flow alert high	unsigned integer	Minimum volume flow alarm value. Air volume flow rate in m <sup>3</sup> /h, holding register 20 contains high significant word, while holding register 21 contains low significant word of minimum volume flow rate alert	Min. volume flow range - Max. volume flow alarm	1.000 = 1.000 m <sup>3</sup> /h	0
21	Min. volume flow alert low	unsigned integer				
22	Max. volume flow alert high	unsigned integer	Maximum volume flow alarm value. Air volume flow rate in m <sup>3</sup> /h, holding register 22 contains high significant word, while holding register 23 contains low significant word of maximum volume flow rate alert	Min. volume flow alarm - Max. volume flow range	10.000 = 10.000 m <sup>3</sup> /h	HPS-X-1K0-2 = 25.000 HPS-X-2K0-2 = 40.000 HPS-X-4K0-2 = 100.000 HPS-X-10K-2 = 180.000
23	Max. volume flow alert low	unsigned integer				

### HOLDING REGISTERS

		Data type	Description	Raw data range	Values	Factory default values
24–25			Reserved, return 0			
26	Minimum air velocity range	unsigned integer	Minimum air velocity range, cannot be set higher than maximum air velocity range - (minus) minimum air velocity range span (1 m/s)	0—(Maximum air velocity range — 1 m/s)	100 = 10,0 m/s	0
27	Maximum air velocity range	unsigned integer	Maximum air velocity range, cannot be set less than minimum air velocity range + minimum air velocity range span (1 m/s)	(Minimum air velocity range + 1 m/s)—300	300 = 30,0 m/s	300
28	Min. air velocity alert	unsigned integer	Minimum air velocity alarm value	Min. air velocity range—Max. air velocity alarm	100 = 10,0 m/s	0
29	Max. air velocity alert	unsigned integer	Maximum air velocity alarm value	Min. velocity alarm—Max. air velocity range	300 = 30,0 m/s	300
30–50			Reserved, return 0			
51	Output type	unsigned integer	Select analog / digital output type.	1–3	1 = 0–10 VDC 2 = 0–20 mA 3 = PWM	1
52	Override enable / disable	unsigned integer	Enables the direct control over output 1.	0–1	0 = Disabled 1 = Enabled	0
53	Override value	unsigned integer	Override 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
55–60			Reserved, returns 0			
61	Operating mode	unsigned integer	Operating mode selection	1–3	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 <sup>2</sup> ]	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 <sup>2</sup>	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			1
92	Altitude	unsigned integer	Current altitude	0—5.000	1.000 = 1.000 m	0
93	Start-up Timer	unsigned integer	Start-up (Power-up) timer before setting alert and range limit flags. During this period the alerts and range limits are not compared with the measured pressure/volume/velocity and alert flag and range limit flag registers will remain '0' for this period	0—1.000	100 = 100 s	60 s
94	Display response time	unsigned integer	Display response time selection	1—100	10 = 1,0 s	10
95	LED intensity / brightness	unsigned integer	LED intensity (incrementing with step of 10 %)	0—10	0 = OFF 1 = 10 % 10 = 100 %	5
96—98			Reserved, return 0			
99	Output response time	unsigned integer	Output signal response time selection	1—100	10 = 1,0 s	1
100			Reserved, returns 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/eu/3SMCenter>