HPD | DUAL DIFFERENTIAL PRESSURE TRANSMITTER

Modbus register map

MODBUS REGISTER MAP

INPUT REGISTERS

		Data type	Description	Raw data range	Values
1	Differential pressure sensor 1	unsigned integer	Measured differential pressure sensor 1	0—1.000 (HPD-X-1K0) 0—2.000 (HPD-X-2K0) 0—4.000 (HPD-X-4K0) 0—10.000 (HPD-X-10K)	100 = 100 Pa
2	Volume flow rate high sensor 1	unsigned integer	Air Volume flow rate in m^3/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)	0—25.000 (HPD-X-1K0) 0—40.000 (HPD-X-2K0) 0—100.000 (HPD-X-4K0) 0—180.000 (HPD-X-10K)	1.000 = 1.000 m^3/h
3	Volume flow rate low sensor 1	unsigned integer			
4	Air velocity sensor 1	unsigned integer	Measured air velocity. **Active only if holding register 64 is set to 1**	0 —300	100 = 10,0 m/s
5	Output 1	unsigned integer	Output value in percentage	0—1.000	100 = 10,0 %
6—7			Reserved, return 0		
8	Air pressure/volume/ velocity alert flag sensor 1	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 sensor 1	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 1 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		

INPUT REGISTERS

		Data type	Description	Raw data range	Values
21	Differential pressure sensor 2	unsigned integer	Measured differential pressure sensor 2	0—1.000 (HPD-X-1K0) 0—2.000 (HPD-X-2K0) 0—4.000 (HPD-X-4K0) 0—10.000 (HPD-X-10K)	100 = 100 Pa
22	Volume flow rate high sensor 2	unsigned integer	Air Volume flow rate in m³/h. Input register 22 contains high significant word, while Input register 23 contains low significant word of Volume flow rate. The value in this registers is equal to the K-factor (holding register 82) 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 83) multiplied by air flow velocity (Pitot air velocity (holding register 84) should be enabled and Pitot tube connected)	0—25.000 (HPD-X-1K0) 0—40.000 (HPD-X-2K0) 0—100.000 (HPD-X-4K0) 0—180.000 (HPD-X-10K)	1.000 = 1.000 m³/h
23	Volume flow rate low sensor 2	unsigned integer			
24	Air velocity sensor 2	unsigned integer	Measured air velocity. **Active only if holding register 64 is set to 1**	0 —300	100 = 10,0 m/s
25	Output 2	unsigned integer	Output value in percentage	0—1.000	100 = 10,0 %
26—27			Reserved, return 0		
28	Air pressure/volume/ velocity alert flag sensor 2	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 33, 34, 40, 41, 42, 43, 48 and 49. 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
29	Air pressure/volume/ velocity range limit flag sensor 2	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 31, 32, 36, 37, 38, 39, 46 and 47. 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
30			Reserved, return 0		
31	Sensor 2 fault	unsigned integer	Indicates a failure in pressure sensor	0—1	0 = Sensor OK 1 = Sensor Fault (Red LED flashing)
32—40			Reserved, return 0		

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

HOLDING REGISTERS

		Data type		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	1719—1726	HPD-F-1K0 = 1719 HPD-F-2K0 = 1720 HPD-F-4K0 = 1721 HPD-F-10K = 1722 HPD-G-1K0 = 1723 HPD-G-2K0 = 1724 HPD-G-4K0 = 1725 HPD-G-10K = 1726	
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	0x0200 - FW version 2.00	
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
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

HOLDING REGISTERS

		Data type		Raw data range	Values		Factory default values
11	Minimum pressure range sensor 1	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
12	Maximum pressure range sensor 1	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	HPD-X-1K0 = HPD-X-2K0 = HPD-X-4K0 = HPD-X-10K =	1.000 2.000 4.000 10.000
13	Min. pressure alert sensor 1	unsigned integer	Minimum differential pressure alarm value	Min. pressure range— Max. pressure alarm	10 = 10 Pa		0
14	Max. pressure alert sensor 1	unsigned integer	Maximum differential pressure alarm value	Min. pressure alarm— Max. pressure range	100 = 100 Pa	HPD-X-1K0 = HPD-X-2K0 = HPD-X-4K0 = HPD-X-10K =	1.000 2.000 4.000 10.000
15			Reserved, returns 0				
16	Minimum volume flow range high sensor 1	unsigned integer	Minimum volume flow range, cannot be set higher than maximum volume flow range - (minus) minimum volume flow range span (10 m^3/h). Air volume flow rate in m^3/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^3/h)	10 = 10 m^3/h		0
17	Minimum volume flow range low sensor 1	unsigned integer					
18	Maximum volume flow range high sensor 1	unsigned integer	Maximum volume flow range, cannot be set less than minimum volume flow range + (plus) minimum volume flow range span (10 m^3/h). Air volume flow rate in m^3/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^3/h)—default	20.000 = 20.000 m^3/h	HPD-X-1K0 = HPD-X-2K0 = HPD-X-4K0 = HPD-X-10K =	25.000 40.000 100.000 180.000
19	Maximum volume flow range low sensor 1	unsigned integer					
20	Min. volume flow alert high sensor 1	unsigned integer	Minimum volume flow alarm value. Air volume flow rate in m^3/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^3/h		0
21	Min. volume flow alert low sensor 1	unsigned integer					

HOLDING REGISTERS

		Data type		Raw data range	Values	Factory default values
22	Max. volume flow alert high sensor 1	unsigned integer	Maximum volume flow alarm value. Air volume flow rate in m3/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 m³/h	HPD-X-1K0 = 25.000 HPD-X-2K0 = 40.000 HPD-X-4K0 = 100.000 HPD-X-10K = 180.000
23	Max. volume flow alert low sensor 1	unsigned integer				
24—25			Reserved, return 0			
26	Minimum air velocity range sensor 1	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 sensor 1	unsigned integer	Maximum air velocity range, cannot be set less than minimum air velocity range + (plus) 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 sensor 1	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 sensor 1		Maximum air velocity alarm value	Min. velocity alarm - Max. air velocity range	300 = 30,0 m/s	300
30			Reserved, returns 0			
31	Minimum pressure range sensor 2	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
32	Maximum pressure range sensor 2	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	HPD-X-1K0 = 1.000 HPD-X-2K0 = 2.000 HPD-X-4K0 = 4.000 HPD-X-10K = 10.000
33	Min. pressure alert sensor 2	unsigned integer	Minimum differential pressure alarm value	Min. pressure range - Max. pressure alarm	10 = 10 Pa	0
34	Max. pressure alert sensor 2	unsigned integer	Maximum differential pressure alarm value	Min. pressure alarm - Max. pressure range	100 = 100 Pa	HPD-X-1K0 = 1.000 HPD-X-2K0 = 2.000 HPD-X-4K0 = 4.000 HPD-X-10K = 10.000

HOLDING REGISTERS

		Data type		Raw data range	Values	Factory default values
35			Reserved, returns 0			
36	Minimum volume flow range high sensor 2	unsigned integer	Minimum volume flow range, cannot be set higher than maximum volume flow range - (minus) minimum volume flow range span (10 m³/h). Air volume flow rate in m³/h, holding register 36 contains high significant word, while holding register 37 contains low significant word of minimum volume flow rate range	0 - (Maximum volume flow range - 10 m³/h)	10 = 10 Pa	0
37	Minimum volume flow range low sensor 2	unsigned integer				
38	Maximum volume flow range high sensor 2	unsigned integer	Maximum volume flow range, cannot be set less than minimum volume flow range + (plus) minimum volume flow range span (10 m³/h). Air volume flow rate in m³/h, holding register 38 contains high significant word, while holding register 39 contains low significant word of maximum volume flow rate range	(Minimum volume flow range + 10 m³/h) - default	20.000 = 20.000 m³/h	HPD-X-1K0 = 25.000 HPD-X-2K0 = 40.000 HPD-X-4K0 = 100.000 HPD-X-10K = 180.000
39	Maximum volume flow range low sensor 2	unsigned integer				
40	Min. volume flow alert high sensor 2	unsigned integer	Minimum volume flow alarm value. Air volume flow rate in m³/h, holding register 40 contains high significant word, while holding register 41 contains low significant word of minimum volume flow rate alert	Min. volume flow range - Max. volume flow alarm	1.000 = 1.000 m³/h	0
41	Min. volume flow alert low sensor 2	unsigned integer				
42	Max. volume flow alert high sensor 2	unsigned integer	Maximum volume flow alarm value. Air volume flow rate in m³/h, holding register 42 contains high significant word, while holding register 43 contains low significant word of maximum volume flow rate alert	Min. volume flow alarm - Max. volume flow range	10.000 = 10.000 m³/h	HPD-X-1K0 = 25.000 HPD-X-2K0 = 40.000 HPD-X-4K0 = 100.000 HPD-X-10K = 180.000
43	Max. volume flow alert low sensor 2	unsigned integer				
44—45			Reserved, return 0			
46	Minimum air velocity range sensor 2	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

HOLDING REGISTERS

		Data type		Raw data range	Values	Factory default values
47	Maximum air velocity range sensor 2	unsigned integer	Maximum air velocity range, cannot be set less than minimum air velocity range + (plus) minimum air velocity range span (1 m/s)	(Minimum air velocity range + 1 m/s) - 300	300 = 30,0 m/s	300
48	Min. air velocity alert sensor 2	unsigned integer	Minimum air velocity alarm value	Min. air velocity range - Max. air velocity alarm	100 = 10,0 m/s	0
49	Max. air velocity alert sensor 2	unsigned integer	Maximum air velocity alarm value	Min. velocity alarm - Max. air velocity range	300 = 30,0 m/s	300
50			Reserved, returns 0			
51	Output 1 type	unsigned integer	Select analogue / modulating output 1 type	1—3	1 = 0—10 VDC 2 = 0—20 mA 3 = PWM	1
52	Overwrite enable / disable output 1	unsigned integer	Enables the direct control over output 1	0—1	0 = Disabled 1 = Enabled	0
53	Overwrite value output 1	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 output 1	unsigned integer	Selection of internal voltage source for PWM output	0—1	0 = 3,3 VDC 1 = 12 VDC	0
55—60			Reserved, return 0			
61	Operating mode sensor 1	unsigned integer	Operating mode selection	1—3	1 = Differential Pressure 2 = Volume Flow 3 = Air Velocity	1
62	Operating mode sensor 1	unsigned integer	K-factor according to the motor / fan specification	0—1.000		0

HOLDING REGISTERS

		Data type		Raw data range	Values	Factory default values
63	Duct cross sectional area [cm²] sensor 1	unsigned integer	Used for calculation of the Volume Flow Rate when K-factor is not known	0—32.000	0 = not used 100 = 100 cm²	0
64	Pitot air velocity sensor 1	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			0
70	Recalibrate sensor 1	unsigned integer	Recalibrate sensor 1	0—1	0 = Inactive 1 = Active	0
71	Output 2 type	unsigned integer	Select analogue / modulating output 2 type	1—3	1 = 0—10 VDC 2 = 0—20 mA 3 = PWM	0
72	Overwrite enable / disable output 2	unsigned integer	Enables the direct control over output 2	0—1	0 = Disabled 1 = Enabled	0
73	Overwrite value output 2	unsigned integer	Overwrite value for output 2. **Active only if Holding register 72 is set to 1**	0—1.000	0 = 0 % 1.000 = 100 %	0
74	Internal voltage source selection output 2	unsigned integer	Selection of internal voltage source for PWM output	**0—1**	0 = 3,3 VDC 1 = 12 VDC	0
75—80			Reserved, return 0			
81	Operating mode sensor 2	unsigned integer	Operating mode selection	1—3	1 = Differential Pressure 2 = Volume Flow 3 = Air Velocity	1
82	K-factor sensor 2	unsigned integer	K factor according to the motor / fan specification	0—1.000		0

HOLDING REGISTERS

		Data type		Raw data range	Values	Factory default values
83	Duct cross sectional area [cm²] sensor 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 cm²	0
84	Pitot air velocity sensor 2	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 24. Pitot tube needed (PSET-PTX-200)	0—1	0 = Disabled 1 = Enabled	0
85—89			Reserved, return 0			
90	Recalibrate sensor 2	unsigned integer	Recalibrate sensor 2	0—1	0 = Inactive 1 = Active	0
91			Reserved, returns 0			
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—98			Reserved, return 0			
99	Output response time	unsigned integer	Output signal response time selection	1—100	10 = 1,0 s	1

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*