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### **PA11xx Series of RS-485 (MODBUS RTU / MODBUS ASCII) Environmental Sensors Models**

Temperature - **PA1111**

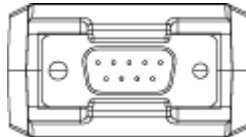
Temperature ~ Humidity - **PA1112**

Temperature ~ Humidity ~ Pressure - **PA1113**

Temperature ~ Humidity ~ Pressure ~ Light - **PA1114**

***User's Manual***

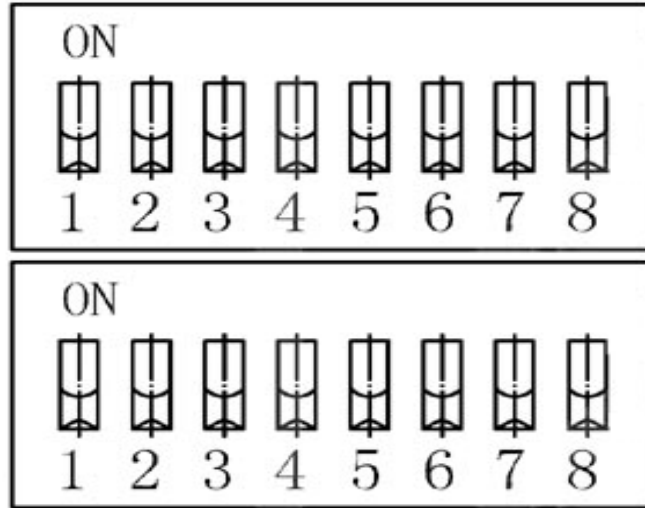
Rev 1.2 2017



## PA111x Specifications

<b>Operating Temperature Range</b>	-40 ° C to +85 ° C (-40 ° F to +185 ° F)
<b>Dimensions</b>	9.1 cm (3.6") x 4.2 cm (1.7") x 2 cm (0.8")
<b>Housing Material</b>	Injection molded ABS plastic
<b>Housing Colour</b>	bone white (black optional)
<b>Power source:</b>	8 to 24 VDC
<b>Current Consumption</b>	~25 mA Max.
<b>Communications Interface</b>	RS485 with built-in selectable termination.
<b>Maximum RS-485 extension cable length</b>	1200 m (4000 ft.).
<b>Selectable Communications Protocol</b>	MODBUS RTU / MODBUS ASCII
<b>Selectable Baud Rates (RTU)</b>	2400, 9600, 19200, 38400, 57600, 115200, 460800, 921600
<b>Selectable Baud Rates (ASCII)</b>	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600
<b>Relative Humidity Measurement Range Deviation</b>	0 to 100 %RH +/- %2 RH
<b>Barometric Pressure Range</b>	300...1100hPa (+9000m...-500m sea level)
<b>Temperature Measurement Range</b>	-40C to +85C (-40 ° F to +185 ° F)
<b>Illumination Measurement Range</b>	0.002 – 32000 LUX

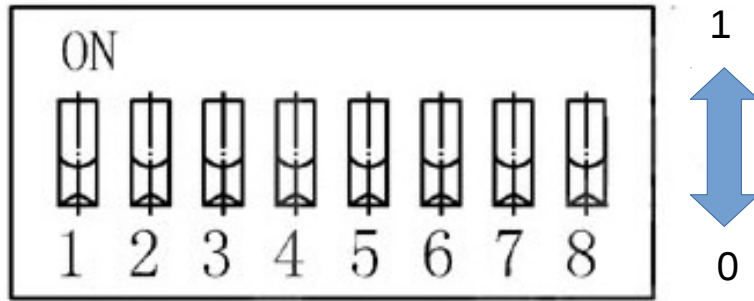
## SETTINGS



## MODBUS ADDRESS

MODBUS ADDRESS selector selects the MODBUS address in binary notation, where the switch in the ON position represents 1, and the OFF position represents 0. See **APPENDIX A** for a full list of binary to decimal conversions.

# SETTINGS



## RS-485 Termination

0 = Disabled  
1 = Enabled

## TEST

0 = Factory  
1 = Normal

## RTU/ASCII

0 = RTU  
1 = ASCII

## Framing

### RTU

x0 = 1 Stop Bit  
x1 = 2 Stop Bit  
0x = Little Endian  
1x = Big Endian

### ASCII

0x = No Parity  
10 = Even Parity  
11 = Odd Parity

## RTU / Baud Rate

000 = 2400  
001 = 9600  
010 = 19200  
011 = 38400  
100 = 57600  
101 = 115200  
110 = 460800  
111 = 921600

## ASCII / Baud Rate

000 = 300  
001 = 1200  
010 = 2400  
011 = 4800  
100 = 9600  
101 = 19200  
110 = 38400  
111 = 57600

**DB9F RS-485 Pinout**

<b>PIN</b>	<b>SIGNAL</b>	<b>IN/OUT *</b>	<b>DESCRIPTION</b>
1	A	IN/OUT	RS-485 DATA (A)
2	-	-	-
3	-	-	-
4	PWR	IN	+8-24 VDC IN
5	GND	-	Signal Ground
6	PWR	IN	+8-24 VDC IN
7	-	-	-
8	-	-	-
9	B	IN/OUT	RS-485 DATA (B)

**MODBUS Register Map for Model PA1113:**

ACCESS	REGISTER ADDRESS	TYPE	DESCRIPTION
R/W‡	40001	IINT16	Model Number
R/W‡	40002	IINT16	Firmware Version
R/W‡	40003	INT32	Serial Number
R/W‡	40005	INT16	Temperature Calibration
R/W‡	40006	INT16	Relative Humidity Calibration
R/W‡	40007	INT16	Pressure Calibration
R/W‡	40008	INT16	Illumination Calibration
R/W‡	40009	UINT16	Feature Settings
R/W‡	40010	UINT16	Reserved for Future Use (0x0000)
R/W‡	40011	UINT16	CRC
R/W‡	40012	UINT16	Write Protect Lock
R	40101	FLOAT32	Temperature C.
R	40103	FLOAT32	Temperature F.
R	40105*	FLOAT32	% Relative Humidity
R	40107*	FLOAT32	DewPoint C.
R	40109*	FLOAT32	DewPoint F.
R	40111**	FLOAT32	Pressure hPa
R	40113**	FLOAT32	Pressure kPa
R	40115**	FLOAT32	Pressure InHG (0°C)
R	40117***	FLOAT32	Illumination LUX
R	40201	INT16	(Temperature C) * 100
R	40202	INT16	(Temperature F) * 100
R	40203*	INT16	(% Relative Humidity) * 100
R	40204*	INT16	(DewPoint C) * 100
R	40205*	INT16	(DewPoint F) * 100
R	40206**	INT16	(Pressure hPa) * 10
R	40207***	INT16	Illumination LUX
R	40301	UINT16	Fault Code
R	40302	UINT16	Comm Fault Count
R	40303	UINT16	Heartbeat (1 HZ)

‡ Factory write-protected register.

\* Available in Models PA1112, PA1113, and PA1114 only.

\*\* Available in Models PA1113 and PA1114 only.

\*\*\* Available in Model PA1114 only.

# APPENDIX A

## Decimal - hexadecimal - binary conversion table

Dec	Hex	Bin	Dec	Hex	Bin	Dec	Hex	Bin	Dec	Hex	Bin
0	0	00000000	64	40	01000000	128	80	10000000	192	c0	11000000
1	1	00000001	65	41	01000001	129	81	10000001	193	c1	11000001
2	2	00000010	66	42	01000010	130	82	10000010	194	c2	11000010
3	3	00000011	67	43	01000011	131	83	10000011	195	c3	11000011
4	4	00000100	68	44	01000100	132	84	10000100	196	c4	11000100
5	5	00000101	69	45	01000101	133	85	10000101	197	c5	11000101
6	6	00000110	70	46	01000110	134	86	10000110	198	c6	11000110
7	7	00000111	71	47	01000111	135	87	10000111	199	c7	11000111
8	8	00001000	72	48	01001000	136	88	10001000	200	c8	11001000
9	9	00001001	73	49	01001001	137	89	10001001	201	c9	11001001
10	a	00001010	74	4a	01001010	138	8a	10001010	202	ca	11001010
11	b	00001011	75	4b	01001011	139	8b	10001011	203	cb	11001011
12	c	00001100	76	4c	01001100	140	8c	10001100	204	cc	11001100
13	d	00001101	77	4d	01001101	141	8d	10001101	205	cd	11001101
14	e	00001110	78	4e	01001110	142	8e	10001110	206	ce	11001110
15	f	00001111	79	4f	01001111	143	8f	10001111	207	cf	11001111
16	10	00010000	80	50	01010000	144	90	10010000	208	d0	11010000
17	11	00010001	81	51	01010001	145	91	10010001	209	d1	11010001
18	12	00010010	82	52	01010010	146	92	10010010	210	d2	11010010
19	13	00010011	83	53	01010011	147	93	10010011	211	d3	11010011
20	14	00010100	84	54	01010100	148	94	10010100	212	d4	11010100
21	15	00010101	85	55	01010101	149	95	10010101	213	d5	11010101
22	16	00010110	86	56	01010110	150	96	10010110	214	d6	11010110
23	17	00010111	87	57	01010111	151	97	10010111	215	d7	11010111
24	18	00011000	88	58	01011000	152	98	10011000	216	d8	11011000
25	19	00011001	89	59	01011001	153	99	10011001	217	d9	11011001
26	1a	00011010	90	5a	01011010	154	9a	10011010	218	da	11011010
27	1b	00011011	91	5b	01011011	155	9b	10011011	219	db	11011011
28	1c	00011100	92	5c	01011100	156	9c	10011100	220	dc	11011100
29	1d	00011101	93	5d	01011101	157	9d	10011101	221	dd	11011101
30	1e	00011110	94	5e	01011110	158	9e	10011110	222	de	11011110
31	1f	00011111	95	5f	01011111	159	9f	10011111	223	df	11011111
32	20	00100000	96	60	01100000	160	a0	10100000	224	e0	11100000
33	21	00100001	97	61	01100001	161	a1	10100001	225	e1	11100001
34	22	00100010	98	62	01100010	162	a2	10100010	226	e2	11100010
35	23	00100011	99	63	01100011	163	a3	10100011	227	e3	11100011
36	24	00100100	100	64	01100100	164	a4	10100100	228	e4	11100100
37	25	00100101	101	65	01100101	165	a5	10100101	229	e5	11100101
38	26	00100110	102	66	01100110	166	a6	10100110	230	e6	11100110
39	27	00100111	103	67	01100111	167	a7	10100111	231	e7	11100111

## APPENDIX B – Fault Codes (MODBUS Register 40301)

0x0000	No Fault Detected
0x0001	Temperature Out Of Range
0x0002	Temperature Sensor Failure
0x0003	Humidity Out Of Range
0x0004	Humidity Sensor Failure
0x0005	Pressure Out Of Range
0x0006	Pressure Sensor Failure
0x0007	Illumination Out Of Range
0x0008	Illumination Sensor Failure
0x0009	Low Voltage Detected
0x000A	Bad Settings CRC
0x000B	General Failure