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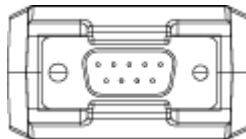
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PA11xx Series of RS-485 (MODBUS RTU / MODBUS ASCII) Environmental Sensors Models

Temperature - **PA1111**
Temperature ~ Humidity - **PA1112**
Temperature ~ Humidity ~ Pressure - **PA1113**
Temperature ~ Humidity ~ Pressure ~ Light - **PA1114**

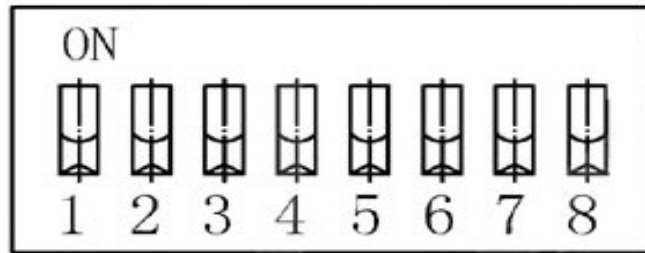
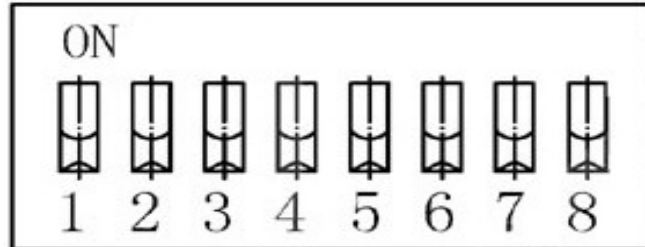
User's Manual
Rev 1.1 2015



PA111x Specifications

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

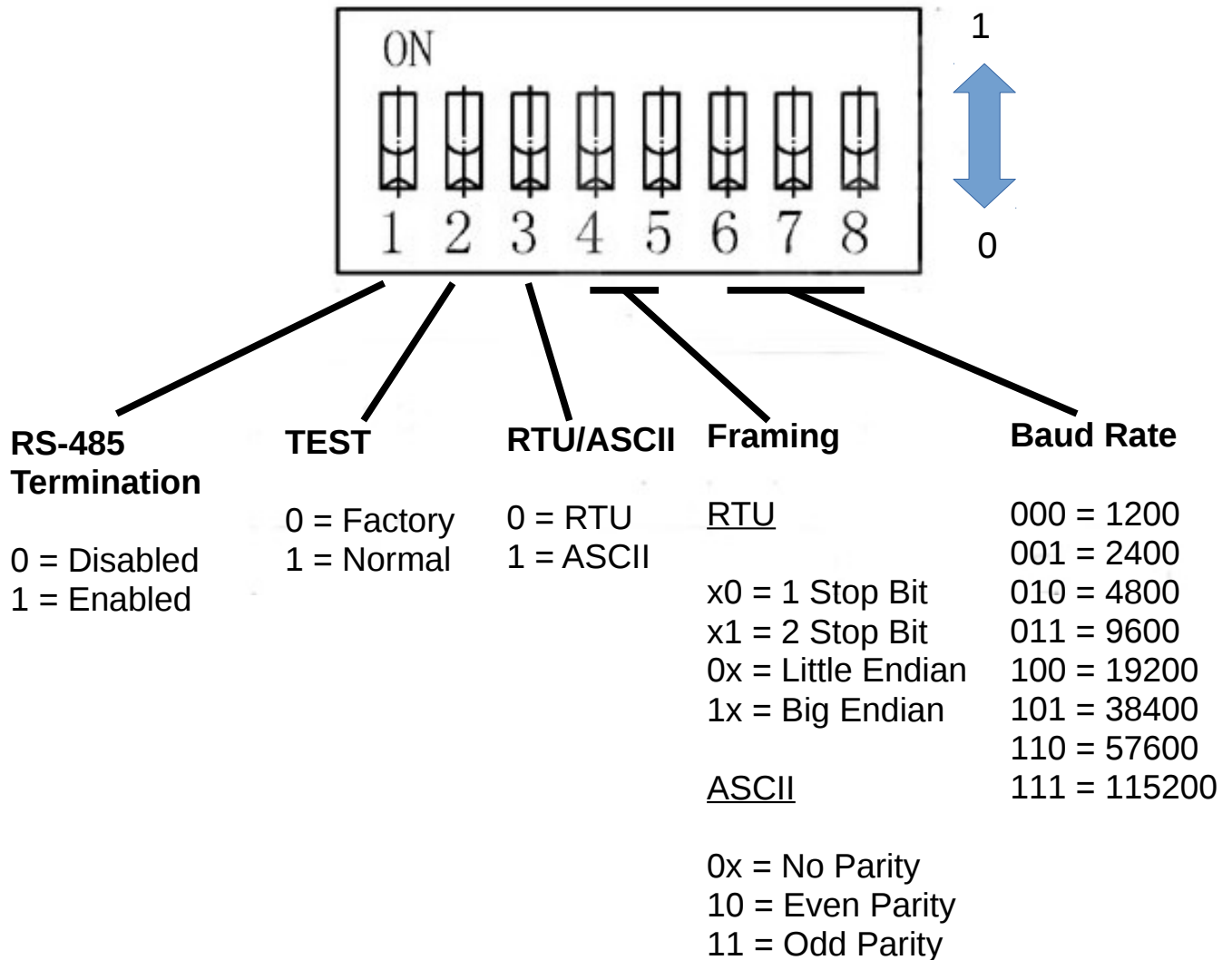
SETTINGS



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



DB9F RS-485 Pinout

| PIN | SIGNAL | IN/OUT * | DESCRIPTION |
|-----|--------|----------|-----------------|
| 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 |