# Serial MODBUS

# Sensor Application Definitions

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**Monnit Corporation**

**Version 2.2**

**Revision History**

| Version | Date | Description |
|---|---|---|
| 1.1 | 1/14/2013 | Added more app profiles. Edited Humidity, app profile # 18 and # 29 |
| 2.0 | 10/1/2013 | Added FRR column |
| 2.1 | 9/15/2014 | Corrected Type 1 math calculation |
| 2.2 | 2/12/2018 | Added additional app profiles. |
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### Data Decoding Table – Gen 1

| TYPE | NAME | DATA TYPE | UNIT | DATA | FRR Data |
|---|---|---|---|---|---|
| 1 | Analog Voltage | Unsigned Int16 | Volts | Divide data by 1000 for three decimal point resolution. Example: 236 / 1000 = 0.236 V. Range: 0-1.25 | [0-1250]-[0]-[0]-[0] |
| 2 | Temperature | Signed Int16 | ° Celsius | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 3 | Dry Contact | Unsigned Int8 | | 0 for loop open and 1 for loop closed in default operation | [0-1]-[0]-[0]-[0] |
| 4 | Water | Unsigned Int8 | | 0 for no water present and 1 for water present in default operation | [0-1]-[0]-[0]-[0] |
| 5 | Activity, Profile 1 | Unsigned Int8 | | 0 for no movement and 1 for movement detected in default operation | [0-1]-[0]-[0]-[0] |
| 9 | Open/Closed | Unsigned Int8 | | 0 for magnet absent and 1 for magnet present in default operation | [0-1]-[0]-[0]-[0] |
| 11 | Button | Unsigned Int8 | | 0 for button not pressed and 1 for button pressed | [0-1]-[0]-[0]-[0] |
| 12 | Control | Unsigned Int8 | Relay1 Status<br>Relay2 Status | LSB bit is the status of Relay 1, which is 0 for off and 1 for on. Bit offset 2 is the status of Relay2. | [0-3]-[0]-[0]-[0] |
| 15 | Accelerometer, Profile 1 | Signed Int16 /<br>Signed Int16 /<br>Signed Int16 | X G-Force<br>Y G-Force<br>Z G-Force | Divide data by 1000 to get three decimal point resolution. Example: -2012 / 1000 = -2.012 G's Range: -8.000 to 8.000 | [X]-[Y]-[Z]-[0]<br>[65472-8000]-[65472-8000][65472-8000]-[0] |
| 16 | Accelerometer, Profile 3 | Unsigned Int8 | | Bit 7 - Internal Communication Problems<br>Bit 6 - EA - 1= Global Event Happened, 0=none<br>Bit 5 - ZTRANSE - 0 = none, 1 = happened Bit<br>4 - Z_Trans_Pol - 0 = g+, 1 = g-<br>Bit 3 - YTRANSE - 0 = none, 1 = happened<br>Bit 2 - Y_Trans_Pol - 0 = g+, 1 = g-<br>Bit 1 - XTRANSE - 0 = none, 1 = happened<br>Bit 0 - X_Trans_Pol - 0 = g+, 1 = g- | [0-255]-[0]-[0]-[0] |

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| 19 | Activity, Profile 2 | Unsigned Int16 | Vibrations | Count of vibrations | [0-65535]-[0]-[0]-[0] |
| 20 | Accelerometer, Profile 2 | Signed Int16 /<br>Signed Int16 /<br>Signed Int16 /<br>Signed Int16 /<br>Signed Int16 /<br>Signed Int16 / | X G-Force<br>Y G-Force<br>Z G-Force<br>X G-Force<br>Y G-Force<br>Z G-Force | Divide data by 1000 to get three decimal point resolution. The first data set is the MAX recorded value, the second data set is the AVG recorded value.<br>Example: 1244 / 1000 = 1.244 G's<br>Range: -8.000 to 8.000<br>Only the average values are available in the FRR. Max values can only be accessed in the corresponding WDR. | [DATA_3]-[DATA_4][DATA_5]-[0]<br><br>[65472-8000]-[65472-8000][65472-8000]-[0] |
| 21 | Lux | Unsigned Int16 | Lux | Lux reading. Range: 0-1300 | [0-13000]-[0]-[0]-[0] |
| 22 | 0-20 mA Current | Unsigned Int16 | mA | Divide data by 100 to get two decimal point resolution. Example = 744/100 = 7.44 mA | [0-2400]-[0]-[0]-[0] |
| 23 | Infrared Motion | Unsigned Int8 | | 0 for no motion detected and 1 for motion detected | [0-1]-[0]-[0]-[0] |
| 24 | Flex | Unsigned Int32 | Resistance | Divide data by 1000 to get three decimal point resolution. Data_High is in the first FRR register. | [0-65535]-[0-65535]-[0]-[0] |
| 26 | Liquid Level, 8" | Unsigned Int16 | Inches | Divide data by 100 to get two decimal point resolution. | [0-850]-[0]-[0]-[0] |
| 27 | Light Presence | Unsigned Int8 | | 0 for light not present and 1 for light present | [0-1]-[0]-[0]-[0] |
| 28 | Compass | Signed Int16 | Azimuth degr. | Azimuth reading. | [0-360]-[0]-[0]-[0] |
| 30 | Grains Per Pound | Signed Int16 /<br>Signed Int16 | °C /<br>%RH | Divide data by 100 to get Temperature.<br>Divide data by 100 to get Relative Humidity. | |
| 32 | 500 VAC/VDC Analog Voltage | Unsigned Int16 | Volts | Divide data by 10 to get one decimal point resolution. Example: 1134/10=113.4V Range: 0-500 | [0-5000]-[0]-[0]-[0] |
| 33 | Vehicle Presence | Unsigned Int8/<br>Signed Int16 | Magnitude | In the state field, the presence is marked 0 for no vehicle and 1 for vehicle presence. This is displayed in the FRR in the first register. The second register contains the data from WDR Data_0 | [0, 1, 2, 15]-[0-65535]-[0]-[0]<br>[STATE]-[DATA_0]-[0]-[0] |
| 34 | CO Gas Sensor | Signed Int16/<br>Unsigned Int16 | Temperature<br>PPM | Temperature and the gas concentration in PPM | [Temp range]-[0-65535]-[0]-[0]<br>[65036-3700]-[0]-[0]-[0] |
| 35 | High Temperature | Signed Int16 | ° Celsius | Divide data by 10 to get one decimal point resolution. Example: 2550/10 = 255.0°C | |
| 36 | Liquid Level 24" | Unsigned Int16 | Inches | Divide data by 100 to get two decimal point resolution. | [0-2400]-[0]-[0]-[0] |

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| 39 | Vehicle Detection | Unsigned Int8/<br>Unsigned Int16/<br>Unsigned Int16/<br>Unsigned Int16/ | Vehicle Count<br>Magnitude<br>Duration Cnt | The number of vehicles counted, the magnitude of the field and the duration is reported. The direction is displayed in the first FRR register. | [0, 1, 15]-[0-65535]-[0-65535]-[0-65535]<br>[Direction]-[Data_0]-[Data_1]-[Data_2] |
| 42 | Activity Counter | Unsigned Int16/<br>Unsigned Int16/ | Minutes | The current amount of time of calculated activity followed by the previous reading. | |
| 43 | HA Humidity | Signed Int16/<br>Signed Int16/ | °C<br>%RH | Divide data by 100 to get Temperature.<br>Divide data by 100 to get Relative Humidity. | [63536-6000]-[0-10000]-[0]-[0]<br>[0-1000]-[0-65535]-[0- |
| 46 | Low Temperature | Signed Int16 | ° C | Divide data by 10 to get one decimal point resolution. Example: -574/10= -57.4°C | [63536-1620]-[0]-[0]-[0] |
| 47 | Multi Input Pulse Counter | Unsigned Int16/<br>Unsigned Int16/<br>Unsigned Int16/<br>Unsigned Int16 | Pulses<br>Pulses<br>Pulses<br>Pulses | The cumulative count of pulse events detected since the last heartbeat. | [0-65535]-[0-65535]-[0-65535]-[0-65535] |
| 51 | Seat Sensor | Unsigned Int8/<br>Unsigned Int32 | KOhms | 0=no event, 1=event followed by the resistance measured (divide by 1000). Data High is in the second FRR register and Data Low is in the third. | [0-1]-[0-65535]-[0-65535]-[0] |
| 52 | Airflow Sensor | Unsigned Int8/<br>Unsigned Int32 | KOhms | 0=no event, 1=event followed by the resistance measured (divide by 1000). Data High is in the second FRR register and Data Low is in the third. | [0-1]-[0-65535]-[0-65535]-[0] |
| 55 | CT1mA | Unsigned Int16 | Milliamps | Milliamp divided by 10 | [0-10000]-[0]-[0]-[0] |
| 59 | Battery Health | Unsigned Int16 | Volts | Volts divided by 1000 | [0-50000]-[0]-[0]-[0] |
| 64 | VAC Detector | Unsigned Int8 | | | |
| 65 | Water Temperature | Signed Int16 | ° Celsius | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 70 | Resistance Sense | Unsigned Int32 | | | |
| 71 | 50VDC Detector | Unsigned Int8 | | 1 for voltage present, 0 for absent | [0-1]-[0]-[0]-[0] |
| 72 | 5VDC Meter | Signed Int16/<br>Unsigned Int16 | Volts | Volts divided by 1000 | [0-1]-[0-65535]-[0]-[0] |
| 73 | Filtered Pulse Counter | Unsigned Int32 | Count | Number of pulses | [0-1]-[0-65535]-[0-65535]-[0] |
| 74 | 10VDC Meter | Signed Int16/<br>Unsigned Int16 | Volts | Volts divided by 1000 | [0-1]-[0-65535]-[0]-[0] |
| 75 | Tilt Sensor | 3 Signed Int16/<br>Unsigned Int16 | | | |
| 76 | Single Control | Unsigned Int8 | | | |

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|---|---|---|---|---|---|
| 78 | Water Area | Unsigned Int8 | | 1 for water present, 0 for absent | [0-1]-[0]-[0]-[0] |
| 79 | Pressure | Signed Int16/ Unsigned Int16 | PSIG | Pressure divided by 10 | [0-1]-[0-65535]-[0]-[0] |
| 84 | Duct Temperature | Signed Int16/ Unsigned Int16 | ° C | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 86 | Thermocouple | Signed Int16/ Unsigned Int16 | ° C | Temperature divided by 10 | [0-1]-[0-65535]-[0]-[0] |
| 90 | Filtered Pulse Counter | Unsigned Int8 | Count | Number of pulses | [0-1]-[0-255]-[0]-[0] |
| 92 | Quad Temperature | 4 Unsigned Int16 | ° C | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 93 | Current Meter 0-20A | 3 Signed Int16/ Unsigned Int16 | Amps | Amps divided by 100 | [0-1]-[0-65535]-[0-65535]-[0-65535] |
| 95 | Vibration Meter | 4 Unsigned bytes | | X axis,Y axis, Z axis, and duty cycle | [0-65535]-[0-65535]-[0-65535]-[0-65535] |
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### Data Decoding Table – ALTA

| TYPE | NAME | DATA TYPE | UNIT | DATA | FRR Data |
|---|---|---|---|---|---|
| 2 | Temperature | Signed Int16 | ° Celsius | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 3 | Dry Contact | Unsigned Int8 | | 0 for loop open and 1 for loop closed in default operation | [0-1]-[0]-[0]-[0] |
| 4 | Water | Unsigned Int8 | | 0 for no water present and 1 for water present in default operation | [0-1]-[0]-[0]-[0] |
| 5 | Activity, Profile 1 | Unsigned Int8 | | 0 for no movement and 1 for movement detected in default operation | [0-1]-[0]-[0]-[0] |
| 9 | Open/Closed | Unsigned Int8 | | 0 for magnet absent and 1 for magnet present in default operation | [0-1]-[0]-[0]-[0] |
| 11 | Button | Unsigned Int8 | | 0 for button not pressed and 1 for button pressed | [0-1]-[0]-[0]-[0] |
| 12 | Control | Unsigned Int8 | Relay1 Status<br>Relay2 Status | LSB bit is the status of Relay 1, which is 0 for off and 1 for on. Bit offset 2 is the status of Relay2. | [0-3]-[0]-[0]-[0] |
| 15 | Accelerometer, Profile 1 | Signed Int16 / Signed Int16 / Signed Int16 | AA G-Force<br>BB G-Force<br>CC G-Force | Divide data by 1000 to get three decimal point resolution. Example: -2012 / 1000 = -2.012 G's Range: -8.000 to 8.000 | [X]-[Y]-[Z]-[0]<br>[65472-8000]-[65472-8000][65472-8000]-[0] |
| 16 | Accelerometer, Profile 3 | Unsigned Int8 | | Bit 7 - Internal Communication Problems<br>Bit 6 - EA - 1= Global Event Happened, 0=none<br>Bit 5 - ZTRANSE - 0 = none, 1 = happened Bit 4 - Z_Trans_Pol - 0 = g+, 1 = g-<br>Bit 3 - YTRANSE - 0 = none, 1 = happened<br>Bit 2 - Y_Trans_Pol - 0 = g+, 1 = g-<br>Bit 1 - XTRANSE - 0 = none, 1 = happened<br>Bit 0 - X_Trans_Pol - 0 = g+, 1 = g- | [0-255]-[0]-[0]-[0] |

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|---|---|---|---|---|---|
| 21 | Lux | Unsigned Int16 | Lux | Lux reading. Range: 0-1300 | [0-13000]-[0]-[0]-[0] |
| 22 | 0-20 mA Current | Unsigned Int16 | mA | Divide data by 100 to get two decimal point resolution. Example = 744/100 = 7.44 mA | [0-2400]-[0]-[0]-[0] |
| 28 | Compass | Signed Int16 | Azimuth degr. | Azimuth reading. | [0-360]-[0]-[0]-[0] |

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|---|---|---|---|---|---|
| 32 | 500 VAC/VDC Analog Voltage | Unsigned Int16 | Volts | Divide data by 10 to get one decimal point resolution. Example: 1134/10=113.4V Range: 0-500 | [0-5000]-[0]-[0]-[0] |
| 35 | High Temperature | Signed Int16 | ° Celsius | Divide data by 10 to get one decimal point resolution. Example: 2550/10 = 255.0°C | [63536-1620]-[0]-[0]-[0] |
| 39 | Vehicle Detection | Unsigned Int8/ Unsigned Int16/ Unsigned Int16/ Unsigned Int16/ | Vehicle Count Magnitude Duration Cnt | The number of vehicles counted, the magnitude of the field and the duration is reported. The direction is displayed in the first FRR register. | [0, 1, 15]-[0-65535]-[0-65535]-[0-65535] [Direction]-[Data_0]-[Data_1]-[Data_2] |
| 43 | HA Humidity | Signed Int16/ Signed Int16/ | °C %RH | Divide data by 100 to get Temperature. Divide data by 100 to get Relative Humidity. | [63536-6000]-[0-10000]-[0]-[0] [0-1000]-[0-65535]-[0- |
| 46 | Low Temperature | Signed Int16 | ° C | Divide data by 10 to get one decimal point resolution. Example: -574/10= -57.4°C | [63536-1620]-[0]-[0]-[0] |
| 59 | Battery Health | Unsigned Int16 | Volts | Volts divided by 1000 | [0-50000]-[0]-[0]-[0] |
| 64 | VAC Detector | Unsigned Int8 | | | |
| 65 | Water Temperature | Signed Int16 | ° Celsius | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 67 | Ultrasonic Ranger | Unsigned Int16 | Cm | Distance to target | [00010 – 00400]-[0]-[0]-[0] |
| 71 | 50VDC Detector | Unsigned Int8 | | 1 for voltage present, 0 for absent | [0-1]-[0]-[0]-[0] |
| 72 | 5VDC Meter | Signed Int16/ Unsigned Int16 | Volts | Volts divided by 1000 | [0-1]-[0-65535]-[0]-[0] |
| 74 | 10VDC Meter | Signed Int16/ Unsigned Int16 | Volts | Volts divided by 1000 | [0-1]-[0-65535]-[0]-[0] |
| 75 | Tilt Sensor | 2 Signed Int16/ Unsigned Int16 | Degrees | Pitch & Roll | [0-65535]-[0-65535]-[0]-[0] |
| 78 | Water Area | Unsigned Int8 | | 1 for water present, 0 for absent | [0-1]-[0]-[0]-[0] |
| 79 | Pressure 50 PSIG | Signed Int16/ Unsigned Int16 | PSIG | Pressure divided by 10 | [0-1]-[0-65535]-[0]-[0] |

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|---|---|---|---|---|---|
| 82 | Pressure 300 PSIG | Signed Int16/ Unsigned Int16 | PSIG | Pressure divided by 10 | [0-1]-[0-65535]-[0]-[0] |
| 83 | Pressure Custom | Signed Int16/ Unsigned Int16 | PSIG | Pressure divided by 10 | [0-1]-[0-65535]-[0]-[0] |
| 84 | Duct Temperature | Signed Int16/ Unsigned Int16 | ° C | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 86 | Thermocouple | Signed Int16/ Unsigned Int16 | ° C | Temperature divided by 10 | [0-1]-[0-65535]-[0]-[0] |
| 90 | Filtered Pulse Counter | Unsigned Int8 | Count | Number of pulses | [0-1]-[0-255]-[0]-[0] |
| 92 | Quad Temperature | 4 Unsigned Int16 | ° C | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[ 65136 – 1250]-[ 65136 – 1250]-[ 65136 – 1250] |
| 93 | Current Meter 0-20A | 3 Signed Int16/ Unsigned Int16 | Amps | Amps divided by 100 | [0-1]-[0-65535]-[0-65535]-[0-65535] |
| 94 | Current Meter 0-150A | 3 Signed Int16/ Unsigned Int16 | Amps | Amps divided by 100 | [0-1]-[0-65535]-[0-65535]-[0-65535] |
| 95 | Vibration Meter | 4 Unsigned bytes | | X axis,Y axis, Z axis, and duty cycle | [0-65535]-[0-65535]-[0-65535]-[0-65535] |
| 100 | Food Grade Temperature | Unsigned Int16 | ° C | Divide data by 10 to get one decimal point resolution. Example: 271 / 10 = 27.1°C . Range: -40 to 125 | [65136 – 1250]-[0]-[0]-[0] |
| 101 | PIR Motion | Unsigned Int8 | | 0 for no motion detected and 1 for motion detected | [0-1]-[0]-[0]-[0] |
| 102 | Air Quality | 3 Signed Int16/ Unsigned Int16 | ug/m^3 | PM1, PM2.5, PM10 | [0-65535]-[0-65535]-[0-65535]-[0] |
| 103 | Differential Pressure | Unsigned Int16 | Pascals | Pressure in pascals multiplied by 10 | [0-65535]-[0]-[0]-[0] |
| 104 | Vibration 800 | | | | |
| 105 | Tank Level Sensor | Unsigned Int16 | Cm | Distance to target | [00004]-[000750]-[0]-[0] |
| 107 | Light Meter | Unsigned Int32 | Lux | Intensity in Lux multiplied by 100 | [0-65535]-[0-65535]-[0]-[0] |
| 109 | Three Phase CT | | | | |
| 110 | Dwell Time Sensor | | | | |