Sample EZ-ZONE PM 32-bit Modbus Packet

Sent to Read (32-bit) Analog Input 1 Process Value

Binary	Hex	Decimal	Purpose
00000001	01	1	Controller Address
00000011	03	3	Function Read
00000001	01	1	Read Starting at Register High Byte (Analog Input 1 Process is Register 360 & 361)
01101000	68	104	Read Starting at Register Low Byte (Analog Input 1 Process is Register 360 & 361)
00000000	00	0	Read number of consecutive registers - High Byte (Always 0)
00000010	02	2	Read number of consecutive registers - Low Byte
10000100	44	68	Low byte of CRC
00101011	2B	43	High byte of CRC

The CRC (also a 16 bit wide value) is sent in reverse order, low byte then high byte.

Received from the Read Analog Input 1 Process Value 78.204 °F (32-bit)

Binary	Hex	Decimal	Purpose	
00000001	01	1	Controller Address	
00000011	03	3	Function Read	
00000100	04	4	Number of data bytes returned	
10010111	97	151	Data High Byte of 1st register Read - MSB of LSW	consecutive registers
01111101	7D	125	Data Low Byte of 1st register Read - LSB of LSW	consecutive registers
01000010	42	66	Data High Byte of 2nd register Read - MSB of MSW	consecutive registers
10011100	9C	156	Data Low Byte of 2nd register Read - LSB of MSW	consecutive registers
01110110	76	118	Low byte of CRC	
10010110	96	150	High byte of CRC	

Some process values may be rounded off to fit into the four-character display of the EZ-ZONE PM, depending on the Decimal setting in the Global, Setup menu.

- **To change the Decimal setting via communications, write a 105 for whole units (0) display, 94 for tenths (0.0) display, 40 for hundredths (0.00) display or 96 for thousands (0.000) display to unsigned integer 16-bit register 398 for analog input 1 or register 478 for analog input 2. This setting has no impact on the values read via communications.**

Full process values are readable via Modbus. The displayed units of measurement are independent of the units of measurement sent via communications.

- **Example: The controller may be set to display in °C on the LED but utilize °F in communication sent values.**

All temperature parameters are in °F through Modbus by default.

- **To change communications temperature units via Modbus, write a 30 for °F or 15 for °C to unsigned integer 16-bit register 2490 for analog input 1 and register 2510 for analog input 2. (Requires firmware version 2.0 or newer)**

The low register numbers contain the two lower bytes (least significant word); high register numbers contain the two higher bytes (most significant word) of the four-byte integer by default for 32-bit floating-point values.

- **To change the word order, set parameter Modbus Word Order 'M.hL' to 'hiLo' instead of 'Lohi' in Com, Setup menu.**

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Sample EZ-ZONE PM 32-bit Modbus Packet

The process value of the EZ-ZONE PM is contained in two 16-bit registers. Register 360 contains the two lower bytes (least significant word, LSW) while register 361 contains the two higher bytes (most significant word, MSW). The 32-bit answer is an IEEE 754, 32-bit float data type.

977D 429C is in Low Word – High Word Order. Changing to High Word – Low Word, the value is 429C 977D.
429C977D = +78.2958755493164060 degrees when read as a 32-bit float

To read a 32-bit value, perform the following:
Assemble a packet to send the controller based on these steps:

1. Determine controller address to read. Example: Address 1
2. Determine function code for read. Example: Function Code 3 hexadecimal for read holding register
3. Determine relative Modbus registers to read (360 & 361 decimal for Analog Input 1)
4. Convert register numbers to Hexadecimal. Example: 360 decimal = 168 hexadecimal
5. Enter 0 for number of registers to read high byte
6. Determine number of registers to read. Example: 2 registers to retrieve a 32-bit value
7. Enter number of registers to read low byte from previous step into packet.
8. Calculate the CRC on the packet.
9. Enter the Low Byte of CRC calculation into packet
10. Enter the High Byte of CRC calculation into packet
11. Send packet as one continuous stream
12. Wait for response from controller

Process the packet received based on these steps:

1. Process packet for accuracy by comparing CRC to calculated value
2. Parse answer from packet based on number of bytes returned
3. Convert answers to appropriate data type

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Sample EZ-ZONE PM 32-bit Modbus Packet

Sent to Write (32-bit) Closed Loop Set Point of 75.0 °F

Binary	Hex	Decimal	Purpose
00000001	01	1	Controller Address
00010000	10	16	Function Multiple Write
00001000	08	8	Write Starting at Register High Byte (Closed Loop Set Point is Register 2160 & 2161)
01110000	70	112	Write Starting at Register Low Byte (Closed Loop Set Point is Register 2160 & 2161)
00000000	00	0	Write number of consecutive registers - High Byte (Always 0)
00000010	02	2	Write number of consecutive registers - Low Byte
00000100	04	4	Number of Bytes to Write
00000000	00	00	Data High Byte of 1st register Write - MSB of LSW consecutive registers
00000000	00	0	Data Low Byte of 1st register Write - LSB of LSW consecutive registers
01000010	42	66	Data High Byte of 2nd register Write - MSB of MSW consecutive registers
10010110	96	150	Data Low Byte of 2nd register Write - LSB of MSW consecutive registers
00100011	23	35	Low byte of CRC
10000101	85	133	High byte of CRC

The CRC (also a 16 bit wide value) is sent in reverse order, low byte then high byte.

Received from Writing Closed Loop Set Point of 75.0 °F

Binary	Hex	Decimal	Purpose
00000001	01	1	Controller Address
00010000	10	16	Function Multiple Write
00000000	08	8	High Byte of Register 2160 decimal – Start writing at register
01110000	70	112	Low Byte of Register 2160 decimal – Start writing at register
00000000	00	0	High Byte – number of registers written
00000010	02	2	Low Byte – number of registers written
01000010	42	66	Low byte of CRC
01110011	73	115	High byte of CRC

Example: To write a 32-bit value in decimal format;

Note: The closed loop set point of the EZ-ZONE PM is contained in two 16-bit registers. Register 2160 contains the two lower bytes (least significant word, LSW) while register 2161 contains the two higher bytes (most significant word, MSW). The 32-bit answer is an IEEE 754, 32-bit float data type.

42960000 = 75.0 degrees when read as a 32-bit float
0000 4296 is in Low Word, High Word Order.
Register 2160 is written with LSW of 0000 hexadecimal
Register 2161 is written with MSW of 4296 hexadecimal

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