

## AQ-500 Manual & Basic Communication Guide

### Foreword:

This is a general guide to communicate with the AQ-500 data logger over USB.

### General Settings:

Baud Rate:	115200
Data Bits:	8
Stop Bits:	1
Parity(check bits):	0

### Reading Sensors:

Because the AQ-500 can be used in many configurations, the first thing we need to do is find out what sensors are attached to the unit. Each AQ-500 can support up to 8 sensors at a time. You can retrieve the configuration by sending the following packet:

0xCC	0x10	0x10	0x00	0xDD
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This will return a response of 48 bytes containing the serial number, build version and other relevant information. The sensor codes are 8 2-byte registers starting at byte 11 (zero indexed). The second byte of each register is blank so we only care about the first.

Byte #	11	12	13	14	15	16	17	18	19	20
Data:	Sensor #1		Sensor #2		Sensor #3		Sensor #4		Sensor #5	

Once we parse out the value for each Sensor type we can use the following table:

Sensor Code	Device	Type	Factor
0	EMPTY	x	x
1	K-30	CO <sub>2</sub>	1
2	SHT-11	Temperature	.01
3	SHT-11	Humidity	.01
4	K-33	CO <sub>2</sub>	10
5	GSS 65-100%	CO <sub>2</sub>	100
6	GSS 20-65%	CO <sub>2</sub>	10
7	GSS 0-20%	CO <sub>2</sub>	1
8	reserved	x	x
9	reserved	x	x
10	K-33	Temperature	.01
11	K-33	Humidity	.01
12	K-33	CO <sub>2</sub>	.01
64	TR250Z	O <sub>2</sub>	100

The AQ-500 stores each value type as a different sensor. So when a K-33 is attached it will take up 3 spots. One for CO<sub>2</sub>, one for Temperature, and one for humidity. Using the Sensor code we can see what type of device is attached, what the data type will be, and what to multiply the value by to get the actual reading.

The values are stored in the AQ-500's input registers. Each Sensor has a single 2 byte register to store its data. These registers are updated every .5 seconds (2Hz) and start at address 0x01. So to get the values for the first 3 data points we use the Modbus protocol to read 8 registers starting at 0x01:

Request to read values from first 3 sensor registers

Device Address	Command (read input registers)	Address (High Byte)	Address (Low Byte)	# of Registers (High Byte)	# of Registers (Low Byte)	CRC	
0xFE	0x04	0x00	0x01	0x00	0x03	0xF5	0xC4

Reply from AQ-500

Device Address	Command (read input registers)	Number of Bytes	Sensor 1		Sensor 2		Sensor 3		CRC	
0xFE	0x04	0x06	0x00	0x06	0x00	0x00	0x00	0x00	0xAD	0x67