

# AcuDew

Dewpoint Transmitter

## Modbus Setup Guide

Issue 1



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# 1 Introduction Modbus

## 1.1 What is Modbus

Modbus is a digital communication protocol commonly used to enable communication between multiple electronic devices and a central controller, such as a programmable logic controller (PLC). It facilitates the transmission of signals and data from instrumentation or other control devices to a main controller or data acquisition system, as well as the transmission of control commands in the opposite direction.

In the Modbus protocol, the device that initiates requests for information is known as the Modbus client, while the devices that respond to these requests and provide data are referred to as Modbus servers. For example, in a system designed to measure temperature and humidity and relay this information to a computer, the temperature and humidity sensors would act as Modbus servers and the computer would function as the Modbus client.

A typical Modbus network consists of one client and up to 247 servers (electronic devices). Each server is assigned a unique address within the range of 1 to 247, allowing the client to communicate with each server individually. This structure makes Modbus a flexible and widely used protocol in industrial automation and control systems.

## 1.2 The Benefits of Modbus

Modbus is an open protocol, which means manufacturers can integrate it into their equipment without paying royalties. This openness has contributed to Modbus becoming a standard communication protocol and one of the most widely used methods for connecting industrial electronic devices. Existing Modbus networks easily integrate new equipment, enhancing their flexibility and appeal in industrial settings.

A key advantage of Modbus over other communication systems is that, in addition to requesting information from devices, it can also issue commands to individual servers. This bidirectional capability allows for both monitoring and control, making Modbus a powerful tool for managing industrial networks.

One of the reasons why Modbus is so widely used as a network management solution in industrial automation is its ability to receive and respond to data.

There are several versions of the Modbus protocol, each suited to different communication needs and physical media. The most widely used versions include: Modbus RTU, the most popular version which uses binary encoding for messages. It operates over serial communication lines such as RS232, RS422 and RS485. This version of Modbus offers efficient and compact data transmission, making it suitable for industrial and automation applications. Modbus ASCII, like RTU, operates over serial communication lines and uses ASCII characters to encode messages, making debugging and monitoring easier. Modbus TCP operates over Ethernet networks. These variations ensure that Modbus can be implemented across a wide range of industrial applications.

## 2 Getting Started

Before starting please check you have all the necessary components. If you do not have access to Modbus test software, please install it. The software is free and this guide will explain how to access it.

## 3 Equipment Required

Please ensure you have the following components to set up your AcuDew Modbus RTU dewpoint transmitter.



TRANSMITTER



TRANSMITTER  
CABLE



USB TO RS485  
CONVERTER



USB CABLE

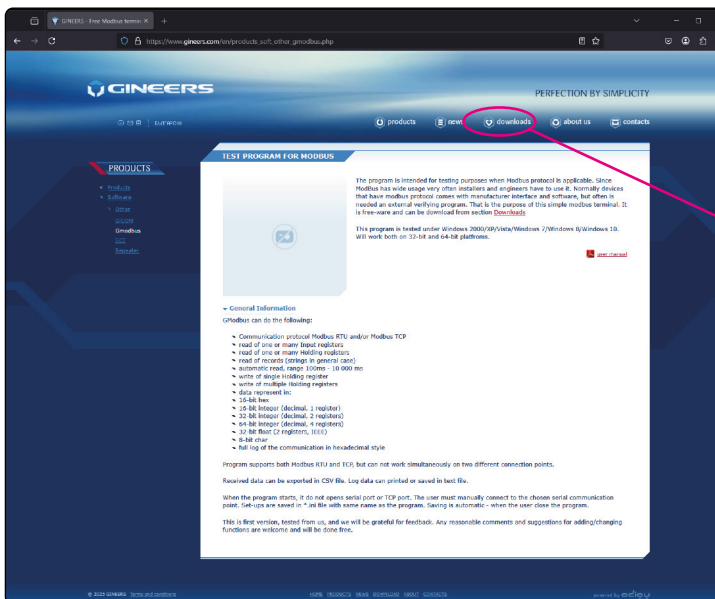


USB CONVERTER  
POWER SUPPLY

## 4 Downloading and Installing Modbus Test Software

Access to Modbus software is necessary for testing the equipment; however, you do not require a specific version to do this.

For this tutorial we will use GModbus, a free version of Modbus software accessible at [www.gineers.com/en/products\\_soft\\_other\\_gmodbus.php](http://www.gineers.com/en/products_soft_other_gmodbus.php).



4.1 Go to the link and access the webpage, the following screen (Fig. 1) will appear.

4.2 Select “downloads” from the tab menu across the top and the following screen will appear (Fig. 1).

Fig. 1



Fig. 2

4.3 To download the Gmodbus zip file, select the option *Modbus RTU/TCP tester (free)* (Fig. 2). Download the Modbus file.

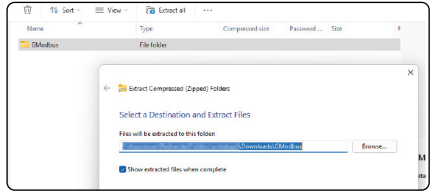


Fig. 3

4.4 Right click and select *Extract All* (Fig. 3).

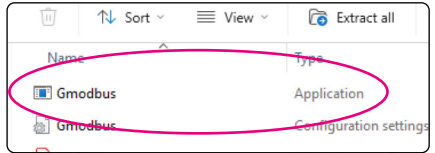


Fig. 4

4.5 Open the folder titled GModbus and select the *Application* file (Fig. 4).

The Modbus tester GModbus dialogue box will open (Fig. 5). You have now successfully installed your software.

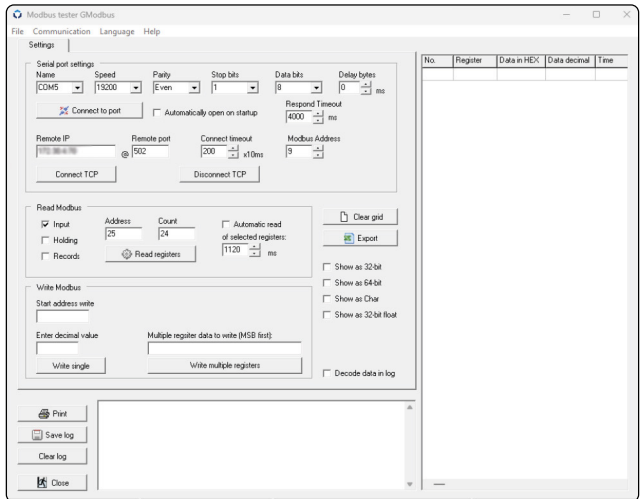


Fig. 5

## 5 Connecting the Transmitter

### 5.1 Equipment Set Up

5.1.1 Loosen the screw terminals in your converter, do not remove fully (Fig. 6).

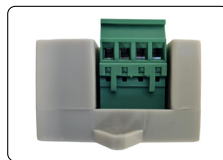


Fig. 6



Fig. 7

5.1.2 Connect the wires to the screw terminals (Fig. 7 and 8).

**NOTE:** If your USB to RS485 converter is different to the one in this tutorial please follow the wiring instructions as per your USB converter.

CABLE COLOUR	RS485 CONVERTER
RED	+Ve
BLUE	-Ve
GREEN	A
YELLOW	B

Fig. 8

5.1.3 Connect the M12 screw collar to the transmitter (Fig. 9).

5.1.4 Connect the USB converter to the USB cable.



Fig. 9

## 5.2 Connecting the Equipment to Your Computer

5.2.1 Open *Device Manager* on your PC.

5.2.2 Connect the USB cable to your PC and switch on the power supply.

5.2.3 Ports (COM & LPT) appear in the list. Click on Ports (COM & LPT) to find the COM number for USB-SERIAL CH340 (Fig. 10).

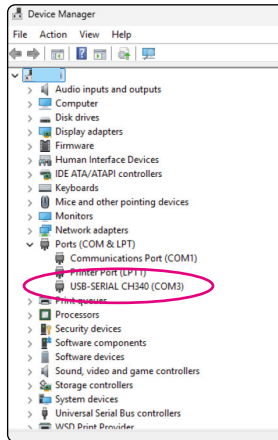


Fig. 10

**Note the COM number.** For this tutorial it is COM3.

Communication Parameters	
Parameter	Value
Name	COM (No.)
Speed	19200
Parity	Even
Stop bits	1
Data bits	8
Delay Bytes	0
Respond Time out	1000
Modbus Address	10
Address	3009
Count	2
Show as 32-bit float	Tick

Fig. 11

5.2.4 Return to the GModbus software. The screen *Modbus tester GModbus* will open. Enter the COM number and use the information in the table titled *Communication Parameters* (Fig. 11) complete the settings highlighted in the *Modbus tester GModbus* screen (Fig. 12).

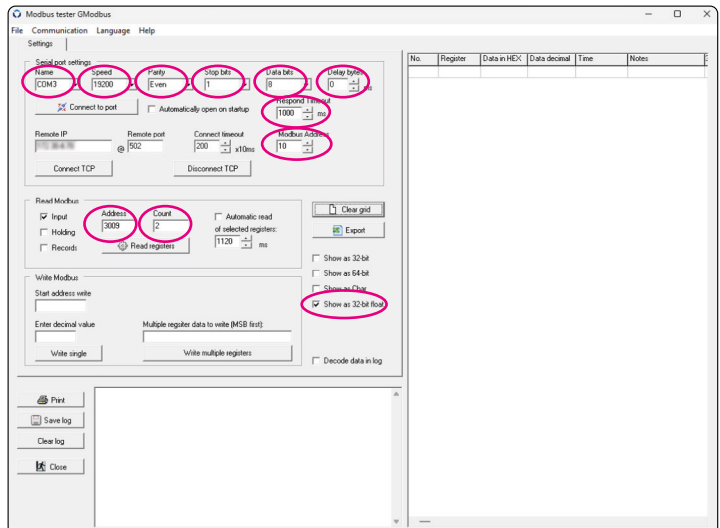


Fig. 12

### 5.2.5 Click Connect to port. Click Read registers (Fig. 13).

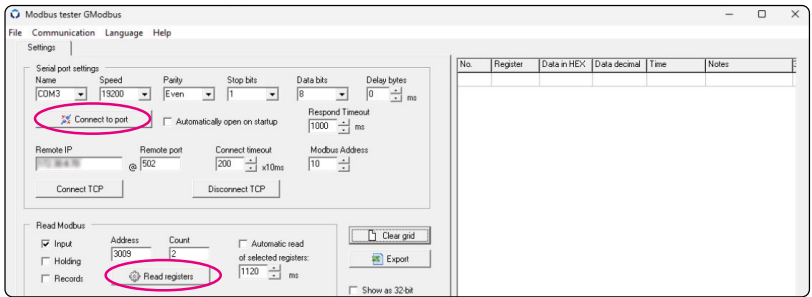


Fig. 13

Once the correct port is selected, the following

No.	Register	Data in HEX	Data decimal	Time	Notes	32-bit value float
1	3009	C2F6	49910	15:36:24		-123.430000305176
2	3010	DC29	56361	15:36:24		

Fig. 14

data will appear on the right hand side of the screen (Fig. 14). This confirms the connections are correct and the transmitter is functional. To measure dewpoint in degrees Celsius change the read Modbus address from 3009 to 3001 and click 'Read registers' again. The '32bit value' column will display the dewpoint, measured by the transmitter, in degrees Celsius (Fig. 15).

You can now integrate the transmitter into your system.

No.	Register	Data in HEX	Data decimal	Time	Notes	32-bit value float
1	3009	C2F6	49910	15:36:24		-123.430000305176
2	3010	DC29	56361	15:36:24		
3	3001	C1B6	49590	15:38:13		-22.79345703125
4	3002	5900	22784	15:38:13		

Fig. 15

## 6 Troubleshooting

Error Message	Problem	Solution
	Incorrect COM port selected	Unplug the transmitter. Check to see if the COM port list appears when the device is connected. Make a note of the COM port No and re-enter.
	Incorrect Baud Rate. Data sent but not received.	Set the Baud rate to 19200 and reconnect.
	Incorrect Parity. Data sent but not received.	Set parity to Even and reconnect.
	Incorrect Wiring. No comms.	Refer to the individual USB converter data sheet and check that the wires are in the correct order. Connections A and B can sometimes be mislabelled. Swap and retest.

## 7 Contact

If you require any support please contact one of our technical team: t: +44 (0) 1274 733582 or e: mail@shawmeters.com



Tutorial Part 1

Tutorial Part 2

