# Application Note

# BRTSYS_AN_079

# Modbus Devices Configuration

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# 1 Introduction

Modbus devices are widely used in industrial and automation applications due to their reliability, ease of integration, and standardized communication protocol. Configuring these devices correctly is essential for ensuring optimal performance, seamless data acquisition, and proper communication within a Modbus network. This application note provides a comprehensive guide on configuring BRTSys Modbus devices using BRTSys adapters and the BRTSys Modbus Configuration Utility.

This document is intended for system integrators, engineers, and technicians involved in industrial automation, building management systems, and IoT applications.

# 2 Modbus Cable Attachments

BRTSys Modbus sensors and actuators come bundled with one of two types of Modbus cable attachments. These are:

1) MA-0101-01A - Modbus RS485 - JST Cable (30cm) and
2) MA-0102-01A – Modbus RS485 - RJ11 Cable (30cm)

The following table shows which devices are bundled with which type of cable.

| BRTSys Device | Cable Attachment |
|---|---|
| Modbus 4in1 Sensor | Modbus RS485 - JST Cable |
| Modbus Gas and TrueVOC Sensor | Modbus RS485 - JST Cable |
| Modbus CO2 Sensor | Modbus RS485 - JST Cable |
| Modbus 2CH Relay | Modbus RS485 - RJ11 Cable |
| Modbus 2CH Relay + iSense | Modbus RS485 - RJ11 Cable |
| Modbus 2CH Non-Latching Relay | Modbus RS485 - RJ11 Cable |
| Modbus 2CH Non-Latching Relay + iSense | Modbus RS485 - RJ11 Cable |
| Modbus 4CH Solid State Relay | Modbus RS485 - RJ11 Cable |
| Modbus Thermocouple Sensor Adapter | Modbus RS485 - RJ11 Cable |
| Modbus DO Sensor Adapter | Modbus RS485 - RJ11 Cable |
| Modbus Salinity Sensor Adapter | Modbus RS485 - RJ11 Cable |
| Modbus pH Sensor Adapter | Modbus RS485 - RJ11 Cable |
| Modbus ORP Sensor Adapter | Modbus RS485 - RJ11 Cable |
| Modbus EC Sensor Adapter | Modbus RS485 - RJ11 Cable |
| Modbus Trailing Edge Light Dimmer | Modbus RS485 - RJ11 Cable |
| Modbus IO Controller | Modbus RS485 - RJ11 Cable |

**Table 1 - BRTSys Modbus Devices and Cable Attachments**

The table below provides the specification for each cable attachment:

| Item | Description | MA-0101-01A Modbus RJ485 - JST Cable (30cm) | MA-0102-01A Modbus RS485 - RJ11 Cable (30cm) |
|---|---|---|---|
| **Input** | Ports | Screw Terminal Block | Screw Terminal Block |
| | Input Voltage | 9V – 24V DC | 9V – 24V DC |
| | Interface | RS485 | RS485 |
| | Wire Size AWG | 24-16AWG | 24-16AWG |
| | Protection | Reverse polarity protection | Reverse polarity protection |
| **Output** | Ports | JST Connector | RJ11 Connector |
| | Output Voltage | 5V | 5V |
| | Output Max. Current | 1000mA | 1000mA |
| | Cable length | 30cm | 30cm |
| **Physical Characteristics** | Color | Light Blue | Light Blue |
| | Material | ABS | ABS |
| | Dimension | 56*26*13mm | 56*26*13mm |
| **Environmental Limits** | Operating Temperature | 0 °C to 70 °C | 0 °C to 70 °C |
| | Storage Temperature | -20 °C to 85 °C | -20 °C to 85 °C |
| | Ambient Relative Humidity | 5 to 95% (non-condensing) | 5 to 95% (non-condensing) |

**Table 2 – Modbus Cable Specifications**

## 2.1 MA-0101-01A: Modbus RS485 - JST Cable (30cm)

Connect the JST connector end of the cable to the device. Refer to individual device's datasheet for this connection.

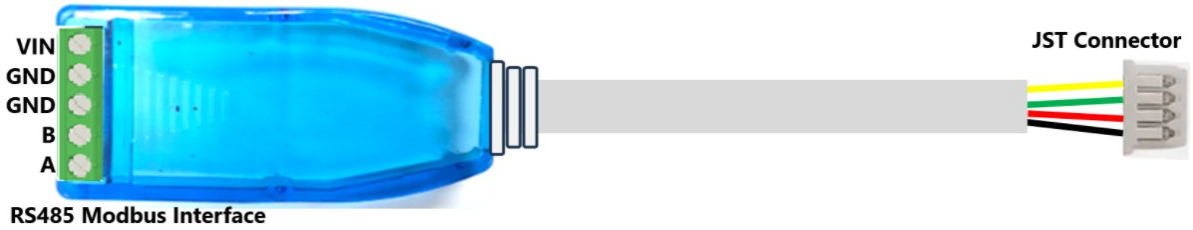



**Figure 1 - MA-0101-01A - Modbus RJ485 - JST Cable (30cm)**

| INPUT Port | | OUTPUT Port | |
|---|---|---|---|
| **Terminal Block** | **Function** | **JST Connector** | **Function** |
| VIN | Modbus Input Voltage 9-24VDC | YELLOW | VOUT (+5VDC) |
| GND | Ground | GREEN | RS485-B |
| GND | Ground | RED | RS485-A |
| B | RS485-B | BLACK | Ground |
| A | RS485-A | | |

**Table 3 - MA-0101-01A - Modbus RJ485 - JST Cable (30cm)**

## 2.2 MA-0102-01A: Modbus RS485 - RJ11 Cable (30cm)

Connect the RJ11 connector end of the cable to the device.

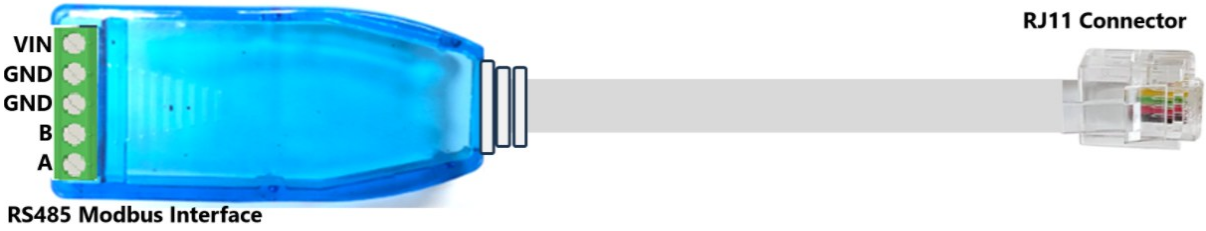



**Figure 2 - MA-0102-01A - Modbus RS485 – RJ11 Cable (30cm)**

| INPUT Port | | OUTPUT Port | |
|---|---|---|---|
| **Terminal Block** | **Function** | **RJ11 Connector** | **Function** |
| VIN | Modbus Input Voltage 9-24VDC | YELLOW | VOUT (+5VDC) |
| GND | Ground | GREEN | RS485-B |
| GND | Ground | RED | RS485-A |
| B | RS485-B | BLACK | Ground |
| A | RS485-A | | |

**Table 4 - MA-0102-01A - Modbus RS485 – RJ11 Cable (30cm)**

# 3 Device Configuration

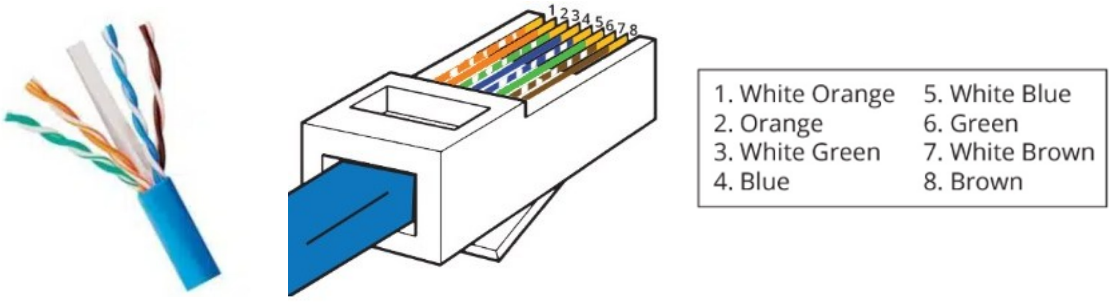
Before we can use the Modbus device, we must ensure the following are configured:

a. A unique Modbus device address
b. Communication Baud rate
c. RS485 Termination (For last device in the bus)
d. Status LED On/OFF

The following sections describe the configuration steps using the BRTSys LDSBus USB Adapter and the BRTSys Modbus Configuration Utility. It is also possible to use any other Modbus host software tool and Modbus cable that meets the requirements. Refer to Table 3 and Table 4 for appropriate connections.

## 3.1 Hardware Setup

a. LDSBus USB Adapter with Power Supply
b. RJ45 network patch cord segment




1. Connect the RJ45 strands according to the table below to the Modbus terminal block.

| Free Wire Color | PIN Legend | Modbus Terminal Block |
|---|---|---|
| 1. White, Orange | B | RS485-B |
| 2. Orange | A | RS485-A |
| 3. White, Green | N/A | N/A |
| 4. Blue | VIN | Modbus Input Voltage 9-24VDC |
| 5. White, Blue | VIN | Modbus Input Voltage 9-24VDC |
| 6. Green | N/A | N/A |
| 7. White, Brown | GND | Ground |
| 8. Brown | GND | Ground |

**Table 5 - Modbus Pin Configuration**

2. Attach the RJ45 connector to the LDSBus USB Adapter and setup the hardware as shown below.

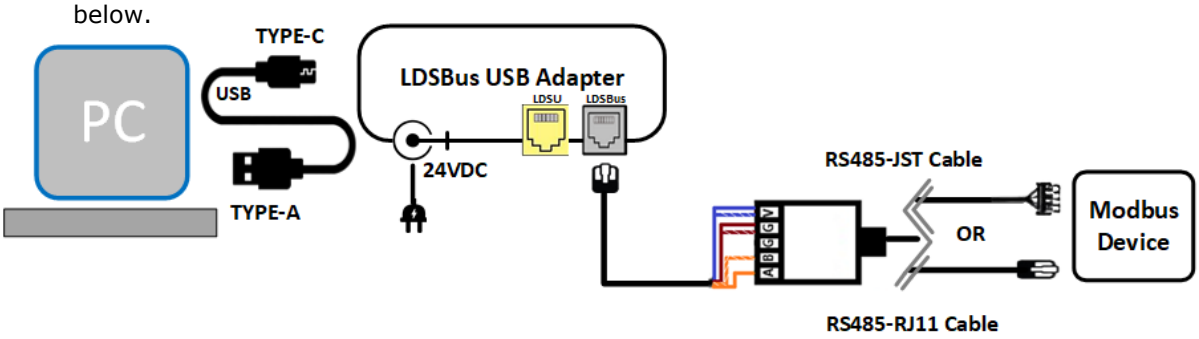



**Figure 3 - Modbus Configuration Hardware Setup**

## 3.2 Configuration

1. Download and install Modbus Configuration Utility in your PC.
2. Launch the app and set up the connection to match the factory default serial settings of the BRTSys Modbus devices.

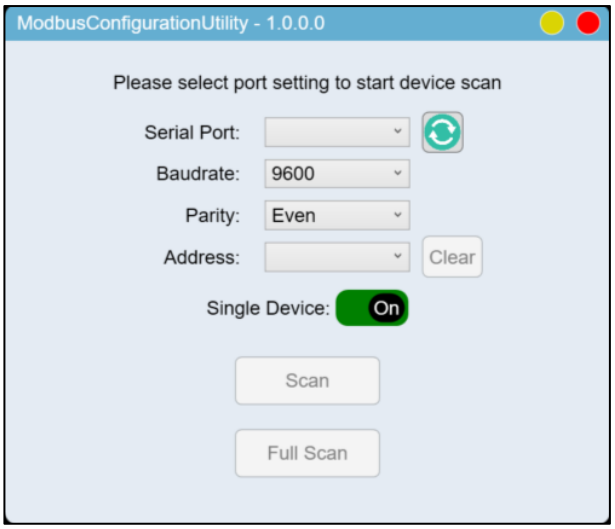



**Figure 4 - Modbus Configuration Utility Startup Window**

| Serial Settings | Value |
|---|---|
| Serial Port | Select COM port. Use icon to rescan and view list of available COM ports. Choose the COM port that is attached to the LDSBus USB Adapter. |
| Baud rate | 9600bps (default) |
| Parity | Even Parity (default) |
| Address | Blank |
| Single Device | Set to ON (if there is only one device on the bus, else set to OFF) |

**Table 6 - Serial Settings**

3. Once all the settings have been configured, click [**Scan**] button to start scanning.

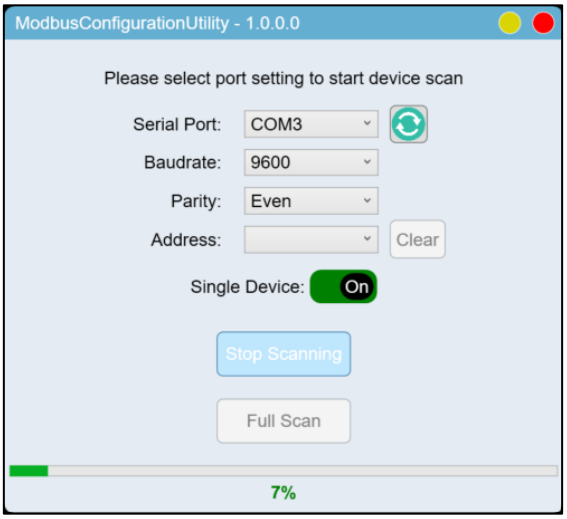



**Figure 5 - Scan in Progress**

**Note:** **Full Scan** feature will search through all possible combinations of **baud rate**, **parity**, and **device address**. This feature is ideal for locating devices with unknown or misconfigured communication settings.

4. Upon completion, a message box appears indicating the number of detected devices.

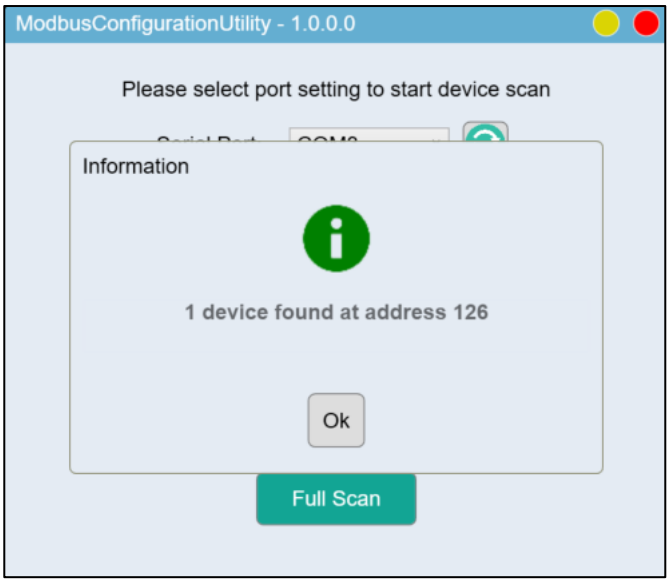



**Figure 6 - Scan Complete**

5. Once devices are detected, the Device Configuration Window will be displayed as shown below. Selecting a device in the Devices panel will display additional information in the Device Info and Parameter Settings panels and these can be ignored for now. The device in this example is a BRTSys Modbus 4in1 Sensor.

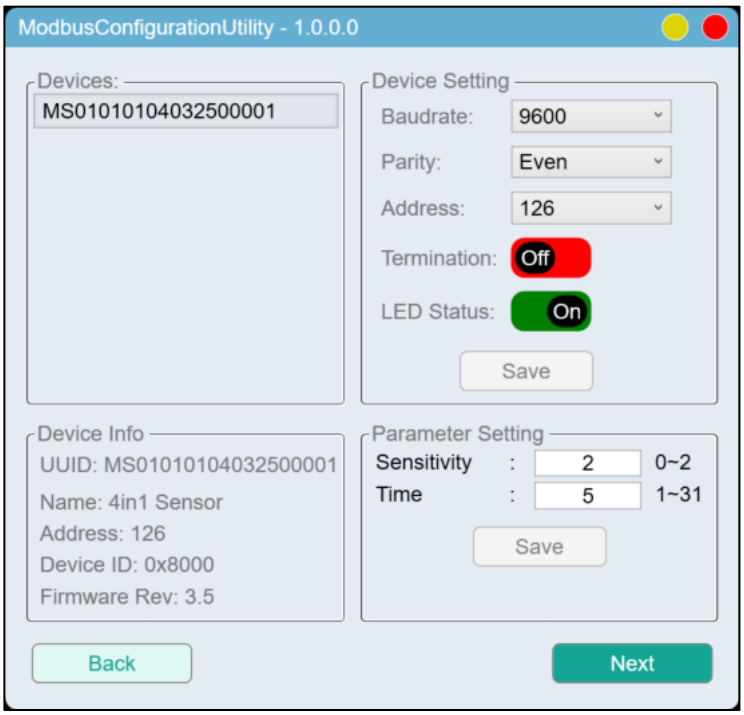



**Figure 7 - Device Setting Window**

Click **[Next]** to proceed to the control interface for the selected Modbus device. For example, if the connected Modbus device is a 4in1 sensor, the window displays live sensor data and data logging preferences may be set.

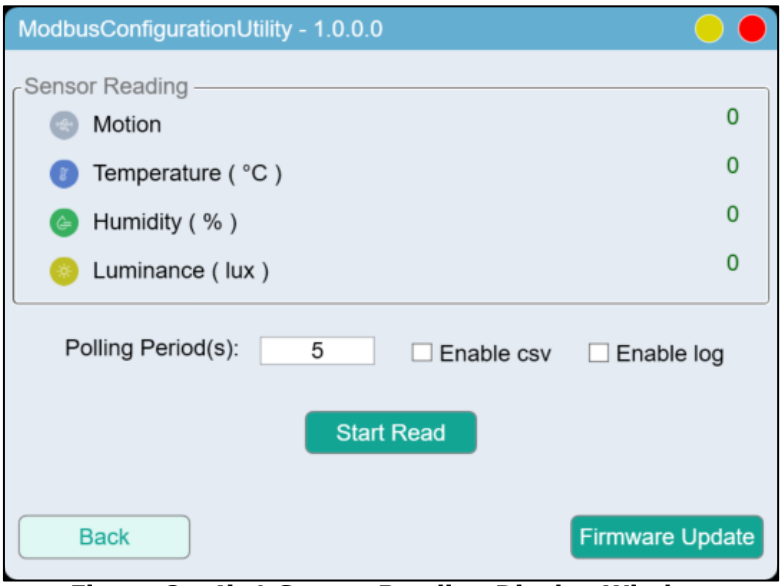



**Figure 8 - 4in1 Sensor Reading Display Window**

Click [**Back**] to the return to the previous screen (Figure 7). The Baudrate, Parity, Address, Termination and LED Status settings may now be altered to match your Modbus settings for deployment. Click on [**Save**] to update the settings to the device. These settings are persistent and need to be done once only.

6. Click [**Back**] again to return to Figure 5 (Device Scan page). Change the Baud Rate, Parity and Address settings on the page to match the device settings. Repeat the scan. If the device can be found with the updated settings, then the updated settings have taken effect and device configuration is complete. The device may now be deployed into its production environment.

# 4 Contact Information

Refer to https://brtsys.com/contact-us/ for contact information.

# Appendix A – References

## Document References

NA

## Acronyms and Abbreviations

| Terms | Description |
|---|---|
| DO | Dissolved Oxygen |
| EC | Electrical Conductivity |
| IoT | Internet of Things |
| LDSBus | Long Distance Sensor Bus |
| LED | Light Emitting Diode |
| ORP | Oxidation Reduction Potential |
| USB | Universal Serial Bus |

# Appendix B – List of Tables & Figures

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# Appendix C – Revision History

Document Title: BRTSYS_AN_079 Modbus Devices Configuration
Document Reference No.: BRTSYS_000164
Clearance No.: BRTSYS#101
Product Page: https://brtsys.com
Document Feedback: Send Feedback

| Revision | Changes | Date |
|---|---|---|
| 1.0 | Initial Release | 13-05-2025 |