

# drive.web modbus

## Modbus Options 02, 04 & 12 Installation & Operation Manual



Contents	Page
Warnings, Introduction, Features, Specifications	1
drive.web and Modbus Overview	2
Physical Installation	2, 3
savvy Modbus Setup	3,4
drive.web and Modbus Training	4

### Warning!

It is essential that you read and understand this entire manual, the entire contents of the **savvy** software “Help” menu and the entire Installation and Operation Manual supplied with your **drive.web** device before proceeding with your installation and product configuration. For more information and to download product manuals and software, go to [www.driveweb.com](http://www.driveweb.com).

### Warning!

Your use of **savvy** software and **drive.web** devices with Modbus may cause motors and machinery to power up with high voltages or start or operate in an unexpected, dangerous or lethal way. It is essential that you are completely familiar with **savvy** and all of the equipment and the system design you are working with before attempting to program or edit a program or connect to any live device.

### Warning!





You are entirely responsible for the configuration or use of any **drive.web** product. By configuring or using these products you agree to indemnify and hold harmless Bardac Corporation, its’ employees, directors, officers, distributors and resellers against the consequences of your configuration or use of the products.

### Warning!

Information in this manual is subject to change without notice. You are responsible for verifying the proper operation of your **drive.web** module. Special care must be taken after loading new firmware or installing new options.

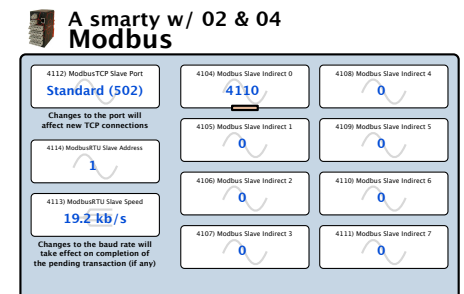
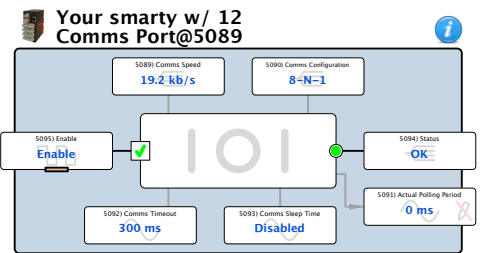
**Note!** This manual is **ONLY** for **drive.web** products dw110 through dw115.

## drive.web Modbus Options Features

-  **Modbus RTU** communication over **EIA485** (RS485) serial networks is enabled with option **02 & 12**. **Isolation** provides excellent rejection of common-mode noise.
-  **Modbus TCP/IP** slave on **Ethernet** networks with option **04**.
-  **Modbus Slaves** or **Servers, 02 & 04**, allow Modbus Masters or Clients on their networks to read and write data in their registers.
-  **Modbus Masters** or **Clients, 12**, are able to read and or write to registers in servers on their serial networks.

## drive.web Modbus Options Specifications

- 02 Modbus RTU Slave.** Isolated, EIA485, **19.2 kbps max.**
- 04 Modbus TCP/IP Slave.** Ethernet, 10baseT, 8P8C RJ45 jack.
- 12 Modbus RTU Master,** Isolated, EIA485, **115 kbps max.**



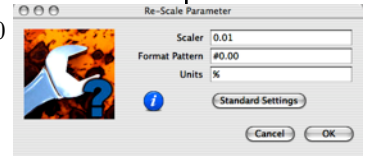
## drive.web and Modbus Overview

Supported Modbus Function Codes	Description
03	Read Multiple Contiguous Holding Registers
06	Preset or Write Single Holding Register
16	Preset or Write Multiple Contiguous Registers

- A **drive.web** device with **option 02 and/or 04** adheres to Modbus Conformance Class 0 and supports Modbus Function Codes 03 and 16.
- A device with **option 12** supports Modbus Function Codes 03, 06 and 16.
- Option 04**, ModbusTCP servers support up to **three simultaneous connections** by ModbusTCP masters. Further connections are refused until a connection is discontinued.
- ModbusRTU networks only allow one master device but can support multiple servers. Ideally **up to 128 drive.web ModbusRTU servers** can be placed on one network.
- drive.web** limits, scales, formats and unitizes raw 16 bit bytes so that numbers are presented in useful form for that parameter's function. Parameters display decimal, hexadecimal, boolean 0 & 1, enumerated lists or binary words. Full 16 bit decimal integer range is **0 to 65535 or ±32767**. Hexadecimal range is **0x0 to 0xFFFF**. Right-click on parameters and choose **Get Info** to determine how the raw number is limited, scaled and displayed.
- Change parameter **Scaler**, **Format** and **Units**. Right-click and choose **Re-Scale...**

### drive.web Integer Scaling Examples

Parameter Type	Uses	Display Range	drive.web scaler	Raw Integer Value
Percentages	Arithmetic Data, Offsets	± 327.67%	1/100	± 32767
Logic/Control	Digital Logic	High/Low		1/0
	Enable	Enable		1
	Reset	Reset		1
	Hold	Hold		1
	Inactive	Inactive		0
Ratios	Scalers	±32.767	1/1000	± 32767
UIP Voltage	Monitor	±327.67V	1/100	±32767
AOP Voltage	Monitor	±32.767V	1/1000	±32767
Advanced Math	Math	± 3.2767	1/10000	± 32767
Time	Timers	0 to 6000s	1/10	0 to 60000
Integral Time	Integrator, PI	0 to 100.00s	1/100	0 to 10000
Derivative Time	Derivative,PID	0 to 10.000s	1/1000	0 to 10000



Integer Scaling is Parameter Dependent,  
Check Scaling When Making Connections.

## drive.web with Modbus - Physical Installation

**Option 04** ModbusTCP/IP requires an Ethernet cable to a switch accessible by your master device.

**Option 02 & 12** Serial communication is achieved using the EIA485 electrical standard.

The isolated serial port includes LED indicators to assist in system verification:

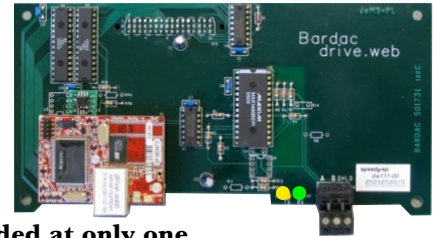
**Yellow** LED indicates data being **transmitted**.

**Green** LED indicates data being **received**.

Shielded cable with a twisted pair such as Belden 3106A must be used for Modbus RTU networks. Shielding is essential in industrial environments near motors and drives. Twisted pair is important for noise rejection and impedance matching A and B to the EIA485 transceivers.

Terminals	EIA485 Name	Description
A	A or "Data -"	Inverting Pin
B	B or "Data +"	Non-Inverting Pin
C	SC or Data 0V	EIA485 Reference Common



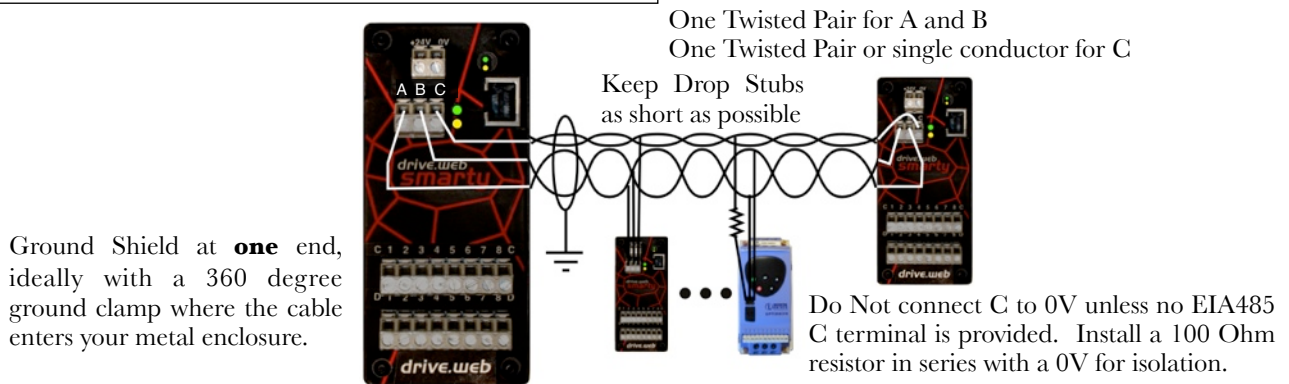


## drive.web with Modbus - Physical Installation

(Continued)

- ❏ **A** and **B** must be in a single twisted pair. **C** may use one or both conductors in another pair. Do NOT pair **C** with any other signal.
- ❏ Industrial wiring practices usually recommend that **cable shields are landed at only one end** to prevent ground loops so **C** connection may not be properly made with the shield.
- ❏ EIA485 requires three wires. The data ground connection is named **C** so that it is not confused with other grounds or shields.
- ❏ Long cable runs can mean large Voltage differentials between devices.
- ❏ **drive.web** device's serial ports incorporate an internal 100 Ohm isolation resistor in series with **C**.
- ❏ If your ModbusRTU device does not provide a dedicated **C** or EIA485 reference common connection, you should install a 100 Ohm resistor in series from the **C** line to a signal ground or 0V terminal on the Modbus device.
- ❏ Correct multipoint topology is one trunk with a device at each end and other devices on individual short stubs. Star, ring, or extended branch topologies are NOT recommended.
- ❏ If you require a trunk over 150 meters long, contact us for our technical manual HG502436.

### Example Multi-drop Network with Trunk and Stubs

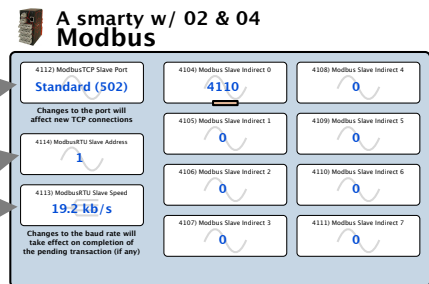


## drive.web Option 02 & 04, Set Up Modbus Servers in savvy

Locate this Modbus screen by clicking on the Modbus icon in your **savvy** system configuration.

This **Modbus TCP Slave Port** parameter is only present with option 04

These **Modbus RTU** parameters are only present with option 02



**ModbusTCP Slave Port** is **502** by default, the standard port in the ModbusTCP protocol.

**ModbusRTU Slave Address** is any number between 1 and 247 and should be unique in your network. The ModbusRTU Master must use this address to communicate with this server.

**Modbus RTU Slave Speed** is **19.2 kb/s** max. Must match speed of the ModbusRTU master.

**Modbus Slave Indirect** parameters are contiguously numbered to make best use of Modbus functions 03 and 16 which allow multiple contiguous registers to be read or preset with one command. Enter any parameter identification number in your **savvy** system configuration to read or write the data there. Use these blocks to optimize communication times.

## drive.web Option 12, Set Up a ModbusRTU Client in *savvy*

### Comms Port Function Block

Configure your serial port with the **ModbusRTU Comms Port** function block.

**Comms Speed.** The communications rate is bits per second. Set the Comms Speed between **300 b/s** and **115.2 kb/s**. The Comms Speed must match the slave device's settings.

**Comms Configuration.** The character framing format is **Data bits-Parity-Stop bits**.

Supported character framing is:

- 8-N-1      8 Data Bits, No Parity, 1 Stop Bit
- 8-O-1      8 Data Bits, Odd Parity, 1 Stop Bit
- 8-E-1      8 Data Bits, Even Parity, 1 Stop Bit
- 8-N-2      8 Data Bits, No Parity, 2 Stop Bits

**Actual Polling Period** The time in milliseconds, ms, required to poll all parameters defined in all the INT16 and UINT16 Holding Registers. The period is directly affected by the number of registers, comms errors, comms timeouts, and the comms sleep time. This parameter is read only, for user information in optimizing systems.

**Comms Timeout.** The time in millisecond, ms, for the master or client to wait for a reply before moving to the next parameter in the polling cycle.

Range=0 to 30000 ms

**Comms Sleep Time.** The time delay in milliseconds, ms, between the end of the previous and the start of the next polling cycle. May be adjusted to limit microprocessor loading of the *drive.web* or slave device if serial link update performance is not a critical factor.

**Status.** Any of the Last Errors of the individual Holding Register function blocks. All individual Last Error codes can be cleared by clicking on the parameter and using the Reset button.

**Enable.** You may globally disable the serial 485 communications here.

### Holding Register INT16 or UINT16 Function Blocks

The holding registers define which signed or unsigned integer parameters or registers in the slave or server device to read and/or write. The Holding Register's Value parameter may have *drive.web* connections to and/or from it, allowing read and/or writes to the server's addressed parameter.

**Modbus Address** is the address number between 1 and 247, unique on the network, assigned to your slave or server device.

**Data Address** is the parameter identification number (PIN) or register number that you wish to read and/or write to/from. In the picture above, the value 4142 is written to parameter 1234 in the the device with Modbus address 1. The blue arrow at *Value* shows data is connected here from elsewhere in your *drive.web* system.

**Enable** allows this register's comms to be disabled to reduce polling periods. Make a *drive.web* connection to this block for dynamic control.

**Last Error** records the last error communicating to this address. Click to reveal the Reset button.

**Options:** A check box for certain devices that require function 06 instead of 16. There is another check box for Yaskawa drives' special Yaskawa Accept/Enter function.

**Value** shows the integer which is read/written to/from the slave's or server's addressed register.

### Complete Your *drive.web* and Modbus Knowledge

Free *drive.web* on line training seminars are held every week. They are interactive with the presenter and take about one hour. Design control schemes, configure networks, create drive systems with almost any drive, generate signal flow documentation, interface to external products such as operator stations, PLCs and SCADA systems.

To register please contact us; [training@driveweb.com](mailto:training@driveweb.com) or call 410-604-3400

**drive.web** 40 Log Canoe Circle, Stevensville, MD 21666 USA  
 Ph. 410-604-3400, Fax 410-604-3500, [www.driveweb.com](http://www.driveweb.com)

