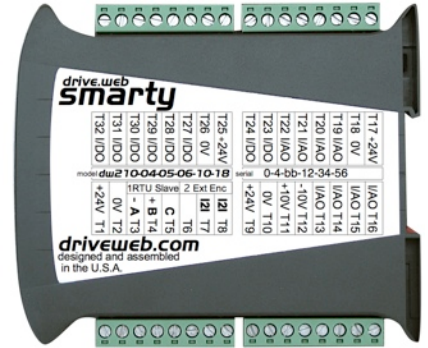


drive.web modbusRTU

smarty dw210

Options 17 to 23 Installation & Operation Manual

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Warning!

It is essential that you read and understand this entire manual, the entire contents of the **savvy** software **Help** menu and the **smarty dw210** Installation and Operation Manual, HG502573, before proceeding with your installation and product configuration. For more information and to download product manuals and software, go to 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.



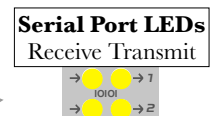
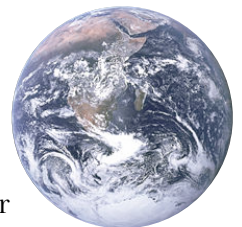
Warning!

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






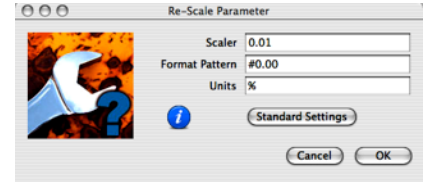
drive.web smarty dw210 ModbusRTU Features

- **ModbusRTU** on **EIA485** (RS485) serial networks up to **500 Kbps** max.
- **Isolated** options provide greater rejection of common-mode noise.
- **ModbusRTU Slaves** or **Servers**, Options **17 to 19**, allow Modbus Masters or Clients on their networks to read or write data at any available numbered parameter.
- **Modbus Masters** or **Clients**, Options **19 to 23**, are able to read and or write data in servers on their serial networks.
- Supported Modbus Function Codes; **01-06 and 16**, special **Yaskawa** Holding Reg.
- ModbusRTU networks only allow one master device but can support multiple servers. Transceivers are **1/8 unit loads**.
- For information on Modbus specifications go to <http://modbus.org/specs.php>
- Serial port LEDs indicate data received and transmitted at Port 1 and 2.



drive.web smarty dw210 ModbusRTU Features continued...

-  **sawvy** limits, scales, formats and unitizes raw 16 bit bytes so that numbers are presented in a useful form for that parameter’s function. Parameters display decimals, hexadecimals, booleans 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.
-  Right-click on parameter and choose **Re-Scale...** to change **Scaler**, **Format** and **Units**.
-  Boolean values are translated to or from 0000 and 0001 where applicable. All non-zero values are translated as Boolean True.



drive.web smarty dw210 ModbusRTU Installation

Port and Terminal by Option Number:

* Indicates OEM-only option. **I2I** interfaces with **smarty** option **40** to **43**.







Option	Port 1	T3	T4	T5	Port 2	T6	T7	T8
-17*	Not Used				Isolated Slave	A	B	C
-18	Isolated Slave	A	B	C	I2I Encoder		I2I	I2I
-19	Master	A	B	C	Isolated Slave	A	B	C
-20*	Not Used				Master	A	B	C
-21*	Not Used				Isolated Master	A	B	C
-22*	Master	A	B	C	I2I Encoder		I2I	I2I
-23	Isolated Master	A	B	C		A	B	C

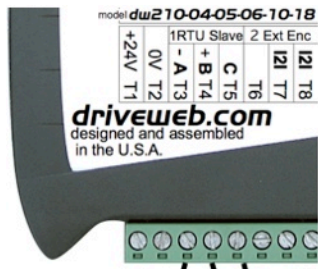


Terminal Definitions:

Terminal	EIA485 Name	Modbus Name	Description
A	A or Data -	D0	Inverting Pin
B	B or Data +	D1	Non-Inverting Pin
C	SC or Data 0V	Common	Common Reference

Wiring Notes All signal wiring should be **twisted-pair**. All wiring outside of the metal enclosure should be shielded cable with individually shielded twisted-pairs such as **Belden 8163**. Typically the cable shield should be grounded only at one end with a 360° ground clamp where the shield enters a “quiet” metal enclosure. Separate all wiring from RF noise sources and AC power cabling.

-  See the **smarty** manual, HG502613, for **Terminal Wiring** requirements.
-  **A** and **B** must share a single twisted pair. **C** may use one or both conductors in another pair. Do NOT pair **C** with any other signal.
-  EIA485 Common Reference is required. It is named **C** so that it is not confused with other common, ground or shield connections.
-  Contact us for technical manual HG502436 if: Your ModbusRTU device has no **C**, EIA485 Reference AND there is more than one slave. Trunks over 150 meters.
-  Correct multipoint topology is single daisy-chain or trunk with a device at each end and additional devices on short stub branches. Star, ring, or extended branch topologies are **NOT** recommended.
-  Line termination is recommended between **A** and **B** at both physical ends of the trunk or chain, NOT at any branches or links. Do **NOT** provide line termination with any **ODP**, **ODV** or **ODE2** AC drives.



Example Industrial EIA485 Network

One twisted-pair for A and B
One twisted-pair or single conductor for C

Install line termination ONLY at each end of EIA485 network, close to devices.

LT, Line Termination should be 150Ω, 0.5W resistor unless network is polarized, use 120Ω, 0.25W and 1nF, 10V cap in series.

Short branch stubs.
NO line termination.

Ground shield at one end with 360° clamp at “quiet” enclosure entry.

Options 17 to 19, ModbusRTU Slave/Server in **savvy**

View the *Modbus* function block by clicking on the *Modbus* icon in your **savvy** system configuration.

You cannot write or force parameters that are read-only or have incoming **drive.web** connections. In the function block view, in the target parameter block, check there is neither a blue arrow at the left side nor a crossed-out pen.

ModbusRTU Slave Address, unique in network, **1 to 247**.

ModbusRTU Slave Speed Choose any speed from **0.1 to 500.0kb/s** to match the master.

ModbusRTU Slave Config, character frame must match master, **1-8-Parity-Stop**.

Parity type; *N* None, *O* Odd, *E* Even, *S* Space(0) or *M* Mark(1).

Number of **Stop** bits; **1, 1.5** or **2**.

ModbusRTU Slave Min Silence, 1.75ms recommended by ModbusRTU standard for speeds 19.2kb/s and above is inefficient and may be reduced for this and other devices. Enter **0** for minimum, 3.5 Characters (3.5(1+8+P+S)/Speed).

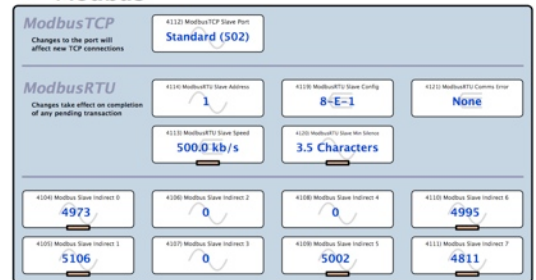
ModbusRTU Comms Error enumerates last error detected. Click to **Reset**.

Modbus Slave Indirect Sequentially numbered parameters allow one-step multiple read or writes with Modbus function codes 01-04, 15 and 16. Use to point to any parameter number in your function block engine. Create more *Modbus Slave Indirect* blocks from the *Utility* function block list.

You are not required to use *Modbus Slave Indirect* blocks. You can directly address any numbered parameter in your function block engine.

Comms Watchdog function block, available in the *Utility* function block list group, can only be written via Modbus comms. Write non zero value to *Input* to keep *Output* = **OK**

A1 RTU Server Modbus



A1 RTU Server Comms Watchdog@4715



Options 19 to 23, ModbusRTU Master/Client in **savvy**

ModbusRTU Comms Port. Configure your serial port.

Comms Speed. Any speed from **0.1 to 500.0kb/s**. All servers must match.

Comms Configuration, character frame must be consistent on network. See ModbusRTU Slave Config. above.

Options 18, 19, ModbusRTU Master/Client, Comms Port continued...

Minimum Comms Silence. See *Slave Min Silence* above.

Actual Polling Period. High, Medium and Low. Read Only. Actual time to poll all parameters defined in all the Modbus Data blocks of that priority. The period is directly affected by the number of parameters, Silence times and any Errors or Comms Timeouts. See *Priority* below.

Comms Timeout. The time, 10 to 30000ms, for the master or client to wait for a reply before moving to the next Modbus Data block in the polling cycle.

Status. Any *Last Error* in Modbus Data blocks. Click to *Reset* all *Last Error* codes.

Enable. Globally enable and disable all serial communications at this port.

Modbus Data Blocks, Boolean, INT16, UINT16

Define the data point, register, discrete or coil and the slave or server device. Create up to 32 of these blocks. Addresses may be changed dynamically by connection.

Boolean data block's *Value* can be True(1) or False(0).

INT16, 16-bit Integer, *Value* is decimal 0 to ± 32767 .

UINT16, Unsigned 16-bit Integer, *Value* is 0 to 65535.

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

PDU Address identifies the parameter, coil, discrete or register number in your server that you wish to read and/or write to/from.

Enable allows this block to be disabled to reduce polling periods when unneeded.

You can make *drive.web* connections to this block for dynamic control.

Last Error enumerates last error detected. Click to *Reset*.

Modbus Type Select Modbus Function Code or style supported by your server.

Priority has three levels. A round-robin scheduler processes all *High* priority Data blocks every round plus one other. The first *Medium* priority block will be in the first round. When all *Medium* priority blocks have been processed, the first *Low* priority block is in the next round. Following rounds process the *Medium* priority blocks again one by one and then the next *Low* priority.

Value. The raw decimal that is read/written to/from the remote parameter. Connect to this parameter to write to the remote. Connect from the parameter for reads.

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 or call 410-604-3400

