drive.web smarty
dw210 - Installation & Operation Manual

Contents ... Page

Warning!

It is essential that you read and understand this entire manual and the entire contents of the *savvy* software "Help" menu 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 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.
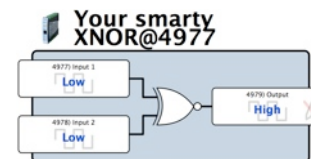
smarty Features

- *drive.web* distributed process control over **Ethernet**
- **Modbus TCP/IP over Ethernet** with option 04.
- **Internet accessible** configuration, monitoring & control.
- **"Drag 'n drop,"** connections, graphical documentation.
- Automated, on-line upgrades with *savvy* software.
- **System libraries** Basic and optional; Process Control, Winders, Math & Encoder Control.
- **Available Function Blocks**; Arithmetic, logic, advanced PID, comparator, filter, latch, timer, profiler, counter, drive control, ramps, diameter calculator, taper tension, torque compensator for winders and more.
- **Configurable Discrete I/O;** 8 Digital Input/Outputs, 8 Analog Input/Outputs
- **Optional I/O;** Direct Encoder, Dedicated Encoder Module, Dual ModbusRTU, CAN bus, High Voltage I/O.
- **Power over Ethernet Option** Power your *smarty* with PoE technology.
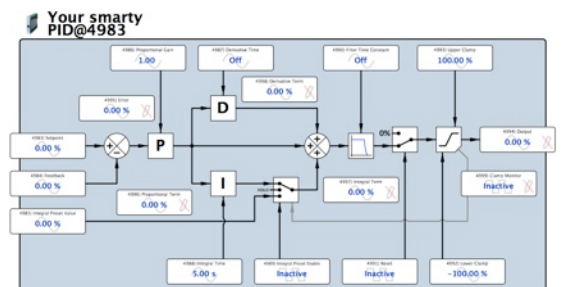
smarty base models include:

drive.web 10/100Base-T(X) Ethernet enabled distributed process control.

Standard I/O Package details on page 6. 16 configurable terminals. 8 Analog Input/Outputs and 8 Digital Input/Outputs. Analog Inputs continue to be available in Output mode.

> **Analog Inputs** ±10V, 100kΩ input impedance, 16 bit resolution. ±25V maximum.
>
> **Analog Outputs** 0 to ±10V, 10mA max. 16 bit res. ±11V max.
>
> **Digital Inputs** 5, 12 or 24V Logic Inputs.
>
> **Digital Outputs** 24V, 50mA max, source and/or sink selectable. **Sink mode may require fusing,** see page 6.

+10V and -10V references provided, **20mA max source**.

Four +24V and Four 0V terminals for power and control reference.

Basic Control Function Block Library with arithmetic, logic, PI, clamps and more. See Appendix A for function block listing.

New Network Stats Block - in-depth network troubleshooting. Complete logging of TCP, UDP, network, data link hardware and software errors and packets dropped:

Real Time Clock with calendar, time stamp, rechargeable battery.

Chassis Ground (Earth) Definite grounding for ease and security. Do NOT use for 0V control wiring.

Indicator LEDs in front panel. For setup, trouble shooting and monitoring:

⏻ **Power On** Green LED

⚠ **Fault** Red LED, alarm requiring immediate action. Check power supply, connect with *savvy* or contact *drive.web* for more information.

👓 **Ethernet Link** Green LED indicates current Ethernet connection

⇌ **Ethernet Activity** Yellow LED indicates data transmitted or rec

100 **100BaseTX** Green LED connection with a 100Base-TX device.

smarty models:

dw210- *smarty* Standard Distributed Process Controller.

dw213- *smarty-o* for Optidrive Plus AC Sensorless Vector Drives. Standard *smarty* features plus serial data link and comprehensive drive parameter control function blocks. Use dw213 Manual, HG502172.

dw215- *smarty-yf7* for Yaskawa F7 Vector Drives. Standard *smarty* features plus dedicated serial data link and comprehensive drive parameter control function blocks. Use dw215 Manual, HG502253

smarty Options

Winder smarty
Taper Tension@5113
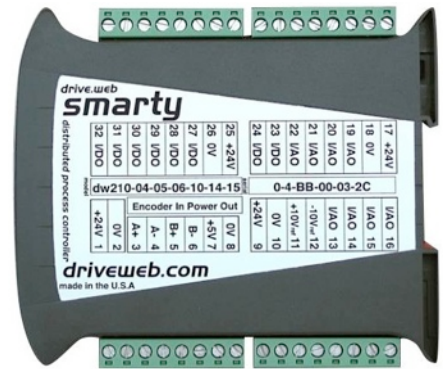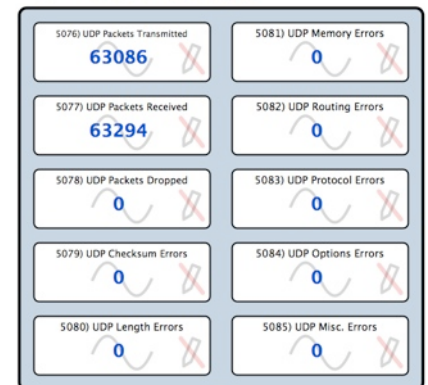
04 ModbusTCP/IP. Ethernet enabled Modbus slave/server.

05 Process Control. Function Block Library 1 - Math, Logic, PID, Switches, Comparators, User data log, Profiler, Presets, Latch, Filters, Counters, Timers and more, see Appendix A.

06 Winder Control Function Block Library 2 - Diameter Calculator, Taper Tension, Torque Compensator.

10 Advanced Math Function Block Library 3 - Trig, Polynomials, Log, Exponent, more, see Appendix A.

11 Encoder Control Function Block Library 4 (Requires *smarty* Encoder Input Module with dual encoder option, dw230-02 or -03). Speed Lock, Registration, Position Function Blocks.

14 Power over Ethernet IEEE 802.3af PoE Technology. Freedom from other power supply requirements. Green LED indicator.

15 Direct Encoder Receiver Bi-directional incremental with marker, EIA 422/485, up to 300kHz, 24V. Encoder logic and speed function blocks.

16 External Encoder Interface Port Two-wire comms connects to the *smarty* Encoder Input Module, dw230, up to 500 ft away. dw230 options include dual encoders with event inputs and single or dual EIA422 retransmit.
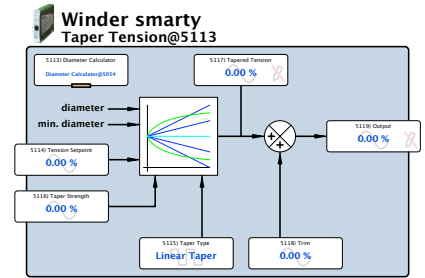
17 Through 23 smarty Serial Ports ModbusRTU uses EIA485 at 230.4Kbps max. Isolated option provides 250V isolation for large systems. Four yellow LED indicators - data received and transmitted on Port 1 and 2.

Option	Port 1	Port2
17	Not Used	Isolated ModbusRTU Slave
18	Isolated ModbusRTU Slave	Encoder Comms
19	Isolated ModbusRTU Slave	ModbusRTU Master
20	Not Used	ModbusRTU Master
21	Not Used	Isolated ModbusRTU Master
22	ModbusRTU Master	Encoder Comms
23	Isolated Modbus Master	Encoder Comms

Serial Port LEDs
Receive   Transmit

24 High Voltage Digital I/O Isolator 2 NO Contacts, 4 120VAC inputs. See page 7.

smarty Options Important Notes:

Modbus Options 04 and 17 through 23 enable communication with a wide range of industrial devices from drives to operator stations, PLCs SCADA systems. **It is essential** that you read and understand the entire *drive.web* Modbus Installation and Operation Manual, HG502421, included with these options before using them.

Options 04, 05, 06, 10 and 11 are software options, easily field installed

Options 16 through 23 are not available with **-15,** Direct Encoder Receiver.
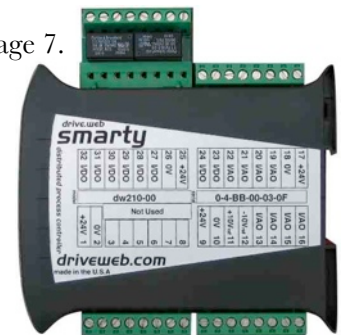
smarty Specials

Engineered solutions include function block libraries, generic system configuration and system wiring diagram drawing.

dw210-1101 Generic Open-loop Constant Tension Center Winder
dw210-1102 Generic Closed-loop Dancer Control Center Winder
dw210-1103 Generic Closed-loop Loadcell Control Center Winder
dw210-1104 Generic Slip Core Winder
dw210-1105 Generic Electronic Line Shaft
dw210-1106 Generic Coordinated Drive, Line Master Controller
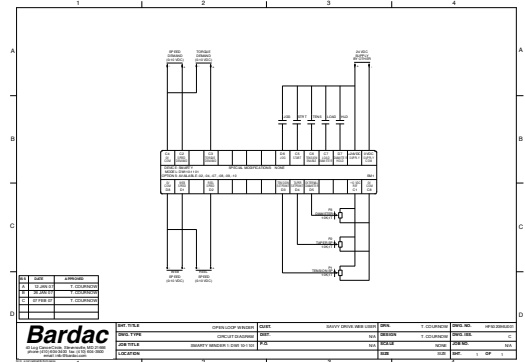
smarty Installation

Requires less than 1" DIN rail space in electrical enclosure with required environmental protection.

smarty **Dimensions and Weight:** 0.9"w, 4.5"h, 4.7"d (59, 115, 120mm) 1.0 lb (0.45 Kg)

smarty **Power Requirements:** Regulated 24VDC ±10%, 130mA plus loads. **1A fuse is required!** Power over Ethernet option -14 requires PoE Ethernet switch port or Midspan Injector.

smarty **Environment:** Clean Air, Operating temperature range, 0 to 50C. Storage temp, -20 to 80C. Humidity less than 95% non-condensing.

smarty **Ethernet Port** MDI 8P8C, "RJ45," jack, 100baseTX or 10BaseT, Full Duplex, Auto Negotiation, Auto-MDIX per IEEE 802.3ab.

smarty **USB Port** Currently not used. USB support is planned, please call for information.

smarty Ethernet Networking & Programming

Before proceeding, it is important to have a basic understanding of Ethernet TCP/IP networks. *smarty* uses the same IP address format as a computer and may disrupt a local network or function improperly if it is not set up with a unique IP address. *smarty*s are all shipped with the **same IP address, 10.189.189.189**. Consult your company's IT department for an appropriate, unique IP address.

You can find useful networking information in the Basic Network Administration Section in the *savvy* user manual under the, "Help," menu.

Set up Your Physical Ethernet Network - You Will Need:

A standard Category 5e cable (with 8P8C/RJ-45 connectors on both ends) for each *drive.web* device and your computer.

An Ethernet switch with sufficient ports to support all your *drive.web* devices and your computer.

Set up Your Computer - Get *savvy*

The free *drive.web savvy* software allows you to easily program and monitor your *smarty* and create distributed control systems.

To download the latest version of *savvy* and to view the *savvy* user manual, go to *www.driveweb.com* and click on, "get savvy."

Windows users will need to have **Java Runtime Environment** installed to run *savvy*. There is a link on this page to download Java for free.

Get started with *savvy*

- Before proceeding with your systems designs it is very important to familiarize yourself with *savvy*, the configuration software.

- We strongly recommend that you read the introductory guides, "Getting Started with *savvy*," "Getting Started with *savvy-SFD*," and , "*savvy-SFD* and the PL series drive." Find these guides under the Help menu.

- Use the unique, " Create Phantom," feature to practice your design and configuration techniques. Design a system in any Phantom *drive.web* device and export it for use in your devices.

- We also strongly recommend that you attend one of our regular on-line training seminars. Contact us at **training@driveweb.com** or **call 410-604-3400** to register.

- Under the Directory menu, click on, "Discover All Local Devices." If your *smarty* is powered up and physically connected to the same local network as your computer, an icon should appear on the screen.

- If the red padlock icon at right appears, your computer's subnet mask is preventing communication with the *smarty*. Under the File menu, click, "Administrate - Set IP Addresses for System." A list will appear with a serial number that should match the label on the bottom of your *smarty*.

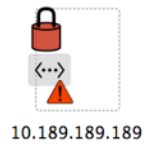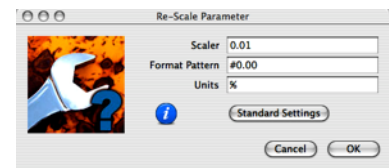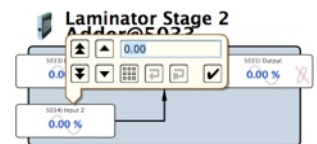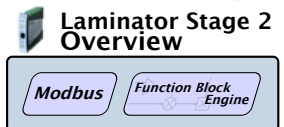- Enter a unique IP address that is within your computer's subnet mask. A *smarty* icon should now appear with the IP address underneath.

- Right click on the icon and choose, "Change Name," to name your *smarty* for easy identification. Now left click on the icon to view and configure.

- The first level under the icon is the device overview screen. You will see the Block Engine and if you have option-02 or -17 to -23, a Modbus icon. Left click on icons to drill to the function block level.

- Left click on function blocks to view and adjust parameters.

- Left click on parameters to open the setter box unless they show a crossed-out pen meaning that they are read-only. You can adjust the parameter value with mouse or keys.

- Right click on parameters to get info, add to a dock, copy, start or end connections, rename, and rescale.

- *drive.web* works with 16 bit words allowing raw decimal integer values **0 to 65535 or ±32767.** These raw values are limited and/or scaled depending on the parameter. This prevents illegal values and presents numbers in the most useful formats. Right click to adjust scaling to fit your needs. Check scaling when making connections.

10.189.189.189

192.168.1.25

Laminator Stage 2

Laminator Stage 2 Overview

Modbus   Function Block Engine

Laminator Stage 2 Adder@5033

Re-Scale Parameter

Scaler 0.01
Format Pattern #0.00
Units %

Standard Settings

Cancel   OK

Upgrade *savvy* with Signal Flow Diagram Option - SFD

- With *savvy-SFD*, implement your systems in a graphical manner and create professional quality engineering drawings that are stored in your *smarty*.

- Set borders, "drag and drop," connections, zoom pan and see your system clearly. Multi-page drawings with cross-referencing and annotation are easy to create.

- You can get the *savvy-SFD* upgrade on-line under the Commerce menu. Select, "Upgrade *savvy*," and install by processing a Voucher, coupon or credit card.

- Find a useful guide to this upgrade, "Getting Started with *savvy-SFD*," under the help menu.

smarty Connections

T23,24, T27-32, 8 Digital Input/Outputs with Analog Monitoring

T19-T22 Analog Inputs or Analog Output with Monitoring

+24V
0V

+24V
0V

Ethernet RJ45 8P8C

DIN Rail Clip. Release with small flat blade screw driver at bottom

Chassis Ground (Earth) Do NOT use for 0V

drive.web
smarty
distributed process controller

| 32 I/DO | 31 I/DO | 30 I/DO | 29 I/DO | 28 I/DO | 27 I/DO | 26 0V | 25 +24V | 24 I/DO | 23 I/DO | 22 I/AO | 21 I/AO | 20 I/AO | 19 I/AO | 18 0V | 17 +24V |

model dw210-04-05-06-10-14-15 serial 0-4-BB-00-03-2C

Encoder In Power Out

| +24V 1 | 0V 2 | A+ 3 | A- 4 | B+ 5 | B- 6 | +5V 7 | 0V 8 | +24V 9 | 0V 10 | +10v-11 | -10v-12 | I/AO 13 | I/AO 14 | I/AO 15 | I/AO 16 |

driveweb.com
made in the U.S.A

+24V
0V

+24V
0V

T3-T8 Option Dependent. Direct Encoder Shown. See Option Section or Manual.

T11 +10Vref

T12 -10Vref

T13-T16 Analog Inputs or Analog Output with Monitoring

smarty Analog and Digital I/O

Analog Input Function Block

±25V max. 16 bit resolution, 100kΩ input impedance. Available for all 16 I/O terminals. Scaling and offset parameters condition the data for the next processing step without additional function blocks.
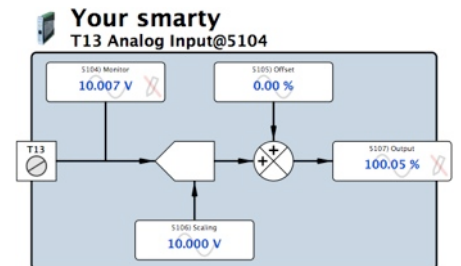
Analog Output Function Block

±11V and 10mA max output. 16 bit resolution. Eight terminals; T13-16 and T19-22. Dynamically enable the output driver with Output Enable parameter. Send a 0 for Input or 1 for Output.
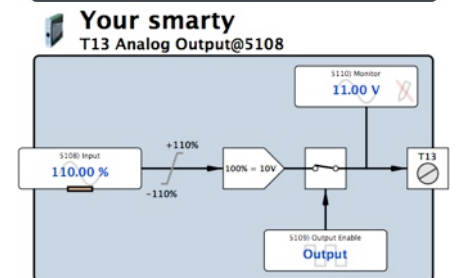
Digital Input Function Block

Selectable Ranges 5V, 12V & 24V, 100kΩ input impedance.
Available for all 16 I/O terminals. Threshold Voltages:

Digital Input Range	Turn On Threshold	Turn Off Threshold
5V	0.83V	2.5V
12V	2V	6V
24V	4V	12V

Your smarty
T13 Analog Input@5104

5104) Monitor 10.007 V
5105) Offset 0.00 %
T13
5107) Output 100.05 %
5106) Scaling 10.000 V

Your smarty
T13 Analog Output@5108

5110) Monitor 11.00 V
5108) Input 110.00 %
+110%
100% = 10V
-110%
T13
5109) Output Enable Output

Your smarty
T23 Digital Input@5117

5117) Monitor 22.9 V
T23
5119) Output High
5118) Range 24V Logic
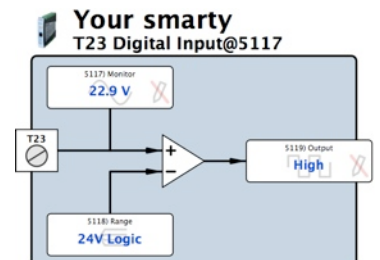
Digital Output Function Block

+24V, **50mA Source or Sink.** Eight terminals; T23, T24 & T27-T32.
May be used as a, "push-pull," or, "totem pole," output.

Source drivers are self-protecting. In case of shut-down due to overheating or over-current, a warning triangle will appear in the affected channel's function block and the Status parameter in that function block will change from OK to Fault. Connect from the Source Status parameter to your fault contingency system for critical applications.

Systems connecting a, "heavy load," i.e. one that is not inherently impedance protected or otherwise current limiting to a **Digital Output in Sink Mode** should be **fuse protected with a 0.5A fuse.**
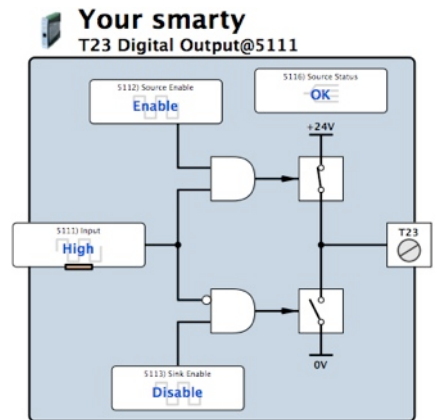

Your smarty
T23 Digital Output@5111

smarty Option 11 Encoder Control F. B. Library 4

Requires *smarty* Encoder Input Module with dual encoder option, dw230-02 or -03

Encoder Position Function Block absolute position measurement

Encoder Speed Lock Function Block provides a numerical speed error signal.

**Encoder Registration Function Block** measure time or pulse delay between markers.
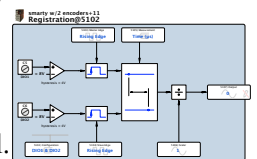
smarty Option 15, Direct Encoder Input

- Encoder inputs are EIA422/EIA485 receivers, **up to 300KHz, 24V max.**

- Connect your encoder with shielded cable with individually shielded twisted pairs such as **Belden 8163**. Ground the shield at only one end.

- Two function block types provide bidirectional speed and logic information.

- EIA422/485 signals are differential-balanced. The, "+," line must swing negative with respect to the, "-," line for proper operation. A single sided logic signal requires that the, "-," terminal be biased at least 250mV higher than logic low at, "+," terminal and 250mV lower than the logic high.

smarty w/ encoder
ENC1 Speed@5106

smarty w/ encoder
ENC1 Logic@5111
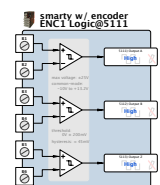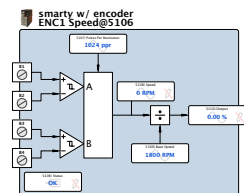
smarty Option 24 High Voltage Digital I/O Isolator

Plug-in option. Fits at T17-24 or T25-32. Two NO relay contacts with shared common and four photocoupled 120VAC digital inputs with shared common.

NO Contact Ratings: Resistive Load - 3A @ 30VDC, 3A @ 250VAC

                    Motor Load - 1.5A @ 120VAC, 0.9A @ 230VAC

Correct function block assignment in *savvy* depending on isolator position:
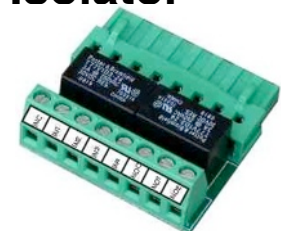
HV Isolator Terminal	Function Blocks for T17-24 Position	Function Blocks for T25-32 Position
120VAC Input Common	Digital Input T19, T20, T21, T22	Digital Input T27, T28, T29, T30
120VAC Input 1	Digital Input T19	Digital Input T27
120VAC Input 2	Digital Input T20	Digital Input T28
120VAC Input 2	Digital Input T21	Digital Input T29
120VAC Input 2	Digital Input T22	Digital Input T30
NO Relay Common	Digital Output T23 and T24	Digital Output T31 and T32
Normally Open 1	Digital Output T23	Digital Output T31
Normally Open 2	Digital Output T24	Digital Output T32

smarty Appendix A Function Blocks by Library and Option

Bold header indicates function block category. Number indicates # of active parameters inside the block.

Basic *smarty*

Arithmetic	Control	3 OR	4 Parameter Block
3 Adder	15 PI	**Switches**	6 Watchdog
3 Divider	**Drive Helper**	4 2-In Switch	1 Watchdog Driver
3 Multiplier	11 Optidrive Helper	4 2-Out Switch	
3 Subtracter	**Logic Gates**	**Utility**	
Clamps	3 AND	1 Dev. Comms Monitor	
4 Clamp	2 NOT	1 Indicator	

Process Control Library Option 05

Arithmetic	15 PI	Logic	17 S Ramp
3 Differential Splitter	20 PID	17 16-Bit Binary Encod.	**Switches**
4 Multiplier-Divider	8 Profiler	17 16-Bit Binarty Decod.	18 16-In Switch
3 Sign And Value	**Counters**	5 4-Bit Binary Encoder	18 16-Out Switch
3 Sign Changer	17 Up/Down Counter	16 4-Bit Priority Encod.	6 4-In Switch
Clamps	**Drive Helper**	3 Bitwise AND	6 4-Out Switch
5 Clamp with Monitor	11 Optidrive Helper	2 Bitwise NOT	10 8-In Switch
4 Deadband	**Filters**	3 Bitwise OR	10 8-Out Switch
4 Skipband	4 Low Pass Filter	3 Bitwise Shift	3 Track and Hold
Comparators	5 Moving Average Filter	3 Bitwise XOR	**Timers**
4 Comparator	**Latches**	**Logic Gates**	5 Delay-Off Timer
5 Equality Comparator	4 D Latch	3 NAND	5 Delay-On Timer
3 Maximum	5 D Latch with Reset	3 NOR	3 One Shot
3 Minimum	5 D Latch with Set	3 XNOR	5 Oscillator
6 Window Comparator	6 D Latch w/Set, Reset	3 XOR	8 Underlap
Control	3 SR Latch	**Ramps**	**Utility**
6 Differentiator	4 T Latch	7 Linear Ramp	4 User Logger
8 Integrator		11 MOP	

Option 02, 04

Utility
4 Modbus Indirect

Option 03

I/O
2 AOP's
3 DIO's
5 UIP Differential
5 UIP Analog
3 UIP Logic

Option 06

Winder
18 Diameter Calculator
7 Taper Tension
30 Torque Compensator

Options 07,08

I/O
3 ENC Logic
5 ENC Speed

Option 10

Math
2 ArcCosine
2 ArcSine
2 ArcTangent
2 Cosine
2 Cube
2 Cube Root
2 Exponential
2 Logarithm
2 Reciprocal
2 Sine
2 Square
2 Square Root
2 Tangent

Option 11

I/O
5 ENC Position
6 ENC Speed Lock
7 Registration

Option 12

ModbusRTU Master
7 Comms Port
48 EurothermERCFW09
6 Holding Reg. INT16
6 Holding Reg. UINT16
54 Optidrive Plus
54 Optidrive VTC
48 WEG CFW09

Appendix B *drive.web* Product Line Overview

smarty distributed process controller simultaneously manages varied process components and drives.

speedy sp and *speedy485* Processing power, tailored for your drive or generic, Ethernet, EIA485

savvy **Signal Flow Diagram Option** Easily implement your systems designs. **"Drag n' Drop,"** connections with complete, graphical documentation created in one step and stored in your device.

drive.web **Training Courses** An essential component in your *drive.web* system. On-line and factory courses are available at all technical levels. Sign up and get the most out of your *drive.web* technologies.

drive.web 4/116 Crockford Street, Northgate, QLD 4013 AUS.
Ph. 61(0)7-3256-8177, Fax 61(0)7-3256-8711, www.invertek.com.au

Free Manuals Download Website

http://myh66.com

http://usermanuals.us

http://www.somanuals.com

http://www.4manuals.cc

http://www.manual-lib.com

http://www.404manual.com

http://www.luxmanual.com

http://aubethermostatmanual.com

Golf course search by state

http://golfingnear.com

Email search by domain

http://emailbydomain.com

Auto manuals search

http://auto.somanuals.com

TV manuals search

http://tv.somanuals.com