

drive.web **smarty-o**[®]

Distributed Process Controller



dw213 - Installation & Operation Manual

for firmware version 0x2016

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smarty, savvy, savvyPanel, speedy, Bardac and drive.web are trade marks of Bardac Corporation, registered in the U.S. and other countries.



Conformity Statements:

EMC Standard, EN 61326-1: 2006, Electrical Equipment for Measurement, Control and Laboratory Use.

Emissions Class A, Commercial Equipment.

Immunity Table 2, Industrial Equipment.

LVD Standards, EN 61010-1: 2010, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use and;

EN 61010-2-030: Particular Requirements for Testing and Measuring Circuits.

smarty is an industrial controller designed for permanent installation by qualified professionals. If it is used in a manner not specified herein the protection provided may be impaired.

smarty and its packaging contain recyclable materials and a small rechargeable battery, classed as “portable”, that is permanently affixed to the underside of the main circuit board. Items must be separated for proper disposal. The battery may be removed with wire-cutting pliers.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class [A] digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe [A] est conforme à la norme NMB-003 du Canada.



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 configuration. See page 9 for **savvy** installation instructions. For more information and to download manuals and software, go to www.driveweb.com or contact us. See page 24.



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 all of the equipment and the system design before attempting to program or edit a program or connect to any live device. It is also essential that a risk assessment is conducted to identify hazards. Risks must be reduced to tolerable levels.



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.



Warning! Avoid permanent damage to your **smarty**, never exceed any **min** or **max** values. Do not connect any **smarty** terminal to mains circuits. See page 8 for IO ratings.

lvIP is incorporated into **smarty** firmware. lvIP Copyright (c) 2001-2004 Swedish Institute of Computer Science. All rights reserved.

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Product Identification **smarty-o** Model dw213

smarty is a range of programmable devices using **drive.web** distributed control over Ethernet for industrial process automation. To program and use a **smarty** you must get the **savvy** software tools from www.driveweb.com. Please see pages 9 to 12.

To find the **smarty's** firmware version, launch **savvy**, choose **Get Detailed Info** from the **smarty** contextual menu. See pages 11, 12.

smarty-o Standard Features

- ❖ **drive.web** distributed process control.
- ❖ **Optidrive Plus** serial link and function blocks
- ❖ 10/100Base-T(X) Ethernet, pages 5 - 7
- ❖ Field upgradeable firmware
- ❖ 8 flexible I/O: $\pm 10V$ 16-bit analog in, $\pm 10V$ 14-bit analog out, digital. in.
- ❖ 8 flexible I/O: 0-10V 16-bit analog in, 24V digital out, digital in. Page 8.
- ❖ Plug-in Terminal Blocks.
- ❖ Compact DIN rail enclosure, pages 5-7.
- ❖ $\pm 10V$ Control Reference Outputs, 20mA max. See page 7 and 8.
- ❖ Four +24V & Four 0V terminals for power & control reference, page 5, 8.
- ❖ Real Time/Date Clock with SNTP network time server synchronization.
- ❖ E-Mail Notify block, outgoing SMTP mail server support, page 11.
- ❖ Basic Control Function Block Library.



smarty Software Options

Software options may be added using **savvy**. See page 13. See **savvy** User Manual, Appendix A for up-to-date function block listings.

- 04** ModbusTCP/IP Slave/Server. See pages 19, 20, 22.
- 05** Process Control. Function Block Library 1.
- 06** Winder Control. Function Block Library 2. See page 18.
- 10** Advanced Math. Function Block Library 3.
- 11** Encoder Control. Function Block Library 4. Requires encoder hardware
- 25** EIP/PCCC Slave/Server. See page 19, 20, 23.
- 26** **savvyPanel** Operator Station Interface. See pages 14 to 17.

smarty-o Internal Hardware Options 14-17

Factory installed. Contact us for availability. ***16,17** are mutually exclusive.

14 Power over Ethernet (PoE) See page 19 & separate manual HG502612.

16* External Encoder Module *i2i* Receiver Port. See page 19.

17* ModbusRTU Slave (RS485) isolated port. See pages 19, 20, 22.

smarty-o External Options see pages 23 and 24

40 & **42** mutually exclusive. **45** & **46** mutually exclusive & require **40** or **42**

30 115V Digital Input, Relay Output Isolator . See manual HG502622.

31 230V Digital Input, Relay Output Isolator . See manual HG502622.

40 Single Incremental Encoder Module 2V to 24V differential with marker.
5VDC, 200mA encoder supply output, Two 24V logic event inputs.

42 Dual Incremental Encoder Module 2V to 24V differential with markers.
Two 5VDC, 200mA enc. supply outputs, Two 24V logic event inputs.

45 Encoder Retransmit EIA(RS)485 & 422 compliant.

46 Encoder Retransmit $\pm 24V$ differential signal out.

smarty-o Specials

Generic engineered solutions include required options (in parentheses), system configuration and wiring diagram. Contact us for other engineered solutions. All options may be added.

dw213-1101 Open-loop Constant Tension Center Winder (**05, 06**)

dw213-1102 Closed-loop Dancer Control Center Winder (**05, 06**)

dw213-1103 Closed-loop Loadcell Control Center Winder (**05, 06**)

dw213-1104 Slip Core Winder (**05, 06**)

dw213-1105 Electronic Line Shaft, Speed Lock (**05, 11, 16, 42** & **45** or **46**)

dw213-1106 Coordinated Drive, Line Master Controller (**05**)

dw213-1107 Analog Drive Front-End Upgrade (**05**)

dw213-1108 Electronic Line Shaft, Phase Lock (**05, 11, 16, 42** & **45** or **46**)

dw213-1109 Electronic Line Shaft, Registration (**05, 11, 16, 42** & **45** or **46**)

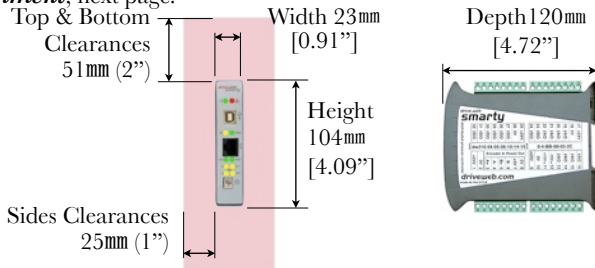
dw213-1110 3 PID Controller w/ integral reset & hold (**05**)

smarty-o Installation

smarty-o is designed for permanent installation by qualified professionals.

Dimensions & Clearances:

Clearances **must** be provided to promote airflow. Lesser clearances may be possible. Ensure the **Temperature** parameter in the **System** function block does not exceed 70°C. Forced air circulation may be required. See **Environment**, next page.



Weight: No hardware opts.-176g(6.2oz). W/ PoE & Serial Ports-213g(7.5oz)

DIN Rail Mounting. Use 35x7.5mm rail per IEC 60715 or EN50022.

Power Requirements: Regulated 24VDC $\pm 10\%$, 100mA plus loads. Do not connect to a distributed DC power network. **External 1A fast-acting fuse or current limiting is required!**

Environment: UL/IEC Pollution Degree 2, Operating temperature, 0°C min., 50°C max. Altitude 3000m max. Storage temp, -20°C to 60°C. Humidity 95% max. non-condensing. Install in metal enclosure with no RF noise source

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

USB Port, Currently not used. Support is planned, please call for information




Terminal Wiring: Strip 7mm(0.28") or use ferrules. Use 0.2mm² (AWG24) minimum. One wire, 2.5mm² (AWG12) maximum. Two wires, 1.5mm² (AWG14) maximum. Two wires with ferrules, 1mm² (AWG18) maximum.

Terminal Tightening Torque: 0.5 Nm (4.4 in·lbs)

smarty-o Installation continued...

smarty-o to *Optidrive Plus* Serial Link assembly LA502803 is provided.

Warning! Only qualified persons should connect this cable! Dangerous Voltages and/or motor activation causing injury, death and property damage may result! You must read and understand the entirety of both this manual and the Optidrive Plus User Guide!

-  Do not install the serial cable next to power wiring. Contact us if you require 1m cable length assembly, LA502804 or custom lengths.
-  Check drive firmware version at **P0-28**. Must be 2.20 or higher. For firmware versions less than 3.0, the drive model number must end in **-M**
-  Set drive parameters **P2-26** = Modbus Address **1**, **P2-27** = **115.2kbps**.

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



Power On Green LED



Fault Red LED. Check power supply, connect with **savvy** or contact us at **drive.web** for more information.



Ethernet Link Green LED indicates Ethernet connection.



Ethernet Activity Yellow LED-Data transmitted or received.



100BaseTX Green LED connection with 100Base-TX.



PoE PoE Option **14** only, see page 19, product manual, HG502612

Four yellow LEDs in **smarty-o** front panel indicate data received and transmitted.



Port 1 displays *Optidrive Plus* serial link activity.



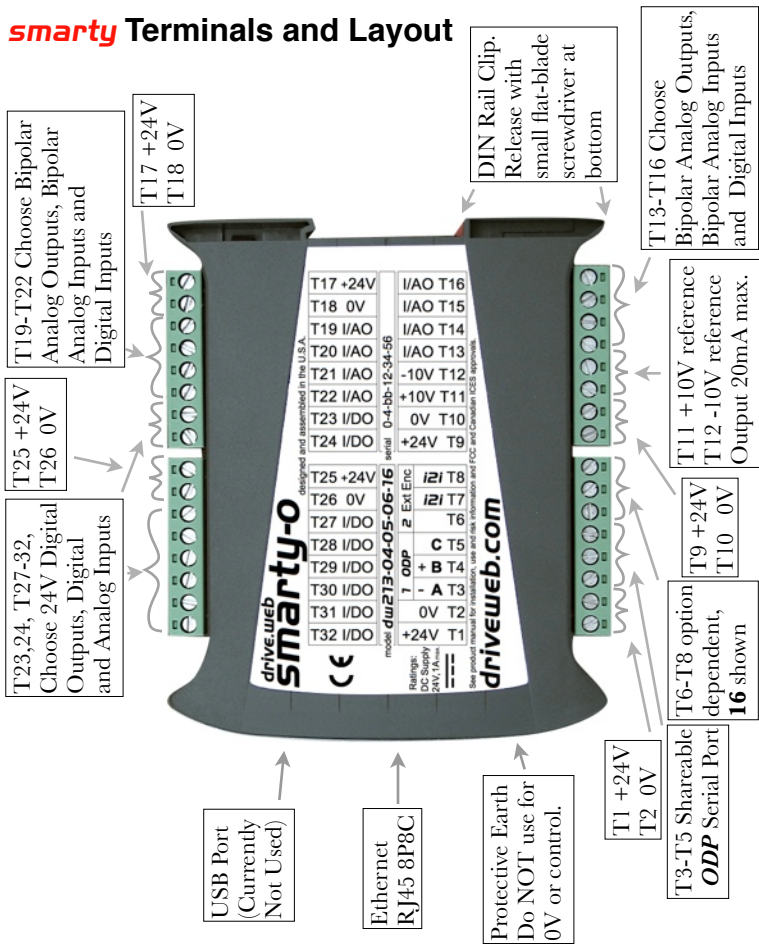
Port 2 is *i2i* receiver-only with option **16** external encoder module or ModbusRTU Slave transceiver with option **17**.

Receive Transmit



Protective Earth Do NOT use for 0V or control wiring. Observe local electrical codes and best wiring practices.

smarty Terminals and Layout



smarty Flexible Analog & Digital I/O & $\pm 10V$ refs

I/O Ratings including $\pm 10V$ refs: Use shielded cable for runs over 30 meters.

Do not connect to any mains circuit.

Fast transient over-Voltage 1kV per EN 61000-4-4.

I/AO Terminals 13-16 and 19-22 +25V **max**, -13V **min**, 100k Ω input impedance. Any combinations; Bipolar Analog Out, Bipolar Analog In and/or Digital In.

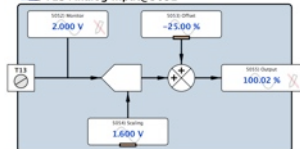
I/DO Terminals 23-24 and 27-32 +25V **max**, -0.6V **min**, 100k Ω input impedance. Any combinations; 24V Digital Out, Unipolar Analog In and/or Digital In.

Analog Input Function Block

16 bit resolution.

4-20mA Input: Connect a **100 Ω resistor** from the Input terminal to a 0V terminal, set *Scaling* = **1.6V** and *Offset* = **-25%**

4-20mA Example
T13 Analog Input@5052



Bipolar Analog Output Function Block

$\pm 10.5V$, 10mA max output. 14 bit resolution. *Enable* “on the fly” with the *Output Enable* parameter.

Digital Input Function Block

Selectable Ranges 5V, 12V & 24V.

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

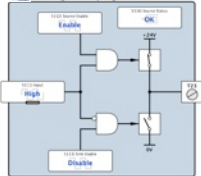
Digital Output Function Block

+24V, 50mA max. Enable Source and/or Sink.

Source drivers shut down in case of overheating or over-current. A warning triangle appears in the function block and its *Source Status* parameter indicates **Fault**. Connect *Source Status* to a fault contingency system for critical applications. Click *Source Status* to reveal a **Reset** button. Find the **Reset** function block in the *I/O (1)* list set. **Note!** Resetting a Digital Output briefly resets **ALL** I/O!



Your smarty
T23 Digital Output@5111



Note! Sink circuits are **NOT** self-protecting. Digital outputs with **Sink Enable** **MUST** be connected to a load that is inherently impedance protected, current limiting or fuse protected with a **fast acting 0.1A fuse**.

smarty Ethernet Networking & Programming

Before proceeding, it is important to have a basic understanding of Ethernet TCP/IP networks. Assigning an invalid or duplicate IP address will cause serious network malfunctions! **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.



Find useful networking information. Under the **Help** menu click on **User Manual**. Scroll down to the **Basic Network Administration** section.

Set up Your Physical Ethernet Network - You Will Need:

- Find a standard Category 5e cable with 8P8C/RJ-45 connectors on both ends for each **drive.web** device and your computer.
- For systems with more than one **drive.web** device, an Ethernet switch with ports for all **drive.web** devices and your computer.

Set up Your Computer - Get **savvy**

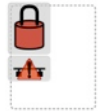
With free **drive.web savvy** software, easily program and monitor your **smarty**, perform data trending and create distributed control systems.



- To download the latest version of **savvy** go to **www.driveweb.com** and click on **Get savvy**.
- Java Runtime Environment** must be installed to run **savvy**. There is a link on the **Get savvy** page to download Java for free.
- If you do not have internet access, install **savvy** and Java from the **Bardac Infodisk**. Browse to the **savvy** link, off-line installation. Contact us for the files or **Infodisk**.

Get started with **savvy**

- 📶 We strongly recommend you attend our free on-line training seminars. To register, e-mail **training@driveweb.com** or **call**.
- 📶 Before proceeding with your systems designs it is very important to familiarize yourself with **savvy**, the configuration software.
- 📶 We strongly recommend you read the *User Manual* and *Getting Started Guides* under the *Help* menu.
- 📶 Use *Create Phantom* in the *Directory* menu to practice, explore all **drive.web** products and options and design and configure off-line. Design systems in Phantom devices and *Export Data* under the *Directory* menu for later use in live devices. *Import Data* into phantoms to work off-line.
- 📶 Under the *Directory* menu, click on *Discover All Local Devices*. If your **smarty** is powered up and on the same local network as your computer, an icon should appear.
- 📶 Discover **drive.web** devices anywhere on the internet unless they are protected by firewalls or other network security devices. Assign a public IP address or use a VPN. Under the *Directory* menu, click on *Discover Device...*
- 📶 If the icon at right appears with the red padlock and comms-fail indication, a network connection problem exists. Check connections, LEDs and that the **smarty** IP address is within your computer's Ethernet subnet mask.



10.189.189.189

Warning! Changing a device IP address **WILL** disrupt its network connections! If a **smarty** is communicating with other devices or drives you must be prepared for system disruption and to remap connections in those devices when changing an IP address. In the *File* menu choose *Utility > Remap Export File* to remap a *dw-system* file with different IP address(es).

- 📶 Under the *File* menu, click *Administrate > Set IP Addresses for System*. Locate the serial number on the product label of your **smarty**. Enter a unique IP address that is within your computer's subnet mask and click OK. A **smarty** icon should appear with IP address beneath.

Get started with **savvy** continued...

- ❏ If the icon above right appears with a question mark, the **smarty-o** is not communicating with the drive. Check the drive power and serial port settings. See page 6.
- ❏ The **smarty-o** icon should depict the drive frame size when communicating properly with the drive.
- ❏ Hover your cursor over any active object such as a device, function block, connection or parameter icon to instantly view information in the status bar at the window top margin and reveal the Hover Button.
- ❏ Click a Hover Button or right-click in any icon to access the Contextual Menu.
- ❏ In the **smarty** contextual menu, choose **Change Name** to name your **smarty** for easy identification. The **Find Parameter...** function locates and jumps to a parameter. Simply enter its number, name or partial name.
- ❏ To Import or Export (load or save) configuration data to or from your **smarty**, use its contextual menu.
- ❏ To Import or Export all configuration and connection data to or from all **drive.web** devices and phantoms in the directory use **Directory** menu.

❏ Advanced Users: At the bottom of the **Setup IP Addresses** window, click the arrow next to **Network Information** to set subnet mask, router, SMTP mail server and SNTP time server IP addresses. See the **savvy** user manual. **Note!** If the **Network Information** box is expanded, this network information will be set in the device(s) whose IP address(es) are changed. →

❏ **savvy** views are hierarchical with the Directory view at top. Use the navigation arrows in the status bar to view the next higher level or go backward and forward through a series of views. Note that menus change as you navigate.

❏ **savvy** functionality may be limited if you do not have the required capability level or a device is locked with a password.



192.168.1.25



192.168.1.25



Laminator Stage 2

If your drive web system is to be integrated with an existing TCP/IP network, it is imperative that you coordinate with that network's system administrator - assigning an invalid or duplicate address will cause malfunctions. If you use the same address before you must update the address provided.

Serial Number	Device Type	Current Address	New Address
0-A-00-00-00-00-00	Ac-control	192.168.1.83	
0-A-00-00-00-00	Smarty/Speed400	192.168.1.85	
0-A-00-00-00-00	Smarty2	192.168.1.84	
0-A-00-00-00-00-00	Smarty2	192.168.1.27	
0-A-00-00-00-00	Smarty2	192.168.1.23	




▼ Network Information

Subnet Mask: 255.255.0.0

Router IP Address: 2.2.2.2

SMTP Server: 192.168.1.18

Get started with **savvy** continued...

- Click the **smarty** icon to view the *Device Overview* screen (Standard **savvy**, no **SFD**). Click the *Function Block Engine* icon or, if you have options **04**, **17** to **19**, **25**, the *Comms Server* icon to view.
 
- In the Function Block Engine view (Standard **savvy**, no **SFD**), click the **FBE** menu and add function blocks in the order that you want them to be processed. Processing order is from left to right, then top to bottom.
- Click on a function block to view its parameters and functional detail.
- Connect between parameters and to parameters in other **drive.web** devices over Ethernet.
- Under the **File** menu, choose *New Viewer...* and then *Open Device Directory*. With two viewer windows, click on a parameter, **drag** a connection and **drop** onto a destination parameter in the other viewer.
- Use parameter contextual menus to *Get Info*, *Add to Dock*, *Copy*, *Connect to...*, start or end connections, *Re-name...*, *Re-scale...* and add custom enumerations.
- Click any blue connection block or arrow to jump views to the other end.
- Use contextual menus in **drive.web**-over-Ethernet and function block engine-to-*Optidrive Plus* connections to *Change Sample Period....* and prioritize connections.
 
- Click on parameters to open the setter box. Adjust the value with convenient graphical buttons or keyboard entry. Also buttons for return to default or last state.
 
- Most **drive.web** parameters use 16 bit words allowing raw decimal integer values **0 to 65535** or **±32767**. These raw values are formatted, limited and scaled depending on the parameter. Use *Get Info* or *Re-Scale* to verify or change.
- Very complex function block configurations with numerous Ethernet connections may produce *Timebase Overrun* indications at the **System** function block and performance will be affected. Increase the **smarty**'s *Timebase Setpoint* with the **System** block's contextual menu. Make a connection from the **Program Status** parameter to log these occurrences or provide warning signals.

Upgrading *savvy* and *smarty*

Upgrade *savvy* with **SFD** Signal Flow Diagram.

Upgrade *smarty* with software options.

Process credit cards or *Vouchers* on-line or *Coupons* off-line.

- To upgrade *savvy* go to the **Commerce** menu, select **Upgrade savvy**, check the desired option and click OK.
- To upgrade *smarty*, right-click on the *smarty* icon, choose **Upgrade Device...**, check the desired option and click OK.
- Your selected options will appear in the Shopping Cart. Select your method of payment.
- To process *Vouchers*, choose **Pay>Online Via Vouchers** in the **Shopping Cart**. Enter each *Voucher* code on a separate line.
- To process *Coupons* click **Buy** and forward the code to your **drive.web** distributor. When you receive your coupons go to the **Commerce** menu and choose **Coupon Manager**. Enter individual codes in the top box and click the **Add** button. Click **Apply**.

savvy-SFD Signal Flow Diagram Upgrade

- With *savvy-SFD*, build systems graphically while creating live drawings that are stored in your *smarty*.
- Set borders with user attributes, drag and drop connections, zoom, pan, cross-reference and annotate multi-page drawings.
- Right-click in an empty area of the SFD to zoom, add a new function block or note or to paste a parameter for convenient viewing.
- A filterable list of function blocks and connections is at the left of the Signal Flow Diagram showing **program execution order** from top down. The order in which function blocks are processed can greatly influence system performance and the function of logic engines. Change execution order by dragging function blocks up or down the list. In this picture, **ENC1 Speed** function block and its outgoing connection will be moved so that they are processed after **ENC Phase Lock**.



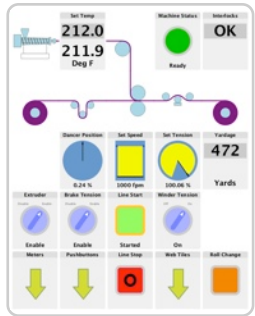
savvyPanel Operator Station

With **savvyPanel**, your computer, Apple® mobile digital device; iPad®, iPhone® and iPod Touch® become operator touch stations.

- Operator station data is located in the **drive.web** devices so setup is easy.
- Editing and building **savvyPanel** systems requires **savvy SFD** upgrade.
- savvyPanel dwOption-26** must be installed in **drive.web** devices to enable the full suite of tiles. A limited set is available without the option.
- Find complete information on **savvyPanel** in the **savvy** User Manual.



Get **savvyPanel** Free from the App StoreSM

- When your iPad or iPhone is connected to the internet with WiFi you are connected live to a real drive system in our plant in Maryland, USA.
- Touch **Roll Change** button to reset roll length.
- Enable all section switches.
- Touch the **Line Start** button and watch the line accelerate, run and automatically slow to stop at the required length.
- Touch **Set Speed**, **Set Temp** or **Set Tension** to open the setter and make changes.
- Touch parameter name to get info.
- Touch page-link arrows to browse demo pages.
- Drive the demo with **savvy** in your computer. In the **File** menu > **Demo Mode**, choose **Discover Internet Demo Devices**, then **File** > **Open savvyPanel**.




Three **savvyPanel** Page Types

Systems Page present with multiple **savvyPanel** systems discovered.

- A **savvyPanel** system may contain tiles from **many devices**.
- A **drive.web** device may contribute to **only one savvyPanel** system.
- Touch the systems button,  or , in the window bar to access the systems page from home page. Lock this button with home password.

Home Page is the first operator page in a **savvyPanel** System.

- Access home page from any operator page with the home button, . This may be locked with the home password.

Operator Pages show graphic, page-link and parameter tiles.

- Pages can be renamed. The name appears in the window title bar.
- View zooms to show all tiles, so layout strongly affects appearance.

Three *savvyPanel* Tile Types

Parameter Tiles. Touch a settable parameter to see its *savvyPanel* setter. Includes; slider, keypad, 1x, 10x increment, default & revert.

⚡ A parameter is settable if it is not read-only and has no incoming *drive.web* connection.

⚡ **Meter** tiles; Digital Panel Meter, dial or bar meter. Unipolar or bipolar. Full-scale or percentage.

⚡ **Indicator** tiles. Variety of colors. Shows on/off, true/false state.

⚡ **Pushbutton** tiles; colored momentary and lighted Start/Stop.

⚡ **Multi-position Switch** tiles for enumerated parameters.

Graphic Tiles - create diagrams with a variety of process elements.

Page-Link Tiles - A graphic tile that is also a touch page-link.

Function Blocks Enable *savvyPanel* Actions

⚡ **Enumerated Parameter** block in *Utility* group. Only custom enumerations appear in the setter and multi-position switch.

⚡ In the *savvyPanel* function block group:

Latch supports lighted Start-Stop pushbuttons.

Setpoint & Monitor blocks control meter range and clamp the setter. Combination blocks support dual display meters.

savvyPanel Launch, Setup and Important Notes

⚡ See the *savvy* User manual for detailed instructions.

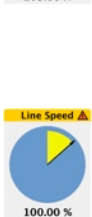
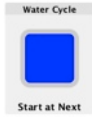
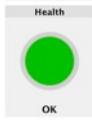
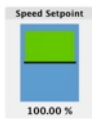
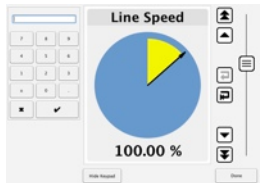
⚡ Launch *savvyPanel* from a command line or batch file.

⚡ Limit operators to *savvyPanel*-only, specify start system & page.

⚡ Discover devices specifically by discovery file, automatically or filtered by Group and/or *savvyPanel* Name.

⚡ Operator's Note: If communication with a *drive.web* device is interrupted, affected tiles indicate a yellow bar at top with an exclamation warning. The displayed value is not updated.

⚠ Important Design Note: An over-range enumeration is required if misreading an out-of-range value could cause a hazard.



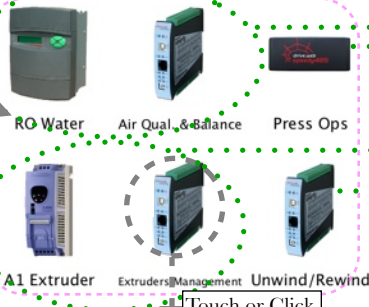
savvy overview

- - - - Device Group
- **savvyPanel** System
- - - - Example

Device Directory

Discover devices when **savvy** launches or by using the **Directory** menu. Discover by group, **savvyPanel** system, Discovery file or all local devices automatically or by request.

Device Name



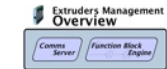
Navigate Up Arrow

Touch or Click

Function Block Engine

With standard **savvy**, the device overview screen gives access to Comms Server setup, Function Block Engine and native device functions where applicable. With **savvy-SFD** place function blocks graphically, use function block list to review and arrange execution order.

Standard **savvy**



savvy-SFD



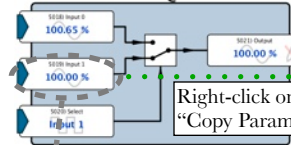
Function Block

View functional elements and signal paths in relation to parameters. Parameters show type, **drive.web** connections, read-only and not at default adornments.

Touch or Click



Touch or Click
Extruders Management
2-In Switch@5018

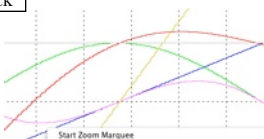


Right-click on parameter, "Copy Parameter"

Right-click on parameter "Add to Parameter Dock"

Parameter Dock

Add parameters of interest to set, view, create trend graphs and export .csv files for spreadsheets. Save docks and open multiple docks in different viewer windows.

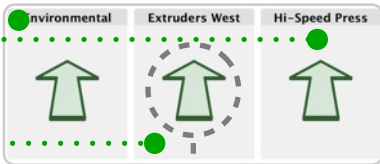


Dock menu > Show Trend

Start Zoom Marquee
Paste Parameter
Show Trend Point Info

savvyPanel overview

savvyPanel
Systems



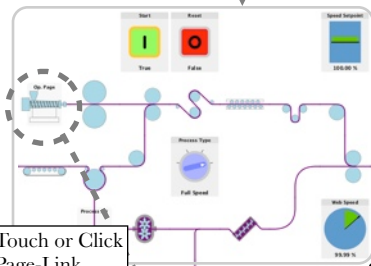
✗
savvyPanel Password is not set in savvyPanel operator station. No savvyPanel data is shown.

Touch or Click

Systems Page

View all available savvyPanel systems. Assign a savvyPanel system in each device's contextual menu, one per device. If a savvyPanel password is set in the device, it must also be added in savvyPanel operator station software under the savvyPanel menu

Systems Button.
Requires Home Password if set.



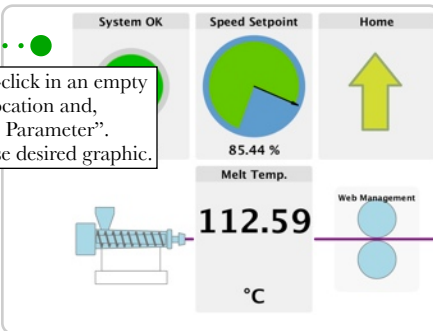
Touch or Click
Page-Link

Home Page

The master page for a savvyPanel system. Similar to operator pages except that it may be accessed from any operator page by pressing the home button. Graphic tiles can be page links.

Home Button.
Requires Home Password if set.

Right-click in an empty grid location and, "Paste Parameter".
Choose desired graphic.



Operator Pages

Up to 256 possible. May be page-linked in any way. Set savvy preferences so that operators view a specific page at launch. Use this preference and the home password to restrict access to the home page and pages linked only from the home page. Provide links to the home page to bypass the home password. home password then only restricts access to the systems page.

smarty Option 06 Winder Control Library

Accurate speed calibration of all components in a winder system is essential before commissioning.

Diameter Calculator Block. An instance of this block is required for *Taper Tension* and *Torque Compensator* blocks. Associate a *Diameter Calculator* in those blocks.

Taper Tension Function Block. A positive setpoint reduces web tension as the roll diameter increases.

Torque Compensator Block. Set Forward/Reverse Line Direction friction compensation, Unwind/Rewind and Wind Forward/Wind Reverse modes. *Friction* and *Inertia Compensator* buttons set *Stiction*, *Static Friction* & more.

smarty Option 11 Encoder Control Library

Speed Lock and *Phase Lock* require dual encoders option **42**. *ENC Cycle Calibrator DINx* requires external encoder module option **40** or **42**.

ENCx Linear Position Master block for linear system, output $\pm 327.67\%$

ENCx Cyclic Position Master block for cyclic system, output 0 to 100%

ENC Cycle Calibrator Automatically calibrate cycle length and zero.

ENC Cyclic Error Converter Convert $\pm 50\%$ output to 0 to 100%.

ENC Indexed Cyclic Position Enter total and requested indexes.

ENC Indexed Position Easy setup indexing at any starting location.

ENC Position Point Locate **64-bit** positions by event or calculation.

ENC Position Monitor Resolution from one encoder edge to full span.

ENC Speed Lock lock shafts with speed matching criteria.

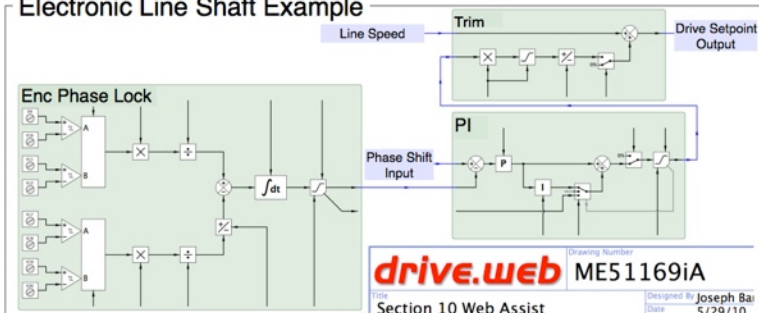
ENC Phase Lock lock shafts with absolute shaft position criteria.

ENC Registration (Call for availability) Align to external event inputs.

Find *Encoder Positioning Application Note*, *HG502932*. Click *Manuals and Software* link at www.driveweb.com.

smarty Option 11 Encoder Control Library continued...

Electronic Line Shaft Examples - Connect **Output** of **ENC Speed Lock** or **ENC Phase Lock** to the **Feedback** parameter in a **PI** block or similar. Connect the **PI Output** to **Trim Input** in a **Trim** block (option **05**) or similar which controls the follower drive's speed setpoint. Input speed or phase offsets at the **Setpoint** parameter in the **PI** block.

Electronic Line Shaft Example**smarty-o** Internal Hardware Options 14, 16**Option 14 Power over Ethernet (PoE)**

Use with a PoE Injector or PoE Ethernet switch. Power your **smarty** and connected devices up to 5W max. without a separate power supply. Use with a 24VDC power supply for fail-safe power.

Option 16 External Encoder Module *i2i* Receiver at Port 2

Intelligent 2-wire Interface receiver for External Encoder Module, option **40** or **42**. Unpolarized & isolated, connect at **T7** and **T8**.

smarty-o Comms Interfaces-Modbus & EIP/PCCC

Warning! Use of **smarty-o** comms interfaces **04**, **17**, **25** and bus-sharing the ODP Port 1 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 the Ethernet server protocol and all of the equipment and the system design you are working with before attempting to use this option. It is also essential that a risk assessment is conducted to identify hazards. Risks must be reduced to tolerable levels.



smarty-o Comms Interfaces, Modbus and EIP/PCCC continued...

- ❏ Modbus Function Codes **FC 01-06** and **16** are supported.
- ❏ ModbusRTU Master also supports Yaskawa Holding Register function.
- ❏ ModbusTCP/IP Slave Option **04** also supports Modbus **FC 15**.
- ❏ Find information on Modbus specifications - modbus.org/specs.php
- ❏ ModbusRTU networks support **only one master** device, transceivers are **1/8 unit loads**.
- ❏ Boolean values are 0 or 1. Non-zero values are Boolean true.
- ❏ **Note!** You cannot write or force parameters that are read-only or have incoming **drive.web** connections.

ModbusRTU Installation

Wiring Notes 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, near the signal destination, with a 360° ground clamp where the shield enters your metal enclosure. Separate wiring from RF noise sources and AC power cabling.

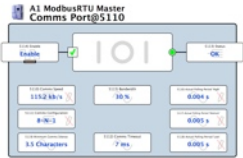
- ❏ **A** and **B** must share a twisted pair. Do NOT pair **C** with other signals.
- ❏ EIA485 Common Reference is required. Do not confuse **C** with other common, ground or shield connections.
- ❏ Contact us for manual HG502436 if: A ModbusRTU device has no **C**, AND there is more than one slave. Trunk is over 150 meters.
- ❏ Correct multipoint topology is daisy-chain or trunk with device at each end and additional devices on short stub branches. Star, ring, or extended branch topologies are NOT recommended.
- ❏ Connect line termination between **A** and **B** at both physical ends of a ModbusRTU network, typically 150Ω, 0.5W or for networks with line polarization, 120Ω, 0.25W and 1nF, 10V cap in series. Do NOT provide line termination on any network with an **Optidrive Plus**.

Terminal	Port 1	Port 2	EIA485 Name	Modbus Name	Description
A	T3	T6	A or Data -	D0	Inverting Pin
B	T4	T7	B or Data +	D1	Non-Inverting Pin
C	T5	T8	SC or Data 0V	Common	Common Reference

smarty-o ModbusRTU Master, Bus-Share Port 1.

Adding network devices may affect *Optidrive Plus* serial link performance.

ModbusRTU Comms Port 1. Comms Speed & Configuration are Read-Only, **115.2kbps** and **8-N-1** to match *Optidrive Plus*.



Minimum Comms Silence. Idle on-the-wire time before a new request is sent. Some devices require longer than minimum 3.5 characters. Longer times decrease comms efficiency.

Bandwidth. The portion of the serial port bandwidth devoted to slave devices other than the *Optidrive Plus* with address 1.

Actual Polling Period, High, Medium and Low. Read-Only. Time required to poll all parameters in all Modbus Data blocks with that priority. Period is directly affected by number of parameters, silence times and any errors or timeouts.

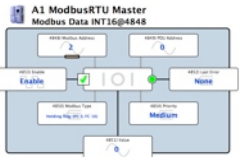
Comms Timeout. 10 to 30000ms, master or client waits for a reply before moving to the next Modbus Data block in the polling cycle.

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

Enable. Globally enable and disable all Modbus Data blocks.

Modbus Data Blocks, Boolean, INT16, UINT16

Define the data point, register, discrete or coil and the slave or server device. Create up to 32 data blocks. Addresses can be changed dynamically.



Boolean 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. Unique address, **1 to 247** of each server device.

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

Enable Dynamically disable block when unneeded to reduce polling periods.

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

smarty-o ModbusRTU Master Bus-Sharing, Data Blocks cont'd...

Modbus Type. ModbusRTU function supported by your server.

Priority Three levels. Round-robin scheduler processes all *High* priority data blocks plus one other every round. All *Medium* priority blocks are processed, one per round, then first *Low* priority block. Following rounds process all *Medium* priority blocks again then next *Low* priority.

Value. Raw decimal that is read/written to/from the remote parameter.

smarty-o Comms Server Options 04, 17 and 25

Click the *Comms Server* icon in the *FBE* or *SFD* view to configure.

Comms Server Indirect parameters are sequentially numbered. Enter any parameter numbers to read or write them all with one operation. Add more with *Comms Server Indirect* function blocks in the *Utility* list set. You can directly address any parameter. You are **NOT** required to use them.



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*

smarty-o Option 04, Modbus TCP/IP Slave/Server

smarty-o with option **04** supports up to **five simultaneous masters**.

Modbus TCP Slave Port 502 is standard. Change to match the master in the unusual case that it is non-standard.

smarty-o Option 17, Port 2 ModbusRTU Slave/Server

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

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

ModbusRTU Slave Config, character framing, **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. Idle time before a response is transmitted. 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. $(3.5(1+8+P+S))/\text{Speed}$

ModbusRTU Comms Error shows last error. Click to *Reset*.

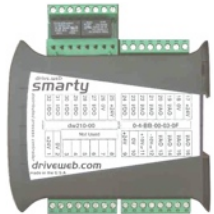
smarty Option 25 EIP/PCCC Server

- Supports EIP/PCCC Typed-Write and Typed-Read functions.
- See Appendix B of the **savvy** User Manual for information, examples and **drive.web** parameter IDs mapping to PLC addresses.
- Supports up to **two simultaneous clients**.

smarty External Module Options

30 & 31 High Voltage Digital I/O Isolator

- See separate product manual HG502622 for details.
- Replace terminal block plugs **T17-T24** or **T25-T32**.
- Two NO relay contacts up to **3A max** with shared common
- Four AC Digital Inputs with shared common, optically isolated from **smarty**
- Option **30** has 115VAC inputs, **31** has 230VAC inputs.




40 or 42 Intelligent External Encoder Module Choose only one.


- See separate product manual HG502613 for details.
- Requires Option **16**. Port 2 Receive LED is lit when module is connected.
- Differential Incremental Receivers** with markers, and fault detection
±2V min. to ±24V max.
- A and B channels, **500kHz max.**
- Z Markers, **6000RPM max.**
- Two digital inputs, **50Hz max.** repetition rate, lock event to encoder edge. Threshold 8.2VDC± 7%.
- Convenient DIN rail mounting. Enclosure matches **smarty**.



40 or 42 Intelligent External Encoder Module continued...

 **i2i** Intelligent 2-Wire Interface transmitter. Easy non-polarized connection transmits up to 500 feet on twisted pair wiring.

 Green, power and yellow, **i2i** transmit LEDs in front panel.

 Add only one option **45** or **46**. Retransmits A & B channels.

40 External Single Incremental Encoder Module One encoder and 5V, 200mA auto-reset fused power output.

42 External Dual Incremental Encoders Module Two encoders & two 5V, 200mA auto-reset fused power outputs.

45 Encoder Retransmit EIA(RS)485 & 422 compliant.

46 Encoder Retransmit $\pm 24V$ differential signal out.



drive.web Product Line Overview

dw210 smarty with optional dual serial ports, encoders.

dw215 smarty-yf7 Yaskawa F7 AC Drive Controller.

speedy[®]sp Adds **drive.web** power and Ethernet access to a **PL/X** Digital DC drive. Add any software and Modbus comms options.

speedy485 Adds **drive.web** power, Ethernet and ModbusTCP to any ModbusRTU enabled device. Add any software options.

savvy-SFD Signal Flow Diagram Upgrade, see page 13.

savvyPanel Operator Touch Station App, see pages 13 to 17.

smarty & **ALL drive.web** products are designed & assembled in the **U.S.A.**

Get expert **drive.web** help. Call or email techsupport@driveweb.com

drive.web Training Courses

Free **drive.web** online interactive training seminars take about one hour.

Specialized online and factory training sessions are also available.

To register email training@driveweb.com or call.