

drive.web speedy®

Distributed Process Controller

model **dw221**

Installation & Operation Manual



Contents	Page
UL, CE, FCC, IC approvals, warnings	1, 2
speedy Identification, Standard Features	2
speedy Options	2
speedy Installation	3
speedy Installation Procedure	3, 4
Get savvy®, USB Plug and Play, Ethernet Networking	4, 5
Get started with savvy engineering & design software	5, 6
Upgrade savvy and speedy, savvy-SFD Upgrade	6
savvyPanel® Touch Screen Operator Station	7, 8
speedy Comms Interfaces, Modbus, EIP	8
Free drive.web Online Training Seminars	8

UL Certification Statements

This process control equipment to be supplied by Class2, LPS, limited power supply.

CE 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.

speedy 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.

speedy 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. The battery must be removed with wire-cutting pliers and separated for proper disposal.

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 5 for **savvy** installation instructions. For more information and to download manuals and software, go to www.driveweb.com or contact us. See page 8.

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.

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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 **speedy**. Special care must be taken after loading new firmware or installing new options.

Warning! Avoid permanent damage to your **speedy**, never exceed any **min** or **max** values. Do not connect any **speedy** terminal to mains circuits. See page 3 for ratings.

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

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- THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, LOSS OF USE, DATA, OR PROFITS, OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Product Identification - **speedy** for PL/X, Model **du221**

speedy is a programmable device using **drive.web** distributed control over Ethernet for industrial process automation. To program and use **speedy** you must get the **savvy** software tools from www.driveweb.com.

Find **speedy** firmware version. Use **savvy**, *Get Detailed Info* from **speedy** contextual menu. Page 5.

du221 for **PL/X** digital DC drives.

speedy Standard Features

- **drive.web** distributed process control.
- Fits onto the **PL/X** control board.
- 10/100Base-T(X) Ethernet. See page 3.
- Update firmware with **savvy** software.
- Promotes **PL/X** drive software updates.
- **Basic Control** function block library.



speedy Options

Software options may be added using **savvy**. See page 6.

04 ModbusTCP/IP - Slave/server. See page 8.

05 Process Control - Recommended for most applications.

06 Winder Control - Diameter Calc., Taper Tension, Torque Comp.

10 Math - With internal 32-bit **Calculator**.

25 EIP/PCCC - Slave/server. See page 8.

26 savvyPanel - Operator station interface. See pages 7, 8.

29 Solar - Calculates sun position azimuth and zenith.

36 Motion Control - With **Trapezoid Motion** and **Cam Profile**.



speedy Installation

speedy is designed for permanent installation by qualified professionals.

Environment - UL/IEC Pollution Degree 2,

Operating temperature, 0°C min., 50°C max.

Storage temperature, -20°C to 60°C.

Altitude 3000m max.

Humidity 95% max. non-condensing.

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

USB port - Peripheral-type, Micro-B jack.

Ethernet LEDs - For setup, troubleshooting, and monitoring:

100 Green LED indicates 100BaseTX Ethernet connection.

Link / Activity Yellow LED. On for Link, flashing for activity.

speedy Installation Procedure

Warning! Risk of electric shock resulting in injury or death!



PLIX drive is powered from more than one source of high-Voltage electricity.



Only qualified personnel should proceed with installation!

Risk of damage to equipment if installed improperly!

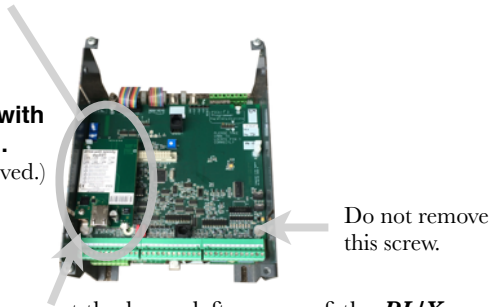
- 1.Ensure all electricity sources are removed and isolated.
- 2.Ensure that you and the equipment are grounded with ESD control equipment.
- 3.Loosen the thumb screws and remove the upper and lower terminal covers.
- 4.Locate and remove the four Philips head screws that hold the **PLIX** display-keypad-cover assembly in place. A long-shank #2 Philips head screwdriver is recommended.
- 5.Gently lift the cover and display assembly and rotate it upwards and away from the drive. **Support the assembly** above the drive so that you **do not strain the two ribbon cables**



speedy Installation Procedure continued...

6. **dw221** locates at the lower left corner of the **PL/X** control board.

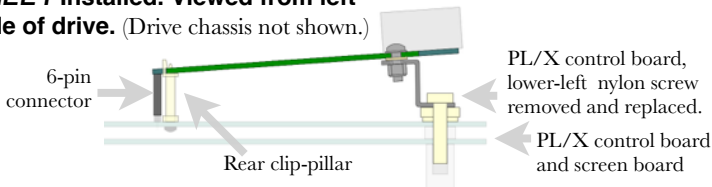
PL/X control board with dw221 installed.
(Display assembly removed.)



7. Remove the nylon screw at the lower-left corner of the **PL/X** control circuit.

8. Carefully install **dw221**, using the rear clip-pillar as a guide, while ensuring that the 6 pins on the **PL/X** control board are inserted into **dw221's** connector.

dw221 Installed. Viewed from left side of drive. (Drive chassis not shown.)



9. Double-check the 6 connector pins are properly aligned and inserted! Misalignment may cause permanent damage!

10. Thread the nylon screw into the **PL/X** control board mounting hole and tighten. This is the lower-left hole that was revealed in step 7. above.

11. Re-install the **PL/X** display-keypad-cover assembly and the four attachment screws.

Set up your computer - Get **savvy**

Use free **drive.web savvy** software to setup, program, monitor, and perform data trending

- Go to www.driveweb.com and click on **Get savvy**, or contact us to get the latest version of **savvy**.



speedy USB - Plug and Play

Experience plug-and-play access to **speedy** and its local Ethernet network. Requires 0x201A firmware or later.

speedy Ethernet Networking & Programming

Assigning an invalid or duplicate IP address will cause serious network malfunctions!

- Find useful networking information. Under the **Help** menu click on **Getting Started with savvy** section.
- **speedys** are all shipped with the IP address, 10.189.189.189.
- Use *Category 5e* cable or better, with 8P8C/RJ-45 connectors for each **drive.web** device and the host computer.
- For systems with more than one **drive.web** device, use an Ethernet switch for all **drive.web** devices and computer.



Get started with savvy

- We strongly recommend attending our free online training seminars. See page 8.
- We strongly recommend you read the **User Manual** and **Getting Started Guides** under the **Help** menu.
- Use **Create Phantom** in the **Directory** menu to explore **drive.web** products and options, design, and configure offline. **Export Data** to save your work. **Import Data** into phantoms to work offline.

savevy Window Title Bar indicates the current view.

Status Bar, above the viewing area, provides **Navigation Arrows** and object and location data.

- **savevy** views are hierarchical with the **Device Directory View** at top. Use the **Navigation Arrows** to go up, back, or forward. Window menus change as you navigate.

Hover cursor over active object, device, function block, connection, or parameter icon to view object information in the **Status Bar** and reveal a **Hover Button**.

Click a Hover Button or right-click an active object to access a **Contextual Menu**. See below.

savevy functions are limited by password-protected capability level. See **File > Capability...**

Device Directory Window

Warning! Changing a device IP address **WILL** disrupt its network connections! If a **speedy** is communicating with other devices, be prepared for system disruption. In the **File** menu choose **Utility > Remap Export File** to remap a **dw-system** file with different IP address(es).

- Select **File>Administrate>Set IP Addresses for System**.
- **speedy** serial number is also its **MAC Address**.
- Enter a valid IP address and click OK.
- An icon appears with IP address or name beneath. The actual frame size of the drive is depicted.
- If the icon at right appears, a network connection problem exists. Check connections, LEDs, and that **speedy** IP address is within the computer's Ethernet subnet mask.



10.189.189.189

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

Warning! Importing data into your **speedy** will result in immediate execution of that configuration. **Dangerous Voltages and rotating machinery may result!** Use a phantom to preview a configuration.



- *Directory* > *Import / Export Data*. All device configurations and connections in the directory in one *.dw-system* file.



Laminator Stage 2

speedy Icon Contextual Menu

- *Change Name* - Name your **speedy** for easy identification.
- *Import / Export Device Data...* - Load / save configuration data to / from this **speedy** only.
- *Unlock, Lock, Set Password* - Choose *Restrict Modification* for view-only, or *Restrict All Access*.



Laminator Stage 2

Click the **speedy** icon to view the device configuration.

Function Block Engine Window - FBE Menu

(Standard **savvy**, no *SFD*)

- Add function blocks in the order to be processed. Processing order is left to right, top to bottom.

Click **function blocks** to view parameters and details.

Connect between **parameters** and other **drive.web** devices.

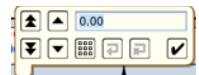
Warning! Making a connection results in immediate execution of that connection. **Dangerous Voltages and rotating machinery may result!**



- Under the *File* menu, choose *New Viewer...* and then, *File* > *Open Device Directory*.
- With two viewer windows, click a parameter, drag and drop onto a parameter in the other viewer.

Parameter Contextual Menu - Most parameter data is 16-bit. Data is formatted, limited, and scaled depending on the parameter. Use *Get Info* or *Re-Scale...* to verify or change.

Click **parameters** for the **Setter Box** - Increment, decrement, default, last state, or keyboard entry.



Click **blue connection block or arrow** to jump to other end.

Upgrade **savvy** and **speedy**

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

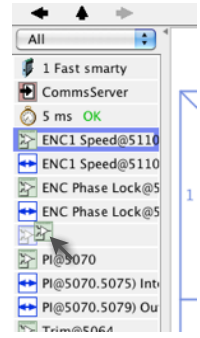
Upgrade **speedy** with software options.

Process credit cards or *Vouchers* online or *Coupons* offline.

- To upgrade **savvy** go to the *Commerce* menu, select *Upgrade savvy*, check desired options, click OK.
- To upgrade **speedy**, choose *Upgrade Device...* in its contextual menu, check desired options, click OK.
- To process *Vouchers*, choose *Pay>Online Via Vouchers* in the *Shopping Cart*. Enter codes on separate lines.
- To process *Coupons*, use *Commerce* menu > *Coupon Manager*. Enter codes in the top box, click the *Add* button, and the coupon is recognized. Click *Apply*.

savvy-SFD Signal Flow Diagram Upgrade

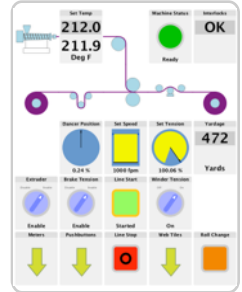
- With **savvy-SFD**, build systems graphically. The live drawings are stored in your **speedy**.
- Set drawing borders and annotate multi-page drawings.
- A filterable list of function blocks and connections is at the left of the **Signal Flow Diagram** showing **program execution order** from top down. Change execution order by dragging function blocks up or down the list. In this picture, **ENC1 Speed** function block is moved so that it is processed after **ENC Phase Lock**.



savvyPanel Operator Station

Computers, Apple® mobile digital devices; iPad®, iPhone®, and iPod Touch® are operator touch stations with **savvyPanel**. Requires Windows(XP, Vista, 7), Mac OS X, Linux-based Ubuntu, or iOS®.

- Configurations are stored in the **drive.web** devices.
- **savvy-SFD** upgrade is required to edit or build **savvyPanel** systems.
- **dwOption-26 savvyPanel**, must be installed in **drive.web** devices to enable the full suite of tiles. A limited set is available without the option.





Get **savvyPanel** free from the Apple App StoreSM


- When your iPad or iPhone is connected to the internet via WiFi, demo mode connects to a live drive system in our plant in Maryland, USA.
- Explore the demo with **savvy**. Select **File** menu > **Demo Mode** > **Discover Internet Demo Devices**.

savvyPanel Pages

Systems Page where multiple **savvyPanel** systems are present.

- A **savvyPanel** system may contain tiles from many **drive.web** devices.
- A **drive.web** device contributes 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, . Lock with the home password.

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

- Pages can be renamed. Page name appears in window title bar.



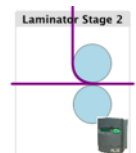
savvyPanel Tiles

Parameter Tiles - Touch a settable parameter to set. Setter includes slider, keypad, 1x and 10x increment and decrement, return-to-default, and revert.

Graphic Tiles - Create diagrams with process elements.

Page-Link Tiles - A graphic tile that is also a page-link. Touch to change the view to that page.

Device Tiles - Link to device's signal flow diagram in Java-based **savvyPanel**. Appears as graphic tile in iOS.



Function blocks enable **savvyPanel** actions

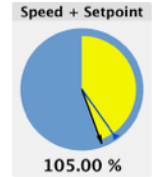
Alarm Annunciator - Provides a system-wide alarm annunciation when active. Touch to view page 255.

Presence Monitor - Indicates the presence of a tagged **savvyPanel** application viewing a particular page.

Latch and **SR Latch** - For lighted start-stop pushbuttons.

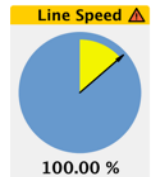
Setpoint & Monitor - Adjust meter and setter range. Dual blocks enable dual-display meters.

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



savvyPanel Launch, Setup, and Important Notes

- See the **savvy** user manual for detailed instructions.
- Launch **savvyPanel** via command line or batch file.
- Limit operators to **savvyPanel** only. Specify start system and page.
- Discover devices automatically, specifically by discovery file, 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 with a warning symbol. The tile is not updated.



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



speedy Comms Interfaces-Modbus & EIP/PCCC

Warning! Use of **speedy** comms interfaces, ModbusTCP and EIP/PCCC, may cause motors and machinery to energize with high Voltages, or start, or operate in an unexpected, dangerous, or lethal way.



- Find Modbus specifications - <http://modbus.org/specs.php>

speedy Comms Server *dwOption-04, -25*

- **Note!** You cannot write or force parameters that are read-only or have incoming **drive.web** connections.
- Click the **Comms Server** icon in the **FBE** or **SFD** view.

dwOption-04 ModbusTCP/IP slave/server

- Supported Modbus Function Codes; 1 thru 6, 15, and 16.
- Supports up to **five simultaneous clients/masters**.

dwOption-25 EIP/PCCC Server

- Supports PLC5 Typed-Write and Typed-Read commands.
- See Appendix B of the **savvy** User Manual for information and **drive.web** parameter IDs mapping to PLC5.
- Supports up to **two simultaneous clients**.

drive.web Training Courses

Free 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.