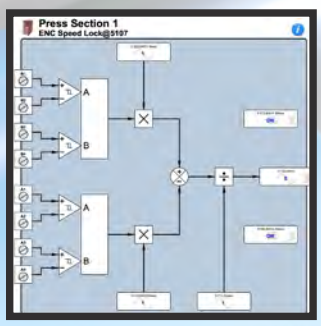
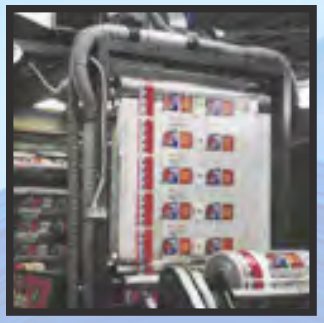
drive.web
automation Catalog 2023
issue 1





Automation Things for the IIoT

Smart devices

Internet accessible

Ethernet, peer-to-peer

Configurable from anywhere

Everything normally in stock!

Since our founding in 1992 we have worked hard to build our reputation around key goals:

- Innovative technologies.
- Reliable products.
- Unrelenting customer support.
- All catalog items normally in stock.
- Competitive pricing.

Our Company President: Paul Crowhurst

Bardac ...the safe bet!

Seamlessly Integrated Automation

AC DRIVES

Vector Systems
To 350 HP - pages 36 - 38

ECO fan & pump
To 350 HP - pages 39 - 41

General Purpose
To 30 HP - pages 42 - 43

NEMA 4X (IP66)
To 15 HP - page 44

Single Phase
To 1.5 HP - page 46 - 47

CONTROLLERS

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Ethernet Distributed Control
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smarty
Universal Automation Controllers with I/O - pages 14 - 19

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Embedded & onboard Controllers
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Motion
smart motion controllers
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TOOLS

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Drive & controller configuration
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savvy-SFD
Signal Flow Diagram tools for system design
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drive.web Apps
Pre-Engineered Apps
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device Apps
Pre-Engineered interfaces for third party drives - pages 26 - 33

HMI

savvyPanel
For industrial PC touch screens
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savvyPanel touch
Hi Res industrial touch screens
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savvyPanel mobile
HMI app for iPhone, & iPad
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DC DRIVES

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To 2000+ HP - pages 52 - 57

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Packaged Drives
Modulus pre-engineered
page 58

POWER QUALITY ~ MOTORS ~ ENGINEERING ~ SERVICE ~ SUPPORT ~ TRAINING

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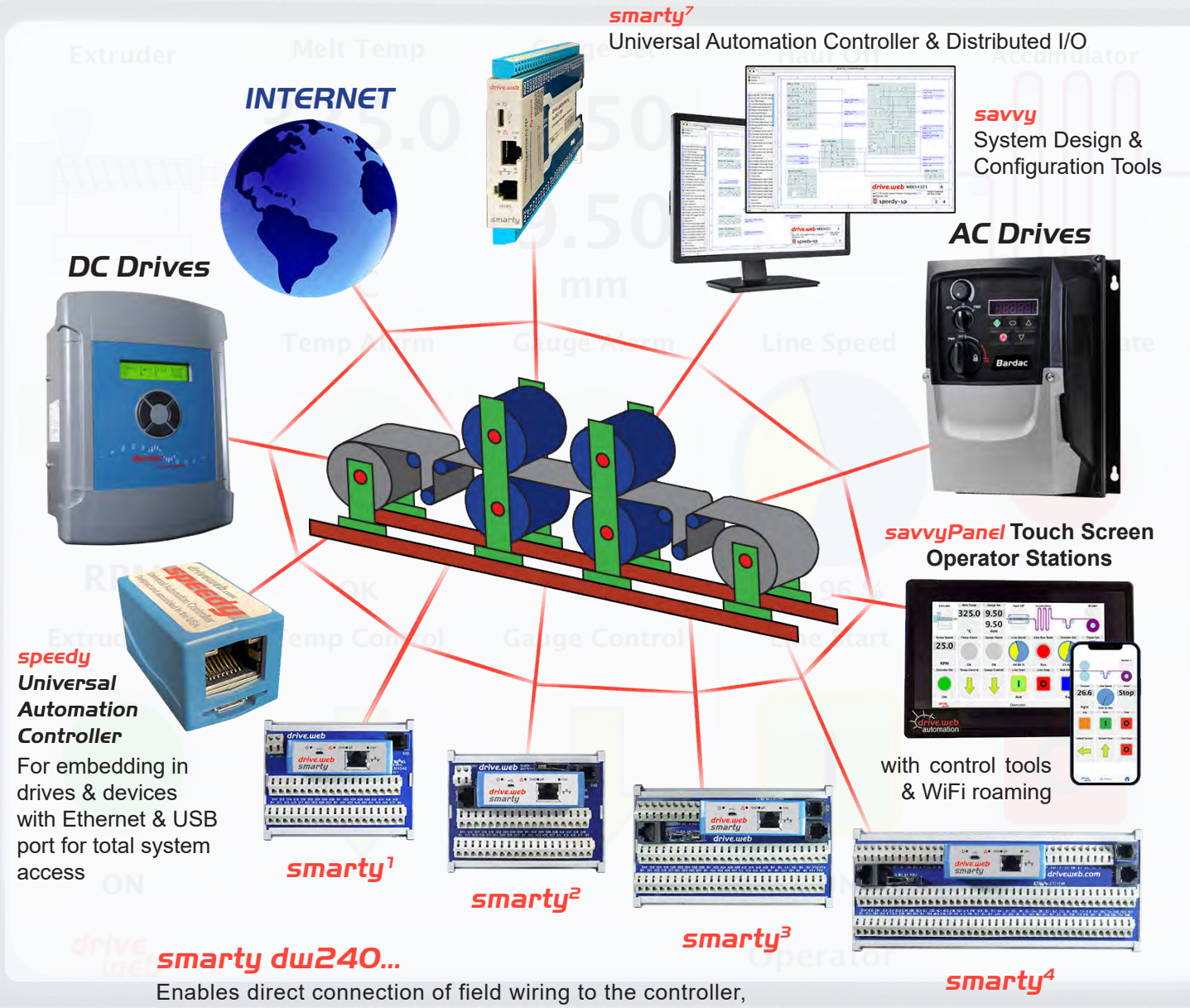
Specifications ... At the time of going to press we believe the information in this catalog to be accurate. However, the specifications of products may be amended at any time, so please check with us when ordering to ensure that such changes will not affect your requirements.

drive.web

SMART AUTOMATION

Configure, connect & control everything ... in one environment
Internet accessible, peer-to-peer Ethernet with savvy tools
Cost effective for systems of any size or complexity



smarty dw240...
Enables direct connection of field wiring to the controller, and thereby to all other *drive.web* distributed devices.
(see pages 15 - 17 for more information)

Automation Things ... smart ... connected ... IIoT ready

drive.web automation

total connectivity

enterprise management - machine operators - system engineering

drive.web

A Unique Architecture

1 ***drive.web*** devices connect peer-to-peer over ethernet to form a completely homogenous control environment.

2 ***drive.web*** devices provide a full featured programmable control environment. Each device processor contributes to the total system processing capacity so that as the system gets bigger it's capacity increases.

3 An unlimited number of ***drive.web*** devices can be incorporated into a system to provide an unlimited amount of processing capacity and I/O with undiminished performance.

4 The ***drive.web*** devices store **all** the device and complete system configuration data including touch screen PC, iOS & Android display data - everything!

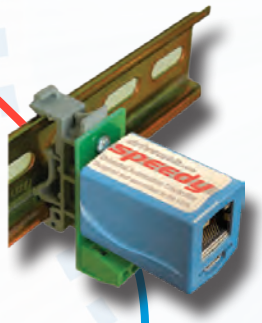
5 A ***speedy*** embedded in a drive takes over the entire drive; its setup, control, & memory management. It becomes an integral part of the drive and now looks just like the drive. Any actions from the drive keypad or terminals or serial ports are instantly synchronized.

6 ***savvyPanel*** touch screen PC, iOS & Android display graphics and configuration data all resides in the ***drive.web*** devices so that you can roam to any WiFi location with your iPad and view a system (subject to access permission).

7 Easily create a graphical interface to almost any control device to bring it into your unique, homogenous, ***drive.web*** environment.

Vector Drives
Easy setup & full featured, programmable control onboard drives

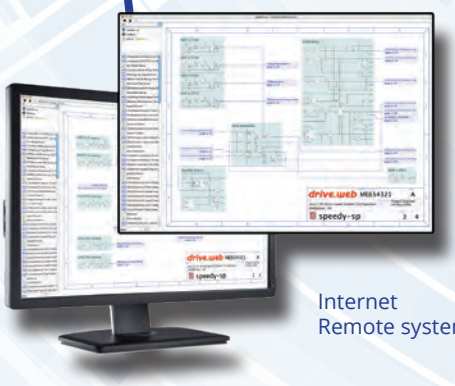
USB Port
- Easy drive configuration
- Plug & play drive interface
- System wide programming access



Sensors

Meters & Displays

Instrmumentation



savvy
Graphical, function black tools
1. Easy drive configuration
2. Powerful systems design & integration
3. Trend charts
4. Signal flow diagrams
5. Internet access
6. Intuitive system navigation tools

Internet
Remote system access

smart automation

production control - maintenance - tech support

speedy
Universal Automation Controllers

- Embedded available
- Easy gateway to instrumentation
- Fast data collection
- Mount anywhere DIN option

DC Regen Drives

save time

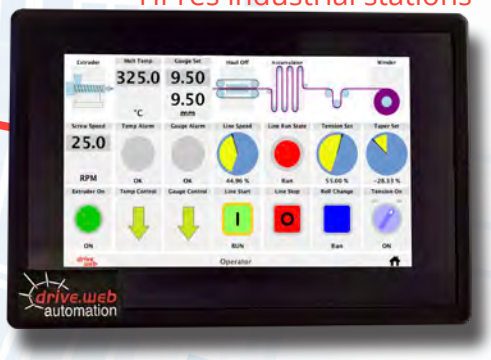
speedy
Integrated Universal Automation Controller

- provides easy coordination of ECO drives in building energy systems
- easily interfaces to existing third party drives & controls
- add ethernet and USB device access
- boost network performance
- add full featured programmable control

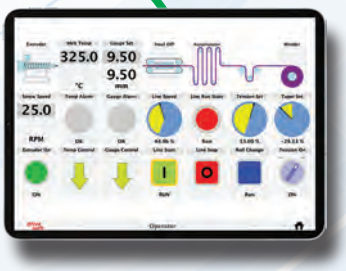
High efficiency ECO drives

save energy

savvyPanel touch
Hi-res industrial stations



NEW! smarty7



savvyPanel
Integrated touch screen HMI technology

For touch screen PC, Android or iOS devices

smarty
Universal Automation Controllers

- Easy sensor interface
- Precision analog I/O
- Fast logic I/O with powerful state machine programming
- 16 precision analog & logic I/O
- Encoder I/O for indexing, registration, and shaft lock
- Multiple communications options
- Unlimited expansion with no loss of system bandwidth

drive.web

drive.web uses distributed control over Ethernet to provide cost effective, high performance integration of drives & controls in systems of any size or complexity.

FROM THE INITIAL CONCEPT, THROUGH PLANNING, DESIGN, CONSTRUCTION, TESTING, INSTALLATION, AND OPERATION, THE DRIVE.WEB SAVVY TOOLS PROVIDE ALL THE VISION, INSIGHT, AND HELP YOU NEED FOR A SUCCESSFUL PROJECT!

1

Concept & Planning
From your initial sketches and notes create *drive.web savvy* "Phantoms" offline to identify all your drives, remote I/O, MMI interfaces, gateways, etc.

2

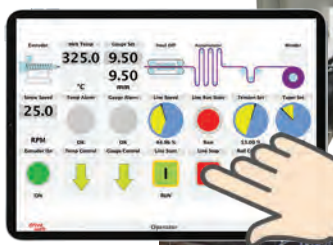
Design & Configuration
Place any control function blocks you need then drag & drop between parameters in your "Phantoms" to make all your device interconnections. The *savvy* Signal Flow Diagrams and powerful navigation aids give you a clear intuitive view of your work. Information and help is always on the spot with hover text, links to the manual, and contextual menus.

3

Construction & Testing
Simply connect all your drives and devices together over Ethernet and load your complete design into the devices from just one location. The System immediately comes alive for testing and monitoring.

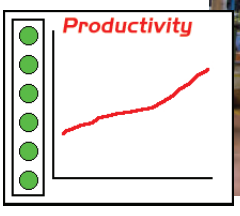
4

Installation & Operation
Use *drive.web savvy* to provide real time monitoring and control of your entire system from any location. No running from drive to drive to check the setup or operational state! Use *savvyPanel* operator station technology to provide smart touch and roaming control from anywhere.



5

Management & Maintenance
Use *savvy* utilities to setup system performance criteria and monitor your productivity, machine state, and process trends locally or remotely over the internet.



smart automation

The innovative *drive.web* technology provides total control in one homogeneous environment with the entire system database resident in the *drive.web* devices.

- Configure & control individual drives & devices
- Design and operate complete drive systems
- Provide fast, peer-to-peer networking over ethernet
- Create clear, graphical signal flow system documentation
- Easily interface to most other drives, MMIs, PLCs, etc.
- Build cost effective systems of any size or complexity
- Add internet accessibility to your system
- Support worldwide enterprise integration

products

savvy Tools

Intuitive, graphical system design and device configuration tools with powerful navigation features, drag & drop connections, trend charting, online help.

savvyPanel Touch Screens

Innovative, touch screen operator station technology that runs on PC or iOS (iPad, iPhone, etc.) & Android. Build clear machine graphics, buttons, switches, meters, and instrumentation and link to your control scheme. Provides multi-user, multi-level, password protected access via WiFi from anywhere to any system.

smarty Universal Controller

A range of DIN mount *drive.web* programmable controllers with peer-to-peer networking over ethernet or stand alone capability and a wide range of I/O and communications options. Intuitive, easy function block configurations are stored on board for instant field access.

speedy Embedded Controller

Miniature, low cost, *drive.web*, programmable controllers for easy embedding in drives & devices. Includes peer-to-peer networking over Ethernet & USB port.

Only 0.91"W x 0.83"H x 1.42"D!

drive.web automation

dw250 smarty⁷

Our most advanced Universal Automation Controller yet

Standard DIN Mounting

Alternate Panel Mounting

Outperforms any PLC! *No Limits!*

Features		
USB	USB-C	savvy
Ethernet	8P8C	100baseTX Ethernet
		drive.web & savvy
		ModbusTCP Client & Server
		EIP/PCCC Server
Communications	6P6C	CANbus: Bardac P2 & E3, CANopen Client
		EIA-485: ModbusRTU Client or Server
		Both CANbus & EIA-485 may be active simultaneously
0V	Ground Reference	All 0V terminals connected together
24V	Power In	+24V±5%, consumes ≈ 100mA plus loads
		Supply from a SELV Class 2 LPS (Limited power source) only
		All 24V terminals connected togther
5V	Power Out	+5V±5%, up to 250mA
		Do not apply external power to 5V
LED Indicators	blue	Power & heartbeat
	red	Fault
	yellow	Ethernet link + activity
	green	Ethernet 100 full duplex
Clock Battery		CR2032 coin cell
		Used only for real-time clock backup
		Typically only one required per system, if NTP is not available

Inputs and Outputs	
Analog Input	[8] Analog (±10V) inputs
	16-bit resolution, ≈100kΩ impedance
	Also configurable as Digital Input (5V or 24V logic)
Analog Output	[8] Analog (±10V) outputs
	16-bit resolution
	Each AO can source or sink up to 10mA
AB (Encoder Inputs)	[2] Encoder inputs
	RS-422, RS-485, 5V, 12V, and 24V encoders supported
	Differential or single-ended
	2A & 2B also configurable as marker/event inputs
Digital Inputs	[8] Digital (24V logic) inputs
	Also configurable as event inputs
Digital Outputs	[8] Digital (24V sourcing) outputs
	Up to 300mA (shared by all DOs); with overcurrent fault detection
	Also configurable as Digital Inputs (24V logic)
Frequency Inputs	[6] Frequency Inputs
	Configurable for 5V logic or 24V logic
	Configurable for pull-down or pull-up (5V logic only)
	Configurable as Frequency input, Counter Input, Digital Input, Event Input
Timing Outputs	[7] Timing (sinking) outputs
	Up to 24V
	Each TO can sink up to 20mA
	Configurable as Frequency Output, Stepper Output, or Digital Output
	TO7 also configurable as a Digital Input, Analog Input (unipolar)
Frequency & Timing Output	FI 1-6 & TO 1-6 share a wiring terminal, labeled FT 1-6

XIO Option Cards	
One or zero option cards are supported	
See separate sketch for dimensions and pinout	
Typically factory installed	
Field installation of CLIO & XDIO may be feasible with appropriate precautions	
High Voltage Digital I/O (HVIO)	[10] 120/240 VAC Digital Inputs
	[6] 120/240 VAC Digital Outputs
Current Loop I/O (CLIO)	[16] 4-20mA Analog Inputs
	[8] 4-20mA Analog Outputs
	[8] 24VDC Digital Outputs, also configurable as Digital Inputs
Extended Digital I/O (XDIO)	[16] 24VDC Digital Inputs
	[16] 24VDC Digital Outputs, also configurable as Digital Inputs

smarty dw240

smarty¹ smarty² smarty³ smarty⁴ smarty⁶

100% compatible with all existing speedys, smartys, and savvyPanels!

- ✔ *Advanced Motion Control*
- ✔ *Distributed, deterministic processing over Ethernet*
- ✔ *savvy system design tools*
- ✔ *Easy, intuitive, affordable, expandable*
- ✔ *Smart Process Control*
- ✔ *Homogeneous integration for drives, HMIs, remote I/O*
- ✔ *Right for the IIoT future*
- ✔ *For systems of any size or complexity*

$$ BIG cost savings with the smarty dw240 $$

Example savings, using a smarty¹ or smarty²

smarty eliminates all the wiring, terminals, and hardware normally required to connect your control devices (such as drives, PLCs, etc.) to your enclosure terminals!

The installation cost for either of these smartys can be as low as $20, and the possible savings are huge!

Assuming an average 6ft wire runs from your devices to your terminals, you save:

- Wire, lugs, wire numbers, DIN terminals, terminal numbers, duct, hardware . . . . . **$83 savings**
- Assembly time (4.5 minutes per wire @ $85/hour) . . . . . **$235 savings**
- Wiring continuity testing (45 seconds per wire @ $85/hour) . . . . . **$39 savings**

Possible net savings of over $300!

drive.web smarty is powerful!

The smarty dw240 series comes fully loaded:

Install a dw240 on the customer interface terminal rail to save on wiring and installation costs!

- Floating point math for accurate and complex calculations.
- Count and Frequency with 64-bit count for precision positioning; to 1MHz input, 500kHz output.
- High speed event inputs for position markers and registration.
- Processing and networking speeds that are up to 10 times faster than the dw210, especially with larger configurations.
- Increased storage; four times more capacity.
- Up to six frequency inputs with multiple modes.
- Up to two current inputs; 0 to 20mA, 4-20mA.
- Up to two encoder inputs.
- Up to seven timing outputs with multiple modes to 500kHz; frequency, stepper, and digital.
- Real-time clock with optional battery back up. Low-power mode allows real time clock to run without power from coin cell battery, USB power, or 24-hour internal storage.
- Sensor bus for large, smarty-dedicated networks to be announced.
- XIO, Extended I/O port for up to 10 fast-updating modules with up to 16 I/O on each. Modules for high current, high voltage, precision analog, load cells and more are planned.

Every dw240 comes fully equipped with dw build options -04 -05 -06 -10 -25 -26 -29 -39 *as standard!* (smarty² and above)

Call for customized OEM builds!

drive.web automation

The ***smarty dw240 series*** controller consists of a "cassette" that connects directly to system field wiring via four alternative, passive "terminal carriers". *This means big installation savings! The* ***smarty dw240*** is available in four models...

smarty[1]

basic UAC - 37 terminals - Analog & Digital I/O

Core Stock Build Includes:

100baseTX Ethernet, auto-negotiating, USB microB
Power: 24VDC
dw build options -04 -05 -25 -26, Clamp Terminals, DIN Rail Mounting

- 8 AI analog in, -11V to +11VDC, 100KΩ, up to 1KHz (can be used as digital inputs)
- 8 AO analog out, ~0.2 to +10.5VDC, 10mA, up to 1KHz (can be used as DO or reference voltages)
- 8 DI digital in, 100KΩ, 8V threshold, ±3V hysteresis, 50V max, up to 1KHz (can also be used as event inputs)
- 8 DO digital out, 24V source, up to 350mA (shared), over current protected

dw241-BX-C1CD
only 4.11" wide x 3.5" high x 3.0" deep
(105mm x 89mm x 76mm)

smarty[2]

advanced UAC - 37 terminals - Analog & Digital I/O

Core Stock Build Includes:

100baseTX Ethernet, auto-negotiating, USB microB
XIO Port for extended I/O options
Battery back up for realtime clock
Port options for CAN & ModbusRTU
Power: 24VDC
dw build options -04 -05 -06 -10 -25 -26 -29 -39,
Master Modbus RTU (unisolated), Clamp Terminals, DIN Rail Mounting

- 8 AI analog in, -11V to +11VDC, 100KΩ, up to 1KHz (can be used as digital inputs)
- 8 AO analog out, ±10.5VDC, 10mA, up to 1KHz (can be used as DO or reference voltages)
- 8 DI digital in, 100KΩ, 8V threshold, ±3V hysteresis, 50V max, up to 1KHz (can also be used as event inputs)
- 8 DO, digital out, 24V source, up to 350mA (shared), internally current limited

dw240-DM-C2CD
only 4.11" wide x 3.5" high x 3.0" deep
(105mm x 89mm x 76mm)

smarty[3] *advanced UAC - 61 terminals - with encoder and steppers*

Core Stock Build Includes: 100baseTX, auto-negotiating, USB microB | XIO Port for extended I/O options | Battery back up for realtime clock
Port options for CAN & ModbusRTU | Power: 24VDC | dw build options -04 -05 -06 -10 -25 -26 -29 -39 | Master Modbus RTU (unisolated)
Clamp Terminals | DIN Rail Mounting

dw240-DM-C3CD
only 5.51" wide x 3.43" high x 3.0" deep
(140mm x 87mm x 76mm)

- 8 AI analog in, -11V to +11VDC, 100KΩ, up to 1KHz (can be used as digital inputs)
- 8 AO analog out, ±10.5VDC, 10mA, up to 1KHz (can be used as DO or reference voltages)
- 8 DI digital in, 100KΩ, 8V threshold, ±3V hysteresis, 50V max, up to 1KHz (can be used as event inputs)
- 8 DO digital out, 24V source, up to 350mA (shared) internally current limited
- 4 FT Frequency/Timing
  Frequency/event input: 5V max, up to 100KHz
  Frequency/Stepper output: 5V sinking, up to 350mA (shared)
  F inputs can be used as event inputs or digital inputs
  F outputs can be used to generate frequency to 500kHz, control stepper amplifiers or as digital outputs
- 1 AB Encoder, differential inputs (5.5V max), up to 1MHz

smarty⁴ advanced UAC - 103 terminals - with encoders, steppers, and more!

Core Stock Build Includes: 100baseTX Ethernet, auto-negotiating, USB microB | XIO Port for extended I/O options
Battery back up for realtime clock | Port options for CAN & ModbusRTU | Power: 24VDC | dw build options -04 -05 -06 -10 -25 -26 -29 -39
Master Modbus RTU (unisolated) | Clamp Terminals | DIN Rail Mounting

dw240-DM-C4CD
only 8.27" wide x 3.5" high x 3.0" deep
(210mm x 89mm x 76mm)

- 8 AI analog in, -11V to +11VDC, 100KΩ, up to 1KHz (can be used as digital inputs)
- 8 AO analog out, ±10.5VDC, 10mA, up to 1KHz (can be used as DO or reference voltages)
- 8 DI digital in, 100KΩ, 8V threshold, ±3V hysteresis, 50V max, up to 1 KHz (can also be used as event inputs)
- 8 DO digital out, 24V source, up to 350mA (shared), internally current limited
- 2 CI Current Input, 4-20mA, 0-20mA, 20-4mA, 20-0mA, 100Ω
- 6 FI Frequency in: up to 100KHz, 30V max, 100KΩ with pull-up or pull-down. Can be event or digital inputs.
- 7 TO Timing Output, up to 500KHz, 30V max, sinking, pull-up, up to 350mA (shared). For frequencies, steppers or DO
- 2 ABZ Encoders, EIA-422/485 differential (5V max), up to 1MHz
- 2 AB Reconnect terminals for encoders

smarty⁶ advanced UAC - 103 terminals - with encoders, steppers, and more!

Core Stock Build Includes: 100baseTX Ethernet, auto-negotiating, USB microB | XIO Port for extended I/O options
Battery back up for realtime clock | Port options for CAN & ModbusRTU | Power: 24VDC | dw build options -04 -05 -06 -10 -25 -26 -29 -39
Master Modbus RTU (unisolated) | Clamp Terminals | DIN Rail Mounting

- 8 AI analog in, -11V to +11VDC, 100KΩ, up to 1KHz (can be used as digital inputs)
- 8 AO analog out, ±10.5VDC, 10mA, up to 1KHz (can be used as DO or reference voltages)
- 8 DI digital in, 100KΩ, 8V threshold, ±3V hysteresis, 50V max, up to 1 KHz (can also be used as event inputs)
- 8 DO digital out, 24V source, up to 350mA (shared), internally current limited
- 2 CI Current Input, 4-20mA, 0-20mA, 20-4mA, 20-0mA, 100Ω
- 6 FI Frequency in: up to 100KHz, 30V max, 100KΩ with pull-up or pull-down. Can be event or digital inputs.
- 7 TO Timing Output, up to 500KHz, 30V max, sinking, pull-up, up to 350mA (shared). For frequencies, steppers or DO
- 2 ABZ Encoders, EIA-422/485 differential (5V max), up to 1MHz

only 1.06" wide x 4.09" high x 4.96" deep (27mm x 104mm x 126mm)

drive.web automation

Universal Automation Controllers - smarty dw210

Standard Features:

- USB port for easy system wide programming and control
- Easy interface to most drives
- Use networked or stand alone
- Internet accessible
- Peer to peer deterministic Ethernet networking:
  * 100baseTX or 10baseT Ethernet with auto-negotiation
  * Full duplex supported
  * Auto-MDIX per IEEE802.3ab (auto-crossover resolution)
  * Optional Power over Ethernet (PoE, IEEE 802.3af)
- ***drive.web*** distributed control
- Intuitive, graphical function block programming tools
- Complete graphical configuration & documentation data stored in devices
- 16 basic I/O terminals each configurable includes:
  * 8: ±10V, 16 bit analog in or out or 24V digital in
  * 8: 0-10V 16 bit analog in or 24/12/5V dig in or 24V dig out, source or sink
- Firmware field upgradable
- All circuit boards conformal coated for very high reliability
- SNTP server time/date synchronization support
- 100% backward compatible with all existing ***drive.web*** installations

Key Features:

- Ethernet peer-to-peer networking
- Gateway options for ModbusTCP/IP, EIP CANopen, and others
- Internet access
- Graphical Signal Flow Diagram system documentation
- Additional I/O
- Easy interface to most operator stations, PLCs, SCADA, etc.
- Event driven emails from devices

Optional Features:

- Full ***savvyPanel*** touch screen PC and iOS device capability
- Encoder input without marker
- 1 or 2 encoder inputs with marker and retransmit via external module
- 1 or 2 isolated or unisolated RS485 ports
- High voltage digital I/O isolator
- 6 additional digital inputs
- 4 channel 20KHz frequency I/O
- 24 channel extended digital I/O
- 2 channel stepper drive controller - pulse, direction & fast event inputs
- External thermocouple and RTD inputs
- ModbusTCP/IP, ModbusRTU, EIP/PCCC
- USB port for system wide programming

Smart distributed control concept:

- No system bandwidth degradation with systems of any size
- One completely homogeneous environment for drives, controls, operator stations, I/O - everything!
- Complete data consistency throughout a system
- The ability to store the entire system configuration in the controllers for easy field total access
- The ability to manage total system program thread and hierarchy
- Consistent multi-level password protection

Key Features:

- Ethernet peer-to-peer networking
- Gateway options for ModbusTCP/IP, EIP CANopen and others
- Internet access
- Graphical Signal Flow Diagram system documentation
- Additional I/O
- Easy interface to most operator stations, PLCs, SCADA, etc.
- Event driven emails from devices

Precision

- 16 bit integer basic arithmetic
- 32 bit floating point calculator functions
- 64 bit encoder pulse counting

Standard ***savvyPanel*** library

For iPad, iPhone, Android and touch screen PC operator stations with arrows, meters, start and stop pushbuttons.

Standard function block library

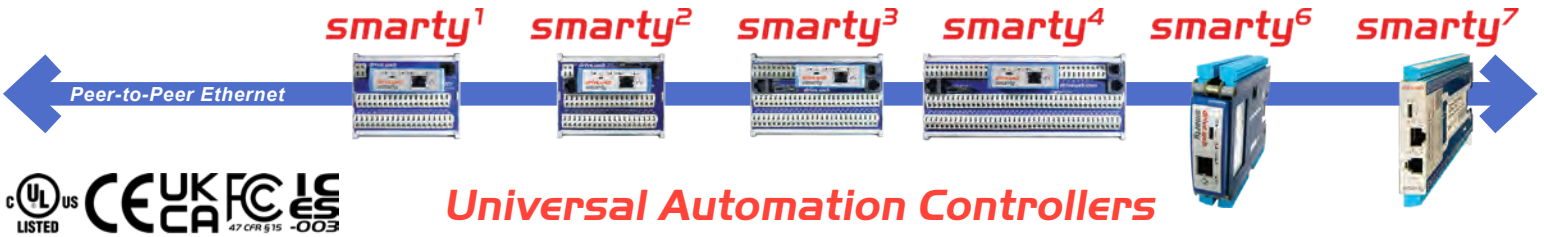
- Adders, Subtracters, Multipliers, Dividers, Clamps, Switches, Logic
- Event driven email messages
- Full featured PI controllers

Optional function block libraries

- Advanced Process Control & PLC
- Winder Control
- Advanced Math
- Encoder Position & Indexing

automation without limits

Smart, compact packaging
0.91" wide x 4.09" high x 4.72" deep
(23 x 104 x 120 mm)



Universal Automation Controllers

	smarty1	smarty2	smarty3	smarty4	smarty6	smarty7
Full Featured PLC Functions	✓	✓	✓	✓	✓	✓
Advanced Process Control	✓	✓ + Winders	✓ + Winders	✓ + Winders	✓ + Winders	✓ + Winders
Basic Motion Control	–	✓	–	–	–	–
Advanced Motion Control	–	–	✓	✓	✓	✓
***drive.web* distributed control**	✓	✓	✓	✓	✓	✓
100baseTX Ethernet	✓	✓	✓	✓	✓	✓
Modbus TCP/IP & EIP/PCCC	✓	✓	✓	✓	✓	✓
USB microB port	✓	✓	✓	✓	✓	USB-C
8 analog inputs	✓	✓	✓	✓	✓	✓
8 analog outputs	✓ (unipolar outputs)	✓ (bipolar outputs)	✓ (bipolar outputs)	✓ (bipolar outputs)	✓ (bipolar outputs)	✓ (bipolar outputs)
8 digital inputs	✓	✓	✓	✓	✓	✓
8 digital outputs	✓	✓	✓	✓	✓	✓
4 status LEDs	✓	✓	✓	✓	✓	✓
Floating-point numbers and math	✓	✓	✓	✓	✓	✓
Battery backup for clock (battery not included)	–	✓	✓	✓	✓	✓
ModbusRTU master (slave optional)	–	✓	✓	✓	✓	✓
Optional drive interface	–	✓	✓	✓	✓	✓
Frequency/events inputs, timing/stepper outputs	–	–	4 selectable inputs or outputs	6 inputs, 7 outputs	6 inputs, 7 outputs	6 inputs, 7 outputs
Encoder	–	–	1 encoder, diff. AB	2 encoders, diff. ABZ + reconnect terminals	2 encoders, diff. ABZ	2 encoders, diff. ABZ
***drive.web* options included**	-04, -05, -25, -26	-04, -05, -06, -10, -25, -26, -29, -39	-04, -05, -06, -10, -25, -26, -29, -39	-04, -05, -06, -10, -25, -26, -29, -39	-04, -05, -06, -10, -25, -26, -29, -39	-04, -05, -06, -10, -25, -26, -29, -39
Core UAC	dw241-BX-C1CD	dw240-DM-C2CD	dw240-DM-C3CD	dw240-DM-C4CD	dw240-DM-C6PD	dw250-DM-S7PD
P2 Vector Drive UAC	–	dw244-DM-C2CD	dw244-DM-C3CD	dw244-DM-C4CD	dw244-DM-C6PD	dw254-DM-S7PD
E3 Industrial Drive UAC	–	dw248-DM-C2CD	dw248-DM-C3CD	dw248-DM-C4CD	dw248-DM-C6PD	dw258-DM-S7PD
CANopen UAC	–	dw249-DM-C2CD	dw249-DM-C3CD	dw249-DM-C4CD	dw249-DM-C6PD	dw259-DM-S7PD
Dimensions (WxHxD)	4.11" x 3.50" x 3.00" (105 x 89 x 76mm)	4.11" x 3.50" x 3.00" (105 x 89 x 76mm)	5.51" x 3.43" x 3.00" (140 x 87 x 76mm)	8.27" x 3.50" x 3.00" (210 x 89 x 76mm)	1.06" x 4.09" x 4.96" (27 x 104 x 126mm)	0.70" x 3.50" x 4.70" (17.2 x 90 x 119mm)

smarty7 certification is still in process, please contact the factory to check status.

faster » compact » versatile » expansive » intelligent » easily wirable » . . . Available!

smarty dw210 - Universal Automation Controllers

Industry leader since 2008
100% compatible with new dw240 and dw250

Smart controllers, DIN mount with 100baseTX Ethernet distributed control, USB port and wide range of I/O & communications options

16 standard I/O, each configurable as:
- 8: ±10V, 16 bit analog in or out or 24V digital in
- 8: 0-10V, 16 bit analog in or 24/12/5V dig in or 24V dig out, source or sink

dw210 ***smarty*** for standalone or networked applications

General purpose programmable controller or drive interface controller

See page 26 for other drive and device integration apps

0.91" wide x 4.09" high x 4.72" deep
(23 x 104 x 120 mm)

speedy dw220 series

Only 21 x 22 x 36 mm!

DIN mount dwOPTION -50

Mini smart controllers for use on-board or embedded in drives & devices with ***drive.web*** distributed control over 100baseTX Ethernet, ModbusTCP/IP, USB port, fast serial port (up to 500kbps), full-featured savvyPanel HMI, & communications options

dw220 ***speedy*** generic interface controller with 500kbps ModbusRTU master & 15" wire interface
dw221 ***speedy*** plug-in automation controller for PL/X Series DC drive
dw222 ***speedy*** plug-in automation controller for ODE2 General Purpose VFD
dw223 ***speedy*** plug-in automation controller for ODP Sensorless Vector drive
dw224 ***speedy*** plug-in automation controller for P2 Closed Loop Vector drive
dw224S ***speedy*** plug-in automation controller for SEW Eurodrive MLTP Closed Loop Vector drive
dw225 ***speedy*** automation controller for Yaskawa F7 drive with 15" wired interface
dw228 ***speedy*** plug-in automation controller for E3 Series General Purpose drive
dw229 ***speedy*** automation controller with generic CANopen device with 15" wired interface

see page 26 for other drive and device integration apps

Easy, on-board & embedded automation for drives & devices
Very small, very smart, very affordable
Goes anywhere - does everything!

High performance film winder

21 section embossing line

Airport transit car load sharing system

Model Numbers

smarty & speedy
Product build options

		smarty	speedy						
		dw210	dw220	dw221	dw222	dw223	dw224	dw225	dw228	dw229
Function Block Libraries										
-05	Advanced Process Control Function Block Library (FBL) (comparators, profilers, presets, latches, filters, counters, timers, PIDs)	X	X	X	X	X	X	X	X	X
-06	Winder Control FBL (dia. calc., taper tension, torque comp.)	X	X	X	X	X	X	X	X	X
-10	Advanced Math FBL (trigonometric, log, exponential)	X	X	X	X	X	X	X	X	X
-11	Encoder Control FBL (shaft lock, indexing, registration for Options 40-44)	X								
-29	Solar FBL with sun position calculator	X	X	X	X	X	X	X	X	X
-36	Motion Control FBL with Trapezoidal Motion & Cam Profile	X	X	X	X	X	X	X	X	X
Communications Options										
-04	Ethernet Modbus TCP/IP slave	X	S	S	S	S	S	S	S	S
-25	Ethernet EIP/PCCC interface for AB PLCs	X	X	X	X	X	X	X	X	X
-17*	ModbusRTU slave (RS485) isolated port	X								
-18*	ModbusRTU slave (RS485) isolated port + external encoder module port	X								
-19*	ModbusRTU slave (RS485) isolated port + ModbusRTU master non-iso	X								
-23*	ModbusRTU master (RS485) isolated port + external encoder module port	X								
I/O Options										
-24*	6 extra digital inputs, 24V	X								
-26	*savvyPanel* iPad/iPhone/Android & touch screen PC operator station interface	X	S	S	S	S	S	S	S	S
-27*	Frequency I/O, up to 100KHz. 2 ~in, 2 ~I/O, with 12V, 400mA pwr supply	X								
-30	115VAC digital I/O voltage isolator, up to 2/smarty (not CE or UL Listed) (each with 2, NO contacts + common and 4, 115VAC inputs +common)	X								
-31	230VAC digital I/O voltage isolator, up to 2/smarty (not CE or UL Listed) (each with 2, NO contacts + common and 4, 230VAC inputs +common)	X								
-37*	2-Channel, Open Loop Stepper Drive Controller with 2 fast event inputs	X								
-38*	2-Channel, Closed Loop Stepper Drive Controller, i2i port for OPT-42-45	X								
Encoder I/O Option										
-15*	Internal encoder input 2-24V, differential A & B (no marker) w/5VDC	X								
-16*	External encoder module interface port	X								
	***smarty* external encoder module (needs a *smarty* dw210 option -16, -18, -23)**									
-42-45	2 ext encoder, 2-24V, marker, 5VDC o/p, 2x 24V event in, RS422 RTX	X								
-42-46	2 ext encoder, 24V retransmit outputs (±1A, ±1B, ±2A, ±2B)	X								
Mounting Options										
-50	DIN rail mount with screw terminal connections		X					X		X

dwOPTION -42-46
Encoder module

* Options are mutually exclusive X = Available if not excluded S = Standard feature

drive.web automation

smarty & speedy - stock controller options (un-configured)

speedy & smarty standard programmable controller dwOPTION -00

- Basic drive coordination and peer to peer networking over Ethernet
- Basic machine control

Includes 100baseTX Ethernet and USB port with system wide access together with:
basic arithmetic, logic, PI control, clamp, switches, basic *savvyPanel* touch screen PC, iOS & Android control, systems utilities, event email

smart systems controller - pack 1

speedy & smarty dwOPTION -1121 for

- Process line drive coordination
- General purpose machine control

Includes all standard controller features together with:
advanced arithmetic, logic, process control, counters, timers, touch screen PC, iOS & Android control, systems utilities

Incorporates standard *drive.web* options
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC, iOS & Android operator station controller

smart systems, winders & motion - pack 2

speedy & smarty dwOPTION -1122 for

- Full featured winder control with single or multi cores, turret indexing, auto splicing, open and closed loop, edging
- Web handling, tension control, accumulators, infeeds, center winding, slip core, surface winding

Includes all *pack 1*,dwOPTION -1121 features together with:
diameter calculation, linear and hyperbolic taper control, static/dynamic friction compensation, inertia compensation

Incorporates standard *drive.web* options
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC, iOS & Android operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion

precision smart control with 1 encoder - pack 3

smarty dwOPTION -1123 for

- Basic precision speed, position or winder control
- Basic encoder count control

Includes all *pack 2*, dwOPTION -1122 features together with:
cyclic position, linear position, indexing

Incorporates standard *drive.web* options
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-11, Encoder Control Function Block Library
-15, Single bidirectional encoder input
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC, iOS & Android operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion

precision smart control with 2 encoders - pack 4

smarty dwOPTION -1124 for

- Precision speed, position or winder control, registration, phase lock, fast event counting
- Encoder count control with home auto calibration
- Dual axis pick & place with trapezoidal motion
- Cut to length with cam motion control

Includes all *pack 3*, dwOPTION -1123 features together with:
registration, fast event counting, speed lock, phase lock, precision ratio

Incorporates standard *drive.web* options
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-11, Encoder Control Function Block Library
-16, External encoder module interface port
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC, iOS & Android operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion
-42-45, External dual, bidirectional encoder module with marker, fast event inputs, buffered encoder retransmit, 5VDC encoder supply

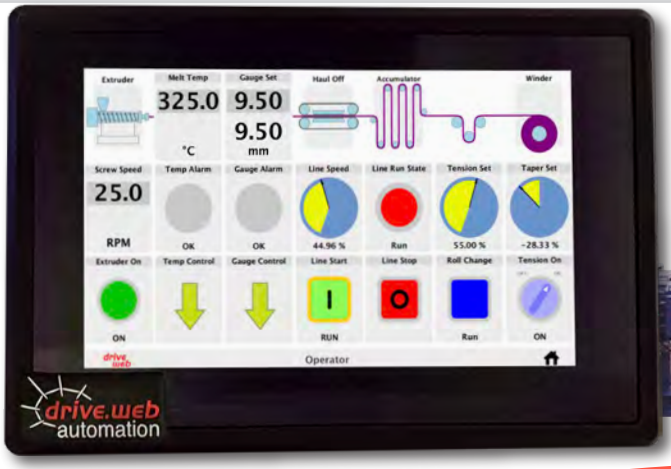
precision stepper control with 2 encoders - pack 5

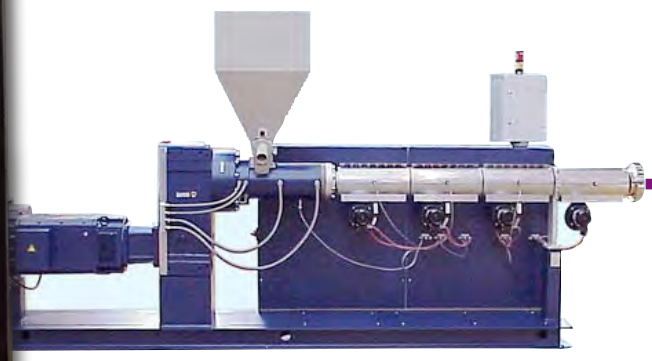
smarty dwOPTION -1125 for stepper drive control

- Precision speed, position or winder control, registration, phase lock, fast event counting
- Encoder count control with home auto calibration
- Dual axis pick & place with trapezoidal motion
- Cut to length with cam motion control

Includes all *pack 3*, dwOPTION -1123 features together with:
registration, fast event counting, speed lock, phase lock, precision ratio

Incorporates standard *drive.web* options
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-11, Encoder Control Function Block Library
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC, iOS & Android operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion
-38, Dual stepper drive controller with external encoder module interface port
-42-45, External dual, bidirectional encoder module with marker, fast event inputs, buffered encoder retransmit, 5VDC encoder supply





dw230 ... *savvyPanel touch*

drive.web device apps

These apps can be installed in ***drive.web speedy*** and ***smarty*** Universal Automation Controllers to provide a plug & play interface to the key features of "*other*" drives or devices. The ***smarty*** or ***speedy*** then brings those "*other*" drives alive with:

- Full featured programmable control functions
- Ethernet networking
- USB port access

"Other" devices include almost any device that has a ModbusRTU port, including:

• AC drives • DC Drives • PLCs • Process Controllers •
• Temperature Controllers • Smart I/O • Power Controllers •

drive apps come complete with a user guide and application notes.

The configurations can easily be edited and additional drive parameters can be added using only the ***savvy*** tools.

Current *"Other"* device app list includes:

dwOPTION -4001 for Yaskawa A1000 Drives (with dwOPTION-1121)
dwOPTION -4002 for Yaskawa V1000 Drives (with dwOPTION-1121)
dwOPTION -4003 for V2 Series Fan & Pump Drives
dwOPTION -4004 for Schneider Altivar 312 Series Drives
dwOPTION -4005 for ABB ACS310 Series Drives
dwOPTION -4006 for Sanyo Denki Stepper Drives
dwOPTION -4007 for Thermal Edge Temperature Controllers
dwOPTION -4008 for V3 Series Eco Drives
dwOPTION -4009 for Fuji Frenic Mega Vector Drives
dwOPTION -4011 for Yaskawa A1000 (with dwOPTION-1124)
dwOPTION -4012 for ABB ACS310
dwOPTION -4013 for Fairford Electronics Synergy Soft Start

These ***drive.web device apps*** are easy for us to create, so don't hesitate to contact if you have a new request.

Please call +410-604-3400 for the latest list or a new *"other"* app.

speedy device app

Connect a ***speedy*** to your "other" device via its ModbusRTU port to provide immediate ***drive.web savvy*** access to all its key parameters. Add any additional parameters you require to make ***savvy*** the only tool you need for your "other" drive configuration, control, systems integration and monitoring. The ***speedy*** is so small (about half the size of your thumb!) that it can easily be mounted unobtrusively onboard almost any drive or device.

smarty device app

Connect a ***smarty*** to your "other" device via its ModbusRTU port to provide immediate ***drive.web savvy*** access to all its key parameters together with 16 extra precision I/O (configurable analog or digital), and with options such as encoder inputs, (see the options lists on pages 23 - 25). Add any additional parameters you require to make ***savvy*** the only tool you need for your drive configuration, control and monitoring.

drive.web

One easy, homogeneous solution for systems integrators!

drive.web apps

CONFIGURED OPTIONS FOR smarty & speedy

These options are pre-programmed units with generic solutions for key applications. The packages are a great design aid.

These generic configurations are easily edited to suit your specific installation using ***savvy*** with the ***SFD*** Signal Flow Diagram option and include the following features:

- detail signal flow diagram documentation
- ***savvyPanel*** touch screen PC, iOS & Android operator station configuration
- basic wiring drawing

ADD CONFIGURED OPTIONS

		smarty	speedy						
		dw210	dw220	dw221	dw222	dw223	dw224	dw225	dw228	dw229
-1101	Open loop constant tension center winder (with option 1122)	X	X	X		X	X	X		
-1102	Closed loop dancer controlled winder (with option 1122)	X	X	X		X	X	X		
-1103	Closed loop load cell controlled winder (with option 1122)	X	X	X		X	X	X		
-1104	Slip core winder controller (with option 1122)	X	X	X		X	X	X		
-1105	Speed lock w/encoder feedback (with option 1124)	X								
-1106	Coordinated drive, line master controller (with option 1121)	X	X	X		X	X	X		
-1107	Controller with networking for analog drives (with option 1121)	X								
-1109	Phase lock, line shaft with registration (with option 1124)	X								
-1110	Three PID Controllers with integral reset and hold (with option 1121)	X								
-1113	2 channel pulse train follower (with options 05, 26, 27)	X								
-1117	Encoder cyclic position/indexing (with option 1124)	X								
-1118	Sun tracking for solar energy (with opts 05, 11, 16, 26, 29, 42 & 45 or 46)	X								
-1131	Encoder analog out, T13, Calibrated 1024PPR @1800RPM = 10V	X								

Please call +410-604-3400 for dw240 & dw250 pre-engineered solutions

c UL us LISTED CE UKCA FC 47 CFR §15 IC ES -003

drive.web accessories

- **Industrial Ethernet switches**
- **Interconnection cables, connectors**
- **Touch screen PCs**
- **Wireless access points**
- **Communications gateways**
- ***drive.web*** **software & firmware upgrade vouchers**

Please call +410-604-3400 for details

Engineering & Support




AC and DC motors from fractional to over 2000 HP

All speed ranges, duties, enclosures and voltages complete with a full range of accessories such as encoders, tachs, thermal protection, brakes, blowers, filters, brushes and slide bases. Please call for details and competitive pricing.

Modulus Packaged Drives

Modulus solutions are a range of standard, pre-engineered drive packages with a selection of options for wide range common applications.

Using the flexible ***drive.web*** programmable automation technology it is possible to adapt a small range of hardware configurations to a wide range of applications thereby keeping design and manufacturing costs to a minimum.

Modulus drives are available either as packages mounted on an open panel, ***Modulus P***, or as assemblies installed in an enclosure, ***Modulus E***, to suit the type of operating environment and the control scheme required.

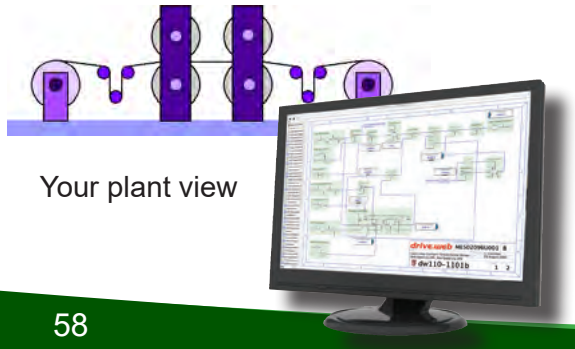
Every ***Modulus*** project is accompanied by a detailed, 50-point, Quality Control Report covering every facet of the product, its design, construction, testing and shipping.

User manuals for all products are available from www.bardac.com

Online Product Support

Using innovative, interactive, Internet online technologies we can provide either product training or product support through your browser from the comfort of your desk! Simply connect via your browser and get live interactive support where ever you are - with savvy running on your computer call +410-604-3400 and in less than a minute an engineer will be able to see your system live and give you the support you need.

... it's as easy as that!



Online Training

Online product training courses are scheduled every week with options for users of all levels of interest and ability.

Level 1 - drive.web introductory seminar - 1½ hours - Free!

This provides an overview of the *drive.web* automation technology. Learn how to connect to drives, create drive "phantoms", navigate systems, create signal flow diagrams and system drawings, find information, identify object attributes, make connections, show trend charts, build *savvyPanel* operator stations, etc.

Level 2 - drive.web design technology course - 3 hours (Level 1 is a prerequisite)

Covers configuration of drives, basic system design concepts, Ethernet networking, password protection, system safety

Level 3 - drive.web system design and application courses (Level 2 is a prerequisite)

3a) Drive and device interfaces - 2 hours

Covers the use of "Templates" and "Helpers" for documented drives, generic ModbusRTU master interfaces to third party drives, operator stations, etc.

3b) Winder Control Systems - 3 hours

Covers standard solutions for open loop CTCW winders, closed loop dancer controlled winders and closed loop load cell controlled winders.

3c) Encoder Control Systems - 3 hours

Covers applications such as "electronic line shaft", spindle orientation, registration and position control.

3d) Advanced Ethernet, Internet Access and Security - 3 hours

Covers local and wide area network configuration, IP addressing, user access and device and system password protection.

For course details, registration, international training options and charges please call us at 1-888-667-7333 (toll free USA 888-ON SPEED) or international at +410-604-3400. Alternatively please contact training@driveweb.com

Terms of Sale & Payment

Complete Terms & Conditions of Sale are shown at www.bardac.com. Net 30 day credit terms are available subject to prior approval. Credit card payments are only accepted for payments made at the time of service or shipment of products and will be subject to a 4% surcharge.

Field Service, Service Center Repair, Training and Start-up - Call +410-604-3400
Rates for the Continental United States

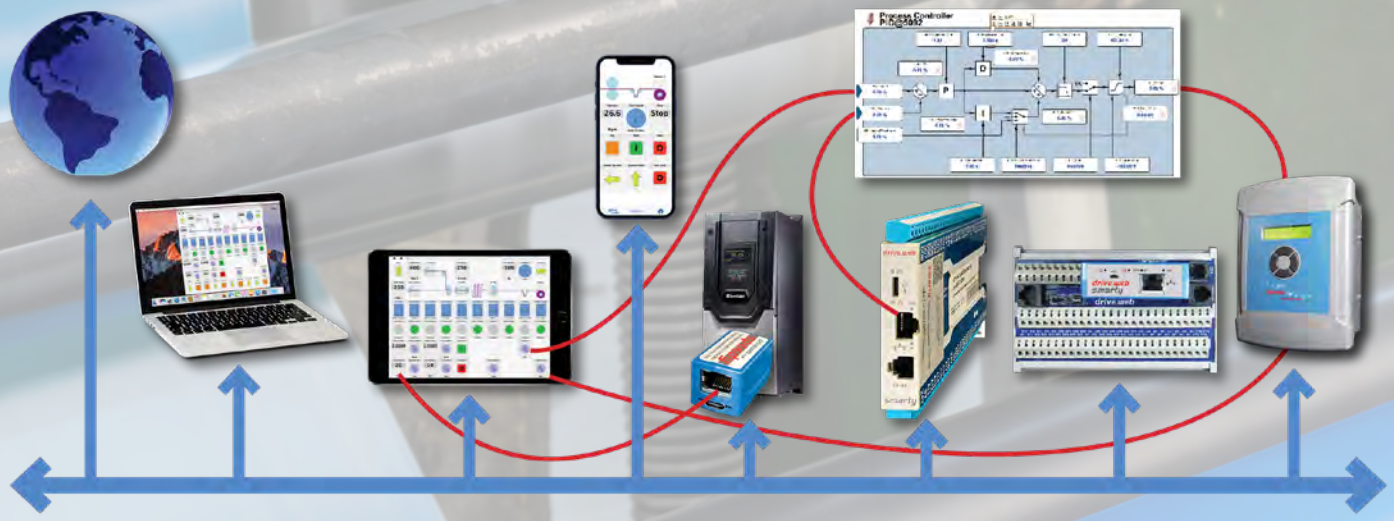
Charge Basis	Rates (US$)
a. Basic Rate - Field Service, Training & Start-up Assistance - up to 8 hours daily Monday to Friday, 7am to 6pm	$190 per hour
b. Standard Overtime - Weekdays 6pm to 7am & all day Saturday - Total work time not to exceed 12 hrs in any 24 hrs	$285 per hour
c. Special Overtime - Sundays, Holidays and excess of 8 hours on Saturday	$380 per hour
d. Overnight - Includes meals, and hotel accommodation	$280 per night
e. Auto Travel - Covering cost of use of company or personal cars, distance to and from the local office	$0.655 per mile
f. Public Transport - Rental cars, Air fares, etc.	At Cost
g. Holdover & Standby Time	Same as service
h. Travel Time - Time taken from Bardac to job site and return	Same as service
i. Basic Rate - Service Center Repair charges - Diagnosis & repair time	$130 per hour + parts
j. Design or application engineering services	$220 per hour

Notes:
1. Minimum service billing is 4 hours for field services, 1 hour for service center services.
2. Parts, materials, special visas, duties, and extraordinary expenses will be charged extra.
3. Warranty credits will be identified on the Daily Field Service Report.

For rates and availability of sales and service outside the US, please call +410-604-3400

24/7 Tech Support

During normal business hours basic tech support will be provided free of charge
Outside normal business hours call +410-604-3535. Tech support will be provided at $340/hour (minimum of 1/2 hour per call) and this must be paid for with a credit card at the time of service.



drive.web automation

~ distributed control over Ethernet
~ full featured programmable control
~ intuitive graphical programming tools
~ Internet accessible
~ cost effective systems any size or complexity
~ configure, connect & control
... everthing from anywhere

Everything normally in stock!

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