

Bardac
drives



Corporate Overview

Bardac . . . the safe bet!

AGENDA

- ▶ Corporate Background
- ▶ AC & DC Drives & Motors overview
- ▶ **drive.web** automation technology overview
- ▶ Global view with a local focus



drive.web
automation



Bardac Drives & Automation



PRODUCTS

- ▶ AC Drives 0.1 to 400 horsepower
- ▶ DC Drives 0.1 to 2,000+ horsepower
- ▶ **drive.web** automation technology
- ▶ DC servo linear amplifier drives
- ▶ AC & DC motors
- ▶ Engineered systems
- ▶ Worldwide sales & service



Bardac Drives & Automation



Quick History

1992 – Founded in Reston Virginia with a primary focus on selling DC drives throughout North America formerly doing business as, Sprint Electric Corp.

1997 – Launched first AC drives

1998 – Relocated to Stevensville, MD where the factory headquarters is still located today.

1999 – Began selling AC flux vector drives.

2002 – The first **drive.web** internet accessible distributed control product is launched.



AC DRIVES

- ▶ Closed loop vector drives up to 400 HP (230 & 460V)
- ▶ Sensorless vector drives up to 400 HP (230 & 460V)
- ▶ 600VAC drives up to 150 HP
- ▶ HVAC & pump drives up to 400 HP (230 & 460V)
- ▶ Industrial general purpose VFDs up to 50 HP
115/230/460 Volts, all purpose features
- ▶ Single Phase Motor VFDs up to 1.5 HP (115 & 230V)
- ▶ NEMA 12 drives up to 400 HP – CLV, HVAC, SV, GP, SP
- ▶ NEMA 4X drives up to 30 HP – CLV, SV, HVAC, GP, SP

Bardac Drives & Automation



AC DRIVES

- ▶ Closed & open loop vector drives
- ▶ Systems drives
- ▶ General purpose VFDs
- ▶ NEMA 12 & NEMA 4X drives



AC DRIVE FAMILY FEATURES

- ▶ High frequency switching for quiet operation
- ▶ Built in a DB switch in size 2 and up
- ▶ ModbusRTU serial port up to 115 kbps
- ▶ Spin start, PI control, boost, trip memory
- ▶ Optional remote keypad & display
- ▶ Optional ModbusTCP/IP over Ethernet
- ▶ Optional peer-to-peer Ethernet networking
- ▶ Optional **drive.web** programmable control
- ▶ Optional distributed i/o over Ethernet

Bardac Drives & Automation



P2 OPEN & CLOSED LOOP VECTOR DRIVES

- ▶ IP20, NEMA 4X, & NEMA 12 enclosures
- ▶ Ratings to 400HP
- ▶ 230/460/600 volts
- ▶ Expandable systems features
- ▶ DC bus sharing
- ▶ **savvy** graphical programming
- ▶ Optional encoder feedback
- ▶ Optional **drive.web** control
- ▶ Many fieldbus options available



V3 HVAC, FAN, & PUMP DRIVES

- ▶ IP20, NEMA 4X, & NEMA 12 enclosures
- ▶ Ratings to 400HP
- ▶ 230/460/600 volts
- ▶ Energy efficient >98%
- ▶ Low input harmonics
- ▶ BACnet, ModbusRTU standard
- ▶ **savvy** graphical programming
- ▶ HVAC & pump functions
- ▶ Optional **drive.web** control



Bardac Drives & Automation



E3 SERIES GENERAL PURPOSE VFDs

- ▶ IP20 & NEMA 4X enclosures
- ▶ Ratings to 50HP
- ▶ 230/460 volts
- ▶ High frequency switching for quiet operation
- ▶ Brake transistor, size 2 and up
- ▶ ModbusRTU, RS485 115 kbps
- ▶ Spin start, PI control, boost
- ▶ Optional **drive.web** control
- ▶ Optional Ethernet



E3 SERIES SINGLE PHASE MOTOR VFDs

- ▶ IP20 & NEMA 4X enclosures
- ▶ For use with Shaded Pole or Permanent Split Capacitor motors
- ▶ For use in variable torque fan & centrifugal pump type applications
- ▶ 115 volts, 1Ø up to 0.75 HP
- ▶ 230 volts, 1Ø up to 1.5 HP
- ▶ Expandable i/o & systems features



NEMA 4X (IP66) DRIVES

For harsh, wet, dirty environments

- ▶ Vector up to 30HP
- ▶ General purpose VFDs up to 30HP
- ▶ HVAC & Pump drives up to 30HP
- ▶ Basic versions with keypad & display
- ▶ Switched versions with:
 - ▶ Lockable isolator switch
 - ▶ FWD/OFF/REV switch
 - ▶ Speed pot
- ▶ Outdoor Rated



DC DRIVES – REGEN & NON-REGEN

- ▶ 1-phase OEM drives up to 2 HP
- ▶ 1-phase systems drives up to 10 HP
- ▶ 3-phase digital systems drives up to 2000+ HP
- ▶ 3-phase analog drives up to 150 HP
- ▶ 3-phase digital separate SCR stack controllers
- ▶ 3-phase 12 pulse SCR stack controllers
- ▶ 3-phase slip ring motor controllers to 2000 HP

DC DRIVES

- ▶ Single Phase, regen & non-regen to 10 HP
- ▶ 3-Phase, regen & non-regen to 2000+HP
- ▶ 3-Phase 12 pulse drives
- ▶ Linear amplifier servos up to 12 amps
- ▶ Separate Stack Controllers
- ▶ Slip ring motor controllers to 2000 HP
- ▶ Annealer Controllers
- ▶ Field Regulators



K-SERIES, OEM DC DRIVES – REGEN & NON-REGEN

- ▶ Up to 2 HP
- ▶ DIN mounting
- ▶ Plug in terminals
- ▶ Arm volts or tach f/b
- ▶ Isolated versions
- ▶ 115/230 VAC selectable for 90/180VDC arm
- ▶ Adjustable ramps, max/min speed, IR comp
- ▶ Fields up to 1 amp
- ▶ Volume discounts



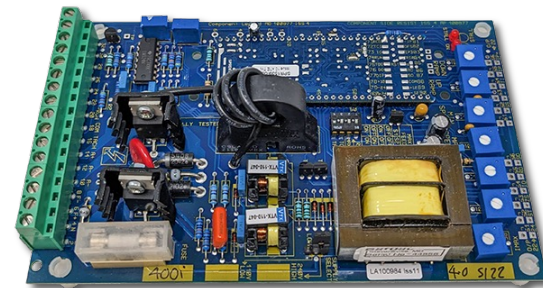
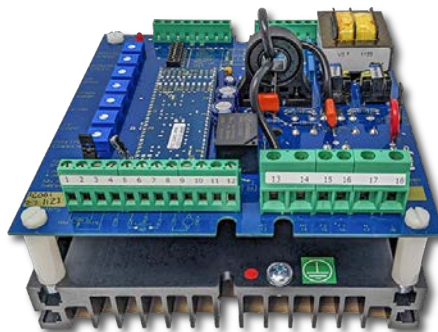
Bardac Drives & Automation



DC DRIVES – 1-PHASE SYSTEMS DRIVES

Regen up to 36A, non-regen up to 48A

- ▶ 115/230 VAC selectable for 90/180VDC arm
- ▶ 230/460 VAC selectable for 180/360VDC arm
- ▶ Adjustable ramps, max/min speed, IR comp
- ▶ European voltage versions



PLX SERIES DC DRIVES – 3-PHASE DIGITAL DRIVES TO 2000+ HP

- ▶ Compact packages
- ▶ 8.5" x 11" thru 75HP!
- ▶ High performance
- ▶ AVF/tach/encoder f/b
- ▶ Auto field controller
- ▶ **drive.web** Ethernet
- ▶ **savvy** graphical tools
- ▶ Extensive, flexible i/o
- ▶ “power” version with fuses, contactor, etc.
- ▶ International ratings
- ▶ Many fieldbus options available

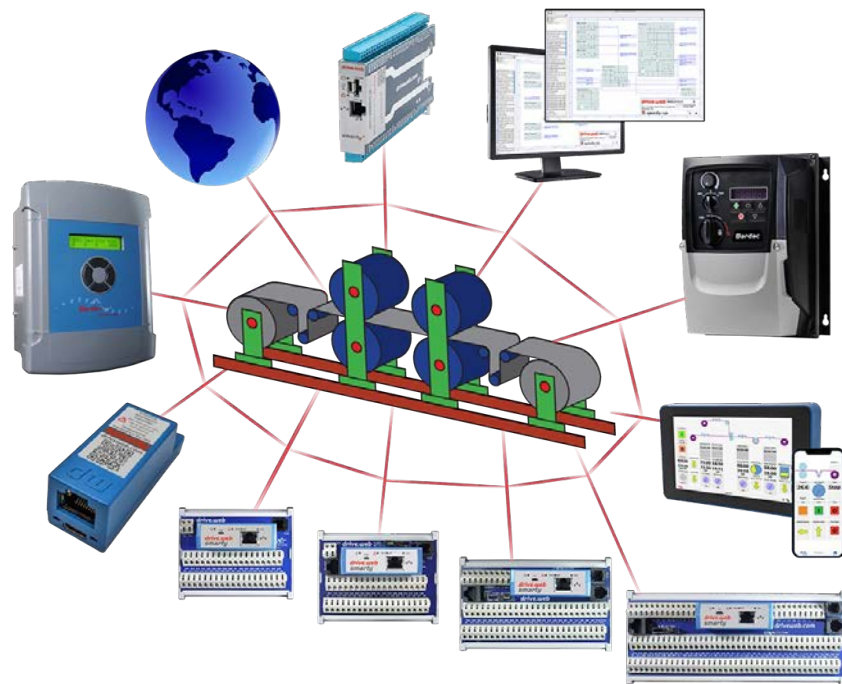


Bardac Drives & Automation

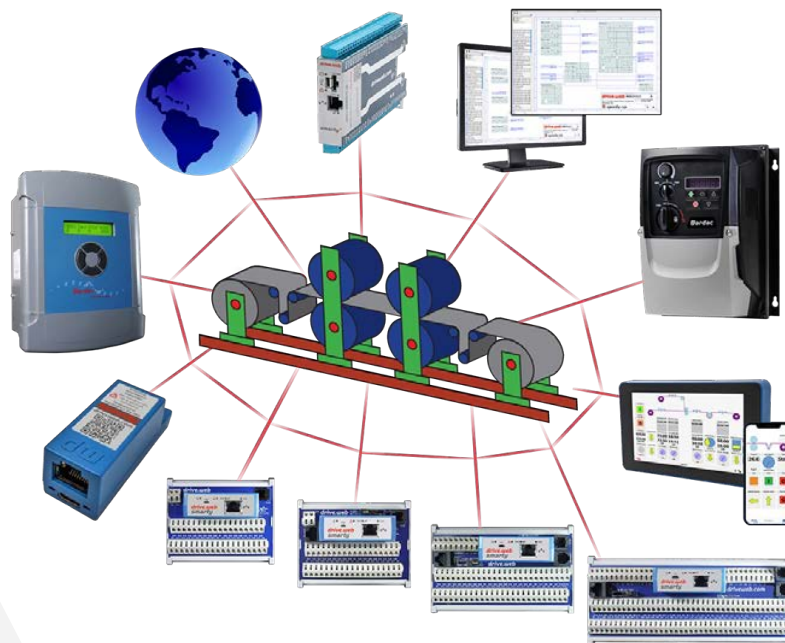


drive.web Distributed Control Technology

- ▶ System integration without PLC
- ▶ Cost effective in systems of any size
- ▶ Peer-to-peer Ethernet networking
- ▶ Internet accessible
- ▶ Graphical function block tools
- ▶ Onboard data storage
- ▶ Powerful system navigation
- ▶ *savvyPanel* touch screens
- ▶ Wi-Fi roaming with iPad, iPhone, etc.
- ▶ Easy links to most drives, PLCs, etc.
- ▶ Supports enterprise integration
- ▶ *savvy* intuitive signal flow tools
- ▶ Online training and field support



drive.web Automation Technology



drive.web product overview



smarty

DIN mount controllers with flexible analog, logic & encoder I/O

16 points of high resolution I/O



speedy

Miniature drive interface controllers with gateway to ModbusTCP/IP, ModbusRTU, EIP/PCCC, etc.



savvy

Smart, intuitive graphical tools for device programming, system design & monitoring



savvyPanel

Smart, touch screen operator station technology

smarty universal automation controllers

- ▶ *PLC, Motion Controller, and Process Controller . . . all in one!*
- ▶ **drive.web** distributed control over Ethernet
- ▶ Direct field wiring for easier, quicker, cost-saving installation
- ▶ Homogeneous integration for drives, HMIs, remote I/O
- ▶ **savvy** system design tools
- ▶ Right for the IIoT future
- ▶ Easy, intuitive, affordable, expandable
- ▶ For systems of any size or complexity
- ▶ Designed and assembled with innovation in the USA

smarty¹



smarty²



smarty³



smarty⁴



smarty⁷



smarty⁷ dw250



- ▶ 8, Analog Inputs: $\pm 11V$ (16 bits) analog in, or 5/24 VDC digital in
- ▶ 8, Analog Outputs: $\pm 10.5VDC$, 10mA
- ▶ 8, Digital Inputs: 50VDC max, 8VDC threshold, 3V hysteresis, 1kHz
- ▶ 8, Digital Inputs: 24VDC, up to 300mA shared
- ▶ 6, Fast I/O: digital inputs (100Khz) or stepper/digital out (500Khz)
- ▶ 1, Fast timing/stepper/frequency output: 30 VDC 100Khz
- ▶ 2, Encoder inputs: Quadrature A/B (or 1, ABZ), 5/24V, 1Mhz
- ▶ ModbusRTU client port (RS485) server optional)
- ▶ ModbusTCP/IP client and server (Ethernet)
- ▶ EthernetIP/PCCC (Ethernet)
- ▶ Accelerometer, barometer, thermometer, hygrometer
- ▶ Advanced Process Control Library
- ▶ Winder & Web Tension Control Library
- ▶ Advanced Math Library
- ▶ savvyPanel touch screen controller
- ▶ Solar Position Library
- ▶ Advanced Motion Library



smarty⁷-XD: Extended Digital I/O

Model: **dw250-DM-XDPD**

- ▶ 16, 5-24VDC Digital Inputs
- ▶ 16, 24VDC Digital Outputs also configurable as Digital Inputs
- ▶ All I/O have common 0V
- ▶ 1.0" x 3.5" x 4.8" (27x90x121 mm)



smarty⁷-RL: Extended Relay I/O

Model: **dw250-DM-RLPD**

- ▶ 2, Form C (Changeover) contacts
- ▶ 2, Form A (single contact, normally open)
- ▶ For use with common power supply lines
- ▶ 1.4" x 3.5" x 4.8" (36x90x121 mm)



smarty⁷-HV: Extended High Voltage Digital I/O

Model: **dw250-DM-HVPD**

- ▶ 10, 120/240VAC Digital Inputs
- ▶ 6, 120/240VAC Digital Outputs
- ▶ For use with common power supply lines
- ▶ 1.3" x 3.5" x 4.8" (33x90x121 mm)

smarty⁷-XA: Extended Precision Analog Inputs



Model: **dw250-DM-XAPD**

Four precision analog inputs, each isolated from each other and the controller. Each channel is individually configurable for:

- ▶ Thermocouple (most common types supported) with cold junction compensation
- ▶ RTD temperature sensor (2, 3, & 4 wire)
- ▶ Strain gauge loadcell (Wheatstone bridge type)
- ▶ Semiconductor tension transducer, full bridge & half bridge
- ▶ mV sensing with ranges from 10mV to 2000mV
- ▶ Compact package only 1.0" x 3.5" x 4.8" (27x90x121 mm)

speedy dw270



Model **dw270-DM-S7MT**

Standard Features

- ▶ **drive.web** distributed process control
- ▶ 10/100Base-T(X) Ethernet.
- ▶ Update firmware with savvy software.
- ▶ Ultra-compact, may be permanently bonded inside equipment.
- ▶ High-speed CANopen up to 1Mb/s.
- ▶ ModbusRTU on EIA485 up to 500kb/s.
- ▶ Basic Control function block library
- ▶ Compact package only 0.91" x 0.89" x 2.42" (23x22.5x61.5 mm)

savvyPanel Touch dw260



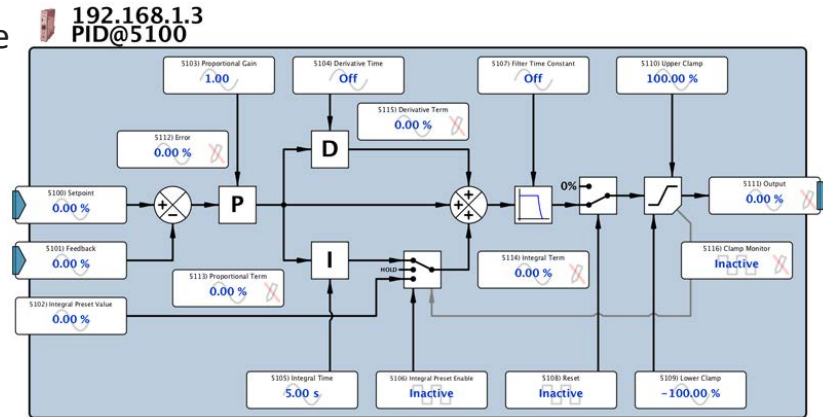
Model: **dw260-070**

Standard Features

- ▶ **drive.web** distributed process control
- ▶ 10/100Base-T(X) Ethernet.
- ▶ Update firmware with savvy software.
- ▶ Ultra-compact, may be permanently bonded inside equipment.
- ▶ High-speed CANopen up to 1Mb/s.
- ▶ ModbusRTU on EIA485 up to 500kb/s.
- ▶ Basic Control function block library
- ▶ Compact package only 0.91" x 0.89" x 2.42" (23x22.5x61.5 mm)

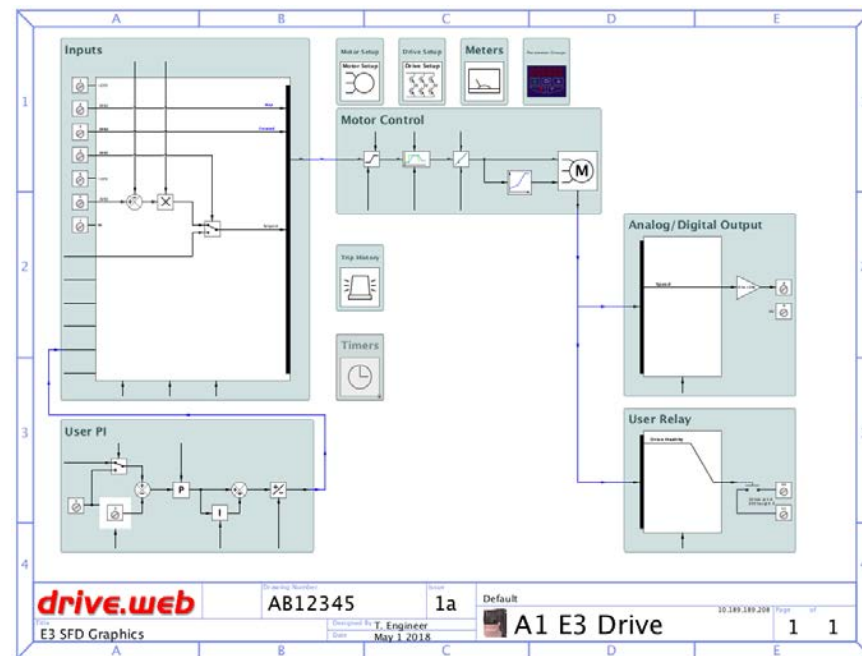
drive.web KEY GRAPHICAL FUNCTION BLOCKS

- ▶ Arithmetic, logic, timers, comparators, switches
- ▶ Presets, latches, filters, counters, state machine
- ▶ Linear & S-ramps, PIDs, profilers
- ▶ Winder diameter, torque, taper calculation
- ▶ “Electronic line shaft”, phase lock, speed lock
- ▶ Encoder registration, indexing & orientation
- ▶ Sun position calc. for solar energy systems
- ▶ Event driven email from devices



drive.web PROGRAMMING FEATURES

- ▶ Drag & drop connections
- ▶ Page and level browse navigation controls
- ▶ Drill down, jump, filter, search, pan, zoom
- ▶ Hover text help
- ▶ Contextual menus for get info, editing, naming, etc.
- ▶ Instant links to the built in manual
- ▶ Trend charts with data export
- ▶ Docks for easy parameter organization



Bardac Drives & Automation



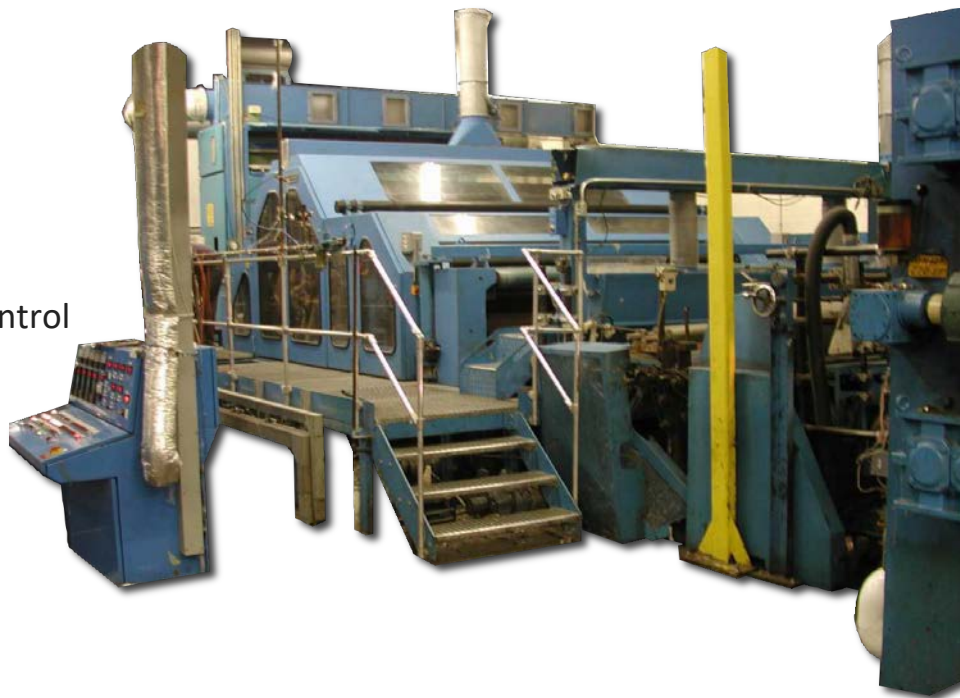
drive.web KEY FEATURES

- ▶ Provides distributed control over Ethernet
- ▶ Easy interface to most drives, MMIs, etc.
- ▶ Easier, cheaper, faster than a PLC
- ▶ Intuitive *savvy* signal flow programming tools
- ▶ Entire system configuration stored in devices
- ▶ Field upgradable firmware options
- ▶ Multi-user tools with Internet access
- ▶ All system devices accessible from one point
- ▶ *savvy* runs on Windows, macOS & Linux
- ▶ Powerful password protection
- ▶ Event driven text/email from devices



drive.web KEY APPLICATIONS

- ▶ Process lines
- ▶ Steel & paper mills
- ▶ Plastic & metal extrusion lines
- ▶ Printing, coating, laminating, winding
- ▶ Material handling, conveyors, hoists
- ▶ Petro-chemical, pharmaceutical, flow control
- ▶ HVAC drive coordination



Bardac Drives & Automation



THANK YOU!

**40 Log Canoe Circle
Stevensville, MD 21666
(410) 604-3400**

bardac.com | driveweb.com | Automationthings.com