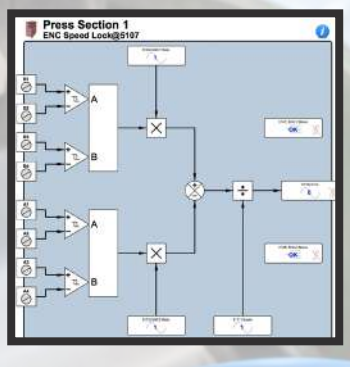
Bardac Drives Catalog 2020

issue 1

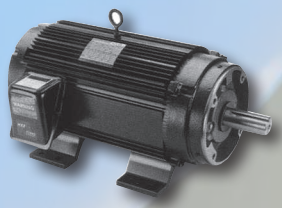


drive.web AUTOMATION

Now outdoor rated!

AC DRIVES

DC DRIVES



MOTORS

SERVICE

Automation Things

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 factory in Stevensville, Kent Island, Maryland

Bardac . . . the safe bet!

Seamless, 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

drive.web
Ethernet Distributed Control
pages 3 - 33

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

speedy
Embedded & onboard Controllers
pages 20 - 21

Motion
smart motion controllers
pages 30 - 31

TOOLS

savvy
Drive & controller configuration
pages 8 - 9

savvy-SFD
Signal Flow Diagram tools for system design
pages 10 - 11

drive.web Apps
Pre-Engineered Apps
pages 26 - 33

device Apps
Pre-Engineered interfaces for third party drives - pages 26 - 33

HMI

savvyPanel
For industrial PC touch screens
pages 12 - 13

savvyPanel touch
Hi Res industrial touch screens
pages 12-13

savvyPanel mobile
HMI app for iPhone, & iPad
pages 12 - 13

DC DRIVES

Single Phase
To 10 HP - pages 48 - 50

DC Servo
Up to 12 A, 48VDC - page 51

3-Phase Digital
To 2000+ HP - pages 52 - 57

Stack Controller
6 & 12 pulse - page 56

Packaged Drives
Modulus pre-engineered
page 58

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

pages 57 - 59

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.

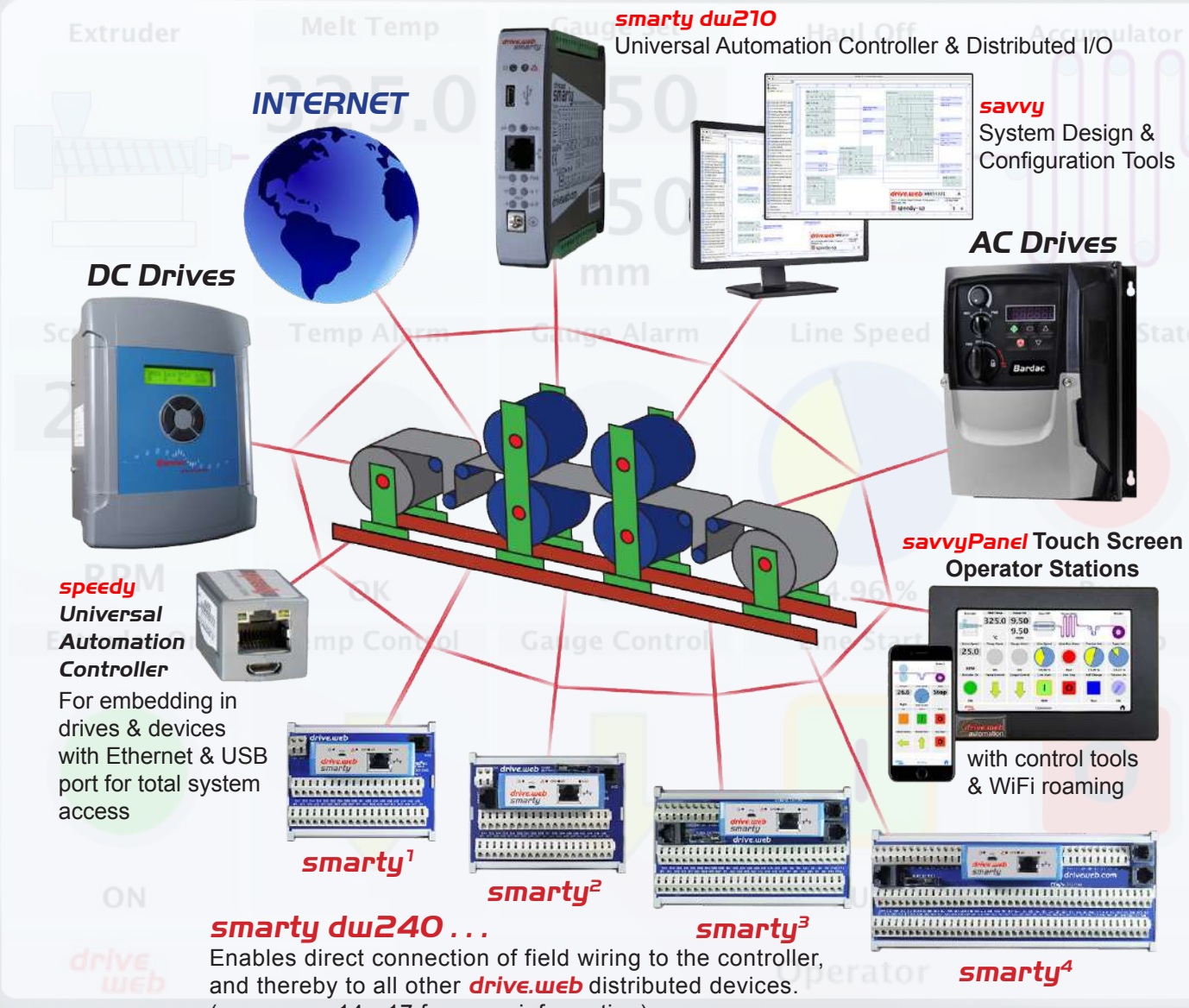
drive.web

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



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

drive.web automation

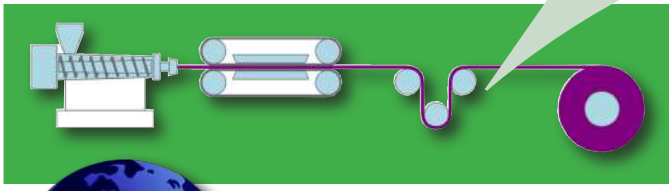
total connectivity

Enterprise management - machine operators - system eng

Everything Internet accessible & Ethernetworkable peer-to-peer

In control & IIoT ready!

save money



savvy

Graphical, function block tools

- Easy drive configuration
- Powerful systems design & integration
- Trend charts
- Signal flow diagrams
- Internet access
- Intuitive system navigation tools

Internet
Remote system access

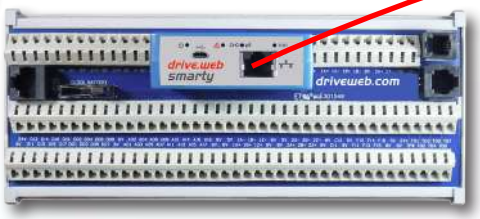
Ethernet

savvyPanel

Integrated touch screen HMI technology

For touch screen PC or iOS devices (iPad, iPhone)

WiFi
go mobile!



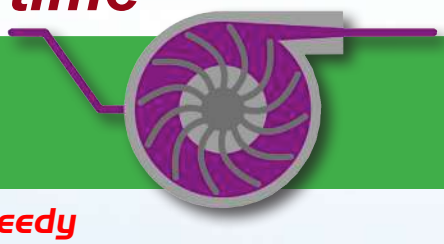
dw240 series

Universal Automation Controllers

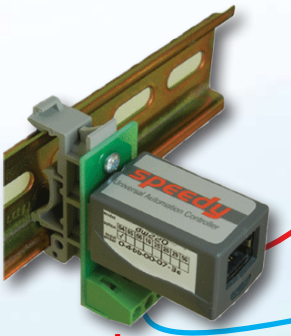
- Save on installation costs, installs on customer terminal rail
- Up to 130 terminals, including multiple analog and digital inputs and output
- Up to 2 x Encoder inputs, up to 7 stepper outputs, high frequency I/O
- Floating point math for accurate & complex math computations

Ethernet

save time



Ethernet



speedy

Integrated Universal Automation Controller

- provides easy coordination of ECO drives in building energy systems
- easy 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

smarty

Universal Automation Controllers

- 16 precision analog & logic I/O
- Encoder I/O for indexing, registration, shaft lock
- Multiple communications options
- Unlimited expansion with no loss of system bandwidth

speedy

Universal Automation Controllers

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

save energy

smart automation

gineering - production control - maintenance - tech support

speedy
Embedded Controllers

DC Regen Drives

Vector Drives

Ethernet

Easy set up & full featured, programmable control onboard drives

Industrial VFDs

USB

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

savvyPanel touch
Hi-res industrial stations

smarty
Universal Automation Controllers
- Easy sensor interface
- Precision analog I/O
- Fast logic I/O with powerful State Machine programming

ModbusRTU

Sensors

Meters & Displays

Instrumentation

drive.web

A Unique Architecture

1 ***drive.web*** devices (***speedys*** and ***smartys***) connect peer to peer over Ethernet to form a completely homogeneous 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 its 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 and iOS display data - everything!

5 A ***speedy*** embedded in a drive takes over the entire drive, its set up, 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 and iOS 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).

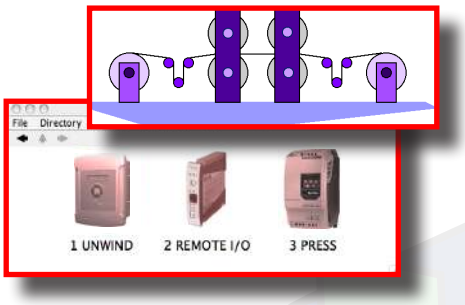
7 Easily create a graphical interface to almost any control device to bring it into your unique, homogeneous, ***drive.web*** environment.

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.

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.



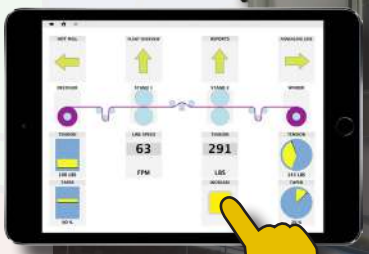
From the initial concept, through planning, design, construction, testing, installation and operation the ***drive.web savvy*** tools provide all the vision, insight and help you need for a successful project.

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 form just one location. The system immediately comes alive for testing and monitoring.

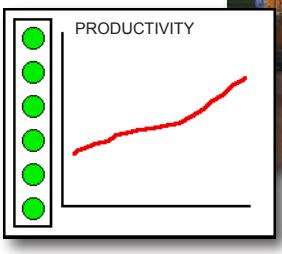


4 INSTALLATION & OPERATION

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 set up or operational state! Use ***savvyPanel*** operator station technology to provide smart touch and roaming control from anywhere.

5 MANAGEMENT & MAINTENANCE

Use ***savvy*** utilities to set up 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 and online help.

savvyPanel Touch Screens

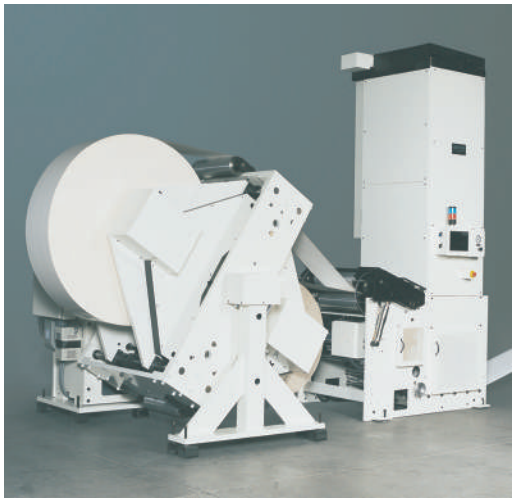
Innovative, touch screen operator station technology that runs on PC or iOS (iPad, iPhone, etc.). Build clear machine graphics, buttons, switches, meters and instrumentation and link to your control scheme. Provides multi-user, multi-level, password protected access via WiFi from anywhere to any system.

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.

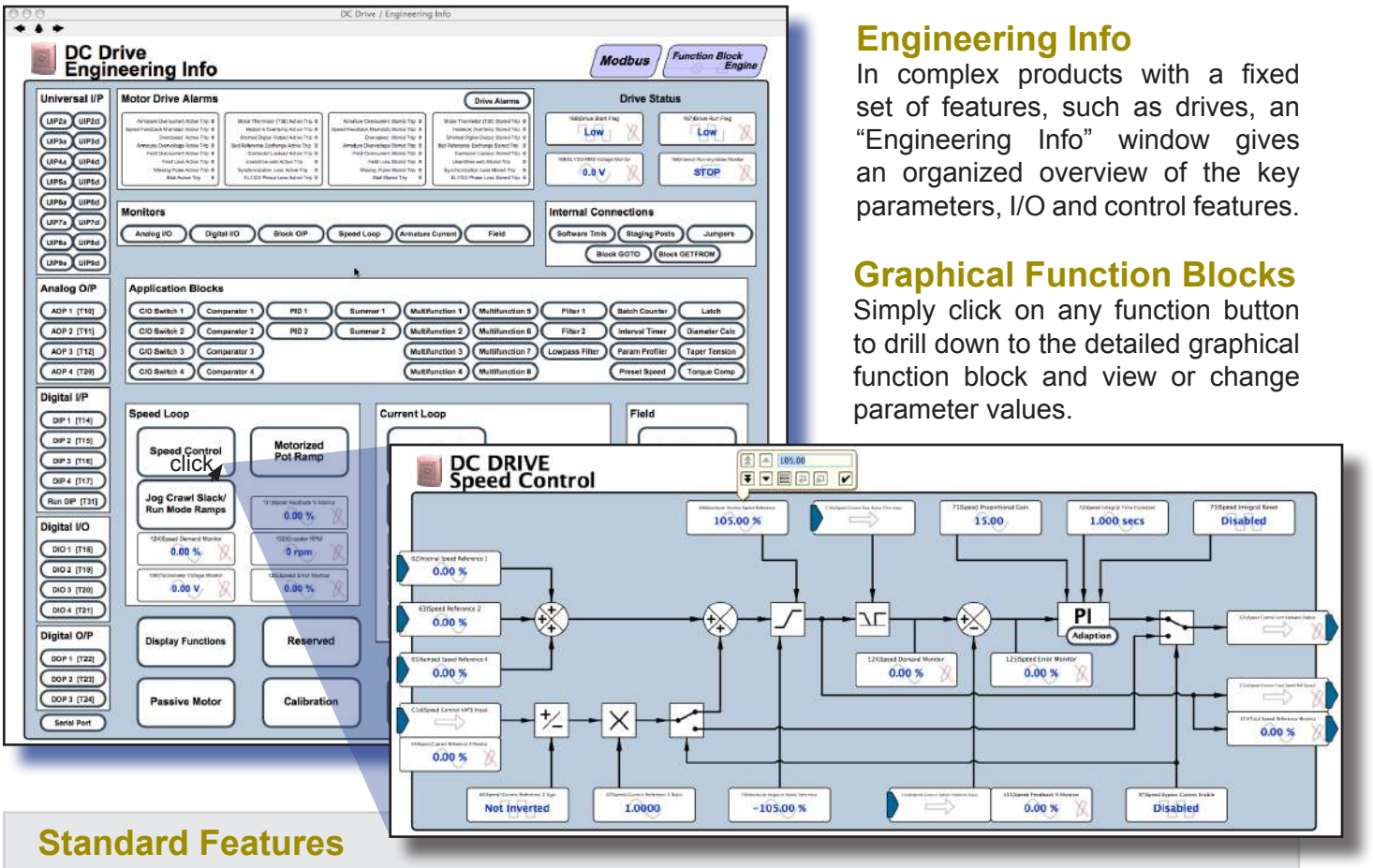
speedy Embedded Controller

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!



savvy ... the smart automation tool.

- **Configure drives, controllers & operator stations**
- **Design & build complete systems of any size or complexity**
- **Network & operate drives & systems over Ethernet**
- **Provide multi-user, system wide access from anywhere**



Engineering Info

In complex products with a fixed set of features, such as drives, an "Engineering Info" window gives an organized overview of the key parameters, I/O and control features.

Graphical Function Blocks

Simply click on any function button to drill down to the detailed graphical function block and view or change parameter values.

Standard Features

- Online or offline design of drive systems using intuitive tools with pre-engineered function blocks.
- Internet access to drives and systems for remote configuration, monitoring and process training.
- Provides easy import, export and cloning of device configurations.
- Dynamic graphics show real time state of switches, indicators, parameter values, etc.
- Low cost, full featured, distributed control capability with peer-to-peer networking.
- Multiple users, local or remote, can have concurrent real-time access to drives or systems.
- Function Block Libraries for winder controls, PID, drive synchronization, arithmetic, logic, etc.
- Deterministic connections provide high performance links between drives, PLCs, Operator Stations, SCADA computers and other control products.
- "drag & drop" techniques make easy parameter connections between drives, control devices, etc.
- "Dock" feature enables key system parameters to be monitored and trended from one location.
- Powerful navigation features include drill down (to detail layers in drives and controllers), search, connection tags, jump, browse, pan and zoom for easy visual system comprehension.
- VPN (Virtual Private Networking) for secure Internet connectivity is supported.
- Password protection is provided at many levels for secure use.

Get *savvy* free from www.driveweb.com

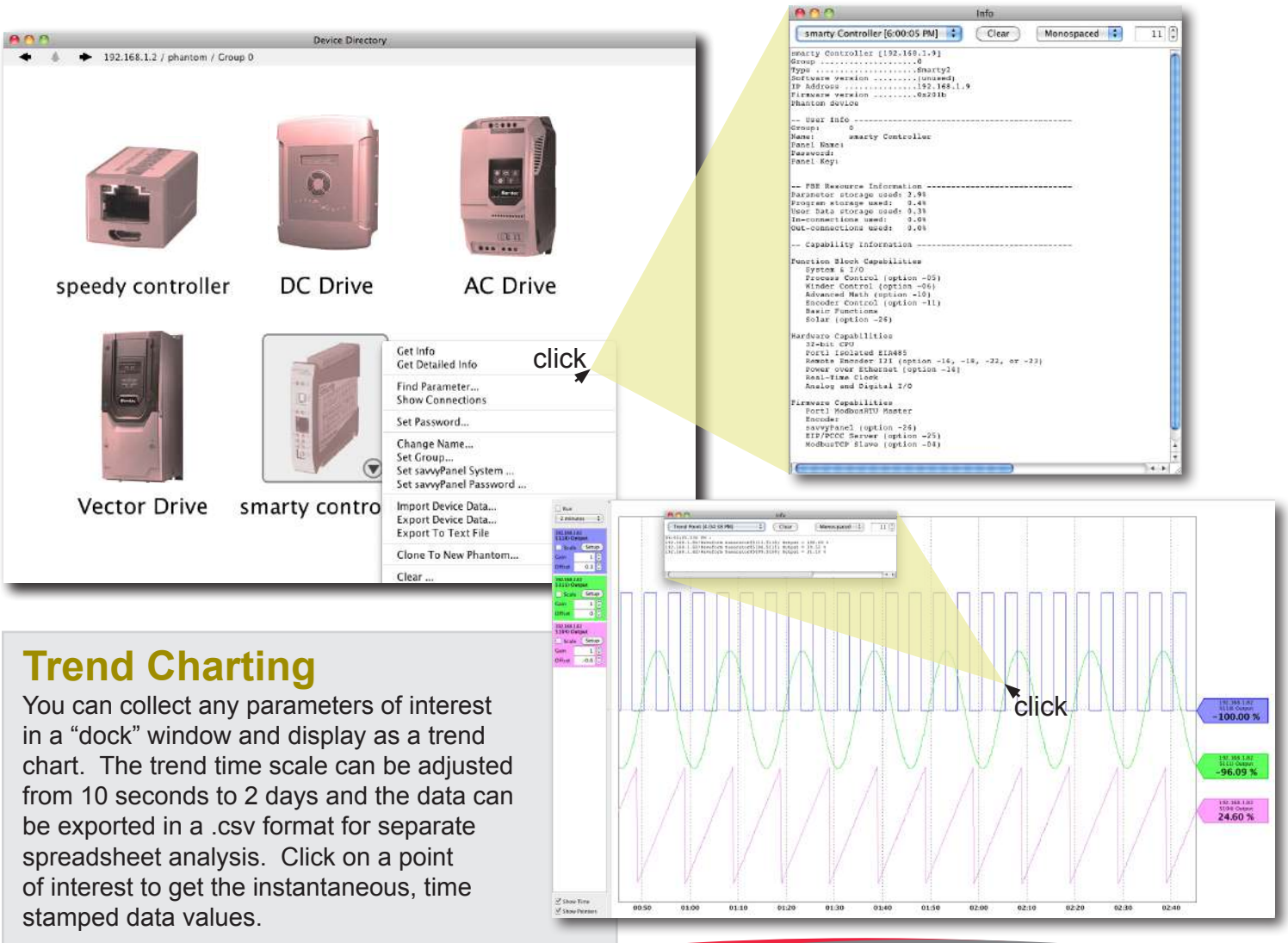
The *savvy* tools and utilities are platform independent and run on Windows, macOS, Unix, Linux and Solaris and they are all automatically updated as new features are released.

Drives, programmable controllers, operator stations and complete systems are configured by making simple drag & drop connections between clear graphical function blocks.

Information always at your finger tips ...

Anywhere in the system you will have easy instant access to the information you need with several different types of resource ...

- Right click on any active object such as a device, connection, parameter or function block to open the contextual menu
- "Hover" over any active object and see its key data appear at the top of the window.
- "Hover" over a button to see its function described.
- Look for the information button. This will jump you to the relevant location in the user manual.
- The "Help" menu links you to the full user manual, and other getting started guides.

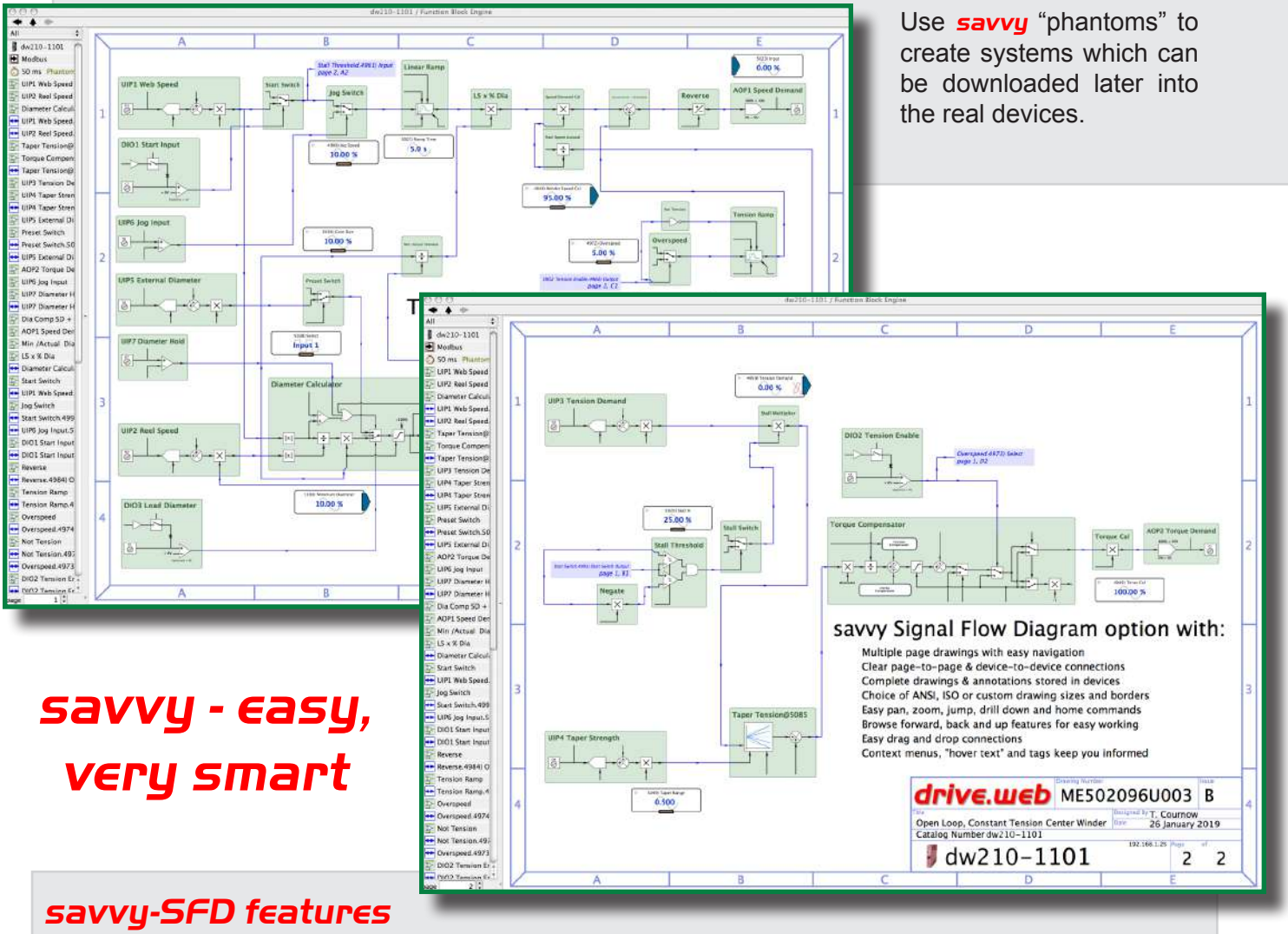


Trend Charting

You can collect any parameters of interest in a "dock" window and display as a trend chart. The trend time scale can be adjusted from 10 seconds to 2 days and the data can be exported in a .csv format for separate spreadsheet analysis. Click on a point of interest to get the instantaneous, time stamped data values.

savvy-SFD ... Signal Flow Diagram

The ***savvy-SFD*** option provides a powerful, graphical, Signal Flow Diagram interface with enhanced system wide navigation and the ability to produce clear, annotated, device and system documentation.



Use ***savvy*** "phantoms" to create systems which can be downloaded later into the real devices.

savvy - easy, very smart

savvy-SFD features

- Basic ***savvyPanel*** operator station functions included
- Create your own customized drawing sheets with choice of ISO or ANSI formats
- Signal flow diagrams provide a clear vision of your control scheme and its functionality
- Tags clearly specify the source, destination and location of connections between multiple pages.
- Entire drawing is stored in the ***drive.web*** devices for instant access in the field.
- Key parameters can be shown at the Signal Flow Diagram level for enhanced monitoring and control
- Connections are "rubber banded" so that function blocks can be moved on pages or between pages
- Drag and drop connections can be made between any parameter anywhere in a system.
- Drawings can be user annotated.
- Powerful navigation features ensure fast searches and that you will never get lost.
- Password protection is provided at many levels for secure use.

savvy programming

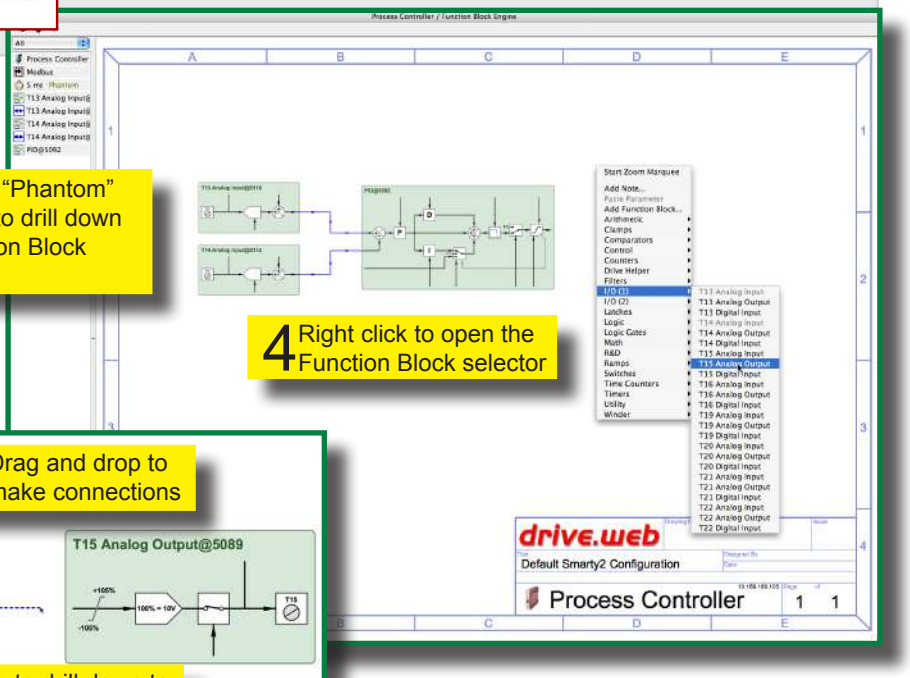
It could not be easier, whether simply configuring a drive or designing a complete integrated system.

A few simple steps are all that is needed to build a complete control scheme with signal flow documentation that is clear and easy to understand. Powerful navigation tools ensure that you will never get lost!

1 Create "phantom" devices or find real devices in your system in the "Device Directory" window

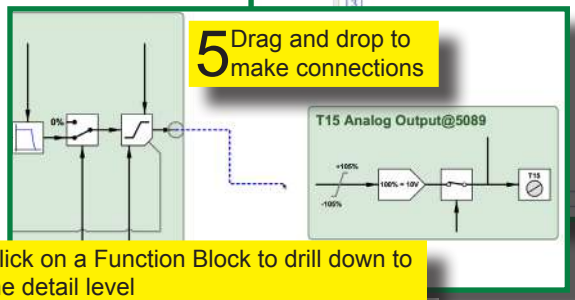
2 Right click on any device or object to open its contextual menu and get information, change names, import/export data, etc.

3 Click on a "Phantom" or device to drill down to the "Function Block Engine"

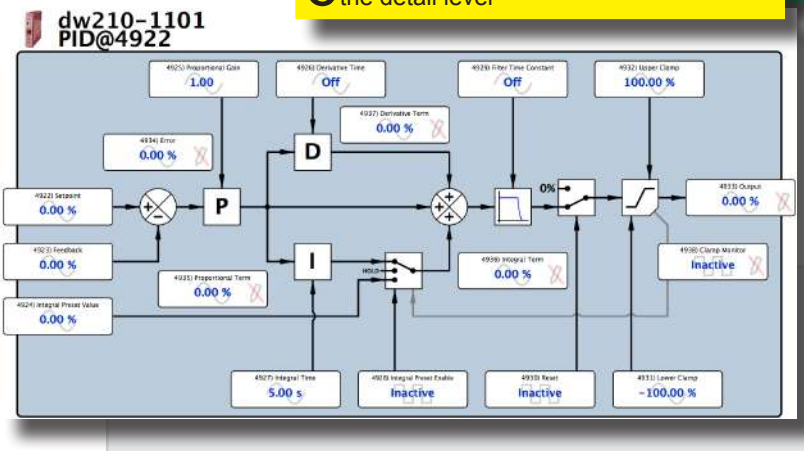


4 Right click to open the Function Block selector

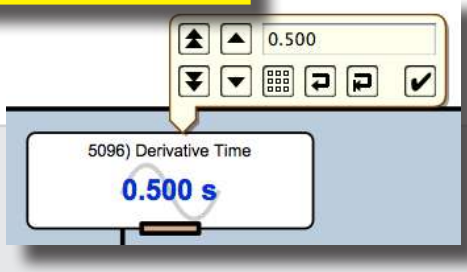
5 Drag and drop to make connections



6 Click on a Function Block to drill down to the detail level



7 Click on a parameter to change its value or state



Function Blocks are complete engineered system components. Their graphics are dynamic so that objects such as switches, indicators, etc., show their instantaneous state. A function block such as the PID above includes all the presets, resets, scaling, filters, clamps, etc., that you need for reliable implementation in the real world.

savvy is your smart friend! With a few simple clicks you can build a system, set up a drive and document your work in a thoroughly professional manner - there is no equal!

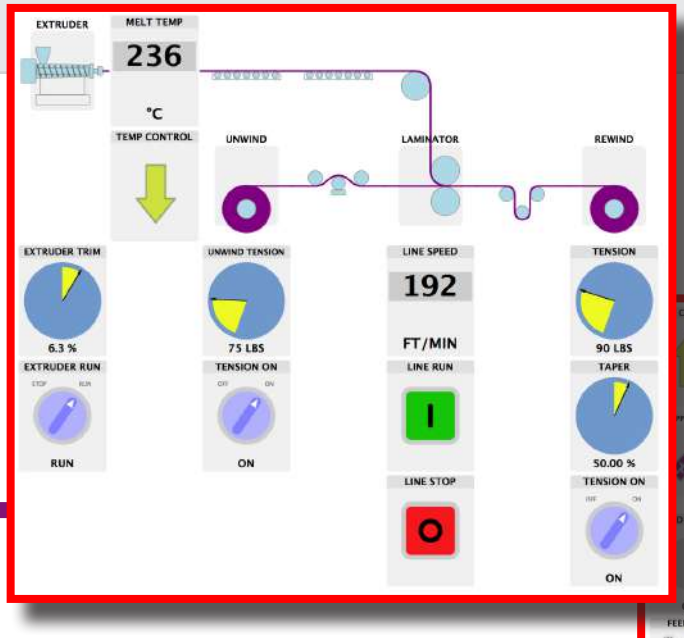
savvyPanel

Smart, touch screen operator station technology

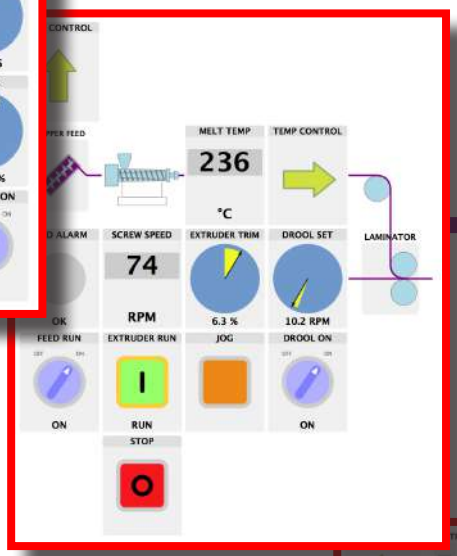
Provides unprecedented flexibility in instrumentation, control and monitoring.

- Runs native on a ***savvyPanel station*** high resolution, touch screen display
- Also runs on any full featured, touch screen PC or on iOS devices (iPad, iPhone, iPod Touch, etc.)
- Extensive library of objects such as pushbuttons, switches, meters, indicators, lamps, buzzers, etc.
- Extensive library of graphical image “tiles” to build smart machine and process graphics.
- Machine graphic “tiles” can be linked to detail control screens.
- Full ***savvyPanel*** configuration is stored in the ***drive.web*** devices for instant WiFi roaming access.
- Supports multiple screens with multiple pages.
- Provides hierarchal access to system groups, individual systems and multiple operator levels.
- Powerful multi-level password protection.

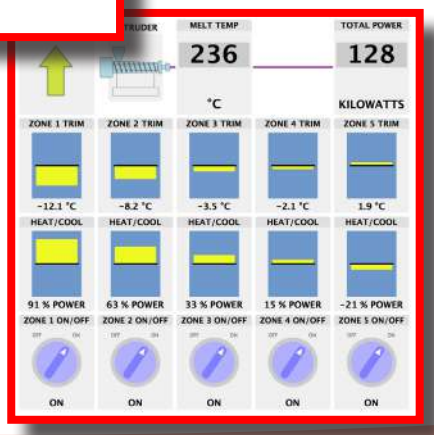
Example - Extrusion Coating Line



Master System Control Station
Easily build your graphics and controls and link them to any location in your drives or process control system.



Operator Screen
Touch a graphic tile such as the “EXTRUDER” to drill down to the detail screen

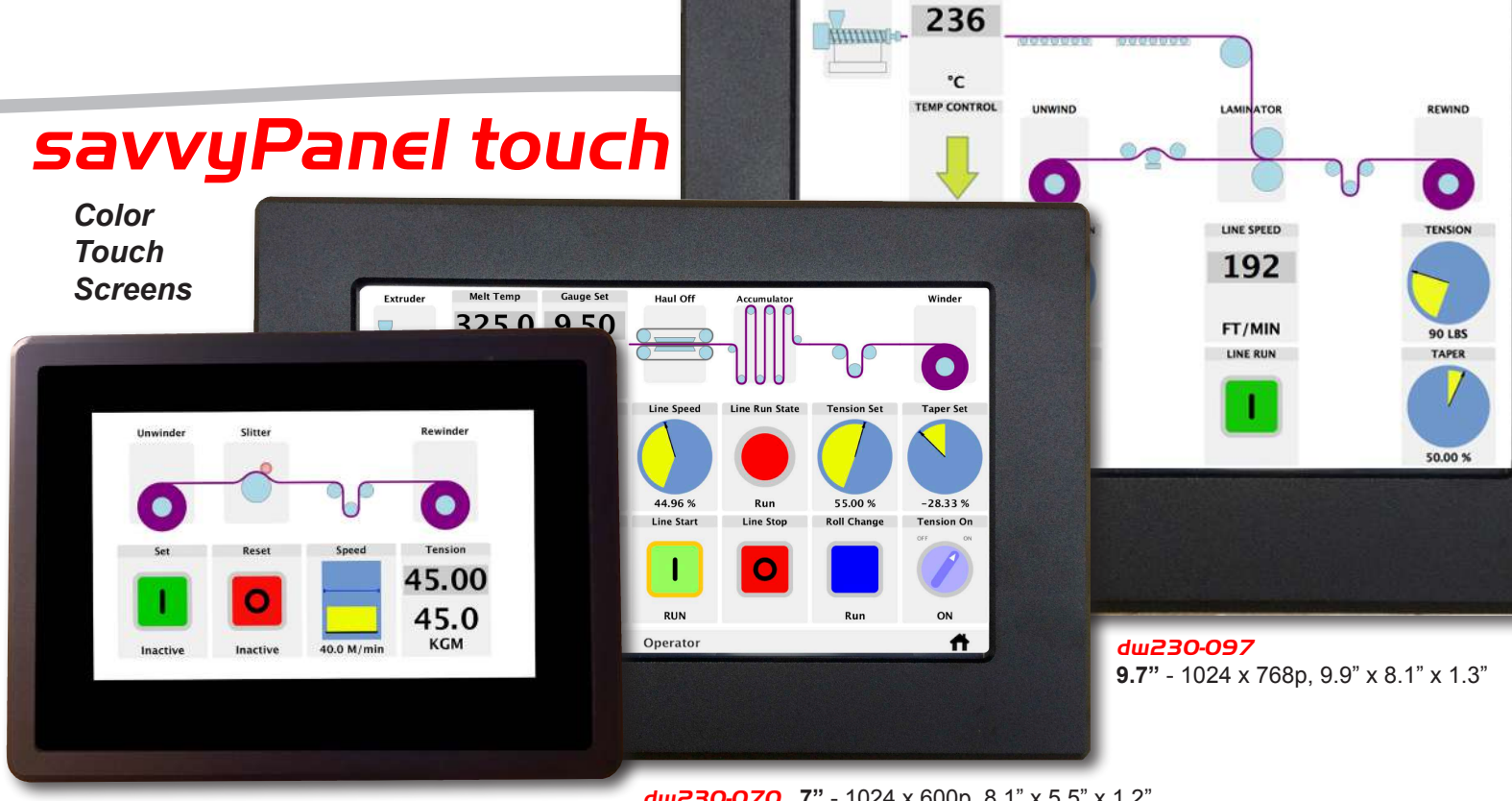


Total Control
Touch an arrow link such as the “TEMP CONTROL” tile to drill down to the temperature control system

Touch the “MELT TEMP” tile in any screen to set the master temperature setpoint.

savvyPanel touch

Color Touch Screens



dw230-097 **9.7"** - 1024 x 768p, 9.9" x 8.1" x 1.3"

dw230-070 **7"** - 1024 x 600p, 8.1" x 5.5" x 1.2"

dw230-050 **5"** - 800 x 480p, 5.9" x 4.4" x 1.1"

- Plug & Play, ***drive.web*** native
- SplasHProof front
- Competitively priced.
- Easy set up.
- Crisp, high visibility graphics
- IP65, NEMA 4 splasHProof front
- IP20 rear
- 1, Ethernet port 10/100baseTX
- Power supply 24VDC
- Working Temp: -20°C to 70°C
- Connect directly to any single ***drive.web*** device or to multiple devices with an Ethernet switch

savvy programing

No separate ***savvyPanel*** programming required. The ***savvyPanel touch*** display configuration resides in the ***drive.web*** drives or automation controllers. Everything is set up and accessed from the ***drive.web*** network using the intuitive ***savvy*** tools.

enclosure for savvyPanel touch

- Impact resistant, flame retardant, polycarbonate industrial enclosure
- NEMA 4 (IP65), light gray.

Dimensions:

5" model dwOPTION-54-052	8.4" x 5.8" x 2.2" (213x142x56 mm)
7" model dwOPTION-54-070	9.5" x 6.3" x 3.6" (241x160x92 mm)
9.7" model dwOPTION-54-097	11.8" x 9.05" x 3.4" (300 x 230 x 86mm)

savvyPanel app for iOS

Go mobile
Get secure machine access anywhere

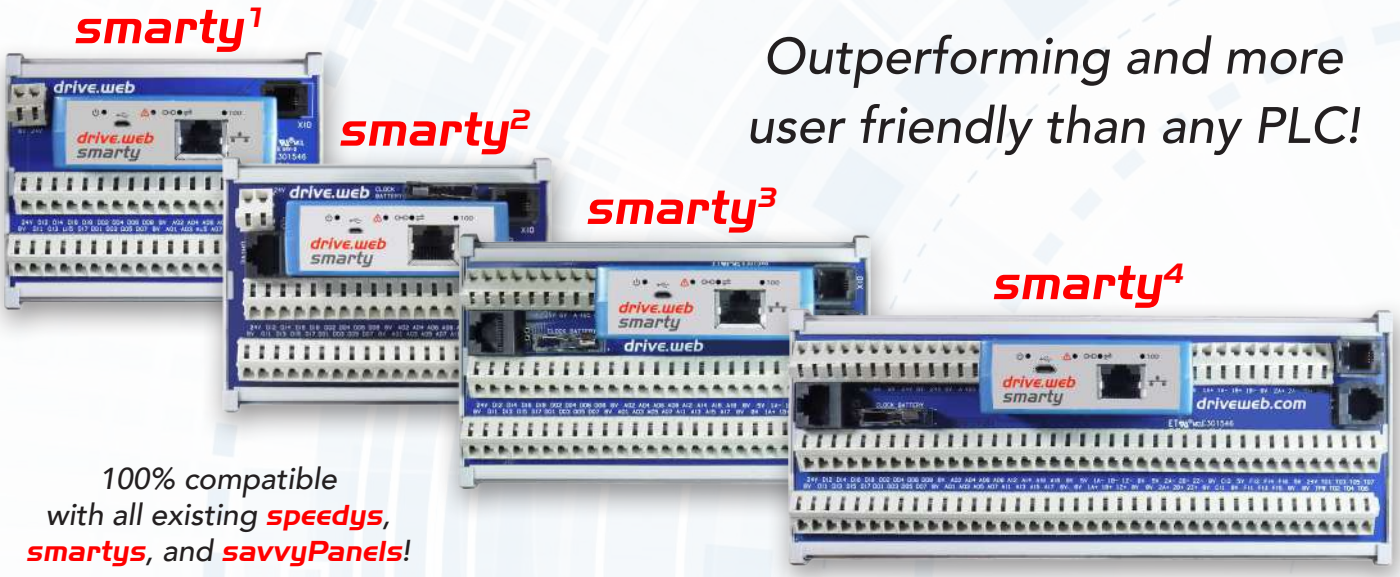
Try it out now!

Download ***savvyPanel*** free from the Apple App Store and get immediate access to a real, live drive system in Stevensville, Maryland, USA.

- ☞ Touch the "Roll Change" button to reset the length to zero
- ☞ Turn on all the section "On/Off" switches
- ☞ Touch the "Line Start" button - see the line run its auto cycle
- ☞ Touch the "Set Speed" indicator to change the line speed
  - Touch the parameter name to get info
  - Touch the square display symbol to close the setter

smarty dw240

the world's most advanced Universal Automation Controller



Outperforming and more user friendly than any PLC!

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

- ✔ *Advanced Motion Control*
- ✔ *Smart Process Control*
- ✔ *Distributed, deterministic processing over Ethernet*
- ✔ *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*

$$ BIG cost savings with the smarty dw240 $$

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

Example savings, using a smarty¹ or smarty²

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 now more powerful than ever!*

The new 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)

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 4.2" wide x 3.5" high x 3.1" deep
(105mm x 87mm x 77mm)

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 4.2" wide x 3.5" high x 3.1" deep
(105mm x 87mm x 77mm)

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 5.5" wide x 3.5" high x 3.1" deep
(140mm x 87mm x 77mm)

- 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 8.3" wide x 3.5" high x 3.1" deep
(210mm x 87mm x 77mm)

- 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

Peer-to-Peer Ethernet

	smarty¹	*smarty²*	*smarty³*	*smarty⁴*
Full Featured PLC Functions	✔	✔	✔	✔
Advanced Process Control	✔	✔ + Winders	✔ + Winders	✔ + Winders
Basic Motion Control	–	✔	–	–
Advanced Motion Control	–	–	✔	✔
***drive.web* distributed control**	✔	✔	✔	✔
100baseTX Ethernet	✔	✔	✔	✔
Modbus TCP/IP & EIP/PCCC	✔	✔	✔	✔
USB microB port	✔	✔	✔	✔
8 analog inputs	✔	✔	✔	✔
8 analog outputs	✔ (unipolar outputs)	✔ (bipolar outputs)	✔ (bipolar outputs)	✔ (bipolar outputs)
8 digital inputs	✔	✔	✔	✔
8 digital outputs	✔	✔	✔	✔
4 status LEDs	✔	✔	✔	✔
XIO extended I/O port	–	✔	✔	✔
Battery backup for clock	–	✔	✔	✔
ModbusRTU master (slave optional)	–	✔	✔	✔
Optional drive interface	–	✔	✔	✔
Frequency inputs/outputs	–	–	4 frequency in or timing/stepper output	6 frequency in + 7 timing/stepper output
Encoder	–	–	1 encoder, diff. AB	2 encoders, diff. ABZ + reconnect terminals
***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
Core UAC	dw241-BX-C1CD	dw240-DM-C2CD	dw240-DM-C3CD	dw240-DM-C4CD
P2 Vector Drive UAC	–	dw244-DM-C2CD	dw244-DM-C3CD	dw244-DM-C4CD
E3 Industrial Drive UAC	–	dw248-DM-C2CD	dw248-DM-C3CD	dw248-DM-C4CD
CANopen UAC	–	dw249-DM-C2CD	dw249-DM-C3CD	dw249-DM-C4CD
Dimensions	4.2" W x 3.5" H x 3.1" D (105 x 87 x 77mm)	4.2" W x 3.5" H x 3.1" D (105 x 87 x 77mm)	5.5" W x 3.5" H x 3.1" D (140 x 87 x 77mm)	8.3" W x 3.5" H x 3.1" D (210 x 87 x 77mm)

even faster » more compact » more versatile » more memory » more I/O » quicker, easier field wiring . . . NOW SHIPPING!

drive.web automation

smarty & speedy ...

The ***drive.web smarty & speedy*** Universal Automation Controllers use distributed control over Ethernet to provide cost effective, high performance integration in systems of any size or complexity.

automation without limits

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, iPad 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

Standards:

UL/cUL, CE, FCC part 15, IECS-003

smarty Universal Automation Controllers

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

CE c UL us LISTED

Winders & unwinders
Web tension control
Process line multi-drive coordination
Position control
Indexing
Cyclic position control
"Electronic line shaft"

Spindle orientation
Registration control
Encoder feedback for open loop drives
Cut-to-length
Speed profiling, MOP & draw
Process recipe and mode control
Temperature & process control

smart
fast
easy
affordable

smarty

controllers with a wide range of I/O

Used for all programmable control, peer-to-peer Ethernet networking and system integration tasks.

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

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

speedy

Embedded & onboard controllers

for total systems integration

so small it's easy to miss,
so smart it's impossible to beat!

Only 0.91" wide x 0.83" high x 1.42" deep
(23 x 21 x 36mm)

take a closer look ...

- **The easiest, affordable way to get all your drives & devices up onto peer to peer Ethernet**
- **Improve your system bandwidth by reducing your RS485 network load**
- **Add full featured programmable control**
- **Same huge processing power as a *smarty***
- **100baseTX Ethernet peer to peer networking**
- **USB port for easy system wide programming**
- **Fast ModbusRTU or CAN bus device interface**
- **Very smart, very fast!**

CE c UL us LISTED

Universal Automation Controller
Unbeatable Performance

speedy
miniature, full featured controllers

Serial interfaced on-board drives and third party devices via ModbusRTU or CANopen to provide low cost, improved performance, peer-to-peer Ethernet networking and full featured programmable control functions.

Film line winder

So small it fits anywhere, does everything!

Includes USB port for system wide programming, Ethernet ModbusTCP/IP and ***savvyPanel*** interface. Available forms:

- Tether interface with either plug-in or 4-wire serial connection
- Optional DIN rail mount with screw terminals
- Customized form for embedding into drives and devices

Cyclic indexing system

configure, connect & control ... everything!

- Provides full featured ***savvyPanel*** operator station interface
- Add unlimited processing muscle to your system
- Add peer to peer Ethernet networking
- Add easy USB system access
- Use as a gateway

speedy
for embedded or onboard control

speedy
embedded control

speedy
DIN mount, free standing controller
- Provide an Ethernet to ModbusRTU gateway to third party devices
- Provide extra system processing capacity & memory

drive.web automation

smarty - Universal Automation Controllers

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

dw212 *smarty* dedicated automation controller for ODE2 General Purpose AC Drives

dw213 *smarty* dedicated automation controller for ODP Sensorless Vector Drives

dw214 *smarty* dedicated automation controller for P2 Closed Loop Vector Drives

dw214S *smarty* dedicated automation controller for SEW MLTP Closed Loop Vector Drives

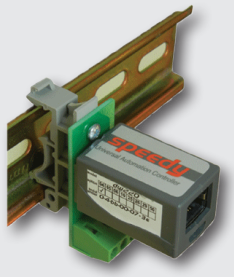
dw215 *smarty* dedicated automation controller for Yaskawa F7 drive

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 - Embedded Automation Controllers

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

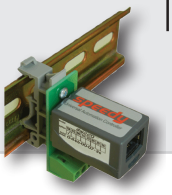
Airport transit car load sharing system

Model Numbers

smarty & speedy
Product build options

		smarty					speedy							
		dw210	dw212	dw213	dw214	dw215	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	X	X	X	X
-06	Winder Control FBL (dia. calc., taper tension, torque comp.)	X	X	X	X	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	X	X	X	X
-11	Encoder Control FBL (shaft lock, indexing, registration for Options 40-44)	X	X	X	X	X								
-29	Solar FBL with sun position calculator	X	X	X	X	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	X	X	X	X
Communications Options														
-04	Ethernet Modbus TCP/IP slave	X	X	X	X	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	X	X	X	X
-14	Power over Ethernet (2W max external load)	X	X	X	X	X								
-17*	ModbusRTU slave (RS485) isolated port	X	X	X	X	X								
-18*	ModbusRTU slave (RS485) isolated port + external encoder module port	X			X									
-19*	ModbusRTU slave (RS485) isolated port + ModbusRTU master non-iso	X			X									
-23*	ModbusRTU master (RS485) isolated port + external encoder module port	X			X									
I/O Options														
-24*	6 extra digital inputs, 24V	X	X	X	X	X								
-26	*savvyPanel* iPad/iPhone & touch screen PC operator station interface	X	X	X	X	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	X	X	X	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	X	X	X	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	X	X	X	X								
-37*	2-Channel, Open Loop Stepper Drive Controller with 2 fast event inputs	X			X									
-38*	2-Channel, Closed Loop Stepper Drive Controller, i2i port for OPT-42-45	X			X									
Encoder I/O Option														
-15*	Internal encoder input 2-24V, differential A & B (no marker) w/5VDC	X	X	X	X	X								
-16*	External encoder module interface port	X	X	X	X	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	X	X	X	X								
-42-46	2 ext encoder, 24V retransmit outputs (±1A, ±1B, ±2A, ±2B)	X	X	X	X	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

CE c UL us LISTED

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 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 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 and iOS 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 and iOS 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 and iOS 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 and iOS 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

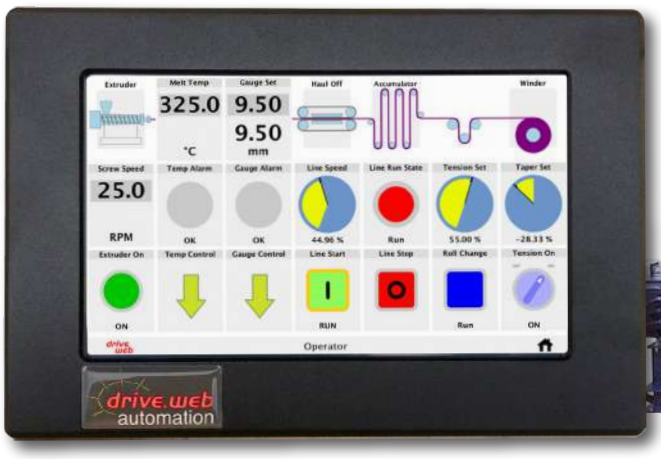
precision stepper control with 2 encoders - pack 5

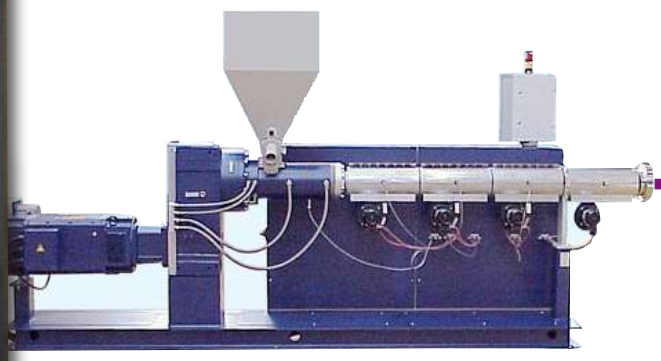
smarty dwOPTION -1125 for stepper drive control

- 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 and iOS 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 automation

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 -4010 for E3 Series General Purpose AC 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 or iOS operator station configuration
- basic wiring drawing

ADD CONFIGURED OPTIONS

		smarty					speedy						
		dw210	dw212	dw213	dw214	dw215	dw220	dw221	dw222	dw223	dw224	dw225	dw228	dw229
-1101	Open loop constant tension center winder (with option 1122)	X		X	X	X	X	X		X	X	X		
-1102	Closed loop dancer controlled winder (with option 1122)	X		X	X	X	X	X		X	X	X		
-1103	Closed loop load cell controlled winder (with option 1122)	X		X	X	X	X	X		X	X	X		
-1104	Slip core winder controller (with option 1122)	X		X	X	X	X	X		X	X	X		
-1105	Speed lock w/encoder feedback (with option 1124)	X			X	X								
-1106	Coordinated drive, line master controller (with option 1121)	X	X	X	X	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			X	X								
-1110	Three PID Controllers with integral reset and hold (with option 1121)	X	X	X	X	X								
-1113	2 channel pulse train follower (with options 05, 26, 27)	X	X	X	X	X								
-1115	RTD Temperature measurement & control up to 4 channels (w/opt 1121)	X												
-1117	Encoder cyclic position/indexing (with option 1124)	X			X	X								
-1118	Sun tracking for solar energy (with opts 05, 11, 16, 26, 29, 42 & 45 or 46)	X	X	X	X									
-1131	Encoder analog out, T13, Calibrated 1024PPR @1800RPM = 10V	X												

C UL US LISTED CE

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

drive.web automation

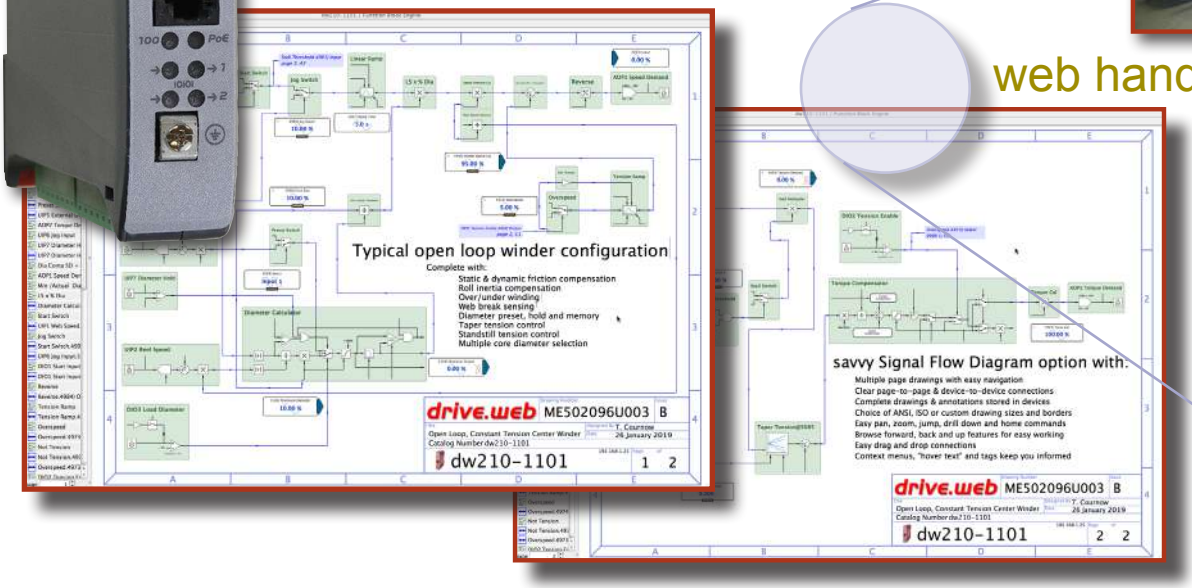
drive.web apps

WINDERS & UNWINDERS

smarty automation controllers use the *drive.web* distributed control technology to bring easy, cost effective intelligence to high performance drive systems.

smarty apps are pre-configured generic packages for common applications:

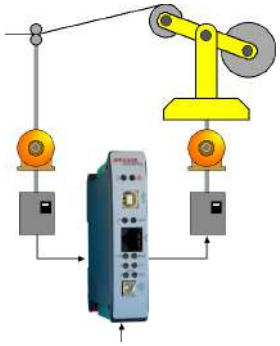
- *smarty* OPTION-1101 Open Loop Constant Tension Center Winder
- *smarty* OPTION-1102 Closed Loop Dancer Controlled Center Winder
- *smarty* OPTION-1103 Closed Loop Load Cell Controlled Center Winder
- *smarty* OPTION-1104 Closed Loop Slip Core Winder



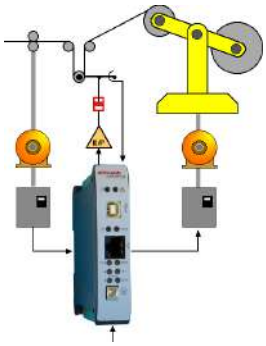
web handling excellence

These generic configurations can easily be edited by the intuitive *drive.web savvy* graphical tools to suit the particular application. The clear signal flow diagrams are stored in the controllers for reliable access in the field.

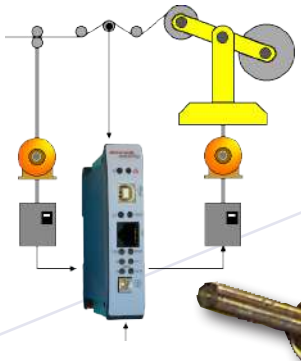
smarty OPTION-1101 OPEN LOOP CENTER WINDER



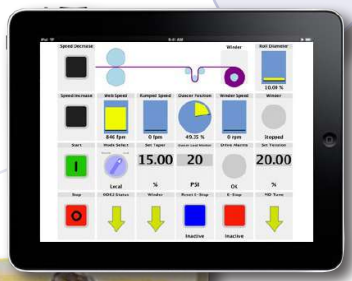
smarty OPTION-1102 DANCER CONTROLLED CENTER WINDER



smarty OPTION-1103 LOAD CELL CONTROLLED CENTER WINDER



savvyPanel touch screen control



Standard features include:

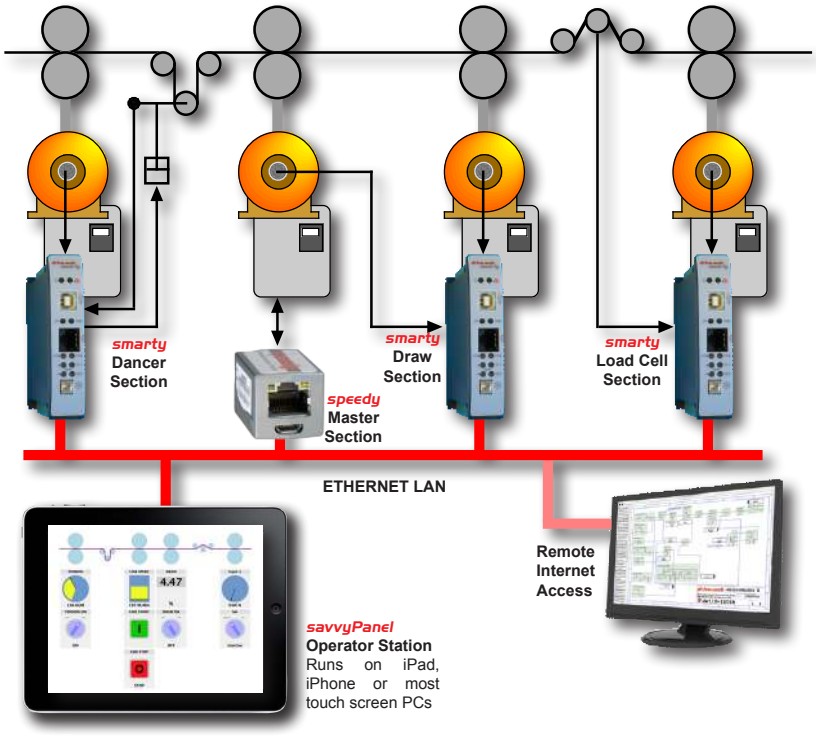
- Fully editable configurations and drawings
- Drive Interface either serial port or analog
- Process control & winder function block libraries
- Web break sensing
- Diameter calculation, memory, preset and hold
- Linear or hyperbolic taper tension
- Friction, inertia & torque compensation
- Multiple core presets
- Integral reset
- Adaptive control for high speed systems
- Standstill tension mode
- Jog/run/slack take up modes
- Turret indexing mode
- Anti-reverse clamps
- Core speed matching

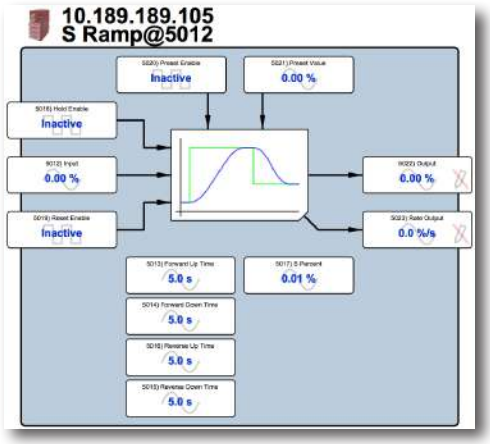
Optional features include:

- Over/under winding
- Line drive coordination
- Manual or auto-splicing modes
- Turret indexing
- Air pressure control
- Length & mass calculation
- Edge guide control
- Encoder inputs
- ModbusTCP/IP over Ethernet
- Serial communications
- ... and more.

smarty app OPTION-1106 Process Line Coordination

Standard function blocks used in combinations of **smartys** and **speedys** can be easily configured to provide line drive coordination in systems of any size or complexity.

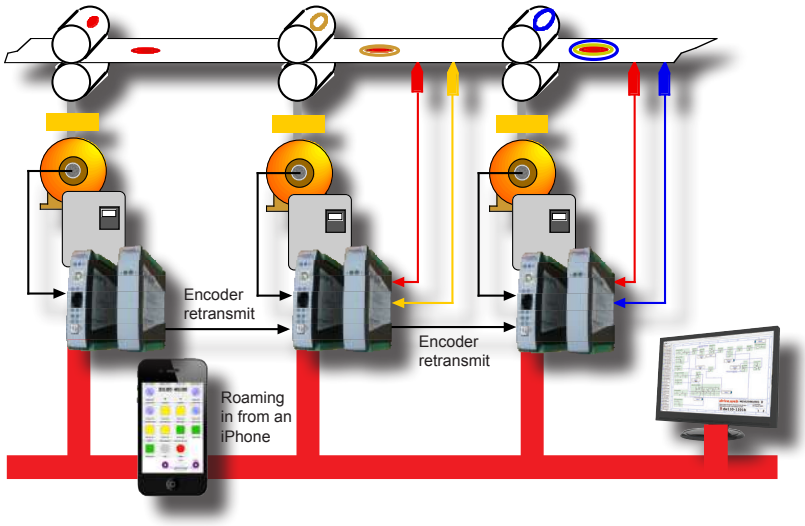


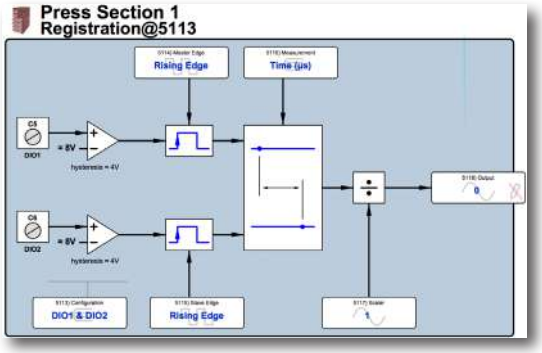


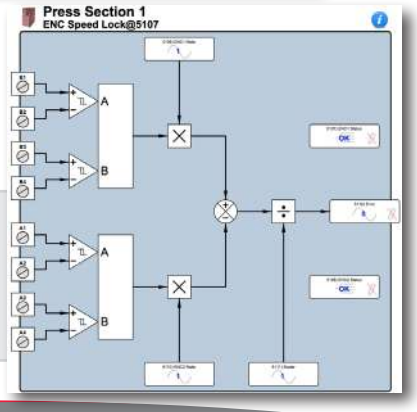
- Functions such as linear, S and hyperbolic ramps are used to provide master references.
- Programmable logic and switch functions are used to provide line run, line jog, local jog, interlocks, etc.
- PIDs, profilers, registration, indexing, phase lock and arithmetic blocks provide precise section control.

smarty app OPTION-1109 Registration & Electronic Line Shaft

The Registration & Electronic Line Shaft package is designed for applications such as print registration, synchronized component handling, position control, cut-to-length, etc., where precision drive coordination and spindle orientation are required.







Standard graphical function blocks for registration and speed locking make these complex processes quick and easy to configure and use.

The encoder retransmit option provides buffered encoder signals for secure use in multiple locations.

drive.web automation

drive.web apps

motion control OPTION-36 Motion Control Function Block Library

For multi-axis motion control of all types of drives - AC drives, DC drives, servos, steppers, hydraulic, linear actuator, etc., in a wide variety of general industrial position control applications including:

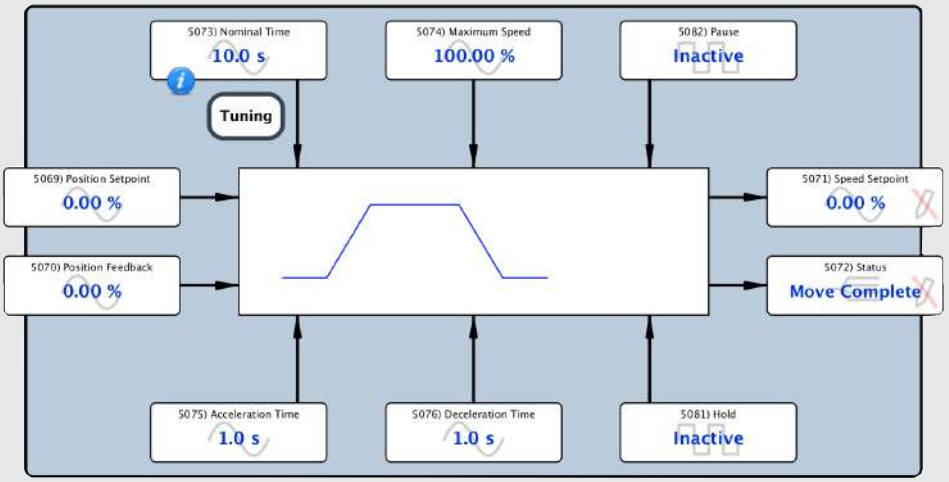
- Pick & place machines
- Packaging machines
- Painting robots
- Cut to length
- Automated assembly processes

Trapezoidal Motion

A key requirement for numerous machine controls

Key Features:

- Continuous target recalculation
- Easy system set up
- Easy performance optimization
- Pause with controlled accel/decel
- Hold with fast stop

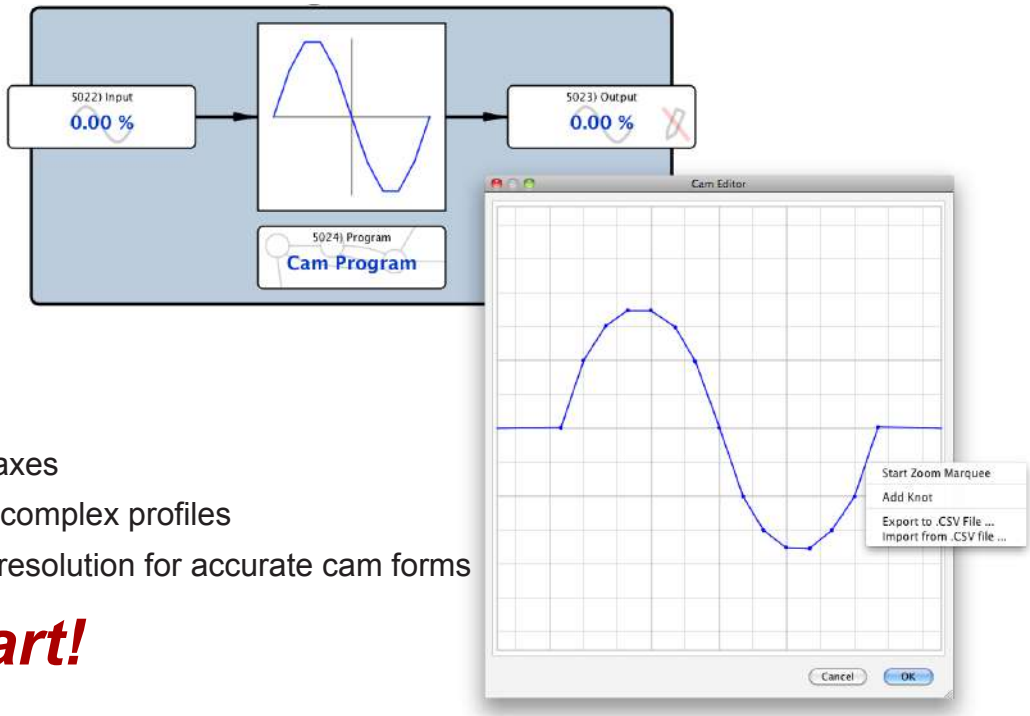


Cam Profile

A key requirement for numerous machine controls

Key Features:

- Easy graphical profile editor
- Optional .csv file import
- Easy .csv file export
- Easy system set up
- Easy integration with multiple axes
- Up to 100 “knots” or points for complex profiles
- 16 bit signed input and output resolution for accurate cam forms



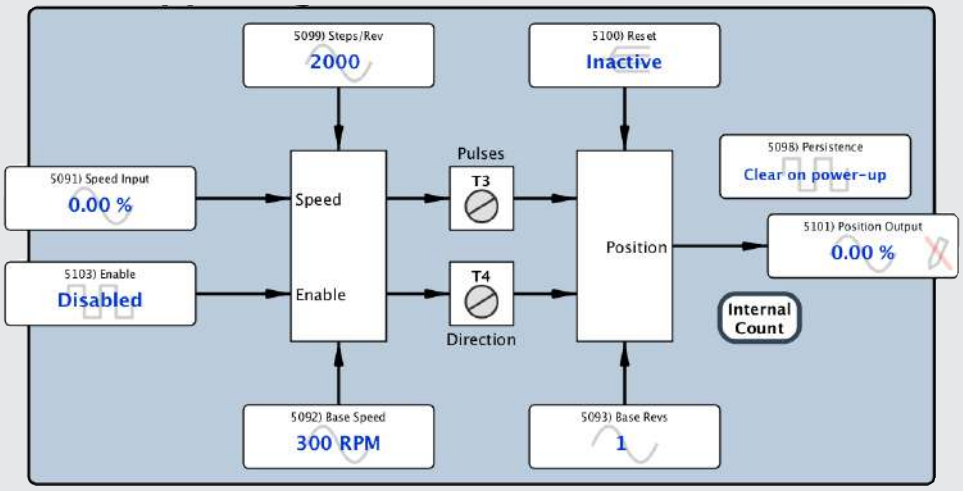
very smart!

motion control Stepper Drive Controllers

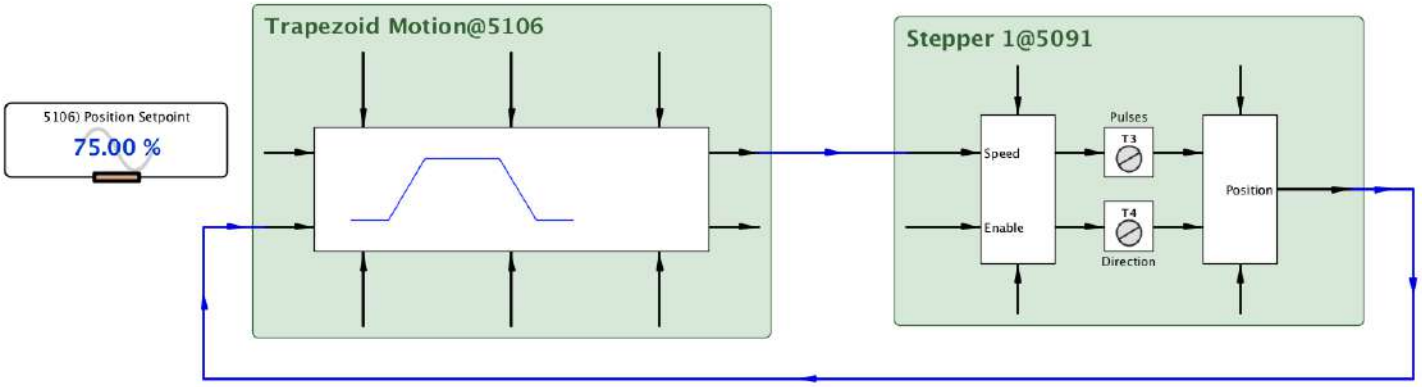
These stepper drive controller options are available for most versions of the ***smarty*** (see option selection table, page 23).

Both options include:

- 2 channels of pulse & direction
- 2 fast event inputs for count reset
- 64 bit pulse counts
- Automatic datum reset
- Easy set up
- Selectable count persistence with "clear on power up"

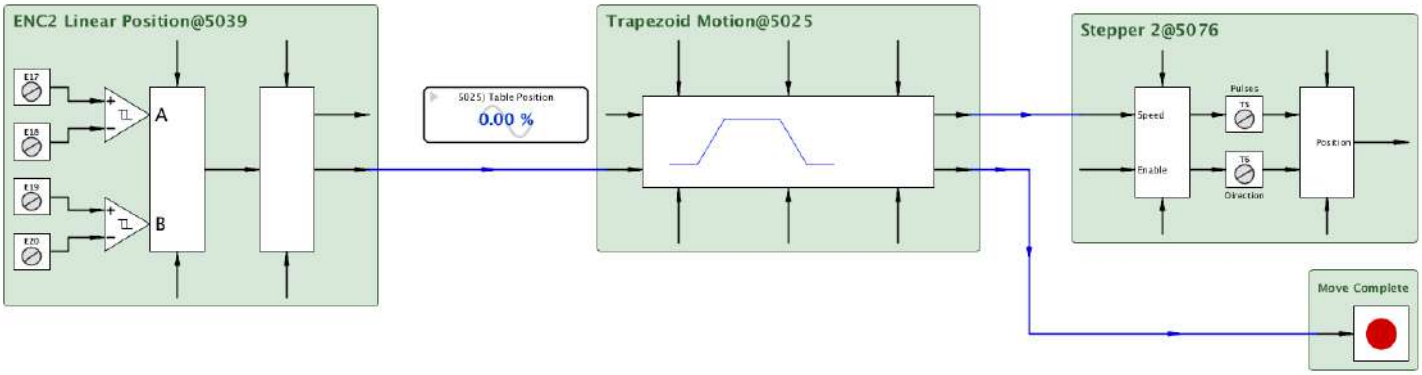


dwOPTION -37 Open Loop Stepper Drive Controller



In a typical open loop stepper drive application the "Position" parameter (derived from the pulse count) can be used to close the position control loop.

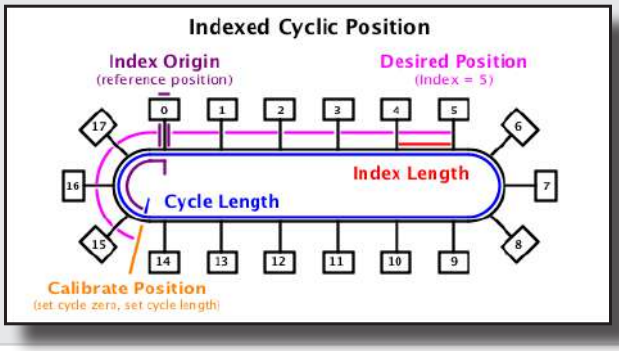
dwOPTION -38 Closed Loop Stepper Drive Controller



In a typical closed loop stepper drive application the position feedback can be provided by an encoder. The dwOPTION -42-45 encoder module also has two fast event inputs for auto count reset.

drive.web automation

smarty app OPTION-1117 Indexing & Cyclic Positioning

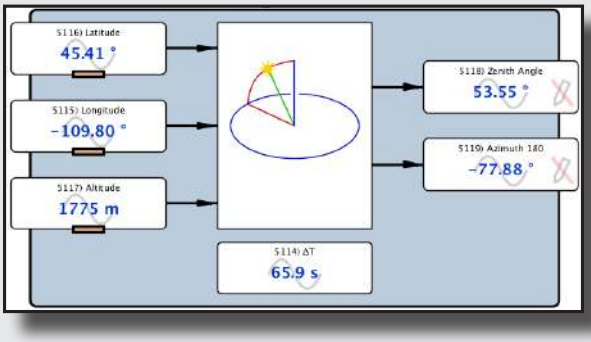


The optional Encoder Function Block Library available in the *smarty* includes a set of engineered function blocks for use in precision positioning applications such as packaging machines, machine center tool loaders, inventory carousels, stackers, etc.

Key Features

- Auto origin checking
- Auto index calculation
- Auto calculation of shortest move from point to point
- 64-bit encoder counts

smarty app OPTION-1118 Sun Position Calculator



The Solar Function Block Library provides precise calculation of the sun zenith and azimuth angles in solar energy systems. It can be synchronized with the SNTP server time and date and include a ∂T input parameter to compensate for the difference between UTC and Terrestrial Time for precise positioning of solar concentrators.

Key Features

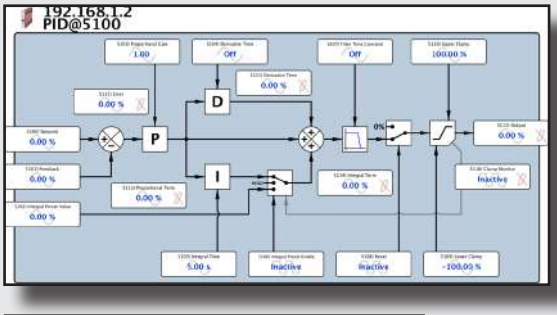
- Set up for any latitude, longitude and altitude.
- Fast calculation for use in mobile systems.
- SNTP synchronization support.
- Terrestrial Time correction input.

smarty app OPTION-1115 Temperature Measurement & Control

smarty controllers provide up to 4 temperature measurement or control loops using standard IEC751, Class A, 100Ω RTD temperature sensors. Both 2 and 3-wire configurations are supported with programmable calibration, linearization, and filtering features. Use Application Note HG503599. Please call for other RTD or thermocouple options.

savvyPanel touch screens provide both your temperature control interface and your complete machine control functions.

smart function blocks

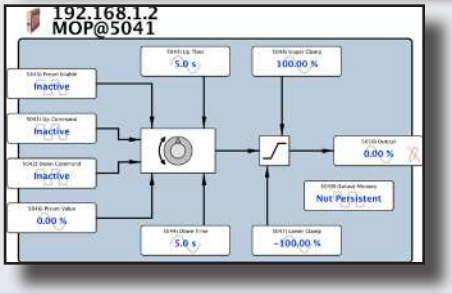


smart PID

One of the most commonly required functions in industrial control.

In most PLCs you get the basics but you are left to sweat the details required to make it work reliably in the real world. We cover the bases by including, integral preset, reset and hold, output filter, upper and lower clamps.

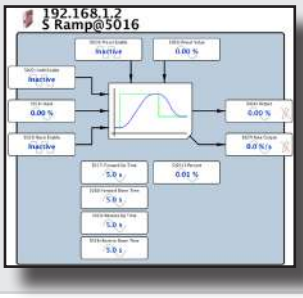
Saves a lot of time and heartache!



Motorized Pot

This MOP block makes short work of figuring out all the functions you need for raise/lower push button control

No sweat!



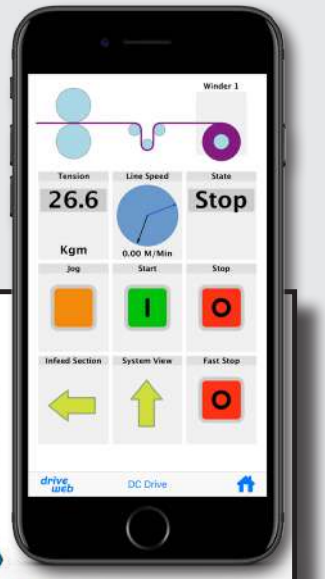
S-Ramps

Ever tried to create an S-Ramp that works predictably in a typical PLC? We make it easy, intuitive and reliable!

No problem!

smart function blocks State Machine Logic

Logic made easy and reliable!



This powerful, Intuitive, 21st. century technology takes the stress out of logic programming. It's very simple ..

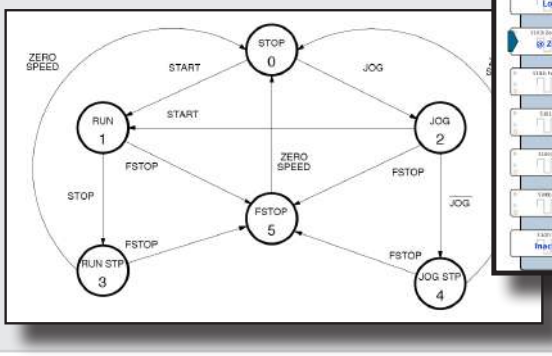
1. Define your machine states such as STOP, RUN, JOG, FAST STOP, etc.
2. Define the transitions that get you from one state to another, for example:
   START button gets you from STOP state to RUN state
   JOG button takes you from STOP state to JOG state
   FAST STOP button takes you from any state to FSTOP state
   (this can then look for a transition to ZERO SPEED before returning you to the STOP state)

It's that simple! No more sweating over relay interlocks, contact races, etc!

So obvious!

So smart!

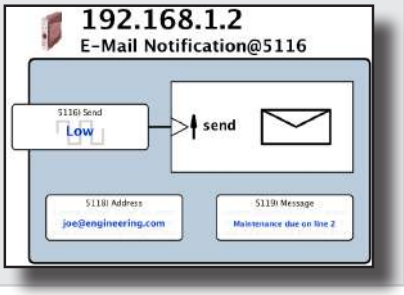
So easy!



smart utilities event email

The E-Mail function block available in every ***drive.web*** device enables you to send alerts, event notices, status reports, etc., to management, quality controllers, plant engineers in any location.

It is easy to set up and it ensures that key process issues are delivered to the right place at the right time.



drive.web smart ideas

WiFi Roaming Interface

There are many inexpensive third party WiFi routers that when plugged into a ***drive.web*** Ethernet network provide secure, robust, roaming system access in an industrial environment using an iOS device such as an iPad or iPhone.

Enterprise Integration

The powerful system wide access inherent in the ***drive.web*** technology provides a great backbone on which to build integrated solutions in your entire global enterprise without additional complex data processing requirements. Multilevel password protection enables safe access for offsite accountants, production controllers and corporate management.

Online Training & System Support

The IP addressing capability in every ***drive.web*** device ensures easy support for field service and live online training for machine operators, system designers and plant maintenance engineers. If an internet connection is available near your machine or process it takes less than 1 minute to set up a live connection to our engineers or any other off site location. ***drive.web*** provides system wide access from any single location on your LAN - very smart, very easy!

AC drives

P2 Series
Closed Loop Vector

High performance coordinated drive for:
- Process automation
- Converting
- Printing
- Machine tools

Up to 125 HP at 230 volts
Up to 350 HP at 460 volts
Up to 150 HP at 600 volts

IP20 package up to 150 HP - 50°C *
Optional NEMA 4X (IP66) to 10HP - 40°C *
NEMA 12 (IP55) 15 to 250 HP - 40°C *
*** Approvals: UL (except size 8), CE, C-Tick**

Closed loop speed better than 0.1%
150% overload, 60 secs (200%, 4 secs)
Up to 200% torque at zero speed
AC Induction, PM & Sync Rel motor modes
Built in brake transistor
EMC filter
Quiet - with switching up to 32KHz
DC Bus sharing
Safe Torque Off function
(IEC61508 SIL 2 & IEC62062 SIL 2)
Modbus or CANopen port
Plug-in control terminals

Options
drive.web programmable control
Extended I/O
EIP, ModbusTCP, ProfibusDP, DeviceNet
OLED display
Remote keypad
savvyPanel touch screen HMI

V3 Series - Energy Efficient Drives
For Fans & Pumps

Variable torque, fan & pump drive for:
- HVAC
- Water treatment
- Building systems
- Climate control
- Flow control
- Swimming pool control

Up to 100 HP at 230 volts
Up to 350 HP at 460 volts
Up to 150 HP at 600 volts

IP20 package up to 150 HP - 50°C *
NEMA 4X (IP66) to 15HP - 40°C (indoor) *
NEMA 12 (IP55) 15 to 250HP - 40°C *
*** Approvals: UL (except size 8), CE, C-Tick**

Low input harmonic current distortion
Compliant with EN61000-3-12
>98% drive efficiency
Low audible motor noise
Internal EMC filter
Smart energy optimization
Resonance avoidance
Sleep/wake functions
Intelligent maintenance intervals
110% overload, 60 secs
Motor flux braking
Quiet - with switching up to 32KHz
Power loss ride through
ModbusRTU, BACnet
OLED display

Motor options: Standard Induction - PM AC - Brushless DC - Synchronous Reluctance

Pump Features

Pump blockage detect/clear/stir
Pump preheat anti-condensation mode
Pump cascade control
Dry run protection

Fan Features

Drive fault auto bypass
Sleep mode with auto-boost
Fire override mode

Options
drive.web programmable control
Extended I/O
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad with OLED display
Power disconnect
savvyPanel touch screen HMI

drive.web distributed Ethernet control
Internet accessibility
Ethernet peer-to-peer networking
USB programming port
IIoT ready

TOUGH DRIVES FOR INDUSTRY

E3 Series
General Purpose VFD

Constant torque, heavy duty drive for:
- General purpose machine control
- Pumps and blowers
- Conveyors
- Mixers

To 1.5 HP at 110V in, 230V 3Ø out
To 15 HP at 230 volts
To 30 HP at 460 volts

Sensorless vector control for:
High starting torque & accurate speed
Motors: Induction, PM, BLDC, SynRM

Standard IP20 - 50°C
Optional NEMA 4X (IP66) to 30 HP, 40°C
Approvals: UL, C-UL, CE, C-Tick

Industrial, Pump & Fan control modes
150% overload, 60 secs (175%, 2 secs)
Spinstart into rotating motor
Built in brake transistor (sizes 2, 3 & 4)
Motor flux braking
Adjustable skip frequency
Quiet - with switching up to 32KHz
Power loss ride through
ModbusRTU port
Configurable I/O
Simple programming
On board help card
DIN rail and foot mount (IP20) (size 1 & 2)
NEMA 4X

Options
drive.web programmable control
Extended I/O
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
savvyPanel touch screen HMI

NEMA 4X - IP66 Series
For Harsh Environments

P2 Series Open/Closed Loop Vector Drives
E3 Series General Purpose VFDs
- Food processing
- Agricultural, water treatment
- Mining, cement, petrochemical

To 1.5 HP at 110V in, 230V 3Ø out (E3)
To 15 HP at 230 volts (E3)
To 30 HP at 460 volts (E3)
To 5 HP at 230 volts (P2)
To 10 HP at 460 volts (P2)

P2 NEMA 4X (IP66) - 40°C (indoor rated)
E3 NEMA 4X (IP66) - 40°C (outdoor rated)

Approvals: UL, C-UL, CE, C-Tick

Open & closed loop vector or V/Hz
Washdown, dust tight
Chemical resistant ABS enclosure
Corrosion protected heat sink
Spinstart into rotating motor
Built in brake transistor (sizes 2 & 3)
Motor flux braking
Adjustable skip frequency
Quiet - with switching up to 32KHz
Power loss ride through
ModbusRTU port
Compact packaging

Options
drive.web programmable control
Power isolator switch, speed pot, F/R switch
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
savvyPanel touch screen HMI

E3 Single Phase VFD
For SP & PSC motors

Variable torque, fan & pump drive for:
- Fans & blowers
- Centrifugal pumps
- Fume extractors
- Air flow control

To 0.75 HP at 110 volts
To 1.5 HP at 230 volts

Standard IP20 - 50°C
Optional NEMA 4X (IP66) - 40°C (outdoor rated)

Approvals: UL, C-UL, CE, C-Tick

For motor types:
- Shaded Pole (SP)
- Permanent Split Capacitor (PSC)

Built in brake transistor (size 2)
Motor flux braking
Adjustable skip frequency
Quiet - with switching up to 32KHz
Power loss ride through
ModbusRTU port
Innovative smart boost start
Simple programming
DIN rail and foot mount (IP20)

Options
drive.web programmable control
Extended I/O
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
savvyPanel touch screen HMI

P2 Series

SYSTEMS VECTOR DRIVES

- High performance
- Induction, PM & Sync Rel Motor Control
- 230, 460, 600 volts models
- IP20 units up to 150HP
- NEMA12 units 15 - 250HP
- NEMA 4X up to 10HP (indoor rated)

0.5 TO 350HP

FEATURES

Multiple Modes:
- Closed Loop Vector for high performance
- Open loop PM Motor Control
- Sensorless vector & V/Hz control

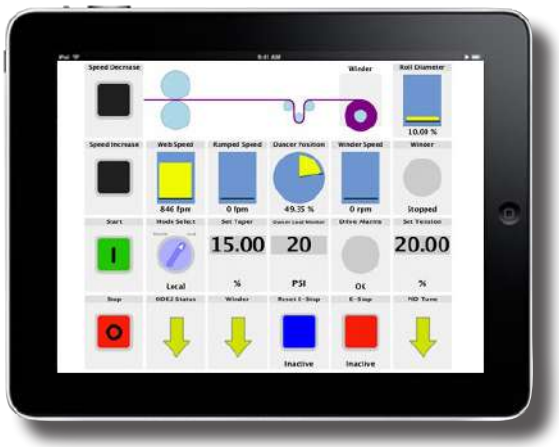
Up to 200% torque at zero speed
Sensorless speed regulation better than 1%
Torque control
DC bus sharing
Safe Torque Off function
Output to 500Hz (V/F Mode), 100Hz (Vector Mode)
Built-in 100% rated DB transistor up to 350HP
Integral PI controller
drive.web savvy function block programming
Silent running with up to 32KHz switching
200% starting torque
Bipolar 12 bit analog input (isolated +/-10V or 4-20mA)
ModbusRTU, RS485 port
CANopen port
EMC Filters
DC chokes in frame sizes 5 to 7
Single phase input up to 125HP
Power loss ride through
Process control options
Programmable I/O
Hours run log & trip log
Cartridge fans for easy maintenance (NEMA12 drives)
Options:
- Encoder feedback
- Additional basic & ***smarty*** I/O options
- EIP, Modbus TCP/IP, Profibus, DeviceNet, BACnet
- Memory stick with bluetooth interface
- Remote keypad
- 2Khz output in V/Hz mode
- Through panel mount for NEMA 12 versions

Smart drives for high performance coordinated drive systems and precision machine control

- Printing presses
- Extrusion & coating lines
- Automated assembly
- Indexing & registration
- Winders & web tension
- Material handling
- Cranes & hoists
- Textiles & fibres
- Metals industry
- Paper & cement mills
- Mining

NEMA 4X washdown models - see page 44

*UL certification does not apply to Size 8 P2 drives



P2 very smart drives

The ***drive.web*** automation technology uses distributed control over Ethernet to provide cost effective systems integration for systems of any size or complexity.

savvyPanel touch

Easy, high resolution, NEMA4, touch screen operator stations.

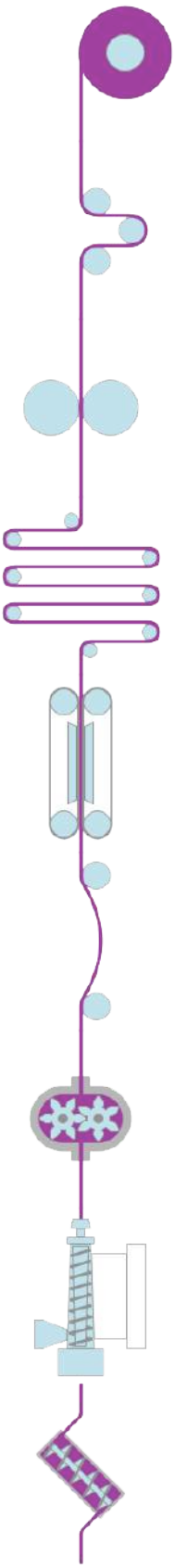
Also run ***savvyPanel*** on PCs or roam on iOS devices such as iPad, iPhone

drive.web smart automation

- powerful programmable control functions
- peer-to-peer over Ethernet
- smart iPad or touch screen PC operation
- Easy system wide Internet access

P2 Specifications

Input Ratings	Supply Voltage	200 - 240 ± 10% 380 - 480 ± 10%
	Supply Frequency	48 - 62 Hz
	Displacement PF	> 0.98
	Phase Imbalance	3% Maximum allowed
	Inrush Current	< Rated current
	Power Cycles	120 per hour max, evenly spaced
Output Ratings	Power Output	230V, 1-ph in: 1-3 HP (0.75-2.2 kW) 230V, 3-ph in: 1-120 HP (0.75-90 kW) 400V, 3-ph in: 0.75-160kW 460V, 3-ph in: 1-350 HP
	Overload Capacity	150% for 60 secs, 200% for 4 secs.
	Output Frequency	0-500Hz in V/Hz mode (0.1 Hz res) (optional 2KHz) 0-100Hz in vector made
Ambient Ratings	Temperature	Storage: -40°C to 60°C Operating: -10°C to 40°C (IP20, IP55 & IP66) -10°C to 50°C (IP20)
	Altitude	Up to 1000m ASL without de-rating Up to 2000m Max UL Approved Up to 4000m Max (non UL) Above 1000m, de-rate 1% per 100m
	Humidity	95% non-condensing
Enclosures	Ingress Protection	IP20 - Frame sizes 2, 3, & 8 IP55 (NEMA 12) - Frame sizes 4 to 7 IP66 (NEMA 4X) - Optional sizes 2 & 3
Programming	Keypad	Standard: built in keypad Optional: Remote keypad Optistick memory stick ***drive.web savvy*** software
	Display	Bright red LED (sizes 2 & 3) Bright Green OLED text (sizes 4 to 7)
Control	Control Modes	Closed Loop (encoder) speed control Closed Loop (encoder) torque control Open Loop PM vector control Sensorless vector speed control V/F Voltage vector Energy optimized V/F
	Modulation	4 - 32 kHz effective
	Stop Mode	Ramp to stop - adjustable 0.1-600 secs Safe Torque Off mode
	Braking	Motor flux braking (DC injection) Built in brake transistor
	Skip Frequency	Single point user adjustable
	Analog Setpoint Control	0-10v, 10-0v, ±10v 0-20mA, 20-0mA, 4-20mA, 20-4mA
	Preset Speeds	Up to 8
	Digital Setpoint Control	Keypad ModbusRTU CANopen
	Automation	Optional ***drive.web*** Ethernet distributed control + programmable control, extra I/O, operator stations
	Communications Options	***drive.web***, ModbusTCP, EIP, DeviceNet, Profibus
I/O Specification	Power Supply	24VDC, 100mA short protected 10VDC, 5mA for setpoint potentiometer
	Programmable Inputs	3 x Digital 10 to 30 VDC, response <4ms 2 x Analog/digital
	Programmable outputs	2 x Analog, 0-10V, 0-20mA, 4-20mA 2 x Relay NO, 6A @ 250VAC, 5A @ 30VDC
Control & Monitoring	PID	Internal PID with feedback display
	Fault Memory	Last 4 trips stored with time stamp
	Data Logging	Current, temperature, DC Bus volts prior to trip
	Maintenance Indicator	Service life monitor with user adjustable interval
	Monitoring	Hours run Resettable and non-resettable kWh meters



P2 Series Models & Ratings

Standard IP20 Packages
With EMC Filter & DB transistor

200-240V ± 10%, 1-ph in, 230V, 3-ph motor

Model	HP	Amps	Size
P2-22010-1HF42	1	4.3	2
P2-22020-1HF42	2	7	2
P2-22030-1HF42	3	10.5	2

200-240V ± 10%, 3-ph in, 230V, 3-ph motor

Model	HP	Amps	Size
P2-22010-3HF42	1	4.3	2
P2-22020-3HF42	2	7	2
P2-22030-3HF42	3	10.5	2
P2-32050-3HF42	5	18	3
P2-32075-3HF42	7.5	24	3

380-480V ± 10%, 3-ph in, 460V, 3-ph motor

Model	HP	Amps	Size
P2-24010-3HF42	1	2.2	2
P2-24020-3HF42	2	4.1	2
P2-24030-3HF42	3	5.8	2
P2-24050-3HF42	5	9.5	2
P2-34075-3HF42	7.5	14	3
P2-34100-3HF42	10	18	3
P2-34150-3HF42	15	24	3

NEMA12 (IP55) Packages
With EMC Filter, DB transistor

200-240V ± 10%, 3-ph in, 230V, 3-ph motor

Model	HP	Amps	Size
P2-42075-3HF4N ‡	7.5	24	4
P2-42100-3HF4N ‡	10	30	4
P2-42150-3HF4N ‡	15	46	4
P2-52020-3HF4N ‡	20	61	5
P2-52025-3HF4N ‡	25	72	5
P2-62030-3HF4N ‡	30	90	6
P2-62040-3HF4N ‡	40	110	6
P2-62050-3HF4N ‡	50	150	6
P2-62060-3HF4N ‡	60	180	6
P2-72075-3HF4N	75	202	7
P2-72100-3HF4N	100	248	7
P2-72125-3HF4N	125	302	7

380-480V ± 10%, 3-ph in, 460V, 3-ph motor

Model	HP	Amps	Size
P2-44150-3HF4N ‡	15	24	4
P2-44200-3HF4N ‡	20	30	4
P2-44250-3HF4N ‡	25	39	4
P2-44300-3HF4N ‡	30	46	4
P2-54040-3HF4N ‡	40	61	5
P2-54050-3HF4N ‡	50	72	5
P2-64060-3HF4N ‡	60	90	6
P2-64075-3HF4N ‡	75	110	6
P2-64120-3HF4N ‡	120	150	6
P2-64150-3HF4N ‡	150	180	6
P2-74175-3HF4N	175	202	7
P2-74200-3HF4N	200	240	7
P2-74250-3HF4N	250	302	7

IP20 units to 350HP

P2-84300-3H042	300	370	8 (not UL)
P2-84350-3H042	350	480	8 (not UL)

For single phase supply derate to 50%

Note:
Drives marked ‡ are also available in IP20 form. Please call for details, pricing, and availability.

P2 Series 600 Volts Drives

600VAC DRIVES

Standard IP20 Packages to 20 HP
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

Model	HP	Amps	Size
P2-26010-3H042	1	2.1	2
P2-26020-3H042	2	3.1	2
P2-26030-3H042	3	4.1	2
P2-26050-3H042	5	6.5	2
P2-26075-3H042	7.5	9	2
P2-36100-3H042	10	12	3
P2-36150-3H042	15	17	3
P2-36200-3H042	20	22	3

NEMA12 (IP55) Packages to 250 HP
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

Model	HP	Amps	Size
P2-46200-3H04N ‡	20	22	4
P2-46250-3H04N ‡	25	28	4
P2-46300-3H04N ‡	30	34	4
P2-46400-3H04N ‡	40	43	4
P2-56050-3H04N ‡	50	54	5
P2-56060-3H04N ‡	60	65	5
P2-66075-3H04N ‡	75	78	6
P2-66100-3H04N ‡	100	105	6
P2-66125-3H04N ‡	125	130	6
P2-66150-3H04N ‡	150	150	6

P2 OPTIONS

T2-ENCOD-IN	Encoder feedback module
T2-OPORT-IN	Remote keypad & display
T2-OPPAD-IN	Remote keypad w/OLED display

Dimensions

Size	2	3	4	5	6	7	8
Height (ins)	8.7"	10.3"	17.7"	21.3"	34.1"	50.4"	40"
Height (mm)	221	261	450	540	865	1280	995
Width (ins)	4.4"	5.2"	6.8"	9.3"	13.0"	13.0"	19"
Width (mm)	112	131	171	235	330	330	482
Depth (ins)	7.3"	8.1"	9.9"	10.7"	13.0"	14.2"	19"
Depth (mm)	185	205	252	270	330	360	480
Weight (LBS)	4	7.7	25.4	50.7	121	196.2	282
Weight (KG)	1.8	3.5	11.5	23	55	89	128

V3 ECO DRIVES

Energy Efficient Drives

Variable torque, fan & pump drive for:

- HVAC
- Building systems
- Climate control
- Flow control

Up to 350HP at 460 Volts

IP20 up to 150HP - 50°C
NEMA4X (IP66) to 15HP - 40°C (indoor) *
NEMA12 (IP55) 15 to 250HP - 40°C *

- Low input harmonic current distortion
- Compliant with EN61000-3-12
- >98% drive efficiency
- Low audible motor noise
- Clear, OLED, multi-language display
- Internal EMC filter
- Smart energy optimization
- Smart pump & fan functions
- Resonance avoidance
- Sleep/wake functions
- Intelligent maintenance intervals
- 110% overload, 60 secs
- Motor flux braking
- ModbusRTU, BACnet
- Energy optimization for max efficiency
- DC bus chokes in frames 6 - 7

Motor compatibility:

- Induction motors
- PM AC motors
- Brushless DC motors
- Synchronous reluctance

Options

drive.web savvy smart programmable automation
Easy off site Internet access to complete systems
Ethernet peer-to-peer networking
Extended I/O
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
Power disconnect, sizes 2 & 3
savvyPanel touch screen HMI

*UL certification does not apply to Size 8 V3 drives

V3 ECO DRIVE

With Smart Energy Optimization
Typically saves 2 to 4% energy over standard VFDs

Every 1% saves 1100 kwh per year for 50HP running 60 hours a week, 50 weeks a year!

How much energy could you save?

Estimate potential energy savings, CO_2 emissions and financial savings for your application with the Bardac Drives Energy Savings Calculator tool.
bardac.com/calculator

V3 ECO PUMP & FAN

VARIABLE TORQUE FAN & PUMP DRIVES

UP TO 350 HP

- **Fan & pump features**
- **IP20 units to 150 HP**
- **NEMA 4X (IP66) units to 15 HP**
- **NEMA 12 (IP55) units to 250 HP**
- **BACnet & ModbusRTU**

FEATURES

Dedicated HVAC and centrifugal pump controller
Built in EMC filter standard
DC bus chokes built in, sizes 6 - 7
Multi-language, plain text OLED display for ease of use
Energy optimization for maximum efficiency
BACnet and ModbusRTU as standard
Built-in hours run and kWh meters
Built-in PID controller
Advanced application functions for easy programming
High frequency switching (up to 32kHz) for quiet running
Built-in motor flux braking
Programmable I/O
Power loss ride through
40°C ambient
HVAC functions:
- Bi-directional Fire Mode for emergency ventilation
- Drive fault bypass select
- Sleep mode with auto boost

Pump functions:
- Blockage detection/clear/stir
- Adjustable cleaning cycle
- Multi-pump cascade control
- Dry run protection
- Pump pre-heat anti condensation mode

Standards - UL (except size 8), CE, C-Tick on all models

Options:

drive.web savvy smart programmable automation
savvyPanel graphical, touch screen operator technology
Easy, off site Internet access to the complete system
Ethernet peer to peer networking
Ethernet ModbusTCP and EIP
3 additional relay outputs for cascade control
Additional ***smarty*** I/O option
Built in power isolator switch sizes 2 & 3

Specifications

Input Ratings	Supply Voltage	200 - 240 ± 10% 380 - 480 ± 10% 500 - 600 ± 10%
	Supply Frequency	48 - 62 Hz
	Displacement PF	> 0.98
	Phase Imbalance	3% Maximum allowed
	Inrush Current	< Rated current
	Power Cycles	120 per hour max, evenly spaced
Output Ratings	Power Output	230V, 1-ph in: 1-3 HP (0.75-2.2 kW) 230V, 3-ph in: 1-120 HP (0.75-90 kW) 460V, 3-ph in: 1-250 HP 575V, 3-ph in: 1-150 HP
	Overload Capacity	110% for 60 secs, 125% for 2 secs.
	Output Frequency	0-120Hz, 0.1 Hz resolution
Ambient Ratings	Temperature	Storage: -40°C to 60°C Operating: -10°C to 40°C
	Altitude	Up to 1000m ASL without de-rating Up to 2000m Max UL Approved Up to 4000m Max (non UL) Above 1000m, de-rate 1% per 100m
	Humidity	95% non-condensing
Enclosures	Ingress Protection	NEMA4X (indoor) sizes 2, 3; NEMA12 sizes 4 to 6
Programming	Keypad	Standard: built in keypad Optional: Remote keypad ***drive.web savvy*** software
	Display	Standard: Bright Green OLED
Control	Control Modes	ECO sensorless vector for: motor options: Standard Induction, PMAC, BLDC, Sync Rel
	Modulation	4 - 32 kHz effective
	Stop Mode	Ramp to stop - adjustable 0.1-600 secs Coast to stop
	Braking	Motor flux braking (DC injection)
	Skip Frequency	Single point user adjustable
	Analog Setpoint Control	0-10v, 10-0v, ±10v 0-20mA, 20-0mA, 4-20mA, 20-4mA
	Digital Setpoint Control	Keypad ModbusRTU BACnet
	Automation	Optional ***drive.web*** Ethernet distributed control + programmable control, extra I/O, operator stations
	Communications Options	***drive.web***, ModbusTCP, EIP, DeviceNet, Profibus
I/O Specification	Power Supply	24VDC, 100mA short protected 10VDC, 5mA for setpoint potentiometer
	Programmable Inputs	3 x Digital 10 to 30 VDC, response <4ms 2 x Analog / digital
	Programmable outputs	2 x Analog, 0-10V, 0-20mA, 4-20mA 2 x Relay NO, 6A @ 250VAC, 5A @ 30VDC
Control & Monitoring	PID	Internal PID with feedback display
	Fault Memory	Last 4 trips stored with time stamp
	Data Logging	Current, temperature, DC Bus volts prior to trip
	Maintenance Indicator	Service life monitor with user adjustable interval
	Monitoring	Drive hours run & cooling fan run time Resettable and non-resettable kWh meters
Application functions	HVAC Functions	Fire mode for emergency ventilation
	Pump functions	Pump blockage detection Pump cleaning cycles Multi-pump cascade control Pump stir mode

The harder they work, the more you save!

200-240V ± 10%, 1-ph in, 230V, 3-ph motor

Model	HP	Amps	Size	NEMA
size 2 - IP20, LED display & EMC Filter:				
V3-220043-1F12	1	4.3	2	IP20
V3-220070-1F12	2	7	2	IP20
V3-220105-1F12	3	10.5	2	IP20
size 2 - NEMA 4X, OLED display & EMC Filter:				
V3-220043-1F1X or D	1	4.3	2	4X
V3-220070-1F1X or D	2	7	2	4X
V3-220105-1F1X or D	3	10.5	2	4X

200-240V ± 10%, 3-ph in, 230V, 3-ph motor

Model	HP	Amps	Size	NEMA
sizes 2 & 3 - IP20, LED display & EMC Filter:				
V3-220043-3F12	1	4.3	2	IP20
V3-220070-3F12	2	7	2	IP20
V3-220105-3F12	3	10.5	2	IP20
V3-320180-3F12	5	18	3	IP20
V3-320240-3F12	7.5	24	3	IP20
sizes 2 & 3 - NEMA 4X, OLED display & EMC Filter:				
V3-220043-3F1X or D	1	4.3	2	4X
V3-220070-3F1X or D	2	7	2	4X
V3-220105-3F1X or D	3	10.5	2	4X
V3-320180-3F1X or D	5	18	3	4X
V3-320240-3F1X or D	7.5	24	3	4X
sizes 4-7 - NEMA 12, OLED display, EMC filter:				
V3-420300-3F1N ‡	10	30	4	12
V3-420460-3F1N ‡	15	46	4	12
V3-520610-3F1N ‡	20	61	5	12
V3-520720-3F1N ‡	25	72	5	12
V3-520900-3F1N ‡	30	90	5	12
V3-621100-3F1N ‡	40	110	6	12
V3-621500-3F1N ‡	50	150	6	12
V3-621800-3F1N ‡	60	180	6	12
V3-722020-3F1N	75	202	7	12
V3-722480-3F1N	100	248	7	12

380-480V ± 10%, 3-ph in, 460V, 3-ph motor

Model	HP	Amps	Size	NEMA
sizes 2 & 3 - IP20, LED display & EMC Filter:				
V3-240022-3F12	1	2.2	2	IP20
V3-240041-3F12	2	4.1	2	IP20
V3-240058-3F12	3	5.8	2	IP20
V3-240095-3F12	5	9.5	2	IP20
V3-340140-3F12	7.5	14	3	IP20
V3-340180-3F12	10	18	3	IP20
V3-340240-3F12	15	24	3	IP20
sizes 2 & 3 - NEMA 4X, OLED display & EMC Filter:				
V3-240022-3F1X or D	1	2.2	2	4X
V3-240041-3F1X or D	2	4.1	2	4X
V3-240058-3F1X or D	3	5.8	2	4X
V3-240095-3F1X or D	5	9.5	2	4X
V3-340140-3F1X or D	7.5	14	3	4X
V3-340180-3F1X or D	10	18	3	4X
V3-340240-3F1X or D	15	24	3	4X
sizes 4-7 - NEMA 12, OLED display & EMC filter:				
V3-440300-3F1N ‡	20	30	4	12
V3-440390-3F1N ‡	25	39	4	12
V3-440460-3F1N ‡	30	46	4	12
V3-540610-3F1N ‡	40	61	5	12
V3-540720-3F1N ‡	50	72	5	12
V3-540900-3F1N ‡	60	90	5	12
V3-641100-3F1N ‡	75	110	6	12
V3-641500-3F1N ‡	120	150	6	12
V3-641800-3F1N ‡	150	180	6	12
V3-642020-3F1N ‡	175	202	6	12
V3-742400-3F1N	200	240	7	12
V3-743020-3F1N	250	302	7	12
size 8 IP20, OLED display & EMC Filter (not UL)				
V3-843700-3F12	300	370	8	IP20
V3-844500-3F12	350	450	8	IP20

speedy on board
Ethernet networking
USB programming
smart automation

Size 2 & 3 drives model number suffix X or D

X = no disconnect switch

D = with power disconnect switch

ECO Efficient Economical Smart Solutions

Note:
Drives marked ‡ are also available in IP20 form. Please call for details, pricing, and availability.

Dimensions & Weights

Size	2	3	4	5	6	7	8
IP20 Drives							
Height (ins)	8.7"	10.3"					40"
Height (mm)	221	261					995
Width (ins)	4.4"	5.2"					19"
Width (mm)	110	131					482
Depth (ins)	7.3"	8.1"					19"
Depth (mm)	185	205					480
Weight LB/KG	4/1.8	7.7/3.5					282/128
NEMA 4X (IP66) Drives							
Height (ins)	10.1"	12.2"					
Height (mm)	257	310					
Width (ins)	7.4"	8.3"					
Width (mm)	188	211					
Depth (ins)	9.4"	10.5"					
Depth (mm)	239	266					
Weight LB/KG	10.6/4.8	17/7.7					
NEMA 12 (IP55) Drives							
Height (ins)			17.8"	21.3"	34.1"	50.4"	
Height (mm)			450	540	865	1280	
Width (ins)			6.8"	9.3"	13.0"	13.0"	
Width (mm)			173	235	330	330	
Depth (ins)			9.9"	10.6"	13.0"	14.2"	
Depth (mm)			252	270	330	360	
Weight LB/KG			25/12	51/23	121/55	196/89	

600 Volts Drives

500-600V ± 10%, 3-ph in 500-600V, 3-ph motor

Model	HP	Amps	Size	NEMA
IP20 with LED display				
V3-260021-3012	1	2.1	2	IP20
V3-260031-3012	2	3.1	2	IP20
V3-260041-3012	3	4.1	2	IP20
V3-260065-3012	5	6.5	2	IP20
V3-260090-3012	7.5	9	2	IP20
V3-360120-3012	10	12	3	IP20
V3-360170-3012	15	17	3	IP20
V3-360220-3012	20	22	3	IP20
NEMA 4X (IP66), with OLED text display				
Unswitched				
V3-260021-301X	1	2.1	2	4X
V3-260031-301X	2	3.1	2	4X
V3-260041-301X	3	4.1	2	4X
V3-260065-301X	5	6.5	2	4X
V3-260090-301X	7.5	9	2	4X
V3-360120-301X	10	12	3	4X
V3-360170-301X	15	17	3	4X
w/Disconnect				
V3-260021-301D	1	2.1	2	4X
V3-260031-301D	2	3.1	2	4X
V3-260041-301D	3	4.1	2	4X
V3-260065-301D	5	6.5	2	4X
V3-260090-301D	7.5	9	2	4X
V3-360120-301D	10	12	3	4X
V3-360170-301D	15	17	3	4X
NEMA 12 (IP55) with OLED text display				
V3-460220-301N ‡	20	22	4	12
V3-460280-301N ‡	25	28	4	12
V3-460340-301N ‡	30	34	4	12
V3-460430-301N ‡	40	43	4	12
V3-560540-301N ‡	50	54	5	12
V3-560650-301N ‡	60	65	5	12
V3-660780-301N ‡	75	78	6	12
V3-661050-301N ‡	100	105	6	12
V3-661300-301N ‡	125	130	6	12
V3-661500-301N ‡	150	150	6	12

E3 Sensorless Vector

General purpose drives with all purpose features
Up to 30 HP
Basic IP20 or NEMA 4X (IP66)
Basic control or full featured systems drive
3-Phase & single phase motor versions

Basic or loaded, the new E3 is designed to give the best in value, performance and ease of use.

Sensorless vector control for:

- *High efficiency operation*
- *Selectable motor types*
  Standard Induction, AC PM, BLDC, Sync Reluctance
- *3 selectable operating modes:*
  Industrial, Fan & Pump

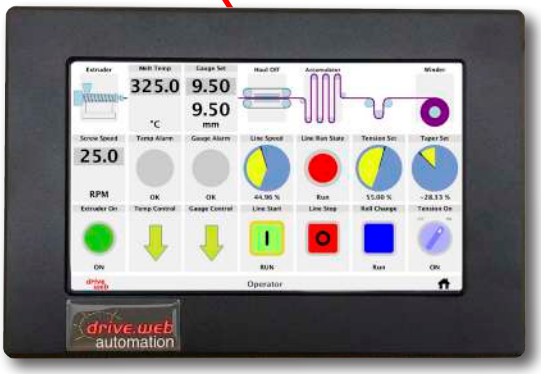
Expandable
Economical
Easy
Enduring
Efficient

OPTISTICK
Plug-in upload/download configuration memory stick

speedy dw228
Programmable control & Ethernet networking

T2-OPPAD-IN
Remote keypad & TFT display

savvyPanel touch
7" touch screen
Auto-connects to all drives & devices on your LAN



KEY FEATURES

Compact packaging
Simple mechanical and electrical installation
50°C ambient rating (IP20), 40°C ambient rating (NEMA 4X)
150% rating for 60 seconds, 175% for 2 seconds
Simple 14 parameter basic set up
Integral brake transistor, sizes 2, 3 & 4 (100% continuous rated)
ModbusRTU serial port

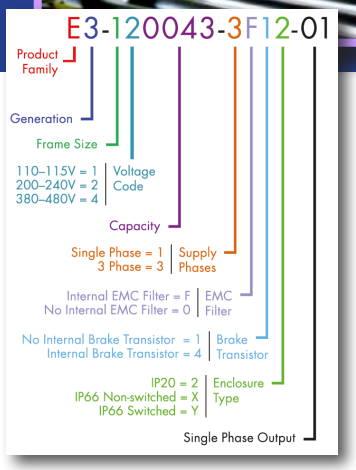
Options:

Remote keypad and display
OPTISTICK plug in unit for fast up/down load of parameters
smarty remote I/O, programmable control & Ethernet networking
speedy programmable control & Ethernet networking
savvyPanel smart touch screen operator station technology
Integral RFI filter option

For NEMA 4X versions, see Page 44

SPECIFICATION

Output	Frequency	0 to 500Hz. (Please call for special builds up to 2000Hz)
Supply options	Frequency	48 - 62 Hz
	Voltage/Phases	100 - 132 volts max, single phase (0.5 - 1.5HP) 180 - 264 volts max, 1-phase (0.5 - 5HP) 180 - 264 volts max, 3-phase (0.5 - 15HP) 342 - 528 volts max, 3-phase (1 - 30HP)
Environment	Temperature	IP20: Operating, -10 to 50°C max | Storage, -40 to 60°C NEMA 4X: Operating, -10 to 40°C max | Storage, -40 to 60°C
	Altitude	0-2000M, derate 1% per 100M above 1000M
	Humidity	up to 95%, non condensing
	Ingress Protection	Basic IP20, Optional IP66 (NEMA 4X outdoor rated)
Control	Mode	Voltage vector
	PWM frequency	4 to 32KHz (effective)
	V/Hz ratio	Linear
	Boost	Yes
	Stop modes	Coast / ramp / DC brake
	Skip frequency	One point, adjustable frequency band
	Setpoint reference	0-10VDC, 4-20mA, 20-4mA, 0-20mA, Keypad, Modbus
	Preset speeds	4
	PI control	Direct & analog input trim
	Spin start	Starts safely into rotating motor
	Accel/Decel	0 - 600 seconds + Ramp stop decel 0 - 600 seconds
Configurable I/O		Input 1 Programmable digital input
	Input 2	Programmable digital input
	Input 3	Configurable analog or digital input
	Input 4	Configurable analog or digital input
	Output 1	Configurable analog or digital output
	Output 2	Normally open relay contact 30VDC 5A, 250VAC 6A
Protection	Drive trip	Over/under volts, over current, external trip,
	Motor	Overload, over temperature, short circuit, ground fault
	Trip memory	Last 4 trips stored



Cost effective either stand alone or networked in coordinated systems

Standard IP20 Protected

IP20

Size	1		2		3		4	
	in	mm	in	mm	in	mm	in	mm
High	6.8	173	8.7	221	10.3	261	16.6	420
Wide	3.3	83	4.4	110	5.2	131	6.8	171
Deep	4.9	123	5.9	150	6.9	175	8.4	212
Weight	lbs	kg	lbs	kg	lbs	kg	lbs	kg
	2.2	1.0	3.75	1.7	7.0	3.2	20.0	9.1

drive.web
smart automation

- powerful programmable control functions
- peer-to-peer over Ethernet
- smart iPad or touch screen PC operation
- Internet access

savvyPanel operator station technology runs on iPad, iPhone or touch screen PC

STANDARD IP20 DRIVES

Model	Supply	Motor	Power	Amps	Size
E3-110023-1012	1Ø, 115V	3Ø, 230V	0.5HP	2.3	1
E3-110043-1012	1Ø, 115V	3Ø, 230V	1.0HP	4.3	1
E3-210058-1042	1Ø, 115V	3Ø, 230V	1.5HP	5.8	2
E3-120023-1012	1Ø, 230V	3Ø, 230V	0.5HP	2.3	1
E3-120043-1012	1Ø, 230V	3Ø, 230V	1HP	4.3	1
E3-120070-1012	1Ø, 230V	3Ø, 230V	2HP	7	1
E3-220070-1042	1Ø, 230V	3Ø, 230V	2HP	7	2
E3-220105-1042	1Ø, 230V	3Ø, 230V	3HP	10.5	2
E3-320153-1042	1Ø, 230V	3Ø, 230V	5HP	15.3	3
E3-120023-3012	3Ø, 230V	3Ø, 230V	0.5HP	2.3	1
E3-120043-3012	3Ø, 230V	3Ø, 230V	1HP	4.3	1
E3-120070-3012	3Ø, 230V	3Ø, 230V	2HP	7	1
E3-220070-3042	3Ø, 230V	3Ø, 230V	2HP	7	2
E3-220105-3042	3Ø, 230V	3Ø, 230V	3HP	10.5	2
E3-320180-3042	3Ø, 230V	3Ø, 230V	5HP	18	3
E3-320240-3042	3Ø, 230V	3Ø, 230V	7.5HP	24	3
E3-420300-3042	3Ø, 230V	3Ø, 230V	10HP	30	4
E3-420460-3042	3Ø, 230V	3Ø, 230V	15HP	46	4
E3-140022-3012	3Ø, 460V	3Ø, 460V	1HP	2.2	1
E3-140041-3012	3Ø, 460V	3Ø, 460V	2HP	4.1	1
E3-240041-3042	3Ø, 460V	3Ø, 460V	2HP	4.1	2
E3-240058-3042	3Ø, 460V	3Ø, 460V	3HP	5.8	2
E3-240095-3042	3Ø, 460V	3Ø, 460V	5HP	9.5	2
E3-340140-3042	3Ø, 460V	3Ø, 460V	7.5HP	14	3
E3-340180-3042	3Ø, 460V	3Ø, 460V	10HP	18	3
E3-340240-3042	3Ø, 460V	3Ø, 460V	15HP	24	3
E3-440300-3042	3Ø, 460V	3Ø, 460V	20HP	30	4
E3-440390-3042	3Ø, 460V	3Ø, 460V	25HP	39	4
E3-440460-3042	3Ø, 460V	3Ø, 460V	30HP	46	4

Please call +410-604-3400 for availability

NEMA 4X (IP66) Enclosed Drives

For harsh, wet & dirty environments

Embed a *speedy* in the drive to provide Ethernet networking & programmable control

Switched version with keypad, display, speed pot, forward/off/reverse switch & power isolator switch.

Unswitched version with keypad & display.

Key Features:

- 40°C ambient temperature
- Conduit cable entry
- Padlockable power switch
- ModbusRTU port
- ABS moldings & corrosion resistant heat sink
- All standard drive features included
- Brake standard on sizes 2 & 3
- Optional internal Ethernet size 2 & 3

NEMA 4X (IP66) OUTDOOR RATED E3 SERIES GENERAL PURPOSE VFD

*sun shade required for outdoor use

SIZE	HP	AMPS	UNSWITCHED	SWITCHED
115V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR				
1	0.5	2.3	E3-110023-101A	E3-110023-101B
1	1.0	4.3	E3-110043-101A	E3-110043-101B
2	1.5	5.8	E3-210058-104A	E3-210058-104B
230V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR				
1	0.5	2.3	E3-120023-101A	E3-120023-101B
1	1	4.3	E3-120043-101A	E3-120043-101B
1	2	7	E3-120070-101A	E3-120070-101B
2	2	7	E3-220070-104A	E3-220070-104B
2	3	10.5	E3-220105-104A	E3-220105-104B
3	5	15.3	E3-320153-104A	E3-320153-104B
230V, 3-PHASE IN, 230V, 3-PHASE MOTOR				
1	0.5	2.3	E3-120023-301A	E3-120023-301B
1	1	4.3	E3-120043-301A	E3-120043-301B
1	2	7	E3-120070-301A	E3-120070-301B
2	2	7	E3-220070-304A	E3-220070-304B
2	3	10.5	E3-220105-304A	E3-220105-304B
3	5	18	E3-320180-304A	E3-320180-304B
3	7.5	24	E3-320240-304A	E3-320240-304B
4	10	30	E3-420300-304A	E3-420300-304B
4	15	46	E3-420460-304A	E3-420460-304B
380/460V, 3-PHASE IN, 380/460V, 3-PHASE MOTOR				
1	1	2.2	E3-140022-301A	E3-140022-301B
1	2	4.1	E3-140041-301A	E3-140041-301B
2	2	4.1	E3-240041-304A	E3-240041-304B
2	3	5.8	E3-240058-304A	E3-240058-304B
2	5	9.5	E3-240095-304A	E3-240095-304B
3	7.5	14	E3-340140-304A	E3-340140-304B
3	10	18	E3-340180-304A	E3-340180-304B
3	15	24	E3-340240-304A	E3-340240-304B
4	20	30	E3-440300-304A	E3-440300-304B
4	25	39	E3-440390-304A	E3-440390-304B
4	30	46	E3-440460-304A	E3-440460-304B

Ethernet networking & basic programmable control option dw228

NEMA 4X (IP66) INDOOR RATED P2 OPEN/CLOSED LOOP VECTOR DRIVES

With EMC filter, brake transistor +/- DC bus

SIZE	HP	AMPS	UNSWITCHED	SWITCHED
230V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR				
2	1	4.3	P2-22010-1HF4X	P2-22010-1HF4Y
2	2	7	P2-22020-1HF4X	P2-22020-1HF4Y
2	3	10.5	P2-22030-1HF4X	P2-22030-1HF4Y
230V, 3-PHASE IN, 230V, 3-PHASE MOTOR				
2	1	4.3	P2-22010-3HF4X	P2-22010-3HF4Y
2	2	7	P2-22020-3HF4X	P2-22020-3HF4Y
2	3	10.5	P2-22030-3HF4X	P2-22030-3HF4Y
3	5	18	P2-32050-3HF4X	P2-32050-3HF4Y
380/460V, 3-PHASE IN, 380/460V, 3-PHASE MOTOR				
2	1	2.2	P2-24010-3HF4X	P2-24010-3HF4Y
2	2	4.1	P2-24020-3HF4X	P2-24020-3HF4Y
2	3	5.8	P2-24030-3HF4X	P2-24030-3HF4Y
2	5	9.5	P2-24050-3HF4X	P2-24050-3HF4Y
3	7.5	14	P2-34075-3HF4X	P2-34075-3HF4Y
3	10	18	P2-34100-3HF4X	P2-34100-3HF4Y
500/600V, 3-PHASE IN, 500/600V, 3-PHASE MOTOR				
2	1	2.1	P2-26010-3HF4X	P2-26010-3HF4Y
2	2	3.1	P2-26020-3HF4X	P2-26020-3HF4Y
2	3	4.1	P2-26030-3HF4X	P2-26030-3HF4Y
2	5	6.5	P2-26050-3HF4X	P2-26050-3HF4Y
2	7.5	9	P2-26075-3HF4X	P2-26075-3HF4Y
3	10	12	P2-36100-3HF4X	P2-36100-3HF4Y
3	15	17	P2-36150-3HF4X	P2-36150-3HF4Y

Encoder feed back option T2-ENCOD-IN
Ethernet networking & smart programmable control option dw224-00

P2 Series NEMA 4X - Dimensions and Weight

Size	Height	Width	Depth	Weight
2	10.1" (257mm)	7.4" (188mm)	9.4" (239mm)	10.6lb (4.8kg)
3	12.2" (310mm)	8.3" (211mm)	10.5" (266mm)	17.0lb (7.7kg)

E3 Series NEMA 4X - Dimensions and Weight

Size	Height	Width	Depth	Weight
1	9.1" (232mm)	6.4" (161mm)	6.4" (162mm)	5.5lb (2.5kg)
2	10.1" (257mm)	7.4" (188mm)	7.2" (182mm)	7.7lb (3.5kg)
3	12.2" (310mm)	8.3" (211mm)	9.4" (238mm)	15.4lb (7.0kg)
4	14.2" (360mm)	9.5" (240mm)	10.8" (275mm)	20.9lb (9.5kg)

AC Drive Options

ITEM	DESCRIPTION	MODEL P2	V3	E3
Touch Screen Programmable Operator Stations				
dw230+dw228	savvyPanel touch, programmable NEMA 4 diaplay			✓
dw230+dw224	savvyPanel touch, programmable NEMA 4 diaplay	✓		
dw230+dw220-4008	savvyPanel touch, programmable NEMA 4 diaplay		✓	
Remote Keypads				
T2-OPORT-IN	Remote Keypad	✓	✓	✓
T2-OPPAD-IN	Remote keypad with OLED display	✓	✓	✓
Communications				
speedy dw21X-04	ModbusTCP/IP Interface Module	✓	✓	✓
speedy dw21X-25	EIP/PCCC Interface Module	✓	✓	✓
T2-DEVNT-IN	DeviceNet Interface Module	✓	✓	
T2-PFNET-IN	ProfiNET Interface Module	✓	✓	
T2-PROFB-IN	Profibus DP Interface Module	✓	✓	
T2-BNTIP-IN	Bacnet IP Interface Module		✓	
T2-BNTSP-IN	Bacnet RJ45 connector		✓	
Programming Interface				
speedy dw21X	USB Interface Module	✓	✓	✓
T3-STICK-IN	Optistick parameter copying stick with Bluetooth	✓	✓	✓
Encoder Feedback				
T2-ENCOD-IN	Encoder feedback module for P2	✓		
EMC Filters				
T2-E1010-20	Optifilter, EMC input filter, 1-phase, 10A, IP20	✓	✓	✓
T2-E1010-66	Optifilter, EMC input filter, 1-phase, 10A, IP66	✓	✓	✓
T2-E1025-20	Optifilter, EMC input filter, 1-phase, 25A, IP20	✓	✓	✓
T2-E1025-66	Optifilter, EMC input filter, 1-phase, 25A, IP66	✓	✓	✓
T2-E3006-20	Optifilter, EMC input filter, 3-phase, 6A, IP20	✓	✓	✓
T2-E3006-66	Optifilter, EMC input filter, 3-phase, 6A, IP66	✓	✓	✓
T2-E3016-20	Optifilter, EMC input filter, 3-phase, 16A, IP20	✓	✓	✓
T2-E3016-66	Optifilter, EMC input filter, 3-phase, 16A, IP66	✓	✓	✓
T2-E3025-20	Optifilter, EMC input filter, 3-phase, 25A, IP20	✓	✓	✓
T2-E3025-66	Optifilter, EMC input filter, 3-phase, 25A, IP66	✓	✓	✓
T2-E3050-20	Optifilter, EMC input filter, 3-phase, 50A, IP20	✓	✓	
T2-E3080-20	Optifilter, EMC input filter, 3-phase, 80A, IP20	✓	✓	
T2-E3180-20	Optifilter, EMC input filter, 3-phase, 180A, IP20	✓	✓	
T2-E3300-00	Optifilter, EMC input filter, 3-phase, 300A, IP00	✓	✓	
Brake Resistors (Case Type)				
OD-BR100-IN	DB Resistor, drive size 2, 100Ω, 200W	✓		✓
OD-BRES4-IN	DB Resistor, drive size 4, IP20, 33Ω, 500W	✓		✓
Brake Resistors (Enclosed, ventilated with over temp switch) Intermittent duty 10%, 10 sec				
CX503069	1 - 3 HP 230VAC, 63Ω, 12"x5"x5"	✓		✓
CX503070	5 HP 230VAC, 38Ω, 12"x5"x5"	✓		
CX503072	7.5 - 10 HP 230VAC, 19Ω, 12"x7"x5"	✓		
CX503073	15 HP 230VAC, 12.6Ω, 12"x10"x5"	✓		
CX503074	20 HP 230VAC, 9.6Ω, 12"x13"x5"	✓		
CX503075	25 HP 230VAC, 7.5Ω, 12"x16"x5"	✓		
CX503076	30 HP 230VAC, 6.3Ω, 19"x10"x5"	✓		
CX503077	40 HP 230VAC, 4.9Ω, 19"x10"x5"	✓		
CX503078	50 HP 230VAC, 3.9Ω, 19"x10"x5"	✓		
CX503079	60 HP 230VAC, 3.3Ω, 19"x13"x5"	✓		
CX503082	1 - 3 HP 460VAC, 250Ω, 12"x5"x5"	✓		✓
CX503085	5 - 10 HP 460VAC, 75Ω, 12"x7"x5"	✓		✓
CX503086	15 HP 460VAC, 50Ω, 12"x10"x5"	✓		✓
CX503087	20 HP 460VAC, 38Ω, 12"x13"x5"	✓		
CX503088	25 HP 460VAC, 30Ω, 12"x16"x5"	✓		
CX503089	30 HP 460VAC, 25Ω, 19"x10"x5"	✓		
CX503090	40 HP 460VAC, 19Ω, 19"x13"x5"	✓		
CX503091	50 HP 460VAC, 15Ω, 19"x13"x5"	✓		
CX503092	60 HP 460VAC, 12.6Ω, 19"x13"x5"	✓		
CX503093	75 HP 460VAC, 10Ω, 26.5"x10"x5"	✓		
CX503094	100 HP 460VAC, 7.5Ω, 26.5"x16"x5"	✓		
CX503095	125 - 150 HP 460VAC, 6Ω, 28"x10"x10"	✓		
Output Filters				
T2-M3008-20	Output filter, 8A, IP20	✓	✓	✓
T2-M3008-66	Output filter, 8A, IP66	✓	✓	✓
T2-M3012-20	Output filter, 12A, IP20	✓	✓	✓
T2-M3012-66	Output filter, 12A, IP66	✓	✓	✓
T2-M3018-66	Output filter, 18A, IP66	✓	✓	✓
T2-M3030-20	Output filter, 30A, IP20	✓	✓	
T2-M3075-20	Output filter, 75A, IP20	✓	✓	
T2-M3180-00	Output filter, 180A, IP00	✓	✓	
T2-M3300-00	Output filter, 300A, IP00	✓	✓	
Data Cables & Splitters				
T-J4505-IN	RS485 data cable, 0.5M, (RJ45 - RJ45)	✓	✓	✓
T-J4510-IN	RS485 data cable, 1M, (RJ45 - RJ45)	✓	✓	✓
T-J4530-IN	RS485 data cable, 3M, (RJ45 - RJ45)	✓	✓	✓
T-J45SP-IN	RS485 data cable 3-way splitter (RJ45)	✓	✓	✓
T2-BNTSP-IN	RJ45 BacNet connector		✓	
I/O Boards				
T-LOGIP-11	110VAC logic input isolator			✓
T-LOGIP-23	230VAC logic input isolator			✓
P-2ROUT-IN	Dual relay output board	✓		
T-HVACO-IN	HVAC drive run, drive tripped relay output board		✓	
T2-CASCD-IN	Cascade control plug in option board	✓	✓	
T2-EXTIO-IN	Extended I/O option board	✓		

3-Phase Line Reactors for AC Drives

460 volts, 3% impedance, open construction for mounting in a protected enclosure

HP	Model	Amps	mH
1	LMAC341	2	12
2	LMAC342	4	6.5
5	LMAC345	8	3
7.5	LMAC347.5	12	2.5
10	LMAC3410	18	1.5
15	LMAC3415	25	1.2
25	LMAC3425	35	0.8
30	LMAC3430	45	0.7
40	LMAC3440	55	0.5
75	LMAC3475	100	0.3
100	LMAC34100	130	0.2
150	LMAC34150	200	0.11
200	LMAC34200	250	0.09
250	LMAC34250	320	0.075
300	LMAC34300	400	0.06
400	LMAC34400	500	0.05

Options:
230 VAC ratings
NEMA 1 & NEMA 4X enclosed units

Consult Factory

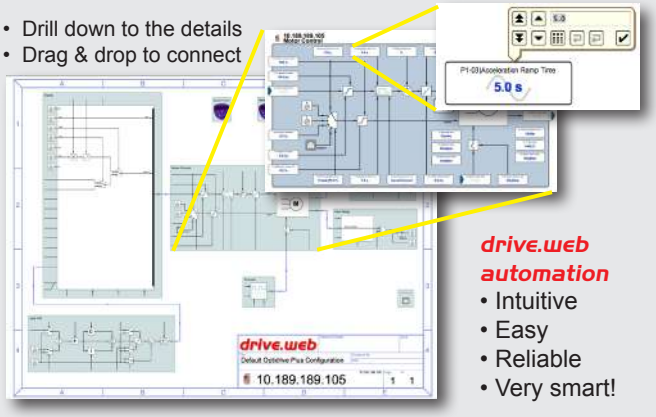
drive.web smart drives

Add a ***drive.web*** Universal Automation Controller to any drive for unlimited automation capability (see pages 3-33):

- Powerful programmable control functions
- Peer-to-peer networking over Ethernet
- Smart iPad or touch screen PC operation
- Internet access
- Unlimited additional I/O

ITEM	DESCRIPTION	MODEL P2
Smart Programmable Control + Peer-to-Peer Networking + Extra I/O		
dw214	***drive.web smarty*** interface for P2 models w/16 extra I/O	✓
-04 OPTION	ModbusTCP/IP	✓
-05 OPTION	Function Block Library 1, Process Control	✓
-06 OPTION	Function Block Library 2, Winder Control	✓
-10 OPTION	Function Block Library 3, Advanced Math	✓
-15 OPTION	Encoder input	✓
For additional options see page 23		
Smart Programmable Control + Peer-to-Peer Networking		
dw22X	***drive.web speedy*** interface modules	✓
	With Ethernet ModbusTCP/IP & basic function blocks - see page 22	
-05 OPTION	Function Block Library 1, Process Control	✓
-06 OPTION	Function Block Library 2, Winder Control	✓
-10 OPTION	Function Block Library 3, Advanced Math	✓

- Drill down to the details
- Drag & drop to connect



drive.web automation

- Intuitive
- Easy
- Reliable
- Very smart!

E3 SINGLE PHASE

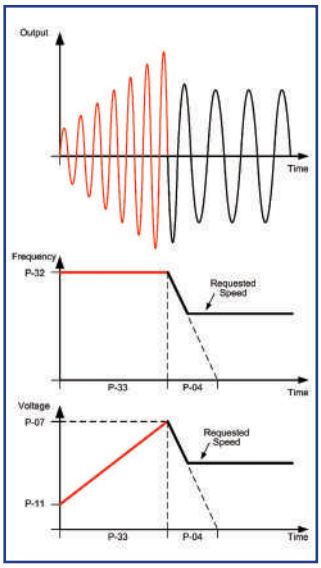
Single Phase Motor Controller

For Shaded Pole (SP) & Permanent Split Capacitor (PSC) motors used in direct drive, variable torque, fan and pump type applications only

The innovative E3 Single Phase motor controller, uses a unique boost control algorithm that ensures reliable starting and control.

- Energy saving
- Macros for fan & pump applications
- Built in PI control
- Bluetooth connectivity
- High frequency switching for quite running in:
  - ~ Commercial and residential HVAC
  - ~ Fume extraction
  - ~ Laboratories
  - ~ Quiet locations

Expandable • Versatile • Economical



Basic IP20 or NEMA4X (outdoor rated) versions
Basic or full featured systems drive
Basic or peer-to-peer networking over Ethernet

THE BASICS

Compact packaging
Simple mechanical and electrical installation
50°C ambient rating
150% rating for 60 seconds, 175% for 2 seconds
Simple basic set up
Integral brake transistor (size 2, 100% rated)
ModbusRTU serial port
Remote keypad and display option
OPTISTICK plug-in for easy parameter up/down load

SPECIFICATION

Output	Frequency	0 to 120Hz
Supply options	Frequency	48 - 62 Hz, >0.98PF, inrush current < rated current
	Volts/Phases	100 - 132 volts max, single phase (0.5 - 1.0HP)
		180 - 264 volts max, 1-phase (0.5 - 1.5HP)
		180 - 264 volts max, 3-phase (0.5 - 1.5HP, special order)
Environment	Temperature	IP20, operating, -10 to 50°C max, storage, -40 to 60°C
		IP66, NEMA 4X, operating -10 to 40°C max, storage, -40 to 60°C
	Altitude	0-2000M, derate 1% per 100M above 1000M
	Humidity	up to 95%, non condensing
	Ingress	Basic IP20
		Optional IP66 (NEMA 4X), outdoor rated
Control	Mode	V/F voltage vector, with energy optimizer
	PWM Hz	4 to 32KHz (effective)
	Skip Freq	Single point, user adjustable
	Boost	Automatic boost phase operation
	Stop modes	Coast / ramp / DC brake
	Setpoint ref	0-10VDC, 4-20mA, 0-20mA, Keypad, Modbus
	Presets	8 preset speeds
	PI control	Direct & analog input trim
	Accel/Decel	0 - 600 secs + Ramp stop decel 0 - 600 secs
Configurable I/O	Input 1	Programmable digital input
	Input/output 2	Selectable digital input / output
	Input 3	Configurable analog or digital input
	Input 4	Configurable analog or digital input
	Output 1	Configurable analog or digital output
	Relay 1	Normally open relay contact 30VDC 5A, 250VAC 6A
Protection	Drive trip	Over/under volts, over current, external trip,
	Motor	Overload, over temp, short circuit, ground fault
	Trip memory	Last 4 trips stored

E3 Single Phase IP20

Single phase motor controller for use only with Shaded Pole (SP) or Permanent Split Capacitor (PSC) type motors on variable torque, direct drive fans and centrifugal pumps

STANDARD E3 1Ø IP20 DRIVES

Model	Supply	Motor	Power	Amps	Size
E3-110070-1012-01	1Ø, 115V	1Ø, 115V	0.5HP	7.0	1
E3-210105-1042-01	1Ø, 115V	1Ø, 115V	0.75HP	10.5	2
E3-120043-1012-01	1Ø, 230V	1Ø, 230V	0.5HP	4.3	1
E3-120070-1012-01	1Ø, 230V	1Ø, 230V	1HP	7.0	1
E3-220105-1042-01	1Ø, 230V	1Ø, 230V	1.5HP	10.5	2

DIMENSIONS & WEIGHT

Size	Height	Width	Depth	Weight
1	6.8" (173mm)	3.3" (83mm)	4.9" (123mm)	2.2lbs (1kg)
2	8.7" (221mm)	4.4" (110mm)	5.9" (150mm)	3.8lbs (1.7kg)

E3 SINGLE PHASE, NEMA 4X (IP66)

Single phase motor controller for use only with Shaded Pole (SP) or Permanent Split Capacitor (PSC) type motors in variable torque, fan and centrifugal pump applications

Switched version with keypad, display, speed pot, forward/off switch & power isolator switch

Unswitched version with keypad & display

For outdoor and harsh, dirty indoor environments

- 40°C ambient temperature
- Conduit cable entry
- Padlockable power switch
- Wash down duty
- ModbusRTU port
- Compact packaging
- All standard drive features included
- Brake switch standard on 230V, size 2
- Optional internal Ethernet
- Optional internal *drive.web* smart control
- Sunshade required for outdoor use

NEMA 4X / IP66 DRIVES (outdoor rated)

Model	Supply	Motor	Power	Amps	Size
E3-110070-101#-01	1Ø, 115V	1Ø, 115V	0.5HP	7.0	1
E3-210105-104#-01	1Ø, 115V	1Ø, 115V	0.75HP	10.5	2
E3-120043-101#-01	1Ø, 230V	1Ø, 230V	0.5HP	4.3	1
E3-120070-101#-01	1Ø, 230V	1Ø, 230V	1HP	7.0	1
E3-220105-104#-01	1Ø, 230V	1Ø, 230V	1.5HP	10.5	2

A = Unswitched, B = Switched

DIMENSIONS & WEIGHT

Size	Height	Width	Depth	Weight
1	9.1" (232mm)	6.4" (161mm)	6.4" (162mm)	5.5lb (2.5kg)
2	10.1" (257mm)	7.4" (188mm)	7.2" (182mm)	7.7lb (3.5kg)

K-Series single phase DC drives - up to 2HP

Regenerative & Non-regenerative

Enclosed, DIN rail mounting drives in elegant compact packages for both stand alone and systems applications.

Standard features include:

- Plug-in screw terminals
- Dual 115 & 230 volts, 50/60Hz supply
- Armature volts or tach feedback
- IP20 enclosure
- Output for ramps, speed demand, current demand
- Inputs for ramped speed, unramped speed, torque (current)
- Logic outputs for overload & trip
- Configurable level comparator & sign changer
- Standards: UL, C-UL, CE

MODEL	RATING	FEATURES	TERMINALS	
NON-ISOLATED				
K340	**Armature current 3.4 amps**			
	1/4HP 0.25kW @90Vdc	Max Speed	+10V	
	1/2HP 0.55kW @180Vdc	Min Speed	Min	
	Size 1.4"W x 4.2"H x 4.7"D	Up Ramp	Input +	
		IR Comp	Common	
K680	**Armature current 6.8 amps**	I max	Run	
	1/2HP 0.55kW @90Vdc	AVF/Tach switch	Tach f/b	
	1HP 0.75kW @180Vdc	Speed range switch		
	Size 1.8"W x 4.2"H x 4.7"D	AC voltage selector		
		Field 1Amp 0.9x ac supply		
K1220	**Armature current 12.2 amps**			
	1HP 0.75kW @90Vdc			
	2HP 1.8kW @180Vdc			
	Size 1.8"W x 4.2"H x 4.7"D			
ISOLATED				
K340i	**Armature current 3.4 amps**			
	1/4HP 0.25kW @90Vdc	Max Speed	+10V ref	LevelO/P
	1/2HP 0.55kW @180Vdc	Min Speed	Min speed	Level iI/P
	Size 2.4"W x 4.2"H x 4.7"D	Up Ramp	Input +	Overload
		Down Ramp	Output +/-	Trip
K680i	**Armature current 6.8 amps**	Stability	Common	Ramp O/P
	1/2HP 0.55kW @90Vdc	I max	Input +/-	Demand O/P
	1HP 0.75kW @180Vdc	IR Comp	Pushbutton +	Speed O/P
	Size 2.8"W x 4.2"H x 4.7"D	AVF/Tach switch	Pushbutton -	Current O/P
		Speed range switch	Run	+ Speed I/P
K1220i	**Armature current 12.2 amps**	AC voltage selector	Common	Torque I/P
	1HP 0.75kW @90Vdc	Level comparator	Tach f/b	
	2HP 1.8kW @180Vdc			
	Size 2.8"W x 4.2"H x 4.7"D			
4-QUADRANT, REGENERATIVE, REVERSING, ISOLATED				
K340XRi	**Armature current 3.4 amps**			
	1/4HP 0.25kW @90Vdc	Max Speed	+10V ref	LevelO/P
	1/2HP 0.55kW @180Vdc	Min Speed	Min speed	Level iI/P
	Size 2.4"W x 4.2"H x 4.7"D	Up Ramp	Input +	Overload
		Down Ramp	Output +/-	Trip
K680XRi	**Armature current 6.8 amps**	Stability	Common	Ramp O/P
	1/2HP 0.55kW @90Vdc	I max	Input +/-	Demand O/P
	1HP 0.75kW @180Vdc	IR Comp	Pushbutton +	Speed O/P
	Size 2.8"W x 4.2"H x 4.7"D	AVF/Tach switch	Pushbutton -	Current O/P
		Speed range switch	Run	+ Speed I/P
K1220XRi	**Armature current 12.2 amps**	AC voltage selector	Common	Torque I/P
	1HP 0.75kW @90Vdc	Level comparator	Tach f/b	
	2HP 1.8kW @180Vdc			
	Size 2.8"W x 4.2"H x 4.7"D			

Optional *drive.web smarty*

For complete process automation Model dw210-1107 uses discrete I/O interface to provide:

- Ethernet networking
- Internet access
- Powerful function blockprogramming
- ModbusRTU and ModbusTCP/IP
- Additional remote I/O
- ***savvyPanel*** smart touch screens

(see page 27)

High Speed Fuse Kits - DIN Rail Mounting

FLN-6.3	Line fuse kit	K340
FLL-6.3	Line/line fuse kit	K340
FLNR-6.3	Line & arm fuse kit	K340XRi
FLLR-6.3	Line/line & arm fuse kit	K340XRi
FLN-20	Line fuse kit	all non-regen K
FLL-20	Line/line fuse kit	all non-regen K
FLNR-20	Line & arm fuse kit	all regen K
FLLR-20	Line/line & arm fuse kit	all regen K

Single Phase DC Systems Drives

This family of single phase DC drives with isolated control circuitry, is designed to meet the most exacting requirements of high performance systems builders. It is a range of full featured products using advanced manufacturing technologies to give unequaled value and functionality to OEMs and System Integrators with world wide markets and demanding applications.

NON-REGEN MODELS			FUSE KIT
	230VAC, 180VDC	115VAC, 90VDC	
400i (4 amps)	0.75HP	0.4HP	included
1600i (16 amps)	3HP	1.5HP	F2-30
3200i/32 (32 amps)	6HP	3HP	F2-60
	415VAC, 320VDC	240VAC, 180VDC	
3200i/48LL (48 amps)	7.5HP	4HP	F2-80
	460VAC, 360VDC	230VAC, 180VDC	
3200i/32C109 (32 amps)	8HP	5HP	F2-60

4-Q REGEN, REVERSING MODELS			FUSE KIT
	230VAC, 180VDC	115VAC, 90VDC	
3600XRi/16	3HP	1.5HP	F3-30
3600XRi/32	6HP	3HP	F3-60
3600XRi/36	6.5HP	3HP	F3-60
	415VAC, 320VDC	240VAC, 180VDC	
3600XRi/36LL	10HP	6HP	F3-60
	480VAC, 360VDC	240VAC, 180VDC	
3600XRi/32C132	10HP	6HP	F3-60

Standard Features

Approvals: CE
Linear torque control
Armature voltage or tach feedback
Calibration range switches
Speed reference 0-10V or 4-20mA
Maximum and minimum speed settings
Adjustable current limit
Current range switch selectable (not on 400i)
Independently adjustable up and down ramps
150% overload capacity, 30 second stall timer
Stall relay contact output (transistor on 400i)
Zero speed relay contact (transistor on 400i)
Control fuses fitted (Power fuse on 400i)
Start inhibit after power loss
Power on and stall indicator LEDs
Speed signal output
Current signal output
Ramp signal output
Total demand signal output
Dual supply voltage 110 / 230 VAC, 50/60Hz
Suitable for shunt or PM motors
IR compensation
Stability adjustment

Additional Regen Drive Features

Speed reference +/-10V or 4-20mA
Speed trim input
Independent up & down ramps in FWD & REV
Separate adjustable current limits motor/brake
Torque control in either 2 or 4 quadrants
Relay for Stall, Zero speed, Reverse, Overload
Control fuses fitted
Fast, ramped or coast stop
LEDs for + current, - current, stall & stall timer
Momentary contact for reversing applications

Optional *drive.web smarty*

For complete process automation
Model dw210-1107 uses discrete I/O interface to the drive and to provide:

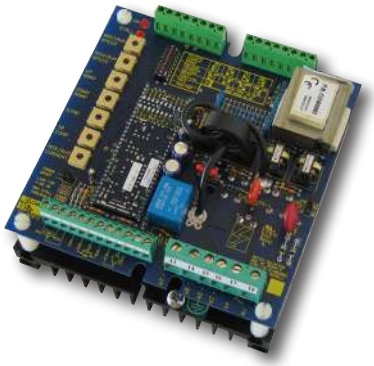
- Ethernet networking
- Internet access
- Powerful function blockprogramming
- ModbusRTU and ModbusTCP/IP
- Additional remote I/O
- ***savvyPanel*** smart touch screens

(see page 19 for details)

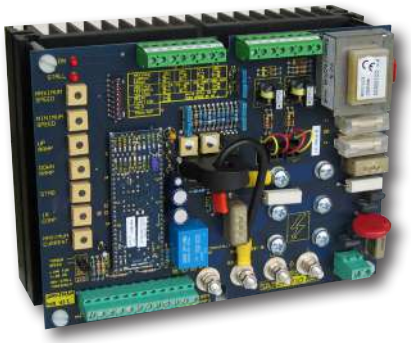
Enclosed Drives

Enclosed wall mounting versions of these drives and a wide range of other options are detailed in the “Modulus Drive Units” section of this catalog

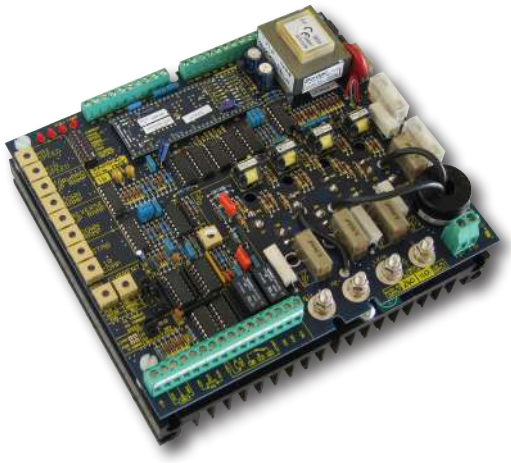
Model 400i, up to 0.75HP
4” x 6.25” x 2” (100 x 160 x 50mm)



Model 1600i, up to 3HP
6.1” x 6.1” x 3.4” (150 x 150 x 85 mm)



Model 3200i, up to 7.5HP
6.1” x 8.0” x 4.2” (150 x 200 x 105 mm)



Model 3600XRi
Up to 32 amps - 6.9”x 8”x 3.2” (175x200x80 mm)
36 amps unit - 6.9”x 8”x 3.8” (175x200x95 mm)

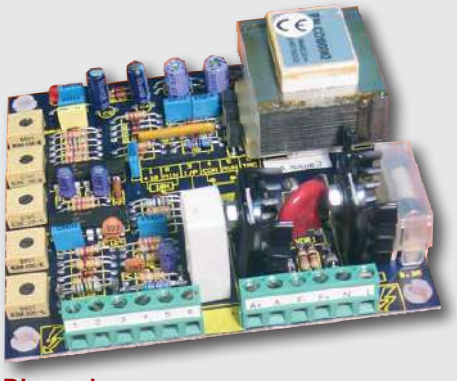
Single Phase DC Drives for OEMs

Model 370 ... OEM Chassis Drives

Compact, DC drives designed for low cost, non-regenerative, non-isolated machine controls.

Basic Specification:

Rating: 1/4HP at 90VDC, 1/2HP at 180VDC
Maximum and minimum speed settings
Current limit
Acceleration pot
Suitable 110 or 230 volts, single phase, 50 or 60Hz (not isolated)
For use with permanent magnet or shunt field motors
Approval: CE



Dimensions
4" x 4" x 1.6" (100 x 100 x 40mm)

Models 400, 800, 1200 ... OEM DC Drives (up to 2HP)

Versatile, basic, low cost drives suitable for wide range of machine control applications

Model	Amps	Description	@ 180VDC	@ 90VDC	Dimensions
400	4 amps	Open chassis with screw terminals	0.75HP	0.38HP	5.2"x4.0"x1.6" (130x100x40mm)
800	8 amps	Open chassis with screw terminals	1.5HP	0.75HP	5.2"x4.0"x2.8" (130x100x70mm)
1200	12 amps	Open chassis with screw terminals	2.0HP	1.0HP	5.2"x4.0"x2.8" (130x100x70mm)
400E	4 amps	Enclosed NEMA 1 with pot, switch, fuse	0.75HP	0.38HP	9.9"x7.0"x3.8" (250x177x95 mm
800E	8 amps	Enclosed NEMA 1 with pot, switch, fuse	1.5HP	0.75HP	9.9"x7.0"x3.8" (250x177x95 mm
1200E	12 amps	Enclosed NEMA 1 with pot, switch, fuse	2.0HP	1.0HP	9.9"x7.0"x3.8" (250x177x95 mm
400ER	4 amps	Enclosed, pot, switch, brake, reverse, fuse	0.75HP	0.38HP	9.9"x7.0"x3.8" (250x177x95 mm)
800ER	8 amps	Enclosed, pot, switch, brake, reverse, fuse	1.5HP	0.75HP	9.9"x7.0"x3.8" (250x177x95 mm)
1200ER	12 amps	Enclosed, pot, switch, brake, reverse, fuse	2.0HP	1.0HP	9.9"x7.0"x3.8" (250x177x95 mm)

Standard features:

Linear torque control
Armature voltage or tach feedback with IR compensation
Calibration range switches (no component changes)
Speed reference 0-10V or 4-20mA
Maximum and minimum speed settings
Adjustable current limit
Independently adjustable up and down ramps
150% overload capacity with 30 second stall timer
Stall and Zero Speed relay driver outputs
Power fuse (up to 12 amps)
Power on and stall indicator LEDs
Stability adjustment
Speed, Ramp Speed and Current signal outputs
International supply voltages 110 / 230 VAC, 50/60hz (not isolated)
Suitable for shunt wound or permanent magnet motors

Approvals: CE

Model 1200E

DC Servo Drives

These drives are designed for small, high performance position and speed control applications such as robotics, mechanical handling, automated assembly, packaging processes, machine tool axis, etc.

The units are miniature, fast response, reversing, linear transistor drives for brushed DC motors with armatures up to 48 volts. They operate from either a smoothed, unregulated, rectified DC, or battery supply, and include built in thermal protection, current limit with short term overcurrent capacity and resettable overload trip.

The control circuits are designed to ensure extremely low noise emissions, and will meet the most stringent of EMC (Electro-Magnetic Compliance) requirements.

Model 200XLV 4-Quadrant DC Drive

Miniature linear amplifier with built in “P” or “P+I” or “PID” (Proportional, Integral, Derivative) for closed loop position, speed or torque control.

Optional configurations:

1. Speed control, armature voltage feedback with IR compensation.
2. Speed control, tach feedback.
3. Position control, position feedback.
4. Torque control with armature current feedback

Specifications

Model	Max Amps	Dimensions
200XLV	2	3.25” x 1.65” x 1.65” (82x40x40mm)

Models 400XLV, 800XLV & 1200XLV 4-Quadrant DC, PWM Servo Drives

These products are designed for small, high performance position and speed control applications such as robotics, mechanical handling, automated assembly, packaging processes, machine tool axis, etc.

Standard Features

Speed, or Torque control modes
Extremely low RF noise emissions
Ready indicator light
Motor voltage range: +/-6 VDC to +/-48 VDC
Armature current (see specifications below)
Supply voltage 12 to 48 VDC
Precision 5v and 10v references
Differential setpoint inputs (300K ohms)
Overload trip
Thermal protection
Adjustable Maximum Speed
Adjustable IR Compensation for arm volts f/b
Plug-in terminals
DIN rail mounting (optional on 200XLV)

Model	Max Amps	Dimensions
400XLV	4	4.2”h x 2.4”w x 4.75”d (106 x 61 x 120mm)
800XLV	8	4.2”h x 2.75”w x 4.75”d (106 x 70 x 120mm)
1200XLV	12	4.2”h x 2.75”w x 4.75”d (106 x 70 x 120mm)

Approvals: CE

smarty Motion Control Options

Full featured motion controller with:

- Trapezoidal and cam motion functions
- Encoder speed & position feedback
- Ethernet, multi-axis networking
- *savvyPanel touch* industrial displays

(see pages 30-31)

PL Series ...digital dc drives

up to 2000+HP

LA503846
dw Ethernet Through-Panel Port for closed door system access

Standard Features

- Total digital control
- Basic peer-to-peer link
- 40 character backlit display
- Friendly, easy menu structure
- Modern, compact packaging
- Extensive, flexible, plug-in I/O
- RS232 serial port
- Easy configuration saving & cloning
- Built-in automatic field controller
- Built in programmable control functions for PID, winders, orientation, etc.
- Tach, encoder & arm volts feedback
- Easy reliable autotune

Size 4 & 5 drives include an embedded ***speedy*** Automation Controller for safe, doors closed, start up & operation with:

- Easy USB port interface
- Peer-to-peer Ethernet communications
- ***drive.web*** programmable control
- ModbusTCP over Ethernet
- Easy, safe, ***savvyPanel*** "Quick Start"

- see pages 20 & 21 for dw221 details -

Optional:

- ModbusRTU RS485 serial port
- Devicenet, Profibus DP, fieldbus

powerDRIVE Packages

PL/X DC drives up to 1200 horsepower are available in compact ***powerDRIVE*** packages complete with:

- Main contactor
- High speed 3-phase line fuses
- High speed armature fuse
- High speed control/field fuses
- Line filter (100HP & up)
- Optional motor blower starter (100HP & up)

Key Features

Analog Inputs & Outputs
8 analog inputs & 4 analog outputs (12 bits)
All outputs short circuit protected
All inputs over voltage protected up to +50v
Inputs configurable 5 to 30v
Input volts programmable up to +/-30v

Digital Inputs & Outputs
17 digital inputs & 7 digital outputs
Digital I/O short circuit protected
Digital inputs over volts protected to +50v
(with settable switching levels)
Digital outputs over volts protected to +50v

Speed Feedback - Standard
Analog tach
Encoder
Armature voltage
Encoder + armature volts
Encoder + analog tach

Field Configurations
Fixed Current
Fixed voltage
Automatic field weakening
Delayed field quench
Standby field setting
Field economy

Diagnostic Monitoring
Scope terminal monitors selectable values
All analog input voltages
All digital input states
All analog output voltages
All digital output states
Tach volts
Motor arm volts & amps
Field current
Output power Kw
AC supply volts

User Configurable Software Functions
PID blocks, Parameter profiler, Winder reel diameter calculator, Winder taper tension calculator, Winder torque/inertia/friction compensator, Preset speed function, Two summers, Software "motorized pot", Interval timer, Current profiling, Zero speed with shaft position lock, Jog / crawl functions, Two filters, Dual motor swap, Latch, Sample & hold function, Auto self-tune current loop, Linear and S-ramps, Slack take-up, Batch Counter, Draw control.

Engineered Configuration Packages
Pre-configured generic apps are available for Open & Closed Loop Winders, Position Controls, Coordinated Line Drives, Indexing, registration and others.

Safe, "Doors Closed" Start Up & Opertation
The optional dw221 Automation Controller is embedded as standard in size 4 & 5 for easy system wide access to configure, connect & control.

Protection
Interline device networks
High energy MOV's
Instantaneous overcurrent
Overcurrent (inverse time)
Field fail and overcurrent
Motor over temperature
SCR (thyristor) over temp
Main power phase loss
Armature over volts
Over speed protection
Speed feedback mismatch
Stall protection
Standstill logic
SCR (Thyristor) trigger failure
Digital output short circuit

Communications Ports
drive.web peer-to-peer Ethernet
ModbusTCP/IP Ethernet
USB port for easy network wide set up
Serial port (RS232)

Optional Communications
Ethernet: EIP (PCCC)
ModbusRTU
Profibus DP

Easily add a *savvyPanel* touch screen HMI with secure WiFi interface

- Simple, intuitive configuration techniques with clear display of information
- No pots or switches to set
- Accurate display of voltages and currents
- Positive displacement pushbuttons for tactile feel
- High power processor and large memory will ensure ease of product enhancement in the future
- 2-button reset gets users back to OEM set up
- Powerful *savvy* graphical configuration, diagnostics & system design tools

Reliable, easy plug-in control terminals

The powerful *savvy* configuration tools are used for the PL Series DC drives, AC drives, *drive.web* programmable controllers, *savvyPanel* operator stations & complete systems.

DC technology

↑ 75 HP, PLX50/123

powerPLX50/123 →
With fuses, contactor & power components (shown hinged open for easy access)

↑ 400 HP, PL265/630

powerPL265/630 →
With fuses, contactor & power components (shown with optional motor blower starter)

Models & Ratings

4-Quadrant, Regenerative Drives

HP @ 500V arm 460VAC	HP @ 240V arm 230VAC	Armature Amps DC @ 40°C	Field Amps DC power(basic)	*powerDRIVE* Model	Dimensions W x H x D (weight) inches (LBS)	*basicDRIVE* Model	Dimensions W x H x D (weight) inches (LBS)	Line Reactor Model
20	10	36	5(8)	*power*PLX15/36	8.5 x 11.4 x 11.7 (26)	PLX15/36	8.5 x 11.4 x 6.9 (16)	LM37
30	10	51	5(8)	*power*PLX20/51	8.5 x 11.4 x 11.7 (26)	PLX20/51	8.5 x 11.4 x 6.9 (16)	LM52
60	25	99	5(8)	*power*PLX40/99	8.5 x 11.4 x 11.7 (30)	PLX40/99	8.5 x 11.4 x 6.9 (17)	LM120
75	35	123	5(8)	*power*PLX50/123	8.5 x 11.4 x 11.7 (30)	PLX50/123	8.5 x 11.4 x 6.9 (17)	LM120
100	50	164	10(16)	*power*PLX65/164	16 x 33 x 9.7 (80)	PLX65/164	8.5 x 16.2 x 8.6 (27)	LM150
125	60	205	10(16)	*power*PLX85/205	16 x 33 x 9.7 (80)	PLX85/205	8.5 x 16.2 x 8.6 (27)	LM195
150	75	270	10(16)	*power*PLX115/270	16 x 33 x 9.7 (82)	PLX115/270	8.5 x 16.2 x 8.6 (28)	LM240
200	100	330	10(16)	*power*PLX145/330	16 x 33 x 9.7 (89)	PLX145/330	8.5 x 16.2 x 8.6 (28)	LM300
250	125	405	20(32)	*power*PLX185/405	16 x 43.5 x 14.4(143)	PLX185/430	8.5 x 19.9 x 14.4 (43)	LM375
300	150	480	20(32)	*power*PLX225/480	16 x 43.5 x 14.4 (145)	PLX225/530	8.5 x 19.9 x 14.4 (45)	LM480

2-Quadrant, Non-Reversing Drives

HP @ 500V arm 460VAC	HP @ 240V arm 230VAC	Armature Amps DC @ 40°C	Field Amps DC power(basic)	*powerDRIVE* Model	Dimensions W x H x D (weight) inches (LBS)	*basicDRIVE* Model	Dimensions W x H x D (weight) inches (LBS)	Line Reactor Model
20	10	36	5(8)	*power*PL15/36	8.5 x 11.4 x 11.7 (26)	PL15/36	8.5 x 11.4 x 6.9 (16)	LM37
30	10	51	5(8)	*power*PL20/51	8.5 x 11.4 x 11.7 (26)	PL20/51	8.5 x 11.4 x 6.9 (16)	LM52
60	25	99	5(8)	*power*PL40/99	8.5 x 11.4 x 11.7 (30)	PL40/99	8.5 x 11.4 x 6.9 (17)	LM120
75	35	123	5(8)	*power*PL50/123	8.5 x 11.4 x 11.7 (30)	PL50/123	8.5 x 11.4 x 6.9 (17)	LM120
100	50	164	10(16)	*power*PL65/164	16 x 33 x 9.7 (80)	PL65/164	8.5 x 16.2 x 8.6 (27)	LM150
125	60	205	10(16)	*power*PL85/205	16 x 33 x 9.7 (80)	PL85/205	8.5 x 16.2 x 8.6 (27)	LM195
150	75	270	10(16)	*power*PL115/270	16 x 33 x 9.7 (82)	PL115/270	8.5 x 16.2 x 8.6 (28)	LM240
200	100	330	10(16)	*power*PL145/330	16 x 33 x 9.7 (89)	PL145/330	8.5 x 16.2 x 8.6 (28)	LM300
250	125	405	20(32)	*power*PL185/405	16 x 43.5 x 14.4 (143)	PL185/430	8.5 x 19.9 x 14.4 (43)	LM375
300	150	480	20(32)	*power*PL225/480	16 x 43.5 x 14.4 (143)	PL225/530	8.5 x 19.9 x 14.4 (45)	LM480
400	200	630	20(32)	*power*PL265/630	16 x 43.5 x 14.4 (154)	PL265/630	8.5 x 19.9 x 14.4 (45)	LM600

basicDRIVES **must be installed with new contactor and the correct high speed SCR fuses to maintain the warranty**
drive.web **options see pages 24 - 25**
Computer RS232 Communications Cable - Drive to DB9 - part number LA102595, included with every drive
For details of Drive Isolation Transformers, Line Reactors and Line Filters, please call +410-604-3400

PL-Series Drives to 2000HP

Models & Ratings

DC drives 400 HP to 2000 HP are normally available as ***basicDRIVES*** but can be supplied with ***powerKITS*** including:

- High speed fuses for line, armature & field
- Main DC contactor
- Line filter
- Flexible bus bar kits

(***basicDRIVES*** must be installed with new power components to maintain the warranty)

Drives are available for either 6-pulse or 12-pulse, 460, 600 or 690 VAC configurations - please call for further information.

savvyPanel touch
Easy HMI option

DC Drives - 500 VDC Armature, 480VAC Supply

HP @	ARMATURE AMPS DC @ 40°C	FIELD AMPS DC Basic(Optional)	*basic*DRIVE 4-QUAD REGEN REVERSING	*basic*DRIVE NON-REVERSING	DIMENSIONS W x H x D (weight) INCHES (LBS) TOP CABLE ENTRY	OVERLOAD RATING
400	650	32 (50)	PLX275/650	PL275/650	10 x 30 x 13.8 (120)	150%, 25 SECS
450	750	32 (50)	PLX315/750	PL315/750	10 x 30 x 13.8 (120)	150%, 25 SECS
500	850	32 (50)	PLX360/850	PL360/850	10 x 30 x 13.8 (120)	150%, 25 SECS
575	950	32 (50)	PLX400/950	PL400/950	10 x 30 x 13.8 (120)	150%, 25 SECS
650	1050	32 (50)	PLX440/1050	PL440/1050	10 x 30 x 13.8 (120)	100%, CONT
750	1250	64	PLX520/1250	PL520/1250	20 x 30 x 13.8 (285)	150%, 25 SECS
895	1450	64	PLX600/1450	PL600/1450	20 x 30 x 13.8 (285)	150%, 25 SECS
1000	1650	64	PLX700/1650	PL700/1650	20 x 30 x 13.8 (285)	150%, 25 SECS
1140	1850	64	PLX800/1850	PL800/1850	20 x 30 x 13.8 (285)	150%, 25 SECS
1260	2050 @35°C	64	PLX900/2050	PL900/2050	20 x 30 x 13.8 (285)	150%, 25 SECS
1380	2250 @35°C	64	PLX980/2250	PL980/2250	20 x 30 x 13.8 (285)	100%, CONT

DC Drives - 600 VDC Armature, 600VAC Supply

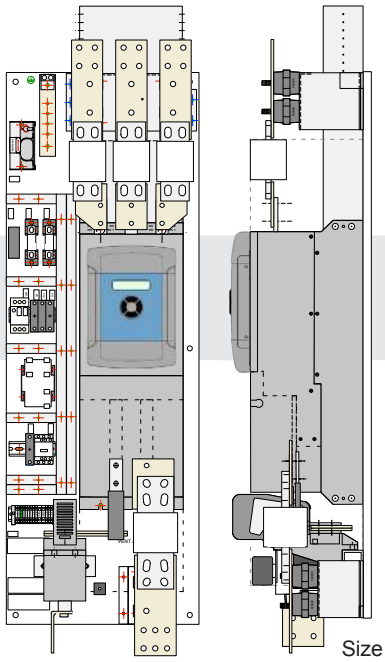
480	650	32 (50)	PLX275MV/650	PL275MV/650	10 x 30 x 13.8 (120)	150%, 25 SECS
550	750	32 (50)	PLX315MV/750	PL315MV/750	10 x 30 x 13.8 (120)	150%, 25 SECS
630	850	32 (50)	PLX360MV/850	PL360MV/850	10 x 30 x 13.8 (120)	150%, 25 SECS
700	950	32 (50)	PLX400MV/950	PL400MV/950	10 x 30 x 13.8 (120)	150%, 25 SECS
775	1050	32 (50)	PLX440/MV1050	PL440MV/1050	10 x 30 x 13.8 (120)	100%, CONT
925	1250	64	PLX520MV/1250	PL520MV/1250	20 x 30 x 13.8 (285)	150%, 25 SECS
1075	1450	64	PLX600MV/1450	PL600MV/1450	20 x 30 x 13.8 (285)	150%, 25 SECS
1220	1650	64	PLX700MV/1650	PL700MV/1650	20 x 30 x 13.8 (285)	150%, 25 SECS
1370	1850	64	PLX800MV/1850	PL800MV/1850	20 x 30 x 13.8 (285)	150%, 25 SECS
1510	2050 @35°C	64	PLX900MV/2050	PL900MV/2050	20 x 30 x 13.8 (285)	150%, 25 SECS
1660	2250 @35°C	64	PLX980MV/2250	PL980MV/2250	20 x 30 x 13.8 (285)	100%, CONT

DC Drives - 700 VDC Armature, 690VAC Supply

550	650	32 (50)	PLX275HV/650	PL275HV/650	10 x 30 x 13.8 (120)	150%, 25 SECS
650	750	32 (50)	PLX315HV/750	PL315HV/750	10 x 30 x 13.8 (120)	150%, 25 SECS
735	850	32 (50)	PLX360HV/850	PL360HV/850	10 x 30 x 13.8 (120)	150%, 25 SECS
820	950	32 (50)	PLX400HV/950	PL400HV/950	10 x 30 x 13.8 (120)	150%, 25 SECS
900	1050	32 (50)	PLX440HV/1050	PL440HV/1050	10 x 30 x 13.8 (120)	100%, CONT
1080	1250	64	PLX520HV/1250	PL520HV/1250	20 x 30 x 13.8 (285)	150%, 25 SECS
1250	1450	64	PLX600HV/1450	PL600HV/1450	20 x 30 x 13.8 (285)	150%, 25 SECS
1420	1650	64	PLX700HV/1650	PL700HV/1650	20 x 30 x 13.8 (285)	150%, 25 SECS
1600	1850	64	PLX800HV/1850	PL800HV/1850	20 x 30 x 13.8 (285)	150%, 25 SECS
1770	2050 @35°C	64	PLX900HV/2050	PL900HV/2050	20 x 30 x 13.8 (285)	150%, 25 SECS
1940	2250 @35°C	64	PLX980HV/2250	PL980HV/2250	20 x 30 x 13.8 (285)	100%, CONT

DC *power*DRIVES - 500 VDC Armature, 480 VAC Supply & *power*KITS

HP @ 500 VDC 460 VAC	ARMATURE AMPS DC @40°C	FIELD AMPS DC	FRAME SIZE	*power*DRIVE w/contactor & fuses & dw221 speedy	Contactor Kit Contactor + mount bus bars & h/w	Fuse Kit Line, Regen Arm & Aux Fuses + mountings + h/w	Fan Supply Kit 460/230V Transfmr Fuses + h/w
REGENERATIVE, REVERSING, 4-QUADRANT DRIVES							
400	650	32 (50)	4	*power*PLX275/650	CON-800V700A	FPX650	FANSUPPLY4
450	750	32 (50)	4	*power*PLX315/750	CON-800V850A	FPX750	FANSUPPLY4
500	850	32 (50)	4	*power*PLX360/850	CON-800V850A	FPX850	FANSUPPLY4
575	950	32 (50)	4	*power*PLX400/950	CON-800V1000A	FPX950	FANSUPPLY4
600	1000	64	5	*power*PLX520/1000	CON-800V1200A	FPX1000	FANSUPPLY5
700	1150	64	5	*power*PLX520/1150	CON-800V1200A	FPX1150	FANSUPPLY5
800	1350	64	5	*power*PLX600/1350	CON-800V1750A	FPX1350	FANSUPPLY5
1000	1650	64	5	*power*PLX700/1650	CON-800V1750A	FPX1650	FANSUPPLY5
1100	1750	64	5	*power*PLX800/1750	CON-800V2000A	FPX1750	FANSUPPLY5
1200	1950	64	5	*power*PLX900/1950	CON-800V2000A	FPX1950	FANSUPPLY5
NON-REGENERATIVE, 2-QUADRANT DRIVES							
400	650	32 (50)	4	*power*PL275/650	CON-800V700A	FP650	FANSUPPLY4
450	750	32 (50)	4	*power*PL315/750	CON-800V850A	FP750	FANSUPPLY4
500	850	32 (50)	4	*power*PL360/850	CON-800V850A	FP850	FANSUPPLY4
575	950	32 (50)	4	*power*PL400/950	CON-800V1000A	FP950	FANSUPPLY4
700	1150	64	5	*power*PL520/1150	CON-800V1200A	FP1150	FANSUPPLY5
800	1350	64	5	*power*PL600/1350	CON-800V1750A	FP1350	FANSUPPLY5
1000	1650	64	5	*power*PL700/1650	CON-800V1750A	FP1650	FANSUPPLY5
1100	1750	64	5	*power*PL800/1750	CON-800V2000A	FP1750	FANSUPPLY5
1200	1950	64	5	*power*PL900/1950	CON-800V2000A	FP1950	FANSUPPLY5



Size 4 *power*PL/X275 - 440

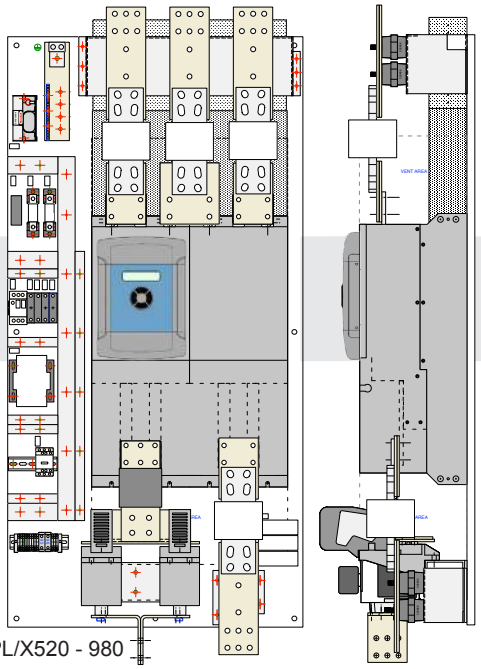
NOTE 1: For "doors closed", safe start up & maintenance practices, all size 4 & 5 drives have an embedded drive.web speedy with isolated USB and Ethernet ports as standard for full remote configuration & peer-to-peer Ethernet (see pages 20 & 21)

Dimensions **Weight**

Size 4, 650A 18.5" w x 53.5" h x 14.1" d (470 x 1360 x 358mm)	235 lbs (108 kg)
Size 4 >650A 18.5" w x 59.6" h x 14.1" d (470 x 1512 x 358mm)	240 lbs (110 kg)
Size 5 30" w x 67" h x16" d (762 x 1698 x 402mm)	575 lbs (260 kg)

NOTE 2: Please call for 600 & 690VAC ***power*DRIVE** versions.

NOTE 3: Due to the weight and dimensions, size 5 powerDRIVES are shipped in two parts that will need to be assembled on site.



Size 5 *power*PL/X520 - 980

PLXD Separate Stack Controller

The PLXD is a great retrofit option for controlling large separate SCR stacks in either 6 or 12-pulse DC drive configurations and also for wound rotor motor SCR stack control. The unit has all the standard PL/X series drive features together with:

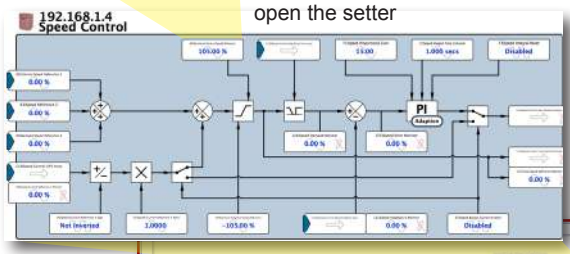
- Available for stacks up to 690 volts AC, 700 volts DC
- Built-in 32 amps fully automatic field controller (optional 50 amps rating)
- Separate gate pulse driver unit for greater noise immunity and reliability
- Optional current transformers
- Optional Ethernet and drive.web distributed control
  Please call for details

savvy tools for the PL/X DC drives

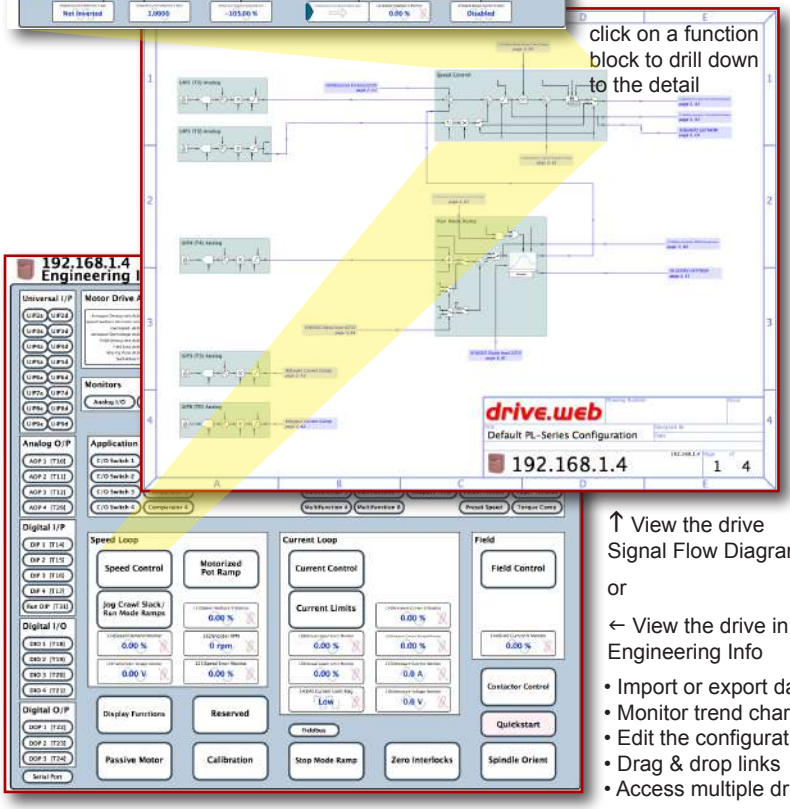
drive.web automation

- *Intuitive*
- *Easy*
- *Reliable*
- *Very smart!*

click on a parameter to open the setter



click on a function block to drill down to the detail



↑ View the drive Signal Flow Diagram

or

← View the drive in Engineering Info

- Import or export data
- Monitor trend charts
- Edit the configuration
- Drag & drop links
- Access multiple drives

drive.web smart drives

Add a ***drive.web*** module to any drive for unlimited automation capability:

- Powerful programmable control functions
- Peer-to-peer networking over Ethernet
- Smart iPad or touch screen PC operation
- Internet access

smarty - adds programmable control & extra I/O
speedy - adds programmable control & gateway

- Get clear graphical signal flow system diagrams.
- Send event driven emails from your drive.
- All in one unique, intuitive, environment.

*power*SL Series

Analog DC drives - up to 200HP

***power*SLX** Regen, reversing drive + field controller
***power*SL** Non-reversing drive + field controller
***power*SLE** Non-reversing OEM drive.
Please call for details

Power Quality For DC Drives

Drive Isolation Transformers

Standard specification:
NEMA 1 enclosed for indoor use
K-factor 4
Windings: Delta Primary, Wye Secondary
Aluminum or Copper windings as indicated
Taps at ± 5%
Approvals: UL, C-UL

Options
Outdoor enclosures
Frequencies other than 60Hz
Voltages other than 230/460/575 pri, 230/460 sec
Special Taps
Fungus Proofing
80°C & 115°C Rise
Copper Windings
Electrostatic Shield
K-13, K-20, K-30

Discount Schedule SX-1

Model	Specification
DIT3**	3KVA - Cu (2HP)
DIT6**	6KVA - Cu (5HP)
DIT11**	11KVA - Al (7.5HP)
DIT14**	14KVA - Al (10HP)
DIT20**	20KVA - Al (15HP)
DIT27**	27KVA - Al (20HP)
DIT34**	34KVA - Al (25HP)
DIT40**	40KVA - Al (30HP)
DIT51**	51KVA - Al (40HP)
DIT63**	63KVA - Al (50HP)
DIT75**	75KVA - Al (60HP)
DIT93**	93KVA - Al (75HP)
DIT118**	118KVA - Al (100HP)
DIT145**	145KVA - Al (125HP)
DIT175**	175KVA - Al (150HP)
DIT220**	220KVA - Al (200HP
DIT275**	275KVA - Al (250HP)
DIT330**	330KVA - Al (300HP)
DIT440**	440KVA - Al (400HP)
DIT550**	550KVA - Al (500HP)
DIT660**	660KVA - Al (600HP)

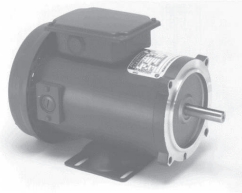
Line Reactors For 3-Phase DC Drives

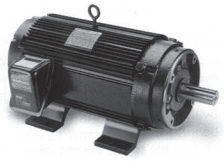
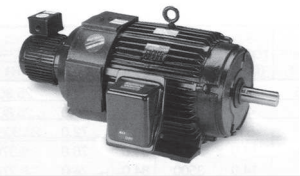
Model Number	HP. at 230V	HP. at 460V	Arm Amps	Dimensions W x D x H	Mount Holes H x W	Weight LBS
LM18	5	10	20	6.0"x4.8"x3.1"	2.1"x2.0"	9
LM37	10	20	41	7.2"x5.6"x3.4"	2.3"x3.0"	11
LM52	15	30	58	7.2"x5.6"x3.8"	2.6"x3.0"	14
LM67	20	40	75	9.0"x7.0"x4.8"	3.2"x3.0"	23
LM82	25	50	91	9.0"x7.0"x4.8"	3.2"x3.0"	24
LM120	35	75	133	10.8"x8.2"x5.6"	3.5"x3.6"	43
LM150	40	100	166	10.8"x8.3"x5.6"	3.5"x3.6"	47
LM195	60	125	216	9.0"x7.1"x4.9"	3.2"x3.0"	29
LM240	75	150	266	10.8"x8.4"x5.8"	3.2"x3.6"	40
LM300		200	333	10.8"x8.4"x6.0"	4.2"x3.6"	48
LM375	100	250	416	10.8"x8.2"x7.3"	4.2"x3.6"	68
LM480	150	300	533	14.8"x14.0"x10.2"	5.9"x4.6"	125
LM600		400	666	15.5"x14.0"x11.5"	6.8"x4.6"	155
LM750	200	500	833	15.5"x14.0"x13.0"	6.8"x4.6"	180
LM900		600	1000	15.5"x14.0"x15.5"	9.3"x4.6"	290
LM1125		750	1250	22.0"x20.0"x14.8"	9.5"x7.2"	400

Line Filter

LF3	Line Filter
LF3-FK	Line Filter Fuse Kit

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.

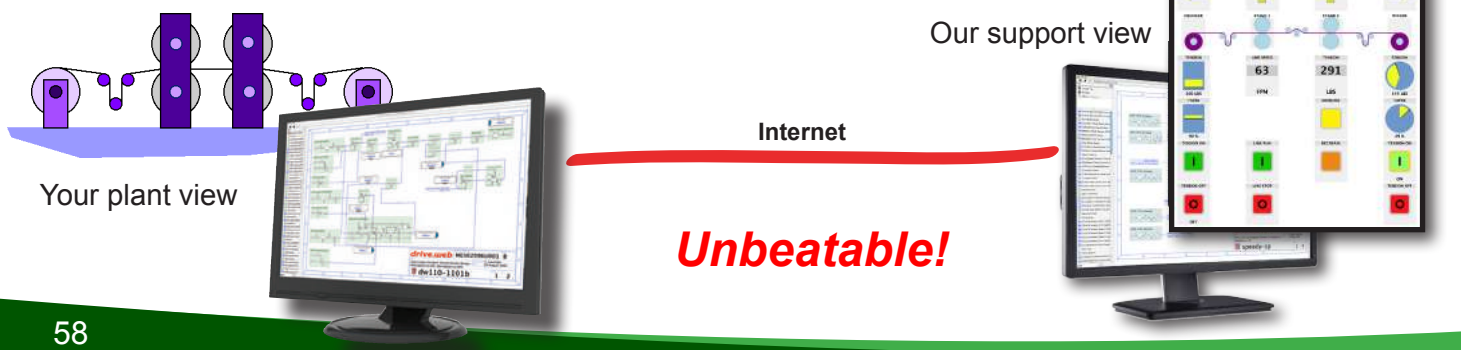
Every ***Modulus*** project is accompanied by a detailed, 50-point, Quality Control Report covering every facet of the product, its design, construction, testing and shipping.

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	$170 per hour
b. Standard Overtime - Weekdays 6pm to 7am & all day Saturday - Total work time not to exceed 12 hrs in any 24 hrs	$255 per hour
c. Special Overtime - Sundays, Holidays and excess of 8 hours on Saturday	$340 per hour
d. Overnight - Includes meals, and hotel accommodation	$255 per night
e. Auto Travel - Covering cost of use of company or personal cars, distance to and from the local office	$0.55 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	$115 per hour + parts
j. Design or application engineering services	$190 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.

Bardac drives

Bardac . . . the safe bet!

Everything normally in stock!

drive.web

Bardac Corporation

40 Log Canoe Circle
Stevensville, MD 21666 USA

bardac.com
driveweb.com

Phone International +410-604-3400
Phone US Toll Free 1-888-667-7333
1-888-ON SPEED

Fax +410-604-3500

bardac.com

Catalog 2020.1

INDEX