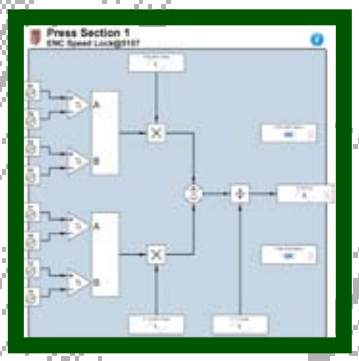
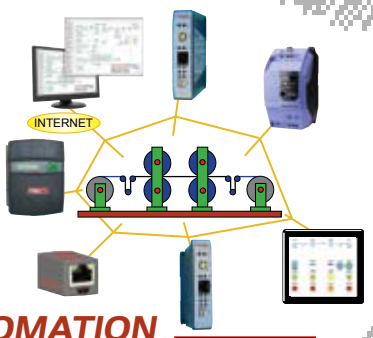
Bardac DRIVES CATALOG 2015

issue 1





drive.web AUTOMATION

AC DRIVES

DC DRIVES

MOTORS

SERVICE

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.

Nothing's changed!

We're tough to beat!

Our factory in Stevensville, Kent Island, Maryland

Please visit us ... take Route 50 East from Washington DC or Annapolis and cross the Chesapeake Bay Bridge to Kent Island … take Exit 37 (the first on Kent Island) Route 8 North, towards Stevensville … after 1/2 mile take the second left onto Schooner Parkway … then left onto Log Canoe Circle and we are the second building to your right … we look forward to seeing you.

Table of Contents

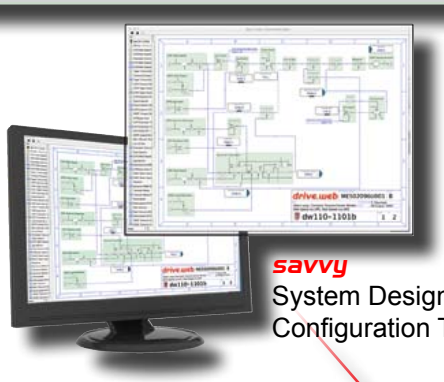
Specifications ... At the time of going to press we believe the information in this catalog to be accurate. However, the specifications of products may be amended at any time, so please check with us when ordering to ensure that such changes will not affect your requirements.

drive.web

SMART AUTOMATION

COST EFFECTIVE FOR SYSTEMS OF ANY SIZE OR COMPLEXITY

WORLD CLASS - NO EQUAL!



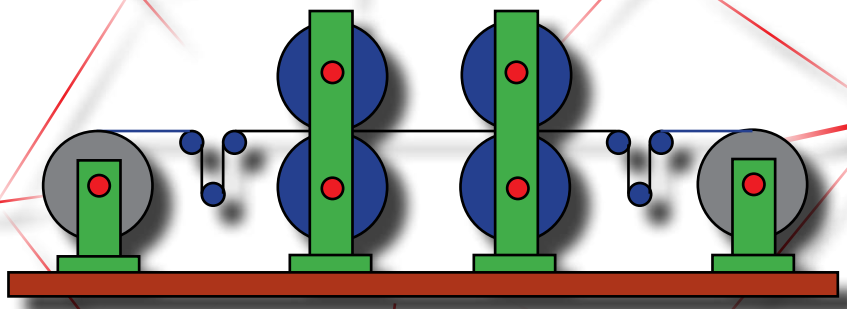
savvy
System Design &
Configuration Tools

smarty
Universal Automation Controller
with comms ports

INTERNET

Ethernet

speedy DC Drive Controller

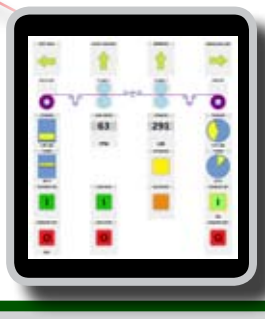


speedy AC Drive Controller

speedy
Universal Automation Controller
For embedding in drives & devices with Ethernet & USB port for total system access

smarty
Universal Automation Controller
& Distributed i/o

Ethernet



savvyPanel
Touch screen operator stations with control tools & WiFi "roaming". For PC, iPad or iPhone

- **Build and operate complete control systems over Ethernet**
- **Program individual drives, controllers & operator stations**
- **Make drag & drop connections between devices**
- **Configure touch screen PC operator stations**
- **Create roaming HMIs in iOS devices - iPad, iPhone, etc.**
- **Provide Internet access to your entire system**
- **Add utilities such as watchdogs, event emails, loggers, etc.**
- **Support interfaces to existing devices via Modbus, EIP, etc.**

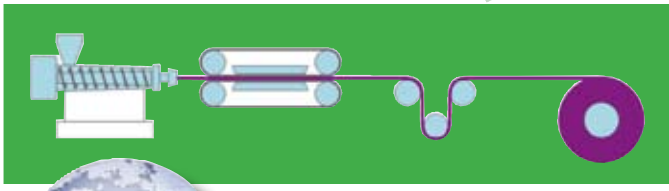
drive.web automation

total connectivity

Enterprise management - machine operators - system engi

one world, one tool, one way

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!

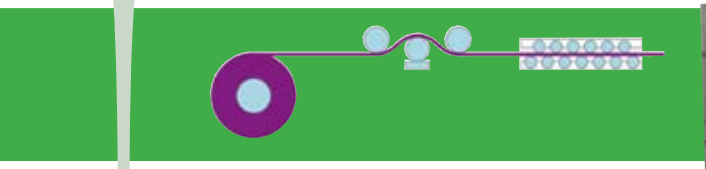
speedy & smarty

Universal Automation Controller Networking

Easy Ethernet field bus, EIP/PCCC, ModbusTCP/IP & others

Ethernet

save time



Ethernet

speedy

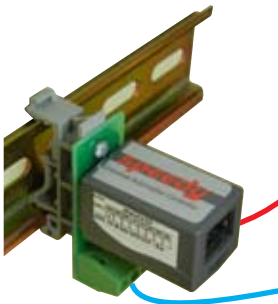
Integrated Universal Automation Controller

- easy interfaces to existing third party drives & controls
- add Ethernet and USB device access
- boost network performance
- add full featured programmable control

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

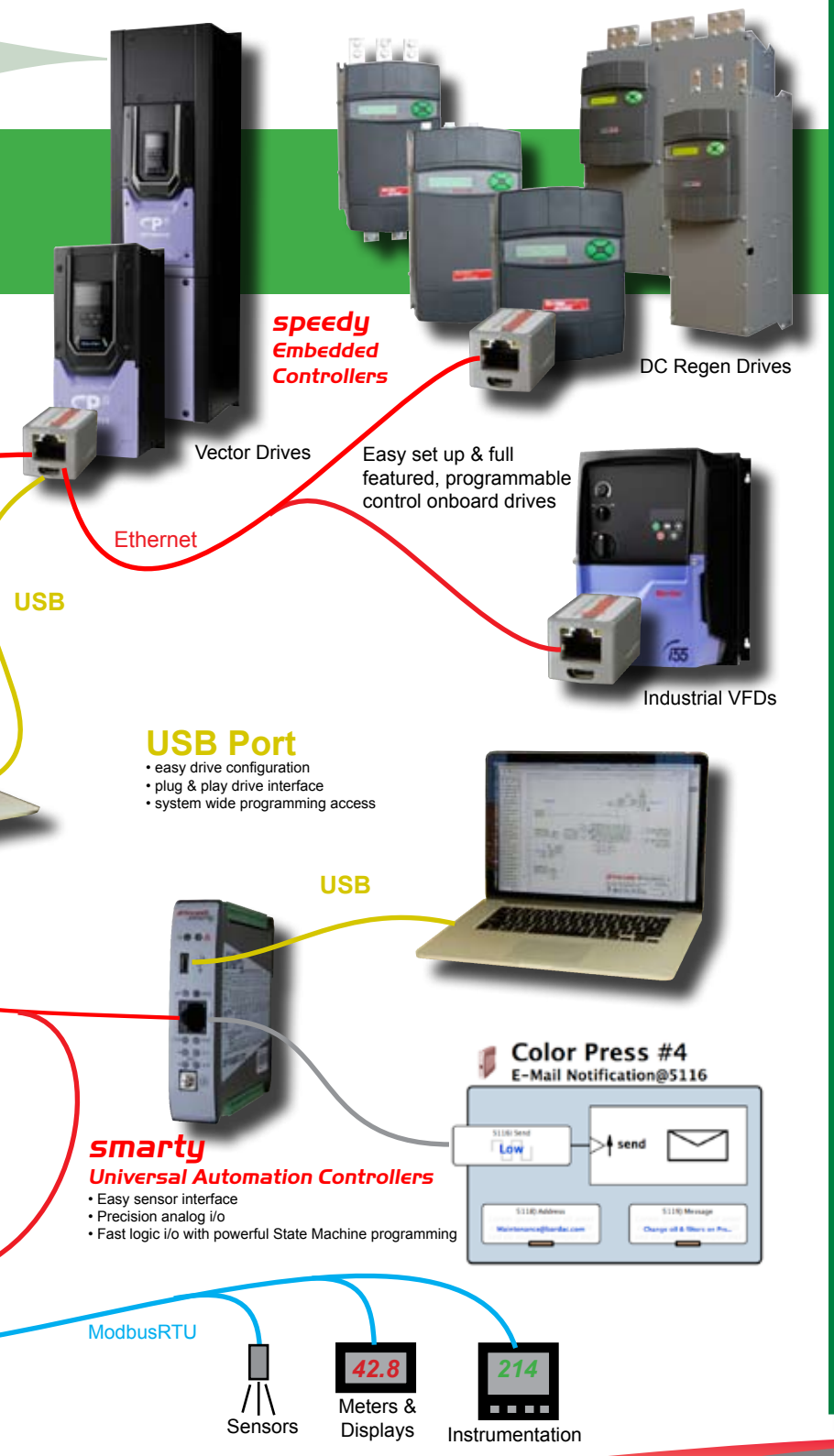
Universal Automation Controllers

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

save resources

smart automation

neering - production control - maintenance - tech support



drive.web

A Unique Architecture

1 ***drive.web*** devices (***speedy***'s and ***smarty***'s) 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)

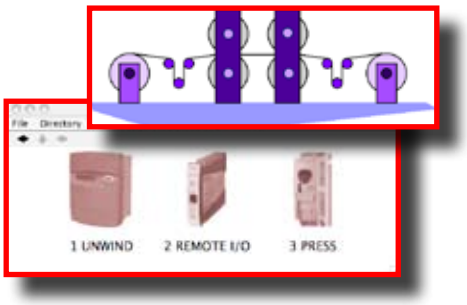
7 Easily create a graphical interface to almost any control device to bring it into your unique, homogeneous, ***drive.web*** environment.

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

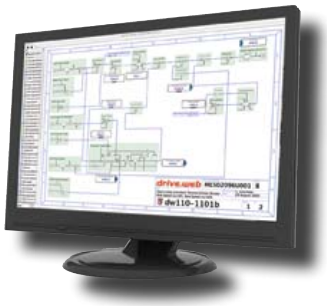
From your initial sketches and notes create ***drive.web savvy*** "Phantoms" offline to identify all your drives, remote i/o, MMI interfaces, gateways, etc.



From the initial concept, through planning, design, construction, testing, installatation 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.

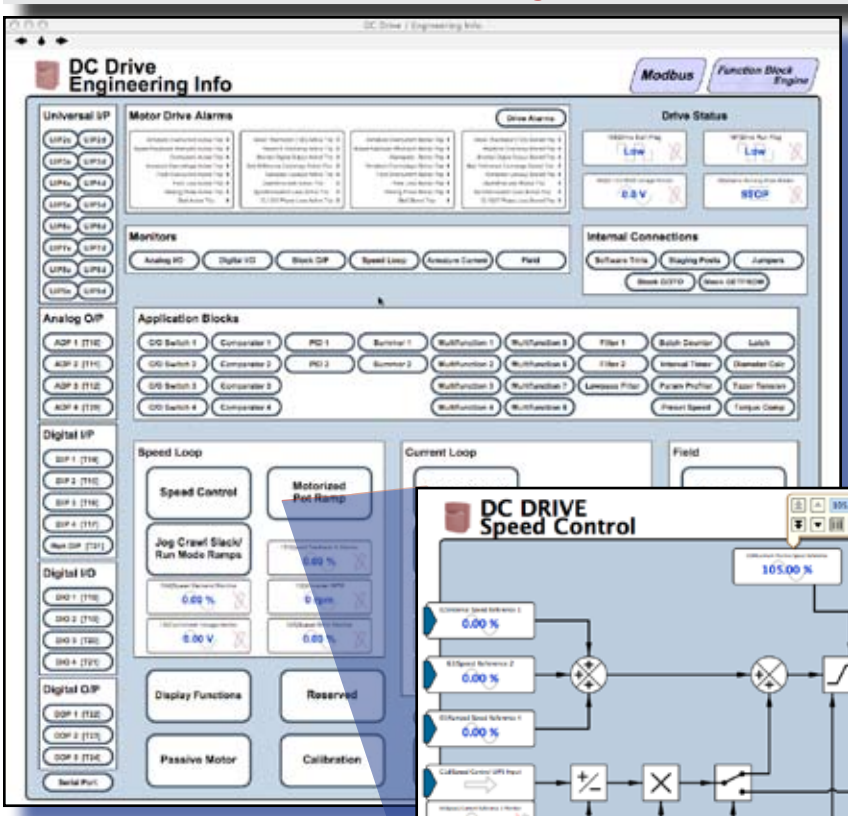
speedy Embedded Controller

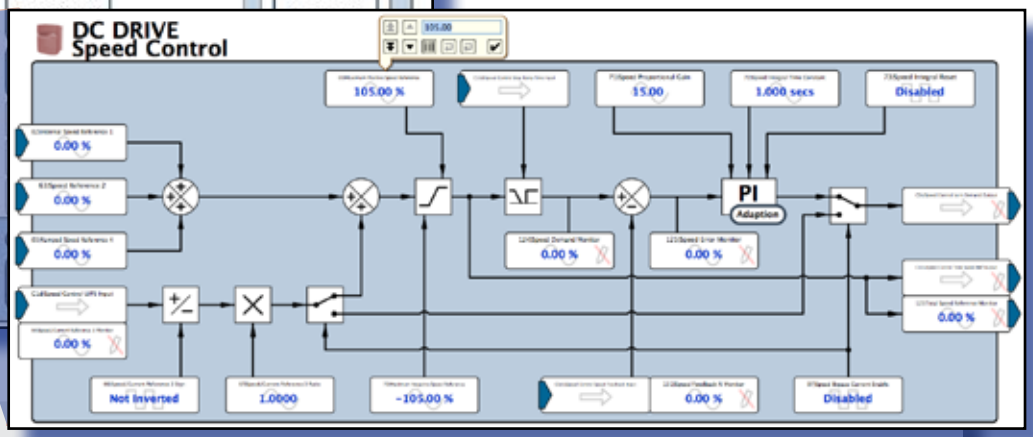
Miniature, low cost, ***drive.web*** programmable controllers for easy embedding in drives & devices. Includes peer-to-peer networking over Ethernet & USB port. Only 21x22x36mm!

drive.web automation

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 a 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

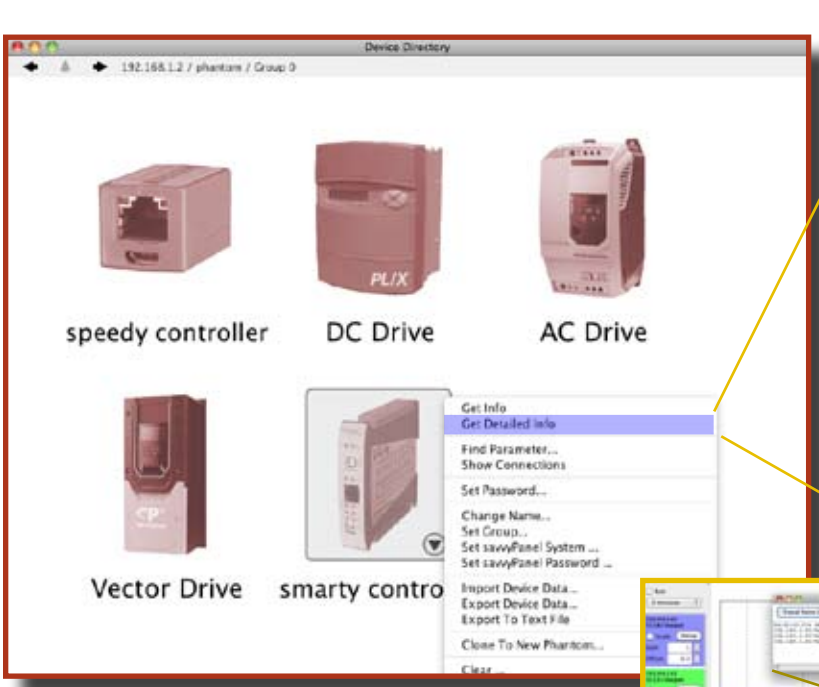
The *savvy* tools and utilities are platform independent and run on Windows, Mac OSX, Unix, Linux and Solaris and they are all automatically updated as new features are released.

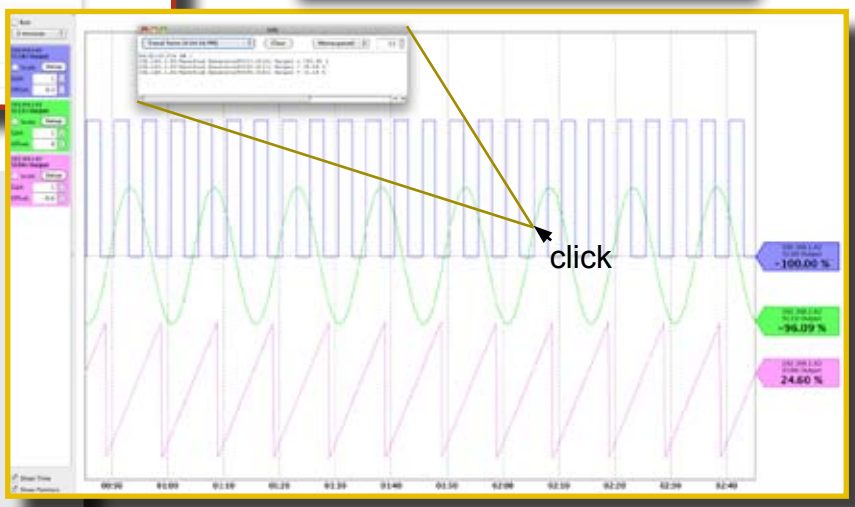
Drives, programmable controllers, operator stations and complete systems are configured by making simple drag & drop connections between clear graphical function blocks.

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 out 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.



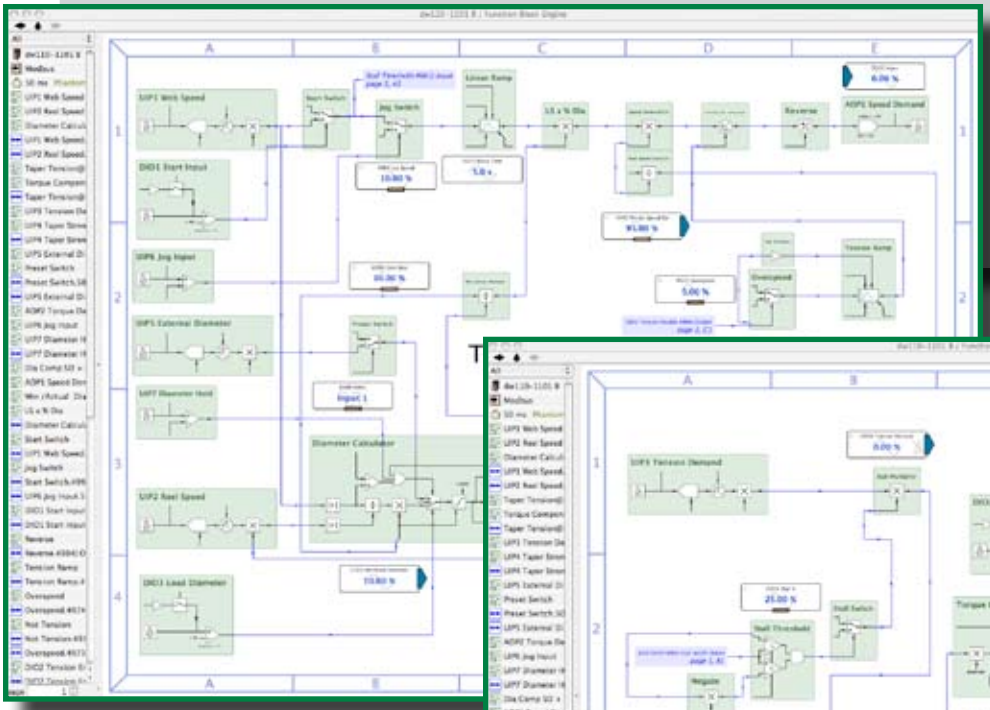


Trend Charting

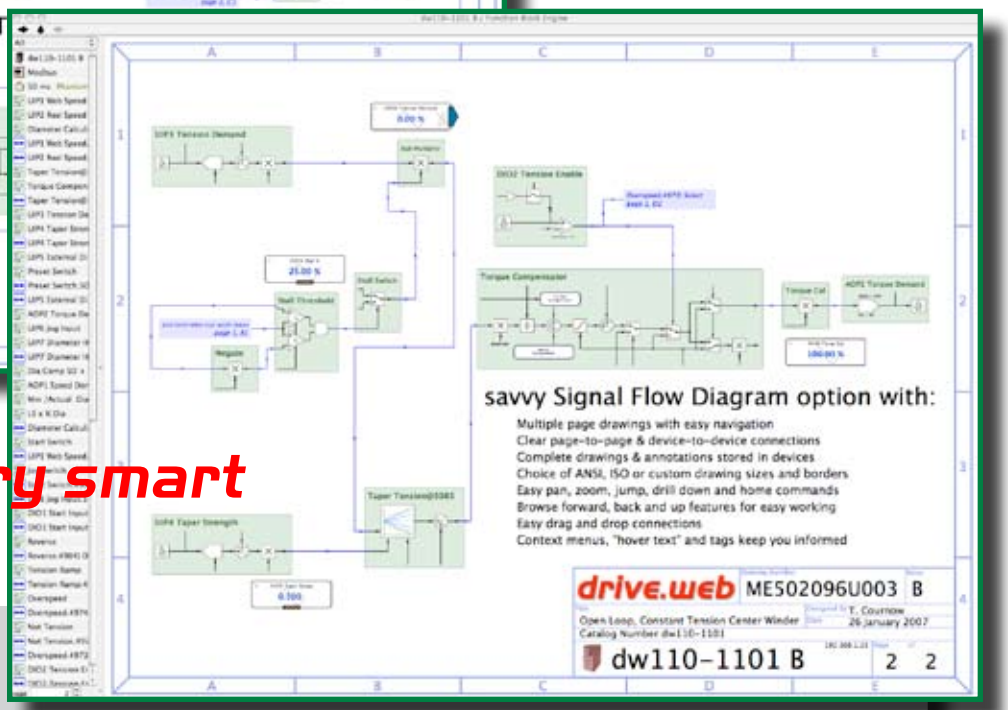
You can collect any parameters of interest in a "dock" window and display as a trend chart. The trend time scale can be adjusted from 10 seconds to 2 days and the data can be exported in a .csv format for separate spreadsheet analysis. Click on a point of interest to get the instantaneous, time stamped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

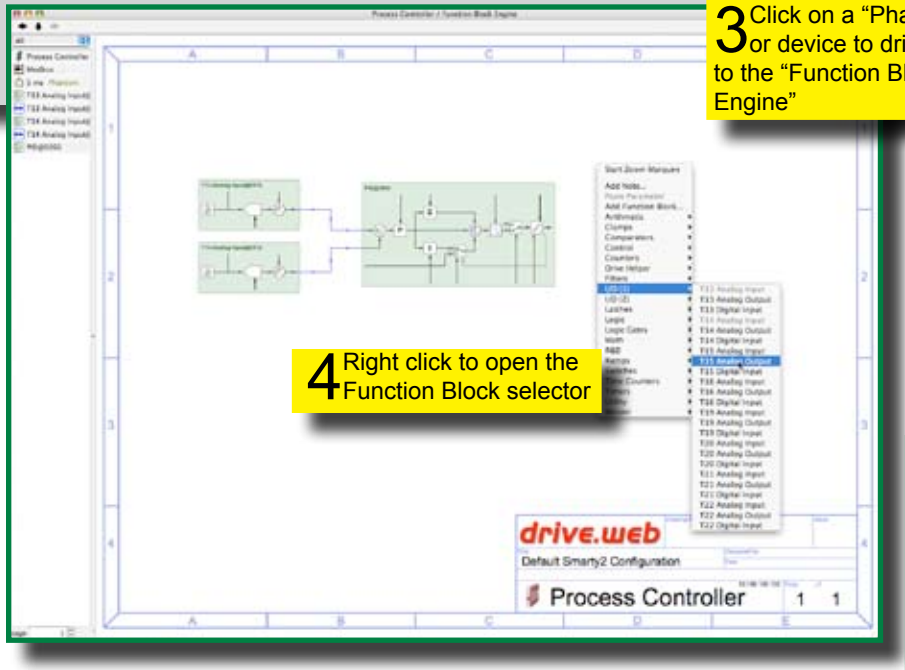
savvy programming

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!

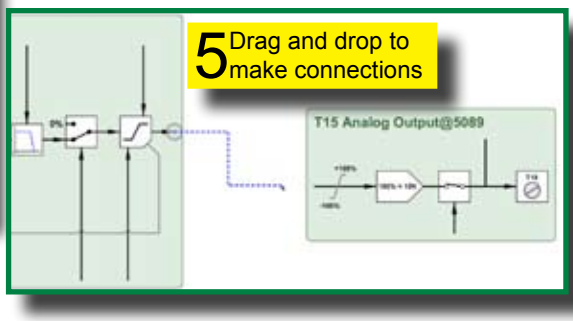
1 Create “phantom” devices or find real devices in your system in the “Device Directory” window.

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



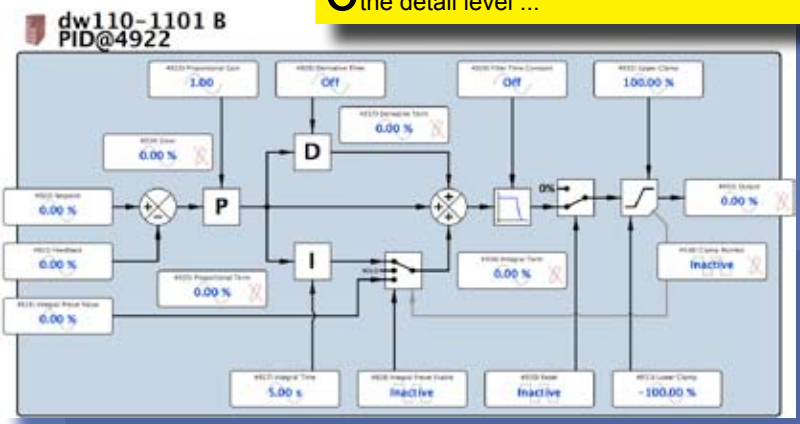
3 Click on a “Phantom” or device to drill down to the “Function Block Engine”

4 Right click to open the Function Block selector

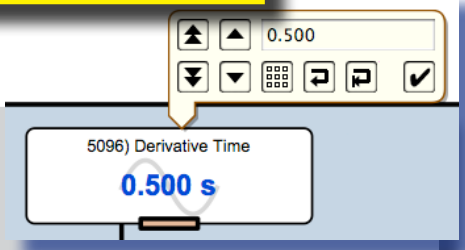


5 Drag and drop to make connections

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!

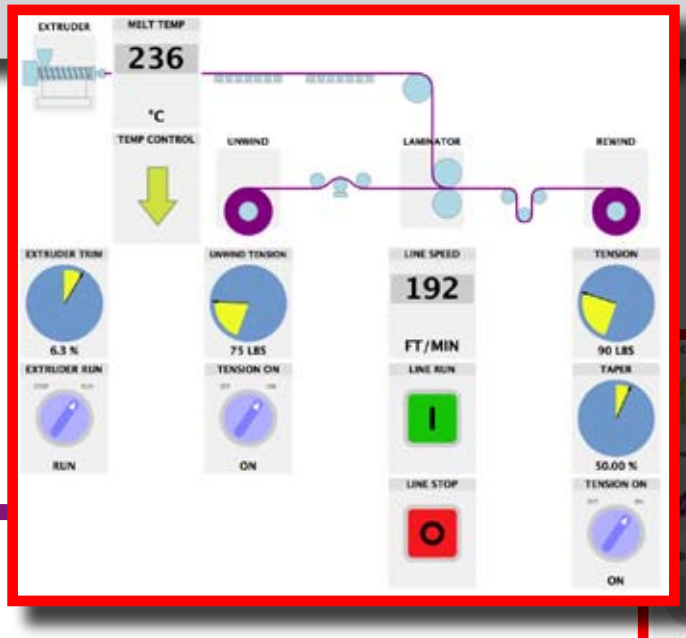
savvyPanel

Smart, touch screen operator station technology

Provides unprecedented flexibility in instrumentation, control and monitoring.

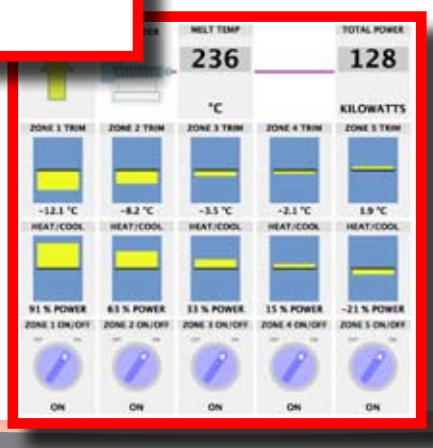
- Runs native on a ***savvyPanel station*** high resolution, touch screen display
- Also runs on any full featured, touch screen PC or on iOS devices (iPad, iPhone, iPod touch, etc.)
- Extensive library of objects such as pushbuttons, switches, meters, indicators, lamps, buzzers, etc.
- Extensive library 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.

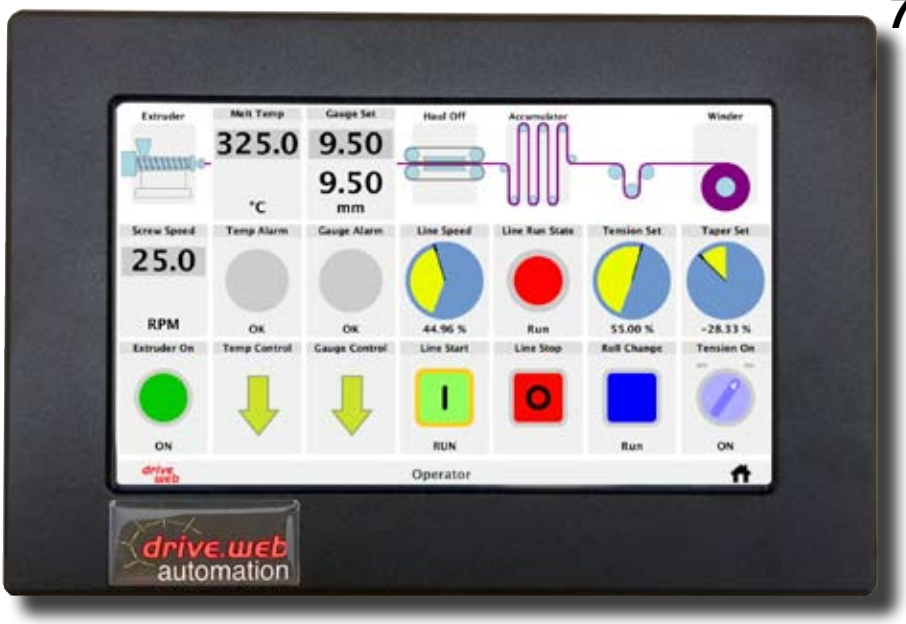
Operator Screen
Touch a graphic tile such as the “EXTRUDER” to drill down to the detail screen



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



7” Color Touch Screens

- Plug & Play, *drive.web* native
- Splashproof front
- High resolution (1024 x 600p)
- Competitively priced.
- Easy set up.

Key Features:

- IP65, NEMA 4 splashproof from the front
- IP20 from the back
- 1, Ethernet port 10/100baseTX
- Power supply 6-30VDC, 5W
- Working Temperature: -20°C to 70°C

savvyPanel touch, 7”
Model dw230
Compact size 8.1” x 5.5” x 1.1” (206x139x28 mm)

enclosure for savvyPanel touch, 7”
Model dwOPTION-54
Impact resistant, flame retardant, polycarbonate industrial enclosure. NEMA 4 (IP65), light gray.
Dimensions: 9.5” x 6.3” x 3.6” (241x160x92 mm)

savvy programing

No separate 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.

Ethernet Networking Options:

- Use with a LAN switch in systems of any size
- Connect directly to any single *drive.web* drive or automation controller.

very smart automation!

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 & 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:

CE, FCC part 15, IECS-003, (UL/cUL in late 2014)

smarty Universal Automation Controllers

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

Smart, compact packaging
4" high x 4.75" deep x 0.9" wide
(102 x 120 x 22 mm)

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 0.78" x 0.79" x 1.37" (20 x 20 x 35mm)

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!**

Universal Automation Controller
Unbeatable Performance

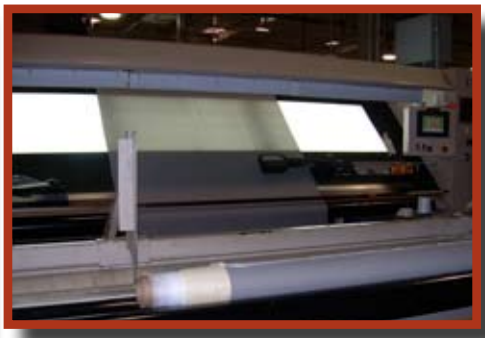
speedy
miniature controllers without i/o

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 programmable control functions.

So small it fits anywhere, does everything!

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

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



Film line winder

Cyclic indexing system

speedy
DIN mount free standing controller

speedy
onboard controller

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 interface controller for ODE2 General Purpose AC Drives

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

dw214 *smarty* dedicated interface controller for ODP2 Closed Loop Vector Drives

dw215 *smarty* dedicated interface controller for Yaskawa F7 drive

See page 22 for other drive and device integration apps

Only 104 x 23 x 120 mm!

speedy - Embedded Automation Controllers

Only 21 x 22 x 36 mm!

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) & communications options

dw220 *speedy* generic on-board controller with 500kbps ModbusRTU master & 15" port cable

dw221 *speedy* plug-in, on-board controller for PL/X series DC drive

dw222 *speedy* plug-in, on-board controller for ODE2 General Purpose drive

dw223 *speedy* plug-in, on-board controller for ODP Sensorless Vector drive

dw224 *speedy* plug-in, on-board controller for ODP2 Closed Loop Vector drive

dw225 *speedy* on-board controller for Yaskawa F7 drive with 15" interface cable

see page 22 for other drive and device integration apps

DIN mount dwOPTION -50

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

smarty & speedy
Product build options

		smarty						speedy						
		dw210	dw212	dw213	dw214	dw215	dw216	dw220	dw221	dw222	dw223	dw224	dw225	dw226
Function Block Libraries														
-05	Advanced Process Control Function Block Library (FBL) (comparators, profilers, presets, latches, filters, counters, timers, PIDs and more)	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	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	X	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	X							
-17*	ModbusRTU slave (RS485) isolated port	X	X	X	X	X	X							
-18*	ModbusRTU slave (RS485) isolated port + external encoder module interface port	X			X									
-19*	ModbusRTU slave (RS485) isolated port + ModbusRTU (RS485) master unisolated	X			X									
-23*	ModbusRTU master (RS485) isolated port + external encoder module interface port	X			X									
I/O Options														
-24*	6 extra digital inputs, 24V	X	X	X	X	X	X							
-26	*savvyPanel* iPad/iPhone & touch screen PC operator station interface	X	X	X	X	X	X	X	X	X	X	X	X	X
-27*	Frequency i/o, up to 20KHz. 2 ~in, 2 ~i/o, with 12V, 400mA regulated power supply	X	X	X	X	X	X							
-28*	Extended digital i/o interface for Opto22 racks (24 channels)	X	X	X	X	X	X							
-30	115VAC digital i/o voltage isolator, up to 2 per smarty (not CE certified) (each with 2, NO contacts + common and 4, 115VAC inputs + common)	X	X	X	X	X	X							
-31	230VAC digital i/o voltage isolator, up to 2 per smarty (not CE certified) (each with 2, NO contacts + common and 4, 230VAC inputs + common)	X	X	X	X	X	X							
-37*	2 channel stepper drive controller - pulse, direction & fast event inputs	X			X									
-38*	2 ch. stepper drive controller - pulse, direction & i2i port for encoder option -42-45	X			X									
Encoder I/O Options														
-15*	Internal encoder input (2-24V, differential A & B (no marker) w/5VDC encoder supply)	X	X	X	X	X	X							
-16*	External encoder module interface port (i2i Port)	X	X	X	X	X	X							
	***smarty* external encoder module (needs a *smarty* dw210 option -16, -18, -22 or -23)**													
-40	1 external encoder, 2-24V + marker, 5VDC encoder supply & two 24V event inputs	X	X	X	X	X	X							
or -42	2 external encoder, 2-24V + marker, 5VDC encoder supply & two 24V event inputs	X	X	X	X	X	X							
-45	External encoder module RS422 retransmit outputs (±1A, ±1B, ±2A, ±2B)	X	X	X	X	X	X							
or -46	External encoder module 24V retransmit outputs (±1A, ±1B, ±2A, ±2B)	X	X	X	X	X	X							
Mounting Options														
-50	DIN rail mount with screw terminal connections							X						X

dwOPTION -16-42
Encoder module

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

drive.web automation

smarty & speedy - stock controllers (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
-23, External encoder module interface port & ModbusRTU Master 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

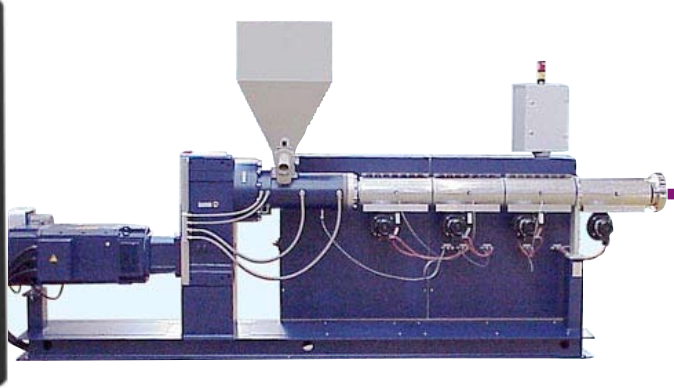
precision stepper control with 2 encoders - pack 5

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



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

dwOPTION -4002 for Yaskawa V1000 Drives

dwOPTION -4003 for Optidrive V2 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

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 19 - 21). 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 integtators!

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

		smarty					speedy					
		dw210	dw212	dw213	dw214	dw215	dw220	dw221	dw222	dw223	dw224	dw225
-1101	Open loop constant tension center winder (includes options 05, 06, 26)	X		X	X	X	X	X		X	X	X
-1102	Closed loop dancer controlled winder (includes options 05, 06, 26)	X		X	X	X	X	X		X	X	X
-1103	Closed loop loadcell controlled winder (includes options 05, 06, 26)	X		X	X	X	X	X		X	X	X
-1104	Slip core winder controller (includes options 05, 06, 26)	X		X	X	X	X	X		X	X	X
-1105	Speed lock with encoder feedback (includes options 05, 11, 16, 26, 42 & 45 or 46)	X			X	X						
-1106	Coordinated drive, line master controller (includes options 05, 26)	X	X	X	X	X	X	X		X	X	X
-1107	Controller networking for an analog/logic interface to drive (includes opts 05, 26)	X										
-1109	Phase lock, electronic line shaft + registration (opts 05, 11, 16, 26, 42 & 45 or 46)	X			X	X						
-1110	Three PID Controllers with integral reset and hold (includes options 05, 26)	X	X	X	X	X	X	X	X	X	X	X
-1113	2 Channel pulse train follower with ratio setting (includes options 05, 26, 27)	X	X	X	X	X						
-1117	Encoder cyclic position w/indexing (includes opts 05, 11, 16, 26, 42 & 45 or 46)	X			X	X						
-1118	Sun tracking for solar energy sys. (includes options 05, 11, 16, 26, 42 & 45 or 46)	X	X	X	X	X						

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

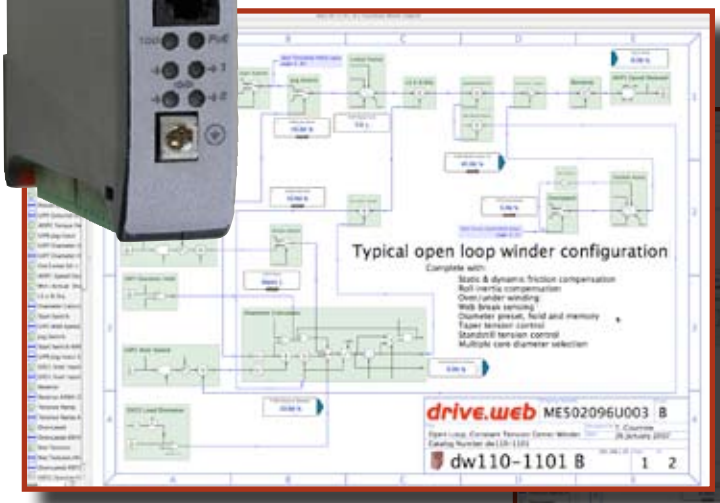
WINDERS & UNWINDERS

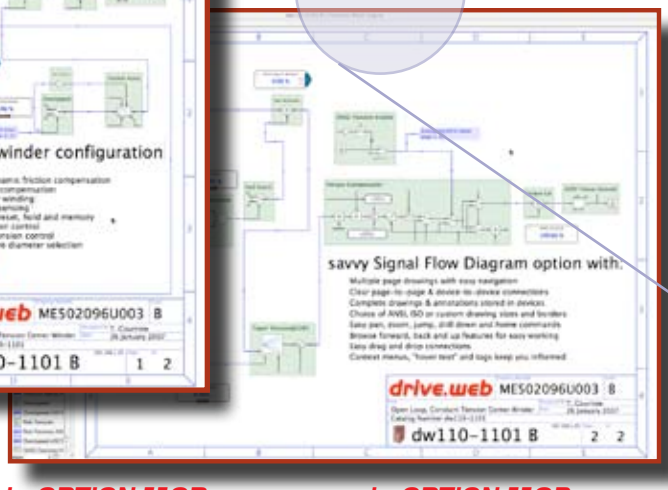
smarty automation controllers use the *drive.web* distributed control technology to bring easy, cost effective intelligence to high performance drive systems.

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

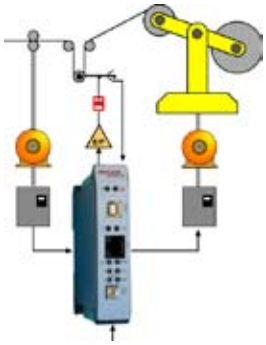




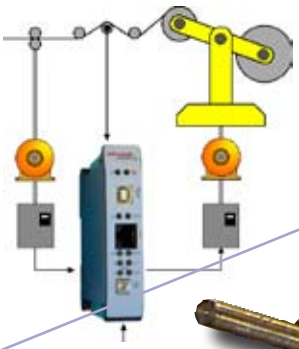
These generic configurations can easily be edited by the intuitive *drive.web savvy* graphical tools to suit the particular application. The clear signal flow diagrams are stored in the controllers for reliable access in the field.

smarty OPTION-1101 OPEN LOOP CENTER WINDER

smarty OPTION-1102 DANCER CONTROLLED CENTER WINDER



smarty OPTION-1103 LOADCELL CONTROLLED CENTER WINDER



smart touch screen control

Standard features include:

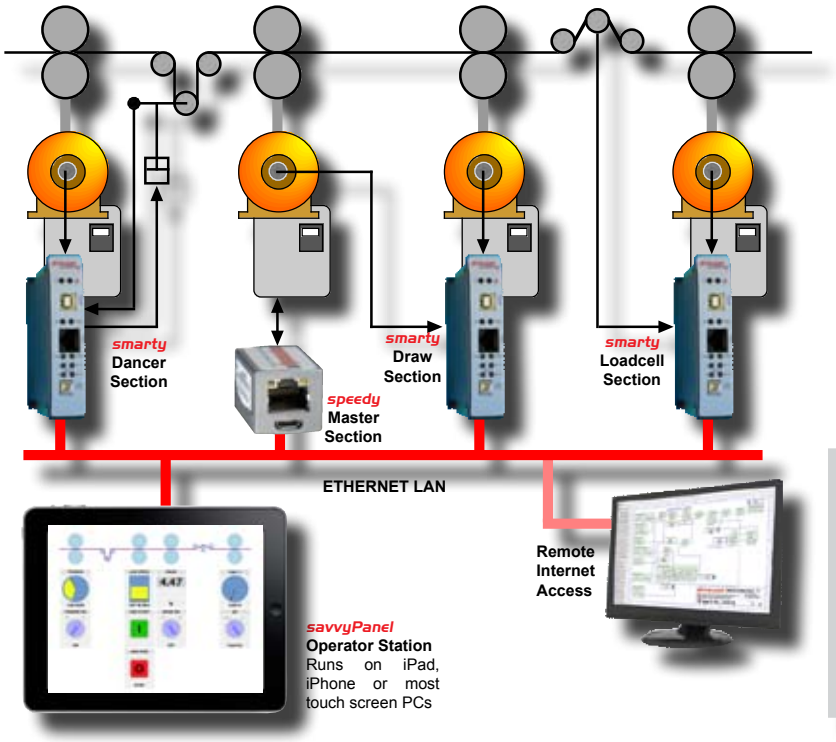
- Fully editable configurations and drawings
- Drive Interface either serial port or analog
- Process control & winder function block libraries
- Web break sensing
- Diameter calculation, memory, preset and hold
- Linear or hyperbolic taper tension
- Friction, inertia & torque compensation
- Multiple 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

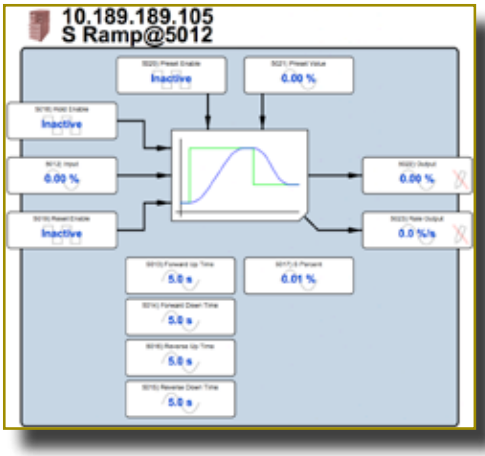
Optional features include:

- 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 *smarty's* and *speedy's* can be easily configured to provide line drive coordination in systems of any size or complexity.

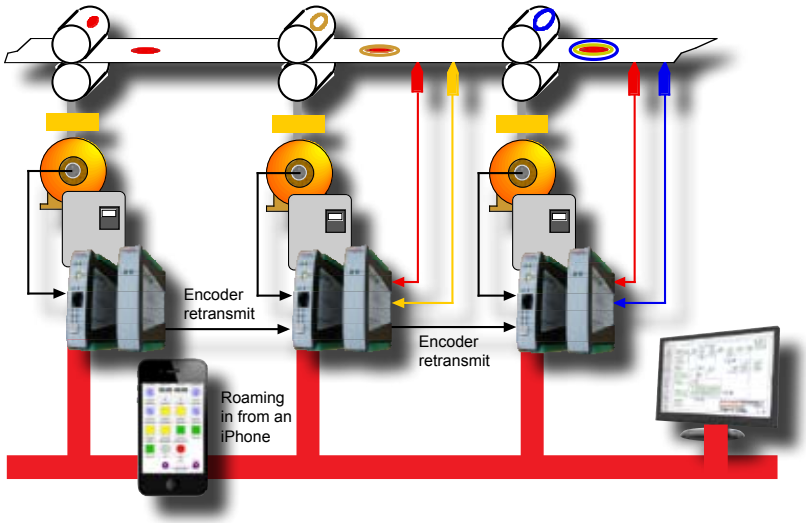


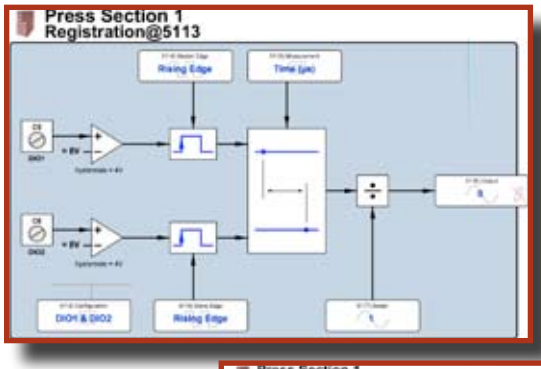


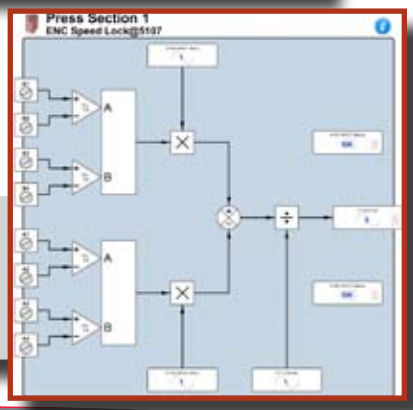
- Functions such as linear, S and hyperbolic ramps are used to provide master references.
- Programmable logic and switch functions are used to provide line run, line jog, local jog, interlocks, etc.
- PIDs, profilers, registration, indexing, phase lock and arithmetic blocks provide precise section control.

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

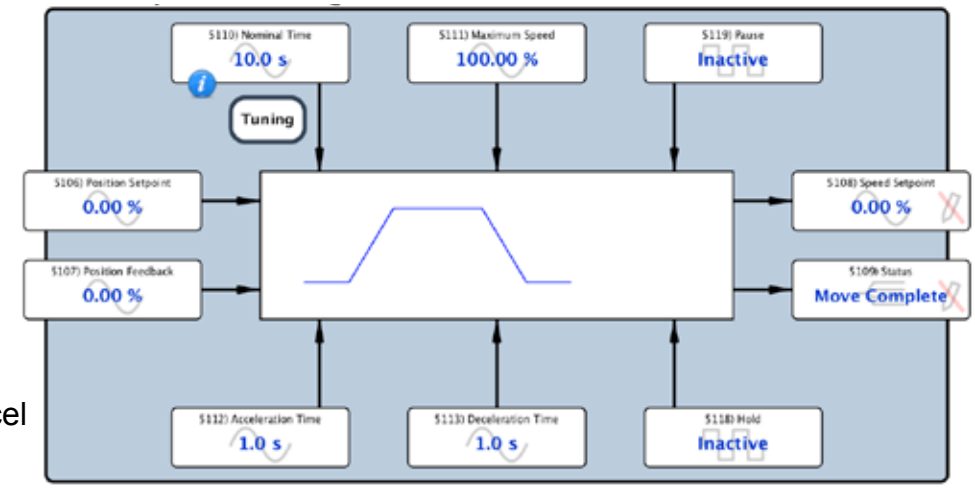
motion control OPTION-36 Motion Control Function Block Library

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

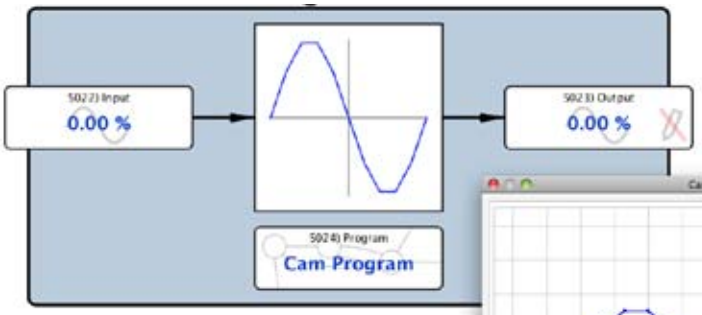


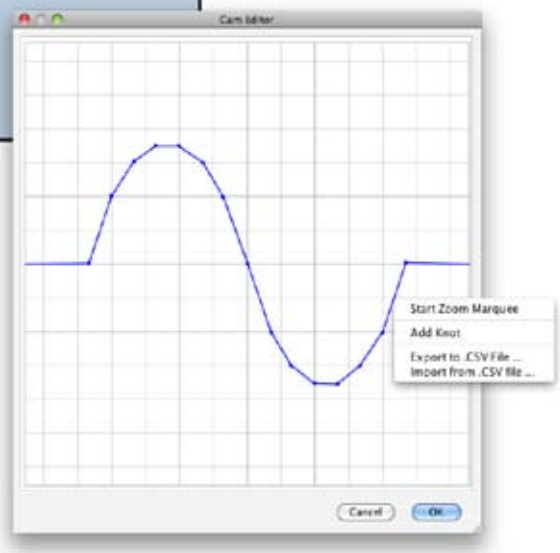
Key Features:

- 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

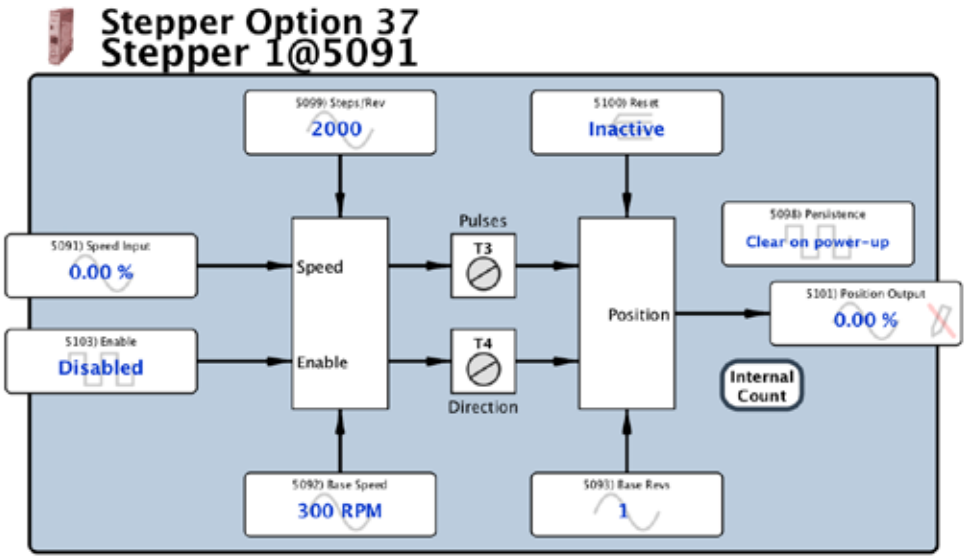
very smart!

motion control Stepper Drive Controllers

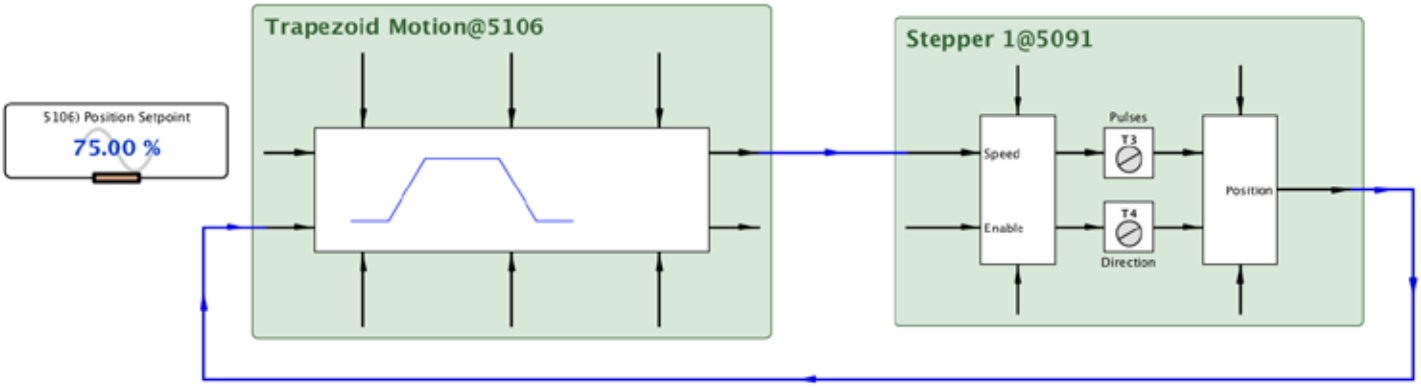
These stepper drive controller options are available for most versions of the smarty (see option selection table, page 19)

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"

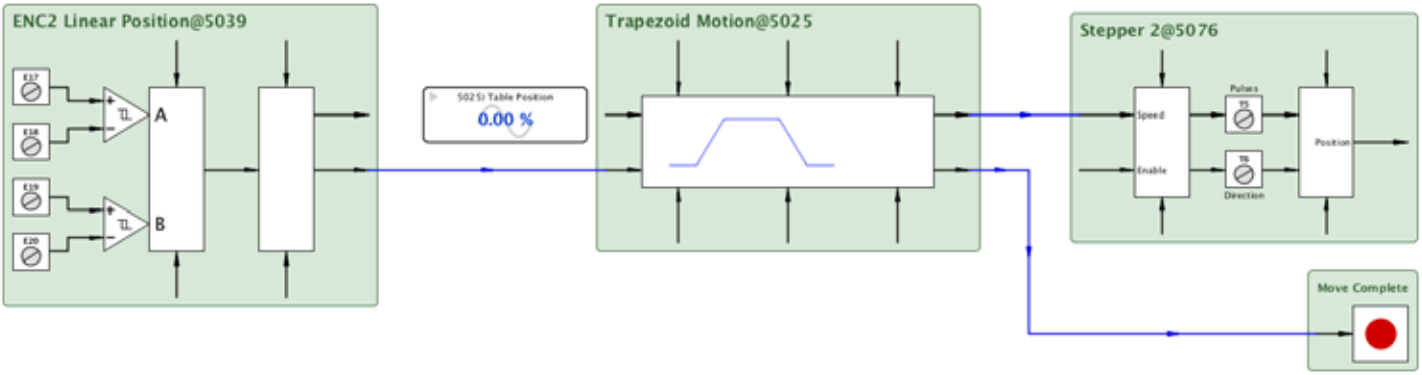


dwOPTION -37 Open Loop Stepper Drive Controller



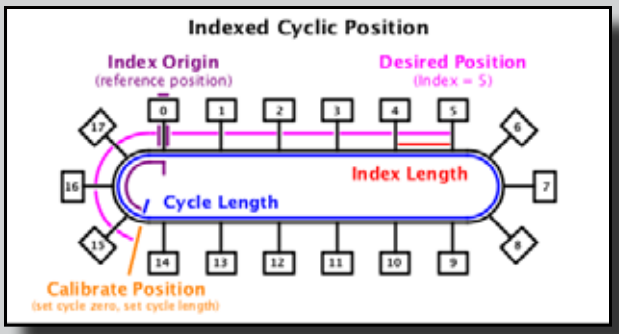
In a typical open loop stepper drive application the "Position" parameter (derived from the pulse count) can be used to close the position control loop

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.

smarty app OPTION-1117 Indexing & Cyclic Positioning

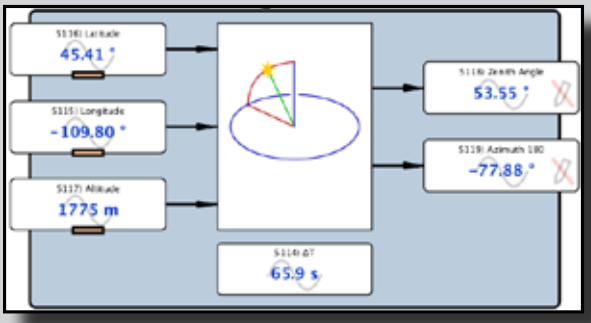


The optional Encoder Function Block Library available in the *smarty* includes a set of engineered function blocks for use in precision positioning applications such as packaging machines, machine center tool loaders, inventory carousels, stackers, etc.

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.

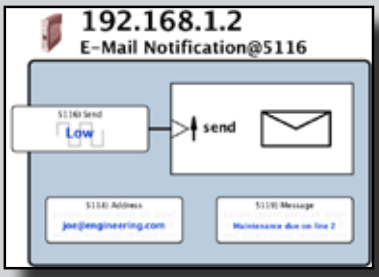
Key Features

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

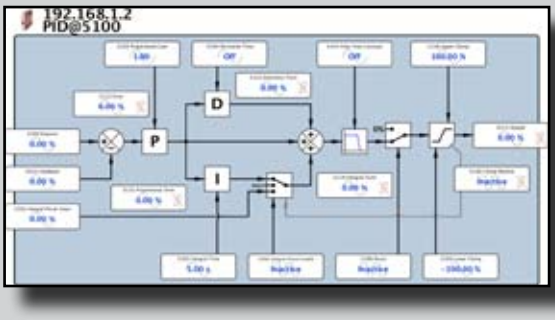
smart utilities smart utilities

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.



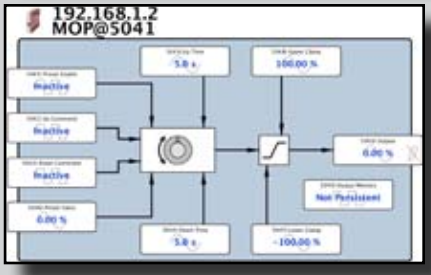
smart function blocks



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.

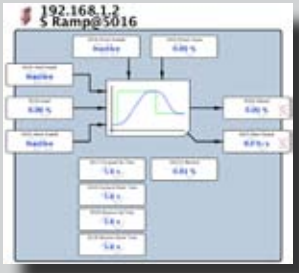
Saves a lot of time and heartache!



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!

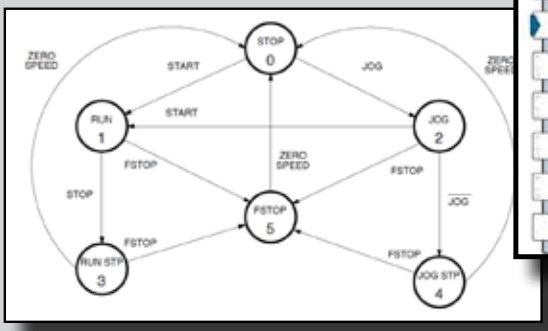
smart function blocks State Machine Logic

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)

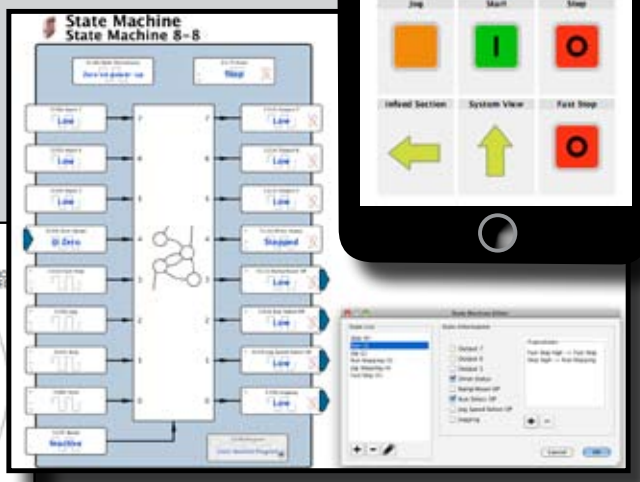
It's that simple! No more sweating over relay interlocks, contact races, etc!

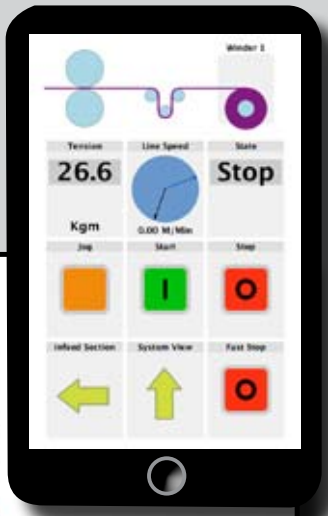


So obvious!

So smart!

So easy!



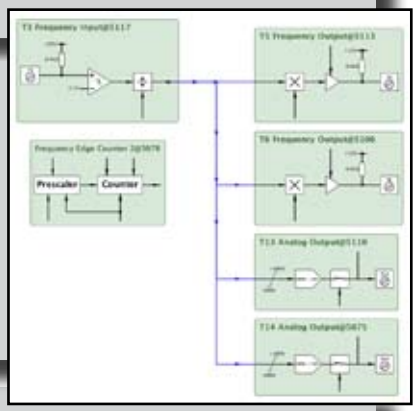


Frequency follower made easy

The frequency input/output function blocks allow you to easily create multiple frequency master/follower configurations that can be either open or closed loop. You can easily monitor, count and reset pulses to build position control systems with easy interfaces to any drive via frequency, analog or serial ports.

Easy interface to stepper drives with either pulse & direction or forward & reverse pulses.

You can easily add graphical touch screen interfaces using the ***savvyPanel*** technology.



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 100 HP at 230 volts
Up to 400 HP at 460 volts
Up to 150 HP at 600 volts

IP20 package up to 15 HP - 50°C *
Optional NEMA 4X (IP66) to 10HP - 40°C *
NEMA12 (IP55) 15 to 250 HP - 40°C *
*** Approvals: UL, 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 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

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

Up to 60 HP at 460 Volts

NEMA4X (IP66) to 15HP - 40°C (indoor) *
NEMA12 (IP55) 15 to 60HP - 40°C *
*** Approvals: CE, C-Tick, (UL in 2015)**

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
ModbusRTU, BACnet
OLED display

Options
drive.web programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
Power disconnect
savvyPanel touch screen HMI

V2 Series
HVAC Variable Torque

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

Up to 100 HP at 230 volts
Up to 350 HP at 460 Volts

IP20 package up to 15 HP - 50°C *
NEMA4X (IP66) to 15HP - 40°C (indoor) *
NEMA12 (IP55) 15 to 250HP - 40°C *
*** Approvals: UL, CE, C-Tick**

Smart energy optimization
110% overload, 60 secs
Motor flux braking
Quiet - with switching up to 32KHz
Power loss ride through
Drive fault auto bypass
Sleep mode with auto-boost
Fire override mode
Pump blockage detect/clear
Pump clean, dry & preheat modes
Pump cascade control
ModbusRTU, BACnet

Options
drive.web programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
Power disconnect
savvyPanel touch screen HMI

TOUGH DRIVES FOR INDUSTRY

E2 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 5 HP at 230 volts
To 15 HP at 460 Volts

Standard IP20 - 50°C
Optional NEMA 4X (IP66) to 10 HP, 40°C
Approvals: UL, C-UL, CE, C-Tick

150% overload, 60 secs (175%, 2 secs)
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
Configurable i/o
Simple programming
On board help card
DIN rail and foot mount (IP20) (size 1 & 2)

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
E2 Series General Purpose VFDs
- Food processing
- Agricultural, water treatment
- Mining, cement, petrochemical

To 1.5 HP at 110V in, 230V 3Ø out
To 5 HP at 230 volts
To 10 HP at 460 Volts

Standard NEMA 4X (IP66) - 40°C (indoor)

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

E2 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(indoor)

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

OPTIDRIVE P2

SYSTEMS VECTOR DRIVES

- High performance
- Induction & PM Motor Control
- NEMA12 packaging 15 - 250HP
  with through panel mount option

0.5 TO 400 HP

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
Filters & DC chokes 25-250 HP
Single phase input up to 125 hp
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
- OLED text display

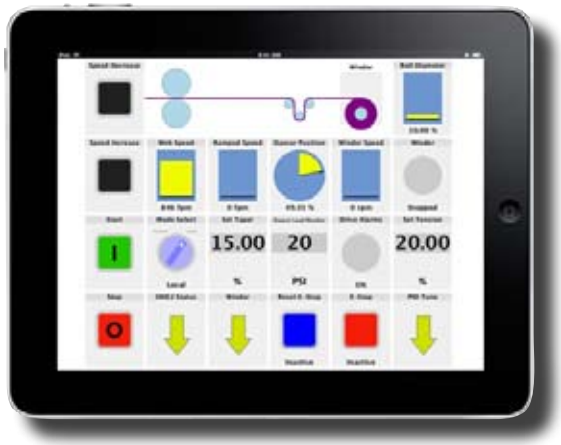
Smart drives for high performance coordinated drive systems and precision machine control

- 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 40

STANDARDS

UL, CE, C-Tick on all models



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.

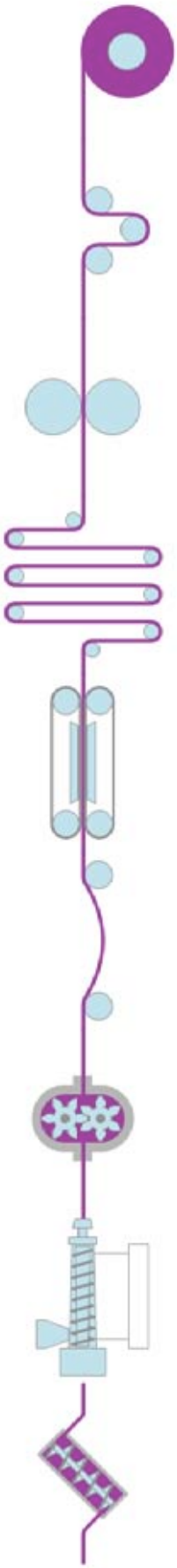
Also run ***savvyPanel*** on PCs or roam on iOS devices such as iPad, iPhone

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 (IP40, 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 IP40 (NEMA 1) - Frame size 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
	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
ODP2-22010-1HF42	1	4.3	2
ODP2-22020-1HF42	2	7	2
ODP2-22030-1HF42	3	10.5	2

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

Model	HP	Amps	Size
ODP2-22010-3HF42	1	4.3	2
ODP2-22020-3HF42	2	7	2
ODP2-22030-3HF42	3	10.5	2
ODP2-32050-3HF42	5	18	3
ODP2-32075-3HF42	7.5	24	3

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

Model	HP	Amps	Size
ODP2-24010-3HF42	1	2.2	2
ODP2-24020-3HF42	2	4.1	2
ODP2-24030-3HF42	3	5.8	2
ODP2-24050-3HF42	5	9.5	2
ODP2-34075-3HF42	7.5	14	3
ODP2-34100-3HF42	10	18	3
ODP2-34150-3HF42	15	24	3

NEMA12 (IP55) Packages
With EMC Filter, DB transistor, DC Chokes

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

Model	HP	Amps	Size
ODP2-42075-3HF4N	7.5	24	4
ODP2-42100-3HF4N	10	30	4
ODP2-42150-3HF4N	15	46	4
ODP2-52020-3HF4N	20	61	5
ODP2-52025-3HF4N	25	72	5
ODP2-62030-3HF4N	30	90	6
ODP2-62040-3HF4N	40	110	6
ODP2-62050-3HF4N	50	150	6
ODP2-62060-3HF4N	60	180	6
ODP2-72075-3HF4N	75	202	7
ODP2-72100-3HF4N	100	248	7

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

Model	HP	Amps	Size
ODP2-44150-3HF4N	15	24	4
ODP2-44200-3HF4N	20	30	4
ODP2-44250-3HF4N	25	39	4
ODP2-44300-3HF4N	30	46	4
ODP2-54040-3HF4N	40	61	5
ODP2-54050-3HF4N	50	72	5
ODP2-64060-3HF4N	60	90	6
ODP2-64075-3HF4N	75	110	6
ODP2-64120-3HF4N	120	150	6
ODP2-64150-3HF4N	150	180	6
ODP2-74175-3HF4N	175	202	7
ODP2-74200-3HF4N	200	240	7
ODP2-74250-3HF4N	250	302	7

NEMA 1 (IP20) units to 400HP

ODP2-84300-3H042	300	370	NEMA 1
ODP2-84400-3H042	400	480	NEMA 1

For single phase supply derate to 50%

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
ODP2-26010-3H042	1	2.1	2
ODP2-26020-3H042	2	3.1	2
ODP2-26030-3H042	3	4.1	2
ODP2-26050-3H042	5	6.5	2
ODP2-26075-3H042	7.5	9	2
ODP2-36100-3H042	10	12	3
ODP2-36150-3H042	15	17	3
ODP2-36200-3H042	20	22	3

NEMA 4X (IP66) Packages to 15 HP
SWITCHED - with keypad, display, speed pot
power isolator switch, FWD/OFF/REV switch
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

Model	HP	Amps	Size
ODP2-26010-3H04Y	1	2.1	2
ODP2-26020-3H04Y	2	3.1	2
ODP2-26030-3H04Y	3	4.1	2
ODP2-26050-3H04Y	5	6.5	2
ODP2-26075-3H04Y	7.5	9	2
ODP2-36100-3H04Y	10	12	3
ODP2-36150-3H04Y	15	17	3

UNSWITCHED - with keypad & display
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

Model	HP	Amps	Size
ODP2-26010-3H04X	1	2.1	2
ODP2-26020-3H04X	2	3.1	2
ODP2-26030-3H04X	3	4.1	2
ODP2-26050-3H04X	5	6.5	2
ODP2-26075-3H04X	7.5	9	2
ODP2-36100-3H04X	10	12	3
ODP2-36150-3H04X	15	17	3

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

Model	HP	Amps	Size
ODP2-46200-3H04N	20	22	4
ODP2-46250-3H04N	25	28	4
ODP2-46300-3H04N	30	34	4
ODP2-46400-3H04N	40	43	4
ODP2-56050-3H04N	50	54	5
ODP2-56060-3H04N	60	65	5
ODP2-66075-3H04N	75	78	6
ODP2-66100-3H04N	100	105	6
ODP2-66125-3H04N	125	130	6
ODP2-66150-3H04N	150	150	6

P2 OPTIONS
OPT2-ENCOD-IN Encoder feedback module
OPT2-OPORT-IN Remote keypad & display
OPT2-OPPAD-IN Remote keypad w/OLED display

Dimensions Size	2	3	4	5	6	7	8
Height (ins)	8.7"	10.3"	17.3"	21.3"	34.1"	50.4"	40"
Height (mm)	221	261	440	540	865	1280	995
Width (ins)	4.4"	5.2"	6.8"	9.3"	13.0"	13.0"	19"
Width (mm)	112	131	173	235	330	330	482
Depth (ins)	7.3"	8.1"	9.1"	10.6"	13.4"	14.6"	19"
Depth (mm)	185	205	230	270	340	370	480

NEW!

V3 Energy Efficient Drives

Variable torque, fan & pump drive for:

HVAC
Building systems
Climate control
Flow control

Up to 60 HP at 460 Volts

NEMA4X (IP66) to 15HP - 40°C (indoor) *
NEMA12 (IP55) 15 to 60HP - 40°C *
*** Approvals: CE, C-Tick, (UL 2015)**

- 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
- ModbusRTU, BACnet
- OLED display

Options

drive.web programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
Power disconnect
savvyPanel touch screen HMI

Motor compatibility:

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

V3 Energy Efficient Drives

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

Model	HP	Amps	Size	NEMA
NEMA 4X, with OLED text display & EMC Filter				
Unswitched				
ODV3-340140-3F1X-TN	7.5	14	3	4X
ODV3-340180-3F1X-TN	10	18	3	4X
ODV3-340240-3F1X-TN	15	24	3	4X
w/Disconnect				
ODV3-340140-3F1D-TN	7.5	14	3	4X
ODV3-340180-3F1D-TN	10	18	3	4X
ODV3-340240-3F1D-TN	15	24	3	4X
NEMA 12, IP55 with OLED text display & EMC Filter				
ODV3-440300-3F1N-TN	20	30	4	12
ODV3-440390-3F1N-TN	25	39	4	12
ODV3-440460-3F1N-TN	30	46	4	12
ODV3-540610-3F1N-TN	40	61	5	12
ODV3-540720-3F1N-TN	50	72	5	12
ODV3-540900-3F1N-TN	60	90	5	12

V2 SERIES HVAC

VARIABLE TORQUE FAN & PUMP DRIVES

0.5 TO 250 HP

- Fan & pump features
- NEMA 4X (IP66) to 10 HP
- NEMA 12 (IP55) to 250 HP
- BACnet & ModbusRTU

FEATURES

Dedicated HVAC and centrifugal pump controller
Built in EMC filter standard
DC bus chokes built in, sizes 4 - 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 sleep and wake functions for on demand use
Built-in motor flux braking
Programmable i/o
Optistick plug-in programming tool
Power loss ride through
40°C ambient
HVAC functions:
- Bi-directional Fire Mode for emergency ventilation

Pump functions:
- Blockage detection
- Adjustable cleaning cycle
- Multi-pump cascade control
- Pump stir mode

Standards - UL, 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%
	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: 1-250 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 7
Programming	Keypad	Standard: built in keypad Optional: Remote keypad Optistick memory stick ***drive.web savvy*** software
	Display	Standard: Bright Green OLED
Control	Control Modes	Variable torque V/F Variable torque Energy optimized V/F
	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	Hours run 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

Models & Ratings

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

Model	HP	Amps	Size	NEMA
size 2 with LED display & EMC Filter:				
ODV2-22010-1HF12-SN	1	4.3	2	IP20
ODV2-22020-1HF12-SN	2	7	2	IP20
ODV2-22030-1HF12-SN	3	10.5	2	IP20
size 2 with OLED text display & EMC Filter:				
ODV2-22010-1HF1X or D	1	4.3	2	4X
ODV2-22020-1HF1X or D	2	7	2	4X
ODV2-22030-1HF1X 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 with LED display & EMC Filter:				
ODV2-22010-3HF12-SN	1	4.3	2	IP20
ODV2-22020-3HF12-SN	2	7	2	IP20
ODV2-22030-3HF12-SN	3	10.5	2	IP20
ODV2-32050-3HF12-SN	5	18	3	IP20
ODV2-32075-3HF12-SN	7.5	24	3	IP20
sizes 2 & 3 with OLED text display & EMC Filter:				
ODV2-22010-3HF1X or D	1	4.3	2	4X
ODV2-22020-3HF1X or D	2	7	2	4X
ODV2-22030-3HF1X or D	3	10.5	2	4X
ODV2-32050-3HF1X or D	5	18	3	4X
sizes 4-7 - OLED text display, EMC filter & DC choke:				
ODV2-42075-3HF1N	7.5	24	4	12
ODV2-42100-3HF1N	10	30	4	12
ODV2-42150-3HF1N	15	46	4	12
ODV2-52020-3HF1N	20	61	5	12
ODV2-52025-3HF1N	25	72	5	12
ODV2-52030-3HF1N	30	90	5	12
ODV2-62040-3HF1N	40	110	6	12
ODV2-62050-3HF1N	50	150	6	12
ODV2-62060-3HF1N	60	180	6	12
ODV2-62075-3HF1N	75	202	6	12
ODV2-72100-3HF1N	100	248	7	12

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

Model	HP	Amps	Size	NEMA
sizes 2 & 3 with LED display & EMC Filter:				
ODV2-24010-3HF12-SN	1	2.2	2	IP20
ODV2-24020-3HF12-SN	2	4.1	2	IP20
ODV2-24030-3HF12-SN	3	5.8	2	IP20
ODV2-24050-3HF12-SN	5	9.5	2	IP20
ODV2-34075-3HF12-SN	7.5	14	3	IP20
ODV2-34100-3HF12-SN	10	18	3	IP20
ODV2-34150-3HF12-SN	15	24	3	IP20
sizes 2 & 3 with EMC Filter:				
ODV2-24010-3HF1X or D	1	2.2	2	4X
ODV2-24020-3HF1X or D	2	4.1	2	4X
ODV2-24030-3HF1X or D	3	5.8	2	4X
ODV2-24050-3HF1X or D	5	9.5	2	4X
ODV2-34075-3HF1X or D	7.5	14	3	4X
ODV2-34100-3HF1X or D	10	18	3	4X
sizes 4-7 with EMC filter & DC choke:				
ODV2-44150-3HF1N	15	24	4	12
ODV2-44200-3HF1N	20	30	4	12
ODV2-44250-3HF1N	25	39	4	12
ODV2-44300-3HF1N	30	46	4	12
ODV2-54040-3HF1N	40	61	5	12
ODV2-54050-3HF1N	50	72	5	12
ODV2-54060-3HF1N	60	90	5	12
ODV2-64075-3HF1N	75	110	6	12
ODV2-64120-3HF1N	120	150	6	12
ODV2-64150-3HF1N	150	180	6	12
ODV2-64175-3HF1N	175	202	6	12
ODV2-74200-3HF1N	200	240	7	12
ODV2-74250-3HF1N	250	302	7	12
size 8 with EMC Filter				
ODV2-84300-3HF12-TN	300	370	8	IP20
ODV2-84400-3HF12-TN	400	450	8	IP20

Dimensions

Size	2	3	4	5	6	7	8
IP20 Drives							
Height (ins)	8.7"	10.3"					
Height (mm)	221	261					
Width (ins)	4.4"	5.2"					
Width (mm)	112	131					
Depth (ins)	7.3"	8.1"					
Depth (mm)	185	205					
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"	10.1"					
Depth (mm)	238	256					
NEMA 12 (IP55) Drives							
Height (ins)			17.3"	21.3"	34.1"	50.4"	40"
Height (mm)			440	540	865	1280	955
Width (ins)			6.8"	9.3"	13.0"	13.0"	19"
Width (mm)			173	235	330	330	482
Depth (ins)			9.1"	10.6"	13.4"	14.6"	19"
Depth (mm)			230	270	340	370	480

Size 2 & 3 drives model number suffix X or D

X = no disconnect switch

D = with power disconnect switch

speedy on board
Ethernet networking
USB programming
smart automation

600 Volts Drives

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

Model	HP	Amps	Size	NEMA
IP20 with LED display				
ODV2-26010-3H012-SN	1	2.1	2	IP20
ODV2-26020-3H012-SN	2	3.1	2	IP20
ODV2-26030-3H012-SN	3	4.1	2	IP20
ODV2-26050-3H012-SN	5	6.5	2	IP20
ODV2-26075-3H012-SN	7.5	9	2	IP20
ODV2-36100-3H012-SN	10	12	3	IP20
ODV2-36150-3H012-SN	15	17	3	IP20
ODV2-36200-3H012-SN	20	22	3	IP20
NEMA 4X (IP66), with OLED text display				
Unswitched				
ODV2-26010-3H01X-TN	1	2.1	2	4X
ODV2-26020-3H01X-TN	2	3.1	2	4X
ODV2-26030-3H01X-TN	3	4.1	2	4X
ODV2-26050-3H01X-TN	5	6.5	2	4X
ODV2-36075-3H01X-TN	7.5	9	3	4X
ODV2-36100-3H01X-TN	10	12	3	4X
ODV2-36150-3H01X-TN	15	17	3	4X
w/Disconnect				
ODV2-26010-3H01D-TN	1	2.1	2	4X
ODV2-26020-3H01D-TN	2	3.1	2	4X
ODV2-26030-3H01D-TN	3	4.1	2	4X
ODV2-26050-3H01D-TN	5	6.5	2	4X
ODV2-36075-3H01D-TN	7.5	9	3	4X
ODV2-36100-3H01D-TN	10	12	3	4X
ODV2-36150-3H01D-TN	15	17	3	4X
NEMA 12 (IP55) with OLED text display, DC choke				
ODV2-46200-3H01N-TN	20	22	4	12
ODV2-46250-3H01N-TN	25	28	4	12
ODV2-46300-3H01N-TN	30	34	4	12
ODV2-46400-3H01N-TN	40	43	4	12
ODV2-56050-3H01N-TN	50	54	5	12
ODV2-56060-3H01N-TN	60	65	5	12
ODV2-66075-3H01N-TN	75	78	6	12
ODV2-66100-3H01N-TN	100	105	6	12
ODV2-66125-3H01N-TN	125	130	6	12
ODV2-66150-3H01N-TN	150	150	6	12

OPTIDRIVE E2

General purpose drives with all purpose features
Up to 15 HP
Basic or NEMA 4X (IP66)
Basic or full featured systems drive
3-Phase & single phase motor versions

Basic or loaded, the new E2 is designed to give you the very best in value, performance and ease of use. The innovative design incorporates flexibility, expandability and convenience that will work in many different applications throughout your plant.

NEMA 4X versions see Page 40

Expandable
Economical
Easy
Enduring
Efficient

OPTISTICK
Plug-in upload/download
configuration memory stick

speedy
Programmable control
& Ethernet networking

OPT2-OPORT-IN
Remote keypad/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
- 150% rating for 60 seconds, 175% for 2 seconds
- Simple 14 parameter basic set up
- Integral RFI filter option
- Integral brake transistor, sizes 2 & 3 (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

Standards:

UL, C-UL, CE, C-Tick

SPECIFICATION

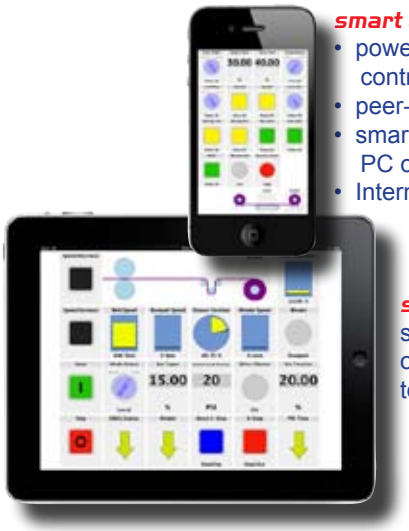
Output	Frequency	0 to 500Hz
Supply options	Frequency	48 - 62 Hz
	Voltage/Phases	100 - 132 volts max, single phase (0.5 - 1.5HP) 180 - 264 volts max, 1-phase (0.5 - 3HP) 180 - 264 volts max, 3-phase (0.5 - 5HP) 342 - 528 volts max, 3-phase (1 - 15HP)
Environment	Temperature	Operating, -10 to 50°C max, 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 indoor 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	8
	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

MODEL NUMBERING

ODE2-12010-1H012 - 01

- Product Series: ODE2
- Generation: 1
- Frame Size 1 - 3: 2
- Input Volts: 1=115VAC, 2=230VAC, 4=460VAC: 0
- Power Rating: 10
- Number of phases: H= HP, K= KW: H
- Power: 12
- Filter Type: A= EMC filter on 460V drives, B= EMC filter on 230V drives, 0= No filter: 0
- Brake Transistor: 1= No Brake, 4= Brake: 1
- IP rating: 2=IP20, N=NEMA12/IP55, unswitched, S=NEMA12/IP55, switched: H
- Suffix for single phase motor only: 01



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
ODE2-11005-1H012	1Ø, 115V	3Ø, 230V	0.5HP	2.3	1
ODE2-11010-1H012	1Ø, 115V	3Ø, 230V	1.0HP	4.3	1
ODE2-21015-1H042	1Ø, 115V	3Ø, 230V	1.5HP	5.8	2
ODE2-12005-1H012	1Ø, 230V	3Ø, 230V	0.5HP	2.3	1
ODE2-12010-1H012	1Ø, 230V	3Ø, 230V	1HP	4.3	1
ODE2-12020-1H012	1Ø, 230V	3Ø, 230V	2HP	7	1
ODE2-22020-1H042	1Ø, 230V	3Ø, 230V	2HP	7	2
ODE2-22030-1H042	1Ø, 230V	3Ø, 230V	3HP	10.5	2
ODE2-12005-3H012	3Ø, 230V	3Ø, 230V	0.5HP	2.3	1
ODE2-12010-3H012	3Ø, 230V	3Ø, 230V	1HP	4.3	1
ODE2-12020-3H012	3Ø, 230V	3Ø, 230V	2HP	7	1
ODE2-22020-3H042	3Ø, 230V	3Ø, 230V	2HP	7	2
ODE2-22030-3H042	3Ø, 230V	3Ø, 230V	3HP	10.5	2
*ODE2-32050-1H042	1Ø, 230V	3Ø, 230V	5HP	18	3
ODE2-32050-3H042	3Ø, 230V	3Ø, 230V	5HP	18	3
ODE2-14010-3H012	3Ø, 460V	3Ø, 460V	1HP	2.2	1
ODE2-14020-3H012	3Ø, 460V	3Ø, 460V	2HP	4.1	1
ODE2-24020-3H042	3Ø, 460V	3Ø, 460V	2HP	4.1	2
ODE2-24030-3H042	3Ø, 460V	3Ø, 460V	3HP	5.8	2
ODE2-24050-3H042	3Ø, 460V	3Ø, 460V	5HP	9.5	2
ODE2-34075-3H042	3Ø, 460V	3Ø, 460V	7.5HP	14	3
ODE2-34100-3H042	3Ø, 460V	3Ø, 460V	10HP	18	3
ODE2-34150-3H042	3Ø, 460V	3Ø, 460V	15HP	24	3

* This unit not UL Listed

Models in blue are stocked in limited quantities
Please call +410-604-3400 for availability

DIMENSIONS & WEIGHT

Size	Height	Width	Depth	Weight
1	6.8" (173mm)	3.3" (82mm)	4.9" (123mm)	2.5lbs (1.1kg)
2	8.7" (221mm)	4.1" (104mm)	5.9" (150mm)	5.9lbs (2.6kg)
3	10.3" (261mm)	5.2" (131mm)	6.9" (175mm)	9lbs (4.0kg)

NEMA 4X (IP66) Enclosed Drives

For harsh, wet & dirty environments

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

Standards

UL, C-UL, CE, C-Tick

NEMA 4X (IP66) INDOOR RATED ODP2 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	ODP2-22010-1HF4X	ODP2-22010-1HF4Y
2	2	7	ODP2-22020-1HF4X	ODP2-22020-1HF4Y
2	3	10.5	ODP2-22030-1HF4X	ODP2-22030-1HF4Y
230V, 3-PHASE IN, 230V, 3-PHASE MOTOR				
2	1	4.3	ODP2-22010-3HF4X	ODP2-22010-3HF4Y
2	2	7	ODP2-22020-3HF4X	ODP2-22020-3HF4Y
2	3	10.5	ODP2-22030-3HF4X	ODP2-22030-3HF4Y
3	5	18	ODP2-32050-3HF4X	*ODP2-32050-3HF4Y
380/460V, 3-PHASE IN, 380/460V, 3-PHASE MOTOR				
2	1	2.2	ODP2-24010-3HF4X	ODP2-14010-3HF4Y
2	2	4.1	ODP2-24020-3HF4X	ODP2-24020-3HF4Y
2	3	5.8	ODP2-24030-3HF4X	ODP2-24030-3HF4Y
2	5	9.5	ODP2-24050-3HF4X	ODP2-24050-3HF4Y
3	7.5	14	ODP2-34075-3HF4X	ODP2-34075-3HF4Y
3	10	18	ODP2-34100-3HF4X	ODP2-34100-3HF4Y

Encoder feed back option OPT2-ENCOD-IN
Ethernet networking & basic programmable control option dw224-00
(for more smart control options see pages 18-21)

DIMENSIONS & WEIGHT

Size	Height	Width	Depth	Weight
2	10.1" (257mm)	7.4" (188mm)	9.4" (259mm)	10.8lbs (4.8kg)
3	12.2" (310mm)	8.3" (211mm)	9.9" (251mm)	16.5lbs (7.5kg)

NEMA 4X (IP66) INDOOR RATED ODE2 SERIES GENERAL PURPOSE VFD

SIZE	HP	AMPS	UNSWITCHED	SWITCHED
115V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR				
1	0.5	2.3	ODE2-11005-1H01X	ODE2-11005-1H01Y
1	1.0	4.3	ODE2-11010-1H01X	ODE2-11010-1H01Y
2	1.5	5.8	ODE2-21015-1H04X	ODE2-21015-1H04Y
230V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR				
1	0.5	2.3	ODE2-12005-1H01X	ODE2-12005-1H01Y
1	1	4.3	ODE2-12010-1H01X	ODE2-12010-1H01Y
1	2	7	ODE2-12020-1H01X	ODE2-12020-1H01Y
2	2	7	ODE2-22020-1H04X	ODE2-22020-1H04Y
2	3	10.5	ODE2-22030-1H04X	ODE2-22030-1H04Y
3	5	18	*ODE2-32050-1H04X	*ODE2-32050-3H04Y
			* This unit not UL Listed	
230V, 3-PHASE IN, 230V, 3-PHASE MOTOR				
3	5	18	ODE2-32050-3H04X	ODE2-32050-3H04Y
380/460V, 3-PHASE IN, 380/460V, 3-PHASE MOTOR				
1	1	2.2	ODE2-14010-3H01X	ODE2-14010-3H01Y
1	2	4.1	ODE2-14020-3H01X	ODE2-14020-3H01Y
2	2	4.1	ODE2-24020-3H04X	ODE2-24020-3H04Y
2	3	5.8	ODE2-24030-3H04X	ODE2-24030-3H04Y
2	5	9.5	ODE2-24050-3H04X	ODE2-24050-3H04Y
3	7.5	14	ODE2-34075-3H04X	ODE2-34075-3H04Y
3	10	18	ODE2-34100-3H04X	ODE2-34100-3H04Y

Ethernet networking & basic programmable control option dw222-00

DIMENSIONS & WEIGHT

Size	Height	Width	Depth	Weight
1	9.1" (232mm)	6.4" (161mm)	6.9" (175mm)	6.2lbs (2.8kg)
2	10.1" (257mm)	7.4" (188mm)	7.4" (187mm)	10.1lbs (4.6kg)
3	12.2" (310mm)	8.3" (211mm)	9.6" (243mm)	16.3lbs (7.4kg)

AC Drive Options

ITEM	DESCRIPTION	MODEL P2	V2	E2
Touch Screen Programmable Operator Stations				
dw230+dw222	7" savvyPanel touch, programmable NEMA 4 diaplay			✓
dw230+dw224	7" savvyPanel touch, programmable NEMA 4 diaplay	✓		
dw230+dw226	7" savvyPanel touch, programmable NEMA 4 diaplay		✓	
Remote Keypads				
OPT2-OPORT-IN	Remote Keypad	✓	✓	✓
OPT2-OPPAD-IN	Remote keypad with OLED display	✓	✓	✓
Communications				
speedy dw21X-04	ModbusTCP/IP Interface Module	✓	✓	✓
speedy dw21X-25	EIP/PCCC Interface Module	✓	✓	✓
OPT2-DEVNT-IN	DeviceNet Interface Module	✓	✓	
OPT2-PFNET-IN	ProfiNET Interface Module	✓	✓	
OPT2-PROFB-IN	Profibus DP Interface Module	✓	✓	
OPT2-BNTIP-IN	Bacnet IP Interface Module		✓	
OPT2-BNTSP-IN	Bacnet RJ45 connector		✓	
Programming Interface				
speedy dw21X	USB Interface Module	✓	✓	✓
OPT-STICK-IN	Optistick parameter copying stick with IR interface			✓
OPT2-STICK-IN	Optistick parameter copying stick with Bluetooth	✓	✓	✓
Encoder Feedback				
OPT2-ENCOD-IN	Encoder feedback module for P2	✓		
EMC Filters				
OPT2-E1010-20	Optifilter, EMC input filter, 1-phase, 10A, IP20	✓	✓	✓
OPT2-E1010-66	Optifilter, EMC input filter, 1-phase, 10A, IP66	✓	✓	✓
OPT2-E1025-20	Optifilter, EMC input filter, 1-phase, 25A, IP20	✓	✓	✓
OPT2-E1025-66	Optifilter, EMC input filter, 1-phase, 25A, IP66	✓	✓	✓
OPT2-E3006-20	Optifilter, EMC input filter, 3-phase, 6A, IP20	✓	✓	✓
OPT2-E3006-66	Optifilter, EMC input filter, 3-phase, 6A, IP66	✓	✓	✓
OPT2-E3016-20	Optifilter, EMC input filter, 3-phase, 16A, IP20	✓	✓	✓
OPT2-E3016-66	Optifilter, EMC input filter, 3-phase, 16A, IP66	✓	✓	✓
OPT2-E3025-20	Optifilter, EMC input filter, 3-phase, 25A, IP20	✓	✓	✓
OPT2-E3025-66	Optifilter, EMC input filter, 3-phase, 25A, IP66	✓	✓	✓
OPT2-E3050-20	Optifilter, EMC input filter, 3-phase, 50A, IP20	✓	✓	
OPT2-E3080-20	Optifilter, EMC input filter, 3-phase, 80A, IP20	✓	✓	
OPT2-E3180-20	Optifilter, EMC input filter, 3-phase, 180A, IP20	✓	✓	
OPT2-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-BR050-IN-i55	DB Resistor, drive size 2, IP55 50Ω, 200W			✓
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"	✓		
CX503096	125 - 150 HP 460VAC, 6Ω, 28"x10"x10"	✓		
Output Filters				
OPT2-M3008-20	Output filter, 8A, IP20	✓	✓	✓
OPT2-M3008-66	Output filter, 8A, IP66	✓	✓	✓
OPT2-M3012-20	Output filter, 12A, IP20	✓	✓	✓
OPT2-M3012-66	Output filter, 12A, IP66	✓	✓	✓
OPT2-M3018-66	Output filter, 18A, IP66	✓	✓	✓
OPT2-M3030-20	Output filter, 30A, IP20	✓	✓	
OPT2-M3075-20	Output filter, 75A, IP20	✓	✓	
OPT2-M3180-00	Output filter, 180A, IP00	✓	✓	
OPT2-M3300-00	Output filter, 300A, IP00	✓	✓	
Data Cables & Splitters				
OPT-J4505-IN	RS485 data cable, 0.5M, (RJ45 - RJ45)	✓	✓	✓
OPT-J4510-IN	RS485 data cable, 1M, (RJ45 - RJ45)	✓	✓	✓
OPT-J4530-IN	RS485 data cable, 3M, (RJ45 - RJ45)	✓	✓	✓
OPT-J45SP-IN	RS485 data cable 3-way splitter (RJ45)	✓	✓	✓
i/o Boards				
OPT-LOGIP-11	110VAC logic input isolator			✓
OPT-LOGIP-23	230VAC logic input isolator			✓
OPT2-CASCD-IN	Cascade control plug in option board	✓	✓	
OPT-LOGIP-23	230VAC logic input isolator	✓	✓	

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

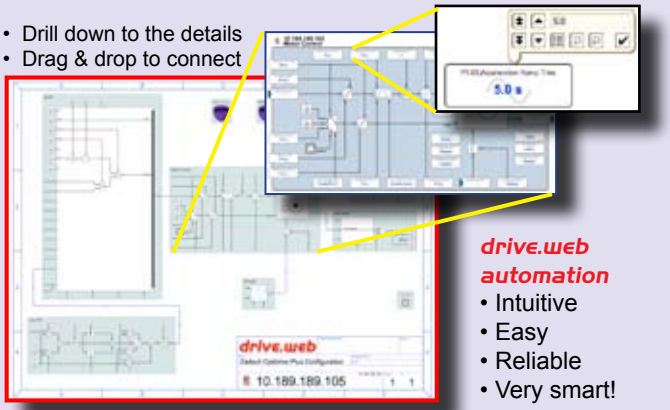
drive.web smart drives

Add a ***drive.web*** Universal Automation Controller to any drive for unlimited automation capability (see pages 3-25):

- 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	V2	E2
Smart Programmable Control + Peer-to-Peer Networking + Extra i/o				
dw212	***drive.web smarty*** interface for E2 models w/16 extra i/o			✓
dw214	***drive.web smarty*** interface for P2 models w/16 extra i/o	✓		
dw216	***drive.web smarty*** interface for V2 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 page14				
Smart Programmable Control + Peer-to-Peer Networking				
dw22X	***drive.web speedy*** interface modules	✓	✓	✓
	With Ethernet ModbusTCP/IP & basic function blocks - see page 14			
-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!

OPTIDRIVE E2 SINGLE PHASE

Single Phase Motor Controller

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

The innovative E2 Single Phase motor controller, uses a unique control algorithm that ensures reliable starting and control.

These drives are designed only for use on Shaded Pole (SP) or Permanent Split Capacitor (PSC) type motors in variable torque, direct drive fan and centrifugal pump applications.

They use high frequency switching to provide near silent running which is most desirable in applications such as:

- Commercial and residential HVAC
- Fume extraction
- Laboratories
- Quiet locations.

Like the other E2 products it is expandable, versatile and economical in all its forms:

Basic or NEMA12 versions
Basic or full featured systems drive
Basic or peer-to-peer networking over Ethernet

SPECIFICATION		
Output	Frequency	0 to 120Hz
Supply options	Frequency	48 - 62 Hz
	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	Operating, -10 to 50°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 IP55 (NEMA12)
Control	Mode	V/F
	PWM Hz	4 to 32KHz (effective)
	V/Hz ratio	Linear
	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

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
Standards: UL, C-UL, CE, C-Tick

E2 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 E2 1Ø IP20 DRIVES

Model	Supply	Motor	Power	Amps	Size
ODE2-11005-1H012-01	1Ø, 115V	1Ø, 115V	0.5HP	7.0	1
ODE2-21007-1H042-01	1Ø, 115V	1Ø, 115V	0.75HP	10.5	2
ODE2-12005-1H012-01	1Ø, 230V	1Ø, 230V	0.5HP	4.3	1
ODE2-12010-1H012-01	1Ø, 230V	1Ø, 230V	1HP	7.0	1
ODE2-22015-1H042-01	1Ø, 230V	1Ø, 230V	1.5HP	10.5	2

DIMENSIONS & WEIGHT

Size	Height	Width	Depth	Weight
1	6.8" (173mm)	3.3" (82mm)	4.9" (123mm)	2.5lbs (1.1kg)
2	8.7" (221mm)	4.1" (104mm)	5.9" (150mm)	5.9lbs (2.6kg)

E2 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 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 standard on 230V, size 2
- Optional internal Ethernet
- Optional internal *drive.web*

NEMA 4X / IP66 DRIVES

Model	Supply	Motor	Power	Amps	Size
ODE2-11005-1H01#-01	1Ø, 115V	1Ø, 115V	0.5HP	7.0	1
ODE2-21007-1H04#-01	1Ø, 115V	1Ø, 115V	0.75HP	10.5	2
ODE2-12005-1H01#-01	1Ø, 230V	1Ø, 230V	0.5HP	4.3	1
ODE2-12010-1H01#-01	1Ø, 230V	1Ø, 230V	1HP	7.0	1
ODE2-22015-1H04#-01	1Ø, 230V	1Ø, 230V	1.5HP	10.5	2

X = Unswitched, Y = Switched

DIMENSIONS & WEIGHT

Size	Height	Width	Depth	Weight
1	9.1" (232mm)	6.4" (161mm)	6.9" (175mm)	6.2lbs (2.8kg)
2	10.1" (257mm)	7.4" (188mm)	7.4" (187mm)	10.1lbs (4.6kg)

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
- Encoder feedback

(see page 20 for details)

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.

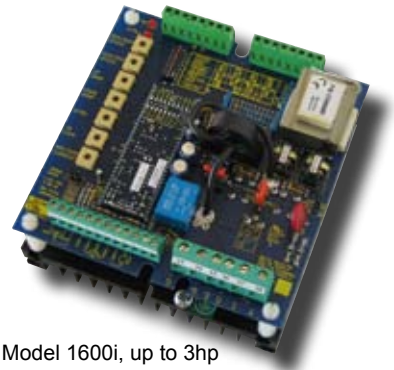
NON-REGEN MODELS

	230VAC, 180VDC	115VAC, 90VDC	FUSE KIT
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

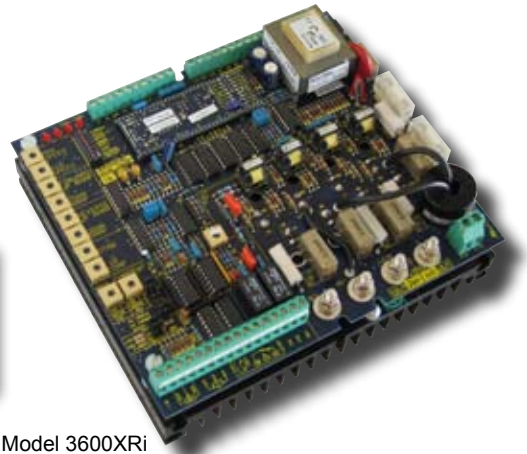
	230VAC, 180VDC	115VAC, 90VDC	FUSE KIT
3600XRi/16	3hp	1.5hp	F3-30
3600XRi/32	6hp	3hp	F3-60
3600XRi/36	6.5hp	3hp	F3-60
	415VAC, 320VDC	240VAC, 180VDC	
3600XRi/36LL	10hp	6hp	F3-60
	480VAC, 360VDC	240VAC, 180VDC	
3600XRi/32C132	10hp	6hp	F3-60

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)

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
- Encoder feedback

(see page 15 for details)

Enclosed Drives

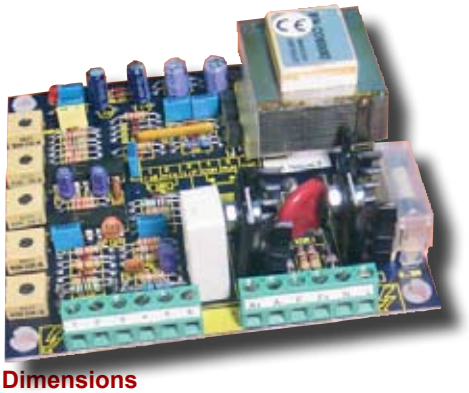
Enclosed wall mounting versions of these drives and a wide range of other options are detailed in the “Modulus Drive Units” section of this catalog

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
400ERB	4 amps	Enclosed, pot, switch, brake, reverse, fuse	0.75hp	0.38hp	9.9"x7.0"x3.8" (250x177x95 mm)
800ERB	8 amps	Enclosed, pot, switch, brake, reverse, fuse	1.5hp	0.75hp	9.9"x7.0"x3.8" (250x177x95 mm)
1200ERB	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

Linear Amplifier 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 unit 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

Dimensions

3.25” x 1.65” x 1.65” (82x40x40mm)

Models 400XLV, 800XLV & 1200XLV 4-Quadrant DC 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.

Dimensions

400XLV 4.2”h x 2.4”w x 4.75”d (106 x 61 x 120mm)
800XLV 4.2”h x 2.75”w x 4.75”d (106 x 70 x 120mm)
1200XLV 4.2”h x 2.75”w x 4.75”d (106 x 70 x 120mm)

Approvals: CE

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 up to 2A cont., 3A peak
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 armature volts f/b

Plug-on terminals

DIN rail mounting (optional on 200XLV)

PL Series ...digital dc drives

up to 2000+ hp

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
- UL, C-UL, CE

Optional:

- Peer-to-peer Ethernet communications
- ***drive.web*** programmable control
- ModbusTCP & EIP over Ethernet
- ModbusRTU RS485 serial port
- Devicenet
- Profibus DP

powerDRIVE Packages

PL/X DC drives up to 400 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
Two 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
Using the drive.web speedy dw111 controller, pre-configured generic apps are available for Open & Closed Loop Winders, Position Controls, Coordinated Line Drives, Indexing and others.

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

RS232 Serial Communications Port
Parameter upload/download to save and print
Drive - to - drive parameter link & set up cloning

Optional Communications
drive.web peer-to-peer
Ethernet: *drive.web*, ModbusTCP/IP, EIP
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

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 20 - 21**
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 VAC or 690 VAC configurations - please call for further information.

drive.web smart control

DC Drives - 500 VDC Armature, 480VAC Supply

HP @	ARMATURE AMPS DC @ 40°C	FIELD AMPS DC Basic(Optional)	basicDRIVE 4-QUAD REGEN REVERSING	basicDRIVE 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, 575VAC 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

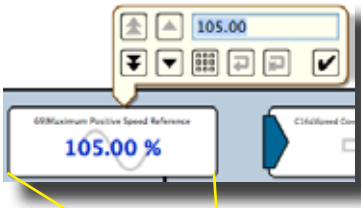
550	650	32 (50)	PLX275HV/650	PL275HV/650	10 x 30 x 13.8 (120)	150%, 25 SECS
650	750	32 (50)	PLX315HV/750	PL315HV/750	10 x 30 x 13.8 (120)	150%, 25 SECS
735	850	32 (50)	PLX360HV/850	PL360HV/850	10 x 30 x 13.8 (120)	150%, 25 SECS
820	950	32 (50)	PLX400HV/950	PL400HV/950	10 x 30 x 13.8 (120)	150%, 25 SECS
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

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:

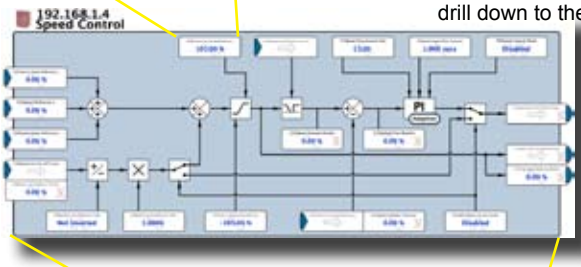
- Available for stacks up to 690 volts AC, 700 volts DC
- Built-in 32 amps fully automatic field controller (optional 50 amps rating)
- Separate gate pulse driver unit for greater noise immunity and reliability
- Optional current transformers
- Optional Ethernet and ***drive.web*** distributed control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

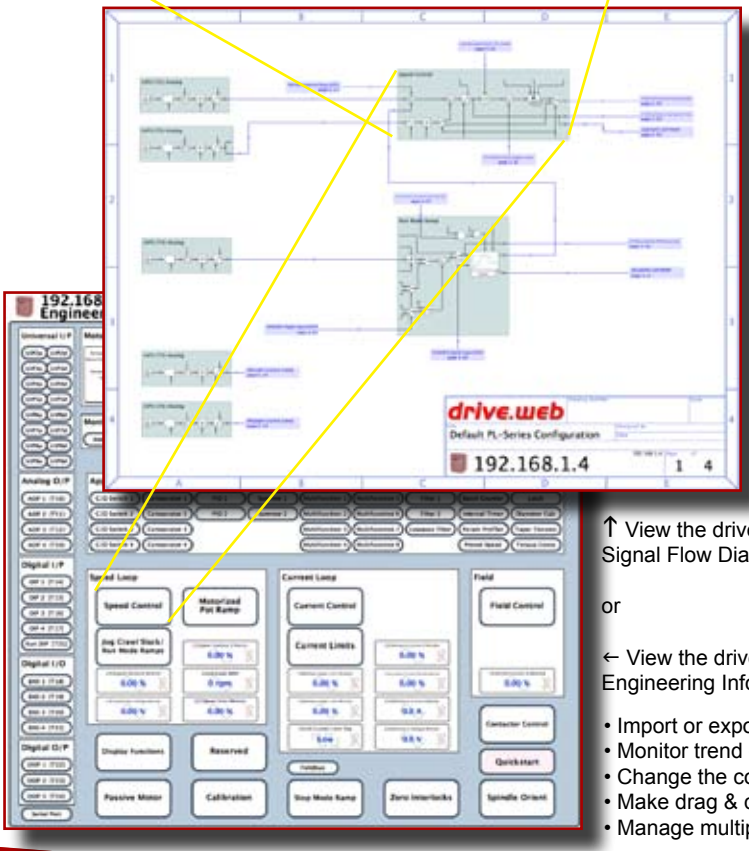
savvy tools for the PL dc drives



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 Engineering Info window

- Import or export data
- Monitor trend charts
- Change the configuration
- Make drag & drop connections
- Manage multiple drives at the same time

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.

drive.web automation

- Intuitive
- Easy
- Reliable
- Very smart!

*power*SL Series
Analog DC drives - up to 200 hp

The ***power***SL Series of dc drives incorporate the well proven SLX, SL & SLE 3-phase basic OEM chassis drives into a compact package, complete with high speed 3-phase power fuses, armature fuses (SLX & SL models only), control power fuses, contactor, and other features.

Easy access to all internal power components and terminals is achieved in a compact, elegant package which, at 75hp is as small as a 8¹/2" x 11" note pad and is less than 10¹/2" deep!

***power*SLX Series ...** 4-Q regenerative, reversing DC systems drive with field controller
***power*SL Series ...** Non-reversing DC systems drive with field controller
***power*SLE Series ...** Non-reversing DC OEM drive.

Standard Features

SL	SLX	SLE		
•	•		Field controller with automatic field weakening	
		•	Configurable field bridge	
•	•	•	Heat sink thermostat protection	
•	•		Diagnostic test socket	
•	•	•	50/60Hz autoranging	
•	•	•	Power supply range: 208-240 or 380-480 volts +/-10%	
•	•	•	Auxiliary control power input: 115 volts 50/60Hz.	
•	•	•	Phase rotation insensitivity	
•	•	•	Linear torque control	
•	•	•	Armature voltage or tach feedback	
•	•	•	Calibration range switches (no component change)	
•	•	•	Speed reference +/-10V or 4-20mA	
•	•	•	Speed trim input	
•	•	•	Maximum and minimum speed settings	
•	•	•	Adjustable up & down ramps	
•	•	•	Adjustable current limit	
•	•	•	Current range selectable for multiple horsepower's	
•	•	•	Torque control	
•	•	•	150% overload capacity with 30 second stall timer	
•	•	•	Relay outputs: Stall, Zero speed, Overload	
•	•		Regen stop (SLX 4-quad. regen drive)	
•	•	•	Setpoint ramp reset	
•	•	•	Start inhibit after power loss	
			LED indicators:	
•	•	•	Stall — Stall Timer	
•	•		+/- Current — Field Loss	
•	•		Tach Loss — Peak Amps	
•	•	•	Ext. Trip — Power On	
•	•		25%, 50%, 95% — Field Volts	
•	•	•	Speed signal output	
•	•	•	Current signal output	
•	•	•	Ramp & Total demand signal outputs	
•	•	•	Shunt wound or permanent magnet motors	
•	•	•	Stability adjustment	
•	•		Current reduction for low power test	

Protection & Control

•	•	•	Control fuses
•	•	•	3-Phase high speed semiconductor fuses
•	•	•	Armature high speed semiconductor fuse
•	•	•	Main AC line contactor

SLE44/106, 60hp DC Drive

***power*SLX50/122**, 75hp regen DC Drive

SL Series Non-Regen DC Drives & SLX Series 4Q Regen DC Drives

powerDRIVE Model	basicDRIVE Model	500VDC Arm	240VDC Arm	Armature Current	Line reactor	Drive Isolation Transformer
***power*SL & SLX15**	SL & SLX15	20hp	10hp	36 amps	LM37	DIT27**
***power*SL & SLX20**	SL & SLX20	30hp	13hp	51 amps	LM52	DIT40**
***power*SL & SLX40**	SL & SLX40	60hp	25hp	99 amps	LM120	DIT75**
***power*SL & SLX50**	SL & SLX50	75hp	35hp	122 amps	LM120	DIT93**

Field current controlled up to 5 amps
Dimensions: basicDRIVE 9.8" high x 8" wide x 5.6" deep (248mm x 203mm x 143mm)
Dimensions: powerDRIVE 11" high x 8" wide x 10.4" deep (280mm x 203mm x 265mm)

SLE Series ... Non-reversing OEM drive

powerDRIVE Model	basicDRIVE Model	500VDC Arm	240VDC Arm	Armature Current	Line reactor	Drive Isolation Transformer
***power*SLE14**	SLE14	20hp	10hp	34 amps	LM37	DIT27**
***power*SLE24**	SLE24	30hp	15hp	58 amps	LM52	DIT40**
***power*SLE34**	SLE34	50hp	20hp	82 amps	LM82	DIT63**
***power*SLE44**	SLE34	60hp	30hp	106 amps	LM120	DIT75**

Field current up to 2.5 amps
Dimensions: basicDRIVE 11.5" high x 8.5" wide x 6.1" deep (290mm x 215mm x 155mm)
Dimensions: powerDRIVE 11.5" high x 8.5" wide x 9.4" deep (290mm x 215mm x 240mm)

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

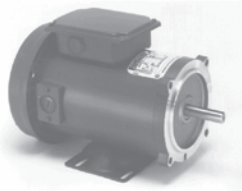
Model Number	hp. at 230V	hp. at 460V	Arm Amps	Dimensions W x D x H	Mount Holes H x W	Weight LBS
LM18	5	10	20	6.0"x4.8"x3.1"	2.1"x2.0"	9
LM37	10	20	41	7.2"x5.6"x3.4"	2.3"x3.0"	11
LM52	15	30	58	7.2"x5.6"x3.8"	2.6"x3.0"	14
LM67	20	40	75	9.0"x7.0"x4.8"	3.2"x3.0"	23
LM82	25	50	91	9.0"x7.0"x4.8"	3.2"x3.0"	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.

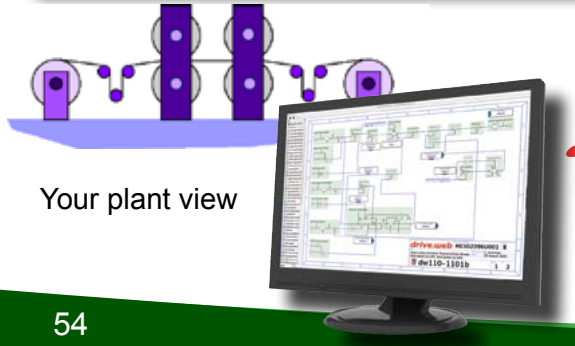
Every ***Modulus*** project is accompanied by a detailed, 50-point, Quality Control Report covering every facet of the product, its design, construction, testing and shipping.

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!



Your plant view

Unbeatable!

Our support view

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 loadcell 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

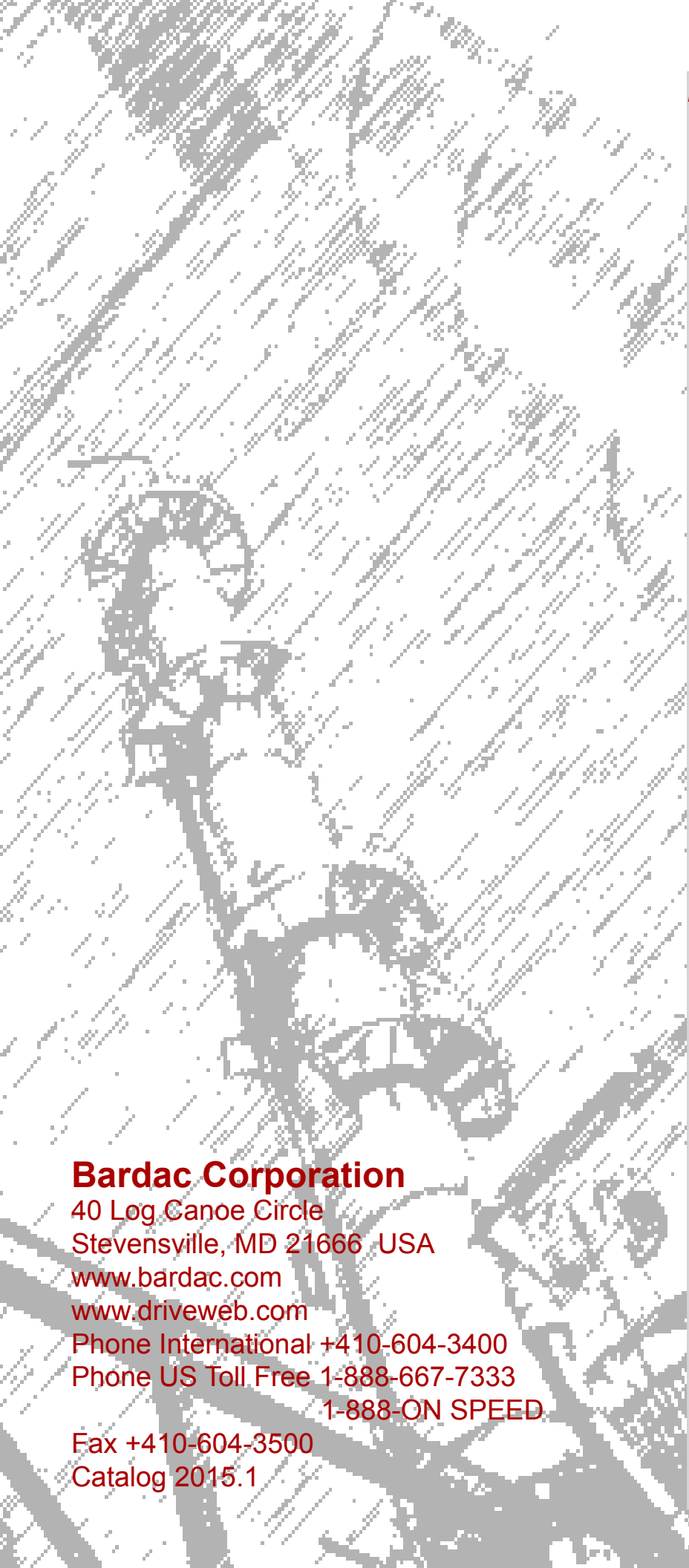
Charge Basis	Rates (US$)
a. Basic Rate - Field Service, Training & Start-up Assistance - up to 8 hours daily Monday to Friday, 7am to 6pm	$150 per hour
b. Standard Overtime - Weekdays 6pm to 7am & all day Saturday - Total work time not to exceed 12 hrs in any 24 hrs	$225 per hour
c. Special Overtime - Sundays, Holidays and excess of 8 hours on Saturday	$300 per hour
d. Overnight - Includes meals, and hotel accommodation	$225 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	$95 per hour + parts
j. Design or application engineering services	$150 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 $300/hour (minimum of 1/2 hour per call) and this must be paid for with a credit card at the time of service.



Everything normally in stock!

INDEX

Bardac Corporation
40 Log Canoe Circle
Stevensville, MD 21666 USA
www.bardac.com
www.driveweb.com
Phone International +410-604-3400
Phone US Toll Free 1-888-667-7333
1-888-ON SPEED
Fax +410-604-3500

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