Bardac drives

PL & PLX Series

Digital DC Drives
up to 2000+HP

bardac.com

Introduction

- The PL/PLX DC drive family is a totally digital DC drive that uses state of the art software to provide the user with an impressive range of standard features.

- It has outstanding dynamic performance, a wide power range, 2 or 4 quadrant operation, clear display with finger friendly keypad and compact size.

- PL/PLX drive…the benchmark for DC Drives.

powerDRIVE Packages

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

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

↑ ***PLX15/36*, 20 HP**

***powerPLX*15/36 →**
With fuses, contactor & power components (shown hinged open for easy access)

↑ ***PLX145/330*, 200 HP**

***powerPLX145/330* →**
With fuses, contactor & power components

Operator Interface

Multifunction LCD Display

- 40 characters, 2 lines
- Backlit when active
- Clear and easy to read
- English language parameters

4 Button Keypad

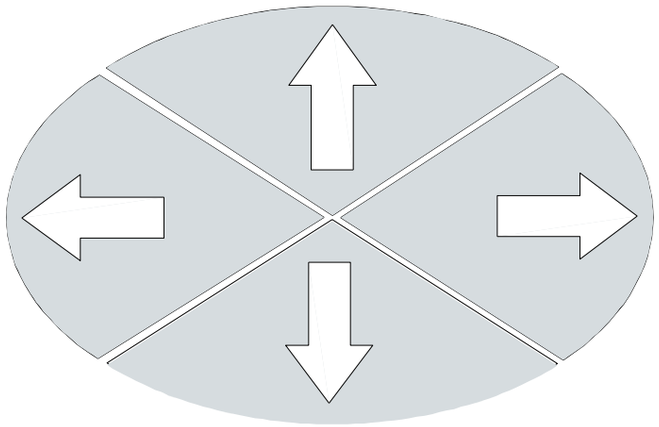
- Easy to learn and use
- Finger friendly keys

Menu Structure

- The menu structure is very simple and easy to operate.
- There are five levels, each one allowing you to step through a tree structure of logical parameter groups.

Up Key scrolls the menu &
increases the parameter value

Left key moves to
previous menu level



Right key moves
to next menu level

Down key scrolls the menu &
decreases the parameter value

Performance and Diagnostics

Steady State Accuracy

- 0.01% with encoder + digital ref
- 0.1% with tachometer feedback
- 2.0% with AVF

Diagnostic Monitoring

- All analog input voltages
- All digital input states
- All analog output voltages
- All digital output states
- Tachometer volts
- Motor armature current
- Motor field current
- Motor armature volts
- Output power (KW)
- AC supply volts

Power Chassis Features

Outstanding Protection

- Interline device networks
- High energy MOV's
- Instantaneous overcurrent
- Stall protection
- Field failure & overcurrent
- Motor over-temperature
- Armature overvolts
- Thyristor trigger failure
- Standstill logic
- Stack over-temperature
- Mains supply phase loss
- Mains synchronization loss
- Digital output short circuit

Field Regulator Feature

Field Modes

- Constant current
- Constant voltage
- Automatic weakening
- Economy mode
- Delayed quench after stop command
- Supply independent of stack supply

Application Blocks

Function Block Programming
The following function blocks are included as standard:

- 2 PID’s
- 2 Filters
- 2 Summers or Adders
- Current Profiling
- Batch Counter
- Latch
- Linear or S Ramp
- Jog / Crawl Functions
- Center Winding Macros
- Motorized Pot
- Field Weakening
- Dual Motor Swap
- Zero Speed Position Lock
- Delay Timer
- Draw Control
- Auto Self-tune Current Loop

Digital I/O Configurability

- 17 Digital Inputs
  - All inputs are over-voltage protected
- 7 Digital Outputs
  - All outputs are over-voltage protected
- All Digital I/O short circuit proof

Analog I/O Features

- Analog Inputs
  - 8 Independent inputs of up to 5 mV resolution
  - Digital threshold function with dual action
- Analog Outputs
  - 4 Outputs, 1 dedicated to output current
  - 3 fully programmable, 12 bit resolution
- All Analog Inputs are over-voltage protected
- All Analog Outputs are short circuit protected

Out-of-Box Features

- Five feedback transducer options as standard
- Non volatile trip alarm memory – even after power-loss
- Real language parameter description eliminates need for look up tables
- Motor parameters entered via keys – no soldering of calibration resistors required
- Motorized pot simulator with power off memory

Commissioning Features

- Built-in “Oscilloscope” output for full parameter monitoring during commissioning

- Unique “Configuration Checker” detects shorting of user programmed block diagram outputs

- Unique electronic regenerative stopping facility on most 2 Quadrant models

- Built-in system application blocks with descriptive connection points

Other Features

- In-depth fault monitoring and comprehensive system alarms
- Serial communications to allow off-site programming and remote diagnostics
- In-depth diagnostic facility available from on board display and “in-built meter”
- Easy to use product manual with display graphics and block diagrams

Horsepower & Current Ratings

Drive Model	HP @ 500VDC	HP @ 240VDC	DC Amps Continuous	Field Amps	
				Std	Opt
PL / PLX 15	20	10	36	8	-
PL / PLX 20	30	10	51	8	-
PL / PLX 40	60	25	99	8	-
PL / PLX 50	75	35	123	8	-
PL / PLX 65	100	50	164	16	-
PL / PLX 85	125	60	205	16	-
PL / PLX 115	150	75	270	16	-
PL / PLX 145	200	100	330	16	-
PL / PLX 185	250	125	405	32	50
PL / PLX 225	300	150	480	32	50
PL 265 only	350	200	630	32	50

Dimensions

Drive Model	HP @ 500VDC	HP @ 240VDC	Frame Size H x W x D
PL / PLX 15 PL / PLX 20 PL / PLX 40 PL / PLX 50	20 30 60 75	10 10 25 35	11.4 x 8.5 x 6.9 in 289 x 216 x 174 mm
PL / PLX 65 PL / PLX 85 PL / PLX 115 PL / PLX 145	100 125 150 200	50 60 75 100	16.2 x 8.5 x 8.6 in 410 x 216 x 218 mm
PL / PLX 185 PL / PLX 225 PL 265 only	250 300 400	125 150 200	19.9 x 8.5 x 14.4 in 505 x 216 x 366 mm

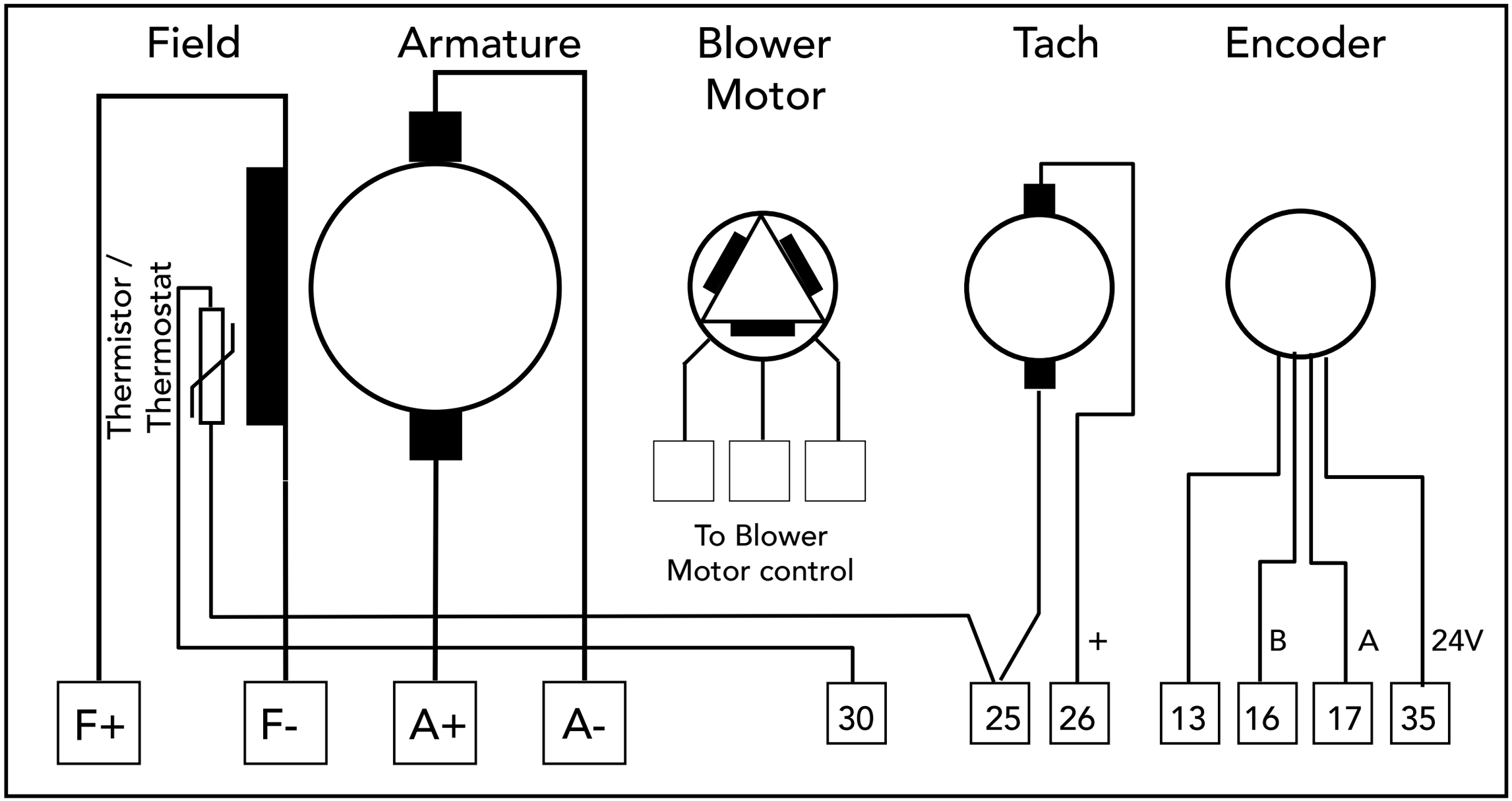
Supply Voltages

- Main Supply for Armature
  - 12 to 480 VAC, 3 phase, 50 to 60 Hz ± 10%
- Auxiliary Supply for Field
  - 100 to 480 VAC, 3 phase, 50 to 60 Hz ± 10%
- Control Supply
  - 100 to 240 VAC, 1 phase, 50 to 60 Hz ± 10%
  - Note: On PL/PLX 185 to 265, a 50va 110VAC 50/60 Hz supply is needed for fans.

Output Voltages

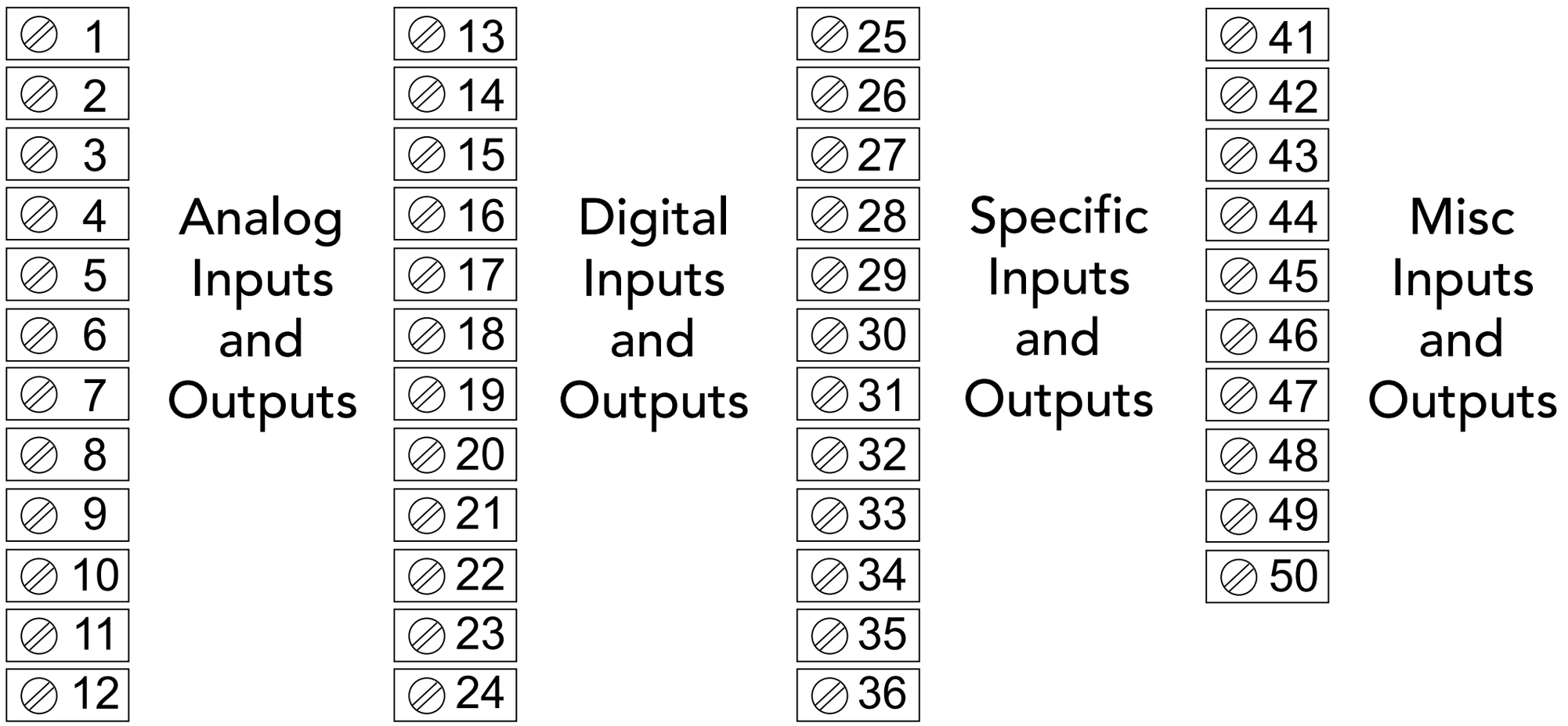
- Armature
  - PL Range: 0 to 1.2 x supply voltage
  - PLX Range: 0 to ±1.2 x supply voltage
- Field
  - All models: 0 to 0.9 x supply voltage

DC Motor General Connections



Control Connections

- The PL/PLX drive control connections are on four sets of terminals. For detailed descriptions, see the following slides.



Analog Inputs and Outputs

Terminal No.	Short Form
1	0V
2	UIP2
3	UIP3
4	UIP4
5	UIP5
6	UIP6
7	UIP7
8	UIP8
9	UIP9
10	AOP1
11	AOP2
12	AOP3

UIP Data
Up to 5mV resolution + sign
Assignable voltage range (± 5/10/20/30 volt)
Built in comparator with adjustable threshold & dual result monitor.
UIP3 is extra high performance for current loop use.
Max & Min Clamps: Linear Scaling Function:
Linear Offset Function:

AOP Data
12 bit resolution + sign
Short Circuit Protection to 0V
Output ± 0 – 5mA maximum
Output range ±0 – 11.0 volts (10V = 100%)

Digital Inputs and Outputs

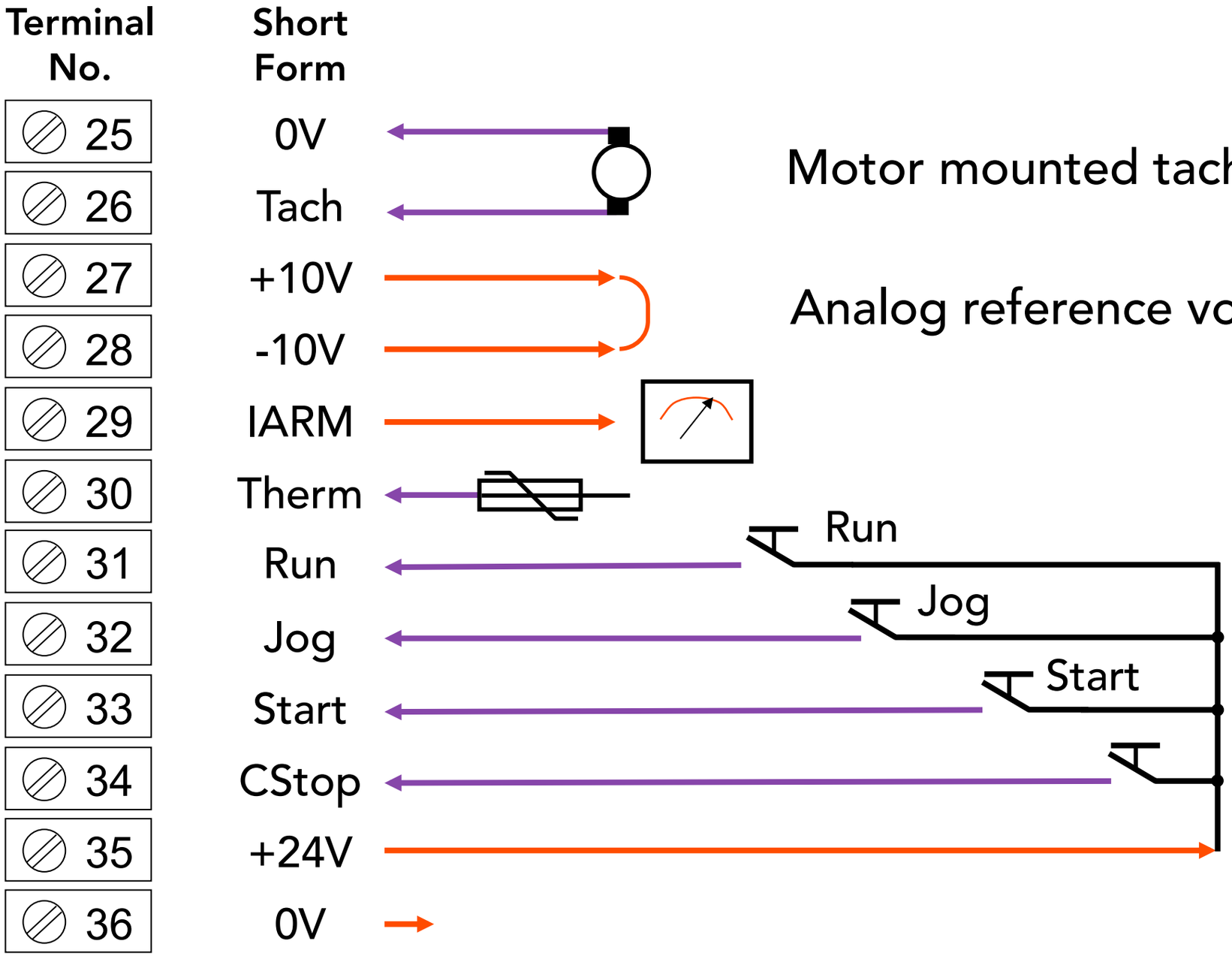
Terminal No.	Short Form
13	0V
14	DIP1
15	DIP2
16	DIP3
17	DIP4
18	DIO1
19	DIO2
20	DIO3
21	DIO4
22	DOP1
23	DOP2
24	DOP3

Digital inputs for logic or incremental encoder data.
Invert function.

Can be digital input or digital output.
When used as output, the input mode continues to function and the terminal state is monitored.
350mA max per output. 350mA total output budget.

Default outputs are: Zero speed, At Speed & Drive Healthy.
350mA max per output.
350mA total output budget.

Digital Inputs and Outputs



Motor mounted tachometer

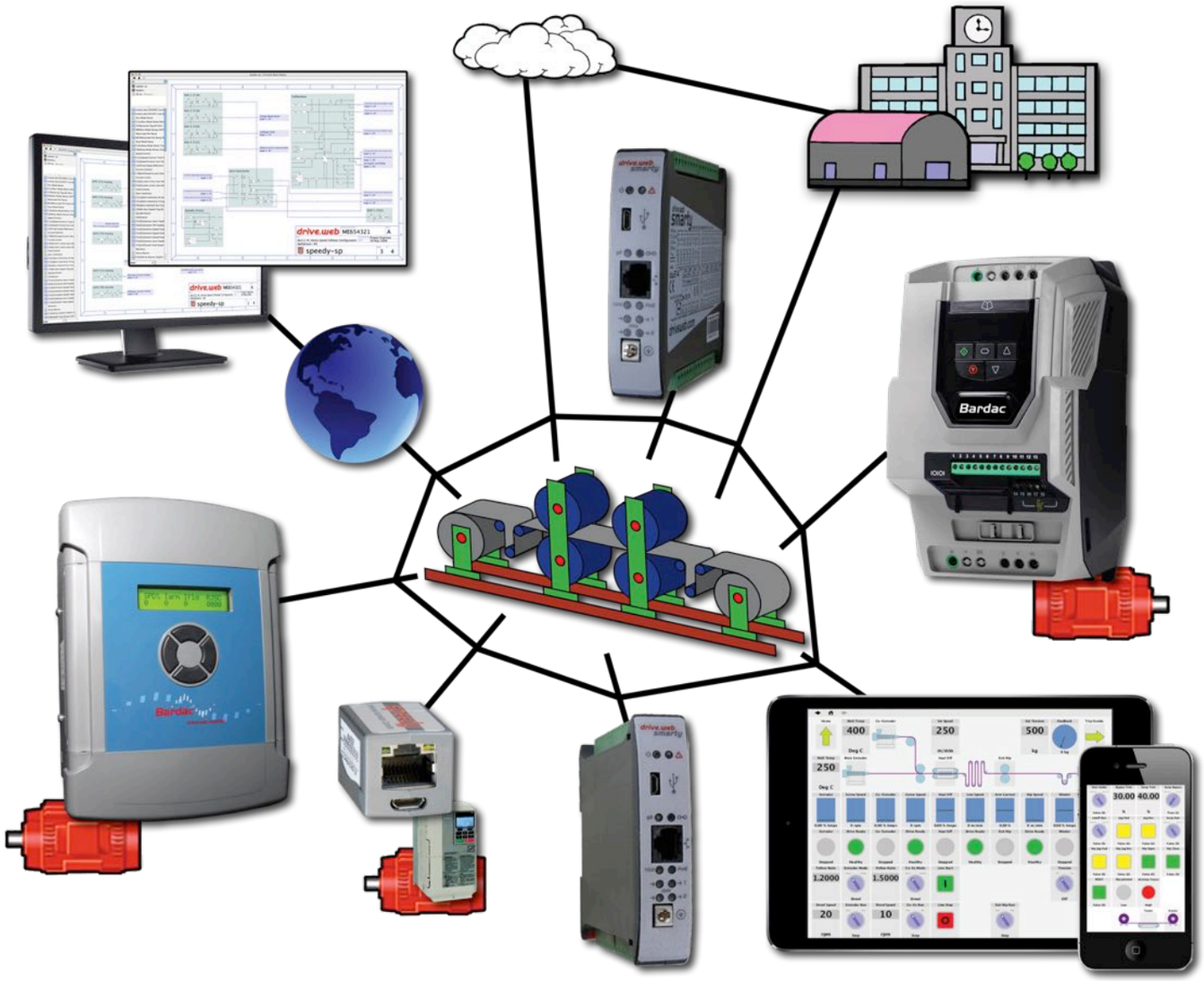
Analog reference voltages

Analog Inputs and Outputs

Terminal No.	Short Form	
41	RA+	These terminals must be used to sense the armature voltage when field weakening with a DC side contactor.
	not used	
43	RA-	
	not used	
45	CON 1	These terminals are volt-free contacts of internal relay for main contactor control. Rating 240V, 500VA.
46	CON 2	
47	LAT1	These terminals are volt-free contacts of internal relay for latching a start pushbutton. Rating 240V, 500VA.
48	LAT2	
51	Earth	These terminals are for 100 – 240 VAC control supply @ 50VA.
52	N	
53	L	

drive.web Distributed Control Technology

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

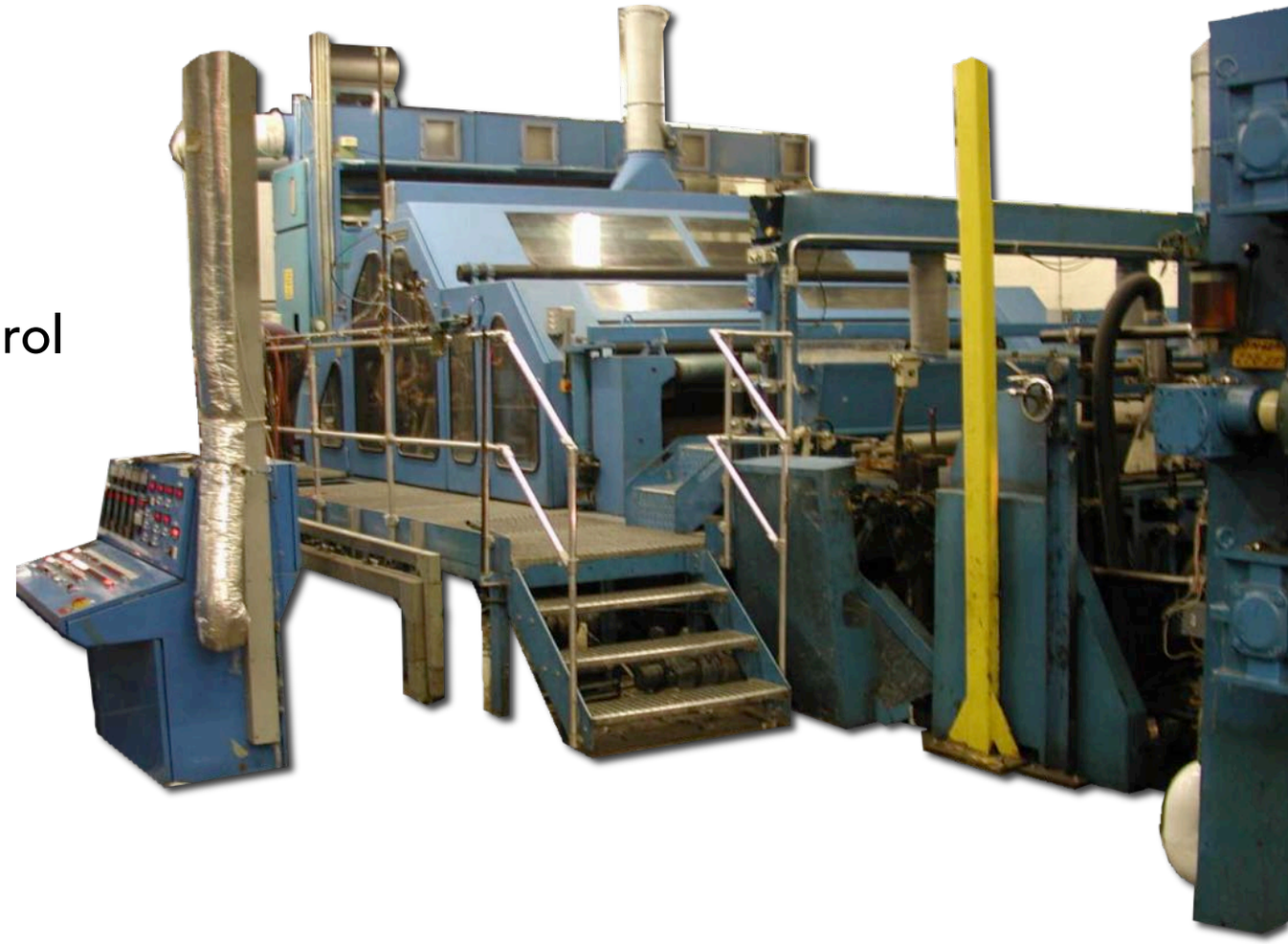


drive.web Key Features

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

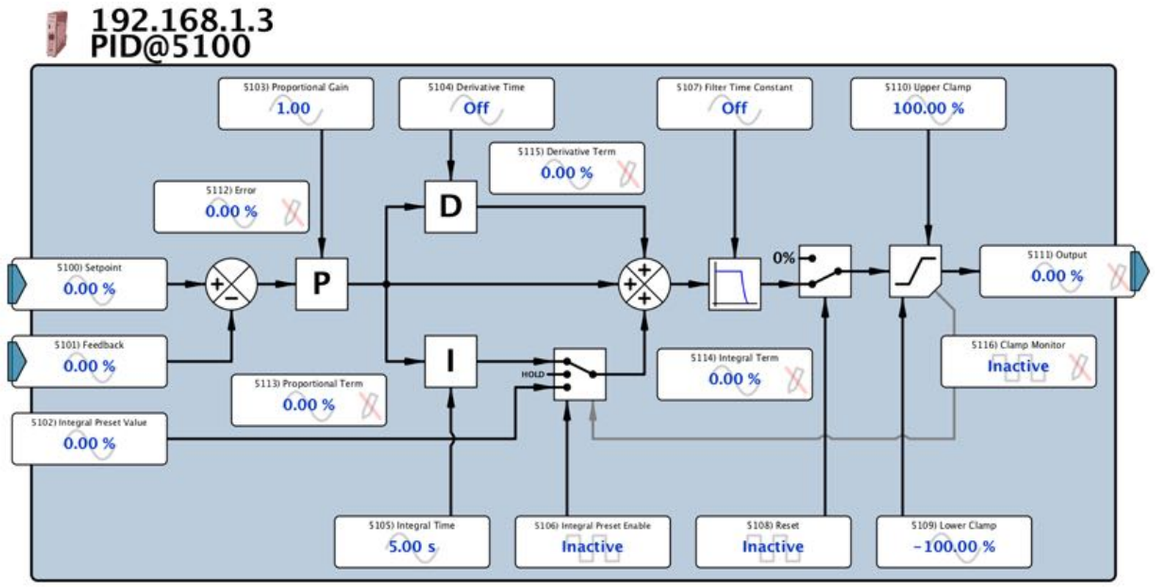
drive.web Key Applications

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



drive.web Key Graphical Function Blocks

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



drive.web Programming Features

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

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Bardac drives

THANK YOU!

PL/PLX Series

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