



innovation
IN CONTROL

Electroline Sales

Gross Automation
12.Sept.2024

Company History

- Started in 1963 in Zionsville, IN by Paul Penn
- Original products included DC SCR controls
- Achieved ISO 9001 in 2001
- 2001– Focus on quality improvements & lean initiatives
- 2005 – Expanded with Engineering and R&D Facility
- Oct 2022 – New ownership and new direction



Why Choose Dart?

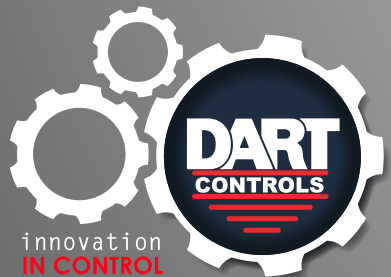


- Proudly Made in USA
- Same Day Shipping Available
- Personal Customer Service
- Ground-Breaking Innovation
- Second-to-none Support & Assistance



Direct Competition

- KB Electronics – Owned by Nidec
- Minarik / ACE (American Controls Electronics)
- Anaheim Automation
- Leeson
- Legacy
 - Fincor (Saftronics)
 - Baldor
 - Reliance
 - Seco (Broncoll)
- Cross reference guides available



Key Industries

- Conveyors
- Pizza Oven type applications
- Door closing
- Fractional DC Motors
- Brushless DC Gear Motors
- Low Voltage DC Motors



Companies Examples

- OEMs
- Automation Integrators
- End Users
- Control Specialists



5 'Hot-Button' Sales Points

- Availability – Usually within 1-2 days
- Customer Support - (317) 873-5211
- Updated control designs
- Made in USA – Indianapolis, IN
- Innovation – New products



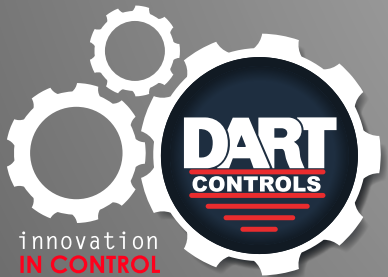
Product Found in Customer Facility

- Manufactured Products
- Operations / Maintenance



Probing Questions

- Are you using DC motors
- Are you purchasing products from KB, ACE, or Minarik



Product Overview

- AC Motor Controls – EZ VFD, AC03, & 55AC
- DC Motor Controls – 150, 125, 250, 15, 130, & 500
- Brushless DC Drives – 700
- Low Voltage DC Motor Controls – 65
- Digital DC Drives – MD
- Digital Potentiometers – DP & ASP
- Encoders – PU, CF, & OPU
- Others – DM8000 & VSI2



EZ VFD® Variable Frequency AC Drive

- Easy to Install & Use
- Universal Input – 110-250VAC 1ph
- Output – 230 VAC 3ph
- Available in Open Chassis & NEMA 4X enclosed
- Trim Pot Adjustments
 - MIN Speed, MAX Speed, Current Limit, Acc, Dec, Boost (Startup), & Brake (DC Inject)
- Options
 - -TP Removable Trimpot Board
 - -20 Cover mounted reversing switch



Model	Description / Option	Supply	Output	HP
VF-100C-R	Open Chassis EZ VFD®	110-240VAC	230VAC 3Ø	1/2HP @ 120VAC 1HP @ 230VAC
VF-100E-R	NEMA 4X Enclosed EZ VFD®	110-240VAC	230VAC 3Ø	1/2HP @ 120VAC 1HP @ 230VAC

AC03 & 55AC Triac AC Motor Speed Control

- Single phase AC Speed Control
- Applications: fans, light dimmers, & resistive loads
- Types of Motors: Permanent Split Capacitor (PSC), Permanent Split Phase (PSP, Shaded Pole and Universal)
 - Will not work on Capacitor Start Motors!
- RoHS Compliant

55/57AC

AC03

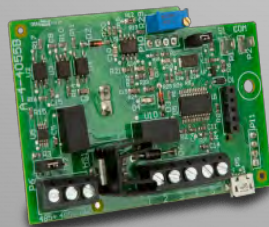


Base Model					
Model	Supply Voltage	Current	Chassis (C) Enclosed (E)	Supply Connection	Output Connection
AC03-05S	120 VAC	2.5A	C	Flying Leads	Flying Leads
55AC10C	120 VAC	10A	C	0.25" male QC	0.25" male QC
55AC10E	120 VAC	10A	E	2' cord and plug	Receptacle
57AC10C	240 VAC	10A	C	0.25" male QC	0.25" male QC
57AC10E	240 VAC	10A	E	6' cord and plug	6' cord with plug
55AC15C	120 VAC	15A	C	0.25" male QC	0.25" male QC
55AC15E	120 VAC	15A	E	2' cord and plug	Receptacle
57AC15C	240 VAC	15A	C	0.25" male QC	0.25" male QC
57AC15E	240 VAC	15A	E	6' cord and plug	6' cord with plug



150 Series DC Motor Control

- Designed for OEM opportunities
- Drop-in replacement for competition
- Available in Chassis & NEMA 4X Enclosed
 - Enclosed available in standard & digital pot
- Trim Pots
 - Min Speed, Max Speed, IR Compensation, Current Limit, Accel, & Decel
- Options available
 - Aux heat sink – only available for chassis model
 - Closed loop option using encoder feedback
 - Terminals (standard: spade terminals)
 - Drive mounted fuses
 - Signal follower input
- RoHS Compliant



Signal follower Option board -55H3/-56H3

Model*	Base Model					Options						
	Supply Voltage	Motor Voltage	DC Current	HP	Body	Speed Pot	-HSK	-T	-F1/F2	-29B	-55H3	-56H3
153D-25C	120 VAC**	90VDC**	2A	1/50-1/8	C	Rotary	√	√	F	√	F	F
	240VAC**	90/180VDC**				5K ohm						
153D-200C	120 VAC**	90VDC**	6A	1/8-1/2	C	Rotary	√	√	F	√	F	F
	240VAC**	90/180VDC**				5K ohm						
153D-25E	120 VAC**	90VDC**	2A	1/50-1/8	E	Rotary	N/A	S	S	N/A	N/A	F
	240VAC**	90/180VDC**				5K ohm						
153D-25E-29	120 VAC**	90VDC**	2A	1/50-1/8	E	Rotary	N/A	S	S	S	N/A	F
	240VAC**	90/180VDC**				5K ohm						
153D-200E	120 VAC**	90VDC**	10A	1/8-1	E	Rotary	N/A	S	S	N/A	N/A	F
	240VAC**	90/180VDC**				5K ohm						
153D-200E-29	120 VAC**	90VDC**	10A	1/8-1	E	Rotary	N/A	S	S	S	N/A	F
	240VAC**	90/180VDC**				5K ohm						
153D-25E-PB	120 VAC**	90VDC**	2A	1/50-1/8	E	Digital	N/A	S	S	N/A	N/A	N/A
	240VAC**	90/180VDC**				5K ohm						
153D-25E-PB-29	120 VAC**	90VDC**	2A	1/50-1/8	E	Digital	N/A	S	S	S	N/A	N/A
	240VAC**	90/180VDC**				5K ohm						
153D-200E-PB	120 VAC**	90VDC**	10A	1/8-1	E	Digital	N/A	S	S	N/A	N/A	N/A
	240VAC**	90/180VDC**				5K ohm						
153D-200E-PB-29	120 VAC**	90VDC**	10A	1/8-1	E	Digital	N/A	S	S	S	N/A	N/A
	240VAC**	90/180VDC**				5K ohm						

*D Series models include motor Field supply, ACCEL/DECEL adjustments, & Power/Current Limit LED's. L series do not.
 **Supply and Motor voltages are jumper selectable. Ex: both 120 and 240VAC supply may have 90VDC Motor Voltage Output.
 ***HP ratings are halved with 90VDC output
 C – open chassis √ - Option is available N/A – Option Not available
 E – NEMA 4X enclosed S - Standard Feature F – Option is available as Factory Installed only
 PB - Digital Push Button Speed Pot



250 Series DC Motor Control

- General Purpose DC Control
- Most Economical 2HP SCR drive
- Available in Chassis & NEMA 4X Enclosed
- Trim Pots
 - Min Speed, Max Speed, Accel, IR Compensation, & Current Limit
- Options available
 - Isolated 4-20mA signal follower input
 - Motor reversing switch
 - Isolated 0-5 to 0-250 VDC signal follower input
- RoHS Compliant

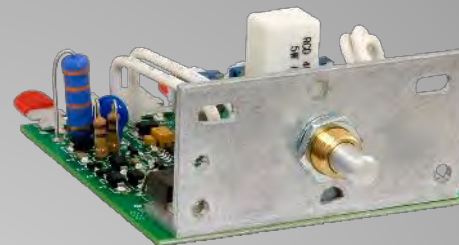


Base Model						Options							
Model	Supply Voltage	Motor Voltage	Current	HP	Body	-4X	-5	-7	-17B	-29	-34A	-55H2	-56H2
251G-12C	120 VAC	90 VDC	1.2 ADC	1/50-1/8	C	N/A	✓	✓	F	✓	N/A	✓	✓
	240 VAC	180 VDC		1/25-1/4									
253G-200C	120 VAC	90 VDC	10 ADC	1/8-1	C	N/A	✓	✓	F	✓	N/A	✓	✓
	240 VAC	180 VDC		1/4-2									
251G-12E	120 VAC	90 VDC	1.2 ADC	1/50-1/8	E	F	N/A	✓	F	F	F	N/A	F
	240 VAC	180 VDC		1/25-1/4									
253G-200E	120 VAC	90 VDC	10 ADC	1/8-1	E	F	N/A	✓	F	F	F	N/A	F
	240 VAC	180 VDC		1/4-2									

C – open chassis
 E – NEMA 4 enclosed
 ✓ - Option is available
 S - Standard Feature
 N/A – Option Not available
 F – Option is available as Factory Installed only

15 Series FHP DC Speed Control

- Dual Voltage input
 - 12/24 VAC or 120/240 VAC
- DC Output Current Rating: 2A
- Chassis available in two bracket configurations
- Enclosed Available
 - NEMA 1
 - NEMA 4
- RoHS Compliant



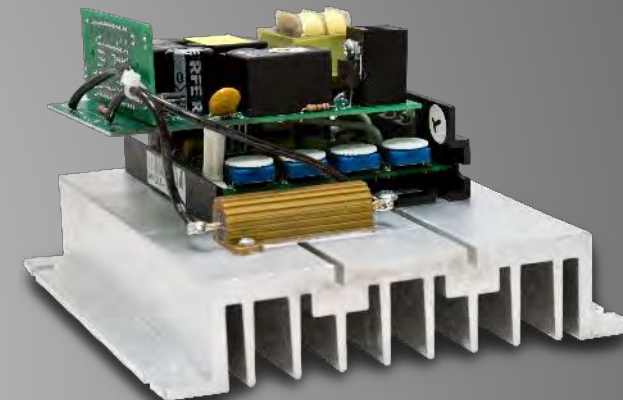
Base Model					Options		
Model	Supply Voltage	Motor Voltage	Current	HP	Body	-TS	-104
13DV1A	12 VAC	12 VDC	2 ADC	<1/20	C	✓	Call Factory
	24 VAC	24 VDC					
13DV2A	12 VAC	12 VDC	2 ADC	<1/20	C	✓	N/A
	24 VAC	24 VDC					
13DVE	12 VAC	12 VDC	3 ADC	<1/12	E4	N/A	S
	24 VAC	24 VDC					
15DV1A	120 VAC	90 VDC	2 ADC	1/50-1/6	C	✓	✓
	240 VAC	180 VDC		1/25-1/3			
15DV2A	120 VAC	90 VDC	2 ADC	1/50-1/6	C	✓	N/A
	240 VAC	180 VDC		1/25-1/3			
15DVP	120 VAC	90 VDC	2 ADC	1/50-1/6	E1	N/A	S
	240 VAC	180 VDC		1/25-1/3			
15DVE	120 VAC	90 VDC	3 ADC	1/50-1/4	E4	N/A	S
	240 VAC	180 VDC		1/25-1/2			

C – open chassis
 E1 - NEMA 1; E4 - NEMA 4 enclosed
 ✓ - Option is available
 S - Standard Feature
 N/A – Option Not available
 F – Option is available as Factory Installed only



130 Reversing DC Speed Control

- Rapid stopping (brake) or Reversal of Motor
- Motor protection designed into device
 - Utilizes dynamic brake resistor
- Currently using 125 Series
 - Update to 150 Series planned 2024
- Available in Chassis Only
- RoHS Compliant



Base Model						
Model	Supply Voltage	Motor Voltage	Current	HP	Body	Cycles/min (up to)
130LC12	120 VAC	90 VDC	1.2 ADC	1/50-1/8	Chassis	3
130LC100	120 VAC	90 VDC	5.5 ADC	1/8-1/2	Chassis	3
130HC12	120 VAC	90 VDC	1.2 ADC	1/50-1/8	Chassis	30
130HC100	120 VAC	90 VDC	10 ADC	1/8-1	Chassis	30
132LC25	240 VAC	180 VDC	1.2 ADC	1/25-1/4	Chassis	3
132LC200	240 VAC	180 VDC	5.5 ADC	1/4-1	Chassis	3
132HC200	240 VAC	180 VDC	10 ADC	1/4-2	Chassis	30



500 Series DC Motor Control

- General Purpose DC Control
- Rated to 3HP
- Available in Chassis & NEMA 4 Enclosed
- Trim Pots
 - Min Speed, Max Speed, IR Compensation, Current Limit, Accel, & Decel
- Options available
 - Isolated 4-20mA signal follower input
 - Motor reversing switch
 - Dynamic braking
- RoHS Compliant



Base Model					Options									
Model	Supply Voltage	Motor Voltage	Current	HP	Body	-4	-5	-7	-15A	-29B	-36M	-36MA	-38M	-38MA
530BC	120 VAC	90 VDC	10 ADC	1/8-1	C	N/A	✓	✓	F	✓	F	F	F	F
	240 VAC	180 VDC		1/4-2		N/A	✓	✓	F	✓	F	F	F	F
530BRC	120 VAC	90 VDC	10 ADC	1/8-1	C	N/A	✓	✓	F	✓	F	F	F	F
	240 VAC	180 VDC		1/4-2		N/A	✓	✓	F	✓	F	F	F	F
533BC	120 VAC	90 VDC	15 ADC	1.5	C	N/A	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	240 VAC	180 VDC		3.0		N/A	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A
530BRE	120 VAC	90 VDC	10 ADC	1/8-1	E	F	N/A	F	F	✓	F	F	F	F
	240 VAC	180 VDC		1/4-2		F	N/A	F	F	✓	F	F	F	F

C – open chassis
E – NEMA 4 enclosed

✓ - Option is available
F – Option is available as Factory Installed only

N/A – Option Not available

700BDC/730BDC Brushless DC Motor Control

- 12-48 VDC voltage supply
- Open or closed loop models
- Available in Chassis, NEMA 4 Enclosed, & Panel mount
- Trim Pots
 - Open Loop: Current Limit, Min Speed, Max Speed
 - Closed Loop: Min Speed, Max Speed, Closed Loop Gain, Accl, Decel
- Can be paired with digital pot for OEM applications
- Options
 - 4-20mA isolated input/output card
 - Heat sink
- RoHS Compliant



Base Model							Options			
Model	Supply Voltage	Motor Voltage	Current	Closed Loop	Isolation*	Body	-CL	BLMKIT1	OPT420	-HSK
700BDC	12-36 VDC	12-36 VDC	5 ADC	No	No	C	N/A	N/A	N/A	✓
730BDC	12-48 VDC	12-48 VDC	7.5 ADC	No	No	C	N/A	N/A	N/A	✓
731BDC	12-48 VDC	12-48 VDC	7.5 ADC	Yes	No	C	N/A	N/A	N/A	✓
733BDC	12-48 VDC	12-48 VDC	7.5 ADC	Yes	No	C	F	N/A	N/A	✓
710ADC	12-48 VDC	12-48 VDC	20 ADC	No	No	C	N/A	N/A	N/A	N/A
711ADC	12-48 VDC	12-48 VDC	20 ADC	Yes	No	C	N/A	N/A	N/A	N/A
BLM701P	12-48 VDC	12-48 VDC	8 ADC	Yes	No	P	✓	✓	✓	N/A

C – Chassis P - Panel Mount
 E – NEMA 4 enclosed * Non-isolated follower voltage may be used

✓ - Option is available N/A – Option Not available
 F – Option is available as Factory Installed only

Low Voltage DC PWM Drives – 65 Series

- Low Voltage Supply (12-48 Vdc)
- Available in Chassis & NEMA 4X Enclosed
- Trim Pots
 - Min Speed, Max Speed, IR Compensation, Current Limit, & Accel
- Options available
 - Motor reversing switch
- RoHS Compliant



Base Model								Options
Model	Supply Voltage	Motor Voltage	Current	Power/ Current Limit LED's	Current Limit Shutdown	Current Limit Output	Body	-LED
65E10C	12-48 VDC	12-48 VDC	10 ADC	Yes	Yes	Yes	C	F
65E10E	12-48 VDC	12-48 VDC	10 ADC	Yes	Yes	Yes	E	STD
65E15E-29**	12-24 VDC	12-24 VDC	15 ADC	Yes	Yes	Yes	E	STD
65E20C	12-48 VDC	12-48 VDC	20 ADC	Yes	Yes	Yes	C	F
65E20E	12-48 VDC	12-48 VDC	20 ADC	Yes	Yes	Yes	E	STD
65E40-12	12 VDC	12 VDC	40 ADC	No	No	No	C	N/A
65E40	24-36 VDC	24-36 VDC	40 ADC	No	No	No	C	N/A
65E60-12	12 VDC	12 VDC	60 ADC	No	No	No	C	N/A
65E60	24-36 VDC	24-36 VDC	60 ADC	No	No	No	C	N/A

C – Chassis
E – NEMA 4 enclosed

STD - Standard Feature

F – Option is available as Factory Installed only

N/A – Option Not available

DC Digital Drives – MD Series

- MD Series – Continuous Applications
- MD Plus Series – Start/Stop or applications requiring rapid drive response
- Up to 2HP
- Closed Loop applications – Encoder required
- Enclosures – Panel Mount and NEMA 4
- Programmable display in Rate, Time, or follower
- Follower mode – Two or more motors to operate in proportion to each other
- Options
 - 4-20mA isolated input/output card
 - RS485 Serial communications card
- RoHS Compliant



Base Model [MD Series] ¹						Options					
Model	Supply Voltage	Motor Voltage	Current	HP	Body	-P	-1	OPT3	-9	OPT51	-420
MD10P	120 VAC	90 VDC	5 ADC	1/8-1/2	P	F	F	✓	F	N/A	N/A
	240 VAC	180 VDC		1/4-1							
MD3P	120 VAC	90 VDC	10 ADC	1/8-1	P	F	F	✓	F	N/A	N/A
	240 VAC	180 VDC		1/4-2							
MD3E	120 VAC	90 VDC	10 ADC	1/8-1	E	F	F	✓	F	N/A	N/A
	240 VAC	180 VDC		1/4-2							

Base Model [MD Plus Series] ²						Options					
Model	Supply Voltage	Motor Voltage	Current	HP	Body	-P	-1	OPT3	-9	OPT51	-420
MD40P*	120 VAC	90 VDC	5 ADC	1/8-1/2	P	N/A	N/A	✓	N/A	✓	✓
	240 VAC	180 VDC		1/4-1							
MD50P*	120 VAC	90 VDC	10 ADC	1/8-1	P	N/A	N/A	✓	N/A	✓	✓
	240 VAC	180 VDC		1/4-2							
MD50E*	120 VAC	90 VDC	10 ADC	1/8-1	E	N/A	F	✓	N/A	✓	✓
	240 VAC	180 VDC		1/4-2							

P – Panel mount
E – NEMA 4 enclosed

✓ - Option is available

F – Option is available as Factory Installed only

N/A – Option Not available



Digital Potentiometers - ASP & DP

- Universal Supply Voltage (120/240 VAC)
- ASP – Closed Loop
 - Sync two or more motor speed
 - Programmable display in engineering units
 - NEMA 4X Rating
 - ASP10 – Continuous applications
 - ASP40 – Start/Stop or applications requiring rapid drive response
- DP4 - Digital Potentiometer – Open Loop
 - Programmable display in Rate or Time modes
 - NEMA 4X Rating
 - Inhibit function
 - Jog function
 - Supports bidirectional connections for regenerative drives
- DP10 – Signal Conditioner / Generator
 - Signal converter (mA to V or V to mA)
 - Signal attenuator (0-100% scaling of input)
 - Signal generator
 - mA loop power provided
 - Scalable display in engineering units
- RoHS Compliant



Base Model					Options					
Model	Supply Voltage	Output	Housing	Body	-P	-1	OPT3 ¹	-9	OPT5 ¹	-420
ASP10	120/240 VAC	Equivalent to a potentiometer. Compatible with 1KΩ to 10MΩ pot circuits	Wash down (NEMA 4X) when installed in similarly rated panel	P	F	F	✓	F	N/A	N/A
ASP40	120/240 VAC			P	N/A	F	✓	N/A	✓	✓
DP4	120/240 VAC			P	F	F	✓	F	N/A	N/A
DP10	120/240 VAC			P	N/A	N/A	N/A	N/A	N/A	N/A

P – Panel mount
 1- Order as separate line item
 ✓ - Option is available
 F – Option is available as Factory Installed only
 N/A – Option Not available



Encoders – PU, CF, & OPU

- PU Series (E – Indoor Rated / R – Wash Down & Outdoor Rated)
 - Reliable and Cost Effective
 - Single screw installation – no alignment needed
 - Installation: Drill & Tap target shaft
 - 6FT cable included
 - Supply Voltage: +4.5 to +30 VDC
 - -40C to 100 C ambient temperature range
- CF Series – C-Face mount
 - Motor face ring, mounting hardware, and sensing disk (shaft mount)
 - Supply voltage: +4.5 to +24 VDC
 - -40C to 125 C ambient temperature range
 - Frames: 56C, 143TC, 145TC, 182C, & 184C
- OPU - Optical
 - Senses rotation using reflective target
 - 3-wire sensor produces square wave output
 - Supply Voltage: +5 to +6 VDC
 - 0C to 70C ambient temperature range



PU-E Series



PU-R Series



CF Series



OPU Series



Base Model				
Indoor Model (NPN)	Outdoor Model	Pulse/Rev Output	Cable	Frame Size
PU-2E	PU-2R	1	Rubber Jacket	N/A
PU-4E	PU-4R	2	Rubber Jacket	N/A
PU-20E	PU-20R	10	Rubber Jacket	N/A
PU-40E	PU-40R	20	Rubber Jacket	N/A
CF-H1	N/A	1	N/A	56C
CF-H2	N/A	2	N/A	56C
CF-H15	N/A	15	N/A	56C
CF-H60	N/A	60	N/A	56C
CF-J2	N/A	2	N/A	143TC, 145TC, 182C, 184C
CF-J60	N/A	60	N/A	143TC, 145TC, 182C, 184C
OPU	N/A	Target Dependent	Shielded	N/A

Other Products

- DM8000 - Programmable Tachometer
 - Can be programmed
 - Rate/Time
 - Process/Percent
 - Counter/Totalizer
 - Zero Speed Switch
- VSI2 – Speed Signal Isolator
 - Input range: 0-5 through 0-25 VDC or 0-25 VDC through 0-250VDC, and 4-20mA
 - Output: filtered, PWM directly proportional to input speed signal
- PCB Updates
 - Re-Shore - Strengthen supply chain
 - Modernize – Convert from 100% thru-hole to SMT
 - Economize – New methods & components
 - Improve – Correct design errors, improve quality



OEM Digital Potentiometer – DP5

- Only for OEM applications with at least 100 EAU; if not OEM use DP4
- Programmable display units of measure
- Customizable display overlay for OEM branding
- Easy to read LED display
- Affordably priced
- Integration of other control functions
 - Speed signal for ECM motor
 - Basic logic / sequencing
 - BLDC drive
 - Menu driven HMI



Innovation – Development Projects

- Development Projects
 - EZ VFD – Gen 2
 - Target cost reduction
 - Frame expansion to 2HP
 - Line Voltage DC Regen Drive
 - Target competitive offering to convert sales
 - 130 series update
 - Convert to 150 series platform



Contact Information

- Sales & Support
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