



E3 Series

AC Variable Speed Drive

General Purpose Drive
Easy control for all motor types

Easy to Use!



0.5HP–50HP / 0.37kW–37kW
110–480V Single & 3 Phase Input

IP20

NEMA 4X (IP66)

E3 SERIES

Easy to Use

General Purpose Drive

Focused on ease of use, E3 Series drives provide unrivalled simplicity of installation, connection and commissioning, allowing the user to benefit from precise motor control and energy savings within minutes.



Simple Commissioning

With just 14 basic parameters and application macro functions providing rapid set up, the E3 Series minimizes start-up time.



Intuitive Keypad Control

Precise digital control at the touch of a button.



Application Macros

Switch between **Industrial**, **Pump & Fan** modes to optimize E3 Series drives for your application.

Industrial | Pump | Fan

See Page 6

IP20

Up to 50HP

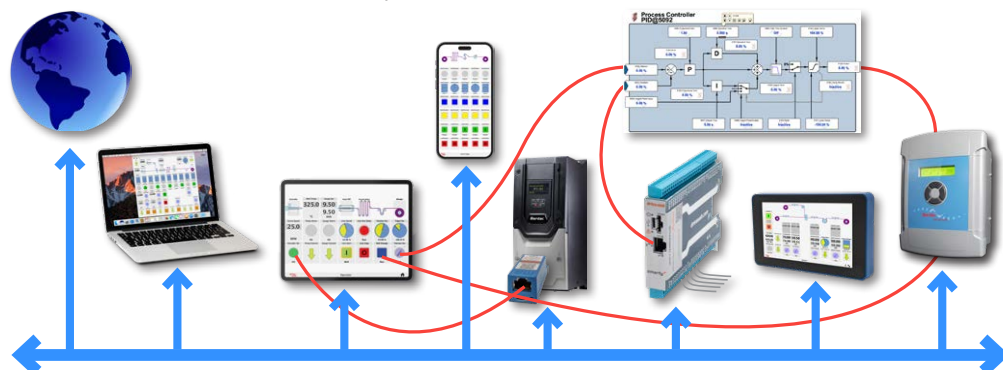
- ✓ Easy to use
- ✓ Compact & robust

See Page 4



All E3 Series drives are **drive.web ready**

drive.web uses distributed control over Ethernet to provide cost effective, high performance integration of drives and controls in systems of any size or complexity.



NEMA 4X (IP66)

Up to 30HP

- ✓ Outdoor rated
- ✓ Dust-tight
- ✓ Washdown ready

See Page 5



Key Features

- ✓ Internal PI control
- ✓ Dynamic brake switch (Frame 2 and up)
- ✓ Dual analog inputs
- ✓ Operates up to 50°C
- ✓ Bluetooth connectivity
- ✓ Optional Internal Category C1 EMC filter
- ✓ Option for control of single phase motors (see Page 8)

Modbus RTU
CAN
on-board as standard



Sensorless Vector Control for all Motor Types

<p>IM IE2 & IE3 Induction Motors</p>	<p>PM AC Permanent Magnet Motors</p>
<p>BLDC Brushless DC Motors</p>	<p>SynRM Synchronous Reluctance Motors</p>

Precise and reliable control for **IE2, IE3, & IE4 motors**

E3 SERIES

IP20

Up to 50HP

Compact, robust and reliable general purpose drive for panel mounting

Incredibly Easy to Use

- ✓ Built in PI control
- ✓ Dynamic brake switch (Frame 2 and up)
- ✓ Application macros for industrial, fan and pump operation
- ✓ Bluetooth connectivity
- ✓ Optional EMC filter (C1)

**Modbus RTU
CAN**
on-board as standard

drive.web speed

Ethernet & USB interface, Modbus TCP/IP, and adds extensive capability



T3-STICK-IN

Rapid commissioning tool



Simple Installation

DIN rail and keyhole mounting options



Power supply connects at top

Fast Connection

5mm rising clamp terminals with captive screws



Quick Reference

Integrated help card



Operates up to 122°F



Dual analog inputs

Motor supply connects at base

Controls Multiple Motor Types

- ✓ IE2, 3, & 4
- ✓ IM, PM, BLDC and SynRM

5 sizes cover global supply ratings



Simply Power Up

E3 Series drives provide precise motor control and energy savings using the factory settings. Simply power up and the drive can immediately deliver energy savings.

14 basic parameters allow simple adjustment for your application if required, with up to 50 parameters available in total for a highly flexible performance.



E3 SERIES



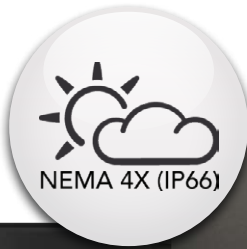
NEMA 4X Outdoor

Up to 30HP

Coated Heatsink as Standard

Ideal for hygiene based operations requiring washdown — such as food and beverage

Outdoor rated enclosed drives for direct machine mounting, dust tight and ready for washdown duty



Locally Customizable

Flat front to terminal cover with mounting points for switches and an internal PCB.



Switched or non-switched

Conformal coating as standard

- 1 2 x RJ45 ports**
eliminate the need for a splitter.
- 2 Easily accessible EMC disconnect**
- 3 Easy to wire**
due to the large, accessible chamber and removeable gland plate.

Please Inquire about our new SunShade

While, your NEMA 4X E3 drive is ultra violet (UV) resistant; a SunShade can go a long way to keep the elements at bay.



NEMA 4X (IP66) outdoor rated

Built with tough polycarbonate plastics specifically chosen to withstand degradation by ultra violet (UV), greases, oils and acids. Also robust enough not to be brittle at -20°C.

Washdown Ready

With a sealed ABS enclosure and corrosion resistant heatsink, E3 Series NEMA 4X drives are ideal for high-pressure washdown applications.

Dust-Tight Design

Install directly on your processing equipment and be sure of protection from dust and contaminants.

Switched Models

Simply wire up the drive, turn the inbuilt potentiometer and the motor will start running – allowing immediate energy savings.

Saving energy cannot be easier than this!

For ultimate ease of use

- Local Speed Potentiometer
- Run Reverse / Off / Run Forward Switch
- Lockable Mains Disconnect / Isolator



E3 SERIES

Application Macros

Switch modes at the touch of a button to optimize E3 Series drives for your application

Single parameter application macro selection



Industrial Mode

Industrial Mode optimizes E3 Series drives for load characteristics of typical industrial applications.

Applications include:

- ✓ Conveyors
- ✓ Mixers
- ✓ Treadmills

Sensorless Vector provides high starting torque and excellent speed regulation

IP20
panel mount units or
NEMA 4X
for direct machine
mounting



Rapid parameter cloning using
T3-STICK



Pump Mode

Pump Mode makes energy efficient pump control easier than ever.

Applications include:

- ✓ Dosing Pumps
- ✓ Borehole Pumps
- ✓ Transfer Pumps
- ✓ Swimming Pools
- ✓ Spas
- ✓ Fountains

- Constant or variable torque
- Internal PI control



Fan Mode

Fan Mode (inc. fire operation) makes air handling a breeze, ideal for simple HVAC systems.

Applications include:

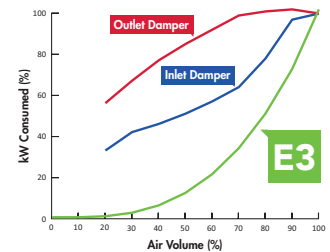
- ✓ Air Handling Units
- ✓ Ventilation Fans
- ✓ Circulating Fans
- ✓ Air Curtains
- ✓ Kitchen Extract



- High efficiency **variable torque** motor control
- Flying start capability
- Mains loss ride through
- PI control

Instant Power Savings

The graph below shows the incredible efficiency of the E3 Series for controlling airflow compared to traditional damper control methods.



Modbus RTU
CAN

on-board as standard

E3 SERIES

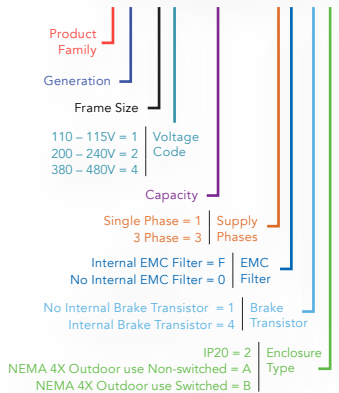


	HP	kW	Amps	Frame	Model Code	Product Family & Generation	Frame Size	Voltage Code	Output Current x 10	Supply Phases	EMC Filter	Brake Transistor	Enclosure Option
										0	1	#	#
110 - 115V ± 10% 1 Phase Input	0.5	0.37	2.3	1	E3 - 1 1 1 0023	-	1	0	1	0	1	#	
	1	0.75	4.3	1	E3 - 1 1 1 0043	-	1	0	1	0	1	#	
	1.5	1.1	5.8	2	E3 - 2 1 1 0058	-	1	0	1	0	4	#	
200 - 240V ± 10% 1 Phase Input	0.5	0.37	2.3	1	E3 - 1 2 2 0023	-	1	#	1	#	1	#	
	1	0.75	4.3	1	E3 - 1 2 2 0043	-	1	#	1	#	1	#	
	2	1.5	7	1	E3 - 1 2 2 0070	-	1	#	1	#	1	#	
	2	1.5	7	2	E3 - 2 2 2 0070	-	1	#	1	#	4	#	
	3	2.2	10.5	2	E3 - 2 2 2 0105	-	1	#	1	#	4	#	
200 - 240V ± 10% 3 Phase Input	0.5	0.37	2.3	1	E3 - 1 2 3 0023	-	3	0	1	#	1	#	
	1	0.75	4.3	1	E3 - 1 2 3 0043	-	3	0	1	#	1	#	
	2	1.5	7	1	E3 - 1 2 3 0070	-	3	0	1	#	1	#	
	2	1.5	7	2	E3 - 2 2 3 0070	-	3	#	1	#	4	#	
	3	2.2	10.5	2	E3 - 2 2 3 0105	-	3	#	1	#	4	#	
	5	4	18	3	E3 - 3 2 3 0180	-	3	#	1	#	4	#	
	7.5	5.5	24	3	E3 - 3 2 3 0240	-	3	#	1	#	4	#	
	10	7.5	30	4	E3 - 4 2 3 0300	-	3	#	1	#	4	#	
	15	11	46	4	E3 - 4 2 3 0460	-	3	#	1	#	4	#	
380 - 480V ± 10% 3 Phase Input	1	0.75	2.2	1	E3 - 1 4 4 0022	-	3	#	1	#	1	#	
	2	1.5	4.1	1	E3 - 1 4 4 0041	-	3	#	1	#	1	#	
	2	1.5	4.1	2	E3 - 2 4 4 0041	-	3	#	1	#	4	#	
	3	2.2	5.8	2	E3 - 2 4 4 0058	-	3	#	1	#	4	#	
	5	4	9.5	2	E3 - 2 4 4 0095	-	3	#	1	#	4	#	
	7.5	5.5	14	3	E3 - 3 4 4 0140	-	3	#	1	#	4	#	
	10	7.5	18	3	E3 - 3 4 4 0180	-	3	#	1	#	4	#	
	15	11	24	3	E3 - 3 4 4 0240	-	3	#	1	#	4	#	
	20	15	30	4	E3 - 4 4 4 0300	-	3	#	1	#	4	#	
	25	18.5	39	4	E3 - 4 4 4 0390	-	3	#	1	#	4	#	
	30	22	46	4	E3 - 4 4 4 0460	-	3	#	1	#	4	#	
40	30	61	5	E3 - 5 4 4 0610	-	3	#	1	#	4	#		
50	37	72	5	E3 - 5 4 4 0720	-	3	#	1	#	4	#		

Drive Specification		
Input Ratings	Supply Voltage	110 - 115V ± 10% 200 - 240V ± 10% 380 - 480V ± 10%
	Supply Frequency	48 - 62Hz
	Displacement Power Factor	> 0.98
	Phase Imbalance	3% Maximum allowed
	Inrush Current	< rated current
	Power Cycles	120 per hour maximum, evenly spaced
Output Ratings	Output Power	110V 1 Ph Input: 0.5 - 1.5HP (230V 3 Ph Output) 230V 1 Ph Input: 0.5 - 10HP (0.37 - 4kW) 230V 3 Ph Input: 0.5 - 20HP (0.37 - 15kW) 400V 3 Ph Input: 0.75 - 22kW 460V 3 Ph Input: 1 - 50HP
	Overload Capacity	150% for 60 seconds 175% for 2.5 seconds
	Output Frequency	0 - 500Hz, 0.1Hz resolution
	Acceleration Time	0.01 - 600 seconds
	Deceleration Time	0.01 - 600 seconds
	Typical Efficiency	>98%
Ambient Conditions	Temperature	IP20: Storage: -40 to 140°F Operating: 14 to 122°F NEMA 4X: Storage: -40 to 140°F Operating: 14 to 104°F
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL)
	Humidity	95% Max, non condensing
	Vibration	Conforms to EN61800-5-1
	Ingress Protection	IP20, NEMA 4X (IP66)
Enclosure	Key pad	Built-in keypad as standard Optional remote mountable keypad
	Display	7 Segment LED
	Computer	drive.web.savvy-SFD software
Control Specification	Control Method	Sensorless Vector Speed Control PM Vector Control BLDC Control Synchronous Reluctance
	PWM Frequency	4 - 32kHz Effective
	Stopping Mode	Ramp to stop: User Adjustable 0.1 - 600 secs Coast to Stop
	Braking	Motor Flux Braking Built-in braking transistor (not frame size 1)
	Skip Frequency	Single point, user adjustable
	Setpoint Control	Analog Signal 0 to 10 Volts 10 to 0 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA Digital Motorized Potentiometer (Keypad) MODBUS RTU CANopen EtherNet/IP
Fieldbus	Built-in	CANopen 125 - 1000 kbps Modbus RTU 9.6 - 115.2 kbps selectable
	I/O Specification	Power Supply 24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer
Application Features	Programmable Inputs	4 Total 2 Digital 2 Analog / Digital selectable
	Digital Inputs	8 - 30 Volt DC, internal or external supply Response time < 4ms
	Analog Inputs	Resolution: 12 bits Response time: < 4ms Accuracy: ± 2% full scale Parameter adjustable scaling and offset
	Programmable Outputs	2 Total 1 Analog / Digital 1 Relay
	Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 6A AC, 5A DC
	Analog Outputs	0 to 10 Volt
Maintenance & Diagnostics	PI Control	Internal PI Controller Standby / Sleep Function
	Fire Mode	Bidirectional Selectable Speed Setpoint (Fixed / PI / Analog / Fieldbus)
	Fault Memory	Last 4 Trips stored with time stamp
	Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage
Standards Compliance	Monitoring	Hours Run Meter
	Low Voltage Directive	Adjustable speed electrical power drive systems. EMC Requirements
	EMC Directive	2014/30/EU Cat C1 according to EN61800-3:2004
	Machinery Directive	2006/42/EC
Conformance	CE, UL, RCM	

Model Code Guide:

E3-120043-3F12



Size		1	2	3	4	5
in Height	mm Height	6.8	8.7	10.3	16.6	19.13
in Width	mm Width	3.3	4.4	5.2	6.7	8.74
in Depth	mm Depth	4.9	5.9	6.9	8.4	8.9
lb Weight	kg Weight	2.2	3.8	7.1	20.1	39.9
Mounting		4xM5	4xM5	4xM5	4xM8	4xM8



Size		1	2	3	4
in Height	mm Height	9.1	10.1	12.2	14.2
in Width	mm Width	6.4	7.4	8.3	9.5
in Depth	mm Depth	6.4	7.2	9.4	10.8
lb Weight	kg Weight	5.5	7.7	15.4	20.9
Mounting		4xM4	4xM4	4xM4	4xM4

E3 SERIES

For Single Phase Motors

IP20

NEMA 4X (IP66)

Up to 1.5HP

Single Phase Motor Control for PSC & Shaded-Pole Motors

Key Features

- ✓ 110–115V and 200–240V models
- ✓ Small mechanical envelope
- ✓ Rugged industrial operation
- ✓ Fast setup, and simple operation with 14 basic parameters
- ✓ Unique motor control strategy optimized for single phase motors
- ✓ Motor current and rpm indication
- ✓ Built in PI control
- ✓ Dynamic brake switch (Frame 2 and up)
- ✓ Application macros for industrial, fan and pump operation
- ✓ Bluetooth connectivity
- ✓ Optional EMC filter (C1)

Modbus RTU CAN

on-board as standard

150% overload for 60 secs
(175% for 2 secs)



Pump control in swimming pools & spas

Simple airflow control

Dedicated to Single Phase Motor Control

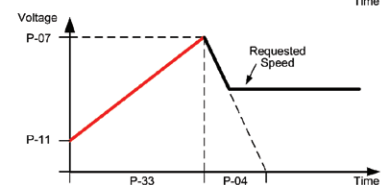
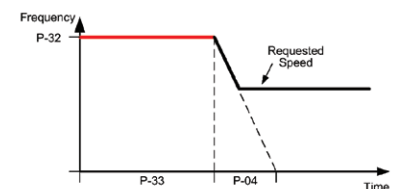
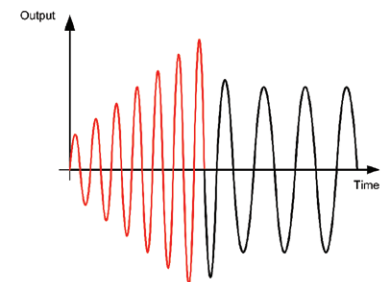
Designed to be cost effective and easy to use, the E3 Series for Single Phase Motors is for use with PSC (Permanent Split Capacitor) or Shaded-Pole Single Phase induction motors. Only for use in variable torque applications such as pumps and fans.

The E3 Series for Single Phase Motors uses a revolutionary motor control strategy to achieve reliable intelligent starting of single phase motors.

- Removes the need for 3 phase supply wiring
- Provides the same performance features as the 3 phase E3 Series
- The ideal energy saving solution where high starting torque is not required — typically including fans, blowers, centrifugal pumps, fume extractors and air flow controllers

Special Boost Phase

To ensure reliable starting of single phase motors, the drive initially ramps the motor voltage up to rated voltage while maintaining a fixed starting frequency, before reducing the frequency and voltage to the desired operating point.



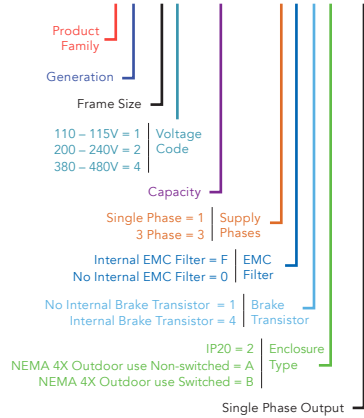
E3 SERIES



HP	kW	Amps	Frame	Model Code	
110-115V ± 10% 1 Phase Input	0.5	0.37	7	1	E3 - 1 1 0070 - 1 # 1 # - 01
	0.75	0.55	10.5	2	E3 - 2 1 0105 - 1 # 4 # - 01
200-240V ± 10% 1 Phase Input	0.5	0.37	4.3	1	E3 - 1 2 0043 - 1 # 1 # - 01
	1	0.75	7	1	E3 - 1 2 0070 - 1 # 1 # - 01
	1.5	1.1	10.5	2	E3 - 2 2 0105 - 1 # 4 # - 01

Model Code Guide:

E3-120043-1012-01



Replace # in model code with color-coded option as seen below

Enclosure Types

- A** NEMA 4X Outdoor Use Non-switched
- B** NEMA 4X Outdoor Use Switched
- 2** IP20

EMC Filter

- F** Internal EMC Filter
- 0** No Internal EMC Filter

IP20		Size	1	2
in	Height		6.8	8.7
mm	Height		173	221
in	Width		3.3	4.4
mm	Width		83	110
in	Depth		4.9	5.9
mm	Depth		123	150
lb	Weight		2.2	3.8
kg	Weight		1.0	1.7
	Mounting		4xM5	4xM5

NEMA 4X		Size	1	2
in	Height		9.1	10.1
mm	Height		232	257
in	Width		6.4	7.4
mm	Width		161	188
in	Depth		6.4	7.2
mm	Depth		162	182
lb	Weight		5.5	7.7
kg	Weight		2.5	3.5
	Mounting		4xM4	4xM4

Drive Specification

Input Ratings	Supply Voltage	110 - 115V ± 10% 200 - 240V ± 10%	Control Specification	Control Method	V/F Voltage Energy Optimised V/F	Application Features	PI Control	Internal PI Controller Standby / Sleep Function			
	Supply Frequency	48 - 62Hz		PWM Frequency	4-32kHz Effective		Fire Mode	Selectable Speed Setpoint (Fixed / PI / Analog / Fieldbus)			
	Displacement Power Factor	> 0.98		Stopping Mode	Ramp to stop: User Adjustable 0.1-600 secs Coast to stop	Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp			
	Phase Imbalance	3% Maximum allowed		Braking	Motor Flux Braking Built-in braking transistor (frame size 2)		Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage			
	Inrush Current	< rated current		Skip Frequency	Single point, user adjustable		Monitoring	Hours Run Meter			
	Power Cycles	120 per hour maximum, evenly spaced		Fieldbus	Setpoint Control	Analog Signal	0 to 10 Volts 10 to 0 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA	Standards Compliance	Low Voltage Directive	Adjustable speed electrical power drive systems. EMC requirements	
	Output Ratings	Output Power				110V 1 Ph Input: 0.5-0.75HP 230V 1 Ph Input: 0.5-1.5HP (0.37-1.1kW)	Digital		Motorised Potentiometer (Keypad) Modbus RTU CANopen EtherNet/IP	EMC Directive	2014/30/EU 230V 1Ph. Filtered Units : Cat C1 according to EN61800-3:2004
Overload Capacity		150% for 60 Seconds 175% for 2.5 seconds	I/O Specification	Built-in	CANopen	125-1000 kbps	Machinery Directive		2006/42/EC		
Output Frequency		0 - 500Hz, 0.1Hz resolution			Modbus RTU	9.6-115.2 kbps selectable	Conformance		CE, UL, RCM		
Acceleration Time	0.01 - 600 seconds	Ambient Conditions	Temperature	IP20: Storage: -40 to 140°F Operating: 14 to 122°F	NEMA 4X: Storage: -40 to 140°F Operating: 14 to 104°F	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer				
Deceleration Time	0.01 - 600 seconds						Altitude	Programmable Inputs	Digital Inputs	Analog Inputs	Programmable Outputs
Typical Efficiency	> 98%										
Enclosure	Ingress Protection	IP20, NEMA 4X (IP66)	8 - 30 Volt DC, internal or external supply Response time < 4ms	Resolution: 12 bits Response time: < 4ms Accuracy: ± 2% full scale Parameter adjustable scaling and offset	2 Total 1 Analog / Digital 1 Relay						
						Programming	Keypad	Built-in keypad as standard Optional remote mountable keypad	Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 6A AC, 5A DC	
Display	7 Segment LED	Vibration	Conforms to EN61800-5-1	Analog Outputs	0 to 10 Volt						
Computer	drive.web savvy-SFD software										

drive.web automation

drive.web uses distributed control over Ethernet to provide cost effective, high performance integration of drives and controls in systems of any size or complexity.



smarty dw250 series controllers with a wide range of I/O

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

- DIN mount controllers with flexible analog, logic, and encoder I/O
- 60 points of high resolution I/O
- Includes gateway to ModbusTCP/IP, ModbusRTU, EIP/PCCC, etc.
- USB port for easy system-wide programming



smarty dw210 series controllers with a wide range of I/O

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

- DIN mount controllers with flexible analog, logic, and encoder I/O
- 16 points of high resolution I/O
- Includes gateway to ModbusTCP/IP, ModbusRTU, EIP/PCCC, etc.
- USB port for easy system-wide programming



speedy dw270 series miniature, full-featured controllers

Tiny, full-featured, programmable controllers for embedding into drives, sensors, HMIs, etc.

- The easiest, affordable way to get all your drives & devices up onto peer-to-peer Ethernet
- Includes gateway to ModbusTCP/IP, ModbusRTU, EIP/PCCC, etc.
- USB port for easy system-wide programming

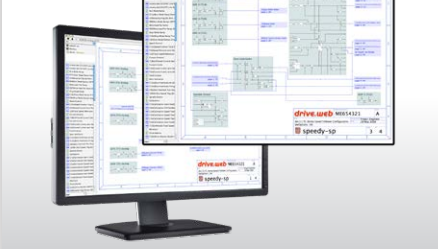
E3 SERIES

Installation & Peripheral Options

A range of external EMC Filters, Brake Resistors, Input Chokes and Output Filters are available, to suit all installation requirements



savvy



the smart automation tool
Smart, intuitive graphical tools for device programming, system design, and monitoring.



savvyPanel
smart, touch screen operator station technology
Provides unprecedented flexibility in instrumentation, control, and monitoring.
Available on iOS and Android, and PC, Mac, and Linux.

Remote Keypads



T3-OPPAD-IN
Remote Keypad & TFT Display
T2-OPPORT-IN
Remote Keypad & LED Display

RJ45 Accessories



Ideal for simple and fast connection of Modbus RTU/CAN networks

T2-J4505	RJ45 Cable 0.5m
T2-J4510	RJ45 Cable 1.0m
T2-J4530	RJ45 Cable 3.0m
T2-J455P	RS485 3 Way Data Cable Splitter RJ45

Ancillary Support Products



Communication Interfaces, Input and Output Reactors, DB resistors, EMC Filters, and Motors are available!
Please visit bardac.com or call (410) 604-3400

E3 SERIES

E3 Series - AC Variable Speed Drive

✓ Low Power Applications

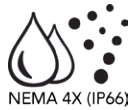
Dedicated to low power applications, E3 Series drives combine innovative technology, reliability, robustness and ease of use in a range of compact IP20 & NEMA 4X enclosures.

✓ Simple Commissioning

14 parameter basic setup. Default settings suitable for most applications. Contactor style connection for simple wiring.

✓ E3 Series NEMA 4X

Environmentally protected, NEMA 4X rated models can be mounted directly on your processing equipment.



✓ Washdown Ready

With a sealed ABS enclosure and corrosion resistant heatsink, E3 Series NEMA 4X models are ideal for high-pressure washdown applications.

✓ On-drive Control

NEMA 4X models feature optional, convenient controls for speed control, REV/OFF/FWD and Power ON/OFF, complete with safety lock.

✓ Single Phase Motor Control

E3 Series drives for Single Phase Motors provides accurate speed control of single phase PSC or shaded pole motors. Special boost phase ensures reliable starting, initially ramping the motor voltage up to rated voltage while maintaining a fixed starting frequency, before reducing the frequency and voltage to the desired operating point.

The Bardac factory is located on Kent Island, MD



About Bardac Drives

Since our founding in 1992, Bardac has worked hard to build our reputation around key goals:

- Innovative technologies
- Reliable products
- Focus on automation; Distributed Control, AC Drives, DC Drives, and Motors
- All catalog items normally in stock
- Competitive pricing
- Unrelenting customer support



For more about the E3 Series:
bardac.com/e3-series/

Bardac Drives

40 Log Canoe Circle
Stevensville, MD 21666
bardac.com

Tel: (410) 604-3400
Fax: (410) 604-3500
Email: info@bardac.com

