

# E3 Series AC Variable Speed Drive

### **General Purpose Drive** Easy control for all motor types



0.5HP-30HP / 0.37kW-22kW 110-480V Single & 3 Phase Input



### 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 30HP



### All E3 Series drives are **drive.ueb 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.







### **Key Features**

- 🖌 Internal PI control
- V Dynamic brake switch (Frame 2 and up)
- 🖌 Dual analogue 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



Precise and reliable control for IE2, IE3 & IE4 motors



Compact, robust and reliable general purpose drive for panel mounting

### Incredibly Easy to Use



- ✓ Dynamic brake switch (Frame 2 and up)
- ✓ Application macros for industrial, fan and pump operation
- 🖌 🚯 Bluetooth' connectivity
- 🖌 Optional EMC filter (C1)



### drive.web speedy

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

> Optistick Smart Rapid commissioning tool

### **Controls Multiple Motor Types**



### Simply Power Up

Dual analog

inputs

NFC

🚯 Bluetooth

Bardac

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.

Motor supply connects at base

Simple Installation DIN rail and keyhole mounting options

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



### 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.



Conformal coating as standard

NEMA 4X (IP66)

2 x RJ45 ports eliminate the need for a splitter.

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DIDI

Easily accessible EMC disconnect

### Easy to wire

due to the large, accessible chamber and removeable gland plate.

### **NEMA 4X (IP66)** outdoor rated

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

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### **Dust-Tight Design**

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

### Washdown Ready

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

### 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



### **Application Macros**

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



Modbus RTU CAN

on-board as standard



### How much energy could you save?

Estimate potential energy savings,  $CO_2$  emissions and financial savings for your application with the Bardac Drives **Energy Savings Calculator** tool.

bardac.com/calculator



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Single parameter application macro selection

	0.5	0.37	2.3	1	E3 - 1 1 0023 - 1 0 1 #
110-115V±10%	1	0.75	4.3	1	E3 - 1 1 0043 - 1 0 1 #
i Flase inpui	1.5	1.1	5.8	2	E3 - 2 1 0058 - 1 0 4 #
	0.5	0.37	2.3	1	E3 - 1 2 0023 - 1 # 1 #
	1	0.75	4.3	1	E3 - 1 2 0043 - 1 # 1 #
200-240V±10%	2	1.5	7	1	E3 - 1 2 0070 - 1 # 1 #
i i nuse inpui	2	1.5	7	2	E3 - 2 2 0070 - 1 # 4 #
	3	2.2	10.5	2	E3 - 2 2 0105 - 1 # 4 #
	5	4	15.3	3	E3 - 3 2 0153 - 1 0 4 #
	0.5	0.37	2.3	1	E3 - 1 2 0023 - 3 0 1 #
	1	0.75	4.3	1	E3 - 1 2 0043 - 3 0 1 #
	2	1.5	7	1	E3 - 1 2 0070 - 3 0 1 #
	2	1.5	7	2	E3 - 2 2 0070 - 3 # 4 #
200-240V±10%	3	2.2	10.5	2	E3 - 2 2 0105 - 3 # 4 #
5 Those input	5	4	18	3	E3 - 3 2 0180 - 3 # 4 #
	7.5	5.5	24	3	E3 - 3 2 0240 - 3 # 4 #
	10	7.5	30	4	E3 - 4 2 0300 - 3 # 4 #
	15	11	46	4	E3 - 4 2 0460 - 3 # 4 #
	1	0.75	2.2	1	E3 - 1 4 0022 - 3 # 1 #
	2	1.5	4.1	1	E3 - 1 4 0041 - 3 # 1 #
	2	1.5	4.1	2	E3 - 2 4 0041 - 3 # 4 #
	3	2.2	5.8	2	E3 - 2 4 0058 - 3 # 4 #
	5	4	9.5	2	E3 - 2 4 0095 - 3 # 4 #
380-480V±10%	7.5	5.5	14	3	E3 - 3 4 0140 - 3 # 4 #
5 rhase input	10	7.5	18	3	E3 - 3 4 0180 - 3 # 4 #
	15	11	24	3	E3 - 3 4 0240 - 3 # 4 #
	20	15	30	4	E3 - 4 4 0300 - 3 # 4 #
	25	18.5	39	4	E3 - 4 4 0390 - 3 # 4 #
	20	22	44	4	E2 4 4 0 4 4 0 2 # 4 #

Model Code Guide: E3-120043-3F	1
Product Family Generation Frame Size	
110 - 115V = 1 Voltage 200 - 240V = 2 Code 380 - 480V = 4 Capacity	
Single Phase = 1 Supply 3 Phase = 3 Phases	
Internal EMC Filter = F EMC No Internal EMC Filter = 0 Filter	
No Internal Brake Transistor = 1 Brake Internal Brake Transistor = 4 Transistor	
IP20 = 2 NEMA 4X Outdoor use Non-switched = A NEMA 4X Outdoor use Switched = B	re

### ,ılı, Bardac'ııı' drives'''

-	P20 Size		1	2	3	4	
in	Height	Г	6.8	8.7	10.3	16.6	
mm	Height		173	221	261	420	
in	Width		3.3	4.4	5.2	6.7	
mm	Width		83	110	131	171	
in	Depth		4.9	5.9	6.9	8.4	
mm	Depth		123	150	175	212	
lb	Weight		2.2	3.8	7.1	20.1	
kg	Weight		1.0	1.7	3.2	9.1	
	Mounting	1	4×M5	4 x M5	4×M5	4×M8	

NE	MA 4X	-		The second s	8		
	Size	1	2		3	4	
in	Height	9.1	10.1		12.2	14.2	
mm	Height	232	257		310	360	
in	Width	6.4	7.4		8.3	9.5	
mm	Width	161	188		211	240	
in	Depth	6.4	7.2		9.4	10.8	
mm	Depth	162	182		238	275	
lb	Weight	5.5	7.7		15.4	20.9	
kg	Weight	2.5	3.5		7.0	9.5	
	Mounting	4×M4	4xM4		4×M4	4×M4	

### **Drive Specification**

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Input Ratings	Supply Voltage	110 - 115V ± 10% 200 - 240V ± 10%	Programming	Keypad	Built-in keyp Optional re	oad as standard mote mountable keypad	I/O Specification	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer
		360-460V ± 10%		Display	7 Segment	LED		Programmable	4 Total
	Supply Frequency	48 – 62Hz		Computer	drive.web	savvy-SFD software		Inputs	2 Digital 2 Analog / Digital selectable
	Displacement Power Factor	> 0.98	Control Specification	Control Sensorless Ver PM Vector Co		/ector Speed Control Control		Digital Inputs	8 – 30 Volt DC, internal or external supply Response time < 4ms
	Phase Imbalance	3% Maximum allowed		Method	BLDC Conti Synchronou	rol Is Reluctance		Analog Inputs	Resolution: 12 bits Response time: < 4ms
	Inrush Current	< rated current		PWM Frequency	ency 4-32kHz Effective ing Ramp to stop: User Adjustable 0.1-600 secs Coast to stop			Analog inputs	Accuracy: ± 2% full scale Parameter adjustable scaling and offset
	Power Cycles	120 per hour maximum, evenly spaced		Stopping Mode				Programmable Outputs	2 Total 1 Analog / Digital
Output Ratings	Output Power	110V 1 Ph Input: 0.5–1.5HP (230V 3 Ph Output) 230V 1 Ph Input: 0.5–5HP (0.37–4kW)		Braking	Motor Flux Built-in brak	Motor Flux Braking Built-in braking transistor (not frame size 1)		Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC
	Output i owei	230V 3 Ph Input: 0.5–15HP (0.37–11kW) 400V 3 Ph Input: 0.75–22kW 460V 3 Ph Input: 1–30HP		Skip Frequency	Single point	t, user adjustable		Analog	0 to 10 Volt
	Quadrad	1500/ fee (0 Gerende				0 to 10 Volts		Outputs	
	Capacity	175% for 2.5 seconds		Setpoint Control	Analog Signal	10 to 0 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA	Application Features	PI Control	Internal PI Controller Standby / Sleep Function
	Output Frequency	0 – 500Hz, 0.1Hz resolution						Fire Mode	Bidirectional
	Acceleration Time	0.01 – 600 seconds			Digital	Motorised Potentiometer			Selectable Speed Setpoint (Fixed / Pl / Analog / Fieldbus)
	Deceleration Time	0.01 – 600 seconds				(Keypad) Modbus RTU	Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp
	Typical Efficiency	> 98%				EtherNet/IP	& Diagnostics	Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current
		1700	Fieldbus		CANopen	125–1000 kbps		Data Logging	Drive Temperature
Ambient Conditions		IP20: Storage: -40 to 140°F		Built-in	Modbus RTU	9.6–115.2 kbps selectable		Monitoring	DC Bus Voltage
	Temperature	operating. This issue						montoring	
		NEMA 4X: Storage: -40 to 140°F Operating: 14 to 104°F					Standards Compliance	Low Voltage Directive	Adjustable speed electrical power drive systems. EMC requirements
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL approved						EMC Directive	2014/30/EU Cat C1 according to EN61800-3:2004
	Humidity	95% Max, non condensing						Machinery Directive	2006/42/EC
	Vibration	Conforms to EN61800-5-1						Conformance	CE, UL, RCM
Enclosure	Ingress Protection	IP20, NEMA 4X (IP66)							



**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
- $\checkmark$  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 (AN

on-board as standard

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





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.





#### **Drive Specification**

Input Ratings	Supply Voltage	110 – 115V ± 10% 200 – 240V ± 10%	Control Specification	Control Method	V/F Voltage Energy Op	e timsied 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 / Pl / Analog / Fieldbus)
	Displacement Power Factor	> 0.98		Stopping Mode	Ramp to stop: User Adjustable 0.1–600 secs		Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp
	Phase Imbalance	3% Maximum allowed		Braking	Motor Flux Braking		Ĩ	Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current
	Inrush Current	< rated current			Built-in braking transistor (trame size 2)				Drive Temperature
	Power Cycles	120 per hour maximum, evenly spaced		Skip Frequency		it, user adjustable			Heure Run Meter
Output Ratings	Output Power	110V 1 Ph Input: 0.5–0.75HP 230V 1 Ph Input: 0.5–1.5HP (0.37–1.1kW)			Analog Signal	0 to 10 Volts 10 to 0 Volts 0 to 20mA 20 to 0mA	Standards Compliance	Low Voltage Directive	Adjustable speed electrical power drive systems.
	Overload Capacity	150% for 60 Seconds 175% for 2.5 seconds		Setpoint		4 to 20mA 20 to 4mA			
	Output Frequency	0 – 500Hz, 0.1Hz resolution		Control	Digital	Motorised Potentiometer (Keypad) Modbus RTU CANopen EtherNet/IP		EMC Directive	230V 1Ph. Filtered Units : Cat C1 according to EN61800-3:2004
	Acceleration Time	0.01 – 600 seconds						Machinery Directive	2006/42/EC
	Deceleration Time	0.01 – 600 seconds	Fieldbus	Built-in	CANopen	125–1000 kbps		Conformance	CE, UL, RCM
	Typical Efficiency	> 98%			Modbus RTU	9.6–115.2 kbps selectable			
Ambient Conditions		IP20: Storage: -40 to 140°F Operating: 14 to 122°F	I/O Specification	Power Supply	24 Volt DC Protected 10 Volt DC	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer			
	Iemperature	NEMA 4X: Storage: -40 to 140°F Operating: 14 to 104°F		Programmable Inputs	4 Total 2 Digital 2 Analog	/ Digital selectable			
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL approved		Digital Inputs	8 – 30 Volt DC, internal or external supply Response time < 4ms				
		Up to 4000m maximum (non UL)			Resolution: 12 bits Response time: < 4ms Accuracy: ± 2% full scale Parameter adjustable scaling and offset				
	Humidity	95% Max, non condensing		Analog Inputs					
	Vibration	Conforms to EN61800-5-1							
Enclosure	Ingress Protection	IP20, NEMA 4X (IP66)	Programmable Outputs Relay Outputs		2 Total 1 Analog / Digital 1 Relay				
Programming	Keypad	Built-in keypad as standard Optional remote mountable keypad			Maximum Switching (	Voltage: 250 VAC, 30 VDC Current Capacity: 6A AC, 5A DC			
	Display	7 Segment LED		Analog	0 to 10 Volt				
	Computer	drive.web savvy-SFD software		Outputs		- 			

# drive.шеb automation

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



**Smarty** dw240 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
- 51 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** 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-topeer 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.



Also available on PC and iOS devices

### savvyPanel

smart, touch screen operator station technology

Provides unprecedented flexibility in instrumentation, control, and monitoring.

### Remote Keypads



T2-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-IN	RJ45 Cable 0.5m
T2-J4510-IN	RJ45 Cable 1.0m
T2-J4530-IN	RJ45 Cable 3.0m
T2-J45SP-IN	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 1-888-667-7333



### E3 Series - AC Variable Speed Drive

NEMA 4X (IP66)

#### 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.



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.



### 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





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For more about the E3 Series:

bardac.com/e3-series/

