E3 Series
AC Variable Speed Drive

General Purpose Drive
Easy control for all motor types

Easy to Use!

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

IP20
NEMA 4X (IP66)
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

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

Sensorless Vector Control for all Motor Types

Key Features

- Internal PI control
- 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

- Up to 30HP
- Outdoor rated
- Dust-tight
- Washdown ready

See Page 5

NEMA 4X (IP66)

Up to 30HP

- Outdoor rated
- Dust-tight
- Washdown ready

See Page 5

NEMA 4X (IP66)

- Connectivity
- Optional Internal Category C1 EMC filter
- Option for control of single phase motors (see Page 8)

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

Precise and reliable control for IE2, IE3 & IE4 motors
E3 SERIES

IP20 Up to 30HP

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)

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.

Controls Multiple Motor Types
✓ IE2, 3 & 4
✓ IM, PM, BLDC and SynRM

4 sizes cover global supply ratings

Operates up to 122°F
Compact, robust and reliable general purpose drive for panel mounting

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

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

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.

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.

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

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

Switched or non-switched
For ultimate ease of use

Conformal coating as standard
Locally Customizable
Flat front to terminal cover with mounting points for switches and an internal PCB.

1. 2 x RJ45 ports
   eliminate the need for a splitter.

2. Easily accessible EMC disconnect
   due to the large, accessible chamber and removeable gland plate.

3. Easy to wire
   Common to all switches
   1. Lockable Mains Disconnect / Isolator
   2. Local Speed Potentiometer
   3. Run Reverse / Off / Run Forward Switch

For ultimate ease of use
1. Lockable Mains Disconnect / Isolator
2. Local Speed Potentiometer
3. Run Reverse / Off / Run Forward Switch

UL & CE

Recentemente, have you seen this document? Let me know.
## E3 SERIES

### Application Macros

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

<table>
<thead>
<tr>
<th><strong>Industrial Mode</strong></th>
<th><strong>Pump Mode</strong></th>
<th><strong>Fan Mode</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industrial Mode</strong> optimizes E3 Series drives for load characteristics of typical industrial applications.</td>
<td><strong>Pump Mode</strong> makes energy efficient pump control easier than ever.</td>
<td><strong>Fan Mode</strong> (inc. fire operation) makes air handling a breeze, ideal for simple HVAC systems.</td>
</tr>
<tr>
<td><strong>Applications include:</strong></td>
<td><strong>Applications include:</strong></td>
<td><strong>Applications include:</strong></td>
</tr>
<tr>
<td>✓ Conveyors</td>
<td>✓ Dosing Pumps</td>
<td>✓ Air Handling Units</td>
</tr>
<tr>
<td>✓ Mixers</td>
<td>✓ Borehole Pumps</td>
<td>✓ Ventilation Fans</td>
</tr>
<tr>
<td>✓ Treadmills</td>
<td>✓ Transfer Pumps</td>
<td>✓ Circulating Fans</td>
</tr>
<tr>
<td><strong>Sensorless Vector</strong> provides high starting torque and excellent speed regulation</td>
<td>✓ Swimming Pools</td>
<td>✓ Air Curtains</td>
</tr>
<tr>
<td>✓ Spas</td>
<td>✓ Spas</td>
<td>✓ Kitchen Extract</td>
</tr>
<tr>
<td>✓ Fountains</td>
<td><strong>Internal PI control</strong></td>
<td><strong>Variable torque motor control</strong></td>
</tr>
<tr>
<td><strong>IP20</strong> panel mount units or NEMA 4X for direct machine mounting</td>
<td><strong>Constant or variable torque</strong></td>
<td>• High efficiency <strong>variable torque</strong> motor control</td>
</tr>
<tr>
<td>Rapid parameter cloning using OPTISTICK Smart</td>
<td><strong>Mains loss ride through</strong></td>
<td>• Flying start capability</td>
</tr>
<tr>
<td></td>
<td><strong>PI control</strong></td>
<td>• Mains loss ride through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PI control</td>
</tr>
</tbody>
</table>

### Instant Power Savings

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

- **Estimate potential energy savings, CO₂ emissions and financial savings for your application with the Bardac Drives Energy Savings Calculator tool.**
- bardac.com/calculator

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

**How much energy could you save?**

- bardac.com/calculator
### E3 SERIES

#### Input Ratings

<table>
<thead>
<tr>
<th>Supply Voltage</th>
<th>Supply Frequency</th>
<th>Displacement Power Factor</th>
<th>Phase Imbalance</th>
<th>Input Current</th>
<th>Power Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>110–115V ± 10%</td>
<td>50 Hz</td>
<td>&gt; 0.8</td>
<td>3% Maximum allowed</td>
<td>&lt; rated current</td>
<td>120 per hour maximum, evenly spaced</td>
</tr>
<tr>
<td>200–240V ± 10%</td>
<td>48–62 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380–480V ± 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Output Ratings

<table>
<thead>
<tr>
<th>Output Power</th>
<th>Overload Capacity</th>
<th>Acceleration Time</th>
<th>Deceleration Time</th>
<th>Typical Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>110–115V ± 10%</td>
<td>150% for 60 Seconds</td>
<td>150% for 2.5 seconds</td>
<td>0.01 to 600 seconds</td>
<td>&gt; 98%</td>
</tr>
<tr>
<td>200–240V ± 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380–480V ± 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Fieldbus

- CANopen
- Modbus RTU
- CANopen Ethernet/IP

### Drive Specification

#### Programming

- Keyboard: Built-in keypad as standard
- Optional remote mountable keypad
- Computer: driveweb.serco-SFO software
- Display: 7 Segment LED

#### Control Specification

- Control Method: Sensorless Vector Speed Control
- Vector Control
- BLOC Control
- Synchronous Reluctance
- PWM Frequency: 4–300 Hz Effective
- Stopping Mode: Ramp to stop: User Adjustable 0.1–600 seconds
- Coast to stop
- Braking: Motor Flux Braking
- Built-in braking transistor (not frame size 1)
- Skip Frequency: Single point, user adjustable

#### I/O Specification

- Power Supply: 24 Vdc, 100mA, Short Circuit Protected
- 10 Vdc, 10mA for Potentiometer
- Programmable Inputs: 4 Total
  - 2 Analog / Digital selectable
- Digital Inputs: 8–30 Volt DC, internal or external supply
  - Response time < 4 ms
- Analog Inputs: Resolution: 12 bits
  - Response time: < 4 ms
  - 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

#### Application Features

- PI Control: Internal PI Controller
- Standby / Sleep Function
- Programmed Run Torque Limits
- Motor Protection
- Bidirectional
- Selectable Speed Setpoint
- Fixed / PI / Standby / Sleep Function
- Minimum / Maximum Speed
- Maximum Torque
- Monitoring
- Monitoring: Hours Run Meter

#### Maintenance & Diagnostics

- Fault Memory: Last 40 Trip events
- Data Logging: Logging of data prior to trip for diagnostic purposes
- Output Current: Drive Temperature
- DC Bus Voltage
- Conformance: CE, UL, C-UL

#### Standards & Compliance

- Low Voltage Directive
- EMC Directive: 2014/30/EU
- Machinery Directive: 2006/42/EC
- Conformance: CE, UL, C-UL

### Model Code Guide:

**E3-120043-3F12**

- **Product Family:**
  - Generation
  - Frame Size
- **Supply Voltage:**
  - 110 – 115V ± 10% = 1
  - 200 – 240V ± 10% = 2
  - 380 – 480V ± 10% = 3
- **Supply Phases:**
  - Single Phase = 1
  - 3 Phase = 3
- **IP20 = 2**
  - Enclosure Type: NEMA 4X Outdoor use
  - Non-switched = A
  - Switched = B

### NEMA 4X

<table>
<thead>
<tr>
<th>Size</th>
<th>in Height</th>
<th>mm Height</th>
<th>in Width</th>
<th>mm Width</th>
<th>in Depth</th>
<th>mm Depth</th>
<th>lb Weight</th>
<th>kg Weight</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9.1</td>
<td>232</td>
<td>7.4</td>
<td>188</td>
<td>6.4</td>
<td>162</td>
<td>2.5</td>
<td>1.8</td>
<td>4.3M</td>
</tr>
<tr>
<td>2</td>
<td>10.1</td>
<td>257</td>
<td>7.9</td>
<td>211</td>
<td>7.4</td>
<td>223</td>
<td>3.6</td>
<td>2.0</td>
<td>4.3M</td>
</tr>
<tr>
<td>3</td>
<td>12.2</td>
<td>310</td>
<td>8.5</td>
<td>240</td>
<td>9.5</td>
<td>275</td>
<td>5.5</td>
<td>2.5</td>
<td>4.3M</td>
</tr>
<tr>
<td>4</td>
<td>14.2</td>
<td>360</td>
<td>10.8</td>
<td></td>
<td></td>
<td></td>
<td>7.0</td>
<td>3.0</td>
<td>4.3M</td>
</tr>
</tbody>
</table>

### Controls

- CANopen
- Modbus RTU
- CANopen Ethernet/IP
- Built-in

### Enclosure

- Protection: IP20, NEMA 4X (IP66)
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)

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 airflow 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.

Pump control in swimming pools & spas

Simple airflow control

Connectivity

Modbus RTU CAN

IP20  NEMA 4X (IP66)
E3 SERIES

Model Code Guide:
E3-120043-3F12-01

- **Product Family:** E3
- **Generation:** 1
- **Frame Size:** 2
- **Supply Voltage:** 230V 1 Ph Input
- **1 Phase Input:** 1
- **Supply Code:** 2
- **Internal EMC Filter:** No Internal EMC Filter
- **IP20:** Yes

**Drive Specification**

- **Input Ratings**
  - **Supply Voltage:** 110 – 115V ± 10%
  - **200 – 240V ± 10%**
  - **Input Current:** 0.5
  - **Frame Size:** 2

- **Output Ratings**
  - **Output Power:** 0.5 – 1.5HP (0.37 – 1.1kW)
  - **Supply Phases:** 1

- **Control Specification**
  - **Control Method:** VF Voltage
  - **PWM Frequency:** 4–32 Hz
  - **Stepping Mode:** Ramp to stop
  - **Braking:** Motor Flux Braking
  - **Skip Frequency:** Single point, user adjustable
  - **Acceleration Time:** 0.01 – 400 seconds
  - **Deceleration Time:** 0.01 – 400 seconds
  - **Typical Efficiency:** > 98%

- **Environmental Conditions**
  - **Temperature:** Storage: -40 to 140°F, Operating: 14 to 122°F
  - **Humidity:** 95% Max, non-condensing
  - **Vibration:** Conforms to EN61800-5-1

- **Enclosure**
  - **Protection:** IP20, NEMA 4X

- **I/O Specification**
  - **Power Supply:** 24V DC, 100mA, Short-Circuit Protection, 10 Volt DC, 10mA for Potentiometer
  - **Programmable Inputs:** 4 Total, 2 Digital, 2 Analog / Digital
  - **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:** 1 Analog / Digital, 1 Relay
  - **Relay Outputs:** Maximum Voltage: 250 VAC, 250 VDC, Switching Current Capacity: 5A AC, 5A DC
  - **Analog Outputs:** 0 to 10 Volt

- **Application Features**
  - **PI Control:** Internal PI Controller
  - **Fine Mode:** Selectable Speed Setpoint (Fixed / PI / Analog / Fieldbus)
  - **Maintenance & Diagnostics**
    - **Fault Memory:** Last 4 Trips stored with time stamp
    - **Data Logging:** Logging of data prior to trip by diagnostic purposes
    - **Monitor:** Drift Temperature
    - **DC Bus Voltage**

- **Standards Compliance**
  - **Low Voltage Directive:** CE, UL, C-Tick
  - **EMC Directive:** 2014/35/EU, 2006/95/EC, Cat C1 according to EN61800-3:2004
  - **Machinery Directive:** 2006/42/EC
  - **Conformance:** CE, UL, RCM

**Enclosure Types**

- **NEMA 4X Outdoor Use Non-switched**
- **NEMA 4X Outdoor Use Switched**

**EMC Filter**

- **Internal EMC Filter**
- **No Internal EMC Filter**

**Fieldbus**

- **CANopen**
- **Modbus RTU**
- **EtherCAT**

**I/O Configuration**

- **IP20**
  - **Size 1:** 1
  - **Size 2:** 2
  - **In Height:** 6.8
  - **mm Height:** 173
  - **W Width:** 6.4
  - **mm Width:** 150
  - **In Depth:** 110
  - **mm Depth:** 232
  - **lb Weight:** 1.7
  - **kg Weight:** 0.8

**Enclosure Options**

- **NEMA 4X:** 3
  - **in Height:** 9.1
  - **mm Height:** 232
  - **W Width:** 6.4
  - **mm Width:** 150
  - **In Depth:** 6.4
  - **mm Depth:** 162
  - **lb Weight:** 1.7
  - **kg Weight:** 0.8

**Operating Temperatures**

- **14 to 104°F**

**Deceleration**

- **Time:** > 98%

**Input Voltage**

- **110 – 115V ± 10%**
  - **0.5 0.37 7 1**
  - **0.75 0.55 10.5 2**

**Output Power**

- **200 – 240V ± 10%**
  - **0.5 0.37 4.3 1**
  - **1 0.75 7 1**
  - **1.5 1.1 10.5 2**

**Supply Phases**

- **1 Phase Input**
  - **E3: 0070 - 1**
  - **E3: 2 1 0070 - 1**
  - **E3: 2 - 2 1 0070 - 1**

**Typical Efficiency**

- **98%**

**Output Current x 10**

- **4 x M4**

**Dimensions**

- **4 x M5**

**Power Requirements**

- **100 – 115V ± 10%**
  - **0.5 0.37 7 1**
  - **0.75 0.55 10.5 2**

**Frame Size**

- **110 – 115V = 1**
  - **200 – 240V = 2**
  - **380 – 480V = 4**

**Humidity**

- **95% Max, non-condensing**

**Vibration**

- **Conforms to EN61800-5-1**
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 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-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.

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

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.

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

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