

PowerXL DE1 Series



Product Description

Eaton's PowerXL® DE1 variable speed starter offers the advantages of both a motor starter and a variable frequency drive in a single device. The DE1 is a compact and easy-to-use device with the ability to change the speed of the motor with the simplicity of a contactor starter. With 14 basic parameters, SmartWire-DT® connectivity and an intuitive configuration module, the DE1 setup and commissioning is easy for any panel builder and MOEM. The DE1 was designed for customers who have concerns of the complexity of a VFD but still require variable frequency and advanced motor protection.

Models rated at 480 volts, three-phase, 50/60 Hz are available in sizes ranging from 0.5 to 10 hp. Models rated at 230 volts, single-phase in/three-phase out, 50/60 Hz are available in sizes ranging from 0.33 to 3 hp.

The DE1 VSS is designed without a keypad to provide a simplistic, cost effective solution. Units are shipped without a keypad. In order to change parameters, there are accessories such as the configuration module that can change up to 5 parameters or connectivity products to connect to the drivesConnect PC Tool.

Features

- Compact, space-saving design
- Rugged design rated up to 60 °C without derating
- DIN rail and screw mountable
- Narrow footprint for true side-by-side installation
- Rated for group motor applications
- Low capacitor design for low harmonics
- Control terminal blocks
 - Three digital inputs
 - One digital/analog (programmable) input
 - One relay output
- Contactor style power wiring
- RS-485/Modbus as standard
- Efficient, simple design without a keypad
 - Three indicating LEDs for fault and condition status
- Reliable design—
 - 150% for 60 s
 - 175% for 2 s
- SmartWire-DT and EtherNet/IP ready for expanding communication gateways

Contents

Description

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Standards and Certifications

Product

- Complies with EN 61800-3

Safety

- IEC 61800-5-1
- CE
- UL
- CSA/cUL
- cTick
- UKRsekpro
- GOST R
- RoHS compliant



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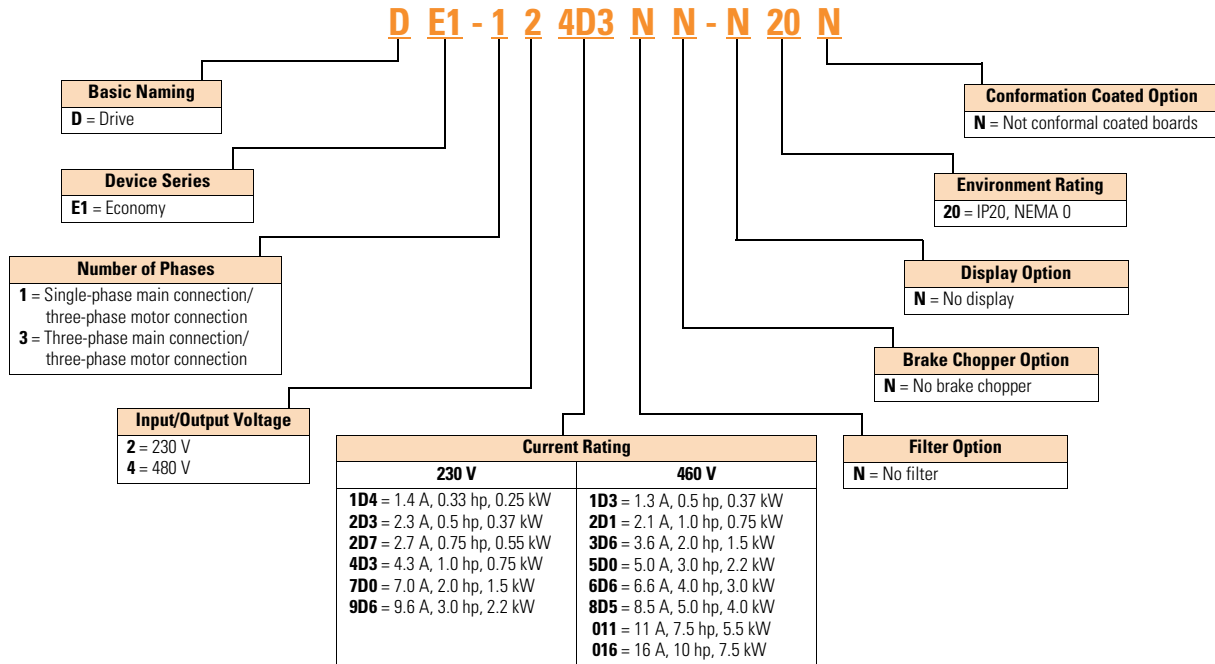
Adjustable Frequency Drives

PowerXL DE1 Series

Catalog Number Selection

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DE1 Series Variable Speed Starter



Product Selection

IP20

DE1 Series IP20 Enclosure Drives



hp ^①	kW	Volts	100% Continuous Current In (A)	Frame Size	Catalog Number ^②
0.33	0.25	200–240 V single-phase in ^③ / 230 V three-phase out	1.4	1	DE1-121D4NN-N20N
0.5	0.37		2.3	1	DE1-122D3NN-N20N
0.75	0.55		2.7	1	DE1-122D7NN-N20N
1	0.75		4.3	1	DE1-124D3NN-N20N
2	1.5		7	1	DE1-127D0NN-N20N
3	2.2		9.6	2	DE1-129D6NN-N20N
0.5	0.37	380–480 V three-phase in/ 480 V three-phase out	1.3	1	DE1-341D3NN-N20N
1	0.75		2.1	1	DE1-342D1NN-N20N
2	1.5		3.6	1	DE1-343D6NN-N20N
3	2.2		5	2	DE1-345D0NN-N20N
4	3		6.6	2	DE1-346D6NN-N20N
5	4		8.5	2	DE1-348D5NN-N20N
7.5	5.5		11.3	2	DE1-34011NN-N20N
10	7.5		16	2	DE1-34016NN-N20N

Notes

- ① For all applications, select the unit such that the motor current is less than or equal to the rated continuous output current.
- ② These are constant torque/high overload rated drives.
- ③ For 230 V three-phase applications, refer to the three-phase to single-phase application note (AP040108EN) to properly set up the system.

Accessories

DE1 Series

PC Communication Kit and Copy/Paste Module

Description	Catalog Number
Bluetooth copy/paste communication stick	DX-COM-STICK2
USB to RJ45 panel mount kit	DX-COM-PCKIT
USB to RJ45 PC Tool cable	DX-CBL-PC-3M0

Keypad Options

Description	Catalog Number
LED remote keypad—7-segment display, IP54 rated	DX-KEY-LED2 ①
Configuration module—plug-in unit, DIP switch and dial control	DXE-EXT-SET

Extension Cables and Data Cable Splitter

Description	Catalog Number
RJ45 communication cable w/terminating resistor	EASY-NT-R
RS-485 data cable, RJ45, 0.5 m	DX-CBL-RJ45-0M5
RS-485 data cable, RJ45, 1.0 m	DX-CBL-RJ45-1M0
RS-485 data cable, RJ45, 3.0 m	DX-CBL-RJ45-3M0
RS-485 three-way data cable splitter, RJ45	DX-SPL-RJ45-3SL
RS-485 data cable splitter, RJ45, (1 connector to 2 socket)	DX-SPL-RJ45-2SL1PL

Communication Modules

Description	Catalog Number
SmartWire-DT interface for DE1 and DC1 IP20	DX-NET-SWD3
Dual EtherNet/IP interface for DE1 and DC1 IP20	DX-NET-ETHERNET2-2

Commoning Links ②

Description	Max. Devices Used	Catalog Number
460 V, three-phase link	3xFS1	XTCEXCLK3B
	2xFS1 + 1xFS2	
	2xFS2	
	4xFS1	XTCEXCLK4B
	3xFS1 + 1xFS2	
	1xFS1 + 2xFS2 ③	
	5xFS1	XTCEXCLK5B
	4xFS1 + 1xFS2	
	2xFS1 + 2xFS2 ③	
3xFS2 ③		
460 V, incoming terminal	—	XTCEXITB ④

Notes

- ① Includes 1 m RS-485 data cable.
- ② Commoning links can be used to connect multiple line side 460 V DE1 units for use in group motor applications.
- ③ These combinations may result in the total of the individual input currents exceeding the three-phase commoning link's and incoming connection block's ampacity (35 A).
- ④ Required for group motor applications when using the 460 V commoning links.

Technical Data and Specifications

DE1 Series

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Ratings

PowerXL DE1 Basic Controller Standard Ratings

Description	Specification
Protections	
Overload protection	150% for 60s for every 600 seconds
Overvoltage protection	Yes
Undervoltage protection	Yes
Ground fault protection	Yes
Overtemperature protection	Yes
Motor overload protection	Yes
Motor stall protection	Yes
Short-circuit protection	100 kAIC with Type J fuses, 65 kAIC with PKZM, 10 kAIC with FAZ

Programmable Parameters

Description
14 Standard operation parameters
Programmable start function
DC-brake at start and stop
Adjustable switching frequency
Autorestart function after fault
Protections and supervisions
Power section fault indication
External fault
Fieldbus communication
Analog input range selection, signal scaling and filtering
Four preset speed reference

Specifications

PowerXL DE1 Series

Description	Specification
Input Ratings	
Input voltage (V_{in})	$\pm 10\%$
Input frequency (f_{in})	50/60 Hz (variation up to 48–62 Hz)
Connection to power	Maximum of one time every 30 seconds
Output Ratings	
Output voltage	0 to V_{in}
Continuous output current	Continuous rated current I_N at ambient temperature max. 140 °F (60 °C), 150% for 60 seconds, 175% for 2 seconds
Output frequency	0 to 500 Hz
Frequency resolution	0.1 Hz
Initial output current (I_{IH})	175% for 2s for every 20 seconds Torque depends on motor
Control Characteristics	
Operation mode	U/f control, slip compensation
Switching frequency	4 to 32 kHz
Voltage reference	10 Vdc (max. 10 mA)
Field weakening point	0 to 500 Hz
Acceleration time	0.1 to 600 seconds
Deceleration time	0.1 to 600 seconds
Ambient Conditions	
Ambient operating temperature	-10 °C to $+50\text{ °C}$, for 60 °C there is no derating required ^①
Storage temperature	-40 °C to $+70\text{ °C}$
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Enclosure class	IP20 (FS1–FS3)

Note

^① All units do not require derating except for the 10 hp 460 V unit which may require derating depending on the switching frequency used.

Standards—DE1 Series Variable Speed Starter**I/O Specifications**

- Digital inputs DI1–DI4 are programmable
- Relay output is programmable
- DI3 and DI4 can be programmed to be digital, thermistor or analog

Includes:

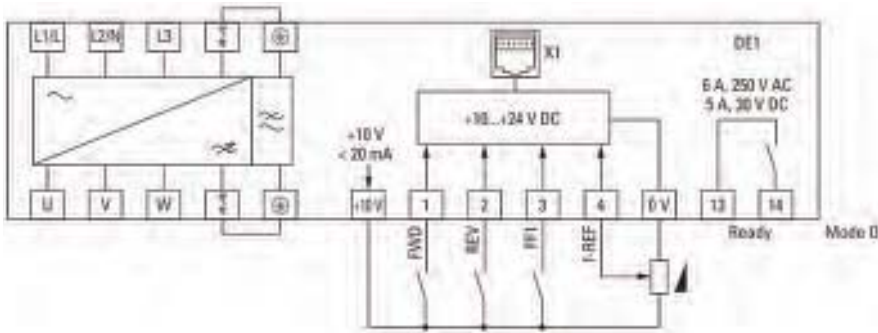
- Four inputs (three digital and one digital/analog)
- Analog input
 - 4–20 mA
 - 0–10 V
- One relay output
- RS-485 interface

Reliability

- Pretested components
- Computerized testing
- Robust design rated to 60 °C

DE1 Series I/O Interface

Terminal	Signal	Factory Preset	Description
0 V	0 V	—	0 V connection
+0 V	+24 Vdc	—	Maximum load 100 mA Reference potential V
1	DI1	FWD	+10 to 24 V
2	DI2	REV	+10 to 24 V
3	DI3	Fixed frequency FF1	+10 to 24 V
	Ther.	Thermistor	Fixed frequency FF1 External fault: Trip at 3600 Ω Reset at 1600 Ω
4	DI4	Digital Input 4	Frequency reference value +10 to 24 V
	AI1	Analog Input	Frequency reference value 0 to 10 V 0/4–20 mA Can be switched with parameter P16
13	K13	Relay 1, normally open contact	Active = RUN Maximum switching load: 250 Vac/6 A or 30 Vdc/5 A
14	K14	Relay 1, normally open contact	Active = RUN Maximum switching load: 250 Vac/6 A or 30 Vdc/5 A



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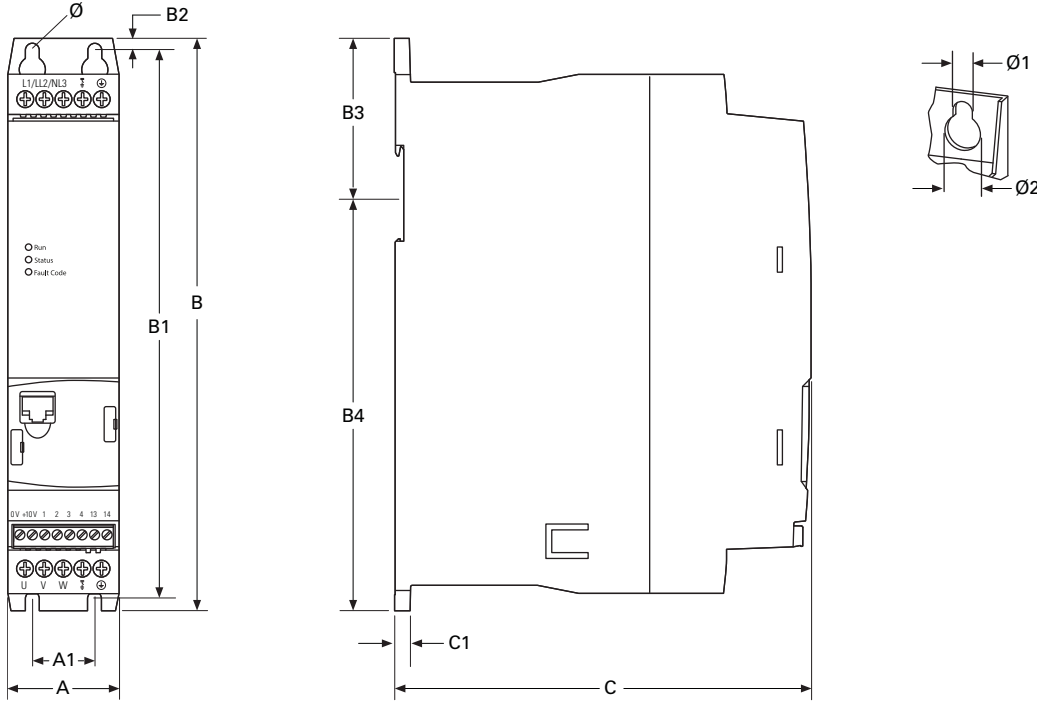
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Dimensions

Approximate Dimensions in Inches (mm)

2 DE1, Sizes FS1 and FS2, Degree of Protection IP20/NEMA 0



Frame Size	A	A1	B	B1	B2	B3	B4
FS1	1.77 (45.0)	0.98 (25.0)	9.09 (231.0)	8.66 (220.0)	0.20 (5.1)	2.52 (64.0)	6.54 (166.1)
FS2	3.54 (90.0)	1.97 (50.0)	9.09 (231.0)	8.66 (220.0)	0.20 (5.1)	2.52 (64.0)	6.54 (166.1)

Frame Size	C	C1	Ø1	Ø2	Weight lbs (kg)
FS1	6.65 (169.0)	0.26 (6.6)	0.20 (5.1)	0.39 (10.0)	2.29 (1.04)
FS2	6.65 (169.0)	0.26 (6.6)	0.20 (5.1)	0.39 (10.0)	3.70 (1.68)