

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

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PowerXL DE1 Series

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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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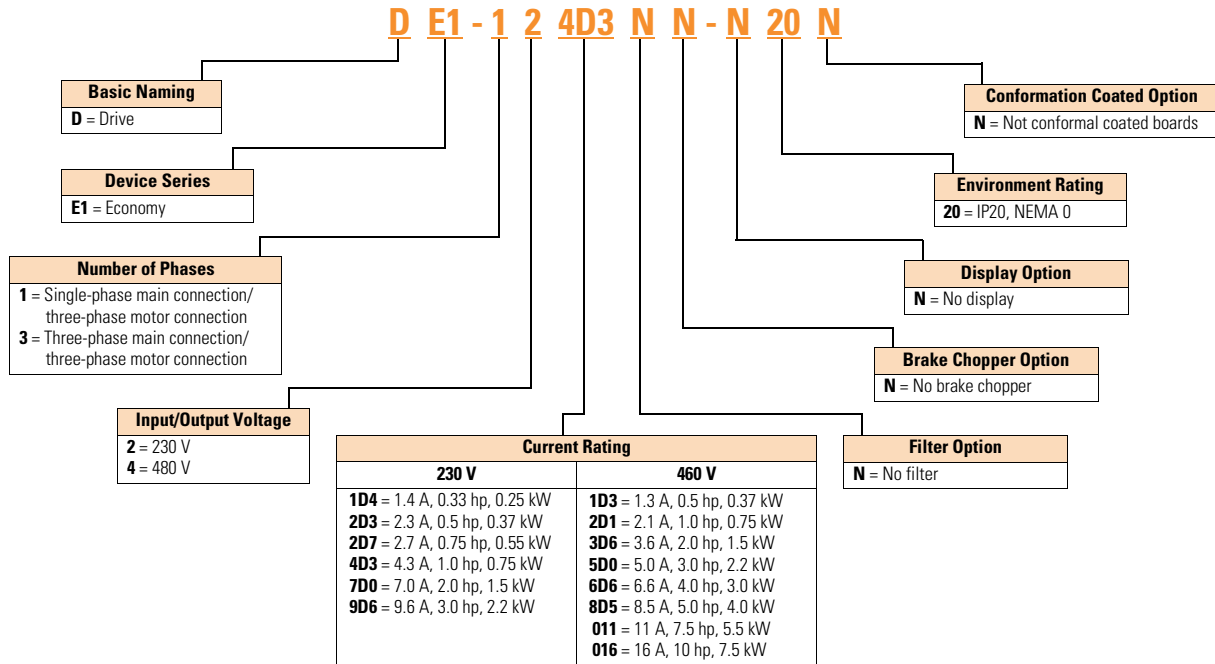
Adjustable Frequency Drives

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
Overtoltage 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:

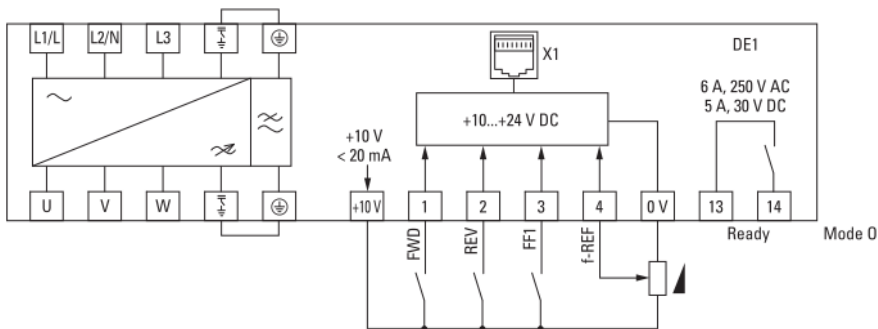
- Four inputs (three digital and one digital/analog)
 - Analog input
 - 4–20 mA
 - 0–10 V
- One relay output
- RS-485 interface

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: [Need info] 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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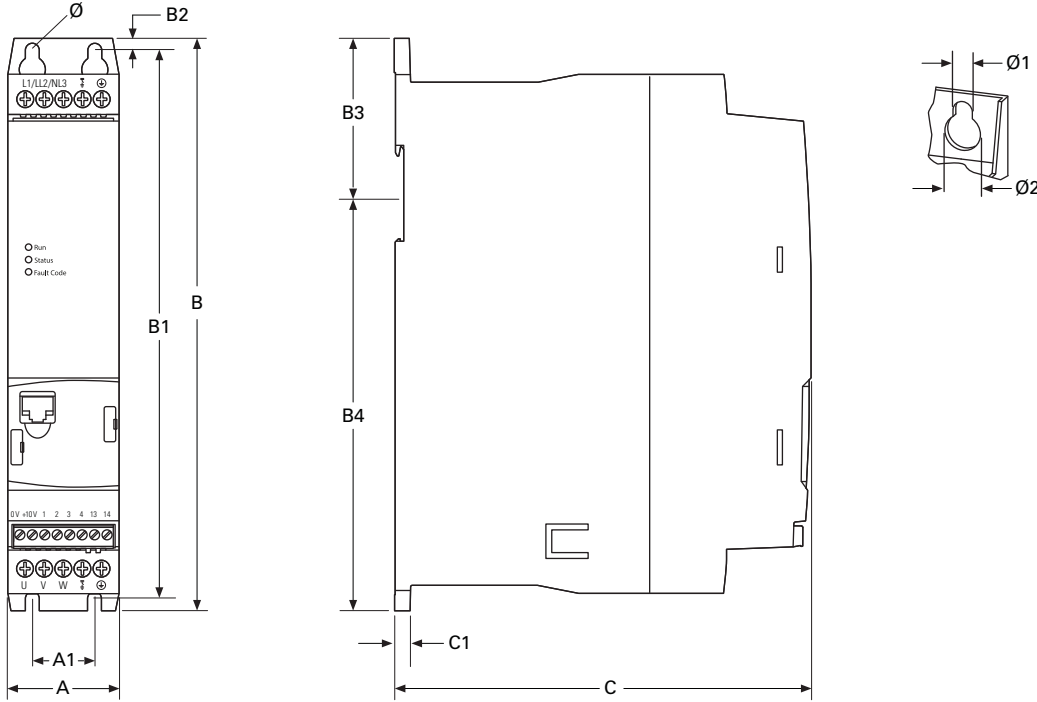
Adjustable Frequency Drives

PowerXL DE1 Series

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)

PowerXL DC1 Series Drives



Product Description

Eaton's PowerXL® DC1 variable frequency drives are the next generation of drives specifically engineered for today's machinery applications.

The DC1 is compact with only 14 basic parameters, SmartWire-DT® and EtherNet/IP connectivity, and outstanding ease of mounting and installation. The newest version adds support for sensorless vector control and permanent magnet motor compatibility. The DC1 is perfect for quick commissioning and is ideal for panel builders. This drive supports single-phase motor applications, and detachable terminal blocks make control wiring much easier.

Models rated at 480 volts, three-phase, 50/60 Hz are available in sizes ranging from 1 to 30 hp. Models rated at 240 volts, single- or three-phase, 50/60 Hz are available in sizes ranging from 0.5 to 15 hp. Models rated at 115 volts, single-phase, 50/60 Hz are available in the 0.5 to 3 hp size range.

Features

- Compact, space-saving design
- Rugged and reliable—175% for 2 s, 50 °C rated
- DIN rail and screw mountable (FS1 and FS2)
- Side-by-side installation
- Industry-leading efficiency delivers energy savings to the customer
- Optional integrated EMC filters make the unit suitable for commercial and industrial networks
- Brake chopper as standard in frames 2 and higher
- Temperature-controlled fan
- RS-485/Modbus® and CANopen™ as standard
- PI controller as standard
- SmartWire capability
- Dual EtherNet/IP communication module
- Removable I/O terminal blocks
- Contactor style power wiring
- Designed for shaded-pole, single-phase motors and permanent split capacitor single-phase motors
- Sensorless vector control
- Permanent magnet motor compatibility

Standards and Certifications

Product

- Complies with EN61800-3 (2004)

EMC (At Default Settings)

- EMC Category C1, C2 and C3 at default settings (1 m, 5 m, 25 m)

Safety^①

- 61800-5-1
- EN 60529
- CE
- UL
- cUL
- UkrSepro
- c-Tick
- RoHS compliant



Note

- ① See unit nameplate for more detailed approvals.

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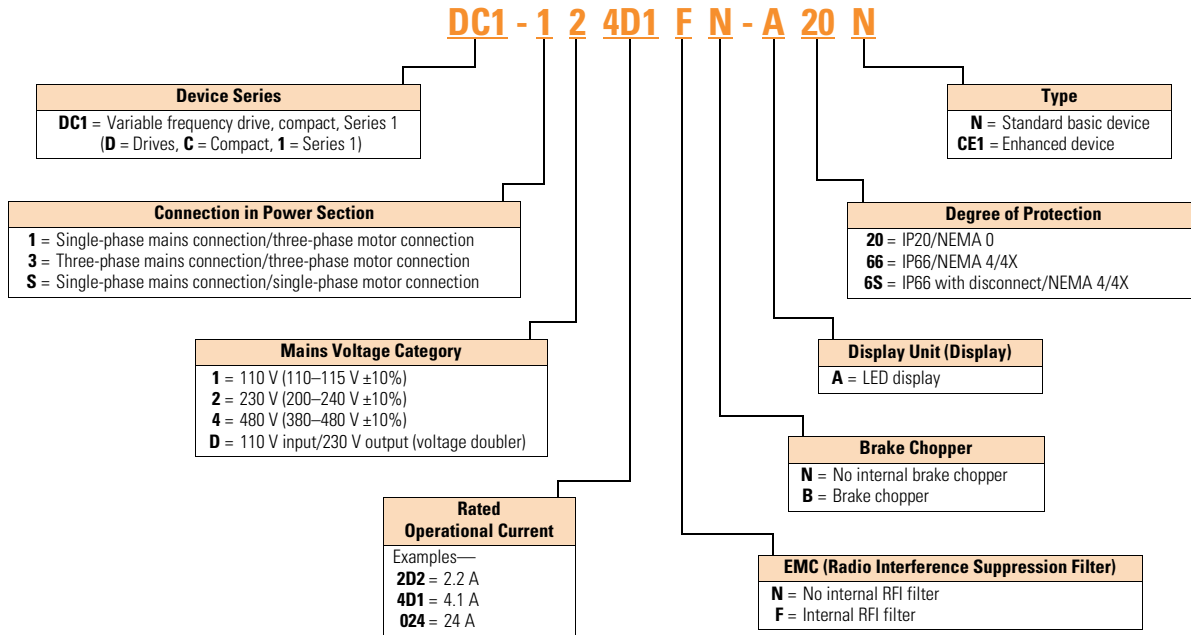
Adjustable Frequency Drives

PowerXL DC1 Series Drives

Catalog Number Selection

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DC1 Series Adjustable Frequency AC Drives



Product Selection

IP20

DC1 Series IP20 Enclosure Drives ^①

hp ^②	kW	Volts	100% Continuous Current In (A)	Frame Size ^③	Catalog Number
0.5	0.37	115 V single-phase in/ ^④	7	1	DC1-S17D0NN-A20N
0.75	0.55	115 V single-phase out	10.5	2	DC1-S1011NB-A20N
0.5	0.37	200–240 V single-phase in/ ^④	4.3	1	DC1-S24D3NN-A20N ^⑤
1	0.75	200–240 V single-phase out	7	1	DC1-S27D0NN-A20N ^⑤
1.5	1.1		10	2	DC1-S2011NB-A20N ^⑤
0.5	0.37	115 V single-phase in/ 230 V three-phase out	2.3	1	DC1-1D2D3NN-A20CE1
1	0.75		4.3	1	DC1-1D4D3NN-A20CE1
1.5	1.1		5.8	2	DC1-1D5D8NB-A20CE1
0.5	0.37	200–240 V single-phase in/ 230 V three-phase out	2.3	1	DC1-122D3NN-A20CE1 ^⑤
1	0.75		4.3	1	DC1-124D3NN-A20CE1 ^⑤
2	1.5		7	1	DC1-127D0NN-A20CE1 ^⑤
2	1.5		7	2	DC1-127D0NB-A20CE1 ^⑤
3	2.2		10.5	2	DC1-12011NB-A20CE1 ^⑤
5	4		15	3	DC1-12015NB-A20CE1
7.5	5.6		24	4	DC1-32024NB-A20CE1 ^⑤
0.5	0.37	200–240 V three-phase in/ 230 V three-phase out	2.3	1	DC1-322D3NN-A20CE1
1	0.75		4.3	1	DC1-324D3NN-A20CE1
2	1.5		7	1	DC1-327D0NN-A20CE1
2	1.5		7	2	DC1-327D0NB-A20CE1 ^⑤
3	2.2		10.5	2	DC1-32011NB-A20CE1 ^⑤
5	4		18	3	DC1-32018NB-A20CE1 ^⑤
10	7.5		30	4	DC1-32030NB-A20CE1 ^⑤
15	11		46	4	DC1-32046NB-A20CE1 ^⑤
1	0.75	380–480 V three-phase in/ 480 V three-phase out	2.2	1	DC1-342D2NN-A20CE1 ^⑤
2	1.5		4.1	1	DC1-344D1NN-A20CE1 ^⑤
2	1.5		4.1	2	DC1-344D1NB-A20CE1 ^⑤
3	2.2		5.8	2	DC1-345D8NB-A20CE1 ^⑤
5	4		9.5	2	DC1-349D5NB-A20CE1 ^⑤
7.5	5.5		14	3	DC1-34014NB-A20CE1 ^⑤
10	7.5		18	3	DC1-34018NB-A20CE1 ^⑤
15	11		24	3	DC1-34024NB-A20CE1 ^⑤
20	15		30	4	DC1-34030NB-A20CE1 ^⑤
25	18.5		39	4	DC1-34039FB-A20N ^⑤
30	22		46	4	DC1-34046FB-A20N ^⑤

Notes

- ① These are constant torque/high overload rated drives.
- ② For all applications, select the unit such that the motor current is less than or equal to the rated continuous output current.
- ③ Brake chopper circuit available as standard in frames 2, 3 and 4.
- ④ Only for use with shaded pole or split capacitor single-phase motors.
- ⑤ RFI version available. Substitute with DC1-*****F*.**** for this option.

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Adjustable Frequency Drives

PowerXL DC1 Series Drives

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IP66 NEMA 4/4X Interior DC1 Drive

The IP66 version of the DC1 is a unique solution to allow for mounting the drive outside of a control panel or next to a motor for distributed control.

“-A66...” Option

This version comes with the keypad that is similar to that of IP20 version. There are no additional cover controls to address security concerns.

“-A6S...” Option

This version has an integrated potentiometer, a forward/off/reverse switch and a disconnect switch with lock-off capability with the standard keypad. This allows for reduced labor and materials when compared to a IP20 solution in separate enclosure.

IP66



IP66S



DC1 Series IP66 Enclosure Drives ^①

hp ^②	kW	Volts	100% Continuous Current In (A)	Frame Size ^③	Catalog Number
0.5	0.37	115 V single-phase in/ 115 V single-phase out	7	1	DC1-S17D0NN-A6SN ^④
0.75	0.55		10.5	2	DC1-S1011NB-A6SN ^④
0.5	0.37	200–240 V single-phase in/ 200–240 V single-phase out	4.3	1	DC1-S24D3NN-A6SN ^{④⑤}
1	0.75		7	1	DC1-S27D0NN-A6SN ^{④⑤}
1.5	1.1		10	2	DC1-S2011NB-A6SN ^{④⑤}
0.5	0.37	115 V single-phase in/ 230 V three-phase out	2.3	1	DC1-1D2D3NN-AS6CE1 ^④
1	0.75		4.3	1	DC1-1D4D3NN-AS6CE1 ^④
1.5	1.1		5.8	2	DC1-1D5D8NB-AS6CE1 ^④
0.5	0.37	200–240 V single-phase in/ 230 V three-phase out	2.3	1	DC1-122D3NN-AS6CE1 ^{④⑤}
1	0.75		4.3	1	DC1-124D3NN-AS6CE1 ^{④⑤}
2	1.5		7	1	DC1-127D0NN-AS6CE1 ^{④⑤}
2	1.5		7	2	DC1-127D0NB-AS6CE1 ^{④⑤}
3	2.2		10.5	2	DC1-12011NB-AS6CE1 ^{④⑤}
5	4		15	3	DC1-12015NB-AS6CE1 ^④
0.5	0.37	200–240 V three-phase in/ 230 V three-phase out	2.3	1	DC1-322D3NN-AS6CE1 ^④
1	0.75		4.3	1	DC1-324D3NN-AS6CE1 ^④
2	1.5		7	1	DC1-327D0NN-AS6CE1 ^④
2	1.5		7	2	DC1-327D0NB-AS6CE1 ^{④⑤}
3	2.2		10.5	2	DC1-32011NB-AS6CE1 ^{④⑤}
5	4		18	3	DC1-32018NB-AS6CE1 ^{④⑤}
1	0.75	380–480 V three-phase in/ 460 V three-phase out	2.2	1	DC1-342D2NN-AS6CE1 ^{④⑤}
2	1.5		4.1	1	DC1-344D1NN-AS6CE1 ^{④⑤}
2	1.5		4.1	2	DC1-344D1NB-AS6CE1 ^{④⑤}
3	2.2		5.8	2	DC1-345D8NB-AS6CE1 ^{④⑤}
5	4		9.5	2	DC1-349D5NB-AS6CE1 ^{④⑤}
7.5	5.5		14	3	DC1-34014NB-AS6CE1 ^{④⑤}
10	7.5		18	3	DC1-34018NB-AS6CE1 ^{④⑤}

Notes

- ① These are constant torque/high overload rated drives.
- ② For all applications, select the unit such that the motor current is less than or equal to the rated continuous output current.
- ③ Brake chopper circuit available as standard in frames 2, 3 and 4.
- ④ Non-disconnect version available. Substitute with -A66....
- ⑤ RFI version available. Substitute with DC1-*****F*..... for this option.

Accessories

DC1 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

Encoder Feedback Plug-In Option Module and Miscellaneous Cards

Description	Catalog Number
Local control/test option card	DXC-EXT-LOCSIM
HVACO drive running and tripped relay output card	DXC-EXT-2R01A0
Dual relay output card	DXC-EXT-2R0
110 V logic input card	DXC-EXT-IO110
230 V logic input card	DXC-EXT-IO230

Remote Keypad

Description	Catalog Number
LED remote keypad—7-segment display, IP54 rated	DX-KEY-LED2 ^①
OLED remote keypad—full text display, multi-line text, multi-language, IP54 hand/auto buttons	DX-KEY-OLED ^①

Brake Resistor (FR2 and FR3)

Description	Catalog Number
DC1, DA1 internal mount 200 W, 100 R	DX-BR3-100

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

Optional Communication Modules

Description	Catalog Number
EtherNet/IP plug-in interface module ^②	DX-NET-ETHERNET2-2

Notes

- ^① Includes 1 m RS-485 data cable.
- ^② Available June 2016.

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Adjustable Frequency Drives

PowerXL DC1 Series Drives

2

Line and Load Reactors

A line and load reactor is a three-phase inductance filter that can be placed on the line and load side of the AFD to help improve the harmonic performance of the system. Consult the factory for additional filtering options and further technical details.

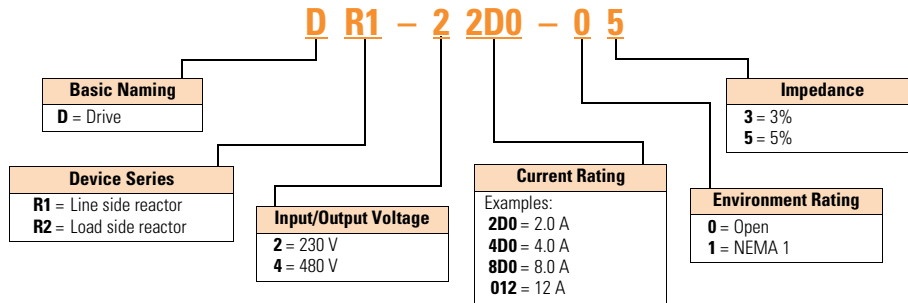
DR1 Line Reactor

A line reactor helps to provide a moderate reduction in current harmonics similar to a DC choke. It also provides increased input protection for AFD and its semiconductors from line transients helping to extend the life of the AFD.

DR2 Output Reactor

An output filter is used to reduce the transient voltage (dV/dt) at the motor terminals. The output filter is recommended for cable lengths exceeding 100 ft (30 m) with a drive of 3 hp and above and for cable lengths of 33 ft (10 m) with a drive of 2 hp and below.

Line and Load Reactors—Catalog Number Selection



Line and Load Reactors—230 V

hp (CT)	Open Load Reactor		Line Reactor		NEMA 1 Load Reactor		Line Reactor	
	3%	5%	3%	5%	3%	5%	3%	5%
0.5	DR2-22D0-03	DR2-22D0-05	DR1-22D2-03	DR1-22D2-05	DR2-22D0-13	DR2-22D0-15	DR1-22D2-13	DR1-22D2-15
1	DR2-24D0-03	DR2-28D0-05	DR1-24D2-03	DR1-24D2-05	DR2-24D0-13	DR2-28D0-15	DR1-24D2-13	DR1-24D2-15
1.5	DR2-28D0-03	DR2-28D0-05	DR1-26D0-03	DR1-26D0-05	DR2-28D0-13	DR2-28D0-15	DR1-26D0-13	DR1-26D0-15
2	DR2-28D0-03	DR2-28D0-05	DR1-26D8-03	DR1-26D8-05	DR2-28D0-13	DR2-28D0-15	DR1-26D8-13	DR1-26D8-15
3	DR2-2012-03	DR2-2012-05	DR1-29D6-03	DR1-29D6-05	DR2-2012-13	DR2-2012-15	DR1-29D6-13	DR1-29D6-15
5	DR2-2018-03	DR2-2018-05	DR1-2015-03	DR1-2015-05	DR2-2018-13	DR2-2018-15	DR1-2015-13	DR1-2015-15
7.5	DR2-2025-03	DR2-2025-05	DR1-2022-03	DR1-2022-05	DR2-2025-13	DR2-2025-15	DR1-2022-13	DR1-2022-15
10	DR2-2035-03	DR2-2035-05	DR1-2028-03	DR1-2028-05	DR2-2035-13	DR2-2035-15	DR1-2028-13	DR1-2028-15
15	DR2-2045-03	DR2-2045-05	DR1-2042-03	DR1-2042-05	DR2-2045-13	DR2-2045-15	DR1-2042-13	DR1-2042-15

Line and Load Reactors—480 V

hp (CT)	Open Load Reactor		Line Reactor		NEMA 1 Load Reactor		Line Reactor	
	3%	5%	3%	5%	3%	5%	3%	5%
1	DR2-42D0-03	DR2-42D0-05	DR1-42D1-03	DR1-42D1-05	DR2-42D0-13	DR2-42D0-15	DR1-42D1-13	DR1-42D1-15
2	DR2-44D0-03	DR2-44D0-05	DR1-43D4-03	DR1-43D4-05	DR2-44D0-13	DR2-44D0-15	DR1-43D4-13	DR1-43D4-15
3	DR2-48D0-03	DR2-48D0-05	DR1-44D8-03	DR1-44D8-05	DR2-48D0-13	DR2-48D0-15	DR1-44D8-13	DR1-44D8-15
5	DR2-48D0-03	DR2-48D0-05	DR1-47D6-03	DR1-47D6-05	DR2-48D0-13	DR2-48D0-15	DR1-47D6-13	DR1-47D6-15
7.5	DR2-4012-03	DR2-4012-05	DR1-4011-03	DR1-4011-05	DR2-4012-13	DR2-4012-15	DR1-4011-13	DR1-4011-15
10	DR2-4018-03	DR2-4018-05	DR1-4014-03	DR1-4014-05	DR2-4018-13	DR2-4018-15	DR1-4014-13	DR1-4014-15
15	DR2-4025-03	DR2-4025-05	DR1-4021-03	DR1-4021-05	DR2-4025-13	DR2-4025-15	DR1-4021-13	DR1-4021-15
20	DR2-4025-03	DR2-4025-05	DR1-4027-03	DR1-4027-05	DR2-4025-13	DR2-4025-15	DR1-4027-13	DR1-4027-15
25	DR2-4035-03	DR2-4035-05	DR1-4034-03	DR1-4034-05	DR2-4035-13	DR2-4035-15	DR1-4034-13	DR1-4034-15
30	DR2-4045-03	DR2-4045-05	DR1-4040-03	DR1-4040-05	DR2-4045-13	DR2-4045-15	DR1-4040-13	DR1-4040-15

Technical Data and Specifications

DC1 Series

Ratings

PowerXL DC1 Basic Controller IP20 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 withstand rating	100 kAIC with Type J fuses

Programmable Parameters

Description
Built-in Help card
14 Standard operation parameters
Reference scaling
Programmable start and stop functions
DC-brake at start and stop
Programmable V/Hz curve
Adjustable switching frequency
Autorestart function after fault
Protections and supervisions
Power section fault indication
External fault
Fieldbus communication
Second deceleration time
Analog input range selection, signal scaling and filtering
PI controller
Skip frequencies

Specifications

PowerXL DC1 Series Drives

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} ^①
Continuous output current	Continuous rated current I_N at ambient temperature max. 122 °F (50 °C), 150% for 60 seconds, 175% for 2 seconds
Output frequency	0 to 500 Hz
Frequency resolution	0.1 Hz
Initial output current (I_{H})	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
Brake Resistor (Minimum Values) ^②	
230 V Series	FS2 and FS3 47 ohms
400 V Series	FS2 100 ohms, FS3 47 ohms
Ambient Conditions	
Ambient operating temperature	+14 °F (–10 °C), no frost to +122 °F (+50 °C); Rated loadability I_N IP20—NEMA 0
Storage temperature	–40 °F (–40 °C) to +140 °F (+60 °C)
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Enclosure class	IP20 (FS1–FS4)

Notes

^① Exception: 115 V single-phase in, 230 V three-phase out.

^② Only FS2, FS3 and FS4 drives are equipped with brake chopper circuit.

Standards—DC1 Series

2

I/O Specifications

- Digital inputs DI1–DI4 are programmable
- Digital, relay and analog outputs are programmable

Includes:

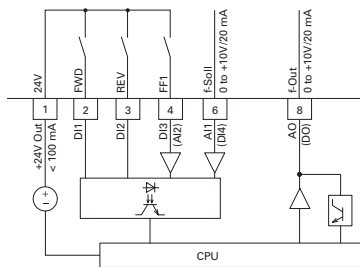
- Four inputs (two digital and two digital/analog)
- Analog inputs
 - 4–20 mA
 - 0–10 V
- One output (analog or digital)
- One relay output
- RS-485 interface

Reliability

- Pretested components
- Computerized testing
- Final test with full load
- Conformal-coated boards
- Eaton's Electrical Services & Systems: national network of AF drive specialists

DC1 Series I/O Interface

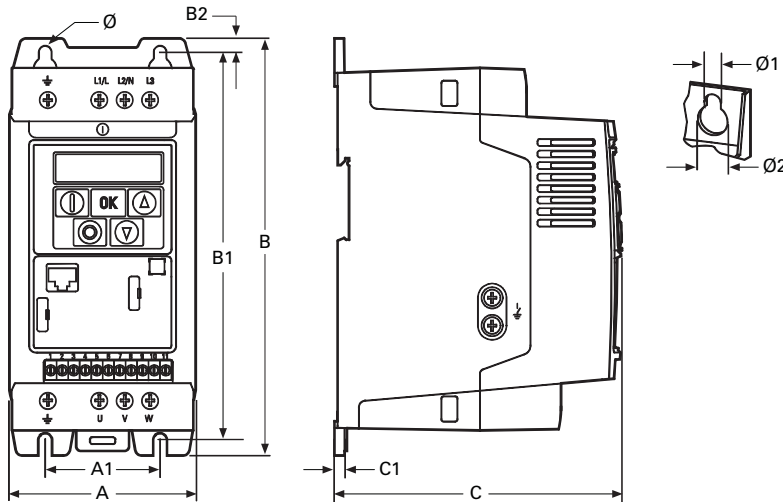
Terminal	Signal	Factory Preset	Description
1	+24 Vdc	Control voltage for DI1–DI4	— Maximum load 100 mA Reference potential V
2	DI1	Digital Input 1	Start Enable FWD
3	DI2	Digital Input 2	Start Enable REV
4	DI3	Digital Input 3	Fixed frequency FF1
	AI2	Analog Input 2	Fixed frequency FF1
			Analog: 0 to +10 V ($R_i > 72 \text{ k}\Omega$) 0/4–20 mA ($R_B = 500 \Omega$) Can be switched with parameter P-16
5	+10 Vdc	Reference voltage, Output (+10 V)	— Maximum load 10 mA Reference potential 0 V
6	AI1	Analog Input 1	Frequency reference value (fixed frequency)
	DI4	Digital Input 5	Frequency reference value (fixed frequency)
7	0 V	Reference potential	— 0 V = connection terminal 9
8	AO1	Analog Output 1	Output frequency
	DO1	Digital Output 1	Output frequency
			Analog: 0 to +10 V, maximum 20 mA Can be switched with parameter P-25
9	0 V	Reference potential	— 0 V connection terminal 7
10	K13	Relay 1, normally open contact	Active = RUN
11	K14	Relay 1, normally open contact	Active = RUN



Dimensions

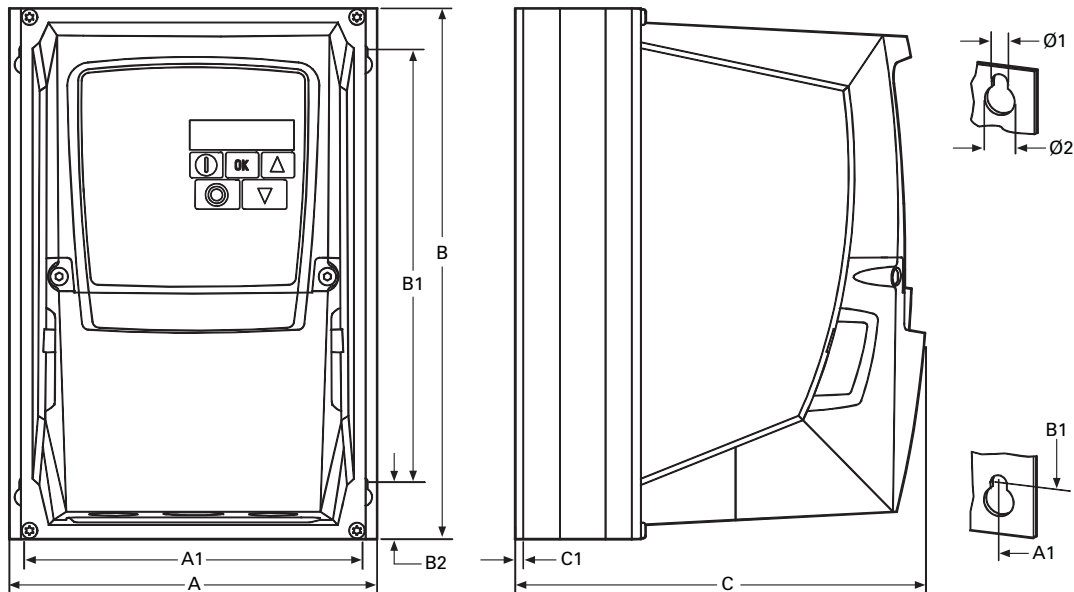
Approximate Dimensions in Inches (mm)

DC1, Sizes FS1–FS4, Degree of Protection IP20/NEMA 0



Frame Size	A	A1	B	B1	B2	C	C1	Ø1	Ø2	Weight lbs (kg)
FS1	3.19 (81)	1.97 (50)	7.24 (184)	6.69 (170)	0.28 (7)	4.88 (124)	0.16 (4)	0.24 (6)	0.47 (12)	2.43 (1.1)
FS2	4.21 (107)	2.95 (75)	9.09 (231)	8.46 (215)	0.31 (8)	5.98 (152)	0.20 (5)	0.24 (6)	0.47 (12)	5.73 (2.6)
FS3	5.08 (129)	3.94 (100)	10.75 (273)	10.04 (255)	0.33 (8.5)	6.89 (175)	0.20 (5)	0.24 (6)	0.47 (12)	8.82 (4.0)
FS4	6.81 (173)	4.92 (125)	16.48 (418.5)	15.75 (400)	0.41 (10.5)	8.31 (211)	0.16 (4)	0.31 (8)	0.57 (14.5)	18.52 (8.4)

DC1, Sizes FS1–FS3, Degree of Protection IP66/NEMA 4



Frame Size	A	A1	B	B1	B2	C	C1	Ø1	Ø2	Weight lbs (kg)
FS1	6.34 (161)	5.85 (148.5)	9.13 (232)	7.44 (189)	0.98 (25)	7.24 (184)	0.14 (3.5)	0.16 (4)	0.31 (8)	6.17 (2.8)
FS2	7.40 (188)	6.93 (176)	10.12 (257)	7.87 (200)	1.10 (28)	7.56 (192)	0.14 (3.5)	0.17 (4.2)	0.33 (8.5)	11.02 (5.0)
FS3	8.27 (210)	7.78 (197.5)	12.20 (310)	9.92 (252)	1.30 (33)	9.45 (240)	0.14 (3.5)	0.17 (4.2)	0.33 (8.5)	18.08 (8.2)

2.3

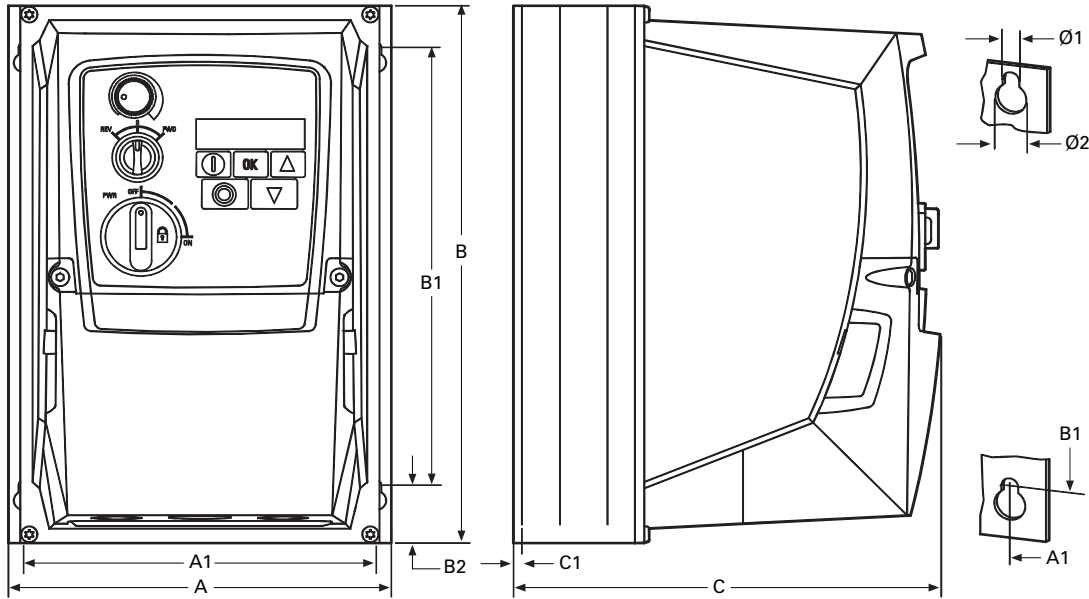
Adjustable Frequency Drives

PowerXL DC1 Series Drives

Approximate Dimensions in Inches (mm)

DC1, Sizes FS1-FS3, Degree of Protection IP66/NEMA 4, with Local Controls

2



Frame Size	A	A1	B	B1	B2	C	C1	Ø1	Ø2	Weight lbs (kg)
FS1	6.34 (161)	5.85 (148.5)	9.13 (232)	7.44 (189)	0.98 (25)	7.24 (184)	0.14 (3.5)	0.16 (4)	0.31 (8)	6.17 (2.8)
FS2	7.40 (188)	6.93 (176)	10.12 (257)	7.87 (200)	1.10 (28)	7.56 (192)	0.14 (3.5)	0.17 (4.2)	0.33 (8.5)	11.02 (5.0)
FS3	8.27 (210)	7.78 (197.5)	12.20 (310)	9.92 (252)	1.30 (33)	9.45 (240)	0.14 (3.5)	0.17 (4.2)	0.33 (8.5)	18.08 (8.2)

PowerXL DA1 Series Drives



Product Description

Eaton's PowerXL® DA1 variable frequency drives are the next generation of drives specifically engineered for today's machinery applications.

DA1 is the perfect match for demanding OEM applications. High-performance processor, safe torque off, multiple fieldbus protocols including SmartWire-DT, sensorless vector control and the possibility to operate permanent magnet motors are sure to leave a lasting impression.

Models rated at 480 volts, three-phase, 50/60 Hz are available in sizes ranging from 1 to 15 hp. Models rated at 240 volts, single- or three-phase, 50/60 Hz are available in sizes ranging from 0.5 to 7.5 hp. Models rated at 575 volts, three-phase, 50/60 Hz are available in sizes ranging from 1 to 20 hp.

Features

- Compact, space-saving design
- Rugged and reliable—200% for 4s 50 °C rated
- DIN rail and screw mountable (FS1 and FS2)
- Side-by-side installation
- Industry-leading efficiency delivers energy savings to the customer
- Integrated EMC filters make the unit suitable for commercial and industrial networks
- Communication cards that integrate into the drive—
 - EtherNet/IP
 - DeviceNet
 - PROFIBUS-DP
 - EtherCAT
 - PROFINET
 - Modbus TCP
 - BACnet
- Brake chopper as standard
- Temperature-controlled fan
- RS-485/Modbus® and CANopen™ as standard
- PID controller as standard
- SmartWire capability
- Removable I/O terminal blocks
- Contactor style power wiring
- 200% torque at zero speed
- Designed to run surface mounted (SPM) and rotor in-built (IPM) permanent magnet motors
- PLC programming
- Closed loop
- Conformal coated boards

Standards and Certifications

Product

- Complies with EN61800-3 (2004)

EMC (At Default Settings)

- EMC Category C1, C2 and C3 at default settings (1 m, 5 m, 25 m)

Safety^①

- 61800-5-1
- EN 60529
- CE
- UL
- cUL
- DNV
- UkrSepro
- c-Tick
- RoHS compliant



Note

- ① See unit nameplate for more detailed approvals.

Contents

Description

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2.4

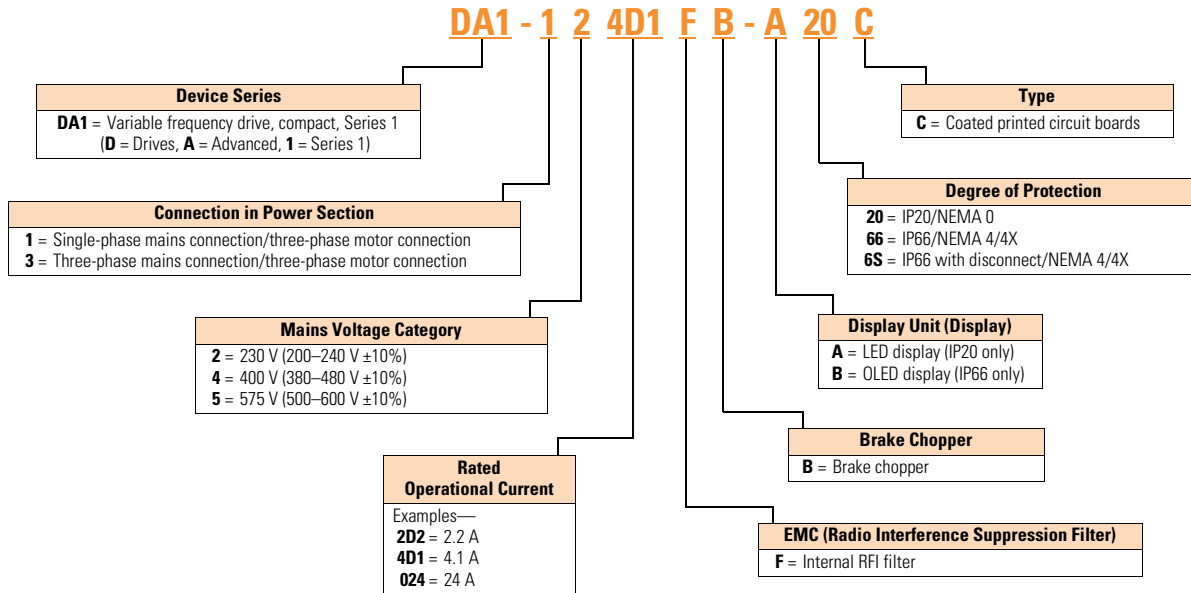
Adjustable Frequency Drives

PowerXL DA1 Series Drives

Catalog Number Selection

2

DA1 Series Adjustable Frequency AC Drives



Product Selection

IP20

DA1 Series IP20 Enclosure Drives ^①

hp ^②	kW	Volts	100% Continuous Current In (A)	Frame Size ^③	Catalog Number
1	0.75	200–240 V single-phase in/ 230 V three-phase out	4.3	2	DA1-124D3FB-A20C
2	1.5		7	2	DA1-127D0FB-A20C
3	2.2		10.5	2	DA1-12011FB-A20C
1	0.75	200–240 V three-phase in/ 230 V three-phase out	4.3	2	DA1-324D3FB-A20C
2	1.5		7	2	DA1-327D0FB-A20C
3	2.2		10.5	2	DA1-32011FB-A20C
5	4		18	3	DA1-32018FB-A20C
7.5	5.5		24	3	DA1-32024FB-A20C
1	0.75	380–480 V three-phase in/ 460 V three-phase out	2.2	2	DA1-342D2FB-A20C
2	1.5		4.1	2	DA1-344D1FB-A20C
3	2.2		5.8	2	DA1-345D8FB-A20C
5	4		9.5	2	DA1-349D5FB-A20C
7.5	5.5		14	3	DA1-34014FB-A20C
10	7.5		18	3	DA1-34018FB-A20C
15	11		24	3	DA1-34024FB-A20C
1	0.75	500–600 V three-phase in/ 575 V three-phase out	2.1	2	DA1-352D1NB-A20C
2	4.5		3.1	2	DA1-353D1NB-A20C
3	2.2		4.1	2	DA1-354D1NB-A20C
5	4		6.5	2	DA1-356D5NB-A20C
7.5	5.5		9	2	DA1-359D0NB-A20C
10	7.5		12	3	DA1-35012NB-A20C
15	11		17	3	DA1-35017NB-A20C
20	15		22	3	DA1-35022NB-A20C

Notes

- ① These are constant torque/high overload rated drives.
- ② For all applications, select the unit such that the motor current is less than or equal to the rated continuous output current.
- ③ Brake chopper circuit available as standard in frames 2 and 3.

2.4

Adjustable Frequency Drives

PowerXL DA1 Series Drives

2

IP66 NEMA 4/4X Interior DA1 Drive

The IP66 version of the DA1 is a unique solution to allow for mounting the drive outside of a control panel or next to a motor for distributed control.

“-B66C” Option

This version comes with the OLED keypad. There are no additional cover controls to address security concerns.

“-B6SC” Option

This version has an integrated potentiometer, a forward/off/reverse switch and a disconnect switch with lock-off capability with the OLED keypad. This allows for reduced labor and materials when compared to a IP20 solution in separate enclosure.

IP66



IP66S



DA1 Series IP66 Enclosure Drives ①

IP66 NEMA 4/4X Interior DA1 Drive

hp ②	kW	Volts	100% Continuous Current In (A)	Frame Size ③	Catalog Number
1	0.75	200–240 V single-phase in/ 230 V three-phase out	4.3	2	DA1-124D3FB-B6SC ④
2	1.5		7	2	DA1-127D0FB-B6SC ④
3	2.2		10.5	2	DA1-12011FB-B6SC ④
1	0.75	200–240 V three-phase in/ 230 V three-phase out	4.3	2	DA1-324D3FB-B6SC ④
2	1.5		7	2	DA1-327D0FB-B6SC ④
3	2.2		10.5	2	DA1-32011FB-B6SC ④
5	4		18	3	DA1-32018FB-B6SC ④
1	0.75	380–480 V three-phase in/ 460 V three-phase out	2.2	2	DA1-342D2FB-B6SC ④
2	1.5		4.1	2	DA1-344D1FB-B6SC ④
3	2.2		5.8	2	DA1-345D8FB-B6SC ④
5	4		9.5	2	DA1-349D5FB-B6SC ④
7.5	5.5		14	3	DA1-34014FB-B6SC ④
10	7.5		18	3	DA1-34018FB-B6SC ④
1	0.75	500–600 V three-phase in/ 575 V three-phase out	2.1	2	DA1-352D1NB-B6SC
2	4.5		3.1	2	DA1-353D1NB-B6SC
3	2.2		4.1	2	DA1-354D1NB-B6SC
5	4		6.5	2	DA1-356D5NB-B6SC
7.5	5.5		9	2	DA1-359D0NB-B6SC
10	7.5		12	3	DA1-35012NB-B6SC
15	11		17	3	DA1-35017NB-B6SC

Notes

- ① These are constant torque/high overload rated drives.
- ② For all applications, select the unit such that the motor current is less than or equal to the rated continuous output current.
- ③ Brake chopper circuit available as standard in frames 2 and 3.
- ④ Non-disconnect version available. Substitute with **-B66C**.

Accessories

DA1 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

Optional Communication Modules

Description	Catalog Number
DeviceNet plug-in interface module	DX-NET-DEVICENET
PROFIBUS-DP plug-in interface module	DX-NET-PROFIBUS
EtherNet/IP plug-in interface module	DX-NET-ETHERNET-2
EtherCAT plug-in interface module	DX-NET-ETHERCAT-2
PROFINET plug-in interface module	DX-NET-PROFINET-2
Modbus TCP plug-in interface module	DX-NET-MOVBUSTCP-2
BACnet/IP plug-in interface module	DX-NET-BACNETIP-2

Encoder Feedback Plug-In Option Module and Miscellaneous Cards

Description	Catalog Number
Expansion card: 3 relay outputs	DXA-EXT-3RO
Encoder feedback plug-in option module	DXA-EXT-ENCOD
Expansion card: 3 digital inputs and 1 relay output	DXA-EXT-3DI1RO

Remote Keypad

Description	Catalog Number
LED remote keypad—7-segment display, IP54 rated	DX-KEY-LED2 ^①
OLED remote keypad—full text display, multi-line text, multi-language, IP54, hand/auto	DX-KEY-OLED ^①

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

SmartWire Modules

Description	Catalog Number
SmartWire-DT interface for DA1 IP20	DX-NET-SWD1

Note

^① Includes 1 m RS-485 data cable.

2.4

Adjustable Frequency Drives

PowerXL DA1 Series Drives

2

Line and Load Reactors

A line and load reactor is a three-phase inductance filter that can be placed on the line and load side of the AFD to help improve the harmonic performance of the system. Consult the factory for additional filtering options and further technical details.

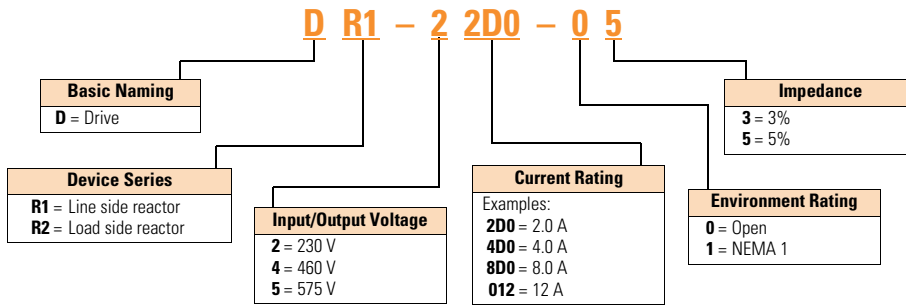
DR1 Line Reactor

A line reactor helps to provide a moderate reduction in current harmonics similar to a DC choke. It also provides increased input protection for AFD and its semiconductors from line transients helping to extend the life of the AFD.

DR2 Output Reactor

An output filter is used to reduce the transient voltage (dV/dt) at the motor terminals. The output filter is recommended for cable lengths exceeding 100 ft (30 m) with a drive of 3 hp and above and for cable lengths of 33 ft (10 m) with a drive of 2 hp and below.

Line and Load Reactors—Catalog Number Selection



Line and Load Reactors—230 V

hp (CT)	Open Load Reactor		Line Reactor		NEMA 1 Load Reactor		Line Reactor	
	3%	5%	3%	5%	3%	5%	3%	5%
1	DR2-24D0-03	DR2-28D0-05	DR1-24D2-03	DR1-24D2-05	DR2-24D0-13	DR2-28D0-15	DR1-24D2-13	DR1-24D2-15
2	DR2-28D0-03	DR2-28D0-05	DR1-26D8-03	DR1-26D8-05	DR2-28D0-13	DR2-28D0-15	DR1-26D8-13	DR1-26D8-15
3	DR2-2012-03	DR2-2012-05	DR1-29D6-03	DR1-29D6-05	DR2-2012-13	DR2-2012-15	DR1-29D6-13	DR1-29D6-15
5	DR2-2018-03	DR2-2018-05	DR1-2015-03	DR1-2015-05	DR2-2018-13	DR2-2018-15	DR1-2015-13	DR1-2015-15
7.5	DR2-2025-03	DR2-2025-05	DR1-2022-03	DR1-2022-05	DR2-2025-13	DR2-2025-15	DR1-2022-13	DR1-2022-15

Line and Load Reactors—480 V

hp (CT)	Open Load Reactor	
	3%	5%
	1	DR2-42D0-03
2	DR2-44D0-03	DR2-44D0-05
3	DR2-48D0-03	DR2-48D0-05
5	DR2-48D0-03	DR2-48D0-05
7.5	DR2-4012-03	DR2-4012-05
10	DR2-4018-03	DR2-4018-05
15	DR2-4025-03	DR2-4025-05

Line Reactor	
3%	5%
DR1-42D1-03	DR1-42D1-05
DR1-43D4-03	DR1-43D4-05
DR1-44D8-03	DR1-44D8-05
DR1-47D6-03	DR1-47D6-05
DR1-4011-03	DR1-4011-05
DR1-4014-03	DR1-4014-05
DR1-4021-03	DR1-4021-05

NEMA 1 Load Reactor	
3%	5%
DR2-42D0-13	DR2-42D0-15
DR2-44D0-13	DR2-44D0-15
DR2-48D0-13	DR2-48D0-15
DR2-48D0-13	DR2-48D0-15
DR2-4012-13	DR2-4012-15
DR2-4018-13	DR2-4018-15
DR2-4025-13	DR2-4025-15

Line Reactor	
3%	5%
DR1-42D1-13	DR1-42D1-15
DR1-43D4-13	DR1-43D4-15
DR1-44D8-13	DR1-44D8-15
DR1-47D6-13	DR1-47D6-15
DR1-4011-13	DR1-4011-15
DR1-4014-13	DR1-4014-15
DR1-4021-13	DR1-4021-15

Line and Load Reactors—575 V

hp (CT)	Open Load Reactor	
	3%	5%
	1	DR2-52D0-03
2	DR2-54D0-03	DR2-54D0-05
3	DR2-54D0-03	DR2-54D0-05
5	DR2-58D0-03	DR2-58D0-05
7.5	DR2-58D0-03	DR2-58D0-05
10	DR2-5012-03	DR2-5012-05
15	DR2-5018-03	DR2-5018-05
20	DR2-5025-03	DR2-5025-05

Line Reactor	
3%	5%
DR1-51D7-03	DR1-51D7-05
DR1-52D7-03	DR1-52D7-05
DR1-53D9-03	DR1-53D9-05
DR1-56D1-03	DR1-56D1-05
DR1-59D0-03	DR1-59D0-05
DR1-5011-03	DR1-5011-05
DR1-5017-03	DR1-5017-05
DR1-5022-03	DR1-5022-05

NEMA 1 Load Reactor	
3%	5%
DR2-52D0-13	DR2-52D0-15
DR2-54D0-13	DR2-54D0-15
DR2-54D0-13	DR2-54D0-15
DR2-58D0-13	DR2-58D0-15
DR2-58D0-13	DR2-58D0-15
DR2-5012-13	DR2-5012-15
DR2-5018-13	DR2-5018-15
DR2-5025-13	DR2-5025-15

Line Reactor	
3%	5%
DR1-51D7-13	DR1-51D7-15
DR1-52D7-13	DR1-52D7-15
DR1-53D9-13	DR1-53D9-15
DR1-56D1-13	DR1-56D1-15
DR1-59D0-13	DR1-59D0-15
DR1-5011-13	DR1-5011-15
DR1-5017-13	DR1-5017-15
DR1-5022-13	DR1-5022-15

Technical Data and Specifications

DA1 Series

2

Ratings

PowerXL DA1 Basic Controller IP20 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 withstand rating	100 kAIC with Type J fuses

Programmable Parameters

Description
Built-in Help card
14 Standard operation parameters
Reference scaling
Programmable start and stop functions
DC-brake at start and stop
Programmable V/Hz curve
Adjustable switching frequency
Autorestart function after fault
Protections and supervisions
Power section fault indication
External fault
Fieldbus communication
Safe torque off (STO) function
Analog input range selection, signal scaling and filtering
PI controller
Skip frequencies

Specifications

PowerXL DA1 Series Drives

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} ①
Continuous output current	Continuous rated current I_N at ambient temperature max. 122 °F (50 °C), 150% for 60 seconds, 200% for 4 seconds
Output frequency	0 to 500 Hz
Frequency resolution	0.1 Hz
Initial output current (I_{hi})	200% for 4s for every 40 seconds Torque depends on motor
Control Characteristics	
Operation mode	U/f control, slip compensation, sensorless vector control (SLV), vector control with feedback (CLV)
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
Brake Resistor (Minimum Values) ②	
230 V Series	FS2 and FS3 15 ohms
400 V Series	FS2 33 ohms, FS3 22 ohms
Ambient Conditions	
Ambient operating temperature	+14 °F (–10 °C), no frost to +122 °F (+50 °C): Rated loadability I_N IP20—NEMA 0
Storage temperature	–40 °F (–40 °C) to +140 °F (+60 °C)
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Enclosure class	IP20 (FS2 and FS3)

Notes

- ① Exception: 115 V single-phase in, 230 V three-phase out.
 ② Only FS2 and FS3 drives are equipped with brake chopper circuit.

Standards—DA1 Series

I/O Specifications

- Digital inputs D11–D15 are programmable
- Digital, relay and analog outputs are programmable

Includes:

- Five inputs (three digital and two digital/analog)
- Analog inputs
 - 4–20 mA
 - 0–10 V
- Two outputs (analog or digital)
- Two relay outputs
- RS-485 interface

Reliability

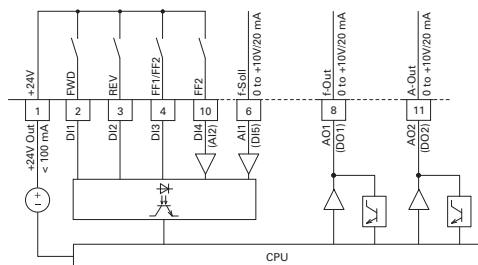
- Pretested components
- Computerized testing
- Final test with full load
- Conformal-coated boards
- Eaton's Electrical Services & Systems: national network of AF drive specialists

DA1 Series I/O Interface

Terminal	Signal	Factory Preset	Description
1	+24 Vdc	Control voltage for D11–D15	Maximum load 100 mA Reference potential V
2	D11	Digital Input 1	Start Enable FWD ①
3	D12	Digital Input 2	Start Enable REV ①
4	D13	Digital Input 3	Fixed frequency FF1/FF2 ①
5	+10 Vdc	Reference voltage, Output (+10 V)	Maximum load 10 mA Reference potential 0 V
6	A11	Analog Input 1	Frequency reference value ①
	D14	Digital Input 5	Frequency reference value ①
7	0 V	Reference potential	0 V = connection terminal 9
8	A01	Analog Output 1	Output frequency
	D01	Digital Output 1	Output frequency
9	0 V	Reference potential	0 V connection terminal 7
10	D14	Digital Input 4	Fixed frequency FF2 ①
	A12	Analog Input 2	Fixed frequency FF2 ①
11	A02	Analog output 2	Output current ①
	D02	Digital output 2	Output current ①
12	STO+	Safe Torque Off +	Enable = +24 V
13	STO-	Safe Torque Off -	Enable = 0 V
14	K11	Relay 1, changeover contact	Active = FAULT ①
15	K14	Relay 1, changeover contact (N/O)	Active = FAULT ①
16	K12	Relay 1, changeover contact (N/C)	Active = FAULT ①
17	K23	Relay 2, N/O contact	Active = FAULT ①
18	K24	Relay 2, N/C contact	Active = FAULT ①

Note

① Programmable function.



2.4

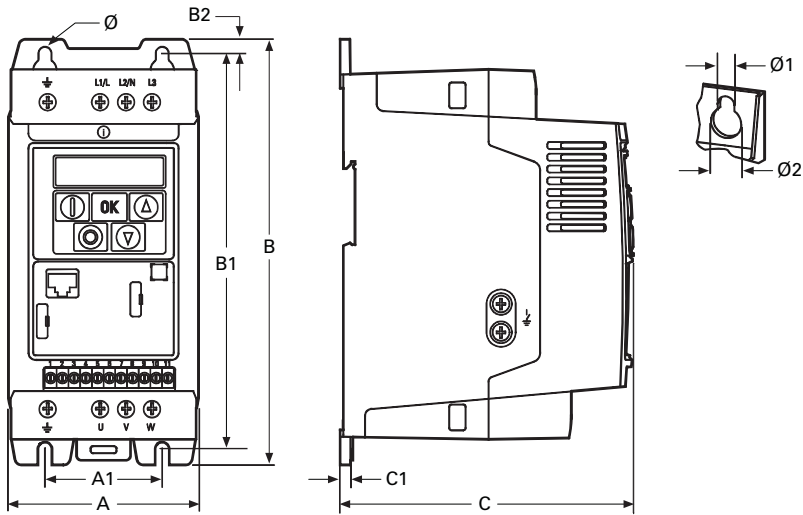
Adjustable Frequency Drives

PowerXL DA1 Series Drives

Dimensions

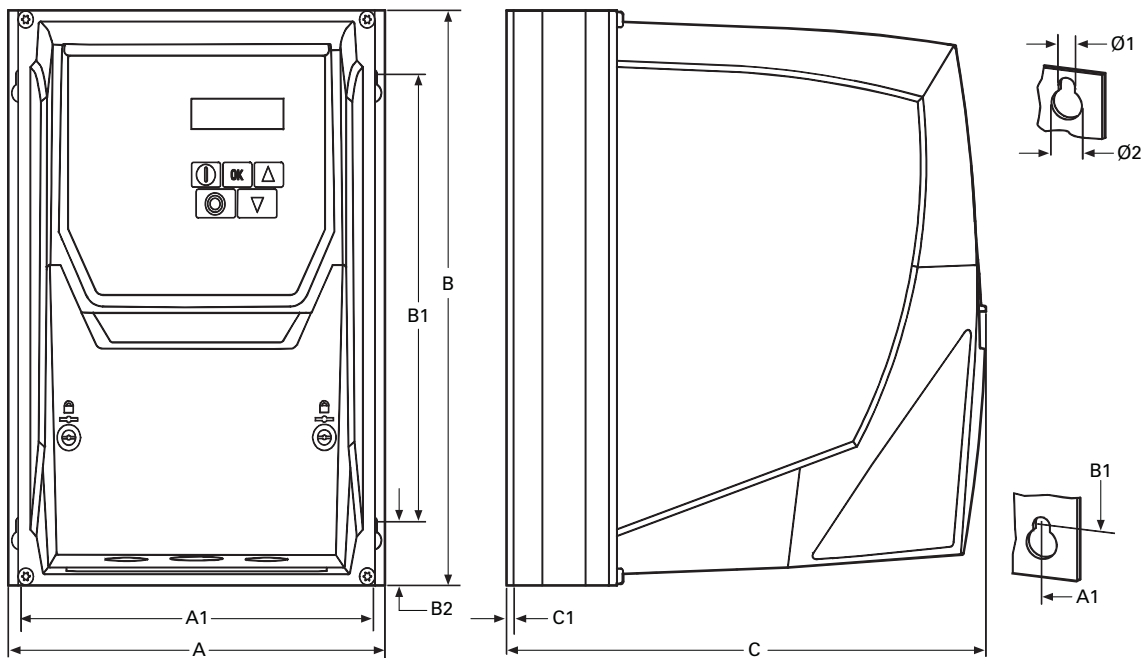
Approximate Dimensions in Inches (mm)

2 DA1, Sizes FS2 and FS3, Degree of Protection IP20/NEMA 0



Frame Size	A	A1	B	B1	B2	C	C1	Ø1	Ø2	Weight lbs (kg)
FS2	4.21 (107.0)	2.95 (75.0)	9.09 (231.0)	8.46 (215.0)	0.31 (8.0)	7.32 (186.0)	0.20 (5.0)	0.24 (6.0)	0.47 (12.0)	3.97 (1.8)
FS3	5.16 (131.0)	3.94 (100.0)	10.75 (273.0)	10.04 (255.0)	0.33 (8.5)	8.03 (204.0)	0.20 (5.0)	0.24 (6.0)	0.47 (12.0)	7.72 (3.5)

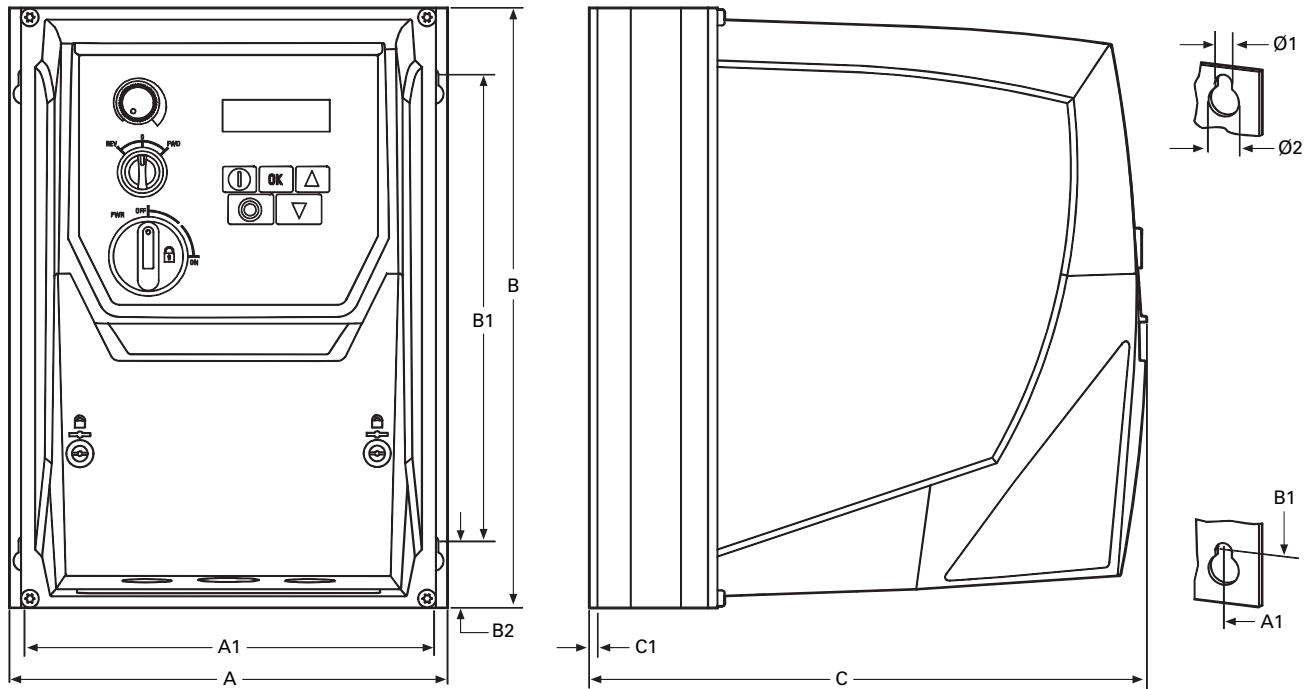
DA1, Sizes FS2 and FS3, Degree of Protection IP66/NEMA 4



Frame Size	A	A1	B	B1	B2	C	C1	Ø1	Ø2	Weight lbs (kg)
FS2	7.40 (188.0)	6.93 (176.0)	10.12 (257.0)	7.87 (200.0)	0.79 (20.0)	9.42 (239.3)	0.14 (3.5)	0.16 (4.2)	0.33 (8.5)	10.4 (4.5)
FS3	8.29 (211.0)	7.78 (198.0)	12.20 (310.0)	9.90 (252.0)	0.98 (25.0)	10.48 (266.3)	0.14 (3.5)	0.16 (4.2)	0.33 (8.5)	15.9 (7.0)

Approximate Dimensions in Inches (mm)

DA1, Sizes FS2 and FS3, Degree of Protection IP66/NEMA 4, with Local Controls



Frame Size	A	A1	B	B1	B2	C	C1	Ø1	Ø2	Weight lbs (kg)
FS2	7.40 (188.0)	6.93 (176.0)	10.12 (257.0)	7.87 (200.0)	0.79 (20.0)	9.42 (239.3)	0.14 (3.5)	0.16 (4.2)	0.33 (8.5)	10.6 (4.8)
FS3	8.29 (211.0)	7.78 (198.0)	12.20 (310.0)	9.90 (252.0)	0.98 (25.0)	10.48 (266.3)	0.14 (3.5)	0.16 (4.2)	0.33 (8.5)	16.1 (7.3)