

#### DG1 General Purpose Drive

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### Product Description

The DG1 general purpose drives are part of Eaton’s next generation PowerXL Series of adjustable frequency drives specifically engineered for today’s more demanding commercial and industrial applications. The power unit makes use of the most sophisticated semiconductor technology and a highly modular construction that can be flexibly adapted to meet the customer’s needs.

The control module was designed to include today’s standard communication protocols and I/O while still having the modularity to add additional option cards.

Eaton’s patented Active Energy Control is also a standard feature on DG1 drives, offering customers increased efficiency, safety and reliability.

These drives continue the tradition of robust performance and raise the bar on features and functionality, ensuring the best solution at the right price.

### Product Range

- 230V to 125 hp, 310A, 90 kW
- 480V to 250 hp, 310A, 160 kW
- 575V to 250 hp, 250A, 160 kW

### Features and Benefits

#### Hardware

- Brake chopper standard on Frames 1, 2, 3
- Dual overload ratings
  - 110% variable torque ( $I_L$ )
  - 150% constant torque ( $I_H$ )
- Type 1/IP21 and Type 12/IP54 enclosures available
- Integrated common mode reduction 5% DC link choke with input surge protection
- EMI/RFI filters standard on all drives—meets EMC Category C2
- Real-time clock—supports calendaring and PLC functionality
- Graphic LCD display and keypad—supports simple menu navigation as well as on-screen diagnostics and troubleshooting
- LOCAL/REMOTE operation from keypad and two configurable soft keys

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#### Software

- Control logic can be powered from an external auxiliary control panel—internal drive functions and fieldbus if necessary
- Standard I/O:
  - 8DI, 1DO
  - 2AI, 2AO
  - Three relays
  - Meets needs of most communication requirements
- Standard communications:
  - EtherNet/IP, Modbus TCP
  - RS-485: Modbus RTU, BACnet MS/TP
  - Meets the needs of most communication requirements
- Seamless integration into EtherNet/IP networks via EIP-Assist I/O tag-generation tool
- Two expansion slots—intended to support additional I/O or communication protocols as necessary
- Quick disconnect terminals for I/O connections—supports fast easy installation
- Active energy control—minimizes energy losses in your motor, resulting in industry-leading energy efficiency for your application
- Quick Start Wizard upon initial power-up supports fast, easy installation
- Standard applications:
  - Standard
  - Multi-pump and fan Control
  - Multi-PID
  - Multi-purpose
- Copy/paste functionality on drive keypad—allows for fast setup of multiple drives
- Pre-programmed I/O—supports fast, easy installation for most applications
- Dynamic motor regenerative energy management
- Advanced PC Tool with diagnostic capabilities
- Two configurable keypad soft keys

### Standards and Certifications

#### Product

- IEC/EN 61800-5-1
- IEC/EN 61800-5-2
- UL 508C
- IEC 61508
- EN 62061
- EN ISO 13849-1

#### EMC

- Immunity: IEC/EN 61800-3
- Category C2

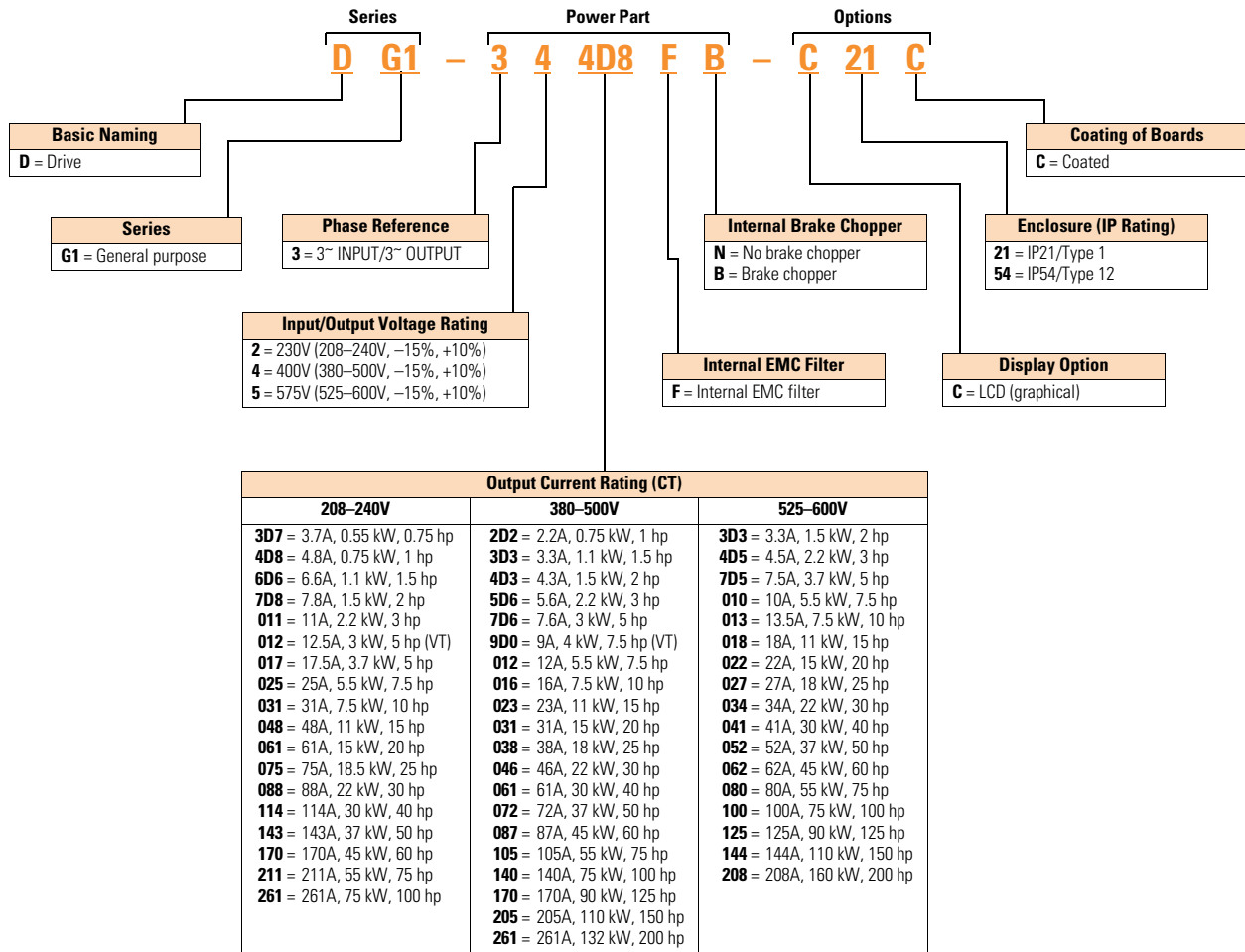
#### Certification

- UL
- cUL
- CE
- C-Tick
- RoHS

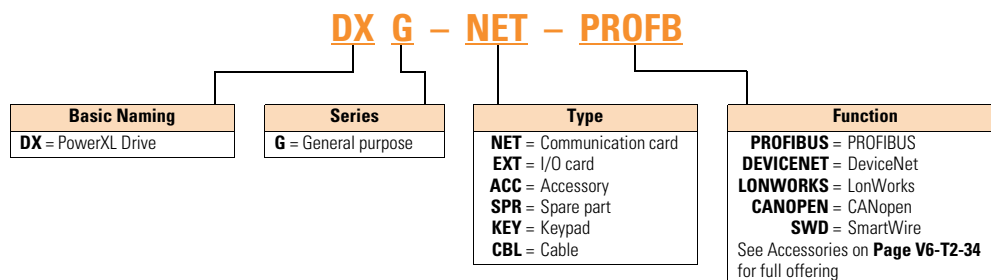


### Catalog Number Selection

#### PowerXL Series—DG1 General Purpose Drive



#### PowerXL Series—DG1 General Purpose Drive Option Boards



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## Adjustable Frequency Drives

### PowerXL DG1 Series Drives

#### Product Selection

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#### DG1 Series Drives—208–240 Volt

PowerXL Series—DG1

##### Type 1/IP21



Frame Size	230V, 50 Hz kW Rating (CT/I <sub>H</sub> )	230V, 50 Hz kW Rating (VT/I <sub>L</sub> )	230V, 60 Hz hp (CT/I <sub>H</sub> )	230V, 60 Hz hp (VT/I <sub>L</sub> )	Current A (CT/I <sub>H</sub> )	Current A (VT/I <sub>L</sub> )	Catalog Number
FR1	0.55	0.75	0.75	1	3.7	4.8	DG1-323D7FB-C21C
	0.75	1.1	1	1.5	4.8	6.6	DG1-324D8FB-C21C
	1.1	1.5	1.5	2	6.6	7.8	DG1-326D6FB-C21C
	1.5	2.2	2	3	7.8	11	DG1-327D8FB-C21C
	2.2	3	3	—	11	12.5	DG1-32011FB-C21C
FR2	3	3.7	—	5	12.5	17.5	DG1-32012FB-C21C
	3.7	5.5	5	7.5	17.5	25	DG1-32017FB-C21C
	5.5	7.5	7.5	10	25	31	DG1-32025FB-C21C
FR3	7.5	11	10	15	31	48	DG1-32031FB-C21C
	11	15	15	20	48	61	DG1-32048FB-C21C
FR4	15	18.5	20	25	61	75	DG1-32061FN-C21C
	18.5	22	25	30	75	88	DG1-32075FN-C21C
	22	30	30	40	88	114	DG1-32088FN-C21C
FR5	30	37	40	50	114	143	DG1-32114FN-C21C
	37	45	50	60	143	170	DG1-32143FN-C21C
	45	55	60	75	170	211	DG1-32170FN-C21C
FR6 ①	55	75	75	100	211	261	DG1-32211FN-C21C
	75	90	100	125	261	312	DG1-32261FN-C21C

PowerXL Series—DG1

##### Type 12/IP54



Frame Size	230V, 50 Hz kW Rating (CT/I <sub>H</sub> )	230V, 50 Hz kW Rating (VT/I <sub>L</sub> )	230V, 60 Hz hp (CT/I <sub>H</sub> )	230V, 60 Hz hp (VT/I <sub>L</sub> )	Current A (CT/I <sub>H</sub> )	Current A (VT/I <sub>L</sub> )	Catalog Number
FR1	0.55	0.75	0.75	1	3.7	4.8	DG1-323D7FB-C54C
	0.75	1.1	1	1.5	4.8	6.6	DG1-324D8FB-C54C
	1.1	1.5	1.5	2	6.6	7.8	DG1-326D6FB-C54C
	1.5	2.2	2	3	7.8	11	DG1-327D8FB-C54C
	2.2	3	3	—	11	12.5	DG1-32011FB-C54C
FR2	3	3.7	—	5	12.5	17.5	DG1-32012FB-C54C
	3.7	5.5	5	7.5	17.5	25	DG1-32017FB-C54C
	5.5	7.5	7.5	10	25	31	DG1-32025FB-C54C
FR3	7.5	11	10	15	31	48	DG1-32031FB-C54C
	11	15	15	20	48	61	DG1-32048FB-C54C
FR4	15	18.5	20	25	61	75	DG1-32061FN-C54C
	18.5	22	25	30	75	88	DG1-32075FN-C54C
	22	30	30	40	88	114	DG1-32088FN-C54C
FR5	30	37	40	50	114	143	DG1-32114FN-C54C
	37	45	50	60	143	170	DG1-32143FN-C54C
	45	55	60	75	170	211	DG1-32170FN-C54C
FR6 ①	55	75	75	100	211	261	DG1-32211FN-C54C
	75	90	100	125	261	312	DG1-32261FN-C54C

**Note**

① FR6 available in 2015.

## DG1 Series Drives—380–500 Volt

## PowerXL Series—DG1 Type 1/IP21



Frame Size	400V, 50 Hz kW Rating (CT/I <sub>H</sub> )	400V, 50 Hz kW Rating (VT/I <sub>L</sub> )	460V, 60 Hz hp (CT/I <sub>H</sub> )	460V, 60 Hz hp (VT/I <sub>L</sub> )	Current A (CT/I <sub>H</sub> )	Current A (VT/I <sub>L</sub> )	Catalog Number
FR1	0.75	1.1	1	1.5	2.2	3.3	DG1-342D2FB-C21C
	1.1	1.5	1.5	2	3.3	4.3	DG1-343D3FB-C21C
	1.5	2.2	2	3	4.3	5.6	DG1-344D3FB-C21C
	2.2	3	3	5	5.6	7.6	DG1-345D6FB-C21C
	3	4	5	—	7.6	9	DG1-347D6FB-C21C
	4	5.5	—	7.5	9	12	DG1-349D0FB-C21C
FR2	5.5	7.5	7.5	10	12	16	DG1-34012FB-C21C
	7.5	11	10	15	16	23	DG1-34016FB-C21C
	11	15	15	20	23	31	DG1-34023FB-C21C
FR3	15	18.5	20	25	31	38	DG1-34031FB-C21C
	18.5	22	25	30	38	46	DG1-34038FB-C21C
	22	30	30	40	46	61	DG1-34046FB-C21C
FR4	30	37	40	50	61	72	DG1-34061FN-C21C
	37	45	50	60	72	87	DG1-34072FN-C21C
	45	55	60	75	87	105	DG1-34087FN-C21C
FR5	55	75	75	100	105	140	DG1-34105FN-C21C
	75	90	100	125	140	170	DG1-34140FN-C21C
	90	110	125	150	170	205	DG1-34170FN-C21C
FR6 ①	110	132	150	200	205	261	DG1-34205FN-C21C
	132	160	200	250	261	310	DG1-34261FN-C21C

## PowerXL Series—DG1 Type 12/IP54



Frame Size	400V, 50 Hz kW Rating (CT/I <sub>H</sub> )	400V, 50 Hz kW Rating (VT/I <sub>L</sub> )	460V, 60 Hz hp (CT/I <sub>H</sub> )	460V, 60 Hz hp (VT/I <sub>L</sub> )	Current A (CT/I <sub>H</sub> )	Current A (VT/I <sub>L</sub> )	Catalog Number
FR1	0.75	1.1	1	1.5	2.2	3.3	DG1-342D2FB-C54C
	1.1	1.5	1.5	2	3.3	4.3	DG1-343D3FB-C54C
	1.5	2.2	2	3	4.3	5.6	DG1-344D3FB-C54C
	2.2	3	3	5	5.6	7.6	DG1-345D6FB-C54C
	3	4	5	—	7.6	9	DG1-347D6FB-C54C
	4	5.5	—	7.5	9	12	DG1-349D0FB-C54C
FR2	5.5	7.5	7.5	10	12	16	DG1-34012FB-C54C
	7.5	11	10	15	16	23	DG1-34016FB-C54C
	11	15	15	20	23	31	DG1-34023FB-C54C
FR3	15	18.5	20	25	31	38	DG1-34031FB-C54C
	18.5	22	25	30	38	46	DG1-34038FB-C54C
	22	30	30	40	46	61	DG1-34046FB-C54C
FR4	30	37	40	50	61	72	DG1-34061FN-C54C
	37	45	50	60	72	87	DG1-34072FN-C54C
	45	55	60	75	87	105	DG1-34087FN-C54C
FR5	55	75	75	100	105	140	DG1-34105FN-C54C
	75	90	100	125	140	170	DG1-34140FN-C54C
	90	110	125	150	170	205	DG1-34170FN-C54C
FR6 ①	110	132	150	200	205	261	DG1-34205FN-C54C
	132	160	200	250	261	310	DG1-34261FN-C54C

**Note**

① FR6 available in 2015.

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## Adjustable Frequency Drives

### PowerXL DG1 Series Drives

#### Accessories

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The PowerXL Series—DG1 drives can accommodate a wide selection of expander and adapter option boards to customize the drive for your application needs. The drive's control unit is designed to accept a total of two additional option boards.

The PowerXL Series—DG1 drives come with a factory-installed standard board configuration including the following:

- Standard I/O:
  - 8DI, 1DO
  - 2AI, 2AO
  - Three relays
- Standard communications:
  - EtherNet/IP, Modbus TCP
  - RS-485: Modbus RTU, BACnet MS/TP

#### PowerXL Series—DG1 I/O Card Kits

Description	Catalog Number
3 x DI, 3 x DO, 1 x thermistor, 24 Vdc/EXT option card	<b>DXG-EXT-3DI3DO1T</b>
1 x AI, 2 x AO (isolated to control board) option card	<b>DXG-EXT-1AI2AO</b>
3 x relay dry contact (2NO + 1NO/NC) option card	<b>DXG-EXT-3RO</b>
3 x PT100 RTD thermistor input option card	<b>DXG-EXT-THER1</b>
6 x DI 240 Vac input option card	<b>DXG-EXT-6DI</b>

#### PowerXL Series—DG1 Communication Card Kits

Description	Catalog Number
PROFIBUS-DP communication card	<b>DXG-NET-PROFIBUS</b>
CANopen communication card	<b>DXG-NET-CANOPEN</b>
DeviceNet communication card	<b>DXG-NET-DEVICENET</b>
PROFIBUS DB9 to 5-pin adapter card	<b>DXG-MNT-PROFIBUS</b>
SmartWire communication card and module	<b>DXG-NET-SWD</b>
LonWorks communication card	<b>DXG-NET-LONWORKS</b>

#### PowerXL Series—DG1 Keypad Kits

Description	Catalog Number
Standard keypad	<b>DXG-KEY-LCD</b>
Remote keypad kit (0.5m cable)	<b>DXG-KEY-RMTKIT</b>
1m remote keypad cable	<b>DXG-CBL-1M0</b>
3m remote keypad cable	<b>DXG-CBL-3M0</b>
Remote keypad mounting holder only	<b>DXG-KEY-HOLDER</b>
Type 12/IP54 keypad hole plug (maintain rating without keypad)	<b>DXG-KEY-N12PLUG</b>

#### PowerXL Series—DG1 Conversion and Flange Kits

The Type 12/IP54 option kit is used to convert a Type 1/IP21 to a Type 12/IP54 drive. The kit includes cover, fan and grommets.

##### Type 12/IP54 Conversion Kits

Description	Catalog Number
Frame 1 230V Type 12/IP54 kit	<b>DXG-ACC-2FR1N12KIT</b>
Frame 1 480V Type 12/IP54 kit	<b>DXG-ACC-4FR1N12KIT</b>
Frame 2 Type 12/IP54 kit	<b>DXG-ACC-FR2N12KIT</b>
Frame 3 Type 12/IP54 kit	<b>DXG-ACC-FR3N12KIT</b>

The flange kit is used when the power section heat sink is mounted through the back panel of an enclosure. The kit includes hardware, top flange plate, bottom flange plate and two side flange plates.

##### Flange Kits

Description	Catalog Number
Frame 1 flange kit Type 12/IP54	<b>DXG-ACC-FR1N12FK</b>
Frame 2 flange kit Type 12/IP54	<b>DXG-ACC-FR2N12FK</b>
Frame 3 flange kit Type 12/IP54	<b>DXG-ACC-FR3N12FK</b>
Frame 4 flange kit Type 12/IP54	<b>DXG-ACC-FR4N12FK</b>
Frame 5 flange kit Type 12/IP54	<b>DXG-ACC-FR5N12FK</b>

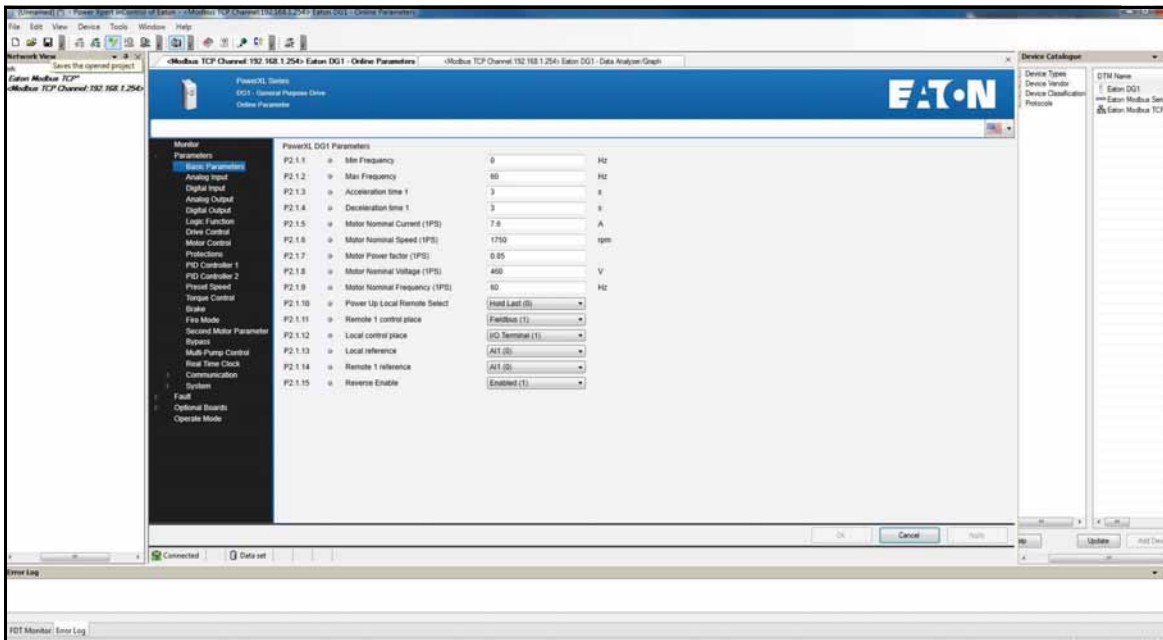
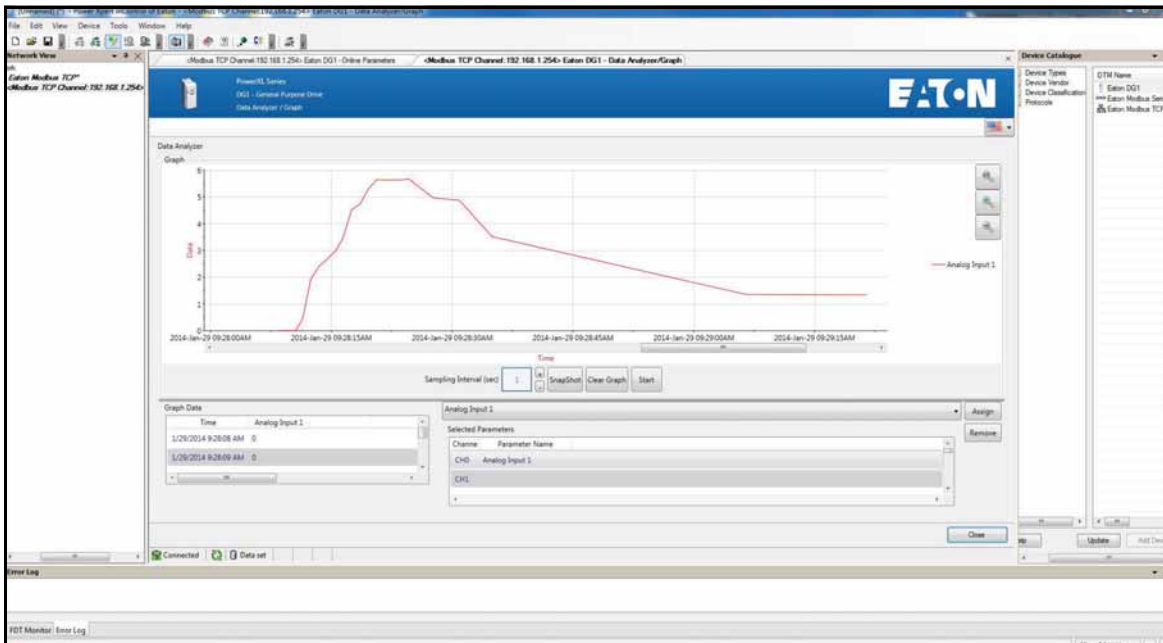
#### PowerXL Series—DG1 Demo Units

##### Demo Units

Description	Catalog Number
DG1 control module demo stand	<b>DG1-DEMO1</b>
DG1 full drive demo case	<b>DG1-DEMO2</b>

### PowerXpert inControl Software

The PowerXL Series PC Tool is designed for programming, controlling and monitoring of the DG1 drives. Features include loading parameters that can be saved to a file or printed, setting references, starting and stopping the motor, monitoring signals in graphical or text form, and real-time display.



### PowerXpert inControl Software

Description	Catalog Number
Software kit (software, cable, manual)	DXG-ACC-SOFTWARE
Software cable (USB to RJ45 [RS-485])	DXG-CBL-PCCABLE
Real-time clock battery	DXG-ACC-RTBATT

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## Adjustable Frequency Drives

### PowerXL DG1 Series Drives

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#### Brake Chopper Options

The brake chopper circuit option is used for applications that require dynamic braking. Dynamic braking resistors are not included with drive purchase. Consult the factory for additional dynamic braking resistor selections that are supplied separately. A list of common resistors are listed below and are complete indoor assemblies, include a pre-wired terminal block and a thermal switch, and are not UL Listed.

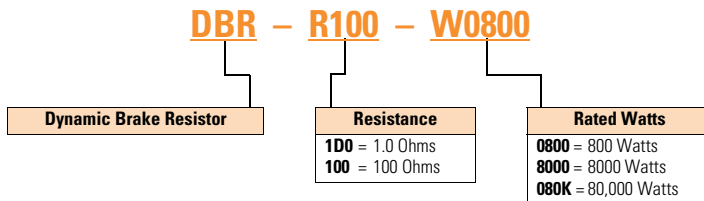
#### Duty Cycle

The duty cycle rating is based on a 60-second period. For example, the 20% duty cycle resistor can carry 100% current for 12 seconds out of every 60 seconds, while the 50% duty cycle resistor can carry 150% current for 30 seconds out of every 60 seconds.

#### Torque

If the braking torque required is less than 15%, dynamic braking is not required because the regenerated energy will be dissipated in the drive and motor losses.

#### Dynamic Brake Resistor—Catalog Number Selection



#### 230V Brake Resistors

Drive hp (CT/l <sub>H</sub> )	Minimum Ohms	20% Duty Cycle, 100% Torque		50% Duty Cycle, 150% Torque	
		Catalog Number	Dimensions	Catalog Number	Dimensions
0.75	15.0	<b>DBR-R100-W0400</b>	12W x 5D x 5H	<b>DBR-R100-W0800</b>	12W x 7D x 5H
1	15.0	<b>DBR-R100-W0400</b>	12W x 5D x 5H	<b>DBR-R100-W0800</b>	12W x 7D x 5H
1.5	15.0	<b>DBR-R100-W0400</b>	12W x 5D x 5H	<b>DBR-R036-W1200</b>	12W x 10D x 5H
2	15.0	<b>DBR-R100-W0400</b>	12W x 5D x 5H	<b>DBR-R036-W1200</b>	12W x 10D x 5H
3	15.0	<b>DBR-R036-W0800</b>	12W x 7D x 5H	<b>DBR-R036-W2000</b>	12W x 16D x 5H
4	9.0	<b>DBR-R036-W0800</b>	12W x 7D x 5H	<b>DBR-R012-W2400</b>	19W x 10D x 5H
5	9.0	<b>DBR-R036-W0800</b>	12W x 7D x 5H	<b>DBR-R020-W2800</b>	19W x 13D x 5H
7.5	9.0	<b>DBR-R020-W1200</b>	12W x 10D x 5H	<b>DBR-R012-W4800</b>	26.5W x 10D x 5H
10	7.0	<b>DBR-R015-W1600</b>	12W x 13D x 5H	<b>DBR-R112-W6000</b>	26.5W x 13D x 5H
15	7.0	<b>DBR-R012-W2400</b>	19W x 10D x 5H	<b>DBR-R7D8-W9000</b>	28W x 10D x 10H
20	2.0	<b>DBR-R9D3-W3200</b>	19W x 10D x 5H	<b>DBR-R3D4-W012K</b>	28W x 10D x 10H
25	2.0	<b>DBR-R5D5-W4000</b>	26.5W x 10D x 5H	<b>DBR-R5D1-W015K</b>	28W x 16D x 10H
30	2.0	<b>DBR-R4D8-W4800</b>	26.5W x 10D x 5H	<b>DBR-R4D1-W020K</b>	28W x 16D x 10H
40	2.0	<b>DBR-R004-W6000</b>	26.5W x 13D x 5H	<b>DBR-R3D4-W025K</b>	30W x 18D x 16H
50	2.0	<b>DBR-R3D1-W7500</b>	26.5W x 16D x 5H	<b>DBR-R2D1-W030K</b>	30W x 18D x 24H
60	2.0	<b>DBR-R2D8-W9000</b>	26.5W x 16D x 5H	<b>DBR-R002-W036K</b>	30W x 18D x 24H
75	2.0	<b>DBR-R2D6-W012K</b>	28W x 10D x 10H	<b>DBR-R002-W045K</b>	30W x 18D x 32H
100	2.0	<b>DBR-R002-W015K</b>	28W x 16D x 10H	<b>DBR-R002-W060K</b>	30W x 18D x 48H

## 480V Brake Resistors

Drive hp (CT/l <sub>H</sub> )	Minimum Ohms	20% Duty Cycle, 100% Torque		50% Duty Cycle, 150% Torque	
		Catalog Number	Dimensions	Catalog Number	Dimensions
1	36.0	<b>DBR-R100-W0400</b>	12W x 5D x 5H	<b>DBR-R100-W0800</b>	12W x 7D x 5H
1.5	36.0	<b>DBR-R100-W0400</b>	12W x 5D x 5H	<b>DBR-R100-W1200</b>	12W x 10D x 5H
2	36.0	<b>DBR-R100-W0400</b>	12W x 5D x 5H	<b>DBR-R100-W1200</b>	12W x 10D x 5H
3	36.0	<b>DBR-R100-W0800</b>	12W x 7D x 5H	<b>DBR-R100-W2000</b>	12W x 16D x 5H
5	36.0	<b>DBR-R100-W0800</b>	12W x 7D x 5H	<b>DBR-R100-W2800</b>	19W x 13D x 5H
6	36.0	<b>DBR-R100-W1200</b>	12W x 10D x 5H	<b>DBR-R070-W4000</b>	19W x 16D x 5H
7.5	18.0	<b>DBR-R100-W1200</b>	12W x 10D x 5H	<b>DBR-R020-W4800</b>	26.5W x 13D x 5H
10	18.0	<b>DBR-R063-W1600</b>	12W x 13D x 5H	<b>DBR-R030-W6000</b>	26.5W x 16D x 5H
15	18.0	<b>DBR-R030-W2400</b>	19W x 10D x 5H	<b>DBR-R030-W9000</b>	28W x 10D x 10H
20	13.0	<b>DBR-R030-W3200</b>	19W x 13D x 5H	<b>DBR-R023-W012K</b>	28W x 13D x 10H
25	13.0	<b>DBR-R030-W4000</b>	19W x 16D x 5H	<b>DBR-R013-W015K</b>	28W x 16D x 10H
30	13.0	<b>DBR-R020-W4800</b>	26.5W x 13D x 5H	<b>DBR-R014-W020K</b>	30W x 18D x 24H
40	2.0	<b>DBR-R112-W6000</b>	26.5W x 13D x 5H	<b>DBR-R007-W025K</b>	30W x 18D x 16H
50	2.0	<b>DBR-R013-W7500</b>	26.5W x 16D x 5H	<b>DBR-R8D5-W030K</b>	30W x 18D x 24H
60	2.0	<b>DBR-R010-W9000</b>	28W x 10D x 10H	<b>DBR-R7D3-W036K</b>	30W x 18D x 24H
75	2.0	<b>DBR-R009-W012K</b>	28W x 13D x 10H	<b>DBR-R002-W045K</b>	30W x 18D x 32H
100	2.0	<b>DBR-R5D1-W015K</b>	28W x 16D x 10H	<b>DBR-R004-W060K</b>	30W x 18D x 40H
125	2.0	<b>DBR-R4D1-W020K</b>	28W x 16D x 10H	<b>DBR-R004-W070K</b>	30W x 18D x 48H
150	2.0	<b>DBR-R3D4-W025K</b>	30W x 18D x 16H	<b>DBR-R3D5-W085K</b>	30W x 18D x 56H
200	2.0	<b>DBR-R3D3-W030K</b>	30W x 18D x 24H	<b>DBR-R2D6-W110K</b>	30W x 18D x 64H



## Replacement Parts

## 2

## Frame 1

Description	Catalog Number 230V	Catalog Number 480V	Catalog Number 575V
Standard keypad ①	DXG-KEY-LCD	DXG-KEY-LCD	DXG-KEY-LCD
Main control board ①	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD
Control board cover	DXG-SPR-BCOVER	DXG-SPR-BCOVER	DXG-SPR-BCOVER
Type 1/IP21 standard cover	DXG-SPR-FR1CVR	DXG-SPR-FR1CVR	②
Main fan kit ①	DXG-SPR-FR1FAN	DXG-SPR-FR1FAN	②
Control fan	DXG-SPR-2FR1CF	DXG-SPR-4FR1CF	②
Main power board	DXG-SPR-2FR1MPB	DXG-SPR-4FR1MPB	②
EMI board	DXG-SPR-2FR1EB	DXG-SPR-4FR1EB	②
Middle chassis cover	DXG-SPR-FR1MCC	DXG-SPR-FR1MCC	②
Outer housing	DXG-SPR-FR1OH	DXG-SPR-FR1OH	②
UL conduit plate	DXG-SPR-FR1CPUL	DXG-SPR-FR1CPUL	②
IEC conduit plate	DXG-SPR-FR1CPIEC	DXG-SPR-FR1CPIEC	②

## Frame 2

Description	Catalog Number 230V	Catalog Number 480V	Catalog Number 575V
Standard keypad ①	DXG-KEY-LCD	DXG-KEY-LCD	DXG-KEY-LCD
Main control board ①	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD
Control board cover	DXG-SPR-BCOVER	DXG-SPR-BCOVER	DXG-SPR-BCOVER
Type 1/IP21 standard cover	DXG-SPR-FR2CVR	DXG-SPR-FR2CVR	②
Main fan kit ①	DXG-SPR-FR2FAN	DXG-SPR-FR2FAN	②
Control fan	DXG-SPR-FR2CF	DXG-SPR-FR2CF	②
Bus capacitor	DXG-SPR-2FR2BC	DXG-SPR-4FR24BC	②
Main power board	DXG-SPR-2FR2MPB	DXG-SPR-4FR2MPB	②
EMI board	DXG-SPR-2FR2EB	DXG-SPR-4FR2EB	②
IGBT module	DXG-SPR-FR2IGBT	DXG-SPR-FR2IGBT	②
Middle chassis cover	DXG-SPR-FR2MCC	DXG-SPR-FR2MCC	②
Outer housing	DXG-SPR-FR2OH	DXG-SPR-FR2OH	②
UL conduit plate	DXG-SPR-FR2CPUL	DXG-SPR-FR2CPUL	②
IEC conduit plate	DXG-SPR-FR2CPIEC	DXG-SPR-FR2CPIEC	②

## Frame 3

Description	Catalog Number 230V	Catalog Number 480V	Catalog Number 575V
Standard keypad ①	DXG-KEY-LCD	DXG-KEY-LCD	DXG-KEY-LCD
Main control board ①	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD
Control board cover	DXG-SPR-BCOVER	DXG-SPR-BCOVER	DXG-SPR-BCOVER
Type 1/IP21 standard cover	DXG-SPR-FR3CVR	DXG-SPR-FR3CVR	②
Main fan kit ①	DXG-SPR-FR3FAN	DXG-SPR-FR3FAN	②
Control fan	DXG-SPR-FR34CF	DXG-SPR-FR34CF	②
Bus capacitor	DXG-SPR-FR3BC	DXG-SPR-FR3BC	②
Main power board	DXG-SPR-2FR3MPB	DXG-SPR-4FR3MPB	②
EMI board	DXG-SPR-2FR3EB	DXG-SPR-4FR3EB	②
Drive board	DXG-SPR-2FR3DB	DXG-SPR-4FR3DB	②
Output board	DXG-SPR-FR3OB	DXG-SPR-FR3OB	②
Middle chassis cover	DXG-SPR-FR3MCC	DXG-SPR-FR3MCC	②
Outer housing	DXG-SPR-FR3OH	DXG-SPR-FR3OH	②
UL conduit plate	DXG-SPR-FR3CPUL	DXG-SPR-FR3CPUL	②
IEC conduit plate	DXG-SPR-FR3CPIEC	DXG-SPR-FR3CPIEC	②

## Notes

① Factory recommended spare parts.

② 575V available in 2015.

## Frame 4

Description	230V Catalog Number	480V Catalog Number	575V Catalog Number
Standard keypad ①	DXG-KEY-LCD	DXG-KEY-LCD	DXG-KEY-LCD
Main control board ①	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD
Control board cover	DXG-SPR-BCOVER	DXG-SPR-BCOVER	DXG-SPR-BCOVER
Type 1/IP21 standard cover	DXG-SPR-FR4CVR	DXG-SPR-FR4CVR	②
Main fan kit ①	DXG-SPR-FR4FAN	DXG-SPR-FR4FAN	②
Control fan	DXG-SPR-FR34CF	DXG-SPR-FR34CF	②
Bus capacitor	DXG-SPR-2FR4BC	DXG-SPR-4FR24BC	②
Main power board	DXG-SPR-2FR4MPB	DXG-SPR-4FR4MPB	②
EMI board	DXG-SPR-2FR4EB	DXG-SPR-4FR4EB	②
Softstart board	DXG-SPR-2FR4SB	DXG-SPR-4FR4SB	②
IGBT module	DXG-SPR-2FR4IGBT	DXG-SPR-4FR4IGBT	②
Rectifier module	DXG-SPR-2FR4RM	DXG-SPR-4FR4RM	②
Brake chopper module	DXG-SPR-2FR4BCM	DXG-SPR-4FR4BCM	②
Middle chassis cover	DXG-SPR-FR4MCC	DXG-SPR-FR4MCC	②
Outer housing	DXG-SPR-FR40H	DXG-SPR-FR40H	②
UL conduit plate	DXG-SPR-FR4CPUL	DXG-SPR-FR4CPUL	②
IEC conduit plate	DXG-SPR-FR4CPIEC	DXG-SPR-FR4CPIEC	②

## Frame 5

Description	230V Catalog Number	480V Catalog Number	575V Catalog Number
Standard keypad ①	DXG-KEY-LCD	DXG-KEY-LCD	DXG-KEY-LCD
Main control board ①	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD	DXG-SPR-CTRLBOARD
Control board cover	DXG-SPR-BCOVER	DXG-SPR-BCOVER	DXG-SPR-BCOVER
Type 1/IP21 standard cover	DXG-SPR-FR5CVR	DXG-SPR-FR5CVR	②
Main fan kit ①	DXG-SPR-FR5FAN	DXG-SPR-FR5FAN	②
Control fan	DXG-SPR-FR5CF	DXG-SPR-FR5CF	②
Bus capacitor	DXG-SPR-FR5BC	DXG-SPR-FR5BC	②
Main power board	DXG-SPR-2FR5MPB	DXG-SPR-4FR5MPB	②
EMI-1 board	DXG-SPR-2FR5E1B	DXG-SPR-4FR5E1B	②
EMI-2 board	DXG-SPR-2FR5E2B	DXG-SPR-4FR5E2B	②
EMI-3 board	DXG-SPR-FR5E3B	DXG-SPR-FR5E3B	②
IGBT module	DXG-SPR-FR5IGBT	DXG-SPR-FR5IGBT	②
Rectifier module	DXG-SPR-2FR5RM	DXG-SPR-4FR5RM	②
Brake chopper module	DXG-SPR-2FR5BCM	DXG-SPR-4FR5BCM	②
Middle chassis cover	DXG-SPR-FR5MCC	DXG-SPR-FR5MCC	②
Outer housing	DXG-SPR-FR50H	DXG-SPR-FR50H	②
UL conduit plate	DXG-SPR-FR5CPUL	DXG-SPR-FR5CPUL	②
IEC conduit plate	DXG-SPR-FR5IECCP	DXG-SPR-FR5IECCP	②

**Notes**

① Factory recommended spare parts.

② 575V available in 2015.

## Technical Data and Specifications

## 2

### PowerXL Series—DG1 Technical Data and Specifications

Attribute	Description	Specification	
Input ratings	Input voltage $U_{in}$	208V to 240V, 380V to 500V, 525V to 600V, –15 to 10%	
	Input frequency	50 Hz to 60 Hz (variation up to 45 Hz to 66 Hz)	
	Connection to power	Once per minute or less	
	Starting delay	3s (FR1 to FR2), 4s (FR3), 5s (FR4), 6s (FR5)	
	Short-circuit withstand rating	100 kAIC	
Output ratings	Output voltage	0 to $U_{in}$	
	Continuous output current	IL: ambient temperature maximum 40°C, up to 60°C with derating, overload 1.1 x IL (1 min./10 min.) IH: ambient temperature maximum 50°C, up to 60°C with derating, overload 1.5 x IH (1 min./10 min.)	
	Overload current	150% respectively 110% (1 min./10 min.)	
	Initial output current	200% (2s/20s)	
	Output frequency	0–400 Hz (standard)	
	Frequency resolution	0.01 Hz	
Control characteristics	Control methods	Frequency control Speed control Open-loop speed control Open-loop torque control	
	Switching frequency	Range: FR1–3: 1 kHz to 12 kHz FR4–5: 1 kHz to 10 kHz Defaults: FR1–3: 4 kHz (IH), 6 kHz (IL) FR4–5: 3.6 kHz Automatic switching frequency derating in case of overload.	
	Frequency reference	Analog input: resolution 0.1% (10-bit), accuracy +1% Panel reference: resolution 0.01 Hz	
	Field weakening point	20 Hz to 400 Hz	
	Acceleration time	0.1s to 3000s	
	Deceleration time	0.1s to 3000s	
	Braking torque	DC brake: 30% x Motor Rated Torque ( $T_n$ ) (without brake chopper) Dynamic braking (with optional brake chopper using an external brake resistor): 100% continuous maximum rating	
	Ambient conditions	Ambient operating temperature	–10°C (no frost) to +50°C, up to +60°C with derating (CT) –10°C (no frost) to +40°C, up to +60°C with derating (VT)
		Storage temperature	–40°C to +70°C
		Relative humidity	0–95% RH, noncondensing, non-corrosive
Air quality: • Chemical vapors • Mechanical particles		Tested according to IEC 60068-2-60 Test Key: Flowing mixed gas corrosion test, Method 1 (H2S [hydrogen sulfide] and SO2 [sulfur dioxide]) Designed according to: IEC 60721-3-3, unit in operation, class 3C2 IEC 60721-3-3, unit in operation, class 3S2	
Altitude		100% load capacity (no derating) up to 3280 ft (1000m); 1% derating for each 328 ft (100m) above 3280 ft (1000m); max. 9842 ft (3000m) (2000m for corner grounded earth main systems)	

## PowerXL Series—DG1 Technical Data and Specifications, continued

Attribute	Description	Specification
Ambient conditions, continued	Vibration:	5–150 Hz
	• EN 61800-5-1	Displacement amplitude: 1 mm (peak) at 5 Hz to 15.8 Hz (FR1–FR5)
	• EN 60668-2-6	Maximum acceleration amplitude: 1g at 15.8 Hz to 150 Hz (FR1–FR5)
	Shock:	Storage and shipping: maximum 15g, 11 ms (in package)
	• ISTA 1 A	
	• EN 60068-2-27	
	Overvoltage	Overvoltage Category III
	Pollution degree	Pollution Degree 2
	Enclosure class	IP21/Type 1 standard in entire kW/hp range IP54/Type 12 option Note: Keypad required to be mounted in drive for IP54/Type 12 rating
	Immunity	Fulfills EN 61800-3 (2004), first and second environment
Standards	MTBF	FR1: 165,457 hours FR2: 134,833 hours FR3: 102,515 hours FR4: 121,567 hours FR5: 108,189 hours FR6: Available in 2015
	Safety	UL 508C, CSA C22.2 No. 274-13 and EN 61800-5-1
	EMC	+EMC2: EN 61800-3 (2004), Category C2 The drive can be modified for IT networks and corner grounding TN system
	Electrostatic discharge	Second environment, IEC 61000-4-2, 4 kV CD or 8 kV AD, Criterion B
	Fast transient burst	Second environment, IEC 61000-4-4, 2 kV/5 kHz, Criterion B
	Dielectrical strength	Primary to secondary: 3600 Vac/5100 Vdc Primary to earth: 2000 Vac/2828 Vdc
	Approvals	EN 61800-5-1 (2007), CE, UL and cUL (see nameplate for more detailed approvals)
Fieldbus connections	Onboard: EtherNet/IP, Modbus <sup>®</sup> TCP, Modbus RTU, BACnet	
Safety/protections	Overvoltage protection	Yes
	Overvoltage trip limit	240V drives: 456V 480V drives: 911V
	Undervoltage protection	Yes
	Undervoltage trip limit	240V drives: 211V 480V drives: 370V
	Earth fault protection	Yes
	Input phase supervision	Yes
	Motor phase supervision	Yes
	Overcurrent protection	Yes
	Unit overtemperature protection	Yes
	Motor overload protection	Yes
	Motor stall protection	Yes
	Motor underload protection	Yes
	DC bus overvoltage control	Yes
	Short-circuit protection of 24V reference voltages	Yes
	Surge protection	Yes (differential mode 2 kV; common mode 4 kV)
	Common coated boards	Yes (prevents corrosion)

# 2.4

## Adjustable Frequency Drives

### PowerXL DG1 Series Drives

#### Wiring Diagram

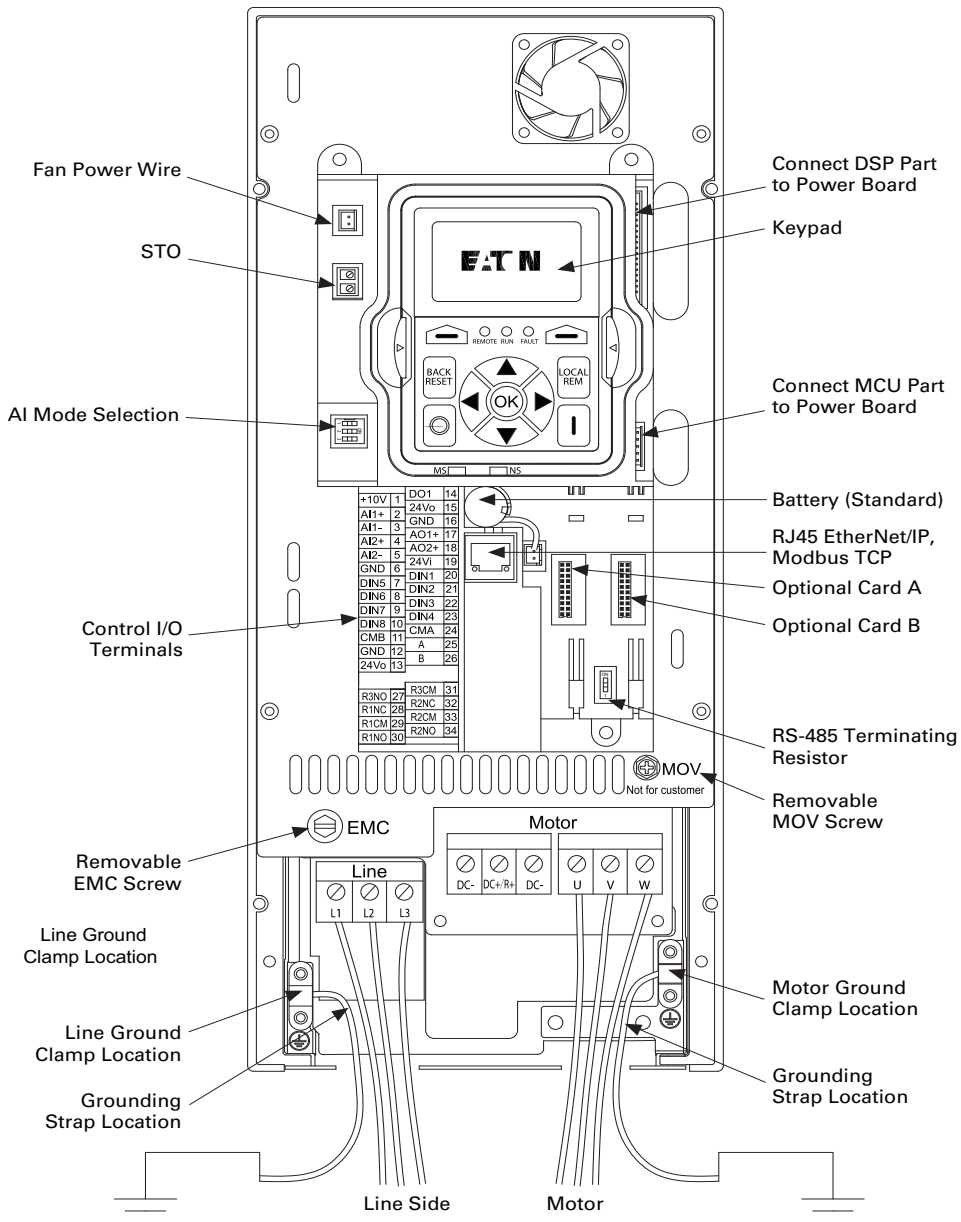
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PowerXL Series—DG1 Control Wiring Diagram

Pin	Signal Name	Signal	Default Setting	Description
1	+10V	Ref. Output Voltage	—	10 Vdc Supply Source
2	AI1+	Analog Input 1	0–10V	Voltage Speed Reference (Programmable to 4 mA to 20 mA)
3	AI1–	Analog Input 1 Ground	—	Analog Input 1 Common (Ground)
4	AI2+	Analog Input 2	4 mA to 20 mA	Current Speed Reference (Programmable to 0–10V)
5	AI2–	Analog Input 2 Ground	—	Analog Input 2 Common (Ground)
6	GND	I/O Signal Ground	—	I/O Ground for Reference and Control
7	DIN5	Digital Input 5	Preset Speed B0	Sets frequency output to Preset Speed 1
8	DIN6	Digital Input 6	Preset Speed B1	Sets frequency output to Preset Speed 2
9	DIN7	Digital Input 7	Emergency Stop (TI–)	Input forces VFD output to shut off
10	DIN8	Digital Input 8	Force Remote (TI+)	Input takes VFD from Local to Remote
11	CMB	DI5 to DI8 Common	Grounded	Allows source input
12	GND	I/O Signal Ground	—	I/O Ground for Reference and Control
13	24V	+24 Vdc Output	—	Control voltage output (100 mA max.)
14	DO1	Digital Output 1	Ready	Shows the drive is ready to run
15	24Vo	+24 Vdc Output	—	Control voltage output (100 mA max.)
16	GND	I/O Signal Ground	—	I/O Ground for Reference and Control
17	A01+	Analog Output 1	Output Frequency	Shows Output frequency to motor 0–60 Hz (4 mA to 20 mA)
18	A02+	Analog Output 2	Motor Current	Shows Motor current of motor 0–FLA (4 mA to 20 mA)
19	24Vi	+24 Vdc Input	—	External control voltage input
20	DIN1	Digital Input 1	Run Forward	Input starts drive in forward direction (start enable)
21	DIN2	Digital Input 2	Run Reverse	Input starts drive in reverse direction (start enable)
22	DIN3	Digital Input 3	External Fault	Input causes drive to fault
23	DIN4	Digital Input 4	Fault Reset	Input resets active faults
24	CMA	DI1 to DI4 Common	Grounded	Allows source input
25	A	RS-485 Signal A	—	Fieldbus Communication (Modbus, BACnet)
26	B	RS-485 Signal B	—	Fieldbus Communication (Modbus, BACnet)
27	R3NO	Relay 3 Normally Open	At Speed	Relay output 3 shows VFD is at Ref. Frequency
28	R1NC	Relay 1 Normally Closed	Run	Relay output 1 shows VFD is in a run state
29	R1CM	Relay 1 Common		
30	R1NO	Relay 1 Normally Open		
31	R3CM	Relay 3 Common	At Speed	Relay output 3 shows VFD is at Ref. Frequency
32	R2NC	Relay 2 Normally Closed	Fault	Relay output 2 shows VFD is in a fault state
33	R2CM	Relay 2 Common		
34	R2NO	Relay 2 Normally Open		

## Control Board Layout

## PowerXL Series—DG1 Control Board Layout



# 2.4

## Adjustable Frequency Drives

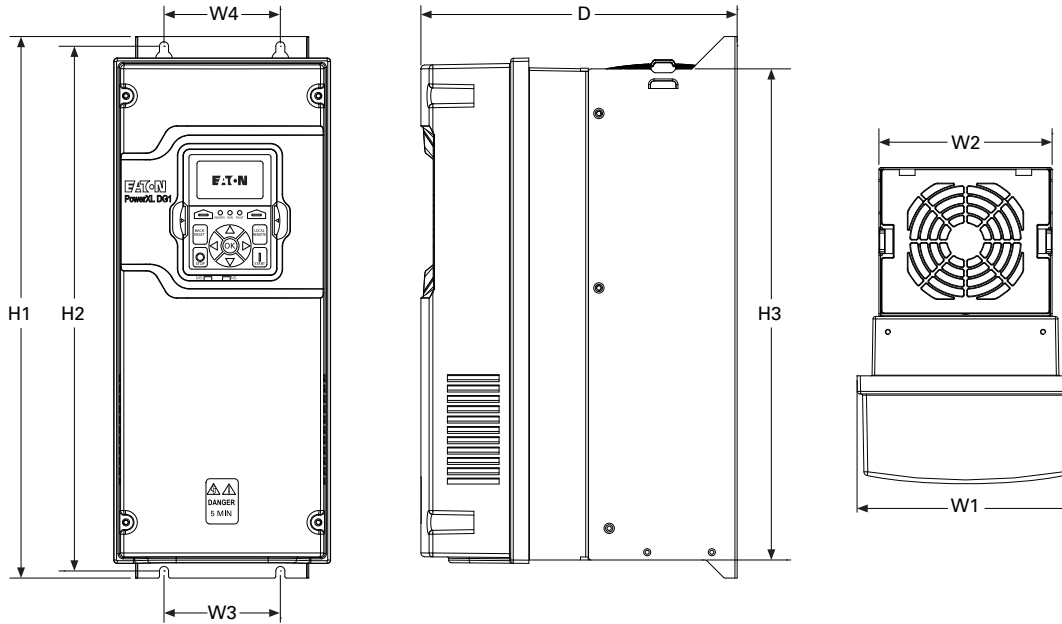
### PowerXL DG1 Series Drives

#### Dimensions

Approximate Dimensions in Inches (mm)

2

#### PowerXL Series—DG1 Dimensions



Frame Size	Voltage	hp (CT/I <sub>H</sub> )	kW	Amperes (CT/I <sub>H</sub> )	Approximate Dimensions in Inches (mm)								Weight Lb (kg)	
					D	H1	H2	H3	W1	W2	W3	W4		Ø
FR1	230 Vac	0.75–3	0.55–2.2	3.5–11	7.89	12.97	12.28	11.50	6.02	4.80	3.94	3.94	0.28	14.33
	480 Vac	1–5	0.75–3.7	2.3–7.6	(200.4)	(326.9)	(311.9)	(292.1)	(153.0)	(121.9)	(100.1)	(100.1)	(7.0)	(6.5)
	575 Vac ①	2–5	1.5–3.7	3.3–7.5										
FR2	230 Vac	5–7.5	3–5.5	12.5–25	9.63	16.50	15.98	14.96	6.61	5.28	3.54	3.54	0.28	23.37
	480 Vac	7.5–15	5.5–11	12–23	(244.7)	(419.1)	(405.9)	(380.0)	(167.8)	(134.1)	(90.0)	(90.0)	(7.0)	(10.6)
	575 Vac ①	7.5–15	5.5–11	10–18										
FR3	230 Vac	10–15	7.5–11	31–48	10.44	21.97	21.46	20.43	8.06	7.24	4.92	4.92	0.35	49.82
	480 Vac	20–30	15–22	31–46	(265.1)	(558.0)	(545.0)	(518.9)	(204.6)	(183.9)	(125.0)	(125.0)	(9.0)	(22.6)
	575 Vac ①	20–30	15–22	22–34										
FR4	230 Vac	20–30	15–22	61–88	11.57	24.80	34.31	23.27	9.36	9.13	8.07	8.07	0.35	77.60
	480 Vac	40–60	30–45	61–87	(294.0)	(629.9)	(617.5)	(591.1)	(237.7)	(231.9)	(205.0)	(205.0)	(9.0)	(35.2)
	575 Vac ①	40–60	30–45	41–62										
FR5	230 Vac	40–60	30–45	114–170	13.41	34.98	29.65	27.83	11.34	11.10	8.66	8.66	0.35	154.32
	480 Vac	75–125	55–90	105–170	(340.7)	(888.5)	(753.1)	(706.9)	(288.0)	(281.9)	(220.0)	(220.0)	(9.0)	(70.0)
	575 Vac ①	75–125	55–90	80–125										
FR6 ①	230 Vac	75–100	55–75	211–261	①	①	①	①	①	①	①	①	①	①
	480 Vac	150–200	110–150	205–261										
	575 Vac ①	150–200	110–160	144–208										

#### Note

① FR6 and 575 Vac available in 2015.