PowerXL DV1X1 Series Low Voltage Frequency Drives

Simple, Reliable and Efficient New Generation Compact Drive

For 0.2kW~22kW three-phase asynchronous and synchronous motors

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PowerXL DV1X1 Series Low Voltage Frequency Drives

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PowerXL DV1X1 Series Low Voltage Frequency Drives

Overview of the Product

Eaton DV1X1 series drives are a new generation of compact drives developed for the manufacturing of machinery and equipment. They feature a book-style narrow-body design, small size, low temperature rise, convenient operation, stable reliable and cost-effectiveness. The DV1X1 series drives are all designed with enhanced PCB protective coating and advanced construction, which balance the heat dissipation and dust prevention requirements to ensure product reliability and stability and are suitable for a wide range of harsh field environments.

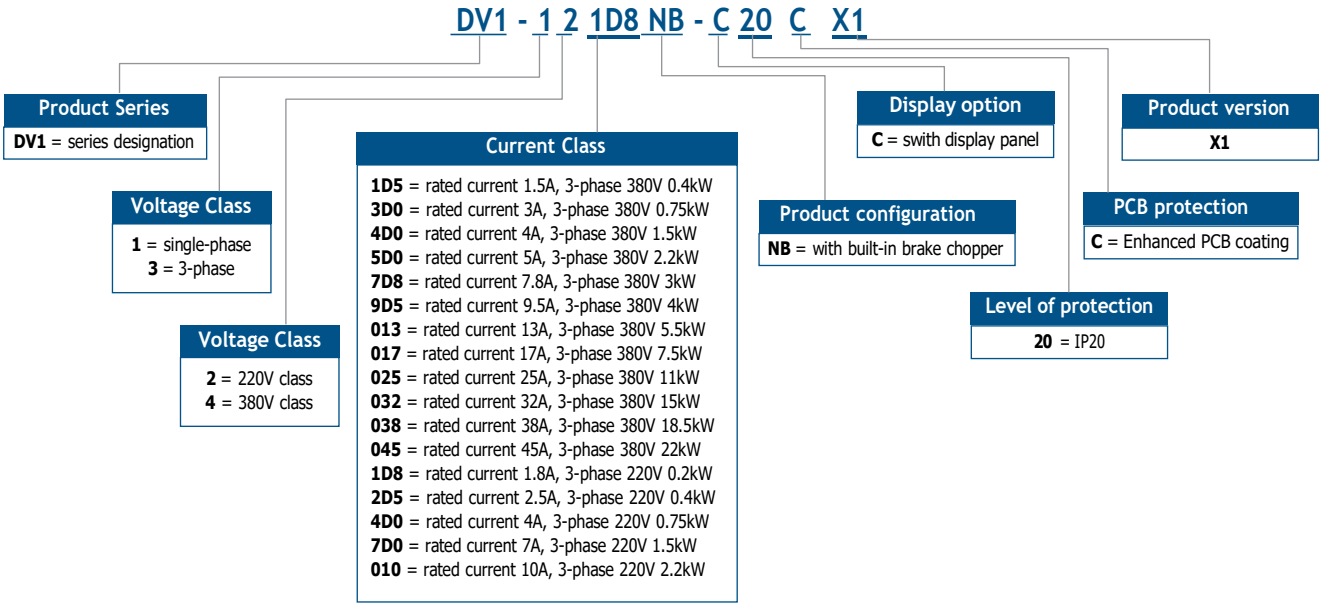
Technical Features

- Support for V/F control (custom curve, energy saving control, etc.) and sensor less vector control to meet different application control needs
- Supports synchronous motor control for greater energy efficiency and reduced carbon emissions
- Enhanced PCBA protective coating meets 3C3 and 3S3 requirements to withstand harsh environmental conditions
- Full range of built-in brake units for improved dynamic braking
- Built-in dual Modbus RJ45 interface for easier networking
- Supports side-by-side zero-spacing mounting, saving space in the cabinet
- **Input and output signals:**
- Digital input: 4 Digital inputs DI1-DI4, PNP or NPN supported
- Analog input: 1 AI (can be set to DI for use)
- Digital output: 1 DO, open collector output
- Relay output: 1 RO, 1 N.O. contact and 1 N.C. contact with common point
- Analog output: 1 AO
- **Various software application features:**
- Built-in energy saving control algorithm reduces energy consumption and monitors power consumption data
- Multi-speed
- Instantaneous power loss control
- Automatic/catch restart
- PID controller
- Built-in tension control algorithm
- Swing frequency (delta wave)
- User-defined program running mode
- With the powerful Drive Xpert software, users can monitor parameters in a real-time manner on a computer with virtual oscilloscope, making debugging, monitoring and troubleshooting more convenient and efficient

Product Standards

- IEC/EN 61800-5-1
- IEC/EN 61800-3
- IEC 61800-2 1998
- IEC 60721-3-3
- RoHs

Product Model Number Description



Product Selection

Voltage Class	Frame Dimensions	Rated Power (kW)	Rated Current (A)	Product Model
3AC 380-480V	FR1	0.4	1.5	DV1-341D5NB-C20CX1
		0.75	3	DV1-343D0NB-C20CX1
		1.5	4	DV1-344D0NB-C20CX1
		2.2	5	DV1-345D0NB-C20CX1
	FR2	3	7.8	DV1-347D8NB-C20CX1
		4	9.5	DV1-349D5NB-C20CX1
		5.5	13	DV1-34013NB-C20CX1
	FR3	7.5	17	DV1-34017NB-C20CX1
		11	25	DV1-34025NB-C20CX1
	FR4	15	32	DV1-34032NB-C20CX1
		18.5	38	DV1-34038NB-C20CX1
		22	45	DV1-34045NB-C20CX1
1AC 200-240V	FR1	0.2	1.8	DV1-121D8NB-C20CX1
		0.4	2.5	DV1-122D5NB-C20CX1
		0.75	4	DV1-124D0NB-C20CX1
	FR2	1.5	7	DV1-127D0NB-C20CX1
		2.2	10	DV1-12010NB-C20CX1

Note:

* The power is determined based on 220V/380V four-stage or six-stage squirrel cage induction motors and is for reference only.

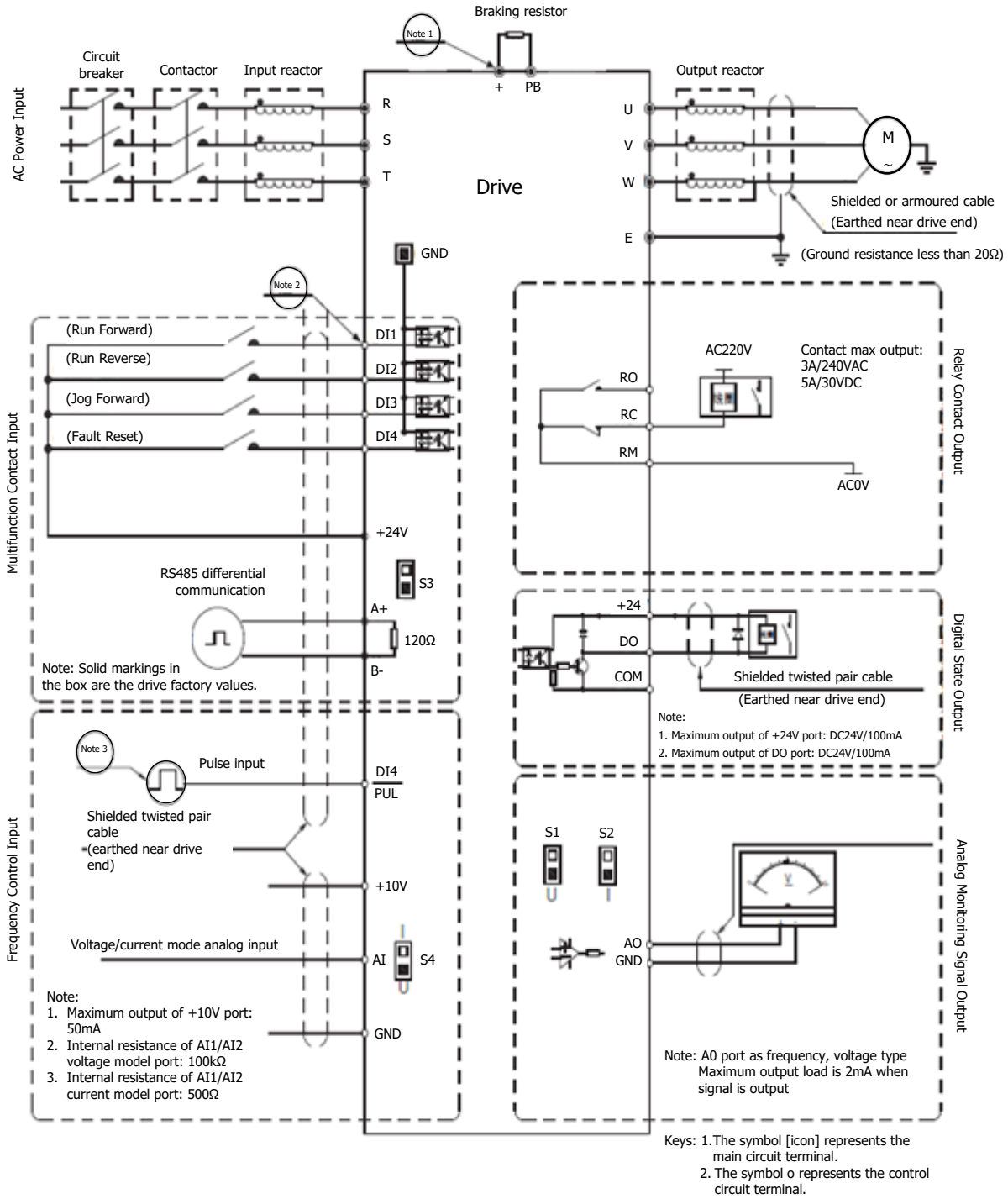
Technical Parameters and Specifications

Attributes	Description	Specifications	
Rated Input	Voltage, frequency	12: Single-phase 200V-240V 50Hz/60Hz; 34: Three-phase 380V-480V 50Hz/60Hz.	
	Allowable fluctuation	-15%~10%; voltage unbalance rate: <3%; frequency: ±5%; distortion rate is IEC61800-2 compliant	
Rated Output	Output voltage	Output at rated conditions: 3-phase, 0V~input voltage	
	Output frequency range	0Hz~600Hz	
	Overload capacity	60s at 150% of rated current, 10s at 180% of rated current, 3s at 200% of rated current	
Control Features	Motor control mode	Sensorless V/F control, Sensorless vector control	
	Carrier frequency	1.0kHz to 16.0kHz	
	Starting torque	Sensorless vector control: 150% of rated torque at 0.5Hz	
	Frequency resolution	Digital setting: 0.01Hz; Analog setting: Maximum frequency X 0.05%	
Basic Functions	Torque control	Torque setting calculation, torque mode speed limiting	
	DC braking capacity	Starting frequency: 0.00Hz~50.00Hz; Braking time: 0.0s-60.0s; Braking current: 0.0% to 150.0% of rated current	
	Torque boost	Automatic torque increase by 0.0% to 100.0%; manual torque increase by 0.0% to 30.0%	
	V/F curve	Four ways: Linear torque characteristic curve, self-set V/F curve, torque reduction characteristic curve (1.1~2.0 power), square V/F curve	
	Acceleration/deceleration curve	Two ways: Linear acceleration/deceleration, S-curve acceleration/deceleration Four sets of acceleration/deceleration time, time unit 0.01s, maximum 65000s	
	Automatic voltage regulation	Automatically keeps the output voltage constant when the grid voltage fluctuates	
	Automatic energy efficient operation	Automatically optimizes output voltage in V/F control mode based on the load for energy efficient operation	
	Automatic current limiting	Automatically limits current during operation to prevent frequent trips due to over-current fault	
	Handling of Instantaneous power loss	Continuous operation with DC-bus voltage control in case of instantaneous power loss	
	Standard features	PID control, RPM tracking and restart after power failure, jump frequency, frequency upper and lower limits control, program operation, multi-stage speed, RS485 communication, analog output, frequency pulse output, parameter access level setting, common parameter setting, monitoring parameter comparator output, counting and timing feature, swing frequency, etc.	
	Frequency setting channels	Keypad numbers, keypad potentiometer, analog voltage/current terminal AI, communication reference and multi-channel terminal selection, combination of primary and secondary channels, which can be switched in various ways	
	Feedback input channels	Keypad potentiometer, voltage/current terminal AI, communication reference, pulse input PUL	
	Run Command channels	Operator panel reference, external terminal reference, communication reference	
	Input Command signals	Start, Stop, Run Forward/Reverse, Jog, Multi-Stage, Free Stop, Reset, Acceleration/Deceleration Time Select, Frequency Setting Channel Select, External Fault Alarm	
	External output signals	1 relay output, 1 open collector output, 1 AO output selectable from 0V~10V or 0mA~20mA or 4mA~20mA output	
Protections		Over-voltage, under-voltage, current limitation, over-current, overload, electronic thermal relay, overheating, overvoltage stall, data protection, flying speed protection, input/output phase loss protection, etc.	
Keypad Display	LED display	Built-in keypad: Single-line 5-digit 7 segment display	Monitors 1 drive status
		External keypad: Single-line, dual-line 5-digit 7 segment display	Monitors 1 drive status
	Parameter replication	Uploads and downloads drive feature code information for fast parameter replication (only for external keypad)	
	Status monitoring	Output frequency, reference requency, output current, input voltage, output voltage, motor speed, PID feedback value, PID setting value, module temperature, reference torque, output torque and all other parameters of the monitoring parameter group	
	Fault alarm	Over-voltage, under-voltage, over-current, short circuit, phase loss, overload, overheating, over-voltage stall, current limitation, data protection breached, current fault health, history of faults	

Environmental Conditions	Altitude	below 1,000 meters; derating is required if the altitude is over 1,000 meters, and derating is 1% for every rise of 100 meters
	Ambient temperature	-10˚C~ +50˚C; derating is required if temperature is above 50˚C, with max. temperature to be 60˚C and derating is 1.5% for every 1˚C increase
	Ambient humidity	5%RH - 95%RH (non-condensing)
	Vibration	5.9m/s2 (0.6G) at 9Hz~200Hz
	Storage temperature	-30˚C ~ +60˚C
	Mounting type	Wall-mounted
	Level of protection	IP20
	Pollution level	2
	Cooling mode	Forced air cooling

DV1X1 Terminal Wiring Diagram

FR1-2 (5.5kW and below):

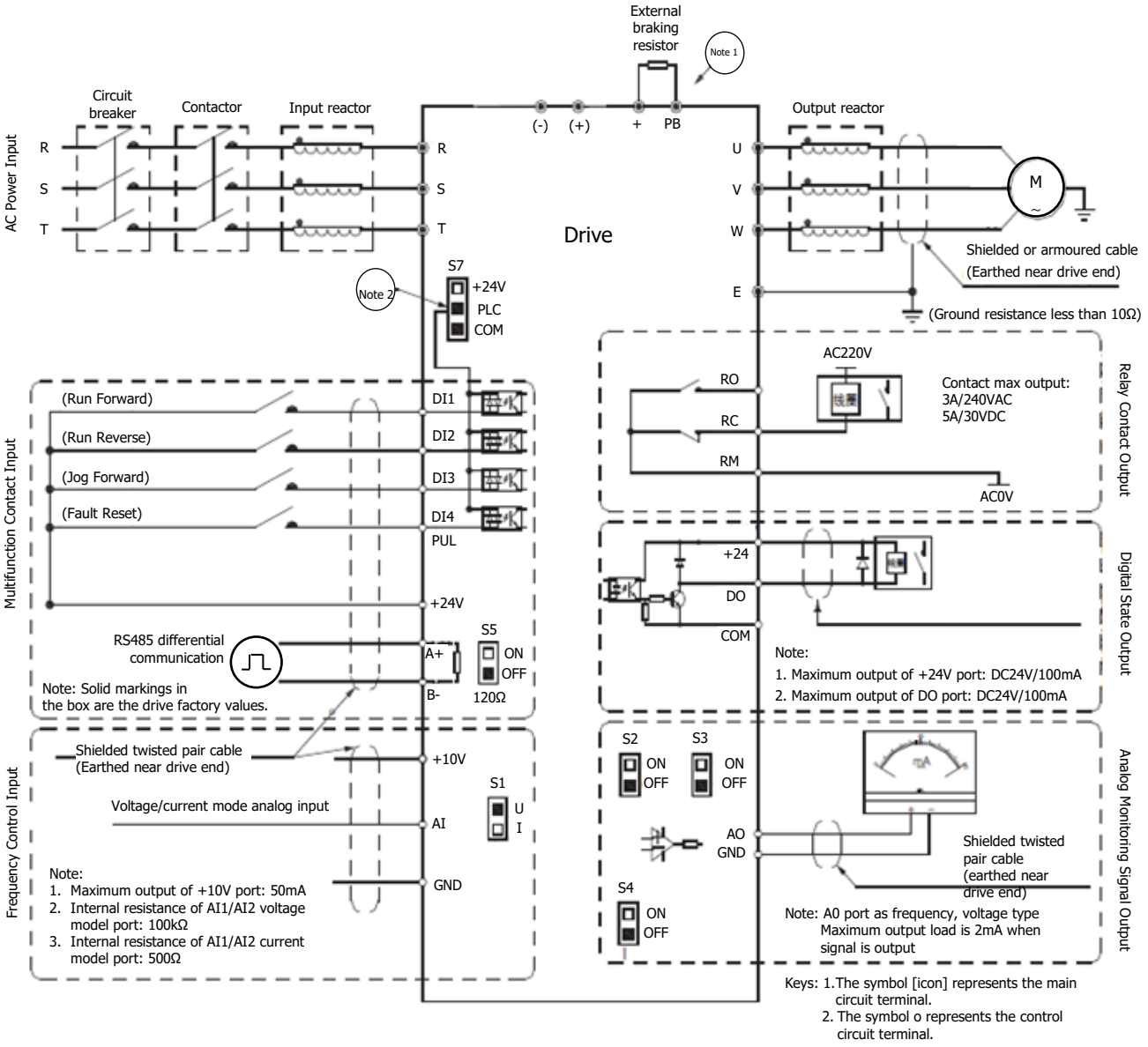


Note:

1. Select the appropriate braking resistor according to the on-site operating conditions and the Braking Resistor Specifications.
2. The multifunction input terminals DI1-DI4/PUL can support PNP and NPN transistor signals as inputs.
3. There are multiple pulse types in use; refer to the detailed description for specific wiring methods

DV1X1 Terminal Wiring Diagram

FR3-4 (7.5-22kW):



Note:

1. Select the appropriate braking resistor according to the on-site operating conditions and the Braking Resistor Specifications. Refer to Annex I for details.
2. The multifunction input terminals (DI1~DI4/PUL) can support PNP and NPN transistor signals as input. Please refer to the detailed description for specific wiring

Wiring Specifications and Torque Recommendations

Main Circuit Wiring and Terminal Specifications

Model	Main Circuit Terminal Screw Specification (mm)	Recommended Fixed Torque N·m	Recommended Copper Core Cable Specification mm2 (AWG)
DV1-341D5NB-C20CX1	M4	1.2~1.5	1.5mm² (14)
DV1-343D0NB-C20CX1	M4	1.2~1.5	1.5mm² (14)
DV1-344D0NB-C20CX1	M4	1.2~1.5	2.5mm² (12)
DV1-345D0NB-C20CX1	M4	1.2~1.5	2.5mm² (12)
DV1-347D8NB-C20CX1	M4	1.2~1.5	4mm² (10)
DV1-349D5NB-C20CX1	M4	1.2~1.5	4mm² (10)
DV1-34013NB-C20CX1	M4	1.2~1.5	6mm² (9)
DV1-34017NB-C20CX1	M4	1.2~1.5	6mm² (9)
DV1-34025NB-C20CX1	M4	1.2~1.5	10mm² (7)
DV1-34032NB-C20CX1	M5	2~3	10mm² (7)
DV1-34038NB-C20CX1	M5	2~3	16mm² (5)
DV1-34045NB-C20CX1	M5	2~3	16mm² (5)
DV1-121D8NB-C20CX1	M4	1.2~1.5	1.5mm² (14)
DV1-122D5NB-C20CX1	M4	1.2~1.5	1.5mm² (14)
DV1-124D0NB-C20CX1	M4	1.2~1.5	2.5mm² (12)
DV1-127D0NB-C20CX1	M4	1.2~1.5	2.5mm² (12)
DV1-12010NB-C20CX1	M4	1.2~1.5	4mm² (10)

Wiring of the Control Loop

FR1-2 (5.5kW and below)

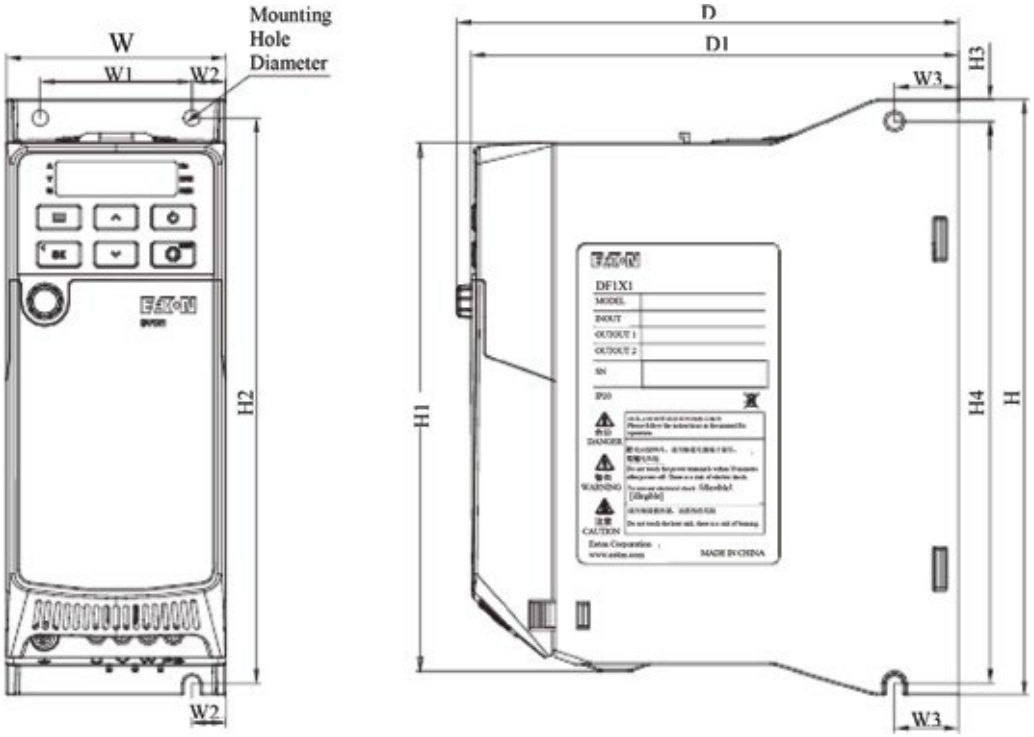
Terminal designation	Screw spec. (mm)	Fixed torque (N·m)	Cable spec. (mm²)	Cable type
A+ B-	M2.0	0.2~0.25	0.75	Shielded twisted pair cable
+10V GND AO AI	M2.0	0.2~0.25	0.75	Shielded twisted pair cable
+24V GND DO DI1 DI2 DI3 DI4	M2.0	0.2~0.25	0.75	Shielded cable

FR3-4 (7.5-22kW)

Terminal designation	Screw spec. (mm)	Fixed torque (N·m)	Cable spec. (mm²)	Cable type
A+ B-	M2.5	0.7~0.8	0.75	Shielded twisted pair cable
+10V GND AO AI	M2.5	0.7~0.8	0.75	Shielded twisted pair cable
+24V GND COM DO RO RC RM DI1 DI2 DI3 DI4	M2.5	0.7~0.8	0.75	Shielded cable

Outline Dimensions of Drive

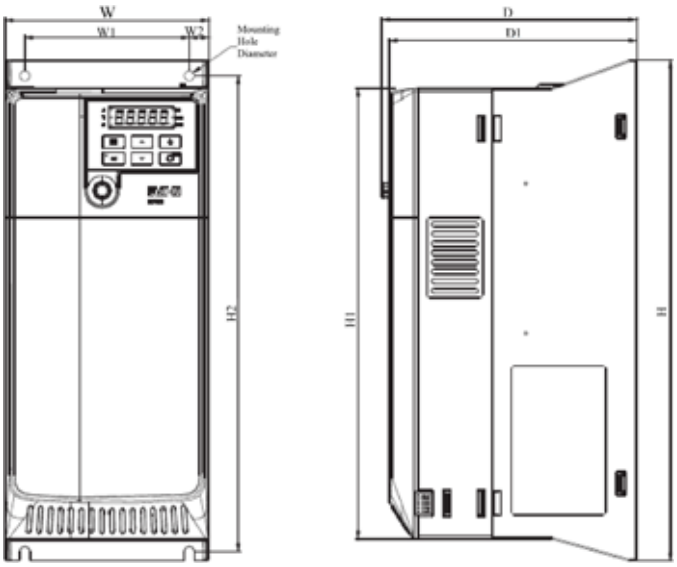
FR1-2 (5.5kW and below)



Drive Model		Outline Dimensions (mm)					Front-facing Mounting Dimensions (mm)			Side-facing Mounting Dimensions (mm)			Mounting Hole Diameter
		W	H	HI	D	DI	W1	W2	H2	W3	H3	H4	
DV1-121D8NB-C20CX1	FR1	65	177	157	149	145	45	10	168	19	6.5	167	3-M4
DV1-122D5NB-C20CX1													
DV1-124D0NB-C20CX1													
DV1-127D0NB-C20CX1	FR2	75	202	180	164.5	160	55	10	193	19	6.5	192	3-M4
DV1-12010NB-C20CX1													
DV1-341D5NB-C20CX1	FR1	65	177	157	149	145	45	10	168	19	6.5	192	3-M4
DV1-343D0NB-C20CX1													
DV1-344D0NB-C20CX1													
DV1-345D0NB-C20CX1													
DV1-347D8NB-C20CX1	FR2	75	202	180	164.5	160	55	10	193	19	6.5	192	3-M4
DV1-349D5NB-C20CX1													
DV1-34013NB-C20CX1													

Outline Dimensions of Drive

FR3-4 (7.5-22kW)



Drive Model		Outline Dimensions (mm)					Front-facing Mounting Dimensions (mm)			Mounting Hole Diameter
		W	H	HI	D	DI	W1	W2	H2	
DV1-34017NB-C20CX1	FR3	130	317.9	285.9	163	158	105	12.5	301.9	4-M6
DV1-34025NB-C20CX1										
DV1-34032NB-C20CX1	FR4	170	342.4	304.4	185	180	145	12.5	326.5	4-M6
DV1-34038NB-C20CX1										
DV1-34045NB-C20CX1										

Optional Accessories

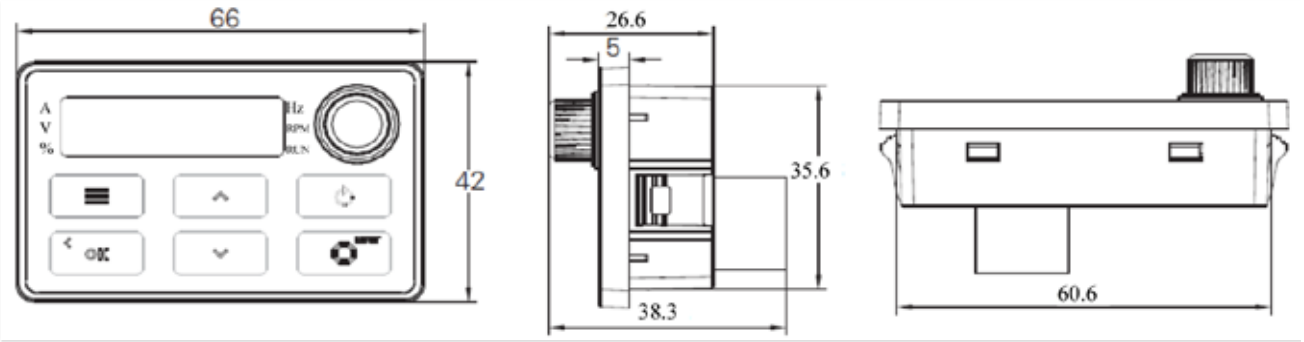
Main Circuit Wiring and Terminal Specifications

Product Description	Product Model
Two-line LED keypad (including door mounting bracket)	DF1X1-KEY-LED2*
Single line Keypad for remote operation	DV1X1-KEY-LED1*
Remote keypad holder for DF1X1-KEY-LED2	DF1X1-RMTKIT

*This keypad allows for Drive control, as well as upload and download of parameters

Outline Dimensions

Mounting Cut-out Size 61mm × 36mm



Reference Cut-out Size: 61x36mm

Braking Resistor Selection

The braking resistor values and powers described in the following table are determined according to normal inertia loads and intermittent braking mode. If high inertia, frequent braking is required over an extended period, adjust the resistance and power of the braking resistor as appropriate according to the specifications of selected Drive and nominal parameters of the brake unit. Consult Eaton for any question.

Three-phase 380V Class

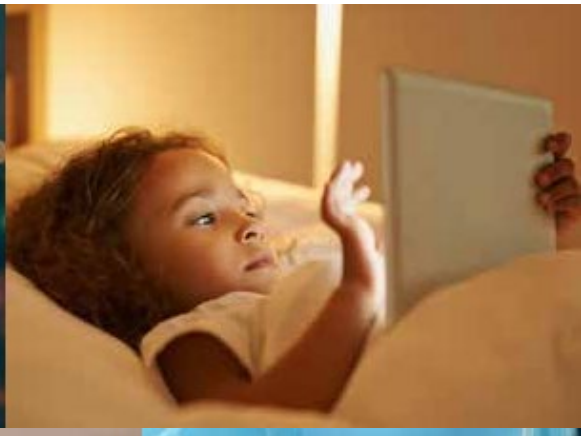
Motor power (kW)	Resistance value (0)	Resistor power (W or kW)	Braking torque (%)
0.4 kW	1500 Ω	100W	100%
0.75 kW	750 Ω	150W	100%
1.5 kW	400 Ω	300W	100%
2.2 kW	250 Ω	400W	100%
3.0 kW	200 Ω	400W	100%
4.0 kW	150 Ω	500W	100%
5.5 kW	100 Ω	600W	100%
7.5 kW	75 Ω	780W	100%
11 kW	50 Ω	1.2kW	100%
15 kW	40 Ω	1.5kW	100%
18.5 kW	35 Ω	2.0kW	100%
22 kW	32 Ω	2.5kW	100%

Single-phase 220V class

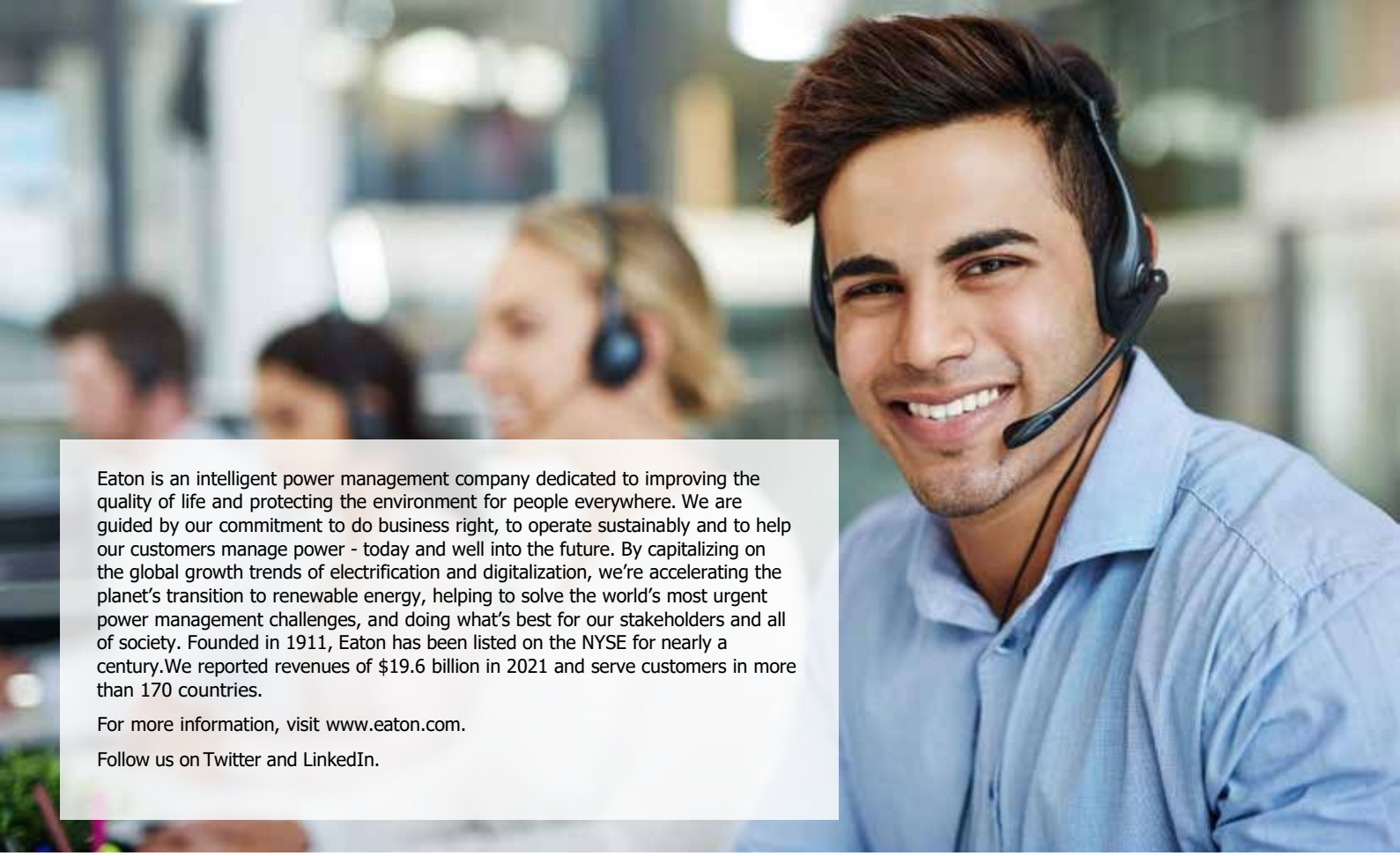
Motor power (kW)	Resistance value (0)	Resistor power (W)	Braking torque (%)
0.2 kW	800 Ω	50W	100%
0.4 kW	400 Ω	100W	100%
0.75 kW	200 Ω	120W	100%
1.5 kW	100 Ω	300W	100%
2.2 kW	75 Ω	300W	100%

LOOK AROUND.

Everything we touch, do, or experience in our modern world is made possible by power.



Notes



Eaton is an intelligent power management company dedicated to improving the quality of life and protecting the environment for people everywhere. We are guided by our commitment to do business right, to operate sustainably and to help our customers manage power - today and well into the future. By capitalizing on the global growth trends of electrification and digitalization, we're accelerating the planet's transition to renewable energy, helping to solve the world's most urgent power management challenges, and doing what's best for our stakeholders and all of society. Founded in 1911, Eaton has been listed on the NYSE for nearly a century.We reported revenues of $19.6 billion in 2021 and serve customers in more than 170 countries.

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Printed in UAE
Publication No. XXXXXXXXXX
Article number 300973-MK
January 2023

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