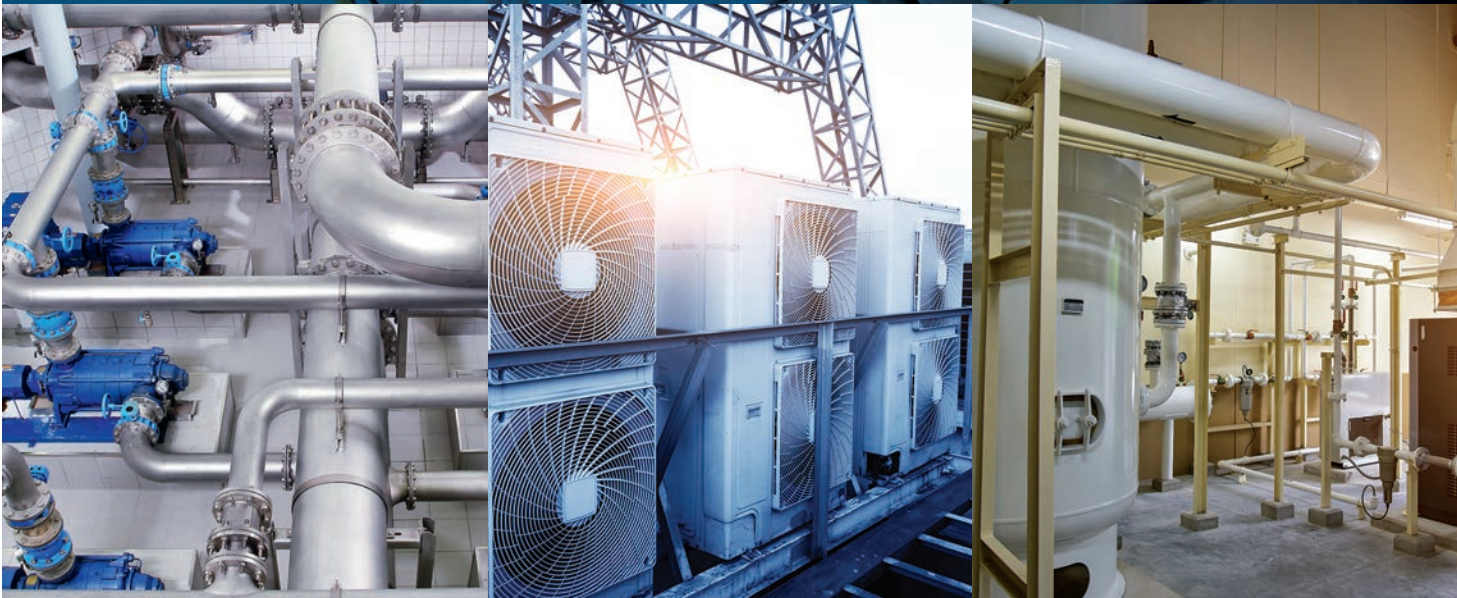


Variable frequency drives **DC1, DA1, DB1, DG1** and **DM1**  
Decentralized, electronic drive system **Rapid Link 5**

Variable speed starter **DE1**  
Soft starters **DS7** and **S811+**

# Product Range Catalog

Efficient drive technology for starting,  
controlling and regulating motors



**EATON**

*Powering Business Worldwide*





We make what matters work.\*



At Eaton, we believe that power is a fundamental part of just about everything people do. That's why we're dedicated to helping our customers find new ways to manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. To improve people's lives, the communities where we live and work, and the planet our future generations depend upon. Because this is what really matters. And we're here to make sure it works.

To learn more go to:  
[www.Eaton.com/whatmatters](http://www.Eaton.com/whatmatters)

**EATON**

*Powering Business Worldwide*

We make what matters work.

# Table of Contents

	<b>Page</b>
Switch, Protect, and Drive Your Motors – Today and Tomorrow	2
Product Overview	4
Software and tools	8
<b>Soft Starters</b>	
DS7 soft starters up to 110 kW (two-phase control)	12
S811+ soft starters up to 710 kW (three-phase control)	38
<b>PowerXL variable speed starter and variable frequency drive</b>	
DE1 variable speed starter up to 7.5 kW	54
Variable frequency drive DC1 to 22 kW	72
Variable frequency drive DB1 up to 4 kW	106
Variable frequency drive DA1 to 160 kW	126
Variable frequency drive DM1 to 22 kW	156
Variable frequency drive DG1 to 160 kW	184
General accessories and engineering	212
<b>Decentralized Drive System Rapid Link 5</b>	
AS-Interface RAM05, RASP5	234
Profinet RAM05, RASP5	245
Ethernet/IP RAM05, RASP5	252
Accessory devices	256
Appendix (motor data, motor information)	266
Worldwide export of machines and plants	270
Service information	272



# Future-proof switching, protection and operation of motors

With Eaton, you are ideally prepared for meeting the requirements of the new ErP Directive. In addition to revising our existing product range for the safe switching, protection and operation of motors, we have also added a number of clever new solutions.

## Flexible solutions for greater energy efficiency

We offer flexible solutions for all types of machine-building applications, from fans, pumps and conveyor belts to hydraulic pumps and more. Whether your application requires constant speed, soft starting or simple or complex speed control – we offer a wide range of products for combination with standard motors and highly energy-efficient drives.

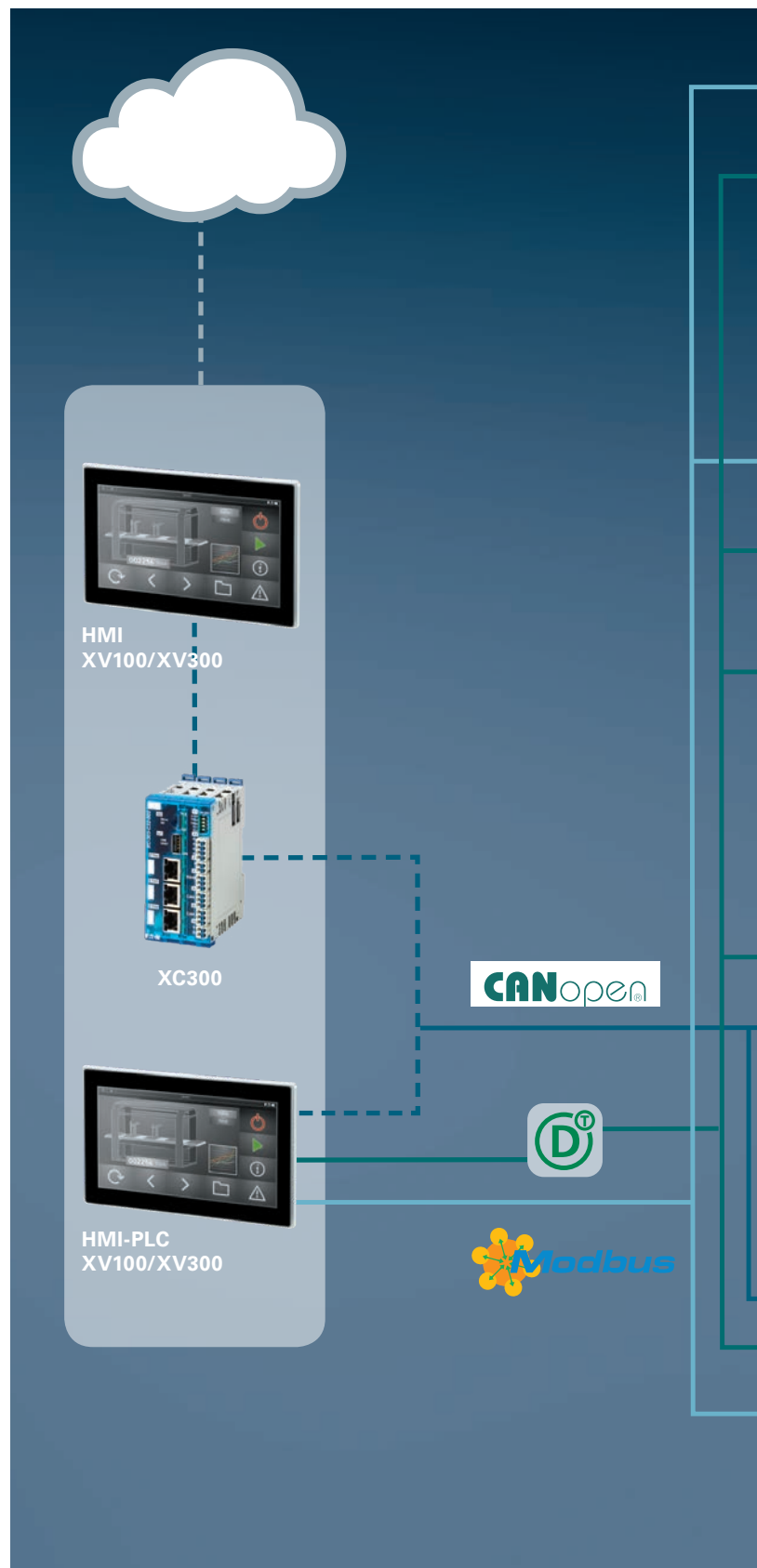
## Versatile communication and data acquisition options

Our intelligent connection system reduces wiring costs by up to 85%. At the same time, it reduces installation errors and simplifies both planning and commissioning. The connected devices deliver both analog and digital data, for example on machine states, motor currents or energy consumption. This helps to increase the availability of machines and systems while optimizing their energy consumption.

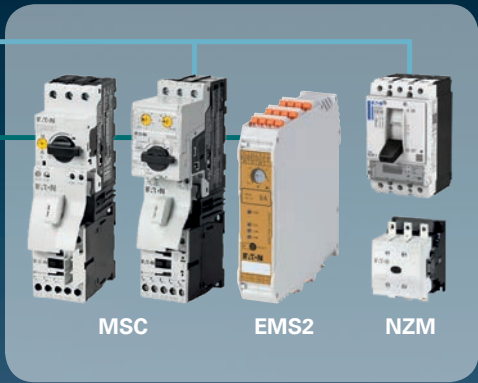
Moreover, we also offer additional communication systems. With CANopen or Modbus RTU, you can choose the system that best matches the needs of your plant.

## System control and data storage and visualization

The trend towards greater data transparency, particularly with regard to optimizing energy consumption in motor applications, not only requires data to be collected, but also to be analyzed more effectively. The data storage options offered by the machine itself are not sufficient for this purpose. Therefore, the data need to be collected and forwarded to a server for processing via the control system. We also offer the right solution for this task, irrespective of whether the data are locally processed or uploaded to the cloud.



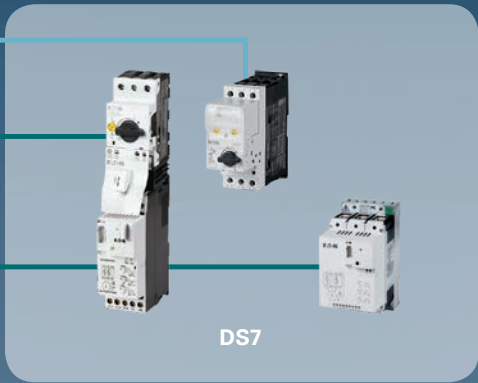




MSC

EMS2

NZM



DS7



DE1

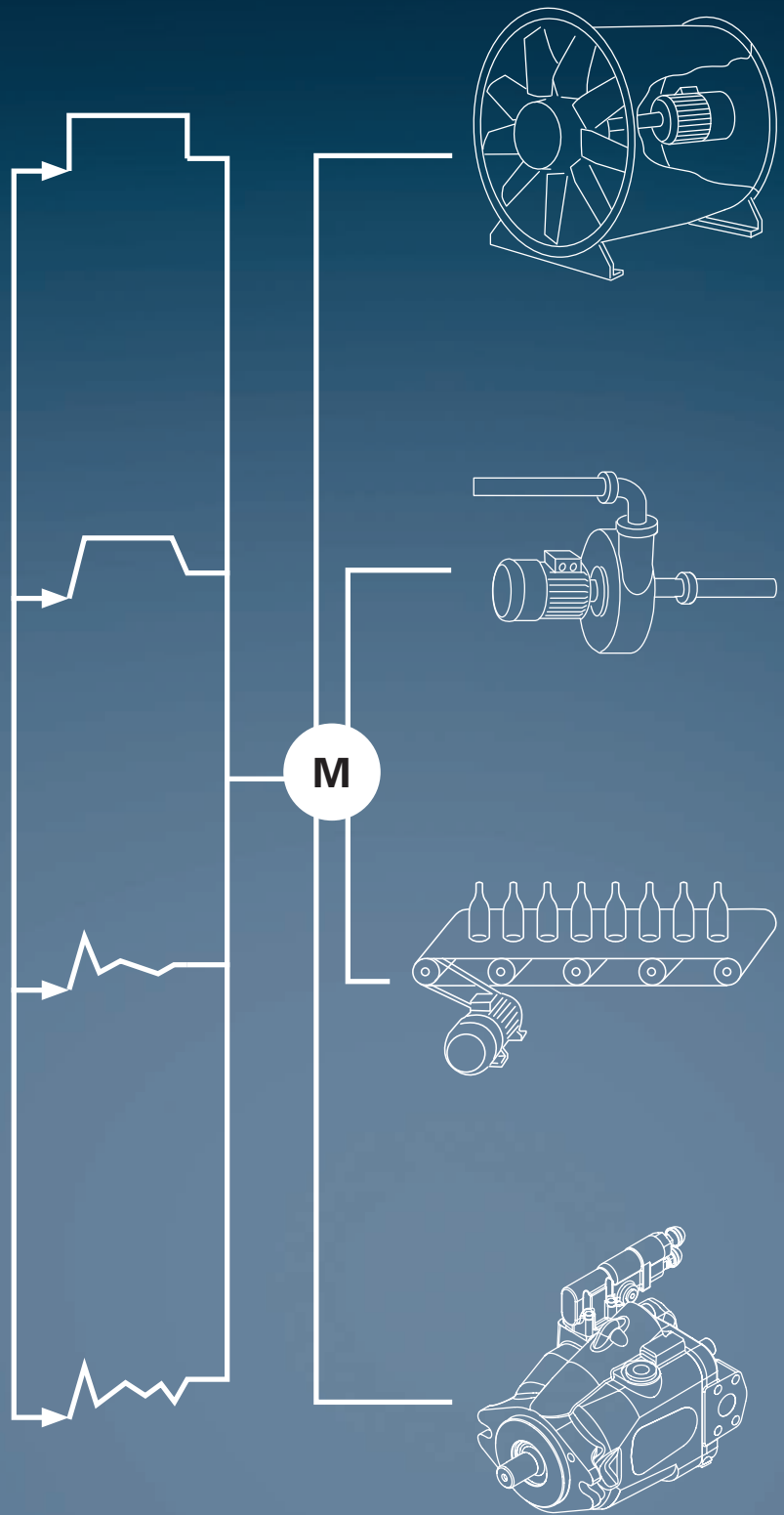
DE11



DC1

DA1

DG1



**Energy savings of 15% for the pumping station of a waterworks**

When the pump system of a waterworks had to be replaced, Aquatech, an Eaton Solution Partner, developed a new drive system in cooperation with the operator. This enabled the operator to reduce its operating and maintenance costs and achieve a rapid return on investment for the system upgrade. The combination of DG1 drives with IE4 motors allows for speed-controlled operation: During start-up, the pumping capacity increases only gradually.

Thereby avoiding the voltage peaks and pressure surges that often plagued the old system. In fact, this has enabled the waterworks to entirely eliminate gate valves during start-up. With the new system, sudden pressure changes in the water mains are also a thing of the past – thanks to the variable frequency drives, which gradually reduce the power output of the pumps. As a result, the non-return valves now close in a much more gentle manner, which translates into less wear on the equipment.

# Variable frequency drives product overview

## DE1/DE11 Machinery Micro



## DC1 Machinery Compact



## DB1 OEM Cold Plate



## DA1 Machinery Advanced



<ul style="list-style-type: none"> <li>Automatic doors and barriers</li> <li>Drilling machines, milling machines</li> <li>Airlocks, industrial washing machines</li> <li>Pumps, low-power fans</li> <li>Conveyor belts, treadmills</li> </ul>	<ul style="list-style-type: none"> <li>Mobile pumps</li> <li>Motor-mounted compressors</li> <li>Gas burners</li> </ul>	<ul style="list-style-type: none"> <li>Extruders, compressors</li> <li>Crane and lifting equipment</li> <li>Tunnel boring machines, draw benches</li> <li>Crushers, mixers, stirrers</li> </ul>
<ul style="list-style-type: none"> <li>V/f Control mode</li> </ul>	<ul style="list-style-type: none"> <li>V/f Control mode</li> <li>Sensorless vector control (SLV)</li> <li>Permanent magnet, synchronous reluctance, and brushless DC motors</li> </ul>	<ul style="list-style-type: none"> <li>V/f Control mode</li> <li>Sensorless vector control (SLV)</li> <li>Closed-loop vector control (CLV)</li> <li>PM- Synchronous reluctance and brushless DC motors</li> </ul>
<b>DE11:</b> <ul style="list-style-type: none"> <li>Plug-in terminals</li> <li>Configurable relay output</li> <li>PTC/EX: Option EMT6</li> </ul>	<ul style="list-style-type: none"> <li>Brake Chopper optional</li> <li>PTC/EX: Option EMT6</li> </ul>	<ul style="list-style-type: none"> <li>Standard + internal PLC</li> <li>Brake Chopper</li> <li>STO (SIL 2, PL c, Cat. 1)</li> <li>PTC/EX: Option EMT6</li> </ul>
Digital Inputs      3 (4) Analog inputs        1 (1) Digital Outputs       0 Analog Outputs       0 Relay outputs         1 Expansion slots       1	Digital Inputs      3 (4) Analog inputs        1 (2) Digital Outputs       0 (1) Analog Outputs       1 (1) Relay outputs         1 Expansion slots       1	Digital Inputs      4 (5+3) Analog inputs        1 (2) Digital Outputs       0 (2) Analog Outputs       2 (2) Relay outputs         2 Expansion slots       1
0.25 - 2.2 kW (1~ 230 V/3~ 230 V) 0.37 - 7.5 kW (3~ 400 V/3~ 400 V)	0.37 - 0.55 kW (1~ 115 V/1~ 115 V) 0.37 - 1.1 kW (1~ 115 V/3~ 230 V) 0.37 - 1.1 kW (1~ 230 V/1~ 230 V) 0.37 - 4 kW (1~ 230 V/3~ 230 V) 0.37 - 11 kW (3~ 230 V/3~ 230 V) 0.75 - 22 kW (3~ 400 V/3~ 400 V)	0.37 - 1.5 kW (1~ 230 V/3~ 230 V) 0.75 - 4.0 kW (3~ 400 V/3~ 400 V) 0.75 - 75 kW (3~ 230 V/3~ 230 V) 0.75 - 160 kW (3~ 400 V/3~ 400 V) 0.75 - 110 kW (3~ 575 V/3~ 575 V)
<b>drivesConnect &amp; drivesConnect mobile App</b>		

# Rapid Link product overview

## RAM05 Decentralized motor starter



## RASP5 Decentralized variable frequency drive





<ul style="list-style-type: none"> <li>Conveyor belts with constant speed</li> <li>Quick Stop</li> <li>2/4 sensor inputs, 2 outputs</li> <li>Manual/automatic mode</li> <li>0.09 - 3.0 kW (400 V AC)</li> </ul>	<ul style="list-style-type: none"> <li>Roller and belt conveyors</li> <li>Chain conveyors</li> <li>Electronic reversing start (DOL and reversing starter)</li> <li>Configurable motor protection / thermistor protection</li> <li>Special material handling equipment functions</li> </ul>	<ul style="list-style-type: none"> <li>Conveyor belts with constant speed</li> <li>Lift drives</li> <li>Quick Stop</li> <li>Braking resistance integrated</li> <li>2/4 sensor inputs, 2 outputs</li> <li>Manual/automatic mode</li> <li>0.75 - 4.0 kW (400 V AC)</li> </ul>	<ul style="list-style-type: none"> <li>Pallet, roller, and belt conveyors</li> <li>Diverter, rotary tables</li> <li>EMC filter, integrated</li> <li>Configurable motor protection / thermistor protection</li> <li>Special material handling equipment functions</li> <li>STO (SIL 3, PL e, Cat. 3)</li> </ul>
<b>drivesConnect &amp; drivesConnect mobile App</b>			



<b>DM1</b> <b>General Purpose</b> <b>Micro</b> 	<b>DM1 Pro</b> <b>General Purpose</b> <b>Compact</b> 	<b>DG1</b> <b>General Purpose</b> 
<ul style="list-style-type: none"> <li>V/f Control mode</li> </ul>	<ul style="list-style-type: none"> <li>Pumps, fans</li> <li>Compressors</li> <li>HVAC</li> <li>Mills, crushers, presses</li> <li>Conveyor belts</li> </ul>	<ul style="list-style-type: none"> <li>V/f Control mode</li> <li>Sensorless vector control (SLV) Torque control (SLV)</li> <li>Permanent magnet motors</li> </ul>
<ul style="list-style-type: none"> <li>Multi-drive / multi-pump</li> <li>Brake Chopper</li> <li>PTC/EX: Option EMT6</li> </ul>	<ul style="list-style-type: none"> <li>Multi-drive / multi-pump, web server</li> <li>Brake Chopper</li> <li>STO (SIL 2, PL d, Cat. 3)</li> <li>PTC/EX: Option EMT6</li> </ul>	<ul style="list-style-type: none"> <li>Multi-drive / multi-pump, RTC, web server</li> <li>Brake Chopper on-board (≥ 61 A optional)</li> <li>STO: (SIL 1, PL c, Cat. 1)</li> <li>PTC/EX: Option EMT6</li> </ul>
Digital Inputs            4 Analog inputs            1 Digital Outputs            0 Analog Outputs            1 Relay outputs            1 Expansion slots            0	Digital Inputs            4 Analog inputs            1 Digital Outputs            0 Analog Outputs            1 Relay outputs            2 Expansion slots            1	Digital Inputs            8 (+12) Analog inputs            2 (+2) Digital Outputs            1 (+6) Analog Outputs            2 (+4) Relay outputs            3 (+6) Expansion slots            2
0.18 - 15 kW (3~ 230 V/3~ 230 V) 0.37 - 22 kW (3~ 400 V/3~ 400 V) 5 - 25 HP (3~ 575 V/3~ 575 V)	0.18 - 1.5 kW (1~ 115 V/3~ 230 V) 0.18 - 5.5 kW (1~ 230 V/3~ 230 V) 0.18 - 15 kW (3~ 230 V/3~ 230 V) 0.37 - 22 kW (3~ 400 V/3~ 400 V) 5 - 25 HP (3~ 575 V/3~ 575 V)	0.75 - 90 kW (3~ 230 V/3~ 230 V) 0.75 - 160 kW (3~ 400 V/3~ 400 V) 2.2 - 250 HP (3~ 575 V/3~ 575 V)

**PowerXpert inControl**

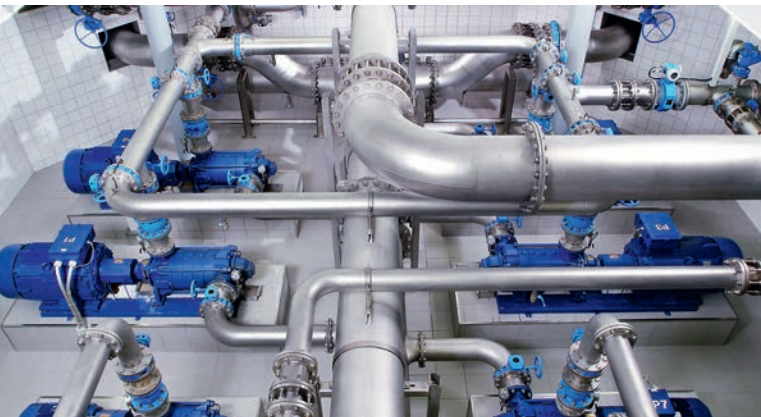
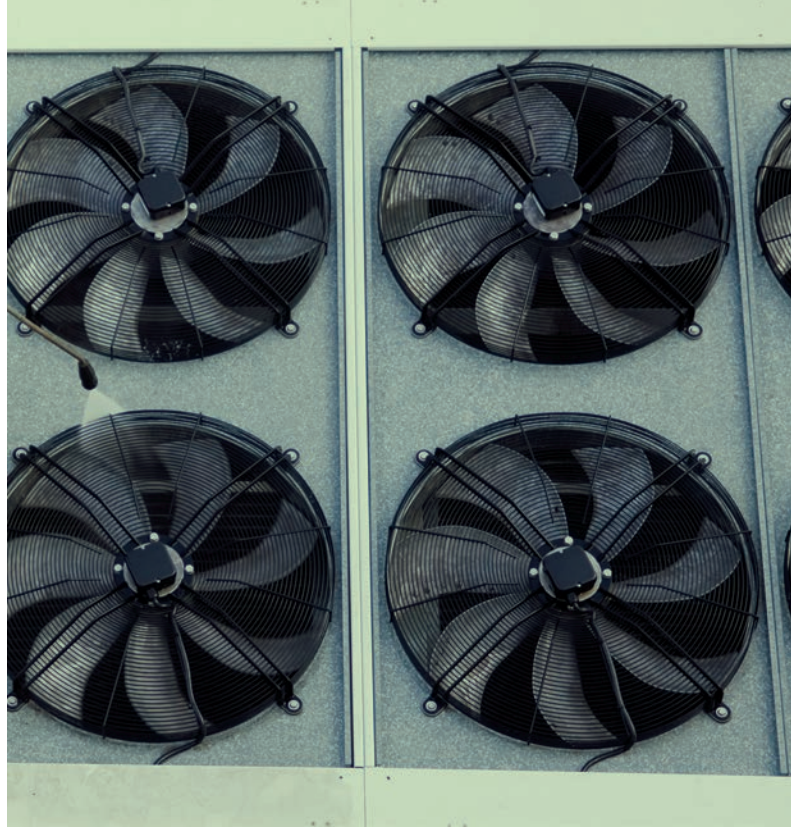
## Soft starter product overview

<b>DS7</b> <b>Industrial Micro</b> 	<b>S811+</b> <b>Industrial General Purpose</b> 
<ul style="list-style-type: none"> <li>Pumping</li> <li>Compressors</li> <li>Two-phase patented control</li> <li>Integrated bypass</li> </ul>	<ul style="list-style-type: none"> <li>Fans</li> <li>Conveyor belts, treadmills</li> <li>Expanded diagnostics with SmartWire-DT</li> <li>xStart-compatible</li> </ul>
<ul style="list-style-type: none"> <li>Control voltage 24 V AC/DC /110 - 230 V AC</li> </ul>	<ul style="list-style-type: none"> <li>24 V DC control voltage</li> <li>Special pump algorithm</li> </ul>
<ul style="list-style-type: none"> <li>1.5 - 110 kW (200 - 480 V AC)</li> </ul>	<ul style="list-style-type: none"> <li>7.5 - 450 kW (200 - 600 V AC)</li> <li>160 - 710 kW (690 V AC)</li> </ul>





# Pumps and fans



# Material handling







# Compressors



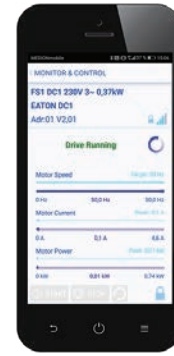
# Machines





# drivesConnect – The Software for optimal implementation.

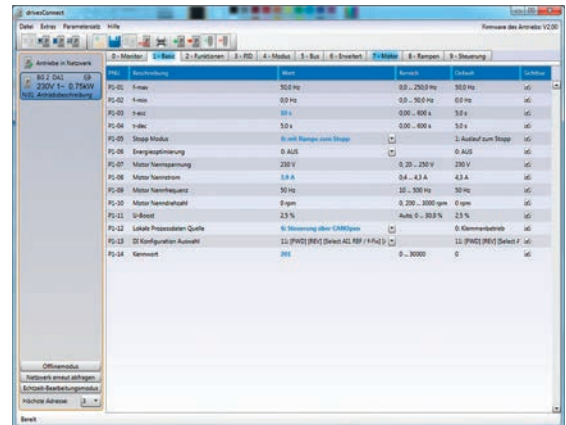
The drivesConnect computer program and the drivesConnect mobile smartphone app are powerful commissioning tools for PowerXL DE1, DC1, DA1, DB1 variable frequency drives and the Rapid Link 5 electronic drive system. Beside parameterization and diagnosis user-defined internal logic links can be set up through the function block editor and transferred to the variable frequency drives.



Android/iOS  
drivesConnect  
Mobile App

## Parameter Editor

The parameterization function has an uncluttered, easy to understand user interface. With the editor variable frequency drives can be parameterized both online and offline. In online mode monitor values can be used for diagnostics.



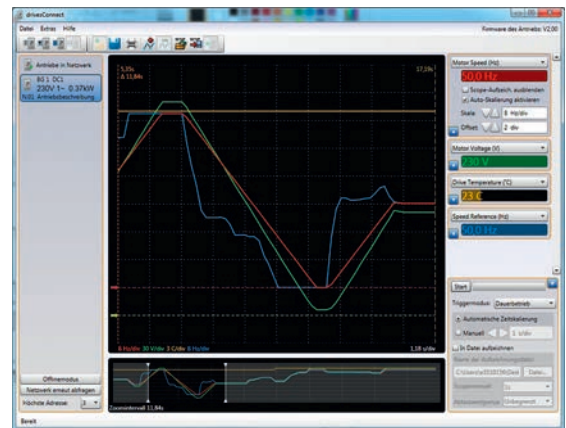
Parameter-Editor starting screen

## Drive control / monitor

The drive control/monitor function makes it possible to easily run connected variable frequency drives with the use of software. This not only means that individual drive functions can be quickly accessed, but also that devices can be easily activated and deactivated.

## Scope/Data Logger

The scope/data logger can be used to graphically show up to four selected variable frequency drive parameters as curves. This ensures that the behavior of display values such as motor voltage and motor current during ongoing operation can be tracked directly – and even recorded.



Display showing recorded signals

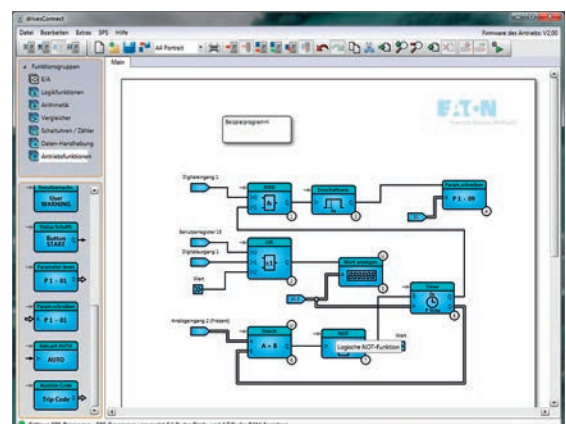
## Function block editor

Together with the DA1 variable frequency drive, the Function Block Editor provides the option of using PLC programming to create separate logic operations – with time dependencies, for example – within the variable frequency drive. In fact, using the blocks from the “Inputs/Outputs,” “Logic Functions,” “Arithmetic,” “Comparators,” “Timers,” “Counters,” “Data Handling,” and “Drive Functions” function groups makes it possible to generate your own applications within the Editor.

By simulating the PLC program, invalid blocks can be identified as errors and corrected directly. This makes it possible to adapt the variable frequency drive to any application, cutting down on additional hardware costs in the process.

### Online installation:

[www.drive-support-studio.com/OTS/Eaton/downloads/deploy/drivesConnect.htm](http://www.drive-support-studio.com/OTS/Eaton/downloads/deploy/drivesConnect.htm)



Example of visualization with various function blocks



# Communications stick

## Easily transfer parameter configurations

The “DX-COM-STICK3-KIT” communications stick makes it possible to quickly and easily transfer parameters from your laptop to PowerXL variable frequency drives using Bluetooth. In addition, the stick can be used to establish a connection to the drivesConnect mobile smartphone app. The convenience of this feature is only matched by the stick’s copy function, which can be used to transfer parameter sets from one variable frequency drive to another. This makes the stick a perfect little helper – especially when it comes to mass production operations.



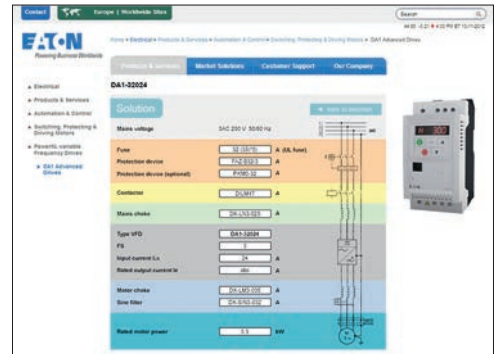
# Additional PC tools

## Selection aid

### Simple planning and engineering

An electronic selection aid provides simple planning, helping you quickly select the drive required for your application and the associated switchgear, protective elements, chokes, and filters complete with the corresponding article number.

[www.Eaton.com/drives-configurator](http://www.Eaton.com/drives-configurator)



# Energy savings estimator

## A few steps are all it takes to determine your energy needs and save big

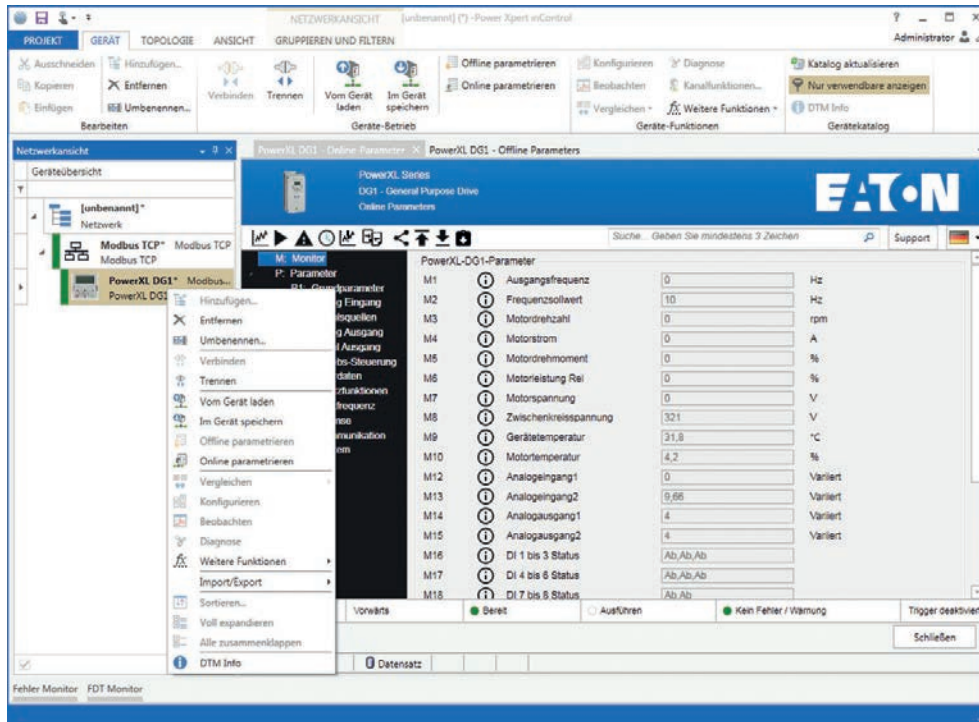
The “Energy Savings Estimator” is a program that calculates the estimated energy needed for applications involving fans and/or pumps. After entering your project information, you will get an estimate of the energy savings and payback time that can be achieved when using variable frequency drives instead of conventional speed controllers.

[www.Eaton.com/energysavingsestimator](http://www.Eaton.com/energysavingsestimator)



# Power Xpert inControl – The Eaton platform that makes configuring parameters a cinch.

The Power Xpert inControl computer program is a powerful commissioning tool for PowerXL DG1 and DM1 variable frequency drives. In addition to its parameter configuration and diagnostic functionalities, it can be used to configure and view the internal oscilloscope featured by DG1 devices, making it possible to obtain plots for up to eight channels using 10 ms intervals. Moreover, Power Xpert inControl is not a platform for DG1 variable frequency drives exclusively, but instead will be used for all future Eaton devices with communication capabilities as well.



## Serial or Ethernet

The connection to a computer can be established either with a serial RS-485 connection or via Ethernet. DG1 units feature hardware ports for both of these options, and Power Xpert inControl has drivers for both interfaces. In other words, the choice is up to you.

## Parameterization

### Online and offline

The parameterization function has an uncluttered, easy to understand user interface. With the editor variable frequency drives can be parameterized both online and offline. In online mode monitor values can be used for diagnostics.

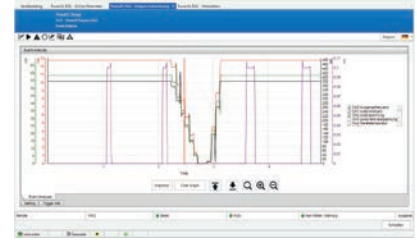




# Internal DG1 oscilloscope

## Faster analysis with 10 ms intervals

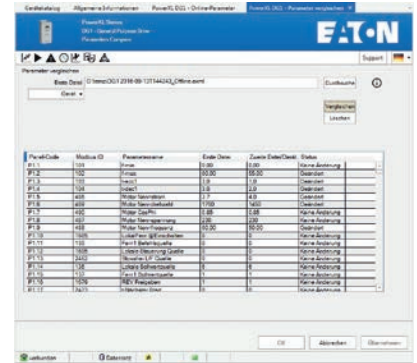
Together with Power Xpert inControl, DG1 devices can be used to plot up to 8 signals at the same time. However, most serial connections to a computer only allow for data to be sampled at relatively large time intervals, which is why DG1 units feature an integrated 8 channel oscilloscope as well. This oscilloscope makes it possible to analyze faster processes with plots using 10 ms as the time interval, and Power Xpert inControl provides comprehensive options for configuring the oscilloscope and selecting trigger signals.



# Compare and document data sets

## Online and offline

The comparison function enables DG1 devices to compare their parameters to another data set quickly and easily. Likewise, data can be quickly and easily entered in a spreadsheet program and filtered to see changed/different parameters – regardless of whether the comparison data comes from a different device in the system or from a saved or default data set. This provides an optimal way of reliably documenting all changes without having to go through every single parameter one at a time.



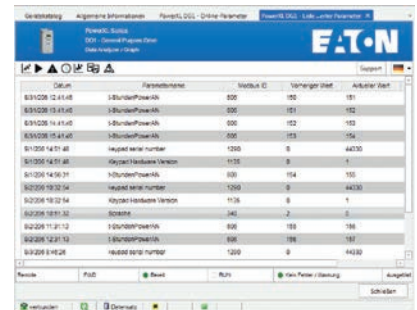
# Exceptional memory

## Track changes easily

Made some changes by accident? Do you need to figure out why your drive won't start anymore all of a sudden?

This is where the DG1's ability to save the last 100 parameter changes, together with a timestamp, comes in handy. Power Xpert inControl can read and show these changes,

making it easy to undo undesirable changes.



# PC-connection

## Cable (Modbus RTU):

By using a wired USB connection, up to 63 variable frequency drives can be connected to a PC via Modbus RTU. The software can then be used to conveniently configure their parameters.

## Cable (Modbus TCP):

By using a wired Ethernet connection, virtually any number of variable frequency drives can be connected to a PC via Modbus TCP. The software can then be used to conveniently configure their parameters.

## Wireless via WLAN:

An external WLAN gateway can be used to integrate the DG1 into industrial wireless networks. The connection to the actual DG1 is established with an Ethernet connection in this case. When using this type of connection, inControl will work as though it were directly connected to the corresponding DG1, and remote diagnostics will work smoothly as always.



# Soft starter DS7

## Soft to start, powerful in torque

Soft starters have become a well-established alternative to the star-delta starter. This is where the DS7, featuring two-phase control and designed to work seamlessly with DILM and PKZ switchgear, comes in. It can be flexibly combined with other units and adds the ability to “start motors softly” to the switching, protection, and starting functions common to control panels.

A patented method ensures that motor run-ups will be exceptionally soft while providing a higher torque than other available solutions.

### Performance range:

- 4 - 200 A
- 1.10 - 110 kW ( $U_e$ : 200 - 480 V)

### Applications:

- Conveyor belts
- Fans
- Pumping
- Cooling compressors

Designed for normal applications such as pumps, fans and small conveyors, the compact DS7 soft starter is ideal. The DS7 is also available with a SmartWire-DT connection to simplify wiring and enhance functionality as an automation solution.

### Features:

- Ramp time in a range of 1 to 30 s (for starting) or 0 to 30 s (for stopping)
- Starting voltage in the range from 30% to 100% of the mains voltage
- Control voltages: 24 V AC/DC, 110 V AC or SmartWire-DT
- The thermal load on the engine is lower thanks to asymmetric ignition control
- Ambient temperature -40°C to 60°C

### Accessory:

- Three-phase commoning links
- Terminal cover
- Feeder unit
- IP2X protection against contact with a finger
- Device fans
- Mounting kit

For more information, visit:  
[www.Eaton.com/DS7](http://www.Eaton.com/DS7)





## 1.1 Soft starter DS7

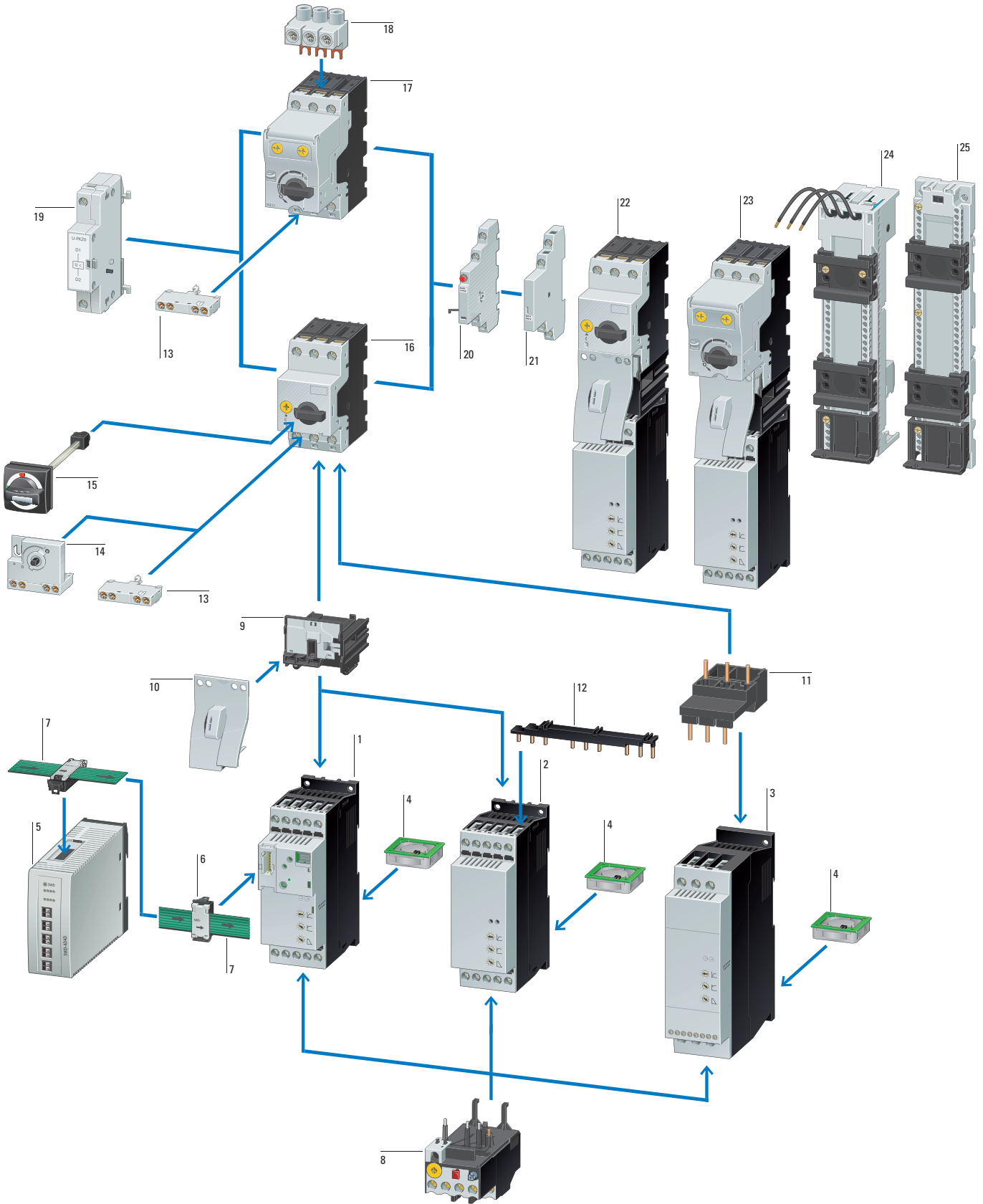
<b>System overview</b> .....	<b>14</b>
DS7 system overview < 32 A .....	<b>14</b>
DS7 system overview > 32 A .....	<b>16</b>
<b>Key to type references</b> .....	<b>17</b>
<b>Description</b> .....	<b>18</b>
<b>Ordering</b> .....	<b>19</b>
Basic devices .....	<b>19</b>
Accessories .....	<b>20</b>
<b>Engineering</b> .....	<b>24</b>
General information on Engineering .....	<b>24</b>
Design with different load cycles .....	<b>26</b>
Connection examples .....	<b>28</b>
Assigned switching and protective elements .....	<b>30</b>
<b>Technical data</b> .....	<b>32</b>
<b>Dimensions and weights</b> .....	<b>34</b>

# 1.1

## Soft starter DS7

DS7 < 32 A system overview

### System overview



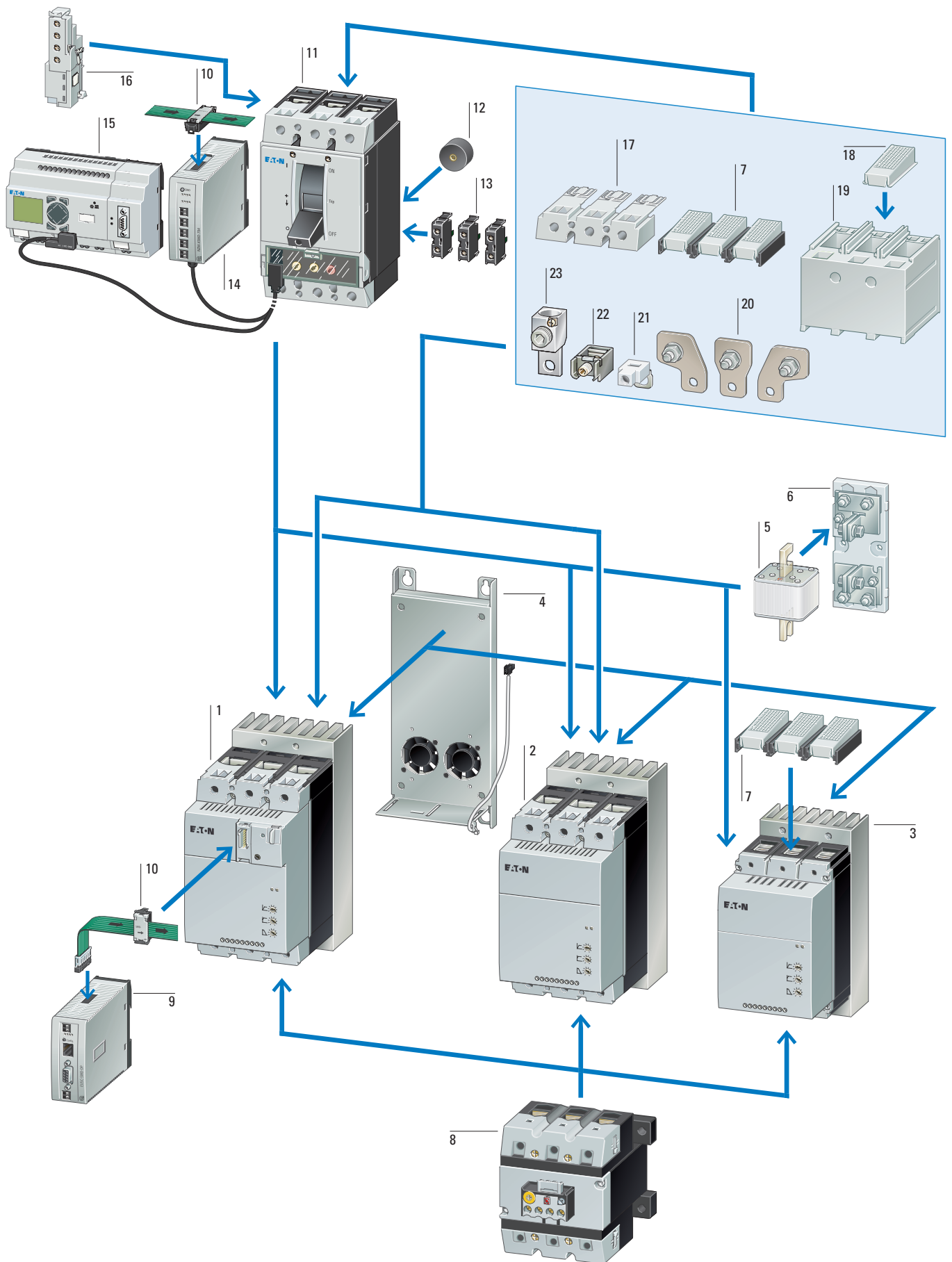


<b>Soft starter DS7 with SmartWire-DT</b>	<b>1</b>	<b>PKZM0-XDM wiring set in tool-less plug connection</b>	<b>9</b>	<b>Connection clamp</b>	<b>18</b>
→ Page 19		→ Page 21	<b>10</b>	→ Page 22	
<b>DS7 soft starters in frame size 1 for assigned motor current up to 12 A</b>	<b>2</b>	<b>PKZM0-XM wiring set</b>	<b>11</b>	<b>Voltage release</b>	<b>19</b>
→ Page 19		→ Page 21		→ Industrial Switchgear catalog	
<b>DS7 soft starters in frame size 2 for assigned motor current up to 32 A</b>	<b>3</b>	<b>Three-phase commoning link</b>	<b>12</b>	<b>Trip indicator</b>	<b>20</b>
→ Page 19		→ Page 22		→ Industrial Switchgear catalog	
<b>DS7-FAN-32 device fan</b>	<b>4</b>	<b>Standard auxiliary contact</b>	<b>13</b>	<b>Standard auxiliary contact</b>	<b>21</b>
→ Page 23		→ Industrial Switchgear catalog		→ Industrial Switchgear catalog	
<b>SmartWire-DT gateway</b>	<b>5</b>	<b>Early-make auxiliary contact</b>	<b>14</b>	<b>Motor-starter combination with PKZ</b>	<b>22</b>
→ Industrial Switchgear catalog		→ Industrial Switchgear catalog		→ Industrial Switchgear catalog	
<b>SmartWire-DT external device plug</b>	<b>6</b>	<b>Door coupling handle</b>	<b>15</b>	<b>Motor-starter combination with PKE</b>	<b>23</b>
→ Industrial Switchgear catalog		→ Industrial Switchgear catalog		→ Industrial Switchgear catalog	
<b>SmartWire-DT flat band conductor</b>	<b>7</b>	<b>Motor Protective Circuit Breakers PKZM0</b>	<b>16</b>	<b>Busbar adapter</b>	<b>24</b>
→ Industrial Switchgear catalog		→ Industrial Switchgear catalog		→ Page 21	
<b>Overload relay</b>	<b>8</b>	<b>Motor Protective Circuit Breakers PKE</b>	<b>17</b>	<b>Top-hat rail adapter</b>	<b>25</b>
→ Page 21		→ Industrial Switchgear catalog		→ Page 21	

# 1.1

## Soft starter DS7

DS7 > 32 A system overview



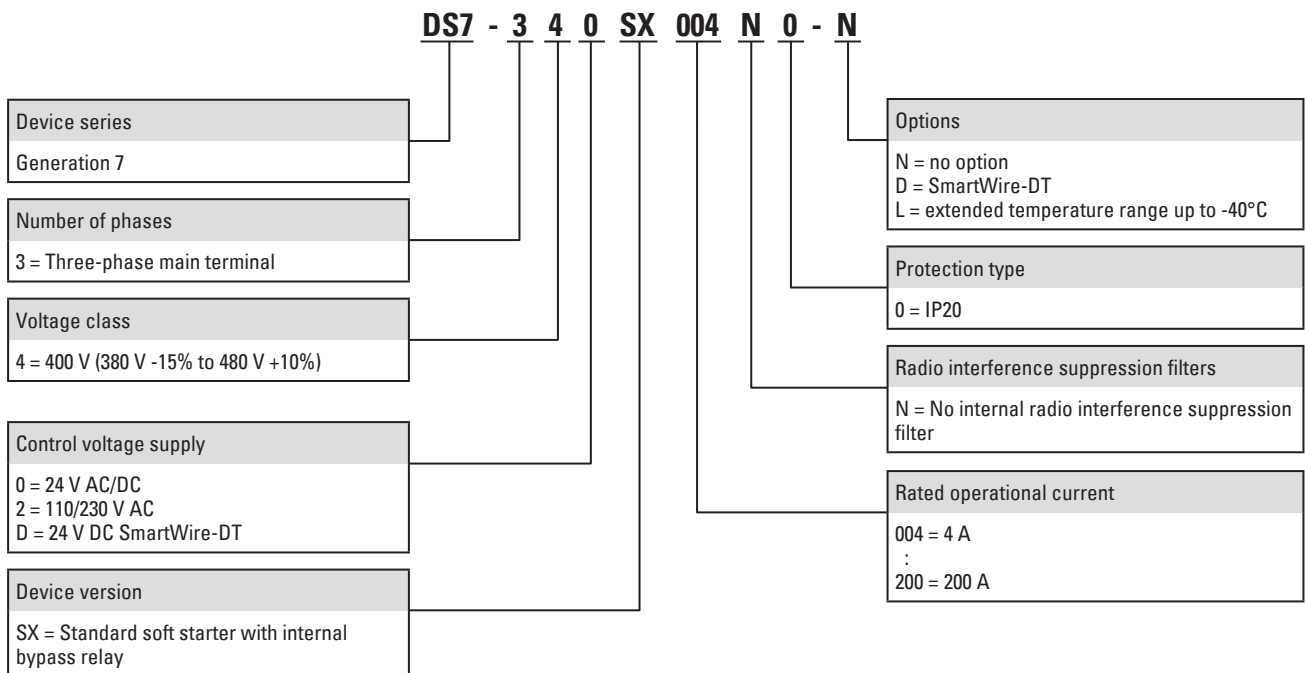


<b>DS7 with SmartWire-DT</b>	<b>1</b>
→ Page 19	
<b>DS7 size 4 up to 200 A</b>	<b>2</b>
→ Page 19	
<b>DS7 size 3 up to 100 A</b>	<b>3</b>
→ Page 19	
<b>Device fans</b>	<b>4</b>
→ Page 23	
<b>Superfast semiconductor fuses</b>	<b>5</b>
→ Page 20	
<b>Fuse bases for superfast semiconductor fuses</b>	<b>6</b>
→ Page 20	
<b>IP2X protection against contact with a finger</b>	<b>7</b>
→ Page 23	
<b>Overload relay</b>	<b>8</b>
→ Page 21	
<b>Gateways for SmartWire-DT</b>	<b>9</b>
→ Industrial Switchgear catalog	

<b>SmartWire-DT external device plug</b>	<b>10</b>
→ Industrial Switchgear catalog	
<b>NZM circuit breakers</b>	<b>11</b>
→ Industrial Switchgear catalog	
<b>Spacer</b>	<b>12</b>
→ Industrial Switchgear catalog	
<b>Standard auxiliary contact/Trip-indicating auxiliary switch</b>	<b>13</b>
→ Industrial Switchgear catalog	
<b>NZM communication module for SmartWire-DT</b>	<b>14</b>
→ Industrial Switchgear catalog	
<b>Data management interface (DMI module)</b>	<b>15</b>
→ Industrial Switchgear catalog	
<b>Voltage release/Early-make auxiliary contact</b>	<b>16</b>
→ Industrial Switchgear catalog	

<b>Terminal cover for terminals</b>	<b>17</b>
→ Page 22	
<b>IP2X protection against contact with a finger</b>	<b>18</b>
→ Page 23	
<b>Terminal cover for cable lugs</b>	<b>19</b>
→ Page 22	
<b>Connection width extension</b>	<b>20</b>
→ Industrial Switchgear catalog	
<b>Control circuit terminal</b>	<b>21</b>
→ Industrial Switchgear catalog	
<b>Frame clamps</b>	<b>22</b>
→ Industrial Switchgear catalog	
<b>Tunnel terminals for Al and Cu cable</b>	<b>23</b>
→ Industrial Switchgear catalog	

Key to type references



# 1.1

## Soft starter DS7

### Description

### Description



### Application

DS7 soft starters are two-phase control soft starters used to soft start three-phase AC motors in applications with a normal operating frequency and a current range of 3 to 200 A (1.1 to 110 kW with a 400 V supply voltage).

Closing transients and DC components during startup are effectively suppressed and guarantee even motor starting.

The special control method (asymmetrical firing control) for the soft start function avoids the DC components (Eaton patent) that are normally produced by two-phase control soft starters. This prevents the formation of an elliptically rotating field, which would otherwise result in the motor not accelerating smoothly and increase starting times unnecessarily. Accordingly, the smooth starting provided by DS7 soft starters is comparable to that provided by three-phase control soft starters.

### Functions

Typical fields of application for Series DS7 soft starters are:

- Pump drives: pressure surges are prevented through soft starting reducing mechanical loads on the entire system and lengthening its life.
- Fan drives: soft starting keeps fan belts from slipping, preventing premature wear. This not only lowers operating costs, but also extends the corresponding system's life.
- Conveyor belts: conveyor belts start running smoothly, instead of starting with a jolt. This ensures that any goods being conveyed will not topple over. In addition, it prevents mechanical damage to the belt itself, making it last longer.

### Features

- The ramp time can be adjusted by potentiometer within a range of 1 to 30 s (for starting) or 0 to 30 s (for stopping) with a potentiometer
- The start voltage (or start torque) can be adjusted within a range of 30 to 100 percent of the mains voltage with a potentiometer
- Significant reduction in switch-on current, achieved with a short soft start ramp time (min. 1 s) for lamp and heating loads
- Internal bypass relay: switches on automatically after the end of the ramp, bypassing the internal thyristors.
- This makes it possible to comply with radio interference level B without any additional measures.
- The motor's thermal load is smaller than it would be without asymmetric ignition control.
- Designed specifically for long cables

### Documentation

Surface mounting and standard mounting procedures are described in the corresponding instruction leaflets and in the manual.

Instruction leaflets:  
ILO3902003Z: for size 1 devices (up to 12 A motor output)  
ILO3902004Z: for size 2 devices (up to 32 A motor output)  
ILO3902005Z: for size 3, 4 devices (up to 200 A motor output)

Manual:  
MN03901001Z

You can download the documentation for the DS7 soft starters from the Internet at: [www.moeller.net/support](http://www.moeller.net/support)

### Communication interface SmartWire-DT

The use of a SmartWire-DT interface completely eliminates the need for conventional control wiring. This has several advantages:

- No incorrect wiring
- Faster wiring
- Cost saving

The interface can be used to send control commands to a DS7-SWD device and modify and diagnose the latter's parameter configuration; in addition, the control electronics can be powered via the SmartWire-DT cable.

The device is controlled with one of three selectable profiles:

- A "start/stop" profile, which should already be familiar from the PKE motor-protective circuit-breaker and contactor combination
- An 8 bit-wide profile for the soft starter, which is provided the same way for the variable frequency drive and features more options
- A control profile comparable to a Profidrive profile, just like the one available for the variable frequency drive.

Regardless of the profile chosen, a DS7-SWD device's parameters can be read and written to at any time by using acyclical services. DS7-SWD devices make it possible to read and write to all device parameters. The mechanisms of the parameter channel that is described for the drives in the Profidrive profile are used for this purpose. This profile provides a standardized parameter access method for variable frequency drives and soft starters.

It is also possible to overwrite the potentiometer settings on the DS7-SWD, which can come in handy, for instance, when a change made to the machine needs to be undone.

DS7-SWD devices come with a detailed diagnostic system with options that extend far beyond those of wired devices. In addition to having an error log, DS7-SWD devices can detect and report nine different device faults. A warning parameter is used to report any alarm messages present. Moreover, the response to each individual fault can be customized. Finally, there are 35 additional messages for communication errors. Using a DS7 in connection with a PKE opens up new functionalities that were previously thought impossible to implement with a low-cost soft starter and that were reserved to significantly more expensive devices. Combining a PKE unit and a DS7-SWD makes it possible to completely protect the DS7-SWD device against overloads. In addition, it provides a current limiting function and can be used to report thermal loads to higher-level controllers.

### Extended temperature range


DS7-340SX...-L soft starters can operate at temperatures as low as -40°C.

## Ordering

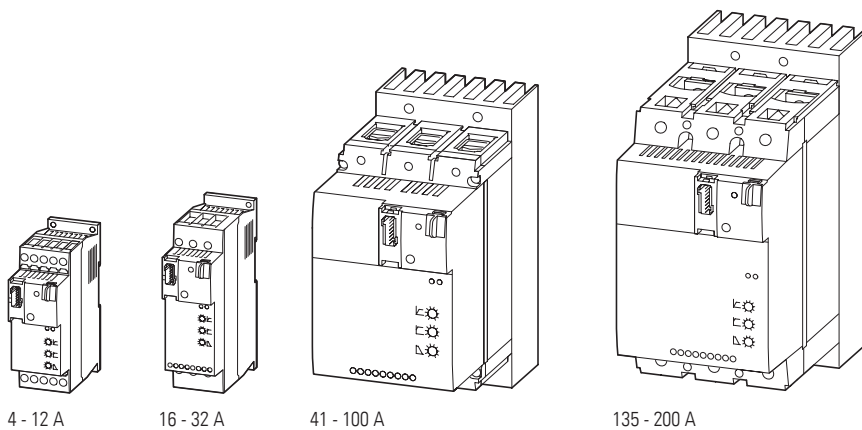
Rated operational current	Assigned motor output		Catalog Number	Article no.	Catalog Number	Article no.	Std. pack
Device (AC-53)	at 400 V, 50 Hz	at 460 V, 60 Hz					
$I_b$	P	P					

## Soft Starters

Soft starters for three-phase loads  
Mains supply voltage (50/60 Hz)  
 $U_{LN}$  200 - 480 V AC

			$U_c$ 24 V AC/DC $U_s$ 24 V AC/DC Standard temperature range				$U_c$ 24 V AC/DC $U_s$ 24 V AC/DC Expanded temperature range down to -40°C
4	1.5	2	DS7-340SX004N0-N	134847	DS7-340SX004N0-L	171740	1 unit
7	3	5	DS7-340SX007N0-N	134849	DS7-340SX007N0-L	171741	
9	4	5	DS7-340SX009N0-N	134910	DS7-340SX009N0-L	171742	
12	5.5	10	DS7-340SX012N0-N	134911	DS7-340SX012N0-L	171743	
16	7.5	10	DS7-340SX016N0-N	134912	DS7-340SX016N0-L	171744	
24	11	15	DS7-340SX024N0-N	134913	DS7-340SX024N0-L	171745	
32	15	25	DS7-340SX032N0-N	134914	DS7-340SX032N0-L	171746	
41	22	30	DS7-340SX041N0-N	134916	DS7-340SX041N0-L	171747	
55	30	40	DS7-340SX055N0-N	134917	DS7-340SX055N0-L	171748	
70	37	50	DS7-340SX070N0-N	134918	DS7-340SX070N0-L	171749	
81	45	60	DS7-340SX081N0-N	134919	DS7-340SX081N0-L	171750	
100	55	75	DS7-340SX100N0-N	134920	DS7-340SX100N0-L	171751	
135	75	100	DS7-340SX135N0-N	134921	DS7-340SX135N0-L	171752	
160	90	125	DS7-340SX160N0-N	134922	DS7-340SX160N0-L	171753	
200	110	150	DS7-340SX200N0-N	134923	DS7-340SX200N0-L	171754	
			$U_c$ 110 - 230 V AC $U_s$ 110 - 230 V AC				$U_c$ 24 V DC $U_s$ 24 V DC 
4	1.5	2	DS7-342SX004N0-N	134925	DS7-34DSX004N0-D	134943	1 unit
7	3	5	DS7-342SX007N0-N	134927	DS7-34DSX007N0-D	134945	
9	4	5	DS7-342SX009N0-N	134928	DS7-34DSX009N0-D	134946	
12	5.5	10	DS7-342SX012N0-N	134929	DS7-34DSX012N0-D	134947	
16	7.5	10	DS7-342SX016N0-N	134930	DS7-34DSX016N0-D	134948	
24	11	15	DS7-342SX024N0-N	134931	DS7-34DSX024N0-D	134949	
32	15	25	DS7-342SX032N0-N	134932	DS7-34DSX032N0-D	134950	
41	22	30	DS7-342SX041N0-N	134934	DS7-34DSX041N0-D	134952	
55	30	40	DS7-342SX055N0-N	134935	DS7-34DSX055N0-D	134953	
70	37	50	DS7-342SX070N0-N	134936	DS7-34DSX070N0-D	134954	
81	45	60	DS7-342SX081N0-N	134937	DS7-34DSX081N0-D	134955	
100	55	75	DS7-342SX100N0-N	134938	DS7-34DSX100N0-D	134956	
135	75	100	DS7-342SX135N0-N	134939	DS7-34DSX135N0-D	134957	
160	90	125	DS7-342SX160N0-N	134940	DS7-34DSX160N0-D	134958	
200	110	150	DS7-342SX200N0-N	134941	DS7-34DSX200N0-D	134959	

## Notes



4 - 12 A

16 - 32 A

41 - 100 A

135 - 200 A



# 1.1

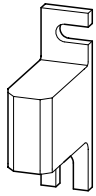
## Soft starter DS7

### Accessories

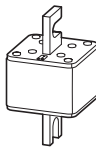
Nominal Current	Max. heat dissipation P <sub>v</sub> W	Frame size	For use with	Article no.	Std. pack
-----------------	--	------------	--------------	-------------	-----------

#### Superfast semiconductor fuses

DIN 43653, 690/700 V (IEC/UL)  
Pitch measure 80 mm



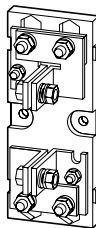
16	5.5	000	DS7-34...SX004NO-...	170M1359	10 unit
25	9	000	DS7-34...SX007NO-...	170M1361	
32	10	000	DS7-34...SX009NO-... DS7-34...SX012NO-...	170M1362	
50	15	000	DS7-34...SX016NO-...	170M1364	
63	16	000	DS7-34...SX024NO-...	170M1365	
80	19	000	DS7-34...SX032NO-...	170M1366	
125	26	S1*	DS7-34...SX041NO-... DS7-34...SX055NO-...	170M3013	
200	45	S1	DS7-34...SX070NO-... DS7-34...SX081NO-... DS7-34...SX100NO-...	170M4008	
315	58	S1	DS7-34...SX135NO-...	170M4010	
400	65	S2	DS7-34...SX160NO-... DS7-34...SX200NO-...	170M5008	



For use with	Article no.	Std. pack
--------------	-------------	-----------

#### Fuse Bases

Dimensions (W x H x D) mm 145 x 43 x 50	000, 00	170H1007	3 unit
205 x 88 x 80	S1*, S1, S2, S3	170H3004	



For use with **Catalog Number** Std. pack  
Article no.

**Overload relay**

DS7-34...SX004...	<b>ZB12-4</b> 278438	1 unit
DS7-34...SX007... DS7-34...SX009...	<b>ZB12-10</b> 278440	
DS7-34...SX012...	<b>ZB12-12</b> 278441	
DS7-34...SX016...	<b>ZB32-16</b> 278452	
DS7-34...SX024...	<b>ZB32-24</b> 278453	
DS7-34...SX032...	<b>ZB32-32</b> 278454	

**Wiring set**

For DOL Starter

DS7-34...SX004... DS7-34...SX007... DS7-34...SX009... DS7-34...SX012...	<b>PKZM0-XDM12</b> 283149	1 unit
--	------------------------------	--------

**Electric contact module**

DS7-34...SX016... DS7-34...SX024... DS7-34...SX032...	<b>PKZM0-XM32DE</b> 239349	5 unit
---	-------------------------------	--------

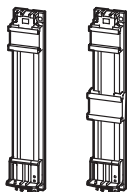
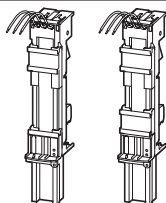
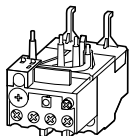
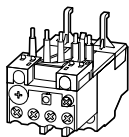
**Busbar adapter**

PKZM0, PKE + DS7...004N... PKZM0, PKE + DS7...007N... PKZM0, PKE + DS7...009N... PKZM0, PKE + DS7...012N...	<b>BBA0L-25</b> 142526	1 unit
PKZM0, PKE + DS7...016N... PKZM0, PKE + DS7...024N... PKZM0, PKE + DS7...032N...	<b>BBA0L-32</b> 142527	1 unit

**Top-hat rail adapter**

45 mm wide adapter plate

PKZM0, PKE + DS7...004N... PKZM0, PKE + DS7...007N... PKZM0, PKE + DS7...009N... PKZM0, PKE + DS7...012N...	<b>PKZM0-XC45L</b> 142529	1 unit
PKZM0, PKE + DS7...016N... PKZM0, PKE + DS7...024N... PKZM0, PKE + DS7...032N...	<b>PKZM0-XC45L/2</b> 142570	1 unit



# 1.1

## Soft starter DS7

### Accessories

For use with **Catalog Number** Std. pack **Notes**  
Article no.

#### Three-phase commoning links

Protected against accidental contact, short-circuit proof,  
 $U_g = 690\text{ V}$ ,  $I_g = 35\text{ A}$   
can be extended by rotating installation ( $\sum I_g \leq 35\text{ A}$ )



DS7-34...SX004...	<b>DILM12-XDSB0/3</b>	5 unit	For the primary side of DS7 Suitable for 3 DS7 soft starters Length 112 mm
DS7-34...SX007...	240084		

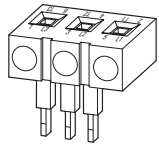


DS7-34...SX009...	<b>DILM12-XDSB0/4</b>		For the primary side of DS7 Suitable for 4 DS7 soft starters Length 157 mm
DS7-34...SX012...	240085		



	<b>DILM12-XDSB0/5</b>		For the primary side of DS7 Suitable for 5 DS7 soft starters Length 202 mm
	240086		

#### Feeder unit



DS7-34...SX004...	<b>DILM12-XEK</b>	5 unit	For three-phase commoning link, protected against accidental contact, $U_g = 690\text{ V}$ , $I_g = 35\text{ A}$ . Terminal capacity: stranded 2.5...16 mm <sup>2</sup> Flexible with ferrule 2.5...16 mm <sup>2</sup> AWG14...8
DS7-34...SX007...	240083		
DS7-34...SX009...			
DS7-34...SX012...			

#### Terminal cover

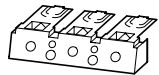
Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers.

**knockout**  
**For box terminal**

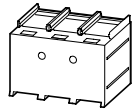


DS7-34...SX041...	<b>NZM1-XKSFA</b>	1 unit	Enhancement of the busbar tag shroud (simple protection against contact with a finger). Cannot be combined with NZM-XSTK control circuit terminal.
DS7-34...SX055...	100780		
DS7-34...SX070...			
DS7-34...SX081...			
DS7-34...SX100...			

**knockout**



DS7-34...SX135...	<b>NZM2-XKSFA</b>	1 unit	Enhancement of the busbar tag shroud (simple protection against contact with a finger). Protection when reaching into the cable connection area with the connection of cables in the box terminal. With two conductors max cross-section 22 mm <sup>2</sup> or AWG4. Cannot be combined with NZM-XSTK control circuit terminal.
DS7-34...SX160...	104640		
DS7-34...SX200...			



DS7-34...SX135...	<b>NZM2-XKSA</b>	1 unit	Busbar tag shroud where cable lugs, busbars or tunnel terminals are used. When using insulated conductor material to IP1X.
DS7-34...SX160...	260038		
DS7-34...SX200...			



For use with	Catalog Number Article no.	Std. pack	Notes
--------------	-------------------------------	-----------	-------

**IP2X protection against contact with a finger**

Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers.  
Enhancement of the busbar tag shroud to IP2X.

**For box terminal**

NZM2, PN2, N2

**NZM2-XIPK**  
266773

1 unit

Protection when reaching into the cable connection area with the connection of cables in the box terminal.  
With 2 conductors max cross section 25 mm<sup>2</sup> or AWG4.  
Cannot be combined with NZM-XSTK control circuit terminal.

**for cover NZM2-XKSA or NZM2 or NZM2...(C)NA und N(S)2...NA**

NZM2, PN2, N(S)2

**NZM2-XIPA**  
266777

1 unit

When mounting NZM2...(C)NA or NZM...NA the following applies:  
with 2 conductors max cross section 25 mm<sup>2</sup> or AWG4.

**Mounting kit**

when using covers NZM1-XKSFA and NZM2-XKSA

DS7-34xSX041NO-x  
DS7-34xSX055NO-x  
DS7-34xSX070NO-x  
DS7-34xSX081NO-x  
DS7-34xSX100NO-x  
DS7-34xSX135NO-x  
DS7-34xSX160NO-x  
DS7-34xSX200NO-x

**DE6-MNT-NZM**  
107323

1 unit

-

**Device fans**

Device fan for increasing the load cycle (more starts per hour higher or longer-lasting starting current)

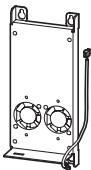


DS7-34...SX004...  
DS7-34...SX007...  
DS7-34...SX009...  
DS7-34...SX012...  
DS7-34...SX016...  
DS7-34...SX024...  
DS7-34...SX032...

**DS7-FAN-032**  
135553

1 unit

Flush-mounted fan



DS7-34...SX041...  
DS7-34...SX055...  
DS7-34...SX070...  
DS7-34...SX081...  
DS7-34...SX100...

**DS7-FAN-100**  
169021

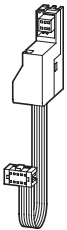
Bottom fans

DS7-34...SX135...  
DS7-34...SX160...  
DS7-34...SX200...

**DS7-FAN-200**  
169022**Communication cable PKE**

6 pole

Prefabricated with two plugs  
For connecting the PKE to DS7-SWD



DS7...SWD

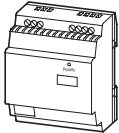
**PKE32-COM**  
168970

1 unit

**Switched-mode power supply units easyPOW**

Single-phase

Rated input voltage 100 - 240 V AC  
Rated output voltage 24 V DC (± 3%)  
Rated output current: 1.25 A

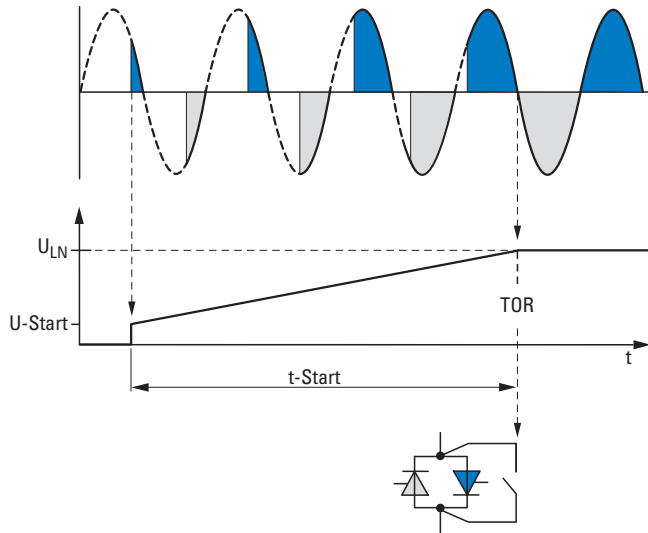
**EASY400-POW**  
212319

1 unit

### Engineering

#### Generalized phase control of motor voltage

By means of generalized phase control, the soft starter adjusts the grid's voltage ( $U_{LN}$ ) smoothly from an adjustable start value to 100% of the rated value  $U_{LN}$ .



$U_{LN}$  = mains supply voltage

U-Start: start voltage

t-Start: Ramp time of the voltage change at start

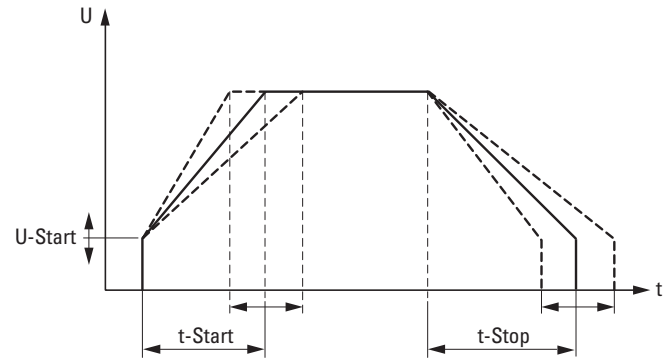
TOR (Top of Ramp) = Signals the end of the set "t-Start" ramp time (output voltage  $U_2$  = mains supply voltage  $U_{LN}$ ). The internal bypass contacts are closed after this.

This voltage control enables the inrush current of a three-phase asynchronous motor to be limited and its starting torque to be reduced. This enables a smooth and jerk-free increase in torque, adjusted in line with the machine's load behavior. This has a positive effect on the lifespan, operating behavior, and operating processes of the mechanical equipment and prevents negative effects such as:

- Impacting of cog edges in the gearbox
- Pressure surge in pipe systems (water impact),
- Slipping of V belts or
- Jitter with conveyor systems.

In DS7 and S801+/S811+ series soft starters, generalized phase control is achieved with anti-parallel thyristors that are bypassed for continuous operation by using bypass contacts (TOR = Top Of Ramp) after the time for a time-triggered voltage change (t-Start) has elapsed. The transition resistance of these bypass contacts is considerably lower than the transition resistance of the power semiconductors. This reduces the heat dissipation in the soft starter and extends the lifespan of the power semiconductors.

As well as the time-controlled startup of a motor, the soft starter also enables a time-controlled reduction of the motor voltage and thus a controlled stopping of the motor.



The output voltage of a soft starter determines the torque of the motor ( $M \sim U_2$ ). Because of this, it is necessary to make sure that, when a machine starts up, the selected U-Start start voltage is not too low and the t-Start ramp time for the linear voltage change is set to be as short as possible.

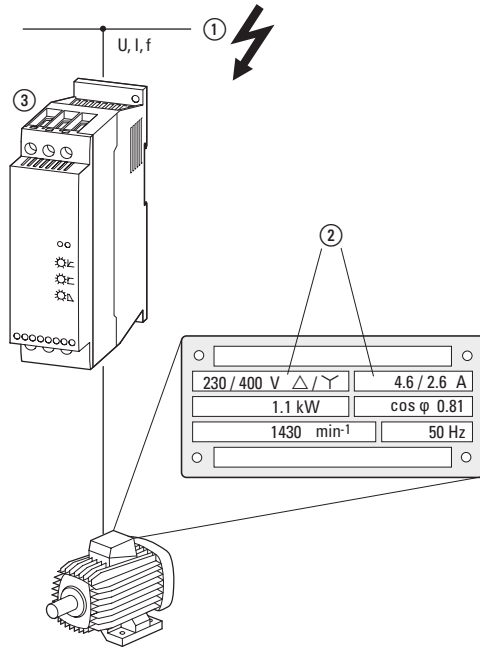
Please note:

- Long ramp times (t-Start) will produce a soft startup behavior, but will also result in a higher thermal load on the thyristors
- A high start voltage (U-Start) will produce a higher torque and a high starting current
- Set the lowest possible start voltage and the shortest possible start ramps.

The following pages include application and setting configuration examples for DS7 soft starters.

If controlled deceleration is required, t-Stop must be set to a longer time than would be necessary for the machine to coast freely based on the load. For the thyristors, the controlled deceleration constitutes a load comparable to that produced during startup. If, for example, the deceleration ramp is activated on a soft starter with a maximum of 10 permissible starts per hour, the number of permissible starts will be reduced to five per hour (plus five stops within that hour).

### Selection Criteria



Soft starters ③ are selected based on the supply voltage of the corresponding grid ① ( $U_{LN}$ ) and the rated operational current of the assigned motor ②. The motor's circuit configuration ( $\Delta/Y$ ) must be selected in such a way that it matches the supply voltage. In addition, the soft starter's rated operational current ( $I_e$ ) must be at least equal to that of the motor.

Additional selection criteria include:

- Ambient air temperature (rated value +40°C)
- The number of starts per hour (< 10 starts, take stops into account)
- Load torque (quadratic, linear)
- Starting torque

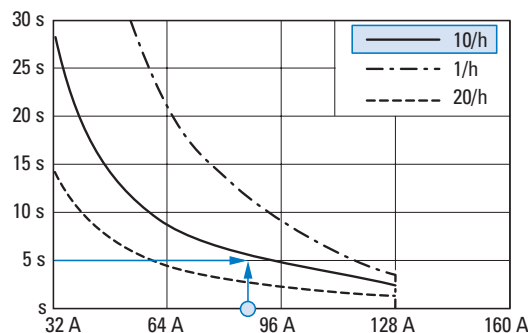
Centrifugal pumps, centrifugal fans, simple and smooth-running conveyor belts and traction drives, and circular saws and ribbon saws are some of the typical applications for which soft starters are used. Reciprocating compressors, mixers, mills, crushers, and lifting gear are instead categorized as heavy starting duty machines. In this case, the soft starter must be oversized in terms of its overload capacity.

In the case of applications that are typical for a soft starter, such as water pumps (centrifugal pumps), and that feature comparable operational data (operating frequency, run-up time, and/or inrush currents) a soft starter can be assigned directly to the motor on the basis of the rated operational current.

Example:

- 15 kW Pump motor
- 400 V
- Rated operational current 29 A
- About three times the starting current ( $I_{LRP} = 87$  A),
- A maximum of 10 starts per hour
- 5-second start-up time,
- ambient air temperature 40°C.

=> DS7-34...032... ( $I_e = 32$  A)



When different operating frequencies, acceleration and/or starting currents are involved, the thermal capacity of the DS7 soft starter must be taken into account in the design. This can be done by using the following diagrams or by calculating the  $I^2t$  values. These  $I^2t$  values define the corresponding load capacity and overload cycle and are defined in product standard IEC/EN 60947-4-2.

DS7-34...SX032...soft starter:

- 32 A: AC-53a: 3-5: 75-10
- Rated operational current ( $I_e$ ) 32 A
- Load cycle AC-53a
- 300% overcurrent for 5 seconds
- 75% duty factor with 10 starts per hour

The resulting  $I^2t$  value is:  $(3 \times 32 \text{ A})^2 \times 5 \text{ s} = 46\,080 \text{ A}^2\text{s}$

The maximum  $I^2t$  value of the connected motor load must be smaller:  $(3 \times 29 \text{ A})^2 \times 5 \text{ s} = 37\,845 \text{ A}^2\text{s}$

Soft starter DS7-34...SX032... is the right choice for this application.

If the motor had a higher inrush current, e.g., 5 times the starting current, a more powerful soft starter would have to be selected:

• Motor inrush current:

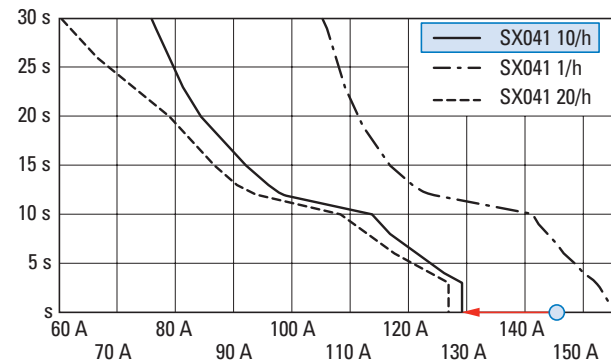
$I_{LRP} = 5 \times 29 = 145 \text{ A}$ ,  $I^2t$  value =  $(5 \times 29 \text{ A})^2 \times 5 \text{ s} = 105\,125 \text{ A}^2\text{s}$

• DS7-34...SX041...: 41 A:

AC-53a: 3-5: 75-10

=>  $(3 \times 41 \text{ A})^2 \times 5 \text{ s} = 75\,645 \text{ A}^2\text{s}$

Soft starter DS7-34...SX041... cannot meet the required startup and load conditions required in this case.



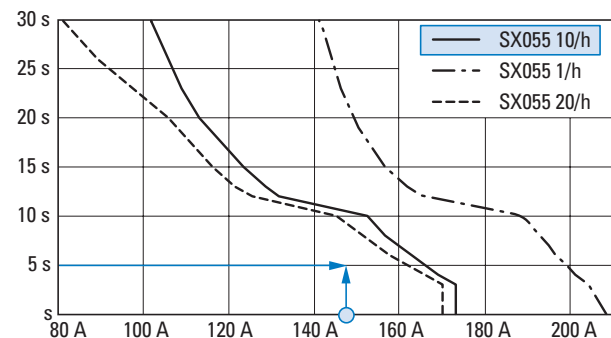
DS7-34...SX055...:

55 A: AC-53a: 3-5: 75-10

=>  $(3 \times 55 \text{ A})^2 \times 5 \text{ s} = 136\,125 \text{ A}^2\text{s}$

Soft starter DS7-34...SX055... however, does meet the required startup and load conditions.

**Note:** As the following diagram shows, the DS7-34...SX055... unit can handle even more demanding startup and load requirements, e.g., up to 20 starts per hour and longer start-up times (up to 10 seconds).



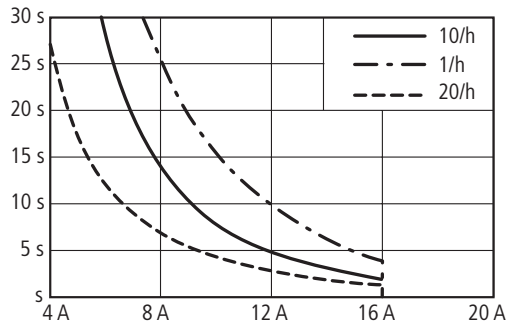


# 1.1

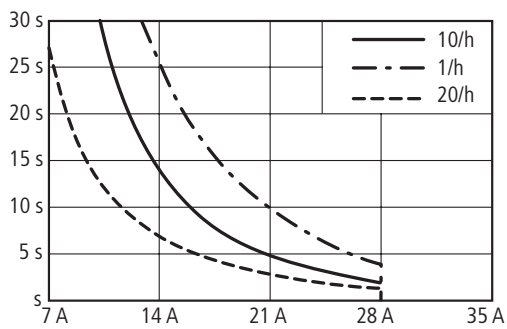
## Soft starter DS7

Design with different load cycles

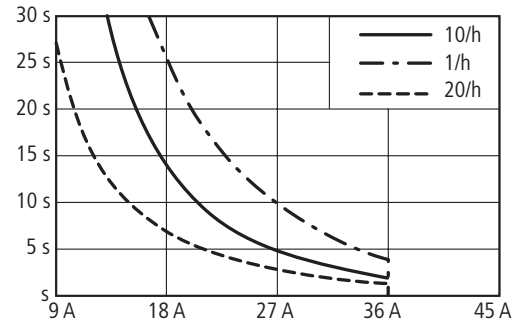
DS7-34x...SX004...



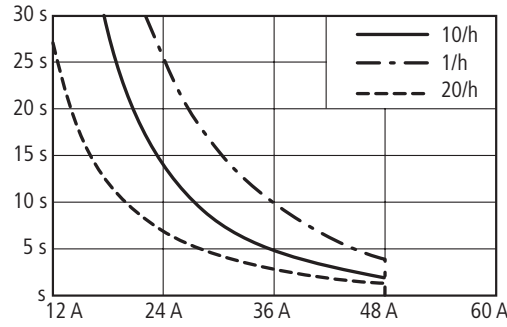
DS7-34x...SX007...



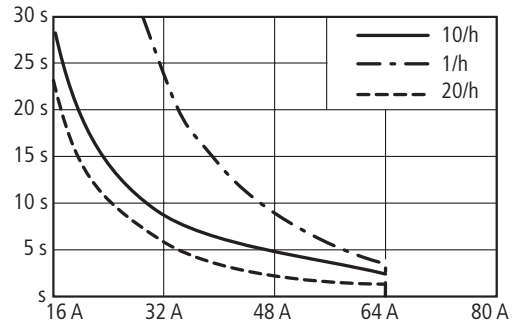
DS7-34x...SX009...



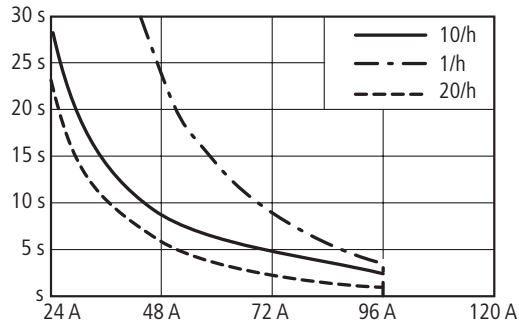
DS7-34x...SX012...



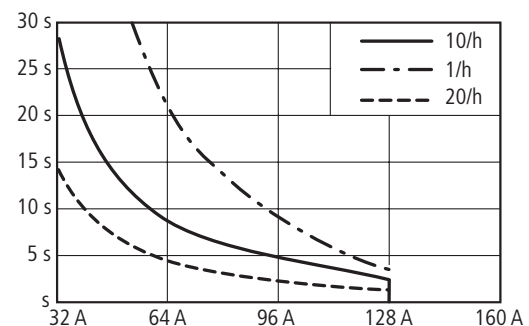
DS7-34x...SX016...



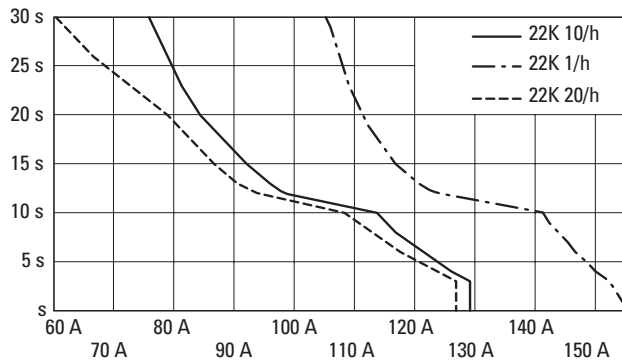
DS7-34x...SX024...



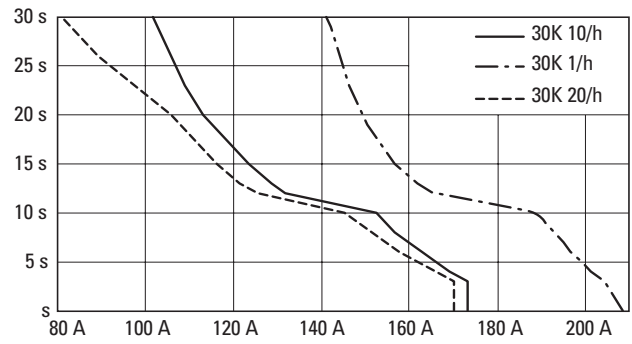
DS7-34x...SX032E...



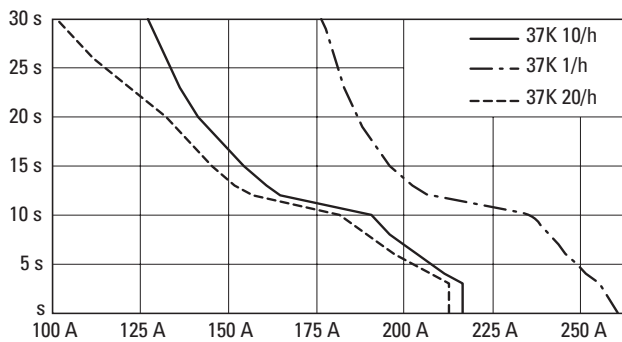
DS7-34...SX041N0-...



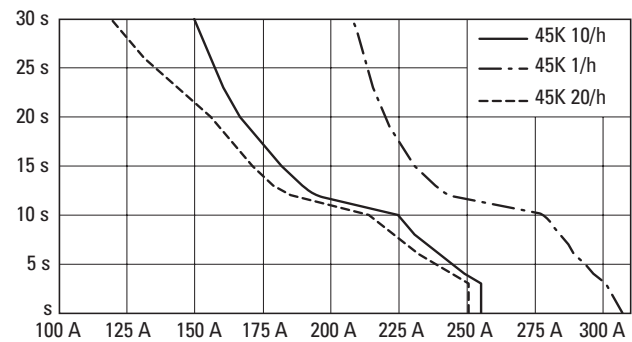
DS7-34...SX055N0-...



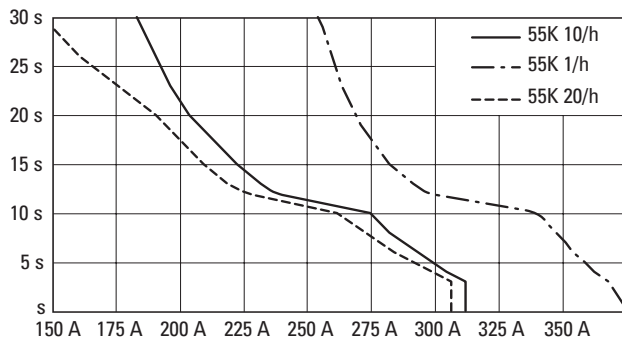
DS7-34...SX070N0-...



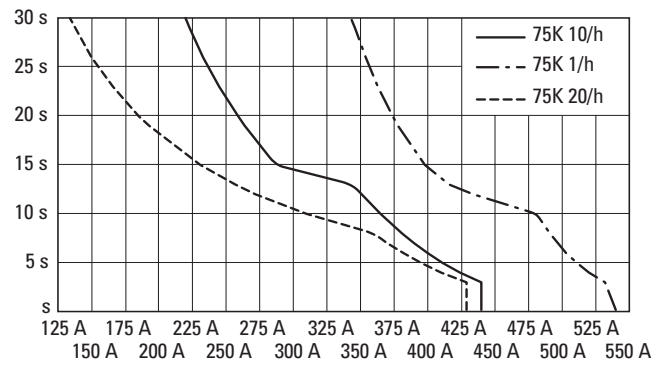
DS7-34...SX081N0-...



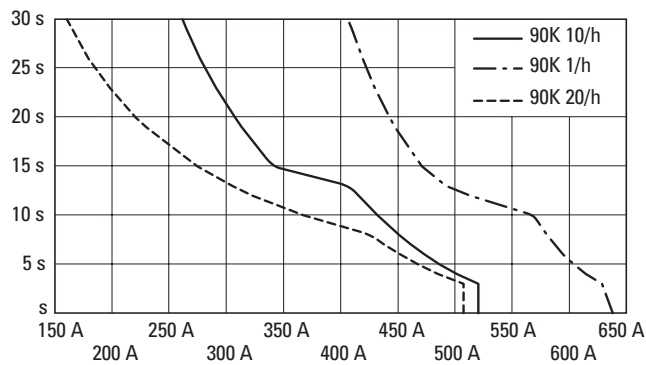
DS7-34...SX100N0-...



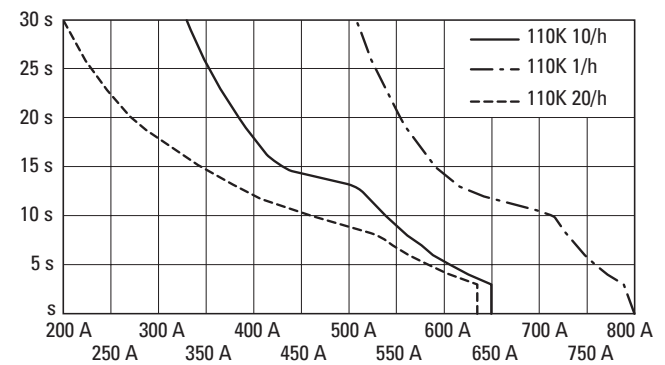
DS7-34...SX135N0-...



DS7-34...SX160N0-...



DS7-34...SX200N0-...

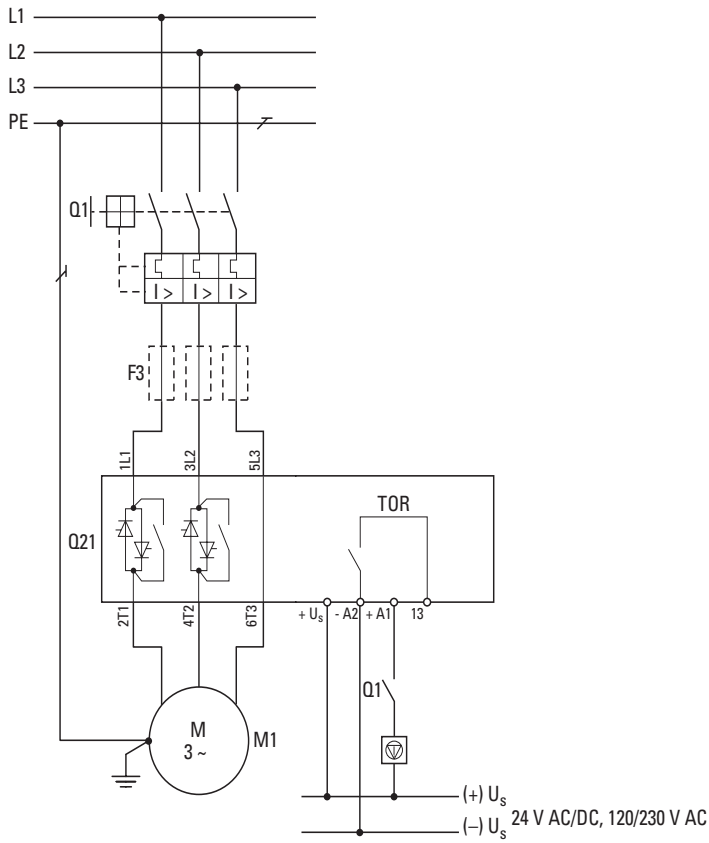


# 1.1

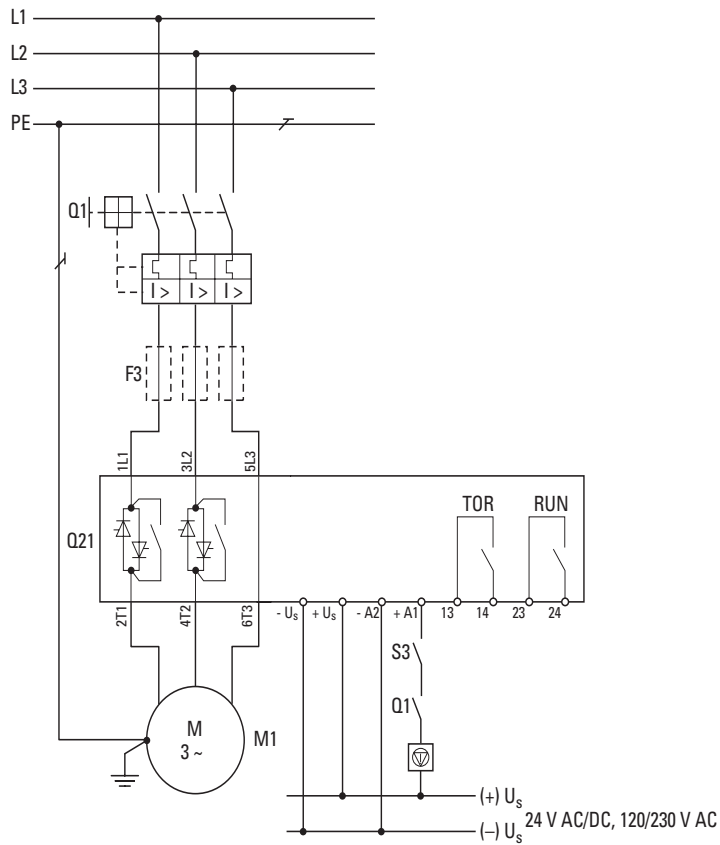
## Soft starter DS7

### Connection examples

#### Standard connection up to 12 A



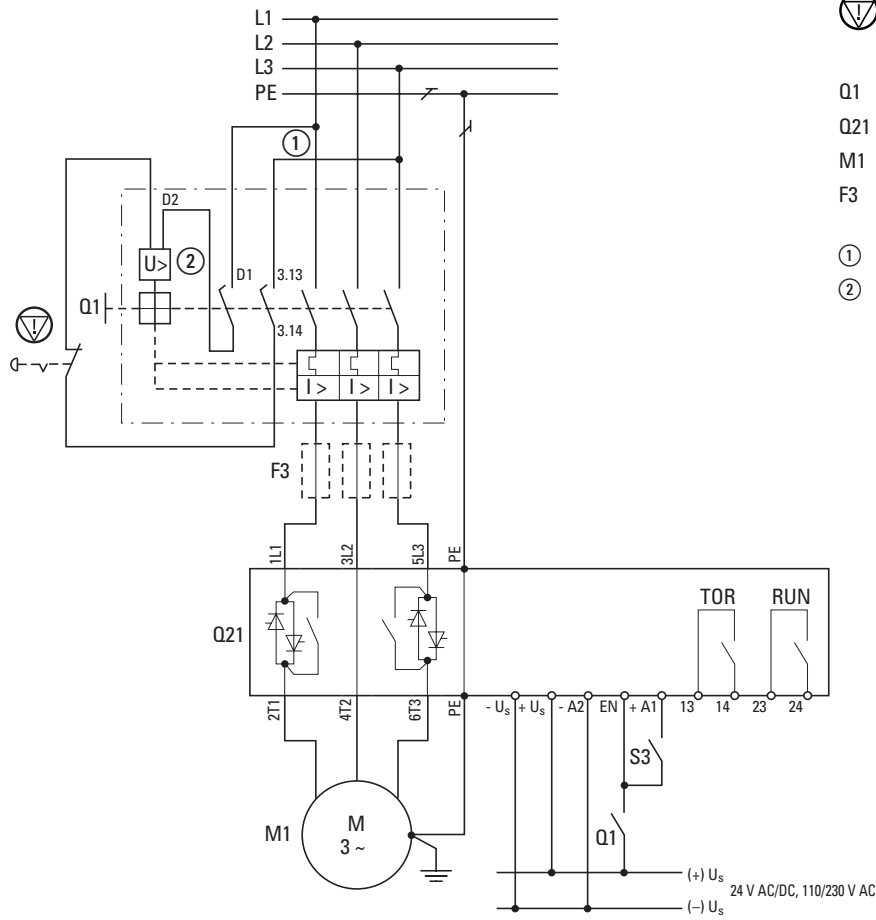
#### Standard connection up to 32 A





### Standard connection 41 - 200 A

With Emergency switching off function according to IEC/EN 60 204-1 and VDE 0113 Part 1



= EMERGENCY SWITCHING OFF

Q1 = Cable and motor protection (NKM (NKM1, NKM2))

Q21 = Soft starter DS7

M1 = Motor

F3 = superfast semiconductor fuse, optional for type 2 coordination (in addition to Q1)

① Control circuit terminal

② Undervoltage release with early-make auxiliary contact

# 1.1

## Soft starter DS7

### Assigned switching and protective elements

Assigned Motor output at		Rated operational current <sup>1)</sup>		Catalog Number	Soft starter function
400 V	480 V	Motor	Soft Starters	Soft Starters (device to be selected)	Line protection <sup>2)</sup> Type 1 coordination
P	P	$I_e$	$I_e$		
kW	HP	A	A		
<b>Soft starters for three-phase mains connection, low operating frequency, (5 s, 3 x <math>I_e</math>, 10 starts/h)</b>					
1.5	2	3.6	4	<b>DS7-34xSX004N0-x</b>	PKZM0-4 (+ CL-PKZO)
3	3	6.6	7	<b>DS7-34xSX007N0-x</b>	PKZM0-10 (+ CL-PKZO)
4	5	8.5	9	<b>DS7-34xSX009N0-x</b>	PKZM0-10 (+ CL-PKZO)
5.5	7.5	11.3	12	<b>DS7-34xSX012N0-x</b>	PKZM0-12 (+ CL-PKZO)
7.5	10	15.2	16	<b>DS7-34xSX016N0-x</b>	PKZM0-16 (+ CL-PKZO)
11	15	21.7	24	<b>DS7-34xSX024N0-x</b>	PKZM0-25 (+ CL-PKZO)
15	20	29.3	32	<b>DS7-34xSX032N0-x</b>	PKZM0-32 (+ CL-PKZO)
22	25	41	41	<b>DS7-34xSX041N0-x</b>	NZMN1-M50 / PKZM4-50
30	30	55	55	<b>DS7-34xSX055N0-x</b>	NZMN1-M63 / PKZM4-58
37	40	68	70	<b>DS7-34xSX070N0-x</b>	NZMN1-M80
45	50	81	81	<b>DS7-34xSX081N0-x</b>	NZMN1-M100
55	60	99	100	<b>DS7-34xSX100N0-x</b>	NZMN1-M100
75	75	134	135	<b>DS7-34xSX135N0-x</b>	NZMN2-M160
90	100	160	160	<b>DS7-34xSX160N0-x</b>	NZMN2-M200
110	125	196	200	<b>DS7-34xSX200N0-x</b>	NZMN2-M200

#### Notes

- <sup>1)</sup> Rated operational current based on the load cycle specified here.
- <sup>2)</sup> Indicates the circuit-breaker required for the indicated load cycle. At different duty cycles (operating frequency, overcurrent, overcurrent time, duty factor), this value changes and must then be adapted accordingly.
- <sup>3)</sup> An external overload relay is required if the main contacts should not be disconnected in the event of an overload and a controlled soft stop is desired instead.
- <sup>4)</sup> A mains contactor is not required. Disconnection characteristics in accordance with VDE can only be ensured with the specified circuit-breaker.
- <sup>5)</sup> The superfast semiconductor fuses protect the soft starters from motor-side short-circuits. This can not, however, prevent damage caused by voltage peaks, for example through lightning strike.

## Assigned switching and protective elements

Soft starter function with soft stop in case of overload		Mains contactor	Semiconductor contactor (optional, in addition to the protective devices for type 1 coordination, required for type 2 coordination) <sup>5)</sup>	
Line protection <sup>2)</sup>	Overload relays <sup>3)</sup>	optional <sup>4)</sup>	Fuses	Fuse holders
Type 1 coordination			Quantity x Part no.	Quantity x Part no.
PKM0-4 (+ CL-PKZO)	ZB12-4	DILM7	3 × <b>170M1359</b>	3 × <b>170H1007</b>
PKM0-10 (+ CL-PKZO)	ZB12-10	DILM9	3 × <b>170M1361</b>	3 × <b>170H1007</b>
PKM0-10 (+ CL-PKZO)	ZB12-10	DILM9	3 × <b>170M1362</b>	3 × <b>170H1007</b>
PKM0-12 (+ CL-PKZO)	ZB12-12	DILM12	3 × <b>170M1362</b>	3 × <b>170H1007</b>
PZM0-16 (+ CL-PKZO)	ZB32-16	DILM17	3 × <b>170M1364</b>	3 × <b>170H1007</b>
PZM0-25 (+ CL-PKZO)	ZB32-24	DILM25	3 × <b>170M1365</b>	3 × <b>170H1007</b>
PZM0-32 (+ CL-PKZO)	ZB32-32	DILM32	3 × <b>170M1366</b>	3 × <b>170H1007</b>
NZMN1-M50 / PKZM4-50	ZB65-40+ZB65-XEZ	DILM50	3 × <b>170M3013</b>	3 × <b>170H3004</b>
NZMN1-M63 / PKZM4-58	ZB65-57+ZB65-XEZ	DILM65	3 × <b>170M3013</b>	3 × <b>170H3004</b>
NZMN1-M80	ZB150-70/KK	DILM80	3 × <b>170M4008</b>	3 × <b>170H3004</b>
NZMN1-M100	ZB150-100/KK	DILM95	3 × <b>170M4008</b>	3 × <b>170H3004</b>
NZMN1-M100	ZB150-100/KK	DILM115	3 × <b>170M4008</b>	3 × <b>170H3004</b>
NZMN2-M160	ZB150-150/KK	DILM150	3 × <b>170M4010</b>	3 × <b>170H3004</b>
NZMN2-M200	Z5-160/FF250	DILM185	3 × <b>170M5008</b>	3 × <b>170H3004</b>
NZMN2-M200	Z5-220/FF250	DILM225	3 × <b>170M5008</b>	3 × <b>170H3004</b>

## Technical specifications

	Supply voltage U <sub>c</sub>		
	24 V AC/DC DS7-340...	120/230 V AC DS7-342...	+24 V DS7-34D... (SmartWire-DT)
<b>General</b>			
Radio interference level	B	"A" group 1	B
<b>Actuating circuit</b>			
Regulator supply voltage U <sub>s</sub>			
Voltage	V	+24 +10%/-15%	120 (-15%) - 230 (+10%) +24 DC +10%/-15%
Frequency at V AC	Hz	(50/60)	50/60
Current consumption no-load losses (without device fan)	mA	50	50
Current consumption operation (without device fan)	mA	130	100
Current consumption peak performance (Close bypass contacts, without device fan)	mA	130	130
Fan current consumption (operation)	mA	50	50
Control voltage range U <sub>c</sub>			
DC operated	V DC	24 +10%/-15%	24 +10%/-15%
AC operated	A DC	24 +10%/-15%	120 (-15%) - 230 (+10%)
Current consumption per input (+A1, EN)	mA	1.6	4
Pick-up voltage (High signal)			
DC operated	V DC	17.3 - 27	17.3 - 27
AC operated	V AC	17.3 - 27	~100 - 253
Drop-out voltage (Low signal)			
DC operated	V DC	0 - 3	0 - 3
AC operated	V AC	0 - 3	0 - 28
Pick-up time			
DC operated	ms	250	250
AC operated	ms	250	250
Falling time			
DC operated	ms	350	350
AC operated	ms	~0	350



Size	Unit	Frame size 1: 4 - 12 A	Frame size 2: 16 - 32 A	Frame size 3: 41 - 100 A	Frame size 4: 135 - 200 A
<b>General</b>					
Dimensions W x H x D	mm	45 x 130 x 95	45 x 150 x 118	93 x 175 x 139	108 x 215 x 178
Weight	kg	0.35	0.4	1.8	3.7
<b>Terminal capacities</b>					
Cables (box terminal)					
Solid	mm <sup>2</sup>	1 x (0.75 - 4) 2 x (0.75 - 2.5)	1 x (0.75 - 16) 2 x (0.75 - 10)	1 x (25 - 70) 2 x (6 - 25)	1 x (4 - 185) 2 x (4 - 70)
Flexible with ferrule	mm <sup>2</sup>	1 x (0.75 - 2.5) 2 x (0.75 - 2.5)	1 x (0.75 - 16) 2 x (0.75 - 10)		
Stranded	mm <sup>2</sup>		1 x 16 2 x 16	1 x (25 - 70) 2 x (6 - 25)	1 x (4 - 185) 2 x (4 - 70)
Solid or stranded	AWG	1 x (18 - 10) 2 x (18 - 10)	1 x (14 - 8) 2 x (14 - 8)	1 x (12 - 2/0)	1 x (12 - 350) 2 x (12 - 00)
Flat conductor					
minimum	mm			2 x 9 x 0.8	2 x 9 x 0.8
maximum	mm			9 x 9 x 0.8	10 x 16 x 0.8
Tightening torque	Nm	1.2	3.2	9 (> 10 mm <sup>2</sup> ) 6 (≤ 10 mm <sup>2</sup> )	14 (> 10 mm <sup>2</sup> ) 5 (≤ 10 mm <sup>2</sup> )
<b>Control cables</b>					
Solid	mm <sup>2</sup>	1 x (0.75 - 4) 2 x (0.75 - 2.5)	1 x (0.75 - 4) 2 x (0.75 - 1.5)	1 x (0.75 - 4) 2 x (0.75 - 1.5)	1 x (0.75 - 4) 2 x (0.75 - 1.5)
Flexible with ferrule	mm <sup>2</sup>	1 x (0.75 - 2.5) 2 x (0.75 - 2.5)	1 x (0.75 - 2.5) 2 x (0.75 - 1.5)	1 x (0.75 - 2.5) 2 x (0.75 - 1.5)	1 x (0.75 - 2.5) 2 x (0.75 - 1.5)
Stranded	mm <sup>2</sup>				
Solid or stranded	AWG	1 x (18 - 10) 2 x (18 - 10)	1 x (18 - 14) 2 x (18 - 16)	1 x (18 - 14) 2 x (18 - 16)	1 x (18 - 14) 2 x (18 - 16)
Tightening torque	Nm	1.2	0.6	0.6	0.6
Screwdriver (flat blade)	mm	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
<b>Actuating circuit</b>					
Relay outputs					
Qty.		1 (TOR)	2 (TOR, RUN/READY) <sup>1)</sup>	2 (TOR, RUN/READY) <sup>1)</sup>	2 (TOR, RUN/READY) <sup>1)</sup>
Max. voltage range	V AC/DC = U <sub>s</sub>		250	250	250
Max. load current	A	1	1	1	1

**Notes**<sup>1)</sup> Does not apply for soft starter DS7 with SmartWire-DT (DS7-...-D).

# 1.1

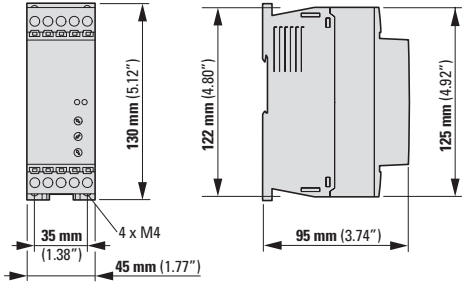
## Soft starter DS7

### Dimensions and weights

#### Dimensions and weights

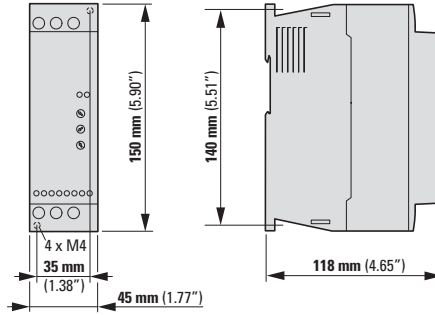
##### Frame size 1

Dimension drawing DS7 without SWD – Size 1 (up to 12 A)

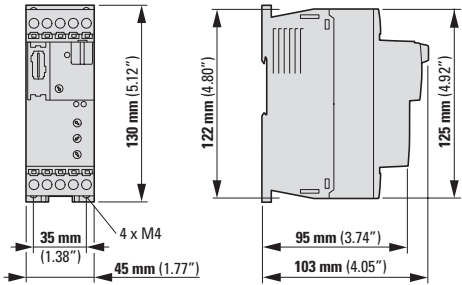


##### Frame size 2

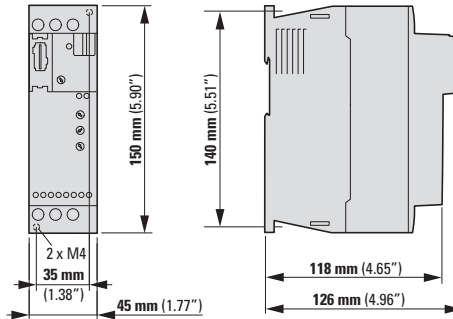
Dimension drawing for DS7 without SWD – Size 2 (16 - 32 A)



Dimension drawing DS7 with SWD – Size 1 (up to 12 A)



Dimension drawing for DS7 with SWD – Size 2 (16 - 32 A)

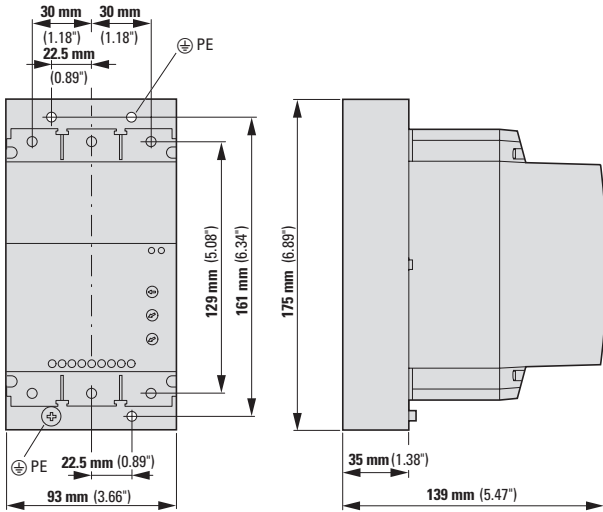


DS7-34...SX...	Weight	
	mm	kg
...003...	4	DS7-340...: 0.3
...004...		DS7-340...: 0.3
...005...		DS7-34D...-D: 0.33
...007...		
...009...		
...012...		

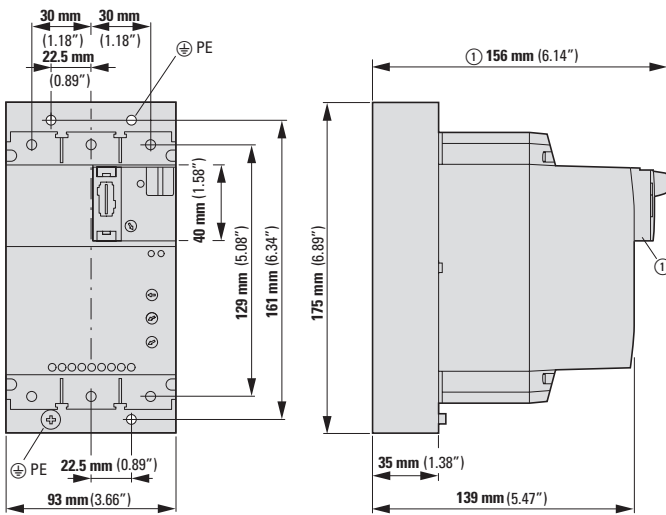
DS7-34...SX...	Weight	
	mm	kg
...016...	4	0.4
...024...		
...032...		

**Frame size 3**

Dimension drawing for DS7 without SWD – Size 3 (41 - 100 A)



Dimension drawing for DS7 with SWD – Size 3 (41 - 100 A)



DS7-34...SX...	Weight	
	mm	kg
...036...	4	1.8
...041...		
...055...		
...070...		
...081...		
...100...		

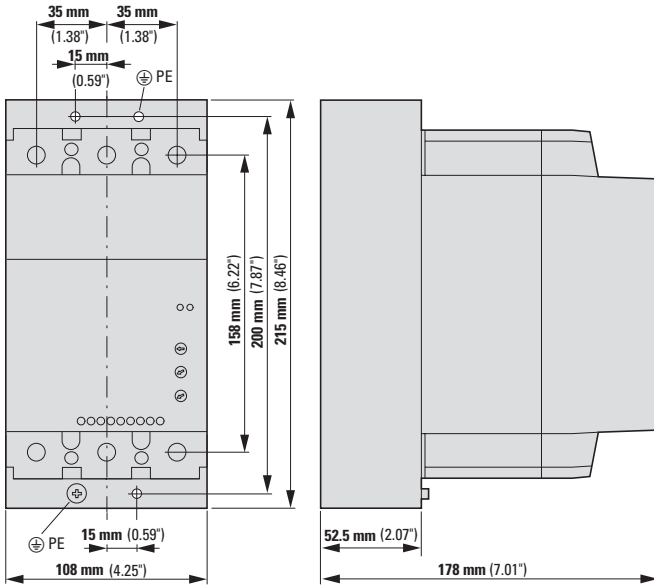
# 1.1

## Soft starter DS7

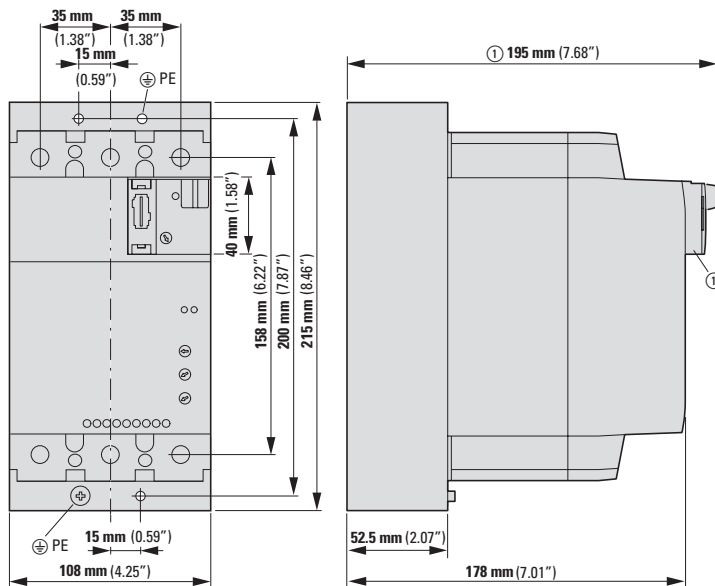
### Dimensions and weights

#### Frame size 4

Dimension drawing for DS7 without SWD – Size 4 (135 - 200 A)



Dimension drawing for DS7 with SWD – Size 4 (135 - 200 A)

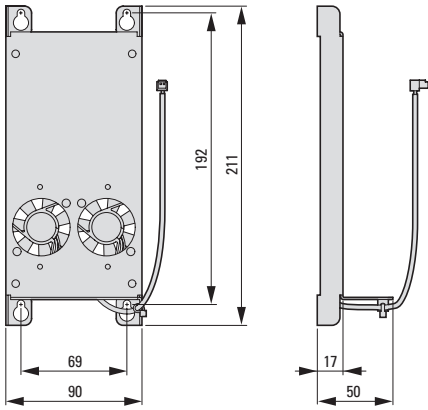


DS7-34...SX...	Weight	
	mm	kg
...135...	5	3.4
...160...		
...200...		

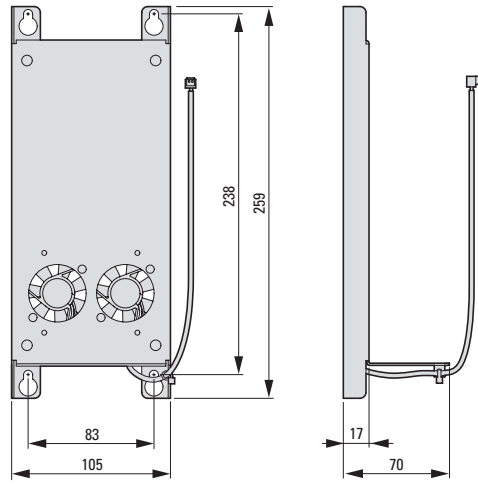


DS7-FAN-... device fan

DS7-FAN-100



DS7-FAN-200





# Soft starter S811+

## Powerful presence in a small design

The unparalleled performance and features behind S811+ soft starters build upon the proven capabilities of our soft starters. With only five frame sizes and rated operational currents of 37 A to 1000 A for supply voltages of 200 V to 690 V, S811+ units are some of the world's smallest compact soft starters.

These three-phase-controlled soft starters, which feature an internal bypass and comprehensive monitoring and protection mechanisms, provide a soft start and ensure that three-phase motors can remain in continuous operation safely and reliably even in applications with large load torques.

#### Performance range:

- 37 - 1000 A
- 18.5 - 750 kW ( $U_n$ : 200 - 690 V)

#### Applications:

- Pumps and fans in HVAC applications
- Water/wastewater industry
- Mixers
- Crushers
- Underground applications
- Chemical industry

S811+ soft starters are not just designed for standard applications, make a strong case with their ease of use, and feature a digital control and display unit that provides access to advanced functions for sophisticated applications.

In addition, S811+ units can be used not only in a standard line (outside the delta) configuration, but also with an inside-the-delta configuration.

#### Features:

- Electronic overload protection
- Programmable relays and inputs
- Standard line or inside-the-delta configuration
- Pump algorithm for minimizing water hammer
- Extensive range of functionalities with comprehensive monitoring and protection functions
- Compact menu structure for easy commissioning, maintenance, and monitoring

#### Accessory:

- Ethernet/IP, Modbus TCP communication modules
- External keypad with display
- Terminal blocks and terminal cover
- Mounting frame
- Surge protection

For more information, visit:  
[www.Eaton.com/S811](http://www.Eaton.com/S811)



## 1.2 Soft starter S811+

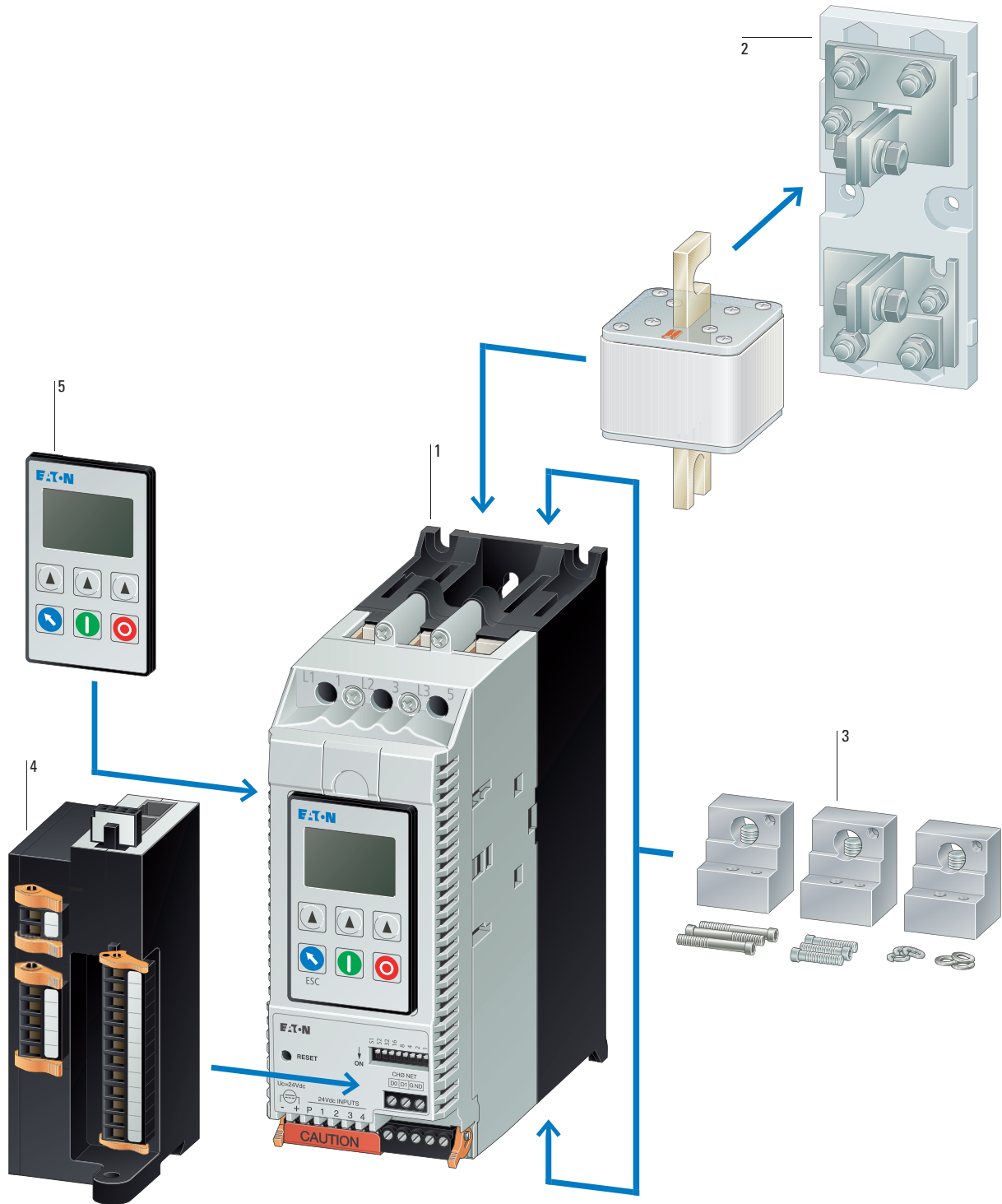
<b>System overview</b> .....	<b>40</b>
<b>Description</b> .....	<b>41</b>
<b>Key to type references</b> .....	<b>42</b>
<b>Ordering</b> .....	<b>43</b>
Basic devices .....	<b>43</b>
Accessories .....	<b>44</b>
<b>Engineering</b> .....	<b>46</b>
<b>Technical data</b> .....	<b>47</b>
<b>Dimensions and weights</b> .....	<b>51</b>

# 1.2

## Soft starter S811+

System overview

### System overview



**S811+** 1  
→ Page 43

**Superfast semiconductor fuses** 2  
→ Industrial Switchgear catalog

**Terminal blocks** 3  
→ Page 44

**EtherNet/IP – Modbus/TCP  
adapter** 4  
→ Page 44

**External keypad** 5  
→ Page 44



## Description



The soft starters are designed to guarantee reliable operation even under harsh and challenging ambient conditions. This series makes a compelling case as a result of its ease of use and is the perfect choice for standard applications such as pumps, fans, compressors, and conveyor belts.

S811+ soft starters have three-phase control and are equipped with internal bypass contacts for continuous operation. With their comprehensive protection and monitoring functions, S811+ soft starters ensure a soft startup, as well as safe and reliable continuous operation, for three-phase motors with rated operational currents of 37 A to 1000 A when working with mains voltages of 200 V to 690 V. For example, when used in pump applications, they prevent water impact by using controlled deceleration (soft stop control) and torque monitoring, significantly reducing the mechanical loads exerted on pump systems in the process.

### S811+ essential characteristics

- Rated operational current: 37 - 1000 A
- Parameterizable overload settings: 31 - 100%
- Adjustable overload classes: class 5, 10, 20, 30
- Base setting: 15 s start ramp, 4 starts per hour, 300% starting current at 40°C ambient temperature
- Allocated motor outputs for in-line connection:
  - 7.5 - 250 kW (3~ 230 V)
  - 18.5 - 450 kW (3~ 400 V)
- Ambient air temperature: -30°C to +50°C
- any required mounting position
- Degree of protection with compact design (IP20 optional)
- 5 compact designs
- Adjustable torque control
- Adjustable kick start
- Efficient use of power achieved with internal bypass contacts during continuous operation
- 24 V control voltage:
  - External power required
  - 1 A continuous current
  - 10 A inrush current (peak value for 150 ms)

When using S811+ soft starters, motors can be connected either using a standard line (outside the delta) configuration or an inside-the-delta configuration. Using an inside-the-delta configuration will reduce the current flowing through the soft starter by approximately 42%. This way, a 58 A soft starter can be used to start and run a motor with a rated operational current of 100 A, for example.



### Important operating unit characteristics (S811+)

- Language-neutral LCD display with backlight
- Easy to use and configure with function keys
- System parameter configuration
- Diagnostic and monitoring options
- Reading display (e.g., L1, L2, L3 phase currents)
- Error Display
- Offset placement (mounted on door), connection via plug-in patch cord with RJ11 plug
- Front IP54

### S811+ specific characteristics

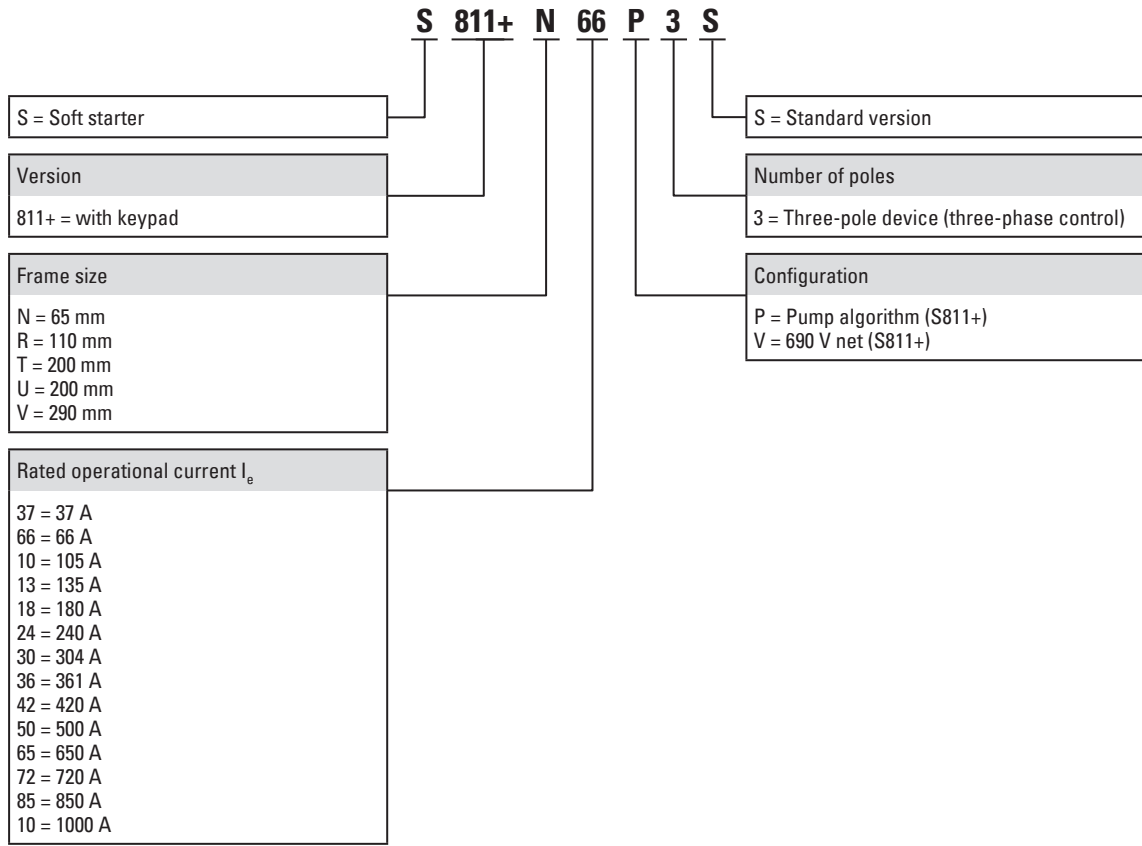
- Mains voltage up to 690 V
- Allocated motor outputs for in-line connection:
  - 7.5 - 250 kW (3~ 230 V)
  - 18.5 - 450 kW (3~ 400 V)
  - 160 - 710 kW (3~ 690 V)
- Special pump control algorithm with prolonged soft stop ramp
- Inside-the-delta configuration; please refer to "Engineering, connecting examples"
- RS485 Modbus Connection
- EtherNet-IP/Modbus-TCP with option C441 (communication adapter).

# 1.2

## Soft starter S811+

Key to type references

### Key to type references



### Ordering

Frame size	Rated operational current Device (AC-53) $I_e$ A	Assigned motor output					Catalog Number-	Article no.	Std. pack
		at 230 V, 50 Hz kW	at 230 V, 60 Hz HP	at 400 V, 50 Hz kW	at 460 V, 60 Hz HP	at 690 V, 50 Hz kW			

#### Soft Starters

Supply voltage  $U_s$ : 24 V DC  
 Control voltage  $U_c$ : 24 V DC  
 With internal bypass contacts  
 Terminal blocks for the terminals are required for frame sizes T, U, and V  
 → Accessories

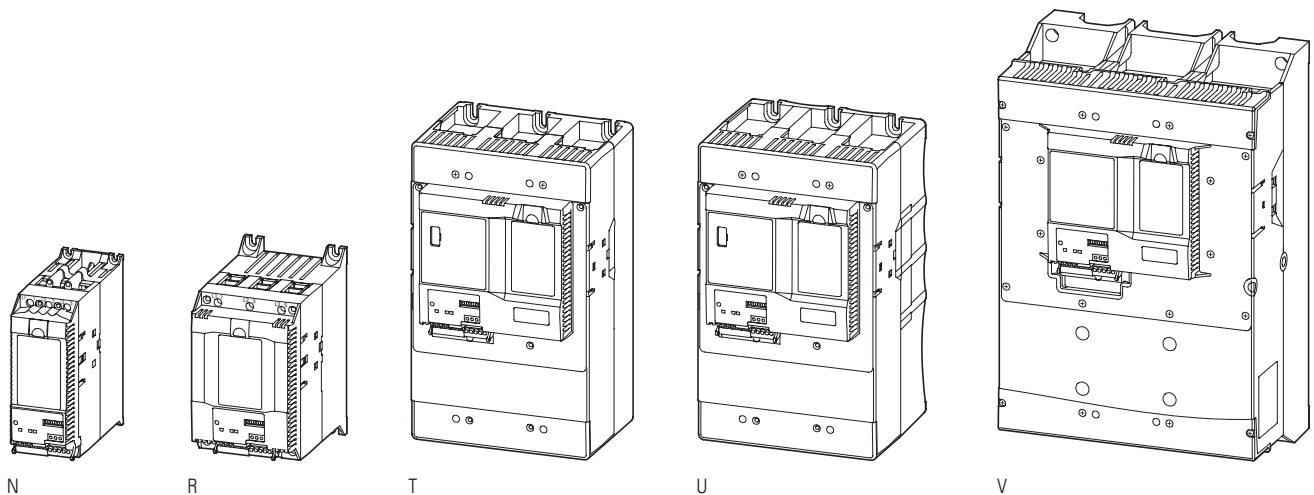
Soft starter for three-phase loads, with control unit and pump algorithm  
 Mains supply voltage (50/60 Hz)  $U_{LN}$ : 200 - 600 V AC  
 In-line configuration/In-delta configuration

Frame size	Rated operational current $I_e$ (A)	at 230 V, 50 Hz kW	at 230 V, 60 Hz HP	at 400 V, 50 Hz kW	at 460 V, 60 Hz HP	at 690 V, 50 Hz kW	Catalog Number-	Article no.	Std. pack
N	37	7.5	10	18.5	25	–	<b>S811+N37P3S</b>	168977	1 unit
	66	18.5	20	30	50	–	<b>S811+N66P3S</b>	168979	
R	105	30	40	55	75	–	<b>S811+R10P3S</b>	168981	1 unit
	135	37	50	75	100	–	<b>S811+R13P3S</b>	168983	
T	180	55	60	90	150	–	<b>S811+T18P3S</b>	168985	1 unit
	240	75	75	132	200	–	<b>S811+T24P3S</b>	168988	
	304	90	100	160	250	–	<b>S811+T30P3S</b>	168991	
U	361	110	125	200	300	–	<b>S811+U36P3S</b>	169872	1 unit
	420	132	150	200	350	–	<b>S811+U42P3S</b>	169873	
V	361	110	125	200	300	–	<b>S811+V36P3S</b>	168994	1 unit
	420	132	150	200	350	–	<b>S811+V42P3S</b>	168997	
	500	160	200	250	400	–	<b>S811+V50P3S</b>	169000	
	650	200	250	315	500	–	<b>S811+V65P3S</b>	169003	
	720	250	–	400	600	–	<b>S811+V72P3S</b>	169006	
	850	–	–	450	600	–	<b>S811+V85P3S</b>	169009	
	1000	–	–	450	600	–	<b>S811+V10P3S</b>	169012	

Soft starter for three-phase loads, with control unit and pump algorithm, for 690 V grids  
 Mains supply voltage (50/60 Hz)  $U_{LN}$ : 200 - 690 V AC  
 In-line circuit

Frame size	Rated operational current $I_e$ (A)	at 230 V, 50 Hz kW	at 230 V, 60 Hz HP	at 400 V, 50 Hz kW	at 460 V, 60 Hz HP	at 690 V, 50 Hz kW	Catalog Number-	Article no.	Std. pack
T	180	55	60	90	150	160	<b>S811+T18V3S</b>	168986	1 unit
	304	90	100	160	250	250	<b>S811+T30V3S</b>	168992	
V	361	110	150	200	300	315	<b>S811+V36V3S</b>	168995	1 unit
	420	132	150	200	350	400	<b>S811+V42V3S</b>	168998	
	500	160	200	250	400	500	<b>S811+V50V3S</b>	169001	
	650	200	250	315	500	630	<b>S811+V65V3S</b>	169004	
	720	250	–	400	600	630	<b>S811+V72V3S</b>	169007	
	850	–	–	450	600	710	<b>S811+V85V3S</b>	169010	

#### S811+ frame sizes

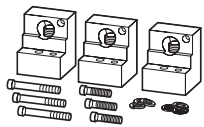
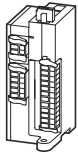


# 1.2

## Soft starter S811+

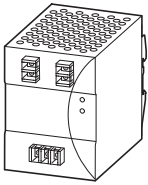
### Accessories

Description	For use with		Catalog Number Article no.	Std. pack
<b>Keypad</b>				
With illuminated LCD display with control buttons and function keys Front IP54 RJ11 plug, 6-pin	S811+		<b>EMA91</b> 144570	1 unit
<b>Shroud</b>				
Protection for installation space in S811+ if the control unit is set up externally.	S811+		<b>EMA68</b> 144556	1 unit
<b>Mounting frame</b>				
For mounting the EMA91 control unit externally with surface mounting (e.g., installation in control panel door).				
with connection cable RJ11, 6 pole	1 m	EMA91	<b>EMA69A</b> 144557	1 unit
	1.5 m	EMA91	<b>EMA69B</b> 144558	
	2 m	EMA91	<b>EMA69C</b> 144559	
	3 m	EMA91	<b>EMA69D</b> 144560	
<b>Fieldbus modules</b>				
Ethernet-IP/Modbus-TCP	S811+		<b>C441V</b> 172306	1 unit
PROFIBUS-DP	S811+		<b>C441QS</b> 184746	1 unit
DeviceNet	S811+		<b>C441LS</b> 184747	1 unit
<b>Control terminal strip</b>				
Spare part	S811+		<b>EMA75</b> 144561	1 unit
<b>Terminal blocks</b>				
Tools with dimensions in inches required 1 set required for each connection side.				
Terminal capacities				
2 x 4-1/0MCM, 2 x 25 - 50 mm <sup>2</sup>	S811+, frame sizes T and U		<b>EML22</b> 127661	1 unit
4/0-500 MCM, 120 - 240 mm <sup>2</sup> S801+, S811+, frame sizes T and U			<b>EML23</b> 127662	
2 x 4/0-500 MCM, 2 x 120 - 240 mm <sup>2</sup> S801+, S811+, frame sizes T and U			<b>EML24</b> 127663	
1 x 2/0-300 MCM, 1 x 70 - 150 mm <sup>2</sup> S801+, S811+, frame sizes T and U			<b>EML25</b> 127664	
2 x 2/0-300 MCM, 2 x 70 - 150 mm <sup>2</sup> S801+, S811+, frame sizes T and U			<b>EML26</b> 127665	
2 x 4/0-500 MCM, 2 x 120 - 240 mm <sup>2</sup> S801+, S811+, frame size V	S811+, frame size V		<b>EML28</b> 127666	
4 x 4/0-500 MCM, 4 x 120 - 240 mm <sup>2</sup> S801+, S811+, frame size V			<b>EML30</b> 127667	
6 x 4/0-500 MCM, 6 x 120 - 240 mm <sup>2</sup> S801+, S811+, frame size V			<b>EML32</b> 127668	
4 x 2/0-300 MCM, 4 x 70 - 150 mm <sup>2</sup> S801+, S811+, frame size V			<b>EML33</b> 127669	





Description	For use with	Catalog Number Article no.	Std. pack
<b>Terminal cover</b>			
For increasing the degree of protection to IP20 1 set required for each connection side.	S811+, frame size N	<b>SS-IP20-N</b> 171990	1 unit
	S811+, frame size R	<b>SS-IP20-R</b> 171991	
	S811+, frame sizes T and U	<b>SS-IP20-TU</b> 171992	
	S811+, frame size V	<b>SS-IP20-V</b> 158650	
<b>Surge protection</b>			
SMD metal-oxide varistors (MOVs) with connection cables for the grid and motor connection sides	S811+, up to 600 V	<b>EMS39</b> 127671	1 unit
	S811+, up to 690 V	<b>EMS41</b> 127672	
<b>Power supplies PSG</b>			
Rated output voltage 24 V DC (+2%) Rated output current: 10 A			
Nominal input voltage 100 - 240 V AC 125 - 250 V DC Single-phase		<b>PSG240E24RM</b> 172893	
	Nominal input voltage 3 x 400 - 500 V AC Three-phase	<b>PSG240F24RM</b> 172884	



# 1.2

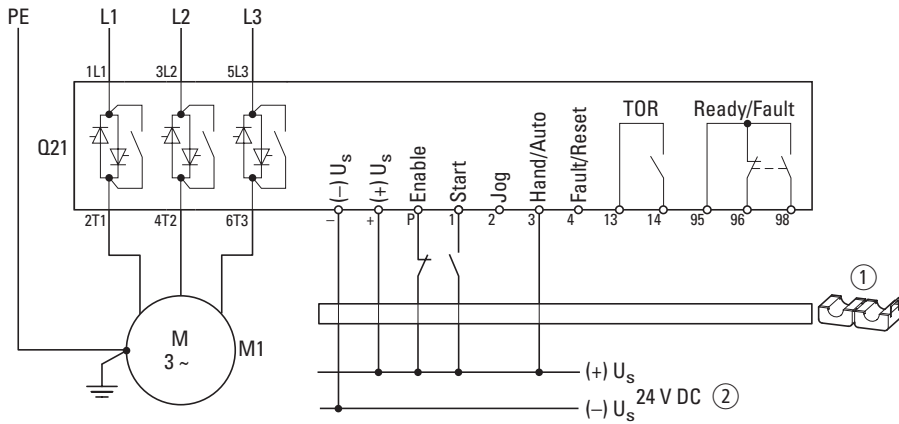
## Soft starter S811+

Engineering

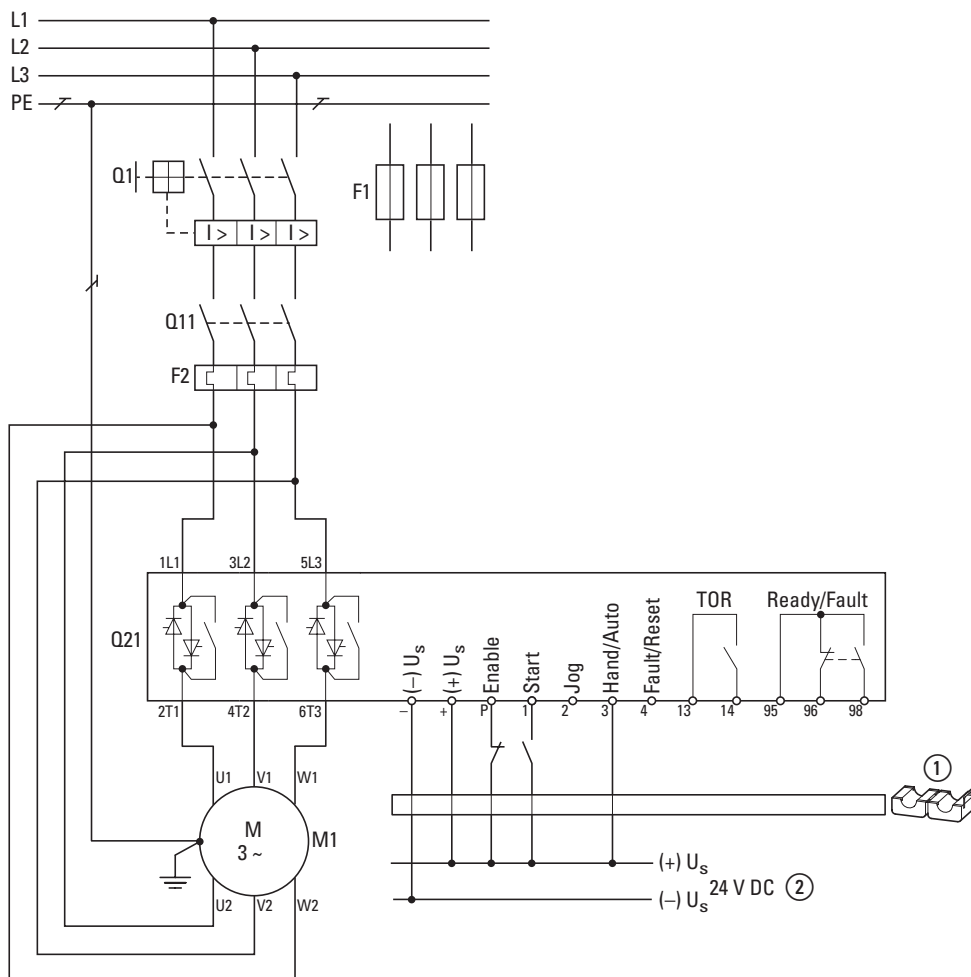
### Engineering

#### Connection examples for S811+...N3S

Standard connection (in-line connection)



Delta circuit (inside-the-delta circuit)



① Snap-on ferrite core, included as standard

② External control voltage (24 V DC) required,  $I_s$  1 A,  $I_{Peak} = 10$  A for 150 ms when bypass contacts are switched  
Short-circuit and cable protection: Q1 circuit-breakers or F1 fuses.

Motor	IEC	NEMA
	U1-V1-W1	T1-T2-T3
	U2-V2-W2	T4-T5-T6

## Technical specifications

Description	Specification
<b>Temperature range</b>	
Operation	-40° to 50°C
Storage	-50° to 70°C
Altitude above sea level	Up to 2000 m; derating of 0.5% for every 100 m above 2000 m
Humidity	Can be used up to 95%, non-condensing
Damp heat, constant, to IEC 60068-2-3	✓
Damp heat, cyclic, to IEC 60068-2-10	✓
<b>Vibration resistance</b>	
Operation	3 g in all directions
Not in operation	3 g in all directions
<b>Protection type</b>	
Protection type	IP20 (terminals IP00)
An IP20 degree of protection can be achieved on all sides by using optional terminal covers SS-IP20-N.	✓
Overvoltage category/pollution degree	II/3
Radio interference level (IEC/EN 55011)	A
Position for operation	Any
Pollution degree IEC 60947-1	3
Impact resistance	15 g in all directions

# 1.2

## Soft starter S811+

### Technical specifications

			Frame size
			N
<b>General</b>			
<b>Actuating circuit</b>			
Digital inputs			
Control voltage (DC operated)			24 V DC $\pm 10\%$
Current consumption 24 V		mA	
External 24 V		mA	150
External 24 V (no load)		mA	100
Pick-up voltage, DC operated	$x U_s$	V DC	21.6 - 26.4
Drop-out voltage, DC operated	$x U_s$	V DC	maxim. 3 V DC
Pick-up time		ms	100
Falling time		ms	100
Regulator supply			
Voltage	$U_s$	V	24 V DC $\pm 10\%$
Current consumption	$I_e$	mA	< 1000
Current consumption at peak performance (close bypass) at 24 V DC	$I_{Peak}$	A/ms	10/150
External supply voltage			✓
Analog inputs			
Number of 4 - 20 mA current inputs			1
Relay outputs			
Number of 120 V AC/DC ; 3 A, AC-11			2
Fully programmable			✓
<b>Soft start function</b>			
Ramp times			
Acceleration time		s	0.5 - 360
Deceleration time		s	0 - 120
Start voltage			
Max. start voltage		%	85
Kick-start			
Voltage			
Max kick-start voltage		%	85
Max. kick-start duration 50/60 Hz		ms	2000
<b>Functions</b>			
Fast switching (semiconductor contactor)			– (minimum ramp time 1 s)
Soft start function			✓
Suppression of closing transients			✓
Current limitation			✓
Overload detection			✓
Underload monitoring			✓
Fault log		Errors	10
Suppression of DC components on motors			✓
Potential isolation between power section and control section			✓
Modbus RTU communication interface			✓
<b>Product range</b>			
Internal bypass contacts			✓
Soft starter for three-phase loads, with control unit and pump algorithm			✓
200 - 600 V mains supply voltage (50/60 Hz)	$U_{LN}$	V AC	✓
200 - 690 V mains supply voltage (50/60 Hz)	$U_{LN}$	V AC	–
24 V supply voltage	$U_s$	V DC	✓
24 V control voltage	$U_c$	V DC	✓
Startup class			CLASS 10 (star-delta replacement) CLASS 20 (heavy starting duty, $3 \times I_e$ for 45 s) CLASS 30 ( $6 \times I_e$ for 30 s)
Terminal blocks for the terminals are required (accessories)			–

Frame size			
R	T	U	V
24 V DC $\pm$ 10%	24 V DC $\pm$ 10%	24 V DC $\pm$ 10%	24 V DC $\pm$ 10%
150	150	150	150
100	100	100	100
21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
maxim. 3 V DC	maxim. 3 V DC	maxim. 3 V DC	maxim. 3 V DC
100	100	100	100
100	100	100	100
24 V DC $\pm$ 10%	24 V DC $\pm$ 10%	24 V DC $\pm$ 10%	24 V DC $\pm$ 10%
< 1000	< 1000	< 1000	< 1400
10/150	10/150	10/150	10/150
✓	✓	✓	✓
1	1	1	1
2	2	2	2
✓	✓	✓	✓
0.5 - 360	0.5 - 360	0.5 - 360	0.5 - 360
0 - 120	0 - 120	0 - 120	0 - 120
85	85	85	85
85	85	85	85
2000	2000	2000	2000
– (minimum ramp time 1 s)	– (minimum ramp time 1 s)	– (minimum ramp time 1 s)	– (minimum ramp time 1 s)
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
10	10	10	10
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
–	✓	–	✓
✓	✓	✓	✓
✓	✓	✓	✓
CLASS 10 (star-delta replacement) CLASS 20 (heavy starting duty, 3 x I <sub>e</sub> for 45 s) CLASS 30 (6 x I <sub>e</sub> for 30 s)	CLASS 10 (star-delta replacement) CLASS 20 (heavy starting duty, 3 x I <sub>e</sub> for 45 s) CLASS 30 (6 x I <sub>e</sub> for 30 s)	CLASS 10 (star-delta replacement) CLASS 20 (heavy starting duty, 3 x I <sub>e</sub> for 45 s) CLASS 30 (6 x I <sub>e</sub> for 30 s)	CLASS 10 (star-delta replacement) CLASS 20 (heavy starting duty, 3 x I <sub>e</sub> for 45 s) CLASS 30 (6 x I <sub>e</sub> for 30 s)
–	✓	✓	✓



# 1.2

## Soft starter S811+

### Technical specifications

#### Tested switchgear combinations for in-line and in-delta connections

Soft starter S811+ offers a flexibly adjustable internal motor protection function. Motor current and overload class can be set up to class 30, eliminating the need for an external overload relay. The measured current can be read out of the internal Modbus interface for further use in the process. The S811+ requires only the NZM circuit-breaker against short circuiting of the motor lines to achieve full motor output. The “In-Delta” connection is only possible with S811+, as it necessitates an extra mains contactor that is not required for “in-line” operation.

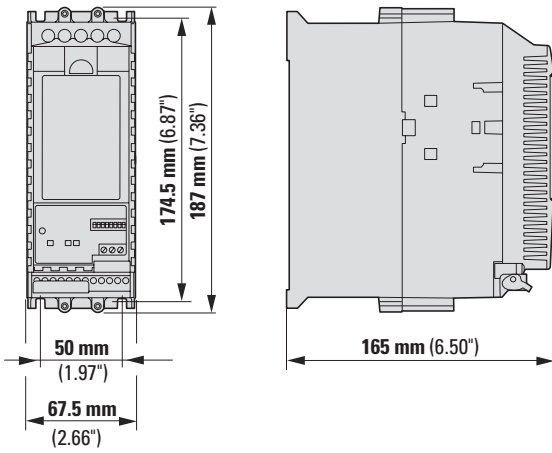


Rated operational current A	assigned motor power at 400 V kW	assigned motor power at 480 V HP	Soft Starters	Soft Starters	Mains contactor	Cable protection
			in-line Type	In-Delta Type	Catalog Number	Catalog Number
37	18.5	25	S811+N37P3S			PKM4-40
66	30	50	S811+N66P3S	S811+N37P3S	DILM72	NZMN1-S80
105	55	75	S811+R10P3S	S811+N66P3S	DILM115	NZMN2-S125
135	75	100	S811+R13P3S			NZMN2-S160
180	90	150	S811+T18P3S	S811+R10P3S	DILM185A	NZMN2-S200
240	132	200	S811+T24P3S	S811+R13P3S	DILM250	NZMN3-S250
304	160	250	S811+T30P3S	S811+T18P3S	DILM400	NZMN3-S320
360	200	250	S811+U36P3S	S811+T24P3S	DILM400	NZMN3-S400
360	200	250	S811+V36P3S			NZMN3-S400
420	200	350	S811+U42P3S			NZMN3-S500
420	200	350	S811+V42P3S			NZMN3-S500
500	250	400	S811+V50P3S	S811+T30P3S	DILM580	NZMN3-S500
650	315	500	S811+V65P3S	S811+U36P3S	DILM750	NZMN4-ME875
720	400	600	S811+V72P3S	S811+U42P3S	DILM750	NZMN4-ME875
850	450	600	S811+V85P3S	S811+V50P3S	DILM1000	NZMN4-ME875
1125	630	850		S811+V65P3S	DILM1600	NZMN4-ME1400
1246	630	850		S811+V72P3S	DILM1600	NZMN4-ME1400
1471	750	1100		S811+V85P3S	DILM1600	IZMX16...

(\*) Switch only when stopped

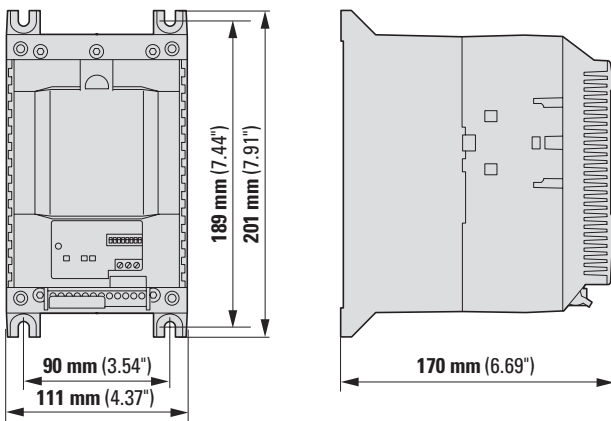
### Dimensions and weights

#### S811+N...



Catalog Number	Weight [kg]
S811+N37...	2.6
S811+N66...	

#### S811+R...



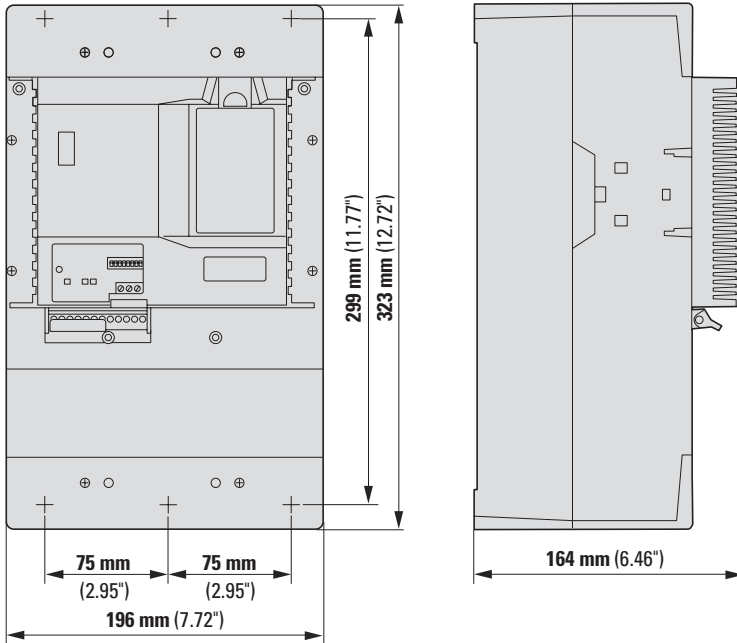
Catalog Number	Weight [kg]
S811+R10...	4.8
S811+R13...	

# 1.2

## Soft starter S811+

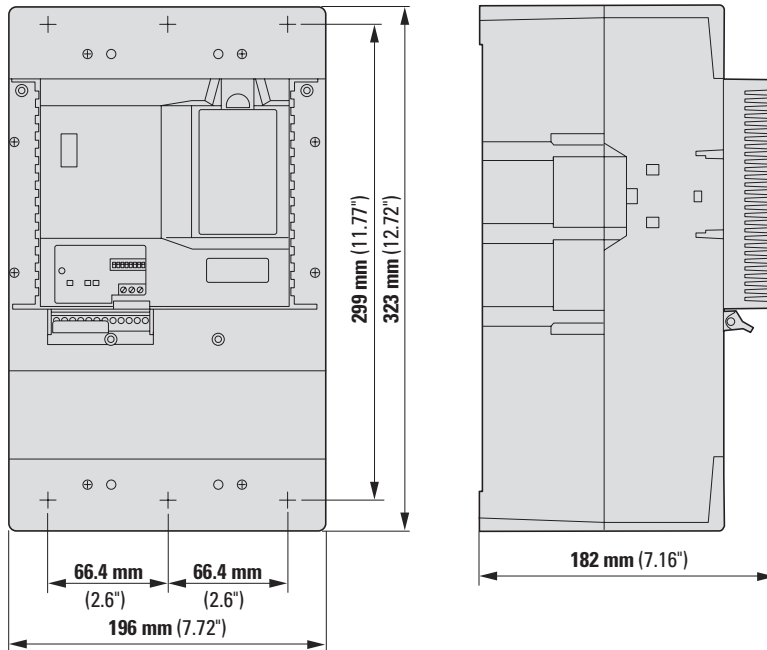
### Dimensions and weights

#### S811+T...



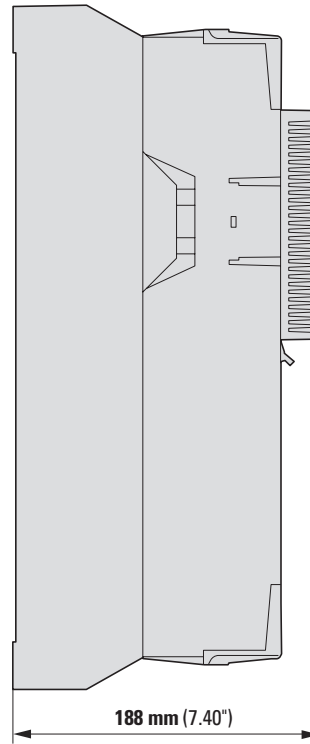
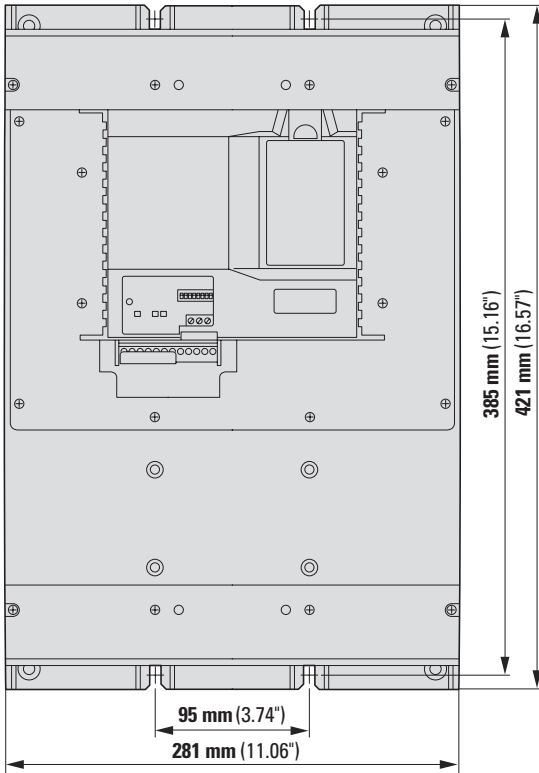
Catalog Number	Weight [kg]
S811+T18...	18.6
S811+T24...	
S811+T30...	

#### S811+U...



Catalog Number	Weight [kg]
S811+U36...	18.6
S811+U42...	
S811+U50...	

S811+V...



Catalog Number	Weight [kg]
S811+V36...	41.4
S811+V42...	
S811+V50...	
S811+V65...	
S811+V72...	
S811+V85...	
S811+V10...	

S811+



# PowerXL DE1 variable speed starter

The PowerXL DE1 variable speed starter offers simple handling and highest reliability while at the same time variable motor speed and improved energy efficiency of the machine. This category of devices is the first to close the gap between conventional motor starters and variable frequency drives and combine all the advantages in a single unit.

## Performance range:

- 0.25 - 2.2 kW ( $U_g$ : 1~ 230 V,  $U_2$ : 3~ 230 V)
- 0.37 - 7.5 kW ( $U_g$ : 3~ 400 V,  $U_2$ : 3~ 400 V)

## Applications:

- Fans, pumps
- Simple Machines
- Retrofits in machines and systems in order to replace conventional motor starters or contactors for motor control

## Features:

- Compact: 45 mm width
- Out-of-the-box commissioning without parameterization
- No special drives engineering skills or knowledge required
- Screwdriver parameterization can be set with DXE-EXT-SET optional configuration module
- Trip-free-design ensures maximum machine availability
- Suitable for use in ambient temperatures of up to 60 °C
- DE11 with on-board CANopen, removable control signal terminal strip, and programmable relay output
- International standards (CE, UL, cUL, cTick, RoHS)

## Accessory:

- Plug-in configuration module
- Plug-in communication modules: SmartWire-DT, Ethernet/IP, PROFINET (PROFIdrive)
- External LED keypad
- Mains chokes
- Motor chokes
- External EMC filter
- Parameter storage unit and Bluetooth communication stick
- drivesConnect parameter configuration software
- drivesConnect mobile App (iOS, Android)

For more information, visit:  
[www.Eaton.com/DE1](http://www.Eaton.com/DE1)





<b>2.1 DE1 variable speed starter up to 7.5 kW</b>	
<b>System overview</b> .....	<b>56</b>
<b>Key to type references</b> .....	<b>57</b>
<b>Sizes and degree of protection</b> .....	<b>57</b>
<b>Ordering</b> .....	<b>58</b>
DE1, for three-phase motors 230 V/400 V, IP20 .....	<b>58</b>
DE11, for three-phase motors 230 V/400 V, IP20 .....	<b>59</b>
Accessories .....	<b>60</b>
<b>Engineering</b> .....	<b>61</b>
Block diagram .....	<b>61</b>
Assigned switching and protective elements for DE1 .....	<b>62</b>
<b>Technical data</b> .....	<b>63</b>
General rated operational data .....	<b>63</b>
Specific rated operational data .....	<b>64</b>
<b>Dimensions and weights</b> .....	<b>70</b>

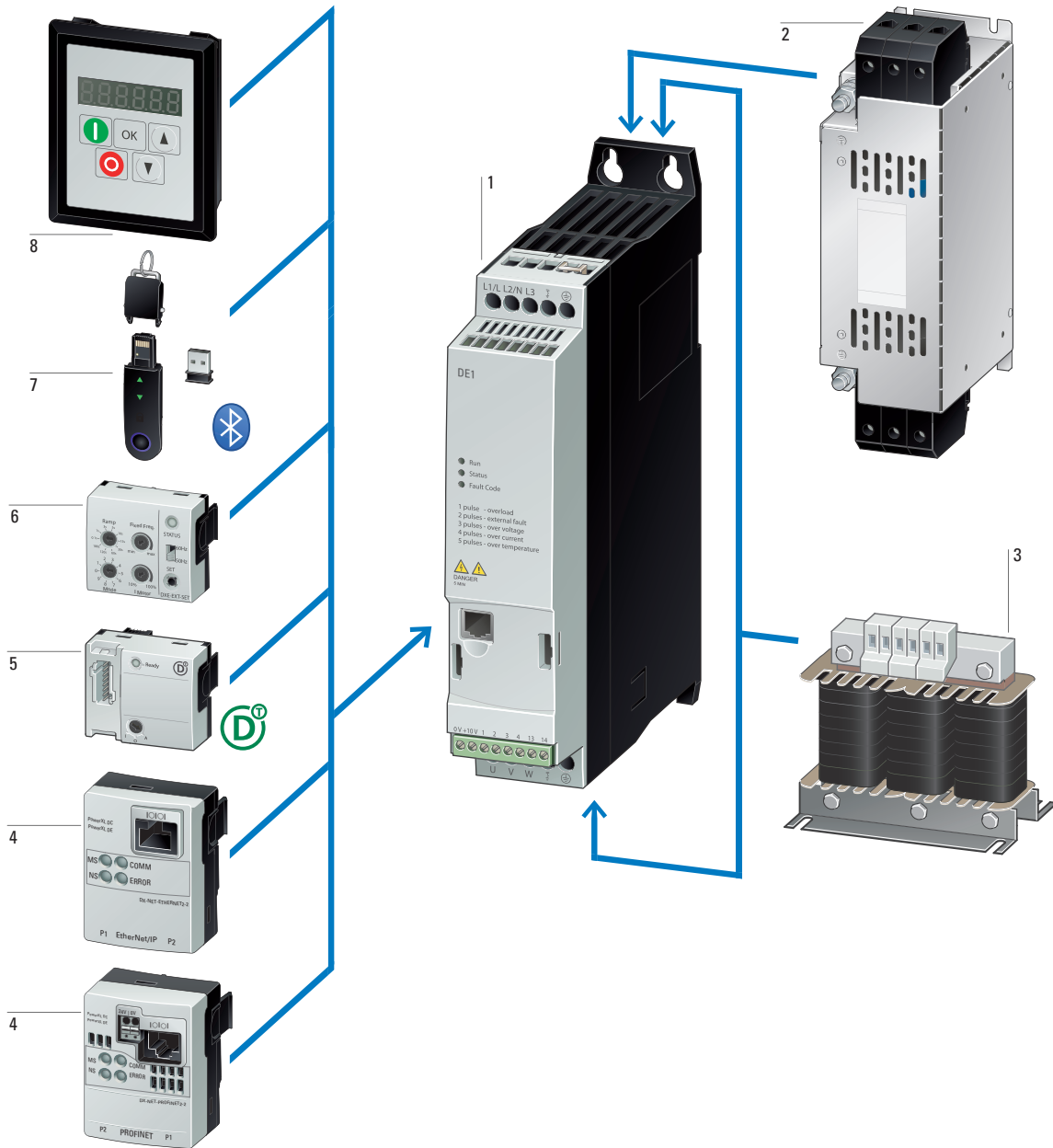
DE1

# 2.1

## DE1 variable speed starter up to 7.5 kW

### System overview

#### System overview



**Variable speed starter DE1/DE11** 1  
→ Page 58

**Radio interference suppression filter** 2  
→ Page 217

**Mains chokes, motor reactors** 3  
→ Page 215  
→ Page 219

**Communication modules** 4  
→ Page 60

**SmartWire-DT module** 5  
→ Page 60

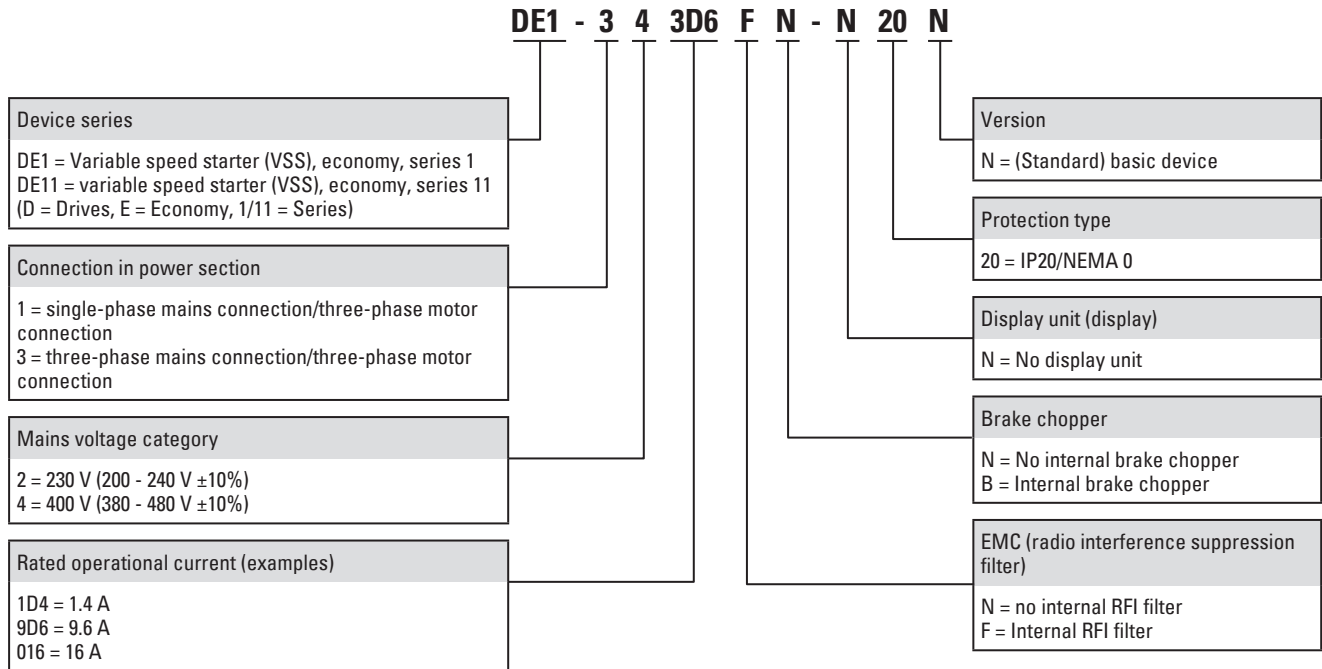
**Configuration module** 6  
→ Page 60

**Memory and Bluetooth stick** 7  
→ Page 60

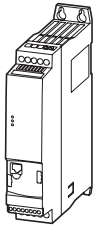
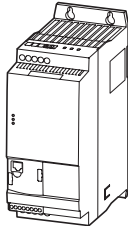
**External keypad** 8  
→ Page 70

Key to type references, sizes and degree of protection

## Key to type references



## Sizes and degree of protection

Frame size	Protection type
FS1	IP20/NEMA 0
	
FS2	
	

# 2.1

## DE1 variable speed starter up to 7.5 kW

DE1, for three-phase motors 230 V/400 V, IP20

### Ordering

Rated operational current <sup>1)2)</sup>	Assigned motor output <sup>2)3)4)</sup>		Radio interference suppression filter	Frame size	Protection type	Catalog Number Article no.	Std. pack
I <sub>b</sub> A	P kW	P HP					
<b>PowerXL DE1 variable speed starter</b>							
U <sub>b</sub> 230 V AC, single-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V							
1.4	0.25	0.33	– ✓	FS1	IP20/NEMA 0	<b>DE1-121D4NN-N20N</b> 177359 <b>DE1-121D4FN-N20N</b> 174327	1 unit
2.3	0.37	0.5	– ✓			<b>DE1-122D3NN-N20N</b> 177360 <b>DE1-122D3FN-N20N</b> 174328	
2.7	0.55		– ✓			<b>DE1-122D7NN-N20N</b> 177361 <b>DE1-122D7FN-N20N</b> 174329	
4.3	0.75	1	– ✓			<b>DE1-124D3NN-N20N</b> 177362 <b>DE1-124D3FN-N20N</b> 174330	
7	1.5	2	– ✓			<b>DE1-127D0NN-N20N</b> 177363 <b>DE1-127D0FN-N20N</b> 174331	
9.6	2.2	3	– ✓	FS2		<b>DE1-129D6NN-N20N</b> 177364 <b>DE1-129D6FN-N20N</b> 174332	
U <sub>b</sub> 400 V AC, three-phase / U <sub>2</sub> 400 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V							
1.3	0.37	0.5	– ✓	FS1	IP20/NEMA 0	<b>DE1-341D3NN-N20N</b> 177365 <b>DE1-341D3FN-N20N</b> 174333	1 unit
2.1	0.75	1	– ✓			<b>DE1-342D1NN-N20N</b> 177366 <b>DE1-342D1FN-N20N</b> 174334	
3.6	1.5	2	– ✓			<b>DE1-343D6NN-N20N</b> 177367 <b>DE1-343D6FN-N20N</b> 174335	
5	2.2	3	– ✓	FS2		<b>DE1-345D0NN-N20N</b> 177368 <b>DE1-345D0FN-N20N</b> 174336	
6.6	3		– ✓			<b>DE1-346D6NN-N20N</b> 177369 <b>DE1-346D6FN-N20N</b> 174337	
8.5	4	5	– ✓			<b>DE1-348D5NN-N20N</b> 177370 <b>DE1-348D5FN-N20N</b> 174338	
11.3	5.5	7.5	– ✓			<b>DE1-34011NN-N20N</b> 177371 <b>DE1-34011FN-N20N</b> 174339	
16	7.5	10	– ✓			<b>DE1-34016NN-N20N</b> 177372 <b>DE1-34016FN-N20N</b> 174340	

#### Notes

<sup>1)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +50°C

<sup>2)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>3)</sup> DE1-12...: at 230 V, 50 Hz/at 220 - 240 V, 60 Hz

DE1-34...: at 400 V, 50 Hz/at 440 - 480 V, 60 Hz

<sup>4)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

# DE1 variable speed starter up to 75 kW

# 2.1

DE11, for three-phase motors 230 V/400 V, IP20

Rated operational current <sup>1)2)</sup>	Assigned motor output <sup>2)3)4)</sup>		Radio interference suppression filter	Frame size	Protection type	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P					
A	kW	HP					
<b>PowerXL DE11 variable speed starter</b>							
U <sub>e</sub> 230 V AC, single-phase / U <sub>e</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V							
1.4	0.25	0.33	–	FS1	IP20/NEMA 0	<b>DE11-121D4NN-N20N</b> 180656	1 unit
			✓			<b>DE11-121D4FN-N20N</b> 180650	
2.3	0.37	0.5	–			<b>DE11-122D3NN-N20N</b> 180657	
			✓			<b>DE11-122D3FN-N20N</b> 180651	
2.7	0.55		–			<b>DE11-122D7NN-N20N</b> 180658	
			✓			<b>DE11-122D7FN-N20N</b> 180652	
4.3	0.75	1	–			<b>DE11-124D3NN-N20N</b> 180659	
			✓			<b>DE11-124D3FN-N20N</b> 180653	
7	1.5	2	–			<b>DE11-127D0NN-N20N</b> 180660	
			✓			<b>DE11-127D0FN-N20N</b> 180654	
9.6	2.2	3	–	FS2		<b>DE11-129D6NN-N20N</b> 180661	
			✓			<b>DE11-129D6FN-N20N</b> 180655	
U <sub>e</sub> 400 V AC, three-phase / U <sub>e</sub> 400 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V							
1.3	0.37	0.5	–	FS1	IP20/NEMA 0	<b>DE11-341D3NN-N20N</b> 180670	1 unit
			✓			<b>DE11-341D3FN-N20N</b> 180670	
2.1	0.75	1	–			<b>DE11-342D1NN-N20N</b> 180671	
			✓			<b>DE11-342D1FN-N20N</b> 180663	
3.6	1.5	2	–			<b>DE11-343D6NN-N20N</b> 180672	
			✓			<b>DE11-343D6FN-N20N</b> 180664	
5	2.2	3	–	FS2		<b>DE11-345D0NN-N20N</b> 180673	
			✓			<b>DE11-345D0FN-N20N</b> 180665	
6.6	3		–			<b>DE11-346D6NN-N20N</b> 180674	
			✓			<b>DE11-346D6FN-N20N</b> 180666	
8.5	4	5	–			<b>DE11-348D5NN-N20N</b> 180675	
			✓			<b>DE11-348D5FN-N20N</b> 180667	
11.3	5.5	7.5	–			<b>DE11-34011NN-N20N</b> 180676	
			✓			<b>DE11-34011FN-N20N</b> 180668	
16	7.5	10	–			<b>DE11-34016NN-N20N</b> 180677	
			✓			<b>DE11-34016FN-N20N</b> 180669	

## Notes

<sup>1)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +50°C

<sup>2)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>3)</sup> DE11-12... : at 230 V, 50 Hz/at 220 - 240 V, 60 Hz

DE11-34... : at 400 V, 50 Hz/at 440 - 480 V, 60 Hz


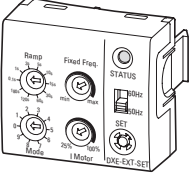
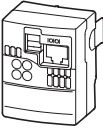
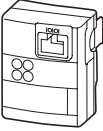
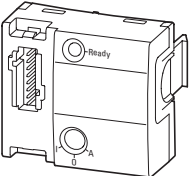
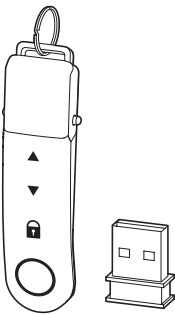
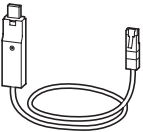
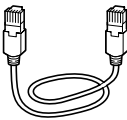

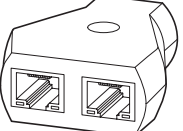
<sup>4)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz



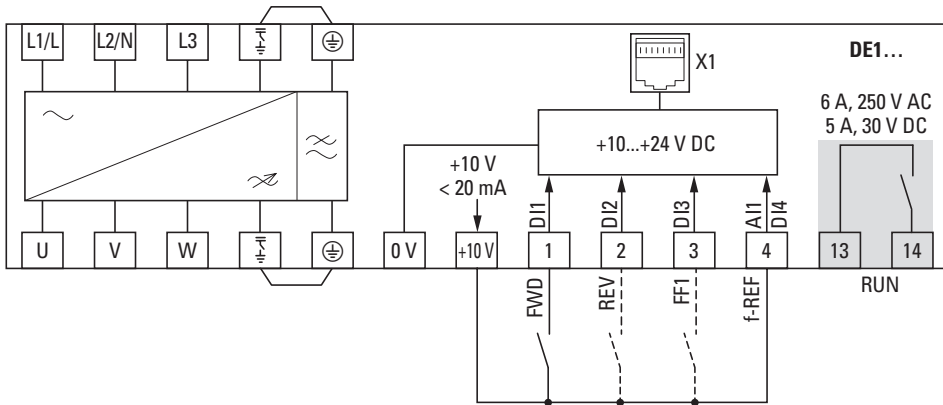
# 2.1

## DE1 variable speed starter up to 7.5 kW

### Accessories

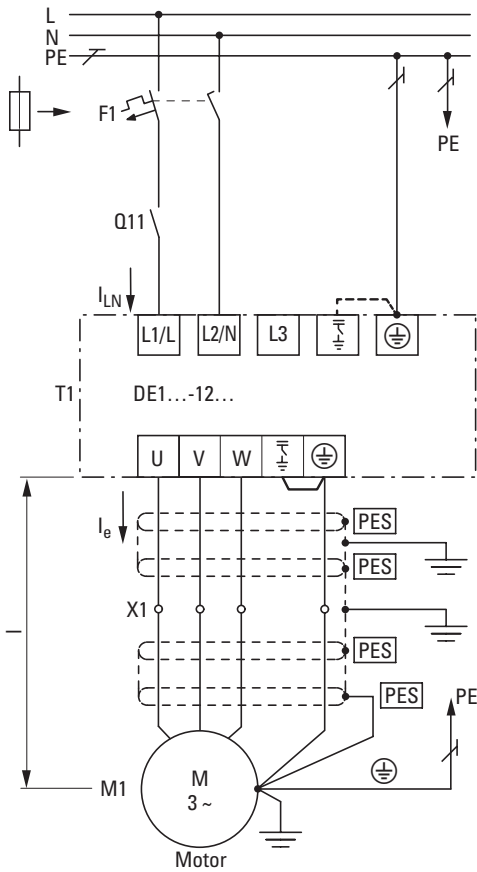
	Description	Length m	For use with	Catalog Number Article no.	Std. pack
	<b>External keypad</b> With 7-digital display assembly Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	3	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-KEY-LED2</b> 186946	1 unit
	<b>Configuration module</b> Plug-in module (front) with selector switch for ramp time and operating mode With potentiometer for motor protection and fixed frequency	–	DE1, DE11	<b>DXE-EXT-SET</b> 174621	1 unit
<b>Communication modules</b>					
	Profinet Profinet plug-in module (front) with 2 x RJ45, 8 pole, PROFdrive profile		DE1, DE11, DC1 (IP20)	<b>DX-NET-PROFINET2-2</b> 184947	1 unit
	Ethernet/IP Ethernet/IP plug-in module (front) with 2 x RJ45, 8 pole	–	DE1, DE11, DC1 (IP20)	<b>DX-NET-ETHERNET2-2</b> 184969	1 unit
	<b>SmartWire-DT module</b> Plug-in module (front) with slot for SWD4-8SF2-5 external device plug	–	DE1, DE11, DC1 (IP20)	<b>DX-NET-SWD3</b> 169131	1 unit
<b>Parameter assignment</b>					
	Parameter storage unit and Bluetooth communication stick For storage, copying parameters, and/or transferring parameters to a PC or smartphone (iOS or Android) via Bluetooth with the drivesConnect software or the drivesConnect mobile app respectively With 2 function keys for uploading and downloading parameters with parameter memory.	–	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-COM-STICK3-KIT</b> 197586	1 unit
	<b>Programming cable</b> Interface converter USB/RS485 with connection cable, RJ45 8 pole For storage, copying parameters, and/or transferring parameters to a PC with the drivesConnect software, electrically isolated	3	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-CBL-PC-3M0</b> 744-A3036-00P	1 unit
	<b>Connection cable</b> Patch cord with RJ45 plugs, 8 pole	0.5 1 3	DE1, DE11, DC1, DB1, DA1	<b>DX-CBL-RJ45-0M5</b> 169137 <b>DX-CBL-RJ45-1M0</b> 169138 <b>DX-CBL-RJ45-3M0</b> 169139	1 unit
	<b>Bus terminating resistor</b> RJ45 8 pole Connection to CANopen® (pin 1/2, 124 Ω) or to Modbus RTU (pin 7/8, 120 Ω)	–	DX-SPL-RJ45-2SL-1PL	<b>EASY-NT-R</b> 256281	2 unit
	<b>Splitter</b> RJ45, 8-pin, 3 sockets RJ45, 8-pin, 2 sockets/1 plug	–	DX-CBL-RJ45... DE1, DE11, DC1, DB1, DA1	<b>DX-SPL-RJ45-3SL</b> 169141 <b>DX-SPL-RJ45-2SL1PL</b> 169142	1 unit

## Engineering



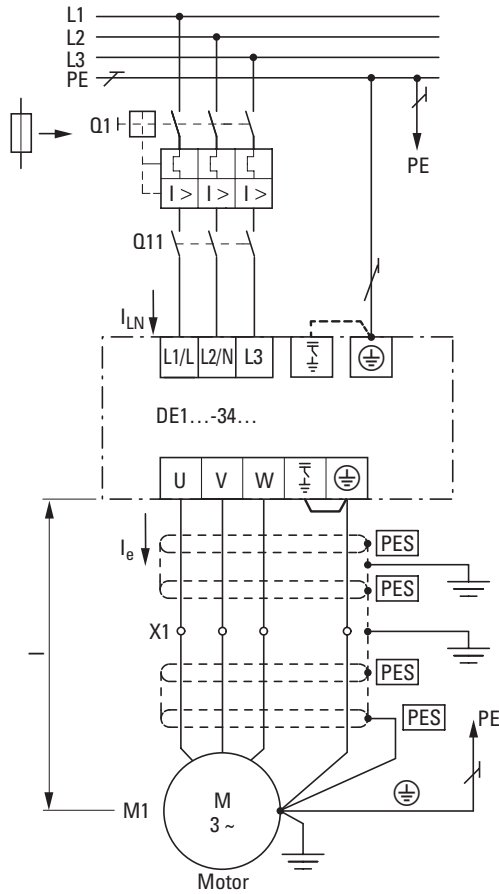
### Mains

1 ~ 200 V - 240 V  $\pm 10\%$ , 50/60 Hz (DE1...-12...)



### Mains

3 ~ 380 V - 480 V  $\pm 10\%$ , 50/60 Hz (DE1...-34...)



# 2.1

## DE1 variable speed starter up to 75 kW

Assigned switching and protective elements for DE1

Catalog Number	Motor	Variable frequency drives		Mains connection		Mains connection		Motor feeder	
		Assigned motor output <sup>1)2)</sup>	Rated operational current <sup>1)</sup>	Input current	Protection device (fuse or miniature circuit-breaker)	Mains contactor	Mains choke		Radio interference suppression filter (external, 150 %) <sup>3)</sup>
	$I_H = 150\%$	$I_H = 150\%$	$I_H = 150\%$	IEC (Type B, gG), 150%	UL (Class CC or J)	$I_H = 150\%$ (CT/IH, at 50°C)	$I_H = 150\%$ (at 50°C)	$I_H = 150\%$ (CT/IH, at 50°C)	
	P kW	$I_e$ A	ILN A		A				
<b>230 V AC, single-phase/230 V AC, three-phase</b>									
DE1-121D4...	0.25	1.4	3.6	FAZ-B10/1N	10	DILEM-... + P1DILEM	DX-LN1-006	DX-EMC12-019-FS1	DX-LM3-008
DE1-122D3...	0.37	2.3	6.2	FAZ-B10/1N	10	DILEM-... + P1DILEM	DX-LN1-009	DX-EMC12-019-FS1	DX-LM3-008
DE1-122D7...	0.55	2.7	7.3	FAZ-B10/1N	10	DILEM-... + P1DILEM	DX-LN1-009	DX-EMC12-019-FS1	DX-LM3-008
DE1-124D3...	0.75	4.3	11.3	FAZ-B16/1N	15	DILEM-... + P1DILEM	DX-LN1-013	DX-EMC12-019-FS1	DX-LM3-008
DE1-127D0...	1.5	7	17.4	FAZ-B20/1N	20	DILEM-... + P1DILEM	DX-LN1-018	DX-EMC12-019-FS1	DX-LM3-008
DE1-129D6...	2.2	9.6	23.2	FAZ-B32/1N	35	DILEM-... + P1DILEM	DX-LN1-024	DX-EMC12-025-FS2	DX-LM3-011
<b>400 V AC, three-phase/400 V AC, three-phase</b>									
DE1-341D3...	0.37	1.3	1.7	FAZ-B6/3	6	DILEM-...	DX-LN3-004	DX-EMC34-008	DX-LM3-008
DE1-342D1...	0.75	2.1	3.1	FAZ-B6/3	6	DILEM-...	DX-LN3-004	DX-EMC34-008	DX-LM3-008
DE1-343D6...	1.5	3.6	4.9	FAZ-B6/3	6	DILEM-...	DX-LN3-006	DX-EMC34-008	DX-LM3-008
DE1-345D0...	2.2	5	7	FAZ-B16/3	15	DILEM-...	DX-LN3-010	DX-EMC34-008	DX-LM3-008
DE1-346D6...	3	6.6	8.5	FAZ-B16/3	15	DILEM-...	DX-LN3-010	DX-EMC34-016	DX-LM3-008
DE1-348D5...	4	8.5	10	FAZ-B16/3	15	DILEM-...	DX-LN3-010	DX-EMC34-016	DX-LM3-011
DE1-34011...	5.5	11.3	12	FAZ-B16/3	15	DILEM-...	DX-LN3-016	DX-EMC34-016	DX-LM3-011
DE1-34016...	7.5	16	16.5	FAZ-B25/3	25	DILEM-...	DX-LN3-024	DX-EMC34-030	DX-LM3-016

**Notes**

<sup>1)</sup> Overload cycle for 60 s every 600 s

<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>3)</sup> Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments

## Technical specifications

	Symbol	Unit	value
<b>General</b>			
Standards			Specification for general requirements: IEC/EN 61800-2 EMC requirements: IEC/EN 61800-3 Safety requirements: IEC/EN 61800-5-1
Certifications and manufacturer's declarations on conformity			CE, UL, cUL, RCM
Production quality			RoHS, ISO 9001
Climatic proofing	pw	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive, no dripping water (IEC/EN 61800-5-1)
Ambient temperature			
Operation			
IP20 (NEMA 0)	θ	°C	-10 - +60 Exception: The following device types use derating: DE1...-34016NN-N20N, DE1...-34016FN-N20N.
Storage	θ	°C	-40 - +70
Impact resistance (EN 60068-2-27)			15 g/11 ms (under operating conditions) Mounted on DIN-rail Mounted on mounting plate with screws
Vibration as per IEC/EN 61800-5-1			Transportation as per IEC/EN 61800-2 DE1... transported as a single device in a separate package and UPS drop test (15 g/11 ms)
MTBF (mean time between failures)			DE1...-12... (FS1): > 73 years DE1...-12... (FS2): > 17 years DE1...-34... (FS1): > 88 years DE1...-34... (FS2): > 73 years
Electrostatic discharge (ESD, IEC 61800-3)	U	kV	±4, contact discharge / ±6, air discharge
Fast transient Burst (IEC 61800-3)			5 kHz for 5 min. / 100 kHz for 5 min.
Radio interference class (EN 61800-3)			
Maximum (screened) motor cable length with integrated radio interference suppression filter			
C1 (DE1...-12... only, for conducted emissions only)	l	m	5
C2	l	m	10
C3	l	m	25
Interference immunity (EN 61800-3)			
1st and 2nd environments			
Maximum motor cable length			
not screened	l	m	125
screened	l	m	65
Mounting position			
Any, not suspended (front not facing downwards), vertical only with DE1...-121D4..., DE1...-122D3..., DE1...-122D7...			
Altitude	h	m	0 - 1000 above sea level, > 1000 with 1% load current reduction (derating) for every 100 m, Max. 2000
Protection type			
IP20 (NEMA 0)			
Protection against contact			
BGV A3 (VBG4, finger- and back-of-hand proof)			

# 2.1

## DE1 variable speed starter up to 75 kW

### Specific rated operational data

	Symbol	Unit	DE1...-121D4...	DE1...-122D3...	DE1...-122D7...	DE1...-124D3...	DE1...-127D0...	DE1...-129D6...
<b>DE1...-12... (single-phase mains connection)</b>								
<b>Mains connection</b>								
Rated operating voltage	$U_e$	V	230, single-phase	230, single-phase	230, single-phase	230, single-phase	230, single-phase	230, single-phase
Mains voltage	$U_{LN}$	V	200 - 240 $\pm$ 10% (180 - 264)	200 - 240 $\pm$ 10% (180 - 264)	200 - 240 $\pm$ 10% (180 - 264)	200 - 240 $\pm$ 10% (180 - 264)	200 - 240 $\pm$ 10% (180 - 264)	200 - 240 $\pm$ 10% (180 - 264)
Mains frequency	$f$	Hz	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%
Input current (without mains choke)	$I_{LN}$	A	3.6	6.2	7.3	11.3	17.4	23.2
<b>Power Part</b>								
Rated operational current	$I_e$	A	1.4	2.3	2.7	4.3	7	9.6
Overload current, 1.5 x $I_e$ , cyclically for 60 s every 600 s	$I_{2-150}$	A	2.1	3.45	4.05	6.45	10.5	14.4
Overload current, max. 2 x $I_e$ every 600 s	$I_{2max}$	A	2.8	4.6	5.4	8.6	14	19.2
Output voltage at $U_e$	$U_2$	V	230, 3-phase	230, 3-phase	230, 3-phase	230, 3-phase	230, 3-phase	230, 3-phase
Output frequency	$f_2$	Hz	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)
Frequency resolution (setpoint value)	$\Delta f$	%	0.025	0.025	0.025	0.025	0.025	0.025
Pulse frequency (audible)	$f_{PVM}$	kHz	16 (4/8/12/16/24/32)	16 (4/8/12/16/24/32)	16 (4/8/12/16/24/32)	16 (4/8/12/16/24/32)	16 (4/8/12/16/24/32)	16 (4/8/12/16/24/32)
Derating between 50°C and 60°C			none	none	none	none	none	none
Contact current <sup>1)</sup>	$I_{PE}$	mA	< 3.5 AC/ < 10 DC	< 3.5 AC/ < 10 DC	< 3.5 AC/ < 10 DC	< 3.5 AC/ < 10 DC	< 3.5 AC/ < 10 DC	< 3.5 AC/ < 10 DC
DC-braking			0 - 100% $U_e$ , 0 - 10 s, parameterizable					
Heat dissipation (idle, standby)	PV	W	3.44	3.44	3.44	3.44	3.44	4.66
Heat dissipation (speed/torque)								
100/100	$P_V$	W	16.4	18.3	25	30.9	78.4	91
90/100	$P_V$	W	16.4	18.3	25	30.9	78.4	91
90/50	$P_V$	W	12.6	10.4	15.1	15.3	51.6	55
50/100	$P_V$	W	13.5	16.8	19.8	28.9	68.9	72
50/50	$P_V$	W	11.6	7.9	12.3	14.7	44.9	46
50/25	$P_V$	W	10.9	5.6	10	10.3	37	38
0/100	$P_V$	W	13	–	25.3	31.8	62.4	–
0/50	$P_V$	W	10.5	10	10.9	15.2	44.6	–
0/25	$P_V$	W	–	–	–	–	–	30

**Notes** <sup>1)</sup> Due to the design used for single-phase DE1...-12... devices, a higher leakage current will be produced if L1 and N are swapped.

Symbol	Unit	DE1...-121D4...	DE1...-122D3...	DE1...-122D7...	DE1...-124D3...	DE1...-127D0...	DE1...-129D6...	
<b>DE1...-12... (single-phase mains connection)</b>								
<b>Motor feeder</b>								
Motor power, assigned								
at 230 V, 50 Hz	P	kW	0.25	0.37	0.55	0.75	1.5	2.2
at 220 -240 V, 60 Hz	P	HP	1/3	1/2	1/2	1	2	3
Apparent power at rated value								
at 230 V	S	kVA	0.56	0.92	1.08	1.71	2.79	3.82
at 240 V	S	kVA	0.58	0.96	1.12	1.79	2.91	3.99
<b>Control section</b>								
Relay								
Switching contact	S (RUN signal)							
Voltage, maximum	U	V	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC
Load current, maximum	I	A	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1
Reference voltage/Control voltage								
Output voltage	U <sub>c</sub>	V	10	10	10	10	10	10
Max. permissible load current	I <sub>c</sub>	mA	20	20	20	20	20	20
Analog input								
Resolution	12 bits							
Voltage	U <sub>s</sub>	V	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10
Current	I <sub>s</sub>	mA	0/4 - 20	0/4 - 20	0/4 - 20	0/4 - 20	0/4 - 20	0/4 - 20
Digital input								
High signal voltage level	U <sub>c</sub>	V	9 - 30	9 - 30	9 - 30	9 - 30	9 - 30	9 - 30
Input current	I <sub>s</sub>	mA	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)
<b>Enclosure material</b>								
Frame size			FS1	FS1	FS1	FS1	FS1	FS2
Dimensions (W x H x D)	mm	45 x 230 x 169		45 x 230 x 169	45 x 230 x 169	45 x 230 x 169	45 x 230 x 169	90 x 230 x 169
Maximum permissible deviation from vertical installation position	Degrees	5		5	5	90	90	90
Internal device fan			no	no	no	Yes	Yes	Yes
Protection type			IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0
Weight	m	kg	1.04	1.04	1.06	1.06	1.06	1.68
<b>Terminal capacities, clampable</b>								
Power Part								
Solid or stranded	A	mm <sup>2</sup>	1 - 6	1 - 6	1 - 6	1 - 6	1 - 6	1 - 6
Flexible with ferrule	A	mm <sup>2</sup>	1 - 6	1 - 6	1 - 6	1 - 6	1 - 6	1 - 6
Solid or stranded	A	AWG	18 - 6	18 - 6	18 - 6	18 - 6	18 - 6	18 - 6
Strip length	l	mm	8	8	8	8	8	8
Tool	PZ2 (PoziDrive) cross screwdriver							
Tightening torque	M	Nm	1.2	1.2	1.2	1.2	1.2	1.2
Control section								
Solid or stranded	A	mm <sup>2</sup>	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5
Flexible with ferrule	A	mm <sup>2</sup>	0.5 - 1	0.5 - 1	0.5 - 1	0.5 - 1	0.5 - 1	0.5 - 1
Solid or stranded	A	AWG	30 - 16	30 - 16	30 - 16	30 - 16	30 - 16	30 - 16
Strip length	l	mm	5	5	5	5	5	5
Tool	0.7 x 3 mm standard screwdriver							
Tightening torque	M	Nm	0.5	0.5	0.5	0.5	0.5	0.5



# 2.1

## DE1 variable speed starter up to 75 kW

### Specific rated operational data

	Symbol	Unit	DE1...-341D3...	DE1...-342D1...	DE1...-343D6...	DE1...-345D0...
<b>DE1...-34... (three-phase mains connection)</b>						
<b>Mains connection</b>						
Rated operating voltage	$U_B$	V	380/400/480, 3-phase	380/400/480, 3-phase	380/400/480, 3-phase	380/400/480, 3-phase
Mains voltage	$U_{LN}$	V	380 - 480 $\pm$ 10% (342 - 528)	380 - 480 $\pm$ 10% (342 - 528)	380 - 480 $\pm$ 10% (342 - 528)	380 - 480 $\pm$ 10% (342 - 528)
Mains frequency	f	Hz	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%
Input current (without mains choke)	$I_{LN}$	A	1.7	3.1	4.9	7
<b>Power Part</b>						
Rated operational current	$I_B$	A	1.3	2.1	3.6	5
Overload current, 1.5 x $I_B$ , cyclically for 60 s every 600 s	$I_{2-150}$	A	1.95	3.15	5.4	7.5
Overload current, max. 2 x $I_B$ every 600 s	$I_{2max}$	A	2.6	4.2	7.2	10
Output voltage at $U_B$	$U_2$	V	380/400/480, 3-phase	380/400/480, 3-phase	380/400/480, 3-phase	380/400/480, 3-phase
Output Frequency	$f_2$	Hz	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)
Frequency resolution (reference value)	$\Delta f$	%	0.025	0.025	0.025	0.025
Pulse frequency (audible)	$f_{PWM}$	kHz	16 (10/12/14/16/18/20)	16 (10/12/14/16/18/20)	16 (10/12/14/16/18/20)	16 (10/12/14/16/18/20)
Derating between 50°C and 60°C			none	<ul style="list-style-type: none"> <li>• None if <math>f_{PWM} \leq 16</math> kHz</li> <li>• None if <math>f_{PWM} \leq 20</math> kHz, up to a max. of 57°C</li> <li>• None if <math>I_B \leq 1.6</math> A</li> </ul>	<ul style="list-style-type: none"> <li>• None if <math>f_{PWM} \leq 16</math> kHz</li> <li>• None if <math>I_B \leq 3.2</math> A</li> <li>• None up to a max. of 57°C</li> </ul>	none
Contact current	$I_{PE}$	mA	< 3.5 AC / < 10 DC	< 3.5 AC / < 10 DC	< 3.5 AC / < 10 DC	< 3.5 AC / < 10 DC
DC-braking			0 - 100% $U_B$ , 0 - 10 s, parameterizable			
Heat dissipation (idle, standby)	$P_V$	W	5.13	5.13	5.13	5.52
Heat dissipation (speed/torque)						
100/100	$P_V$	W	16.7	26.8	44.9	57
90/100	$P_V$	W	16.7	26.8	44.9	57
90/50	$P_V$	W	14.2	16.7	30.4	39
50/100	$P_V$	W	20.7	27.9	44.7	50
50/50	$P_V$	W	11.4	17.2	28.4	37
50/25	$P_V$	W	9.9	14.3	24.9	30
0/100	$P_V$	W	–	–	41.6	–
0/50	$P_V$	W	–	–	22.3	36
0/25	$P_V$	W	–	–	–	29
<b>Motor feeder</b>						
Motor power, assigned						
at 400 V, 50 Hz	P	kW	0.37	0.75	1.5	2.2
at 440 - 480 V, 60 Hz	P	HP	1/2	1	2	3
Apparent power at rated value						
at 400 V	S	kVA	0.90	1.45	2.49	3.46
at 480 V	S	kVA	1.08	1.75	2.99	4.16
<b>Control section</b>						
Relay						
Switching contact			S (RUN signal)			
Voltage, maximum	U	V	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC
Load current, maximum	I	A	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1
Reference voltage/Control voltage						
Output voltage	$U_c$	V	10	10	10	10
Maximum permissible load current	$I_c$	mA	20	20	20	20
Analog input						
Resolution			12 bits	12 bits	12 bits	12 bits
Voltage	$U_s$	V	0 - 10	0 - 10	0 - 10	0 - 10
Current	$I_s$	mA	0/4 - 20	0/4 - 20	0/4 - 20	0/4 - 20
Digital Input						
High signal voltage level	$U_c$	V	9 - 30	9 - 30	9 - 30	9 - 30
Input current	$I_c$	mA	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)	1.15 (10 V)/ 3 (24 V)

# DE1 variable speed starter up to 7.5 kW

## Specific rated operational data

# 2.1

	Symbol	Unit	DE1...-341D3...	DE1...-342D1...	DE1...-343D6...	DE1...-345D0...
<b>DE1...-34... (three-phase mains connection)</b>						
<b>Enclosure material</b>						
Frame size			FS1	FS1	FS1	FS2
Dimensions (W x H x D)		mm	45 x 230 x 169	45 x 230 x 169	45 x 230 x 169	90 x 230 x 169
Maximum permissible deviation from vertical installation position		Degrees	90	90	90	90
Internal device fan			Yes	Yes	Yes	Yes
Protection type			IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0
Weight	m	kg	1	1	1	1.6
<b>Terminal capacities, clampable</b>						
Power Part						
Solid or stranded	A	mm <sup>2</sup>	1 - 6	1 - 6	1 - 6	1 - 6
Flexible with ferrule	A	mm <sup>2</sup>	1 - 6	1 - 6	1 - 6	1 - 6
Solid or stranded	A	AWG	18 - 6	18 - 6	18 - 6	18 - 6
Strip length	l	mm	8	8	8	8
Tool			PZ2 (Pozidrive) cross screwdriver			
Tightening Torque		Nm	1.2	1.2	1.2	1.2
Control section						
Solid or stranded	A	mm <sup>2</sup>	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5
Flexible with ferrule	A	mm <sup>2</sup>	0.5 - 1	0.5 - 1	0.5 - 1	0.5 - 1
Solid or stranded	A	AWG	30 - 16	30 - 16	30 - 16	30 - 16
Strip length	l	mm	5	5	5	5
Tool			0.7 x 3 mm standard screwdriver			
Tightening Torque	M	Nm	0.5	0.5	0.5	0.5

# 2.1

## DE1 variable speed starter up to 75 kW

### Specific rated operational data

	Symbol	Unit	DE1...-346D6...	DE1...-348D5...	DE1...-34011...	DE1...-34016...
<b>DE1...-34... (three-phase mains connection)</b>						
<b>Mains connection</b>						
Rated operating voltage	$U_B$	V	380/400/480, 3-phase	380/400/480, 3-phase	380/400/480, 3-phase	380/400/480, 3-phase
Mains voltage	$U_{LN}$	V	380 - 480 $\pm$ 10% (342 - 528)			
Mains frequency	f	Hz	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%	50/60 $\pm$ 10%
Input current (without mains choke)	$I_{LN}$	A	8.5	10	12	16.5
<b>Power Part</b>						
Rated Current	$I_B$	A	6.6	8.5	11	16
Overload current, 1.5 x $I_B$ , cyclically for 60 s every 600 s	$I_{2-150}$	A	9.9	12.75	16.5	24
Overload current, max. 2 x $I_B$ every 600 s	$I_{2max}$	A	13.2	17	22	32
Output voltage at $U_B$	$U_Z$	V	380/480, 3-phase	380/480, 3-phase	380/480, 3-phase	380/480, 3-phase
Output Frequency	$f_Z$	Hz	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)	0 - 50/60 (max. 300)
Frequency resolution (setpoint value)	$\Delta f$	%	0.025	0.025	0.025	0.025
Pulse frequency (audible)	$f_{PWM}$	kHz	16 (10/12/14/16/18/20)	16 (10/12/14/16/18/20)	16 (10/12/14/16/18/20)	16 (10/12/14/16/18/20)
Derating between 50°C and 60°C			none	none	<ul style="list-style-type: none"> <li>• None if <math>f_{PWM} \leq 16</math> kHz</li> <li>• None if <math>I_B \leq 10.6</math> A and <math>f_{PWM} \leq 20</math> kHz</li> <li>• None up to a max. of 57°C</li> </ul>	<ul style="list-style-type: none"> <li>• None if <math>f_{PWM} \leq 14</math> kHz up to a max. of 50°C</li> <li>• None if <math>f_{PWM} \leq 16</math> kHz up to a max. of 46°C</li> <li>• None if <math>I_B \leq 14.9</math> A and <math>f_{PWM} \leq 10</math> kHz</li> <li>• None if <math>I_B \leq 10.6</math> A and <math>f_{PWM} \leq 20</math> kHz</li> </ul>
Contact current	$I_{PE}$	mA	< 3.5 AC/< 10 DC	< 3.5 AC/< 10 DC	< 3.5 AC/< 10 DC	< 3.5 AC/< 10 DC
DC-braking			0 - 100% $U_B$ , 0 - 10 s, parameterizable			
Heat dissipation (idle, standby) Pv		W	5.52	5.52	5.52	5.52
<b>Heat dissipation (speed/torque)</b>						
100/100	$P_v$	W	76	101	132	216
90/100	$P_v$	W	76	101	132	216
90/50	$P_v$	W	55	65	88	126
50/100	$P_v$	W	69	93	121	198
50/50	$P_v$	W	51	60	85	121
50/25	$P_v$	W	48	51	64	86
0/100	$P_v$	W	–	76	–	–
0/50	$P_v$	W	–	55	72	–
0/25	$P_v$	W	–	47	58	78
<b>Motor feeder</b>						
<b>Motor power assigned</b>						
at 400 V, 50 Hz	P	kW	3	4	5.5	7.5
at 440 - 480 V, 60 Hz	P	HP	3	5	7.5	10
<b>Apparent power at rated value</b>						
at 400 V	S	kVA	4.57	5.89	7.62	11.09
at 480 V	S	kVA	5.49	7.07	9.15	13.30
<b>Control section</b>						
<b>Relay</b>						
Switching contact			S (RUN signal)			
Voltage, maximum	U	V	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC	250 AC/30 DC
Load current, maximum	I	A	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1	6 AC-1/5 DC-1
<b>Reference voltage/Control voltage</b>						
Output voltage	$U_c$	V	10	10	10	10
Maximum permissible load current	$I_c$	mA	20	20	20	20
<b>Analog input</b>						
Resolution			12 bits	12 bits	12 bits	12 bits
Voltage	$U_s$	V	0 - 10	0 - 10	0 - 10	0 - 10
Current	$I_s$	mA	0/4 - 20	0/4 - 20	0/4 - 20	0/4 - 20
<b>Digital Input</b>						
High signal voltage level	$U_c$	V	9 - 30	9 - 30	9 - 30	9 - 30
Input current	$I_c$	mA	1.15 (10 V)/3 (24 V)	1.15 (10 V)/3 (24 V)	1.15 (10 V)/3 (24 V)	1.15 (10 V)/3 (24 V)

# DE1 variable speed starter up to 7.5 kW

## Specific rated operational data

# 2.1

	Symbol	Unit	DE1...-346D6...	DE1...-348D5...	DE1...-34011...	DE1...-34016...
<b>DE1...-34... (three-phase mains connection)</b>						
<b>Enclosure material</b>						
Frame size			FS2	FS2	FS2	FS2
Dimensions (W x H x D)		mm	90 x 230 x 169	90 x 230 x 169	90 x 230 x 169	90 x 230 x 169
Maximum permissible deviation from vertical installation position		Degrees	90	90	90	90
Internal device fan			Yes	Yes	Yes	Yes
Protection type			IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0	IP20/NEMA 0
Weight	m	kg	1.6	1.6	1.6	1.6
<b>Terminal capacities, clampable</b>						
<b>Power Part</b>						
Solid or stranded	A	mm <sup>2</sup>	1 - 6	1 - 6	1 - 6	1 - 6
Flexible with ferrule	A	mm <sup>2</sup>	1 - 6	1 - 6	1 - 6	1 - 6
Solid or stranded	A	AWG	18 - 6	18 - 6	18 - 6	18 - 6
Strip length	l	mm	8	8	8	8
Tool			PZ2 (Pozidrive) cross screwdriver			
Tightening Torque		Nm	1.2	1.2	1.2	1.2
<b>Control section</b>						
Solid or stranded	A	mm <sup>2</sup>	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5	0.05 - 1.5
Flexible with ferrule	A	mm <sup>2</sup>	0.5 - 1	0.5 - 1	0.5 - 1	0.5 - 1
Solid or stranded	A	AWG	30 - 16	30 - 16	30 - 16	30 - 16
Strip length	l	mm	5	5	5	5
Tool			0.7 x 3 mm standard screwdriver			
Tightening Torque	M	Nm	0.5	0.5	0.5	0.5

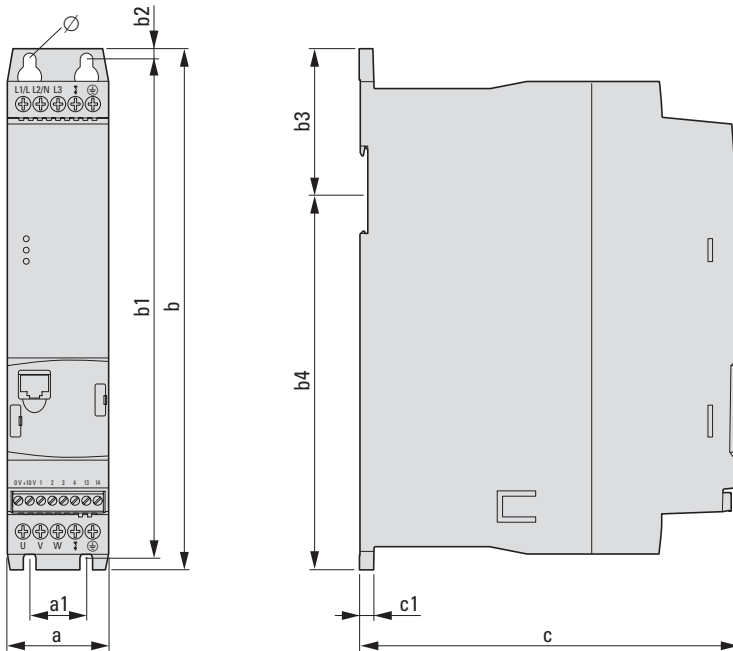
# 2.1

## DE1 variable speed starter up to 7.5 kW

### Dimensions and weights

#### Dimensions and weights

##### Frame sizes FS1 and FS2



Frame size	a	a1	b	b1	b2	b3	b4	c	c1	Ø 1	Ø 2	m
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
FS1	45	25	230	220	5	64	166	168	6.5	5.1	10	1.04
FS2	90	50	230	220	5	64	166	168	6.5	5.1	10	1.68





# PowerXL variable frequency drives DC1 Compact Machinery Drive

The compact PowerXL DC1 variable frequency drive is particularly well-suited for use with simple pump, fan, and conveyor belt systems. It can be quickly and easily configured and commissioned, resulting in tangible savings.

## Performance range:

- 0.37 - 0.55 kW ( $U_e$ : 1~ 115 V,  $U_2$ : 1~ 115 V)
- 0.37 - 1.1 kW ( $U_e$ : 1~ 115 V,  $U_2$ : 3~ 230 V)
- 0.37 - 1.1 kW ( $U_e$ : 1~ 230 V,  $U_2$ : 1~ 230 V)
- 0.37 - 4 kW ( $U_e$ : 1~ 230 V,  $U_2$ : 3~ 230 V)
- 0.37 - 11 kW ( $U_e$ : 3~ 230 V,  $U_2$ : 3~ 230 V)
- 0.75 - 22 kW ( $U_e$ : 3~ 400 V,  $U_2$ : 3~ 400 V)

## Applications:

- Fans, pumps
- Machines
- Coating systems
- Conveyor belts
- Filling machines
- Distributed applications (IP66)
- 1~ AC motors

## Features:

- Fast commissioning with 14 basic parameters
- Large overload capability: 150% for 60 seconds, 175% for 2 seconds
- Ambient air temperature up to 50°C without derating
- Sensorless vector control
- Can be used to drive high-efficiency IE4 motors
- Short-circuit proof in all operating modes
- Integrated CANopen and Modbus RTU
- Degrees of protection IP20 and IP66
- Integrated EMC filter
- Integrated Brake Transistor
- Integrated PI controller
- U/f control
- Voltage boost
- DC braking
- Detachable control signal terminal strip
- International standards (CE, UL, cUL, RCM, RoHS, EAC, UkrSEPRO)

## Accessory:

- Plug-in communication modules: SmartWire-DT, Ethernet/IP, PROFINET (PROFIdrive)
- External LED keypad
- Mains chokes
- Motor chokes
- External EMC filter
- I/O expansions
- External keypad
- Sine filter
- Braking resistances
- Parameter storage unit and Bluetooth communication stick
- drivesConnect parameter configuration software
- drivesConnect mobile App (iOS, Android)

For more information, visit:  
[www.Eaton.com/DC1](http://www.Eaton.com/DC1)





<b>2.2 PowerXL variable frequency drives DC1</b>	
<b>System overview</b>	<b>74</b>
<b>Key to type references</b>	<b>75</b>
<b>Sizes and degree of protection</b>	<b>76</b>
<b>Ordering</b>	<b>77</b>
DC1, for AC motors 115 V/230 V, IP20	<b>77</b>
DC1, for three-phase motors 230 V, IP20	<b>78</b>
DC1, for three-phase motors 400 V, IP20	<b>80</b>
DC1, for AC motors 115 V/230 V, IP66	<b>81</b>
DC1, for three-phase motors 230 V, IP66	<b>82</b>
DC1, for three-phase motors 400 V, IP66	<b>84</b>
Accessories	<b>85</b>
<b>Engineering</b>	<b>87</b>
Connection examples	<b>87</b>
Switching and protective devices rated for DC1	<b>92</b>
<b>Technical data</b>	<b>94</b>
General rated operational data	<b>94</b>
Specific rated operational data	<b>97</b>
<b>Dimensions and weights</b>	<b>103</b>

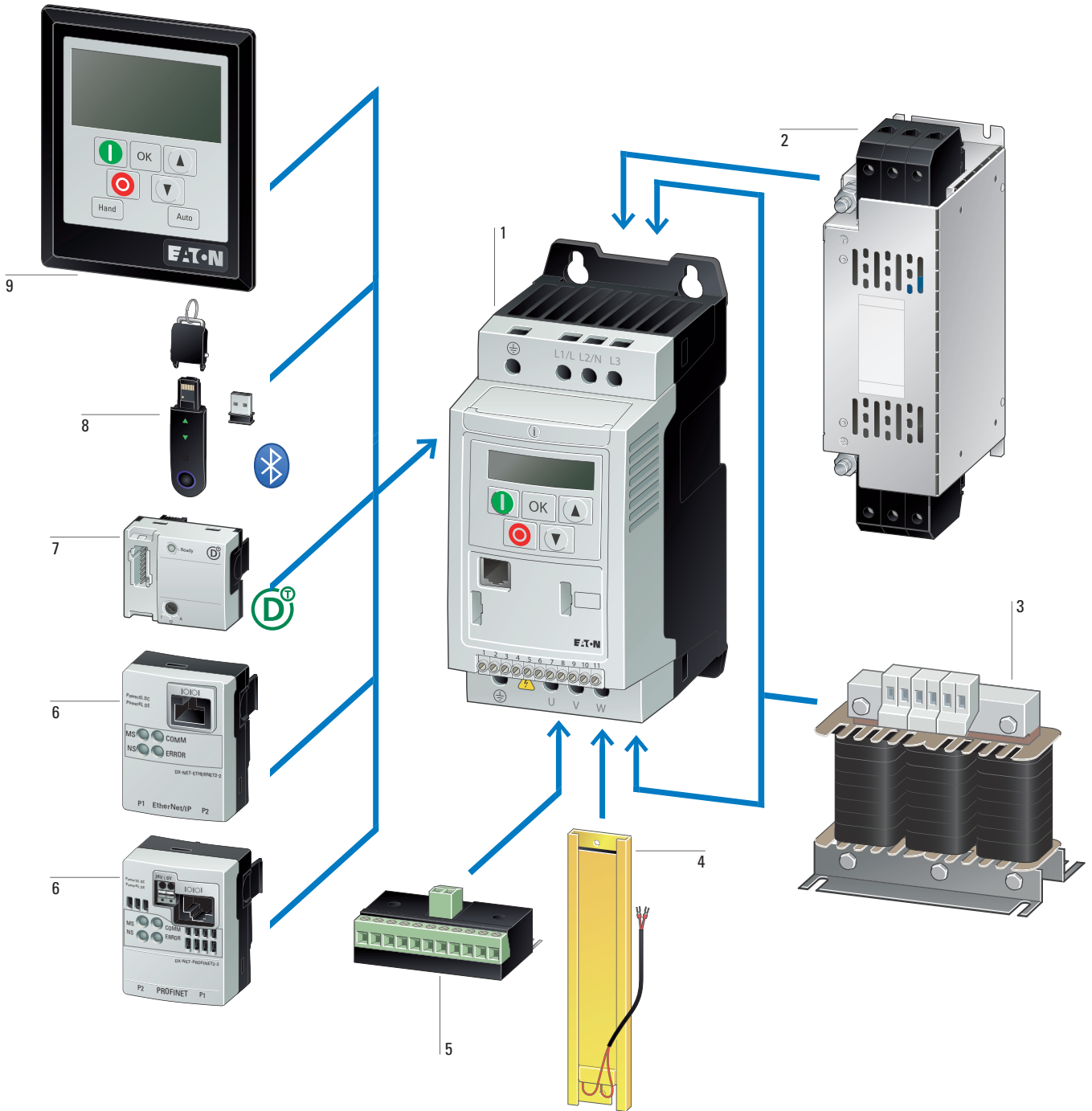
DC1

# 2.2

## PowerXL variable frequency drives DC1

### System overview

#### System overview



**DC1 variable frequency drive** 1  
→ Page 77

**External radio interference suppression filter** 2  
→ Page 229

**Mains choke, motor choke, sine filter** 3  
→ Page 215  
→ Page 219  
→ Page 220

**Braking resistor** 4  
→ Page 222

**Expansion modules** 5  
→ Page 85

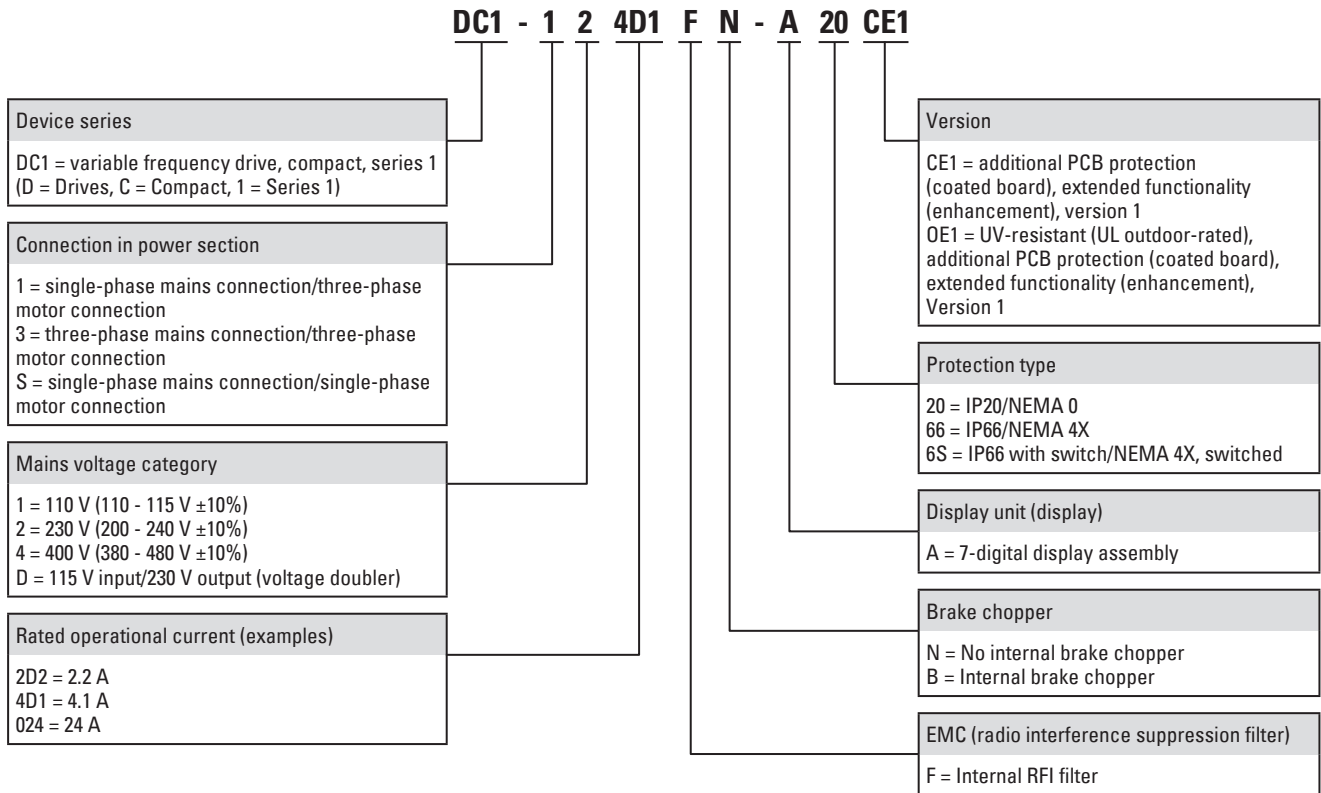
**Communication modules** 6  
→ Page 85

**SmartWire-DT module** 7  
→ Page 85

**Memory and Bluetooth stick** 8  
→ Page 85

**External keypad** 9  
→ Page 85

## Key to type references



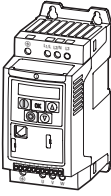
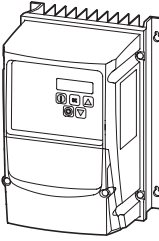
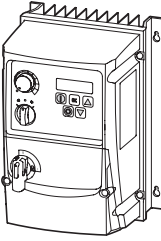
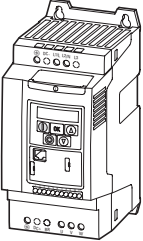
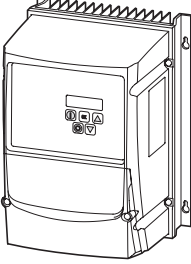
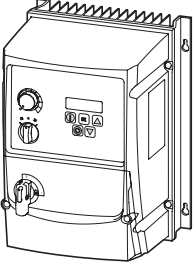
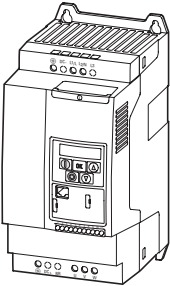
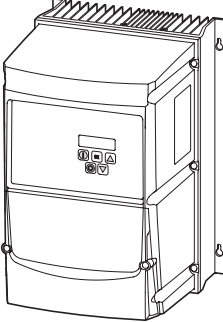
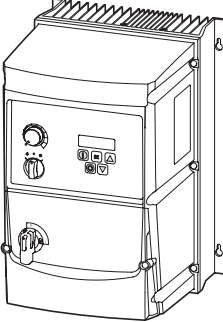
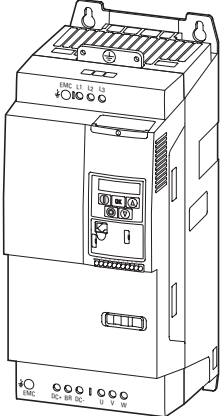
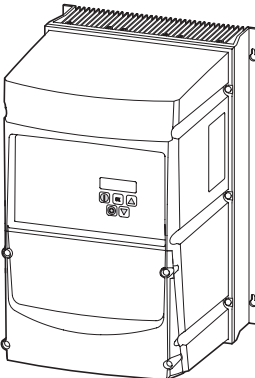
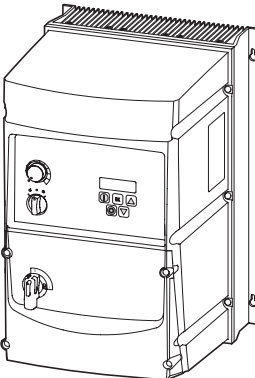
DC1

# 2.2

## PowerXL variable frequency drives DC1

Sizes and degree of protection

### Sizes and degree of protection

Frame size	Protection type		
	IP20/NEMA 0	IP66/NEMA 4X	IP66/NEMA 4X Local controls
FS1			
FS2			
FS3			
FS4			

## Ordering

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup> P kW      P HP		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack
	Radio interference suppression filter	Brake chopper	7-segment display						
<b>PowerXL variable frequency drives DC1</b>									
U <sub>1</sub> 115 V AC, single-phase / U <sub>2</sub> 115 V AC, single-phase Mains voltage (50/60Hz) U <sub>LN</sub> 110 (-10%) - 115 (+10%) V									
7	0.37	0.5	-	-	✓	FS1	IP20/NEMA 0	<b>DC1-S17D0NN-A20CE1</b> 186073	1 unit
10.5	0.55	0.75	-	✓	✓	FS2		<b>DC1-S1011NB-A20CE1</b> 186076	
U <sub>1</sub> 230 V AC, single-phase / U <sub>2</sub> 230 V AC, single-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V									
4.3	0.37	0.5	-	-	✓	FS1	IP20/NEMA 0	<b>DC1-S24D3NN-A20CE1</b> 186079	1 unit
			✓	-	✓			<b>DC1-S24D3FN-A20CE1</b> 186088	
7	0.75	1	-	-	✓			<b>DC1-S27D0NN-A20CE1</b> 186082	
			✓	-	✓			<b>DC1-S27D0FN-A20CE1</b> 186091	
10.5	1.1	1.5	-	✓	✓	FS2		<b>DC1-S2011NB-A20CE1</b> 186085	
			✓	✓	✓			<b>DC1-S2011FB-A20CE1</b> 186094	

### Notes

- <sup>1)</sup> Overload cycle: 150% for 60 s every 600 s
- <sup>2)</sup> DC1-S1... : at 115 V, 50 Hz/at 110 - 120 V, 60 Hz  
DC1-S2... : at 230 V, 50 Hz/at 220 - 240 V, 60 Hz
- <sup>3)</sup> For AC motors with internal and external ventilation with 50/60 Hz without additional start capacitor
- <sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +50°C

# 2.2

## PowerXL variable frequency drives DC1

DC1, for three-phase motors 230 V, IP20

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup> P kW      P HP		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack
	Radio interference suppression filter	Brake chopper	7-segment display						
<b>PowerXL variable frequency drives DC1</b>									
The mains voltage of 115 V is raised to 230 V (output voltage) through an internal voltage double connection. U <sub>s</sub> 115 V AC, single-phase / U <sub>s</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 110 (-10%) - 115 (+10%) V									
2.3	0.37	0.5	-	-	✓	FS1	IP20/NEMA 0	<b>DC1-1D2D3NN-A20CE1</b> 185765	1 unit
4.3	0.75	1	-	-	✓			<b>DC1-1D4D3NN-A20CE1</b> 185768	
5.8	1.1	1.5	-	✓	✓	FS2		<b>DC1-1D5D8NB-A20CE1</b> 185771	
U <sub>s</sub> 230 V AC, single-phase / U <sub>s</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V									
2.3	0.37	0.5	-	-	✓	FS1	IP20/NEMA 0	<b>DC1-122D3NN-A20CE1</b> 185785	1 unit
			✓	-	✓			<b>DC1-122D3FN-A20CE1</b> 185803	
4.3	0.75	1	-	-	✓			<b>DC1-124D3NN-A20CE1</b> 185788	
			✓	-	✓			<b>DC1-124D3FN-A20CE1</b> 185806	
7	1.5	2	-	-	✓			<b>DC1-127D0NN-A20CE1</b> 185791	
			✓	-	✓			<b>DC1-127D0FN-A20CE1</b> 185809	
			-	✓	✓	FS2		<b>DC1-127D0NB-A20CE1</b> 185794	
			✓	✓	✓			<b>DC1-127D0FB-A20CE1</b> 185812	
10.5	2.2	3	-	✓	✓			<b>DC1-12011NB-A20CE1</b> 185797	
			✓	✓	✓			<b>DC1-12011FB-A20CE1</b> 185815	
15.3 <sup>5)</sup>	4	5	-	✓	✓	FS3		<b>DC1-12015NB-A20CE1</b> 185800	

**Notes**

<sup>1)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>2)</sup> At 230 V, 50 Hz/at 220 - 240 V, 60 Hz

<sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +50°C

<sup>5)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +50°C

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup> P		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack
	kW	HP	Radio interference suppression filter	Brake chopper	7-segment display				
<b>PowerXL variable frequency drives DC1</b>									
U <sub>2</sub> 230 V AC, three-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V									
2.3	0.37	0.5	-	-	✓	FS1	IP20/NEMA 0	<b>DC1-322D3NN-A20CE1</b> 185818	1 unit
4.3	0.75	1	-	-	✓			<b>DC1-324D3NN-A20CE1</b> 185821	
7	1.5	2	-	-	✓			<b>DC1-327D0NN-A20CE1</b> 185824	
			-	✓	✓	FS2		<b>DC1-327D0NB-A20CE1</b> 185827	
			✓	✓	✓			<b>DC1-327D0FB-A20CE1</b> 185836	
10.5	2.2	3	-	✓	✓			<b>DC1-32011NB-A20CE1</b> 185830	
			✓	✓	✓			<b>DC1-32011FB-A20CE1</b> 185839	
18 <sup>5)</sup>	4	5	-	✓	✓	FS3		<b>DC1-32018NB-A20CE1</b> 185833	
			✓	✓	✓			<b>DC1-32018FB-A20CE1</b> 185842	
24	5.5	7.5	-	✓	✓			<b>DC1-32024NB-A20CE1</b> 185777	
			✓	✓	✓			<b>DC1-32024FB-A20CE1</b> 185774	
30	7.5	10	-	✓	✓	FS4		<b>DC1-32030NB-A20CE1</b> 185778	
			✓	✓	✓			<b>DC1-32030FB-A20CE1</b> 185775	
46	11	15	-	✓	✓			<b>DC1-32046NB-A20CE1</b> 185779	
			✓	✓	✓			<b>DC1-32046FB-A20CE1</b> 185776	

### Notes

<sup>1)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>2)</sup> At 230 V, 50 Hz/at 220 - 240 V, 60 Hz

<sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +50°C

<sup>5)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +50°C



# 2.2

## PowerXL variable frequency drives DC1

DC1, for three-phase motors 400 V, IP20

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup> P kW      P HP		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack	
	Radio interference suppression filter	Brake chopper	7-segment display							
<b>PowerXL variable frequency drives DC1</b>										
U <sub>e</sub> 400 V AC, three-phase / U <sub>2</sub> 400 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V										
2.2	0.75	1	-	-	✓	FS1	IP20/NEMA 0	<b>DC1-342D2NN-A20CE1</b> 185721	1 unit	
			✓	-	✓			<b>DC1-342D2FN-A20CE1</b> 185743		
4.1	1.5	2	-	-	✓			<b>DC1-344D1NN-A20CE1</b> 185724		
			✓	-	✓			<b>DC1-344D1FN-A20CE1</b> 185746		
			-	✓	✓	FS2		<b>DC1-344D1NB-A20CE1</b> 185727		
			✓	✓	✓			<b>DC1-344D1FB-A20CE1</b> 185749		
5.8	2.2	3	-	✓	✓			<b>DC1-345D8NB-A20CE1</b> 185730		
			✓	✓	✓			<b>DC1-345D8FB-A20CE1</b> 185752		
9.5	4	5	-	✓	✓			<b>DC1-349D5NB-A20CE1</b> 185733		
			✓	✓	✓			<b>DC1-349D5FB-A20CE1</b> 185755		
14	5.5	10	-	✓	✓	FS3		<b>DC1-34014NB-A20CE1</b> 185736		
			✓	✓	✓			<b>DC1-34014FB-A20CE1</b> 185758		
18	7.5		-	✓	✓			<b>DC1-34018NB-A20CE1</b> 185739		
			✓	✓	✓			<b>DC1-34018FB-A20CE1</b> 185761		
24 <sup>5)</sup>	11	15	-	✓	✓			<b>DC1-34024NB-A20CE1</b> 185742		
			✓	✓	✓			<b>DC1-34024FB-A20CE1</b> 185764		
30	15	20	-	✓	✓	FS4		<b>DC1-34030NB-A20CE1</b> 185783		
			✓	✓	✓			<b>DC1-34030FB-A20CE1</b> 185780		
39	18.5	25	-	✓	✓			<b>DC1-34039NB-A20CE1</b> 185784		
			✓	✓	✓			<b>DC1-34039FB-A20CE1</b> 185781		
46	22	30	-	✓	✓			<b>DC1-34046NB-A20CE1</b> 185844		
			✓	✓	✓			<b>DC1-34046FB-A20CE1</b> 185782		

### Notes

<sup>1)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>2)</sup> DC1-34... : at 400 V, 50 Hz/at 440 - 480 V, 60 Hz

<sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +50°C

<sup>5)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +50°C

Rated operational current <sup>1)4)</sup> $I_e$  A	Assigned motor output <sup>1)2)3)</sup> P  kW      HP		Configuration				Frame size	Protection type	Catalog Number Article no.	Std. pack
	Radio interference suppression filter	Brake chopper	7-segment display	Local controls						
<b>PowerXL variable frequency drives DC1</b>										
U <sub>e</sub> 230 V AC, single-phase / U <sub>2</sub> 230 V AC, single-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V										
4.3	0.37	0.5	✓	-	✓	-	FS1	IP66/NEMA 4X	<b>DC1-S24D3FN-A660E1</b> 199387	1 unit
			✓	-	✓	✓			<b>DC1-S24D3FN-A6S0E1</b> 199388	
7	0.75	1	✓	-	✓	-			<b>DC1-S27D0FN-A660E1</b> 199389	
			✓	-	✓	✓			<b>DC1-S27D0FN-A6S0E1</b> 199390	
10.5	1.1	1.5	✓	✓	✓	-	FS2		<b>DC1-S2011FB-A660E1</b> 199391	
			✓	✓	✓	✓			<b>DC1-S2011FB-A6S0E1</b> 199392	

**Notes**

- <sup>1)</sup> Overload cycle: 150% for 60 s every 600 s
- <sup>2)</sup> DC1-S2... : at 230 V, 50 Hz/at 220 - 240 V, 60 Hz
- <sup>3)</sup> For AC motors with internal and external ventilation with 50/60 Hz without additional start capacitor
- <sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40°C

DC1

# 2.2

## PowerXL variable frequency drives DC1

DC1, for three-phase motors 230 V, IP66

Rated operational current <sup>1)4)</sup> $I_e$	Assigned motor output <sup>1)2)3)</sup>		Configuration				Frame size	Protection type	Catalog Number Article no.	Std. pack
	P	P	Radio interference suppression filter	Brake chopper	7-segment display	Local controls				
A	kW	HP								
<b>PowerXL variable frequency drives DC1</b>										
$U_1$ 115 V AC, single-phase / $U_2$ 230 V AC, three-phase The mains voltage of 115 V is raised to 230 V (output voltage) through an internal voltage double connection. Mains voltage (50/60Hz) $U_{LN}$ 110 (-10%) - 115 (+10%) V										
2.3	0.37	0.5	-	-	✓	-	FS1	IP66/NEMA 4X	<b>DC1-1D2D3NN-A660E1</b> 199393	1 unit
			-	-	✓	✓			<b>DC1-1D2D3NN-A6S0E1</b> 199394	
4.3	0.75	1	-	-	✓	-			<b>DC1-1D4D3NN-A660E1</b> 199395	
			-	-	✓	✓			<b>DC1-1D4D3NN-A6S0E1</b> 199396	
5.8	1.1	1.5	-	✓	✓	-	FS2		<b>DC1-1D5D8NB-A660E1</b> 199397	
			-	✓	✓	✓			<b>DC1-1D5D8NB-A6S0E1</b> 199398	
$U_1$ 230 V AC, single-phase / $U_2$ 230 V AC, three-phase Mains voltage (50/60Hz) $U_{LN}$ 200 (-10%) - 240 (+10%) V										
2.3	0.37	0.5	✓	-	✓	-	FS1	IP66/NEMA 4X	<b>DC1-122D3FN-A660E1</b> 199399	1 unit
			✓	-	✓	✓			<b>DC1-122D3FN-A6S0E1</b> 199400	
4.3	0.75	1	✓	-	✓	-			<b>DC1-124D3FN-A660E1</b> 199401	
			✓	-	✓	✓			<b>DC1-124D3FN-A6S0E1</b> 199402	
7	1.5	2	✓	-	✓	-			<b>DC1-127D0FN-A660E1</b> 199403	
			✓	-	✓	✓			<b>DC1-127D0FN-A6S0E1</b> 199404	
			✓	✓	✓	-	FS2		<b>DC1-127D0FB-A660E1</b> 199405	
			✓	✓	✓	✓			<b>DC1-127D0FB-A6S0E1</b> 199406	
10.5	2.2	3	✓	✓	✓	-			<b>DC1-12011FB-A660E1</b> 199407	
			✓	✓	✓	✓			<b>DC1-12011FB-A6S0E1</b> 199408	
15.3 <sup>5)</sup>	4	5	✓	✓	✓	-	FS3		<b>DC1-12015FB-A660E1</b> 199409	
			✓	✓	✓	✓			<b>DC1-12015FB-A6S0E1</b> 199410	

**Notes**

- <sup>1)</sup> Overload cycle: 150% for 60 s every 600 s
- <sup>2)</sup> At 230 V, 50 Hz/at 220 - 240 V, 60 Hz
- <sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40°C
- <sup>5)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C

Rated operational current <sup>1)4)</sup> <i>I<sub>e</sub></i>	Assigned motor output <sup>1)2)3)</sup>		Configuration				Frame size	Protection type	Catalog Number Article no.	Std. pack
	P	P	Radio interference suppression filter	Brake chopper	7-segment display	Local controls				
A	kW	HP								
<b>PowerXL variable frequency drives DC1</b>										
U <sub>e</sub> 230 V AC, three-phase / U <sub>e</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V										
2.3	0.37	0.5	✓	-	✓	-	FS1	IP66/NEMA 4X	<b>DC1-322D3FN-A660E1</b> 199411	1 unit
			✓	-	✓	✓			<b>DC1-322D3FN-A6S0E1</b> 199412	
4.3	0.75	1	✓	-	✓	-			<b>DC1-324D3FN-A660E1</b> 199413	
			✓	-	✓	✓			<b>DC1-324D3FN-A6S0E1</b> 199414	
7	1.5	2	✓	-	✓	-			<b>DC1-327D0FN-A660E1</b> 199415	
			✓	-	✓	✓			<b>DC1-327D0FN-A6S0E1</b> 199416	
			✓	✓	✓	-	FS2		<b>DC1-327D0FB-A660E1</b> 199417	
			✓	✓	✓	✓			<b>DC1-327D0FB-A6S0E1</b> 199418	
10.5	2.2	3	✓	✓	✓	-			<b>DC1-32011FB-A660E1</b> 199419	
			✓	✓	✓	✓			<b>DC1-32011FB-A6S0E1</b> 199420	
18 <sup>5)</sup>	4	5	✓	✓	✓	-	FS3		<b>DC1-32018FB-A660E1</b> 199421	
			✓	✓	✓	✓			<b>DC1-32018FB-A6S0E1</b> 199422	
24 <sup>5)</sup>	5.5	7.5	✓	✓	✓	-			<b>DC1-32024FB-A660E1</b> 199423	
			✓	✓	✓	✓			<b>DC1-32024FB-A6S0E1</b> 199424	
30 <sup>5)</sup>	7.5	7.5	✓	✓	✓	-	FS4		<b>DC1-32030FB-A660E1</b> 199425	
			✓	✓	✓	✓			<b>DC1-32030FB-A6S0E1</b> 199426	
46 <sup>5)</sup>	11	15	✓	✓	✓	-			<b>DC1-32046FB-A660E1</b> 199427	
			✓	✓	✓	✓			<b>DC1-32046FB-A6S0E1</b> 199428	

**Notes**

<sup>1)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>2)</sup> At 230 V, 50 Hz/at 220 - 240 V, 60 Hz

<sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40°C

<sup>5)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C

# 2.2

## PowerXL variable frequency drives DC1

DC1, for three-phase motors 400 V, IP66

Rated operational current <sup>1)4)</sup> <i>I<sub>e</sub></i>	Assigned motor output <sup>1)2)3)</sup>		Configuration				Frame size	Protection type	Catalog Number Article no.	Std. pack
	P	P	Radio interference suppression filter	Brake chopper	7-segment display	Local controls				
A	kW	HP								
<b>PowerXL variable frequency drives DC1</b>										
U <sub>e</sub> 400 V AC, three-phase / U <sub>2</sub> 400 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V										
2.2	0.75	1	✓	-	✓	-	FS1	IP66/NEMA 4X	<b>DC1-342D2FN-A660E1</b> 199429	1 unit
			✓	-	✓	✓			<b>DC1-342D2FN-A6S0E1</b> 199430	
4.1	1.5	2	✓	-	✓	-			<b>DC1-344D1FN-A660E1</b> 199431	
			✓	-	✓	✓			<b>DC1-344D1FN-A6S0E1</b> 199432	
			✓	✓	✓	-	FS2		<b>DC1-344D1FB-A660E1</b> 199433	
			✓	✓	✓	✓			<b>DC1-344D1FB-A6S0E1</b> 199434	
5.8	2.2	3	✓	✓	✓	-			<b>DC1-345D8FB-A660E1</b> 199435	
			✓	✓	✓	✓			<b>DC1-345D8FB-A6S0E1</b> 199436	
9.5	4	5	✓	✓	✓	-			<b>DC1-349D5FB-A660E1</b> 199437	
			✓	✓	✓	✓			<b>DC1-349D5FB-A6S0E1</b> 199438	
14 <sup>5)</sup>	5.5	7.5	✓	✓	✓	-	FS3		<b>DC1-34014FB-A660E1</b> 199439	
			✓	✓	✓	✓			<b>DC1-34014FB-A6S0E1</b> 199440	
18 <sup>5)</sup>	7.5	10	✓	✓	✓	-			<b>DC1-34018FB-A660E1</b> 199441	
			✓	✓	✓	✓			<b>DC1-34018FB-A6S0E1</b> 199442	
24 <sup>5)</sup>	11	15	✓	✓	✓	-			<b>DC1-34024FB-A660E1</b> 199443	
			✓	✓	✓	✓			<b>DC1-34024FB-A6S0E1</b> 199444	
30 <sup>5)</sup>	15	20	✓	✓	✓	-	FS4		<b>DC1-34030FB-A660E1</b> 199445	
			✓	✓	✓	✓			<b>DC1-34030FB-A6S0E1</b> 199446	
39 <sup>5)</sup>	18.5	25	✓	✓	✓	-			<b>DC1-34039FB-A660E1</b> 199447	
			✓	✓	✓	✓			<b>DC1-34039FB-A6S0E1</b> 199448	
46 <sup>5)</sup>	22	30	✓	✓	✓	-			<b>DC1-34046FB-A660E1</b> 199449	
			✓	✓	✓	✓			<b>DC1-34046FB-A6S0E1</b> 199450	

### Notes

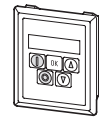
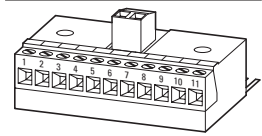
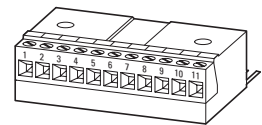
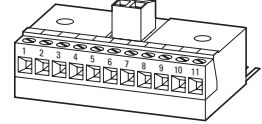

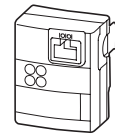
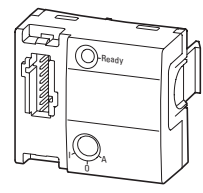
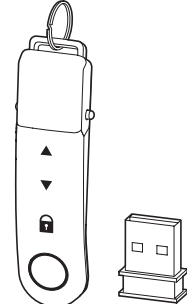
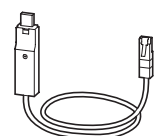
<sup>1)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>2)</sup> At 400 V, 50 Hz/at 440 - 480 V, 60 Hz

<sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40°C

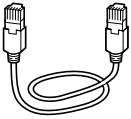

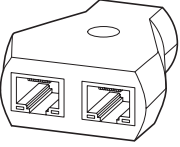
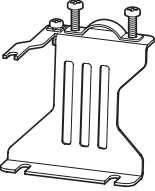
<sup>5)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C

	Description	Length m	For use with	Catalog Number Article no.	Std. pack
	<b>External keypad</b> With 7-digital display assembly Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	3	DE1, DE11, DC1, DB1, DA1	<b>DX-KEY-LED2</b> 186946	1 unit
	With multi-language plain text display (OLED) Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	3	DC1, DB1, DA1, RAM05, RASP5	<b>DX-KEY-OLED</b> 169133	
	<b>Expansion modules</b> Output expansion 2 relay outputs N/O, 250 V AC/220 V DC, max. 1 A) 1 analog output (0 - +10 V, max. 20 mA) For connecting to the control signal terminals on the DC1	-	DC1	<b>DXC-EXT-2R01A0</b> 169030	1 unit
	2 relay outputs N/O, 250 V AC/220 V DC, max. 1 A) For connecting to the control signal terminals on the DC1	-	DC1	<b>DXC-EXT-2R0</b> 169031	
	<b>Coupling module</b> 115 V AC input (electrically isolated) for 4 digital inputs For connecting to the control signal terminals on the DC1	-	DC1	<b>DXC-EXT-IO110</b> 169032	1 unit
	230 V AC input (electrically isolated) for 4 digital inputs For connecting to the control signal terminals on the DC1	-	DC1	<b>DXC-EXT-IO230</b> 169033	
	<b>Communication modules</b> Profinet Profinet plug-in module (front) with 2 x RJ45, 8 pole, PROFIdrive profile		DE1, DE11, DC1 (IP20)	<b>DX-NET-PROFINET2-2</b> 184947	1 unit
	Ethernet/IP Ethernet/IP plug-in module (front) with 2 x RJ45, 8 pole	-	DE1, DE11, DC1 (IP20)	<b>DX-NET-ETHERNET2-2</b> 184969	1 unit
	<b>SmartWire-DT</b> Plug-in module (front) with slot for SWD4-8SF2-5 external device plug	-	DE1, DE11, DC1 (IP20)	<b>DX-NET-SWD3</b> 169131	1 unit
	<b>Parameter assignment</b> Parameter storage unit and Bluetooth communication stick For storage, copying parameters, and/or transferring parameters to a PC or smartphone (iOS or Android) via Bluetooth with the drivesConnect software or the drivesConnect mobile app respectively With 2 function keys for uploading and downloading parameters with parameter memory.	-	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-COM-STICK3-KIT</b> 197586	1 unit
	<b>Programming cable</b> Interface converter USB/RS485 with connection cable, RJ45 8 pole For storage, copying parameters, and/or transferring parameters to a PC with the drivesConnect software, electrically isolated	3	DE1, DE11, DC1, DB1, DA1	<b>DX-CBL-PC-3M0</b> 744-A3036-00P	1 unit

# 2.2

## PowerXL variable frequency drives DC1

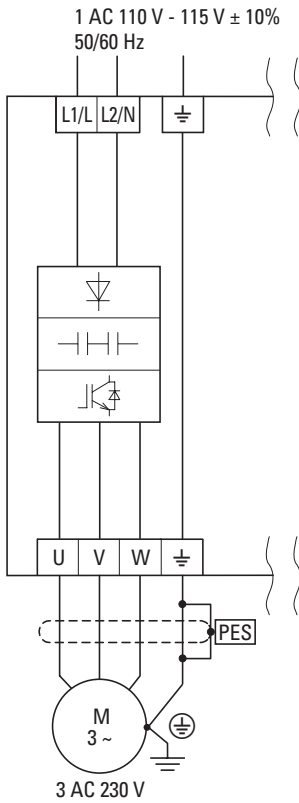
### Accessories

Description	Length m	For use with	Catalog Number Article no.	Std. pack	
<b>Connection cable</b>					
 Patch cord with RJ45 plugs, 8 pole	0.5	DE1, DE11, DC1, DB1, DA1	<b>DX-CBL-RJ45-0M5</b> 169137	1 unit	
	1		<b>DX-CBL-RJ45-1M0</b> 169138		
	3		<b>DX-CBL-RJ45-3M0</b> 169139		
<b>Bus terminating resistor</b>					
 RJ45 8 pole Connection to CANopen® (pin 1/2, 124 Ω) or to Modbus RTU (pin 7/8, 120 Ω)	–	DX-SPL-RJ45-2SL-1PL	<b>EASY-NT-R</b> 256281	2 unit	
<b>Splitter</b>					
 RJ45, 8-pin, 3 sockets  RJ45, 8-pin, 2 sockets/1 plug	–	DX-CBL-RJ45...	<b>DX-SPL-RJ45-3SL</b> 169141	1 unit	
	–	DE1, DE11, DC1, DB1, DA1	<b>DX-SPL-RJ45-2SL1PL</b> 169142		
<b>Mounting accessories</b>					
Mounting adapter with gland plates					
 For installing the connection cables on the mains side	Size FS2	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-2N</b> 172927	1 unit
	Size FS3	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-3N</b> 172929	
For installing the connection cables on the motor side	Size FS2	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-2M</b> 172928	
	Size FS3	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-3M</b> 172930	

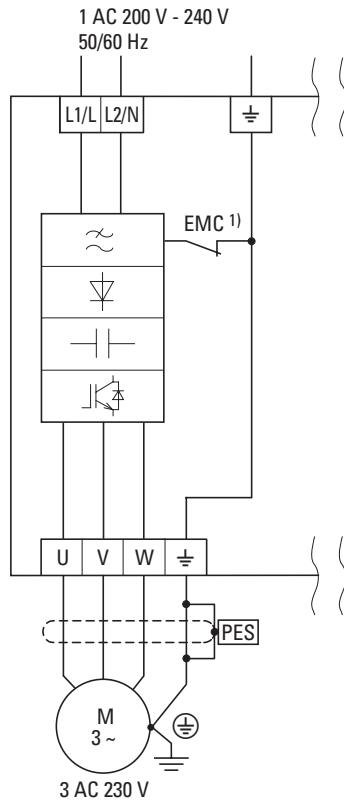


## Engineering

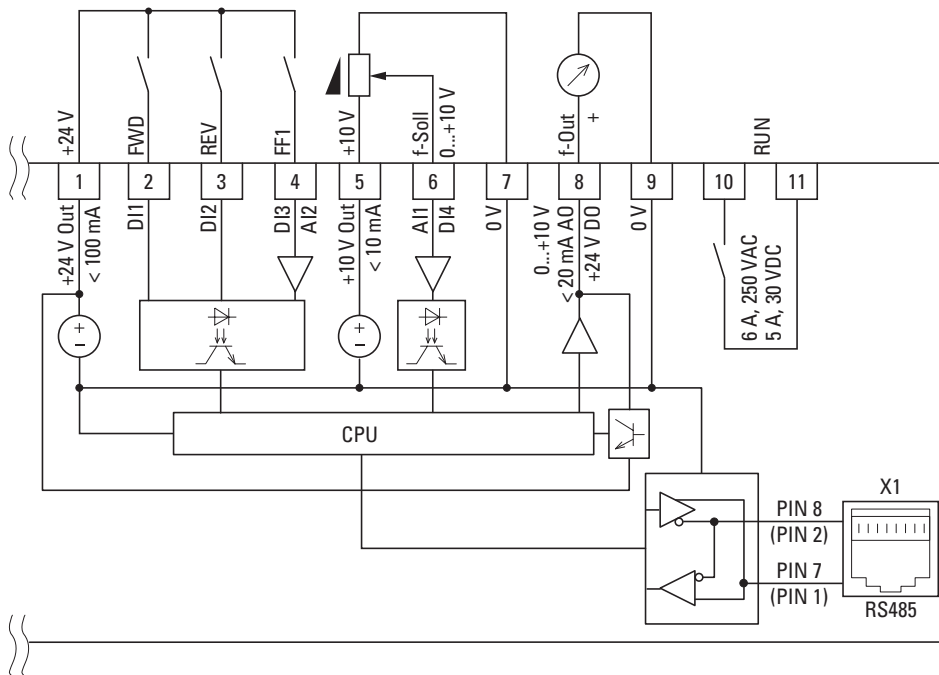
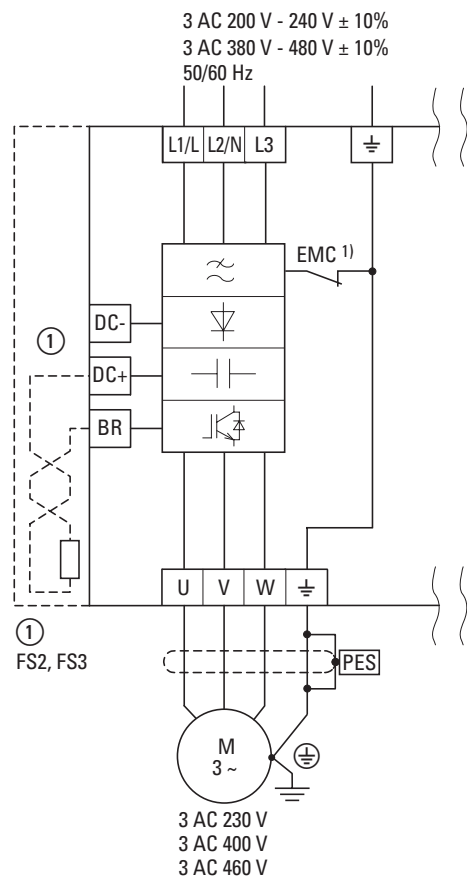
DC1-1DxxxN...



DC1-12...



DC1-32...  
DC1-34...



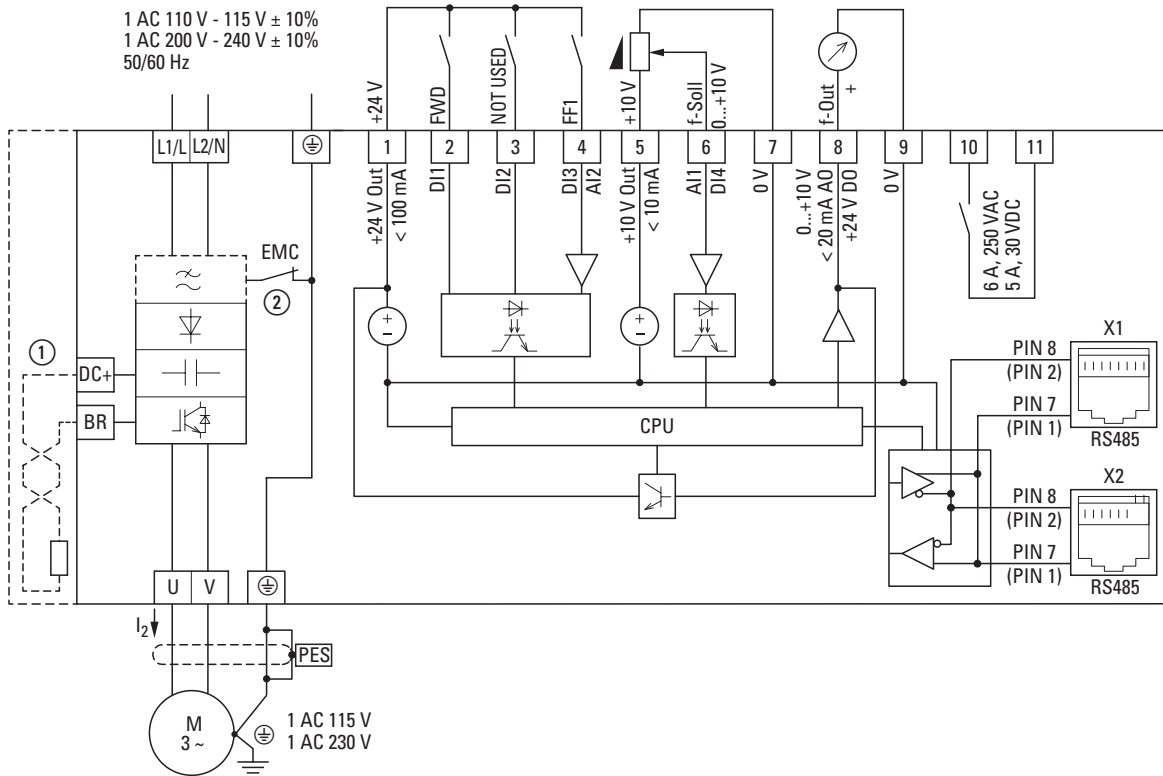
DC1

# 2.2

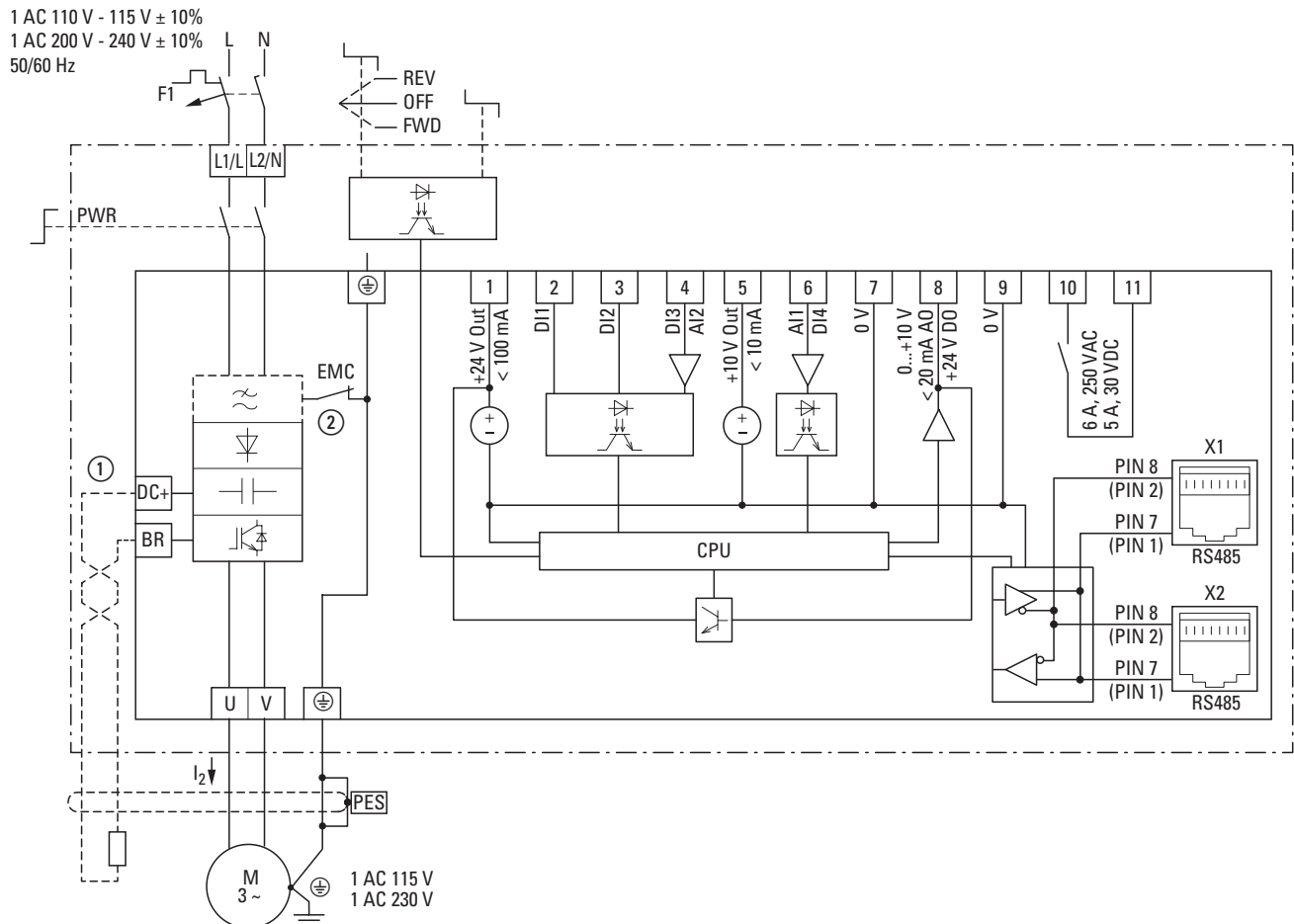
## PowerXL variable frequency drives DC1

### Connection examples

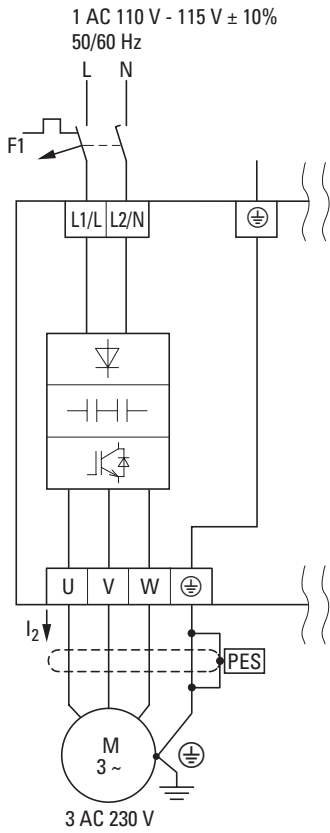
#### DC1-S1 -A660E1, DC1-S2 -A660E



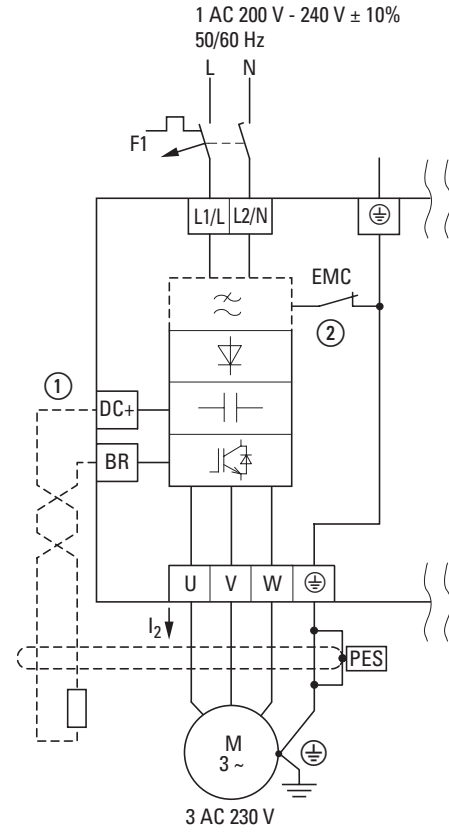
#### DC1-S1 -A6S0E1, DC1-S2 -A6S0E



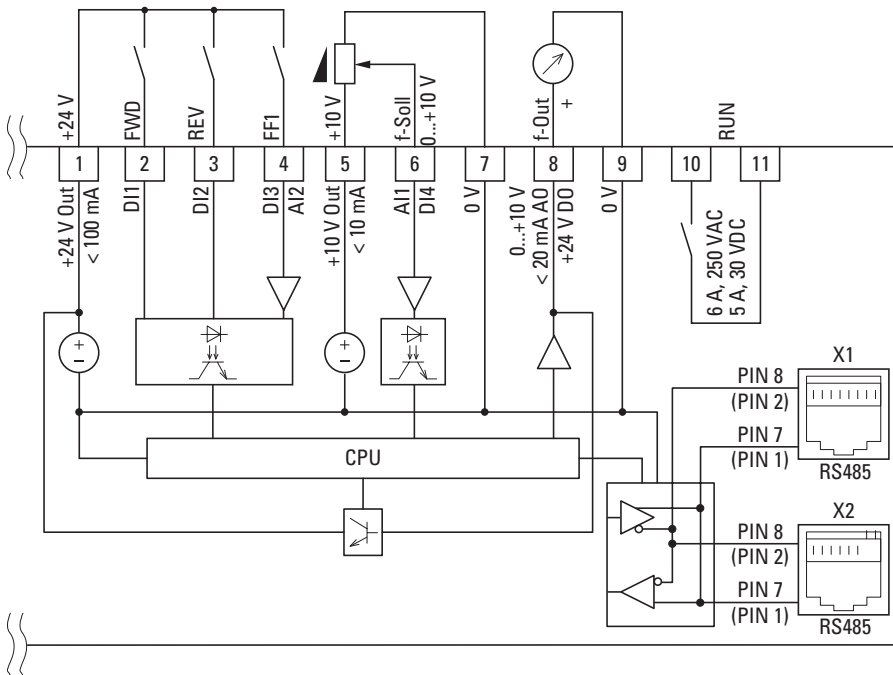
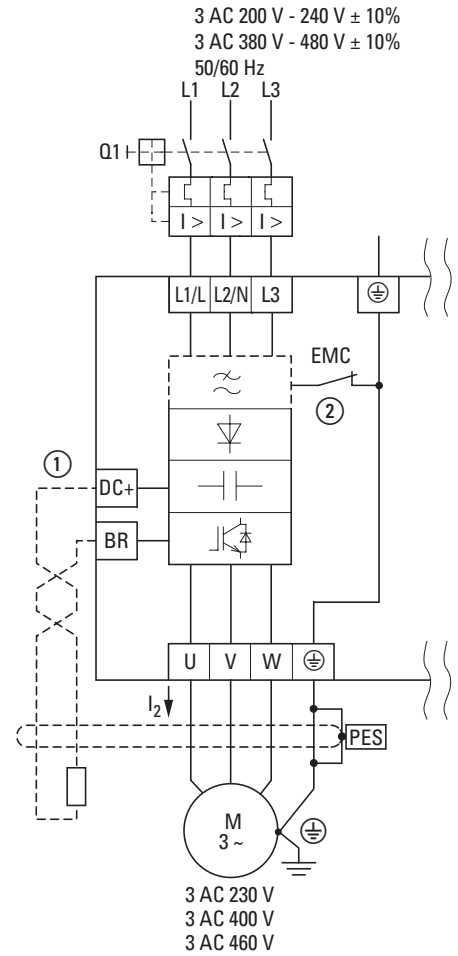
DC1-1D...-A66...



DC1-12...-A66...



DC1-32...-A66...  
DC1-34...-A66...

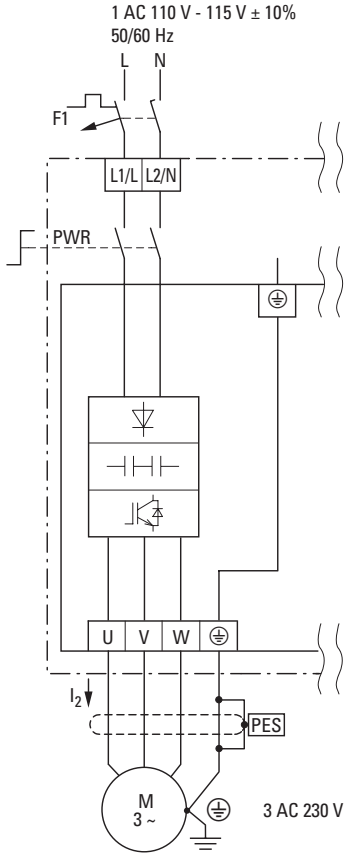


# 2.2

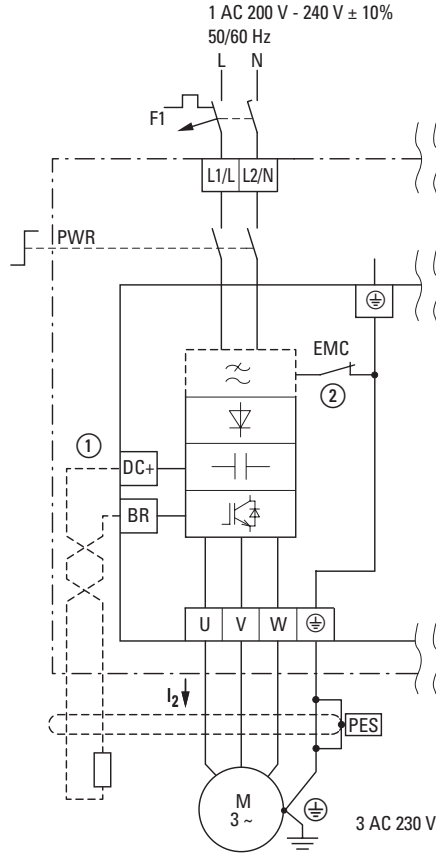
## PowerXL variable frequency drives DC1

### Connection examples

DC1-1D...-A6S...

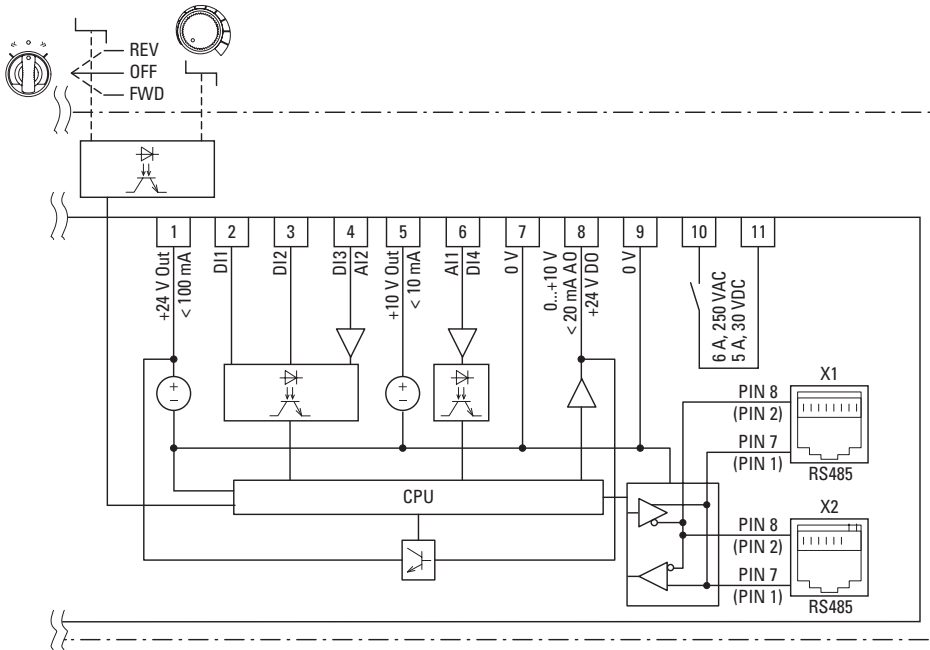
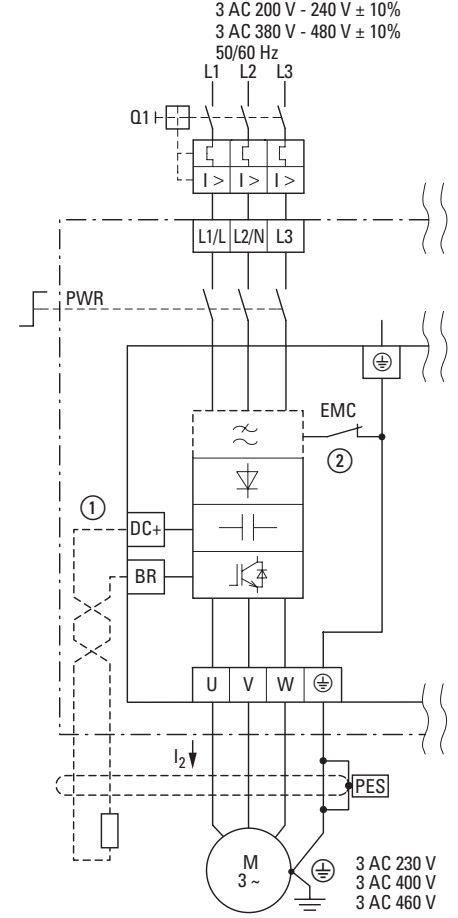


DC1-12...-A6S...



DC1-32...-A6S...

DC1-34...-A6S...





# 2.2

## PowerXL variable frequency drives DC1

Switching and protective devices rated for DC1

Catalog Number	Motor	Variable frequency drives		Mains connection			
	Assigned motor output <sup>1)2)</sup>	Rated operational current <sup>1)</sup>	Input current	Protection device (fuse or miniature circuit-breaker)		Mains contactor	Mains choke
	$I_H = 150\%$ P kW	$I_H = 150\%$ $I_e$ A	$I_H = 150\%$ $I_{LN}$ A	IEC (Type B, gG), 150%	UL (Class CC or J)  A	$I_H = 150\%$ (CT/IH, at 50°C)	$I_H = 150\%$ (at 50°C)
<b>115 V AC, single-phase/115 V AC, single-phase</b>							
DC1-S17D0...	0.37	7	12.9	FAZ-B16/1N	15	DILEM-... + P1DILEM	DX-LN1-018
DC1-S1011...	0.55	10.5	19.2	FAZ-B25/1N	25	DILEM-... + P1DILEM	DX-LN1-024
<b>230 V AC, single-phase/230 V AC, single-phase</b>							
DC1-S24D3...	0.37	4.3	7.5	FAZ-B10/1N	10	DILEM-... + P1DILEM	DX-LN1-009
DC1-S27D0...	0.75	7	12.9	FAZ-B16/1N	15	DILEM-... + P1DILEM	DX-LN1-018
DC1-S2011...	1.1	10.5	19.2	FAZ-B25/1N	25	DILEM-... + P1DILEM	DX-LN1-024
<b>115 V AC, single-phase/230 V AC, three-phase</b>							
DC1-1D2D3...	0.37	2.3	7.8	FAZ-B16/1N	15	DILEM-... + P1DILEM	DX-LN1-009
DC1-1D4D3...	0.75	4.3	15.8	FAZ-B25/1N	25	DILEM-... + P1DILEM	DX-LN1-018
DC1-1D5D8...	1.1	5.8	21.9	FAZ-B32/1N	35	DILEM-... + P1DILEM	DX-LN1-024
<b>230 V AC, single-phase/230 V AC, three-phase</b>							
DC1-122D3...	0.37	2.3	3.7	FAZ-B10/1N	10	DILM7	DX-LN1-006
DC1-124D3...	0.75	4.3	7.5	FAZ-B10/1N	10	DILM7	DX-LN1-009
DC1-127D0...	1.5	7	12.9	FAZ-B16/1N	15	DILM7	DX-LN1-018
DC1-12011...	2.2	10.5	19.2	FAZ-B25/1N	25	DILM7	DX-LN1-024
DC1-12015...	4	15.3	29.2	FAZ-B40/1N	50	DILM7	DX-LN1-032
<b>230 V AC, three-phase/230 V AC, three-phase</b>							
DC1-322D3...	0.37	2.3	3.4	FAZ-B6/3	6	DILM7	DX-LN3-004
DC1-324D3...	0.75	4.3	5.6	FAZ-B6/3	6	DILM7	DX-LN3-006
DC1-327D0...	1.5	7	9.5	FAZ-B10/3	10	DILM7	DX-LN3-010
DC1-32011...	2.2	10.5	12.1	FAZ-B16/3	15	DILM7	DX-LN3-016
DC1-32018...	4	18	20.9	FAZ-B20/3	20	DILM7	DX-LN3-025
DC1-32030...	7.5	30	33.3	FAZ-B40/3	–	DILM17	DX-LN3-040
DC1-32046...	11	46	50.1	FAZ-B63/3	–	DILM40	DX-LN3-060
<b>400 V AC, three-phase/400 V AC, three-phase</b>							
DC1-342D2...	0.75	2.2	3.5	FAZ-B6/3	6	DILM7	DX-LN3-004
DC1-344D1...	1.5	4.1	5.6	FAZ-B6/3	6	DILM7	DX-LN3-006
DC1-345D8...	2.2	5.8	7.5	FAZ-B10/3	10	DILM7	DX-LN3-010
DC1-349D5...	4	9.5	11.5	FAZ-B16/3	15	DILM7	DX-LN3-016
DC1-34014...	5.5	14	17.2	FAZ-B20/3	20	DILM7	DX-LN3-025
DC1-34018...	7.5	18	21.2	FAZ-B25/3	25	DILM7	DX-LN3-025
DC1-34024...	11	24	27.5	FAZ-B32/3	35	DILM17	DX-LN3-040
DC1-34030...	15	30	34.2	FAZ-B40/3	–	DILM17	DX-LN3-040
DC1-34046...	22	46	51.9	FAZ-B63/3	–	DILM40	DX-LN3-060

**Notes**

<sup>1)</sup> Overload cycle for 60 s every 600 s

<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>3)</sup> Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments

Mains connection Radio interference suppression filter (external, 150%) <sup>2)</sup>	DC link connection		Motor feeder	
	Braking resistance		Motor choke	Sine filter
	10% duty factor (ED)	20% duty factor (ED)	$I_H = 150\%$ (CT/ $I_H$ , at 50°C)	$I_H = 150\%$ (CT/ $I_H$ , at 50°C)
DX-EMC12-014-FS1	–	–	–	–
DX-EMC12-025-FS2	DX-BR3-100	–	–	–
DX-EMC12-014-FS1	–	–	–	–
DX-EMC12-014-FS1	–	–	–	–
DX-EMC12-025-FS2	DX-BR3-100	–	–	–
DX-EMC12-014-FS1	–	–	DX-LM3-008	DX-SIN3-004
DX-EMC12-019-FS1	–	–	DX-LM3-008	DX-SIN3-010
DX-EMC12-025-FS2	–	–	DX-LM3-008	DX-SIN3-010
DX-EMC12-014-FS1	–	–	DX-LM3-008	DX-SIN3-004
DX-EMC12-014-FS1	–	–	DX-LM3-008	DX-SIN3-010
DX-EMC12-014-FS1	–	–	DX-LM3-008	DX-SIN3-010
DX-EMC12-025-FS2	DX-BR050-0K4	DX-BR050-0K8	DX-LM3-016	DX-SIN3-016
DX-EMC12-031-FS3	DX-BR050-0K4	DX-BR050-0K8	DX-LM3-016	DX-SIN3-016
DX-EMC34-008	–	–	DX-LM3-008	DX-SIN3-004
DX-EMC34-008	–	–	DX-LM3-008	DX-SIN3-010
DX-EMC34-016	–	–	DX-LM3-008	DX-SIN3-010
DX-EMC34-016	DX-BR050-0K4	DX-BR050-0K8	DX-LM3-016	DX-SIN3-016
DX-EMC34-030	DX-BR050-0K4	DX-BR050-0K8	DX-LM3-035	DX-SIN3-023
DX-EMC34-042	DX-BR022-1K4	DX-BR022-3K1	DX-LM3-035	DX-SIN3-032
DX-EMC34-055	DX-BR022-1K4	DX-BR022-3K1	DX-LM3-050	DX-SIN3-048
DX-EMC34-008	–	–	DX-LM3-008	DX-SIN3-004
DX-EMC34-008	–	–	DX-LM3-008	DX-SIN3-010
DX-EMC34-008	DX-BR100-0K8	DX-BR100-1K6	DX-LM3-008	DX-SIN3-010
DX-EMC34-016	DX-BR100-0K8	DX-BR100-1K6	DX-LM3-011	DX-SIN3-010
DX-EMC34-030	DX-BR047-3K1	DX-BR047-5K1	DX-LM3-016	DX-SIN3-016
DX-EMC34-030	DX-BR047-3K1	DX-BR047-5K1	DX-LM3-035	DX-SIN3-023
DX-EMC34-030	DX-BR047-3K1	DX-BR047-5K1	DX-LM3-035	DX-SIN3-023
DX-EMC34-042	DX-BR022-5K1	DX-BR022-9K2	DX-LM3-035	DX-SIN3-032
DX-EMC34-055	DX-BR022-5K1	DX-BR022-9K2	DX-LM3-050	DX-SIN3-048



## Technical specifications

	Symbol	Unit	Value
<b>General</b>			
Standards			EMC: EN 61800-3:2004+A1-2012 Radio interference: EN 55011: 2010 Security: EN 61800-5: 2007 Degree of protection: EN 60529: 1992 Soiling: IEC 721-3-3
Certifications and manufacturer's declarations on conformity			CE, UL, cUL, c-Tick, UkrSEPRO, Gost-R
Production quality			RoHS, ISO 9001
Climatic proofing	pw	%	< 95%, average relative humidity (RH), non-condensing (EN 50178)
Ambient temperature			
Operation			
IP20 (NEMA 0)	θ	°C	-10 - +50 without derating -10 - +45 at DC1-12011... and DC1-32011..., UL compliance over a period of 24 hours
IP66 (NEMA 4X)	θ	°C	-20 - +40 without derating
Storage	θ	°C	-40 - +60 (frost-free and condensation-free)
Pollution degree			
Non-conductive dust permissible			
Transport			
IP20: Class 1C2 (chemical gases), Class 1S2 (solid particles) IP66: Class 1C3 (chemical gases), Class 1S3 (solid particles)			
Storage			
IP20: Class 2C2 (chemical gases), Class 2S2 (solid particles) IP66: Class 2C3 (chemical gases), Class 2S3 (solid particles)			
Operation			
IP20: Class 3C2 (chemical gases), Class 3S2 (solid particles) IP66: Class 3C3 (chemical gases), Class 3S3 (solid particles)			
Vibration level (not evaluated during operation)			
Shock test			
Pulse shape			Half sinus
Top acceleration			15 g
Time Window			11 ms
Vibration test			
Frequency range			f Hz 10 - 150 10 - 57.55: 0.15 mm peak-peak 57.55 - 150: 1 g Top acceleration
Vibration evaluation			1 octave/minute
MTBF (mean time between failures)		Years	157
Electrostatic discharge (ESD, EN 61000-4-2:2009)		U kV	±4, contact discharge / ±8, air discharge
Fast transient burst (EFT/B, EN 61000-4-4: 2004)		U kV	±1, at 5 kHz, control signal terminal ±2, at 5 kHz, motor connection terminals, single-phase mains connection terminals ±4, at 5 kHz, three-phase mains connection terminals
Overvoltage (surge, EN 61000-4-5: 2006)			
110 - 115 V, 200 - 240 V		U kV	±1, phase to phase/neutral conductor ±2, phase/neutral conductor to earth
380 - 480 V		U kV	±2, phase to phase ±4, phase to earth
Electric strength (flash, EN 61800-5-1: 2007)			
110 - 115 V, 200 - 240 V		U kV	1.5
380 - 480 V		U kV	2.5
Radio interference class (EMC)			
Maximum screened motor cable length with integrated radio interference suppression filter			
Category C1		l m	1, only for DC1-122D3F... to DC1-12011F...(FS1, FS2)
Category C2		l m	5
Category C3		l m	25
Mounting position			vertical
Altitude		h m	0 - 1000 above sea level, > 1000 with 1% load current reduction every 100 m, maximum 2000 with UL approval, maximum 4000 without UL approval
Protection type			IP20 (NEMA 0) / IP66 (NEMA 4X)
Protection against contact			BGV A3 (VBG4, finger- and back-of-hand proof)

	Symbol	Unit	Value
<b>Main circuit / power section</b>			
<b>Feeder</b>			
Rated operating voltage			
DC1-1D...	$U_e$	V	1~ 110 (110 V (-10%) - 115 V (+10%)) → $U_2 = 230$ V)
DC1-12...	$U_e$	V	1~ 230 (200 V (-10%) - 240 V (+10%))
DC1-32...	$U_e$	V	3~ 230 (200 V (-10%) - 240 V (+10%))
DC1-34...	$U_e$	V	3~ 400 (380 V (-10%) - 480 V (+10%))
Single-phase power supply with DC1-3... units			When powered with a single-phase power supply, variable frequency drives from the DC1-32... and DC1-34... series can be operated with a maximum of 50% of the device's rated operational current ( $I_e$ ).
Mains frequency	$f$	Hz	50/60 ±10%
Phase imbalance		%	max. 3
Maximum short-circuit current (supply voltage)	SCCR	kA	100
Mains switch-on frequency			Maximum of one time every 30 seconds
Mains network configuration (AC supply system)			TN and TT network with directly earthed neutral point. IT earthing systems with PCM insulation monitoring relays only. Operation on phase-earthed networks is only permissible up to a maximum phase-earth voltage of 300 V AC.
Inrush current	$I$	A	< $I_{LN}$
<b>Motor feeder</b>			
Output voltage			
DC1-1D...	$U_2$	V	3~ 0 - 2 x $U_e$ (voltage doubler)
DC1-12..., DC1-32..., DC1-34...	$U_2$	V	3~ 0 - $U_e$
Maximum Motor Power Cable Length	$l$	m	100 (screened) 200 (unshielded)
Assigned motor output			
at 230 V, 50 Hz	$P$	kW	0.37 - 4
at 400 V, 50 Hz	$P$	kW	0.75 - 22
Output Frequency			
Range, parameterizable	$f_2$	Hz	0 - 50/60 (max. 500 Hz)
Resolution		Hz	0.1
Rated operational current	$I_e$	A	2.3 - 46
Overload current for 60 s every 600 s	$I_L$	%	150
Overload current for 2.5 s every 600 s	$I_L$	%	175
Switching frequency (double modulation)	$f_{PWM}$	kHz	max. 32
Operating mode			
V/Hz control (speed accuracy)			±20%, with slip compensation
Vector control (static speed accuracy)			±0.033% ±1% load range: 0 - 100%
Torque response time	$t_r$	ms	1 - 8
Torque linearity			±5% (10 - 90% of speed variable range, 20 - 100% of torque load range)
Response time (enable IGBT)	$t_r$	ms	< 10
DC braking			
Time before start	$t$	s	0 - 25, in the event of a stop
Motor pick-up control function (for catching spinning motors)			all frame sizes
Brake chopper			only for sizes FS2 to FS4
Braking current during continuous operation		%	100 ( $I_e$ )
Maximum braking current		%	150 for 60 s

# 2.2

## PowerXL variable frequency drives DC1

### General rated operational data

	Symbol	Unit	Value
<b>Control section</b>			
Control voltage			
Output voltage (control signal terminal 1)	$U_C$	V DC	24
Load rating (control signal terminal 1)	$I_1$	mA	100
Reference voltage (control signal terminal 5)	$U_S$	V DC	10
Load rating (control signal terminal 5)	$I_S$	mA	10
Digital Input (DI)			
Qty.			2 - 4
Logic (level)			increase (NPN)
Time of reaction	$t_r$	ms	< 8
Input voltage range High (1)	$U_C$	V DC	8 - 30
Input voltage range Low (0)	$U_C$	V DC	0 - 4
Analog Input (AI)			
Qty.			0 - 2
Resolution			12 bits
Accuracy		%	< 1 to the final value
Time of reaction	$t_r$	ms	< 16
Input voltage range	$U_S$	V	0 - 10, DC ( $R_i \sim 72 \text{ k}\Omega$ )
Input current range	$I_S$	mA	0/4 - 20 ( $R_B \sim 500 \Omega$ )
Relay output (RO1)			
Qty.			1 relays
Relay contact			Make
Switching capacity			
AC	I	A	6 (250 V AC)
DC	I	A	5 (30 V AC)
Digital Output (DO)			
Qty.			0 - 1
Output voltage	$U_{out}$	V	+24
Load rating (control signal terminal 8)	$I_g$	mA	20 max.
Analog Output (AO)			
Qty.			0 - 1
Output voltage	$U_{out}$	V	0 - +10
Load rating (control signal terminal 8)	$I_g$	mA	20 (maximum)
Resolution		Bit	10
Accuracy		%	< 1 to the final value
Interface (RJ45)			
			OP bus, Modbus RTU, CANopen, RS485
Response time (after valid command)	$t_r$	ms	< 8 (Modbus, CANopen) < 8 (OP bus: Master slave, 60 ms cycle)

Variable frequency drives with voltage doubler  
 $U_{LN} = 2 \times U_2: 115 \text{ V} \rightarrow 230 \text{ V}$

Size	Symbol	Unit	2D3	4D3	5D8
<b>DC1-1D...device series</b>					
Rated operational current	$I_e$	A	2.3	4.3	5.8
Overload current for 60 s every 600 s	$I_L$	A	3.45	6.45	8.7
Overload current for 2.5 s every 600 s	$I_L$	A	4.03	7.53	10.15
Apparent power at rated operation <sup>1)</sup> 230 V	S	kVA	0.92	1.71	2.31
Assigned motor power					
at 230 V, 50 Hz	P	kW	0.37	0.75	1.1
at 220 - 240 V, 60 Hz	P	HP	0.5	1	1.5
Power side (primary side):					
Number of phases			single-phase or two-phase		
Device Voltage Rating	$U_{LN}$	V	110 (-10%) - 115 (+10%), 48 - 62 Hz 99 - 126 ±0%		
Input current (phase current)	$I_{LN}$	A	7.8	15.8	21.9
Minimum braking resistance	$R_B$	Ω	–	–	100
Switching frequency (pulse frequency)					
Default settings	$f_{PWM}$	kHz	8	8	8
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32
Voltage Boost ( $U_{Boost}/U_{LN}$ )					
Default settings		%	3	3	2.5
Max Value		%	25	25	20
Maximum leakage current (contact current) to earth (PE), at $U_{LN}$ : 120 V, without motor	$I_{Touch}$	mA	4.8	4.8	4.8
Efficiency	$\eta$		0.95	0.95	0.95
Heat dissipation					
at $I_e$ (150%)	$P_V$	W	18.5	37.5	44
During no-load running, standby (locked, without fan)	$P_V$	W	3.07	3.07	4.51
Fans			–	✓ <sup>1)</sup>	✓ <sup>1)</sup>
Frame size			FS1	FS1	FS2

**Notes** <sup>1)</sup> Not with IP66 degree of protection

# 2.2

## PowerXL variable frequency drives DC1

### Specific rated operational data

Size	Symbol	Unit	2D3	4D3	7D0NN 7D0FN	7D0NB 7D0FB	011	015
<b>DC1-12...device series</b>								
Rated operational current	$I_b$	A	2.3	4.3	7	7	10.5	15
Overload current for 60 s every 600 s	$I_L$	A	3.45	6.45	10.5	10.5	15.75	22.5
Overload current for 2.5 s every 600 s	$I_L$	A	4.03	7.53	12.25	12.25	18.38	26.25
Apparent power at rated operation 230 V	S	kVA	0.92	1.71	2.79	2.79	4.18	5.98
Apparent power at rated operation 240 V	S	kVA	0.96	1.79	2.91	2.91	4.36	6.24
Assigned motor power								
at 230 V, 50 Hz	P	kW	0.37	0.75	1.5	1.5	2.2	4
at 220 - 240 V, 60 Hz	P	HP	0.5	1	2	2	3	5
Power side (primary side):								
Number of phases	single-phase or two-phase							
Device Voltage Rating	$U_{LN}$	V	200 (-10%) - 240 (+10%), 50/60 Hz 180 - 264 ±0%, 48 - 62 Hz ±0%					
Input current (phase current)	$I_{LN}$	A	3.7	7.5	12.9	12.9	19.2	29.2
Minimum braking resistance	$R_B$	Ω	–	–	–	100	50	25
Switching frequency (pulse frequency)								
Default settings	$f_{PWM}$	kHz	8	8	8	8	8	8
Setting range	$f_{PWM}$	kHz	4 -32	4 -32	4 -32	4 -32	4 -32	4 -24
Voltage Boost ( $U_{boost}/U_{LN}$ )								
Default settings		%	3	3	3	2.5	2.5	2
Max Value		%	25	25	25	20	20	15
Maximum leakage current to earth (PE), at $U_{LN}$ : 240 V, without motor	$I_{PE}$	mA	4.8	4.8	4.8	4.8	4.8	4.7
Efficiency	$\eta$		0.95	0.94	0.96	0.96	0.95	0.96
Heat dissipation								
at $I_b$ (150%)	$P_V$	W	18.5	45.75	63	63	103.4	160
During no-load running, standby (locked, without fan)	$P_V$	W	3.07	3.07	3.07	4.51	4.51	5.16
Fans			–	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>
Frame size			FS1	FS1	FS1	FS2	FS2	FS3

**Notes** <sup>1)</sup> Not with IP66 degree of protection

Size	Symbol	Unit	2D3	4D3	7D0NN	7D0NB 7D0FB
<b>DC1-32...device series</b>						
Rated operational current	$I_b$	A	2.3	4.3	7	7
Overload current for 60 s every 600 s	$I_L$	A	3.45	6.45	10.5	10.5
Overload current for 2.5 s every 600 s	$I_L$	A	4.03	7.53	12.25	12.25
Apparent power at rated operation 230 V	S	kVA	0.92	1.71	2.79	2.79
Apparent power at rated operation 240 V	S	kVA	0.96	1.79	2.91	2.91
Assigned motor power						
at 230 V, 50 Hz	P	kW	0.37	0.75	1.5	1.5
at 220 - 240 V, 60 Hz	P	HP	0.5	1	2	2
Power side (primary side):						
Number of phases			3	3	3	3
Device Voltage Rating	$U_{LN}$	V	200 (-10%) - 240 (+10%), 50/60 Hz 180 - 264 $\pm$ 0%, 48 - 62 Hz $\pm$ 0%			
Input current (phase current)	$I_{LN}$	A	3.4	5.6	9.5	8.9
Minimum braking resistance	$R_B$	$\Omega$	–	–	–	100
Switching frequency (pulse frequency)						
Default settings	$f_{PWM}$	kHz	8	8	8	8
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32	4 - 32
Voltage Boost ( $U_{boost}/U_{LN}$ )						
Default settings		%	3	3	3	2.5
Max Value		%	25	25	25	20
Maximum leakage current (contact current) to earth (PE), at $U_{LN}$ : 240 V, without motor	$I_{Touch}$	mA	7.5	7.5	7.5	7.2
Efficiency	$\eta$		0.96	0.95	0.96	0.96
Heat dissipation						
at $I_b$ (150%)	$P_V$	W	14.8	39.75	61.5	61.5
During no-load running, standby (locked, without fan)	$P_V$	W	3.07	3.07	3.07	4.51
Fans			–	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>
Frame size			FS1	FS1	FS1	FS2

**Notes** <sup>1)</sup> Not with IP66 degree of protection

# 2.2

## PowerXL variable frequency drives DC1

### Specific rated operational data

Size	Symbol	Unit	011	018	024	030	046
<b>DC1-32...device series</b>							
Rated operational current	$I_e$	A	10.5	18	24	30	46
Overload current for 60 s every 600 s	$I_L$	A	15.75	27	36	45	69
Overload current for 2.5 s every 600 s	$I_L$	A	18.38	31.5	42	52.5	80.5
Apparent power at rated operation 230 V	S	kVA	4.18	7.17	9.55	11.94	18.30
Apparent power at rated operation 240 V	S	kVA	4.36	7.48	9.96	12.46	19.10
Assigned motor power							
at 230 V, 50 Hz	P	kW	2.2	4	5.5	7.5	11
at 220 - 240 V, 60 Hz	P	HP	3	5	7.5	10	15
Power side (primary side):							
Number of phases			3	3	3	3	3
Device Voltage Rating	$U_{LN}$	V	200 - (10%) - 264 (+10%), 50/60 Hz 180 - 264 $\pm$ 0%, 48 - 62 Hz $\pm$ 0%				
Input current (phase current)	$I_{LN}$	A	12.1	20.9	26.4	33.3	50.1
Minimum braking resistance	$R_B$	$\Omega$	50	25	20	15	10
Switching frequency (pulse frequency)							
Default settings	$f_{PWM}$	kHz	8	8	8	8	8
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 24	4 - 24	4 - 24	4 - 24
Voltage Boost ( $U_{Boost}/U_{LN}$ )							
Default settings		%	2.5	2	2	1.5	1.5
Max Value		%	20	15	15	10	10
Maximum leakage current (contact current) to earth (PE), at $U_{LN}$ : 240 V, without motor	$I_{Touch}$	mA	7.2	6.8	6.8	6.9	6.9
Efficiency	$\eta$		0.96	0.96	0.97	0.97	0.96
Heat dissipation							
at $I_e$ (150%)	$P_V$	W	90.2	160	223	304	446
During no-load running, standby (locked, without fan)	$P_V$	W	4.51	5.16	5.16	7.54	7.54
Fans			✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓	✓
Frame size			FS2	FS3	FS3	FS4	FS4

**Notes** <sup>1)</sup> Not with IP66 degree of protection

Size	Symbol	Unit	2D2	4D1NN 4D1FN	4D1NB 4D1FB	5D8	9D5
<b>DC1-34...device series</b>							
Rated operational current	$I_e$	A	2.2	4.1	4.1	5.8	9.5
Overload current for 60 s every 600 s	$I_L$	A	3.3	6.15	6.15	8.7	14.25
Overload current for 3.75 s every 600 s	$I_L$	A	3.85	7.18	7.18	10.15	16.63
Apparent power at rated operation 400 V	S	kVA	1.52	2.84	2.84	4.02	6.58
Apparent power at rated operation 480 V	S	kVA	1.83	3.41	3.41	4.82	7.9
Assigned motor power							
at 400 V, 50 Hz	P	kW	0.75	1.5	1.5	2.2	4
at 460 V, 60 Hz	P	HP	1	2	2	3	5
Power side (primary side):							
Number of phases			3	3	3	3	3
Device Voltage Rating	$U_{LN}$	V	380 (-10%) - 480 (+10%), 50/60 Hz 342 - 528 V $\pm 0\%$ , 48 - 62 Hz $\pm 0\%$				
Input current (phase current)	$I_{LN}$	A	3.5	5.6	5.6	7.5	11.5
Minimum braking resistance	$R_B$	$\Omega$	–	–	250	200	120
Switching frequency (pulse frequency)							
Default settings	$f_{PWM}$	kHz	8	8	8	8	8
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32	4 - 32	4 - 32
Voltage Boost ( $U_{boost}/U_{LN}$ )							
Default settings		%	3	3	2.5	2.5	2.5
Max Value		%	25	25	20	20	20
Maximum leakage current (contact current) to earth (PE), at $U_{LN}$ : 400 V, without motor	$I_{Touch}$	mA	13	13	12.6	12.6	12.6
Efficiency	$\eta$		0.92	0.95	0.95	0.95	0.97
Heat dissipation							
at $I_e$ (150%)	$P_V$	W	33.75	66.5	66.5	101.2	136
During no-load running, standby (locked, without fan)	$P_V$	W	4.55	4.55	6.44	6.44	6.44
Fans			✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>
Frame size			FS1	FS1	FS2	FS2	FS2

**Notes** <sup>1)</sup> Not with IP66 degree of protection



# 2.2

## PowerXL variable frequency drives DC1

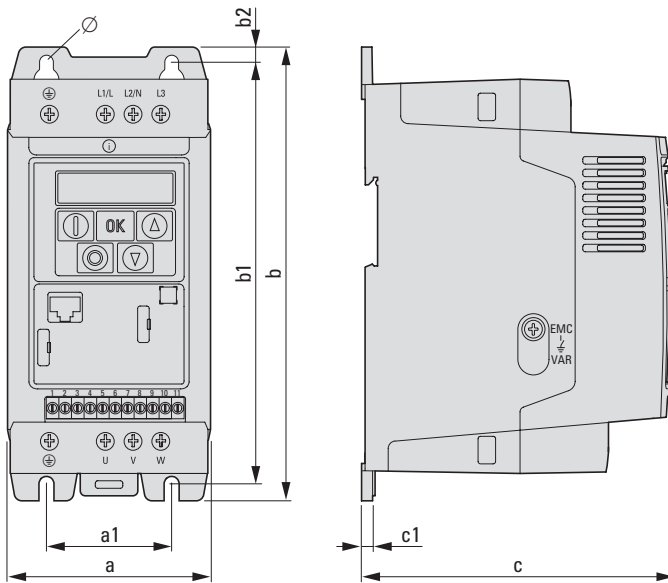
### Specific rated operational data

Size	Symbol	Unit	014	018	024	030	039	046
<b>DC1-34...device series</b>								
Rated operational current	$I_e$	A	14	18	24	30	39	46
Overload current for 60 s every 600 s	$I_L$	A	21	27	36	45	58.5	69
Overload current for 3.75 s every 600 s	$I_L$	A	24.5	31.5	42	52.5	68.25	80.5
Apparent power at rated operation 400 V	S	kVA	9.67	12.47	16.63	20.76	26.99	31.83
Apparent power at rated operation 480 V	S	kVA	11.64	14.96	19.95	24.91	32.39	38.20
Assigned motor power								
at 400 V, 50 Hz	P	kW	5.5	7.5	11	15	18.5	22
at 460 V, 60 Hz	P	HP	7.5	10	15	20	25	30
Power side (primary side):								
Number of phases			3	3	3	3	3	3
Device Voltage Rating	$U_{LN}$	V	380 (-10%) - 480 (+10%), 50/60 Hz 342 - 528 V $\pm 0\%$ , 48 - 62 Hz $\pm 0\%$					
Input current (phase current)	$I_{LN}$	A	17.2	21.2	27.5	34.2	44.1	51.9
Minimum braking resistance	$R_B$	$\Omega$	100	80	50	30	22	22
Switching frequency (pulse frequency)								
Default settings	$f_{PWM}$	kHz	8	8	8	8	8	8
Setting range	$f_{PWM}$	kHz	4 - 24	4 - 24	4 - 24	4 - 24	4 - 24	4 - 24
Voltage Boost ( $U_{Boost}/U_{LN}$ )								
Default settings		%	2	2	2	2	1.5	1.5
Max Value		%	15	15	15	10	10	10
Maximum leakage current to earth (PE), at $U_{LN}$ : 400 V, without motor	$I_{Touch}$	mA	12.7	12.7	12.7	12.9	12.9	12.9
Efficiency	$\eta$		0.96	0.97	0.97	0.97	0.97	0.96
Heat dissipation								
at $I_e$ (150%)	$P_V$	W	223	304	446	607	728	801
During no-load running, standby (locked, without fan)	$P_V$	W	6.42	6.42	6.52	14.6	14.6	14.6
Fans			✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓	✓	✓
Frame size			FS3	FS3	FS3	FS4	FS4	FS4

**Notes** <sup>1)</sup> Not with IP66 degree of protection

## Dimensions and weights

### Sizes FS1 to FS3 in IP20



Size	a	a1	b	b1	b2	c	c1	Ø1	Ø2	m
	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
FS1	81	50	184	170	7	124	4	6	12	1.1
FS2	107	75	231	215	8	152	5	6	12	2.6
FS3	131	100	273	255	8.5	175	5	6	12	4

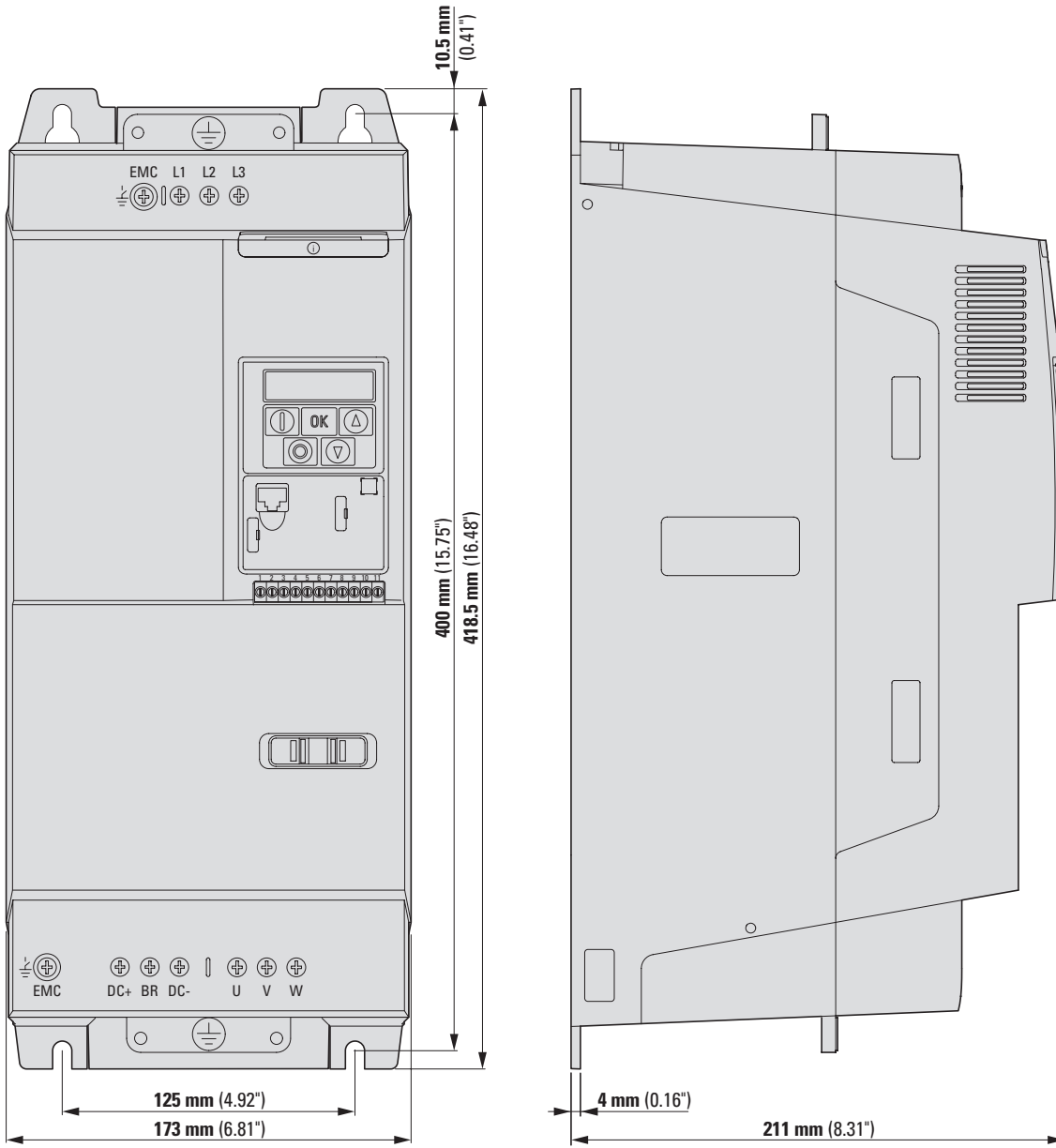
DC1

# 2.2

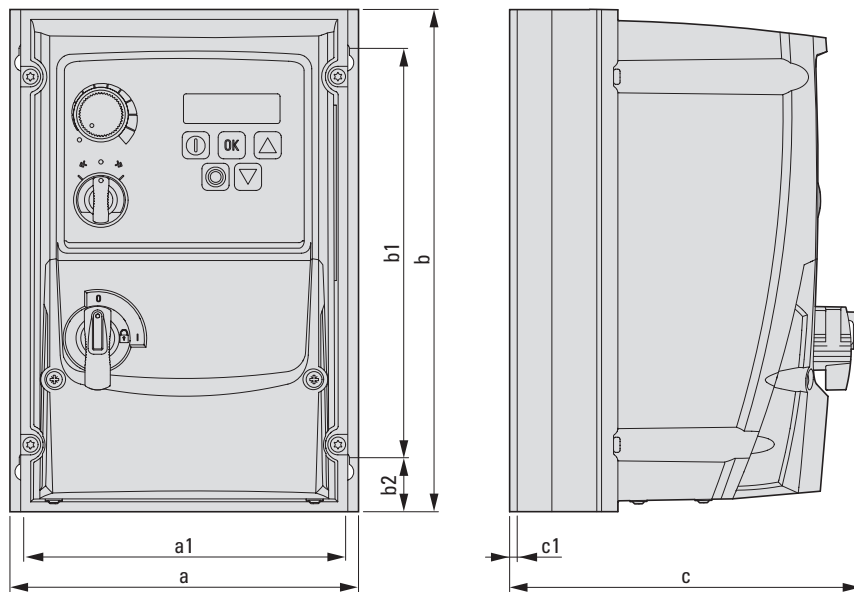
## PowerXL variable frequency drives DC1

Specific rated operational data

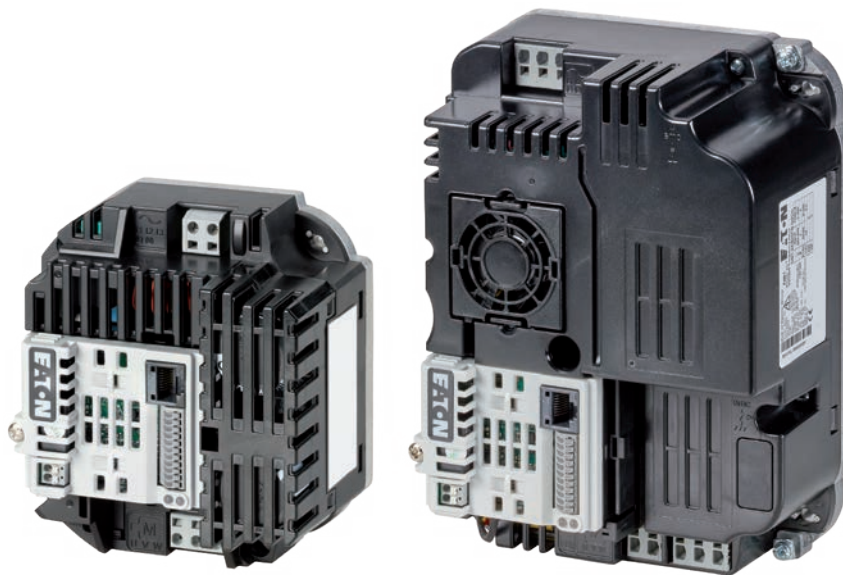
Size FS4 in IP20



## Sizes FS1 to FS4 in IP66



Size	a	a1	b	b1	b2	c	c1	Ø1	Ø2	m
	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
FS1	161	148.5	232	189	25	162	3.5	4	8	2.5
FS2	188	176	257	200	28	182	3.5	4.2	8.5	3.5
FS3	211	197.5	310	252	33	238	3.5	4.2	8.5	7
FS4	240	226	360	300	33	275	3.5	4.2	8.5	9.5



# PowerXL variable frequency drives DB1 Cold Plate Drive

PowerXL DB1 variable frequency drives combine all the functionalities from the tried-and-true DC1 series in the smallest possible IEC-compatible format. In addition, cold plate technology makes these powerful devices the ideal solution for customers who need to integrate a variable frequency drive into existing systems without enough space for heat sinks or ventilation.

## Performance range:

- 0.55 kW ( $U_g$ : 1~ 115 V,  $U_2$ : 3~ 230 V)
- 0.75 kW ( $U_g$ : 1~ 115-230 V,  $U_2$ : 3~ 230 V)
- 0.37 - 0.75 kW ( $U_g$ : 1~ 230 V,  $U_2$ : 3~ 230 V)
- 0.37 - 1.5 kW ( $U_g$ : 3~ 230 V,  $U_2$ : 3~ 230 V)
- 0.75 - 4 kW ( $U_g$ : 3~ 400 V,  $U_2$ : 3~ 400 V)

## Applications:

- Pumps with integrated variable frequency drive
- Fans with integrated variable frequency drive
- Air Handling Units
- Compressors
- Mobile conveyor belts

## Features:

- Fast commissioning with 14 basic parameters
- Large overload capability: 150% for 60 seconds, 175% for 2 seconds
- Ambient air temperature up to 60°C without derating
- Sensorless vector control
- Can be used to drive high-efficiency IE4 motors
- Short-circuit proof in all operating modes
- Integrated CANopen and Modbus RTU
- IP20 degree of protection
- Integrated EMC filter
- Power Factor Compensation (PFC)
- Integrated Brake Transistor
- Integrated PI controller
- U/f control
- Voltage boost
- DC braking
- Control signal terminals with push-in technology
- International standards (CE, UL, cUL, EAC; RoHS)

## Accessory:

- External keypad
- Parameter storage unit and Bluetooth communication stick
- Mains chokes
- Motor chokes
- Sine filter
- Braking resistances
- drivesConnect parameter configuration software
- drivesConnect mobile App (iOS, Android)

For more information, visit:  
[www.Eaton.com/DB1](http://www.Eaton.com/DB1)



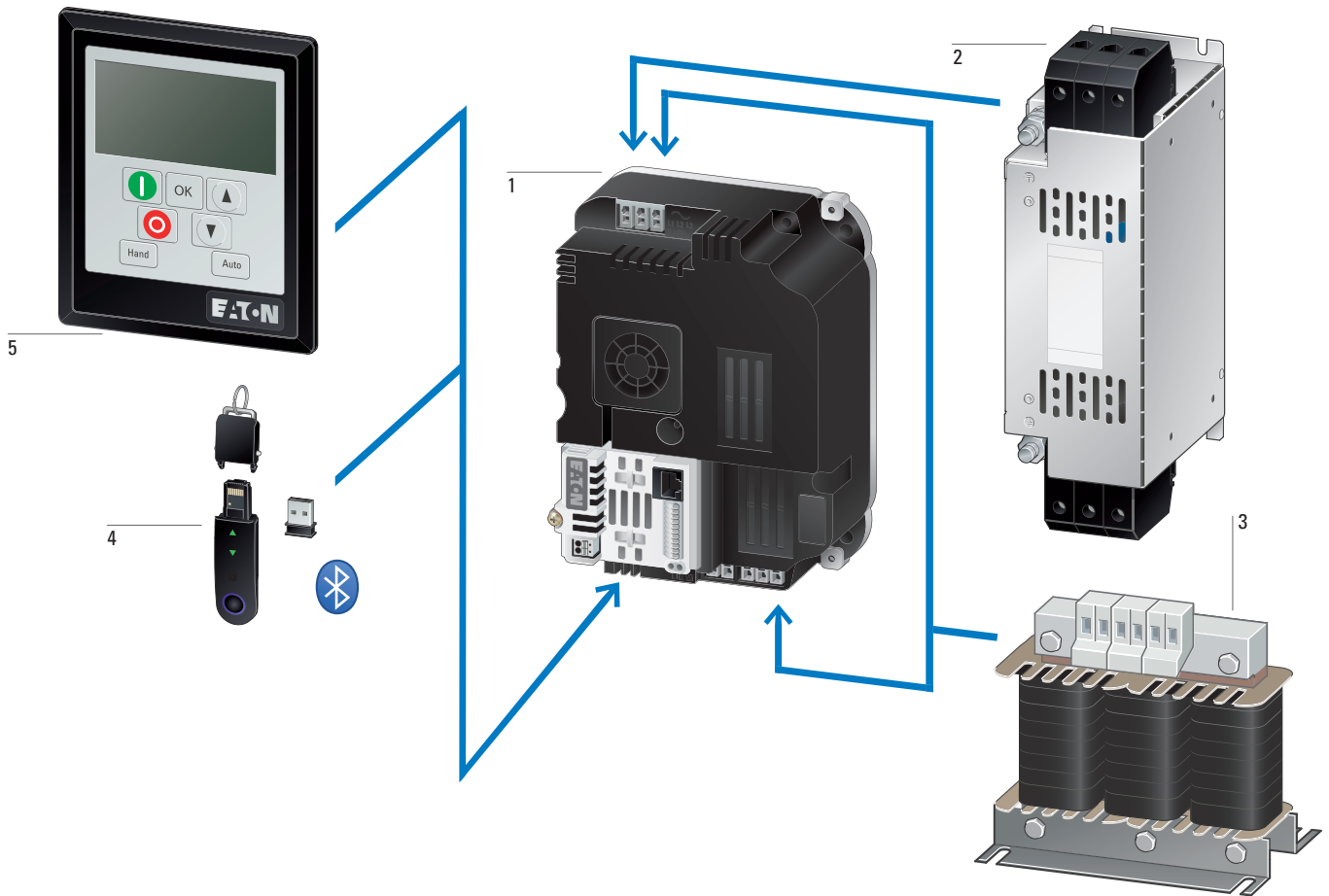
<b>2.3</b>	<b>Variable frequency drive DB1 up to 4 kW</b>	
	<b>System overview</b> .....	<b>108</b>
	<b>Key to type references</b> .....	<b>109</b>
	<b>Sizes and degree of protection</b> .....	<b>109</b>
	<b>Ordering</b> .....	<b>110</b>
	DB1, for three-phase motors 230 V/400 V, IP20 .....	<b>110</b>
	Accessories .....	<b>111</b>
	<b>Engineering</b> .....	<b>112</b>
	Block diagram .....	<b>112</b>
	Assigned switching and protective elements for DB1 .....	<b>114</b>
	<b>Technical data</b> .....	<b>116</b>
	General rated operational data .....	<b>116</b>
	Specific rated operational data .....	<b>119</b>
	<b>Dimensions and weights</b> .....	<b>125</b>

# 2.3

## Variable frequency drive DB1 up to 4 kW

### System overview

#### System overview



**DB1 variable frequency drives** 1  
→ Page 110

**External radio interference suppression filter** 2  
→ Page 217

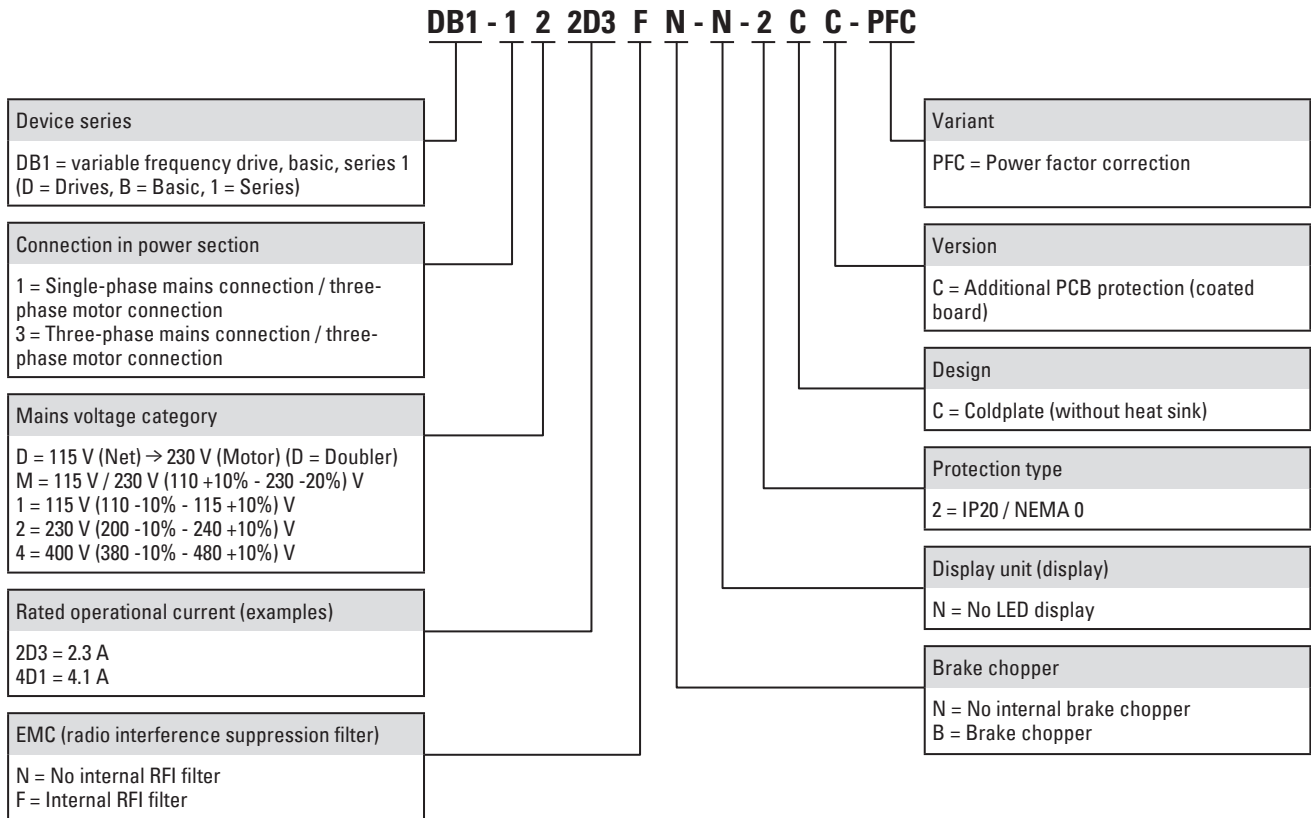
**Mains chokes, motor reactors** 3  
→ Page 215  
→ Page 219

**Memory and Bluetooth stick** 4  
→ Page 111

**External keypad** 5  
→ Page 111

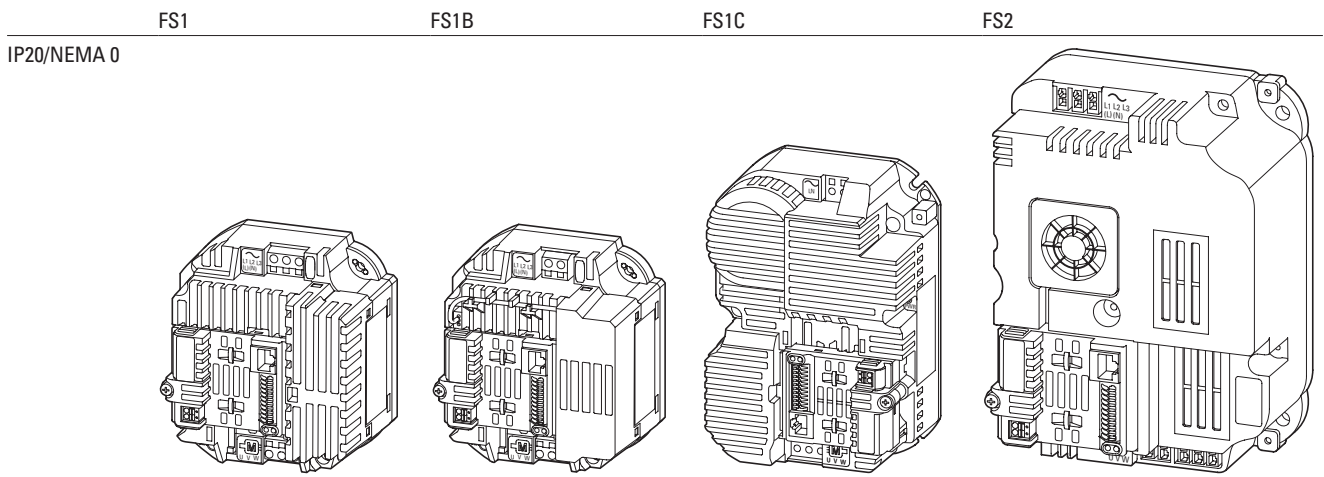
Key to type references, sizes and degree of protection

## Key to type references



## Sizes and degree of protection

Protection type Frame size



DB1



# 2.3

## Variable frequency drive DB1 up to 4 kW

DB1, for three-phase motors 230 V/400 V, IP20

### Ordering

Rated operational current <sup>1)4)</sup> I <sub>b</sub> A	Assigned motor output <sup>1)2)3)</sup> P kW      P HP		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack
	Radio interference suppression filter	Brake chopper	7-segment display	✓	–				
<b>PowerXL variable frequency drives DB1</b>									
The mains voltage of 115 V is raised to 230 V (output voltage) through an internal voltage double connection. U <sub>g</sub> 115 V AC, single-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 110 (-10%) - 115 (+10%) V									
3.2	0.55	0.75	✓	–	–	FS1B	IP20/NEMA 0	<b>DB1-1D3D2FN-N2CC</b> 199347	1 unit
U <sub>g</sub> 115 - 230 V AC, single-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V									
4.3	0.75	1	✓	–	–	FS1C	IP20/NEMA 0	<b>DB1-1M4D3FN-N2CC-PFC</b> 199738	1 unit
U <sub>g</sub> 230 V AC, single-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V									
2.3	0.37	0.5	✓	–	–	FS1	IP20/NEMA 0	<b>DB1-122D3FN-N2CC</b> 197193	1 unit
4.3	0.75	1	✓	–	–	FS1	IP20/NEMA 0	<b>DB1-124D3FN-N2CC</b> 197194	
7	1.5	2	✓	–	–	FS1C	IP20/NEMA 0	<b>DB1-127D0FN-N2CC-PFC</b> 199739	
U <sub>g</sub> 230 V AC, three-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V									
2.3	0.37	0.5	✓	–	–	FS1	IP20/NEMA 0	<b>DB1-322D3FN-N2CC</b> 199735	1 unit
4.3	0.75	1	✓	–	–	FS1	IP20/NEMA 0	<b>DB1-324D3FN-N2CC</b> 199736	
7	1.5	2	✓	–	–	FS1B	IP20/NEMA 0	<b>DB1-327D0FN-N2CC</b> 199737	
U <sub>g</sub> 400 V AC, three-phase / U <sub>2</sub> 400 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V									
2.2	0.75	1	✓	–	–	FS1	IP20/NEMA 0	<b>DB1-342D2FN-N2CC</b> 197196	1 unit
4.1	1.5	2	✓	–	–	FS1	IP20/NEMA 0	<b>DB1-344D1FN-N2CC</b> 197197	
5.8	2.2	3	✓	✓	–	FS2	IP20/NEMA 0	<b>DB1-345D8FB-N2CC</b> 197565	
9.5	4	5	✓	✓	–	FS2	IP20/NEMA 0	<b>DB1-349D5FB-N2CC</b> 197566	

#### Notes

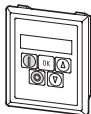
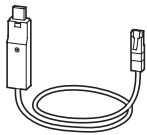
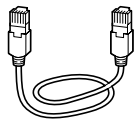

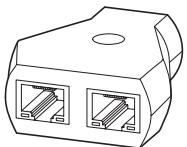
<sup>1)</sup> Overload cycle: 150% for 60 s every 600 s

<sup>2)</sup> At 230 V, 50 Hz/at 220 - 240 V, 60 Hz

At 400 V, 50 Hz/at 440 - 480 V, 60 Hz

<sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +60°C

Descriptions	Length m	For use with	Catalog Number Article no.	Std. pack
<b>External keypad</b>				
 With 7-digit display assembly Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	3	DE1, DE11, DC1, DB1, DA1	<b>DX-KEY-LED2</b> 186946	1 unit
With multi-language plain text OLED display Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	3	DC1, DB1, DA1, RAM05, RASP5	<b>DX-KEY-OLED</b> 169133	
<b>Parameter assignment</b>				
Parameter storage unit and Bluetooth communication stick For storage, copying parameters, and/or transferring parameters to a PC or smartphone (iOS or Android) via Bluetooth with the drivesConnect software or the drivesConnect mobile app respectively With 2 function keys for uploading and downloading parameters with parameter memory.	–	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-COM-STICK3-KIT</b> 197586	1 unit
<b>Programming cable</b>				
 Interface converter USB/RS485 with connection cable, RJ45 8 pole For storage, copying parameters, and/or transferring parameters to a PC with the drivesConnect software, electrically isolated	3	DE1, DE11, DC1, DB1, DA1	<b>DX-CBL-PC-3M0</b> 744-A3036-00P	1 unit
<b>Connection cable</b>				
 Patch cord with RJ45 plugs, 8 pole	0.5	DE1, DE11, DC1, DB1, DA1	<b>DX-CBL-RJ45-0M5</b> 169137	1 unit
	1		<b>DX-CBL-RJ45-1M0</b> 169138	
	3		<b>DX-CBL-RJ45-3M0</b> 169139	
<b>Bus terminating resistor</b>				
 RJ45 8 pole Connection to CANopen® (pin 1/2, 124 Ω) or to Modbus RTU (pin 7/8, 120 Ω)	–	DX-SPL-RJ45-2SL-1PL	<b>EASY-NT-R</b> 256281	2 unit
<b>Splitter</b>				
 RJ45, 8-pin, 3 sockets	–	DX-CBL-RJ45...	<b>DX-SPL-RJ45-3SL</b> 169141	1 unit
RJ45, 8-pin, 2 sockets/1 plug	–	DE1, DE11, DC1, DB1, DA1	<b>DX-SPL-RJ45-2SL1PL</b> 169142	

# 2.3

## Variable frequency drive DB1 up to 4 kW

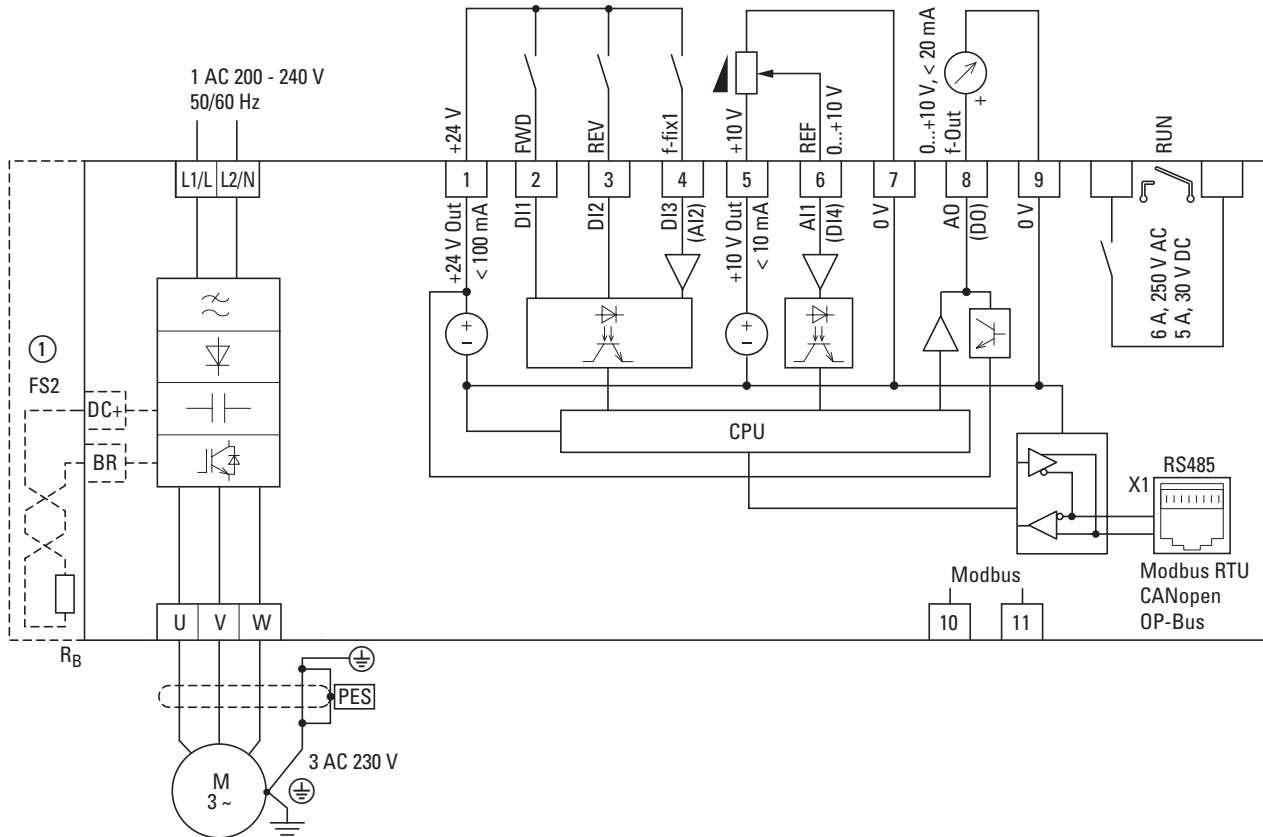
### Block flow diagram

#### Engineering

##### DB1-12...

Mains voltage  $U_{LN}$ : single-phase, 200 (-10%) - 240 (+10%) V, 50/60 Hz

Motor voltage  $U_2$ : three-phase,  $U_2 = U_{LN}$ , 0 - 50/60 Hz (max. 500 Hz)



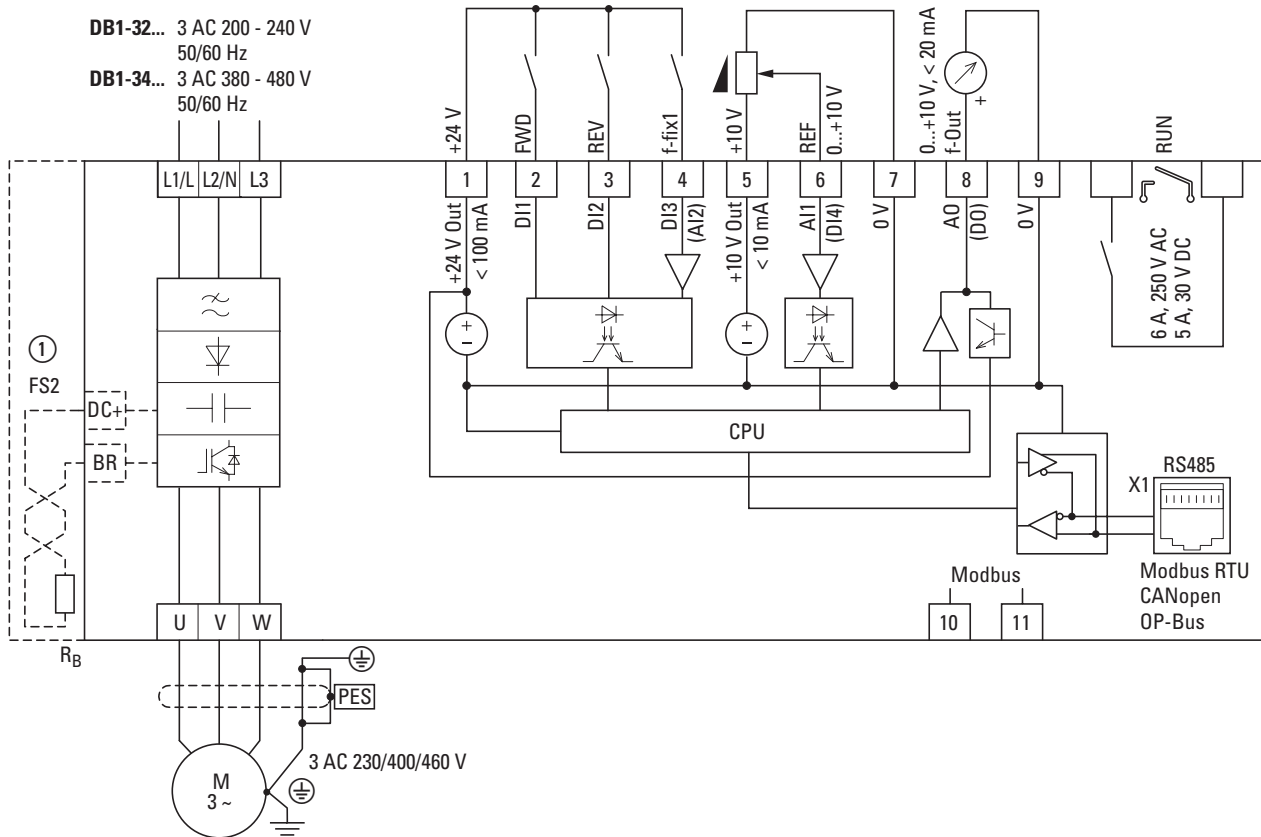
① FS2-size devices make it possible to connect braking resistors (DC+, BR).

Variable frequency drive with single-phase supply system voltage and three-phase motor connection

### DB1-34...

Mains voltage  $U_{LN}$ : three-phase, 380 (-10%) - 480 (+10%) V, 50/60 Hz

Motor voltage  $U_2$ : three-phase,  $U_2 = U_{LN}$ , 0 - 50/60 Hz (max. 500 Hz)



① FS2-size devices make it possible to connect braking resistors (DC+, BR).

Variable frequency drive with three-phase mains supply voltage and three-phase motor connection

# 2.3

## Variable frequency drive DB1 up to 4 kW

Assigned switching and protective elements for DB1

Catalog Number	Motor	Variable frequency drives		Mains connection	
	Assigned motor output <sup>1) 2)</sup> $I_H = 150\%$  P kW	Rated operational current <sup>1)</sup> $I_H = 150\%$  $I_e$ A	Input current $I_H = 150\%$  $I_{LN}$ A	Protective device  IEC (Type B, gG), 150% UL (Class CC or J) <sup>3)</sup>  A A	
<b>Variable frequency drive DB1 up to 4 kW</b>					
DB1-122D3FN-N2CC	0.37	2.3	4.5	10	10
DB1-124D3FN-N2CC	0.75	4.3	9.1	16	15
DB1-127D0FN-N2CC-PFC	0.75	7	8.7	16	15
DB1-1D3D2FN-N2CC	0.5	3.2	11.4	16	15
DB1-1M4D3FN-N2CC-PFC (at 110 V)	0.75	4.3	10.9	16	15
DB1-1M4D3FN-N2CC-PFC (at 230 V)	0.75	4.3	5.1	10	10
DB1-322D3FN-N2CC	0.37	2.3	2.2	10	10
DB1-324D3FN-N2CC	0.75	4.3	4.4	10	10
DB1-327D0FN-N2CC	1.5	7	9.6	16	15
DB1-342D2FN-N2CC	0.75	2.2	2.3	6	6
DB1-344D1FN-N2CC	1.5	4.1	5.6	10	10
DB1-345D8FB-N2CC	2.2	5.8	7.5	10	10
DB1-349D5FB-N2CC	4	9.5	10.7	16	15

**Notes**

<sup>1)</sup> Overload cycle for 60 s every 600 s

<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>3)</sup> Maximum short-circuit current of the supply network: 100 kA rms

<sup>4)</sup> Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments

## Assigned switching and protective elements for DB1

Mains connection			Motor feeder		
Mains contactor	Mains choke		Radio interference suppression filter (external, 150%) <sup>4)</sup>		Motor choke
$I_H = 150\%$ (CT/I <sub>H</sub> , at 50°C)	$I_H = 150\%$ (at 50°C)				$I_H = 150\%$ (CT/I <sub>H</sub> , at 50°C)
	Type (max. 50°C)	Type (max. 40°C)	Low leakage current	Standard	
DILEM-...+P1DILEM	DX-LN1-006	DX-LN1-006	DX-EMC12-008-SL	DX-EMC12-014-FS1	DX-LM3-008
DILEM-...+P1DILEM	DX-LN1-013	DX-LN1-013	DX-EMC12-012-SL	DX-EMC12-014-FS1	DX-LM3-008
DILEM-...+P1DILEM	DX-LN1-013	DX-LN1-009	DX-EMC12-012-SL	DX-EMC12-014-FS1	DX-LM3-008
DILEM-...+P1DILEM	DX-LN1-013	DX-LN3-016	DX-EMC12-012-SL	DX-EMC12-014-FS1	DX-LM3-008
DILEM-...+P1DILEM	DX-LN1-013	DX-LN1-013	DX-EMC12-012-SL	DX-EMC12-014-FS1	DX-LM3-008
DILEM-...+P1DILEM	DX-LN1-006	DX-LN1-006	DX-EMC12-012-SL	DX-EMC12-014-FS1	DX-LM3-008
DILEM-...	DX-LN3-004	DX-LN3-004	DX-EMC34-008-SL	DX-EMC34-008	DX-LM3-008
DILEM-...	DX-LN3-006	DX-LN3-006	DX-EMC34-008-SL	DX-EMC34-008	DX-LM3-008
DILEM-...	DX-LN3-016	DX-LN3-010	DX-EMC34-012-SL	DX-EMC34-016	DX-LM3-008
DILEM-...	DX-LN3-004	DX-LN3-004	DX-EMC34-008-SL	DX-EMC34-008	DX-LM3-008
DILEM-...	DX-LN3-006	DX-LN3-006	DX-EMC34-008-SL	DX-EMC34-008	DX-LM3-008
DILEM-...	DX-LN3-010	DX-LN3-010	DX-EMC34-012-SL	DX-EMC34-016	DX-LM3-008
DILEM-...	DX-LN3-016	DX-LN3-016	DX-EMC34-012-SL	DX-EMC34-016	DX-LM3-011

# 2.3

## Variable frequency drive DB1 up to 4 kW

### General rating data

#### Technical specifications

	Symbol	Unit	Value
<b>General</b>			
Standards			General requirements: EN 61800-2 EMV: EN 61800-3: Safety: EN 61800-5-1
Certifications and manufacturer's declarations on conformity			CE, UL, cUL
Production quality			RoHS, ISO 9001
Climatic proofing	pw	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive, no dripping water (EN 61800-2)
Ambient temperature			
Operation	θ	°C	-10 - +60 – depending on the cooling system
Storage	θ	°C	-40 - +60 (frost-free and condensation-free)
Vibration level (not evaluated during operation)			
Shock test			
Pulse shape			Half sinus
Top acceleration			15 g
Time Window			11 ms
Vibration test			
Frequency range	f	Hz	10 - 150 10 - 57.55: 0.075 mm peak-peak 57.55 - 150: 1 g Top acceleration
Vibration evaluation			
Electrostatic discharge (ESD, EN 61000-4-2:2009)	U	kV	±4, contact discharge ±8, air discharge
Fast transient burst (EFT/B, EN 61000-4-4: 2004)	U	kV	±1, at 5 kHz, control signal terminal ±2, at 5 kHz, motor connection terminals, single-phase mains connection terminals ±2, at 5 kHz, three-phase mains connection terminals
Overvoltage (surge, EN 61000-4-5: 2006)			
115 V			±1, phase to phase/neutral conductor ±2, phase/neutral conductor to earth
(200 - 240) V			±1, phase to phase/neutral conductor ±2, phase/neutral conductor to earth
(380 - 480) V			±2, phase to phase ±2, phase to earth ±4, Fail Safe
Electric strength (flash, EN 61800-5-1: 2007)			
(110 - 115) V	U	kV	1.5
(200 - 240) V	U	kV	1.5
(380 - 480) V	U	kV	2.5
Radio interference class (EMC)			
Maximum screened motor cable length with integrated radio interference suppression filter			
Category C1 (conducted)	l	m	1
Category C2	l	m	3
Category C3	l	m	10
Mounting position			
Any – depends on the cooling system			
Altitude	h	m	0 - 1000 above sea level, > 1000 with 1% load current reduction every 100 m, max. 2000
Protection type			
IP20 (NEMA 0)			
Protection against contact			
BGV A3 (VBG4, finger- and back-of-hand proof)			

	Symbol	Unit	Value
<b>Main circuit / power section</b>			
Feeder			
Rated operating voltage			
DB1-12...	$U_e$	V	1~ 230 (200 V (-10%) - 240 V (+10%))
DB1-1D...	$U_e$	V	1~ 110 (110 V (-10%) - 115 V (+10%)) → $U_2 = 230$ V
DB1-1M...	$U_e$	V	1~ 110 - 230 (110 V (-20%) - 230 V (+10%)) → $U_2 = 230$ V
DB1-32...	$U_e$	V	3~ 230 (200 V (-10%) - 240 V (+10%))
DB1-34...	$U_e$	V	3~ 400 (380 V (-10%) - 480 V (+10%))
Mains frequency	$f$	Hz	48 - 62
Phase imbalance		%	max. 3
Maximum short-circuit current (supply voltage)	SCCR	kA	100
Mains switch-on frequency			Maximum of one time every 30 seconds
Mains network configuration (AC supply system)			TN and TT network with directly earthed neutral point.
Inrush current	$I$	A	$< I_{LN}$
Motor feeder			
Output voltage	$U_2$	V	3- 0 - $U_e$
Assigned motor output			
at 115 V, 50 Hz	$P$	kW	0.5
at 230 V, 50 Hz	$P$	kW	0.37 - 1.5
at 400 V, 50 Hz	$P$	kW	0.75 - 4
Output Frequency			
Range, parameterizable	$f_2$	Hz	0 - 5 x Rated motor frequency (P-09), max. 500 Hz
Resolution		Hz	0.1
Rated Current	$I_e$	A	2.2 - 9.5
Overload current for 60 s every 600 s	$I_L$	%	150
Overload current for 3.75 s every 600 s	$I_L$	%	175
Switching frequency (double modulation)	$f_{PWM}$	kHz	max. 32
Operating mode			
V/Hz control (speed accuracy)			±20%, with slip compensation
Vector control (static speed accuracy)			±1% load range: 0 - 100%
Torque response time	$t_r$	ms	1 - 8
Torque linearity			±5% (10 - 90% of speed variable range, 20 - 100% of torque load range)
Response time (enable IGBT)	$t_r$	ms	< 10
DC-braking			
Time before start	$t$	s	0 - 25, in the event of a stop
Motor pick-up control function (for catching spinning motors)			all frame sizes



# 2.3

## Variable frequency drive DB1 up to 4 kW

### General rating data

	Symbol	Unit	Value
<b>Control section</b>			
Control voltage			
Output voltage (control signal terminal 1)	$U_c$	V DC	24
Load rating (control signal terminal 1)	$I_1$	mA	100
Reference voltage (control signal terminal 5)	$U_s$	V DC	10
Load rating (control signal terminal 5)	$I_s$	mA	10
Digital Input (DI)			
Qty.			2 - 4
Logic (level)			increase (NPN)
Time of reaction	$t_r$	ms	< 8
Input voltage range High (1)	$U_c$	V DC	8 - 30
Input voltage range Low (0)	$U_c$	V DC	0 - 4
Analog Input (AI)			
Qty.			0 - 2
Resolution			12 bits
Accuracy		%	< 1 to the final value
Time of reaction	$t_r$	ms	< 16
Input voltage range	$U_s$	V	0 - 10, DC ( $R_i > 100 \text{ k}\Omega$ )
Input current range	$I_s$	mA	0/4 - 20 ( $R_B \sim 500 \Omega$ )
Relay output (RO1)			
Qty.			1 relays
Relay contact			Make
Switching capacity			
AC	I	A	6 (250 V AC)
DC	I	A	5 (30 V AC)
Digital Output (DO)			
Qty.			0 - 1
Output voltage	$U_{out}$	V	+24
Load rating (control signal terminal 8)	$I_g$	mA	20 max.
Analog Output (AO)			
Qty.			0 - 1
Output voltage (control signal terminal 8)	$U_{out}$	V	0 - 10
Output current (control signal terminal 8)	$I_g$	mA	0 - 20, 4 - 20
Load rating (control signal terminal 8)	$I_g$	mA	20 max.
Resolution		Bit	10
Accuracy		%	< 1 to the final value
Interface (RJ45)			
			OP bus, Modbus RTU, CANopen, RS485
Response time (after valid command)	$t_r$	ms	< 8 (Modbus, CANopen) < 8 (OP bus: Master slave, 60 ms cycle)

Size	Symbol	Unit	3D2
<b>DB1-1D... device series</b>			
Rated operational current	$I_e$	A	3.2
Overload current for 60 s every 600 s	$I_L$	A	4.8
Overload current for 3.75 s every 600 s	$I_L$	A	5.6
Apparent power at rated operation 230 V	S	kVA	0.74
Apparent power at rated operation 240 V	S	kVA	0.77
Assigned motor power			
at 230 V, 50 Hz	P	kW	0.5
at (220 - 240) V, 60 Hz	P	HP	0.75
Power side (primary side):			
Number of phases			single-phase or two-phase
Device Voltage Rating	$U_{LN}$	V	110 (-10%) - 115 (+10%), 48 - 62 Hz 99 - 126 ±0%
Input current (phase current)	$I_{LN}$	A	11.4
Switching frequency (pulse frequency)			
Default settings	$f_{PWM}$	kHz	8
Setting range	$f_{PWM}$	kHz	4 - 32
Maximum leakage current to earth (PE), at $U_{LN}$ : 240 V, without motor			
ITouch			< 3.5
Heat dissipation (% nN / % MN)			
90 / 100 @ 4 kHz	PV	W	33
90 / 100 @ 8 kHz	PV	W	36
90 / 100 @ 12 kHz	PV	W	23
90 / 100 @ 16 kHz	PV	W	24
90 / 100 @ 24 kHz	PV	W	35
90 / 100 @ 32 kHz	PV	W	42
90 / 50 @ 8 kHz	PV	W	34
50 / 100 @ 8 kHz	PV	W	37
50 / 50 @ 8 kHz	PV	W	25
50 / 25 @ 8 kHz	PV	W	20
0 / 100 @ 8 kHz	PV	W	52
0 / 50 @ 8 kHz	PV	W	17
0 / 25 @ 8 kHz	PV	W	16
Standby, (device not enabled)	PV	W	5
Frame size	-	-	FS1B

**Note** N/A = no entry

# 2.3

## Variable frequency drive DB1 up to 4 kW

### Specific rated operational data

Size	Symbol	Unit	4D3
<b>DB1-1M... device series</b>			
Rated operational current	$I_e$	A	4.3
Overload current for 60 s every 600 s	$I_L$	A	6.5
Overload current for 3.75 s every 600 s	$I_l$	A	7.5
Apparent power at rated operation 230 V	S	kVA	0.99
Apparent power at rated operation 240 V	S	kVA	1
Assigned motor power			
at 230 V, 50 Hz	P	kW	0.75
at (220 - 240) V, 60 Hz	P	HP	1
Power side (primary side):			
Number of phases			single-phase or two-phase
Device Voltage Rating	$U_{LN}$	V	110 (-20%) - 230 (+10%), 48 - 62 Hz 88 - 253 ±0%
Input current (phase current)	$I_{LN}$	A	110 V: 10.92 230 V: 5.1
Switching frequency (pulse frequency)			
Default settings	$f_{PWM}$	kHz	8
Setting range	$f_{PWM}$	kHz	4 - 32
Maximum leakage current to earth (PE), at $U_{LN}$ : 240 V, without motor			
$I_{Touch}$		mA	< 3.5
Heat dissipation (% nN / % MN)			
90 / 100 @ 4 kHz	PV	W	N/A
90 / 100 @ 8 kHz	PV	W	N/A
90 / 100 @ 12 kHz	PV	W	N/A
90 / 100 @ 16 kHz	PV	W	N/A
90 / 100 @ 24 kHz	PV	W	N/A
90 / 100 @ 32 kHz	PV	W	N/A
90 / 50 @ 8 kHz	PV	W	N/A
50 / 100 @ 8 kHz	PV	W	N/A
50 / 50 @ 8 kHz	PV	W	N/A
50 / 25 @ 8 kHz	PV	W	N/A
0 / 100 @ 8 kHz	PV	W	N/A
0 / 50 @ 8 kHz	PV	W	N/A
0 / 25 @ 8 kHz	PV	W	N/A
Standby, (device not enabled)	PV	W	6.5
Frame size	-	-	FS1C

**Note** N/A = no entry

Size	Symbol	Unit	7D0
<b>DB1-12...-PFC device series</b>			
Rated operational current	$I_e$	A	7
Overload current for 60 s every 600 s	$I_L$	A	10.5
Overload current for 3.75 s every 600 s	$I_L$	A	12.25
Apparent power at rated operation 230 V	S	kVA	1.6
Apparent power at rated operation 240 V	S	kVA	1.7
Assigned motor power			
at 230 V, 50 Hz	P	kW	1.5
at (220 - 240) V, 60 Hz	P	HP	2
Power side (primary side):			
Number of phases			single-phase or two-phase
Device Voltage Rating	$U_{LN}$	V	200 (-10%) - 240 (+10%), 50/60 Hz 180 - 264 $\pm$ 0%, 48 - 62 Hz $\pm$ 0%
Input current (phase current)	$I_{LN}$	A	8.7
Switching frequency (pulse frequency)			
Default settings	$f_{PWM}$	kHz	8
Setting range	$f_{PWM}$	kHz	4 - 32
Maximum leakage current to earth (PE), at $U_{LN}$ : 240 V, without motor			
$I_{Touch}$		mA	< 3.5
Heat dissipation (% nN / % MN)			
90 / 100 @ 4 kHz	PV	W	N/A
90 / 100 @ 8 kHz	PV	W	105
90 / 100 @ 12 kHz	PV	W	N/A
90 / 100 @ 16 kHz	PV	W	N/A
90 / 100 @ 24 kHz	PV	W	N/A
90 / 100 @ 32 kHz	PV	W	N/A
90 / 50 @ 8 kHz	PV	W	63
50 / 100 @ 8 kHz	PV	W	80
50 / 50 @ 8 kHz	PV	W	52
50 / 25 @ 8 kHz	PV	W	33
0 / 100 @ 8 kHz	PV	W	N/A
0 / 50 @ 8 kHz	PV	W	41
0 / 25 @ 8 kHz	PV	W	33
Standby, (device not enabled)	PV	W	N/A
Frame size	-	-	FS1C

**Note** N/A = no entry

# 2.3

## Variable frequency drive DB1 up to 4 kW

### Specific rated operational data

Size	Symbol	Unit	2D3	4D3
<b>DB1-12... device series</b>				
Rated operational current	$I_e$	A	2.3	4.3
Overload current for 60 s every 600 s	$I_L$	A	3.45	6.45
Overload current for 3.75 s every 600 s	$I_l$	A	4.03	7.53
Apparent power at rated operation 230 V	S	kVA	0.53	0.99
Apparent power at rated operation 240 V	S	kVA	0.55	1.03
Assigned motor power				
at 230 V, 50 Hz	P	kW	0.37	0.75
at (220 - 240) V, 60 Hz	P	HP	0.5	1
Power side (primary side):				
Number of phases			single-phase or two-phase	
Device Voltage Rating	$U_{LN}$	V	200 (-10%) - 240 (+10%), 50/60 Hz 180 - 264 $\pm$ 0%, 48 - 62 Hz $\pm$ 0%	
Input current (phase current)	$I_{LN}$	A	4.5	9.1
Switching frequency (pulse frequency)				
Default settings	$f_{PWM}$	kHz	8	8
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32
Maximum leakage current to earth (PE), at $U_{LN}$ : 240 V, without motor	$I_{Touch}$	mA	< 3.5	< 3.5
Heat dissipation (% nN / % MN)				
90 / 100 @ 4 kHz	PV	W	N/A	57
90 / 100 @ 8 kHz	PV	W	34	60
90 / 100 @ 12 kHz	PV	W	N/A	47
90 / 100 @ 16 kHz	PV	W	N/A	59
90 / 100 @ 24 kHz	PV	W	N/A	59
90 / 100 @ 32 kHz	PV	W	N/A	60
90 / 50 @ 8 kHz	PV	W	29	32
50 / 100 @ 8 kHz	PV	W	28	41
50 / 50 @ 8 kHz	PV	W	25	23
50 / 25 @ 8 kHz	PV	W	23	18
0 / 100 @ 8 kHz	PV	W	23	27
0 / 50 @ 8 kHz	PV	W	22	18
0 / 25 @ 8 kHz	PV	W	21	13
Standby, (device not enabled)	PV	W	4.3	4.3
Frame size	-	-	FS1	FS1

**Note** N/A = no entry

Size	Symbol	Unit	2D3	4D3	7D0
<b>DB1-32... device series</b>					
Rated operational current	$I_e$	A	2.3	4.3	7
Overload current for 60 s every 600 s	$I_L$	A	3.45	6.45	10.5
Overload current for 3.75 s every 600 s	$I_L$	A	4	7.5	12.3
Apparent power at rated operation 230 V	S	kVA	0.53	0.99	1.6
Apparent power at rated operation 240 V	S	kVA	0.55	1	1.7
Assigned motor power					
at 230 V, 50 Hz	P	kW	0.37	0.75	1.5
at (220 - 240) V, 60 Hz	P	HP	0.5	1	2
Power side (primary side):					
Number of phases			single-phase or two-phase		
Device Voltage Rating	$U_{LN}$	V	200 (-10%) - 240 (+10%), 50/60 Hz 180 - 264 $\pm$ 0%, 48 - 62 Hz $\pm$ 0%		
Input current (phase current)	$I_{LN}$	A	2.2	4.4	9.6
Switching frequency (pulse frequency)					
Default settings	$f_{PWM}$	kHz	8	8	8
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32
Maximum leakage current to earth (PE), at $U_{LN}$ : 240 V, without motor					
$I_{Touch}$		mA	< 3.5	< 3.5	< 3.5
Heat dissipation (% nN/% MN)					
90 / 100 @ 4 kHz	PV	W	N/A	N/A	N/A
90 / 100 @ 8 kHz	PV	W	29	51	89
90 / 100 @ 12 kHz	PV	W	N/A	N/A	N/A
90 / 100 @ 16 kHz	PV	W	N/A	N/A	N/A
90 / 100 @ 24 kHz	PV	W	N/A	N/A	N/A
90 / 100 @ 32 kHz	PV	W	N/A	N/A	N/A
90 / 50 @ 8 kHz	PV	W	20	33	58
50 / 100 @ 8 kHz	PV	W	28	45	78
50 / 50 @ 8 kHz	PV	W	24	32	52
50 / 25 @ 8 kHz	PV	W	23	28	41
0 / 100 @ 8 kHz	PV	W	24	41	N/A
0 / 50 @ 8 kHz	PV	W	21	30	45
0 / 25 @ 8 kHz	PV	W	21	26	37
Standby, (device not enabled)	PV	W	4.2	4	4.9
Frame size	—	—	FS1	FS1	FS1B

**Note** N/A = no entry

# 2.3

## Variable frequency drive DB1 up to 4 kW

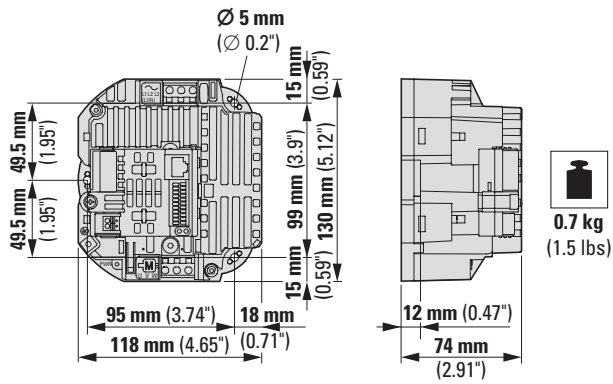
### Specific rated operational data

Size	Symbol	Unit	2D2	4D1	5D8	9D5
<b>DB1-34... device series</b>						
Rated operational current	$I_e$	A	2.2	4.1	5.8	9.5
Overload current for 60 s every 600 s	$I_L$	A	3.3	6.15	8.7	14.25
Overload current for 3.75 s every 600 s	$I_L$	A	3.85	7.18	10.15	16.63
Apparent power at rated operation 400 V	S	kVA	0.88	1.64	2.32	3.8
Apparent power at rated operation 480 V	S	kVA	1.06	1.97	2.78	4.56
Assigned motor power						
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4
at 480 V, 60 Hz	P	HP	1	2	3	8
Power side (primary side):						
Number of phases			3	3	3	3
Device Voltage Rating	$U_{LN}$	V	380 (-10%) - 480 (+10%), 50/60 Hz 342 - 528 $\pm$ 0%, (48 - 62) Hz $\pm$ 0%			
Input current (phase current)	$I_{LN}$	A	2.3	5.6	7.5	10.7
Switching frequency (pulse frequency)						
Default settings	$f_{PWM}$	kHz	8	8	8	8
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32	4 - 32
Maximum leakage current (contact current) to earth (PE), at $U_{LN}$ : 400 V, without motor	$I_{Touch}$	mA	< 3.5	< 3.5	< 3.5	< 3.5
Heat dissipation (% nN/% MN)						
90 / 100 @ 4 kHz	PV	W	N/A	46	75	128
90 / 100 @ 8 kHz	PV	W	N/A	53	82	148
90 / 100 @ 12 kHz	PV	W	N/A	63	99	169
90 / 100 @ 16 kHz	PV	W	N/A	59	115	191
90 / 100 @ 24 kHz	PV	W	N/A	69	143	244
90 / 100 @ 32 kHz	PV	W	N/A	80	–	–
90 / 50 @ 8 kHz	PV	W	N/A	36	62	94
50 / 100 @ 8 kHz	PV	W	N/A	50	72	126
50 / 50 @ 8 kHz	PV	W	N/A	35	55	84
50 / 25 @ 8 kHz	PV	W	N/A	29	45	67
0 / 100 @ 8 kHz	PV	W	N/A		62	108
0 / 50 @ 8 kHz	PV	W	N/A	30	54	75
0 / 25 @ 8 kHz	PV	W	N/A	27	40	61
Standby, (device not enabled)	PV	W	4.6	4.6	7.4	7.4
Frame size			FS1	FS1	FS2	FS2

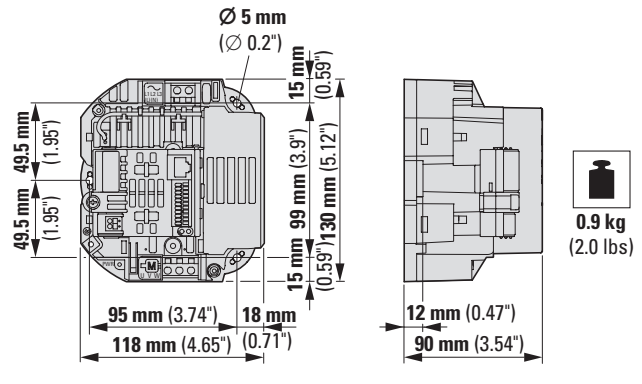
**Note** N/A = no entry

### Dimensions and weights

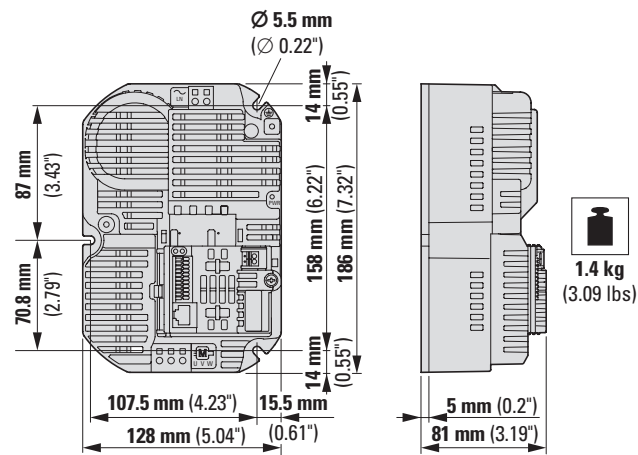
**FS1**



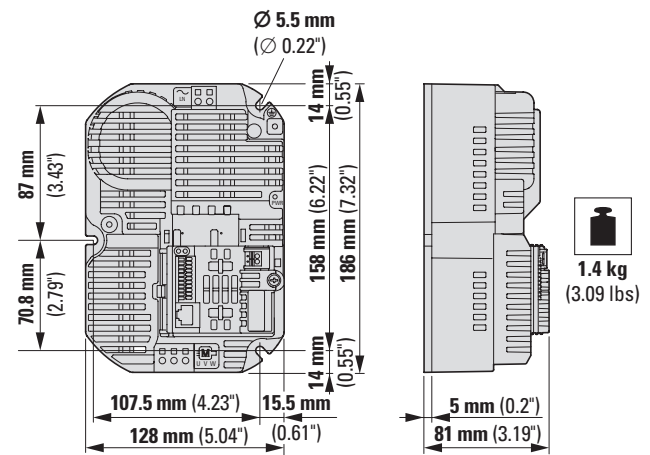
**FS1B**



**FS1C**



**FS2**







# PowerXL variable frequency drives DA1 Advanced Machinery Drive

The PowerXL DA1 variable frequency drive, designed for the machine and system building industry, is characterized by its enormous flexibility in terms of communications protocols, a function block editor (PLC) that makes it possible to configure the drive as necessary for specific applications, and a powerful vector control mode for highly dynamic applications.

## Performance range:

- 0.75 - 2.2 kW ( $U_e$ : 1~ 230 V,  $U_2$ : 3~ 230 V)
- 0.75 - 75 kW ( $U_e$ : 3~ 230 V,  $U_2$ : 3~ 230 V)
- 0.75 - 160 kW ( $U_e$ : 3~ 400 V,  $U_2$ : 3~ 400 V)
- 0.75 - 110 kW ( $U_e$ : 3~ 575 V,  $U_2$ : 3~ 575 V)

## Applications:

- Winding machines
- Respooler machines
- Coating systems
- Compressors
- Mills, roller mills, shredders
- Extruders
- Cranes and lifting systems
- Marine
- Distributed applications (IP66)

## Features:

- Large overload capability: 150% for 60 seconds, 200% for 4 seconds.
- Integrated Modbus RTU and CANopen
- Ambient air temperature up to 50°C without derating
- Integrated EMC filter
- Integrated Brake Transistor
- Degrees of protection IP20 and IP66
- Various I/O expansions
- V/F control, vector SL and CL, PM motor, BLDC motor, SynRel motor
- Optional field bus connections
- Integrated function block editor, optional
- Safe Torque Off (STO, SIL 2/PI d)
- Optional high-resolution OLED display
- International standards (CE, UL, cUL, RCM, RoHS, EAC, UkrSEPRO, DNV (754–757))

## Accessory:

- Communication modules (PROFIBUS, PROFINET, Ethernet/IP, EtherCAT, SmartWire-DT, DeviceNet...)
- I/O expansions
- Encoder module
- External keypad
- Mains chokes
- Motor chokes
- Sine filter
- Braking resistances
- External EMC filter
- Parameter storage unit and Bluetooth communication stick
- drivesConnect parameter configuration software
- drivesConnect mobile App (iOS, Android)

For more information, visit:  
[www.Eaton.com/DA1](http://www.Eaton.com/DA1)



## 2.4 Variable frequency drive DA1 to 160 kW

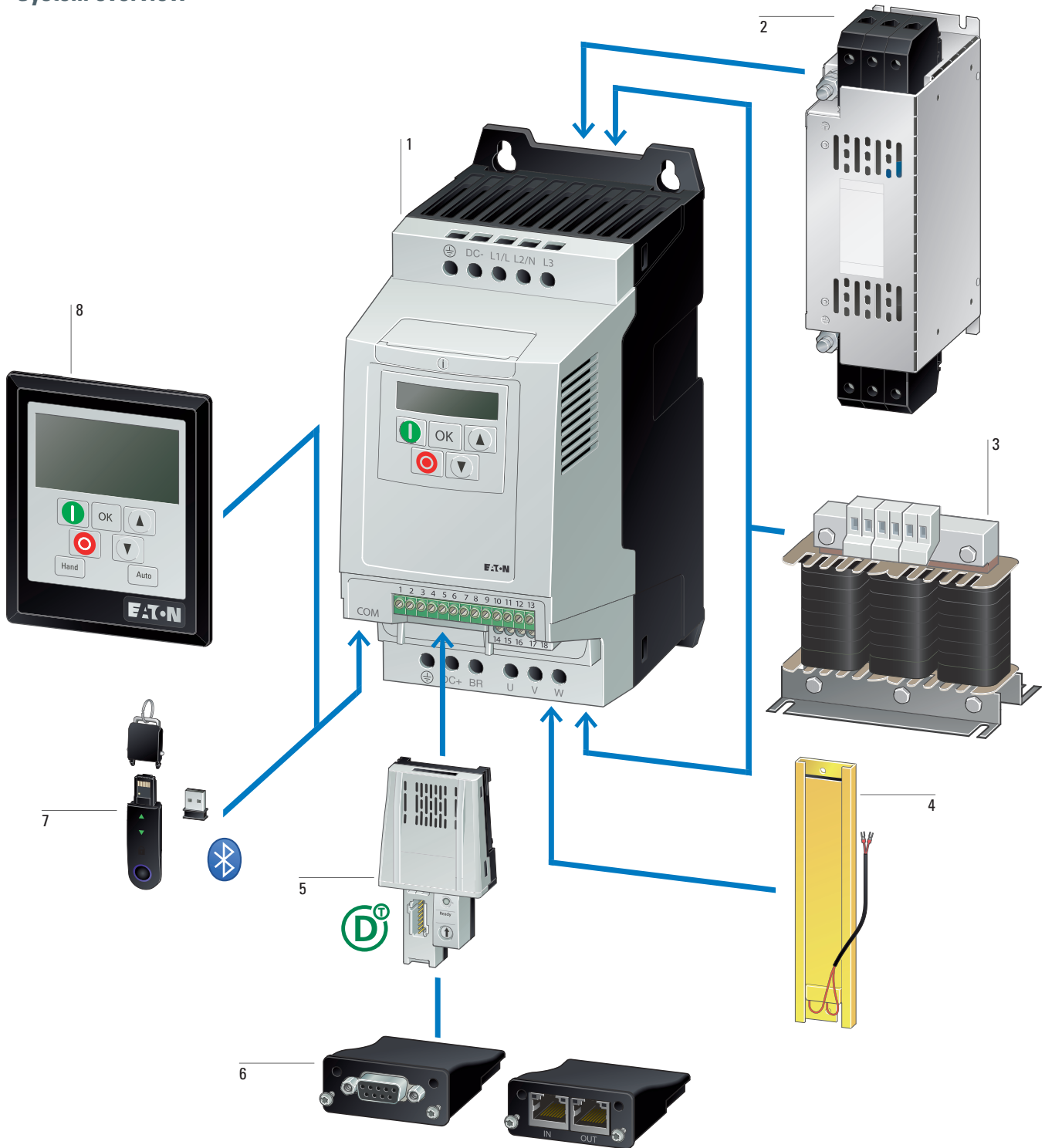
<b>System overview</b> .....	<b>128</b>
<b>Key to type references</b> .....	<b>129</b>
<b>Sizes and degree of protection</b> .....	<b>130</b>
<b>Ordering</b> .....	<b>131</b>
DA1 for three-phase motors 230 V, IP20/IP55 .....	<b>131</b>
DA1 for three-phase motors 400 V, IP20/IP55 .....	<b>132</b>
DA1 for three-phase motors 500 V, IP20/IP55 .....	<b>133</b>
DA1 for three-phase motors 230 V, IP66 .....	<b>134</b>
DA1 for three-phase motors 400 V/500 V, IP66 .....	<b>135</b>
Accessories .....	<b>137</b>
<b>Engineering</b> .....	<b>139</b>
Block diagram .....	<b>139</b>
Assigned switching and protective elements .....	<b>142</b>
<b>Technical data</b> .....	<b>146</b>
General rated operational data .....	<b>146</b>
Specific rated operational data .....	<b>149</b>
<b>Dimensions and weights</b> .....	<b>154</b>

# 2.4

## Variable frequency drive DA1 to 160 kW

### System overview

#### System overview



**DA1 variable frequency drives** 1  
→ Page 131

**Radio interference suppression filter** 2  
→ Page 217

**Mains choke, motor choke, sine filter** 3  
→ Page 215  
→ Page 219  
→ Page 220

**Braking resistance** 4  
→ Page 222

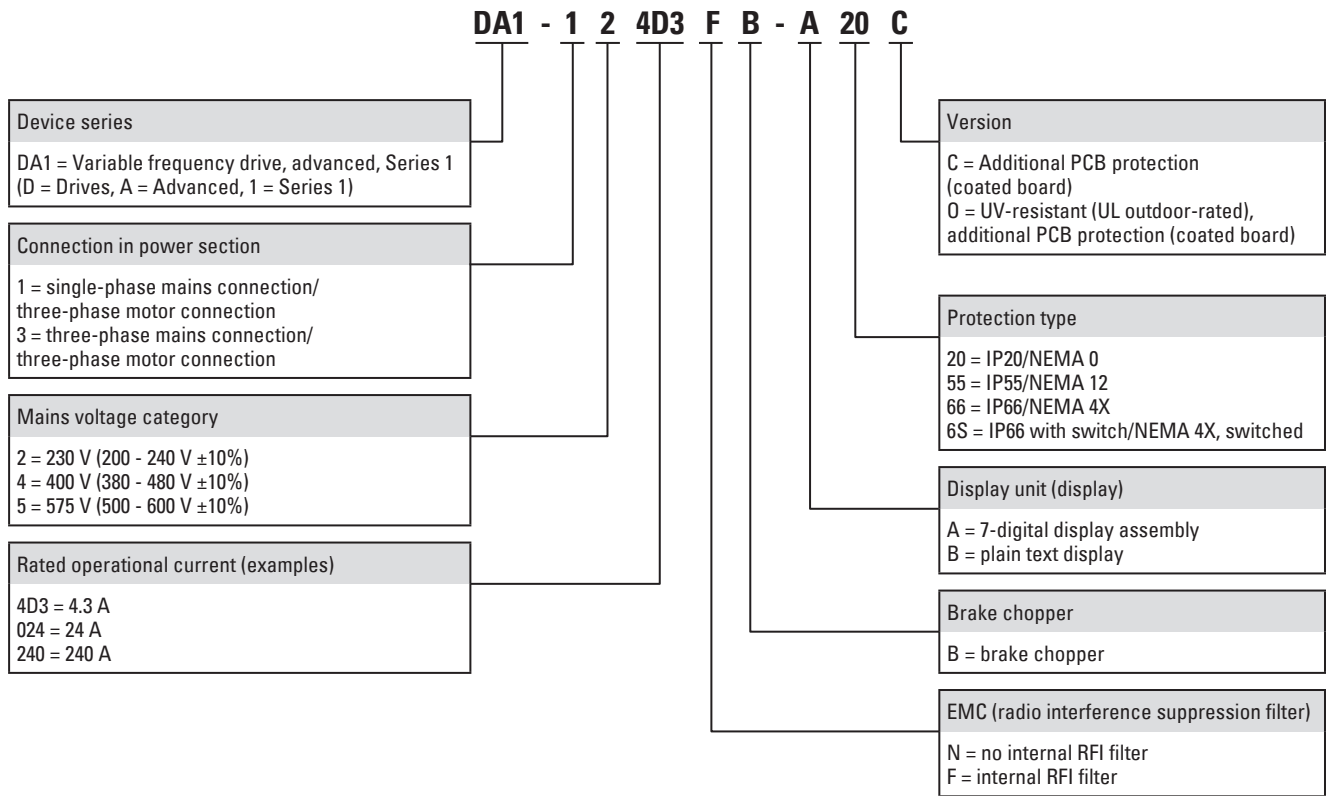
**SmartWire-DT module** 5  
→ Page 137

**Communication modules, expansion modules** 6  
→ Page 137

**Memory and Bluetooth communication stick** 7  
→ Page 137

**External keypad** 8  
→ Page 137

## Key to type references


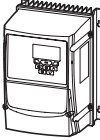
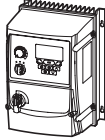

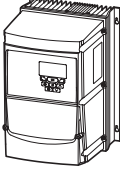
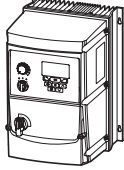


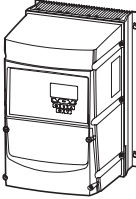
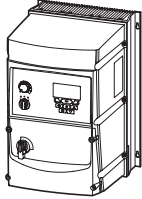
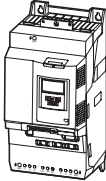

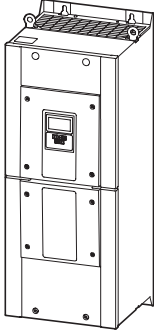



# 2.4

## Variable frequency drive DA1 to 160 kW

Sizes and degree of protection

### Sizes and degree of protection

Frame size	Protection type			
	IP20/NEMA 0	IP55/NEMA 12	IP66/NEMA 4X	IP66/NEMA 4X Local controls
FS2				
FS3				
FS4				
FS5				
FS6				
FS7				

### Ordering

Rated operational current <sup>1)4)</sup> I <sub>b</sub> A	Assigned motor output <sup>1)2)3)</sup>		Configuration							Frame size	Protection type	Catalog Number Article no.	Std. pack
	P kW	P HP	Radio interference suppression filter	Brake chopper	DC link choke	7-segment display	Plain text display	Safe Torque Off	Local controls				
<b>PowerXL variable frequency drives DA1</b>													
U <sub>1</sub> 230 V AC, single-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V													
4.3	0.75	1	✓	✓	–	✓	–	✓	–	FS2	IP20/NEMA 0	<b>DA1-124D3FB-A20C</b> 169078	1 unit
7	1.5	2	✓	✓	–	✓	–	✓	–			<b>DA1-127D0FB-A20C</b> 169081	
10.5	2.2	3	✓	✓	–	✓	–	✓	–			<b>DA1-12011FB-A20C</b> 169084	
U <sub>1</sub> 230 V AC, three-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V													
4.3	0.75	1	✓	✓	–	✓	–	✓	–	FS2	IP20/NEMA 0	<b>DA1-324D3FB-A20C</b> 169087	1 unit
7	1.5	2	✓	✓	–	✓	–	✓	–			<b>DA1-327D0FB-A20C</b> 169090	
10.5	2.2	3	✓	✓	–	✓	–	✓	–			<b>DA1-32011FB-A20C</b> 169093	
18	4	5	✓	✓	–	✓	–	✓	–	FS3		<b>DA1-32018FB-A20C</b> 169096	
24	5.5	7.5	✓	✓	–	✓	–	✓	–			<b>DA1-32024FB-A20C</b> 169099	
30	7.5	10	✓	✓	–	–	✓	✓	–	FS4		<b>DA1-32030FB-B20C</b> 197488	
46	11	15	✓	✓	–	–	✓	✓	–			<b>DA1-32046FB-B20C</b> 197489	
61	15	20	✓	✓	✓	–	✓	✓	–	FS5		<b>DA1-32061FB-B20C</b> 197490	
72	18.5	25	✓	✓	✓	–	✓	✓	–			<b>DA1-32072FB-B20C</b> 197491	
24 <sup>5)</sup>	5.5	7.5	✓	✓	–	–	✓	✓	–	FS4	IP55/NEMA 12	<b>DA1-32024FB-B55C</b> 169361	
30	7.5	10	✓	✓	–	–	✓	✓	–			<b>DA1-32030FB-B55C</b> 169362	
46	11	15	✓	✓	–	–	✓	✓	–			<b>DA1-32046FB-B55C</b> 169363	
61	15	20	✓	✓	✓	–	✓	✓	–	FS5		<b>DA1-32061FB-B55C</b> 169364	
72	18.5	25	✓	✓	✓	–	✓	✓	–			<b>DA1-32072FB-B55C</b> 169365	
90 <sup>5)</sup>	22	30	✓	✓	✓	–	✓	✓	–	FS6		<b>DA1-32090FB-B55C</b> 169367	
110 <sup>5)</sup>	30	40	✓	✓	✓	–	✓	✓	–			<b>DA1-32110FB-B55C</b> 169369	
150 <sup>5)</sup>	45	50	✓	✓	✓	–	✓	✓	–			<b>DA1-32150FB-B55C</b> 169371	
180 <sup>5)</sup>	55	60	✓	✓	✓	–	✓	✓	–			<b>DA1-32180FB-B55C</b> 169373	
202 <sup>5)</sup>	55	75	✓	✓	✓	–	✓	✓	–	FS7		<b>DA1-32202FB-B55C</b> 169375	
248 <sup>5)</sup>	75	100	✓	✓	✓	–	✓	✓	–			<b>DA1-32248FB-B55C</b> 169377	

#### Notes

- <sup>1)</sup> Overload cycle for 60 s every 600 s
- <sup>2)</sup> At 230 V, 50 Hz/at 220 - 240 V, 60 Hz
- <sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>4)</sup> IP20/NEMA 0: Rated operational current at an operating frequency of 16 kHz and an ambient air temperature of +50°C  
IP55/NEMA 12: Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40°C
- <sup>5)</sup> IP20/NEMA 0: Rated operational current at an operating frequency of 8 kHz and an ambient air temperature of +50°C  
IP55/NEMA 12: Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C

# 2.4

## Variable frequency drive DA1 to 160 kW

DA1 for three-phase motors 400 V, IP20/IP55

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup>		Configuration							Frame size	Protection type	Catalog Number Article no.	Std. pack
	P kW	P HP	Radio interference suppression filter	Brake chopper	DC link choke	7-segment display	Plain text display	Safe Torque Off	Local controls				
<b>PowerXL variable frequency drives DA1</b>													
U <sub>2</sub> 400 V AC, three-phase / U <sub>2</sub> 400 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V													
2.2	0.75	1	✓	✓	-	✓	-	✓	-	FS2	IP20/NEMA 0	<b>DA1-342D2FB-A20C</b> 169117	1 unit
4.1	1.5	2	✓	✓	-	✓	-	✓	-			<b>DA1-344D1FB-A20C</b> 169120	
5.8	2.2	3	✓	✓	-	✓	-	✓	-			<b>DA1-345D8FB-A20C</b> 169051	
9.5	4	5	✓	✓	-	✓	-	✓	-			<b>DA1-349D5FB-A20C</b> 169054	
14	5.5	7.5	✓	✓	-	✓	-	✓	-	FS3		<b>DA1-34014FB-A20C</b> 169057	
18	7.5	10	✓	✓	-	✓	-	✓	-			<b>DA1-34018FB-A20C</b> 169060	
24	11	15	✓	✓	-	✓	-	✓	-			<b>DA1-34024FB-A20C</b> 169063	
30	15	20	✓	✓	-	-	✓	✓	-	FS4		<b>DA1-34030FB-B20C</b> 197493	
39	18.5	25	✓	✓	-	-	✓	✓	-			<b>DA1-34039FB-B20C</b> 197494	
46	22	30	✓	✓	-	-	✓	✓	-			<b>DA1-34046FB-B20C</b> 197495	
61	30	40	✓	✓	✓	-	✓	✓	-	FS5		<b>DA1-34061FB-B20C</b> 197496	
72	37	50	✓	✓	✓	-	✓	✓	-			<b>DA1-34072FB-B20C</b> 197497	
24	11	15	✓	✓	-	-	✓	✓	-	FS4	IP55/NEMA 12	<b>DA1-34024FB-B55C</b> 169390	
30	15	20	✓	✓	-	-	✓	✓	-			<b>DA1-34030FB-B55C</b> 169391	
39	18.5	25	✓	✓	-	-	✓	✓	-			<b>DA1-34039FB-B55C</b> 169392	
46	22	30	✓	✓	-	-	✓	✓	-			<b>DA1-34046FB-B55C</b> 169393	
61	30	40	✓	✓	✓	-	✓	✓	-	FS5		<b>DA1-34061FB-B55C</b> 169394	
72	37	50	✓	✓	✓	-	✓	✓	-			<b>DA1-34072FB-B55C</b> 169395	
90 <sup>5)</sup>	45	60	✓	✓	✓	-	✓	✓	-	FS6		<b>DA1-34090FB-B55C</b> 169397	
110 <sup>5)</sup>	55	75	✓	✓	✓	-	✓	✓	-			<b>DA1-34110FB-B55C</b> 169399	
150 <sup>5)</sup>	75	100	✓	✓	✓	-	✓	✓	-			<b>DA1-34150FB-B55C</b> 169401	
180 <sup>5)</sup>	90	125	✓	✓	✓	-	✓	✓	-			<b>DA1-34180FB-B55C</b> 169403	
202 <sup>5)</sup>	110	150	✓	✓	✓	-	✓	✓	-	FS7		<b>DA1-34202FB-B55C</b> 169405	
240 <sup>5)</sup>	132	200	✓	✓	✓	-	✓	✓	-			<b>DA1-34240FB-B55C</b> 169407	
302 <sup>5)</sup>	160	250	✓	✓	✓	-	✓	✓	-			<b>DA1-34302FB-B55C</b> 169217	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s
- <sup>2)</sup> At 400 V, 50 Hz/at 440 - 480 V, 60 Hz
- <sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>4)</sup> IP20/NEMA 0: Rated operational current at an operating frequency of 8 kHz and an ambient air temperature of +50°C  
IP55/NEMA 12: Rated operational current at an operating frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>5)</sup> IP20/NEMA 0: Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C  
IP55/NEMA 12: Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +40°C

# Variable frequency drive DA1 to 160 kW

# 2.4

DA1 for three-phase motors 500 V, IP20/IP55

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup>		Configuration							Frame size	Protection type	Catalog Number Article no.	Std. pack
	P kW	P HP	Radio interference suppression filter	Brake chopper	DC link choke	7-segment display	Plain text display	Safe Torque Off	Local controls				
<b>PowerXL variable frequency drives DA1</b>													
U <sub>2</sub> 500 V AC, three-phase / U <sub>2</sub> 500 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 500 (-10%) - 600 (+10%) V													
2.1	0.75	1	-	✓	-	✓	-	✓	-	FS2	IP20/NEMA 0	<b>DA1-352D1NB-A20C</b> 177034	1 unit
3.1	1.5	2	-	✓	-	✓	-	✓	-			<b>DA1-353D1NB-A20C</b> 177035	
4.1	2.2	3	-	✓	-	✓	-	✓	-			<b>DA1-354D1NB-A20C</b> 177036	
6.5	4	5	-	✓	-	✓	-	✓	-			<b>DA1-356D5NB-A20C</b> 177037	
9	5.5	7.5	-	✓	-	✓	-	✓	-			<b>DA1-359D0NB-A20C</b> 177038	
12	7.5	10	-	✓	-	✓	-	✓	-	FS3		<b>DA1-35012NB-A20C</b> 177039	
17	11	15	-	✓	-	✓	-	✓	-			<b>DA1-35017NB-A20C</b> 177040	
22	15	20	-	✓	-	✓	-	✓	-			<b>DA1-35022NB-A20C</b> 177041	
28	18.5	25	-	✓	-	-	✓	✓	-	FS4		<b>DA1-35028NB-B20C</b> 197499	
34	22	30	-	✓	-	-	✓	✓	-			<b>DA1-35034NB-B20C</b> 197500	
43	30	40	-	✓	-	-	✓	✓	-			<b>DA1-35043NB-B20C</b> 197501	
54	37	50	-	✓	✓	-	✓	✓	-	FS5		<b>DA1-35054NB-B20C</b> 197502	
65	45	60	-	✓	✓	-	✓	✓	-			<b>DA1-35065NB-B20C</b> 197503	
22	15	20	-	✓	-	-	✓	✓	-	FS4	IP55/NEMA 12	<b>DA1-35022NB-B55C</b> 176965	
28	18.5	25	-	✓	-	-	✓	✓	-			<b>DA1-35028NB-B55C</b> 176966	
34	22	30	-	✓	-	-	✓	✓	-			<b>DA1-35034NB-B55C</b> 176967	
43	30	40	-	✓	✓	-	✓	✓	-	FS5		<b>DA1-35043NB-B55C</b> 176968	
54	37	50	-	✓	✓	-	✓	✓	-			<b>DA1-35054NB-B55C</b> 176969	
65	45	60	-	✓	✓	-	✓	✓	-			<b>DA1-35065NB-B55C</b> 176970	
78 <sup>5)</sup>	55	75	-	✓	✓	-	✓	✓	-	FS6		<b>DA1-35078NB-B55C</b> 176971	
105 <sup>5)</sup>	75	100	-	✓	✓	-	✓	✓	-			<b>DA1-35105NB-B55C</b> 176972	
130 <sup>5)</sup>	90	125	-	✓	✓	-	✓	✓	-			<b>DA1-35130NB-B55C</b> 176973	
150 <sup>5)</sup>	110	150	-	✓	✓	-	✓	✓	-			<b>DA1-35150NB-B55C</b> 176974	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s
- <sup>2)</sup> At 500 V, 50 Hz/at 550 - 600 V, 60 Hz
- <sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>4)</sup> IP20/NEMA 0: Rated operational current at an operating frequency of 8 kHz and an ambient air temperature of +50°C  
IP55/NEMA 12: Rated operational current at an operating frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>5)</sup> IP20/NEMA 0: Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C  
IP55/NEMA 12: Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +40°C



# 2.4

## Variable frequency drive DA1 to 160 kW

DA1 for three-phase motors 230 V, IP66

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup>		Configuration							Frame size	Protection type	Catalog Number Article no.	Std. pack
	P kW	P HP	Radio interference suppression filter	Brake chopper	DC link choke	7-segment display	Plain text display	Safe Torque Off	Local controls				
<b>PowerXL variable frequency drives DA1</b>													
U <sub>1</sub> 230 V AC, single-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V													
4.3	0.75	1	✓	✓	-	-	✓	✓	-	FS2	IP66/NEMA 4X	<b>DA1-124D3FB-B660</b> 400015	1 unit
4.3	0.75	1	✓	✓	-	-	✓	✓	✓			<b>DA1-124D3FB-B6S0</b> 400016	
7	1.5	2	✓	✓	-	-	✓	✓	-			<b>DA1-127D0FB-B660</b> 400017	
7	1.5	2	✓	✓	-	-	✓	✓	✓			<b>DA1-127D0FB-B6S0</b> 400018	
10.5	2.2	3	✓	✓	-	-	✓	✓	-			<b>DA1-12011FB-B660</b> 400019	
10.5	2.2	3	✓	✓	-	-	✓	✓	✓			<b>DA1-12011FB-B6S0</b> 400020	
U <sub>1</sub> 230 V AC, three-phase / U <sub>2</sub> 230 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 200 (-10%) - 240 (+10%) V													
4.3	0.75	1	✓	✓	-	-	✓	✓	-	FS2	IP66/NEMA 4X	<b>DA1-324D3FB-B660</b> 400021	1 unit
4.3	0.75	1	✓	✓	-	-	✓	✓	✓			<b>DA1-324D3FB-B6S0</b> 400022	
7	1.5	2	✓	✓	-	-	✓	✓	-			<b>DA1-327D0FB-B660</b> 400023	
7	1.5	2	✓	✓	-	-	✓	✓	✓			<b>DA1-327D0FB-B6S0</b> 400024	
10.5	2.2	3	✓	✓	-	-	✓	✓	-			<b>DA1-32011FB-B660</b> 400025	
19.5	2.2	3	✓	✓	-	-	✓	✓	✓			<b>DA1-32011FB-B6S0</b> 400026	
18	4	5	✓	✓	-	-	✓	✓	-	FS3		<b>DA1-32018FB-B660</b> 400027	
18	4	5	✓	✓	-	-	✓	✓	✓			<b>DA1-32018FB-B6S0</b> 400028	
24	5.5	7.5	✓	✓	-	-	✓	✓	-			<b>DA1-32024FB-B660</b> 400029	
24	5.5	7.5	✓	✓	-	-	✓	✓	✓			<b>DA1-32024FB-B6S0</b> 400030	
30	7.5	10	✓	✓	-	-	✓	✓	-	FS4		<b>DA1-32030FB-B660</b> 400031	
30	7.5	10	✓	✓	-	-	✓	✓	✓			<b>DA1-32030FB-B6S0</b> 400032	
46	11	15	✓	✓	-	-	✓	✓	-			<b>DA1-32046FB-B660</b> 400033	
46	11	15	✓	✓	-	-	✓	✓	✓			<b>DA1-32046FB-B6S0</b> 400034	

**Notes**

<sup>1)</sup> Overload cycle for 60 s every 600 s

<sup>2)</sup> At 230 V, 50 Hz/at 220 - 240 V, 60 Hz

<sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>4)</sup> Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40°C

# Variable frequency drive DA1 to 160 kW

# 2.4

DA1 for three-phase motors 400 V/500 V, IP66

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup>		Configuration							Frame size	Protection type	Catalog Number Article no.	Std. pack
	P kW	P HP	Radio interference suppression filter	Brake chopper	DC link choke	7-segment display	Plain text display	Safe Torque Off	Local controls				
<b>PowerXL variable frequency drives DA1</b>													
U <sub>2</sub> 400 V AC, three-phase / U <sub>2</sub> 400 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V													
2.2	0.75	1	✓	✓	-	-	✓	✓	-	FS2	IP66/NEMA 4X	<b>DA1-342D2FB-B660</b> 400035	1 unit
2.2	0.75	1	✓	✓	-	-	✓	✓	✓			<b>DA1-342D2FB-B6S0</b> 400036	
4.1	1.5	2	✓	✓	-	-	✓	✓	-			<b>DA1-344D1FB-B660</b> 400037	
4.1	1.5	2	✓	✓	-	-	✓	✓	✓			<b>DA1-344D1FB-B6S0</b> 400038	
5.8	2.2	3	✓	✓	-	-	✓	✓	-			<b>DA1-345D8FB-B660</b> 400039	
5.8	2.2	3	✓	✓	-	-	✓	✓	✓			<b>DA1-345D8FB-B6S0</b> 400040	
9.5	4	5	✓	✓	-	-	✓	✓	-			<b>DA1-349D5FB-B660</b> 400041	
9.5	4	5	✓	✓	-	-	✓	✓	✓			<b>DA1-349D5FB-B6S0</b> 400042	
14	5.5	7.5	✓	✓	-	-	✓	✓	-	FS3		<b>DA1-34014FB-B660</b> 400043	
14	5.5	7.5	✓	✓	-	-	✓	✓	✓			<b>DA1-34014FB-B6S0</b> 400044	
18	7.5	10	✓	✓	-	-	✓	✓	-			<b>DA1-34018FB-B660</b> 400045	
18	7.5	10	✓	✓	-	-	✓	✓	✓			<b>DA1-34018FB-B6S0</b> 400046	
24	11	15	✓	✓	-	-	✓	✓	-			<b>DA1-34024FB-B660</b> 400047	
24	11	15	✓	✓	-	-	✓	✓	✓			<b>DA1-34024FB-B6S0</b> 400048	
30	15	20	✓	✓	-	-	✓	✓	-	FS4		<b>DA1-34030FB-B660</b> 400049	
30	15	20	✓	✓	-	-	✓	✓	✓			<b>DA1-34030FB-B6S0</b> 400050	
39	18.5	25	✓	✓	-	-	✓	✓	-			<b>DA1-34039FB-B660</b> 400051	
39	18.5	25	✓	✓	-	-	✓	✓	✓			<b>DA1-34039FB-B6S0</b> 400052	
46	22	30	✓	✓	-	-	✓	✓	-			<b>DA1-34046FB-B660</b> 400053	
46	22	30	✓	✓	-	-	✓	✓	✓			<b>DA1-34046FB-B6S0</b> 400054	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s
- <sup>2)</sup> DA1-34... : at 400 V, 50 Hz/at 440 - 480 V, 60 Hz  
DA1-35... : at 500 V, 50 Hz/bei 550 - 600 V, 60 Hz
- <sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>4)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C

DA1

# 2.4


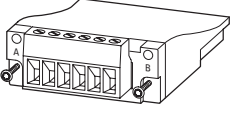
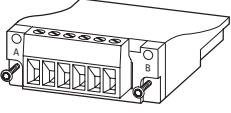
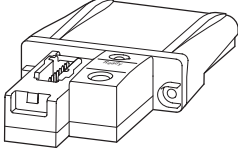
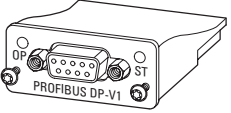
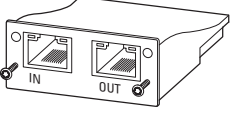
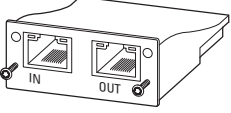
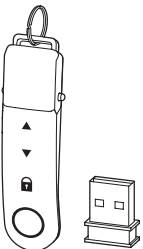
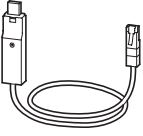
## Variable frequency drive DA1 to 160 kW

DA1 for three-phase motors 400 V/500 V, IP66

Rated operational current <sup>1)4)</sup> I <sub>e</sub> A	Assigned motor output <sup>1)2)3)</sup>		Configuration							Frame size	Protection type	Catalog Number Article no.	Std. pack
	P kW	P HP	Radio interference suppression filter	Brake chopper	DC link choke	7-segment display	Plain text display	Safe Torque Off	Local controls				
<b>PowerXL variable frequency drives DA1</b>													
U <sub>1</sub> 500 V AC, three-phase / U <sub>2</sub> 500 V AC, three-phase Mains voltage (50/60Hz) U <sub>LN</sub> 500 (-10%) - 600 (+10%) V													
2.1	0.75	1	-	✓	-	-	✓	✓	-	FS2	IP66/NEMA 4X	<b>DA1-352D1NB-B660</b> 400055	1 unit
2.1	0.75	1	-	✓	-	-	✓	✓	✓			<b>DA1-352D1NB-B6SO</b> 400056	
3.1	1.5	2	-	✓	-	-	✓	✓	-			<b>DA1-353D1NB-B660</b> 400057	
3.1	1.5	2	-	✓	-	-	✓	✓	✓			<b>DA1-353D1NB-B6SO</b> 400058	
4.1	2.2	3	-	✓	-	-	✓	✓	-			<b>DA1-354D1NB-B660</b> 400059	
4.1	2.2	3	-	✓	-	-	✓	✓	✓			<b>DA1-354D1NB-B6SO</b> 400060	
6.5	4	5	-	✓	-	-	✓	✓	-			<b>DA1-356D5NB-B660</b> 400061	
6.5	4	5	-	✓	-	-	✓	✓	✓			<b>DA1-356D5NB-B6SO</b> 400062	
9	5.5	7.5	-	✓	-	-	✓	✓	-			<b>DA1-359D0NB-B660</b> 400063	
9	5.5	7.5	-	✓	-	-	✓	✓	✓			<b>DA1-359D0NB-B6SO</b> 400064	
12	7.5	10	-	✓	-	-	✓	✓	-	FS3		<b>DA1-35012NB-B660</b> 400065	
12	7.5	10	-	✓	-	-	✓	✓	✓			<b>DA1-35012NB-B6SO</b> 400066	
17	11	15	-	✓	-	-	✓	✓	-			<b>DA1-35017NB-B660</b> 400067	
17	11	15	-	✓	-	-	✓	✓	✓			<b>DA1-35017NB-B6SO</b> 400068	
22	15	20	-	✓	-	-	✓	✓	-			<b>DA1-35022NB-B660</b> 400069	
22	15	20	-	✓	-	-	✓	✓	✓			<b>DA1-35022NB-B6SO</b> 400070	
28	18.5	25	-	✓	-	-	✓	✓	-	FS4		<b>DA1-35028NB-B660</b> 400071	
28	18.5	25	-	✓	-	-	✓	✓	✓			<b>DA1-35028NB-B6SO</b> 400072	
34	22	30	-	✓	-	-	✓	✓	-			<b>DA1-35034NB-B660</b> 400073	
34	22	30	-	✓	-	-	✓	✓	✓			<b>DA1-35034NB-B6SO</b> 400074	
43	22	30	-	✓	-	-	✓	✓	-			<b>DA1-35043NB-B660</b> 400075	
43	22	30	-	✓	-	-	✓	✓	✓			<b>DA1-35043NB-B6SO</b> 400076	

**Notes**

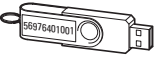
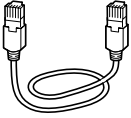

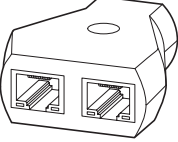
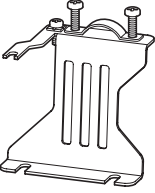
- <sup>1)</sup> Overload cycle for 60 s every 600 s
- <sup>2)</sup> DA1-34... : at 400 V, 50 Hz/at 440 - 480 V, 60 Hz  
DA1-35... : at 500 V, 50 Hz/bei 550 - 600 V, 60 Hz
- <sup>3)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>4)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C

	Description	Length m	For use with	Catalog Number Article no.	Std. pack
	<b>External operating units</b>				
	With 7-digital display assembly Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	3	DE1, DE11, DC1, DB1, DA1	<b>DX-KEY-LED2</b> 186946	1 unit
	With multi-language plain text display (OLED) Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	3	DC1, DB1, DA1, RAM05, RASP5	<b>DX-KEY-OLED</b> 169133	
	<b>Expansion modules</b>				
	Output expansion Plug-in module with plug-in terminal block, 5 pole 3 relay outputs (N/O, 250 V AC, max. 6 A/ 30 V DC, max. 5 A)	–	DA1	<b>DXA-EXT-3RO</b> 169121	1 unit
	I/O expansion Plug-in module with plug-in terminal block, 6 pole 3 digital inputs (+24 V) 1 relay output (N/O, 250 V AC, max. 6 A/ 30 V DC, max. 5 A)	–	DA1	<b>DXA-EXT-3DI1RO</b> 169036	
	Encoder module Plug-in module with plug-in terminal block, 5 pole 2-channel max. 500 kHz 5 V TTL, A & B, /A & /B, 5 V DC, max. 200 mA 24 V HTL, A & B, /A & /B, 24 V DC, external power supply required, max. 30 V DC	–	DA1	<b>DXA-EXT-ENCOD</b> 169035	
	<b>Communication modules</b>				
	SmartWire-DT Plug-in module with slot for SWD4-8SF2-5 external device plug	–	DA1 (IP20, IP55)	<b>DX-NET-SWD1</b> 169129	1 unit
	PROFIBUS SUB-D socket, 9-pole Plug-in module	–	DA1	<b>DX-NET-PROFIBUS</b> 169124	1 unit
	PROFINET 2 x RJ45, 8 pole Plug-in module	–	DA1	<b>DX-NET-PROFINET-2</b> 169125	
	Modbus TCP 2 x RJ45, 8 pole Plug-in module	–	DA1	<b>DX-NET-MOVBUSTCP-2</b> 169126	
	EtherNet/IP 2 x RJ45, 8 pole Plug-in module	–	DA1	<b>DX-NET-ETHERNET-2</b> 169122	
	EtherCAT 2 x RJ45, 8 pole Plug-in module	–	DA1	<b>DX-NET-ETHERCAT-2</b> 169127	
	BACnet/IP 2 x RJ45, 8 pole Plug-in module	–	DA1	<b>DX-NET-BACNETIP-2</b> 169128	
	<b>Parameter assignment</b>				
	Parameter storage unit and Bluetooth communication stick For storage, copying parameters, and/or transferring parameters to a PC or smartphone (iOS or Android) via Bluetooth with the drivesConnect software or the drivesConnect mobile app respectively With 2 function keys for uploading and downloading parameters with configuration memory	–	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-COM-STICK3-KIT</b> 197586	1 unit
	<b>Programming cable</b>				
	Interface converter USB/RS485 with connection cable, RJ45 8 pole For storage, copying parameters, and/or transferring parameters to a PC with the drivesConnect software, electrically isolated	3	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-CBL-PC-3M0</b> 744-A3036-00P	1 unit

# 2.4

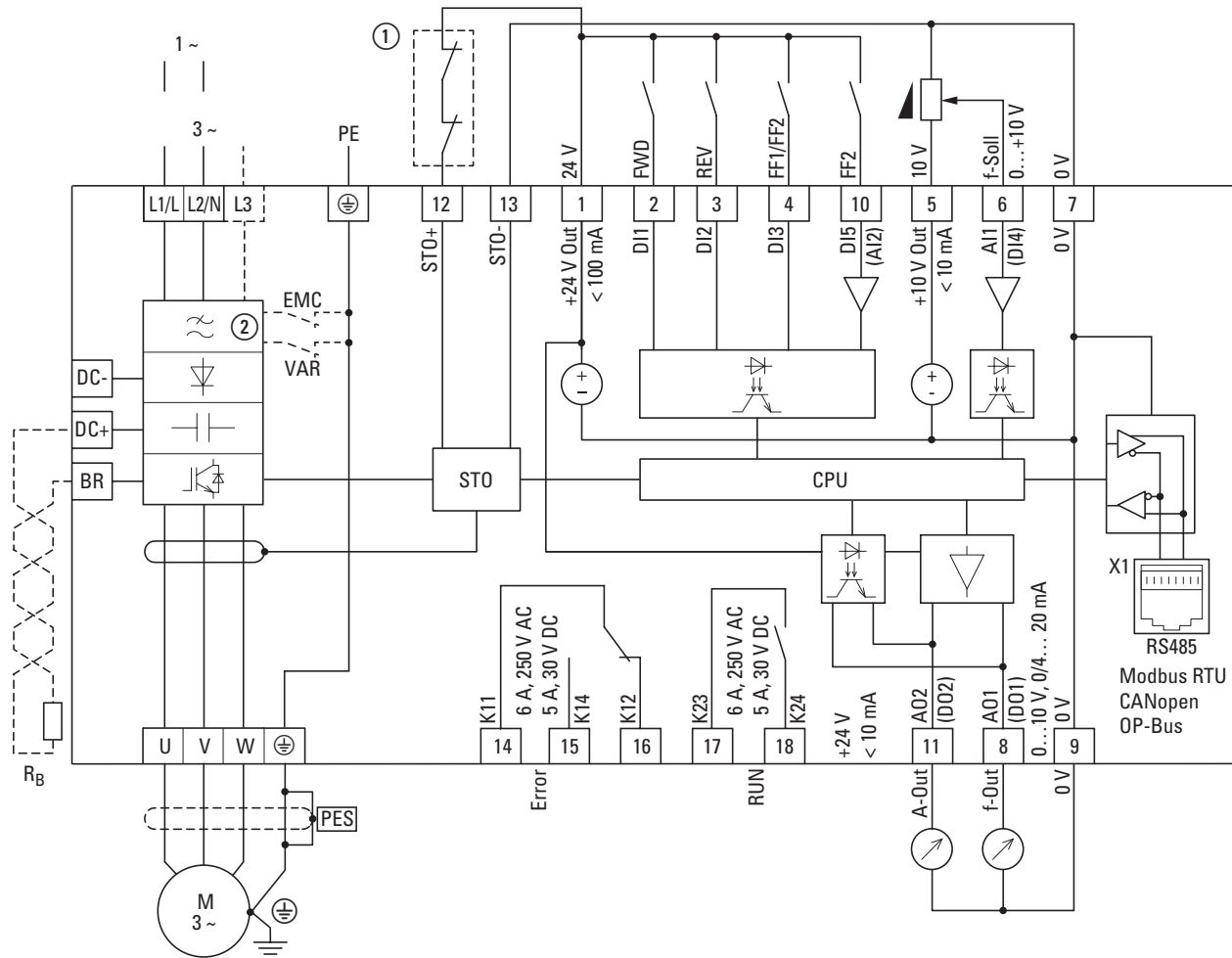
## Variable frequency drive DA1 to 160 kW

### Accessories

Description	Length m	For use with	Catalog Number Article no.	Std. pack	
<b>License Keys</b>					
 <p>to activate the function block editor in the PC software USB flash drive</p>	–	DA1	<b>DX-COM-SOFT</b> 169136	1 unit	
<b>Connection cable</b>					
 <p>Patch cord with RJ45 plugs, 8 pole</p>	0.5	DE1, DE11, DC1, DB1, DA1	<b>DX-CBL-RJ45-0M5</b> 169137	1 unit	
	1		<b>DX-CBL-RJ45-1M0</b> 169138		
	3		<b>DX-CBL-RJ45-3M0</b> 169139		
<b>Bus terminating resistor</b>					
 <p>RJ45 8 pole Connection to CANopen® (pin 1/2, 124 Ω) or to Modbus RTU (pin 7/8, 120 Ω)</p>	–	DX-SPL-RJ45-2SL-1PL	<b>EASY-NT-R</b> 256281	2 unit	
<b>Splitter</b>					
 <p>RJ45, 8-pin, 3 sockets</p> <p>RJ45, 8-pin, 2 sockets/1 plug</p>	–	DX-CBL-RJ45...	<b>DX-SPL-RJ45-3SL</b> 169141	1 unit	
	–	DE1, DE11, DC1, DB1, DA1	<b>DX-SPL-RJ45-2SL1PL</b> 169142		
<b>Mounting accessories</b>					
 <p>Mounting adapter with gland plates</p> <p>For installing the connection cables on the mains side</p>	Size FS2	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-2N</b> 172927	1 unit
	Size FS3	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-3N</b> 172929	
	Size FS2	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-2M</b> 172928	
	Size FS3	–	DC1 (IP20), DA1 (IP20)	<b>DX-EMC-MNT-3M</b> 172930	

### Engineering

#### DA1-...-A20C



- ① Relais: Safe Torque Off (STO), SIL 2 (EN 61800-5-2).
- ② The RFI filter is not included in the DA1-35-...-B6XC device.

- The STO connection must be made by the user.
- The VAR screw cannot be disabled in devices with a size of FS4 or FS5.

Catalog Number	Mains		Motor	
	Voltage $U_{LN}$	Frequency $f_{LN}$	Voltage $U_2$	Frequency $f_2$
DA1-12-...-A20C	1~ 200 V (-10%) - 240 V (+10%)	50/60 Hz	3~ 230 V	0-500Hz
DA1-32-...-A20C	3~ 200 V (-10%) - 240 V (+10%)	50/60 Hz	3~ 230 V	0-500Hz
DA1-34-...-A20C	3~ 380 V (-10%) - 480 V (+10%)	50/60 Hz	3~ 400 V/460 V	0-500Hz
DA1-35-...-A20C	3~ 500 V (-10%) - 600 V (+10%)	50/60 Hz	3~ 500 V/575 V	0-500Hz

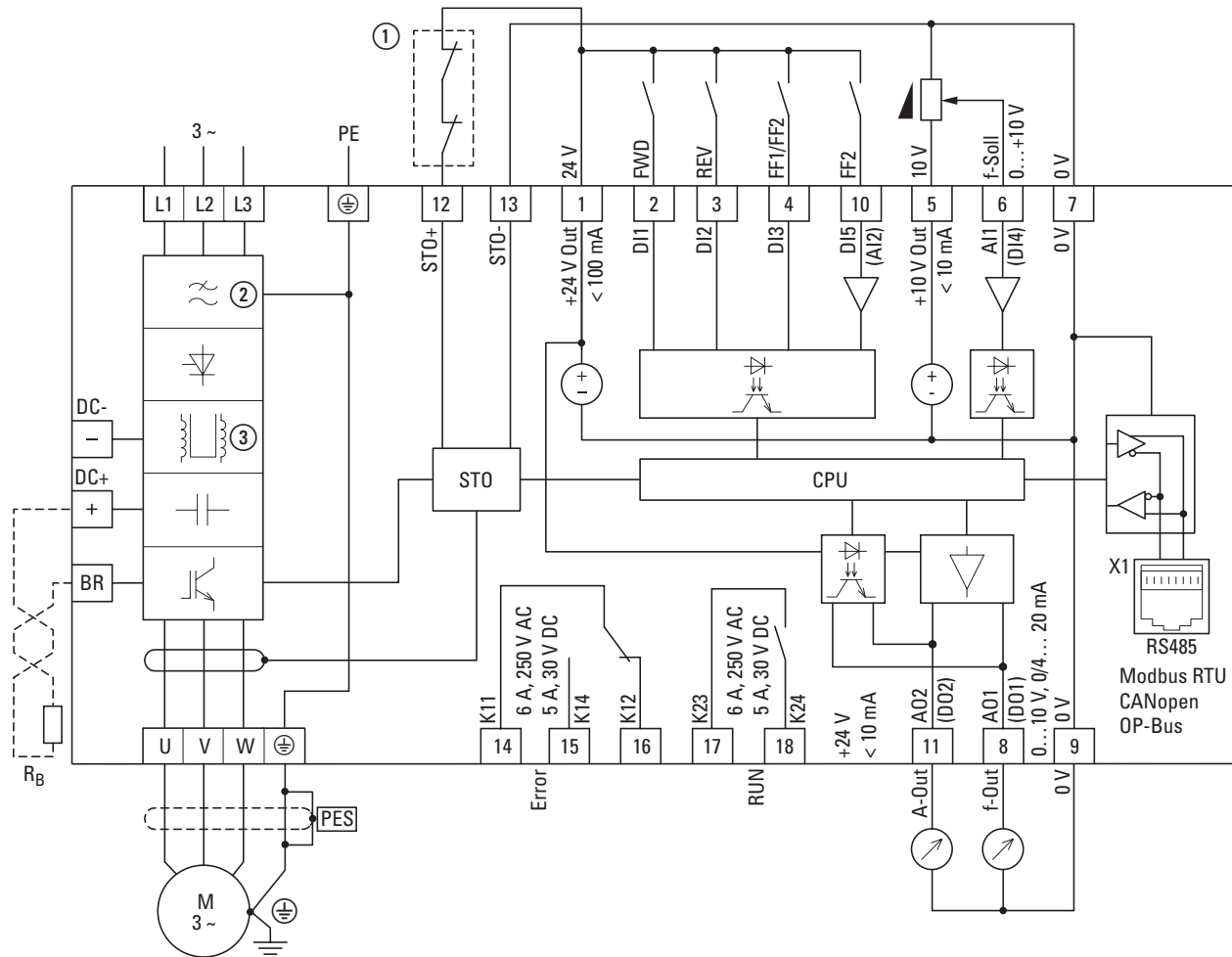
DA1

# 2.4

## Variable frequency drive DA1 to 160 kW

### Block diagram

DA1-...-B55C

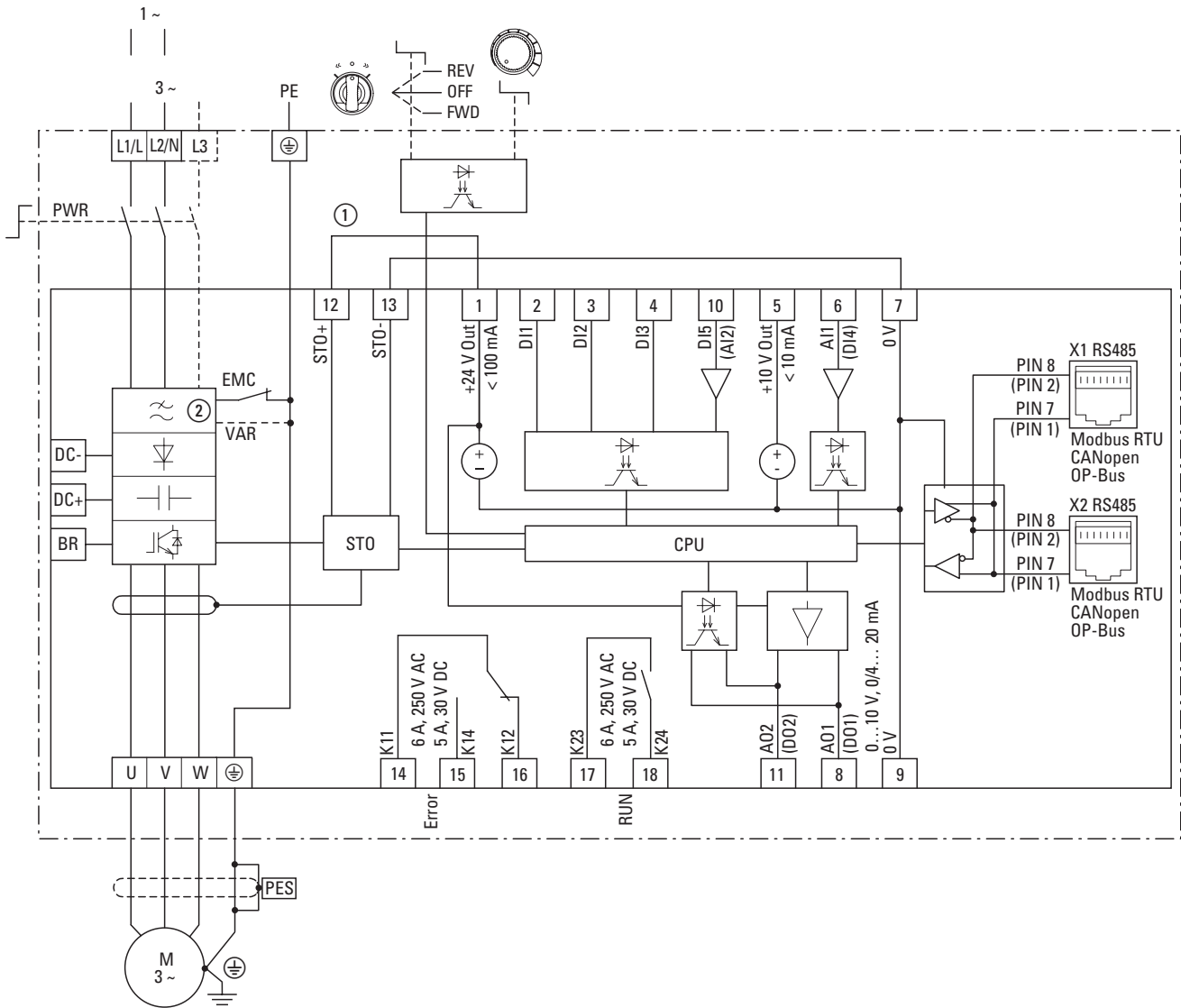


- ① Direct enable signal for STO function or relay: Safe Torque Off (STO), SIL 2 (EN 61800-5-2).
- ② The RFI filter is not included in the DA1-35-...-B6XC device.
- ③ A DC link choke is included in sizes of FS5, FS6, FS7.

- The STO connection must be made by the user.
- The VAR screw cannot be disabled in devices with a size of FS4, FS5, FS6, or FS7.

Catalog Number	Mains		Motor	
	Voltage $U_{LN}$	Frequency $f_{LN}$	Voltage $U_2$	Frequency $f_2$
DA1-32-...-B55C	3~ 200 V (-10%) - 240 V (+10%)	50/60 Hz	3~ 230 V	0-500Hz
DA1-34-...-B55C	3~ 380 V (-10%) - 480 V (+10%)	50/60 Hz	3~ 400 V/460 V	0-500Hz
DA1-35-...-B55C	3~ 500 V (-10%) - 600 V (+10%)	50/60 Hz	3~ 500 V/575 V	0-500Hz

### DA1-...-B6SC



- ① Direct enable signal for STO function or relay: Safe Torque Off (STO), SIL 2 (EN 61800-5-2).
- ② The RFI filter is not included in the DA1-35-...-B6XC device.

→ The STO connection must be made by the user.

Catalog Number	Mains		Motor	
	Voltage $U_{LN}$	Frequency $f_{LN}$	Voltage $U_2$	Frequency $f_2$
DA1-12-...-B6SC	1~ 200 V (-10%) - 240 V (+10%)	50/60 Hz	3~ 230 V	0-500Hz
DA1-32-...-B6SC	3~ 200 V (-10%) - 240 V (+10%)	50/60 Hz	3~ 230 V	0-500Hz
DA1-34-...-B6SC	3~ 380 V (-10%) - 480 V (+10%)	50/60 Hz	3~ 400 V/460 V	0-500Hz
DA1-35-...-B6SC	3~ 500 V (-10%) - 600 V (+10%)	50/60 Hz	3~ 500 V/575 V	0-500Hz



# 2.4

## Variable frequency drive DA1 to 160 kW

### Assigned switching and protective elements

Catalog Number	Motor Assigned motor output <sup>1)2)</sup> $I_H = 150\%$  P kW	Variable frequency drives		Mains connection			
		Rated operational current <sup>1)</sup> $I_H = 150\%$  $I_e$ A	Input current $I_H = 150\%$  $I_{LN}$ A	Protection device (fuse or miniature circuit-breaker)  IEC (Type B, gG), 150%  UL (Class CC or J)  A	Mains contactor  $I_H = 150\%$ (CT/IH, at 50°C)	Mains choke  $I_H = 150\%$ (at 50°C)	
<b>230 V AC, single-phase/230 V AC, three-phase</b>							
DA1-124D3...	0.75	4.3	8.6	FAZ-B16/1N	16	DILM7	DX-LN1-013
DA1-127D0...	1.5	7	12.9	FAZ-B20/1N	20	DILM7	DX-LN1-018
DA1-12011...	2.2	10.5	19.2	FAZ-B25/1N	25	DILM7	DX-LN1-024
<b>230 V AC, three-phase/230 V AC, three-phase</b>							
DA1-324D3...	0.75	4.3	5.7	FAZ-B10/3	10	DILM7	DX-LN3-006
DA1-327D0...	1.5	7	10.5	FAZ-B10/3	15	DILM7	DX-LN3-010
DA1-32011...	2.2	10.5	13.2	FAZ-B16/3	17.5	DILM7	DX-LN3-016
DA1-32018...	4	18	20.9	FAZ-B25/3	30	DILM7	DX-LN3-025
DA1-32024...	5.5	24	26.4	FAZ-B40/3	40	DILM17	DX-LN3-025
DA1-32030...	7.5	30	33.3	FAZ-B50/3	50	DILM17	DX-LN3-040
DA1-32046...	11	46	50.1	FAZ-B63/3	70	DILM40	DX-LN3-050
DA1-32061...	15	61	63.9	NZMC1-S80	90	DILM50	DX-LN3-080
DA1-32072...	22	72	74	NZMC2-S125	110	DILM65	DX-LN3-080 <sup>3)</sup>
DA1-32090...	22	90	99.1	NZMC2-S125	150	DILM80	DX-LN3-100 <sup>3)</sup>
DA1-32110...	30	110	121	NZMC2-S160	175	DILM95	DX-LN3-120 <sup>3)</sup>
DA1-32150...	45	150	159.7	NZMC2-S200	225	DILM150	DX-LN3-160 <sup>3)</sup>
DA1-32180...	55	180	187.5	NZMC3-S250	250	DILM170	DX-LN3-200 <sup>3)</sup>
DA1-32202...	55	202	206.5	NZMC3-S250	300	DILM185A	DX-LN3-250 <sup>3)</sup>
DA1-32248...	75	248	255.5	NZMC3-S320	350	DILM185A	DX-LN3-300 <sup>3)</sup>
<b>400 V AC, three-phase/400 V AC, three-phase</b>							
DA1-342D2...	0.75	2.2	3.5	FAZ-B6/3	6	DILM7	DX-LN3-006
DA1-344D1...	1.5	4.1	5.6	FAZ-B10/3	10	DILM7	DX-LN3-006
DA1-345D8...	2.2	5.8	7.5	FAZ-B10/3	10	DILM7	DX-LN3-010
DA1-349D5...	4	9.5	11.5	FAZ-B16/3	15	DILM7	DX-LN3-010
DA1-34014...	5.5	14	17.2	FAZ-B25/3	25	DILM7	DX-LN3-016
DA1-34018...	7.5	18	21.8	FAZ-B32/3	30	DILM7	DX-LN3-025
DA1-34024...	11	24	27.5	FAZ-B40/3	40	DILM17	DX-LN3-025
DA1-34030...	15	30	34.2	FAZ-B50/3	50	DILM17	DX-LN3-040
DA1-34039...	18.5	39	44.1	FAZ-B63/3	60	DILM25	DX-LN3-040
DA1-34046...	22	46	51.9	NZMC1-S80	70	DILM40	DX-LN3-050
DA1-34061...	30	61	66.1	NZMC1-S80	80	DILM50	DX-LN3-080 <sup>3)</sup>
DA1-34072...	37	72	77.3	NZMC1-S100	100	DILM65	DX-LN3-080 <sup>3)</sup>
DA1-34090...	45	90	102.7	NZMC2-S125	125	DILM80	DX-LN3-100 <sup>3)</sup>
DA1-34110...	55	110	126.4	NZMC2-S160	150	DILM95	DX-LN3-120 <sup>3)</sup>
DA1-34150...	75	150	164.7	NZMC2-S200	200	DILM150	DX-LN3-160 <sup>3)</sup>
DA1-34180...	90	180	192.1	NZMC3-S250	250	DILM170	DX-LN3-200 <sup>3)</sup>
DA1-34202...	110	202	210.8	NZMC3-S320	300	DILM185A	DX-LN3-250 <sup>3)</sup>
DA1-34240...	132	240	244.5	NZMC3-S320	350	DILM185A	DX-LN3-250 <sup>3)</sup>
DA1-34302...	160	302	307.8	NZMC3-S400	400	DILM225A	DX-LN3-370 <sup>3)</sup>

#### Notes

<sup>1)</sup> Overload cycle for 60 s every 600 s

<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>3)</sup> Mains choke recommended only if the power quality is poor. Current harmonics (THD) are attenuated by internal DC link chokes.

<sup>4)</sup> If it is not guaranteed that the system percentage impedance is greater than or equal to 1%, a mains choke ( $U_k = 1 - 4\%$ ) must be connected upstream.

<sup>5)</sup> Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments

Mains connection	DC link connection		Motor feeder	
	Braking resistance		Motor choke	Sine filter
Radio interference suppression filter (external, 150%) <sup>9)</sup>	10% duty factor (ED)	20% duty factor (ED)	$I_H = 150\%$ ( $C_T/I_H$ , at 50°C)	$I_H = 150\%$ ( $C_T/I_H$ , at 50°C)
DX-EMC12-014-FS2	DX-BR100-0K2	DX-BR100-0K4	DX-LM3-008	DX-SIN3-010
DX-EMC12-014-FS2	DX-BR050-0K4	DX-BR050-0K8	DX-LM3-008	DX-SIN3-010
DX-EMC12-025-FS2	DX-BR050-0K8	DX-BR035-1K1	DX-LM3-016	DX-SIN3-016
DX-EMC34-008	DX-BR100-0K2	DX-BR100-0K4	DX-LM3-008	DX-SIN3-010
DX-EMC34-008	DX-BR050-0K4	DX-BR050-0K8	DX-LM3-008	DX-SIN3-010
DX-EMC34-016	DX-BR050-0K8	DX-BR035-1K1	DX-LM3-016	DX-SIN3-016
DX-EMC34-030	DX-BR022-1K4	DX-BR022-3K1	DX-LM3-035	DX-SIN3-023
DX-EMC34-030	DX-BR022-1K4	DX-BR022-3K1	DX-LM3-035	DX-SIN3-032
DX-EMC34-042	DX-BR022-1K4	DX-BR022-3K1	DX-LM3-035	DX-SIN3-032
DX-EMC34-055	DX-BR022-1K4	DX-BR022-3K1	DX-LM3-050	DX-SIN3-048
DX-EMC34-075	DX-BR012-3K1	DX-BR012-5K1	DX-LM3-063	DX-SIN3-061
DX-EMC34-075	DX-BR012-3K1	DX-BR012-5K1	DX-LM3-080	DX-SIN3-072
DX-EMC34-100	DX-BR006-5K1	DX-BR006-9K2	DX-LM3-100	DX-SIN3-090
DX-EMC34-130	DX-BR006-5K1	DX-BR006-9K2	DX-LM3-150	DX-SIN3-115
DX-EMC34-180	DX-BR006-5K1	DX-BR006-9K2	DX-LM3-180	DX-SIN3-150
DX-EMC34-250	DX-BR006-5K1	DX-BR006-9K2	DX-LM3-220	DX-SIN3-180
DX-EMC34-250	DX-BR006-5K1	DX-BR006-9K2	DX-LM3-220	DX-SIN3-250
DX-EMC34-400	DX-BR006-5K1	DX-BR006-9K2	DX-LM3-260	DX-SIN3-250
DX-EMC34-008	DX-BR400-0K4	DX-BR400-0K4	DX-LM3-008	DX-SIN3-004
DX-EMC34-008	DX-BR200-0K4	DX-BR200-0K8	DX-LM3-008	DX-SIN3-010
DX-EMC34-008	DX-BR150-0K5	DX-BR150-1K4	DX-LM3-008	DX-SIN3-010
DX-EMC34-016	DX-BR100-0K8	DX-BR100-1K4	DX-LM3-011	DX-SIN3-010
DX-EMC34-016	DX-BR075-1K4	DX-BR075-5K1	DX-LM3-016	DX-SIN3-016
DX-EMC34-030	DX-BR050-3K1	DX-BR050-5K1	DX-LM3-035	DX-SIN3-023
DX-EMC34-030	DX-BR040-3K1	DX-BR040-5K1	DX-LM3-035	DX-SIN3-023
DX-EMC34-042	DX-BR022-5K1	DX-BR022-9K2	DX-LM3-035	DX-SIN3-032
DX-EMC34-042	DX-BR022-5K1	DX-BR022-9K2	DX-LM3-050	DX-SIN3-048
DX-EMC34-055	DX-BR022-5K1	DX-BR022-9K2	DX-LM3-050	DX-SIN3-048
DX-EMC34-075	DX-BR012-9K2	DX-BR012-18K1	DX-LM3-063	DX-SIN3-061
DX-EMC34-075	DX-BR012-9K2	DX-BR012-18K1	DX-LM3-080	DX-SIN3-090
DX-EMC34-100	DX-BR006-18K1	DX-BR006-33K3	DX-LM3-100	DX-SIN3-090
DX-EMC34-130	DX-BR006-18K1	DX-BR006-33K3	DX-LM3-150	DX-SIN3-115
DX-EMC34-180	DX-BR006-18K1	DX-BR006-33K3	DX-LM3-180	DX-SIN3-150
DX-EMC34-250	DX-BR006-18K1	DX-BR006-33K3	DX-LM3-220	DX-SIN3-180
DX-EMC34-250	DX-BR006-18K1	DX-BR006-33K3	DX-LM3-220	DX-SIN3-250
DX-EMC34-250	DX-BR006-18K1	DX-BR006-33K3	DX-LM3-260	DX-SIN3-250
DX-EMC34-400	DX-BR006-18K1	DX-BR006-33K3	DX-LM3-370	DX-SIN3-440

# 2.4

## Variable frequency drive DA1 to 160 kW

### Assigned switching and protective elements

Catalog Number	Motor Assigned motor output <sup>1) 2)</sup> $I_H = 150\%$  P kW	Variable frequency drives		Mains connection			
		Rated operational current <sup>1)</sup> $I_H = 150\%$  $I_e$ A	Input current $I_H = 150\%$  $I_{LN}$ A	Protection device (fuse or miniature circuit-breaker)  IEC (Type B, gG), 150% <sup>3)</sup>  UL (Class CC or J) <sup>4)</sup>  A	Mains contactor  $I_H = 150\%$ (CT/ $I_H$ , at 50°C)	Mains choke  $I_H = 150\%$ (at 50°C)	
<b>500 V AC, three-phase/500 V AC, three-phase</b>							
DA1-352D1...	0.75	2.1	3.4	6NHG000B	LPJ-6SP	DILM7	DX-LN3-004
DA1-353D1...	1.5	3.1	4.2	6NHG000B	LPJ-6SP	DILM7	DX-LN3-004
DA1-354D1...	2.2	4.1	4.9	10NHG000B	LPJ-10SP	DILM7	DX-LN3-006
DA1-356D5...	4	6.5	8.6	10NHG000B	LPJ-10SP	DILM7	DX-LN3-010
DA1-359D0...	5.5	9	12.2	16NHG000B	LPJ-15SP	DILM7	DX-LN3-016
DA1-35012...	7.5	12	15.1	20NHG000B	LPJ-20SP	DILM7	DX-LN3-016
DA1-35017...	11	17	20.9	32NHG000B	LPJ-30SP	DILM17	DX-LN3-025
DA1-35022...	15	22	26	40NHG000B	LPJ-35SP	DILM17	DX-LN3-040
DA1-35028...	18.5	28	32.2	50NHG000B	LPJ-45SP	DILM17	DX-LN3-040
DA1-35034...	22	34	39.1	63NHG000B	LPJ-60SP	DILM25	DX-LN3-050
DA1-35043...	30	43	48.9	63NHG000B	LPJ-70SP	DILM40	DX-LN3-050
DA1-35054...	37	54	59.9	80NHG000B NZMC1-S80	LPJ-80SP	DILM50	DX-LN3-080
DA1-35065...	45	65	70.4	100NHG000B NZMC1-S100	LPJ-100SP	DILM80	DX-LN3-080
DA1-35078...	55	78	90.6	125NHG000B NZMC2-S125	LPJ-125SP	DILM95	DX-LN3-100
DA1-35105...	75	105	121.1	160NHG000B NZMC2-S160	LPJ-150SP	DILM95	DX-LN3-120
DA1-35130...	90	130	143.2	160NHG000B NZMC2-S160	LPJ-175SP	DILM115	DX-LN3-160
DA1-35150...	110	150	158.4	200NHG1B NZMC2-S200	LPJ-200-SP	DILM150	DX-LN3-160

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> NH fuse used together with TB00-D fuse base
- <sup>4)</sup> LPJ fuse used together with J60060-3 fuse base
- <sup>5)</sup> Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments

Mains connection	DC link connection		Motor feeder	
	Braking resistance		Motor choke	Sine filter
Radio interference suppression filter (external, 150%) <sup>2)</sup>	10% duty factor (ED)	20% duty factor (ED)	$I_H = 150\%$ (CT/ $I_H$ , at 50°C)	$I_H = 150\%$ (CT/ $I_H$ , at 50°C)
–	–	–	DX-LM3-008	SIN-0005-6-0-P
–	DX-BR400-0K4	–	DX-LM3-008	SIN-0005-6-0-P
–	DX-BR200-0K4	DX-BR200-0K8	DX-LM3-008	SIN-0005-6-0-P
–	DX-BR150-0K5	DX-BR150-1K4	DX-LM3-008	SIN-0008-6-0-P
–	DX-BR100-0K8	DX-BR100-1K4	DX-LM3-011	SIN-0014-6-0-P
–	DX-BR100-0K8	DX-BR100-1K6	DX-LM3-016	SIN-0014-6-0-P
–	DX-BR050-3K1	DX-BR050-5K1	DX-LM3-035	SIN-0023-6-0-P
–	DX-BR040-3K1	DX-BR040-5K1	DX-LM3-035	SIN-0035-6-0-P
–	DX-BR040-3K1	DX-BR040-5K1	DX-LM3-035	SIN-0035-6-0-P
–	DX-BR022-3K1	DX-BR022-5K1	DX-LM3-035	SIN-0052-6-0-P
–	DX-BR022-3K1	DX-BR022-5K1	DX-LM3-050	SIN-0052-6-0-P
–	DX-BR022-3K1	DX-BR022-5K1	DX-LM3-063	SIN-0085-6-0-P
–	DX-BR012-3K1	DX-BR012-5K1	DX-LM3-080	SIN-0085-6-0-P
–	DX-BR012-3K1	DX-BR012-5K1	DX-LM3-080	SIN-0085-6-0-P
–	DX-BR012-3K1	DX-BR012-5K1	DX-LM3-150	SIN-0122-6-0-P
–	DX-BR012-3K1	DX-BR012-9K2	DX-LM3-150	SIN-0185-6-0-P
–	DX-BR012-3K1	DX-BR012-18K1	DX-LM3-150	SIN-0185-6-0-P

# 2.4

## Variable frequency drive DA1 to 160 kW

### General rated operational data

#### Technical specifications

	Symbol	Unit	Value
<b>General</b>			
Standards			EMC: EN 61800-3:2004+A1-2012 Radio interference: EN 55011: 2010 Security: EN 61800-5: 2007 Degree of protection: EN 60529: 1992
Certifications and manufacturer's declarations on conformity			CE, UL, cUL, c-Tick, UkrSEPRO, Gost-R
Production quality			RoHS, ISO 9001
Climatic proofing	pw	%	< 95%, average relative humidity (RH), non-condensing (EN 50178)
Ambient temperature			
Operation			
IP20 (NEMA 0)	θ	°C	-10 - +50 (frost-free and condensation-free)
IP55 (NEMA 3)	θ	°C	-10 - +40, with derating of 1.5% per °C above 40°C on rated operational current I <sub>e</sub>
			<b>Notes</b> Operation within a temperature range of 40 to 50°C does not conform to UL listing.
IP66 (NEMA 4X)	θ	°C	-10 - +40, with derating of 2.5% per °C above 40°C on rated operational current I <sub>e</sub>
			<b>Notes</b> Operation within a temperature range of 40 to 50°C does not conform to UL listing.
Storage	θ	°C	-40 - +60
MTTF <sub>d</sub>		Years	4525
mtbf (mean time between two failures)		Years	50
PFH <sub>0</sub>			1.23 - 09 1/h (0.12% of SIL)
Electrostatic discharge (ESD, EN 61000-4-2:2009)	U	kV	±4, contact discharge ±8, air discharge
Fast transient burst (EFT/B, EN 61000-4-4: 2004)	U	kV	±1, at 5 kHz, control signal terminal ±2, at 5 kHz, motor connection terminals, Single-phase mains connection terminals ±4, at 5 kHz, three-phase mains connection terminals
Overvoltage (surge, EN 61000-4-5: 2006)			
110 - 115 V, 200 - 240 V	U	kV	±1, phase to phase/neutral conductor ±2, phase/neutral conductor to earth
380 - 480 V, 500 - 600 V	U	kV	±2, phase to phase ±4, phase to earth
Electric strength (flash, EN 61800-5-1: 2007)			
110 - 115 V, 200 - 240 V	U	kV	1.5
380 - 480 V, 500 - 600 V	U	kV	2.5
Radio interference class (EMC)			
Category and maximum screened motor cable length with integrated radio interference suppression filter			
C1	l	m	1
C2	l	m	5
C3	l	m	25
Mounting position			vertical
Altitude	h	m	0 - 1000 above sea level, > 1000 with 1% load current reduction every 100 m, maximum 2000 with UL approval, maximum 4000 without UL approval
Protection type			IP20 (NEMA 0) IP55 (NEMA 3) IP66 (NEMA 4X)
Fan (built-in)			Yes
Protection against contact			BGV A3 (VBG4, finger- and back-of-hand proof)

	Symbol	Unit	Value
<b>Main circuit / power section</b>			
Feeder			
Rated operating voltage			
DA1-12...	$U_e$	V	1~ 230 (200 V -10% - 240 V +10%)
DA1-32...	$U_e$	V	3~ 230 (200 V -10% - 240 V +10%)
DA1-34...	$U_e$	V	3~ 400 (380 V -10% - 480 V +10%)
DA1-35...	$U_e$	V	3~ 575 (500 V - 10% - 600 V +10%)
Mains frequency	f	Hz	50/60 ±10%
Phase Imbalance		%	max. 3
Maximum short-circuit current (supply voltage)	SCCR	kA	100 (according to IEC 60439-1)
Mains switch-on frequency			Maximum of one time every 30 seconds
Mains network configuration (AC supply system)			TN and TT network with directly earthed neutral point. IT earthing systems with PCM insulation monitoring relays only. Operation on phase-earthed networks is only permissible up to a maximum phase-earth voltage of 300 V AC.
Motor feeder			
Output voltage			
DA1-12..., DA1-32..., DA1-34..., DA1-35...	$U_2$	V	3- 0 - $U_e$
Assigned motor output			
at 230 V, 50 Hz	P	kW	0.75 - 75
at 400 V, 50 Hz	P	kW	0.75 - 250
at 500 V, 60 Hz	P	kW	0.75 - 110
Output Frequency			
Range, parameterizable	$f_2$	Hz	0 - 50/60 (max. 500 Hz)
Resolution	$\Delta f$	Hz	0.1
Rated operational current	$I_e$	A	IP20: 4.3- 72/370 - 450 IP55: 24 -302 IP66: 4.3 -18
Overload current for 60 s every 600 s	$I_L$	%	150
Starting current for 4 s every 40 s	$I_L$	%	200
Motor cable length			
screened	l	m	100
unscreened	l	m	150
with motor choke	$\Delta l$	%	100 (increased maximum cable length)
Switching frequency (pulse frequency)	$f_{PWM}$	kHz	4 - 32 (double modulation) / 2 - 16 (effective) Maximum value depends on rating
Operating mode			
SLV, max. speed error	$\Delta n$	%	±0.5
DC-braking			
Time before start	t	s	0 - 25, in the event of a stop
Motor pick-up control function (for catching spinning motors)			Yes
Brake chopper			Yes
Braking current during continuous operation	$I_{BR}$	%	100 ( $I_e$ )
Maximum braking current	$I_{BRmax}$	%	150 for 60 s

# 2.4

## Variable frequency drive DA1 to 160 kW

### General rated operational data

	Symbol	Unit	Value
<b>Control section</b>			
Terminal capacity (clampable)	A	mm <sup>2</sup>	0.05 - 2.5 (30 - 12 AWG)
Control voltage			
Output voltage (control signal terminal 1)	$U_c$	V DC	24
Input voltage (control signal terminal 1)	$U_c$	V DC	18 - 30
Load rating (control signal terminal 1), maximum	I	mA	100
Reference voltage (control signal terminal 5)	$U_s$	V DC	10
Load rating (control signal terminal 5), maximum	I	mA	10
Digital Input (DI)			
Number (configurable)			3 - 5
Logic (level)			Increase
Time of reaction	t	ms	< 4
Input voltage range High (1)	$U_c$	V DC	8 - 30
Input voltage range Low (0)	$U_c$	V DC	0 - 4
Analog Input (AI)			
Number (configurable)			0 - 2
Resolution			12 bits
Accuracy		%	< 1 to the final value
Time of reaction	t	ms	< 4
Input voltage range	$U_{ref}$	V	0/-10 - +10, DC ( $R_i \sim 72 \text{ k}\Omega$ )
Input current range	I	mA	0/4 - 20 (RB $\sim 500 \Omega$ )
Setpoint potentiometer (recommended fixed resistance)	R	k $\Omega$	1 - 10
Relay output (K)			
Number of relays (contacts)			2 (1 N/O/1 changeover contact)
Switching capacity			
AC	I	A	6 (250 V)
DC	I	A	5 (30 V)
Digital/analog output (DO/AO)			
Qty.			2 (digital/analogue)
Output voltage			
TH	$U_{out}$	V DC	+24
AO	$U_{out}$	V DC	0/-10 - +10
Current carrying capacity DO	$I_{out}$	mA	< 20
AO resolution			12 bits
Interface (RJ45)			OP bus, Modbus RTU, CANopen, (RS485)
STO (Safe Torque Off)			
Voltage	U	V DC	+24 (18 - 30)
Current	I	mA	100
SIL category			2
PL			d

Size	Symbol	Unit	4D3	7D0	011	
<b>DA1-12... series</b>						
Rated operational current	$I_e$	A	4.3	7.0	10.5	
Overload current for 60 s every 600 s	$I_L$	A	6.45	10.5	15.75	
Apparent power at rated operation	230 V	S	kVA	1.71	2.79	4.18
	240 V	S	kVA	1.79	2.91	4.36
Assigned motor power	230 V	P	kW	0.75	1.5	2.2
	230 V	P	HP	1	2	3
Power side (primary side):						
Number of phases	single-phase or two-phase					
Device Voltage Rating	$U_{LN}$	V	200 - 10% - 240 + 10%, 50/60 Hz (180 - 264 ±0%, 48 - 62 Hz ±0%)			
Input current (phase current)	$I_{LN}$	A	8.5	15.2	19.5	
Minimum braking resistance	$R_B$	Ω	100	50	35	
Switching frequency (pulse frequency)						
Default settings	$f_{PWM}$	kHz	16	16	16	
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	2.49	2.49	2.49	
Efficiency	$\eta$		0.94	0.96	0.95	
Heat dissipation at $I_e$	$P_V$	W	45.75	63	103.4	
Frame size			FS2	FS2	FS2	

Size	Symbol	Unit	4D3	7D0	011	018	024	024	
<b>DA1-32... series</b>									
Rated operational current	$I_e$	A	4.3	7.0	10.5	18	24	24	
Overload current for 60 s every 600 s	$I_L$	A	6.45	10.5	15.75	27	36	36	
Apparent power at rated operation	230 V	S	kVA	1.71	2.79	4.18	7.17	9.56	9.56
	240 V	S	kVA	1.79	2.91	4.36	7.48	9.98	9.98
Assigned Instance Motor Power	230 V	P	kW	0.75	1.5	2.2	4.0	5.5	5.5
	230 V	P	HP	1	2	3	5	7.5	7.5
Power side (primary side):									
Number of phases	three-phase								
Rated operating voltage	$U_{LN}$	V	200 - 10% - 240 + 10%, 50/60 Hz (180 - 264 ±0%, 48 - 62 Hz ±0%)						
Input current (phase current)	$I_{LN}$	A	5.1	8.3	12.6	21.6	29.1	29.1	
Minimum braking resistance	$R_B$	Ω	100	50	35	20	20	20	
Switching frequency (pulse frequency)									
Default settings	$f_{PWM}$	kHz	16	16	16	16	16	16	
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32	4 - 32	4 - 16	4 - 16	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	1.73	1.73	1.73	0.93	0.93	1.42	
Efficiency	$\eta$		0.95	0.96	0.96	0.96	0.97	0.97	
Heat dissipation at $I_e$	$P_V$	W	39.75	61.5	90.2	160	170.5	170.5	
Frame size			FS2	FS2	FS2	FS3	FS3	FS4	



# 2.4

## Variable frequency drive DA1 to 160 kW

### Specific rated operational data

Size	Symbol	Unit	030	046	061	072	090	110	
<b>DA1-32... series</b>									
Rated operational current	$I_e$	A	30	46	61	72	90	110	
Overload current for 60 s every 600 s at 50°C	$I_L$	A	58.5	69	91.5	108	135	165	
Apparent power at rated operation	230 V	S	kVA	15.5	18.3	24.3	28.7	35.9	43.8
	240 V	S	kVA	16.2	19.1	25.4	29.9	37.4	45.7
Assigned Instance Motor Power	230 V	P	kW	7.5	11	15	18.5	22	30
	230 V	P	HP	10	15	20	25	30	40
Power side (primary side):									
Number of phases	three-phase								
Rated operating voltage	$U_{LN}$	V	200 V (-10%) - 240 V (+10%), 50/60 Hz (180 - 264 V $\pm 0\%$ , 48 - 62 Hz $\pm 0\%$ )						
Input current (phase current)	$I_{LN}$	A	36.4	55.8	70.2	82.9	103.6	126.7	
Minimum braking resistance	$R_B$	$\Omega$	22	22	12	12	6	6	
Switching frequency									
Default settings	$f_{PWM}$	kHz	8	8	8	8	8	4	
Setting range	$f_{PWM}$	kHz	4 - 24	4 - 24	4 - 24	4 - 24	4 - 24	4 - 16	
Maximum leakage current to earth (PE), without motor	IPE	mA	1.42	1.42	0.28	0.28	1.54	1.54	
Efficiency	$\eta$		0.97 (IP55) 0.96 (IP20)	0.97	0.97	0.97	0.97	0.97	
Heat dissipation at $I_e$	$P_V$	W	187.5 (IP55) 410 (IP20)	264	345	518	550	720	
Frame size			FS4	FS4	FS5	FS5	FS6	FS6	

Size	Symbol	Unit	150	180	202	248	
<b>DA1-32... series</b>							
Rated operational current	$I_e$	A	150	180	202	248	
Overload current for 60 s every 600 s	$I_L$	A	225	270	303	372	
Apparent power at rated operation	230 V	S	kVA	59.8	71.7	80.5	98.8
	240 V	S	kVA	62.4	74.8	84	103.1
Assigned Instance Motor Power	230 V	P	kW	37	45	55	75
	230 V	P	HP	50	60	75	100
Power side (primary side):							
Number of phases	three-phase						
Rated operating voltage	$U_{LN}$	V	200 V (-10%) - 240 V (+10%), 50/60 Hz (180 - 264 V $\pm 0\%$ , 48 - 62 Hz $\pm 0\%$ )				
Input current (phase current)	$I_{LN}$	A	172.7	183.3	205.7	255.5	
Minimum braking resistance	$R_B$	$\Omega$	6	6	6	6	
Switching frequency (pulse frequency)							
Default settings	$f_{PWM}$	kHz	4	4	4	4	
Setting range	$f_{PWM}$	kHz	4 - 12	4 - 8	4 - 16	4 - 12	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	1.54	1.54	2.74	2.74	
Efficiency	$\eta$		0.97	0.98	0.98	0.98	
Heat dissipation at $I_e$	$P_V$	W	814	945	1100	1425	
Frame size			FS6	FS6	FS7	FS7	

Size	Symbol	Unit	2D2	4D1	5D8	9D5	014	018	024	
<b>DA1-34... series</b>										
Rated operational current	$I_e$	A	2.2	4.1	5.8	9.5	14	18	24	
Overload current for 60 s every 600 s	$I_L$	A	3.3	6.15	8.7	14.25	21	27	36	
Apparent power at rated operation	400 V	S	kVA	1.52	2.84	4.02	6.58	9.7	12.5	16.6
	480 V	S	kVA	1.83	3.41	4.8	7.9	11.6	15	20
Assigned Instance Motor Power	400 V	P	kW	0.75	1.5	2.2	4.0	5.5	7.5	11
	460 V	P	HP	1	2	3	5	7.5	10	15
Power side (primary side):										
Number of phases	three-phase									
Rated operating voltage	$U_{LN}$	V	380 V (-10%) - 480 V (+10%), 50/60 Hz (342 - 528 V $\pm 0\%$ , 48 - 62 Hz $\pm 0\%$ )							
Input current (phase current)	$I_{LN}$	A	2.4	5.1	7.5	11.2	19	22	28.9	
Minimum braking resistance	$R_B$	$\Omega$	400	200	150	100	75	50	40	
Switching frequency (pulse frequency)										
Default settings	$f_{PWM}$	kHz	8	8	8	8	8	8	8	
Setting range	$f_{PWM}$	kHz	4 - 32	4 - 32	4 - 32	4 - 32	4 - 24	4 - 24	4 - 16	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	4.65	4.65	4.65	4.65	1.55	1.55	1.55	
Efficiency	$\eta$		0.92	0.95	0.95	0.96	0.96	0.97	0.97	
Heat dissipation at $I_e$	$P_V$	W	63.75	76.5	101.2	136	209	300	297	
Frame size			FS2	FS2	FS2	FS2	FS3	FS3	FS3	

Size	Symbol	Unit	024	030	039	046	061	072	090	
<b>DA1-34... series</b>										
Rated operational current	$I_e$	A	24	30	39	46	61	72	90	
Overload current for 60 s every 600 s	$I_L$	A	36	45	58.5	69	91.5	108	135	
Apparent power at rated operation	400 V	S	kVA	16.6	20.8	27	31.9	42.3	49.9	62.4
	480 V	S	kVA	20	24.9	32.4	38.2	50.7	59.9	74.8
Assigned Instance Motor Power	400 V	P	kW	11	15	18.5	22	30	37	45
	460 V	P	HP	15	20	25	30	40	50	60
Power side (primary side):										
Number of phases	three-phase									
Rated operating voltage	$U_{LN}$	V	380 V (-10%) - 480 V (+10%), 50/60 Hz (342 - 528 V $\pm 0\%$ , 48 - 62 Hz $\pm 0\%$ )							
Input current (phase current)	$I_{LN}$	A	28.9	37.2	47	52.4	66.1	77.3	92.2	
Minimum braking resistance	$R_B$	$\Omega$	40	22	22	22	12	12	6	
Switching frequency (pulse frequency)										
Default settings	$f_{PWM}$	kHz	8	8	8	8	8	8	4	
Setting range	$f_{PWM}$	kHz	4 - 16	4 - 24	4 - 24	4 - 24	4 - 24	4 - 24	4 - 16	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	2.47	2.47	2.47	2.47	0.49	0.49	2.68	
Efficiency	$\eta$		0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Heat dissipation at $I_e$	$P_V$	W	297	375	444	506	840	925	1080	
Frame size			FS4	FS4	FS4	FS4	FS5	FS5	FS6	

# 2.4

## Variable frequency drive DA1 to 160 kW

### Specific rated operational data

Size	Symbol	Unit	110	150	180	202	240	302	
<b>DA1-34... series</b>									
Rated operational current	$I_e$	A	110	150	180	202	240	302	
Overload current for 60 s every 600 s	$I_L$	A	165	225	270	303	360	453	
Apparent power at rated operation	400 V	S	kVA	76.2	104	125	140	166	209
	480 V	S	kVA	91.5	125	150	168	200	251
Assigned Instance Motor Power	400 V	P	kW	55	75	90	110	132	160
	460 V	P	HP	75	120	150	175	200	250
Power side (primary side):									
Number of phases	three-phase								
Rated operating voltage	$U_{LN}$	V	380 V (-10%) - 480 V (+10%), 50/60 Hz (342 - 528 V $\pm 0\%$ , 48 - 62 Hz $\pm 0\%$ )						
Input current (phase current)	$I_{LN}$	A	112.5	153.2	183.7	217	256	302	
Minimum braking resistance	$R_B$	$\Omega$	6	6	6	6	6	6	
Switching frequency (pulse frequency)									
Default settings	$f_{PWM}$	kHz	4	4	4	4	4	4	
Setting range	$f_{PWM}$	kHz	4 - 16	4 - 12	4 - 8	4 - 16	4 - 12	4 - 8	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	2.68	2.68	2.68	4.75	4.75	4.75	
Efficiency	$\eta$		0.98	0.98	0.98	0.98	0.98	0.98	
Heat dissipation at $I_e$	$P_V$	W	1210	1575	1800	2090	2375	3040	
Frame size			FS6	FS6	FS6	FS7	FS7	FS7	

Size	Symbol	Unit	2D1	3D1	4D1	6D5	9D0	012	
<b>DA1-35... series</b>									
Rated operational current	$I_e$	A	2.1	3.1	4.1	6.5	9	12	
Overload current for 60 s every 600 s at 50°C	$I_L$	A	3.15	4.65	6.15	9.75	13.5	18	
Apparent power at rated operation	500 V	S	kVA	1.6	2.1	2.4	4.3	6	7.5
	600 V	S	kVA	2	2.5	2.9	5.1	7.3	9
Assigned Instance Motor Power	500 V	P	kW	0.75	1.5	2.2	4	5.5	7.5
	575 V	P	HP	1	2	3	5	7.5	10
Power side (primary side):									
Number of phases	three-phase								
Rated operating voltage	$U_{LN}$	V	500 V (-10%) - 600 V (+10%), 50/60 Hz						
Input current (phase current)	$I_{LN}$	A	2.5	3.7	4.9	7.8	10.8	14.4	
Minimum braking resistance	$R_B$	$\Omega$	50	50	50	50	50	40	
Switching frequency (pulse frequency)									
Default settings	$f_{PWM}$	kHz	8	8	8	8	8	8	
Setting range	$f_{PWM}$	kHz	4 - 24	4 - 24	4 - 24	4 - 24	4 - 24	4 - 24	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	–	–	–	–	–	–	
Efficiency	$\eta$		0.97	0.97	0.97	0.97	0.97	0.97	
Heat dissipation at $I_e$	$P_V$	W	22.5	45	66	120	165	225	
Frame size			FS2	FS2	FS2	FS2	FS2	FS3	

Size	Symbol	Unit	017	022	022	028	034	043	
<b>DA1-35... series</b>									
Rated operational current	$I_b$	A	17	22	22	28	34	43	
Overload current for 60 s every 600 s	$I_L$	A	25.5	33	33	42	51	64.5	
Apparent power at rated operation	500 V	S	kVA	10.4	12.7	12.7	16	19.5	24.4
	600 V	S	kVA	12.5	15.2	15.5	19.3	23.4	29.3
Assigned Instance Motor Power	500 V	P	kW	11	15	15	18.5	22	30
	575 V	P	HP	15	20	20	25	30	40
Power side (primary side):									
Number of phases	three-phase								
Rated operating voltage	$U_{LN}$	V	500 V (-10%) - 600 V (+10%), 50/60 Hz						
Input current (phase current)	$I_{LN}$	A	20.6	26.7	26.7	34	41.2	53	
Minimum braking resistance	$R_B$	$\Omega$	40	40	22	22	22	22	
Switching frequency (pulse frequency)									
Default settings	$f_{PWM}$	kHz	8	8	8	8	8	8	
Setting range	$f_{PWM}$	kHz	24	24	24	24	24	24	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	–	–	–	–	–	–	
Efficiency	$\eta$		0.97	0.97	0.97	0.97	0.97	0.97	
Heat dissipation at $I_b$	$P_V$	W	330	450	450	555	660	850	
Frame size			FS3	FS3	FS4	FS4	FS4	FS4	

Size	Symbol	Unit	054	065	078	105	130	150	
<b>DA1-35... series</b>									
Rated operational current	$I_b$	A	54	65	78	105	130	150	
Overload current for 60 s every 600 s	$I_L$	A	81	97.5	117	157.5	195	225	
Apparent power at rated operation	500 V	S	kVA	29.7	35.2	45.2	60.5	71.5	79.1
	600 V	S	kVA	35.6	42.2	54.3	72.6	85.9	95
Assigned Instance Motor Power	500 V	P	kW	37	45	55	75	90	110
	575 V	P	HP	50	60	75	100	125	150
Power side (primary side):									
Number of phases	three-phase								
Rated operating voltage	$U_{LN}$	V	500 V (-10%) - 600 V (+10%), 50/60 Hz						
Input current (phase current)	$I_{LN}$	A	62.2	75.8	90.9	108.2	162	187	
Minimum braking resistance	$R_B$	$\Omega$	12	12	6	6	6	6	
Switching frequency (pulse frequency)									
Default settings	$f_{PWM}$	kHz	8	8	4	4	4	4	
Setting range	$f_{PWM}$	kHz	4 - 24	4 - 24	4 - 16	4 - 16	4 - 12	4 - 12	
Maximum leakage current to earth (PE), without motor	$I_{PE}$	mA	–	–	–	–	–	–	
Efficiency	$\eta$		0.97	0.97	0.97	0.97	0.97	0.97	
Heat dissipation at $I_b$	$P_V$	W	1110	1350	1650	2250	2700	3300	
Frame size			FS5	FS5	FS6	FS6	FS6	FS6	

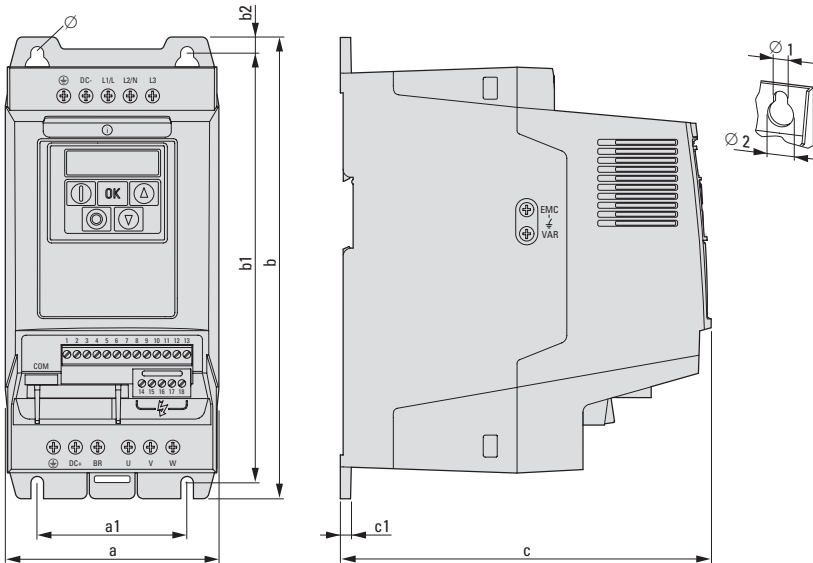
# 2.4

## Variable frequency drive DA1 to 160 kW

### Dimensions and weights

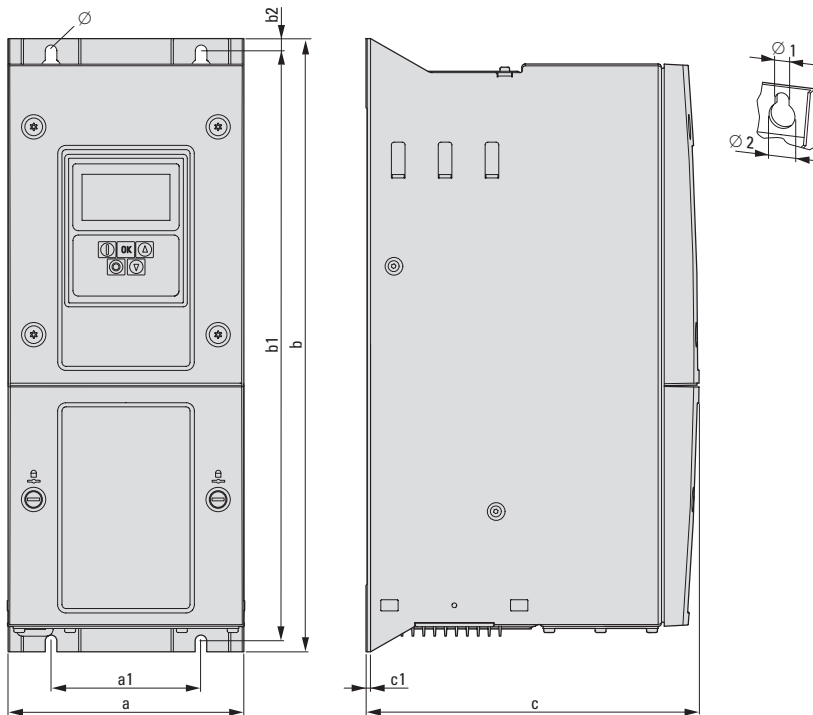
#### Dimensions and weights

##### Frame sizes FS2, FS3, FS4 and FS5 in IP20



Size	a	a1	b	b1	b2	c	c1	Ø1	Ø2	m
	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
FS2	107	75	231	215	8	186	5	6.5	12.2	1.8
FS3	131	100	273	255	8.5	204	5	6.5	12.2	3.5
FS4	173	125	419	400	10	241	5	8	15	9.2
FS5	234	175	485	460	13	261	5	8	18	18.2

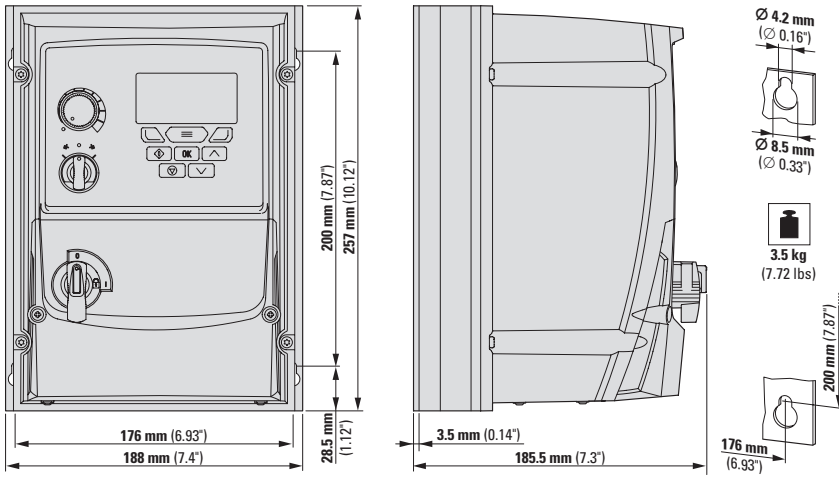
##### Frame sizes FS4 to FS7 in IP55



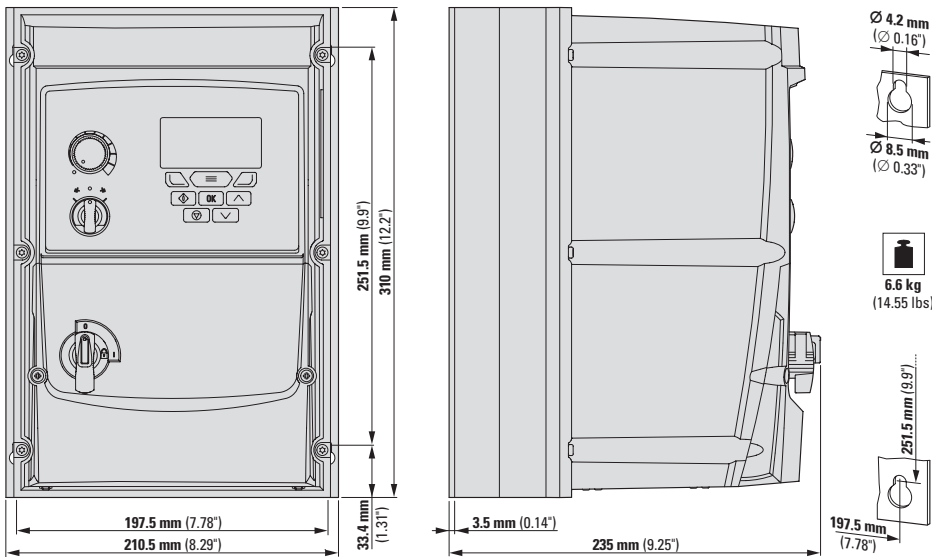
Frame size	a	a1	b	b1	b2	c	c1	Ø1	Ø2	m
	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
FS4	171	110	450	433	9	240	2	8	15	11.5
FS5	235	175	540	520	12	270	2	8	15	22.5
FS6	330	200	865	840	15	313.5	2	11	22	50
FS7	330	200	1280	1255	15	341	2	11	22	80

### Frame sizes FS2, FS3 and FS4 in IP66

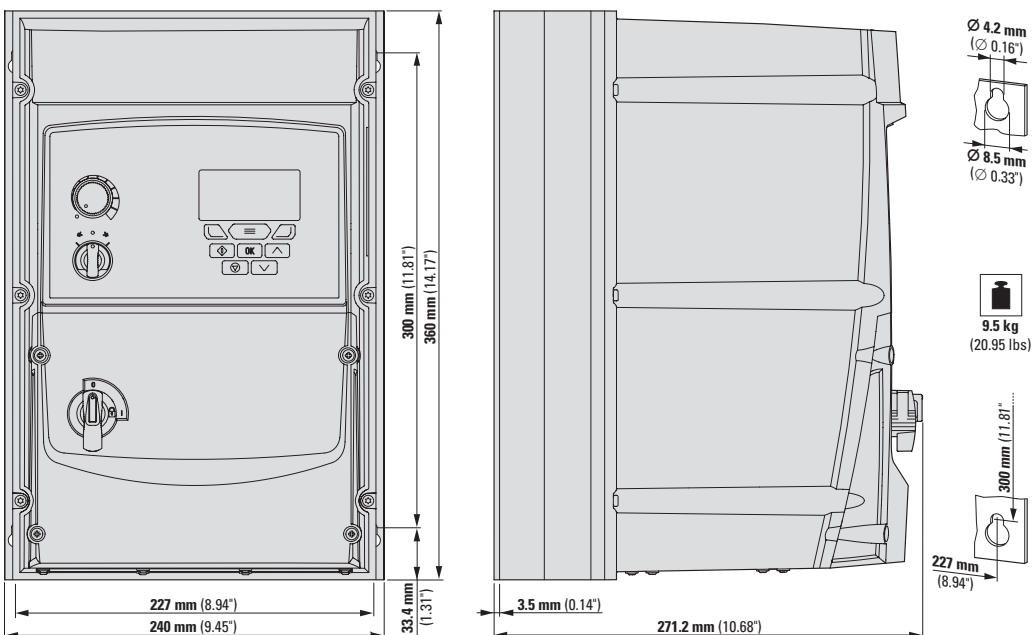
#### FS2



#### FS3



#### FS4





# PowerXL Variable Frequency Drive DM1 and DM1Pro General Purpose Drive

PowerXL DM1 variable frequency drives take a high level of functionality and put it in an extremely compact space. They are the perfect choice for applications in which space is at a premium but the full functionality of a standard universal variable frequency drive is still required, with examples including pump functions, HVAC functions, and controlling common motors such as asynchronous motors and permanent magnet motors.

## Performance range:

- 0.25 - 1.5 kW (115 V)
- 0.55 - 15 kW (230 V)
- 0.75 - 22 kW (400 V)
- 5 - 25 HP (575 V)

## Applications:

- Multi-Pump applications
- Booster Pumps
- Sprinklers
- Supply and exhaust fans
- Chain conveyors, roller and chain conveyors
- Compressors
- Screw conveyors
- Centrifuges
- Sawing & Drilling
- Water jet cutters

## Features:

- The integrated web server makes it possible to configure and control devices without having to install additional software.
- PowerXpert inControl can communicate with the DM1 via Bluetooth without having to open the control cabinet.
- For booster pump systems in which multiple pumps run as a group, the DM1 provides all the basic functions for adding and removing pumps to and from the group and for ensuring that all pumps are controlled uniformly
- IP20 degree of protection with optional IP21/NEMA1 kit Ambient temperature as low as -30°C with cold-weather functionality and as high as +50°C (+60°C with derating)
- Integrated energy measurement and energy cost calculator
- No additional upstream devices (such as a mains choke) are required for short-circuit protection up to 100 kA. The short-circuit current that can be reached depends exclusively on the protective device used

## Accessory:

- Profinet connection
- Profibus connection
- CANopen connection
- IP21 / NEMA1 Kit
- DG1-Remote Keypad

For more information, visit:  
[www.Eaton.com/DM1](http://www.Eaton.com/DM1)



## 2.5 Variable frequency drive DM1 to 22 kW

<b>System overview</b> .....	<b>158</b>
<b>Key to type references</b> .....	<b>159</b>
<b>Ordering</b> .....	<b>160</b>
DM1 for three-phase motors 230 V, three-phase .....	<b>160</b>
DM1 for three-phase motors 400 V, three-phase .....	<b>161</b>
DM1Pro for three-phase motors 115 V/230 V, single-phase .....	<b>162</b>
DM1Pro for three-phase motors 230 V, three-phase .....	<b>163</b>
DM1Pro for three-phase motors 400 V, three-phase .....	<b>164</b>
DM1Pro for three-phase motors, 575 V, three-phase, DM1 and DM1Pro options .....	<b>165</b>
<b>Engineering</b> .....	<b>166</b>
DM1 External components .....	<b>166</b>
Connection examples .....	<b>178</b>
<b>Technical data</b> .....	<b>179</b>
<b>Dimensions</b> .....	<b>181</b>

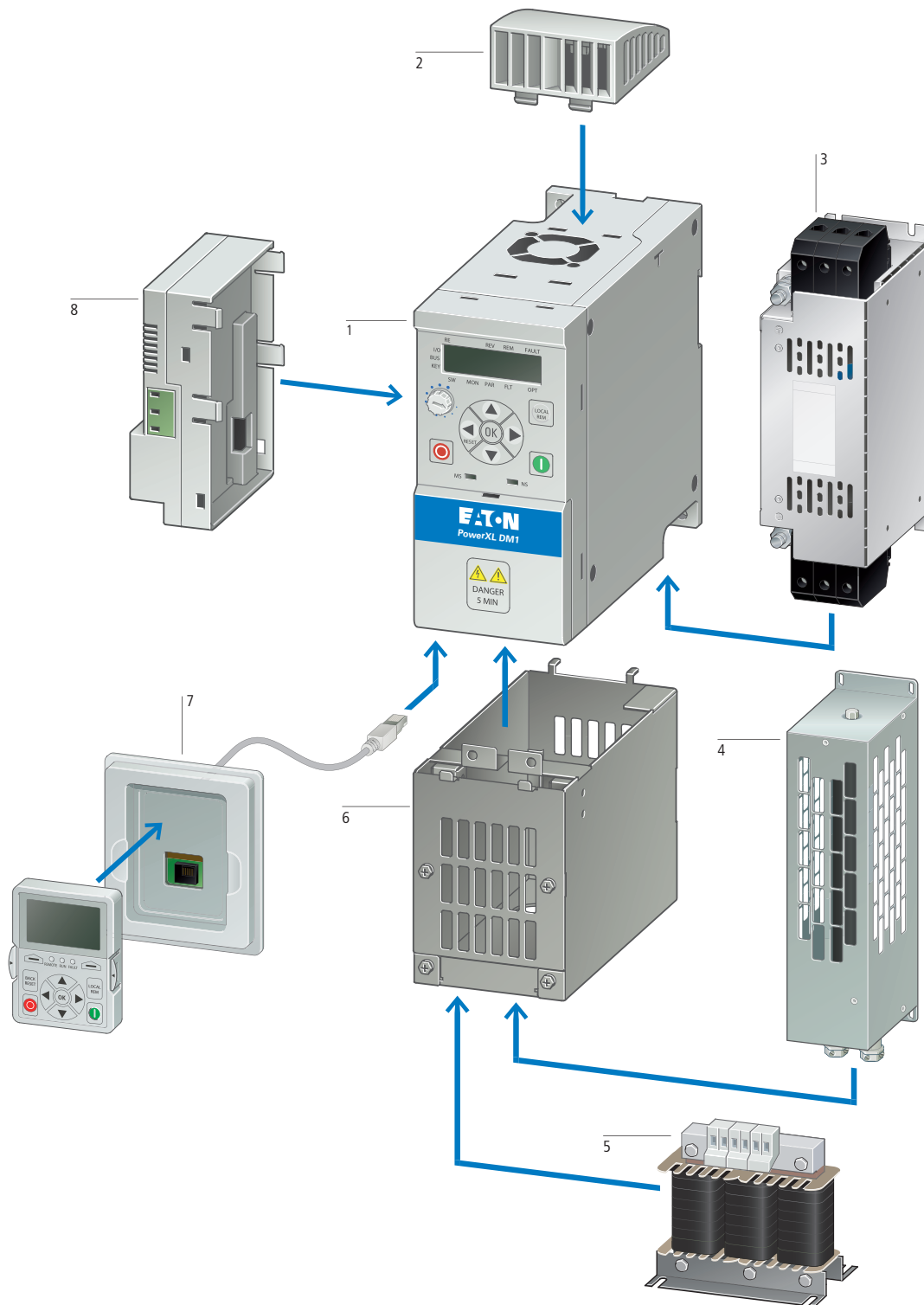


# 2.5

## Variable frequency drive DM1 to 22 kW

### System overview

#### System overview



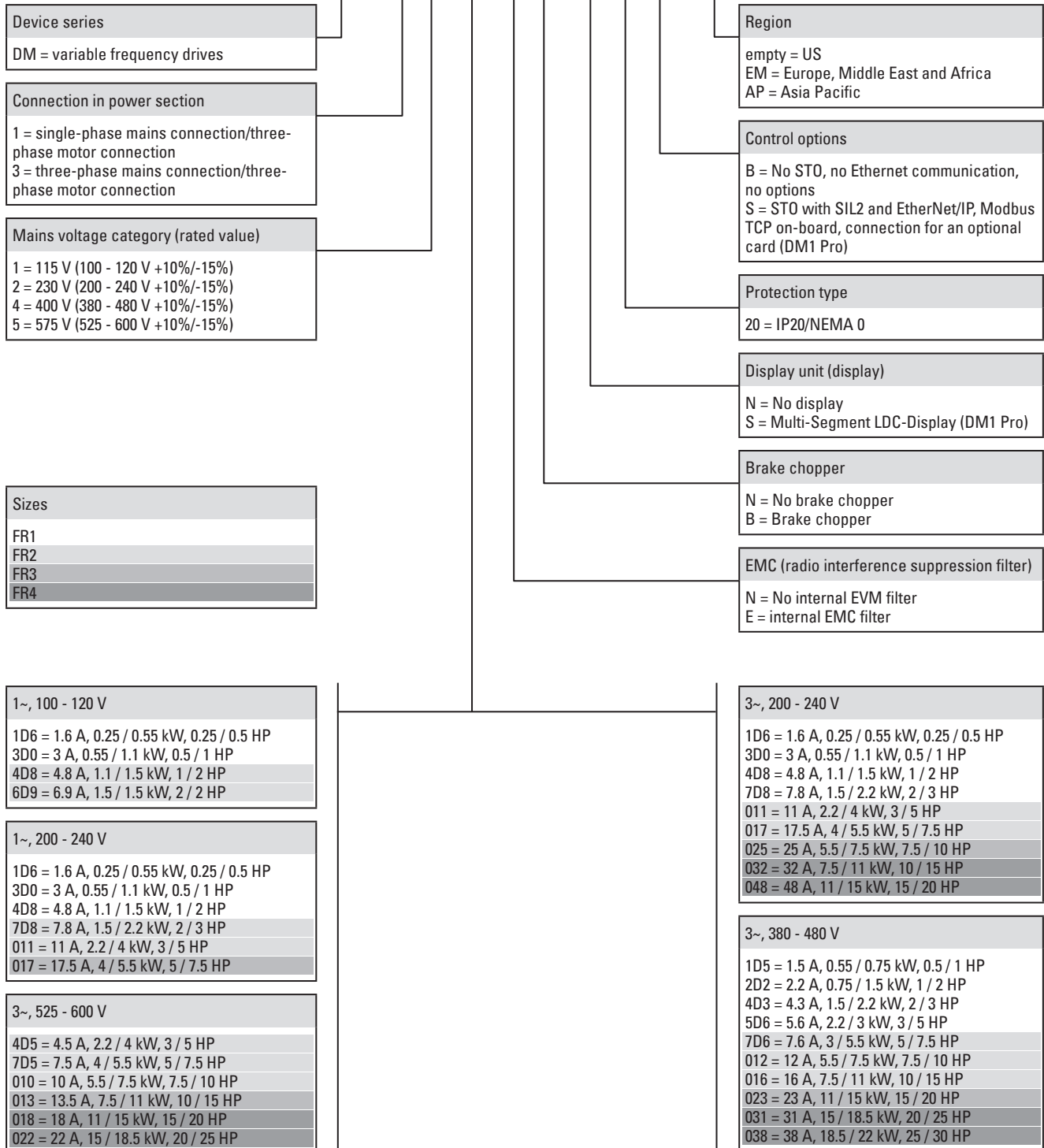
<b>DM1 / DM1 Pro</b>	<b>1</b>
→ Page 160	
<b>NEMA1 / IP21 Kits DXM-ACC...</b>	<b>2</b>
→ Page 165	
<b>EMC filter DX-EMC...</b>	<b>3</b>
→ Page 217	

<b>Braking resistances DX-BR...</b>	<b>4</b>
→ Page 222	
<b>Net-/motor chokes DX-LN.../DX-LM..., DX-PHF... harmonic filters</b>	<b>5</b>
→ Page 215	
→ Page 216	
→ Page 219	

<b>NEMA1 kits DXM-ACC-FRxN1...</b>	<b>6</b>
→ Page 165	
<b>Remote Keypad Kit DXG-KEY-RMTKIT</b>	<b>7</b>
→ Page 165	
<b>Communication Cards DXM-NET...</b>	<b>8</b>
→ Page 165	

## Key to type references

**DM1 - 3 4 4D3 E B - S 20 S - EM**



Power specifications are for a 150%/110% Overload cycle. In the case of a 110% Overload cycle, the permissible ambient temperature is reduced to +40°C.

# 2.5

## Variable frequency drive DM1 to 22 kW

DM1 for three-phase motors 230 V, three-phase

### Ordering

Rated operation current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operation current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150%$ $I_e$ A	kW		HP	$I_n = 110%$ $I_e$ A						kW	HP
<b>U<sub>2</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, without EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	-	✓	-	FS1	IP20/NEMA0	<b>DM1-321D6NB-N20B-EM</b> 3-5018-005A	1 unit
3	0.55	0.5	4.8	1.1	1	-	✓	-			<b>DM1-323D0NB-N20B-EM</b> 3-5018-006A	
4.8	1.1	1	7.8	1.5	2	-	✓	-			<b>DM1-324D8NB-N20B-EM</b> 3-5018-007A	
7.8	1.5	2	11	2.2	3	-	✓	-			<b>DM1-327D8NB-N20B-EM</b> 3-5018-008A	
11	2.2	3	17.5	4	5	-	✓	-	FS2		<b>DM1-32011NB-N20B-EM</b> 3-5020-003A	
17.5	4	5	25	5.5	7.5	-	✓	-			<b>DM1-32017NB-N20B-EM</b> 3-5020-004A	
25	5.5	7.5	32	7.5	10	-	✓	-	FS3		<b>DM1-32025NB-N20B-EM</b> 3-5022-002A	
32	7.5	10	48	11	15	-	✓	-	FS4		<b>DM1-32032NB-N20B-EM</b> 3-5024-003A	
48	11	15	61	15	20	-	✓	-			<b>DM1-32048NB-N20B-EM</b> 3-5024-004A	
<b>U<sub>2</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, with EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	✓	✓	-	FS1	IP20/NEMA0	<b>DM1-321D6EB-N20B-EM</b> 3-5017-005A	1 unit
3	0.55	0.5	4.8	1.1	1	✓	✓	-			<b>DM1-323D0EB-N20B-EM</b> 3-5017-006A	
4.8	1.1	1	7.8	1.5	2	✓	✓	-			<b>DM1-324D8EB-N20B-EM</b> 3-5017-007A	
7.8	1.5	2	11	2.2	3	✓	✓	-			<b>DM1-327D8EB-N20B-EM</b> 3-5017-008A	
11	2.2	3	17.5	4	5	✓	✓	-	FS2		<b>DM1-32011EB-N20B-EM</b> 3-5019-003A	
17.5	4	5	25	5.5	7.5	✓	✓	-			<b>DM1-32017EB-N20B-EM</b> 3-5019-004A	
25	5.5	7.5	32	7.5	10	✓	✓	-	FS3		<b>DM1-32025EB-N20B-EM</b> 3-5021-002A	
32	7.5	10	48	11	15	✓	✓	-	FS4		<b>DM1-32032EB-N20B-EM</b> 3-5023-003A	
48	11	15	61	15	20	✓	✓	-			<b>DM1-32048EB-N20B-EM</b> 3-5023-004A	

#### Notes

<sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature

<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

# Variable frequency drive DM1 to 22 kW

DM1 for three-phase motors 400 V, three-phase

# 2.5

Rated operation current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Rated operation current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack
	$I_n = 150%$ $I_e$ A	kW HP		$I_n = 110%$ $I_e$ A	kW HP	Radio interference suppression filter	Brake chopper	Seven-segment display				
<b>U<sub>e</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, without EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
1.5	0.55	0.5	2.2	0.75	1	-	✓	-	FS1	IP20/NEMA0	<b>DM1-341D5NB-N20B-EM</b> 3-5026-005A	1 unit
2.2	0.75	1	4.3	1.5	2	-	✓	-			<b>DM1-342D2NB-N20B-EM</b> 3-5026-006A	
4.3	1.5	2	5.6	2.2	3	-	✓	-			<b>DM1-344D3NB-N20B-EM</b> 3-5026-007A	
5.6	2.2	3	7.6	3	5	-	✓	-			<b>DM1-345D6NB-N20B-EM</b> 3-5026-008A	
7.6	3	5	12	5.5	7.5	-	✓	-	FS2		<b>DM1-347D6NB-N20B-EM</b> 3-5028-004A	
12	5.5	7.5	16	7.5	10	-	✓	-			<b>DM1-34012NB-N20B-EM</b> 3-5028-005A	
16	7.5	10	23	11	15	-	✓	-			<b>DM1-34016NB-N20B-EM</b> 3-5028-006A	
23	11	15	31	15	20	-	✓	-	FS3		<b>DM1-34023NB-N20B-EM</b> 3-5030-002A	
31	15	20	38	18.5	25	-	✓	-	FS4		<b>DM1-34031NB-N20B-EM</b> 3-5032-003A	
38	18.5	25	46	22	30	-	✓	-			<b>DM1-34038NB-N20B-EM</b> 3-5032-004A	
<b>U<sub>e</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, with EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
1.5	0.55	0.5	2.2	0.75	1	✓	✓	-	FS1	IP20/NEMA0	<b>DM1-341D5EB-N20B-EM</b> 3-5025-005A	1 unit
2.2	0.75	1	4.3	1.5	2	✓	✓	-			<b>DM1-342D2EB-N20B-EM</b> 3-5025-006A	
4.3	1.5	2	5.6	2.2	3	✓	✓	-			<b>DM1-344D3EB-N20B-EM</b> 3-5025-007A	
5.6	2.2	3	7.6	3	5	✓	✓	-			<b>DM1-345D6EB-N20B-EM</b> 3-5025-008A	
7.6	3	5	12	5.5	7.5	✓	✓	-	FS2		<b>DM1-347D6EB-N20B-EM</b> 3-5027-004A	
12	5.5	7.5	16	7.5	10	✓	✓	-			<b>DM1-34012EB-N20B-EM</b> 3-5027-005A	
16	7.5	10	23	11	15	✓	✓	-			<b>DM1-34016EB-N20B-EM</b> 3-5027-006A	
23	11	15	31	15	20	✓	✓	-	FS3		<b>DM1-34023EB-N20B-EM</b> 3-5029-002A	
31	15	20	38	18.5	25	✓	✓	-	FS4		<b>DM1-34031EB-N20B-EM</b> 3-5031-003A	
38	18.5	25	46	22	30	✓	✓	-			<b>DM1-34038EB-N20B-EM</b> 3-5031-004A	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

DM1

# 2.5

## Variable frequency drive DM1 to 22 kW

DM1Pro for three-phase motors 115 V/230 V, single-phase

Rated operation current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operation current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150\%$ $I_e$ A	kW		HP	$I_n = 110\%$ $I_e$ A						kW	HP
<b>U<sub>e</sub> 115 V AC, single-phase / U<sub>2</sub> 230 V AC, three-phase, without EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 100 (-15%) - 120 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	-	✓	✓	FS1	IP20/NEMA0	<b>DM1-111D6NB-S20S-EM</b> 3-5042-003A	1 unit
3	0.55	0.5	4.8	1.1	1	-	✓	✓			<b>DM1-113D0NB-S20S-EM</b> 3-5042-004A	
4.8	1.1	1	6.9	1.5	2	-	✓	✓	FS2		<b>DM1-114D8NB-S20S-EM</b> 3-5044-003A	
6.9	1.5	2	7.8	1.5	2	-	✓	✓			<b>DM1-116D9NB-S20S-EM</b> 3-5044-004A	
<b>U<sub>e</sub> 115 V AC, single-phase / U<sub>2</sub> 230 V AC, three-phase, with EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 100 (-15%) - 120 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	✓	✓	✓	FS1	IP20/NEMA0	<b>DM1-111D6EB-S20S-EM</b> 3-5041-003A	1 unit
3	0.55	0.5	4.8	1.1	1	✓	✓	✓			<b>DM1-113D0EB-S20S-EM</b> 3-5041-004A	
4.8	1.1	1	6.9	1.5	2	✓	✓	✓	FS2		<b>DM1-114D8EB-S20S-EM</b> 3-5043-003A	
6.9	1.5	2	7.8	1.5	2	✓	✓	✓			<b>DM1-116D9EB-S20S-EM</b> 3-5043-004A	
<b>U<sub>e</sub> 230 V AC, single-phase / U<sub>2</sub> 230 V AC, three-phase, without EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	-	✓	✓	FS1	IP20/NEMA0	<b>DM1-121D6NB-S20S-EM</b> 3-5046-004A	1 unit
3	0.55	0.5	4.8	1.1	1	-	✓	✓			<b>DM1-123D0NB-S20S-EM</b> 3-5046-005A	
4.8	1.1	1	7.8	1.5	2	-	✓	✓			<b>DM1-124D8NB-S20S-EM</b> 3-5046-006A	
7.8	1.5	2	11	2.2	3	-	✓	✓	FS2		<b>DM1-127D8NB-S20S-EM</b> 3-5048-003A	
11	2.2	3	17.5	4	5	-	✓	✓			<b>DM1-12011NB-S20S-EM</b> 3-5048-004A	
17.5	4	5	25	5.5	7.5	-	✓	✓	FS3		<b>DM1-12017NB-S20S-EM</b> 3-5050-002A	
<b>U<sub>e</sub> 230 V AC, single-phase / U<sub>2</sub> 230 V AC, three-phase, with EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	✓	✓	✓	FS1	IP20/NEMA0	<b>DM1-121D6EB-S20S-EM</b> 3-5045-004A	1 unit
3	0.55	0.5	4.8	1.1	1	✓	✓	✓			<b>DM1-123D0EB-S20S-EM</b> 3-5045-005A	
4.8	1.1	1	7.8	1.5	2	✓	✓	✓			<b>DM1-124D8EB-S20S-EM</b> 3-5045-006A	
7.8	1.5	2	11	2.2	3	✓	✓	✓	FS2		<b>DM1-127D8EB-S20S-EM</b> 3-5047-003A	
11	2.2	3	17.5	4	5	✓	✓	✓			<b>DM1-12011EB-S20S-EM</b> 3-5047-004A	
17.5	4	5	25	5.5	7.5	✓	✓	✓	FS3		<b>DM1-12017EB-S20S-EM</b> 3-5049-002A	
<b>Notes</b>	<sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz											

# Variable frequency drive DM1 to 22 kW

DM1Pro for three-phase motors 230 V, three-phase

# 2.5

Rated operation current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Rated operation current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150\%$ $I_e$ A	kW		HP	$I_n = 110\%$ $I_e$ A						kW	HP
<b>U<sub>e</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, without EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	-	✓	✓	FS1	IP20/NEMA0	<b>DM1-321D6NB-S20S-EM</b> 3-5002-005A	1 unit
3	0.55	0.5	4.8	1.1	1	-	✓	✓			<b>DM1-323D0NB-S20S-EM</b> 3-5002-006A	
4.8	1.1	1	7.8	1.5	2	-	✓	✓			<b>DM1-324D8NB-S20S-EM</b> 3-5002-007A	
7.8	1.5	2	11	2.2	3	-	✓	✓			<b>DM1-327D8NB-S20S-EM</b> 3-5002-008A	
11	2.2	3	17.5	4	5	-	✓	✓	FS2		<b>DM1-32011NB-S20S-EM</b> 3-5004-003A	
17.5	4	5	25	5.5	7.5	-	✓	✓			<b>DM1-32017NB-S20S-EM</b> 3-5004-004A	
25	5.5	7.5	32	7.5	10	-	✓	✓	FS3		<b>DM1-32025NB-S20S-EM</b> 3-5006-002A	
32	7.5	10	48	11	15	-	✓	✓	FS4		<b>DM1-32032NB-S20S-EM</b> 3-5008-003A	
48	11	15	61	15	20	-	✓	✓			<b>DM1-32048NB-S20S-EM</b> 3-5008-004A	
<b>U<sub>e</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, with EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
1.6	0.25	0.25	3	0.55	0.5	✓	✓	✓	FS1	IP20/NEMA0	<b>DM1-321D6EB-S20S-EM</b> 3-5001-005A	1 unit
3	0.55	0.5	4.8	1.1	1	✓	✓	✓			<b>DM1-323D0EB-S20S-EM</b> 3-5001-006A	
4.8	1.1	1	7.8	1.5	2	✓	✓	✓			<b>DM1-324D8EB-S20S-EM</b> 3-5001-007A	
7.8	1.5	2	11	2.2	3	✓	✓	✓			<b>DM1-327D8EB-S20S-EM</b> 3-5001-008A	
11	2.2	3	17.5	4	5	✓	✓	✓	FS2		<b>DM1-32011EB-S20S-EM</b> 3-5003-003A	
17.5	4	5	25	5.5	7.5	✓	✓	✓			<b>DM1-32017EB-S20S-EM</b> 3-5003-004A	
25	5.5	7.5	32	7.5	10	✓	✓	✓	FS3		<b>DM1-32025EB-S20S-EM</b> 3-5005-002A	
32	7.5	10	48	11	15	✓	✓	✓	FS4		<b>DM1-32032EB-S20S-EM</b> 3-5007-003A	
48	11	15	61	15	20	✓	✓	✓			<b>DM1-32048EB-S20S-EM</b> 3-5007-004A	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

DM1

# 2.5

## Variable frequency drive DM1 to 22 kW

DM1Pro for three-phase motors 400 V, three-phase

Rated operation current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operation current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack
	$I_n = 150\%$ $I_e$ A	kW HP		$I_n = 110\%$ $I_e$ A	kW HP	Radio interference suppression filter	Brake chopper	Seven-segment display				
<b>U<sub>e</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, without EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
1.5	0.55	0.5	2.2	0.75	1	-	✓	✓	FS1	IP20/NEMA0	<b>DM1-341D5NB-S20S-EM</b> 3-5010-005A	1 unit
2.2	0.75	1	4.3	1.5	2	-	✓	✓			<b>DM1-342D2NB-S20S-EM</b> 3-5010-006A	
4.3	1.5	2	5.6	2.2	3	-	✓	✓			<b>DM1-344D3NB-S20S-EM</b> 3-5010-007A	
5.6	2.2	3	7.6	3	5	-	✓	✓			<b>DM1-345D6NB-S20S-EM</b> 3-5010-008A	
7.6	3	5	12	5.5	7.5	-	✓	✓	FS2		<b>DM1-347D6NB-S20S-EM</b> 3-5012-004A	
12	5.5	7.5	16	7.5	10	-	✓	✓			<b>DM1-34012NB-S20S-EM</b> 3-5012-005A	
16	7.5	10	23	11	15	-	✓	✓			<b>DM1-34016NB-S20S-EM</b> 3-5012-006A	
23	11	15	31	15	20	-	✓	✓	FS3		<b>DM1-34023NB-S20S-EM</b> 3-5014-002A	
31	15	20	38	18.5	25	-	✓	✓	FS4		<b>DM1-34031NB-S20S-EM</b> 3-5016-003A	
38	18.5	25	46	22	30	-	✓	✓			<b>DM1-34038NB-S20S-EM</b> 3-5016-004A	
<b>U<sub>e</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, with EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
1.5	0.55	0.5	2.2	0.75	1	✓	✓	✓	FS1	IP20/NEMA0	<b>DM1-341D5EB-S20S-EM</b> 3-5009-005A	1 unit
2.2	0.75	1	4.3	1.5	2	✓	✓	✓			<b>DM1-342D2EB-S20S-EM</b> 3-5009-006A	
4.3	1.5	2	5.6	2.2	3	✓	✓	✓			<b>DM1-344D3EB-S20S-EM</b> 3-5009-007A	
5.6	2.2	3	7.6	3	5	✓	✓	✓			<b>DM1-345D6EB-S20S-EM</b> 3-5009-008A	
7.6	3	5	12	5.5	7.5	✓	✓	✓	FS2		<b>DM1-347D6EB-S20S-EM</b> 3-5011-004A	
12	5.5	7.5	16	7.5	10	✓	✓	✓			<b>DM1-34012EB-S20S-EM</b> 3-5011-005A	
16	7.5	10	23	11	15	✓	✓	✓			<b>DM1-34016EB-S20S-EM</b> 3-5011-006A	
23	11	15	31	15	20	✓	✓	✓	FS3		<b>DM1-34023EB-S20S-EM</b> 3-5013-002A	
31	15	20	38	18.5	25	✓	✓	✓	FS4		<b>DM1-34031EB-S20S-EM</b> 3-5015-003A	
38	18.5	25	46	22	30	✓	✓	✓			<b>DM1-34038EB-S20S-EM</b> 3-5015-004A	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

## DM1Pro for three-phase motors, 575 V, three-phase, DM1 and DM1Pro options

Rated operation current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Rated operation current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150\%$ $I_e$ A	kW		HP	$I_n = 110\%$ $I_e$ A						kW	HP
<b>U<sub>e</sub> 575 V AC, three-phase / U<sub>2</sub> 575 V AC, three-phase, without EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 525 (-15%) - 600 (+10%) V												
4.5	2.2	3	7.5	4	5	-	✓	✓	FS2	IP20/NEMA0	<b>DM1-354D5NB-S20S-EM</b> 3-5051-004A	1 unit
7.5	4	5	10	5.5	7.5	-	✓	✓			<b>DM1-357D5NB-S20S-EM</b> 3-5051-005A	
10	5.5	7.5	13.5	7.5	10	-	✓	✓			<b>DM1-35010NB-S20S-EM</b> 3-5051-006A	
13.5	7.5	10	18	11	15	-	✓	✓	FS3		<b>DM1-35013NB-S20S-EM</b> 3-5052-002A	
18	11	15	22	15	20	-	✓	✓	FS4		<b>DM1-35018NB-S20S-EM</b> 3-5053-003A	
22	15	20	27	18.5	25	-	✓	✓			<b>DM1-35022NB-S20S-EM</b> 3-5053-004A	
<b>U<sub>e</sub> 575 V AC, three-phase / U<sub>2</sub> 575 V AC, three-phase, with EMC filter</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 525 (-15%) - 600 (+10%) V												
4.5	2.2	3	7.5	4	5	✓	✓	✓	FS2	IP20/NEMA0	<b>DM1-354D5EB-S20S-EM</b> 3-5060-004A	1 unit
7.5	4	5	10	5.5	7.5	✓	✓	✓			<b>DM1-357D5EB-S20S-EM</b> 3-5060-005A	
10	5.5	7.5	13.5	7.5	10	✓	✓	✓			<b>DM1-35010EB-S20S-EM</b> 3-5060-006A	
13.5	7.5	10	18	11	15	✓	✓	✓	FS3		<b>DM1-35013EB-S20S-EM</b> 3-5061-002A	
18	11	15	22	15	20	✓	✓	✓	FS4		<b>DM1-35018EB-S20S-EM</b> 3-5062-003A	
22	15	20	27	18.5	25	✓	✓	✓			<b>DM1-35022EB-S20S-EM</b> 3-5062-004A	

### Notes

<sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature

<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

### Options

Description	Length m	For use with	Catalog Number	Article no.	Std. pack
<b>IP21 / NEMA1 Kit DM1</b>					
In addition to increasing the degree of protection, the NEMA1 kit also features a cable duct and the option of terminating shielding. Moreover, the ferrite cores can be housed inside this enclosure.					
DM1 FR1 NEMA 1 Kit	3	DM1	<b>DXM-ACC-FR1N1KIT</b>	3-5033-001A	1 unit
DM1 FR2 NEMA 1 Kit		DM1	<b>DXM-ACC-FR2N1KIT</b>	3-5034-001A	
DM1 FR3 NEMA 1 Kit		DM1	<b>DXM-ACC-FR3N1KIT</b>	3-5035-001A	
DM1 FR4 NEMA 1 Kit		DM1	<b>DXM-ACC-FR4N1KIT</b>	3-5036-001A	
<b>IP21 / NEMA1 Kit DM1 100kA UL Plenum rating</b>					
DM1 Size 1 Flammwidriges NEMA 1 Kit	3	DM1	<b>DXM-ACC-FR1N1PKIT</b>	3-5056-001A	1 unit
DM1 Size 2 Flammwidriges NEMA 1 Kit		DM1	<b>DXM-ACC-FR2N1PKIT</b>	3-5057-001A	
DM1 Size 3 Flammwidriges NEMA 1 Kit		DM1	<b>DXM-ACC-FR3N1PKIT</b>	3-5058-001A	
DM1 Size 4 Flammwidriges NEMA 1 Kit		DM1	<b>DXM-ACC-FR4N1PKIT</b>	3-5059-001A	
<b>DM1Pro network interfaces</b>					
DM1 PROFIBUS option with plug-in enclosure	3	DM1	<b>DXM-NET-PROFIBUS</b>	3-5039-001A	1 unit
DM1 CANopen option with plug-in enclosure		DM1	<b>DXM-NET-CANOPEN</b>	3-5040-001A	
DM1 PROFINET option with plug-in enclosure		DM1	<b>DXM-NET-PROFINET</b>	400004	
<b>DG1, DH1 &amp; DM1 keypad options</b>					
DG1/DH1 Keypad: RMTKIT	3		<b>DXG-KEY-RMTKIT</b>	730-32033-00P	1 unit



# 2.5

## Variable frequency drive DM1 to 22 kW

### DM1 External components

#### Engineering

Catalog Number	<b>I<sub>e</sub> (150% overload)</b>			<b>I<sub>e</sub> (110% overload)</b>		
	Rated operational current A	Type 1 coordination	Type 1 coordination	Rated operational current A	Type 1 coordination	Type 1 coordination
<b>3~/3~ 230 V without EMC</b>						
DM1-321D6NB-N20B-EM	1.6	PKZM0-1.6	C10G4	3	PKZM0-4	C10G4
DM1-323D0NB-N20B-EM	3	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DM1-324D8NB-N20B-EM	4.8	PKZM0-6.3	C10G10	7.8	PKZM0-10	C10G10
DM1-327D8NB-N20B-EM	7.8	PKZM0-10	C10G16	11	PKZM0-12	C10G16
DM1-32011NB-N20B-EM	11	PKZM0-12	C10G32	17.5	PKZM0-20	C10G32
DM1-32017NB-N20B-EM	17.5	PKZM0-20	C10G32	25	PKZM0-25	C10G32
DM1-32025NB-N20B-EM	25	PKZM0-25	C14G40	32	PKZM0-32	C14G40
DM1-32032NB-N20B-EM	32	PKZM0-32	C22G63	48	PKZM4-50	C22G63
DM1-32048NB-N20B-EM	48	PKZM4-50	C22G80	61	PKZM4-63	C22G80
<b>3~/3~ 230 V with EMC</b>						
DM1-321D6EB-N20B-EM	1.6	PKZM0-1.6	C10G4	3	PKZM0-4	C10G4
DM1-323D0EB-N20B-EM	3	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DM1-324D8EB-N20B-EM	4.8	PKZM0-6.3	C10G10	7.8	PKZM0-10	C10G10
DM1-327D8EB-N20B-EM	7.8	PKZM0-10	C10G16	11	PKZM0-12	C10G16
DM1-32011EB-N20B-EM	11	PKZM0-12	C10G32	17.5	PKZM0-20	C10G32
DM1-32017EB-N20B-EM	17.5	PKZM0-20	C10G32	25	PKZM0-25	C10G32
DM1-32025EB-N20B-EM	25	PKZM0-25	C14G40	32	PKZM0-32	C14G40
DM1-32032EB-N20B-EM	32	PKZM0-32	C22G63	48	PKZM4-50	C22G63
DM1-32048EB-N20B-EM	48	PKZM4-50	C22G80	61	PKZM4-63	C22G80
<b>3~/3~ 400 V without EMC</b>						
DM1-341D5NB-N20B-EM	1.5	PKZM0-1.6	C10G4	2.2	PKZM0-2.5	C10G4
DM1-342D2NB-N20B-EM	2.2	PKZM0-2.5	C10G10	4.3	PKZM0-6.3	C10G10
DM1-344D3NB-N20B-EM	4.3	PKZM0-6.3	C10G10	5.6	PKZM0-6.3	C10G10
DM1-345D6NB-N20B-EM	5.6	PKZM0-6.3	C10G10	7.6	PKZM0-10	C10G10
DM1-347D6NB-N20B-EM	7.6	PKZM0-10	C10G16	12	PKZM0-12	C10G16
DM1-34012NB-N20B-EM	12	PKZM0-12	C10G20	16	PKZM0-16	C10G20
DM1-34016NB-N20B-EM	16	PKZM0-16	C10G32	23	PKZM0-25	C10G32
DM1-34023NB-N20B-EM	23	PKZM0-25	C14G40	31	PKZM0-32	C14G40
DM1-34031NB-N20B-EM	31	PKZM0-32	C14G50	38	PKZM4-40	C14G50
DM1-34038NB-N20B-EM	38	PKZM4-40	C22G63	46	PKZM4-50	C22G63
<b>3~/3~ 400 V with EMC</b>						
DM1-341D5EB-N20B-EM	1.5	PKZM0-1.6	C10G4	2.2	PKZM0-2.5	C10G4
DM1-342D2EB-N20B-EM	2.2	PKZM0-2.5	C10G10	4.3	PKZM0-6.3	C10G10
DM1-344D3EB-N20B-EM	4.3	PKZM0-6.3	C10G10	5.6	PKZM0-6.3	C10G10
DM1-345D6EB-N20B-EM	5.6	PKZM0-6.3	C10G10	7.6	PKZM0-10	C10G10
DM1-347D6EB-N20B-EM	7.6	PKZM0-10	C10G16	12	PKZM0-12	C10G16
DM1-34012EB-N20B-EM	12	PKZM0-12	C10G20	16	PKZM0-16	C10G20
DM1-34016EB-N20B-EM	16	PKZM0-16	C10G32	23	PKZM0-25	C10G32
DM1-34023EB-N20B-EM	23	PKZM0-25	C14G40	31	PKZM0-32	C14G40
DM1-34031EB-N20B-EM	31	PKZM0-32	C14G50	38	PKZM4-40	C14G50
DM1-34038EB-N20B-EM	38	PKZM4-40	C22G63	46	PKZM4-50	C22G63

Minimum braking resistance $\Omega$	Inrush Voltage	The number of brake choppers	External brake resistors			RCD type
			10.0% ED	20.0% ED	40.0% ED	
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-3K1	FRCdM-40/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-5K1	FRCdM-40/4/003-G/Bfq
12	395	1	DX-BR012-3K1	DX-BR012-3K1	DX-BR012-9K2	FRCdM-40/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	FRCdM-63/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	P:3 x DX-BR022-5K1	
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-3K1	FRCdM-40/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-5K1	FRCdM-40/4/003-G/Bfq
12	395	1	DX-BR012-3K1	DX-BR012-3K1	DX-BR012-9K2	FRCdM-40/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	FRCdM-63/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	P:3 x DX-BR022-5K1	
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR035-1K1	DX-BR040-3K1	DX-BR040-5K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR047-9K2	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-5K1	DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
26	790	1	DX-BR040-3K1	DX-BR040-5K1	P2R2: DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR035-1K1	DX-BR040-3K1	DX-BR040-5K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR047-9K2	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-5K1	DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
26	790	1	DX-BR040-3K1	DX-BR040-5K1	P2R2: DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq

# 2.5

## Variable frequency drive DM1 to 22 kW

### DM1 External components

Catalog Number	$I_o$ (150% overload)			$I_o$ (110% overload)		
	Rated operational current A	Type 1 coordination	Type 1 coordination	Rated operational current A	Type 1 coordination	Type 1 coordination
<b>1~ 115 V/3~230 V without EMC</b>						
DM1-111D6NB-S20S-EM	1.6	PKZM0-1.6	C10G10	3	PKZM0-4	C10G10
DM1-113D0NB-S20S-EM	3	PKZM0-4	C10G25	4.8	PKZM0-6.3	C10G25
DM1-114D8NB-S20S-EM	4.8	PKZM0-6.3	C10G32	6.9	PKZM0-10	C10G32
DM1-116D9NB-S20S-EM	6.9	PKZM0-10	C14G40	7.8	PKZM0-10	C14G40
<b>1~ 115 V/3~ 230 V with EMC</b>						
DM1-111D6EB-S20S-EM	1.6	PKZM0-1.6	C10G10	3	PKZM0-4	C10G10
DM1-113D0EB-S20S-EM	3	PKZM0-4	C10G25	4.8	PKZM0-6.3	C10G25
DM1-114D8EB-S20S-EM	4.8	PKZM0-6.3	C10G32	6.9	PKZM0-10	C10G32
DM1-116D9EB-S20S-EM	6.9	PKZM0-10	C14G40	7.8	PKZM0-10	C14G40
<b>1~/3~ 230 V without EMC</b>						
DM1-121D6NB-S20S-EM	1.6	PKZM0-1.6	C10G4	3	PKZM0-4	C10G4
DM1-123D0NB-S20S-EM	3	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DM1-124D8NB-S20S-EM	4.8	PKZM0-6.3	C10G10	7.8	PKZM0-10	C10G10
DM1-127D8NB-S20S-EM	7.8	PKZM0-10	C10G16	11	PKZM0-12	C10G16
DM1-12011NB-S20S-EM	11	PKZM0-12	C10G25	17.5	PKZM0-20	C10G25
DM1-12017NB-S20S-EM	17.5	PKZM0-20	C10G32	25	PKZM0-25	C10G32
<b>1~/3~ 230 V with EMC</b>						
DM1-121D6EB-S20S-EM	1.6	PKZM0-1.6	C10G4	3	PKZM0-4	C10G4
DM1-123D0EB-S20S-EM	3	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DM1-124D8EB-S20S-EM	4.8	PKZM0-6.3	C10G10	7.8	PKZM0-10	C10G10
DM1-127D8EB-S20S-EM	7.8	PKZM0-10	C10G16	11	PKZM0-12	C10G16
DM1-12011EB-S20S-EM	11	PKZM0-12	C10G25	17.5	PKZM0-20	C10G25
DM1-12017EB-S20S-EM	17.5	PKZM0-20	C10G32	25	PKZM0-25	C10G32
<b>3~/3~ 230 V without EMC</b>						
DM1-321D6NB-S20S-EM	1.6	PKZM0-1.6	C10G4	3	PKZM0-4	C10G4
DM1-323D0NB-S20S-EM	3	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DM1-324D8NB-S20S-EM	4.8	PKZM0-6.3	C10G10	7.8	PKZM0-10	C10G10
DM1-327D8NB-S20S-EM	7.8	PKZM0-10	C10G16	11	PKZM0-12	C10G16
DM1-32011NB-S20S-EM	11	PKZM0-12	C10G25	17.5	PKZM0-20	C10G25
DM1-32017NB-S20S-EM	17.5	PKZM0-20	C10G32	25	PKZM0-25	C10G32
DM1-32025NB-S20S-EM	25	PKZM0-25	C14G40	32	PKZM0-32	C14G40
DM1-32032NB-S20S-EM	32	PKZM0-32	C22G63	48	PKZM4-50	C22G63
DM1-32048NB-S20S-EM	48	PKZM4-50	C22G80	61	PKZM4-63	C22G80
<b>3~/3~ 230 V with EMC</b>						
DM1-321D6EB-S20S-EM	1.6	PKZM0-1.6	C10G4	3	PKZM0-4	C10G4
DM1-323D0EB-S20S-EM	3	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DM1-324D8EB-S20S-EM	4.8	PKZM0-6.3	C10G10	7.8	PKZM0-10	C10G10
DM1-327D8EB-S20S-EM	7.8	PKZM0-10	C10G16	11	PKZM0-12	C10G16
DM1-32011EB-S20S-EM	11	PKZM0-12	C10G25	17.5	PKZM0-20	C10G25
DM1-32017EB-S20S-EM	17.5	PKZM0-20	C10G32	25	PKZM0-25	C10G32
DM1-32025EB-S20S-EM	25	PKZM0-25	C14G40	32	PKZM0-32	C14G40
DM1-32032EB-S20S-EM	32	PKZM0-32	C22G63	48	PKZM4-50	C22G63
DM1-32048EB-S20S-EM	48	PKZM4-50	C22G80	61	PKZM4-63	C22G80

Minimum braking resistance Ω	Switch-on voltage – brake chopper	Quantity – brake chopper	External brake resistors			RCD type
			10.0% ED	20.0% ED	40.0% ED	
36	395	1				FRCdM-25/4/003-G/Bfq
36	395	1				FRCdM-25/4/003-G/Bfq
16	395	1				FRCdM-40/4/003-G/Bfq
16	395	1				FRCdM-40/4/003-G/Bfq
36	395	1				FRCdM-25/4/003-G/Bfq
36	395	1				FRCdM-25/4/003-G/Bfq
16	395	1				FRCdM-40/4/003-G/Bfq
16	395	1				FRCdM-40/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-1K4	DX-BR022-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-3K1	FRCdM-25/4/003-G/Bfq
12	395	1	DX-BR012-3K1	DX-BR012-3K1	DX-BR012-5K1	FRCdM-40/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-1K4	DX-BR022-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-3K1	FRCdM-25/4/003-G/Bfq
12	395	1	DX-BR012-3K1	DX-BR012-3K1	DX-BR012-5K1	FRCdM-40/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-5K1	FRCdM-40/4/003-G/Bfq
12	395	1	DX-BR012-3K1	DX-BR012-3K1	DX-BR012-9K2	FRCdM-40/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	FRCdM-63/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	P:3 x DX-BR022-5K1	
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
36	395	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-3K1	FRCdM-25/4/003-G/Bfq
16	395	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-5K1	FRCdM-40/4/003-G/Bfq
12	395	1	DX-BR012-3K1	DX-BR012-3K1	DX-BR012-9K2	FRCdM-40/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	FRCdM-63/4/003-G/Bfq
6	395	1	P:3 x DX-BR022-1K4	P:3 x DX-BR022-3K1	P:3 x DX-BR022-5K1	

# 2.5

## Variable frequency drive DM1 to 22 kW

### DM1 External components

Catalog Number	<b>I<sub>o</sub> (150% overload)</b>			<b>I<sub>o</sub> (110% overload)</b>		
	Rated operational current A	Type 1 coordination	Type 1 coordination	Rated operational current A	Type 1 coordination	Type 1 coordination
<b>3~/3~ 400 V without EMC</b>						
DM1-341D5NB-S20S-EM	1.5	PKZM0-1.6	C10G4	2.2	PKZM0-2.5	C10G4
DM1-342D2NB-S20S-EM	2.2	PKZM0-2.5	C10G10	4.3	PKZM0-6.3	C10G10
DM1-344D3NB-S20S-EM	4.3	PKZM0-6.3	C10G10	5.6	PKZM0-6.3	C10G10
DM1-345D6NB-S20S-EM	5.6	PKZM0-6.3	C10G10	7.6	PKZM0-10	C10G10
DM1-347D6NB-S20S-EM	7.6	PKZM0-10	C10G16	12	PKZM0-12	C10G16
DM1-34012NB-S20S-EM	12	PKZM0-12	C10G20	16	PKZM0-16	C10G20
DM1-34016NB-S20S-EM	16	PKZM0-16	C10G32	23	PKZM0-25	C10G32
DM1-34023NB-S20S-EM	23	PKZM0-25	C14G40	31	PKZM0-32	C14G40
DM1-34031NB-S20S-EM	31	PKZM0-32	C14G50	38	PKZM4-40	C14G50
DM1-34038NB-S20S-EM	38	PKZM4-40	C22G63	46	PKZM4-50	C22G63
<b>3~/3~ 400 V with EMC</b>						
DM1-341D5EB-S20S-EM	1.5	PKZM0-1.6	C10G4	2.2	PKZM0-2.5	C10G4
DM1-342D2EB-S20S-EM	2.2	PKZM0-2.5	C10G10	4.3	PKZM0-6.3	C10G10
DM1-344D3EB-S20S-EM	4.3	PKZM0-6.3	C10G10	5.6	PKZM0-6.3	C10G10
DM1-345D6EB-S20S-EM	5.6	PKZM0-6.3	C10G10	7.6	PKZM0-10	C10G10
DM1-347D6EB-S20S-EM	7.6	PKZM0-10	C10G16	12	PKZM0-12	C10G16
DM1-34012EB-S20S-EM	12	PKZM0-12	C10G20	16	PKZM0-16	C10G20
DM1-34016EB-S20S-EM	16	PKZM0-16	C10G32	23	PKZM0-25	C10G32
DM1-34023EB-S20S-EM	23	PKZM0-25	C14G40	31	PKZM0-32	C14G40
DM1-34031EB-S20S-EM	31	PKZM0-32	C14G50	38	PKZM4-40	C14G50
DM1-34038EB-S20S-EM	38	PKZM4-40	C22G63	46	PKZM4-50	C22G63
<b>3~/3~ 575 V without EMC</b>						
DM1-354D5NB-S20S-EM	4.5	PKZM0-6.3	C10G10	7.5	PKZM0-10	C10G10
DM1-357D5NB-S20S-EM	7.5	PKZM0-10	C10G10	10	PKZM0-10	C10G10
DM1-35010NB-S20S-EM	10	PKZM0-10	C10G16	13.5	PKZM0-16	C10G16
DM1-35013NB-S20S-EM	13.5	PKZM0-16	C10G20	18	PKZM0-20	C10G20
DM1-35018NB-S20S-EM	18	PKZM0-20	C10G25	22	PKZM0-25	C10G25
DM1-35022NB-S20S-EM	22	PKZM0-25	C14G40	27	PKZM0-32	C14G40
<b>3~/3~ 575 V with EMC</b>						
DM1-354D5EB-S20S-EM	4.5	PKZM0-6.3	C10G10	7.5	PKZM0-10	C10G10
DM1-357D5EB-S20S-EM	7.5	PKZM0-10	C10G10	10	PKZM0-10	C10G10
DM1-35010EB-S20S-EM	10	PKZM0-10	C10G16	13.5	PKZM0-16	C10G16
DM1-35013EB-S20S-EM	13.5	PKZM0-16	C10G20	18	PKZM0-20	C10G20
DM1-35018EB-S20S-EM	18	PKZM0-20	C10G25	22	PKZM0-25	C10G25
DM1-35022EB-S20S-EM	22	PKZM0-25	C14G40	27	PKZM0-32	C14G40

Minimum braking resistance Ω	Switch-on voltage – brake chopper	Quantity – brake chopper	External brake resistors			RCD type
			10.0% ED	20.0% ED	40.0% ED	
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR035-1K1	DX-BR040-3K1	DX-BR040-5K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR047-9K2	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-5K1	DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
26	790	1	DX-BR040-3K1	DX-BR040-5K1	P2R2: DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
105	790	1	R:3 x DX-BR035-1K1	R:3 x DX-BR040-3K1	R:3 x DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR035-1K1	DX-BR040-3K1	DX-BR040-5K1	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-3K1	DX-BR047-9K2	FRCdM-25/4/003-G/Bfq
35	790	1	DX-BR040-3K1	DX-BR040-5K1	DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
26	790	1	DX-BR040-3K1	DX-BR040-5K1	P2R2: DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
17	790	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-40/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-25/4/003-G/Bfq
0	990	1				FRCdM-40/4/003-G/Bfq

# 2.5

## Variable frequency drive DM1 to 22 kW

### DM1 External components

Catalog Number	High Overload (150%)			Internal EMC Filter			External EMC filter			
	Rated operational current I <sub>e</sub>	Optional mains contactor		Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	
	A			m	m	m	m	m	m	
<b>3~/3~ 230 V without EMC</b>										
DM1-321D6NB-N20B-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-323D0NB-N20B-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-324D8NB-N20B-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-327D8NB-N20B-EM	7.8	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-32011NB-N20B-EM	11	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-016	5	50	75
DM1-32017NB-N20B-EM	17.5	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-030	5	50	75
DM1-32025NB-N20B-EM	25	DILM17-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-030	5	50	75
DM1-32032NB-N20B-EM	32	DILM17-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-042	5	50	75
DM1-32048NB-N20B-EM	48	DILM40 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-055	5	50	75
<b>3~/3~ 230 V with EMC</b>										
DM1-321D6EB-N20B-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-323D0EB-N20B-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-324D8EB-N20B-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-327D8EB-N20B-EM	7.8	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-32011EB-N20B-EM	11	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-016	5	50	75
DM1-32017EB-N20B-EM	17.5	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-030	5	50	75
DM1-32025EB-N20B-EM	25	DILM17-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-030	5	50	75
DM1-32032EB-N20B-EM	32	DILM17-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-042	5	50	75
DM1-32048EB-N20B-EM	48	DILM40 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-055	5	50	75
<b>3~/3~ 400 V without EMC</b>										
DM1-341D5NB-N20B-EM	1.5	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-342D2NB-N20B-EM	2.2	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-344D3NB-N20B-EM	4.3	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-345D6NB-N20B-EM	5.6	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-347D6NB-N20B-EM	7.6	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-34012NB-N20B-EM	12	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-016	5	50	75
DM1-34016NB-N20B-EM	16	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-016	5	50	75
DM1-34023NB-N20B-EM	23	DILM17-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-030	5	50	75
DM1-34031NB-N20B-EM	31	DILM17-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-042	5	50	75
DM1-34038NB-N20B-EM	38	DILM17-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-042	5	50	75
<b>3~/3~ 400 V with EMC</b>										
DM1-341D5EB-N20B-EM	1.5	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-342D2EB-N20B-EM	2.2	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-344D3EB-N20B-EM	4.3	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-345D6EB-N20B-EM	5.6	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-347D6EB-N20B-EM	7.6	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-34012EB-N20B-EM	12	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-016	5	50	75
DM1-34016EB-N20B-EM	16	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-016	5	50	75
DM1-34023EB-N20B-EM	23	DILM17-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-030	5	50	75
DM1-34031EB-N20B-EM	31	DILM17-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-042	5	50	75
DM1-34038EB-N20B-EM	38	DILM17-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-042	5	50	75

External EMC filter (low fault current)	Mains choke			$u_k$	Motor choke			Sine filter	All-pole sine filter
	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3						
	m	m	m		%				
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A		
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-004-A		
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A		
DX-EMC34-008-L	25	50	DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A		
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-011	DX-SIN3-016	DX-SIN3-013-A		
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A		
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A		
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A		
DX-EMC34-055-L	25	50	DX-LN3-050	0.37	DX-LM3-050	DX-SIN3-048	DX-SIN3-065-A		
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A		
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-004-A		
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A		
DX-EMC34-008-L	25	50	DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A		
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-011	DX-SIN3-016	DX-SIN3-013-A		
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A		
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A		
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A		
DX-EMC34-055-L	25	50	DX-LN3-050	0.37	DX-LM3-050	DX-SIN3-048	DX-SIN3-065-A		
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A		
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A		
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A		
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A		
DX-EMC34-008-L	25	50	DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A		
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-013-A		
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-024-A		
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A		
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A		
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A		
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A		
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A		
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A		
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A		
DX-EMC34-008-L	25	50	DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A		
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-013-A		
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-024-A		
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A		
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A		
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A		



# 2.5

## Variable frequency drive DM1 to 22 kW

### DM1 External components

Catalog Number	High Overload (150%)			Internal EMC Filter			External EMC filter			
	Rated operational current I <sub>e</sub>	Optional mains contactor	A	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	
										m
<b>1~ 115 V/3~230 V without EMC</b>										
DM1-111D6NB-S20S-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-113D0NB-S20S-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-114D8NB-S20S-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-116D9NB-S20S-EM	6.9	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
<b>1~ 115 V/3~ 230 V with EMC</b>										
DM1-111D6EB-S20S-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-113D0EB-S20S-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-114D8EB-S20S-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-116D9EB-S20S-EM	6.9	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
<b>1~/3~ 230 V without EMC</b>										
DM1-121D6NB-S20S-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-123D0NB-S20S-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-124D8NB-S20S-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-127D8NB-S20S-EM	7.8	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-12011NB-S20S-EM	11	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-014	50	75	
DM1-12017NB-S20S-EM	17.5	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC12-019	50	75	
<b>1~/3~ 230 V with EMC</b>										
DM1-121D6EB-S20S-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-123D0EB-S20S-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-124D8EB-S20S-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-127D8EB-S20S-EM	7.8	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-12011EB-S20S-EM	11	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-014	50	75	
DM1-12017EB-S20S-EM	17.5	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC12-019	50	75	
<b>3~/3~ 230 V without EMC</b>										
DM1-321D6NB-S20S-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-323D0NB-S20S-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-324D8NB-S20S-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-327D8NB-S20S-EM	7.8	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-008	5	50	75
DM1-32011NB-S20S-EM	11	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-016	5	50	75
DM1-32017NB-S20S-EM	17.5	DILM7-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-030	5	50	75
DM1-32025NB-S20S-EM	25	DILM17-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-030	5	50	75
DM1-32032NB-S20S-EM	32	DILM17-10 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-042	5	50	75
DM1-32048NB-S20S-EM	48	DILM40 (230V50HZ,240V60HZ)		0	0	0	DX-EMC34-055	5	50	75
<b>3~/3~ 230 V with EMC</b>										
DM1-321D6EB-S20S-EM	1.6	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-323D0EB-S20S-EM	3	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-324D8EB-S20S-EM	4.8	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-327D8EB-S20S-EM	7.8	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-008	5	50	75
DM1-32011EB-S20S-EM	11	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-016	5	50	75
DM1-32017EB-S20S-EM	17.5	DILM7-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-030	5	50	75
DM1-32025EB-S20S-EM	25	DILM17-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-030	5	50	75
DM1-32032EB-S20S-EM	32	DILM17-10 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-042	5	50	75
DM1-32048EB-S20S-EM	48	DILM40 (230V50HZ,240V60HZ)		0	5	25	DX-EMC34-055	5	50	75



# 2.5

## Variable frequency drive DM1 to 22 kW

### DM1 External components

Catalog Number	High Overload (150%)								
	Rated operational current I <sub>o</sub>	Optional mains contactor	Internal EMC Filter			External EMC filter			
			Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	
A			m	m	m	m	m	m	
<b>3~ / 3~ 400 V without EMC</b>									
DM1-341D5NB-S20S-EM	1.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	5	50	75
DM1-342D2NB-S20S-EM	2.2	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	5	50	75
DM1-344D3NB-S20S-EM	4.3	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	5	50	75
DM1-345D6NB-S20S-EM	5.6	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	5	50	75
DM1-347D6NB-S20S-EM	7.6	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	5	50	75
DM1-34012NB-S20S-EM	12	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-016	5	50	75
DM1-34016NB-S20S-EM	16	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-016	5	50	75
DM1-34023NB-S20S-EM	23	DILM17-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-030	5	50	75
DM1-34031NB-S20S-EM	31	DILM17-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-042	5	50	75
DM1-34038NB-S20S-EM	38	DILM17-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-042	5	50	75
<b>3~ / 3~ 400 V with EMC</b>									
DM1-341D5EB-S20S-EM	1.5	DILM7-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-008	5	50	75
DM1-342D2EB-S20S-EM	2.2	DILM7-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-008	5	50	75
DM1-344D3EB-S20S-EM	4.3	DILM7-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-008	5	50	75
DM1-345D6EB-S20S-EM	5.6	DILM7-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-008	5	50	75
DM1-347D6EB-S20S-EM	7.6	DILM7-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-008	5	50	75
DM1-34012EB-S20S-EM	12	DILM7-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-016	5	50	75
DM1-34016EB-S20S-EM	16	DILM7-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-016	5	50	75
DM1-34023EB-S20S-EM	23	DILM17-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-030	5	50	75
DM1-34031EB-S20S-EM	31	DILM17-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-042	5	50	75
DM1-34038EB-S20S-EM	38	DILM17-10 (230V50HZ,240V60HZ)	0	5	25	DX-EMC34-042	5	50	75
<b>3~ / 3~ 575 V without EMC</b>									
DM1-354D5NB-S20S-EM	4.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	n.v.			
DM1-357D5NB-S20S-EM	7.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	n.v.			
DM1-35010NB-S20S-EM	10	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	n.v.			
DM1-35013NB-S20S-EM	13.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	n.v.			
DM1-35018NB-S20S-EM	18	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	n.v.			
DM1-35022NB-S20S-EM	22	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	n.v.			
<b>3~ / 3~ 575 V with EMC</b>									
DM1-354D5EB-S20S-EM	4.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	25	n.v.			
DM1-357D5EB-S20S-EM	7.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	25	n.v.			
DM1-35010EB-S20S-EM	10	DILM7-10 (230V50HZ,240V60HZ)	0	0	25	n.v.			
DM1-35013EB-S20S-EM	13.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	25	n.v.			
DM1-35018EB-S20S-EM	18	DILM7-10 (230V50HZ,240V60HZ)	0	0	25	n.v.			
DM1-35022EB-S20S-EM	22	DILM7-10 (230V50HZ,240V60HZ)	0	0	25	n.v.			

Notes: n.a. – not available

External EMC filter (low leakage current)	Mains choke			$u_k$	Motor choke		Sine filter	All-pole sine filter
	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3					
	m	m	m		%			
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A	
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A	
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A	
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A	
DX-EMC34-008-L	25	50	DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A	
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-013-A	
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-024-A	
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A	
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A	
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A	
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A	
DX-EMC34-008-L	25	50	DX-LN3-004	7.51	DX-LM3-008	DX-SIN3-004	DX-SIN3-2D5-A	
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A	
DX-EMC34-008-L	25	50	DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A	
DX-EMC34-008-L	25	50	DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A	
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-013-A	
DX-EMC34-016-L	25	50	DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	DX-SIN3-024-A	
DX-EMC34-030-L	25	50	DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A	
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A	
DX-EMC34-042-L	25	50	DX-LN3-040	0.64	DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A	
n.v.			DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	n.v.	
n.v.			DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	n.v.	
n.v.			DX-LN3-010	2.94	DX-LM3-011	DX-SIN3-010	n.v.	
n.v.			DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	n.v.	
n.v.			DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	n.v.	
n.v.			DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	n.v.	
n.v.			DX-LN3-006	4.9	DX-LM3-008	DX-SIN3-010	n.v.	
n.v.			DX-LN3-010	2.94	DX-LM3-008	DX-SIN3-010	n.v.	
n.v.			DX-LN3-010	2.94	DX-LM3-011	DX-SIN3-010	n.v.	
n.v.			DX-LN3-016	1.84	DX-LM3-016	DX-SIN3-016	n.v.	
n.v.			DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	n.v.	
n.v.			DX-LN3-025	1.18	DX-LM3-035	DX-SIN3-023	n.v.	

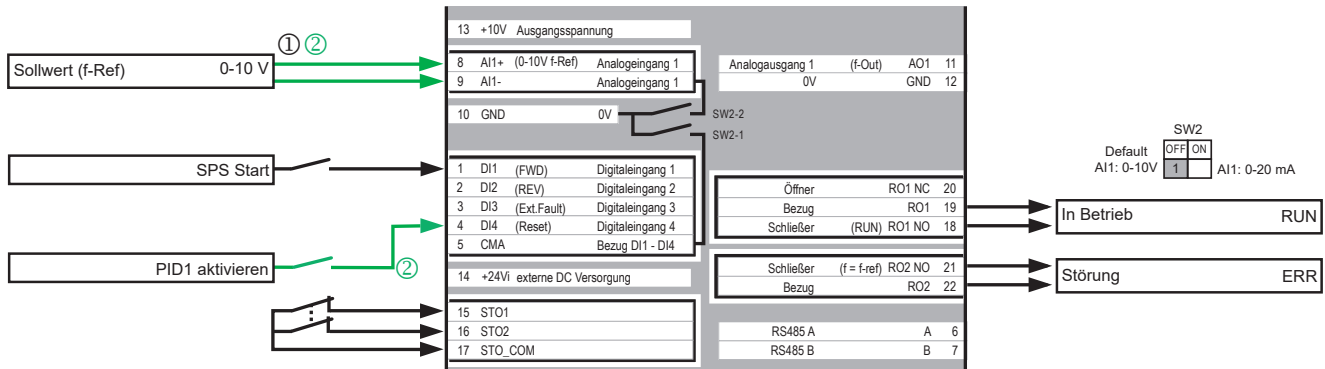
# 2.5

## Variable frequency drive DM1 to 22 kW

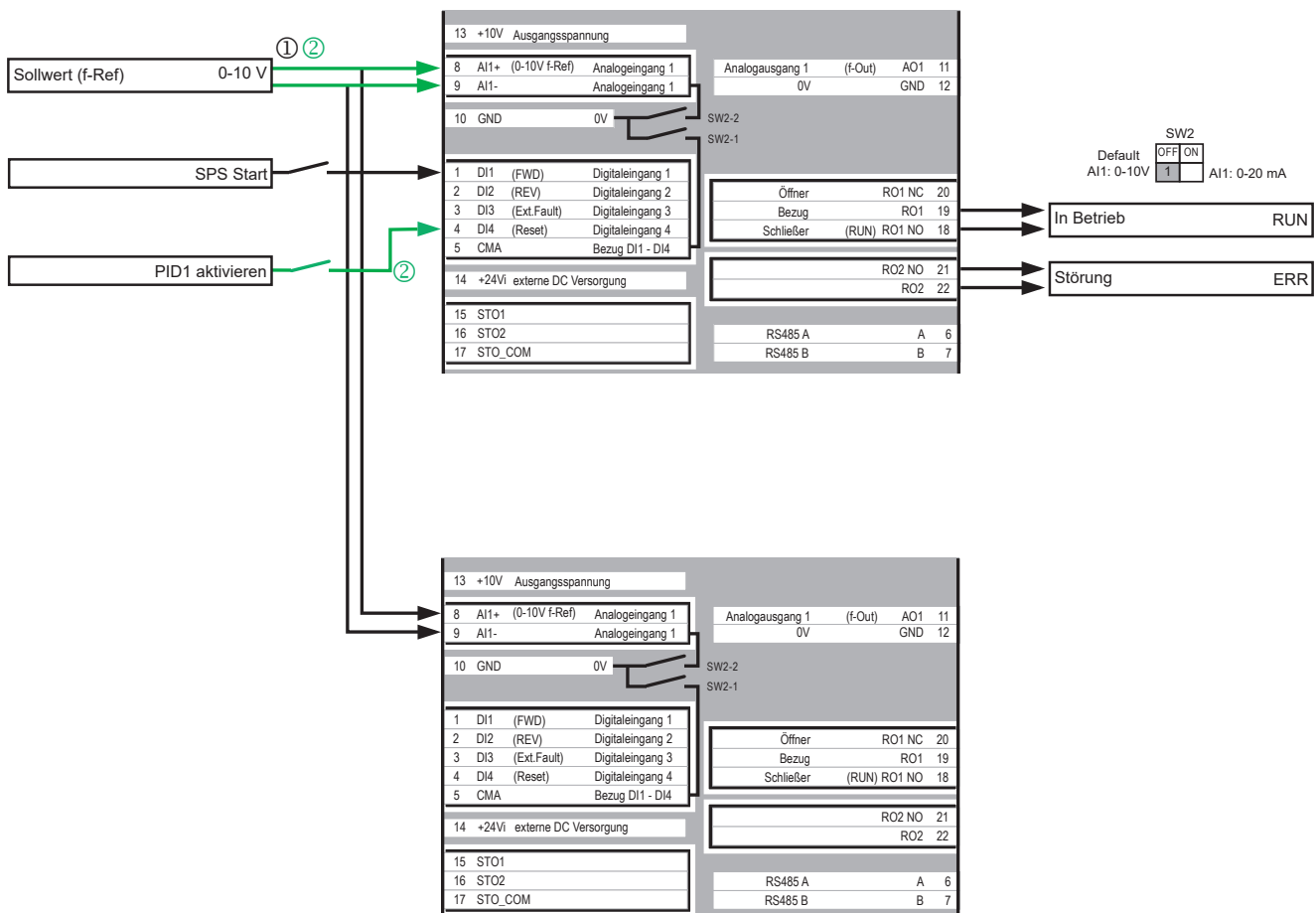
### Connection examples

#### Connection example for DM1Pro with the following functions:

- ① Setpoint input via external analog setpoint
- ② Setpoint input via keyboard, network, or internal setpoint potentiometer; process value fed back to AI1 and use of PID controller
- Dual-channel STO



Connection example for master-follower operation in which the follower runs with the same torque as the master. A rigid mechanical coupling is required. For non-rigid couplings, the droop function is used instead of torque forwarding via AO1 to the follower. The same setpoint input / PID use specifications as for the previous example apply here as well.



## Technical specifications

	Unit	Value
<b>General</b>		
Product standard		IEC/EN 61800-2
Production standard		RoHS, ISO 9001
Security		IEC/EN 61800-5-1:2007/A1:2017; UL 61800-5-1:2012 (Rev. 2018), CSA C22.2 No. 274-17:2017
Radio interference level		IEC/EN 61800-3
Integrated radio interference suppression filter		Yes, C2
Radio interference class (EMC)		C1 (with external filter, for conducted emissions only), C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.
Radio interference class (EMC), external filters		Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments
Environment (EMC)		1st and 2nd environments as per EN 61800-3
first environment		Yes
second environment		Yes
longest permissible length of motor cable with internal filter		C2 ≤ 5 m   C3 ≤ 25 m
Interference immunity		EN 61800-3:2004+A1-2012, first and second environment
Emissions		EN 61800-3:2004+A1-2012, Category C2
Electrostatic discharge (ESD)		IEC 61000-4-2, 4 kV contact, 8 kV air, Second environment, Criterion B
Fast transients (burst)		IEC 61000-4-4, 2 kV/5 kHz, Second environment, Criterion B
Dielectrical strength		Input to output: 3600 V AC/5100 V DC Input to earth: 2000 V AC/2828 V DC
THD		((depends on size))
Acoustic		
Average sound level (fan); sound power level in dB(A)		TBD
Sound level		EN 61800-5-1 (2007)
Climatic proofing		< 95%, average relative humidity (RH), non-condensing, non-corrosive
Ambient temperature		
110% overload (1 min./10 min.)	°C	-10 – +40 (max. +55 with 1% derating per Kelvin temperature rise)
150% overload (1 min./10 min.)	°C	-10 – +50 (max. +60 with 1% derating per Kelvin temperature rise)
T <sub>min</sub>	°C	-10
T <sub>max</sub>	°C	60
Ambient conditions		
Ambient air in conformity with IEC/EN 60721-3-3		3C2, 3S2
Storage temperature	°C	-40 - +70
Altitude		Depends on the device model
permissible network configurations		TN-S, TN-C, TN-C-S, TT, IT
Mounting position		vertical
Protection type		EN 60529:1992
DM1...-C00C		IP20 / NEMA Type 0, IP21/NEMA 1 with option
Busbar tag shroud		BGV A3 (VBG4, finger- and back-of-hand proof)
Oversvoltage category		III
Pollution degree		2
Mechanical shock resistance		EN 61800-5-1, EN 60068-2-27   UPS drop test (for weights inside the UPS frame)   Storage and transportation: maximum 15 g, 11 ms (inside the packaging)

# 2.5

## Variable frequency drive DM1 to 22 kW

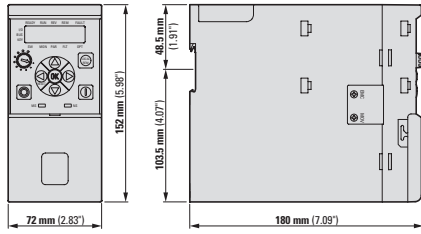
### Technical specifications

	Unit	Value
<b>Main circuit</b>		
Rated operating voltage (three-phase)		
DM1-11...	V	115 (-10%/+10%)
DM1-12...	V	208 (-10%) - 240 (+10%)
DM1-32...	V	208 (-10%) - 240 (+10%)
DM1-34...	V	380 (-10%) - 500 (+10%)
DM1-35...	V	500 (-10%) - 600 (+10%)
Tolerance up	%	10
Tolerance dwn	%	15
Mains frequency	Hz	50/60
Tolerance	%	10
Mains frequency range	Hz	45 - 66
Mains switch-on frequency		Maximum of one time every 60 seconds
Overload withstand capability		Overload cycle for 60 s every 600 s
$I_L$ (1 min./10 min.)	%	110
$I_H$ (1 min./10 min.)	%	150
Comment		Rated operational current for a standard switching frequency and an ambient temperature of +50°C for a 150% overload and +40°C for a 110% overload
Short-time overload withstand capability (2 sec / 20 sec)	%	200
Peak-Overload cycle		for 2 seconds every 20 seconds
Output voltage at $U_o$	V	0 - $U_{in}$
<b>Variable frequency drive functions</b>		
Ramp times		
Startup	s	0.1 - 3000
Delay	s	0.1 - 3000
Control types		All DM1: V/Hz control   DM1Pro:   Speed control with slip compensation   Sensorless vector control (SLV)   Torque control   Permanent magnet motor control
Inputs / outputs		
Digital Inputs		4, parameterizable, max. 30 V DC
Digital Outputs		0
Analog inputs		1, parameterizable, 0 - 10 V DC, 2 - 10 V DC, 0/4 - 20 mA
Analog Outputs		1, parameterizable, 0 - 10 V
Relay		3 A (240 V AC) / 3 A (24 V DC)   DM1: 1 C/O, parameterizable   DM1Pro: 1 C/O and 1 N/O, parameterizable
Communication		
on-board		All DM1: Modbus RTU   DM1Pro: Modbus TCP, BACnet MS/TP, Bacnet TCP, Ethernet IP
optional		Profibus, CAN, DeviceNet, SmartWire-DT, PROFINET

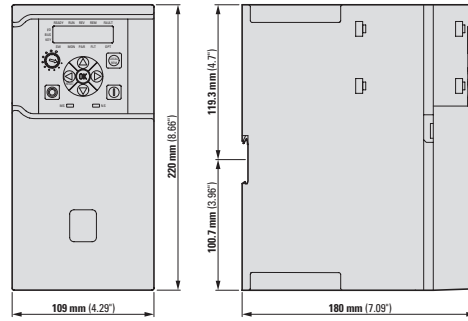
### Dimensions

#### DM1 Pro

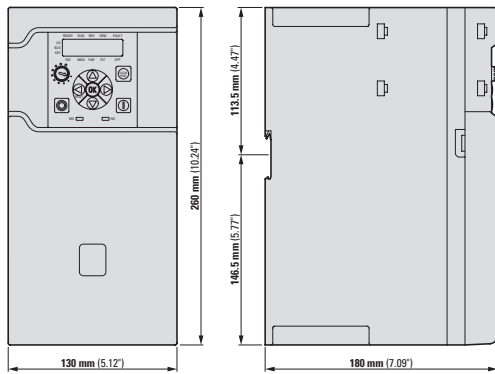
##### Frame size 1



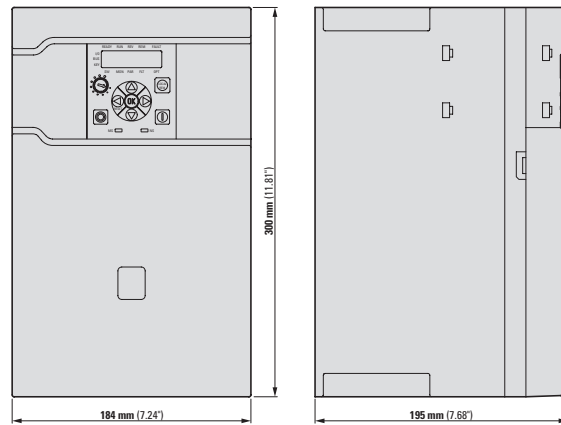
##### Frame size 2



##### Frame size 3

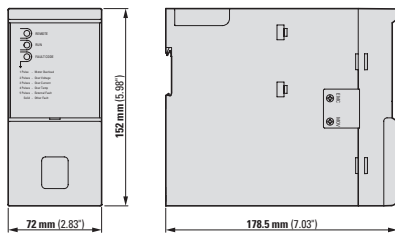


##### Frame size 4

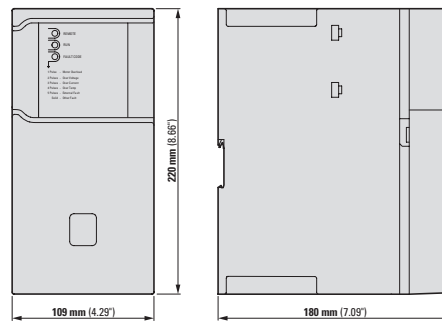


#### DM1

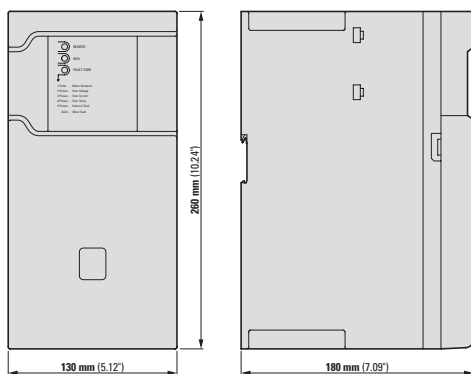
##### Frame size 1



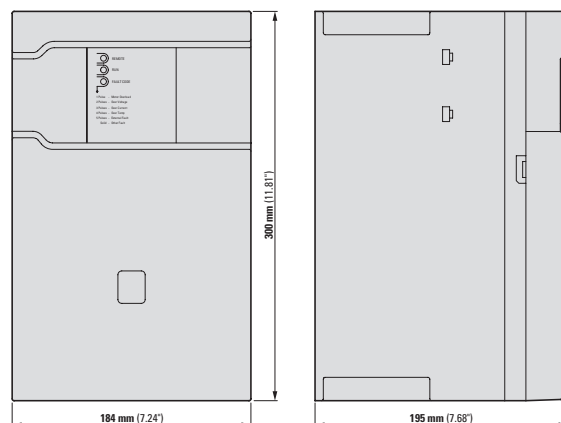
##### Frame size 2



##### Frame size 3



##### Frame size 4





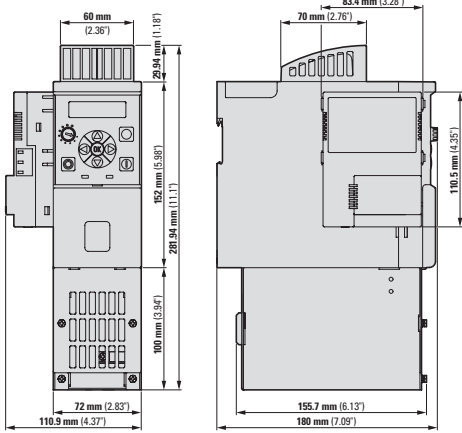
# 2.5

## Variable frequency drive DM1 to 22 kW

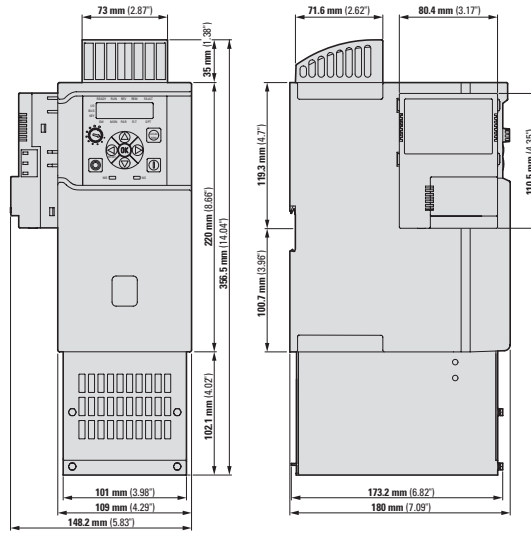
### Dimensions

#### IP21 / NEMA1 Kit DM1

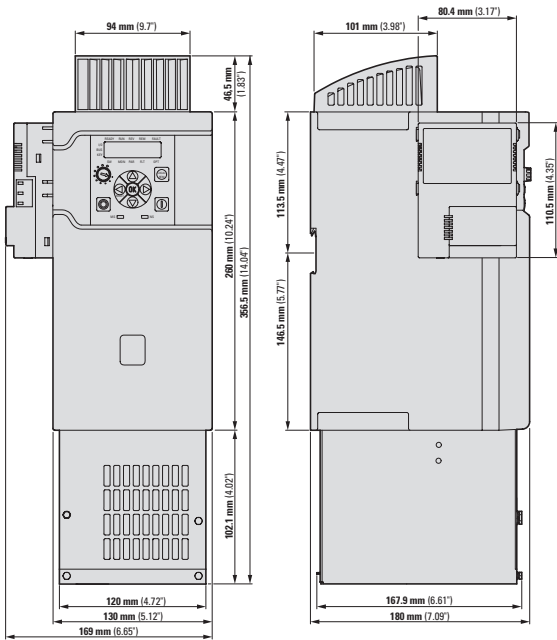
Frame size 1



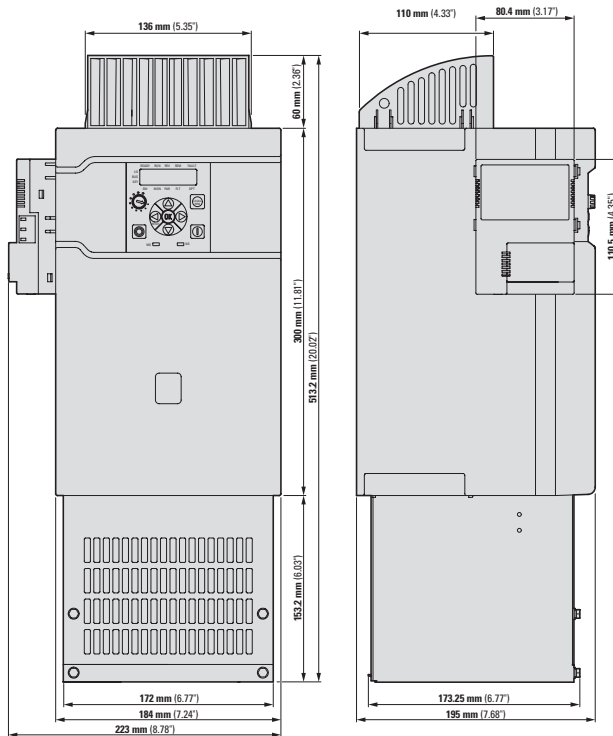
Frame size 2



Frame size 3

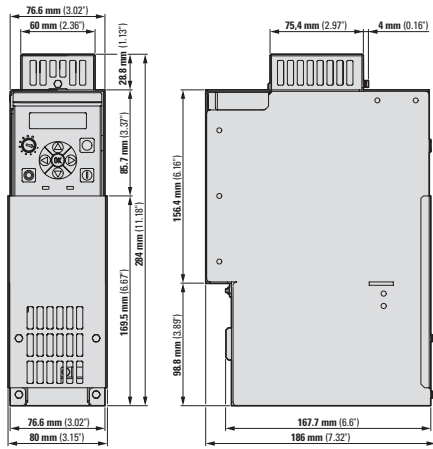


Frame size 4

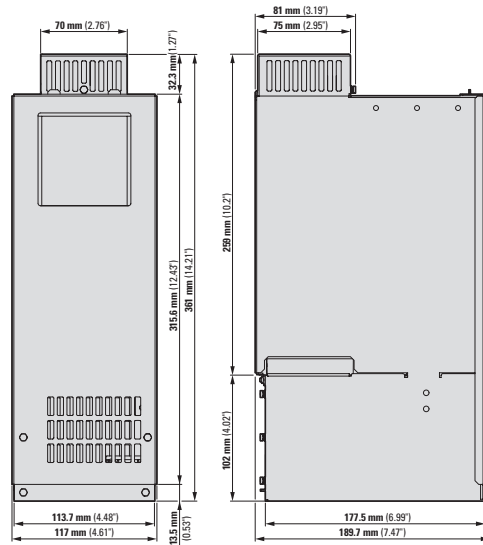


### IP21 / NEMA1 Kit DM1 100 kA UL Plenum rating

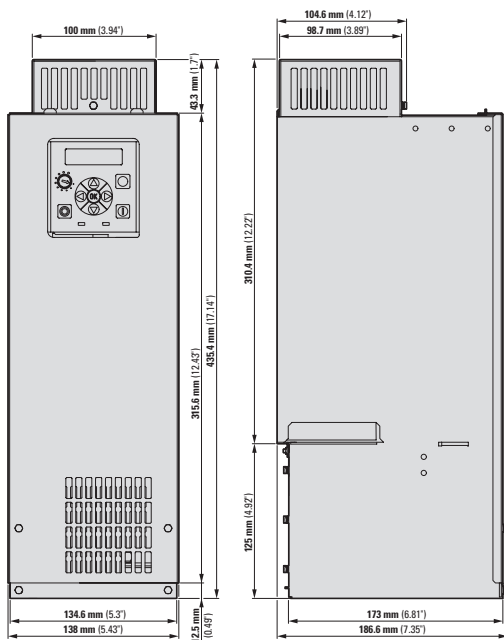
Frame size 1



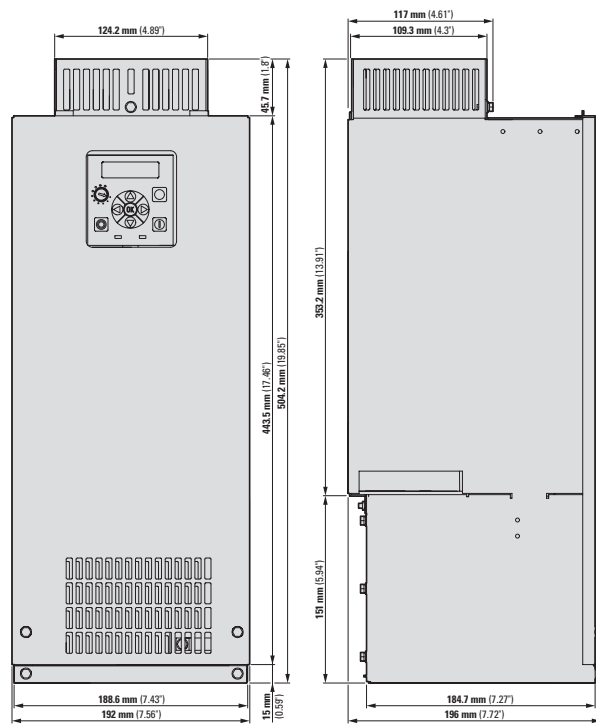
Frame size 2



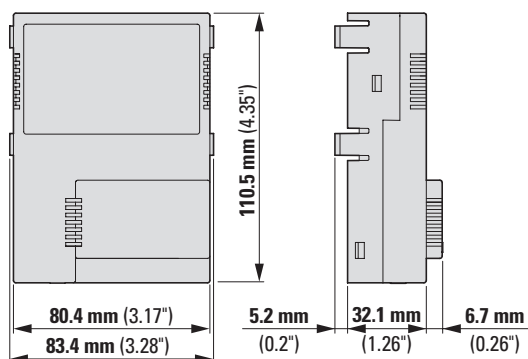
Frame size 3



Frame size 4



### DM1 Pro (PROFIBUS, CANOPEN, PROFINET) network interfaces





# PowerXL Variable Frequency Drive DG1 General Purpose Drive

PowerXL DG1 general-purpose drives are variable frequency drives in Eaton's "Next-Generation PowerXL" series. They are specifically designed for modern, sophisticated applications: In fact, energy-saving algorithms, high short-circuit values, and a heavy-duty design all enable them to provide maximum efficiency, safety, and reliability.

## Performance range:

- 0.75 - 90 kW ( $U_e$ : 3~ 230 V,  $U_2$ : 3~ 230 V)
- 0.75 - 160 kW ( $U_e$ : 3~ 400 V,  $U_2$ : 3~ 400 V)
- 2.2 - 250 HP ( $U_e$ : 3~ 575 V,  $U_2$ : 3~ 575 V)

## Applications:

- Multi-pump applications
- HVAC
- Roller and chain conveyors
- Compressors, mills
- Production machines
- Centrifuges and extruders
- Traction drives, conveyor belts
- Sawing, drilling, dosing unit drives
- Chemical and primary industries
- Water jet cutting, crushers

## Features:

- Ease of use: Startup Wizard, inControl PC Tool software, four built-in applications, diagnostics, local/remote button, removable keypad with copy/paste functionality.
- Communicative: Modbus RTU, Modbus TCP, Ethernet IP and BacNet MS/TP Standard on each device. In addition, extensive I/O above the average for this device class.
- Efficiency: Active energy control algorithm, 5% DC choke, input surge protection, EMC filter built-in
- Rugged and reliable: Dual rating with high (CT) and low (VT) overload capability, conformal coated boards, brake chopper circuit.
- Durable metal power section, 50°C rating (60°C de-rating)
- Removable keypad rated IP54
- Global acceptance: UL, CE, cUL, RoHS, RCM

## Accessory:

- Communication modules (PROFIBUS, PROFINET, CANopen, etc.)
- I/O expansions
- External keypad
- Motor chokes
- Sine filter
- Braking resistances
- Power Xpert inControl operating software
- DG1-Remote Keypad

For more information, visit:  
[www.Eaton.com/DG1](http://www.Eaton.com/DG1)




---

<b>2.6 Variable frequency drive DG1 to 160 kW</b>	
<b>System overview</b> .....	<b>186</b>
<b>Key to type references</b> .....	<b>187</b>
<b>Ordering</b> .....	<b>188</b>
DG1 for three-phase motors 230 V, three-phase .....	<b>188</b>
DG1 for three-phase motors 400 V, three-phase .....	<b>190</b>
DG1Pro for three-phase motors 400 V, three-phase .....	<b>192</b>
DG1 for three-phase motors 575 V, three-phase .....	<b>193</b>
<b>Options</b> .....	<b>195</b>
<b>Engineering</b> .....	<b>196</b>
DG1 External components .....	<b>196</b>
<b>Technical specifications</b> .....	<b>208</b>
<b>Connection examples</b> .....	<b>210</b>
<b>Dimensions and weights</b> .....	<b>211</b>

# 2.6

## Variable frequency drive DG1 to 160 kW

### System overview

#### System overview



**DG1-...** 1  
→ Page 188

**Mounting frame DXG-ACC-FR...** 2  
→ Page 195

**EMV filter DX-EMC...** 3  
→ Page 217

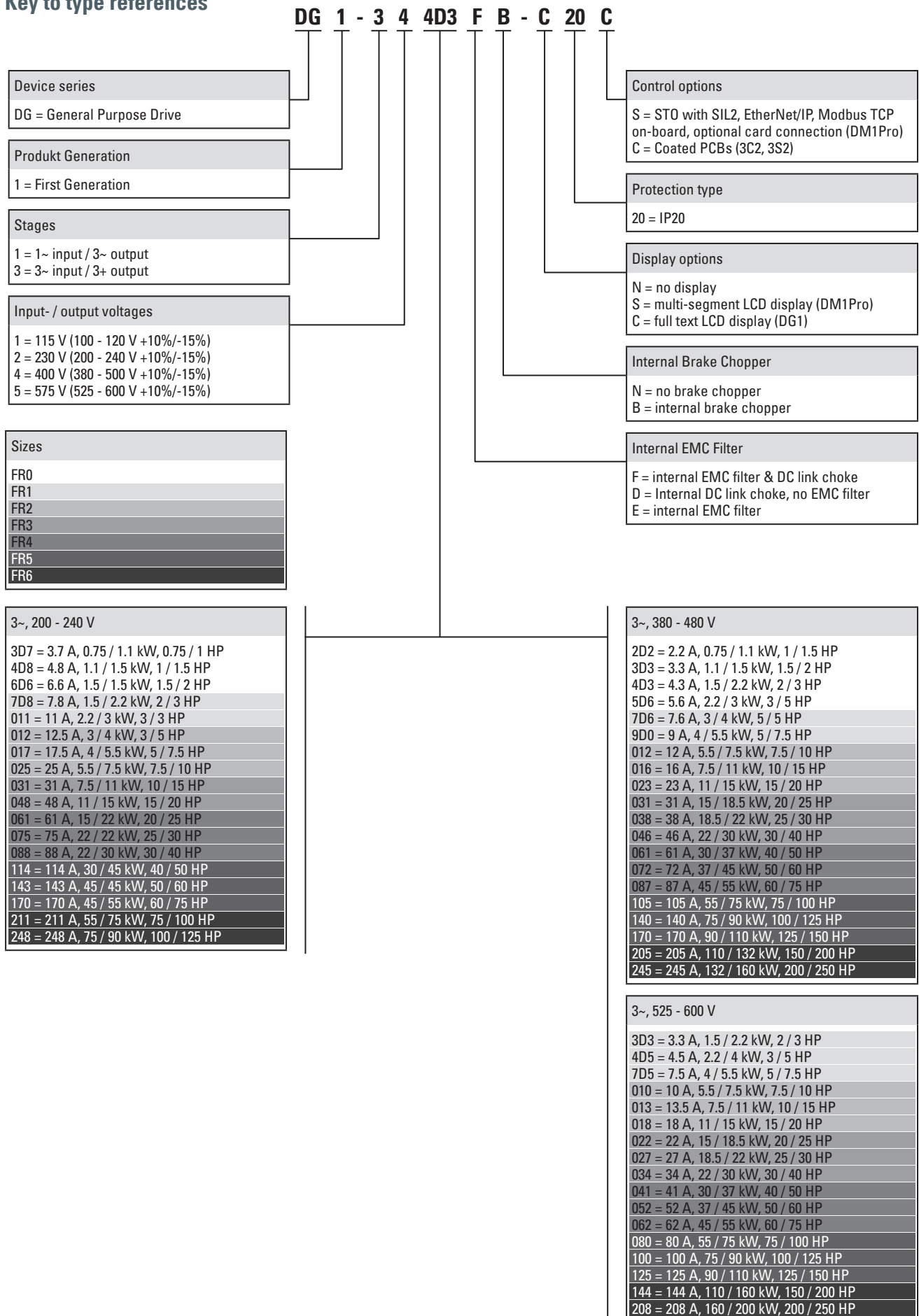
**Braking resistances DX-BR...** 4  
→ Page 222

**DX-LN.../DX-LM..., mains/motor chokes, DX-PHF... harmonic filters, DX-SIN... sine filters** 5  
→ Page 215  
→ Page 216  
→ Page 219  
→ Page 220

**Expansions and communication cards DXG-EXT-... DXG-NET-...** 6  
→ Page 195

**External keypad DXG-KEY-...** 7  
→ Page 195

## Key to type references



# 2.6

## Variable frequency drive DG1 to 160 kW

DG1 for three-phase motors 230 V, three-phase

### Ordering

Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150%$ $I_e$ A	kW		HP	$I_n = 110%$ $I_e$ A						kW	HP
<b>U<sub>e</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, with BU, IP20</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
3.7	0.75	0.75	4.8	1.1	1	✓	✓	–	FS0	IP20/NEMA0	<b>DG1-323D7EB-C20C</b> 9701-0200	1 unit
4.8	1.1	1	6.6	1.5	1.5	✓	✓	–			<b>DG1-324D8EB-C20C</b> 9701-0201	
6.6	1.5	1.5	7.8	1.5	2	✓	✓	–			<b>DG1-326D6EB-C20C</b> 9701-0202	
<b>U<sub>e</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, with BU, IP21</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
3.7	0.75	0.75	4.8	1.1	1	✓	✓	✓	FS1	IP21/NEMA1	<b>DG1-323D7FB-C21C</b> 9701-1002-00P	1 unit
4.8	1.1	1	6.6	1.5	1.5	✓	✓	✓			<b>DG1-324D8FB-C21C</b> 9701-1004-00P	
6.6	1.5	1.5	7.8	1.5	2	✓	✓	✓			<b>DG1-326D6FB-C21C</b> 9701-1006-00P	
7.8	1.5	2	11	2.2	3	✓	✓	✓			<b>DG1-327D8FB-C21C</b> 9701-1008-00P	
11	2.2	3	12.5	3	3	✓	✓	✓			<b>DG1-32011FB-C21C</b> 9701-1001-00P	
12.5	3	3	17.5	4	5	✓	✓	✓	FS2		<b>DG1-32012FB-C21C</b> 9701-2002-00P	
17.5	4	5	25	5.5	7.5	✓	✓	✓			<b>DG1-32017FB-C21C</b> 9701-2004-00P	
25	5.5	7.5	31	7.5	10	✓	✓	✓			<b>DG1-32025FB-C21C</b> 9701-2001-00P	
31	7.5	10	48	11	15	✓	✓	✓	FS3		<b>DG1-32031FB-C21C</b> 9701-3002-00P	
48	11	15	61	15	20	✓	✓	✓			<b>DG1-32048FB-C21C</b> 9701-3001-00P	
61	15	20	75	22	25	✓	✓	✓	FS4		<b>DG1-32061FB-C21C</b> 9701-4002-00P	
75	22	25	88	22	30	✓	✓	✓			<b>DG1-32075FB-C21C</b> 9701-4006-00P	
88	22	30	114	30	40	✓	✓	✓			<b>DG1-32088FB-C21C</b> 9701-4010-00P	
114	30	40	143	45	50	✓	✓	✓	FS5		<b>DG1-32114FB-C21C</b> 9701-5002-00P	
143	45	50	170	45	60	✓	✓	✓			<b>DG1-32143FB-C21C</b> 9701-5006-00P	
170	45	60	211	55	75	✓	✓	✓			<b>DG1-32170FB-C21C</b> 9701-5010-00P	
211	55	75	261	75	100	✓	✓	✓	FS6		<b>DG1-32211FB-C21C</b> 9701-6001-00P	
248	75	100	312	90	125	✓	✓	✓			<b>DG1-32248FB-C21C</b> 9701-6005-00P	
<b>U<sub>e</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, without BU, IP21</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
61	15	20	75	22	25	✓	–	✓	FS4	IP21/NEMA1	<b>DG1-32061FN-C21C</b> 9701-4004-00P	1 unit
75	22	25	88	22	30	✓	–	✓			<b>DG1-32075FN-C21C</b> 9701-4008-00P	
88	22	30	114	30	40	✓	–	✓			<b>DG1-32088FN-C21C</b> 9701-4001-00P	
114	30	40	143	45	50	✓	–	✓	FS5		<b>DG1-32114FN-C21C</b> 9701-5004-00P	
143	45	50	170	45	60	✓	–	✓			<b>DG1-32143FN-C21C</b> 9701-5008-00P	
170	45	60	211	55	75	✓	–	✓			<b>DG1-32170FN-C21C</b> 9701-5001-00P	
211	55	75	261	75	100	✓	–	✓	FS6		<b>DG1-32211FN-C21C</b> 9701-6003-00P	
248	75	100	312	90	125	✓	–	✓			<b>DG1-32248FN-C21C</b> 9701-6007-00P	

#### Notes

<sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature

<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

<sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

# Variable frequency drive DG1 to 160 kW

# 2.6

DG1 for three-phase motors 230 V, three-phase

Rated operational current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Rated operational current <sup>1)</sup>	Assigned motor output <sup>1)2)3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150%$ $I_e$ A	kW		HP	$I_n = 110%$ $I_e$ A						kW	HP
<b>U<sub>2</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, with BU, IP54</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
3.7	0.75	0.75	4.8	1.1	1	✓	✓	✓	FS1	IP54/NEMA12	<b>DG1-323D7FB-C54C</b> 9701-1101-00P	1 unit
4.8	1.1	1	6.6	1.5	1.5	✓	✓	✓			<b>DG1-324D8FB-C54C</b> 9701-1103-00P	
6.6	1.5	1.5	7.8	1.5	2	✓	✓	✓			<b>DG1-326D6FB-C54C</b> 9701-1105-00P	
7.8	1.5	2	11	2.2	3	✓	✓	✓			<b>DG1-327D8FB-C54C</b> 9701-1107-00P	
11	2.2	3	12.5	3	3	✓	✓	✓			<b>DG1-32011FB-C54C</b> 9701-1109-00P	
12.5	3	3	17.5	4	5	✓	✓	✓	FS2		<b>DG1-32012FB-C54C</b> 9701-2101-00P	
17.5	4	5	25	5.5	7.5	✓	✓	✓			<b>DG1-32017FB-C54C</b> 9701-2103-00P	
25	5.5	7.5	31	7.5	10	✓	✓	✓			<b>DG1-32025FB-C54C</b> 9701-2105-00P	
31	7.5	10	48	11	15	✓	✓	✓	FS3		<b>DG1-32031FB-C54C</b> 9701-3101-00P	
48	11	15	61	15	20	✓	✓	✓			<b>DG1-32048FB-C54C</b> 9701-3103-00P	
61	15	20	75	22	25	✓	✓	✓	FS4		<b>DG1-32061FB-C54C</b> 9701-4101-00P	
75	22	25	88	22	30	✓	✓	✓			<b>DG1-32075FB-C54C</b> 9701-4105-00P	
88	22	30	114	30	40	✓	✓	✓			<b>DG1-32088FB-C54C</b> 9701-4109-00P	
114	30	40	143	45	50	✓	✓	✓	FS5		<b>DG1-32114FB-C54C</b> 9701-5101-00P	
143	45	50	170	45	60	✓	✓	✓			<b>DG1-32143FB-C54C</b> 9701-5105-00P	
170	45	60	211	55	75	✓	✓	✓			<b>DG1-32170FB-C54C</b> 9701-5109-00P	
211	55	75	261	75	100	✓	✓	✓	FS6		<b>DG1-32211FB-C54C</b> 9701-6101-00P	
248	75	100	312	90	125	✓	✓	✓			<b>DG1-32248FB-C54C</b> 9701-6105-00P	
<b>U<sub>2</sub> 230 V AC, three-phase / U<sub>2</sub> 230 V AC, three-phase, without BU, IP54</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 200 (-15%) - 240 (+10%) V												
61	15	20	75	22	25	✓	-	✓	FS4	IP54/NEMA12	<b>DG1-32061FN-C54C</b> 9701-4103-00P	1 unit
75	22	25	88	22	30	✓	-	✓			<b>DG1-32075FN-C54C</b> 9701-4107-00P	
88	22	30	114	30	40	✓	-	✓			<b>DG1-32088FN-C54C</b> 9701-4111-00P	
114	30	40	143	45	50	✓	-	✓	FS5		<b>DG1-32114FN-C54C</b> 9701-5103-00P	
143	45	50	170	45	60	✓	-	✓			<b>DG1-32143FN-C54C</b> 9701-5107-00P	
170	45	60	211	55	75	✓	-	✓			<b>DG1-32170FN-C54C</b> 9701-5111-00P	
211	55	75	261	75	100	✓	-	✓	FS6		<b>DG1-32211FN-C54C</b> 9701-6103-00P	
248	75	100	312	90	125	✓	-	✓			<b>DG1-32248FN-C54C</b> 9701-6107-00P	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

DG1



# 2.6

## Variable frequency drive DG1 to 160 kW

DG1 for three-phase motors 400 V, three-phase

Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration			Frame size	Protection type	Catalog Number Article no.	Std. pack
	$I_n = 150\%$ $I_e$ A	kW HP		$I_n = 110\%$ $I_e$ A	kW HP	Radio interference suppression filter	Brake chopper	DC choke				
<b>U<sub>n</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, with BU, IP20</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
2.2	0.75	1	3.3	1.1	1.5	✓	✓	–	FS0	IP20/NEMA0	<b>DG1-342D2EB-C20C</b> 9702-0200	1 unit
3.3	1.1	1.5	4.3	1.5	2	✓	✓	–			<b>DG1-343D3EB-C20C</b> 9702-0201	
4.3	1.5	2	5.6	2.2	3	✓	✓	–			<b>DG1-344D3EB-C20C</b> 9702-0202	
5.6	2.2	3	7.6	3	5	✓	✓	–			<b>DG1-345D6EB-C20C</b> 9702-0203	
<b>U<sub>n</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, with BU, IP21</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
2.2	0.75	1	3.3	1.1	1.5	✓	✓	✓	FS1	IP21/NEMA1	<b>DG1-342D2FB-C21C</b> 9702-1002-00P	1 unit
3.3	1.1	1.5	4.3	1.5	2	✓	✓	✓			<b>DG1-343D3FB-C21C</b> 9702-1004-00P	
4.3	1.5	2	5.6	2.2	3	✓	✓	✓			<b>DG1-344D3FB-C21C</b> 9702-1006-00P	
5.6	2.2	3	7.6	3	5	✓	✓	✓			<b>DG1-345D6FB-C21C</b> 9702-1008-00P	
7.6	3	5	9	4	5	✓	✓	✓			<b>DG1-347D6FB-C21C</b> 9702-1001-00P	
9	4	5	12	5.5	7.5	✓	✓	✓			<b>DG1-349D0FB-C21C</b> 9702-1011-00P	
12	5.5	7.5	16	7.5	10	✓	✓	✓	FS2		<b>DG1-34012FB-C21C</b> 9702-2002-00P	
16	7.5	10	23	11	15	✓	✓	✓			<b>DG1-34016FB-C21C</b> 9702-2004-00P	
23	11	15	31	15	20	✓	✓	✓			<b>DG1-34023FB-C21C</b> 9702-2001-00P	
31	15	20	38	18.5	25	✓	✓	✓	FS3		<b>DG1-34031FB-C21C</b> 9702-3002-00P	
38	18.5	25	46	22	30	✓	✓	✓			<b>DG1-34038FB-C21C</b> 9702-3004-00P	
46	22	30	61	30	40	✓	✓	✓			<b>DG1-34046FB-C21C</b> 9702-3001-00P	
61	30	40	72	37	50	✓	✓	✓	FS4		<b>DG1-34061FB-C21C</b> 9702-4002-00P	
72	37	50	87	45	60	✓	✓	✓			<b>DG1-34072FB-C21C</b> 9702-4006-00P	
87	45	60	105	55	75	✓	✓	✓			<b>DG1-34087FB-C21C</b> 9702-4010-00P	
105	55	75	140	75	100	✓	✓	✓	FS5		<b>DG1-34105FB-C21C</b> 9702-5002-00P	
140	75	100	170	90	125	✓	✓	✓			<b>DG1-34140FB-C21C</b> 9702-5006-00P	
170	90	125	205	110	150	✓	✓	✓			<b>DG1-34170FB-C21C</b> 9702-5010-00P	
205	110	150	261	132	200	✓	✓	✓	FS6		<b>DG1-34205FB-C21C</b> 9702-6001-00P	
245	132	200	310	160	250	✓	✓	✓			<b>DG1-34245FB-C21C</b> 9702-6005-00P	

**Notes**

<sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature  
<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz  
<sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

# Variable frequency drive DG1 to 160 kW

# 2.6

DG1 for three-phase motors 400 V, three-phase

Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150%$ $I_e$ A	kW		HP	$I_n = 110%$ $I_e$ A						kW	HP
<b>U<sub>1</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, without BU, IP21</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
61	30	40	72	37	50	✓	-	✓	FS4	IP21/NEMA1	<b>DG1-34061FN-C21C</b> 9702-4004-00P	1 unit
72	37	50	87	45	60	✓	-	✓			<b>DG1-34072FN-C21C</b> 9702-4008-00P	
87	45	60	105	55	75	✓	-	✓			<b>DG1-34087FN-C21C</b> 9702-4001-00P	
105	55	75	140	75	100	✓	-	✓	FS5		<b>DG1-34105FN-C21C</b> 9702-5004-00P	
140	75	100	170	90	125	✓	-	✓			<b>DG1-34140FN-C21C</b> 9702-5008-00P	
170	90	125	205	110	150	✓	-	✓			<b>DG1-34170FN-C21C</b> 9702-5001-00P	
205	110	150	261	132	200	✓	-	✓	FS6		<b>DG1-34205FN-C21C</b> 9702-6003-00P	
245	132	200	310	160	250	✓	-	✓			<b>DG1-34245FN-C21C</b> 9702-6007-00P	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

DG1

# 2.6

## Variable frequency drive DG1 to 160 kW

DG1Pro for three-phase motors 400 V, three-phase

Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150%$ $I_e$ A	kW HP		$I_n = 110%$ $I_e$ A	kW HP						Radio interference suppression filter	Brake chopper
<b>U<sub>e</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, with BU, IP54</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
2.2	0.75	1	3.3	1.1	1.5	✓	✓	✓	FS1	IP54/NEMA12	<b>DG1-342D2FB-C54C</b> 9702-1101-00P	1 unit
3.3	1.1	1.5	4.3	1.5	2	✓	✓	✓			<b>DG1-343D3FB-C54C</b> 9702-1103-00P	
4.3	1.5	2	5.6	2.2	3	✓	✓	✓			<b>DG1-344D3FB-C54C</b> 9702-1105-00P	
5.6	2.2	3	7.6	3	5	✓	✓	✓			<b>DG1-345D6FB-C54C</b> 9702-1107-00P	
7.6	3	5	9	4	5	✓	✓	✓			<b>DG1-347D6FB-C54C</b> 9702-1109-00P	
9	4	5	12	5.5	7.5	✓	✓	✓			<b>DG1-349D0FB-C54C</b> 9702-1111-00P	
12	5.5	7.5	16	7.5	10	✓	✓	✓	FS2		<b>DG1-34012FB-C54C</b> 9702-2101-00P	
16	7.5	10	23	11	15	✓	✓	✓			<b>DG1-34016FB-C54C</b> 9702-2103-00P	
23	11	15	31	15	20	✓	✓	✓			<b>DG1-34023FB-C54C</b> 9702-2105-00P	
31	15	20	38	18.5	25	✓	✓	✓	FS3		<b>DG1-34031FB-C54C</b> 9702-3101-00P	
38	18.5	25	46	22	30	✓	✓	✓			<b>DG1-34038FB-C54C</b> 9702-3103-00P	
46	22	30	61	30	40	✓	✓	✓			<b>DG1-34046FB-C54C</b> 9702-3105-00P	
61	30	40	72	37	50	✓	✓	✓	FS4		<b>DG1-34061FB-C54C</b> 9702-4101-00P	
72	37	50	87	45	60	✓	✓	✓			<b>DG1-34072FB-C54C</b> 9702-4105-00P	
87	45	60	105	55	75	✓	✓	✓			<b>DG1-34087FB-C54C</b> 9702-4109-00P	
105	55	75	140	75	100	✓	✓	✓	FS5		<b>DG1-34105FB-C54C</b> 9702-5101-00P	
140	75	100	170	90	125	✓	✓	✓			<b>DG1-34140FB-C54C</b> 9702-5105-00P	
170	90	125	205	110	150	✓	✓	✓			<b>DG1-34170FB-C54C</b> 9702-5109-00P	
205	110	150	261	132	200	✓	✓	✓	FS6		<b>DG1-34205FB-C54C</b> 9702-6101-00P	
245	132	200	310	160	250	✓	✓	✓			<b>DG1-34245FB-C54C</b> 9702-6105-00P	
<b>U<sub>e</sub> 400 V AC, three-phase / U<sub>2</sub> 400 V AC, three-phase, without BU, IP54</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
61	30	40	72	37	50	✓	-	✓	FS4	IP54/NEMA12	<b>DG1-34061FN-C54C</b> 9702-4103-00P	1 unit
72	37	50	87	45	60	✓	-	✓			<b>DG1-34072FN-C54C</b> 9702-4107-00P	
87	45	60	105	55	75	✓	-	✓			<b>DG1-34087FN-C54C</b> 9702-4111-00P	
105	55	75	140	75	100	✓	-	✓	FS5		<b>DG1-34105FN-C54C</b> 9702-5103-00P	
140	75	100	170	90	125	✓	-	✓			<b>DG1-34140FN-C54C</b> 9702-5107-00P	
170	90	125	205	110	150	✓	-	✓			<b>DG1-34170FN-C54C</b> 9702-5111-00P	
205	110	150	261	132	200	✓	-	✓	FS6		<b>DG1-34205FN-C54C</b> 9702-6103-00P	
245	132	200	310	160	250	✓	-	✓			<b>DG1-34245FN-C54C</b> 9702-6107-00P	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

# Variable frequency drive DG1 to 160 kW

# 2.6

DG1 for three-phase motors 575 V, three-phase

Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150\%$ $I_e$ A	kW HP		$I_n = 110\%$ $I_e$ A	kW HP						Radio interference suppression filter	Brake chopper
<b>U<sub>2</sub> 575 V AC, three-phase / U<sub>2</sub> 575 V AC, three-phase, with BU, IP21</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
3.3	1.5	2	4.5	2.2	3	✓	✓	✓	FS1	IP21/NEMA1	<b>DG1-353D3FB-C21C</b> 9703-1002-00P	1 unit
4.5	2.2	3	7.5	4	5	✓	✓	✓			<b>DG1-354D5FB-C21C</b> 9703-1004-00P	
7.5	4	5	10	5.5	7.5	✓	✓	✓			<b>DG1-357D5FB-C21C</b> 9703-1006-00P	
10	5.5	7.5	13.5	7.5	10	✓	✓	✓	FS2		<b>DG1-35010FB-C21C</b> 9703-2002-00P	
13.5	7.5	10	18	11	15	✓	✓	✓			<b>DG1-35013FB-C21C</b> 9703-2004-00P	
18	11	15	22	15	20	✓	✓	✓			<b>DG1-35018FB-C21C</b> 9703-2006-00P	
22	15	20	27	18.5	25	✓	✓	✓	FS3		<b>DG1-35022FB-C21C</b> 9703-3002-00P	
27	18.5	25	34	22	30	✓	✓	✓			<b>DG1-35027FB-C21C</b> 9703-3004-00P	
34	22	30	41	30	40	✓	✓	✓			<b>DG1-35034FB-C21C</b> 9703-3006-00P	
41	30	40	52	37	50	✓	✓	✓	FS4		<b>DG1-35041FB-C21C</b> 9703-4002-00P	
52	37	50	62	45	60	✓	✓	✓			<b>DG1-35052FB-C21C</b> 9703-4006-00P	
62	45	60	80	55	75	✓	✓	✓			<b>DG1-35062FB-C21C</b> 9703-4010-00P	
80	55	75	100	75	100	✓	✓	✓	FS5		<b>DG1-35080FB-C21C</b> 9703-5002-00P	
100	75	100	125	90	125	✓	✓	✓			<b>DG1-35100FB-C21C</b> 9703-5006-00P	
125	90	125	144	110	150	✓	✓	✓			<b>DG1-35125FB-C21C</b> 9703-5010-00P	
144	110	150	208	160	200	✓	✓	✓	FS6		<b>DG1-35144FB-C21C</b> 9703-6002-00P	
208	160	200	250	200	250	✓	✓	✓			<b>DG1-35208FB-C21C</b> 9703-6005-00P	
<b>U<sub>2</sub> 575 V AC, three-phase / U<sub>2</sub> 575 V AC, three-phase, without BU, IP21</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
41	30	40	52	37	50	✓	-	✓	FS4	IP21/NEMA1	<b>DG1-35041FN-C21C</b> 9703-4004-00P	1 unit
52	37	50	62	45	60	✓	-	✓			<b>DG1-35052FN-C21C</b> 9703-4008-00P	
62	45	60	80	55	75	✓	-	✓			<b>DG1-35062FN-C21C</b> 9703-4012-00P	
80	55	75	100	75	100	✓	-	✓	FS5		<b>DG1-35080FN-C21C</b> 9703-5004-00P	
100	75	100	125	90	125	✓	-	✓			<b>DG1-35100FN-C21C</b> 9703-5008-00P	
125	90	125	144	110	150	✓	-	✓			<b>DG1-35125FN-C21C</b> 9703-5012-00P	
144	110	150	208	160	200	✓	-	✓	FS6		<b>DG1-35144FN-C21C</b> 9703-6004-00P	
208	160	200	250	200	250	✓	-	✓			<b>DG1-35208FN-C21C</b> 9703-6006-00P	

**Notes**

- <sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

# 2.6

## Variable frequency drive DG1 to 160 kW

DG1Pro for three-phase motors 400 V, three-phase

Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Rated operational current <sup>1)</sup>	Assigned motor output <sup>1) 2) 3)</sup>		Configuration	Frame size	Protection type	Catalog Number Article no.	Std. pack		
	$I_n = 150%$ $I_e$ A	kW HP		$I_n = 110%$ $I_e$ A	kW HP						Radio interference suppression filter	Brake chopper
<b>U<sub>n</sub> 575 V AC, three-phase / U<sub>2</sub> 575 V AC, three-phase, with BU, IP54</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
3.3	1.5	2	4.5	2.2	3	✓	✓	✓	FS1	IP54/NEMA12	<b>DG1-353D3FB-C54C</b> 9703-1102-00P	1 unit
4.5	2.2	3	7.5	4	5	✓	✓	✓			<b>DG1-354D5FB-C54C</b> 9703-1104-00P	
7.5	4	5	10	5.5	7.5	✓	✓	✓			<b>DG1-357D5FB-C54C</b> 9703-1106-00P	
10	5.5	7.5	13.5	7.5	10	✓	✓	✓	FS2		<b>DG1-35010FB-C54C</b> 9703-2102-00P	
13.5	7.5	10	18	11	15	✓	✓	✓			<b>DG1-35013FB-C54C</b> 9703-2104-00P	
18	11	15	22	15	20	✓	✓	✓			<b>DG1-35018FB-C54C</b> 9703-2106-00P	
22	15	20	27	18.5	25	✓	✓	✓	FS3		<b>DG1-35022FB-C54C</b> 9703-3102-00P	
27	18.5	25	34	22	30	✓	✓	✓			<b>DG1-35027FB-C54C</b> 9703-3104-00P	
34	22	30	41	30	40	✓	✓	✓			<b>DG1-35034FB-C54C</b> 9703-3106-00P	
41	30	40	52	37	50	✓	✓	✓	FS4		<b>DG1-35041FB-C54C</b> 9703-4102-00P	
52	37	50	62	45	60	✓	✓	✓			<b>DG1-35052FB-C54C</b> 9703-4106-00P	
62	45	60	80	55	75	✓	✓	✓			<b>DG1-35062FB-C54C</b> 9703-4110-00P	
80	55	75	100	75	100	✓	✓	✓	FS5		<b>DG1-35080FB-C54C</b> 9703-5102-00P	
100	75	100	125	90	125	✓	✓	✓			<b>DG1-35100FB-C54C</b> 9703-5106-00P	
125	90	125	144	110	150	✓	✓	✓			<b>DG1-35125FB-C54C</b> 9703-5110-00P	
144	110	150	208	160	200	✓	✓	✓	FS6		<b>DG1-35144FB-C54C</b> 9703-6102-00P	
208	160	200	250	200	250	✓	✓	✓			<b>DG1-35208FB-C54C</b> 9703-6105-00P	
<b>U<sub>n</sub> 575 V AC, three-phase / U<sub>2</sub> 575 V AC, three-phase, without BU, IP54</b>												
Mains voltage (50/60Hz) U <sub>LN</sub> : 380 (-15%) - 500 (+10%) V												
41	30	40	52	37	50	✓	-	✓	FS4	IP54/NEMA12	<b>DG1-35041FN-C54C</b> 9703-4104-00P	1 unit
52	37	50	62	45	60	✓	-	✓			<b>DG1-35052FN-C54C</b> 9703-4108-00P	
62	45	60	80	55	75	✓	-	✓			<b>DG1-35062FN-C54C</b> 9703-4112-00P	
80	55	75	100	75	100	✓	-	✓	FS5		<b>DG1-35080FN-C54C</b> 9703-5104-00P	
100	75	100	125	90	125	✓	-	✓			<b>DG1-35100FN-C54C</b> 9703-5108-00P	
125	90	125	144	110	150	✓	-	✓			<b>DG1-35125FN-C54C</b> 9703-5112-00P	
144	110	150	208	160	200	✓	-	✓	FS6		<b>DG1-35144FN-C54C</b> 9703-6104-00P	
208	160	200	250	200	250	✓	-	✓			<b>DG1-35208FN-C54C</b> 9703-6106-00P	

**Notes**

<sup>1)</sup> Overload cycle for 60 s every 600 s, 150% at 50°C ambient temperature, 110% at 40°C ambient temperature  
<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz  
<sup>3)</sup> At 400 V, 50 Hz/at 480 V, 60 Hz

## Options

Description	Catalog Number Article no.	Std. pack
<b>DG1 network interfaces</b>		
DG1/DH1 networking: PROFINET	<b>DXG-NET-PROFINET</b> 400003	1 unit
DG1/DH1 networking: PROFIBUS	<b>DXG-NET-PROFIBUS</b> 744-A2617-00P	
DG1/DH1 networking: DEVICENET	<b>DXG-NET-DEVICENET</b> 744-F0117-00P	
DG1/DH1 networking: SWD-IP54	<b>DXG-NET-SWD-IP54</b> 744-F0191-00P	
DG1/DH1 networking: CANOPEN	<b>DXG-NET-CANOPEN</b> 744-F0116-00P	
DG1/DH1 networking: SWD-IP20	<b>DXG-NET-SWD-IP20</b> 744-F0190-00P	
DG1/DH1 D-sub adapter on terminals	<b>DXG-MNT-PROFIBUS</b> 744-A2618-00P	
<b>I/O expansions DG1 &amp; DH1</b>		
DG1/DH1 IO expansion: THER1	<b>DXG-EXT-THER1</b> 744-A2615-00P	1 unit
DG1/DH1 IO expansion: 3RO	<b>DXG-EXT-3RO</b> 744-A2614-00P	
DG1/DH1 IO expansion: 3DI3DO1T	<b>DXG-EXT-3DI3DO1T</b> 744-A2612-00P	
DG1/DH1 IO expansion: 1AI2AO	<b>DXG-EXT-1AI2AO</b> 744-A2613-00P	
DG1/DH1 IO expansion: 6DI	<b>DXG-EXT-6DI</b> 744-A2616-00P	
<b>Keypad options DG1, DH1 &amp; DM1</b>		
DG1 Remote Keypad mounting frame	<b>DXG-KEY-HOLDER</b> 730-32032-00P	1 unit
DG1 Remote Keypad Kit (3m cable)	<b>DXG-KEY-RMTKIT</b> 730-32033-00P	
DG1 Type12/IP54 Keypad stopper	<b>DXG-KEY-N12PLUG</b> 730-32038-00P	
DG1 Standard Keypad	<b>DXG-KEY-LCD</b> 730-32047-00P	
DG1 RJ-45 male-to-male Keypad connector	<b>DXG-SPR-KEYM2M</b> 744-S0000-00P	
<b>IP54 Keypad Adapter</b>		
DG1/DH1: IP54 keypad cable adapter	<b>DXG-KEY-N12CON</b> 199366	1 unit
<b>Battery</b>		
DG1/DH1 spare battery	<b>DXG-ACC-RTBATT</b> 730-32039-00P	1 unit
<b>Cable</b>		
DG1/DH1 RJ45 cable, 1m	<b>DXG-CBL-1M0</b> 730-32034-00P	1 unit
DG1/DH1 RJ45 cable, 3m	<b>DXG-CBL-3M0</b> 730-32035-00P	
DG1/DH1 USB to RJ45 cable, 1.5m	<b>DXG-CBL-PCCABLE</b> 730-32037-00P	
<b>Unit-through mounting frames</b>		
DG1/DH1 unit-through frame, frame size 1	<b>DXG-ACC-FR1N12FK</b> 730-32022-00P	1 unit
DG1/DH1 unit-through frame, frame size 2	<b>DXG-ACC-FR2N12FK</b> 730-32023-00P	
DG1/DH1 unit-through frame, frame size 3	<b>DXG-ACC-FR3N12FK</b> 730-32024-00P	
DG1/DH1 unit-through frame, frame size 4	<b>DXG-ACC-FR4N12FK</b> 730-32025-00P	
DG1/DH1 unit-through frame, frame size 5	<b>DXG-ACC-FR5N12FK</b> 730-32026-00P	
DG1/DH1 unit-through frame, frame size 6	<b>DXG-ACC-FR6N12FK</b> 744-A3845-00P	
<b>IP21 to IP54 retrofit kit, frame size 1 and frame size 2</b>		
DG1/DH1 retrofit kit for conversion to IP54/NEMA12, frame size 1, 400 V	<b>DXG-ACC-4FR1N12KIT</b> 730-32029-00P	1 unit
DG1/DH1 retrofit kit for conversion to IP54/NEMA12, frame size 1, 230 V	<b>DXG-ACC-2FR1N12KIT</b> 744-A2815-00P	
DG1/DH1 retrofit kit for conversion to IP54/NEMA12, frame size 2	<b>DXG-ACC-FR2N12KIT</b> 730-32030-00P	

# 2.6

## Variable frequency drive DG1 to 160 kW

### DG1 External components

#### Engineering

Catalog Number	$I_e$ (150% overload)		$I_e$ (110% overload)			
	Rated operational current A	Type 1 coordination	Type 1 coordination	Rated operational current A	Type 1 coordination	Type 1 coordination
<b>230 V with EMC filter, with braking chopper, IP20</b>						
DG1-323D7EB-C20C	3.7	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DG1-324D8EB-C20C	4.8	PKZM0-6.3	C10G10	6.6	PKZM0-10	C10G10
DG1-326D6EB-C20C	6.6	PKZM0-10	C10G16	7.8	PKZM0-10	C10G16
<b>230 V with EMC filter, with braking chopper, IP21/IP54</b>						
DG1-323D7FB...	3.7	PKZM0-4	C10G10	4.8	PKZM0-6.3	C10G10
DG1-324D8FB...	4.8	PKZM0-6.3	C10G10	6.6	PKZM0-10	C10G10
DG1-326D6FB...	6.6	PKZM0-10	C10G10	7.8	PKZM0-10	C10G10
DG1-327D8FB...	7.8	PKZM0-10	C10G16	11	PKZM0-12	C10G16
DG1-32011FB...	11	PKZM0-12	C10G16	12.5	PKZM0-16	C10G16
DG1-32012FB...	12.5	PKZM0-16	C10G20	17.5	PKZM0-20	C10G20
DG1-32017FB...	17.5	PKZM0-20	C10G32	25	PKZM0-25	C10G32
DG1-32025FB...	25	PKZM0-25	C14G40	31	PKZM0-32	C14G40
DG1-32031FB...	31	PKZM0-32	C22G63	48	PKZM4-50	C22G63
DG1-32048FB...	48	PKZM4-50	C22G80	61	PKZM4-63	C22G80
DG1-32061FB...	61	PKZM4-63	C22G100	75	NZMC1-A80	C22G100
DG1-32075FB...	75	NZMC1-A80	125NHG00B	88	NZMC1-A100	125NHG00B
DG1-32088FB...	88	NZMC1-A100	125NHG00B	114	NZMC1-A125	125NHG00B
DG1-32114FB...	114	NZMC1-A125	200NHG1B	143	NZMC1-A160	200NHG1B
DG1-32143FB...	143	NZMC1-A160	200NHG1B	170	NZMC2-A200	200NHG1B
DG1-32170FB...	170	NZMC2-A200	250NHG1B	211	NZMC2-A250	250NHG1B
DG1-32211FB...	211	NZMC2-A250	400NHG03B	261	NZMC2-A300	400NHG03B
DG1-32248FB...	248	NZMC2-A250	400NHG03B	312	NZMC3-A320	400NHG03B
<b>230 V with EMC filter, without braking chopper, IP21/IP54</b>						
DG1-32061FN...	61	PKZM4-63	C22G100	75	NZMC1-A80	C22G100
DG1-32075FN...	75	NZMC1-A80	125NHG00B	88	NZMC1-A100	125NHG00B
DG1-32088FN...	88	NZMC1-A100	125NHG00B	114	NZMC1-A125	125NHG00B
DG1-32114FN...	114	NZMC1-A125	200NHG1B	143	NZMC1-A160	200NHG1B
DG1-32143FN...	143	NZMC1-A160	200NHG1B	170	NZMC2-A200	200NHG1B
DG1-32170FN...	170	NZMC2-A200	250NHG1B	211	NZMC2-A250	250NHG1B
DG1-32211FN...	211	NZMC2-A250	400NHG03B	261	NZMC2-A300	400NHG03B
DG1-32248FN...	248	NZMC2-A250	400NHG03B	312	NZMC3-A320	400NHG03B

Minimum braking resistance $\Omega$	Switch-on voltage – brake chopper	Quantity – brake chopper	External brake resistors			RCD Type
			10.0% ED	20.0% ED	40.0% ED	
30	425	1	DX-BR035-1K1	DX-BR035-1K1	DX-BR035-1K1	FRCdM-25/4/003-G/Bfq
30	425	1	DX-BR035-1K1	DX-BR035-1K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
30	425	1	DX-BR035-1K1	DX-BR035-1K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
30	425	1	DX-BR035-1K1	DX-BR035-1K1	DX-BR035-1K1	FRCdM-25/4/003-G/Bfq
30	425	1	DX-BR035-1K1	DX-BR035-1K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
30	425	1	DX-BR035-1K1	DX-BR040-3K1	DX-BR040-3K1	FRCdM-25/4/003-G/Bfq
20	425	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-5K1	FRCdM-25/4/003-G/Bfq
20	425	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-5K1	FRCdM-40/4/003-G/Bfq
20	425	1	DX-BR022-1K4	DX-BR022-3K1	DX-BR022-5K1	FRCdM-40/4/003-G/Bfq
10	425	1	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
10	425	1	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	
3.3	425	1	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	
3.3	425	1	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	
3.3	425	1	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	
1.4	425	1	P:4 x DX-BR006-5K1	P:4 x DX-BR006-5K1	DX-BR002-54K3	
1.4	425	1	P:4 x DX-BR006-5K1	P:4 x DX-BR006-5K1	DX-BR002-54K3	
1.4	425	1	P:4 x DX-BR006-5K1	DX-BR002-54K3	DX-BR002-54K3	
1.4	425	1	P:4 x DX-BR006-5K1	DX-BR002-54K3	DX-BR002-54K3	
1.4	425	1	P:4 x DX-BR006-5K1	DX-BR002-54K3	DX-BR002-54K3	



# 2.6

## Variable frequency drive DG1 to 160 kW

### DG1 External components

Catalog Number	$I_b$ (150% overload)		$I_b$ (110% overload)			
	Rated operational current A	Type 1 coordination	Type 1 coordination	Rated operational current A	Type 1 coordination	Type 1 coordination
<b>400 V with EMC filter, with braking chopper, IP20</b>						
DG1-342D2EB-C20C	2.2	PKZM0-2.5	C10G6	3.3	PKZM0-4	C10G6
DG1-343D3EB-C20C	3.3	PKZM0-4	C10G10	4.3	PKZM0-6.3	C10G10
DG1-344D3EB-C20C	4.3	PKZM0-6.3	C10G10	5.6	PKZM0-6.3	C10G10
DG1-345D6EB-C20C	5.6	PKZM0-6.3	C10G16	7.6	PKZM0-10	C10G16
<b>400 V with EMC filter, with braking chopper, IP21/IP54</b>						
DG1-342D2FB...	2.2	PKZM0-2.5	C10G10	3.3	PKZM0-4	C10G10
DG1-343D3FB...	3.3	PKZM0-4	C10G10	4.3	PKZM0-6.3	C10G10
DG1-344D3FB...	4.3	PKZM0-6.3	C10G10	5.6	PKZM0-6.3	C10G10
DG1-345D6FB...	5.6	PKZM0-6.3	C10G10	7.6	PKZM0-10	C10G10
DG1-347D6FB...	7.6	PKZM0-10	C10G16	9	PKZM0-10	C10G16
DG1-349D0FB...	9	PKZM0-10	C10G16	12	PKZM0-12	C10G16
DG1-34012FB...	12	PKZM0-12	C10G20	16	PKZM0-16	C10G20
DG1-34016FB...	16	PKZM0-16	C10G32	23	PKZM0-25	C10G32
DG1-34023FB...	23	PKZM0-25	C14G40	31	PKZM0-32	C14G40
DG1-34031FB...	31	PKZM0-32	C14G50	38	PKZM4-40	C14G50
DG1-34038FB...	38	PKZM4-40	C22G63	46	PKZM4-50	C22G63
DG1-34046FB...	46	PKZM4-50	C22G80	61	PKZM4-63	C22G80
DG1-34061FB...	61	PKZM4-63	C22G100	72	NZMC1-A80	C22G100
DG1-34072FB...	72	NZMC1-A80	125NHG00B	87	NZMC1-A100	125NHG00B
DG1-34087FB...	87	NZMC1-A100	125NHG00B	105	NZMC1-A125	125NHG00B
DG1-34105FB...	105	NZMC1-A125	200NHG1B	140	NZMC1-A160	200NHG1B
DG1-34140FB...	140	NZMC1-A160	200NHG1B	170	NZMC2-A200	200NHG1B
DG1-34170FB...	170	NZMC2-A200	250NHG1B	205	NZMC2-A250	250NHG1B
DG1-34205FB...	205	NZMC2-A250	400NHG03B	261	NZMC2-A300	400NHG03B
DG1-34245FB...	245	NZMC2-A250	400NHG03B	310	NZMC3-A320	400NHG03B
<b>400 V with EMC filter, without braking chopper, IP21/IP54</b>						
DG1-34061FN...	61	PKZM4-63	C22G100	72	NZMC1-A80	C22G100
DG1-34072FN...	72	NZMC1-A80	125NHG00B	87	NZMC1-A100	125NHG00B
DG1-34087FN...	87	NZMC1-A100	125NHG00B	105	NZMC1-A125	125NHG00B
DG1-34105FN...	105	NZMC1-A125	200NHG1B	140	NZMC1-A160	200NHG1B
DG1-34140FN...	140	NZMC1-A160	200NHG1B	170	NZMC2-A200	200NHG1B
DG1-34170FN...	170	NZMC2-A200	250NHG1B	205	NZMC2-A250	250NHG1B
DG1-34205FN...	205	NZMC2-A250	400NHG03B	261	NZMC2-A300	400NHG03B
DG1-34245FN...	245	NZMC2-A250	400NHG03B	310	NZMC3-A320	400NHG03B

Minimum braking resistance $\Omega$	Switch-on voltage – brake chopper	Quantity – brake chopper	External brake resistors			RCD Type
			10.0% ED	20.0% ED	40.0% ED	
63	850	1	DX-BR075-1K4	DX-BR075-1K4	DX-BR075-1K4	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-1K4	DX-BR075-5K1	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-1K4	DX-BR075-5K1	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-5K1	DX-BR075-5K1	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-1K4	DX-BR075-1K4	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-1K4	DX-BR075-5K1	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-1K4	DX-BR075-5K1	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-5K1	DX-BR075-5K1	FRCdM-25/4/003-G/Bfq
63	850	1	DX-BR075-1K4	DX-BR075-5K1	DX-BR075-5K1	FRCdM-25/4/003-G/Bfq
42	850	1	DX-BR047-3K1	DX-BR047-3K1	DX-BR047-9K2	FRCdM-25/4/003-G/Bfq
42	850	1	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
42	850	1	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
14	850	1	P:3 x DX-BR047-3K1	P:3 x DX-BR047-3K1	P:3 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
14	850	1	P:3 x DX-BR047-3K1	P:3 x DX-BR047-5K1	P:3 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
14	850	1	P:3 x DX-BR047-3K1	P:3 x DX-BR047-5K1	P:3 x DX-BR047-9K2	
6.5	850	1	P:3 x DX-BR022-3K1	P:3 x DX-BR022-9K2	R:4 x DX-BR002-54K3	
6.5	850	1	P:3 x DX-BR022-3K1	P:3 x DX-BR022-9K2	R:4 x DX-BR002-54K3	
6.5	850	1	P:3 x DX-BR022-5K1	P:3 x DX-BR022-9K2	R:4 x DX-BR002-54K3	
3.3	850	1	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	
3.3	850	1	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	R:2 x DX-BR002-102K4	
3.3	850	1	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	R:2 x DX-BR002-102K4	
3.3	850	1	R:2 x DX-BR002-54K3	R:2 x DX-BR002-54K3	R:2 x DX-BR002-102K4	

# 2.6

## Variable frequency drive DG1 to 160 kW

### DG1 External components

Catalog Number	$I_b$ (150% overload)		$I_b$ (110% overload)			
	Rated operational current A	Type 1 coordination	Type 1 coordination	Rated operational current A	Type 1 coordination	Type 1 coordination
<b>575 V with EMC filter, with braking chopper, IP21/IP54</b>						
DG1-353D3FB...	3.3	PKZM0-4	C10G10	4.5	PKZM0-6.3	C10G10
DG1-354D5FB...	4.5	PKZM0-6.3	C10G10	7.5	PKZM0-10	C10G10
DG1-357D5FB...	7.5	PKZM0-10	C10G16	10	PKZM0-10	C10G16
DG1-35010FB...	10	PKZM0-10	C10G20	13.5	PKZM0-16	C10G20
DG1-35013FB...	13.5	PKZM0-16	C10G32	18	PKZM0-20	C10G32
DG1-35018FB...	18	PKZM0-20	C14G40	22	PKZM0-25	C14G40
DG1-35022FB...	22	PKZM0-25	C14G40	27	PKZM0-32	C14G40
DG1-35027FB...	27	PKZM0-32	C14G50	34	PKZM4-40	C14G50
DG1-35034FB...	34	PKZM4-40	C14G50	41	PKZM4-50	C14G50
DG1-35041FB...	41	PKZM4-50	C22G80	52	PKZM4-58	C22G80
DG1-35052FB...	52	PKZM4-58	C22G80	62	PKZM4-63	C22G80
DG1-35062FB...	62	PKZM4-63	125NHG00B	80	NZMC1-A80	125NHG00B
DG1-35080FB...	80	NZMC1-A80	160NHG00B	100	NZMC1-A100	160NHG00B
DG1-35100FB...	100	NZMC1-A100	200NHG1B	125	NZMC1-A125	200NHG1B
DG1-35125FB...	125	NZMC1-A125	200NHG1B	144	NZMC1-A160	200NHG1B
DG1-35144FB...	144	NZMC1-A160	400NHG03B	208	NZMC2-A250	400NHG03B
DG1-35208FB...	208	NZMC2-A250	400NHG03B	250	NZMC2-A250	400NHG03B
<b>575 V with EMC filter, without braking chopper, IP21/IP54</b>						
DG1-35041FN...	41	PKZM4-50	C22G80	52	PKZM4-58	C22G80
DG1-35052FN...	52	PKZM4-58	C22G80	62	PKZM4-63	C22G80
DG1-35062FN...	62	PKZM4-63	125NHG00B	80	NZMC1-A80	125NHG00B
DG1-35080FN...	80	NZMC1-A80	160NHG00B	100	NZMC1-A100	160NHG00B
DG1-35100FN...	100	NZMC1-A100	200NHG1B	125	NZMC1-A125	200NHG1B
DG1-35125FN...	125	NZMC1-A125	200NHG1B	144	NZMC1-A160	200NHG1B
DG1-35144FN...	144	NZMC1-A160	400NHG03B	208	NZMC2-A250	400NHG03B
DG1-35208FN...	208	NZMC2-A250	400NHG03B	250	NZMC2-A250	400NHG03B

Minimum braking resistance	Switch-on voltage – brake chopper	Quantity – brake chopper	External brake resistors			RCD Type
			10.0% ED	20.0% ED	40.0% ED	
$\Omega$						
100	1050	1	DX-BR100-0K8	DX-BR100-1K4	DX-BR100-6K2	FRCdM-25/4/003-G/Bfq
100	1050	1	DX-BR100-1K4	DX-BR100-6K2	DX-BR100-6K2	FRCdM-25/4/003-G/Bfq
100	1050	1	DX-BR100-1K4	DX-BR100-6K2	DX-BR100-6K2	FRCdM-25/4/003-G/Bfq
30	1050	1	DX-BR040-3K1	DX-BR040-5K1	DX-BR047-9K2	FRCdM-25/4/003-G/Bfq
30	1050	1	DX-BR040-3K1	DX-BR040-5K1	DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
30	1050	1	DX-BR040-3K1	DX-BR047-9K2	P2R2: DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
18	1050	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-40/4/003-G/Bfq
18	1050	1	DX-BR022-5K1	DX-BR022-9K2	P:2 x DX-BR047-9K2	FRCdM-63/4/003-G/Bfq
18	1050	1	DX-BR022-9K2	P:2 x DX-BR047-9K2	P:4 x DX-BR100-6K2	FRCdM-63/4/003-G/Bfq
9	1050	1	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	
9	1050	1	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	
9	1050	1	P:4 x DX-BR047-9K2	P:4 x DX-BR047-9K2	R:5 x DX-BR002-54K3	
7	1050	1	P:3 x DX-BR022-5K1	P:3 x DX-BR022-9K2	R:4 x DX-BR002-54K3	
7	1050	1	P:3 x DX-BR022-9K2	R:4 x DX-BR002-54K3	R:4 x DX-BR002-102K4	
7	1050	1	P:3 x DX-BR022-9K2	R:4 x DX-BR002-54K3	R:4 x DX-BR002-102K4	
2.5	1050	1	P:2 x DX-BR006-18K1	P:2 x DX-BR006-33K3	R:2 x DX-BR002-102K4	
2.5	1050	1	P:2 x DX-BR006-18K1	P:2 x DX-BR006-33K3	R:2 x DX-BR002-102K4	

# 2.6

## Variable frequency drive DG1 to 160 kW

### DG1 External components

Catalog Number	High Overload (150%)								
	Rated operational current $I_e$	Optional mains contactor	Internal EMC Filter			External EMC filter			
			Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	
A			m	m	m	m	m	m	
<b>230 V with EMC filter, with braking chopper, IP20</b>									
DG1-323D7EB-C20C	3.7	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	25	50	75
DG1-324D8EB-C20C	4.8	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	25	50	75
DG1-326D6EB-C20C	6.6	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	25	50	75
<b>230 V with EMC filter, with braking chopper, IP21/IP54</b>									
DG1-323D7FB...	3.7	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-324D8FB...	4.8	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-326D6FB...	6.6	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-327D8FB...	7.8	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-32011FB...	11	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-016	25	50	75
DG1-32012FB...	12.5	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-016	25	50	75
DG1-32017FB...	17.5	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-030	25	50	75
DG1-32025FB...	25	DILM17-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-030	25	50	75
DG1-32031FB...	31	DILM17-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-042	25	50	75
DG1-32048FB...	48	DILM40 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-055	25	50	75
DG1-32061FB...	61	DILM50 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-32075FB...	75	DILM65 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-32088FB...	88	DILM80 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-100	25	50	75
DG1-32114FB...	114	DILM115 (RAC240)	0	10	50	DX-EMC34-130	25	50	75
DG1-32143FB...	143	DILM150 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-32170FB...	170	DILM170 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-32211FB...	211	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75
DG1-32248FB...	248	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75
<b>230 V with EMC filter, without braking chopper, IP21/IP54</b>									
DG1-32061FN...	61	DILM50 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-32075FN...	75	DILM65 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-32088FN...	88	DILM80 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-100	25	50	75
DG1-32114FN...	114	DILM115 (RAC240)	0	10	50	DX-EMC34-130	25	50	75
DG1-32143FN...	143	DILM150 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-32170FN...	170	DILM170 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-32211FN...	211	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75
DG1-32248FN...	248	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75

# Variable frequency drive DG1 to 160 kW

## DG1 External components

# 2.6

External EMC filter (low leakage current)	Mains choke			$u_k$	Motor choke	Sine filter	All-pole sine filter	
	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3					
	m	m	m					
DX-EMC34-008-L	5	25	50	DX-LN3-004	7.5%	DX-LM3-008	DX-SIN3-004	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DX-LN3-006	4.9%	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DX-LN3-010	2.9%	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A
DX-EMC34-008-L	5	25	50	Internal DC link choke	5%	DX-LM3-008	DX-SIN3-004	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	Internal DC link choke	5%	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	Internal DC link choke	5%	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A
DX-EMC34-008-L	5	25	50	Internal DC link choke	5%	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A
DX-EMC34-016-L	5	25	50	Internal DC link choke	5%	DX-LM3-011	DX-SIN3-016	DX-SIN3-013-A
DX-EMC34-016-L	5	25	50	Internal DC link choke	5%	DX-LM3-016	DX-SIN3-016	DX-SIN3-013-A
DX-EMC34-030-L	5	25	50	Internal DC link choke	5%	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A
DX-EMC34-030-L	5	25	50	Internal DC link choke	5%	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A
DX-EMC34-042-L	5	25	50	Internal DC link choke	5%	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A
DX-EMC34-055-L	5	25	50	Internal DC link choke	5%	DX-LM3-050	DX-SIN3-048	
DX-EMC34-075-L	5	25	50	Internal DC link choke	5%	DX-LM3-063	DX-SIN3-061	
DX-EMC34-075-L	5	25	50	Internal DC link choke	5%	DX-LM3-080	DX-SIN3-090	
DX-EMC34-100-L	5	25	50	Internal DC link choke	5%	DX-LM3-100	DX-SIN3-090	
DX-EMC34-130-L	5	25	50	Internal DC link choke	5%	DX-LM3-150	DX-SIN3-115	
DX-EMC34-180-L	5	25	50	Internal DC link choke	5%	DX-LM3-150	DX-SIN3-150	
DX-EMC34-180-L	5	25	50	Internal DC link choke	5%	DX-LM3-180	DX-SIN3-180	
DX-EMC34-250-L	5	25	50	Internal DC link choke	5%	DX-LM3-220	DX-SIN3-250	
DX-EMC34-250-L	5	25	50	Internal DC link choke	5%	DX-LM3-260	DX-SIN3-250	
DX-EMC34-075-L	5	25	50	Internal DC link choke	5%	DX-LM3-063	DX-SIN3-061	
DX-EMC34-075-L	5	25	50	Internal DC link choke	5%	DX-LM3-080	DX-SIN3-090	
DX-EMC34-100-L	5	25	50	Internal DC link choke	5%	DX-LM3-100	DX-SIN3-090	
DX-EMC34-130-L	5	25	50	Internal DC link choke	5%	DX-LM3-150	DX-SIN3-115	
DX-EMC34-180-L	5	25	50	Internal DC link choke	5%	DX-LM3-150	DX-SIN3-150	
DX-EMC34-180-L	5	25	50	Internal DC link choke	5%	DX-LM3-180	DX-SIN3-180	
DX-EMC34-250-L	5	25	50	Internal DC link choke	5%	DX-LM3-220	DX-SIN3-250	
DX-EMC34-250-L	5	25	50	Internal DC link choke	5%	DX-LM3-260	DX-SIN3-250	

# 2.6

## Variable frequency drive DG1 to 160 kW

### DG1 External components

Catalog Number	High Overload (150%)								
	Rated operational current $I_e$	Optional mains contactor	Internal EMC Filter			External EMC filter			
			Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3	
A		m	m	m	m	m	m		
<b>400 V with EMC filter, with braking chopper, IP20</b>									
DG1-342D2EB-C20C	2.2	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	25	50	75
DG1-343D3EB-C20C	3.3	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	25	50	75
DG1-344D3EB-C20C	4.3	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	25	50	75
DG1-345D6EB-C20C	5.6	DILM7-10 (230V50HZ,240V60HZ)	0	0	0	DX-EMC34-008	25	50	75
<b>400 V with EMC filter, with braking chopper, IP21/IP54</b>									
DG1-342D2FB...	2.2	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-343D3FB...	3.3	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-344D3FB...	4.3	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-345D6FB...	5.6	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-347D6FB...	7.6	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-008	25	50	75
DG1-349D0FB...	9	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-016	25	50	75
DG1-34012FB...	12	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-016	25	50	75
DG1-34016FB...	16	DILM7-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-016	25	50	75
DG1-34023FB...	23	DILM17-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-030	25	50	75
DG1-34031FB...	31	DILM17-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-042	25	50	75
DG1-34038FB...	38	DILM17-10 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-042	25	50	75
DG1-34046FB...	46	DILM40 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-055	25	50	75
DG1-34061FB...	61	DILM50 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-34072FB...	72	DILM65 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-34087FB...	87	DILM80 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-100	25	50	75
DG1-34105FB...	105	DILM95 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-130	25	50	75
DG1-34140FB...	140	DILM150 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-34170FB...	170	DILM170 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-34205FB...	205	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75
DG1-34245FB...	245	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75
<b>400 V with EMC filter, without braking chopper, IP21/IP54</b>									
DG1-34061FN...	61	DILM50 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-34072FN...	72	DILM65 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-075	25	50	75
DG1-34087FN...	87	DILM80 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-100	25	50	75
DG1-34105FN...	105	DILM95 (230V50HZ,240V60HZ)	0	10	50	DX-EMC34-130	25	50	75
DG1-34140FN...	140	DILM150 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-34170FN...	170	DILM170 (RAC240)	0	10	50	DX-EMC34-180	25	50	75
DG1-34205FN...	205	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75
DG1-34245FN...	245	DILM185A/22 (RAC240)	0	10	50	DX-EMC34-250	25	50	75

# Variable frequency drive DG1 to 160 kW

# 2.6

## DG1 External components

External EMC filter (low leakage current)	Mains choke			$u_k$	Motor choke	Sine filter	All-pole sine filter	
	Permissible cable length for C1	Permissible cable length for C2	Permissible cable length for C3					
	m	m	m					
DX-EMC34-008-L	5	25	50	DX-LN3-004	7.5%	DX-LM3-008	DX-SIN3-004	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DX-LN3-004	7.5%	DX-LM3-008	DX-SIN3-004	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DX-LN3-006	4.9%	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DX-LN3-006	4.9%	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DC choke internal	5%	DX-LM3-008	DX-SIN3-004	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DC choke internal	5%	DX-LM3-008	DX-SIN3-004	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DC choke internal	5%	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DC choke internal	5%	DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A
DX-EMC34-008-L	5	25	50	DC choke internal	5%	DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A
DX-EMC34-016-L	5	25	50	DC choke internal	5%	DX-LM3-011	DX-SIN3-010	DX-SIN3-013-A
DX-EMC34-016-L	5	25	50	DC choke internal	5%	DX-LM3-016	DX-SIN3-016	DX-SIN3-013-A
DX-EMC34-016-L	5	25	50	DC choke internal	5%	DX-LM3-016	DX-SIN3-016	DX-SIN3-024-A
DX-EMC34-030-L	5	25	50	DC choke internal	5%	DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A
DX-EMC34-042-L	5	25	50	DC choke internal	5%	DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A
DX-EMC34-042-L	5	25	50	DC choke internal	5%	DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A
DX-EMC34-055-L	5	25	50	DC choke internal	5%	DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A
DX-EMC34-075-L	5	25	50	DC choke internal	5%	DX-LM3-063	DX-SIN3-061	
DX-EMC34-075-L	5	25	50	DC choke internal	5%	DX-LM3-080	DX-SIN3-072	
DX-EMC34-100-L	5	25	50	DC choke internal	5%	DX-LM3-100	DX-SIN3-090	
DX-EMC34-130-L	5	25	50	DC choke internal	5%	DX-LM3-150	DX-SIN3-115	
DX-EMC34-180-L	5	25	50	DC choke internal	5%	DX-LM3-150	DX-SIN3-150	
DX-EMC34-180-L	5	25	50	DC choke internal	5%	DX-LM3-180	DX-SIN3-180	
DX-EMC34-250-L	5	25	50	DC choke internal	5%	DX-LM3-220	DX-SIN3-250	
DX-EMC34-250-L	5	25	50	DC choke internal	5%	DX-LM3-260	DX-SIN3-250	
DX-EMC34-075-L	5	25	50	DC choke internal	5%	DX-LM3-063	DX-SIN3-061	
DX-EMC34-075-L	5	25	50	DC choke internal	5%	DX-LM3-080	DX-SIN3-072	
DX-EMC34-100-L	5	25	50	DC choke internal	5%	DX-LM3-100	DX-SIN3-090	
DX-EMC34-130-L	5	25	50	DC choke internal	5%	DX-LM3-150	DX-SIN3-115	
DX-EMC34-180-L	5	25	50	DC choke internal	5%	DX-LM3-150	DX-SIN3-150	
DX-EMC34-180-L	5	25	50	DC choke internal	5%	DX-LM3-180	DX-SIN3-180	
DX-EMC34-250-L	5	25	50	DC choke internal	5%	DX-LM3-220	DX-SIN3-250	
DX-EMC34-250-L	5	25	50	DC choke internal	5%	DX-LM3-260	DX-SIN3-250	



# 2.6

## Variable frequency drive DG1 to 160 kW

### DG1 External components

Catalog Number	High Overload (150%)					
	Rated operational current	Optional mains contactor	Internal EMC Filter			Mains choke
	$I_e$ A		Permissible cable length for C1 m	Permissible cable length for C2 m	Permissible cable length for C3 m	$u_k$ %
<b>575 V with EMC filter, with braking chopper, IP21/IP54</b>						
DG1-353D3FB...	3.3	DILM7-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-354D5FB...	4.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-357D5FB...	7.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35010FB...	10	DILM7-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35013FB...	13.5	DILM7-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35018FB...	18	DILM7-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35022FB...	22	DILM7-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35027FB...	27	DILM17-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35034FB...	34	DILM17-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35041FB...	41	DILM25-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35052FB...	52	DILM50 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35062FB...	62	DILM50 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35080FB...	80	DILM65 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35100FB...	100	DILM95 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35125FB...	125	DILM115 (RAC240)	0	0	10	DC choke internal 5%
DG1-35144FB...	144	DILM150 (RAC240)	0	0	10	DC choke internal 5%
DG1-35208FB...	208	DILM185A/22 (RAC240)	0	0	10	DC choke internal 5%
<b>575 V with EMC filter, without braking chopper, IP21/IP54</b>						
DG1-35041FN...	41	DILM25-10 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35052FN...	52	DILM50 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35062FN...	62	DILM50 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35080FN...	80	DILM65 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35100FN...	100	DILM95 (230V50HZ,240V60HZ)	0	0	10	DC choke internal 5%
DG1-35125FN...	125	DILM115 (RAC240)	0	0	10	DC choke internal 5%
DG1-35144FN...	144	DILM150 (RAC240)	0	0	10	DC choke internal 5%
DG1-35208FN...	208	DILM185A/22 (RAC240)	0	0	10	DC choke internal 5%

Motor choke                      Sine filter                      All-pole sine filter

DX-LM3-008	DX-SIN3-004	DX-SIN3-006-A
DX-LM3-008	DX-SIN3-010	DX-SIN3-006-A
DX-LM3-008	DX-SIN3-010	DX-SIN3-013-A
DX-LM3-011	DX-SIN3-010	DX-SIN3-013-A
DX-LM3-016	DX-SIN3-016	DX-SIN3-024-A
DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A
DX-LM3-035	DX-SIN3-023	DX-SIN3-024-A
DX-LM3-035	DX-SIN3-032	DX-SIN3-046-A
DX-LM3-035	DX-SIN3-037	DX-SIN3-046-A
DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A
DX-LM3-063	DX-SIN3-061	
DX-LM3-063	DX-SIN3-072	
DX-LM3-080	DX-SIN3-090	
DX-LM3-100	DX-SIN3-115	
DX-LM3-150	DX-SIN3-150	
DX-LM3-150	DX-SIN3-150	
DX-LM3-220	DX-SIN3-250	
DX-LM3-050	DX-SIN3-048	DX-SIN3-046-A
DX-LM3-063	DX-SIN3-061	
DX-LM3-063	DX-SIN3-072	
DX-LM3-080	DX-SIN3-090	
DX-LM3-100	DX-SIN3-115	
DX-LM3-150	DX-SIN3-150	
DX-LM3-150	DX-SIN3-150	
DX-LM3-220	DX-SIN3-250	

# 2.6

## Variable frequency drive DG1 to 160 kW

### Technical specifications

#### Technical specifications

	Unit	Value
<b>General</b>		
Product standard		IEC/EN 61800-2
Production standard		RoHS, ISO 9001
Security		IEC/EN 61800-5, IEC/EN 60950-1: SELF
Radio interference level		IEC/EN 61800-3
Integrated radio interference suppression filter		Yes, C2
Radio interference class (EMC)		C1 (with external filter, for conducted emissions only), C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.
Radio interference class (EMC), external filters		Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments
Environment (EMC)		1st and 2nd environments as per EN 61800-3
first environment		Yes
second environment		Yes
longest permissible length of motor cable with internal filter		C2 ≤ 10 m   C3 ≤ 50 m   DG1-35...: C3 ≤ 10 m
Interference immunity		EN 61800-3:2004+A1-2012, first and second environment
Emissions		EN 61800-3:2004+A1-2012, Category C2
Electrostatic discharge (ESD)		IEC 61000-4-2, 4 kV contact, 8 kV air, Second environment, Criterion B
Fast transients (burst)		IEC 61000-4-4, 2 kV/5 kHz, Second environment, Criterion B
Dielectrical strength		Input to output: 3600 V AC/5100 V DC Input to earth: 2000 V AC/2828 V DC
THD		((depends on size))
<b>Acoustic</b>		
Average noise level (cooling fan) sound power level in dB(A)		TBD
Noise Level		EN 61800-5-1 (2007)
<b>Climatic proofing</b>		
< 95%, average relative humidity (RH), non-condensing, non-corrosive		
<b>Ambient temperature</b>		
110% overload (1 min./10 min.)	°C	-30 - +40 (max. +55 with 1% derating per Kelvin temperature rise)
150% overload (1 min./10 min.)	°C	-30 - +50 (max. +60 with 1% derating per Kelvin temperature rise)
T <sub>min</sub>	°C	-30
T <sub>max</sub>	°C	60
<b>Ambient conditions</b>		
IEC 60068-2-60 Test Parameter: Flowing mixed gas corrosion test, Method 1 (H2S [hydrogen sulfide] and SO2 [sulfur dioxide])		
Ambient air according to IEC/EN 60721-3-3 ((class beyond EN60721-3-3 is missing))		3C2, 3S2
Storage temperature	°C	-40 - +70
Altitude		by voltage
permissible network configurations		TN-S, TN-C, TN-C-S, TT, IT
Mounting position		vertical
<b>Protection type</b>		
DG1-...-C21C		IP21 / NEMA Type 1
DG1-...-C54C		IP54 / NEMA Type 12 (keypad required)
Protection against contact		BGV A3 (VBG4, finger- and back-of-hand proof)
Overvoltage category		III
Pollution degree		2
Mechanical shock resistance		EN 61800-5-1, EN 60068-2-27   UPS drop test (for weights inside the UPS frame)   Storage and transportation: maximum 15 g, 11 ms (inside the packaging)

	Unit	Value
<b>Main circuit</b>		
Rated operating voltage (three-phase)		
DG1-32...	V	208 (-10%) - 240 (+10%)
DG1-34...	V	380 (-10%) - 500 (+10%)
DG1-35...	V	500 (-10%) - 600 (+10%)
Tolerance up	%	10
Tolerance dwn	%	15
Mains frequency	Hz	50/60
Tolerance	%	10
Mains frequency range	Hz	45 - 66
Mains switch-on frequency		Maximum of one time every 60 seconds
Overload withstand capability		
Overload cycle for 60 s every 600 s		
IL (1 min./10 min.)	%	110
IH (1 min./10 min.)	%	150
Comment		Rated operational current for a standard switching frequency and an ambient temperature of +50°C for a 150% overload and +40°C for a 110% overload
Short-time overload withstand capability (2 sec / 20 sec)		
Peak-overload cycle		for 2 seconds every 20 seconds
Output voltage at $U_e$	V	0 - $U_{in}$
Integrated DC link choke	$u_k$	% 5
Rated surge voltage invariability	$U_{imp}$	1.2/50 $\mu$ s
Rated insulation voltage $U_i$	V	
<b>Actuating circuit</b>		
External control voltage	$U_c$	V 24 V DC (max. 250 mA options incl.)
Permissible residual ripple		
Reference voltage		
Analog input 1 (voltage)	V DC	0 - 10, 2 - 10, variable - 10
Analog input 2 (voltage)	V DC	0 - 10, 2 - 10, variable - 10, -10 - +10, variable negative to variable positive
Analog input 1&2 (current)	mA	0 - 20, 4 - 20, variable - 20
Internal reference voltage		10 V DC (max. 10 mA)
Setpoint input (resolution)		
Analog input	%	0.1% (10-bit), accuracy +1%
Keypad input	Hz	0.01
Frequency resolution	Hz	0.01
<b>Variable frequency drive functions</b>		
Ramp times		
Startup	s	0.1 - 3000
Delay	s	0.1 - 3000
Control types		U/f control   Speed control with slip compensation   sensorless vector control (SLV)   torque regulation
Inputs / outputs		
Digital Inputs		8, parameterizable, max. 30 V DC
Digital Outputs		1, parameterizable, 24 V DC
Analog inputs		2, parameterizable, 0 - 10 V DC, 2 - 10 V DC, -10 - +10 V DC, 0/4 - 20 mA
Analog Outputs		2, parameterizable, 0 - 10 V, 0/4 - 20 mA
Relay		3, parameterizable, 2 changeover contacts and 1 N/O, 6 A (240 V AC) / 6 A (24 V DC)
Communication		
on-board		Modbus RTU, Modbus TCP, BACnet MS/TP, Ethernet IP
optional		Profibus, CAN, DeviceNet, SmartwireDT, i.V.: Profinet
SmartWire-DT connection		DXG-NET-SWD
Fault Current protection		RCD Type B (AC/DC sensitive)
Safety functions		STO (Safe Torque Off, SIL1, PLc Cat 1)
Real time clock		Yes
Plug-in terminal strips		Yes
Keypad (...-C...)		Multi-line LCD keypad, removable, can be installed in remote location
Display		Yes
Keypad		Yes
Variable frequency drive configuration		Variable frequency drive with internal DC link, DC link choke and IGBT inverter
Variable frequency drive type		U converter
Application field		For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz

# 2.6

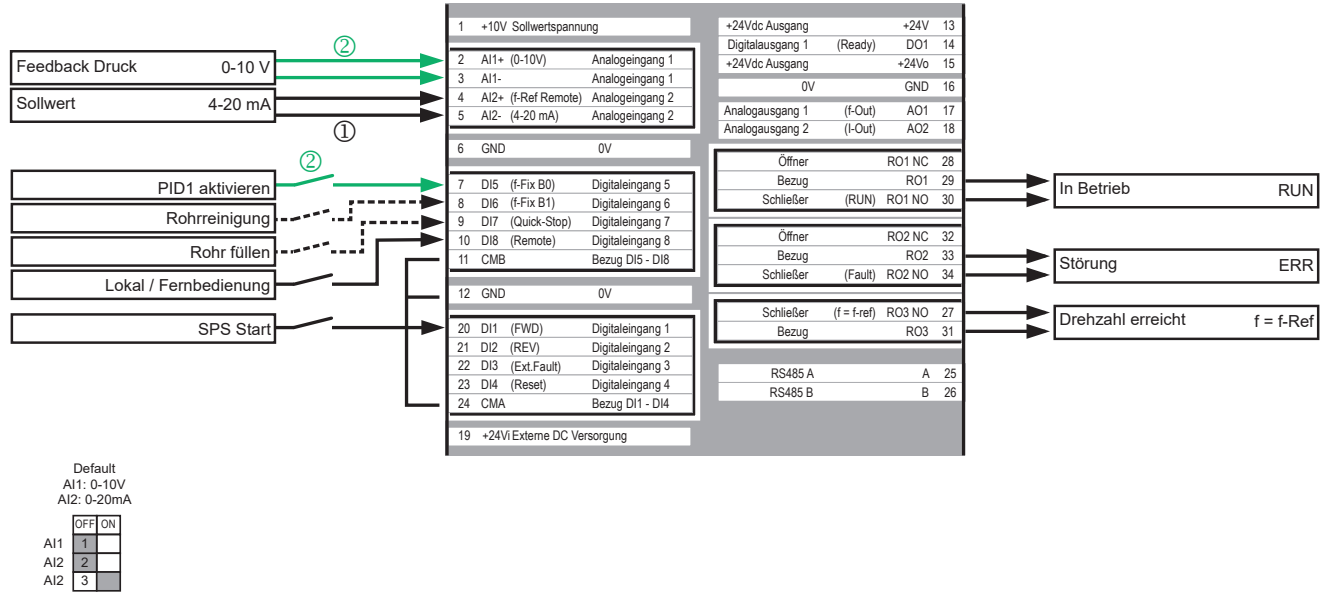
## Variable frequency drive DG1 to 160 kW

### Connection examples

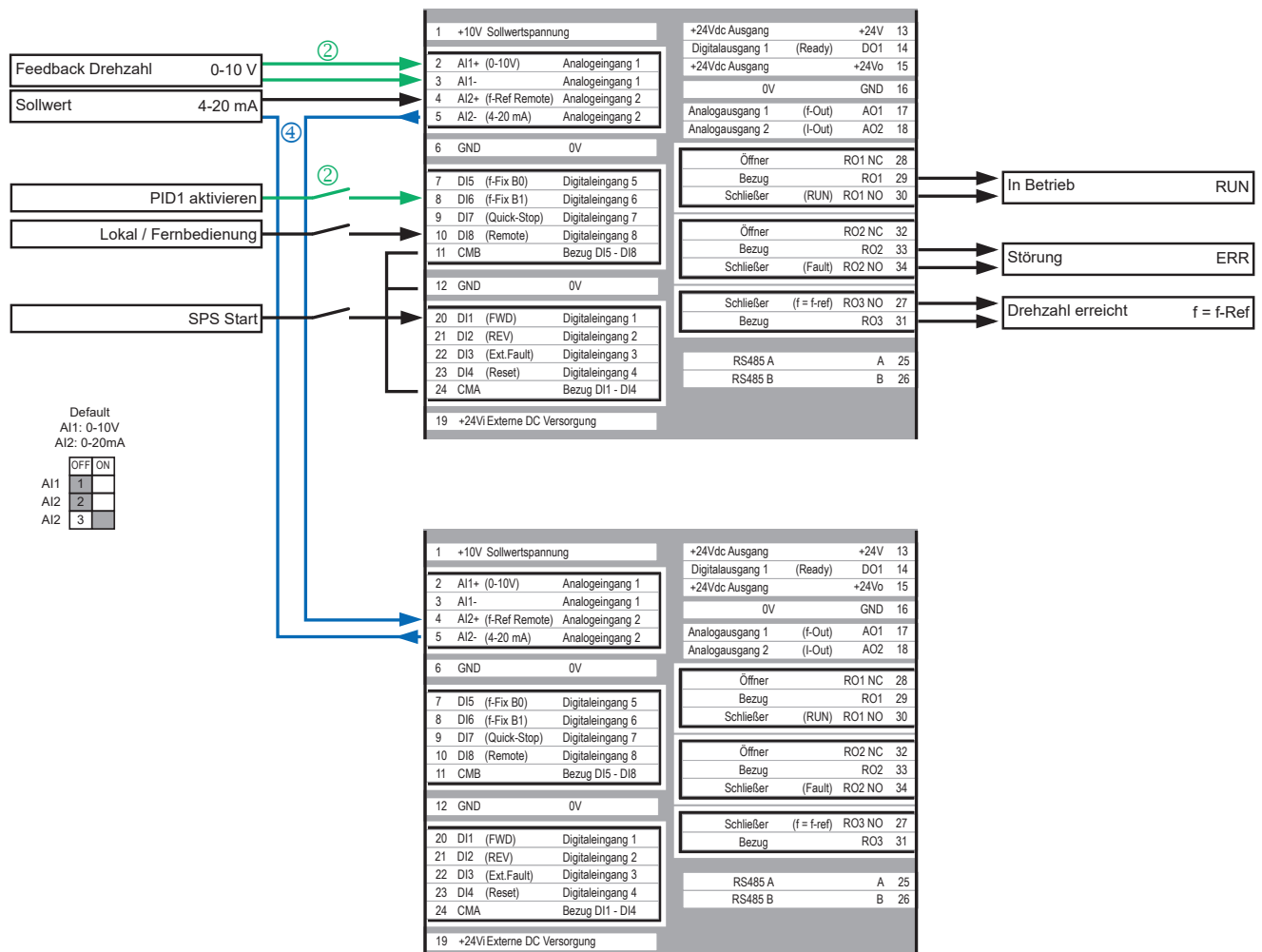
#### Connection examples

Connection example for DG1 with the following functions:

- ① Setpoint input via external analog setpoint AI2
- ② Process value feedback via AI1 and PID control

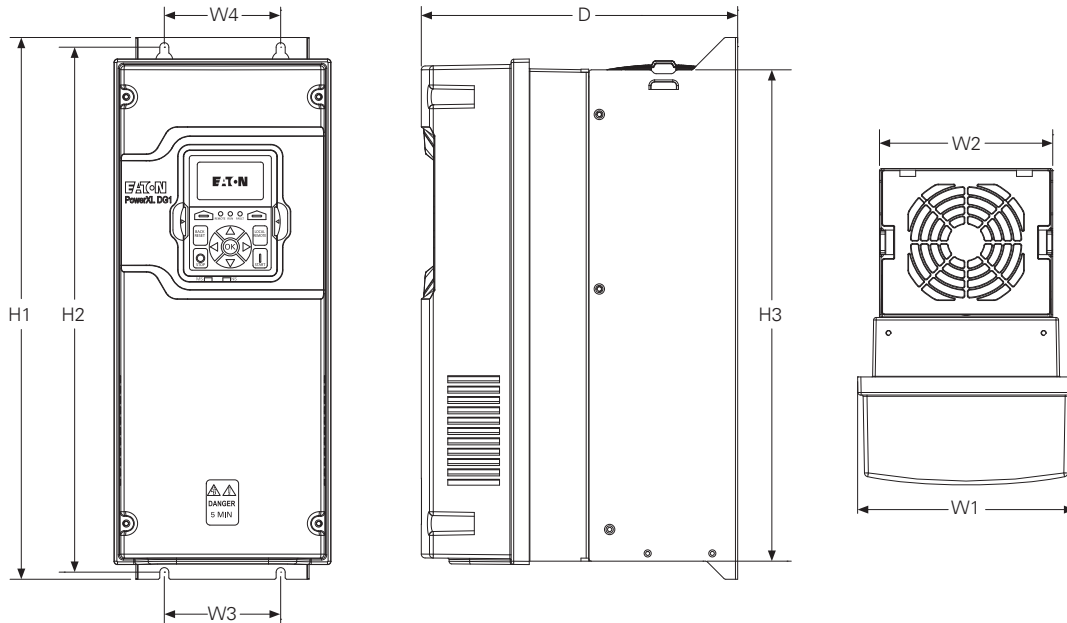


Connection example for master-follower operation. The droop function is used ④  
The same setpoint input / PID use specifications as for the previous example apply here as well.

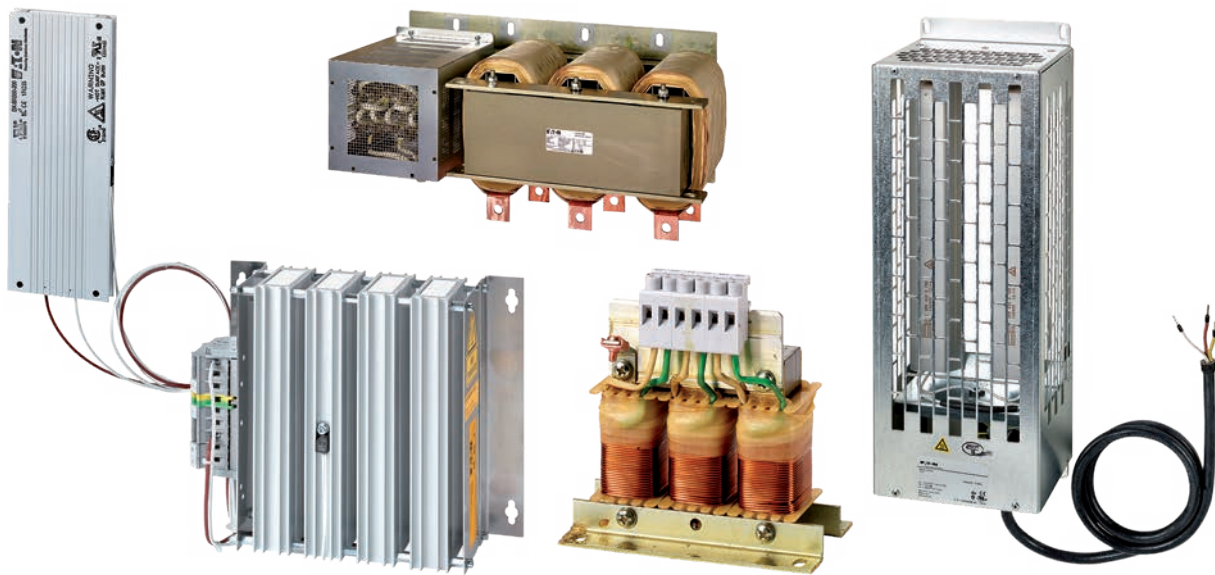


### Dimensions and weights

#### DG1



Frame size	D	H1 Chaser light on times	H2 Chaser light on times	H3 Chaser light on times	W1	W2	W3	W4	Ø	Weight
	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
FR0	173.5	268.7	258.0	242.3	127.0	126.3	108.3	108.3	7.0	2.0
FR1	200.9	327.0	312.0	292.0	153.0	122.0	100.0	100.0	7.0	6.5
FR2	244.7	419.0	406.0	380.0	167.8	134.0	90.0	90.0	7.0	10.6
FR3	265.1	558.0	545.0	518.5	204.6	184.0	125.0	125.0	9.0	22.6
FR4	294.0	630.0	617.5	590.7	237.7	232.0	205.0	205.0	9.0	35.2
FR5	340.7	888.5	753.0	707.0	288.0	282.0	220.0	220.0	9.0	70.0
FR6	371.1	1035.1	845.1	797.1	485.9	480.1	400.1	400.1	9.0	112.0



## General accessories and engineering

With PowerXL variable speed starters and PowerXL variable frequency drives, you can rest assured knowing that your variable-speed power drive system (PDS) needs will be well taken care of. These units are known for their compact design and wide applicability, making them the ideal choice for most applications on the global market.

Additional options such as mains chokes, motor chokes, sine filters, and braking resistors make it possible not only to expand the devices' range of applications, but also to adapt to a variety of EMC environments and mains-side operating conditions.



**2.7 General accessories**

<b>Description</b> .....	<b>214</b>
<b>Ordering</b> .....	<b>215</b>
Mains choke .....	<b>215</b>
400 V passive harmonic filters / radio interference suppression filters .....	<b>216</b>
Radio interference suppression filter .....	<b>217</b>
Motor choke .....	<b>219</b>
Sine filter .....	<b>220</b>
All-pole sine filters 400 V .....	<b>221</b>
Braking resistances .....	<b>222</b>
<b>Engineering</b> .....	<b>226</b>
Components of the Power Drives System (PDS) .....	<b>226</b>
General information on Engineering .....	<b>227</b>
DM1 connection example .....	<b>229</b>



## Description

The voltage drop at the chokes and filters must be taken into account in the design. A voltage drop of 5% can be assumed across the board for all devices. For detailed specifications for specific cases, please contact Eaton.

### DX-LN... mains chokes

DX-LN1...: single-phase, max. 260 V, 50/60 Hz, 6 - 32 A  
DX-LN3...: three-phase, max. 550 V, 50/60 Hz, 4 - 450 A

### DX-PHF... passive harmonic filters

- three-phase, 0 - 520 V, 0 - 150 Hz, 10 - 433 A
- the THDi for the typical operating range can be reduced to less than 8% with a harmonic filter. The value will drop as low as 5% above speeds of 50%.

### Radio interference suppression filter DX-EMC...

Leakage current: normal filters: 20 - 37 mA; low leakage current: < 7 mA; super low leakage current: < 3 mA (230 V) or < 0.4 mA (400 V) With lower leakage currents, the usable motor cable length is reduced. For detailed specifications for specific cases, please contact Eaton.

Calibrated and assigned radio interference suppression filter for Series DA1, DC1 DX-EMC12...: single-phase, with prefabricated connection cables

DX-EMC12...-SL: single-phase, 4 - 55 A, super low leakage current  
DX-EMC34...: three-phase, 8 - 750 A  
DX-EMC34...-L: three-phase, 8 - 750 A, low leakage current  
DX-EMC34...-SL: three-phase, 8 - 250 A, super low leakage current  
DX-EMC44...-L: 4-pole, 8 - 250 A, low leakage current with filtered neutral conductor

### Motor choke DX-LM3...

DX-LM3...: 3-phase, max. 750 V, 0 - 400 Hz, 5 - 450 A

### Sine filter DX-SIN3...

DX-SIN3...: three-phase, 0 - 520 V, 0 - 150 Hz, 4 - 480 A  
Sine filters used with variable frequency drives require the frequency to be set to a fixed value within a range of 4 - 8 kHz.

### DX-SIN3...-A all-pole sine filter

DX-SIN3...: three-phase, 0 - 520 V, 0 - 150 Hz, 1.3 - 110 A  
Sine filters used with variable frequency drives require the frequency to be set to a fixed value within a range of 4 - 8 kHz. With all-pole filters, the maximum cable length for variable frequency drives is limited exclusively by the voltage drop on the cable.

### DX-BR... braking resistance

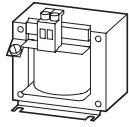
- with prefabricated connection cables for installation in DA1, DC1
- with 1-m long connection cable, temperature monitoring switch, 75 - 400 Ω, 0.4 - 1.6 kW
- with temperature monitoring switch, 2 - 100 Ω, 0.2 - 102.4 kW

Ordering

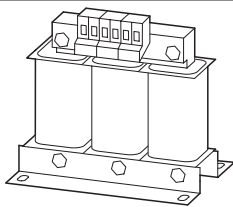
Rated operational current	Reactor	Max. heat dissipation	For use with	Catalog Number Article no.	Std. pack
$I_e$	L	P <sub>v</sub>			
A	mH	W			

**Mains choke**

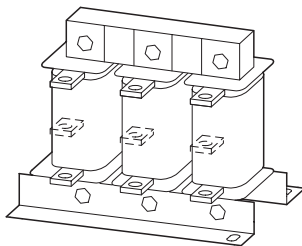
Ambient air temperature: +40°C, max. 70°C with derating



single-phase max. permissible connection voltage V AC: 260 V + 0% (50/60 Hz)					
5.8	5.05	9	DE1, DC1, DM1	<b>DX-LN1-006</b> 269490	1 unit
8.6	3.41	11	DE1, DC1, DM1	<b>DX-LN1-009</b> 269495	
13	2.25	12	DE1, DC1, DA1, DM1	<b>DX-LN1-013</b> 269496	
18	1.63	17	DE1, DC1, DA1, DM1	<b>DX-LN1-018</b> 269497	
24	1.22	20	DE1, DC1, DA1, DM1	<b>DX-LN1-024</b> 269498	
32	0.92	24	DC1, DM1	<b>DX-LN1-032</b> 169791	



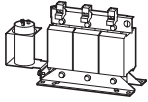
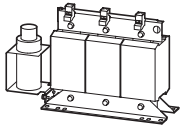
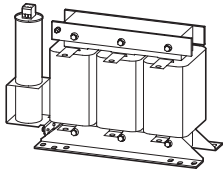
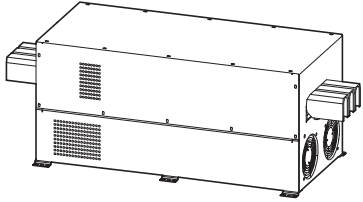
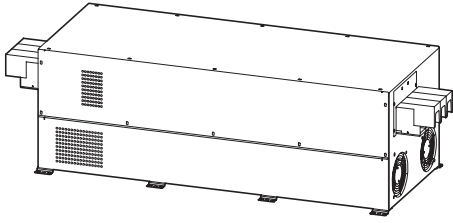
three-phase max. permissible connection voltage V AC: 550 V + 0% (50/60 Hz)					
3.9	7.51	17	DE1, DC1, DA1, DM1	<b>DX-LN3-004</b> 269500	1 unit
6	4.9	19	DE1, DC1, DA1, DM1	<b>DX-LN3-006</b> 269501	
10	2.94	33	DE1, DC1, DA1, DM1	<b>DX-LN3-010</b> 269502	
16	1.84	44	DE1, DC1, DA1, DM1	<b>DX-LN3-016</b> 269503	
25	1.18	57	DC1, DA1, DM1	<b>DX-LN3-025</b> 269504	
40	0.64	59	DA1, DM1	<b>DX-LN3-040</b> 269505	
50	0.37	58	DA1	<b>DX-LN3-050</b> 269506	
60	0.31	60	DA1	<b>DX-LN3-060</b> 269507	
80	0.23	86	DA1,	<b>DX-LN3-080</b> 269508	
100	0.18	101	DA1	<b>DX-LN3-100</b> 269509	
120	0.15	100	DA1	<b>DX-LN3-120</b> 269510	
160	0.11	140	DA1	<b>DX-LN3-160</b> 269511	
200	0.09	154	DA1	<b>DX-LN3-200</b> 269512	
250	0.07	155	DA1	<b>DX-LN3-250</b> 269513	
300	0.06	196	DA1	<b>DX-LN3-300</b> 269514	
303	0.06	230	DA1	<b>DX-LN3-303</b> 169143	
370	0.05	290	DA1	<b>DX-LN3-370</b> 169144	
450	0.04	300	DA1	<b>DX-LN3-450</b> 169145	

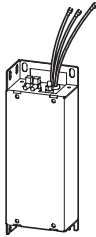



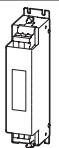
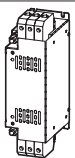
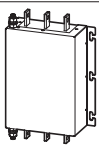
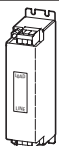

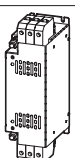
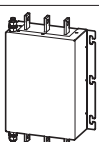
# 2.7

## General accessories

### 400 V passive harmonic filters / radio interference suppression filters

	Description	Current A	For use with	Catalog Number Article no.	Std. pack
<b>400 V passive harmonic filters</b>					
	440 V/10 A passive harmonic filters	10	DE1, DC1, DM1, DG1, DH1	<b>DX-PHF34-010</b> 400088	1 unit
	440 V/19 A passive harmonic filters	19		<b>DX-PHF34-019</b> 400089	
	440 V/26 A passive harmonic filters	26		<b>DX-PHF34-026</b> 400090	
	440 V/35 A passive harmonic filters	35		<b>DX-PHF34-035</b> 400091	
	440 V/44 A passive harmonic filters	44		<b>DX-PHF34-044</b> 400092	
	440 V/72 A passive harmonic filters	73	DA1, DG1, DH1	<b>DX-PHF34-073</b> 400093	
	440 V/102 A passive harmonic filters	102		<b>DX-PHF34-102</b> 400094	
	440 V/144 A passive harmonic filters	144		<b>DX-PHF34-144</b> 400095	
	440 V/180 A passive harmonic filters	180		<b>DX-PHF34-180</b> 400096	
	440 V/217 A passive harmonic filters	217		<b>DX-PHF34-217</b> 400097	
	440 V/289 A passive harmonic filters	289		<b>DX-PHF34-289</b> 400098	
	440 V/325 A passive harmonic filters	325		<b>DX-PHF34-325</b> 400099	
	440 V/370 A passive harmonic filters	370		<b>DX-PHF34-370</b> 400100	
	440 V/433 A passive harmonic filters	433		<b>DX-PHF34-433</b> 400101	

	Description	Current A	For use with	Catalog Number Article no.	Std. pack
<b>EMC base-mounted filter DC1 230 V</b>					
	Base mounted EMC filter 240V/14A	14	DE1, DE11, DC1, DM1	<b>DX-EMC12-014-FS1</b> 172273	1 unit
	Base mounted EMC filter 240V/14A	14		<b>DX-EMC12-014-FS2</b> 172275	
	Base mounted EMC filter 240V/19A	19		<b>DX-EMC12-019-FS1</b> 172274	
	Base mounted EMC filter 240V/25A	25		<b>DX-EMC12-025-FS2</b> 172276	
	Base mounted EMC filter 240V/31A	31		<b>DX-EMC12-031-FS3</b> 172277	

Connection type	Rated operational current $I_e$ A	For use with <sup>1)</sup>	Protection type	Catalog Number Article no.	Std. pack
<b>Radio interference suppression filter</b>					
Separate positioning					
three-phase, mains voltage (50/60Hz) ULN [V] max. 520 + 10%, leakage current 20 - 60 mA					
	8	DE1, DC1, DA1, DG1, DM1	IP20	<b>DX-EMC34-008</b> 184500	1 unit
	16	DE1, DC1, DA1, DG1, DM1		<b>DX-EMC34-016</b> 184501	
	30	DC1, DA1, DG1, DM1		<b>DX-EMC34-030</b> 184502	
	42	DC1, DA1, DG1, DM1		<b>DX-EMC34-042</b> 184503	
	55	DC1, DA1, DG1, DM1		<b>DX-EMC34-055</b> 184504	
	75	DA1, DG1		<b>DX-EMC34-075</b> 184505	
	100	DA1, DG1		<b>DX-EMC34-100</b> 172285	
	130			<b>DX-EMC34-130</b> 172286	
	180			<b>DX-EMC34-180</b> 172287	
	250			<b>DX-EMC34-250</b> 172288	
	400		IP00	<b>DX-EMC34-400</b> 172289	
	750			<b>DX-EMC34-750</b> 177636	
Low leakage current (6 - 8 mA)					
	8	DE1, DC1, DA1, DG1, DM1	IP20	<b>DX-EMC34-008-L</b> 184506	1 unit
	16	DE1, DC1, DA1, DG1, DM1		<b>DX-EMC34-016-L</b> 184507	
	30	DC1, DA1, DG1, DM1		<b>DX-EMC34-030-L</b> 184508	
	42	DC1, DA1, DG1, DM1		<b>DX-EMC34-042-L</b> 184509	
	55	DC1, DA1, DG1, DM1		<b>DX-EMC34-055-L</b> 184510	
	75	DA1, DG1		<b>DX-EMC34-075-L</b> 184511	
	100	DA1, DG1		<b>DX-EMC34-100-L</b> 174611	
	130			<b>DX-EMC34-130-L</b> 174612	
	180			<b>DX-EMC34-180-L</b> 174613	
	250			<b>DX-EMC34-250-L</b> 174614	
	400	DA1, DG1	IP00	<b>DX-EMC34-400-L</b> 174615	
	750			<b>DX-EMC34-750-L</b> 177637	

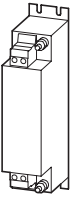

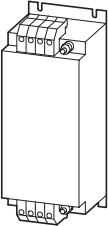

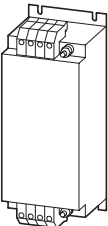
### Notes

<sup>1)</sup> See assigned switching and protective elements for an article-specific selection.

# 2.7

## General accessories

### Radio interference suppression filter

Description	Current	For use with	Catalog Number Article no.	Std. pack
<b>EMC filter 230 V, extra low leakage current (&lt; 0.4 mA)</b>				
 Extra low leakage current EMC filter 240V/4A	4	DE1, DC1, DA1, DM1, DG1	<b>DX-EMC12-004-SL</b> 400102	1 unit
Extra low leakage current EMC filter 240V/8A	8		<b>DX-EMC12-008-SL</b> 400103	
Extra low leakage current EMC filter 240V/12A	12		<b>DX-EMC12-012-SL</b> 400104	
Extra low leakage current EMC filter 240V/16A	16		<b>DX-EMC12-016-SL</b> 400105	
Extra low leakage current EMC filter 240V/20A	20		<b>DX-EMC12-020-SL</b> 400106	
Extra low leakage current EMC filter 240V/25A	25		<b>DX-EMC12-025-SL</b> 400107	
Extra low leakage current EMC filter 240V/30A	30		<b>DX-EMC12-030-SL</b> 400108	
Extra low leakage current EMC filter 240V/42A	42		<b>DX-EMC12-042-SL</b> 400109	
Extra low leakage current EMC filter 240V/55A	55		<b>DX-EMC12-055-SL</b> 400110	
<b>EMC filter 400 V, extra low leakage current (&lt; 0.4 mA)</b>				
 Extra low leakage current EMC filter 440V/8A	8	DE1, DC1, DA1, DM1, DG1	<b>DX-EMC34-008-SL</b> 400111	1 unit
Extra low leakage current EMC filter 440V/12A	12		<b>DX-EMC34-012-SL</b> 400112	
Extra low leakage current EMC filter 440V/16A	16		<b>DX-EMC34-016-SL</b> 400113	
Extra low leakage current EMC filter 440V/30A	30		<b>DX-EMC34-030-SL</b> 400114	
Extra low leakage current EMC filter 440V/42A	42		<b>DX-EMC34-042-SL</b> 400115	
Extra low leakage current EMC filter 440V/55A	55		<b>DX-EMC34-055-SL</b> 400116	
 Extra low leakage current EMC filter 440V/75A	75	DA1, DG1	<b>DX-EMC34-075-SL</b> 400117	
Extra low leakage current EMC filter 440V/100A	100		<b>DX-EMC34-100-SL</b> 400118	
Extra low leakage current EMC filter 440V/130A	130		<b>DX-EMC34-130-SL</b> 400119	
Extra low leakage current EMC filter 440V/180A	180		<b>DX-EMC34-180-SL</b> 400120	
Extra low leakage current EMC filter 440V/250A	250		<b>DX-EMC34-250-SL</b> 400121	
<b>EMC filter 400 V, 4 pole, leakage current 6 - 8 mA</b>				
 Low leakage current EMC filter 440V/8A	8	DE1, DC1, DA1, DM1, DG1	<b>DX-EMC44-008-L</b> 400143	1 unit
Low leakage current EMC filter 440V/16A	16		<b>DX-EMC44-016-L</b> 400144	
Low leakage current EMC filter 440V/30A	30		<b>DX-EMC44-030-L</b> 400145	
Low leakage current EMC filter 440V/42A	42		<b>DX-EMC44-042-L</b> 400146	
Low leakage current EMC filter 440V/55A	55		<b>DX-EMC44-055-L</b> 400147	
 Low leakage current EMC filter 440V/75A	75	DA1, DG1	<b>DX-EMC44-075-L</b> 400148	
Low leakage current EMC filter 440V/100A	100		<b>DX-EMC44-100-L</b> 400149	
Low leakage current EMC filter 440V/130A	130		<b>DX-EMC44-130-L</b> 400150	
Low leakage current EMC filter 440V/180A	180		<b>DX-EMC44-180-L</b> 400151	
Low leakage current EMC filter 440V/250A	250		<b>DX-EMC44-250-L</b> 400152	

## Motor choke

Rated operational current	Inductance	Max. heat dissipation	For use with	Catalog Number Article no.	Std. pack
$I_e$	L	$P_v$			
A	mH	W			

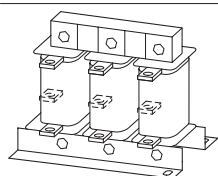
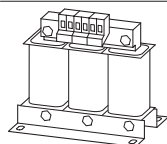
### Motor choke

Ambient air temperature: +40°C, max. 70°C with derating

three-phase

max. permissible connection voltage V AC: 750 V + 0% (0 - 400 Hz)

Max. permissible pulse frequency:  $f_{PWM} \leq 12$  kHz (rms)

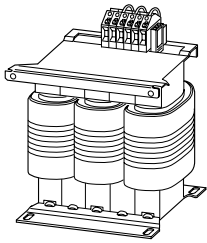


8	4.1	54	DE1, DC1, DA1, DG1, DM1	<b>DX-LM3-008</b> 269539	1 unit
11	3	71	DE1, DC1, DA1, DG1, DM1	<b>DX-LM3-011</b> 269541	
16	1.5	78	DE1, DC1, DA1, DG1, DM1	<b>DX-LM3-016</b> 269542	
35	1	116	DC1, DA1, DG1, DM1	<b>DX-LM3-035</b> 269543	
50	0.6	168	DA1, DG1, DM1	<b>DX-LM3-050</b> 269544	
63	0.5	193	DA1, DG1	<b>DX-LM3-063</b> 269545	1 unit
80	0.5	206	DA1, DG1	<b>DX-LM3-080</b> 269546	
100	0.45	294	DA1, DG1	<b>DX-LM3-100</b> 269547	
150	0.35	424	DA1, DG1	<b>DX-LM3-150</b> 269548	
180	0.3	439	DA1, DG1	<b>DX-LM3-180</b> 269549	
220	0.2	517	DA1, DG1	<b>DX-LM3-220</b> 269560	
260	0.15	520	DA1, DG1	<b>DX-LM3-260</b> 269561	
303	0.15	–	DA1	<b>DX-LM3-303</b> 169146	
370	0.12	–	DA1	<b>DX-LM3-370</b> 169147	
450	0.1	–	DA1	<b>DX-LM3-450</b> 169148	

# 2.7

## General accessories

### Sine filter



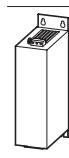
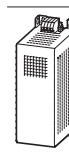
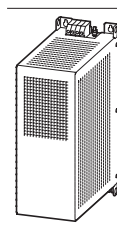
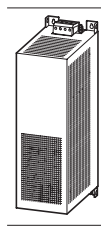
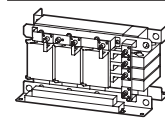
Rated operational current	Inductance	Max. heat dissipation	For use with	Catalog Number Article no.	Std. pack
$I_e$	L	$P_v$			
A	mH	W			

#### Sine filter

Ambient air temperature: +40°C, max. 50°C with derating

three-phase  
 max. permissible connection voltage V AC: 520 V + 0% (0 - 150 Hz)  
 Max. permissible pulse frequency:  $f_{PWM} = \text{Constant } 4 - 8 \text{ kHz (rms)}$ .

4	11	50	DC1, DA1, DM1, DG1, DH1	<b>DX-SIN3-004</b> 271538	1 unit
10	5.1	100		<b>DX-SIN3-010</b> 271590	
16.5	3.07	70		<b>DX-SIN3-016</b> 271591	
23.5	2.5	125		<b>DX-SIN3-023</b> 271593	
32	2	100		<b>DX-SIN3-032</b> 271594	
37	1.7	100		<b>DX-SIN3-037</b> 271595	
48	1.2	240		<b>DX-SIN3-048</b> 271597	
61	1	280	DA1, DG1, DH1	<b>DX-SIN3-061</b> 271599	
72	0.95	300		<b>DX-SIN3-072</b> 271600	
90	0.8	290		<b>DX-SIN3-090</b> 271601	
115	0	460		<b>DX-SIN3-115</b> 271602	
150	0.5	530		<b>DX-SIN3-150</b> 271603	
180	0.4	500		<b>DX-SIN3-180</b> 271604	
250	0.35	550		<b>DX-SIN3-250</b> 271605	
480	0.14	1550		<b>DX-SIN3-480</b> 169149	

	Description	Current A	For use with	Catalog Number Article no.	Std. pack
<b>All-pole sine filters 400 V</b>					
	All-pole sine filters 440V/1.3A	1.3	DC1, DA1, DM1, DG1, DH1	<b>DX-SIN3-1D3-A</b> 400085	1 unit
	All-pole sine filters 440V/2.5A	2.5		<b>DX-SIN3-2D5-A</b> 400086	
	All-pole sine filters 440V/4A	4		<b>DX-SIN3-004-A</b> 400087	
	All-pole sine filters 440V/6A	6		<b>DX-SIN3-006-A</b> 184492	
	All-pole sine filters 440V/13A	13		<b>DX-SIN3-013-A</b> 184493	
	All-pole sine filters 440V/24A	24		<b>DX-SIN3-024-A</b> 184494	
	All-pole sine filters 440V/46A	46		<b>DX-SIN3-046-A</b> 184495	
	All-pole sine filters 440V/65A	65	DA1, DG1, DH1	<b>DX-SIN3-065-A</b> 184496	
	All-pole sine filters 440V/110A	110		<b>DX-SIN3-110-A</b> 197529	



# 2.7

## General accessories

### Braking resistances

Resistance value	Continuous braking power	Protection type	For use with <sup>1)</sup>	Catalog Number Article no.	Std. pack
R	PDB				
Ω	kW				

#### Braking resistances



Wire wound resistor in aluminum case for direct installation in Variable frequency drive enclosure of frame sizes FS2 and FS3. With prefabricated connection cable

100	0.2	IP54	DC1, DA1	<b>DX-BR3-100</b> 169150	1 unit
-----	-----	------	----------	-----------------------------	--------



Wire wound resistor in ceramic potting compound inside aluminum case for direct installation in Variable frequency drive enclosure of frame sizes FS4 and FS5.

33	0.5	IP54	DA1	<b>DX-BR5-033</b> 169151	1 unit
----	-----	------	-----	-----------------------------	--------



Wire wound resistor in ceramic potting compound inside aluminum case with temperature monitoring switch with connection cables (approx. 0.5 m long)

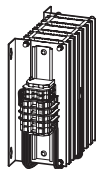
27	0.24	IP65	DC1, DA1, DG1, DM1	<b>DX-BR027-240</b> 174243	1 unit
40	0.2			<b>DX-BR040-200</b> 174242	
47	0.24			<b>DX-BR047-240</b> 174236	
50	0.2			<b>DX-BR050-200</b> 174235	
100	0.1			<b>DX-BR100-100</b> 174241	
100	0.2			<b>DX-BR100-200</b> 174237	
100	0.24			<b>DX-BR100-240</b> 174238	
150	0.2			<b>DX-BR150-200</b> 174248	
210	0.2			<b>DX-BR210-200</b> 174247	
430	0.1			<b>DX-BR430-100</b> 174246	

#### Notes

<sup>1)</sup> See assigned switching and protective elements for an article-specific selection.

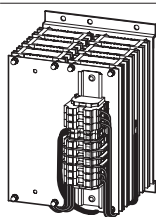
Resistance value	Continuous braking power	Protection type	For use with <sup>1)</sup>	Catalog Number Article no.	Std. pack
R	PDB				
Ω	kW				

### Braking resistances



Resistor combination (size 1)  
with temperature monitoring switch  
with connection terminals

20	0.96	IP20	DC1, DA1, DG1, DM1	<b>DX-BR020-960</b> 174257	1 unit
24	0.4			<b>DX-BR024-400</b> 174244	
24	0.6			<b>DX-BR024-600</b> 174267	
24	0.72			<b>DX-BR024-720</b> 174245	
42	0.72			<b>DX-BR042-720</b> 174266	
50	0.4			<b>DX-BR050-400</b> 174239	
50	0.6			<b>DX-BR050-600</b> 174240	
50	0.72			<b>DX-BR050-720</b> 174265	
50	0.96			<b>DX-BR050-960</b> 174250	
75	0.4			<b>DX-BR075-400</b> 174249	
100	0.6			<b>DX-BR100-600</b> 174251	
100	0.72			<b>DX-BR100-720</b> 174252	
100	0.96			<b>DX-BR100-960</b> 174253	
150	0.8			<b>DX-BR150-800</b> 174262	
216	0.6			<b>DX-BR216-600</b> 174268	
400	0.4			<b>DX-BR400-400</b> 174261	



Resistor combination (size 2)  
with temperature monitoring switch  
with connection terminals

25	1.44	IP20	DC1, DA1, DG1, DM1	<b>DX-BR025-1440</b> 174258	1 unit
25	1.92			<b>DX-BR025-1920</b> 174259	
27	2.88			<b>DX-BR027-2880</b> 174260	
50	1.44			<b>DX-BR050-1440</b> 174254	
50	1.92			<b>DX-BR050-1920</b> 174255	
50	2.88			<b>DX-BR050-2880</b> 174264	
54	2.88			<b>DX-BR054-2880</b> 174256	
84	1.44			<b>DX-BR084-1440</b> 174263	

### Notes

<sup>1)</sup> See assigned switching and protective elements for an article-specific selection.

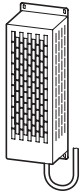
# 2.7

## General accessories

### Braking resistances

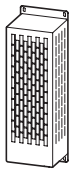
Resistance value	Continuous braking power	Protection type	For use with <sup>1)</sup>	Catalog Number Article no.	Std. pack
R	PDB				
Ω	kW				

#### Braking resistances



Wire wound resistor in ceramic potting compound inside aluminum case, combined  
Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring  
switch and a 1-meter connection cable

75	1.1	IP20	DA1, DG1, DM1	<b>DX-BR075-1K1</b> 171917	1 unit
100	0.8	IP20		<b>DX-BR100-0K8</b> 171907	
100	1.1	IP20		<b>DX-BR100-1K1</b> 171896	
100	1.6	IP20		<b>DX-BR100-1K6</b> 171924	
150	0.5	IP20		<b>DX-BR150-0K5</b> 171916	
150	1.1	IP20		<b>DX-BR150-1K1</b> 171895	
200	0.4	IP20		<b>DX-BR200-0K4</b> 171915	
200	0.8	IP20		<b>DX-BR200-0K8</b> 171894	
400	0.4	IP20		<b>DX-BR400-0K4</b> 171914	



Wire wound resistor in ceramic potting compound inside aluminum case, combined  
Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring  
switch and internal connecting terminals

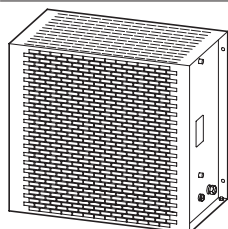
35	1.1	IP20	DA1, DG1, DM1	<b>DX-BR035-1K1</b> 171927	1 unit
50	0.4	IP20		<b>DX-BR050-0K4</b> 171906	
50	0.8	IP20		<b>DX-BR050-0K8</b> 171910	
100	0.2	IP20		<b>DX-BR100-0K2</b> 171909	
100	0.4	IP20		<b>DX-BR100-0K4</b> 171926	

#### Notes

<sup>1)</sup> See assigned switching and protective elements for an article-specific selection.

Resistance value	Continuous braking power	Protection type	For use with <sup>1)</sup>	Catalog Number Article no.	Std. pack
R	PDB				
Ω	kW				

**Braking resistances**



Steel grid resistor, combined  
Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring switch and internal connection terminals/terminal bolts

2	54.3	IP20	DC1, DA1, DG1, DM1	<b>DX-BR002-54K3</b> 171923	1 unit
	102.4			<b>DX-BR002-102K4</b> 171903	
6	5.1			<b>DX-BR006-5K1</b> 171913	
	9.2			<b>DX-BR006-9K2</b> 171893	
	18.1			<b>DX-BR006-18K1</b> 171922	
	33.3			<b>DX-BR006-33K3</b> 171902	
12	3.1			<b>DX-BR012-3K1</b> 171912	
	5.1			<b>DX-BR012-5K1</b> 171929	
	9.2			<b>DX-BR012-9K2</b> 171921	
	18.1			<b>DX-BR012-18K1</b> 171901	
22	1.4			<b>DX-BR022-1K4</b> 171911	
	3.1			<b>DX-BR022-3K1</b> 171928	
	5.1			<b>DX-BR022-5K1</b> 171920	
	9.2			<b>DX-BR022-9K2</b> 171900	
40	3.1			<b>DX-BR040-3K1</b> 171919	
	5.1			<b>DX-BR040-5K1</b> 171899	
47	3.1			<b>DX-BR047-3K1</b> 171908	
	5.1			<b>DX-BR047-5K1</b> 171925	
	9.2			<b>DX-BR047-9K2</b> 171905	
50	3.1			<b>DX-BR050-3K1</b> 171918	
	5.1			<b>DX-BR050-5K1</b> 171898	
75	5.1			<b>DX-BR075-5K1</b> 171897	
100	6.2			<b>DX-BR100-6K2</b> 171904	

**Notes**

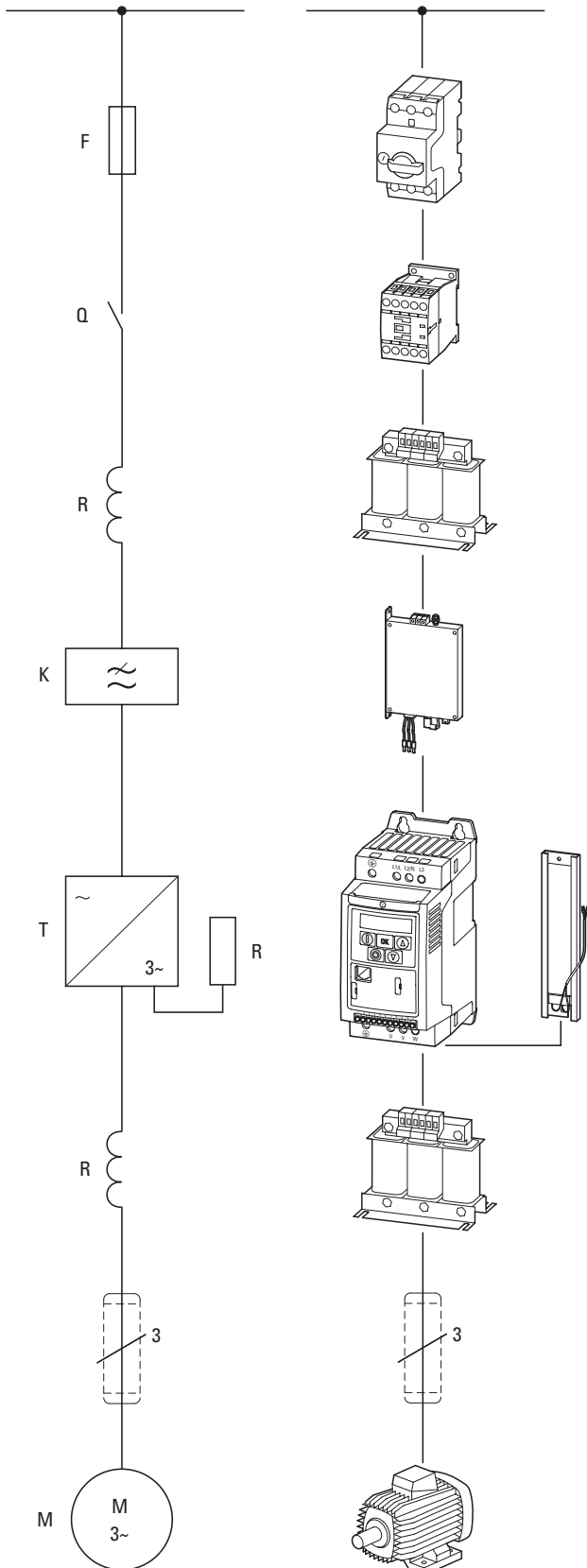
<sup>1)</sup> See assigned switching and protective elements for an article-specific selection.

# 2.7

## General accessories

### Components of the Power Drives System (PDS)

#### Engineering



#### Equipment code

- F = fuses and circuit-breakers
- Q = controlled switching within energy flow (contactors, circuit-breakers)
- R = limitation (reactors, resistors)
- K = radio interference suppression filters
- T = variable-frequency drives
- M = motors

**AC supply system:** variable-frequency drives can be connected without restriction to AC supply systems with an earthed star point (TN/TT grounding systems). Directly connecting them to and running them on unbalanced or B phase-grounded systems (e.g., USA) is not permissible. Fuses (circuit-breakers) enable you to protect wiring and electrical devices and appliances. For personal protection, additional AC/DC sensitive residual current circuit-breakers (RCD type B) are required.

**Contactors** serve to engage and disengage mains voltage.

**Mains chokes** damp any harmonic distortion (THD) that occurs as well as current spikes and limit inrush currents (the link capacitor's charging current). In addition, they protect the mains rectifier from voltage peaks coming from the supply mains.

**Passive harmonic filters** reduce harmonic currents (THDi) so that limits required by standards can be met. They protect the connected electrical power network from the effects of line side harmonics and improve the system's interference immunity.

**Radio interference suppression filters** damp high-frequency electromagnetic emissions from devices and appliances. They ensure that the EMC limit values for conducted interference specified in the applicable product standards are complied with (variable-frequency drives).

**Note:** External radio interference suppression filters (option) permit longer motor cables and have low leakage currents. Normally, they should only be used with variable-frequency drives that do not feature an internal radio interference suppression filter. Exception: directly assigned variable-frequency drives with internal filters (calibrated combination)

**Variable frequency drives** enable the infinitely variable speed control of three-phase motors. To do this, the variable-frequency drive converts the voltage of the AC supply system with a constant voltage and a constant frequency to a new AC voltage with a variable amplitude and a variable frequency.

A **braking resistance** converts the generator braking energy of the variable frequency drive into heat. The variable frequency drive must be equipped with a brake chopper, which connects the braking resistance parallel to the internal DC link.

#### Motor chokes

- Compensate the capacitive capacitive currents,
- Reduce current ripple and the motor's current change noise,
- Attenuate the retroaction on parallel connection of several motors.

#### Sine filter or du/dt filter

- Smoothen the output voltage sinusoidally,
- reduce motor noise through du/dt reduction, and thereby increase the motor insulation's lifespan,
- Reduce the leakage currents to allow better motor performance at improved EMC values.

#### All-pole sine filter

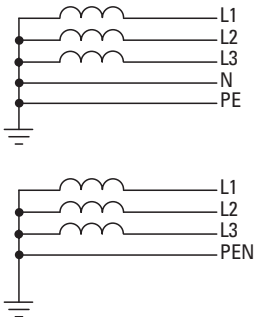
- Smoothen the output voltage sinusoidally,
- reduce motor noise through du/dt reduction, and thereby increase the motor insulation's lifespan,
- Reduce leakage currents and accordingly make it possible to use very long unshielded motor cables with improved EMC values.

**Screened motor cables** attenuate emitted and conducted high-frequency emissions within the limit values specified in the applicable product standard (EMC). They must be connected to the earth potential on both sides across a large area (PES).

**A three-phase asynchronous motor (standard motor)** converts electrical power ( $P \sim U \times I$ ) into mechanical power ( $P \sim M \times n$ ).

**Electrical mains connection**

Variable frequency drives can be connected and operated without restriction on star-point-grounded AC supply systems (according to IEC 60364).



Connecting them to and operating them on asymmetrically earthed networks, such as phase-earthed delta networks (grounded delta, USA) or non-earthed or high-resistance earthed (> 30 Ω) IT networks is permitted with limitations. In these networks, only variable frequency drives without internal radio interference suppression filters (EMC) may

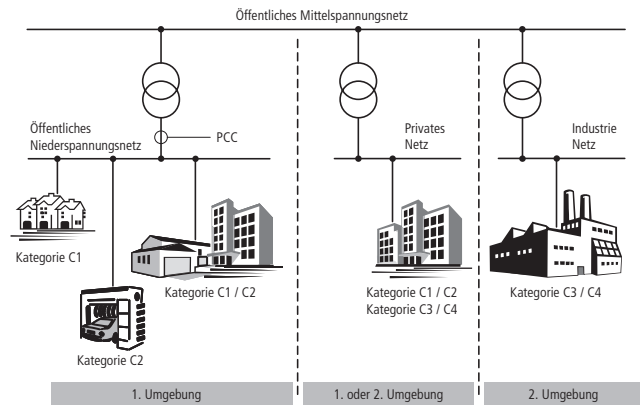
be used. On devices with internal radio interference suppression, the ground connection of the filter must be disconnected.

The standardized rated operating voltages of the power supply (EVU) assure the following conditions at the transfer point to the consumer:

- maximum deviation from the rated voltage ( $U_{LN}$ ):  $\pm 10\%$
- Maximum deviation in the voltage symmetry:  $\pm 3\%$
- Maximum deviation from the rated frequency value:  $\pm 4\%$

A further voltage drop of 4 percent in the consumer networks is permissible in relation to the lower voltage value ( $U_{LN} - 10\%$ ) of the mains voltage.

In mesh networks (such as those found in the EU), the standardized consumer voltages (230/400/690 V) are identical to the utility company's supply voltages. In star networks (for example in North America/USA), the stated consumer voltages take the voltage drop from the utility company's infeed point to the last consumer into account.



**Variable frequency drives**

A variable frequency drive is an electronic apparatus used for the variable-speed control of three-phase motors. It is intended for installation in a machine or for assembly with other components to a machine or plant. The main components of a modern compact variable frequency drive are a power section ① and a control section ②. Functional actuation of the variable frequency drive and the output parameters in the power section (e.g. frequency, voltage and current) can be adjusted through:

- Control signal terminals (I/O) with analog and digital (binary) inputs,
- A keypad with function keys and display units,
- Serial interfaces (BUS) with RS485 (Modbus RTU) and optional fieldbus connections (CANopen, PROFIBUS-DP etc.) and an optional PC connection.

Internal open and closed-loop control circuits monitor all variable values in the variable frequency drive and automatically switch the process off if a value reaches a dangerous level.

**North American voltage level**

Supply voltage $U_{LN}$ of the EVU	Motor voltage according to UL 508 C	Consumer voltage, rated value for the motors
120 V	110 - 120 V	115 V
240 V	220 - 240 V	230 V
400 V	440 - 480 V	460 V
600 V	550 - 600 V	575 V

**Safety and switching**

For variable frequency drives, the components placed on the mains-side are assigned as per the input-side rated operational current  $I_{LN}$  and the AC-1 utilization category.

Fuses, circuit-breakers and conductor cross-sections must meet the national and regional requirements and the required approvals at the point of operation.

For fire prevention and the protection of persons and domestic animals from excessive contact voltages residual current devices (RCD) must be used. Only AC/DC sensitive residual current devices (RCD, type B) may be used in connection with a variable frequency drive that works with a three-phase power supply.

Marking on residual current devices for AC/DC sensitive RCDs, type B:



Earth leakage currents will be produced when using frequency-controlled drives due to the nature of the system. The main reasons for this consist of external capacitances between the phases of the motor cable, the motor cable's screening, star capacitors in the variable frequency drive, and radio interference suppression filters, as well as earthing measures at the motor's site of operation. These leakage currents can exceed 3.5 mA (AC) and/or

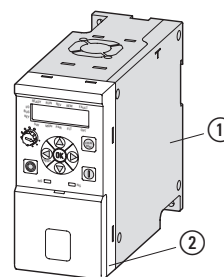
greater than 10 mA (DC) can require improved PDS earthing as per EN 50178 (earth cable cross-section  $\geq 10$  mm (cable cross-section of earthing wire  $\geq 10$  mm<sup>2</sup>).

**EMC Measures**

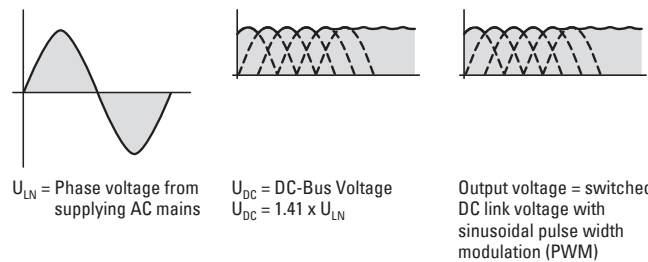
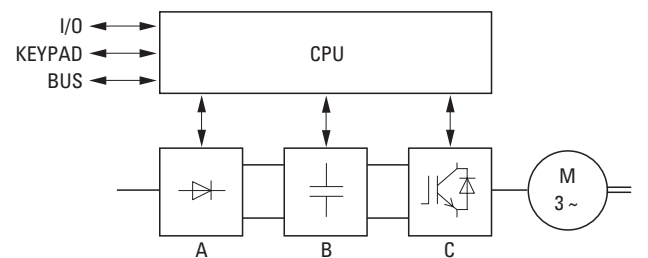
Variable frequency drives work with fast electronic switches (IGBT) in the inverter. This can cause radio interference in a magnet system, which, in turn, can adversely affect nearby electronic equipment. To provide protection against this high-frequency interference, said equipment should be spatially separated and screened from frequency-controlled drives.

In Europe, compliance with the EMC Directive is mandatory and a prerequisite for the CE marking. The EMC conditions for drive systems (PDS) are described in standard IEC/EN 61800-3. This product standard considers the complete magnet system from mains-side power supply right through to the motor.

The Eaton variable frequency drive and speed starter with internal/external radio interference suppressor satisfy the requirements of the EMC product standard for the sensitive residential sector (first environment) and therefore also the higher limit values in the industrial sector (second environment).



- ① **Power section with:**  
A = Rectifier  
B = Internal DC link  
C = inverter (IGBT)
- ② **Control section with:**  
I/O = Analog and binary inputs and outputs  
KEYPAD = Operating unit with display unit  
BUS = Serial ports/interfaces (RS485, field bus, PC interface)



Block diagram with main components of a variable frequency drive

General accessories

#### Control methods

The IGBTs in the inverter of the variable frequency drive are controlled with sinusoidal pulse-width modulation (PWM). In real-life applications, the industry draws a distinction between the following control methods:

- Voltage frequency control (U/f control),
- V/Hz control with slip compensation
- Sensorless vector control (speed control)
- Vector control (closed-loop), speed control.

**Volts-per-Hertz control** is the best known and most commonly used method. In it, the rotating field frequency for the motor is defined with a simple characteristic (linear or quadratic), and the corresponding three-phase line-to-line motor voltage is selected in such a way that the motor will not be undermagnetized or overmagnetized.

The main applications for V/Hz control are:

- pump and fan drives,
- horizontal conveying and transportation systems,
- multiple motor drives (parallel operation of several motors at the variable frequency drive's output).

With the **U/f control section with slip compensation** the load-dependent speed change of individual drives can be compensated for (without sensors).

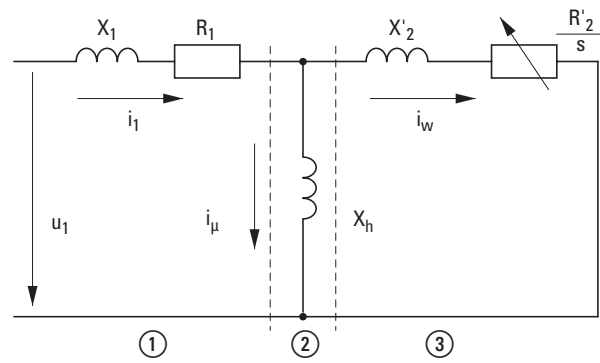
With **sensorless vector control** the magnetic fields of rotor and stator are opposed to one another. With asynchronous motors the magnetic

flux in the rotor must be mapped in an electronic model of the motor. This requires the input of the physical parameters of the rating plate on the motor.

In vector operation, the variable frequency drive can only control one motor at the output end. A parallel operation of several motors is not possible here. The exact calculation of the phase voltages at the variable frequency drive's output, however, improves the motor's operational behavior. The motor also heats up less in the lower speed range. The field-oriented vector control results in a significant improvement in the drive dynamics as well as optimizing performance; it also increases the range of possible applications. The main applications of sensorless vector control are:

- Material machining and processing equipment
- Condensers (compressor),
- Heavy starting duty (extruder, agitators, mixer),
- Lifting mechanisms and lifting gear (vertical movement, crane, lift).

With the **vector feedback control** the output current of the variable frequency drive acts serves a controlled variable. This makes it possible to perfectly adjust the three-phase motor in line with the corresponding torque boost. The motor speed can be controlled in connection with an rpm sensor (tachometer, pulse generator) (closed loop).



- ① Stator winding
- ② Air gap
- ③ Transformed rotor winding

Simplified equivalent circuit diagram of a three-phase motor

#### Motor model

Regardless of the control method used, a variable frequency drive uses the measured voltage and current values on the stator winding ( $u_1, i_1$ ) to calculate the required manipulated variable for flux-generating component  $i_\mu$  and the torque-forming magnitude in rotor  $i_w$ . The motor's load dependent slip is represented as resistor  $R'_2/s$ . During no-load operation, this value approaches infinity ( $i_w \rightarrow 0$ ). On the other hand, the value approaches zero as the load increases. The current in the rotor grows at this point.

#### Explanation:

EMC = Electromagnetic Compatibility  
 EVU = Power supply companies  
 IGBT = Insulated-Gate-Bipolar-Transistor  
 PDS = Power Drives System  
 RCD = Residual Current Device

#### Energy-efficient drive control technology (ERP directive)

The need for energy efficiency in a PDS and legislative specifications (EC 640/2009) has been redefined by the minimum efficiency ratings of motors. Accordingly, all motors with a performance range of 0.75 to 1000 kW that are placed on the market on or after July 1st, 2021 will have to meet one of the following two requirements: A) A minimum efficiency level of IE3 or B) An efficiency level of IE2 if the motors are coupled with electronic speed control systems (variable frequency drives, variable speed starters). Under these conditions, the following versions of three-phase motor predominate at the present time:

- Three-phase asynchronous motor (DASM),
- Permanent magnet motor (PM),
- Synchronous reluctance motor (SynRM)

Within the same efficiency class, these three motor technologies have a comparable efficiency rating at their nominal operating point. However, there are significant differences in terms of startup behavior, in part-load operation, in respect of acquisition costs and in terms of size.

The asynchronous motor functions in accordance with the familiar principle whereby the creation of magnetic fields in stator and rotor give rise to repulsion and, in response to that, to rotational movement. This motor can be started directly off the mains supply.

PM motor are synchronous motors, i.e. there is no slip between the rotational fields of rotor and stator. The magnets assure magnetization of the rotor. That reduces losses in the rotor and increases the efficiency rating, especially at low speed. For starting and operational purposes, the PM motor needs to have a variable frequency drive (e.g. DG1 / DM1).

With the SynRM motor, the rotor plates have specific cut sections. These guide the magnetic lines into the interior of the rotor and generate what is known as a reluctance torque. This results in a change of magnetic resistance and is characterized from about 11 kW by a very good efficiency rating at reduced speeds that changes under load. Here too, operation without friction and optimum speed control are only assured through the use of variable frequency drives (DA1).

In principle, all three variants operate using what is known as the U/f characteristics curve but the efficiency benefits of individual technologies are only guaranteed by feedback control algorithms adapted to suit the prevailing motor technology. With algorithms of this kind, motor operation can be optimized at every operating point, even with alternating loads.

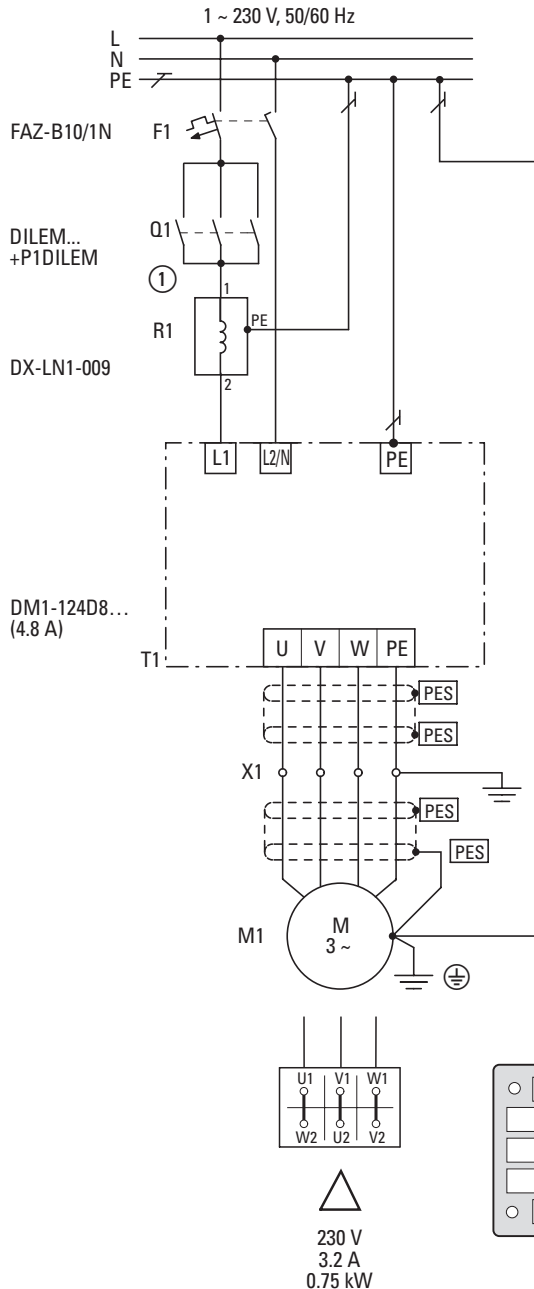
### Connection example for a 0.75 kW motor

Motor: P = 0.75 kW  
 Mains: 3/N/PE 400 V 50/60 Hz  
 Connection examples meeting EMC requirements: Power section (see figure below)

#### Variant A:

Motor in delta configuration

DM1... variable frequency drive with single-phase mains supply (230 V)



① Optional connection option for single-phase connections

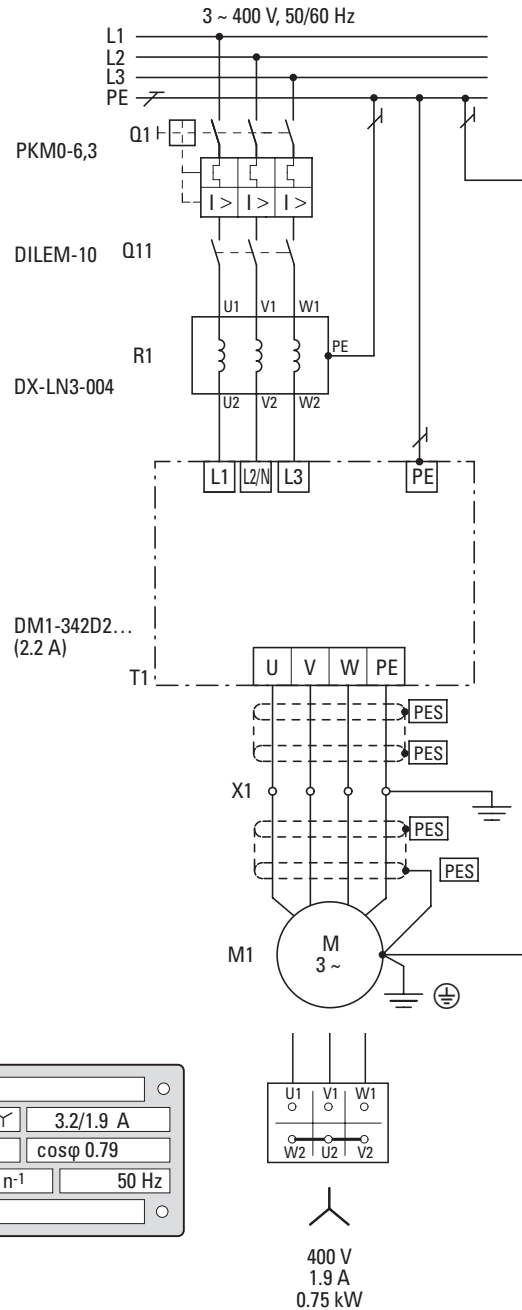
The previously indicated 0.75 kW motor can be connected in a delta configuration for a single-phase 230 V supply system (version A) or in a star configuration for a 400 V supply system (version B).

Depending on the mains voltage, a variable frequency drive is selected for 230 V single-phase AC (DM1-124D8...), or a DF5-340 for 400 V 3-phase AC (DM1-342D2), together with the corresponding accessories.

#### Variant B:

Motor in star configuration

DM1... variable frequency drive with three-phase mains supply (400 V)







# Decentralized Drive System Rapid Link 5

Rapid Link 5 is a decentralized electronic drive system that can be used for simple to complex tasks in all material handling system areas. It provides all the functions needed to switch, control, protect, and network conveyor belt electric motors. Devices are installed close to motors and can be connected quickly and in a foolproof manner thanks to the

use of standard plug connectors. In addition, a key switch can be used to select the manual and automatic operating modes. In automatic mode, the devices can communicate via AS-Interface, PROFINET, or EtherNet/IP.

## Performance range:

### RAM05 electronic motor starters

- 0.09 - 3 kW ( $U_g$ : 3~ 400 V,  $U_2$ : 3~ 400 V)

### RASP5 variable frequency drives

- 0.75 - 4 kW ( $U_g$ : 3~ 400 V,  $U_2$ : 3~ 400 V)

## Applications:

- Intralogistics applications
- Airport logistics / baggage conveyor systems
- Transportation and warehouse logistics
- Belt conveyors
- Roller conveyors
- Chain conveyors
- Pallet conveyors
- Lifting applications
- Corner transfer units
- Mergers / diverters
- Rotary table applications

## System features:

- Communication via AS-Interface, PROFINET or Ethernet/IP
- Same base area and hole pattern for all models and power classes
- All terminals pluggable
- Integrated manual / automatic mode
- Robust design with IP65 degree of protection
- Up to 4 sensor inputs and 2 sensor outputs
- International standards (CE, UL, cUL, CCC, RoHS)

## Features RAM05

- DOL and reversing starters
- Lifespan of more than 10 million operations
- Programmable motor protection from 90 W to 3 kW (400 V) in a single device

## Features RASP5

- Sensorless vector control
- Can be used to drive high-efficiency permanent magnet, synchronous reluctance, and brushless DC motors
- Short-circuit proof in all operating modes
- Integrated EMC filter
- Integrated braking resistance
- Safe Torque Off (STO, SIL 3, PL e, Cat. 3)

## Accessory:

- External keypad
- Parameter storage unit and Bluetooth communication stick
- Adapter cables for various power bus systems
- Motor cables
- drivesConnect parameter configuration software
- drivesConnect mobile App (iOS, Android)

For more information, visit:  
[www.Eaton.com/RapidLink5](http://www.Eaton.com/RapidLink5)



<b>3</b>	<b>Rapid Link 5 decentralized, electronic drive system</b>	
	<b>System overview</b> . . . . .	<b>232</b>
	<b>Sizes and degree of protection</b> . . . . .	<b>232</b>
	<b>Key to type references</b> . . . . .	<b>233</b>
	<b>Ordering</b> . . . . .	<b>234</b>
	AS-Interface . . . . .	<b>234</b>
	Profinet . . . . .	<b>245</b>
	Ethernet/IP . . . . .	<b>252</b>
	Accessories . . . . .	<b>256</b>
	<b>Engineering</b> . . . . .	<b>257</b>
	RAMO5 with AS-Interface . . . . .	<b>257</b>
	RASP5 with AS-Interface . . . . .	<b>258</b>
	RAMO5 with PROFINET or Ethernet/IP . . . . .	<b>259</b>
	RASP5 with PROFINET or Ethernet/IP . . . . .	<b>260</b>
	<b>Technical data</b> . . . . .	<b>261</b>
	General rated operational data . . . . .	<b>261</b>
	Spezifische Specific rated operational data RAMO5 . . . . .	<b>263</b>
	Specific rated operational data RASP5 . . . . .	<b>264</b>
	<b>Dimensions and weights</b> . . . . .	<b>265</b>

# 3

## Rapid Link 5 decentralized, electronic drive system

System overview, sizes and degree of protection

### System overview



<b>RAM05 motor starter</b>	<b>1</b>
Three-phase electronic DOL starter or reversing starter	
→ Page 234	
→ Page 245	
→ Page 252	

<b>RASP5 variable frequency drives</b>	<b>2</b>
three-phase, frequency-controlled motor starter	
→ Page 237	
→ Page 246	
→ Page 253	

<b>Keypad</b>	<b>3</b>
for parameter setting	
→ Page 256	

<b>Communications stick</b>	<b>4</b>
for parameter setting	
→ Page 256	

<b>Power connection cables</b>	<b>5</b>
For connection to a power bus	
→ Page 256	

<b>Unshielded motor cable</b>	<b>6</b>
→ Page 256	

<b>Shielded motor supply cable (EMC)</b>	<b>7</b>
→ Page 256	

### Sizes and degree of protection

Frame size

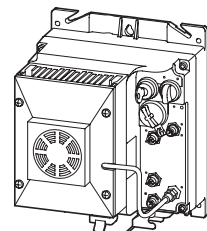
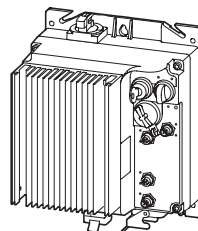
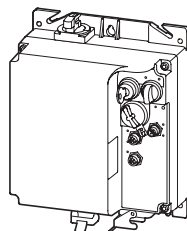
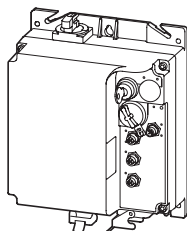
Protection type

IP66/NEMA 12

RAM05-...

RASP5-...

FS1



## Key to type references

### Electronic motor starter

**RAM05 - D 2 0 0 A31 - 512 0 S1**

<b>Device series</b> RA = Rapid Link MO5 = motor starter, generation 5
<b>Starters</b> D = direct-on-line starter (DOL) W = reversing starter (FWD/REV)
<b>Sensor inputs</b> 2 = 2 sensor inputs (2 x M12, 2 PIN assignment) 4 = 4 sensor inputs (2 x M12, 4 PIN assignment)
<b>Actuator outputs</b> 0 = 0 actuator outputs (0 x M12) 1 = 1 actuator outputs (1 x M12, 2 PIN assignment) 2 = 2 actuator outputs (1 x M12, 4 PIN assignment)
<b>Motor brake drive section</b> 0 = No motor brake drive section 1 = 180/207 V DC motor brake drive section 2 = 230/277 V AC motor brake drive section 4 = 400/480 V AC motor brake drive section

<b>Version</b> S1 = Standard
<b>Repair switch</b> 0 = without manual override switch R = with manual override switch
<b>Power input plug</b> 512 = HAN Q5, lower input 412 = HAN Q4/2, lower input
<b>Field bus</b> A31 = ASI-3 profiles S-7.4 A32 = ASI-3 profiles S-7.A.E PNT = PROFINET EIP = Ethernet/IP

### Variable frequency drives

**RASP5 - 2 4 0 0 A31 - 512 0 0 0 0 S1**

<b>Device series</b> RA = Rapid Link SP5 = Speed Control Unit, Generation 5
<b>Rated Current</b> 2 = 2.4 A (0.75 kW @ 400 V) 4 = 4.3 A (1.5 kW @ 400 V) 5 = 5.6 A (2.2 kW @ 400 V) 8 = 8.5 A (4.0 kW @ 400 V)
<b>Sensor inputs</b> 4 = 4 sensor inputs (2 x M12, 4 PIN assignment)
<b>Actuator outputs</b> 0 = 0 actuator outputs (0 x M12) 2 = 2 actuator outputs (1 x M12, 4 PIN assignment)
<b>Motor brake drive section</b> 0 = No motor brake drive section 1 = 180/207 V DC motor brake drive section 2 = 230/277 V AC motor brake drive section 4 = 400/480 V AC motor brake drive section
<b>Field bus</b> A31 = ASI-3 profile S-7.4 PNT = PROFINET EIP = Ethernet/IP

<b>Version</b> S1 = Standard
<b>Fans</b> 0 = without fan 1 = with fan (only at 4.0 kW)
<b>Functional safety</b> 0 = without STO 1 = with STO (Safe Torque Off)
<b>Braking resistance</b> 0 = without braking resistance 1 = with braking resistance
<b>Repair switch</b> 0 = without manual override switch R = with manual override switch
<b>Power input plug</b> 512 = HAN Q5, lower input 412 = HAN Q4/2, lower input

### Ordering

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Actuator output <sup>5)</sup>	AS-Interface profile		Power supply via		Repair switch	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P			S-7.4 <sup>6)</sup>	S-7.A.E <sup>7)</sup>	HAN Q4/2 plug	HAN Q5 plug			
A	kW	HP									
<b>RAM05 motor starter</b>											
Rated operating voltage 400 V AC, three-phase, mains voltage (50/60Hz) U <sub>LN</sub> 380 (-10%) - 480 (+10%) V											
Direct-on-line starter, 2 sensor inputs											
6.6	3	3	-	0	✓	-	✓	-	-	<b>RAM05-D200A31-4120S1</b> 199060	1 unit
					✓	-	✓	-	✓	<b>RAM05-D200A31-412RS1</b> 199069	
					✓	-	-	✓	-	<b>RAM05-D200A31-5120S1</b> 198517	
					✓	-	-	✓	✓	<b>RAM05-D200A31-512RS1</b> 198518	
					-	✓	✓	-	-	<b>RAM05-D200A32-4120S1</b> 199064	
					-	✓	✓	-	✓	<b>RAM05-D200A32-412RS1</b> 199075	
					-	✓	-	✓	✓	<b>RAM05-D200A32-512RS1</b> 199073	
			180/207 V DC		✓	-	✓	-	-	<b>RAM05-D201A31-4120S1</b> 199061	
					✓	-	✓	-	✓	<b>RAM05-D201A31-412RS1</b> 199070	
					✓	-	-	✓	✓	<b>RAM05-D201A31-512RS1</b> 199068	
					-	✓	✓	-	-	<b>RAM05-D201A32-4120S1</b> 199065	
					-	✓	✓	-	✓	<b>RAM05-D201A32-412RS1</b> 199076	
					-	✓	-	✓	✓	<b>RAM05-D201A32-512RS1</b> 199074	
			230/277 V AC		✓	-	✓	-	-	<b>RAM05-D202A31-4120S1</b> 199062	
					✓	-	✓	-	✓	<b>RAM05-D202A31-412RS1</b> 199071	
					✓	-	-	✓	-	<b>RAM05-D202A31-5120S1</b> 198519	
					✓	-	-	✓	✓	<b>RAM05-D202A31-512RS1</b> 198520	
					✓	-	-	✓	-	<b>RAM05-D212A31-5120S1</b> 198527	
					-	✓	✓	-	-	<b>RAM05-D202A32-4120S1</b> 199066	
					-	✓	✓	-	✓	<b>RAM05-D202A32-412RS1</b> 199077	
					-	✓	-	✓	-	<b>RAM05-D202A32-5120S1</b> 198521	
					-	✓	-	✓	✓	<b>RAM05-D202A32-512RS1</b> 198522	
			400/480 V AC		✓	-	✓	-	-	<b>RAM05-D204A31-4120S1</b> 199063	
					✓	-	✓	-	✓	<b>RAM05-D204A31-412RS1</b> 199072	
					✓	-	-	✓	-	<b>RAM05-D204A31-5120S1</b> 198523	
					✓	-	-	✓	✓	<b>RAM05-D204A31-512RS1</b> 198524	
					✓	-	-	✓	-	<b>RAM05-D214A31-5120S1</b> 198528	
					-	✓	✓	-	-	<b>RAM05-D204A32-4120S1</b> 199067	
					-	✓	✓	-	✓	<b>RAM05-D204A32-412RS1</b> 199078	
					-	✓	-	✓	-	<b>RAM05-D204A32-5120S1</b> 198525	
					-	✓	-	✓	✓	<b>RAM05-D204A32-512RS1</b> 198526	

#### Notes

- <sup>1)</sup> 0.3 - 6.6 adjustable
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz, at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Operation with external 24V DC supply
- <sup>6)</sup> Profile with 31 modules
- <sup>7)</sup> Profile with 62 modules

Rated operational current <sup>1)</sup> $I_e$	Assigned motor output <sup>2)3)</sup> P P		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Actuator output <sup>5)</sup>	AS-Interface profile		Power supply via		Repair switch	Catalog Number Article no.	Std. pack
					S-7.4 <sup>6)</sup>	S-7.A.E <sup>7)</sup>	HAN Q4/2 plug	HAN Q5 plug			
A	kW	HP									

### RAM05 motor starter

Rated operating voltage 400 V AC, three-phase, mains voltage (50/60Hz)  $U_{LN}$  380 (-10%) - 480 (+10%) V

Reversing starter with selector switch REV - OFF - FWD, 2 sensor inputs

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup> P	Assigned motor output <sup>2)3)</sup> P	Control voltage external brake (50/60 Hz) <sup>4)</sup>	Actuator output <sup>5)</sup>	AS-Interface profile S-7.4 <sup>6)</sup>	AS-Interface profile S-7.A.E <sup>7)</sup>	Power supply via HAN Q4/2 plug	Power supply via HAN Q5 plug	Repair switch	Catalog Number Article no.	Std. pack
6.6	3	3	-	0	✓	-	✓	-	-	<b>RAM05-W200A31-4120S1</b> 199080	1 unit
				0	✓	-	✓	-	✓	<b>RAM05-W200A31-412RS1</b> 199099	
				1	✓	-	✓	-	-	<b>RAM05-W210A31-4120S1</b> 199084	
				1	✓	-	✓	-	✓	<b>RAM05-W210A31-412RS1</b> 199103	
				0	✓	-	-	✓	-	<b>RAM05-W200A31-5120S1</b> 198529	
				0	✓	-	-	✓	✓	<b>RAM05-W200A31-512RS1</b> 198530	
				0	-	✓	✓	-	-	<b>RAM05-W200A32-4120S1</b> 199090	
				0	-	✓	✓	-	✓	<b>RAM05-W200A32-412RS1</b> 199109	
				1	-	✓	✓	-	-	<b>RAM05-W210A32-4120S1</b> 199094	
				1	-	✓	✓	-	✓	<b>RAM05-W210A32-412RS1</b> 199113	
				0	-	✓	-	✓	-	<b>RAM05-W200A32-5120S1</b> 199088	
				0	-	✓	-	✓	✓	<b>RAM05-W200A32-512RS1</b> 199107	
			180/207 V DC	0	✓	-	✓	-	-	<b>RAM05-W201A31-4120S1</b> 199081	
				0	✓	-	✓	-	✓	<b>RAM05-W201A31-412RS1</b> 199100	
				1	✓	-	✓	-	-	<b>RAM05-W211A31-4120S1</b> 199085	
				1	✓	-	✓	-	✓	<b>RAM05-W211A31-412RS1</b> 199104	
				0	✓	-	-	✓	-	<b>RAM05-W201A31-5120S1</b> 199079	
				0	✓	-	-	✓	✓	<b>RAM05-W201A31-512RS1</b> 199098	
				0	-	✓	✓	-	-	<b>RAM05-W201A32-4120S1</b> 199091	
				0	-	✓	✓	-	✓	<b>RAM05-W201A32-412RS1</b> 199110	
				1	-	✓	✓	-	-	<b>RAM05-W211A32-4120S1</b> 199095	
				1	-	✓	✓	-	✓	<b>RAM05-W211A32-412RS1</b> 199114	
				0	-	✓	-	✓	-	<b>RAM05-W201A32-5120S1</b> 199089	
				0	-	✓	-	✓	✓	<b>RAM05-W201A32-512RS1</b> 199108	
			230/277 V AC	0	✓	-	✓	-	-	<b>RAM05-W202A31-4120S1</b> 199082	
				0	✓	-	✓	-	✓	<b>RAM05-W202A31-412RS1</b> 199101	
				1	✓	-	✓	-	-	<b>RAM05-W212A31-4120S1</b> 199086	
				1	✓	-	✓	-	✓	<b>RAM05-W212A31-412RS1</b> 199105	

### Notes

- <sup>1)</sup> 0,3 - 6.6 adjustable
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz, at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Operation with external 24V DC supply
- <sup>6)</sup> Profile with 31 modules
- <sup>7)</sup> Profile with 62 modules

# 3

## Rapid Link 5 decentralized, electronic drive system

### AS-Interface

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Actuator output <sup>5)</sup>	AS-Interface profile		Power supply via		Repair switch	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P			S-7.4 <sup>6)</sup>	S-7.A.E <sup>7)</sup>	HAN Q4/2 plug	HAN Q5 plug			
A	kW	HP									

#### RAM05 motor starter

Rated operating voltage 400 V AC, three-phase, mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V

Reversing starter with selector switch REV - OFF - FWD, 2 sensor inputs

I <sub>e</sub>	P	P	Control voltage external brake (50/60 Hz) <sup>4)</sup>	Actuator output <sup>5)</sup>	S-7.4 <sup>6)</sup>	S-7.A.E <sup>7)</sup>	HAN Q4/2 plug	HAN Q5 plug	Repair switch	Catalog Number Article no.	Std. pack					
6.6	3	3	230/277 V AC	0	✓	-	-	✓	-	<b>RAM05-W202A31-5120S1</b> 198531	1 unit					
				0	✓	-	-	✓	✓	<b>RAM05-W202A31-512RS1</b> 198532						
				1	✓	-	-	✓	-	<b>RAM05-W212A31-5120S1</b> 198539						
				0	-	✓	✓	-	-	<b>RAM05-W202A32-4120S1</b> 199092						
				0	-	✓	✓	-	✓	<b>RAM05-W202A32-412RS1</b> 199111						
				1	-	✓	✓	-	-	<b>RAM05-W212A32-4120S1</b> 199096						
				1	-	✓	✓	-	✓	<b>RAM05-W212A32-412RS1</b> 199115						
				0	-	✓	-	✓	-	<b>RAM05-W202A32-5120S1</b> 198533						
				0	-	✓	-	✓	✓	<b>RAM05-W202A32-512RS1</b> 198534						
				1	-	✓	-	✓	-	<b>RAM05-W212A32-5120S1</b> 198540						
				400/480 V AC				0	✓	-		✓	-	-	<b>RAM05-W204A31-4120S1</b> 199083	
								0	✓	-		✓	-	✓	<b>RAM05-W204A31-412RS1</b> 199102	
								1	✓	-		✓	-	-	<b>RAM05-W214A31-4120S1</b> 199087	
								1	✓	-		✓	-	✓	<b>RAM05-W214A31-412RS1</b> 199106	
0	✓	-	-					✓	-	<b>RAM05-W204A31-5120S1</b> 198535						
0	✓	-	-					✓	✓	<b>RAM05-W204A31-512RS1</b> 198536						
1	✓	-	-					✓	-	<b>RAM05-W214A31-5120S1</b> 198541						
0	-	✓	✓					-	-	<b>RAM05-W204A32-4120S1</b> 199093						
0	-	✓	✓					-	✓	<b>RAM05-W204A32-412RS1</b> 199112						
1	-	✓	✓					-	-	<b>RAM05-W214A32-4120S1</b> 199097						
1	-	✓	✓					-	✓	<b>RAM05-W214A32-412RS1</b> 199116						
0	-	✓	-					✓	-	<b>RAM05-W204A32-5120S1</b> 198537						
0	-	✓	-					✓	✓	<b>RAM05-W204A32-512RS1</b> 198538						

#### Notes

- <sup>1)</sup> 0.3 - 6.6 adjustable
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz, at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Operation with external 24V DC supply
- <sup>6)</sup> Profile with 31 modules
- <sup>7)</sup> Profile with 62 modules

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
 4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

2.4	0.75	1	-	✓	-	-	-	-	<b>RASP5-2400A31-412000S1</b> 198728	1 unit
				✓	-	-	-	✓	<b>RASP5-2400A31-412001S1</b> 198736	
				✓	-	-	-	-	<b>RASP5-2400A31-412R00S1</b> 198744	
				✓	-	-	-	✓	<b>RASP5-2400A31-412R01S1</b> 198752	
				✓	-	-	✓	-	<b>RASP5-2400A31-412010S1</b> 198732	
				✓	-	-	✓	✓	<b>RASP5-2400A31-412011S1</b> 198740	
				✓	-	✓	✓	-	<b>RASP5-2400A31-412R10S1</b> 198748	
				✓	-	✓	✓	✓	<b>RASP5-2400A31-412R11S1</b> 198756	
				-	✓	-	-	-	<b>RASP5-2400A31-512000S1</b> 198542	
				-	✓	-	-	-	<b>RASP5-2400A31-512R00S1</b> 198548	
				-	✓	-	✓	-	<b>RASP5-2400A31-512010S1</b> 198545	
				-	✓	✓	✓	-	<b>RASP5-2400A31-512R10S1</b> 198551	
			180/207 V DC	✓	-	-	-	-	<b>RASP5-2401A31-412000S1</b> 198729	
				✓	-	-	-	✓	<b>RASP5-2401A31-412001S1</b> 198737	
				✓	-	-	-	-	<b>RASP5-2401A31-412R00S1</b> 198745	
				✓	-	-	-	✓	<b>RASP5-2401A31-412R01S1</b> 198753	
				✓	-	-	✓	-	<b>RASP5-2401A31-412010S1</b> 198733	
				✓	-	-	✓	✓	<b>RASP5-2401A31-412011S1</b> 198741	
				✓	-	✓	✓	-	<b>RASP5-2401A31-412R10S1</b> 198749	
				✓	-	✓	✓	✓	<b>RASP5-2401A31-412R11S1</b> 198757	
				-	✓	-	-	-	<b>RASP5-2401A31-512000S1</b> 198724	
				-	✓	-	-	-	<b>RASP5-2401A31-512R00S1</b> 198726	
				-	✓	-	✓	-	<b>RASP5-2401A31-512010S1</b> 198725	
				-	✓	✓	✓	-	<b>RASP5-2401A31-512R10S1</b> 198727	
			230/277 V AC	✓	-	-	-	-	<b>RASP5-2402A31-412000S1</b> 198730	
				✓	-	-	-	✓	<b>RASP5-2402A31-412001S1</b> 198738	
				✓	-	-	-	-	<b>RASP5-2402A31-412R00S1</b> 198746	
				✓	-	-	-	✓	<b>RASP5-2402A31-412R01S1</b> 198754	

#### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.



# 3

## Rapid Link 5 decentralized, electronic drive system

### AS-Interface

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

#### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

2.4	0.75	1	230/277 V AC	✓	-	-	✓	-	<b>RASP5-2402A31-4120100S1</b> 198734	1 unit			
				✓	-	-	✓	✓	<b>RASP5-2402A31-4120110S1</b> 198742				
				✓	-	✓	✓	-	<b>RASP5-2402A31-412R100S1</b> 198750				
				✓	-	✓	✓	✓	<b>RASP5-2402A31-412R110S1</b> 198758				
				-	✓	-	-	-	<b>RASP5-2402A31-5120000S1</b> 198543				
				-	✓	-	-	-	<b>RASP5-2402A31-512R000S1</b> 198549				
				-	✓	-	✓	-	<b>RASP5-2402A31-5120100S1</b> 198546				
				-	✓	✓	✓	-	<b>RASP5-2402A31-512R100S1</b> 198552				
				400/480 V AC				✓	-		-	-	<b>RASP5-2404A31-4120000S1</b> 198731
				✓	-	-	-	✓	<b>RASP5-2404A31-4120010S1</b> 198739				
				✓	-	-	-	-	<b>RASP5-2404A31-412R000S1</b> 198747				
				✓	-	-	-	✓	<b>RASP5-2404A31-412R010S1</b> 198755				
				✓	-	-	✓	-	<b>RASP5-2404A31-4120100S1</b> 198735				
				✓	-	-	✓	✓	<b>RASP5-2404A31-4120110S1</b> 198743				
✓	-	✓	✓	-	<b>RASP5-2404A31-412R100S1</b> 198751								
✓	-	✓	✓	✓	<b>RASP5-2404A31-412R110S1</b> 198759								
-	✓	-	-	-	<b>RASP5-2404A31-5120000S1</b> 198544								
-	✓	-	-	-	<b>RASP5-2404A31-512R000S1</b> 198550								
-	✓	-	✓	-	<b>RASP5-2404A31-5120100S1</b> 198547								
-	✓	✓	✓	-	<b>RASP5-2404A31-512R100S1</b> 198553								
4.3	1.5	2	-	✓	-	-	-	-	<b>RASP5-4400A31-4120000S1</b> 198764				
				✓	-	-	-	✓	<b>RASP5-4400A31-4120010S1</b> 198772				
				✓	-	-	-	-	<b>RASP5-4400A31-412R000S1</b> 198780				
				✓	-	-	-	✓	<b>RASP5-4400A31-412R010S1</b> 198788				
				✓	-	-	✓	-	<b>RASP5-4400A31-4120100S1</b> 198768				
				✓	-	-	✓	✓	<b>RASP5-4400A31-4120110S1</b> 198776				
				✓	-	✓	✓	-	<b>RASP5-4400A31-412R100S1</b> 198784				
				✓	-	✓	✓	✓	<b>RASP5-4400A31-412R110S1</b> 198792				

#### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
 4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

4.3	1.5	2	-	-	✓	-	-	-	<b>RASP5-4400A31-512000S1</b> 198554	1 unit
					✓	-	-	-	<b>RASP5-4400A31-512R000S1</b> 198560	
					✓	-	✓	-	<b>RASP5-4400A31-5120100S1</b> 198557	
					✓	✓	✓	-	<b>RASP5-4400A31-512R100S1</b> 198563	
			180/207 V DC	✓	-	-	-	-	<b>RASP5-4401A31-4120000S1</b> 198765	
				✓	-	-	-	✓	<b>RASP5-4401A31-4120010S1</b> 198773	
				✓	-	-	-	-	<b>RASP5-4401A31-412R000S1</b> 198781	
				✓	-	-	-	✓	<b>RASP5-4401A31-412R010S1</b> 198789	
				✓	-	-	✓	-	<b>RASP5-4401A31-4120100S1</b> 198769	
				✓	-	-	✓	✓	<b>RASP5-4401A31-4120110S1</b> 198777	
				✓	-	✓	✓	-	<b>RASP5-4401A31-412R100S1</b> 198785	
				✓	-	✓	✓	✓	<b>RASP5-4401A31-412R110S1</b> 198793	
				-	✓	-	-	-	<b>RASP5-4401A31-5120000S1</b> 198760	
				-	✓	-	-	-	<b>RASP5-4401A31-512R000S1</b> 198762	
				-	✓	-	✓	-	<b>RASP5-4401A31-5120100S1</b> 198761	
				-	✓	✓	✓	-	<b>RASP5-4401A31-512R100S1</b> 198763	
			230/277 V AC	✓	-	-	-	-	<b>RASP5-4402A31-4120000S1</b> 198766	
				✓	-	-	-	✓	<b>RASP5-4402A31-4120010S1</b> 198774	
				✓	-	-	-	-	<b>RASP5-4402A31-412R000S1</b> 198782	
				✓	-	-	-	✓	<b>RASP5-4402A31-412R010S1</b> 198790	
				✓	-	-	✓	-	<b>RASP5-4402A31-4120100S1</b> 198770	
				✓	-	-	✓	✓	<b>RASP5-4402A31-4120110S1</b> 198778	
				✓	-	✓	✓	-	<b>RASP5-4402A31-412R100S1</b> 198786	
				✓	-	✓	✓	✓	<b>RASP5-4402A31-412R110S1</b> 198794	
				-	✓	-	-	-	<b>RASP5-4402A31-5120000S1</b> 198555	
				-	✓	-	-	-	<b>RASP5-4402A31-512R000S1</b> 198561	
				-	✓	-	✓	-	<b>RASP5-4402A31-5120100S1</b> 198558	
				-	✓	✓	✓	-	<b>RASP5-4402A31-512R100S1</b> 198564	

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

# 3

## Rapid Link 5 decentralized, electronic drive system

### AS-Interface

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

#### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

4.3	1.5	2	400/480 V AC	✓	-	-	-	-	<b>RASP5-4404A31-412000S1</b> 198767	1 unit					
				✓	-	-	-	✓	<b>RASP5-4404A31-412001S1</b> 198775						
				✓	-	-	-	-	<b>RASP5-4404A31-412R00S1</b> 198783						
				✓	-	-	-	✓	<b>RASP5-4404A31-412R01S1</b> 198791						
				✓	-	-	✓	-	<b>RASP5-4404A31-412010S1</b> 198771						
				✓	-	-	✓	✓	<b>RASP5-4404A31-412011S1</b> 198779						
				✓	-	✓	✓	-	<b>RASP5-4404A31-412R10S1</b> 198787						
				✓	-	✓	✓	✓	<b>RASP5-4404A31-412R11S1</b> 198795						
				-	✓	-	-	-	<b>RASP5-4404A31-512000S1</b> 198556						
				-	✓	-	-	-	<b>RASP5-4404A31-512R00S1</b> 198562						
				-	✓	-	✓	-	<b>RASP5-4404A31-512010S1</b> 198559						
				-	✓	✓	✓	-	<b>RASP5-4404A31-512R10S1</b> 198565						
				5.6	2.2	3	-	✓	-		-	-	-	<b>RASP5-5400A31-412000S1</b> 198800	
								✓	-		-	-	✓	<b>RASP5-5400A31-412001S1</b> 198808	
								✓	-		-	-	-	<b>RASP5-5400A31-412R00S1</b> 198816	
✓	-	-	-					✓	<b>RASP5-5400A31-412R01S1</b> 198824						
✓	-	-	✓					-	<b>RASP5-5400A31-412010S1</b> 198804						
✓	-	-	✓					✓	<b>RASP5-5400A31-412011S1</b> 198812						
✓	-	✓	✓					-	<b>RASP5-5400A31-412R10S1</b> 198820						
✓	-	✓	✓					✓	<b>RASP5-5400A31-412R11S1</b> 198828						
-	✓	-	-					-	<b>RASP5-5400A31-512000S1</b> 198566						
-	✓	-	-					-	<b>RASP5-5400A31-512R00S1</b> 198572						
-	✓	-	✓					-	<b>RASP5-5400A31-512010S1</b> 198569						
-	✓	✓	✓					-	<b>RASP5-5400A31-512R10S1</b> 198575						
180/207 V DC								✓	-	-	-	-	<b>RASP5-5401A31-412000S1</b> 198801		
								✓	-	-	-	✓	<b>RASP5-5401A31-412001S1</b> 198809		
								✓	-	-	-	-	<b>RASP5-5401A31-412R00S1</b> 198817		
				✓	-	-	-	✓	<b>RASP5-5401A31-412R01S1</b> 198825						

#### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
 4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

5.6	2.2	3	180/207 V DC	✓	-	-	✓	-	<b>RASP5-5401A31-4120100S1</b> 198805	1 unit			
				✓	-	-	✓	✓	<b>RASP5-5401A31-4120110S1</b> 198813				
				✓	-	✓	✓	-	<b>RASP5-5401A31-412R100S1</b> 198821				
				✓	-	✓	✓	✓	<b>RASP5-5401A31-412R110S1</b> 198829				
				-	✓	-	-	-	<b>RASP5-5401A31-5120000S1</b> 198796				
				-	✓	-	-	-	<b>RASP5-5401A31-512R000S1</b> 198798				
				-	✓	-	✓	-	<b>RASP5-5401A31-5120100S1</b> 198797				
				-	✓	✓	✓	-	<b>RASP5-5401A31-512R100S1</b> 198799				
							230/277 V AC	✓	-		-	-	<b>RASP5-5402A31-4120000S1</b> 198802
				✓	-	-		-	✓		<b>RASP5-5402A31-4120010S1</b> 198810		
✓	-	-	-	-	<b>RASP5-5402A31-412R000S1</b> 198818								
✓	-	-	-	✓	<b>RASP5-5402A31-412R010S1</b> 198826								
✓	-	-	✓	-	<b>RASP5-5402A31-4120100S1</b> 198806								
✓	-	-	✓	✓	<b>RASP5-5402A31-4120110S1</b> 198814								
✓	-	✓	✓	-	<b>RASP5-5402A31-412R100S1</b> 198822								
✓	-	✓	✓	✓	<b>RASP5-5402A31-412R110S1</b> 198830								
-	✓	-	-	-	<b>RASP5-5402A31-5120000S1</b> 198567								
-	✓	-	-	-	<b>RASP5-5402A31-512R000S1</b> 198573								
-	✓	-	✓	-	<b>RASP5-5402A31-5120100S1</b> 198570								
-	✓	✓	✓	-	<b>RASP5-5402A31-512R100S1</b> 198576								
			400/480 V AC	✓	-	-	-	<b>RASP5-5404A31-4120000S1</b> 198803					
✓	-	-		-	✓	<b>RASP5-5404A31-4120010S1</b> 198811							
✓	-	-		-	-	<b>RASP5-5404A31-412R000S1</b> 198819							
✓	-	-		-	✓	<b>RASP5-5404A31-412R010S1</b> 198827							
✓	-	-		✓	-	<b>RASP5-5404A31-4120100S1</b> 198807							
✓	-	-		✓	✓	<b>RASP5-5404A31-4120110S1</b> 198815							
✓	-	✓		✓	-	<b>RASP5-5404A31-412R100S1</b> 198823							
✓	-	✓		✓	✓	<b>RASP5-5404A31-412R110S1</b> 198831							

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

# 3

## Rapid Link 5 decentralized, electronic drive system

### AS-Interface

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
$I_e$	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

#### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz)  $U_{LN}$  380 (-10%) - 480 (+10%) V  
 4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

5.6	2.2	3	400/480 V AC	–	✓	–	–	–	<b>RASP5-5404A31-512000S1</b> 198568	1 unit
			400/480 V AC	–	✓	–	–	–	<b>RASP5-5404A31-512R00S1</b> 198574	
			400/480 V AC	–	✓	–	✓	–	<b>RASP5-5404A31-512010S1</b> 198571	
			400/480 V AC	–	✓	✓	✓	–	<b>RASP5-5404A31-512R10S1</b> 198577	

#### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
 4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

8.5	4	5	-	✓	-	-	-	-	<b>RASP5-8400A31-4120001S1</b> 198836	1 unit
				✓	-	-	-	✓	<b>RASP5-8400A31-4120011S1</b> 198844	
				✓	-	-	-	-	<b>RASP5-8400A31-412R001S1</b> 198852	
				✓	-	-	-	✓	<b>RASP5-8400A31-412R011S1</b> 198860	
				✓	-	-	✓	-	<b>RASP5-8400A31-4120101S1</b> 198840	
				✓	-	-	✓	✓	<b>RASP5-8400A31-4120111S1</b> 198848	
				✓	-	✓	✓	-	<b>RASP5-8400A31-412R101S1</b> 198856	
				✓	-	✓	✓	✓	<b>RASP5-8400A31-412R111S1</b> 198864	
				-	✓	-	-	-	<b>RASP5-8400A31-5120001S1</b> 198578	
				-	✓	-	-	-	<b>RASP5-8400A31-512R001S1</b> 198584	
				-	✓	-	✓	-	<b>RASP5-8400A31-5120101S1</b> 198581	
				-	✓	✓	✓	-	<b>RASP5-8400A31-512R101S1</b> 198587	
			180/207 V DC	✓	-	-	-	-	<b>RASP5-8401A31-4120001S1</b> 198837	
				✓	-	-	-	✓	<b>RASP5-8401A31-4120011S1</b> 198845	
				✓	-	-	-	-	<b>RASP5-8401A31-412R001S1</b> 198853	
				✓	-	-	-	✓	<b>RASP5-8401A31-412R011S1</b> 198861	
				✓	-	-	✓	-	<b>RASP5-8401A31-4120101S1</b> 198841	
				✓	-	-	✓	✓	<b>RASP5-8401A31-4120111S1</b> 198849	
				✓	-	✓	✓	-	<b>RASP5-8401A31-412R101S1</b> 198857	
				✓	-	✓	✓	✓	<b>RASP5-8401A31-412R111S1</b> 198865	
				-	✓	-	-	-	<b>RASP5-8401A31-5120001S1</b> 198832	
				-	✓	-	-	-	<b>RASP5-8401A31-512R001S1</b> 198834	
				-	✓	-	✓	-	<b>RASP5-8401A31-5120101S1</b> 198833	
				-	✓	✓	✓	-	<b>RASP5-8401A31-512R101S1</b> 198835	
			230/277 V AC	✓	-	-	-	-	<b>RASP5-8402A31-4120001S1</b> 198838	
				✓	-	-	-	✓	<b>RASP5-8402A31-4120011S1</b> 198846	
				✓	-	-	-	-	<b>RASP5-8402A31-412R001S1</b> 198854	
				✓	-	-	-	✓	<b>RASP5-8402A31-412R011S1</b> 198862	

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

# 3

## Rapid Link 5 decentralized, electronic drive system

### AS-Interface

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

#### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
4 sensor inputs, without actuator output, AS-Interface profile S7.4 (for 31 modules)

8.5	4	5	230/277 V AC	✓	-	-	✓	-	<b>RASP5-8402A31-4120101S1</b> 198842	1 unit
				✓	-	-	✓	✓	<b>RASP5-8402A31-4120111S1</b> 198850	
				✓	-	✓	✓	-	<b>RASP5-8402A31-412R101S1</b> 198858	
				✓	-	✓	✓	✓	<b>RASP5-8402A31-412R111S1</b> 198866	
				-	✓	-	-	-	<b>RASP5-8402A31-5120001S1</b> 198579	
				-	✓	-	-	-	<b>RASP5-8402A31-512R001S1</b> 198585	
				-	✓	-	✓	-	<b>RASP5-8402A31-5120101S1</b> 198582	
				-	✓	✓	✓	-	<b>RASP5-8402A31-512R101S1</b> 198588	
			400/480 V AC	✓	-	-	-	-	<b>RASP5-8404A31-4120001S1</b> 198839	
				✓	-	-	-	✓	<b>RASP5-8404A31-4120011S1</b> 198847	
				✓	-	-	-	-	<b>RASP5-8404A31-412R001S1</b> 198855	
				✓	-	-	-	✓	<b>RASP5-8404A31-412R011S1</b> 198863	
				✓	-	-	✓	-	<b>RASP5-8404A31-4120101S1</b> 198843	
				✓	-	-	✓	✓	<b>RASP5-8404A31-4120111S1</b> 198851	
				✓	-	✓	✓	-	<b>RASP5-8404A31-412R101S1</b> 198859	
				✓	-	✓	✓	✓	<b>RASP5-8404A31-412R111S1</b> 198867	
				-	✓	-	-	-	<b>RASP5-8404A31-5120001S1</b> 198580	
				-	✓	-	-	-	<b>RASP5-8404A31-512R001S1</b> 198586	
				-	✓	-	✓	-	<b>RASP5-8404A31-5120101S1</b> 198583	
				-	✓	✓	✓	-	<b>RASP5-8404A31-512R101S1</b> 198589	

#### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup> $I_e$ A	Assigned motor output <sup>2)3)</sup> P kW		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Catalog Number Article no.	Std. pack
	P	HP		HAN Q4/2 plug	HAN Q5 plug			

## RAM05 motor starter

Rated operating voltage 400 V AC, three-phase  
Mains voltage (50/60Hz)  $U_{LN}$  380 (-10%) - 480 (+10%) V  
4 sensor inputs, 2 sensor outputs

DOL starter								
6.6	3	3	-	✓	-	-	<b>RAM05-D420PNT-4120S1</b> 199125	1 unit
				✓	-	✓	<b>RAM05-D420PNT-412RS1</b> 199129	
			180/207 V DC	✓	-	-	<b>RAM05-D421PNT-4120S1</b> 199126	
				✓	-	✓	<b>RAM05-D421PNT-412RS1</b> 199130	
			230/277 V AC	✓	-	-	<b>RAM05-D422PNT-4120S1</b> 199127	
				✓	-	✓	<b>RAM05-D422PNT-412RS1</b> 199131	
			400/480 V AC	✓	-	-	<b>RAM05-D424PNT-4120S1</b> 199128	
				✓	-	✓	<b>RAM05-D424PNT-412RS1</b> 199132	
Reversing starter with selector switch REV - OFF - FWD								
6.6	3	3	-	✓	-	-	<b>RAM05-W420PNT-4120S1</b> 199133	1 unit
				✓	-	✓	<b>RAM05-W420PNT-412RS1</b> 199137	
			180/207 V DC	✓	-	-	<b>RAM05-W421PNT-4120S1</b> 199134	
				✓	-	✓	<b>RAM05-W421PNT-412RS1</b> 199138	
			230/277 V AC	✓	-	-	<b>RAM05-W422PNT-4120S1</b> 199135	
				✓	-	✓	<b>RAM05-W422PNT-412RS1</b> 199139	
			400/480 V AC	✓	-	-	<b>RAM05-W424PNT-4120S1</b> 199136	
				✓	-	✓	<b>RAM05-W424PNT-412RS1</b> 199140	

### Notes

- <sup>1)</sup> 0,3 - 6.6 adjustable
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Operation with external 24V DC supply



# 3

## Rapid Link 5 decentralized, electronic drive system

Profinet

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								
<b>RASP5 variable frequency drives</b>										
Rated operating voltage 400 V AC, three-phase Mains voltage (50/60Hz) ULN 380 (-10%) - 480 (+10%) V 4 sensor inputs, 2 sensor outputs										
2.4	0.75	1	-	✓	-	-	-	-	<b>RASP5-2420PNT-412000S1</b> 198932	1 unit
				✓	-	-	-	✓	<b>RASP5-2420PNT-412001S1</b> 198940	
				✓	-	-	-	-	<b>RASP5-2420PNT-412R00S1</b> 198948	
				✓	-	-	-	✓	<b>RASP5-2420PNT-412R01S1</b> 198956	
				✓	-	-	✓	-	<b>RASP5-2420PNT-412010S1</b> 198936	
				✓	-	-	✓	✓	<b>RASP5-2420PNT-412011S1</b> 198944	
				✓	-	✓	✓	-	<b>RASP5-2420PNT-412R10S1</b> 198952	
				✓	-	✓	✓	✓	<b>RASP5-2420PNT-412R11S1</b> 198960	
			180/207 V DC	✓	-	-	-	-	<b>RASP5-2421PNT-412000S1</b> 198933	
				✓	-	-	-	✓	<b>RASP5-2421PNT-412001S1</b> 198941	
				✓	-	-	-	-	<b>RASP5-2421PNT-412R00S1</b> 198949	
				✓	-	-	-	✓	<b>RASP5-2421PNT-412R01S1</b> 198957	
				✓	-	-	✓	-	<b>RASP5-2421PNT-412010S1</b> 198937	
				✓	-	-	✓	✓	<b>RASP5-2421PNT-412011S1</b> 198945	
				✓	-	✓	✓	-	<b>RASP5-2421PNT-412R10S1</b> 198953	
				✓	-	✓	✓	✓	<b>RASP5-2421PNT-412R11S1</b> 198961	
			230/277 V AC	✓	-	-	-	-	<b>RASP5-2422PNT-412000S1</b> 198934	
				✓	-	-	-	✓	<b>RASP5-2422PNT-412001S1</b> 198942	
				✓	-	-	-	-	<b>RASP5-2422PNT-412R00S1</b> 198950	
				✓	-	-	-	✓	<b>RASP5-2422PNT-412R01S1</b> 198958	
				✓	-	-	✓	-	<b>RASP5-2422PNT-412010S1</b> 198938	
				✓	-	-	✓	✓	<b>RASP5-2422PNT-412011S1</b> 198946	
				✓	-	✓	✓	-	<b>RASP5-2422PNT-412R10S1</b> 198954	
				✓	-	✓	✓	✓	<b>RASP5-2422PNT-412R11S1</b> 198962	
			400/480 V AC	✓	-	-	-	-	<b>RASP5-2424PNT-412000S1</b> 198935	
				✓	-	-	-	✓	<b>RASP5-2424PNT-412001S1</b> 198943	
				✓	-	-	-	-	<b>RASP5-2424PNT-412R00S1</b> 198951	
				✓	-	-	-	✓	<b>RASP5-2424PNT-412R01S1</b> 198959	

**Notes**

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup> I <sub>e</sub>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								
<b>RASP5 variable frequency drives</b>										
Rated operating voltage 400 V AC, three-phase Mains voltage (50/60Hz) ULN 380 (-10%) - 480 (+10%) V 4 sensor inputs, 2 sensor outputs										
2.4	0.75	1	400/480 V AC	✓	–	–	✓	–	<b>RASP5-2424PNT-4120100S1</b> 198939	1 unit
				✓	–	–	✓	✓	<b>RASP5-2424PNT-4120110S1</b> 198947	
				✓	–	✓	✓	–	<b>RASP5-2424PNT-412R100S1</b> 198955	
				✓	–	✓	✓	✓	<b>RASP5-2424PNT-412R110S1</b> 198963	
4.3	1.5	2	–	✓	–	–	–	–	<b>RASP5-4420PNT-4120000S1</b> 198964	
				✓	–	–	–	✓	<b>RASP5-4420PNT-4120010S1</b> 198972	
				✓	–	–	–	–	<b>RASP5-4420PNT-412R000S1</b> 198980	
				✓	–	–	–	✓	<b>RASP5-4420PNT-412R010S1</b> 198988	
				✓	–	–	✓	–	<b>RASP5-4420PNT-4120100S1</b> 198968	
				✓	–	–	✓	✓	<b>RASP5-4420PNT-4120110S1</b> 198976	
				✓	–	✓	✓	–	<b>RASP5-4420PNT-412R100S1</b> 198984	
				✓	–	✓	✓	✓	<b>RASP5-4420PNT-412R110S1</b> 198992	
			180/207 V DC	✓	–	–	–	–	<b>RASP5-4421PNT-4120000S1</b> 198965	
				✓	–	–	–	✓	<b>RASP5-4421PNT-4120010S1</b> 198973	
				✓	–	–	–	–	<b>RASP5-4421PNT-412R000S1</b> 198981	
				✓	–	–	–	✓	<b>RASP5-4421PNT-412R010S1</b> 198989	
				✓	–	–	✓	–	<b>RASP5-4421PNT-4120100S1</b> 198969	
				✓	–	–	✓	✓	<b>RASP5-4421PNT-4120110S1</b> 198977	
				✓	–	✓	✓	–	<b>RASP5-4421PNT-412R100S1</b> 198985	
				✓	–	✓	✓	✓	<b>RASP5-4421PNT-412R110S1</b> 198993	
			230/277 V AC	✓	–	–	–	–	<b>RASP5-4422PNT-4120000S1</b> 198966	
				✓	–	–	–	✓	<b>RASP5-4422PNT-4120010S1</b> 198974	
				✓	–	–	–	–	<b>RASP5-4422PNT-412R000S1</b> 198982	
				✓	–	–	–	✓	<b>RASP5-4422PNT-412R010S1</b> 198990	
				✓	–	–	✓	–	<b>RASP5-4422PNT-4120100S1</b> 198970	
				✓	–	–	✓	✓	<b>RASP5-4422PNT-4120110S1</b> 198978	
				✓	–	✓	✓	–	<b>RASP5-4422PNT-412R100S1</b> 198986	
				✓	–	✓	✓	✓	<b>RASP5-4422PNT-412R110S1</b> 198994	

**Notes**

<sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C  
<sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz  
<sup>3)</sup> At 400 V, 50 Hz  
 at 440 - 480 V, 60 Hz  
<sup>4)</sup> For actuation of motors with electromechanical brake  
<sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking  
<sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

# 3

## Rapid Link 5 decentralized, electronic drive system

Profinet

Rated operational current <sup>1)</sup> I <sub>e</sub>	Assigned motor output <sup>2)3)</sup> P P		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack	
	A	kW		HP	HAN Q4/2 plug						HAN Q5 plug
<b>RASP5 variable frequency drives</b>											
Rated operating voltage 400 V AC, three-phase Mains voltage (50/60Hz) ULN 380 (-10%) - 480 (+10%) V 4 sensor inputs, 2 sensor outputs											
4.3	1.5	2	400/480 V AC	✓	–	–	–	–	<b>RASP5-4424PNT-412000S1</b> 198967	1 unit	
				✓	–	–	–	✓	<b>RASP5-4424PNT-412001S1</b> 198975		
				✓	–	–	–	–	<b>RASP5-4424PNT-412R00S1</b> 198983		
				✓	–	–	–	✓	<b>RASP5-4424PNT-412R01S1</b> 198991		
				✓	–	–	✓	–	<b>RASP5-4424PNT-412010S1</b> 198971		
				✓	–	–	✓	✓	<b>RASP5-4424PNT-412011S1</b> 198979		
				✓	–	✓	✓	–	<b>RASP5-4424PNT-412R10S1</b> 198987		
				✓	–	✓	✓	✓	<b>RASP5-4424PNT-412R11S1</b> 198995		
5.6	2.2	3	–	✓	–	–	–	–	<b>RASP5-5420PNT-412000S1</b> 198996		
				✓	–	–	–	✓	<b>RASP5-5420PNT-412001S1</b> 199004		
				✓	–	–	–	–	<b>RASP5-5420PNT-412R00S1</b> 199012		
				✓	–	–	–	✓	<b>RASP5-5420PNT-412R01S1</b> 199020		
				✓	–	–	✓	–	<b>RASP5-5420PNT-412010S1</b> 199000		
				✓	–	–	✓	✓	<b>RASP5-5420PNT-412011S1</b> 199008		
				✓	–	✓	✓	–	<b>RASP5-5420PNT-412R10S1</b> 199016		
				✓	–	✓	✓	✓	<b>RASP5-5420PNT-412R11S1</b> 199024		
			180/207 V DC	✓	–	–	–	–	<b>RASP5-5421PNT-412000S1</b> 198997		
				✓	–	–	–	✓	<b>RASP5-5421PNT-412001S1</b> 199005		
				✓	–	–	–	–	<b>RASP5-5421PNT-412R00S1</b> 199013		
				✓	–	–	–	✓	<b>RASP5-5421PNT-412R01S1</b> 199021		
				✓	–	–	✓	–	<b>RASP5-5421PNT-412010S1</b> 199001		
				✓	–	–	✓	✓	<b>RASP5-5421PNT-412011S1</b> 199009		
				✓	–	✓	✓	–	<b>RASP5-5421PNT-412R10S1</b> 199017		
				✓	–	✓	✓	✓	<b>RASP5-5421PNT-412R11S1</b> 199025		
230/277 V AC	✓	–	–	–	–	<b>RASP5-5422PNT-412000S1</b> 198998					
	✓	–	–	–	✓	<b>RASP5-5422PNT-412001S1</b> 199006					
	✓	–	–	–	–	<b>RASP5-5422PNT-412R00S1</b> 199014					
	✓	–	–	–	✓	<b>RASP5-5422PNT-412R01S1</b> 199022					

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

## RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz) ULN 380 (-10%) - 480 (+10%) V  
 4 sensor inputs, 2 sensor outputs

5.6	2.2	3	230/277 V AC	✓	-	-	✓	-	<b>RASP5-5422PNT-4120100S1</b> 199002	1 unit
				✓	-	-	✓	✓	<b>RASP5-5422PNT-4120110S1</b> 199010	
				✓	-	✓	✓	-	<b>RASP5-5422PNT-412R100S1</b> 199018	
				✓	-	✓	✓	✓	<b>RASP5-5422PNT-412R110S1</b> 199026	
				400/480 V AC	✓	-	-	-	<b>RASP5-5424PNT-4120000S1</b> 198999	
					✓	-	-	-	<b>RASP5-5424PNT-4120010S1</b> 199007	
					✓	-	-	-	<b>RASP5-5424PNT-412R000S1</b> 199015	
					✓	-	-	✓	<b>RASP5-5424PNT-412R010S1</b> 199023	
					✓	-	-	✓	<b>RASP5-5424PNT-4120100S1</b> 199003	
					✓	-	-	✓	<b>RASP5-5424PNT-4120110S1</b> 199011	
					✓	-	✓	✓	<b>RASP5-5424PNT-412R100S1</b> 199019	
					✓	-	✓	✓	<b>RASP5-5424PNT-412R110S1</b> 199027	

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

# 3

## Rapid Link 5 decentralized, electronic drive system

Profinet

Rated operational current <sup>1)</sup> I <sub>e</sub>	Assigned motor output <sup>2)3)</sup> P P		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via HAN Q4/2 HAN Q5 plug plug		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
A	kW	HP								
<b>RASP5 variable frequency drives</b>										
Rated operating voltage 400 V AC, three-phase Mains voltage (50/60Hz) ULN 380 (-10%) - 480 (+10%) V 4 sensor inputs, 2 sensor outputs										
8.5	4	5	-	✓	-	-	-	-	<b>RASP5-8420PNT-4120001S1</b> 199028	1 unit
				✓	-	-	-	✓	<b>RASP5-8420PNT-4120011S1</b> 199036	
				✓	-	-	-	-	<b>RASP5-8420PNT-412R001S1</b> 199044	
				✓	-	-	-	✓	<b>RASP5-8420PNT-412R011S1</b> 199052	
				✓	-	-	✓	-	<b>RASP5-8420PNT-4120101S1</b> 199032	
				✓	-	-	✓	✓	<b>RASP5-8420PNT-4120111S1</b> 199040	
				✓	-	✓	✓	-	<b>RASP5-8420PNT-412R101S1</b> 199048	
				✓	-	✓	✓	✓	<b>RASP5-8420PNT-412R111S1</b> 199056	
			180/207 V DC	✓	-	-	-	-	<b>RASP5-8421PNT-4120001S1</b> 199029	
				✓	-	-	-	✓	<b>RASP5-8421PNT-4120011S1</b> 199037	
				✓	-	-	-	-	<b>RASP5-8421PNT-412R001S1</b> 199045	
				✓	-	-	-	✓	<b>RASP5-8421PNT-412R011S1</b> 199053	
				✓	-	-	✓	-	<b>RASP5-8421PNT-4120101S1</b> 199033	
				✓	-	-	✓	✓	<b>RASP5-8421PNT-4120111S1</b> 199041	
				✓	-	✓	✓	-	<b>RASP5-8421PNT-412R101S1</b> 199049	
				✓	-	✓	✓	✓	<b>RASP5-8421PNT-412R111S1</b> 199057	
			230/277 V AC	✓	-	-	-	-	<b>RASP5-8422PNT-4120001S1</b> 199030	
				✓	-	-	-	✓	<b>RASP5-8422PNT-4120011S1</b> 199038	
				✓	-	-	-	-	<b>RASP5-8422PNT-412R001S1</b> 199046	
				✓	-	-	-	✓	<b>RASP5-8422PNT-412R011S1</b> 199054	
				✓	-	-	✓	-	<b>RASP5-8422PNT-4120101S1</b> 199034	
				✓	-	-	✓	✓	<b>RASP5-8422PNT-4120111S1</b> 199042	
				✓	-	✓	✓	-	<b>RASP5-8422PNT-412R101S1</b> 199050	
				✓	-	✓	✓	✓	<b>RASP5-8422PNT-412R111S1</b> 199058	
			400/480 V AC	✓	-	-	-	-	<b>RASP5-8424PNT-4120001S1</b> 199031	
				✓	-	-	-	✓	<b>RASP5-8424PNT-4120011S1</b> 199039	
				✓	-	-	-	-	<b>RASP5-8424PNT-412R001S1</b> 199047	
				✓	-	-	-	✓	<b>RASP5-8424PNT-412R011S1</b> 199055	

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

## RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz) ULN 380 (-10%) - 480 (+10%) V  
 4 sensor inputs, 2 sensor outputs

8.5	4	5	400/480 V AC	✓	-	-	✓	-	<b>RASP5-8424PNT-4120101S1</b> 199035	1 unit
				✓	-	-	✓	✓	<b>RASP5-8424PNT-4120111S1</b> 199043	
				✓	-	✓	✓	-	<b>RASP5-8424PNT-412R101S1</b> 199051	
				✓	-	✓	✓	✓	<b>RASP5-8424PNT-412R111S1</b> 199059	

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

# 3

## Rapid Link 5 decentralized, electronic drive system

Ethernet/IP

Rated operation- al current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug			
A	kW	HP						

### RAM05 motor starter

Rated operating voltage 400 V AC, three-phase  
Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
4 sensor inputs, 2 sensor outputs

DOL starter								
6.6	3	3	–	✓	–	✓	<b>RAM05-D420EIP-412RS1</b> 199117	1 unit
			180/207 V DC	✓	–	✓	<b>RAM05-D421EIP-412RS1</b> 199118	
			230/277 V AC	✓	–	✓	<b>RAM05-D422EIP-412RS1</b> 199119	
			400/480 V AC	✓	–	✓	<b>RAM05-D424EIP-412RS1</b> 199120	
Reversing starter with selector switch REV - OFF - FWD								
6.6	3	3	–	✓	–	✓	<b>RAM05-W420EIP-412RS1</b> 199121	1 unit
			180/207 V DC	✓	–	✓	<b>RAM05-W421EIP-412RS1</b> 199122	
			230/277 V AC	✓	–	✓	<b>RAM05-W422EIP-412RS1</b> 199123	
			400/480 V AC	✓	–	✓	<b>RAM05-W424EIP-412RS1</b> 199124	

#### Notes

- <sup>1)</sup> 0.3 - 6.6 adjustable
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Operation with external 24V DC supply

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
4 sensor inputs, 2 sensor outputs

2.4	0.75	1	-	✓	-	-	-	-	<b>RASP5-2420EIP-412R000S1</b> 198868	1 unit			
				✓	-	-	-	✓	<b>RASP5-2420EIP-412R010S1</b> 198876				
				✓	-	✓	✓	-	<b>RASP5-2420EIP-412R100S1</b> 198872				
				✓	-	✓	✓	✓	<b>RASP5-2420EIP-412R110S1</b> 198880				
				180/207 V DC				✓	-		-	-	<b>RASP5-2421EIP-412R000S1</b> 198869
				✓	-	-	-	✓	<b>RASP5-2421EIP-412R010S1</b> 198877				
				✓	-	✓	✓	-	<b>RASP5-2421EIP-412R100S1</b> 198873				
				✓	-	✓	✓	✓	<b>RASP5-2421EIP-412R110S1</b> 198881				
				230/277 V AC				✓	-		-	-	<b>RASP5-2422EIP-412R000S1</b> 198870
				✓	-	-	-	✓	<b>RASP5-2422EIP-412R010S1</b> 198878				
				✓	-	✓	✓	-	<b>RASP5-2422EIP-412R100S1</b> 198874				
				✓	-	✓	✓	✓	<b>RASP5-2422EIP-412R110S1</b> 198882				
400/480 V AC				✓	-	-	-	<b>RASP5-2424EIP-412R000S1</b> 198871					
✓	-	-	-	✓	<b>RASP5-2424EIP-412R010S1</b> 198879								
✓	-	✓	✓	-	<b>RASP5-2424EIP-412R100S1</b> 198875								
✓	-	✓	✓	✓	<b>RASP5-2424EIP-412R110S1</b> 198883								
4.3	1.5	2	-	✓	-	-	-	-	<b>RASP5-4420EIP-412R000S1</b> 198884				
				✓	-	-	-	✓	<b>RASP5-4420EIP-412R010S1</b> 198892				
				✓	-	✓	✓	-	<b>RASP5-4420EIP-412R100S1</b> 198888				
				✓	-	✓	✓	✓	<b>RASP5-4420EIP-412R110S1</b> 198896				
				180/207 V DC				✓	-		-	-	<b>RASP5-4421EIP-412R000S1</b> 198885
				✓	-	-	-	✓	<b>RASP5-4421EIP-412R010S1</b> 198893				
				✓	-	✓	✓	-	<b>RASP5-4421EIP-412R100S1</b> 198889				
				✓	-	✓	✓	✓	<b>RASP5-4421EIP-412R110S1</b> 198897				
				230/277 V AC				✓	-		-	-	<b>RASP5-4422EIP-412R000S1</b> 198886
				✓	-	-	-	✓	<b>RASP5-4422EIP-412R010S1</b> 198894				
				✓	-	✓	✓	-	<b>RASP5-4422EIP-412R100S1</b> 198890				

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.



# 3

## Rapid Link 5 decentralized, electronic drive system

Ethernet/IP

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

### RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
4 sensor inputs, 2 sensor outputs

4.3	1.5	2	230/277 V AC	✓	-	✓	✓	✓	<b>RASP5-4422EIP-412R110S1</b> 198898	1 unit	
				✓	-	-	-	-	<b>RASP5-4424EIP-412R000S1</b> 198887		
				✓	-	-	-	✓	<b>RASP5-4424EIP-412R010S1</b> 198895		
				✓	-	✓	✓	-	<b>RASP5-4424EIP-412R100S1</b> 198891		
				✓	-	✓	✓	✓	<b>RASP5-4424EIP-412R110S1</b> 198899		
5.6	2.2	3	-	✓	-	-	-	-	<b>RASP5-5420EIP-412R000S1</b> 198900		
				✓	-	-	-	✓	<b>RASP5-5420EIP-412R010S1</b> 198908		
				✓	-	✓	✓	-	<b>RASP5-5420EIP-412R100S1</b> 198904		
				✓	-	✓	✓	✓	<b>RASP5-5420EIP-412R110S1</b> 198912		
				180/207 V DC	✓	-	-	-	-		<b>RASP5-5421EIP-412R000S1</b> 198901
					✓	-	-	-	✓		<b>RASP5-5421EIP-412R010S1</b> 198909
					✓	-	✓	✓	-		<b>RASP5-5421EIP-412R100S1</b> 198905
					✓	-	✓	✓	✓		<b>RASP5-5421EIP-412R110S1</b> 198913
				230/277 V AC	✓	-	-	-	-		<b>RASP5-5422EIP-412R000S1</b> 198902
					✓	-	-	-	✓		<b>RASP5-5422EIP-412R010S1</b> 198910
					✓	-	✓	✓	-		<b>RASP5-5422EIP-412R100S1</b> 198906
					✓	-	✓	✓	✓		<b>RASP5-5422EIP-412R110S1</b> 198914
					400/480 V AC	✓	-	-	-		-
				✓		-	-	-	✓		<b>RASP5-5424EIP-412R010S1</b> 198911
				✓		-	✓	✓	-		<b>RASP5-5424EIP-412R100S1</b> 198907
				✓		-	✓	✓	✓		<b>RASP5-5424EIP-412R110S1</b> 198915

#### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
At 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

Rated operational current <sup>1)</sup>	Assigned motor output <sup>2)3)</sup>		Control voltage external brake (50/60 Hz) <sup>4)</sup>	Power supply via		Repair switch	Internal braking resistance <sup>5)</sup>	STO <sup>6)</sup>	Catalog Number Article no.	Std. pack
I <sub>e</sub>	P	P		HAN Q4/2 plug	HAN Q5 plug					
A	kW	HP								

## RASP5 variable frequency drives

Rated operating voltage 400 V AC, three-phase  
 Mains voltage (50/60Hz) U<sub>LN</sub> 380 (-10%) - 480 (+10%) V  
 4 sensor inputs, 2 sensor outputs

8.5	4	5	-	✓	-	-	-	-	<b>RASP5-8420EIP-412R001S1</b> 198916	1 unit
				✓	-	-	-	✓	<b>RASP5-8420EIP-412R011S1</b> 198924	
				✓	-	✓	✓	-	<b>RASP5-8420EIP-412R101S1</b> 198920	
				✓	-	✓	✓	✓	<b>RASP5-8420EIP-412R111S1</b> 198928	
180/207 V DC				✓	-	-	-	-	<b>RASP5-8421EIP-412R001S1</b> 198917	
				✓	-	-	-	✓	<b>RASP5-8421EIP-412R011S1</b> 198925	
				✓	-	✓	✓	-	<b>RASP5-8421EIP-412R101S1</b> 198921	
				✓	-	✓	✓	✓	<b>RASP5-8421EIP-412R111S1</b> 198929	
230/277 V AC				✓	-	-	-	-	<b>RASP5-8422EIP-412R001S1</b> 198918	
				✓	-	-	-	✓	<b>RASP5-8422EIP-412R011S1</b> 198926	
				✓	-	✓	✓	-	<b>RASP5-8422EIP-412R101S1</b> 198922	
				✓	-	✓	✓	✓	<b>RASP5-8422EIP-412R111S1</b> 198930	
400/480 V AC				✓	-	-	-	-	<b>RASP5-8424EIP-412R001S1</b> 198919	
				✓	-	-	-	✓	<b>RASP5-8424EIP-412R011S1</b> 198927	
				✓	-	✓	✓	-	<b>RASP5-8424EIP-412R101S1</b> 198923	
				✓	-	✓	✓	✓	<b>RASP5-8424EIP-412R111S1</b> 198931	


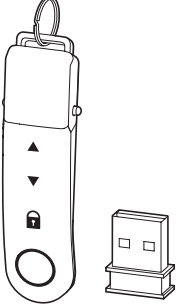
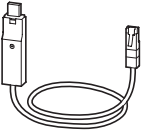
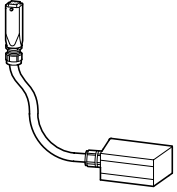
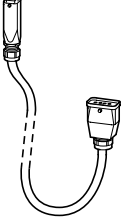

### Notes

- <sup>1)</sup> Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +40°C
- <sup>2)</sup> For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
- <sup>3)</sup> At 400 V, 50 Hz  
at 440 - 480 V, 60 Hz
- <sup>4)</sup> For actuation of motors with electromechanical brake
- <sup>5)</sup> Integrated brake chopper with braking resistance for dynamic braking
- <sup>6)</sup> Corresponds to uncontrolled stopping as defined in IEC 60204-1, Stop Category 0.

# 3

## Rapid Link 5 decentralized, electronic drive system

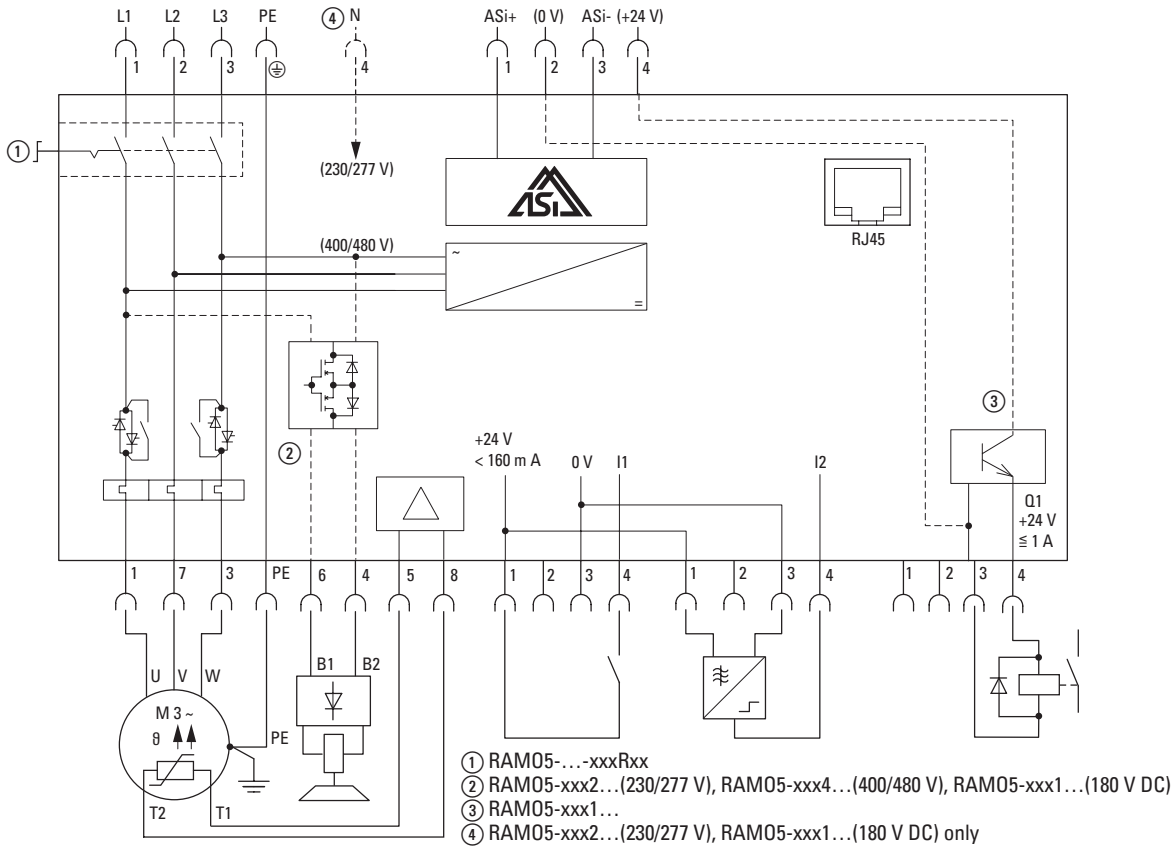
### Accessory

Description	Length m	For use with	Catalog Number Article no.	Std. pack
<b>External keypad</b>				
 <p>With multi-language plain text OLED display Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)</p>	3	DC1, DB1, DA1, RAM05, RASP5	<b>DX-KEY-OLED</b> 169133	1 unit
<b>Parameter assignment</b>				
 <p>Parameter storage unit and Bluetooth communication stick For storage, copying parameters, and/or transferring parameters to a PC or smartphone (iOS or Android) via Bluetooth with the drivesConnect software or the drivesConnect mobile app respectively With 2 function keys for uploading and downloading parameters with parameter memory.</p>	—	DE1, DE11, DC1, DB1, DA1, RAM05, RASP5	<b>DX-COM-STICK3-KIT</b> 197586	1 unit
<b>Programming cable</b>				
 <p>Interface converter USB/RS485 with connection cable, RJ45 8 pole For storage, copying parameters, and/or transferring parameters to a PC with the drivesConnect software, electrically isolated</p>	3	DE1, DE11, DC1, DB1, DA1	<b>DX-CBL-PC-3M0</b> 744-A3036-00P	1 unit
<b>Mains connection</b>				
Power connection cable: For connecting the device to a flat cable outlet from the Wieland podis CON 7G4 system				
 <p>halogen-free, 5 x 1.5 mm<sup>2</sup>, with power plug Han Q5 and plug for flexible busbar junction FCS 4 7 SI BU SW Article no. 75.015.5153.1</p>	1.5	RAM05, RASP5	<b>RA-C3/C1-1.5HF</b> 290210	1 unit
<p>halogen-free, 5 x 1.5 mm<sup>2</sup>, with power plug Han Q4/2 and plug for flexible busbar junction FCS 4 7 SI BU SW Article no. 75.015.5153.1</p>	1.5	RAM05, RASP5	<b>RA-Q4/C1-1M5</b> 198283	
Power connection cable For connecting the device to a Harting Han-Power S energy distributor				
 <p>halogen-free, 5 x 1.5 mm<sup>2</sup>, with power plug Han Q5 and plug for Han-Power S 1 x Han Q8 Article no. 09 12 008 4801</p>	1.5	RAM05, RASP5	<b>RA-C3/C2-1.5HF</b> 290211	1 unit
<p>halogen-free, 5 x 1.5 mm<sup>2</sup>, with power plug Han Q4/2 and plug for Han-Power S 1 x Han Q8 Article no. 09 12 008 4801</p>	1.5	RAM05, RASP5	<b>RA-Q4/C1-1M5</b> 198284	
<b>Motor feeder</b>				
Motor cable For connecting the motor starter / variable frequency drive to a motor				
 <p>halogen-free, 8 x 1.5 mm<sup>2</sup> With plastic Han Q8 plug and unterminated cable end</p>	2	RAM05	<b>RAMO-CM1-2M0</b> 164282	1 unit
	5	RAM05	<b>RAMO-CM1-5M0</b> 164283	
	10	RAM05	<b>RAMO-CM1-10M</b> 164284	
<p>halogen-free, screened, 4 x 1.5 mm<sup>2</sup> + 2 x (2 x 0.75 mm<sup>2</sup>) With metal Han Q8 plug and unterminated cable end</p>	2	RASP5	<b>RASP-CM2-2M0</b> 198280	1 unit
	5	RASP5	<b>RASP-CM2-5M0</b> 198281	
	10	RASP5	<b>RASP-CM2-10M</b> 198282	

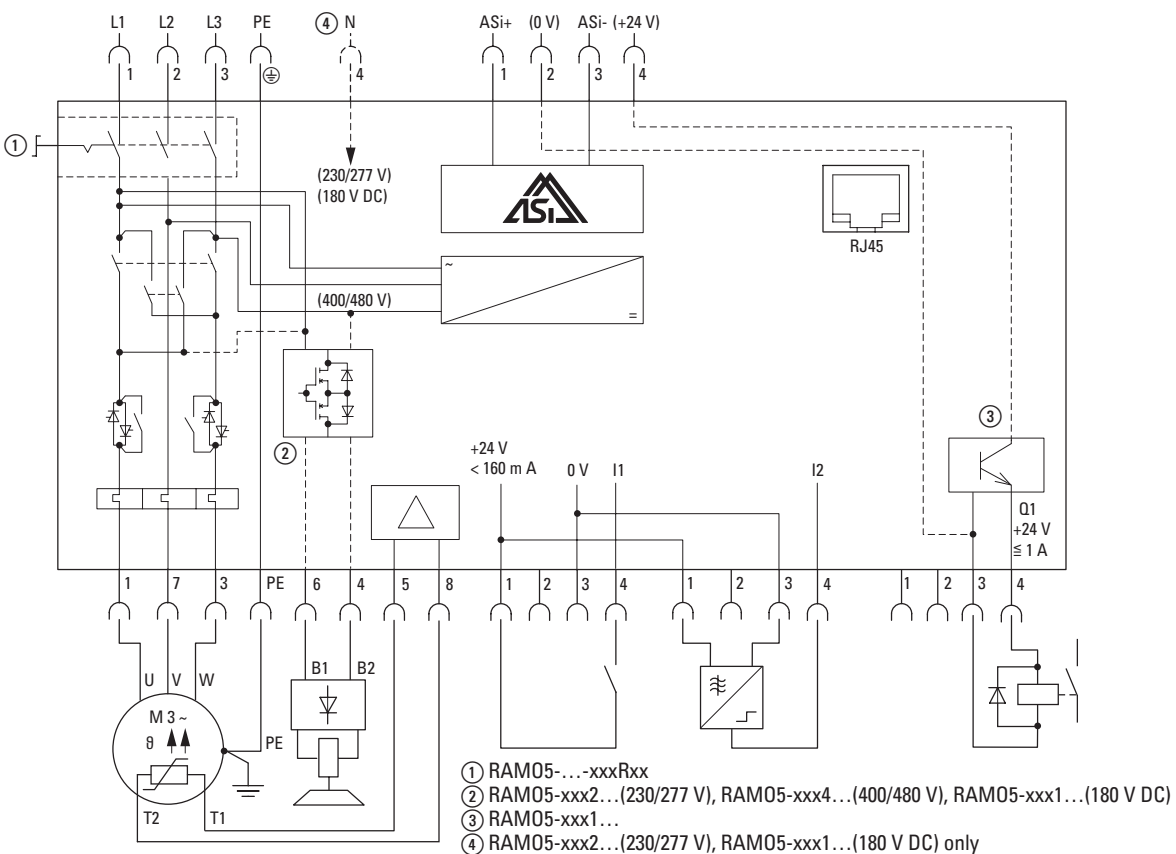
### Engineering

#### RAMO5 with AS-Interface

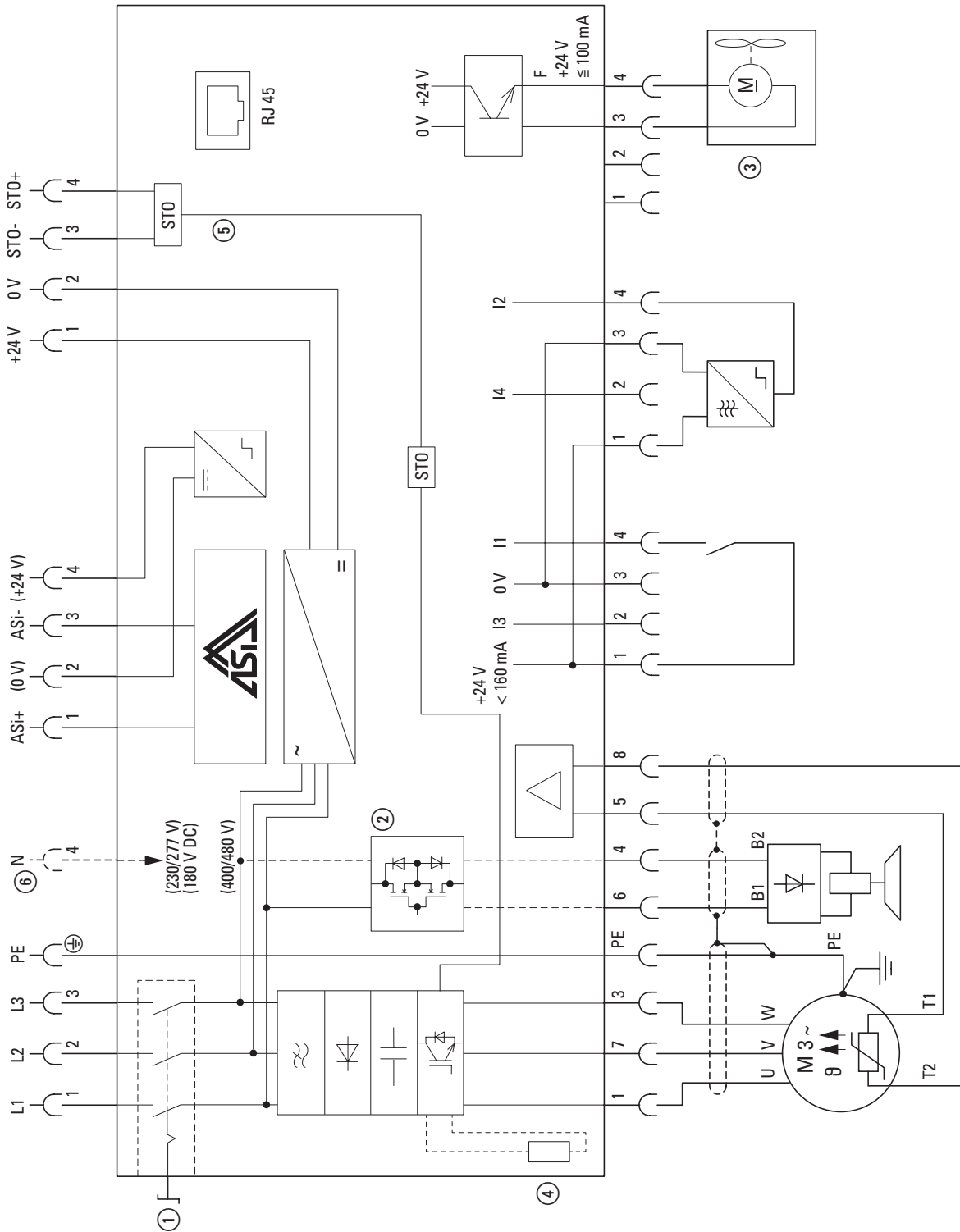
RAMO5-D...



RAMO5-W...



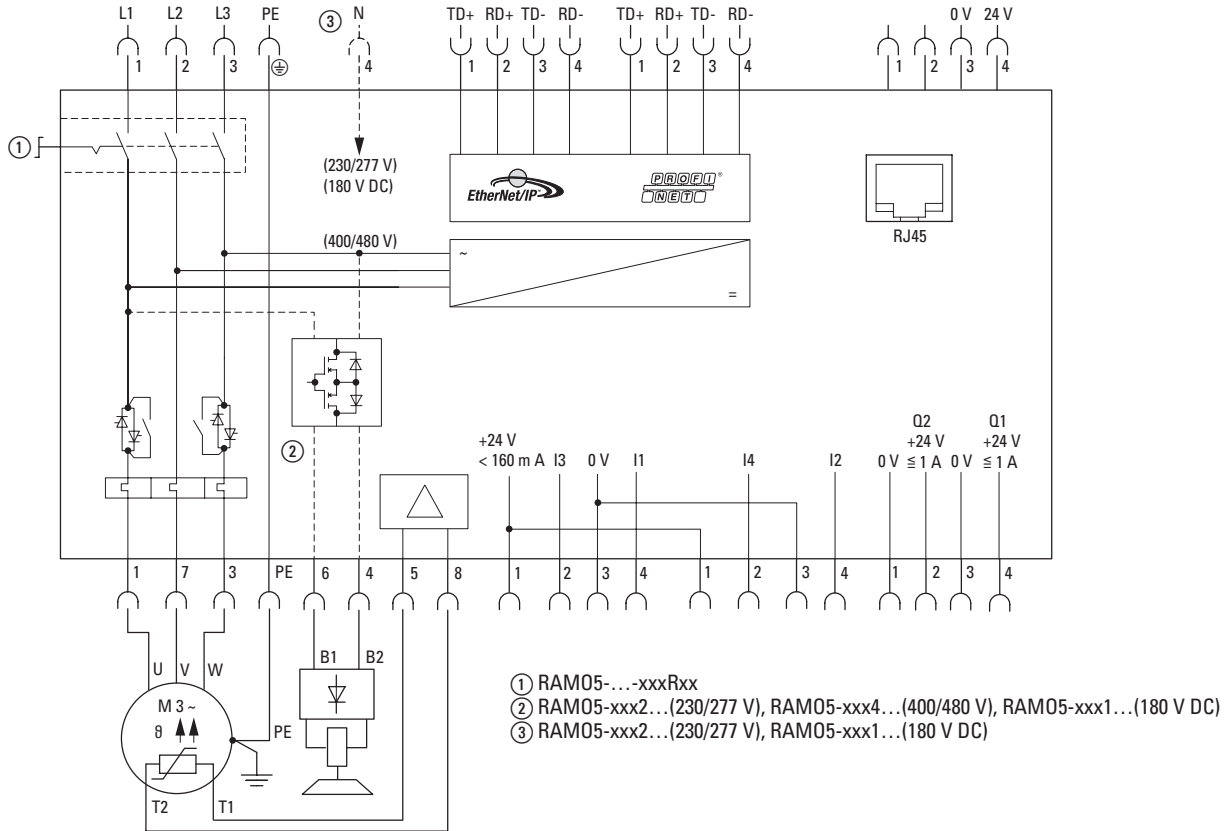
#### RASP5 with AS-Interface



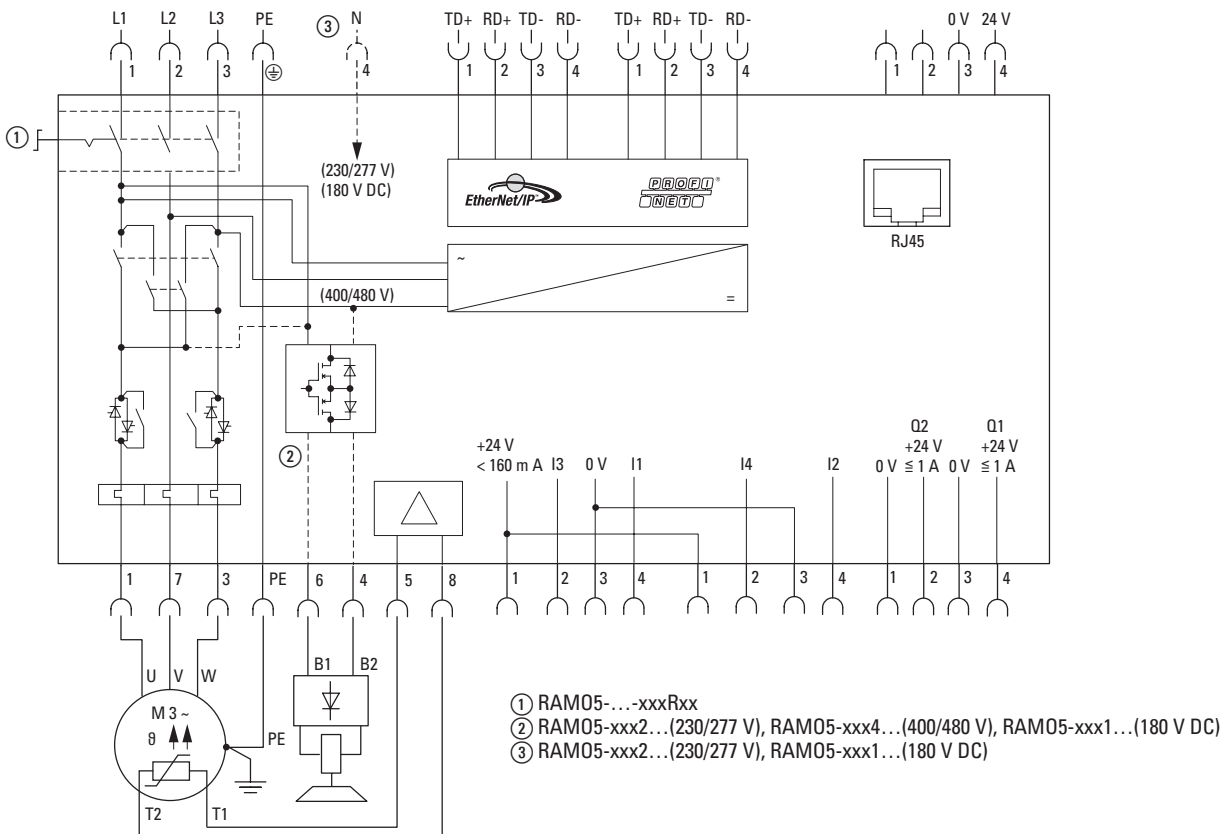
- ① RASP5-...-xxxR...
- ② RASP5-xxx1... (180 V DC)
- ③ RASP5-xxx2... (230/277 V)
- ④ RASP5-xxx3... (400/480 V)
- ⑤ RASP5-...-xxxxx1xx (FAN)
- ⑥ RASP5-...-xxxx1... (Brake resistor)
- ⑦ RASP5-...-xxxx1xxx (STO)
- ⑧ RASP5-xxx1... (180 V DC), RASP5-xxx2... (230/277 V) only

### RAMO5 with PROFINET or Ethernet/IP

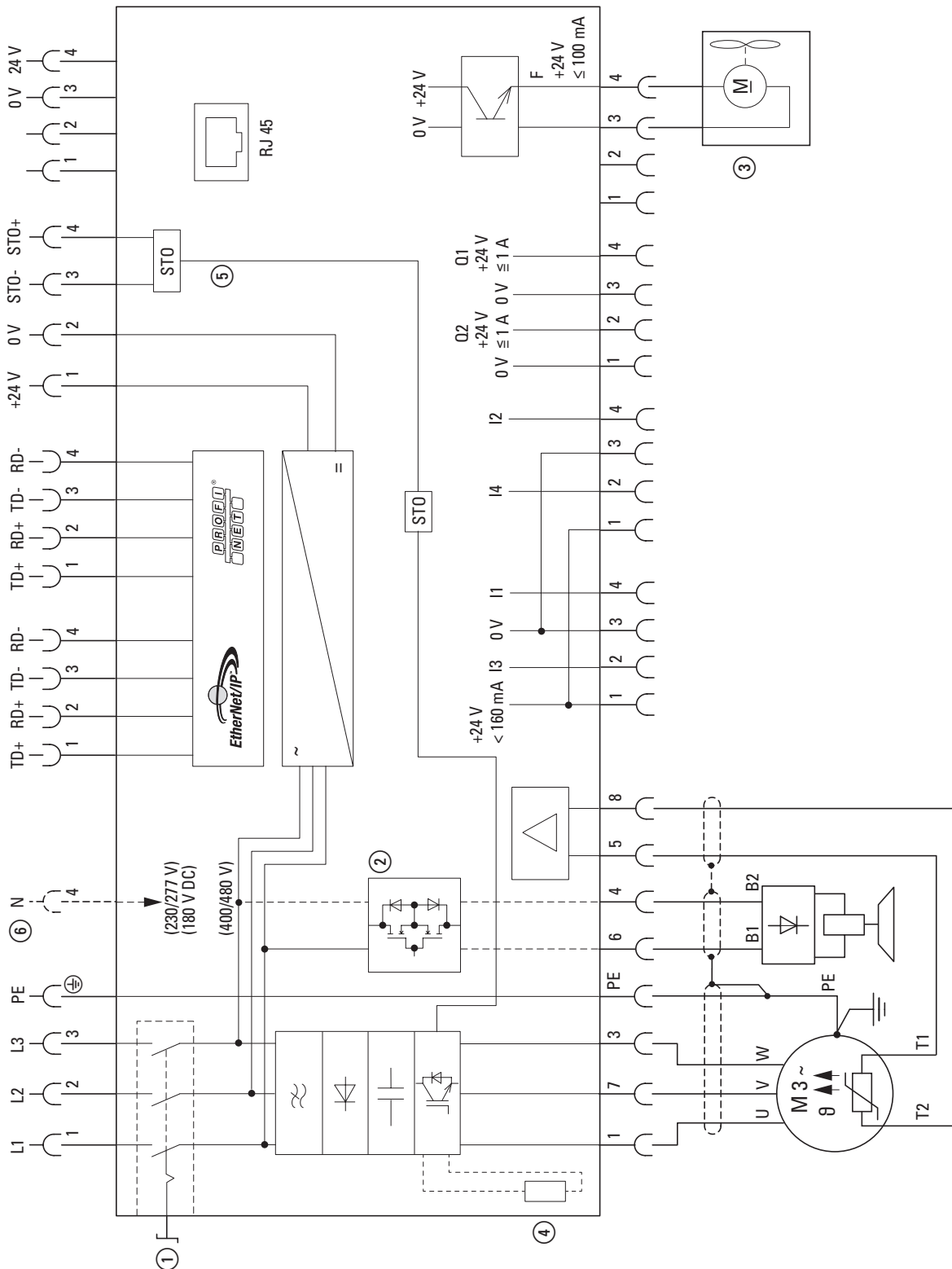
RAMO5-D...



RAMO5-W...



#### RASP5 with PROFINET or Ethernet/IP



- ① RASP5-...-xxxR...
- ② RASP5-xxx1... (180 V DC)
- ③ RASP5-xxx2... (230/277 V)
- ④ RASP5-xxx3... (400/480 V)
- ⑤ RASP5-...-xxxxx1xx (FAN)
- ⑥ RASP5-...-xxx1... (Brake resistor)
- ⑦ RASP5-...-xxxx1xxx (STO)
- ⑧ RASP5-xxx1... (180 V DC), RASP5-xxx2... (230/277 V) only

### Technical data

	Formula	Unit	Value	
			RAM05	RASP5
<b>General</b>				
Standards			IEC/EN 60947-4-2 EN 50581	IEC/EN 61800-3 IEC/EN 61800-5-1 EN 50581 EN 61800-5-2 EN ISO 13849-1 EN 62061
Approvals, certificates			CE, CCC, cUL	CE, cUL
Production quality			Directive 2011/65/EU (RoHS), ISO 9001	Directive 2011/65/EU (RoHS), ISO 9001
Protection type			IP65, NEMA 12 / NEMA 12K	IP65, NEMA 12 / NEMA 12K
Mounting position			vertical	vertical
Ambient temperature				
Operation		°C	-10 - +40	-10 - +40 (without derating)
Storage		°C	-40 - +70	-40 - +70
Altitude	H	m	0 to 2000 a.s.l., above 1000 m with 1% derating per 100 m	0 to 2000 a.s.l., above 1000 m with 1% derating per 100 m
Humidity (IEC/EN 50178)	$p_w$	%	< 95%, relative humidity, non-condensing	< 95%, relative humidity, non-condensing
Vibration (IEC/EN 60068-2-6)				
Amplitude		Hz	3 - 15.8 Vibration amplitude: 0.15 mm	3 - 15.8 Vibration amplitude: 0.15 mm
Acceleration		Hz	15.8 - 150 constant acceleration 2 g	15.8 - 150 constant acceleration 2 g
Mechanical shock resistance (IEC/EN 60068-2-27)				
			1000 shocks per shaft, Semisinusoidal 15 g/11 ms	1000 shocks per shaft, Semisinusoidal 15 g/11 ms
<b>Main circuit</b>				
Feeder				
Rated operating voltage	$U_e$	V	3 AC 400/480	3 AC 400/480
Rated operating voltage for brake control	$U_e$	V	180/207 V DC 230/277 V AC 400/480 V AC	180/207 V DC 230/277 V AC 400/480 V AC
Voltage levels	$U_{LN}$	V	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)
Frequency range	$f_{LN}$	Hz	50 (-10%) - 60 (+10%)	50/60 (45 - 66 Hz $\pm$ 0%)
Network configuration			Alternating voltage, center-point-earthed star network (TN-S network) Phase-earthed AC supply systems are not permitted.	Alternating voltage, center-point-earthed star network (TN-S network) Phase-earthed AC supply systems are not permitted.
Mains switch-on frequency		Qty.	–	At least a one-minute pause between two switching operations
Mains current	THD	%	< 120	< 120
Short-circuit current	$I_k$	kA	< 10	< 10
Short-circuit protection device (power bus supply) (Power bus incoming unit)			PKE3/XTUCP-36 FAZ-3-B20 or FAZ-3-C20	PKE3/XTUCP-36 FAZ-3-B20 or FAZ-3-C20
Overvoltage category/ pollution degree (DIN/VDE 0110)			III	III
Rated surge voltage invariability	$U_{imp}$	kV	4	–
Leakage current to PE earth (EN 50178)	$I_{PE}$	mA	< 3.5	< 3.5



# 3

## Rapid Link 5 decentralized, electronic drive system

RASP5 with PROFINET or Ethernet/IP

	Symbol	Unit	Value	RASP5
			RAM05	RASP5
<b>Main circuit</b>				
Power Part				
Instance			RAM05-D: DOL starter with thyristors and bypass contacts RAM05-W: Reversing starter with relays, thyristors and bypass contacts two-phase controlled	Variable frequency drive with internal DC link and IGBT inverter
Lifespan (AC3)		Qty.	> 10 millions connections	–
Output voltage	$U_2$	V AC	$U_{LN}$	0 - $U_{LN}$
Output Frequency	$f_2$	Hz	50/60 Hz	0 - 50 Hz, max. 500 Hz
Rated operational current	$I_e$	A	6.6	2.4 / 4.3 / 5.6 / 8.5
Load current for the control unit for an external brake	I	A	≤ 0.6 600 mA konstant, 6 A for 120 ms	≤ 0.6 600 mA konstant, 6 A for 120 ms
Adjustable motor protection	I	A	0.3 - 6.6	0.48 - 8.5
Overload withstand capability				
for 60 s every 600 s at +40°C	$I_L$	%	–	150
for 2 s every 20 s at +40°C	$I_H$	%	–	200
Allocated motor output <sup>1)</sup>				
(with motor protection) with 400 V, 50 Hz	P	kW	0.09 - 3	0.18 - 4
at 440 - 460 V, 60 Hz	P	HP	0.125 - 3	0.25 - 5
<b>Control voltage</b>				
External control voltage	U	V	24, for actuators, maximum load current: 1 A	24, for quick stop function via AS-Interface plug
Tolerance		%	-15 - +20	
<b>AS-Interface Specification</b>				
Total power consumption from AS-Interface -power supply unit (30 V-)	I	mA	50 + 160 for sensors	50 + 160 for sensors
Specification			S-7.4 S-7.A.E	S-7.4
Station addresses		Qty.	31/62	31
I/O Code or I/O configuration			7 (hex)	7 (hex)
ID-code			4 (hex)	4 (hex)

**Notes** <sup>1)</sup> Assigned motor rating For normal internally and externally ventilated three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz).

	Symbol	Unit	Value	
			RAMO5-D...	RAMO5-W...
<b>RAMO5... device series</b>				
Instance			DOL starter L1 → U, L2 → V, L3 → W	Reversing starter FWD: L1 → U, L2 → V, L3 → W REV: L1 → W, L2 → V, L3 → U
Rated operational current	$I_e$	A	6.6	
Adjustable motor protection		A	0.3 - 6.6	
Assigned motor power at				
400 V, 50 Hz	P	kW	0.18 - 3	
440 - 460 V, 60 Hz	P	HP	0.25 - 4	
Power side (Primary side)				
Number of phases			3	
Device Voltage Rating	$U_{LN}$	V	380 V (-10%) - 480 V (+10%), 45 - 66 Hz	
Input current	$I_{LN}$	A	0.3 - 6.6	
Braking				
Control voltage (external brake)	U	V	RAMO5-xxx1...: 180 V DC RAMO5-xxx2...: 230/277 V AC RAMO5-xxx4...: 400/480 V AC	
Load current (external brake)	I	A	0.6 A, max. 6 A for 120 ms	
Heat dissipation at rated operational current ( $I_e$ )	$P_v$	W	max. 8 W, depending on motor current and brake	
Time of reaction				
Motor On (automatic) <sup>1)</sup>	$t_{ON}$	ms	Motor 20-35, brake 20-35	
Motor Off (automatic) <sup>1)</sup>	$t_{OFF}$	ms	Motor 20-35, brake 20-35	
Switch off the motor (quick stop)	$t_{OFF}$	ms	Motor 20-35, brake 20-35	
Q1 On	$t_{ON}$	ms	2 - 20	
Q1 Off	$t_{OFF}$	ms	2 - 20	
Minimum pulse duration I1/I2	$t_{ON}$	ms	5	

**Notes** <sup>1)</sup> Without bus runtime, depending on PLC

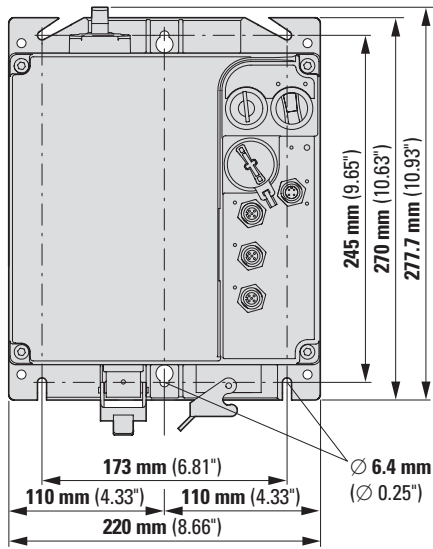
## Specific rated operational data RASP5

	Symbol	Unit	Value			
			RASP5-2...	RASP5-4...	RASP5-5...	RASP5-8...
<b>RASP5-... device series</b>						
Rated operational current	$I_e$	A	2.4	4.3	5.6	8.5
Overload current for 60 s every 600 s at 40°C	$I_L$	A	3.6	6.5	8.4	12.75
Starting current for 2 s every 20 s at 40°C	$I_L$	A	4.8	8.6	11.2	17
Apparent power at 400 V rated operation	S	kVA	1.84	3.27	4.24	6.49
Assigned motor power						
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4
at 440 V, 60 Hz	P	HP	1	2	3	5
Setting range Current limitation (P1-08)	$I_2$	A	0.2 - 2.4	0.4 - 4.3	0.5 - 5.6	0.8 - 8.5
Power side (Primary side)						
Number of phases			3	3	3	3
Rated operating voltage	$U_{LN}$	V	380 V (-15%) - 480 V (+10%), 50/60 Hz (380 - 480 V $\pm$ 0%, 45 - 66 Hz $\pm$ 0%)			
Input current	$I_{LN}$	A	2.5	4.1	5.3	7.8
Braking						
Braking value	$I/I_e$	%	$\leq 30$	$\leq 30$	$\leq 30$	$\leq 30$
Switch-on threshold for the braking transistor	$U_{DC}$	V DC	765	765	765	765
DC-braking	$I/I_e$	%	$\leq 100$ , adjustable	$\leq 100$ , adjustable	$\leq 100$ , adjustable	$\leq 100$ , adjustable
Rated operating voltage for brake control	U	V AC	RASP5-xx1... (180 V DC) RASP5-xx2... (230/277 V AC) RASP5-xx4... (400/480 V AC)			
Switching frequency	$f_{PWM}$	kHz	8 (adjustable 4 – 32)			
U/f characteristic			linear	linear	linear	linear
Heat dissipation at rated operational current ( $I_e$ ) and a pulse frequency ( $f_{PWM}$ ) of 6 kHz	$P_v$	W	32	46	58	95
Heat dissipation at idle (standby) with AS-Interface supply voltage	$P_v$	W	< 9	< 9	< 9	< 12
Efficiency	$\eta$		0.97	0.98	0.98	0.98
Fans						
internal			temperature controlled			
Device fans on heat sink			–	–	–	Fans
Output frequency	$f_z$	Hz	50/60 Hz, adjustable 0 - 320 Hz			
1. fixed frequency (P1-12)	$f_z$	Hz	30	30	30	30
2. fixed frequency (P2-01)	$f_z$	Hz	40	40	40	40
3. fixed frequency (P2-02)	$f_z$	Hz	50	50	50	50
4. fixed frequency (P2-03)	$f_z$	Hz	50	50	50	50
Factory set response time						
Motor On (automatic) <sup>1)</sup>	$t_{ON}$	ms	< 10	< 10	< 10	< 10
Motor Off (automatic) <sup>1)</sup>	$t_{OFF}$	ms	< 10	< 10	< 10	< 10
Switch off the motor (quick stop)	$t_{OFF}$	ms	< 10	< 10	< 10	< 10
Minimum pulse duration I3/I4	$t_{ON}$	ms	5	5	5	5
Longest permissible length of motor cable (EMC, 2nd environment, C3)	l	m	25	25	25	25

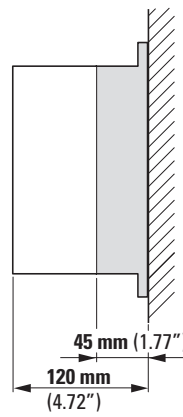
**Notes** <sup>1)</sup> Without bus runtime, depending on PLC.

### Dimensions and weights

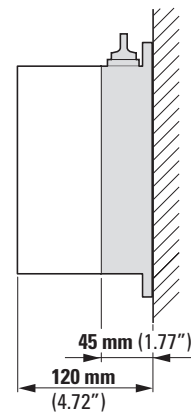
RAM05-...-xxx0xx



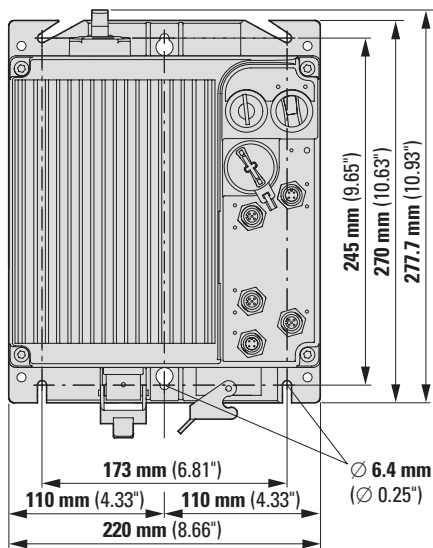
RAM05-...-xxx0xx



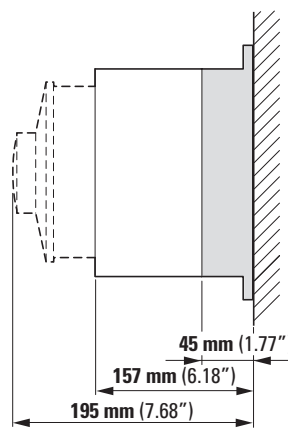
RAM05-...-xxxRxx



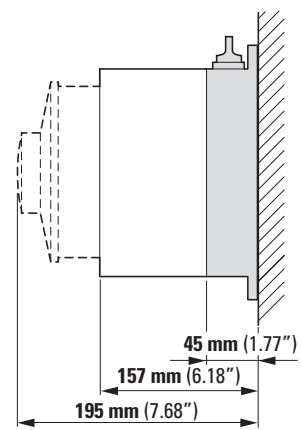
RASP5-...-xxx0xx0xx



RASP5-...-xxx0xx1xx



RASP5-...-xxxR



## Full-load motor-running currents in amperes corresponding to various AC horsepower ratings

HP	110 - 120 V			220 - 240 V <sup>1)2)</sup>			360 - 380 V		440 - 480 V			550 - 600 V		
	Single phase	Two phase	Three phase	Single phase	Two phase	Three phase	Single phase	Three phase	Single phase	Two phase	Three phase	Single phase	Two phase	Three phase
1/10	3.0	–	–	1.5	–	–	1.0	–	–	–	–	–	–	–
1/8	3.8	–	–	1.9	–	–	1.2	–	–	–	–	–	–	–
1/6	4.4	–	–	2.2	–	–	1.4	–	–	–	–	–	–	–
1/4	5.8	–	–	2.9	–	–	1.8	–	–	–	–	–	–	–
1/3	7.2	–	–	3.6	–	–	2.3	–	–	–	–	–	–	–
1/2	9.8	4.0	4.4	4.9	2.0	2.2	3.2	1.3	2.5	1.0	1.1	2.0	0.8	0.9
3/4	13.8	4.8	6.4	6.9	2.4	3.2	4.5	1.8	3.5	1.2	1.6	2.8	1.0	1.3
1	16.0	6.4	8.4	8.0	3.2	4.2	5.1	2.3	4.0	1.6	2.1	3.2	1.3	1.7
1-1/2	20.0	9.0	12.0	10.0	4.5	6.0	6.4	3.3	5.0	2.3	3.0	4.0	1.8	2.4
2	24.0	11.8	13.6	12.0	5.9	6.8	7.7	4.3	6.0	3.0	3.4	4.8	2.4	2.7
3	34.0	16.6	19.2	17.0	8.3	9.6	10.9	6.1	8.5	4.2	4.8	6.8	3.3	3.9
5	56.0	26.4	30.4	28.0	13.2	15.2	17.9	9.7	14.0	6.6	7.6	11.2	5.3	6.1
7-1/2	80.0	38.0	44.0	40.0	19.0	22.0	27.0	14.0	21.0	9.0	11.0	16.0	8.0	9.0
10	100	48.0	56.0	50.0	24.0	28.0	33.0	18.0	26.0	12.0	14.0	20.0	10.0	11.0
15	135	72.0	84.0	68.0	36.0	42.0	44.0	27.0	34.0	18.0	21.0	27.0	14.0	17.0
20	–	94.0	108	88.0	47.0	54.0	56.0	34.0	44.0	23.0	27.0	35.0	19.0	22.0
25	–	118	136	110	59.0	68.0	70.0	44.0	55.0	29.0	34.0	44.0	24.0	27.0
30	–	138	160	136	69.0	80.0	87.0	51.0	68.0	35.0	40.0	54.0	28.0	32.0
40	–	180	208	176	90.0	104	112	66.0	88.0	45.0	52.0	70.0	36.0	41.0
50	–	226	260	216	113	130	139	83.0	108	56.0	65.0	86.0	45.0	52.0
60	–	–	–	–	133	154	–	103	–	67.0	77.0	–	53.0	62.0
75	–	–	–	–	166	192	–	128	–	83.0	96.0	–	66.0	77.0
100	–	–	–	–	218	248	–	165	–	109	124	–	87.0	99.0
125	–	–	–	–	–	312	–	208	–	135	156	–	108	125
150	–	–	–	–	–	360	–	240	–	156	180	–	125	144
200	–	–	–	–	–	480	–	320	–	208	240	–	167	192
250	–	–	–	–	–	602	–	403	–	–	302	–	–	242
300	–	–	–	–	–	–	–	482	–	–	361	–	–	289
350	–	–	–	–	–	–	–	560	–	–	414	–	–	336
400	–	–	–	–	–	–	–	636	–	–	477	–	–	382
500	–	–	–	–	–	–	–	786	–	–	590	–	–	472

**Notes**

<sup>1)</sup> To obtain full-load currents for 200 and 208 V motors, increase corresponding 220 - 240 V ratings by 15 and 10 percent, respectively.

<sup>2)</sup> To obtain full-load currents for 265 and 277 V motors, decrease corresponding 220 - 240 V ratings by 13 and 17 percent, respectively.

Quote from "Power Conversion Equipment - UL 508C, May 3, 2002".

Reproduced from UL 508 C, Power Conversion Equipment, 3rd edition (May 2, 2002) with permission of Underwriters Laboratories Inc.

Rated operational current (in amperes) and shaft power (in kilowatts ) of standard three-phase squirrel-cage motors (in conformity with IEC 60947-4-1)

Minimum fuse size for short-circuit protection of three-phase motors

The maximum value depends on the switching device or the overload relay.

Motor Power			230 V			400 V			440 V			500 V			690 V		
			Rated motor current	Fuse Starting		Rated motor current	Fuse Starting		Rated motor current	Fuse Starting		Rated motor current	Fuse Starting		Rated motor current	Fuse Starting	
kW	cos φ	η (%)	A	Direct	Y/Δ	A	Direct	Y/Δ	A	Direct	Y/Δ	A	Direct	Y/Δ	A	Direct	Y/Δ
0.06	0.7	58	0.37	2	–	0.21	2	–	0.19	2	–	0.17	2	–	0.12	2	–
0.09	0.7	60	0.54	2	–	0.31	2	–	0.28	2	–	0.25	2	–	0.18	2	–
0.12	0.7	60	0.72	4	2	0.41	2	–	0.37	2	–	0.33	2	–	0.24	2	–
0.18	0.7	62	1.04	4	2	0.6	2	–	0.54	2	–	0.48	2	–	0.35	2	–
0.25	0.7	62	1.4	4	2	0.8	4	2	0.76	2	–	0.7	2	–	0.5	2	–
0.37	0.72	66	2	6	4	1.1	4	2	1	4	2	0.9	2	2	0.7	2	–
0.55	0.75	69	2.7	10	4	1.5	4	2	1.4	4	2	1.2	4	2	0.9	4	2
0.75	0.79	74	3.2	10	4	1.9	6	4	1.7	4	2	1.5	4	2	1.1	4	2
1.1	0.81	74	4.6	10	6	2.6	6	4	2.4	4	2	2.1	6	4	1.5	4	2
1.5	0.81	74	6.3	16	10	3.6	6	4	3.3	6	4	2.9	6	4	2.1	6	4
2.2	0.81	78	8.7	20	10	5	10	6	4.6	10	6	4	10	4	2.9	10	4
3	0.82	80	11.5	25	16	6.6	16	10	6	16	10	5.3	16	6	3.8	10	4
4	0.82	83	14.8	32	16	8.5	20	10	7.7	16	10	6.8	16	10	4.9	16	6
5.5	0.82	86	19.6	32	25	11.3	25	16	10.2	20	10	9	20	16	6.5	16	10
7.5	0.82	87	26.4	50	32	15.2	32	16	13.8	25	16	12.1	25	16	8.8	20	10
11	0.84	87	38	80	40	21.7	40	25	19.8	32	25	17.4	32	20	12.6	25	16
15	0.84	88	51	100	63	29.3	63	32	26.6	50	32	23.4	50	25	17	32	20
18.5	0.84	88	63	125	80	36	63	40	32.8	63	32	28.9	50	32	20.9	32	25
22	0.84	92	71	125	80	41	80	50	37	80	40	33	63	32	23.8	50	25
30	0.85	92	96	200	100	55	100	63	50	100	63	44	80	50	32	63	32
37	0.86	92	117	200	125	68	125	80	61	125	80	54	100	63	39	80	50
45	0.86	93	141	250	160	81	160	100	74	125	100	65	125	80	47	80	63
55	0.86	93	173	250	200	99	200	125	90	125	100	79	160	80	58	100	63
75	0.86	94	233	315	250	134	200	160	122	160	125	107	200	125	78	160	100
90	0.86	94	279	400	315	161	250	200	146	200	160	129	200	160	93	160	100
110	0.86	94	342	500	400	196	315	200	179	250	200	157	250	160	114	200	125
132	0.87	95	401	630	500	231	400	250	210	315	250	184	250	200	134	250	160
160	0.87	95	486	630	630	279	400	315	254	400	250	224	315	250	162	250	200
200	0.87	95	607	800	630	349	500	400	318	400	315	279	400	315	202	315	250
250	0.87	95	–	–	–	437	630	500	397	630	400	349	500	400	253	400	315
315	0.87	96	–	–	–	544	800	630	495	630	630	436	630	500	316	500	400
400	0.88	96	–	–	–	683	1000	800	621	800	800	547	800	630	396	630	400
450	0.88	96	–	–	–	769	1000	800	699	800	800	615	800	630	446	630	630
500	0.88	97	–	–	–	–	–	–	–	–	–	–	–	–	491	630	630
560	0.88	97	–	–	–	–	–	–	–	–	–	–	–	–	550	800	630
630	0.88	97	–	–	–	–	–	–	–	–	–	–	–	–	618	800	630

Notes

The rated motor currents apply to normal internally and surface-cooled three-phase motors with 1500 rpm.

DOL starting: Starting current max. 6 × rated motor current.

Starting time max. 5 s.

Y/Δ-start:

Starting current max. 2 × motor rated current.

Starting time max. 15 s.

Set overload relay in line to 0.58 × motor rated current.

Fuse ratings at Y/Δ starting apply also to three-phase slipring motors.

For higher rated currents, starting currents and/or longer starting times, larger fuses will be required.

Table applies for time delay and gL fuses (VDE 0636)

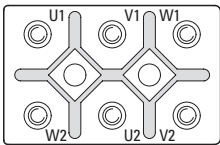
**For low voltage h.b.c. fuses with aM characteristics, the fuse should be equal to the rated current.**

#### Drives engineering selection criteria

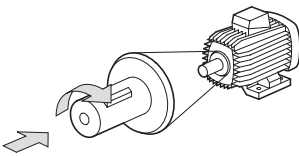
Each drive task requires a drive motor. The speed, torque and controllability of each motor must fulfill the requirements of the task. The following generally applies: the application determines the drive. The drive motor most frequently used worldwide in industrial plants and large buildings is the three-phase asynchronous motor. Its robust and simple construction as well as its high degrees of protection and standard types are the main features of this inexpensive electric motor.

#### Motor connection

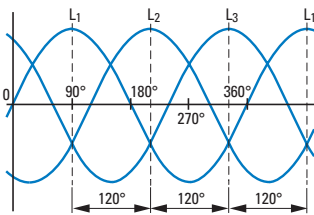
When connecting a three-phase motor to the mains supply, the data on the rating plate of the motor must correspond to the mains voltage and frequency. The standard connection is implemented via six screw terminals in the terminal box of the motor and with two types of circuit, the star connection and the delta circuit, depending on the mains voltage.



The rotation direction of a motor is always determined by directly looking at the drive shaft of the motor (from the drive end). On motors with two shaft ends, the driving end is denoted with D (= Drive), the non-driving end with N (= No drive).

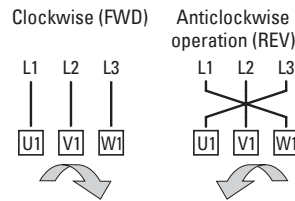


Regardless of the circuit type and the type of three-phase asynchronous motor, the connections must be labeled, so that their alphabetical sequence (e.g. U1, V1, W1) corresponds with the order of the mains voltage phase sequence (L1, L2, L3) and causes the motor to rotate clockwise.



On the three-phase asynchronous motor, three windings are arranged offset from each other by  $120^\circ/p$  ( $p$  = number of pole pairs). To generate a rotating field in the motor, an alternating voltage is applied to each phase in turn at a time delay of  $120^\circ$ .

The effect of inductance causes the rotation field and torque to be formed in the rotor winding. The speed of the motor thus depends on the number of pole pairs and the frequency of the supply voltage. The operating direction can be reversed by swapping over two of the supply phases.



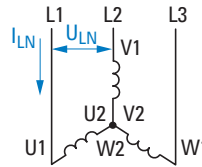
FWD = forward run (clockwise rotation field)  
REV = reverse run (anticlockwise rotation field active)

#### Information on the rating plate

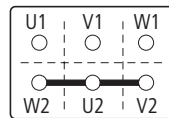
The electrical and mechanical rating data of the motor must be stated on its rating plate (IEC 34-1, VDE 0530). The data on the rating plate describes the stationary operation of the motor in the area of its operating point (MN, e.g. at 400 V and 50 Hz). The operational data is unstable in the motor start phase. The following examples show the rating plates for two motors with a motor shaft output of 4 kW and the respective connection circuits on a three-phase AC network with 400 V and 50 Hz.

#### Star connection

230 / 400 V	$\Delta / Y$	14.5 / 8.5 A
S1	4.0 kW	$\cos \varphi$ 0.82
1410 min <sup>-1</sup>		50 Hz
IP 54 Iso. KI F		



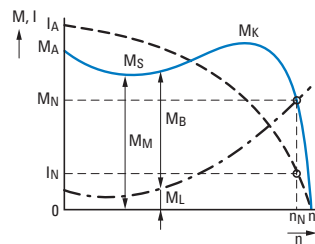
$$U_{LN} = \sqrt{3} \times U_W \quad I_{LN} = I_W$$



- With the specified 230/400 V voltage, this motor must be connected to the three-phase system ( $U_{LN} = 400$  V) in a star-connected circuit.
- The voltage of each motor winding is designed for 230 V. The windings must therefore be connected in sequence to the phase voltage (400 V).
- The three winding phases (W2-U2-V2) are configured in the terminal box to the so-called star point. The voltage of the individual phases to the star point is 230 V (= UW).

#### Startup characteristics

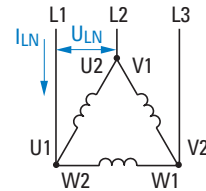
The following figure shows the characteristic startup curves of a three-phase asynchronous motor.



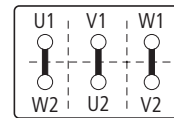
- $I_A$ : Starting current
- $I_N$ : Rated operational current at the operating point
- $M_A$ : Starting torque
- $M_B$ : Accelerating torque ( $M_M > M_L$ )
- $M_K$ : Breakdown torque
- $M_L$ : Load torque
- $M_M$ : Motor torque
- $M_N$ : Rated load torque, (stable operating point, intersection point of the three-phase speed torque characteristic with the load characteristic)
- $n_S$ : Synchronous speed
- $n$ : Speed (actual value)
- $n_N$ : Rated speed at the operating point
- $n_S - n_N = \text{slip speed } s$

#### Delta circuit

400 / 690 V	$\Delta / Y$	8.5 / 4.9 A
S1	4.0 kW	$\cos \varphi$ 0.82
1410 min <sup>-1</sup>		50 Hz
IP 54 Iso. KI F		



$$U_{LN} = U_W \quad I_{LN} = \sqrt{3} \times I_W$$



- With the specified 400/690 V voltage, this motor must be connected to the three-phase system ( $U_{LN} = 400$  V) in a delta circuit.
- Each motor winding is designed for the maximum phase voltage of 400 V and can be connected directly.
- The three winding phases (U1 - W2, V1 - U2, W1 - V2) are combined in the terminal box and connected directly to the individual phases.

Synchronous speed:

$$n_S = \frac{f}{p}$$

Slip speed in %:

$$s = \frac{n_S - n}{n_S} \times 100\%$$

Three-phase asynchronous motor speed:

$$n = \frac{f}{p} \times (1 - s)$$

$f$ : Frequency of voltage in Hz (= s<sup>-1</sup>)

$n$ : Speed in r.p.m.

$p$ : Number of pole pairs

$s$ : Slip speed in r.p.m.

Electric power:

$$P_1 = U \cdot I \cdot \sqrt{3} \cdot \cos \varphi$$

$P_1$ : Electrical power in W

$U$ : Rated operating voltage in V

$I$ : Rated operational current in A

$\cos \varphi$ : Power factor

Motor output (power equation):

$$P_2 = \frac{M_N \times n}{9550}$$

$P_2$ : Mechanical shaft output power in kW

$M_N$ : Rated torque in Nm

$n$ : Speed in r.p.m.

Efficiency:

$$\eta = \frac{P_2}{P_1}$$







# Worldwide export of machines and plants

European machine and system building and worldwide exports are closely related. Even if you don't export your machines at present, you should be prepared for it in the future. Eaton provides switchgear and protective devices with all the essential approvals and certificates for machine and system building. In most countries around the world, conformity with international standards is the sole requirement for successful exports. This is because components in these locations are governed by compliance with well known and established IEC standards. In this respect, the European CE mark is not only the passport for exports within Europe but also far beyond its borders.



## World market equipment for machine building

Nearly all the switchgear and protective devices of Eaton's Moeller series are world market devices. Each product line thus carries all the approvals and certification marks required for worldwide use.

These product lines include those for

- Pilot devices, limit switches
- Contactors and various timing and special relays
- Motor-protective circuit-breakers and relays
- Electronic components and systems.

With circuit-breakers and switch-disconnectors, Eaton offers IEC devices for use in most countries in the world and NA devices with virtually the same dimensions and the same accessories for the North American market. This considerably simplifies device selection since the North American standards often involve the need for considerably different technical specifications.

**Electrical engineering products and their applications are not harmonized internationally.**

The greatest differences to the IEC world are in North America, i.e. the USA and Canada. For many newcomers to the export business, it is initially surprising to experience the very different approaches and solutions.

Special components, such as handles for main switches that can only be operated by the intentional switching of an additional handle when the control panel door is opened, may sometimes be required for export to North America. Likewise, the European motor-protective circuit-breaker is only accepted with an upstream protective device (such as a UL248 fuse) or with larger air and creepage distances at the input terminals. Eaton is the competent partner of choice for export-related issues here.



**Explanations regarding the changes to NEC 2020 and NEC 2017**

This publication covers all important "chapters, articles" and "parts" of NEC 2020. Each code section is identified with "ÜBERARBEITUNG/ REVISION" or "NEU/NEW," followed by an explanation of what it means and references to related NEC sections. It points out what needs to be observed in order to check whether there is conformity with the code. Where required, it provides a detailed explanation of the standard.

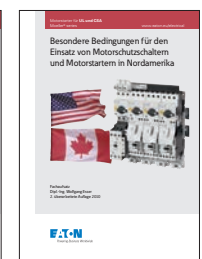
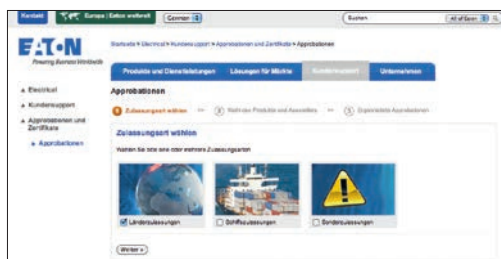
**Qualified information is a critical key to success**

<b>Isolierstoffgehäuse oben unten offen, HVxVT-286x28x150mm, NA-Ausführung</b>	
Typ	CG3-125-NA
Art.-Nr.	90224
<b>Lieferprogramm</b>	
Satzname	Isolierstoffgehäuse C für Nordamerika
Grundfunktion	Leertgehäuse
Produktfunktion	Vorbereitungsbasis für Nordamerika
Einbaueigenschaften	Verbindungen an Deckel und Flanschen
Einbaueigenschaften	Einseitig
Schwermetalle	frei
Beschreibung	aus dem 4-Serien mit abnehmbarem glatten Flanschen bestückt
Ausführung	Reinigungsflächen für Wartungsarbeiten
Ausführung	gerundete Ecken
Ausführung	durchschlag
Ausführung	NAL 7022 (Internat)
Abmessungen	
Stärke	mm 254
Höhe	mm 236
Tiefe	mm 150
Einbaueigen.	mm 128
Ausführung	Selbstschließe mit glatten Flanschen
Ausführung	Selbstschließe mit abnehmbaren glatten Flanschen
<b>Approbationen</b>	
Product Standards	UL 508A, CSA, C22.2 No.94, IEC60020, CE marking
UL File No.	E54120, E337418
UL Catalog Control No.	9719
CSA File No.	27130
CSA Class No.	3211-07
North America Certification	UL listed, CSA certified
Specifically designed for North America	Yes
Suitable for	Industrial Control Panels
Current Limiting Circuit-Breaker	No
Degree of Protection	IEC: IP65, UL/CSA Types 1, 12, 13, 4X, indoor only
<b>Allgemeines</b>	
Normen und Bestimmungen	IEC 60020 DIN 5020 DIN 4362 DIN 4363 DIN EN 61411-1 DIN EN 61411-2 DIN EN 61411-3 DIN EN 61411-4 DIN EN 61411-5 DIN EN 61411-6 DIN EN 61411-7 DIN EN 61411-8 DIN EN 61411-9 DIN EN 61411-10 DIN EN 61411-11 DIN EN 61411-12 DIN EN 61411-13 DIN EN 61411-14 DIN EN 61411-15 DIN EN 61411-16 DIN EN 61411-17 DIN EN 61411-18 DIN EN 61411-19 DIN EN 61411-20 DIN EN 61411-21 DIN EN 61411-22 DIN EN 61411-23 DIN EN 61411-24 DIN EN 61411-25 DIN EN 61411-26 DIN EN 61411-27 DIN EN 61411-28 DIN EN 61411-29 DIN EN 61411-30 DIN EN 61411-31 DIN EN 61411-32 DIN EN 61411-33 DIN EN 61411-34 DIN EN 61411-35 DIN EN 61411-36 DIN EN 61411-37 DIN EN 61411-38 DIN EN 61411-39 DIN EN 61411-40 DIN EN 61411-41 DIN EN 61411-42 DIN EN 61411-43 DIN EN 61411-44 DIN EN 61411-45 DIN EN 61411-46 DIN EN 61411-47 DIN EN 61411-48 DIN EN 61411-49 DIN EN 61411-50 DIN EN 61411-51 DIN EN 61411-52 DIN EN 61411-53 DIN EN 61411-54 DIN EN 61411-55 DIN EN 61411-56 DIN EN 61411-57 DIN EN 61411-58 DIN EN 61411-59 DIN EN 61411-60 DIN EN 61411-61 DIN EN 61411-62 DIN EN 61411-63 DIN EN 61411-64 DIN EN 61411-65 DIN EN 61411-66 DIN EN 61411-67 DIN EN 61411-68 DIN EN 61411-69 DIN EN 61411-70 DIN EN 61411-71 DIN EN 61411-72 DIN EN 61411-73 DIN EN 61411-74 DIN EN 61411-75 DIN EN 61411-76 DIN EN 61411-77 DIN EN 61411-78 DIN EN 61411-79 DIN EN 61411-80 DIN EN 61411-81 DIN EN 61411-82 DIN EN 61411-83 DIN EN 61411-84 DIN EN 61411-85 DIN EN 61411-86 DIN EN 61411-87 DIN EN 61411-88 DIN EN 61411-89 DIN EN 61411-90 DIN EN 61411-91 DIN EN 61411-92 DIN EN 61411-93 DIN EN 61411-94 DIN EN 61411-95 DIN EN 61411-96 DIN EN 61411-97 DIN EN 61411-98 DIN EN 61411-99 DIN EN 61411-100
Klimatyp	Feuchte Wärme, trocken, nach IEC 60068-2-30
Umgebungstemperatur	Feuchte Wärme, trocken, nach IEC 60068-2-30
Schwermetalle	frei

For reliable information concerning the approval of components for export to North America, please refer to the Eaton online catalog. The catalog provides information for each product regarding the applicable product standard, the e-file number, the Category Control Number, or the CSA class number. You can incorporate this information into your bills of materials and documentation in order to be well prepared for all relevant acceptance procedures.

<b>Approbationen</b>	
Product Standards	UL 508A; CSA-C22.2 No.94; IEC/EN60529; CE marking
UL File No.	E54120, E337418
UL Category Control No.	NITW
CSA File No.	27130
CSA Class No.	3211-07
North America Certification	UL listed, CSA certified
Specially designed for North America	Yes
Suitable for	Industrial Control Panels
Current Limiting Circuit-Breaker	No
Degree of Protection	IEC: IP65; UL/CSA Types 1, 12, 13, 4X, indoor only

Up to 13 information items are listed here for each product, e.g., suitability for use in feeders or branch circuits, maximum operating voltage, or the North American degree of protection, such as UL / CSA Type 4X.



The link [www.Eaton.com/certificates](http://www.Eaton.com/certificates) shows the relevant approvals or permits for each component type. This therefore enables you to view the certificates provided or, depending on the test authority, also the product report. The information given is the same as what is provided in the databases of the authorities.

In order to avoid problems and other issues, you should first consult the large number of publications that Eaton offers in regard to the issue of exports to North America. They contain the implementation of the codes & standards and a description of different practices.

You can find the various relevant technical essays at [www.Eaton.de/export](http://www.Eaton.de/export), where they are available for download free of charge.





## To find the right contact person:

At Eaton, we believe that building and maintaining strong relationships with our customers is something that deserves our undivided attention.

This is why you can rest assured knowing that you will be able to count on us for every project from the very start. To find out whom to contact for your needs, please visit our website:

**In just a few steps, we will get you the contact information for the person or team in charge of support for your specific industry in your region.**

Your contacts in your region: [www.Eaton.com/contacts](http://www.Eaton.com/contacts)

### Do you have questions about our products?

Our technical support will advise you on all questions concerning our products.

#### Germany

#### Technical Support

[www.Eaton.de/EatonCare](http://www.Eaton.de/EatonCare)

#### Your contact persons in your region:

[Eaton.com/contacts](http://Eaton.com/contacts)

#### Helpline

**E-Mail:** [AfterSalesEGBonn@eaton.com](mailto:AfterSalesEGBonn@eaton.com)

**Internet:** [www.Eaton.com/aftersales](http://www.Eaton.com/aftersales)

#### Onsite Service

Troubleshooting, inspections, tests, maintenance, commissioning

#### Repairs

Replacement devices and spare parts for current and discontinued products; direct/warranty replacement for select products; repairs

#### Online Services

Downloads, FAQs and interactive troubleshooting

### Eatons After Sales Service

Eaton is known for its unparalleled after-sales support for all low-voltage switchgear, switchgear systems, and services. For more detailed information, as well as to view our terms and conditions, please visit [www.Eaton.com/aftersales](http://www.Eaton.com/aftersales)

#### Service Specialists

Gain the benefit of our Service personnel. Comprehensive expertise linked with long term experience and modern equipment help you find the solution to your tasks.

#### Material

Components, cards and spare parts of the Eaton product range are available for your use.

#### Service products

The After Sales Service offers appropriate service products for the Eaton products.



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. For more information, visit [www.eaton.com](http://www.eaton.com).

Subject to changes to products, information contained in this document and prices as well as errors and omissions. Only the order confirmation and the technical documentation of Eaton are binding. Photos and illustrations also do not guarantee a specific design or functionality. Their further use in any form must be approved by Eaton in advance. The same applies to brands (especially Eaton, Moeller, Cutler-Hammer, Cooper, Bussmann). The terms of sale of Eaton apply, as referenced on Eaton internet pages and Eaton order confirmations.

**Eaton Industries GmbH**  
Hein-Moeller-Str. 7-11  
D-53115 Bonn / Germany

© 2014 by Eaton Corporation  
All Rights Reserved  
Common name: CA04020001Z-EN-INT  
Version 2.0 September 2022

Eaton is a registered trademark  
of Eaton Corporation

All other trademarks are property of  
their respective owners.

Follow us on social media to get the  
latest product and support information.

