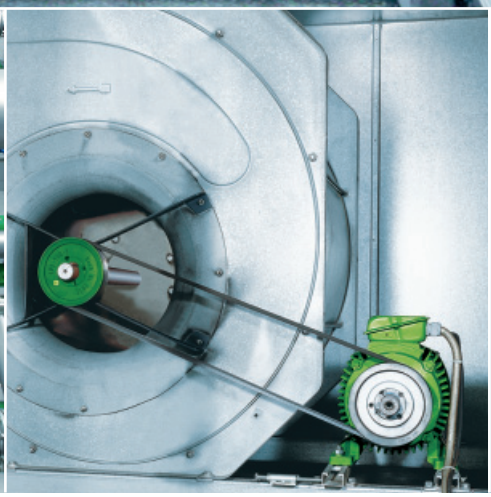
DC1/DA1 and **SVX/SPX** variable frequency drives
DS7 and **S801+/S811+** soft starters
Rapid Link 4.0 distributed, electronic drive system

Product range catalog

Efficient Engineering for starting and controlling motors.



EATON
Powering Business Worldwide

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There's a certain energy at Eaton. It's the power of uniting some of the world's most respected names to build a brand you can trust to meet your every power management need.

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. Building on over 100 years of experience in electrical power management, the experts at Eaton deliver customized, integrated solutions to solve your most critical challenges. To learn more visit **www.eaton.eu/electrical.**

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Powering business worldwide

As a global diversified power management company, we help customers worldwide manage the power needed for buildings, aircraft, trucks, cars, machinery and businesses.

Eaton's innovative technologies help customers manage electrical, hydraulic and mechanical power more reliably, efficiently, safely and sustainably.

EATON

Powering Business Worldwide

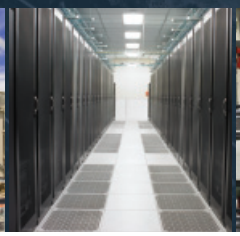
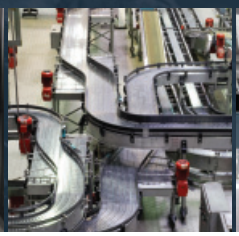
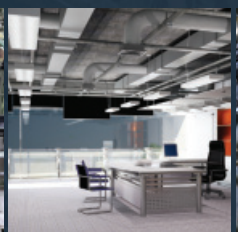
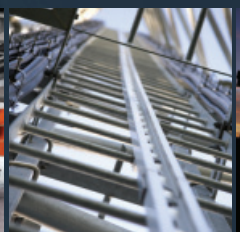



We deliver:

- **Electrical solutions** that use less energy, improve power reliability and make the places we live and work safer and more comfortable
- **Hydraulic and electrical solutions** that enable machines to deliver more productivity without wasting power
- **Aerospace solutions** that make aircraft lighter, safer and less costly to operate, and help airports operate more efficiently
- **Vehicle drivetrain and powertrain solutions** that deliver more power to cars, trucks and buses, while reducing fuel consumption and emissions

We provide integrated solutions that help make energy, in all its forms, more practical and accessible.

With 2012 sales of $16.3 billion, Eaton has approximately 103,000 employees around the world and sells products in more than 175 countries.

Eaton's electrical business

Eaton is a global leader with expertise in:

- Power distribution and circuit protection
- Backup power protection
- Solutions for harsh and hazardous environments
- Lighting and security
- Structural solutions and wiring devices
- Control and automation
- Engineering services

Eaton is positioned through its global solutions to answer today's most critical electrical power management challenges. With 100 years of electrical experience behind us, we're energized by the challenge of powering up a world that demands twice as much energy as today. We're anticipating needs, engineering products, and creating solutions to energize our markets today and in the future.

We are dedicated to ensuring that reliable, efficient and safe power is available when it's needed most.

www.eaton.eu

PowerXL™ DC1, DA1 variable frequency drives

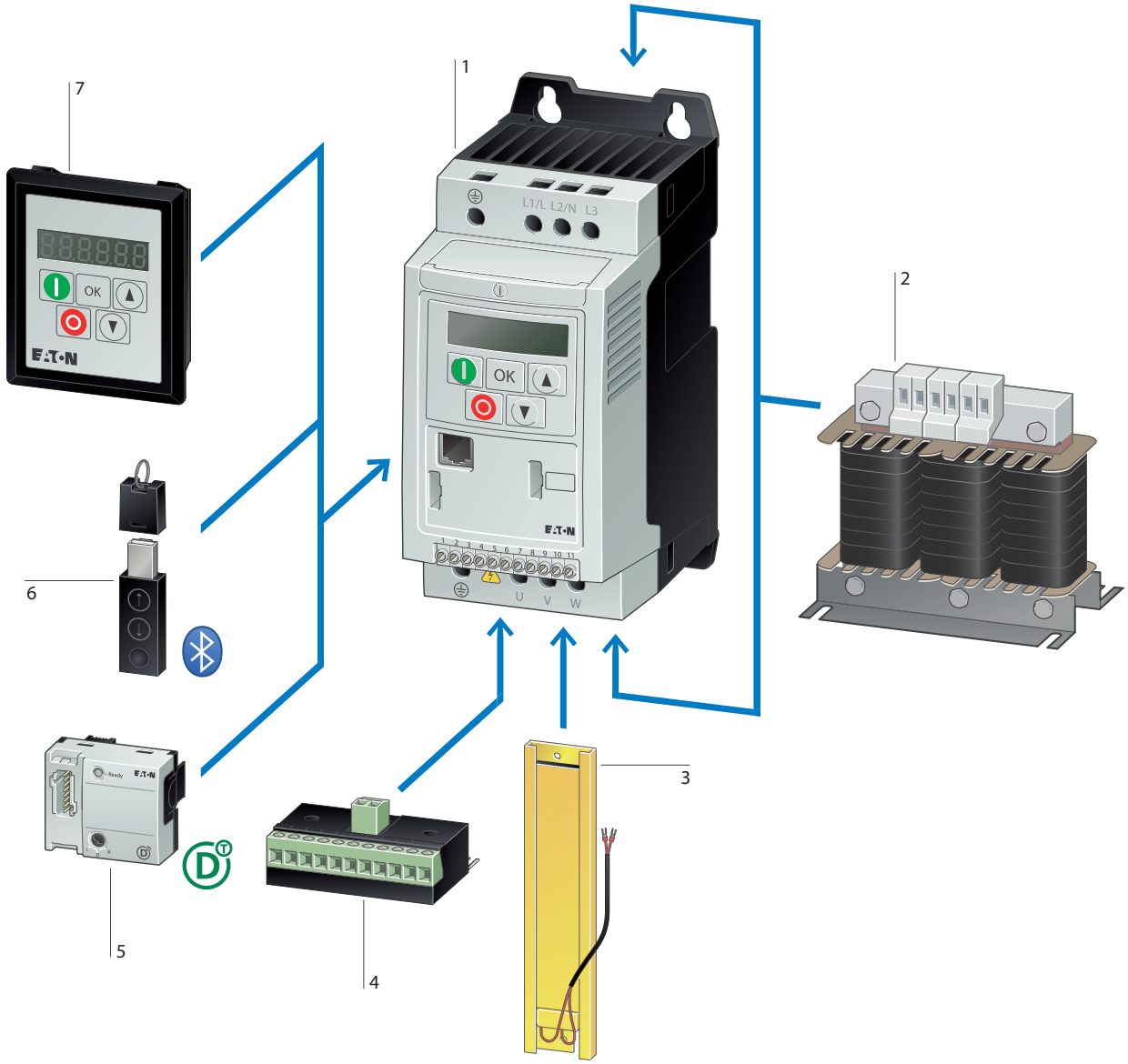
Variable frequency drives make it possible to use infinitely variable speed control with three-phase asynchronous motors and AC motors. To do so, they convert a single-phase or three-phase alternating voltage with a specific frequency and amplitudes into a single-phase or three-phase alternating voltage with a variable frequency and a variable amplitude. With its DC1 and DA1 device series, Eaton has just the right variable frequency drive for any machine building application or standard electric drive system application, regardless of whether your needs are extremely simple or extremely complex.

DC1 variable frequency drives
Output voltage with sinusoidal pulse-width modulation (PWM) when using Volts-per-Hertz control (V/Hz control) with slip compensation and start voltage boost.
DC1-12…: U_{IN} 1~230 V/U_{OUT} 3~230 V, allocated motor output 0.37 – 4 kW
DC1-32…: U_{IN} 3~230 V/U_{OUT} 3~230 V, allocated motor output 0.37 – 4 kW
DC1-34…: U_{IN} 3~400 V/U_{OUT} 3~400 V, allocated motor output 0.75 – 11 kW
DC1-S2…: U_{IN} 1~230 V/U_{OUT} 1~230 V, allocated motor output 0.37 – 1.1 kW (Single-phase motor)
DC1-S1…: U_{IN} 1~115 V/U_{OUT} 1~115 V, allocated motor output 0.37 – 0.55 kW
DC1-1D…: U_{IN} 1~115 V/U_{OUT} 3~230 V, allocated motor output 0.37 – 1.1 kW (voltage doubler)

DA1 variable frequency drives
Output voltage with sinusoidal pulse-width modulation (PWM) when using Volts-per-Hertz control (V/Hz control), sensorless (SLVC) and sensored vector control
DA1-12…: U_{IN} 1~230 V/U_{OUT} 3~230 V, allocated motor output 0.75 – 2.2 kW
DA1-32…: U_{IN} 3~230 V/U_{OUT} 3~230 V, allocated motor output 0.75 – 75 kW
DA1-34…: U_{IN} 3~400 V/U_{OUT} 3~400 V, allocated motor output 0.75 – 250 kW

System overview

DC1 with IP20 degree of protection



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Expansion modules → page 33	4
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Description

The DC1 is Eaton's compact variable frequency drive. It has been specifically designed for simple applications. With only 14 basic parameters and outstanding ease of mounting and installation, the DC1 is perfect for quick commissioning. This makes these compact variable frequency drive ideal for series production applications in the field of machine building.

Typical applications for this series include fans, pumps, and conveyor systems. In addition, additional parameters and functionalities can be flexibly enabled in order to allow the DC1 to handle more demanding applications as well.

When configured with an IP66 degree of protection, DC1 variable frequency drives can be installed in humid and wet locations as well.

In addition, these variable frequency drives can also be used as stand-alone units directly on site if they are equipped with a setpoint potentiometer, a selector switch, and a mains transfer switch and are configured with an IP66 degree of protection.

Essential features

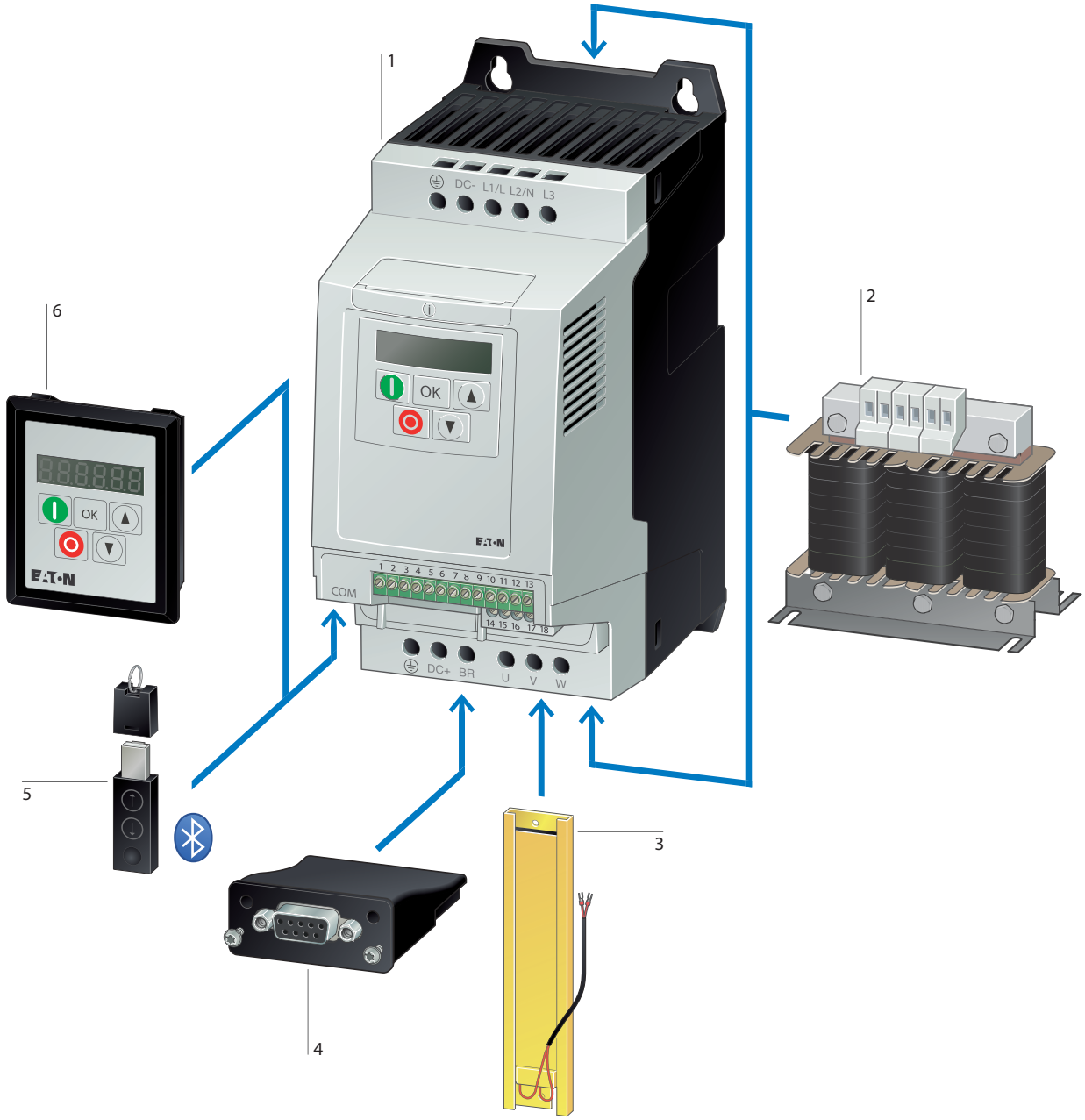
- Fast commissioning with 14 basic parameters
- Performance range (allocated motor output)
  – 0.37 - 4 kW (U_{IN}: 1~ 230 V / U_{OUT}: 3~ 230 V)
  – 0.37 - 4 kW (U_{IN}: 3~ 230 V / U_{OUT}: 3~ 230 V)
  – 0.75 - 11 kW (U_{IN}: 3~ 400 V / U_{OUT}: 3~ 400 V), up to 7.5 kW at IP66
  – 0.37 - 1.1 kW (U_{IN}: 1~230 V / U_{OUT}: 1~230 V), single-phase motor
  – 0.37 - 0.55 kW (U_{IN}: 1~ 115 V / U_{OUT}: 1~ 115 V), single-phase motor
  – 0.37 - 1.1 kW (U_{IN}: 1~ 115 V / U_{OUT}: 3~ 230 V) with voltage doubler
- Large overload capability: 150% for 60 seconds, 175% for 2 seconds
- Maximum ambient temperature:
  50 °C without derating (IP20) / 40 °C (IP66)
- Integrated® CANopen and Modbus
- Degree of protection to IP20 and IP66
- EMC filter
- Optional internal braking transistor for IP20 degree of protection
- Integrated PI controller
- V/Hz control with start voltage boost and slip compensation
- International standards (CE, UL, cUL, C-Tick, UkrSEPRO, RoHS)
- Side-by-side mounting

Accessory consideration

- SmartWire-DT field bus module
- I/O expansion with plug-in modules
- External keypad for control panel door
- Mains choke
- Motor choke
- sine filter
- braking resistances

System overview

DA1 with IP20 degree of protection



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Bluetooth communications stick → page 31	5
External Keypad → page 31	6

Description

DA1 frequency inverters are ideal for demanding, speed-dependent applications. Their wide performance range of up to 250 kW, together with their compact dimensions and high level of functionality, are sure to leave a lasting impression. Accordingly, DA1 units come with an integrated EMC filter and braking transistor. Moreover, the Modbus RTU and CANopen protocols are integrated as standard.®. With sensorless vector control, DA1 variable frequency drives are able to provide 200% torque at zero rpm. This makes them the perfect choice for applications that involve lifting or tractive forces. Comprehensive expansions such as additional inputs and outputs (analog, digital) and various field bus modules round off this variable frequency drive's flexibility.
When configured with an IP66 degree of protection, DA1 variable frequency drives can be installed in humid and wet locations as well.
In addition, these variable frequency drives can also be used as stand-alone units directly on site if they are equipped with a setpoint potentiometer, a selector switch, and a mains transfer switch.

Essential features

- Performance range:
  – 0.75 - 2.2 kW (U_{IN}: 1~ 230 V / U_{OUT}: 3~ 230 V)
  – 0.75 - 75 kW (U_{IN}: 3~ 230 V / U_{OUT}: 3~ 230 V)
  – 0.75 - 250 kW (U_{IN}: 3~ 400 V / U_{OUT}: 3~ 400 V)
- Large overload capability: 150% for 60 seconds, 200% for 4 seconds
- Degrees of protection
  – IP20 to 11 kW at 400 V
  – IP40 at 200/250 kW at 400 V
  – IP55 for 11 to 160 kW with 400 V
  – IP66 up to 7.5 kW with 400 V; 0.75–4 kW with 230 V
- The maximum allocated motor output is 7.5 kW with degree of protection IP66.
- Integrated® CANopen and Modbus
- EMC filter, integrated
- Braking transistor, integrated
- Control method: V/Hz control, sensorless vector control, vector control with encoder
- Safe Torque Off (STO)
- Can be used to drive high-efficiency PM motors
- International standards (CE, UL, cUL, C-Tick, UkrSEPRO, RoHS)
- Side-by-side mounting
- Ambient air temperature 50 °C without derating (IP20), max. 40 °C (IP66)
- Master/Slave functionality

Accessory consideration

- SmartWire-DT field bus module
- Field bus modules (PROFIBUS, PROFINET, Ethernet/IP, EtherCat, Modbus TCP, BACnet, and DeviceNet)
- I/O expansion with plug-in modules
- External keypad for control panel door
- High-resolution OLED display
- Mains choke
- Motor chokes
- sine filter
- braking resistances

Technical overview

			DC1...	DA1...
Rated operational voltage	U_e			
115 V AC, single-phase			✓	-
230 V AC, 1-phase			✓	✓
230 V AC, 3-phase			✓	✓
400 V AC, 3-phase			✓	✓
Supply frequency	f_{LN}	Hz	50/60	50/60
Rated operational current	I_e	A	2.3 - 24	2.2 - 450
Overload current for 60 s every 600 s	I_L	%	150	150
Starting current for 2 s	I_L	%	175	-
Starting current for 4 s	I_L	%	-	200
Assigned motor rating				
at 115 V, 50 Hz	P	kW	0.37 - 0.55 (Single-phase motors)	-
at 230 V, 50 Hz	P	kW	0.37 - 4 (0.37 - 4 for single-phase motors)	0.75 - 75
at 400 V, 50 Hz	P	kW	0.75 - 11	0.75 - 250
Ambient temperature				
Operation		°C		
IP20/NEMA 0			-10 - +50	-10 - +50
IP40			-	-10 - +30
IP55/NEMA 3			-	-10 - +40 / -10 - +30 (I_e > 180 A)
IP66/NEMA 4X			-10 - +40	-10 - +40
Storage		°C	-40 - +60	-40 - +60
Operation Mode				
U/f control			✓	✓
Slip compensation			✓	✓
sensorless vector control (SLV)			-	✓
Vector control with feedback (CLV)			-	✓
Switching frequency	f_{PWM}	kHz	4 - 32	4 - 32
Output voltage with V_e	U_2			
115 V AC, single-phase			✓	-
230 V AC, single-phase			✓	-
230 V AC, 3-phase			✓	✓
400 V AC, 3-phase			✓	✓
Output Frequency	f_2	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Protection type				
IP20/NEMA 0			✓	✓
IP40			-	✓
IP55/NEMA 3			-	✓
IP66/NEMA 4X			✓	✓
Fitted with				
Radio interference suppression filter			✓	✓
Brake chopper			✓	✓
Additional PCB protection			-	✓
7-digital display assembly			✓	✓
OLED display			-	✓
Interface			OP-Bus (RS485)/Modbus RTU, CANopen®	OP-Bus (RS485)/Modbus RTU, CANopen®
Fieldbus connection			SmartWire-DT	Ethernet IP DeviceNet PROFIBUS PROFINET Modbus-TCP EtherCAT BACnet/IP SmartWire-DT
Analog inputs			parameterizable, max. 2 x (0 - 10 V, 0/4 - 20 mA)	parameterizable, max. 2 x (0 - 10 V, 0/4 - 20 mA)
Analog outputs			parameterizable, max. 1 x (0 - 10 V)	parameterizable, max. 2 x (0 - 10 V, 0/4 - 20 mA)
Digital inputs			parameterizable, max. 4 x (max. 30 V DC)	parameterizable, 3 x (max. 30 V DC)
Digital outputs			parameterizable, max. 1 x (24 V DC)	parameterizable, max. 2 x (24 V DC)
Relay outputs			parameterizable, 1 x N/O, 6 A (250 V AC) / 5 A (30 V DC)	parameterizable, 1 x N/O and 1 x changeover contact, 6 A (250 V AC) / 5 A (30 V DC)
Production quality			RoHS, ISO 9001	RoHS, ISO 9001
Safety functions			-	STO (Safe Torque Off)
Standards			EMC: EN 61800-3:2004+A1-2012	EMC: EN 61800-3:2004+A1-2012
Certifications			CE, cUL, UL, c-Tick, Ukr Sepro	CE, cUL, UL, c-Tick, Ukr Sepro

Key to type references

DC1 - 1 2 4D1 F N - A 20 N

Device series
DC1 = variable frequency drive, compact, series 1
(D = Drives, C = Compact, 1 = Series 1)

Connection in power section
1 = single-phase mains connection/
three-phase motor connection
3 = three-phase mains connection/
three-phase motor connection
S = single-phase mains connection/
single-phase motor connection

Mains voltage category
1 = 110 V (110 - 115 V ± 10 %)
2 = 230 V (200 - 240 V ± 10 %)
4 = 400 V (380 - 480 V ± 10 %)
D = 110 V input/230 V output
(voltage doubler)

Rated operational current (examples)
2D2 = 2,2 A
4D1 = 4,1 A
024 = 24 A

Type
N = Standard basic device

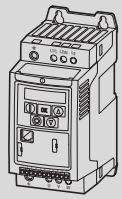
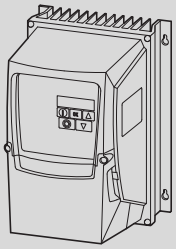
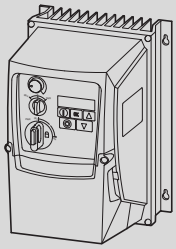
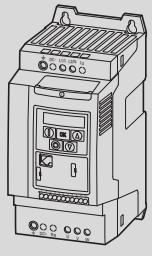
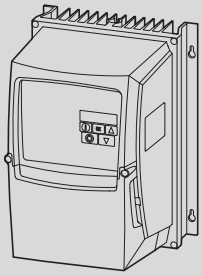
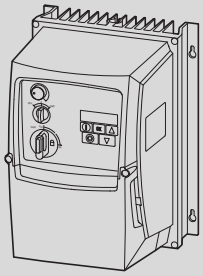
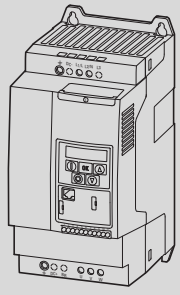
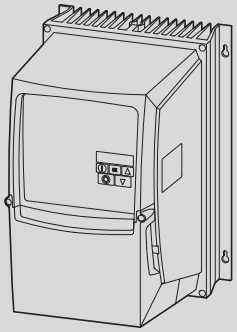
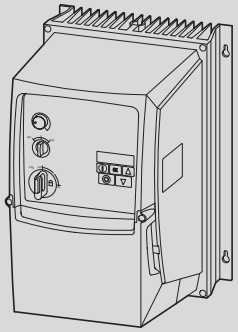
Degree of protection
20 = IP20/NEMA 0
66 = IP66/NEMA 4X
6S = IP66 with switch/NEMA 4X, switched

Display unit (display)
A = LED display

B = Brake chopper
N = no internal brake chopper
B = Brake chopper

EMC (radio interference suppression filter)
N = no internal RFI filter
F = Internal RFI filter

Sizes and degree of protection

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

UL/CSA

Information relevant for export to North America

Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E172143
UL Category Control No.	NMMS, NMMS7
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Suitable for	Branch circuits
Max. Voltage Rating	1~ 120 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey) 1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey) 3~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey) 3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)

Ordering

Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 115 V AC, single-phase / U_2 115 V AC, single-phase Mains voltage (50/60Hz) U_{LN} 110 (-10%) - 115 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
7	0.37	7	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-S17D0NN-A20N** 169497		1 off
			-	-	✓	-		IP66/NEMA 4X	**DC1-S17D0NN-A66N** 169498		
			-	-	✓	✓			**DC1-S17D0NN-A6SN** 169499		
10.5	0.55	10.5	-	✓	✓	-	FS2	IP20/NEMA 0	**DC1-S1011NB-A20N** 169500		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-S1011NB-A66N** 169501		
			-	✓	✓	✓			**DC1-S1011NB-A6SN** 169502		
U_e 230 V AC, 1-phase / U_2 230 V AC, single-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
4.3	0.37	4.3	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-S24D3NN-A20N** 169512		1 off
			✓	-	✓	-			**DC1-S24D3FN-A20N** 169521		
			-	-	✓	-		IP66/NEMA 4X	**DC1-S24D3NN-A66N** 169513		
			-	-	✓	✓			**DC1-S24D3NN-A6SN** 169514		
			✓	-	✓	-			**DC1-S24D3FN-A66N** 169522		
			✓	-	✓	✓			**DC1-S24D3FN-A6SN** 169523		
7	0.75	7	-	-	✓	-		IP20/NEMA 0	**DC1-S27D0NN-A20N** 169515		
			✓	-	✓	-			**DC1-S27D0FN-A20N** 169524		
			-	-	✓	-		IP66/NEMA 4X	**DC1-S27D0NN-A66N** 169516		
			-	-	✓	✓			**DC1-S27D0NN-A6SN** 169517		
			✓	-	✓	-			**DC1-S27D0FN-A66N** 169525		
			✓	-	✓	✓			**DC1-S27D0FN-A6SN** 169526		
10.5	1.1	10.5	-	✓	✓	-	FS2	IP20/NEMA 0	**DC1-S2011NB-A20N** 169518		
			✓	✓	✓	-			**DC1-S2011FB-A20N** 169527		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-S2011NB-A66N** 169519		
			-	✓	✓	✓			**DC1-S2011NB-A6SN** 169520		
			✓	✓	✓	-			**DC1-S2011FB-A66N** 169528		
			✓	✓	✓	✓			**DC1-S2011FB-A6SN** 169529		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → page 11

Rated operational current[1] I_e A	Assigned motor rating [2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 115 V AC, single-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 110 (-10%) - 115 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
2.3	0.37	2	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-1D2D3NN-A20N** 169503		1 off
			-	-	✓	-		IP66/NEMA 4X	**DC1-1D2D3NN-A66N** 169504		
			-	-	✓	✓			**DC1-1D2D3NN-A6SN** 169505		
4.3	0.75	3.2	-	-	✓	-		IP20/NEMA 0	**DC1-1D4D3NN-A20N** 169506		
			-	-	✓	-		IP66/NEMA 4X	**DC1-1D4D3NN-A66N** 169507		
			-	-	✓	✓			**DC1-1D4D3NN-A6SN** 169508		
5.8	1.1	4.6	-	✓	✓	-	FS2	IP20/NEMA 0	**DC1-1D5D8NB-A20N** 169509		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-1D5D8NB-A66N** 169510		
			-	✓	✓	✓			**DC1-1D5D8NB-A6SN** 169511		
U_e 230 V AC, 1-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
2.3	0.37	2	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-122D3NN-A20N** 169222		1 off
			✓	-	✓	-			**DC1-122D3FN-A20N** 169240		
			-	-	✓	-		IP66/NEMA 4X	**DC1-122D3NN-A66N** 169223		
			-	-	✓	✓			**DC1-122D3NN-A6SN** 169224		
			✓	-	✓	-			**DC1-122D3FN-A66N** 169241		
			✓	-	✓	✓			**DC1-122D3FN-A6SN** 169242		
4.3	0.75	3.2	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-124D3NN-A20N** 169225		
			✓	-	✓	-			**DC1-124D3FN-A20N** 169243		
			-	-	✓	-		IP66/NEMA 4X	**DC1-124D3NN-A66N** 169226		
			-	-	✓	✓			**DC1-124D3NN-A6SN** 169227		
			✓	-	✓	-			**DC1-124D3FN-A66N** 169244		
			✓	-	✓	✓			**DC1-124D3FN-A6SN** 169245		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 230 V AC, 1-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
7	1.5	6.3	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-127D0NN-A20N** 169228		1 off
			✓	-	✓	-			**DC1-127D0FN-A20N** 169246		
			-	✓	✓	-	FS2		**DC1-127D0NB-A20N** 169231		
			✓	✓	✓	-			**DC1-127D0FB-A20N** 169249		
			-	-	✓	-	FS1	IP66/NEMA 4X	**DC1-127D0NN-A66N** 169229		
			-	-	✓	✓			**DC1-127D0NN-A6SN** 169230		
			✓	-	✓	-			**DC1-127D0FN-A66N** 169247		
			✓	-	✓	✓			**DC1-127D0FN-A6SN** 169248		
			-	✓	✓	-	FS2		**DC1-127D0NB-A66N** 169232		
			-	✓	✓	✓			**DC1-127D0NB-A6SN** 169233		
			✓	✓	✓	-			**DC1-127D0FB-A66N** 169250		
			✓	✓	✓	✓			**DC1-127D0FB-A6SN** 169251		
10.5	2.2	8.7	-	✓	✓	-	FS2	IP20/NEMA 0	**DC1-12011NB-A20N** 169234		
			✓	✓	✓	-			**DC1-12011FB-A20N** 169252		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-12011NB-A66N** 169235		
			-	✓	✓	✓			**DC1-12011NB-A6SN** 169236		
			✓	✓	✓	-			**DC1-12011FB-A66N** 169253		
			✓	✓	✓	✓			**DC1-12011FB-A6SN** 169254		
15	4	14.8	-	✓	✓	-	FS3	IP20/NEMA 0	**DC1-12015NB-A20N** 169237		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-12015NB-A66N** 169238		
			-	✓	✓	✓			**DC1-12015NB-A6SN** 169239		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]	Assigned motor rating [2]	Rated motor current	Fitted with				Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
I_e	P	I_e	Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls					
A	kW	A									
U_e 230 V AC, 3-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
2.3	0.37	2	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-322D3NN-A20N** 169255		1 off
			-	-	✓	-		IP66/NEMA 4X	**DC1-322D3NN-A66N** 169256		
			-	-	✓	✓			**DC1-322D3NN-A6SN** 169257		
4.3	0.75	3.2	-	-	✓	-		IP20/NEMA 0	**DC1-324D3NN-A20N** 169258		
			-	-	✓	-		IP66/NEMA 4X	**DC1-324D3NN-A66N** 169259		
			-	-	✓	✓			**DC1-324D3NN-A6SN** 169260		
7	1.5	6.3	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-327D0NN-A20N** 169261		
			-	✓	✓	-	FS2		**DC1-327D0NB-A20N** 169264		
			✓	✓	✓	-			**DC1-327D0FB-A20N** 169444		
			-	-	✓	-	FS1	IP66/NEMA 4X	**DC1-327D0NN-A66N** 169262		
			-	-	✓	✓			**DC1-327D0NN-A6SN** 169263		
			-	✓	✓	-	FS2		**DC1-327D0NB-A66N** 169436		
			-	✓	✓	✓			**DC1-327D0NB-A6SN** 169437		
			✓	✓	✓	-			**DC1-327D0FB-A66N** 169445		
			✓	✓	✓	✓			**DC1-327D0FB-A6SN** 169446		
10.5	2.2	8.7	-	✓	✓	-	FS2	IP20/NEMA 0	**DC1-32011NB-A20N** 169438		
			✓	✓	✓	-			**DC1-32011FB-A20N** 169447		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-32011NB-A66N** 169439		
			-	✓	✓	✓			**DC1-32011NB-A6SN** 169440		
			✓	✓	✓	-			**DC1-32011FB-A66N** 169448		
			✓	✓	✓	✓			**DC1-32011FB-A6SN** 169449		
18	4	14.8	-	✓	✓	-	FS3	IP20/NEMA 0	**DC1-32018NB-A20N** 169441		
			✓	✓	✓	-			**DC1-32018FB-A20N** 169450		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-32018NB-A66N** 169442		
			-	✓	✓	✓			**DC1-32018NB-A6SN** 169443		
			✓	✓	✓	-			**DC1-32018FB-A66N** 169451		
			✓	✓	✓	✓			**DC1-32018FB-A6SN** 169452		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
2.2	0.75	1.9	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-342D2NN-A20N** 169453		1 off
			✓	-	✓	-			**DC1-342D2FN-A20N** 169475		
			-	-	✓	-		IP66/NEMA 4X	**DC1-342D2NN-A66N** 169454		
			-	-	✓	✓			**DC1-342D2NN-A6SN** 169455		
			✓	-	✓	-			**DC1-342D2FN-A66N** 169476		
			✓	-	✓	✓			**DC1-342D2FN-A6SN** 169477		
4.1	1.5	3.6	-	-	✓	-	FS1	IP20/NEMA 0	**DC1-344D1NN-A20N** 169456		
			✓	-	✓	-			**DC1-344D1FN-A20N** 169478		
			-	✓	✓	-			**DC1-344D1NB-A20N** 169459		
			✓	✓	✓	-			**DC1-344D1FB-A20N** 169481		
			-	-	✓	-	FS1	IP66/NEMA 4X	**DC1-344D1NN-A66N** 169457		
			-	-	✓	✓			**DC1-344D1NN-A6SN** 169458		
			✓	-	✓	-			**DC1-344D1FN-A66N** 169479		
			-	✓	✓	-	FS2		**DC1-344D1NB-A66N** 169460		
			-	✓	✓	✓			**DC1-344D1NB-A6SN** 169461		
			✓	-	✓	✓	FS1		**DC1-344D1FN-A6SN** 169480		
			✓	✓	✓	-	FS2		**DC1-344D1FB-A66N** 169482		
			✓	✓	✓	✓			**DC1-344D1FB-A6SN** 169483		
5.8	2.2	5	-	✓	✓	-	FS2	IP20/NEMA 0	**DC1-345D8NB-A20N** 169462		
			✓	✓	✓	-			**DC1-345D8FB-A20N** 169484		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-345D8NB-A66N** 169463		
			-	✓	✓	✓			**DC1-345D8NB-A6SN** 169464		
			✓	✓	✓	-			**DC1-345D8FB-A66N** 169485		
			✓	✓	✓	✓			**DC1-345D8FB-A6SN** 169486		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®											
9.5	4	8.5	-	✓	✓	-	FS2	IP20/NEMA 0	**DC1-349D5NB-A20N** 169465		1 off
			✓	✓	✓	-			**DC1-349D5FB-A20N** 169487		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-349D5NB-A66N** 169466		
			-	✓	✓	✓			**DC1-349D5NB-A6SN** 169467		
			✓	✓	✓	-			**DC1-349D5FB-A66N** 169488		
			✓	✓	✓	✓			**DC1-349D5FB-A6SN** 169489		
14	5.5	11.3	-	✓	✓	-	FS3	IP20/NEMA 0	**DC1-34014NB-A20N** 169468		
			✓	✓	✓	-			**DC1-34014FB-A20N** 169490		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-34014NB-A66N** 169469		
			-	✓	✓	✓			**DC1-34014NB-A6SN** 169470		
			✓	✓	✓	-			**DC1-34014FB-A66N** 169491		
			✓	✓	✓	✓			**DC1-34014FB-A6SN** 169492		
18	7.5	15.2	-	✓	✓	-		IP20/NEMA 0	**DC1-34018NB-A20N** 169471		
			✓	✓	✓	-			**DC1-34018FB-A20N** 169493		
			-	✓	✓	-		IP66/NEMA 4X	**DC1-34018NB-A66N** 169472		
			-	✓	✓	✓			**DC1-34018NB-A6SN** 169473		
			✓	✓	✓	-			**DC1-34018FB-A66N** 169494		
			✓	✓	✓	✓			**DC1-34018FB-A6SN** 169495		
24	11	21.7	-	✓	✓	-		IP20/NEMA 0	**DC1-34024NB-A20N** 169474		
			✓	✓	✓	-		IP20/NEMA 0	**DC1-34024FB-A20N** 169496		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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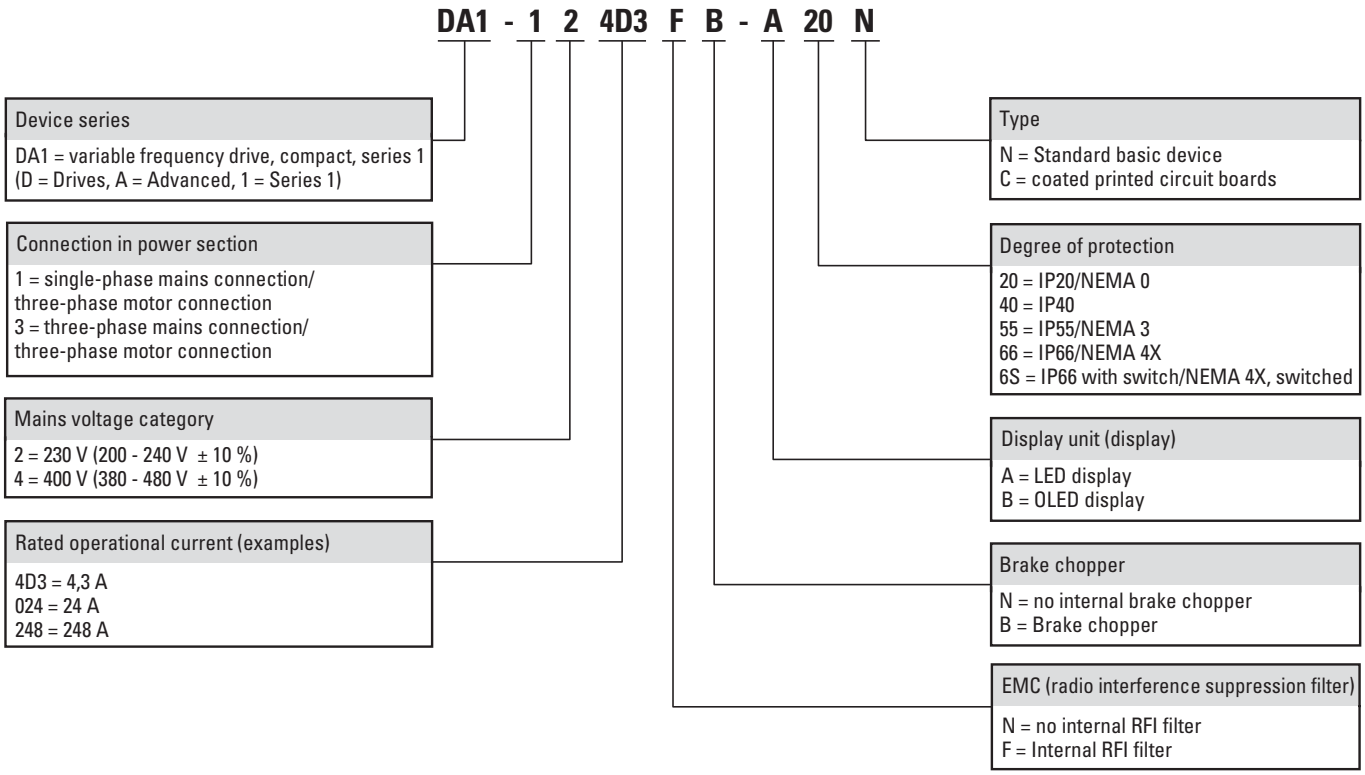
Key to type references

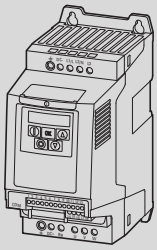
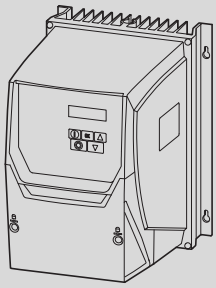
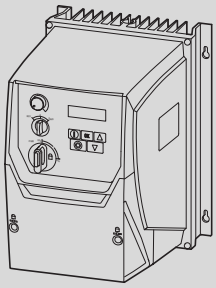
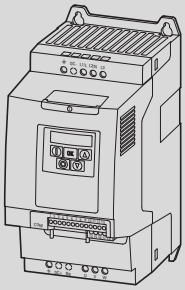
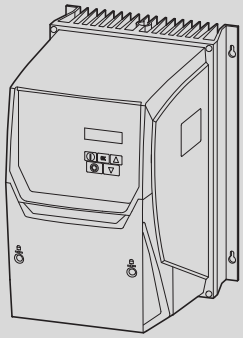
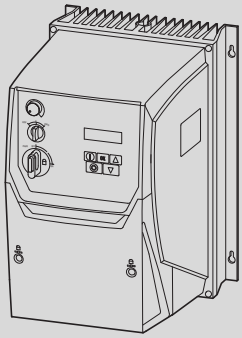


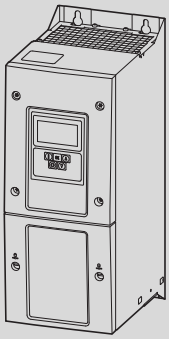
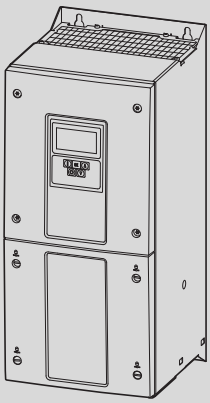
UL/CSA

Information relevant for export to North America

Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E172143
UL Category Control No.	NMMS, NMMS7
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Suitable for	Branch circuits
Max. Voltage Rating	1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
	3~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
	3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)

Sizes and degree of protection

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

Frame size	Protection type IP55/NEMA 3	IP40	
FS4		-	-
FS5	 FS5	-	-
FS8	-	Panel version	-

Rated operational current[1] I_e A	Assigned motor rating [2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 230 V AC, 1-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
4.3	0.75	3.2	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-124D3FB-A20N** 169152		1 off
			✓	✓	✓	-	-	✓			**DA1-124D3FB-A20C** 169078		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-124D3FB-A66N** 169153		
			✓	✓	-	✓	-	-			**DA1-124D3FB-B66N** 169280		
			✓	✓	-	✓	-	✓			**DA1-124D3FB-B66C** 169347		
			✓	✓	✓	-	✓	-			**DA1-124D3FB-A6SN** 169154		
			✓	✓	-	✓	✓	-			**DA1-124D3FB-B6SN** 169281		
			✓	✓	✓	-	-	✓			**DA1-124D3FB-A66C** 169079		
			✓	✓	✓	-	✓	✓			**DA1-124D3FB-A6SC** 169080		
			✓	✓	-	✓	✓	✓			**DA1-124D3FB-B6SC** 169348		
7	1.5	6.3	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-127D0FB-A20N** 169155		
			✓	✓	✓	-	✓	✓			**DA1-127D0FB-A20C** 169081		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-127D0FB-A66N** 169156		
			✓	✓	-	✓	-	-			**DA1-127D0FB-B66N** 169282		
			✓	✓	✓	-	-	✓			**DA1-127D0FB-A66C** 169082		
			✓	✓	-	✓	✓	-			**DA1-127D0FB-B6SN** 169283		
			✓	✓	-	✓	-	✓			**DA1-127D0FB-B66C** 169349		
			✓	✓	✓	-	✓	-			**DA1-127D0FB-A6SN** 169157		
			✓	✓	-	✓	✓	✓			**DA1-127D0FB-B6SC** 169350		
			✓	✓	✓	-	✓	✓			**DA1-127D0FB-A6SC** 169083		
10.5	2.2	8.7	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-12011FB-A20N** 169158		
			✓	✓	✓	-	-	✓			**DA1-12011FB-A20C** 169084		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-12011FB-A66N** 169159		
			✓	✓	-	✓	-	-			**DA1-12011FB-B66N** 169284		
			✓	✓	✓	-	✓	-			**DA1-12011FB-A6SN** 169160		
			✓	✓	-	✓	✓	-			**DA1-12011FB-B6SN** 169285		
			✓	✓	-	✓	-	✓			**DA1-12011FB-B66C** 169351		
			✓	✓	✓	-	-	✓			**DA1-12011FB-A66C** 169085		
			✓	✓	-	✓	✓	✓			**DA1-12011FB-B6SC** 169352		
			✓	✓	✓	-	✓	✓			**DA1-12011FB-A6SC** 169086		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 230 V AC, 3-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
4.3	0.75	3.2	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-324D3FB-A20N** 169161		1 off
			✓	✓	✓	-	✓	✓			**DA1-324D3FB-A20C** 169087		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-324D3FB-A66N** 169162		
			✓	✓	-	✓	-	-			**DA1-324D3FB-B66N** 169286		
			✓	✓	-	✓	✓	-			**DA1-324D3FB-B6SN** 169287		
			✓	✓	-	✓	-	✓			**DA1-324D3FB-B66C** 169353		
			✓	✓	✓	-	✓	-			**DA1-324D3FB-A6SN** 169163		
			✓	✓	✓	-	-	✓			**DA1-324D3FB-A66C** 169088		
			✓	✓	-	✓	✓	✓			**DA1-324D3FB-B6SC** 169354		
			✓	✓	✓	-	✓	✓			**DA1-324D3FB-A6SC** 169089		
7	1.5	6.3	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-327D0FB-A20N** 169164		
			✓	✓	✓	-	-	✓			**DA1-327D0FB-A20C** 169090		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-327D0FB-A66N** 169165		
			✓	✓	-	✓	-	-			**DA1-327D0FB-B66N** 169288		
			✓	✓	✓	-	-	✓			**DA1-327D0FB-A66C** 169091		
			✓	✓	-	✓	-	✓			**DA1-327D0FB-B66C** 169355		
			✓	✓	✓	-	✓	-			**DA1-327D0FB-A6SN** 169166		
			✓	✓	-	✓	✓	-			**DA1-327D0FB-B6SN** 169289		
			✓	✓	-	✓	✓	✓			**DA1-327D0FB-B6SC** 169356		
			✓	✓	✓	-	✓	✓			**DA1-327D0FB-A6SC** 169092		
10.5	2.2	8.7	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-32011FB-A20N** 169167		
			✓	✓	✓	-	-	✓			**DA1-32011FB-A20C** 169093		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-32011FB-A66N** 169168		
			✓	✓	-	✓	-	-			**DA1-32011FB-B66N** 169290		
			✓	✓	✓	-	✓	-			**DA1-32011FB-A6SN** 169169		
			✓	✓	-	✓	-	✓			**DA1-32011FB-B66C** 169357		
			✓	✓	-	✓	✓	-			**DA1-32011FB-B6SN** 169291		
			✓	✓	✓	-	-	✓			**DA1-32011FB-A66C** 169094		
			✓	✓	✓	-	✓	✓			**DA1-32011FB-A6SC** 169095		
			✓	✓	-	✓	✓	✓			**DA1-32011FB-B6SC** 169358		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 230 V AC, 3-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
18	4	14.8	✓	✓	✓	-	-	-	FS3	IP20/NEMA 0	**DA1-32018FB-A20N** 169170		1 off
			✓	✓	✓	-	-	✓			**DA1-32018FB-A20C** 169096		
			✓	✓	-	✓	-	-		IP66/NEMA 4X	**DA1-32018FB-B66N** 169292		
			✓	✓	✓	-	-	-			**DA1-32018FB-A66N** 169171		
			✓	✓	✓	-	✓	-			**DA1-32018FB-A6SN** 169172		
			✓	✓	-	✓	✓	-			**DA1-32018FB-B6SN** 169293		
			✓	✓	✓	-	-	✓			**DA1-32018FB-A66C** 169097		
			✓	✓	-	✓	-	✓			**DA1-32018FB-B66C** 169359		
			✓	✓	✓	-	✓	✓			**DA1-32018FB-A6SC** 169098		
			✓	✓	-	✓	✓	✓			**DA1-32018FB-B6SC** 169360		
24	5.5	19.6	✓	✓	✓	-	-	-	FS3	IP20/NEMA 0	**DA1-32024FB-A20N** 169173		
			✓	✓	✓	-	-	✓			**DA1-32024FB-A20C** 169099		
			✓	✓	✓	-	-	-	FS4	IP55	**DA1-32024FB-A55N** 169174		
			✓	✓	-	✓	-	-			**DA1-32024FB-B55N** 169294		
			✓	✓	-	✓	-	✓			**DA1-32024FB-B55C** 169361		
			✓	✓	✓	-	-	✓			**DA1-32024FB-A55C** 169100		
39	7.5	26.5	✓	✓	✓	-	-	-	FS4	IP55/NEMA 3	**DA1-32039FB-A55N** 169175		
			✓	✓	-	✓	-	-			**DA1-32039FB-B55N** 169295		
			✓	✓	-	✓	-	✓			**DA1-32039FB-B55C** 169362		
			✓	✓	✓	-	-	✓			**DA1-32039FB-A55C** 169101		
46	11	38	✓	✓	✓	-	-	-			**DA1-32046FB-A55N** 169176		
			✓	✓	-	✓	-	-			**DA1-32046FB-B55N** 169296		
			✓	✓	-	✓	-	✓			**DA1-32046FB-B55C** 169363		
			✓	✓	✓	-	-	✓			**DA1-32046FB-A55C** 169102		
61	15	51	✓	✓	✓	-	-	-			**DA1-32061FB-A55N** 169177		
			✓	✓	-	✓	-	-			**DA1-32061FB-B55N** 169297		
			✓	✓	-	✓	-	✓			**DA1-32061FB-B55C** 169364		
			✓	✓	✓	-	-	✓			**DA1-32061FB-A55C** 169103		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 230 V AC, 3-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
72	18.5	63	✓	✓	✓	-	-	-	FS5	IP55/NEMA 3	**DA1-32072FB-A55N** 169178		1 off
			✓	✓	-	✓	-	-			**DA1-32072FB-B55N** 169298		
			✓	✓	✓	-	-	✓			**DA1-32072FB-A55C** 169104		
			✓	✓	-	✓	-	✓			**DA1-32072FB-B55C** 169365		
90	22	71	✓	-	-	✓	-	-	FS6		**DA1-32090FN-B55N** 169299		
			✓	-	✓	-	-	-			**DA1-32090FN-A55N** 169179		
			✓	-	✓	-	-	✓			**DA1-32090FN-A55C** 169105		
			✓	✓	-	✓	-	-			**DA1-32090FB-B55N** 169300		
			✓	✓	✓	-	-	-			**DA1-32090FB-A55N** 169180		
			✓	-	-	✓	-	✓			**DA1-32090FN-B55C** 169366		
			✓	✓	✓	-	-	✓			**DA1-32090FB-A55C** 169106		
			✓	✓	-	✓	-	✓			**DA1-32090FB-B55C** 169367		
110	30	96	✓	-	-	✓	-	-			**DA1-32110FN-B55N** 169301		
			✓	-	✓	-	-	-			**DA1-32110FN-A55N** 169181		
			✓	✓	✓	-	-	-			**DA1-32110FB-A55N** 169182		
			✓	✓	-	✓	-	-			**DA1-32110FB-B55N** 169302		
			✓	-	-	✓	-	✓			**DA1-32110FN-B55C** 169368		
			✓	-	✓	-	-	✓			**DA1-32110FN-A55C** 169107		
			✓	✓	✓	-	-	✓			**DA1-32110FB-A55C** 169108		
			✓	✓	-	✓	-	✓			**DA1-32110FB-B55C** 169369		
150	45[3]	141	✓	-	-	✓	-	-			**DA1-32150FN-B55N** 169303		
			✓	-	✓	-	-	-			**DA1-32150FN-A55N** 169183		
			✓	✓	✓	-	-	-			**DA1-32150FB-A55N** 169184		
			✓	✓	-	✓	-	-			**DA1-32150FB-B55N** 169304		
			✓	-	-	✓	-	✓			**DA1-32150FN-B55C** 169370		
			✓	-	✓	-	-	✓			**DA1-32150FN-A55C** 169109		
			✓	✓	-	✓	-	✓			**DA1-32150FB-B55C** 169371		
			✓	✓	✓	-	-	✓			**DA1-32150FB-A55C** 169110		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C
[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)
[3] Alternatively: allocated motor output of 37 kW (230 V) with 117-A rated motor current

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 230 V AC, 3-phase / U_2 230 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 200 (-10%) - 240 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
180	55[3]	173	✓	-	-	✓	-	-	FS6	IP55	**DA1-32180FN-B55N** 169305		1 off
			✓	-	✓	-	-	-			**DA1-32180FN-A55N** 169185		
			✓	✓	✓	-	-	-			**DA1-32180FB-A55N** 169186		
			✓	-	✓	-	-	✓			**DA1-32180FN-A55C** 169111		
			✓	-	-	✓	-	✓			**DA1-32180FN-B55C** 169372		
			✓	✓	-	✓	-	-			**DA1-32180FB-B55N** 169306		
			✓	✓	-	✓	-	✓			**DA1-32180FB-B55C** 169373		
			✓	✓	✓	-	-	✓			**DA1-32180FB-A55C** 169112		
202	55	173	✓	-	-	✓	-	-	FS7		**DA1-32202FN-B55N** 169307		
			✓	-	✓	-	-	-			**DA1-32202FN-A55N** 169187		
			✓	✓	✓	-	-	-			**DA1-32202FB-A55N** 169188		
			✓	-	✓	-	-	✓			**DA1-32202FN-A55C** 169113		
			✓	✓	-	✓	-	-			**DA1-32202FB-B55N** 169308		
			✓	-	-	✓	-	✓			**DA1-32202FN-B55C** 169374		
			✓	✓	-	✓	-	✓			**DA1-32202FB-B55C** 169375		
			✓	✓	✓	-	-	✓			**DA1-32202FB-A55C** 169114		
248	75	233	✓	-	-	✓	-	-			**DA1-32248FN-B55N** 169309		
			✓	-	✓	-	-	-			**DA1-32248FN-A55N** 169189		
			✓	✓	✓	-	-	-			**DA1-32248FB-A55N** 169190		
			✓	✓	-	✓	-	-			**DA1-32248FB-B55N** 169310		
			✓	-	-	✓	-	✓			**DA1-32248FN-B55C** 169376		
			✓	-	✓	-	-	✓			**DA1-32248FN-A55C** 169115		
			✓	✓	✓	-	-	✓			**DA1-32248FB-A55C** 169116		
			✓	✓	-	✓	-	✓			**DA1-32248FB-B55C** 169377		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

[3] Alternatively: allocated motor output of 45 kW (230 V) with 141-A rated motor current

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
2.2	0.75	1.9	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-342D2FB-A20N** 169191		1 off
			✓	✓	✓	-	-	✓			**DA1-342D2FB-A20C** 169117		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-342D2FB-A66N** 169192		
			✓	✓	-	✓	-	-			**DA1-342D2FB-B66N** 169311		
			✓	✓	✓	-	✓	-			**DA1-342D2FB-A6SN** 169193		
			✓	✓	✓	-	-	✓			**DA1-342D2FB-A66C** 169118		
			✓	✓	-	✓	✓	-			**DA1-342D2FB-B6SN** 169312		
			✓	✓	-	✓	-	✓			**DA1-342D2FB-B66C** 169378		
			✓	✓	-	✓	✓	✓			**DA1-342D2FB-B6SC** 169379		
			✓	✓	✓	-	✓	✓			**DA1-342D2FB-A6SC** 169119		
4.1	1.5	3.6	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-344D1FB-A20N** 169194		
			✓	✓	✓	-	-	✓			**DA1-344D1FB-A20C** 169120		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-344D1FB-A66N** 169195		
			✓	✓	-	✓	-	-			**DA1-344D1FB-B66N** 169313		
			✓	✓	✓	-	✓	-			**DA1-344D1FB-A6SN** 169196		
			✓	✓	-	✓	✓	-			**DA1-344D1FB-B6SN** 169314		
			✓	✓	✓	-	-	✓			**DA1-344D1FB-A66C** 169049		
			✓	✓	-	✓	-	✓			**DA1-344D1FB-B66C** 169380		
			✓	✓	-	✓	✓	✓			**DA1-344D1FB-B6SC** 169381		
			✓	✓	✓	-	✓	✓			**DA1-344D1FB-A6SC** 169050		
5.8	2.2	5	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-345D8FB-A20N** 169197		
			✓	✓	✓	-	-	✓			**DA1-345D8FB-A20C** 169051		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-345D8FB-A66N** 169198		
			✓	✓	-	✓	-	-			**DA1-345D8FB-B66N** 169315		
			✓	✓	✓	-	✓	-			**DA1-345D8FB-A6SN** 169199		
			✓	✓	-	✓	-	✓			**DA1-345D8FB-B66C** 169382		
			✓	✓	-	✓	✓	-			**DA1-345D8FB-B6SN** 169316		
			✓	✓	✓	-	-	✓			**DA1-345D8FB-A66C** 169052		
			✓	✓	-	✓	✓	✓			**DA1-345D8FB-B6SC** 169383		
			✓	✓	✓	-	✓	✓			**DA1-345D8FB-A6SC** 169053		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating [2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
9.5	4	8.5	✓	✓	✓	-	-	-	FS2	IP20/NEMA 0	**DA1-349D5FB-A20N** 169200		1 off
			✓	✓	✓	-	✓	✓			**DA1-349D5FB-A20C** 169054		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-349D5FB-A66N** 169201		
			✓	✓	-	✓	-	-			**DA1-349D5FB-B66N** 169317		
			✓	✓	✓	-	-	✓			**DA1-349D5FB-A66C** 169055		
			✓	✓	-	✓	✓	-			**DA1-349D5FB-B6SN** 169318		
			✓	✓	✓	-	✓	-			**DA1-349D5FB-A6SN** 169202		
			✓	✓	-	✓	-	✓			**DA1-349D5FB-B66C** 169384		
			✓	✓	✓	-	✓	✓			**DA1-349D5FB-A6SC** 169056		
			✓	✓	-	✓	✓	✓			**DA1-349D5FB-B6SC** 169385		
14	5.5	11.3	✓	✓	✓	-	-	-	FS3	IP20/NEMA 0	**DA1-34014FB-A20N** 169203		
			✓	✓	✓	-	-	✓			**DA1-34014FB-A20C** 169057		
			✓	✓	✓	-	-	-		IP66/NEMA 4X	**DA1-34014FB-A66N** 169204		
			✓	✓	-	✓	-	-			**DA1-34014FB-B66N** 169319		
			✓	✓	✓	-	✓	-			**DA1-34014FB-A6SN** 169205		
			✓	✓	-	✓	✓	-			**DA1-34014FB-B6SN** 169320		
			✓	✓	-	✓	-	✓			**DA1-34014FB-B66C** 169386		
			✓	✓	✓	-	-	✓			**DA1-34014FB-A66C** 169058		
			✓	✓	✓	-	✓	✓			**DA1-34014FB-A6SC** 169059		
			✓	✓	-	✓	✓	✓			**DA1-34014FB-B6SC** 169387		
18	7.5	15.2	✓	✓	✓	-	-	-	FS3	IP20/NEMA 0	**DA1-34018FB-A20N** 169206		
			✓	✓	✓	-	✓	✓			**DA1-34018FB-A20C** 169060		
			✓	✓	-	✓	-	-		IP66/NEMA 4X	**DA1-34018FB-B66N** 169321		
			✓	✓	✓	-	-	-			**DA1-34018FB-A66N** 169207		
			✓	✓	-	✓	-	✓			**DA1-34018FB-B66C** 169388		
			✓	✓	✓	-	✓	-			**DA1-34018FB-A6SN** 169208		
			✓	✓	-	✓	✓	-			**DA1-34018FB-B6SN** 169322		
			✓	✓	✓	-	-	✓			**DA1-34018FB-A66C** 169061		
			✓	✓	✓	-	✓	✓			**DA1-34018FB-A6SC** 169062		
			✓	✓	-	✓	✓	✓			**DA1-34018FB-B6SC** 169389		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
24	11	21.7	✓	✓	✓	-	-	-	FS3	IP20/NEMA 0	**DA1-34024FB-A20N** 169209		1 off
			✓	✓	✓	-	-	✓			**DA1-34024FB-A20C** 169063		
			✓	✓	✓	-	-	-	FS4	IP55	**DA1-34024FB-A55N** 169210		
			✓	✓	-	✓	-	-			**DA1-34024FB-B55N** 169323		
			✓	✓	-	✓	-	✓			**DA1-34024FB-B55C** 169390		
			✓	✓	✓	-	-	✓			**DA1-34024FB-A55C** 169064		
30	15	29.3	✓	✓	-	✓	-	-			**DA1-34030FB-B55N** 169324		
			✓	✓	✓	-	-	-			**DA1-34030FB-A55N** 169211		
			✓	✓	✓	-	-	✓			**DA1-34030FB-A55C** 169065		
			✓	✓	-	✓	-	✓			**DA1-34030FB-B55C** 169391		
39	18.5	36	✓	✓	-	✓	-	-			**DA1-34039FB-B55N** 169325		
			✓	✓	✓	-	-	-			**DA1-34039FB-A55N** 169212		
			✓	✓	✓	-	-	✓			**DA1-34039FB-A55C** 169066		
			✓	✓	-	✓	-	✓			**DA1-34039FB-B55C** 169392		
46	22	41	✓	✓	✓	-	-	-			**DA1-34046FB-A55N** 169213		
			✓	✓	-	✓	-	-			**DA1-34046FB-B55N** 169326		
			✓	✓	-	✓	-	✓			**DA1-34046FB-B55C** 169393		
			✓	✓	✓	-	-	✓			**DA1-34046FB-A55C** 169067		
61	30	55	✓	✓	✓	-	-	-	FS5		**DA1-34061FB-A55N** 169214		
			✓	✓	-	✓	-	-			**DA1-34061FB-B55N** 169327		
			✓	✓	✓	-	-	✓			**DA1-34061FB-A55C** 169068		
			✓	✓	-	✓	-	✓			**DA1-34061FB-B55C** 169394		
72	37	68	✓	✓	✓	-	-	-			**DA1-34072FB-A55N** 169215		
			✓	✓	-	✓	-	-			**DA1-34072FB-B55N** 169328		
			✓	✓	✓	-	-	✓			**DA1-34072FB-A55C** 169069		
			✓	✓	-	✓	-	✓			**DA1-34072FB-B55C** 169395		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → page 18

Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
90	45	81	✓	-	✓	-	-	-	FS6	IP55/NEMA 3	**DA1-34090FN-A55N** 169216		1 off
			✓	-	-	✓	-	-			**DA1-34090FN-B55N** 169329		
			✓	✓	✓	-	-	-			**DA1-34090FB-A55N** 169037		
			✓	-	✓	-	-	✓			**DA1-34090FN-A55C** 169070		
			✓	✓	-	✓	-	-			**DA1-34090FB-B55N** 169330		
			✓	-	-	✓	-	✓			**DA1-34090FN-B55C** 169396		
			✓	✓	-	✓	-	✓			**DA1-34090FB-B55C** 169397		
			✓	✓	✓	-	-	✓			**DA1-34090FB-A55C** 169071		
110	55	99	✓	-	✓	-	-	-			**DA1-34110FN-A55N** 169038		
			✓	-	-	✓	-	-			**DA1-34110FN-B55N** 169331		
			✓	✓	✓	-	-	-			**DA1-34110FB-A55N** 169039		
			✓	-	✓	-	-	✓			**DA1-34110FN-A55C** 169072		
			✓	-	-	✓	-	✓			**DA1-34110FN-B55C** 169398		
			✓	✓	-	✓	-	-			**DA1-34110FB-B55N** 169332		
			✓	✓	-	✓	-	✓			**DA1-34110FB-B55C** 169399		
			✓	✓	✓	-	-	✓			**DA1-34110FB-A55C** 169265		
150	75	134	✓	-	-	✓	-	-			**DA1-34150FN-B55N** 169333		
			✓	-	✓	-	-	-			**DA1-34150FN-A55N** 169040		
			✓	✓	✓	-	-	-			**DA1-34150FB-A55N** 169041		
			✓	✓	-	✓	-	-			**DA1-34150FB-B55N** 169334		
			✓	-	-	✓	-	✓			**DA1-34150FN-B55C** 169400		
			✓	-	✓	-	-	✓			**DA1-34150FN-A55C** 169266		
			✓	✓	-	✓	-	✓			**DA1-34150FB-B55C** 169401		
			✓	✓	✓	-	-	✓			**DA1-34150FB-A55C** 169267		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → page 18

Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
180	90	161	✓	-	✓	-	-	-	FS6	IP55	**DA1-34180FN-A55N** 169042		1 off
			✓	-	-	✓	-	-			**DA1-34180FN-B55N** 169335		
			✓	-	✓	-	-	✓			**DA1-34180FN-A55C** 169268		
			✓	✓	✓	-	-	-			**DA1-34180FB-A55N** 169043		
			✓	✓	-	✓	-	-			**DA1-34180FB-B55N** 169336		
			✓	-	-	✓	-	✓			**DA1-34180FN-B55C** 169402		
			✓	✓	✓	-	-	✓			**DA1-34180FB-A55C** 169269		
			✓	✓	-	✓	-	✓			**DA1-34180FB-B55C** 169403		
202	110	196	✓	-	✓	-	-	-	FS7		**DA1-34202FN-A55N** 169044		
			✓	-	-	✓	-	-			**DA1-34202FN-B55N** 169337		
			✓	✓	✓	-	-	-			**DA1-34202FB-A55N** 169045		
			✓	-	-	✓	-	✓			**DA1-34202FN-B55C** 169404		
			✓	-	✓	-	-	✓			**DA1-34202FN-A55C** 169270		
			✓	✓	-	✓	-	-			**DA1-34202FB-B55N** 169338		
			✓	✓	-	✓	-	✓			**DA1-34202FB-B55C** 169405		
			✓	✓	✓	-	-	✓			**DA1-34202FB-A55C** 169271		
240	132	231	✓	-	-	✓	-	-			**DA1-34240FN-B55N** 169339		
			✓	-	✓	-	-	-			**DA1-34240FN-A55N** 169046		
			✓	-	✓	-	-	✓			**DA1-34240FN-A55C** 169272		
			✓	-	-	✓	-	✓			**DA1-34240FN-B55C** 169406		
			✓	✓	-	✓	-	-			**DA1-34240FB-B55N** 169340		
			✓	✓	✓	-	-	-			**DA1-34240FB-A55N** 169047		
			✓	✓	✓	-	-	✓			**DA1-34240FB-A55C** 169273		
			✓	✓	-	✓	-	✓			**DA1-34240FB-B55C** 169407		

Notes

[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → page 18

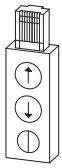
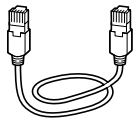
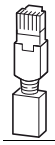
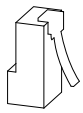
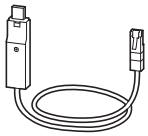
Rated operational current[1] I_e A	Assigned motor rating[2] P kW	Rated motor current I_e A	Fitted with: Radio interference suppression filter	Brake chopper	7-digital display assembly	OLED display	Local controls	Additional PCB protection	Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN} 380 (-10%) - 480 (+10%) V Interface OP-Bus (RS485)/Modbus RTU, CANopen®													
302	160	279	-	-	-	✓	-	✓	FS7	IP55	**DA1-34302FN-B55C** 169408		1 off
			✓	-	-	✓	-	-			**DA1-34302FN-B55N** 169341		
			✓	-	✓	-	-	✓			**DA1-34302FN-A55C** 169274		
			✓	✓	-	✓	-	✓			**DA1-34302FB-B55C** 169217		
			✓	✓	✓	-	-	-			**DA1-34302FB-A55N** 169073		
			✓	✓	-	✓	-	-			**DA1-34302FB-B55N** 169342		
			✓	✓	✓	-	✓	-			**DA1-34302FN-A55N** 169048		
			✓	✓	✓	-	-	✓			**DA1-34302FB-A55C** 169275		
370	200	349	✓	-	-	✓	-	-	FS8	IP40	**DA1-34370FN-B40N** 169343		1 off
			✓	-	✓	-	-	-			**DA1-34370FN-A40N** 169074		
			✓	-	-	✓	-	✓			**DA1-34370FN-B40C** 169218		
			✓	✓	✓	-	-	-			**DA1-34370FB-A40N** 169075		
			✓	-	✓	-	-	✓			**DA1-34370FN-A40C** 169276		
			✓	✓	-	✓	-	-			**DA1-34370FB-B40N** 169344		
			✓	✓	-	✓	-	✓			**DA1-34370FB-B40C** 169219		
			✓	✓	✓	-	-	✓			**DA1-34370FB-A40C** 169277		
450	250	437	✓	-	-	✓	-	-			**DA1-34450FN-B40N** 169345		
			✓	-	✓	-	-	-			**DA1-34450FN-A40N** 169076		
			✓	✓	-	✓	-	-			**DA1-34450FB-B40N** 169346		
			✓	✓	✓	-	-	-			**DA1-34450FB-A40N** 169077		
			✓	-	-	✓	-	✓			**DA1-34450FN-B40C** 169220		
			✓	-	✓	-	-	✓			**DA1-34450FN-A40C** 169278		
			✓	✓	-	✓	-	✓			**DA1-34450FB-B40C** 169221		
			✓	✓	✓	-	-	✓			**DA1-34450FB-A40C** 169279		

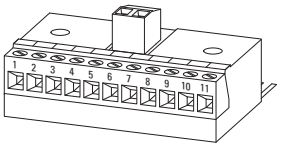
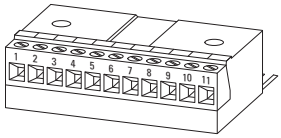
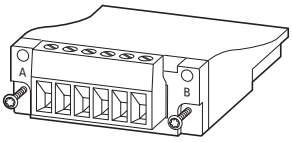
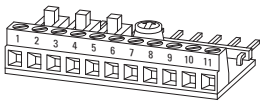
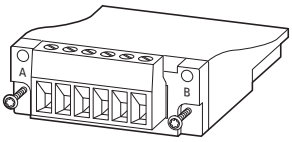
Notes

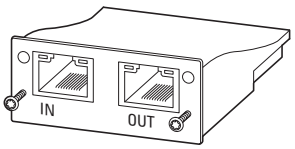
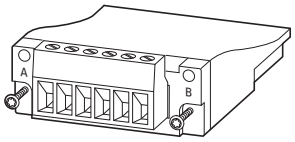
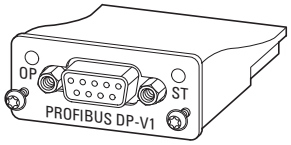
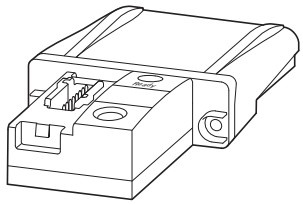
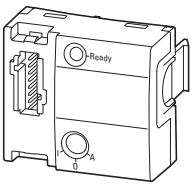
[1] Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

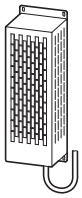
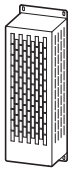
[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → page 18

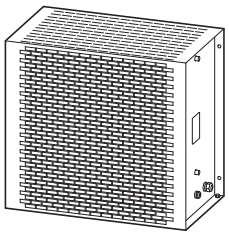
	Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
External keypad						
	with LED display Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	DC1, DA1	**DX-KEY-LED** 169132		1 off	UL/CSA certification not required
	with OLED display Front IP54 Multilingual With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	DC1, DA1	**DX-KEY-OLED** 169133			
Bluetooth communications stick						
For transferring parameters to a computer with drivesConnect software via Bluetooth						
 	With 2 function keys for uploading and downloading parameters with configuration memory	DC1, DA1	**DX-COM-STICK** 169134		1 off	UL/CSA certification not required
License Keys						
	For enabling the drivesConnect program's PLC function	DA1	**DX-COM-SOFT** 169136		1 off	UL/CSA certification not required
Connection cable						
Connection cable with RJ45 plugs, 8 pole						
	Length 0.5 m	DC1, DA1	**DX-CBL-RJ45-0M5** 169137		1 off	UL/CSA certification not required
	Length 1 m	DC1, DA1	**DX-CBL-RJ45-1M0** 169138			
	Length 3 m	DC1, DA1	**DX-CBL-RJ45-3M0** 169139			
Bus termination resistor						
	With 2 resistors, 120 Ω RJ45 plug, 8-pin for CANopen® and Modbus RTU	DX-SPL-RJ45-2SL-1PLT	**DX-CBL-TERM** 169140		1 off	UL/CSA certification not required
	8 pole RJ45 124 Ω Connection to PIN 1 and PIN 2 für CANopen®	easyNet easyNet	**EASY-NT-R** 256281		2 off	
Cable and splitter						
	RJ45, 8-pin, 2 sockets/1 plug	DC1, DA1	**DX-SPL-RJ45-2SL1PL** 169142		1 off	UL/CSA certification not required
Interface converter						
For directly connecting the variable-frequency drive to a computer with drivesConnect software						
	Interface converter USB/RS485 with connection cable, RJ45, 8 pole electrically isolated	DC1, DA1	**DX-CBL-PC-1M5** 171018		1 off	UL/CSA certification not required
	Interface converter USB/RS485 with connection cable, RJ45, 8 pole electrically isolated 1 × SUB-D plug, 9-pole Terminal strip, 5-terminal LED indicators	DC1, DA1	**DX-COM-PCKIT** 169135		1 off	UL/CSA certification not required

	Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
Expansion modules						
	110-V-input (electrically isolated)	DC1	**DXC-EXT-IO110** 169032		1 off	
	230-V-input (electrically isolated)	DC1	**DXC-EXT-IO230** 169033			
	2 relay outputs 1 analog output	DC1	**DXC-EXT-2RO1AO** 169030			
	2 relay outputs	DC1	**DXC-EXT-2RO** 169031			
	3 digital inputs 1 Relay output	DA1	**DXA-EXT-3DI1RO** 169036			
	3 relay outputs	DA1	**DXA-EXT-3RO** 169121			
Simulator						
	3 digital inputs 1 Relay output 1 Potentiometer	DC1	**DXC-EXT-LOCSIM** 169034		1 off	UL/CSA certification not required
Encoder module						
	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	**DXA-EXT-ENCOD** 169035		1 off	UL/CSA certification not required

	Fieldbus connection	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
Fieldbus modules						
2 x RJ45, 8 pole 	Ethernet IP	DA1	**DX-NET-ETHERNET-2** 169122		1 off	UL/CSA certification not required
	Modbus-TCP	DA1	**DX-NET-MODBUSTCP-2** 169126			
	EtherCAT	DA1	**DX-NET-ETHERCAT-2** 169127			
	BACnet/IP	DA1	**DX-NET-BACNETIP-2** 169128			
	PROFINET	DA1	**DX-NET-PROFINET-2** 169125			
Terminal strip, plug-in, 6-terminal 	DeviceNet	DA1	**DX-NET-DEVICENET** 169123			
SUB-D socket, 9-pole 	PROFIBUS-DP	DA1	**DX-NET-PROFIBUS** 169124			
SmartWire-DT Modules						
with slot for SWD4-8SF2-5 	SmartWire-DT	DA1 (IP20)	**DX-NET-SWD1** 169129		1 off	UL/CSA certification not required
	SmartWire-DT	DC1/DA1 (IP55/IP66)	**DX-NET-SWD2** 169130			
with slot for SWD4-8SF2-5 	SmartWire-DT	DC1 (IP20)	**DX-NET-SWD3** 169131			

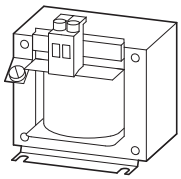
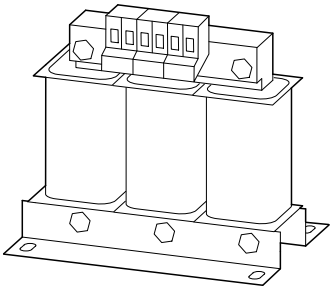
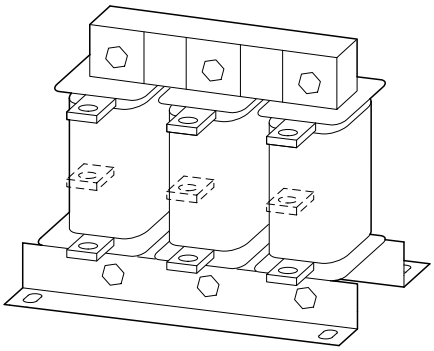
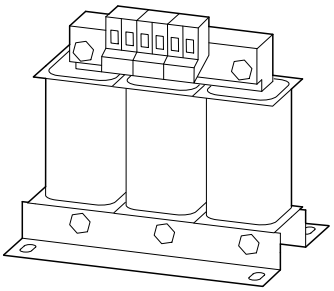
	Resistance value R Ω	Continuous braking rating P_{DB} kW	Protection type	For use with	**Part no.** Article no.	**Price** see price list	Std. pack	**Information relevant for export to North America**
Braking resistances								
Braking resistance in anodized aluminium enclosure for direct installation in frequency inverter enclosure of frame sizes FS2 und FS3								
	100	0.2	IP54	DC1, DA1	**DX-BR3-100** 169150		1 off	
Braking resistance in aluminum housing for direct installation in frequency inverter enclosure of frame sizes FS4 und FS5								
	33	0.5	IP54	DA1	**DX-BR5-033** 169151		1 off	
Braking resistance in aluminum housing Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring switch and a 1-meter connection cable								
	75	1.4	IP20	DC1, DA1	**DX-BR075-1K4** 171917		1 off	Product Standards UL508; C22.2 UL File No. E300773 UL Category Control No. NMTR2, NMTR8 CSA File No. E300773 CSA Class No. 14-M05 North America Certification UL listed, certified by UL for use in Canada Suitable for Branch circuits Max. Voltage Rating 600 Degree of Protection IEC: IP00
	100	1.4	IP20	DC1, DA1	**DX-BR100-1K4** 171896			
	100	0.8	IP20	DC1, DA1	**DX-BR100-0K8** 171907			
	100	1.6	IP20	DC1, DA1	**DX-BR100-1K6** 171924			
	150	0.5	IP20	DC1, DA1	**DX-BR150-0K5** 171916			
	150	1.4	IP20	DC1, DA1	**DX-BR150-1K4** 171895			
	200	0.8	IP20	DC1, DA1	**DX-BR200-0K8** 171894			
	200	0.4	IP20	DC1, DA1	**DX-BR200-0K4** 171915			
	400	0.4	IP20	DC1, DA1	**DX-BR400-0K4** 171914			
Braking resistance in aluminum housing Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring switch and internal connecting terminals								
	35	1.1	IP20	DA1	**DX-BR035-1K1** 171927		1 off	Product Standards UL508; C22.2 UL File No. E300773 UL Category Control No. NMTR2, NMTR8 CSA File No. E300773 CSA Class No. 14-M05 North America Certification UL listed, certified by UL for use in Canada Suitable for Branch circuits Max. Voltage Rating 600 Degree of Protection IEC: IP00
	50	0.4	IP20	DC1, DA1	**DX-BR050-0K4** 171906			
	50	9.8	IP20	DC1, DA1	**DX-BR050-0K8** 171910			
	100	0.2	IP20	DC1, DA1	**DX-BR100-0K2** 171909			
	100	0.4	IP20	DC1, DA1	**DX-BR100-0K4** 171926			

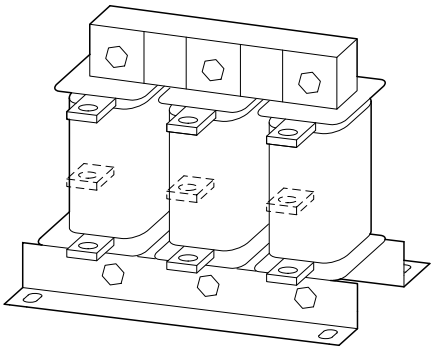
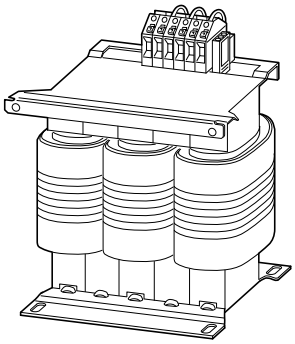
Braking resistance with steel wire mesh elements
Installed in a housing designed to prevent accidental contact and featuring a temperature monitoring switch and internal connecting terminals



Resistance value R Ω	Continuous braking rating P_{DB} kW	Protection type	For use with	**Part no.** Article no.	**Price** see price list	Std. pack	**Information relevant for export to North America**
2	54.3	IP20	DA1	**DX-BR002-54K3** 171923		1 off	
2	102.4	IP20	DA1	**DX-BR002-102K4** 171903			
6	5.1	IP20	DA1	**DX-BR006-5K1** 171913			
6	9.2	IP20	DA1	**DX-BR006-9K2** 171893			
6	18.1	IP20	DA1	**DX-BR006-18K1** 171922			
6	33.3	IP20	DA1	**DX-BR006-33K3** 171902			
12	3.1	IP20	DA1	**DX-BR012-3K1** 171912			
12	5.1	IP20	DA1	**DX-BR012-5K1** 171929			
12	9.2	IP20	DA1	**DX-BR012-9K2** 171921			
12	18.1	IP20	DA1	**DX-BR012-18K1** 171901			
22	1.4	IP20	DA1	**DX-BR022-1K4** 171911			
22	3.1	IP20	DA1	**DX-BR022-3K1** 171928			
22	5.1	IP20	DA1	**DX-BR022-5K1** 171920			
22	9.2	IP20	DA1	**DX-BR022-9K2** 171900			
40	3.1	IP20	DA1	**DX-BR040-3K1** 171919			
40	5.1	IP20	DA1	**DX-BR040-5K1** 171899			
47	3.1	IP20	DC1, DA1	**DX-BR047-3K1** 171908			
47	5.1	IP20	DC1, DA1	**DX-BR047-5K1** 171925			
47	9.2	IP20	DC1, DA1	**DX-BR047-9K2** 171905			
50	3.1	IP20	DC1, DA1	**DX-BR050-3K1** 171918			
50	5.1	IP20	DC1, DA1	**DX-BR050-5K1** 171898			
75	5.1	IP20	DC1, DA1	**DX-BR075-5K1** 171897			
100	6.2	IP20	DC1, DA1	**DX-BR100-6K2** 171904			

Product Standards	UL508; C22.2
UL File No.	E300773
UL Category Control No.	NMTR2, NMTR8
CSA File No.	E300773
CSA Class No.	14-M91
North America Certification	UL listed, certified by UL for use in Canada
Suitable for	Branch circuits
Max. Voltage Rating	1000
Degree of Protection	IEC: IP00

	Rated operational current I_e A	Inductance L mH	Maximum heat dissipation P_v W	**Part no.** Article no.	**Price** see price list	Std. pack
Mains chokes						
Single-phase max. permitted mains supply voltage V AC: 260 V + 0% (50/60 Hz)						
	5.8	5.05	9	**DX-LN1-006** 269490		1 off
	8.6	3.41	11	**DX-LN1-009** 269495		
	13	2.25	12	**DX-LN1-013** 269496		
	18	1.63	17	**DX-LN1-018** 269497		
	24	1.22	20	**DX-LN1-024** 269498		
	32	0.92	24	**DX-LN1-032** 169791		
three-phase max. permitted mains supply voltage V AC: 550 V + 0% (50/60 Hz)						
	3.9	7.51	17	**DX-LN3-004** 269500		1 off
	6	4.9	19	**DX-LN3-006** 269501		
	10	2.94	33	**DX-LN3-010** 269502		
	16	1.84	44	**DX-LN3-016** 269503		
	25	1.18	57	**DX-LN3-025** 269504		
	40	0.64	59	**DX-LN3-040** 269505		
	50	0.37	58	**DX-LN3-050** 269506		
	60	0.31	60	**DX-LN3-060** 269507		
	80	0.23	86	**DX-LN3-080** 269508		
	100	0.18	101	**DX-LN3-100** 269509		
	120	0.15	100	**DX-LN3-120** 269510		
	160	0.11	140	**DX-LN3-160** 269511		
	200	0.09	154	**DX-LN3-200** 269512		
	250	0.07	155	**DX-LN3-250** 269513		
	300	0.06	196	**DX-LN3-300** 269514		
	303	0.06	230	**DX-LN3-303** 169143		
	370	0.05	290	**DX-LN3-370** 169144		
	450	0.04	300	**DX-LN3-450** 169145		
Motor chokes			max. heat dissipation (pulse frequency) (12 kHz)			
three-phase max. permitted mains supply voltage V AC: 750 V + 0% (50/60 Hz)						
	5	2	24	**DX-LM3-005** 269538		1 off
	8	4.1	54	**DX-LM3-008** 269539		
	11	3	71	**DX-LM3-011** 269541		
	16	1.5	78	**DX-LM3-016** 269542		
	35	1	116	**DX-LM3-035** 269543		
	50	0.6	168	**DX-LM3-050** 269544		

	Rated operational current I_e A	Inductance L mH	Maximum heat dissipation P_v W	Part no. Article no.	Price see price list	Std. pack
Motor chokes			max. heat dissipation (pulse frequency) (12 kHz)			
three-phase max. permitted mains supply voltage V AC: 750 V + 0% (50/60 Hz)						
	63	0.5	193	**DX-LM3-063** 269545		1 off
	80	0.5	206	**DX-LM3-080** 269546		
	100	0.45	294	**DX-LM3-100** 269547		
	150	0.35	424	**DX-LM3-150** 269548		
	180	0.3	439	**DX-LM3-180** 269549		
	220	0.2	517	**DX-LM3-220** 269560		
	260	0.15	520	**DX-LM3-260** 269561		
	303	0.15	-	**DX-LM3-303** 169146		
	370	0.12	-	**DX-LM3-370** 169147		
	450	0.1	-	**DX-LM3-450** 169148		
Sine filter						
three-phase						
	4	11	50	**DX-SIN3-004** 271538		1 off
	10	5.1	100	**DX-SIN3-010** 271590		
	16.5	3.07	70	**DX-SIN3-016** 271591		
	23.5	2.5	125	**DX-SIN3-023** 271593		
	32	2	100	**DX-SIN3-032** 271594		
	37	1.7	100	**DX-SIN3-037** 271595		
	48	1.2	240	**DX-SIN3-048** 271597		
	61	1	280	**DX-SIN3-061** 271599		
	72	0.95	300	**DX-SIN3-072** 271600		
	90	0.8	290	**DX-SIN3-090** 271601		
	115	0	460	**DX-SIN3-115** 271602		
	150	0.5	530	**DX-SIN3-150** 271603		
	180	0.4	500	**DX-SIN3-180** 271604		
	250	0.35	550	**DX-SIN3-250** 271605		
	440	0.14	650	**DX-SIN3-440** 271606		1 off
	480	0.14	1550	**DX-SIN3-480** 169149		1 off

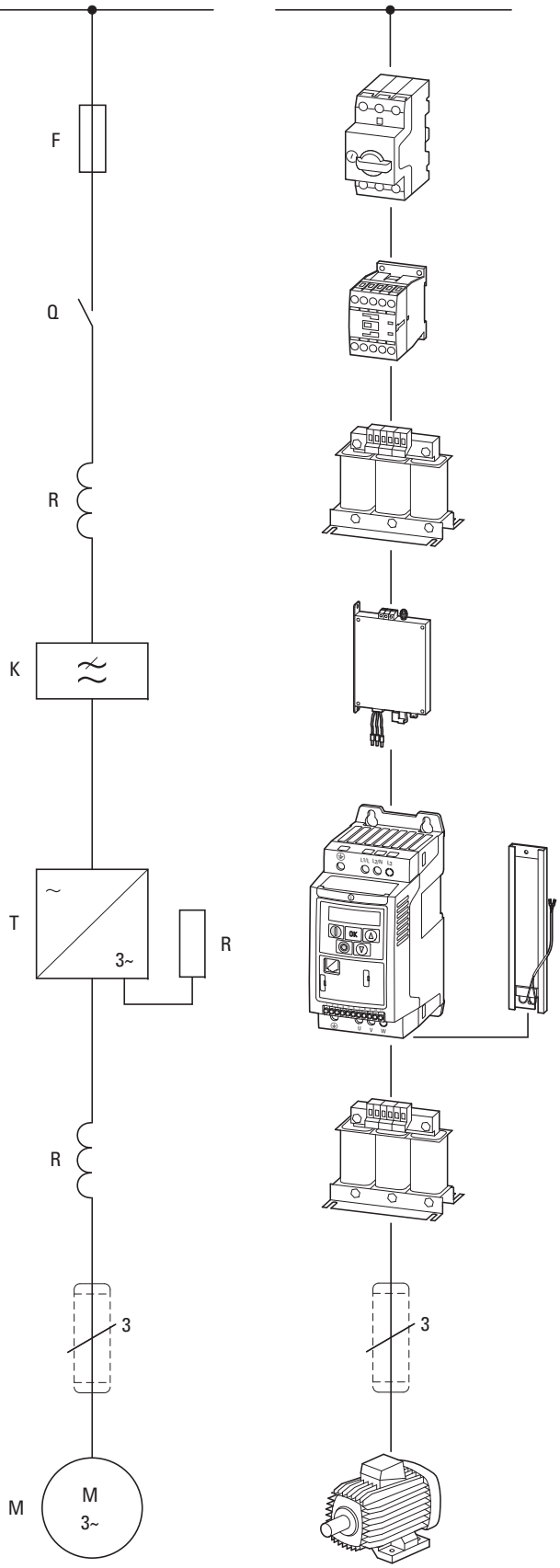
Instructions

Information relevant for export to North America

Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E167225
UL Category Control No.	XPTQ2, XPTQ8
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Suitable for	Branch circuits
Max. Voltage Rating	1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection	IEC: IP00

	Input current I_{LN} T	For use with	Part no. Article no.	Price see price list	Std. pack
Radio interference suppression filters					
Single-phase Mains voltage (50/60Hz) U_{LN} [V] max. 240 + 10% Base-mounted filter					
	8	DC1-12 DA1-12…	**DX-EMC12-008** 172273		1 off
	12		**DX-EMC12-012** 172274		
	16		**DX-EMC12-016** 172275		
	20		**DX-EMC12-020** 172276		
	30		**DX-EMC12-030** 172277		
three-phase Mains voltage (50/60Hz) U_{LN} [V] max. 480 + 10% Base-mounted filter					
	8	DC1-32… DC1-34… DA1-32… DA1-34…	**DX-EMC34-008** 172278		1 off
	12		**DX-EMC34-012** 172279		
	16		**DX-EMC34-016** 172280		
	30		**DX-EMC34-030** 172281		
Mounting to the side, next to the variable frequency drive					
	42	DA1-32… DA1-34…	**DX-EMC34-042** 172282		
	55		**DX-EMC34-055** 172283		
	75		**DX-EMC34-075** 172284		
	100		**DX-EMC34-100** 172285		
	130		**DX-EMC34-130** 172286		
	180		**DX-EMC34-180** 172287		
	250		**DX-EMC34-250** 172288		
	400		**DX-EMC34-400** 172289		

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 a grounded 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) allow the protection of lines and electrical devices. For the protection of persons, AC/DC-sensitive residual current circuit-breakers (RCD Type B) are required in addition.

Contactors are used to switch the mains voltage on and off.

Mains choke damp harmonic distortion (THD) and current peaks and limit inrush currents (the DC link capacitors' charging current). In addition, they protect the mains rectifier from voltage peaks coming from the mains.

Radio interference suppression filter attenuate high-frequency electromagnetic emissions from devices. 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 (optional) make it possible to use 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 drive allow the continuously 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.

On **brake resistor** converts the variable frequency drive's regenerative braking energy 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 choke
- Compensate the capacitive capacitive currents,
- Reduce current ripple and the motor's current change noise,
- Attenuate the retroaction on parallel connection of several motors.

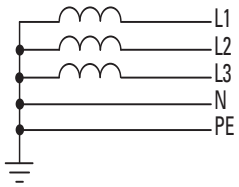
sine filter
- Smoothen the output voltage sinusoidally,
- reduce motor noise through du/dt reduction, and thereby increase the motor insulation's lifespan,
- Reduce the leakage currents to allow better motor performance at improved EMC values.

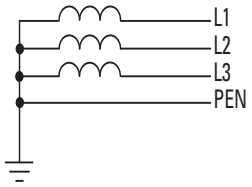
Screened motor cables attenuate radiated and conducted high-frequency emissions within the limits defined in the applicable product standard (EMC). They must be connected to the earth potential on both sides across a large area (PES).

Three-phase asynchronous motor (standard motor) converts electric power (P ~ U × I) into mechanical power (P ~ M × n).

Electrical mains connection

Frequency inverters can be connected to and operated on star point-earthed AC supply systems (as per IEC 60364) without restrictions.





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 frequency inverters without internal radio interference suppression filters (EMC) may be used. In the case of devices with an integrated radio interference suppression filter, the filter's protective earth connection must be disconnected.

The standardized rated operating voltages of the utility companies fulfil the following conditions at the point of transfer to the consumer:

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

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

In ring-operated mesh networks (such as 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.

Table: 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
480 V	440 - 480 V	460 V
600 V	550 - 600 V	575V

Safety and switching

For frequency inverters, 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 frequency inverter.

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

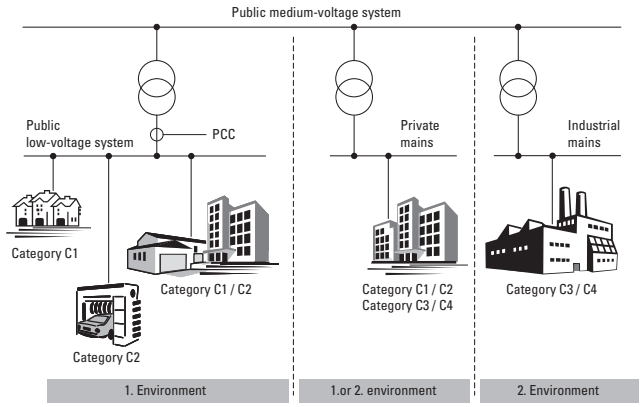
Earth leakage currents will be produced when using frequency-controlled drives due to the nature of the system. The main reasons for this consist of external capacitances between the phases of the motor cable, the motor cable's screening, Y capacitors in the frequency inverter, and radio interference suppression filters, as well as earthing measures at the motor's site of operation. These leakage currents can exceed 3.5 mA and require improved PDS earthing as per EN 50178 (earth conductor cross-section ≥ 10 mm²).

EMC compliance

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

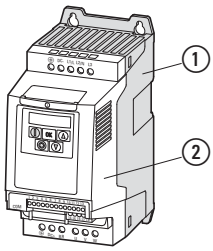
In Europe, adherence to the EMC Directive is mandatory. The EMC product standard for power drive systems (PDS) is IEC/EN 61800-3. This standard covers the complete drive system, from mains infeed to the motor.

Both versions of DC1 and DA1 series frequency inverters (with internal/external radio interference suppression filter) meet the requirements of the EMC product standard for residential areas (first environment) and therefore the higher limits for industrial environment (second environment) as well.



Frequency inverters

A frequency inverter 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 frequency inverter are a power section ① and a control section ②.



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)

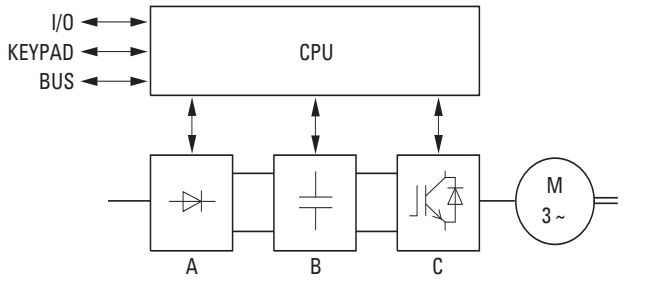
The functional control of the frequency inverter and the output values in the power section (such as frequency, voltage and current) can be adjusted through:

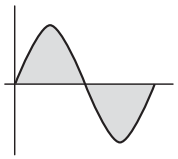
- Control terminals (I/O) with analog and digital (binary) inputs,
- A keypad with function keys and display units,
- Serial interfaces (BUS) with RS485 (Modbus RTU) and optional fieldbus connections (CANopen, PROFIBUS-DP etc.) and an optional PC connection.

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

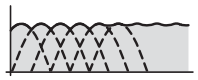
The power section of a static compact frequency generally consists of three subgroups:

- Rectifier (A),
- Internal DC link (B),
- Inverter module (C).

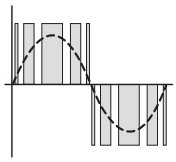




U_{LN} = phase voltage fromsupplying AC mains



U_{DC} = DC link voltage
U_{DC} = 1.41 x U_{LN}



Output voltage = switched DC link voltage with sinusoidal pulse width modulation (PWM)

Block diagram with main components of a frequency inverter

Control methods

The IGBTs in the variable frequency series' inverter 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)

The **Voltage frequency control** is the best known and most commonly used method. A simple characteristic curve (linear or quadratic) defines the motor's rotating field frequency and the corresponding three-phase line-to-line motor voltage is selected such that the motor is neither over nor under-magnetized.

Main applications of U/f control:

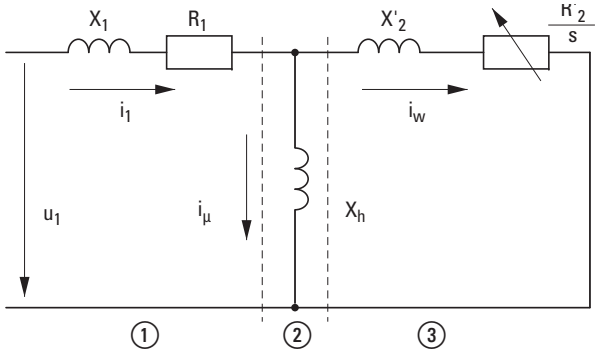
- pump and fan drives,
- horizontal conveying and transportation systems,
- multiple motor drives (parallel operation of several motors at the variable frequency drive's output).

Bei der **V/Hz control with slip compensation** can compensate for the load-dependent speed change in individual drives (sensorless).

Bei der **In sensorless vector control** the magnetic fields of the stator and rotor windings are aligned so as to oppose each other. With asynchronous motors the magnetic flux in the rotor must be mapped in an electronic model of the motor. This requires the physical parameters on the motor's rating plate to be entered. In vector operation the frequencyinverter can control only one motor. 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 sensorlessvector control are:

- Material machining and processing equipment
- Condensors (compressor),
- Heavy starting duty (extruder, agitators, mixer),
- Horizontal conveying equipment (cranes, elevators).

Bei der **Vector control** uses the variable frequency drive's output current as 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 for 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 (u1, i1) to calculate the required manipulated variable for flux-generating component i_μ and torque-generating component in the rotor iw. The motor's load dependent slip is represented as resistor R'2/s. During no-load operation, this value approaches infinity (iw → 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 = Utility company
IGBT = Insulated-gate bipolar transistor
PDS = Magnet system
RCD = Residual current device

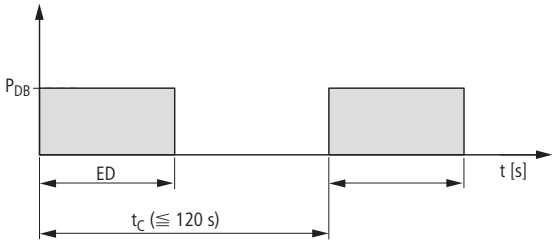
Technical information concerning braking resistances:

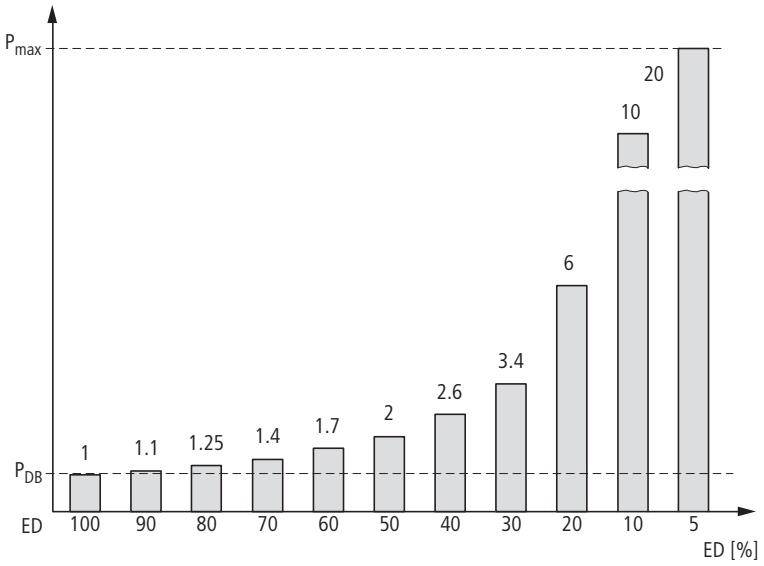
The braking resistors' specified P_{DB} power dissipation applies to continuous operation.
In short-time operation these values can be increased by multiplying them with the type-specific power factor using the following formula:

$P_{max} \leq (P_{DB} \times 100\ \%) \div ED\ [\%]$

P_{max} = maximum pulse rating
P_{DB} = continuous rating at a duty factor of 100 %
ED = duty factor
t_c = Cycle time (max. 120 seconds)
The duty factor is stated as a percentage (%) and is calculated with the formula:

$ED\ [\%] = (ED \times 100\ \%) \div t_c$



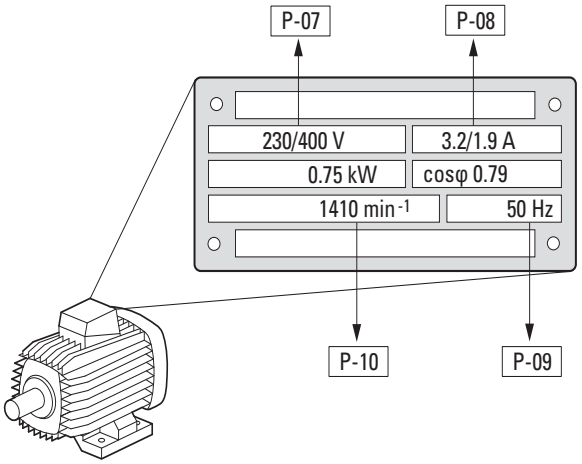


Connecting example for a 0.75 kW motor with the rating plate illustrated here.

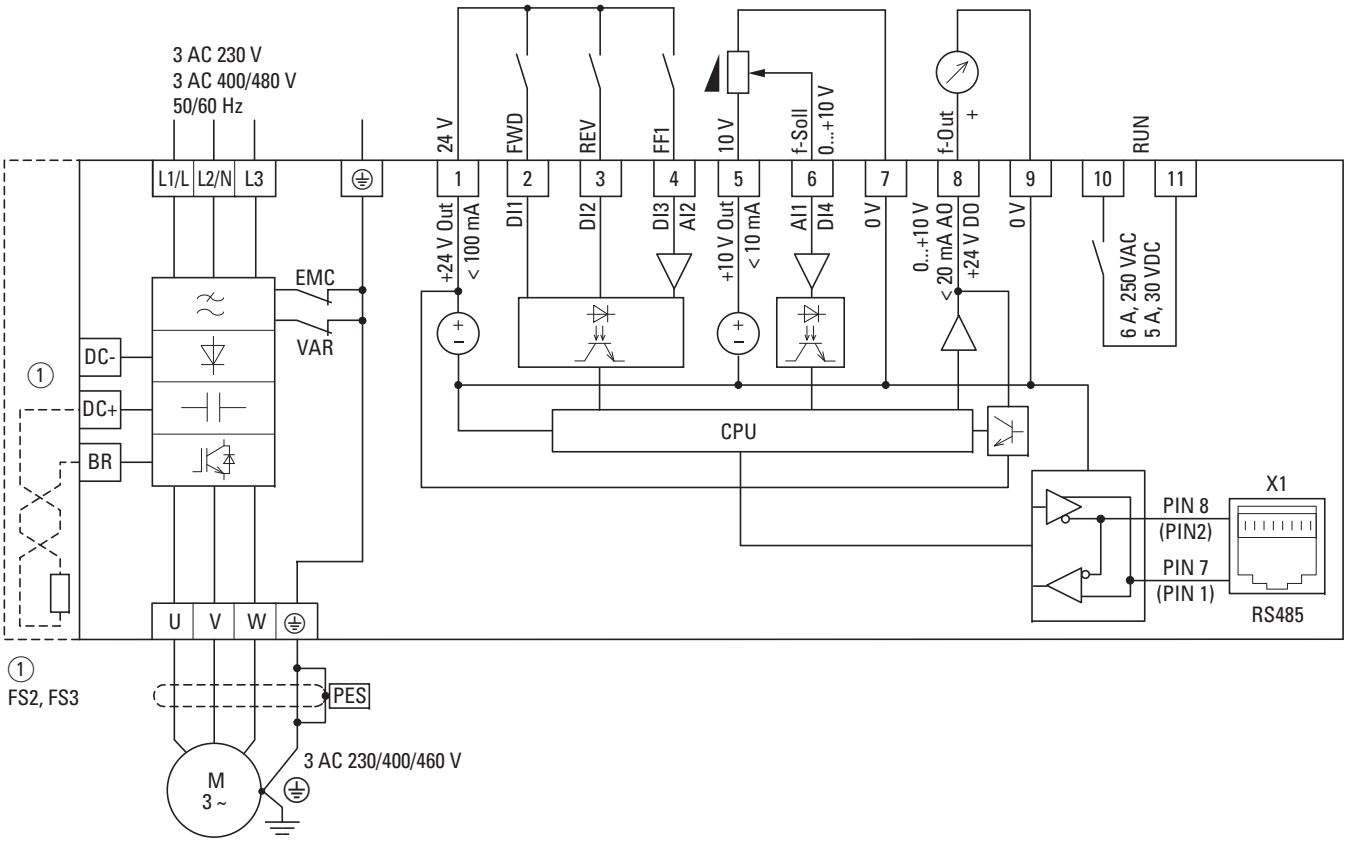
The variable frequency drives are configured by default in such a way that they can be operated immediately with V/Hz control when connected to the assigned motor rating without having to configure any additional parameters.

To ensure ideal operational behavior (e.g., slip compensation, vector control, etc.), the data on the motor's rating plate should be entered into the variable frequency drive (electric motor map).

The following example shows the necessary parameter settings for a variable frequency drive (a DC1 in this example)



and connection examples for single-phase and three-phase mains voltages:



Block diagram for DC1-32... and DC1-34... with internal radio interference suppression filter
① Only sizes FS2 and FS3 have connection terminals DC+ and BR- for an external braking resistance (optional).

The control signal terminals are factory set as follows:

1: 24 V: +24 V control voltage, max. 100 mA
2: DI1: FWD = Clockwise rotating field enable (Forward)
3: DI2: REV = Anticlockwise rotating field enable (Reverse)
4: DI3: FF1 = Fixed frequency 1 or AI2
5: 10 V: +10 V reference voltage, max. 10 mA
6: AI1: f-setpoint = Frequency setpoint value (0 - +10 V)
7: 0 V, reference potential
8: AO: f-Out = Output frequency to motor (0 - +10 V)
9: 0 V, reference potential
10/11: Relay: RUN = Operating signal (N/O)

DI: Digital input = +24 VDC digital input
AI: Analog input = 0 - 10 V, 0/4 - 20 mA analog input
DO: Digital output = +24 VDC, max. 20 mA digital output
AO: Analog output = 0 - +10 V, max. 20 mA analog output

Parameters are used to define the function and mode of operation for the digital and analog inputs/outputs. These parameters are described in manual MN04020003Z.

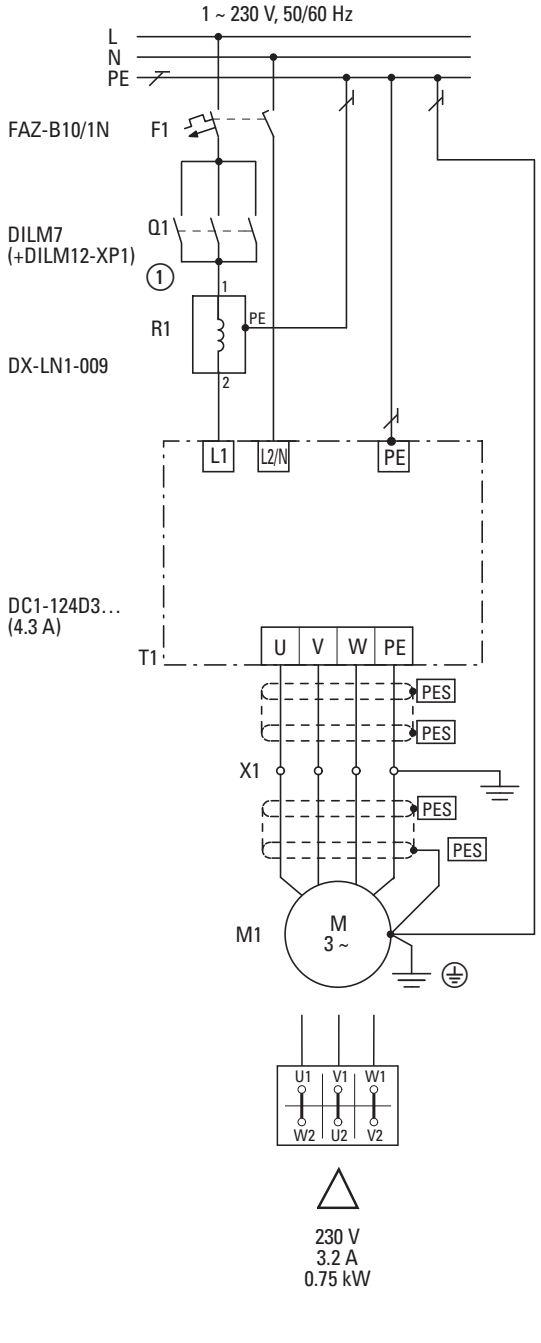
Connection example for a 0.75 kW motor

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

DC1… frequency inverter with single-phase mains supply (230 V)

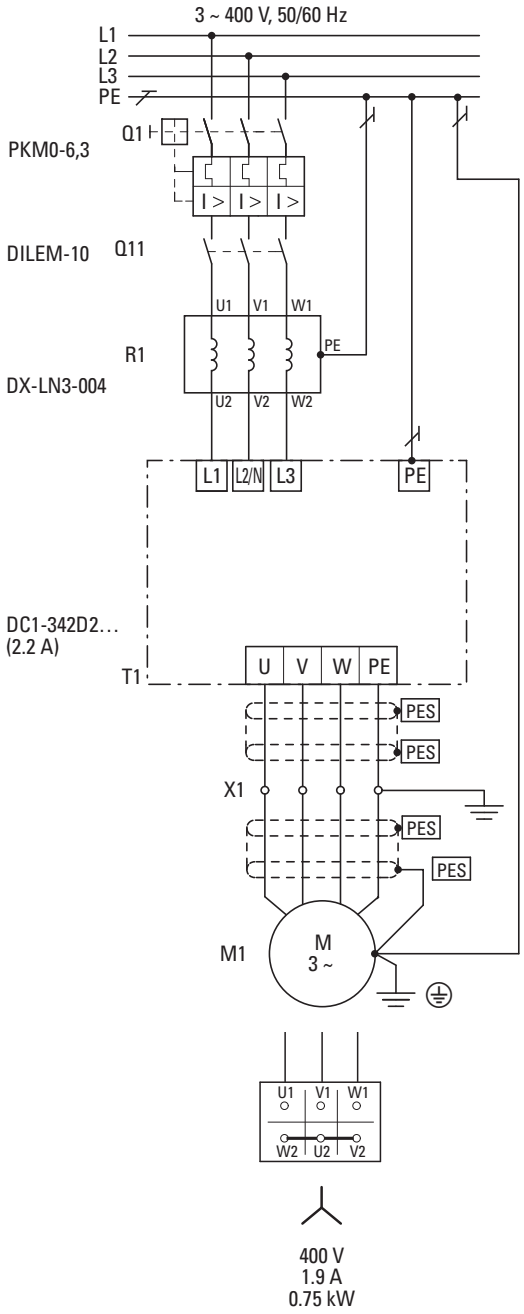


The previously indicated 0.75 kW motor can be connected in a delta configuration for a single-phase 230-V supply system (version A) or in a star configuration for a 400-V supply system (version B).
The frequency inverter and the type-specific accessories are selected for 1 AC 230 V (DC1-124D3...) or for 3 AC 400 V (MMX34AA2D4) depending on the mains voltage selected.

Variant B:

Motor in star configuration

DC1… frequency inverter with three-phase mains supply (400 V)



① Optional connection option for single-phase connections

Engineering

Part no.	Motor			Frequency inverters		Power Wiring				Motor connection		Braking resistances for duty factors (DF) as a %[3]		
	Assigned motor rating [1]		Rated motor current	Rated operational current[2]	Input current	Protection device	Protection device	Contactor	Mains choke	Motor choke	Sine filter	10%	20%	40%
	P	P	I_e	I_e	I_{LN}									
	kW	HP	A	A	T									
U_e230 V AC, 1-phase/$U_2$230 V AC, 3-phase														
DC1-122D3	0.37	0.5	2	2.3	5	FAZ-B10/1N	-	DILM7	DX-LN1-006	DX-LM3-005	DX-SIN3-004	-	-	-
DC1-124D3	0.75	1	3.2	4.3	8.5	FAZ-B10/1N	-	DILM7	DX-LN1-013	DX-LM3-005	DX-SIN3-010	-	-	-
DC1-127D0	1.5	2	6.3	7	13.9	FAZ-B16/1N	-	DILM7	DX-LN1-018	DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DC1-12011	2.2	3	8.7	10.5	19.5	FAZ-B25/1N	-	DILM7	DX-LN1-024	DX-LM3-011	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DC1-12015	4	5	14.8	15	30.5	FAZ-B40/1N	-	DILM7	DX-LN1-032	DX-LM3-016	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
U_e230 V AC, 3-phase/$U_2$230 V AC, 3-phase														
DC1-322D3	0.37	0.5	2	2.3	3	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-004	DX-LM3-005	DX-SIN3-004	-	-	-
DC1-324D3	0.75	1	3.2	4.3	4.5	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006	DX-LM3-005	DX-SIN3-010	-	-	-
DC1-327D0	1.5	2	6.3	7	7.3	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010	DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DC1-32011	2.2	3	8.7	10.5	11	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-016	DX-LM3-011	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DC1-32018	4	5	14.8	18	18.8	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-025	DX-LM3-035	DX-SIN3-023	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
U_e400 V AC, 3-phase/$U_2$400 V AC, 3-phase														
DC1-342D2	0.75	1	1.9	2.2	2.4	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-004	DX-LM3-005	DX-SIN3-004	-	-	-
DC1-344D1	1.5	2	3.6	4.1	4.3	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006	DX-LM3-005	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DC1-345D8	2.2	3	5	5.8	6.1	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010	DX-LM3-008	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DC1-349D5	4	5	8.5	9.5	9.8	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-010	DX-LM3-011	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DC1-34014	5.5	7.5	11.3	14	14.6	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-016	DX-LM3-016	DX-SIN3-016	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DC1-34018	7.5	10	15.2	18	18.1	FAZ-B25/3	PKM0-25	DILM7	DX-LN3-025	DX-LM3-035	DX-SIN3-023	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DC1-34024	11	15	21.7	24	24.7	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025	DX-LM3-035	DX-SIN3-023	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
U_e230 V AC, 1-phase/$U_2$230 V AC, 3-phase														
DA1-124D3	0.75	1	3.2	4.3	8.5	FAZ-B10/1N	-	DILM7	DX-LN1-013	DX-LM3-005	DX-SIN3-010	DX-BR100-0K2	DX-BR100-0K4	-
DA1-127D0	1.5	2	6.3	7	13.9	FAZ-B16/1N	-	DILM7	DX-LN1-018	DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	-
DA1-12011	2.2	3	8.7	10.5	19.5	FAZ-B25/1N	-	DILM7	DX-LN1-024	DX-LM3-011	DX-SIN3-016	DX-BR050-0K8	DX-BR035-1K1	-
U_e230 V AC, 3-phase/$U_2$230 V AC, 3-phase														
DA1-324D3	0.75	1	3.2	4.3	4.5	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006	DX-LM3-005	DX-SIN3-010	DX-BR100-0K2	DX-BR100-0K4	-
DA1-327D0	1.5	2	6.3	7	7.3	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010	DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	-
DA1-32011	2.2	3	8.7	10.5	11	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-016	DX-LM3-011	DX-SIN3-016	DX-BR050-0K8	DX-BR035-1K1	-
DA1-32018	4	5	14.8	18	18.8	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-025	DX-LM3-035	DX-SIN3-023	DX-BR022-1K4	DX-BR022-3K1	-
DA1-32024	5.5	7.5	19.6	24	24.8	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025	DX-LM3-035	DX-SIN3-032	DX-BR022-1K4	DX-BR022-3K1	-
DA1-32039	7.5	10	26.4	39	40	FAZ-B50/3	-	DILM25	DX-LN3-040	DX-LM3-050	DX-SIN3-048	DX-BR022-1K4	DX-BR022-3K1	-
DA1-32046	11	15	38	46	47.1	FAZ-B63/3	-	DILM40	DX-LN3-050	DX-LM3-050	DX-SIN3-048	DX-BR022-1K4	DX-BR022-3K1	-
DA1-32061	15	20	51	61	62.4	NZMC1-S80	-	DILM50	DX-LN3-080	DX-LM3-063	DX-SIN3-061	DX-BR012-3K1	DX-BR012-5K1	-
DA1-32072	18.5	25	63	72	74.1	NZMC1-S80	-	DILM65	DX-LN3-080	DX-LM3-080	DX-SIN3-072	DX-BR012-3K1	DX-BR012-5K1	-
DA1-32090	22	30	71	90	92.3	NZMC2-S100	-	DILM80	DX-LN3-100	DX-LM3-100	DX-SIN3-090	DX-BR006-5K1	DX-BR006-9K2	-
DA1-32110	30	40	96	110	112.7	NZMC2-S125	-	DILM95	DX-LN3-120	DX-LM3-150	DX-SIN3-115	DX-BR006-5K1	DX-BR006-9K2	-
DA1-32150	45	50	141	150	153.5	NZMC2-S160	-	DILM150	DX-LN3-160	DX-LM3-150	DX-SIN3-150	DX-BR006-5K1	DX-BR006-9K2	-
DA1-32180	55	60	173	180	183.8	NZMC2-S200	-	DILM170	DX-LN3-200	DX-LM3-180	DX-SIN3-180	DX-BR006-5K1	DX-BR006-9K2	-
DA1-32202	55	75	173	202	206.2	NZMC3-S250	-	DILM185A	DX-LN3-250	DX-LM3-220	DX-SIN3-250	DX-BR006-5K1	DX-BR006-9K2	-
DA1-32248	75	100	233	248	252.8	NZMC3-S320	-	DILM185A	DX-LN3-300	DX-LM3-260	DX-SIN3-250	DX-BR006-5K1	DX-BR006-9K2	-

[1] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)
[2] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0
[3] Only for devices with an internal braking chopper

Part no.	Motor			Frequency inverters		Power Wiring			
	Assigned motor rating [1]		Rated motor current	Rated operational current[2]	Input current	Protection device	Protection device	Contactor	Mains choke
	P	P	I_e	I_e	I_{LN}				
	kW	HP	A	A	T				
U_e400 V AC, 3-phase/$U_2$400 V AC, 3-phase									
DA1-342D2	0.75	1	1.9	2.2	2.4	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-004
DA1-344D1	1.5	2	3.6	4.1	4.3	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006
DA1-345D8	2.2	3	5	5.8	6.1	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DA1-349D5	4	5	8.5	9.5	9.8	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-010
DA1-34014	5.5	7.5	11.3	14	14.6	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-016
DA1-34018	7.5	10	15.2	18	18.1	FAZ-B25/3	PKM0-25	DILM7	DX-LN3-025
DA1-34024	11	15	21.7	24	24.7	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025
DA1-34030	15	20	29.3	30	30.8	FAZ-B40/3	-	DILM17	DX-LN3-040
DA1-34039	18.5	25	36	39	40	FAZ-B50/3	-	DILM25	DX-LN3-040
DA1-34046	22	30	41	46	47.1	FAZ-B63/3	-	DILM40	DX-LN3-050
DA1-34061	30	40	55	61	62.8	NZMC1-S80	-	DILM50	DX-LN3-080
DA1-34072	37	50	68	72	73.8	NZMC1-S80	-	DILM65	DX-LN3-080
DA1-34090	45	60	81	90	92.2	NZMC1-S100	-	DILM80	DX-LN3-100
DA1-34110	55	75	99	110	112.5	NZMC2-S125	-	DILM95	DX-LN3-120
DA1-34150	75	100	134	150	153.2	NZMC2-S160	-	DILM150	DX-LN3-160
DA1-34180	90	150	161	180	183.7	NZMC2-S200	-	DILM170	DX-LN3-200
DA1-34202	110	175	196	202	205.9	NZMC3-S250	-	DILM185A	DX-LN3-250
DA1-34240	132	200	231	240	244.5	NZMC3-S320	-	DILM185A	DX-LN3-250
DA1-34302	160	250	279	302	307.8	NZMC3-S400	-	DILM225A	DX-LN3-370
DA1-34370	200	300	349	370	-	NZMC3-S400	-	-	-
DA1-34450	250	350	437	450	-	NZMC3-S500	-	-	-

[1] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)
[2] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0
[3] Only for devices with an internal braking chopper

Motor connection		Braking resistances for duty factors (DF) as a %[3]		
Motor choke	Sine filter	10%	20%	40%
DX-LM3-005	DX-SIN3-004	DX-BR400-0K4	DX-BR400-0K4	-
DX-LM3-005	DX-SIN3-010	DX-BR200-0K4	DX-BR200-0K8	-
DX-LM3-008	DX-SIN3-010	DX-BR150-0K5	DX-BR150-1K4	-
DX-LM3-011	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K4	-
DX-LM3-016	DX-SIN3-016	DX-BR075-1K4	DX-BR075-5K1	-
DX-LM3-035	DX-SIN3-023	DX-BR050-3K1	DX-BR050-5K1	-
DX-LM3-035	DX-SIN3-023	DX-BR040-3K1	DX-BR040-5K1	-
DX-LM3-035	DX-SIN3-032	DX-BR022-5K1	DX-BR022-9K2	-
DX-LM3-050	DX-SIN3-048	DX-BR022-5K1	DX-BR022-9K2	-
DX-LM3-050	DX-SIN3-048	DX-BR022-5K1	DX-BR022-9K2	-
DX-LM3-063	DX-SIN3-061	DX-BR012-9K2	DX-BR012-18K1	-
DX-LM3-080	DX-SIN3-090	DX-BR012-9K2	DX-BR012-18K1	-
DX-LM3-100	DX-SIN3-115	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-150	DX-SIN3-115	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-150	DX-SIN3-150	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-180	DX-SIN3-180	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-220	DX-SIN3-250	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-260	DX-SIN3-250	DX-BR006-18K1	DX-BR006-33K3	-
DX-LM3-303	DX-SIN3-440	DX-BR006-18K1	DX-BR006-33K3	-
-	-	DX-BR002-54K3	DX-BR002-102K4	-
-	-	DX-BR002-54K3	DX-BR002-102K4	-

			DC1-S17D0…	DC1-S1011…	DC1-1D2D3…	DC1-1D4D3…	DC1-1D5D3…	DC1-S24D3…	DC1-S27D0…	
General										
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)					< 95 %, average relative humidity (RH), non-condensing (EN 50178)		
Mounting position			Vertical					Vertical		
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m					0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m		
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)					BGV A3 (VBG4, finger- and back-of-hand proof)		
Radio interference level										
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.		
Environment (EMC)			1st and 2nd environments					1st and 2nd environments		
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit										
Supply										
Rated operational voltage	U_e		115 V AC, single-phase					230 V AC, 1-phase		
Notes			-	-	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}	V	110 (-10%) - 115 (+10%)					200 (-10%) - 240 (+10%)		
Input current	I_{LN}	T	8.5	12.5	11	19	25	6	9.3	14
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds		Maximum of one time every 30 seconds			Maximum of one time every 30 seconds		
Power section										
Overload current for 60 s every 600 s	I_L	A	10.5	15.75	3.45	6.45	8.7	6.45	10.5	15.75
Starting current for 2 s	I_L	A	12.25	18.38	4.03	7.53	10.15	7.53	12.25	18.38
Output voltage with V_e	U_2		115 V AC, single-phase		230 V AC, 3-phase			230 V AC, single-phase	230 V AC, single-phase	230 V AC, single-phase
Output Frequency	f_2	Hz	0 - 50 Hz (max. 120 Hz)		0 - 50 Hz (max. 500 Hz)			0 - 50 Hz (max. 120 Hz)	0 - 50 Hz (max. 120 Hz)	0 - 50 Hz (max. 120 Hz)
Switching frequency	f_{PWM}	kHz	16 (adjustable 4 - 32)					16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)
Operation Mode			U/f control					U/f control		
			Slip compensation					Slip compensation		
Frequency resolution (setpoint value)	△f	Hz	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rated operational current	I_e	A	7	10.5	2.3	4.3	5.8	4.3	7	10.5
Power loss										
Heat dissipation at rated operational current	P_V	W	18.5	22	18.5	37.5	44	18.5	37.5	44
Efficiency	η	%	95	96	95	95	96	95	95	96
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	2.49	2.49	< 1	< 1	< 1	2.49	2.49	2.49
Frame size			FS1	FS2	FS1	FS1	FS2	FS1	FS1	FS2
Motor feeder										
Assigned motor rating										
at 115 V, 50 Hz	P	kW	0.37	0.55	-	-	-	-	-	-
at 230 V, 50 Hz	P	kW	-	-	0.37	0.75	1.1	-	-	-
110 - 120 V, 60 Hz	P	HP	0.5	0.75	-	-	-	-	-	-
at 220 - 240 V, 60 Hz	P	HP	-	-	0.5	1	1.5	-	-	-
Apparent power										
Apparent power at rated operation 230 V	S	kVA	0	0	-	-	-	0.99	1.61	2.42
Apparent power at rated operation 240 V	S	kVA	0	0	-	-	-	1.03	1.68	2.52
Braking function										
Standard braking torque			-	-	max. 30% M_N	max. 30% M_N	max. 30% M_N	-	-	-
DC braking torque			max. 100% of rated operational current I_e, variable					max. 100% of rated operational current I_e, variable		
Braking torque with external braking resistance			-	max. 100% rated operational current I_e, with external braking resistance	-	-	max. 100% rated operational current I_e, with external braking resistance	-	-	max. 100% rated operational current I_e, with external braking resistance
minimum external braking resistance	R_{min}	Ω	-	47	-	-	47	-	-	47
Switch-on threshold for the braking transistor	U_{DC}	V	-	-	-	-	390 V DC	-	-	390 V DC
DC braking	%	I/I_e	-	-	-	-	-	-	-	-
Braking torque	%	I/I_e	-	-	-	-	-	-	-	-
Control section										
External control voltage	U_c	V	24 V DC (max. 100 mA)					24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)					10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note [1] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

Part no.			DC1-122D3…	DC1-124D3…	DC1-127D0…	DC1-12011…	DC1-12015…	DC1-322D3…	DC1-324D3…	DC1-327D0…	DC1-32011…	DC1-32018…
General												
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)									
Mounting position			Vertical									
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m									
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)									
Radio interference level												
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.									
Environment (EMC)			1st and 2nd environments									
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit												
Supply												
Rated operational voltage	U_e		230 V AC, 1-phase					230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	200 (-10%) - 240 (+10%)					200 (-10%) - 240 (+10%)				
Input current	I_{LN}	T	5	8.5	13.9	19.5	30.5	3	4.5	7.3	11	18.8
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds					Maximum of one time every 30 seconds				
Power section												
Overload current for 60 s every 600 s	I_L	A	3.45	6.45	10.5	15.75	22.5	3.45	6.45	10.5	15.75	27
Starting current for 2 s	I_L	A	4.03	7.53	12.25	18.38	26.25	4.03	7.53	12.25	18.38	31.5
Output voltage with V_e	U_2		230 V AC, 3-phase					230 V AC, 3-phase				
Output Frequency	f_2	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f_{PWM}	kHz	16 (adjustable 4 - 32)				8 (adjustable 4 - 24)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	8 (adjustable 4 - 24)
Operation Mode			U/f control Slip compensation					U/f control Slip compensation				
Frequency resolution (setpoint value)	△f	Hz	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rated operational current	I_e	A	2.3	4.3	7	10.5	15	2.3	4.3	7	10.5	18
Power loss												
Heat dissipation at rated operational current	P_V	W	18.5	45.75	63	103.4	160	14.8	39.75	61.5	90.2	160
Efficiency	η	%	95	93.9	95.8	95.3	96	96	94.7	95.9	95.9	96
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	2.49	2.49	2.49	2.49	< 1	< 1	< 1	< 1	< 1	< 1
Frame size			FS1	FS1	FS2	FS2	FS3	FS1	FS1	FS2	FS2	FS3
Motor feeder												
Assigned motor rating												
at 230 V, 50 Hz	P	kW	0.37	0.75	1.5	2.2	4	0.37	0.75	1.5	2.2	4
at 220 - 240 V, 60 Hz	P	HP	0.5	1	2	3	5	0.5	1	2	3	5
Apparent power												
Apparent power at rated operation 230 V	S	kVA	0.92	1.71	2.79	4.18	5.98	0.92	1.71	2.79	4.18	7.17
Apparent power at rated operation 240 V	S	kVA	0.96	1.79	2.91	4.36	6.24	0.96	1.79	2.91	4.36	7.48
Braking function												
Standard braking torque			max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N
DC braking torque			max. 100% of rated operational current I_e, variable					max. 100% of rated operational current I_e, variable				
Braking torque with external braking resistance			-	-	max. 100% rated operational current I_e, with external braking resistance				-	max. 100% rated operational current I_e, with external braking resistance	max. 100% rated operational current I_e, with external braking resistance	max. 100% rated operational current I_e, with external braking resistance
minimum external braking resistance	R_{min}	Ω	-	-	100	47	47		-	100	47	47
Switch-on threshold for the braking transistor	U_{DC}	V	-	-	390 V DC	390 V DC	390 V DC		-	390 V DC	390 V DC	390 V DC
DC braking	%	I/I_e	-	-	-	-	-		-	-	-	-
Braking torque	%	I/I_e	-	-	-	-	-		-	-	-	-
Control section												
External control voltage	U_c	V	24 V DC (max. 100 mA)					24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)					10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note [1] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

Part no.			DC1-342D2…	DC1-344D1…	DC1-345D8…	DC1-349D5…	DC1-34014…	DC1-34018…	DC1-34024…
General									
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)				< 95 %, average relative humidity (RH), non-condensing (EN 50178)		
Mounting position			Vertical				Vertical		
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m		
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)				BGV A3 (VBG4, finger- and back-of-hand proof)		
Radio interference level									
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.		
Environment (EMC)			1st and 2nd environments				1st and 2nd environments		
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit									
Supply									
Rated operational voltage	U_e		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)
Input current	I_{LN}	T	2.4	4.3	6.1	9.8	14.6	18.1	24.7
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds				Maximum of one time every 30 seconds		
Power section									
Overload current for 60 s every 600 s	I_L	A	3.3	6.15	8.7	14.25	21	27	36
Starting current for 2 s	I_L	A	3.85	7.18	10.15	16.63	24.5	31.5	42
Output voltage with V_e	U_2		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f_{PWM}	kHz	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)
Operation Mode			U/f control Slip compensation				U/f control Slip compensation		
Frequency resolution (setpoint value)	△f	Hz	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rated operational current	I_e	A	2.2	4.1	5.8	9.5	14	18	24
Power loss									
Heat dissipation at rated operational current	P_V	W	63.75	76.5	101.2	136	209	300	297
Efficiency	η	%	91.5	94.9	95.4	96.6	96.2	97	97.3
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	< 1	< 1	< 1	< 1	< 1	< 1	2.49
Frame size			FS1	FS2	FS2	FS2	FS3	FS3	FS3
Motor feeder									
Assigned motor rating									
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4	5.5	7.5	11
at 440 - 480 V, 60 Hz	P	HP	1	2	3	5	7.5	10	15
Apparent power									
Apparent power at rated operation 400 V	S	kVA	1.52	2.84	4.02	6.58	9.67	12.47	16.63
Apparent power at rated operation 480 V	S	kVA	1.83	3.41	4.82	7.9	11.64	14.96	19.95
Braking function									
Standard braking torque			max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N
DC braking torque			max. 100% of rated operational current I_e, variable				max. 100% of rated operational current I_e, variable		
Braking torque with external braking resistance			-	max. 100% rated operational current I_e, with external braking resistance			max. 100% rated operational current I_e, with external braking resistance		
minimum external braking resistance	R_{min}	Ω	-	200	200	100	100	47	47
Switch-on threshold for the braking transistor	U_{DC}	V	-	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC
DC braking	%	I/I_e	-	-	-	-	-	-	-
Braking torque	%	I/I_e	-	-	-	-	-	-	-
Control section									
External control voltage	U_c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note [1] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

Typ			DA1-124D3…	DA1-127D0…	DA1-12011…	DA1-324D3…	DA1-327D0…	DA1-32011…	DA1-32018…	DA1-32024…
General										
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)							
Mounting position			Vertical							
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m							
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)							
Radio interference level										
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.							
Environment (EMC)			1st and 2nd environments							
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit										
Supply										
Rated operational voltage	U_e		230 V AC, 1-phase	230 V AC, 1-phase	230 V AC, 1-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	200 (-10%) - 240 (+10%)			200 (-10%) - 240 (+10%)				
Input current	I_{LN}	T	8.5	13.9	19.5	4.5	7.3	11	18.8	24.8
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds			Maximum of one time every 30 seconds				
Power section										
Overload current for 60 s every 600 s	I_L	A	6.45	10.5	15.75	6.45	10.5	15.75	27	36
Starting current for 4 s	I_L	A	8.6	14	21	8.6	14	21	36	48
Output voltage with V_e	U_2		230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f_{PWM}	kHz	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 24)	16 (adjustable 4 - 16)
Operation Mode			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
Frequency resolution (setpoint value)	$\triangle f$	Hz	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rated operational current	I_e	A	4.3	7	10.5	4.3	7	10.5	18	24
Power loss										
Heat dissipation at rated operational current	P_V	W	45.75	63	103.4	39.75	61.5	90.2	160	170.5
Efficiency	η	%	93.9	95.8	95.3	94.7	95.9	95.9	96	96.9
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	2.49	2.49	2.49	1.73	1.73	1.73	0.93	0.93
Frame size			FS2	FS2	FS2	FS2	FS2	FS2	FS3	FS3
Motor feeder										
Assigned motor rating										
at 230 V, 50 Hz	P	kW	0.75	1.5	2.2	0.75	1.5	2.2	4	5.5
at 220 - 240 V, 60 Hz	P	HP	1	2	3	1	2	3	5	7.5
Apparent power										
Apparent power at rated operation 230 V	S	kVA	1.71	2.79	4.18	1.71	2.79	4.18	7.17	9.56
Apparent power at rated operation 240 V	S	kVA	1.79	2.91	4.36	1.79	2.91	4.36	7.48	9.98
Braking function										
Standard braking torque			max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N
DC braking torque			max. 100% of rated operational current I_e, variable			max. 100% of rated operational current I_e, variable				
Braking torque with external braking resistance			max. 100% rated operational current I_e, with external braking resistance			max. 100% rated operational current I_e, with external braking resistance				
minimum external braking resistance	R_{min}	Ω	100	50	35	100	50	35	20	20
Switch-on threshold for the braking transistor	U_{DC}	V	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC
Control section										
External control voltage	U_c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note [1] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

Part no.			DA1-342D2…	DA1-344D1FB…	DA1-345D8…	DA1-349D5…	DA1-34014…	DA1-34018…	DA1-34024…	DA1-34030…	DA1-34039…	DA1-34046…
General												
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)									
Mounting position			Vertical									
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m									
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)									
Radio interference level												
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.									
Environment (EMC)			1st and 2nd environments									
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit												
Supply												
Rated operational voltage	U_e		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-10%) - 480 (+10%)									
Input current	I_{LN}	T	2.4	4.3	6.1	9.8	14.6	18.1	24.7	30.8	40	47.1
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds									
Power section												
Overload current for 60 s every 600 s	I_L	A	3.3	6.15	8.7	14.25	21	27	36	45	58.5	69
Starting current for 4 s	I_L	A	4.4	8.2	11.6	19	28	36	48	60	78	92
Output voltage with V_e	U_2		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f_{PWM}	kHz	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 32)	8 (adjustable 4 - 32)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)
Operation Mode			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)									
Frequency resolution (setpoint value)	$\triangle$f	Hz	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rated operational current	I_e	A	2.2	4.1	5.8	9.5	14	18	24	30	39	46
Power loss												
Heat dissipation at rated operational current	P_V	W	63.75	76.5	101.2	136	209	300	297	375	444	506
Efficiency	η	%	91.5	94.9	95.4	96.6	96.2	97	97.3	97.5	97.6	97.7
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	4.65	4.65	4.65	4.65	1.55	1.55	2.47	2.47	2.47	2.47
Frame size			FS2	FS2	FS2	FS2	FS3	FS3	FS4	FS4	FS4	FS4
Motor feeder												
Assigned motor rating												
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4	5.5	7.5	11	15	18.5	22
at 440 - 480 V, 60 Hz	P	HP	1	2	3	5	7.5	10	15	20	25	30
Apparent power												
Apparent power at rated operation 400 V	S	kVA	1.52	2.84	4.02	6.58	9.67	12.47	16.63	20.78	27.02	31.87
Apparent power at rated operation 480 V	S	kVA	1.83	3.41	4.82	7.9	11.64	14.96	19.95	24.94	32.42	38.24
Braking function												
Standard braking torque			max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N
DC braking torque			max. 100% of rated operational current I_e, variable									
Braking torque with external braking resistance			max. 100% rated operational current I_e, with external braking resistance									
minimum external braking resistance	R_{min}	Ω	400	200	150	100	75	50	40	22	22	22
Switch-on threshold for the braking transistor	U_{DC}	V	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC
Control section												
External control voltage	U_c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note [1] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

Part no.			DA1-34090…									
General												
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)									
Mounting position			Vertical									
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m									
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)									
Radio interference level												
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.									
Environment (EMC)			1st and 2nd environments									
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	
Main circuit												
Supply												
Rated operational voltage	U_e		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	
Mains voltage (50/60Hz)	U_{LN}	V	380 (-10%) - 480 (+10%)									
Input current	I_{LN}	T	62.8	73.8	92.2	112.5	153.2	183.7	205.9	244.5	307.8	
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	
Frequency range	f_{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	
Mains switch-on frequency			Maximum of one time every 30 seconds									
Power section												
Overload current for 60 s every 600 s	I_L	A	91.5	105	135	165	225	270	303	360	453	
Starting current for 4 s	I_L	A	122	140	180	220	300	360	404	480	604	
Output voltage with V_e	U_2		400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	
Output Frequency	f_2	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	
Switching frequency	f_{PWM}	kHz	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	4 (adjustable 4 - 16)	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)	4 (adjustable 4 - 8)	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)	4 (adjustable 4 - 8)	
Operation Mode			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)									
Frequency resolution (setpoint value)	△f	Hz	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Rated operational current	I_e	A	61	72	90	110	150	180	202	240	302	
Power loss												
Heat dissipation at rated operational current	P_V	W	840	925	1080	1210	1575	1800	2090	2376	3040	
Efficiency	η	%	97.2	97.5	97.6	97.8	97.9	98	98.1	98.2	98.1	
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	0.49	0.49	2.68	2.68	2.68	2.68	4.75	4.75	4.75	
Frame size			FS5	FS5	FS6	FS6	FS6	FS6	FS7	FS7	FS7	
Motor feeder												
Assigned motor rating												
at 400 V, 50 Hz	P	kW	30	37	45	55	75	90	110	132	160	
at 440 - 480 V, 60 Hz	P	HP	40	50	60	75	100	150	175	200	250	
Apparent power												
Apparent power at rated operation 400 V	S	kVA	42.26	48.5	62.35	76.21	103.92	124.71	139.95	166.28	209.23	
Apparent power at rated operation 480 V	S	kVA	50.71	58.2	74.82	91.45	124.71	149.65	167.94	199.53	251.08	
Braking function												
Standard braking torque			max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	
DC braking torque			max. 100% of rated operational current I_e, variable									
Braking torque with external braking resistance			max. 100% rated operational current I_e, with external braking resistance									
minimum external braking resistance	R_{min}	Ω	12	12	6	6	6	6	6	6	6	
Switch-on threshold for the braking transistor	U_{DC}	V	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	
Control section												
External control voltage	U_c	V	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	

Note [1] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

Typ			DA1-32039…	DA1-32046…	DA1-32061…	DA1-32072…	DA1-32090…	DA1-32110…	DA1-32150…	DA1-32180…	DA1-32202…	DA1-32248…
General												
Climatic proofing	ρ_w	%	< 95 %, average relative humidity (RH), non-condensing (EN 50178)									
Mounting position			Vertical									
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m									
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)									
Radio interference level												
Radio interference class (EMC)			C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.									
Environment (EMC)			1st and 2nd environments									
longest permissible length of motor cable	l	m	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
Main circuit												
Supply												
Rated operational voltage	U_e		230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	200 (-10%) - 240 (+10%)									
Input current	I_{LN}	T	40	47.1	62.4	74.1	92.3	112.7	153.5	183.8	206.2	252.8
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Mains switch-on frequency			Maximum of one time every 30 seconds									
Power section												
Overload current for 60 s every 600 s	I_L	A	45	69	91.5	108	135	165	225	270	303	372
Starting current for 4 s	I_L	A	60	92	122	144	180	220	300	360	404	496
Output voltage with V_e	U_2		230 V AC, 3-phase					230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase	230 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
Switching frequency	f_{PWM}	kHz	8 (adjustable 4 - 24)				4 (adjustable 4 - 16)	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)	4 (adjustable 4 - 8)	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)
Operation Mode			U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)					U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
Frequency resolution (setpoint value)	△f	Hz	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rated operational current	I_e	A	39	46	61	72	90	110	150	180	202	248
Power loss												
Heat dissipation at rated operational current	P_V	W	187.5	264	345	518	550	720	814	945	1100	1425
Efficiency	η	%	97.5	97.6	97.7	97.2	97.5	97.6	97.8	97.9	98	98.1
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	1.42	1.42	0.28	0.28	1.54	1.54	1.54	1.54	2.74	2.74
Frame size			FS4	FS4	FS5	FS5	FS6	FS6	FS6	FS6	FS7	FS7
Motor feeder												
Assigned motor rating												
at 230 V, 50 Hz	P	kW	7.5	11	15	18.5	22	30	45	55	55	75
at 220 - 240 V, 60 Hz	P	HP	10	15	20	25	30	40	50	60	75	100
Apparent power												
Apparent power at rated operation 230 V	S	kVA	11.95	18.33	24.3	28.68	35.85	43.82	59.76	71.71	80.47	98.8
Apparent power at rated operation 240 V	S	kVA	12.47	19.12	25.36	29.93	37.41	45.73	62.35	74.82	83.97	103.09
Braking function												
Standard braking torque			max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N	max. 30% M_N
DC braking torque			max. 100% of rated operational current I_e, variable					max. 100% of rated operational current I_e, variable				
Braking torque with external braking resistance			max. 100% rated operational current I_e, with external braking resistance					max. 100% rated operational current I_e, with external braking resistance				
minimum external braking resistance	R_{min}	Ω	22	12	12	6	6	6	6	6	6	6
Switch-on threshold for the braking transistor	U_{DC}	V	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC	390 V DC
Control section												
External control voltage	U_c	V	24 V DC (max. 100 mA)					24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)					10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Note [1] With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

Technical data

			DX-LN1…	DX-LN3…	DX-LM3…
General					
Standards			IEC/EN 61558-2-20-2000, VDE 0570 Part 2-20/2001-04, UL, CSA	IEC/EN 61558-2-20-2000, VDE 0570 Part 2-20/2001-04, UL, CSA	IEC/EN 61558-2-20-2000, VDE 0570 Part 2-20/2001-04, UL, CSA
Operating temperature		°C	-25 to +40, up to 70 with current derating (see the note)	-25 to +40, up to 70 with current derating (see the note)	-25 to +40, up to 70 with current derating (see the note)
Storage temperature	ϑ	°C	-25 - +85	-25 - +85	-25 - +85
Mechanical shock resistance		g	11 ms^2/15 3 shocks	11 ms^2/15 3 shocks	11 ms^2/15 3 shocks
Vibration resistance		g	1 (0 - 150 Hz)	1 (0 - 150 Hz)	1 (0 - 150 Hz)
Vibration			0.35 mm at 10 - 55 Hz	0.35 mm at 10 - 55 Hz	0.35 mm at 10 - 55 Hz
Altitude		m	0 – 1000 above sea level, up to 5000 with current reduction (see notes)	0 – 1000 above sea level, up to 5000 with current reduction (see notes)	0 – 1000 above sea level, up to 5000 with current reduction (see notes)
Mounting position			Standing vertically, suspended horizontally	Standing vertically, suspended horizontally	Standing vertically, suspended horizontally
Free surrounding areas		MM	< 50	< 50	< 50
Protection type			IP20 (terminal)	IP20 (terminal)	IP20 (terminal)
Rated duty factor		% DF	100	100	100
Weight		kg	0.7	1.5	1.5
Electrical data					
Rated operational voltage			1 AC 230 V	3 AC 400 V	3 AC 400 V
Max. supply voltage		V AC	260 V + 0% (50/60 Hz)	550 V + 0% (50/60 Hz)	750 V + 0% (50/60 Hz)
Operating frequency	f	Hz	50/60	50/60	0…200
Insulation class			B	B	B
Connection					
Terminations			✓	✓	✓
Connection lugs			-	✓ (≧ 50 A)	✓ (≧ 63 A)
PE stud			✓	✓	✓

Mains choke

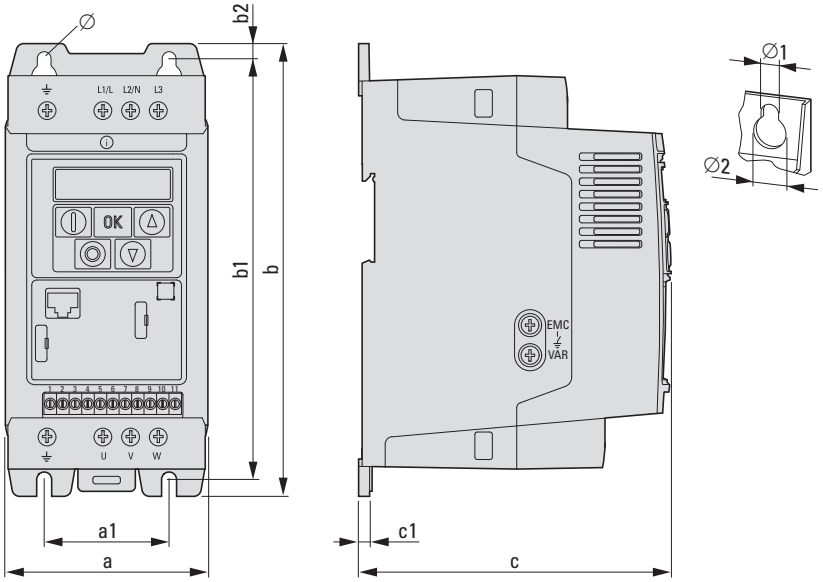
Part no.	Rated operational current	Induct-ance	Maximum heat dissipation	Cu factor	Voltage sag	Connection			Drilling	Tightening torque	Weight
	I_e	L	P_v		U_k	Terminal	Terminal	Connection lug			
	A	mH	W	kg	%	mm²	AWG	mm²	mm	Nm	kg
Rated operational voltage 1 AC 230 V											
DX-LN1-006	5.8	5.05	9	0,09	4	4	20 - 10	-	-	0.8	0.7
DX-LN1-009	8.6	3.41	11	0,11	4	4	20 - 10	-	-	0.8	0.7
DX-LN1-013	13	2.25	12	0,18	4	4	20 - 10	-	-	0.8	1.5
DX-LN1-018	18	1.63	17	0,27	4	4	20 - 10	-	-	0.8	1.5
DX-LN1-024	24	1.22	20	0,33	4	4	20 - 10	-	-	0.8	2
DX-LN1-032	32	0.92	24	0,00	4	4	20 - 10	-	0	0.8	3
Rated operational voltage 3 AC 400 V											
DX-LN3-004	3.9	7.51	17	0,25	4	4	20 - 10	-	-	0.8	1.5
DX-LN3-006	6	4.9	19	0,34	4	4	20 - 10	-	-	0.8	1.5
DX-LN3-010	10	2.94	33	0,45	4	4	20 - 10	-	-	0.8	2.2
DX-LN3-016	16	1.84	44	0,53	4	4	20 - 10	-	-	0.8	2.9
DX-LN3-025	25	1.18	57	0,90	4	4	20 - 10	-	-	0.8	4.8
DX-LN3-040	40	0.64	59	0,91	2.5	10	20 - 6	-	-	1.5	4.8
DX-LN3-050	50	0.37	58	1,08	2.5	-	-	Cu 15 x 2	7	3	5.9
DX-LN3-060	60	0.31	60	1,51	2.5	-	-	Cu 15 x 2	7	3	5.9
DX-LN3-080	80	0.23	86	1,67	2.5	-	-	Cu 20 x 3	9	6	7.3
DX-LN3-100	100	0.18	101	1,68	2.5	-	-	Cu 20 x 3	9	6	10.2
DX-LN3-120	120	0.15	100	2,26	2.5	-	-	Cu 25 x 5	11	10	10.2
DX-LN3-160	160	0.11	140	2,35	2.5	-	-	Cu 25 x 5	11	10	12.3
DX-LN3-200	200	0.09	154	3,81	2.5	-	-	Cu 25 x 5	11	10	14.9
DX-LN3-250	250	0.07	155	4,26	2.5	-	-	Cu 40 x 5	14	15.5	20.6
DX-LN3-300	300	0.06	196	4,28	2.5	-	-	Cu 40 x 5	14	15.5	20.6
DX-LN3-303	303	0.06	230	0,00	2.5	-	-	Cu 40 x 5	14	15.5	20.6
DX-LN3-370	370	0.05	290	0,00	2.5	-	-	Cu 40 x 5	14	15.5	24.3
DX-LN3-450	450	0.04	300	0,00	2.5	-	-	Cu 40 x 10	14	15.5	23.8

Motor chokes

Part no.	Rated operational current	Induct-ance	max. heat dissipation (pulse frequency)			Cu factor	Connection			Drilling	Tightening torque	Weight
			(3 kHz)	(5 kHz)	(12 kHz)		Terminal	Terminal	Connection lug			
	I_e	L	P_v	P_v	P_v							
	A	mH	W	W	W	kg	mm²	AWG	mm²	mm	Nm	kg
Rated operational voltage 3 AC 400 V												
DX-LM3-005	5	2	12	14	24	0,29	4	20 - 10	-	-	0.8	1.5
DX-LM3-008	8	4.1	32	46	54	1,09	4	20 - 10	-	-	0.8	4.8
DX-LM3-011	11	3	45	66	71	1,23	4	20 - 10	-	-	0.8	4.8
DX-LM3-016	16	1.5	50	75	78	0,88	4	20 - 10	-	-	0.8	4.8
DX-LM3-035	35	1	75	114	116	2,30	4	20 - 10	-	-	0.8	7.3
DX-LM3-050	50	0.6	110	157	168	3,60	10	20 - 6	-	-	1.5	12.3
DX-LM3-063	63	0.5	130	190	193	3,01	-	-	Cu 15 x 2	7	3	14.9
DX-LM3-080	80	0.5	132	206	206	5,88	-	-	Cu 20 x 2	9	6	20.6
DX-LM3-100	100	0.45	177	279	294	10,10	-	-	Cu 20 x 2	9	6	31
DX-LM3-150	150	0.35	293	418	424	8,22	-	-	Cu 25 x 5	11	10	45
DX-LM3-180	180	0.3	418	298	439	14,75	-	-	Cu 25 x 5	11	10	45
DX-LM3-220	220	0.2	344	512	517	11,37	-	-	Cu 40 x 5	14	15.5	45
DX-LM3-260	260	0.15	358	526	520	11,10	-	-	Cu 40 x 5	14	15.5	45
DX-LM3-303	303	0.15	685	-	-	0,00	-	-	Cu 40 x 5	14	15.5	48.7
DX-LM3-370	370	0.12	685	-	-	0,00	-	-	Cu 40 x 5	14	15.5	61.7
DX-LM3-450	450	0.1	730	-	-	0,00	-	-	Cu 40 x 10	14	15.5	81.7

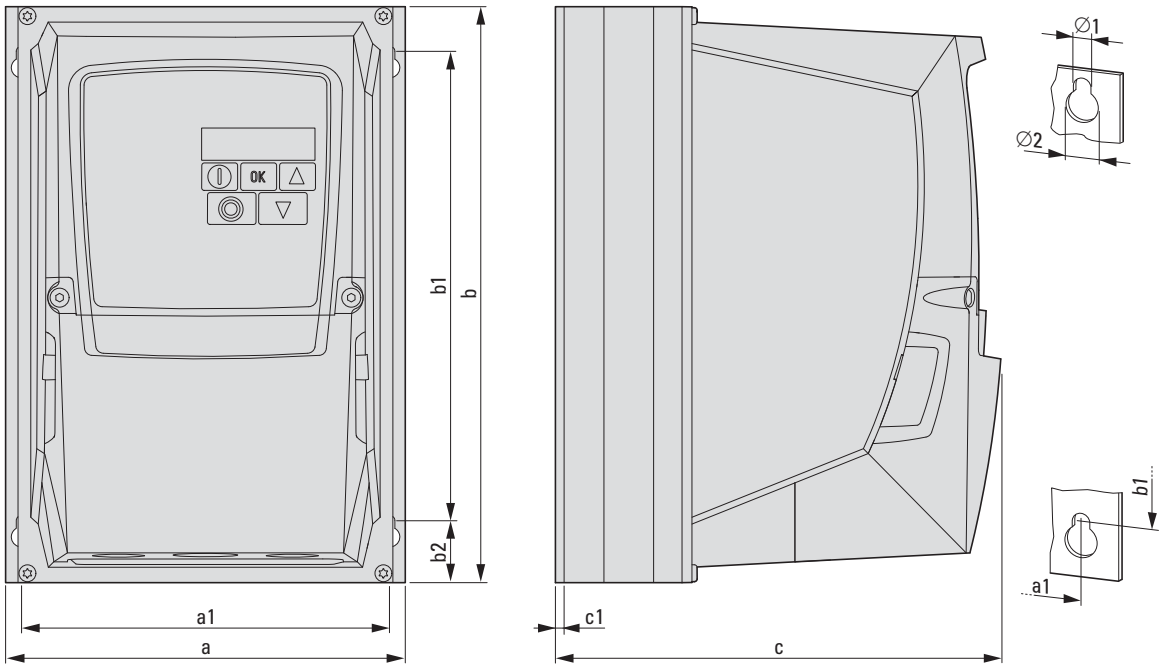
Dimensions

DC1, sizes FS1 - FS3, degree of protection IP20/NEMA 0



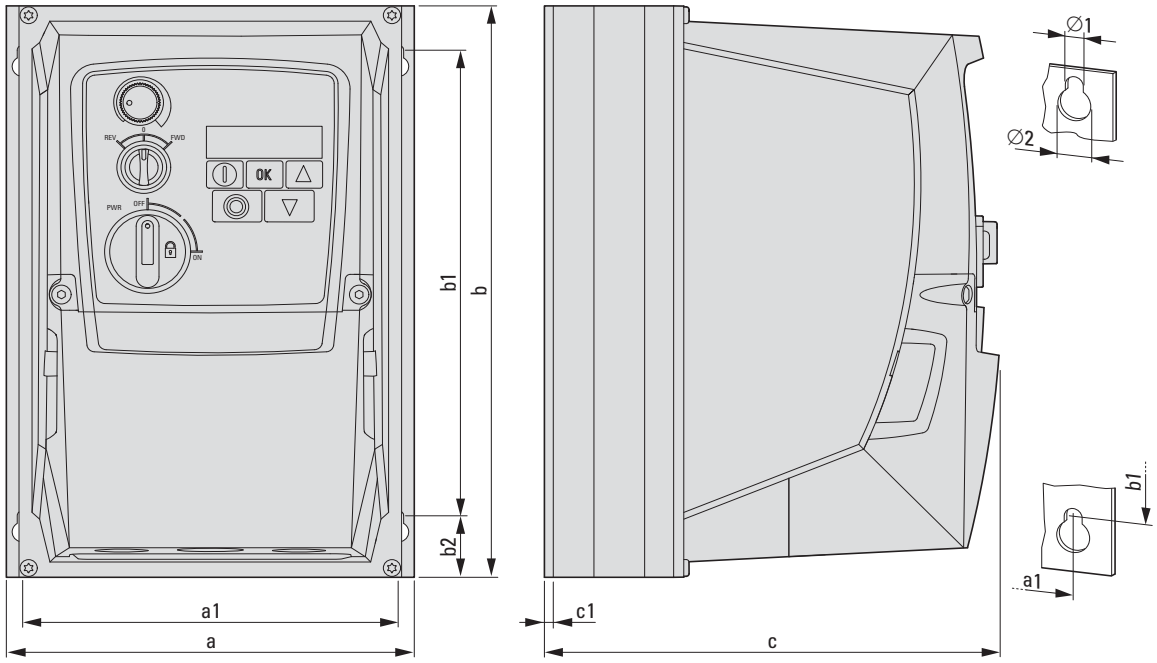
a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg	Size
81 (3.19)	50 (1.97)	184 (7.24)	170 (6.69)	7 (0.28)	124 (4.88)	4 (0.16)	6 (0.24)	12 (0.47)	1.1	FS1
107 (4.21)	75 (2.95)	231 (9.09)	215 (8.46)	8 (0.31)	152 (5.98)	5 (0.2)	6 (0.24)	12 (0.47)	2.6	FS2
131 (5.16)	100 (3.94)	273 (10.75)	255 (10.04)	8.5 (0.33)	175 (6.89)	5 (0.2)	6 (0.24)	12 (0.47)	4	FS3

DC1, sizes FS1 - FS3, degree of protection IP66/NEMA 4X



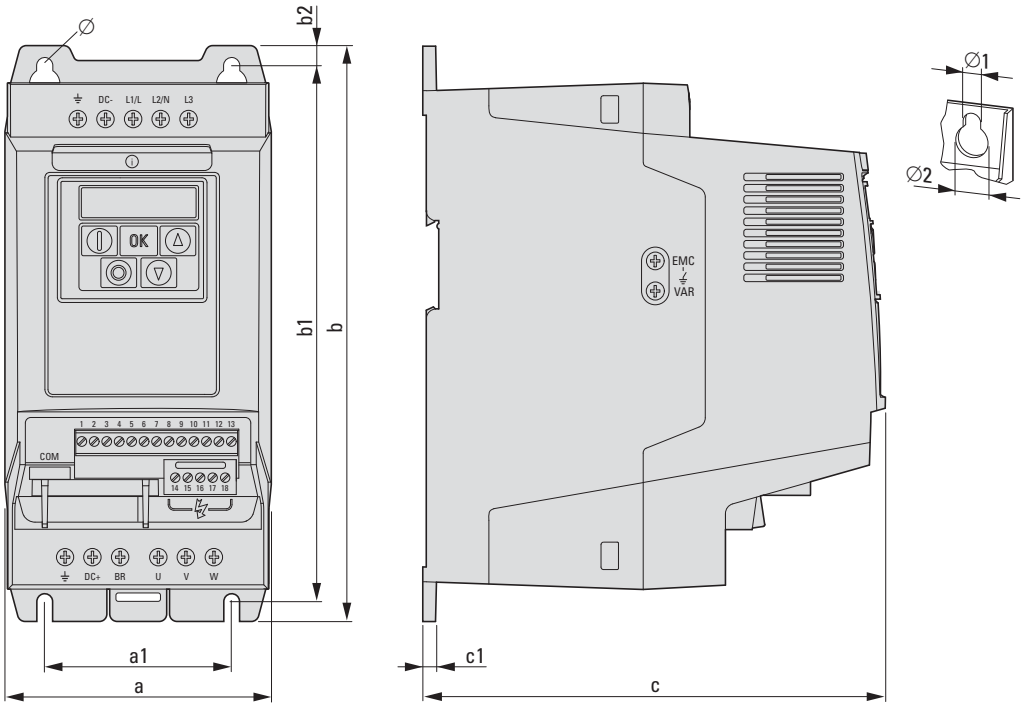
a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg (lbs)	Size
161 (6.34)	148.5 (5.85)	232 (9.13)	189 (7.44)	25 (0.98)	184 (7.24)	3.5 (0.14)	4 (0.15)	8 (0.31)	2.5 (5.51)	FS1
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	28.5 (1.12)	192 (7.56)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	4.7 (10.36)	FS2
210.5 (8.29)	197.5 (7.78)	310 (12.2)	251.5 (9.9)	33.4 (1.31)	234 (9.21)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	7.9 (17.42)	FS3

DC1, sizes FS1 - FS3, degree of protection IP66/NEMA 4X, with local controls



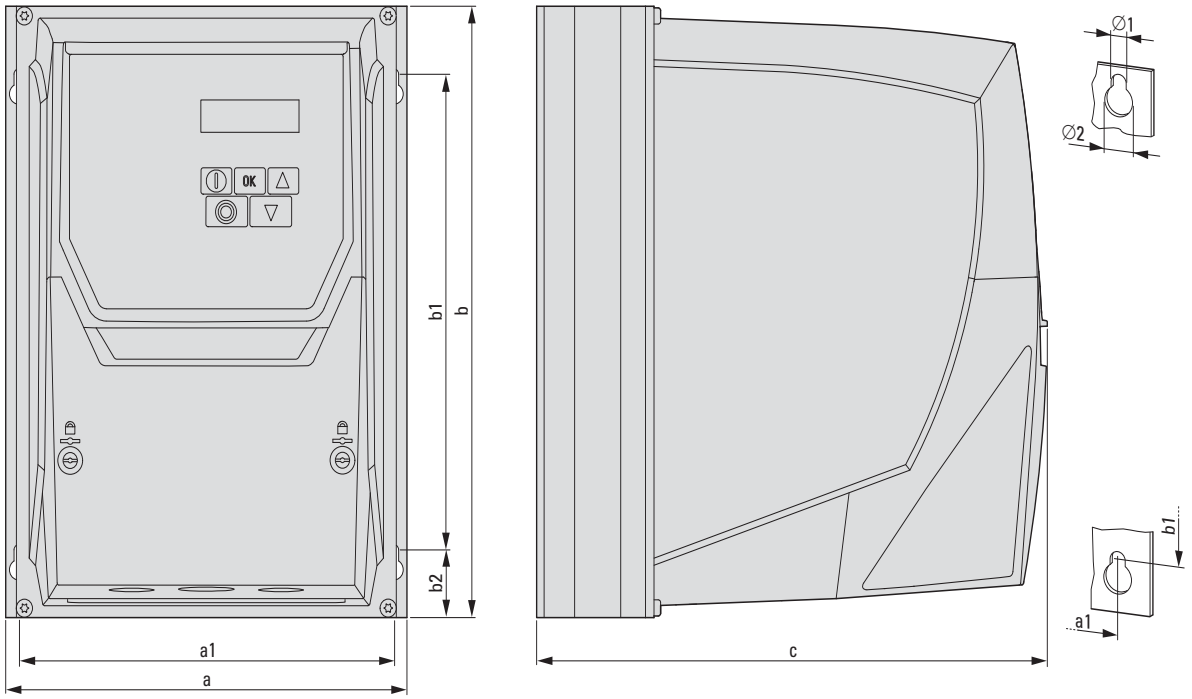
a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg (lbs)	Size
161 (6.34)	148.5 (5.85)	232 (9.13)	189 (7.44)	25 (0.98)	184 (7.24)	3.5 (0.14)	4 (0.15)	8 (0.31)	2.8 (6.17)	FS1
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	28.5 (1.12)	192 (7.56)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	5 (11.02)	FS2
210.5 (8.29)	197.5 (7.78)	310 (12.2)	251.5 (9.9)	33.4 (1.31)	234 (9.21)	3.5 (0.14)	4.2 (0.16)	8.5 (0.33)	8.2 (18.08)	FS3

DA1, sizes FS2 - FS3, degree of protection IP20/NEMA 0



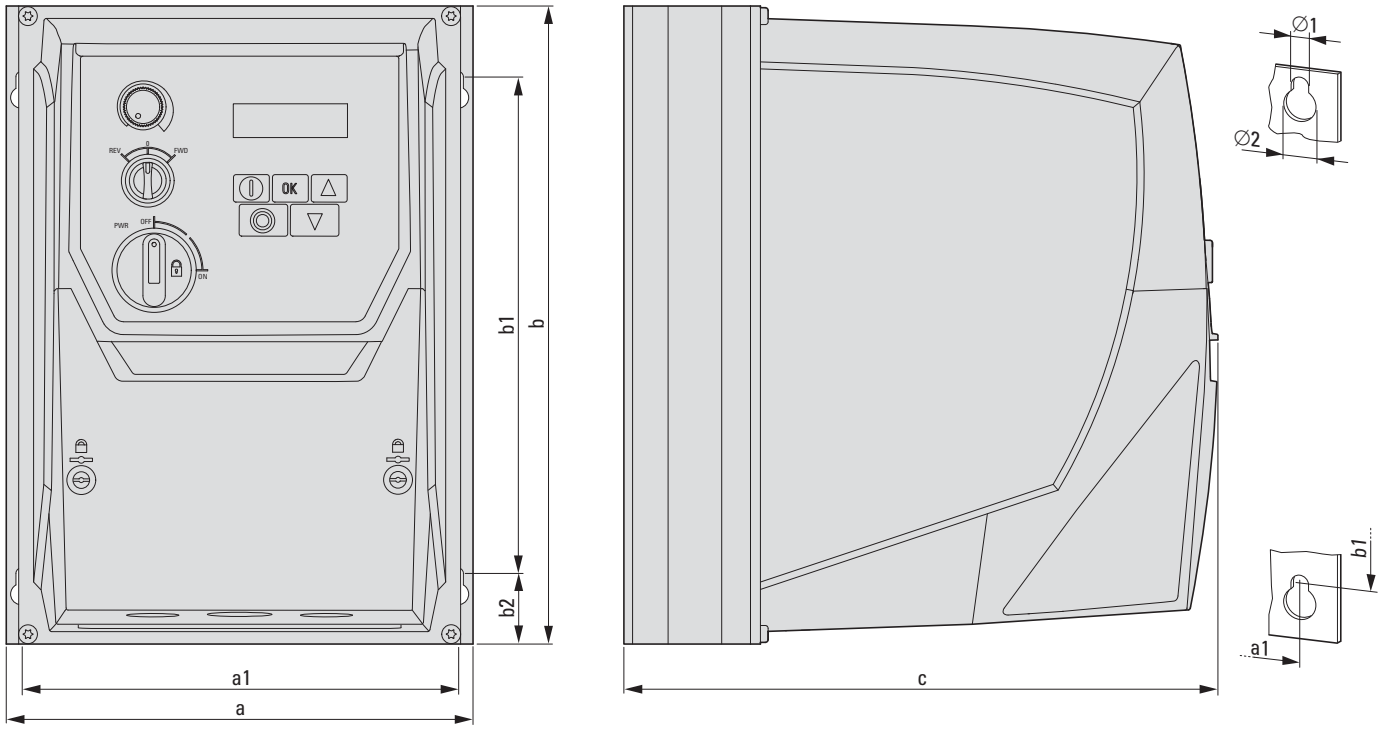
a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg	Size
107 (4.21)	75 (2.95)	231 (9.09)	215 (8.46)	8 (0.31)	186 (7.32)	5 (0.2)	6 (0.24)	12 (0.47)	1.8	FS2
131 (5.16)	100 (3.94)	273 (10.75)	255 (10.04)	8.5 (0.33)	204 (8.03)	5 (0.2)	6 (0.24)	12 (0.47)	3.5	FS3

DA1, sizes FS2 - FS3, degree of protection IP66/NEMA 4X



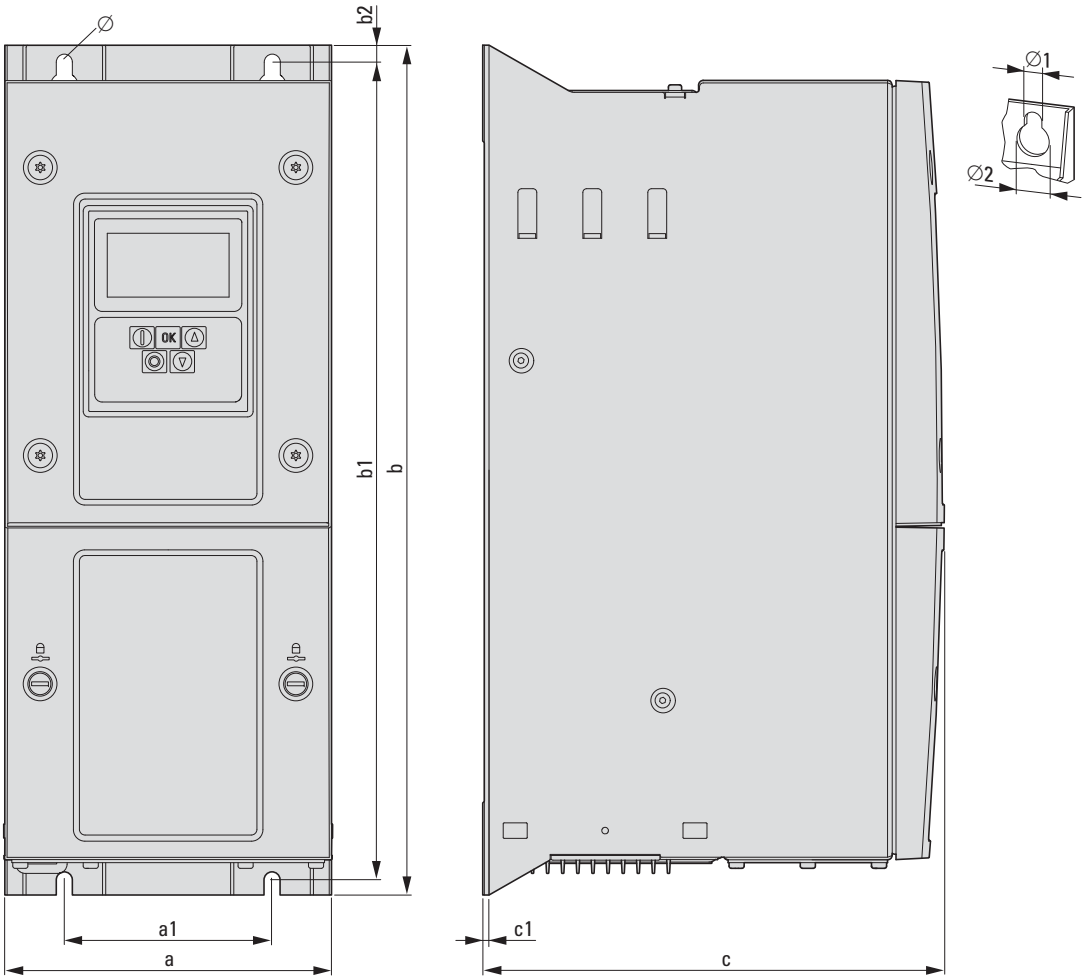
a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg (lbs)	Size
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	20 (0.79)	239.3 (9.42)	4.2 (0.16)	8.5 (0.33)	4.5 (10.4)	FS2
211 (8.29)	198 (7.78)	310 (12.2)	252 (9.9)	25 (0.98)	266.3 (10.48)	4.2 (0.16)	8.5 (0.33)	7 (15.9)	FS3

DA1, sizes FS2 - FS3, degree of protection IP66/NEMA 4X, with local controls



a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg (lbs)	Size
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	20 (0.79)	239.3 (9.42)	4.2 (0.16)	8.5 (0.33)	4.8 (10.6)	FS2
211 (8.29)	198 (7.78)	310 (12.2)	252 (9.9)	25 (0.98)	266.3 (10.48)	4.2 (0.16)	8.5 (0.33)	7.3 (16.1)	FS3

DA1, sizes FS4 - FS7, degree of protection IP55



a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg	Size
171 (6.73)	110 (4.33)	450 (17.72)	428 (16.85)	9 (0.35)	240 (9.45)	2 (0.08)	8 (0.31)	15 (0.59)	11.5	FS4
235 (9.25)	175 (6.89)	540 (20.28)	515 (20.28)	12 (0.47)	270 (10.63)	2 (0.08)	8 (0.31)	15 (0.59)	22.5	FS5
330 (12.99)	200 (7.87)	865 (34.06)	840 (33.07)	15 (0.59)	330 (12.99)	2 (0.08)	11 (0.43)	22 (0.87)	50	FS6
330 (12.99)	200 (7.87)	1280 (50.39)	1255 (44.41)	15 (0.59)	360 (14.17)	2 (0.08)	11 (0.43)	22 (0.87)	80	FS7

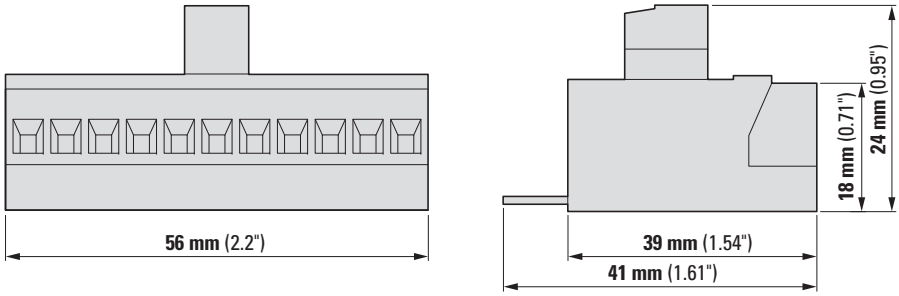
DA1, size FS8, degree of protection IP40

Control panel version

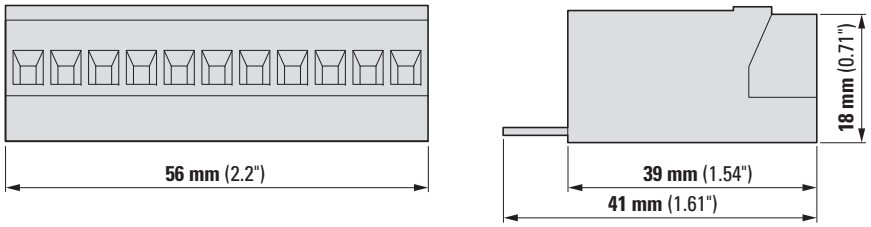
a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	∅1 mm (inch)	∅2 mm (inch)	Weight kg	Size
500 (19.69)	350 (13.78)	2000 (78.74)	1950 (76.77)	33 (1.3)	516 (20.31)	2 (0.08)	18 (0.71)	35 (1.38)	270	FS8

Expansion modules for DC1

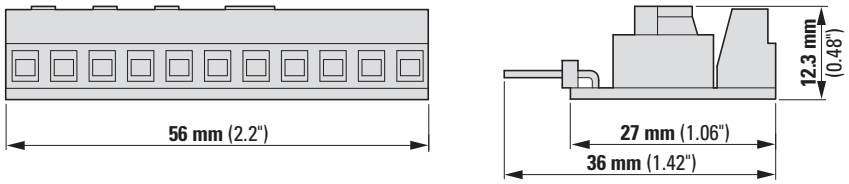
DXC-EXT-IO110
DXC-EXT-IO230
DXC-EXT-2RO1AO



DXC-EXT-2RO

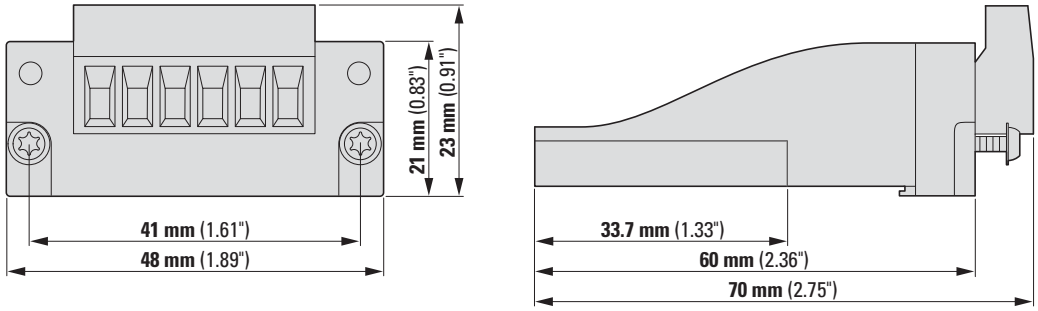


DXC-EXT-LOCSIM



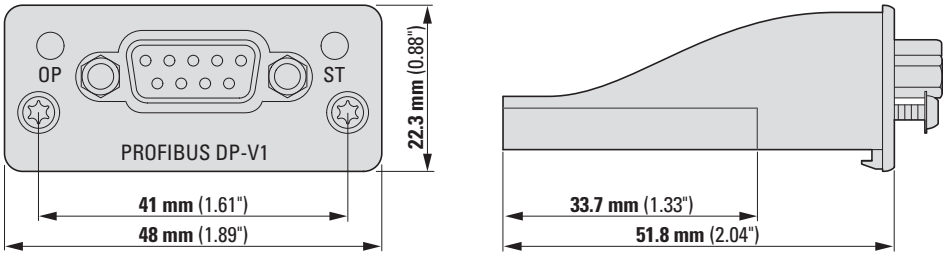
Expansion modules for DA1

DXA-EXT-3DI1RO
DXA-EXT-3RO
DXA-EXT-ENCOD



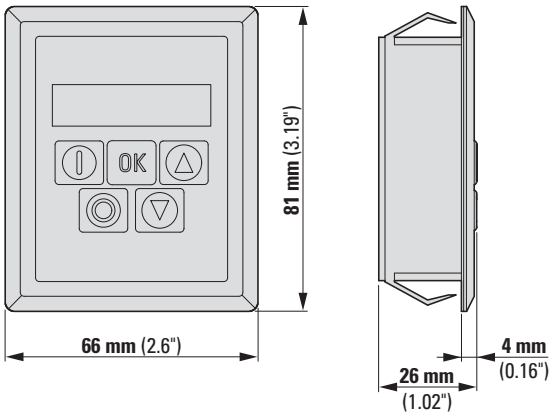
Fieldbus module for DA1

DX-NET-PROFIBUS

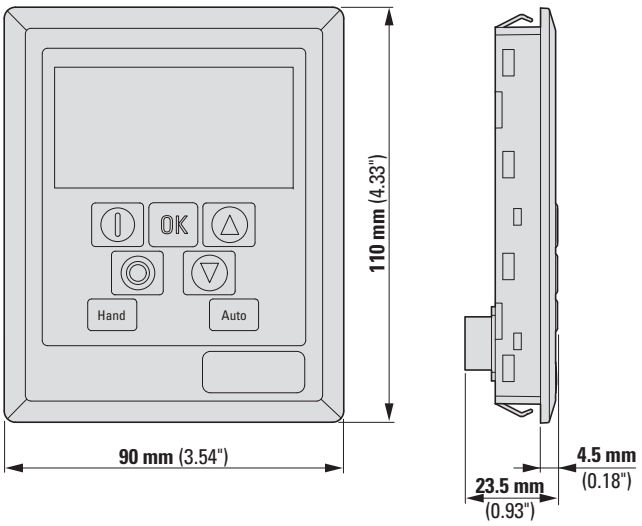


External keypad

DX-KEY-LED

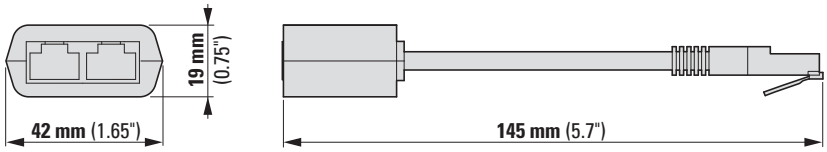


DX-KEY-OLED



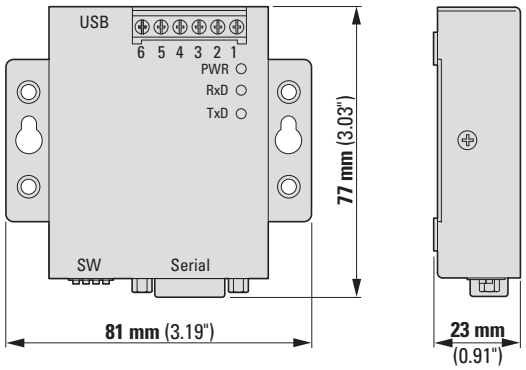
Cable and splitter

DX-SPL-RJ45-2SL1PL



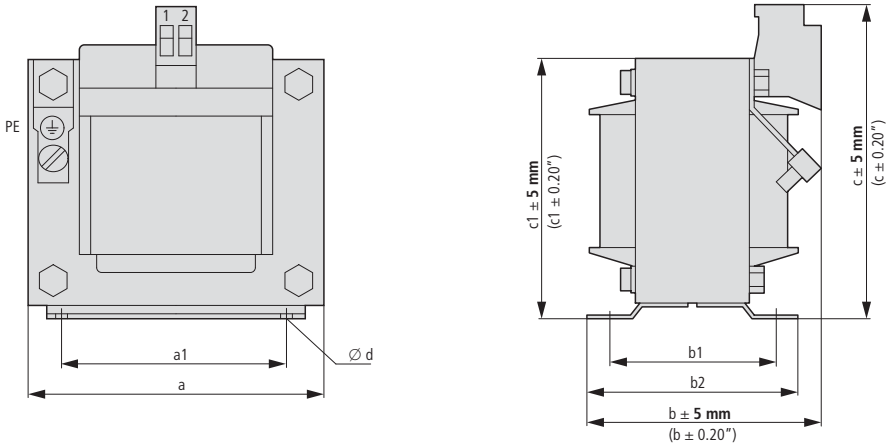
Interface converter

DX-COM-PCKIT



Mains chokes

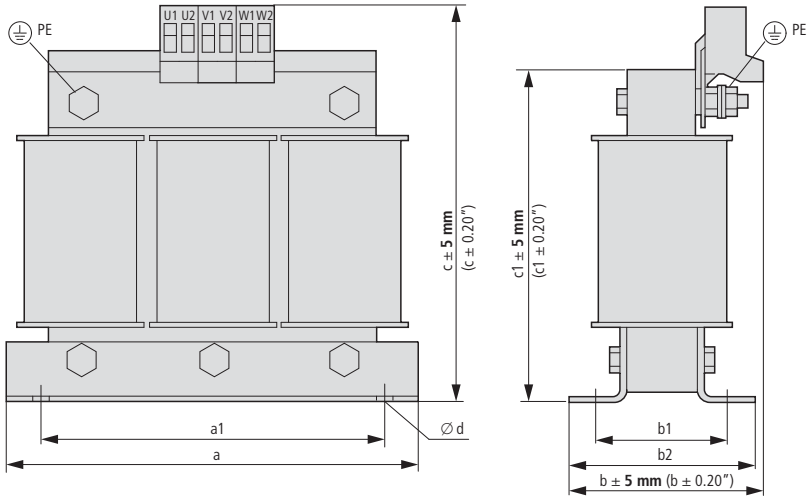
DX-LN1-…



	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	d mm (inch)	Weight kg
DX-LN1-006	66 (2.6)	50 (1.97)	71 (2.8)	44 (1.73)	55 (2.17)	80 (3.15)	61 (2.36)	4.5 x 8 (0.18 x 0.31)	0.7
DX-LN1-009	66 (2.6)	50 (1.97)	71 (2.8)	44 (1.73)	55 (2.17)	80 (3.15)	61 (2.36)	4.5 x 8 (0.18 x 0.31)	0.7
DX-LN1-013	84 (3.31)	64 (2.52)	67 (2.64)	47 (1.85)	60 (2.36)	90 (3.54)	75 (2.95)	4.8 x 8 (0.18 x 0.31)	1.5
DX-LN1-018	84 (3.31)	64 (2.52)	67 (2.64)	47 (1.85)	60 (2.36)	90 (3.54)	75 (2.95)	4.8 x 8 (0.18 x 0.31)	1.5
DX-LN1-024	84 (3.31)	64 (2.52)	81 (3.19)	61 (2.4)	74 (2.91)	90 (3.54)	75 (2.95)	4.8 x 8 (0.18 x 0.31)	2
DX-LN1-032	105 (4.13)	84 (3.31)	102 (4.02)	65 (2.56)	81 (3.19)	121 (4.76)	94 (3.7)	5.8 x 11 (0.23 x 0.43)	3

Mains chokes, motor chokes

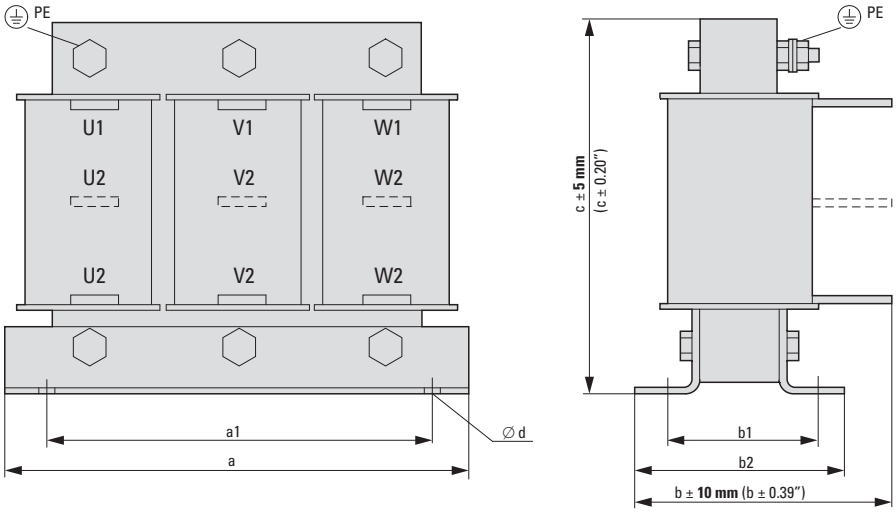
DX-LN3-004…-DX-LN3-040
DX-LM3-005…-DX-LM3-050



	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	d mm (inch)	Weight kg
DX-LN3-004	115 (4.53)	100 (3.94)	66 (2.6)	50 (1.97)	66 (2.6)	118 (4.65)	84 (3.31)	5 x 10 (0.2 x 0.39)	1.5
DX-LN3-006	115 (4.53)	100 (3.94)	66 (2.6)	50 (1.97)	66 (2.6)	118 (4.65)	84 (3.31)	5 x 10 (0.2 x 0.39)	1.5
DX-LN3-010	140 (5.51)	125 (4.92)	61 (2.4)	50 (1.97)	61 (2.4)	138 (5.43)	105 (4.13)	5 x 10 (0.2 x 0.39)	2.2
DX-LN3-016	140 (5.51)	125 (4.92)	71 (2.8)	50 (1.97)	71 (2.8)	138 (5.43)	105 (4.13)	5 x 10 (0.2 x 0.39)	2.9
DX-LN3-025	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LN3-040	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	188 (7.4)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-005	115 (4.53)	100 (3.94)	66 (2.6)	50 (1.97)	66 (2.6)	118 (4.65)	84 (3.31)	5 x 10 (0.2 x 0.39)	1.5
DX-LM3-008	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-011	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-016	195 (7.68)	175 (6.89)	104 (4.09)	50 (1.97)	76.5 (3.01)	175 (6.89)	134 (5.28)	8 x 13 (0.31 x 0.51)	4.8
DX-LM3-035	220 (8.66)	200 (7.87)	132 (5.2)	75 (2.95)	101.5 (4)	195 (7.68)	160 (6.3)	8 x 13 (0.31 x 0.51)	7.3
DX-LM3-050	270 (10.63)	250 (9.84)	106 (4.17)	75 (2.95)	96 (3.78)	228 (8.98)	198 (7.8)	8 x 13 (0.31 x 0.51)	12.3

Mains chokes, motor chokes

DX-LN3-050…-DX-LN3-450
DX-LM3-063…-DX-LM3-450

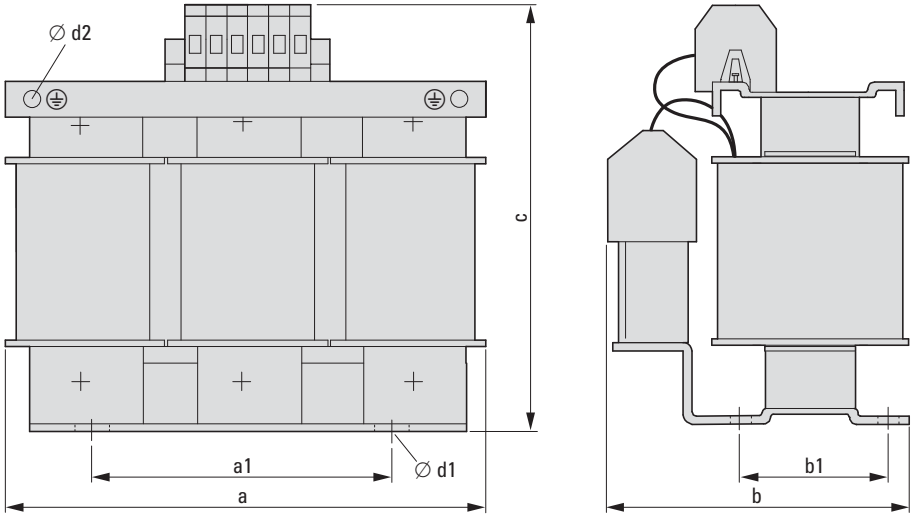


Height tolerance depends on gap
The position of connection lugs U2-V2-W2 depends on the coil material and can deviate from the position illustrated here.

	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	d mm (inch)	Weight kg
DX-LN3-050	195 (7.68)	175 (6.89)	105 (4.13)	75 (2.95)	91.5 (3.6)	132 ±5 (5.2 ±0.2)	8 x 13 (0.31 x 0.51)	5.9
DX-LN3-060	195 (7.68)	175 (6.89)	105 (4.13)	75 (2.95)	91.5 (3.6)	132 ±5 (5.2 ±0.2)	8 x 13 (0.31 x 0.51)	5.9
DX-LN3-080	220 (8.66)	200 (7.87)	110 (4.33)	50 (1.97)	81.5 (3.21)	160 ±5 (6.3 ±0.2)	8 x 13 (0.31 x 0.51)	7.3
DX-LN3-100	220 (8.66)	200 (7.87)	130 (5.12)	75 (2.95)	101.5 (4)	160 ±5 (6.3 ±0.2)	8 x 13 (0.31 x 0.51)	10.2
DX-LN3-120	220 (8.66)	200 (7.87)	130 (5.12)	75 (2.95)	101.5 (4)	160 ±5 (6.3 ±0.2)	8 x 13 (0.31 x 0.51)	10.2
DX-LN3-160	270 (10.63)	250 (9.84)	125 (4.92)	75 (2.95)	96 (3.75)	200 ±5 (7.87 ±0.2)	8 x 13 (0.31 x 0.51)	12.3
DX-LN3-200	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	120 (4.72)	202 ±5 (7.95 ±0.2)	8 x 13 (0.31 x 0.51)	14.9
DX-LN3-250	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±5 (8.27 ±0.2)	10 x 18 (0.39 x 0.71)	20.6
DX-LN3-300	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±5 (8.27 ±0.2)	10 x 18 (0.39 x 0.71)	20.6
DX-LN3-303	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±5 (8.27 ±0.2)	10 x 18 (0.39 x 0.71)	20.6
DX-LN3-370	384 (15.12)	350 (13.78)	215 (8.46)	100 (3.94)	130 (5.12)	258 ±5 (10.16 ±0.2)	12 x 20 (0.47 x 0.79)	24.3
DX-LN3-450	384 (15.12)	350 (13.78)	215 (8.46)	100 (3.94)	130 (5.12)	258 ±5 (10.16 ±0.2)	12 x 20 (0.47 x 0.79)	23.8
DX-LM3-063	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	120 (4.72)	202 ±10 (7.95 ±0.39)	8 x 13 (0.31 x 0.51)	14.9
DX-LM3-080	270 (10.63)	250 (9.84)	155 (6.1)	100 (3.94)	125 (4.92)	210 ±10 (8.27 ±0.39)	10 x 18 (0.39 x 0.71)	20.6
DX-LM3-100	384 (15.12)	350 (13.78)	215 (8.46)	100 (3.94)	130 (5.12)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	31
DX-LM3-150	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-180	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-220	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-260	384 (15.12)	350 (13.78)	260 (10.24)	150 (5.91)	180 (7.09)	258 ±30 (10.16 ±1.18)	12 x 20 (0.47 x 0.79)	45
DX-LM3-303	454 (17.87)	425 (16.73)	270 (10.63)	100 (3.94)	150 (5.9)	313 ±5 (12.32 ±0.2)	12 x 20 (0.47 x 0.79)	48.7
DX-LM3-370	454 (17.87)	425 (16.73)	285 (11.22)	125 (4.92)	165 (6.5)	313 ±5 (12.32 ±0.2)	12 x 20 (0.47 x 0.79)	61.7
DX-LM3-450	454 (17.87)	425 (16.73)	300 (11.81)	150 (5.9)	180 (7.09)	313 ±5 (12.32 ±0.2)	12 x 20 (0.47 x 0.79)	81.7

Sine filter

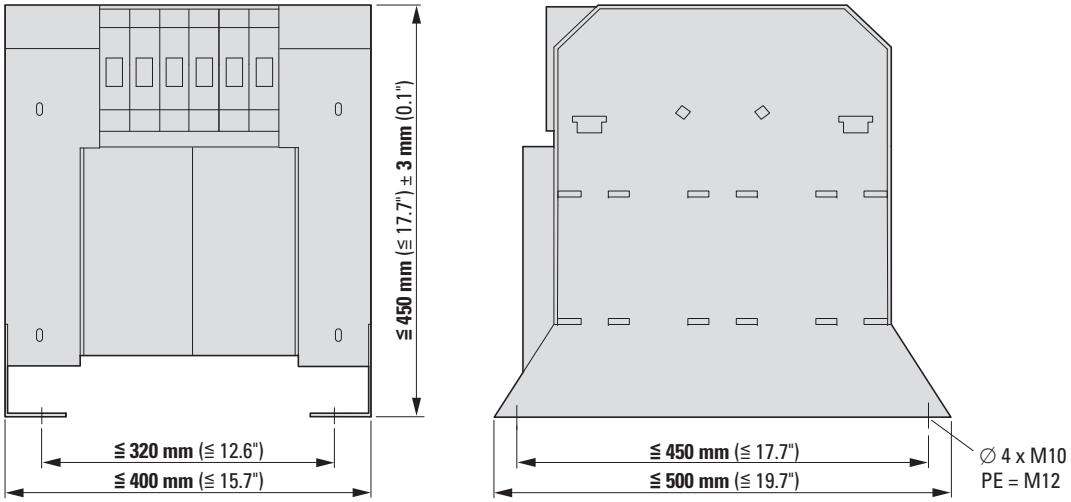
DX-SIN3-004 - DX-SIN3-180



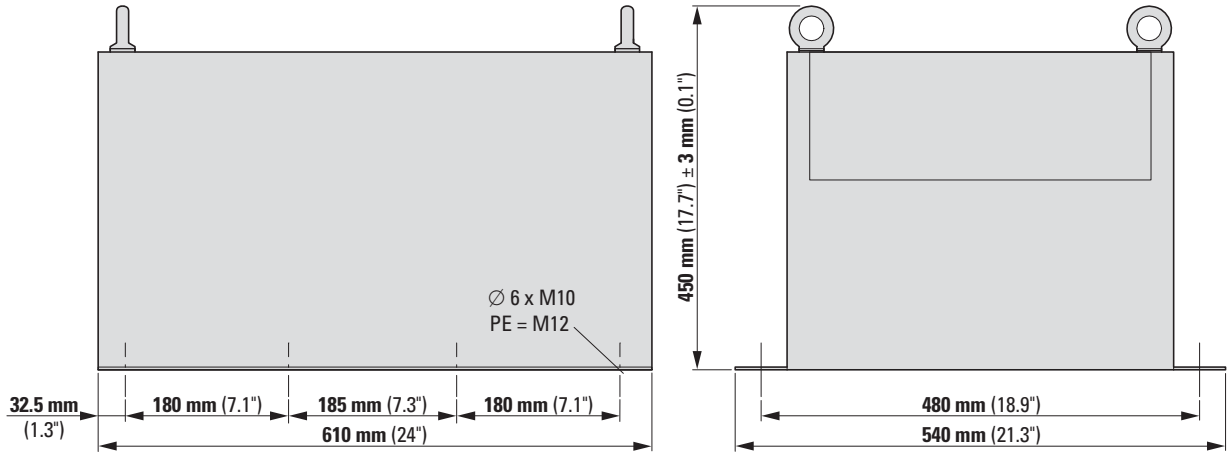
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	d1	d2	Weight kg
DX-SIN3-004	155 (6.1)	130 (5.12)	105 (4.13)	56 (2.2)	160 (6.3)	4 x M5	M4	4.2
DX-SIN3-010	155 (6.1)	130 (5.12)	120 (4.72)	71 (2.8)	160 (6.3)	4 x M5	M4	6.1
DX-SIN3-016	190 (7.48)	170 (6.69)	160 (6.3)	67 (2.64)	185 (7.28)	4 x M5	M4	9.4
DX-SIN3-023	240 (9.45)	190 (7.48)	190 (7.48)	105 (4.13)	280 (11.02)	4 x M6	M6	14.5
DX-SIN3-032	240 (9.45)	190 (7.48)	200 (7.87)	105 (4.13)	280 (11.02)	4 x M6	M6	19.7
DX-SIN3-037	240 (9.45)	190 (7.48)	210 (8.27)	115 (4.53)	280 (11.02)	4 x M6	M6	21.3
DX-SIN3-048	240 (9.45)	190 (7.48)	220 (8.66)	125 (4.92)	280 (11.02)	4 x M6	M6	26.2
DX-SIN3-061	300 (11.81)	240 (9.45)	228 (8.97)	133 (5.24)	315 (12.4)	4 x M8	M8	35
DX-SIN3-072	300 (11.81)	240 (9.45)	240 (9.45)	145 (5.71)	315 (12.4)	4 x M8	M8	39
DX-SIN3-090	300 (11.81)	240 (9.45)	270 (10.63)	171 (6.73)	320 (12.6)	4 x M8	M8	53.3
DX-SIN3-115	360 (14.17)	264 (10.39)	210 (8.27)	125 (4.92)	415 (16.34)	4 x M8	M8	66
DX-SIN3-150	360 (14.17)	264 (10.39)	225 (8.86)	140 (5.51)	415 (16.34)	4 x M10	M8	69
DX-SIN3-180	360 (14.17)	264 (10.39)	240 (9.45)	154 (6.06)	415 (16.34)	4 x M10	M8	88.7

Sine filter

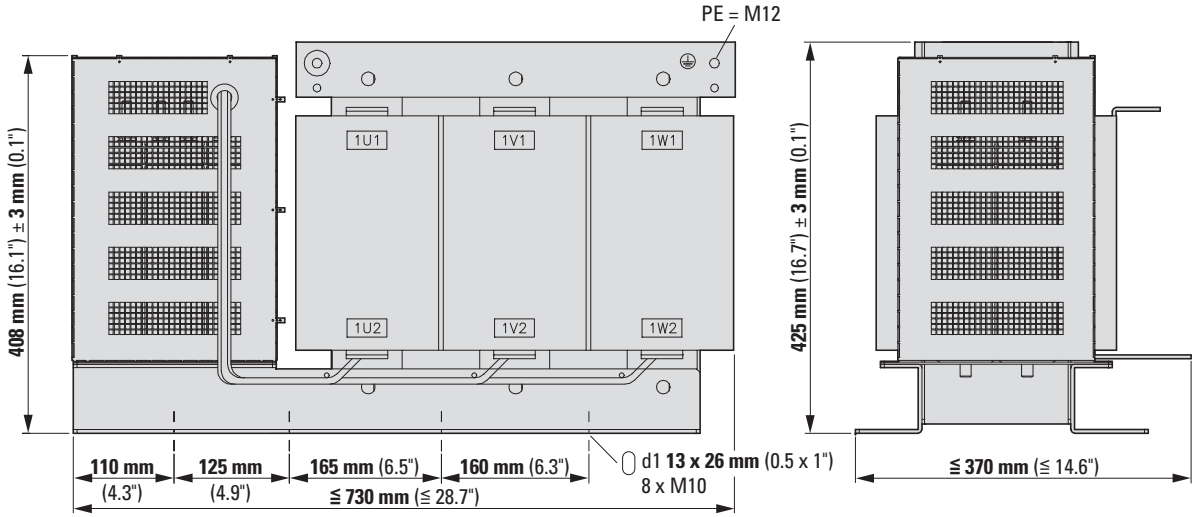
DX-SIN3-250



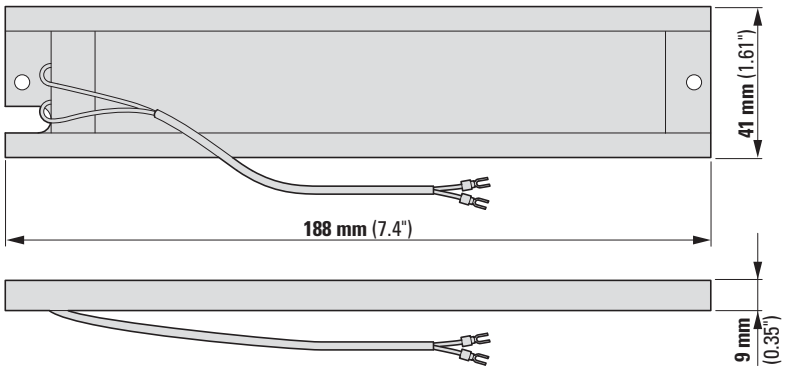
DX-SIN3-440



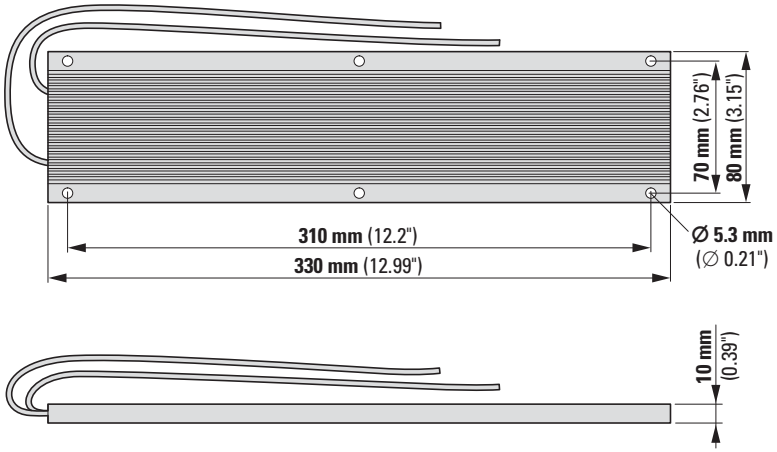
DX-SIN3-480



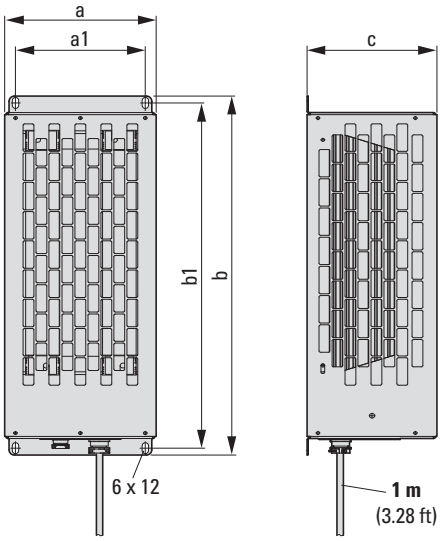
DX-BR3-100



DX-BR5-033

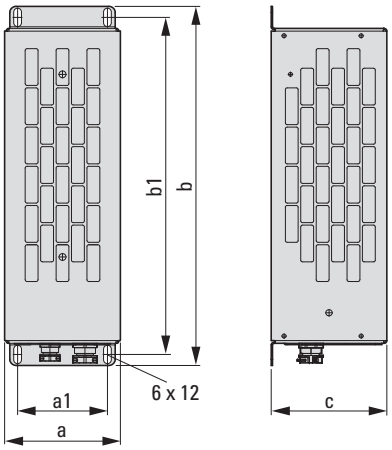


DX-BR... with connection cable



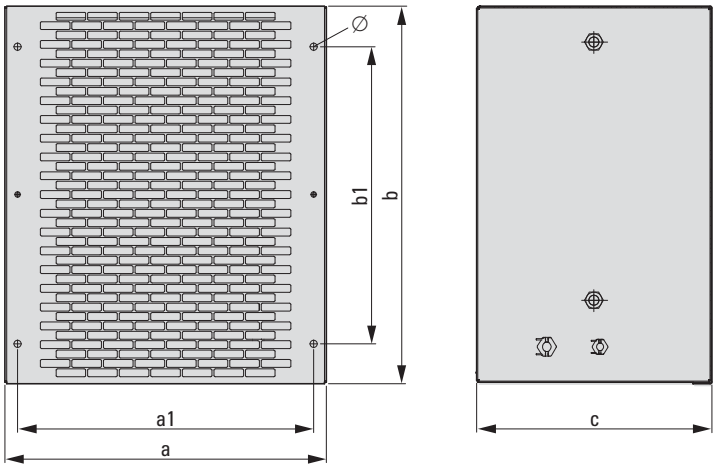
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Weight kg (lbs)
DX-BR200-0K4 DX-BR400-0K4	95 (3.07)	70 (2.76)	445 (17.52)	425 (16.73)	95 (3.07)	2.4 (5.29)
DX-BR150-0K5	140 (5.51)	120 (4.72)	395 (15.55)	375 (14.76)	120 (4.72)	3.7 (8.16)
DX-BR100-0K8 DX-BR200-0K8	140 (5.51)	120 (4.72)	445 (17.52)	425 (16.73)	120 (4.72)	4 (8.82)
DX-BR075-1K4 DX-BR100-1K4 DX-BR150-1K4	230 (9.06)	210 (8.27)	445 (17.52)	425 (16.73)	120 (4.72)	5.7 (12.57)
DX-BR100-1K6	2 x 140 (5.51)	2 x120 (4.72)	445 (17.52)	425 (16.73)	120 (4.72)	2 x 4 (8.82)

DX-BR... with connection cable



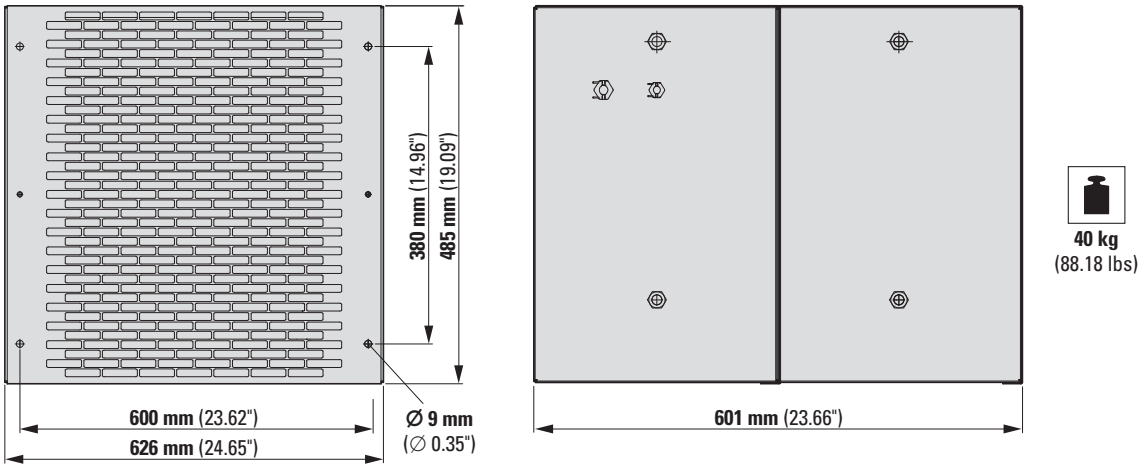
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Weight kg (lbs)
DX-BR050-0K4 DX-BR100-0K4	95 (3.07)	70 (2.76)	445 (17.52)	425 (16.73)	95 (3.07)	2.1 (4.63)
DX-BR100-0K2	95 (3.07)	70 (2.76)	345 (13.58)	325 (12.8)	95 (3.07)	1.7 (3.75)
DX-BR050-0K8	140 (5.51)	120 (4.72)	445 (17.52)	425 (16.73)	120 (4.72)	4 (8.82)
DX-BR035-1K1	230 (9.06)	210 (8.27)	445 (17.52)	425 (16.73)	120 (4.72)	5.5 (12.13)

DX-BR... with connection cable

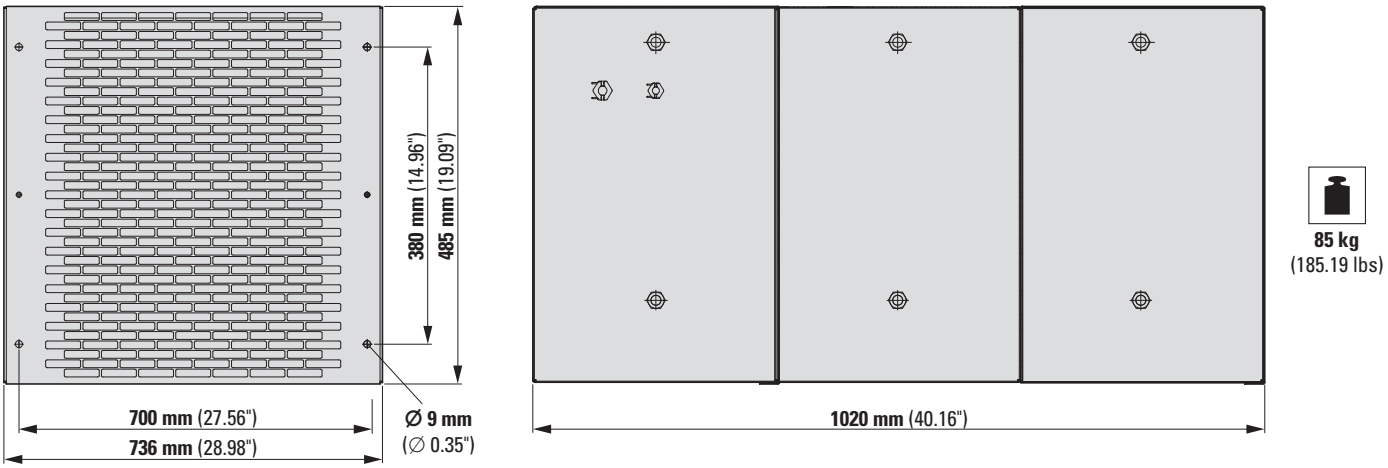


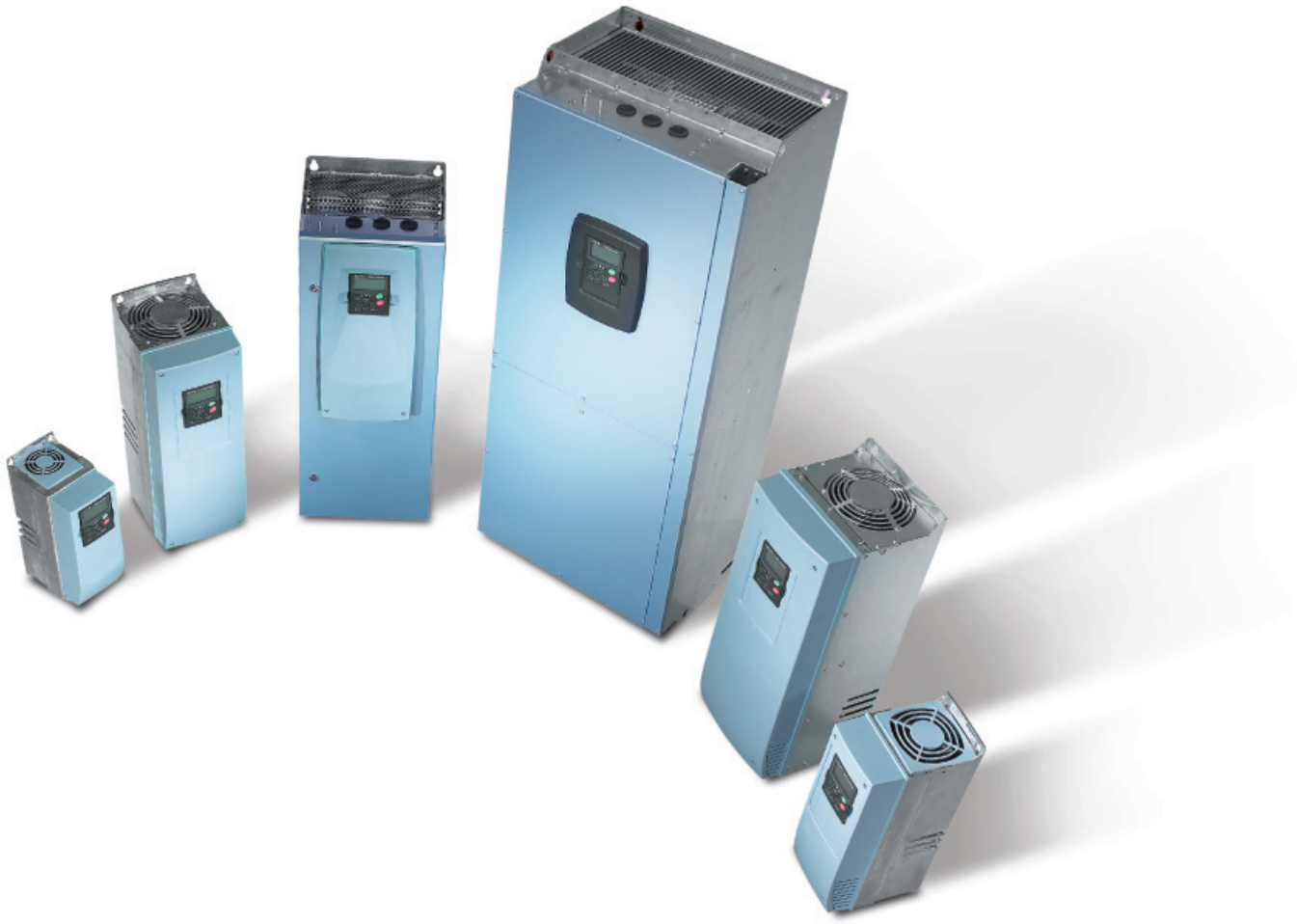
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Ø1 mm (inch)	Weight kg (lbs)
DX-BR022-1K4	226 (8.9)	200 (7.87)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	8.6 (18.96)
DX-BR012-3K1 DX-BR022-3K1 DX-BR040-3K1 DX-BR047-3K1 DX-BR050-3K1	326 (12.83)	300 (11.81)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	12 (26.46)
DX-BR006-5K1 DX-BR012-5K1 DX-BR022-5K1 DX-BR040-5K1 DX-BR047-5K1 DX-BR050-5K1 DX-BR075-5K1	426 (16.77)	400 (15.75)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	15.5 (34.17)
DX-BR100-6K2	526 (20.71)	500 (19.69)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	18 (39.68)
DX-BR006-9K2 DX-BR012-9K2 DX-BR022-9K2 DX-BR047-9K2	626 (24.65)	600 (23.62)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	20.5 (45.19)

DX-BR002-54K3, DX-BR006-18K1, DX-BR012-18K1



DX-BR002-102K4, DX-BR006-33K3





9000X SVX, SPX variable frequency drive

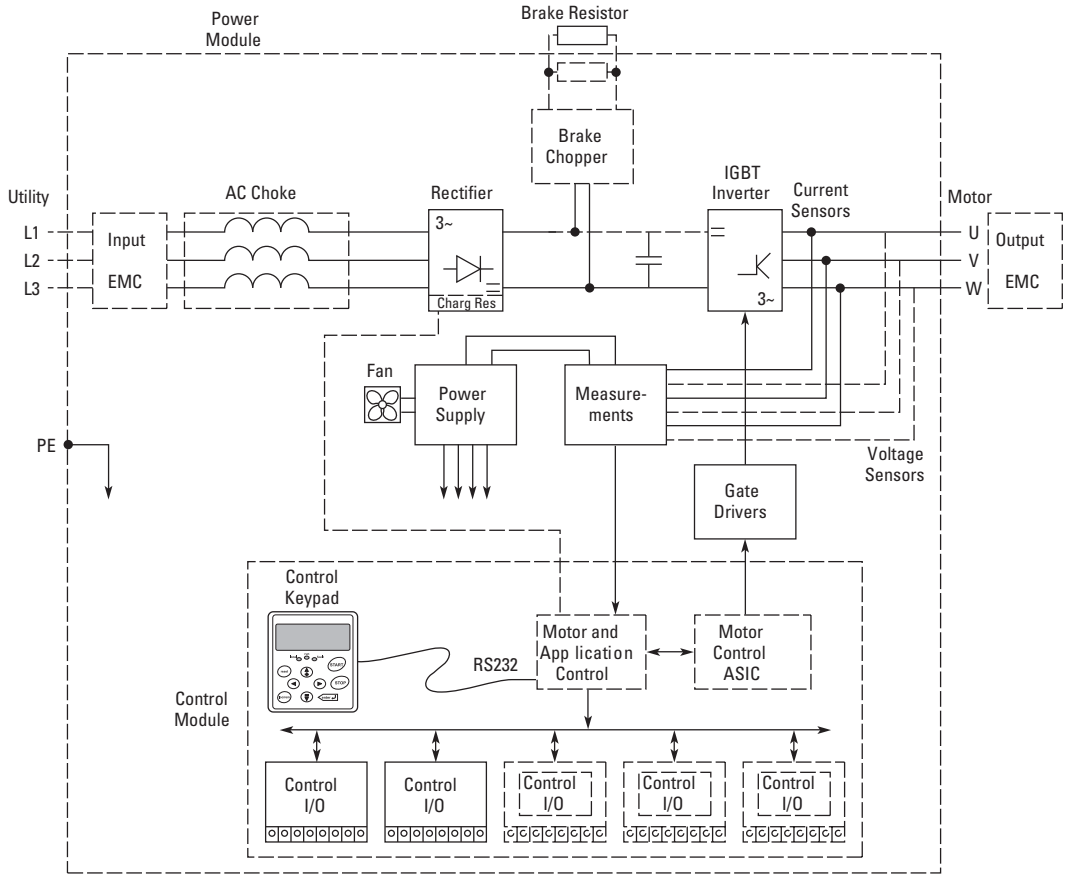
9000X variable frequency drives are ideal for sophisticated applications. With two different device series, they make a compelling case in a variety of scenarios: SVX standard variable frequency drives when it comes to simple and complex motor control systems in industrial machine building environments, and SPX application frequency drives when it comes to sophisticated, high-performance requirements. In both open-loop and closed-loop modes, their vector control guarantees reliable, dynamic, and sophisticated motor control performance when working with three-phase induction or permanent magnet motors.

SVX variable frequency drive
Variable frequency drives for operation with two overload options: 150% or 110%. The compact enclosures are rated IP21 (NEMA 1) and IP54 (NEMA 12) and come with an integrated radio interference suppression filter. A braking chopper is integrated into all units up to size FR6, and, in addition, there are two different models.
SVX…-4A…: U_{IN} 3~400 V/U_{OUT} 3~400 V, allocated motor outputs 0.75 – 132 kW
SVX…-5A…: U_{IN} 3~690 V/U_{OUT} 3~690 V, allocated motor outputs 2.2 – 160 kW

SPX variable frequency drive
Variable frequency drives for operation with two overload options: 150% or 110%. The enclosures for the compact devices are rated IP21 (NEMA 1) and IP54 (NEMA 12) and come with an integrated radio interference suppression filter. A braking chopper is integrated into all units up to size FR6, and, in addition, there are two different models.
SPX…-4A…: U_{IN} 3~400 V/U_{OUT} 3~400 V, allocated motor outputs 0.75 – 132 kW[1)]
SPX…-5A…: U_{IN} 3~690 V/U_{OUT} 3~690 V, allocated motor outputs 2.2 – 160 kW[1)]

1) Higher outputs of up to 1,100 kW (400 V) and 2,000 kW (690 V) are covered by variable frequency drives with sizes FR10 to FR14. These devices are available upon request from your sales office.

Description



SVX variable frequency drive

SVX units are heavy-duty, all-purpose standard variable frequency drives. Featuring a variety of application settings, they can be configured to meet virtually any challenge that arises when used to control induction motors, including applications involving multiple motors or multiple pumps run in parallel. SVX variable frequency drives are suitable for all standard applications in machines, buildings, and industrial projects. One of the factors contributing to this is their sturdy design, which features integrated chokes and EMC filters and provides effective protection against interference from the grid. In addition, their sophisticated motor control design and effective protection features for both motor and variable frequency drive guarantee reliable operation.

Essential features

- Performance range:
  – 0.75 - 132 kW (U_{IN}: 3~ 400 V / U_{OUT}: 3~ 400 V)
  – 2.2 - 160 kW (U_{IN}: 3~ 690 V / U_{OUT}: 3~ 690 V)
- High load capacity:
  – H = 2x rated operational current (2 seconds/20 seconds) and 150% overload (60 seconds/600 seconds)
  – L = 2x rated operational current (2 seconds/20 seconds) and 110% overload (60 seconds/600 seconds)
- Ambient air temperature: -10 °C up to +50 °C without derating
- Degree of protection with compact design: IP21 (NEMA1) and IP54 (NEMA12)
- I/O expansion with plug-in modules (5 slots)
- Optional fieldbus connection (CANopen, PROFIBUS-DP, DeviceNet), LonWorks
- PID control and power factor correction (PFC) for 1 to 5 pumps
- Programmable start and application wizard for an easy parameter configuration process
- Multiple display (multi-monitoring) for monitoring up to 3 different readings at the same time
- V/Hz control with boost and slip compensation
- Dynamic open-loop and closed-loop vector control
- Internal braking chopper available in sizes of up to FR9 (compact design)

SPX variable frequency drive

SPX variable frequency drives are the perfect choice when it comes to demanding applications in which reliability, a highly dynamic response, precision, and power are a must. Popular applications include lifting equipment and conveyances (cranes, winches, elevators, lifts), compressors and oil pumps, chippers, crushers, mixers, extruders, take-up and pay-off units, and tunnel boring machines. Multi-purpose SPX variable frequency drives are designed to cover a wide variety of applications while keeping things simple. In fact, with their excellent flexibility, they make it easy to adapt to additional process requirements for custom and complex applications used to control induction and permanent magnet motors. On top of this, their sturdy design, which features integrated chokes and EMC filters, provides effective protection against interference from the grid. Finally, their sophisticated motor control design and effective protection features for both motor and variable frequency drive guarantee reliable operation.

Essential features

- Performance range:
  – 0.75 - 132 kW (U_{IN}: 3~ 400 V / U_{OUT}: 3~ 400 V)
  – 2.2 - 160 kW (U_{IN}: 3~ 690 V / U_{OUT}: 3~ 690 V)
- Expanded performance range with distributed design (IP00). Please enquire:
  – up to 1100 kW (U_{IN}: 3~ 400 V / U_{OUT}: 3~ 400 V)
  – up to 2000 kW (U_{IN}: 3~ 690 V / U_{OUT}: 3~ 690 V)
- High load capacity:
  – H = 2x rated operational current (2 seconds/20 seconds) and 150% overload (60 seconds/600 seconds)
  – L = 2x rated operational current (2 seconds/20 seconds) and 110% overload (60 seconds/600 seconds)
- Ambient air temperature: -10 °C up to +50 °C without derating
- Degree of protection with compact design: Up to 132/160 kW: IP21 (NEMA1) and IP54 (NEMA12)
- I/O expansion with plug-in modules (5 slots)
- Optional fieldbus connection (CANopen, PROFIBUS-DP, DeviceNet), LonWorks
- PID control and power factor correction (PFC)
- Direct and parallel circuit solutions, even for PM motors with high outputs
- Programmable start and application wizard for an easy parameter configuration process
- Multiple display (multi-monitoring) for monitoring up to 3 different readings at the same time
- V/Hz control with boost and slip compensation
- Dynamic open-loop and closed-loop vector control
- Internal braking chopper available in sizes up to FR9

Technical overview

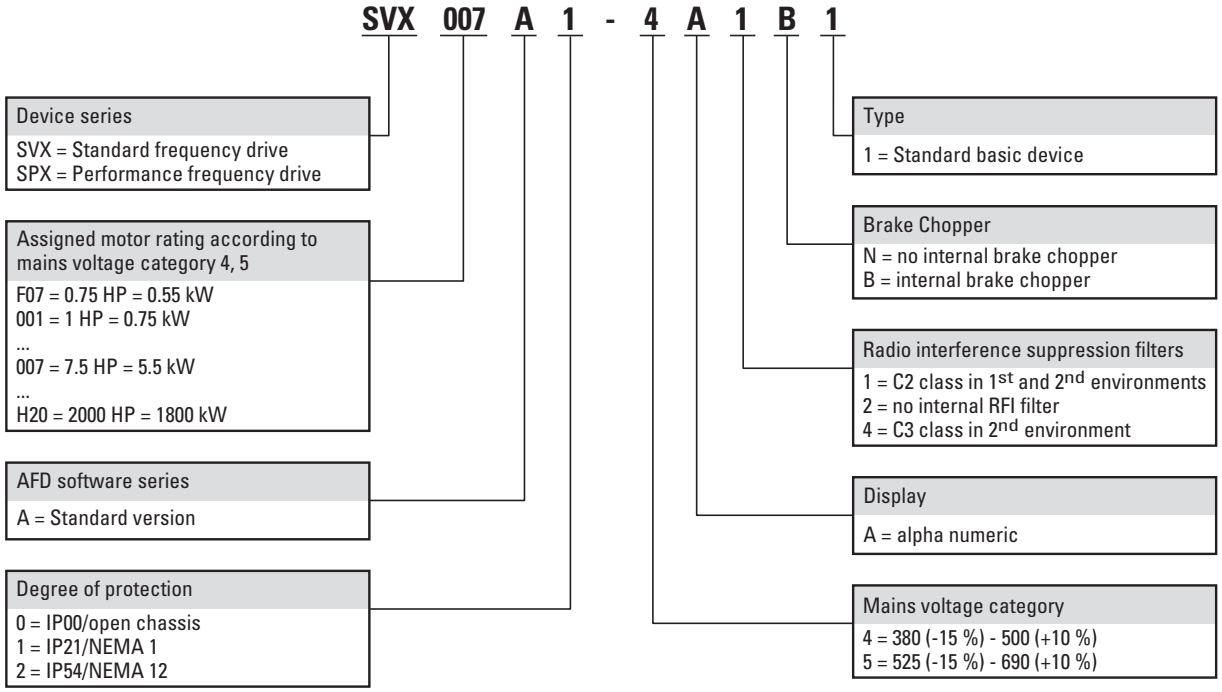
			SVX	SPX
Rated operational voltage	U_e			
400 V AC, 3-phase			✓	✓
690 V AC, 3-phase			✓	✓
Mains voltage (50/60Hz)	U_{LN}	V		
380 (-15%) - 500 (+10%)			✓	✓
525 (-15%) - 690 (±10%)			✓	✓
Supply frequency	f_{LN}	Hz	50/60	50/60
Rated operational current[1)]				
At 110% overload	I_e	A	3.3 - 300	3.3 - 300 (2250)[2)]
At 150% overload	I_e	A	2.2 - 245	2.2 - 245 (1940)[2)]
Assigned motor rating [1)]				
With 400 V, 50 Hz (110% overload)	P	kW	1.1 - 160	1.1 - 160 (1200)[2)]
With 400 V, 50 Hz (150% overload)	P	kW	0.75 - 132	0.75 - 132 (1100)[2)]
With 690 V, 60 Hz (110% overload)	P	kW	3 - 200	3 - 200 (2000)[2)]
With 690 V, 60 Hz (150% overload)	P	kW	2.2 - 160	2.2 - 160 (1800)[2)]
Ambient temperature				
Operation	ϑ	°C	-10 - +40	-10 - +40
Storage	ϑ	°C	-40 - +70	-40 - +70
Operation Mode				
U/f control			-	✓
sensorless vector control (SLV)			✓	✓
Vector control with feedback (CLV)			✓	✓
Switching frequency	f_{PWM}	kHz	1 - 16	1 - 16
Output voltage with V_e	U_2			
400 V AC, 3-phase			✓	✓
690 V AC, 3-phase			✓	✓
Output Frequency	f_2	Hz	0 - 320 Hz	0 - 320 Hz
Protection type				
IP00			-	(✓)[2)]
IP21			✓	✓
IP54			✓	✓
Fitted with				
Radio interference suppression filter			✓	✓
Brake chopper			✓	✓
Analog inputs			parameterizable, 2 x (0 - 10 V, 0/4 - 20 mA)	parameterizable, 2 x (0 - 10 V, 0/4 - 20 mA)
Analog outputs			parameterizable, 1 x (0/4 - 20 mA)	parameterizable, 1 x (0/4 - 20 mA)
Digital inputs			parameterizable, 6 x (max. 30 V DC)	parameterizable, 6 x (max. 30 V DC)
Digital outputs			parameterizable, 1 x (48 V DC / 50mA)	parameterizable, 1 x (48 V DC / 50mA)
Relay outputs			Parameterizable, two N/Os, 8 A (24 VDC) / 8 A (250 VAC) / 0.4 A (125 VDC)	Parameterizable, two N/Os, 8 A (24 VDC) / 8 A (250 VAC) / 0.4 A (125 VDC)
Production quality			RoHS, ISO 9001	RoHS, ISO 9001
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003	EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003
EMC: EN 61800-3:2004+A1-2012			✓	✓
Safety: EN 61800-5-1: 2003			✓	✓
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick

Notes

1) L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

2) Higher outputs are covered by variable frequency drives with sizes FR10 to FR14. These devices are available as modules with protection class IP 00 upon request from your sales office.

Key to type references



UL/CSA

Information relevant for export to North America

Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E134360
UL Category Control No.	NMMS, NMMS2, NMMS7. NMMS8
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Specially designed for North America	No
Suitable for	Branch circuits
Max. Voltage Rating	
SVX/SPX…-4…	3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
SVX/SPX…-5…	3~ 690 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection	
SPX…A0…	IEC: IP00
SVX/SPX…A1…	IEC: IP21
SVX/SPX…A2…	IEC: IP54

Ordering

Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 380 (-15%) - 500 (+10%) V												
3.3	2.2	1.1	0.75	2.6	1.9	✓	✓	FR4	IP21	**SVX001A1-4A1B1** 125676		1 off
						✓	✓		IP54	**SVX001A2-4A1B1** 125677		
4.3	3.3	1.5	1.1	3.6	2.6	✓	✓		IP21	**SVXF15A1-4A1B1** 125707		
						✓	✓		IP54	**SVXF15A2-4A1B1** 125708		
5.6	4.3	2.2	1.5	5	3.6	✓	✓		IP21	**SVX002A1-4A1B1** 125748		
						✓	✓		IP54	**SVX002A2-4A1B1** 125678		
7.6	5.6	3	2.2	6.6	5	✓	✓		IP21	**SVX003A1-4A1B1** 125679		
						✓	✓		IP54	**SVX003A2-4A1B1** 125680		
9	7.6	4	3	8.5	6.6	✓	✓		IP21	**SVX005A1-4A1B1** 125749		
						✓	✓		IP54	**SVX005A2-4A1B1** 125753		
12	9	5.5	4	11.3	8.5	✓	✓		IP21	**SVX006A1-4A1B1** 125682		
						✓	✓		IP54	**SVX006A2-4A1B1** 125683		
16	12	7.5	5.5	15.2	11.3	✓	✓	FR5	IP21	**SVX007A1-4A1B1** 125684		
						✓	✓		IP54	**SVX007A2-4A1B1** 125685		
23	16	11	7.5	21.7	15.2	✓	✓		IP21	**SVX010A1-4A1B1** 125686		
						✓	✓		IP54	**SVX010A2-4A1B1** 125687		
31	23	15	11	29.3	21.7	✓	✓		IP21	**SVX015A1-4A1B1** 125688		
						✓	✓		IP54	**SVX015A2-4A1B1** 125689		
38	31	18.5	15	36	29.3	✓	✓	FR6	IP21	**SVX020A1-4A1B1** 125690		
						✓	✓		IP54	**SVX020A2-4A1B1** 125754		
46	38	22	18.5	41	36	✓	✓		IP21	**SVX025A1-4A1B1** 125691		
						✓	✓		IP54	**SVX025A2-4A1B1** 125692		
61	46	30	22	55	41	✓	✓		IP21	**SVX030A1-4A1B1** 125693		
						✓	✓		IP54	**SVX030A2-4A1B1** 125694		
72	61	37	30	68	55	✓	-	FR7	IP21	**SVX040A1-4A1N1** 125695		
						✓	-		IP54	**SVX040A2-4A1N1** 125696		
						✓	✓		IP21	**SVX040A1-4A1B1** 132656		
						✓	✓		IP54	**SVX040A2-4A1B1** 138452		

Notes

[1] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → Page 82

Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %	Radio interference suppression filter	Brake chopper					
I_e	I_e	P	P	I_e	I_e							
A	A	kW	kW	A	A							
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase												
Mains voltage (50/60Hz) U_{LN}: 380 (-15%) - 500 (+10%) V												
87	72	45	37	81	68	✓	✓	FR7	IP21	**SVX050A1-4A1B1** 138430		1 off
						✓	-		IP54	**SVX050A2-4A1N1** 125697		
						✓	-		IP21	**SVX050A1-4A1N1** 125750		
						✓	✓		IP54	**SVX050A2-4A1B1** 138453		
105	87	55	45	99	81	✓	-		IP54	**SVX060A2-4A1N1** 125698		
						✓	✓		IP54	**SVX060A2-4A1B1** 138454		
						✓	✓		IP21	**SVX060A1-4A1B1** 138431		
						✓	-		IP21	**SVX060A1-4A1N1** 125751		
140	105	75	55	134	99	✓	-	FR8	IP21	**SVX075A1-4A1N1** 125699		
						✓	-		IP54	**SVX075A2-4A1N1** 125700		
						✓	✓		IP21	**SVX075A1-4A1B1** 132657		
						✓	✓		IP54	**SVX075A2-4A1B1** 138455		
170	140	90	75	161	134	✓	-		IP21	**SVX100A1-4A1N1** 125701		
						✓	-		IP54	**SVX100A2-4A1N1** 125755		
						✓	✓		IP21	**SVX100A1-4A1B1** 132658		
						✓	✓		IP54	**SVX100A2-4A1B1** 138456		
205	170	110	90	196	161	✓	-		IP21	**SVX125A1-4A1N1** 125702		
						✓	-		IP54	**SVX125A2-4A1N1** 125703		
						✓	✓		IP21	**SVX125A1-4A1B1** 135242		
						✓	✓		IP54	**SVX125A2-4A1B1** 138457		
261	205	132	110	231	196	✓	-	FR9	IP21	**SVX150A1-4A1N1** 125704		
						✓	-		IP54	**SVX150A2-4A1N1** 125705		
						✓	✓		IP54	**SVX150A2-4A1B1** 138458		
						✓	✓		IP21	**SVX150A1-4A1B1** 138432		
300	245	160	132	279	231	✓	-		IP21	**SVX200A1-4A1N1** 125752		
						✓	-		IP54	**SVX200A2-4A1N1** 125706		
						✓	✓		IP54	**SVX200A2-4A1B1** 138459		
						✓	✓		IP21	**SVX200A1-4A1B1** 132900		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 690 V AC, 3-phase / U_2 690 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 525 (-15%) - 690 (±10%) V												
4.5	3.2	3	2.2	3.8	2.9	✓	-	FR6	IP21	**SVX002A1-5A4N1** 125756		1 off
						✓	-		IP54	**SVX002A2-5A4N1** 125774		
						✓	✓		IP54	**SVX002A2-5A4B1** 138498		
						✓	✓		IP21	**SVX002A1-5A4B1** 138480		
5.5	4.5	4	3	4.9	3.8	✓	-		IP21	**SVX003A1-5A4N1** 125757		
						✓	-		IP54	**SVX003A2-5A4N1** 125775		
						✓	✓		IP21	**SVX003A1-5A4B1** 138481		
						✓	✓		IP54	**SVX003A2-5A4B1** 138499		
7.5	5.5	5.5	4	6.5	4.9	✓	-		IP21	**SVX004A1-5A4N1** 125758		
						✓	-		IP54	**SVX004A2-5A4N1** 125776		
						✓	✓		IP21	**SVX004A1-5A4B1** 138482		
						✓	✓		IP54	**SVX004A2-5A4B1** 138500		
10	7.5	7.5	5.5	8.8	6.5	✓	-		IP21	**SVX005A1-5A4N1** 125759		
						✓	-		IP54	**SVX005A2-5A4N1** 125777		
						✓	✓		IP21	**SVX005A1-5A4B1** 138483		
						✓	✓		IP54	**SVX005A2-5A4B1** 138501		
13.5	10	11	7.5	12.6	8.8	✓	-		IP21	**SVX007A1-5A4N1** 125760		
						✓	-		IP54	**SVX007A2-5A4N1** 125778		
						✓	✓		IP21	**SVX007A1-5A4B1** 138484		
						✓	✓		IP54	**SVX007A2-5A4B1** 138502		
18	13.5	15	11	17	12.6	✓	-		IP21	**SVX010A1-5A4N1** 125761		
						✓	-		IP54	**SVX010A2-5A4N1** 125779		
						✓	✓		IP21	**SVX010A1-5A4B1** 138485		
						✓	✓		IP54	**SVX010A2-5A4B1** 138503		
22	18	18.5	15	20.9	17	✓	-		IP21	**SVX015A1-5A4N1** 125762		
						✓	-		IP54	**SVX015A2-5A4N1** 125780		
						✓	✓		IP21	**SVX015A1-5A4B1** 138486		
						✓	✓		IP54	**SVX015A2-5A4B1** 138504		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 690 V AC, 3-phase / U_2 690 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 525 (-15%) - 690 (±10%) V												
27	22	22	18.5	23.8	20.9	✓	-	FR6	IP21	**SVX020A1-5A4N1** 125763		1 off
						✓	-		IP54	**SVX020A2-5A4N1** 125781		
						✓	✓		IP21	**SVX020A1-5A4B1** 138487		
						✓	✓		IP54	**SVX020A2-5A4B1** 138505		
34	27	30	22	32	23.8	✓	-		IP21	**SVX025A1-5A4N1** 125764		
						✓	-		IP54	**SVX025A2-5A4N1** 125782		
						✓	✓		IP21	**SVX025A1-5A4B1** 138488		
						✓	✓		IP54	**SVX025A2-5A4B1** 138506		
41	34	37	30	39	32	✓	-	FR7	IP21	**SVX030A1-5A4N1** 125765		
						✓	-		IP54	**SVX030A2-5A4N1** 125783		
						✓	✓		IP21	**SVX030A1-5A4B1** 138489		
						✓	✓		IP54	**SVX030A2-5A4B1** 138507		
52	41	45	37	47	39	✓	-		IP54	**SVX040A2-5A4N1** 125784		
						✓	-		IP21	**SVX040A1-5A4N1** 125766		
						✓	✓		IP21	**SVX040A1-5A4B1** 138490		
						✓	✓		IP54	**SVX040A2-5A4B1** 138508		
62	52	55	45	58	47	✓	-	FR8	IP21	**SVX050A1-5A4N1** 125767		
						✓	-		IP54	**SVX050A2-5A4N1** 125785		
						✓	✓		IP54	**SVX050A2-5A4B1** 138509		
						✓	✓		IP21	**SVX050A1-5A4B1** 138491		
80	62	75	55	78	58	✓	-		IP21	**SVX060A1-5A4N1** 125768		
						✓	-		IP54	**SVX060A2-5A4N1** 125786		
						✓	✓		IP21	**SVX060A1-5A4B1** 138492		
						✓	✓		IP54	**SVX060A2-5A4B1** 138510		
100	80	90	75	93	78	✓	-		IP21	**SVX075A1-5A4N1** 125769		
						✓	-		IP54	**SVX075A2-5A4N1** 125787		
						✓	✓		IP21	**SVX075A1-5A4B1** 138493		
						✓	✓		IP54	**SVX075A2-5A4B1** 138511		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 690 V AC, 3-phase / U_2 690 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 525 (-15%) - 690 (±10%) V												
125	100	110	90	114	93	✓	-	FR9	IP21	**SVX100A1-5A4N1** 125770		1 off
						✓	-		IP54	**SVX100A2-5A4N1** 125788		
						✓	✓		IP21	**SVX100A1-5A4B1** 138494		
						✓	✓		IP54	**SVX100A2-5A4B1** 138512		
144	125	132	110	134	114	✓	-		IP21	**SVX125A1-5A4N1** 125771		
						✓	-		IP54	**SVX125A2-5A4N1** 125789		
						✓	✓		IP54	**SVX125A2-5A4B1** 138513		
						✓	✓		IP21	**SVX125A1-5A4B1** 138495		
170	144	160	132	162	134	✓	-		IP21	**SVX150A1-5A4N1** 125772		
						✓	-		IP54	**SVX150A2-5A4N1** 125790		
						✓	✓		IP21	**SVX150A1-5A4B1** 138496		
						✓	✓		IP54	**SVX150A2-5A4B1** 138514		
208	170	200	160	202	162	✓	-		IP21	**SVX175A1-5A4N1** 125773		
						✓	-		IP54	**SVX175A2-5A4N1** 125791		
						✓	✓		IP21	**SVX175A1-5A4B1** 138497		
						✓	✓		IP54	**SVX175A2-5A4B1** 138515		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 380 (-15%) - 500 (+10%) V												
3.3	2.2	1.1	0.75	2.6	1.9	✓	✓	FR4	IP21	**SPX001A1-4A1B1** 125203		1 off
						✓	✓		IP54	**SPX001A2-4A1B1** 125207		
4.3	3.3	1.5	1.1	3.6	2.6	✓	✓		IP21	**SPXF15A1-4A1B1** 125675		
						✓	✓		IP54	**SPXF15A2-4A1B1** 125480		
5.6	4.3	2.2	1.5	5	3.6	✓	✓		IP21	**SPX002A1-4A1B1** 125657		
						✓	✓		IP54	**SPX002A2-4A1B1** 125216		
7.6	5.6	3	2.2	6.6	5	✓	✓		IP21	**SPX003A1-4A1B1** 125658		
						✓	✓		IP54	**SPX003A2-4A1B1** 125226		
9	7.6	4	3	8.5	6.6	✓	✓		IP21	**SPX005A1-4A1B1** 125659		
						✓	✓		IP54	**SPX005A2-4A1B1** 125245		
12	9	5.5	4	11.3	8.5	✓	✓		IP21	**SPX006A1-4A1B1** 125249		
						✓	✓		IP54	**SPX006A2-4A1B1** 125251		
16	12	7.5	5.5	15.2	11.3	✓	✓	FR5	IP21	**SPX007A1-4A1B1** 125660		
						✓	✓		IP54	**SPX007A2-4A1B1** 125260		
23	16	11	7.5	21.7	15.2	✓	✓		IP21	**SPX010A1-4A1B1** 125661		
						✓	✓		IP54	**SPX010A2-4A1B1** 125662		
31	23	15	11	29.3	21.7	✓	✓		IP21	**SPX015A1-4A1B1** 125663		
						✓	✓		IP54	**SPX015A2-4A1B1** 125664		
38	31	18.5	15	36	29.3	✓	✓	FR6	IP21	**SPX020A1-4A1B1** 125665		
						✓	✓		IP54	**SPX020A2-4A1B1** 125291		
46	38	22	18.5	41	36	✓	✓		IP21	**SPX025A1-4A1B1** 125666		
						✓	✓		IP54	**SPX025A2-4A1B1** 125302		
61	46	30	22	55	41	✓	✓		IP21	**SPX030A1-4A1B1** 125667		
						✓	✓		IP54	**SPX030A2-4A1B1** 125313		
72	61	37	30	68	55	✓	-	FR7	IP21	**SPX040A1-4A1N1** 125319		
						✓	-		IP54	**SPX040A2-4A1N1** 125325		
						✓	✓		IP21	**SPX040A1-4A1B1** 134844		
						✓	✓		IP54	**SPX040A2-4A1B1** 138609		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 400 V AC, 3-phase / U_2 400 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 380 (-15%) - 500 (+10%) V												
87	72	45	37	81	68	✓	-	FR7	IP21	**SPX050A1-4A1N1** 125331		1 off
						✓	-		IP54	**SPX050A2-4A1N1** 125337		
						✓	✓		IP21	**SPX050A1-4A1B1** 138606		
						✓	✓		IP54	**SPX050A2-4A1B1** 138610		
105	87	55	45	99	81	✓	-		IP21	**SPX060A1-4A1N1** 125668		
						✓	-		IP54	**SPX060A2-4A1N1** 125348		
						✓	✓		IP21	**SPX060A1-4A1B1** 138607		
						✓	✓		IP54	**SPX060A2-4A1B1** 138611		
140	105	75	55	134	99	✓	-	FR8	IP21	**SPX075A1-4A1N1** 125354		
						✓	-		IP54	**SPX075A2-4A1N1** 125359		
						✓	✓		IP21	**SPX075A1-4A1B1** 138608		
						✓	✓		IP54	**SPX075A2-4A1B1** 138612		
170	140	90	75	161	134	✓	-		IP21	**SPX100A1-4A1N1** 125365		
						✓	-		IP54	**SPX100A2-4A1N1** 125370		
						✓	✓		IP21	**SPX100A1-4A1B1** 131744		
						✓	✓		IP54	**SPX100A2-4A1B1** 138613		
205	170	110	90	196	161	✓	-		IP21	**SPX125A1-4A1N1** 125669		
						✓	-		IP54	**SPX125A2-4A1N1** 125377		
						✓	✓		IP21	**SPX125A1-4A1B1** 134489		
						✓	✓		IP54	**SPX125A2-4A1B1** 138614		
261	205	132	110	231	196	✓	-	FR9	IP21	**SPX150A1-4A1N1** 125381		
						✓	-		IP54	**SPX150A2-4A1N1** 125385		
						✓	✓		IP21	**SPX150A1-4A1B1** 129701		
						✓	✓		IP54	**SPX150A2-4A1B1** 138615		
300	245	160	132	279	231	✓	-		IP21	**SPX200A1-4A1N1** 125670		
						✓	-		IP54	**SPX200A2-4A1N1** 125398		
						✓	✓		IP21	**SPX200A1-4A1B1** 134845		
						✓	✓		IP54	**SPX200A2-4A1B1** 138616		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 690 V AC, 3-phase / U_2 690 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 525 (-15%) - 690 (±10%) V												
4.5	3.2	3	2.2	3.8	2.9	✓	-	FR6	IP21	**SPX002A1-5A4N1** 125212		1 off
						✓	-		IP54	**SPX002A2-5A4N1** 125218		
						✓	✓		IP21	**SPX002A1-5A4B1** 138638		
						✓	✓		IP54	**SPX002A2-5A4B1** 129582		
5.5	4.5	4	3	4.9	3.8	✓	-		IP54	**SPX003A2-5A4N1** 125228		
						✓	-		IP21	**SPX003A1-5A4N1** 125222		
						✓	✓		IP21	**SPX003A1-5A4B1** 138639		
						✓	✓		IP54	**SPX003A2-5A4B1** 129583		
7.5	5.5	5.5	4	6.5	4.9	✓	-		IP21	**SPX004A1-5A4N1** 125232		
						✓	✓		IP54	**SPX004A2-5A4B1** 129584		
						✓	✓		IP21	**SPX004A1-5A4B1** 138640		
						✓	-		IP54	**SPX004A2-5A4N1** 125236		
10	7.5	7.5	5.5	8.8	6.5	✓	-		IP21	**SPX005A1-5A4N1** 125241		
						✓	-		IP54	**SPX005A2-5A4N1** 125247		
						✓	✓		IP21	**SPX005A1-5A4B1** 138641		
						✓	✓		IP54	**SPX005A2-5A4B1** 129585		
13.5	10	11	7.5	12.6	8.8	✓	-		IP21	**SPX007A1-5A4N1** 125256		
						✓	-		IP54	**SPX007A2-5A4N1** 125262		
						✓	✓		IP21	**SPX007A1-5A4B1** 138642		
						✓	✓		IP54	**SPX007A2-5A4B1** 129586		
18	13.5	15	11	17	12.6	✓	-		IP21	**SPX010A1-5A4N1** 125267		
						✓	-		IP54	**SPX010A2-5A4N1** 125272		
						✓	✓		IP21	**SPX010A1-5A4B1** 138643		
						✓	✓		IP54	**SPX010A2-5A4B1** 129587		
22	18	18.5	15	20.9	17	✓	-		IP21	**SPX015A1-5A4N1** 125277		
						✓	-		IP54	**SPX015A2-5A4N1** 125282		
						✓	✓		IP21	**SPX015A1-5A4B1** 138644		
						✓	✓		IP54	**SPX015A2-5A4B1** 129588		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

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Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 690 V AC, 3-phase / U_2 690 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 525 (-15%) - 690 (±10%) V												
27	22	22	18.5	23.8	20.9	✓	-	FR6	IP21	**SPX020A1-5A4N1** 125287		1 off
						✓	-		IP54	**SPX020A2-5A4N1** 125293		
						✓	✓		IP21	**SPX020A1-5A4B1** 138645		
						✓	✓		IP54	**SPX020A2-5A4B1** 129589		
34	27	30	22	32	23.8	✓	-		IP21	**SPX025A1-5A4N1** 125298		
						✓	-		IP54	**SPX025A2-5A4N1** 125304		
						✓	✓		IP54	**SPX025A2-5A4B1** 129590		
						✓	✓		IP21	**SPX025A1-5A4B1** 138646		
41	34	37	30	39	32	✓	-	FR7	IP21	**SPX030A1-5A4N1** 125309		
						✓	-		IP54	**SPX030A2-5A4N1** 125315		
						✓	✓		IP21	**SPX030A1-5A4B1** 138647		
						✓	✓		IP54	**SPX030A2-5A4B1** 129591		
52	41	45	37	47	39	✓	-		IP21	**SPX040A1-5A4N1** 125321		
						✓	-		IP54	**SPX040A2-5A4N1** 125327		
						✓	✓		IP21	**SPX040A1-5A4B1** 138648		
						✓	✓		IP54	**SPX040A2-5A4B1** 129592		
62	52	55	45	58	47	✓	-	FR8	IP21	**SPX050A1-5A4N1** 125333		
						✓	-		IP54	**SPX050A2-5A4N1** 125339		
						✓	✓		IP21	**SPX050A1-5A4B1** 138649		
						✓	✓		IP54	**SPX050A2-5A4B1** 129593		
80	62	75	55	78	58	✓	-		IP21	**SPX060A1-5A4N1** 125344		
						✓	-		IP54	**SPX060A2-5A4N1** 125350		
						✓	✓		IP21	**SPX060A1-5A4B1** 138650		
						✓	✓		IP54	**SPX060A2-5A4B1** 129594		
100	80	90	75	93	78	✓	-		IP21	**SPX075A1-5A4N1** 125356		
						✓	-		IP54	**SPX075A2-5A4N1** 125361		
						✓	✓		IP54	**SPX075A2-5A4B1** 129595		
						✓	✓		IP21	**SPX075A1-5A4B1** 138651		

Notes

[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → Page 82

Rated operational current[1]		Assigned motor rating [1), 2)]		Rated motor current[1), 2)]		Fitted with		Frame size	Protection type	**Part no.** Article no.	**Price** see price list	Std. pack
L = 110 % I_e A	H = 150 % I_e A	L = 110 % P kW	H = 150 % P kW	L = 110 % I_e A	H = 150 % I_e A	Radio interference suppression filter	Brake chopper					
U_e 690 V AC, 3-phase / U_2 690 V AC, 3-phase Mains voltage (50/60Hz) U_{LN}: 525 (-15%) - 690 (±10%) V												
125	100	110	90	114	93	✓	-	FR9	IP21	**SPX100A1-5A4N1** 125367		1 off
						✓	-		IP54	**SPX100A2-5A4N1** 125372		
						✓	✓		IP21	**SPX100A1-5A4B1** 138652		
						✓	✓		IP54	**SPX100A2-5A4B1** 129596		
144	125	132	110	134	114	✓	-		IP21	**SPX125A1-5A4N1** 125375		
						✓	-		IP54	**SPX125A2-5A4N1** 125379		
						✓	✓		IP21	**SPX125A1-5A4B1** 138653		
						✓	✓		IP54	**SPX125A2-5A4B1** 129597		
170	144	160	132	162	134	✓	-	FR9	IP21	**SPX150A1-5A4N1** 125383		1 off
						✓	-		IP54	**SPX150A2-5A4N1** 125387		
						✓	✓		IP21	**SPX150A1-5A4B1** 138654		
						✓	✓		IP54	**SPX150A2-5A4B1** 129598		
208	170	200	160	202	162	✓	-		IP21	**SPX175A1-5A4N1** 125389		
						✓	-		IP54	**SPX175A2-5A4N1** 125391		
						✓	✓		IP21	**SPX175A1-5A4B1** 138655		
						✓	✓		IP54	**SPX175A2-5A4B1** 129599		

Notes

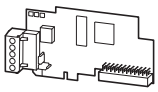
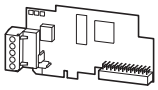
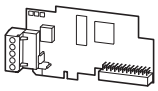
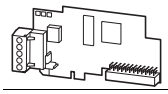
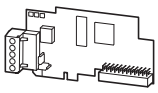
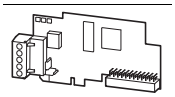
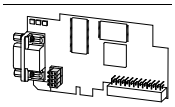
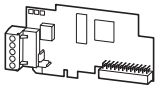
[1)] L = 110% overload for 60 s every 10 min.
H = 150% overload for 60 s every 10 min.

[2)] Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

Information relevant for export to North America → Page 82

Accessories

	Description	For use with	**Part no.** Article no.	**Price** see price list	Std. pack	**Information relevant for export to North America**	
External keypad							
	With illuminated LCD display Plain text, multi-line With control buttons and function keys Front IP54	SVX, SPX	**KEYPAD-LOC/REM** 139787		1 off	Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
						UL File No.	E134360
Mounting unit						UL Category Control No.	NMMS, NMMS2, NMMS7. NMMS8
	Mounting frame for control panel door 3 m	KEYPAD-LOC/REM	**OPTRMT-KIT** 126868		1 off	CSA File No.	UL report applies to both US and Canada
Connection cable						CSA Class No.	3211-06
	Connection between variable frequency drive and PC 1.5 m	SVX, SPX	**SVDRIVECABLE** 129001		1 off	North America Certification	UL listed, certified by UL for use in Canada
						Suitable for	Branch circuits

	Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
Expansion modules						
The expansion module is plugged into the variable-frequency drive.						
Adapters						
	System bus adapter	SPX	**OPTD1** 125077		1 off	
	System bus adapter with CANopen® interface	SPX	**OPTD2** 125078			
	RS232 adapter	SPX	**OPTD3** 125079			
Output expansion						
	1 relay output (NO/NC) 1 relay output (NC) 1 Thermistor input	SPX	**OPTA3** 125050		1 off	
	2 relay outputs (NO/NC)	SVX, SPX	**OPTA2** 125049			
	1 relay output (NO) 5 digital inputs (42 - 240 V AC)	SVX, SPX	**OPTB9** 125064			
	3 relay outputs (NO)	SVX, SPX	**OPTB5** 125062			
	1 relay output (NO/NC) 1 relay output (NO) 1 Thermistor input	SVX, SPX	**OPTB2** 125060			
I/O expansion						
	6 digital inputs External 24 V supply	SVX, SPX	**OPTB1** 125059		1 off	
	6 digital inputs 1 digital output 2 analog inputs (mA/V) 1 analog output	SVX, SPX	**OPTA9** 125055			
	3 digital inputs 1 relay output (NO/NC) 1 digital output	SVX, SPX	**OPTAA** 125056			
	6 digital inputs 1 digital output 2 analog inputs (mA/V) 1 analog output	SPX	**OPTA8** 125054			
	1 analog input (mA, isolated) 2 analog outputs (mA, isolated)	SVX, SPX	**OPTB4** 125061			
Encoder module						
	HTL (+15 V/24 V) Master / Slave capability	SPX	**OPTA7** 125053		1 off	
Temperature sensor expansion						
	3 Pt100 External 24 V supply	SVX, SPX	**OPTB8** 125063		1 off	
Fieldbus modules						
The field bus module is plugged into the variable-frequency drive.						
	Modbus RS485 Screw terminals	SVX, SPX	**OPTC2** 125067		1 off	
	PROFIBUS-DP Screw terminals	SVX, SPX	**OPTC3** 125068			
	LonWorks Screw terminals	SVX, SPX	**OPTC4** 125069			
	CANopen® Screw terminals	SVX, SPX	**OPTC6** 125710			
	PROFIBUS-DP SUB-D 9 pole, socket	SVX, SPX	**OPTC5** 125070			
	DeviceNet SUB-D 9 pole, socket	SVX, SPX	**OPTC7** 125071			
	Modbus RS485 SUB-D 9 pole, socket	SVX, SPX	**OPTC8** 125072			
	Modbus-TCP RJ45, 8-pole	SVX, SPX	**OPTCI** 125075			
	BACnet/IP RJ45, 8-pole	SVX, SPX	**OPTCJ** 125076			

Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E134360
UL Category Control No.	NMMS, NMMS2, NMMS7. NMMS8
CSA File No.	UL report applies to both US and Canada
CSA Class No.	3211-06
North America Certification	UL listed, certified by UL for use in Canada
Suitable for	Branch circuits

Technical data

			SVX001… SPX001…	SVXF15… SPXF15…	SVX002… SPX002…	SVX003… SPX003…	SVX005… SPX005…	SVX006… SPX006…	SVX007… SPX007…	SVX010… SPX010…	SVX015… SPX015…	SVX020… SPX020…
General												
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003				EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing	ρ_w	%	< 95% relative humidity, no condensation, no corrosion, no dripping water				< 95% relative humidity, no condensation, no corrosion, no dripping water					
Ambient temperature												
Operation	ϑ	°C	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage	ϑ	°C	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level												
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m				0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)				BGV A3 (VBG4, finger- and back-of-hand proof)					
Weight		kg	5	5	5	5	5	5	8.1	8.1	8.1	18.5
Main circuit												
Supply												
Rated operational voltage	U_e	V	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section												
Function			Frequency inverter with internal DC link and IGBT inverter				Frequency inverter with internal DC link and IGBT inverter					
Output voltage with V_e	U_2	V	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency	f_{PWM}	kHz	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)
Operation Mode												
SVX…			U/f control sensorless vector control (SLV)				U/f control sensorless vector control (SLV)					
SPX…			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)				U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
Frequency resolution (setpoint value)	△f	Hz	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Rated operational current												
At 110% overload	I_e	A	3.3	4.3	5.6	7.6	9	12	16	23	31	38
At 150% overload	I_e	A	2.2	3.3	4.3	5.6	7.6	9	12	16	23	31
Motor feeder												
Assigned motor rating												
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz				For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
With 400 V, 50 Hz (110% overload)	P	kW	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5
With 400 V, 50 Hz (150% overload)	P	kW	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15
With 440 - 480 V, 60 Hz (110% overload)	P	HP	1.5	2	3	5	6	7.5	10	15	20	25
With 440 - 480 V, 60 Hz (150% overload)	P	HP	1	1.5	2	3	5	6	7.5	10	15	20
Control section												
External control voltage	U_c	V	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

			SVX025… SPX025…	SVX030… SPX030…	SVX040… SPX040…	SVX050… SPX050…	SVX060… SPX060…	SVX075… SPX075…	SVX100… SPX100…	SVX125… SPX125…	SVX150… SPX150…	SVX200… SPX200…
General												
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003				EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing	ρ_w	%	< 95% relative humidity, no condensation, no corrosion, no dripping water				< 95% relative humidity, no condensation, no corrosion, no dripping water					
Ambient temperature												
Operation	ϑ	°C	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage	ϑ	°C	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level												
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m				0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)				BGV A3 (VBG4, finger- and back-of-hand proof)					
Weight		kg	18.5	18.5	35	35	35	58	58	58	146	146
Main circuit												
Supply												
Rated operational voltage	U_e	V	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section												
Function			Frequency inverter with internal DC link and IGBT inverter				Frequency inverter with internal DC link and IGBT inverter					
Output voltage with V_e	U_2	V	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency	f_{PWM}	kHz	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)	3.6 (adjustable 1 - 10)
Operation Mode												
SVX…			U/f control sensorless vector control (SLV)				U/f control sensorless vector control (SLV)					
SPX…			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)				U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
Frequency resolution (setpoint value)	△f	Hz	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Rated operational current												
At 110% overload	I_e	A	46	61	72	87	105	140	170	205	261	300
At 150% overload	I_e	A	38	46	61	72	87	105	140	170	205	245
Motor feeder												
Assigned motor rating												
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz				For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
With 400 V, 50 Hz (110% overload)	P	kW	22	30	37	45	55	75	90	110	132	160
With 400 V, 50 Hz (150% overload)	P	kW	18.5	22	30	37	45	55	75	90	110	132
With 440 - 480 V, 60 Hz (110% overload)	P	HP	30	40	50	60	75	100	125	150	200	250
With 440 - 480 V, 60 Hz (150% overload)	P	HP	25	30	40	50	60	75	100	125	150	200
Control section												
External control voltage	U_c	V	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

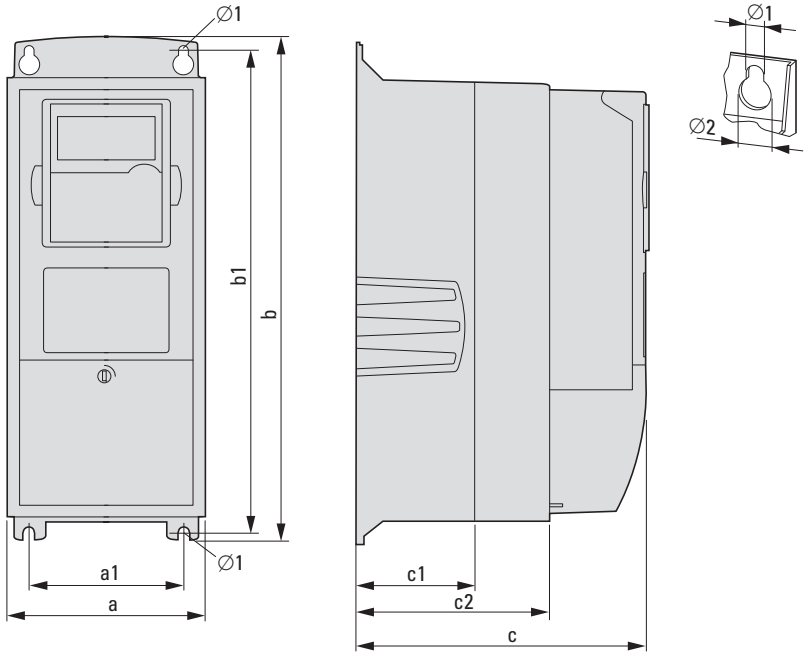
			SVX002… SPX002…	SVX003… SPX003…	SVX004… SPX004…	SVX005… SPX005…	SVX007… SPX007…	SVX010… SPX010…	SVX015… SPX015…	SVX020… SPX020…	SVX025… SPX025…	SVX030… SPX030…
General												
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003				EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing	ρ_w	%	< 95% relative humidity, no condensation, no corrosion, no dripping water				< 95% relative humidity, no condensation, no corrosion, no dripping water					
Ambient temperature												
Operation	ϑ	°C	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage	ϑ	°C	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level												
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m				0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)				BGV A3 (VBG4, finger- and back-of-hand proof)					
Weight		kg	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	35
Main circuit												
Supply												
Rated operational voltage	U_e	V	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section												
Function			Frequency inverter with internal DC link and IGBT inverter				Frequency inverter with internal DC link and IGBT inverter					
Output voltage with V_e	U_2	V	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency	f_{PWM}	kHz	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)
Operation Mode												
SVX…			U/f control sensorless vector control (SLV)				U/f control sensorless vector control (SLV)					
SPX…			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)				U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
Frequency resolution (setpoint value)	△f	Hz	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Rated operational current												
At 110% overload	I_e	A	4.5	5.5	7.5	10	13.5	18	22	27	34	41
At 150% overload	I_e	A	3.2	4.5	5.5	7.5	10	13.5	18	22	27	34
Motor feeder												
Assigned motor rating												
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz				For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
With 690 V, 60 Hz (110% overload)	P	kW	3	4	5.5	7.5	11	15	18.5	22	30	37
With 690 V, 60 Hz (150% overload)	P	kW	2.2	3	4	5.5	7.5	11	15	18.5	22	30
With 550 - 600 V, 60 Hz (110% overload)	P	HP	3	4	5	7.5	10	15	20	25	30	40
With 550 - 600 V, 60 Hz (150% overload)	P	HP	2	3	4	5	7.5	10	15	20	25	30
Control section												
External control voltage	U_c	V	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

			SVX040… SPX040…	SVX050… SPX050…	SVX060… SPX060…	SVX075… SPX075…	SVX100… SPX100…	SVX125… SPX125…	SVX150… SPX150…	SVX175… SPX175…	SVX200… SPX200…
General											
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003				EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003				
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing	ρ_w	%	< 95% relative humidity, no condensation, no corrosion, no dripping water				< 95% relative humidity, no condensation, no corrosion, no dripping water				
Ambient temperature											
Operation	ϑ	°C	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage	ϑ	°C	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
Radio interference level											
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m				0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m				
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)				BGV A3 (VBG4, finger- and back-of-hand proof)				
Weight		kg	35	58	58	58	146	146	146	146	176
Main circuit											
Supply											
Rated operational voltage	U_e	V	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Power section											
Function			Frequency inverter with internal DC link and IGBT inverter				Frequency inverter with internal DC link and IGBT inverter				
Output voltage with V_e	U_2	V	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase	690 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
Switching frequency	f_{PWM}	kHz	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)	1.5 (adjustable 1 - 6)
Operation Mode											
SVX…			U/f control sensorless vector control (SLV)				U/f control sensorless vector control (SLV)				
SPX…			U/f control sensorless vector control (SLV) Vector control with feedback (CLV)				U/f control sensorless vector control (SLV) Vector control with feedback (CLV)				
Frequency resolution (setpoint value)	△f	Hz	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Rated operational current											
At 110% overload	I_e	A	52	62	80	100	125	144	170	208	261
At 150% overload	I_e	A	41	52	62	80	100	125	144	170	208
Motor feeder											
Assigned motor rating											
Note			For AC motors with internal and external ventilation with 50 Hz / 60 Hz				For AC motors with internal and external ventilation with 50 Hz / 60 Hz				
With 690 V, 60 Hz (110% overload)	P	kW	45	55	75	90	110	132	160	200	250
With 690 V, 60 Hz (150% overload)	P	kW	37	45	55	75	90	110	132	160	200
With 550 - 600 V, 60 Hz (110% overload)	P	HP	50	60	75	100	125	150	175	200	250
With 550 - 600 V, 60 Hz (150% overload)	P	HP	40	50	60	75	100	125	150	175	200
Control section											
External control voltage	U_c	V	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)	24 V DC (max. 250 mA)
Reference voltage	U_s	V	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Dimensions

Sizes FR4 - FR6

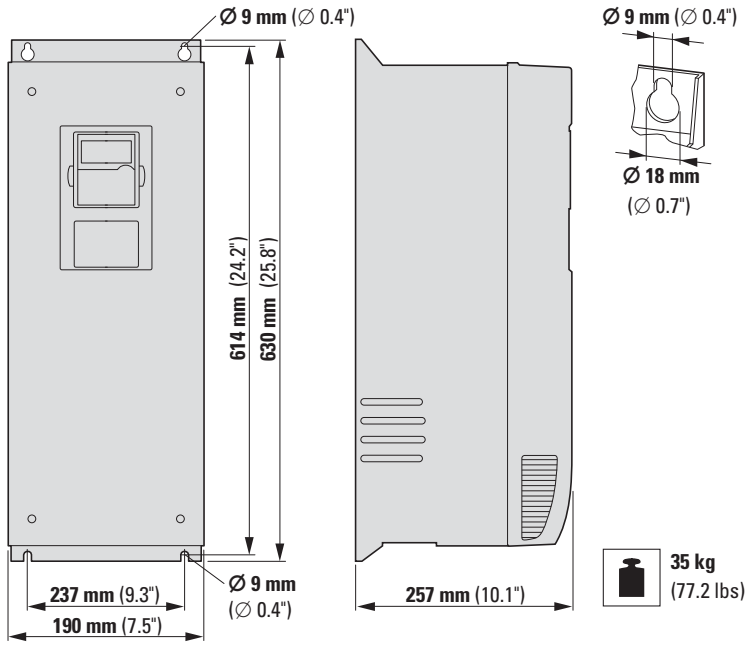
Protection type IP20/NEMA 0 and IP20/NEMA 0



a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	b2 mm (inch)	c mm (inch)	c1 mm (inch)	c2 mm (inch)	Ø1 mm (inch)	Ø2 mm (inch)	Weight kg (lbs)	Size
128 (5)	100 (3.9)	327 (12.9)	313 (12.3)	292 (11.5)	190 (7.5)	77 (3)	126 (4.9)	7 (0.3)	13 (0.5)	5 (11)	FR4
143 (5.6)	100 (3.9)	419 (16.5)	406 (16)	389 (15.3)	214 (8.4)	100 (3.9)	148 (5.9)	7 (0.3)	13 (0.5)	8 (17.9)	FR5
195 (7.6)	148 (5.8)	558 (22)	541 (21.3)	519 (20.4)	237 (9.3)	105 (4.2)	165 (6.5)	9 (0.4)	15.5 (0.6)	19 (40.8)	FR6

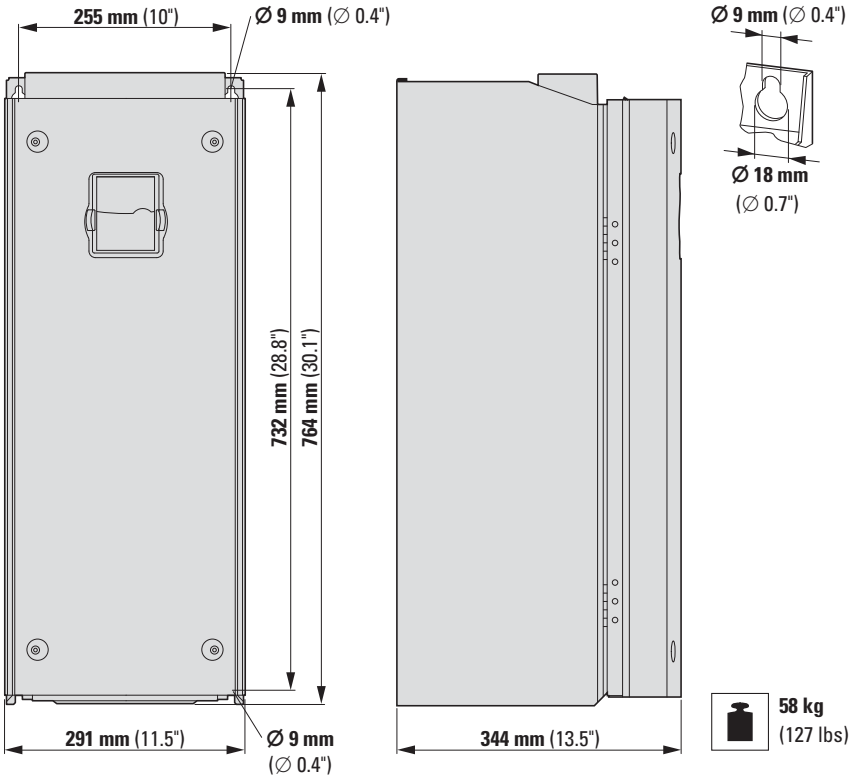
Sizes FR7

Protection type IP20/NEMA 0 and IP20/NEMA 0



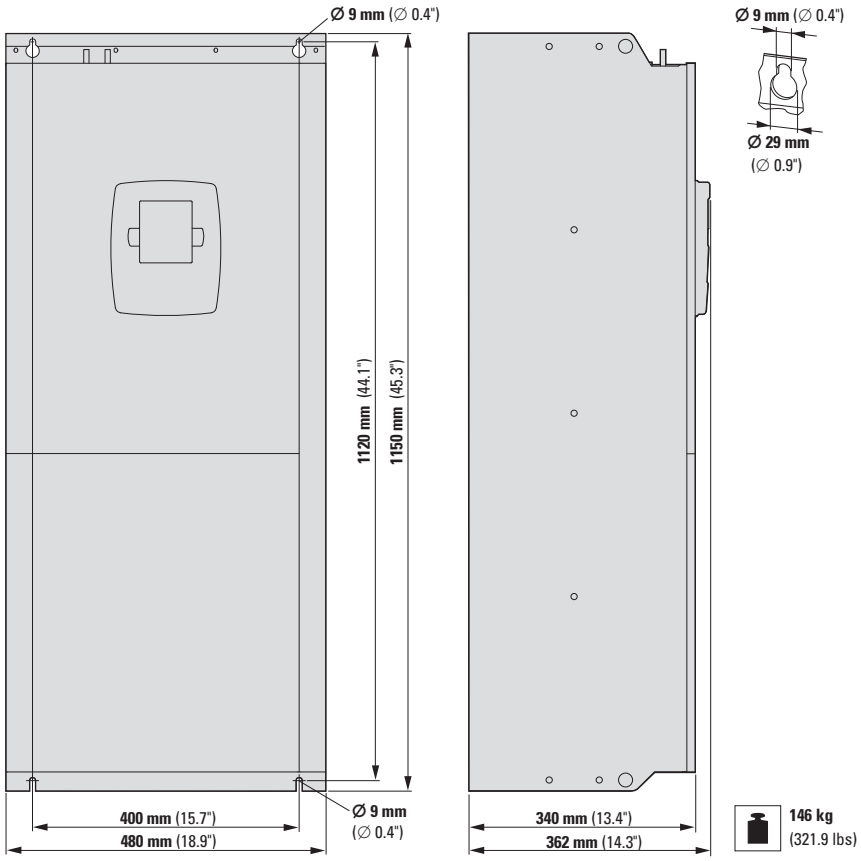
Sizes FR8

Protection type IP20/NEMA 0 and IP20/NEMA 0



Sizes FR9

Protection type IP20/NEMA 0 and IP20/NEMA 0

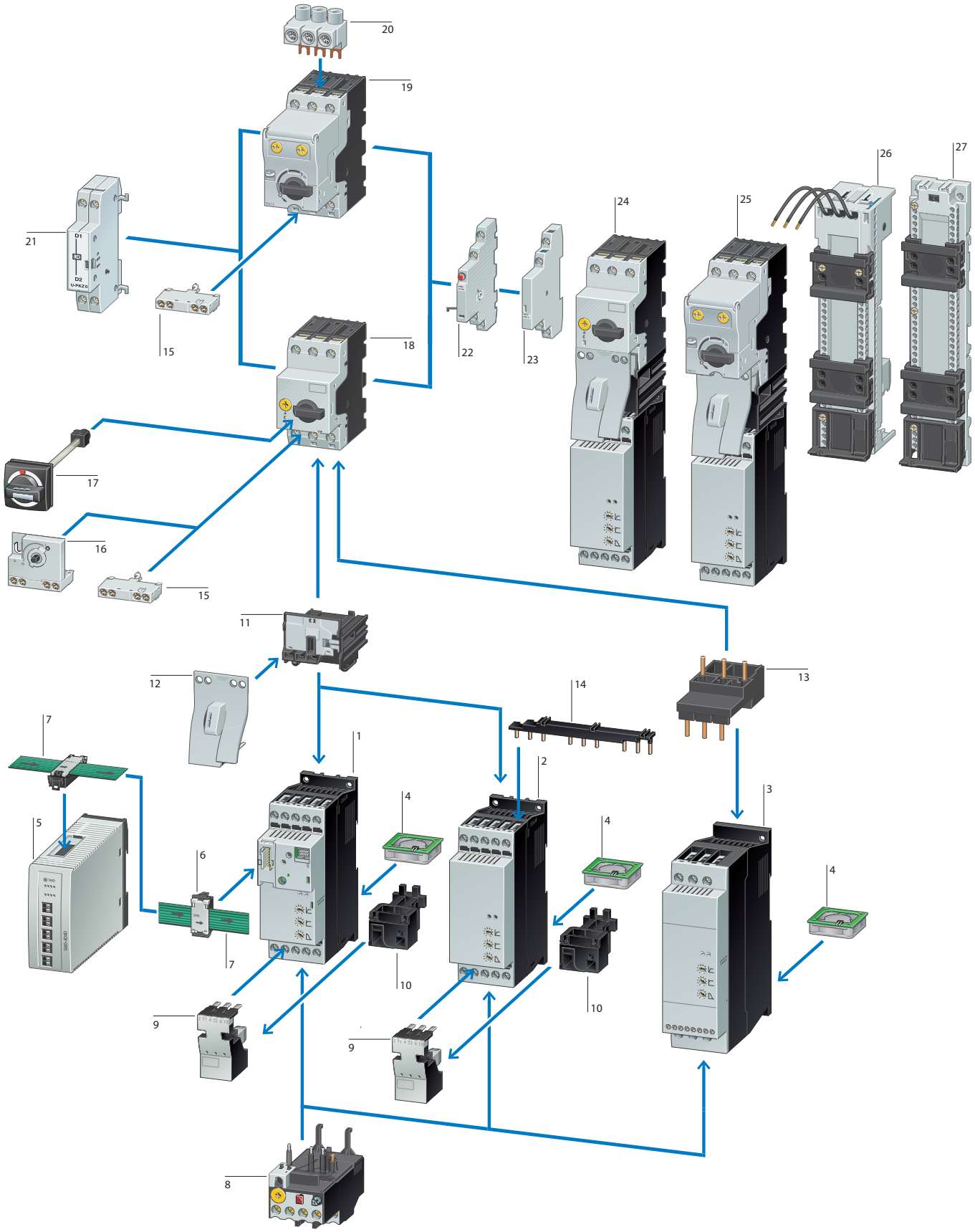


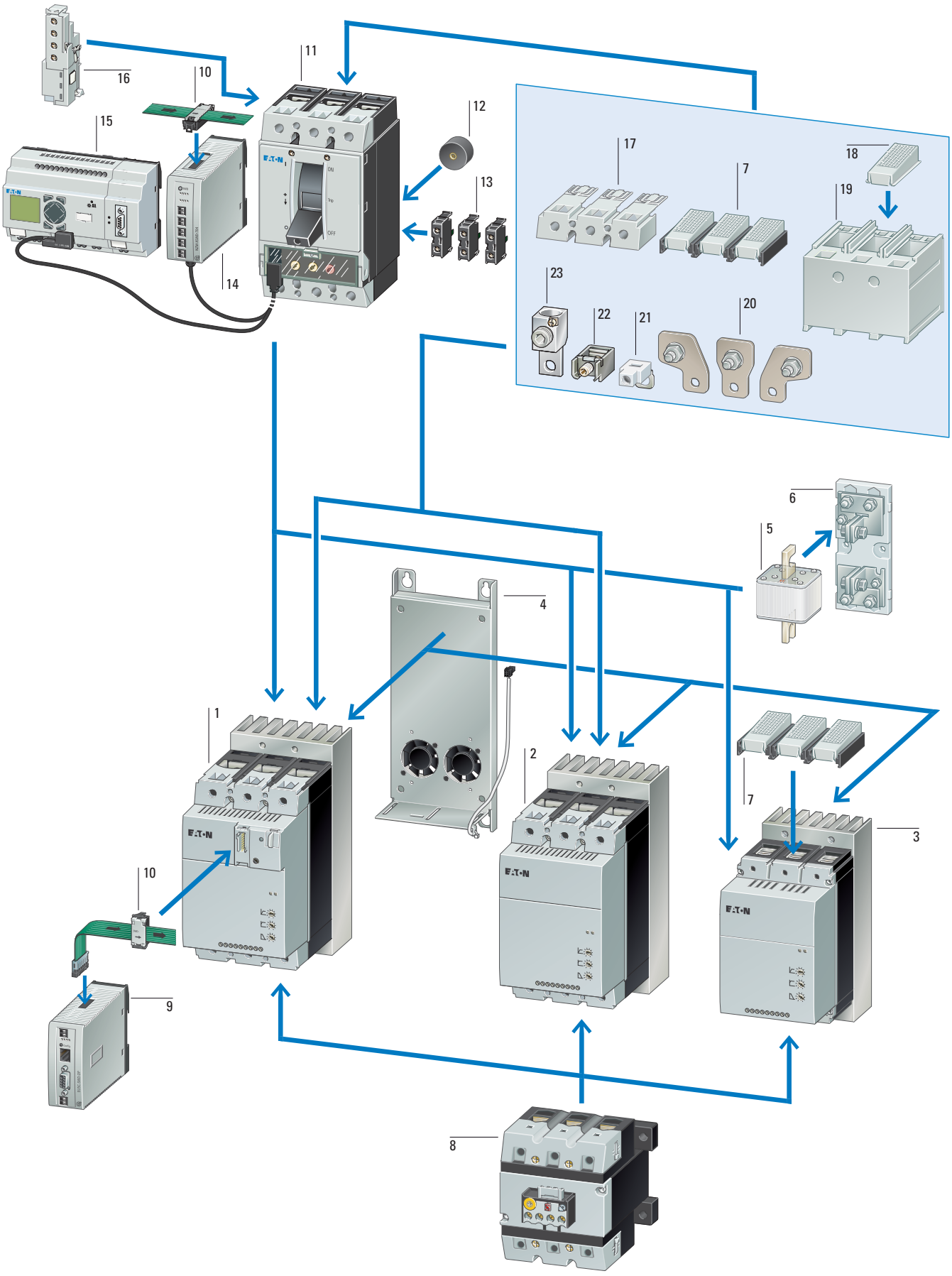
DS7 soft starters in xStart system – Soft to start, powerful in torque

The soft starters have become increasingly established as an alternative to the star-delta starter. The DS7 replaces the mechanical contactor and extends the function "Motor soft start". Motor run-up is soft but still at a higher torque than other available solutions using the patented method. Extended service intervals and reduced operating costs are welcomed side effects.

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

System overview

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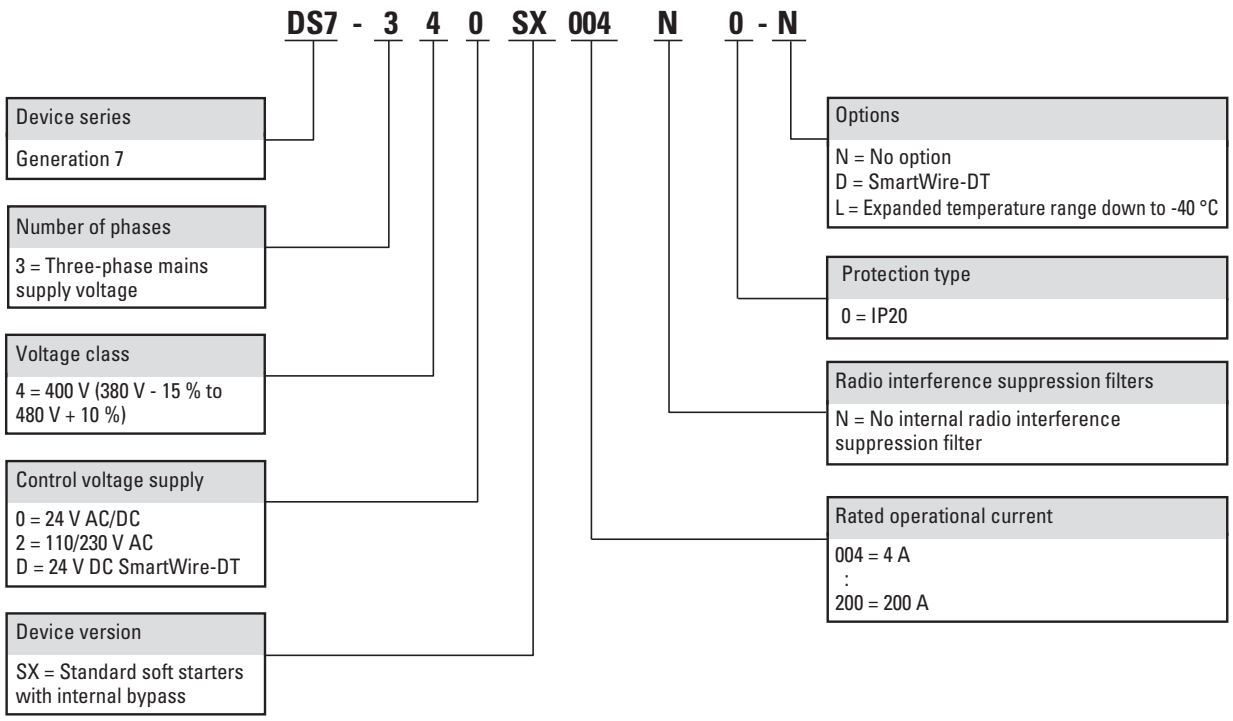
Key to type references



Description

Application

The DS7 series soft starters are two-phased controlled soft starters used for soft starting three-phase AC motors for applications with a normal operating frequency and a performance range of 3 to 200 A (1.1 to 110 kW with a 400 V mains voltage). Closing transients and DC components during startup are effectively suppressed and guarantee even motor starting.
The special actuation method (asymmetrical trigger phase control) for the soft starter function avoids the DC components (Eaton patent) that would normally occur in two-phase-controlled soft starters. This suppresses the generation of an elliptical rotating field, which would cause uneven motor starting and increase the motor's acceleration. The true run behavior of the DS7 is therefore comparable with that of a three-phase controlled soft starter.

Functions

Typical fields of application for Series DS7 soft starters are:
- Pump drives: pressure surges are prevented through soft starting. The mechanical load on the whole plant is reduced and its service life increases.
- Fan drives: soft starting keeps fan belts from slipping, preventing premature wear. This lowers operating costs and extends the system's lifespan.
- Conveyor belts: conveyor belts start running smoothly, instead of starting with a jolt. This ensures that any goods being conveyed do not topple over. Mechanical damage to the belt itself is avoided, making it more durable.

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 mounting instructions and in the manual.

Instructional leaflets:
IL03902003Z: for size 1 devices (up to 12 A motor output)
IL03902004Z: for size 2 devices (up to 32 A motor output)
IL03902005Z: 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

Communication interface SmartWire-DT

Our 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 the DS7-SWD and change and diagnose its 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, the DS7-SWD's parameters can be read and written to at any time by using acyclic services.
DS7-SWD makes 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.

The DS7-SWD comes with a detailed diagnostic system with options that extend far beyond those of wired devices. In addition to having an error log, the DS7-SWD can detect and report nine different device faults. A warning parameter reports any present alarm messages. Moreover, the response to each individual fault can be customized. Finally, there are 35 additional messages for communication errors. Using the DS7 in connection with the 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 report thermal capacity utilization levels to higher level controllers.

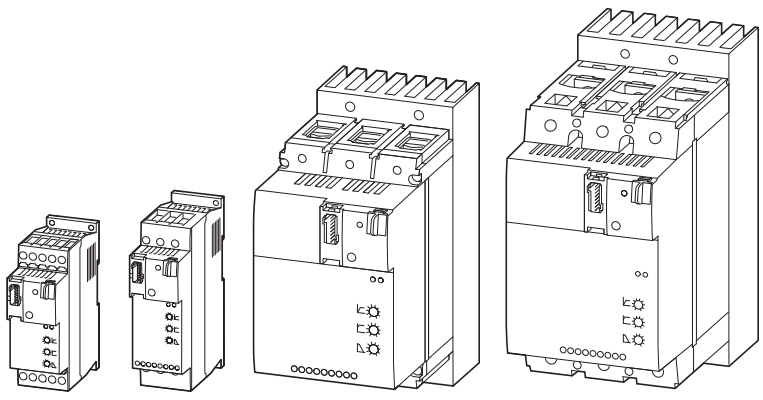
Expanded temperature range

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

Ordering

Rated operational current	Assigned motor rating		Part no.	Article no.	Price see price list		Part no.	Article no.	Price see price list		Std. pack
Device (AC-53)	at 400 V, 50 Hz	at 480 V, 60 Hz									
I_e	P	P									
A	kW	HP	**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**				
Soft starters											
Soft starters for three-phase loads Mains supply voltage (50/60 Hz) U_{LN} 200 - 480 V AC											
4	1.5	2	**DS7-340SX004N0-N**	134847			**DS7-340SX004N0-L**	171740			1 off
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 off
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

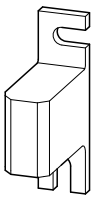
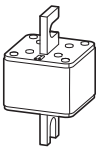
Information relevant for export to North America

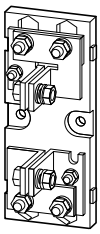
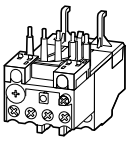
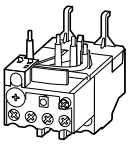
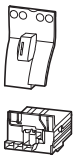
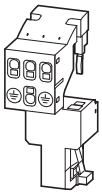
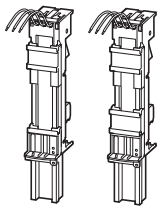
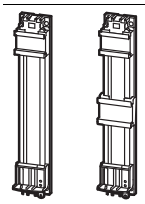
UL/CSA applies only for DS7…-N

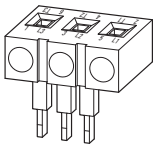
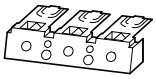
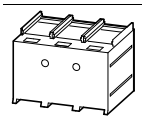
Product Standards	IEC/EN 60947-4-2; GB 14048.6; UL 508; CSA-C22.2 No 0-M91; CSA-C22.2 No 14-05 CE marking
UL File No.	E251034
CSA File No.	2511305
CSA Class No.	321106
Suitable for	Branch circuits
Max. Voltage Rating	480 V
Degree of Protection	IP20; UL/CSA Type 1

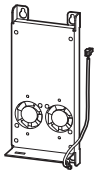
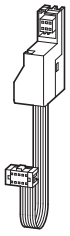
Superfast semiconductor fuses

DIN 43653, 690/700 V (IEC/UL)
Inside micrometer 80 mm

	Rated device current A	Maximum power loss P_v W	Frame size	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
	16	5.5	000	DS7-34…SX004N0-…	**170M1359** 171968		1 off	Product Standards: IEC/EN 60269-4; UL 248-1; CSA-C22.2 No. 248.14; CE marking UL File No.: E125085 UL Category Control No.: JFHR2 CSA File No.: 053787_C_000 CSA Class No.: 1422-30 North America Certification: UL recognized, CSA certified Suitable for: semiconductor protection
	25	9	000	DS7-34…SX007N0-…	**170M1361** 171969			
	32	10	000	DS7-34…SX009N0-… DS7-34…SX012N0-…	**170M1362** 171970			
	40	12	000	DM4-340-7K5	**170M1363** 171971			
	50	15	000	DS4-340-2K2-M DS4-340-2K2-MR DS4-340-2K2-M-DC DS7-34…SX016N0-…	**170M1364** 171972			
	63	16	000	DS4-340-4K0-M DS4-340-4K0-MR DS4-340-7K5-MX DS4-340-7K5-MXR DS7-34…SX024N0-…	**170M1365** 171973			
	80	19	000	DS4-340-5K5-M DS4-340-5K5-MR DS4-340-11K-MX DS4-340-11K-MXR DS7-34…SX032N0-…	**170M1366** 171974			
	100	21	S1*	DS6-340-22K-MX	**170M3012** 171976			
	125	25	000	DM4-340-22K DM4-340-30K	**170M2615** 171975			Product Standards: IEC/EN 60269-4; UL 248-1; CE marking UL File No.: E125085 UL Category Control No.: JFHR2 North America Certification: UL recognized Suitable for: semiconductor protection
	160	30	S1*	DS4-340-11K-M DS4-340-11K-MR	**170M3014** 171977			Product Standards: IEC/EN 60269-4; UL 248-1; CSA-C22.2 No. 248.14; CE marking UL File No.: E125085 UL Category Control No.: JFHR2 CSA File No.: 053787_C_000 CSA Class No.: 1422-30 North America Certification: UL recognized, CSA certified Suitable for: semiconductor protection
	200	45	S1	DM4-340-37K DM4-340-45K DS6-340-37K-MX DS6-340-45K-MX DS6-340-55K-MX DS7-34…SX070N0-… DS7-34…SX081N0-… DS7-34…SX100N0-…	**170M4008** 171978			
	315	58	S1	DS6-340-75K-MX DS7-34…SX135N0-…	**170M4010** 171979			
	350	60	S1	DM4-340-55K DM4-340-75K	**170M4011** 171980			
	400	65	S2	DS6-340-90K-MX DS7-34…SX160N0-…	**170M5008** 171984			
	450	70	S1	DM4-340-90K DM4-340-110K	**170M4013** 171981			
	500	72	S1	DM4-340-132K DM4-340-160K	**170M4014** 171982			
	500	95	S3	DS6-340-110K-MX DS7-34…SX200N0-… DM4-340-132K DM4-340-160K	**170M6008** 171985			
	630	80	S1	DM4-340-200K	**170M4016** 171983			
	900	120	S3	DM4-340-250K DM4-340-315K	**170M6013** 171986			
	1250	140	S3	DM4-340-400K DM4-340-500K	**170M6016** 171987			

		For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
Fuse Bases						
	Dimensions (W x H x D) mm 145 x 43 x 50	000, 00	**170H1007** 171988		1 off	Product Standards: IEC/EN 60269-1; UL 512; CE marking UL File No.: E14853 UL Category Control No.: IZLT2 North America Certification: UL listed Suitable for: DIN 43653 fuses
	205 x 88 x 80	S1*, S1, S2, S3	**170H3004** 171989			
Overload relays						
		DS7-34…SX004…	**ZB12-4** 278438		1 off	Product Standards: UL 508; CSA-C22.2 No. 14; IEC/EN 60947-4-1; IEC/EN 60947-5-1; CE marking UL File No.: E29184 UL Category Control No.: NKCR CSA File No.: 12528 CSA Class No.: 3211-03 North America Certification: UL listed, CSA certified Suitable for: Branch circuits Max. Voltage Rating: 600 V AC Degree of Protection: IEC: IP20, UL/CSA Type: -
		DS7-34…SX007… DS7-34…SX009…	**ZB12-10** 278440			
		DS7-34…SX012…	**ZB12-12** 278441			
		DS7-34…SX016…	**ZB32-16** 278452			
		DS7-34…SX024…	**ZB32-24** 278453			
		DS7-34…SX032…	**ZB32-32** 278454			
Wiring set						
For DOL Starter						
		DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**PKZM0-XDM12** 283149		1 off	Product Standards: UL 508; CSA-C22.2 No. 14; IEC60947-4-1; CE marking UL File No.: E36332 UL Category Control No.: NLRV CSA File No.: 165628 CSA Class No.: 3211-05 North America Certification: UL listed, CSA certified
Electric contact module						
		DS7-34…SX016… DS7-34…SX024… DS7-34…SX032…	**PKZM0-XM32DE** 239349		5 off	Product Standards: UL 508; CSA-C22.2 No. 14; IEC60947-4-1; CE marking UL File No.: E36332 UL Category Control No.: NLRV CSA File No.: 165628 CSA Class No.: 3211-05 North America Certification: UL listed, CSA certified
Motor feeder plug						
		DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**DILM12-XMCP/T** 121770		1 off	Product Standards: IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking North America Certification: Request filed for UL and CSA
Busbar adapters						
		PKZM0, PKE + DS7...004N... PKZM0, PKE + DS7...007N... PKZM0, PKE + DS7...009N... PKZM0, PKE + DS7...012N...	**BBA0L-25** 142526		1 off	
		PKZM0, PKE + DS7...016N... PKZM0, PKE + DS7...024N... PKZM0, PKE + DS7...032N...	**BBA0L-32** 142527		1 off	
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...	**PKZM0-XC45L** 142529		1 off	
		PKZM0, PKE + DS7...016N... PKZM0, PKE + DS7...024N... PKZM0, PKE + DS7...032N...	**PKZM0-XC45L/2** 142570		1 off	

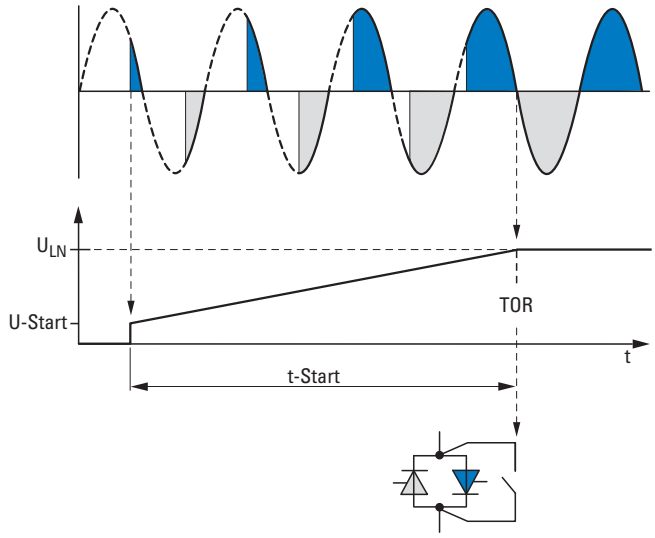
	For use with	Part no. Article no.	Price see price list	Std. pack	Notes	Information relevant for export to North America
Three-phase commoning links						
For the primary side of DS7 Suitable for 3 DS7 soft starters Length 112 mm protected against accidental contact, short-circuit proof, U_e = 690 V, I_u = 35 A can be extended by rotating by mounting						
	DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**DILM12-XDSB0/3** 240084		5 off	For the primary side of DS7 Suitable for 3 DS7 soft starters Length 112 mm	Product Standards IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking UL File No. E36332 UL Category Control No. NLRV CSA File No. 012528 CSA Class No. 2411-03 North America Certification UL listed, CSA certified
		**DILM12-XDSB0/4** 240085			For the primary side of DS7 Suitable for 4 DS7 soft starters Length 157 mm	
		**DILM12-XDSB0/5** 240086			For the primary side of DS7 Suitable for 5 DS7 soft starters Length 202 mm	
Incoming connection block						
	DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**DILM12-XEK** 240083		5 off	For three-phase commoning link, protected against accidental contact, U_e = 690 V, I_u = 35 A. Connection cross section: Stranded 2.5…16 mm² Flexible with ferrule 2.5…16 mm² AWG14…8	Product Standards IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking UL File No. E36332 UL Category Control No. NLRV CSA File No. 012528 CSA Class No. 2411-03 North America Certification UL listed, CSA certified
Terminal cover						
Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Enhancement of the busbar tag shroud (simple protection against contact with a finger). Cannot be combined with NZM-XSTK control circuit terminal.						
knockout For box terminal 	DS7-34…SX041… DS7-34…SX055… DS7-34…SX070… DS7-34…SX081… DS7-34…SX100…	**NZM1-XKSFA** 100780		1 off	Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Enhancement of the busbar tag shroud (simple protection against contact with a finger). Cannot be combined with NZM-XSTK control circuit terminal.	
knockout 	DS7-34…SX135… DS7-34…SX160… DS7-34…SX200…	**NZM2-XKSFA** 104640		1 off	Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. 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 2 conductors max cross section 22 mm² or AWG4. Cannot be combined with NZM-XSTK control circuit terminal.	
	DS7-34…SX135… DS7-34…SX160… DS7-34…SX200…	**NZM2-XKSA** 260038		1 off	Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Busbar tag shroud where cable lugs, busbars or tunnel terminals are used. When using insulated conductor material to IP1X.	Product Standards UL489; CSA-C22.2 No. 5-09; IEC60947, CE marking UL File No. E31593 UL Category Control No. DIHS CSA File No. 22086 CSA Class No. 1432-01 North America Certification UL listed, CSA certified Suitable for Refer to main component information

	For use with	Part no. Article no.	Price see price list	Std. pack	Notes	Information relevant for export to North America
IP2X protection against contact with a finger Typ enthält Teile für eine Schalterseite oben oder unten für 3-polige Schalter. Erhöhung des Berührungsschutzes auf IP2X.						
For box terminal 	NZM2, PN2, N(S)2	**NZM2-XIPK** 266773		1 off	Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Enhancement of the busbar tag shroud to IP2X. Protection when reaching into the cable connection area with the connection of cables in the box terminal. With 2 conductors max cross section 25 mm² 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 off	Type contains parts for a terminal located at top or bottom for 3 pole circuit-breakers. Enhancement of the busbar tag shroud to IP2X. When mounting NZM2-..-(C)NA or NZM...-NA the following applies: with 2 conductors max cross section 25 mm² or AWG4.	
Mounting kit when using covers NZM1-XKSFA and NZM2-XKSA						
	DS7-34xSX041N0-x DS7-34xSX055N0-x DS7-34xSX070N0-x DS7-34xSX081N0-x DS7-34xSX100N0-x DS7-34xSX135N0-x DS7-34xSX160N0-x DS7-34xSX200N0-x	**DE6-MNT-NZM** 107323		1 off	-	
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 off		North America Certification: Request filed for UL and CSA
	DS7-34…SX041… DS7-34…SX055… DS7-34…SX070… DS7-34…SX081… DS7-34…SX100…	**DS7-FAN-100** 169021		1 off		
	DS7-34…SX135… DS7-34…SX160… DS7-34…SX200…	**DS7-FAN-200** 169022		1 off		
PKE communications cable 6-Pole Prefabricated with two plugs For connecting the PKE to DS7-SWD						
	DS7…SWD	**PKE32-COM** 168970		1 off		

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} .

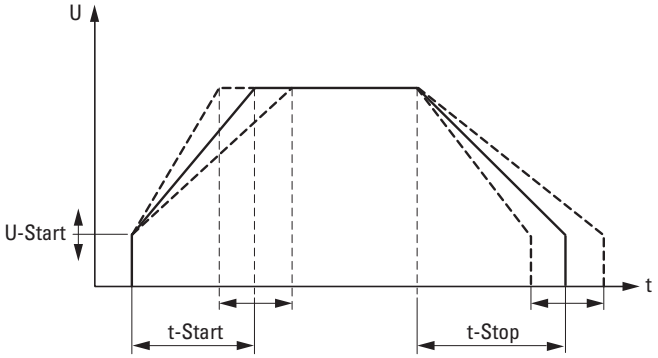


U_{LN}:Mains supply voltage
U-Start: start voltage
t-Start: Ramp time of the voltage change at start
TOR (Top of Ramp): Signals the end of the set "t-Start" ramp time (output voltage U_2 = Mains supply voltage U_{LN}). The internal bypass contacts are closed after this.

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.



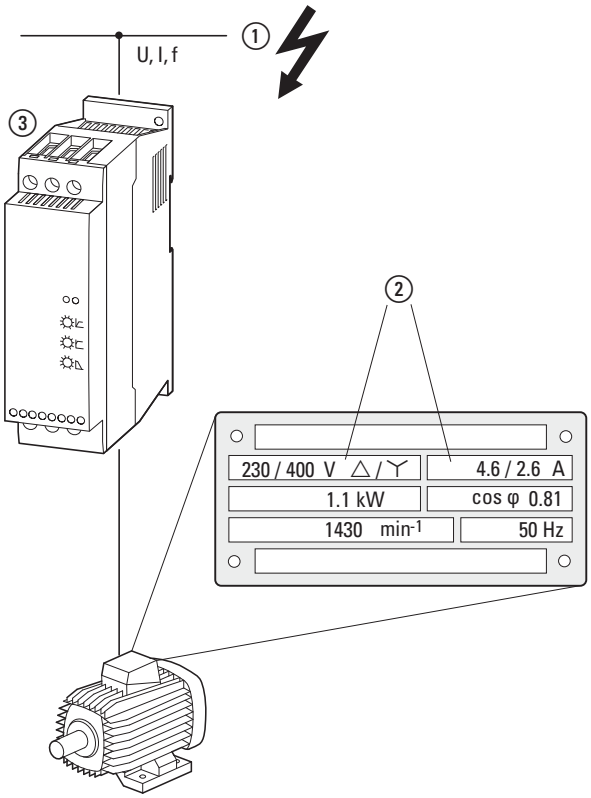
The output voltage of a soft starter determines the torque of the motor ($M \sim U^2$). Because of this, it is necessary to make sure that, when a machine starts up, the selected U-Start start voltage is not too low and the t-Start ramp time for the linear voltage change is set to be as short as possible.

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 (ULN) and the rated operational current of the assigned motor ②. The motor's circuit configuration (Δ/Y) must be selected in such a way that it matches the supply voltage. In addition, the soft starter's rated operational current (Ie) must be at least equal to that of the motor.

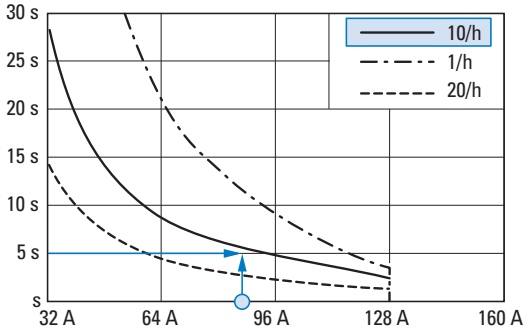
Additional selection criteria include:
- Ambient air temperature (rated value +40 °C)
- The number of starts per hour (< 10 starts, take stops into account)
- Load torque (quadratic, linear)
- Starting torque

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)



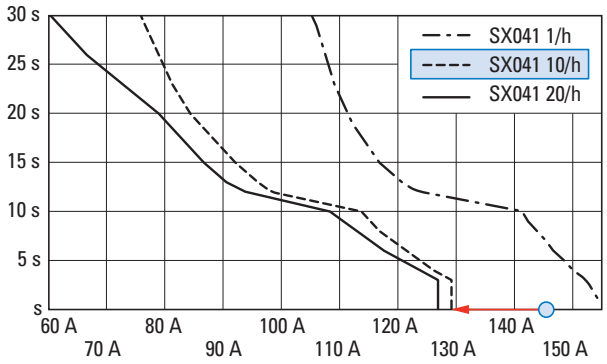
When different operating frequencies, run-up times and/or starting currents are involved, the thermal capacity of the DS7 soft starter must be taken into account in the design. This can be done by using the following diagrams or by calculating the I^2t values. These I^2t values define the corresponding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

DS7-34…SX032…soft starter:
- 32A: 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: $(3 \times 32\ A)^2 \times 5\ s = 46.080\ A^2s$
The maximum I^2t value of the connected motor load must be smaller:
$(3 \times 29\ A)^2 \times 5\ s = 37.845\ A^2s$
Soft starter DS7-34…SX032… is the right choice for this application.

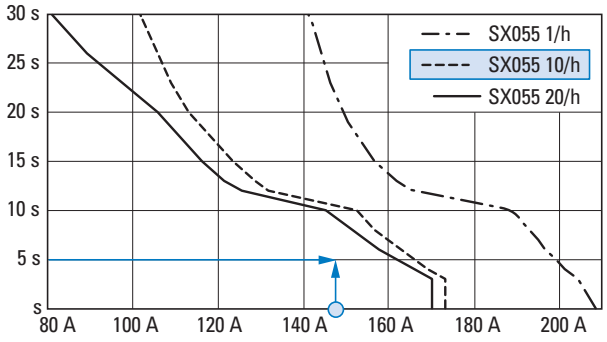
If the motor had a higher inrush current, e.g., 5 times the starting current, a more powerful soft starter would have to be selected:
- Motor inrush current: $I_{LRP} = 5 \times 29 = 145$ A, I^2t value = $(5 \times 29\ A)^2 \times 5\ s = 105.125\ A^2s$
- DS7-34…SX041…: 41A:
  AC-53a: 3-5: 75-10
  => $(3 \times 41\ A)^2 \times 5\ s = 75.645\ A^2s$

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

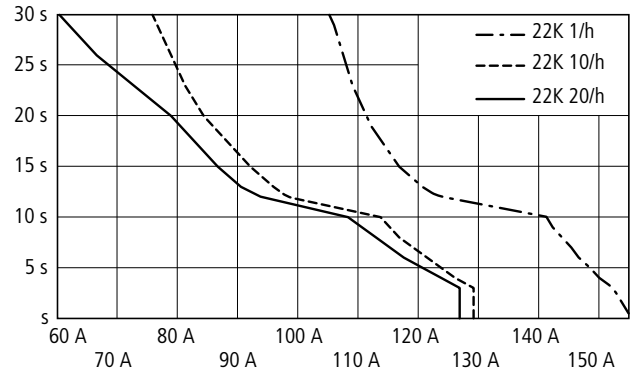


DS7-34…SX055…:
55A: AC-53a: 3-5: 75-10
=> $(3 \times 55\ A)^2 \times 5\ s = 136.125\ A^2s$
Soft starter DS7-34…SX055…, however, does meet the required startup and load conditions.

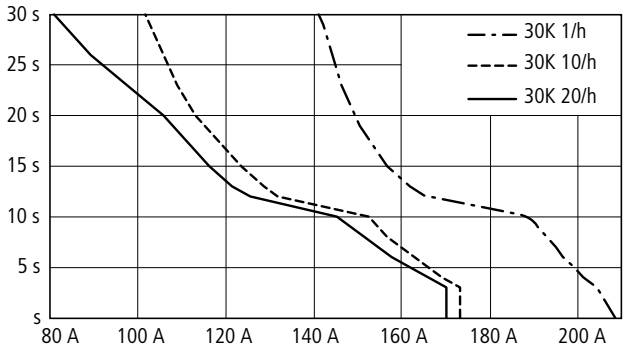
Note: As the following diagram shows, the DS7-34…SX055… unit can handle even more demanding startup and load requirements, e.g., up to 20 starts per hour and longer start-up times (up to 10 seconds).



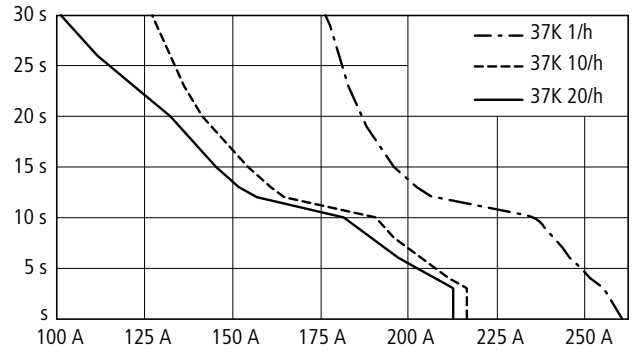
DS7-34...SX041N0-...



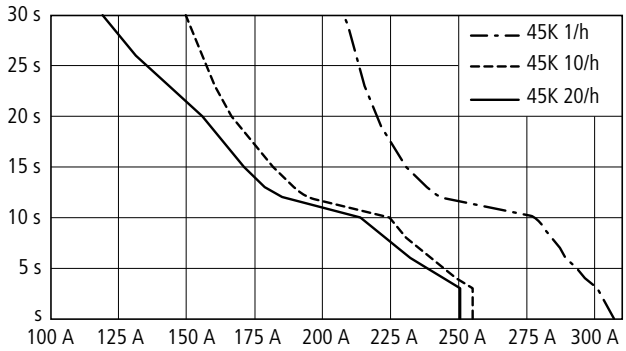
DS7-34...SX055N0-...



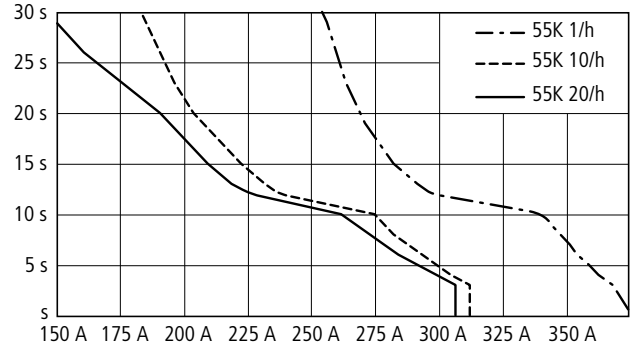
DS7-34...SX070N0-...



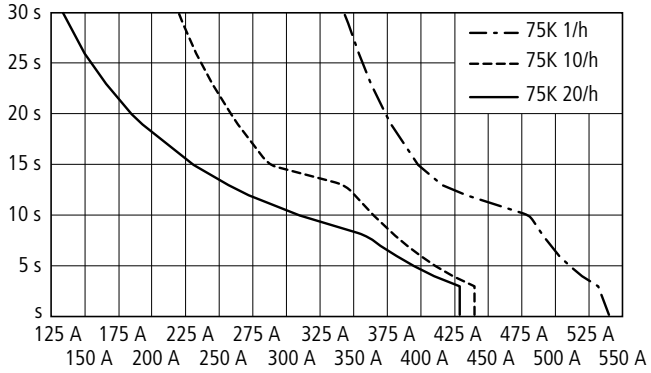
DS7-34...SX081N0-...



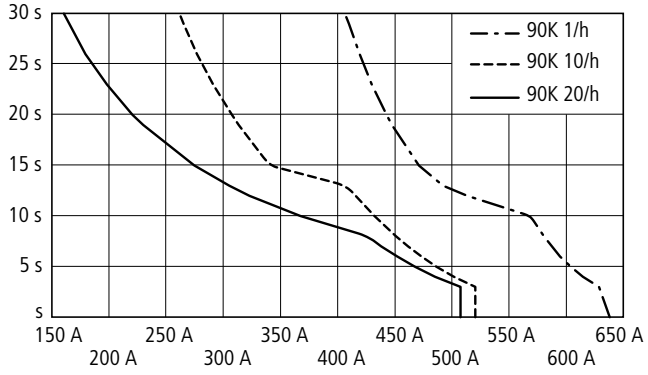
DS7-34...SX100N0-...



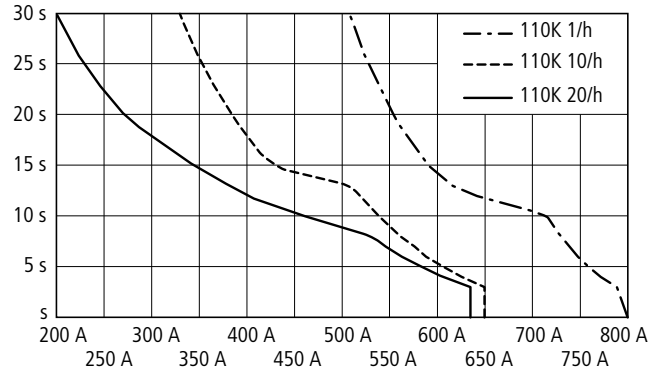
DS7-34...SX135N0-...



DS7-34...SX160N0-...



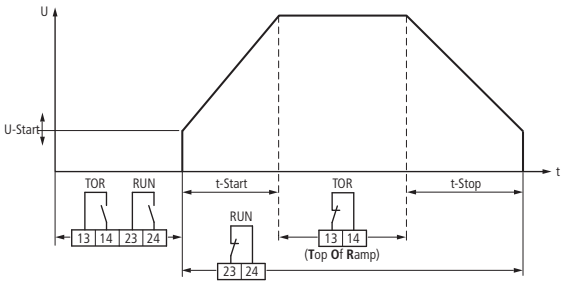
DS7-34...SX200N0-...

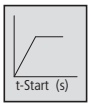


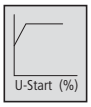
Note: Additional diagrams for 4-32 A soft starters can be found in the manual for DS7 soft starters (MN03901001Z).

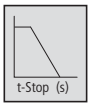
Setting of potentiometer

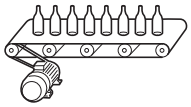
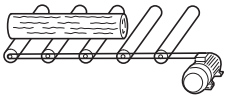
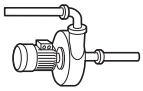
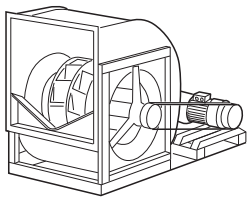
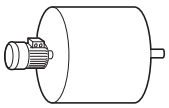
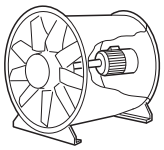
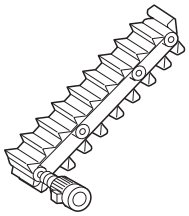
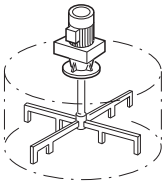
U	I (L)	(R) (AC11	I_{min}	U_{min}
250 V ~	0.2 A	1 A	10 mA	250 V ~
30 V H	0.7 A	0.5 A	100 mA	5 V H



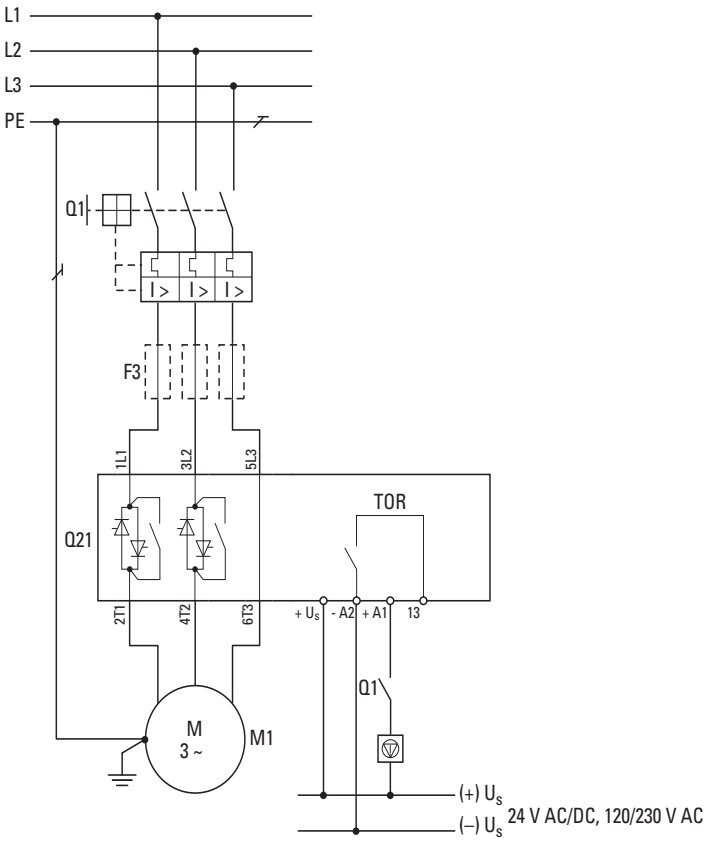




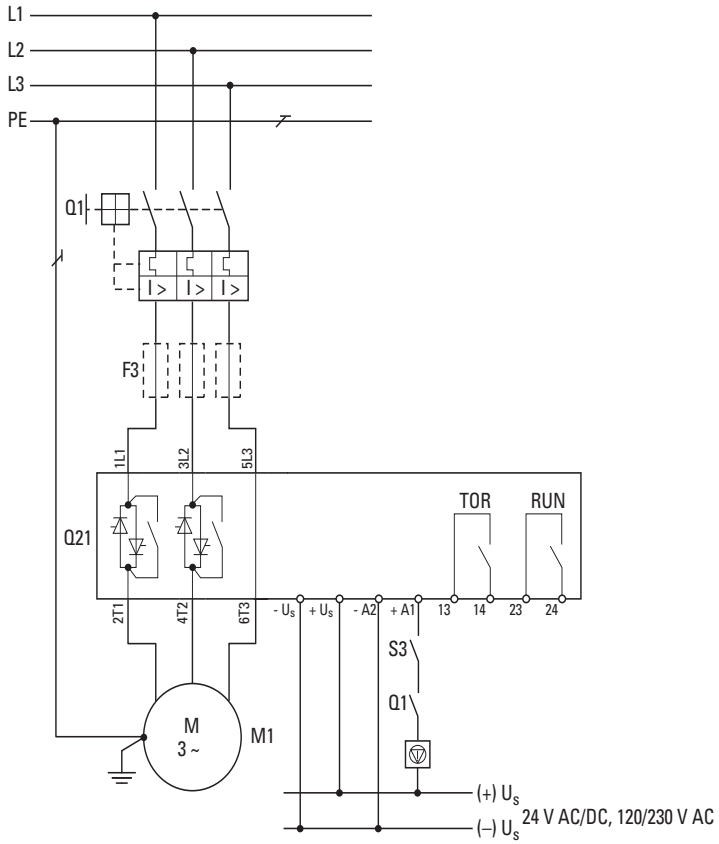


t-Start (s)	U-Start %	t-Stop (s)		
~10	~30	0		J → 0 Low flywheel mass
~25	~30	~30		Conveyor belt with loose belt
~20	~40	0		Roller conveyers
~10	~30	~20		Centrifugal pump
~15	~40	0		Fan general (building) with belt drive
~18	~40	0		J → ∞ Large gyrating mass → The DS7 soft starter's rating should be higher than the assigned motor output.
~15	~50	0		Tunnel fan Axial fan → a Soft starter DS7 should have a higher rating than the assigned motor.
~10	~60	0		Bulk conveyor Escalator
~10	~60	0		Mixers Agitators → a Soft starter DS7 should have a higher rating than the assigned motor.

Standard connection
up to 12 A



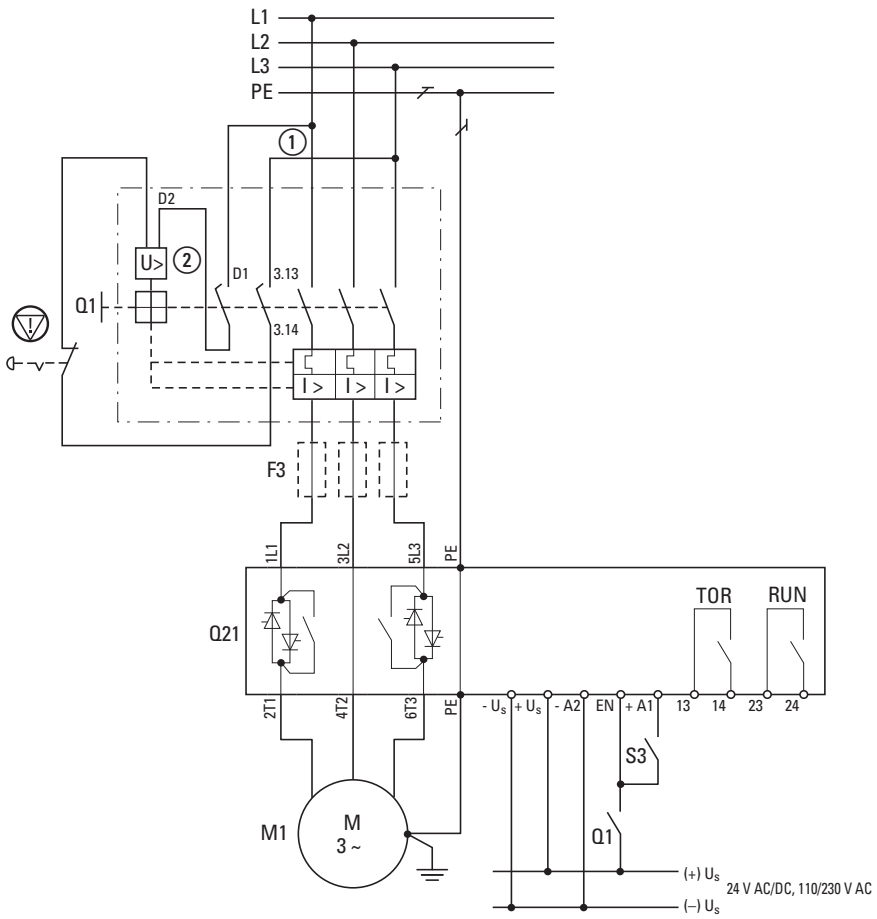
Standard connection
up to 32 A



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

Q 1 = Cable and motor protection (NZM (NZM1, NZM2)

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

DS7

assigned Motor output at		Rated operational current[1]		Part no. Soft starters (device to be selected)	Soft starter function
400 V P kW	480 V P HP	Motor I_e A_x	Soft starters I_e A_x		Cable protection[2] Type “1” coordination
				Soft starters for three-phase mains connection, low operating frequency (5 s, 3 x I_e, 10 starts/h)	
1.5	2	3.6	4	**DS7-34xSX004N0-x**	PKZM0-4 (+ CL-PKZ0)
3	3	6.6	7	**DS7-34xSX007N0-x**	PKZM0-10 (+ CL-PKZ0)
4	5	8.5	9	**DS7-34xSX009N0-x**	PKZM0-10 (+ CL-PKZ0)
5.5	7.5	11.3	12	**DS7-34xSX012N0-x**	PKZM0-12 (+ CL-PKZ0)
7.5	10	15.2	16	**DS7-34xSX016N0-x**	PKZM0-16 (+ CL-PKZ0)
11	15	21.7	24	**DS7-34xSX024N0-x**	PKZM0-25 (+ CL-PKZ0)
15	20	29.3	32	**DS7-34xSX032N0-x**	PKZM0-32 (+ CL-PKZ0)
22	25	41	41	**DS7-34xSX041N0-x**	NZMN1-M50 / PKZM4-50
30	30	55	55	**DS7-34xSX055N0-x**	NZMN1-M63 / PKZM4-58
37	40	68	70	**DS7-34xSX070N0-x**	NZMN1-M80
45	50	81	81	**DS7-34xSX081N0-x**	NZMN1-M100
55	60	99	100	**DS7-34xSX100N0-x**	NZMN1-M100
75	75	134	135	**DS7-34xSX135N0-x**	NZMN2-M160
90	100	160	160	**DS7-34xSX160N0-x**	NZMN2-M200
110	125	196	200	**DS7-34xSX200N0-x**	NZMN2-M200

Notes

[1] Rated operational current based on the load cycle specified here.

[2] Used to specify the circuit-breaker required for the specified load cycle. At different duty cycles (operating frequency, overcurrent, overcurrent time, duty factor), this value changes and must then be adapted accordingly.

[3] 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.

[4] A mains contactor is not required. Disconnection characteristics in accordance with VDE can only be ensured with the specified circuit-breaker.

[5] The superfast semiconductor fuses protect the soft starter from short circuits on the motor side. This can not, however, prevent damage caused by voltage peaks, for example through lightning strike.

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)[5]	
Cable protection[2] Type “1” coordination	overload relay[3]	optional[4]	Fuses Number x Part no.	Fuse holders Number x Part no.
PKM0-4 (+ CL-PKZ0)	ZB12-4	DILM7	3 × 170M1359	3 x 170H1007
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 × 170M1361	3 x 170H1007
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 × 170M1362	3 x 170H1007
PKM0-12 (+ CL-PKZ0)	ZB12-12	DILM12	3 × 170M1362	3 x 170H1007
PZM0-16 (+ CL-PKZ0)	ZB32-16	DILM17	3 × 170M1364	3 x 170H1007
PZM0-25 (+ CL-PKZ0)	ZB32-24	DILM25	3 × 170M1365	3 x 170H1007
PZM0-32 (+ CL-PKZ0)	ZB32-32	DILM32	3 × 170M1366	3 x 170H1007
NZMN1-M50 / PKZM4-50	ZB65-40+ZB65-XEZ	DILM50	3 × 170M1366	3 x 170H1007
NZMN1-M63 / PKZM4-58	ZB65-57+ZB65-XEZ	DILM65	3 × 170M2615	3 x 170H1007
NZMN1-M80	ZB150-70/KK	DILM80	3 × 170M4008	3 x 170H3004
NZMN1-M100	ZB150-100/KK	DILM95	3 × 170M4008	3 x 170H3004
NZMN1-M100	ZB150-100/KK	DILM115	3 × 170M4008	3 x 170H3004
NZMN2-M160	ZB150-150/KK	DILM150	3 × 170M4011	3 x 170H3004
NZMN2-M200	Z5-160/FF250	DILM185	3 × 170M5008	3 x 170H3004
NZMN2-M200	Z5-220/FF250	DILM225	3 × 170M6008	3 x 170H3004

Technical data

			DS7…004…	DS7…007…	DS7…009…	DS7…012…	DS7…016…	DS7…024…	DS7…032…	DS7…041…	DS7…055…	DS7…070…	DS7…081…	DS7…100…	DS7…135…	DS7…160…	DS7…200…
General																	
Standards			IEC/EN 60947-4-2 UL 508 CSA22.2-14														
Approvals			CE														
Approvals			UL CSA C-Tick UkrSEPRO														
Climatic proofing			Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10														
DS7…-L			Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10 Cold test as per EN 60068-2-4														
Ambient temperature																	
Operation	ϑ	°C	-5 - +40 up to 60 at 2% derating per Kelvin temperature rise														
DS7…-L			-40 - +40 up to 60 at 2% derating per Kelvin temperature rise														
Storage	ϑ	°C	-25 - +60														
DS7…-L			-40 - +40 up to 60 at 2% derating per Kelvin temperature rise														
Altitude		m	0 - 1000 m, above that 1 % derating per 100 m , up to 2000 m														
Mounting position			Vertical														
Degree of protection																	
Protection type			IP20														
Integrated			-														
Protection against direct contact			Finger- and back-of-hand proof														
Rated insulation voltage	U_i	V AC	500														
Overvoltage category/ pollution degree			II/2														
Shock resistance			8 g/11 ms														
Vibration resistance to EN 60721-3-2			2M2														
Radio interference level (IEC/EN 55011)			B														
…342SX…			A														
Heat dissipation		W	0.2	0.35	0.45	0.6	0.8	1.1	1.5	7	10	13	18	25	24	30	42
Weight		kg															
…340SX…-N			0.35				0.4		1.8	1.8					3.7		
…340SX…-L			0.44				0.49		0.44	1.8					3.7		
…342SX…			0.4				0.45		0.4	1.8					3.7		
…34DSX…			0.41				0.46		0.41	1.8					3.7		
Main conducting paths																	
Rated operating voltage	U_e	V AC	200 - 480							200 - 480							
Supply frequency	f_{LN}	Hz	50/60							50/60							
Rated operational current																	
Device (AC-53)	I_e	A	4	7	9	12	16	24	24	41	55	70	81	100	135	160	200
Assigned motor rating (Standard connection, In-Line)																	
at 230 V, 50 Hz	P	kW	0.75	1.5	2.2	3	4	5.5	5.5	11	15	15	22	30	30	45	55
at 400 V, 50 Hz	P	kW	1.5	3	4	5.5	7.5	11	11	22	30	37	45	55	75	90	110
at 200 V, 60 Hz	P	HP	0.75	2	2	3	5	7.5	7.5	10	15	20	25	30	40	50	60
at 230 V, 60 Hz	P	HP	1	2	3	3	5	7.5	7.5	15	20	25	30	30	50	60	75
at 480 V, 60 Hz	P	HP	2	5	5	10	10	15	15	30	40	50	60	75	100	125	150
Overload cycle to IEC/EN 60947-4-2																	
AC-53a (without bypass)			4 A: AC-53a: 3 - 5: 75 - 10	7 A: AC-53a: 3 - 5: 75 - 10	9 A: AC-53a: 3 - 5: 75 - 10	12 A: AC-53a: 3 - 5: 75 - 10	16 A: AC-53a: 3 - 5: 75 - 10	24 A: AC-53a: 3 - 5: 75 - 10	32 A: AC-53a: 3 - 5: 75 - 10	41 A: AC-53a: 3 - 5: 75 - 10	55 A: AC-53a: 3 - 5: 75 - 10	70 A: AC-53a: 3 - 5: 75 - 10	81 A: AC-53a: 3 - 5: 75 - 10	100 A: AC-53a: 3 - 5: 75 - 10	135 A: AC-53a: 3 - 5: 75 - 10	160 A: AC-53a: 3 - 5: 75 - 10	200 A: AC-53a: 3 - 5: 75 - 10
Internal bypass contacts			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

			DS7…004…	DS7…007…	DS7…009…	DS7…012…	DS7…016…	DS7…024…	DS7…032…
Short-circuit rating									
Type "1" coordination									
Type "1" coordination			PKM0-4 (+ CL-PKZ0)	PKM0-10 (+ CL-PKZ0)	PKM0-10 (+ CL-PKZ0)	PKM0-12 (+ CL-PKZ0)	PKM0-16 (+ CL-PKZ0)	PKM0-25 (+ CL-PKZ0)	PKM0-32 (+ CL-PKZ0)
Type „2" coordination short-circuit rating (additional with the fuses for coordination type „1")			3 x 170M1359	3 x 170M1361	3 x 170M1362	3 x 170M1362	3 x 170M1364	3 x 170M1365	3 x 170M1366
Fuse base (number x part no.)			3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007	3 x 170H1007
Terminal capacities									
Cable lengths									
Solid		mm²	1 x (0.75 - 4) 2 x (0.75 - 2.5)				1 x (0.75 - 16) 2 x (0.75 - 10)		
Flexible with ferrule		mm²	1 x (0.75 - 2.5) 2 x (0.75 - 2.5)				1 x (0.75 - 16) 2 x (0.75 - 10)		
Stranded		mm²	-				1 x 16		
Solid or stranded		AWG	18 - 10				18 - 6		
Copper band		MM	-				-		
Tightening torque		Nm	1.2				3.2		
Screwdriver (PZ: Pozidriv)		mm	PZ2; 1 x 6 mm				PZ2; 1 x 6 mm		
Control cables									
Solid		mm²	1 x (0.75 - 4) 2 x (0.75 - 2.5)				1 x (0.5 - 2.5) 2 x (0.5 - 1.0)		
Flexible with ferrule		mm²	1 x (0.75 - 2.5) 2 x (0.75 - 2.5)				1 x (0.5 - 1.5) 2 x (0.5 - 0.75)		
Stranded		mm²	-				1 x (0.5 - 1.5) 2 x (0.5 - 1.0)		
Solid or stranded		AWG	18 - 10				1 x (21 - 14) 2 x (21 - 18)		
Tightening torque		Nm	1.2				1.2		
Screwdriver		mm	0,8 x 5,5 1 x 6				0,6 x 3,5		
Control circuit									
Regulator supply									
Notes External supply voltage									
Voltage	U_s	V							
…340SX…			24 V AC/DC +10 %/- 15 %						
…342SX…			110 V AC -15 % - 230 V AC +10 %						
…34DSX…			24 V DC +10 %/- 15 %						
Current consumption	I_e	mA	50						
Current consumption at peak performance (close bypass) at 24 V DC	I_{Peak}	mA/ms	-						
Digital inputs									
Control voltage									
DC-operated		V DC							
…340SX…-N			24 V DC +10 %/- 15 %						
…340SX…-L			24 V DC +10 %/- 15 %						
…34DSX…			24 V DC +10 %/- 15 % oder über SWD						
AC operated		V AC							
…340SX…-N			24 V AC +10 %/- 15 %						
…342SX…-N			110 V AC - 15 % - 230 V AC +10 %						
Current consumption 24 V									
External 24 V		mA	1.6						
Current consumption 230 V									
230 V AC		mA							
…342SX…			4						
Pick-up voltage									
DC-operated		V DC	17.3 - 27						
AC operated		V AC							
…340SX…			17.3 - 27						
…342SX…			108 - 253						

DS7…041…	DS7…055…	DS7…070…	DS7…081…	DS7…100…	DS7…135…	DS7…160…	DS7…200…
NZMN1-M50/ PKZM4-49	NZMN1-M63/ PKZM4-57	NZMN1-M80	NZMN1-M100	NZMN1-M100	NZMN2-M160	NZMN2-M200	NZMN2-M200
3 x 170M3012	3 x 170M2615	3 x 170M4008	3 x 170M4008	3 x 170M4008	3 x 170M4010	3 x 170M5008	3 x 170M6008
3 x 170H3004	3 x 170H1007	3 x 170H3004	3 x 170H3004	3 x 170H3004	3 x 170H3004	3 x 170H3004	3 x 170H3004
1 x (25 - 70) 2 x (6 - 25)					1 x (4 - 185) 2 x (4 - 70)		
-					-		
1 x (25 - 70) 2 x (6 - 25)					1 x (4 - 185) 2 x (4 - 70)		
1 x (12 - 2/0)					1 x (12 - 350 kcmil) 2 x (12 - 00)		
2 x 9 x 0.89 x 9 x 0.8							
6 (≤ 10 mm²); 9 (> 10 mm²)					5 (≤ 10 mm²); 14 (> 10 mm²)		
PZ2; 1 x 6 mm					PZ2; 1 x 6 mm		
1 x (0.5 - 2.5) 2 x (0.5 - 1.0)					1 x (0.5 - 2.5) 2 x (0.5 - 1.0)		
1 x (0.5 - 1.5) 2 x (0.5 - 0.75)					1 x (0.5 - 1.5) 2 x (0.5 - 0.75)		
1 x (0.5 - 1.5) 2 x (0.5 - 1.0)					1 x (0.5 - 1.5) 2 x (0.5 - 1.0)		
1 x (21 - 14) 2 x (21 - 18)					1 x (21 - 14) 2 x (21 - 18)		
0.4					0.4		
0,6 x 3,5					0,6 x 3,5		
24 V AC/DC +10 %/- 15 %							
110 V AC -15 % - 230 V AC +10 %							
24 V DC +10 %/- 15 %							
50							
600/50							
24 V DC +10 %/- 15 %							
24 V DC +10 %/- 15 %							
24 V DC +10 %/- 15 % oder über SWD							
24 V AC +10 %/- 15 %							
110 V AC - 15 % - 230 V AC +10 %							
1.6							
4							
17.3 - 27							
17.3 - 27							
108 - 253							

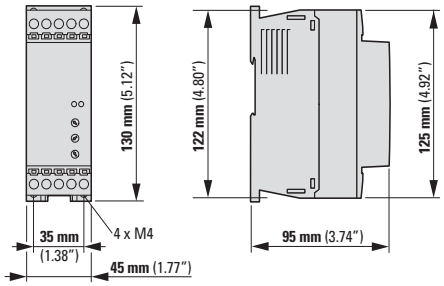
DS7

			DS7…004…	DS7…007…	DS7…009…	DS7…012…	DS7…016…	DS7…024…	DS7…032…	DS7…041…	DS7…055…	DS7…070…	DS7…081…	DS7…100…	DS7…135…	DS7…160…	DS7…200…
Drop-out voltage																	
DC operated		V DC	0 - 3							0 - 3							
AC operated		V AC															
…340SX…			0 - 3							0 - 3							
…342SX…			0 - 15							0 - 15							
Pick-up time																	
DC operated		ms	250							250							
AC operated		ms	250							250							
Drop-out time																	
DC operated		ms	350							350							
AC operated		ms	350							350							
Relay outputs																	
Number			1 (TOR)				2 (TOR, Ready)			2 (TOR, Ready)							
Voltage range		V AC	= U_s				250			250							
AC-11 current range		A	1 A, AC-11				1 A, AC-11			1 A, AC-11							
Soft start function																	
Ramp times																	
Acceleration		s	1 - 30							1 - 30							
Deceleration		s	0 - 30							0 - 30							
Start pedestal		%	30 - 100							30 - 100							
Current limitation																	
…34DSX…(+PKE)			(0 - 8) x I_e							(0 - 8) x I_e							
Fields of application																	
Fields of application			Soft starting of three-phase asynchronous motors							Soft starting of three-phase asynchronous motors							
3-phase motors			✓							✓							
Functions																	
Fast switching (semiconductor contactor)			- (minimum ramp time 1s)							- (minimum ramp time 1s)							
Soft start function			✓							✓							
Reversing starter			External solution required							External solution required							
Suppression of closing transients			✓							✓							
Current limitation																	
…34DSX…			✓, with PKE							✓, with PKE							
Overload monitoring			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Underload monitoring			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thermistor input			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fault memory		Faults															
…34DSX…			8							8							
Pre-programmed parameter sets			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Suppression of DC components for motors			✓							✓							
Potential isolation between power and control sections			✓							✓							
Built-in interfaces																	
…34DSX…			SmartWire-DT							SmartWire-DT							

Dimensions

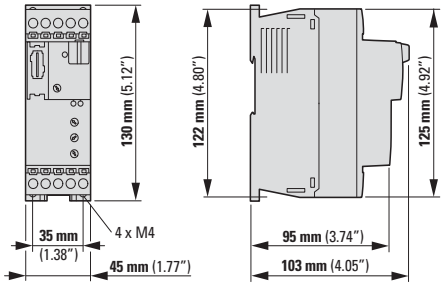
DS7-340SX004N0-N
DS7-340SX007N0-N
DS7-340SX009N0-N
DS7-340SX012N0-N

DS7-342SX004N0-N
DS7-342SX007N0-N
DS7-342SX009N0-N
DS7-342SX012N0-N



DS7-34DSX004N0-D
DS7-34DSX007N0-D

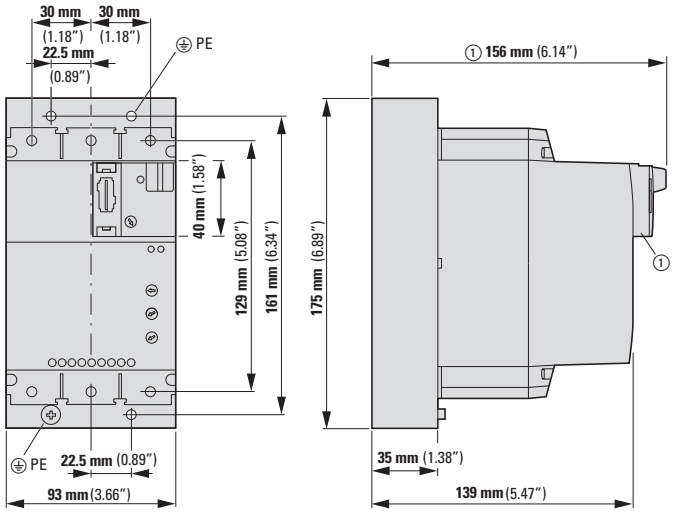
DS7-34DSX009N0-D
DS7-34DSX012N0-D



DS7-340SX041N0-N
DS7-340SX055N0-N
DS7-340SX070N0-N
DS7-340SX081N0-N
DS7-340SX100N0-N

DS7-342SX041N0-N
DS7-342SX055N0-N
DS7-342SX070N0-N
DS7-342SX081N0-N
DS7-342SX100N0-N

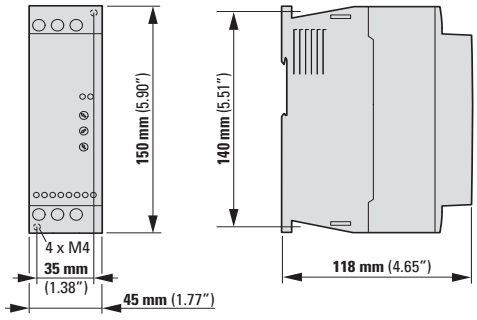
DS7-34DSX041N0-D
DS7-34DSX055N0-D
DS7-34DSX070N0-D
DS7-34DSX081N0-D
DS7-34DSX100N0-D



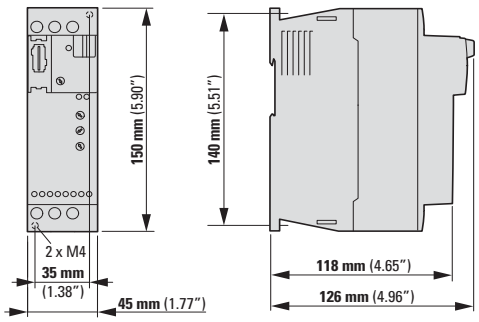
1 DS7-...-D

DS7-340SX016N0-N
DS7-340SX024N0-N
DS7-340SX032N0-N

DS7-342SX016N0-N
DS7-342SX024N0-N
DS7-342SX032N0-N



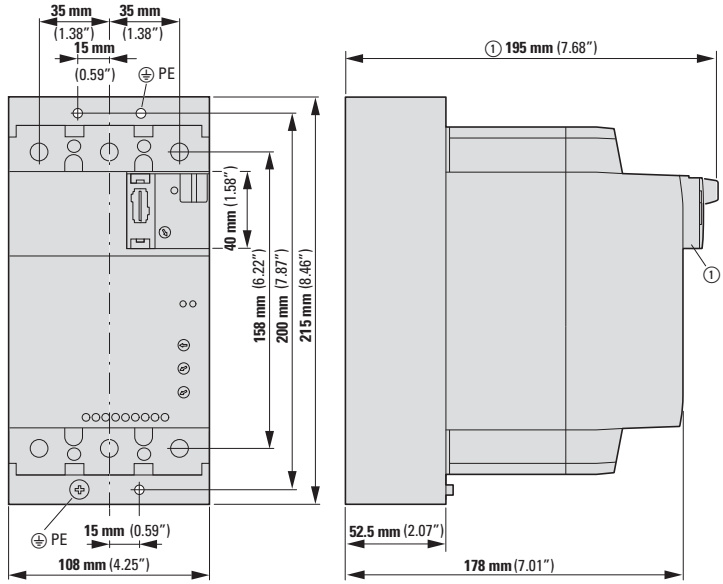
DS7-34DSX016N0-D
DS7-34DSX024N0-D
DS7-34DSX032N0-D



DS7-340SX135N0-N
DS7-340SX160N0-N
DS7-340SX200N0-N

DS7-342SX135N0-N
DS7-342SX160N0-N
DS7-342SX200N0-N

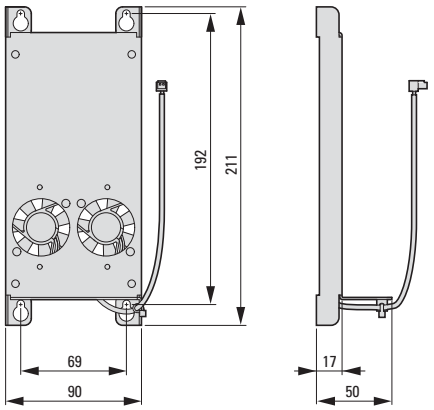
DS7-34DSX135N0-D
DS7-34DSX160N0-D
DS7-34DSX200N0-D



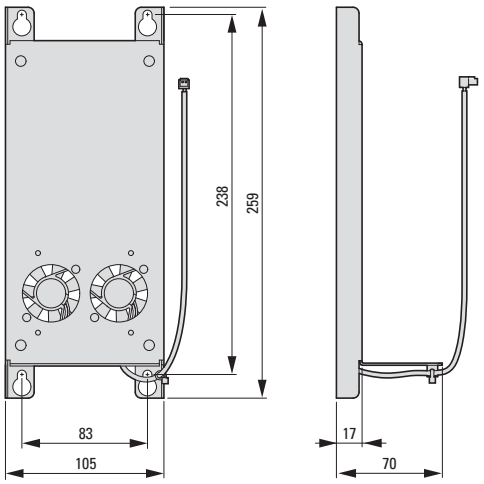
1 DS7-...-D

Device fans

DS7-FAN-100

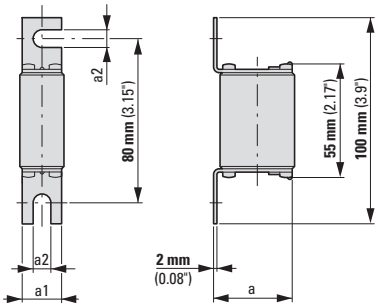


DS7-FAN-200



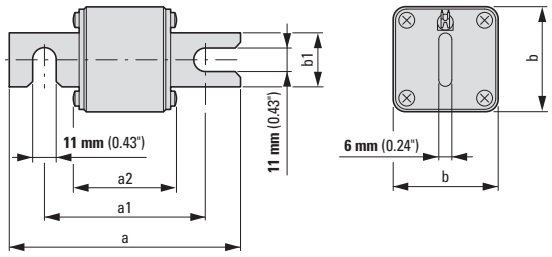
Superfast semiconductor fuses

Sizes 000, 00



a mm (inch)	a1 mm (inch)	a2 mm (inch)	Size (size)
40 (1.57)	20 (0.79)	8 (0.31)	000
51 (2.01)	28 (1.1)	10 (0.39)	00

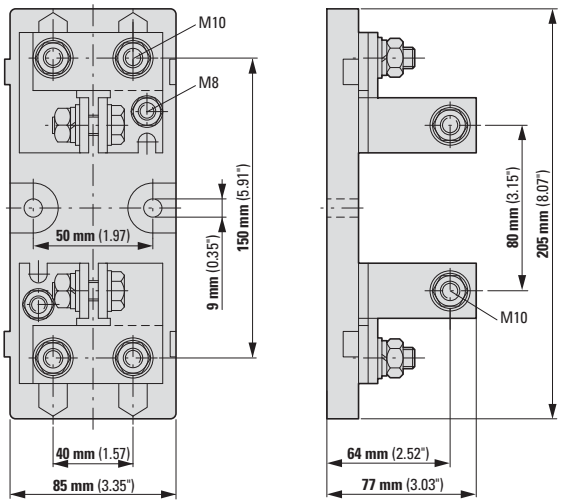
Sizes S1*, S1, S2, S3



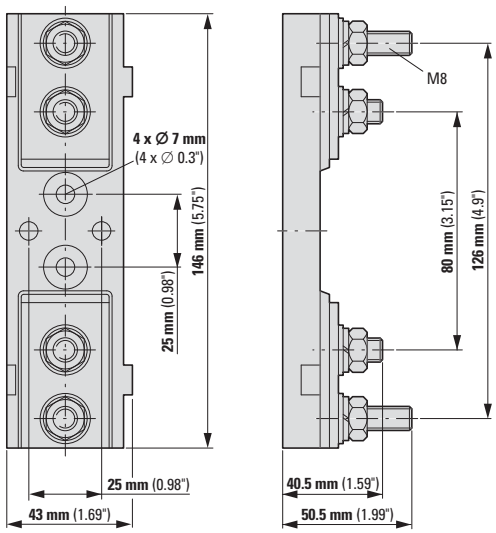
a mm (inch)	a1 mm (inch)	a2 mm (inch)	b mm (inch)	b1 mm (inch)	Size (size)
104 (4.09)	78 (3.07)	50 (1.97)	45 (1.77)	22 (0.87)	S1*
108 (4.25)	78 (3.07)	50 (1.97)	53 (2.09)	25 (0.98)	S1
108 (4.25)	78 (3.07)	50 (1.97)	61 (2.40)	25 (0.98)	S2
109 (4.29)	78 (3.07)	51 (2.01)	76 (2.99)	30 (1.18)	S3

Fuse Bases

170H3004



170H1007



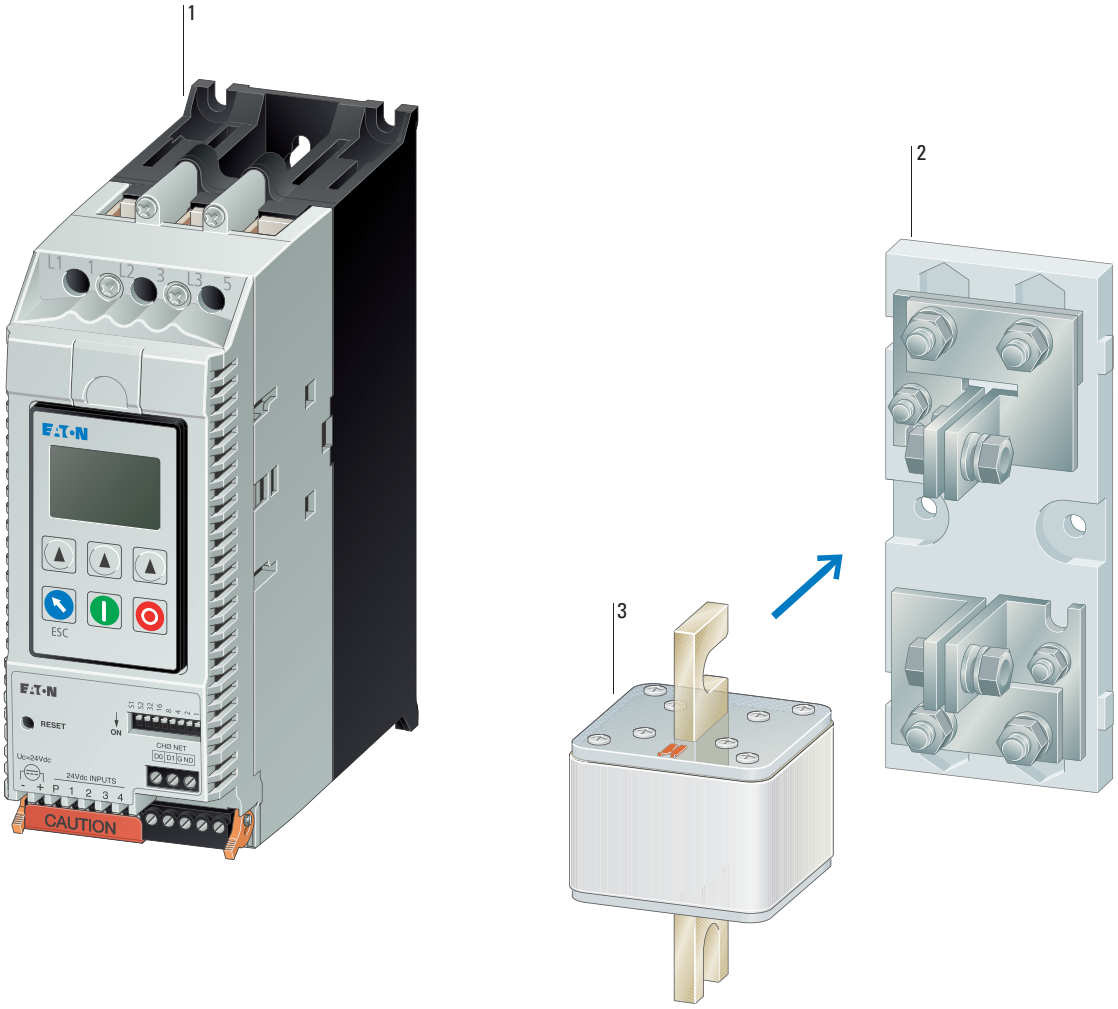
S801+/S811+ Soft Starters – Powerful Performance in a Small Package

The incredible performance of our two new S801+ and S811+ soft starter series is shaped by the expanded functionality that we have integrated into our tried-and-true series of soft starters. With only five sizes and rated operational currents of 37 A to 1,000 A for line voltages of 200 V to 690 V, the S801+ and S811+ are two of the smallest, most compact soft starters in the world.

These three-phase controlled soft starters, which feature an internal bypass and extensive monitoring and protection mechanisms, guarantee not only soft motor start-ups, but also the safe and reliable continuous operation of three-phase motors even in applications involving high load torques. In addition, these soft starters can be connected with a standard in-line configuration or with an inside-the-delta (also called "six wire connection") configuration as needed.

S801+ soft starters were designed with standard applications in mind and owe an important part of their appeal to their ease of use, while the devices in the S811+ series are characterized by a digital control and display unit that provides access to extended functions for sophisticated applications.

System overview



S801+ / S811+ 1
→ page 137

Fuse base for superfast semiconductor fuses 2
→ page 111

Superfast semiconductor fuses 3
→ page 112

Description

S801+ series soft starters are an innovative addition that further enhances their tried-and-true predecessors. They are designed to guarantee reliable operation even under harsh and challenging ambient conditions. In addition, the 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.

S801+ soft starters are three-phase controlled and come with internal bypass contacts for continuous operation. With them, motors can be connected with a standard in-line circuit or inside the delta circuit (inside-the-delta circuit, √3 circuit). Using an inside-the-delta circuit will reduce the current flowing through the soft starter by approximately 42%. This makes it possible, for example, to start and run a motor with a rated operational current of 100 A using a 58-A soft starter. In addition, their comprehensive protection and monitoring features enable S801+ soft starters to ensure that three-phase motors with rated operational currents of 11 A to 1000 A will have soft startups and safe and reliable continuous operation at mains voltages of 200 V to 600 V – up to 690 V in the case of S811+ soft starters. Accordingly, for instance, their controlled coasting (soft stop control) and torque monitoring features can be used to prevent water impact in pumps and to reduce the mechanical loads on pump systems significantly.

Essential features S801+ / S811+

- 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 - 277 kW (3~ 230 V)
  – 18.5 - 525 kW (3~ 400 V)
  – 30 - 900 kW (3~ 690 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 supply required
  – 1 A continuous current
  – 10 A starting current (peak value for 15 ms)

S801+ specific characteristics

- Microswitches and potentiometers make it easy to configure these soft starters

S811+ series soft starters provide all the features and characteristics of S801+ soft starters, plus expanded functionality and an operating unit (DIM = digital interface module).

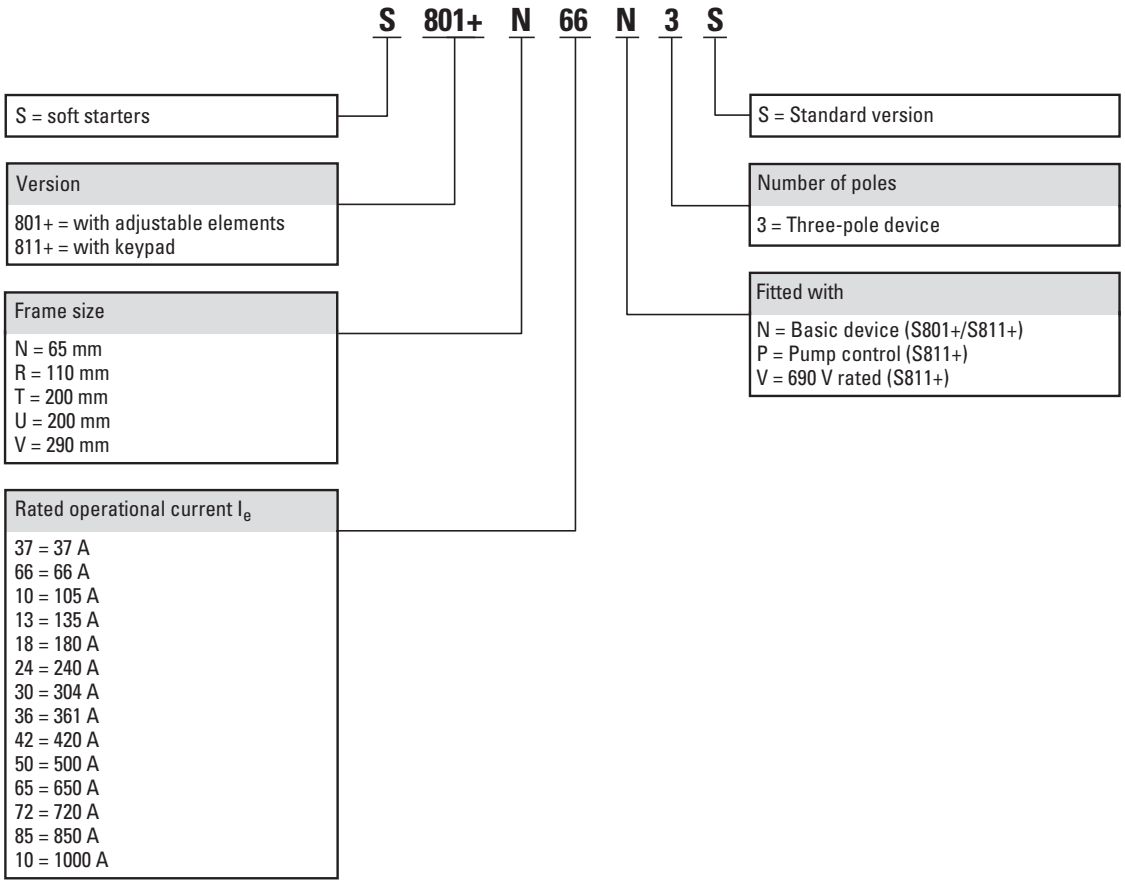
Important operating unit characteristics (S811+)

- 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 RJ45 plug
- Front IP54

S811+ specific characteristics

- Mains voltage up to 690 V?
- Special pump control algorithm with prolonged soft stop ramp

Key to type references



UL/CSA

Information relevant for export to North America

	S801+N…, S801+R…, S801+T… (600 V) **S811+N…, S811+R…, S811+T… (600 V)**	**S801+U…, S801+V… bis 850 A (600 V)** **S811+U…, S811+V… bis 850 A (600 V)**
Product Standards	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking
UL File No.	E202571	E202571
UL CCN	NMFT	NMFT
CSA File No.	LR 353	LR 353
CSA Class No.	3211-06, 2411-01	3211-06
NA Certification	UL Listed, CSA Certified	UL Listed, CSA Certified
Conditions of Acceptability	None	None
Suitable for	Branch Circuits, not as BCPD	Branch Circuits, not as BCPD
Max. Voltage Rating	600 Vac	600 Vac
Degree of Protection	IP20 with kit	IP20 with kit

	S801+V…, 1000 A (600 V) **S811+V…, 1000 A (600 V)**	**S811+…V3S (690 V)**
Product Standards	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking	IEC/EN 60947-4-2; UL 508; CE marking
UL File No.	E202571	E202571
UL CCN	NMFT2	NMFT
CSA File No.	LR 353	
CSA Class No.	3211-06	
NA Certification	UL Recognized, CSA Certified	UL Listed
Conditions of Acceptability	98-115 CFM fan and 4" x 4" vent req'd	None
Suitable for	Branch Circuits, not as BCPD	Branch Circuits, not as BCPD
Max. Voltage Rating	600 Vac	690 Vac
Degree of Protection	IP20 with kit	IP20 with kit

Ordering

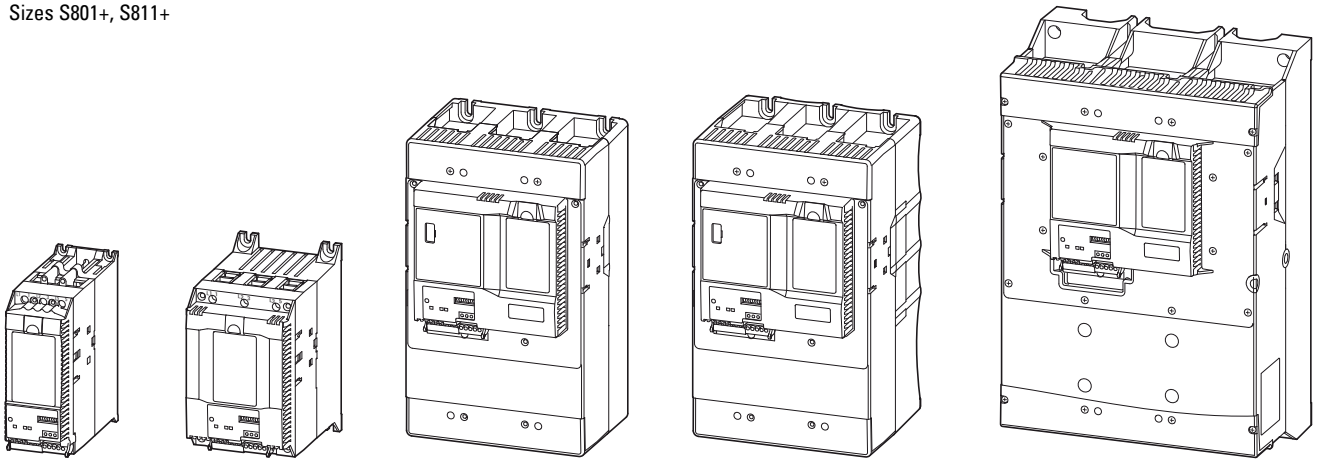
Frame size	Rated operational current Device (AC-53) I_e A	Assigned motor rating at 400 V, 50 Hz P kW	at 480 V, 60 Hz P HP	**Part no.**	Article no.	**Price** see price list	Std. pack
Soft starters							
Mains supply voltage (50/60 Hz) U_{LN}: 200 - 600 V AC Supply voltage U_s: 24 V DC Control voltage U_C: 24 V DC, With internal bypass contacts							
Soft starters for three-phase loads							
N	37	18.5	25	**S801+N37N3S**	169852		1 off
	66	30	50	**S801+N66N3S**	169853		
R	105	55	75	**S801+R10N3S**	169854		
	135	75	100	**S801+R13N3S**	169855		
T	180	90	150	**S801+T18N3S**	169856		
	240	132	200	**S801+T24N3S**	169857		
	304	160	250	**S801+T30N3S**	169858		
U	361	200	300	**S801+U36N3S**	169859		
	420	200	350	**S801+U42N3S**	169860		
V	361	200	300	**S801+V36N3S**	169863		
	420	200	350	**S801+V42N3S**	169864		
	500	250	400	**S801+V50N3S**	169865		
	650	315	500	**S801+V65N3S**	169866		
	720	400	600	**S801+V72N3S**	169867		
	850	450	600	**S801+V85N3S**	169868		
	1000	560	750	**S801+V10N3S**	169862		
Soft starter for three-phase loads, with control unit							
N	37	18.5	25	**S811+N37N3S**	168976		1 off
	66	30	50	**S811+N66N3S**	168978		
R	105	55	75	**S811+R10N3S**	168980		
	135	75	100	**S811+R13N3S**	168982		
T	180	90	150	**S811+T18N3S**	168984		
	240	132	200	**S811+T24N3S**	168987		
	304	160	250	**S811+T30N3S**	168990		
U	361	200	300	**S811+U36N3S**	169869		
	420	200	350	**S811+U42N3S**	169870		
V	361	200	300	**S811+V36N3S**	168993		
	420	200	350	**S811+V42N3S**	168996		
	500	250	400	**S811+V50N3S**	168999		
	650	315	500	**S811+V65N3S**	169002		
	720	400	600	**S811+V72N3S**	169005		
	850	450	600	**S811+V85N3S**	169008		
	1000	560	750	**S811+V10N3S**	169011		
Soft starter for three-phase loads, with control unit and pump algorithm							
N	37	18.5	25	**S811+N37P3S**	168977		1 off
	66	30	50	**S811+N66P3S**	168979		
R	105	55	75	**S811+R10P3S**	168981		
	135	75	100	**S811+R13P3S**	168983		
T	180	90	150	**S811+T18P3S**	168985		
	240	132	200	**S811+T24P3S**	168988		
	304	160	250	**S811+T30P3S**	168991		
U	361	200	300	**S811+U36P3S**	169872		
	420	200	350	**S811+U42P3S**	169873		
V	361	200	300	**S811+V36P3S**	168994		
	420	200	350	**S811+V42P3S**	168997		
	500	250	400	**S811+V50P3S**	169000		
	650	315	500	**S811+V65P3S**	169003		
	720	400	600	**S811+V72P3S**	169006		
	850	450	600	**S811+V85P3S**	169009		
	1000	560	750	**S811+V10P3S**	169012		

Notes **Information relevant for export to North America** → Page 136

Frame size	Rated operational current	Assigned motor rating			Part no.	Article no.	Price see price list	Std. pack
	Device (AC-53)	at 400 V, 50 Hz	at 690 V, 50 Hz	at 480 V, 60 Hz				
	I_e	P	P	P				
	A	kW	kW	HP				
Soft starters								
Mains supply voltage (50/60 Hz) U_{LN}: 200 - 690 V AC Supply voltage U_s: 24 V DC Control voltage U_C: 24 V DC With internal bypass contacts								
Soft starter for three-phase loads, with control unit and pump algorithm, for 690-V grids								
T	180	90	160	150	**S811+T18V3S**	168986		1 off
	240	132	200	200	**S811+T24V3S**	168989		
	304	160	250	250	**S811+T30V3S**	168992		
V	361	200	315	300	**S811+V36V3S**	168995		
	420	200	400	350	**S811+V42V3S**	168998		
	500	250	500	400	**S811+V50V3S**	169001		
	650	315	630	500	**S811+V65V3S**	169004		
	720	400	630	600	**S811+V72V3S**	169007		
	850	450	710	600	**S811+V85V3S**	169010		

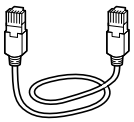
Notes

Sizes S801+, S811+



N R T U V

Information relevant for export to North America → Page 136

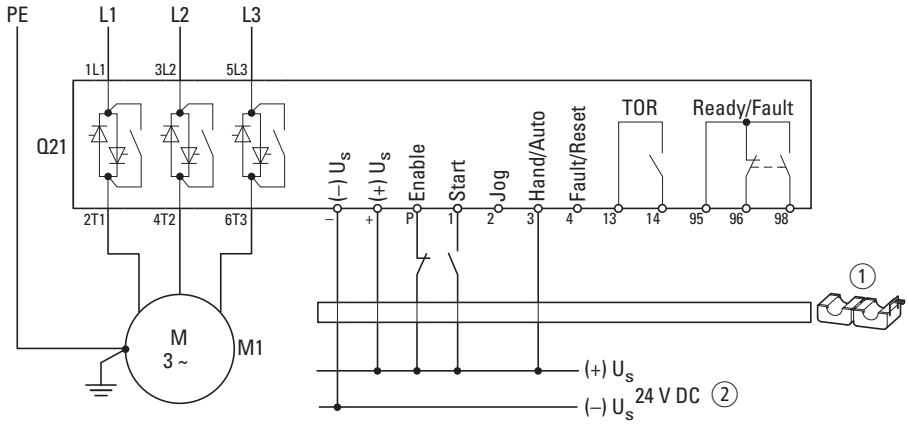
Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
Control unit					
With adjusting elements (potentiometer, microswitch)	S801+	**EMA71** 144346		1 off	Product Standards: IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking UL File No.: E202571 CSA File No.: LR 353 Conditions of Acceptability: UL unlisted component, CSA Investigated Component
With illuminated LCD display With control buttons and function keys Front IP54 RJ45 plug, 8-pin	S811+	**EMA91** 144570			
Cover					
Protection for installation space in S811+ if the control unit is set up externally.					
-	S811+	**EMA68** 144556		1 off	
Mounting frame					
For mounting the EMA91 control unit externally with surface mounting (e.g., installation in control panel door).					
-	EMA91	**EMA69A** 144557		1 off	Product Standards: IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking UL File No.: E202571 UL Category Control No.: NMFT2 CSA File No.: LR 353 CSA Class No.: 3211-06 North America Certification: UL listed, CSA certified
Connection cable					
Connection cable with RJ45 plugs, 8 pole					
	EMA91	**EMA69B** 144558		1 off	Product Standards: IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking UL File No.: E202571 UL Category Control No.: NMFT2 CSA File No.: LR 353 CSA Class No.: 3211-06 North America Certification: UL listed, CSA certified
	EMA91	**EMA69C** 144559			
	EMA91	**EMA69D** 144560			
Control terminal strip					
-	S801+, S811+	**EMA75** 144561		1 off	
IP20 Kits					
-	S801+, S811+, Baugröße N	**SS-IP20-N** 171990		1 off	
-	S801+, S811+, Baugröße R	**SS-IP20-R** 171991			
-	S801+, S811+, Baugrößen T und U	**SS-IP20-TU** 171992			
-	S801+, S811+, Baugröße V	**SS-IP20-V** 158650			

Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America	
Terminal blocks						
Tools with dimensions in inches required						
Terminal capacities						
2 x 4-1/0MCM, 2 x 25-50 mm²	S801+, S811+, Baugrößen T und U	**EML22** 127661		1 off	Product Standards UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification Conditions of Acceptability Max. Voltage Rating	UL 1059 E60693 NMFT LR 353 6223-02 UL listed, CSA certified 10A min, Use group C or D, 30 to 12 AWG solid/stranded 300 V_{ac}
4/0-500 MCM, 120-150 mm²		**EML23** 127662			Product Standards UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification	UL508, CSA C22.2 No. 65 E202571 NMFT LR 353 6223-02 UL listed, CSA certified
2 x 4/0-500 MCM, 2 x 120-150 mm²		**EML24** 127663				
2 x 2/0-300 MCM, 2 x 70-150 mm²		**EML25** 127664				
2/0-300 MCM, 70-150 mm²		**EML26** 127665				
4/0-500 MCM, 120-150 mm²	S801+, S811+, Baugröße V	**EML27** 144549				
2 x 4/0-500 MCM, 2 x 120-150 mm²		**EML28** 127666				
4 x 4/0-500 MCM, 4 x 120-150 mm²		**EML30** 127667				
6 x 4/0-500 MCM, 6 x 120-150 mm²		**EML32** 127668				
4 x 2/0-300 MCM, 4 x 70-150 mm²		**EML33** 127669				
TVSS						
SMD metal-oxide varistors (MOVs) with connection cables for the grid and motor connection sides	S801+, S811+, bis 600 V	**EMS39** 127671		1 off	Product Standards UL File No. CSA File No. Conditions of Acceptability Max. Voltage Rating	UL 508; CSA C22.2 No. 14 E202571 LR 353 UL and CSA Investigated Component 1000 V_{ac} 3 ph
	S811+, bis 690 V	**EMS41** 127672		1 off		
EtherNet/IP - Modbus/TCP adapter						
-	S801+, S811+	**C441V** 172306		1 off	Product Standards UL File No. UL Category Control No. CSA File No. CSA Class No. Max. Voltage Rating	IEC/EN 60947-4-1; UL 508; CSA C22.2 No. 14; CE marking E1230 NKCR LR 353 3211-03 240 Vac (auxiliary contacts)

Engineering

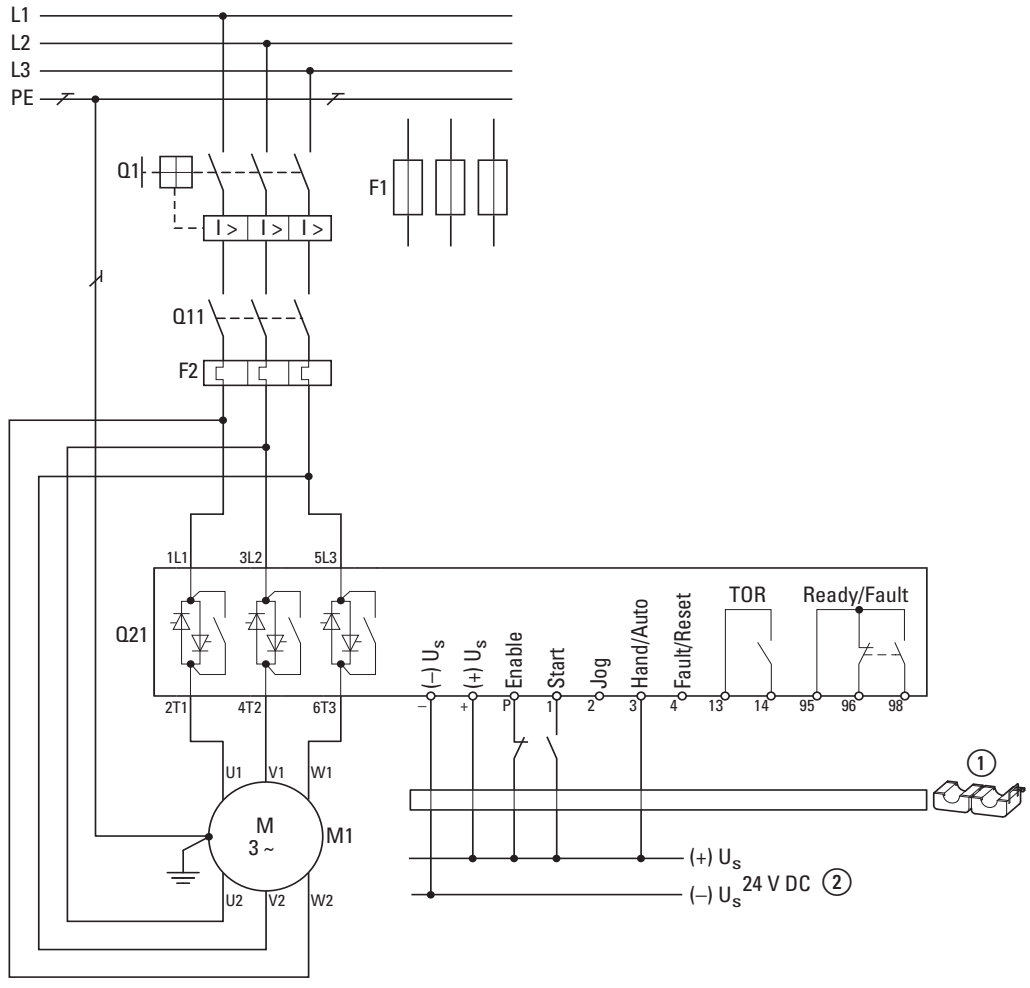
Connection examples for S811+…N3S

Standard connection (in-line connection)



① Snap-on ferrite core, included as standard
② External control voltage (24 VDC) required, IS 100 mA, IPeak = 10 A for 15 ms when bypass contacts are switched

Delta circuit (inside-the-delta circuit)



① Snap-on ferrite core, included as standard
② External control voltage (24 VDC) required, IS 100 mA, IPeak = 10 A for 15 ms when bypass contacts are switched
Short-circuit and cable protection: Q1 circuit-breakers or F1 fuses.

Technical data

			S8x1+N37…	S8x1+N66…	S8x1+R10…	S8x1+R13…	S8x1+T18…	S8x1+T24…	S8x1+T30…	S8x1+U36…	S8x1+U42…
General											
Standards			IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048				IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048				
Approvals			CE				CE	CE	CE	CE	CE
Approvals			UL CSA C-Tick CCC				UL CSA C-Tick CCC				
Climatic proofing			Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10				Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10				
Ambient temperature											
Operation	ϑ	°C	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50
Storage	ϑ	°C	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70
Altitude		m	0 - 2000 m, above that each 100 m 0.5% Derating				0 - 2000 m, above that each 100 m 0.5% Derating				
Mounting position			As required	As required	As required	As required	As required	As required	As required	As required	As required
Degree of protection											
Protection type			IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)				
Integrated			Protection type IP40 can be achieved on all sides with covers SS-IP20-N.				An IP20 degree of protection can be achieved on all sides by using optional terminal covers SS-IP20-TU.				
Protection against direct contact			Finger- and back-of-hand proof				Finger- and back-of-hand proof				
Overvoltage category/pollution degree			II/3	II/3	II/3	II/3	II/3	II/3	II/3	II/3	II/3
Shock resistance			15 g	15 g	15 g	15 g	15 g	15 g	15 g	15 g	15 g
Radio interference level (IEC/EN 55011)			A	A	A	A	A	A	A	A	A
Heat dissipation		W	25	25	25	25	25	25	25	25	25
Weight		kg	2.6	2.6	4.8	4.8	18.6	18.6	18.6	18.6	18.6
Main conducting paths											
Rated operating voltage	U_e	V AC	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600
…V3S			-	-	-	-	200 - 690	200 - 690	200 - 690	-	-
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated operational current											
Device (AC-53)	I_e	A	37	66	105	135	180	240	304	361	420
Assigned motor rating (Standard connection, In-Line)											
at 230 V, 50 Hz	P	kW	7.5	18.5	30	37	55	75	90	110	132
at 400 V, 50 Hz	P	kW	18.5	30	55	75	90	132	160	200	200
at 500 V, 50 Hz	P	kW	22	45	55	90	110	160	200	250	250
at 690 V, 50 Hz	P	kW	-	-	-	-	160	200	250	-	-
at 200 V, 60 Hz	P	HP	10	20	30	40	60	75	100	125	125
at 230 V, 60 Hz	P	HP	10	20	40	50	60	75	100	150	150
at 480 V, 60 Hz	P	HP	25	50	75	100	150	200	250	300	350
at 600 V, 60 Hz	P	HP	30	60	100	125	150	200	300	350	450
Internal bypass contacts			✓	✓	✓	✓	✓	✓	✓	✓	✓
Terminal capacities											
Cable lengths											
Solid		mm²	1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)
Flexible with ferrule		mm²	1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)
Stranded		mm²	1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 240) 2 x (25 - 240)	1 x (70 - 150) 2 x (25 - 240)	1 x (70 - 150) 2 x (25 - 240)
Solid or stranded		AWG	1 x (14 - 2)	1 x (14 - 2)	1 x (14 - 4/0)	1 x (14 - 4/0)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)	1 x (4 - 500 kcmil) 2 x (4 - 500 kcmil)
Tightening torque		Nm	4 (≤ 6 mm²); 4.5 (≤ 10 mm²); 5 (≤ 25 mm²); 5.6 (> 25 mm²)		11.3	11.3	25.5 (≤ 150 mm²); 28.3 (> 150 mm²)	25.5 (≤ 150 mm²); 28.3 (> 150 mm²)	25.5 (≤ 150 mm²); 28.3 (> 150 mm²)	-	-
Screwdriver (PZ: Pozidriv)		mm	1,5 x 6 mm	1,5 x 6 mm	4 mm Hexagon socket-head screw	4 mm Hexagon socket-head screw	4 mm Hexagon socket-head screw			-	-

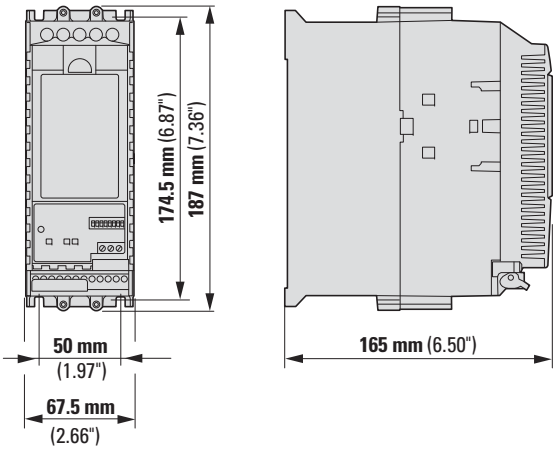
			S8x1+N37…	S8x1+N66…	S8x1+R10…	S8x1+R13…	S8x1+T18…	S8x1+T24…	S8x1+T30…	S8x1+U36…	S8x1+U42…
Control cables											
Solid		mm²	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Flexible with ferrule		mm²	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Stranded		mm²	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Solid or stranded		AWG	1 x (12 - 14) 2 x (12 - 14)	3 x (12 - 14) 2 x (12 - 14)	5 x (12 - 14) 2 x (12 - 14)	7 x (12 - 14) 2 x (12 - 14)	9 x (12 - 14) 2 x (12 - 14)	12 x (12 - 14) 2 x (12 - 14)	15 x (12 - 14) 2 x (12 - 14)	18 x (12 - 14) 2 x (12 - 14)	21 x (12 - 14) 2 x (12 - 14)
Tightening torque		Nm	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Screwdriver		mm	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5
Control circuit											
Regulator supply											
Notes External supply voltage											
Voltage	U_s	V	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %				
Current consumption	I_e	mA	1000	1000	1000	1000	1000	1000	1000	1000	1000
Current consumption at peak performance (close bypass) at 24 V DC	I_{Peak}	mA/ms	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15
Digital inputs											
Control voltage											
DC-operated		V DC	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %				
Current consumption 24 V											
External 24 V (no-load)		mA	100	100	100	100	100	100	100	100	100
Pick-up voltage											
DC-operated		V DC	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
Drop-out voltage											
DC operated		V DC	3	3	3	3	3	3	3	3	3
Pick-up time											
DC operated		ms	100	100	100	100	100	100	100	100	100
Drop-out time											
DC operated		ms	100	100	100	100	100	100	100	100	100
Relay outputs											
Number			2	2	2	2	2	2	2	2	2
Voltage range		V AC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC
AC-11 current range		A	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11
Soft start function											
Ramp times											
Acceleration		s	180	180	180	180	180	180	180	180	180
Deceleration		s	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60
Start pedestal		%	85	85	85	85	85	85	85	85	85
Kickstart											
Voltage		%	100	100	100	100	100	100	100	100	100
Duration											
50 Hz		ms	2000	2000	2000	2000	2000	2000	2000	2000	2000
60 Hz		ms	2000	2000	2000	2000	2000	2000	2000	2000	2000
Fields of application											
Fields of application			Soft starting of three-phase asynchronous motors				Soft starting of three-phase asynchronous motors				
3-phase motors			✓	✓	✓	✓	✓	✓	✓	✓	✓
Functions											
Fast switching (semiconductor contactor)			- (minimum ramp time 1s)				- (minimum ramp time 1s)				
Soft start function			✓	✓	✓	✓	✓	✓	✓	✓	✓
Reversing starter			External solution required (reversing contactor)				External solution required (reversing contactor)				
Suppression of closing transients			✓	✓	✓	✓	✓	✓	✓	✓	✓
Current limitation			✓	✓	✓	✓	✓	✓	✓	✓	✓
Overload monitoring			✓	✓	✓	✓	✓	✓	✓	✓	✓
Underload monitoring			✓	✓	✓	✓	✓	✓	✓	✓	✓
Fault memory		Faults	10	10	10	10	10	10	10	10	10
Suppression of DC components for motors			✓	✓	✓	✓	✓	✓	✓	✓	✓
Potential isolation between power and control sections			✓	✓	✓	✓	✓	✓	✓	✓	✓
Built-in interfaces			Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU

			S8x1+V36…	S8x1+V42…	S8x1+V50…	S8x1+V65…	S8x1+V72…	S8x1+V85…	S8x1+V10…
General									
Standards			IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048
Approvals			CE	CE	CE	CE	CE	CE	CE
Approvals			UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC
Climatic proofing			Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10				Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10		
Ambient temperature									
Operation	ϑ	°C	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50
Storage	ϑ	°C	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70
Altitude		m	0 - 2000 m, above that each 100 m 0.5% Derating				0 - 2000 m, above that each 100 m 0.5% Derating		
Mounting position			As required	As required	As required	As required	As required	As required	As required
Degree of protection									
Protection type			IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)
Integrated			Protection type IP40 can be achieved on all sides with covers SS-IP20-N.				Protection type IP40 can be achieved on all sides with covers SS-IP20-N.		
Protection against direct contact			Finger- and back-of-hand proof				Finger- and back-of-hand proof		
Overvoltage category/pollution degree			II/3	II/3	II/3	II/3	II/3	II/3	II/3
Shock resistance			15 g	15 g	15 g	15 g	15 g	15 g	15 g
Radio interference level (IEC/EN 55011)			A	A	A	A	A	A	A
Heat dissipation		W	25	25	25	25	25	25	25
Weight		kg	41.4	41.4	41.4	41.4	41.4	41.4	41.4
Main conducting paths									
Rated operating voltage	U_e	V AC	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600	200 - 600
…V3S			200 - 690	200 - 690	200 - 690	200 - 690	200 - 690	200 - 690	-
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated operational current									
Device (AC-53)	I_e	A	361	420	500	650	720	850	1000
Assigned motor rating (Standard connection, In-Line)									
at 230 V, 50 Hz	P	kW	110	132	160	200	200	200	200
at 400 V, 50 Hz	P	kW	200	200	250	315	400	450	560
at 500 V, 50 Hz	P	kW	250	250	315	450	500	560	630
at 690 V, 50 Hz	P	kW	315	400	500	630	630	710	-
at 200 V, 60 Hz	P	HP	125	150	150	200	200	200	200
at 230 V, 60 Hz	P	HP	150	150	200	250	250	350	400
at 480 V, 60 Hz	P	HP	300	350	400	500	600	600	750
at 600 V, 60 Hz	P	HP	350	450	500	600	750	850	850
Internal bypass contacts			✓	✓	✓	✓	✓	✓	✓
Terminal capacities									
Cable lengths									
Solid		mm²	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
Flexible with ferrule		mm²	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
Stranded		mm²	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)	2 x (120 - 240) 4 x (70 - 240) 6 x (120 - 240)
Solid or stranded		AWG	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)	2 x (4 - 500 kcmil) 4 x (4 - 500 kcmil) 6 x (4 - 500 kcmil)
Tightening torque		Nm	-	-	-	-	-	-	-
Screwdriver (PZ: Pozidriv)		mm	-	-	-	-	-	-	-

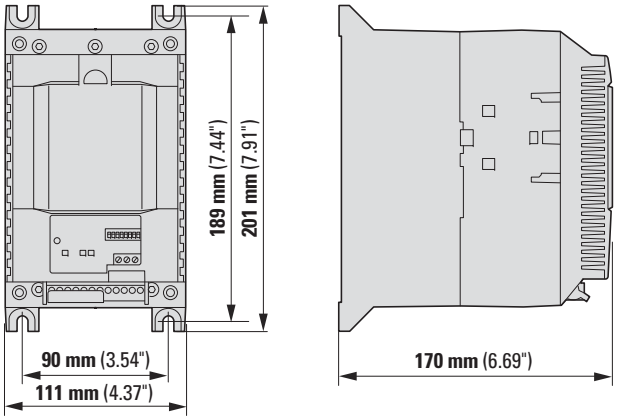
			S8x1+V36…	S8x1+V42…	S8x1+V50…	S8x1+V65…	S8x1+V72…	S8x1+V85…	S8x1+V10…
Control cables									
Solid		mm²	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Flexible with ferrule		mm²	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Stranded		mm²	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
Solid or stranded		AWG	27 x (12 - 14) 2 x (12 - 14)	30 x (12 - 14) 2 x (12 - 14)	33 x (12 - 14) 2 x (12 - 14)	36 x (12 - 14) 2 x (12 - 14)	39 x (12 - 14) 2 x (12 - 14)	42 x (12 - 14) 2 x (12 - 14)	45 x (12 - 14) 2 x (12 - 14)
Tightening torque		Nm	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Screwdriver		mm	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5	0,6 x 3,5
Control circuit									
Regulator supply									
Notes External supply voltage									
Voltage	U_s	V	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
Current consumption	I_e	mA	1400	1400	1400	1400	1400	1400	1400
Current consumption at peak performance (close bypass) at 24 V DC	I_{Peak}	mA/ms	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15
Digital inputs									
Control voltage									
DC-operated		V DC	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
Current consumption 24 V									
External 24 V (no-load)		mA	100	100	100	100	100	100	100
Pick-up voltage									
DC-operated		V DC	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
Drop-out voltage									
DC operated		V DC	3	3	3	3	3	3	3
Pick-up time									
DC operated		ms	100	100	100	100	100	100	100
Drop-out time									
DC operated		ms	100	100	100	100	100	100	100
Relay outputs									
Number			2	2	2	2	2	2	2
Voltage range		V AC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC
AC-11 current range		A	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11
Soft start function									
Ramp times									
Acceleration		s	180	180	180	180	180	180	180
Deceleration		s	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60
Start pedestal		%	85	85	85	85	85	85	85
Kickstart									
Voltage		%	100	100	100	100	100	100	100
Duration									
50 Hz		ms	2000	2000	2000	2000	2000	2000	2000
60 Hz		ms	2000	2000	2000	2000	2000	2000	2000
Fields of application									
Fields of application			Soft starting of three-phase asynchronous motors				Soft starting of three-phase asynchronous motors		
3-phase motors			✓	✓	✓	✓	✓	✓	✓
Functions									
Fast switching (semiconductor contactor)			- (minimum ramp time 1s)				- (minimum ramp time 1s)		
Soft start function			✓	✓	✓	✓	✓	✓	✓
Reversing starter			External solution required (reversing contactor)				External solution required (reversing contactor)		
Suppression of closing transients			✓	✓	✓	✓	✓	✓	✓
Current limitation			✓	✓	✓	✓	✓	✓	✓
Overload monitoring			✓	✓	✓	✓	✓	✓	✓
Underload monitoring			✓	✓	✓	✓	✓	✓	✓
Fault memory		Faults	10	10	10	10	10	10	10
Suppression of DC components for motors			✓	✓	✓	✓	✓	✓	✓
Potential isolation between power and control sections			✓	✓	✓	✓	✓	✓	✓
Built-in interfaces			Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU

Dimensions

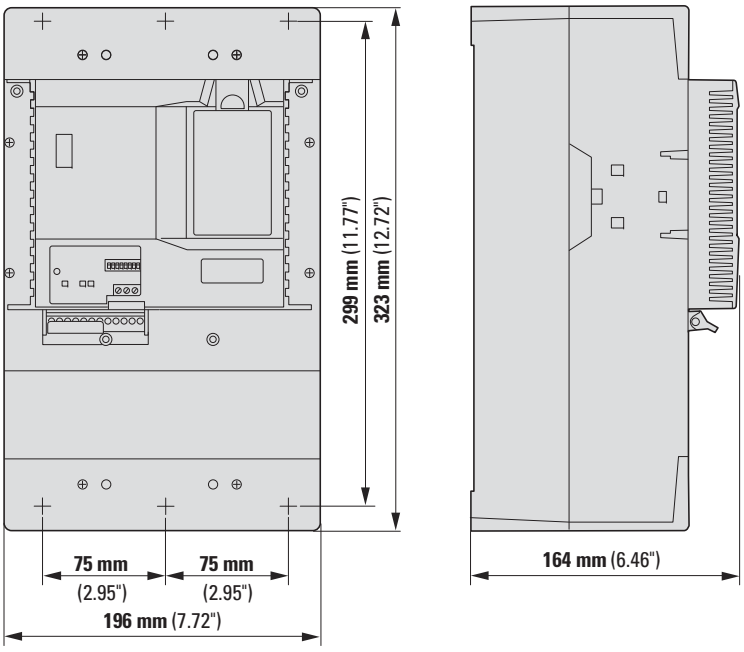
S8x1+N…



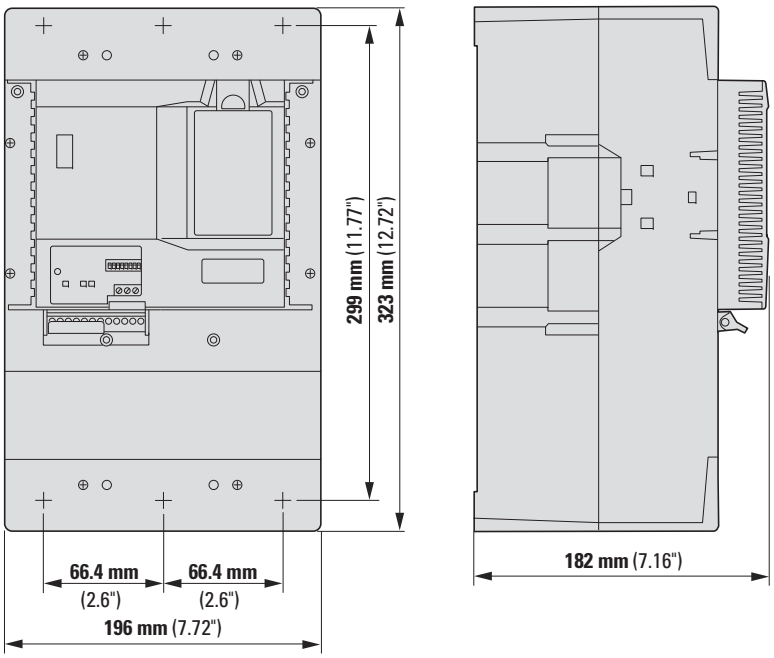
S8x1+R…



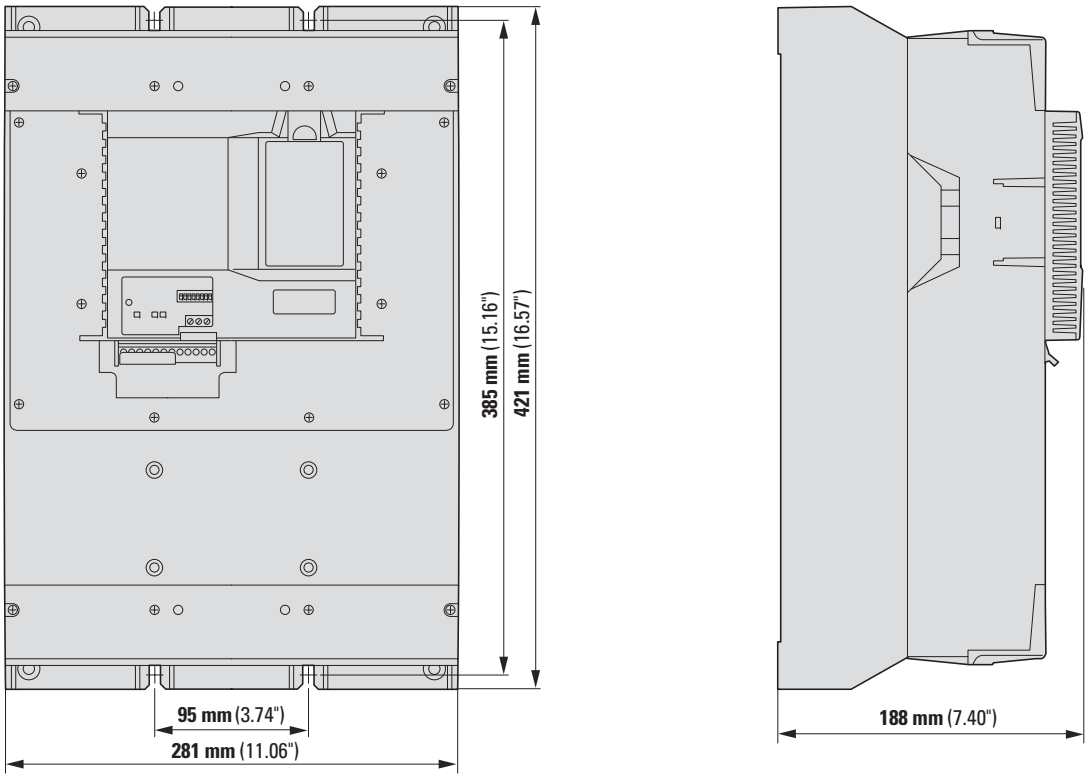
S8x1+T…



S8x1+U…


299 mm (11.77")
323 mm (12.72")
66.4 mm
(2.6")
66.4 mm
(2.6")
196 mm (7.72")
182 mm (7.16")

S8x1+V…


385 mm (15.16")
421 mm (16.57")
95 mm (3.74")
281 mm (11.06")
188 mm (7.40")

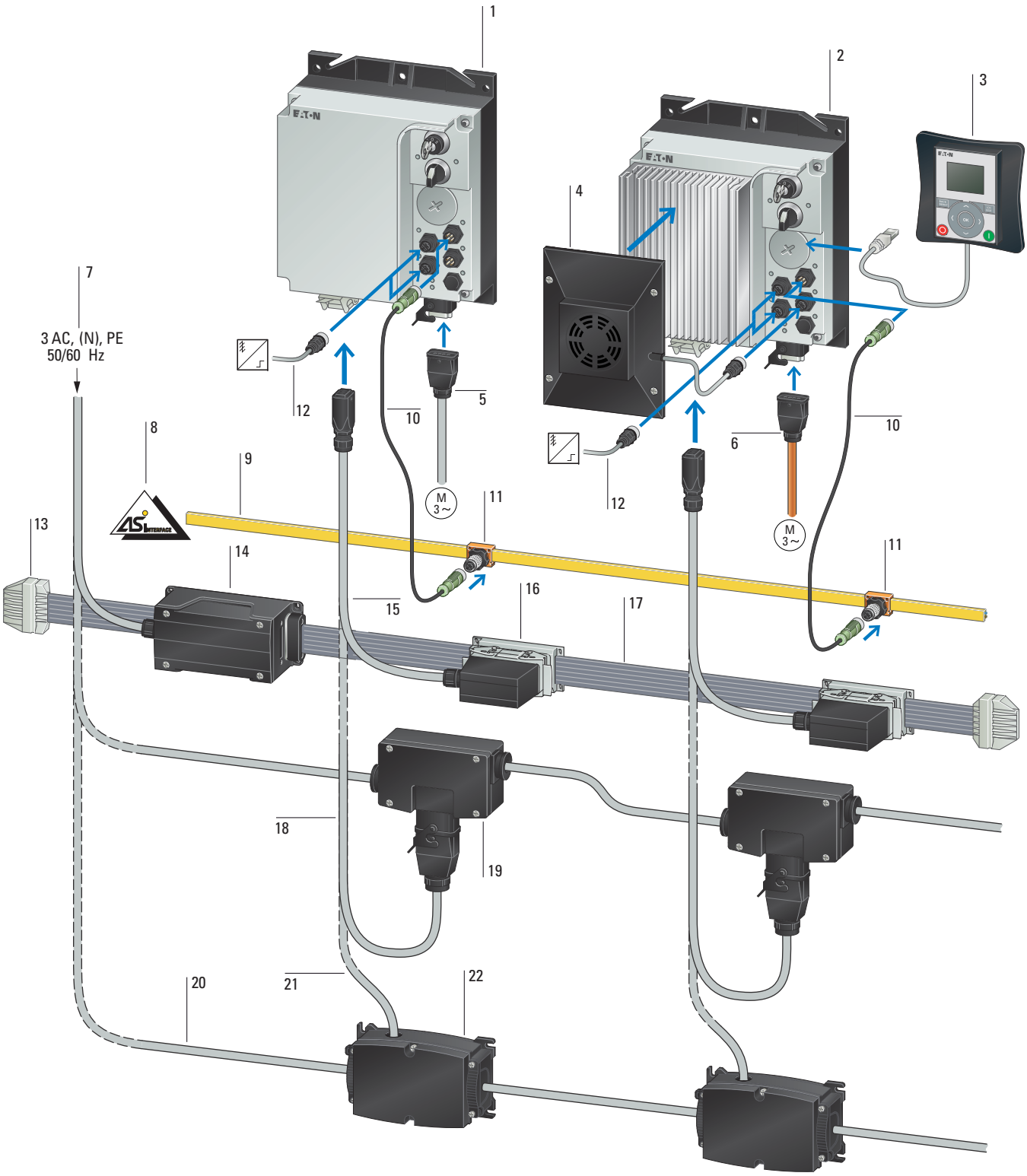
Rapid Link 4.0 distributed, electronic drive system

Standardized installation procedures, the ability to directly and locally configure parameters with a plug and play configuration, and networked communications – these are the needs of material handling system applications today when it comes to state-of-the-art drive engineering and the systems it produces.
Eaton delivers a modern answer with the Rapid Link 4.0 distributed electronic drive system. With its flexible power spectrum, its simple handling and its intelligent programming options, this new motor starter and variable frequency drives generation is the first choice for all kinds of conveying engineering applications.

RAMO electronic motor starters
Electronic DOL and reversing starters with a lifespan of more than 10 million switching operations, IP 65 degree of protection. Rated adjustable operational current of 0.3 – 6.6 A with three-phase mains connection of 400 V; allocated motor output of 0.09 – 3.0 kW
RAMO-D…: DOL starter
RAMO-W…: reversing starter

RASP speed controllers
Frequency-controlled motor starters with Volts-per-Hertz control (V/Hz control) and slip compensation or voltage-controlled vector control, as well as an integrated radio interference suppression filter (EMC), IP65 degree of protection.
RASP-2…: Rated operational current of 0.48 – 2.4 A with three-phase mains connection of 400 V; assigned motor output of up to 0.75 kW
RASP-3…: Rated operational current of 0.66 – 3.3 A with three-phase mains connection of 400 V; assigned motor output of up to 1.1 kW
RASP-4…: Rated operational current of 0.86 – 4.3 A with three-phase mains connection of 400 V; assigned motor output of up to 1.5 kW
RASP-5…: Rated operational current of 1.12 – 5.6 A with three-phase mains connection of 400 V; allocated motor output of up to 2.2 kW

System overview



Function modules

Motor starter (Motor Control Unit) 1
Three-phase electronic DOL starter or reversing starter
→ page 158

Speed controller RASP (Speed Control Unit) 2
Three phase frequency-controlled motor starter (fixed speeds, two rotational directions, adjustable acceleration and deceleration ramps)
→ page 159

operating unit 3
for parameter setting
→ page 160

Fan 4
for operation at high temperatures without derating
→ page 160

Motor feeder

Unscreened motor cable 5
→ page 160

Screened motor supply cable (EMC) 6
→ page 160

Power and data bus

Energy supply (3 AC 400 V) via circuit-breaker for overload and short-circuit protection 7
for protection against short-circuit and overload

AS-Interface® feeder unit 8

AS-Interface® flat cable 9

AS-Interface® connection cable 10
→ page 163

AS-Interface® junction 11
→ page 163

Sensor connection 12
→ page 163

End-piece for flat cable 13
→ page 162

distributor module 14
for 400-V-AC incoming unit of the flat cable
→ page 161

Power connection cable 15
to flexible busbar junction
→ page 160

flexible busbar junction 16
→ page 161

Ribbon cable for 400 V AC 17
→ page 160

Power connection cable 18
to round cable junction
→ page 162

Round cable junction 19
→ page 162

Round cable for 400 V AC 20

Power connection cable 21
to round cable junction
→ page 162

Round cable junction 22
→ page 162

Rapid Link 4.0 is a modern, efficient drive and PLC. It is the competent further development of the Rapid Link 2.1/3.0 device series, suitable for simple and complex tasks in all aspects of material handling. For example in airports, industrial production and logistics centers.
The Rapid Link system consists of the RAMO electronic motor starters and the RASP frequency controlled motor starters.

The RAMO and RASP motor starters are designed with IP65 protection and can be installed in direct proximity to the drive. Their versions and mounting depend on the required specifications and the local conditions.
The RAMO and RASP are connected with standard plug connectors to the energy and databus systems predominantly used in material handling systems (AS-Interface). Connection can be implemented without interrupting the required location. This simplifies installation and reduces the wiring requirement.







Overview of features

RAMO 4.0 electronic motor starters

Application and function
The RAMO motor starters enable the electronic DOL or reversing starting of three-phase motors in automatic or manual mode. The electronic overload protection for motor ratings from 90 W to 3 kW at 400 V (50/60 Hz) is configured with DIP switches. Full motor protection is ensured when used in connection with temperature sensors.
The operating mode is set via the AUTO - OFF/RESET – MANUAL key switch and can be combined with the 'Quick stop' and 'Interlocked manual operation' via the two sensor inputs (M12 sockets). Operating states are diagnosed and error messages (Reset) acknowledged on the device or via the AS-Interface.
RAMO is available in different versions:
- with actuator output (24 V DC) for a direct actuation of external switching devices, e.g. solenoid valves.
- with electronic actuation for mechanical motor brakes.
- with lockable repair switch for diagnostic and maintenance work, making it possible to safely de-energize the device locally.

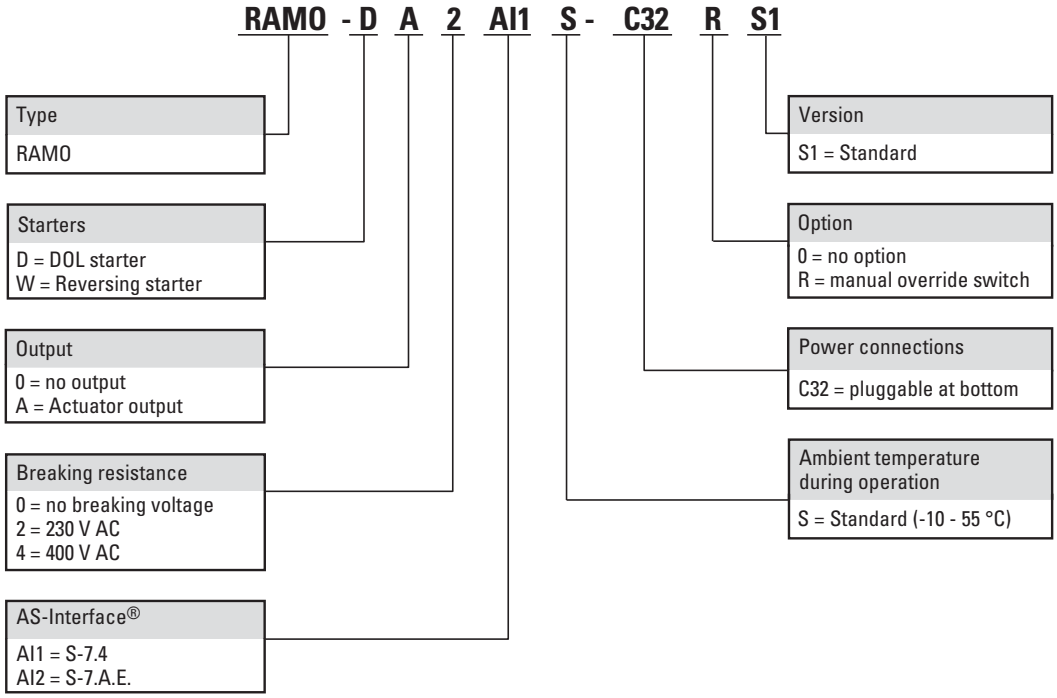
Essential features
- Standard size in square enclosure. The bottom section with the two power terminals (power plug, motor feeder socket) and the repair and maintenance switch can be turned 90° clockwise and counterclockwise.
- Long lifespan up to 10 million switching operations and up to 3,000 switch cycles per hour at 2.2 kW.
- Rated operational current 6.6 A.
- Operating and ambient temperature from -10 to +55 °C, without derating.
- Monitoring of thermistor and motor cable.
- Maximum motor cable length: 10 m.

Frequency controlled motor starter RASP 4.0

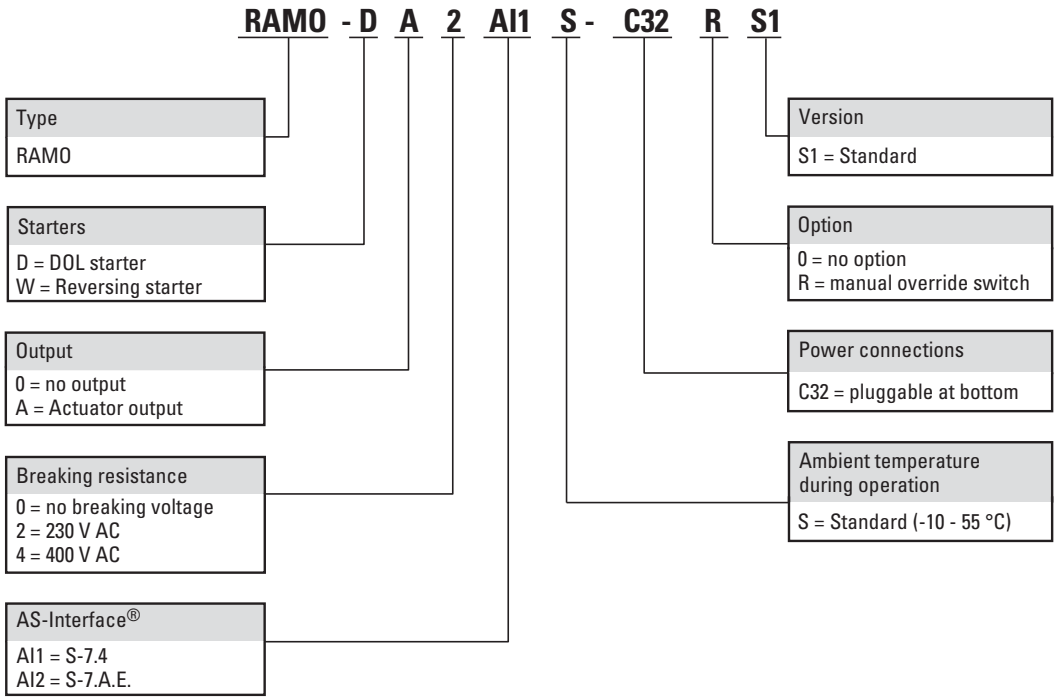
Application and function
The RASP motor starter enables the infinitely variable speed control of three-phase motors in the range from zero to 320 Hz . The standard size for 400 V (50/60 Hz) is assigned four motor ratings: 0.75 kW, 1.1 kW, 1.5 kW and 2.2 kW. Full motor protection is ensured by the adjustable current limitation (I^2t controller).
The operating mode is set via the AUTO - OFF/RESET – MANUAL key switch and can be combined with the 'Quick stop' and 'Interlocked manual operation' via the two sensor inputs (M12 sockets). Settable fixed frequencies and cyclical program sequences extend the application range and relieve the load on the higher-level head-end controller (PLC). Operating states are diagnosed and error messages (Reset) acknowledged on the device or via the AS-Interface. A hand-held programmer and a PC interface are available for the parameterization of the variable frequency drive module.
RASP is available in different versions:
- with integrated brake chopper with braking resistance for dynamic braking.
- with electronic actuation for mechanical motor brakes.
- with lockable repair switch for diagnostic and maintenance work, making it possible to safely de-energize the device locally.

Essential features
- Standard size in square enclosure. The bottom section with the two power terminals (power plug, motor feeder socket) and the repair and maintenance switch can be turned 90° clockwise and counterclockwise.
- Monitoring of thermistor and motor cable.
- Operating and ambient temperatures from 0 to +40 °C without derating, with optional fan in the performance range up to 1.5 kW max. +55 °C.
- Rated operational current: 2.4 A, 3.3 A, 4.3 A, 5.6 A
- EMC class C3 in 2nd environment
- Maximum motor cable length: 5 m.

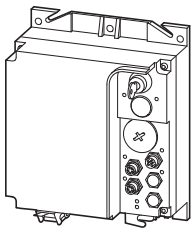
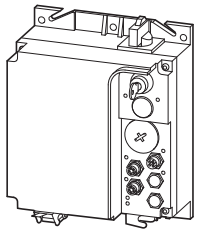
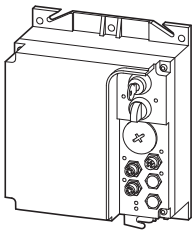
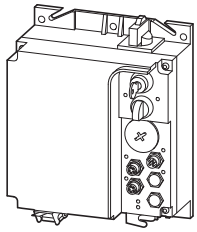
Electronic motor starters RAMO



Frequency controlled motor starter RASP

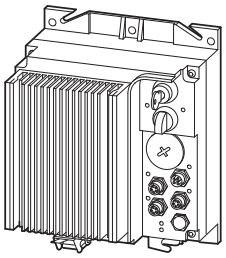
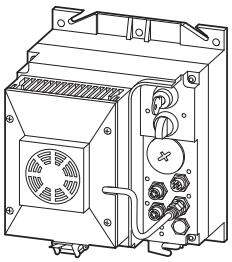
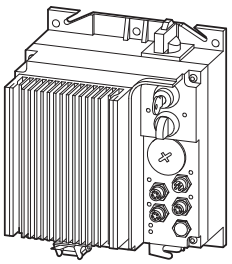
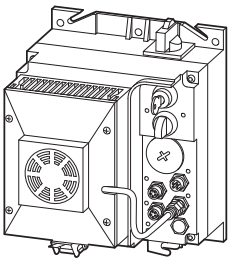


Ordering

	Rated operational current I_e A	Control voltage external brake (50/60 Hz)[1] V AC	Actuator output[2] Number	AS-Interface profile cable S-7.4 for 31 modules	AS-Interface profile cable S-7.A.E. for 62 modules	Part no. Article no.	Price see price list	Std. pack
Motor starter RAMO								
Rated operational voltage 400 V AC								
DOL starters								
	6.6	-	-	✓	-	**RAMO-D00AI1S-C320S1** 150150		1 off
	6.6	230	-	✓	-	**RAMO-D02AI1S-C320S1** 150152		
	6.6	230	-	-	✓	**RAMO-D02AI2S-C320S1** 171776		
	6.6	230	1	✓	-	**RAMO-DA2AI1S-C320S1** 164321		
	6.6	400	-	✓	-	**RAMO-D04AI1S-C320S1** 169799		
	6.6	400	-	-	✓	**RAMO-D04AI2S-C320S1** 171778		
	6.6	400	1	✓	-	**RAMO-DA4AI1S-C320S1** 169800		
with manual override switch								
	6.6	-	-	✓	-	**RAMO-D00AI1S-C32RS1** 150158		1 off
	6.6	230	-	✓	-	**RAMO-D02AI1S-C32RS1** 150160		
	6.6	230	-	-	✓	**RAMO-D02AI2S-C32RS1** 171782		
	6.6	400	-	✓	-	**RAMO-D04AI1S-C32RS1** 169801		
	6.6	400	-	-	✓	**RAMO-D04AI2S-C32RS1** 171784		
Reversing starter with selector switch REV - OFF - FWD								
	6.6	-	-	✓	-	**RAMO-W00AI1S-C320S1** 150151		1 off
	6.6	230	-	✓	-	**RAMO-W02AI1S-C320S1** 150153		
	6.6	230	-	-	✓	**RAMO-W02AI2S-C320S1** 171777		
	6.6	230	1	✓	-	**RAMO-WA2AI1S-C320S1** 164322		
	6.6	400	-	✓	-	**RAMO-W04AI1S-C320S1** 169802		
	6.6	400	-	-	✓	**RAMO-W04AI2S-C320S1** 171779		
	6.6	400	1	✓	-	**RAMO-WA4AI1S-C320S1** 169803		
with manual override switch								
	6.6	-	-	✓	-	**RAMO-W00AI1S-C32RS1** 150159		1 off
	6.6	230	-	✓	-	**RAMO-W02AI1S-C32RS1** 150161		
	6.6	230	-	-	✓	**RAMO-W02AI2S-C32RS1** 171783		
	6.6	400	-	✓	-	**RAMO-W04AI1S-C32RS1** 169804		
	6.6	400	-	-	✓	**RAMO-W04AI2S-C32RS1** 171785		

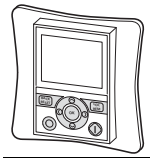
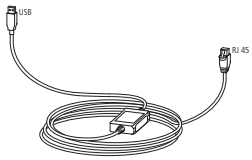
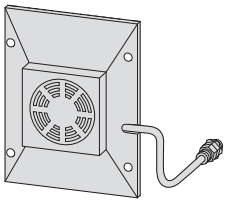
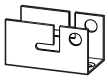
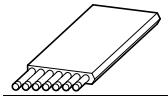
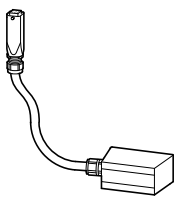
Instructions

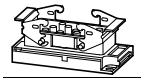
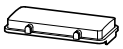
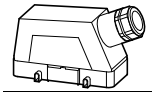
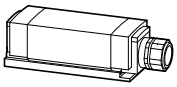
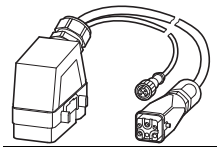
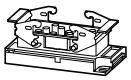
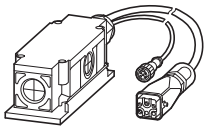
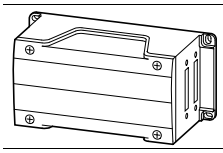
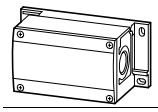
[1] for actuation of motors with mechanical brake
[2] Operation with external 24V DC supply

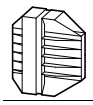
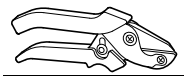
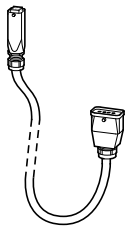
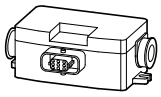
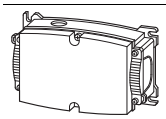
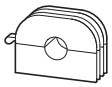
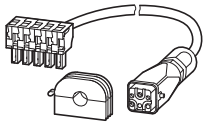
	Rated operational current[1]	assigned motor rating P[2]	Control voltage external brake (50/60 Hz)[3]	Part no. Article no.	Price see price list	with braking resistance[4] Part no. Article no.	Price see price list	Std. pack
		at 400 V, 50 Hz						
	I_e	P						
	A	A	V AC					
RASP speed controllers								
Rated operational voltage 400 V AC AS-Interface profile cable S-7.4 for 31 modules								
	2.4	-	-	**RASP-200AI1S0-C320S1** 150168		**RASP-210AI1S0-C320S1** 150172		1 off
	2.4	-	230	**RASP-202AI1S0-C320S1** 150176		**RASP-212AI1S0-C320S1** 150180		
	2.4	-	400	**RASP-204AI1S0-C320S1** 169805		**RASP-214AI1S0-C320S1** 169809		
	3.3	-	-	**RASP-300AI1S0-C320S1** 150169		**RASP-310AI1S0-C320S1** 150173		
	3.3	-	230	**RASP-302AI1S0-C320S1** 150177		**RASP-312AI1S0-C320S1** 150181		
	3.3	-	400	**RASP-304AI1S0-C320S1** 169806		**RASP-314AI1S0-C320S1** 169810		
	4.3	-	-	**RASP-400AI1S0-C320S1** 150170		**RASP-410AI1S0-C320S1** 150174		
	4.3	-	230	**RASP-402AI1S0-C320S1** 150178		**RASP-412AI1S0-C320S1** 150182		
	4.3	-	400	**RASP-404AI1S0-C320S1** 169807		**RASP-414AI1S0-C320S1** 169811		
	5.6	-	-	**RASP-500AI1SL-C320S1** 150171		**RASP-510AI1SL-C320S1** 150175		
	5.6	-	230	**RASP-502AI1SL-C320S1** 150179		**RASP-512AI1SL-C320S1** 150183		
	5.6	-	400	**RASP-504AI1SL-C320S1** 169808		**RASP-514AI1SL-C320S1** 169812		
with manual override switch								
	2.4	-	-	**RASP-200AI1S0-C32RS1** 150200		**RASP-210AI1S0-C32RS1** 150204		1 off
	2.4	-	230	**RASP-202AI1S0-C32RS1** 150208		**RASP-212AI1S0-C32RS1** 150212		
	2.4	-	400	**RASP-204AI1S0-C32RS1** 169813		**RASP-214AI1S0-C32RS1** 169817		
	3.3	-	-	**RASP-300AI1S0-C32RS1** 150201		**RASP-310AI1S0-C32RS1** 150205		
	3.3	-	230	**RASP-302AI1S0-C32RS1** 150209		**RASP-312AI1S0-C32RS1** 150213		
	3.3	-	400	**RASP-304AI1S0-C32RS1** 169814		**RASP-314AI1S0-C32RS1** 169818		
	4.3	-	-	**RASP-400AI1S0-C32RS1** 150202		**RASP-410AI1S0-C32RS1** 150206		
	4.3	-	230	**RASP-402AI1S0-C32RS1** 150210		**RASP-412AI1S0-C32RS1** 150214		
	4.3	-	400	**RASP-404AI1S0-C32RS1** 169815		**RASP-414AI1S0-C32RS1** 169819		
	5.6	-	-	**RASP-500AI1SL-C32RS1** 150203		**RASP-510AI1SL-C32RS1** 150207		
	5.6	-	230	**RASP-502AI1SL-C32RS1** 150211		**RASP-512AI1SL-C32RS1** 150215		
	5.6	-	400	**RASP-504AI1SL-C32RS1** 169816		**RASP-514AI1SL-C32RS1** 169820		

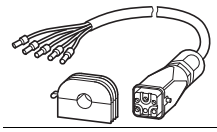
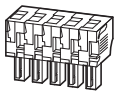
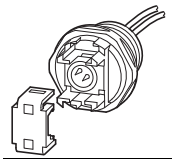
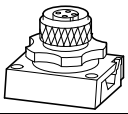
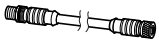
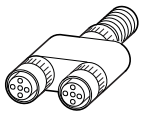
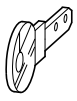
Instructions

[1] for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm^{-1} at 50 Hz or 1800 min^{-1} at 60 Hz
[2] Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C
[3] for actuation of motors with mechanical brake
[4] integrated brake chopper with braking resistance for dynamic braking

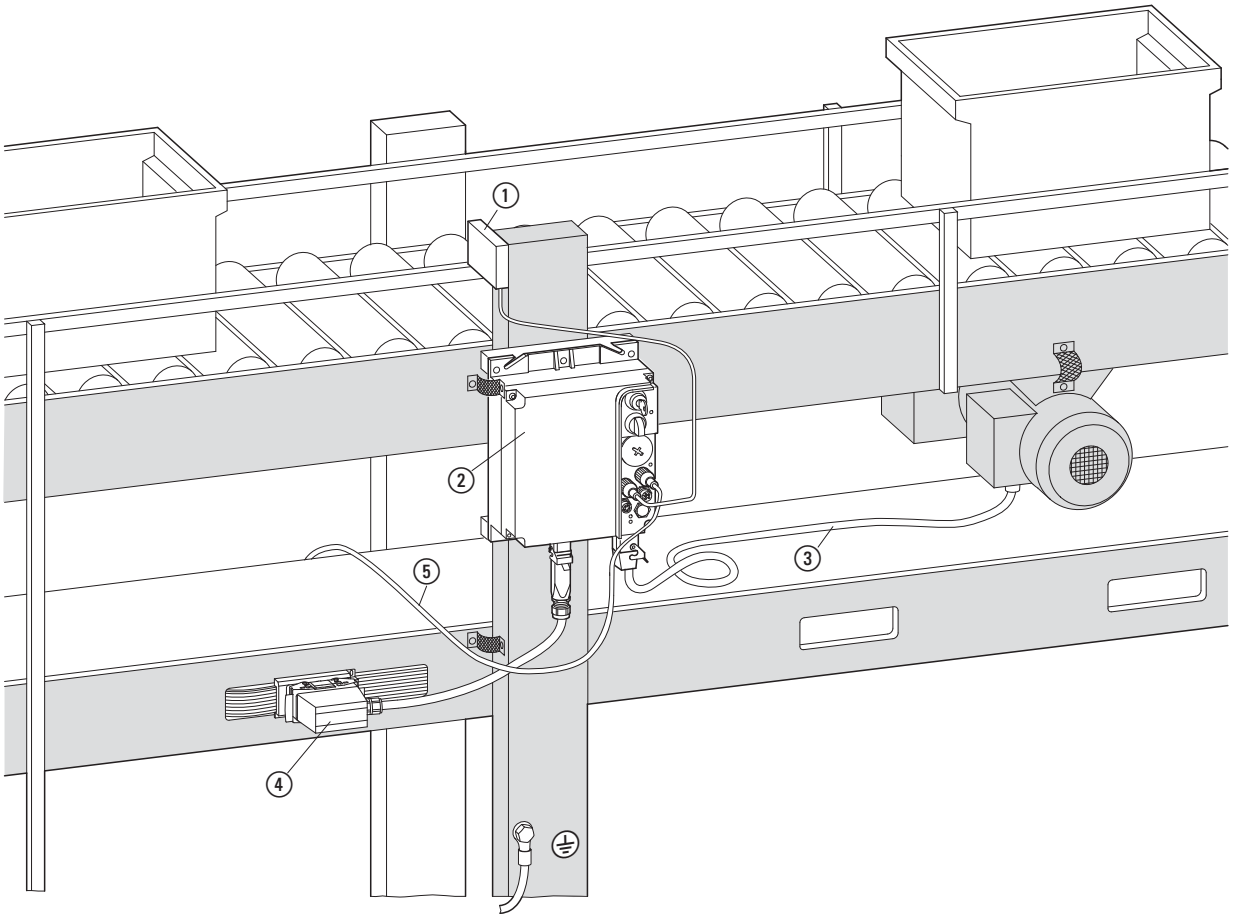
	Description		For use with	Part no. Article no.	Price see price list	Std. pack	Instructions
Communications							
Operating unit for setting the device parameters							
	with non-volatile parameter memory for copying parameter sets Equipment supplied: including 1 m connection cable with RJ45 connectors		RASP	**RASP-KEY-S1** 156644		1 off	-
Programming cable for connecting the device to the PC							
	For configuring the device's parameters with the MaxConnect computer program with RJ 45 plug and USB plug	Length 3.4 m	RASP	**XMX-CBL-3M4-USB** 153448		1 off	-
Device fans							
RASP device fan for operation at high temperatures without derating							
	Power supply and control via RASP through M12 plug connector Enhanced cooling for ambient temperatures of up to +55 °C for RASP-2…, RASP-3…., and RASP-4... Spare part for RASP-5...		RASP	**RASP-FAN-S1** 156643		1 off	-
Motor feeder							
Motor cable for connecting the motor starter to the motor		Length m					
	halogen free, 8 x 1.5 mm², plastic plug	2	RAMO	**RAMO-CM1-2M0** 164282		1 off	-
		5	RAMO	**RAMO-CM1-5M0** 164283		1 off	-
		10	RAMO	**RAMO-CM1-10M** 164284		1 off	-
	halogen free, screened, 4 x 1.5 mm² + 2 x (2 x 0.75 mm²), plastic plug	2	RASP	**RASP-CM1-2M0** 164285		1 off	-
		5	RASP	**RASP-CM1-5M0** 164286		1 off	-
Locking brackets for the safe isolation of the motor cables from power							
	For motor cables and motor plugs, disconnection device to EN 60204-1		RAMO-CM1… RASP-CM1…	**SET-M-LOCK** 272085		1 off	For padlocks with hasp thickness up to 8 mm
Power supply at flat cable RA-C1							
Flat cable for 400 V AC/24 V DC decentralized power supply or AS-Interface							
	halogen free, 7 x 4 mm²		RA-C1…	**RA-C1-7X4HF** 230860		100 runn. m	Paint film contaminant/ silicon-free
Power connection cable for connecting the device with the 400 V AC flexible busbar junction							
	with power plug and plug for flexible busbar junction, halogen-free, 5 x 1.5 mm²		RAMO RASP RA-C1-PLF	**RA-C3/C1-1,5HF** 290210		1 off	-

	Description	For use with	Part no. Article no.	Price see price list	Std. pack	Instructions
Power supply at flat cable RA-C1						
Flexible busbar junction 400 V AC/24 V DC Connection socket for power connection cable						
	Insulation piercing terminals, terminal socket with lock mechanism	RA-C1-7X4HF RA-C3/C1-1,5HF	**RA-C1-PLF** 290188		5 off	-
Protection cover for protecting the 400 V AC/24 V DC flexible busbar junction						
	-	RA-C1-PLF	**RA-C1-COV** 254693		10 off	-
Plug connector for 400 V AC/24 V DC flexible busbar junction						
	Plug insert with hood	RA-C1-PLF	**RA-C1-VP-PLM** 231574		5 off	Order cable gland V-M25 separately.
Distributor module for feeding the 400-V-AC/24-V-DC of the ribbon cable with a round cable						
	Termination with piercing screws, 2 x V-M25 and 2 x V-M20 knockout plates, connection module with spring-loaded terminals, connection of round cables up to 4 mm².	RA-C1-7X4HF	**RA-C1-AM-7** 290214		5 off	Order cable gland V-M25 or V-M20 separately.
Power/AS-Interface connection cable for connecting the device with the 400 V AC AS-Interface flexible busbar junction						
	Double cable with outgoer plug (flexible busbar end) and M12 plug and power plug (device end)	RAMO RASP RA-C1-PLF1	**RA-C1-PLM/C3-1M5** 112624		1 off	Can be used when AS-Interface implemented in flat cable.
400 V AC/AS-Interface flexible busbar junction Connection socket for power/AS-Interface cable						
	Insulation piercing terminals, terminal socket with lock mechanism	RA-C1-7X4HF RA-C1-PLM/C3-1M5	**RA-C1-PLF1** 116904		1 off	Can be used when AS-Interface implemented in flat cable.
Power/AS-Interface connection cable For connecting the device with 400 V AC/24 V DC/AS-Interface flexible busbar						
	Double cable with connection module (flexible busbar end) and M12 plug as well as power plug (device end), termination with piercing screws, knockouts Length 1.5 m	RAMO RASP RA-C1-7X4HF	**RA-C1-AM/C3-1M5** 112625		1 off	Can be used when AS-Interface implemented in flat cable.
Distributor module for the 400V AC feeding to the ribbon cable with a round cable						
	With 3 flexible busbar inputs and 2 round cable inputs Connection of round cables 4 mm²	RA-C1-7X4HF	**RA-C1-VM-7** 264244		2 off	Order V-M25/V-M20 cable gland and RA-C1-DF bushing separately.
Flexible busbar bushing for bushing for flat cable in distributor module or control cabinet						
	-	RA-C1-VM-7	**RA-C1-DF** 264243		10 off	-
Distributor module 24 V DC control voltage is taken from the ribbon cable						
	Termination with piercing screws, connection sockets with screw contacts	RA-C1-7X4HF	**RA-C1-VP-AM-2** 264315		5 off	Order cable gland V-M20 separately
Flexible busbars for fastening the ribbon cable						
	-	RA-C1-7X4HF	**RA-C1-FIX** 272086		100 off	One set with 100 clips.

	Description	Length m	For use with	**Part no.** Article no.	**Price** see price list	Std. pack	**Instructions**
Power supply at flat cable RA-C1							
End-piece for terminating the ribbon cable							
	-		RA-C1-7X4HF	**RA-C1-END1** 290189		10 off	-
Tools							
	For cutting flat cable		RA-C1-7X4HF	**RA-C1-CUT** 254690		1 off	-
	for removing casing at the ends of the flat cable		RA-C1-7X4HF	**RA-C1-AZ-4** 272087		1 off	A standard engineer's pliers is required.
Power supply at round cable RA-C2							
Power connection cable for connecting the device with the round cable junction							
	with power plug and plug for round cable junction, halogen-free, 5 x 1.5 mm²	1.5	RAMO RASP RA-C2-S1-4	**RA-C3/C2-1,5HF** 290211		1 off	-
Round cable junction Connection socket for power connection cable							
	for 7 x 2.5/4 mm², 400 V AC and 24 V DC, termination with insulation piercing technology, cable fixing with metal screws, pre-wired socket insert, suitable for cable outer diameters 10 - 13 mm.		RA-C3/C2-1,5HF	**RA-C2-S1-4** 257830		1 off	Equipment supplied: 1 pairs of gaskets for these cable diameters, 1 lock mechanism.
Blanking plug for closing the last round cable junction in the power line							
	-		RA-C2-S1-4	**RA-C2-SBL** 265357		10 off	One set with 10 blanking plugs.
Power supply at round cable RA-C4							
Round cable junction Connection socket for power cables from 2.5 - 6 mm²							
	T junction via spring-cage terminal, 1.5 to 6 mm² and/or plug connection of 0.5 - 4 mm², Enclosure IP65		RA-C4-PPB/ C3-1M5 RA-C4-X/ C3-1M5	**RA-C4-PB65** 116905		1 off	Tools required: Stripping tool AM16 from Weidmüller or similar. Enclosure continuous seals must be ordered separately.
Gasket Slotted enclosure bushing seal							
	for Ø 11 - 13 mm EPDM round cable, silicon free and halogen free, IP65		RA-C4-PB65	**RA-C4-D13** 116907		10 off	-
	for Ø 13 - 15 mm EPDM round cable, silicon free and halogen free, IP65		RA-C4-PB65	**RA-C4-D15** 116908		10 off	-
	for Ø 15 - 17 mm EPDM round cable, silicon free and halogen free, IP65		RA-C4-PB65	**RA-C4-D17** 116909		10 off	-
Blanking plug for closing off unused housing openings							
	Enclosure seal, closed, EPDM, silicon free and halogen free, IP65		RA-C4-PB65	**RA-C4-D0** 116960		10 off	One set with 10 blanking plugs.
Power connection cable for connecting the device with the round cable junction							
	Cable 5 x 1.5 mm², halogen-free, with RA-C4-PPB plug for round cable junction, power plug and gasket IP65	1.5	RAMO RASP RA-C4-PB65	**RA-C4-PPB/C3-1M5** 116962		1 off	-

	Description	Length m	For use with	**Part no.** Article no.	**Price** see price list	Std. pack	**Instructions**
Power connection cable for user assembly for connecting the device with the round cable junction							
	Cable 5 x 1.5 mm² halogen free, with ferrules, power plug and IP65 gasket	1.5	RAMO RASP RA-C4-PB65	**RA-C4-X/C3-1M5** 116961		1 off	-
Plug connectors for wiring the power connection cable for user assembly							
	Plug with spring-cage terminal 0.5 - 4 mm², printed with 1; N; 2; PE; 3.		RA-C4-PB65	**RA-C4-PPB** 116906		10 off	-
AS-Interface connection and sensors							
Connection clip for AS-Interface flat cable to AS-Interface incomer/outgoer for connection modules							
	with integrated AS-Interface overvoltage protection, protection against interference on switch operations or short-circuit, cable termination with insulation displacement		RA-C1-AM-7 RA-C1-AM/C3-1M5 RA-C1-VP-AM-2	**RA-C1-AZPG** 112978		1 off	-
AS-Interface link M12 connection socket for AS-Interface connection cable							
	IDC termination		RAMO RASP	**ZB2-100-AZ1** 082667		1 off	-
24V/AS-Interface connection cable for supplying the device with 24 V/AS-Interface							
	with M12 socket and double outgoer for AS-Interface and 24 V, cable termination with insulation displacement	1	RASP RASP	**RA-XAZ2-1M** 292253		1 off	-
AS-Interface connection cable for connecting the device with AS-Interface junction							
	with M12 socket and M12 plug, 3-pole	1	RAMO RASP	**RA-XM12-1M** 272057		1 off	Pins 1, 3, 4 are assigned
Y connector For connecting up to 2 sensors per M12 socket							
	-		RASP	**RA-XM12-Y** 290424		1 off	-
AS-Interface connection and sensors							
Spare keys for AUTO - OFF/RESET - HAND key-switches							
	Lock mechanism MS1		RAMO RASP	**M22-ES-MS1** 216416		5 off	-

The Rapid Link 4.0 electronic drive system enables remote and flexible installation in the direct proximity of the drive unit. The entire system is designed with protection to IP65. All electrical connections (mains voltage, motor feeder, sensors) are implemented simply with the standard connectors that are primarily used in materials handling applications.



① Sensor (light barriers)
② RAMO
③ Motor connection cable
④ Mains connection on power bus
⑤ AS-Interface

Motor starter selection

All motor starters (RAMO, RASP) can provide electronic motor protection and the additional connection of temperature sensors (thermistor, ThermoClick, PTC). The motor starters are available in the following variants, with or without a lockable repair switch (mains transfer switch):

- RAMO-D, electronic DOL starter for one operating direction.
- RAMO-W, electronic reversing starter (two operating directions).
- RASP, frequency-controlled motor starter with several speeds for two operating direction in assigned ratings.

Electrical mains connection

The motor starters can be connected to and operated on 400 V three-phase, star point-earthed AC supply systems (in accordance with IEC 60364) without any restriction. The neutral conductor must be connected for motor starter variants that actuate a 230 V motor brake.

Safety and protective device

The power bus must have short-circuit protection. The length of the power bus depends on the upstream group protection. Calculations for design examples are provided in the Rapid Link manual (MN03406003Z):

- PKZM0-25 motor-protective circuit-breaker, max. approx. 40 m.
- FAZ C25/3 miniature circuit-breaker, max. approx. 60 m.
- PKE32/XTU-32 system protective circuit-breaker, 50 m to 220 m.

The group protective devices listed here protect:

- the power bus from overloads and short-circuits.
- the spur lines to the motor starter (RAMO, RASP) from overloads and short-circuits.
- the motor feeder of the RAMO

On the RASP frequency-controlled motor starter, the motor feeder is protected by the internal variable frequency drive.

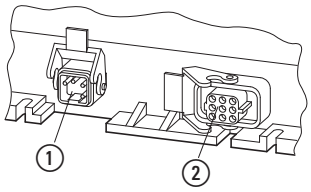
When using residual current devices, a Type B AC/DC sensitive residual current circuit-breaker must be used with the RASP frequency-controlled motor starter.

EMC compliance

All motor starters observe the required EMC limit values when connected as specified. The RASP frequency-controlled motor starter must be provided with a shielded motor cable (RASP-CM1-…) and installed with the specified EMC measures. The internal RFI filter then allows operation in accordance with category C3 in the second environment.

Terminal Models

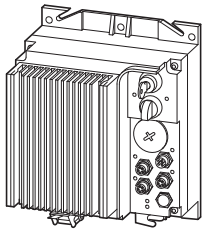
The electrical connection in the power section (mains voltage, motor feeder) is implemented with plug-in terminals in the base.



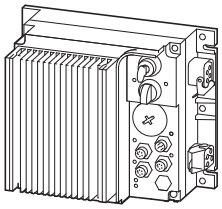
① 5-pole power connector for connecting the 3 AC 400 V mains voltage, (N), PE.
② 8-pole motor feeder socket as per DESINA specification.

By rotating the base 90 degrees, connection is also possible from the right or left. This makes it possible to keep the operating and connection area and the heat sink on the RASP in the preferred vertical position.

Example RASP:

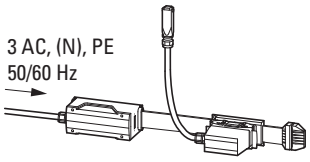


Connection from below (standard)

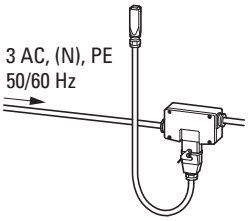


Connection from the right (90 degree rotation of the base to the left)

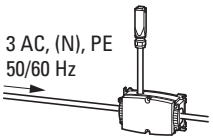
Three installation systems are available for connecting the power plug to the mains:



RA-C1, flat cable system



RA-C2, round cable system with plug connectors

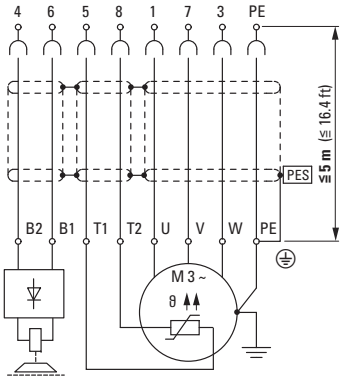


RA-C4, round cable system with contact connectors

Device variants with a repair switch (RAMO-…-C32R…, RASP-….-C32R…) ensure that the drive can be isolated locally from the power supply for repair or maintenance work, even when it is still connected. A padlock can be used to secure the repair switch.

The 8-pole motor feeder can be used to connect:

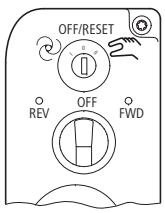
- a three-phase AC motor (U1, V1, W1, PE),
- a motor brake (B1, B2) with a control voltage of 230 V AC or 400 V AC,
- a thermistor or temperature switch (ThermoClick). These connection cables (T1, T2) can at the same time be used to monitor the motor cable and the connection of the motor feeder plug.



Example: Motor feeder with shielded motor cable on the RASP

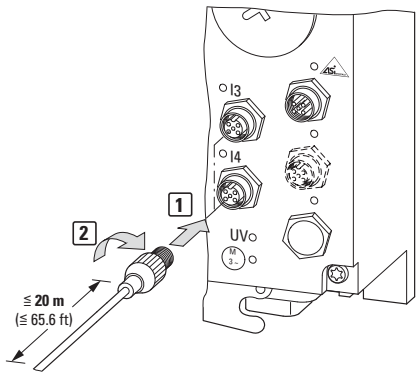
Control level

The control level features a selector switch (key switch) for selecting automatic mode and manual mode locally. The RAMO-W and RASP motor starters are also provided with a selector switch for reversing the motor direction in manual mode.



The automatic mode and the control voltage power supply are implemented via the AS-Interface. All connections in the control level (AS-i, sensors etc.) are implemented with M12 plug connectors. For this the M12 connectors just have to be fitted on [1] and rotated to secure them [2] (see illustration below).

The sensor inputs (I3, I4) enable the Rapid Link motor starters to execute sensor-controlled functions immediately and independently of PLC and bus cycle times:



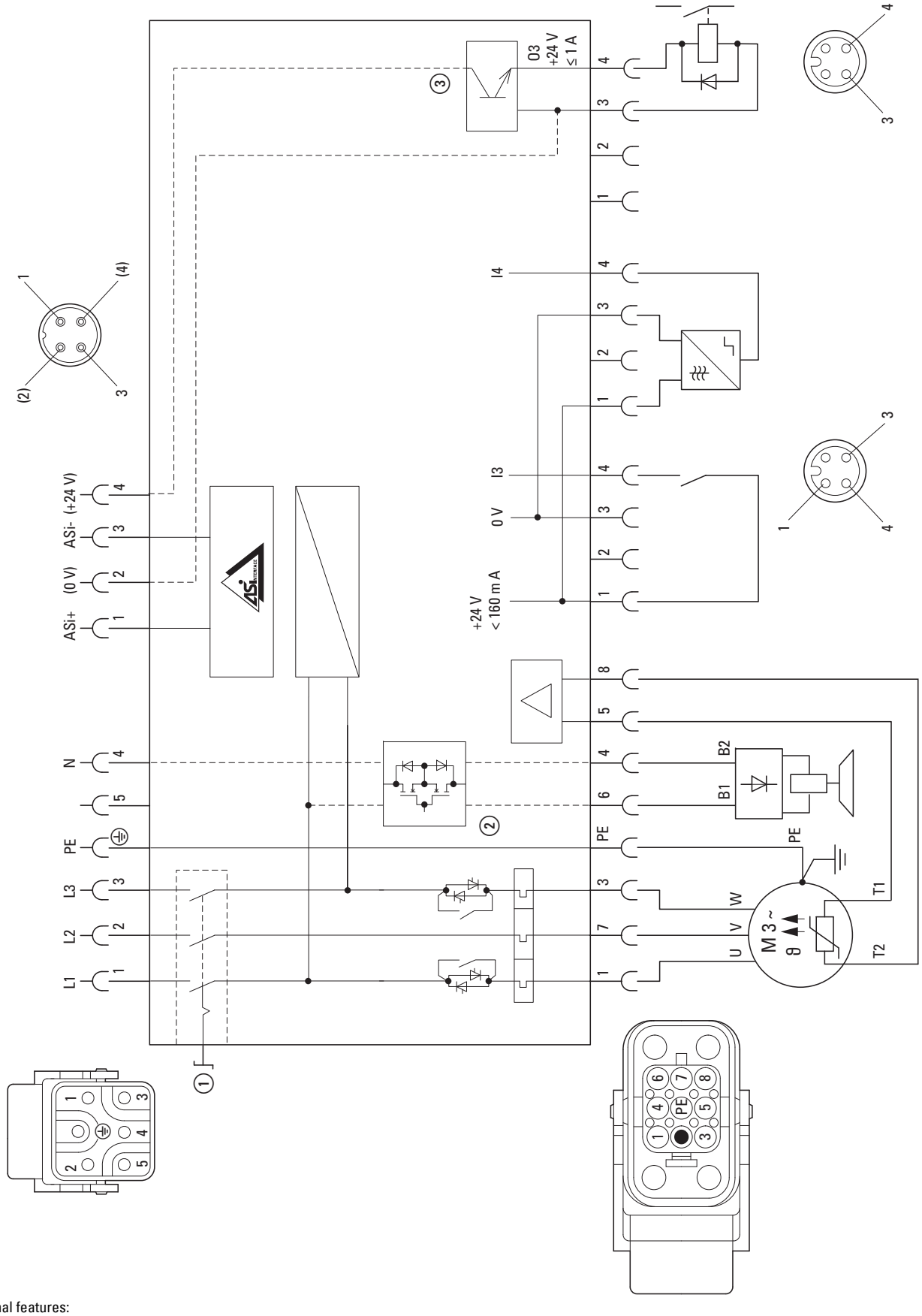
- Interlocked manual operation,
- Quick Stop,
- Rotation direction change (on RAMO-W and RASP),
- Controlled speeds (only RASP)

On the RAMO-DA… and RAMO-WA… a 24 V DC output (max. 1 A, O3) also makes it possible to control external actuators (valves, couplings, indicator lights) directly.

The functions are selected directly on the motor starter via microswitches. On the RASP additional settings (variable frequency drives) can be made from a hand-held terminal or from the parameter software.

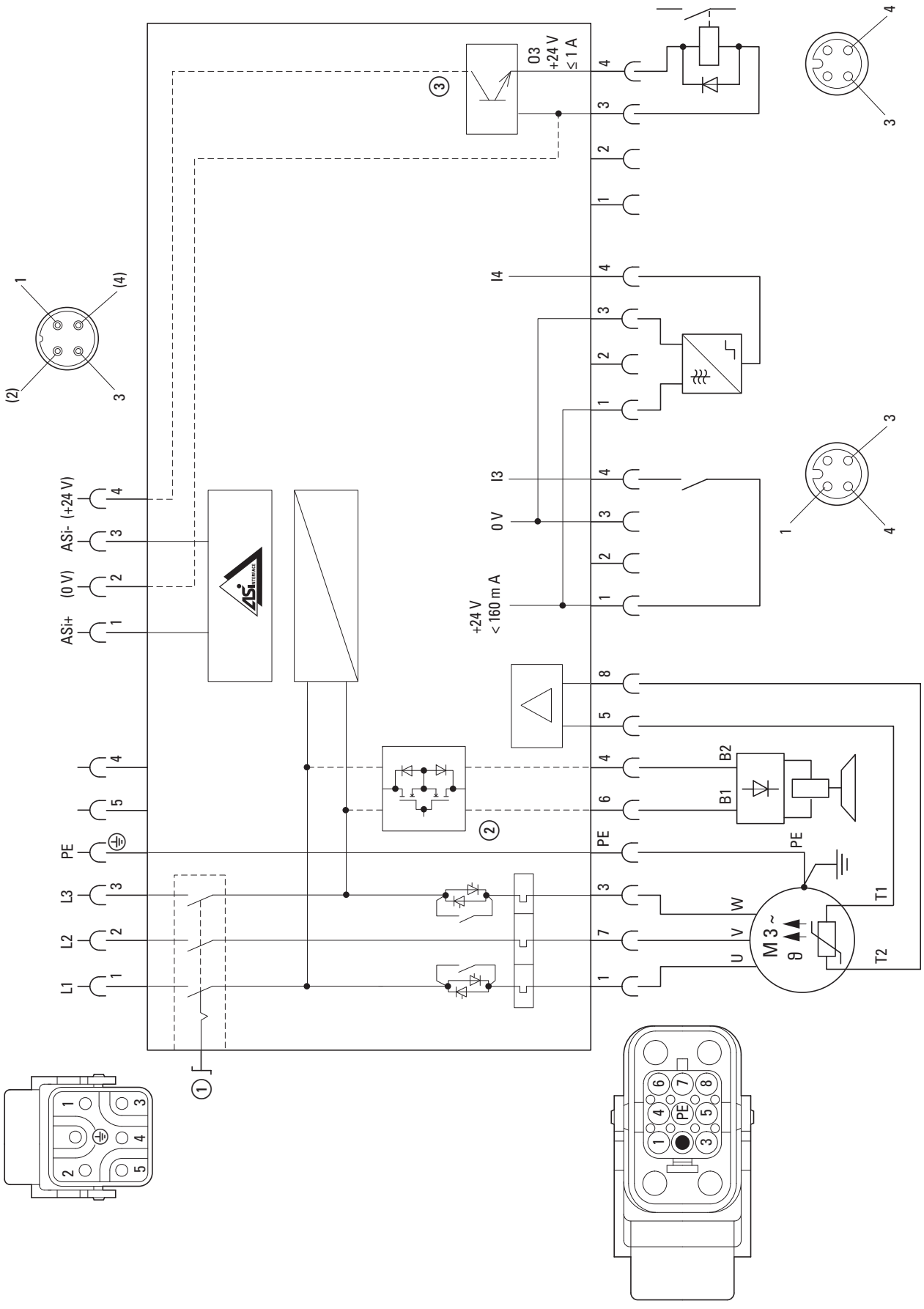
Engineering

Block diagram RAMO-D DOL starter



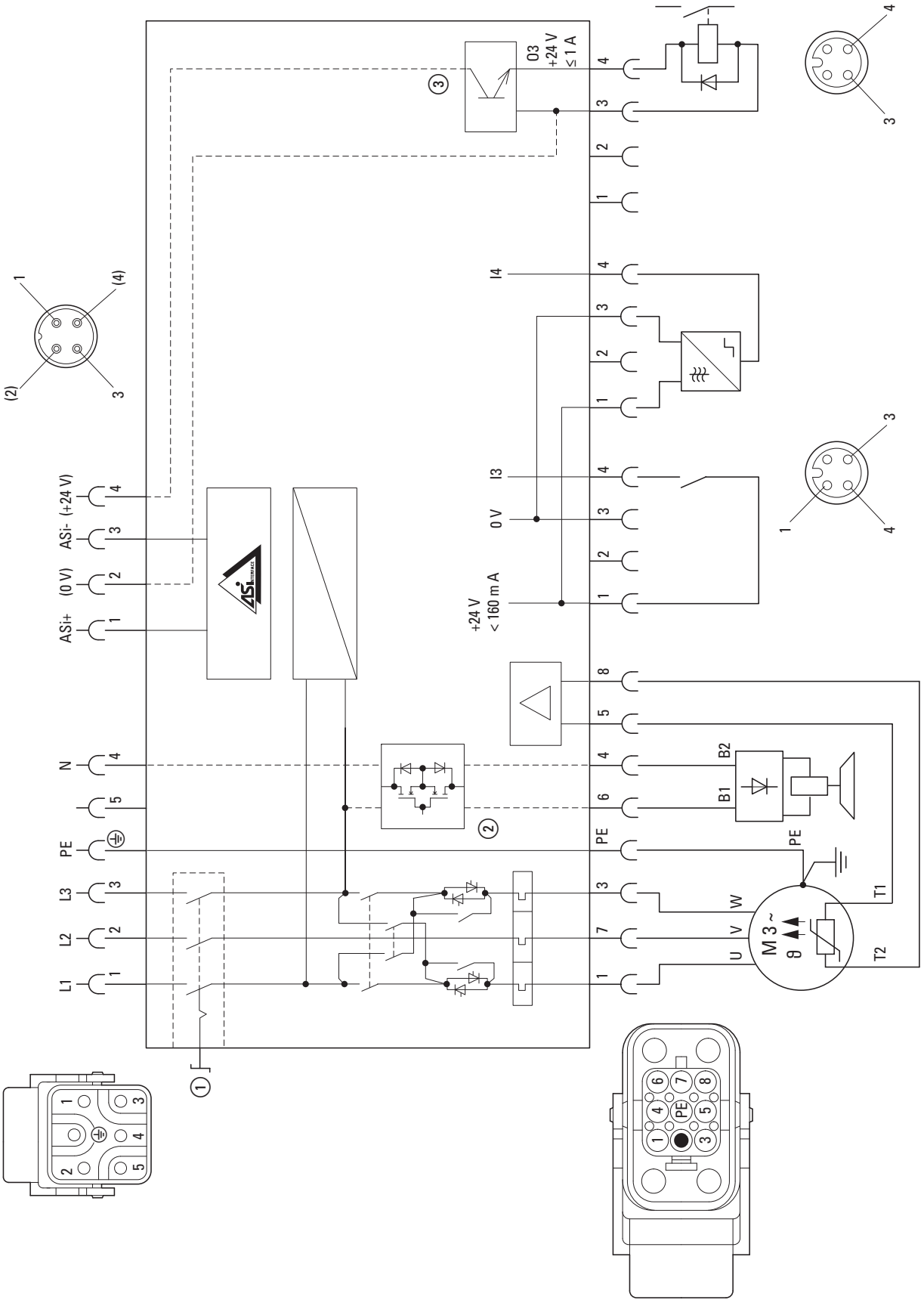
Optional features:
① RAMO-D…-C32R… Repair and maintenance switch
② Actuation of external brake (230 V), RAMO-Dx2…
③ Actuator output, RAMO-DA…

Block diagram DOL starter RAMO-D



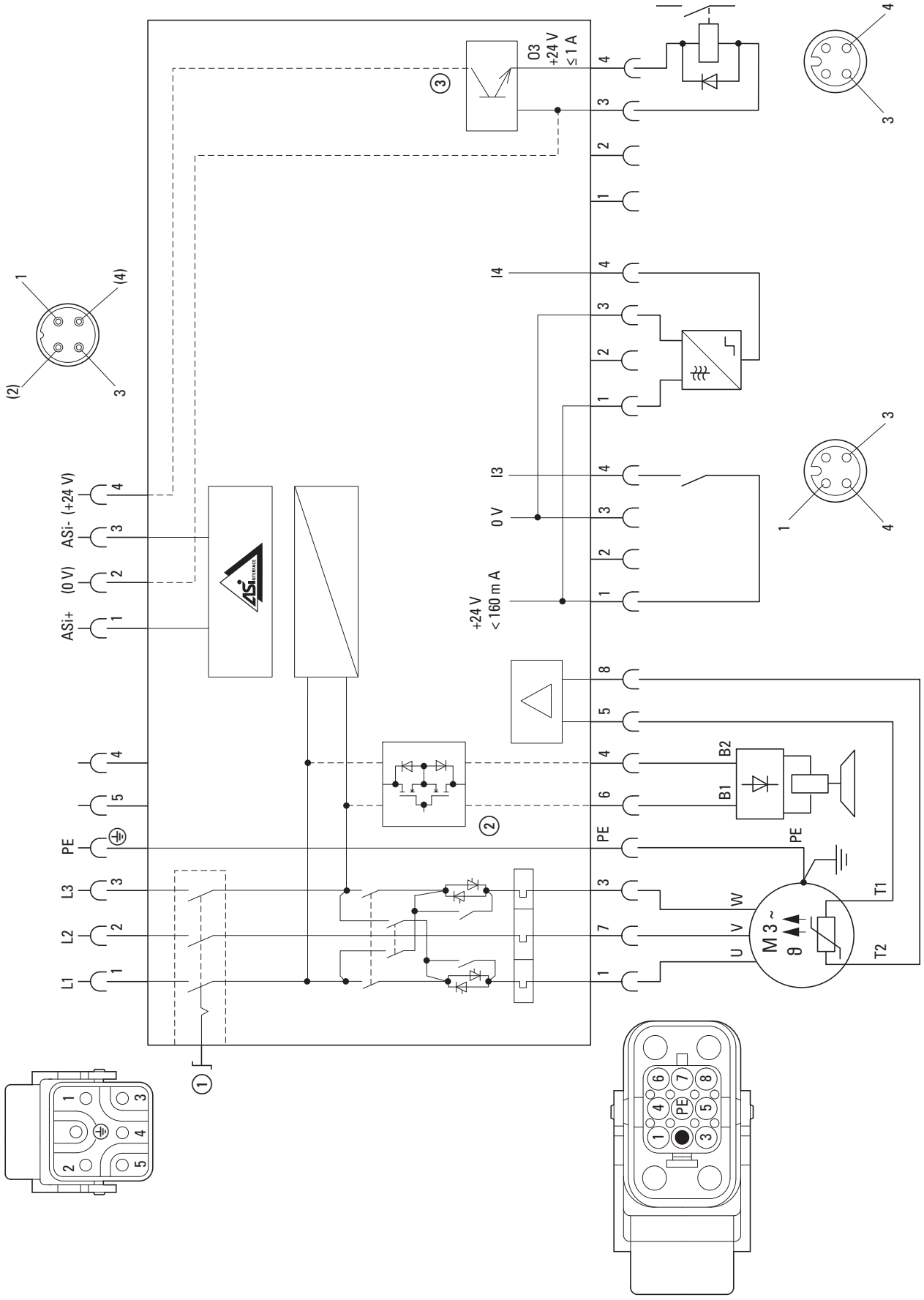
① RAMO-D…-C32R… Repair and maintenance switch
② Actuation of external brake (400 V), RAMO-Dx4…
③ Actuator output, RAMO-DA…

Block diagram RAMO-W reversing starter



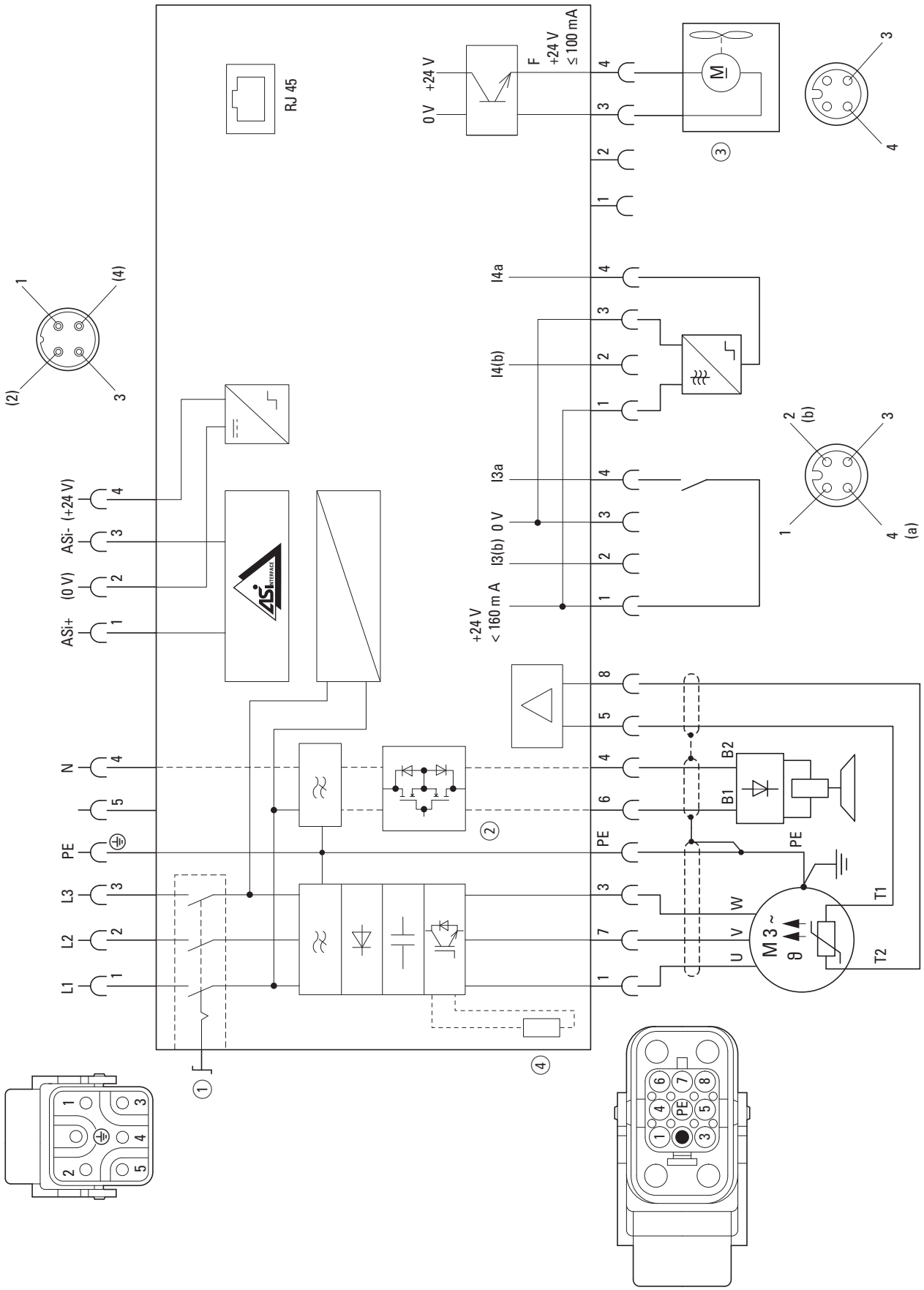
Optional features:
① Repair and maintenance switch RAMO-W…-C32R…
② Actuation of external brake (230 V), RAMO-Wx2…
③ Actuator output, RAMO-WA…

Block diagram RAMO-W reversing starter



Optional features:
① Repair and maintenance switch RAMO-W…-C32R…
② Actuation of external brake (400 V), RAMO-Wx4…
③ Actuator output, RAMO-WA…

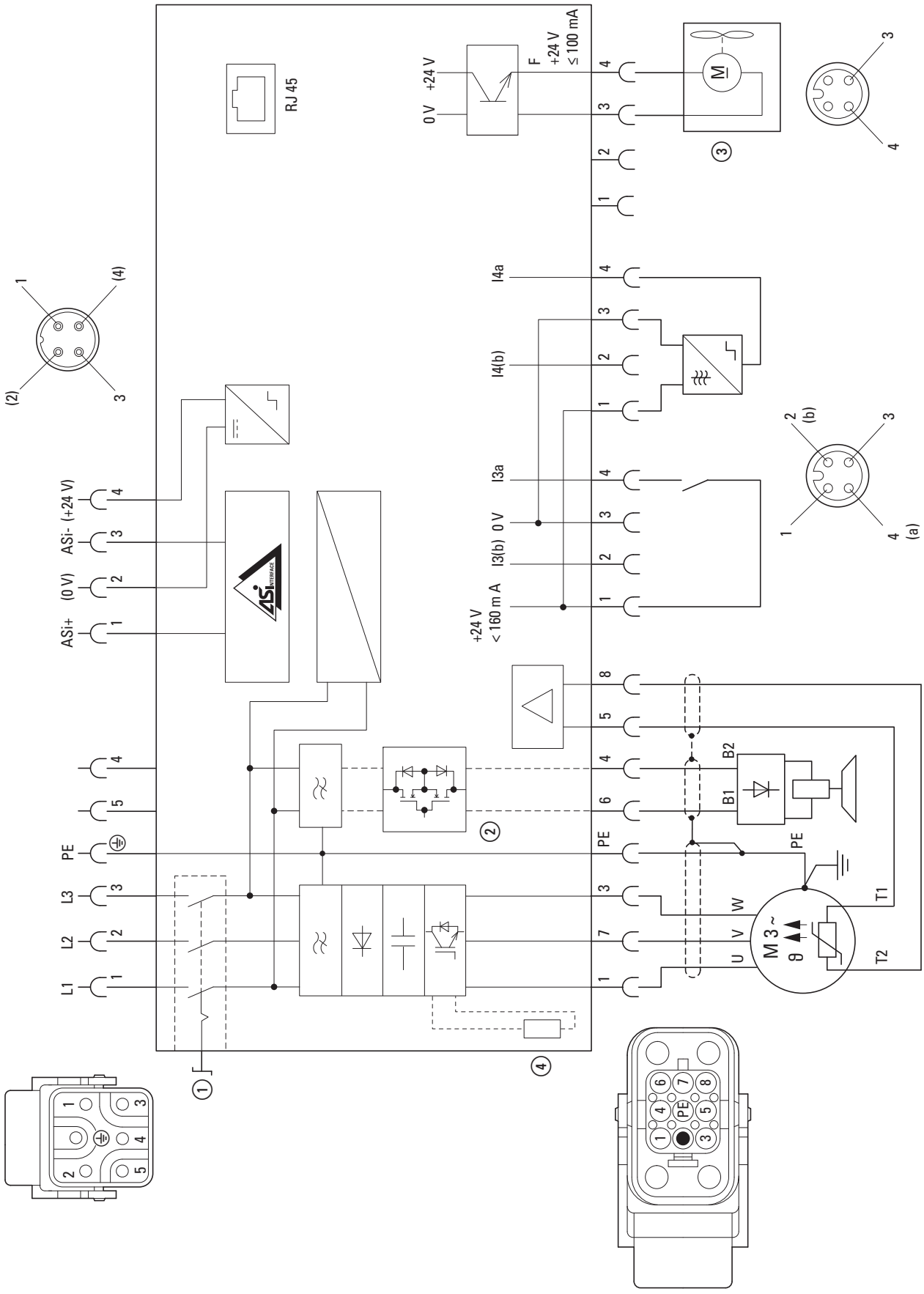
Block diagram RASP



Optional features:
(1) Repair and maintenance switch, RASP-…-C32R…
(2) Actuation of external brake (230 V), RASP-…xx2…
(3) Device fan, RASP-….L-C32…
(4) internal braking resistance, RASP-x1…

Note:
Y connector RA-XM12-Y is required in order to connect 4 sensors (I3a, I3b/I4a, I4b) (→ accessory)

Block diagram RASP



Optional features:
① Repair and maintenance switch, RASP-…-C32R…
② Actuation of external brake (400 V), RASP-…xx4…
③ Device fan, RASP-…L-C32…
④ internal braking resistance, RASP-x1…

Note:
Y connector RA-XM12-Y is required in order to connect 4 sensors (I3a, I3b/I4a, I4b) (→ accessory)

Technical data

			RAMO-D…	RAMO-W…	RASP-2…	RASP-3…	RASP-4…	RASP-5…
General								
Standards			IEC/EN 60947-4-2 IEC/EN 60947-5-1 IEC/EN 61000-6-2 IEC/EN 61000-6-4 Directive 2002/95/EG (RoHS) CE approval		EN 61800-5-1 EN 61800-3 Directive 2002/95/EG (RoHS) CE approval			
Climatic proofing	ρ_w	%	< 95%, non-condensing IEC/EN 50178					
Ambient temperature								
Operation	ϑ	°C	-10 - +55	-10 - +55	0 - +40 0 - +55 (with fan RASP-FAN-1)			0 - +45
Storage	ϑ	°C	-30 - +70	-30 - +70	-30 - +70	-30 - +70	-30 - +70	-30 - +70
Overvoltage category			III	III	III	III	III	III
Rated impulse withstand voltage	U_{imp}	kV	4	4	2	2	2	2
Radio interference level								
Environment (EMC)			Device class A	Device class A	2. Environment, Class C3	2. Environment, Class C3	2. Environment, Class C3	2. Environment, Class C3
longest permissible length of motor cable	l	m	10	10	5	5	5	5
Mechanical shock resistance		g	1000 shocks per shaft, semi-sinusoidal 15 g/11 ms IEC/EN 60068-2-27					
Vibration			Oscillation frequency: 10 - 150 Hz Amplitude 0.15 mm: 6 Hz Amplitude transition frequency on acceleration: 57 Hz IEC/EN 60068-2-6					
Mounting position			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 2000 m					
Protection type			IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529
Weight								
without manual override switch		kg	1.6	1.7	4.2	4.2	4.2	4.4
with manual override switch		kg	1.9	1.9	4.4	4.4	4.4	4.6
Main circuit								
Supply								
Rated operational voltage	U_e		400 V AC		400 V AC			
Mains voltage (50/60Hz)	U_{LN}	V	400 (-15%) - 415 (+10%)		380 (-15%) - 400 (+10%)			
Input current	I_{LN}	T	≤ 6.6	≤ 6.6	3.2	4	5.6	7.3
System configuration			AC voltage Center-point earthed star network (TN-S network) Phase-earthed AC supply systems are not permitted.					
Supply frequency	f_{LN}	Hz	50/60	50/60	50/60	50/60	50/60	50/60
Frequency range	f_{LN}	Hz	47 - 63 Hz (± 0%)	47 - 63 Hz (± 0%)	47 - 66 Hz (± 0%)	47 - 66 Hz (± 0%)	47 - 66 Hz (± 0%)	47 - 66 Hz (± 0%)
Mains switch-on frequency			max. one time per minute					
Mains current distortion	THD	%	-	-	> 120	> 120	> 120	> 120
Rated conditional short-circuit current	I_q	kA	< 10	< 10	< 5	< 5	< 5	< 5
Short-circuit protective device			Type 1 coordination via the power bus' feeder unit					

			RAMO-D…	RAMO-W…	RASP-2…	RASP-3…	RASP-4…	RASP-5…
Power section								
Function			DOL starter with thyristors and bypass contacts, 2-phase	Reversing starter with relays, thyristors and bypass contacts, 2-phase controlled	Frequency inverter with internal DC link and IGBT inverter			
On-delay	t_{ON}	ms	20 - 35	20 - 35	30 - 50	30 - 50	30 - 50	30 - 50
Off-delay	t_{OFF}	ms	20 - 35	20 - 35	15 - 35	15 - 35	15 - 35	15 - 35
Lifespan, mechanical	Operations		AC3: > 10.000.000	AC3: > 10.000.000	-	-	-	-
Lifespan, electrical	Operations		AC3: > 10.000.000	AC3: > 10.000.000	-	-	-	-
Overload cycle			AC-53a	AC-53a	-	-	-	-
Overload current for 60 s every 600 s	I_L	A	-	-	3.6 (at 40 °C)	5 (at 40 °C)	6.5 (at 40 °C)	8.4 (at 40 °C)
Starting current for 2 s	I_L	A	-	-	4.8 (at 40 °C)	6.6 (at 40 °C)	8.6 (at 40 °C)	11.2 (at 40 °C)
Output voltage with V_e	U_2		= U_{LN}	= U_{LN}	0 - U_{LN}	0 - U_{LN}	0 - U_{LN}	0 - U_{LN}
Output Frequency	f_2	Hz	= f_{LN}	= f_{LN}	0 - 50 Hz (max. 320 Hz)			
Switching frequency	f_{PWM}	kHz	-	-	6 (adjustable 1.5 - 16)			
Operation Mode			-	-	linear, parameterizable			
Frequency resolution (setpoint value)	△f	Hz	-	-	0.01	0.01	0.01	0.01
Rated operational current	I_e	A	6.6	6.6	2.4	3.3	4.3	5.6
Note			-	-	Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C			
Motor current limit	I	A	0.3 - 6.6 adjustable	0.3 - 6.6 adjustable	0.48 - 4.8 adjustable	0.66 - 6.6 adjustable	0.86 - 8.6 adjustable	1.12 - 11.2 adjustable
Efficiency	η	%	-	-	0.95	0.95	0.96	0.96
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	-	-	3.5	3.5	3.5	3.5
Fan			-	-	internal, temperature controlled optional RASP-FAN-S1 on heat sink, temperature-controlled			internal and on heat sink, temperature-controlled
Motor feeder								
Assigned motor rating								
Note			for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm^{-1} at 50 Hz or 1800 min^{-1} at 60 Hz					
at 400 V, 50 Hz	P	A	-	-	-	-	-	-
Actuator for external motor brake								
Breaking voltage	U	V	230 V AC -15% / +10% 400 V AC -15% / +10%		230 V AC -15% / +10% 400 V AC -15% / +10%			
Braking current	I	A	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)	≤ 0.6 A (max. 6 A for 120 ms)
Braking function								
Braking torque	%	I/I_e	-	-	≦ 30	≦ 30	≦ 30	≦ 30
Switch-on threshold for the braking transistor	U_{DC}	V	-	-	765 V DC	765 V DC	765 V DC	765 V DC
DC braking	%	I/I_e	-	-	≦ 100, adjustable			
Control section								
External control voltage	U_c	V	24 V DC - 15 % / + 20 % via AS-Interface® plug					
AS-Interface®			max. total power consumption from AS-Interface® power supply unit (30 V): 250 mA					
RAMO-…AI1… RASP…			Specification: S-7.4 Number of slave addresses: 31		Specification: S-7.4 Number of slave addresses: 31			
RAMO-…AI2…			Specification: S-7.A.E. Number of slave addresses: 62		-			

			Flat cable RA-C1-7X4HF	Distributor module RA-C1-AM-7
General				
Standards			IEC 60332-1 DIN VDE 0295 Class 6 DIN VDE 0281 Part 404	DIN/EN 60664-1 DIN/EN 60529 DIN/EN 60999 DIN VDE 0470 Part 1
Protection type			IP65 IEC/EN 60529	IP65 IEC/EN 60529
Mounting position			As required	As required
Ambient temperature				
Operation	ϑ	°C	-15 - +50	-15 - +40
Storage	ϑ	°C	-5 - +70	-5 - +50
Flame retardance, fire propagation			Self-extinguishing to IEC 60332-1	-
Resistance to oils and acids			To VDE 0473, Part 811-2-1	-
Sheathing			Material according to DIN VDE 0282, EVA mixture EM4, black	-
Minimum bending radius		mm	18	-
Cable weight		kg/km	440	-
Outer dimensions L x W x H		mm	L x 34.8 x 6.0	160 x 60.2 x 59.5
Overvoltage category			-	III
Pollution degree			-	3
Termination			-	Springloaded terminals 1.5 to 4 mm²
Outer cable diameter		mm	-	V-M25: 9 - 17 V-M20: 6 - 13
Main circuit				
Rated operational voltage	U_e		500 V AC	500 V AC
Rated operational current	I_e	A	25	25
Line protection		Type	PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3
Control circuit				
Rated operational voltage	U_e	V	24 V DC	24 V DC
Rated operational current	I_e	A	25	10

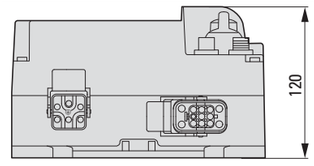
			Motor cable and motor feeder plug RAMO-CM1-2M0 /-5M0 /-10M0	Motor cable and motor feeder plug RASP-CM1-2M0 /-5M0
General				
Standards			EN 61684 DIN VDE 0110	EN 61684 DIN VDE 0110
Protection type			IP65 IEC/EN 60529	IP65 IEC/EN 60529
Ambient temperature				
Operation	ϑ	°C	-30 - +70	-30 - +70
Connection cable				
Terminal capacities		mm²	8 x 1.5	4 x 1.5 + 2 x (2 x 0.75) screened
Outer cable diameter		mm	9 - 13	9 - 13
Minimum bending radius		mm	6 x outer cable diameter	10 x outer cable diameter
Conductor material			-	-
Material			Outer casing halogen free Cable: Cu flexible to VDE 0295 Class 5	Outer casing halogen free Cable: Cu flexible to VDE 0295 Class 6
Colour			Silver grey (RAL 7001)	Orange (RAL 2003)
Resistance to oils and acids			VDE 0472 Part 803 B	VDE 0472 Part 803 A/B
Flame retardance, fire propagation			EN 50265-2-1	IEC 60332-2
Metal housing with plug-in connection				
Conductor cross-section		mm²	Contact pins: 8 x 1.5	Contact pins: 4 x 1.5 + 4 x 0.75
Material				
Contacts			Polycarbonate	Polycarbonate
Contact material			Cu silver-plated	Cu silver-plated
Housing			Polycarbonate	Polycarbonate
Locking facility			Polyamide	Polyamide

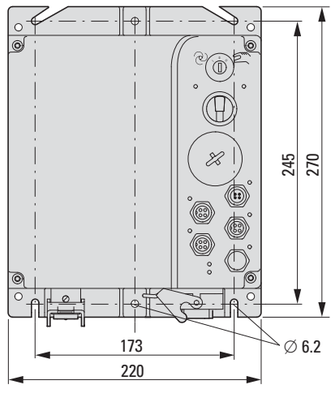
Distributor module RA-C1-VM-7	Flexible busbar junction 400 V AC/24 V DC RA-C1-PLF	Round cable junction RA-C2-S1-4	Round cable junction RA-C4-PB65
IEC/EN 60047-7-1 DIN VDE 0470 Part 1	IEC/EN 68000-2-27 IEC/EN 60998-3 DIN VDE 0660 Part 1535	EN 61684 DIN VDE 0110 DESINA	-
IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529	IP65 IEC/EN 60529
As required	As required	As required	As required
-15 - +50	-15 - +50	-15 - +50	-40 - +55
-5 - +50	-5 - +50	-5 - +50	-10 - +40
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
175 x 83 x 78	119 x 57.5 x H	158 x 112.5 x 55	181 x 104 x 67
III	III	III	III
3	3	3	3
Twin-level terminal block, 1.5 to 4 mm²	IDC termination	Piercing/screw terminals	Insulation piercing terminals
9 - 17	-	10 - 13 13 - 16	11 - 13 13 - 15 15 - 17
500 V AC	500 V AC	500 V AC	690 V AC
25	-	20/25 (2.5 mm²/4 mm²)	25 (4 mm²)
PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3	PKE32/XTU-32 PKZM0-25 FAZ-C25/3
24 V DC	24 V DC	24 V DC	-
25	-	20/25 (2.5 mm²/4 mm²)	-

Dimensions

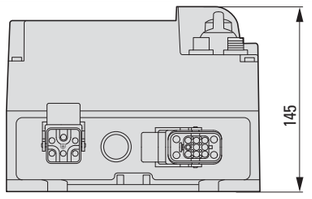
Motor starter RAMO

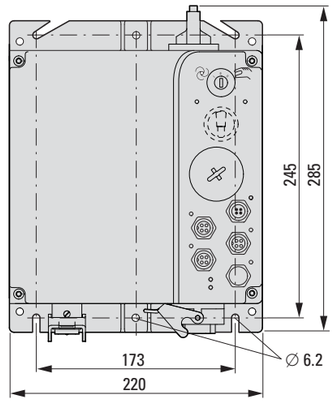
without manual override switch





with manual override switch

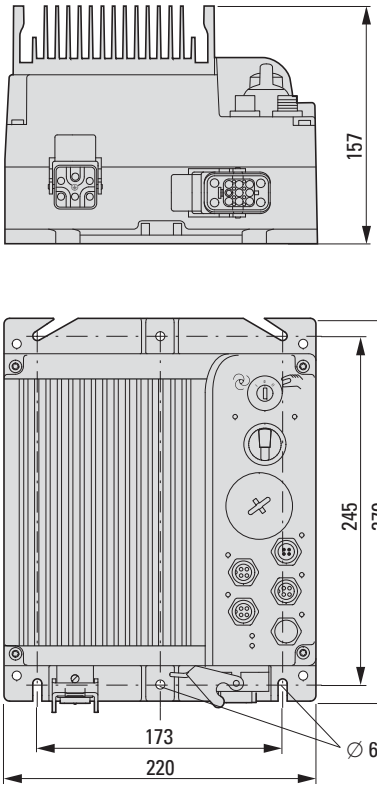




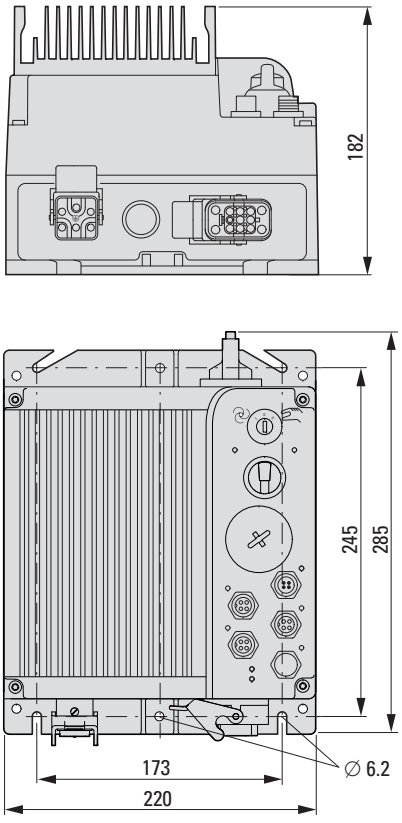
RASP speed controllers

without fan

without manual override switch

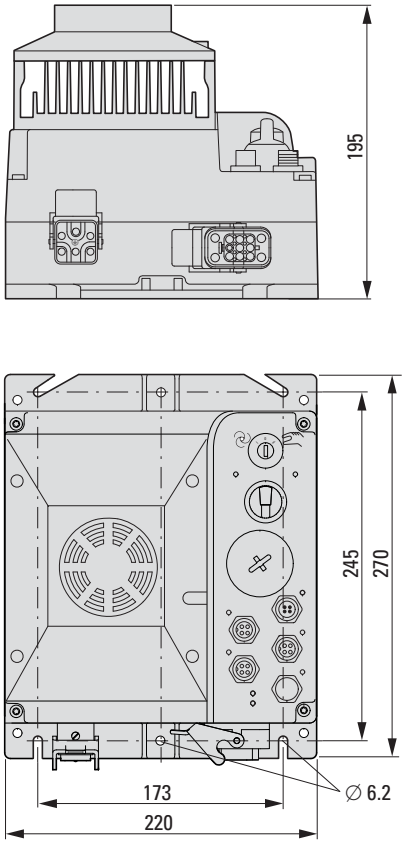


with manual override switch

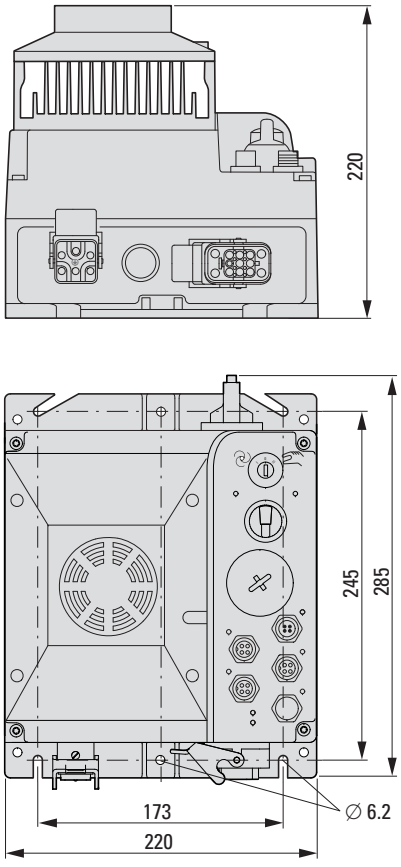


with fan

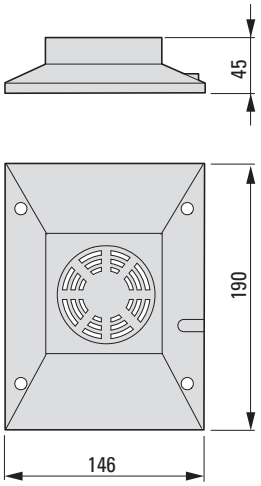
without manual override switch



with manual override switch



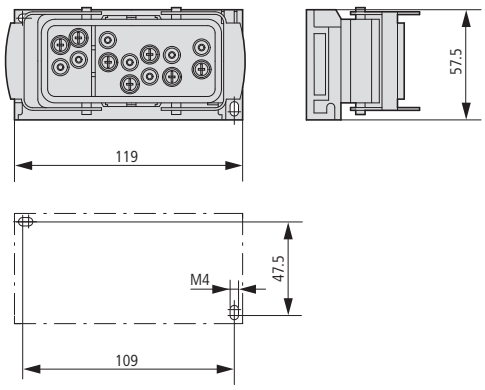
Device fans RASP-FAN-S1



Accessories

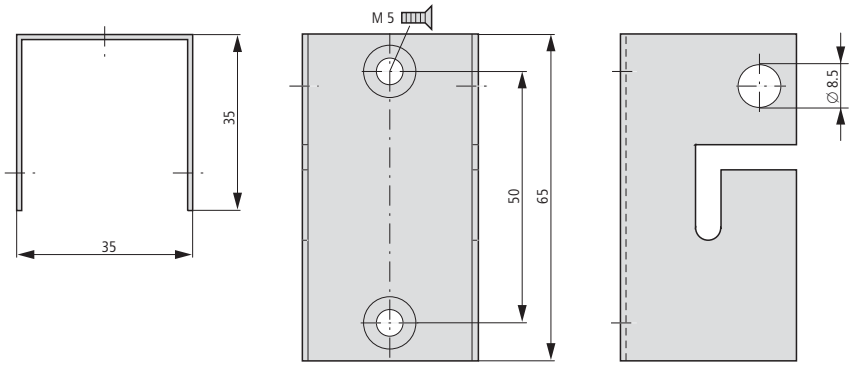
flexible busbar junction

RA-C1-PLF
RA-C1-PLF1



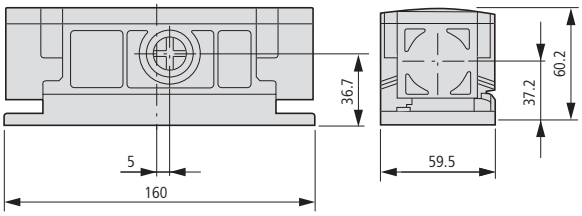
Locking brackets

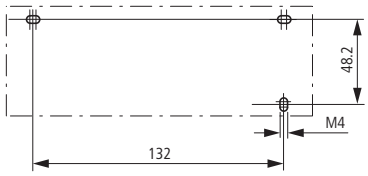
SET-M-LOCK



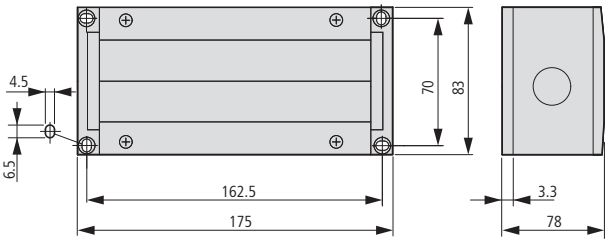
Distributor module

RA-C1-AM-7

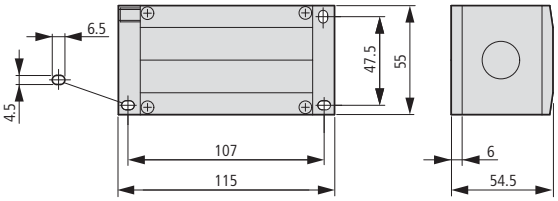




RA-C1-VM-7

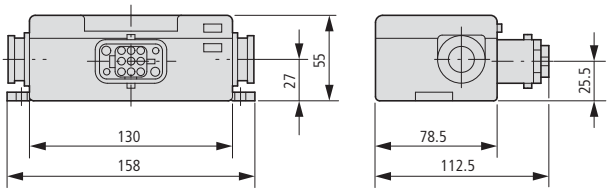


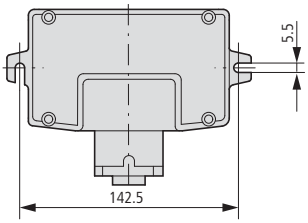
RA-C1-VP-AM-2



Round cable junction

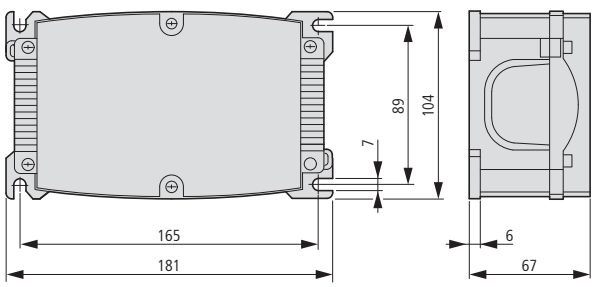
RA-C2-S1-4





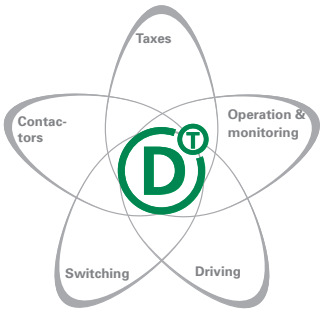
Locking brackets

RA-C4-PB65



SmartWire-DT®
The easy way to connect

SmartWire-DT™ – Cost-optimized communication for switchgear

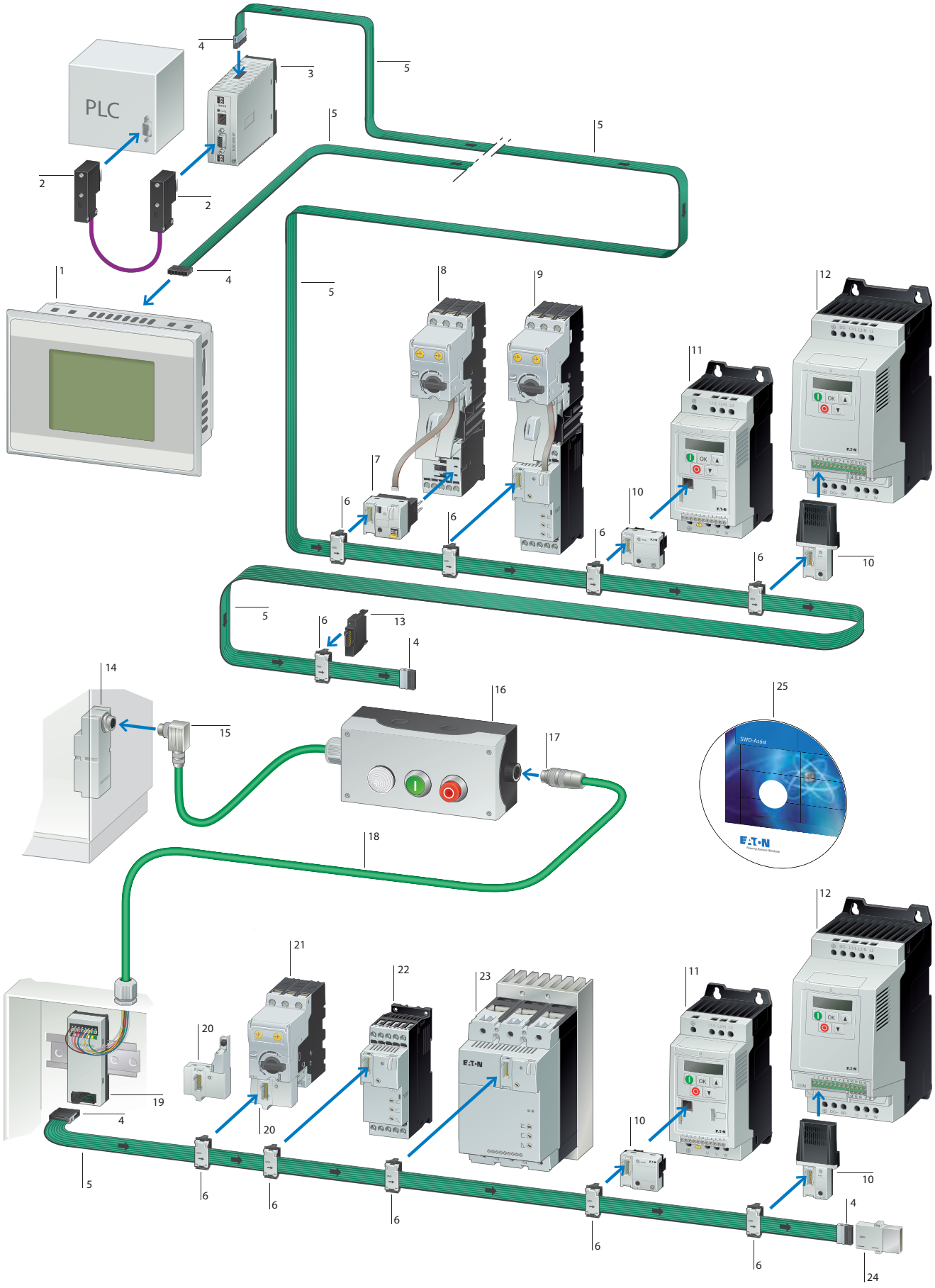


Manufacturers of machines and systems strive to achieve a balance between the maximum level of functionality and cost optimization. Designed for further development, SmartWire-DT is a communication system for industrial switchgear in control panels and the periphery: from control, protection and switching to actuation, operation and monitoring. One technology from which you will profit, now and in the future.

PowerXL variable frequency drives and DS7 soft starters – Communicate with SmartWire-DT

Being able to use a controller to directly access all of a soft starter's and/or variable frequency drive's parameters via SmartWire-DT is the epitome of ease of operation. Users can read and overwrite potentiometer settings. Extended status, error, and diagnostic messages can be retrieved directly. The result: absolute data transparency. The plug-in units make installation fast and foolproof, and the resulting connection includes the soft starter's control current supply. SmartWire-DT modules for expanding the functionality of the variable frequency drives in the DC1 and DA1 series are scheduled to hit the market soon. This will enable users to communicate with their variable frequency drives via SmartWire-DT on the basis of the relevant Profidrive profile. Other profiles will also be available for simple applications. Another important function that will complement the ability to change parameters in variable frequency drives will be the ability to use extended diagnostic functions. Within this context, function blocks will make it easy to connect to Eaton PLCs and HMIs.

System overview



Note: You can find the entire SmartWire-DT range of products by consulting our industrial main catalog or our online catalog at http://ecat.moeller.net

Features

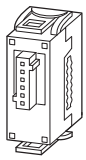
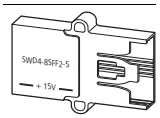
SmartWire-DT HMI-PLC
- with SmartWire-DT master interface and PLC function
- Compact design with light plastic enclosures
- Wide selection of onboard interfaces
- 3.5" , 5.7" or 7" TFT-LCD screen

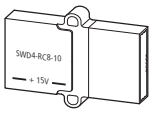
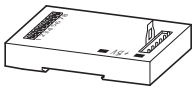
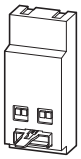
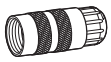
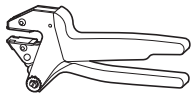
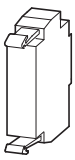
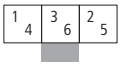
SmartWire-DT Gateways
- Connection of SmartWire-DT to field bus.
- Field bus address setting with dip switches
- Automatic baud rate detection
- Feeding the supply voltage for the SmartWire-DT modules
- Supplies the control voltage for the motor starter or contactor
- Configuration button for automatic addressing of the SmartWire-DT module.
- Support of up to 99 SmartWire-DT modules.

SmartWire-DT module
- Function element for connecting to RMQ-Titan pilot devices.
- Function element for connecting to DLM contactors
- Function element for connecting to PKZ/PKE motor-protective circuit-breakers
- Function module for connecting to NZM2,3,4 circuit-breakers
- Connection of digital and analog input/output modules
- DS7 Soft starter connection
- Function element for connecting to PowerXL™ DC1, DA1 variable frequency drives

SmartWire-DT Assist (SWD-Assist)
- Easy creation of SmartWire-DT networks
- Integrated validity check
- Generation of ordering lists.
- Online-Functionality
  - Simple pre-commissioning
  - Configuration check and comparison
  - Display of parameters and diagnostics
  - Easy diagnostics of SmartWire-DT module
- Free download under: http://downloadcenter.moeller.net

Ordering

	Description	Baud Rates	Number of SmartWire-DT slaves	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
SmartWire-DT Gateways							
supply of the SmartWire-DT modules and switchgear							
	For connection to PROFIBUS-DP field bus field bus connection through 9-pin SUB-D socket Separate RS232 diagnostics interface (RJ45)	up to 12 MBit/s	Max. 58	**EU5C-SWD-DP** 116308		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
	For connection to CANopen® field bus Field bus connection through 9-pin SUB-D plug Separate RS232 diagnostics interface (RJ45)	up to 1 MBit/s	Max. 99	**EU5C-SWD-CAN** 116307			
	For connection to the Ethernet-IP/MODBUS-TCP field bus Field bus connection via Ethernet Switch Separate RS232 diagnostics interface (RJ45)	10/100 MBit/s	Max. 99	**EU5C-SWD-EIP-MODTCP** 153163			
	for connection to field bus PROFINET as PROFINET IO-Device Field bus connection via Ethernet Switch Separate USB diagnostics interface (Mini-USB)	100 MBit/s	Max. 99	**EU5C-SWD-PROFINET** 170124		1off	UL File No. E221530 UL Category Control No. NRQA CSA File No. UL report applies to both US and Canada North America Certification UL listed, CSA certified
Flat band conductor, 8 pole							
For connecting the SmartWire-DT modules within the control panel 8 pole							
	not ready-assembled		Length 100 m	**SWD4-100LF8-24** 116026		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
	not ready-assembled		Length 3 m	**SWD4-3LF8-24-2S** 116027			
			Length 5 m	**SWD4-5LF8-24-2S** 116028			
			Length 10 m	**SWD4-10LF8-24-2S** 116029			
External device plugs							
	For connecting the ribbon cable to SmartWire-DT modules			**SWD4-8SF2-5** 116022		10 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Link							
	For bridging open mounting locations for external device plugs Front fixing			**SWD4-SEL8-10** 116021		5 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Blade terminal							
	For connecting the ribbon cable to the gateway, power feeder module, coupling, bus termination resistor			**SWD4-8MF2** 116023		10 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Coupling							
	Coupling blade terminal 8-pole			**SWD4-8SFF2-5** 116024		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified

	Description	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America
Network terminator					
	For connecting each SmartWire-DT line	**SWD4-RC8-10** 116020		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Cable adapters					
	for connection flat cable (plug) on round cable (terminal)	**SWD4-8FRF-10** 121377		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Switch cabinet bushing					
for transition from SmartWire-DT ribbon cable to round cable Connection of ribbon cable with blade terminal SWD4-8MF2 8 pole double conductor run pluggable Additional control voltage feeder for the motor starter and contactors.					
	Connection round cable via socket	**SWD4-SFL8-20** 121380		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
	Connection round cable via plug	**SWD4-SML8-20** 121381		1 off	
Round conductor					
For laying the SmartWire-DT network outside of the control panel.					
	For connecting the SmartWire-DT module outside the control panel 8 pole HK-S0-Li2YY, 8 mm diameter Length 50 m	**SWD4-50LR8-24** 116030		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
Connectors for SWD round conductors					
	8 pole socket Straight	**SWD4-SF8-67** 116033		1 off	UL File No. E29184 UL Category Control No. NKCR CSA File No. 2324643 CSA Class No. 3211-07 North America Certification UL listed, CSA certified
	8-pinplug connector Straight	**SWD4-SM8-67** 116034			
	8 pole socket 90° angled	**SWD4-SF8-67W** 116035			
	8-pinplug connector 90° angled	**SWD4-SM8-67W** 116036			
Tools for plugs					
	Pliers for connecting external device plug and ribbon cable	**SWD4-CRP-1** 116025		1 off	UL/CSA certification not required
	Pliers for making contacts with blade terminals and ribbon cables	**SWD4-CRP-2** 116699			
Universal slave					
for configured but not yet installed SmartWire-DT slaves Front mount					
	Configuration 	**M22-SWD-NOP** 147637		20 off	North America Certification Request filed for UL and CSA

SmartWire-DT®

Technical data

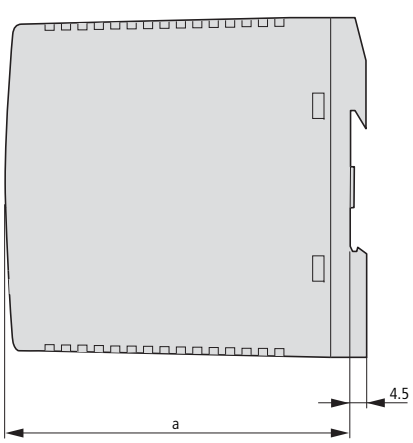
			EU5C-SWD-DP	EU5C-SWD-CAN	EU5C-SWD-EIP-MODTCP
General					
Standards			IEC/EN 61131-2 EN 50178		
Dimensions (W x H x D)		mm	35 x 90 x 127		35 x 90 x 124
Weight		kg	0.16	0.16	0.17
Mounting			Top-hat rail IEC/EN 60715, 35 mm		
Mounting position			As required		
Ambient conditions, mechanical					
Protection type (IEC/EN 60529, EN50178, VBG 4)			IP20	IP20	IP20
Vibrations (IEC/EN 61131-2:2008)					
Constant amplitude 3,5 mm		Hz	5 - 8.4	5 - 8.4	5 - 8.4
Constant acceleration 1 g		Hz	8.4 - 150	8.4 - 150	8.4 - 150
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms		Impacts	9	9	9
Drop to IEC/EN 60068-2-31	Fallhöhe	mm	50	50	50
Free fall, packaged (IEC/EN 60068-2-32)		m	0.3	0.3	0.3
Electromagnetic compatibility (EMC)					
Overvoltage category			II	II	II
Pollution degree			2	2	2
Electrostatic discharge (IEC/EN 61131-2:2008)					
Air discharge (Level 3)		kV	8	8	8
Contact discharge (Level 2)		kV	4	4	4
Electromagnetic fields (IEC/EN 61131-2:2008)					
80 - 1000 MHz		V/m	10	10	10
1.4 - 2 GHz		V/m	3	3	3
2 - 2.7 GHz		V/m	1	1	1
Radio interference suppression (SmartWire-DT)			EN 55011 Class A		
Burst (IEC/EN 61131-2:2008, Level 3)					
Supply cables		kV	2	2	2
CAN/DP bus cable		kV	1	1	1
SmartWire-DT cables		kV	1	1	1
Surge (IEC/EN 61131-2:2008, Level 1)					
Supply cables/CAN/DP bus cable			Supply cables 0.5 kV, CAN/DP bus cable 1 kV		
Radiated RFI (IEC/EN 61131-2:2008, Level 3)		V	10	10	10
Climatic environmental conditions					
Operating ambient temperature (IEC 60068-2)		°C	- 25 - + 55	- 25 - + 55	- 25 - + 55
Condensation			Take appropriate measures to prevent condensation		
Storage		°C	- 40 - + 70	- 40 - + 70	- 40 - + 70
relative humidity, non-condensing (IEC/EN 60068-2-30)		%	5 - 95	5 - 95	5 - 95
Supply voltage U_{Aux}					
Rated operational voltage		V	24 V DC (-15/+20%)		
Residual ripple on the input voltage		%	≦ 5	≦ 5	≦ 5
Protection against polarity reversal			Yes	Yes	Yes
Max. current	I_{max}	A	3	3	3
			If contactors with a total power consumption > 3 A are connected, a power feeder module EU5C-SWD-PF1/2 has to be used.		
Short-circuit rating			no, external fuse FAZ Z3		
Power loss		W	Normally 1	Normally 1	Normally 1
Potential isolation			No	No	No
Rated operating voltage of 24-V-DC slaves		V	typ. U_{Aux} - 0.2	typ. U_{Aux} - 0.2	typ. U_{Aux} - 0.2

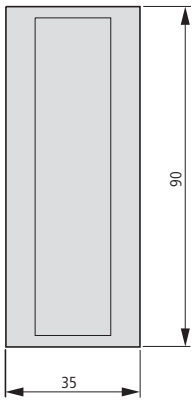
			EU5C-SWD-DP	EU5C-SWD-CAN	EU5C-SWD-EIP-MODTCP
Supply voltage U_{Pow}					
Supply voltage		V	24 DC -15 % + 20 %	24 DC -15 % + 20 %	24 DC -15 % + 20 %
Input voltage ripple		%	≦ 5	≦ 5	≦ 5
Siemens MPI, (optional)			yes	yes	yes
Rated current	I	A	0.7	0.7	0.7
Overload proof			yes	yes	yes
Inrush current and duration		A	12.5 A/6 ms	12.5 A/6 ms	12.5 A/6 ms
Heat dissipation at 24 V DC		W	3.8	3.8	3.8
Potential isolation between U_{Pow} and 15 V SmartWire-DT supply voltage			No	No	No
Bridging voltage dips		ms	10	10	10
Repetition rate		s	1	1	1
Status indication		LED	yes	yes	yes
SmartWire-DT supply voltage					
Rated operating voltage	U_e	V	14,5 ± 3 %	14,5 ± 3 %	14,5 ± 3 %
max. current	I_{max}	A	0.7	0.7	0.7
			If SmartWire-DT modules with a total power consumption > 0.7 A are connected, a power feeder module EU5C-SWD-PF2 has to be used.		
Short-circuit rating			Yes	Yes	Yes
Connection supply and inputs/outputs					
Connection type			Push in terminals		
Solid		mm^2	0.2 - 1.5	0.2 - 1.5	0.2 - 1.5
Flexible with ferrule		mm^2	0.25 - 1.5	0.25 - 1.5	0.25 - 1.5
UL/CSA solid or stranded		AWG	24 - 16	24 - 16	24 - 16
SmartWire-DT network					
Station type			SmartWire-DT master		
Number of SmartWire-DT slaves			58	99	99
Baud Rates		kBd	125 250	125 250	125 250
Address allocation			automatic	automatic	automatic
Status indication		LED	SmartWire-DT master LED: green Configurations LED: red		
Connection SmartWire-DT			Plug, 8-pole		
Plug connectors			Blade terminal SWD4-8MF2		
Fieldbus interface					
Function			PROFIBUS DP slave	CANopen® slave	Ethernet IP/MODBUS-TCP Slave
Protocol			PROFIBUS-DP	CANopen®	Ethernet IP/MODBUS-TCP
Input data, max.		Byte	240	128	Ethernet-IP: 546 MODBUS-TCP: 800
Output data, max.		Byte	240	128	Ethernet-IP: 496 MODBUS-TCP: 642
Baud Rates			up to 12 MBit/s	up to 1 MBit/s	10/100 MBit/s
Baud rates switching			automatic	automatic	automatic
Address			2 … 125	2 … 32	-
Address allocation			DIP switch	DIP switch	Dip switch/DHCP/ BOOTP Selection via DIP switch
Status display interface		LED	Two-coloured red/green	Two-coloured red/green	Link status: yellow (10 MBit), green (100 MBit) flashing
Terminating resistor			switchable via plug	DIP switches	-
Terminal type			1 x D-SUB socket, 9-pin	1 x D-SUB socket, 9-pin	2 x RJ45 (2-channel switch)
Potential isolation			Yes	Yes	Yes

Part no.			M22-SWD-NOP...	SWD4-RC8-10	SWD4-8SF2-5	SWD4-8SFF2-5	SWD4-8FRF-10	SWD4-SFL8-20	SWD4-SML8-20
General									
Standards			IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178
Dimensions (W x H x D)		mm	12 x 42 x 39	48.5 x 34.5 x 10	15 x 36.5 x 17.5	48.5 x 34.5 x 10	35 x 90 x 35	35 x 83 x 40	35 x 83 x 46
Weight		kg	-	-	-	-	-	-	-
Weight		g	10	10	5.5	4.5	42	50	50
Mounting position			As required	As required	As required	As required	As required	As required	As required
Ambient conditions, mechanical									
Protection type (IEC/EN 60529, EN50178, VBG 4)			IP20	IP20	IP20	IP20	IP20	IP67	IP67
Vibrations (IEC/EN 61131-2:2008)									
Constant amplitude 3,5 mm		Hz	5 - 8.4	5 - 8.4	5 - 8.4	5 - 8.4	5 - 8.4	5 - 8.4	5 - 8.4
Constant acceleration 1 g		Hz	8.4 - 150	8.4 - 150	8.4 - 150	8.4 - 150	8.4 - 150	8.4 - 150	8.4 - 150
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms		Impacts	9	9	9	9	9	9	9
Drop to IEC/EN 60068-2-31	Fallhöhe	mm	50	50	-	-	-	-	-
Free fall, packaged (IEC/EN 60068-2-32)		m	0.3	0.3	-	-	-	-	-
Electromagnetic compatibility (EMC)									
Overvoltage category			Not applicable	II	-	-	-	-	-
Pollution degree			2	2	-	-	-	-	-
Electrostatic discharge (IEC/EN 61131-2:2008)									
Air discharge (Level 3)		kV	8	8	-	8	8	8	8
Contact discharge (Level 2)		kV	4	4	-	4	4	4	4
Electromagnetic fields (IEC/EN 61131-2:2008)									
80 - 1000 MHz		V/m	10	10	-	-	-	10	10
1.4 - 2 GHz		V/m	3	3	-	-	-	3	3
2 - 2.7 GHz		V/m	1	1	-	-	-	1	1
Radio interference suppression (SmartWire-DT)			EN 55011 Class A	EN 55011 Class A	-	-	-	-	-
Burst (IEC/EN 61131-2:2008, Level 3)									
Supply cables		kV	2	-	-	-			
SmartWire-DT cables		kV	1	1	-	-	-	-	-
Radiated RFI (IEC/EN 61131-2:2008, Level 3)		V	10	10	-	-	-	10	10
Climatic environmental conditions									
Operating ambient temperature (IEC 60068-2)		°C	- 30 - + 55	- 25 - + 55	- 25 - + 55	- 25 - + 55	- 25 - + 55	- 25 - + 55	- 25 - + 55
Condensation			Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation
Storage		°C	- 40 - 80	- 40 - 70	- 40 - 70	- 40 - 70	- 40 - 70	- 40 - 70	- 40 - 70
relative humidity, non-condensing (IEC/EN 60068-2-30)		%	5 - 95	5 - 95	5 - 95	5 - 95	5 - 95	5 - 95	5 - 95
SmartWire-DT network									
Station type			SmartWire-DT slave	-	-	-	-	-	-
Number			-	-	-	-	-	-	-
Baud rate setting			automatic	-	-	-	-	-	-
SmartWire-DT status LED		LED	Green	-	-	-	-	-	-
Connections			Plug, 8-pole	-	-	-	-	-	-
Plug connectors			SWD4-8SF2-5	-	-	-	-	-	-
Number of insertion cycles			≥ 50	-	-	-	-	-	-
Function element									
Contacts			-	-	-	-	-	-	-
Lifespan mechanical/electrical	Opera-tions		-	-	-	-	-	-	-
LED display		LED	No	-	-	-	-	-	-
Diagnostics			Yes	-	-	-	-	-	-
Fixing			Front fixing	-	-	-	-	-	-
Connection options									
SWD-In				Plug, 8-pole	Plug connector	Plug, 8-pole	Plug, 8-pole	Plug, 8-pole	Plug, 8-pole
Number of insertion cycles				≥ 200	≥ 1	≥ 200	≥ 200	≥ 200	≥ 500
SWD-Out				-	Socket, 8-pole	Plug, 8-pole	Push in terminals	Socket, 8-pole	Plug, 8-pole
Number of insertion cycles				-	≥ 200	≥ 200	-	≥ 500	≥ 200

Dimensions

SmartWire-DT Gateways

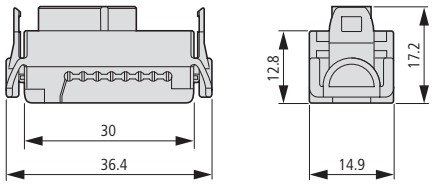




	a	b
EU5C-SWD-DP	122	90
EU5C-SWD-CAN	122	90
EU5E-SWD-...	97	90
EU5C-SWD-PF...	120	90
EU5C-SWD-EIP-MODTCP...	120	90
EU5C-SWD-PROFINET	120	
NZM-XSWD-704...	97	90

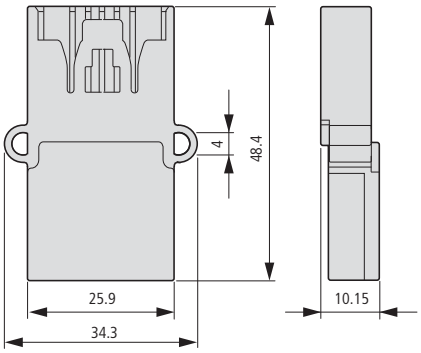
External device plugs

SWD4-8SF2-5



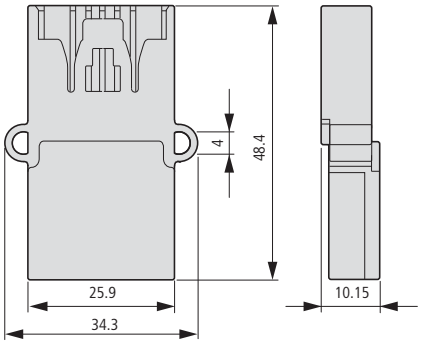
Network terminator

SWD4-RC8-10



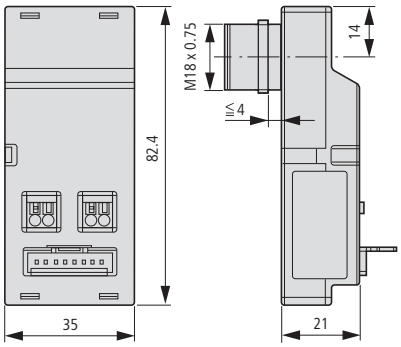
Coupling

SWD4-8SFF2-5



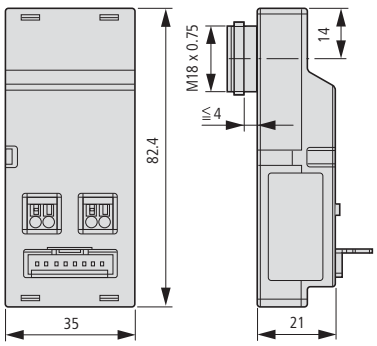
Switch cabinet bushing plug

SWD4-SM8-20



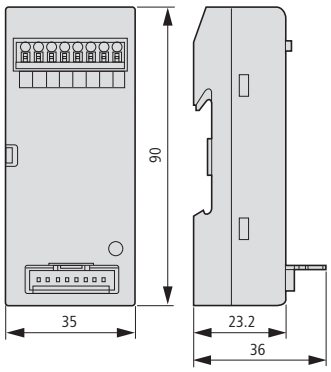
Switch cabinet bushing socket

SWD4-SFL8-20



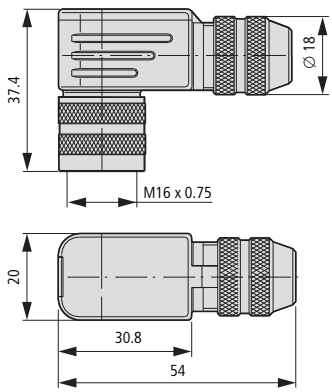
Adapter flat cable on round cable

SWD4-8FRF-10

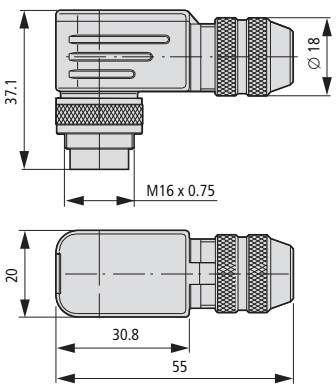


Connectors for SmartWire-DT round cables, angled

SWD4-SF8-67W

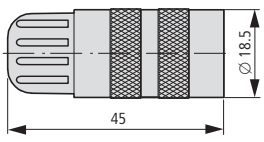


SWD4-SM8-67W

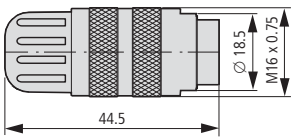


Plug connectors for SmartWire-DT round cables, flat

SWD4-SF8-67



SWD4-SM8-67



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URL
www.moeller.net/cad

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.

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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.

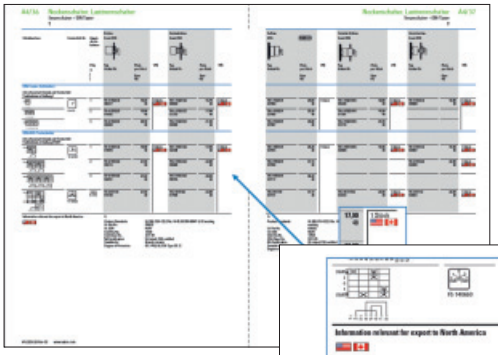
With circuit-breakers and switch-disconnectors, Eaton offers IEC devices for use in most countries in the world and NA devices with virtually the same dimensions and the same accessories for the North American market. This considerably simplifies device selection since the North American standards often involve the need for considerably different technical specifications.

Electrical engineering products and their applications are not harmonized internationally.

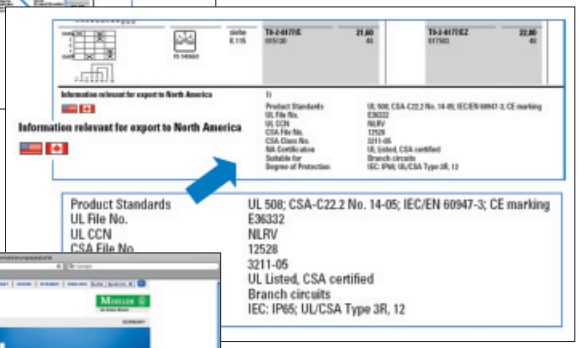
The greatest differences to the IEC world are in North America, i.e. the USA and Canada. For many newcomers to the export business, it is initially surprising to experience the very different approaches and solutions.

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 or with larger air and creepage distances at the incoming terminals. Eaton is the competent partner of choice for export-related issues here.

Qualified information is a critical key to success



The Eaton Main Catalogue for Moeller® series products provides reliable information for machine and panel builders on the approval of components deployed for North American market. Each selection page provides information such as the relevant product standard, the E-File Number, the Category Control Number or the CSA Class Number. Many customers incorporate this information in their parts lists in order to be well prepared for the acceptance procedures.

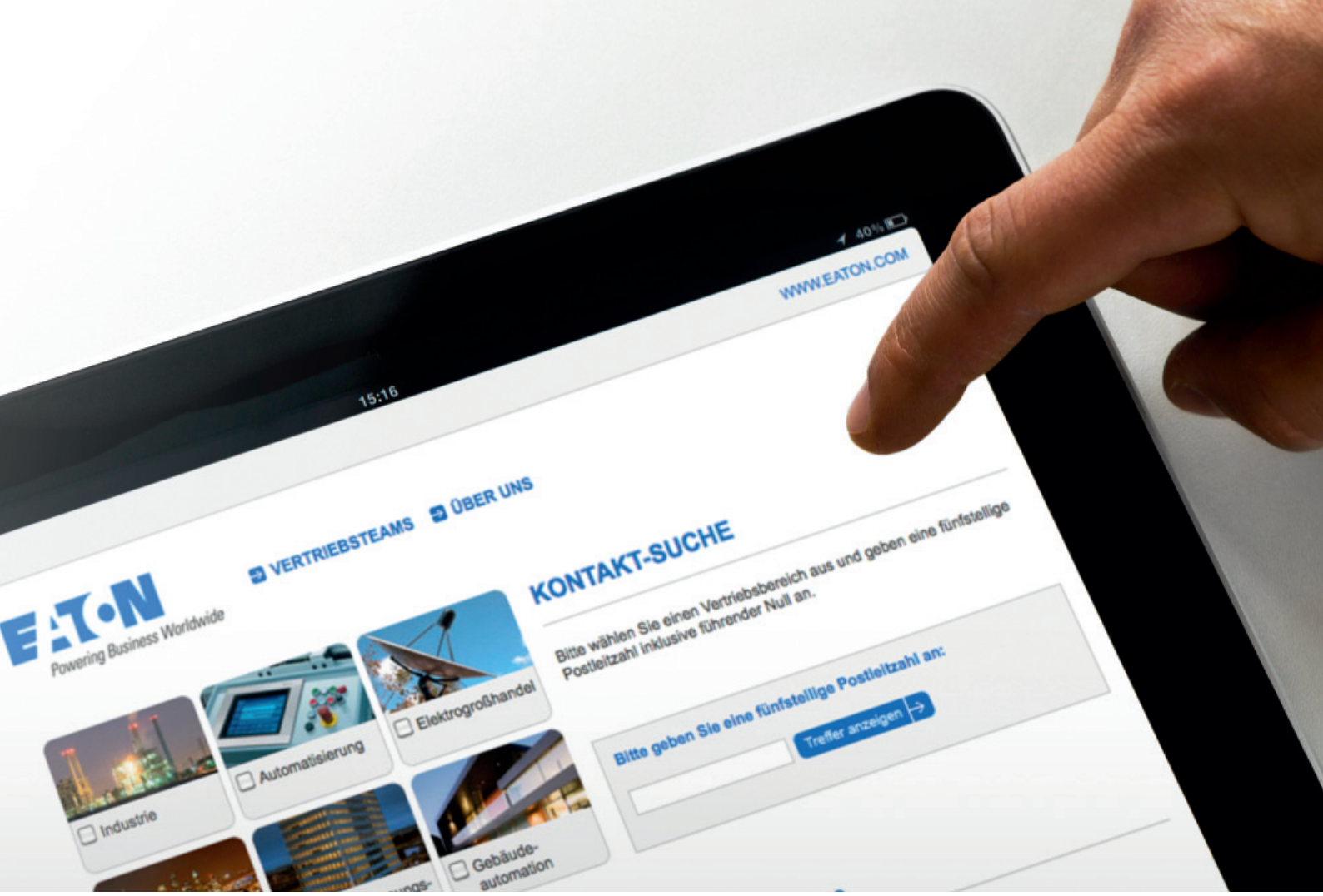


Up to 13 data items are listed here for each product, such as the suitability for use in feeders or branch circuits, the maximum operating voltage, or the North American degree of protection, such as UL / CSA Type 4X. The Main Catalogue also contains a glossary with explanations of the American terms.

The link http://www.moeller.net/eaton-approbationen/en/index.jsp 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.

Anyone wishing to avoid unfortunate experiences, should make use beforehand of the large number of publications that Eaton is offering on the issue of exports to North America. They contain the implementation of the codes & standards and a description of different practices.

These technical articles can be accessed via http://www.moeller.net/en/company/news/publications/index.jsp
They can be downloaded or ordered free of charge.



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At Eaton, an efficient customer relationship management is standard practice.

This guarantees you our support right from the start of any new project. Use these contact addresses to find your personal customer contact:

In just a few steps we can direct you to specialist local support specifically for your business sector.

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→ http://salesbonn.moeller.net

Your customer contact worldwide:

→ www.eaton.eu/electrical/contact

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We can be contacted here between Monday – Thursday from 08.00 – 17.00 CET and Friday from 08.00 – 16.00 CET.

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D-76532 Baden-Baden
Tel.: +49 (0)7221 682 - 0
Fax: +49 (0)7221 682 - 788
Email: customersupportemea@eaton.com

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

HP	110 - 120 V			220 - 240 V[a,b]			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

[a]To obtain full-load currents for 200 and 208 V motors, increase corresponding 220 - 240 V ratings by 15 and 10 percent, respectively.
[b]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.

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

Minimum fuse sizes 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		
			Motor rated operational current	Fuse Starting		Motor rated operational current	Fuse Starting		Motor rated operational current	Fuse Starting		Motor rated operational current	Fuse Starting		Motor rated operational current	Fuse Starting	
				DOL	Y/Δ		DOL	Y/Δ		DOL	Y/Δ		DOL	Y/Δ		DOL	Y/Δ
kWh	p.f.	η (%)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
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	250	250	184	250	200	134	250	160
160	0.87	95	486	630	630	279	400	315	254	315	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

Instructions

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)

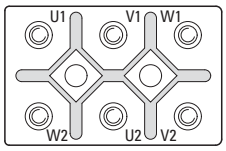
For LV h.b.c. fuse with aM characteristics the fuse should be equal to the rated operational current.

Drives egineering selection criteria

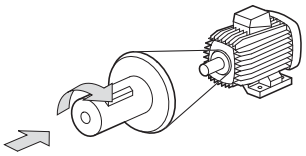
Each drive task requires a drive motor. The speed, torque and controllability of each motor must fulfill the requirements of the task. The following generally applies:
the application determines the drive. The drive motor most frequently used worldwide in industrial plants and large buildings is the 3-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

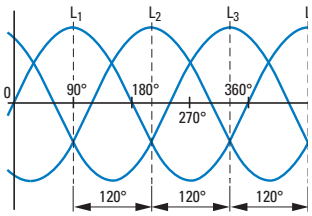
When connecting a 3-phase motor to the mains supply, the data on the rating plate of the motor must correspond to the mains voltage and frequency.
The standard connection is implemented via six screw terminals in the terminal box of the motor and with two types of circuit, the star connection and the 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).



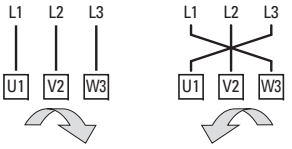
Regardless of the circuit type and the type of three-phase asynchronous motor, the connections must be labeled, so that their alphabetical sequence (e.g. U1, V1, W1) corresponds with the order of the mains voltage phase sequence (L1, L2, L3) and causes the motor to rotate clockwise.



On the three-phase asynchronous motor, three windings are arranged offset from each other by 120°/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 °.

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.

Clockwise (FWD) Anticlockwise operation (REV)

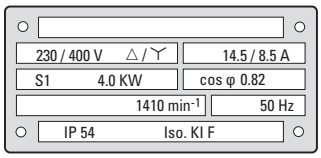


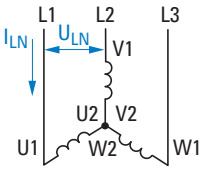
FWD = forward run (clockwise rotation field)
REV = reverse run (anticlockwise rotation field)

Information on the rating plate

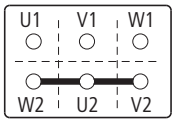
The electrical and mechanical rating data of the motor must be stated on its rating plate (IEC 34-1, VDE 0530). The data on the rating plate describes the stationary operation of the motor in the area of its operating point (MN, e.g. at 400 V and 50 Hz). The operational data is unstable in the motor 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 3-phase AC network with 400 V and 50 Hz.

Star circuit



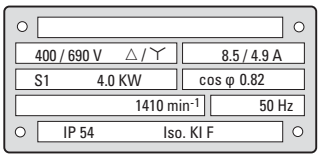


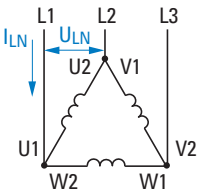
$U_{LN} = \sqrt{3} \times U_W$, $_{LN} = I_W$



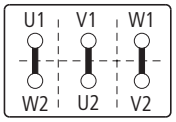
- With the specified 230/400 V voltage, this motor must be connected to the 3-phase system (U_{LN} = 400 V) in a star-connected circuit.
- The voltage of each motor winding is designed for 230 V. The windings must therefore be connected in sequence to the phase voltage (400 V).
- The three winding phases (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 (= U_W).

Delta circuit





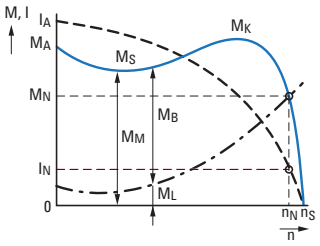
$U_{LN} = U_{W,\,LN} = \sqrt{3} \times I_W$



- With the specified 400/690 V voltage, this motor must be connected to the 3-phase system (U_{LN} = 400 V) in a delta circuit.
- Each motor winding is designed here 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.

Startup characteristics

The following figure shows the characteristic startup curves of a 3-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 3-phase speed torque characteristic with the load characteristic)
M_S: Pull-up torque
n: Speed (actual value)
n_N: Rated speed at the operating point
n_S: Synchronous speed (n_S - n_N = slip speed s)

Synchronous speed:

$$n_s = \frac{f}{p}$$

Slip speed in %:

$$s = \frac{n_s - n}{n_s} \cdot 100\,\%$$

3-phase asynchronous motor speed:

$$n = \frac{f}{p} \cdot (1 - s)$$

f Frequency of voltage in Hz (= s^{-1})
n: Speed in r.p.m.
p Number of pole pairs
s: Slip speed in r.p.m.

Electric power:

$$P_1 = U \times I \times \sqrt{3} \times \cos\varphi$$

P_1: Electrical power in W
U: Rated operating voltage in V
I: Rated operational current in A
cos ?: 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:

$$\eta = \frac{P_2}{P_1}$$

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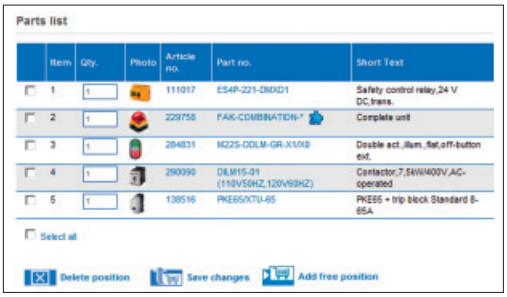

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