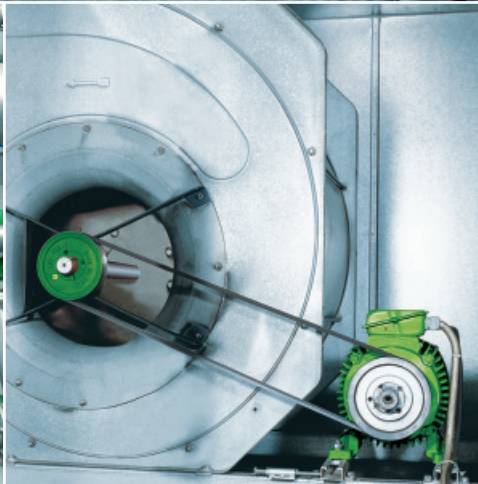


DC1/DA1 and **SVX/SPX** variable frequency drives
DS7 and **S801+/S811+** soft starters
Rapid Link 4.0 distributed, electronic drive system

Product range catalog

Efficient Engineering for
starting and controlling motors.



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DC1, DA1 variable frequency drives

SVX, SPX variable frequency drives

DS7 soft starters

S801+, S811+ soft starters

Rapid Link

SmartWire-DT™

Appendix



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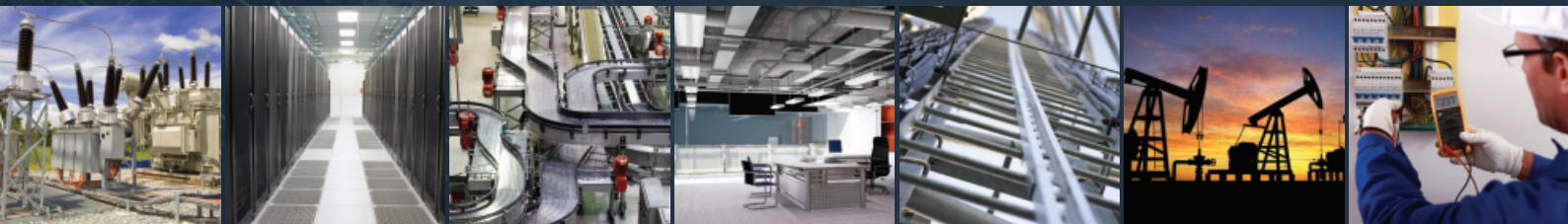


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- Solutions for harsh and hazardous environments
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- Structural solutions and wiring devices
- Control and automation
- Engineering services

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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 sensed 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



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System overview

DC1 with IP20 degree of protection



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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

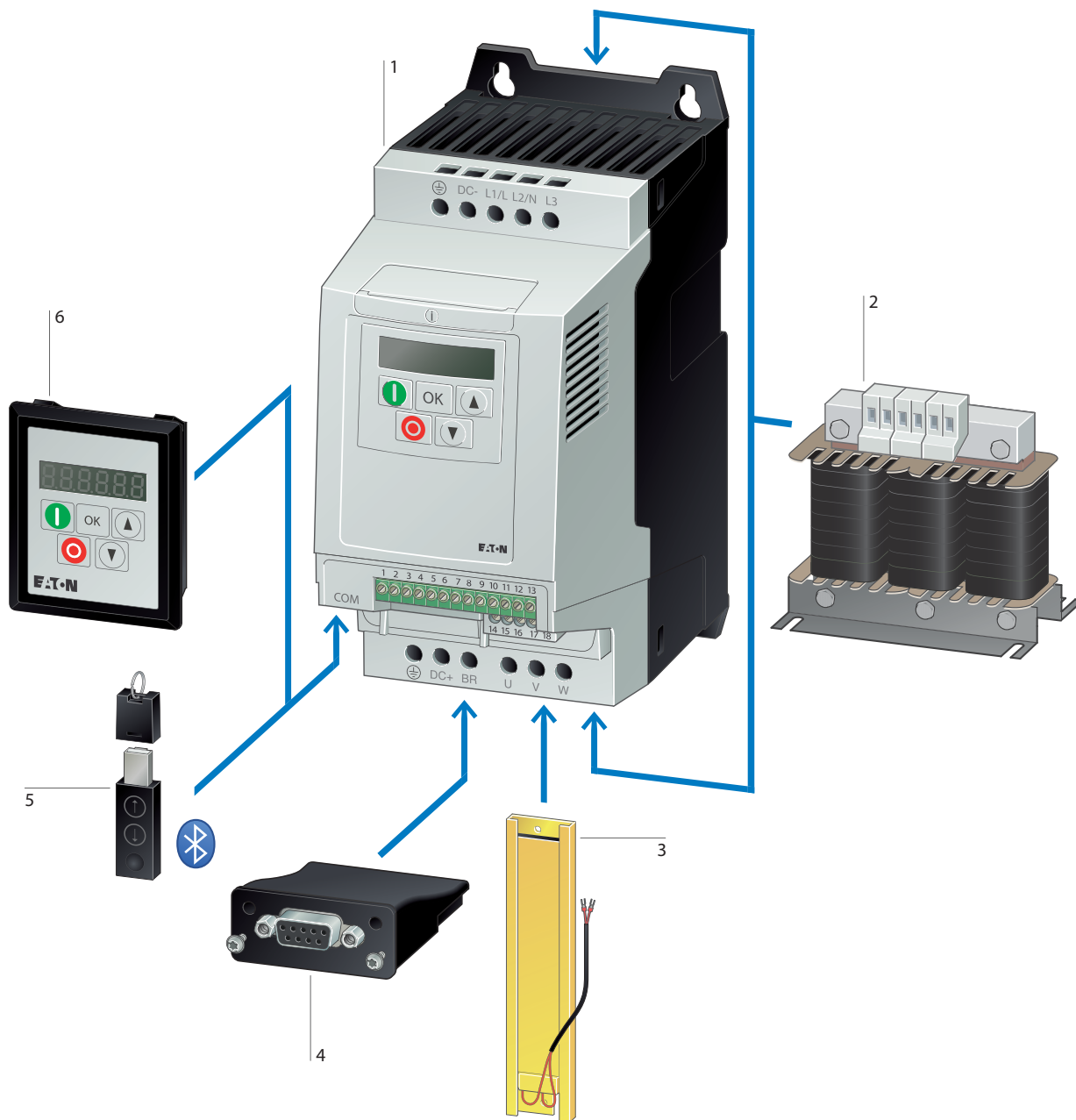
- Fast commissioning with 14 basic parameters
- Performance range (allocated motor output)
 - 0.37 - 4 kW (U_{IN} : 1~ 230 V / U_{OUT} : 3~ 230 V)
 - 0.37 - 4 kW (U_{IN} : 3~ 230 V / U_{OUT} : 3~ 230 V)
 - 0.75 - 11 kW (U_{IN} : 3~ 400 V / U_{OUT} : 3~ 400 V), up to 7.5 kW at IP66
 - 0.37 - 1.1 kW (U_{IN} : 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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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

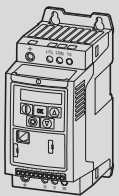
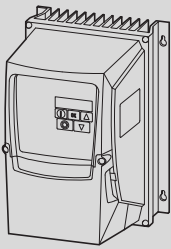
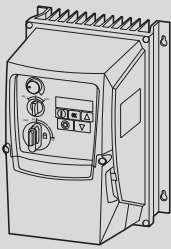
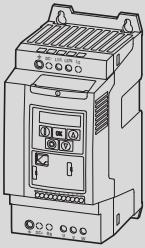
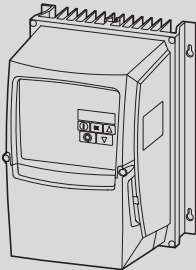
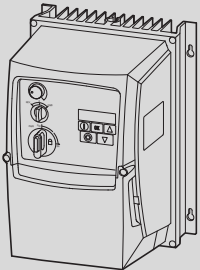
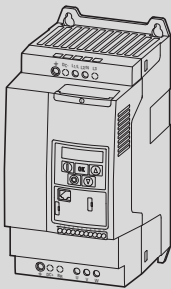
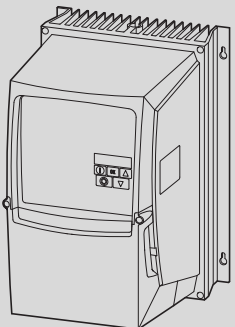
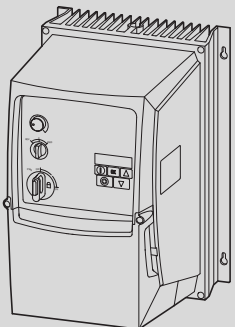
Technical overview

			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)	Type N = Standard basic device
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	Degree of protection 20 = IP20/NEMA 0 66 = IP66/NEMA 4X 6S = IP66 with switch/NEMA 4X, switched
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)	Display unit (display) A = LED display
Rated operational current (examples) 2D2 = 2,2 A 4D1 = 4,1 A 024 = 24 A	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 E172143
UL File No.	MMMS, NMMS7
UL Category Control No.	UL report applies to both US and Canada
CSA File No.	3211-06
CSA Class No. North America Certification	UL listed, certified by UL for use in Canada
Suitable for Max. Voltage Rating	Branch circuits 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 / U₂ 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 / U₂ 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	- ✓ ✓ -	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⁾	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 A	P kW	I _e A	Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls					
U_e 115 V AC, single-phase / U₂ 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 / U₂ 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)



Information relevant for export to North America → page 11

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 A	P kW	I _e A	Radio interference suppression filter Brake chopper 7-digital display assembly Local controls					
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 A	P kW	I _e A	Radio interference suppression filter	Brake chopper	7-digital display assembly	Local controls								
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-A66SN 169455			
			✓ - ✓ -			DC1-342D2FN-A66N 169476			
			✓ - ✓ ✓			DC1-342D2FN-A66SN 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-A66SN 169458			
			✓ - ✓ -			DC1-344D1FN-A66N 169479			
			- ✓ ✓ -	FS2		DC1-344D1NB-A66N 169460			
			- ✓ ✓ ✓			DC1-344D1NB-A66SN 169461			
			✓ - ✓ ✓	FS1		DC1-344D1FN-A66SN 169480			
			✓ ✓ ✓ -	FS2		DC1-344D1FB-A66N 169482			
			✓ ✓ ✓ ✓			DC1-344D1FB-A66SN 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-A66SN 169464			
			✓ ✓ ✓ -			DC1-345D8FB-A66N 169485			
			✓ ✓ ✓ ✓			DC1-345D8FB-A66SN 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 / U₂ 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-A66SN 169467		
			✓ ✓ ✓ -			DC1-349D5FB-A66N 169488		
			✓ ✓ ✓ ✓			DC1-349D5FB-A66SN 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-A66SN 169470		
			✓ ✓ ✓ -			DC1-34014FB-A66N 169491		
			✓ ✓ ✓ ✓			DC1-34014FB-A66SN 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-A66SN 169473		
			✓ ✓ ✓ -			DC1-34018FB-A66N 169494		
			✓ ✓ ✓ ✓			DC1-34018FB-A66SN 169495		
24	11	21.7	- ✓ ✓ -		IP20/NEMA 0	DC1-34024NB-A20N 169474		
			✓ ✓ ✓ -		IP20/NEMA 0	DC1-34024FB-A20N 169496		

Notes

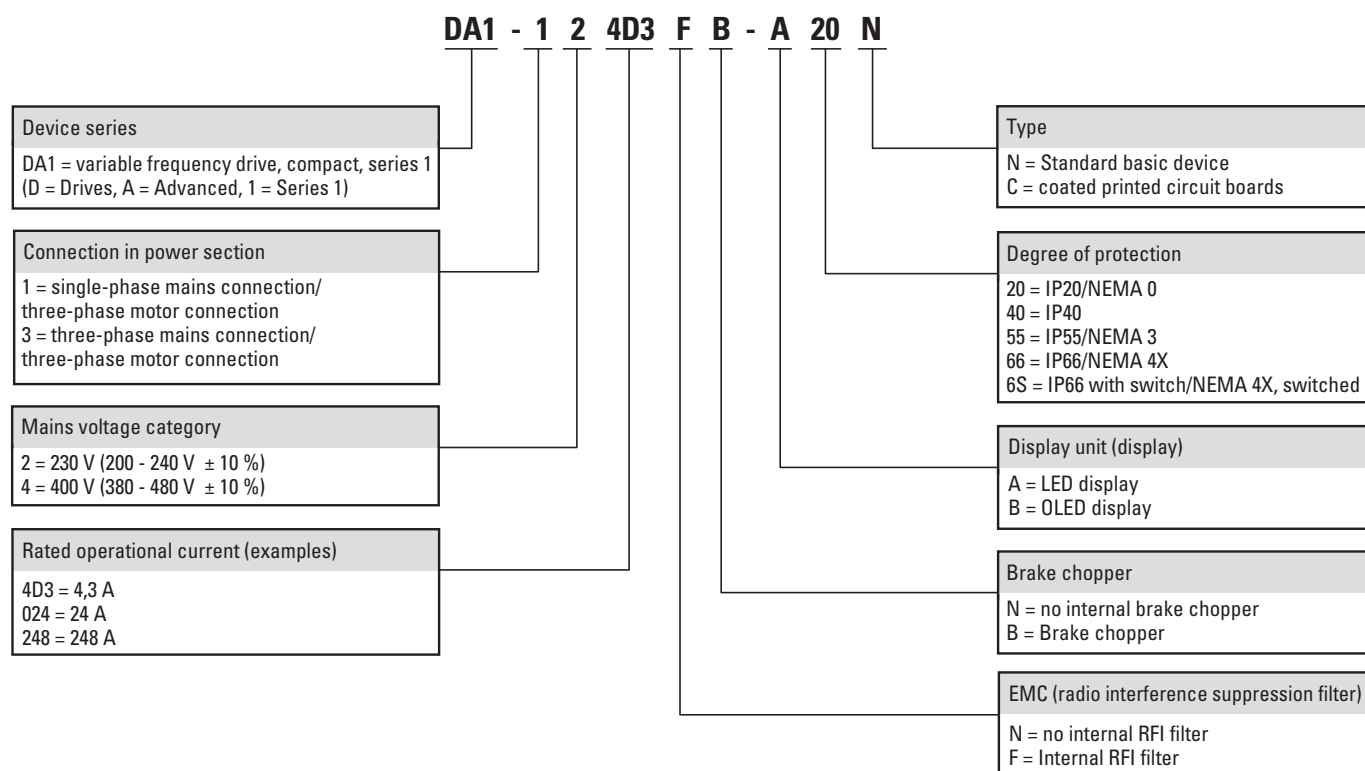
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

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



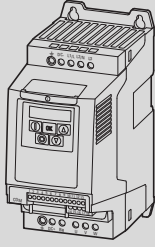
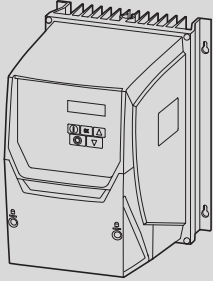
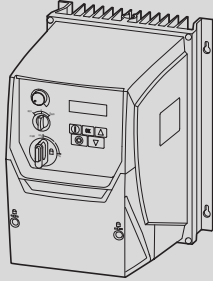
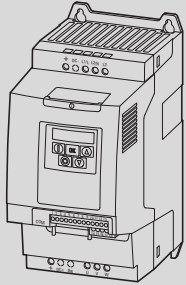
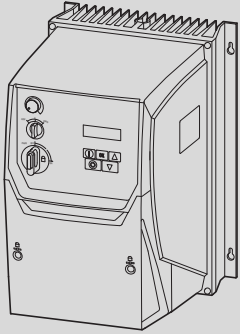
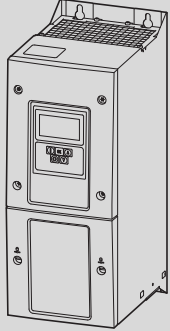
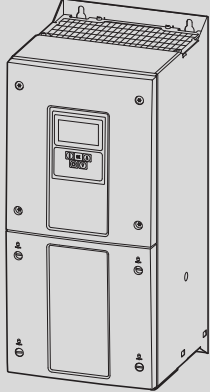
UL/CSA



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 _e 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⁾	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 OLED display Local controls Additional PCB protection						
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®									
4.3	0.75	3.2	✓	✓	✓	-	-	-	1 off 
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	-	-	
			✓	✓	-	✓	-	-	
			✓	✓	-	✓	✓	-	
			✓	✓	-	✓	-	✓	
			✓	✓	✓	-	✓	-	
			✓	✓	✓	-	-	✓	
			✓	✓	-	✓	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
7	1.5	6.3	✓	✓	✓	-	-	-	
			✓	✓	✓	-	-	✓	
			✓	✓	✓	-	-	-	
			✓	✓	-	✓	-	-	
			✓	✓	✓	-	-	✓	
			✓	✓	-	✓	-	✓	
			✓	✓	✓	-	✓	-	
			✓	✓	-	✓	✓	-	
			✓	✓	-	✓	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
10.5	2.2	8.7	✓	✓	✓	-	-	-	
			✓	✓	✓	-	-	✓	
			✓	✓	✓	-	-	-	
			✓	✓	-	✓	-	-	
			✓	✓	✓	-	✓	-	
			✓	✓	-	✓	-	✓	
			✓	✓	-	✓	✓	-	
			✓	✓	-	✓	✓	✓	
			✓	✓	✓	-	-	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	-	✓	✓	✓	
			✓	✓	-	✓	✓	✓	

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 / U₂ 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°C²⁾ 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 230 V AC, 3-phase / U₂ 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	IP55/NEMA 3	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	✓ - - ✓ - -	FS6	IP55/NEMA 3	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	✓ - - ✓ - -	FS6	IP55/NEMA 3	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

  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 230 V AC, 3-phase / U₂ 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 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		1 off  
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		

Notes¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C²⁾ 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  **Information relevant for export to North America → page 18**

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 OLED display Local controls Additional PCB protection						
A	kW	A							
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	✓	✓	✓	-	-	-	1 off  
			✓	✓	✓	-	-	✓	
			✓	✓	✓	-	-	-	
			✓	✓	-	✓	-	-	
			✓	✓	✓	-	✓	-	
			✓	✓	✓	-	-	✓	
			✓	✓	-	✓	✓	-	
			✓	✓	-	✓	-	✓	
			✓	✓	-	✓	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
4.1	1.5	3.6	✓	✓	✓	-	-	-	
			✓	✓	✓	-	-	✓	
			✓	✓	✓	-	-	-	
			✓	✓	-	✓	-	-	
			✓	✓	✓	-	✓	-	
			✓	✓	-	✓	✓	-	
			✓	✓	✓	-	-	✓	
			✓	✓	-	✓	-	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	
5.8	2.2	5	✓	✓	✓	-	-	-	
			✓	✓	✓	-	-	✓	
			✓	✓	✓	-	-	-	
			✓	✓	-	✓	-	-	
			✓	✓	✓	-	✓	-	
			✓	✓	-	✓	-	✓	
			✓	✓	✓	-	-	✓	
			✓	✓	-	✓	✓	-	
			✓	✓	✓	-	-	✓	
			✓	✓	-	✓	✓	✓	
			✓	✓	✓	-	✓	✓	
			✓	✓	✓	-	✓	✓	

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°C²⁾ 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)

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 OLED display Local controls Additional PCB protection					
A	kW	A						
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)

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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 / U₂ 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 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		1 off  
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		

Notes¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C²⁾ 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 / U₂ 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 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		1 off  
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

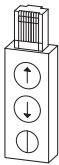
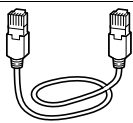
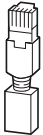
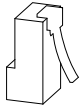
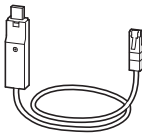
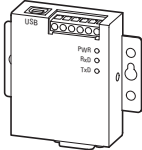
¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C

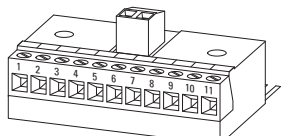
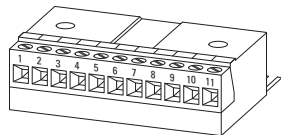
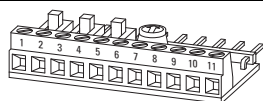
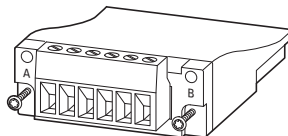
²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)

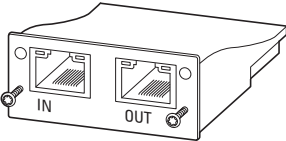
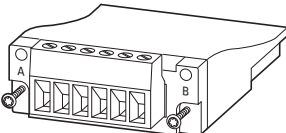
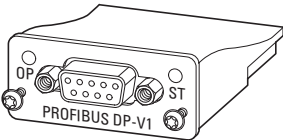
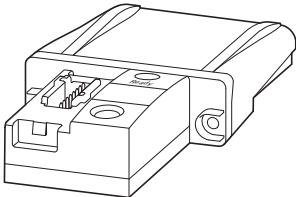
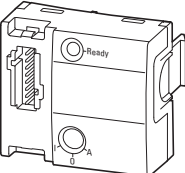
  **Information relevant for export to North America → page 18**

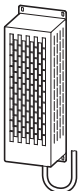
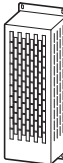
Rated operational current ¹⁾ I _e A	Assigned motor rating ²⁾ P kW	Rated motor current I _e A	Fitted with Radio interference suppression filter Brake chopper 7-digital display assembly OLED display Local controls Additional PCB protection	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
U_e 400 V AC, 3-phase / U₂ 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 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		1 off  
370	200	349	✓ - - ✓ - - ✓ - ✓ - - - ✓ - - ✓ - ✓ ✓ ✓ ✓ - - - ✓ - ✓ - - ✓ ✓ ✓ - ✓ - - ✓ ✓ - ✓ - ✓ ✓ ✓ ✓ - - ✓	FS8	IP40	DA1-34370FN-B40N 169343 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		1 off
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		

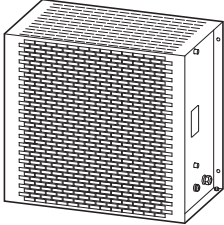
Notes¹⁾ Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +50°C²⁾ Assigned motor rating for normal internally and externally ventilated four-pole, three-phase asynchronous motors with 1500 rpm (at 50 Hz) or 1800 rpm (at 60 Hz)**Information relevant for export to North America → page 18**

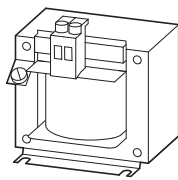
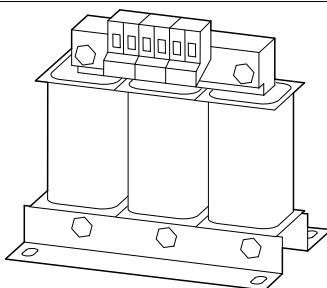
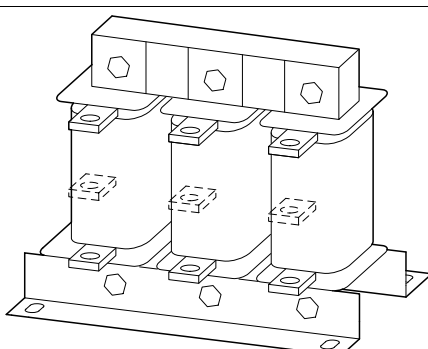
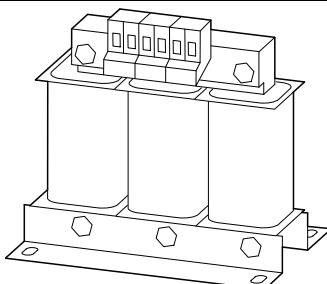
Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America  
External keypad					
	with LED display Front IP54 With approx. 3 m-long, plug-in connection cable (RJ45, 8-pin)	DC1, DA1	DX-KEY-LED 169132	1 off  	UL/CSA certification not required
	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

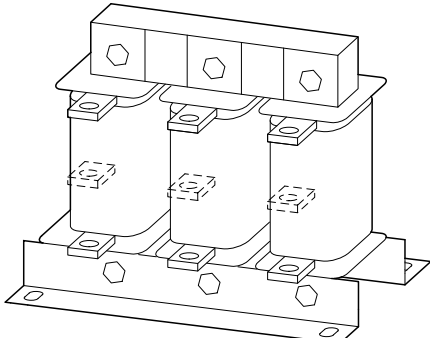
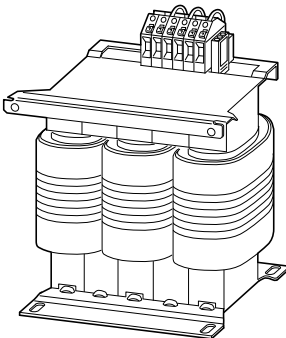
	Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America  
Expansion modules						
	110-V-input (electrically isolated)	DC1	DXC-EXT-IO110 169032		1 off	
	230-V-input (electrically isolated)	DC1	DXC-EXT-IO230 169033			
	2 relay outputs 1 analog output	DC1	DXC-EXT-2R01A0 169030			
	2 relay outputs	DC1	DXC-EXT-2R0 169031			
	3 digital inputs 1 Relay output	DA1	DXA-EXT-3DI1R0 169036			
	3 relay outputs	DA1	DXA-EXT-3R0 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							
	Ethernet IP	DA1	DX-NET-ETHERNET-2 169122		1 off  	UL/CSA certification not required	
	Modbus-TCP	DA1	DX-NET-MOVBUSTCP-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	Continuous braking rating	Protection type	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America	
	R Ω	P _{DB} kW							
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 UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification	UL508; C22.2 E300773 NMTR2, NMTR8 E300773 14-M05 UL listed, certified by UL for use in Canada Branch circuits
	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 UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification	UL508; C22.2 E300773 NMTR2, NMTR8 E300773 14-M05 UL listed, certified by UL for use in Canada Branch circuits
	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				
Suitable for									
Max. Voltage Rating Degree of Protection									
600 IEC: IP00									

	Resistance value	Continuous braking rating	Protection type	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America	
	R Ω	P _{DB} kW							
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									
	2	54.3	IP20	DA1	DX-BR002-54K3 171923		1 off  	Product Standards UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification Suitable for Max. Voltage Rating Degree of Protection	UL508; C22.2 E300773 NMTR2, NMTR8 E300773 14-M91 UL listed, certified by UL for use in Canada Branch circuits 1000 IEC: IP00
	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				

	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

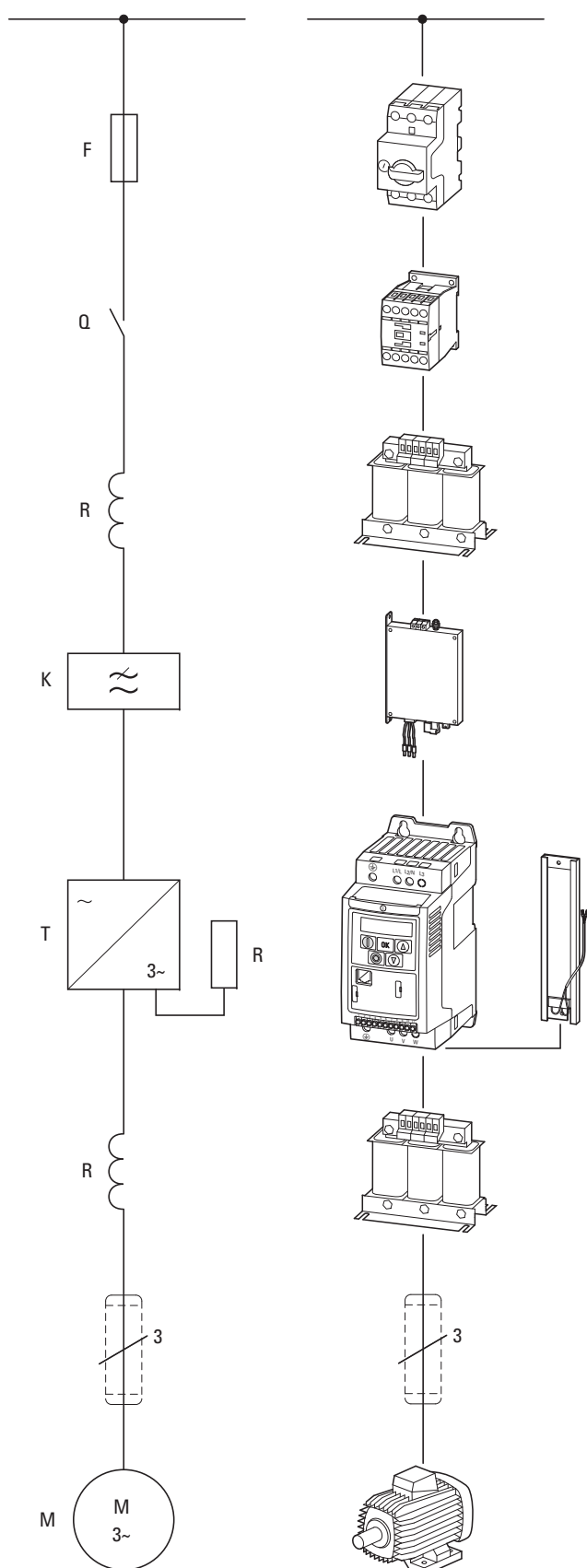


Information relevant for export to North America

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 Wye)
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 DX-EMC12-012 172274 DX-EMC12-016 172275 DX-EMC12-020 172276 DX-EMC12-030 172277		1 off	
12					
16					
20					
30					
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 DX-EMC34-012 172279 DX-EMC34-016 172280 DX-EMC34-030 172281		1 off	
12					
16					
30					
Mounting to the side, next to the variable frequency drive					
42	DA1-32... DA1-34...	DX-EMC34-042 172282 DX-EMC34-055 172283 DX-EMC34-075 172284 DX-EMC34-100 172285 DX-EMC34-130 172286 DX-EMC34-180 172287 DX-EMC34-250 172288 DX-EMC34-400 172289			
55					
75					
100					
130					
180					
250					
400					

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

sine filter

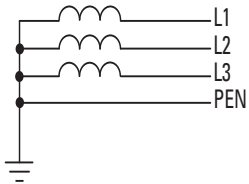
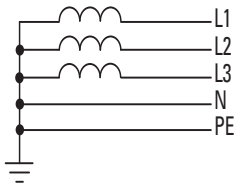
- Smoothen the output voltage sinusoidally,
- reduce motor noise through du/dt reduction, and thereby increase the motor insulation's lifespan,
- Reduce the leakage currents to allow better motor performance at improved EMC values.

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 ($P \sim U \times I$) into mechanical power ($P \sim M \times n$).

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}): $\pm 10\%$
- Maximum deviation in the voltage symmetry: $\pm 3\%$
- Maximum deviation from the rated frequency: $\pm 4\%$

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:



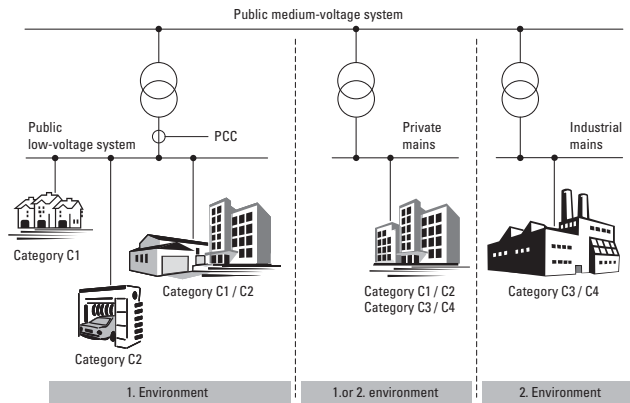
Earth leakage currents will be produced when using frequency-controlled drives due to the nature of the system. The main reasons for this consist of external capacitances between the phases of the motor cable, the motor cable's screening, Y capacitors in the frequency inverter, and radio interference 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 $\geq 10 \text{ mm}^2$).

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.

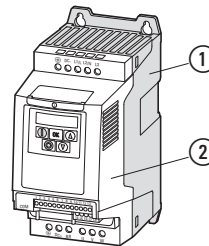
In Europe, adherence to the EMC Directive is mandatory. The EMC product standard for power drive systems (PDS) is IEC/EN 61800-3. This standard covers the complete drive system, from mains infeed to the motor.

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.

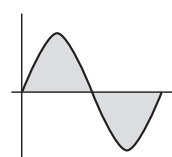
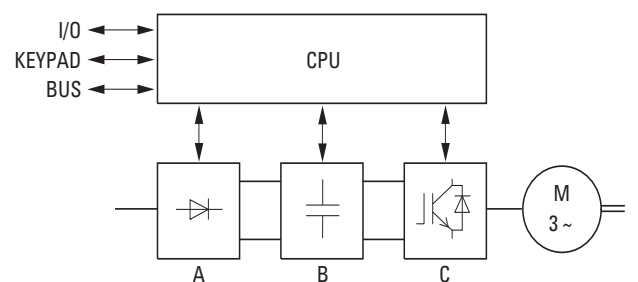


① Power section with:

A = Rectifier
B = Internal DC link
C = inverter (IGBT)

② Control section with:

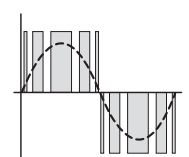
I/O = Analog and binary inputs and outputs
KEYPAD = Operating unit with display unit
BUS = Serial ports/interfaces (RS485, field bus, PC interface)



U_{LN} = phase voltage from supplying AC mains



U_{DC} = DC link voltage
 $U_{DC} = 1.41 \times U_{LN}$



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:

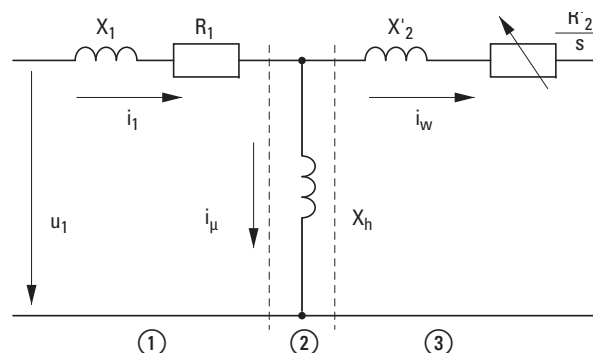
- pump and fan drives,
- horizontal conveying and transportation systems,
- multiple motor drives (parallel operation of several motors at the variable frequency drive's output).

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 frequency inverter 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 sensorless vector control are:

- Material machining and processing equipment
- Condensers (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 (u_1, i_1) to calculate the required manipulated variable for flux-generating component i_μ and torque-generating component in the rotor i_w . The motor's load dependent slip is represented as resistor $R'2/s$. During no-load operation, this value approaches infinity ($i_w \rightarrow 0$). On the other hand, the value approaches zero as the load increases. The current in the rotor grows at this point.

Explanation:

EMC = Electromagnetic compatibility
EVU = 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

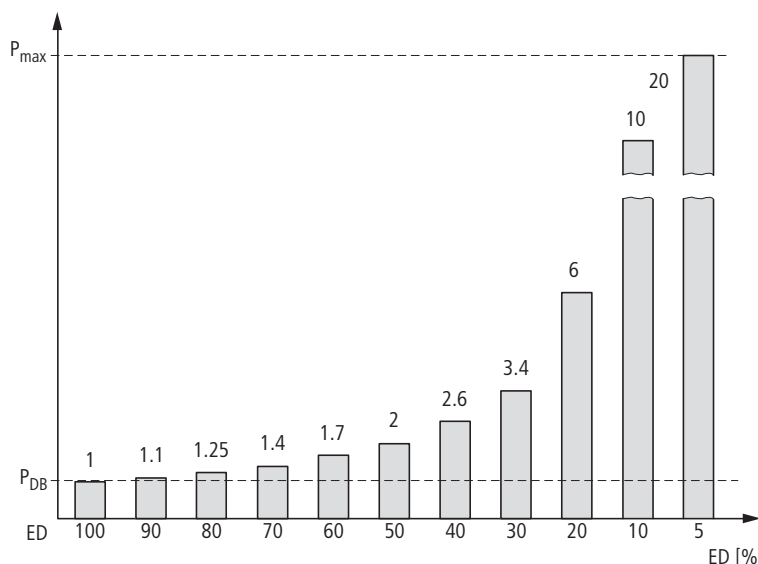
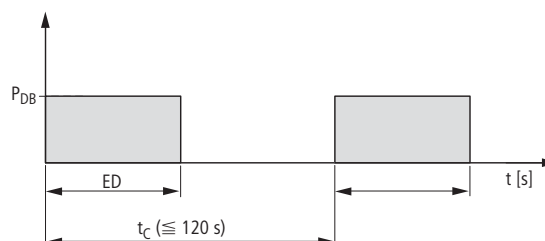
P_{DB} = continuous rating at a duty factor of 100 %

ED = duty factor

t_c = Cycle time (max. 120 seconds)

The duty factor is stated as a percentage (%) and is calculated with the formula:

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



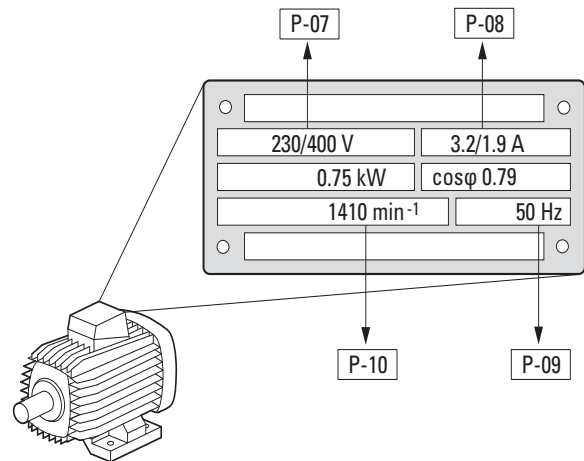
Connecting example for a 0.75 kW motor with the rating plate illustrated here.

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.

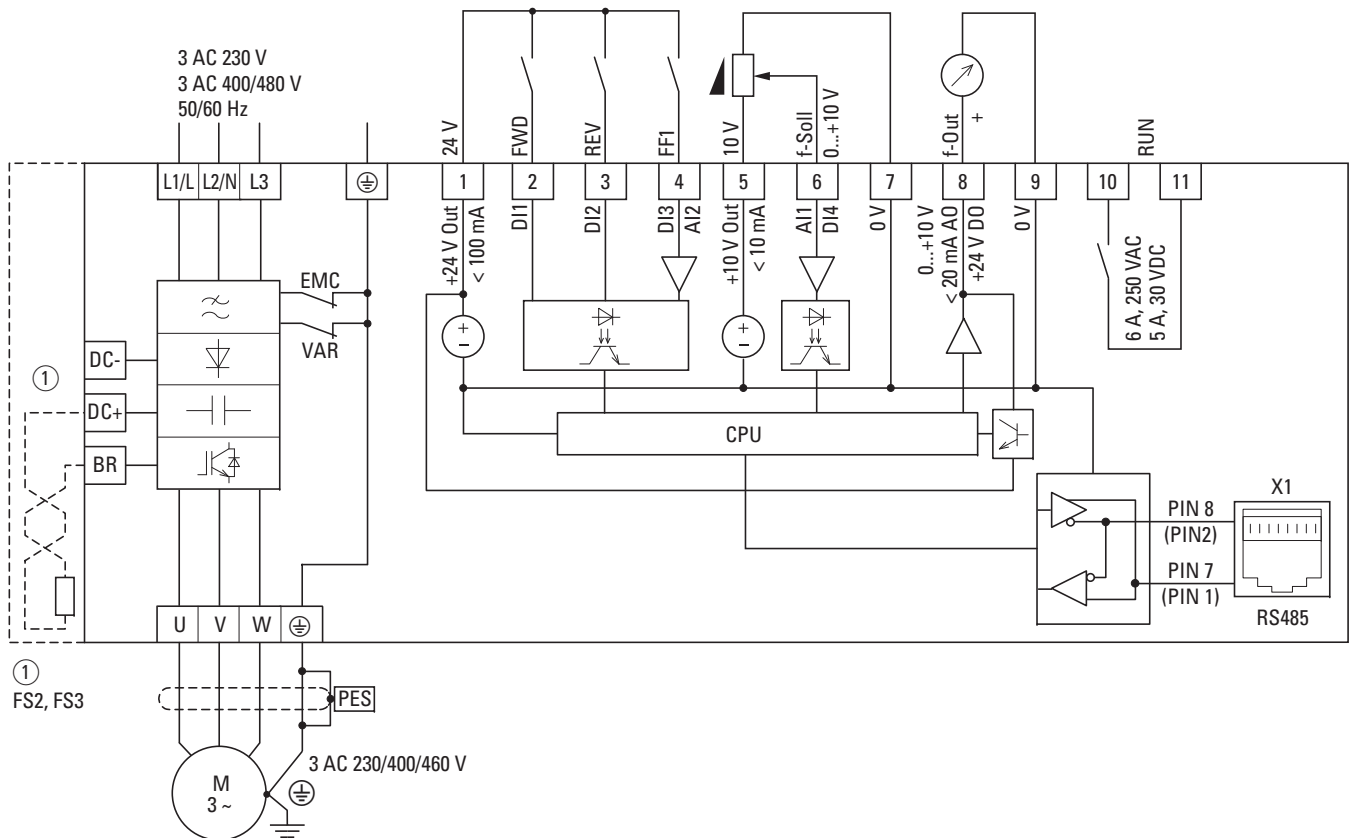
To ensure ideal operational behavior (e.g., slip compensation, vector control, etc.), the data on the motor's rating plate should be entered into the variable frequency drive (electric motor map).

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

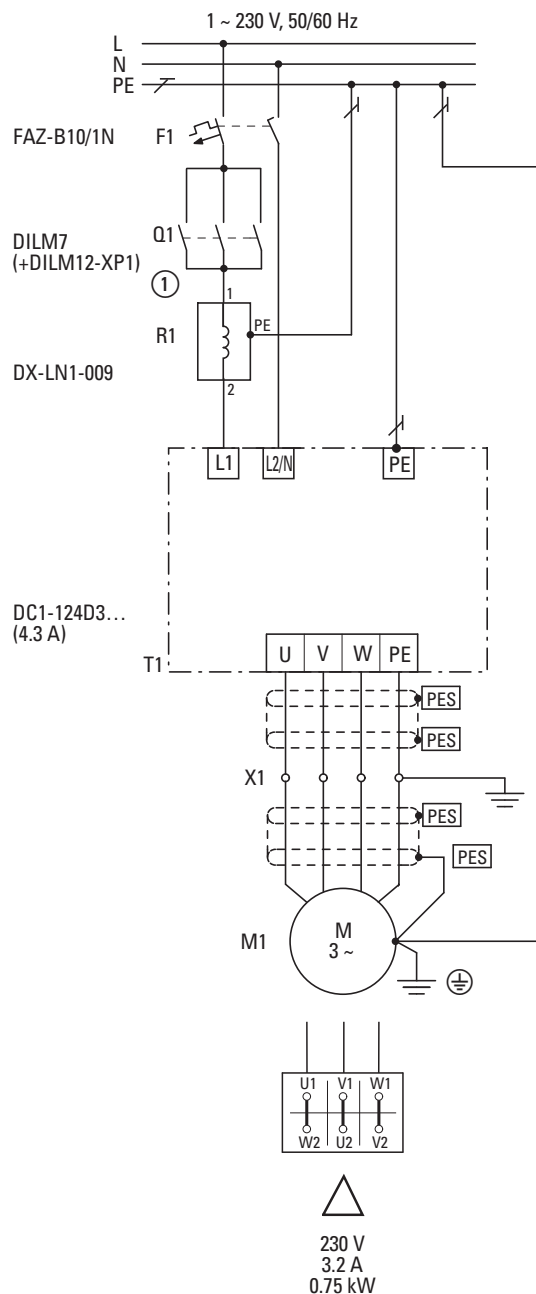
Mains: 3/N/PE 400 V 50/60 Hz

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)



① Optional connection option for single-phase connections

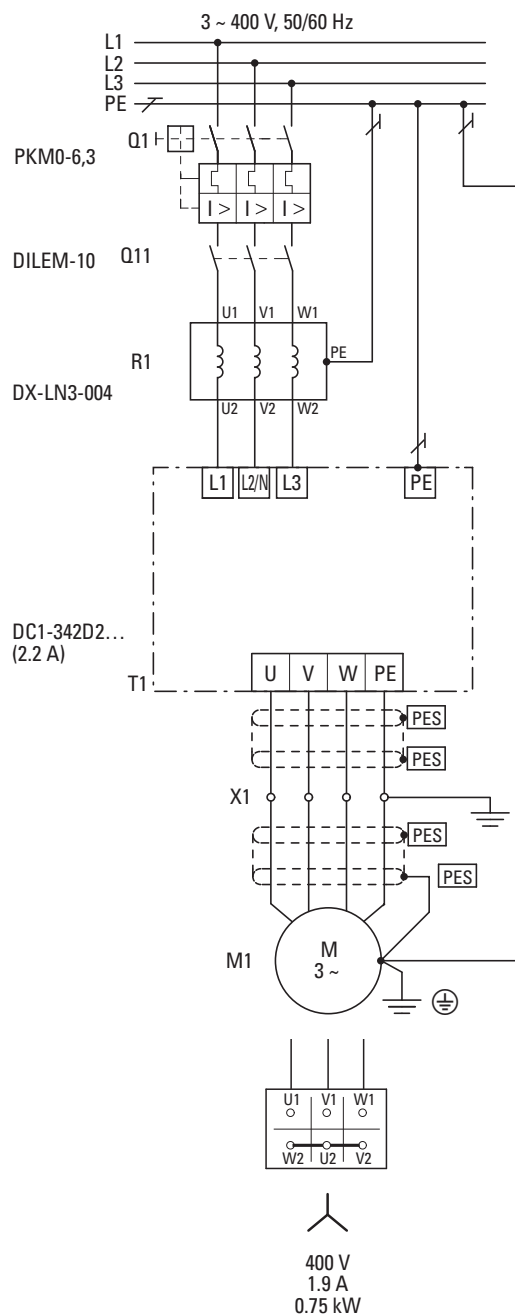
The previously indicated 0.75 kW motor can be connected in a delta configuration for a single-phase 230-V supply system (version A) or in a star configuration for a 400-V supply system (version B).

The frequency inverter and the type-specific accessories are selected for 1 AC 230 V (DC1-124D3...) or for 3 AC 400 V (IMX34AA2D4) depending on the mains voltage selected.

Variant B:

Motor in star configuration

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



Engineering

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 kW	P HP							
U ₀ 230 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
DC1-124D3	0.75	1	3.2	4.3	8.5	FAZ-B10/1N	-	DILM7	DX-LN1-013
DC1-127D0	1.5	2	6.3	7	13.9	FAZ-B16/1N	-	DILM7	DX-LN1-018
DC1-12011	2.2	3	8.7	10.5	19.5	FAZ-B25/1N	-	DILM7	DX-LN1-024
DC1-12015	4	5	14.8	15	30.5	FAZ-B40/1N	-	DILM7	DX-LN1-032
U ₀ 230 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
DC1-324D3	0.75	1	3.2	4.3	4.5	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006
DC1-327D0	1.5	2	6.3	7	7.3	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DC1-32011	2.2	3	8.7	10.5	11	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-016
DC1-32018	4	5	14.8	18	18.8	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-025
U ₀ 400 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
DC1-344D1	1.5	2	3.6	4.1	4.3	FAZ-B6/3	PKM0-6,3	DILM7	DX-LN3-006
DC1-345D8	2.2	3	5	5.8	6.1	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DC1-349D5	4	5	8.5	9.5	9.8	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-010
DC1-34014	5.5	7.5	11.3	14	14.6	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-016
DC1-34018	7.5	10	15.2	18	18.1	FAZ-B25/3	PKM0-25	DILM7	DX-LN3-025
DC1-34024	11	15	21.7	24	24.7	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025
U ₀ 230 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
DA1-127D0	1.5	2	6.3	7	13.9	FAZ-B16/1N	-	DILM7	DX-LN1-018
DA1-12011	2.2	3	8.7	10.5	19.5	FAZ-B25/1N	-	DILM7	DX-LN1-024
U ₀ 230 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
DA1-327D0	1.5	2	6.3	7	7.3	FAZ-B10/3	PKM0-10	DILM7	DX-LN3-010
DA1-32011	2.2	3	8.7	10.5	11	FAZ-B16/3	PKM0-16	DILM7	DX-LN3-016
DA1-32018	4	5	14.8	18	18.8	FAZ-B20/3	PKM0-20	DILM7	DX-LN3-025
DA1-32024	5.5	7.5	19.6	24	24.8	FAZ-B32/3	PKM0-32	DILM17	DX-LN3-025
DA1-32039	7.5	10	26.4	39	40	FAZ-B50/3	-	DILM25	DX-LN3-040
DA1-32046	11	15	38	46	47.1	FAZ-B63/3	-	DILM40	DX-LN3-050
DA1-32061	15	20	51	61	62.4	NZMC1-S80	-	DILM50	DX-LN3-080
DA1-32072	18.5	25	63	72	74.1	NZMC1-S80	-	DILM65	DX-LN3-080
DA1-32090	22	30	71	90	92.3	NZMC2-S100	-	DILM80	DX-LN3-100
DA1-32110	30	40	96	110	112.7	NZMC2-S125	-	DILM95	DX-LN3-120
DA1-32150	45	50	141	150	153.5	NZMC2-S160	-	DILM150	DX-LN3-160
DA1-32180	55	60	173	180	183.8	NZMC2-S200	-	DILM170	DX-LN3-200
DA1-32202	55	75	173	202	206.2	NZMC3-S250	-	DILM185A	DX-LN3-250
DA1-32248	75	100	233	248	252.8	NZMC3-S320	-	DILM185A	DX-LN3-300

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 3
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-LM3-005	DX-SIN3-010	-	-	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-011	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-016	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-005	DX-SIN3-004	-	-	-
DX-LM3-005	DX-SIN3-010	-	-	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-011	DX-SIN3-016	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-035	DX-SIN3-023	DX-BR050-0K4	DX-BR050-0K8	DX-BR047-3K1
DX-LM3-005	DX-SIN3-004	-	-	-
DX-LM3-005	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DX-LM3-008	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DX-LM3-011	DX-SIN3-010	DX-BR100-0K8	DX-BR100-1K6	DX-BR100-6K2
DX-LM3-016	DX-SIN3-016	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DX-LM3-035	DX-SIN3-023	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DX-LM3-035	DX-SIN3-023	DX-BR047-3K1	DX-BR047-5K1	DX-BR047-9K2
DX-LM3-005	DX-SIN3-010	DX-BR100-0K2	DX-BR100-0K4	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	-
DX-LM3-011	DX-SIN3-016	DX-BR050-0K8	DX-BR035-1K1	-
DX-LM3-005	DX-SIN3-010	DX-BR100-0K2	DX-BR100-0K4	-
DX-LM3-008	DX-SIN3-010	DX-BR050-0K4	DX-BR050-0K8	-
DX-LM3-011	DX-SIN3-016	DX-BR050-0K8	DX-BR035-1K1	-
DX-LM3-035	DX-SIN3-023	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-035	DX-SIN3-032	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-050	DX-SIN3-048	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-050	DX-SIN3-048	DX-BR022-1K4	DX-BR022-3K1	-
DX-LM3-063	DX-SIN3-061	DX-BR012-3K1	DX-BR012-5K1	-
DX-LM3-080	DX-SIN3-072	DX-BR012-3K1	DX-BR012-5K1	-
DX-LM3-100	DX-SIN3-090	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-150	DX-SIN3-115	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-150	DX-SIN3-150	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-180	DX-SIN3-180	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-220	DX-SIN3-250	DX-BR006-5K1	DX-BR006-9K2	-
DX-LM3-260	DX-SIN3-250	DX-BR006-5K1	DX-BR006-9K2	-

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							
	kW	HP	I _e A	I _e A	I _{LN} T				
U ₁ 400 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...
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)
Main circuit							
Supply							
Rated operational voltage	U _e		115 V AC, single-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%)				
Input current	I _{LN}	T	8.5	12.5	11	19	25
Supply frequency	f _{LN}	Hz	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
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	10.5	15.75	3.45	6.45	8.7
Starting current for 2 s	I _L	A	12.25	18.38	4.03	7.53	10.15
Output voltage with V _e	U ₂		115 V AC, single-phase		230 V AC, 3-phase		
Output Frequency	f ₂	Hz	0 - 50 Hz (max. 120 Hz)		0 - 50 Hz (max. 500 Hz)		
Switching frequency	f _{PWM}	kHz	16 (adjustable 4 - 32)				
Operation Mode			U/f control Slip compensation				
Frequency resolution (setpoint value)	△f	Hz	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
Power loss							
Heat dissipation at rated operational current	P _V	W	18.5	22	18.5	37.5	44
Efficiency	η	%	95	96	95	95	96
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	2.49	2.49	< 1	< 1	< 1
Frame size			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	-	-	-
Apparent power at rated operation 240 V	S	kVA	0	0	-	-	-
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				
Braking torque with external braking resistance			-	max. 100% rated operational current I _B , with external braking resistance	-	-	max. 100% rated operational current I _B , with external braking resistance
minimum external braking resistance	R _{min}	Ω	-	47	-	-	47
Switch-on threshold for the braking transistor	U _{DC}	V	-	-	-	-	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)				
Reference voltage	U _s	V	10 V DC (max. 10 mA)				

DC1-S24D3...	DC1-S27D0...	
< 95 %, average relative humidity (RH), non-condensing (EN 50178)		
Vertical		
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m		
BGV A3 (VBG4, finger- and back-of-hand proof)		
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.		
1st and 2nd environments		
25 (200)	25 (200)	25 (200)
230 V AC, 1-phase		
-	-	-
200 (-10%) - 240 (+10%)		
6	9.3	14
50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds		
6.45	10.5	15.75
7.53	12.25	18.38
230 V AC, single-phase	230 V AC, single-phase	230 V AC, single-phase
0 - 50 Hz (max. 120 Hz)	0 - 50 Hz (max. 120 Hz)	0 - 50 Hz (max. 120 Hz)
16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)
U/f control Slip compensation		
0.1	0.1	0.1
4.3	7	10.5
18.5	37.5	44
95	95	96
2.49	2.49	2.49
FS1	FS1	FS2
-	-	-
-	-	-
-	-	-
-	-	-
0.99	1.61	2.42
1.03	1.68	2.52
-	-	-
max. 100% of rated operational current I _e , variable		
-	-	max. 100% rated operational current I _e , with external braking resistance
-	-	47
-	-	390 V DC
-	-	-
-	-	-
24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Part no.			DC1-122D3...	DC1-124D3...	DC1-127D0...	DC1-12011...	DC1-12015...
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)
Main circuit							
Supply							
Rated operational voltage	U _e		230 V AC, 1-phase				
Mains voltage (50/60Hz)	U _{LN}	V	200 (-10%) - 240 (+10%)				
Input current	I _{LN}	T	5	8.5	13.9	19.5	30.5
Supply frequency	f _{LN}	Hz	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
Mains switch-on frequency			Maximum of one time every 30 seconds				
Power section							
Overload current for 60 s every 600 s	I _L	A	3.45	6.45	10.5	15.75	22.5
Starting current for 2 s	I _L	A	4.03	7.53	12.25	18.38	26.25
Output voltage with V _e	U ₂		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)
Switching frequency	f _{PWM}	kHz	16 (adjustable 4 - 32)				8 (adjustable 4 - 24)
Operation Mode			U/f control Slip compensation				
Frequency resolution (setpoint value)	△f	Hz	0.1	0.1	0.1	0.1	0.1
Rated operational current	I _e	A	2.3	4.3	7	10.5	15
Power loss							
Heat dissipation at rated operational current	P _V	W	18.5	45.75	63	103.4	160
Efficiency	η	%	95	93.9	95.8	95.3	96
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	2.49	2.49	2.49	2.49	< 1
Frame size			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
at 220 - 240 V, 60 Hz	P	HP	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
Apparent power at rated operation 240 V	S	kVA	0.96	1.79	2.91	4.36	6.24
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
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	-	-	100	47	47
Switch-on threshold for the braking transistor	U _{DC}	V	-	-	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)				
Reference voltage	U _s	V	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

DC1-322D3...	DC1-324D3...	DC1-327D0...	DC1-32011...	DC1-32018...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Vertical				
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
BGV A3 (VBG4, finger- and back-of-hand proof)				
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
1st and 2nd environments				
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
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
200 (-10%) - 240 (+10%)				
3	4.5	7.3	11	18.8
50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds				
3.45	6.45	10.5	15.75	27
4.03	7.53	12.25	18.38	31.5
230 V AC, 3-phase				
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)
16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	8 (adjustable 4 - 24)
U/f control Slip compensation				
0.1	0.1	0.1	0.1	0.1
2.3	4.3	7	10.5	18
14.8	39.75	61.5	90.2	160
96	94.7	95.9	95.9	96
< 1	< 1	< 1	< 1	< 1
FS1	FS1	FS2	FS2	FS3
0.37	0.75	1.5	2.2	4
0.5	1	2	3	5
0.92	1.71	2.79	4.18	7.17
0.96	1.79	2.91	4.36	7.48
max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
max. 100% of rated operational current I _e , variable				
	-	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
	-	100	47	47
	-	390 V DC	390 V DC	390 V DC
	-	-	-	-
	-	-	-	-
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)
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)

Part no.			DC1-342D2...	DC1-344D1...	DC1-345D8...	DC1-349D5...
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	I	m	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
Mains voltage (50/60Hz)	U _{LN}	V	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
Supply frequency	f _{LN}	Hz	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
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
Starting current for 2 s	I _L	A	3.85	7.18	10.15	16.63
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
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)
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 Slip compensation			
Frequency resolution (setpoint value)	△f	Hz	0.1	0.1	0.1	0.1
Rated operational current	I _e	A	2.2	4.1	5.8	9.5
Power loss						
Heat dissipation at rated operational current	P _V	W	63.75	76.5	101.2	136
Efficiency	η	%	91.5	94.9	95.4	96.6
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	< 1	< 1	< 1	< 1
Frame size			FS1	FS2	FS2	FS2
Motor feeder						
Assigned motor rating						
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4
at 440 - 480 V, 60 Hz	P	HP	1	2	3	5
Apparent power						
Apparent power at rated operation 400 V	S	kVA	1.52	2.84	4.02	6.58
Apparent power at rated operation 480 V	S	kVA	1.83	3.41	4.82	7.9
Braking function						
Standard braking torque			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	-	200	200	100
Switch-on threshold for the braking transistor	U _{DC}	V	-	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)
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)

Note¹⁾ With a switching frequency of 4 kHz and an ambient air temperature of +40°C or +50°C for IP20/NEMA 0

DC1-34014...	DC1-34018...	DC1-34024...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)		
Vertical		
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m		
BGV A3 (VBG4, finger- and back-of-hand proof)		
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.		
1st and 2nd environments		
25 (200)	25 (200)	25 (200)
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)	380 (-10%) - 480 (+10%)
14.6	18.1	24.7
50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds		
21	27	36
24.5	31.5	42
400 V AC, 3-phase	400 V AC, 3-phase	400 V AC, 3-phase
0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)	0 - 50 Hz (max. 500 Hz)
8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)
U/f control Slip compensation		
0.1	0.1	0.1
14	18	24
209	300	297
96.2	97	97.3
< 1	< 1	2.49
FS3	FS3	FS3
5.5	7.5	11
7.5	10	15
9.67	12.47	16.63
11.64	14.96	19.95
max. 30% M _N	max. 30% M _N	max. 30% M _N
max. 100% of rated operational current I _e , variable		
max. 100% rated operational current I _e , with external braking resistance		
100	47	47
780 V DC	780 V DC	780 V DC
-	-	-
-	-	-
24 V DC (max. 100 mA)	24 V DC (max. 100 mA)	24 V DC (max. 100 mA)
10 V DC (max. 10 mA)	10 V DC (max. 10 mA)	10 V DC (max. 10 mA)

Typ			DA1-124D3...	DA1-127D0...	DA1-12011...
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)
Main circuit					
Supply					
Rated operational voltage	U _b		230 V AC, 1-phase	230 V AC, 1-phase	230 V AC, 1-phase
Mains voltage (50/60Hz)	U _{LN}	V	200 (-10%) - 240 (+10%)		
Input current	I _{LN}	T	8.5	13.9	19.5
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60
Frequency range	f _{LN}	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	6.45	10.5	15.75
Starting current for 4 s	I _L	A	8.6	14	21
Output voltage with V _e	U ₂		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)
Switching frequency	f _{PWM}	kHz	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)
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
Rated operational current	I _e	A	4.3	7	10.5
Power loss					
Heat dissipation at rated operational current	P _V	W	45.75	63	103.4
Efficiency	η	%	93.9	95.8	95.3
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	2.49	2.49	2.49
Frame size			FS2	FS2	FS2
Motor feeder					
Assigned motor rating					
at 230 V, 50 Hz	P	kW	0.75	1.5	2.2
at 220 - 240 V, 60 Hz	P	HP	1	2	3
Apparent power					
Apparent power at rated operation 230 V	S	kVA	1.71	2.79	4.18
Apparent power at rated operation 240 V	S	kVA	1.79	2.91	4.36
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		
Braking torque 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
Switch-on threshold for the braking transistor	U _{DC}	V	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)
Reference voltage	U _s	V	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

DA1-324D3...	DA1-327D0...	DA1-32011...	DA1-32018...	DA1-32024...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Vertical				
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
BGV A3 (VBG4, finger- and back-of-hand proof)				
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
1st and 2nd environments				
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
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
200 (-10%) - 240 (+10%)				
4.5	7.3	11	18.8	24.8
50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds				
6.45	10.5	15.75	27	36
8.6	14	21	36	48
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
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)
16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 32)	16 (adjustable 4 - 24)	16 (adjustable 4 - 16)
U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
0.1	0.1	0.1	0.1	0.1
4.3	7	10.5	18	24
39.75	61.5	90.2	160	170.5
94.7	95.9	95.9	96	96.9
1.73	1.73	1.73	0.93	0.93
FS2	FS2	FS2	FS3	FS3
0.75	1.5	2.2	4	5.5
1	2	3	5	7.5
1.71	2.79	4.18	7.17	9.56
1.79	2.91	4.36	7.48	9.98
max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
max. 100% of rated operational current I _e , variable				
max. 100% rated operational current I _e , with external braking resistance				
100	50	35	20	20
390 V DC	390 V DC	390 V DC	390 V DC	390 V DC
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)
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)

Part no.			DA1-342D2...	DA1-344D1FB...	DA1-345D8...	DA1-349D5...
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)
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
Mains voltage (50/60Hz)	U _{LN}	V	380 (-10%) - 480 (+10%)			
Input current	I _{LN}	T	2.4	4.3	6.1	9.8
Supply frequency	f _{LN}	Hz	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
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
Starting current for 4 s	I _L	A	4.4	8.2	11.6	19
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
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)
Switching frequency	f _{PWM}	kHz	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 32)	8 (adjustable 4 - 32)
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
Rated operational current	I _e	A	2.2	4.1	5.8	9.5
Power loss						
Heat dissipation at rated operational current	P _V	W	63.75	76.5	101.2	136
Efficiency	η	%	91.5	94.9	95.4	96.6
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	4.65	4.65	4.65	4.65
Frame size			FS2	FS2	FS2	FS2
Motor feeder						
Assigned motor rating						
at 400 V, 50 Hz	P	kW	0.75	1.5	2.2	4
at 440 - 480 V, 60 Hz	P	HP	1	2	3	5
Apparent power						
Apparent power at rated operation 400 V	S	kVA	1.52	2.84	4.02	6.58
Apparent power at rated operation 480 V	S	kVA	1.83	3.41	4.82	7.9
Braking function						
Standard braking torque			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
Switch-on threshold for the braking transistor	U _{DC}	V	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)
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

DA1-34014...	DA1-34018...	DA1-34024...	DA1-34030...	DA1-34039...	DA1-34046...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)					
Vertical					
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments					
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
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
380 (-10%) - 480 (+10%)					
14.6	18.1	24.7	30.8	40	47.1
50/60	50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds					
21	27	36	45	58.5	69
28	36	48	60	78	92
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
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)
8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)
U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)					
0.1	0.1	0.1	0.1	0.1	0.1
14	18	24	30	39	46
209	300	297	375	444	506
96.2	97	97.3	97.5	97.6	97.7
1.55	1.55	2.47	2.47	2.47	2.47
FS3	FS3	FS4	FS4	FS4	FS4
5.5	7.5	11	15	18.5	22
7.5	10	15	20	25	30
9.67	12.47	16.63	20.78	27.02	31.87
11.64	14.96	19.95	24.94	32.42	38.24
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. 100% of rated operational current I _e , variable					
max. 100% rated operational current I _e , with external braking resistance					
75	50	40	22	22	22
780 V DC	780 V DC	780 V DC	780 V DC	780 V DC	780 V DC
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)
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)

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)	
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	
Mains voltage (50/60Hz)	U _{LN}	V	380 (-10%) - 480 (+10%)				
Input current	I _{LN}	T	62.8	73.8	92.2	112.5	
Supply frequency	f _{LN}	Hz	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	
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	
Starting current for 4 s	I _L	A	122	140	180	220	
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	
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)	
Switching frequency	f _{PWM}	kHz	8 (adjustable 4 - 24)	8 (adjustable 4 - 24)	4 (adjustable 4 - 16)	4 (adjustable 4 - 16)	
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	
Rated operational current	I _e	A	61	72	90	110	
Power loss							
Heat dissipation at rated operational current	P _V	W	840	925	1080	1210	
Efficiency	η	%	97.2	97.5	97.6	97.8	
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	0.49	0.49	2.68	2.68	
Frame size			FS5	FS5	FS6	FS6	
Motor feeder							
Assigned motor rating							
at 400 V, 50 Hz	P	kW	30	37	45	55	
at 440 - 480 V, 60 Hz	P	HP	40	50	60	75	
Apparent power							
Apparent power at rated operation 400 V	S	kVA	42.26	48.5	62.35	76.21	
Apparent power at rated operation 480 V	S	kVA	50.71	58.2	74.82	91.45	
Braking function							
Standard braking torque			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	
Switch-on threshold for the braking transistor	U _{DC}	V	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)	
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

< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Vertical				
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
BGV A3 (VBG4, finger- and back-of-hand proof)				
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
1st and 2nd environments				
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
400 V AC, 3-phase				
380 (-10%) - 480 (+10%)				
153.2	183.7	205.9	244.5	307.8
50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds				
225	270	303	360	453
300	360	404	480	604
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
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)
4 (adjustable 4 - 12)	4 (adjustable 4 - 8)	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)	4 (adjustable 4 - 8)
U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
0.1	0.1	0.1	0.1	0.1
150	180	202	240	302
1575	1800	2090	2376	3040
97.9	98	98.1	98.2	98.1
2.68	2.68	4.75	4.75	4.75
FS6	FS6	FS7	FS7	FS7
75	90	110	132	160
100	150	175	200	250
103.92	124.71	139.95	166.28	209.23
124.71	149.65	167.94	199.53	251.08
max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
max. 100% of rated operational current I _e , variable				
max. 100% rated operational current I _e , with external braking resistance				
6	6	6	6	6
780 V DC	780 V DC	780 V DC	780 V DC	780 V DC
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)
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)

Typ			DA1-32039...	DA1-32046...	DA1-32061...	DA1-32072...	DA1-32090...
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)
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
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
Supply frequency	f _{LN}	Hz	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
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
Starting current for 4 s	I _L	A	60	92	122	144	180
Output voltage with V _e	U ₂		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)
Switching frequency	f _{PWM}	kHz	8 (adjustable 4 - 24)				4 (adjustable 4 - 16)
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
Rated operational current	I _e	A	39	46	61	72	90
Power loss							
Heat dissipation at rated operational current	P _V	W	187.5	264	345	518	550
Efficiency	η	%	97.5	97.6	97.7	97.2	97.5
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	1.42	1.42	0.28	0.28	1.54
Frame size			FS4	FS4	FS5	FS5	FS6
Motor feeder							
Assigned motor rating							
at 230 V, 50 Hz	P	kW	7.5	11	15	18.5	22
at 220 - 240 V, 60 Hz	P	HP	10	15	20	25	30
Apparent power							
Apparent power at rated operation 230 V	S	kVA	11.95	18.33	24.3	28.68	35.85
Apparent power at rated operation 240 V	S	kVA	12.47	19.12	25.36	29.93	37.41
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
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	22	12	12	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
Control section							
External control voltage	U _c	V	24 V DC (max. 100 mA)				
Reference voltage	U _s	V	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

DA1-32110...	DA1-32150...	DA1-32180...	DA1-32202...	DA1-32248...
< 95 %, average relative humidity (RH), non-condensing (EN 50178)				
Vertical				
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m				
BGV A3 (VBG4, finger- and back-of-hand proof)				
C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
1st and 2nd environments				
25 (200)	25 (200)	25 (200)	25 (200)	25 (200)
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
200 (-10%) - 240 (+10%)				
112.7	153.5	183.8	206.2	252.8
50/60	50/60	50/60	50/60	50/60
48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz	48 - 62 Hz
Maximum of one time every 30 seconds				
165	225	270	303	372
220	300	360	404	496
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
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)
4 (adjustable 4 - 16)	4 (adjustable 4 - 12)	4 (adjustable 4 - 8)	4 (adjustable 4 - 16)	4 (adjustable 4 - 12)
U/f control Slip compensation sensorless vector control (SLV) Vector control with feedback (CLV)				
0.1	0.1	0.1	0.1	0.1
110	150	180	202	248
720	814	945	1100	1425
97.6	97.8	97.9	98	98.1
1.54	1.54	1.54	2.74	2.74
FS6	FS6	FS6	FS7	FS7
30	45	55	55	75
40	50	60	75	100
43.82	59.76	71.71	80.47	98.8
45.73	62.35	74.82	83.97	103.09
max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N	max. 30% M _N
max. 100% of rated operational current I _e , variable				
max. 100% rated operational current I _e , with external braking resistance				
6	6	6	6	6
390 V DC	390 V DC	390 V DC	390 V DC	390 V DC
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)
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)

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			✓	✓	✓

Part no.	Rated operational current	Inductance	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		%	mm ²	AWG	mm ²		Nm	kg

Mains choke

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

Part no.	Rated operational current	Inductance	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		mm ²	AWG	mm ²		Nm	kg
	A	mH	W	W	W	kg				mm		

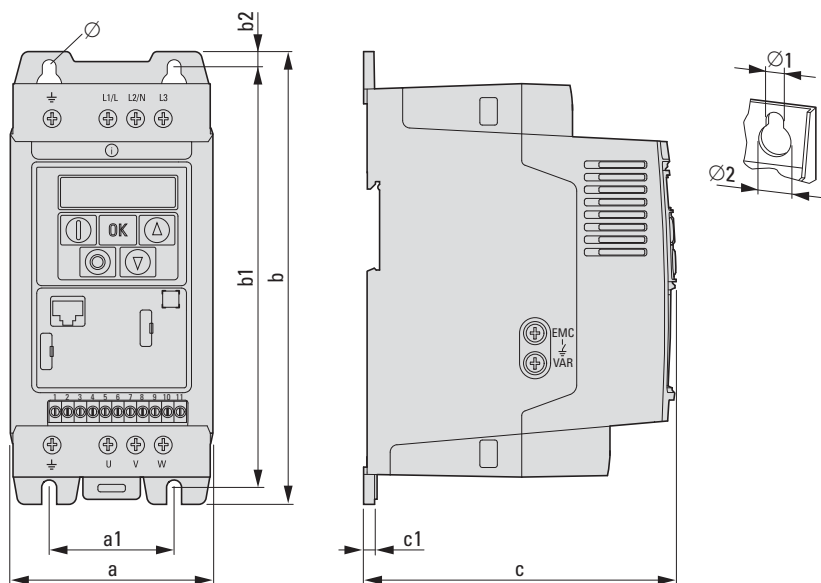
Motor chokes

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

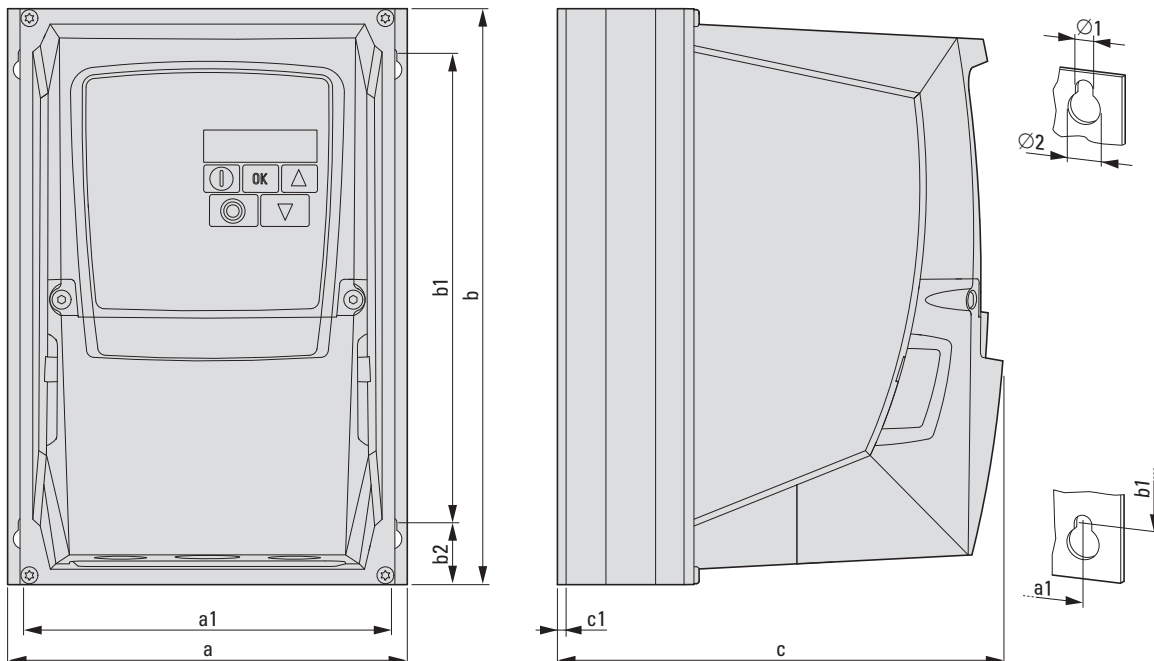
Dimensions

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



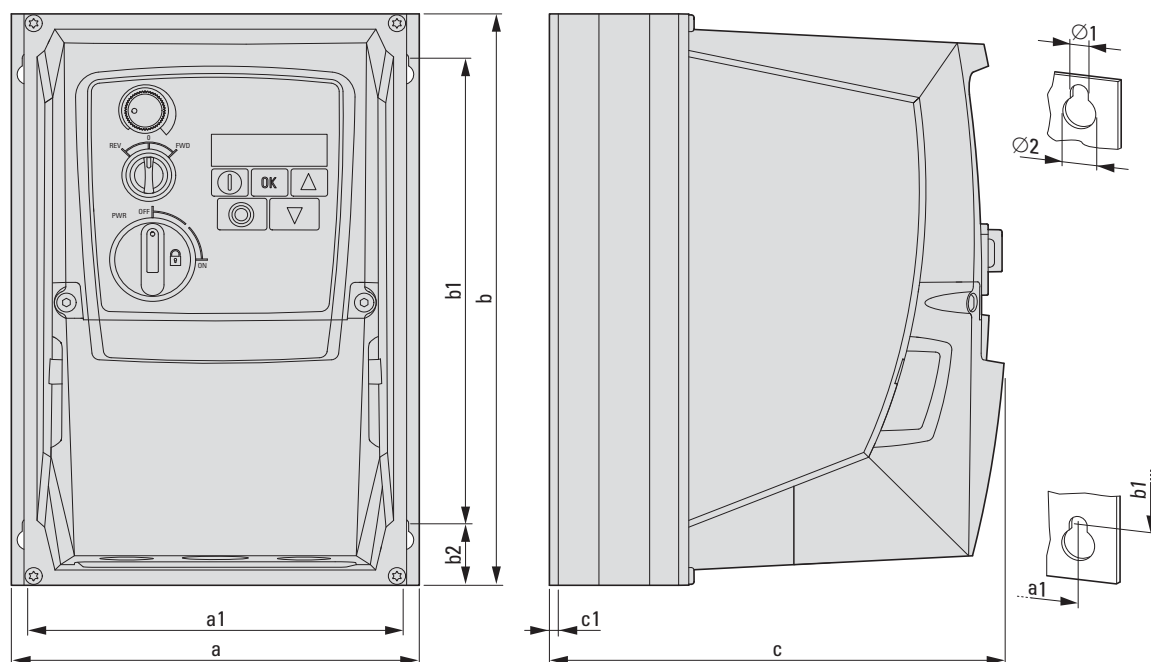
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
81 (3.19)	50 (1.97)	184 (7.24)	170 (6.69)	7 (0.28)	124 (4.88)	4 (0.16)	6 (0.24)	12 (0.47)	1.1	FS1
107 (4.21)	75 (2.95)	231 (9.09)	215 (8.46)	8 (0.31)	152 (5.98)	5 (0.2)	6 (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



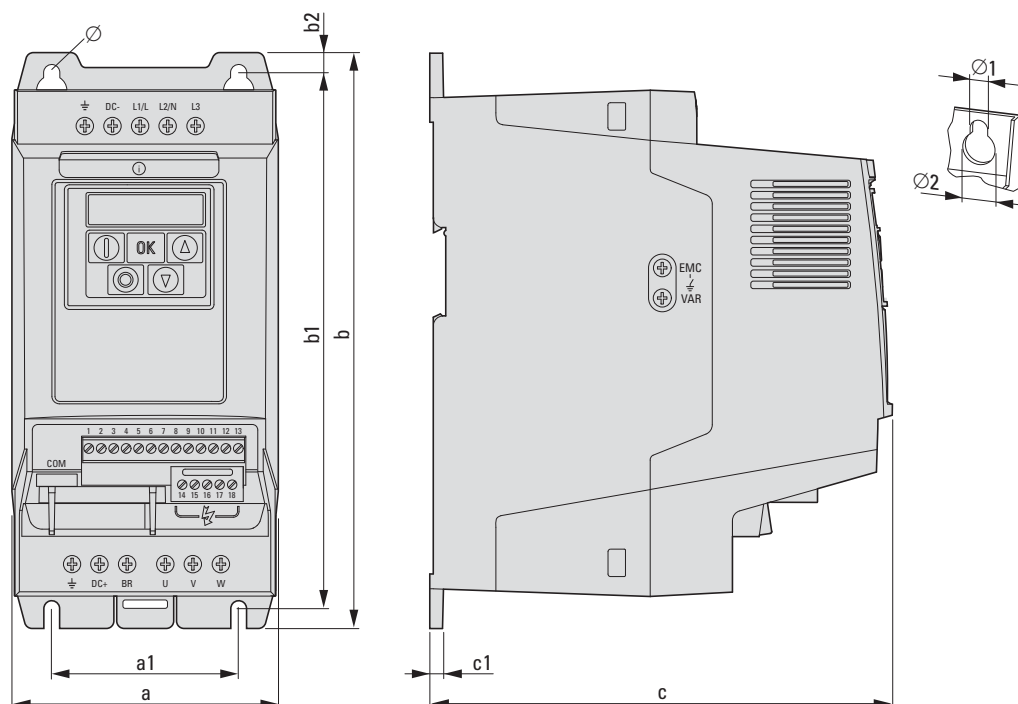
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
161 (6.34)	148.5 (5.85)	232 (9.13)	189 (7.44)	25 (0.98)	184 (7.24)	3.5 (0.14)	4 (0.15)	8 (0.31)	2.5 (5.51)	FS1
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	28.5 (1.12)	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



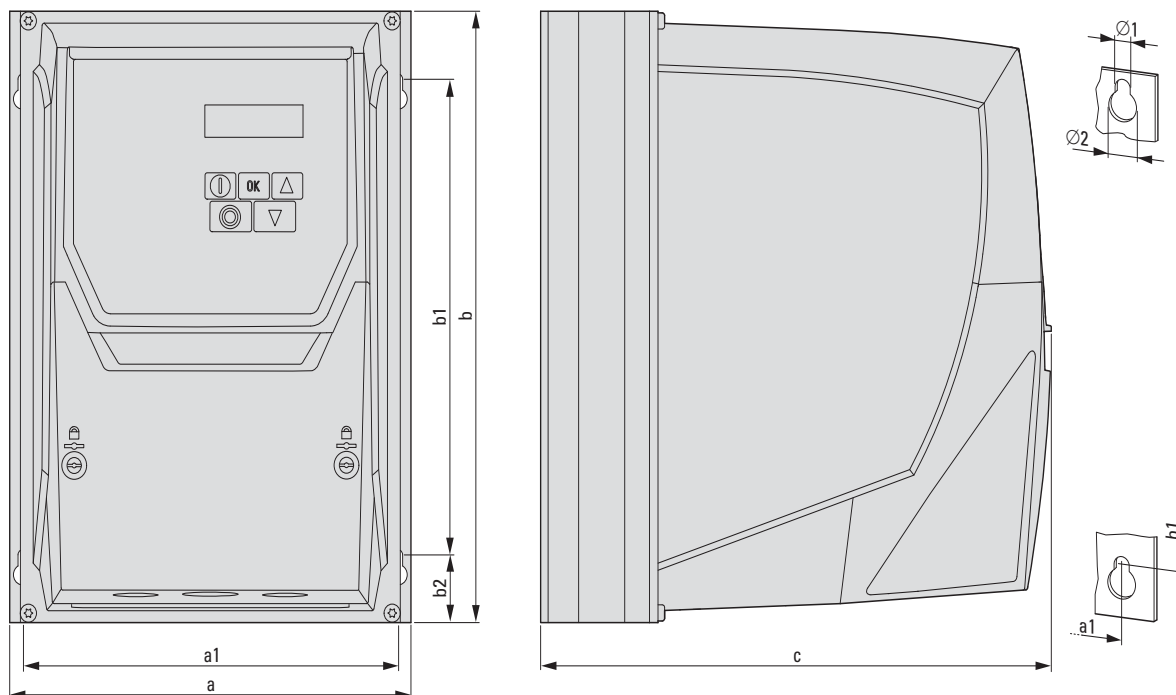
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
161 (6.34)	148.5 (5.85)	232 (9.13)	189 (7.44)	25 (0.98)	184 (7.24)	3.5 (0.14)	4 (0.15)	8 (0.31)	2.8 (6.17)	FS1
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	28.5 (1.12)	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



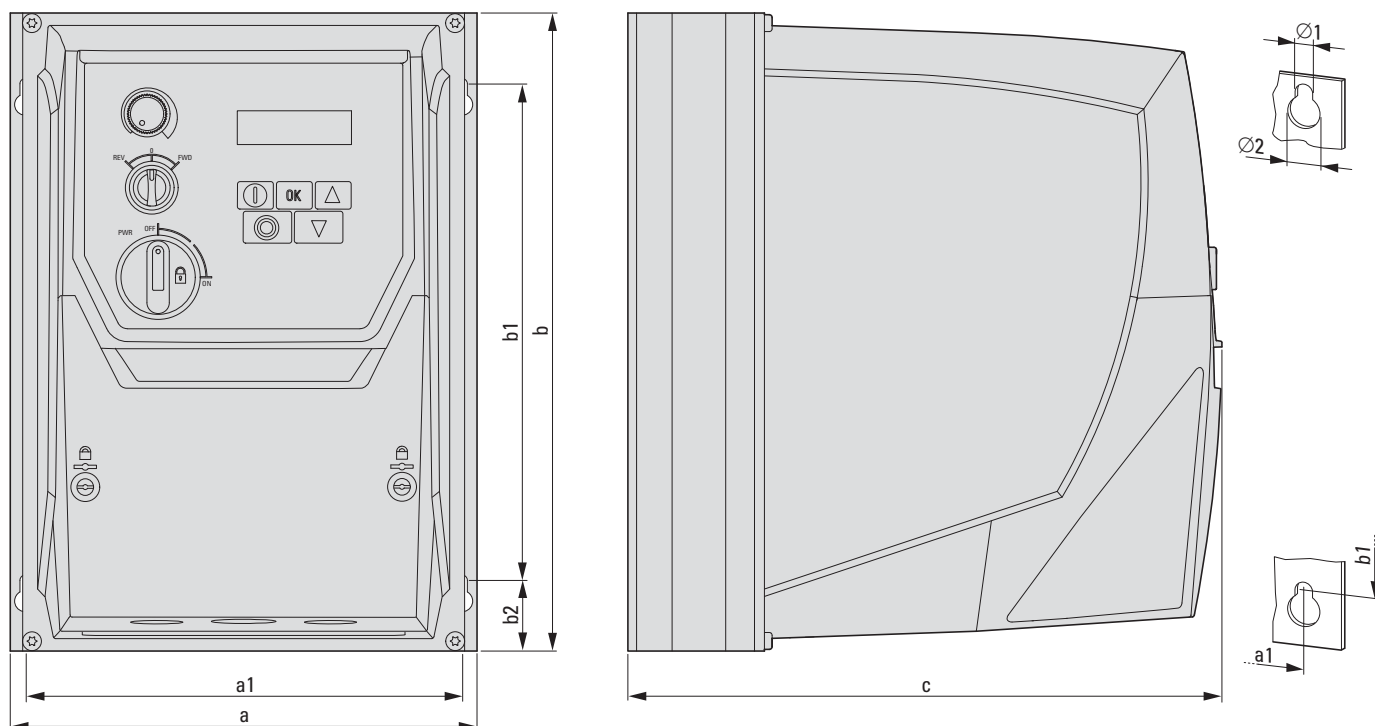
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
107 (4.21)	75 (2.95)	231 (9.09)	215 (8.46)	8 (0.31)	186 (7.32)	5 (0.2)	6 (0.24)	12 (0.47)	1.8	FS2
131 (5.16)	100 (3.94)	273 (10.75)	255 (10.04)	8.5 (0.33)	204 (8.03)	5 (0.2)	6 (0.24)	12 (0.47)	3.5	FS3

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



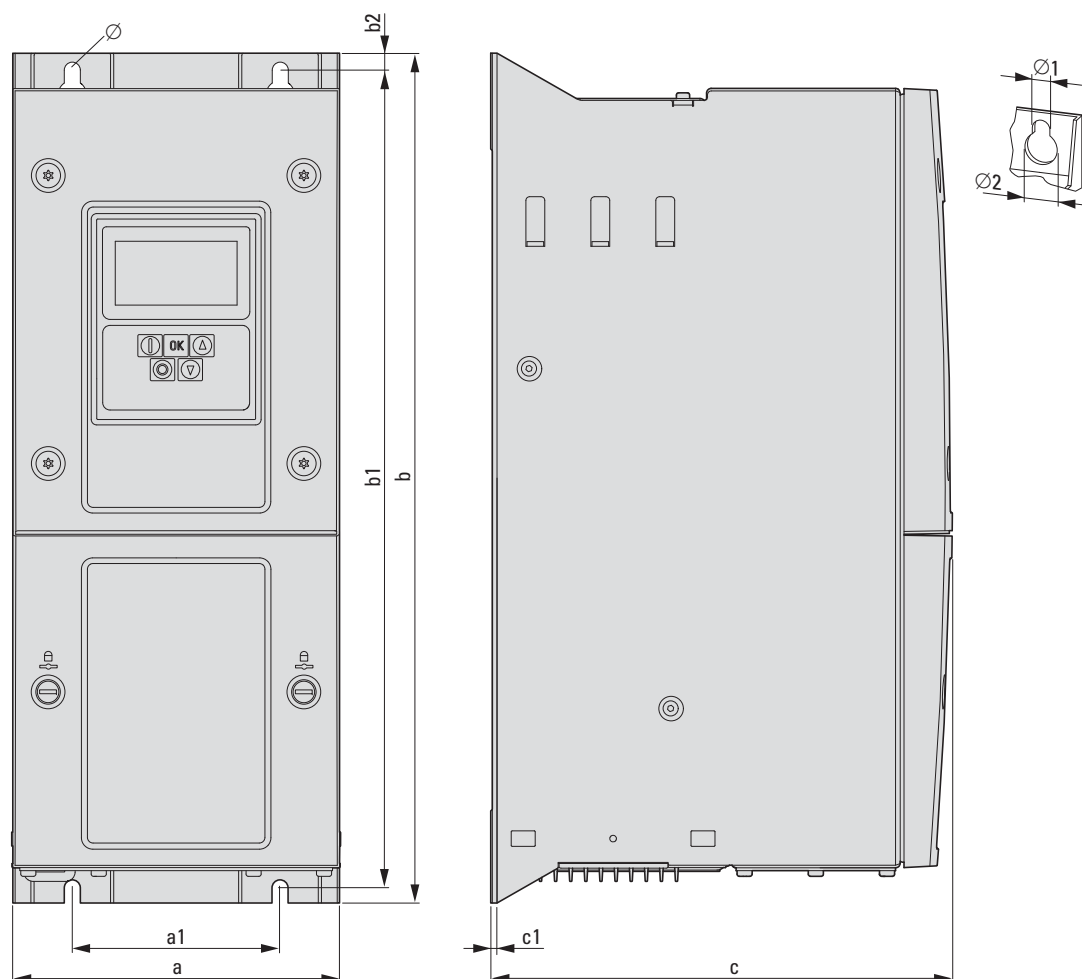
a	a1	b	b1	b2	c	$\varnothing 1$	$\varnothing 2$	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
188 (7.4)	176 (6.93)	257 (10.12)	200 (7.87)	20 (0.79)	239.3 (9.42)	4.2 (0.16)	8.5 (0.33)	4.5 (10.4)	FS2
211 (8.29)	198 (7.78)	310 (12.2)	252 (9.9)	25 (0.98)	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	a1	b	b1	b2	c	$\varnothing 1$	$\varnothing 2$	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
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	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
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

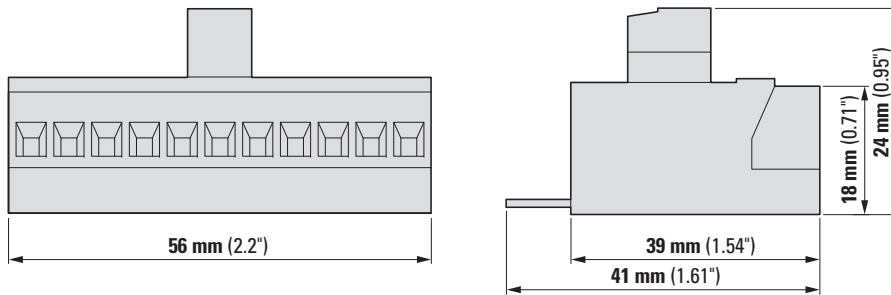
DA1, size FS8, degree of protection IP40

Control panel version

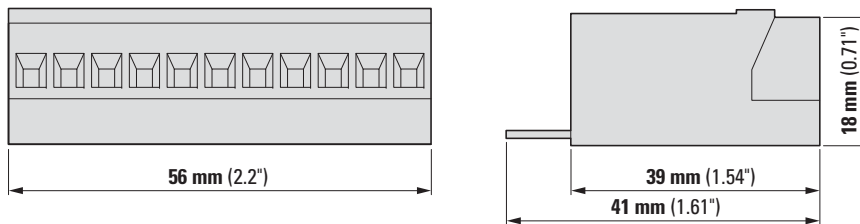
a	a1	b	b1	b2	c	c1	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg	
500 (19.69)	350 (13.78)	2000 (78.74)	1950 (76.77)	33 (1.3)	516 (20.31)	2 (0.08)	18 (0.71)	35 (1.38)	270	FS8

Expansion modules for DC1

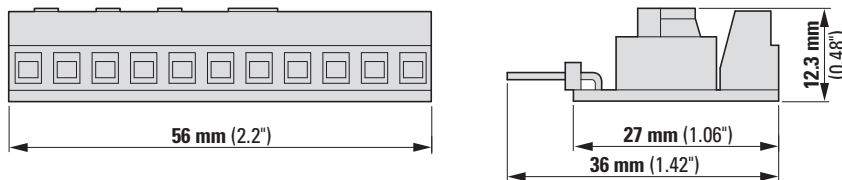
DXC-EXT-IO110
DXC-EXT-IO230
DXC-EXT-2R01A0



DXC-EXT-2R0

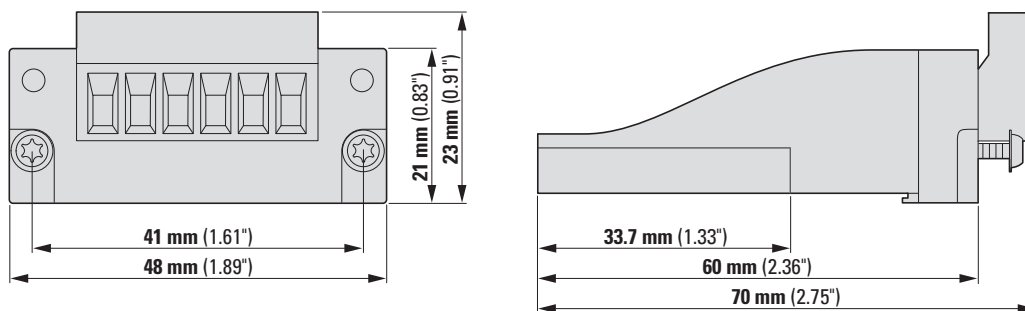


DXC-EXT-LOCSIM



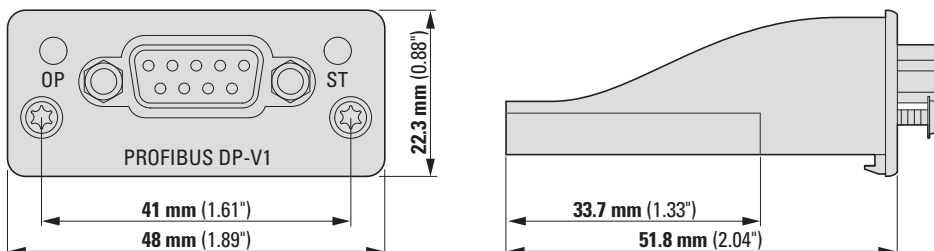
Expansion modules for DA1

DXA-EXT-3DI1R0
DXA-EXT-3R0
DXA-EXT-ENCOD



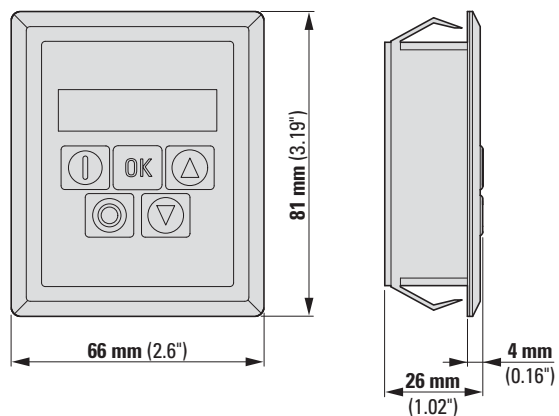
Fieldbus module for DA1

DX-NET-PROFIBUS

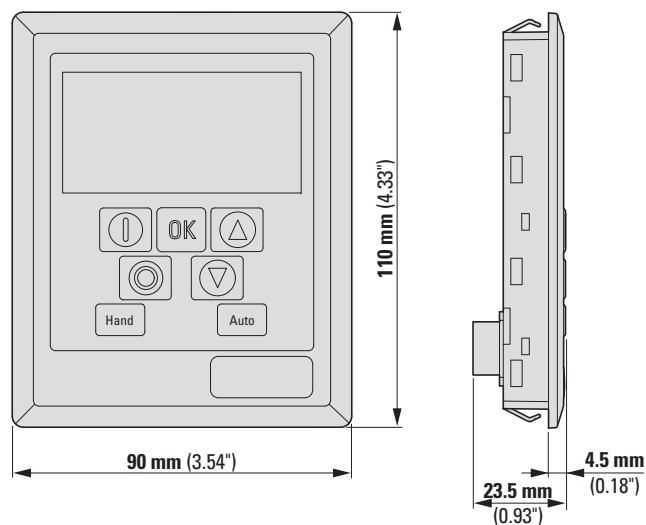


External keypad

DX-KEY-LED

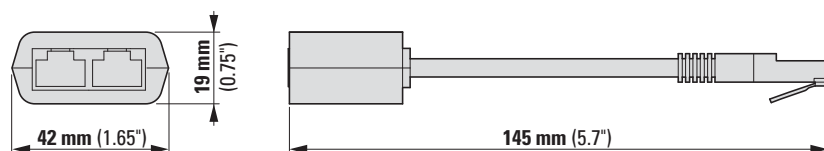


DX-KEY-OLED



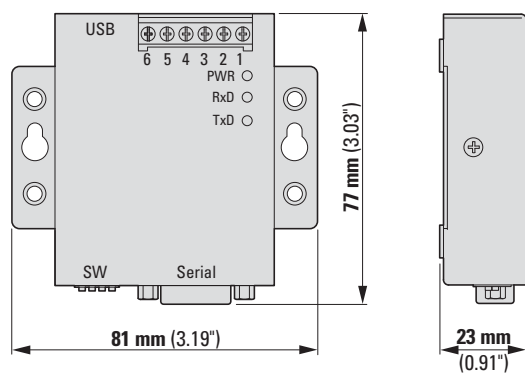
Cable and splitter

DX-SPL-RJ45-2SL1PL



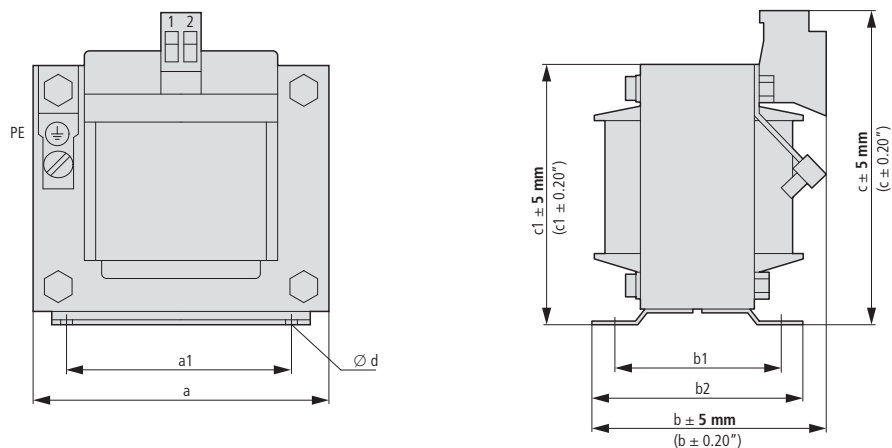
Interface converter

DX-COM-PCKIT



Mains chokes

DX-LN1-...

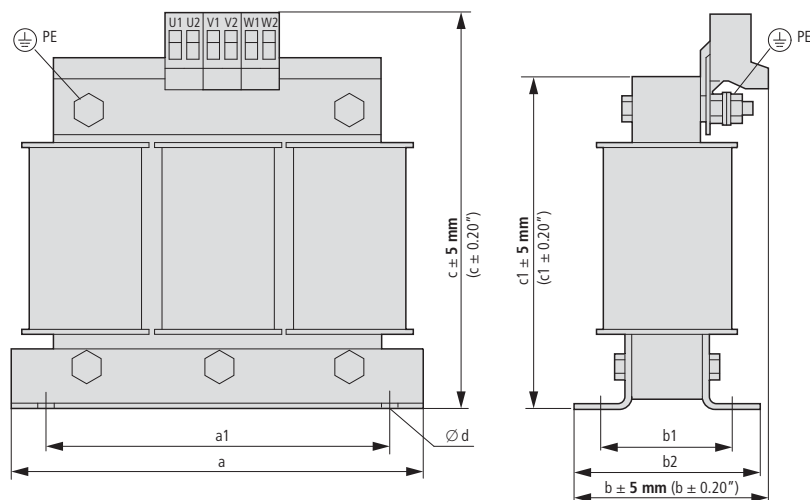


	a	a1	b	b1	b2	c	c1	d	Weight
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg
DX-LN1-006	66 (2.6)	50 (1.97)	71 (2.8)	44 (1.73)	55 (2.17)	80 (3.15)	61 (2.36)	4.5 x 8 (0.18 x 0.31)	0.7
DX-LN1-009	66 (2.6)	50 (1.97)	71 (2.8)	44 (1.73)	55 (2.17)	80 (3.15)	61 (2.36)	4.5 x 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

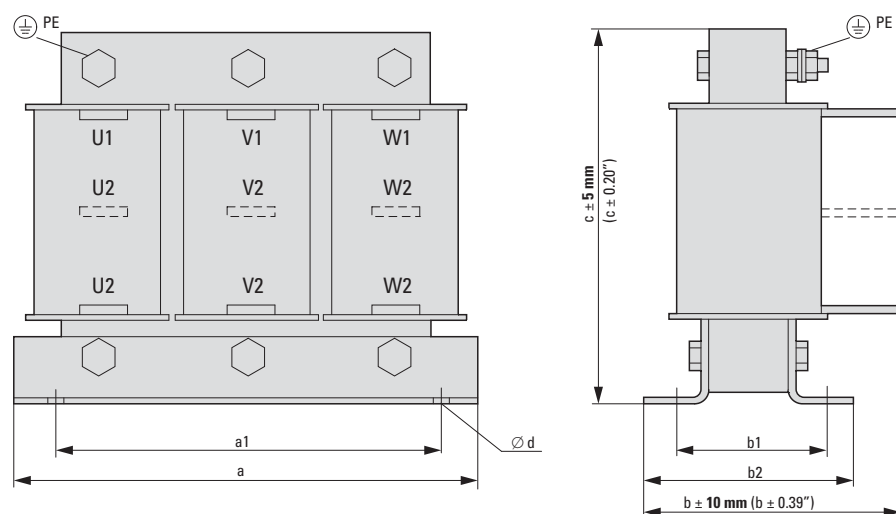
DX-LM3-005...-DX-LM3-050



	a	a1	b	b1	b2	c	c1	d	Weight
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	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



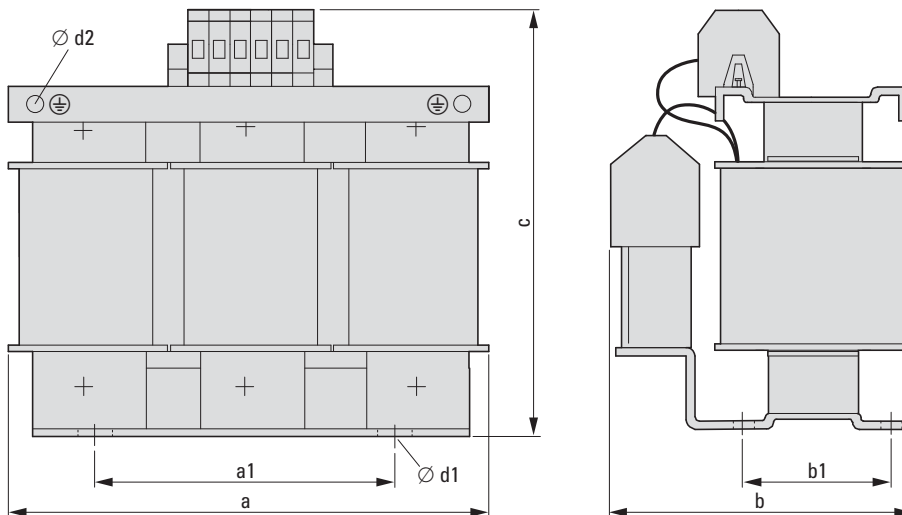
Height tolerance depends on gap

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

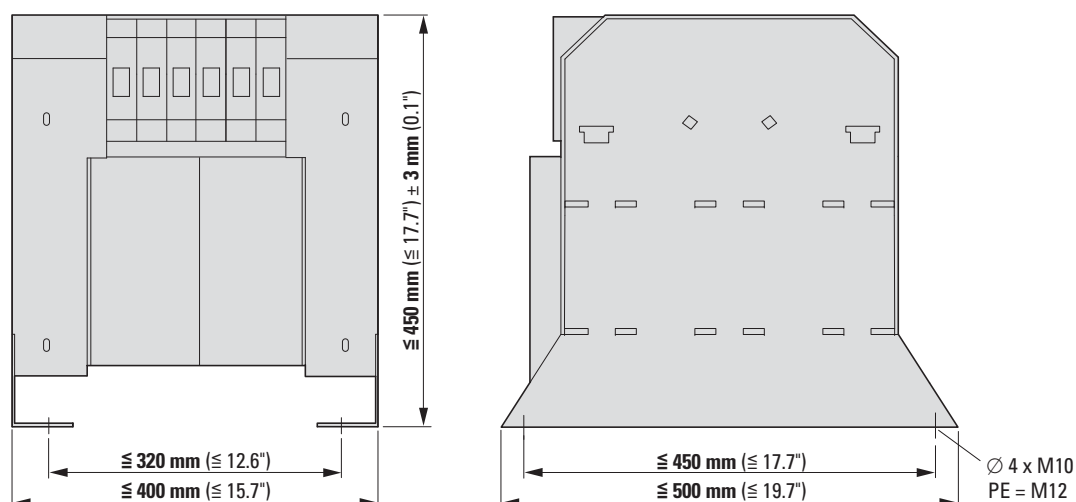
DX-SIN3-004 - DX-SIN3-180



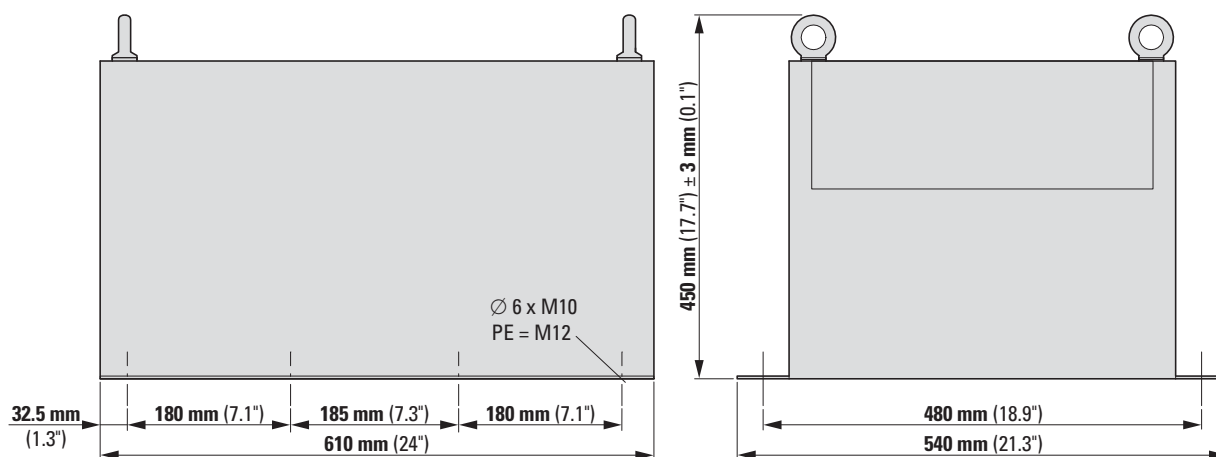
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	d1	d2	Weight kg
DX-SIN3-004	155 (6.1)	130 (5.12)	105 (4.13)	56 (2.2)	160 (6.3)	4 x M5	M4	4.2
DX-SIN3-010	155 (6.1)	130 (5.12)	120 (4.72)	71 (2.8)	160 (6.3)	4 x M5	M4	6.1
DX-SIN3-016	190 (7.48)	170 (6.69)	160 (6.3)	67 (2.64)	185 (7.28)	4 x 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

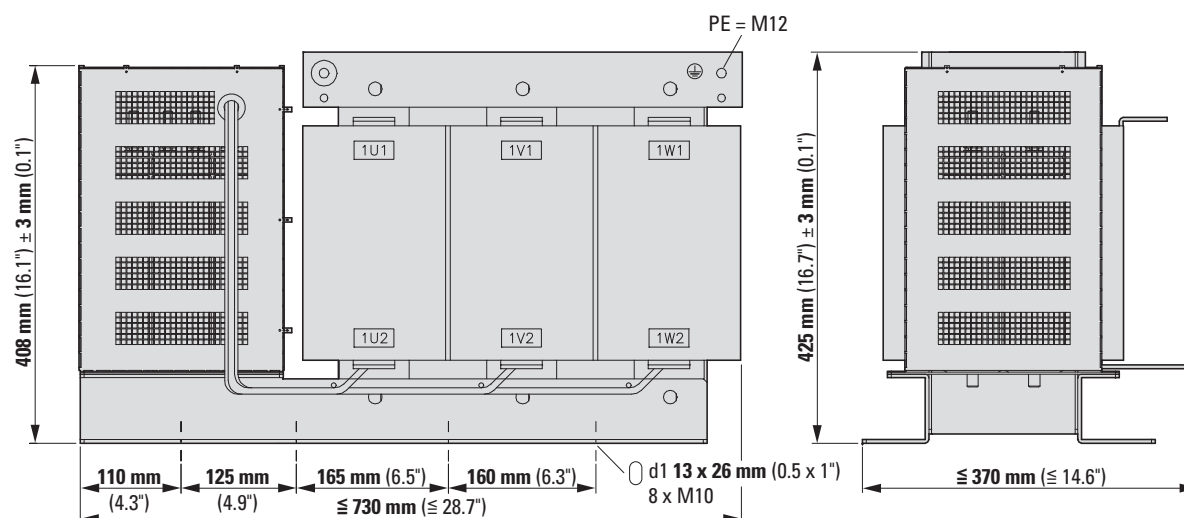
DX-SIN3-250



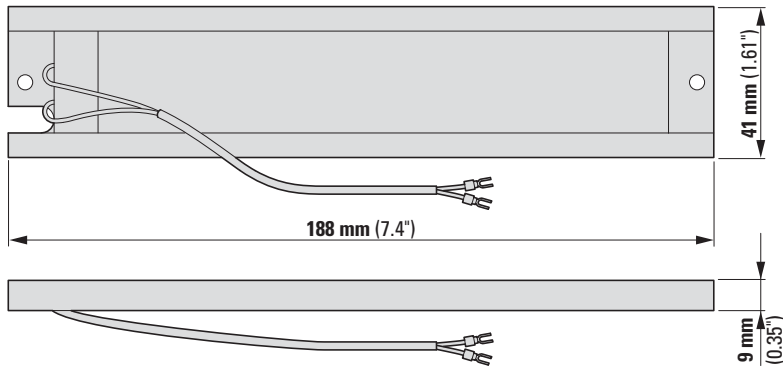
DX-SIN3-440



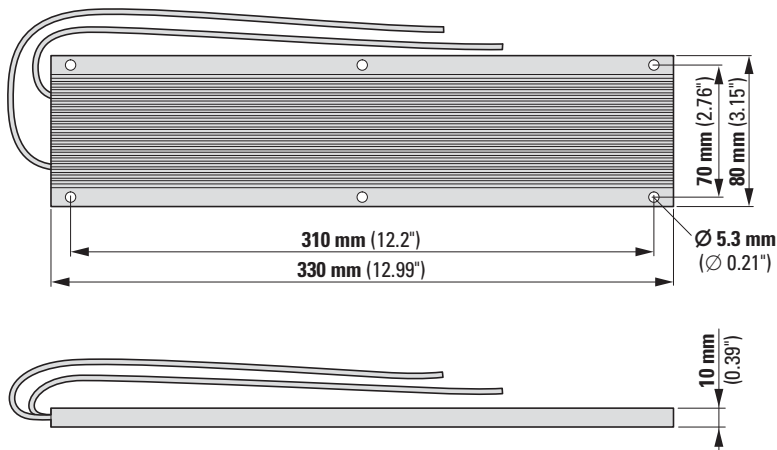
DX-SIN3-480



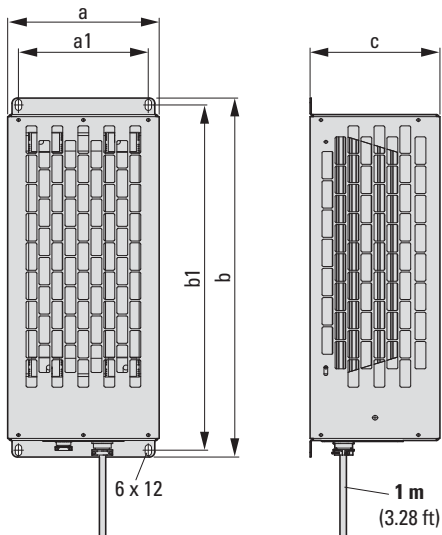
DX-BR3-100



DX-BR5-033

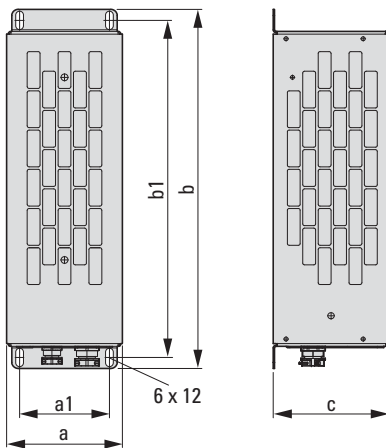


DX-BR... with connection cable



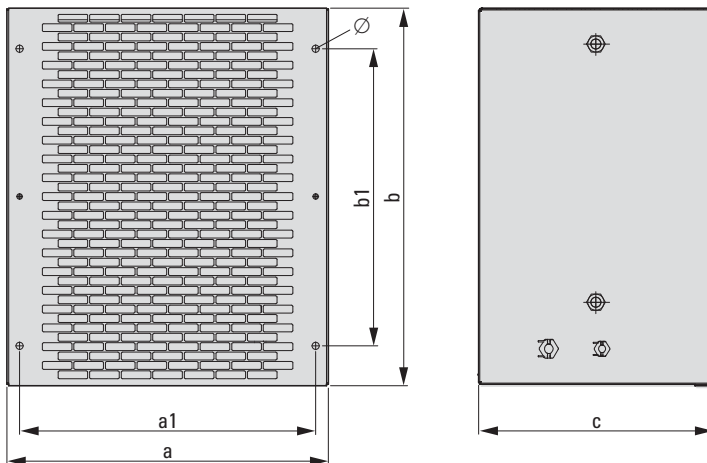
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Weight kg (lbs)
DX-BR200-0K4 DX-BR400-0K4	95 (3.07)	70 (2.76)	445 (17.52)	425 (16.73)	95 (3.07)	2.4 (5.29)
DX-BR150-0K5	140 (5.51)	120 (4.72)	395 (15.55)	375 (14.76)	120 (4.72)	3.7 (8.16)
DX-BR100-0K8 DX-BR200-0K8	140 (5.51)	120 (4.72)	445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

DX-BR... with connection cable



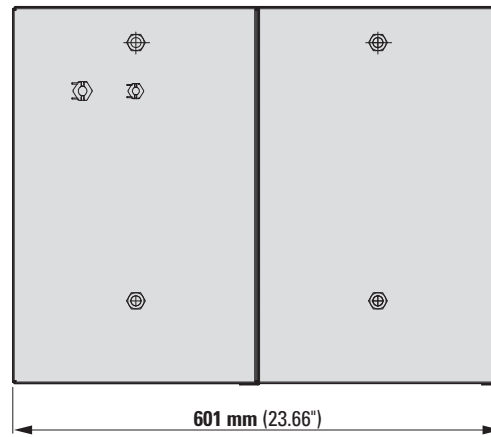
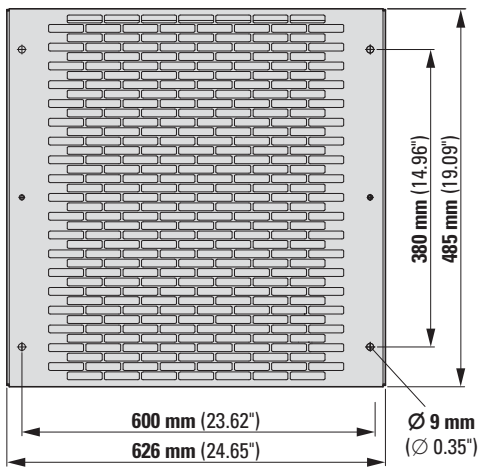
	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Weight kg (lbs)
DX-BR050-0K4 DX-BR100-0K4	95 (3.07)	70 (2.76)	445 (17.52)	425 (16.73)	95 (3.07)	2.1 (4.63)
DX-BR100-0K2	95 (3.07)	70 (2.76)	345 (13.58)	325 (12.8)	95 (3.07)	1.7 (3.75)
DX-BR050-0K8	140 (5.51)	120 (4.72)	445 (17.52)	425 (16.73)	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

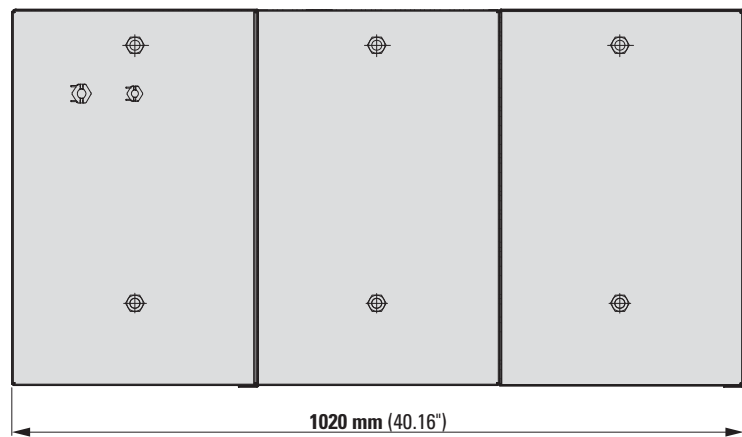
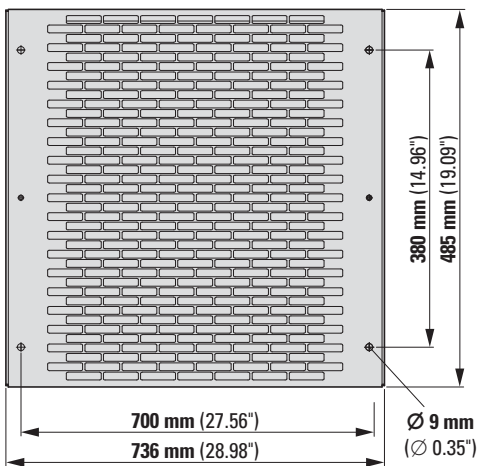


	a mm (inch)	a1 mm (inch)	b mm (inch)	b1 mm (inch)	c mm (inch)	Ø1 mm (inch)	Weight kg (lbs)
DX-BR022-1K4	226 (8.9)	200 (7.87)	485 (19.09)	380 (14.96)	301 (11.85)	9 (0.35)	8.6 (18.96)
DX-BR012-3K1 DX-BR022-3K1 DX-BR040-3K1 DX-BR047-3K1 DX-BR050-3K1	326 (12.83)	300 (11.81)	485 (19.09)	380 (14.96)	301 (11.85)	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 kW¹⁾

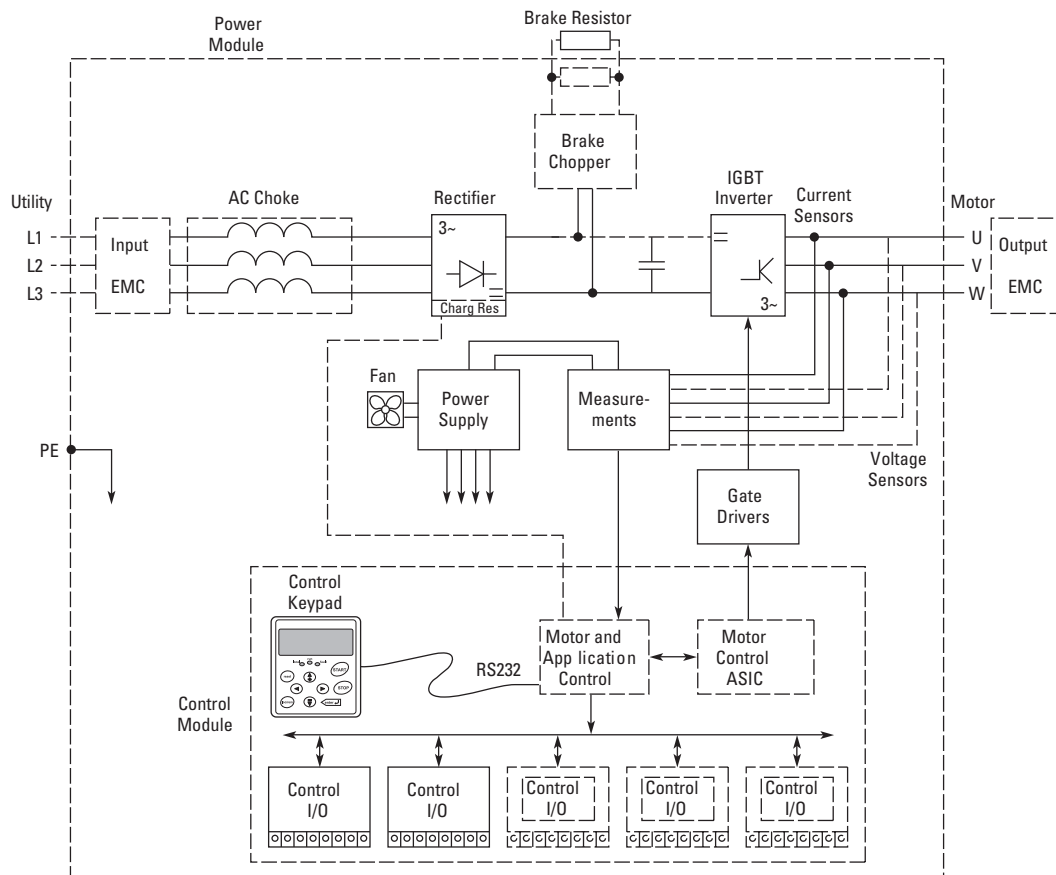
SPX...-5A...: U_{IN} 3~690 V/ U_{OUT} 3~690 V, allocated motor outputs 2.2 – 160 kW¹⁾

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.



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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

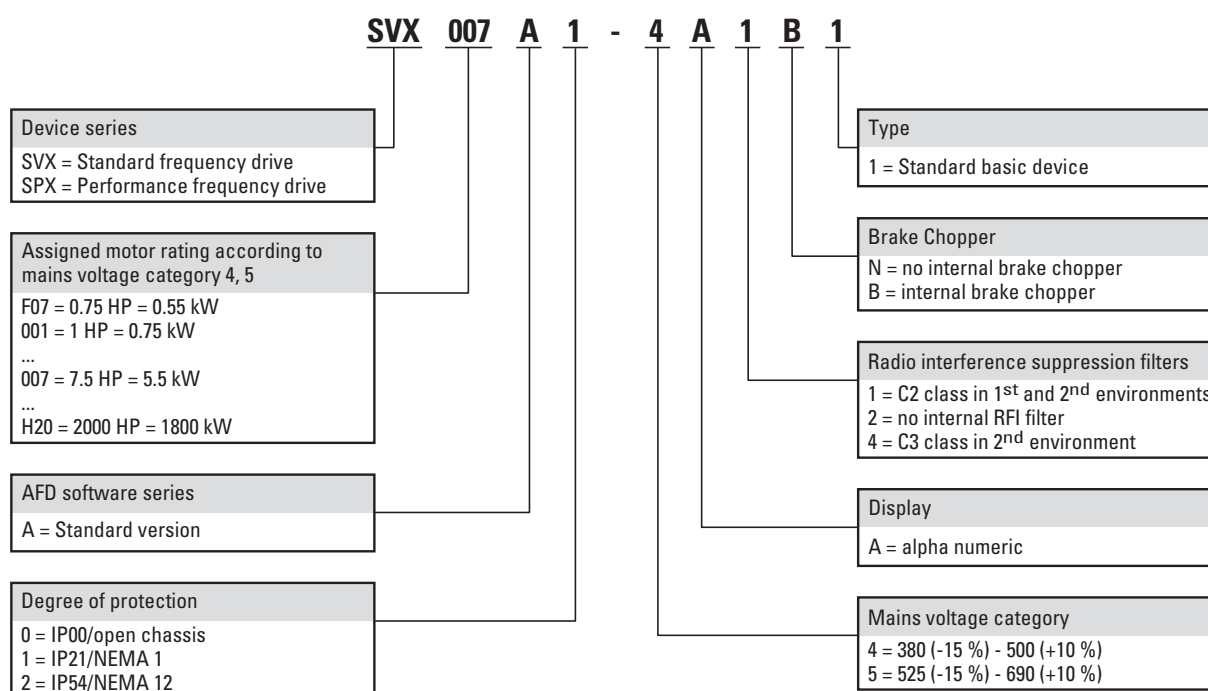
			SVX	SPX
Rated operational voltage	U _e			
400 V AC, 3-phase			✓	✓
690 V AC, 3-phase			✓	✓
Mains voltage (50/60Hz)	U _{LN}	V		
380 (-15%) - 500 (+10%)			✓	✓
525 (-15%) - 690 (±10%)			✓	✓
Supply frequency	f _{LN}	Hz	50/60	50/60
Rated operational current ¹⁾				
At 110% overload	I _e	A	3.3 - 300	3.3 - 300 (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 %	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												
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)

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 / U₂ 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						
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	
						✓	-		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 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %						
I _e	I _e	P	P	I _e	I _e	Radio interference suppression filter Brake chopper					
A	A	kW	kW	A	A						
U_e 690 V AC, 3-phase / U₂ 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 IP54 IP21 IP54	SVX020A1-5A4N1 125763 SVX020A2-5A4N1 125781 SVX020A1-5A4B1 138487 SVX020A2-5A4B1 138505		1 off  
34	27	30	22	32	23.8	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SVX025A1-5A4N1 125764 SVX025A2-5A4N1 125782 SVX025A1-5A4B1 138488 SVX025A2-5A4B1 138506		
41	34	37	30	39	32	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP21 IP54 IP21 IP54	SVX030A1-5A4N1 125765 SVX030A2-5A4N1 125783 SVX030A1-5A4B1 138489 SVX030A2-5A4B1 138507		
52	41	45	37	47	39	✓ - ✓ - ✓ ✓ ✓ ✓		IP54 IP21 IP21 IP54	SVX040A2-5A4N1 125784 SVX040A1-5A4N1 125766 SVX040A1-5A4B1 138490 SVX040A2-5A4B1 138508		
62	52	55	45	58	47	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21 IP54 IP54 IP21	SVX050A1-5A4N1 125767 SVX050A2-5A4N1 125785 SVX050A2-5A4B1 138509 SVX050A1-5A4B1 138491		
80	62	75	55	78	58	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SVX060A1-5A4N1 125768 SVX060A2-5A4N1 125786 SVX060A1-5A4B1 138492 SVX060A2-5A4B1 138510		
100	80	90	75	93	78	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SVX075A1-5A4N1 125769 SVX075A2-5A4N1 125787 SVX075A1-5A4B1 138493 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 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %						
I _e	I _e	P	P	I _e	I _e	Radio interference suppression filter Brake chopper					
A	A	kW	kW	A	A						
U_e 690 V AC, 3-phase / U₂ 690 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 525 (-15%) - 690 (±10%) V											
125	100	110	90	114	93	✓ - ✓ - ✓ ✓ ✓ ✓	FR9	IP21 IP54 IP21 IP54	SVX100A1-5A4N1 125770 SVX100A2-5A4N1 125788 SVX100A1-5A4B1 138494 SVX100A2-5A4B1 138512		1 off  
144	125	132	110	134	114	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP54 IP21	SVX125A1-5A4N1 125771 SVX125A2-5A4N1 125789 SVX125A2-5A4B1 138513 SVX125A1-5A4B1 138495		
170	144	160	132	162	134	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SVX150A1-5A4N1 125772 SVX150A2-5A4N1 125790 SVX150A1-5A4B1 138496 SVX150A2-5A4B1 138514		
208	170	200	160	202	162	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SVX175A1-5A4N1 125773 SVX175A2-5A4N1 125791 SVX175A1-5A4B1 138497 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 %	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												
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 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %						
I _e	I _e	P	P	I _e	I _e	Radio interference suppression filter Brake chopper					
A	A	kW	kW	A	A						
U_e 400 V AC, 3-phase / U₂ 400 V AC, 3-phase Mains voltage (50/60Hz) U _{LN} : 380 (-15%) - 500 (+10%) V											
87	72	45	37	81	68	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP21 IP54 IP21 IP54	SPX050A1-4A1N1 125331 SPX050A2-4A1N1 125337 SPX050A1-4A1B1 138606 SPX050A2-4A1B1 138610		1 off  
105	87	55	45	99	81	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX060A1-4A1N1 125668 SPX060A2-4A1N1 125348 SPX060A1-4A1B1 138607 SPX060A2-4A1B1 138611		
140	105	75	55	134	99	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21 IP54 IP21 IP54	SPX075A1-4A1N1 125354 SPX075A2-4A1N1 125359 SPX075A1-4A1B1 138608 SPX075A2-4A1B1 138612		
170	140	90	75	161	134	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX100A1-4A1N1 125365 SPX100A2-4A1N1 125370 SPX100A1-4A1B1 131744 SPX100A2-4A1B1 138613		
205	170	110	90	196	161	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX125A1-4A1N1 125669 SPX125A2-4A1N1 125377 SPX125A1-4A1B1 134489 SPX125A2-4A1B1 138614		
261	205	132	110	231	196	✓ - ✓ - ✓ ✓ ✓ ✓	FR9	IP21 IP54 IP21 IP54	SPX150A1-4A1N1 125381 SPX150A2-4A1N1 125385 SPX150A1-4A1B1 129701 SPX150A2-4A1B1 138615		
300	245	160	132	279	231	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX200A1-4A1N1 125670 SPX200A2-4A1N1 125398 SPX200A1-4A1B1 134845 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 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %						
I _e	I _e	P	P	I _e	I _e	Radio interference suppression filter Brake chopper					
A	A	kW	kW	A	A						
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)  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 %						
I _e	I _e	P	P	I _e	I _e	Radio interference suppression filter Brake chopper					
A	A	kW	kW	A	A						
U_e 690 V AC, 3-phase / U₂ 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 IP54 IP21 IP54	SPX020A1-5A4N1 125287 SPX020A2-5A4N1 125293 SPX020A1-5A4B1 138645 SPX020A2-5A4B1 129589		1 off  
34	27	30	22	32	23.8	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP54 IP21	SPX025A1-5A4N1 125298 SPX025A2-5A4N1 125304 SPX025A2-5A4B1 129590 SPX025A1-5A4B1 138646		
41	34	37	30	39	32	✓ - ✓ - ✓ ✓ ✓ ✓	FR7	IP21 IP54 IP21 IP54	SPX030A1-5A4N1 125309 SPX030A2-5A4N1 125315 SPX030A1-5A4B1 138647 SPX030A2-5A4B1 129591		
52	41	45	37	47	39	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX040A1-5A4N1 125321 SPX040A2-5A4N1 125327 SPX040A1-5A4B1 138648 SPX040A2-5A4B1 129592		
62	52	55	45	58	47	✓ - ✓ - ✓ ✓ ✓ ✓	FR8	IP21 IP54 IP21 IP54	SPX050A1-5A4N1 125333 SPX050A2-5A4N1 125339 SPX050A1-5A4B1 138649 SPX050A2-5A4B1 129593		
80	62	75	55	78	58	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP21 IP54	SPX060A1-5A4N1 125344 SPX060A2-5A4N1 125350 SPX060A1-5A4B1 138650 SPX060A2-5A4B1 129594		
100	80	90	75	93	78	✓ - ✓ - ✓ ✓ ✓ ✓		IP21 IP54 IP54 IP21	SPX075A1-5A4N1 125356 SPX075A2-5A4N1 125361 SPX075A2-5A4B1 129595 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)

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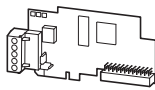
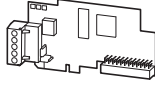
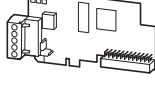
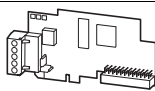
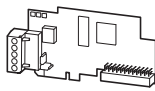
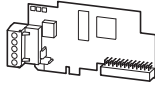
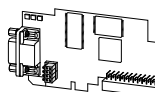
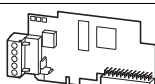
Rated operational current ¹⁾		Assigned motor rating ^{1), 2)}		Rated motor current ^{1), 2)}		Fitted with Radio interference suppression filter Brake chopper	Frame size	Protection type	Part no. Article no.	Price see price list	Std. pack
L = 110 %	H = 150 %	L = 110 %	H = 150 %	L = 110 %	H = 150 %						
I _e	I _e	P	P	I _e	I _e						
A	A	kW	kW	A	A						
U_e 690 V AC, 3-phase / U₂ 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		

Notes¹⁾ 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 E134360
Mounting unit					UL File No. UL Category Control No.	NMMS, NMMS2, NMMS7. NMMS8 UL report applies to both US and Canada 3211-06
Mounting frame for control panel door 3 m	KEYPAD- LOC/REM	OPTRMT-KIT 126868		1 off  	CSA File No.	
Connection cable					CSA Class No. North America Certification	
Connection between variable frequency drive and PC 1.5 m	SVX, SPX	SVDRIVECABLE 129001		1 off  	Suitable for	UL listed, certified by UL for use in Canada 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						1 off  	Product Standards UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking E134360 UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification Suitable for	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking E134360 NMMS, NMMS2, NMMS7. NMMS8 UL report applies to both US and Canada 3211-06 UL listed, certified by UL for use in Canada Branch circuits	
	System bus adapter	SPX	OPTD1 125077						
	System bus adapter with CANopen® interface	SPX	OPTD2 125078						
	RS232 adapter	SPX	OPTD3 125079						
Output expansion						1 off  			
	1 relay output (NO/NC) 1 relay output (NC) 1 Thermistor input	SPX	OPTA3 125050						
	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						1 off  			
	6 digital inputs External 24 V supply	SVX, SPX	OPTB1 125059						
	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						1 off  			
	HTL (+15 V/24 V) Master / Slave capability	SPX	OPTA7 125053						
Temperature sensor expansion						1 off  			
	3 Pt100 External 24 V supply	SVX, SPX	OPTB8 125063						
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						

Technical data

			SVX001... SPX001...	SVXF15... SPXF15...	SVX002... SPX002...	SVX003... SPX003...
General						
Standards			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
Production quality			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			
Ambient temperature						
Operation		θ °C	-10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage		θ °C	-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.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			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			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Weight		kg	5	5	5	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
Mains voltage (50/60Hz)		U _{LN} V	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
Frequency range		f _{LN} 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			
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
Output Frequency		f ₂ 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)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			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
Rated operational current						
At 110% overload		I _e A	3.3	4.3	5.6	7.6
At 150% overload		I _e A	2.2	3.3	4.3	5.6
Motor feeder						
Assigned motor rating						
Note			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
With 400 V, 50 Hz (150% overload)		P kW	0.75	1.1	1.5	2.2
With 440 - 480 V, 60 Hz (110% overload)		P HP	1.5	2	3	5
With 440 - 480 V, 60 Hz (150% overload)		P HP	1	1.5	2	3
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)
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)

SVX005... SPX005...	SVX006... SPX006...	SVX007... SPX007...	SVX010... SPX010...	SVX015... SPX015...	SVX020... SPX020...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water					
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
5	5	8.1	8.1	8.1	18.5
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
380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
50/60	50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Frequency inverter with internal DC link and IGBT inverter					
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
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)	10 (adjustable 1 - 16)
U/f control sensorless vector control (SLV)					
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
0.01	0.01	0.01	0.01	0.01	0.01
9	12	16	23	31	38
7.6	9	12	16	23	31
For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
4	5.5	7.5	11	15	18.5
3	4	5.5	7.5	11	15
6	7.5	10	15	20	25
5	6	7.5	10	15	20
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)
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...
General						
Standards			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
Production quality			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			
Ambient temperature						
Operation		θ °C	-10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage		θ °C	-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.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			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			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Weight		kg	18.5	18.5	35	35
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
Mains voltage (50/60Hz)		U _{LN} V	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
Frequency range		f _{LN} 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			
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
Output Frequency		f ₂ 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)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			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
Rated operational current						
At 110% overload		I _e A	46	61	72	87
At 150% overload		I _e A	38	46	61	72
Motor feeder						
Assigned motor rating						
Note			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
With 400 V, 50 Hz (150% overload)		P kW	18.5	22	30	37
With 440 - 480 V, 60 Hz (110% overload)		P HP	30	40	50	60
With 440 - 480 V, 60 Hz (150% overload)		P HP	25	30	40	50
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)
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)

SVX060... SPX060...	SVX075... SPX075...	SVX100... SPX100...	SVX125... SPX125...	SVX150... SPX150...	SVX200... SPX200...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water					
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
35	58	58	58	146	146
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
380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)	380 (-15%) - 500 (+10%)
50/60	50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Frequency inverter with internal DC link and IGBT inverter					
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
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
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)
U/f control sensorless vector control (SLV)					
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
0.01	0.01	0.01	0.01	0.01	0.01
105	140	170	205	261	300
87	105	140	170	205	245
For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
55	75	90	110	132	160
45	55	75	90	110	132
75	100	125	150	200	250
60	75	100	125	150	200
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)
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...
General						
Standards			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
Production quality			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			
Ambient temperature						
Operation		θ °C	-10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage		θ °C	-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.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			Vertical	Vertical	Vertical	Vertical
Altitude			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)			
Weight		kg	18.5	18.5	18.5	18.5
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
Mains voltage (50/60Hz)		U _{LN} V	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
Frequency range		f _{LN} 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			
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
Output Frequency		f ₂ 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)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			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
Rated operational current						
At 110% overload		I _e A	4.5	5.5	7.5	10
At 150% overload		I _e A	3.2	4.5	5.5	7.5
Motor feeder						
Assigned motor rating						
Note			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
With 690 V, 60 Hz (150% overload)		P kW	2.2	3	4	5.5
With 550 - 600 V, 60 Hz (110% overload)		P HP	3	4	5	7.5
With 550 - 600 V, 60 Hz (150% overload)		P HP	2	3	4	5
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)
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)

SVX007... SPX007...	SVX010... SPX010...	SVX015... SPX015...	SVX020... SPX020...	SVX025... SPX025...	SVX030... SPX030...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003					
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water					
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.					
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m					
BGV A3 (VBG4, finger- and back-of-hand proof)					
18.5	18.5	18.5	18.5	18.5	35
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
525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
50/60	50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Frequency inverter with internal DC link and IGBT inverter					
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
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
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)
U/f control sensorless vector control (SLV)					
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)					
0.01	0.01	0.01	0.01	0.01	0.01
13.5	18	22	27	34	41
10	13.5	18	22	27	34
For AC motors with internal and external ventilation with 50 Hz / 60 Hz					
11	15	18.5	22	30	37
7.5	11	15	18.5	22	30
10	15	20	25	30	40
7.5	10	15	20	25	30
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)
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)

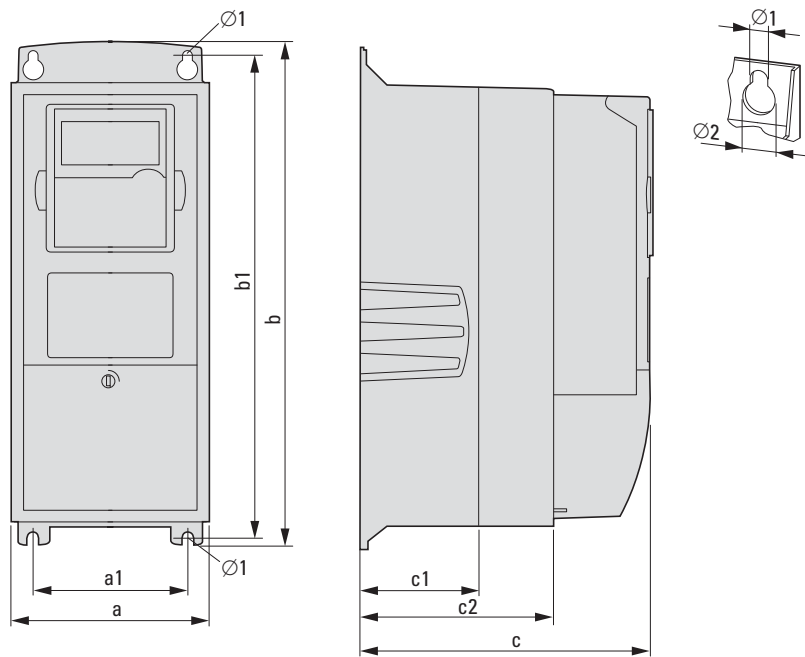
			SVX040... SPX040...	SVX050... SPX050...	SVX060... SPX060...	SVX075... SPX075...
General						
Standards			EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003			
Certifications			CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
Production quality			RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
Climatic proofing			ρ _w % < 95% relative humidity, no condensation, no corrosion, no dripping water			
Ambient temperature						
Operation			θ °C -10 - +40	-10 - +40	-10 - +40	-10 - +40
Storage			θ °C -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.			
Environment (EMC)			1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Mounting position			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			
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)			
Weight			kg 35	58	58	58
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
Mains voltage (50/60Hz)			U _{LN} V 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
Frequency range			f _{LN} 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			
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
Output Frequency			f ₂ 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)
Operation Mode						
SVX...			U/f control sensorless vector control (SLV)			
SPX...			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
Rated operational current						
At 110% overload			I _e A 52	62	80	100
At 150% overload			I _e A 41	52	62	80
Motor feeder						
Assigned motor rating						
Note			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
With 690 V, 60 Hz (150% overload)			P kW 37	45	55	75
With 550 - 600 V, 60 Hz (110% overload)			P HP 50	60	75	100
With 550 - 600 V, 60 Hz (150% overload)			P HP 40	50	60	75
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)
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)

SVX100... SPX100...	SVX125... SPX125...	SVX150... SPX150...	SVX175... SPX175...	SVX200... SPX200...
EMC: EN 61800-3:2004+A1-2012 Safety: EN 61800-5-1: 2003				
CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick	CE, cUL, c-Tick
RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001	RoHS, ISO 9001
< 95% relative humidity, no condensation, no corrosion, no dripping water				
-10 - +40	-10 - +40	-10 - +40	-10 - +40	-10 - +40
-40 - +70	-40 - +70	-40 - +70	-40 - +70	-40 - +70
C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.				
1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments	1st and 2nd environments
Vertical	Vertical	Vertical	Vertical	Vertical
0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 3000 m				
BGV A3 (VBG4, finger- and back-of-hand proof)				
146	146	146	146	176
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
525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)	525 (-15%) - 690 (±10%)
50/60	50/60	50/60	50/60	50/60
45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz	45 - 66 Hz
Frequency inverter with internal DC link and IGBT inverter				
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
0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz	0 - 320 Hz
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)
U/f control sensorless vector control (SLV)				
U/f control sensorless vector control (SLV) Vector control with feedback (CLV)				
0.01	0.01	0.01	0.01	0.01
125	144	170	208	261
100	125	144	170	208
For AC motors with internal and external ventilation with 50 Hz / 60 Hz				
110	132	160	200	250
90	110	132	160	200
125	150	175	200	250
100	125	150	175	200
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)
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

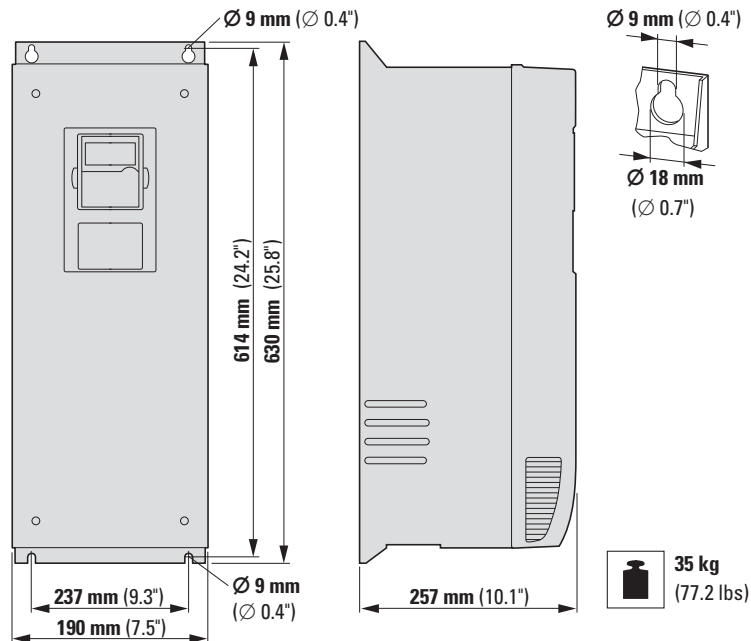
Protection type IP20/NEMA 0 and IP20/NEMA 0



a	a1	b	b1	b2	c	c1	c2	Ø1	Ø2	Weight	Size
mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lbs)	
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

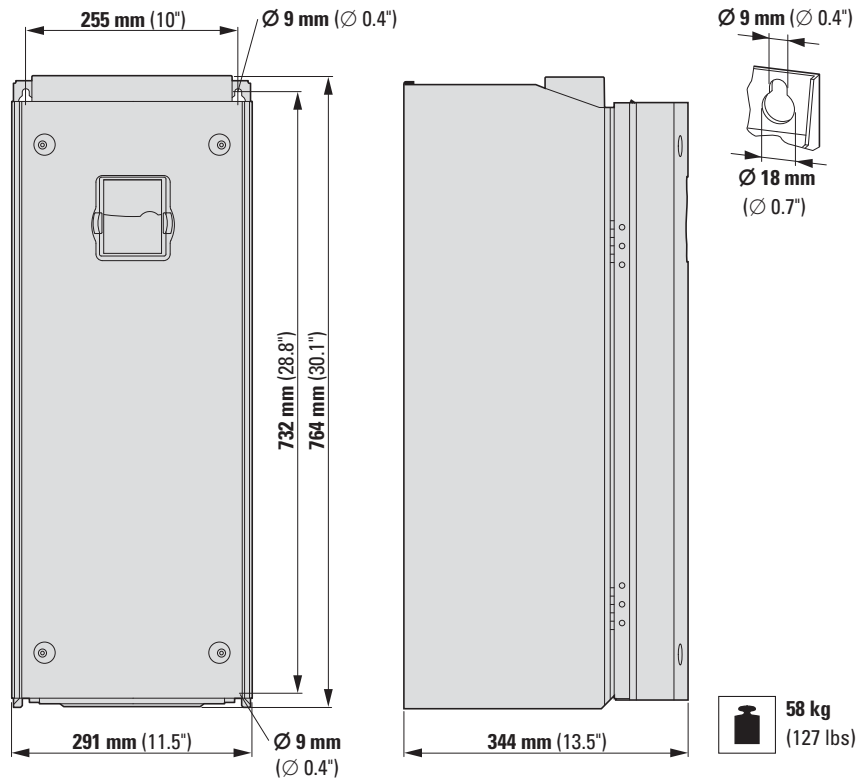
Sizes FR7

Protection type IP20/NEMA 0 and IP20/NEMA 0



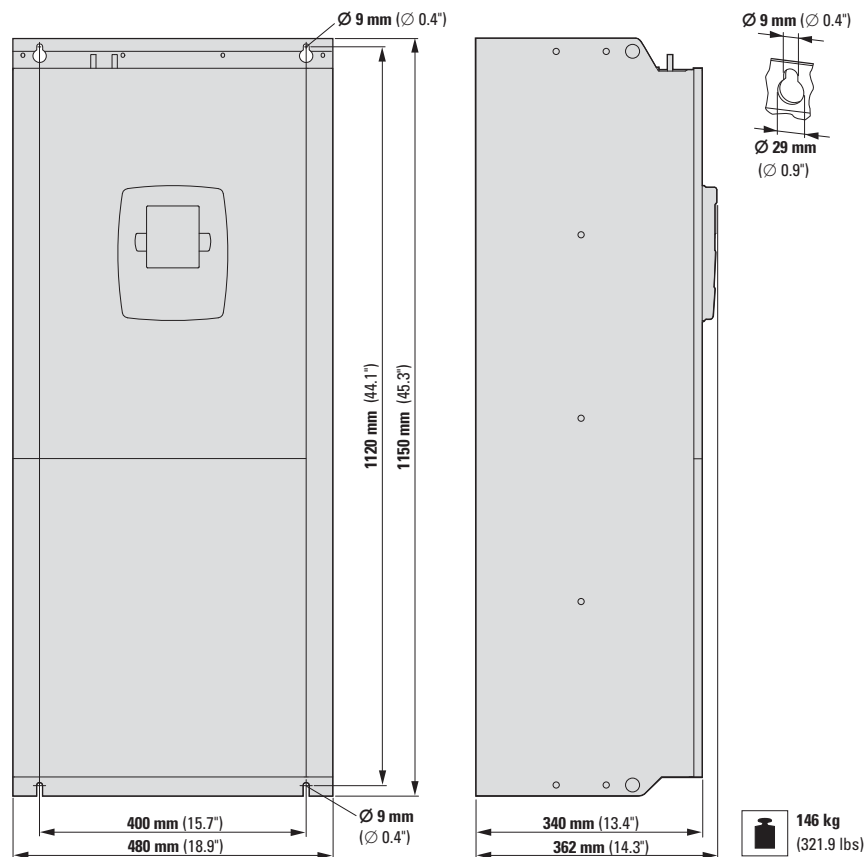
Sizes FR8

Protection type IP20/NEMA 0 and IP20/NEMA 0



Sizes FR9

Protection type IP20/NEMA 0 and IP20/NEMA 0





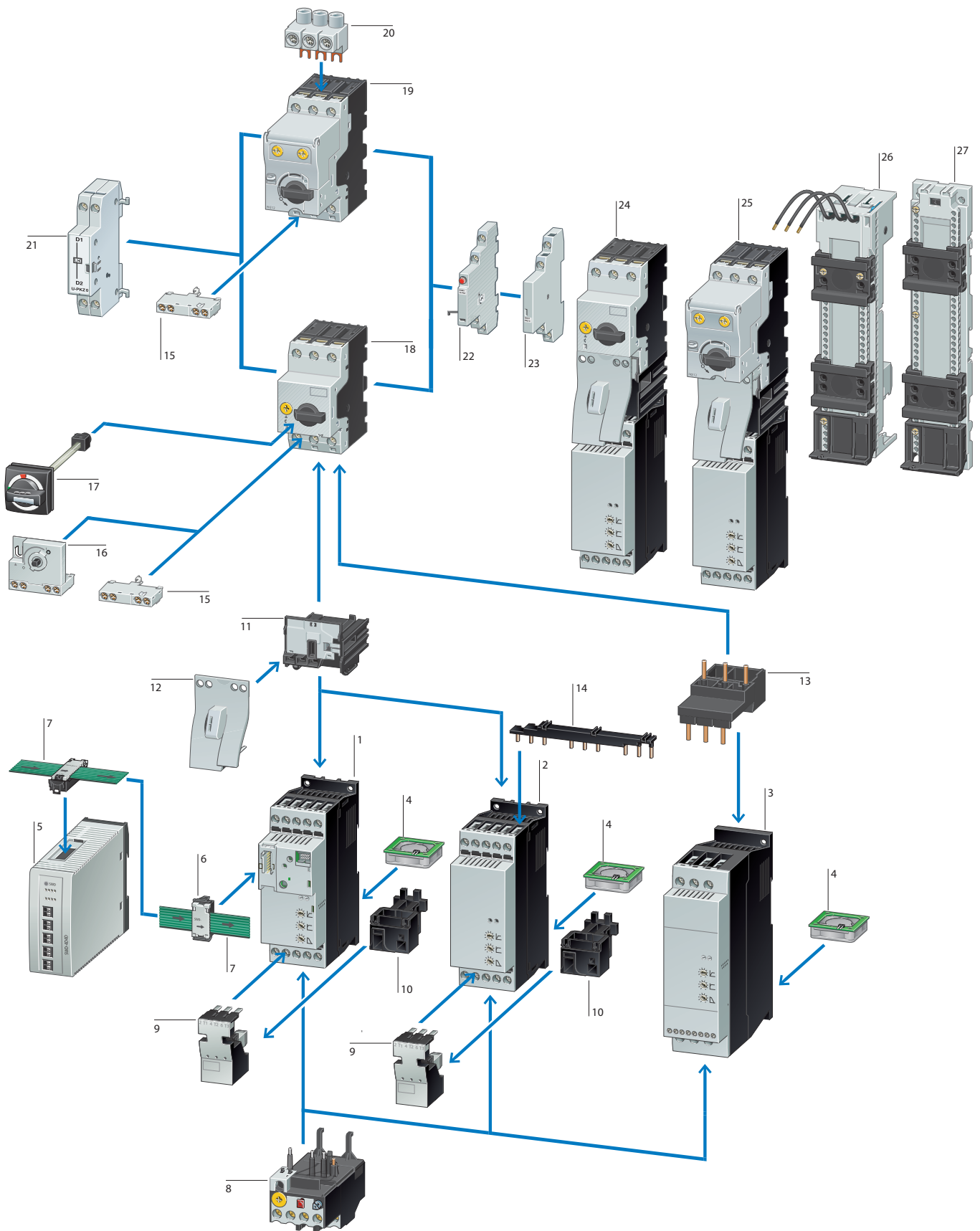
DS7 soft starters in xStart system – Soft to start, powerful in torque

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.

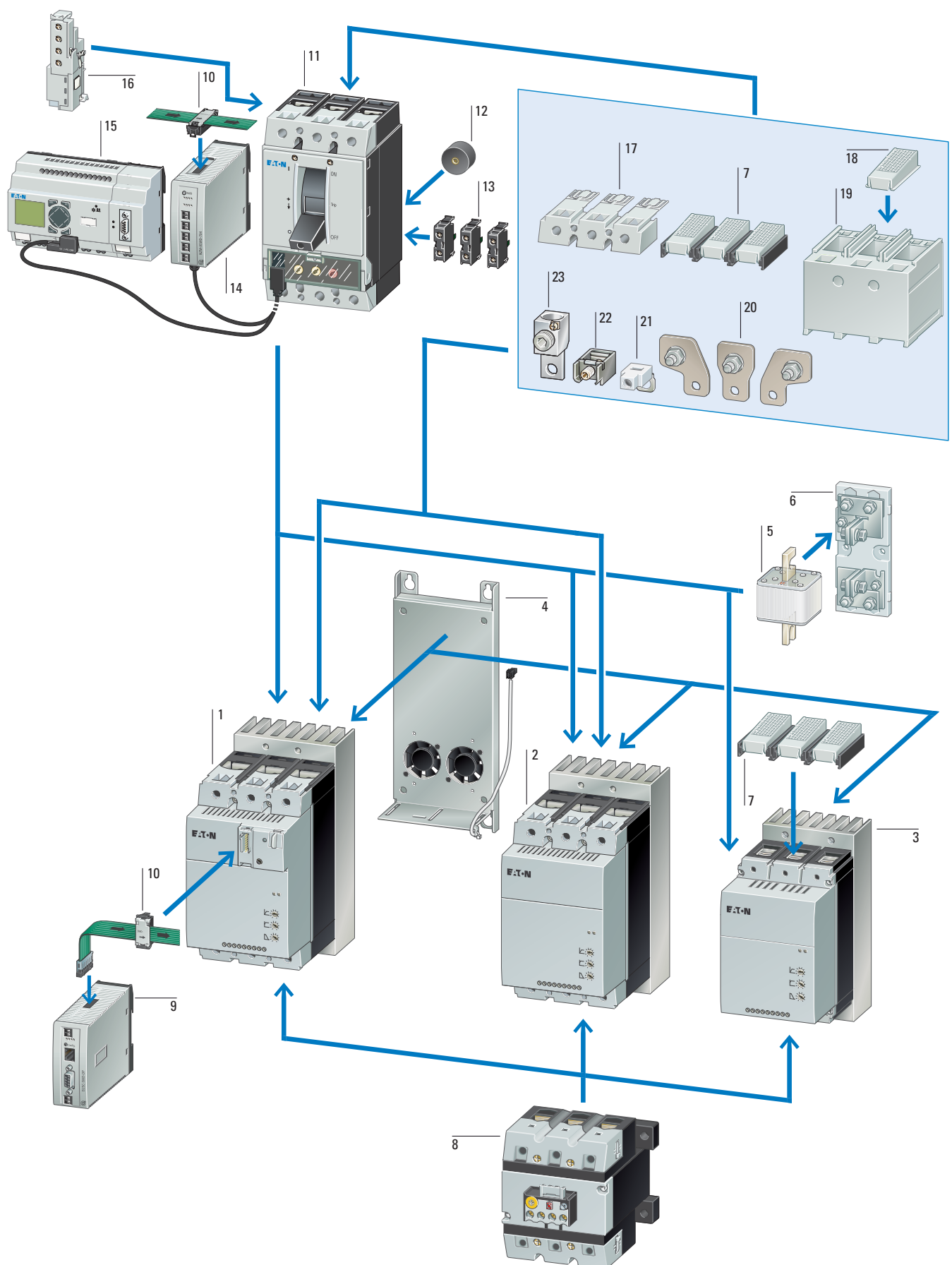
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System overview



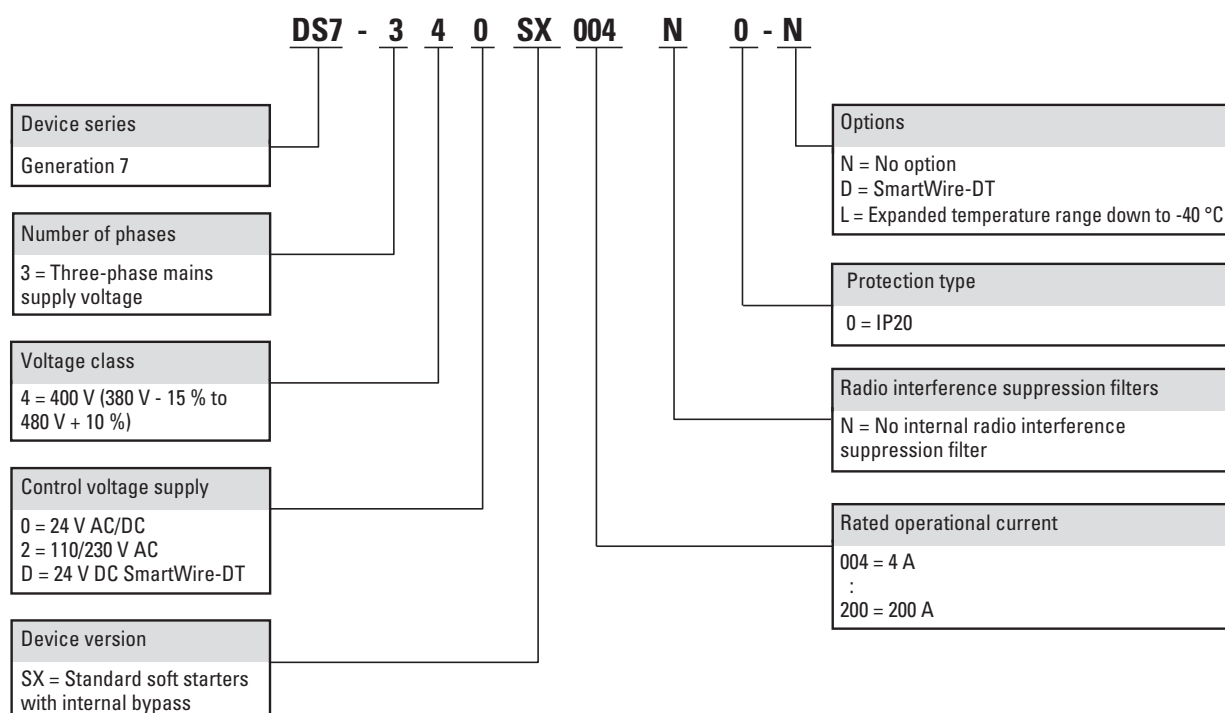
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Key to type references



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.

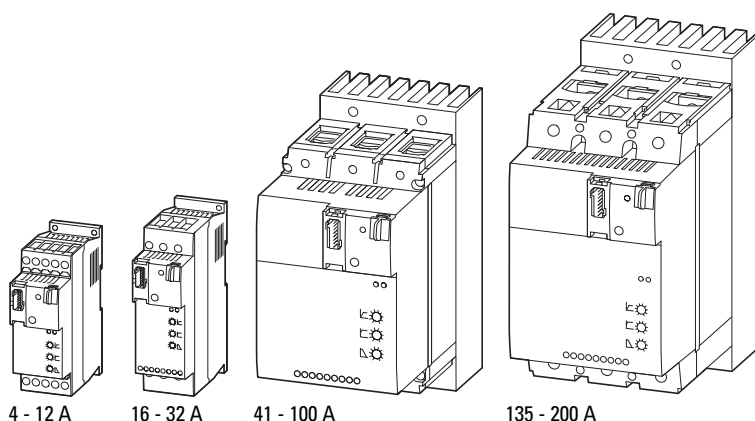
Ordering

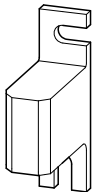
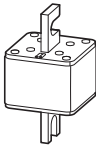
Rated operational current	Assigned motor rating		Part no.	Article no.	Price see price list	Part no.	Article no.	Price see price list	Std. pack
Device (AC-53)	at 400 V, 50 Hz	at 480 V, 60 Hz							
I _e	P	P							
A	kW	HP							
			U _C 24 V AC/DC U _S 24 V AC/DC Standard temperature range			U _C 24 V 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		

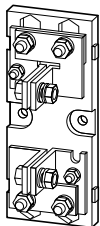
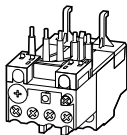
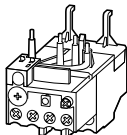
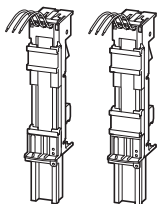
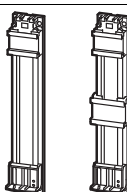
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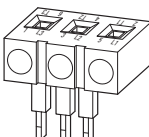
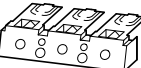
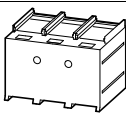
  Information relevant for export to North America
UL/CSA applies only for DS7...-N

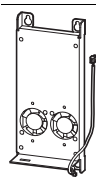
Product Standards IEC/EN 60947-4-2; GB 14048.6; UL 508;
CSA-C22.2 No 0-M91; CSA-C22.2 No 14-05 CE marking
UL File No. E251034
CSA File No. 2511305
CSA Class No. 321106
Suitable for Branch circuits
Max. Voltage Rating 480 V
Degree of Protection IP20; UL/CSA Type 1



	Rated device current	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  
	A							
Superfast semiconductor fuses								
DIN 43653, 690/700 V (IEC/UL) Inside micrometer 80 mm								
	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 E125085 UL File No. UL Category Control No. CSA File No. 053787_C_000 CSA Class No. 1422-30 North America Certification JFHR2 Suitable for UL recognized, CSA certified 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		1 off  	Product Standards IEC/EN 60269-4; UL 248-1; CE marking E125085 UL File No. UL Category Control No. North America Certification JFHR2 Suitable for UL recognized semiconductor protection
	125	25	000	DM4-340-22K DM4-340-30K	170M2615 171975			
	160	30	S1*	DS4-340-11K-M DS4-340-11K-MR	170M3014 171977			
	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			Product Standards IEC/EN 60269-4; UL 248-1; CE marking E125085 UL File No. UL Category Control No. CSA File No. 053787_C_000 CSA Class No. 1422-30 North America Certification JFHR2 Suitable for UL recognized, CSA certified semiconductor protection

		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	000, 00	170H1007 171988		1 off  	Product Standards	IEC/EN 60269-1; UL 512; CE marking	
	145 x 43 x 50					UL File No.	E14853	
	205 x 88 x 80	S1*, S1, S2, S3	170H3004 171989			UL Category Control No.	IZLT2	
						North America Certification	UL listed	
						Suitable for	DIN 43653 fuses	
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	
		DS7-34...SX007...	ZB12-10 278440			UL File No.	E29184	
		DS7-34...SX009...				UL Category Control No.	NKCR	
		DS7-34...SX012...	ZB12-12 278441			CSA File No.	12528	
		DS7-34...SX016...	ZB32-16 278452			CSA Class No.	3211-03	
		DS7-34...SX024...	ZB32-24 278453			North America Certification	UL listed, CSA certified	
		DS7-34...SX032...	ZB32-32 278454			Suitable for	Branch circuits	
						Max. Voltage Rating	600 V AC	
						Degree of Protection	IEC: IP20, UL/CSA Type: -	
Wiring set								
For DOL Starter								
 		DS7-34...SX004...	PKZM0-XDM12 283149		1 off  	Product Standards	UL 508; CSA-C22.2 No. 14; IEC60947-4-1; CE marking	
		DS7-34...SX007...				UL File No.	E36332	
		DS7-34...SX009...				UL Category Control No.	NLRV	
		DS7-34...SX012...				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...	DILM12-XMCP/T 121770		1 off  	Product Standards	IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking	
		DS7-34...SX007...						
		DS7-34...SX009...					North America Certification	Request filed for UL and CSA
		DS7-34...SX012...						
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			

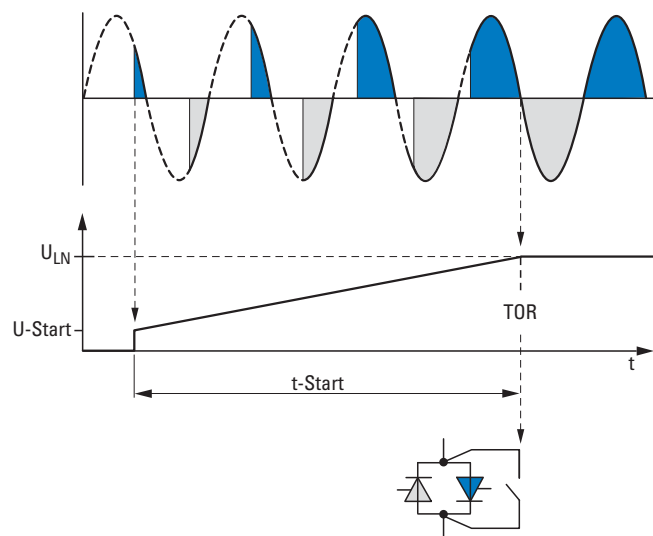
For use with	Part no. Article no.	Price see price list	Std. pack	Notes	Information relevant for export to North America 
Three-phase commoning links					
For the primary side of DS7 Suitable for 3 DS7 soft starters Length 112 mm protected against accidental contact, short-circuit proof, $U_e = 690\text{ V}$, $I_u = 35\text{ A}$ 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 E36332 UL File No. 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, $U_e = 690\text{ V}$, $I_u = 35\text{ A}$. Connection cross section: Stranded 2.5...16 mm ² Flexible with ferrule 2.5...16 mm ² AWG14...8	Product Standards IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking E36332 UL File No. 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 mm ² 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 E31593 UL File No. UL Category Control No. DIHS CSA File No. 22086 CSA Class No. 1432-01 North America Certification UL listed, CSA certified Refer to main component information Suitable for

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 mm ² 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 mm ² 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

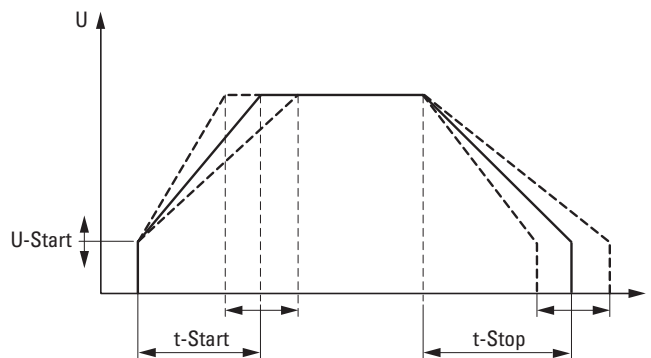
TOR (Top of Ramp): Signals the end of the set " t_{Start} " ramp time (output voltage U_2 = Mains supply voltage U_{LN}). The internal bypass contacts are closed after this.

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.

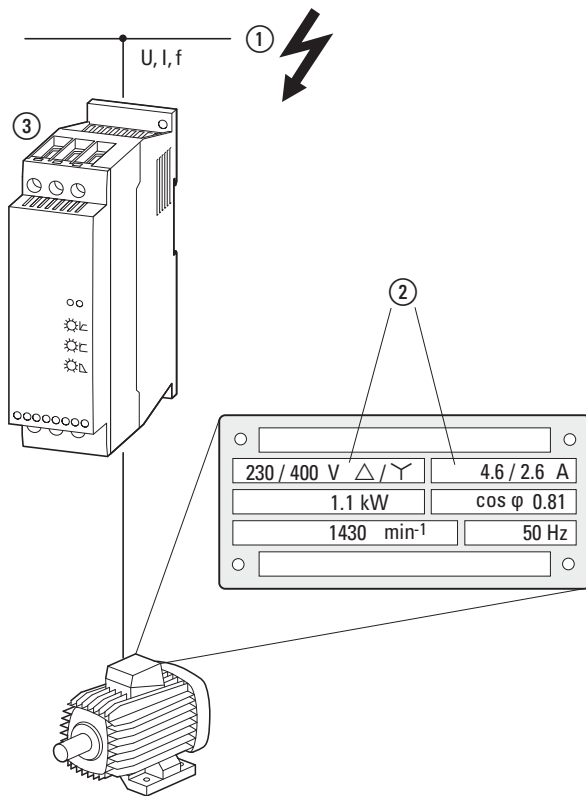
Please note:

- 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 (I_e) must be at least equal to that of the motor.

Additional selection criteria include:

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

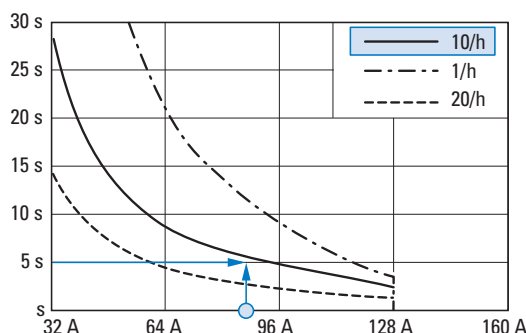
Centrifugal pumps, centrifugal fans, simple and smooth-running conveyor belts and traction drives, and circular saws and ribbon saws are some of the typical applications for which soft starters are used. Reciprocating compressors, mixers, mills, crushers, and lifting gear are instead categorized as heavy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

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

Example:

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

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



When different operating frequencies, 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: $(3 \times 32 \text{ A})^2 \times 5 \text{ s} = 46.080 \text{ A}^2\text{s}$

The maximum I^2t value of the connected motor load must be smaller:

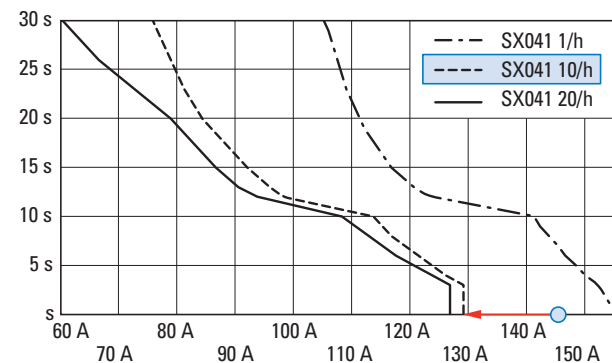
$(3 \times 29 \text{ A})^2 \times 5 \text{ s} = 37.845 \text{ A}^2\text{s}$

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

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

- Motor inrush current: $I_{LRP} = 5 \times 29 = 145 \text{ A}$, I^2t value = $(5 \times 29 \text{ A})^2 \times 5 \text{ s} = 105.125 \text{ A}^2\text{s}$
- DS7-34...SX041... 41A:
AC-53a: 3-5: 75-10
=> $(3 \times 41 \text{ A})^2 \times 5 \text{ s} = 75.645 \text{ A}^2\text{s}$

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



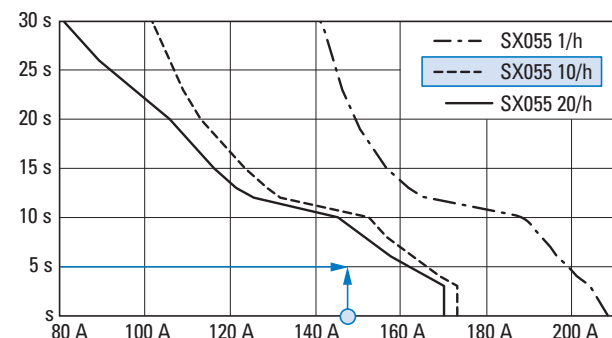
DS7-34...SX055...:

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

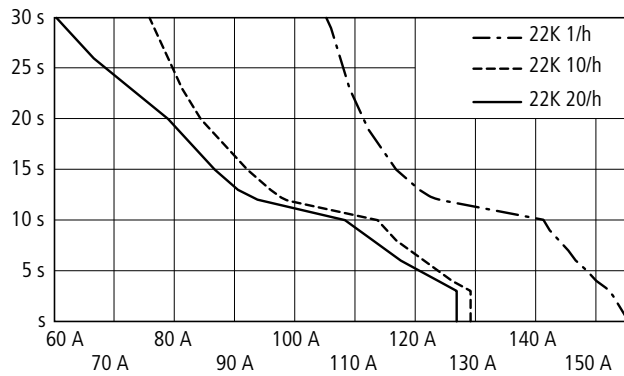
=> $(3 \times 55 \text{ A})^2 \times 5 \text{ s} = 136.125 \text{ A}^2\text{s}$

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

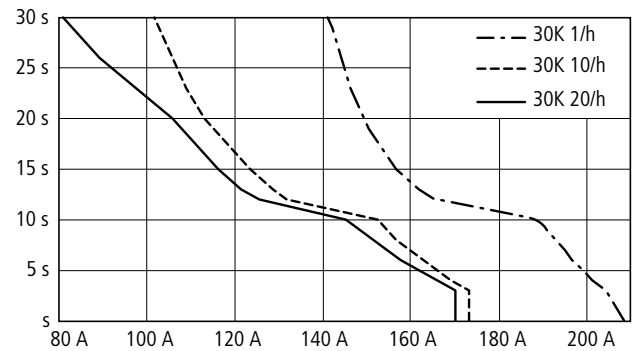
Note: As the following diagram shows, the DS7-34...SX055... unit can handle even more demanding startup and load requirements, e.g., up to 20 starts per hour and longer start-up times (up to 10 seconds).



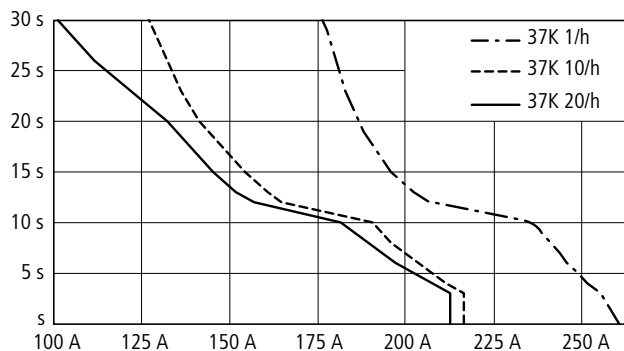
DS7-34...SX041N0-...



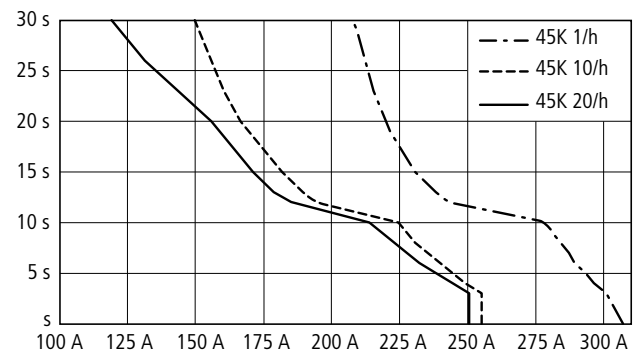
DS7-34...SX055N0-...



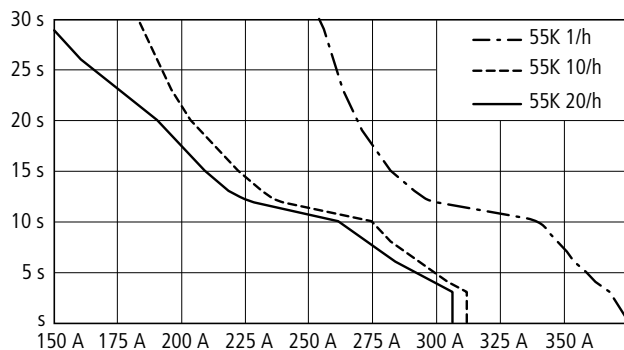
DS7-34...SX070N0-...



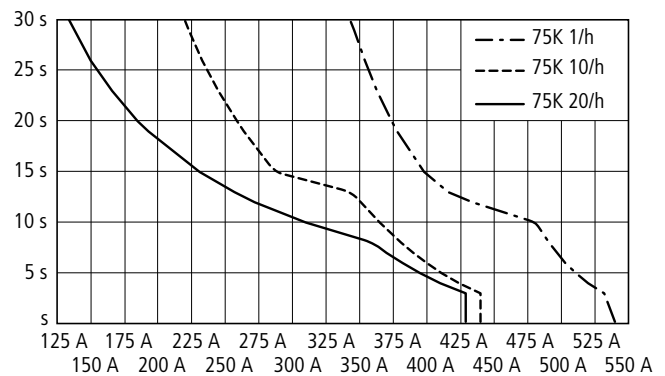
DS7-34...SX081N0-...



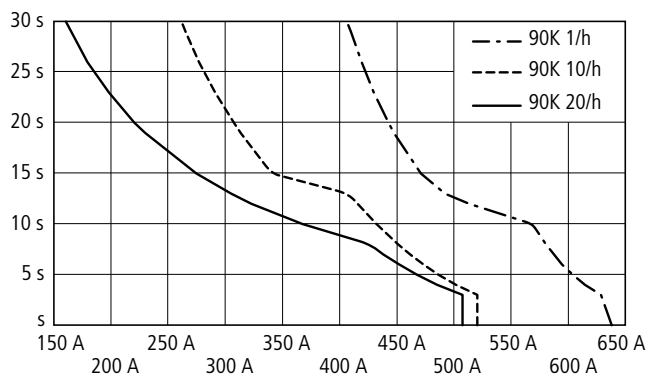
DS7-34...SX100N0-...



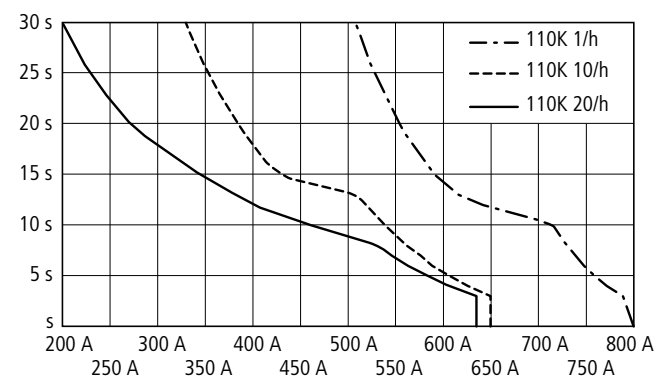
DS7-34...SX135N0-...



DS7-34...SX160N0-...

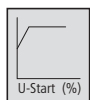
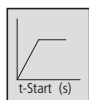
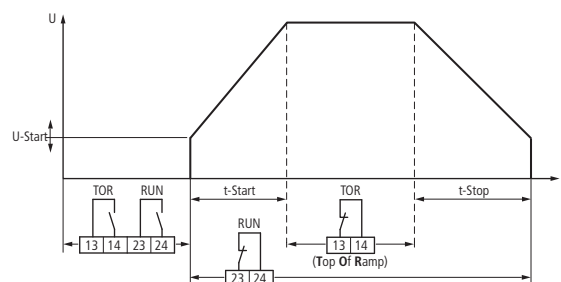


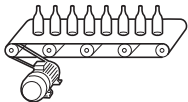
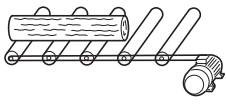
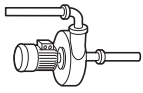
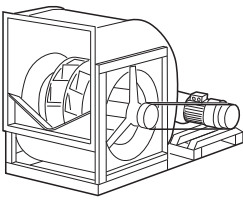
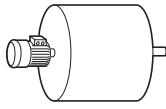
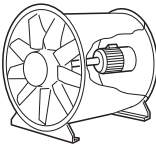
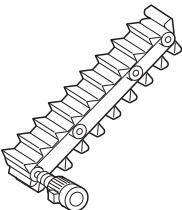
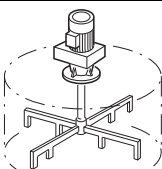
DS7-34...SX200N0-...



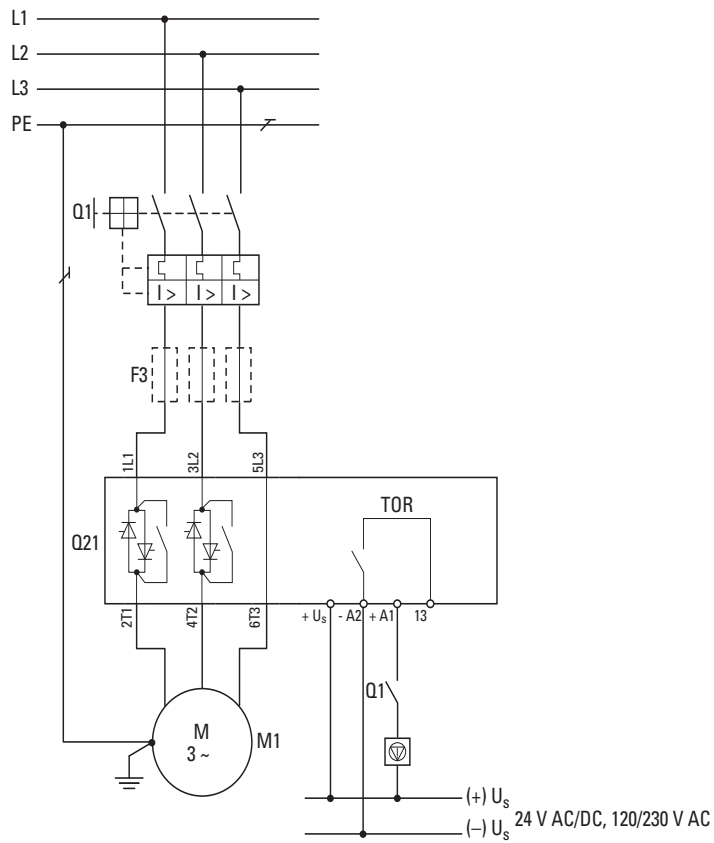
Note: Additional diagrams for 4-32 A soft starters can be found in the manual for DS7 soft starters (MN03901001Z).

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

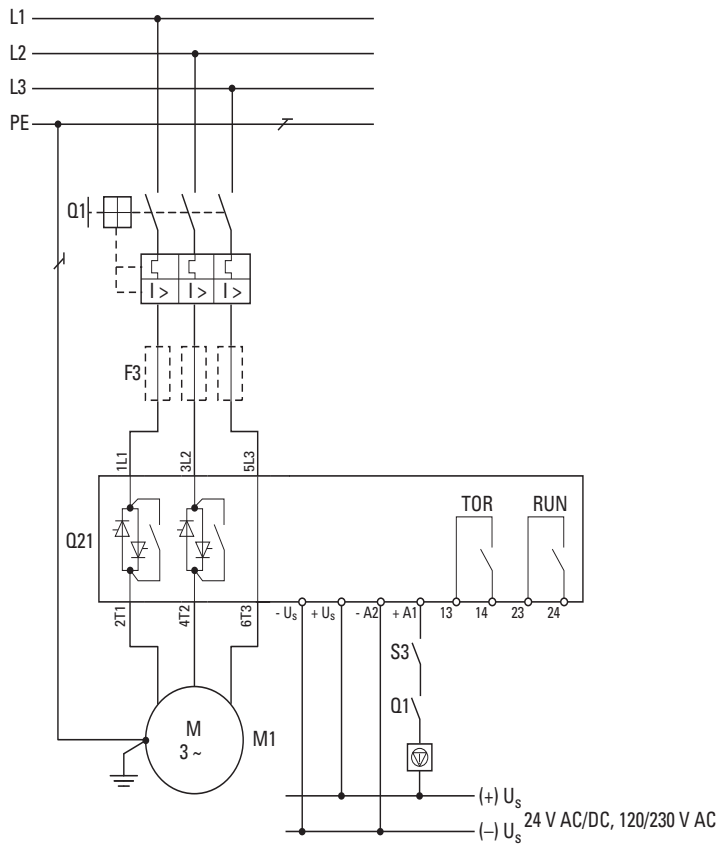


t-Start (s)	U-Start %	t-Stop (s)		
~10	~30	0		J → 0 Low flywheel mass
~25	~30	~30		Conveyor belt with loose belt
~20	~40	0		Roller conveyers
~10	~30	~20		Centrifugal pump
~15	~40	0		Fan general (building) with belt drive
~18	~40	0		J → ∞ Large gyrating mass → The DS7 soft starter's rating should be higher 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



assigned Motor output at		Rated operational current ¹⁾		Part no. Soft starters (device to be selected)	Soft starter function
400 V	480 V	Motor	Soft starters		Cable protection ²⁾
P	P	I _e	I _e		Type “1” coordination
kW	HP	A _x	A _x		
				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	Fuse holders
			Number x Part no.	Number x Part no.
PKM0-4 (+ CL-PKZ0)	ZB12-4	DILM7	3 × 170M1359	3 × 170H1007
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 × 170M1361	3 × 170H1007
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 × 170M1362	3 × 170H1007
PKM0-12 (+ CL-PKZ0)	ZB12-12	DILM12	3 × 170M1362	3 × 170H1007
PZM0-16 (+ CL-PKZ0)	ZB32-16	DILM17	3 × 170M1364	3 × 170H1007
PZM0-25 (+ CL-PKZ0)	ZB32-24	DILM25	3 × 170M1365	3 × 170H1007
PZM0-32 (+ CL-PKZ0)	ZB32-32	DILM32	3 × 170M1366	3 × 170H1007
NZMN1-M50 / PKZM4-50	ZB65-40+ZB65-XEZ	DILM50	3 × 170M1366	3 × 170H1007
NZMN1-M63 / PKZM4-58	ZB65-57+ZB65-XEZ	DILM65	3 × 170M2615	3 × 170H1007
NZMN1-M80	ZB150-70/KK	DILM80	3 × 170M4008	3 × 170H3004
NZMN1-M100	ZB150-100/KK	DILM95	3 × 170M4008	3 × 170H3004
NZMN1-M100	ZB150-100/KK	DILM115	3 × 170M4008	3 × 170H3004
NZMN2-M160	ZB150-150/KK	DILM150	3 × 170M4011	3 × 170H3004
NZMN2-M200	Z5-160/FF250	DILM185	3 × 170M5008	3 × 170H3004
NZMN2-M200	Z5-220/FF250	DILM225	3 × 170M6008	3 × 170H3004

Technical data

			DS7...004...	DS7...007...	DS7...009...	DS7...012...	DS7...016...	DS7...024...	DS7...032...
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
Weight		kg							
...340SX...-N			0.35				0.4		1.8
...340SX...-L			0.44				0.49		0.44
...342SX...			0.4				0.45		0.4
...34DSX...			0.41				0.46		0.41
Main conducting paths									
Rated operating voltage	U _e	V AC	200 - 480						
Supply frequency	f _{LN}	Hz	50/60						
Rated operational current									
Device (AC-53)	I _e	A	4	7	9	12	16	24	24
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
at 400 V, 50 Hz	P	kW	1.5	3	4	5.5	7.5	11	11
at 200 V, 60 Hz	P	HP	0.75	2	2	3	5	7.5	7.5
at 230 V, 60 Hz	P	HP	1	2	3	3	5	7.5	7.5
at 480 V, 60 Hz	P	HP	2	5	5	10	10	15	15
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
Internal bypass contacts			✓	✓	✓	✓	✓	✓	✓

DS7...041...	DS7...055...	DS7...070...	DS7...081...	DS7...100...	DS7...135...	DS7...160...	DS7...200...
IEC/EN 60947-4-2							
UL 508							
CSA22.2-14							
CE							
UL							
CSA							
C-Tick							
UkrSEPRO							
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							
Cold test as per EN 60068-2-4							
-5 - +40							
up to 60 at 2% derating per Kelvin temperature rise							
-40 - +40							
up to 60 at 2% derating per Kelvin temperature rise							
-25 - +60							
-40 - +60							
0 - 1000 m, above that 1 % derating per 100 m , up to 2000 m							
Vertical							
IP20 (terminals IP00)							
Protection type IP40 can be achieved on all sides with covers from the NZM range.							
Finger- and back-of-hand proof							
500							
II/2							
8 g/11 ms							
2M2							
B							
A							
7	10	13	18	25	24	30	42
1.8					3.7		
1.8					3.7		
1.8					3.7		
1.8					3.7		
200 - 480							
50/60							
41	55	70	81	100	135	160	200
11	15	15	22	30	30	45	55
22	30	37	45	55	75	90	110
10	15	20	25	30	40	50	60
15	20	25	30	30	50	60	75
30	40	50	60	75	100	125	150
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
✓	✓	✓	✓	✓	✓	✓	✓

			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							

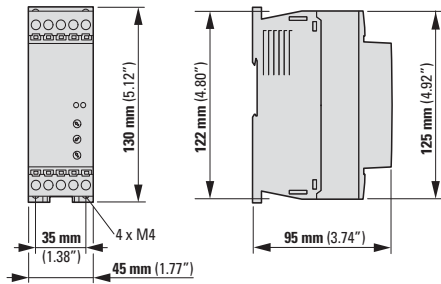
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Drop-out voltage									
DC operated		V DC	0 - 3						
AC operated		V AC							
...340SX...			0 - 3						
...342SX...			0 - 15						
Pick-up time									
DC operated		ms	250						
AC operated		ms	250						
Drop-out time									
DC operated		ms	350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

DS7...041...	DS7...055...	DS7...070...	DS7...081...	DS7...100...	DS7...135...	DS7...160...	DS7...200...
0 - 3							
0 - 3							
0 - 15							
250							
250							
350							
350							
2 (TOR, Ready)							
250							
1 A, AC-11							
1 - 30							
0 - 30							
30 - 100							
$(0 - 8) \times I_n$							
Soft starting of three-phase asynchronous motors							
✓							
- (minimum ramp time 1s)							
✓							
External solution required							
✓							
✓, with PKE							
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
8							
-	-	-	-	-	-	-	-
✓							
✓							
SmartWire-DT							

Dimensions

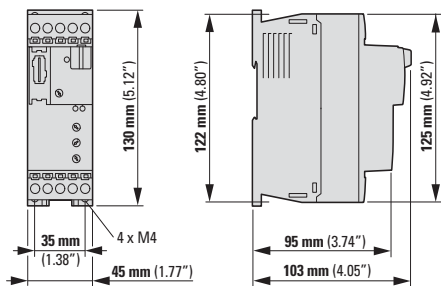
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DS7-340SX007N0-N
DS7-340SX009N0-N
DS7-340SX012N0-N

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



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

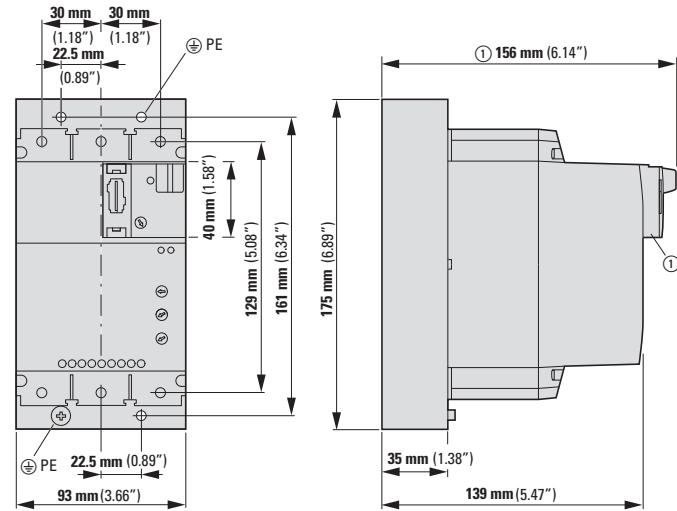
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DS7-34DSX012N0-D



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

DS7-342SX041N0-N
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DS7-342SX081N0-N
DS7-342SX100N0-N

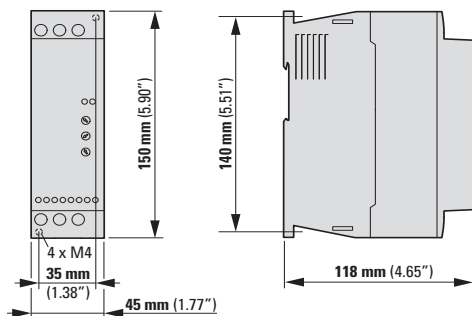
DS7-34DSX041N0-D
DS7-34DSX055N0-D
DS7-34DSX070N0-D
DS7-34DSX081N0-D
DS7-34DSX100N0-D



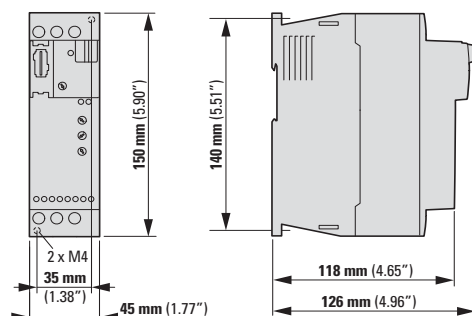
① DS7-...-D

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

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



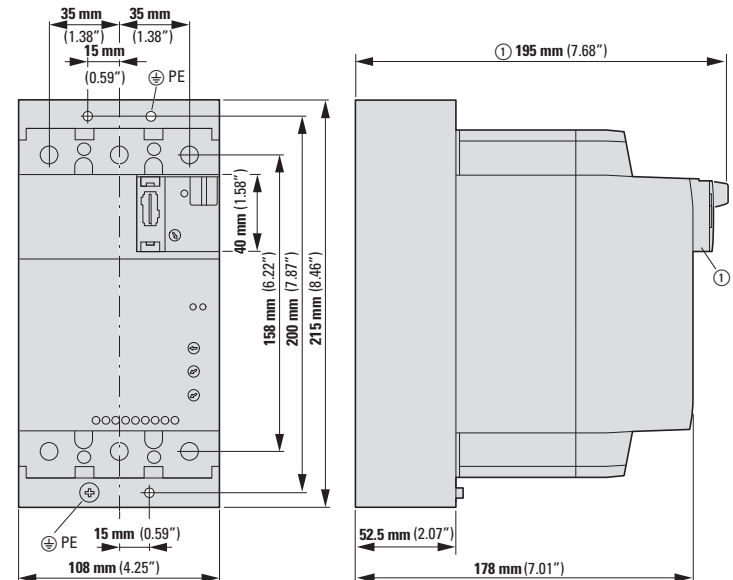
DS7-34DSX016N0-D
DS7-34DSX024N0-D
DS7-34DSX032N0-D



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

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

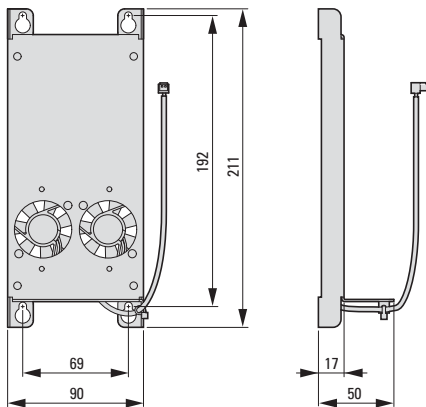
DS7-34DSX135N0-D
DS7-34DSX160N0-D
DS7-34DSX200N0-D



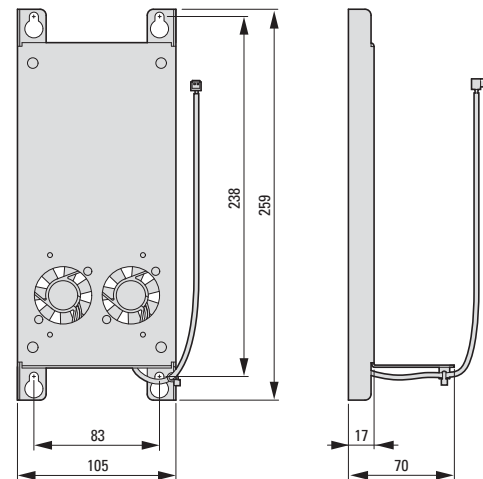
① DS7-...-D

Device fans

DS7-FAN-100

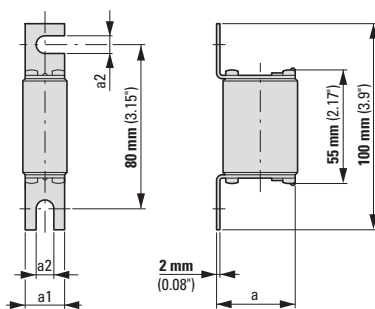


DS7-FAN-200



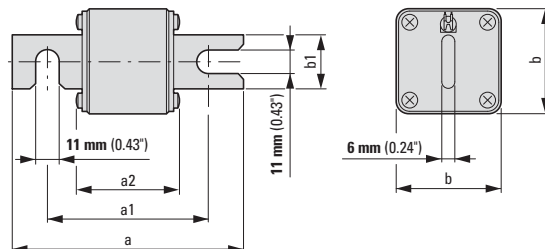
Superfast semiconductor fuses

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

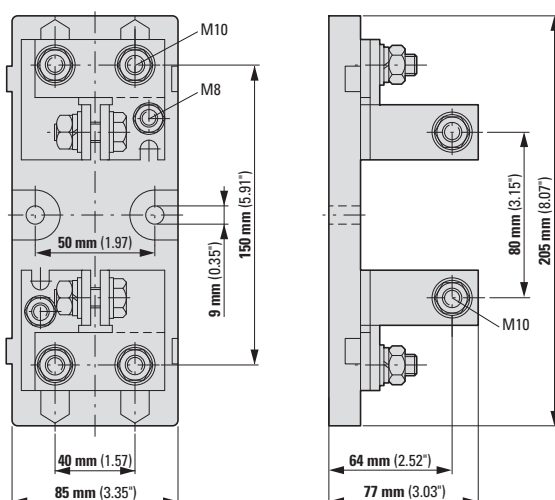
Sizes S1*, S1, S2, S3



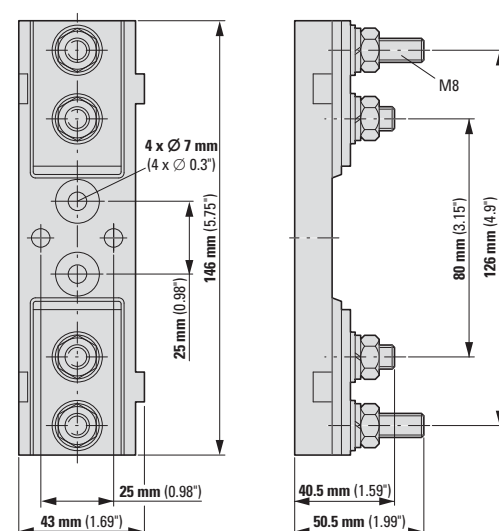
a mm (inch)	a1 mm (inch)	a2 mm (inch)	b mm (inch)	b1 mm (inch)	Size (size)
104 (4.09)	78 (3.07)	50 (1.97)	45 (1.77)	22 (0.87)	S1*
108 (4.25)	78 (3.07)	50 (1.97)	53 (2.09)	25 (0.98)	S1
108 (4.25)	78 (3.07)	50 (1.97)	61 (2.40)	25 (0.98)	S2
109 (4.29)	78 (3.07)	51 (2.01)	76 (2.99)	30 (1.18)	S3

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.

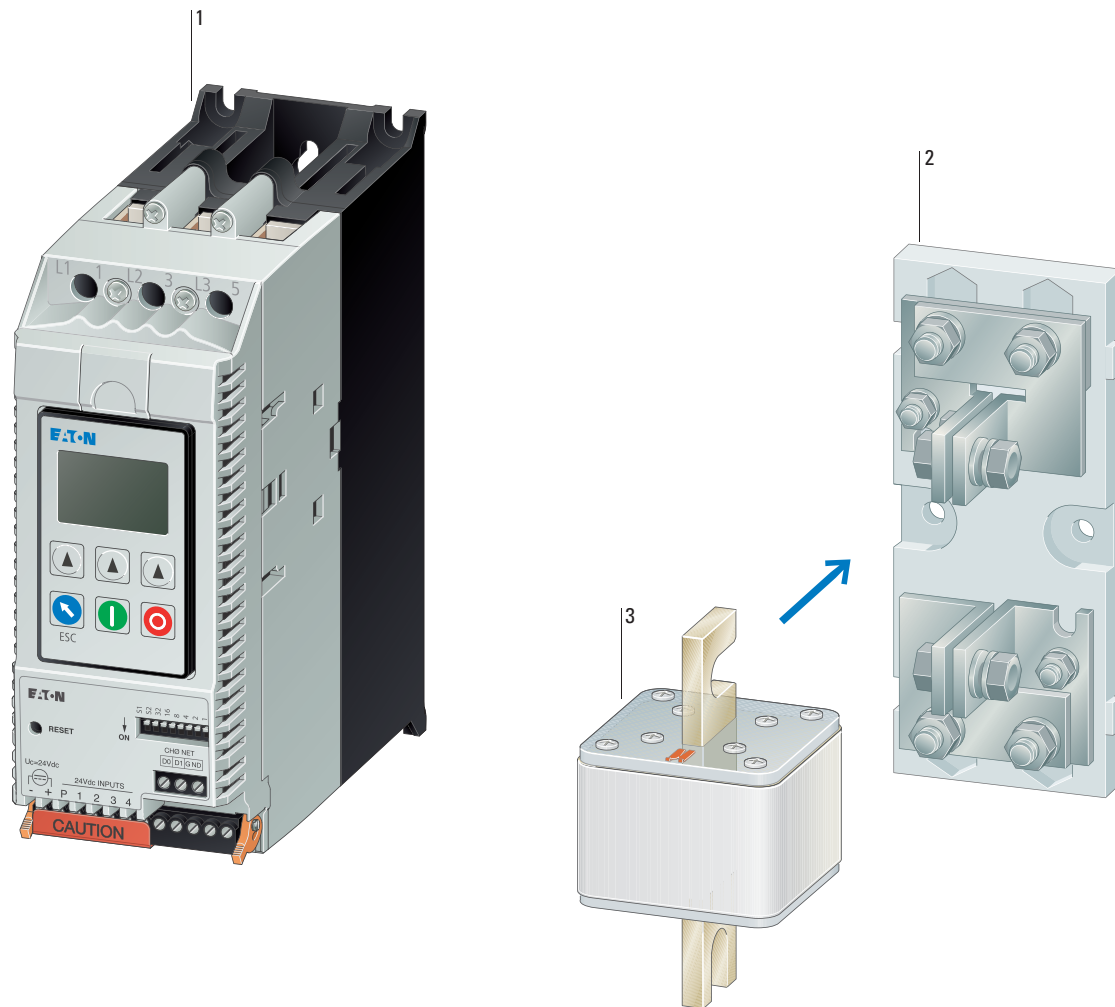
These three-phase controlled soft starters, which feature an internal bypass and extensive monitoring and protection mechanisms, guarantee not only soft motor start-ups, but also the safe and reliable continuous operation of three-phase motors even in applications involving high load torques. In addition, 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.



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Soft starter S801+, S811+	142
Dimensions	
Soft starter S801+, S811+	150

System overview



S801+ / S811+

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Fuse base for superfast semiconductor fuses

2

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Superfast semiconductor fuses

3

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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, $\sqrt{3}$ 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).



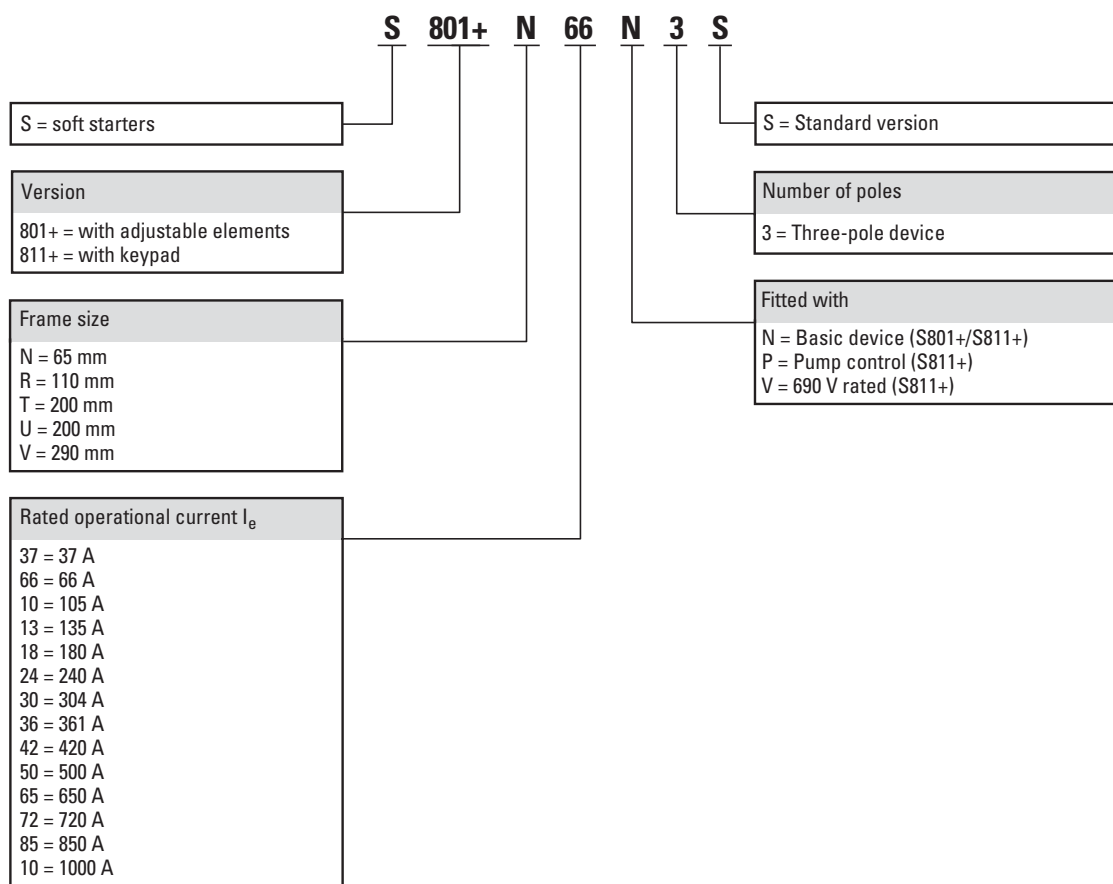
Important operating unit characteristics (S811+)

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

	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
UL File No.	E202571
UL CCN	NMFT
CSA File No.	LR 353
CSA Class No.	3211-06
NA Certification	UL Listed, CSA Certified
Conditions of Acceptability	None
Suitable for	Branch Circuits, not as BCPD
Max. Voltage Rating	600 Vac
Degree of Protection	IP20 with kit

	S801+V..., 1000 A (600 V) S811+V..., 1000 A (600 V)
Product Standards	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking
UL File No.	E202571
UL CCN	NMFT2
CSA File No.	LR 353
CSA Class No.	3211-06
NA Certification	UL Recognized, CSA Certified
Conditions of Acceptability	98-115 CFM fan and 4" x 4" vent req'd
Suitable for	Branch Circuits, not as BCPD
Max. Voltage Rating	600 Vac
Degree of Protection	IP20 with kit

	S811+...V3S (690 V)
Product Standards	IEC/EN 60947-4-2; UL 508; CE marking
UL File No.	E202571
UL CCN	NMFT
UL Listed	UL Listed
Conditions of Acceptability	None
Suitable for	Branch Circuits, not as BCPD
Max. Voltage Rating	690 Vac
Degree of Protection	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	168989		
	420	200	350	S811+U42N3S	168970		
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	168972		
	420	200	350	S811+U42P3S	168973		
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		

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 ACSupply voltage U_s : 24 V DCControl voltage U_C : 24 V DC

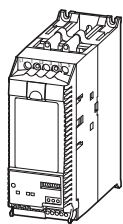
With internal bypass contacts

Soft starter for three-phase loads, with control unit and pump algorithm, for 690-V grids

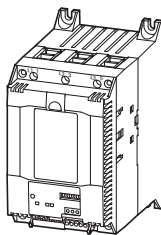
T	180	90	160	150	S811+T18V3S	168986		1 off 
	240	132	200	200	S811+T24V3S	168989		
	304	160	250	250	S811+T30V3S	168992		
V	361	200	315	300	S811+V36V3S	168995		
	420	200	400	350	S811+V42V3S	168998		
	500	250	500	400	S811+V50V3S	169001		
	650	315	630	500	S811+V65V3S	169004		
	720	400	630	600	S811+V72V3S	169007		
	850	450	710	600	S811+V85V3S	169010		

Notes

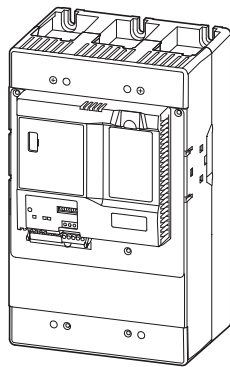
Sizes S801+, S811+



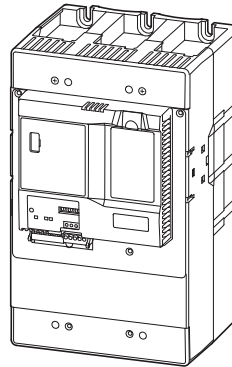
N



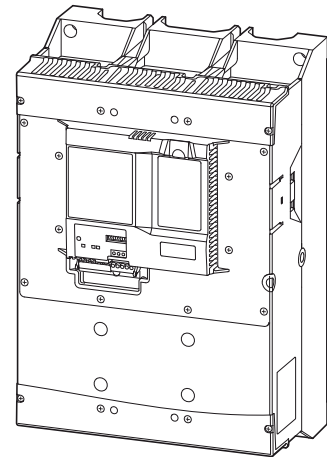
R



T

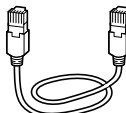


U



V

 Information relevant for export to North America → Page 136

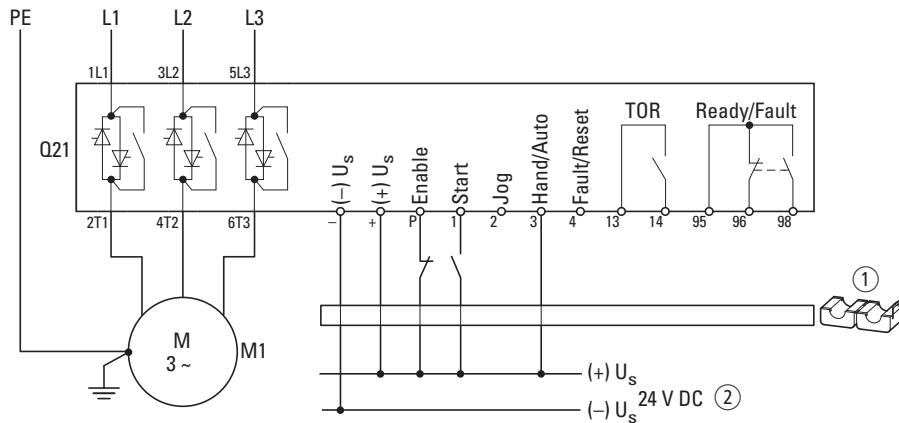
Description	For use with	Part no. Article no.	Price see price list	Std. pack	Information relevant for export to North America  	
Control unit						
With adjusting elements (potentiometer, microswitch)	S801+	EMA71 144346		1 off  	Product Standards	IEC/EN 60947-4-2; UL 508; CSA C22.2 No. 14; CE marking
With illuminated LCD display With control buttons and function keys Front IP54 RJ45 plug, 8-pin	S811+	EMA91 144570			UL File No. CSA File No. Conditions of Acceptability	E202571 LR 353 UL unlisted component, CSA Investigated Component
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. UL Category Control No. CSA File No. CSA Class No. North America Certification	E202571 NMFT2 LR 353 3211-06 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
	EMA91	EMA69C 144559			UL File No. UL Category Control No.	E202571 NMFT2
	EMA91	EMA69D 144560			CSA File No. CSA Class No. North America Certification	LR 353 3211-06 UL listed, CSA certified
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 1059
					UL File No.	E60693
					UL Category Control No.	NMFT
					CSA File No.	LR 353
					CSA Class No.	6223-02
				North America Certification	UL listed, CSA certified	
				Conditions of Acceptability	10A min, Use group C or D, 30 to 12 AWG solid/stranded	
				Max. Voltage Rating	300 V _{ac}	
4/0-500 MCM, 120-150 mm²		EML23 127662			Product Standards	UL508, CSA C22.2 No. 65
					UL File No.	E202571
2 x 4/0-500 MCM, 2 x 120-150 mm²		EML24 127663			UL Category Control No.	NMFT
					CSA File No.	LR 353
2 x 2/0-300 MCM, 2 x 70-150 mm²		EML25 127664			CSA Class No.	6223-02
				North America Certification	UL listed, CSA certified	
2/0-300 MCM, 70-150 mm²		EML26 127665				
4/0-500 MCM, 120-150 mm²		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 508; CSA C22.2 No. 14
					UL File No.	E202571
					CSA File No.	LR 353
					Conditions of Acceptability	UL and CSA Investigated Component
					Max. Voltage Rating	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	IEC/EN 60947-4-1; UL 508; CSA C22.2 No. 14; CE marking
					UL File No.	E1230
					UL Category Control No.	NKCR
					CSA File No.	LR 353
					CSA Class No.	3211-03
					Max. Voltage Rating	240 Vac (auxiliary contacts)

Engineering

Connection examples for S811+...N3S

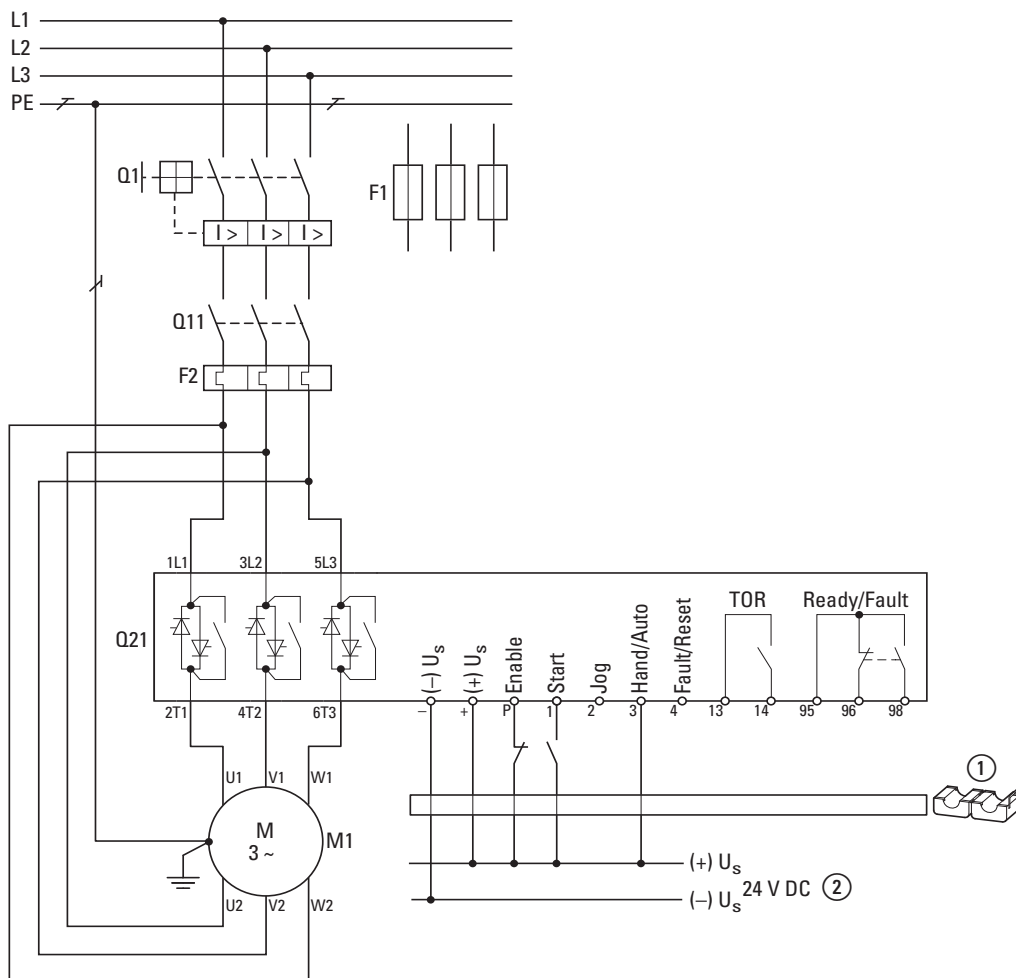
Standard connection (in-line connection)



① Snap-on ferrite core, included as standard

② External control voltage (24 VDC) required, IS 100 mA, I_{Peak} = 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, I_{Peak} = 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...
General						
Standards			IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048			
Approvals			CE			
Approvals			UL CSA C-Tick CCC			
Climatic proofing			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
Storage	θ	°C	-50 - +70	-50 - +70	-50 - +70	-50 - +70
Altitude		m	0 - 2000 m, above that each 100 m 0.5% Derating			
Mounting position			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)
Integrated			Protection type IP40 can be achieved on all sides with covers SS-IP20-N.			
Protection against direct contact			Finger- and back-of-hand proof			
Overvoltage category/pollution degree			II/3	II/3	II/3	II/3
Shock resistance			15 g	15 g	15 g	15 g
Radio interference level (IEC/EN 55011)			A	A	A	A
Heat dissipation		W	25	25	25	25
Weight		kg	2.6	2.6	4.8	4.8
Main conducting paths						
Rated operating voltage	U _e	V AC	200 - 600	200 - 600	200 - 600	200 - 600
...V3S			-	-	-	-
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60
Rated operational current						
Device (AC-53)	I _θ	A	37	66	105	135
Assigned motor rating (Standard connection, In-Line)						
at 230 V, 50 Hz	P	kW	7.5	18.5	30	37
at 400 V, 50 Hz	P	kW	18.5	30	55	75
at 500 V, 50 Hz	P	kW	22	45	55	90
at 690 V, 50 Hz	P	kW	-	-	-	-
at 200 V, 60 Hz	P	HP	10	20	30	40
at 230 V, 60 Hz	P	HP	10	20	40	50
at 480 V, 60 Hz	P	HP	25	50	75	100
at 600 V, 60 Hz	P	HP	30	60	100	125
Internal bypass contacts			✓	✓	✓	✓
Terminal capacities						
Cable lengths						
Solid		mm ²	1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)
Flexible with ferrule		mm ²	1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)
Stranded		mm ²	1 x (2.5 - 35)	1 x (2.5 - 35)	1 x (2.5 - 95)	1 x (2.5 - 95)
Solid or stranded		AWG	1 x (14 - 2)	1 x (14 - 2)	1 x (14 - 4/0)	1 x (14 - 4/0)
Tightening torque		Nm	4 (≤ 6 mm ²); 4.5 (≤ 10 mm ²); 5 (≤ 25 mm ²); 5.6 (> 25 mm ²)		11.3	11.3
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

S8x1+T18...	S8x1+T24...	S8x1+T30...	S8x1+U36...	S8x1+U42...
IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048				
CE	CE	CE	CE	CE
UL CSA C-Tick CCC				
Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10				
-30 - +50	-30 - +50	-30 - +50	-30 - +50	-30 - +50
-50 - +70	-50 - +70	-50 - +70	-50 - +70	-50 - +70
0 - 2000 m, above that each 100 m 0.5% Derating				
As required	As required	As required	As required	As required
IP20 (terminals IP00)				
An IP20 degree of protection can be achieved on all sides by using optional terminal covers SS-IP20-TU.				
Finger- and back-of-hand proof				
II/3	II/3	II/3	II/3	II/3
15 g	15 g	15 g	15 g	15 g
A	A	A	A	A
25	25	25	25	25
18.6	18.6	18.6	18.6	18.6
200 - 600	200 - 600	200 - 600	200 - 600	200 - 600
200 - 690	200 - 690	200 - 690	-	-
50/60	50/60	50/60	50/60	50/60
180	240	304	361	420
55	75	90	110	132
90	132	160	200	200
110	160	200	250	250
160	200	250	-	-
60	75	100	125	125
60	75	100	150	150
150	200	250	300	350
150	200	300	350	450
✓	✓	✓	✓	✓
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)
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)
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)
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)
25.5 (≤ 150 mm ²); 28.3 (> 150 mm ²)	25.5 (≤ 150 mm ²); 28.3 (> 150 mm ²)	25.5 (≤ 150 mm ²); 28.3 (> 150 mm ²)	-	-
4 mm Hexagon socket-head screw			-	-

			S8x1+N37...	S8x1+N66...	S8x1+R10...	S8x1+R13...
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)
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)
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)
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)
Tightening torque		Nm	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
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 %
Current consumption	I _a	mA	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
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 %
Current consumption 24 V						
External 24 V (no-load)		mA	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
Drop-out voltage						
DC operated		V DC	3	3	3	3
Pick-up time						
DC operated		ms	100	100	100	100
Drop-out time						
DC operated		ms	100	100	100	100
Relay outputs						
Number			2	2	2	2
Voltage range		V AC	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
Soft start function						
Ramp times						
Acceleration		s	180	180	180	180
Deceleration		s	0 - 60	0 - 60	0 - 60	0 - 60
Start pedestal		%	85	85	85	85
Kickstart						
Voltage		%	100	100	100	100
Duration						
50 Hz		ms	2000	2000	2000	2000
60 Hz		ms	2000	2000	2000	2000
Fields of application						
Fields of application			Soft starting of three-phase asynchronous motors			
3-phase motors			✓	✓	✓	✓
Functions						
Fast switching (semiconductor contactor)			- (minimum ramp time 1s)			
Soft start function			✓	✓	✓	✓
Reversing starter			External solution required (reversing contactor)			
Suppression of closing transients			✓	✓	✓	✓
Current limitation			✓	✓	✓	✓
Overload monitoring			✓	✓	✓	✓
Underload monitoring			✓	✓	✓	✓
Fault memory		Faults	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

S8x1+T18...	S8x1+T24...	S8x1+T30...	S8x1+U36...	S8x1+U42...
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)	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)
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)
0.4	0.4	0.4	0.4	0.4
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
24 V DC +10 %/- 10 %				
1000	1000	1000	1000	1000
10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15	10.000 / 15
24 V DC +10 %/- 10 %				
100	100	100	100	100
21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
3	3	3	3	3
100	100	100	100	100
100	100	100	100	100
2	2	2	2	2
120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC	120 V AC/DC
3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11	3 A, AC-11
180	180	180	180	180
0 - 60	0 - 60	0 - 60	0 - 60	0 - 60
85	85	85	85	85
100	100	100	100	100
2000	2000	2000	2000	2000
2000	2000	2000	2000	2000
Soft starting of three-phase asynchronous motors				
✓	✓	✓	✓	✓
- (minimum ramp time 1s)				
✓	✓	✓	✓	✓
External solution required (reversing contactor)				
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
10	10	10	10	10
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU	Modbus RTU

			S8x1+V36...	S8x1+V42...	S8x1+V50...	S8x1+V65...
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
Approvals			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
Climatic proofing			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
Storage	θ	°C	-50 - +70	-50 - +70	-50 - +70	-50 - +70
Altitude		m	0 - 2000 m, above that each 100 m 0.5% Derating			
Mounting position			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)
Integrated			Protection type IP40 can be achieved on all sides with covers SS-IP20-N.			
Protection against direct contact			Finger- and back-of-hand proof			
Overvoltage category/pollution degree			II/3	II/3	II/3	II/3
Shock resistance			15 g	15 g	15 g	15 g
Radio interference level (IEC/EN 55011)			A	A	A	A
Heat dissipation		W	25	25	25	25
Weight		kg	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
...V3S			200 - 690	200 - 690	200 - 690	200 - 690
Supply frequency	f _{LN}	Hz	50/60	50/60	50/60	50/60
Rated operational current						
Device (AC-53)	I _e	A	361	420	500	650
Assigned motor rating (Standard connection, In-Line)						
at 230 V, 50 Hz	P	kW	110	132	160	200
at 400 V, 50 Hz	P	kW	200	200	250	315
at 500 V, 50 Hz	P	kW	250	250	315	450
at 690 V, 50 Hz	P	kW	315	400	500	630
at 200 V, 60 Hz	P	HP	125	150	150	200
at 230 V, 60 Hz	P	HP	150	150	200	250
at 480 V, 60 Hz	P	HP	300	350	400	500
at 600 V, 60 Hz	P	HP	350	450	500	600
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)
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)
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)
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)
Tightening torque		Nm	-	-	-	-
Screwdriver (PZ: Pozidriv)		mm	-	-	-	-

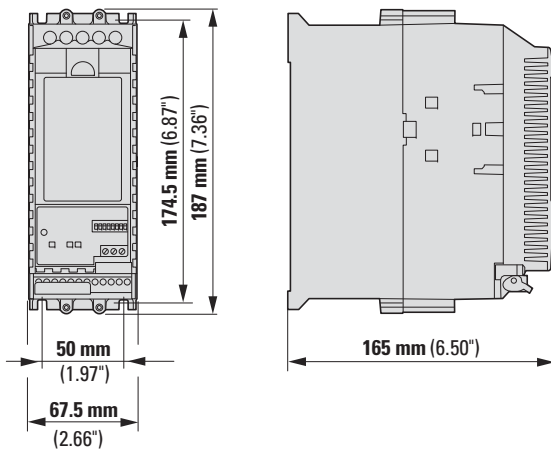
S8x1+V72...	S8x1+V85...	S8x1+V10...
IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048	IEC/EN 60947-4-2 UL 508 CSA22.2-14-1995 GB14048
CE	CE	CE
UL CSA C-Tick CCC	UL CSA C-Tick CCC	UL CSA C-Tick CCC
Damp heat, constant, to IEC 60068-2-3 Damp heat, cyclic, to IEC 60068-2-10		
-30 - +50	-30 - +50	-30 - +50
-50 - +70	-50 - +70	-50 - +70
0 - 2000 m, above that each 100 m 0.5% Derating		
As required	As required	As required
IP20 (terminals IP00)	IP20 (terminals IP00)	IP20 (terminals IP00)
Protection type IP40 can be achieved on all sides with covers SS-IP20-N.		
Finger- and back-of-hand proof		
II/3	II/3	II/3
15 g	15 g	15 g
A	A	A
25	25	25
41.4	41.4	41.4
200 - 600	200 - 600	200 - 600
200 - 690	200 - 690	-
50/60	50/60	50/60
720	850	1000
200	200	200
400	450	560
500	560	630
630	710	-
200	200	200
250	350	400
600	600	750
750	850	850
✓	✓	✓
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)	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 (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)
-	-	-
-	-	-

			S8x1+V36...	S8x1+V42...	S8x1+V50...	S8x1+V65...
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)
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)
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)
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)
Tightening torque		Nm	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
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 %
Current consumption	I _a	mA	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
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 %
Current consumption 24 V						
External 24 V (no-load)		mA	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
Drop-out voltage						
DC operated		V DC	3	3	3	3
Pick-up time						
DC operated		ms	100	100	100	100
Drop-out time						
DC operated		ms	100	100	100	100
Relay outputs						
Number			2	2	2	2
Voltage range		V AC	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
Soft start function						
Ramp times						
Acceleration		s	180	180	180	180
Deceleration		s	0 - 60	0 - 60	0 - 60	0 - 60
Start pedestal		%	85	85	85	85
Kickstart						
Voltage		%	100	100	100	100
Duration						
50 Hz		ms	2000	2000	2000	2000
60 Hz		ms	2000	2000	2000	2000
Fields of application						
Fields of application			Soft starting of three-phase asynchronous motors			
3-phase motors			✓	✓	✓	✓
Functions						
Fast switching (semiconductor contactor)			- (minimum ramp time 1s)			
Soft start function			✓	✓	✓	✓
Reversing starter			External solution required (reversing contactor)			
Suppression of closing transients			✓	✓	✓	✓
Current limitation			✓	✓	✓	✓
Overload monitoring			✓	✓	✓	✓
Underload monitoring			✓	✓	✓	✓
Fault memory		Faults	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

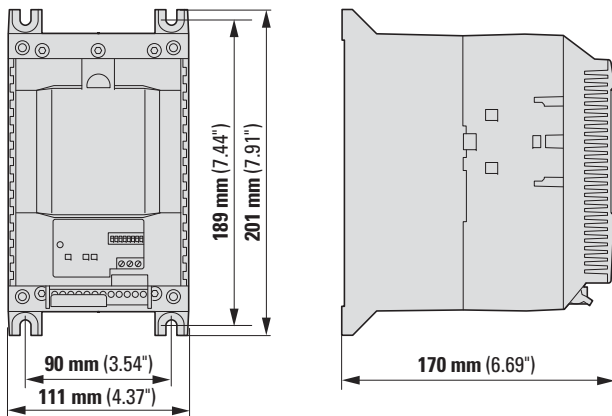
S8x1+V72...	S8x1+V85...	S8x1+V10...
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)	1 x (2.5 - 4) 2 x (1.0 - 2.5)
39 x (12 - 14) 2 x (12 - 14)	42 x (12 - 14) 2 x (12 - 14)	45 x (12 - 14) 2 x (12 - 14)
0.4	0.4	0.4
0,6 x 3,5	0,6 x 3,5	0,6 x 3,5
24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
1400	1400	1400
10.000 / 15	10.000 / 15	10.000 / 15
24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %	24 V DC +10 %/- 10 %
100	100	100
21.6 - 26.4	21.6 - 26.4	21.6 - 26.4
3	3	3
100	100	100
100	100	100
2	2	2
120 V AC/DC	120 V AC/DC	120 V AC/DC
3 A, AC-11	3 A, AC-11	3 A, AC-11
180	180	180
0 - 60	0 - 60	0 - 60
85	85	85
100	100	100
2000	2000	2000
2000	2000	2000
Soft starting of three-phase asynchronous motors		
✓	✓	✓
- (minimum ramp time 1s)		
✓	✓	✓
External solution required (reversing contactor)		
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
10	10	10
✓	✓	✓
✓	✓	✓
Modbus RTU	Modbus RTU	Modbus RTU

Dimensions

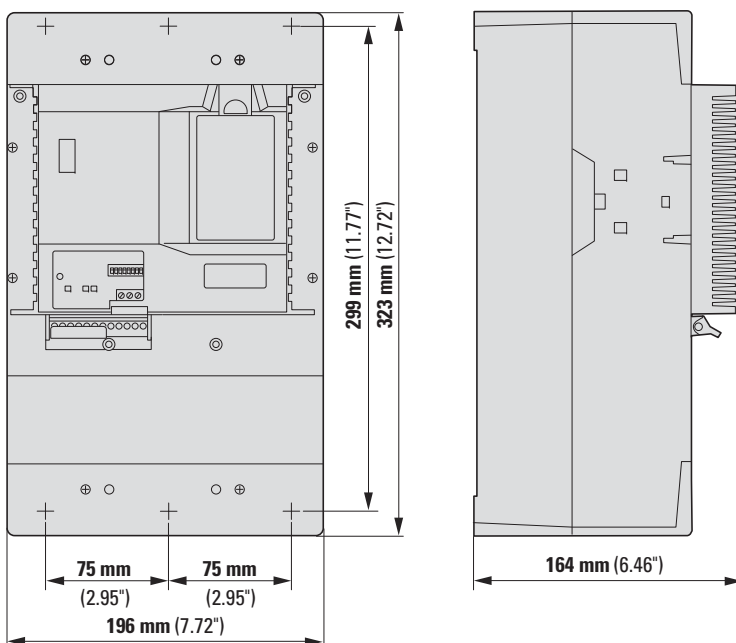
S8x1+N...



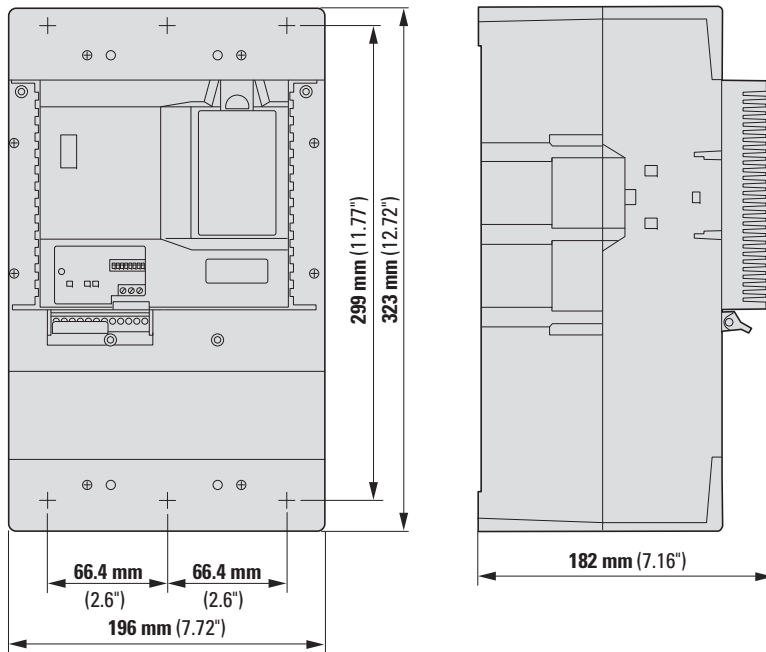
S8x1+R...



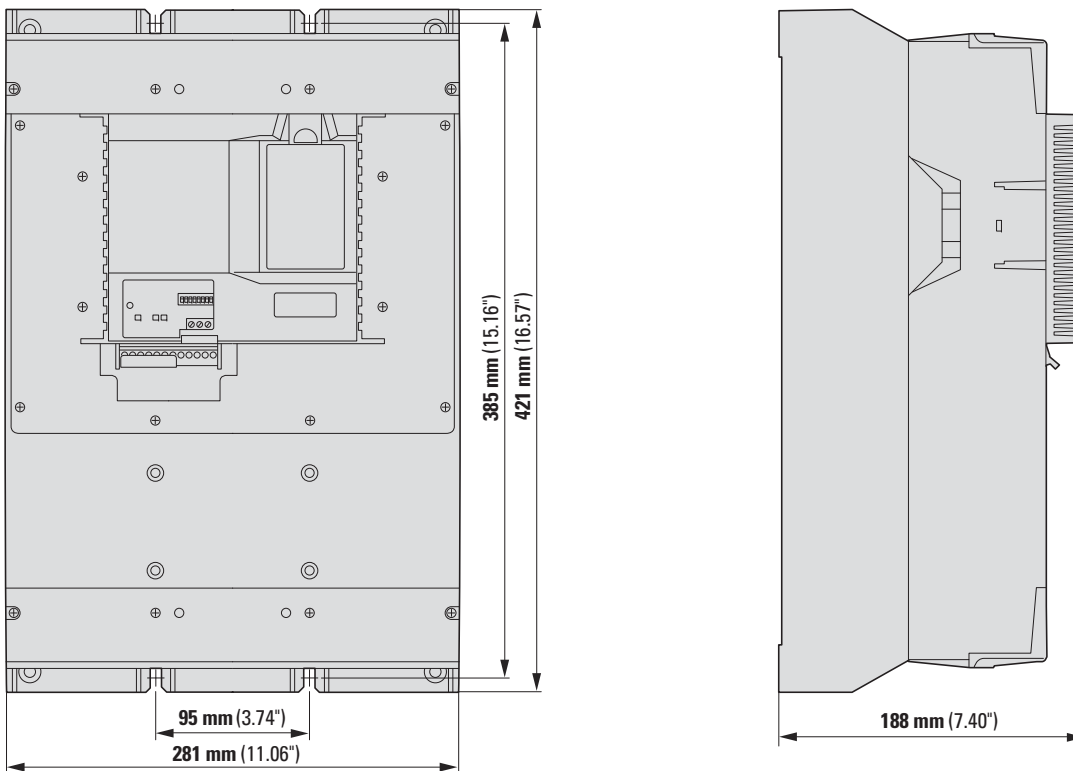
S8x1+T...



S8x1+U...



S8x1+V...





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

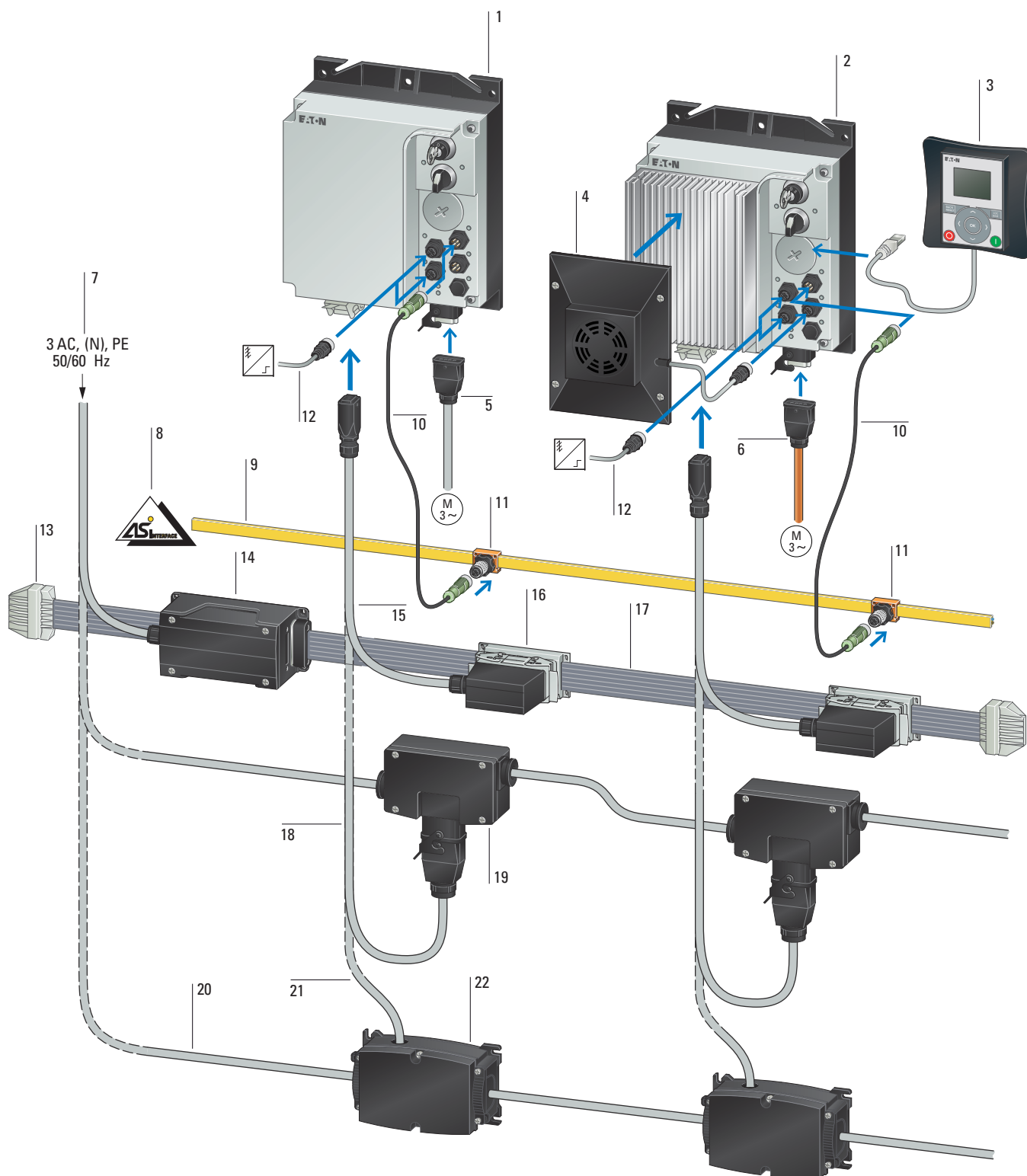
RASP-3....: Rated operational current of 0.66 – 3.3 A with three-phase mains connection of 400 V; assigned motor output of up to 1.1 kW

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

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System overview



Function modules

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Three-phase electronic DOL starter or reversing starter	
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Three phase frequency-controlled motor starter (fixed speeds, two rotational directions, adjustable acceleration and deceleration ramps)	
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Motor feeder

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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 (I²t controller).

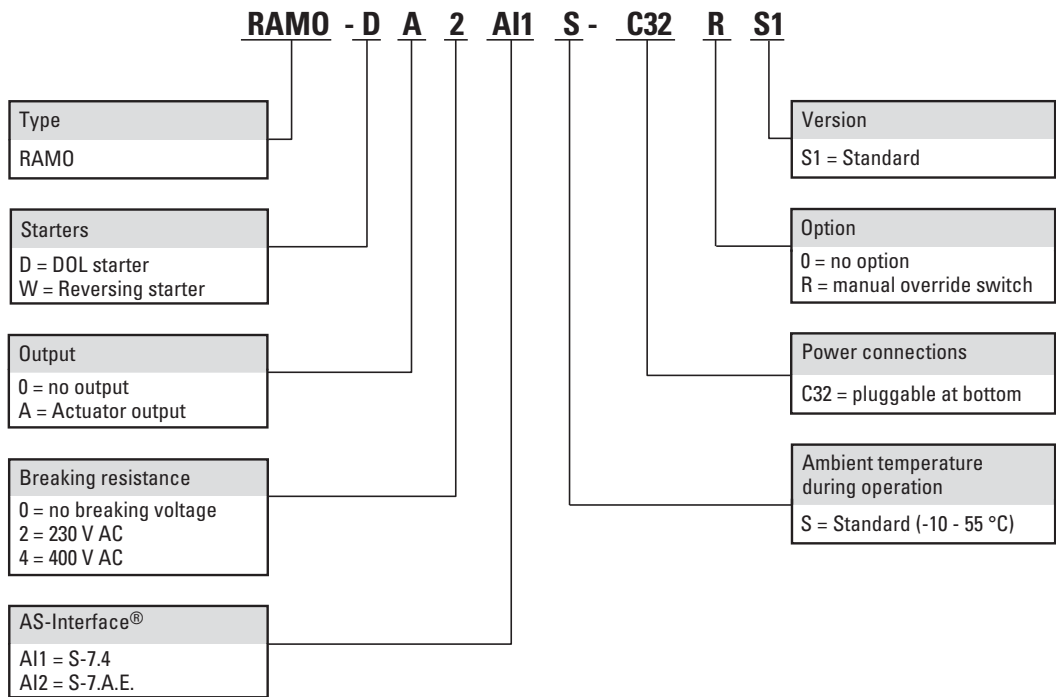
The operating mode is set via the AUTO - OFF/RESET – MANUAL key switch and can be combined with the 'Quick stop' and 'Interlocked manual operation' via the two sensor inputs (M12 sockets). Settable fixed frequencies and cyclical program sequences extend the application range and relieve the load on the 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.

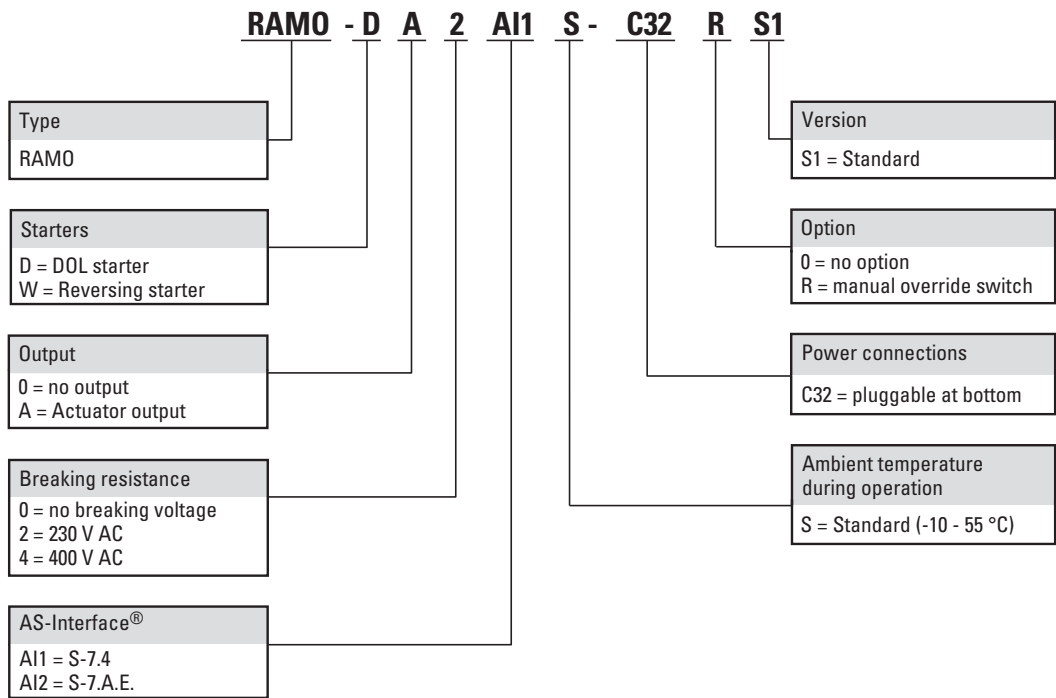
Essential features

- 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.

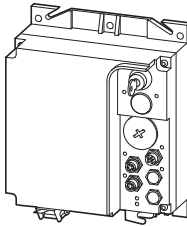
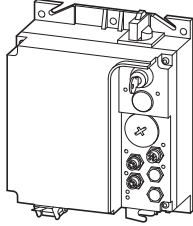
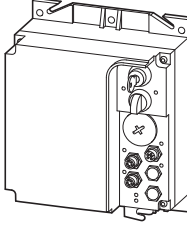
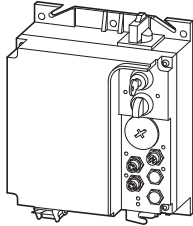
Electronic motor starters RAMO



Frequency controlled motor starter RASP

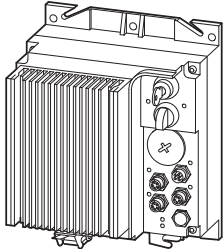
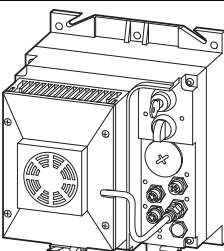
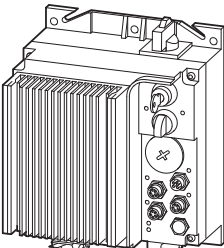
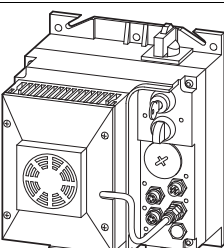


Ordering

	Rated operational current I_e A	Control voltage external brake (50/60 Hz) ¹⁾ V AC	Actuator output ²⁾ Number	AS-Interface profile cable		Part no. Article no.	Price see price list	Std. pack
				S-7.4 for 31 modules	S-7.4 E. for 62 modules			
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		

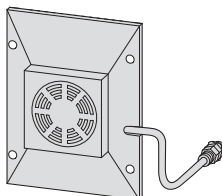
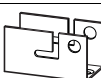
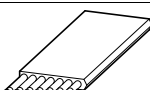
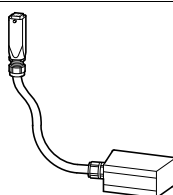
Instructions

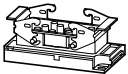
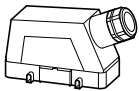
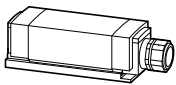
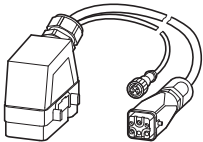
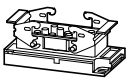
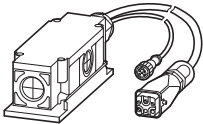
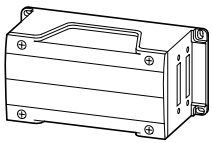
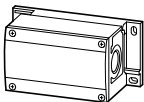
¹⁾ for actuation of motors with mechanical brake²⁾ Operation with external 24V DC supply

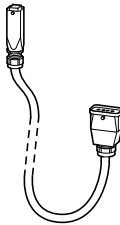
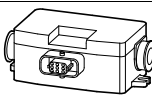
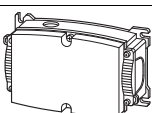
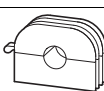
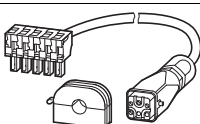
	Rated operatio nal current ¹⁾	assigned motor rating P ²⁾ at 400 V, 50 Hz	Control voltage external brake (50/60 Hz) ³⁾	Part no. Article no.	Price see price list	with braking resistance ⁴⁾ Part no. Article no.	Price see price list	Std. pack
	I _e A	P A	V AC					
RASP speed controllers								
Rated operational 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		

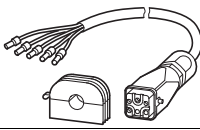
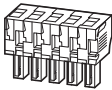
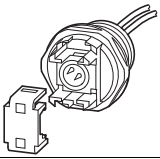
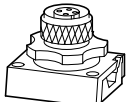
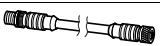
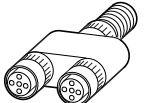
Instructions

- 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

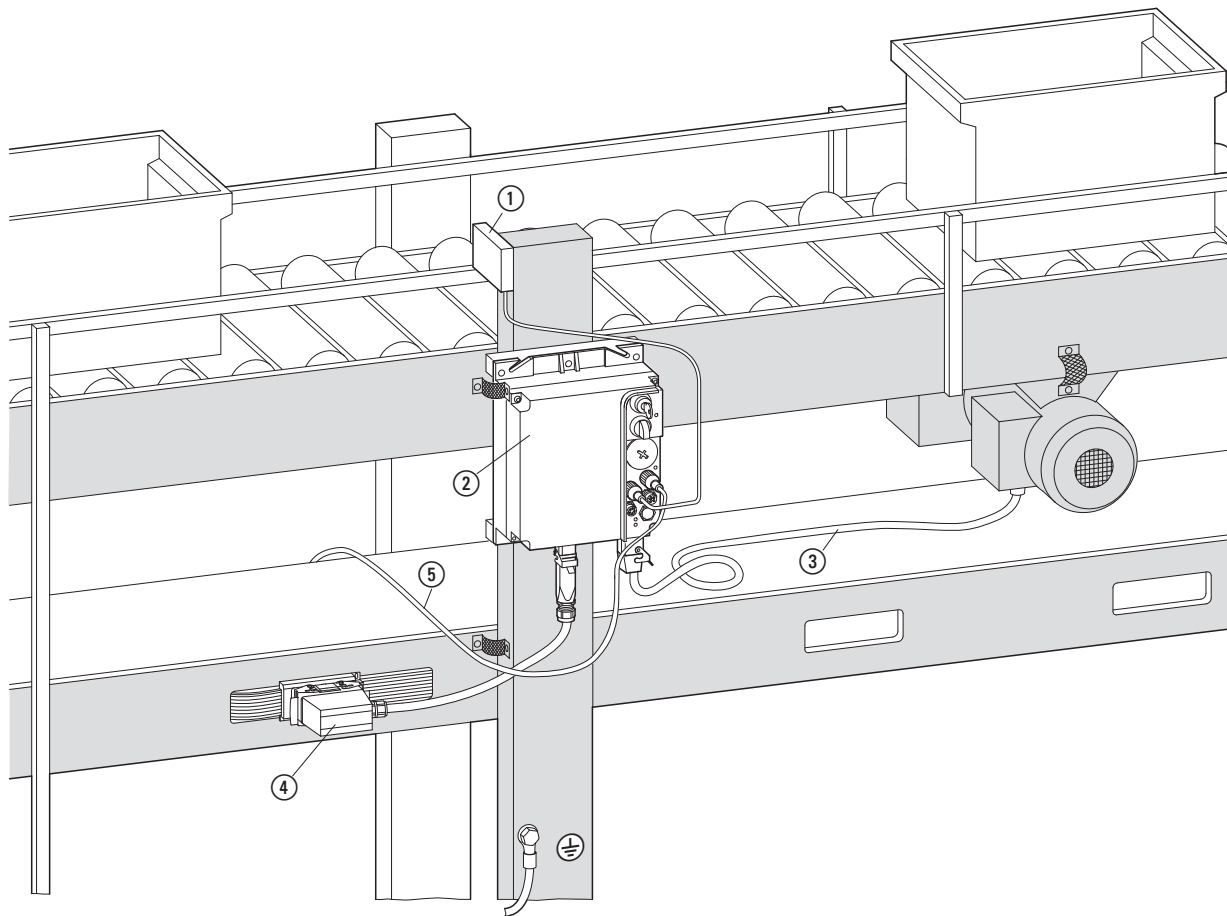
Description	For use with	Part no. Article no.	Price see price list	Std. pack	Instructions	
Communications						
Operating unit for setting the device parameters						
	with non-volatile parameter memory for copying parameter sets Equipment supplied: including 1 m connection cable with RJ45 connectors	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 mm ² , 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 mm ² + 2 x (2 x 0.75 mm ²), 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 mm ²	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 mm ²	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 mm ²	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 mm ² , 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 mm ²						
	T junction via spring-cage terminal, 1.5 to 6 mm ² and/or plug connection of 0.5 - 4 mm ² , 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 mm ² , 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 mm ² 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 mm ² , 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.

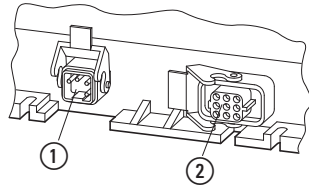
When using residual current devices, a Type B AC/DC sensitive residual current circuit-breaker must be used with the RASP frequency-controlled motor starter.

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

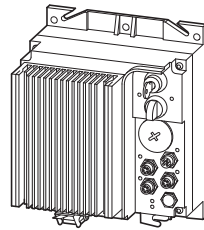
The electrical connection in the power section (mains voltage, motor feeder) is implemented with plug-in terminals in the base.



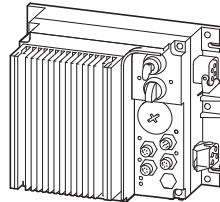
- ① 5-pole power connector for connecting the 3 AC 400 V mains voltage, (N), PE.
- ② 8-pole motor feeder socket as per DESINA specification.

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:

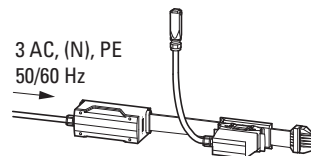


Connection from below (standard)

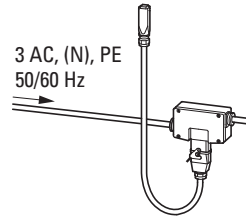


Connection from the right (90 degree rotation of the base to the left)

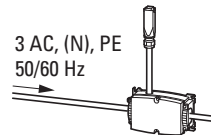
Three installation systems are available for connecting the power plug to the mains:



RA-C1, flat cable system



RA-C2, round cable system with plug connectors

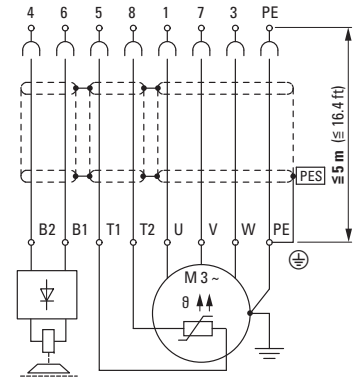


RA-C4, round cable system with contact connectors

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:

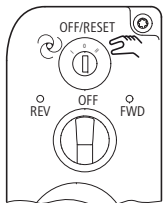
- a three-phase AC motor (U1, V1, W1, PE),
- a motor brake (B1, B2) with a control voltage of 230 V AC or 400 V AC,
- a thermistor or temperature switch (ThermoClick). These connection cables (T1, T2) can at the same time be used to monitor the motor cable and the connection of the motor feeder plug.



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.



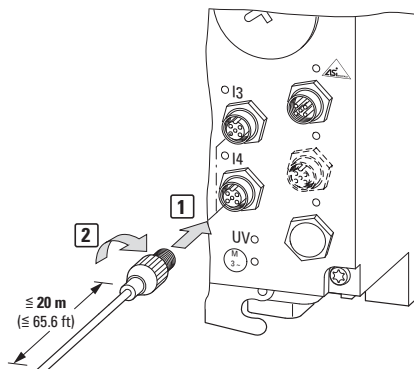
The automatic mode and the control voltage power supply are implemented via the AS-Interface. All connections in the control level (AS-i, sensors etc.) are implemented with M12 plug connectors. For this the M12 connectors just have to be fitted on [1] and rotated to secure them [2] (see illustration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

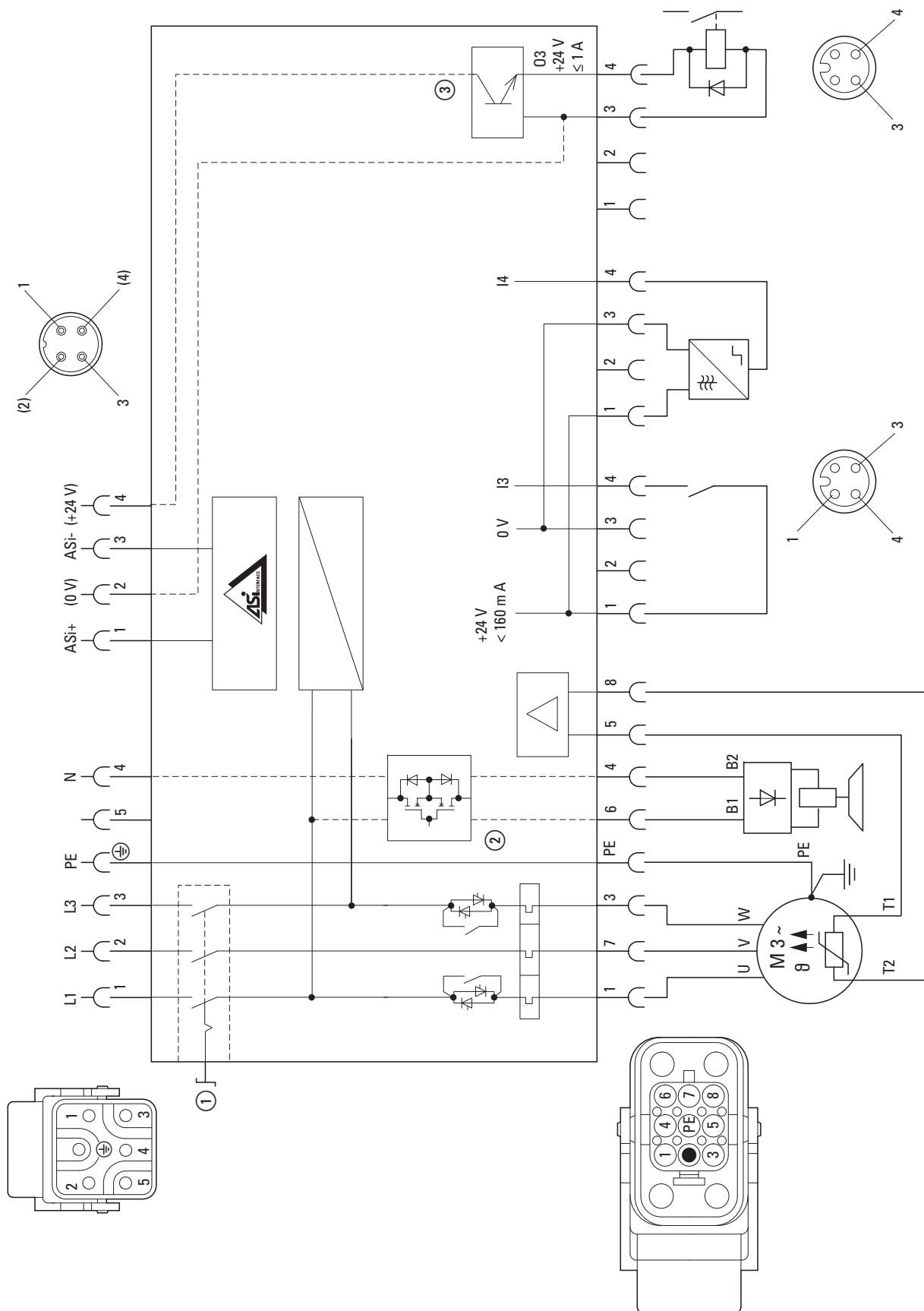
On the RAMO-DA... and RAMO-WA... a 24 V DC output (max. 1 A, O3) also makes it possible to control external actuators (valves, couplings, indicator lights) directly.

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

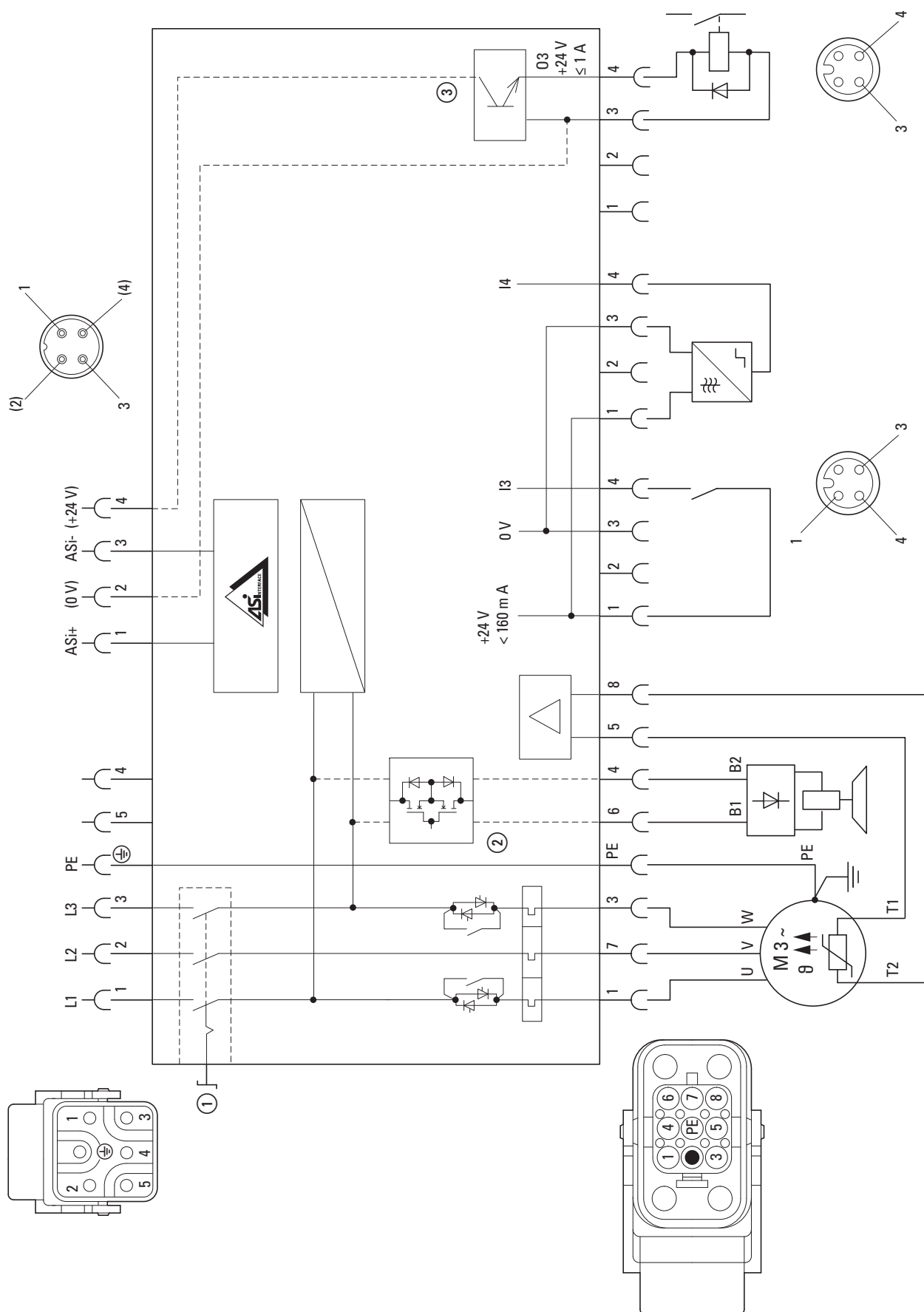
Block diagram RAMO-D DOL starter



Optional features:

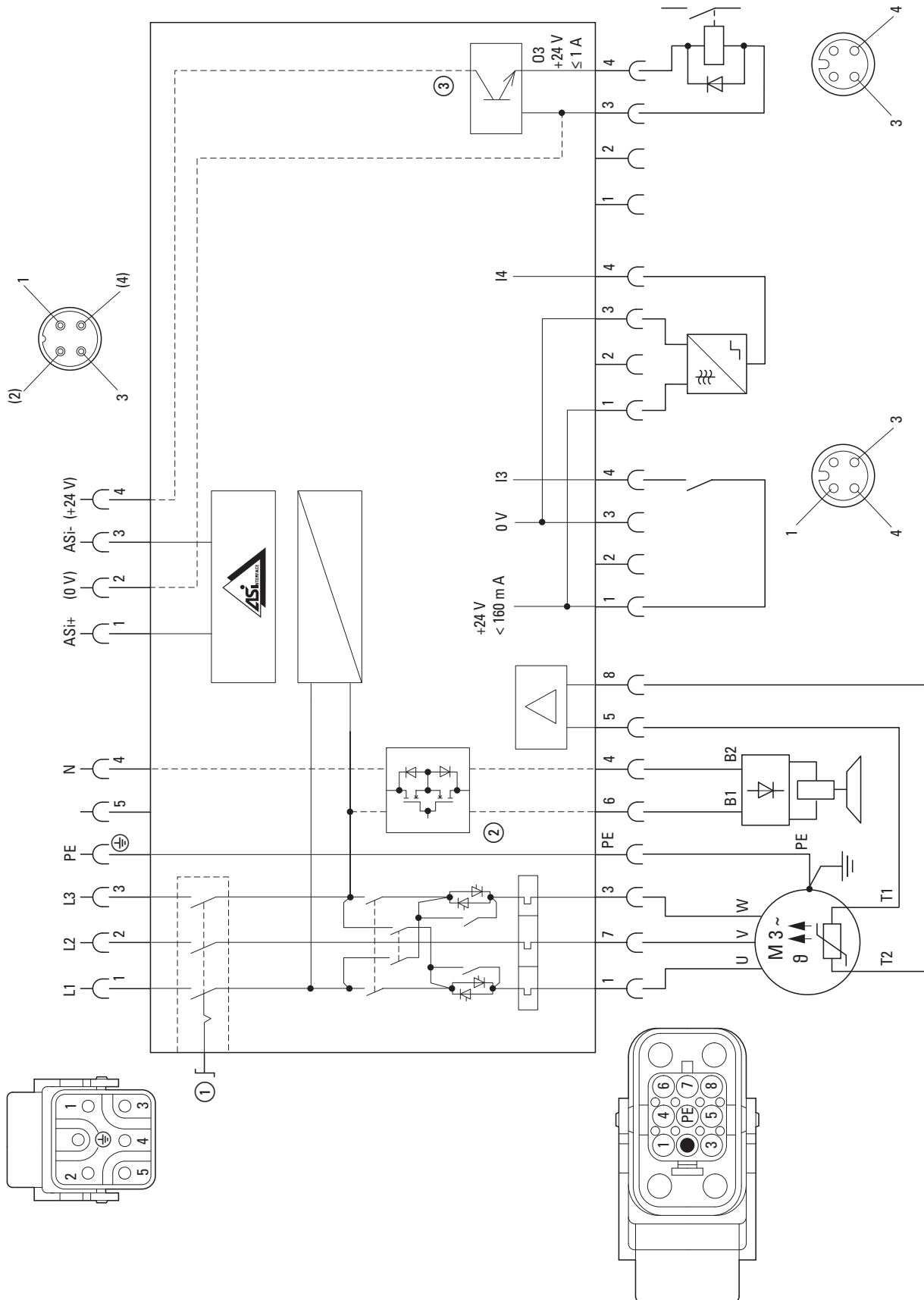
- ① RAMO-D...-C32R... Repair and maintenance switch
- ② Actuation of external brake (230 V), RAMO-Dx2...
- ③ Actuator output, RAMO-DA...

Block diagram DOL starter RAM0-D



- ① RAM0-D...-C32R... Repair and maintenance switch
- ② Actuation of external brake (400 V), RAM0-Dx4...
- ③ Actuator output, RAM0-DA...

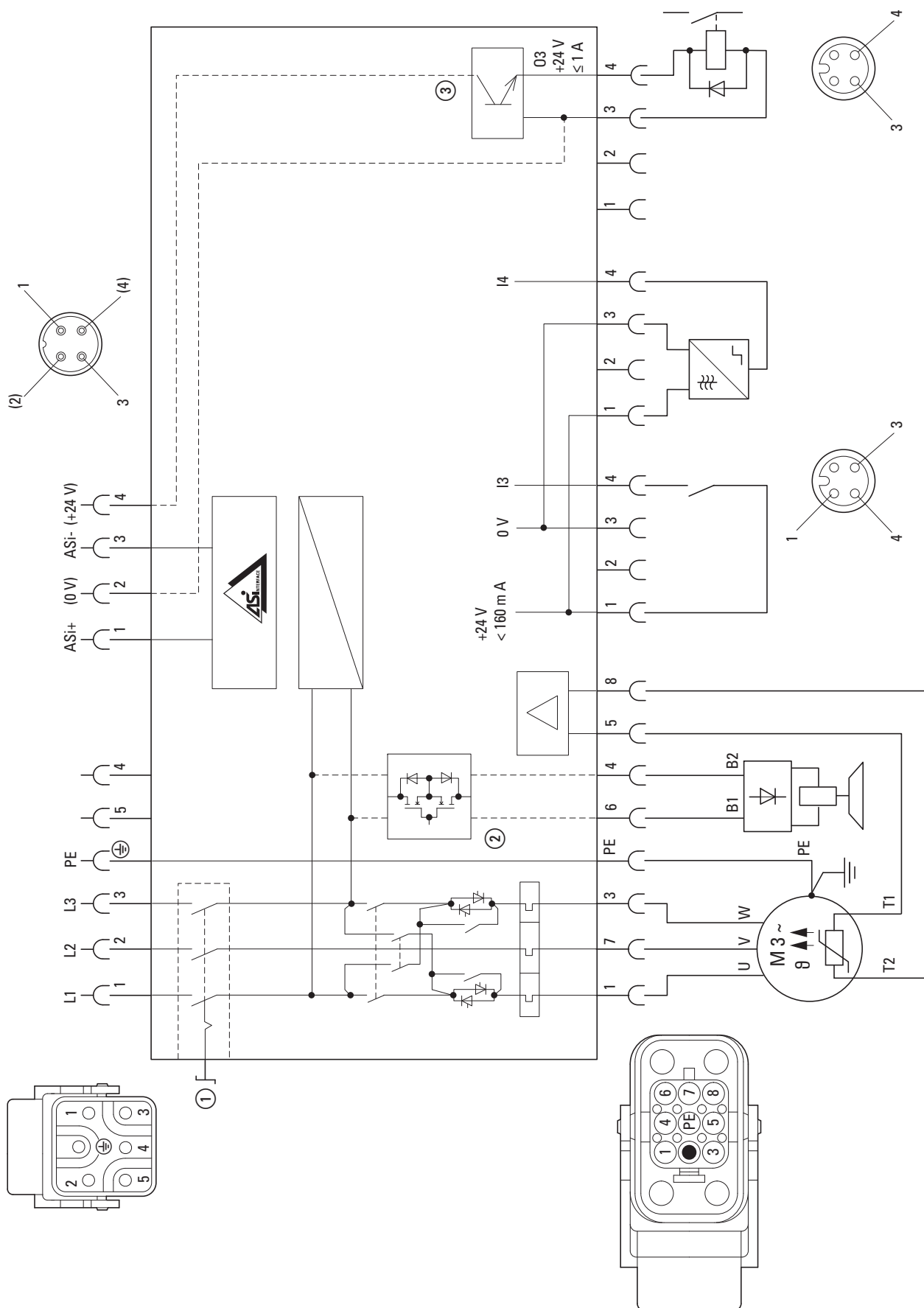
Block diagram RAMO-W reversing starter



Optional features:

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

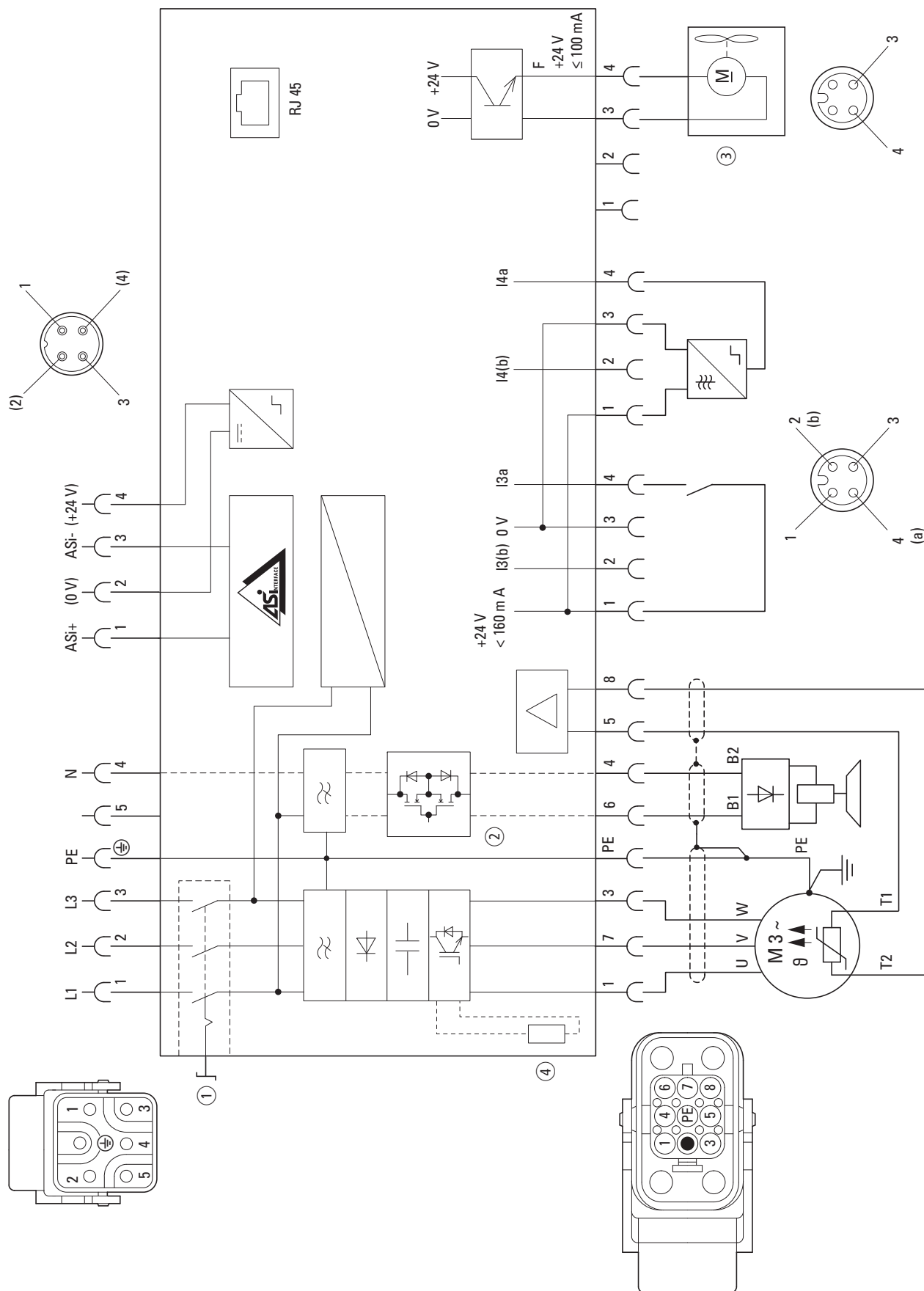
Block diagram RAMO-W reversing starter



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



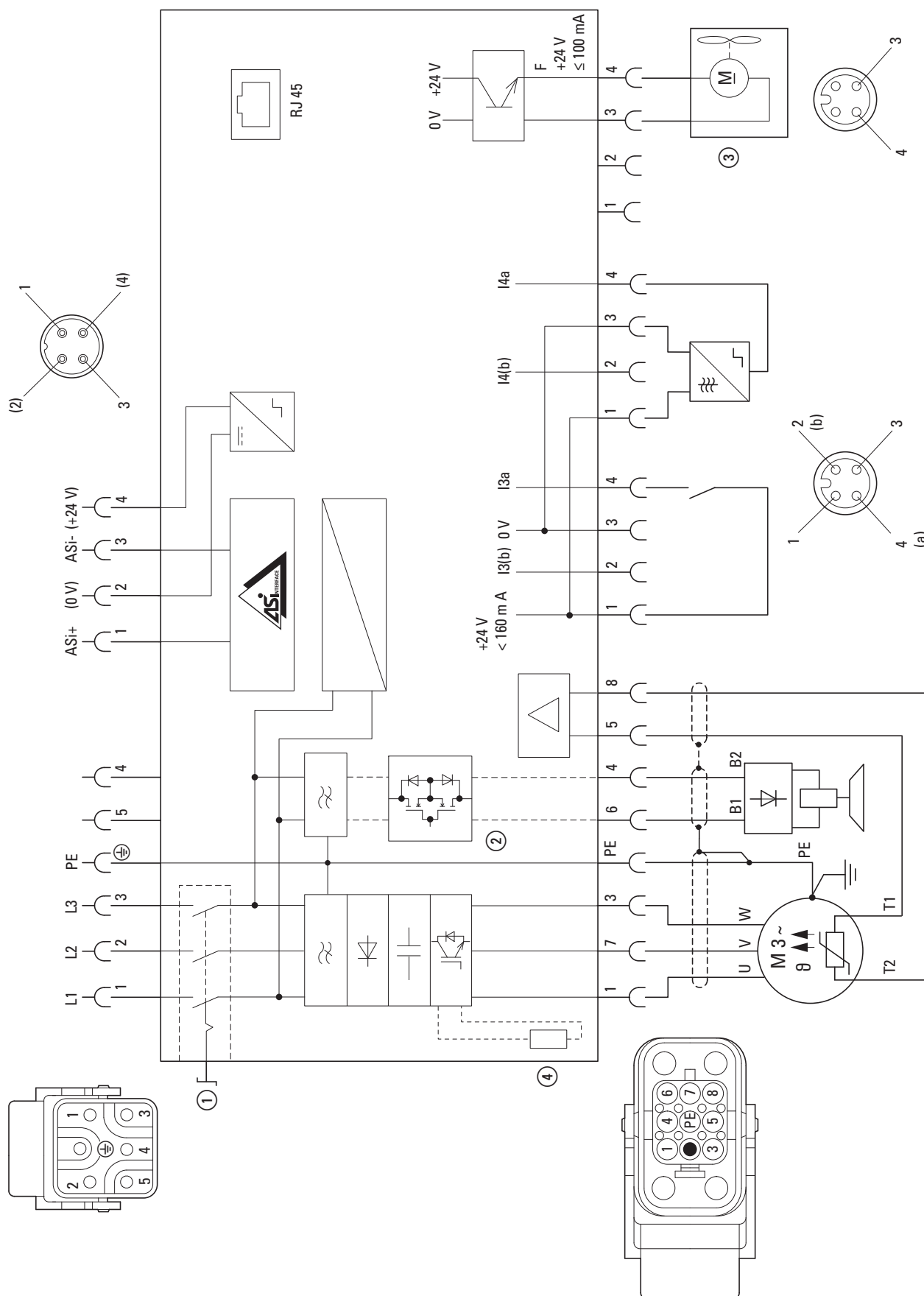
Optional features:

- 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					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			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	Operat ions		AC3: > 10.000.000	AC3: > 10.000.000	-	-	-	-
Lifespan, electrical	Operat ions		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)	Δf	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...			Specification: S-7.4		Specification: S-7.4			
RASP...			Number of slave addresses: 31		Number of slave addresses: 31			
RAMO-...AI2...			Specification: S-7.A.E.		-			
			Number of slave addresses: 62					

			Flat cable	Distributor module
			RA-C1-7X4HF	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 mm ²
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

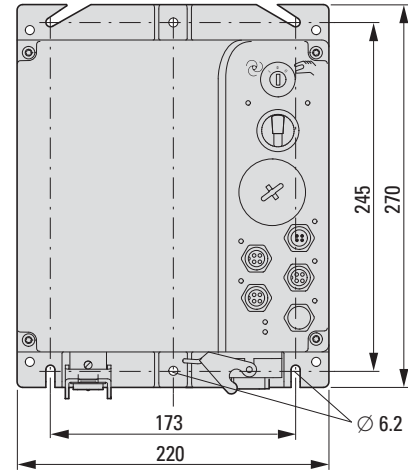
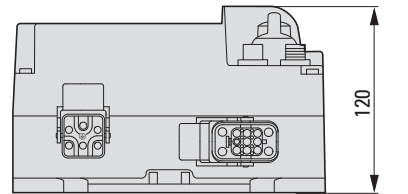
			Motor cable and motor feeder plug	Motor cable and motor feeder plug
			RAMO-CM1-2M0 /-5M0 /-10M0	RASP-CM1-2M0 /-5M0
General				
Standards			EN 61684 DIN VDE 0110	EN 61684 DIN VDE 0110
Protection type			IP65 IEC/EN 60529	IP65 IEC/EN 60529
Ambient temperature				
Operation	θ	°C	-30 - +70	-30 - +70
Connection cable				
Terminal capacities		mm ²	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		mm ²	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	Flexible busbar junction 400 V AC/24 V DC	Round cable junction	Round cable junction
RA-C1-VM-7	RA-C1-PLF	RA-C2-S1-4	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 mm ²	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 mm ² /4 mm ²)	25 (4 mm ²)
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 mm ² /4 mm ²)	-

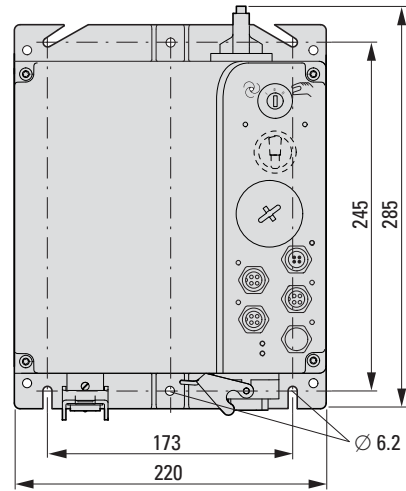
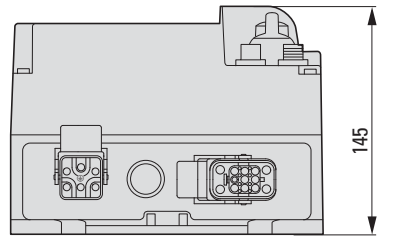
Dimensions

Motor starter RAMO

without manual override switch

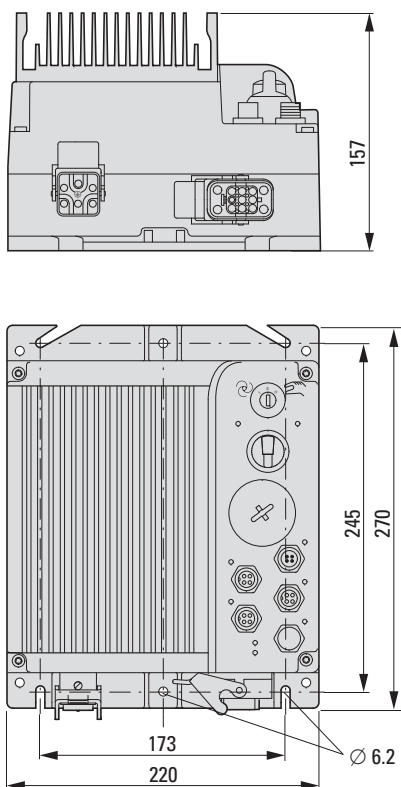


with manual override switch

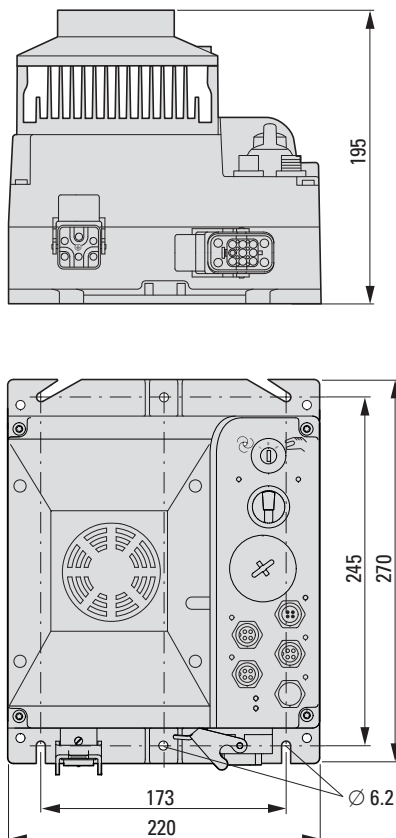
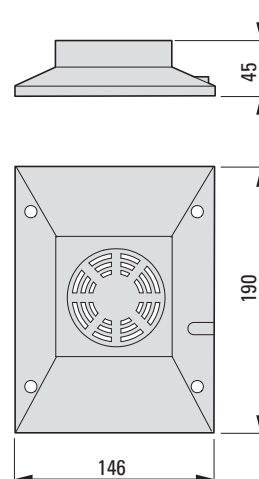
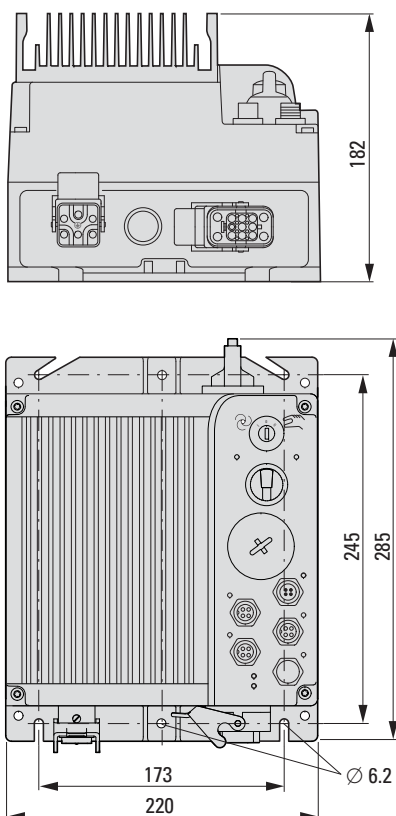
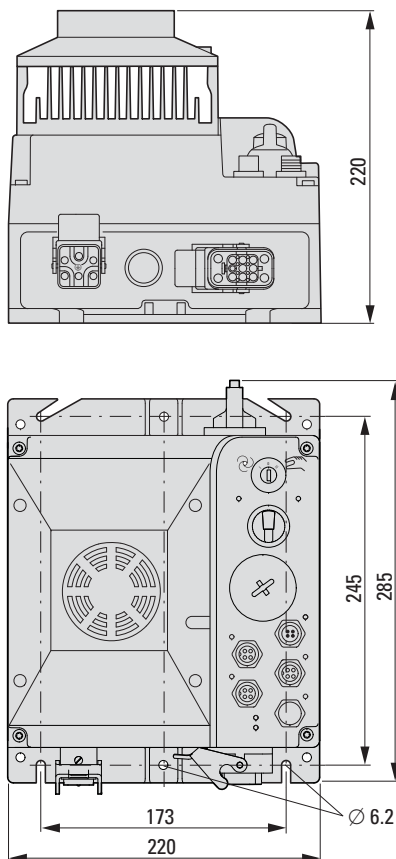


RASP speed controllers
without fan

without manual override switch


with fan

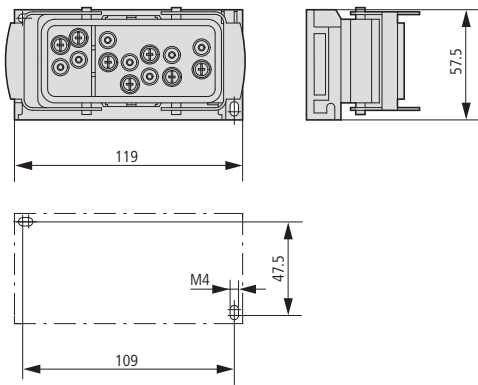
without manual override switch


Device fans RASP-FAN-S1

with manual override switch

with manual override switch


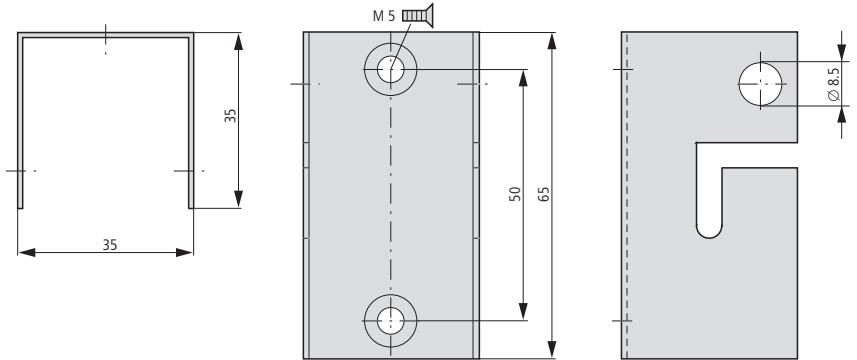
Accessories

flexible busbar junction

RA-C1-PLF
RA-C1-PLF1

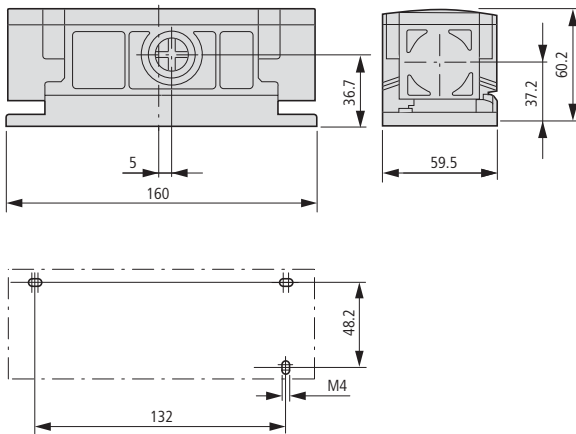


Locking brackets SET-M-LOCK

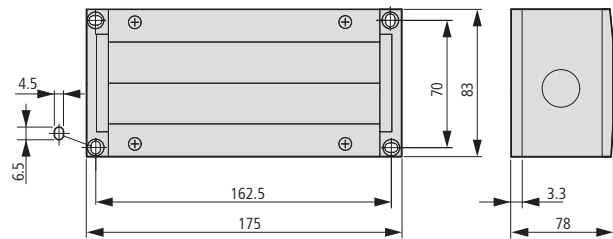


Distributor module

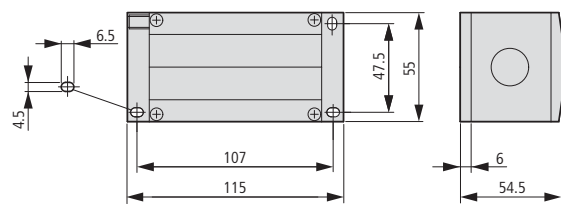
RA-C1-AM-7



RA-C1-VM-7

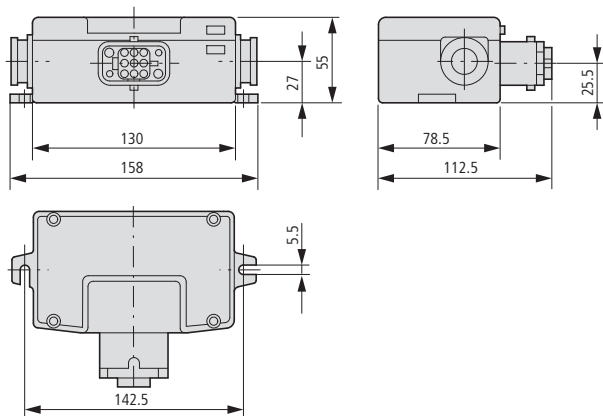


RA-C1-VP-AM-2



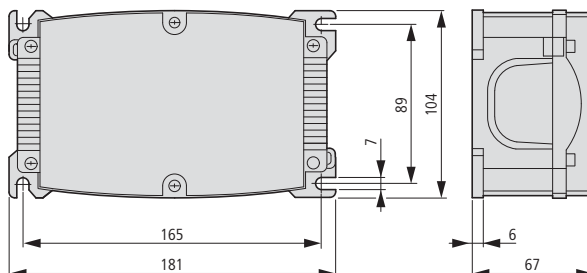
Round cable junction

RA-C2-S1-4



Locking brackets

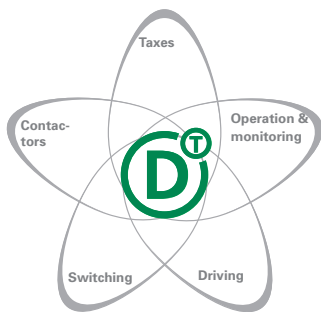
RA-C4-PB65





SmartWire-DT™ – 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.



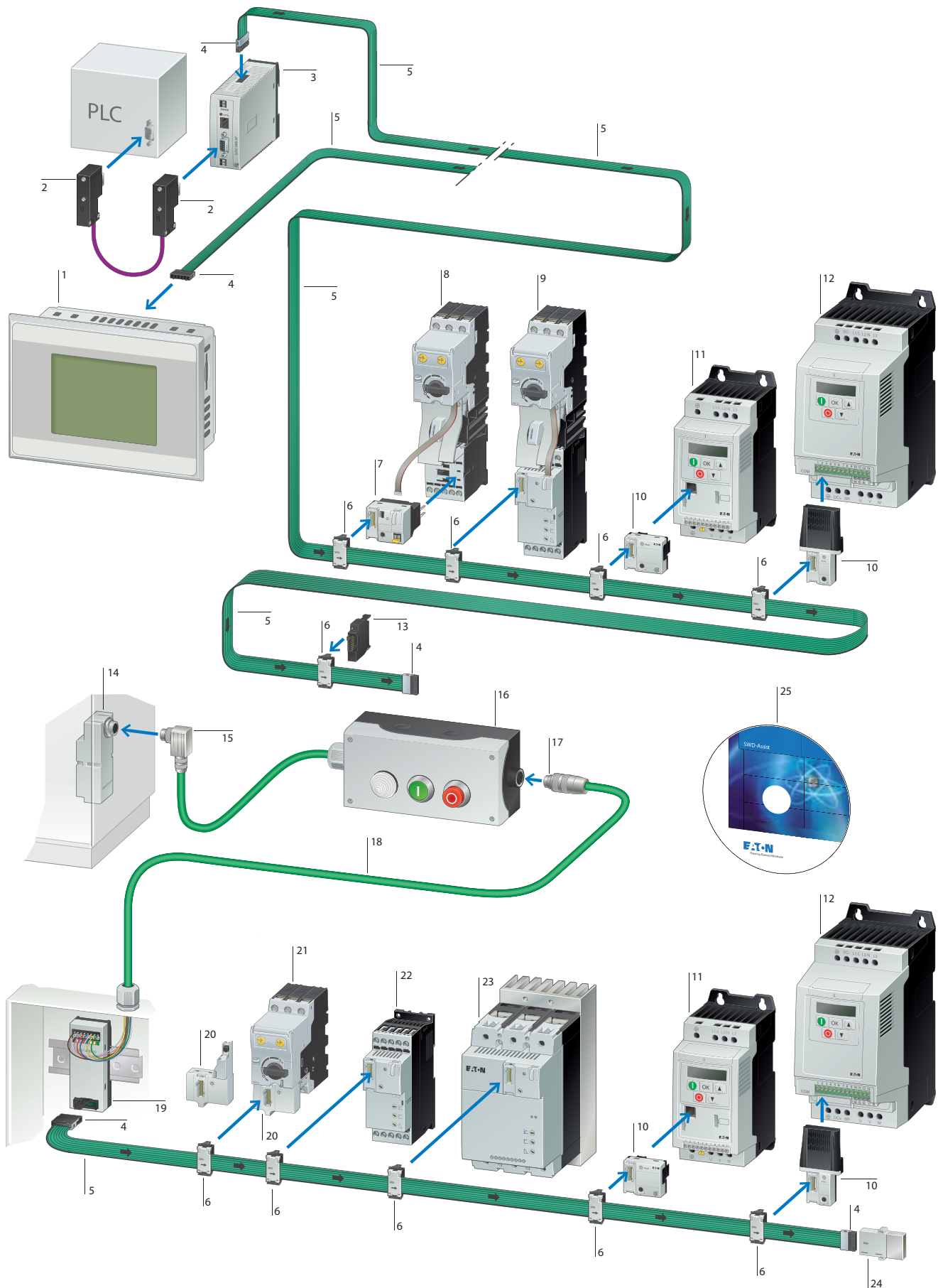
PowerXL variable frequency drives and DS7 soft starters – Communicate with SmartWire-DT

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.



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Dimensions	
SmartWire-DT Gateways	188
SmartWire-DT accessories	188

System overview



SmartWire-DT HMI-PLC → Industrial Switchgear 2011 catalog	1	SmartWire-DT module for variable frequency drives → page 33	10	SmartWire-DT adapter for flat/round cable for top-hat rail mounting → page 183	19
Data plug Sub-D 9 pole	2	DC1 variable frequency drive → page 12	11	SmartWire-DT PKE (motor-protective circuit-breaker) → Industrial Switchgear 2011 catalog	20
SmartWire-DT Gateways → page 182	3	DA1 variable frequency drives → page 20	12	Motor-protective circuit-breaker PKE12, PKE32 → Industrial Switchgear 2011 catalog	21
SmartWire-DT blade terminal 8 pole → page 182	4	SmartWire-DT universal module, front mount → page 183	13	Soft starter DS7 < 32 A → page 111	22
SmartWire-DT flat ribbon cable 8 pole → page 182	5	SmartWire-DT control panel cable entry for flat to round cable → page 183	14	Soft starter DS7 > 32 A → page 111	23
SmartWire-DT external device plug 8 pole → page 182	6	SmartWire-DT plug connector → page 183	15	SmartWire-DT bus termination resistor for 8-pole flat band conductor → page 183	24
SmartWire-DT PKE module (motor starter) → Industrial Switchgear 2011 catalog	7	RMQ-Titan surface-mounting enclosure with RMQ-Titan elements → Industrial Switchgear 2011 catalog	16	SmartWire-DT planning and ordering aid, SWD-Assist	25
Motor starter with PKE electronic motor protection → Industrial Switchgear 2011 catalog	8	SmartWire-DT plug connector → page 183	17		
Soft starter DS7 with electronic motor protection from PKE → Industrial Switchgear 2011 catalog	9	SmartWire-DT round cable, 8-pole → page 183	18		

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.

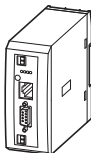
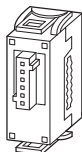
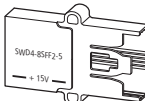
SmartWire-DT module

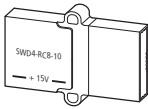
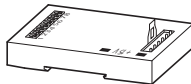
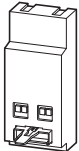
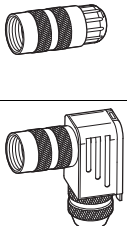
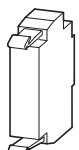
- Function element for connecting to RMQ-Titan pilot devices.
- Function element for connecting to DLM contactors
- Function element for connecting to PKZ/PKE motor-protective circuit-breakers
- Function module for connecting to NZM2,3,4 circuit-breakers
- Connection of digital and analog input/output 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. UL Category Control No. CSA File No. CSA Class No. North America Certification	E29184 NKCR 2324643 3211-07 UL listed, CSA certified					
Cable adapters										
 for connection flat cable (plug) on round cable (terminal)	SWD4-8FRF-10 121377		1 off	UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification	E29184 NKCR 2324643 3211-07 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. UL Category Control No. CSA File No. CSA Class No. North America Certification	E29184 NKCR 2324643 3211-07 UL listed, CSA certified					
	Connection round cable via plug	SWD4-SML8-20 121381	1 off	UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification	E29184 NKCR 2324643 3211-07 UL listed, CSA certified					
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. UL Category Control No. CSA File No. CSA Class No. North America Certification	E29184 NKCR 2324643 3211-07 UL listed, CSA certified					
Connectors for SWD round conductors										
	8 pole socket Straight	SWD4-SF8-67 116033	1 off	UL File No. UL Category Control No. CSA File No. CSA Class No. North America Certification	E29184 NKCR 2324643 3211-07 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 <table><tr><td>1</td><td>3</td><td>2</td></tr><tr><td>4</td><td>6</td><td>5</td></tr></table>	1	3	2	4	6	5	M22-SWD-NOP 147637	20 off	North America Certification	Request filed for UL and CSA
1	3	2								
4	6	5								

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

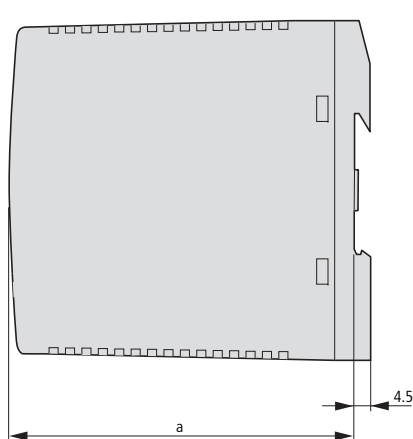
			EU5C-SWD-DP	EU5C-SWD-CAN	EU5C-SWD-EIP-MODTCP
Supply voltage U_{Pow}					
Supply voltage		V	24 DC -15 % + 20 %	24 DC -15 % + 20 %	24 DC -15 % + 20 %
Input voltage ripple		%	≤ 5	≤ 5	≤ 5
Siemens MPI, (optional)			yes	yes	yes
Rated current	I	A	0.7	0.7	0.7
Overload proof			yes	yes	yes
Inrush current and duration		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
General					
Standards			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
Weight		kg	-	-	-
Weight		g	10	10	5.5
Mounting position			As required	As required	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
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	-
Contact discharge (Level 2)		kV	4	4	-
Electromagnetic fields (IEC/EN 61131-2:2008)					
80 - 1000 MHz		V/m	10	10	-
1.4 - 2 GHz		V/m	3	3	-
2 - 2.7 GHz		V/m	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	-
Climatic environmental conditions					
Operating ambient temperature (IEC 60068-2)		°C	- 30 - + 55	- 25 - + 55	- 25 - + 55
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
relative humidity, non-condensing (IEC/EN 60068-2-30)			%	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
Number of insertion cycles				≥ 200	≥ 1
SWD-Out				-	Socket, 8-pole
Number of insertion cycles				-	≥ 200

SWD4-8SFF2-5	SWD4-8FRF-10	SWD4-SFL8-20	SWD4-SML8-20
IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178	IEC/EN 61131-2 EN 50178
48.5 x 34.5 x 10	35 x 90 x 35	35 x 83 x 40	35 x 83 x 46
-	-	-	-
4.5	42	50	50
As required	As required	As required	As required
IP20	IP20	IP67	IP67
5 - 8.4	5 - 8.4	5 - 8.4	5 - 8.4
8.4 - 150	8.4 - 150	8.4 - 150	8.4 - 150
9	9	9	9
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
8	8	8	8
4	4	4	4
-	-	10	10
-	-	3	3
-	-	1	1
-	-	-	-
-	-	-	-
-	-	-	-
-	-	10	10
- 25 - + 55	- 25 - + 55	- 25 - + 55	- 25 - + 55
Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation	Take appropriate measures to prevent condensation
- 40 - 70	- 40 - 70	- 40 - 70	- 40 - 70
5 - 95	5 - 95	5 - 95	5 - 95
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Plug, 8-pole	Plug, 8-pole	Plug, 8-pole	Plug, 8-pole
≥ 200	≥ 200	≥ 200	≥ 500
Plug, 8-pole	Push in terminals	Socket, 8-pole	Plug, 8-pole
≥ 200	-	≥ 500	≥ 200

Dimensions

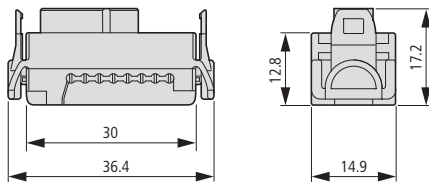
SmartWire-DT Gateways



	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

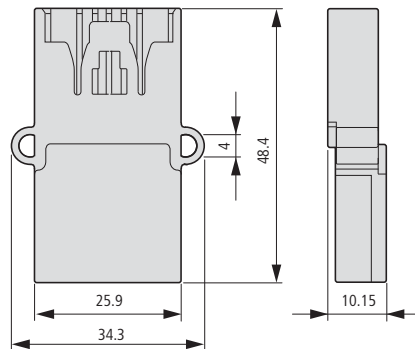
External device plugs

SWD4-8SF2-5



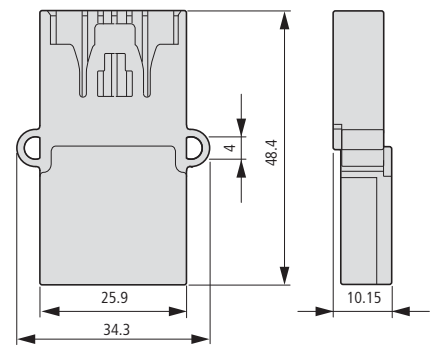
Network terminator

SWD4-RC8-10



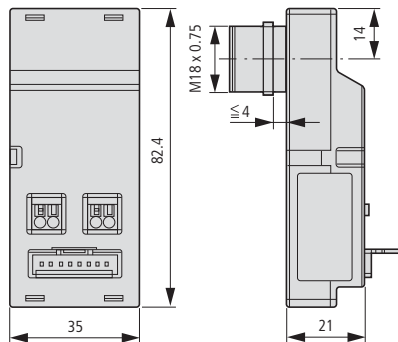
Coupling

SWD4-8SFF2-5



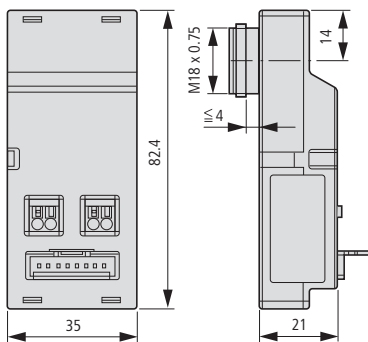
Switch cabinet bushing plug

SWD4-SM8-20



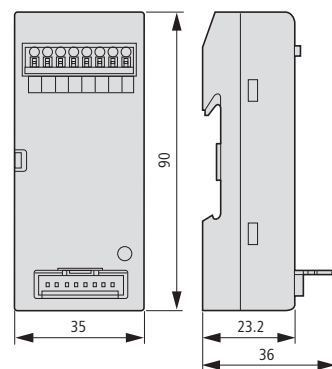
Switch cabinet bushing socket

SWD4-SFL8-20



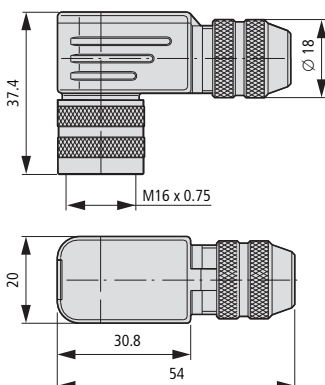
Adapter flat cable on round cable

SWD4-8FRF-10

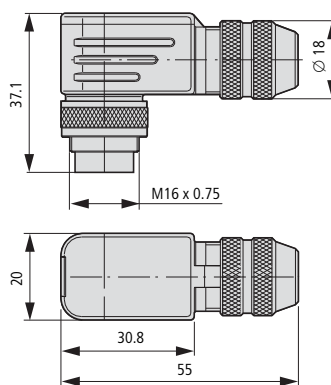


Connectors for SmartWire-DT round cables, angled

SWD4-SF8-67W

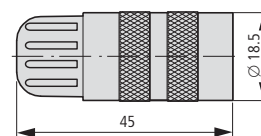


SWD4-SM8-67W

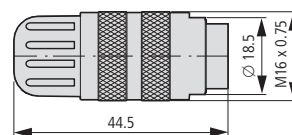


Plug connectors for SmartWire-DT round cables, flat

SWD4-SF8-67



SWD4-SM8-67





Planning safety and process optimization – CAD data at the click of a mouse!



- 9,500 article data items and macros
- Convenient selection tool
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- 70 different neutral & native formats

eCAD: Eaton makes product data and macros available for the EPLAN planning system and the Electric P8 version. Device data for over 9,500 products can be downloaded from the Eaton website and integrated in customer article databases using a specially developed selector.

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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.



World market equipment for machine building

Nearly all the switchgear and protective devices of Eaton's Moeller® series are world market devices. Each product line thus carries all the approvals and certification marks required for worldwide use.

These product lines include those for

- Pilot devices, limit switches
- Contactors and various timing and special relays
- Motor-protective circuit-breakers and relays
- Electronic components and systems.

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

Electrical engineering products and their applications are not harmonized internationally.

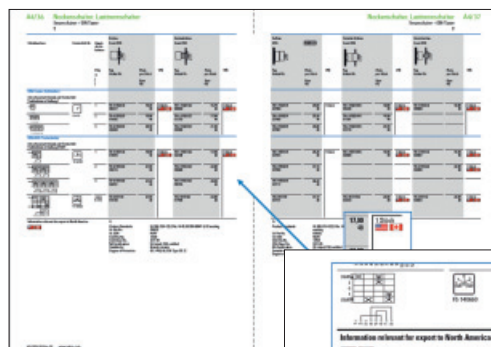


The greatest differences to the IEC world are in North America, i.e. the USA and Canada. For many newcomers to the export business, it is initially surprising to experience the very different approaches and solutions.

Special components, such as handles for main switches that can only be operated by the intentional switching of an

additional handle when the control panel door is opened, may sometimes be required for export to North America. Likewise, the European motor-protective circuit-breaker is only accepted with an upstream protective device 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.



Product Standards	UL File No.	UL CCN	CSA File No.
UL 508; CSA-C22.2 No. 14-05; IEC/EN 60947-3; CE marking	E36332	NLRV	12526
3211-05	UL Listed, CSA certified	Branch circuits	IEC: IP65; UL/CSA Type 3R, 12

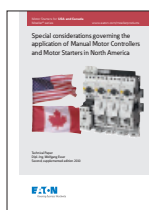
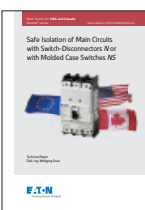
Up to 13 data items are listed here for each product, such as the suitability for use in feeders or branch circuits, the maximum operating voltage, or the North American degree of protection, such as UL / CSA Type 4X. The Main Catalogue also contains a glossary with explanations of the American terms.

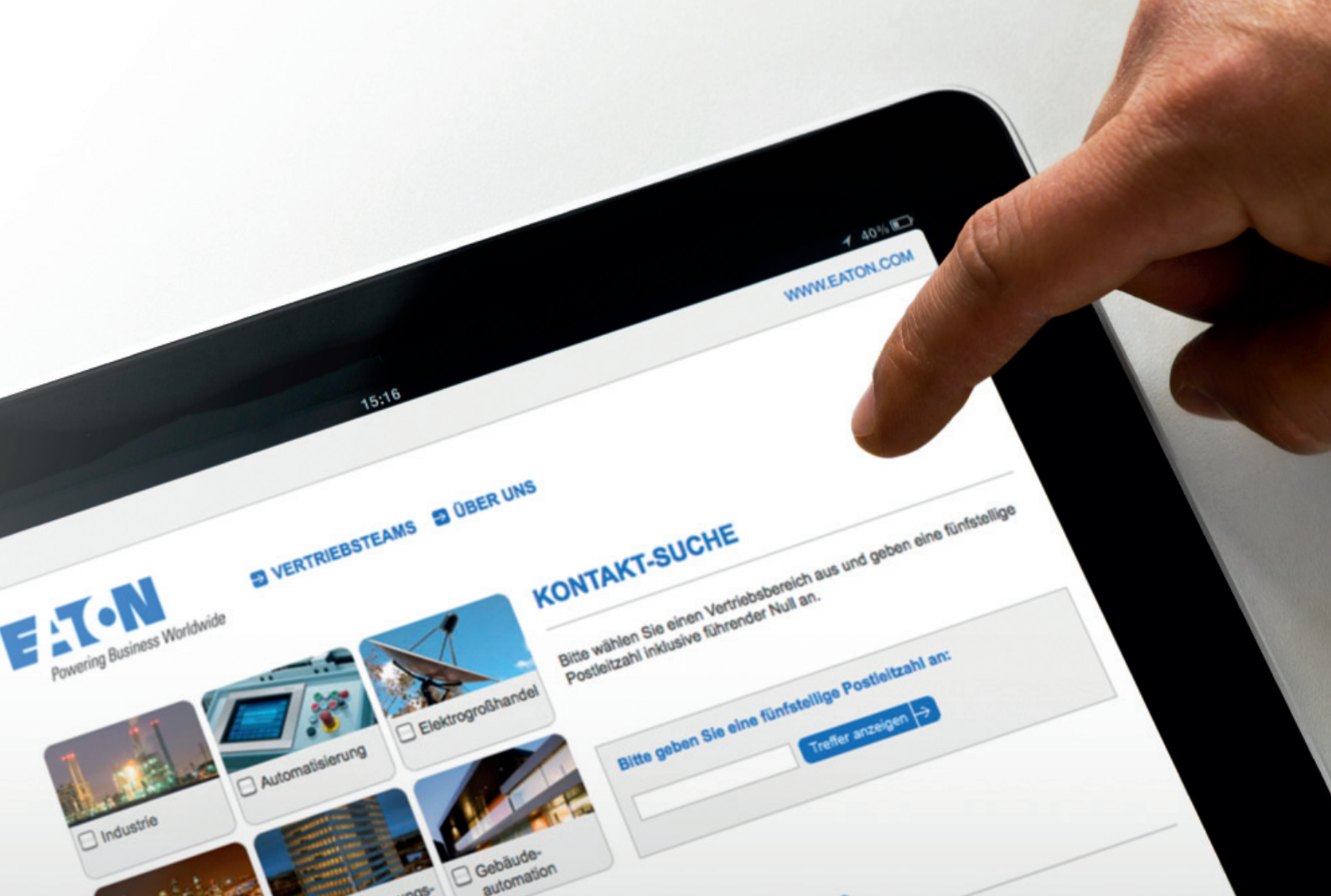
The link <http://www.moeller.net/eaton-approbationen/en/index.jsp> shows the relevant approvals or permits for each component type. This therefore enables you to view the certificates provided or, depending on the test authority, also the product report. The information given is the same as what is provided 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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Your customer contact worldwide:

→ www.eaton.eu/electrical/contact

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or contact us by phone at:

Tel.: +49 (0)7841 604 - 334

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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Our customer service:

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Dr.-Reckeweg-Straße 1
D-76532 Baden-Baden
Tel.: +49 (0)7221 682 - 0
Fax: +49 (0)7221 682 - 788
Email: customersupportemea@eaton.com

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Onsite service

Repair and replacement service for Eaton devices.

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Online services

Downloads, FAQs and interactive troubleshooting

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.

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		Motor rated operational current	Fuse		Motor rated operational current	Fuse		Motor rated operational current	Fuse		Motor rated operational current	Fuse	
				Starting DOL	Y/Δ		Starting DOL	Y/Δ		Starting DOL	Y/Δ		Starting DOL	Y/Δ		Starting 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. $6 \times$ rated motor current.
Starting time max. 5 s.
Y/Δ-start: Starting current max. $2 \times$ motor rated current.
Starting time max. 15 s.
Set overload relay in line to $0.58 \times$ 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)

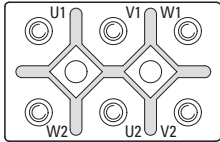
**For LV h.b.c. fuse with aM characteristics
the fuse should be equal to the rated operational current.**

Drives engineering selection criteria

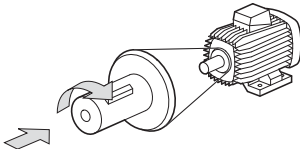
Each drive task requires a drive motor. The speed, torque and controllability of each motor must fulfill the requirements of the task. The following generally applies: the application determines the drive. The drive motor most frequently used worldwide in industrial plants and large buildings is the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

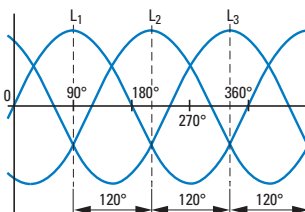
When connecting a 3-phase motor to the mains supply, the data on the rating plate of the motor must correspond to the mains voltage and frequency. The standard connection is implemented via six screw terminals in the terminal box of the motor and with two types of circuit, the star connection and the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

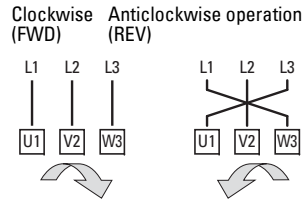


Regardless of the circuit type and the type of three-phase asynchronous motor, the connections must be labeled, so that their alphabetical sequence (e.g. U1, V1, W1) corresponds with the order of the mains voltage phase sequence (L1, L2, L3) and causes the motor to rotate clockwise.



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.



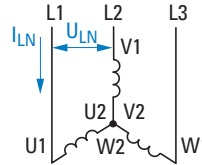
FWD = forward run (clockwise rotation field)
REV = reverse run (anticlockwise rotation field)

Information on the rating plate

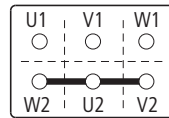
The electrical and mechanical rating data of the motor must be stated on its rating plate (IEC 34-1, VDE 0530). The data on the rating plate describes the stationary operation of the motor in the area of its operating point (MN, e.g. at 400 V and 50 Hz). The operational data is unstable in the motor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

230 / 400 V	Δ / Y	14.5 / 8.5 A
S1	4.0 kW	cos φ 0.82
1410 min ⁻¹		50 Hz
IP 54	Iso. KI F	



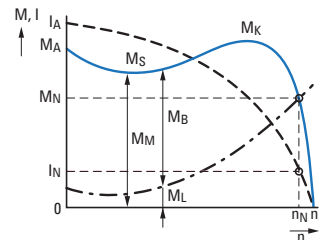
$$U_{LN} = \sqrt{3} \times U_W, I_{LN} = I_W$$



- 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).

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)

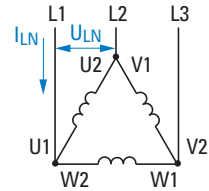
Synchronous speed:

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

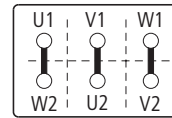
Slip speed in %:

Delta circuit

400 / 690 V	Δ / Y	8.5 / 4.9 A
S1	4.0 kW	cos φ 0.82
1410 min ⁻¹		50 Hz
IP 54	Iso. KI F	



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



- 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.

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

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 φ: 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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	Item	Qty	Photo	Article no.	Part no.	Short Text
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☐	2	1		229758	FAK-COMBINATION-3	Complete unit
☐	3	1		204831	M225-DLM-GR-X/1X2	Double act. limit. stop button ext.
☐	4	1		290390	DLM15-01 (110V50HZ, 120V60HZ)	Connector, 7,5kV/1400V, A.C.-operated
☐	5	1		130516	PKES50TU-85	PKES5 - trip block Standard 8-85A
☐ Select all						
Delete position Save changes Add new position						

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