DS, DM soft starters

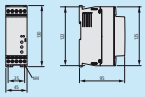
Soft starters enable the gentle start of alternating current asynchronous motors through a continuously variable control of the motor supply voltage during the start phase. The resulting torque increase ensures that the motor is adapted to the load characteristics of the machine and is accelerated smoothly.
The soft starter DS7 is available in a communications-capable version for connection to the SmartWire-Darwin communication system.

Two-phase controlled DS6 soft starter with internal bypass
Easy setting through three regulating switches(U-start, t-start, t-stop) +++ special control method (asymmetrical ignition control) +++ Performance range 41 – 200 A, 18.5 – 110 kW (with 400 V) → Page 9/19

Two-phased controlled DS7 soft starter with asymmetrical trigger
Easy setting through three regulating switches(U-start, t-start, t-stop) +++ special control method (asymmetrical ignition control) +++ Optional fan to increase switching rate +++ can be used with numerous contactor options +++ Ramp times and start voltages adjustable by potentiometer +++ Performance range: 3 – 200 A, 1.1 – 110 kW (with 400 V) → Page 9/31

Three-phased controlled DM4 soft starter
Parameterizable and communication-capable +++ Selector switch with 10 standard applications +++ Performance range: 16 – 900 A, 7.5 – to 900 kW (with 400 V) → Page 9/55

Eaton After Sales Service
Testing switching devices in compliance with regulations applicable to this technology
→ Chapter 22



Technical overview

DS6, DS7, DM4

	DS6-340-…-MX	DS7-34…SX…	DM4-340-…
Power section	Thyristors in two phases	Thyristors in two phases	Thyristors in three phases
Mains supply voltage U_{LN}	230 - 460 V ±15 %	230 - 480 V ±10 %	230 - 460 V ±15 %
Supply voltage	24 V DC	24 V AC/DC, 110/230 V AC	24 V DC, 110 - 230 V AC
Mains frequency	45 - 65 Hz ±0 %	45 - 65 Hz ±0 %	45 - 65 Hz ±0 %
Rated operational current I_e			
Heating load AC 51	–	–	–
Motor load AC 53	41 - 196 A	3 - 200 A	16 - 900 A
Assigned motor rating at 400 V	18.5 - 110 kW	1.1 - 110 kW	7.5 - 500 kW, 11 - 900 kW
Overload cycle	10 starts per h with 3 x I_N for 5 s	10 starts per h with 3 x I_N for 5 s	10 starts per h at 3.5 × I_N for 35 s (up to part no. ... 90K)
Operating temperature	0 - 40 °C	0 - 40 °C	0 - 40 °C
Storage temperature	-25 - +55 °C	-25 - +55 °C	-25 - +55 °C
Installation altitude	Up to 1000 m a.s.l., over 1000 m with reduced current (2.5 % per 100 m)	Up to 1000 m a.s.l., over 1000 m with reduced current (2.5 % per 100 m)	Up to 1000 m a.s.l., over 1000 m with reduced current (2.5 % per 100 m)
Protection type	IP20	IP20	IP20
Changeover time for reversing contactors (transition from 100 % FWD to 100 % REV)	–	–	–
Fields of application			
Three-phase resistive and inductive loads	–	–	●
Three-phase motors	●	●	●
Functions			
Fast and silent switching (semiconductor contactor)	–	–	–
Soft start/Soft stop	●	●	●
Reversing function	-	-	–
Suppression of DC components on motors	●	●	●
Potential isolation between power section and control section	●	●	●
Internal bypass	●	●	–
Product standard, determination	IEC/EN 60 947-4-2	IEC/EN 60 947-4-2	IEC/EN 60 947-4-2
Approval, certification	UL, CSA, CCC	UL, CSA, CCC, Gost, Gost-R	UL, cUL

Notes

The value range specifications for the rated operational current and the assigned motor output within each column refer to the entire group, and not to an individual device.
Depending on the specific model, DS7 series soft starters require 24 VDC/VAC or 110/230 VAC as a supply voltage.
An Easy200-POW power supply is sufficient for operation (keep the total load in mind!).

Key to part numbers

DS6 soft starters

DS6-340-22K-MX (example)

DS	6	-	3	4	0	-	22K	-	M	X
DS	6		3	4	0	–	Variable three-digit code	–	M	X

DS = Drives soft starters

Device series

6 = Generation 6

Number of phases

3 = Three-phase connection

Voltage class

4 = 400 V/480 V

Version

0

Motor rating (in kW)

x(x)(x)Ky xx = Decimal specification, whole-number component, y = decimal place

Motor code

M = For three-phase AC motors

Code for additional functions

X = With internal bypass

DS7 soft starters

DS7-340SX081N0-N (example)

DS7	3	4	0	SX	081	N	0	-	N
DS7	3	4	0	SX	Variable three-digit code	N	0	–	N
			2						D
			D						

DS7 = Device series, Generation 7

Number of phases

3 = Three-phase mains supply voltage

Voltage class

4 = 400 V (380 V – -15 % to 480 V + +10 %)

Control voltage supply

0 = 24 V AC/DC

2 = 110/230 V AC

D = 24 V DC SmartWire-Darwin

Device version

SX = Standard soft starters with internal bypass

Rated operational current

Variable magnitude in decimal notation

Radio interference suppression filters

N = No internal radio interference suppression filter

Protection type

0 = IP20

Options

N = No option

D = SmartWire-Darwin

DM4 soft starter

DM4-340-200K (example)

DM	4	-	3	4	0	-	200	K
DM	4		3	4	0		Variable three-digit code	K

DM = drives, motor controllers

Device series

4 = Generation 4

Number of phases

3 = Three-phase connection

Voltage class

4 = 400 V/480 V

Version

0

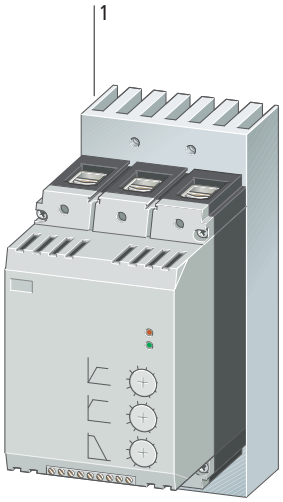
Motor rating (in kW)

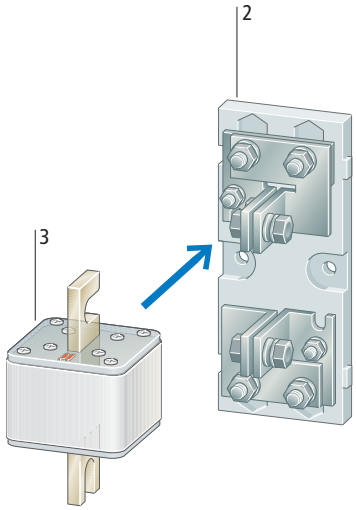
x(x)(x)Ky xx = Decimal specification, whole-number component, y = decimal place

Unit

K = kW

System overview





Basic devices

DS6 soft starters	1
Soft starters for three-phase AC motors	
Assigned motor rating: 18.5 to 110 kW at 400 V	
Rated operating voltage: 230 to 480 V	
Asymmetric trigger control for clearly improved true run behavior (Moeller Patent: PCT/EP00/12938)	
Selection data → Engineering - Assigned switching and protective devices.	
Ordering data → Page 9/7	

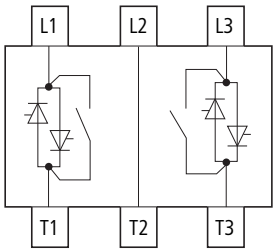
Add-on functions

Superfast semiconductor fuses	3
Fuses for protecting the DS7 soft starters from short-circuits or to achieve type “2” coordination for external surface mounting	
Selection data → Engineering - Assigned switching and protective devices.	
Ordering data → Page 9/8	

Fuse bases	2
For external surface mounting of the superfast semiconductor fuse	
Selection data → Engineering - Assigned switching and protective devices.	
Ordering data → Page 9/8	

DS6

Description



Application

The DS6 series soft starters are intended for three-phase motors with normal operating frequency and a rating range of 22 to 110 kW.
A significant reduction of the inrush current for three-phase lamps and heaters (with an ungrounded star point) is achieved by setting a short soft start ramp time (at least 1 s).
The special actuation method (asymmetrical trigger phase control) for the soft start function avoids the DC components 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 phase. The true run behavior of the DS6 is therefore comparable with that of a three-phase-controlled soft starter.

Features

The soft starter DS6-340-MX is available with a rating of 22 to 110 kW. Starting transients and DC components during startup are effectively suppressed and guarantee even motor starting.
The ramp times and the start voltage are adjustable via potentiometers. The time can be adjusted between 1 and 30 s (start) and between 0 and 30 s (stop); the start voltage (i.e. the starting torque) from 30 to 100 % mains voltage.
The DS6-340-MX models feature built-in bypass contacts that close automatically at TOR (top-of-ramp) and bypass the built-in thyristors. This function provides radio interference level "B" in continuous operation without additional measures.

Typical applications for soft starters

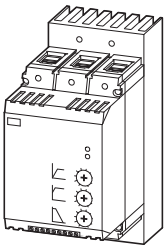
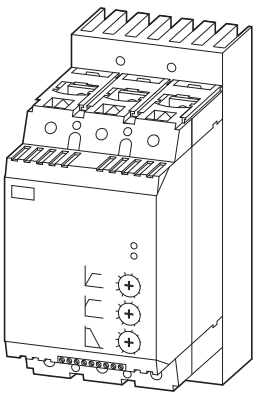
- Pump drives: Soft starting prevents sudden pressure surges. The mechanical load on the whole plant is reduced and its service life increases.
- Fan drives: Soft starting prevents drive belt slippage and premature wear. This reduces operating costs and extends durability.
- Conveyors: The conveyor belt starts up gently instead of with a jerk. The conveyed goods do not fall over, the mechanical stress on the conveyor is reduced and its lifespan increased.

Documentation

Installation instructions
AWA8250-2330

Manual
AWB8250-1346
("Design of soft starters")

Notes:
See also Engineering of DS7 Settings for Potentiometer

	Mains supply voltage (50/60 Hz)	Assigned motor rating		Rated operational current	**Part no.** Article no.	**Price** See price list	Std. pack
		400 V	480 V	(AC-53)			
	U_{LN}	P	P	I_e			
	V AC	kW	HP	A			
DS6 soft starters							
	230…480	22	30	41	**DS6-340-22K-MX** 103086		1 off
		30	40	55	**DS6-340-30K-MX** 103087		
		37	50	68	**DS6-340-37K-MX** 103088		
		45	60	81	**DS6-340-45K-MX** 103089		
		55	75	99	**DS6-340-55K-MX** 103150		
		75	100	134	**DS6-340-75K-MX** 103151		
		90	125	161	**DS6-340-90K-MX** 103152		
		110	150	196	**DS6-340-110K-MX** 103153		

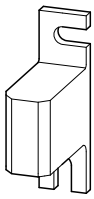
Information relevant for export to North America

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
UL CCN	NMFT
CSA File No.	012528
CSA Class No.	3211-06
NA Certification	UL Listed, CSA certified
Suitable for	Branch circuits
Max. Voltage Rating	480 V
Degree of Protection	IP20; UL/CSA Type 1

HPL09008EN

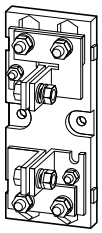
Accessories

Fuse links

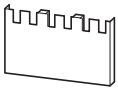
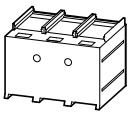
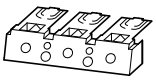
	Rated operational current A	Maximum power loss P_v W	Frame size/ inside micrometer mm	For use with	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America	
	100	22	80	DS6-340-22K-MX	**20.282.20-100** 106654		6 off	Product Standards	UL 248-13 CE marking
	125	24	80	DS6-340-30K-MX	**20.282.20-125** 232087		6 off	UL File No.	E180276
	200	44	80	DS6-340-37K-MX DS6-340-45K-MX DS6-340-55K-MX	**20.610.32-200** 106475		3 off	UL CCN CSA File No.	JFHR2 UL report applies to both US and Canada
	350	61	80	DS6-340-75K-MX	**20.610.32-350** 221161		2 off	CSA Class No. NA Certification	JFHR8 UL Recog-nized, certified by UL for use in Canada
	400	70	80	DS6-340-90K-MX	**20.610.32-400** 106476		3 off		
	500	72	80	DS6-340-110K-MX	**20.610.32-500** 221163		2 off	Max. Voltage Rating	660V

Fuse bases

For semiconductor fuses

	Frame size/ inside micrometer mm	For use with	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America
	80	20.282.20-… 20.189.20-…	**21.189.01** 232064		5 off	
	80	20.6xx.32-…	**21.313.02** 232076		2 off	

HPL09009EN

	Frame size/ inside micrometer mm	For use with	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America
Terminal cover, knockout, no UL/CSA approval						
For box terminal[1]						
	–	NZM1, PN1, N1 DS6-340-22K…55K-MX	**NZM1-XKSFA** 100780		1 off	UL/CSA certification not required
Cover[2]						
	–	NZM2, PN2, NS2 DS6-340-75K…110K	**NZM2-XKSA** 260038		1 off	Product Standards: UL489; CSA-C22.2 No. 5-09; IEC60947, CE marking UL File No.: E31593 UL CCN: DIHS CSA File No.: 22086 CSA Class No.: 1432-01 NA Certification: UL Listed, CSA certified Suitable for: Refer to main component information
Terminal cover[1]						
	–	NZM2, PN2, N(S)2 DS6-340-75K…110K	**NZM2-XKSFA** 104640		1 off	UL/CSA certification not required
IP2X protection against contact with a finger						
For box terminal[3]						
	–	NZM2, PN2, N(S)2 DS6-340-75K…110K	**NZM2-XIPK** 266773		1 off	UL/CSA certification not required
IP2X protection against contact with a finger						
For cover NZM2-XKSA or NZM2 or NZM2...(C)NA und N(S)2...NA[4]						
	–	NZM2, PN2, N(S)2	**NZM2-XIPA** 266777		1 off	UL/CSA certification not required

Notes

[1] Type contains parts for a terminal located at top or bottom for 3 or 4-pole switches.
Increased protection against direct contact (simplified finger protection).

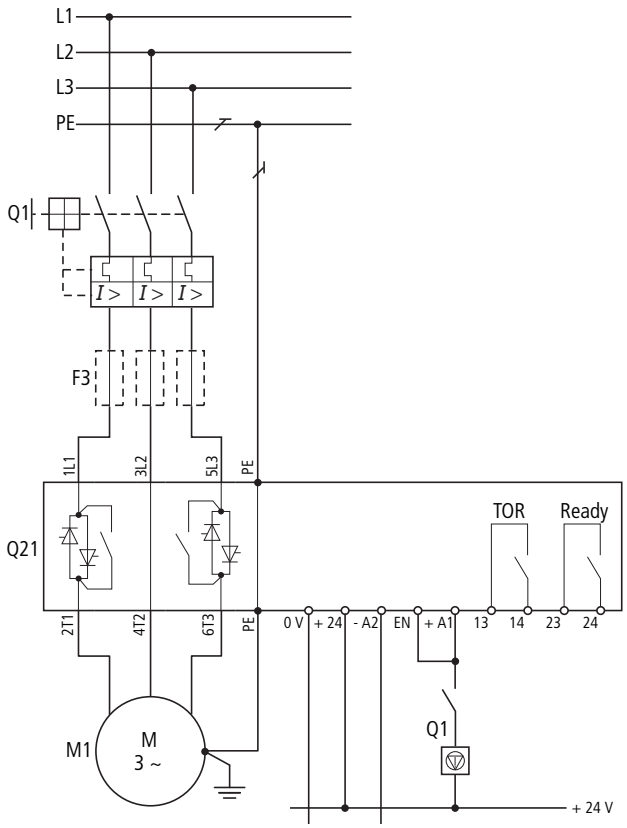
[2] Type contains parts for a terminal located at top or bottom for 3 pole switches.
Protection against direct contact where cable lugs, busbars or tunnel terminals are used.
When using insulated conductor material to protection type IP1X.

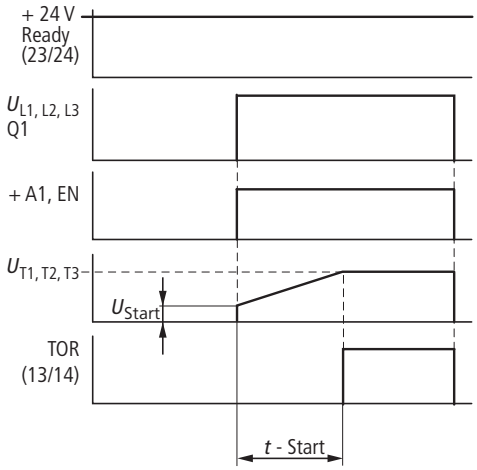
[3] Type contains parts for a terminal located at top or bottom for 3 pole switches.
Increased protection against direct contact to IP2X.
Protection when reaching into the cable connection area with the connection of cables in the box terminal.
With two conductors max cross-section 25 mm^2 or AWG4.
Cannot be combined with NZM-XSTK control circuit terminal.

[4] Type contains parts for a terminal located at top or bottom for 3 or 4-pole switches.
Increased protection against direct contact to IP2X.
When mounting NZM2-..-(C)NA or NZM...-NA the following applies:
With two conductors max cross-section 25 mm^2 or AWG4.

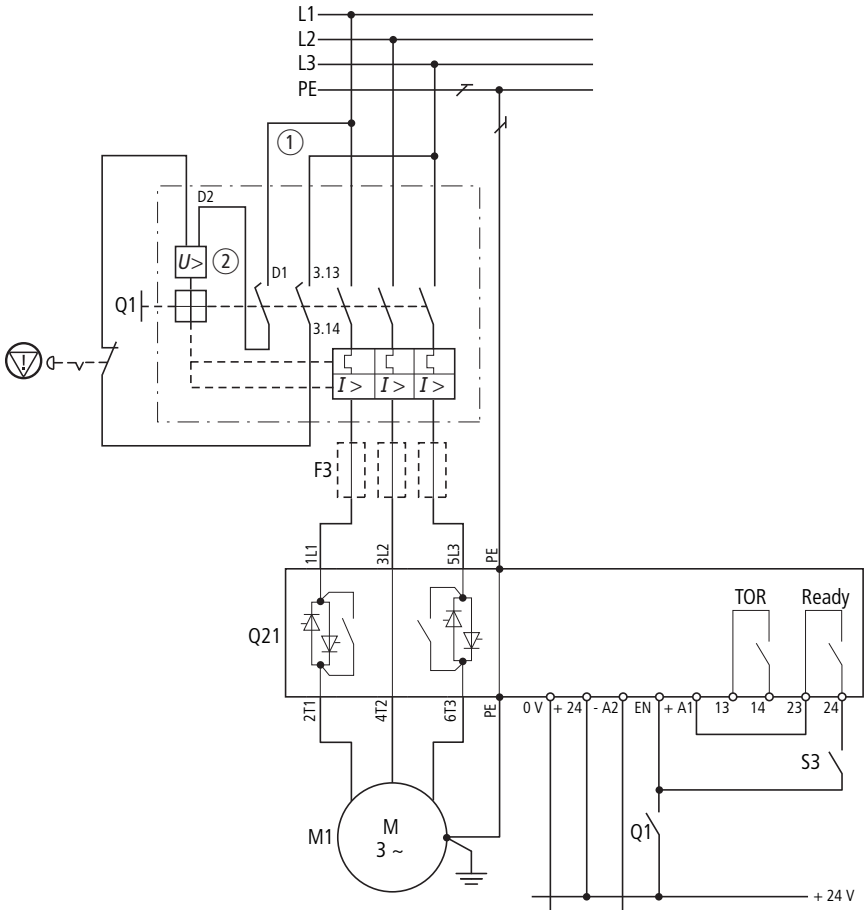
Standard connection

Direct soft start





Soft starters and main switches with EMERGENCY STOP function according to IEC/EN 60204-1 and VDE 0113-1



Q1: NZM1, NZM2

① Control circuit terminal

② Undervoltage releases with early-make auxiliary contacts

3 AC, 230 V	NZM1-XUHIV208-240AC
	NZM2/3-XUHIV208-240AC
3 AC, 400 V	NZM1-XUHIV380-440AC
	NZM2/3-XUHIV380-440AC

= Emergency switching off

Assigned motor rating for		Rated operational current[1]		Part no. Soft starters	Soft starter function			Semiconductor fuse (optional, in addition to the protective devices for type "1" coordination, required for type "2" coordination) [5]	
400 V	480 V	Device	Motor		Cable protection[2]	Mains contactor (optional)[3]	Overload relays[4]	Fuses	Fuse holders
P	P	I_e	I_e						
kW	HP	A	A		Type "1" coordination			Number x Part no.	Number x Part no.
Soft starters for three-phase mains connection, low operating frequency, (5 s, 3 x I_e, 10 Starts/h)									
18.5	25	41	36	DS6-340-22K-MX	NZMN1-M40 / PKZM4-40	DILM40	ZB65-40+ZB65-XEZ	2 x 20.282.20-100	3 x 21.189.01
22	30	41	41	DS6-340-22K-MX	NZMN1-M50 / PKZM4-50	DILM50	ZB65-40+ZB65-XEZ	3 x 20.282.20-100	3 x 21.189.01
30	40	55	55	DS6-340-30K-MX	NZMN1-M63 / PKZM4-58	DILM65	ZB65-57+ZB65-XEZ	3 x 20.282.20-125	3 x 21.189.01
37	50	68	68	DS6-340-37K-MX	NZMN1-M80	DILM80	ZB150-100/KK	3 x 20.610.32-200	3 x 21.313.02
45	60	81	81	DS6-340-45K-MX	NZMN1-M100	DILM90	ZB150-100/KK	3 x 20.610.32-200	3 x 21.313.02
55	75	99	99	DS6-340-55K-MX	NZMN1-M100	DILM115	ZB150-125/KK	3 x 20.610.32-200	3 x 21.313.02
75	100	134	134	DS6-340-75K-MX	NZMN2-M160	DILM150	ZB150-150/KK	3 x 20.610.32-350	3 x 21.313.02
90	125	161	160	DS6-340-90K-MX	NZMN2-M200	DILM185	Z5-160/FF250	3 x 20.610.32-400	3 x 21.313.02
110	150	196	196	DS6-340-110K-MX	NZMN2-M200	DILM225	Z5-160/FF250	3 x 20.610.32-500	3 x 21.313.02

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. For other switching cycles (operating frequency, overcurrent, overcurrent time, duty factor), this value changes and must be modified accordingly. The same applies to higher motor currents.

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

4) An external overload relay is required if the main contacts are not to be disconnected in the event of an overload and a controlled soft stop is desired instead.

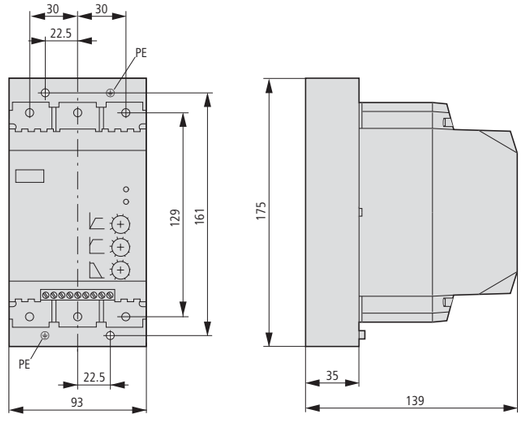
5) The superfast semiconductor fuses protect the soft starter from short circuits on the motor side. This cannot prevent damage caused by voltage peaks (e.g. caused by a lightning strike).

			DS6-340-22K-MX	DS6-340-30K-MX	DS6-340-37K-MX	DS6-340-45K-MX	DS6-340-55K-MX	DS6-340-75K-MX	DS6-340-90K-MX	DS6-340-110K-MX
General										
Standards			IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2	IEC/EN 60947-4-2
Approvals			–	–	–	–	–	–	–	–
Climatic proofing			Damp heat, constant, according to IEC 60068-2-78, damp heat, cyclic, according to IEC 60068-2-10							
Ambient temperature		°C	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise	0 - +40, up to 60 at 1 % derating per Kelvin temperature rise
Ambient temperature storage		°C	-25 - 55	-25 - 55	-25 - 55	-25 - 55	-25 - 55	-25 - 55	-25 - 55	-25 - 55
Installation altitude		m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m	0 - 1000, above that 1 % derating per 100 m, to max. 2000 m
Mounting position			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Protection type (power terminals)			IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Protection against direct contact			Finger- and back-of-hand proof							
Overvoltage category/pollution degree			II/2	II/2	II/2	II/2	II/2	II/2	II/2	II/2
Mechanical shock resistance			8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms	8 g/11 ms
Vibration resistance to EN 60721-3-2		g	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2
Average heat dissipation with nominal load cycle		W	7	10	13	18	25	24	30	42
Dimensions (W x H x D)		mm	93 x 175 x 139	93 x 175 x 139	93 x 175 x 139	93 x 175 x 139	93 x 175 x 139	108 x 215 x 178	108 x 215 x 178	108 x 215 x 178
Radio interference level			A1	A1	A1	A1	A1	A1	A1	A1
Weight		kg	1.8	1.8	1.8	1.8	1.8	3.7	3.7	3.7
Main contacts										
Rated operating voltage	U_e	V AC	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460
Mains frequency		Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated operational current										
Motor load (AC-53)	I_e	A	41	55	68	81	99	134	160	196
Assigned motor rating (standard connection)										
230 V	P	kW	11	15	15	22	30	30	45	55
400 V	P	kW	22	30	37	45	55	75	90	110
480 V	P	HP	30	40	50	60	75	100	125	150
Overload cycle to IEC/EN 60947-4-2										
AC-53			41 A: AC-53a: 3 - 5; 75 - 10	55 A: AC-53a: 3 - 5; 75 - 10	68 A: AC-53a: 3 - 5; 75 - 10	81 A: AC-53a: 3 - 5; 75 - 10	99 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
Terminal capacity										
Power cables										
Solid		mm²	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (4 - 185) 2 x (4 - 70)	1 x (4 - 185) 2 x (4 - 70)	1 x (4 - 185) 2 x (4 - 70)
Flexible with ferrule		mm²	–	–	–	–	–	–	–	–
Stranded		mm²	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (25 - 70) 2 x (6 - 25)	1 x (4 - 185) 2 x (4 - 70)	1 x (4 - 185) 2 x (4 - 70)	1 x (4 - 185) 2 x (4 - 70)
Solid or stranded		AWG	1 x (12 - 2/0)	1 x (12 - 2/0)	1 x (12 - 2/0)	1 x (12 - 2/0)	1 x (12 - 2/0)	1 x (12 - 350 kcmil) 2 x (12 - 00)	1 x (12 - 350 kcmil) 2 x (12 - 00)	1 x (12 - 350 kcmil) 2 x (12 - 00)
Flat conductor										
	min.	mm	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8	2 x 9 x 0.8
	max.	mm	9 x 9 x 0.9	9 x 9 x 0.9	9 x 9 x 0.9	9 x 9 x 0.9	9 x 9 x 0.9	10 x 16 x 0.8	10 x 16 x 0.8	10 x 16 x 0.8
Tightening torque		Nm	–	–	–	–	–	–	–	–
Control cables										
Solid		mm²	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 - 2.5) 2 x (0.5 - 1.0)	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 - 2.5) 2 x (0.5 - 1.0)	1 x (0.5 - 2.5) 2 x (0.5 - 1.0)	1 x (0.5 - 2.5) 2 x (0.5 - 1.0)
Flexible with ferrule		mm²	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 - 0.75)	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 - 0.75)	1 x (0.5 - 1.5) 2 x (0.5 - 0.75)	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)	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 (0.5 - 1.5) 2 x (0.5 - 1.0)	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 (0.5 - 1.5) 2 x (0.5 - 1.0)	1 x (0.5 - 1.5) 2 x (0.5 - 1.0)
Solid or stranded		AWG	1 x (21 - 14) 2 x (21 - 18)	1 x (21 - 14) 2 x (21 - 18)	1 x (21 - 14) 2 x (21 - 18)	1 x (21 - 14) 2 x (21 - 18)	1 x (21 - 14) 2 x (21 - 18)	1 x (21 - 14) 2 x (21 - 18)	1 x (21 - 14) 2 x (21 - 18)	1 x (21 - 14) 2 x (21 - 18)
Flat conductor			–	–	–	–	–	–	–	–
Tightening torque		Nm	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Screwdriver		mm	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5

			DS6-340-22K-MX	DS6-340-30K-MX	DS6-340-37K-MX	DS6-340-45K-MX	DS6-340-55K-MX	DS6-340-75K-MX	DS6-340-90K-MX	DS6-340-110K-MX
Power section										
Rated impulse withstand voltage 1.2 µs/50 µs (pulse rise time/decay time according to IEC/EN 60947-2 and -3) Applies for control circuit/power section/enclosure	U_{imp}	kV	4	4	4	4	4	4	4	4
Rated insulation voltage	U_i	V AC	500	500	500	500	500	500	500	500
Short-circuit rating										
Type “1” of coordination										
at AC-53a: 3…5 : 75…10			NZMN1-M50/PKZM4-50	NZMN1-M63/PKZM4-58	NZMN1-M80	NZMN1-M100	NZMN1-M100	NZMN2-M160	NZMN2-M200	NZMN2-M200
Type “2” of coordination (in addition to the fuses for type of coordination “1”)			3 x 20.282.20-100	3 x 20.282.20-125	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-350	3 x 20.610.32-400	3 x 20.610.20-500
Fuse base (number x Part no.)			3 x 21.189.01	3 x 21.189.01	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02
Control circuit										
Controller supply voltage										
Voltage		V	+24 DC +10 %/-15 %	+24 DC +10 %/-15 %	+24 DC +10 %/-15 %	+24 DC +10 %/-15 %	+24 DC +10 %/-15 %	+24 DC +10 %/-15 %	+24 DC +10 %/-15 %	+24 DC +10 %/-15 %
Current consumption										
Current consumption at 24 V DC		mA	35	35	35	35	35	35	35	35
Current consumption in operation at 24 V DC		mA	65	65	65	65	65	65	65	65
Current consumption at peak load (close bypass) at 24 V DC			600/50 ms	600/50 ms	600/50 ms	600/50 ms	600/50 ms	600/50 ms	600/50 ms	600/50 ms
Control voltage										
DC operated		V DC	+24 +10 %/-15 %	+24 +10 %/-15 %	+24 +10 %/-15 %	+24 +10 %/-15 %	+24 +10 %/-15 %	+24 +10 %/-15 %	+24 +10 %/-15 %	+24 +10 %/-15 %
Current consumption at 24 V DC		mA	14	14	14	14	14	14	14	14
Pick-up voltage										
DC operated		V DC	+17.3 - 27	+17.3 - 27	+17.3 - 27	+17.3 - 27	+17.3 - 27	+17.3 - 27	+17.3 - 27	+17.3 - 27
Drop-out voltage										
DC operated		V DC	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3
Pick-up time										
DC operated		ms	250	250	250	250	250	250	250	250
Drop-out time										
DC operated		ms	190	190	190	190	190	190	190	190
Relay outputs										
Number (top of ramp)			2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)	2 (TOR, Ready)
Voltage		V AC	250	250	250	250	250	250	250	250
Current		A	3	3	3	3	3	3	3	3
Soft start function										
Ramp times										
Acceleration time		s	1 - 30	1 - 30	1 - 30	1 - 30	1 - 30	1 - 30	1 - 30	1 - 30
Deceleration time		s	0 - 30	0 - 30	0 - 30	0 - 30	0 - 30	0 - 30	0 - 30	0 - 30
Start voltage (= switch-off voltage)		%	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 100
Voltage reduction at stop		%	8	8	8	8	8	8	8	8
Torque-free time when changing direction of rotation		ms	–	–	–	–	–	–	–	–

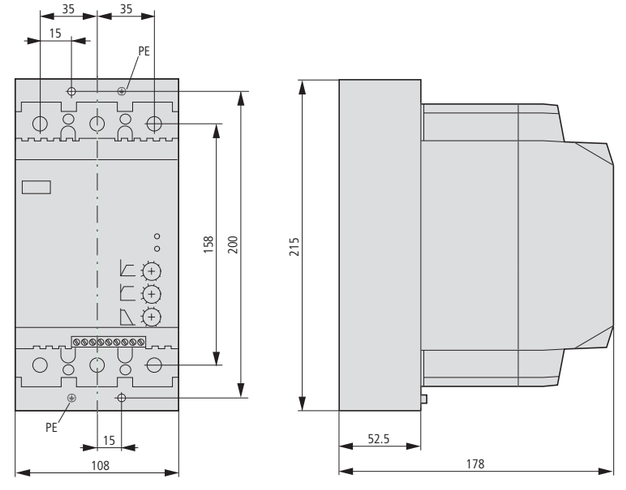
Dimensions

DS6-340-22K-MX
DS6-340-30K-MX
DS6-340-37K-MX
DS6-340-45K-MX
DS6-340-55K-MX



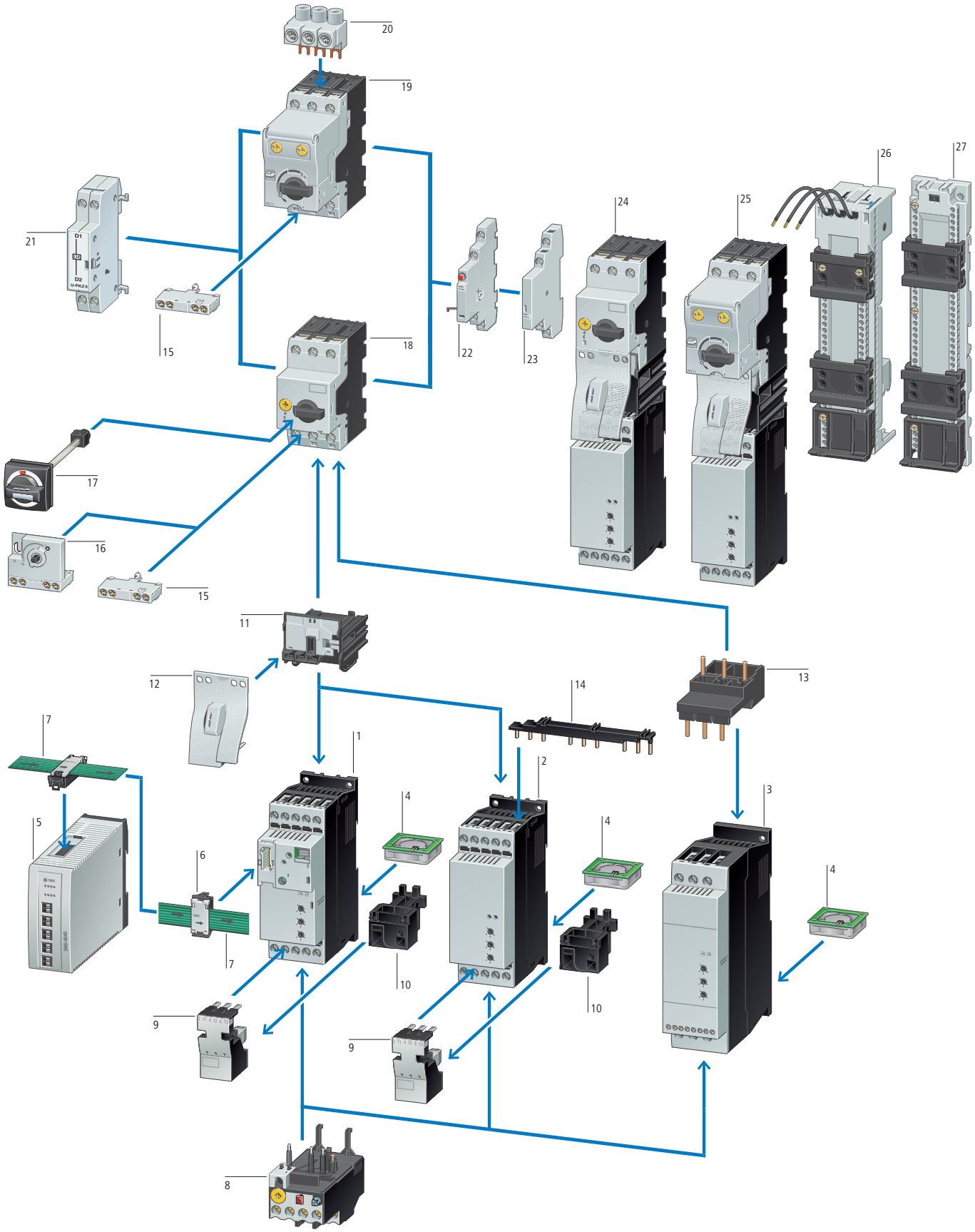
Dimensions

DS6-340-75K-MX
DS6-340-90K-MX
DS6-340-110K-MX



DS7

System overview



DS7

DS7 soft starters with SmartWire-Darwin	1
→ Page 9/32	
DS7 soft starters in frame size 1 for assigned motor current up to 12 A	2
→ Page 9/31	
DS7 soft starters in frame size 2 for assigned motor current up to 32 A	3
→ Page 9/19	
DS7-FAN-32 device fan	4
→ Page 9/24	
SmartWire-Darwin gateway	5
→ Page 1/6	
SmartWire-Darwin external device plug	6
→ Page 1/17	
SmartWire-Darwin ribbon cable	7
→ Page 1/17	
Overload relays	8
→ Page 9/22	
Motor plug for tool-less plug connection	9
→ Page 9/22	
Base for motor connector	10
→ Page 9/22	
PKZM0-XDM wiring set for tool-less plug connection	11
→ Page 9/22	
PKZM0-XDM wiring set for tool-less plug connection	12
→ Page 9/22	
PKZM0-XDM wiring set	13
→ Page 9/22	
Three-phase commoning link	14
→ Page 7/26	

Standard auxiliary contact	15
→ Page 7/10	
Early-make auxiliary contacts	16
→ Page 7/10	
Door coupling handle	17
→ Page 7/20	
PKZM0 motor protective circuit breaker	18
→ Page 7/2	
PKE motor protective circuit breaker	19
→ Page 7/8	
Incoming terminal	20
→ Page 7/27	
Voltage releases	21
→ Page 7/29	
Current limiter	22
→ Page 7/12	
Standard auxiliary contact	22
→ Page 7/12	
Standard auxiliary contact	23
→ Page 7/10	
Motor-starter combination with PKZ	24
→ Page 8/2	
Motor-starter combination with PKE	25
→ Page 8/4	
Busbar adapter	26
→ Page 9/22	
Top-hat rail adapter	27
→ Page 9/22	

DS7

Description

Application

DS7 soft starter series are two-phase controlled soft starters used to soft start applications with a normal operating frequency and a rating range from 3 to 200 A (1.1 to 110 kW with a 400 V line voltage).
Starting transients and DC components during startup are effectively suppressed and guarantee even motor starting.
The special actuation method (asymmetric trigger control) used for the soft start function prevents DC components (Moeller patent) that would otherwise normally be produced with two-phase controlled soft starters. This eliminates the formation of an elliptical rotary field that would cause the motor to accelerate in a non-uniform manner and lengthen its run-up time unnecessarily, making the smooth-running behavior of a DS7 soft starter comparable to that of a three-phase controlled soft starter.

Features

- The ramp time can be adjusted 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 line 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 in DS7-340 models: 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 trigger control.
- Designed specifically for long cables.

Functions

Typical applications for DS7 soft starter series are:
- Pump drives: soft starting three-phase motors prevents fluid hammers. The mechanical load on the entire system is decreased, increasing its durability.
- 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.

Documentation

Surface mounting and standard mounting procedures are described in the corresponding installation instructions and in the manual.

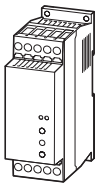
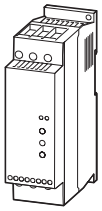
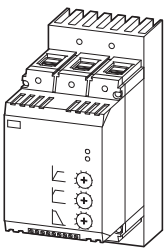
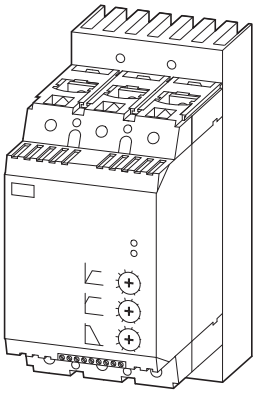
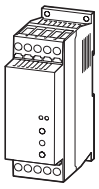
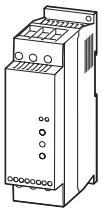
Installation instructions
Instructional leaflet 8250-2541: For devices with frame size 1 (up to 12 A motor rating)
Instructional leaflet 8250-2542: For devices with frame size 2 (up to 32 A motor rating)
Instructional leaflet 8250-2543: For devices with frame sizes 3 and 4 (up to 200 A motor rating)

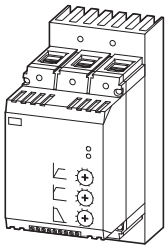
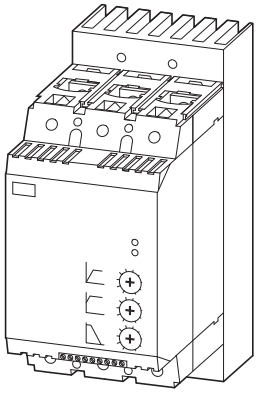
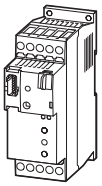
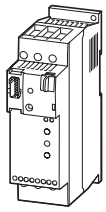
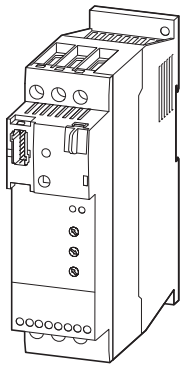
Manual
AWB 8250-1634

You can download the documentation for the DS7 soft starters from the Internet:
www.moeller.net/support

HPL09019EN

Ordering

	Rated operational current	Assigned motor rating at		Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America
	Device (AC-53)	400 V	480 V				
	I_e	P	P				
	A	kW	HP				
DS7 soft starters							
Soft starters for three-phase loads, mains supply voltage 230 – 480 V AC (50/60 Hz) Rated control circuit voltage U_c: 24 V AC/DC							
	4	1.5	2	**DS7-340SX004N0-N** 134847		1 off	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 NA Certification: Request filed for UL and CSA Suitable for: Branch circuits Max. Voltage Rating: 480 V Degree of Protection: IP20; UL/CSA Part no. 1
	7	3	3	**DS7-340SX007N0-N** 134849			
	9	4	5	**DS7-340SX009N0-N** 134910			
	12	5.5	7.5	**DS7-340SX012N0-N** 134911			
	16	7.5	10	**DS7-340SX016N0-N** 134912			
	24	11	15	**DS7-340SX024N0-N** 134913			
	32	15	20	**DS7-340SX032N0-N** 134914			
	41	22	30	**DS7-340SX041N0-N** 134916			
	55	30	40	**DS7-340SX055N0-N** 134917			
	70	37	50	**DS7-340SX070N0-N** 134918			
	81	45	60	**DS7-340SX081N0-N** 134919			
	100	55	75	**DS7-340SX100N0-N** 134920			
	135	75	100	**DS7-340SX135N0-N** 134921			
	160	90	125	**DS7-340SX160N0-N** 134922			
	200	110	150	**DS7-340SX200N0-N** 134923			
Rated control circuit voltage U_c: 110/230 V AC							
	4	1.5	2	**DS7-342SX004N0-N** 134925		1 off	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 NA Certification: Request filed for UL and CSA Suitable for: Branch circuits Max. Voltage Rating: 480 V Degree of Protection: IP20; UL/CSA Part no. 1
	7	3	3	**DS7-342SX007N0-N** 134927			
	9	4	5	**DS7-342SX009N0-N** 134928			
	12	5.5	7.5	**DS7-342SX012N0-N** 134929			
	16	7.5	10	**DS7-342SX016N0-N** 134930			
	24	11	15	**DS7-342SX024N0-N** 134931			
	32	15	20	**DS7-342SX032N0-N** 134932			

	Rated operational current Device (AC-53) I_e A	Assigned motor rating at 400 V P kW	Assigned motor rating at 480 V P HP	**Part no.** Article no.	**Price** See price list	Std. pack	**Information relevant for export to North America**
	41	22	30	**DS7-342SX041N0-N** 134934		1 off	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 NA Certification: Request filed for UL and CSA Suitable for: Branch circuits Max. Voltage Rating: 480 V Degree of Protection: IP20; UL/CSA Part no. 1
	55	30	40	**DS7-342SX055N0-N** 134935			
	70	37	50	**DS7-342SX070N0-N** 134936			
	81	45	60	**DS7-342SX081N0-N** 134937			
	100	55	75	**DS7-342SX100N0-N** 134938			
	135	75	100	**DS7-342SX135N0-N** 134939			
	160	90	125	**DS7-342SX160N0-N** 134940			
	200	110	150	**DS7-342SX200N0-N** 134941			
Rated control circuit voltage U_c: 24 VDC, for SmartWire-Darwin							
	4	1.5	2	**DS7-34DSX004N0-D** 134943		1 off	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 NA Certification: Request filed for UL and CSA Suitable for: Branch circuits Max. Voltage Rating: 480 V Degree of Protection: IP20; UL/CSA Part no. 1
	7	3	3	**DS7-34DSX007N0-D** 134945			
	9	4	5	**DS7-34DSX009N0-D** 134946			
	12	5.5	7.5	**DS7-34DSX012N0-D** 134947			
	16	7.5	10	**DS7-34DSX016N0-D** 134948			
	24	11	15	**DS7-34DSX024N0-D** 134949			
	32	15	20	**DS7-34DSX032N0-D** 134950			
	41	22	30	**DS7-34DSX041N0-D** 134952			
	55	30	40	**DS7-34DSX055N0-D** 134953			
	70	37	50	**DS7-34DSX070N0-D** 134954			
	81	45	60	**DS7-34DSX081N0-D** 134955			
	100	55	75	**DS7-34DSX100N0-D** 134956			
	135	75	100	**DS7-34DSX135N0-D** 134957			
	160	90	125	**DS7-34DSX160N0-D** 134958			
	200	110	150	**DS7-34DSX200N0-D** 134959			

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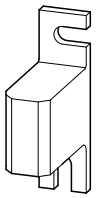
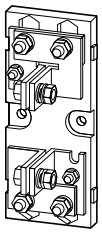
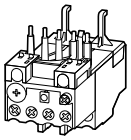
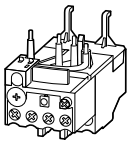
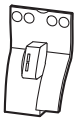
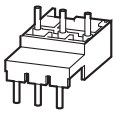
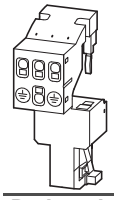
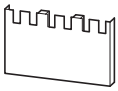
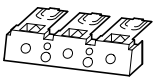
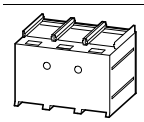
	Rated operational current	Maximum power loss P_v	Frame size/ inside micrometer	For use with	**Part no.** Article no.	**Price** See price list	Std. pack	**Information relevant for export to North America**
	A	W	mm					
Accessories								
Superfast semiconductor fuses								
	16	5	10 x 38	DS7-34…SX004N0-…	**50.179.06-16** 232077		10 off	Product Standards: UL 248-13, CE marking UL File No.: E180276 UL CCN: JFHR2 CSA File No.: UL report applies to both US and Canada CSA Class No.: JFHR8 NA Certification: UL Recognized, certified by UL for use in Canada Max. Voltage Rating: 660 V
	25	7	22 x 58	DS7-34…SX007N0-…	**50.140.06-25** 138284		1 off	
	32	9	80	DS7-34…SX009N0-… DS7-34…SX012N0-…	**20.282.20-32** 138285		1 off	
	50	15	22 x 58	DS7-34…SX016N0-…	**50.140.06-50** 232079		10 off	
	63	16	22 x 58	DS7-34…SX024N0-…	**50.140.06-63** 232080		10 off	
	80	18	22 x 58	DS7-34…SX032N0-…	**50.140.06-80** 232081		10 off	
Fuse links								
	100	22	80	DS7-34…SX041N0-…	**20.282.20-100** 106654		6 off	Product Standards: UL 248-13 CE marking UL File No.: E180276 UL CCN: JFHR2 CSA File No.: UL report applies to both US and Canada CSA Class No.: JFHR8 NA Certification: UL Recognized, certified by UL for use in Canada Max. Voltage Rating: 660 V
	125	24	80	DS7-34…SX055N0-…	**20.282.20-125** 232087		6 off	
	200	44	80	DS7-34…SX070N0-… DS7-34…SX081N0-… DS7-34…SX100N0-…	**20.610.32-200** 106475		3 off	
	350	61	80	DS7-34…SX135N0-…	**20.610.32-350** 221161		2 off	
	400	70	80	DS7-34…SX160N0-…	**20.610.32-400** 106476		3 off	
	500	72	80	DS7-34…SX200N0-…	**20.610.32-500** 221163		2 off	
Fuse bases								
	–	–	10 x 38	50.179.06-…	**51.063.04** 232082		12 off	Product Standards: UL 512; CE marking UL File No.: E186970 UL CCN: IZLT2
	–	–	22 x 58	50.140.06-…	**51.060.04** 232084		6 off	
	–	–	80	20.282.20-… 20.189.20-…	**21.189.01** 232064		5 off	
	–	–	80	20.6xx.32-… 20.6...32-...	**21.313.02** 232076		2 off	

HPL09022EN

	For use with	Part no. Article no.	Price See price list	Std. pack	Information relevant for export to North America
Overload relays					
	DS7-34…SX004…	**ZB12-4** 278438		1 off	Product Standards: UL 508; CSA-C22.2 No. 14; IEC/EN 60947-4-1; CE marking UL File No.: E29184 UL CCN: NKCR CSA File No.: 12528 CSA Class No.: 3211-03 NA Certification: UL Listed, CSA certified Suitable for: Branch circuits Max. Voltage Rating: 600 V AC Degree of Protection: IEC: IP20, UL/CSA Type: -
	DS7-34…SX007… DS7-34…SX009…	**ZB12-10** 278440			
	DS7-34…SX012…	**ZB12-12** 278441			
	DS7-34…SX016…	**ZB32-16** 278452		1 off	
	DS7-34…SX024…	**ZB32-24** 278453			
	DS7-34…SX032…	**ZB32-32** 278454			
PKZ-DS7 wiring set					
 	DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**PKZM0-XDM12** 283149		1 off	Product Standards: UL 508; CSA-C22.2 No. 14; IEC60947-4-1; CE marking UL File No.: E36332 UL CCN: NLRV CSA File No.: 12528 CSA Class No.: 3211-05 NA 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 CCN: NLRV CSA File No.: 12528 CSA Class No.: 3211-05 NA Certification: UL Listed, CSA certified
Motor feeder plug					
	DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**DILM12-XMCP/T** 121770		1 off	Product Standards: IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking NA Certification: Request filed for UL and CSA
Busbar adapter					
	PKZM0, PKE + DS7...004N... PKZM0, PKE + DS7...007N... PKZM0, PKE + DS7...009N... PKZM0, PKE + DS7...012N...	**BBA0L-25** 142526		1 off	–
	PKZM0, PKE + DS7...004N... PKZM0, PKE + DS7...007N... PKZM0, PKE + DS7...009N... PKZM0, PKE + DS7...012N... PKZM0, PKE + DS7...016N... PKZM0, PKE + DS7...024N... PKZM0, PKE + DS7...032N...	**BBA0L-32** 142527		1 off	
Top-hat rail adapter					
Consists of: 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...004N... PKZM0, PKE + DS7...007N... PKZM0, PKE + DS7...009N... PKZM0, PKE + DS7...012N... PKZM0, PKE + DS7...016N... PKZM0, PKE + DS7...024N... PKZM0, PKE + DS7...032N...	**PKZM0-XC45L/2** 142570		1 off	

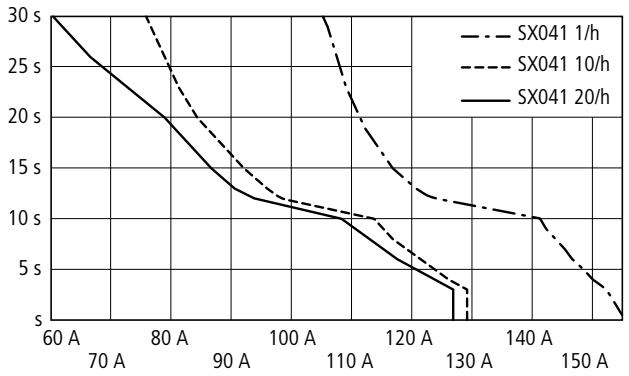
HPL09023EN

	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 DS7's primary side, protected against accidental contact, short-circuit proof, U_e = 690 V, I_u = 35 A, can be lengthened with rotated mounting						
	DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**DILM12-XDSB0/3** 240084		5 off	Suitable for 3 DS7 soft starters Length 135 mm	Product Standards: IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking UL File No.: E36332 UL CCN: NLRV CSA File No.: 012528 CSA Class No.: 2411-03 NA Certification: UL Listed, CSA certified
		**DILM12-XDSB0/4** 240085		5 off	Suitable for 4 DS7 soft starters Length 180 mm	
		**DILM12-XDSB0/5** 240086		5 off	Suitable for 5 DS7 soft starters Length 225 mm	
Incoming connection block						
	DS7-34…SX004… DS7-34…SX007… DS7-34…SX009… DS7-34…SX012…	**DILM12-XEK** 240083		5 off		Product Standards: IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking UL File No.: E36332 UL CCN: NLRV CSA File No.: 012528 CSA Class No.: 2411-03 NA Certification: UL Listed, CSA certified
Terminal cover						
Knockout, no UL/CSA approval 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 switches. Increased protection against accidental contact (simplified protection against contact with a finger).	UL/CSA certification not required
Terminal cover						
knockout						
	NZM2, PN2, N(S)2 DS6-340-75K…110K 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 switches. Protection against accidental contact increased to IP2X. Protection when reaching into the cable connection area with the connection of cables in the box terminal. With two conductors max cross-section 22 mm² or AWG4. Cannot be combined with NZM-XSTK control circuit terminal.	UL/CSA certification not required
Cover						
	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 switches. Protection against direct contact where cable lugs, busbars or tunnel terminals are used. When using insulated conductor material to protection type IP1X.	Product Standards: UL489; CSA-C22.2 No. 5-09; IEC60947, CE marking UL File No.: E31593 UL CCN: DIHS CSA File No.: 22086 CSA Class No.: 1432-01 NA Certification: UL Listed, CSA certified Suitable for: Refer to main component information

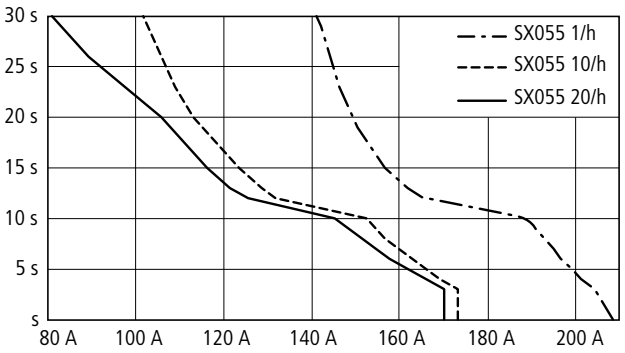
HPL09024EN

	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 For box terminal						
	DS7-34…SX135… DS7-34…SX160… DS7-34…SX200…	**NZM2-XIPK** 266773		1 off	Type contains parts for a terminal located at top or bottom for 3 pole switches. Increased protection against direct contact to IP2X. Protection when reaching into the cable connection area with the connection of cables in the box terminal. With two conductors max cross-section 25 mm² or AWG4. Cannot be combined with NZM-XSTK control circuit terminal.	UL/CSA certification not required
IP2X protection against contact with a finger for NZM2-XKSA cover						
	DS7-34…SX135… DS7-34…SX160… DS7-34…SX200…	**NZM2-XIPA** 266777		1 off		UL/CSA certification not required
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		
Equipment fan For increasing the load cycle (more starts per hour 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		NA Certification: Request filed for UL and CSA

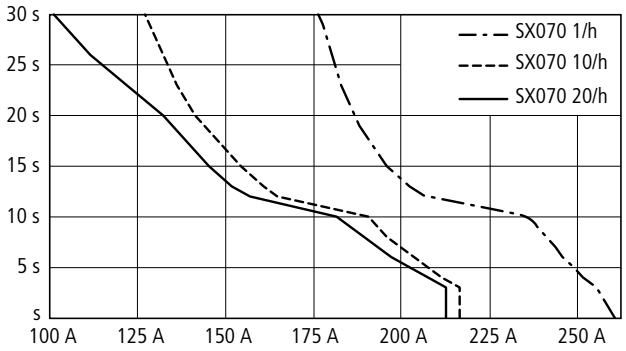
DS7-34...SX041...



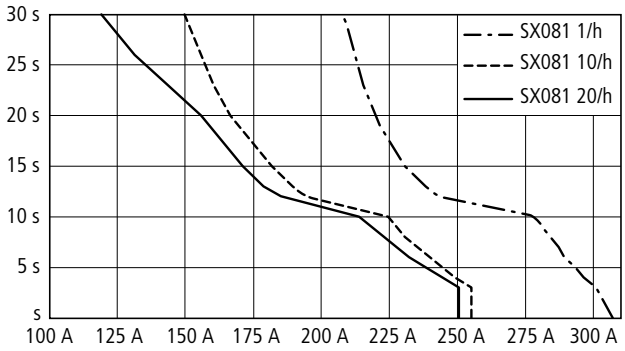
DS7-34...SX055...



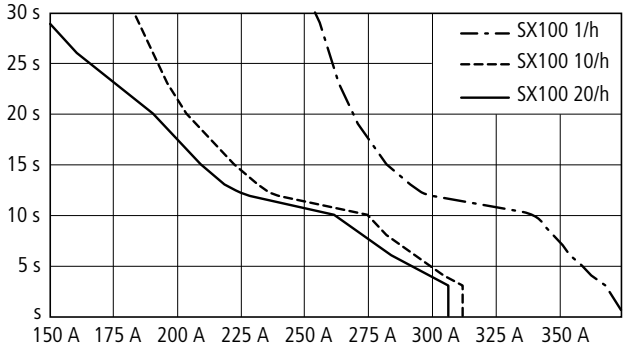
DS7-34...SX070...



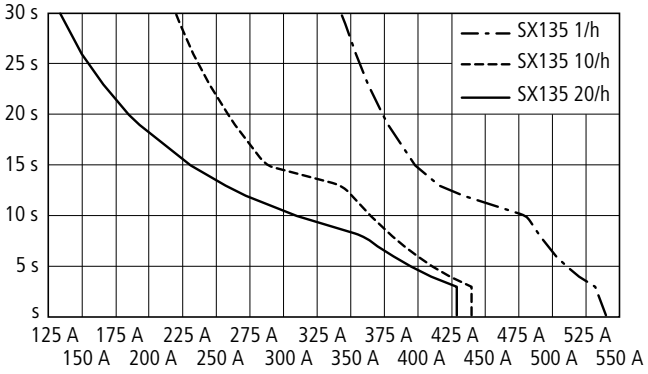
DS7-34...SX081...



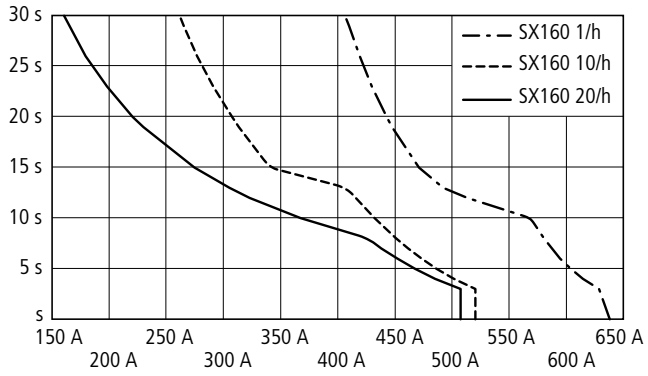
DS7-34...SX100...



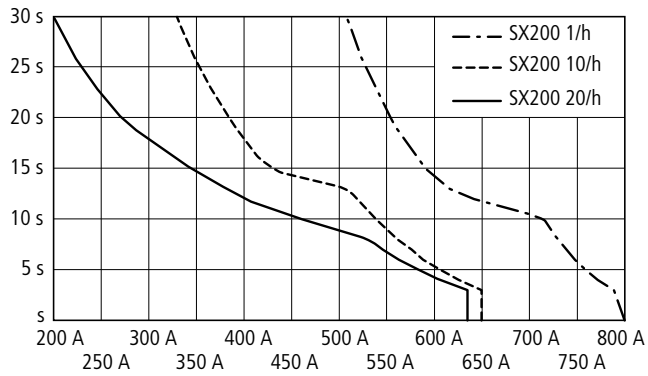
DS7-34...SX135...



DS7-34...SX160...

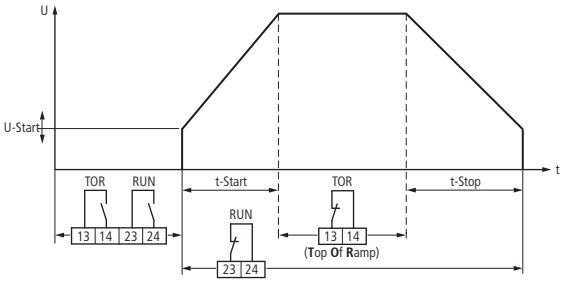


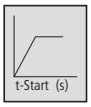
DS7-34...SX200...

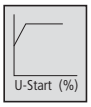


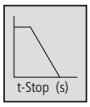
Potentiometer settings

U	I			
		(R)		
(L)		(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



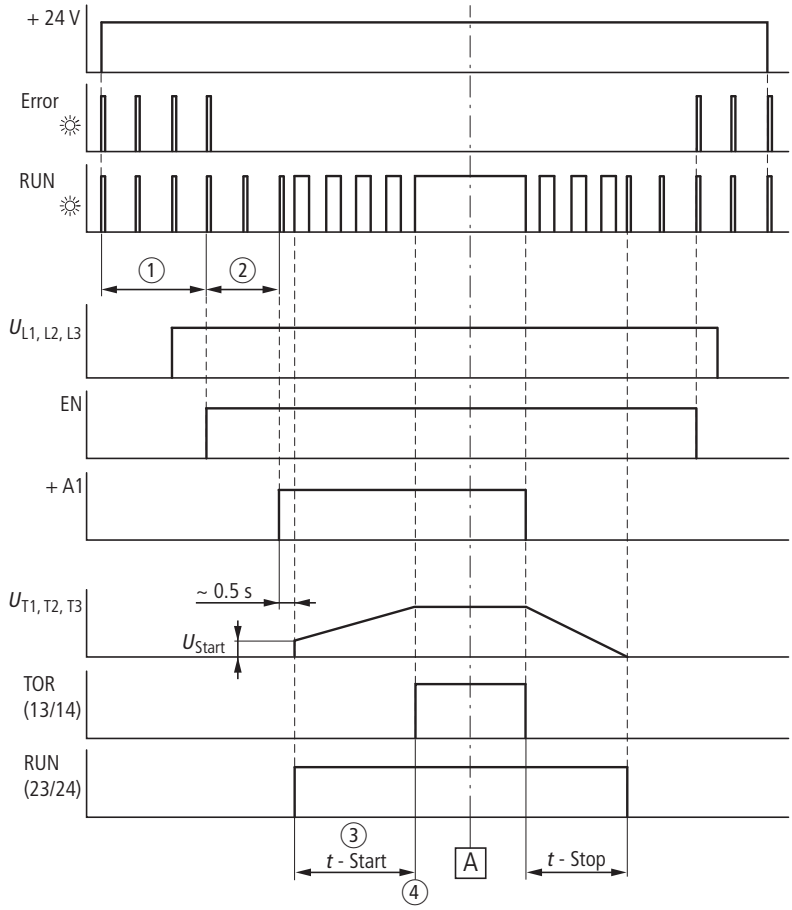




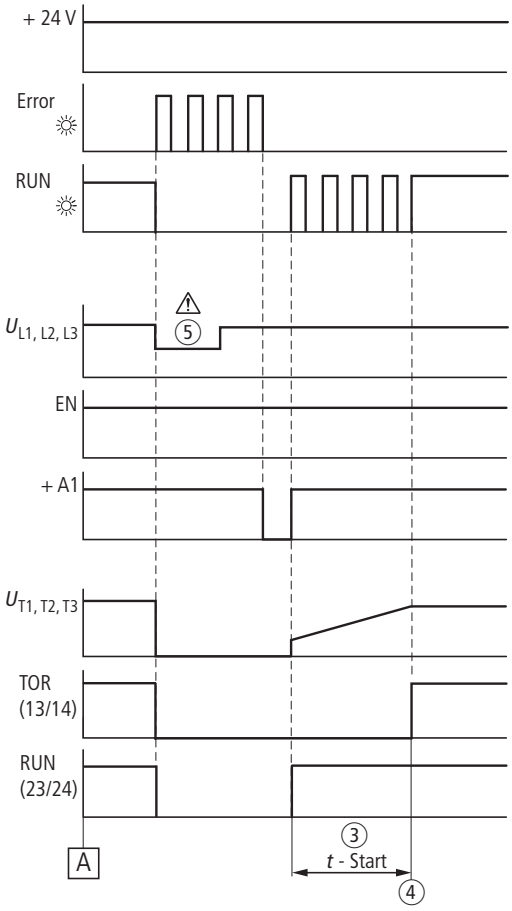


t-Start (s)	U-Start %	t-Stop (s)		
~10	~30	0		J → 0
~25	~30	~30		
~20	~40	0		
~10	~30	~20		
~15	~40	0		
~18	~40	0		J → ∞ → DS7 > P_{Motor}
~15	~50	0		→ DS7 > P_{Motor}
~10	~60	0		
~10	~60	0		→ DS7 > P_{Motor}

Operation



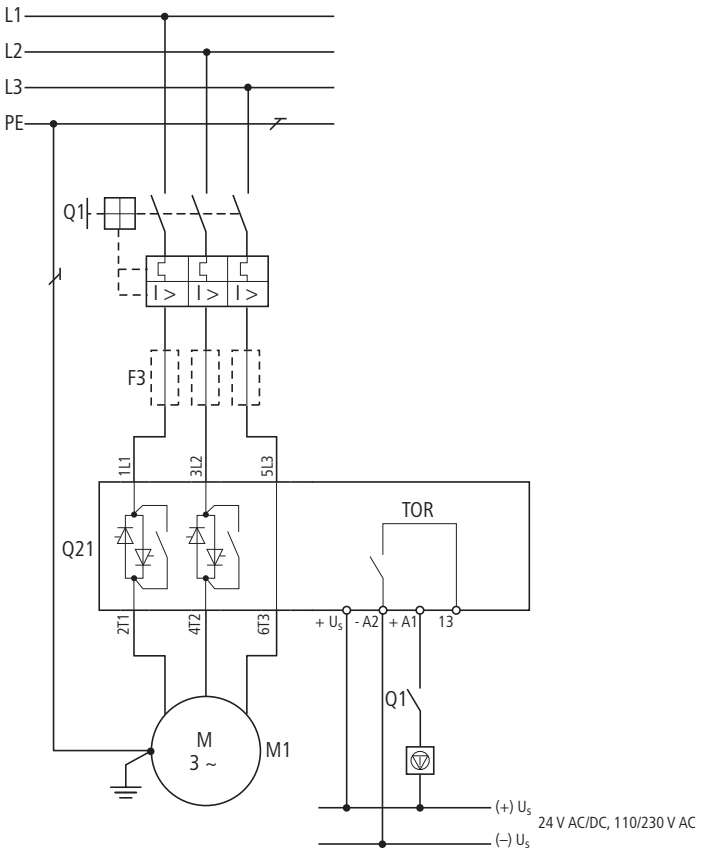
Fault

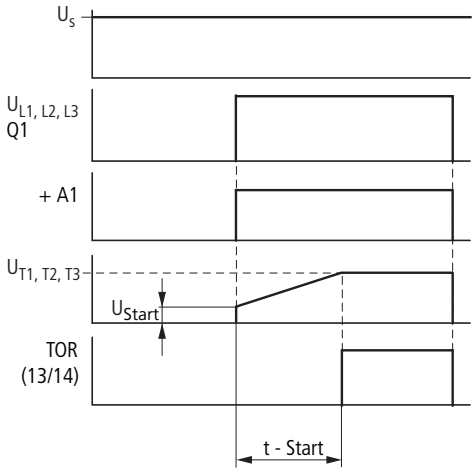


RUN-LED green
Error-LED red

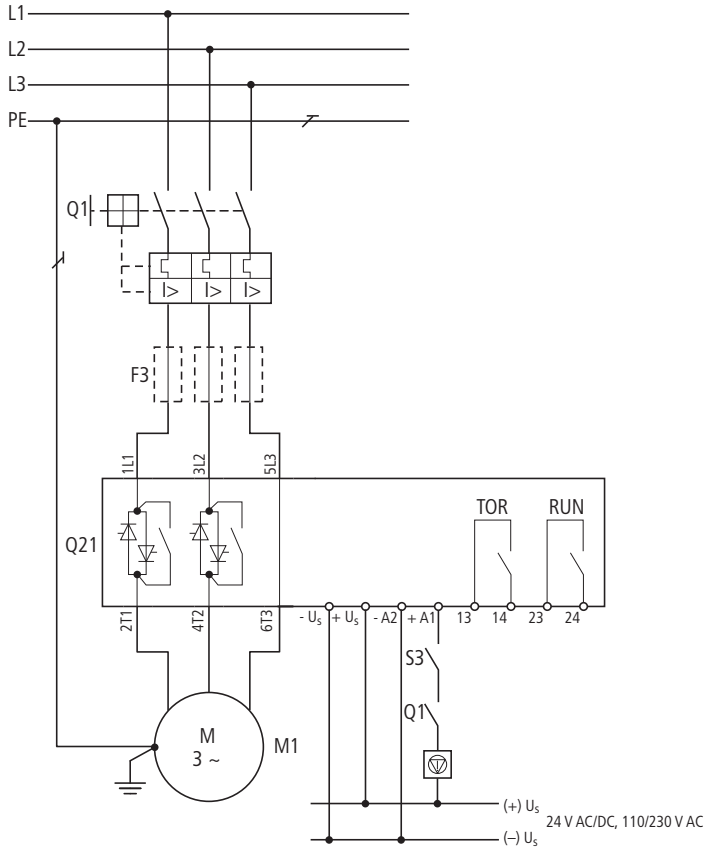
① Initialization
② Ready for operation
③ In ramp
④ Top of ramp reached
⑤ Fault – One phase drops out

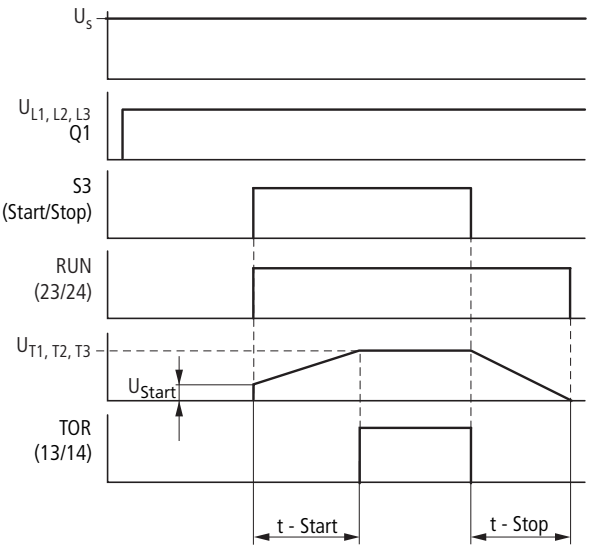
Standard connection
up to 12 A





Standard connection
up to 32 A





Standard connection

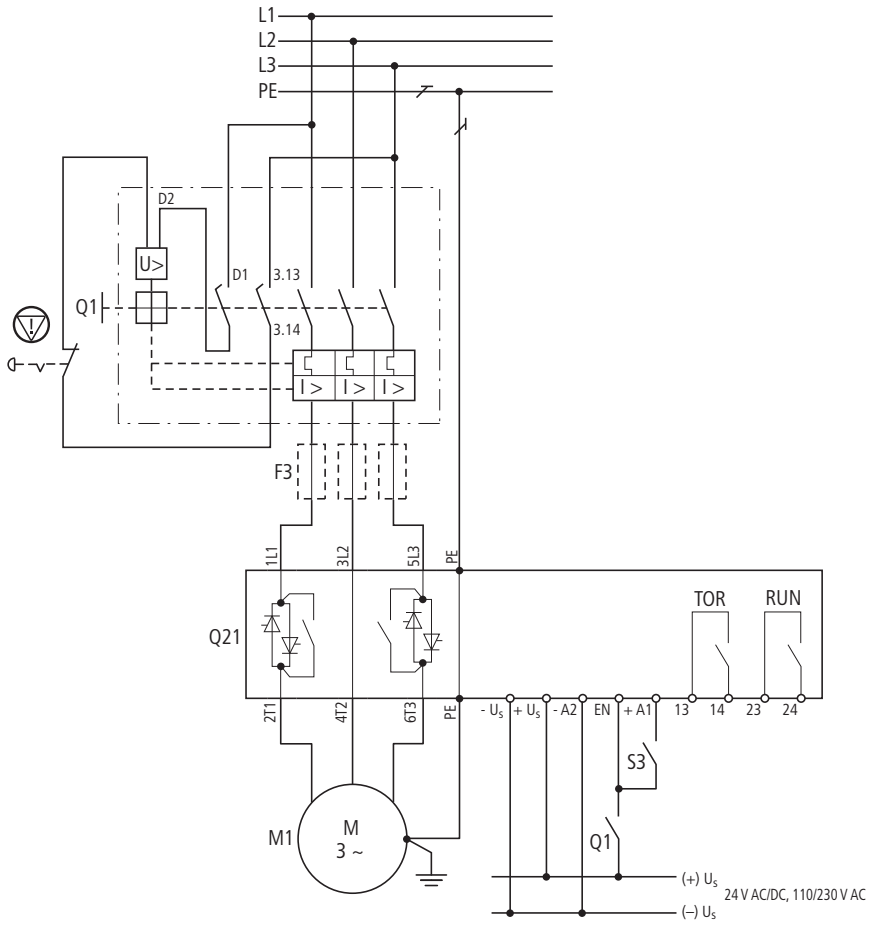
over 32 A

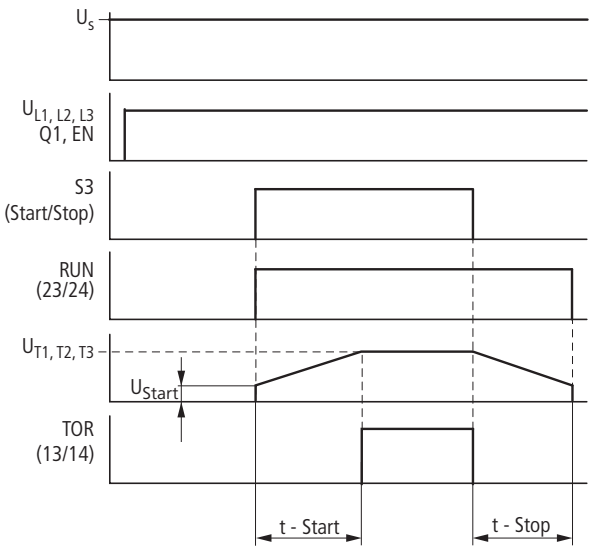
With Emergency switching off function according to IEC/EN 60 204-1 and VDE 0113 Part 1

= Emergency switching off

① Control circuit terminal

② Undervoltage release with early-make auxiliary contact





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

Notes

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

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

[3] An external overload relay is required if the main contacts are not to 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 starters from motor-side short-circuits. 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 protection (optional, fuse required for type 2 coordination in addition to cable protection for type 1 coordination)[5]	
Cable protection[2] Type “1” coordination	Overload relays[3]	optional[4]	Fuses Number x Part no.	Fuse holders Number x Part no.
PKM0-4 (+ CL-PKZ0)	ZB12-4	DILM7	3 × 50.179.06-16	3 x 51.060.04
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 × 50.140.06-25	3 x 51.060.04
PKM0-10 (+ CL-PKZ0)	ZB12-10	DILM9	3 × 20.282.20-32	3 x 21.189.01
PKM0-12 (+ CL-PKZ0)	ZB12-12	DILM12	3 × 20.282.20-32	3 x 21.189.01
PZM0-16 (+ CL-PKZ0)	ZB32-16	DILM17	3 × 50.140.06-50	3 x 51.060.04
PZM0-25 (+ CL-PKZ0)	ZB32-24	DILM25	3 × 50.140.06-63	3 x 51.060.04
PZM0-32 (+ CL-PKZ0)	ZB32-32	DILM32	3 × 50.140.06-80	3 x 51.060.04
NZMN1-M50 / PKZM4-50	ZB65-40+ZB65-XEZ	DILM50	3 × 50.140.06-80	3 x 21.189.01
NZMN1-M63 / PKZM4-58	ZB65-57+ZB65-XEZ	DILM65	3 × 20.282.20-125	3 x 21.189.01
NZMN1-M80	ZB150-70/KK	DILM80	3 × 20.610.32-200	3 x 21.313.02
NZMN1-M100	ZB150-100/KK	DILM95	3 × 20.610.32-200	3 x 21.313.02
NZMN1-M100	ZB150-100/KK	DILM115	3 × 20.610.32-200	3 x 21.313.02
NZMN2-M160	ZB150-150/KK	DILM150	3 × 20.610.32-350	3 x 21.313.02
NZMN2-M200	Z5-160/FF250	DILM185	3 × 20.610.32-400	3 x 21.313.02
NZMN2-M200	Z5-220/FF250	DILM225	3 × 20.610.32-500	3 x 21.313.02

				DS7-340SX004	DS7-340SX007	DS7-340SX009	DS7-340SX012
General							
Standards				IEC/EN 60 947-4-2			
Climatic proofing				Damp heat, cyclic, to DIN IEC Part 68 2-10, Damp heat, constant, to DIN IEC 68 Part 2-3			
Ambient temperature			°C	0…40, up to 60 °C at 1 % derating per Kelvin temperature rise			
Ambient temperature storage			°C	-25 - +55			
Installation altitude	Higher installation altitude upon request			0…1000 m, above that 1 % derating per 100 m, up to 2000 m			
Mounting position				Vertical			
Protection type				IP20			
Protection type applies to the front and operator control and operating elements. Protection type from all sides is IP00.				Protection type IP40 can be achieved on all sides with covers from the NZM range.			
Protection against direct contact				Finger- and back-of-hand proof			
Overvoltage category/pollution degree				II/2			
Mechanical shock resistance				8 g/11 ms			
Vibration resistance to EN 60721-3-2				2M2			
Average heat dissipation with nominal load cycle			W	0.2	0.35	0.45	0.6
Dimensions (W x H x D)			mm	45 x 130 x 95			
Radio interference level				B			
Weight			kg	0.35	0.35	0.35	0.35
Main contacts							
Rated operational voltage			V AC	230 - 460			
Mains frequency			Hz	50/60			
Rated operational current	AC-53 (motor loads)	I_e	A	4	7	9	12
Assigned motor rating	230 V	P	kWh	0.75	1.5	2.2	3
	400 V	P	kWh	1.5	3	4	5.5
	480 V	P	HP	2	3	5	7.5
Overload cycle to EN 60947-4-2							
AC-53a (int. bypass)	For AC-53a:3-5:75-10		A	4	7	9	12
Terminal capacity							
Power cable (box terminal)	Solid		mm^2	1 x (0.75 - 4); 2 x (0.75 - 2.5)			
	Flexible with ferrule		mm^2	1 x (0.75 - 2.5); 2 x (0.75 - 2.5)			
	Stranded		mm^2	–	–	–	–
	Solid or stranded		AWG	18 - 10			
	Flat conductor		min, mm	–	–	–	–
			max, mm	–	–	–	–
	Tightening torque		Nm	1.2	1.2	1.2	1.2
Control cables	Solid		mm^2	1 x (0.75 - 4); 2 x (0.75 - 2.5)			
	Flexible with ferrule		mm^2	1 x (0.75 - 2.5); 2 x (0.75 - 2.5)			
	Stranded		mm^2	–	–	–	–
	Solid or stranded		AWG	18 - 10			
	Tightening torque		Nm	1.2	1.2	1.2	1.2
	Screwdriver (flat blade)		mm	0.8 x 5.5; 1 x 6			
Power section							
Rated impulse withstand voltage		U_{imp} 1.2/50 µs	kV	4	4	4	4
Rated insulation voltage		U_i	V	500	500	500	500
Short-circuit rating							
Type "1" coordination	For AC-53a:3-5:75-10			PKZM0-4 (+ CL-PKZ0)	PKZM0-10 (+ CL-PKZ0)	PKZM0-10 (+ CL-PKZ0)	PKZM0-12 (+ CL-PKZ0)
Type "2" coordination (in addition to fuses for type "1" of coordination)				3 x 50.179.06-16	3 x 50.140.06-25	3 x 20.282.20-32	3 x 20.282.20-32
Fuse holders				3 x 51.060.04	3 x 51.060.04	3 x 51.060.04	3 x 51.060.04
Control circuit							
Controller supply voltage	Voltage	U_s	V	24 V AC/DC + 10 % / - 15 %			
	Current consumption at no load 24 V DC		mA	–	–	–	–
	Current consumption in operation at 24 V DC		mA	–	–	–	–
	Current consumption at peak load (close bypass) at 24 V DC		mA/ms	–	–	–	–
Control voltage range	AC operated			24 V AC/DC + 10 % / - 15 %			
	Current consumption at 230 V DC		mA	–	–	–	–
Pick-up voltage	DC operated		V DC	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27
	AC operated		V AC	–	–	–	–
Drop-out voltage	DC operated		V DC	0 - +3	0 - +3	0 - +3	0 - +3
	AC operated		V AC	–	–	–	–
Pick-up time	AC operated		ms	–	–	–	–
Drop-out time	AC operated		ms	–	–	–	–
Relay outputs	Number			1 (TOR)			
	Voltage range		V AC	250			
	Current range		A	1 A, AC-1			
Soft start functions							
Ramp times	Acceleration		s	1 - 30			
	Deceleration		s	0 - 30			
Start voltage (= switch-off voltage)				30 % - 100 %			
Voltage reduction at stop				8 %			

DS7-340SX016	DS7-340SX024	DS7-340SX032	DS7-340SX041	DS7-340SX055	DS7-340SX070	DS7-340SX081	DS7-340SX100	DS7-340SX135	DS7-340SX160	DS7-340SX200
IEC/EN 60 947-4-2										
Damp heat, cyclic, to DIN IEC Part 68 2-10, Damp heat, constant, to DIN IEC 68 Part 2-3										
0…40, up to 60 °C at 1 % derating per Kelvin temperature rise										
-25 - +55										
0…1000 m, above that 1 % derating per 100 m, up to 2000 m										
Vertical										
IP20										
Protection type IP40 can be achieved on all sides with covers from the NZM range.										
Finger- and back-of-hand proof										
II/2										
8 g/11 ms										
2M2										
0.8	1.1	1.5	7	10	13	18	25	24	30	42
45 x 150 x 118										
B										
0.4	0.4	0.4	1.8	1.8	1.8	1.8	1.8	3.7	3.7	3.7
230 - 460										
50/60										
16	24	32	41	55	70	81	100	135	160	200
4	5.5	7.5	11	15	15	22	30	30	45	55
7.5	11	15	22	30	37	45	55	75	90	110
10	15	20	30	40	50	60	75	100	125	150
16	24	32	41	55	70	81	100	135	160	200
1 x (0.75 - 16); 2 x (0.75 - 10)			1 x (25 - 70); 2 x (6 - 25)					1 x (4 - 185); 2 x (4 - 70)		
1 x (0.75 - 16); 2 x (0.75 - 10)			–	–	–	–	–	–	–	–
1 x 16			1 x (25 - 70); 2 x (6 - 25)					1 x (4 - 185); 2 x (4 - 70)		
18 - 6			1 x (12 - 2/0)					1 x (12 - 350 kcmil); 2 x (12 - 00)		
–	–	–	2 x 9 x 0.8					2 x 9 x 0.8		
–	–	–	9 x 9 x 0.8					10 x 16 x 0.8		
3	3	3	–	–	–	–	–	–	–	–
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 - 1.0)										
1 x (21 - 14); 2 x (21 - 18)										
1.2	1.2	1.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
0.6 x 3.5										
4	4	4	4	4	4	4	4	4	4	4
500	500	500	500	500	500	500	500	500	500	500
PKZM0-16 (+ CL-PKZ0)	PKZM0-25 (+ CL-PKZ0)	PKZM0-32 (+ CL-PKZ0)	NZMN1-M50 / PKZM4-50	NZMN1-M63 / PKZM4-58	NZMN1-M80	NZMN1-M100	NZMN1-M100	NZMN2-M160	NZMN2-M200	NZMN2-M200
3 x 50.140.06-50	3 x 50.140.06-63	3 x 50.140.06-80	3 x 20.282.20-100	3 x 20.282.20-125	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-350	3 x 20.610.32-400	3 x 20.610.32-500
3 x 51.060.04	3 x 51.060.04	3 x 51.060.04	3 x 21.189.01	3 x 21.189.01	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02
24 V AC/DC + 10 % / - 15 %										
–	–	–	35	35	35	35	35	35	35	35
–	–	–	65	65	65	65	65	65	65	65
–	–	–	600/50	600/50	600/50	600/50	600/50	600/50	600/50	600/50
24 V AC/DC + 10 % / - 15 %										
–	–	–	14	14	14	14	14	14	14	14
+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27
–	–	–	–	–	–	–	–	–	–	–
0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3
–	–	–	–	–	–	–	–	–	–	–
–	–	–	250	250	250	250	250	250	250	250
–	–	–	190	190	190	190	190	190	190	190
2 (TOR)										
250										
1 A, AC-1			3 A, AC-1							
1 - 30										
0 - 30										
30 % - 100 %										
8 %										

				DS7-342SX004	DS7-342SX007	DS7-342SX009	DS7-342SX012
General							
Standards				IEC/EN 60 947-4-2			
Climatic proofing				Damp heat, cyclic, to DIN IEC Part 68 2-10, Damp heat, constant, to DIN IEC 68 Part 2-3			
Ambient temperature			°C	0…40, up to 60 °C at 1 % derating per Kelvin temperature rise			
Ambient temperature storage			°C	-25 - +55			
Installation altitude	Higher installation altitude upon request			0…1000 m, above that 1 % derating per 100 m, up to 2000 m			
Mounting position				Vertical			
Protection type				IP20			
Protection type applies to the front and operator control and operating elements. Protection type from all sides is IP00.				Protection type IP40 can be achieved on all sides with covers from the NZM range.			
Protection against direct contact				Finger- and back-of-hand proof			
Overvoltage category/pollution degree				II/2			
Mechanical shock resistance				8 g/11 ms			
Vibration resistance to EN 60721-3-2				2M2			
Average heat dissipation with nominal load cycle			W	0.2	0.35	0.45	0.6
Dimensions (W x H x D)			mm	45 x 130 x 95			
Radio interference level				B			
Weight			kg	0.4	0.4	0.4	0.4
Main contacts							
Rated operational voltage			V AC	230 - 460			
Mains frequency			Hz	50/60			
Rated operational current	AC-53 (motor loads)	I_e	A	4	7	9	12
Assigned motor rating	230 V	P	kW	0.75	1.5	2.2	3
	400 V	P	kW	1.5	3	4	5.5
	480 V	P	HP	2	3	5	7.5
Overload cycle to EN 60947-4-2							
AC-53a (int. bypass)	For AC-53a:3-5:75-10		A	4	7	9	12
Terminal capacity							
Power cable (box terminal)	Solid		mm²	1 x (0.75 - 4); 2 x (0.75 - 2.5)			
	Flexible with ferrule		mm²	1 x (0.75 - 2.5); 2 x (0.75 - 2.5)			
	Stranded		mm²	–	–	–	–
	Solid or stranded		AWG	18 - 10			
	Flat conductor		min, mm	–	–	–	–
			max, mm	–	–	–	–
	Tightening torque		Nm	1.2	1.2	1.2	1.2
Control cables	Solid		mm²	1 x (0.75 - 4); 2 x (0.75 - 2.5)			
	Flexible with ferrule		mm²	1 x (0.75 - 2.5); 2 x (0.75 - 2.5)			
	Stranded		mm²	–	–	–	–
	Solid or stranded		AWG	18 - 10			
	Tightening torque		Nm	1.2	1.2	1.2	1.2
	Screwdriver (flat blade)		mm	0.8 x 5.5; 1 x 6			
Power section							
Rated impulse withstand voltage		U_{imp} 1.2/50 µs	kV	4	4	4	4
Rated insulation voltage		U_i	V	500	500	500	500
Short-circuit rating							
Type "1" coordination	For AC-53a:3-5:75-10			PKZM0-4 (+ CL-PKZ0)	PKZM0-10 (+ CL-PKZ0)	PKZM0-10 (+ CL-PKZ0)	PKZM0-12 (+ CL-PKZ0)
Type "2" coordination (in addition to fuses for type "1" of coordination)				3 x 50.179.06-16	3 x 50.140.06-25	3 x 20.282.20-32	3 x 20.282.20-32
Fuse holders				3 x 51.060.04	3 x 51.060.04	3 x 51.060.04	3 x 51.060.04
Control circuit							
Controller supply voltage	Voltage	U_s	V	120 -15 % - 230 +10 %			
	Current consumption at no load 24 V DC		mA	–	–	–	–
	Current consumption in operation at 24 V DC		mA	–	–	–	–
	Current consumption at peak load (close bypass) at 24 V DC		mA/ms	–	–	–	–
Control voltage range	AC operated			120 -15 % - 230 +10 %			
	Current consumption at 230 V DC		mA	–	–	–	–
Pick-up voltage	DC operated		V DC	–	–	–	–
	AC operated		V AC	120 -15 %			
Drop-out voltage	DC operated		V DC	–	–	–	–
	AC operated		V AC	–	–	–	–
Pick-up time	AC operated		ms	–	–	–	–
Drop-out time	AC operated		ms	–	–	–	–
Relay outputs	Number			1 (TOR)			
	Voltage range		V AC	250			
	Current range		A	3 A, AC1			
Soft start functions							
Ramp times	Acceleration		s	1 - 30			
	Deceleration		s	0 - 30			
Start voltage (= switch-off voltage)				30 % - 92 %			
Voltage reduction at stop				8 %			

DS7-342SX016	DS7-342SX024	DS7-342SX032	DS7-342SX041	DS7-342SX055	DS7-342SX070	DS7-342SX081	DS7-342SX100	DS7-342SX135	DS7-342SX160	DS7-342SX200
IEC/EN 60 947-4-2										
Damp heat, cyclic, to DIN IEC Part 68 2-10, Damp heat, constant, to DIN IEC 68 Part 2-3										
0…40, up to 60 °C at 1 % derating per Kelvin temperature rise										
-25 - +55 °C										
0…1000 m, above that 1 % derating per 100 m, up to 2000 m										
Vertical										
IP20										
Protection type IP40 can be achieved on all sides with covers from the NZM range.										
Finger- and back-of-hand proof										
II/2										
8 g/11 ms										
2M2										
0.8	1.1	1.5	7	10	13	18	25	24	30	42
45 x 150 x 118										
B										
0.45	0.45	0.45	1.8	1.8	1.8	1.8	1.8	3.7	3.7	3.7
230 - 460										
50/60										
16	24	30	41	55	70	81	100	135	160	200
4	5.5	7.5	11	15	15	22	30	30	45	55
7.5	11	15	22	30	37	45	55	75	90	110
10	15	20	30	40	50	60	75	100	125	150
16	24	30	41	55	70	81	100	135	160	200
1 x (0.75 - 16); 2 x (0.75 - 10)			1 x (25 - 70); 2 x (6 - 25)					1 x (4 - 185); 2 x (4 - 70)		
1 x (0.75 - 16); 2 x (0.75 - 10)			–	–	–	–	–	–	–	–
1 x 16			1 x (25 - 70); 2 x (6 - 25)					1 x (4 - 185); 2 x (4 - 70)		
18 - 6			1 x (12 - 2/0)					1 x (12 - 350 kcmil); 2 x (12 - 00)		
–	–	–	2 x 9 x 0.8					2 x 9 x 0.8		
–	–	–	9 x 9 x 0.8					10 x 16 x 0.8		
3	3	3	–	–	–	–	–	–	–	–
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 - 1.0)										
1 x (21 - 14); 2 x (21 - 18)										
1.2	1.2	1.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
0.8 x 5.5; 1 x 6			0.6 x 3.5							
4	4	4	4	4	4	4	4	4	4	4
500	500	500	500	500	500	500	500	500	500	500
PKZM0-16 (+ CL-PKZ0)	PKZM0-25 (+ CL-PKZ0)	PKZM0-32 (+ CL-PKZ0)	NZMN1-M50 / PKZM4-50	NZMN1-M63 / PKZM4-58	NZMN1-M80	NZMN1-M100	NZMN1-M100	NZMN2-M160	NZMN2-M200	NZMN2-M200
3 x 50.140.06-50	3 x 50.140.06-63	3 x 50.140.06-80	3 x 20.282.20-100	3 x 20.282.20-125	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-350	3 x 20.610.32-400	3 x 20.610.32-500
3 x 51.060.04	3 x 51.060.04	3 x 51.060.04	3 x 21.189.01	3 x 21.189.01	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02
120 -15 % - 230 +10 %										
–	–	–	35	35	35	35	35	35	35	35
–	–	–	65	65	65	65	65	65	65	65
–	–	–	600/50	600/50	600/50	600/50	600/50	600/50	600/50	600/50
120 -15 % - 230 +10 %										
–	–	–	14	14	14	14	14	14	14	14
–	–	–	–	–	–	–	–	–	–	–
120 -15 %										
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	250	250	250	250	250	250	250	250
–	–	–	190	190	190	190	190	190	190	190
2 (TOR)										
250										
3 A, AC1										
1 - 30										
0 - 30										
30 % - 92 %										
8 %										

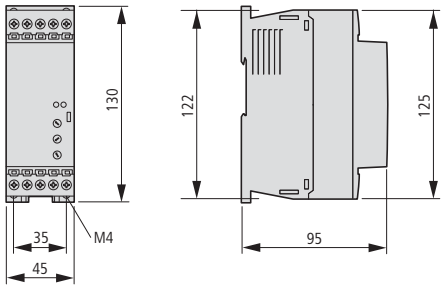
				DS7-34DSX004	DS7-34DSX007	DS7-34DSX009	DS7-34DSX012
General							
Standards				IEC/EN 60 947-4-2			
Climatic proofing				Damp heat, cyclic, to DIN IEC Part 68 2-10, Damp heat, constant, to DIN IEC 68 Part 2-3			
Ambient temperature			°C	0…40, up to 60 °C at 1 % derating per Kelvin temperature rise			
Ambient temperature storage			°C	-25 - +55 °C			
Installation altitude	Higher installation altitude upon request			0…1000 m, above that 1 % derating per 100 m, up to 2000 m			
Mounting position				Vertical			
Protection type				IP20			
Protection type applies to the front and operator control and operating elements. Protection type from all sides is IP00.				Protection type IP40 can be achieved on all sides with covers from the NZM range.			
Protection against direct contact				Finger- and back-of-hand proof			
Overvoltage category/pollution degree				II/2			
Mechanical shock resistance				8 g/11 ms			
Vibration resistance to EN 60721-3-2				2M2			
Average heat dissipation with nominal load cycle			W	0.2	0.35	0.45	0.6
Dimensions (W x H x D)			mm	45 x 135 x 95			
Radio interference level				B			
Weight			kg	0.41	0.41	0.41	0.41
Main contacts							
Rated operational voltage			V AC	230 - 460			
Mains frequency			Hz	50/60			
Rated operational current	AC-53 (motor loads)	I_e	A	4	7	9	12
Assigned motor rating	230 V	P	kW	0.75	1.5	2.2	3
	400 V	P	kW	1.5	3	4	5.5
	480 V	P	HP	2	3	5	7.5
Overload cycle to EN 60947-4-2							
AC-53a (int. bypass)	For AC-53a:3-5:75-10		A	4	7	9	12
Terminal capacity							
Power cable (box terminal)	Solid		mm^2	1 x (0.75 - 4); 2 x (0.75 - 2.5)			
	Flexible with ferrule		mm^2	1 x (0.75 - 2.5); 2 x (0.75 - 2.5)			
	Stranded		mm^2	–	–	–	–
	Solid or stranded		AWG	18 - 10			
	Flat conductor		min, mm	–	–	–	–
			max, mm	–	–	–	–
	Tightening torque		Nm	1.2	1.2	1.2	1.2
Control cables	Solid		mm^2	1 x (0.75 - 4); 2 x (0.75 - 2.5)			
	Flexible with ferrule		mm^2	1 x (0.75 - 2.5); 2 x (0.75 - 2.5)			
	Stranded		mm^2	–	–	–	–
	Solid or stranded		AWG	18 - 10			
	Tightening torque		Nm	1.2	1.2	1.2	1.2
	Screwdriver (flat blade)		mm	0.8 x 5.5; 1 x 6			
Power section							
Rated impulse withstand voltage		U_{imp} 1.2/50 µs	kV	4	4	4	4
Rated insulation voltage		U_i	V	500	500	500	500
Short-circuit rating							
Type "1" coordination	For AC-53a:3-5:75-10			PKZM0-4 (+ CL-PKZ0)	PKZM0-10 (+ CL-PKZ0)	PKZM0-10 (+ CL-PKZ0)	PKZM0-12 (+ CL-PKZ0)
Type "2" coordination (in addition to fuses for type "1" coordination)				3 x 50.179.06-16	3 x 50.179.06-25	3 x 20.282.20-32	3 x 20.282.20-32
Fuse holders				3 x 51.060.04	3 x 51.060.04	3 x 21.189.01	3 x 21.189.01
Control circuit							
Controller supply voltage	Voltage	U_s	V	+24 V AC/DC +10 %/-15 %			
	Current consumption at no load 24 V DC		mA	–	–	–	–
	Current consumption in operation at 24 V DC		mA	–	–	–	–
	Current consumption at peak load (close bypass) at 24 V DC		mA/ms	–	–	–	–
Control voltage range	AC operated			24 +10 %/-15 %			
	Current consumption at 230 V DC		mA	-	-	-	-
Pick-up voltage	DC operated		V DC	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27
	AC operated		V AC	–	–	–	–
Drop-out voltage	DC operated		V DC	0 - +3	0 - +3	0 - +3	0 - +3
	AC operated		V AC	–	–	–	–
Pick-up time	DC operated		ms	–	–	–	–
Drop-out time	DC operated		ms	–	–	–	–
Relay outputs	Number			1 (TOR)			
	Voltage range		V AC	250			
	Current range		A	3 A, AC1			
Soft start functions							
Ramp times	Acceleration		s	1 - 30			
	Deceleration		s	0 - 30			
Start voltage (= switch-off voltage)				30 % - 92 %			
Voltage reduction at stop				8 %			

DS7-34DSX016	DS7-34DSX024	DS7-34DSX032	DS7-34DSX041	DS7-34DSX055	DS7-34DSX070	DS7-34DSX081	DS7-34DSX100	DS7-34DSX135	DS7-34DSX160	DS7-34DSX200
IEC/EN 60 947-4-2										
Damp heat, cyclic, to DIN IEC Part 68 2-10, Damp heat, constant, to DIN IEC 68 Part 2-3										
0…40, up to 60 °C at 1 % derating per Kelvin temperature rise										
-25 - +55 °C										
0…1000 m, above that 1 % derating per 100 m, up to 2000 m										
Vertical										
IP20										
Protection type IP40 can be achieved on all sides with covers from the NZM range.										
Finger- and back-of-hand proof										
II/2										
8 g/11 ms										
2M2										
0.8	1.1	1.5	7	10	13	18	25	24	30	42
45 x 150 x 118										
B										
0.41	0.46	0.46	1.8	1.8	1.8	1.8	1.8	3.7	3.7	3.7
230 - 460										
50/60										
16	24	30	41	55	70	81	100	135	160	200
4	5.5	7.5	11	15	15	22	30	30	45	55
7.5	11	15	22	30	37	45	55	75	90	110
10	15	20	30	40	50	60	75	100	125	150
16	24	30	41	55	70	81	100	135	160	200
1 x (0.75 - 16); 2 x (0.75 - 10)			1 x (25 - 70); 2 x (6 - 25)					1 x (4 - 185); 2 x (4 - 70)		
1 x (0.75 - 16); 2 x (0.75 - 10)			–	–	–	–	–	–	–	–
1 x 16			1 x (25 - 70); 2 x (6 - 25)					1 x (4 - 185); 2 x (4 - 70)		
18 - 6			1 x (12 - 2/0)					1 x (12 - 350 kcmil); 2 x (12 - 00)		
–	–	–	2 x 9 x 0.8					2 x 9 x 0.8		
–	–	–	9 x 9 x 0.8					10 x 16 x 0.8		
3	3	3	–	–	–	–	–	–	–	–
1 x (0.75 - 4); 2 x (0.75 - 4)			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 (0.75 - 2.5); 2 x (0.75 - 2.5)			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)		
18 - 14			1 x (21 - 14); 2 x (21 - 18)					1 x (21 - 14); 2 x (21 - 18)		
1.2	1.2	1.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
0.6 x 3.5; 1 x 6			0.6 x 3.5					0.6 x 3.5		
4	4	4	4	4	4	4	4	4	4	4
500	500	500	500	500	500	500	500	500	500	500
PKZM0-16 (+ CL-PKZ0)	PKZM0-25 (+ CL-PKZ0)	PKZM0-32 (+ CL-PKZ0)	NZMN1-M50/ PKZM4-50	NZMN1-M63/ PKZM4-58	NZMN1-M80	NZMN1-M100	NZMN1-M100	NZMN2-M160	NZMN2-M200	NZMN2-M200
3 x 50.140.06-50	3 x 50.140.06-63	3 x 50.140.06-80	3 x 20.282.20-100	3 x 20.282.20-125	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-200	3 x 20.610.32-350	3 x 20.610.32-400	3 x 20.610.32-500
3 x 51.060.04	3 x 51.060.04	3 x 51.060.04	3 x 21.189.01	3 x 21.189.01	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02	3 x 21.313.02
+24 V AC/DC +10 %/-15 %										
–	–	–	35	35	35	35	35	35	35	35
–	–	–	65	65	65	65	65	65	65	65
–	–	–	600/50	600/50	600/50	600/50	600/50	600/50	600/50	600/50
24 +10 %/-15 %										
-	-	-	14	14	14	14	14	14	14	14
+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27	+17.3 - +27
–	–	–	–	–	–	–	–	–	–	–
0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3	0 - +3
–	–	–	–	–	–	–	–	–	–	–
–	–	–	250	250	250	250	250	250	250	250
–	–	–	190	190	190	190	190	190	190	190
2 (TOR, Ready)										
250										
3 A, AC1										
1 - 30										
0 - 30										
30 % - 92 %										
8 %										

Dimensions

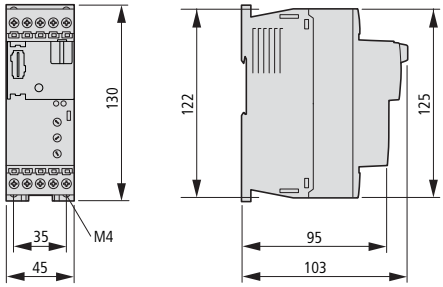
DS7-340SX004N0-N
DS7-340SX007N0-N
DS7-340SX009N0-N
DS7-340SX012N0-N

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



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

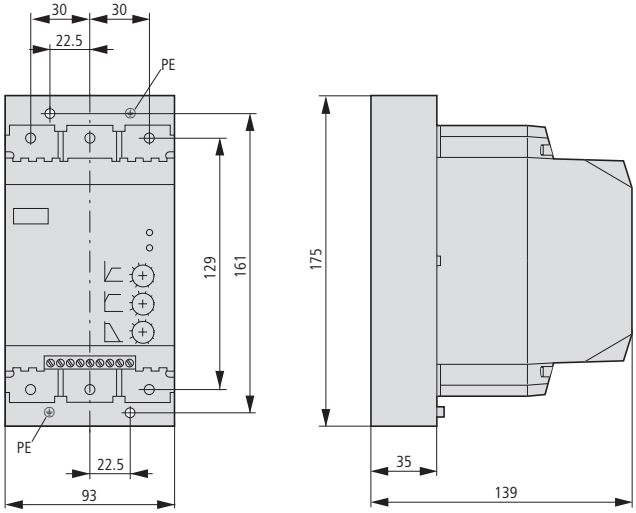
DS7-34DSX009N0-D
DS7-34DSX012N0-D



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

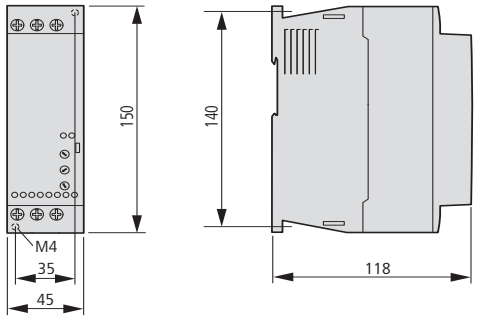
DS7-342SX041N0-N
DS7-342SX055N0-N
DS7-342SX070N0-N
DS7-342SX081N0-N
DS7-342SX100N0-N

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

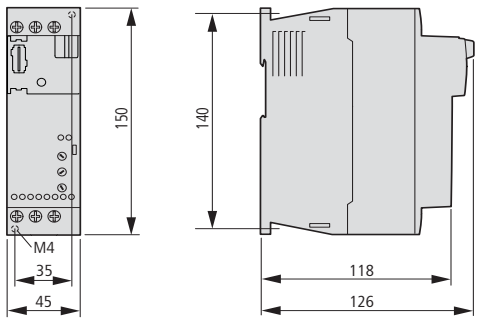


DS7-340SX016N0-N
DS7-340SX024N0-N
DS7-340SX032N0-N

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



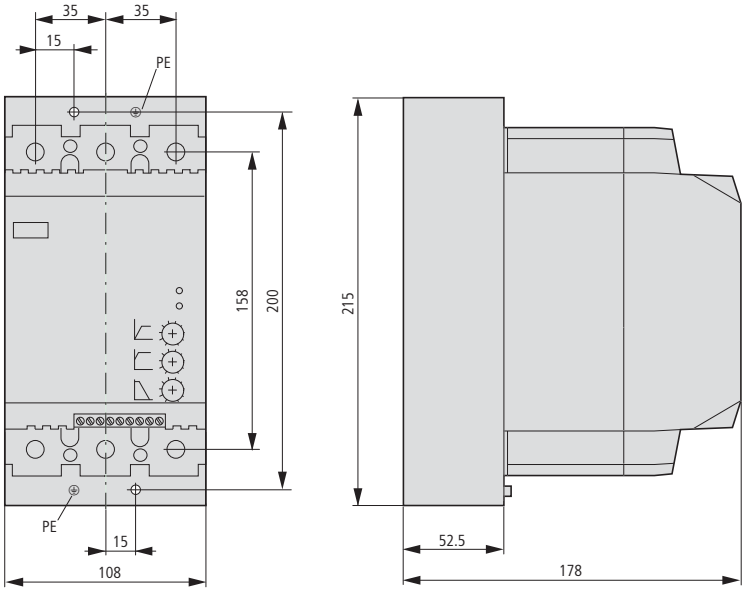
DS7-34DSX016N0-D
DS7-34DSX024N0-D
DS7-34DSX032N0-D



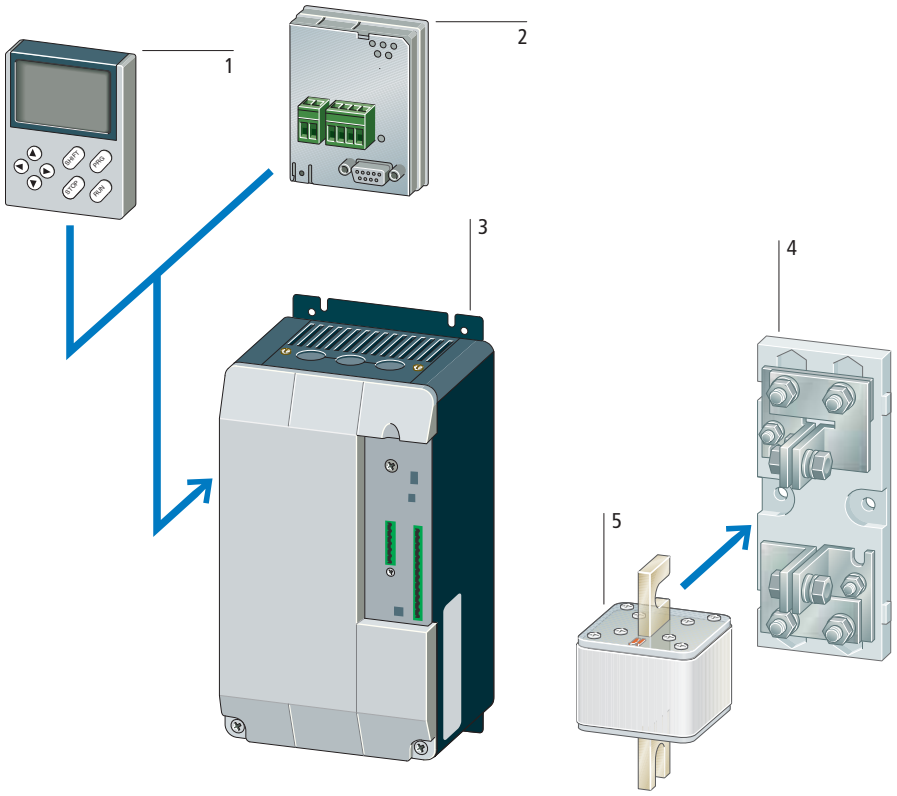
DS7-342SX135N0-N
DS7-342SX160N0-N
DS7-342SX200N0-N

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

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



System overview



Basic devices

DM4 soft starter	3
Soft starters for three-phase AC motors	
Assigned motor rating: • From 7.5 to 500 kW for in-line terminal type (before load, standard) • 11 to 900 kW for Delta terminal type (In-Delta)	
Rated operating voltage: 230 to 480 V	
10 programmed standard applications allow direct operation; parameter set selection through rotary switch.	
Ramp time adjustable from 1 to 255 s	
Energy-saving function optimizes efficiency and power factor.	
Adjustable current limitation prevents high starting current.	
Controller operation for 3-phase resistive and inductive loads from 16 to 900 A (400 V)	
Selection data → Engineering - Assigned switching and protective devices.	
Ordering data → Page 9/43	

Add-on functions

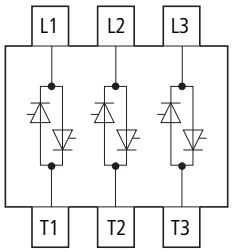
DE4-KEY-2 keypad	1
Pluggable on DM4 soft starters, with 8 function keys and plain text display; Language can be selected (German/English)	
Ordering data → Page 9/44	

Communication modules	2
DE4-COM-2X	
RS 485/RS 232 serial interface	
DE4-NET-DP2	
PROFIBUS DP interface	
Ordering data → Page 9/44	

Superfast semiconductor fuses	5
Fuses for the protection of semiconductors, optionally for direct installation in DM4 soft starters or for external surface mounting.	
Selection data → Engineering - Assigned switching and protective devices.	
Ordering data → Page 9/45	

Fuse bases	4
For external surface mounting of the superfast semiconductor fuse.	
Selection data → Engineering - Assigned switching and protective devices.	
Ordering data → Page 9/8	

Description



Operation as three-phase soft starter

DM4 soft starter series are soft starters for standard three-phase asynchronous motors. They round off Eaton's soft starter range with devices meant for more demanding applications. With a power range (assigned motor rating) starting with 7.5 kW, DM4 soft starters are also suitable for demanding automation tasks.

Their terminal type determines the rating range:

- Inline terminal type (upstream of load = standard):
  7.5 to 500 kW at 400 V.
- Delta terminal type:
  11 to 900 kW at 400 V,
  each phase of the soft starter being connected in series with the individual motor windings
  (6 lines required, motor delta connected only).

Features

- Current limitation
- High overload withstand capability
- Large rating range up to 500 kW (or 900 kW in delta terminal type)
- Predefined parameter sets can be selected for standard applications
- All parameters also individually adjustable
- Keypad with plain text display (optional)
- Programmable relay and analog outputs
- Networkable
- Voltage controller function (generalized phase control) can be implemented for each software changeover.

Typical applications as soft starter

- Pump drives: pressure surges are prevented through soft starting. The mechanical load on the whole plant is reduced and the plant components' service life increases.
- Fan drives and compressors: The soft start prevents belt slippage and premature wear. This in turn lowers the operating costs and increases the durability of the plant.
- Conveyors: Instead of starting with a jolt, the conveyor starts up gently and the transported goods do not fall over. The mechanical stress on the conveyor is reduced and its lifespan increased.
- Circular and ribbon saws: The current limitation at startup prevents current peaks. This results in energy savings and reduced electricity bills.
- Agitators, mixers, mills, crushers: the same advantages described above.

Operation as three-phase controller

The DM4 devices can be changed over with the software to three-phase controller operation. The rating range is 16 to 900 A at 400 V (standard connection only, in-line connection possible). They can be operated in pure controller mode or with a closed-loop control circuit.
The units each have two analog inputs for setpoint/actual values and an additional built-in current feedback loop.
Note: A keypad or the serial interface and PC software are required to configure controller operation.

Typical applications as three-phase controller

- Heater loads: Continuous temperature regulation reduces thermal and mechanical load on heating elements to increase their lifespan.
- Lighting control systems: Gentle switching on of lamps reduce current consumption in cold state. Utilization of the lamps' ideal operating point reduces their current consumption at the same light emission and extends their lifespan. This results in energy savings and reduced electricity bills.
- Ozone generators: Regulation of high-voltage transformers.

Documentation

You can download the documentation for the soft starters from the Internet:
www.moeller.net/support

Installation instructions
AWA8250-1704 (for devices within a rating range from 7.5 to 37 kW)
AWA8250-1751 (for devices within a rating range from 45 to 75 kW)
AWA8250-1752 (for devices within a rating range from 90 to 200 kW)
AWA8250-1783 (for devices within a rating range from 250 to 500 kW)

Manuals
AWB8250-1341
("Hardware and engineering")
AWB8250-1346
("Design of soft starters")

Description

Part no. overview

DE4-KEY-2
Keypad

Application

The DM4 soft starters are factory set for the most common applications.
For various standard applications, parameter sets can be selected via an application selector switch.
There is no longer a need for manual setting for different applications and its associated risk of errors.
The preset application parameter sets can also be selected via an optional keypad with plain text display. With the keypad, all parameters can be viewed, edited and adapted for specific applications. The keypad is also required for reprogramming the soft starter's digital or analog inputs and outputs. Interface modules can be used as an alternative to the keypad.
The soft starters can be interfaced with a PLC via PROFIBUS-DP.
Assigning parameters via the PLC offers the same range of functions as are possible via the keypad.

Documentation

For a detailed description, see the documentation: AWB8240-1344.
The documentation is available on the Internet at:
www.moeller.net/support

Part no. overview

DE4-COM-2X
RS 232C/RS 485 serial interface

Application

The DE4-COM-2X plug-in communication module contains RS 232C and RS 485 serial interfaces for direct connection to a PC (point-to-point connection). It can be used with DM4 soft starters.

Function

The DE4-COM-2X module can be plugged in and removed during operation. It provides direct access to all parameters. The drive can be controlled and monitored from the PC. Status and alarm messages are displayed.

Features

The DE4-COM-2X module receives its power from the basic device or from an external DC supply (+24 V, max. 80 mA) through two plug-in screw terminals.

RS232C interface
- 9-pole SUB-D plug
- Pin 2 (RxD), pin 3 (TxD), pin 5 (GND)
- Point-to-point connection
- Max. cable length: 15 m
- Maximum data transfer rate: 19200 Bit/s

RS485 interface
- 4 pole plug-in screw terminals
- Network topology: in-line
- Max. cable length: 1200 m
- Maximum data transfer rate: 19200 Bit/s

Notes
The PS416-ZBK-210 serial interface cable for connecting the serial interface with a PC must be ordered separately.

Documentation

For a detailed description, see manual AWB823-1279D/GB/F.
This documentation is not supplied with the device. You can download it from our website:
www.moeller.net/support

Part no. overview

DE4-NET-DP2
PROFIBUS DP fieldbus module

Application

The plug-in DE4-NET-DP2 communication module is used for direct connection to the PROFIBUS DP fieldbus (DIN 19245 Part 1 and 3). It can be used with DM4 soft starters.

Function

The DE4-NET-DP2 module can be plugged in and removed during operation. It provides direct access to all parameters. The drive (slave) can be controlled and monitored via the PLC (master). Status and alarm messages are displayed.

Features

The DE4-NET-DP2 module receives its power from the basic device or from an external DC supply (+24 V, max. 60 mA) through two plug-in screw terminals.

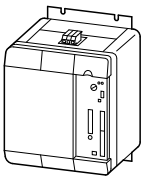
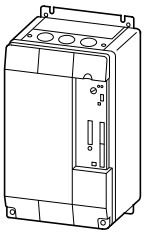
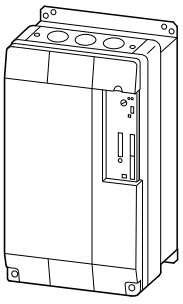
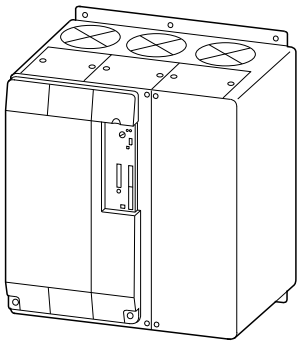
Model:
- 9-pole SUB-D plug
- Network topology: PROFIBUS-DP line
- Max. cable length: 1200 m at 93.7 kBaud, 25 m at 12000 Baud

Documentation

For a detailed description, see the documentation: AWB8240-1398-EN. This documentation is not supplied with the device. You can download it from our website: www.moeller.net/support

HPL09043EN

Ordering

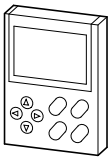
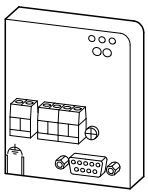
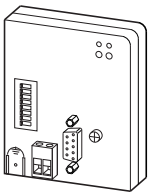
	Mains supply voltage (50/60 Hz) U_{LN} V AC	Rated operational current (AC 53) I_e A	Assigned motor rating 400 V, In-Line terminal type kW	400 V, Delta terminal type kW	**Part no.** Article no.	**Price** See price list	Std. pack
Soft starters up to 37/55 kW at 400 V							
	190-520	16	7	11	**DM4-340-7K5** 207897		1 off
	190-520	23	11	15	**DM4-340-11K** 207898		
	190-520	30	15	22	**DM4-340-15K** 207899		
	190-520	44	22	37	**DM4-340-22K** 207900		
	190-520	59	30	55	**DM4-340-30K** 207901		
	190-520	72	37	55	**DM4-340-37K** 207902		
Soft starters up to 75/132 kW at 400 V							
	190-520	85	45	75	**DM4-340-45K** 207903		1 off
	190-520	105	55	90	**DM4-340-55K** 207904		
	190-520	146	75	132	**DM4-340-75K** 207905		
Soft starters up to 200/315 kW at 400 V							
	190-520	174	90	160	**DM4-340-90K** 207906		1 off
	190-520	202	110	160	**DM4-340-110K** 207907		
	190-520	242	132	200	**DM4-340-132K** 207908		
	190-520	300	160	250	**DM4-340-160K** 207909		
	190-520	370	200	315	**DM4-340-200K** 207910		
Soft starters up to 500/900 kW at 400 V							
	190-520	500	250	400	**DM4-340-250K** 207911		1 off
	190-520	600	315	560	**DM4-340-315K** 207912		
	190-520	750	400	750	**DM4-340-400K** 207913		
	190-520	900	500	900	**DM4-340-500K** 207914		

Notes

Information relevant for export to North America

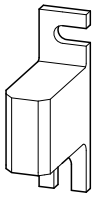
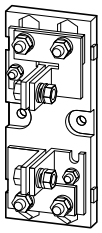
Assigned motor rating data applies for in-line/in-delta terminal type, tripping class 10.

Product Standards	IEC/EN 60947-4-2; UL 508; cUL 508 CE marking
UL File No.	E208760
UL CCN	NMFT
CSA File No.	UL report applies to both US and Canada
CSA Class No.	NMFT7
NA Certification	UL Listed, certified by UL for use in Canada
Suitable for	Branch circuits
Max. Voltage Rating	480 V
Degree of Protection	IP20; UL/CSA Type 1

	Description	For use with	**Part no.** Article no.	**Price** See price list	Std. pack
Keypad					
	Allows matching of all of the soft starter's parameters for any application and drive control through the keypad. Connection to DM4 soft starters through simple plugging/ pulling, also during operation. With non-volatile memory for parameters; parameter sets can be transferred between soft starters for series applications. Two-line plain text display. Operating status signalling through status symbols.	DM4	**DE4-KEY-2** 211291		1 off
RS 232C/RS 485 serial interface					
Module with RS 232C and RS 485 serial interfaces for direct connection to a PLC or a PC					
	RS 232C: 9-pin SUB-D plug RS 485: plug-in screw terminals PS416-ZBK-210 serial interface cable required	DM4	**DE4-COM-2X** 085028		1 off
–	For connecting the programming PC to the CPU card via the RS232C interface	DE4-COM-2X PS416-CPU-…	**PS416-ZBK-210** 051751		1 off
PROFIBUS DP communication module					
Module for direct connection to the PROFIBUS DP fieldbus					
	All parameters can be addressed and transferred. Connection through 9-pin SUB-D plug	DM4	**DE4-NET-DP2** 230240		1 off

Information relevant for export to North America	UL File No.	E172143
	UL CCN	NMMS
	CSA File No.	UL report applies to both US and Canada
	CSA Class No.	NMMS7
	NA Certification	UL Listed, certified by UL for use in Canada
	Suitable for	Branch circuits
	Degree of Protection	IP20; UL/CSA Type 2

HPL09045EN

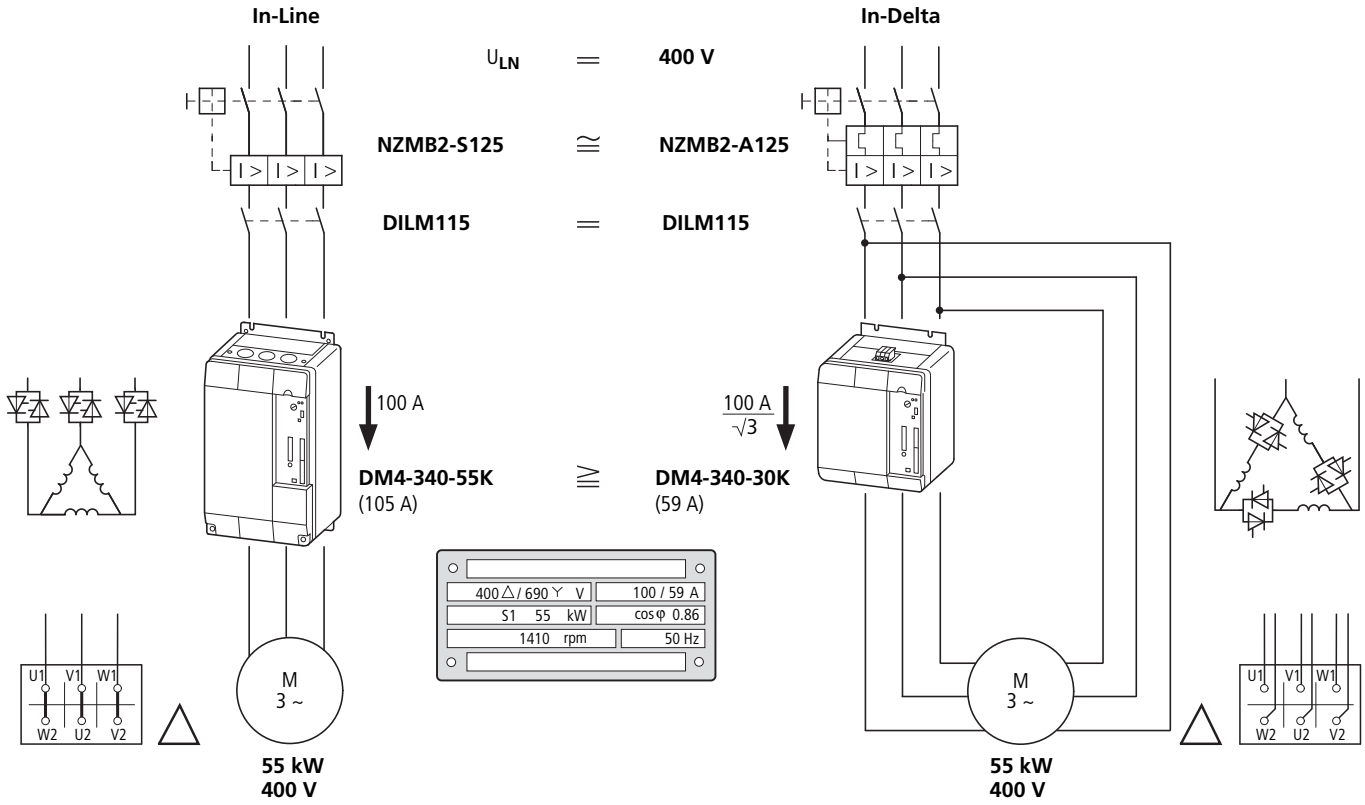
	Rated operational current	Maximum power loss	Frame size/ inside micrometer	For use with	**Part no.** Article no.	**Price** See price list	Std. pack	**Notes**
	A	P_v W	mm					
Superfast semiconductor fuses								
Fuse links								
	40	10	80	DM4-340-7K5	**20.282.20-40** 232085		6 off	–
	80	18	80	DM4-340-11K DM4-340-15K	**20.282.20-80** 232086		6 off	–
	125	24	80	DM4-340-22K DM4-340-30K	**20.282.20-125** 232087		6 off	–
	200	44	80	DM4-340-37K DM4-340-45K	**20.610.32-200** 106475		3 off	–
	350	61	80	DM4-340-55K DM4-340-75K	**20.610.32-350** 221161		2 off	–
	450	70	80	DM4-340-90K DM4-340-110K	**20.610.32-450** 221162		2 off	Mounted internally
	500	72	80	DM4-340-132K DM4-340-160K	**20.610.32-500** 221163		2 off	
	630	80	80	DM4-340-200K	**20.610.32-630** 221164		3 off	
	900	120	80	DM4-340-250K DM4-340-315K	**20.630.32-900** 221165		2 off	
	1250	147	80	DM4-340-400K DM4-340-500K	**20.630.32-1250** 221166		2 off	
Fuse base for semiconductor fuses								
	–	–	80	20.282.20-… 20.189.20-…	**21.189.01** 232064		5 off	–
	–	–	80	20.6xx.32-…	**21.313.02** 232076		2 off	–

Information relevant for export to North America

Product Standards	UL 248-13 CE marking
UL File No.	E180276
UL CCN	JFHR2
CSA File No.	UL report applies to both US and Canada
CSA Class No.	JFHR8
NA Certification	UL Recognized, certified by UL for use in Canada
Max. Voltage Rating	660V

Engineering

In-line/in-delta connection



Soft starters are normally connected directly in series with the motor (so-called "in-line connection"). DM4 series soft starters also allow for operation in a so-called in-delta connection.

Advantages of an in-delta connection in comparison to an in-line connection:

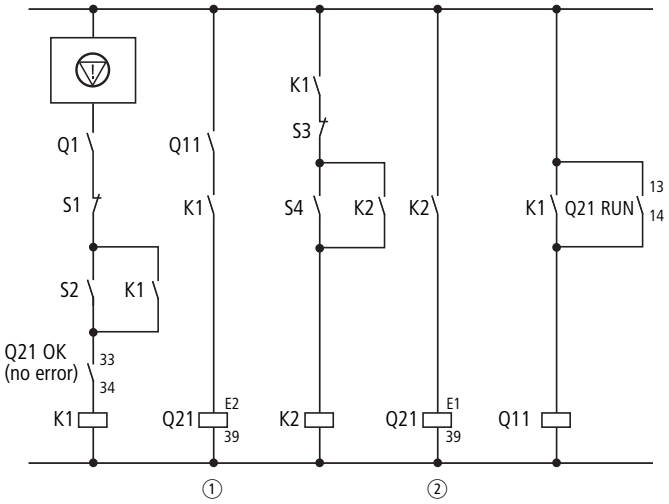
- In-delta connections are more cost-effective, since the soft starter only has to be designed for 58 percent (= 1/√3) of the rated operational current.

Disadvantages of an in-delta connection in comparison to an in-line connection:

- The motor must be connected with six conductors, similar to the star-delta connection.
- The DM4 soft starter's overload protection is active only in one line, so that additional motor protection must be fitted in the parallel phase or in the supply cable.

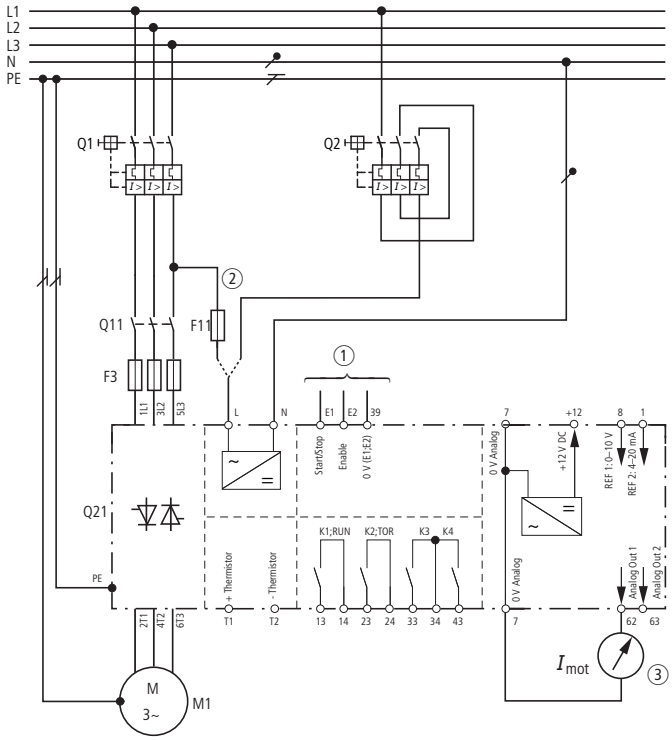
Soft starters with separate mains contactor

Actuation



⏚ = Emergency switching off

S1: Off (uncontrolled deceleration)
S2: On
S3: Soft stop (deceleration ramp)
S4: Soft start
① Enable
② Soft start/Soft stop



① See actuation
② Control voltage through Q1 and F11 or through Q2
③ Motor current indication
E1: Start/stop
E2: Enable
T1: + Thermistor
T3: - Thermistor

Connection examples

DM4

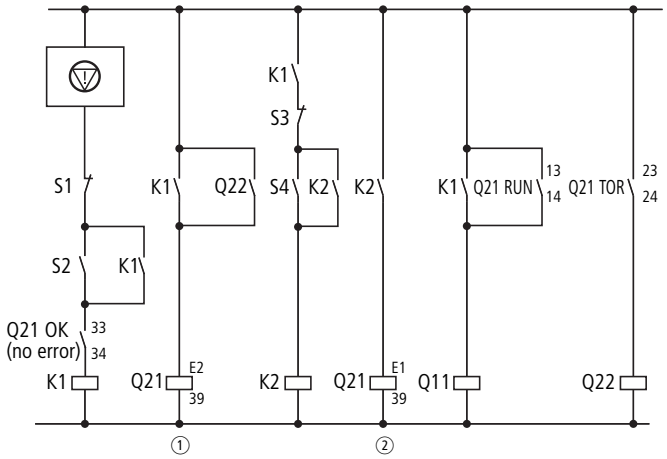
Bypass circuit

After the run-up (full mains voltage reached) the DM4 soft starter actuates the bypass contactor. The motor is then directly connected with the mains.

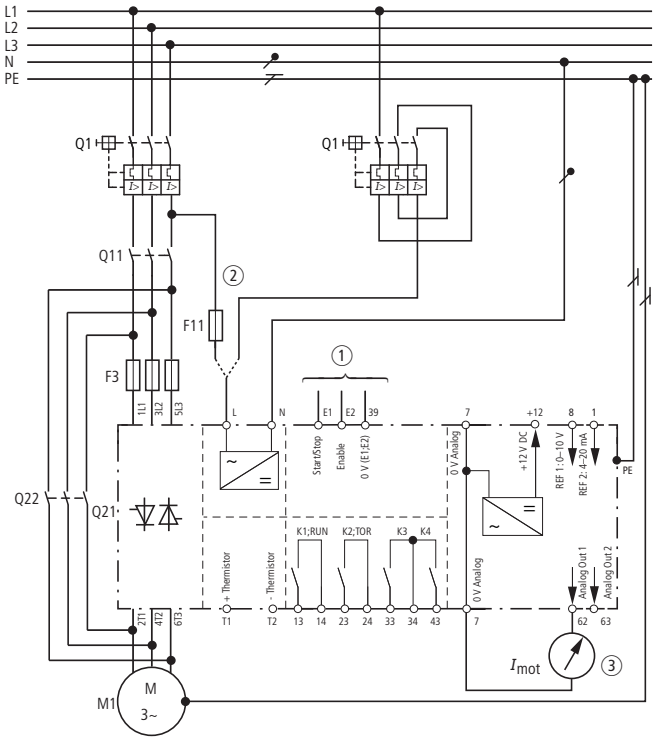
Advantages:

- The soft starter's power loss is reduced to the no-load power loss.
- The limit values of radio interference class "B" are maintained.

Actuation



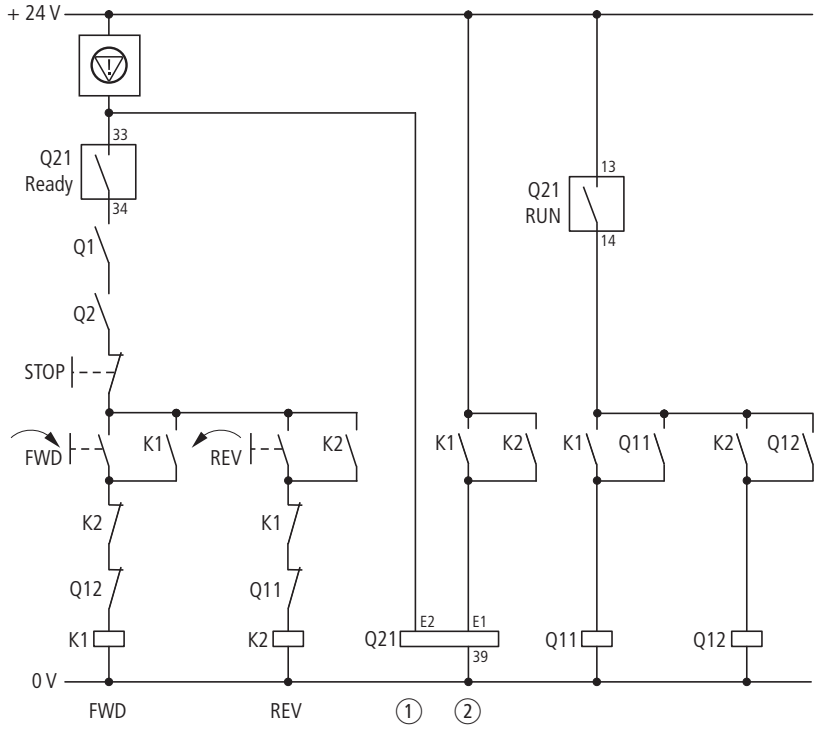
⏚ = Emergency switching off
S1: Off (uncontrolled deceleration)
S2: On
① Enable
② Soft start/Soft stop



① See actuation
② Control voltage through Q1 and F11 or through Q2
③ Motor current indication
E1: Start/stop
E2: Enable
T1: + Thermistor
T2: - Thermistor

Soft starters with reversing circuit

Actuation



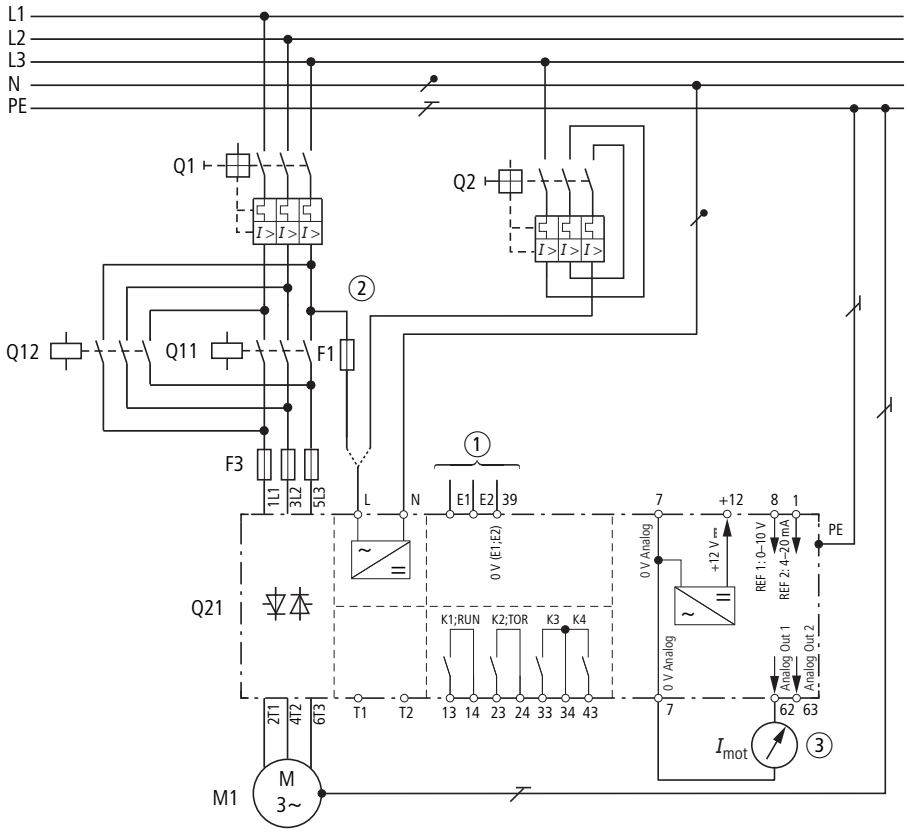
= Emergency switching off

S1: Off (uncontrolled deceleration)

S2: On

① Enable

② Soft start/Soft stop



① See actuation

② Control voltage through Q1 and F11 or through Q2

③ Motor current indication

E1: Start/stop

E2: Enable

Engineering

Assigned motor rating at		Rated operational current[2]			Part no.[1] Soft starters	Soft starter function			Bypass contactor (optional)[10]	Circuit-breakers Controller supply	Semiconductor fuse (optional, in addition to the protective devices for type "1" coordination, required for type "2" coordination)	
						Cable protection[4]	Mains contactor (optional)[4]	Overload relay[5][7]			Fuses	Fuse holders
400 V	480 V	Device	Motor	Cable[3]								
P	P	I_e	I_e	I_e[2]							Number x Part no.	Number x Part no.
kW	HP	A	A	A								
Soft starter for three-phase mains connection, short start-up time, Tripping CLASS 10 (15 s, 3.5 x I_e)												
"In-line" terminal type (upstream of load, standard)												
7.5	10	16	15.2	16	DM4-340-7K5	PKM0-16 (+ CL-PKZ0)	DILM17	ZB32-16 (+ZB32-XEZ)	DILM7	PKZM0-0,16	3 x 20.282.20-40	3 x 21.189.01
11	15	22	21.7	23	DM4-340-11K	PKM0-25 (+ CL-PKZ0)	DILM25	ZB32-24 (+ZB32-XEZ)	DILM7	PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01
15	20	30	29.3	30	DM4-340-15K	PKM0-32 (+ CL-PKZ0)	DILM32	ZB32-32 (+ZB32-XEZ)	DILM17	PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01
22	30	44	41	44	DM4-340-22K	PKZM4-50 (+ CL-PKZ0)	DILM50	ZB65-57 (+ZB65-XEZ)	DILM25	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
30	40	59	55	59	DM4-340-30K	PKZM4-63 (+ CL-PKZ0)	DILM65	ZB65-65 (+ZB65-XEZ)	DILM40	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
37	50	72	68	72	DM4-340-37K	NZMN1-S80	DILM80	ZB150-100/KK	DILM65	PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01
45	60	85	81	85	DM4-340-45K	NZMN1-S100	DILM95	ZB150-100/KK	DILM65	PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01
55	75	105	99	105	DM4-340-55K	NZMN2-S125	DILM115	ZB150-125/KK	DILM95	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
75	100	146	134	146	DM4-340-75K	NZMN2-S160	DILM150	ZB150-150/KK	DILM150	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
90	125	174	161	174	DM4-340-90K	NZMN2-S200	DILM185	Z5-220/FF6	DILM150	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
110	150	202	196	202	DM4-340-110K	NZMN2-ME220	DILM225	Z5-220/FF6	DILM185	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
132	200	242	231	242	DM4-340-132K	NZMN3-ME3506)	DILM250	ZW7-290	DILM185	PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02
160	250	300	279	300	DM4-340-160K	NZMN3-ME3506)	DILM300	ZW7-400	DILM185	PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02
200	300	370	349	370	DM4-340-200K	NZMN3-ME350/...-ME450[6]	DILM400	ZW7-400	DILM225	PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02
250	400	500	437	500	DM4-340-250K	NZMN3-ME450/...-ME550[6]	DILM500	ZW7-540	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
315	500	600	544	600	DM4-340-315K	NZMN3-ME550/...-ME875[6]	DILM580/750[12]	ZW7-630	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
400	600	750	683	750	DM4-340-400K	NZMN3-ME875	DILM750	ZEV (+ZEV-XSW-820)	DILM500	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02
500	750	900	860	900	DM4-340-500K	NZMN3-ME875/...-ME1400[9]	DILM1000	–	DILM580	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02
"In-Delta" terminal type (in series with each motor winding)												
11	15	16	21.7	21.7	DM4-340-7K5	PKM0-25 (+ CL-PKZ0)	DILM25	ZB32-16 (+EZ00)	DILM7	PKZM0-0,16	3 x 20.282.20-40	3 x 21.189.01
15	20	22	29.3	29.3	DM4-340-11K	PKM0-32 (+ CL-PKZ0)	DILM32	ZB32-24 (+EZ00)	DILM7	PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01
22	25	30	41	41	DM4-340-15K	PKM0-50 (+ CL-PKZ0)	DILM50	ZB32-32 (+EZ1)	DILM17	PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01
30	30	44	55	55	DM4-340-22K	PKM0-58 (+ CL-PKZ0)	DILM65	ZB65-57 (+EZ1)	DILM25	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
37	40	44	68	68		NZMN1-S80	DILM80	ZB65-57 (+EZ1)	DILM25	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
45	50	59	81	81	DM4-340-30K	NZMN1-S100	DILM95	ZB65-65 (+EZ1)	DILM40	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
55	60	59	99	99		NZMN1-S100	DILM115	ZB65-65 (+EZ1)	DILM40	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
75	75	85	134	134	DM4-340-45K	NZMN2-S160	DILM150	ZB150-100/KK	DILM65	PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01
90	100	105	161	161	DM4-340-55K	NZMN2-S2006)	DILM185	ZB150-125/KK	DILM95	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
110	125	146	196	196	DM4-340-75K	NZMN2-ME2206)	DILM225	ZB150-150/KK	DILM150	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
132	200	146	231	231		NZMN3-ME3506)	DILM250	ZB150-150/KK	DILM150	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
160	250	174	279	279	DM4-340-90K	NZMN3-ME3506)	DILM300	Z5-220/FF6	DILM150	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
200	300	242	349	349	DM4-340-132K	NZMN3-ME3506)	DILM400	ZW7-290	DILM185	PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02
250	400	300	437	437	DM4-340-160K	NZMN3-ME4506)	DILM500	ZW7-400	DILM185	PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02
315	500	370	544	544	DM4-340-200K	NZMN3-ME5506)	DILM580	ZW7-400	DILM225	PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02
400	600	500	683	683	DM4-340-250K	NZMN4-ME8756)	DILM750	ZW7-540	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
500	750	600	860	860	DM4-340-315K	NZMN4-ME8756)	DILM1000	ZW7-630	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
560		600	960	960		NZMN4-ME14006)	DILM1000	ZW7-630	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
750		750	1280	1280	DM4-340-400K	NZMN4-ME1400(+NZM4-XR...)6)		ZEV (+ZEV-XSW-820)	DILM500	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02
900		900	1540	1540	DM4-340-500K	IZMB2-U20008)		–	DILM580	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02

Notes

1) At a different operating cycle, the r.m.s. current changes so that a higher-rated device may have to be used.
The switching and protective elements are always dimensioned for the following operating cycles (no bypass for any operating cycle):
- Devices DM4-340-7K5 to DM4-340-90K: each 10 switching operations per hour, continuous operation.
- Devices DM4-340-110K and DM4-340-132K: each 10 switching operations per hour with at least 3 minutes no-load pause before each start.
- Devices from DM4-340-160K: each 3 switching operations per hour with at least 8 minutes no-load pause before each start. For all other switching cycles or when a bypass is used, the effective rating changes and a different device is therefore required.
- The rated operational current (device) must be greater than the motor current (in-line operation) indicated on the motor's nameplate or motor current/√3 (delta operation).

2) Rated operational current relative to the specified load cycle.

3) Used to specify the current for which the supply cable must be dimensioned with the given operation and motor current. For higher motor currents and for other operations (operating frequency, overcurrent, overcurrent time, duty factor), the current value changes and must be modified accordingly.

4) In the case of motors with the same rating but with a higher current than the one specified, a switch/contactor with greater specifications must be used if necessary. The motor current is decisive in this case.

5) If the soft starter remains continually live, it can also act as overload relay.
For delta connection, set overload relay to the value motor current/√3.

6) Overload trip block set to $t_r = \infty$

7) In delta connection, the overload relay is connected in series with the motor winding (set to value motor current/√3).

8) To use IZM as "contactor", accessories are required I (see chapter 5). In that case, the recommended circuits may not apply since different contacts may have to be assigned depending on the selected accessories.
If the rated operational current is utilized fully, the switch or contactor with greater specifications must be used.

9) The bypass is dimensioned according to AC-1. If the bypass has to be opened immediately in the event of an emergency stop, it must be dimensioned according to AC-3.

10) In this case, the contactors in the "Mains contactor" column must be used.

Assigned motor rating at		Rated operational current[2]			Part no.[1] Soft starters	Soft starter function			Bypass contactor (optional)[10]	Circuit-breakers Controller supply	Semiconductor fuse (optional, in addition to the protective devices for type "1" coordination, required for type "2" coordination)	
						Cable protection	Mains contactor (optional)[4]	Overload relay[5][7]			Fuses	Fuse holders
400 V	480 V	Device	Motor	Cable[3]								
P	P	I_e	I_e	I_e[2]							Number x Part no.	Number x Part no.
kW	HP	A	A	A								
Soft starters for three-phase mains connection, long start-up time												
Tripping class CLASS 10 (15 s, 3.5 x I_e)												
"In-line" terminal type												
(upstream of load, standard)												
7.5	10	22	15.2	21	DM4-340-11K	PKM0-25 (+ CL-PKZ0)	DILM17	ZB32-16 (+ZB32-XEZ)	DILM7	PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01
11	15	30	21.7	31	DM4-340-15K	PKM0-32 (+ CL-PKZ0)	DILM25	ZB32-24 (+ZB32-XEZ)	DILM17	PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01
15	20	44	29.3	41	DM4-340-22K	PKZM4-58 (+ CL-PKZ0)	DILM32	ZB32-32 (+ZB32-XEZ)	DILM25	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
22	30	59	41	58	DM4-340-30K	PKZM4-58 (+ CL-PKZ0)	DILM50	ZB65-57 (+ZB65-XEZ)	DILM40	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
30	40	72	55	78	DM4-340-37K	NZMN1-ME90[6]	DILM65	ZB65-65 (+ZB65-XEZ)	DILM65	PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01
37	50	85	68	96	DM4-340-45K	NZMN1-ME90[6]	DILM80	ZEV + ZEV-XSW-145	DILM65	PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01
45	60	105	81	114	DM4-340-55K	NZMN1-ME90[6]	DILM95	ZEV + ZEV-XSW-145	DILM95	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
55	75	146	99	140	DM4-340-75K	NZMN2-ME140[6]	DILM115	ZEV + ZEV-XSW-145	DILM115	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
75	100	174	134	189	DM4-340-90K	NZMN2-ME140[6]	DILM150	ZEV + ZEV-XSW-145	DILM150	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
90	125	202	161	227	DM4-340-110K	NZMN2-ME220[6]	DILM185	ZEV + ZEV-XSW-820	DILM185	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
110	150	242	196	276	DM4-340-132K	NZMN2-ME220[6]	DILM225	ZEV + ZEV-XSW-820	DILM185	PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02
132	200	300	231	326	DM4-340-160K	NZMN3-ME350[6]	DILM250	ZEV + ZEV-XSW-820	DILM185	PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02
160	250	370	279	393	DM4-340-200K	NZMN3-ME350[6]	DILM300	ZEV + ZEV-XSW-820	DILM225	PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02
200	300	500	349	492	DM4-340-250K	NZMN3-ME350[6]	DILM400	ZEV + ZEV-XSW-820	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
250	400	600	437	616	DM4-340-315K	NZMN3-ME450[6]	DILM500	ZEV + ZEV-XSW-820	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
315	500	750	544	767	DM4-340-400K	NZMN3-ME550[6]	DILM580	ZEV + ZEV-XSW-820	DILM500	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02
400	600	900	683	963	DM4-340-500K	NZMN3-ME875[6]	DILM750	ZEV + ZEV-XSW-820	DILM580	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02
"In-Delta" terminal type												
(in series with each motor winding)												
11	15	16	21.7	31	DM4-340-7K5	PKM0-32 (+ CL-PKZ0)	DILM25	ZEV + ZEV-XSW-25	DILM7	PKZM0-0,16	3 x 20.282.20-40	3 x 21.189.01
15	20	30	29.3	41	DM4-340-15K	PKZM4-58 (+ CL-PKZ0)	DILM32	ZEV + ZEV-XSW-65	DILM17	PKZM0-0,16	3 x 20.282.20-80	3 x 21.189.01
22	25	44	41	58	DM4-340-22K	PKZM4-58 (+ CL-PKZ0)	DILM50	ZEV + ZEV-XSW-65	DILM25	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
30	30	59	55	78	DM4-340-30K	NZMN1-ME90[6]	DILM65	ZEV + ZEV-XSW-65	DILM40	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
37	40	59	68	96		NZMN1-ME90[6]	DILM80	ZEV + ZEV-XSW-145	DILM40	PKZM0-0,16	3 x 20.282.20-125	3 x 21.189.01
45	50	72	81	114	DM4-340-37K	NZMN1-ME90[6]	DILM95	ZEV + ZEV-XSW-145	DILM65	PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01
55	60	85	99	140	DM4-340-45K	NZMN2-ME140[6]	DILM115	ZEV + ZEV-XSW-145	DILM65	PKZM0-0,16	3 x 20.189.20-200	3 x 21.189.01
75	75	105	134	189	DM4-340-55K	NZMN2-ME140[6]	DILM150	ZEV + ZEV-XSW-145	DILM95	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
90	100	146	161	227	DM4-340-75K	NZMN2-ME220[6]	DILM185	ZEV + ZEV-XSW-820	DILM150	PKZM0-0,16	3 x 20.610.32-350	3 x 21.313.02
110	125	174	196	276	DM4-340-90K	NZMN2-ME220[6]	DILM225	ZEV + ZEV-XSW-820	DILM150	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
132	200	174	231	326		NZMN3-ME350[6]	DILM250	ZEV + ZEV-XSW-820	DILM150	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
160	250	202	279	393	DM4-340-110K	NZMN3-ME350[6]	DILM300	ZEV + ZEV-XSW-820	DILM185	PKZM0-0,16	3 x 20.610.32-450	3 x 21.313.02
200	300	300	349	492	DM4-340-160K	NZMN3-ME350[6]	DILM400	ZEV + ZEV-XSW-820	DILM185	PKZM0-0,16	3 x 20.610.32-500	3 x 21.313.02
250	400	370	437	616	DM4-340-200K	NZMN3-ME450[6]	DILM500	ZEV + ZEV-XSW-820	DILM225	PKZM0-0,16	3 x 20.610.32-630	3 x 21.313.02
315	500	500	544	767	DM4-340-250K	NZMN3-ME550[6]	DILM580	ZEV + ZEV-XSW-820	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
400	600	600	683	963	DM4-340-315K	NZMN3-ME875[6]	DILM750	ZEV + ZEV-XSW-820	DILM400	PKZM0-1.6	3 x 20.630.32-900	3 x 21.313.02
500	750	750	860	1213	DM4-340-400K	NZMN3-ME875[6]	DILM1000	ZEV + ZEV-XSW-820	DILM500	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02
560		900	960	1354	DM4-340-500K	NZMN4-ME1400[6]	DILM1000	ZEV + ZEV-XSW-820	DILM580	PKZM0-1.6	3 x 20.630.32-1250	3 x 21.313.02

Notes

1) At a different operating cycle, the r.m.s. current changes so that a higher-rated device may have to be used.
The switching and protective elements are always dimensioned for the following operating cycles (no bypass for any operating cycle):
- Devices DM4-340-7K5 to DM4-340-90K: each 10 switching operations per hour, continuous operation.
- Devices DM4-340-110K and DM4-340-132K: each 10 switching operations per hour with at least 3 minutes no-load pause before each start.
- Devices from DM4-340-160K: each 3 switching operations per hour with at least 8 minutes no-load pause before each start.
For all other switching cycles or when a bypass is used, the effective rating changes and a different device is therefore required.
- The rated operational current (device) must be greater than the motor current (in-line operation) indicated on the motor's nameplate ("in-line" operation) or motor current/√3 (delta operation).

2) Rated operational current relative to the specified load cycle
.

3) Used to specify the current for which the supply cable must be dimensioned with the given operation and motor current. For higher motor currents and for other operations (operating frequency, overcurrent, overcurrent time, duty factor), the current value changes and must be modified accordingly.

4) In the case of motors with the same rating but with a higher current than the one specified, a switch/contactor with greater specifications must be used if necessary. The motor current is decisive in this case.

5) If the soft starter remains continually live, it can also act as overload relay.
For delta connection, set overload relay to the value motor current/√3.

6) Overload trip block set to $t_r = \infty$

7) In delta connection, the overload relay is connected in series with the motor winding (set to value motor current/√3).

8) To use IZM as "contactor", accessories are required I (see chapter 5). In that case, the recommended circuits may not apply since different contacts may have to be assigned depending on the selected accessories.

9) The bypass is dimensioned according to AC-1. If the bypass has to be opened immediately in the event of an emergency stop, it must be dimensioned according to AC-3.

10) In this case, the contactors in the "Mains contactor" column must be used.

			DM4-340-7K5	DM4-340-11K	DM4-340-15K	DM4-340-22K
General						
Standards			IEC/EN 60947-4-2			
Approvals			UL, cUL	UL, cUL	UL, cUL	UL, cUL
Climatic proofing			Damp heat, constant, according to IEC 60068-2-78; Damp heat, cyclic, according to IEC 60068-2-30			
Ambient temperature		°C	0 - +40, to 60 with a reduction of I_e of 2 % per °C			
Ambient temperature storage		°C	-25 - 60	-25 - 60	-25 - 60	-25 - 60
Installation altitude		m	0 - 1000, to 2000 m with a current reduction of 1 % per 100 m			
Mounting position			Vertical	Vertical	Vertical	Vertical
Protection type			IP20	IP20	IP20	IP20
Protection against direct contact			Finger- and back-of-hand proof			
Pollution degree			2	2	2	2
Power loss of rated operational current I_e		W	50	63	91	120
Dimensions (W x H x D)		mm	222 x 290 x 195	222 x 290 x 195	222 x 290 x 195	222 x 290 x 195
Weight		kg	6.7	6.7	6.7	6.7
Main contacts						
Rated operating voltage	U_e	V AC	230 - 460	230 - 460	230 - 460	230 - 460
Rated insulation voltage	U_i	V AC	460	460	460	460
Mains frequency		Hz	50/60	50/60	50/60	50/60
Control section power supply	U_C	V AC	110/230	110/230	110/230	110/230
Rated operational current						
Motor load (AC-53)	I_e	A	16	23	30	44
Assigned motor rating (standard connection)						
230 V	P	kW	4	5.5	7.5	11
400V	P	kW	7.5	11	15	22
480 V	P	HP	10	15	20	30
Phase current						
In-delta terminal type		A	27	39	51	76
Assigned motor rating (in-delta terminal type)						
230 V		kW	7.5	11	15	22
400 V		kW	11	15	22	37
480 V		HP	20	25	30	50
Overload cycle to IEC/EN 60947-4-2						
AC-53a (without bypass)			16 A: AC-53a: 3-35: 99-10	23 A: AC-53a: 3-35: 99-10	30 A: AC-53a: 3-35: 99-10	44 A: AC-53a: 3-35: 99-10
Short-circuit rating						
Type “1” of coordination			PKZM0-16	PKZM0-25	PKZ2/ZM-32	NZM7-63N
Type “2” of coordination additionally			20.282.20-40	20.282.20-80	20.282.20-80	20.282.20-125

DM4-340-30K	DM4-340-37K	DM4-340-45K	DM4-340-55K	DM4-340-75K	DM4-340-90K
IEC/EN 60947-4-2					
UL, cUL	UL, cUL	UL, cUL	UL, cUL	UL, cUL	UL, cUL
Damp heat, constant, according to IEC 60068-2-78; Damp heat, cyclic, according to IEC 60068-2-30					
0 - +40, to 60 with a reduction of I_e of 2 % per °C					
-25 - 60	-25 - 60	-25 - 60	-25 - 60	-25 - 60	-25 - 60
0 - 1000, to 2000 m with a current reduction of 1 % per 100 m					
Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
IP20	IP20	IP20	IP20	IP20	IP20
Finger- and back-of-hand proof					
2	2	2	2	2	2
152	190	227	276	380	452
222 x 290 x 195	222 x 290 x 195	222 x 420 x 195	222 x 420 x 195	222 x 420 x 195	520 x 338 x 248
6.7	6.7	15	15	15	15.7
230 - 460	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460
460	460	460	460	460	460
50/60	50/60	50/60	50/60	50/60	50/60
110/230	110/230	110/230	110/230	110/230	110/230
59	72	85	105	146	174
15	18.5	22	30	37	45
30	37	45	55	75	90
40	50	60	75	100	125
102	124	147	181	252	301
30	37	45	55	75	90
55	55	75	90	132	160
75	100	100	150	200	250
59 A: AC-53a: 3-35: 99-10	72 A: AC-53a: 3-35: 99-10	85 A: AC-53a: 3-35: 99-10	105 A: AC-53a: 3-35: 99-10	146 A: AC-53a: 3-35: 99-10	174 A: AC-53a: 3-35: 99-10
NZM7-63N	NZM7-80N	NZM7-100N	NZM7-100N	NZM7-160N	NZM7-200N
20.282.20-125	20.189.20-200	20.189.20-200	20.610.32-350	20.610.32-350	20.610.32-450

			DM4-340-7K5	DM4-340-11K	DM4-340-15K	DM4-340-22K	DM4-340-30K	DM4-340-37K	DM4-340-45K	DM4-340-55K	DM4-340-75K	DM4-340-90K
Terminal capacity												
Power cables												
Connection			–	–	–	–	–	–	M8 bolt for cable lug			
Solid		mm²	1 x (1.5 - 16) 2 x (1 - 4)	1 x (1.5 - 16) 2 x (1 - 4)	1 x (1.5 - 16) 2 x (1 - 4)	1 x (1.5 - 16) 2 x (1 - 4)	1 x (4 - 35) 2 x (4 - 10)	1 x (4 - 35) 2 x (4 - 10)	–	–	–	–
Flexible with ferrule		mm²	1 x (1 - 16) 2 x (1 - 4)	1 x (1 - 16) 2 x (1 - 4)	1 x (1 - 16) 2 x (1 - 4)	1 x (1 - 16) 2 x (1 - 4)	1 x (6 - 35) 2 x (6 - 10)	1 x (6 - 35) 2 x (6 - 10)	–	–	–	–
Flexible with cable lug		mm²	–	–	–	–	–	–	35 - 95	35 - 95	35 - 95	35 - 95
Stranded		mm²	1 x (2.5 - 25) 2 x (2.5 - 4)	1 x (2.5 - 25) 2 x (2.5 - 4)	1 x (2.5 - 25) 2 x (2.5 - 4)	1 x (2.5 - 25) 2 x (2.5 - 4)	1 x (10 - 50) 2 x 10	1 x (10 - 50) 2 x 10	–	–	–	–
Stranded with cable lug		mm²	–	–	–	–	–	–	50 - 120	50 - 120	50 - 120	50 - 120
Solid or stranded		AWG	12 - 4	12 - 4	12 - 4	12 - 4	10 - 1	10 - 1	1 - 0 250 MCM	1 - 0 250 MCM	1 - 0 250 MCM	1 - 0 250 MCM
Flat conductor	Number of layers x width x thick-ness	mm	–	–	–	–	–	–	6 x 16 x 0.8	6 x 16 x 0.8	6 x 16 x 0.8	2 x (6 x 16 x 0.8)
Busbar	Width	mm	–	–	–	–	–	–	–	–	–	2 x (20 x 6)
Tightening torque		Nm	2	2	2	2	3	3	12	12	12	12
Screwdriver (PZ: Pozidriv)		mm	0.8 x 4	0.8 x 4	0.8 x 4	0.8 x 4	1.2 x 6.5	1.2 x 6.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Control cables												
Solid		mm²	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)
Flexible with ferrule		mm²	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)
Stranded		mm²	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)
Solid or stranded		AWG	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12
Tightening torque		Nm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Screwdriver		mm	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Control circuit												
Current consumption												
Digital inputs												
24 V DC		mA	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
230 V AC		mA	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Analog inputs												
0 - 10 V		mA	1	1	1	1	1	1	1	1	1	1
Pick-up voltage												
DC operated		V DC	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230
AC operated		V AC	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230
Drop-out voltage												
DC operated		V DC	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3
AC operated		V AC	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3
Programmable relay outputs												
Quantity			4	4	4	4	4	4	4	4	4	4
Max. voltage		V AC	250	250	250	250	250	250	250	250	250	250
Max. current AC-11		A	3	3	3	3	3	3	3	3	3	3
Programmable analog outputs												
Quantity			2	2	2	2	2	2	2	2	2	2
Voltage range		V DC	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10
Current carrying capacity		mA	10	10	10	10	10	10	10	10	10	10
Programmable analog inputs												
Ref 1		V DC	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10
Ref 2		mA	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20
Soft start function												
Ramp times												
Acceleration time		s	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255
Deceleration time		s	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255
Start voltage		%	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60
Voltage reduction at stop		%	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100
Kick-start												
Voltage		%	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90
Duration												
50 Hz		ms	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400
60 Hz		ms	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664
Current limitation			(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e

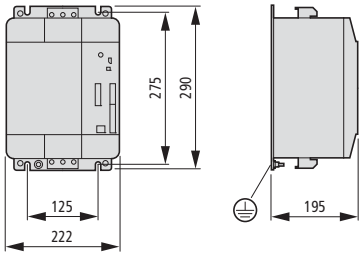
			DM4-340-110K	DM4-340-132K	DM4-340-160K	DM4-340-200K	DM4-340-250K	DM4-340-315K	DM4-340-400K	DM4-340-500K
General										
Standards			IEC/EN 60947-4-2			IEC/EN 60947-4-2				
Approvals			UL, cUL	UL, cUL	UL, cUL	UL, cUL	UL, cUL	UL, cUL	UL, cUL	UL, cUL
Climatic proofing			Damp heat, constant, according to IEC 60068-2-78; Damp heat, cyclic, according to IEC 60068-2-30			Damp heat, constant, according to IEC 60068-2-78; Damp heat, cyclic, according to IEC 60068-2-30				
Ambient temperature		°C	0 - +40, to 60 with a reduction of I_e of 2 % per C			0 - +40, to 60 with a reduction of I_e of 2 % per C				
Ambient temperature storage		°C	-25 - 60	-25 - 60	-25 - 60	-25 - 60	-25 - 60	-25 - 60	-25 - 60	-25 - 60
Installation altitude		m	0 - 1000, to 2000 m with a current consumption of 1% per 100 m			0 - 1000, to 2000 m with a current consumption of 1% per 100 m				
Mounting position			Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Protection type			IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Protection against direct contact			Finger- and back-of-hand proof			Finger- and back-of-hand proof				
Pollution degree			2	2	2	2	2	2	2	2
Power loss at rated operational current I_e		W	545	662	795	925	1371	1705	2106	2775
Dimensions (W x H x D)		mm	338 x 520 x 248	338 x 520 x 248	338 x 520 x 248	338 x 520 x 248	640 x 610 x 375	640 x 610 x 375	640 x 610 x 375	640 x 610 x 375
Weight		kg	15.7	22	22	22	56	65	72	72
Main contacts										
Rated operating voltage	U_e	V AC	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460	230 - 460
Rated insulation voltage	U_i	V AC	460	460	460	460	460	460	460	460
Mains frequency		Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Control section power supply	U_C	V AC	110/230	110/230	110/230	110/230	110/230	110/230	110/230	110/230
Rated operational current										
Motor load (AC-53)	I_e	A	202	242	300	370	500	600	750	900
Assigned motor rating (standard connection)										
230 V	P	kW	55	75	90	110	132	160	200	250
400V	P	kW	110	132	160	200	250	315	400	500
480 V	P	HP	150	200	250	300	400	500	600	750
Phase current										
In-delta terminal type		A	349	419	519	640	866	1039	1299	1558
Assigned motor rating (in-delta terminal type)										
230 V		kW	110	132	160	200	250	315	400	500
400 V		kW	160	200	250	315	400	560	750	900
480 V		HP	250	350	400	500	600	850	1100	1300
Overload cycle to IEC/EN 60947-4-2										
AC-53a (without bypass)			202 A: AC-53a: 3-35: 60-10	242 A: AC-53a: 3-35: 60-10	300 A: AC-53a: 3-35: 60-3	370 A: AC-53a: 3-35: 60-3	500 A: AC-53a: 3-35: 60-3	600 A: AC-53a: 3-35: 60-3	750 A: AC-53a: 3-35: 60-3	900 A: AC-53a: 3-35: 60-3
Short-circuit rating										
Type “1” of coordination			NZM7-200N	NZM7-250N	NZM10-400N/ZM-400	NZM10-400N/ZM-400	NZM10-630N/ZM-630	NZM10-630N/ZM-630	NZM14-800S	NZM14-1000S
Type “2” of coordination additionally			20.610.32-450	20.610.32-500	20.610.32-500	20.610.32-630	20.610.32-900	20.610.32-900	20.610.32-1250	20.610.32-1250

		DM4-340-110K	DM4-340-132K	DM4-340-160K	DM4-340-200K	DM4-340-250K	DM4-340-315K	DM4-340-400K	DM4-340-500K
Terminal capacity									
Power cables									
Connection		M8 bolt for cable lug			M8 bolt for cable lug	2 x screws M12 for cable lug	2 x screws M12 for cable lug	2 x screws M12 for busbar connection	2 x screws M12 for cable lug
Solid	mm^2	–	–	–	–	–	–	–	–
Flexible with ferrule	mm^2	–	–	–	–	–	–	–	–
Flexible with cable lug	mm^2	2 x (35 - 95)	2 x (35 - 95)	2 x (35 - 95)	2 x (35 - 95)	2 x (50 - 240)	2 x (50 - 240)	–	–
Stranded	mm^2	–	–	–	–	–	–	–	–
Stranded with cable lug	mm^2	2 x (50 - 120)	2 x (50 - 120)	2 x (50 - 120)	2 x (50 - 120)	2 x (70 - 240)	2 x (70 - 240)	–	–
Solid or stranded	AWG	2 x 1/0 2 x 250 MCM	2 x 1/0 2 x 250 MCM	2 x 1/0 2 x 250 MCM	2 x 1/0 2 x 250 MCM	2 x 2/0 2 x 500 MCM	2 x 2/0 2 x 500 MCM	–	–
Flat conductor (number of layers x width x thickness)	mm	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (10 x 21 x 1)	2 x (10 x 21 x 1)	–	–
Busbar (width)	mm	2 x (20 x 6)	2 x (20 x 6)	2 x (20 x 6)	2 x (20 x 6)	21 x 20	21 x 20	45 x 20 60 x 10 80 x 10	45 x 20 60 x 10 80 x 10
Tightening torque	Nm	12	12	12	12	24	24	24	24
Screwdriver (PZ: Pozidriv)	mm	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Control cables									
Solid	mm^2	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)
Flexible with ferrule	mm^2	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)
Stranded	mm^2	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)	1 x (0.75 - 2.5)
Solid or stranded	AWG	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12	22 - 12
Tightening torque	Nm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Screwdriver	mm	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Control circuit									
Current consumption									
Digital inputs									
24 V DC	mA	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
230 V AC	mA	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Analog inputs									
0 - 10 V	mA	1	1	1	1	1	1	1	1
Pick-up voltage									
DC operated	V DC	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230
AC operated	V AC	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230	24 - 230
Drop-out voltage									
DC operated	V DC	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3
AC operated	V AC	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3	0 - 3
Programmable relay outputs									
Quantity		4	4	4	4	4	4	4	4
Max. voltage	V AC	250	250	250	250	250	250	250	250
Max. current AC-11	A	3	3	3	3	3	3	3	3
Programmable analog outputs									
Quantity		2	2	2	2	2	2	2	2
Voltage range	V DC	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10
Current carrying capacity	mA	10	10	10	10	10	10	10	10
Programmable analog inputs									
Ref 1	V DC	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10	0 - 10
Ref 2	mA	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20	4 - 20
Soft start function									
Ramp times									
Acceleration time	s	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255	1 - 255
Deceleration time	s	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255	0 - 255
Start voltage	%	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60	10 - 60
Voltage reduction at stop	%	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100	0 - 100
Kick-start									
Voltage	%	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90	60 - 90
Duration									
50 Hz	ms	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400	100 - 400
60 Hz	ms	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664	166 - 664
Current limitation		(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e	(0.5 - 8) x I_e

Dimensions

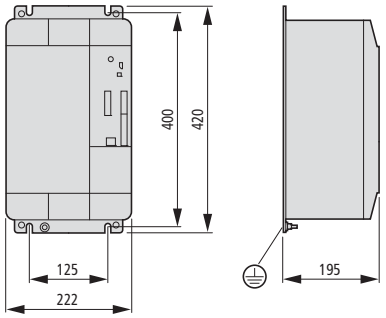
Soft starters

DM4-340-7K5
DM4-340-11K
DM4-340-15K

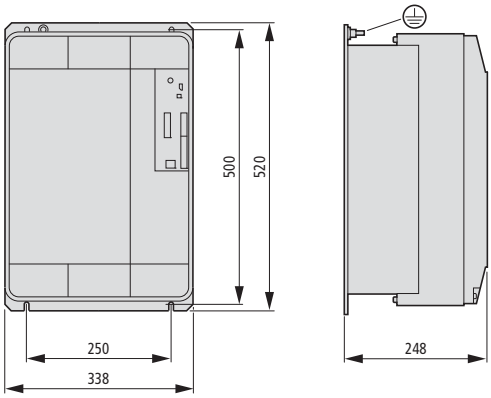


DM4-340-22K
DM4-340-30K
DM4-340-37K

DM4-340-45K
DM4-340-55K
DM4-340-75K

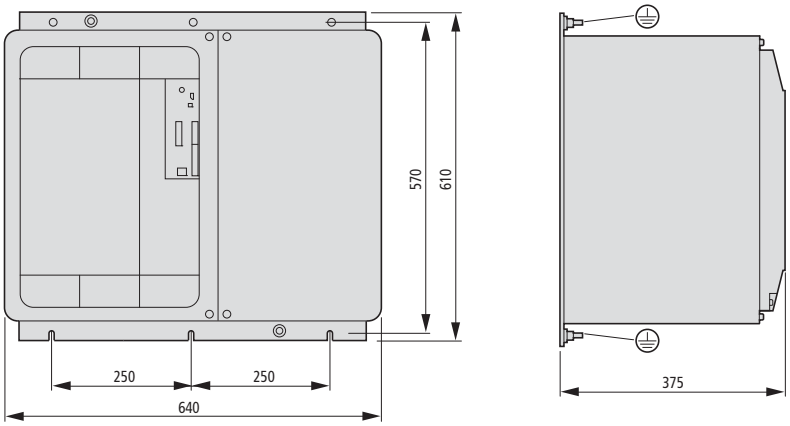


DM4-340-90K
DM4-340-110K
DM4-340-132K



DM4-340-160K
DM4-340-200K

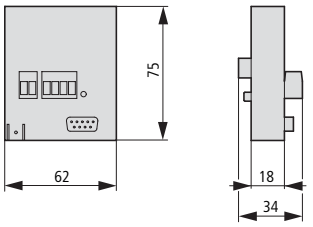
DM4-340-250K
DM4-340-315K



DM4-340-400K
DM4-340-500K

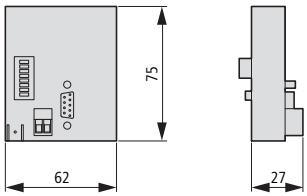
RS 232C/RS 485 serial interface

DE4-COM-2X



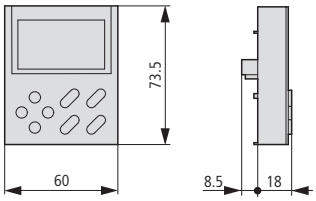
PROFIBUS DP fieldbus connection

DE4-NET-DP2



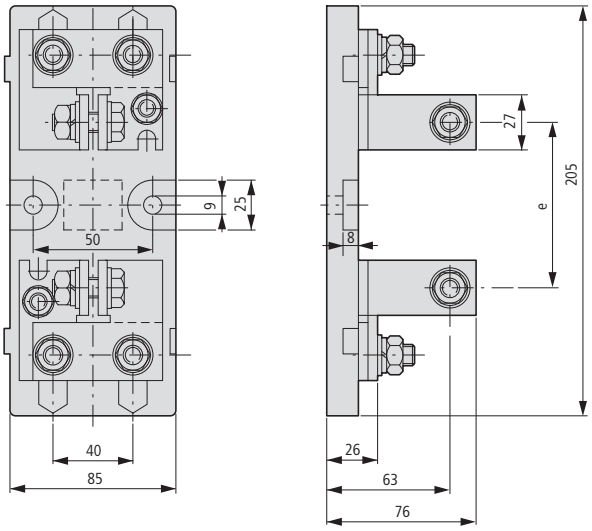
LCD keypad for DM4

DE4-KEY-2

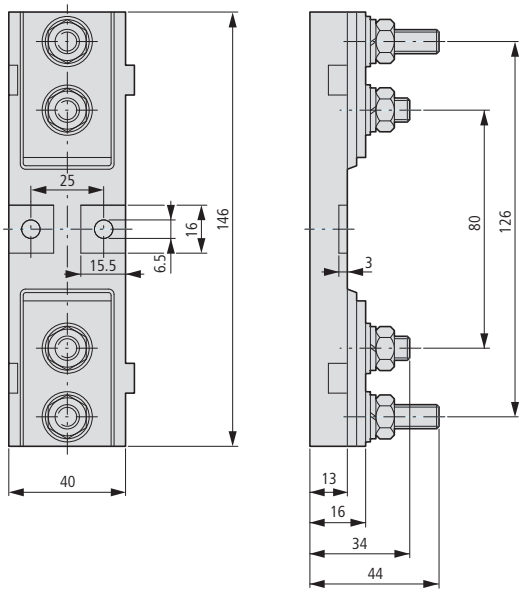


Fuse base

21.313.02

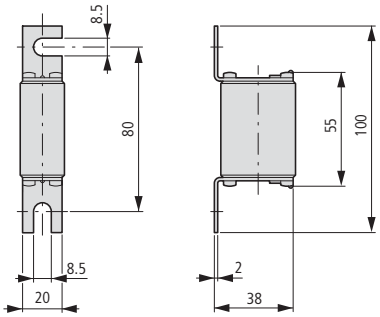


21.189.01



Fuses

20.282.20-...



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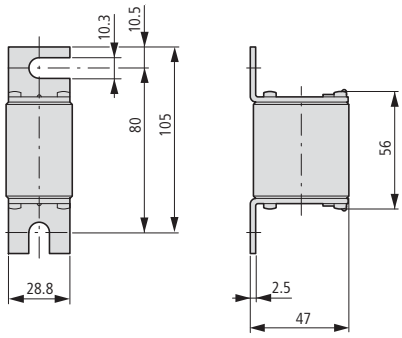
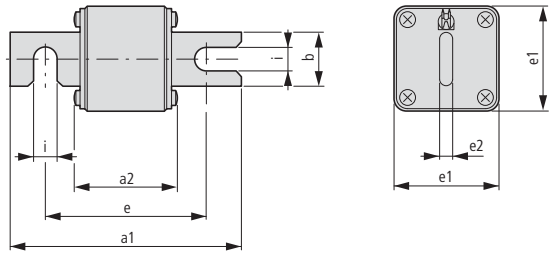


20.6×0.20



Part no.	a1	a2	b	e	e1	e2	l
20.610.32-200	109	47.5	26	76	51	6	11
20.610.32-350	109	47.5	26	76	51	6	11
20.610.32-450	109	47.5	26	76	51	6	11
20.610.32-500	109	47.5	26	76	51	6	11
20.610.32-630	109	47.5	26	76	51	6	11
20.610.32-900	109	49	35	76	73	6	11
20.610.32-1250	109	49	35	76	73	6	11

51.060.04