

Elektronik für Antriebe
Electronic for drives
Électronique pour systèmes d' entraînement



Quality is our Drive.

Table of contents

Soft Starters

1

Combined Motor Start and Braking Devices

2

Braking Devices

3

AC Drives

4

DC-Controllers

5

Safety Technique

6

Agencies

7

1 Soft Starters			Page	
Single-phase Soft Starters	SAS	3 - 11kW	1.01	
Two-phase Soft Starters	VS II ...-3,5...16	1,5 - 7,5kW	1.03	
	VS II 9 PS	4kW	1.05	
	VS II ...-17 ... 45	7,5 - 22kW	1.07	
	VersiStart II ... LDS	3 - 15kW	1.09	
	VersiStart p II ...-24 ... 229	11 - 110kW	1.11	
	VersiStart p II ...-250 ... 580	132 - 315kW	1.13	
	Three-phase Soft Starters	VS III ...-9...45	4 - 22kW	1.15
		VS III ...-9...45L B	4 - 22kW	1.17
VersiStart p III ... -24 ... 229		11 - 110kW	1.19	
VersiStart p III ... -250 ... 580		132 - 315kW	1.21	
Dimensioning Rules for Soft Starters			1.23 – 1.34	
2 Combined Motor Start and Braking Devices				
VBMS ...	VBMS	1,5 - 2,2kW	2.01	
VersiComb II S (two-phase)	VC II Safe	5,5 - 30kW	2.03	
Dimensioning Rules for Combined Motor Start and Braking Devices			2.05 – 2.06	
3 Braking Devices				
Braking Devices with standstill- or time-dependent braking	VB 230-6/25/30L (LP)	0,75 - 3kW	3.01	
	VB 400-6/25/30L (LP)	1,1 - 7,5kW	3.01	
	VB 230-6/25/30LT	0,75 - 3kW	3.03	
	VB 400-6/25/30LT	1,1 - 7,5kW	3.03	
	VB 230-25	3kW	3.05	
	VB 400-25	5,5kW	3.05	
	VB 230-36	4,5kW	3.07	
	VB 400-36	7,5kW	3.07	
	VB 230-40 ... 600	5,5 - 95kW	3.09	
	VB 400-40 ... 600	7,5 - 160kW	3.09	
	Dimensioning Rules for Braking Devices			3.11 – 3.14
	4 AC Drives			
	AC Drives, single-phase	VersiDrive i .../E3	0,37 - 2,2kW	4.01
		VersiDrive i .../E3/IP66/IP66S	0,37 - 2,2kW	4.03
VersiDrive i .../E3S		0,37 - 1,1kW	4.05	
VersiDrive i .../E3S/IP66/IP66S		0,37 - 1,1kW	4.07	
VersiDrive I .../Pro		0,75 - 2,2kW	4.09	
VersiDrive I .../Pro/IP66		0,75 - 2,2kW	4.13	
FUS .../L5		0,20 - 2,2kW	4.17	
FUS .../E5		0,37 - 2,2kW	4.19	
FUS .../E5/IP66		0,37 - 2,2kW	4.21	
AC Drives, three-phase		VersiDrive i .../3E3	0,75 - 22kW	4.01
		VersiDrive i .../3E3/IP66/IP66S	0,75 - 7,5kW	4.03
		VersiDrive I .../3Pro	0,75 - 11kW	4.09
		VersiDrive .../3Pro/IP55	11 - 160kW	4.11
		VersiDrive .../3Pro/IP20	200 - 250kW	4.11
		VersiDrive .../3Pro/IP66	0,75 - 7,5kW	4.13
		FUS .../3L5	0,75 - 2,2kW	4.17
	FUS .../3E5	0,75 - 18,5kW	4.19	
	FUS .../3E5/IP66	0,75 - 18,5kW	4.21	
	Accessories	AC Drive		4.15
FUS L5/E5			4.23	
Braking Resistor			4.25	
Mains Filter			4.27	
Motor Reactors			4.29	
5 DC-Controllers				
Thyristor Controllers	SGP 160 - 2,5 ... 16	0,25 - 1,8kW	5.01 - 5.04	
6 Safety Technique				
Safety Standstill Monitor	VersiSafe		6.01	
Safety Frequency Monitor	VersiSafe Speed		6.03	
7 Agencies				
Domestic Agencies			7.01	
Agencies Abroad			7.03 – 7.04	

Features:

- ☑ single-phase controlled soft starter
- ☑ all devices for pole-changing motors
- ☑ dual-voltage, for 400V and 230V networks
- ☑ terminal arrangement suitable for switchgear connection
- ☑ for snap-mounting on 35mm standard rail
- ☑ integrated bypass relay
- ☑ no mains neutral conductor (N) required
- ☑ special voltages up to 640V
- ☑ also for single-phase applications
- ☑ degree of protection IP 20



Soft Starters
SAS 3 ... 11
CE

Function:

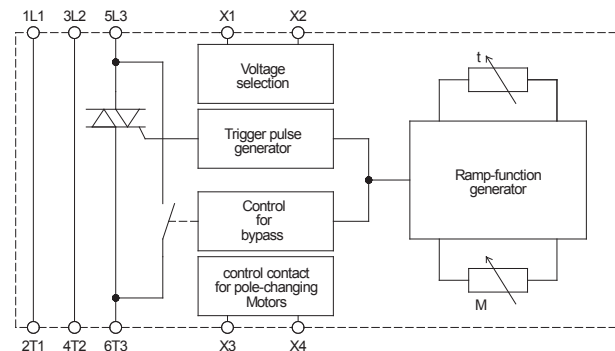
- ☑ soft start
- ☑ 2 separately adjustable parameters
starting torque, starting time
- ☑ control contact for pole-changing motors

Typical Applications:

- packaging machinery
- sliding doors
- belt drives
- conveying machinery
- door drives of passenger and goods lifts
- limitation of starting current for transformers

Upon request:

- ☑ potential-free input
control voltage 10 ... 30VDC
- ☑ SAS 3 up to SAS 11:
suitable standard up to 480V
special voltages 500V up to 640V
(all types in 100mm-housing)



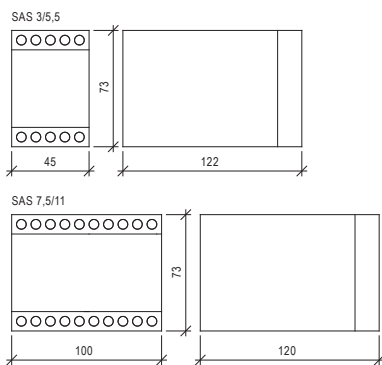
Typical designation	SAS 3	SAS 5,5	SAS 7,5	SAS 11
motor rating at 230V	1,5kW	3kW	4kW	5,5kW
motor rating at 400V	3kW	5,5kW	7,5kW	11kW
mains / motor voltage X1-X2 jumpered according to DIN EN 50160 (IEC 38)	160 ... 240V ±10 %			
mains / motor voltage X1-X2 not jumpered according to DIN EN 50160 (IEC 38)	380 ... 480V ±10 %			
order number	20700.40003	20700.40005	20700.40007	20700.40011

Technical data	SAS 3	SAS 5,5	SAS 7,5	SAS 11
mains / motor voltage X1-X2 jumpered according to DIN EN 50160 (IEC 38)	160 ... 240V ± 10%			
mains / motor voltage X1-X2 not jumpered according to DIN EN 50160 (IEC 38)	380 ... 480V ± 10%			
rated device current	6,5A	12A	15A	25A
mains frequency	50/60Hz			
rated power at 230V	1,5kW	3kW	4kW	5,5kW
rated power at 400V	3kW	5,5kW	7,5kW	11kW
min. motor current	10% of device rating			
starting torque	0 ... 50%			
starting time	0,5 ... 5s			
restart time	200ms			
max. switching cycle at 3xI _e and 5s t _{an}	240/h	200/h	120/h	70/h
max. cross-sectional area	2,5mm ²			
ambient / storage temperature	0°C ... 45°C / -25°C ... 75°C			
weight / kg	0,3		0,5	

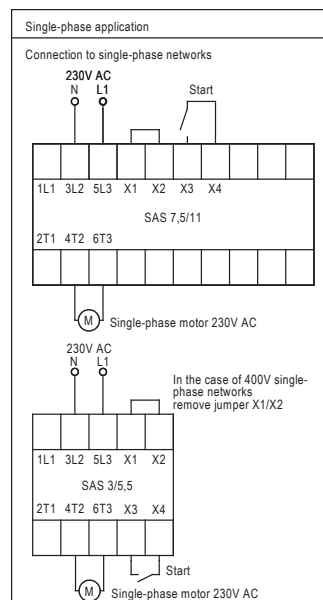
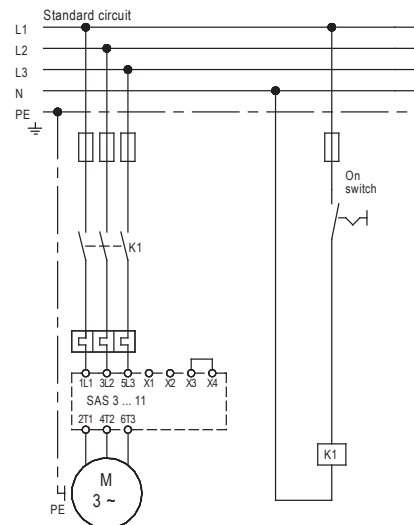
Note:

Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

All dimensions indicated in mm

Connection Diagram:

Features:

- ▣ two-phase controlled soft starter
- ▣ controlled by microcontroller
- ▣ optimized soft start
- ▣ current and torque reduction during acceleration
- ▣ easy mounting, for snap-mounting on 35mm standard rail
- ▣ integrated bypass relay
- ▣ parameterization by means of three potentiometers
- ▣ no additional control voltage required
- ▣ no mains neutral conductor (N) required
- ▣ economically priced substitute for star-delta starters
- ▣ compact design, 45mm
- ▣ degree of protection IP20



Soft Starters
VS II ...-3,5...16



Function:

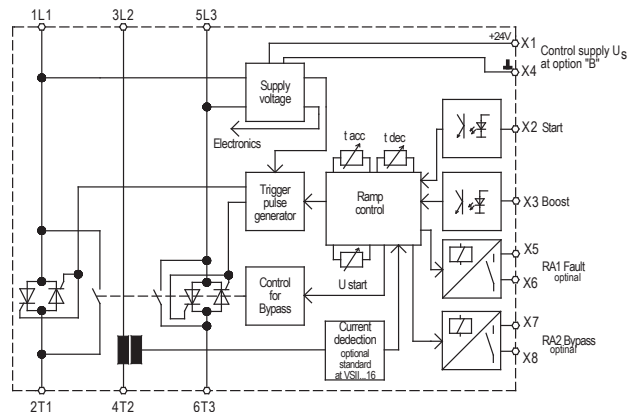
- ▣ soft acceleration and deceleration
- ▣ potential-free control input for soft acceleration and deceleration
- ▣ 3 separately adjustable parameters
accel. time, start voltage, decel. time
- ▣ boost-start selectable
- ▣ potential-free relay output for operating state
- unit bypassed – and failure (optional)

Options: (upon request)

- ▣ special voltages 230V and 480V
- ▣ wide voltage range 200-480V with external control supply voltage U_s 24VDC (B)
- ▣ signalling contact (I)
bypass and failure
- ▣ motor-PTC (I)
- ▣ current control ($200...500\% x I_N$) (I)
- ▣ heat sink temperature monitoring (I)
- ▣ $\sqrt{3}$ – connection (cost saving via smaller rating)
- ▣ signalling contact (M)
(beginning of acceleration until end of deceleration)

Typical Applications:

- door and gate drives
- pumps, ventilators, fans
- conveying machines, packaging machines
- transport systems, assembly lines
- machine applications



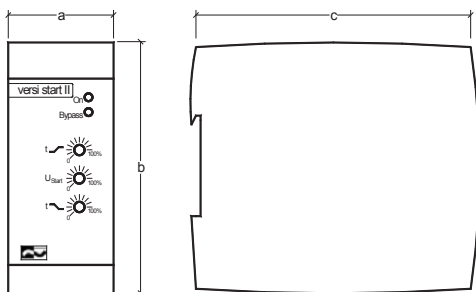
Typical designation (standard)		VS II 400-3,5	VS II 400-6,5	VS II 400-12	VS II 400-16
rated device current		3,5A	6,5A	12A	16A
rated operating voltage U_e		400V $\pm 10\%$ 50/60Hz			
control supply voltage U_s only with option B		24V $\pm 10\%$ DC			
motor rating at U_e 400V		1,5kW	3kW	5,5kW	7,5kW
order number	standard	25700.40003	25700.40006	25700.40012	25760.40016
	option I	25703.40003	25703.40006	25703.40012	25703.40016
special voltages (optional)		230V / 480V / wide voltage range 200-480V with external control voltage 24VDC			

Technical data (standard)	VS II 400-3,5	VS II 400-6,5	VS II 400-12	VS II 400-16
rated device current	3,5A	6,5A	12A	16A
max. switching frequency at $3 \times I_N$ and $5 s t_{an}$	150/h	70/h	30/h	15/h
max. power dissipation				
- in operating related to max. starting frequency	11W	10W	9W	7W
- standby	2,5W	2,5W	2,5W	2,5W
I^2t –power semiconductors in A ² s	390	390	720	720
min. motor load	20% of device rating			
acceleration	voltage ramp			
starting time	0,5 ... 10s			
starting voltage	40 ... 80%			
stopping time	0,25 ... 10s			
restart time	300ms			
input resistance control inputs	10kOhm			
contact rating of relay outputs RA1/RA2	2A / 250VAC / 30VDC			
installation class	4			
overvoltage category / pollution degree:				
control and auxiliary circuit	II / 2			
main circuit	III (TT / TN-systems) / 2			
rated impulse strength U_{imp} : control and auxiliary circuit	2,5kV			
main circuit	4kV			
rated insulation voltage U_i : main circuit	500V			
control and auxiliary circuit	250V			
cross-sectional area for connection (max.):				
control terminals	1,5mm ² / AWG 16			
power terminals	2,5mm ² / AWG 14			
tightening torque (max.): control terminals	0,6 Nm / 5 lbs in			
main circuit	0,6 Nm / 5 lbs in			
ambient / storage temperature	0°C ... 45°C up to an altitude of 1000m / -25°C ... 70°C			
weight / kg	0,4g			

Note:

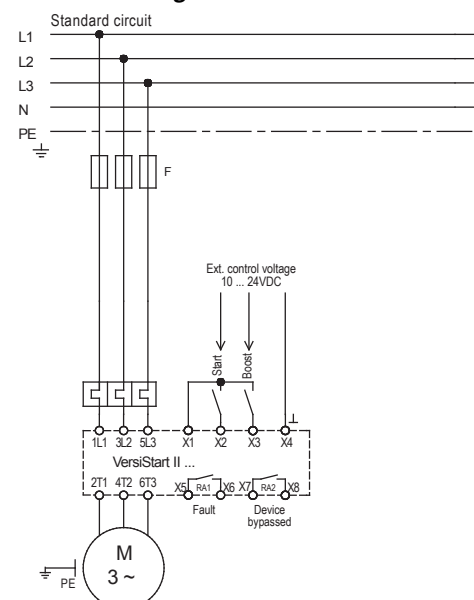
Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

Mounting dimensions	a	b	c
VS II ...-3,5...16	45	110	121

All dimensions indicated in mm.

Connection Diagram:

Subject to change without notice.

Soft Starter with reversing function VersiStart II 9 PS 1.05

Features:

- ❑ two-phase controlled soft starter with reversing function
- ❑ controlled by microcontroller
- ❑ currentless reversing with relay, soft start with thyristors
- ❑ overload protection
- ❑ 4 potentiometers to adjust starting torque, stopping torque, acceleration /deceleration time and overcurrent limit
- ❑ electrically isolated 24V inputs for clockwise / anti clockwise rotation
- ❑ reset via device panel or external reset switch
- ❑ 4 LEDs as status indicators
- ❑ current and torque reduction during start-up
- ❑ integrated bypass relay
- ❑ integrated mains contactor
- ❑ ultra-slim compact design, width: 22,5mm
- ❑ degree of protection IP20



Soft Starter with reversing function
VersiStart II 9 PS
CE

Function:

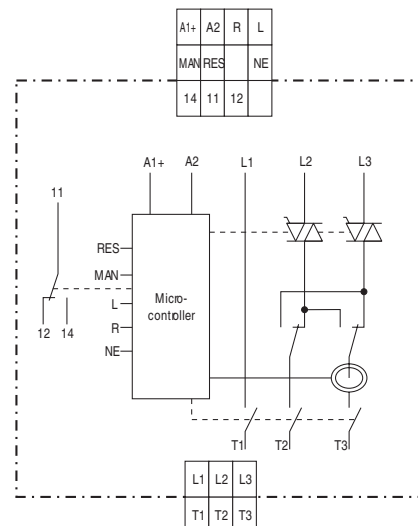
- ❑ soft start and soft stop
- ❑ reversing function
- ❑ current monitoring
- ❑ blocking protection
- ❑ potential-free relay outputs for operational status
- ❑ signalling output programmable acc. to customer requirements

Typical Applications:

reversing drive for door and gate control, bridge drives and hoisting gear with blocking protection
conveying systems with blocking protection
actuators in process technology with blocking protection
points drives

Option: (upon request)

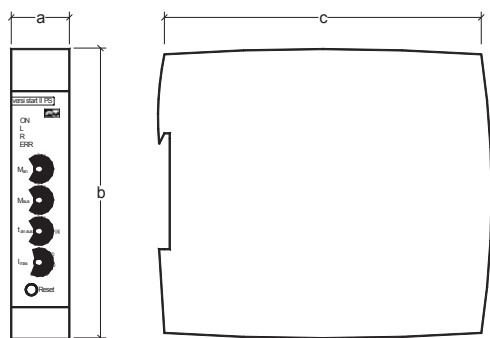
- ❑ special acceleration/deceleration time 0 ... 1s
- ❑ motor protection variant



Typical designation	VersiStart II 9 PS
rated device current	9A
mains / motor voltage acc. to DIN EN 50160 (IEC 38)	200-480V ±10% 50/60Hz
motor rating at 400V mains voltage	4kW
order number	25610.40009

Technical data	VersiStart II 9 PS
mains / motor voltage acc. to DIN EN 50160 (IEC 38)	200-480V $\pm 10\%$ 50/60Hz
rated device current	9A
motor rating at 400V mains voltage	4kW
power consumption	2W
min. motor rating	25W
operating mode	9,0A: AC 53a: 6-2 100-30
auxiliary voltage	24VDC $\pm 10\%$
acceleration time	1 ... 10s (special times available)
start voltage	30 ... 80%
deceleration time	1 ... 10s (special times available)
restart time	250ms
I^2t –power semiconductor in A ² s	200
overcurrent measuring unit	5 ... 50A
cross-sectional area for connetion	0,34 ... 2,5mm ²
switching capacity relay output open/close contact	3A/230VAC; 1A/230VAC
ambient / storage temperature	0 ... 60°C (derating)
weight / kg	0,25

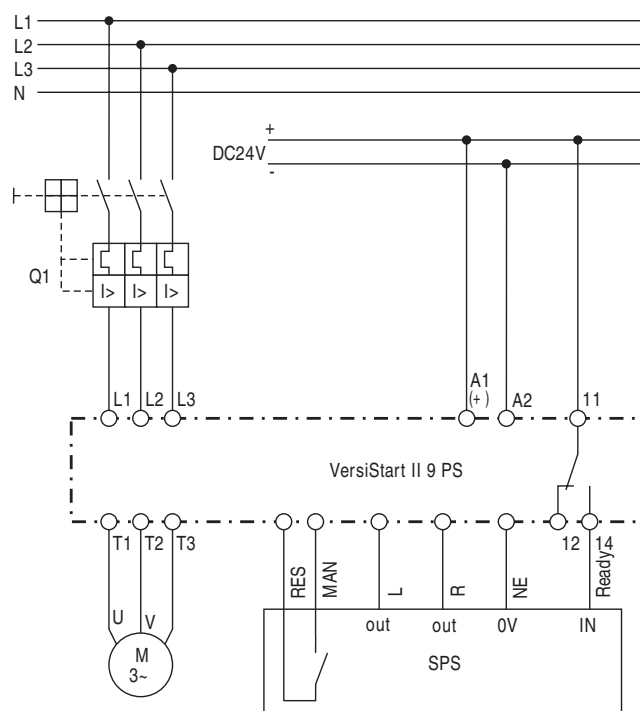
Dimensions:



Mounting dimensions	a	b	c
VersiStart II 9 PS	22,5	105	120,3

All dimensions indicated in mm.

Connection Diagram:



Features:

- ☑ two-phase controlled soft starter
- ☑ controlled by microcontroller
- ☑ optimized soft start
- ☑ connection in the motor delta winding (cost saving via smaller rating)
- ☑ current and torque reduction during acceleration
- ☑ easy mounting, for snap-mounting on 35 mm standard rail
- ☑ integrated bypass relay
- ☑ parameterization by means of three potentiometers
- ☑ no additional control voltage required
- ☑ no mains neutral conductor (N) required
- ☑ economically priced substitute for star-delta starters
- ☑ plug-in power terminals
- ☑ control outputs with spring-loaded terminals
- ☑ heat sink temperature monitoring
- ☑ compact design, 45mm up to 32A and 52,5mm at 45A
- ☑ degree of protection IP20



Soft Starters
VS II ...-17...45
CE cUL US LISTED

Function:

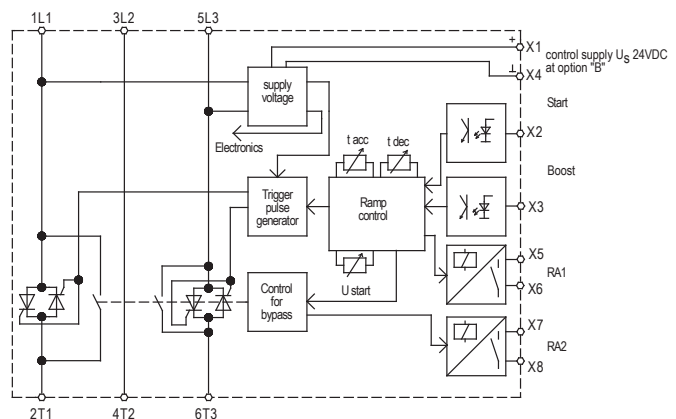
- ☑ soft acceleration and deceleration
- ☑ potential-free control input for soft acceleration and deceleration
- ☑ 3 separately adjustable parameters accel. time, start voltage, decel. time
- ☑ boost-start selectable
- ☑ potential-free relay output for operating state -unit bypassed – and failure

Typical Applications:

door and gate drives
pumps, ventilators, fans
conveying systems, packaging machines
transport systems, assembly lines, machine applications

Options: (upon request)

- ☑ special voltages 230V and 480V
- ☑ wide voltage range 400-600V with external control supply voltage U_s 24VDC (B)
- ☑ signalling contact (M)
- ☑ beginning of acceleration until end of deceleration
- ☑ motor PTC



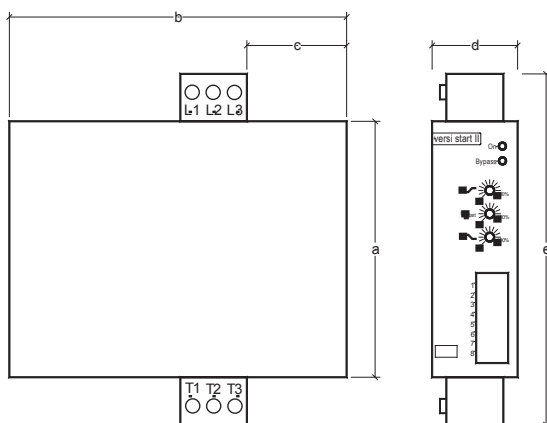
Typical designation	VS II 400-17	VS II 400-25	VS II 400-32	VS II 400-45
rated device current	17A	25A	32A	45A
motor rating at 400V mains voltage	7,5kW	11kW	15kW	22kW
mains / motor voltage according to DIN EN 50160 (IEC 38)	400V ± 10% 50/60Hz			
order number	25700.40017	25700.40025	25700.40032	25700.40045

Technical data	VS II 400-17	VS II 400-25	VS II 400-32	VS II 400-45
mains / motor voltage according to DIN EN 50160 (IEC 38)	400V ± 10% 50/60Hz			
rated device current	17A	25A	32A	45A
motor rating at 400V mains voltage	7,5kW	11kW	15kW	22kW
max. power dissipation- - in operation - in standby	29,5W 7,5W	29,5W 7,5W	28,5W 7,5W	27W 7,5W
min. motor current	20% of the device rated current			
acceleration time	0,5 ... 10s			
start voltage	40 ... 80%			
deceleration time	0,5 ... 10s			
restart time	200ms			
max. switching frequency at 3xle and 5s t _{on}	60/h	40/h	30/h	10/h
cross-sectional area control terminals power terminals	1,5mm ² / AWG 16 6mm ² / AWG 10		1,5mm ² / AWG 16 16mm ² / AWG 6	
I ² t – power semiconductor in A ² s	4000	4000	9100	16200
tightening torque	1,2-1,5 Nm 11-13 lbs in			1,5-1,7 Nm 13-15 lbs in
input resistance control input	10kΩ			
switching rating of relay output RA1/RA2	3A/250VAC; 3A/30VDC			
overvoltage category / pollution degree	III (TT / TN-systems) / 2			
installation class	3			
surge strength	4kV			
ambient / storage temperature	0°C ... 45°C up to an altitude of 1000m / -25°C ... 70°C			
weight / kg	1			
special voltages	230V / 480V / wide voltage range 400-600V with external control supply voltage US 24VDC±10%/150mA			

Note:

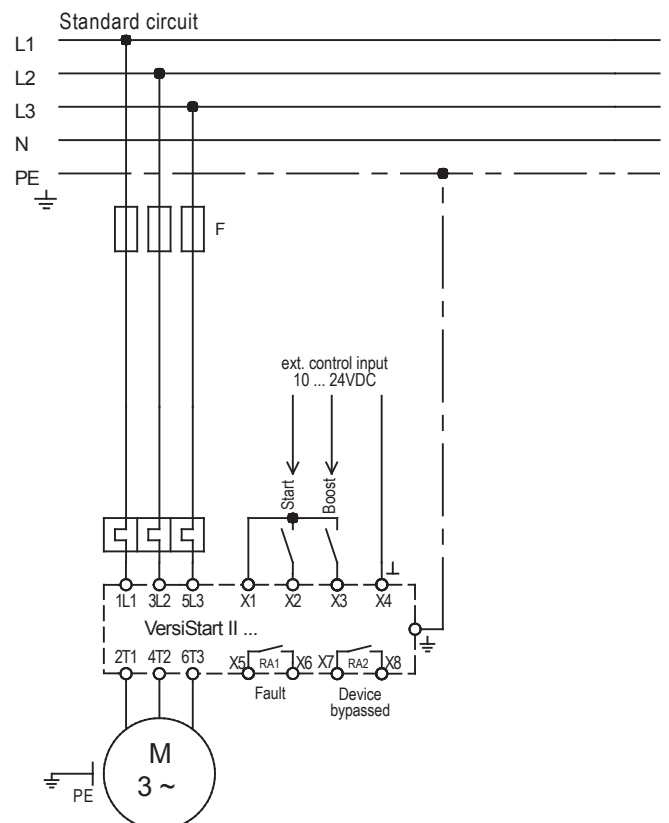
Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

Mounting dimensions	a	b	c	d	e
VS II ...- 17...32	125	158	53	45	173
VS II ...- 45	125	158	53	52,5	178

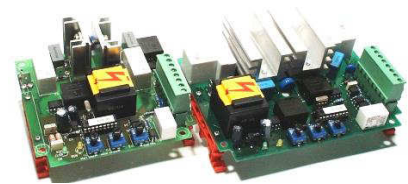
All dimensions indicated in mm

Connection Diagram:

Soft Starters VersiStart II 3 ... 15LDS 1.09

Features:

- ▣ two-phase controlled soft starter
- ▣ controlled by microcontroller
- ▣ easy mounting, also for retrofitting into existing plants
- ▣ integrated bypass relay
- ▣ no additional control voltage required
- ▣ no mains neutral conductor (N) required
- ▣ parameterization by means of three potentiometers
- ▣ economically priced substitute for star-delta starters
- ▣ current reduction during acceleration
- ▣ circuit-board version for mounting onto DIN rail
- ▣ plug-in control terminals
- ▣ degree of protection IP00



Soft Starters
VS II 3 ... 15LDS
CE

Function:

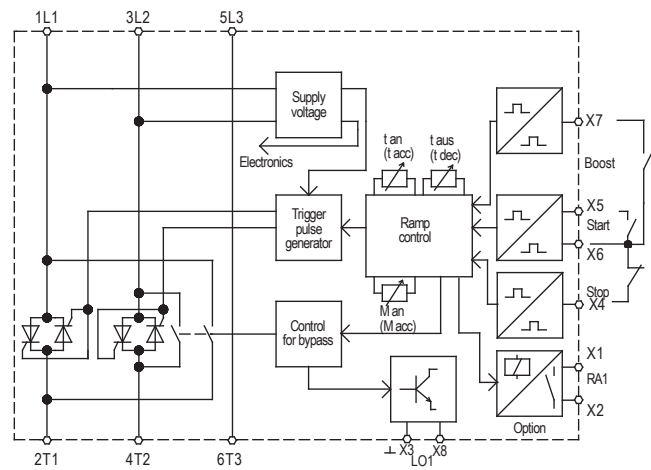
- ▣ soft acceleration and deceleration
- ▣ potential-free control input for soft acceleration and deceleration
- ▣ 3 separately adjustable parameters starting torque, accel. time, decel. time
- ▣ two wire or three wire control via contact or voltage 10-42VDC
- ▣ boost-start selectable

Options: (upon request)

- ▣ special voltages 230V and 480V

Typical Applications:

door and gate drives
pumps, ventilators
conveying systems
packaging machines



Typical designation	VS II 3 LDS	VS II 5,5 LDS	VS II 7,5 LDS	VS II 11 LDS	VS II 15 LDS
rated device current	6,5A	12A	15A	25A	32A
motor rating at 400V mains voltage	3kW	5,5kW	7,5kW	11kW	15kW
mains / motor voltage according to DIN EN 50160 (IEC 38)	400V ± 10% 50/60Hz				
order number	25723.40003	25723.40005	25723.40007	25723.40011	25723.40015

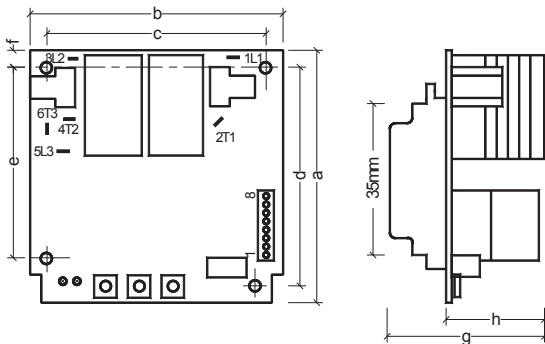
Please observe supplementary sheet with dimensioning rules!

Technical data	VS II 3 LDS	VS II 5,5 LDS	VS II 7,5 LDS	VS II 11 LDS	VS II 15 LDS
mains / motor voltage according to DIN EN 50160 (IEC 38)	400V ± 10% 50/60Hz				
rated device current	6,5A	12A	15A	25A	32A
motor rating at 400V mains voltage	3kW	5,5kW	7,5kW	11kW	15kW
min. motor current	20% of the device rated current				
starting torque	0 ... 80%				
acceleration time	0,5 ... 10s				
deceleration time	0,5 ... 10s				
restart time	200ms				
max. switching frequency at 3xI _e and 5s t _{on}	120/h	65/h	100/h	65/h	35/h
cross-sectional area FASTON 6,3	1,5mm ²		2,5mm ²		strand 2,5mm ²
I ² t – power semiconductor in A ² s	265	610	4900	4900	6050
techn. parameter of relay output RA1	3A/250VAC; 3A/30VDC				
techn. parameter of open-collector LO1	24VDC / 200mA				
ambient / storage temperature	0°C ... 40°C / -25°C ... 75°C				
weight / kg	0,27		0,4		
special voltages (optional)	230V / 480V				

Note:

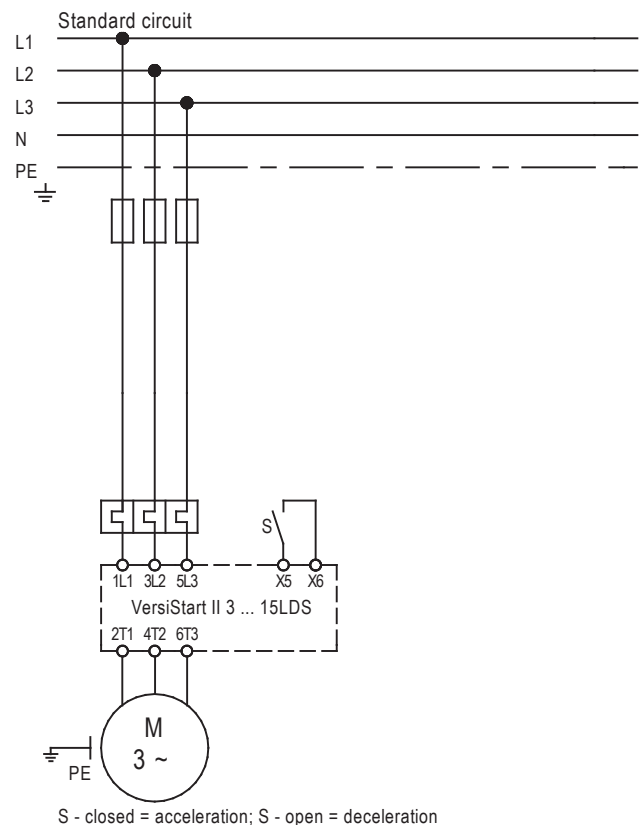
Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

Mounting dimensions	a	b	c	d	e	f	g	h
VS II 3 ... 5,5LDS	102,5	108,5	98,5	92,5	82,5	5,0	55,0	40,0
VS II 7,5 ... 15LDS	102,5	139,0	129,0	92,5	82,5	5,0	55,0	40,0

All dimensions indicated in mm

Connection Diagrams:

Features:

- ❑ two-phase controlled digital soft starter (11-800kW)
- ❑ integrated bypass
- ❑ current and torque reduction during acceleration
- ❑ USB port
- ❑ comprehensive and customizable motor operating performance
- ❑ display graphical LCD – real time graphs of motor operating performance
- ❑ degree of protection IP20 up to 135A
- ❑ motor PTC connection



Soft Starters
VS p II ...-24 ... 229



Function:

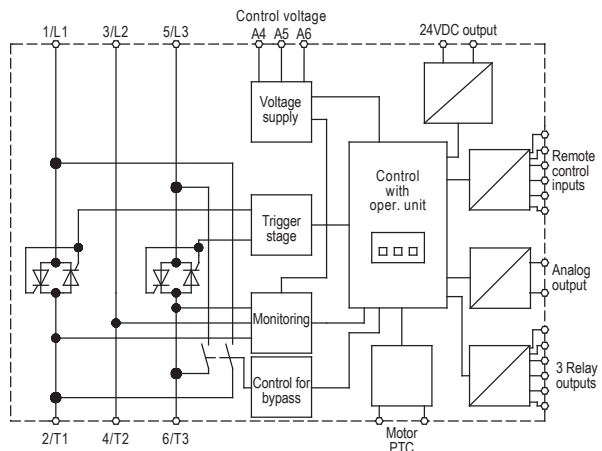
- ❑ remote control inputs (2x fixed, 2x programmable)
- ❑ relay outputs (3x programmable)
- ❑ 24VDC output
- ❑ analog output
- ❑ divers soft start/stop control types
- ❑ units with 600V upon request

Typical Application:

pumps, ventilators
compressors
mills, crushers, presses
conveying systems
drives with high-inertia starting
machines with gear units, belt or chain drives

Accessories:

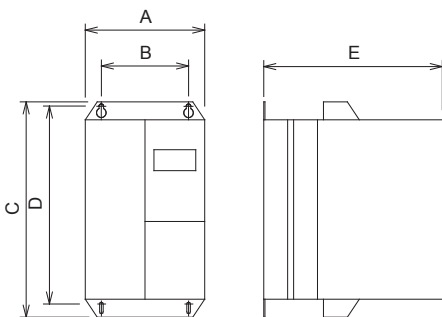
- ❑ Remote Keypad & Cable (29000.2S801)
- ❑ DeviceNet Interface (29000.2S802)
- ❑ Ethernet IP Interface (29000.2S803)
- ❑ ModBus RTU Interface (29000.2S804)
- ❑ ModBus TCP Interface (29000.2S805)
- ❑ Profibus Interface (29000.2S806)
- ❑ Profinet Interface (29000.2S807)
- ❑ Remote Keypad Card (29000.2S808)
- ❑ Remote Keypad, Card & Cable (29000.2S809)
- ❑ SmartCard Pump Application (29000.2S810)
- ❑ Finger protection (from 184A up to 580A, 29000.2S811)



Typical designation	VS p II 525 -							
	24 C1 / C2	42 C1 / C2	52 C1 / C2	69 C1 / C2	105 C1 / C2	135 C1 / C2	184 C1 / C2	229 C1 / C2
rated device current	24A	42A	52A	69A	105A	135A	184A	229A
mains voltage	200-525V 45-66Hz							
control voltage	C1: 110VAC; 220VAC -15%/+10% 600mA; C2: 24VDC/24 VAC ±20% 2.8A							
motor rating at Ue 400V	11kW	18,5kW	22kW	30kW	55kW	60kW	75kW	110kW
order number:								
C1 2S800.50...	024	042	052	069	105	135	184	229
C2 2S801.50...	024	042	052	069	105	135	184	229

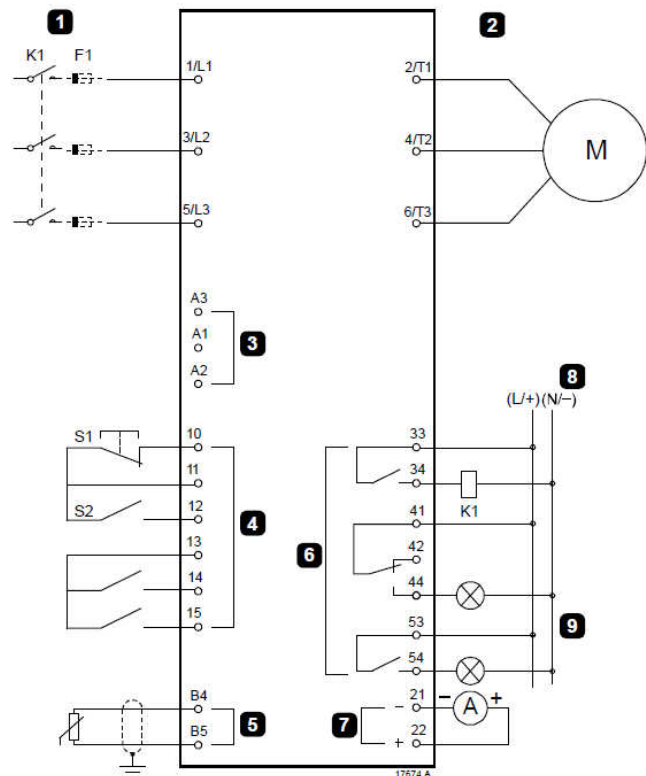
	VS p II 525 -							
Technical data	24 C1 / C2	42 C1 / C2	52 C1 / C2	69 C1 / C2	105 C1 / C2	135 C1 / C2	184 C1 / C2	229 C1 / C2
max. power dissipation - during start - in operation	4,5W per A about 35W		4,5W per A about 50W			4,5W per A about 120W		
I ² t-value power semiconductors in A ² s	1150	8000	8000	15000	80000	125000	320000	320000
min. motor load	5A	9A	11A	15A	21A	29A	34A	44A
utilization category	AC53b							
EMC	meets EU standard 89/336/EEC; IEC 60947-4-2 class B; IEC 60947-4-2							
ambient / storage temperature	-25°C up to +60°C (derating) / -25°C up to +60°C							
inputs	active 24VDC about 8mA, motor PTC (trip >3,6kOhm, reset <1,6kOhm)							
relay outputs	10A at 250VAC resistive, 5A at 250VAC AC15 Lf 0,3							
analog output	0 up to 20mA or 4 up to 20mA							
24VDC output	max. 200mA							
kinds of start	constant current, current ramp, adaptive control							
kinds of stop	soft stop via voltage drop in an allowed time, free deceleration							
adaptable protection functions	motor overload, min. current, max. starting time, short-time over-current, current unbalance, mains frequency, phase sequence							
certificaton	CE, RoHS conform, RCM, Lloyds Register, UL / cUL							
weight / kg	4,8		4,9		5,5		12,7	

Dimensions:



	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
VS p II...-24	152	92	336	307	231
VS p II...-42	152	92	336	307	231
VS p II...-52	152	92	336	307	231
VS p II...-69	152	92	336	307	231
VS p II...-105	152	92	336	307	231
VS p II...-135	152	92	336	307	231
VS p II...-184	216	180	495	450	243
VS p II...-229	216	180	495	450	243

Connection Diagram:



1	Three-phase supply	K1	Main contactor
2	Motor	F1	Semiconductor fuses (optional)
3	Control voltage (soft starter)	10, 11 (S1)	Reset
4	Digital inputs	11, 12 (S2)	Start/Stop
5	Motor thermistor input	13, 14	Programmable input A (default = Input Trip (NO))
6	Relay outputs	13, 15	Programmable input B (default = Input Trip (NO))
7	Analog output	B4, B5	Motor thermistor input
8	Control voltage (external equipment)	33, 34	Main contactor output
9	Pilot lamps	41, 42, 44	Relay output A (default = Run)
		53, 54	Relay output B (default = Trip)
		21, 22	Analog output

Features:

- ❑ two-phase controlled digital soft starter (11-800kW)
- ❑ integrated bypass
- ❑ current and torque reduction during acceleration
- ❑ USB port
- ❑ comprehensive and customizable motor operating performance
- ❑ display graphical LCD – real time graphs of motor operating performance
- ❑ degree of protection IP20 up to 135A
- ❑ motor PTC connection



Soft Starters
VS p II ...-250 ... 580



Function:

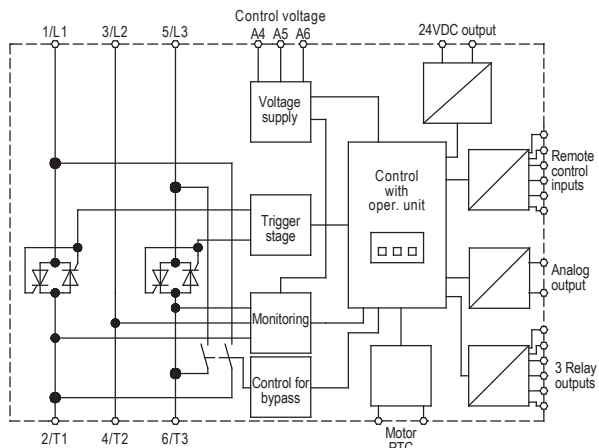
- ❑ remote control inputs (2x fixed, 2x programmable)
- ❑ relay outputs (3x programmable)
- ❑ 24VDC output
- ❑ analog output
- ❑ divers soft start/stop control types
- ❑ units with 600V upon request

Typical Applications:

- pumps, ventilators
- compressors
- mills, crushers, presses
- conveying systems
- drives with high-inertia starting
- machines with gear units, belt or chain drives

Accessories:

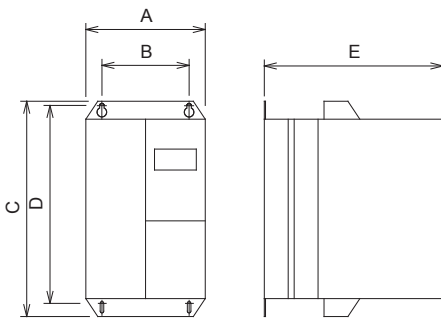
- ❑ Remote Keypad & Cable (29000.2S801)
- ❑ DeviceNet Interface (29000.2S802)
- ❑ Ethernet IP Interface (29000.2S803)
- ❑ ModBus RTU Interface (29000.2S804)
- ❑ ModBus TCP Interface (29000.2S805)
- ❑ Profibus Interface (29000.2S806)
- ❑ Profinet Interface (29000.2S807)
- ❑ Remote Keypad Card (29000.2S808)
- ❑ Remote Keypad, Card & Cable (29000.2S809)
- ❑ SmartCard Pump Application (29000.2S810)
- ❑ Finger protection (from 184A up to 580A, 29000.2S811)



Typical designation	VS p II 525 -					
	250 C1 / C2	352 C1 / C2	397 C1 / C2	410 C1 / C2	550 C1 / C2	580 C1 / C2
rated device current	250A	352A	397A	410A	550A	580A
mains voltage	200-525V 45-66Hz					
control voltage	C1: 110VAC; 220VAC -15%/+10% 600mA; C2: 24VDC/24 VAC ±20% 2.8A					
motor rating at Ue 400V	132kW	160kW	185kW	220kW	280kW	315kW
order number:						
C1 2S800.50...	250	352	397	410	550	580
C2 2S801.50...	250	352	397	410	550	580

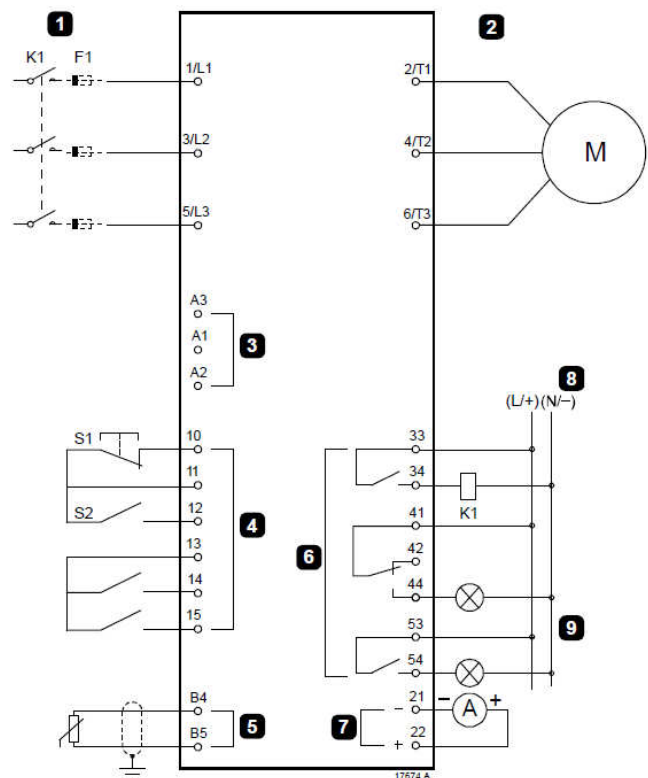
	VS p II 525 -					
Technical data	250 C1 / C2	352 C1 / C2	397 C1 / C2	410 C1 / C2	550 C1 / C2	580 C1 / C2
max. power dissipation - during start - in operation	4,5W per A 120W		4,5W per A 140W			
I ² t – value power semiconductors in A ² s	320000	202000		320000	781000	781000
min. motor load	5A	9A	11A	15A	21A	29A
utilization category	AC53b					
EMC	meets EU standard 89/336/EEC; IEC 60947-4-2 class B; IEC 60947-4-2					
ambient / storage temperature	-25°C up to +60°C (derating) / -25°C up to +60°C					
inputs	active 24VDC about 8mA, motor PTC (trip >3,6kOhm, reset <1,6kOhm)					
relay outputs	10A at 250VAC resistive, 5A at 250VAC AC15 Lf 0,3					
analog output	0 up to 20mA or 4 up to 20mA					
24VDC output	max. 200mA					
kinds of start	constant current, current ramp, adaptive control					
kinds of stop	soft stop via voltage drop in an allowed time, free deceleration					
adaptable protection functions	motor overload, min. current, max. starting time, short-time over-current, current unbalance, mains frequency, phase sequence					
certification	CE, RoHS conform, RCM, Lloyds Register, UL / cUL					
weight / kg	12,5		15,5		19	

Dimensions:



	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
VS p II...-250	216	180	495	450	243
VS p II...-352	216	180	523	450	243
VS p II...-397	216	180	523	450	243
VS p II...-410	216	180	523	450	243
VS p II...-550	216	180	523	450	243
VS p II...-580	216	180	523	450	243

Connection Diagram:



1	Three-phase supply	K1	Main contactor
2	Motor	F1	Semiconductor fuses (optional)
3	Control voltage (soft starter)	10, 11 (S1)	Reset
4	Digital inputs	11, 12 (S2)	Start/Stop
5	Motor thermistor input	13, 14	Programmable input A (default = Input Trip (N/O))
6	Relay outputs	13, 15	Programmable input B (default = Input Trip (N/O))
7	Analog output	B4, B5	Motor thermistor input
8	Control voltage (external equipment)	33, 34	Main contactor output
9	Pilot lamps	41, 42, 44	Relay output A (default = Run)
		53, 54	Relay output B (default = Trip)
		21, 22	Analog output

Soft Starters VersiStart III ...-9...45 1.15

Features:

- ☑ three-phase controlled soft starter
- ☑ controlled by microcontroller
- ☑ optimized soft start and current control
- ☑ connection in the motor delta winding (cost saving via smaller rating)
- ☑ current and torque reduction during acceleration
- ☑ easy mounting, for snap-mounting on 35 mm standard rail
- ☑ integrated bypass relay
- ☑ parameterization by means of potentiometers
- ☑ no mains neutral conductor (N) required
- ☑ economically priced substitute for star-delta starters
- ☑ spring-loaded terminals
- ☑ heat sink temperatur monitoring
- ☑ compact design, 45mm up to 25A and 52,5mm at 45A
- ☑ degree of protection IP20
- ☑ motor protection
- ☑ thermal device protection



Soft Starters
VS III ...-9...45
CE

Function:

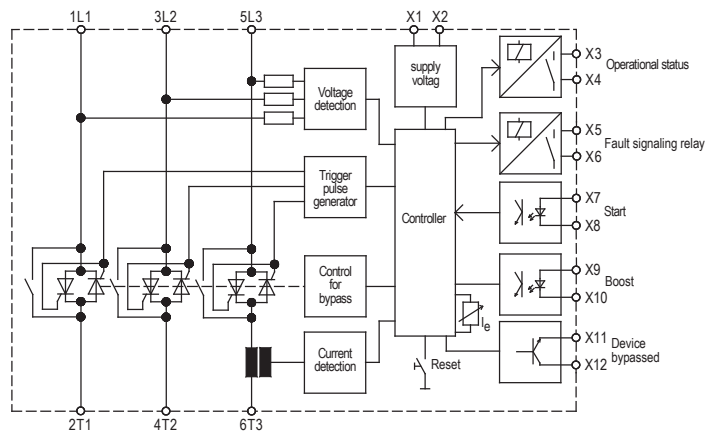
- ☑ soft acceleration and deceleration
- ☑ potential-free control input for soft acceleration and deceleration
- ☑ separately adjustable parameters accel. time, start voltage, decel. time, current limiting, rated device current and tripping class
- ☑ boost-start selectable
- ☑ potential-free relay output for operating state
- ☑ transistor output – unit bypassed

Typical Applications:

door and gate drives
pumps, ventilators, fans
conveying systems, packaging machines
transport systems, assembly lines, machine application

Options (upon request)

- ☑ special voltages 230V and 480V
- ☑ wide voltage range 200-480V with external control supply voltage U_c 230VAC (B)



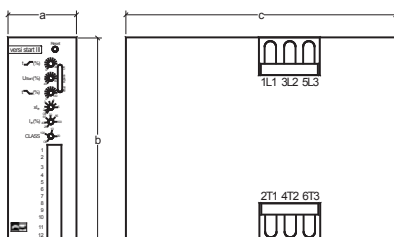
Typical designation (standard)	VS III 400- ...				
	9	16	25	37	45
rated device current	9A	16A	25A	37A	45A
rated operating voltage U_e	400V $\pm 10\%$ 50/60Hz				
control supply voltage U_c only with option B	230V $\pm 10\%$ AC 50/60Hz				
motor rating at U_e 400V	4kW	7,5kW	11kW	18,5kW	22kW
order number	2S500.40009	2S500.40016	2S500.40025	2S500.40037	2S500.40045
special voltages (optional)	230V / 480V / wide voltage range 200-480V with external control voltage 230VAC				

Technical data	VS III 400- ...	9	16	25	37	45
rated device current		9A	16A	25A	37A	45A
switch. frequency/hour at $3xI_N$ und $t_{an} = 5s$		50	30	20	15	10
utilization category		9A:AC-53b:6-3:69	16A:AC-53b:6-3:117	25A:AC-53b:6-3:177	37A:AC-53b:6-3:237	45A:AC-53b:6-3:360
max. power dissipation						
- in operation related to max. starting frequency		20W	20W	20W	20W	20W
- standby		5W	5W	5W	5W	5W
I^2t – power semiconductors in A ² s		390	720	4000	9100	16200
min. motor load		20% of the device rating				
starting time		0,5 ... 10s				
starting voltage		40 ... 80%				
current limitation		200 ... 500%				
stopping time		0,25 ... 10s				
restart time		200ms				
input resistance control inputs		80kOhm				
control voltage U_c		24VDC ... 230VAC				
contact rating of relay outputs RA1/RA2		2A / 250VAC / 30VDC				
contract rating of transistor output		20mA / 30VDC				
installation class		3				
overvoltage category / pollution degree:						
control and auxiliary circuit		II / 2				
main circuit		III (TT / TN-systems) / 2				
rated impulse strength U_{imp} :						
control and auxiliary circuit		2,5kV				
main circuit		4kV				
rated insulation voltage U_i :						
main circuit		500V				
control and auxiliary circuit		250V				
cross-sectional area for connection:						
control terminals		1,5mm ²			1,5mm ²	
power terminals		6mm ²			16mm ²	
max tightening torque		- spring-loaded terminals				
control / power terminals						
ambient / storage temperature		0°C ... 45°C up tp an altitude of 1000m / -25°C ... 75°C				
weight / kg		1,1				

Note:

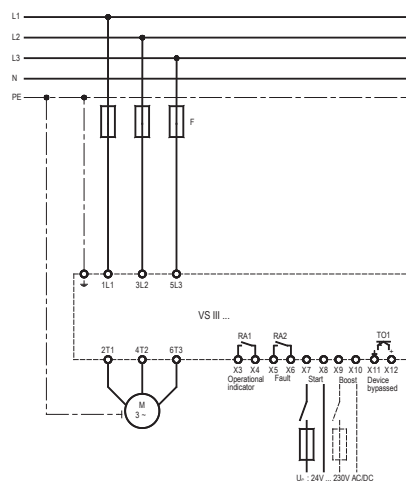
Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

Mounting dimensions	a	b	c
VS III ...-9...25	45	147	158
VS III ...-37...45	52,5	147	158

All dimensions indicated in mm.

Connection Diagram:

Subject to change without notice.

Soft Starters VersiStart III ...-9...45L B 1.17

Features:

- ▣ three-phase controlled soft starter
- ▣ controlled by microcontroller
- ▣ optimized soft start and current control
- ▣ current and torque reduction during acceleration
- ▣ easy mounting, for snap-mounting on 35mm standard rail
- ▣ integrated bypass relay
- ▣ parameterization by means of a potentiometer
- ▣ no mains neutral conductor (N) required
- ▣ economically priced substitute for star-delta starters
- ▣ spring-loaded terminals
- ▣ heat sink temperature monitoring
- ▣ compact design, 45mm up to 45A
- ▣ degree of protection IP20
- ▣ motor protection
- ▣ thermal device protection



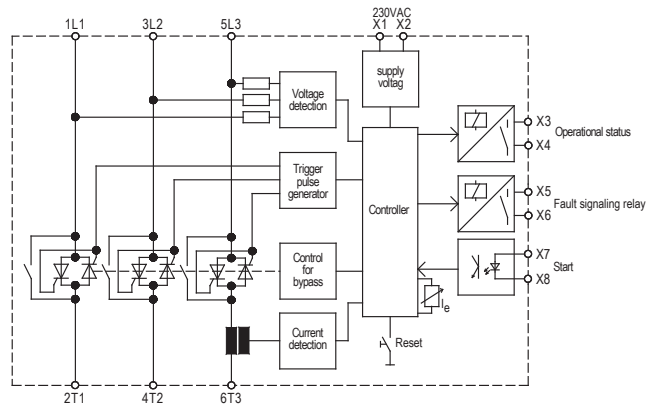
Soft Starters
VS III ...-9...45L B
CE

Function:

- ▣ soft acceleration and deceleration
- ▣ potential-free control input for soft acceleration and deceleration
- ▣ potential-free relay output for operating state failure

Typical Applications:

heat pumps and compressors



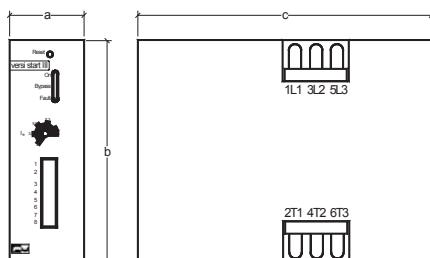
Typical designation (standard)	VS III 480- ...L B				
	9	16	25	37	45
rated device current	9A	16A	25A	37A	45A
rated operational voltage U_e	200V – 480V ±10% 50/60Hz				
control supply voltage U_s	230V ±10% AC 50/60Hz				
motor rating at U_e 400V	4kW	7,5kW	11kW	18,5kW	22kW
order number	2S511.48009	2S511.48016	2S511.48025	2S511.48037	2S511.48045

Technical data	VS III 480- L B	9	16	25	37	45
rated device current		9A	16A	25A	37A	45A
switch. frequency/hour at $2,5xI_N$ and $t_{an}=5s$		10	6	4	3	2
	$2,5xI_N$ and $t_{an}=1s$	40	24	16	12	8
utilization category		9A:AC-53b:6-3:360	16A:AC-53b:6-3:597	25A:AC-53b:6-3:870	37A:AC-53b:6-3:1197	45A:AC-53b:6-3:1797
max. power dissipation						
- in operation related to max. starting frequency		9W	9W	9W	9W	9W
- standby		5W	5W	5W	5W	5W
I^2t – power semiconductors in A ² s		390	720	4000	9100	16200
min. motor load		20% of device rating				
starting time		0,6s				
stopping time		0,25s				
restart time		200ms				
input resistance control inputs		80kOhm				
control voltage U_c		24VDC ... 230VAC				
contact rating of relay outputs RA1/RA2		2A / 250VAC / 30VDC				
installation class		3				
overvoltage category / pollution degree:						
control and auxiliary circuit		II / 2				
main circuit		III (TT / TN-systems) / 2				
rated impulse strength U_{imp} :						
control and auxiliary circuit		2,5kV				
main circuit		4kV				
rated insulation voltage U_i :						
main circuit		500V				
control and auxiliary circuit		250V				
max. cross-sectional area for connection:						
control terminals			1,5mm ²			1,5mm ²
power terminals			6mm ²			16mm ²
max. tightening torque:						
control terminals						- spring-loaded terminals
main circuit						- spring-loaded terminals
ambient / storage temperature		0°C ... 45°C up to an altitude of 1000m / -25°C ... 75°C				
weight / kg		0,95				

Note:

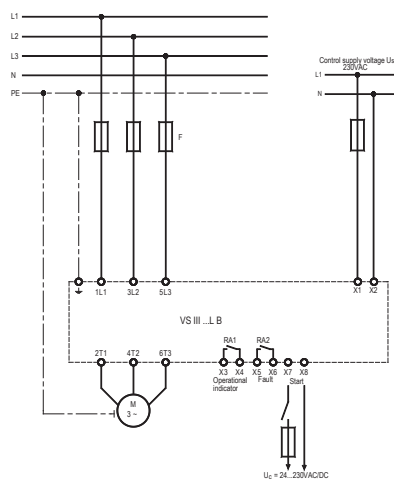
Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

Mounting dimensions	a	b	c
VS III ...-9...45L B	45	147	158

All dimensions indicated in mm.

Connection Diagram:

Features:

- ▣ three-phase controlled digital-soft starter (11-800kW)
- ▣ integrated bypass
- ▣ current and torque reduction during acceleration
- ▣ USB port
- ▣ comprehensive and customizable motor protection
- ▣ display graphical LCD – real time graphs of motor operating performance
- ▣ inside delta (6-wire) connection
- ▣ degree of protection IP20 up to 135A
- ▣ motor PTC connection



Soft Starters
VS p III ...-24 ... 229



Function:

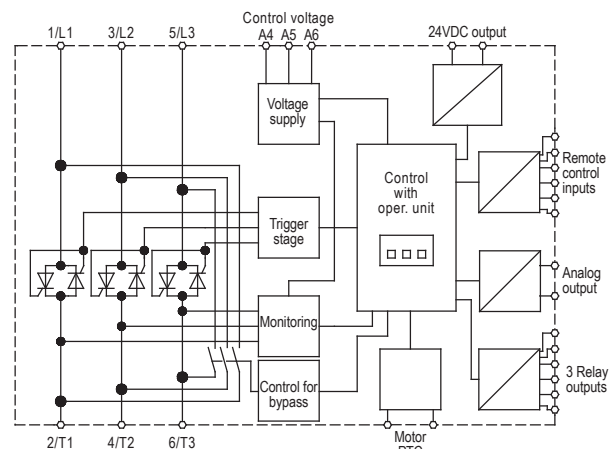
- ▣ emergency run
- ▣ 2 motor sets: forward or reverse jog direction
- ▣ remote control inputs (2x fixed, 2x programmable)
- ▣ relay outputs (3x programmable)
- ▣ 24VDC output
- ▣ analog output
- ▣ divers soft start/stop control types
- ▣ units with 690V upon request

Typical Applications:

- pumps, ventilators
- compressors
- mills, crushers, presses
- conveying systems
- drives with high-inertia starting
- machines with gear units, belt or chain drives

Accessories:

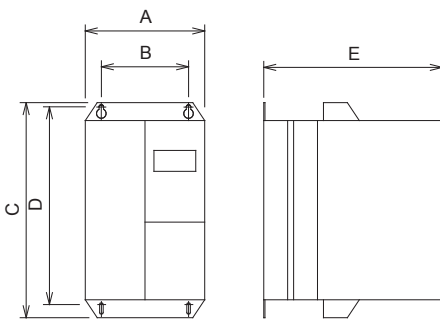
- ▣ Remote Keypad & Cable (29000.2S801)
- ▣ DeviceNet Interface (29000.2S802)
- ▣ Ethernet IP Interface (29000.2S803)
- ▣ ModBus RTU Interface (29000.2S804)
- ▣ ModBus TCP Interface (29000.2S805)
- ▣ Profibus Interface (29000.2S806)
- ▣ Profinet Interface (29000.2S807)
- ▣ Remote Keypad Card (29000.2S808)
- ▣ Remote Keypad, Card & Cable (29000.2S809)
- ▣ SmartCard Pump Application (29000.2S810)
- ▣ Finger protection (from 184A up to 580A, 29000.2S811)



Typical designation	VSp III 525 -							
	24 C1 / C2	42 C1 / C2	52 C1 / C2	69 C1 / C2	105 C1 / C2	135 C1 / C2	184 C1 / C2	229 C1 / C2
rated device current	24A	42A	52A	69A	105A	135A	184A	229A
mains voltage	200-525V 45-66Hz							
control voltage	C1: 110VAC; 220VAC -15%/+10% 600mA; C2: 24VDC/24 VAC ±20% 2.8A							
motor rating at Ue 400V	11kW	18,5kW	22kW	30kW	55kW	60kW	75kW	110kW
order number:								
C1 2S900.50...	024	042	052	069	105	135	184	229
C2 2S901.50...	024	042	052	069	105	135	184	229

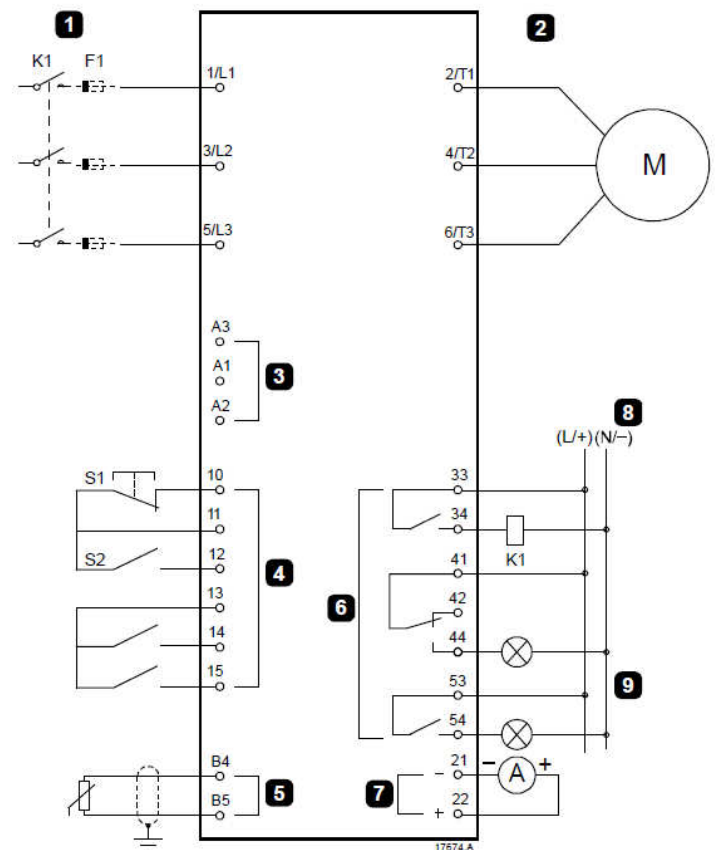
Technical data	VS p III 525 -							
	24 C1 / C2	42 C1 / C2	52 C1 / C2	69 C1 / C2	105 C1 / C2	135 C1 / C2	184 C1 / C2	229 C1 / C2
max. power dissipation - during start - in operation	4,5W per A about 35W			4,5W per A about 50W			4,5W per A about 120W	
I ² T – value power semiconductors in A ² s	1150	8000	8000	15000	80000	125000	320000	320000
min. motor load	5A	9A	11A	15A	21A	29A	34A	44A
utilization category	AC53b							
EMC	meets EU-standard 89/336/EEC; IEC 60947-4-2 class B; IEC 60947-4-2							
ambient / storage temperature	-25°C up to +60°C (derating) / - 25° up to +60°C							
inputs	active 24VDC about 8mA, motor PTC (trip >3,6kOhm, reset <1,6kOhm)							
relay outputs	10A at 250VAC resistive, 5A at 250VAC AC15 Lf 0,3							
analog output	0 up to 20mA or 4 up to 20mA							
24VDC output	max. 200mA							
kinds of start	constant current, current ramp, adaptive control, kick start							
kinds of stop	soft stop via voltage drop in an allowed time, DC brake, free deceleration							
adaptable protection functions	motor overload, min. current, max. starting time, short time over-current, current unbalance, mains frequency, phase sequence							
certification	CE, RoHS conform, RCM, Lloyds Register, UL / cUL							
weight / kg	4,8		4,9		5,5		12,7	

Dimensions:



	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
VS p III...-24	152	92	336	307	231
VS p III...-42	152	92	336	307	231
VS p III...-52	152	92	336	307	231
VS p III...-69	152	92	336	307	231
VS p III...-105	152	92	336	307	231
VS p III...-135	152	92	336	307	231
VS p III...-184	216	180	495	450	243
VS p III...-229	216	180	495	450	243

Connection Diagram:



1	Three-phase supply	K1	Main contactor
2	Motor	F1	Semiconductor fuses (optional)
3	Control voltage (soft starter)	10, 11 (S1)	Reset
4	Digital inputs	11, 12 (S2)	Start/Stop
5	Motor thermistor input	13, 14	Programmable input A (default = Input Trip (N/O))
6	Relay outputs	13, 15	Programmable input B (default = Input Trip (N/O))
7	Analog output	B4, B5	Motor thermistor input
8	Control voltage (external equipment)	33, 34	Main contactor output
9	Pilot lamps	41, 42, 44	Relay output A (default = Run)
		53, 54	Relay output B (default = Trip)
		21, 22	Analog output

Features:

- ▣ three-phase controlled digital soft starter (11-800kW)
- ▣ integrated bypass
- ▣ current and torque reduction during acceleration
- ▣ USB port
- ▣ comprehensive and customizable motor protection
- ▣ display graphical LCD – real time graphs of motor operating performance
- ▣ inside delta (6-wire) connection
- ▣ degree of protection IP20 up to 135A
- ▣ motor PTC connection



Soft Starters
VS p III ...-250 ... 580



Function:

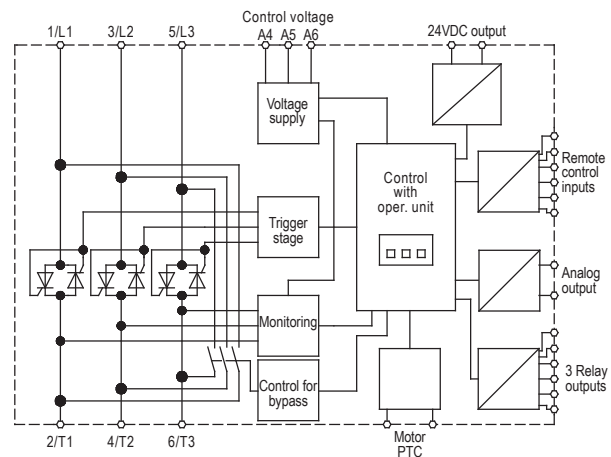
- ▣ emergency run
- ▣ 2 motor sets: forward or reverse jog function
- ▣ remote control inputs (2x fixed, 2x programmable)
- ▣ relay inputs (3x programmable)
- ▣ 24VDC output
- ▣ analog output
- ▣ divers soft start/stop control types
- ▣ units with 690V upon request

Accessories:

- ▣ Remote Keypad & Cable (29000.2S801)
- ▣ DeviceNet Interface (29000.2S802)
- ▣ Ethernet IP Interface (29000.2S803)
- ▣ ModBus RTU Interface (29000.2S804)
- ▣ ModBus TCP Interface (29000.2S805)
- ▣ Profibus Interface (29000.2S806)
- ▣ Profinet Interface (29000.2S807)
- ▣ Remote Keypad Card (29000.2S808)
- ▣ Remote Keypad, Card & Cable (29000.2S809)
- ▣ SmartCard Pump Application (29000.2S810)
- ▣ Finger protection (from 184A up to 580A, 29000.2S811)

Typical Applications:

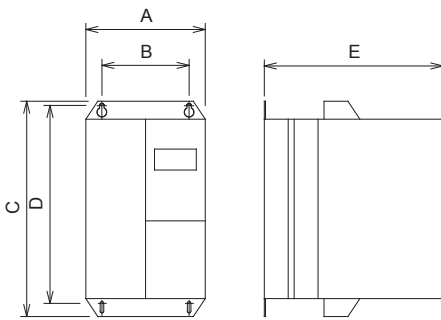
- pumps, ventilators
- compressors
- mills, crushers, presses
- conveying systems
- drives with high-inertia starting
- machines with gear units, belt or chain drives



Typical designation	VS p III 525 -					
	250 C1 / C2	352 C1 / C2	397 C1 / C2	410 C1 / C2	550 C1 / C2	580 C1 / C2
rated device current	250A	352A	397A	410A	550A	580A
operating rated voltage	200-525V 45-66Hz					
control supply voltage	C1: 110VAC; 220VAC -15%/+10% 600mA; C2: 24VDC/24 VAC ±20% 2.8A					
motor rating at Ue 400V	132kW	160kW	185kW	220kW	280kW	315kW
order number:						
C1 2S900.50...	250	352	397	410	550	580
C2 2S901.50...	250	352	397	410	550	580

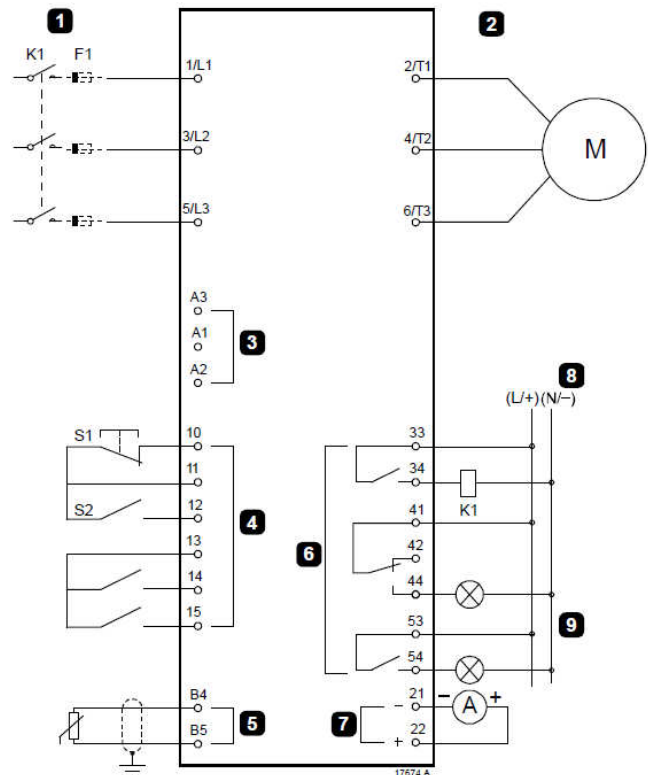
Technical data	VS p III 525 -					
	250 C1 / C2	352 C1 / C2	397 C1 / C2	410 C1 / C2	550 C1 / C2	580 C1 / C2
max. power dissipation - during start - in operation	4,5W per A 120W		4,5W per A 140W			
I ² t – value power semiconductors in A ² s	320000	202000		320000	781000	781000
min. motor load	5A	9A	11A	15A	21A	29A
utilization category	AC53b					
EMC	meets EU-standard 89/336/EEC; IEC 60947-4-2 class B; IEC 60947-4-2					
ambient / storage temperature	-25°C up to +60°C (Derating) / -25°C up to +60°C					
inputs	active 24VDC about 8mA, motor PTC (trip >3,6kOhm, reset <1,6kOhm)					
relay outputs	10A at 250VAC resistive, 5A at 250VAC AC15 Lf 0,3					
analog output	0 up to 20mA or 4 up to 20mA					
24VDC output	max. 200mA					
kinds of start	constant current, current ramp, adaptive control, kick start					
kinds of stop	soft stop via voltage drop in an allowed time, DC brake, free deceleration					
adaptable protection functions	motor overload, min. current, max. starting time, short-time over-current, current unbalance, mains frequency, phase sequence					
certification	CE, RoHS conform, RCM, Lloyds Register, UL / cUL					
weight / kg	12,5		15,5		19	

Dimensions:



	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
VS p III...-250	216	180	495	450	243
VS p III...-352	216	180	523	450	243
VS p III...-397	216	180	523	450	243
VS p III...-410	216	180	523	450	243
VS p III...-550	216	180	523	450	243
VS p III...-580	216	180	523	450	243

Connection Diagram:

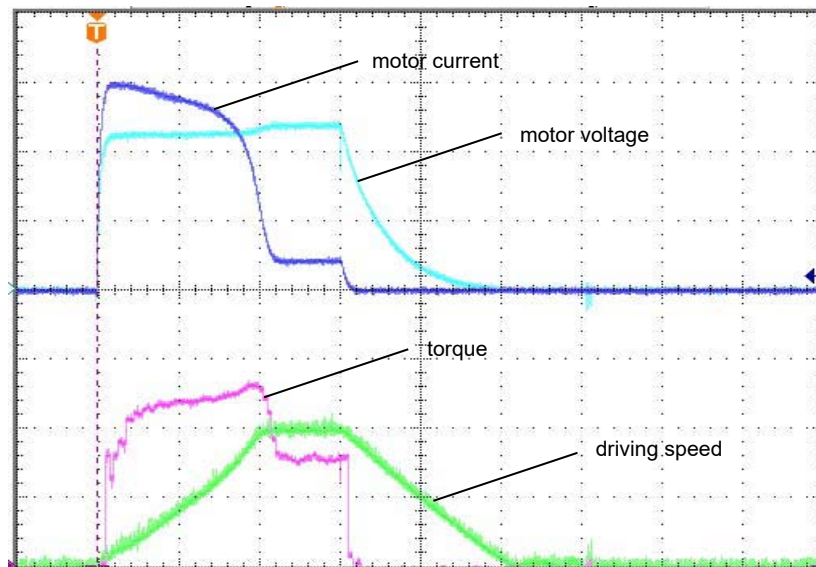


1	Three-phase supply	K1	Main contactor
2	Motor	F1	Semiconductor fuses (optional)
3	Control voltage (soft starter)	10, 11 (S1)	Reset
4	Digital inputs	11, 12 (S2)	Start/Stop
5	Motor thermistor input	13, 14	Programmable input A (default = Input Trip (N/O))
6	Relay outputs	13, 15	Programmable input B (default = Input Trip (N/O))
7	Analog output	B4, B5	Motor thermistor input
8	Control voltage (external equipment)	33, 34	Main contactor output
9	Pilot lamps	41, 42, 44	Relay output A (default = Run)
		53, 54	Relay output B (default = Trip)
		21, 22	Analog output

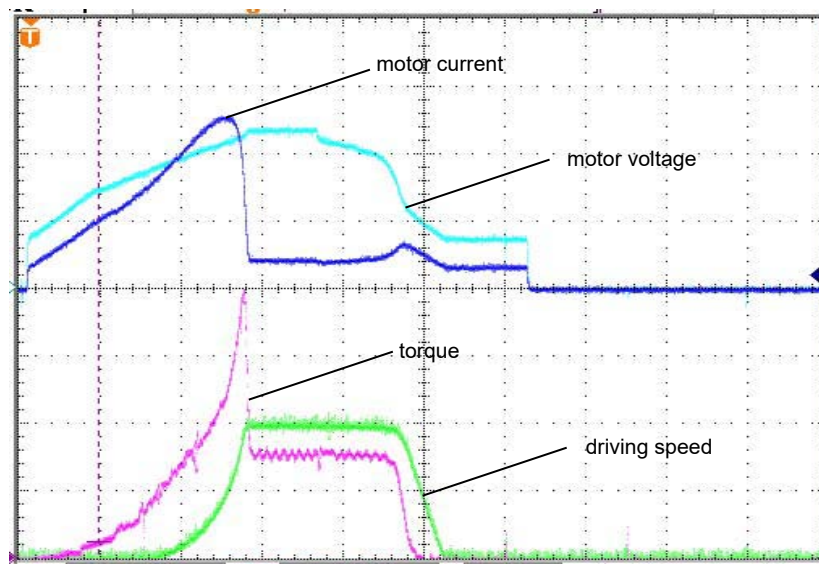
All data sheets and commissioning instructions are available on our homepage at www.peter-electronic.com.

Configuration Instructions

The two following diagrams for an 11kW-drive operated at nominal load show the waveforms of electrical and mechanical quantities of the drive during the ramp-up phase, both with and without soft starter:



Ramp-up of the three-phase asynchronous motor directly connected to the mains (at nominal load)



Ramp-up of a three-phase asynchronous motor with soft starter (at nominal load)

Both groups of curves show the complete acceleration and deceleration phase.

In this connection, especially the waveform of the current during ramp-up with a soft starter is of interest. Depending on the adjusted starting voltage (boost), the current increases more or less steeply until nominal speed is reached. For the following load diagrams (thermal load), the mean value of that current is to be used which is formed by the current flowing at the starting point and the current flowing when nominal speed is reached (see example).

The following diagrams show how the maximum starting frequency (in starts per hour) depends on the ramp-up time and the mean starting current flowing during ramp-up.

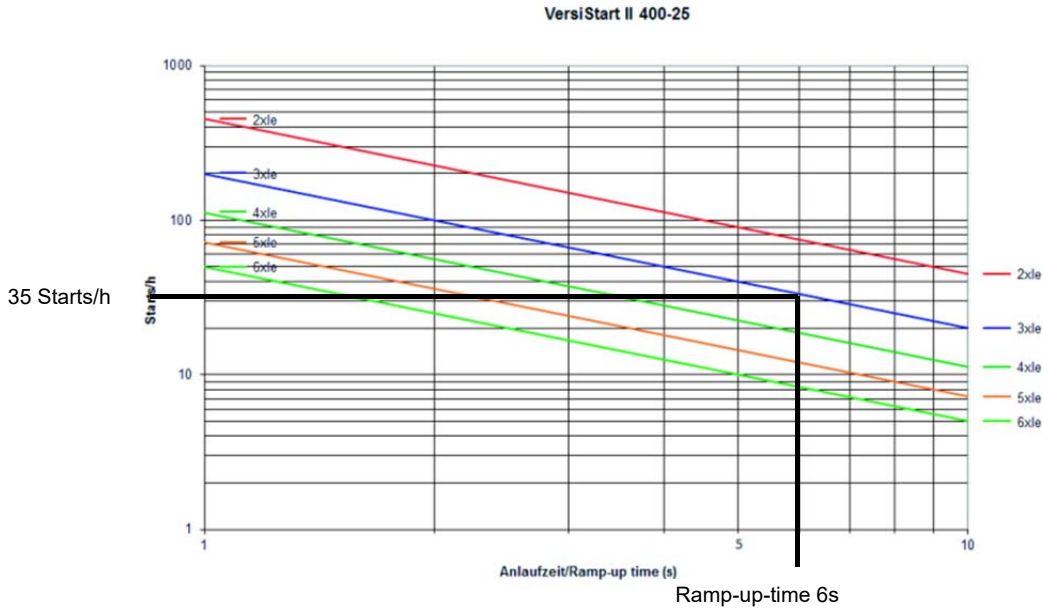
The curves represent the thermal ratio of the heat generated in the power semiconductors and the possible dissipation of heat by the integrated heat sinks, i.e., a high starting frequency in combination with a large mean starting current causes intense heating by the power demiconductors. If, in addition, a long ramp-up time is required for the starting operation, the number of starts possible within a certain unit of time reduces accordingly.

The following example is to explain how to select a soft starter:

Assumption:	motor shaft power:	11kW
	nominal/rated motor current:	21,7A
	max. ramp-up time:	6s
	mean starting current to be expected:	65A (no high-inertia starting)
	max. starting frequency:	50 starts/h

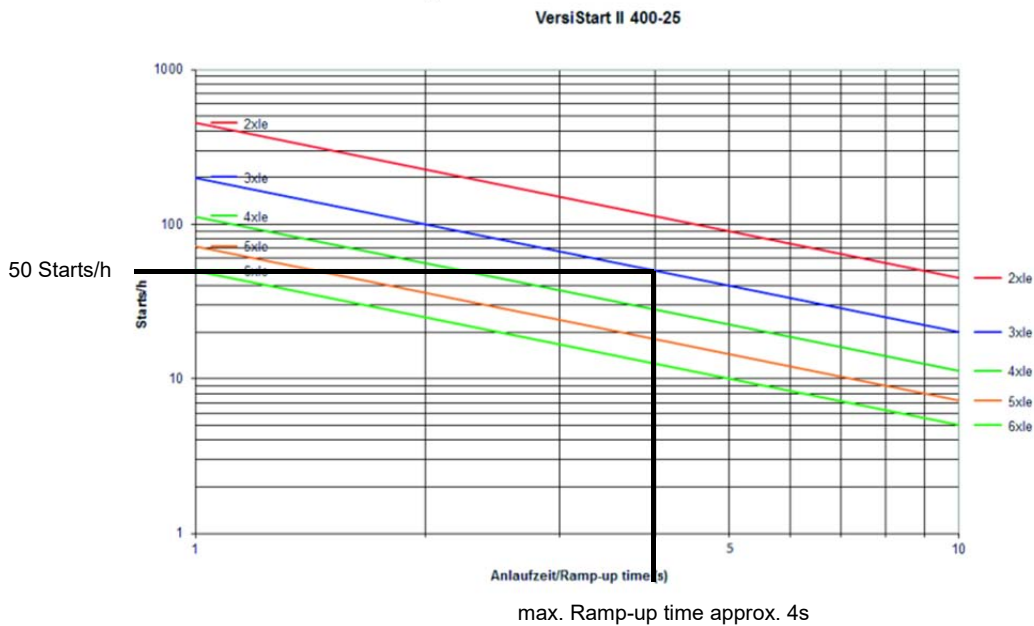
In compliance with the power rating of the motor, a **VersiStart II 400-25** soft starter is selected (acc. to the data sheet it is suitable for 11kW motors, $I_e = 25A$).

However, when checking the number of starts per hour possible with this device under these conditions, it turns out that this device is not suitable:



When dividing the starting current of 65A to be expected by the nominal current of 25A of the soft starter **VersiStart II 400-25**, this gives approx. $3 \times I_e$ (65A/25A) of the soft starter. Consequently, a maximum starting frequency of 35 starts per hour is permissible for this device, i.e., in this case **VersiStart II 400-25** would be overloaded.

This is only possible by reducing the ramp-up time. As demonstrated by the two below diagrams, the ramp-up time maximally possible for the application of a **VersiStart II 400-25** would be approx. 4s.

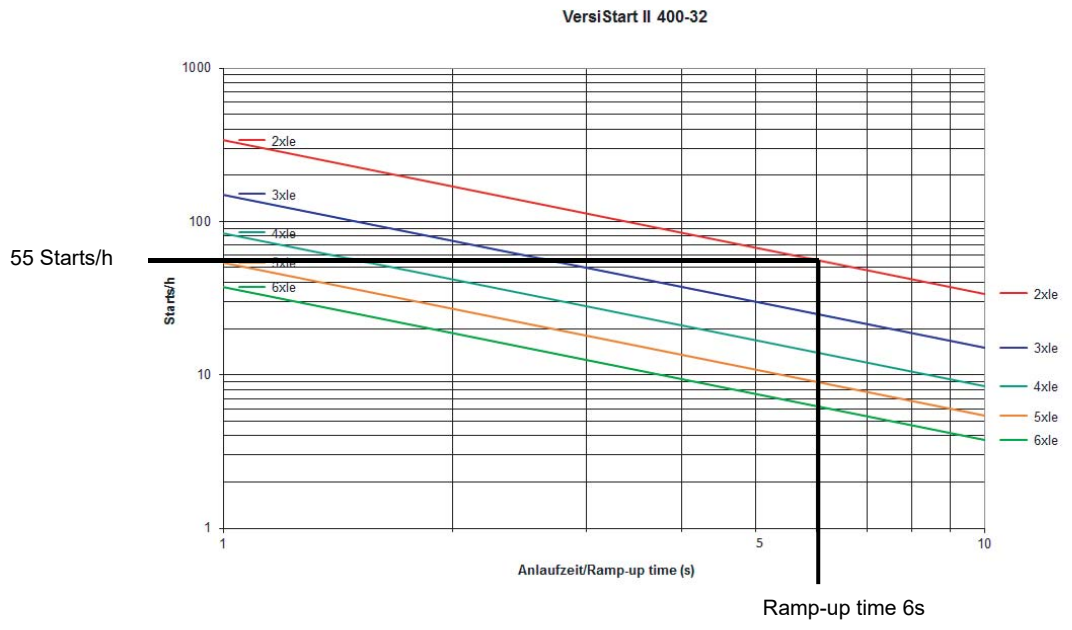


Dimensioning Rules for Soft Starters 1.25

If it is due to technological reasons not possible to go below the specified ramp-up time of 6s, a device that complies with the requested parameters has to be used.

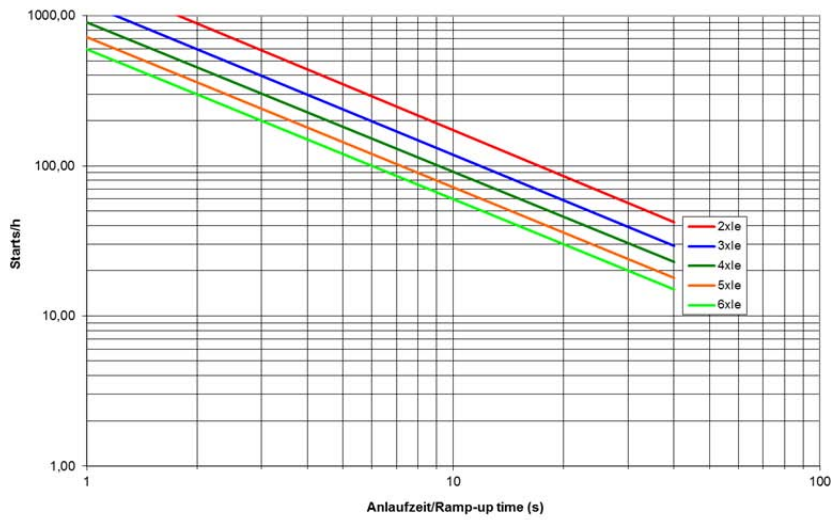
When looking at the characteristic curves, it becomes clear that, for this case of application, a **VersiStart II 400-32** is suitable. With a twofold nominal current of the soft starter, i.e., $2 \times I_e$ (65A/32A), and a ramp-up time of 6s, this device has a starting frequency of approx. 55 starts/h.

Since only 50 starts/h are required, this device is optimally designed to withstand the most the most unfavorable thermal loading.

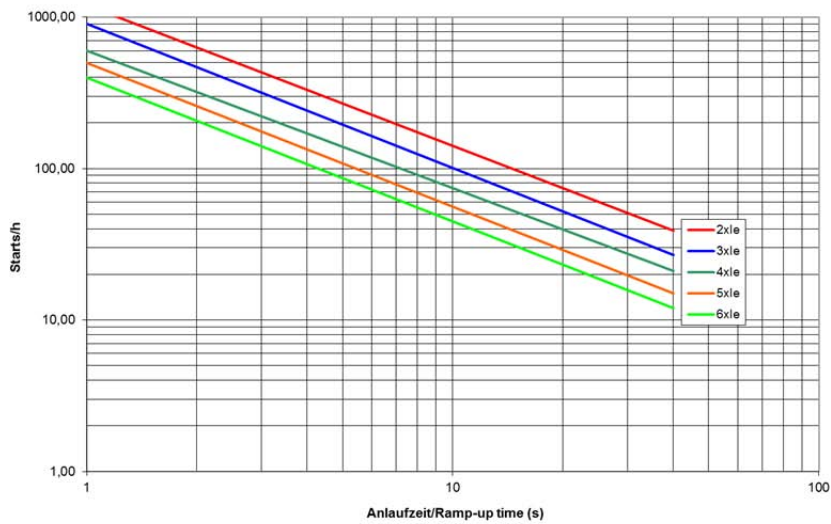


Load diagrams:

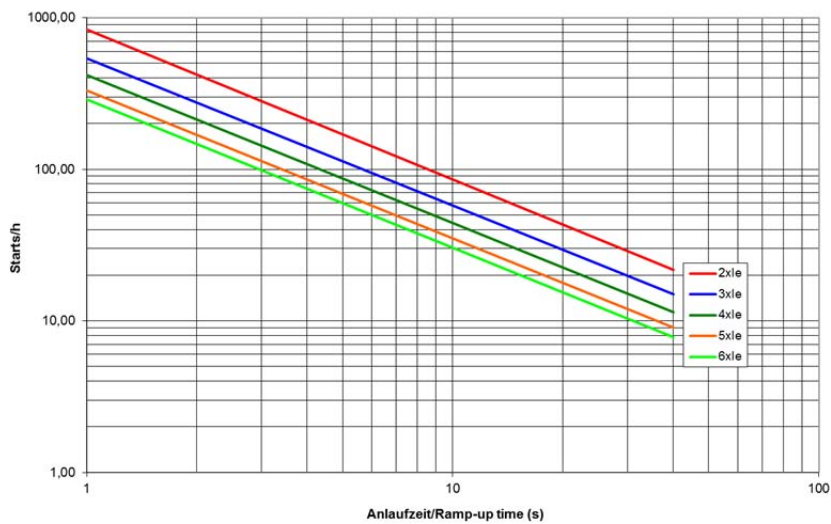
SAS3, SAS11 PUST



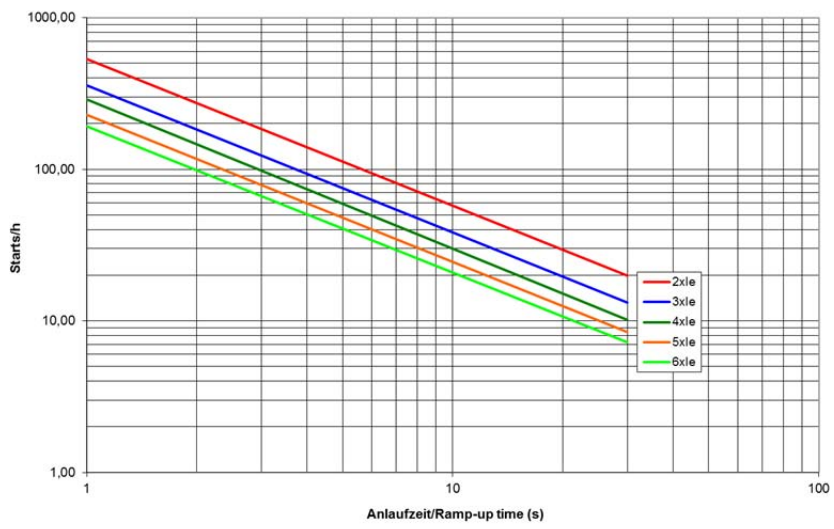
SAS 5,5



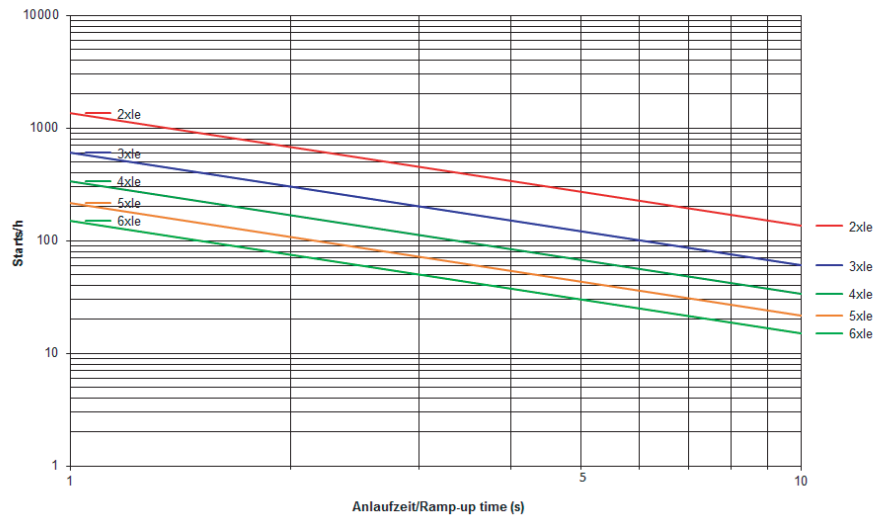
SAS 7,5, SAS 22PUST



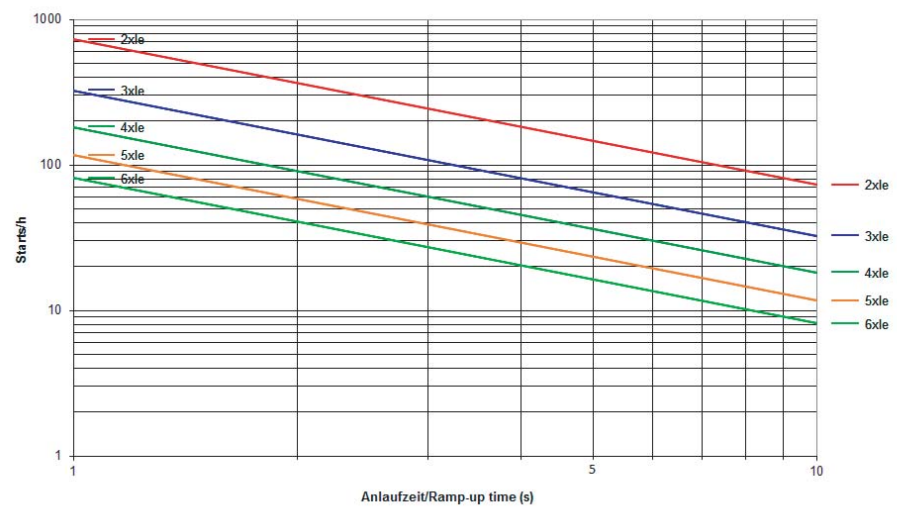
SAS 11



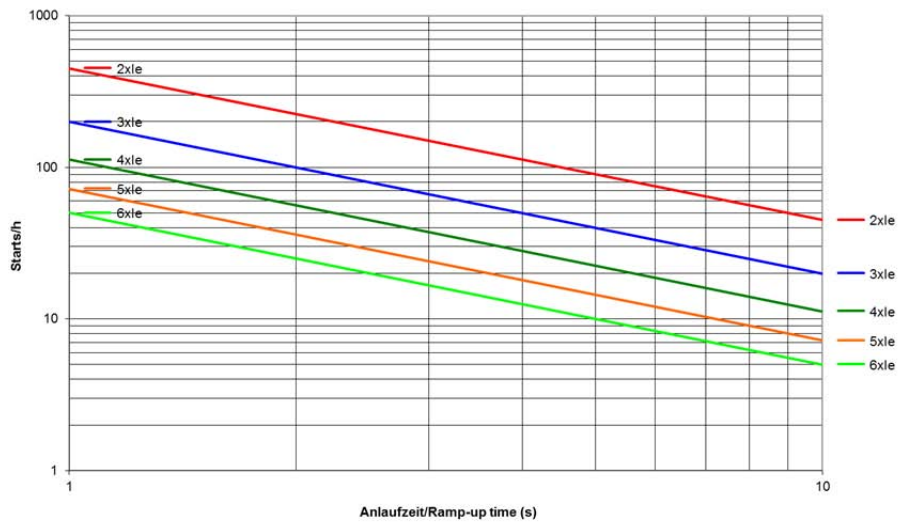
VersiStart II 3 LDS



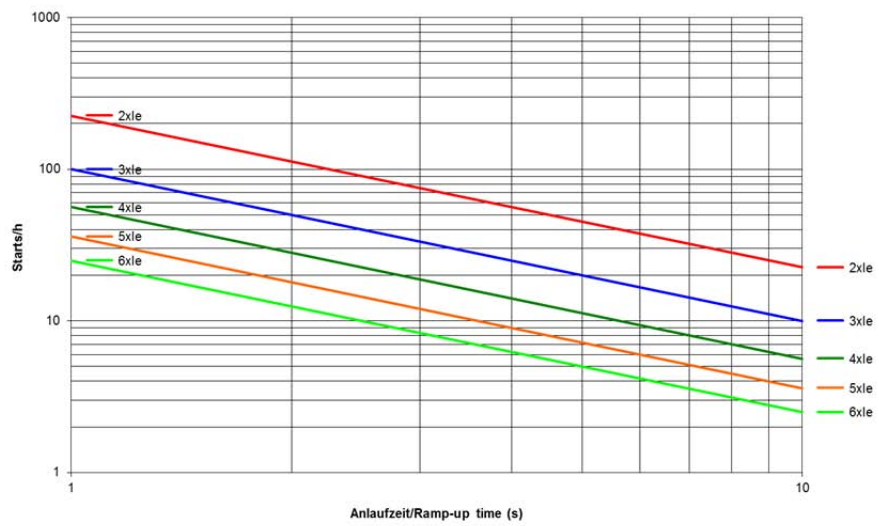
VersiStart II 5,5 / 11 LDS



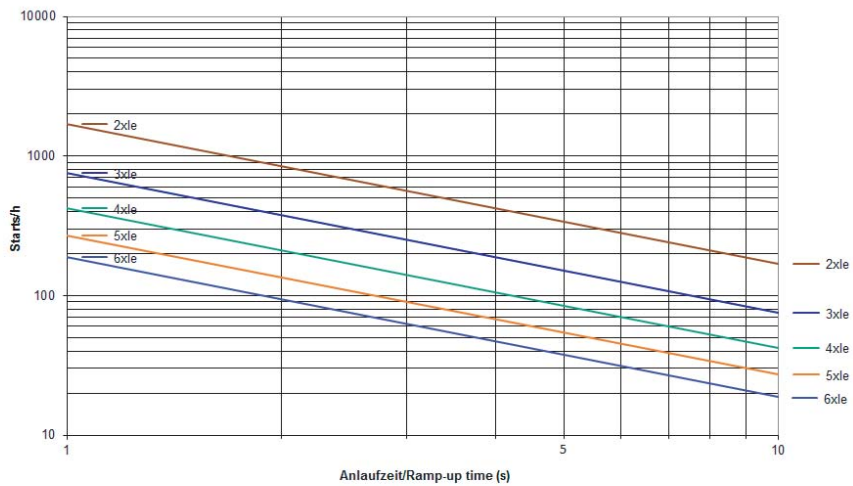
VersiStart II 7,5 LDS



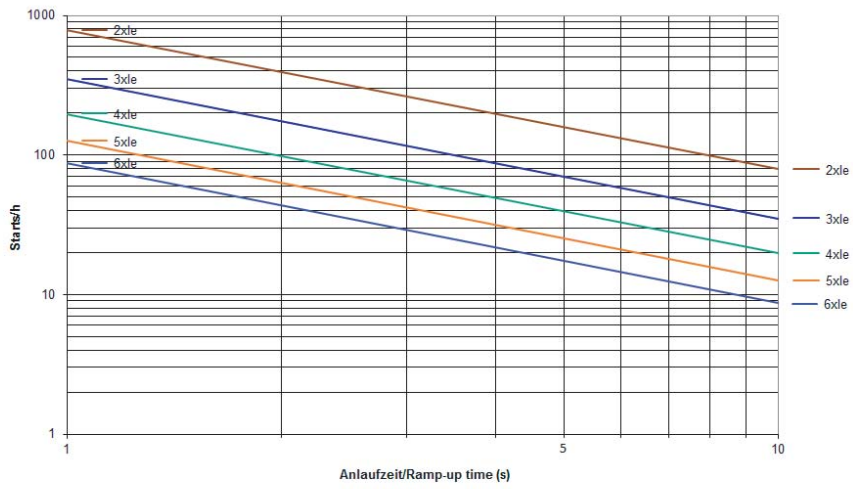
VersiStart II 15 LDS



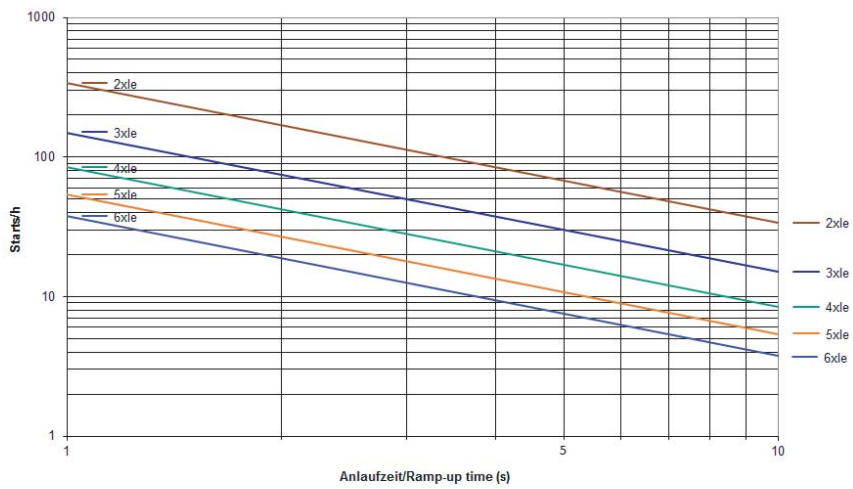
VersiStart II 400-3,5



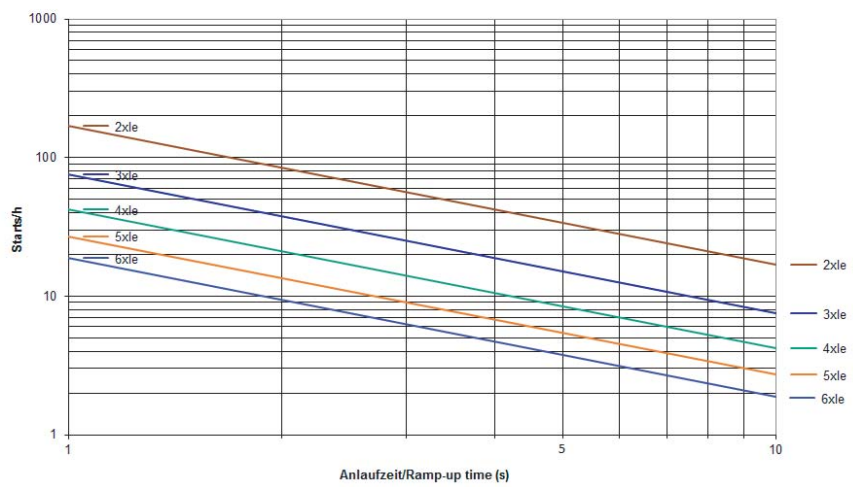
VersiStart II 400-6,5



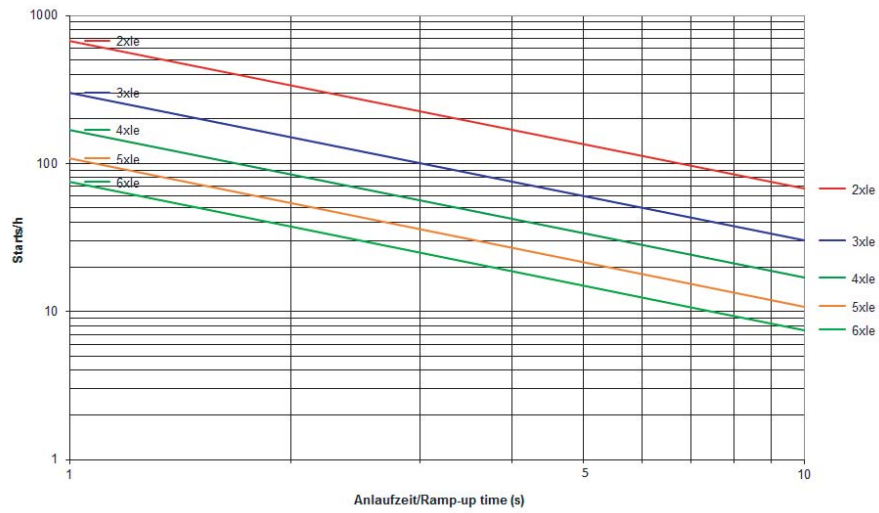
VersiStart II 400-12



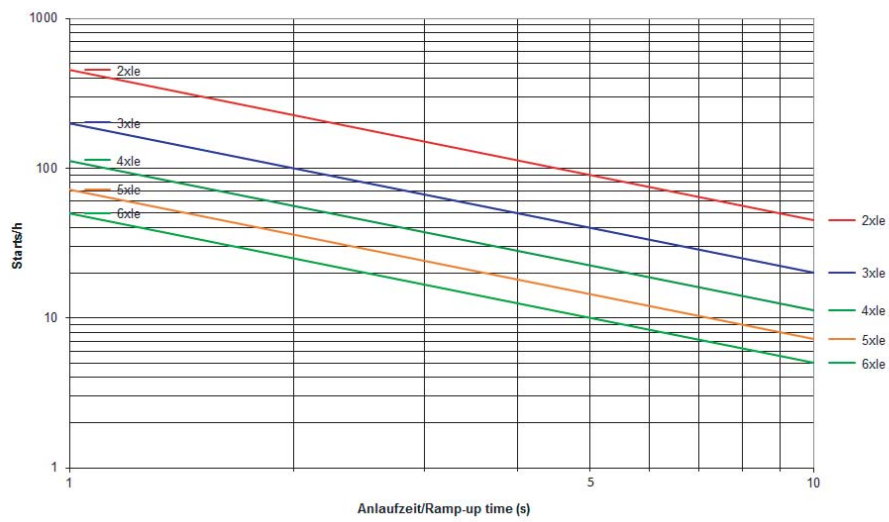
VersiStart II 400-16



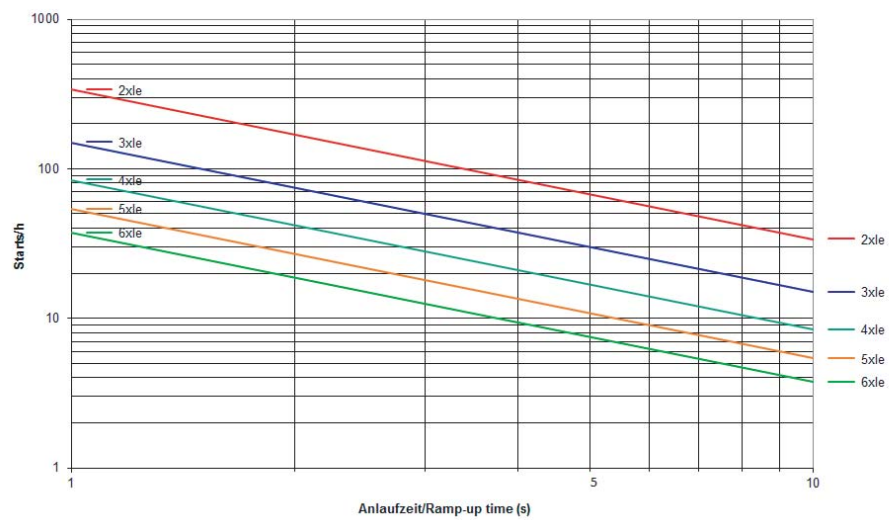
VersiStart II 400-17



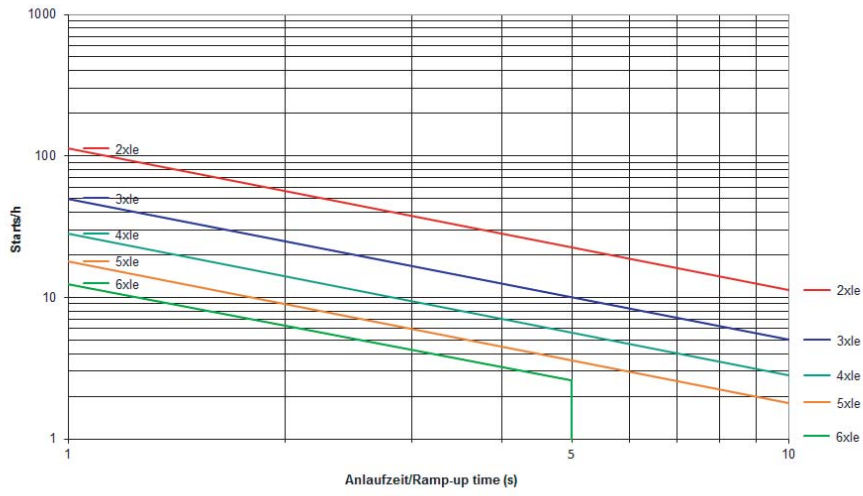
VersiStart II 400-25



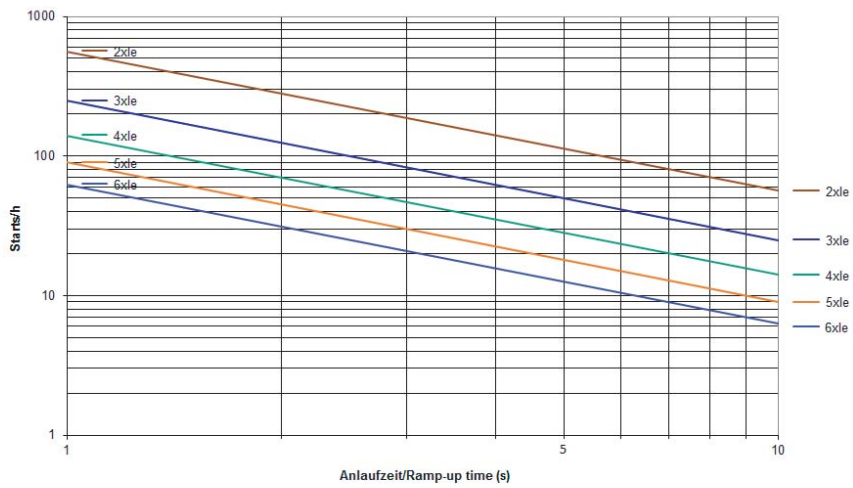
VersiStart II 400-32



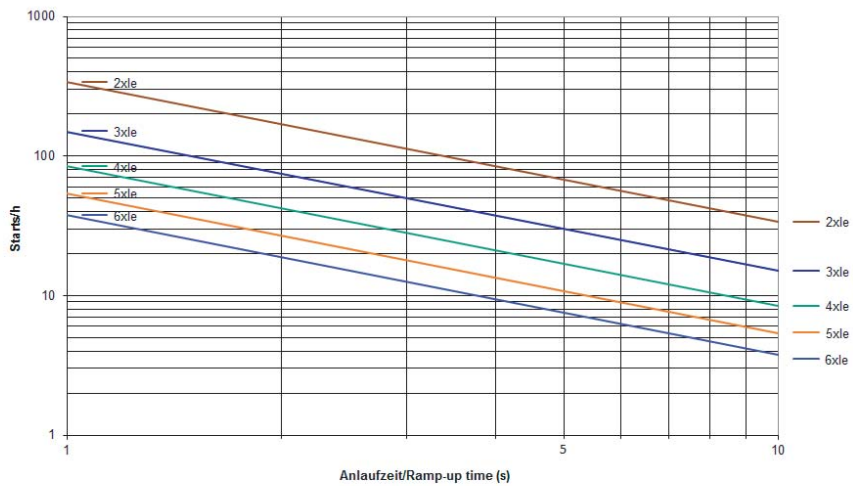
VersiStart II 400-45



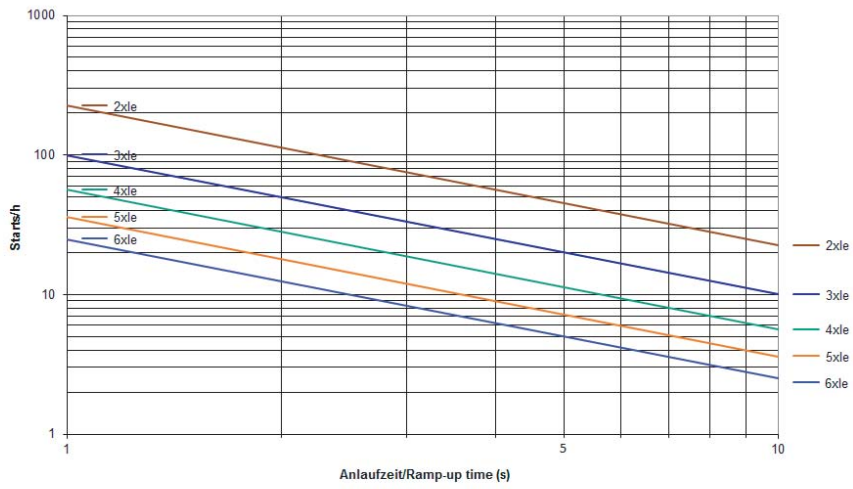
VersiStart III 400-9



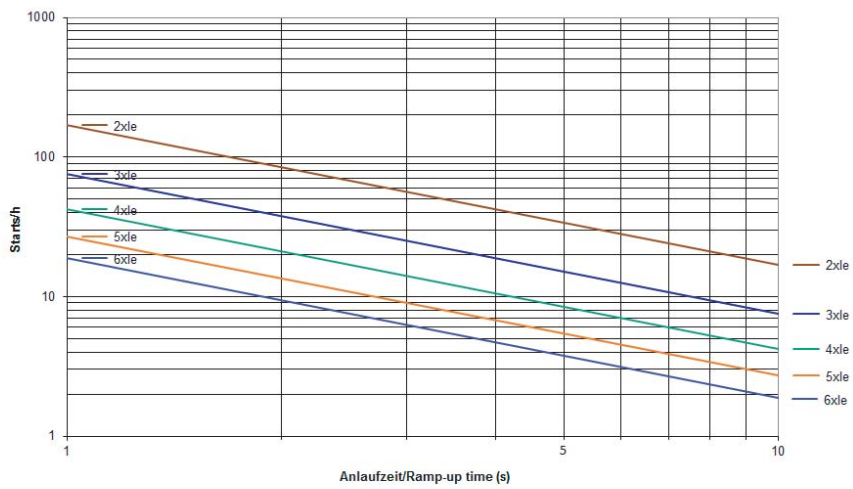
VersiStart III 400-16



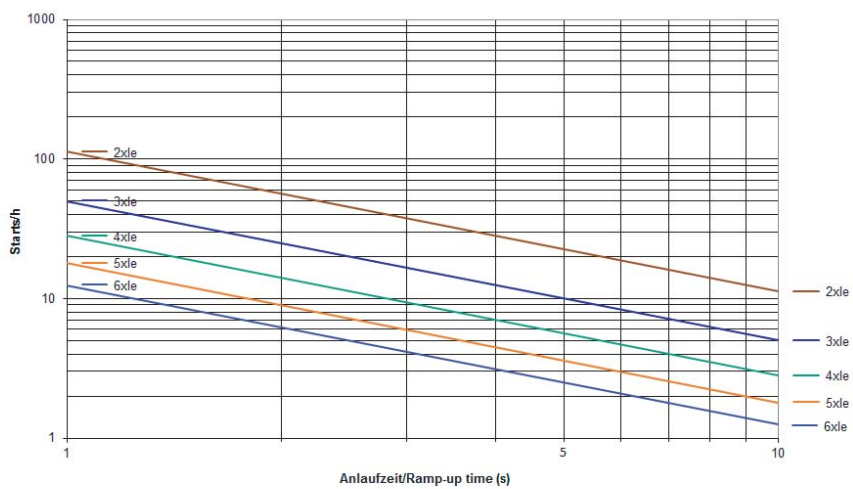
VersiStart III 400-25



VersiStart III 400-37



VersiStart III 400-45



Dimensioning of pre-fuses:

Basically, two types of fuse protection are available for the user:

1. Fusing according to allocation type „1“ DIN EN 60947-4-2.
After a short circuit the soft starter is allowed to be inoperative and repair work is possible.
2. Fusing according to allocation type „2“ DIN EN 60947-4-2.
After a short circuit the device must be suitable for further use. However, there is the danger that the contacts of the by-pass relays (-contactors) weld. Therefore, if possible, these contacts are to be checked prior to reconnecting the device to the supply. If this check cannot be carried out by the user, the device has to be returned to the producer in order to have it checked.

The following dimensioning information refers to the below operating conditions:

- Use of standard asynchronous motors
- Standard ramp-up and/or deceleration times

Fusing according to allocation type „1“:

As pre-fuses, we recommend to use fuses of utilization category gG or aM.

The fuse values are to be determined by taking the conductor cross-sectional area of the wiring into account. The wiring cross-sectional area is to be determined in dependence on the rated motor current, the maximally occurring starting current (normally up to the 5-fold rated device current) and the starting frequency. Table 1 shows the values for numerous applications, i.e., with a 3-fold nominal/rated current as mean starting current and a maximum ramp-up time of 10s. In the case of parameter values exceeding these values, it may be necessary to adapt the fuse value accordingly.

Note: Wiring cross-sectional area according to DIN VDE 0100-430, DIN EN 57100-430.

Fusing according to allocation type „2“:

The power semiconductors are to be protected by fuses of the utilization category gR (semiconductor fuses, high-speed fuses). However, since these fuses do not ensure line protection, it is necessary to use additionally line protection fuses (utilization category gL).

To protect the semiconductors it is necessary to select gR-fuses featuring cutoff I^2t -values which are approx. 10-15% below the I^2t -value of the power semiconductor (see technical data). In this connection, the current-value of the selected fuse should not be smaller than the starting current to be expected.

PETER electronic does not prescribe the use of semiconductor protection fuses. However, for some UL- or CSA-listed devices there are exceptions which are indicated in the relevant commissioning instructions.

Notes

- *On the basis of the I^2t -value of the power semiconductors, the ramp-up time and possibly the max. starting current, the fuse supplier is able to select a suitable type. Due to the great variety of producers, sizes and types, PETER electronic does not recommend any particular fuses.*
- *If the value of the fuse or the cutoff- I^2t -value is selected too small, it may happen that the semiconductor fuse reacts during the starting phase or during deceleration.*
- *In the case of special devices having increased ramp-up or deceleration times, the recommended fuse value may have to be adapted.*

Table 1

device type	nominal/rated device current (techn. data)	fuse value in the case of allocation type 1	starting frequency starts / h (3xle 5s)
VS II	3,5A	10A	150
VS II-3LDS, VS II	6,5A	16A/20A	120/75
VS III	9A	20A	50
VS II-5,5LDS, VS II	12A	20A/32A	65/30
VS II-7,5LDS	15A	35A	100
VS II, VS III	16A	32A	15/30
VS II	17A	35A	60
VS II, VS II-11LDS, VS III	25A	50A	40/65/20
VS II, VS II-15LDS	32A	63A	30/35
VS III	37A	63A	15
VS II, VS III	45A	100A/80A	10

Combined Motor Start and Braking Devices VBMS ... 2.01

Deatures:

- ❑ simple motor control with only a few elements
- ❑ motor contactor and DC-brake in a single device
- ❑ suitable for all asynchrounous motors
- ❑ controlled by microcontroller
- ❑ easy mounting, also for retrofitting into existing plants
- ❑ motor contactor with contact gap $\geq 3\text{mm}$, utilization category AC-3
- ❑ operator's controls physically separated from load (24V extral-low voltage)
- ❑ connection of several „STOP“ buttons possible
- ❑ for snap-mounting onto 35mm top-hat rail
- ❑ degree of protection IP 20
- ❑ meets trade assoc. requirements for category 2 acc. to GS-HO-01
- ❑ intermateable with BRMS



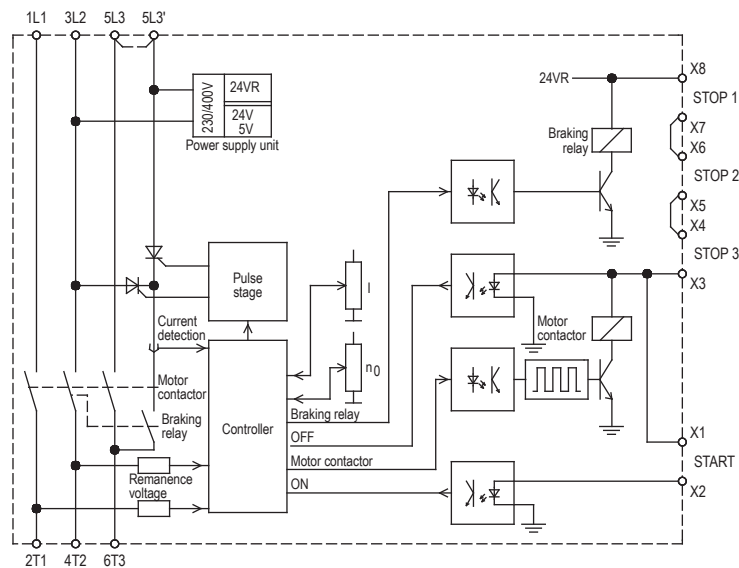
Combined Motor Start and Braking Devices
VBMS ...
CE

Function:

- ❑ direct online start via motor contactor
- ❑ DC braking
- ❑ control via buttons or via switch
- ❑ braking current infinitely adjustable
- ❑ standstill threshold adjustable
- ❑ braking current cutoff after motor standstill
- ❑ monitoring of braking frequency (overload protection)
- ❑ monitoring of exceeded braking time of 10s
- ❑ start interlock in case of safety relevant errors

Typical Applications:

- sawing machines
- centrifuges
- vibrators



Type designation	VBMS 400-2,2/20	VBMS 230-1,5/20
AC-3 rated operational power	2,2kW	1,5kW
rated operational voltage 50/60Hz according to DIN EN 50160 (IEC 38)	3x 380/415V $\pm 10\%$	3x 200/240V $\pm 10\%$
order number	2C000.40020	2C000.23020

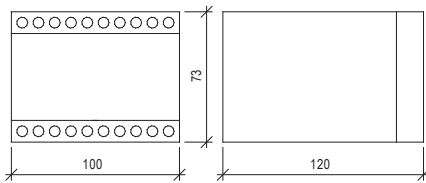
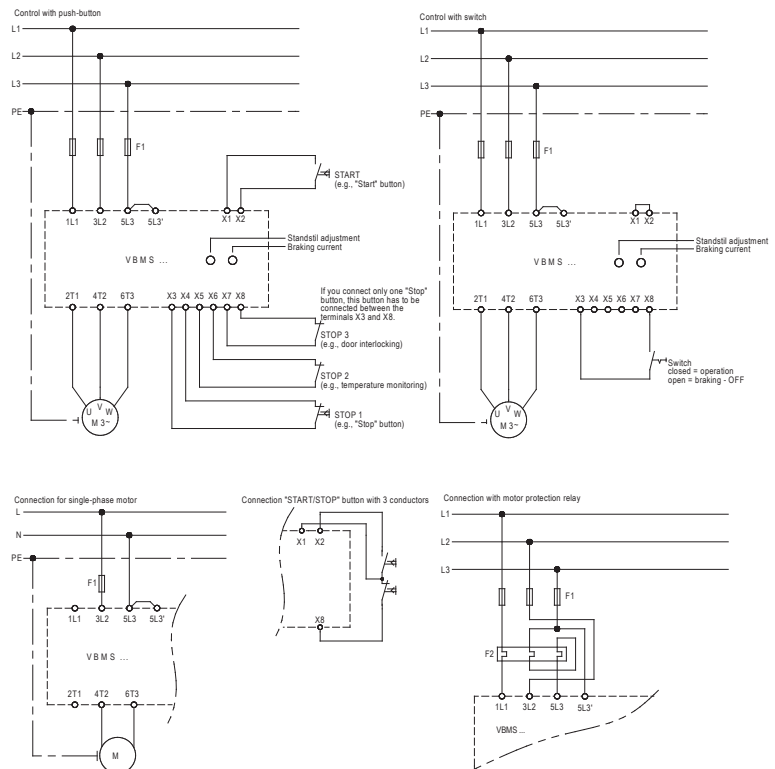
Please observe supplementary sheet with dimensioning rules!

Technical data	VBMS 400-2,2/20	VBMS 230-1,5/20
rated operational voltage 50/60Hz according to DIN EN 50160 (IEC 38)	3x 380/415V ± 10%	3x 200/240V ± 10%
AC-3 rated operational power	2,2kW	1,5kW
conventional enclosed thermal current $I_{th} = I_e$ (valid for motor contactor)	16A	
braking current	2 ... 20A	
max. braking time	10s	
max. braking frequency at braking current 10A braking current 20A	at 5s braking time: 1 in 25s, at 10s braking time: 1 in 50s at 5s braking time: 1 in 60s, at 10s braking time: 1 in 120s	
delay time during switch-off and braking	500ms	
braking voltage	0 ... 220V DC	0 ... 110V DC
max. cross-sectional area	2,5mm ² per terminal	
ambient / storage temperature	0°C ... 45°C / -25°C ... 75°C	
weight / kg	0,6	

Note:

Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:**Connection Diagrams:**

Features:

- two-phase controlled soft start
- integrated by-pass relay
- reduction of starting current peaks
- DC braking
- integrated braking contactor
- integrated standstill detection
- monitoring of stopping time
- suitable for all asynchronous motors
- suitable for IE1, IE2 and IE3 motors
- self-optimizing soft start and braking
- CANopen on board
- degree of protection IP20
- plugable push-in control terminals
- meets trad assoc. requirements for PL =c, acc. to EN13849-1:2008



Combined Motor Start and Braking Devices
VC II S 480/575 – 12 ... 60



Function:

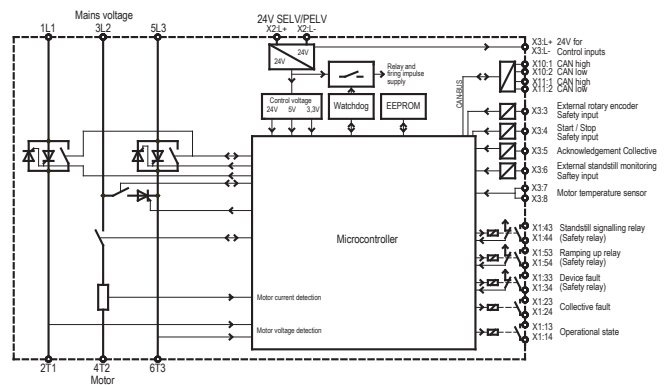
- parameterization via keypad or CAN-Bus
- motor auto tuning
- potential-free control inputs and outputs
- TVR or current controlled soft start
- motor temperature monitoring (PTC, KTY, PT1000)
- device protection
- motor protection
- tool speed monitoring (external speed sensor required)
- device fault relay (safety relevant)
- summary fault relay

Typical Applications:

- centrifuges
- vibration sifters
- wood working machines
- grinding machines
- mixer, et cetera

Accessory:

- adaptor for VC II Safe 12A-37A for mounting onto DIN rail (order nr: 29000.29700)

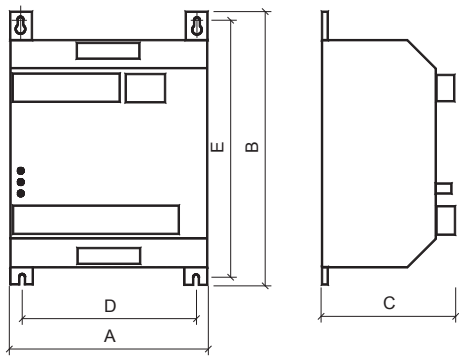


Typ designation	VC II S 480/575-12	VC II S 480/575-22	VC II S 480/575-37	VC II S 480/575-50	VC II S 480/575-60
IE3-motor rating at 400V mains voltage	1,5 – 4kW	5,5 – 7,5kW	11 – 15kW	18,5 – 22kW	25 – 30kW
motor rating at 400V mains voltage	5,5kW	11kW	18,5kW	25kW	30kW
mains / motor voltage acc. to DIN EN 50160 (IEC 38)	VC II S 480-...: 200...480V ± 10% 50/60Hz VC II S 575-...: 400...575V ± 10% 50/60Hz				
control voltage	24VDC ± 10%				
order number 480V	2C300.48012	2C300.48022	2C300.48037	2C300.48050	2C300.48060
order number 575V	2C300.57012	2C300.57022	2C300.57037	2C300.57050	2C300.57060

2.04 Combined Motor Start and Braking Devices VersiComb II Safe

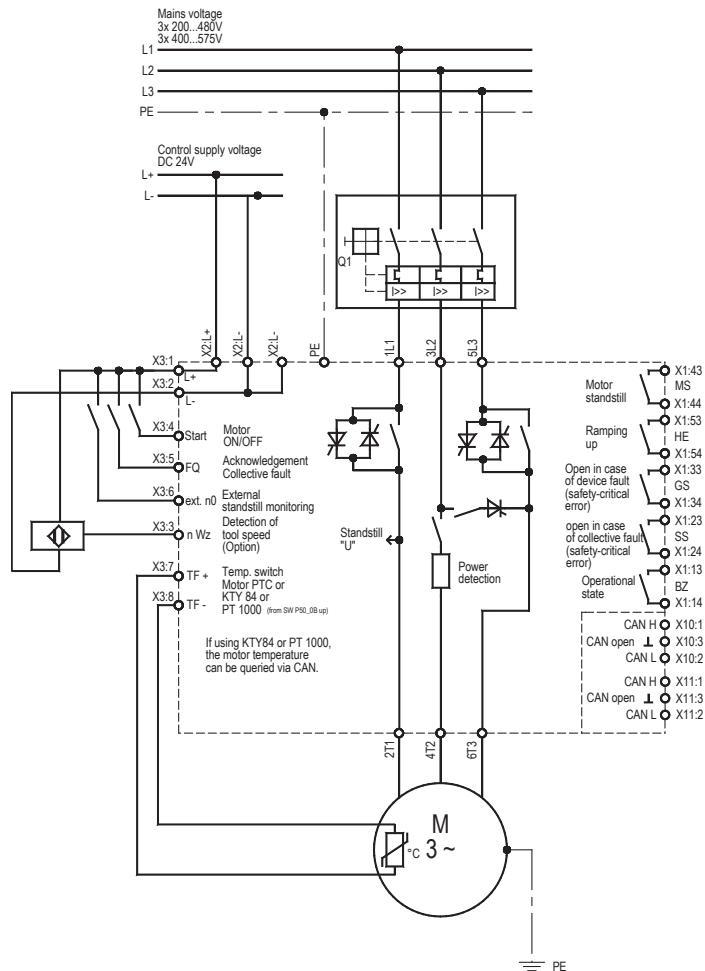
Technical data	VC II S 480/575-12	VC II S 480/575-22	VC II S 480/575-37	VC II S 480/575-50	VC II S 480/575-60
mains / motor voltage acc. to DIN EN 50160 (IEC 38)	VC II S 480-...: 200...480V ± 10% 50/60Hz VC II S 575-...: 400...575V ± 10% 50/60Hz				
rated device current starting section I _e	12A	22A	37A	50A	60A
max. starting / braking current (6x I _e)	72A	132A	222A	300A	360A
IE3-motor rating at 400V mains voltage	1,5 - 4kW	5,5 - 7,5kW	11 - 15kW	18,5 - 22kW	25 - 30kW
motor rating at 400V mains voltage	5,5kW	11kW	18,5kW	25kW	30kW
switching cycle per hour at tan/tbr=10s with 3x I _{Nenn} each	30				
max. power dissipation					
- during operation at max. start frequency	24W	40W	62W	81W	96W
- only control voltage	6W	6W	6W	6W	6W
I ² t ^(125°) (A ² s) - thyristors	720	9100	16200	51200	125000
starting time	self-optimizing (Default = 9s) max. 25s				
current limit starting/braking current	150...600% I _{NENN}				
max. braking time	self-optimizing (Default = 9s) max. 25s				
contact loading of output relays	4A / 250VAC, 4A / 24VDC				
max. cross-sectional area for connection	1,5mm ² push-in terminals 16mm ²		1,5mm ² screw terminals 35mm ²		
functional safety:					
DIN EN 61508	SIL 1				
DIN EN 13849	PL c				
ambient / storage temperature	0°C ... 45°C (de-rating up to 50°C) / -25°C ... 75°C				
degree of protectionchutzart	IP20				
size	1	1	1	2	2
weight / kg	1,45	1,5	1,55	3,8	3,9

Dimensions:



size	a	b	c	d	e
1	103	230	138	86	220
2	205	230	160	183	220

Connection Diagram:



Dimensioning Rules for Combined Soft Start and Braking Devices 2.05

Note! All data sheets and commissioning instructions are available on our homepage at:
www.peter-electronic.com

Dimensioning VC II Safe

Dimensioning of pre-fuses:

The pre-fuses can be dimensioned according to the following instructions:

Fusing according to allocation type „1“, DIN EN 60947-4-2. After a short circuit, the device is allowed to be inoperative. After an overload or a short-circuit on the output-side, repair work is possible.

The following dimensioning information refers to the operating conditions below:

- Use of asynchronous motors IE1, IE2 and IE3 (IE4 in preparation)
- Start-up and/or braking times in accordance with the datasheet
- Switching frequency is not higher than stated in the datasheet

Fusing according to allocation type „1“:

As pre-fuses, we recommend using fuses in the operating class aM.

If these fuses are also used as cable protection, the cable cross-section must be coordinated accordingly!

Short-circuit protection according to EN 60947-4-2

Device rated current (technical data)	Device type	Fuse rating with allocation type 1	Fuse type (recommendation)
12A	VC II S ...-12	16A	690V NHO aM
22A	VC II S ...-22	25A	690V NHO aM
37A	VC II S ...-37	40A	690V NHO aM
50A	VC II S ...-50	63A	690V NHO aM
60A	VC II S ...-60	80A	690V NHO aM

Short-circuit protection according to UL 508 (Class RK5 Fuse)

Device rated current (technical. data)	Device type	Fuse rating	Fuse
12A	VC II S 575-12	20A	600V AC
22A	VC II S 575-22	40A	600V AC
37A	VC II S 575-37	50A	600V AC
50A	VC II S 575-50	60A	600V AC
60A	VC II S 575-60	80A	600V AC

Fusing according to allocation type „2“:

For the protection of the power semiconductors, semi-conductor fuses of the operating class aR or gR are necessary. However, since these fuses do not guarantee any line protection, circuit breakers (operating class gG), must be used in addition.

As fuses for the semi-conductor protection, fuses must be selected whose switch-off is suitable for I^2t -value approx. 10-15% below the I^2t value boundary of the power semiconductor (see technical data). The current value of the selected fuse in this case should not be less than the inrush current to be expected.

Notes

- *The employment of semi-conductor fuses is not prescribed by PETER electronic. There are exceptions in case of some UL or CSA authorised devices. In this case, this is referred to in the start-up instruction.*
- *With the specifications on the Pt value of the power semiconductors, the start-up time and possibly the max. inrush current, the fuse supplier is able to select a suitable type. Because of the large number of manufacturers, construction sizes and types, a fuse recommendation by PETER electronic is not appropriate.*
- *If the fuse rating or the switch-off Pt value is selected too small, the semiconductor protection fuse can release during the start phase or the soft rundown.*

Motor protection switch

IEC / Europe 400V

Motor power	Siemens	EATON
5,5kW	3RV2021_17-22A	PKE 16-65A
11kW	3RV1031_28-40A	PKE 16-65A
22kW	3RV1041_45-63A	PKE 16-65A
25kW	3RV1041_45-63A	PKE 16-65A
30kW	3RV1041_57-75A	PKE 16-65A

Dimensioning VBMS

Dimensioning of pre-fuses:

Basically, two types of fuse protection are available for the user:

1. Fusing according to allocation type „1“, DIN EN 60947-4-2.
After a short circuit, the braking device is allowed to be inoperative.
2. Fusing according to allocation type „2“, DIN EN 60947-4-2.
After a short circuit, the braking device must be suitable for further use. However, there is the danger that the contacts of the braking relay (braking conductor) weld. Therefore, if possible, these contacts are to be checked prior to applying again mains voltage to the device. If this check cannot be carried out by the user, the device has to be returned to the producer in order to have it checked.

The following dimensioning information refers to the below operating conditions:

- Use of standard asynchronous motors
- Braking current not exceeding $2.5 \times I_{\text{NOM}}$ of the motor
- Cyclic duration factor (c.d.f.) not exceeding the value indicated in the datasheet

Fusing according to allocation type „1“:

As pre-fuses, we recommend to use line protection fuses (utilization category gL) or automatic circuit breakers with tripping characteristics B, C, D or K.

Taking into account the maximum braking currents that occur (normally the rated device current), we recommend fuses according to table 2, column 3.

Note:

- Wiring cross-sectional area according to DIN VDE 0100-430, DIN EN 57100-430.

Fusing according to allocation type „2“:

The power semiconductors are to be protected by fuses of the utilization category gR (semiconductor fuses, high-speed fuses). However, since these fuses do not ensure line protection, it is necessary to use additionally line protection fuses (utilization category gL).

As for the dimensioning of the line protection fuse (gL), please refer to table 2, column 3.

To protect the semiconductors it is necessary to select gR-fuses featuring cutoff- I^2t -values of the ranges indicated in table 2, column 4. In this connection, the fuse rating of the selected fuse should not be smaller than the braking current to be expected (rated device current).

Notes

- On the basis of the recommended I^2t -value, braking current, and possibly the c.d.f., the fuse supplier is able to select a suitable type. Due to the great variety of producers, sizes, and types, PETER electronic does not recommend any particular fuses.
- If the fuse or cutoff I^2t -value is selected too small, it may happen that the semiconductor fuse reacts during braking.

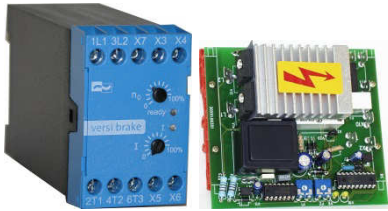
Table 2

Column 1	Column 2	Column 3	Column 4
max. Braking current	Device Typ	Fuse value in the case of allocation type 1	Recommended range for cutoff- I^2t -value of semiconductor protection fuses in the case of allocation type „2“
20A	VBMS	16A	300 ... 650 A ² s

Braking Devices VersiBrake 230/400-6/25/30L (LP) 3.01

Features:

- ❑ DC braking with one-way rectification
- ❑ suitable for all asynchronous motors and for mono phase motors
- ❑ controlled by microcontroller
- ❑ easy mounting, also for retrofitting into existing plants
- ❑ wear-resistant and maintenance-free
- ❑ integrated braking contactor
- ❑ printed circuit-board version with fault signaling contact for snap-on mounting onto 35mm DIN rail
- ❑ degree of protection: case version IP 20, printed circuit-board version IP 00
- ❑ meets trade assoc. requirements for PL = b, acc. to DIN EN ISO 13849-1



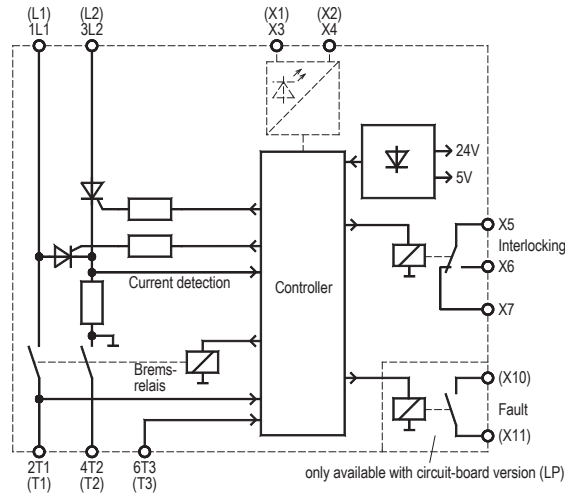
Braking Devices
VB 230-6/25/30L (LP)
VB 400-6/25/30L (LP)
CE

Function:

- ❑ start braking via detection of motor voltage and via motor contactor (double safety)
- ❑ overload protection
- ❑ braking current cutoff after motor standstill
- ❑ braking current control
- ❑ automatic remanence time optimization
- ❑ braking current infinitely adjustable 10-100%
- ❑ potential-free output for motor contactor interlocking during braking; also usable to energize the star contactor during braking
- ❑ standstill threshold adjustable, individual adaptable to different motor types

Typical Applications:

- sawing machines
- centrifuges
- wood working machines
- textile machines
- conveying systems



Type designation	VB 230-6L	VB 230-25L	VB 230-30L	VB 400-6L	VB 400-25L	VB 400-30L
rated device current	6A	25A	30A	6A	25A	30A
mains voltage according to DIN EN 50160 (IEC 38)	220/240V ±10% 50/60Hz			380/415V ±10% 50/60Hz		
order number case version (L)	2B000.23006	2B000.23025	2B000.23030	2B000.40006	2B000.40025	2B000.40030
order number printed circuit-board version (LP)	2B100.23006	2B100.23025	2B100.23030	2B100.40006	2B100.40025	2B100.40030

Technical data	VB 230-6L	VB 230-25L	VB 230-30L	VB 400-6L	VB 400-25L	VB 400-30L
mains voltage acc. to DIN EN 50160 (IEC 38)	220/240V ±10% 50/60Hz			380/415V ±10% 50/60Hz		
power draw of electronics	3 VA					
recommended for rated motor current up to	0,3 ... 3A	2 ... 12,5A	2 ... 15A	0,3 ... 3A	2 ... 12,5A	2 ... 15A
rated device current	6A	25A	30A	6A	25A	30A
max. braking frequency at braking time of 5s	1/8s	1/60s	1/90s	1/8s	1/60s	1/90s
I ² t-value of power semiconductors in A ² s	310	1250	1350	310	1250	1350
braking voltage	0 ... 110VDC			0 ... 220VDC		
max. braking time	125					
contact rating (control relay)	3A/250VAC; 3A/30VDC					
delay time for reduction of residual e.m.f.	self-optimizing in the range between 0,2 ... 2s					
max. cross-sectional area for connection	2x 2,5mm ² per terminal					
ambient /storage temperature	0°C ... 45°C / -25°C ... 75°C					
weight / kg	0,6					

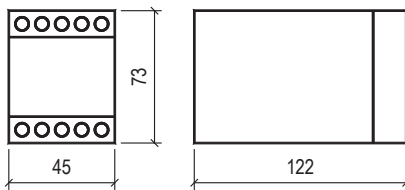
Note:

Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

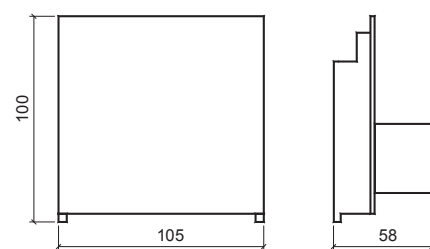
For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

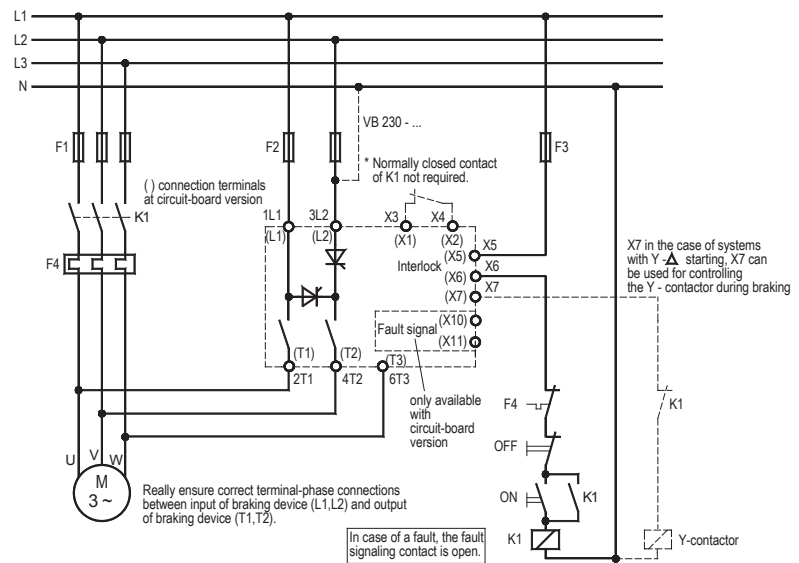
case version (L)



printed circuit-board version (LP)



Alle dimensions in mm

Connection Diagram:

Features:

- ▣ DC braking with one-way rectification
- ▣ suitable for all asynchronous motors and for mono phase motors
- ▣ controlled by microcontroller
- ▣ easy mounting, also for retrofitting into existing plants
- ▣ wear-resistant and maintenance-free
- ▣ integrated braking contactor
- ▣ for snap-on mounting onto 35mm DIN rail
- ▣ degree of protection IP 20
- ▣ successor for braking devices type BR und BR-L



(photo similar)

Braking devices
VB 230-6/25/30LT
VB 400-6/25/30LT

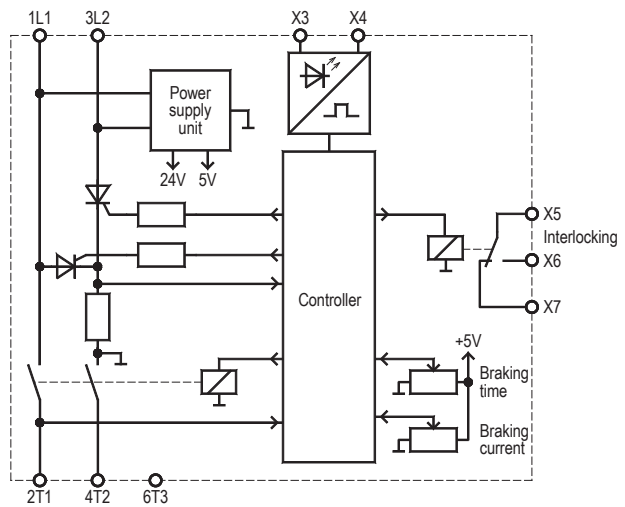


Function:

- ▣ direct online start via motor contactor
- ▣ overload protection
- ▣ braking current control
- ▣ automatic remanence time optimization
- ▣ braking current infinitely adjustable 10-100%
- ▣ braking interrupt is possible
- ▣ restart 1,2s after braking interrupt
- ▣ braking time adjustable
- ▣ potential-free output for motor contactor Interlocking during braking; also usable to energize the star contactor during braking

Typical Applications:

- sawing machines
- centrifuges
- wood working machines
- textile machines
- conveying systems



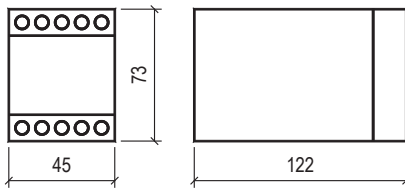
Type designation	VB 230-6LT	VB 230-25LT	VB 230-30LT	VB 400-6LT	VB 400-25LT	VB 400-30LT
rated device current	6A	25A	30A	6A	25A	30A
mains voltage acc. To DIN EN 50160 (IEC 38)	220/240V ±10% 50/60Hz			380/415V ±10% 50/60Hz		
order number printed circuit-board version	2B200.23006	2B200.23025	2B200.23030	2B200.40006	2B200.40025	2B200.40030

Technical data	VB 230-6LT	VB 230-25LT	VB 230-30LT	VB 400-6LT	VB 400-25LT	VB 400-30LT
mains voltage acc. to DIN EN 50160 (IEC 38)	220/240V ±10% 50/60Hz			380/415V ±10% 50/60Hz		
power draw of electronics	3 VA					
recommended for rated motor current up to	0,3 ... 3A	2 ... 12,5A	2 ... 15A	0,3 ... 3A	2 ... 12,5A	2 ... 15A
rated device current upto a braking time of 20s	6A	25A	30A	6A	25A	30A
rated device current upto a braking time of 30s	6A	17A	20A	6A	17A	20A
max. braking frequency at a braking time of 5s	1/8s	1/60s	1/90s	1/8s	1/60s	1/90s
I ² t-value of power semiconductors in A ² s	310	1250	1350	310	1250	1350
braking voltage	0 ... 110VDC			0 ... 220VDC		
max. braking time	0 ... 30s (special device 0 ... 60s available)					
contact rating (control relay)	3A/250VAC; 3A/30VDC					
delay time for reduction of residual e.m.f.	self-optimizing in the range between 0,2 ... 1,8s					
max. cross-sectional area for connection	2x 2,5mm ² per terminal					
ambient / storage temperature	0°C ... 45°C / -25°C ... 75°C					
weight / kg	0,6					

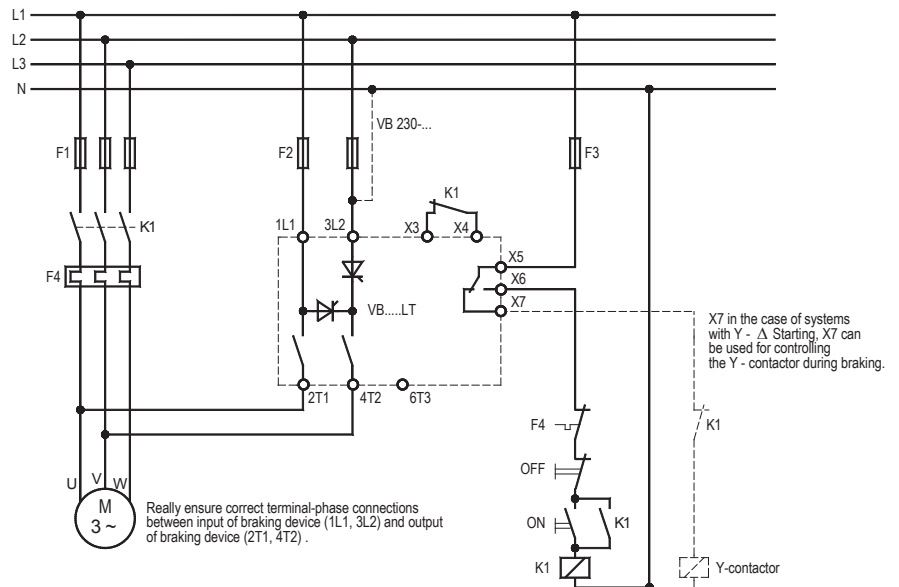
Note:

Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

All dimensions in mm

Connection Diagram:**EMC**

The limit values for emitted interference according to the applicable device standards do not rule out the possibility that receivers and susceptible electronic devices within a radius of 10m are subjected to interference. If such interference, which is definitely attributable to the operation of the braking devices "VB", occurs, the emitted interference can be reduced by taking appropriate measures.

Such measures are, e.g.:

To connect reactors (3mH) or a suitable mains filter in series before the braking device, or to connect X-capacitors (0,15μF) in parallel to the supply voltage terminals.

Braking Devices VersiBrake 25A 3.05

Features:

- ❑ DC Braking with one-way rectification
- ❑ controlled bei microcontroller
- ❑ suitable for all asynchronous motors
- ❑ easy mounting, also for retrofitting into existing plants
- ❑ wear-resistant and maintenance-free
- ❑ special voltages up tp 575V (UL: bis 480V) with Option „B“
- ❑ for snap-mounting onto 35mm top-hat-rail
- ❑ degree of protection IP 20



**Braking Devices
VB 230/400-25**



Function:

- ❑ control via motor contactor
- ❑ standstill detection
- ❑ braking current limited to rated device current
- ❑ remanence time optimization
- ❑ braking current infinitely adjustable
- ❑ potential-free output for motor contactor interlocking during braking
- ❑ potential-free output for fault signalling relay

Options: (upon request)

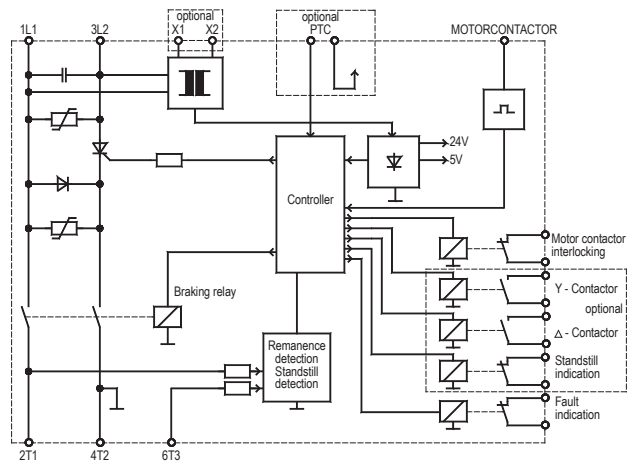
- ❑ star-delta starting control (D)
- ❑ motor temperature monitoring (P)
- ❑ standstill sognalling relay (S)
- ❑ wide-voltage-range 200...575V (B)
control voltage of 24VAC or 230VAC is necessary
(please note on order)

Upon Request:

- ❑ printed circuit-board version

Typical Applications:

- sawing machines
- centrifuges
- wood working machines
- textile machines
- conveying systems



Type designation		VB 230-25 VB 400-25
rated device current		25A
mains voltage according to DIN EN 50160 (IEC 38)	VB 230 ... 220/240V ±10% 50/60Hz	option „B“
	VB 400 ... 380/415V ±10% 50/60Hz	200...575V ±10% 50/60Hz
order number	230V	21900.23025
	400V	21900.40025
	230V – UL	29800.23025
	400V – UL	29800.40025

Technical data	VB 230-25		VB 400-25	
mains voltage according to DIN EN 50160 (IEC 38)	VB 230 ...	220/240V ±10%	50/60Hz	option „B“
	VB 400 ...	380/415V ±10%	50/60Hz	200...575V ±10% 50/60Hz
power draw of electronics	6 VA			
recommended for rated motor current up to	12,5A			
rated device current	25A			
c.d.f. at max. braking current	8%			
I ² t-value of power semiconductor in A ² s	1250			
braking voltage	0 ... 130VDC bei 220/240V 0 ... 220VDC bei 380/415V			
max. braking time	15s (other times upon request)			
contact rating (control relay)	6A/250VAC; 6A/30VDC			
delay time for reduction of residual e.m.f.	self-optimizing in the range between (100 ... 2500ms)			
max. cross-sectional area	2x 2,5mm ² per terminal			
ambient- / storage temperature	0°C ... 45°C / -25°C ... 75°C			
weight / kg	0,8			

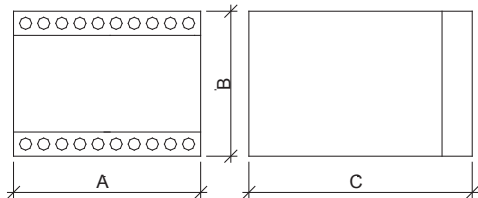
Note:

Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

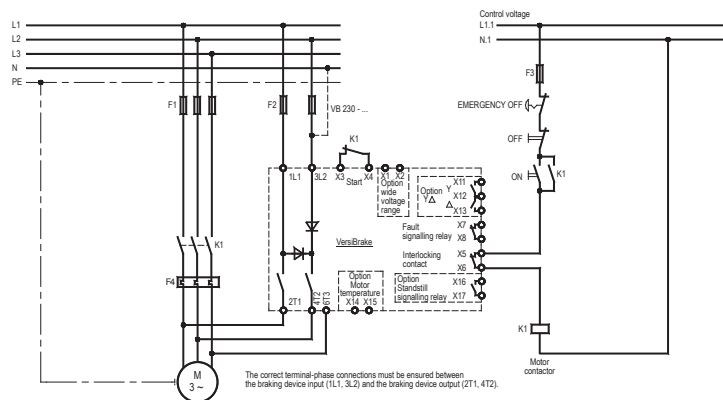
For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

VB 230-25
VB 400-25



Mounting dimensions	A	B	C
VB ... - 25	100	73	120

Connection Diagram:

Features:

- ▣ DC Braking with one-way rectification
- ▣ controlled by microcontroller
- ▣ suitable for all asynchronous motors
- ▣ easy mounting, also for retrofitting into existing plants
- ▣ wear-resistant and maintenance-free
- ▣ special voltages up to 575V (UL: bis 480V) with Option „B“
- ▣ for snap-mounting onto 35mm top-hat-rail
- ▣ degree of protection IP 20



Braking Devices
VB 230/400-36



Function:

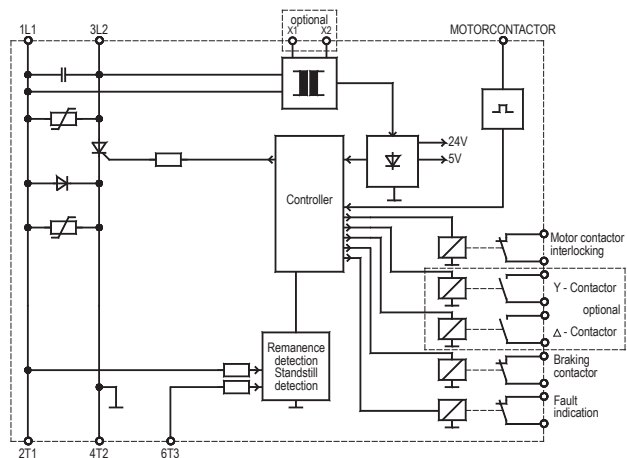
- ▣ control via motor contactor
- ▣ standstill detection
- ▣ braking current limited to rated device current
- ▣ remanence time optimization
- ▣ braking current infinitely adjustable
- ▣ potential-free output for motor contactor interlocking during braking
- ▣ potential-free output for fault signalling relay
- ▣ potential-free output for braking contactor
- ▣ temperature monitoring of power module

Options: (upon request)

- ▣ star-delta starting control (D)
- ▣ wide-voltage-range 200...575V (B)
- ▣ control voltage of 24VAC or 230VAC (please note on order)

Typical Applications:

- sawing machines
- centrifuges
- wood working machines
- textile machines
- conveying systems



Type designation		VB 230-36 VB 400-36
rated device current		36A
mains voltage according to DIN EN 50160 (IEC 38)	VB 230 ... 220/240V ±10% 50/60Hz VB 400 ... 380/415V ±10% 50/60Hz	option „B“ 200...575V ±10% 50/60Hz
order number	230V	21900.23036
	400V	21900.40036
	230V – UL	29800.23036
	400V – UL	29800.40036

Technical data	VB 230-36		VB 400-36	
mains voltage according to DIN EN 50160 (IEC 38)	VB 230 ...	220/240V ±10%	50/60Hz	option „B“
	VB 400 ...	380/415V ±10%	50/60Hz	200...575V ±10% 50/60Hz
power draw of electronics	6 VA			
recommended for rated motor current up to	17A			
rated device current	36A			
c.d.f. at max. braking current	5%			
I ² t-value power semiconductors in A ² s	1050			
braking voltage	0 ... 130VDC bei 220/240V 0 ... 220VDC bei 380/415V			
max. braking time	15s (other times upon request)			
contact rating of output relay	6A/250VAC; 6A/30VDC			
delay time for reduction of residual e.m.f.	self-optimizing (100 ... 2500ms)			
max. cross-sectional area	2x 2,5mm ² per terminal			
ambient / storage temperature	0°C ... 45°C / -25°C ... 75°C			
weight / kg	1			

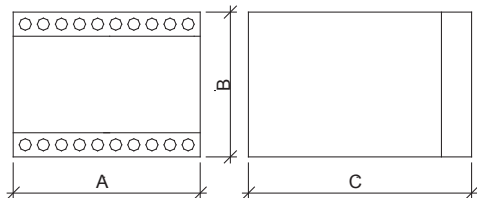
Note:

Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

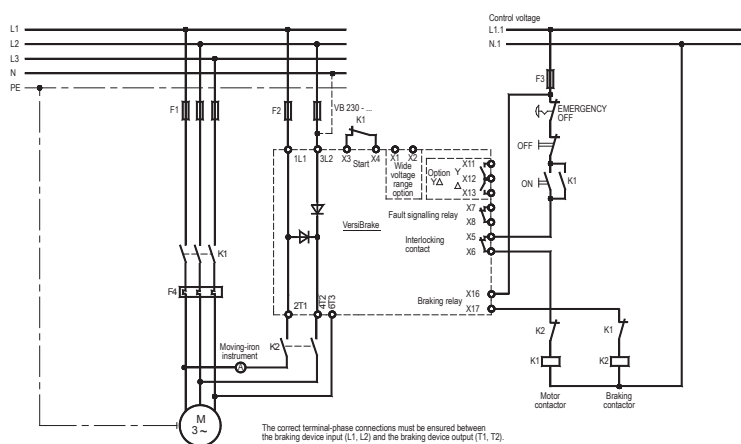
For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

Dimensions:

VB 230-36
VB 400-36



Mounting dimensions	A	B	C
VB ... - 25	100	73	120

Connection Diagram:

Features:

- ▣ DC braking with on-way rectification
- ▣ controlled by microcontroller
- ▣ suitable for all asynchronous motors
- ▣ easy mounting, also for retrofitting into existing plants
- ▣ wear-resistant and maintenance-free
- ▣ integrated braking contactor (devices up to 60A)
- ▣ degree of protection IP 20



Braking Devices
VB 230/400-40 ... 600



Function:

- ▣ control via motor contactor
- ▣ standstill- or time-dependent braking
- ▣ signalling relay for exceeded braking times
- ▣ braking current adjustments 0...100%, current control
- ▣ automatic remanence time optimization
- ▣ braking times 0,5 – 320s
- ▣ temperature monitoring of heat sink
- ▣ potential-free signalling and control outputs
- ▣ 2nd braking time 0,5 – 40s selectable
- ▣ manual braking stop selectable

Typical Applications:

- sawing machines
- centrifuges
- wood working machines
- textile machines
- conveying systems

Options:

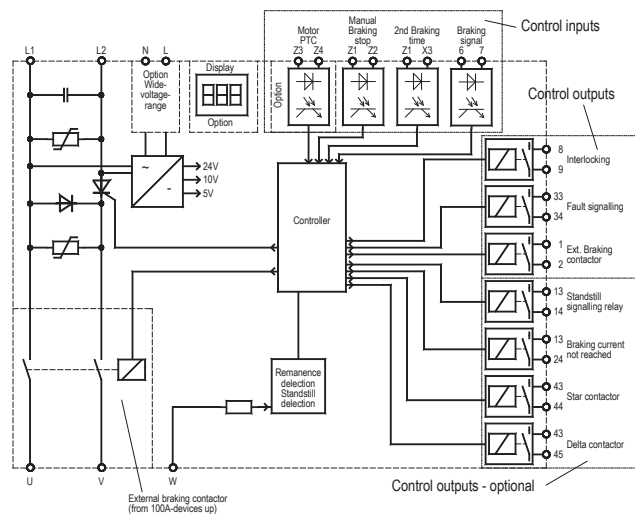
The following option packages are available:

VersiBrake 230/400-40 ... 600, "with option package APC"

- ▣ braking current display
- ▣ plug-in control terminals
- ▣ motor PTC monitoring
- ▣ star-delta starting control
- ▣ standstill signalling relay
- ▣ braking current monitoring

VersiBrake 600-40 ... 600 UL, „with option package APBC“

- ▣ all options included as "option package APC"
- ▣ wide voltage range 200-600V
- ▣ further control voltages upon request



Typical designation	VB ...					
	230-40 400-40	230-60 400-60	230-100 400-100	230-200 400-200	230-400 400-400	230-600 400-600
rated device current	40A	60A	100A	200A	400A	600A
mains voltage according to DIN EN 50160 (IEC 38)		220/240V ±10%	50/60Hz	(standard)		
		380/415V ±10%	50/60Hz	(standard)		
		200 – 690V ± 10%	50/60Hz	(wide voltage range)		
order number 230V	29700.23040	29700.23060	29700.23100	29700.23200	29700.23400	29700.23600
order number 400V	29700.40040	29700.40060	29700.40100	29700.40200	29700.40400	29700.40600
order number 230V, with option package APC	29731.23040	29731.23060	29731.23100	29731.23200	29731.23400	29731.23600
order number 400V, with option package APC	29731.40040	29731.40060	29731.40100	29731.40200	29731.40400	29731.40600
order number UL-devices	upon request					
accessory: adaptor for VersiBrake 40A-200A and VersiComb II Safe 12A-37A for mounting onto DIN rail, order number	29000.29700					

Please observe supplementary sheet with dimensioning rules!

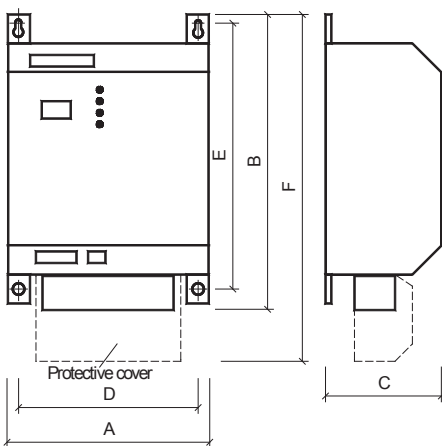
Technical data	VB ...					
	230-40 400-40	230-60 400-60	230-100 400-100	230-200 400-200	230-400 400-400	230-600 400-600
mains voltage according to DIN EN 50160 (IEC 38)	220/240V ±10% 50/60Hz (standard) 380/415V ±10% 50/60Hz (standard) 200 – 690V ± 10% 50/60Hz (wide voltage range)					
power draw of the electronics	6 VA					
recommended for rated motor currents up to	20A	30A	50A	100A	200A	300A
rated device current	40A	60A	100A	200A	400A	600A
c.d.f. at max. braking current	20%					
I ² t-value power semiconductor in A ² s	1050	4900	6050	80000	320000	1125000
braking voltage	0 ... 130VDC at 220/240V 0 ... 220VDC at 380/415V					
max. braking time	40s with standstill-dependent braking 320s with time-dependent braking					
contact rating of output relays	3A/250VAC; 3A/30VDC					
delay time for reduction of residual e.m.f.	self-optimizing (200 ... 3100ms)			self-optimizing (1600 ... 3100ms)		
max. cross-sectional area	16mm ²	16mm ²	16mm ²	35mm ²	screw M12	
ambient / storage temperature	0°C ... 45°C / -25°C ... 75°C					
weight / kg	2,1	2,1	2,1	3,1	7,2	10,2

Note:

Please pay attention and consider for the operation of IE3 motors while dimensioning of softstarters and dc brakes the resulting higher starting and braking currents.

For the use of IE3 motors we highly recommend to dimension and design the needed softstarters and braking devices one size higher.

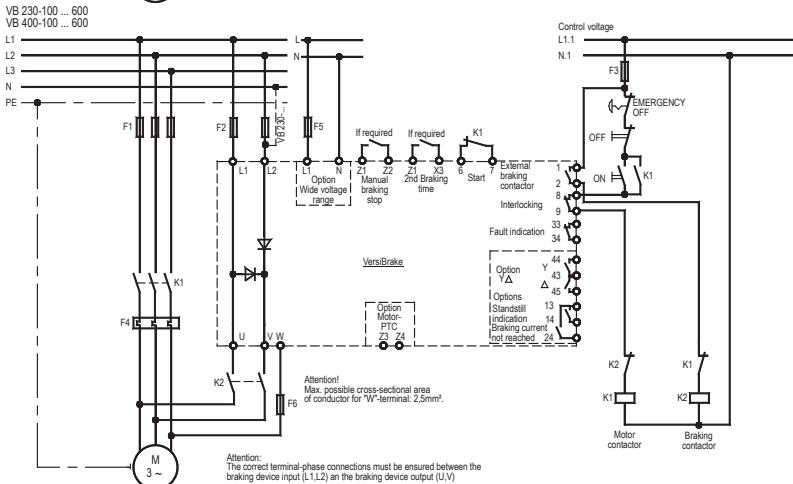
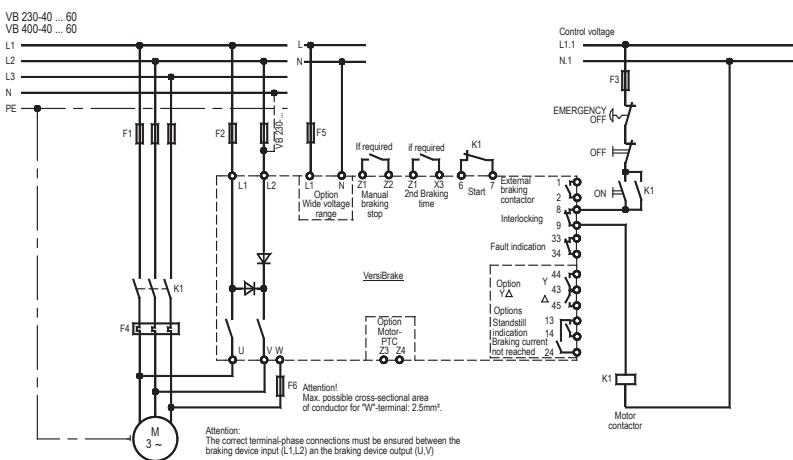
Dimensions:



	A	B	C	D	E	F
VB ... - 40	110	242	140	86	226	
VB ... - 60	110	242	140	86	226	
VB ... - 100	110	242	140	86	226	
VB ... - 200	110	255	155	80	226	
VB ... - 400	210	275	165	180	226	340
VB ... - 600	310	280	165	280	226	355

All dimensions indicated in mm

Connection Diagram:



Dimensioning Rules for Braking Devices

3.11

All data sheets and commissioning instructions are available on our homepage at:
www.peter-electronic.com

Configuration Instructions:

The motor ratings or nominal motor currents specified or recommended on the datasheets for the use of a braking device refer to normal applications with drives having a moment of inertia that approximately equals the moment of inertia of the motor. In all other cases, the required braking torque or braking current need to be determined more precisely (see below).




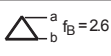

Without taking into account any possible braking torques of the load, the required braking current (direct current) can be estimated according to the following formula:

$$I_B = f_B \times \sqrt{\frac{t_A}{t_B}} \times I_N$$

- I_B Braking current in A
- f_B Braking factor acc. to the table specified below
- t_B Braking time required in s
- I_N Nominal/rated motor current in A
- t_A Time until nominal speed is reached (in the case of motors with star-delta start – approx. switch-over time)

Values usual for t_A :

Conveyor belt - 20s	Pump - 8s	Power crusher - 30s
Compressor - 10s	Fan - 20s	Circular saw - 10s

Connection of motor winding	
at nominal operation	during braking
	 $f_B = 3$
	 $f_B = 2.6$  $f_B = 1.7$

The two following examples are to explain the calculation:

Example 1

Assumption:	Motor shaft power:	2.2kW (230V/400V)
	Nominal motor current (2-pole motor):	8.5A/4.9A
	Ramp-up time (circular saw):	6s (direct start)
	Braking frequency:	1/h

The application of the circular saw requires that, after switching the saw off, the saw disk must come to a standstill within 5s. From this, there results a maximum braking time of 5s which we use in the calculation formula, too:

$$16.1A = 3 \times \sqrt{\frac{6s}{5s}} \times 4.9A$$

In the case of this application with direct start, the motor windings are in nominal operation star-connected. Braking too is effected in star-connection, which results in a braking current of approx. 16A ($f_B = 3$), i.e. for this circular saw, a braking device with a nominal/rated current of at least 20A, such as a **VB 400-25L** or **VB 400-25** (with a max. braking current of 25A each), has to be used.

Example 2

Assumption:	Motor shaft power:	30kW (400V/690V)
	Nominal motor current (2-pole motor):	56A/32.5A
	Ramp-up time (circular saw):	12s (star-delta start)
	Braking frequency:	2/h

In this example, the motor is to be braked within 5s. In the first case, braking is effected with the motor windings being star-connected and, in the second case, delta-connected.

case 1 ($f_B = 1.7$):

$$147A = 1.7 \times \sqrt{\frac{12s}{5s}} \times 56A$$

case 2 ($f_B = 2.6$):

$$225A = 2.6 \times \sqrt{\frac{12s}{5s}} \times 56A$$

This example shows that, if braking is effected in delta-connection, a larger braking current and therefore a larger braking device is required than in cases in which braking is effected with the motor windings being star-connected.

In case 1, a braking with 200A could be used, and in case 2, a 400A device would have to be used. For case 1, it is sensible to use a braking device featuring the star-delta contactor control option (option „APC“) by means of which the motor windings are automatically star-connected during the braking operation. Besides, it is thus possible to save the costs otherwise required for the star-delta contactor combination.

The device to be recommended for case 1 would then be a braking device of the **VB 400-200 APC** type.

If you have detailed data on the drive available, such as the moment of inertia of the load and of the motor as well as the starting torque, you can determine the braking current more precisely:

$$I_B = 0.31 \times k \times I_A \sqrt{\frac{n_N \times J}{t_B \times M_A}}$$

I_A	Starting current in star or in delta/1.72 in A
$k = 1$	Braking in star-connection
$k = 1.15$	Braking in delta connection
t_B	Braking time required (in s)
n_N	Nominal speed (in 1/min)
J	Moment of inertia of the drive (motor with load) in kgm ²
M_A	Starting torque (in Nm)

Example 3

Assumption:	Motor shaft power:	15kW (400V/690V)
	Nominal Motor current (2-pole motor):	29.5A/17A
	Starting current:	140A
	Starting torque:	75Nm
	Moment of inertia of motor:	0.1kgm ²
	Circular saw disk Diameter	800mm
	Thickness	5mm

For the saw disk, there results the mass „m“ of approx. 20kg; based on this mass, the moment of inertia of the saw disk is 1.6 kgm². Consequently, the following values can be used for calculating the braking current:

$$123A = 0.31 \times 1 \times 140A \sqrt{\frac{2850 \text{ 1/min} \times (0.1 + 1.6) \text{ kgm}^2}{8s \times 75Nm}}$$

Based on a guesstimate regarding the application of the braking device, we would have offered a 100A braking device for a 15kW-motor

This example shows that if large centrifugal masses are to be braked, it is quite useful to do a precise calculation. Such a large mass, in combination with a high speed, requires a larger braking current than normally needed, which is proved by the calculation.

In this case too, it would be sensible to use the above mentioned brake **VB 400-200 APC**.

From this equation, the influence of the speed and the moment of inertia of the drive to be braked becomes obvious.

The braking current determined according to one of the above descriptions should be less than or equal to the nominal/rated current of the braking device. If in these dimensional calculations, a braking current which equals 100% of the nominal device current is used, please make sure that in the case of devices up to 36A the max. braking time is 20s, and for devices from 40A up the max. braking time is 40s. If braking times > 20s (devices up to 36A) or > 40s (devices from 40A up) are to be expected, it must be taken into account when selecting a braking device that the permissible max. braking current is to be accordingly reduced. For more detailed information please see the device-specific commissioning instructions.

A very important aspect in the dimensional calculation of brakes is to take into account the cyclic duration factor (c.d.f.) indicated on the data sheets. Under no circumstances the c.d.f. be exceeded (the worst case is to be taken into account !!).

How to calculate the cyclic duration factor (c.d.f.):

$$c.d.f. = \frac{t_B}{t_Z} \times 100 \quad \begin{array}{l} t_B \text{ Braking time} \\ t_Z \text{ Cycle time (running - braking)} \end{array}$$

If the required cyclic duration factor (c.d.f.) exceeds the permissible values indicated on the data sheet, the permissible maximum braking current is to be accordingly reduced.

The data required in this connection can be found in the device-specific commissioning instructions.

If it is not possible to reduce the braking current, a braking device with a higher braking current has to be used.

Example:

If the required c.d.f. is twice as high as the value indicated on the data sheet, a braking device of twice the nominal/rated device current has to be used.

Dimensioning of braking contactors:

The braking contactor is switched on or off via a control contact of the braking device (no-load switching).

When selecting the braking contactor, it must be ensured that the contacts are able to carry the maximally occurring braking current (nominal/rated device current). Therefore, the value "conventional thermal current" (I_{th}) is decisive when selecting the braking contactor.

If this value is not indicated, the rated operational current for AC1-operation may be used instead.

Tip: By connecting contacts in parallel it is often possible to use a lower-priced contactor of a smaller design.

Dimensioning of pre-fuses:

Basically, two types of fuse are available for the user:

1. Fusing according to allocation type „1“ DIN EN 60947-4-2.
After a short circuit, the braking device is allowed to be inoperative.
2. Fusing according to allocation type „2“ DIN EN 60947-4-2.
After a short circuit, the braking device must be suitable for further use. However, there is the danger that the contacts of the braking relay (braking contactor) weld. Therefore, if possible, these contacts are to be checked prior to reconnecting the device to the supply. If this check cannot be carried out by the user, the device has to be returned to the producer in order to have it checked.

The following dimensioning information refers to the below operating conditions:

- Use of standard asynchronous motors
- Braking time not exceeding 20s, for braking devices up to 36A
- Braking time not exceeding 40s, for braking devices from 40A up
- Braking current not exceeding $2.5 \times I_{NOM}$ of the motor
- Cyclic duration factor (c.d.f.) not exceeding the value indicated on the data sheet

Fusing according to allocation type „1“:

As pre-fuses, we recommend to use line protection fuses (utilization category gL) or automatic circuit-breakers with tripping characteristic B, C, D or K.

Taking into account the maximum braking currents that occur (normally the nominal/rated device current), we recommend fuses according to table 2, column 3.

Note! Wiring cross-sectional area according to DIN VDE 0100-430, DIN EN 57100-430.

Fusing according to allocation type „2“:

The power semiconductors are to be protected by fuses of the utilization category gR (semiconductors fuses, high-speed fuses).

However, since these fuses do not ensure line protection, it is necessary to use additionally line protection fuses (utilize. Category gL).

As for the dimensioning of the line protection fuse (gL), please refer to table 2, column 3.

To protect the semiconductors it is necessary to select gR-fuses featuring cutoff I^2t -values of the ranges indicated in table 2, column 4.

In this connection, the current value of the selected fuse should not be smaller than the braking current to be expected (nominal/rated device current).

Notes

- On the basis of the recommended I^2t -value, braking current, and possibly the c.d.f., the fuse supplier is able to select a suitable type. Due to the great variety of producers, sizes and types, PETER electronic does not recommend any particular fuses.
- If the value of the fuse or cutoff- I^2t is selected too small, it may happen that the semiconductor fuse reacts during braking

Table 2


max. braking current / nominal/rated device current	device type	fuse value, allocation type „1“	recommended range for cutoff- I^2t -value of semiconductor protection fuses, allocation type „2“
6A	VB ...-6LT	6A	150 ... 250 A ² s
25A	VB ...-25L VB ...-25 VB ...-25LT	20A	500 ... 900 A ² s
30A	VB ...-30LT	25A	600 ... 900 A ² s
36A	VB ...-36	25A	700 ... 1000 A ² s
40A	VB ...-40	35A	1400 ... 3500 A ² s
60A	VB ...-60	40A	3000 ... 4650 A ² s
100A	VB ...-100	63A	6000 ... 7600 A ² s
200A	VB ...-200	125A	50000 ... 76000 A ² s
400A	VB ...-400	250A	200000 ... 305000 A ² s
600A	VB ...-600	400A	600000 ... 1050000 A ² s

AC drive VersiDrive i ... /E3/3E3 up to 22kW 4.01

Features:

- small design
- easy programming and connection
- precise and reliable control for IE2, IE3 & IE4 motors
- induction motors, PM motors, brushless DC motors, synchronous reluctance motors
- 14 parameters for basic settings
- precise digital control via push of a button
- application macros (industrial-, pumps- and fan operation)
- PTC input
- max. rotating field frequency 500Hz
- integrated braking chopper (up from 2,2kW)
- degree of protection IP20
- integrated mains filter
- serial communication with Modbus RTU and CANopen



AC drive
VD i 037 ... 220/E3
VD i 075 ... 2200/3E3
 CE 

Function:

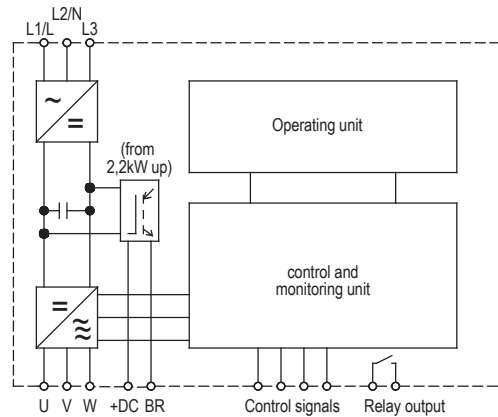
- control and setpoint entry via terminals, operating unit and Bus-systems
- PWM clock frequency 4 - 32kHz
- DC braking
- potential-free control and signalling contacts
- 150% overload for 60s
- detailed trouble check via parameter „0“
- integrated PI controller
- U/f characteristics control
- Open Loop vector speed control
- Open Loop speed control for synchronous motors
- BLDC vector control
- synchronous reluctance motor

Options: (please see accessories)

- memory stick with copying function
- remote control module (LED or OLED display)
- RJ45 cable and cable splitter
- braking resistors
- software for parameterization

Typical Application:

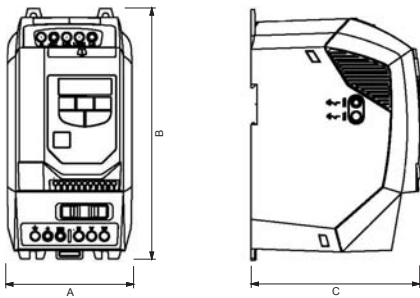
- | | |
|-------------------|-----------------------|
| pumps | wood working machines |
| grinding machines | conveying systems |
| ventilators | printing machinery |
| textile machines | packaging machines |



Typical designation	VD i .../E3				VD i.../3E3									
	037	075	150	220	075	150	220	400	550	750	1100	1500	1850	2200
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5	11,0	15,0	18,5	22
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz				three-phase 380-480V, 48-62Hz									
output current / A	2,3	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18	24	30	39	46
order number: 21300. ...	23037	23075	23150	23220	40075	40150	40220	40004	40005	40007	40011	40015	40018	40022
recommended mains filter (class C1)	27012.24016		27012.24030		27114.48006		27114.48016		27114.48030			27114.48055		

Technical data	VD i ... /E3				VD i ... /3E3									
	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5	11,0	15,0	18,5	22,0
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5	11,0	15,0	18,5	22,0
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz				three-phase 380-480V, 48-62Hz									
output current / A	2,3	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18	24	30	39	46
peak current for 1min./ A	3,5	6,5	10,5	15,7	3,3	6,2	8,7	14,3	21	27	36	45	58	69
control functions														
frequency setting range	0 – 500Hz													
torque boost	sensorless vector speed control, PM vector control, BLDC vector control, synchronous reluctance motor													
ramp-up and ramp-down time	0 ... 600s													
frequency setpoint	potentiometer $\geq 1k\Omega$, analogue signals, keypad, fixed frequencies, motor potentiometer, Modbus RTU, CANopen													
ambient / storage temperature	-10 ... 50°C, -40 ... 60°C													
design size	1			2	1		2	3			4			
weight / kg	1			1,7	1		1,7	3,2			9,1			

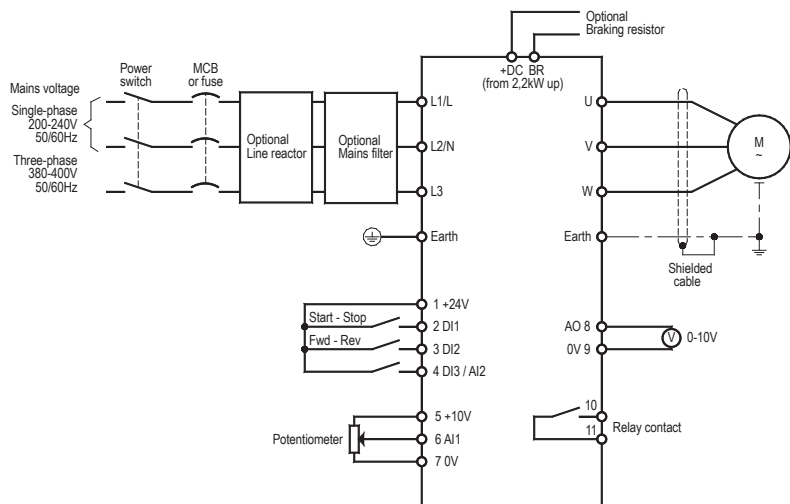
Dimensions:



size	A	B	C
1	82	173	123
2	109	221	150
3	131	261	175
4	171	420	212

All dimensions indicated in mm

Connection Diagram:



AC drive VersiDrive i ... /E3/3E3/IP66/IP66S up to 7,5kW 4.03

Features:

- small design for IP66 unit
- easy programming and connection
- precise and reliable control for IE2, IE3 & IE4 motors
- induction motors, PM motors, brushless DC motors, synchronous reluctance motors
- 14 parameters for basic settings
- precise digital control via push of a button
- application macros (industrial, pumps and fan operation)
- PTC input
- max. rotating field frequency 500Hz
- integrated braking chopper (up from 2,2kW)
- degree of protection IP20
- integrated mains filter
- serial communication with Modbus RTU and CANopen



AC drive
VD i 037 ... 220/E3/IP66/IP66S
VD i 075 ... 750/3E3/IP66/IP66S



Function:

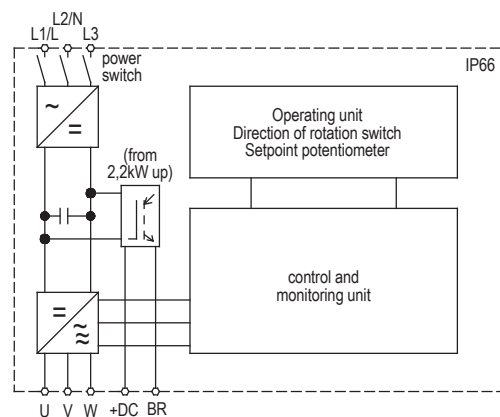
- control and setpoint entry via terminals, operating unit and Bus-systems
- PWM clock frequency 4 - 32kHz
- DC braking
- potential-free control and signalling contacts
- 150% overload for 60s
- detailed trouble check via parameter „0“
- integrated PI controller
- U/f characteristics control
- Open Loop vector speed control
- Open Loop speed control for synchronous motors
- BLDC vector control
- synchronous reluctance motor
- „IP66S“ model with potentiometer, right left switch and line disconnecter

Options: (please see accessories)

- memory stick with copying function
- remote control module (LED or OLED display)
- RJ45 cable and cable splitter
- braking resistors
- software for parameterization

Typical Application:

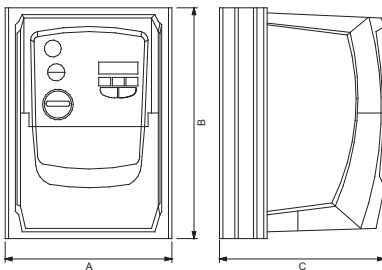
- | | |
|-------------------|-----------------------|
| pumps | wood working machines |
| grinding machines | conveying systems |
| ventilators | printing machinery |
| textile machines | packaging machines |



Typical designation	VD i ... /E3/IP66/IP66S				VD i ... /3E3/IP66/IP66S					
	037	075	150	220	075	150	220	400	550	750
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz				three-phase 380-480V, 48-62Hz					
output current / A	2,3	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18
order number with switch IP66S: 21301. ...	23037	23075	23150	23220	40075	40150	40220	40004	40005	40007
order number without switch IP66: 21302. ...	23037	23075	23150	23220	40075	40150	40220	40004	40005	40007

Technical data	VD i ... /E3/IP66/IP66S				VD i ... /3E3/IP66/IP66S					
	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz				three-phase 380-480V, 48-62Hz					
output current / A	2,3	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18
peak current for 1min. / A	3,5	6,5	10,5	15,7	3,3	6,2	8,7	14,3	21	27
control functions										
frequency setting range	0 – 500Hz									
torque boost	sensorless vector speed control, PM vector control, BLDC vector control, synchronous reluctance motor									
ramp-up and ramp-down time	0 ... 600s									
frequency setpoint	potentiometer \geq 1k Ω , analogue signals, keypad, fixed frequencies, motor potentiometer Modbus RTU, CANopen									
ambient / storage temperature	-10 ... 40°C, -40 ... 60°C									
design size	1			2		1	2		3	
weight / kg	2,8			4,6		2,8	4,6		7,4	

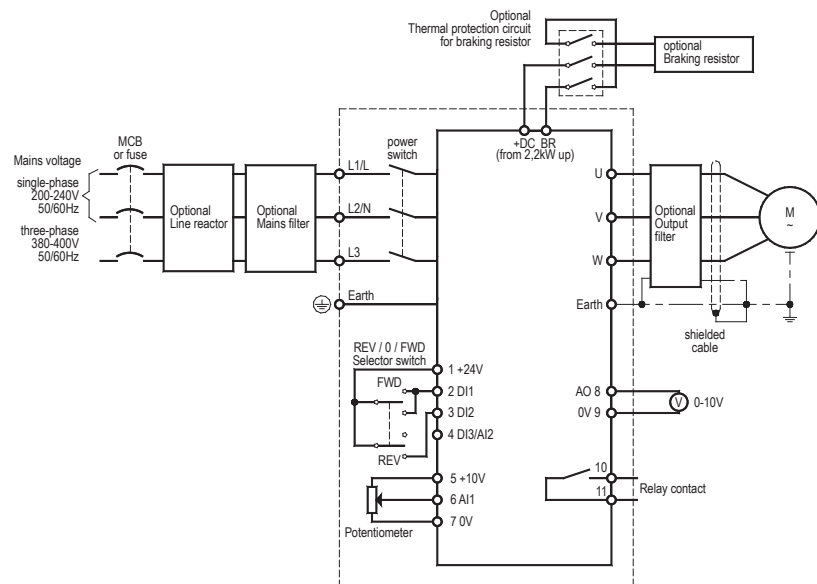
Dimensions:



size	A	B	C
1	161	232	179
2	188	257	186,5
3	210,5	310	229

All dimensions indicated in mm

Connection Diagram:



AC drive for single-phase AC motors VersiDrive i ... /E3S up to 1,1kW 4.05

Features:

- small inverters for single-phase AC motors
- suitable for capacitor and shaded pole motor
- easy programming and connection
- 14 parameter for basic settings
- precise digital control via push of a button
- application macros (industrial, pumps and fan operation)
- PTC input
- adjustable fixed frequencies
- max. rotating field frequency 120Hz
- integrated braking chopper at 1,1kW
- degree of protection IP20
- integrated mains filter
- serial communication with Modbus RTU and CANopen



AC drive for single-phase AC motors
VD i 037 ... 110/E3S



Function:

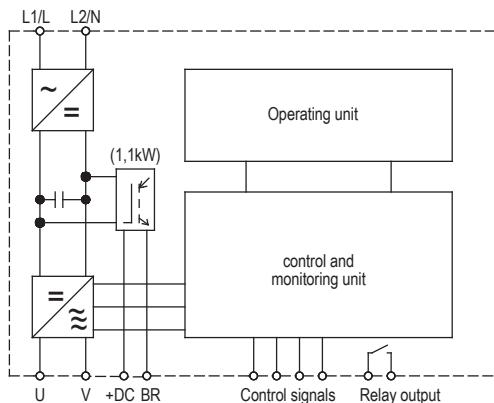
- control and setpoint entry via terminals, operating unit and Bus-systems
- PWM clock frequency 4 - 32kHz
- DC braking
- potential-free control and signalling contacts
- 150% overload for 60s
- detailed trouble check via parameter „o“
- integrated PI controller
- U/f characteristics control

Typical Application:

- pumps
- grinding machines
- ventilators

Options : (please see accessories)

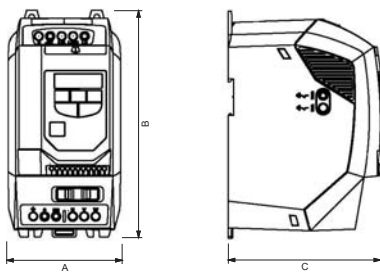
- memory stick with copying function
- remote control module (LED or OLED display)
- RJ45 cable and cable splitter
- braking resistors
- software for parameterization



Typical designatin	VD i ... /E3S		
	037	075	110
motor shaft power / kW	0,37	0,75	1,1
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz		
output current / A	4,3	7	10,5
order number 21305, ...	23037	23075	23110
recommended mains filter	27012.24016		27012.24030

Technical data	VD i ... /E3S		
motor shaft power / kW	0,37	0,75	1,10
mains voltage according to DIN EN 50160 (IEC 38)	0,37	0,75	1,1
output current / A	single-phase 200-240V, 48-62Hz		
control functions	4,3	7	10,5
frequency setting range	0 – 120Hz		
torque boost	U/f characteristics, energy optimized U/f control		
ramp-up and ramp-down time	0 ... 600s		
frequency setpoint	potentiometer >= 1kΩ, analogue signals, keypad, fixed frequencies, motor potentiometer, Modbus RTU, CANopen		
ambient / storage temperature	-10 ... 50°C, -40 ... 60°C		
design size	1	2	
weight / kg	1,1	2,6	

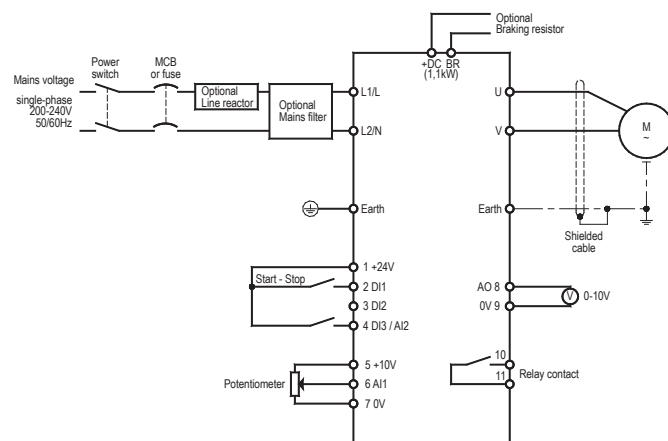
Dimensions:



size	A	B	C
1	82	173	123
2	109	221	150

All dimensions indicated in mm

Connection Diagram:



AC drive for single-phase AC motors VersiDrive i ... /E3S/IP66/IP66S up to 1,1kW 4.07

Features:

- ▣ small inverter for single-phase AC motors
- ▣ suitable for capacitor and shaded pole motor
- ▣ easy programming and connection
- ▣ 14 parameter for basic settings
- ▣ precise digital control via push of a button
- ▣ application macros (industrial, pumps and fan operation)
- ▣ PTC input
- ▣ adjustable fixed frequencies
- ▣ max. rotating field frequency 120Hz
- ▣ integrated braking chopper at 1,1kW
- ▣ degree of protection IP66
- ▣ integrated mains filter
- ▣ serial communication with Modbus RTU and CANopen



AC drive for single-phase AC motors
VD i 037 ... 110/E3S/IP66/IP66S



Function:

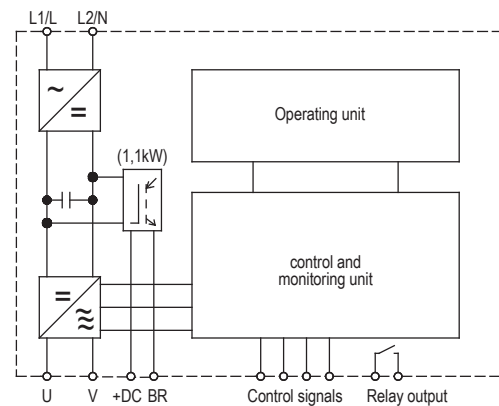
- ▣ control and setpoint entry via terminals, operating unit and Bus-systems
- ▣ PWM clock frequency 4 - 32kHz
- ▣ DC braking
- ▣ potential-free control and signalling contacts
- ▣ 150% overload for 60s
- ▣ detailed trouble check via parameter „O“
- ▣ integrated PI controller
- ▣ U/f characteristics control
- ▣ „IP66S“ model with potentiometer, right-left switch and line disconnecter

Typical application:

- pumps
- grinding machines
- ventilators

Options : (please see accessories)

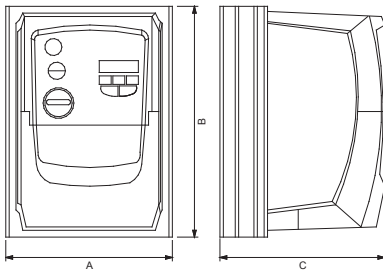
- ▣ memory stick with copying function
- ▣ remote control module (LED or OLED display)
- ▣ RJ45 cable and cable splitter
- ▣ braking resistors
- ▣ software for parameterization



Typical designation	VD i ... /E3S/IP66/IP66S		
	037	075	110
motor shaft power / kW	0,37	0,75	1,1
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz		
output current / A	4,3	7	10,5
order number with switch IP66S:	23037	23075	23110
21308. ...			
order number without switch IP66:	23037	23075	23110
21311. ...			

Technical data	VD i ... /E3S/IP66/IP66S		
motor shaft power / kW	0,37	0,75	1,10
mains voltage according to DIN EN 50160 (IEC 38)	0,37	0,75	1,1
output current / A	single-phase 200-240V, 48-62Hz		
control functions	4,3	7	10,5
frequency setting range	0 – 120Hz		
torque boost	U/f characteristics, energy optimized U/f control		
ramp-up and ramp-down time	0 ... 600s		
frequency setpoint	potentiometer $\geq 1k\Omega$, analogue signals, keypad, fixed frequencies, motor potentiometer, Modbus RTU, CANopen		
ambient / storage temperature	-10 ... 40°C, -40 ... 60°C		
design size	1	2	
weight / kg	2,8	4,6	

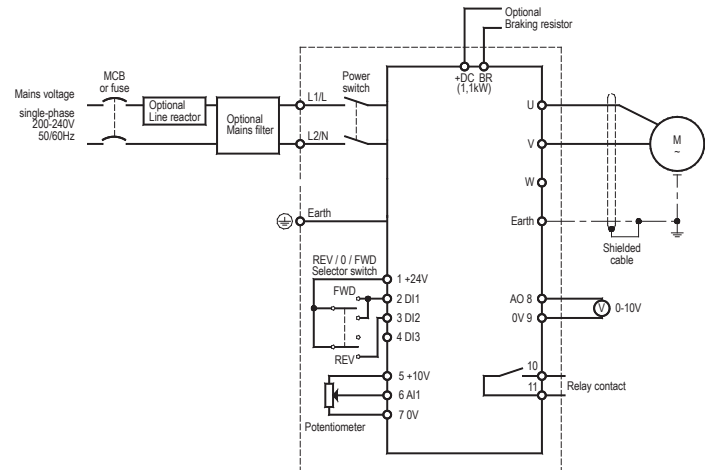
Dimensions:



size	A	B	C
1	161	232	179
2	188	257	186,5

All dimensions indicated in mm

Connection Diagram:



AC drive VersiDrive i ... /Pro/3Pro up to 11kW 4.09

Features:

- U/f-characteristics control
- open loop vector control (200% start torque)
- closed loop encoder control (plug-in)
- open und closed loop control for synchronous motors
- PTC-input
- max. rotating field frequency 500Hz
- safety stop according to IEC 61508 SIL2
- integrated braking chopper
- degree of protection IP20
- integrated mains filter
- integrated Modbus RTU and CANbus



AC drive
VD i 075 ... 220/Pro
VD i 075 ... 1100/3Pro
 CE 

Function:

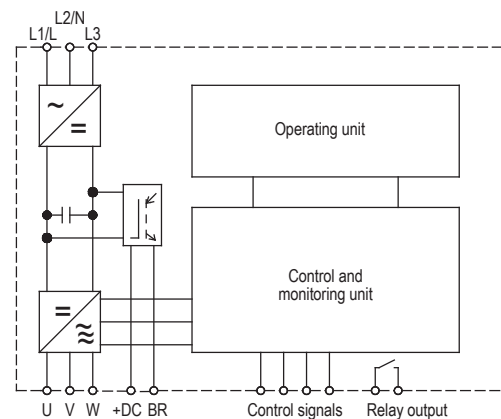
- control and setpoint entry via terminals, operating units and bus systems
- PWM clock frequency 4 - 32kHz
- sensorless speed and torque control
- potential-free control and signalling contacts
- 150% overload for 60s
- integrated PI controller
- detailed trouble check via parameter Po-13
- easy PLC functionality

Typical Application:

- lifts and hoisting units
- pumps
- grinding machines
- printing machinery
- textile machines
- drives requiring high torque
- centrifuges
- ventilators
- conveying systems
- woodworking machines
- packaging machines

Options: (please see accessories)

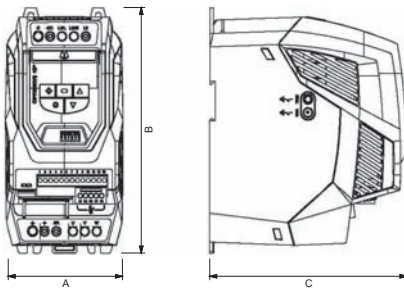
- remote control module
- additional input and output module
- RJ45-cable and cable splitter
- encoder extension module
- communication- and bus-plug-ins
- bluetooth-memory stick
- braking resistors
- software for parameterization and operating
- license key for PLC



Typical designation	VD i ... /Pro			VD i ... /3Pro						
	075	150	220	075	150	220	400	550	750	1100
motor shaft power / kW	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V ± 10% 48-62Hz			three-phase 380-480V ± 10% 48-62Hz						
output current / A	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18	24
order number: 2100. ...	23075	23150	23220	40075	40150	40220	40004	40005	40007	40011
recommended mains filter order number	27012. 24016	27012.24030		27114.48006		27114.48016		27114.48030		

Technical data	VD i ... /Pro			VD i ... /3Pro						
	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5	11,0
motor shaft power / kW	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V \pm 10% 48-62Hz			three-phase 380-480V \pm 10% 48-62Hz						
output current / A	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18	24
peak current for 1min / A	6,5	10,5	15,7	3,3	6,2	8,7	14,3	21	27	36
control functions										
frequency setting range	0 – 500Hz									
torque boost	boost (U/f) adjustable via parameter setting; open loop vector control									
ramp-up and ramp-down time	0 ... 3000s									
frequency setpoint	potentiometer \geq 1k Ω , 0-10V, 4-20mA, keypad, fixed frequencies, motor potentiometer, Modbus RTU, CANbus									
ambient / storage temperature	-10 ... 50°C, -40 ... 60°C									
design size	2			2				3		
weight / kg				1,8				3,5		

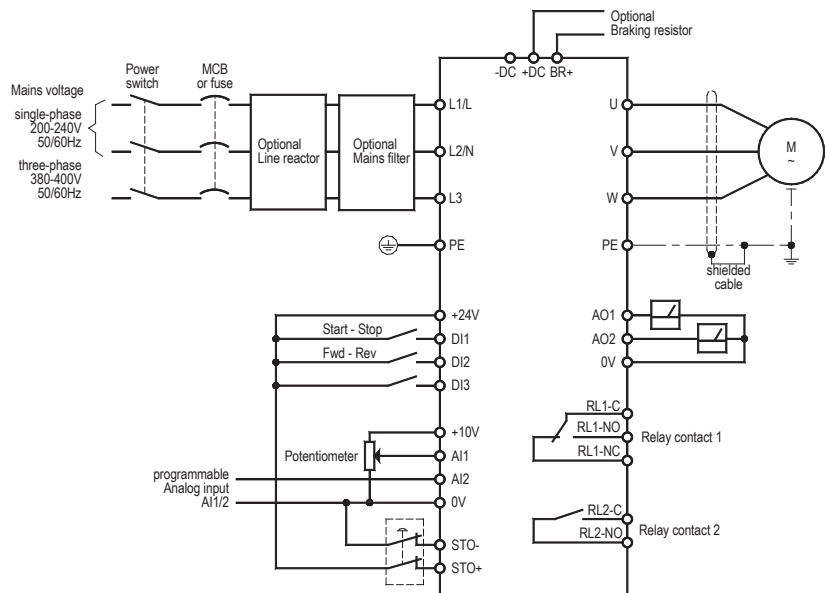
Dimensions:



size	A	B	C
2	112	221	185
3	131	261	205

All dimensions indicated in mm

Connection Diagram:




AC drive VersiDrive i ... /3Pro/IP20/IP55 up to 250kW 4.11

Features:

- degree of protection IP55 up to 160kW
- U/f-characteristics control
- open loop vector control (200% start torque)
- closed loop encoder control (plug-in)
- open und closed loop control for synchronous motors
- PTC-input
- max. rotating field frequency 500Hz
- safety stop according to IEC 61508 SIL2
- integrated braking chopper
- built-in DC reactor as standard
- integrated mains filter
- integrated Modbus RTU module and CANbus



AC drive
VD i 1100 ... 16000/3Pro/IP55
VD i 20000 ... 25000/3Pro/IP20
 

Function:

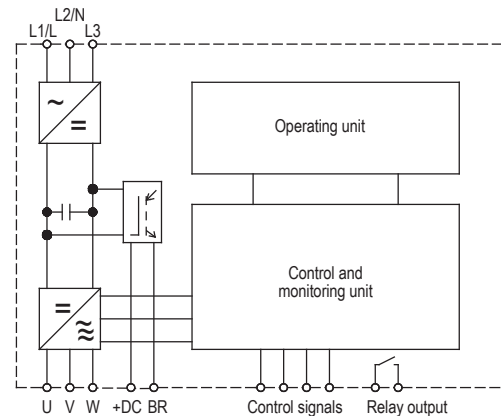
- control and setpoint entry via terminals, operating units and bus systems
- PWM clock frequency 4 - 32kHz
- sensorless speed and torque control
- potential-free control and signalling contacts
- 150% overload for 60s
- integrated PI controller
- detailed trouble check via parameter Po-13
- easy PLC functionality

Typical Application:

- lifts and hoisting units
- pumps
- grinding machines
- printing machinery
- textile machines
- drives requiring high torque
- centrifuges
- ventilators
- conveying systems
- woodworking machines
- packaging machines

Options: (please see accessories)

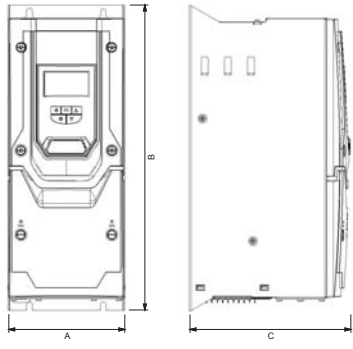
- remote control module
- additional input and output module
- RJ45-cable and cable splitter
- encoder extension module
- communication- and bus-plug-ins
- bluetooth-memory stick
- braking resistors
- software for parameterization and operating
- license key for PLC



Typical designation	VD i .../3Pro/IP55															VD i /3Pro/IP20		
	1100	1500	1850	2200	3000	3700	4500	5500	7500	9000	11000	13200	16000	20000	25000			
motor shaft power / kW	11	15	18,5	22	30	37	45	55	75	90	110	132	160	200	250			
mains voltage according to DIN EN 50160 (IEC 38)	three-phase 380-480V ± 10% 48-62Hz																	
output current / A	25	30	39	46	61	72	90	110	150	180	202	240	300	370	450			
order number: 2101. ...	40011	40015	40018	40022	40030	40037	40045	40055	40075	40090	40110	40132	40150	40200	40250			
recommended mains filter order number	27114.48055			27114.48100			27114.48180			27114.48300			-	-	-			

Technical data	VD i ... /3Pro/IP55														VD i/3Pro/IP20					
	1100	1500	1850	2200	3000	3700	4500	5500	7500	9000	11000	13200	16000	20000	25000					
motor shaft power / kW	11	15	18,5	22	30	37	45	55	75	90	110	132	160	200	250					
mains voltage according to DIN EN 50160 (IEC 38)	three-phase 380-480V ± 10% 48-62Hz																			
output current / A	25	30	39	46	61	72	90	110	150	180	202	240	300	370	450					
peak current for 1min./ A	38	45	59	69	91	108	135	165	225	270	303	360	450	555	675					
control functions	0 – 500Hz																			
frequency setting range	boost (U/f) adjustable via parameter setting: open loop vector control																			
torque boost	0 ... 300s																			
ramp-up and ramp-down time	potentiometer >= 1kΩ, 0-10V, 4-20mA, keypad, fixed frequencies, motor potentiometer, Modbus RTU, CANbus																			
frequency setpoint	-10 ... 50°C, -40 ... 60°C																			
ambient / storage temperature	4																			
design size	5				6				7				8							
weight / kg	11,5				22,5				50				80				200			

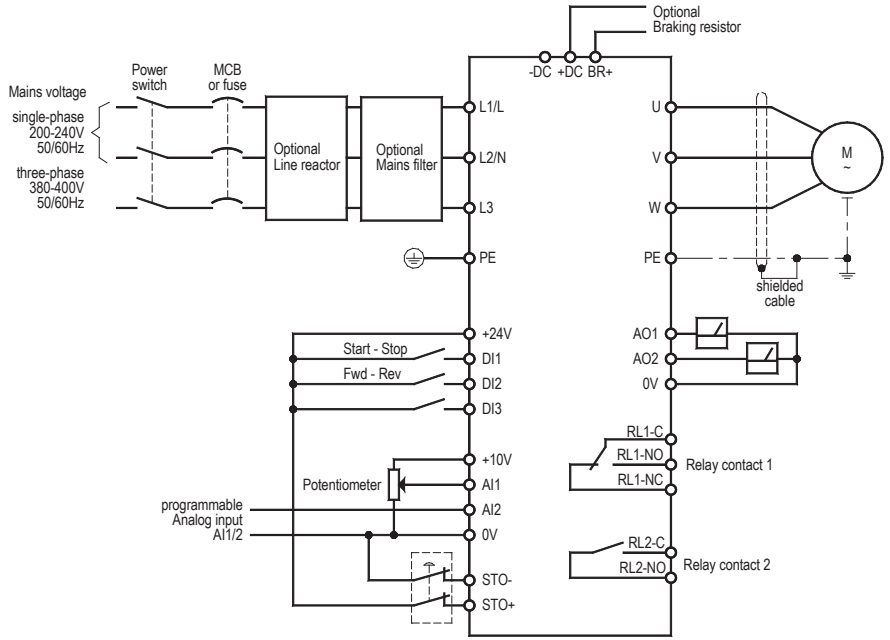
Dimensions:



size	A	B	C
4	171	440	240
5	235	540	270
6	330	865	330
7	330	1280	360
8	482	995	480

All dimensions indicated in mm

Connection Diagram:



Features:

- U/f-characteristics control
- open loop vector control (200% start torque)
- closed loop encoder control (plug-in)
- open und closed loop control for synchronous motors
- PTC-input
- max. rotating field frequency 500Hz
- safety stop according to IEC 61508 SIL2
- integrated braking chopper
- degree of protection IP66
- integrated mains filter
- integrated Modbus RTU module and CANbus



AC drive
VD i 075 ... 220/Pro/IP66
VD i 075 ... 750/3Pro/IP66
 CE cUL US LISTED

Function:

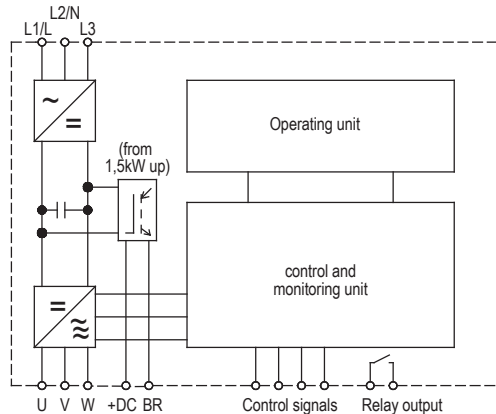
- control and setpoint entry via terminals, operating units and bus systems
- PWM clock frequency 4 - 32kHz
- sensorless speed and torque control
- potential-free control and signalling contacts
- 150% overload for 60s
- integrated PI controller
- detailed trouble check via parameter Po-13
- PLC function

Typical Application:

- | | |
|-------------------|----------------------|
| pumps | woodworking machines |
| grinding machines | conveying systems |
| ventilators | printing machinery |
| textile machines | packaging machines |

Options: (please see accessories)

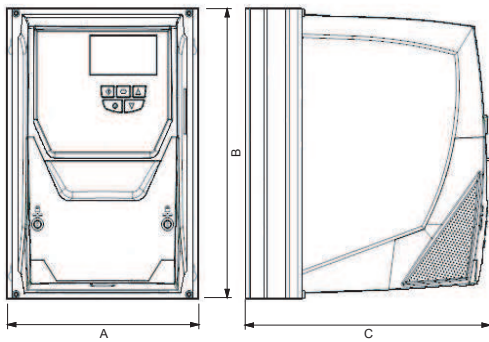
- remote control module
- input and output module
- RJ45-cable and cable splitter
- encoder extension module
- communication- and bus-plug-ins
- bluetooth-memory stick
- braking resistors
- software for parameterization and operating
- license key for PLC
- available with switch



Typical designation	VD i ... /Pro/IP66			VD i ... /3Pro/IP66					
	075	150	220	075	150	220	400	550	750
motor shaft power / kW	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V ±10% 48-62Hz			three-phase 380-480V ±10%, 48-62Hz					
output current / A	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18
order number with switch (right, left, potentiometer, mains disconnection)	21107. 23075	21107. 23150	21107. 23220	21109. 40075	21109. 40150	21109. 40220	21109. 40004	21109. 40005	21109. 40007
order number without switch	21103. 23075	21103. 23150	21103. 23220	21105. 40075	21105. 40150	21105. 40220	21105. 40004	21105. 40005	21105. 40007

Technical data	VD i ... /Pro/IP66			VD i ... /3Pro/IP66					
	075	150	220	075	150	220	400	550	750
motor shaft power / kW	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V ±10% 48-62Hz			three-phase 380-480V ±10%, 48-62Hz					
output current / A	4,3	7	10,5	2,2	4,1	5,8	9,5	14	18
peak current for 1min. / A	6,5	10,5	15,7	3,3	6,2	8,7	14,3	21	27
control functions									
frequency setting range	0 – 500Hz								
torque boost	boost (U/f) adjustable via parameter setting; open loop vector control								
ramp-up and ramp-down time	0 ... 3000s								
frequency setpoint	potentiometer, 0-10V, 4-20mA, keypad, fixed frequencies, motor potentiometer, Modbus RTU, CANbus								
ambient / storage temperature	-10 ... 50°C, -40 ... 60°C								
design size	2			2			3		
weight / kg	4,5			4,5			7,0		

Dimensions:

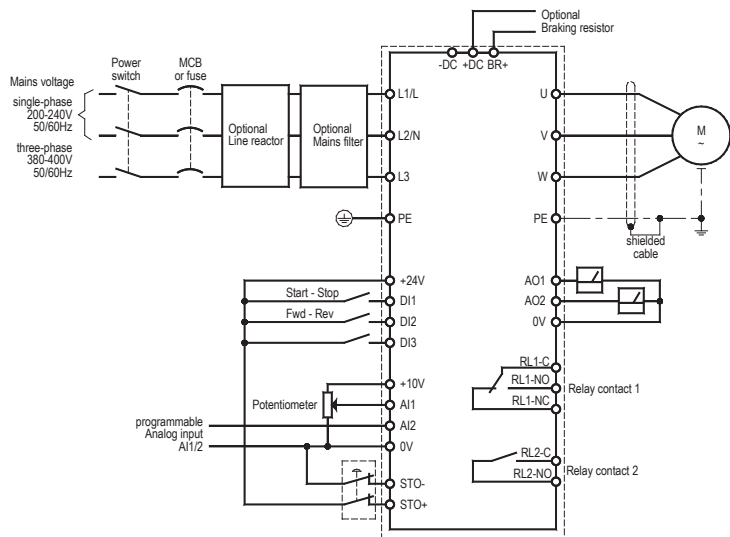


size	A	B	C
2	188	257	239
3	211	310	251

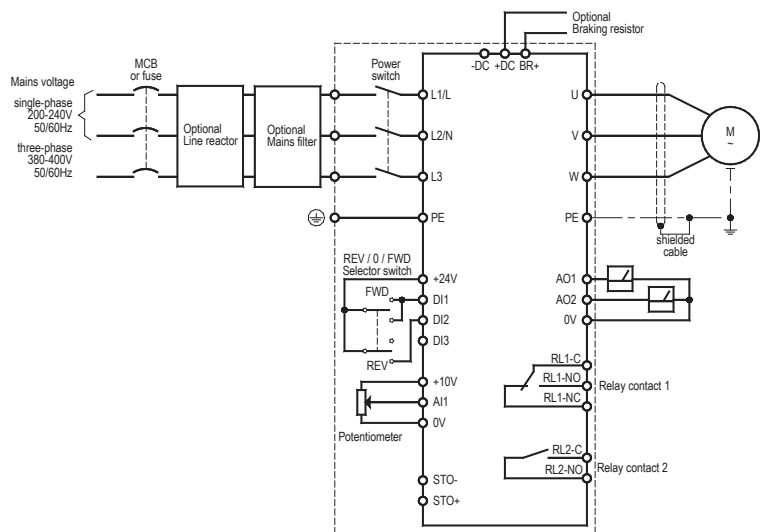
All dimensions indicated in mm

Connection Diagram:

without switch



with switch



Options

Expansion Modules:

	order number	E3S/E3	Pro
VersiE/A PRO (plug-in for additional I / O)	29000.21101		x
VersiRel PRO (plug-in for additional relay output)	29000.21102		x
VersiModulTTL (TTL-Encoder module)	29000.21103		x
VersiModulE (Ethernet module)	29000.21104		x
VersiModulP (Profibus module)	29000.21105		x
VersiModulD (DeviceNet module)	29000.21106		x
VersiRel 1 (1 additional relay output)	29000.21010	x	
VersiCont (control inputs via 230VAC)	29000.21012	x	
VersiGateE (ext. Gateway for Ethernet)	29000.21014	x	
VersiGateP (ext. Gateway for Profibus-DP)	29000.21015	x	
VersiGateD (ext. Gateway for DeviceNet)	29000.21017	x	

PC Communication:

	order number	E3S/E3	Pro
VersiStick (Bluetooth-memory stick)	29000.21003	x	x
VersiSplit (data splitter)	29000.21005	x	x
PC-Kit (RS485 USB-converter)	29000.21009	x	x
VersiPC (Windows-program for VersiDrive / download on homepage) *	29000.21016	x	x
licence key for PLC	29000.21107		x
USB-bluetooth gateway for PC	29000.21021		

* For use with PC-software USB-converter (PC-Kit) or bluetooth-VersiStick is needed !

General Accessories:

	order number	E3S/E3	Pro
VersiStick (memory stick with copying funtion)	29000.21003	x	x
VersiPad (remote keypad)	29000.21004	x	x
VersiOLED (OLED remote keypad)	29000.21019	x	x
VersiSplit (RS 485 cable splitter)	29000.21005	x	x
RJ45-cable 0,5m	29000.21006	x	x
RJ45-cable 1m	29000.21007	x	x
RJ45-cable 3m	29000.21008	x	x
potentiometer in VDE-design 10kΩ	41750.01103	x	x
rotary button, 20mm, complete	65000.00002	x	x
scale, 50mm x 50mm; 0 - 10	77200.00014	x	x

AC drive FUS ... /L5/3L5 up to 2,2kW 4-17

Features:

- space saving design
- RS485 Modbus interface as standard
- voltage vector control
- fixed frequencies adjustable
- max. rotating field frequency 650Hz
- digital keypad with speed potentiometer
- integrated braking chopper at FUS .../3L5
- degree of protection IP20
- integrated mains filter



AC drive
FUS 020 ... 220/L5
FUS 075 ... 220/3L5
CE 

Function:

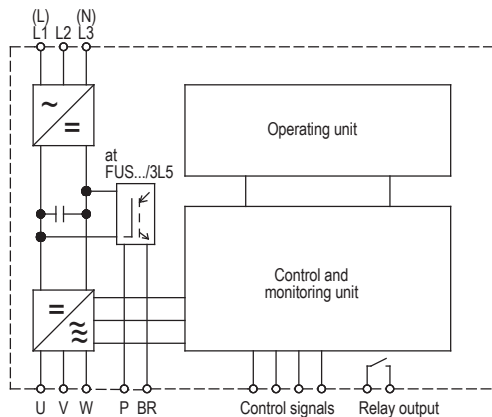
- control and setpoint entry via terminals, operating unit or bus systems
- PWM clock frequency 1 - 16kHz
- integrated motor overload protection
- potentialfree control and signalling contacts
- fault memory
- internal PI controller

Typical Application:

- | | |
|-------------------|----------------------|
| pumps | woodworking machines |
| grinding machines | conveying systems |
| ventilators | printing machinery |
| textile machines | packaging machines |

Options: (please see accessories)

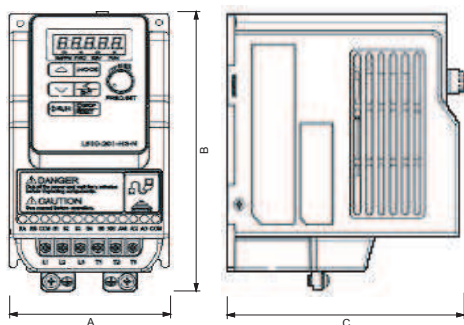
- remote control/ copying module
- keypad extension cable
- Profibus DP module
- TCP-IP module
- DeviceNet module
- CANopen module
- RJ45 to USB cable
- operating software
- mounting plate for DIN rail



Typical designation	FUS ... /L5					FUS .../3L5		
	020	037	075	150	220	075	150	220
motor shaft power / kW	0,2	0,37	0,75	1,5	2,2	0,75	1,5	2,2
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V ,+10%, -15% 50/60Hz ±5%					three-phase 380-460V,+10%,-15% 50/60Hz ±5%		
output current / A	1,8A	2,6A	4,3A	7,5A	10,5A	2,3A	3,8A	5,2A
order number: 2T000. ...	23020	23037	23075	23150	23220	40075	40150	40220
recommended mains filter (class C1)	27012.24016			27012.24030		27114.48006		27114.48016

Technical data	FUS ... /L5					FUS .../3L5		
	020	037	075	150	220	075	150	220
motor shaft power / kW	0,2	0,37	0,75	1,5	2,2	0,75	1,5	2,2
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V ,+10%,-15% 50/60Hz ±5%					three-phase 380-460V,+10%,-15% 50/60Hz ±5%		
output current / A	1,8A	2,6A	4,3A	7,5A	10,5A	2,3A	3,8A	5,2A
control functions								
frequency setting range	0 – 650Hz							
torque boost	6 fixed U/f-characteristic, free configurable U/f-characteristic							
ramp-up and ramp-down time	0 ... 3600s							
frequency setpoint	potentiometer >= 1kΩ, 0-10V, 0/4-20mA, keypad, keypad potentiometer, fixed frequencies, motor potentiometer, Modbus							
ambient / storage temperature	-10 ... 40°C (-10 ... 50°C für BG 2), -20 ... 60°C							
design size	1				2		2	
weight / kg	0,7	0,9		1,6		1,7		

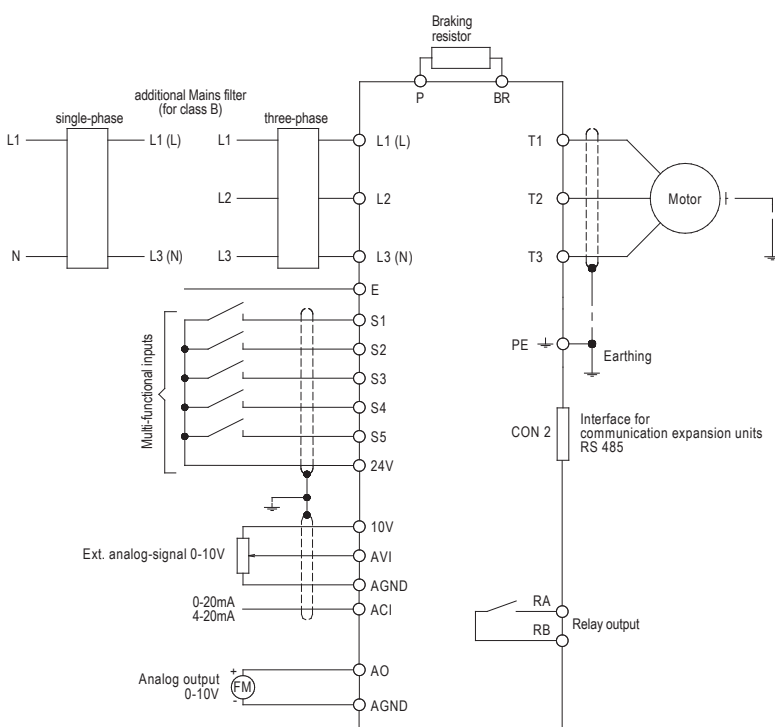
Dimensions:



size	A	B	C
1	72	141	141
2	118	144	150

All dimensions indicated in mm

Connection Diagram:



AC drive FUS ... /E5/3E5 up to 18,5kW 4.19

Features:

- U/f-characteristics control
- open loop vector control (150% start torque at 1Hz)
- safety stop and fire mode
- digital keypad with speed potentiometer
- detachable operating unit
- max. rotating field frequency 650Hz
- integrated braking chopper
- degree of protection IP20
- integrated mains filter
- integrated Modbus RTU
- controllable ventilator



AC drive
FUS 037 ... 220/E5
FUS 075 ... 1850/3E5



Function:

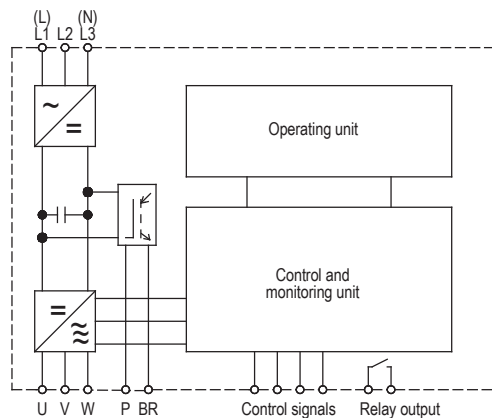
- control and setpoint entry via terminals, operating unit and bus systems
- PWM clock frequency 1 - 16kHz
- built-in SPS function
- potentialfree control and signalling contacts
- 150% overload for 60s
- integrated PI-controller

Typical Application:

- lifts and hoisting units
- pumps
- grinding machines
- printing machinery
- textile machines
- drives requiring high torque
- centrifuges
- ventilators
- conveying systems
- woodworking machines
- packaging machines

Options: (please see accessories)

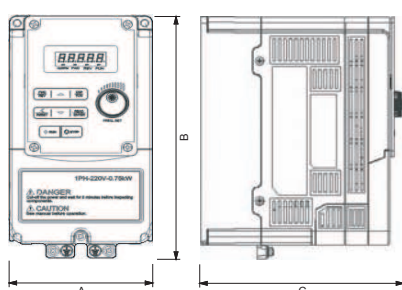
- remote control / copying module
- keypad extension cable
- Profibus DP module
- TCP-IP module
- DeviceNet module
- CANopen module
- RJ45 to USB cable
- operating software
- mounting plate for DIN rail



Typical designation	FUS ... /E5				FUS ... /3E5								
	037	075	150	220	075	150	220	400	550	750	1100	1500	1850
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11	15	18,5
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, +10%, -15% 50/60Hz ±5%				three-phase 380-460V, +10%, -15% 50/60Hz ±5%								
output current / A	3,1	4,5	7,5	10,5	2,3	3,8	5,2	8,8	13	17,5	24	32	40
order number: 2T100. ...	23037	23075	23150	23220	40075	40150	40220	40004	40005	40007	40011	40015	40018
recommended mains filter (class C1)	27012.24016		27012.24030		27114.48006		27114.48016		27114.48030			27114.48055	

Technical data	FUS ... /E5				FUS ... /3E5								
	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11	15	18,5
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11	15	18,5
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, +10%, -15% 50/60Hz ±5%				three-phase 380-460V, +10%, -15% 50/60Hz ±5%								
output current / A	3,1	4,5	7,5	10,5	2,3	3,8	5,2	8,8	13	17,5	24	32	40
control functions	o – 650Hz												
frequency setting range	18 adjustable U/f-characteristics; open loop vector control												
torque boost	o ... 3600s												
ramp-up and ramp-down time	potentiometer >= 1kΩ, 0-10V, 0/4-20mA, keypad, keypad potentiometer, fixed frequencies, motor potentiometer, Modbus RTU												
frequency setpoint	-10 ... 50°C, -40 ... 60°C												
ambient / storage temperature	1												
design size	2												
weight / kg	3												
	4												

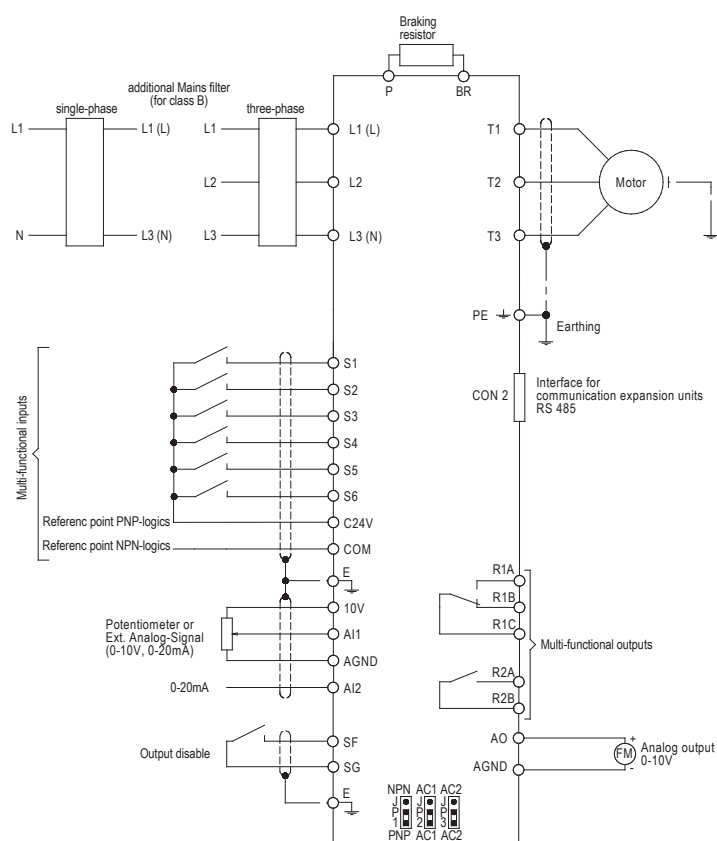
Dimensions:



size	A	B	C
1	91	164	149
2	129	188	149
3	187	261	197
4	225	435	201

Alle dimensions indicated in mm

Connection Diagram:



AC drive FUS ... /E5/3E5/IP66 up to 18,5kW 4.21

Features:

- U/f-characteristics control
- open loop vector control (150% start torque at 1Hz)
- safety stop and fire mode
- digital keypad with speed potentiometer
- built-in mains switch
- max. rotating field frequency 650Hz
- integrated braking chopper
- degree of protection IP66
- integrated mains filter
- integrated Modbus RTU
- controllable ventilator



AC drive
FUS 037 ... 220/E5/IP66
FUS 075 ... 1850/3E5/IP66
 CE cUL US LISTED

Function:

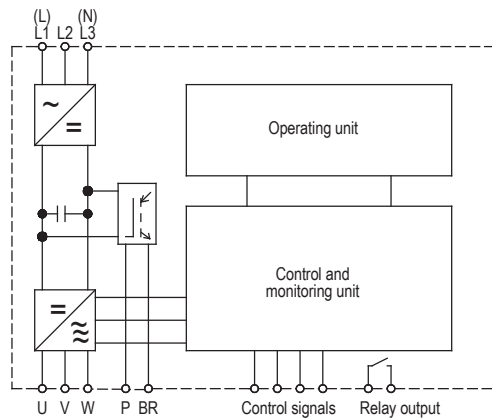
- control and setpoint entry via terminals, operating unit and bus systems
- PWM clock frequency 1 - 16kHz
- built-in SPS function
- potentialfree control and signalling contacts
- 150% overload for 60s
- integrated PI-controller

Typical Application:

All applications where the machine is exposed to harsh environment and extreme conditions. The IP 66 housing provides full protection against:
 dust
 electrical shock
 strong jets of water

Options: (please see accessories)

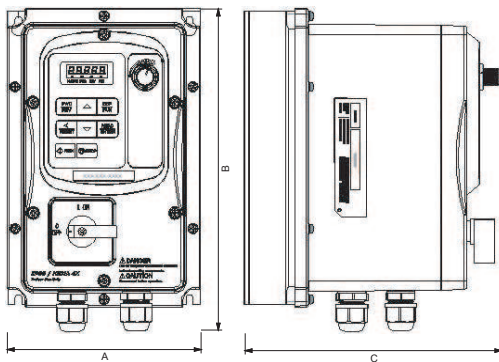
- remote control / copying module
- keypad extension cable
- Profibus DP module
- TCP-IP module
- DeviceNet module
- CANopen module
- RJ45 to USB cable
- operating software



Typical designation	FUS ... /E5/IP66				FUS ... /3E5/IP66								
	037	075	150	220	075	150	220	400	550	750	1100	1500	1850
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11	15	18,5
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, +10%, -15% 50/60Hz ±5%				three-phase 380-460V, +10%, -15% 50/60Hz ±5%								
output current / A	3,1	4,5	7,5	10,5	2,3	3,8	5,2	8,8	13	17,5	24	32	40
order number: 2T101. ...	23037	23075	23150	23220	40075	40150	40220	40004	40005	40007	40011	40015	40018

Technical data	FUS ... /E5/IP66				FUS ... /3E5/IP66										
	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11	15	18,5		
motor shaft power / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4	5,5	7,5	11	15	18,5		
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, +10%, -15% 50/60Hz ±5%				three-phase 380-460V, +10%, -15% 50/60Hz ±5%										
output current / A	3,1	4,5	7,5	10,5	2,3	3,8	5,2	8,8	13	17,5	24	32	40		
control functions	o – 650Hz														
frequency setting range	18 adjustable U/f-characteristics; open loop vector control														
torque boost	o ... 3600s														
ramp-up and ramp-down time	potentiometer >= 1kΩ, 0-10V, 0/4-20mA, keypad, keypad potentiometer, fixed frequencies, motor potentiometer, Modbus RTU														
frequency setpoint	-10 ... 50°C, -40 ... 60°C														
ambient / storage temperature	-10 ... 50°C, -40 ... 60°C														
design size	1			2			1			2			3		
weight / kg	2,9			6			2,9			6			12,7		

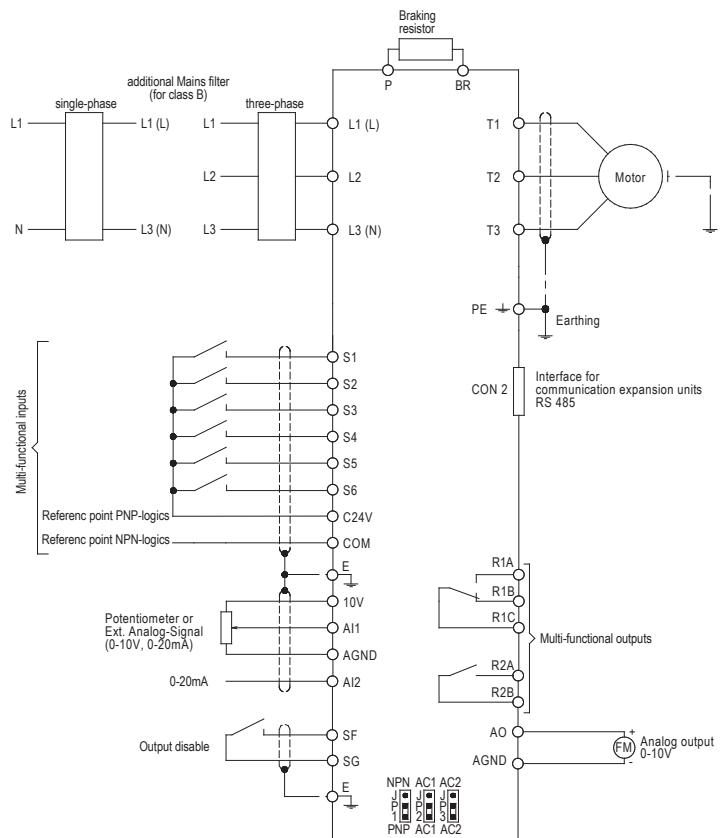
Dimensions:



size	A	B	C
1	151	249	200
2	198	335	235
3	223	466	267

Alle dimensions indicated in mm

Connection Diagram:



Options

Extension modules:

	order number	L5	E5
Profibus DP Gateway	29000.2T001	x	x
TCP-IP Gateway	29000.2T002	x	x
DeviceNet Gateway	29000.2T003	x	x
CANopen Gateway	29000.2T004	x	x

PC communication:

	order number	L5	E5
RJ45 to USB cable	29000.2T005	x	x

General accessories:

	order number	L5	E5
remote control / copying module	29000.2T006	x	x
keypad extension cable 1m	29000.2T007	x	x
keypad extension cable 2m	29000.2T008	x	x
keypad extension cable 3m	29000.2T009	x	x
keypad extension cable 5m	29000.2T010	x	x
mounting plate for DIN rail installation	29000.2T011	x	x

Features:

- short-circuit-proof, „intrinsically safe“ resistor, especially for our inverters (with built-in braking transistor)
- anodized aluminium housing
- the inverter software protects the braking resistor against overload, thus making additional overload relays unnecessary
- degree of protection IP65



Braking Resistor
BWD

Typical Applications:

Our braking resistors have been especially developed for use in inverter applications involving high moments of inertia that need to be brought to a standstill rapidly and in a controlled way. A dynamic braking resistor supports our inverters by converting excess energy from the motor into heat. For the braking resistor appropriate for your inverter, please see the tables below.

recommended for drive rating / kW	0,75	1,5	2,2
mains voltage acc. to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz		
recommended braking resistor	BWD250100	BWD500040	BWD500033
order number	29000.2l202	29000.2l203	29000.2l204
resistance / Ω	100	40	33
power dissipation / W at 35%ED	250	500	500
dimensions / mm	110x80x15	216x80x15	216x80x15

recommended for drive rating / kW	0,75	1,5	2,2	4,0	5,5	7,5	11
mains voltage acc. to DIN EN 50160 (IEC 38)	three-phase 380-480V, 48-62Hz						
recommended braking resistor	BWD250200	BWD500150		BWD600150	BWD600072	BWD600100 Ko2LV	BWD600080 Ko2LV
order number	29000.2l205	29000.2l206		29000.2l207	29000.2l208	29000.2l209	29000.2l210
resistance / Ω	200	150		150	72	50	40
power dissipation / W at 35%ED	250	500		600	600	480	480
dimensions / mm	110x80x15	216x80x15		216x80x30	216x80x30	*	*

recommended for drive rating / kW	15	22	30	37	45	55
mains voltage acc. to DIN EN 50160 (IEC 38)	three-phase 380-480V, 48-62Hz					
recommended braking resistor	BWD600100 Ko3LV	BWD600100 Ko4LV	BWD600072 Ko5LV	BWD600072 Ko6LV	BWD600100 Ko8LV	BWD600080 K10LV
order number	29000.2l211	29000.2l212	29000.2l213	29000.2l214	29000.2l215	29000.2l216
resistance / Ω	33	25	14	12	12	8
power dissipation / W at 35%ED	700	1000	1200	1500	2000	2400
dimensions / mm	*	*	*	*	*	*

*dimensions upon request

Up from 55kW upon request.

Should you need any further technical information on braking resistors, please simply get in touch with us.

Features:

- ☑ slim, compact design
- ☑ single-/threephase mains filter
- ☑ extremely high insertion loss, from 150kHz to 30MHz
- ☑ suitable for all PETER electronic inverters
- ☑ degree of protection IP20



**Mains Filter
NF 240/380**

Function:

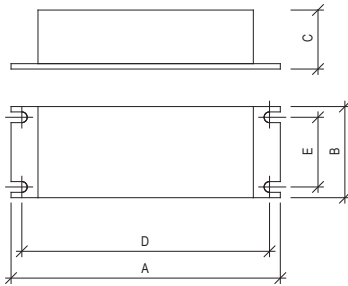
A mains filter keeps interferences generated by the inverter away from the mains, thus ensuring that applicable standards are complied with.
Class A limits in accordance with EN 55011 are complied with up to a maximum cable length of 50m.
For the mains filter suitable for your inverter, please refer to the tables below.

Typical Application:

AC drive

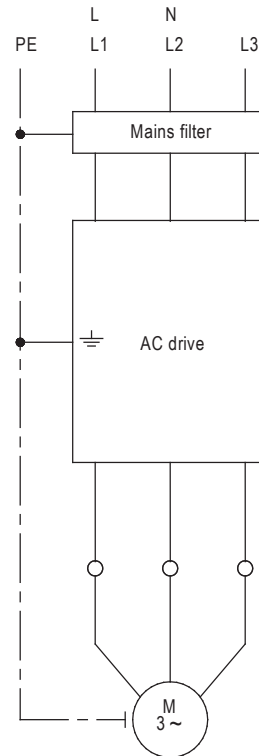
recommended for drive rating / kW	0,37	0,75	1,5	2,2	0,75	1,5	2,2	4,0	5,5	7,5	11
mains voltage according to DIN EN 50160 (IEC 38)	single-phase 200-240V, 48-62Hz				three-phase 380-480V, 48-62Hz						
recommended mains filter	NF 240/16/VDi		NF 240/25/VDi		NF 480/7/VDi		NF 480/16/VDi		NF 480/30/VDi		
nominal current / A	16		25		7		16		30		
order number	27012.24016		27012.24030		27114.48006		27114.48016		27114.48030		

recommended for drive rating / kW	11	15	18,5	22	30	37	45	55	75	90	110	132	160
mains voltage according to DIN EN 50160 (IEC 38)	three-phase 380-480V ± 10% 48-62Hz												
recommended mains filter	NF 480/55/3PRO				NF 480/100/3PRO			NF 480/180/3PRO		NF480/300/3PO		-	
nominal current / A	55				100			180		300		-	
order number	27114.48055				27114.48100			27114.48180		27114.48300		-	

Dimensions:

	A	B	C	D	E
NF 240/16/VDi	130	93	62	120	70
NF 240/30/VDi	130	93	76	120	70
NF 480/7/VDi	190	40	70	180	20
NF 480/16/VDi	250	45	70	220	25
NF 480/30/VDi	270	50	85	240	30
NF 480/55/3PRO	250	85	90	220	60
NF 480/100/3PRO	270	90	150	240	65
NF 480/180/3PRO	380	120	170	350	102
NF 480/300/3PRO	440	200	200	400	160

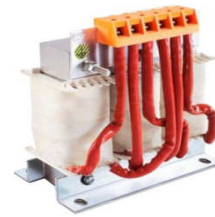
All dimensions indicated in mm

Connection Diagram:

Accessories AC drive Motor Reactor 4.29

Features:

- ☑ 3-phase dv/dt filter
- ☑ insulation class T40N <182A; T40F >230A
- ☑ typical dv/dt reduction > factor 5
- ☑ impedance Uk 0,8%
- ☑ vertically mounted on angle bracket
- ☑ suitable for use for all PETER electronic inverters
- ☑ degree of protection IP00



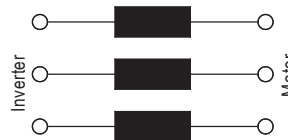
Motor Reactor
RWK 305

Function:

To ensure a long service-life of motors, it may become necessary to reduce the steep voltage edges (dv/dt) on the output of the frequency inverter by means of a motor reactor. At the same time, motor reactors also eliminate excessive overvoltage and interference current caused by parasitic line capacitance. If this type of filtering is insufficient or if you require a sinusoidal voltage on the output of the frequency inverter, a sine filter is to be used. In this case, please consult the factory.

Typical Application:

AC drive

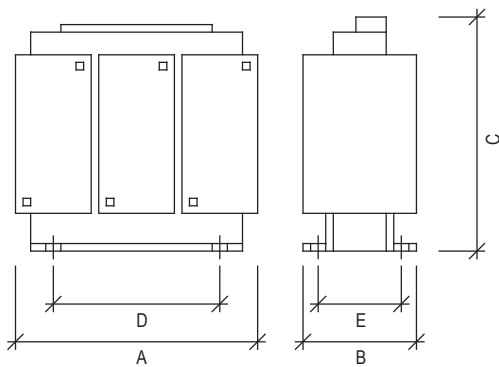


For the dv/dt filter suitable for your VersiDrive i, please see the tables below.

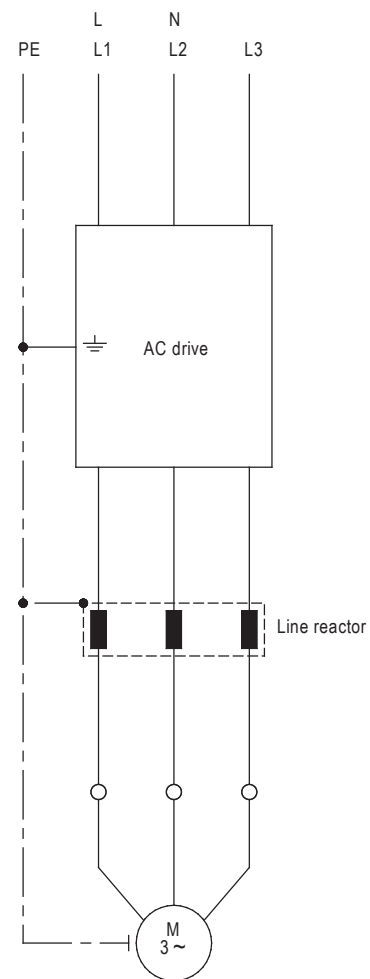
Type designation	Motor Reactor RWK 305-...						
	4	10	14	17	24	32	45
for motor shaft power / kW	1,5	-4	5,5	7,5	11	15	-22
nominal current / A	4	10	14	17	24	32	45
inductance / mH	1,47	0,588	0,42	0,346	0,245	0,184	0,131
max. operating voltage / frequency	3 x 500/288 VAC 60Hz						
order number	22802.00004	22802.00010	22802.00014	22802.00017	22802.00024	22802.00032	22802.00045

Type designation	Motor Reactor RWK 305-...						
	60	72	90	110	156	182	280
for motor shaft power / kW	30	37	45	55	75	90	-132
nominal current / A	60	72	90	110	156	182	280
inductance / mH	0,098	0,082	0,065	0,053	0,038	0,032	0,021
max. operating voltage / frequency	3 x 500/288 VAC 60Hz						
order number	22802.00060	22802.00072	22802.00090	22802.00110	22802.00156	22802.00182	22802.00280

Should you need any further technical information on motor reactors, please simply get in touch with us.

Dimensions:

	dimensions (mm)					weight (kg)
	A	B	C	D	E	
RWK 305-4	100	60	115	56	34	1,2
RWK 305-10	100	70	115	56	43	1,8
RWK 305-14	125	70	135	100	45	2,2
RWK 305-17	125	75	135	100	55	2,5
RWK 305-24	125	75	135	100	55	3,9
RWK 305-32	155	95	170	130	56	3,9
RWK 305-45	155	110	190	130	72	6,1
RWK 305-60	155	125	190	130	70	6,1
RWK 305-72	155	125	190	130	70	6,1
RWK 305-90	190	115	225	170	57	7,4
RWK 305-110	190	130	220	170	67	8,2
RWK 305-156	190	180	160	170	77	10,7
RWK 305-182	210	180	220	175	97	16
RWK 305-280	240	235	220	190	133	29

Connection diagram:

Thyristor Controllers SGP 160 – 2,5 ...16 5.01

Features:

- ▣ for motors with external and permanent excitation
- ▣ one-quadrant operation
- ▣ control range with armature voltage control 1:30
- ▣ control range with tachometer control 1:100
- ▣ degree of protection IP 00



Thyristor Controllers
SGP 160 – 2,5 ... 16
CE

Function:

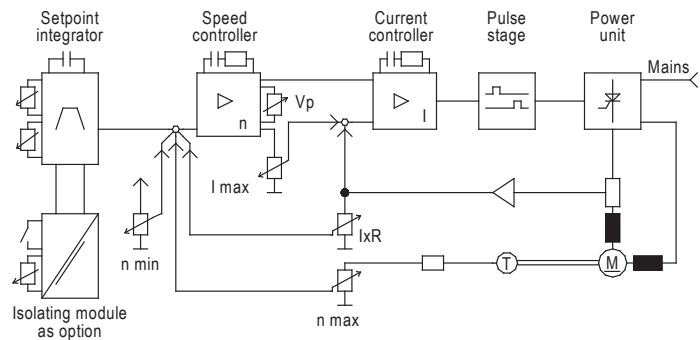
- ▣ half-controlled symmetrical bridge circuit with excitation voltage source
- ▣ adjustable current controller and thus very suitable for permanently excited motors

Typical Applications:

- conveying systems
- printing machines
- pumps
- rotary table drives
- welding wire feed mechanisms
- packaging machinery

Options:

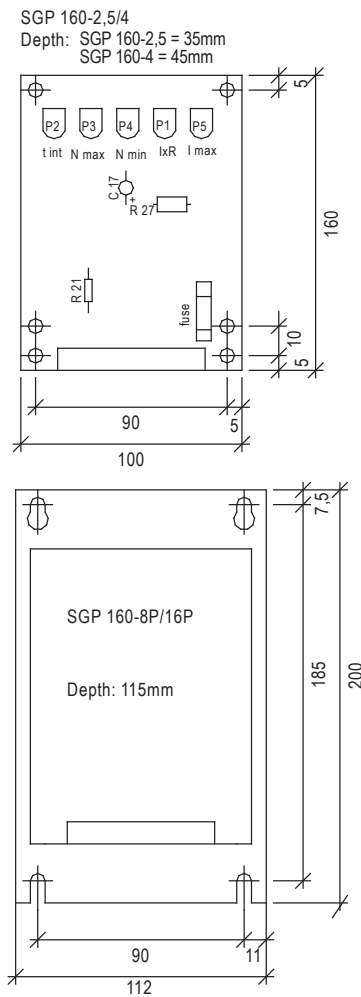
- ▣ with isolating module (P)
- ▣ pluggable with pin connector DIN 41617 (ST)
- ▣ pluggable with isolating module (ST/P)



Typical designation	SGP 160-2,5	SGP 160-4	SGP 160-8P	SGP 160-16P
eff. armature current	2,5A	4A	8A	16A
max. motor shaft power	0,25kW	0,37kW	0,9kW	1,8kW
operating voltage acc. to DIN EN 50160 (IEC 38)	230V + 15% 50/60Hz			
order number	22300.22002	22300.22004	22311.22008	22311.22016
recommended mains filter	27000.25003	27000.25006	27000.25010	27000.25020

Technical data	SGP 160-2,5	SGP 160-4	SGP 160-8P	SGP 160-16P
operating voltage acc. to DIN EN 50160 (IEC 38)	230V + 15% 50/60Hz			
eff. armature current	2,5A	4A	8A	16A
max. motor shaft power	0,25kW	0,37kW	0,9kW	1,8kW
armature voltage	0 ... 180VDC			
excitation voltage / current	200VDC / 0,5A		200VDC / 1A	
control characteristics				
with I x R compensation	1 : 30 / ±3%			
with tachometer control	1 : 100 / ±1%			
setpoint input	0 - 10VDC 5 - 10kΩ potentiometer			
actual value input	12 - 300VDC depending on adaptation Factory-adapted to 160V armature voltage			
connection	16-pole terminal strip, 1,5mm ²		Control unit: 6-pole terminal strip, 1,5mm ² Power unit: 6-pole terminal strip, 1,5mm ²	
ambient / storage temperature	0 ... 45°C not subject to moisture condensation / -25°C ... 75°C			
cooling	convection			
temperature-dependent power reduction	2% / °C above 45°C...max. 55°C			
weight / kg	0,25	0,3	1,1	1,3

Dimensions:

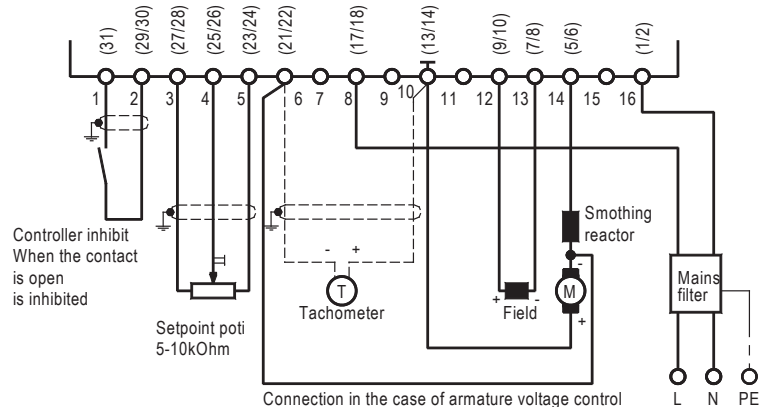


All dimensions indicated in mm

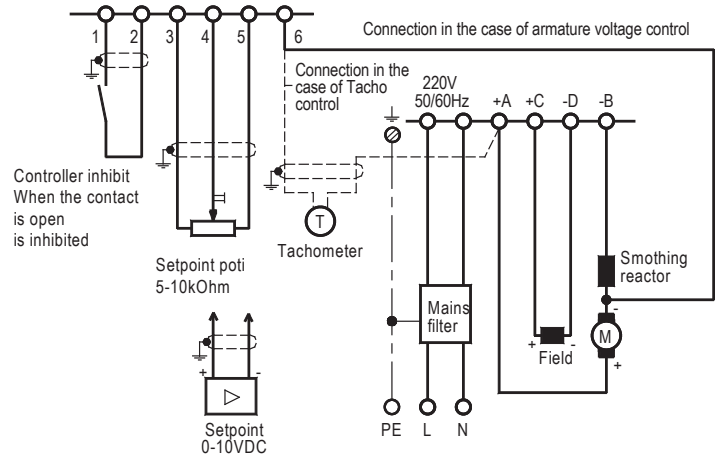
Connection Diagrams:

SGP 160-2,5/4

Plug-connector version indicated in brackets



SGP 160-8/16P

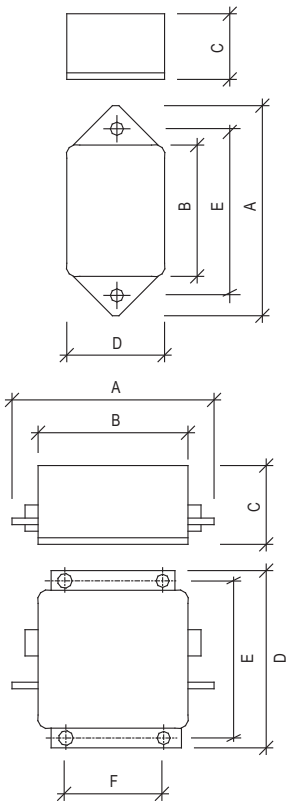
Connection Control unit
(6-pole terminal strip)Control Power unit
(6-pole terminal strip)

To ensure a good commutation and a long service life of the carbon brushes, we recommend to use a smoothing reactor in the case of thyristor controllers.

Mains filter

Technical Data	NF 250/3	NF 250/6	NF 250/10	NF 250/20
area required	85x54mm	114x58mm	156x58mm	139x105mm
leakage current	0,4mA	0,4mA	0,4mA	5,0mA
type of connection	flat pin 6,3	flat pin 6,3	flat pin 6,3	screw terminal
for motor shaft power	- 0,25kW	- 0,55kW	- 1,0kW	- 2,2kW
nominal current	3A	6A	10A	20A
order number	27000.25003	27000.25006	27000.25010	27000.25020

Dimensions:



	dimensions (mm)						weight (kg)
	A	B	C	D	E	F	
NF 250/3	85	64,8	40,3	54	75	-	0,25
NF 250/6	113,5	94,0	45,4	57,5	103,0	-	0,45
NF 250/10	156,0	130,5	45,4	57,5	143,0	-	0,73

	dimensions (mm)						weight (kg)
	A	B	C	D	E	F	
NF 250/20	139,0	99,0	57,0	105,0	95,0	51,0	1,0

Smoothing Reactors

Type	nominal current in A	inductance in mH	dimensions in mm (B x H x T)	order number
SGP 5-96	2 - 4	90 - 135	80 x 78 x 112	23000.09604
SGP 5-106	3 - 6	45 - 60	86 x 100 x 120	23000.10606
SGP 5-135A-12	6 - 12	35 - 40	115 x 120 x 145	23000.13512
SGP 5-135A-16	8 - 16	25 - 35	115 x 120 x 145	23000.13516

Reversing Cards

Type	nominal current	suitable for	dimensions in mm (B x H x T)	order number
RK 8	up to 8A	SGP 160-2,5 ... 8	160 x 100 x 30	29000.22302
RK 8/ST	up to 8A	SGP 160-2,5 ... 8	160 x 100 x 30	29000.22303

General Accessories

	order number
potentiometer in VDE-design 10k Ω	41750.01103
socket connector DIN 41617 / 31pole	53231.00003

Safety Standstill Monitor VersiSafe 6.01

Features:

- ❑ no external initiators necessary
- ❑ independent of direction
- ❑ broken wire detection
- ❑ positive guided safety contacts: 3 NO contacts, 1 NC contact for AC 250V
- ❑ adjustable voltage setting
- ❑ adjustable standstill time delay
- ❑ LED indicators for standstill, event of line breakage and operating voltage
- ❑ Suitable for operating with inverters
- ❑ width 45mm
- ❑ nominal motor voltage up to 690V



Safety Standstill Monitor VersiSafe



Function:

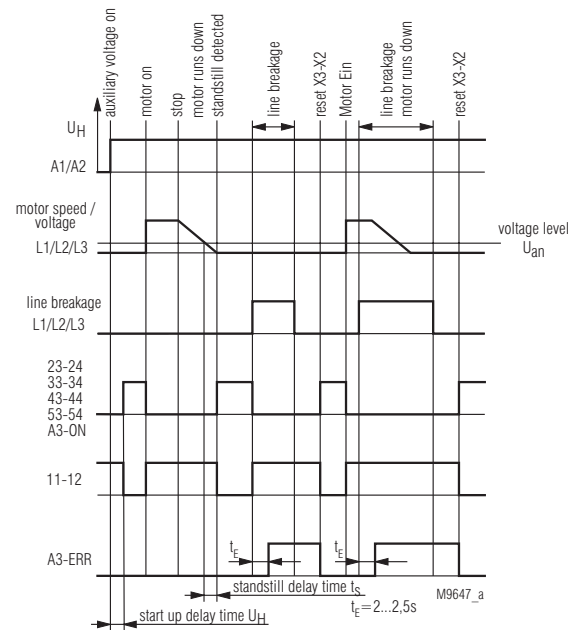
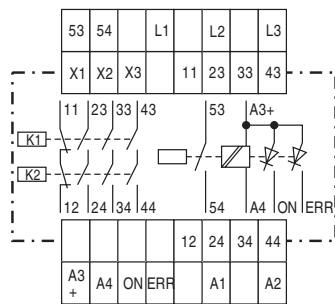
- ❑ safe standstill detection on three- and single-phase motors
- ❑ detection of standstill via monitoring of remanence voltage
- ❑ redundant measurement via two independent channels
- ❑ adaptable to various motor types and applications

Typical applications:

- Safe standstill detection in:
- safety circuits according to IEC/EN 60204 in machines with dangerous parts or tools (e.g. to enable gate interlocks on machine tools or to activate hold in brakes)
 - to avoid damage if unexpected start can cause collision
 - motor control when reversing direction

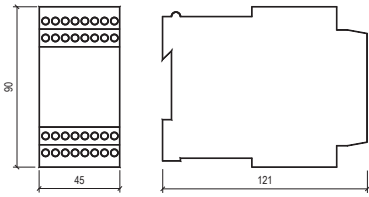
Safety rated data:

- ❑ values according to EN ISO 13849-1:
 - safety category: 4
 - performance level: e
 - MTTF_d: 93a
 - DC_{avg}: 99,0%
 - d_{op}: 365 days/year
 - h_{op}: 24 hours/day
 - t_{zyklus}: 28,8E+03 s/zyklus = 1 / 8 hours
- ❑ values according to IEC EN 62061 / IEC EN 61508:
 - SIL CL: 3 IEC EN 62061
 - SIL 3 IEC EN 61508
 - HFT: 1 (Hardware-Failure-Tolerance)
 - DC_{avg}: 99,0%
 - SFF 99,7%
 - PFH_D: 4,10E-10 h⁻¹



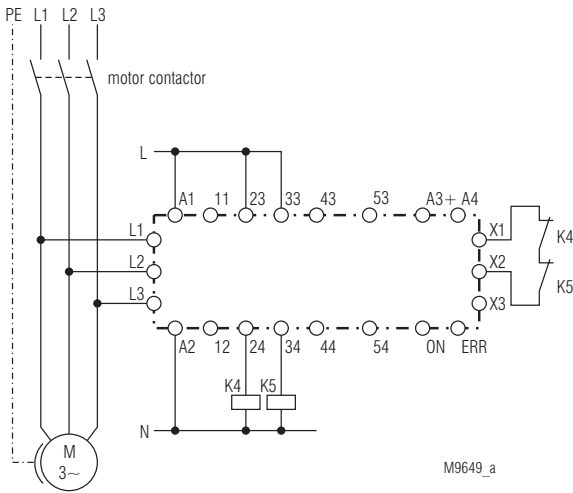
Typical designation	VersiSafe		
input L1, L2, L3 measuring-/motor voltage	max. 690 V		
safety output (3 NO contacts/1 NC contact)	AC 250V, 5A		
indicator contact	AC 250V, 3A		
auxiliary voltage U _H	DC 24V	AC 230V	AC 400V
response value U _{an}	20...400mV (special unit 0,2 ... 4V)		
standstill time	0,2...6s		
max. operating frequency	1200/h		
ambient/storage temperature	-25°C...+60°C / -40°C...+75°C		
weight / kg	0,4		
order number	27801.69000	27800.69000	27802.69000
special unit/response value U _{an} 0,2 ... 4V			
order number	27804.69000	27803.69000	27805.69000

Dimensions:

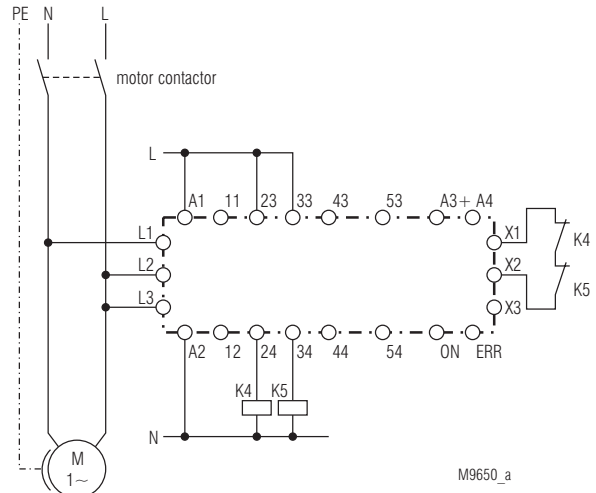


All dimensions indicated in mm

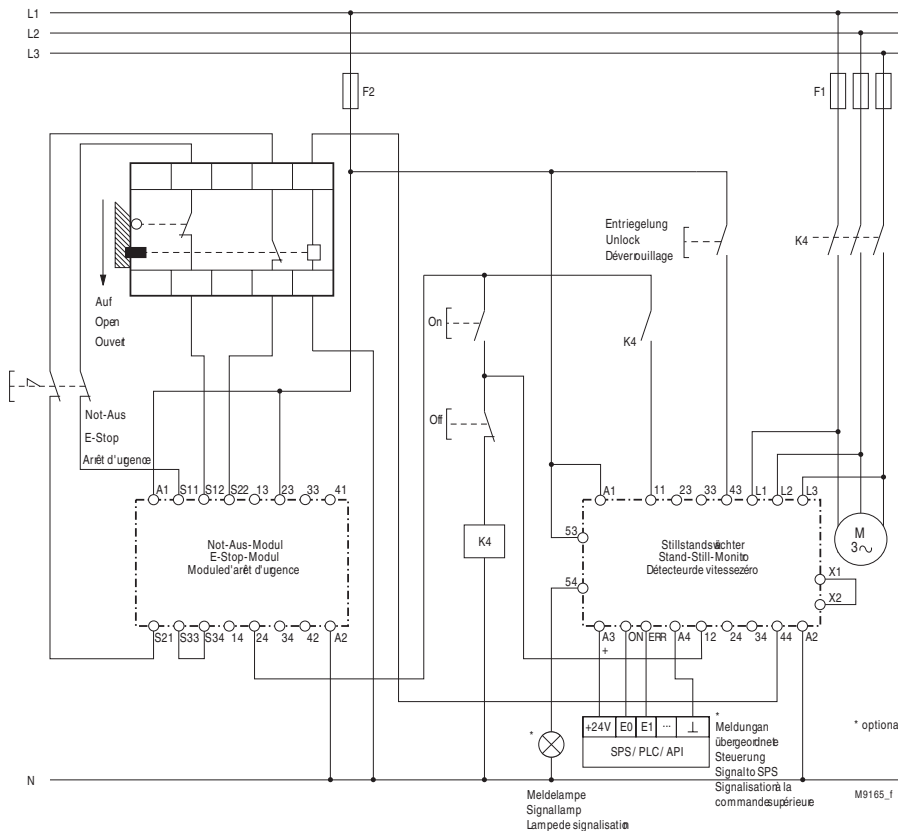
Connection Diagrams:



with three-phase motor



with single-phase motor



typical combined connection with emergency stop

Subject to change without notice.

Features:

- ❑ safe, sensorless drive monitoring
- ❑ over-, underfrequency or window monitoring of single-phase or 3-phase AC systems
- ❑ user friendly frontside display
 - comfortable, menu guided configuration
 - for set point and actual value of Hz
- ❑ manual or auto-reset
- ❑ simple and time-saving setup without PC
- ❑ extensive diagnostic functions
- ❑ possibility of overriding the speed by a supervisory function (muting)
- ❑ up to 4 activatable operating modes (e.g. automatic-, installation- or service operation)
- ❑ galvanic separation between measuring input, auxiliary voltage and output contacts
- ❑ 2-channel function
- ❑ forcibly guided output contacts
- ❑ LED-indicators and 2 semiconductor monitoring output analog output
- ❑ up to 4 frequency modes selectable
- ❑ width 45 mm



Safety Frequency Monitor
VersiSafe Speed
CE

Function:

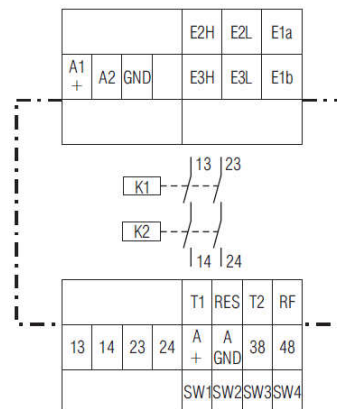
- ❑ fast reaction time by measuring duration of cycle of input frequency
- ❑ adjustable hysteresis
- ❑ adjustable reset delay function from 0 ... 100 s
- ❑ adjustable start up time delay from 0 ... 100 s
- ❑ adjustable alarm delay from 0,1 ... 100 s

Typical Applications:

monitoring of output frequency of inverters
platform technics
wood working machinery
machine tools
wind generator machines
crane applications

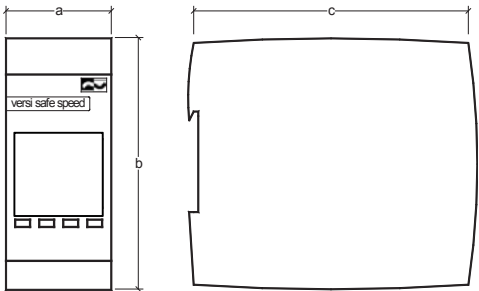
Safety rated data:

- ❑ safety category 4 / Performance Level (PL) e to DIN EN ISO 13849-1
- ❑ SIL-Claimed Level (CL) 3 to EN 62061 and EN 61800-5-2
- ❑ SIL 3 to IEC 61508 and EN 61511
- ❑ safety functions according to EN 61800-5-2
STO (Safe Torque Off),
SOS (Safe Operating Stop),
SLS (Safely Limited Speed),
SSM (Safe Speed Monitor)
SSR (Safe Speed Range)



Typical designation	VersiSafe Speed
voltage range	
E1a-E2L, E1b-E3L	AC 8 ... 280 V
E1a-E2H, E1b-E3H	AC 16 ... 600 V
auxiliary voltage U _H	24 VDC, typ. 3,2W
input frequency	<700Hz
response value (frequency threshold)	adjustable from 1 Hz ... 600 Hz
pulse frequency inverter	≥ 1 kHz
measuring accuracy	< ± 2 %
reaction time of frequency monitoring	duration of 1 cycle (inverse value of adjusted frequency) + 10 ms + adjusted response delay
contacts	2 NO contacts forcibly guide, Semiconductor monitoring output
degree of protection	housing IP40, terminals IP20
ambient- /storage temperature	-25°C...+60°C / -40°C...+75°C
weight / kg	0,4
order number	27810.69000

Dimensions:

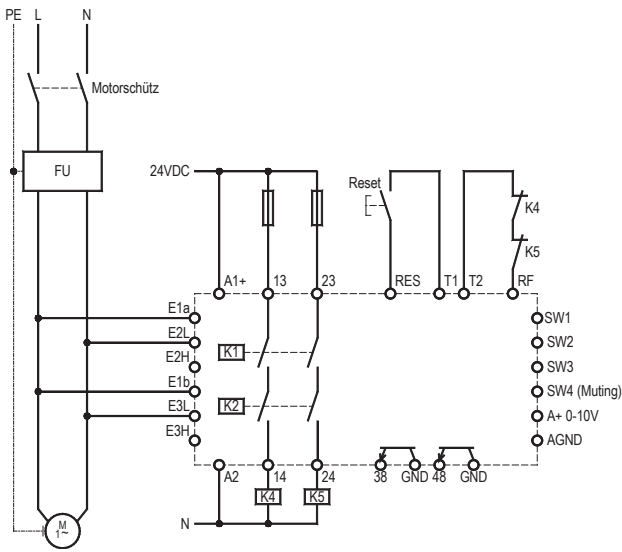


Mounting dimensions	a	b	c
VersiSafe Speed	45	107	121

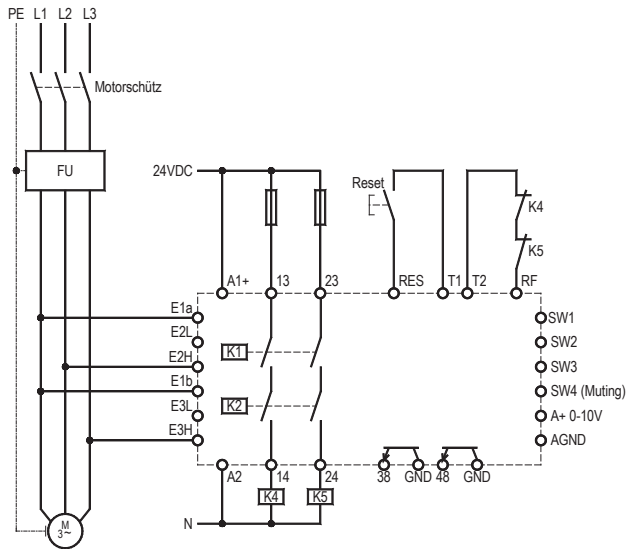
All dimensions in mm

Connection Diagram:

single-phase:



three-phase:



Domestic Agencies

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77-79, 80-99

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92348 Berg

Mr. Rainer Beesk
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70-76

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