



3VS Motor Protection Circuit Breaker

Smart & Reliable

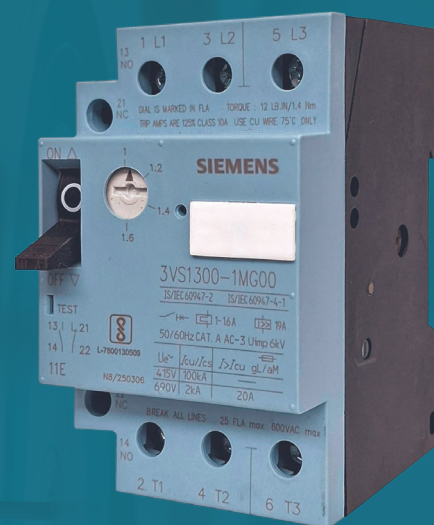
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Index

Overview	Pg 3
Selection and ordering data	Pg 4
Technical data	Pg 5
Characteristic curves	Pg 7
Accessories	Pg 8
Dimensional drawings	Pg 10



3VS Motor Starter Protectors

Overview

Description

The 3VS13 motor starter protectors are compact motor starter protectors for currents up to 25 A which operate according to the current limiting principle. The devices are used for switching and protecting motors or other loads. They are fitted with instantaneous overcurrent releases and inverse-time delayed overload relay. Motor starter protectors and contactors can be combined to form fuseless starter combinations.

The 3VS13 motor starter protectors are suitable for use in any climate.

Motor Starter Protectors

- for motor protection
 - 3VS13: 0.4~25 A

The characteristic curves of these motor starter protectors are specially laid-out for the overload and short-circuit protection of motors.

The inverse-time delayed releases ("a releases") are adjustable for setting the rated current of the motors to be protected. The instantaneous short-circuit releases ("n releases") are fixed-set to 12 times the value so as to assure faultless starting of the motors.

Current Limiting is achieved in 3VS as follows

In case of a short circuit, the contacts are opened electro-dynamically by the short circuit current. The instantaneous overcurrent release, through the switching mechanism, trips all the three poles of the breaker. A large arc voltage is quickly built up in the arc chamber limiting the short circuit current. Thus ensures faster fault clearing.

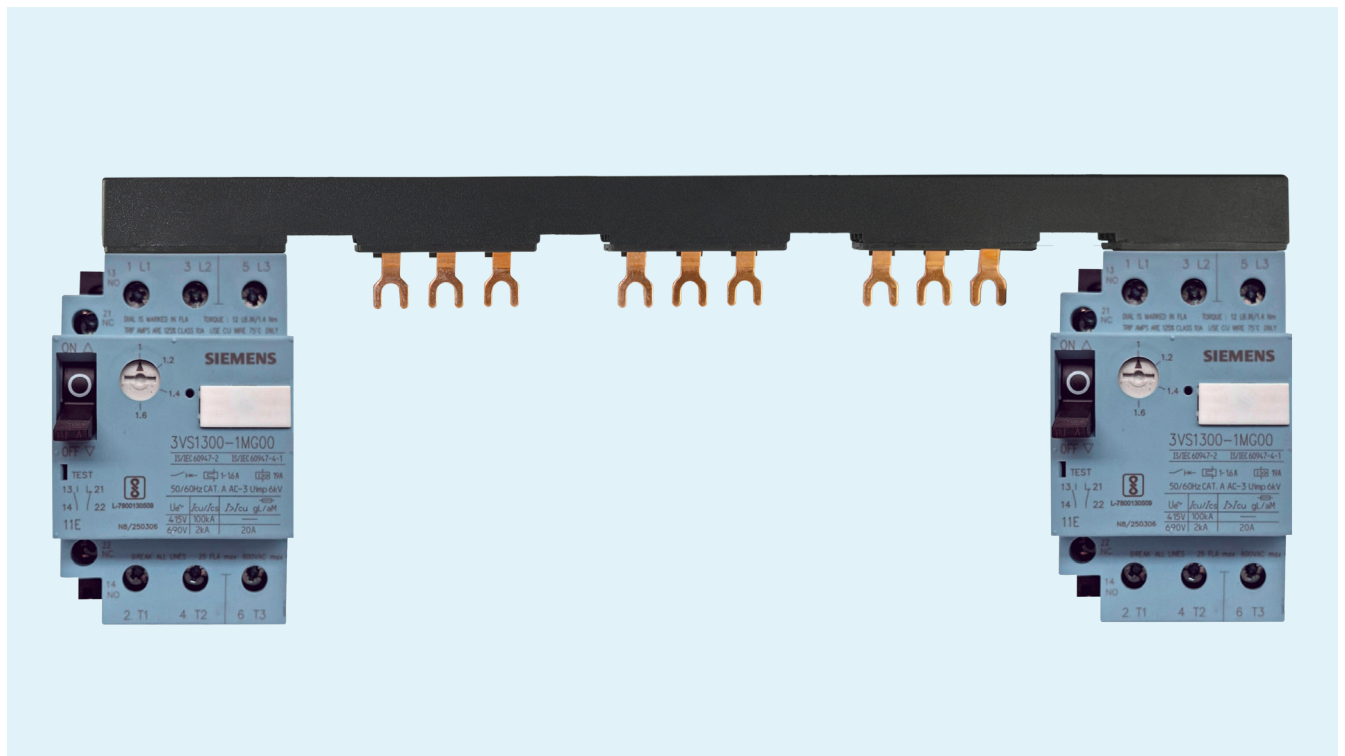
Ambient temperature compensation upto 55°C hence no derating required upto 55°C.

Safety

- Trip Free Mechanism
The breakers have a trip-free mechanism. Even by holding the toggle, tripping operation can not be stopped or blocked once it is started. Thus ensure positive opening in the event of fault.
- Positive ON/OFF indication through toggle switch
- Compact and space saving

Certification

3VS13 range has CE and EEQCO Scheme-X certifications.

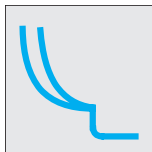


3VS Busbar Mounting

3VS Motor Starter Protectors

Selection and ordering data

Motor starter protectors

	Rated current I_n	Motor output	Setting range		DT	Order No.	Weight per PU approx. kg
			Thermal overload releases	Instantaneous overcurrent releases			
							
	A	kW	A	A			
3VS13 Motor Starter Protectors, up to 25 A							
	0.6	0.12/0.18	0.4 ... 0.6	7.2		3VS13 00-□ME00	0,280
	1	0.25	0.6 ... 1	12		3VS13 00-□MF00	0,280
	1.6	0.37/0.55	1 ... 1.6	19		3VS13 00-□MG00	0,280
	2.4	0.75	1.6 ... 2.4	29		3VS13 00-□MH00	0,280
	3.2	1.1	2 ... 3.2	38		3VS13 00-□NH00	0,280
	4	1.1/1.5	2.4 ... 4	48		3VS13 00-□MJ00	0,280
	5	1.5/2.2	3.2 ... 5	60		3VS13 00-□NJ00	0,280
	6	2.2	4 ... 6	72		3VS13 00-□MK00	0,280
	8	3	5 ... 8	96		3VS13 00-□NK00	0,280
	10	3/4	6 ... 10	120		3VS13 00-□ML00	0,280
	13	4/5.5	8 ... 13	156		3VS13 00-□NL00	0,280
	16	7.5	10 ... 16	190		3VS13 00-□MM00	0,280
	20	7.5	14 ... 20	240		3VS13 00-□MN00	0,280
	25	11	18 ... 25	300		3VS13 00-□MP00	0,280
	No auxiliary contacts						0
with auxiliary contacts					1NO+1NC	1	
integrated in the motor starter protector							



3VS Padlock in OFF position

3VS Motor Starter Protectors

Technical data

according to DIN VDE 0660; IEC 60947-1; IEC 60947-2; IEC 60947-4-1

Type		3VS13		
Number of poles		3		
Max. rated current I_n				
• motor protection	A	25		
• starter combinations	A	25		
Permissible ambient temperature				
• at full rated current	°C	-20 ... +55		
• in storage	°C	-50 ... +80		
Rated operational voltage U_e	AC V	690		
Rated frequency	Hz	50/60		
Rated insulation voltage U_i	AC V	750		
Rated impulse withstand voltage U_{imp}	kV	6		
Utilization category				
• to IEC 60947-2 (motor starter protectors)		A		
• to IEC 60947-4-1 (motor starters)		AC-3		
Mechanical endurance				
• up to 25 A	Operating cycles	100,000		
Number of operating cycles/h (on load)	1/h	25		
Degree of protection with open terminals/with conductors connected		IP00/IP20		
Temperatures compensation	to IEC 60947-4-1	Yes		
Phase failure sensitivity	To IEC 60947-4-1	Yes		
Auxiliary contact				
Rated operational voltage U_e	AC V	230	400	500
Rated operational current I_e	A	3	1.5	1
Utilization category		AC-15	AC-15	AC-15
Rated operational voltage U_e DC L/R200 ms	DC V	24	60	220
Rated operational current I_e	A	2.3	0.7	0.3
Utilization category		DC-13	DC-13	DC-13

3VS Motor Starter Protectors

Technical data

Type		3VS13
Cross-section for main conductors		
Solid or stranded	mm ²	2 x (1 ... 6)
Finely stranded with end sleeve	mm ²	2 x (1 ... 4)
Cross-sections for auxiliary and control connecting leads		
Solid or stranded	mm ²	1 x 0.5 ... 2 x 2.5
Finely stranded with end sleeve	mm ²	1 x 0.5 ... 2 x 1.5

Rated short-circuit breaking capacity

The table shows the rated ultimate short-circuit breaking capacity I_{cu} and the rated service short-circuit breaking capacity I_{cs} for the 3VS motor starter protectors with respect to rated current I_n and rated operational voltage U_e .

Infeed is permitted at top or bottom without reduction of rated data. In the short-circuit proof areas, I_{cu} is at least 100 kA. A backup fuse is therefore not necessary.

In the other areas, when the short-circuit current at the installation point exceeds the rated short-circuit breaking capacity given in the table for the motor starter protectors, the motor starter protector must be protected by a backup fuse. See the following table for the maximum rated current for the backup fuse. With a backup fuse according to the table, the maximum short-circuit current is permitted to equal the rated breaking capacity of the backup fuse.

Motor Starter Protectors	Rated current I_n	Up to AC 240 V			Up to AC 415 V			Up to AC 440 V			Up to AC 500 V			Up to AC 690 V		
		I_{cu}	I_{cs}	Max. backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. backup fuse (gL/gG)
Type	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
3VS13	Up to 1 A	Short-circuit proof up to 100 kA, backup fuse is not necessary														
	1.6 A													2	2	20
	2.4 A										10	10	35	2	2	35
	3.2 and 4 A							10	10	50	3	3	50	2	2	50
	5 and 6 A							5	5	63	3	3	63	2	2	63
	8 and 10 A				10	10	80	5	5	80	3	3	80	2	2	80
	13 and 16 A				6	6	80	5	5	80	3	3	80	2	2	80
	20 and 25 A	10	10	100	6	6	80	5	5	80	3	3	80	2	2	80

Relation between short-circuit breaking capacity I , related power factor and minimum short-circuit making capacity to IEC 60947-2		
Short-circuit breaking capacity	Power factor $\cos \varphi$	Short-circuit making capacity
A		
$I \leq 3000$	0.9	$1.42 \times I$
$3000 < I \leq 4500$	0.8	$1.47 \times I$
$4500 < I \leq 6000$	0.7	$1.5 \times I$
$6000 < I \leq 10000$	0.5	$1.7 \times I$
$10000 < I \leq 20000$	0.3	$2.0 \times I$
$20000 < I \leq 50000$	0.25	$2.1 \times I$
$50000 < I$	0.2	$2.2 \times I$

3VS Motor Starter Protectors

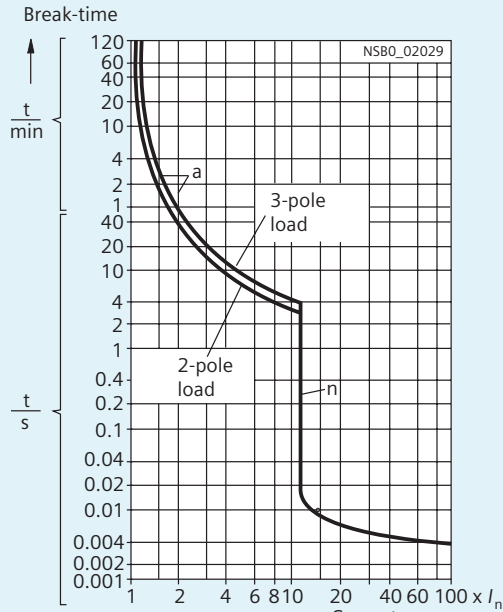
Characteristic curves

The characteristic curves are obtained in the cold state and 3-pole loading.

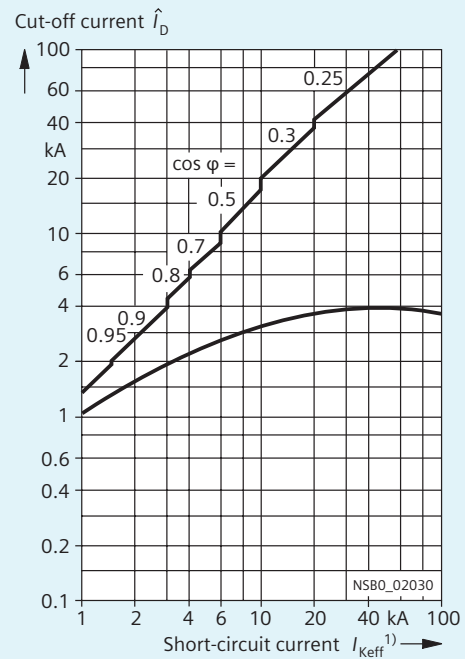
At operating temperature, the tripping time of the thermal releases drops by about 25 %. With 3-pole loading, the deviation in tripping time for 3 times the current and upwards is $\pm 20\%$ in accordance with DIN VDE 0165

Characteristic curves for 3VS13

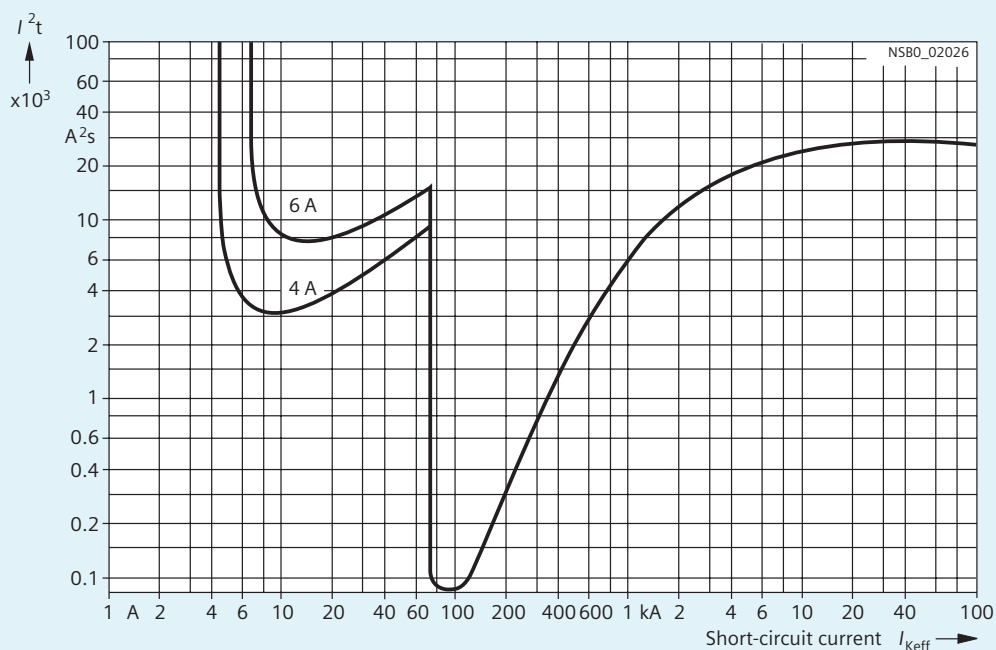
The characteristic curves shown here apply for a 3VS1300-OMK00 motor starter protector with a rated current of 6 A, a current setting range of 4 to 6 A and a tripping current for the instantaneous overcurrent release of 72 A, at a rated voltage of AC 50 Hz, 400 V.



Schematic representation of the time/current characteristic for 3VS13



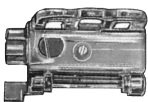
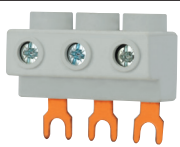
Current limiting characteristic for 3VS1300-OMK00



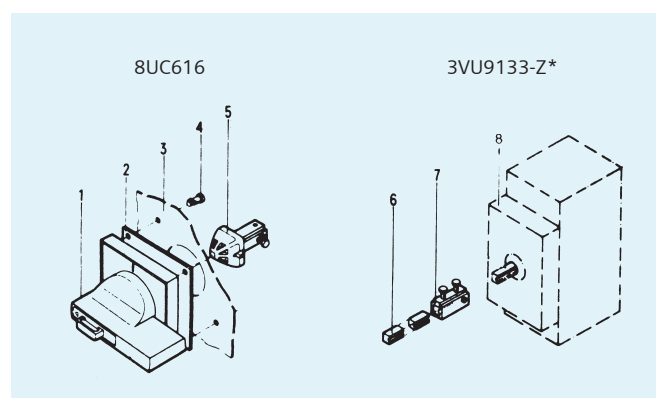
I^2t characteristic for 3VS1300-OMK00

3VS Motor Starter Protectors

Accessories for 3VS13

3VU9	Description	Width (modules) 1=18mm	Information	Order Number	Wt. (Kg)
 3VU9 131-3AA00	Auxiliary contact block 1NO+1NC	0.5	1NO+1NC side mounted auxiliary contact blocks for 3VS	3VU9131-3AA00	0.04
 3VU9 131-7AA00	Signaling Switch 1NO+1NC	0.5	1NO+1NC side mounted signaling switch. Contacts changeover when MPCB trips. Useful for remote tripping indication.	3VU9131-7AA00	0.04
 3VU9168-0KA00	Padlocking device	—	Padlocking in OFF position to avoid accidental ON command during maintenance work	3VU9168-0KA00	0.02
	3VS-3TS connector for Direct mounting of Contactor on MPCB	3	Upto 12A, with 3TF30/31 OR 3TS30/31	3TS9001-8K	0.04
			Upto 22A, with 3TF32/33 OR 3TS33/34	3TS9002-8K	
	3-Phase Feed in Terminal Only for 3VS13	—	To be used with 3 Phase bus bar for cable connection. For use with cables 4-16 Sq.mm with Sleeve 6-25 Sq.mm without Sleeve	3VU9 135-1BB01	0.03
	3-Phase Bus bars Only for 3VS13	—	To be used with 3VU9135-1BB01 for cable entry with 1st MPCB. For 63A max, 690V.	2MPCB 3VU9135-1AB02	0.05
				3MPCB 3VU9135-1AB03	0.05
				4MPCB 3VU9135-1AB04	0.10
				5 MPCB 3VU9135-1AB05	0.12
	Cover Caps for - Empty slots of 3 Phase bus bars	—	Cover caps provide touch protection for reserve/empty slots.	3VU9 135-1GB00	0.01

Door operating mechanism for 3VS13



1. Handle with masking frame
2. Gasket
3. Fixing screws
4. Drive coupling
5. Extension shaft - 300 mm
6. Adapter
7. Breaker operator

* 1 set consisting of breaker operator kit and 8UC front drive together

Breaker Operator Kit for 3VS13 - 3VU9133-Z

Note: All the above accessories have standard package no. = 1

For maximum flexibility, accessories can be added to the motor starter protector as required, easily

3VS Motor Starter Protectors

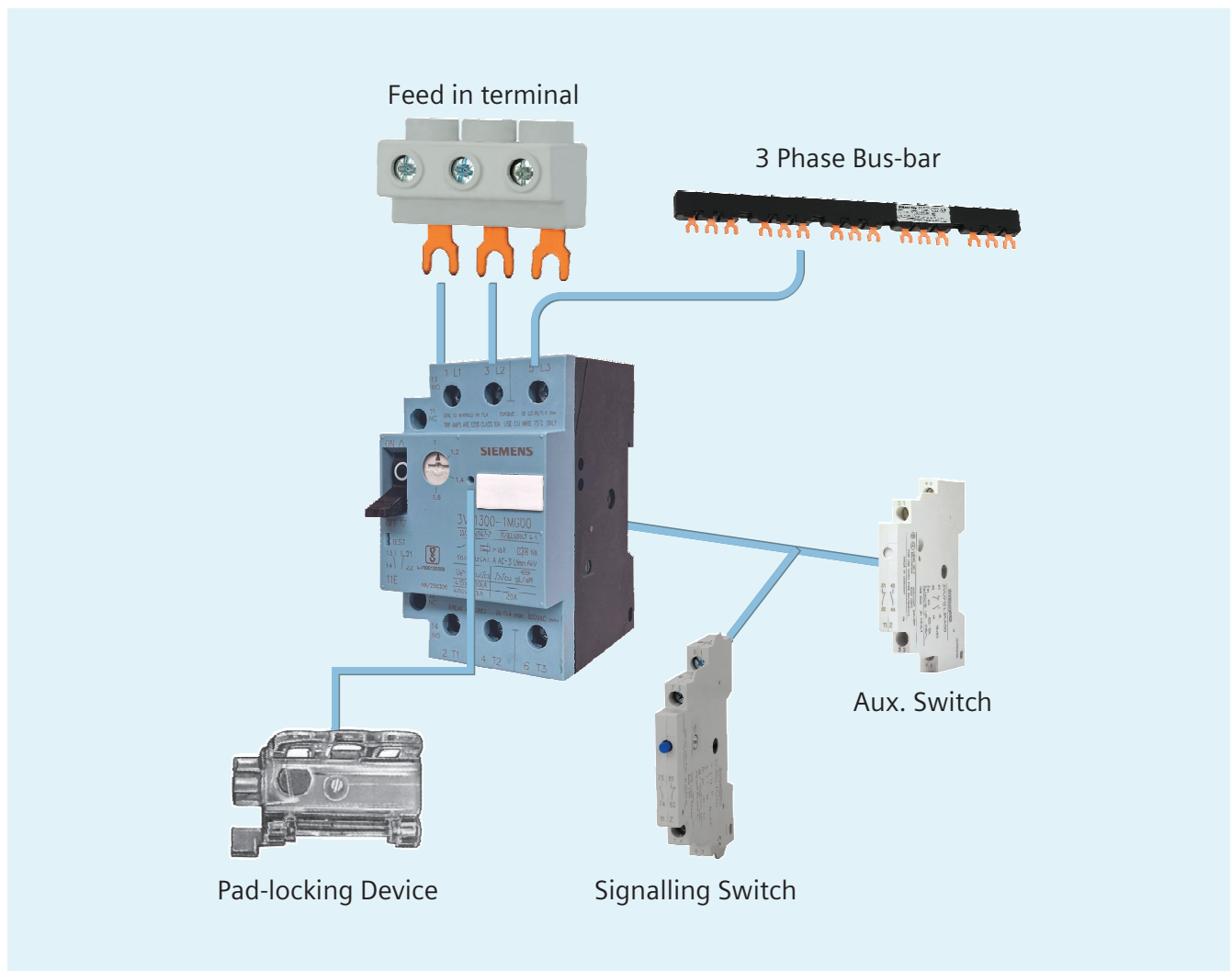
Accessories for 3VS13

3VS Accessory compatibility table

Accessory 1 \ Accessory 2	MLFB	3VS13	Aux Switch 3VU9 131-3AA00	Signaling Switch 3VU9 131-7AA00	Pad locking 3VU9168-0KA00	Connector 3TS9001-8K/02
Aux Switch	3VU9 131-3AA00	✓	X	X	✓	✓
Signaling Switch	3VU9 131-7AA00	✓	X	X	✓	✓
Pad locking device	3VU9168-0KA00	✓	✓	✓	X	✓
Connector for Direct mounting of contactor	3TS9001-8K/02	✓	✓	✓	✓	X
3 Phase Feed in Terminal	3VU9 135-1BB01	✓	✓	✓	✓	✓
3 Phase Busbars	3VU9135-1AB02/3/4/5	✓	X	X	✓	✓
3 Phase Busbars with Aux / Accessories	3VU9135-1KA02/4	✓	✓	✓	✓	✓
Cover caps for empty slots	3VU9 135-1GB00	✓	✓	✓	✓	✓

✓ Recommended combination of accessory 1 & 2

X Combination not recommended of accessory 1 & 2

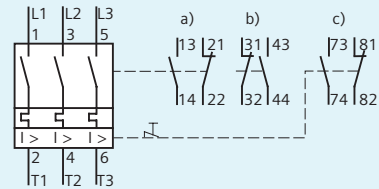


3VS Motor Starter Protectors

Circuit diagrams & dimension drawings

As defined by DIN 40 713, the graphical symbols in the equipment circuit diagrams only provide information about the type, connection and operation of the devices, but not about their construction.

Equipment circuit diagrams



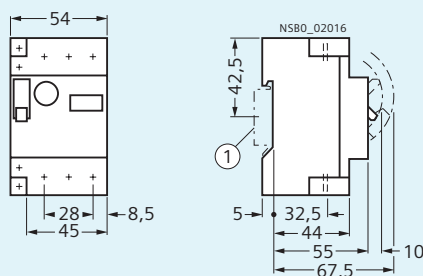
3VS13

- a) Integral auxiliary contacts
- b) Additional auxiliary contacts for separate mounting
- c) short circuit signaling contact

3VS13 motor starter protectors

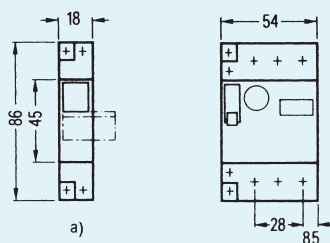
Dimension drawings

3VS13



① 35 mm standard mounting rail acc. to EN 50 022

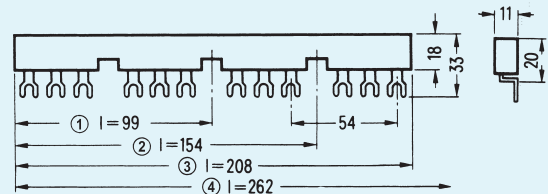
3VS13 circuit-breakers and accessories



3VS13 circuit-breakers

can be combined with

- a) short-circuit signalling switch and/or
- b) auxiliary contacts



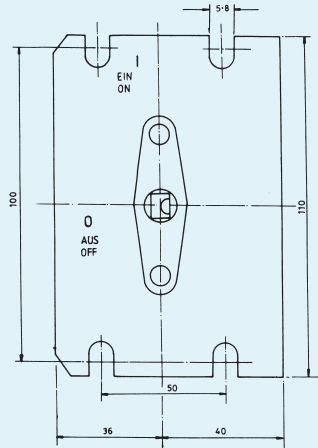
3VU9 135-1AB02,
3VU9 135-1AB03,
3VU9 135-1AB04,
3VU9 135-1AB05
three-phase busbar

- ① For 2 devices: 3VU9 135-1AB02
- ② For 3 devices: 3VU9 135-1AB03
- ③ For 4 devices: 3VU9 135-1AB04
- ④ For 5 devices: 3VU9 135-1AB05

3VS Motor Starter Protectors

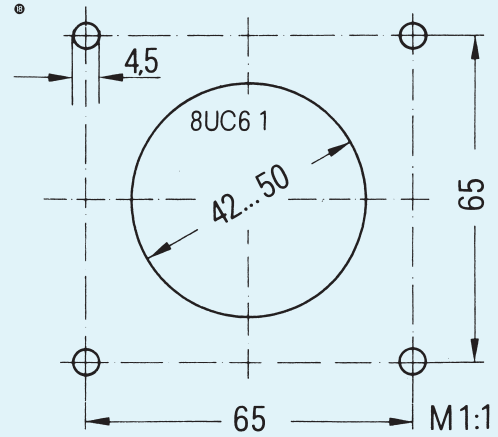
Dimension drawings

Door operating mechanism with extension shaft (300mm) with door interlock & padlocking facilities.



Mounting bracket of 3VS 13
3VU9133-1PA01 for 3VS 13

Mounting bracket



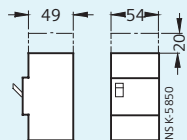
Front door cutout for Handle

Space required above arc chutes for 3VS motor starter protectors

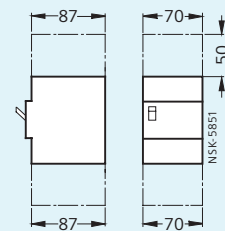
Minimum clearance with rated voltage to adjacent parts as well as non-insulated live parts.

The spacing of minimum 1 cm with 3VS13 between large-surface covers and arc openings should be observed.

3VS13



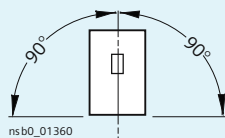
3VS13



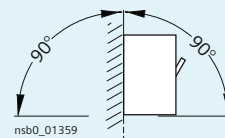
Uninsulated conductors must be insulated within the space required above arc chutes.

3VS Permissible mounting position

3VS13 motor starter protectors permissible mounting position due to position of the operating parts, note DIN 43 602.



3VS13 motor starter protectors



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