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3VT Molded Case Circuit Breakers up to 1600 A

SENTRON

Catalog LV 36

Edition 2014

Answers for infrastructure and cities.

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All products of automation and drives technology and of low-voltage power distribution and electrical installation technology

All products of automation and drives technology and of low-voltage power distribution and electrical installation technology

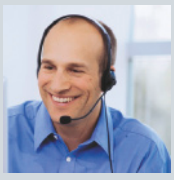
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3VT Molded Case Circuit Breakers up to 1600 A
Catalog LV 36 · 2014



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Supersedes:
Catalog LV 36 · 2011

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The products contained in this catalog can also be found in the Interactive Catalog CA 01.
Article No.:
E86060-D4001-A510-D3-7600

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3VT1
Molded Case Circuit Breakers up to 160 A 1

3VT2
Molded Case Circuit Breakers up to 250 A 2

3VT3
Molded Case Circuit Breakers up to 630 A 3

3VT4
Molded Case Circuit Breakers up to 1000 A 4

3VT5
Molded Case Circuit Breakers up to 1600 A 5

Appendix 6

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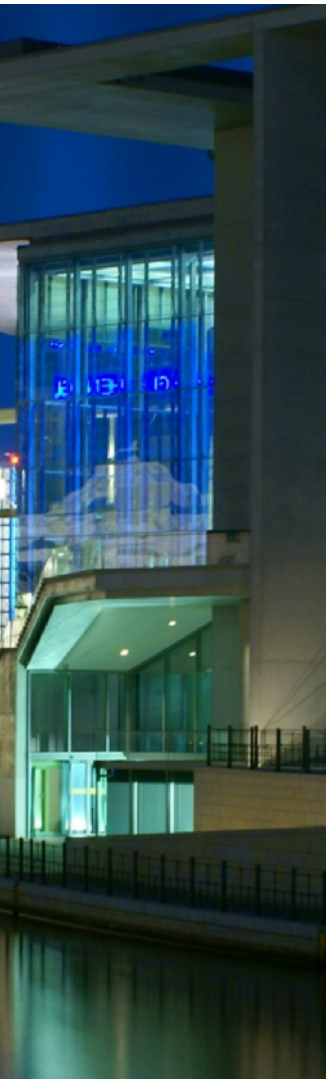
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Universal, safe and intelligent power distribution

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Everything for power distribution

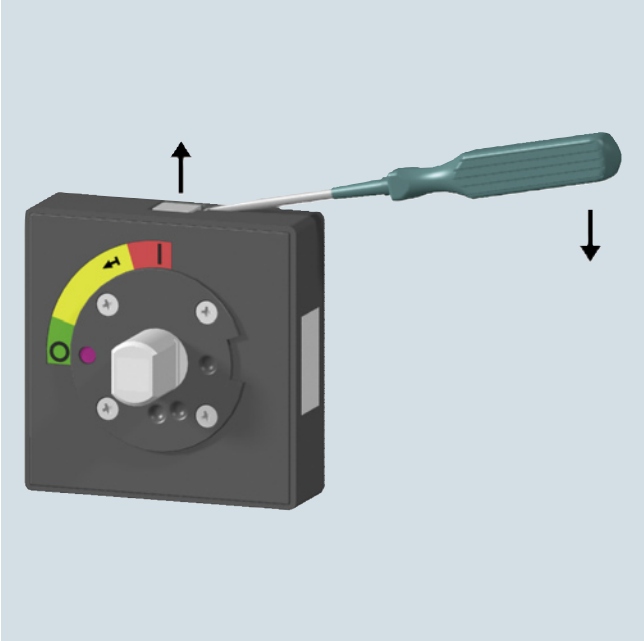
Consistent solutions are required for electrical power distribution in buildings. Our answer is Totally Integrated Power (TIP). TIP stands for innovative products, systems and software tools which ensure the safe and reliable distribution of electric power. They are supplemented by communication-capable circuit breakers and modules which connect the power distribution system to the building automation system or industrial automation solutions. These in turn can be linked to a comprehensive energy management system which contributes to optimizing the consumption of electricity and hence to lowering the costs of operation.

Excellent support

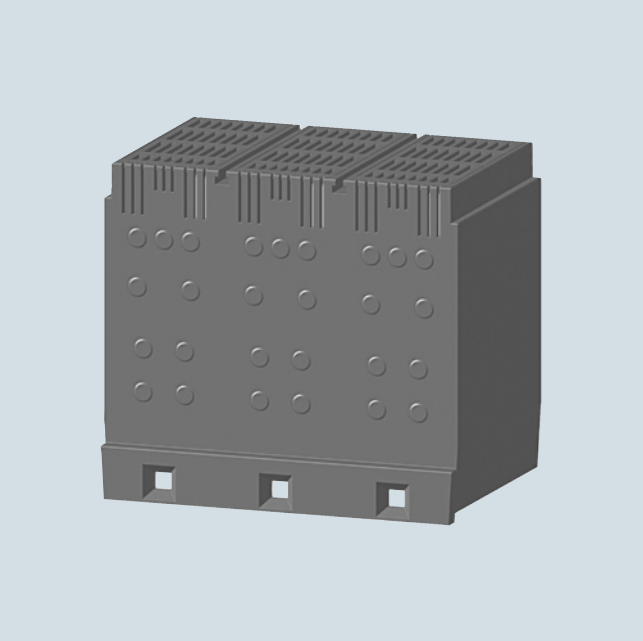
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New developments



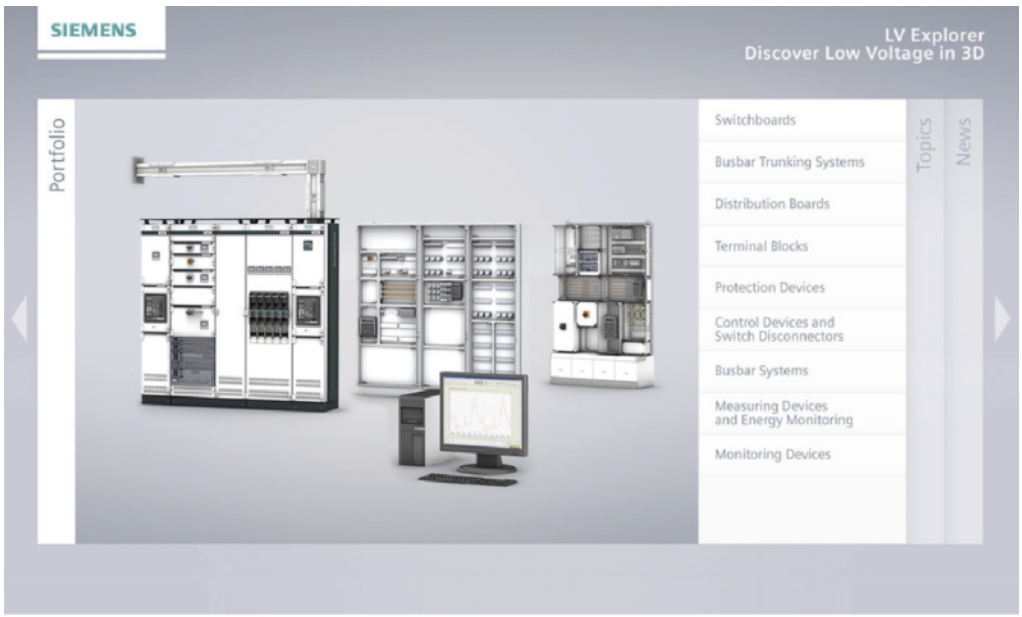
Coupling driver for door-coupling operating mechanism can be defeated. For 3VT2 and for 3VT3 → page 2/6 or 3/6



Terminal cover protection. For 3VT4 and for 3VT5 → page 4/7 or 5/7

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3VT1 Molded Case Circuit Breakers up to 160 A



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3VT1 Molded Case Circuit Breakers up to 160 A

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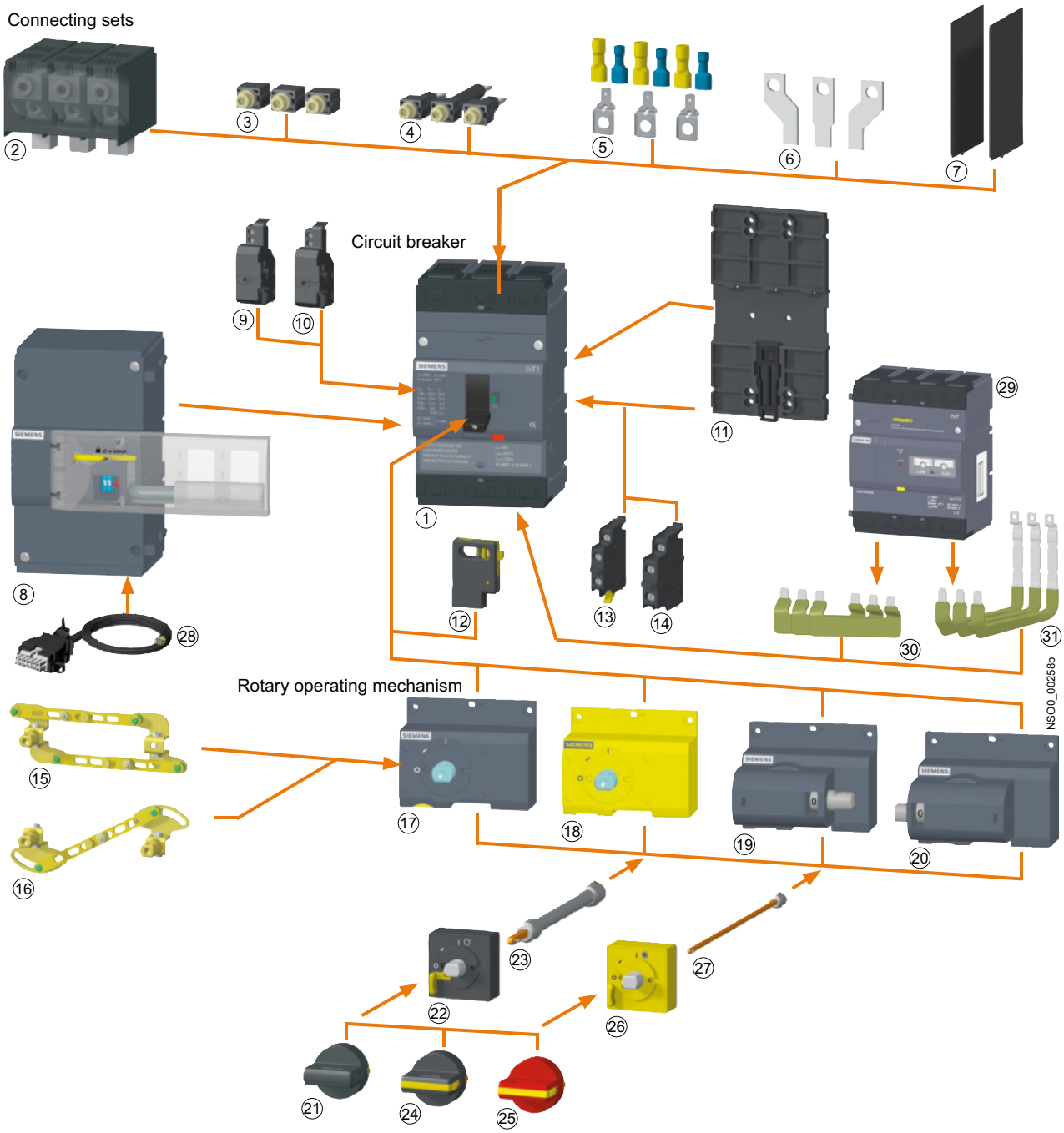
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Overview

Circuit breaker

Circuit breaker, 3-/4-pole versions

The 3- or 4-pole versions of the circuit breakers include:
- 2 connecting sets (box terminals), for connecting Cu/Al cables[1] with cross-sections of 2.5 ... 95 mm^2 (these terminals are connected to the circuit breaker)
- insulating barriers
- set of two mounting bolts (M3 x 30)

Switch disconnector

Switch disconnector, 3-/4-pole versions

The 3- or 4-pole versions of the switch disconnectors include:
- 2 connecting sets (box terminals), for connecting Cu/Al cables[1] with cross-sections of 2.5 ... 95 mm^2 (these terminals are connected to the switch disconnector)
- insulating barriers
- set of two mounting bolts (M3 x 30)

Selection and ordering data

Rated current I_n	Current setting of the inverse-time delayed overcurrent releases "L" I_R	Operating current of the instantaneous short circuit releases "I" I_i	DT	Article No.	PS*/ P. unit	Weight per PU approx.
A	A	A				kg
Circuit breakers with tripping characteristic L[2]						
						
TM[3], LI function, 3-pole						
• with permanently fixed thermal overload trip unit, fixed short-circuit trip unit						
40	40	160		**3VT1704-2DA36-0AA0**	1 unit	1.043
50	50	200		**3VT1705-2DA36-0AA0**	1 unit	1.043
63	63	252		**3VT1706-2DA36-0AA0**	1 unit	1.062
80	80	320		**3VT1708-2DA36-0AA0**	1 unit	1.050
100	100	400		**3VT1710-2DA36-0AA0**	1 unit	1.047
125	125	500		**3VT1712-2DA36-0AA0**	1 unit	1.047
160	160	640		**3VT1716-2DA36-0AA0**	1 unit	1.047
TM, LI function, 3-pole + N, for unprotected N-conductor						
• with permanently fixed thermal overload trip unit, fixed short-circuit trip unit						
40	40	160		**3VT1704-2EA46-0AA0**	1 unit	1.336
50	50	200		**3VT1705-2EA46-0AA0**	1 unit	1.336
63	63	252		**3VT1706-2EA46-0AA0**	1 unit	1.336
80	80	320		**3VT1708-2EA46-0AA0**	1 unit	1.336
100	100	400		**3VT1710-2EA46-0AA0**	1 unit	1.336
125	125	500		**3VT1712-2EA46-0AA0**	1 unit	1.336
160	160	640		**3VT1716-2EA46-0AA0**	1 unit	1.336
TM, LIN function, 4-pole, for protected N-conductor, Permissible load of N pole is 100%						
• with permanently fixed overload trip unit, fixed short-circuit trip unit						
40	40	160		**3VT1704-2EH46-0AA0**	1 unit	1.336
50	50	200		**3VT1705-2EH46-0AA0**	1 unit	1.336
63	63	252		**3VT1706-2EH46-0AA0**	1 unit	1.336
80	80	320		**3VT1708-2EH46-0AA0**	1 unit	1.336
100	100	400		**3VT1710-2EH46-0AA0**	1 unit	1.336
125	125	500		**3VT1712-2EH46-0AA0**	1 unit	1.336
160	160	640		**3VT1716-2EH46-0AA0**	1 unit	1.336

[1] For other connection methods, use connecting sets, see page 1/10

[2] See pages 1/16 (3-pole) and 1/21 (4-pole)

[3] TM = Thermal-magnetic trip unit.

* You can order this quantity or a multiple thereof.

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Rated current I_n	Current setting of the inverse-time delayed overcurrent releases "***L***" I_R	Operating current of the instantaneous short circuit releases "***I***" I_i	DT	Article No.	PS*/ P. unit	Weight per PU approx.
A	A	A				kg
Circuit breakers with tripping characteristic D[1]						
TM, LI function 3-pole						
• with adjustable thermal overload trip unit, adjustable short-circuit trip unit						
16	12.5 ... 16	160 ... 240		**3VT1701-2DC36-0AA0**	1 unit	1.048
20	16 ... 20	200 ... 300		**3VT1702-2DC36-0AA0**	1 unit	1.048
25	20 ... 25	250 ... 375		**3VT1792-2DC36-0AA0**	1 unit	1.043
32	25 ... 32	160 ... 320		**3VT1703-2DC36-0AA0**	1 unit	1.047
40	32 ... 40	200 ... 400		**3VT1704-2DC36-0AA0**	1 unit	1.038
50	40 ... 50	250 ... 500		**3VT1705-2DC36-0AA0**	1 unit	1.043
63	50 ... 63	315 ... 630		**3VT1706-2DC36-0AA0**	1 unit	1.062
80	63 ... 80	400 ... 800		**3VT1708-2DC36-0AA0**	1 unit	1.062
100	80 ... 100	500 ... 1000		**3VT1710-2DC36-0AA0**	1 unit	1.047
125	100 ... 125	625 ... 1250		**3VT1712-2DC36-0AA0**	1 unit	1.047
160	125 ... 160	800 ... 1600		**3VT1716-2DC36-0AA0**	1 unit	1.070
TM, LI function 3-pole +N, for unprotected N-conductor						
• with adjustable thermal overload trip unit, adjustable short-circuit trip unit						
16	12.5 ... 16	160 ... 240		**3VT1701-2EC46-0AA0**	1 unit	1.336
20	16 ... 20	200 ... 300		**3VT1702-2EC46-0AA0**	1 unit	1.336
25	20 ... 25	250 ... 375		**3VT1792-2EC46-0AA0**	1 unit	1.336
32	25 ... 32	160 ... 320		**3VT1703-2EC46-0AA0**	1 unit	1.336
40	32 ... 40	200 ... 400		**3VT1704-2EC46-0AA0**	1 unit	1.336
50	40 ... 50	250 ... 500		**3VT1705-2EC46-0AA0**	1 unit	1.336
63	50 ... 63	315 ... 630		**3VT1706-2EC46-0AA0**	1 unit	1.336
80	63 ... 80	400 ... 800		**3VT1708-2EC46-0AA0**	1 unit	1.336
100	80 ... 100	500 ... 1000		**3VT1710-2EC46-0AA0**	1 unit	1.336
125	100 ... 125	625 ... 1250		**3VT1712-2EC46-0AA0**	1 unit	1.336
160	125 ... 160	800 ... 1600		**3VT1716-2EC46-0AA0**	1 unit	1.336
TM, LIN function, 4-pole, for protected N-conductor, Permissible load of N pole is 100%						
• with adjustable thermal overload trip unit, adjustable short-circuit trip unit						
16	12.5 ... 16	160 ... 240		**3VT1701-2EJ46-0AA0**	1 unit	1.336
20	16 ... 20	200 ... 300		**3VT1702-2EJ46-0AA0**	1 unit	1.336
25	20 ... 25	250 ... 375		**3VT1792-2EJ46-0AA0**	1 unit	1.336
32	25 ... 32	160 ... 320		**3VT1703-2EJ46-0AA0**	1 unit	1.336
40	32 ... 40	200 ... 400		**3VT1704-2EJ46-0AA0**	1 unit	1.336
50	40 ... 50	250 ... 500		**3VT1705-2EJ46-0AA0**	1 unit	1.336
63	50 ... 63	315 ... 630		**3VT1706-2EJ46-0AA0**	1 unit	1.336
80	63 ... 80	400 ... 800		**3VT1708-2EJ46-0AA0**	1 unit	1.336
100	80 ... 100	500 ... 1000		**3VT1710-2EJ46-0AA0**	1 unit	1.336
125	100 ... 125	625 ... 1250		**3VT1712-2EJ46-0AA0**	1 unit	1.336
160	125 ... 160	800 ... 1600		**3VT1716-2EJ46-0AA0**	1 unit	1.336

[1] See pages 1/16 (3-pole) and 1/21 (4-pole)

* You can order this quantity or a multiple thereof.

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	Rated current I_n	Current setting of the inverse-time delayed overcurrent releases "L" I_R	Operating current of the instantaneous short circuit releases "I" I_i	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	A	A				kg
Circuit breakers, for short-circuit protection only (tripping characteristic N[1]), for starter combination							
	TM, I function, 3-pole						
	• without overload trip unit, with adjustable short-circuit trip unit						
	32	32	160 ... 320		**3VT1703-2DB36-0AA0**	1 unit	1.043
	40	40	200 ... 400		**3VT1704-2DB36-0AA0**	1 unit	1.043
	50	50	250 ... 500		**3VT1705-2DB36-0AA0**	1 unit	1.048
	63	63	315 ... 630		**3VT1706-2DB36-0AA0**	1 unit	1.048
	80	80	400 ... 800		**3VT1708-2DB36-0AA0**	1 unit	1.048
	100	100	500 ... 1000		**3VT1710-2DB36-0AA0**	1 unit	1.050
	125	125	625 ... 1250		**3VT1712-2DB36-0AA0**	1 unit	1.059
	160	160	800 ... 1600		**3VT1716-2DB36-0AA0**	1 unit	1.048
	TM, I function, 3-pole +N, for unprotected conductors						
	• without overload trip unit, with adjustable short-circuit trip unit						
	32	32	160 ... 320		**3VT1703-2EB46-0AA0**	1 unit	1.336
	40	40	200 ... 400		**3VT1704-2EB46-0AA0**	1 unit	1.336
	50	50	250 ... 500		**3VT1705-2EB46-0AA0**	1 unit	1.336
	63	63	315 ... 630		**3VT1706-2EB46-0AA0**	1 unit	1.336
	80	80	400 ... 800		**3VT1708-2EB46-0AA0**	1 unit	1.336
	100	100	500 ... 1000		**3VT1710-2EB46-0AA0**	1 unit	1.336
	125	125	625 ... 1250		**3VT1712-2EB46-0AA0**	1 unit	1.336
	160	160	800 ... 1600		**3VT1716-2EB46-0AA0**	1 unit	1.336
	TM, I function, 4P, for protected N conductor, Permissible load of N pole is 100% NEW						
	• without overload trip unit, with adjustable short-circuit trip unit						
	32	32	160 ... 320		**3VT1703-2EG46-0AA0**	1 unit	1.336
	40	40	200 ... 400		**3VT1704-2EG46-0AA0**	1 unit	1.336
	50	50	250 ... 500		**3VT1705-2EG46-0AA0**	1 unit	1.336
	63	63	315 ... 630		**3VT1706-2EG46-0AA0**	1 unit	1.336
	80	80	400 ... 800		**3VT1708-2EG46-0AA0**	1 unit	1.336
	100	100	500 ... 1000		**3VT1710-2EG46-0AA0**	1 unit	1.336
	125	125	625 ... 1250		**3VT1712-2EG46-0AA0**	1 unit	1.336
	160	160	800 ... 1600		**3VT1716-2EG46-0AA0**	1 unit	1.336
Circuit breakers with tripping characteristic M[2], for motor protection							
	***TM, LI function, 3-pole***						
	• with adjustable thermal overload trip units, fixed short-circuit trip units						
	16	12.5 ... 16	160		**3VT1701-2DM36-0AA0**	1 unit	1.048
	20	16 ... 20	200		**3VT1702-2DM36-0AA0**	1 unit	1.048
	25	20 ... 25	250		**3VT1792-2DM36-0AA0**	1 unit	1.043
	32	25 ... 32	315		**3VT1703-2DM36-0AA0**	1 unit	1.043
	40	32 ... 40	400		**3VT1704-2DM36-0AA0**	1 unit	1.043
	50	40 ... 50	500		**3VT1705-2DM36-0AA0**	1 unit	1.043
	63	50 ... 63	625		**3VT1706-2DM36-0AA0**	1 unit	1.062
	80	63 ... 80	800		**3VT1708-2DM36-0AA0**	1 unit	1.059
	100	80 ... 100	1000		**3VT1710-2DM36-0AA0**	1 unit	1.047
Switch disconnectors							
	Switch disconnector, without overload protection, without short circuit protection						
	160		3-pole		**3VT1716-2DE36-0AA0**	1 unit	1.015
	160		4-pole		**3VT1716-2EE46-0AA0**	1 unit	1.336

[1] See page 1/16 (3-pole)

[2] See pages 1/16 and 1/20

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Overview

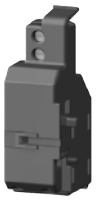
Circuit breakers can be equipped with

- auxiliary switches,
- alarm switches,
- shunt trip units,
- undervoltage trip units.

Shunt trip units can trip the circuit breaker from a remote location. A control supply voltage is required.

An undervoltage trip unit trips the circuit breaker automatically when the circuit voltage drops below 70 % U_e. The undervoltage trip unit protects motors and other equipment in case of undervoltage. A control supply voltage is required.

Selection and ordering data

	Rated control supply voltage U_s	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	AC 50/60 Hz or DC				kg
Auxiliary switches and alarm switches					
	**Auxiliary switches for signalling the state of the main contacts**				
	• AC/DC 60 ... 250 V		**3VT9100-2AB10**	1 unit	0.020
	• AC/DC 5 ... 60 V		**3VT9100-2AB20**	1 unit	0.010
	**Alarm switches for signalling the tripping of the circuit breaker by an trip unit**				
	• AC/DC 60 ... 250 V		**3VT9100-2AH10**	1 unit	0.020
	• AC/DC 5 ... 60 V		**3VT9100-2AH20**	1 unit	0.010
Shunt trip units					
	**Shunt trip units can trip the circuit breaker from a remote location.**				
	• DC 12 V NEW		**3VT9100-1SB00**	1 unit	0.050
	• AC/DC 24, 48 V		**3VT9100-1SC00**	1 unit	0,050
	• AC 110, 230 V/DC 110, 220 V		**3VT9100-1SD00**	1 unit	0.050
	• AC 230, 400 V/DC 220 V		**3VT9100-1SE00**	1 unit	0.050
Undervoltage trip units					
	**Undervoltage trip units trip the circuit breaker automatically when the circuit voltage drops below 70 % Ue**				
	• AC 24, 48 V		**3VT9100-1UC00**	1 unit	0.050
	• AC 110, 230 V		**3VT9100-1UD00**	1 unit	0.050
	• AC 230, 400 V		**3VT9100-1UE00**	1 unit	0.050
	• DC 24, 48 V		**3VT9100-1UU00**	1 unit	0.050
	• DC 110, 220 V		**3VT9100-1UV00**	1 unit	0.050

* You can order this quantity or a multiple thereof.

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Overview

Rotary operating mechanisms

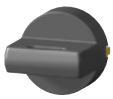
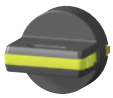
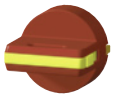
The rotary operating mechanism must be combined from the following parts:

- For rotary operation of the circuit breaker:
  - 3VT9100-3HE../HF.. knob
- For operation through the switchgear cabinet door:
  - 3VT9100-3HE../HF.. knob
  - 3VT9100-3HG../HH.. coupling driver
  - 3VT9100-3HJ.. extension shaft,
- For operating through side panel of switchgear cabinet (lateral operation):
  - 3VT9100-3HE../HF.. knob
  - 3VT9100-3HG../HH.. coupling driver
  - 3VT9100-3HJ.. extension shaft

Mechanical interlocking and parallel switching

- The mechanical interlocking must be combined from the following parts:
  - 2 x 3VT9100-3HA/HB.. rotary operating mechanisms (cannot be used with lateral operation)
  - 2 x 3VT9100-3HE/HF.. knobs (standard) or 1 x 3VT9100-3HE/HF.. knob (parallel switching)

Selection and ordering data

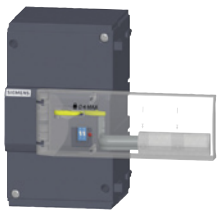
	Version	Color	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Rotary operating mechanisms						
	Rotary operating mechanism					
	• not lockable	gray		**3VT9100-3HA10**	1 unit	0.079
	• lockable with padlock	gray		**3VT9100-3HA20**	1 unit	0.122
	• lockable with padlock	yellow		**3VT9100-3HB20**	1 unit	0.079
	• for lateral operation, mounted on the left side, not lockable	gray		**3VT9100-3HC10**	1 unit	0.137
	• for lateral operation, mounted on the right side, not lockable	gray		**3VT9100-3HD10**	1 unit	0.137
	Knob					
	• not lockable	black		**3VT9100-3HE10**	1 unit	0.019
	• lockable with padlock	black		**3VT9100-3HE20**	1 unit	0.021
	• lockable with padlock	red		**3VT9100-3HF20**	1 unit	0.019
	Coupling driver for door-coupling operating mechanism (with defeat mechanism)					
	Additionally requires 3VT9100-3HE10 or 3VT9100-3HE20 black knob					
	• degree of protection IP40	black		**3VT9100-3HG10**	1 unit	0.042
	• degree of protection IP66	black		**3VT9100-3HG20**	1 unit	0.098
	Additionally requires 3VT9100-3HF20 red knob					
	• degree of protection IP40	yellow		**3VT9100-3HH10**	1 unit	0.042
	• degree of protection IP66	yellow		**3VT9100-3HH20**	1 unit	0.098
	Extension shaft					
	• length 350 mm, can be shortened			**3VT9100-3HJ10**	1 unit	0.113
	• length 199 ... 352 mm, telescopic			**3VT9100-3HJ20**	1 unit	0.092

* You can order this quantity or a multiple thereof.

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Manual/motorized operating mechanisms

	Version	Color	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Mechanical interlocking						
	The mechanical interlocks additionally require the following parts: • 2 x 3VT9 100-3HA../HB.. rotary operating mechanisms • 1 or 2 x 3VT9 100-3HE/HF.. knobs					
	**Mechanical interlocking**			**3VT9100-8LA00**	1 unit	0.089
	**Mechanical interlocking for parallel switching**			**3VT9100-8LB00**	1 unit	0.109

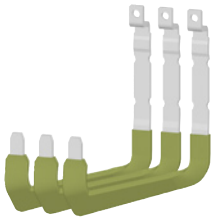
	Rated control supply voltage U_s	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Motorized operating mechanism	AC 50/60 Hz or DC				
	**Laterally mounted motorized operating mechanism** For a detailed description see page 1/28.				
	• AC/DC 24 V		**3VT9100-3MA00**	1 unit	0.900
	• AC/DC 48 V		**3VT9100-3MB00**	1 unit	0.900
	• AC/DC 110 V		**3VT9100-3MD00**	1 unit	0.900
	• AC 230 V/DC 220 V		**3VT9100-3ME00**	1 unit	0.900

* You can order this quantity or a multiple thereof.

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Selection and ordering data

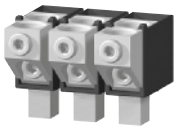
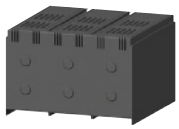
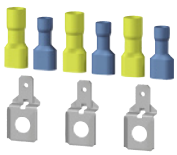
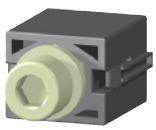
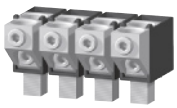
Circuit breakers for system protection, only for TM[1)], starters, disconnectors

	Rated current I_N	Residual current $I_{\Delta n}$, adjustable	Delay time t_d, adjustable	Rated operational voltage U_e	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	A	s	V AC				kg
RCD modules								
	4-pole							
	160	0.030 0.100 0.300 0.500 1.000 3.000	instantaneous 0.1 0.2 0.3 0.5 1	80 ... 440		**3VT9116-5GA40**	1 unit	1.277
	4-pole							
	160	0.300	instantaneous	80 ... 440		**3VT9116-5GB40**	1 unit	1.277
Accessories for RCD modules								
	Connection set, short							
	3-pole					**3VT9115-5GY31**	1 unit	0.491
	4-pole					**3VT9115-5GY41**	1 unit	0.645
	Connection set, long							
	3-pole					**3VT9116-5GY32**	1 unit	0.504
	4-pole					**3VT9116-5GY42**	1 unit	0.662

1) Thermal-magnetic

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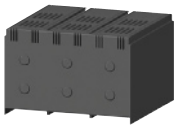
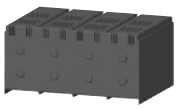
Selection and ordering data

	Version	Conductor cross-sections *S*	Type of connection	DT	Article No.	PS*/ P. unit	Weight per PU approx.
		mm^2					kg
Terminals for fixed-mounted circuit breakers							
	Connecting set for 3-pole version						
	**Terminals for front connection** 1 set = 3 units	--	Cu/Al busbars, cable lugs		**3VT9100-4TA30**	1 unit	0.055
	**Terminals for circular conductors** 1 set = 3 units Set includes a terminal cover, degree of protection IP20	2 x 25 ... 120	Cu/Al cable		**3VT9100-4TF30**	1 unit	0,240
	**Terminals for rear connection** 1 set = 3 units Rotation in 45-degree increments		Cu/Al busbars, cable lugs		**3VT9100-4RC30**	1 unit	0.179
	**Auxiliary conductor terminals**	1.5 ... 2.5; 4 ... 6	Cu flexible conductors		**3VT9100-4TN30**	1 unit	0.010
	**Front connection bars** Increases pole spacing 1 set = 3 units		Cu/Al busbars, cable lugs		**3VT9100-4ED30**	1 unit	0.108
	Terminals for 4-pole version						
	**Terminal for front connection** 1 set = 1 unit For 4th pole (to be used with 3VT9100-4TA30 connecting set)	--	Cu/Al busbars, cable lugs		**3VT9100-4TA00**	1 unit	0.015
	**Terminals for circular conductors** 1 set = 4units Set includes a terminal cover, degree of protection IP20	2 x 25 ... 120	Cu/Al cable		**3VT9100-4TF40**	1 unit	0,250
	**Terminal for rear connection** 1 set = 1 unit For 4th pole (to be used with 3VT9100-4RC30 connecting set)		Cu/Al-busbars, cable lugs		**3VT9100-4RC00**	1 unit	0.080
	**Auxiliary conductor terminals** For 4th pole (to be used with 3VT9100-4TN30 connecting set)	1.5 ... 2.5; 4 ... 6	Cu flexible conductor		**3VT9100-4TN00**	1 unit	0.005

* You can order this quantity or a multiple thereof.

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Selection and ordering data

	Description		DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Accessories						
	***3-pole version*** **Insulating barriers for circuit breakers** Included in the scope of supply of the circuit breaker or switch disconnector In case of feed-in from below (power supply connected to terminals 2, 4 , 6), it is necessary to install these barriers on the bottom side For more information, see page 1/34.			**3VT9100-8CE30**	1 unit	0.053
	**Terminal protection cover, degree of protection IP20** Increases degree of protection of the connection point to degree of protection IP20, e.g. when used with cable lugs.	3-pole 4-pole NEW		**3VT9100-8CA30** **3VT9100-8CA40**	1 unit 1 unit	0.091 0.080
	**Locking devices for toggle levers** • Enables locking of circuit breaker or switch disconnector in "switched off manually" position • Locking is possible using a padlock with a shank diameter of up to 4 mm.			**3VT9100-3HL00**	1 unit	0.015
	***4-pole version*** **Insulating barrier for circuit breakers** • Included in the scope of supply of circuit breaker or switch disconnector • In case of feed-in from below, (power supply connected to terminals 2, 4, 6, N), it is necessary to install these barriers on the bottom side For more information, see page 1/35.			**3VT9100-8CE00**	1 unit	0.020
	**Terminal cover, degree of protection IP20** Increases the degree of protection of the connecting point to degree of protection IP20, e.g. when used with cable lugs			**3VT9100-8CA40**	1 unit	0.080
	***3-pole/4-pole version*** **For mounting on a 35 mm standard DIN mounting rail and RCD** For dimensions, see page 1/46.			**3VT9100-4PP30**	1 unit	0.065
	**Extension cable for motorized operating mechanism**			**3VT9100-3MF00**	1 unit	0.056

* You can order this quantity or a multiple thereof.

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Design

Installation and connection

Main circuit

- The main circuit is connected with Cu or Al busbars, cables, and possibly cables with cable lugs.
- For further connecting options, connecting sets can be used (see page 1/10).
- Generally, conductors from the power supply are connected to input terminals 1, 3, 5, (N) and conductors from the load to terminals 2, 4, 6, (N). It is possible to reverse the current flow inside the unit (i. e. infeed from below) without reducing the rated short-circuit ultimate breaking capacity I_{cu}.
- In case of infeed from below, the units must additionally be fitted with 3VT9100-8CE30 insulating barriers on the side of terminals 2, 4, 6 (see pages 1/34 and 1/35).
- We recommend painting the connection busbars.
- Input and output connectors/busbars must be mechanically reinforced to avoid transferring electrodynamic forces to the circuit breaker during short-circuiting.
- The power circuit must be connected in such a way that the deionizing space of the circuit breaker/switch disconnector is not obstructed (see pages 1/34 and 1/35).

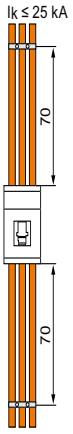
Recommended cross-section of cables, busbars and flexibars

Rated current I_n	Conductor cross-section S Solid Stranded		Busbars W x H Solid	
	Cu	Al	Cu	Al
A	mm²	mm²	mm	mm
16	2,5	--	--	--
20	2,5	--	--	--
25	4	--	--	--
32	6	--	--	--
40	10	--	--	--
50	10	16	--	--
63	16	25	--	--
80	25	35	--	--
100	35	50	16 x 2; 12 x 3	16 x 4; 12 x 5
125	50	70	16 x 4; 12 x 5	16 x 5; 12 x 6
160	70	95	16 x 5; 12 x 6	16 x 6; 12 x 8

Auxiliary circuits

Switches, shunt trip units or undervoltage trip units are connected to the terminals of the circuit breaker/switch disconnector using flexible Cu conductors with cross-section 0.5 ... 1 mm².

Mechanical reinforcement of conductors for 3VT1



Conductor cross-sections of main terminals

Article No.	Maximum permitted current I_{max}	Maximum permissible conductor cross-sections S Cable type				Max. width of busbars and cable lugs	Dimensional drawings
		Sector-shaped conductor, stranded	Sector-shaped conductor, solid	Round conductor, stranded	Round conductor, solid		
	A	mm²	mm²	mm²	mm²	mm	See page
3-pole							
3VT9100-4TF30	160	2 x 25[1] ... 120	2 x 25 ... 120	2 x 25[1] ... 120	2 x 25 ... 120		1/39
3VT9100-4TA30	160					16	
3VT9100-4RC30	160					16	1/40
3VT9100-4TN30	10/16	1.5 ... 2.5/4 ... 6				--	--
3VT9100-4ED30	160					30	1/40
4-pole							
3VT9100-4TF40	160	2 x 25[1] ... 120	2 x 25 ... 120	2 x 25[1] ... 120	2 x 25 ... 120		1/44
3VT9100-4TA00	160					16	
3VT9100-4RC00	160					16	1/44
3VT9100-4TN00	10/16	1.5 ... 2.5/4 ... 6					

Required sleeves for cable end: Fine Strand: Yes, Strand: No.

[1] For cross-sections from 25 mm² up to 50 mm² only with tubular cable lugs for stranded conductors

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Technical specifications

Article No.		3VT17..-2..36-0AA0	3VT1716-2DE36-0AA0	3VT17..-2..46-0AA0	3VT1716-2EE46-0AA0
Description		**Circuit breakers**	**Switch disconnectors**	**Circuit breakers** [3]	**Switch disconnectors**
Number of poles		**3**		**4**	
Standards		EN 60 947-2, IEC 947-2	EN 60 947-3,IEC 947-3	EN 60 947-2, IEC 947-2	EN 60 947-3,IEC 947-3
Approval marks		CE			
Rated current I_n	A	16 ... 160[2]	--	16 ... 160[2]	--
Rated uninterrupted current I_u	A	16 ... 160[2]	160	16 ... 160[2]	160
Rated operational current I_e	A	--	160	--	160
Rated operational voltage U_e	V	max. AC 690, max. DC 250		max. AC 690, max. DC 440	
Rated frequency f_n	Hz	50/60			
Rated impulse withstand voltage U_{imp}	kV	8			
Rated insulation voltage U_i	V	690			
Utilization category • selectivity AC 690 V • switching mode		A AC-3 (16 ... 100 A) AC-2 (100 ... 160 A) DC-22 A	-- AC-23 A DC-22 A	A AC-3 (16 ... 100 A) AC-2 (100 ... 160 A) DC-22 A	-- AC-23 A DC-22 A
Rated short-time withstand current I_{cw} / t		--	2 kA/ 1 s	--	2 kA/1 s
Rated ultimate short-circuit breaking capacity (rms value)[1] I_{cu}/U_e		25 kA/DC 250 V (τ = max. 15 ms) 6 kA/AC 690 V 12 kA/AC 500 V 25 kA/AC 415 V 40 kA/AC 230 V	--	20 kA/DC 440V (τ = max. 15 ms) 6 kA/AC 690 V 12 kA/AC 500 V 25 kA/AC 415 V 40 kA/AC 230 V	--
Off-time at I_{cu}	ms	7	--	7	--
Rated service short-circuit breaking capacity (rms value) I_{cs}/U_e		13 kA/DC 250 V (τ = max. 10 ms) 3 kA/AC 690 V 6 kA/AC 500 V 13 kA/AC 415 V 20 kA/AC 230 V	--	13 kA/DC 440V (τ = max. 10 ms) 3 kA/AC 690 V 6 kA/AC 500 V 13 kA/AC 415 V 20 kA/AC 230 V	--
Rated short-circuit making capacity (peak value) I_{cm}/U_e		52 kA/AC 415 V	2,83 kA/AC 415 V	52 kA/AC 415 V	2,83 kA/AC 415 V
Losses per pole at I_n = 160 A[4]	W	15			
Mechanical endurance	cycles	20 000			
Electrical endurance (U_e = AC 415 V)	cycles	6 000			
Frequency of switching	cycles/hr	120			
Operating force	N	55		65	
Front side device protection		IP40			
Terminal protection		IP20			
Operating conditions					
Reference ambient temperature	°C	40			
Ambient temperature range	°C	-40 ... +55			
Working environment		dry and tropical climate			
Degree of pollution		3			
Max. elevation	m	2000			
Seismic resistance	m/s^2	3 g at 8 ... 50 Hz			
Design modifications					
Front/rear connection		✓/✓			
Plug-in version		--			
Withdrawable version		--			
Accessories					
Switches - auxiliary/relative/signal/leading		✓/–/✓/–			
Shunt trip unit/with alarm switch		✓/✓			
Undervoltage trip unit/with leading switch/with alarm switch		✓/–/✓			
Front hand drive/lateral drive right/left		✓/✓/✓			
Mechanical interlocking to the manual drive by Bowden wire		--/--		--/--	
Motor. oper. mechanism/with oper. counter		✓/--		✓/--	
Locking-type lever		✓			

✓ available, -- unavailable, + in preparation

1) When reversing the circuit breaker connection (power supply connected to terminals 2, 4, 6, (N) output to terminals 1, 3, 5, (N)), I_{cu} does not change.

2) Ranges of rated currents vary according to characteristics, see page 1/17.

3) Permissible load of N pole is 100%.

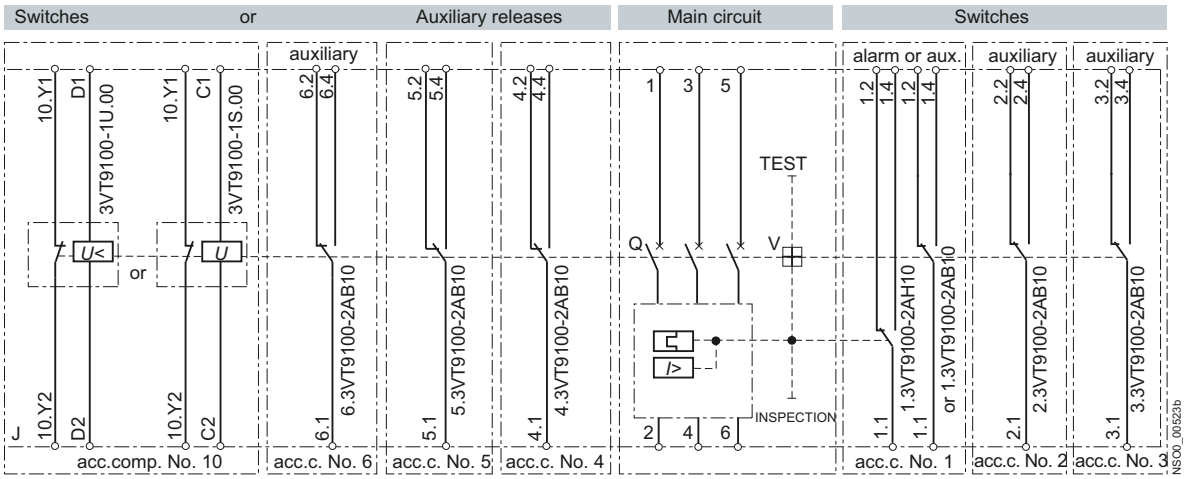
4) For I_n <160A, see table page 1/14.

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Schematics

Circuit breakers with accessories

3-pole version



Explanations

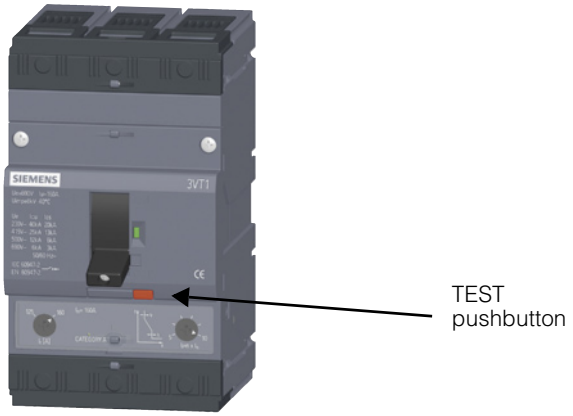
J	3VT1 circuit breaker
Q	main contacts
V	trip-free mechanism
TEST	test push button
3VT9100-1U.00	undervoltage trip unit
3VT9100-1S.00	shunt trip unit
INSPECTION	inspection push button
acc. c.	accessory compartment
acc. comp.	accessory compartment

Power losses (per pole)

Rated current I_n	Power loss P per pole of circuit breaker at maximum current
A	W
16	4
20	4
25	4
32	4
40	4
50	5
63	6
80	7
100	10
125	15
160	15

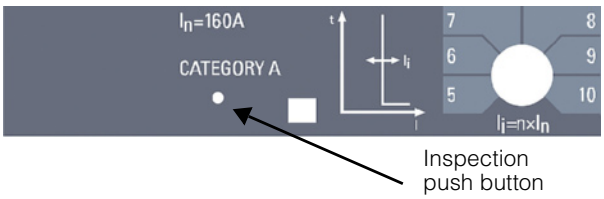
TEST pushbutton

Pressing the TEST pushbutton switches the circuit breaker/switch disconnector off and actuates the auxiliary switches.



Indication of circuit breaker tripping

When the circuit breaker was tripped by the overcurrent trip unit, the following symbol is displayed: ""

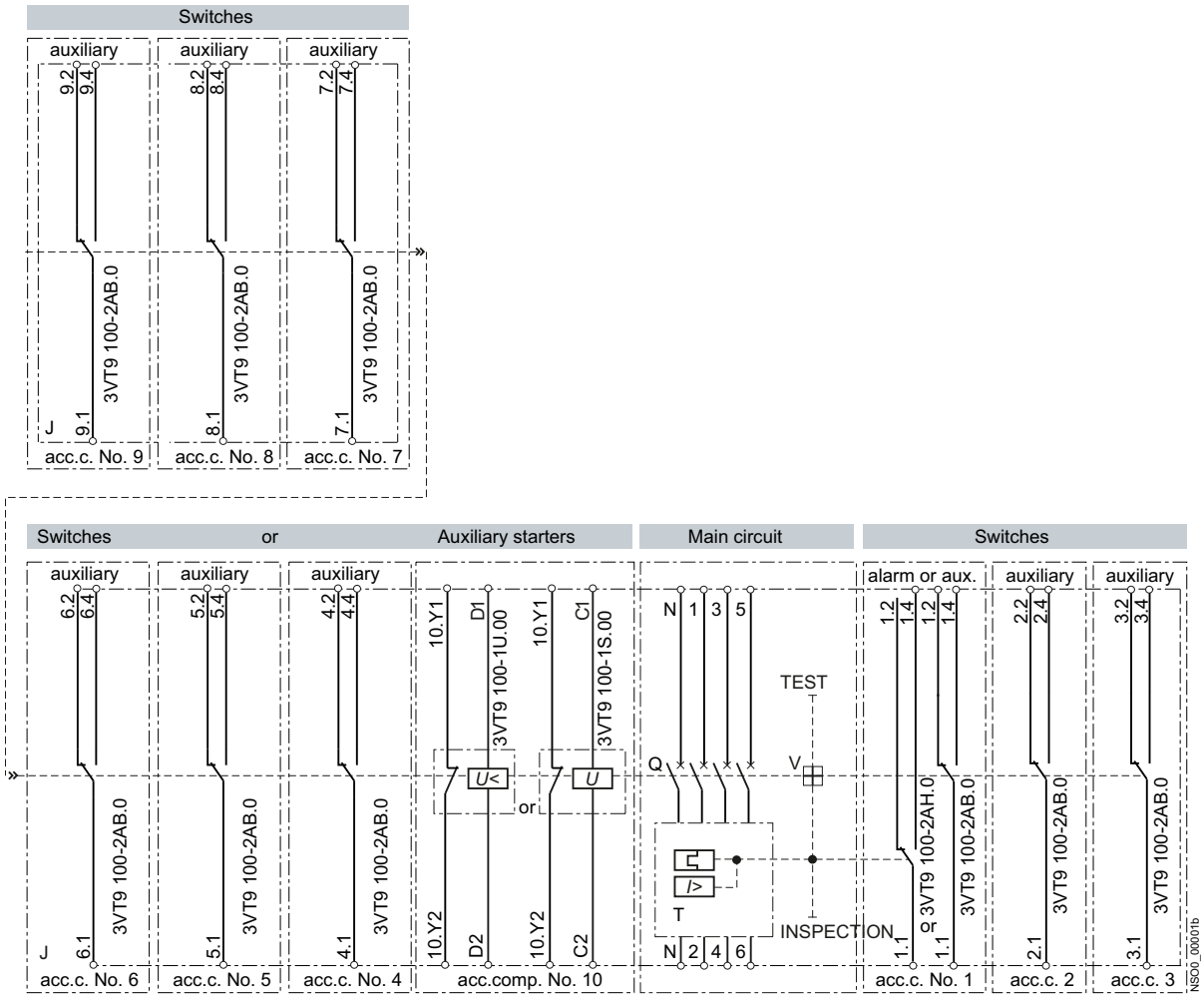


Inspection push button

by pressing you will simulate tripping of the circuit breaker by the overcurrent release, including actuating of the auxiliary switches and signal switch. Pressing requires a suitable instrument, such as wire with cross-section about 1 mm.

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4-pole version



Explanations

J	3VT1 circuit breakers
Q	main contacts
T	thermomagnetic trip unit 3-pole +N (3 poles protected, N-pole unprotected) 4-pole (all four poles protected)
V	trip-free mechanism
TEST	test pushbutton
3VT9100-1U.00	undervoltage trip unit
3VT9100-1S.00	shunt trip unit
INSPECTION	inspection push button
acc. c.	accessory compartment
acc. comp.	accessory compartment

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Trip units

Overview

Trip units, 3-pole version

Trip units are integrated in the circuit breakers.

Tripping characteristics

Circuit breakers are available with four types of tripping characteristics. They are designated with the letters:

"L" - lines
For protection of lines with low starting currents
3VT1 circuit breakers with characteristic **"L"** have a pre-set and fixed rated current value. The circuit breakers feature I_n values in a standardized current range from 40 A to 160 A (see "Ranges of trip units and their possible settings"). Short-circuit trip units are fixed at 4 x I_n.

"D" - distribution
For protection of lines and transformers
3VT1 circuit breakers with characteristic **"D"** have the option of setting to a reduced current in a range of approximately 0.75 ... 1 I_n. The circuit breakers feature I_n values in a standardized current range from 16 A to 160 A (see "Ranges of trip units and their possible settings"). The short-circuit trip unit is adjustable.
Setting values are shown in the table on page 1/17.

"M" - motor
For motor protection
3VT1 circuit breakers with characteristic **"M"** have the option of setting a reduced current in a range of approximately 0.75 ... 1 I_n. The circuit breakers feature I_n values in a standardized series of currents from 16 A to 100 A (see "Ranges of trip units and their possible setting"). The short-circuit trip unit is fixed at the value of 10 x I_n.
See page 1/20.

"N" - short-circuit trip unit only
3VT1 circuit breakers with characteristic **"N"** have a short circuit trip unit only. They feature I_n values in a standardized series of currents ranging from 32 A to 160 A. The short-circuit trip unit is adjustable.
The values are shown in the table on page 1/17.

Article Numbers

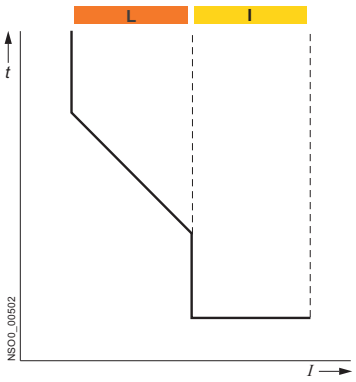
The article number of a circuit breaker depends on the rated current and on the tripping characteristics.
For example: Motor protection with I_n = 32 A.
The article number is: 3VT1703-3DM36-0AA0.

Setting of tripping characteristics

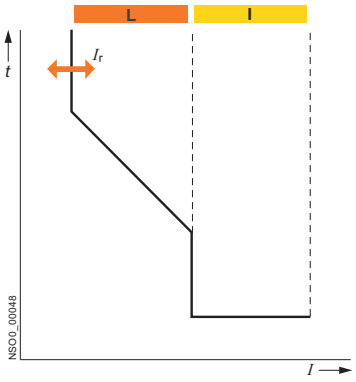
- **Time-dependent trip unit (thermal) L** (for circuit breakers with characteristics "D" and "M"). The time-dependent trip unit for overload protection I_r (instantaneous) is adjusted in a continuous range using the I_r adjustment dial on the overload trip unit. The I_r adjustment range is 0.75 ... 1 I_n.
- **Time-independent trip unit (short-circuit trip unit) I** (for circuit breakers with characteristics "D" and "N"). With an time-independent instantaneous trip unit (value of the short circuit current I_i), adjustment is possible within a continuous range.
  All values are shown in the table on page 1/17.

Circuit breakers with characteristic

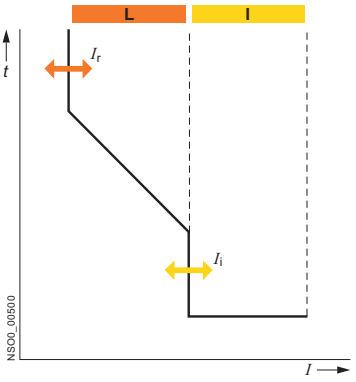
"L":



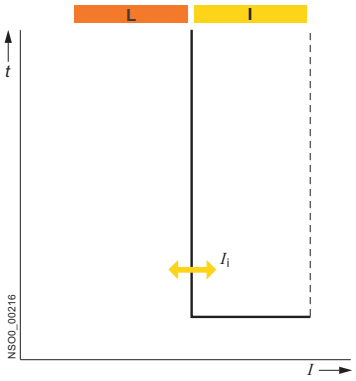
"M":



"D":



"N":



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Derating in accordance with ambient temperature

Rated current I_n	Permissible load at							
A	+ 70 °C	+ 65 °C	+60 °C	+ 55 °C	+ 50 °C	+ 40 °C	+20 °C	-15 ~ -40 °C
16	14	14.5	14.5	15	15.5	16	17	19
20	18	18.5	18.5	19	19.5	20	22	25
25	21	21.5	22	23	24	25	28	31
32	25	27	28	29	30.5	32	36	41
40	34	35.5	37	38	39	40	45	53
50	43	45	47	48	49	50	56	66
63	50	53	55	57	59	63	69	83
80	63	67	70	73	75	80	88	100
100	80	84	88	92	95	100	108	122
125	97	102	107	112	117	125	133	145
160	130	135	140	145	151	160	168	175

Current ranges of trip units and their possible settings at 40 °C

Rated current I_n	3VT17..-2DA36-0AA0		3VT17..-2DC36-0AA0		3VT17..-2DM36-0AA0		3VT17..-2DB36-0AA0	
	Overload protection I_r	Short circuit protection I_i (instantaneous)	Overload protection I_r	Short circuit protection I_i (instantaneous)	Overload protection I_r	Short circuit protection I_i (instantaneous)	Overload protection I_r	Short circuit protection I_i (instantaneous)
A	A	A	A	A	A	A	A	A
16	--	--	12,5 ... 16	160 ... 240	12,5 ... 16	160	--	--
20	--	--	16 ... 20	200 ... 300	16 ... 20	200	--	--
25	--	--	20 ... 25	250 ... 375	20 ... 25	250	--	--
32	--	--	25 ... 32	160 ... 320	25 ... 32	320	--	160 ... 320
40	40	160	32 ... 40	200 ... 400	32 ... 40	400	--	200 ... 400
50	50	200	40 ... 50	250 ... 500	40 ... 50	500	--	250 ... 500
63	63	252	50 ... 63	315 ... 630	50 ... 63	630	--	315 ... 630
80	80	320	63 ... 80	400 ... 800	63 ... 80	800	--	400 ... 800
100	100	400	80 ... 100	500 ... 1000	80 ... 100	1000	--	500 ... 1000
125	125	500	100 ... 125	625 ... 1250	--	--	--	625 ... 1250
160	160	640	125 ... 160	800 ... 1600	--	--	--	800 ... 1600

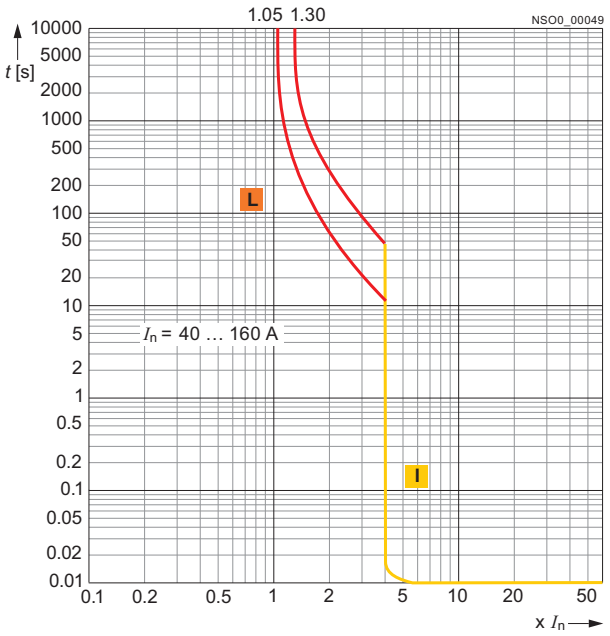
Current ranges of trip units and their possible settings at 40 °C

Rated current I_n	3VT17..-2EA46-0AA0		3VT17..-2EC46-0AA0		3VT17..-2EB46-0AA0	
	Overload protection I_r	Short circuit protection I_i (instantaneous)	Overload protection I_r	Short circuit protection I_i (instantaneous)	Overload protection I_r	Short circuit protection I_i (instantaneous)
A	A	A	A	A	A	A
16	-	--	12,5 ... 16	160 ... 240	-	-
20	-	--	16 ... 20	200 ... 300	-	-
25	-	--	20 ... 25	250 ... 375	-	-
32	-	--	25 ... 32	160 ... 320	-	160 ... 320
40	40	160	32 ... 40	200 ... 400	-	200 ... 400
50	50	200	40 ... 50	250 ... 500	-	250 ... 500
63	63	252	50 ... 63	315 ... 630	-	315 ... 630
80	80	320	63 ... 80	400 ... 800	-	400 ... 800
100	100	400	80 ... 100	500 ... 1000	-	500 ... 1000
125	125	500	100 ... 125	625 ... 1250	-	625 ... 1250
160	160	640	125 ... 160	800 ... 1600	-	800 ... 1600

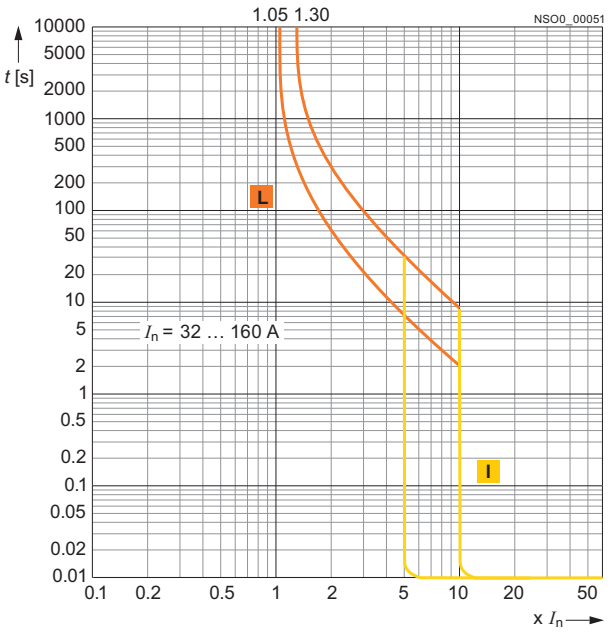
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Trip units

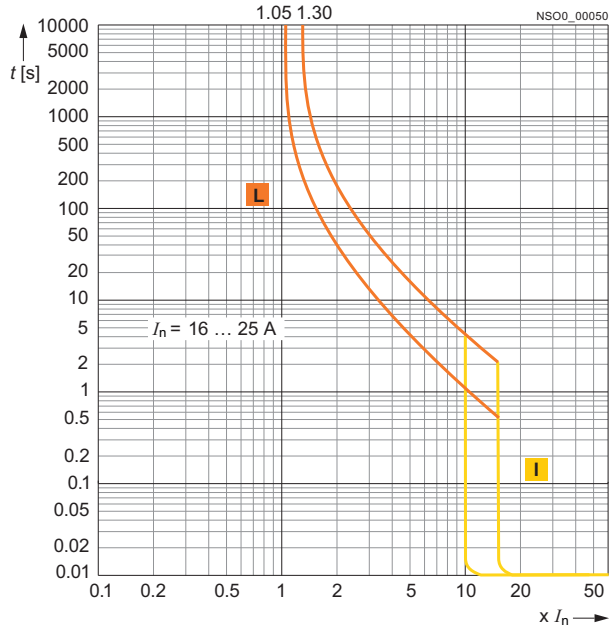
Characteristic "L", I_n = 40, 50, 63, 80, 100, 125, 160 A



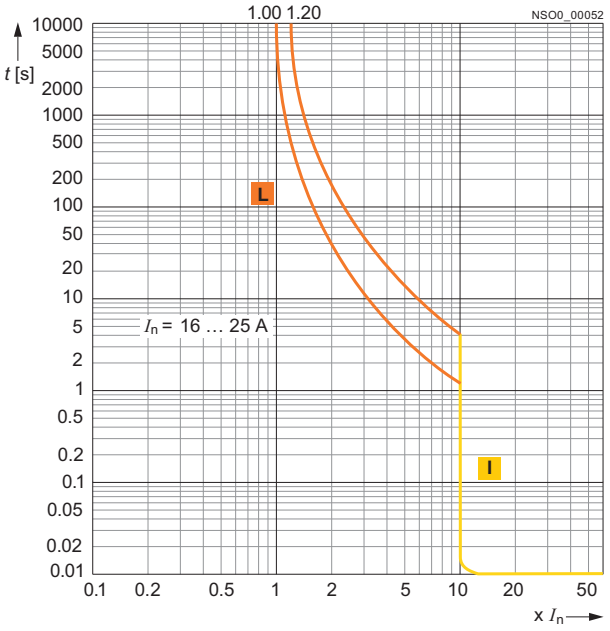
Characteristic "D", I_n = 32, 40, 50, 63, 80, 100, 125, 160 A



Characteristic "D", I_n = 16, 20, 25 A

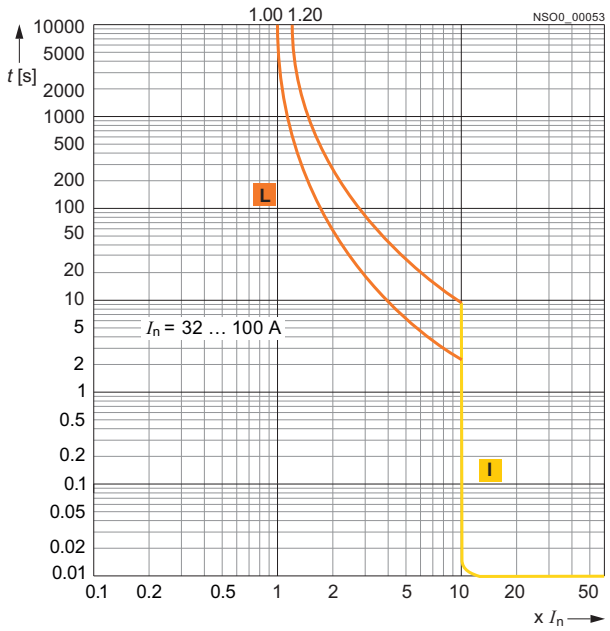


Characteristic "M", I_n = 16, 20, 25 A

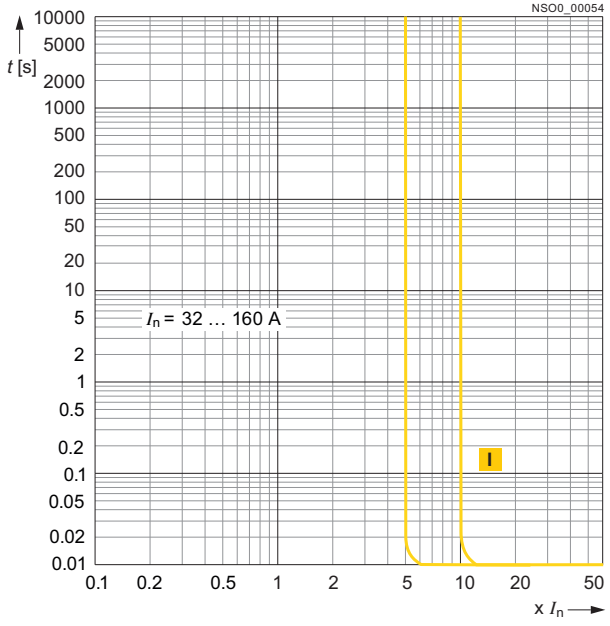


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Characteristic "M", I_n = 32, 40, 50, 63, 80, 100 A



Characteristic "N", I_n = 32, 40, 50, 63, 80, 100, 125, 160 A



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Trip units

Trip units, with tripping characteristic M class

The tripping time of the 3-pole trip unit of 3VT1 circuit breakers with characteristic M at 7.2 I_n corresponds to the tripping classes 10A, 10 and 20 according to EN 60947-4-1.

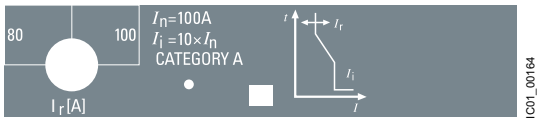
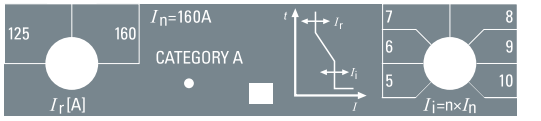


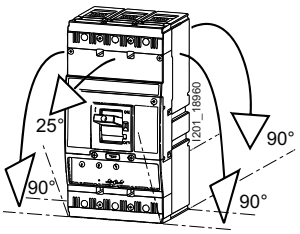
Plate of the trip units with characteristic M

Rated current I_n	Article No.	Class
16 A	3VT1701-2DM36-0AA0	10A
20 A	3VT1702-2DM36-0AA0	10A
25 A	3VT1792-2DM36-0AA0	10A
32 A	3VT1703-2DM36-0AA0	10
40 A	3VT1704-2DM36-0AA0	10
50 A	3VT1705-2DM36-0AA0	20
63 A	3VT1706-2DM36-0AA0	20
80 A	3VT1708-2DM36-0AA0	20
100 A	3VT1710-2DM36-0AA0	20

Setting I_R and I_i for circuit breakers with characteristic "D"

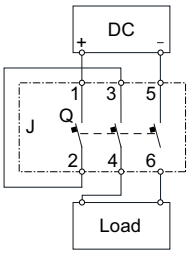
Adjusting I_R Adjusting I_i



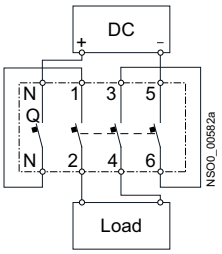


Installation positions

Connection of 3-/4-pole 3VT1 circuit breakers in DC circuits



Connection of 3P circuit breaker in DC circuit up to 250 V DC



Connection of 4P circuit breaker in DC circuit up to 440 V DC

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Trip units, 4-pole version

Trip units are integrated into the 3VT1 circuit breakers.

It is not possible to deinstall or exchange the trip units.
4-pole circuit breakers are manufactured in the following versions:

- 3-pole +N (three poles protected, N-pole unprotected)
- 4-pole (all four poles protected)

The permissible load of the N-pole is 100% I_n.

Tripping characteristics

The circuit breakers are delivered with three types of tripping characteristics, designated by the following letters:

"L" - lines
For protection of lines with low starting currents
3VT1 circuit breakers with characteristic **"L"** have a fixed value of rated current I (without I_n control). The circuit breakers feature I_n values of standard current range 40 ... 160 A, see "Ranges of trip units and their possible setting". The short-circuit trip unit has a fixed setting to 4 x I_n.

"D" - distribution
For protection of lines and transformers
3VT1 circuit breakers with characteristic **"D"** can be set to a reduced current in the range of approx. 0.75 ... 1 I_n.
The circuit breakers feature I_n values within a standard current range of 16 ... 160 A.
Setting values are shown in the table on page 1/17.

"N" - short-circuit
For protection against short circuits only
3VT1 circuit breakers with characteristic **"N"** have a short circuit trip unit only. They feature circuit breaker values within a standard current range of 32 ... 160 A. The short circuit trip unit is adjustable.
The values are shown in the table on page 1/17.

Article Numbers

The article number of a circuit breaker depends on the rated current and on the tripping characteristics.

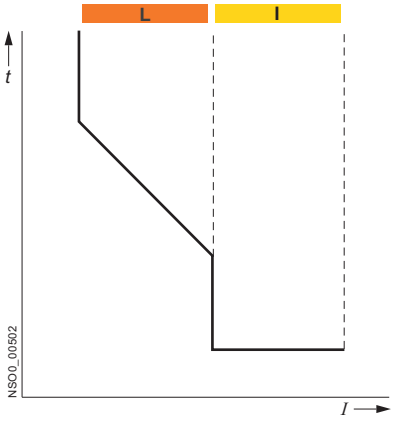
For example: Protection of a circuit with I_n = 40 A.
The article number is 3VT1704-2EC46-0AA0.

Setting of tripping characteristics

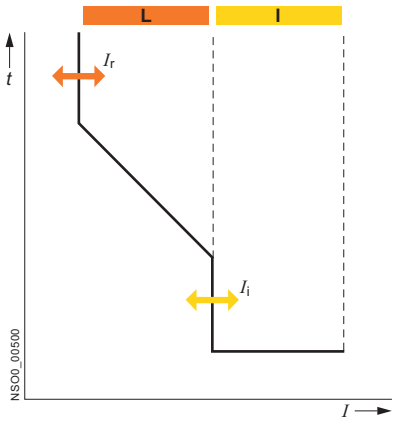
- **Time-dependent trip unit (thermal) L**
  (for circuit breakers with characteristics "D" and "M"). The time-dependent trip unit for overload protection I_r (instantaneous), is adjusted in a continuous range using the I_r adjustment dial on the overload trip unit. The I_r adjustment range is 0.75 ... 1 I_n.
- **Time-independent instantaneous trip unit (short-circuit trip unit) I**
  (for circuit breakers with characteristics "D" and "N"). With a time-independent instantaneous trip unit (value of the short circuit current I_i), adjustment is possible within a continuous range.
  All values are shown in the table on page 1/17.

Circuit breakers with characteristic

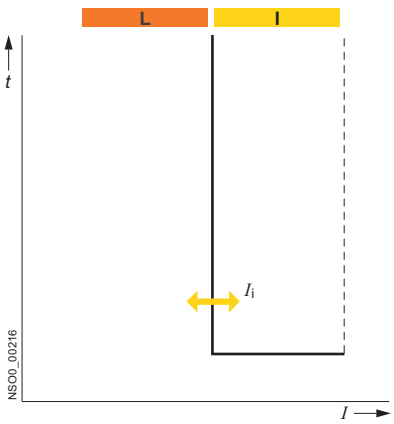
"L"



"D"



"N"

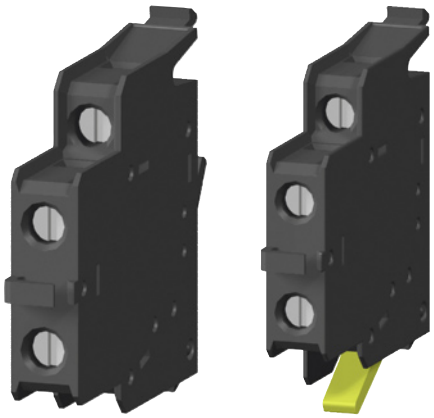


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Auxiliary switches

Overview

Auxiliary switches



Auxiliary and alarm switches

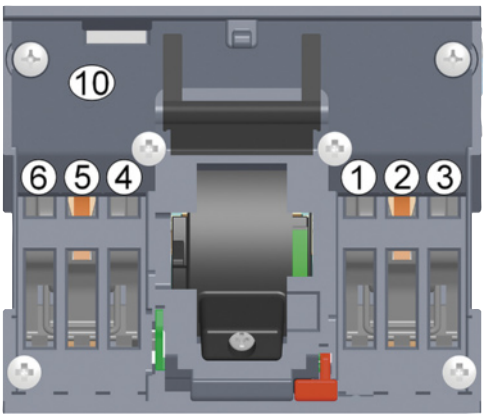
Function, name and location of switches

Article No.	Type	Switch location	Switch function
3VT9100-2AB10 **3VT9100-2AB20**	Auxiliary switch	Accessory compartment 1[1], 2, 3, 4, 5, 6[2]	Signals the condition of the main contact of the circuit breaker/ switch disconnector
3VT9100-2AH10 **3VT9100-2AH20**	Alarm switch	Accessory compartment 1[1]	Signals whether the circuit breaker was tripped by the trip unit

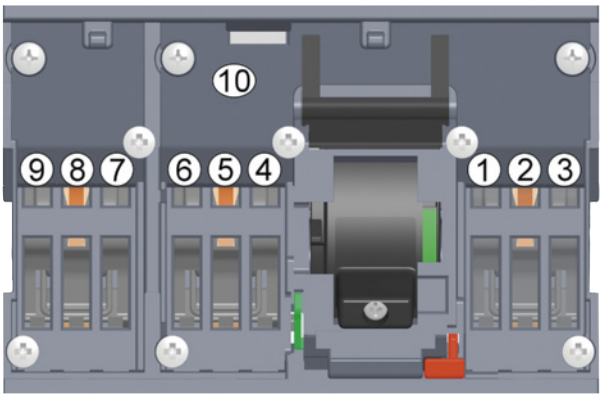
[1] In accessory compartment 1, a 3VT9100-2AB10 auxiliary switch and 3VT9100-2AH10 alarm switch cannot be used simultaneously.

[2] When one of accessory compartments 4, 5 or 6 is already in use for auxiliary switches, a shunt trip unit or undervoltage trip unit cannot be installed additionally.

Location of switches in accessory compartments



Location of accessory compartments in a 3-pole 3VT1 circuit breaker/switch disconnector.



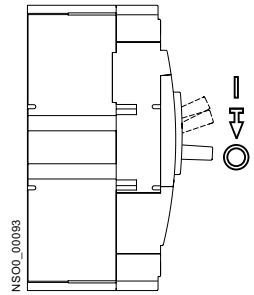
Location of accessory compartments in a 4-pole 3VT1 circuit breaker/switch disconnector.

When using one of the accessory compartments 4, 5 or 6, neither a shunt trip unit nor an undervoltage trip unit can be installed.

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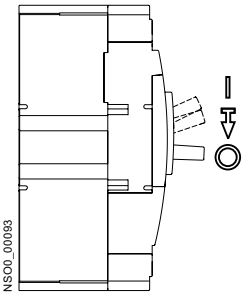
Function

Switching states (4-pole)

Accessory compartment			1 ... 9		1		10
Switching states of the circuit breaker 	Lever position	Position of the main contacts	3VT9100-2AB10		3VT9100-2AH10		3VT9100-1UC/UD/UE.. 3VT9100-1SC/SD/SE..
Switched on		**1**	1	0	0	1	1
Switched off manually		**0**	0	1	0	1	1
Switched off by the trip unit or INSPECTION button		**0**	0	1	1	0	1
Switched off by auxiliary trip unit		**0**	0	1	0	1	0
Switched off by TEST button		**0**	0	1	0	1	1

0 = contact open, 1 = contact closed

Switching states (3-pole)

Accessory compartment			1 ... 6		1		10
Switching states of the circuit-breaker 	Lever position	Position of the main contacts	3VT9100-2AB10		3VT9100-2AH10		3VT9100-1S... 3VT9100-1U...
Switched on		**1**	1	0	0	1	1
Switched off manually		**0**	0	1	0	1	1
Switched off by the trip unit or INSPECTION button		**0**	0	1	1	0	1
Switched off by auxiliary trip unit		**0**	0	1	0	1	0
Switched off by TEST button		**0**	0	1	0	1	1

0 = contact open, 1 = contact closed

Technical specifications

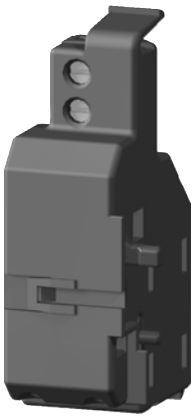
Article No.		3VT9100-2AB10, 3VT9100-2AH10	3VT9100-2AB20, 3VT9100-2AH20
Rated operational voltage U_e	V	AC 60 ... 250 V DC 60 ... 250 V	AC 5 ... 60 V DC 5 ... 60 V
Rated insulation voltage U_i	V	250 V	
Rated impulse withstand voltage U_{imp}	kV	4 kV	
Rated frequency f_n	Hz	50/60 Hz	
Rated operational current I_e/U_e			
AC-12		6 A/250 V	0.0004 ... 0.1 A/5 ... 60 V
AC-15		5 A/60 V, 3 A/110 V, 1.5 A/230 V	0.0004 ... 0.1 A/5 ... 60 V
DC-12		0.25 A/250 V	0.1 A/5 ... 60 V
DC-13		0.5 A/60 V, 0.2 A/110 V, 0.1 A/250 V	0.0004 ... 0.1 A/5 ... 60 V
Thermal current I_{th}	A	6 A	0.5 A
Contacts arrangement		001	
Connector cross-section S	mm^2	0.5 ... 1	
Terminal protection (connected switch)		IP20	

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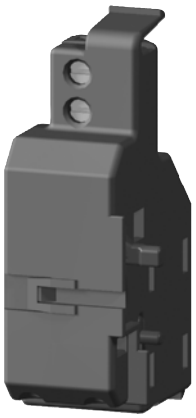
Auxiliary trip units

Design

Auxiliary trip units

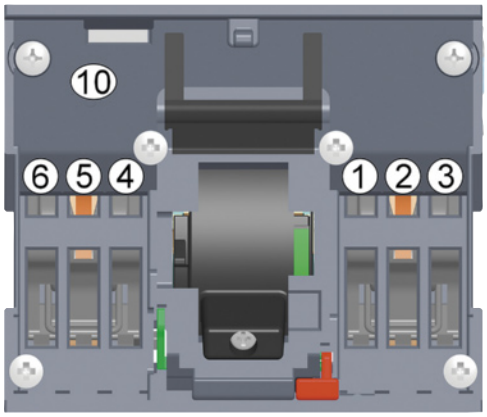


Shunt trip unit



Undervoltage trip unit

Location of auxiliary trip unit



One auxiliary trip unit can be installed in accessory compartment 10

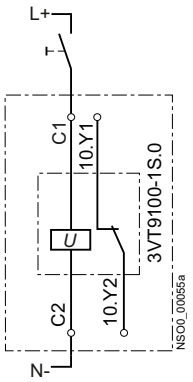
The article number of the auxiliary trip unit depends on the rated operational voltage

U_e	Article No.
AC/DC 24/48 V	3VT9100-1SC00
AC 110/230 V, DC 110/220 V	3VT9100-1SD00
AC 230/400 V, DC 220 V	3VT9100-1SE00
DC 12 V	3VT9100-1SB00

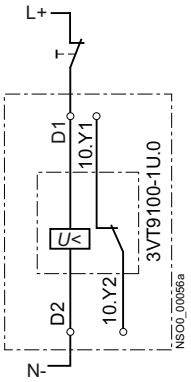
U_e	Article No.
AC/DC 24/48 V	3VT9100-1UC00
AC 110/230 V, DC 110/220 V	3VT9100-1UD00
AC 230/400 V, DC 220 V	3VT9100-1UE00

The specific rated operational voltage of the shunt trip unit is set by jumpers located on the trip unit. The standard setting by the manufacturer is always to the value corresponding to the article number.

Schematics



Shunt trip unit



Undervoltage trip unit

Technical specifications

Article No.	3VT9100-1S.00
Rated operational voltage U_e	AC 24/48/110/230/400 V DC 12/24/48/110/220 V
Rated frequency f_n	50/60 Hz
Input power at 1.1 U_e	
• AC	2 VA
• DC	2 W
Characteristics	$U \geq 0.7\ U_e$: circuit breaker must trip
Time before switching off	15 ms
Continuous load	yes
Connection cross-section S	0,5 ... 1 mm^2
Terminal protection (connected trip unit)	IP20
Location in accessory compartment no.	10
Alarm switch - signals that the circuit breaker was switched off by the shunt trip unit	
Rated operational voltage U_e	AC 230 V
Rated insulation voltage U_i	250 V
Rated impulse withstand voltage U_{imp}	4 kV
Rated frequency f_n	50/60 Hz
Rated operational current I_e/U_e	2 A/AC 230 V
Thermal current I_{th}	6 A
Contact arrangement	01

Article No.	3VT9100-1U.00
Rated operational voltage U_e	AC 24/48/110/230/400 V DC 24/48/110/220 V
Rated frequency f_n	50/60 Hz
Input power at 1.1 U_e	
• AC	2 VA
• DC	2 W
Characteristics	$U \leq 0.35\ U_e$: circuit breaker must trip $U \geq 0.85\ U_e$: circuit breaker can be switched on
Time before switching off	15 ms
Continuous load	yes
Connector cross-section S	0.5 ... 1 mm^2
Terminal protection (connected trip unit)	IP20
Location in accessory compartment no.	10
Alarm switch - signals that the circuit breaker was switched off by the undervoltage trip unit	
Rated operational voltage U_e	AC 230 V
Rated insulation voltage U_i	250 V
Rated impulse withstand voltage U_{imp}	4 kV
Rated frequency f_n	50/60 Hz
Rated operational current I_e/U_e	2 A/AC 230 V
Thermal current I_{th}	6 A
Contact arrangement	01

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Design

Rotary operating mechanisms

The rotary operating mechanism actuates the circuit breakers/switch disconnector when the operator turns the knob, e.g. in order to switch machines on and off. The modular concept of the operating mechanism allows simple mounting on the circuit breaker. Mounting can be done after having removed the accessory compartment cover. An attached drive can be sealed (with sealing wire). The drive and its accessories are ordered separately to match the requirements (see page 1/7).

- The rotary operating mechanism is mounted directly on the circuit breaker or switch disconnector.
- The coupling driver is fixed to the switchgear cabinet door and provides for degree of protection IP40 or IP66.
- The knob is mounted onto the rotary operating mechanism or onto the coupling driver.
- The extension shaft is supplied in two versions, standard (length 350 mm - can be shortened) and telescopic (adjustable length 199 ... 352 mm). It is fitted onto the rotary operating mechanism.

The rotary operating mechanism makes it possible to actuate the circuit breaker:

Operation from the front panel of the circuit breaker (Fig. 1)
3VT9100-3HA/HB.. rotary operating mechanism
+ 3VT9100-3HE/HF.. knob



Fig. 1: Rotary operating mechanism with knob

Operation through the switchgear cabinet door (Fig. 2)
3VT9100-3HA/HB.. rotary operating mechanism
+ 3VT9100-3HJ.. extension shaft
+ 3VT9100-3HG/HH.. coupling driver
+ 3VT9100-3HE/HF.. knob

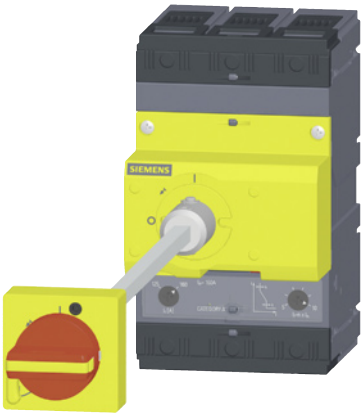


Fig. 2: Rotary operating mechanism with extension shaft, coupling driver and knob

Operation through the side wall of the switchgear cabinet (Fig. 3)

in left- or right-side designs of rotary operating mechanisms for lateral operation
3VT9100-3HD10 (right) or 3VT9 100-3HC10 (left)
+ 3VT9100-3HJ.. extension shaft
+ 3VT9100-3HG/HH.. coupling driver
+ 3VT9100-3HE/HF.. knob.

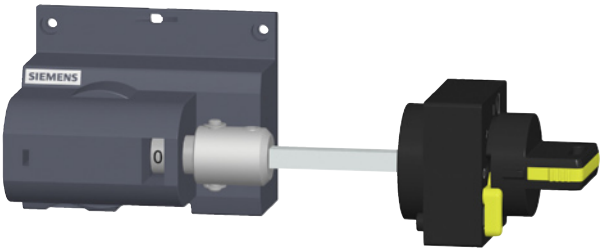


Fig. 3: Lateral rotary operating mechanism with extension shaft, coupling driver and knob

Enhanced safety for operator

- The rotary operating mechanism and knob allow operators to lock the circuit breaker into the "switched off manually" position. The rotary operating mechanism and lever can be locked with up to three padlocks with a shaft diameter up to 4 mm.
- Every coupling driver prevents the switchgear cabinet door from opening when the circuit breaker is switched on or if it was tripped. By means of the coupling driver it is possible to switch off this locking and to open the door.
  Locking of the switchgear cabinet door is also possible in the OFF mode of the circuit breaker. It is necessary to activate the locking by means of the knob on the coupling drive and to lock the hand drive arm.
- Two circuit breakers with rotary operating mechanism can also be provided with reciprocal mechanical interlocking or mechanical parallel switching (see page 1/27).

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Rotary operating mechanisms

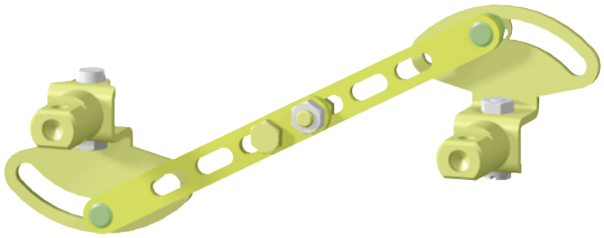
Features

Article No.	Description	Color	Permits operator to lock the circuit breaker in OFF mode	Degree of Protection	Switchgear cabinet door is locked when circuit breaker is		Length mm
					switched on	switched off manually and locked	
3VT9100-3HA10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9100-3HA20	Rotary operating mechanism	gray	yes	--	--	--	--
3VT9100-3HB20	Rotary operating mechanism	yellow	yes	--	--	--	--
3VT9100-3HC10	Rotary operating mechanism - lateral, left	gray	no	--	-	--	--
3VT9100-3HD10	Rotary operating mechanism - lateral, right	gray	no	--	-	--	--
3VT9100-3HE10	Knob	black	no	--	--	--	--
3VT9100-3HE20	Knob, lockable with padlock	black	yes	--	--	--	--
3VT9100-3HF20	Knob, lockable with padlock	red	yes	--	--	--	--
3VT9100-3HG10	Coupling driver	black	--	IP40	yes	yes	--
3VT9100-3HH10	Coupling driver	yellow	--	IP40	yes	yes	--
3VT9100-3HG20	Coupling driver	black	--	IP66	yes	yes	--
3VT9100-3HH20	Coupling driver	yellow	--	IP66	yes	yes	--
3VT9100-3HJ10	Extension shaft (can be shortened)	--	--	--	--	--	350
3VT9100-3HJ20	Extension shaft, telescopic	--	--	--	--	--	199 ... 352

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Mechanical interlockig and mechanical interlocking for parallel switching

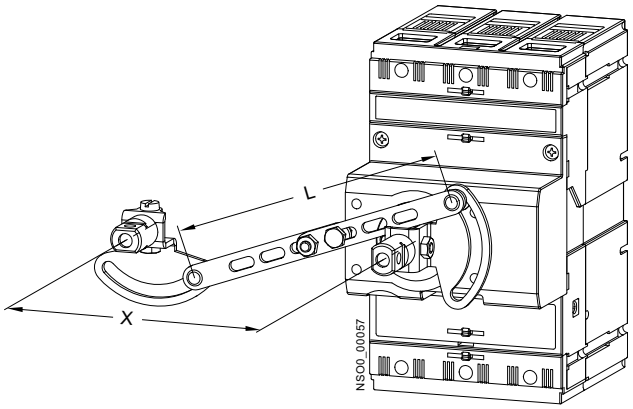
3VT9100-8LA00 mechanical interlocking



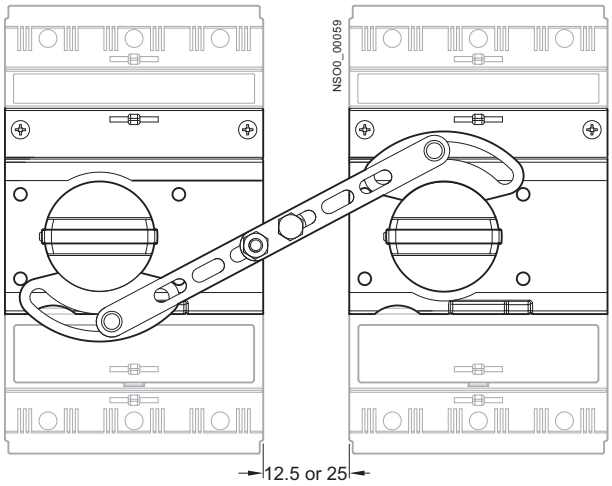
Mechanical interlocking make sure that two circuit breakers cannot trip simultaneously, but always just individually. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two 3VT1 circuit breakers. Each circuit breaker must be furnished with a rotary operating mechanism – at least one of them with a rotary operating mechanism and a knob (see page 1/25).

When using a mechanical interlocking it is required to comply with the dimensions shown in the figure and in the table.

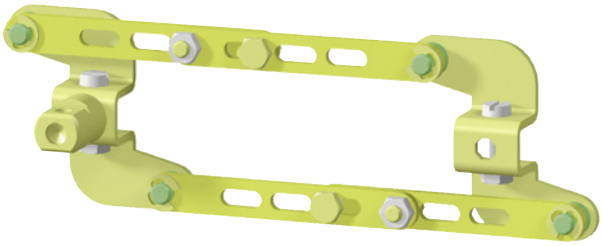
Dimensions	mm
X	87.5 or 100
L	94.5 or 106



Arrangement of circuit breakers/switch disconnectors with 3VT9100-8LA00 mechanical interlocking



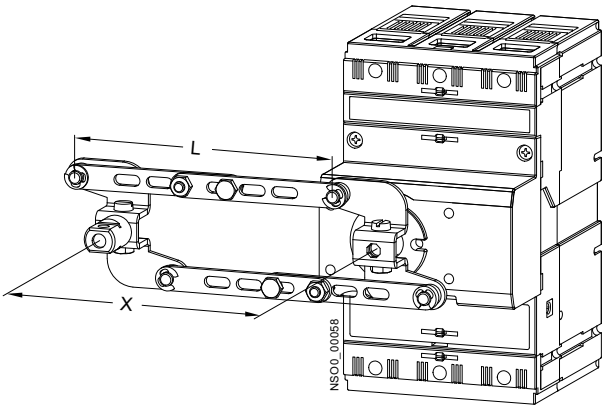
3VT9100-8LB00 mechanical interlocking for parallel switching



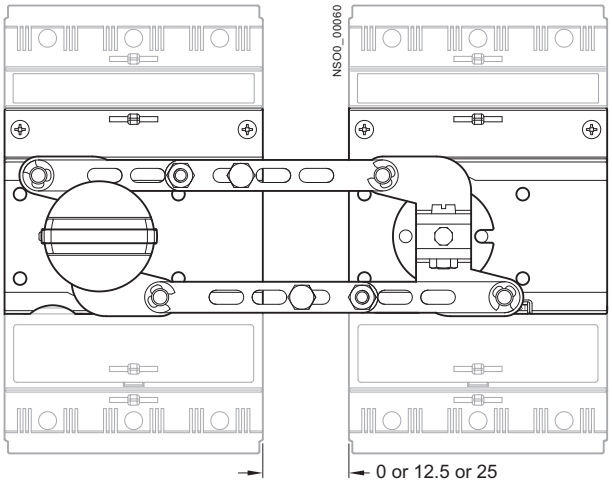
Mechanical interlocking for parallel switching are for simultaneous switching of two circuit breakers. Parallel switching can be used between two 3VT1 circuit breakers. Each circuit breaker must be furnished with a rotary operating mechanism and at least one of them with a knob (see page 1/25).

When using a mechanical interlocking for parallel switching it is required to comply with the dimensions shown in the figure and in the table.

Dimensions	mm
X	75 or 87.5 or 100
L	to be determined



Arrangement of circuit breakers/switch disconnectors with 3VT9100-8LB00 mechanical interlocking for parallel switching



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Motorized operating mechanism

Design

Motorized operating mechanism

The motorized operating mechanism is an accessory to the circuit breaker/switch disconnector, by means of which it is possible to switch the circuit breaker or switch disconnector remotely on and off. The modular design of the motorized operating mechanism enables its simple attachment to the circuit breaker (also in addition to a rotary operating mechanism). The motorized operating mechanism is used for both remote and local control of 3VT1 3-pole and 4-pole circuit breakers. The circuit breaker with attached motorized operating mechanism can be installed on a mounting plate or on a standard DIN mounting rail. The motorized operating mechanism is fastened by means of a bayonet mechanism to the circuit breaker.

3VT1 circuit breakers with motorized operating mechanism are intended for industrial, power engineering and infrastructure applications. The motorized operating mechanisms are for direct actuation of the circuit breaker, without a spring storage unit.

The motorized operating mechanism can work in local or remote control mode. The local control mode is used, for instance, in case of loss of the control voltage. Local control of the circuit breaker is only accessible after lifting the transparent safety cover off the operating mechanism. This procedure locks the remote electrical control circuits. The lifted position of the cover can be indicated remotely.

The circuit breaker is switched on and off by means of the control lever. After returning the safety cover to the original position, the operating mechanism is switched automatically into the remote control mode.

After the safety cover was removed, it is possible to actuate an automatic mode selector switch. Under the transparent cover, there is a red LED. The lighting of the LED indicates a failure (failed on/off/wind-up operations).

Electronic circuits of the motorized operating mechanism block erroneous control process, e.g. drive cycling after tripping of trip unit or shunt trip/undervoltage trip unit.

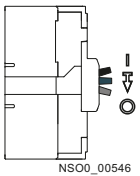
Lateral operating mechanisms can be locked in "off position" of the circuit breaker by up to three padlocks with a shank diameter of max. 4 mm. The protective cover of the operating mechanisms can also be sealed.

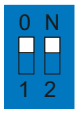
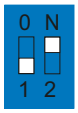
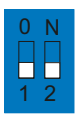
Motorized operating mechanism automatic operation presets

The position of the main circuit breaker is indicated by the position of the circuit breaker driver lever under the transparent protective cover of the operating mechanism. The wound up position of the circuit breaker can also be signalled remotely.

In the remote control mode, the circuit breaker is switched on and off by an ON and OFF pushbutton. The accessories for the motorized operating mechanism includes an 3VT9100-3MF00 extension cable.

Symbol	Description
	Switched on manually or by motorized operating mechanism electrically
	Switched off by trip unit, shunt trip unit, undervoltage trip unit or TEST pushbutton
	Switched off manually or by motorized operating mechanism electrically, wound up state



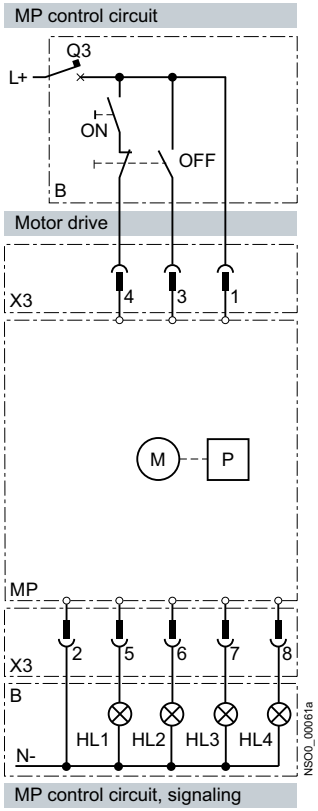
Switch position	Automatic operation preset	Preset description	Circuit breaker switching off to TRIP position	Circuit breaker will be switched to OFF position	Circuit breaker will be switched to ON position
	1[1]	Automatic winding up is on	By trip unit By auxiliary trip unit By TEST pushbutton	The motorized operating mechanism switches the circuit breaker OFF automatically.	The motorized operating mechanism switches circuit breaker on when it receives an ON signal.
	2	Automatic winding up is off		The motorized operating mechanism stays in TRIP mode until it receives an OFF signal.	The motorized operating mechanism switches circuit breaker on when it receives an ON signal.
	3	Simultaneous winding up and switching on		When receiving an ON signal the motorized operating mechanism switches the circuit breaker off and on again immediately.[2]	
	The motorized operating mechanism is out of operation, the red LED is lit.				

[1] Standard factory setting of the switch.

[2] Pressing the OFF pushbutton causes the motorized operating mechanism to wind up the circuit breaker to position ◎ only.

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Schematics



Technical specifications

Article No.		3VT9100-3M.00
Rated operational voltage U_e		AC 24/48/110/230 V DC 24/48/110/220 V
Rated frequency f_n		50/60 Hz
Control pulse length for switching on for switching off		 60 ms ... ∞[1)] 60 ms ... ∞[1)]
Time for switching on		< 70 ms[1)]
Time for switching off		< 50 ms[1)]
Frequency of cycles ON/OFF		5 cycles/min
Frequency of cycles-successive ON/OFF		10 cycles
Mechanical endurance		20000 cycles
Power input	AC	100 VA
	DC	100 W
Starting current		12 A, at AC/DC 24 V 6 A, at AC/DC 48 V 4 A, at AC/DC 110 V 2 A, at AC 230 V/DC 220 V
Protection AC 24/48/110 V; AC 230 V DC 24/48/110 V; DC 220 V		 5SX4104-7; 5SX4102-7 5SX5104-7; 5SX5102-7
Article No.		3VT9100-3MF00
Number of conductors		8
Conductor cross section S		0.35 mm^2
Conductor length		60 cm

[1)] The values depend on the motorized operating mechanism automatic operation preset, see pages 1/30 ff.

Explanation of designations

MP	3VT9100-3M.00 motorized operating mechanism
M	Motor
P	Gearbox
X3	Connector for connection of control and signalling circuits
B	recommended connection of control circuits-not part of MP
ON	Pushbutton
OFF	Pushbutton
Q3	motorized operating mechanism circuit breaker
HL1	remote failure signalling (unreliable making or breaking), permissible load max. 10 W[2)]
HL2	signalling of circuit breaker lever "wound up" position, permissible load max. 10 W[2)]
HL3	signalling of opening of the front safety cover of the operating mechanism, permissible load max. 10 W[2)]
HL4	signalling of extension of the operating mechanism locking bar, permissible load max. 10 W[2)]

[2)] Voltage on terminals 5, 6, 7, 8 is the same as U_n of the motorized operating mechanism.

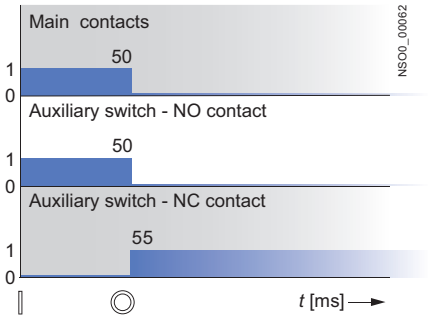
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Motorized operating mechanism

3VT1 circuit breakers with motorized operating mechanism

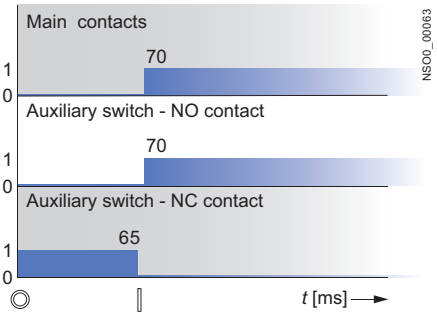
Circuit breaker switched off by motorized operating mechanism (OFF signal)

Automatic operation presets no. 1, 2, 3



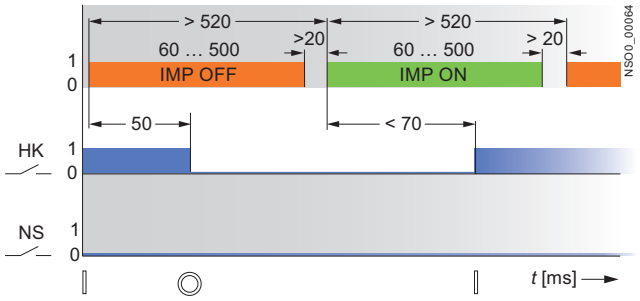
Circuit breaker switched on by motorized operating mechanism (ON signal).

Automatic operation presets no. 1, 2, 3

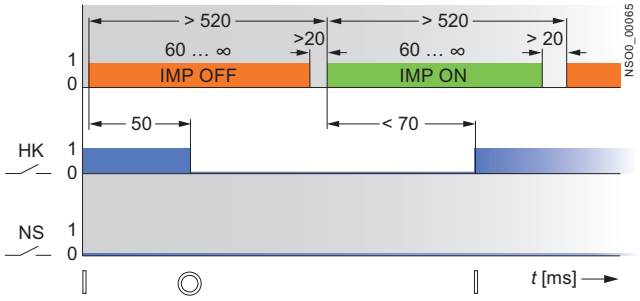


Recommended pulse durations for electrical switching

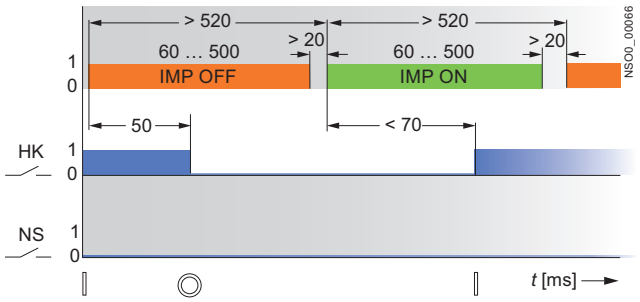
Automatic operation no. 1



Automatic operation no. 2



Automatic operation no. 3



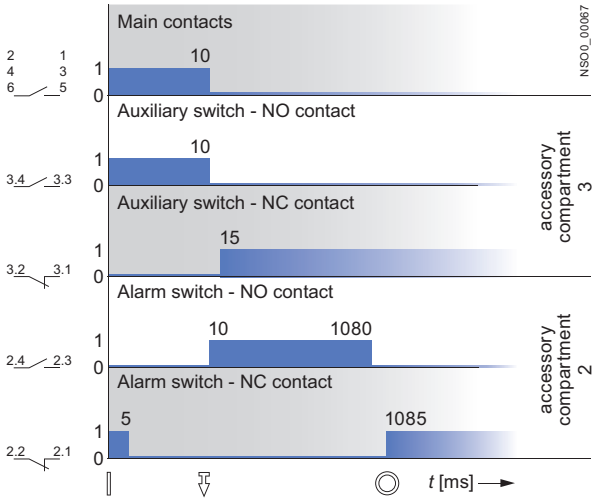
Graph description

Symbol	Description
HK	Main contacts
NS	Alarm switch
IMP ON	Make pulse for motorized operating mechanism
IMP OFF	Break pulse for motorized operating mechanism
	Switched on
	Switched off manually or electrically by motorized operating mechanism (wound up state)

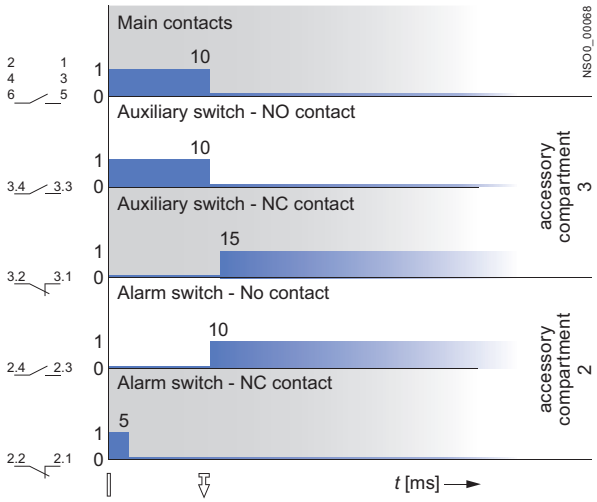
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Circuit breaker switches off by trip unit or INSPECTION pushbutton

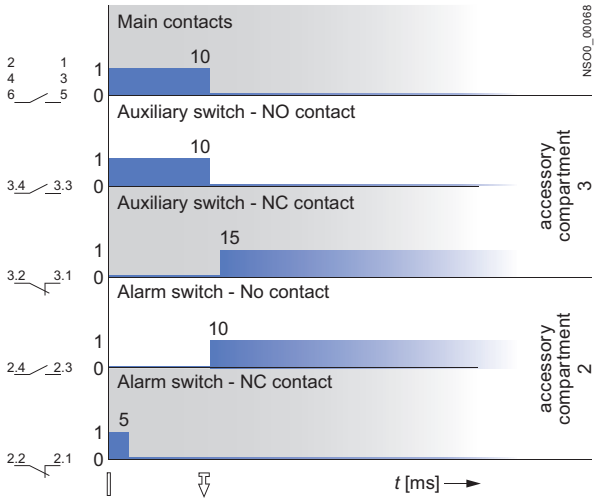
Automatic operation no. 1



Automatic operation no. 2

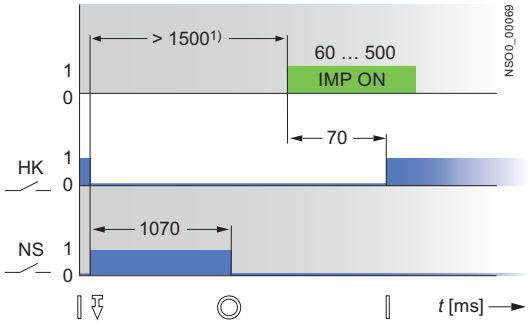


Automatic operation no. 3

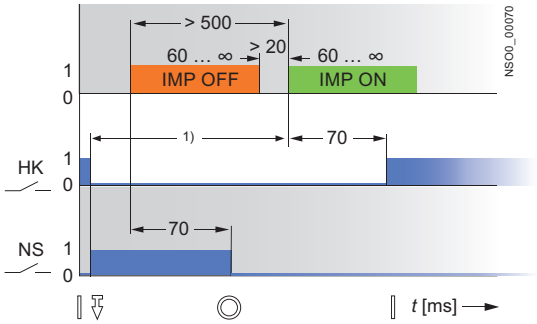


Recommended control pulses for switching the circuit breaker with motorized operating mechanism after it was switched off by trip unit or INSPECTION pushbutton

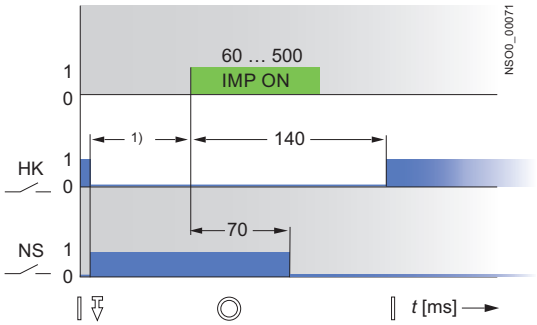
Automatic operation no. 1



Automatic operation no. 2



Automatic operation no. 3



1) If the circuit breaker was switched off by a trip unit, it is necessary to remove the error before it switches on again.

Graph description

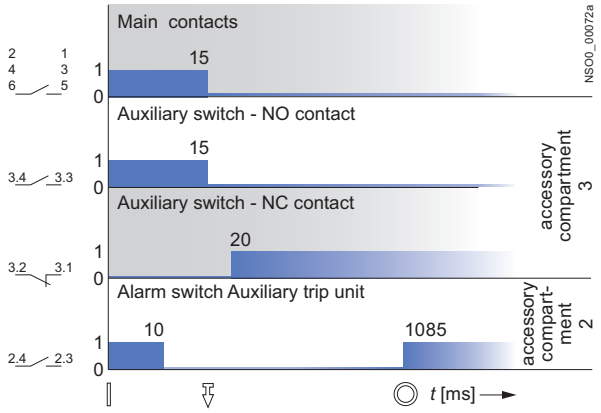
Symbol	Description
HK	Main contacts
NS	Alarm switch
IMP ON	Make pulse for motorized operating mechanism
IMP OFF	Break pulse for motorized operating mechanism
	Switched on
	Switched off by trip units, TEST or INSPECTION pushbutton
	Switched off manually or electrically by motorized operating mechanism (wound-up state)

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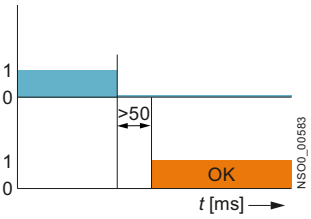
Motorized operating mechanism

Circuit breaker switches off by
shunt trip unit, undervoltage trip unit or TEST pushbutton

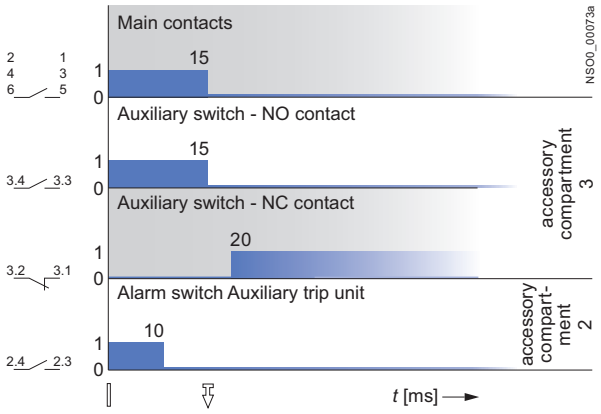
Automatic operation no. 1



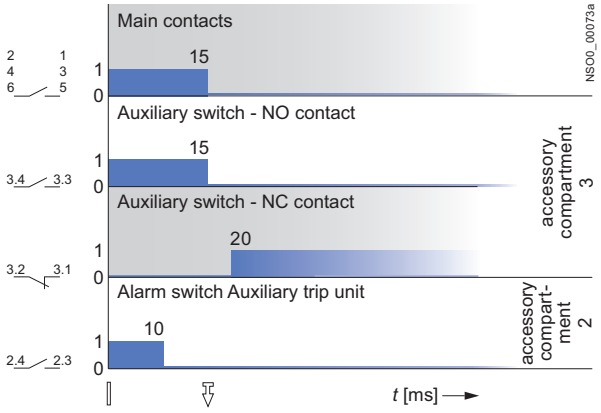
Reaction time of the shunt trip



Automatic operation no. 2



Automatic operation no. 3

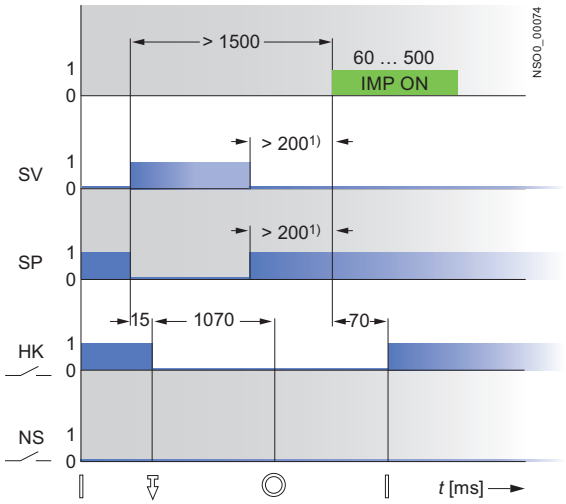


* You can order this quantity or a multiple thereof.

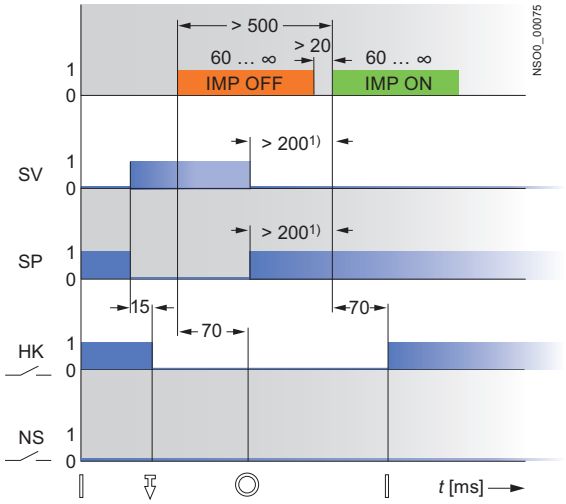
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Recommended control pulses for switching the circuit breaker with motorized operating mechanism after it was switched off by trip unit or INSPECTION pushbutton

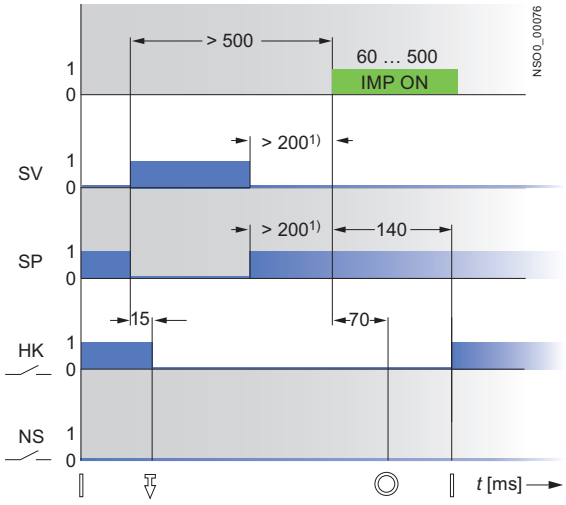
Automatic operation no. 1



Automatic operation no.2



Automatic operation no. 3



¹⁾ Re-switching is only possible after deactivation of the shunt trip unit or undervoltage trip unit.

Graph description

Symbol	Description
HK	Main contacts
NS	Alarm switch
SV	Pulse for shunt trip unit
SP	Pulse for undervoltage trip unit
IMP ON	Make pulse for motorized operating mechanism
IMP OFF	Break pulse for motorized operating mechanism
	Switched on
	Switched off by trip units, TEST or INSPECTION pushbuttons
	Switched off manually or by electrically by motorized operating mechanism (wound up state)

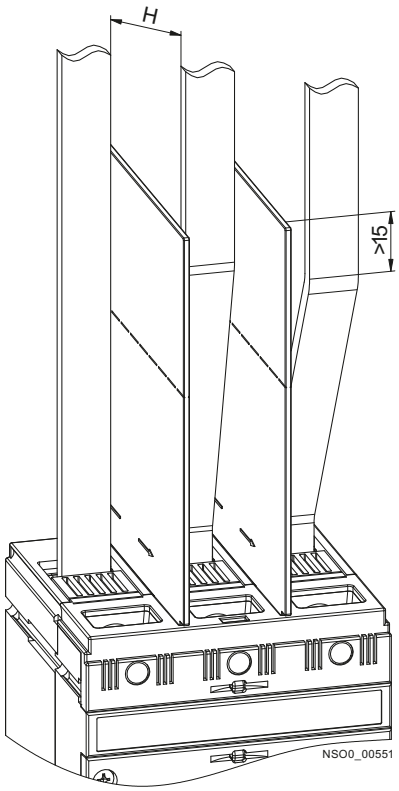
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1

Insulating barriers and terminal covers

Overview

3-pole version

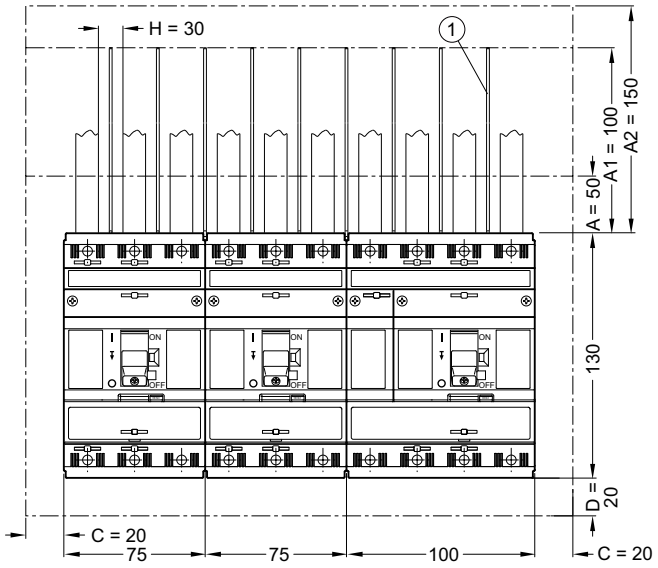


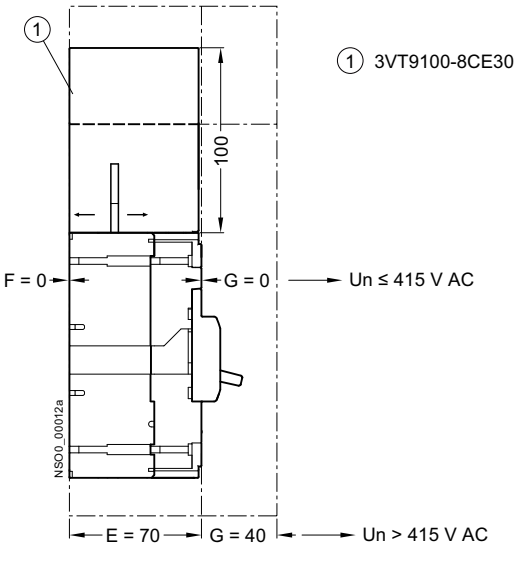
Fixed-mounted version

- Front connection
  - Terminals 1, 3, 5
    3VT9100-8CE30 insulating barriers or 3VT9100-8CA30 terminal covers have to be used (when using 3VT9100-4TF30 connection sets for connecting circuit breakers/switch disconnectors, the terminal cover is included in the connecting set).
  - Terminals 2, 4, 6
    3VT9100-8CE30 insulating barriers or 3VT9100-8CA30 terminal covers have to be used (when using 3VT9100-4TF30 connection sets for connecting circuit breaker/switch disconnector, the terminal cover is included in the connecting set).
- Rear connection
  - Insulating barriers and covers need not be used.

Reference	Size mm	
A	50	Minimum distance between the circuit breaker/switch disconnector and uninsulated earthed wall (applicable for connections using insulated conductors, cables, flexibars or with rear connection)
A1	100	Minimum insulation length of bare conductors (using 3VT9 100-8CE30 insulating barriers from 50 mm to max. 100 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)
A2	150	Minimum distance: • between circuit breaker/switch disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars) • between circuit breaker/switch disconnector and busbar • between two circuit breakers/switch disconnectors situated vertically above one another • between uninsulated connections of two circuit breakers/switch disconnectors above one another
C, D, E, F, G		Minimum distance between the circuit breaker/switch disconnector and uninsulated earthed wall
H	30	Minimum distance between uninsulated conductors

Deionization of the arc space

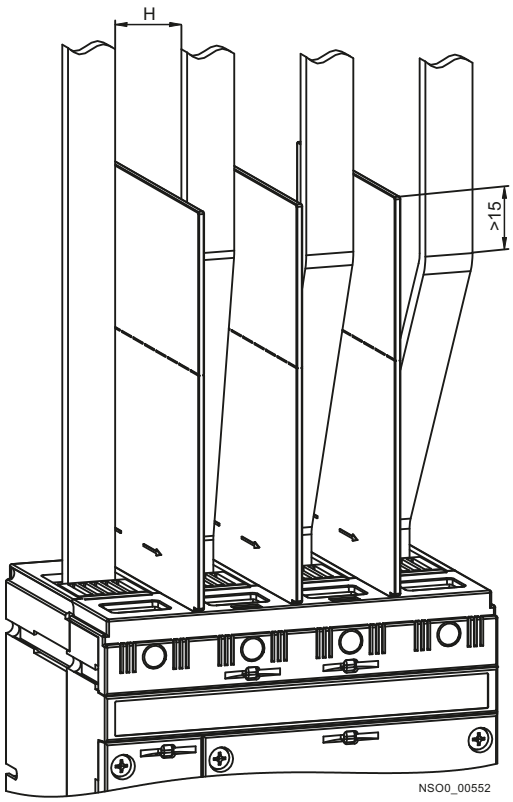




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Insulating barriers and terminal covers

4-pole version

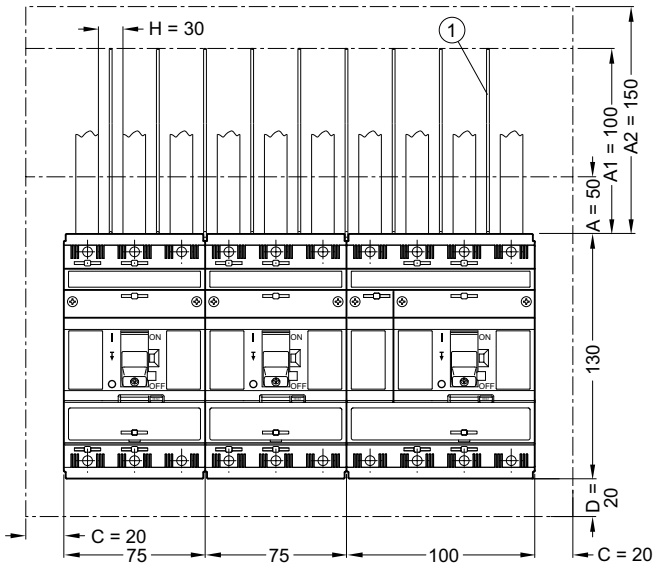


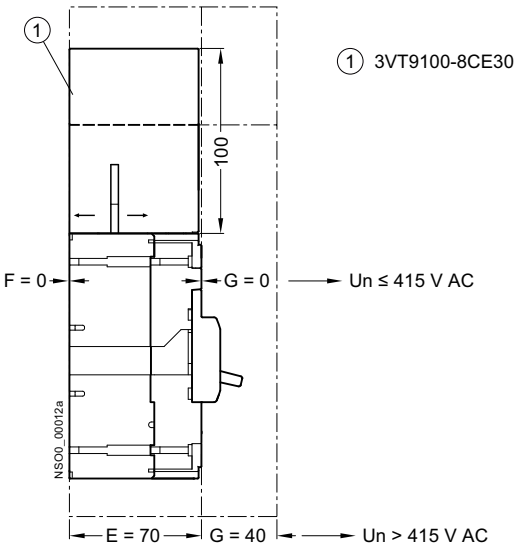
Fixed-mounted version

- Front connection
  - terminals N, 1, 3, 5
    3VT9100-8CE30 and 3VT9100-8CE00 insulating barriers or 3VT9100-8CA40 terminal covers have to be used
    (if 3VT9100-4TF40 connecting sets are used to connect the circuit breaker/switch disconnector, the terminal cover is included in the connecting set)
  - Terminals N, 2, 4, 6
    3VT9100-8CE30 and 3VT9100-8CE00 insulating barriers or 3VT9100-8CA40 terminal covers have to be used
    (if 3VT9100-4TF40 connecting sets are used to connect the circuit breaker/switch disconnector, the terminal cover is included in the connecting set)
- Rear connection
  - Insulating barriers or covers need not be used.

Reference	Size mm	
A	50	Minimum distance between the circuit breaker/switch disconnector and uninsulated earthed wall (applicable for connection by means of insulated conductors, cables, flexibars or rear connection)
A1	100	Minimum insulation length of bare conductors (using 3VT9100-8CE30 and 3VT9100-8CE00 insulating barriers from 50 mm to max. 100 mm, or by means of additional insulating of conductors over the barriers at least to the value of A1)
A2	150	Minimum distance: • between circuit breaker/switch disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars) • between circuit breaker/switch disconnector and a busbar • between two circuit breakers/switch disconnectors installed vertically one above the other • between uninsulated leads of two circuit breakers/switch disconnectors
C, D, E, F, G		Minimum distance between circuit breaker/switch disconnector and uninsulated earthed wall
H	30	Minimum distance between uninsulated conductors

Deionization of the arc space





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1

Residual current devices

Overview

- Designed to protect against leakage/residual current
- Accessories for circuit breakers - simple mounting on left side of the device
- Can be mounted on DIN rail by means of adapter
- Can be connected with the circuit breaker by interconnecting busbars or by standard cable
  - Version without interconnecting busbars (they are not a part of module)
  - interconnecting busbars can be bought separately
  - can be connected to the circuit breaker by a cable, (cable is not part of the module)
- The circuit breaker is switched off by special shunt trip, that is part of the residual current module
- Design according to nominal current:
  - Version up to 160 A for circuit breakers from 80 up to 160 A
- Design according to the parameters setting:
  - Version with fixed residual current $I_{\Delta n}$ =300mA, without delay
  - Design with gradual setting of residual current $I_{\Delta n}$ and with setting of ultimate no action time of $t_{\Delta n}$ (see table)
  - When there is set $I_{\Delta n}$ = 0.03 A the delay is always 0 s!
- Setting can be sealed
- Module can be connected directly by means of Cu/Al cable max.95 mm^2
- For other connection standard terminals with the exception of rear connection can be used
- LED to indicate device operation
- LED signals 50% $I_{\Delta n}$
- Remote signalling of 50% $I_{\Delta n}$ by means of make contact
- Remote signalling of circuit breaker switched off based on $I_{\Delta n}$ level by means of break contact in shunt trip
- Mechanism for disconnection of electronic parts of module from voltage-disconnection has to be done before the insulation resistance test is effected
- TEST push button - complete test of the device by means of simulation of real residual current
- Circuit breaker can not be assembled by another shunt trip or undervoltage release
- Two circuit breakers with residual current module can be assembled neither by mechanical interlocking nor by parallel switching

Technical specifications

Type	3VT9116-5GA40	3VT9116-5GB40
Weight	1.3 kg	
Standards	EN 60947-2, IEC 947-2	
Type	A	
Number of poles	4	
Rated current I_n	160 A	
Rated residual current $I_{\Delta n}$	0.03; 0.1; 0.3; 0.5; 1.0; 3 A	0.3 - fixed
Maximum inactivity time $t_{\Delta n}$	0; 0.1; 0.2; 0.3; 0.5; 1.0 s	0 - without delay
Rated voltage U_n	440 V a.c.	
Rated operational voltage U_e	AC 80 ... 440 V	
Rated impulse voltage U_{imp}	6 kV	
Rated frequency f_n	50/60 Hz	
Losses per 1 pole	4 W	
Mechanical/electrical endurance	80000 cycles	
Method of mounting	side	
Installation of DIN rail	✓	
Use	circuit breaker 3VT1	
Operating conditions		
Reference temperature	40°C	
Ambient temperature range	-40 ... +55°C	
Working environment	dry and tropical climate	
Pollution degree	3	
Max. sea level	2000 m	
Seismic resistance	3g (8 ... 50) Hz	
Accessories		
Connecting sets have to be bought separately	✓	

* You can order this quantity or a multiple thereof.

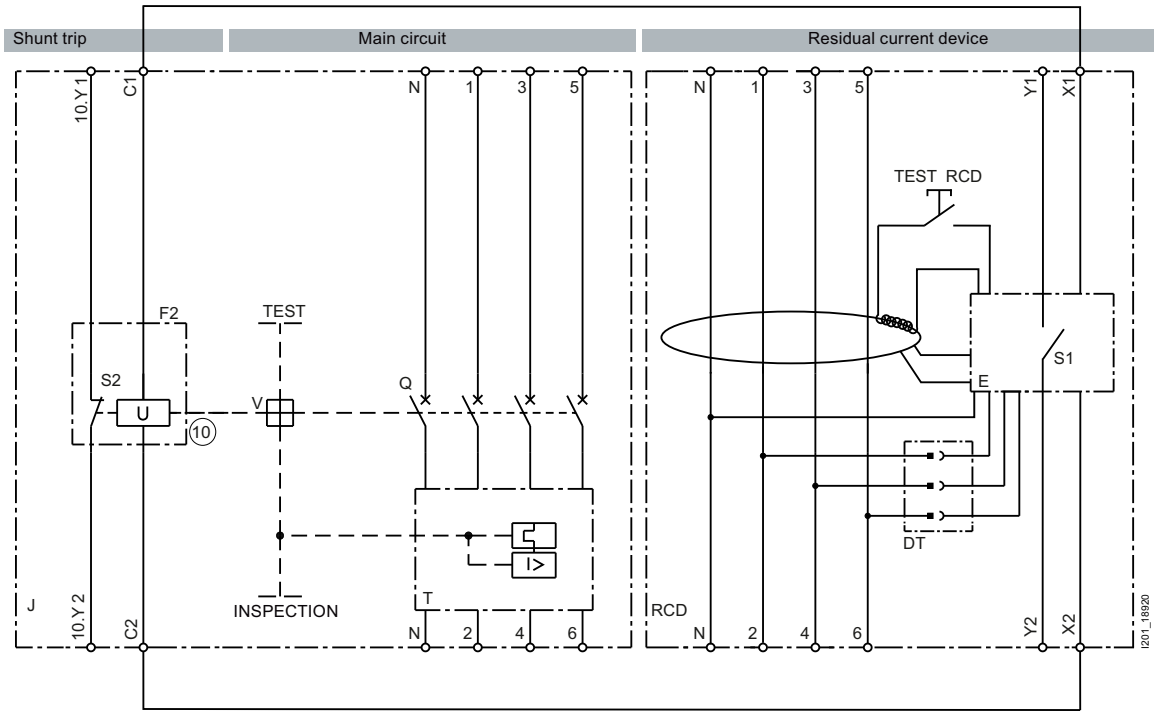
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Signal contact specifications

		Signalling switch of switch off by a failure
Rated operational voltage	U_e	230 V a.c.
Rated insulating voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	4 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_e/U_e	2 A/230 V AC
Thermal current	I_{th}	6 A
Arrangement of contacts		01
		Signalling switch of meeting the value of 50% $I_{\Delta n}$
Rated operational voltage	U_e	250 V a.c./30 V d.c.
Rated insulating voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	6 kV
Rated frequency	f_n	50/60 Hz
Rated operating current		AC 5 A/250 V DC 5 A/30 V
Thermal current	I_{th}	5 A
Arrangement of contacts		10



Schematics



Explanations

J	3VT1 circuit breaker
RCD	residual current device
Q	main contacts
V	trip-free mechanism
T	thermomagnetic overcurrent relaese
E	electronic of residual current device
TEST	pushbutton to test release
MINITEST	inspection push button of release
TEST RCD	button of residual current module
S1	signalling of 50% residual current value
S2	signalling switch of switch off by a failure
F2	shunt trip
DT	disconnection of residual current module from voltage

Maximum total time shutdown

Time limit - configured value						
	0 ms	100 ms	200 ms	300 ms	500 ms	1000 ms
1 x $I_{\Delta n}$	<70 ms	<230 ms	<350 ms	<440 ms	<630 ms	<1200 ms
2 x $I_{\Delta n}$	<40 ms	<200 ms	<320 ms	<430 ms	<620 ms	<1200 ms
5 x $I_{\Delta n}$	<40 ms	<210 ms	<310 ms	<420 ms	<630 ms	<1200 ms

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Residual current devices

Connection and mounting

Reduction of rated current of circuit breaker according to the type of connection

Circuit breaker[1]	Rated current of the circuit breaker I_n	Connection between circuit breaker and RCD	Inlet/outlet cables	Reduction coefficient: k[3]	Adjusted current I_r	Real current I_{rt} (t=40°C)[4] $I_{rt} = I_n \times k$		Figure
3VT1716-2...6-0AA0		3VT911.-5GY..	Cu, 70 mm² [5]	0.9	160 A	144 A	(160x0.90)	1
3VT1716-2...6-0AA0		3VT911.-5GY..	Cu, 70 mm² [5]	0.9	125 A	112.5 A	(125x0.90)	1
3VT1716-2...6-0AA0		3VT911.-5GY..	Cu, 95mm² [5]	1	160 A	160 A		1
3VT1716-2...6-0AA0	160	3VT911.-5GY..	Cu, 95mm² [5]	1	125 A	125 A		1
3VT1716-2...6-0AA0			Cu, 70 mm² [5]	1	160 A	160 A		2
3VT1716-2...6-0AA0		cable S = 95 mm² [6]	Cu, 70 mm² [5]	1	125 A	125 A		2

[1] For other circuit breaker is reduction coefficient k = 1

[2] Connecting sets can be mounted on both upper/lower terminals

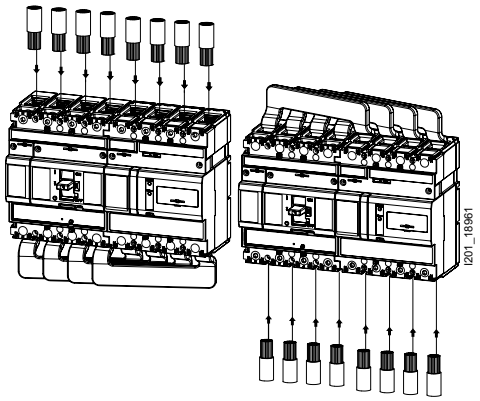
[3] coefficients k are not dependent on ambient temperature

[4] dependency of nominal current I_n on ambient conditions can be found in the catalogue

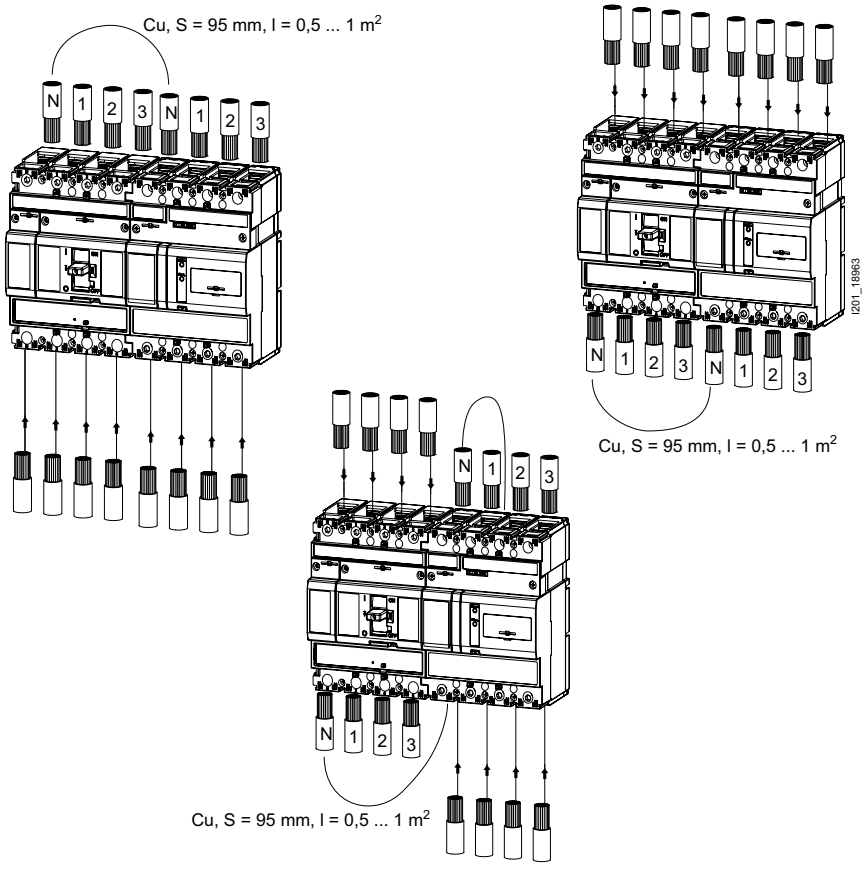
[5] length of cables 2 m is given by standard EN 60947-1

[6] cables length 0.5 up to 1 m

1



2

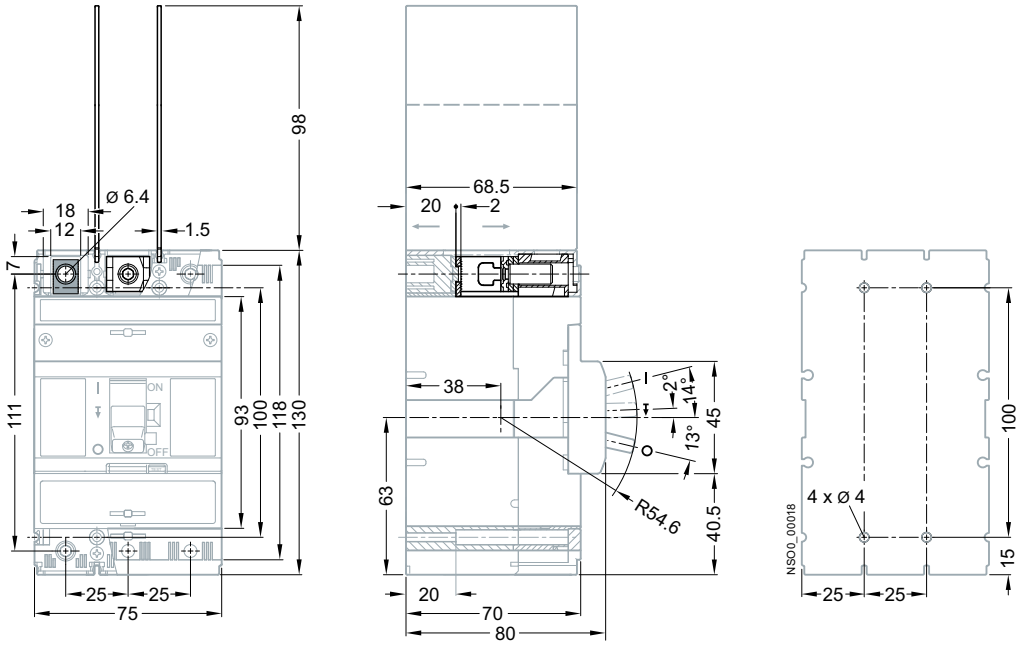


* You can order this quantity or a multiple thereof.

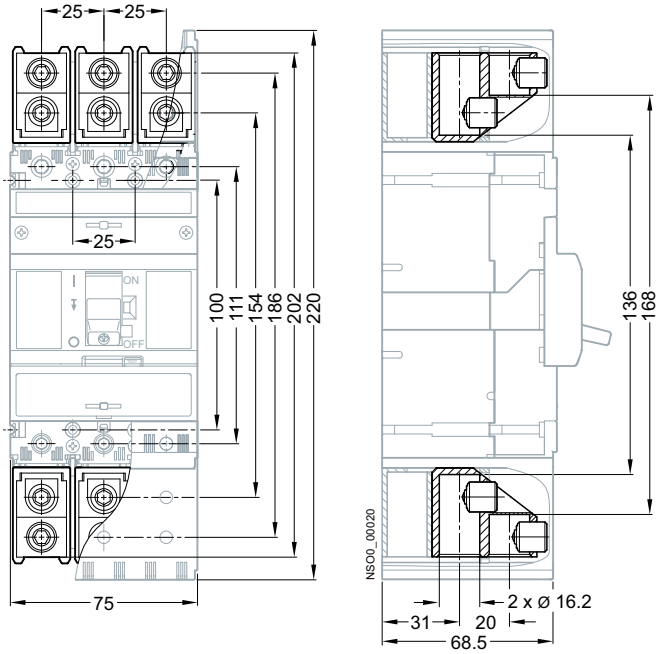
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Dimensional drawings - 3-pole, fixed-mounted version

Fixed-mounted version, front connection



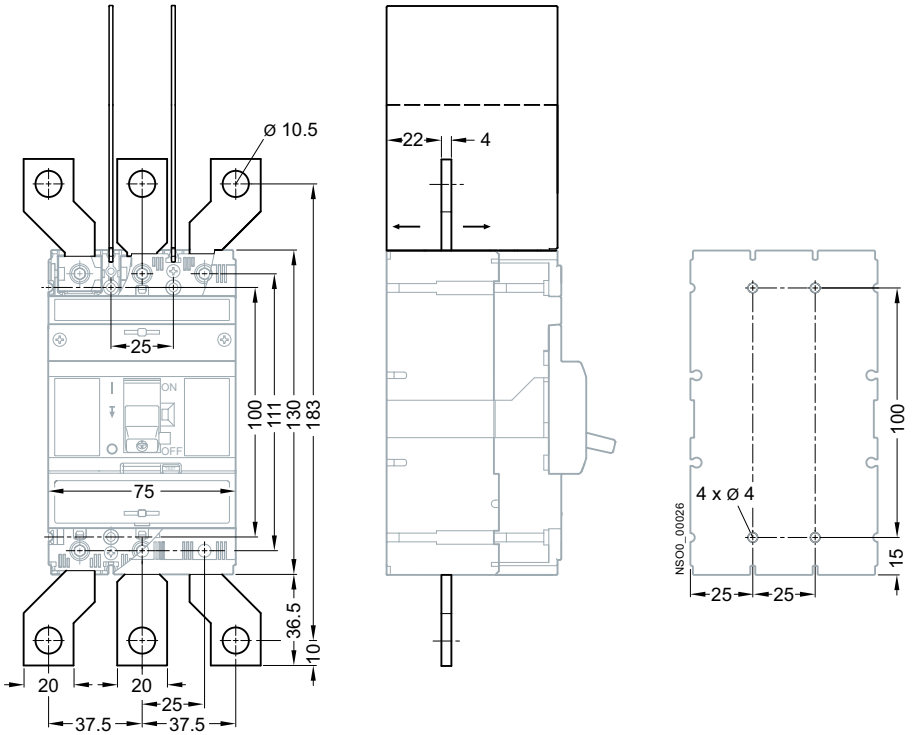
Fixed-mounted version, front connection (3VT9100-4TF30 connecting set)



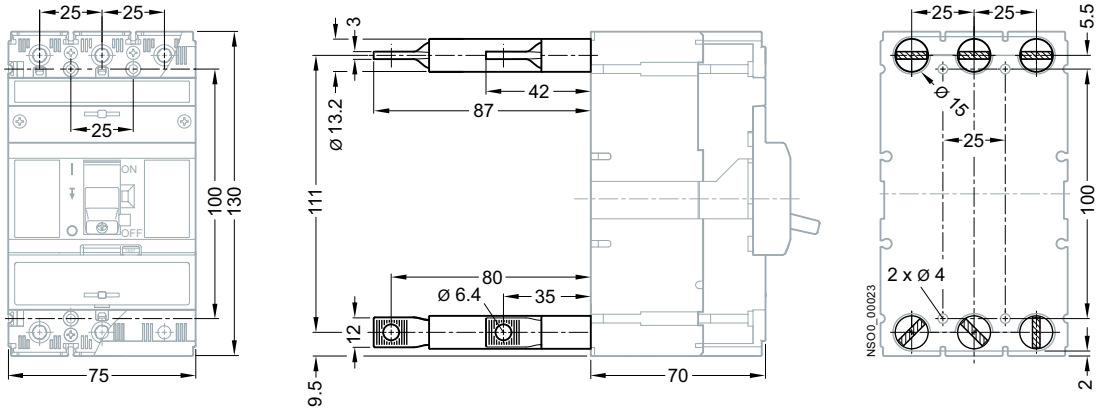
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Dimensional drawings

Fixed-mounted version, front connection (3VT9100-4ED30 connecting set)

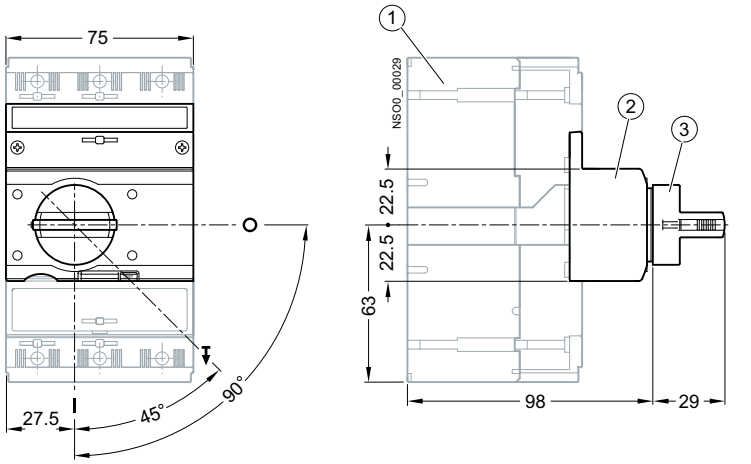


Fixed-mounted version, rear connection (3VT9100-4RC30 connecting set)



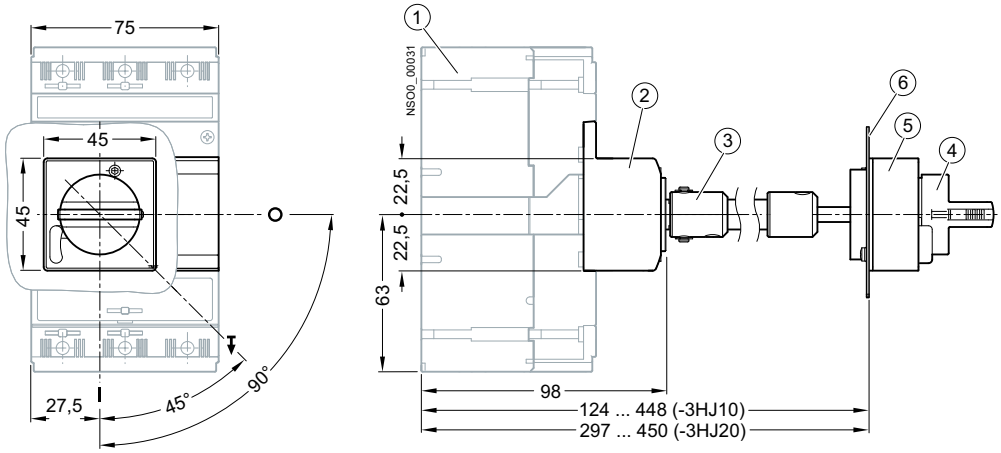
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Fixed-mounted version, rotary operating mechanism



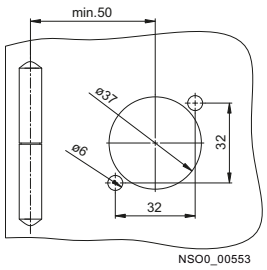
1 3VT1
2 3VT9100-3HA.0, -3HB.0
3 3VT9100-3HE.0, 3HF.0

Fixed-mounted version, rotary operating mechanism with adjustable knob



1 3VT1
2 3VT9100-3HA.0, -3HB.0
3 3VT9100-3HJ.0
4 3VT9100-3HE.0, -3HF.0
5 3VT9100-3HG.0, -3HH.0
6 Outside surface of cabinet door

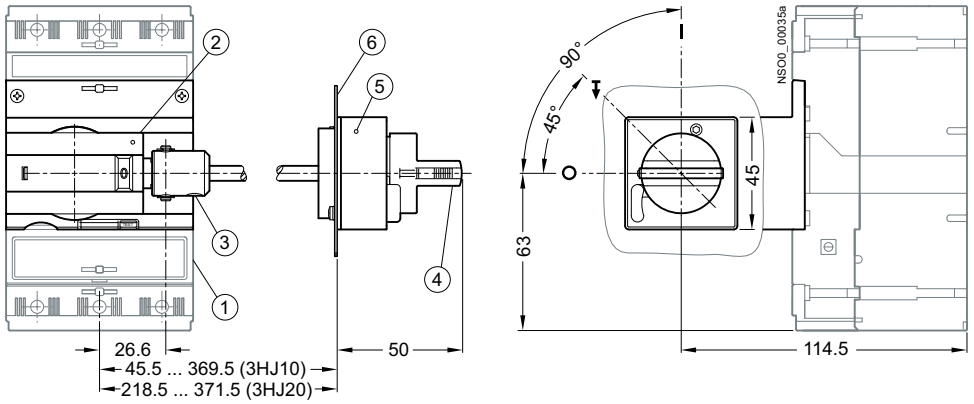
Dimensions of door cut-out



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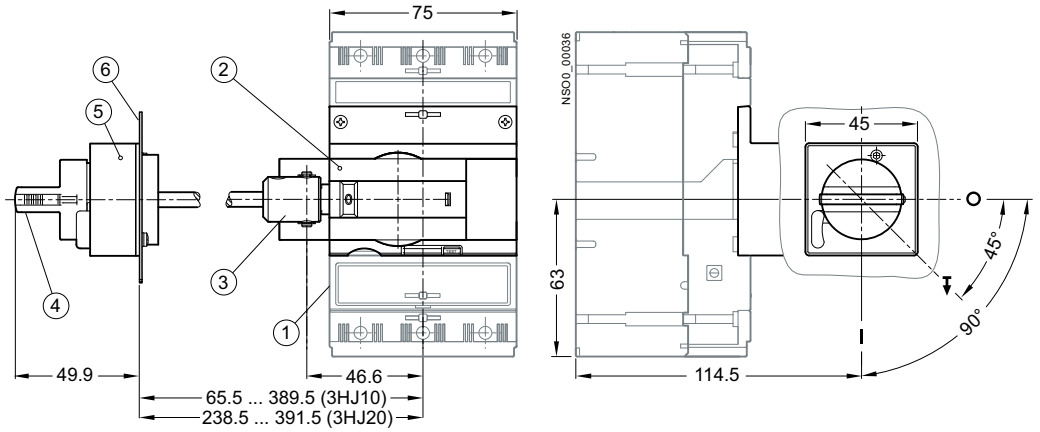
Dimensional drawings

Fixed-mounted version, lateral rotary operating mechanism - right



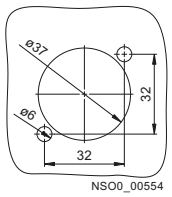
1 3VT1
2 3VT9100-3HD10
3 3VT9100-3HJ.0
4 3VT9100-3HE.0, -3HF.0
5 3VT9100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Fixed-mounted version, lateral rotary operating mechanism - left

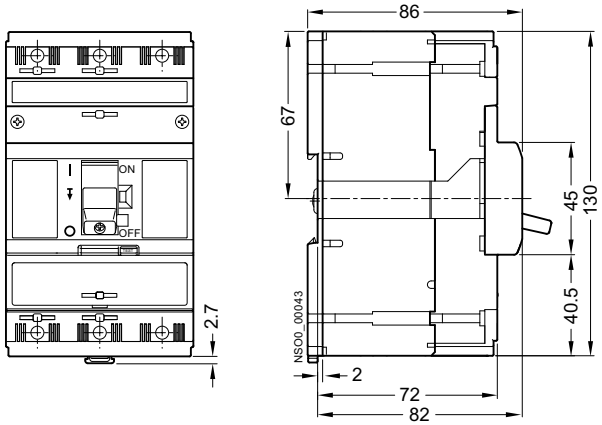


1 3VT1
2 3VT9100-3HC10
3 3VT9100-3HJ.0
4 3VT9100-3HE.0, -3HF.0
5 3VT9100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Dimensions of door cut-out

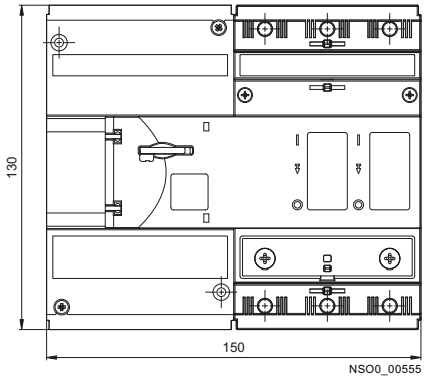


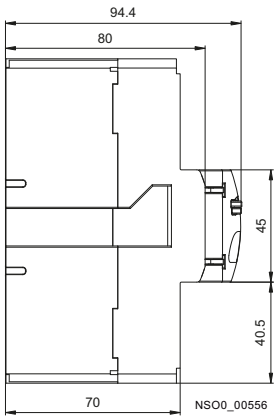
Fixed-mounted version, installation on standard DIN mounting rail (width 35 mm)



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Fixed-mounted version and lateral motorized operating mechanism



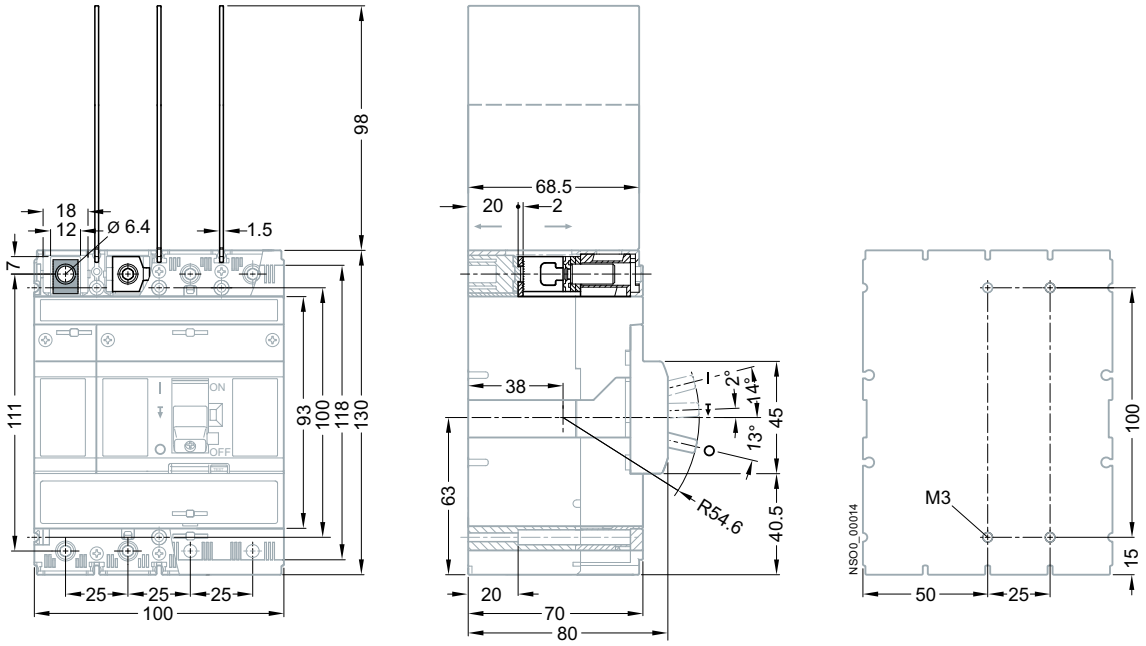


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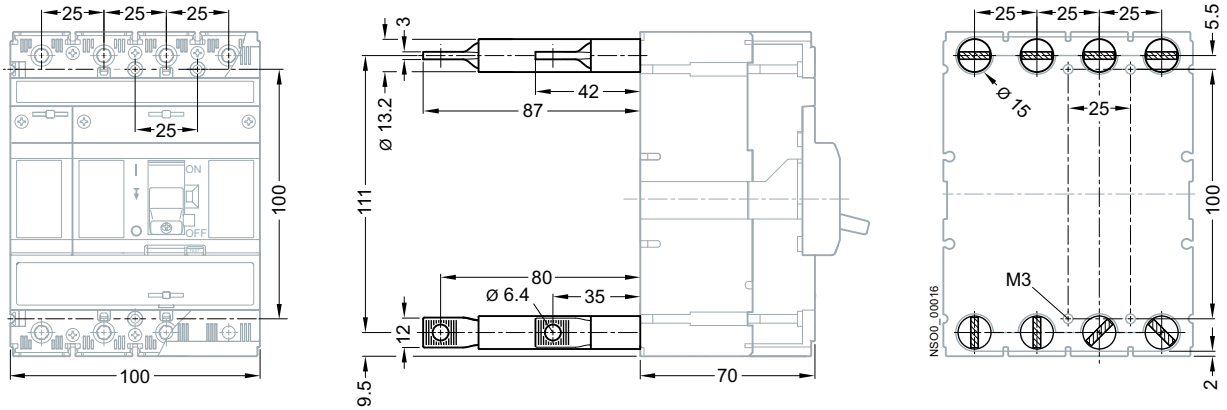
Dimensional drawings

Dimensional drawings - 4-pole, fixed-mounted version

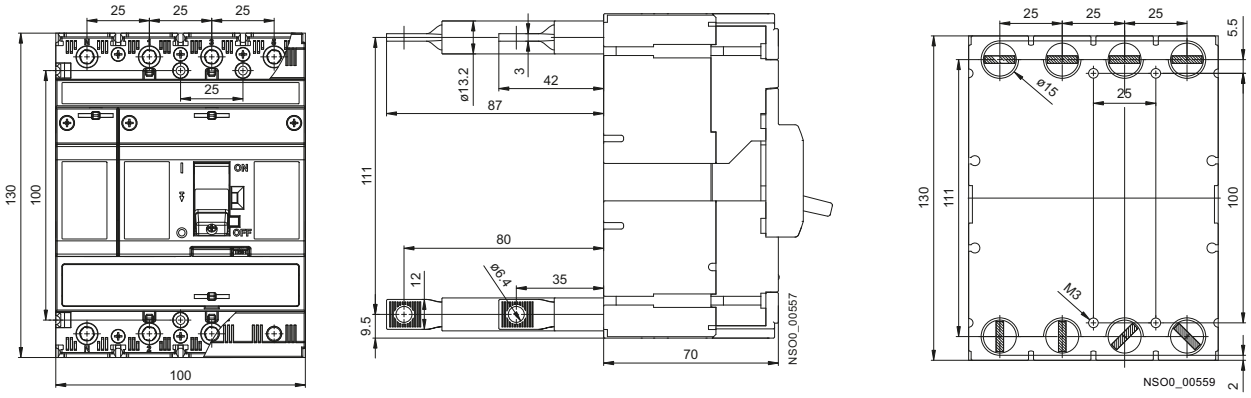
Fixed-mounted version, front connection



Fixed-mounted version, front connection (3VT9100-4TF40 connecting set)

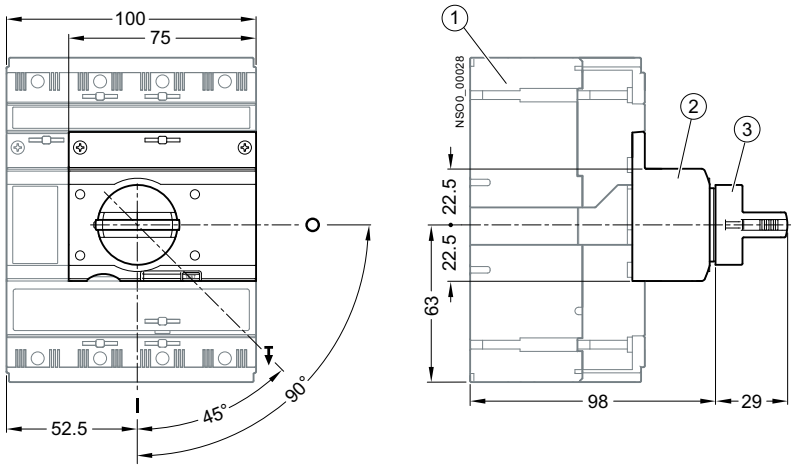


Fixed-mounted version, rear connection (3VT9100-4RC00 connecting set)



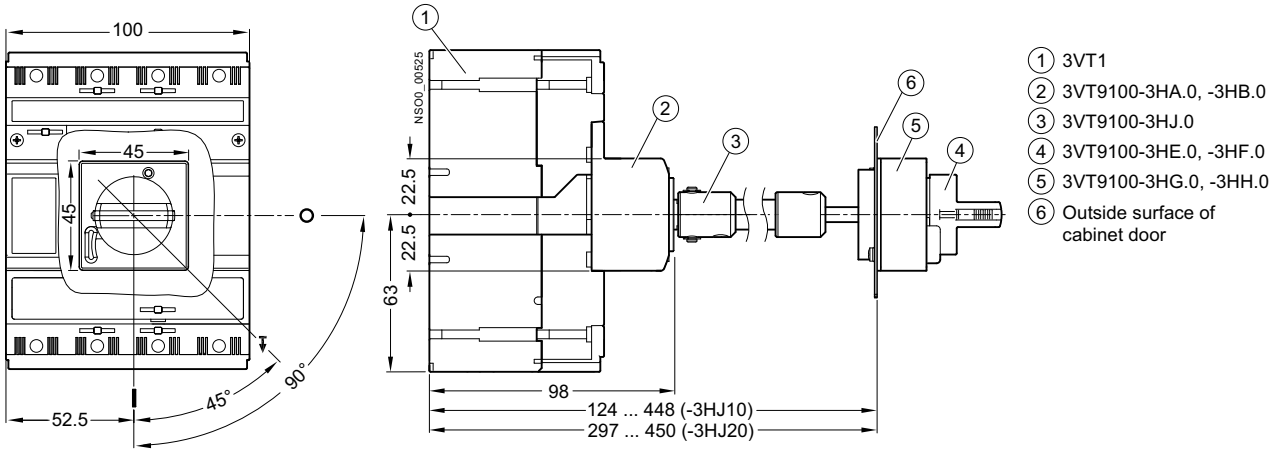
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Fixed-mounted version, front rotary operating mechanism



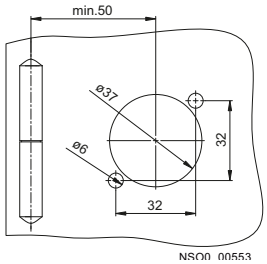
1 3VT1
2 3VT9100-3HA.0, -3HB.0
3 3VT9100-3HE.0, 3HF.0

Fixed version, front rotary operating mechanism with adjustable knob

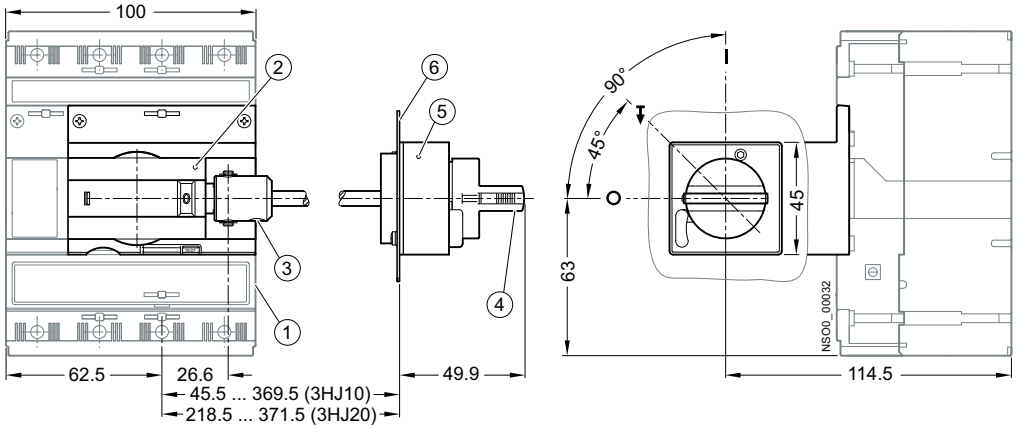


1 3VT1
2 3VT9100-3HA.0, -3HB.0
3 3VT9100-3HJ.0
4 3VT9100-3HE.0, -3HF.0
5 3VT9100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Dimensions of door cut-out



Fixed-mounted version, lateral rotary operating mechanism - right

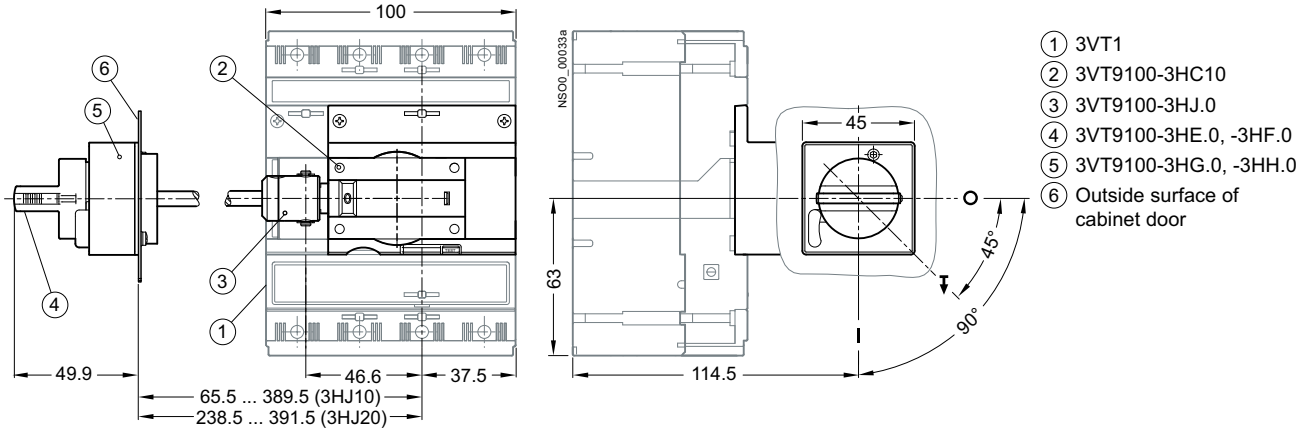


1 3VT1
2 3VT9100-3HD10
3 3VT9100-3HJ.0
4 3VT9100-3HE.0, -3HF.0
5 3VT9100-3HG.0, -3HH.0
6 Outside surface of cabinet door

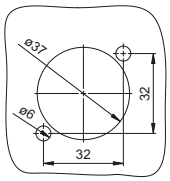
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Dimensional drawings

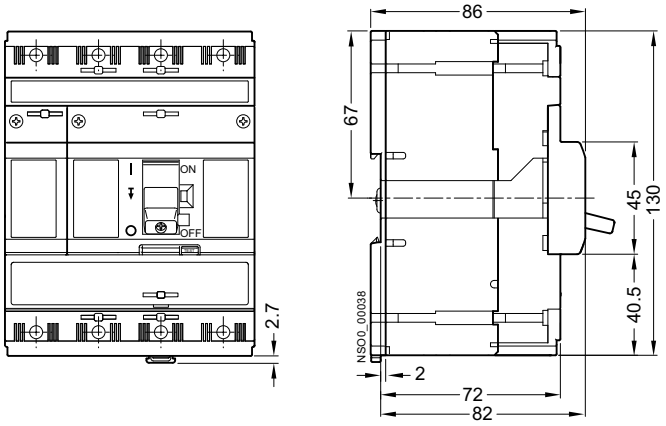
Fixed-mounted version, lateral rotary operating mechanism - left



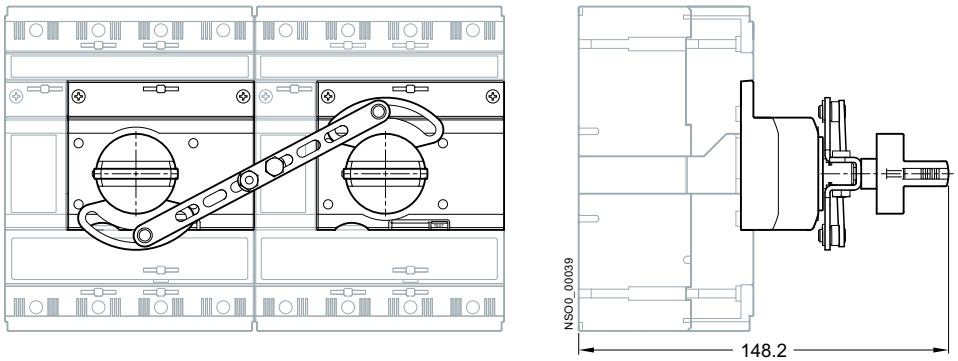
Dimensions of door cut-out



Fixed-mounted version, installation on a standard DIN mounting rail (width 35 mm)

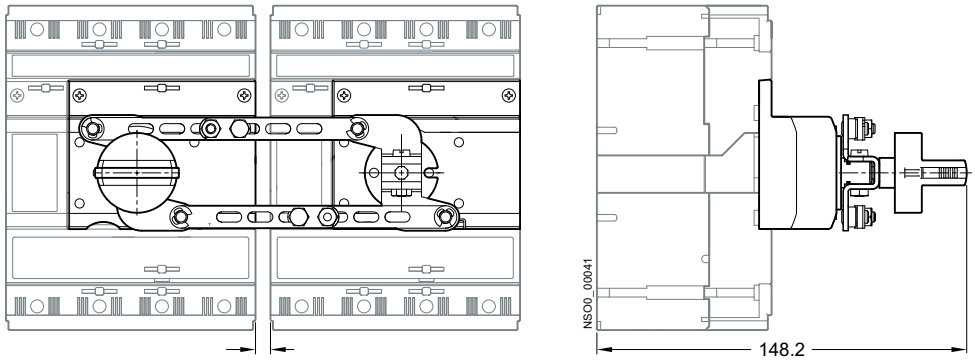


Arrangement of circuit breaker/switch disconnectors with 3VT9100-8LA00 mechanical interlocking

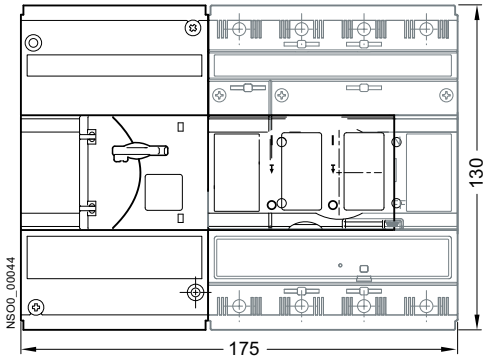


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Arrangement of circuit breaker/switch disconnectors with 3VT9100-8LB00 mechanical interlocking for parallel switching



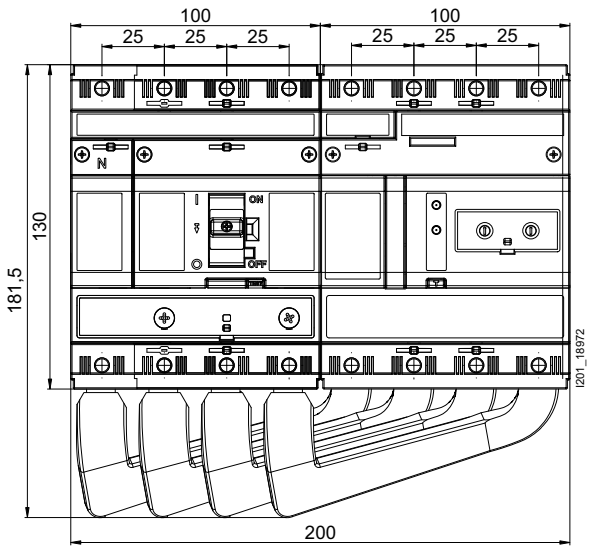
Fixed-mounted version and lateral motorized operating mechanism

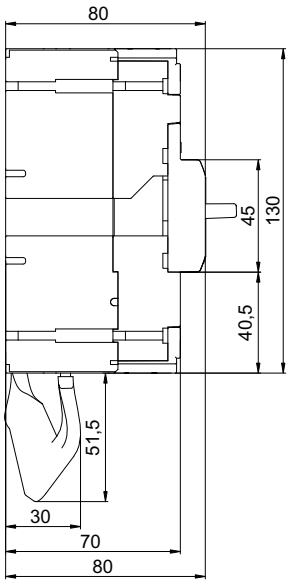


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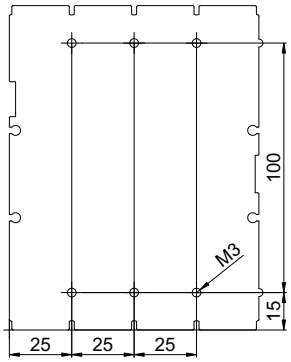
Dimensional drawings

Fixed design, Residual current device, rear connection

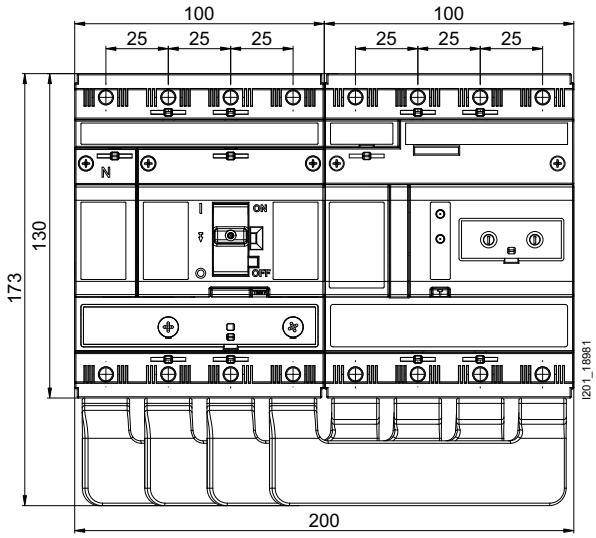


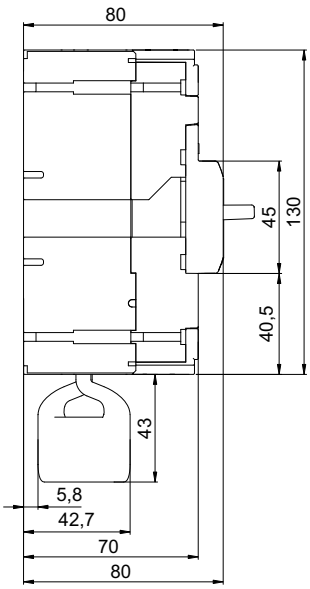


Drilling diagram



Fixed design, Residual current device,bottom connection





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3VT2 Molded Case Circuit Breakers up to 250 A



Catalog

3VT2 Molded Case Circuit Breakers up to 250 A

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2/5 Auxiliary switches · Auxiliary trip units
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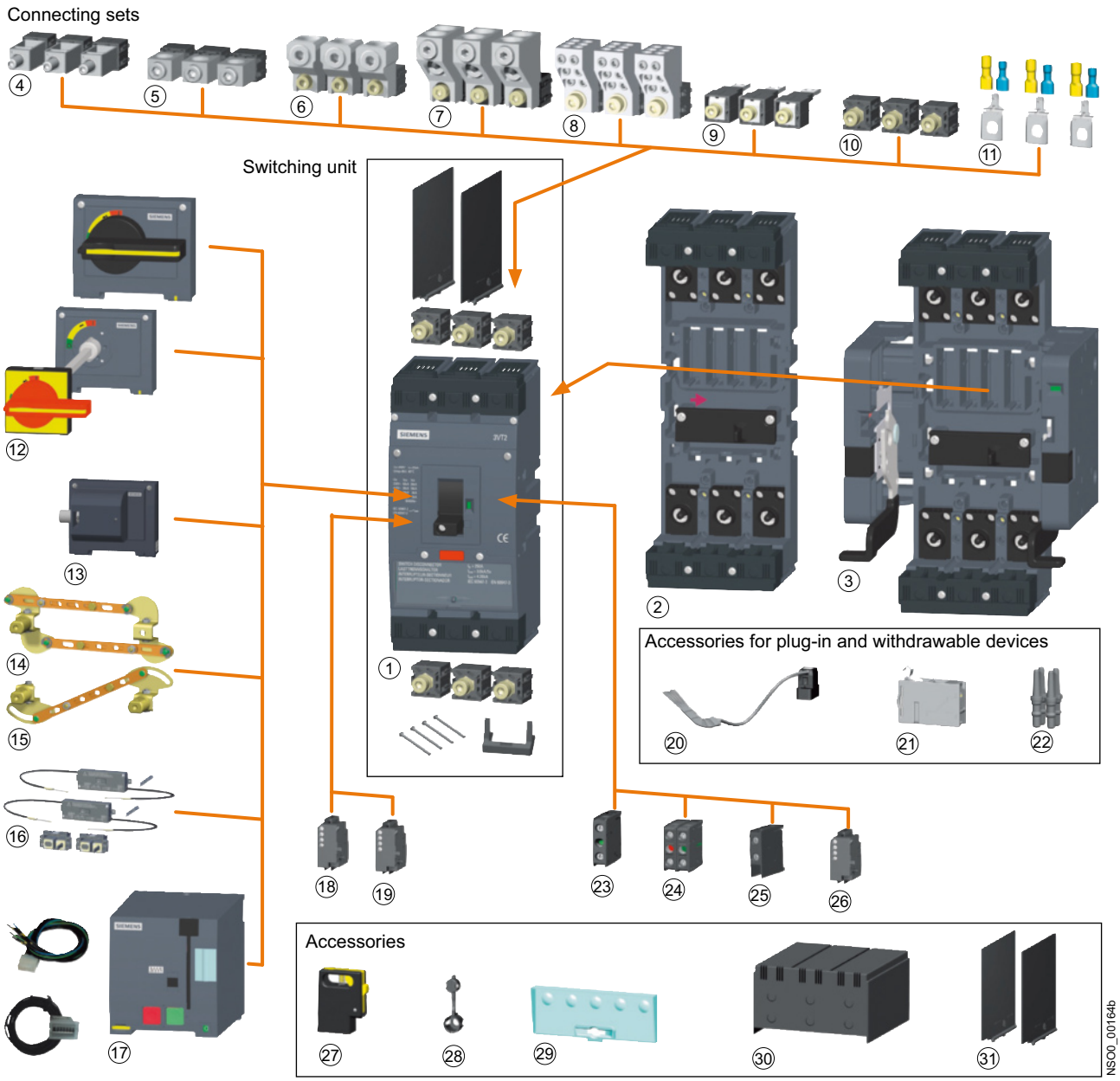
Technical Information

3VT2 Molded Case Circuit Breakers up to 250 A

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Overview



① Molded case circuit breaker
② Plug-in device
③ Withdrawable device
④ Box terminals
⑤ Circular conductor terminal
⑥ Circular conductor terminal
⑦ Multiple feed-in terminal
⑧ Multiple feed-in terminal
⑨ Rear connection
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⑱ Shunt trip unit
⑲ Undervoltage trip unit
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㉑ Position signalling
㉒ Coding set
㉓ Auxiliary switch NC/NO
㉔ Auxiliary switch NC/NO
㉕ Auxiliary switch, change-over contact
㉖ Auxiliary switch, early, leading contact
㉗ Lockingtype lever
㉘ Sealing inset
㉙ Additional cover for overcurrent releases
㉚ Terminal cover
㉛ Insulating barriers

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Overview

Switching unit

The switching unit includes:
- Two connecting sets (front connection terminals), 3VT9200-4TA30 – for connecting busbars or cable lugs
- Insulating barriers
- A set of 4 installation bolts (M4 x 35)

The switching unit must be fitted with a trip unit (circuit breaker) or a switch disconnector unit (switch disconnector).

For maximum circuit breaker/switch disconnector loads in accordance with the ambient temperature, see page 2/11.

For recommended cross-sections of cables, busbars and flexibars for fixed-mounted, plug-in and withdrawable versions, see page 2/11.

Circuit breaker

The circuit breakers consist of a 3- or 4-pole switching unit and a trip unit which is available with a choice of different characteristics.

Switch disconnector

The switch disconnector consists of a switching unit and a switch disconnector unit.

Selection and ordering data

	Rated current I_n	Breaking capacity I_{cu} (AC 415 V)	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	kA				kg
Switching units						
	***3-pole version***					
	250	36		**3VT2725-2AA36-0AA0**	1 unit	3.314
	250	65		**3VT2725-3AA36-0AA0**	1 unit	3.330
	4-pole version, unprotected N					
	250	36		**3VT2725-2AA46-0AA0**	1 unit	4.100
	250	65		**3VT2725-3AA46-0AA0**	1 unit	4.100
	4-pole version, protected N					
	250	36		**3VT2725-2AA56-0AA0**	1 unit	4.100
	250	65		**3VT2725-3AA56-0AA0**	1 unit	4.100

* You can order this quantity or a multiple thereof.

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Selection and ordering data for accessories

	Rated current I_n	Current setting of the inverse- time delayed overcur- rent releases"*L*" I_R	S function short- circuit protec- tion (short-time delayed) "S" I_{sd}	Operating cur- rent of the ins- tantaneous short-circuit releases"*i*" I_i DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	A					kg
Electronic trip units (ETU)							
	***Line protection, ETU LP, LI function***[1]						
	with fixed overload trip unit, fixed short-circuit trip unit						
	160	160		640 A	**3VT9216-6AB00**	1 unit	0.267
	200	200		800 A	**3VT9220-6AB00**	1 unit	0.283
	250	250		1000 A	**3VT9225-6AB00**	1 unit	0.283
	***Distribution protection, ETU DP, LI function***[1]						
	with adjustable thermal overload trip unit, adjustable short-circuit trip unit						
	100	40 ... 100		4 X I_R / 8 X I_R	**3VT9210-6AC00**	1 unit	0.283
	160	63 ... 160		4 X I_R / 8 X I_R	**3VT9216-6AC00**	1 unit	0.284
	250	100 ... 250		4 X I_R / 8 X I_R	**3VT9225-6AC00**	1 unit	0.235
	***Distribution protection with N-pole protection, ETU DPN, LIN function***[2]						
	with adjustable thermal overload trip unit, adjustable short-circuit trip unit						
	100	40 ... 100		2 ... 9 x I_R	**3VT9210-6BC00**	1 unit	0.327
	160	63 ... 160		2 ... 9 x I_R	**3VT9216-6BC00**	1 unit	0.327
	250	100 ... 250		2 ... 9 x I_R	**3VT9225-6BC00**	1 unit	0.327
	***Motor/generator protection, ETU MP, LI function***[1]						
	with adjustable thermal overload trip unit, adjustable short-circuit trip unit						
	100	40 ... 100		125 ... 1500 A	**3VT9210-6AP00**	1 unit	0.285
	160	63 ... 160		200 ... 2400 A	**3VT9216-6AP00**	1 unit	0.284
	250	100 ... 250		350 ... 2500 A	**3VT9225-6AP00**	1 unit	0.273
	***Motor/generator protection, ETU MPS, LSI function***[1]						
	with adjustable thermal overload trip unit, fixed short-circuit trip unit						
	100	40 ... 100	3 ... 9 x I_R	2500 A	**3VT9210-6AS00**	1 unit	0.230
	160	63 ... 160	3 ... 9 x I_R	2500 A	**3VT9216-6AS00**	1 unit	0.230
	250	100 ... 250	3 ... 9 x I_R	2500 A	**3VT9225-6AS00**	1 unit	0.230
Switch disconnector unit							
	250				**3VT9225-6DT00**	1 unit	0.219
	Switch disconnector unit[1]						

For a description of trip units, see page 2/16.

1) Only for switching units 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0

2) Only for switching unit 3VT2725-.AA56-0AA0

* You can order this quantity or a multiple thereof.

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Overview

The circuit breakers can be equipped with

- auxiliary switches,
- shunt trip units,
- undervoltage trip units.

Shunt trip units can trip the circuit breaker from a remote location. A control supply voltage is required.

An undervoltage trip unit trips the circuit breaker automatically when the circuit voltage drops below 70 % U_e. The undervoltage trip unit protects motors and other equipment in case of undervoltage. A control supply voltage is required.

Selection and ordering data

	Rated control supply voltage U_s	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	AC 50/60 Hz/DC				kg
Auxiliary switches					
	**with single NO contacts**				
	AC/DC 60 ... 500 V		**3VT9300-2AC10**	1 unit	0.035
	AC/DC 5 ... 60 V		**3VT9300-2AC20**	1 unit	0.036
	**with single NC contacts**				
	AC/DC 60 ... 500 V		**3VT9300-2AD10**	1 unit	0.013
	AC/DC 5 ... 60 V		**3VT9300-2AD20**	1 unit	0.013
	**with double contacts (2 x NC)**				
	AC/DC 60 ... 500 V		**3VT9300-2AE10**	1 unit	0.038
	AC/DC 5 ... 60 V		**3VT9300-2AE20**	1 unit	0.038
	with double contacts (NO and NC)				
	AC/DC 60 ... 500 V		**3VT9300-2AF10**	1 unit	0.038
	AC/DC 5 ... 60 V		**3VT9300-2AF20**	1 unit	0.038
	with double contacts (2 x NO)				
	AC/DC 60 ... 500 V		**3VT9300-2AG10**	1 unit	0.038
	AC/DC 5 ... 60 V		**3VT9300-2AG20**	1 unit	0.038
	**with change-over contacts**				
	AC/DC 60 ... 250 V		**3VT9300-2AH10**	1 unit	0.013
	AC/DC 5 ... 60 V		**3VT9300-2AH20**	1 unit	0.013
	**with leading contacts (early)**				
	AC 250 V		**3VT9300-2AJ00**	1 unit	0.040
Shunt trip units					
	DC 12 V NEW		**3VT9300-1SB00**	1 unit	0.149
	AC/DC 24, 40, 48 V		**3VT9300-1SC00**	1 unit	0.140
	AC/DC 110 V		**3VT9300-1SD00**	1 unit	0.140
	AC 230, 400, 500 V/DC 220 V		**3VT9300-1SE00**	1 unit	0.154
Undervoltage trip units					
	AC/DC 24, 40, 48 V		**3VT9300-1UC00**	1 unit	0.151
	AC/DC 110 V		**3VT9300-1UD00**	1 unit	0.110
	AC 230, 400, 500 V/DC 220 V		**3VT9300-1UE00**	1 unit	0.110
	with leading contact (early)[1)]				
	AC/DC 24, 40, 48 V		**3VT9300-1UC10**	1 unit	0.120
	AC/DC 110 V		**3VT9300-1UD10**	1 unit	0.140
	AC 230, 400, 500 V/DC 220 V		**3VT9300-1UE10**	1 unit	0.120

1) Not to be used with 3VT9200-3M..0 motorized operating mechanism.

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Manual/motorized operating mechanisms

Overview

Rotary operating mechanisms

The rotary operating mechanism must be combined from the following components:

- For rotary operation of the circuit breaker:
  - 3VT9200-3HA.0 or 3VT9200-3HB.0 for frontside operation
  - 3VT9300-3HE10 or 3VT9300-3HE20 black knob or
  - 3VT9300-3HF20 red knob
- For operation through the switchgear cabinet door:
  - 3VT9200-3HA.0 or 3VT9200-3HB.0 for frontside operation
  - 3VT9300-3HJ..extension shaft
  - 3VT9300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9300-3HE/HF.. knob
- For operation through side wall of cabinet:
  - 3VT9200-3HC10 for left side operation OR
  - 3VT9200-3HD10 for right side operation
  - 3VT9300-3HJ..extension shaft
  - 3VT9300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9300-3HE/HF.. knob

Mechanical interlocking and parallel switching

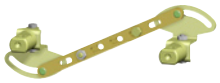
- Mechanical interlocking for fixed-mounted version must be combined from the following parts:
  - 2 x 3VT9200-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9200-3HE/HF.. knob or
  - 1 x 3VT9200-3HE/HF.. knob for parallel switching
- Mechanical interlocking by Bowden wire is intended for fixed-mounted, plug-in and withdrawable versions

Selection and ordering data

	Version	Color	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Rotary operating mechanisms						
	• not lockable	gray		**3VT9200-3HA10**	1 unit	0.223
	• lockable with padlock	gray		**3VT9200-3HA20**	1 unit	0.223
	• lockable with padlock	yellow label		**3VT9200-3HB20**	1 unit	0.223
	• for lateral operation, • mounted on the left side, • not lockable	gray		**3VT9200-3HC10**	1 unit	0.700
	• for lateral operation, • mounted on the right side, • not lockable	gray		**3VT9200-3HD10**	1 unit	0.700
	Knobs for rotary operating mechanism					
	• not lockable	black		**3VT9300-3HE10**	1 unit	0.075
	• lockable with padlock	black		**3VT9300-3HE20**	1 unit	0.075
	• lockable with padlock	red		**3VT9300-3HF20**	1 unit	0.075
	Coupling driver for door-coupling operating mechanism					
	To be used with the 3VT9300-3HE10 or 3VT9300-3HE20 black knob					
	• degree of protection IP40	black		**3VT9300-3HG10**	1 unit	0.146
	• degree of protection IP40 (switchboard door opening with the circuit breaker switched on)	black NEW		**3VT9300-3HG30**	1 unit	0.211
	• degree of protection IP66	black		**3VT9300-3HG20**	1 unit	0.146
	Additionally requires 3VT9300-3HF20 red knob					
	• degree of protection IP40	yellow		**3VT9300-3HH10**	1 unit	0.140
	• degree of protection IP40 (switchboard door opening with the circuit breaker switched on)	yellow NEW		**3VT9300-3HH30**	1 unit	0.209
	• degree of protection IP66	yellow		**3VT9300-3HH20**	1 unit	0.200
	**Extension shaft,** length 365 mm, may be shortened			**3VT9300-3HJ10**	1 unit	0.205
	**Extension shaft, telescopic,** length 245 ... 410 mm			**3VT9300-3HJ20**	1 unit	0.255

* You can order this quantity or a multiple thereof.

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	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
	Mechanical interlocking				
	**Mechanical interlocking** for fixed-mounted version only The mechanical interlocking additionally requires the following parts: • 2 x 3VT9200-3HA../HB.. rotary operating mechanisms, • 2 x 3VT9300-3HE../HF.. knobs		**3VT9300-8LA00**	1 unit	0.136
	**Mechanical interlocking for parallel switching** for fixed-mounted version only The mechanical interlocking additionally requires the following parts: • 2 x 3VT9200-3HA../HB.. rotary operating mechanisms, • 1 x 3VT9300-3HE../HF.. knobs		**3VT9300-8LB00**	1 unit	0.162
	**Mechanical interlocking** by Bowden wires				
	• for two 3VT2 circuit breakers		**3VT9200-8LC10**	1 unit	0.393
	• for one 3VT2 and one 3VT3 circuit breaker		**3VT9300-8LC20**	1 unit	0.393
	Motorized operating mechanism with storage spring				
	**Degree of protection IP00, with locking device for 3 padlocks**				
	AC/DC 24 V		**3VT9200-3MJ00**	1 unit	1.529
	AC/DC 48 V		**3VT9200-3ML00**	1 unit	1.529
	AC/DC 110 V		**3VT9200-3MN00**	1 unit	1.529
	AC 230 V/DC 220 V		**3VT9200-3MQ00**	1 unit	1.564
	Motorized operating mechanism with operations counter				
	AC/DC 24 V		**3VT9200-3MJ10**	1 unit	1.546
	AC/DC 48 V		**3VT9200-3ML10**	1 unit	1.546
	AC/DC 110 V		**3VT9200-3MN10**	1 unit	1.546
	AC 230 V/DC 220 V		**3VT9200-3MQ10**	1 unit	1.546
	Accessories for motorized operating mechanism				
	**Operations counter with cable,** length 110 cm		**3VT9300-3MF10**	1 unit	0.003
	**Extension cable** for motorized operating mechanism, 12 wires, length 60 cm		**3VT9300-3MF00**	1 unit	0.060

* You can order this quantity or a multiple thereof.

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Mounting accessories

Overview

Plug-in version base

- The plug-in base includes:
  - Complete accessories for assembling circuit breakers/ switch disconnectors in plug-in version.
  - A set of four installation bolts (M4 x 40) for fixing the switching unit to the plug-in base.

3VT9200-4TA30 connecting sets are intended for connecting the plug-in base with busbars or cable lugs. These connecting sets are included in the scope of supply of the 3-pole 3VT2725-.AA36-0AA0 or 4-pole 3VT2725-.AA46-0AA0 switching units.

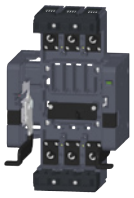
Other connecting sets are also available.

Withdrawable version base

In the withdrawable version base the circuit breaker is fixed by side racks, therefore screws are not necessary. Changing of circuit breaker is faster as compared to plug-in version.

- The withdrawable version base includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable version.
- The circuit breaker located inside the withdrawable version base can be moved between an operating position (ON-OFF) and a checking position (withdrawn).

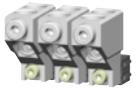
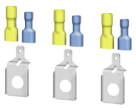
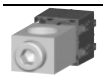
Selection and ordering data

	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Plug-in base					
	**3-pole version**		**3VT9200-4PA30**	1 unit	1.766
	4-pole version		**3VT9200-4PA40**	1 unit	2.100
Withdrawable version base					
	same as plug-in base, but with additional side panels and racks				
	**3-pole version**		**3VT9200-4WA30**	1 unit	3.497
	4-pole version		**3VT9200-4WA40**	1 unit	3.200

* You can order this quantity or a multiple thereof.

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Selection and ordering data

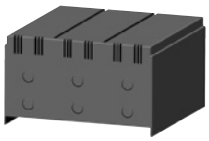
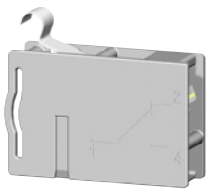
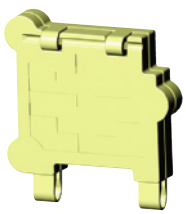
	Version	Conductor cross-section *S*	Type of connection	DT	Article No.	PS*/ P. unit	Weight per PU approx.
		mm²					kg
Terminals for fixed-mounted circuit breakers							
	Connecting sets for 3-pole version						
	**Box terminals** 1 set = 3 units	16 ... 150	Cu cables, flexibars		**3VT9200-4TC30**	1 unit	0.240
	**Terminals for circular conductors** 1 set = 3 units	25 ... 150	Cu/Al cables		**3VT9215-4TD30**	1 unit	0.200
		150 ... 240	Cu/Al cables		**3VT9224-4TD30**	1 unit	0.339
	**Terminals for circular conductors** for enhancing termination point protection to IP20 use the 3VT9200-8CB30 terminal cover						
	1 set = 3 units	2 x 25 ... 150	Cu/Al cables		**3VT9215-4TF30**	1 unit	0.520
		2 x 150 ... 240	Cu/Al cables		**3VT9224-4TF30**	1 unit	0.630
	**Terminals for circular conductors,** for 6 cables 1 set = 3 units	6 x 6 ... 35	Cu/Al cables		**3VT9203-4TF30**	1 unit	0.300
	**Terminals for rear connection** 1 set = 3 units		Cu/Al busbars cable lugs		**3VT9200-4RC30**	1 unit	0.250
	**Terminals for front connection** 1 set = 3 units Included in every supply of switching units		Cu/Al busbars, cable lugs, flexibars		**3VT9200-4TA30**	1 unit	0.120
	**Auxiliary conductor terminals**	1.5 ... 2.5; 4 ... 6	Cu flexible conductors		**3VT9200-4TN30**	1 unit	0.017
	**Front connection bars** increases pole spacing 1 set = 3 units	--	Cu/Al busbars cable lugs, flexibars		**3VT9200-4ED30**	1 unit	0.303
	increases pole spacing 1 set = 3 units	--	Cu/Al busbars cable lugs, flexibars		**3VT9200-4EE30**	1 unit	0.447
	Single terminals for 3- or 4-pole versions						
	**Box terminal** 1 set = 1 unit	16 ... 150	Cu cables, flexibars		**3VT9200-4TC00**	1 unit	0.320
	**Terminal for circular conductors** 1 set = 1 unit	25 ... 150	Cu/Al cables		**3VT9215-4TD00**	1 unit	0.280
	1 set = 1 unit	150 ... 240	Cu/Al cables		**3VT9224-4TD00**	1 unit	0.430
	1 set = 1 unit	2 x 25 ... 150	Cu/Al cables		**3VT9215-4TF00**	1 unit	0.680
	1 set = 1 unit	2 x 150 ... 240	Cu/Al cables		**3VT9224-4TF00**	1 unit	0.830
	**Terminals for circular conductors, for 6 cables** 1 set = 1 unit	6 x 6 ... 35	Cu/Al cables		**3VT9203-4TF00**	1 unit	0.100
	**Terminal for rear connection** 1 set = 1 unit		Cu/Al busbars cable lugs		**3VT9200-4RC00**	1 unit	0.320

* You can order this quantity or a multiple thereof.

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Further accessories

Selection and ordering data

	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
	**Insulating barriers** Included in the scope of supply of the switching unit; in case the circuit breaker/switch disconnector is fed-in from below (power supply connected to terminals 2, 4, 6), it is necessary in most cases to install these barriers also on the bottom side				
	• set of two pieces, for 3-pole version		**3VT9300-8CE30**	1 unit	0.090
	• one piece, additionally needed for 4-pole version		**3VT9300-8CE00**	1 unit	0.040
	**Terminal cover, degree of protection IP20** Increases degree of protection of the connection point to IP20 when using 3VT9224-4TD30, 3VT9215-4TF30, 3VT9224-4TF30 or 3VT9203-4TF30 block type terminals, intended for fixed-mounted, plug-in and withdrawable versions.				
	• 3-pole version		**3VT9200-8CB30**	1 unit	0.140
	• 4-pole version		**3VT9200-8CB40**	1 unit	0.081
	**Locking device for knob** Enables locking the circuit breaker in "switched off manually" position. For locking the device, you can use up to three padlocks with a shank diameter of max. 6 mm		**3VT9200-3HL00**	1 unit	0.013
	**Bolt sealing inset** Provides sealing for: • trip unit • accessory compartment cover • terminal cover • rotary operating mechanism • motorized operating mechanism		**3VT9200-8BN00**	1 unit	0.001
	**Additional cover for trip units** Provides protection for trip units		**3VT9200-8BL00**	1 unit	0.080
	**Connecting cable** For connecting the circuit breaker/switch disconnector accessories in withdrawable version (can also be used for plug-in and fixed-mounted version)		**3VT9300-4PL00**	1 unit	0.167
	**Position signalling switch** For indicating the position of the circuit breaker located in the plug-in base or withdrawable version base		**3VT9300-4WL00**	1 unit	0.020
	**Coding set** Prevents insertion of wrong switching unit into the plug-in base or withdrawable version base		**3VT9200-4WN00**	1 unit	0.002
	**Pushbutton cover** For motorized operating mechanism		**3VT9300-3MF20**	1 unit	0.054

* You can order this quantity or a multiple thereof.

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Design

Installation and connection

Main circuit

- The main circuit is connected with Cu or Al busbars, or with cables and cable lugs.
- Connecting sets are available for additional connecting options (see page 2/9).
- Generally, conductors from the power supply are connected to input terminals 1, 3. 5 and conductors from the load to terminals 2, 4, 6. But it is possible to exchange this connection (exchanging input and output terminals without limiting rated short-circuit ultimate breaking capacity I_{cu}).
- In case of feed-in from below, the circuit breakers/switch disconnectors must be fitted with 3VT9300-8CE30 insulating barriers also next to and between terminals 2, 4, 6.
- We recommend painting the connecting busbars with different colors.
- Input and output connectors/busbars must be mechanically reinforced in order to avoid transferring electrodynamic forces to the circuit breaker during short circuiting.
- The power circuit must be connected in such a way that the deionizing space of the circuit breaker/switch disconnector is not obstructed (see page 2/44).

Auxiliary circuits

- Switches, shunt trip units or undervoltage trip units are connected using flexible 0.5 ... 1 mm^2 Cu conductors.
- Motorized operating mechanism and auxiliary circuits of the plug-in base or withdrawable version base are connected with a connector.

Recommended cross-sections of cables, busbars and flexibars for fixed-mounted, plug-in and withdrawable versions

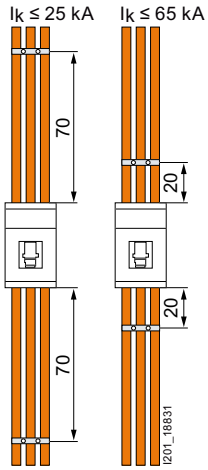
Rated current I_n	Permissible cross-section S		Busbars W x H	
	Cu	Al	Cu	Al
A	mm^2	mm^2	mm	mm
40	10	16		
50	10	16		
63	16	25		
80	25	35		
100	35	50	20 x 2	25 x 2
125	50	70	25 x 2	25 x 3
160	70	95	25 x 3	25 x 4
200	95	120	25 x 4	25 x 5
250	120	150	25 x 5	25 x 6

Maximum circuit breaker/switch disconnector loads in accordance with the ambient temperature

3VT2 circuit breaker/switch disconnector connection to pole by 1 x 120 mm^2 Cu cable

-15 °C...50 °C	55 °C	60 °C	65 °C	70 °C
250 A	250 A	250 A	250 A	250 A

Mechanical reinforcement of conductors for 3VT2

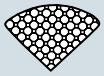
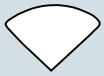
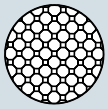
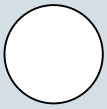


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Circuit breakers · Switch disconnectors

2

Conductor cross-sections of main terminals

Article No.	Maximum permitted current I_{max}	Maximum permissible conductor cross-section Cable type Sector-shaped conductor, stranded	Sector-shaped conductor, solid	Round conductor, stranded	Round conductor, solid	Busbars and cable lugs	Technical information
						W x H	
	A	mm²	**mm²**	**mm²**	**mm²**	mm	See page
3VT9200-4TA30	250					25 x ...	
3VT9200-4RC30	250					25 x ...	2/48, 2/59
3VT9200-4TF00							
3VT9200-4TC30	250	16 ... 150 Cu	10 ...150 Cu	16 ... 150	10 ...150 Cu		
3VT9200-4TC00							
3VT9215-4TD30	250	25 ... 150 Cu/Al	16 ...150 Cu/Al	25 ... 150 Cu/Al	16 ... 150 Cu/Al		
3VT9215-4TD00							
3VT9224-4TD30	250	150 ... 240 Cu/Al	120 ... 240 Cu/Al	150 ... 240 Cu/Al	120 ... 240 Cu/Al		2/46, 2/59
3VT9224-4TD00							
3VT9215-4TF30	250	2 x (25 ... 150) Cu/Al	2 x (16 ... 150) Cu/Al	2 x (25 ... 150) Cu/Al	2 x (16 ... 150) Cu/Al		2/47, 2/59
3VT9215-4TF00							
3VT9224-4TF30	250	2 x (150 ... 240) Cu/Al	2 x (120 ... 240) Cu/Al	2 x (150 ... 240) Cu/Al	2 x (120 ... 240) Cu/Al		2/46, 2/60
3VT9224-4TF00							
3VT9203-4TF30	250	6 x (6 ... 35) Cu/Al	6 x (6 ... 35) Cu/Al	6 x (6 ... 35) Cu/Al	6 x (6 ... 35) Cu/Al		2/47, 2/60
3VT9203-4TF00							
3VT9200-4ED30	250						2/48
3VT9200-4EE30	250						2/49
3VT9200-4TN30	10/16	1,5 ... 2,5/4 ... 6 Cu flexible conductor					

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Technical specifications

Description Article Numbers		Circuit breakers 3VT2725-2AA36/46/56-0AA0, 3VT2725-3AA36/46/56-0AA0			Switch disconnector Unit 3VT9225-6DT00
Standards		EN 60947-2, IEC 60947-2			EN 60947-3, IEC 60947-3
Approval marks		CE			
Number of poles		3, 4			
Rated current I_n	A	100, 160, 200, 250			--
Rated uninterrupted current I_u	A	250			
Rated operational current I_e	A	--			250
Rated operational voltage U_e	V	AC max. 690			AC max. 690, DC max. 440
Rated frequency f_n	Hz	50/60			
Rated impulse withstand voltage U_{imp}	kV	8			
Rated insulation voltage U_i	V	690			
Utilization category (selectivity) AC 690 V		A			--
Utilization category (switching mode) • AC 609 V • DC 440 V		 -- --			 AC-23 B DC-23 B
Rated short-time withstand current U_e = AC 690 V I_{cw}/t		2,5 kA/1 s			3 kA/5 s
Series U_e		3VT2 N	3VT2 H	U_e	--
Rated ultimate short-circuit breaking capacity (rms value) I_{cu}		60 kA 36 kA 25 kA 16 kA 10 kA	100 kA 65 kA 25 kA 25 kA 13 kA	AC 230 V AC 415 V AC 440 V AC 500 V AC 690 V	--
Rated short-circuit service breaking capacity (rms value) I_{cs}/U_e		30 kA 18 kA 13 kA 8 kA 5 kA	50 kA 36 kA 13 kA 13 kA 8 kA	AC 230 V AC 415 V AC 440 V AC 500 V AC 690 V	--
Rated short-circuit making capacity (peak value) I_{cm}/U_e		75 kA	140 kA	AC 415 V	4 kA/AC 415 V, 4 kA/DC 440 V
Off-time at I_{cu}	ms	10			--
Losses per pole at I_n = 250 A	W	18			
Mechanical endurance	cycles	30 000			
Electrical endurance (U_e = AC 415 V)	cycles	3 000			
Switching frequency	cycles/hr	120			
Operating force	N	80			
Front-side device protection		IP40			
Terminal protection		IP20			
Operating conditions					
Reference ambient temperature	°C	40			
Ambient temperature range	°C	-40 ... +55			
Working environment		dry and tropical climate			
Pollution degree		3			
Max. elevation	m	2000			
Seismic resistance	m/s^2	3 *g* at 8 ... 50 Hz			
Design modifications					
Front/rear connection		✓/✓			
Plug-in design		✓/✓			
Withdrawable design		✓/✓			
Accessories					
Switches – auxiliary/relative/signal/leading (early)		✓/✓/✓/✓			
Shunt trip unit/with alarm switch		✓			
Undervoltage trip unit/with leading switch/with alarm switch		✓/✓			
Front rotary operating mechanism/lateral operating mechanism at the right/left hand side		✓/✓			
Mechanical interlocking of rotary operating mechanisms, by Bowden wire		✓/✓			
Motorized operating mechanism/with operations counter		✓/✓			
Locking-type knob		✓			
Bolt sealing inset/additional cover for trip unit		✓/✓			

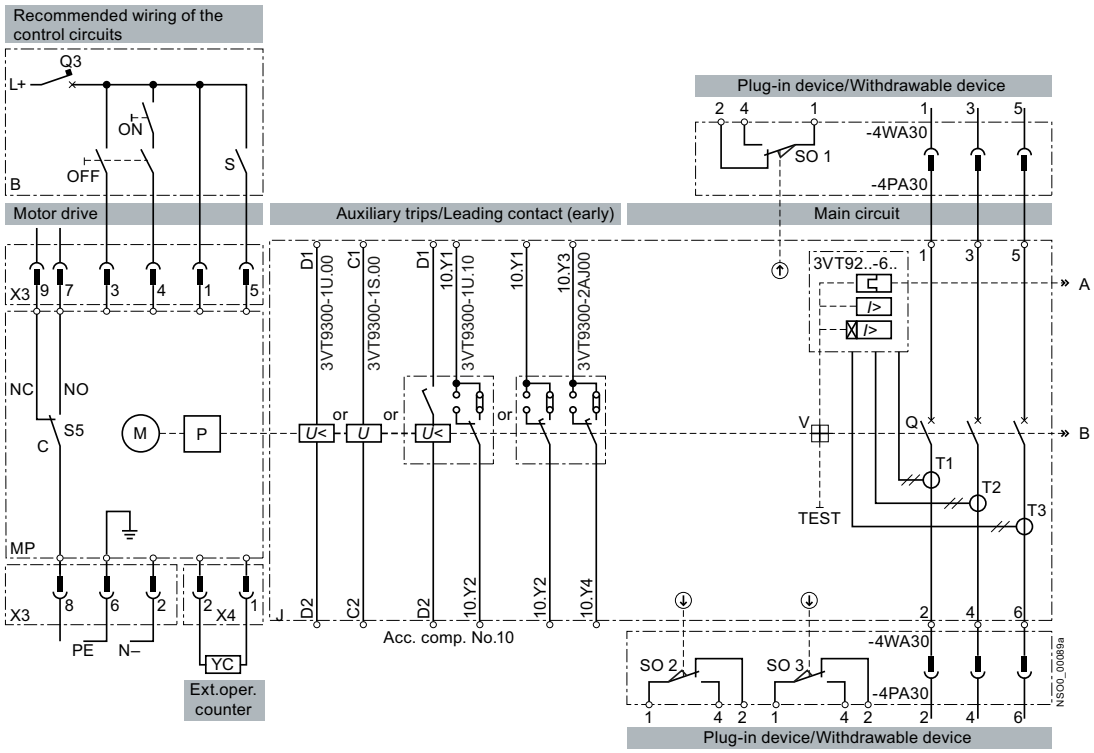
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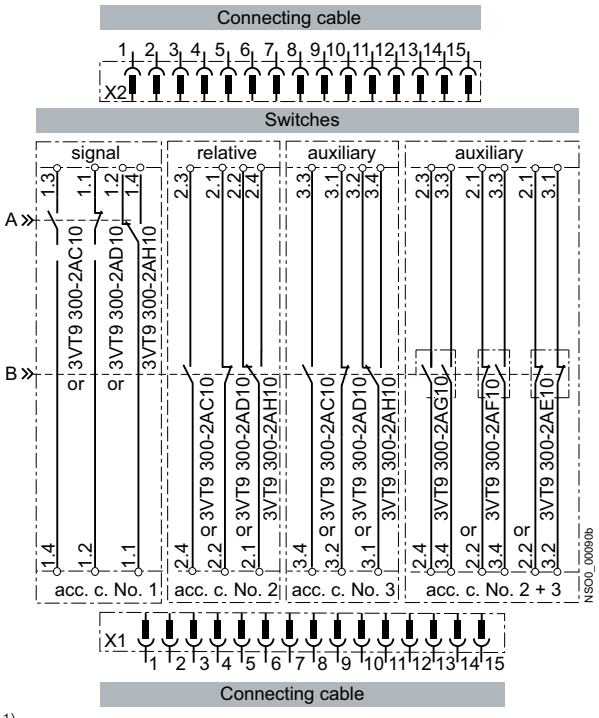
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Schematics

Circuit breakers with accessories

3-pole version



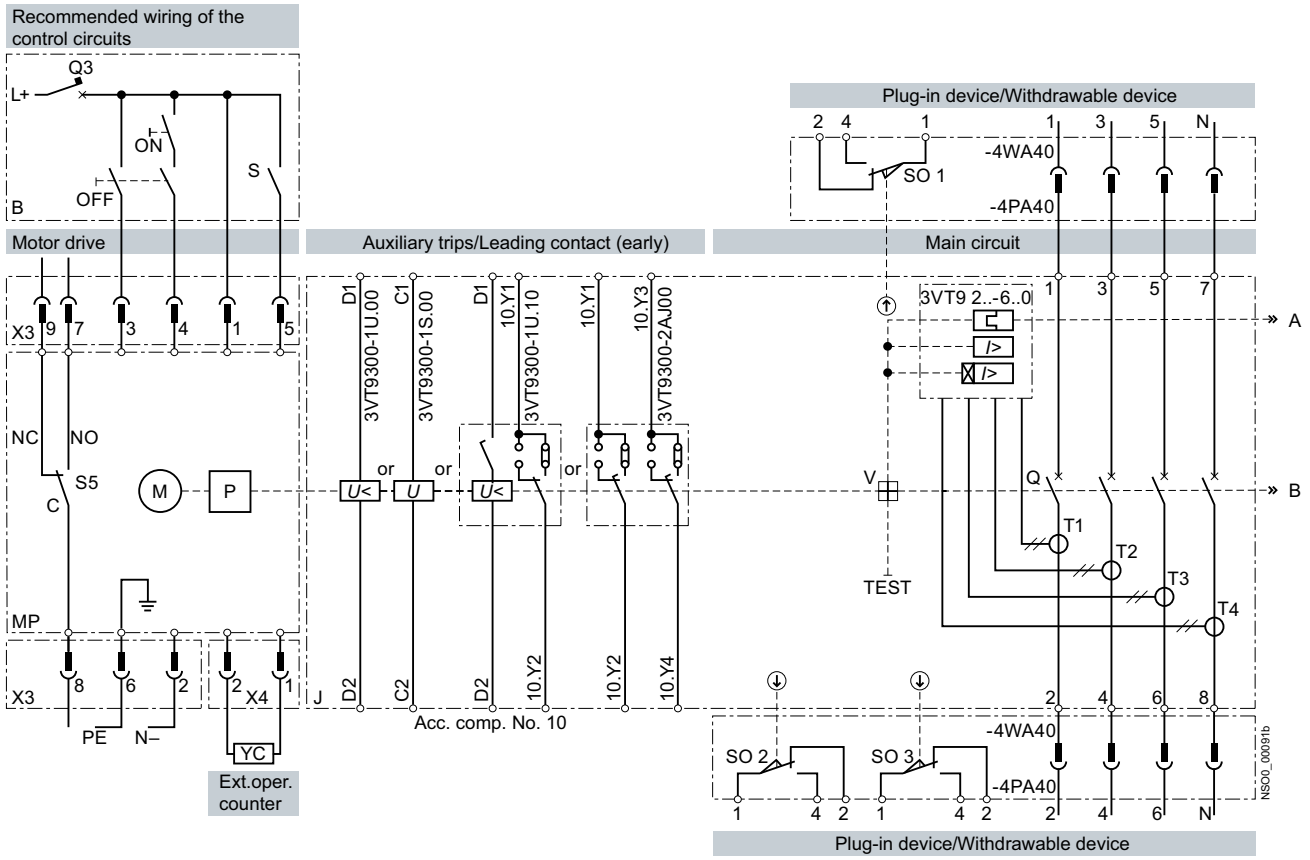


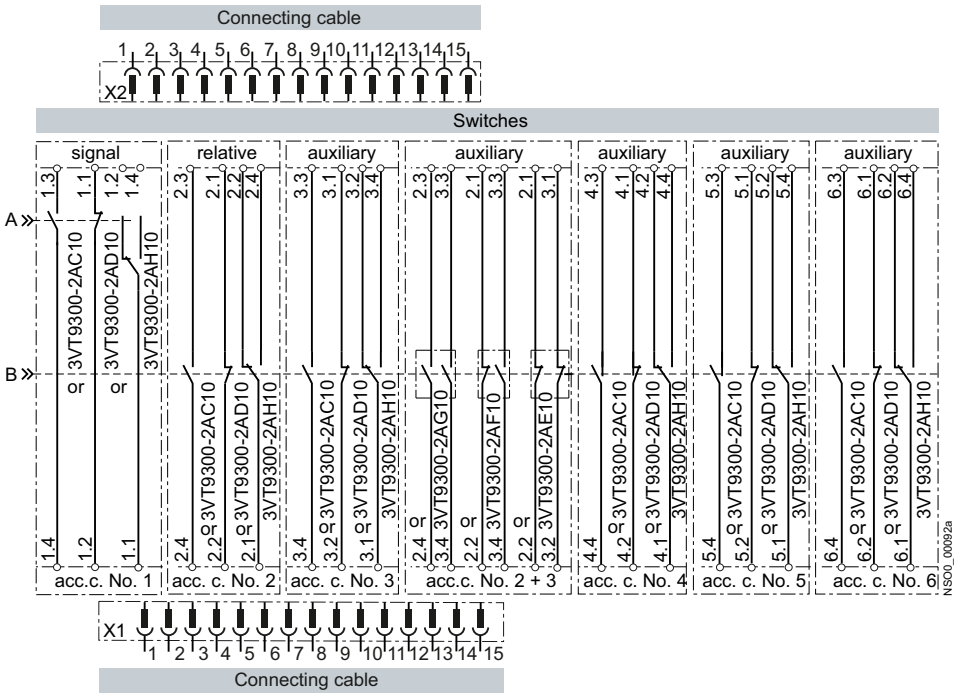
[1] Only for 4-pole version of 3VT2725-.AA46-0AA0 switching unit.

MP	3VT3200-3M..0 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Connector to connect control circuits
X4	Connector for external operations counter
S5	Switch to signal AUTO (NO-C) / MANUAL (NC-C) modes
YC	3VT9300-3MF10 external operations counter
B	Recommended wiring of the control circuits (not included in the scope of supply of the operating mechanism)
ON, OFF	Pushbutton
S	Switch for energy storage (switched on = automatic storage, switch may be continuously switched on)
Q3	Motorized operating mechanism circuit breaker
J	3VT2725-.AA36-0AA0 switching unit
Q	Main contacts
T1, T2, T3, T4[1]	Current transformers
V	Trip-free mechanism
TEST	Pushbutton to test trip unit
3VT9200-4PA30/ -4PA40	3-pole plug-in base/ 4-pole plug-in base
3VT9200-4WA30/ -4WA40	3-pole withdrawable version base/ 4-pole withdrawable version base
X1, X2	3VT9300-4PL00 connecting cable
SO1, SO2, SO3	Contacts signalling position of circuit breaker/switch disconnector in plug-in base or withdrawable version base (Position signalling switch 3VT9300-4WL00)
3VT9300-1U.00	Undervoltage trip unit
3VT9300-1S.00	Shunt trip unit
3VT9300-1U.10	Undervoltage trip unit with leading contact
3VT9300-2AJ00	Leading contact (early)
acc. c. No.	Accessory compartment number

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4-pole version





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Trip units

Overview

The electronic trip unit is a separate and interchangeable unit, which has to be ordered in addition to the 3VT2 switching unit. By exchanging the trip unit, the range of the rated current of the circuit breaker can be easily changed.

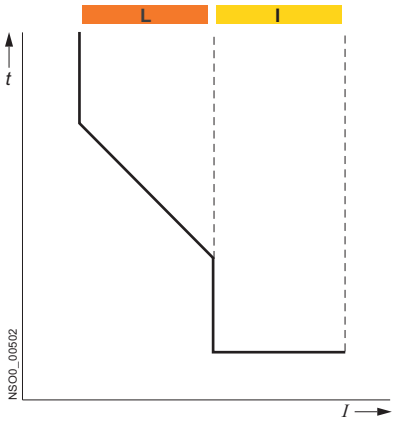
Trip units for 3VT2 switching units are available for current values of I_n = **100, 160 and 250 A**. The ETU LP feature rated currents of 160, 200 and 250 A. The trip units (including regulation of -60%) cover a current range **from 40 to 250 A**.

Tripping characteristics

Several different trip units are available. Some have adjustable characteristics (in order to match the protected device and to achieve the required selectivity).

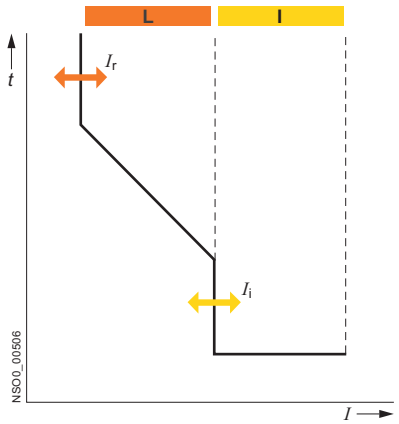
ETU LP, DP, MP and MPS trip units are intended for 3-pole 3VT2725-.AA36-0AA0 switching units and 4-pole 3VT2725-.AA46-0AA0 switching units with disconnecting of the N pole.

ETU LP trip units



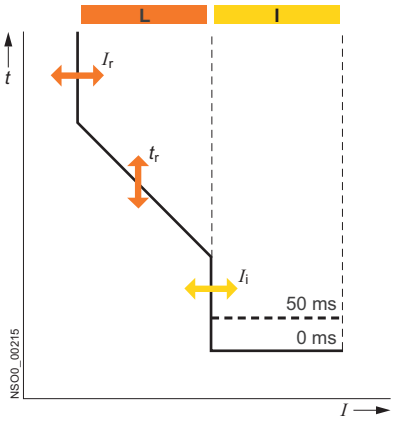
ETU LP trip units have one type of characteristic and fixed-set I_r and I_i settings.

ETU DP trip units



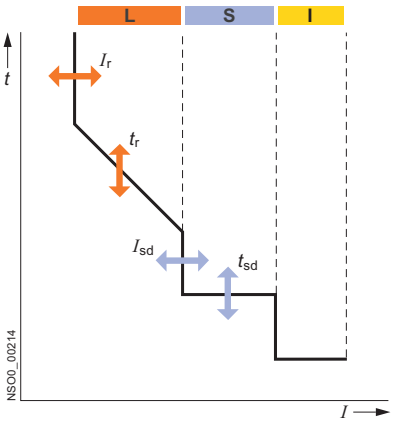
ETU DP trip units have one type of characteristic with adjustable I_r and I_i.

ETU MP trip units



ETU MP trip units have more characteristics with adjustable I_r, t_r and I_i.

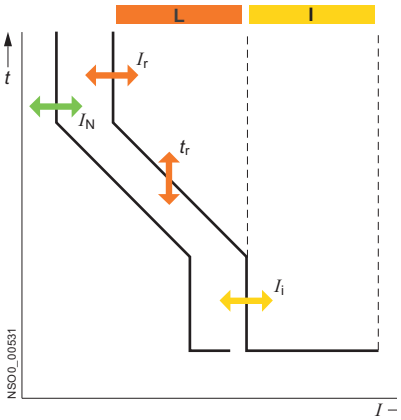
ETU MPS trip units



ETU MPS trip units have more characteristics with adjustable I_r, t_r, I_i and t_v.

ETU DPN trip units

ETU DPN trip units are intended for 4-pole 3VT2725-AA56-0AA0 switching units with protected N pole. They have more characteristics with adjustable I_r , t_r , I_i and I_N.



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Function

Trip units ETU LP, DP, MP and MPS - description of function

Proper functioning of trip units does not depend on the current waveform in the main circuit. The function of the trip unit is supported by a microprocessor, which processes a sampled signal of the power circuit and recalculates it to obtain an rms value. Therefore, the trip units are suitable for protecting circuits where the sinusoidal current is distorted by high harmonics (e.g. circuits with controlled rectifiers, power factor compensators, pulse loading, and the like).

All the trip units protect a circuit against short-circuiting and overloading. The tripping characteristics are independent of the ambient temperature. The trip unit is fixed to the switching unit by two bolts. The transparent cover over the adjustment controls can be sealed (with sealing wire).

Setting the tripping characteristic

The tripping characteristic of the trip units is defined by standard EN 60947-2. For trip units ETU DP, MP, MPS and DPN, the characteristic is adjusted with latched switches located on the trip unit.

A visual demonstration on setting the tripping characteristic is available in the SIMARIS design software (Tool for Dimensioning Electrical Power Distribution).

L is a zone of low overcurrents and includes the area of thermal protection.

S is a zone of medium overcurrents and includes long-distance short-circuit protection for lines. Intentional delay in tripping of these low short-circuit currents can be used to achieve selectivity of protective devices. For MPS trip units, the delay can be set at 0, 100, 200 or 300 ms.

I is a zone of high overcurrents and includes protection against ultimate short-circuit currents. For MP trip units, the time delay can be set at 0 or 50 ms.

1. Time-dependent trip unit (thermal) L

- The time-dependent trip unit **ETU DP** is adjusted with the I_r switch. The I_r switch adjusts the rated current of the circuit breaker, with the characteristic shifting on the current axis. The trip unit is set to one type of characteristic.
- The time-dependent trip units **ETU MP, MPS and DPN** are adjusted with two switches, I_r and t_r. The first (I_r) switch adjusts the circuit breaker's rated current. The characteristic moves along the current axis.
  By turning the other switch (t_r), the time is adjusted after which the circuit breaker will trip while passing through 7.2 I_r. The tripping characteristic thus moves on the time axis. Using the t_r switch, it is possible to set a total of 8 characteristics.
  ETU MP and MPS trip units have 4 characteristics for motor protection and 4 characteristics for protecting lines.
  Breaking times correspond to trip unit classes 10, 20, 30. By changing t_r, it is possible to select the trip unit characteristic according to the required motor starting characteristic (light, medium, heavy or very heavy starting).
  ETU DPN trip units have 8 characteristics for protecting lines or transformers.
  It is not possible to turn the circuit breaker back on immediately after the time-dependent trip unit has been actuated and the circuit breaker has tripped. The trip unit must be allowed to cool off (it has a thermal memory). The thermal memory can be disabled by turning the switch from the normal "T_t" position to the "T_0" position. In the "T_0" position the time-dependent trip unit remains active, and only its thermal memory is deactivated. Switching off the thermal memory should be used only in well-justified cases, and with the knowledge that there could be rising temperature in the protected device, causing repeated tripping.

2. Delayed time-independent trip unit S

This trip unit characteristic is available only in **ETU MPS** trip units. It is used to set up a selective cascade of circuit breakers. It is set up using parameters I_{sd} and t_{sd}. I_{sd} is an n-multiple of current I_r (I_{sd}= n × I_r). I_{sd} is a short-circuit current that, within the span of I_i to I_i, will trip the circuit breaker with delay t_{sd}, where t_{sd} is a delay set up for switching off the trip unit. The delayed time-independent trip unit actuates the circuit breaker if the current in the circuit reaches at least the preset n-multiple and lasts at least the preset delay time t_{sd}.

3. Time-independent instantaneous trip unit (short-circuit trip unit) I

- For trip units **ETU DP, MP and DPN**, the time-independent instantaneous trip unit is adjusted with the I_i switch. The I_i switch is used for setting up the short-circuit current that, when reached or exceeded, causes instantaneous tripping of the circuit breaker.

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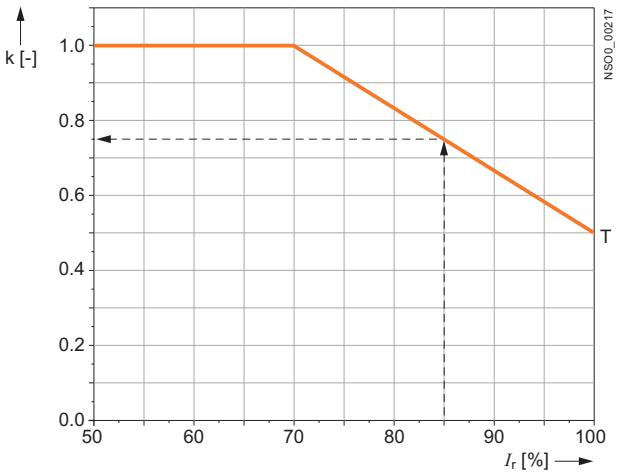
Trip units

Tripping characteristics of ETU LP, DP, MP, MPS and DPN trip units with load

The tripping characteristic from the cold state indicates the tripping times during which it is assumed that, up to the moment when an overcurrent develops, no current is flowing through the circuit breaker.

The tripping characteristic tripped from warm state indicates the tripping times during which it is assumed that, before the moment when an overcurrent develops, current is flowing through the circuit breaker.

Characteristics of electronic trip units are independent of the ambient temperature and are plotted in a cold state. Digital trip units enable simulation of a trip unit in warm state. The tripping times become shorter in a steady state, as shown in the following diagram. The steady state is a period during which the characteristic does not change. If the circuit breaker is loaded with a reduced current for at least 30 minutes, the tripping times will be cut by a half. If the load is less than 70% of I_r , the tripping time does not become shorter.



Decrease of tripping time with load

T - When tripping from the "warm" state, the tripping time of the characteristic is cut short during the standstill time t_u by coefficient **k**.

Thermal standstill time of the characteristics

For all trip units, the thermal standstill time is $t_u \geq 30$ min. During this time, the tripping time t_{sd} is cut short from the cold-state characteristic by the coefficient **k**.

The real tripping time is $t_s = k \times t_{sd}$

Example

The shortening constant can be read from the graph. With steady current 85% of I_r the real tripping time will be shortened to:

t_s **= 0.74 x** t_{sd}

k [–] time shortening coefficient

I_r [A] adjusted rated current of the trip unit

t_{sd} [s] tripping time of the trip unit derived from the characteristic

t_s [s] real tripping time of the trip unit tripped from warm state

t_u [s] standstill period for particular characteristics

Trip units are preset by the manufacturer

I_r = min

Restart = $T_{(t)}$

I_i = min, 0 ms

t_r = TV, $t_{(t)}$, min

I_{sd} = 0 ms, min

I_N = 0.5 I_r

Trip units ETU LP - Lines protection

- Provides protection for lines with low starting currents

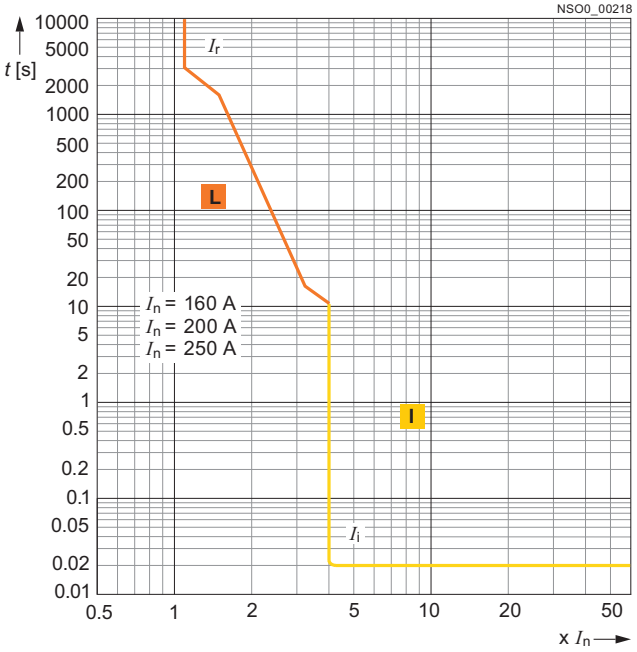
The 3VT92..-6AB00 trip unit is intended only for 3VT2725 -.AA36-0AA0 or 3VT2725 -.AA46-0AA0 switching unit. The LP trip unit has a thermal memory that cannot be disabled. The rated currents of the trip units are given by their article numbers and correspond to a standardized series of currents (see specifications table). The short-circuit trip unit is fixed-set at $4 \times I_n$.

One of the advantages of the LP trip unit is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

Specifications

Article No.	Rated current I_n	Instantaneous short circuit protection I_i
	A	A
3VT9216-6AB00	160	640
3VT9200-6AB00	200	800
3VT9250-6AB00	250	1000

Tripping characteristics





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Trip units ETU DP - Distribution protection

- Provides protection for lines and transformers

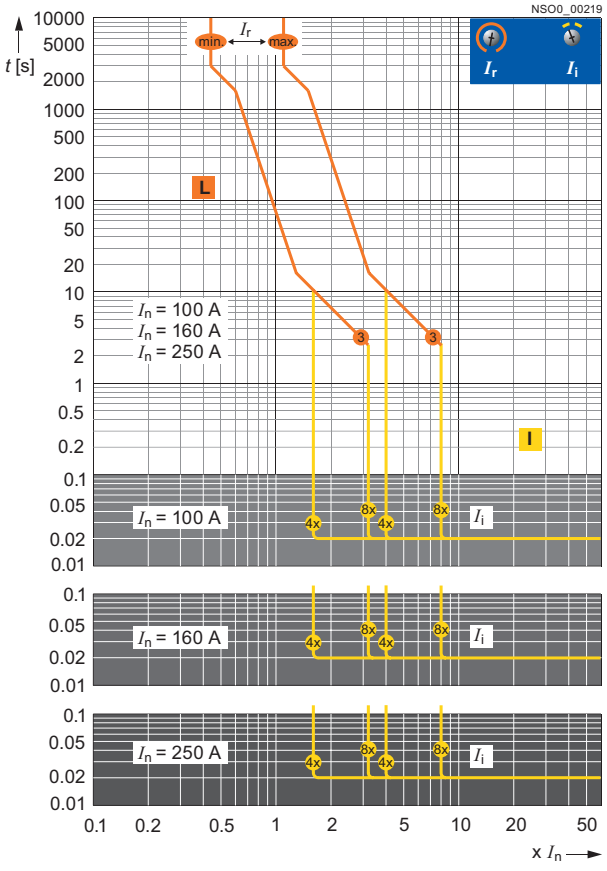
The 3VT92..-6AC00 trip unit is intended only for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling the thermal memory, the thermal trip unit remains active. The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and will begin to blink red just before tripping.

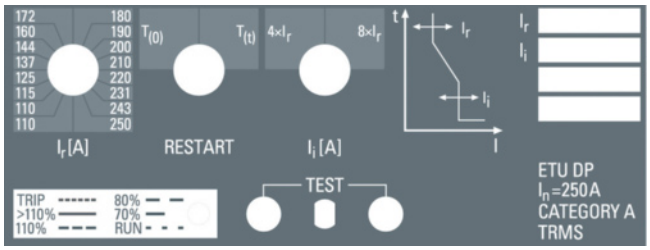
Located on the lower part of the DP trip unit cover are two photocells for communicating with the prospective signalling unit.

DP trip units have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r.

DP trip units offer simple adjustment of the tripping characteristics. Set-up includes only the rated current and the short-circuit tripping level at 4 I_r or 8 I_r.

Tripping characteristics





Adjustable specifications

Article No.	Rated current I_n A	Overload protection I_r A	Restart	Instantaneous short circuit protection I_i
3VT9210-6AC00	100	40 43 46 48 50 55 58 61 63 69 72 76 80 87 91 100	$T_{(0)}$ $T_{(t)}$	4 x I_r 8 x I_r
3VT9216-6AC00	160	63 69 72 80 87 91 100 110 115 120 125 130 137 144 150 160	$T_{(0)}$ $T_{(t)}$	4 x I_r 8 x I_r
3VT9225-6AC00	250	100 110 115 125 137 144 160 172 180 190 200 210 220 231 243 250	$T_{(0)}$ $T_{(t)}$	4 x I_r 8 x I_r

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Trip units

Trip units ETU MP - Motor protection

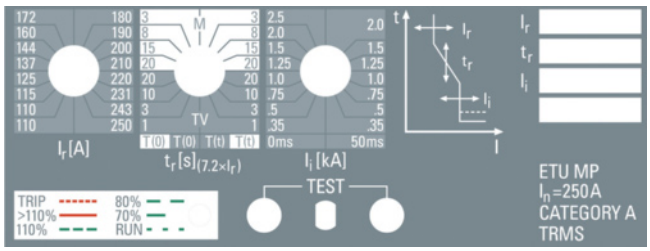
- Provides protection for motors and generators
- Can protect lines and transformers

The 3VT92..-6AP00 trip unit is intended only for 3VT2725-.AA36-0AA0 and 3VT2725-.AA46-0AA0 switching units. The operation of the MP trip unit is controlled by a microprocessor. The MP trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal trip unit remains active.

When one or two phases fail (due to current greater than I_r in the remaining phases), in the M-characteristic mode, the switch will open with a 4 s delay (so called undercurrent tripping).

Another parameter for adjusting the MP trip unit consists of the rated current and short-circuit tripping level. The time delay of the short-circuit trip unit can be set to 0 or 50 ms. The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and will begin to blink red just before tripping. Located on the lower part of the MP trip unit cover are two photocells for communicating with the prospective signalling unit.

MP trip units have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the trip unit. Mode "M" provides 4 characteristics suitable for protecting motors and mode "TV" provides 4 characteristics for protecting transformers and lines. The shape of each characteristic can be changed with a selector switch.

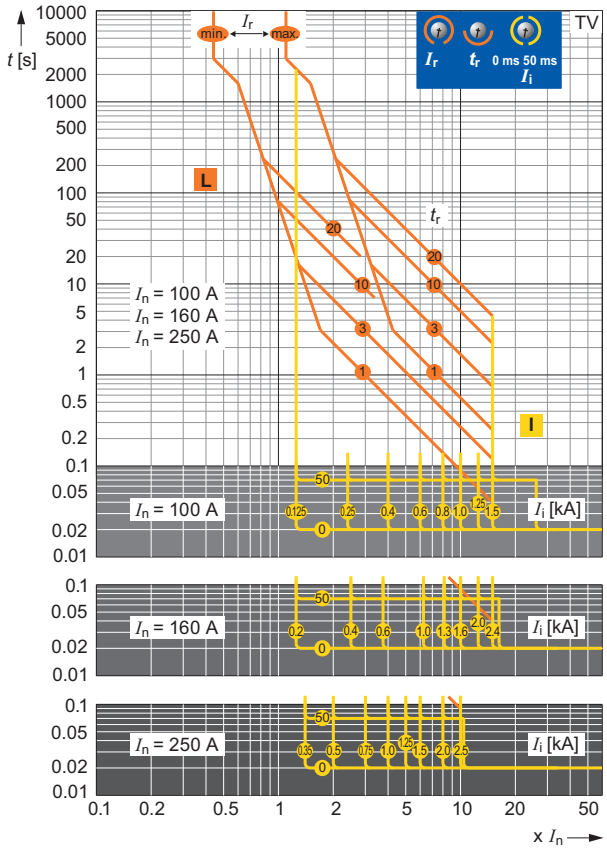


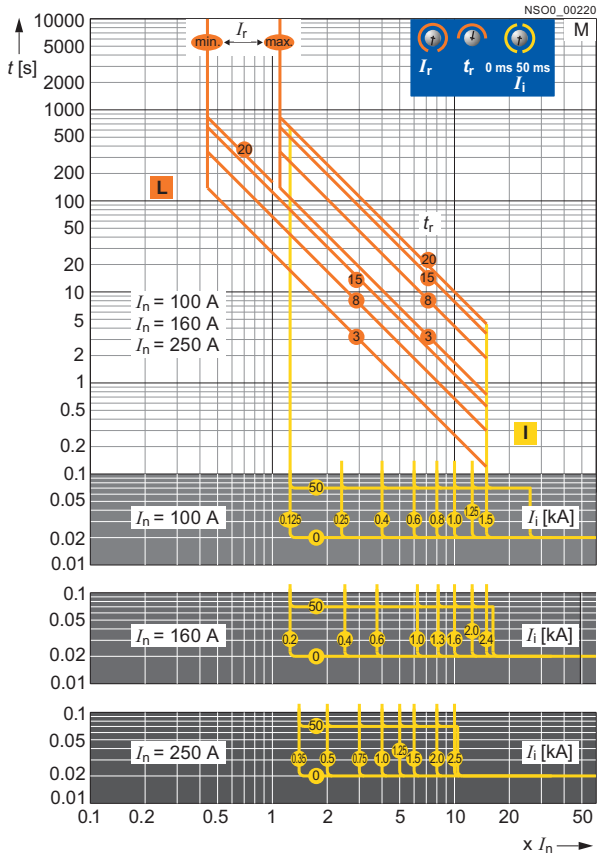
Adjustable specifications

Article No.	Rated current I_n	Overload protection I_r	t_r (7,2 x I_r)	Restart	Instantaneous short circuit protection I_i	
	A	A	s		kA	ms
		40	1 (TV 1)	$T_{(0)}$	0,125	
		43	3 (TV 3)	$T_{(0)}$	0,25	
		46	10 (TV 10)	$T_{(0)}$	0,4	
		48	20 (TV 20)	$T_{(0)}$	0,6	0
		50	20 (M 20)	$T_{(0)}$	0,8	
		55	15 (M 15)	$T_{(0)}$	1,0	
		58	8 (M 8)	$T_{(0)}$	1,25	
3VT9210-6AP00	100	61	3 (M 3)	$T_{(0)}$	1,5	
		63	3 (M 3)	$T_{(t)}$	1,5	
		69	8 (M 8)	$T_{(t)}$	1,25	
		72	15 (M 15)	$T_{(t)}$	1,0	
		76	20 (M 20)	$T_{(t)}$	0,8	50
		80	20 (TV 20)	$T_{(t)}$	0,6	
		87	10 (TV 10)	$T_{(t)}$	0,4	
		91	3 (TV 3)	$T_{(t)}$	0,25	
		100	1 (TV 1)	$T_{(t)}$	0,125	
		63	1 (TV 1)	$T_{(0)}$	0,2	
		69	3 (TV 3)	$T_{(0)}$	0,4	
		72	10 (TV 10)	$T_{(0)}$	0,6	
		80	20 (TV 20)	$T_{(0)}$	1,0	
		87	20 (M 20)	$T_{(0)}$	1,3	0
		91	15 (M 15)	$T_{(0)}$	1,6	
		100	8 (M 8)	$T_{(0)}$	2,0	
3VT9216-6AP00	160	110	3 (M 3)	$T_{(0)}$	2,4	
		115	3 (M 3)	$T_{(t)}$		
		120	8 (M 8)	$T_{(t)}$	2,0	
		125	15 (M 15)	$T_{(t)}$	1,6	
		130	20 (M 20)	$T_{(t)}$	1,3	
		137	20 (TV 20)	$T_{(t)}$	1,0	50
		144	10 (TV 10)	$T_{(t)}$	0,6	
		150	3 (TV 3)	$T_{(t)}$	0,4	
		160	1 (TV 1)	$T_{(t)}$	0,2	
		100	1 (TV 1)	$T_{(0)}$	0,35	
		110	3 (TV 3)	$T_{(0)}$	0,5	
		115	10 (TV 10)	$T_{(0)}$	0,75	
		125	20 (TV 20)	$T_{(0)}$	1,0	0
		137	20 (M 20)	$T_{(0)}$	1,25	
		144	15 (M 15)	$T_{(0)}$	1,5	
		160	8 (M 8)	$T_{(0)}$	2,0	
3VT9225-6AP00	250	172	3 (M 3)	$T_{(0)}$	2,5	
		180	3 (M 3)	$T_{(t)}$		
		190	8 (M 8)	$T_{(t)}$	2,0	
		200	15 (M 15)	$T_{(t)}$	1,5	
		210	20 (M 20)	$T_{(t)}$	1,25	
		220	20 (TV 20)	$T_{(t)}$	1,0	50
		231	10 (TV 10)	$T_{(t)}$	0,75	
		243	3 (TV 3)	$T_{(t)}$	0,5	
		250	1 (TV 1)	$T_{(t)}$	0,35	

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Tripping characteristics





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Trip units

Trip units ETU MPS - Motor protection with timing selectivity

- Provides protection for motors and generators
- Can protect lines and transformers
- Enables adjusting time delay of time-independent trip unit

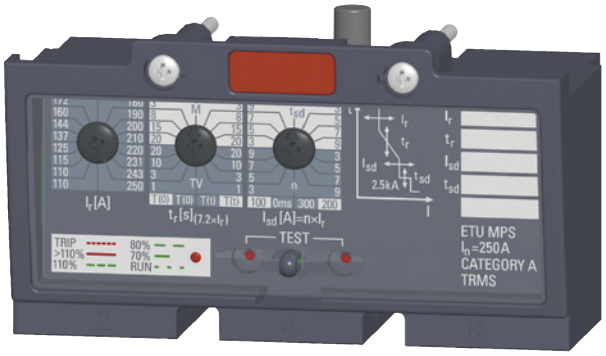
The 3VT92..-6AS00 trip unit is intended for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal trip unit remains active.

When one or two phases fail (due to current greater than I_r in the remaining phases), in the M-characteristic mode, the switch will open with a 4 s delay (so called undercurrent trip unit).

Another parameter for adjusting the MPS trip unit is the rated current and tripping level of the delayed short-circuit trip unit. The time delay (t_{sd}) can be set on the delayed short-circuit trip unit at 0, 100, 200 or 300 ms. The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and will begin to blink red just before tripping.

Located on the lower part of the MPS trip unit cover are two photocells for communicating with the prospective signalling unit.

MPS trip units have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the trip unit. Mode "M" provides 4 characteristics suitable for protecting motors, and mode "TV" provides 4 characteristics for protecting transformers and lines. The shape of each characteristic can be changed with a selector switch.

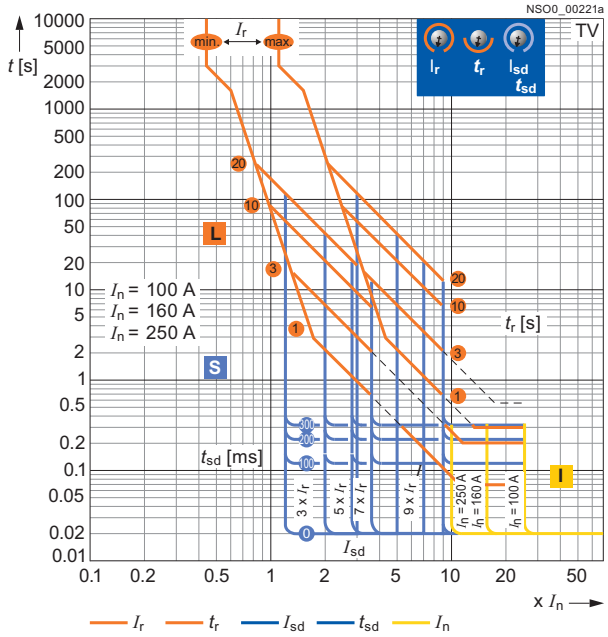


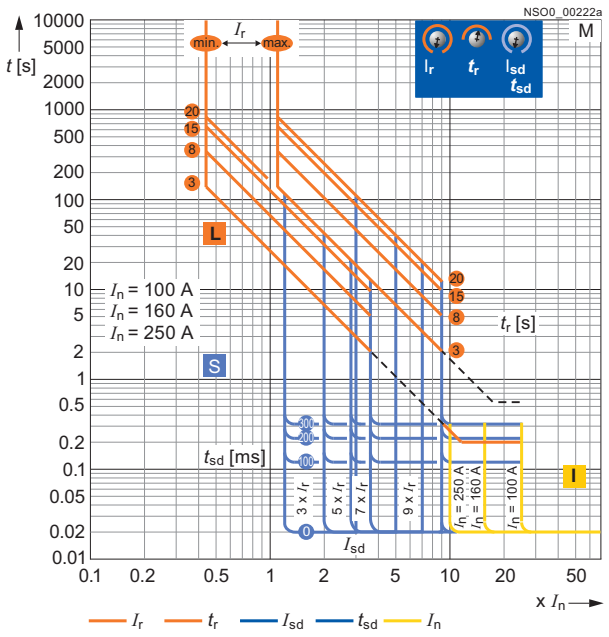
Adjustable specifications

Article No.	Rated current I_n	Overload protection I_r	t_{sd} (7.2 x I_r)	Restart	Short circuit protection (short time delayed) I_i	
	A	A	S		x I_r	ms
3VT9210-6AS00	100	40	1 (TV 1)	$T_{(0)}$	3	
		43	3 (TV 3)	$T_{(0)}$	5	0
		46	10 (TV 10)	$T_{(0)}$	7	
		48	20 (TV 20)	$T_{(0)}$	9	
		50	20 (M 20)	$T_{(0)}$	3	
		55	15 (M 15)	$T_{(0)}$	5	100
		58	8 (M 8)	$T_{(0)}$	7	
		61	3 (M 3)	$T_{(0)}$	9	
		63	3 (M 3)	$T_{(t)}$	3	
		69	8 (M 8)	$T_{(t)}$	5	200
		72	15 (M 15)	$T_{(t)}$	7	
		76	20 (M 20)	$T_{(t)}$	9	
		80	20 (TV 20)	$T_{(t)}$	3	
		87	10 (TV 10)	$T_{(t)}$	5	300
		91	3 (TV 3)	$T_{(t)}$	7	
		100	1 (TV 1)	$T_{(t)}$	9	
3VT9216-6AS00	160	63	1 (TV 1)	$T_{(0)}$	3	
		69	3 (TV 3)	$T_{(0)}$	5	0
		72	10 (TV 10)	$T_{(0)}$	7	
		80	20 (TV 20)	$T_{(0)}$	9	
		87	20 (M 20)	$T_{(0)}$	3	
		91	15 (M 15)	$T_{(0)}$	5	100
		100	8 (M 8)	$T_{(0)}$	7	
		110	3 (M 3)	$T_{(0)}$	9	
		115	3 (M 3)	$T_{(t)}$	3	
		120	8 (M 8)	$T_{(t)}$	5	200
		125	15 (M 15)	$T_{(t)}$	7	
		130	20 (M 20)	$T_{(t)}$	9	
		137	20 (TV 20)	$T_{(t)}$	3	
		144	10 (TV 10)	$T_{(t)}$	5	300
		150	3 (TV 3)	$T_{(t)}$	7	
		160	1 (TV 1)	$T_{(t)}$	9	
3VT9225-6AS00	250	100	1 (TV 1)	$T_{(0)}$	3	
		110	3 (TV 3)	$T_{(0)}$	5	0
		115	10 (TV 10)	$T_{(0)}$	7	
		125	20 (TV 20)	$T_{(0)}$	9	
		137	20 (M 20)	$T_{(0)}$	3	
		144	15 (M 15)	$T_{(0)}$	5	100
		160	8 (M 8)	$T_{(0)}$	7	
		172	3 (M 3)	$T_{(0)}$	9	
		180	3 (M 3)	$T_{(t)}$	3	
		190	8 (M 8)	$T_{(t)}$	5	200
		200	15 (M 15)	$T_{(t)}$	7	
		210	20 (M 20)	$T_{(t)}$	9	
		220	20 (TV 20)	$T_{(t)}$	3	
		231	10 (TV 10)	$T_{(t)}$	5	300
		243	3 (TV 3)	$T_{(t)}$	7	
		250	1 (TV 1)	$T_{(t)}$	9	

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Tripping characteristics





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Trip units

Trip units ETU DPN - Distribution protection with protected N pole

- Provides protection for lines and transformers in TN-C-S and TN-S networks

The 3VT92..-6BC00 trip unit is intended only for the 3VT2725-.AA56-0AA0 switching unit. The operation of the DPN trip unit is controlled by a microprocessor. The DPN trip unit is equipped with a thermal memory that can be disabled by turning a switch located on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal trip unit remains active.

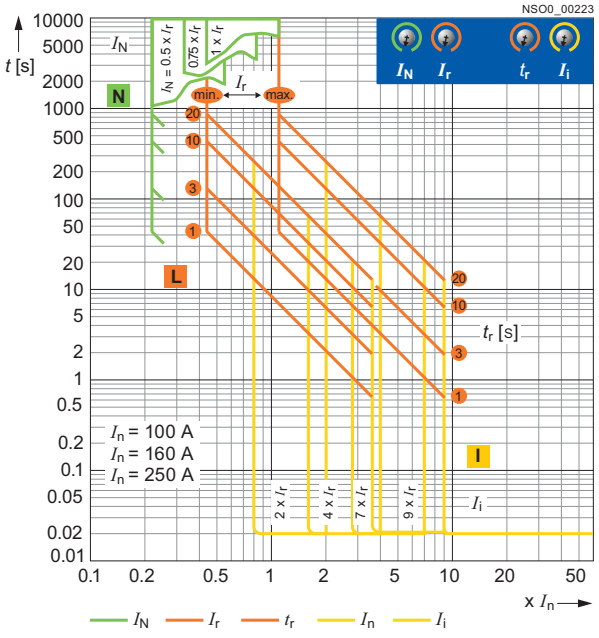
The rated current I_r, delay for switching off the trip unit at 7.2 I_r, and the tripping level of the short-circuit tripping can be adjusted.

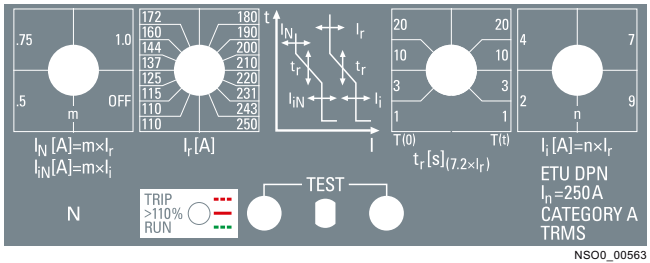
The operational state is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and will begin to blink red just before tripping.

Located on the lower part of the DPN trip unit cover are two photocells for communicating with the prospective signalling unit.

The current of the fourth pole (N pole) is adjusted using the IN switch as a multiple of the I_r current. Measuring of current on the fourth pole can be disabled by turning the button to the "OFF" position.

Tripping characteristics



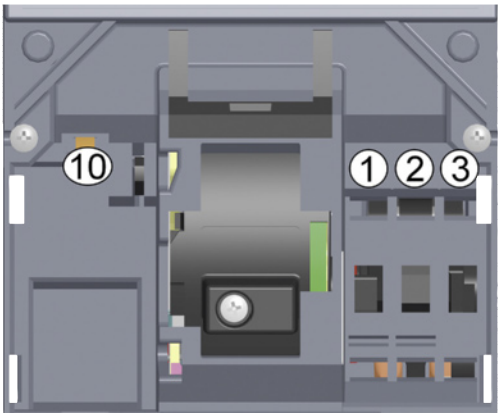


Adjustable specifications

Article No.	Rated current I_n	Overload protection I_r	t_R (7,2 x I_r)	Restart	Instantaneous short circuit protection I_i	
	A	A	S		x I_r	ms
		40	1	$T_{(0)}$	2	
		43		$T_{(0)}$	4	0
		46	3	$T_{(0)}$	7	
		48		$T_{(0)}$	9	
		50	10	$T_{(0)}$	2	
		55		$T_{(0)}$	4	100
		58	20	$T_{(0)}$	7	
3VT9210-6BC00	100	61		$T_{(0)}$	9	
		63	20	$T_{(t)}$	2	
		69		$T_{(t)}$	4	200
		72	10	$T_{(t)}$	7	
		76		$T_{(t)}$	9	
		80	3	$T_{(t)}$	2	
		87		$T_{(t)}$	4	300
		91	1	$T_{(t)}$	7	
		100		$T_{(t)}$	9	
		63	1	$T_{(0)}$	2	
		69		$T_{(0)}$	4	0
		72	3	$T_{(0)}$	7	
		80		$T_{(0)}$	9	
		87	10	$T_{(0)}$	2	
		91		$T_{(0)}$	4	100
		100	20	$T_{(0)}$	7	
3VT9216-6BC00	160	110		$T_{(0)}$	9	
		115	20	$T_{(t)}$	2	
		120		$T_{(t)}$	4	200
		125	10	$T_{(t)}$	7	
		130		$T_{(t)}$	9	
		137	3	$T_{(t)}$	2	
		144		$T_{(t)}$	4	300
		150	1	$T_{(t)}$	7	
		160		$T_{(t)}$	9	
		100	1	$T_{(0)}$	2	
		110		$T_{(0)}$	4	0
		115	3	$T_{(0)}$	7	
		125		$T_{(0)}$	9	
		137	10	$T_{(0)}$	2	
		144		$T_{(0)}$	4	100
		160	20	$T_{(0)}$	7	
3VT9225-6BC00	250	172		$T_{(0)}$	9	
		180	20	$T_{(t)}$	2	
		190		$T_{(t)}$	4	200
		200	10	$T_{(t)}$	7	
		210		$T_{(t)}$	9	
		220	3	$T_{(t)}$	2	
		231		$T_{(t)}$	4	300
		243	1	$T_{(t)}$	7	
		250		$T_{(t)}$	9	

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Overview



Location of accessory compartments in 3VT2 circuit breakers

Article number according to contact arrangement

Arrangement of contacts	Article No.	Number of contacts	Contact types
01	3VT9300-2AC10 (20)	1	NO
20	3VT9300-2AE10 (20)	2	NO
01	3VT9300-2AD10 (20)	1	NC
02	3VT9300-2AG10 (20)	2	NC
11	3VT9300-2AF10 (20)	1 + 1	NC + NO
001	3VT9300-2AH10 (20)	1	NC + NO

Functions and names of switches according to their location in accessory compartments

Accessory compartment	Switch name	Switch function
1	Signalling	Signalling switch to indicate the state of the circuit breaker by the trip unit
2	Relative	Relative switch to indicate tripping of the circuit breaker by trip units, TEST push-button or by OFF pushbutton on the motorized operating mechanism
3, (4, 5, 6)[1)]	Auxiliary	Auxiliary switch to indicate the position of the main contacts
10	Leading (early)	Leading switch to make/break in advance of the main contacts

[1)] Accessory compartments 4, 5, 6 for 4-pole version only.

Function

States of auxiliary switches located in the switching unit accessory compartments

Circuit breaker state	Toggle position of circuit breaker	State of the main contacts	Accessory compartment																			
			1		2		3 (4 ... 6)[1)]		10		2 and 3		2 and 3		2 and 3		1		2		3	
			3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AJ00	3VT9300-1U.10	3VT9300-2AG10		3VT9300-2AF10		3VT9300-2AE10		3VT9300-2AH10		3VT9300-2AH10		3VT9300-2AH10	
Switched on		**1**	1	0	0	1	1	0	1	0	1	1	0	1	0	0	1	0	0	1	1	0
Switched off manually or electrically by operating mechanism		**0**	1	0	0	1	0	1	0	1	0	0	1	0	1	1	1	0	0	1	0	1
Switched off by trip unit		**0**	0	1	1	0	0	1	0	1	0	0	1	0	1	1	0	1	1	0	0	1
Switched off by auxiliary trip unit or by TEST button or the trip pushbutton on the motorized operating mechanism		**0**	1	0	1	0	0	1	0	1	0	0	1	0	1	1	1	0	1	0	0	1

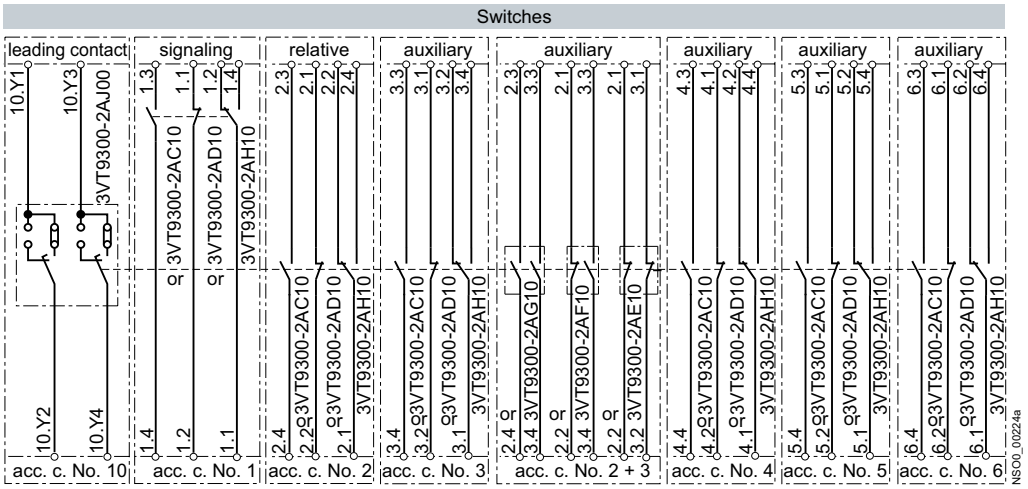
0 = contact open, 1 = contact closed

[1)] Accessory compartments 4, 5, 6 for 4-pole version only.

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Auxiliary switches

State of switches located in the switching unit accessory compartments



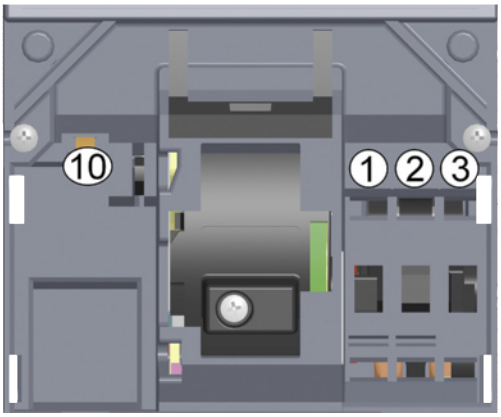
Technical specifications

Article No.		3VT9300-2A.00	3VT9300-2A.10[1)]	3VT9300-2AJ00	3VT9300-2AH10	3VT9300-2AH20[1)]
Rated operational voltage U_e	V	AC 60 ... 500 DC 60 ... 500	AC 5 ... 60 DC 5 ... 60	AC 250	AC 24 ...250 DC 24 ...250	AC 5 ..60 DC 5 ...60
Rated isolation voltage U_i	V	500		250		
Rated frequency f_n	Hz	50/60				
Rated operational current I_e/U_e						
• AC-12		--	0.004 ... 0.5A/5 V	--	--	--
• AC-15		6 A/240 V, 4 A/400 V, 2A/500 V	0.004 ... 0.5A/5 V	1 A/AC 250 V	1.5 A/AC 250 V	--
• DC-12		--	--	--	--	0.01 A/DC 60 V
• DC-13		0.4 A/240 V, 0.3 A/400 V, 0.2 A/500 V	0.004 ... 0.01/60 V	--	0.2 A/DC 250 V	--
Thermal current I_{th}	A	10	0,5	--	6	0.5
Arrangement of contacts		01, 10, 02, 11, 20		02, 11, 20	001	001
Connector cross-section S	mm^2	0.5 ... 1				
Terminal protection (connected switch)		IP20				

[1)] 3VT9300-2A.10 is not suitable for controlling electromagnetic loads

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Overview



Location of accessory compartments 10 in 3VT2 circuit breakers



The particular rated operating voltage of the shunt trip unit is set up by jumpers located on the right hand side in the trip unit. Default setting is always the maximum value.

Article number of shunt trip units
according to the rated operating voltage

Article No.	U_e
3VT9300-1SC00	AC/DC 24, 40, 48 V
3VT9300-1SD00	AC/DC 110 V
3VT9300-1SE00	AC 230, 400, 500 V/DC 220 V
3VT9300-1SB00	DC 12 V

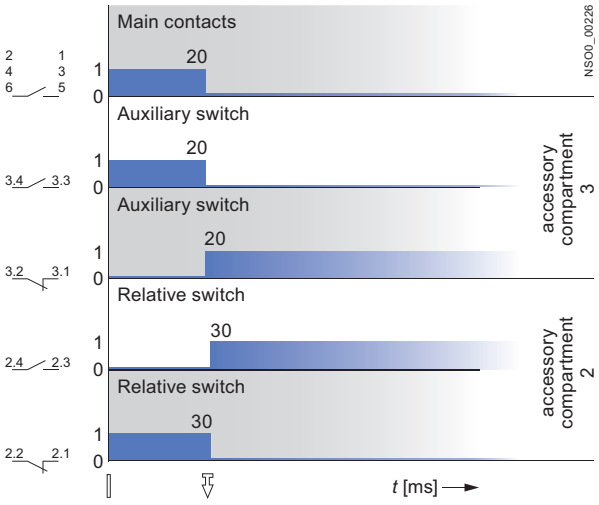
Article number of undervoltage trip units
according to the rated operating voltage

Article No.	Rated operating voltage U_e
3VT9300-1UC00	AC/DC 24, 40, 48 V
3VT9300-1UD00	AC/DC 110 V
3VT9300-1UE00	AC 230, 400, 500/DC 220 V

Function

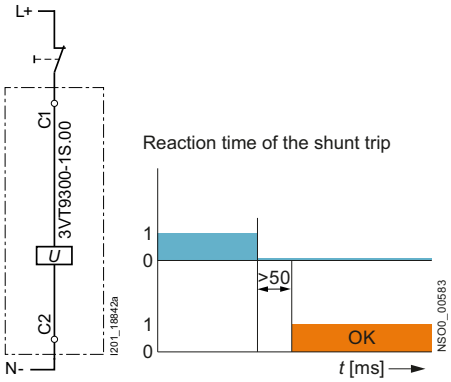
Shunt trip units

Circuit breaker switched off by the shunt trip unit



Circuit breaker states and toggle positions of the circuit breaker

Circuit breaker state	Toggle positions of circuit breaker
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

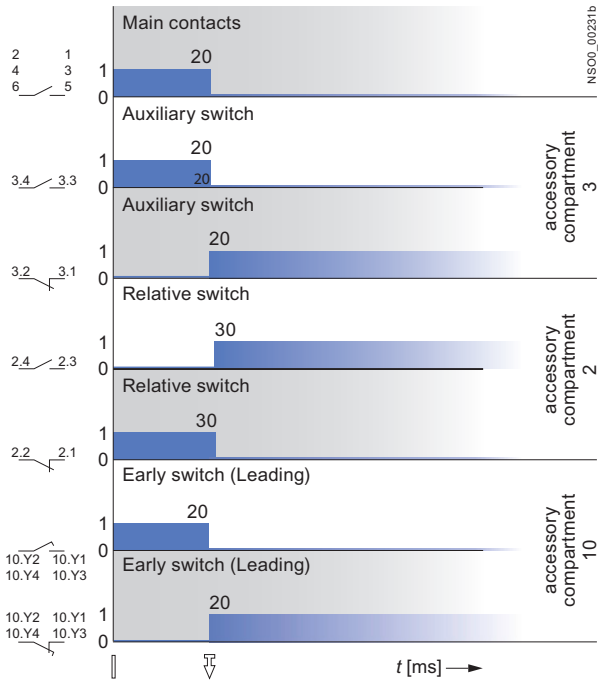


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Auxiliary trip units

Undervoltage trip units

Circuit breaker switched off by the undervoltage trip unit

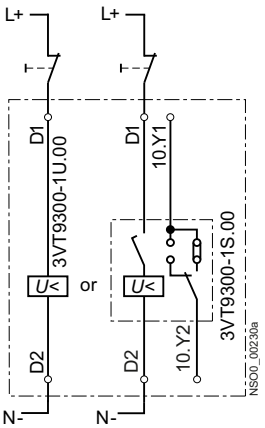


Circuit breaker states and toggle positions of the circuit breaker

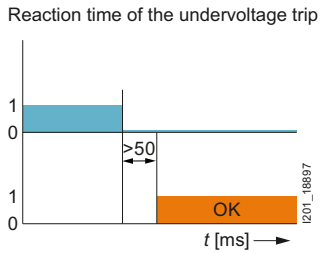
Circuit breaker state	Toggle positions of circuit breakers
Switched on	
Switched off by trip units, by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by operating mechanism	

Arrangement, number and type of contacts

Arrangement of contacts	Number of contacts	Contact types
02	2	NC
11	1 + 1	NC + NO
20	2	NO



Reaction time of the undervoltage trip unit



Technical specifications

Shunt trip units

Article No.		3VT9300-1S.00
Rated operating voltage U_e	V	AC 24, 40, 48, 110, 230, 400, 500 DC 12, 24, 40, 48, 110, 220
Rated frequency f_n	Hz	50/60
Input power at 1.1 U_e		AC < 3 VA DC < 3 W
Functional description		U ≥ 0,7U_e the circuit breaker must trip
Time to switch-off	ms	20
Continuous load		Yes
Connection cross-section S	mm^2	0.5 ... 1
Terminal protection (connected trip unit)		IP20
Location in accessory compartment No.		10

Undervoltage trip units

Article No.		3VT9300-1U.00	3VT9300-1U.10[1]
Rated operating voltage U_e	V	AC 24, 40, 48, 110, 230, 400, 500 DC 24, 40, 48, 110, 220	
Rated frequency f_n	Hz	50/60	
Input power at 1.1 U_e	VA W	AC <3 DC <3	
Functional description[1]		U ≥ 0.85 U_e (circuit breaker can switch on) U ≤ 0.35 U_e (the circuit breaker must trip)	
Time to switch off	ms	20	
Continuous load		Yes	
Connector cross-section S	mm^2	0.5 ... 1	
Terminal protection (connected trip unit)		IP20	
Location in accessory compartment No.		10	
Leading switch			
Rated operating voltage U_e	V	--	AC 250
Rated frequency f_n	Hz	--	50/60
Rated operating current I_e/U_e	V	--	AC 1 A/259
Arrangement of contacts		--	02, 11, 20
Connector cross-section S	mm^2	--	0.5 ... 1
Terminal protection (connected trip unit)		--	IP20

[1] Cannot be used in combination with 3VT9200-3M..0 motorized operating mechanism.

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Overview

Rotary operating mechanism

The following components of the rotary operating mechanisms are required:

- To switch the switching unit:
  - 3VT9300-3HE10 or 3VT9300-3HE20 black knob
  - 3VT9300-3HF20 red knob
- To switch the switching unit through the switchgear cabinet door:
  - 3VT9300-3HJ..extension shaft
  - 3VT9300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9300-3HE/HF.. knob

Mechanical interlocking and mechanical interlocking for parallel switching

- Mechanical interlocking for fixed-mounted versions require the following components:
  - 2 x 3VT9200-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9200-3HE/HF.. knob
- Mechanical interlocking with Bowden wire is suitable for fixed-mounted, plug-in and withdrawable versions
- Mechanical interlocking with Bowden wire requires the following components:
  - 2 x 3VT9200-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9200-3HE/HF.. knob

Design



Fig. 1: Rotary operating mechanism with knob

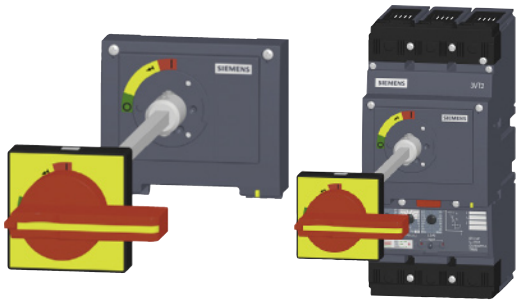


Fig. 2: Rotary operating mechanism with extension shaft, coupling driver and knob

The rotary operating mechanism makes it possible to actuate the circuit breaker by turning a knob, e.g. in order to switch machines on and off. The modular concept of the operating mechanisms allows simple mounting on the switching unit after the accessory compartment cover is removed. The operating mechanism and its accessories must be ordered separately, (see page 2/6).

- The rotary operating mechanism is attached to the switching unit of the circuit breaker
- The coupling driver is attached to the switchgear door. It provides degree of protection IP40 or IP66
- The knob is placed on the rotary operating mechanism or on the coupling driver
- The extension shaft is available in two versions, standard (length 365 mm - can be shortened) and telescopic (adjustable length 245 ... 410 mm).

The rotary operating mechanism makes it possible to actuate the circuit breaker:

Operation from the front panel of the circuit breaker (Fig. 1)

3VT9200-3HA/HB.. rotary operating mechanism
+ 3VT9300-3HE/HF.. knob

Operation through the switchgear cabinet door (Fig. 2)

3VT9200-3HA/HB.. rotary operating mechanism
+ 3VT9300-3HJ.. extension shaft
+ 3VT9300-3HE/HF.. knob
+ 3VT9300-3HG/HH.. coupling driver

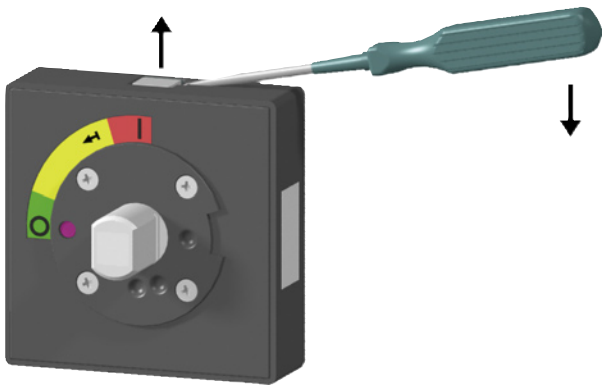
Operation through side wall of switchgear cabinet

3VT9200-3HC/HD10.. rotary operating mechanism
+ 3VT9300-3HJ.. extension shaft
+ 3VT9300-3HE/HF.. knob
+ 3VT9300-3HG/HH.. coupling driver

Enhanced safety for operator:

- The rotary operating mechanism and knob allow operators to lock the circuit breaker in position "switched off manually". The unit and knob of the rotary operating mechanism can be locked by three padlocks with a shank diameter up to 6 mm
- Each coupling driver prevents the cabinet door from being opened when the circuit breaker is in on-state or after tripping. Types 3VT9300-3HG10 and 3VT9300-3HG20 prevent the cabinet door from being opened when the circuit breaker is in the state "switched off manually" and when the rotary operating mechanism knob is locked out.
- Two circuit breakers with rotary operating mechanisms can be provided with mechanical interlocking or with parallel mechanical switching (see page 2/31).

By a screwdriver it is possible to unlock the mechanism blocking the switchboard door opening with the circuit breaker switched on (3VT9300-3HG30 or 3VT9300-3HH30).



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Rotary operating mechanisms

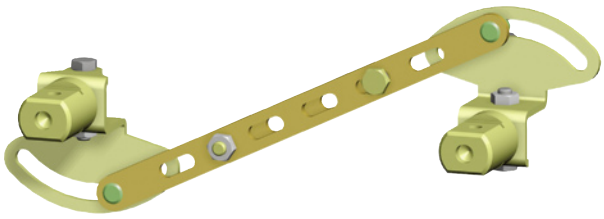
Features

Article No.	Description	Color	Permits operator to lock the circuit breaker in OFF mode	Degree of protection	Switchgear cabinet door is locked when circuit breaker is		Length mm
					switched on	switched off manually and locked	
3VT9200-3HA10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9200-3HA20	Rotary operating mechanism	gray	yes	--	--	--	--
3VT9200-3HB20	Rotary operating mechanism	yellow	yes	--	--	--	--
3VT9200-3HC10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9200-3HD10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9300-3HE10	Knob	black	no	--	--	--	--
3VT9300-3HE20	Knob, lockable with padlock	black	yes	--	--	--	--
3VT9300-3HF20	Knob, lockable with padlock	red	yes	--	--	--	--
3VT9300-3HG10	Coupling driver	black	--	IP40	yes	yes	--
3VT9300-3HG30	Coupling driver	black	--	IP40	yes	yes	--
3VT9300-3HG20	Coupling driver	black	--	IP66	yes	no	--
3VT9300-3HH10	Coupling driver	yellow	--	IP40	yes	yes	--
3VT9300-3HH30	Coupling driver	yellow	--	IP40	yes	yes	--
3VT9300-3HH20	Coupling driver	yellow	--	IP66	yes	no	--
3VT9300-3HJ10	Extension shaft, can be shortened	--	--	--	--	--	365
3VT9300-3HJ20	Extension shaft, telescopic	--	--	--	--	--	245 ... 410

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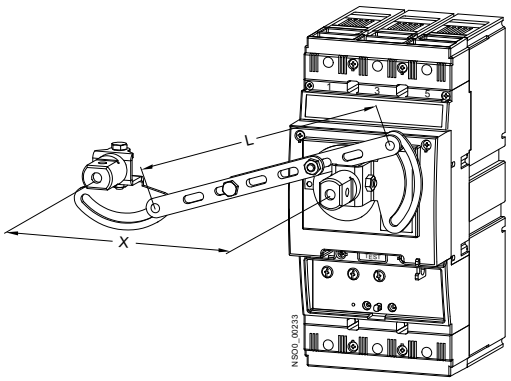
Function

3VT9300-8LA00 Mechanical interlocking

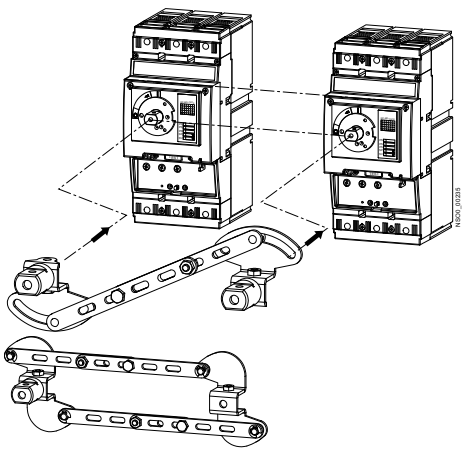


Mechanical interlocking make sure that two circuit breakers cannot trip simultaneously, but always just individually. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two 3VT2 circuit breakers or between one 3VT2 and one 3VT3 circuit breaker. Both circuit breakers must be furnished with rotary operating mechanisms (at least one of them with a rotary operating mechanism and knob).

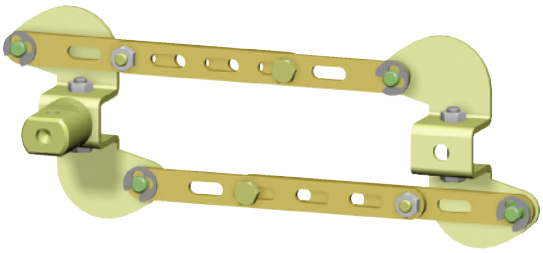
When using a mechanical interlocking it is required to comply with the dimensions shown in the figure and in the table.



Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2 3P	105	112	140	145.5	122.5	128.5	181	185.5
3VT2 4P	105	112	140	145.5	122.5	128.5	181	185.5
3VT3 3P	122.5	128.5	157.5	145.5	140	145.5	185	189
3VT3 4P	122.5	128.5	157.5	145.5	140	145.5	185	189

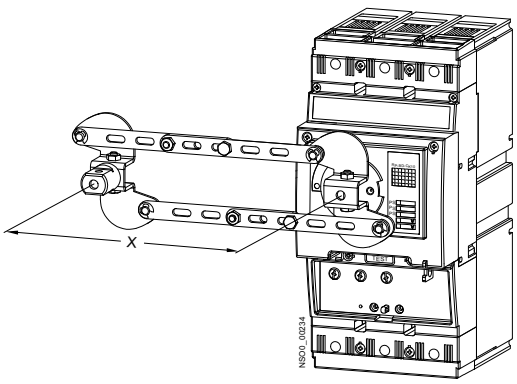


3VT9300-8LB00 Mechanical parallel switching



Mechanical interlocking for parallel switching are for simultaneous switching of two circuit breakers. Parallel switching can be used between two 3VT2 circuit breakers or between 3VT2 and 3VT3 circuit breakers. Each circuit breaker must be furnished with a rotary operating mechanism and at least one of them with a knob.

When using a mechanical interlocking for parallel switching it is required to comply with the dimensions shown in the figure and in the table.



Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole[1]	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2 3P	105^{+7}	112^{+7}	140^{+7}	145.5^{+7}	122.5^{+7}	128.5^{+7}	x	x
3VT2 4P	105^{+7}	112^{+7}	140^{+7}	145.5^{+7}	122.5^{+7}	128.5^{+7}	x	x
3VT3 3P	122.5^{+7}	128.5^{+7}	157.5^{+7}	145.5^{+7}	140^{+7}	145.5^{+7}	x	x
3VT3 4P	122.5^{+7}	128.5^{+7}	157.5^{+7}	145.5^{+7}	140^{+7}	145.5^{+7}	x	x

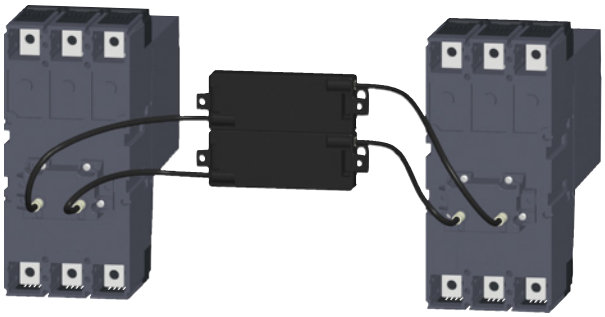
[1] Switching unit 3VT3 4P (4-pole version) must be located on the right side.

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Mechanical interlocking and parallel switching

3VT9.00-8LC.0 Mechanical interlocking



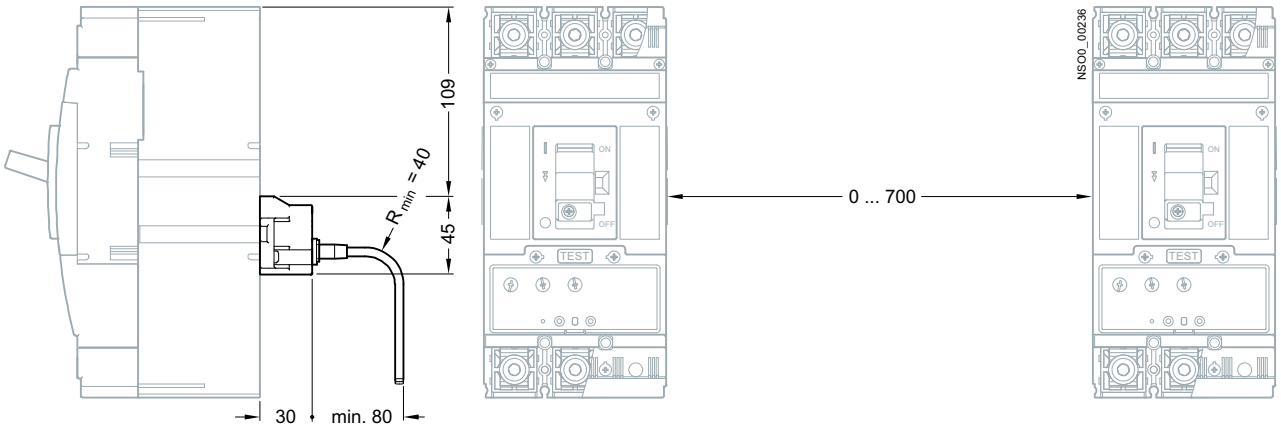


- Provides mechanical interlocking of two circuit breakers/ switch disconnectors, so that they cannot both trip simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- The 3VT9200-8LC10 mechanical interlocking is intended for two 3VT2 circuit breakers. 3VT9300-8LC20 interlocking is intended for one 3VT2 circuit breaker and one 3VT3.
- Circuit breakers can be delivered in fixed-mounted, plug-in and withdrawable versions.

Article No. of mechanical interlocking	3VT9200-8LC10	3VT9300-8LC20
Circuit breaker types	3VT2	3VT3
	3VT2	3VT2

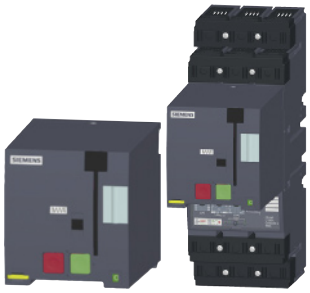
Circuit breaker installation in switchgear and controlgear assemblies

Detailed information is included in the "Instructions for use", which is available on our website:
www.siemens.com/lowvoltage/product-support



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Design



- It is used for remote control of the circuit breaker (switch off/on).
- Simple mounting on the circuit breaker after the circuit breaker cover of cavities is removed.
- Usage in industrial applications e.g. switching of stand by units etc. or wherever the automatic operation of electric devices is needed.
- In order to speed up the circuit breaker's switch off (e.g. safety STOP button) the undervoltage release or shunt trip can be used.
- On the motor drive front panel there is a change-over switch to select the drive modes AUTO/MANUAL:
  - AUTO mode - remote control. The circuit breaker is controlled by buttons for remote switch off/on, furthermore in this position mechanical control can be used on the front panel of the motor drive.
  - MANUAL mode - manual control. Control voltage is not needed. The circuit breaker can be switched on using the green switch on button and switched off using the red switch off button on the front part of the drive cover. Electric switch on is blocked. Electric switch off is functional. The accumulation of energy can be done by means of hinged lever.
- Possibility to indicate remotely the state of the AUTO/MANUAL switch.
- In MANUAL mode it is possible to switch on and off with the green and red pushbuttons located on the front panel of the motorized operating mechanism cover. The function of the remote control ON button in MANUAL mode is locked out, whereas the function of the remote control OFF button remains active for safety reasons.
- The motorized operating mechanism, as opposed to the circuit breaker, recognizes only two fixed positions. In the first position the circuit breaker is ON. When the circuit breaker is tripped in AUTO mode by the trip unit or shunt/undervoltage trip units, then because of mechanical link between the circuit breaker and the motor mechanism, a pulse will be generated to automatically wind up the spring of the storage unit. The motor mechanism can be wound up automatically by permanent closing switch S. In the second fixed position the circuit breaker is switched off and the loaded drive is ready to switch the breaker on after it has received the setting pulse.
- The motorized operating mechanism makes it possible to control the circuit breaker after the loss of control voltage. In MANUAL and AUTO modes, it is possible to wind up the storage unit by repeated rotation of the foldable handle. After charging the spring mechanism with spring energy, it is possible to switch the circuit breaker on and off with the control buttons located on the front panel of the motor mechanism.
- The front panel incorporates a storage unit status indicator to indicate what state the 3VT motor mechanism unit storage is in and whether it is possible to switch the circuit breaker on. The 3VT motor mechanism is also able to remotely indicate the storage status. A corresponding signal is issued to the terminal strip. 3VT2 motor mechanism have optional designs, alternatively with MANUAL/AUTO indication.
- The mechanism can be furnished with an electromechanical operations counter that may be installed in the drive cover or outside of the circuit breaker (e.g. in the switchgear door). A metal holder included in the scope of supply of the external operations counter. Connecting is facilitated with connectors.
- The motorized operating mechanism can be locked in off position using as many as three padlocks with shank diameter max. 4.3 mm.
- A 3VT9300-3MF20 cover can be attached to the ON-OFF switch of the motorized operating mechanism, and then sealed with sealing wire. The cover prevents turning on the circuit breaker from the drive panel.
- Extension cable 3VT9300-3MF00 has a connector on one side that connects to the connector located on the motor mechanism and conductors on the other side that connect, for example, to a terminal block.
- Front panel state indicating device of the stored energy signals the state of motor drive storage devices. The state can be signalled from a distance.
- Motor drive can be sealed means of bolt sealing 3VT9200-8BN00

Article No.		3VT9200-3M..0
Operational voltage U_e	V	AC 24, 48, 110, 230, 400, 500 DC 24, 48, 110, 220
Rated frequency f_n	Hz	50/60
Control pulse length for storing	ms	400 ... ∞[1)]
Control pulse length	ms	20 ... 700[1)], 400 ... ∞[1)]
Time before switching on	ms	< 50
Time before switching off	ms	800
Frequency of cycles ON/OFF		3 contact making/min
Frequency of cycles - instant successive ON/OFF cycles		10 contact making
Mechanical endurance		30000 contact making
Input power	AC VA DC W	100 100
Protection		
• AC 24, 48, 110 V; AC 230 V		5SX4104-7; 5SX4102-7
• DC 24, 48, 110 V; DC 220 V		5SX5104-7; 5SX5102-7
Rated operating current AUTO/MANUAL switches I_e/U_e	V	AC 5 A/250 DC 0.5A/250

Article No.		3VT9300-3MF00
Number of conductors		12
Conductor cross sections S	mm^2	0.35
Conductor lengths	cm	60

[1)] For sequence of control pulses, see 2/34.

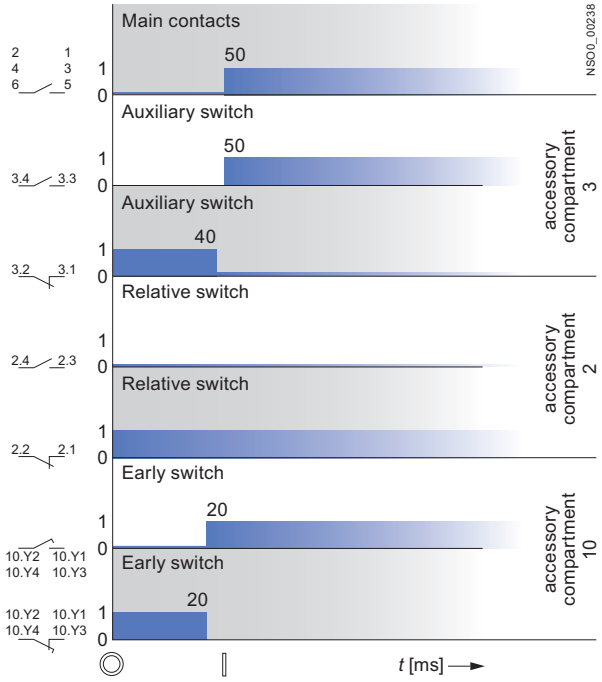
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Motorized operating mechanism

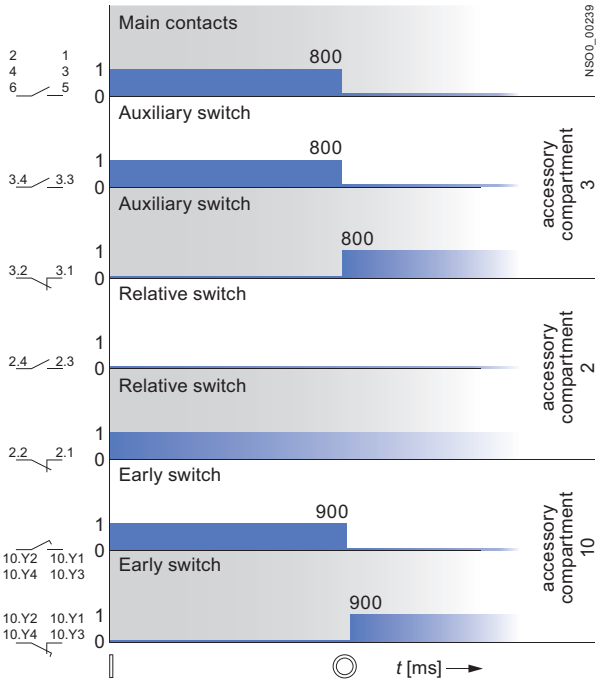
Function

Circuit breaker switched on/off by the motorized operating mechanism

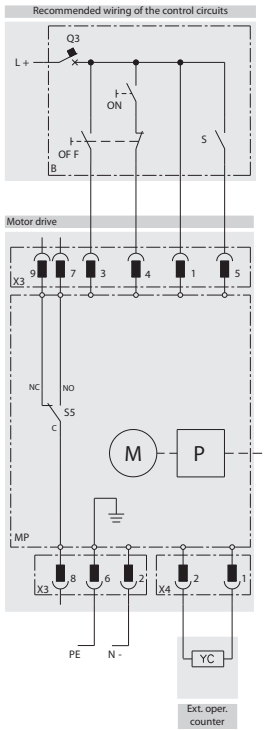
Circuit breaker switched on by the motorized operating mechanism – electrically by pushbutton ON



Circuit breaker switched off by the motorized operating mechanism – electrically by pushbutton OFF



Wiring diagram



Circuit breaker states and toggle positions of the circuit breaker

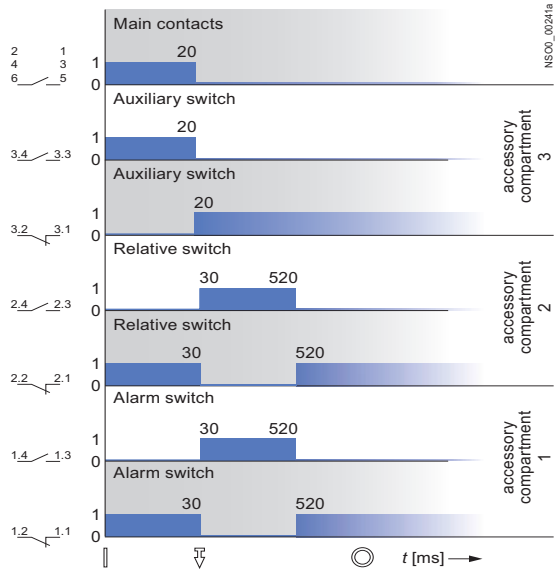
Circuit breaker state	Toggle positions of circuit breaker
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

Wiring diagram description

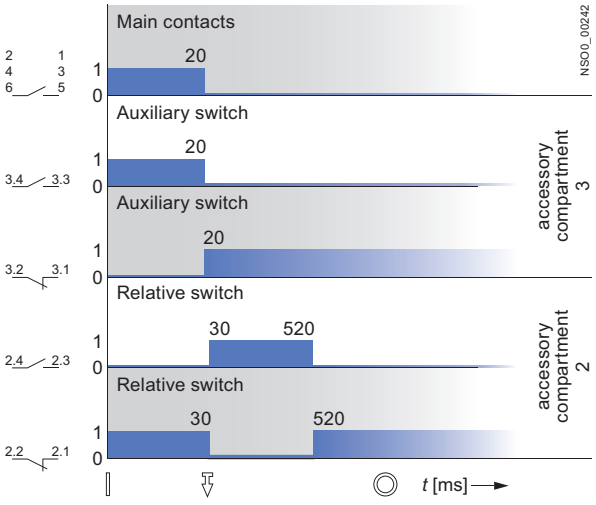
Symbol	Description
MP	3VT9200-3M..0 motorized operating mechanism
M	Motor
P	storage mechanism
X3	Connector to connect control circuits
X4	Connector for external operations counter
S5	Switch indicating AUTO/MANUAL modes
YC	external 3VT9300-3MF10 operations counter
B	recommended wiring of the control circuits (not included in operating mechanism order)
ON	make pushbutton
OFF	break pushbutton
S	Switch for energy storage (switched on = automatic storage, may be continuously switched on)
Q3	Motorized operating mechanism circuit breaker

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Tripping off the circuit breaker with motorized operating mechanism by the trip unit (switch S – automatic spring charging)

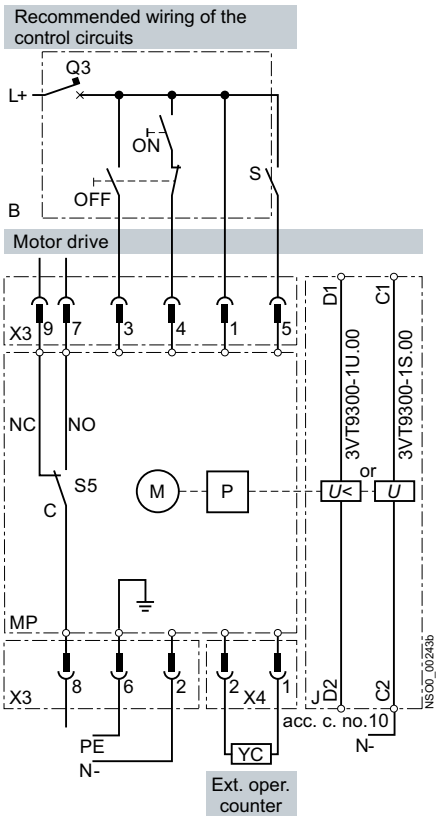


Tripping off the circuit breaker with motorized operating mechanism by a shunt trip unit or undervoltage trip unit (switch S – automatic spring charging)

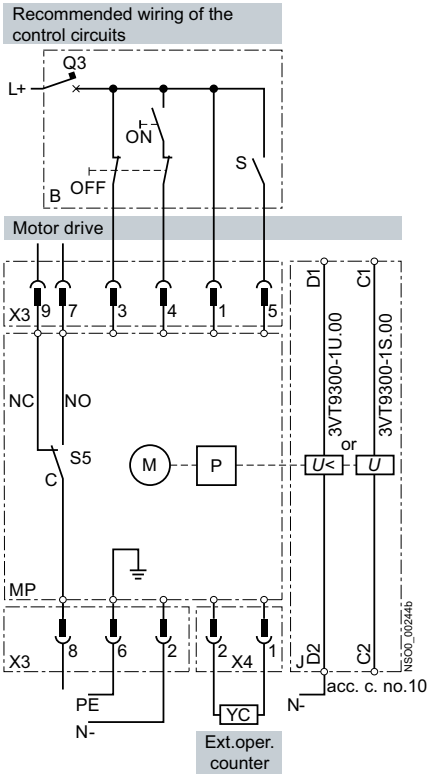


Wiring diagram

Circuit breaker switched on by the motorized operating mechanism (electrical ON signal) and switched off by the shunt trip unit



Circuit breaker switched on by motorized operating mechanism (electrical ON signal) and switched off by the undervoltage trip unit

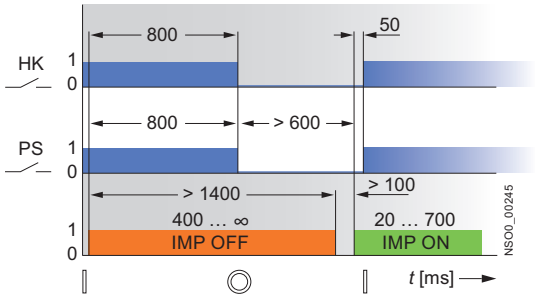


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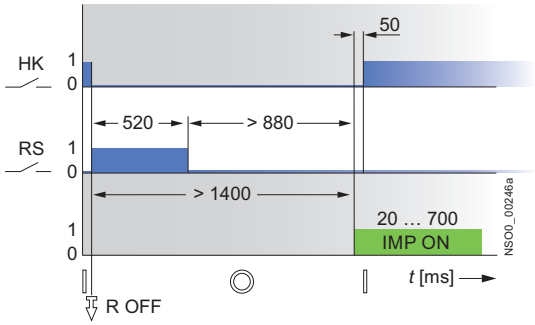
Motorized operating mechanism

Recommended actuating pulses

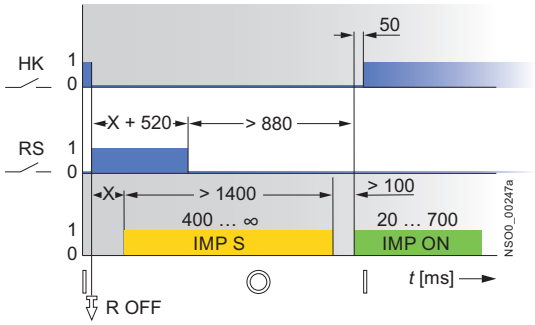
Circuit breaker switched on/off by motorized operating mechanism – switch S permanently closed (automatic spring charging) or open



Circuit breaker switched off by trip unit or shunt/undervoltage trip units and switched on by the motorized operating mechanism – switch S permanently closed (automatic spring charging)



Circuit breaker switched off by the rip unit or shunt/undervoltage trip units and switched on by the motorized operating mechanism – S switch closed only for storing



Description of charts

Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closes instantly, by trip unit
IMP S	pulse to charge spring mechanism
IMP ON	make pulse for motorized operating mechanism
IMP OFF	break pulse for motorized operating mechanism
X	random segment of time

Circuit breaker states and toggle positions of the circuit breakers

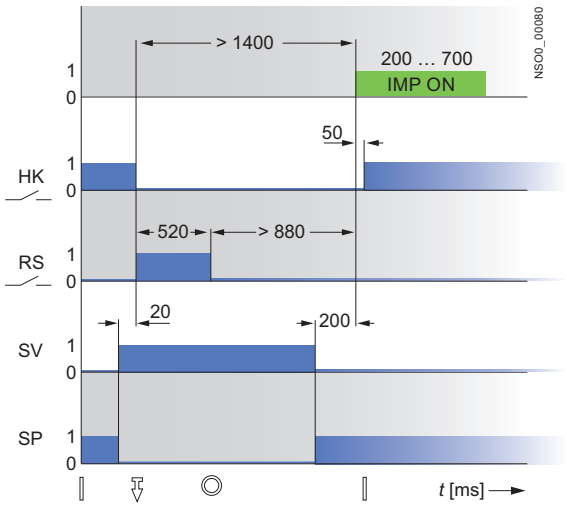
Circuit breaker state	Toggle positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

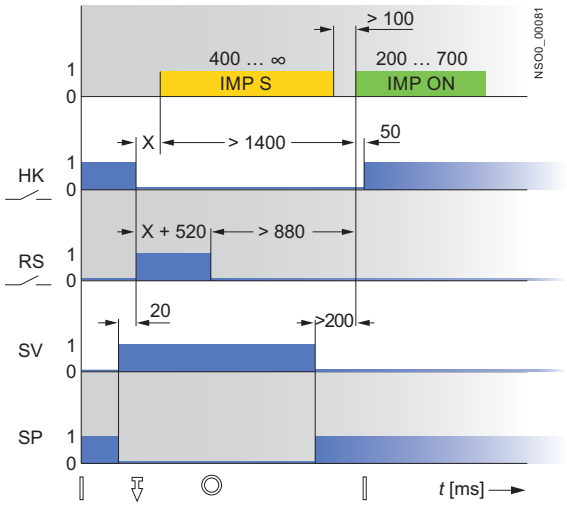
In a standby system, if a Bowden cable is used for mechanical interlocking, then an auxiliary trip unit should be used to switch the circuit breaker off. Otherwise, the first attempt of switching a standby circuit breaker may fail.

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Motorized operating mechanism

Recommended control pulses for switching of the 3VT2 circuit breakers by the motorized operating mechanism after their switching off by a shunt trip unit or undervoltage trip unit in the automatic standby system





Symbol	Description
HK	Main contacts
RS	Relative switch
SV	Pulse for shunt trip unit
SP	Pulse for undervoltage trip unit
IMP ON	Motorized operating mechanism make pulse
IMP OFF	Motorized operating mechanism storage pulse (generated by S switch)
	Switched on
	Switched off by trip units, TEST or REVISION pushbutton
	Switched off manually or by motorized operating mechanism electrically (wound up state)

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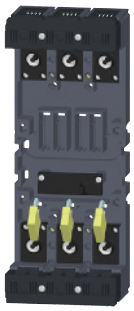
Mounting accessories for plug-in version

Overview

Plug-in bases



3VT9200-4PA30
base



Locking plug-in base against inserting the circuit breaker/disconnector

The plug-in version of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker is needed.

- The plug-in base includes complete accessories for assembling a circuit breaker/switch disconnector in plug-in design from the original fixed-mounted version
- The components of the plug-in base are:
  - supporting part of the plug-in base
  - 2 connection sets (total of 6 terminals) for fitting on to the switching unit
  - interlocking connecting rod (ensures automatic switching off of the circuit breaker for handling – inserting and removal)
  - set of mounting bolts for securing circuit breaker into plug-in base (to secure plug-in base into switchboard, a set of mounting bolts is used that is included in the scope of supply of the 3VT2725-.AA36-0AA0 switching unit.

Main circuit

- The 3VT9200-4TA30 connecting set is used for connecting with busbars or cable lugs and is included in the scope of supply of the 3VT9275-.AA36-0AA0 switching unit
- For connecting in another way, it is necessary to use connecting sets (see page 2/9)
- The type of connections must comply with our recommendations (see page 2/11).

Auxiliary circuits



These are connected using a 3VT9300-4PL00 15-wire cable.

Coding

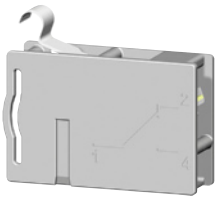
3VT9200-4WN00 coding set



The plug-in base and the circuit breaker can be provided with a coding set, which prevents inserting any other circuit breaker into the plug-in base.

Position signalling

3VT9300-4WL00 position signalling switch



The plug-in base may be provided with a maximum of four switches (for 4-pole version, max. 6 switches) for signalling the connected/removed position.

States of 3VT9300-4WL00 switches in the plug-in base according to the circuit breaker position

Accessory compartment	11 ... 14 (19, 20)[1]	
Circuit breaker position		
Connected	0	1
Removed	1	0

0 = contact open, 1 = contact closed

[1] Accessory compartments 19 and 20 are for 4-pole version only.

Technical specifications

Article No.		3VT9300-4WL00
Rated operational voltage U_e	V	AC 400 DC 250
Rated isolation voltage U_i	V	AC 500
Rated frequency f_n	Hz	50/60
Rated operational current I_e/U_e		
AC-13		3 A/400 V
DC-15		0.15 A/250 V, 3 A/125 V, 4 A/30 V
Thermal current I_{th}	A	6
Arrangement of contacts		001
Connector cross-section S	mm^2	0.5 ... 1
Terminal protection (connected switch)		IP20

A wiring diagram showing the circuit breaker situated in a plug-in mounting base and outfitted with accessories, is shown on page 2/14.

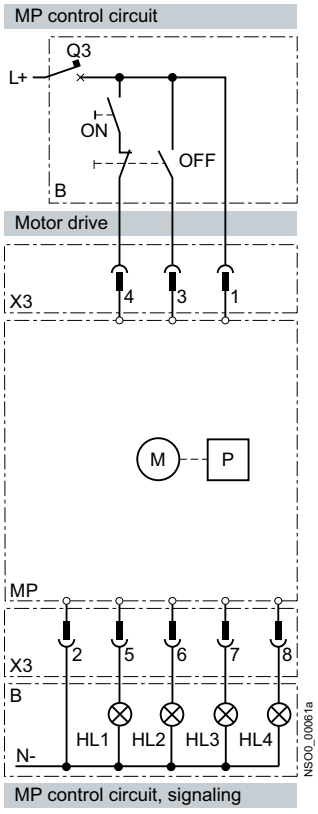
Plug-in base with motorized operating mechanism



Circuit breaker, plug-in version, with motorized operating mechanism

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Recommended wiring of the circuit breaker in plug-in design with motorized operating mechanism



Recommended process of manipulation

After every manipulation with circuit breaker in plug-in design it is necessary to accomplish the operations in following sequence, after repeated insertation into the plug-in device:



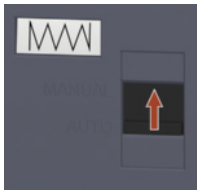
1) press the switch off button (red) on the motor operating mechanism

2) press the switch on button (green) on the motor operating mechanism

Symbol	Description
MP	3VT9300-3M..0 motorized operating mechanism
M	Motor
P	energy storage device
X3	terminal strip to connect control circuits
X4	terminal strip for external operations counter
S5	Switch indicating AUTO (NO-C)/MANUAL (NC-C) modes
YC	3VT9300-3MF10 external operations counter
B	recommended wiring of the control circuits (control circuits not included in motorized operating mechanism delivery)
ON	make pushbutton
OFF	break pushbutton
S	Switch to store energy
Q3	Motorized operating mechanism circuit breaker for AC 24 V 5SX4104-7 AC 48 V 5SX4104-7 AC 110 V 5SX4104-7 AC 230 V 5SX4102-7 DC 24 V 5SX5104-7 DC 48 V 5SX5104-7 DC 110 V 5SX5104-7 DC 230 V 5SX5104-7

Unplugging the circuit breaker with motorized operating mechanism

- Each time before removing the circuit breaker, we recommend first to turn the AUTO/MANUAL switch on the motorized operating mechanism to the MANUAL position
- More operating information is available in the operating instructions
- Not adhering to this procedure or failing to follow the recommended wiring, could mean that the circuit breaker will not successfully switch on at the first attempt.



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Mounting accessories for plug-in version

2

Changes in states of switches when inserting and withdrawing the circuit breaker

			State of switches before removing inserted position →						State of switches after removing withdrawn position					
			Accessory compartment						Accessory compartment					
			1		2		3 (4,5,6)[1]		1		2		3 (4,5,6)[1]	
	Knob position of circuit breaker	State of the main contacts	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10
														
Switched on		1	1	0	0	1	1	0	0	1	0	0	0	1
Manually switched off or switched off by motorized operating mechanism		0	1	0	0	1	0	1	1	1	0	0	0	1
Switched off by trip units		0	0	1	1	0	0	1	1	0	1	0	0	1
Switched off from switched-on state: by means of auxiliary trip unit, TEST pushbutton or by OFF pushbutton located on the motorized operating mechanism		0	1	0	1	0	0	1	1	1	0	0	0	1

0 = contact open, 1 = contact closed

[1] Accessory compartments 4, 5, 6 are for 4-pole version only.

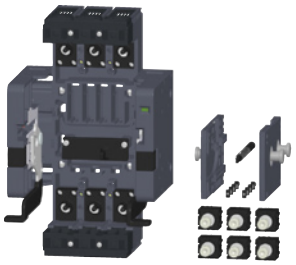
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Design

Withdrawable version mounting base



Circuit breaker installed in withdrawable version base



3VT9200-4WA30 withdrawable version base

The withdrawable version of the circuit breaker/switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker and frequent checking of the circuit are needed.

- The withdrawable version base includes all parts needed to convert a circuit breaker or switch disconnector from fixed-mounted version to withdrawable version.
- The components of the withdrawable version are:
  - supporting part of the withdrawable version
  - 2 movable side plates
  - 2 connection sets (total of 6 terminals) for fitting onto the switching unit
  - interlocking connecting rod (ensures automatic switching off of the circuit breaker for handling, inserting and withdrawing)
  - a set of mounting bolts is used to fasten the withdrawable version mounting base into the switchboard

Main circuit

- The 3VT9200-4TA30 connecting set is used for connecting with busbars or cable lugs and is included in the scope of supply of the 3VT2725-.AA36-0AA0 switching unit
- For connecting in another way, it is necessary to use connecting sets (see page 2/9)
- The type of connections must comply with our recommendations (see page 2/11).

Auxiliary circuits



These are connected using the 3VT9300-4PL00 15-wire cable.

Coding

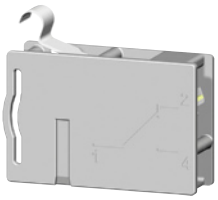
3VT9200-4WN00 coding set



The withdrawable version mounting base and the circuit breaker can be provided with a coding set, which prevents inserting another circuit breaker into the withdrawable version mounting base.

Position signalling

3VT9300-4WL00 position signalling switch



The withdrawable version can be provided with switches for signalling the position of the circuit breaker, see table.

Technical specifications

Article No.		3VT9300-4WL00
Rated operational voltage U_e	V	AC 400, AC 250
Rated isolation voltage U_i	V	AC 500
Rated frequency f_n	Hz	50/60
Rated operational current I_e/U_e		
AC-13		3 A/400 V
DC-15		0.15 A/250 V, 3 A/125 V, 4 A/30 V
Thermal current I_{th}	A	6
Arrangement of contacts		001
Connector cross-section S	mm^2	0.5 ... 1
Terminal protection (connected switch)		IP20

For wiring diagram of the circuit breaker in plug-in base with accessories, see page 2/14.

States of 3VT9300-4WL00 switches in withdrawable device according to circuit breaker and lockout positions

Circuit breaker and lockout position	Accessory compartment 11,12,13,14 (19, 20)[1]		15,17 (19, 20)[1]		16,18	
Connected and unlocked	0	1	1	0	0	1
	1	1	1	0	1	0
Withdrawn and unlocked	1	0	0	1	0	1
	1	0	0	1	1	0
Removed and unlocked	1	0	1	0	0	1
	1	0	1	0	1	0

0 = contact open; 1 = contact closed

[1] Accessory compartments 19 and 20 are for 4-pole version only.

- Operating state is always in locked-out position
- In locked-out position, it is possible to lock the withdrawable device, so that the circuit breaker cannot be switched on (for more detailed information, see "Advantages and enhanced safety for operator")

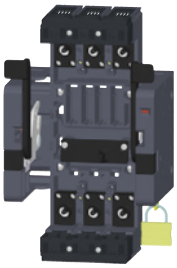
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Mounting accessories for withdrawable version

Locking



Locking the circuit breaker in withdrawable version base against tampering

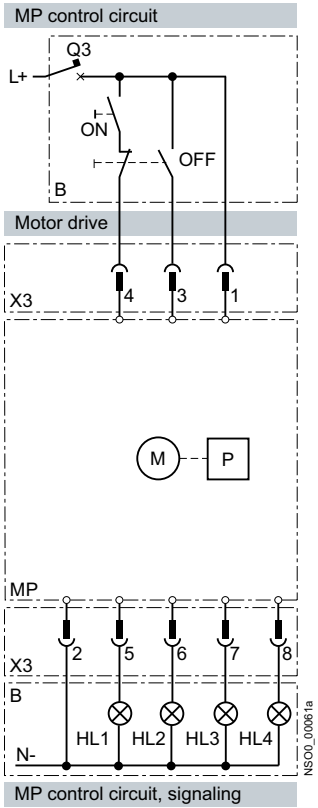


Locking the withdrawable version base against inserting the circuit breaker

Withdrawable version with motorized operating mechanism



Recommended wiring of the circuit breaker in withdrawable version with motorized operating mechanism

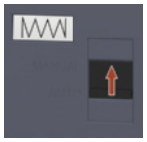


Description

Symbol	Description
MP	3VT9300-3M..0 motorized operating mechanism
M	Motor
P	energy storage device
X3	terminal strip to connect control circuits
X4	terminal strip for external operations counter
S5	Switch indicating AUTO (NO-C)/MANUAL (NC-C) modes
YC	3VT9300-3MF10 external operations counter
B	recommended wiring of the control circuits (control circuits not included in motorized operating mechanism delivery)
ON	make pushbutton
OFF	break pushbutton
S	Switch to charge spring mechanism
Q3	Motorized operating mechanism circuit breaker for AC 24 V 5SX4104-7 AC 48 V 5SX4104-7 AC 110 V 5SX4104-7 AC 230 V 5SX4102-7 DC 24 V 5SX5104-7 DC 48 V 5SX5104-7 DC 110 V 5SX5104-7 DC 230 V 5SX5104-7

Inserting and withdrawing the circuit breaker with motorized operating mechanism

- Each time before inserting or withdrawing the circuit breaker, we recommend placing the AUTO/MANUAL switch on the motorized operating mechanism to MANUAL position
- More operating information is available in the operating instructions
- Not adhering to this procedure or failing to follow the recommended wiring, could mean that the circuit breaker will not successfully switch on at the first attempt.



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Switches in the accessory compartments of the switching unit

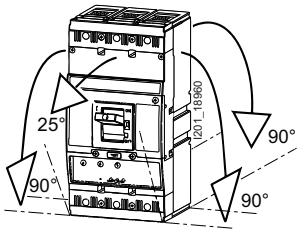
Changes in states of the switches when inserting and withdrawing the circuit breaker

			State before inserted/withdrawn position						State after inserted/withdrawn position					
Circuit breaker before insertion			State of switches before insertion - withdrawn position →						State of switches after insertion - connected position					
Circuit breaker before withdrawal			State of switches before withdrawal - connected position →						State of switches after withdrawal - withdrawn position					
Accessory compartment			1		2		3 (4,5,6)[1]		1		2		3 (4,5,6)[1]	
	Knob position of circuit breaker	State of the main contacts	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10
Switched on		1	1	0	0	1	1	0	1	0	1	0	0	1
Manually switched off or by motorized operating mechanism		0	1	0	0	1	0	1	1	0	1	0	0	1
Switched off by trip units		0	0	1	1	0	0	1	0	1	1	0	0	1
Switched off from switched-on state: by means of auxiliary trip unit, TEST pushbutton or by OFF push-button on the motorized operating mechanism		0	1	0	1	0	0	1	1	0	1	0	0	1

0 = contact open, 1 = contact closed

[1] Accessory compartments 4, 5, 6 are for 4-pole version only.

Installation positions: fixed, plug-in and withdrawable design



Installation positions

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Insulating barriers and terminal covers

Overview

Use of insulating barriers and terminal covers with circuit breakers and switch disconnectors

Fixed-mounted version

Front connection

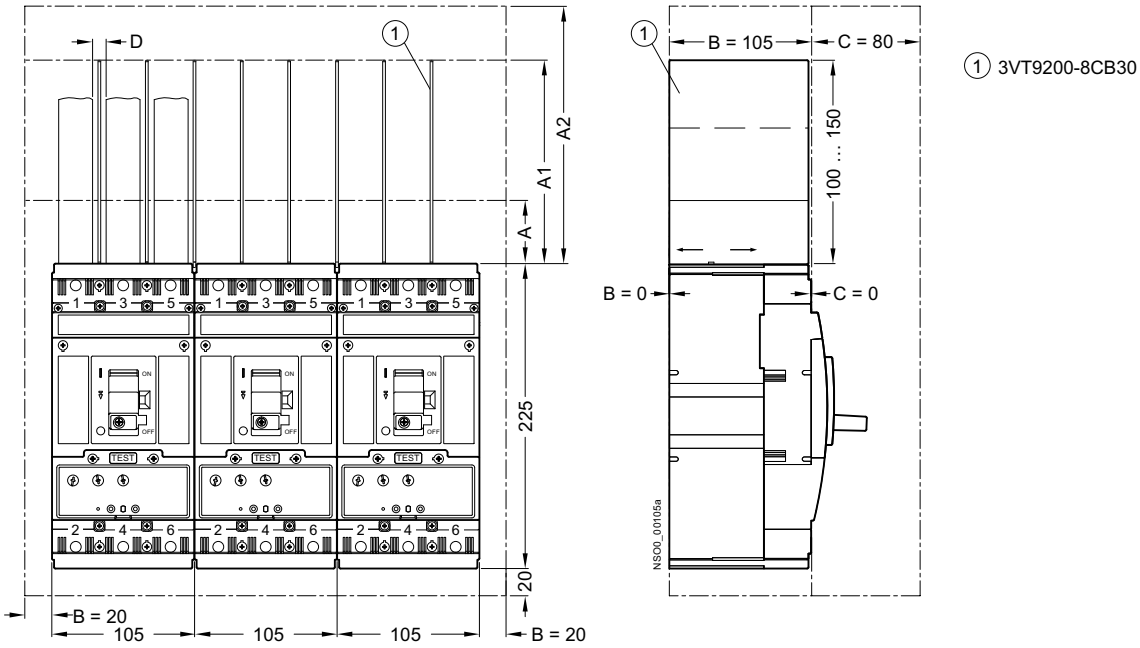
- Terminals 1, 3, 5
  - If U_e = AC 415 V, it is necessary to use 3VT9300-8CE30 insulating barriers or 3VT9200-8CB30 terminal covers.
  - If insulated conductors are not used for connecting the main circuit to terminals 1, 3, 5, flexibars or rear connection, it is necessary to use 3VT9300-8CE30 insulating barriers or a 3VT9200-8CB30 terminal cover.
- Terminals 2, 4, 6
  - If the circuit breaker/switch disconnector is connected to the source with terminals 2, 4, 6 and if U_e = AC 415 V, it is necessary to use 3VT9300-8CE30 insulating barriers or a 3VT9200-8CB30 terminal cover.
  - If insulated conductors are not used for connecting the main circuit to terminals 2, 4, 6, and flexibars or rear connections are not used, then it is necessary to use 3VT9300-8CE30 insulating barriers or 3VT9200-8CB30 terminal covers.

Rear connection

- Neither insulating barriers nor terminal covers have to be used.

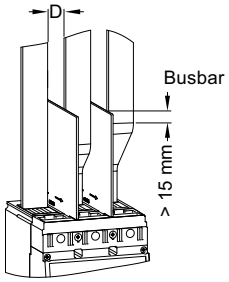
Plug-in and withdrawable versions

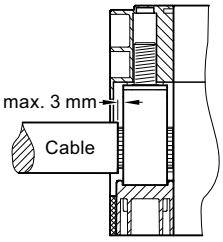
Neither insulating barriers nor terminal covers have to be used.

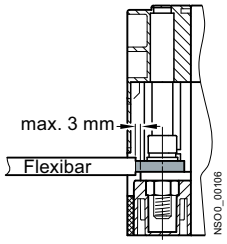


A	Minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for connections using insulated conductors, cables, flexibars or with rear connection)
A1	Minimum insulation length of bare conductors (using 3VT9300-8CE30 insulating barriers from 50 mm to max. 100 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)
A2	Minimum distance: • between circuit breaker/switch disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars) • between circuit breaker/switch disconnector and busbar • between two circuit breaker/switch disconnectors situated vertically above one another • between uninsulated connections of two circuit breakers/switch disconnectors above one another
B, C	Minimum distance between circuit breaker/switch disconnector and uninsulated earthed wall
D	Minimum distance between uninsulated conductors

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AC U_e			230 V	415 V		500 V	690 V
3VT2 H wired with I_k [1]			≤ 100 kA	> 36 ... 65 kA	≤ 36 kA	≤ 25 kA	≤ 13 kA
3VT2 N wired with I_k			≤ 60 kA		≤ 36 kA	≤ 16 kA	≤ 10 kA
C < 80 mm		A (mm)	50	50	50	50	50
	D ≥ 10 mm	A1 (mm)	100	150	100	150	150
		A2 (mm)	200	250	200	250	250
		A (mm)	50	50	50	50	50
	D ≥ 30 mm	A1 (mm)	100	150	100	150	150
		A2 (mm)	150	200	150	200	200
C ≥ 80 mm		A (mm)	50	50	50	50	50
	D ≥ 10 mm	A1 (mm)	100	150	100	150	150
		A2 (mm)	150	200	150	200	200

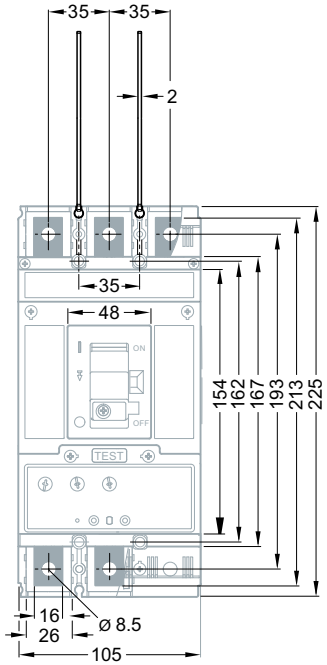
[1] I_k = max. short-circuit current in the protected circuit (rms).

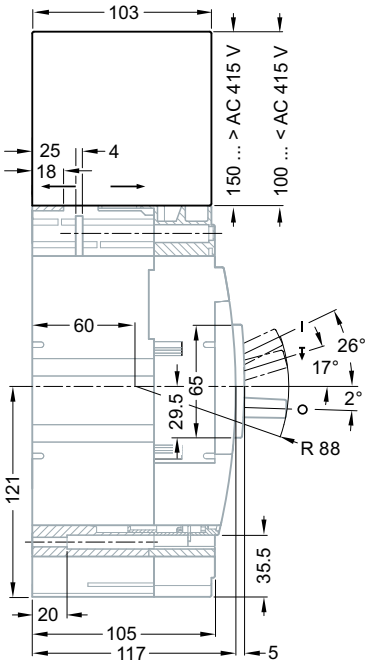
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Dimensional drawings

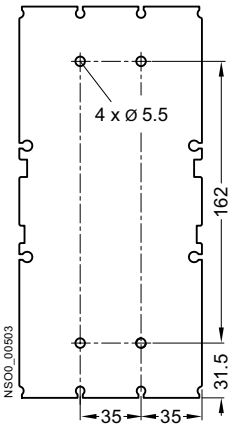
Dimensional drawings - 3-pole, fixed-mounted version

Fixed-mounted version, front connection

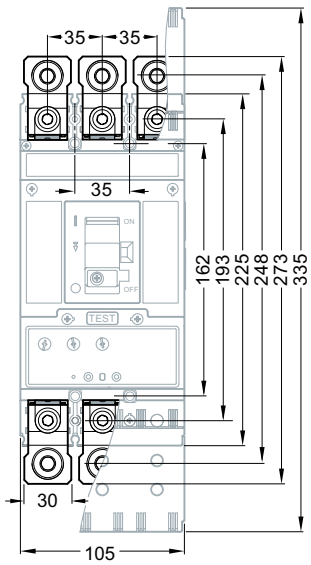


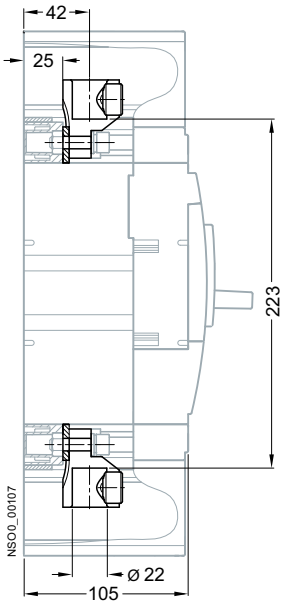


Drilling pattern



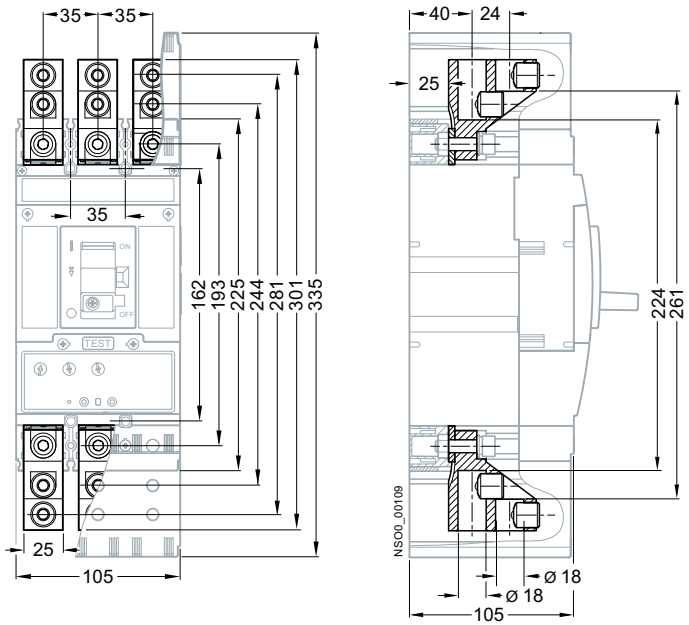
Fixed-mounted version, front connection (3VT9224-4TD30 connecting set)



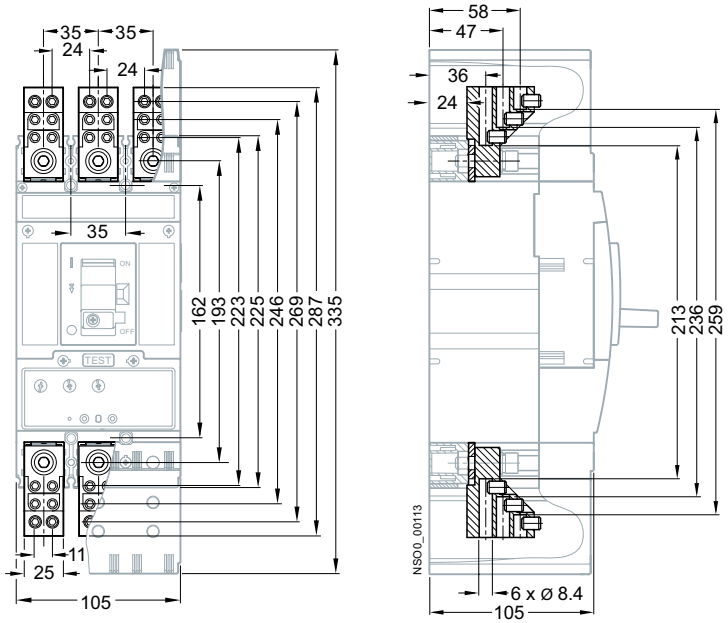


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Fixed-mounted version, front connection (3VT9215-4TF30 connecting set)



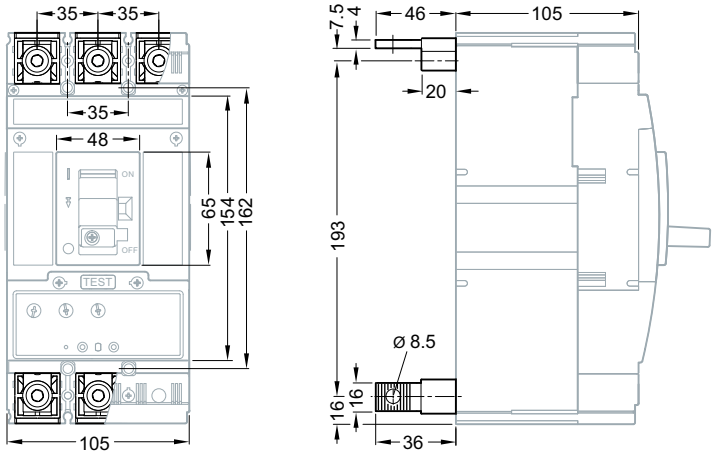
Fixed-mounted version, front connection (3VT9203-4TF30 connecting set)



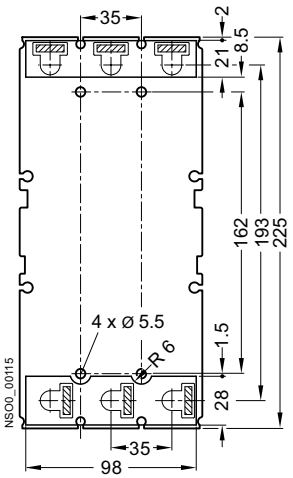
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Dimensional drawings

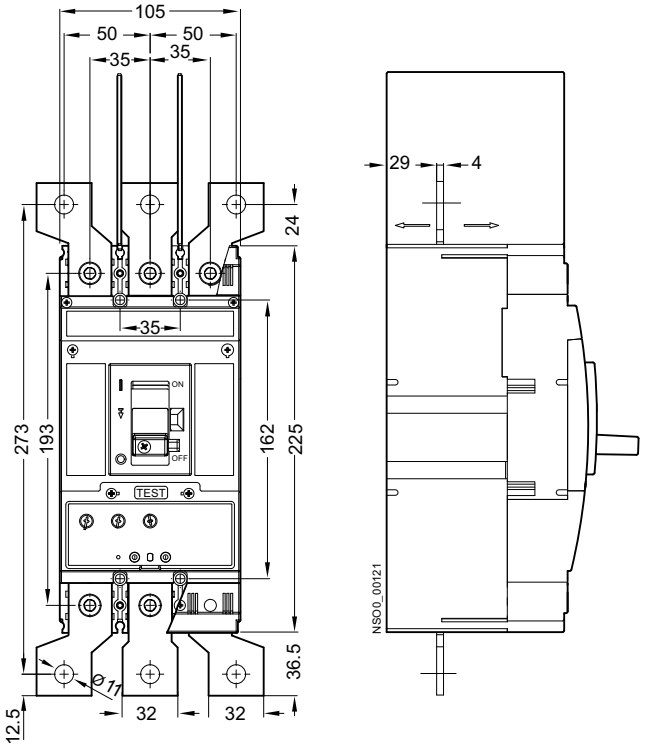
Fixed-mounted version, rear connection (3VT9200-4RC30 connecting set)



Drilling pattern

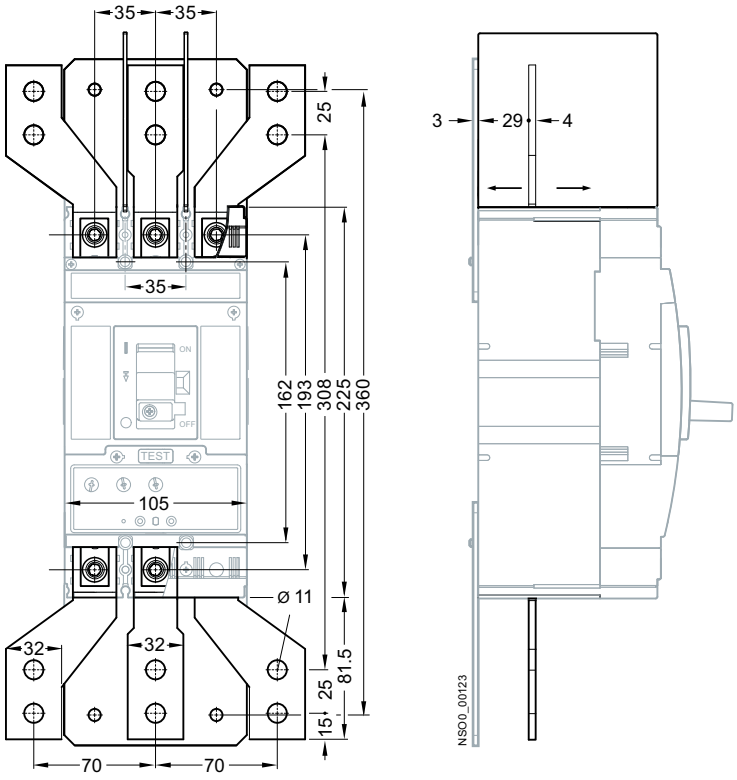


Fixed-mounted version, front connection (3VT9200-4ED30 connecting set)

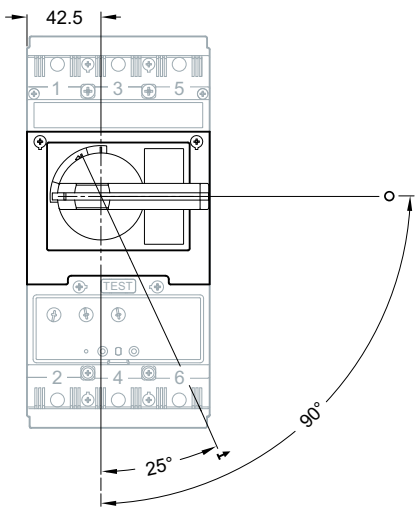


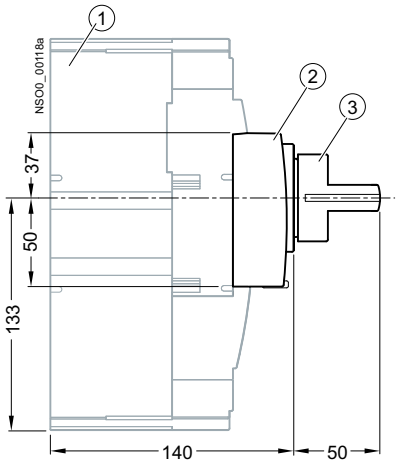
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Fixed-mounted version, front connection (3VT9200-4EE30 connecting set)



Fixed-mounted version, with rotary operating mechanism



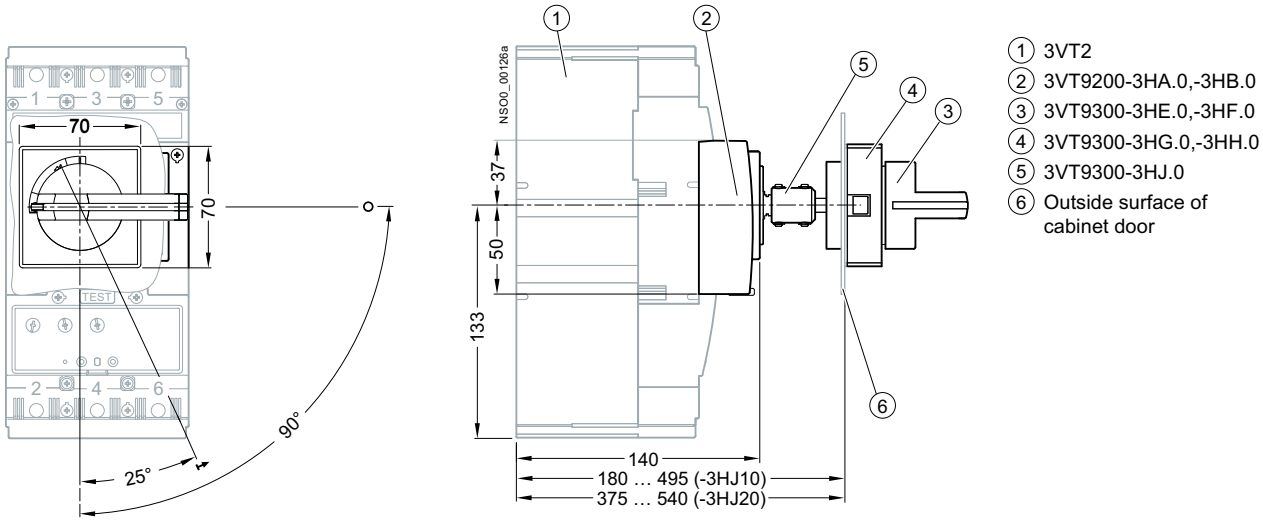


1 3VT2
2 3VT9200-3HA.0,-3HB.0
3 3VT9300-3HE.0,-3HF.0

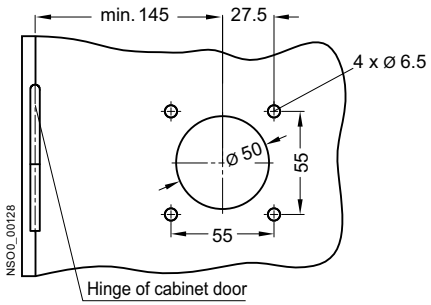
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Dimensional drawings

Fixed-mounted version, rotary operating mechanism with adjustable knob

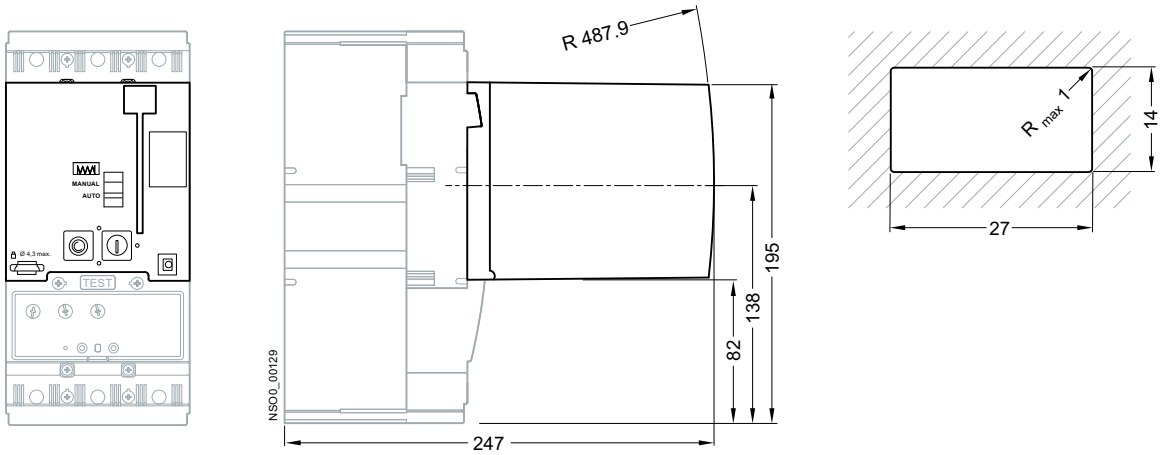


Cabinet door cut-out



Fixed-mounted version, 3VT9200-3M..0 motorized operating mechanism

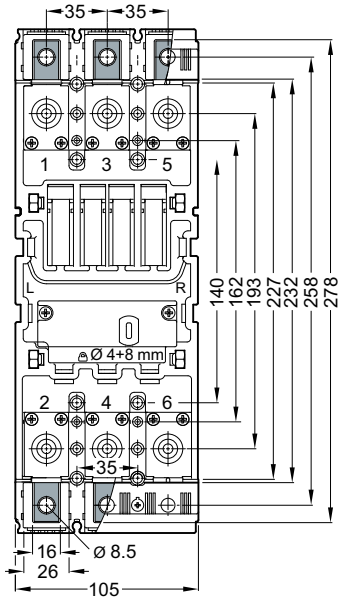
Opening dimensions in switchgear door for external operation cycle

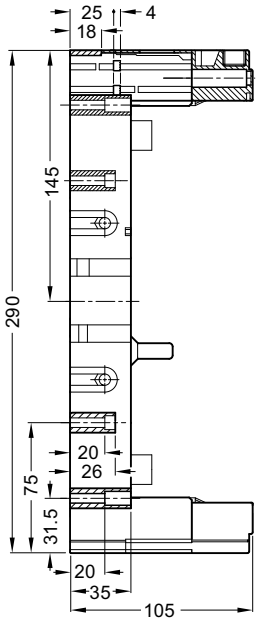


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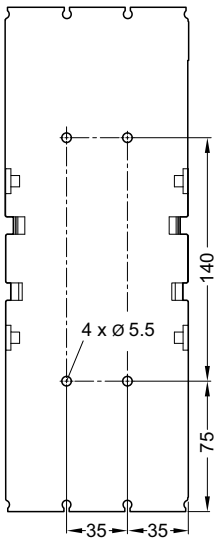
Dimensional drawings - 3-pole, plug-in version

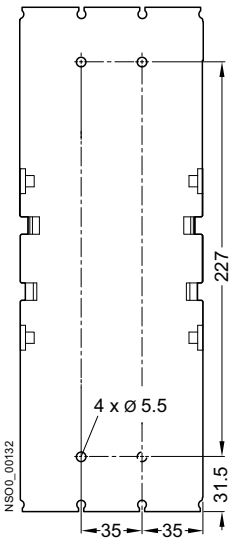
Plug-in base 3VT9200-4PA30





Drilling patterns

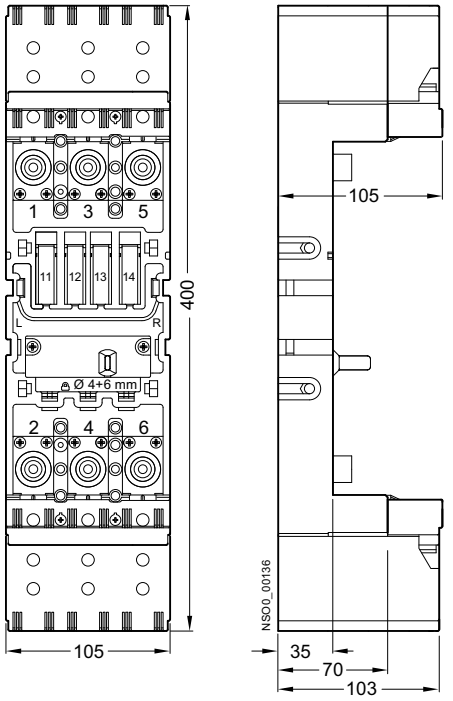




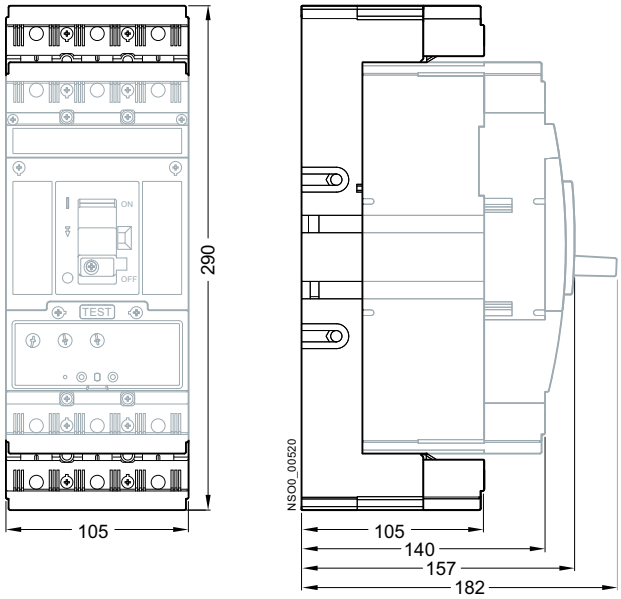
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Dimensional drawings

Plug-in base, 3VT9200-8CB30 terminal cover

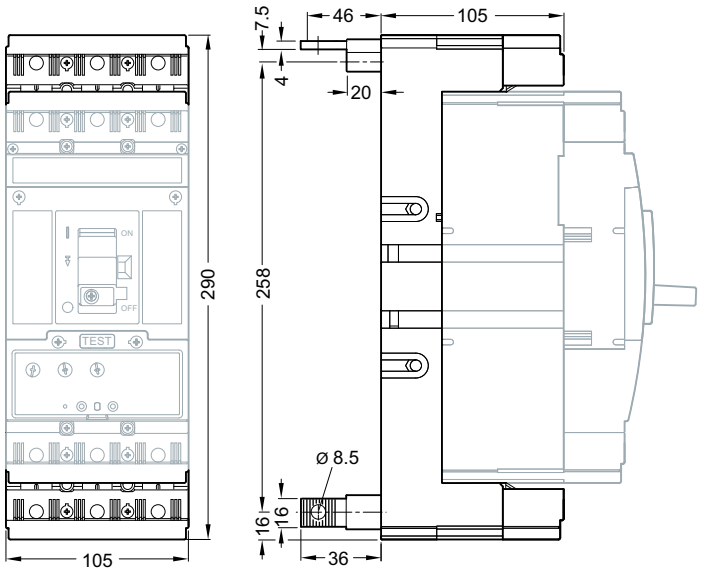


Plug-in version

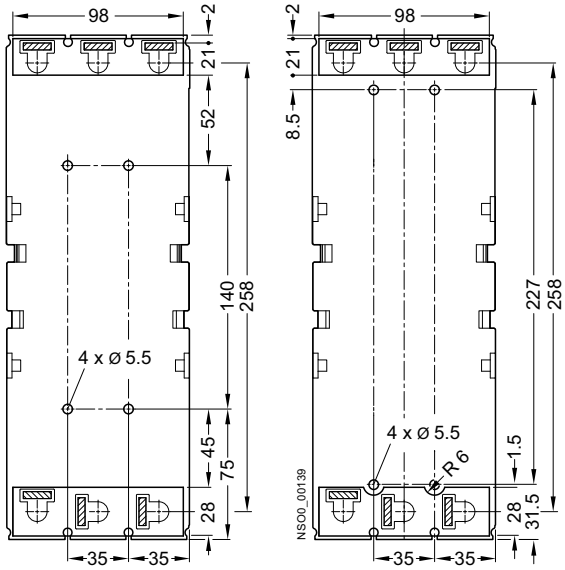


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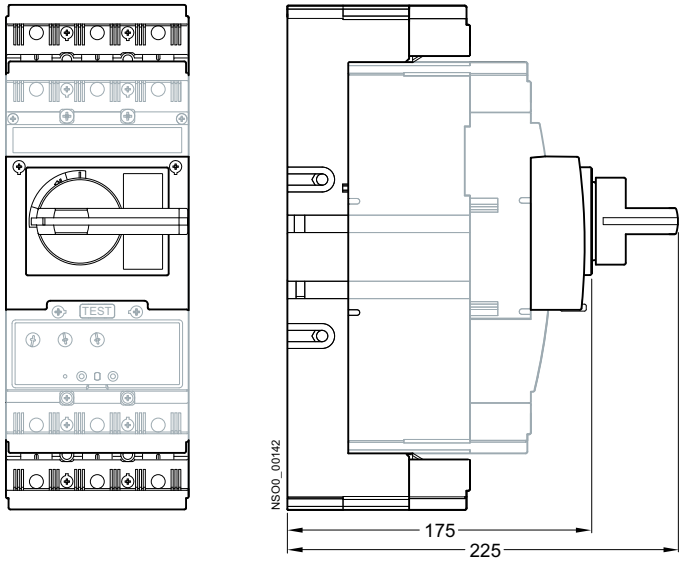
Plug-in version



Drilling patterns



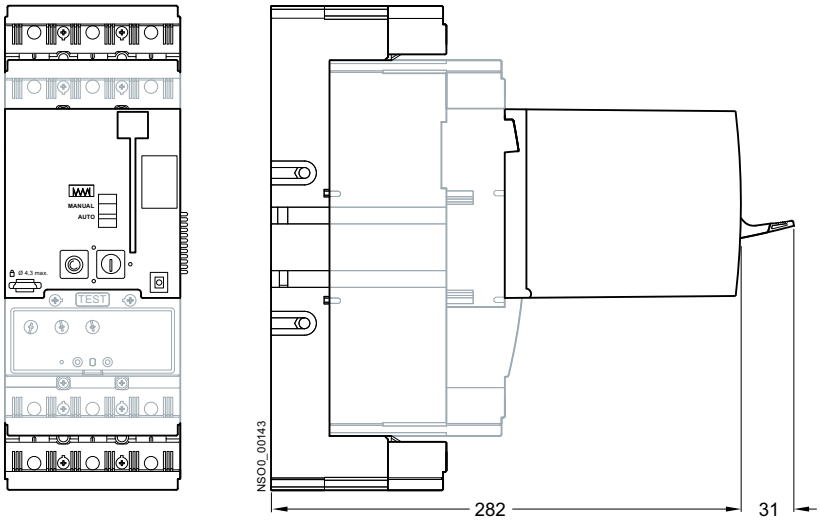
Plug-in version, rotary operating mechanism



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Dimensional drawings

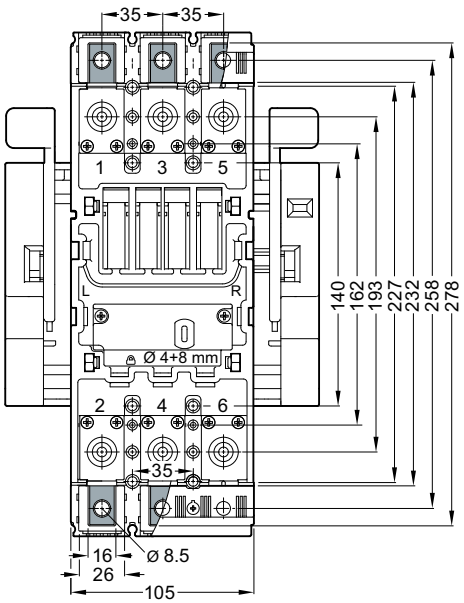
Plug-in version, 3VT9200-3M..0 motorized operating mechanism

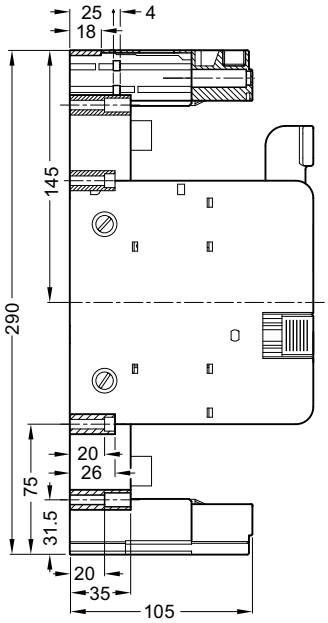


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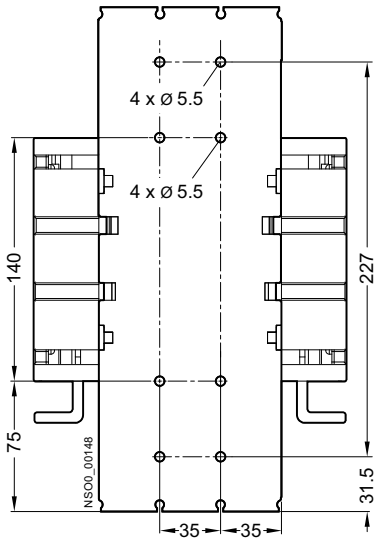
Dimensional drawings - 3-pole, withdrawable version

Withdrawable version 3VT9200-4WA30

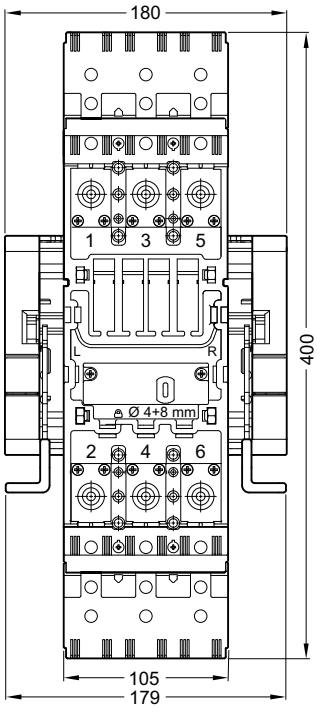


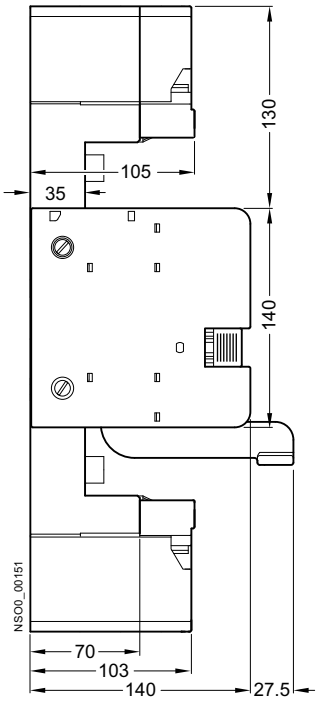


Drilling patterns



Withdrawable version, 3VT9200-8CB30 terminal cover



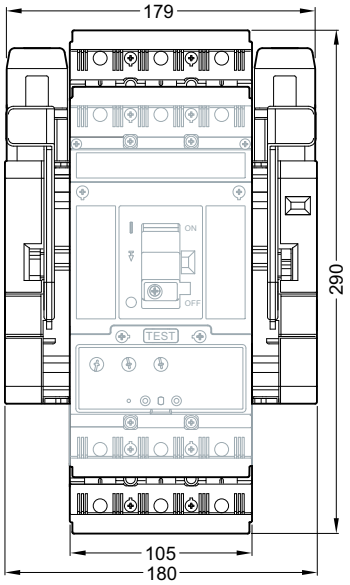


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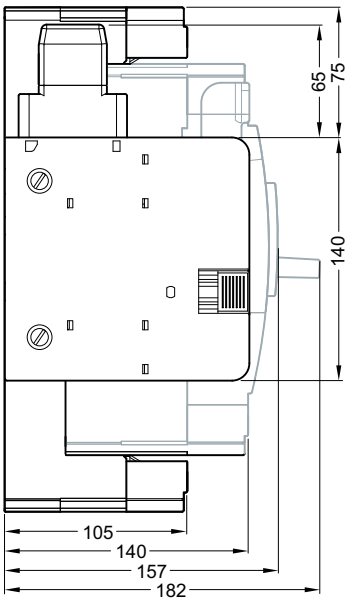
Dimensional drawings

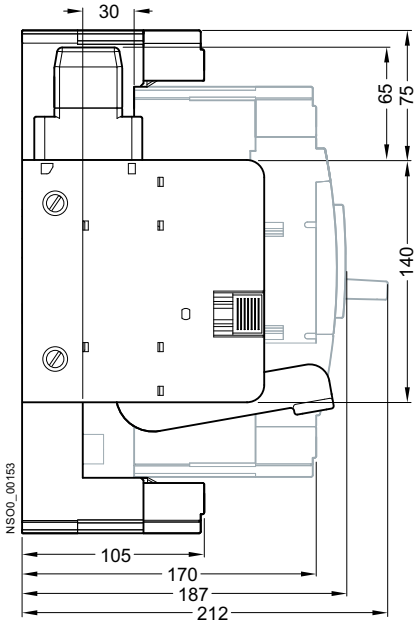
Withdrawable version

Operating position



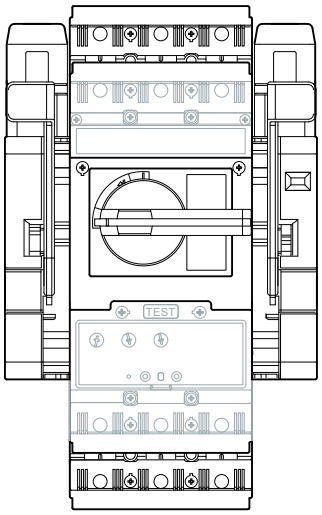
Maintenance position



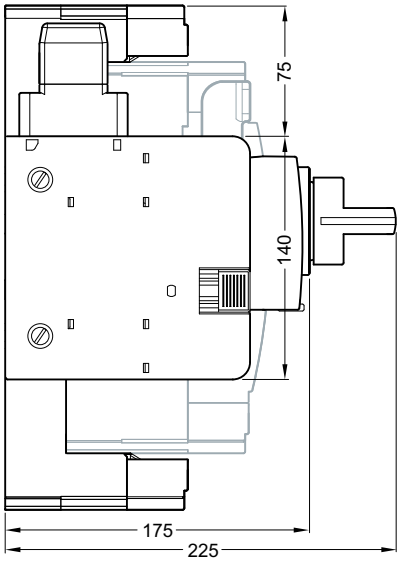


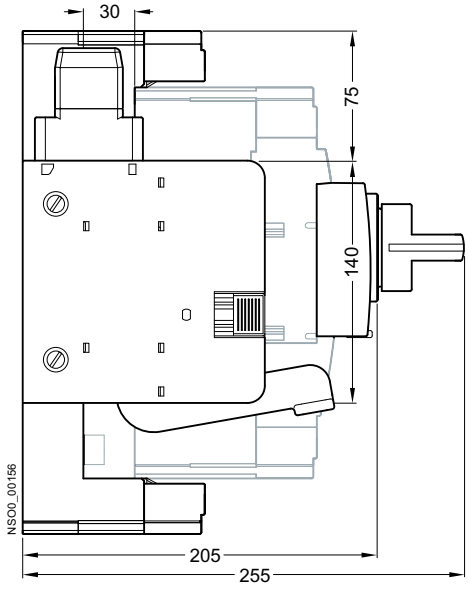
Withdrawable version, rotary operating mechanism

Operating position



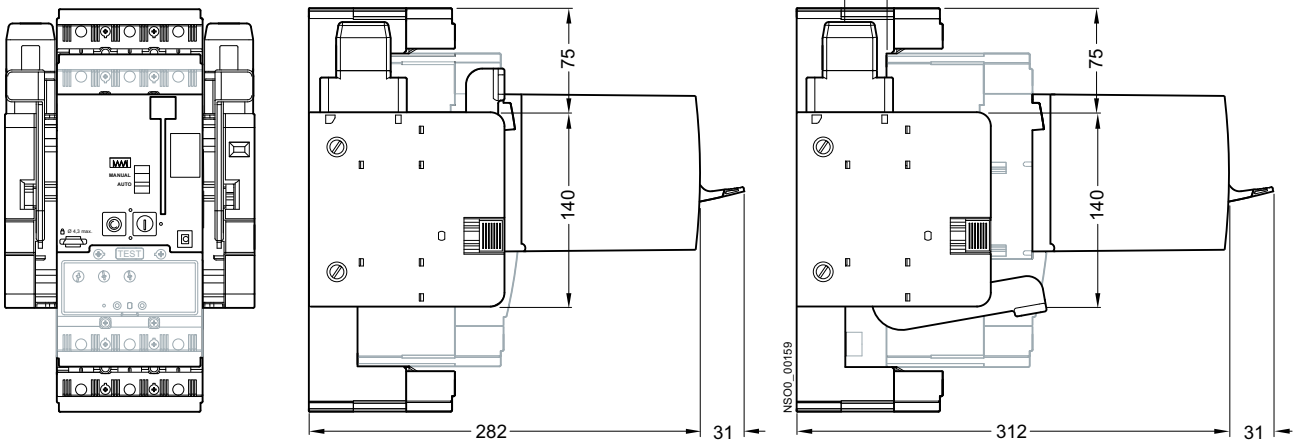
Maintenance position



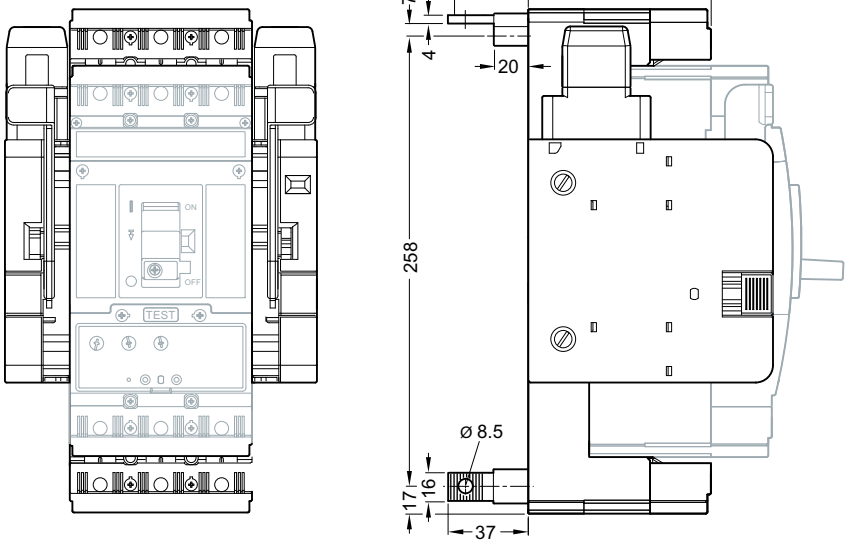


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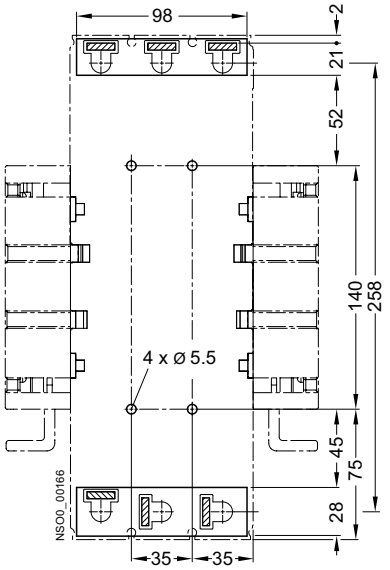
Withdrawable version, 3VT9200-3M..0 motorized operating mechanism



Withdrawable device, rear connection (3VT9200-4RC00 connecting sets)



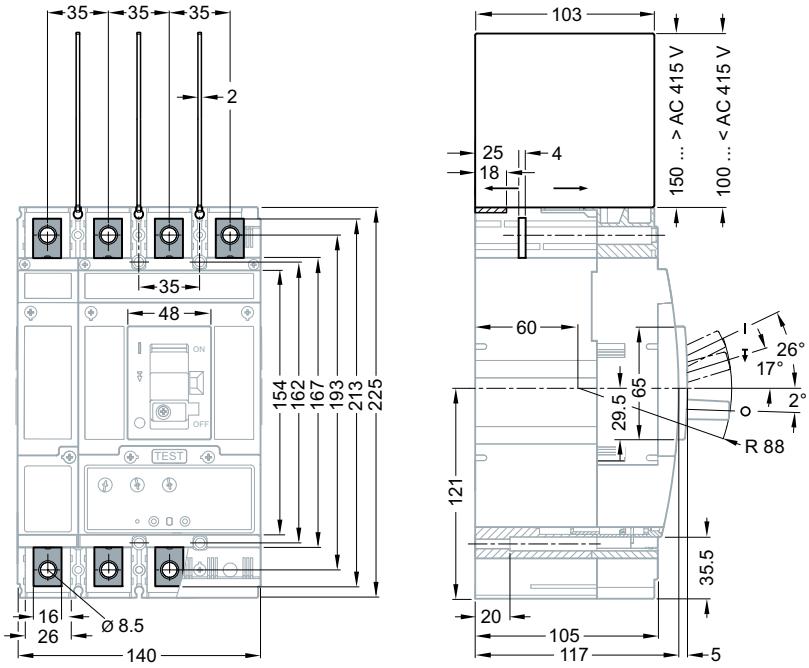
Drilling pattern



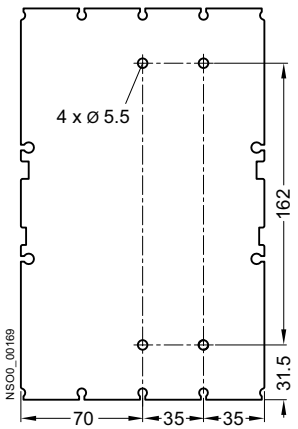
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Dimensional drawings

Withdrawable device, rear connection (3VT9200-4RC00 connecting sets)



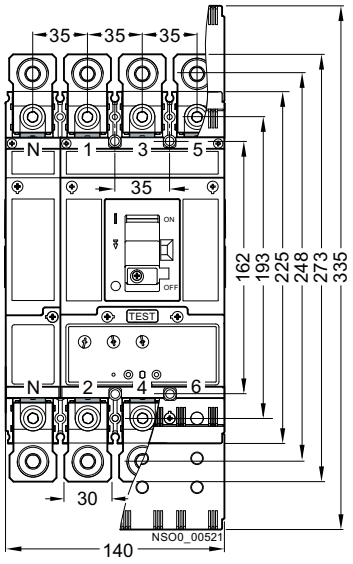
Drilling pattern



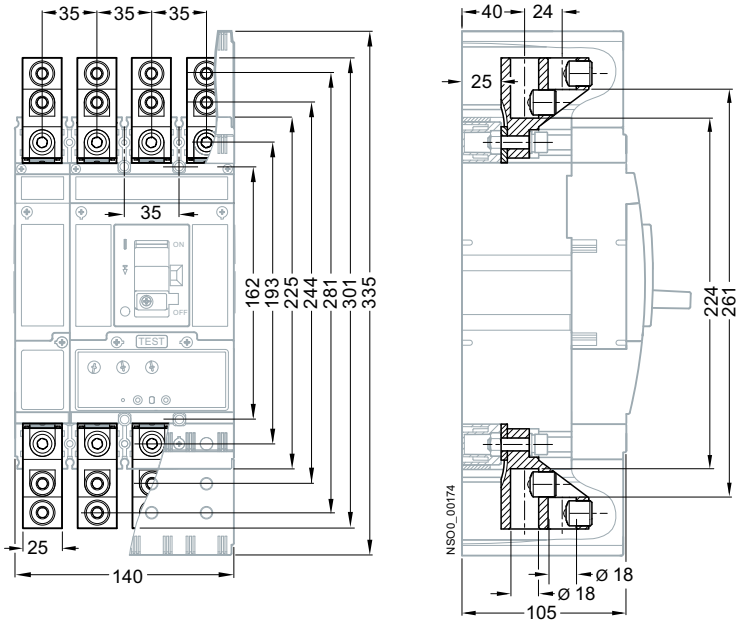
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Dimensional drawings - 4-pole, fixed-mounted version

Fixed-mounted version, front connection (connecting set 3VT9224-4TD30 + 3VT9224-4TD00)



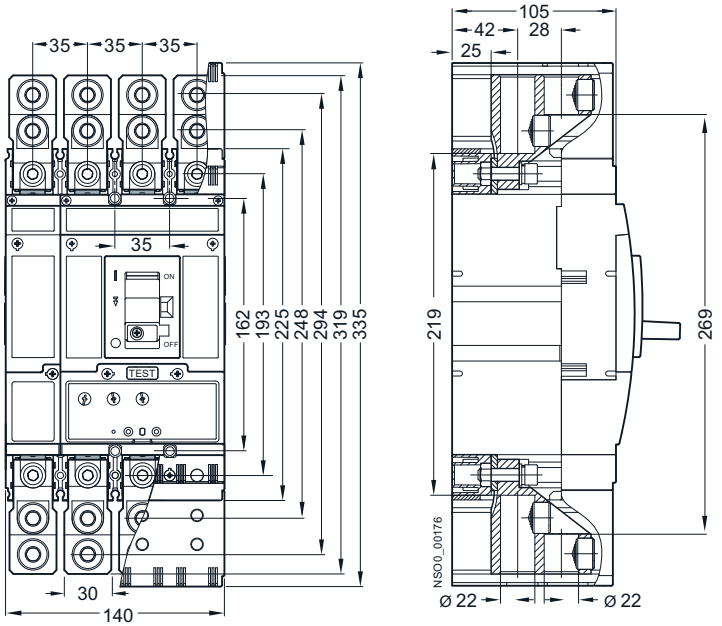
Fixed-mounted version, front connection (connecting set 3VT9215-4TF30 + 3VT9215-4TF00)



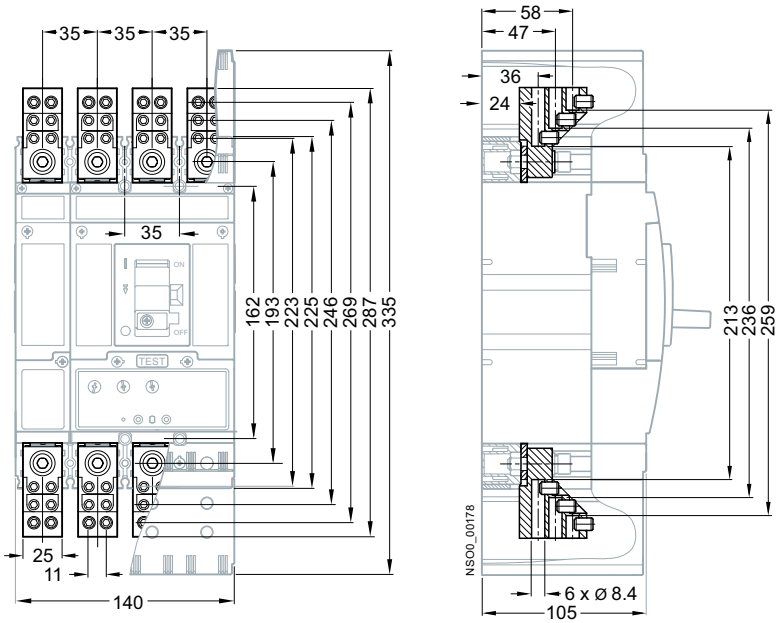
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Dimensional drawings

Fixed-mounted version, front connection (connecting set 3VT9224-4TF30 + 3VT9224-4TF00)

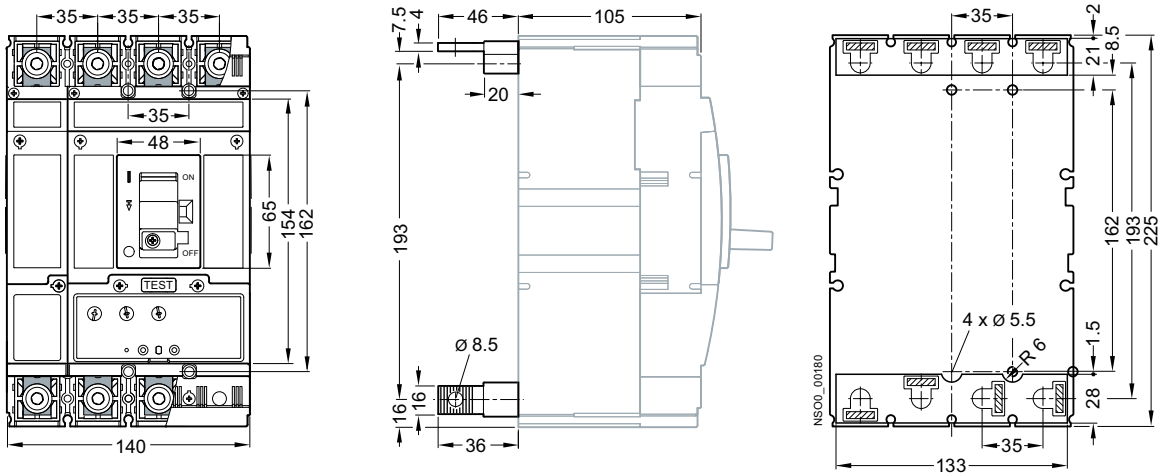


Fixed-mounted version, front connection (connecting set 3VT9203-4TF30 + 3VT9203-4TF00)

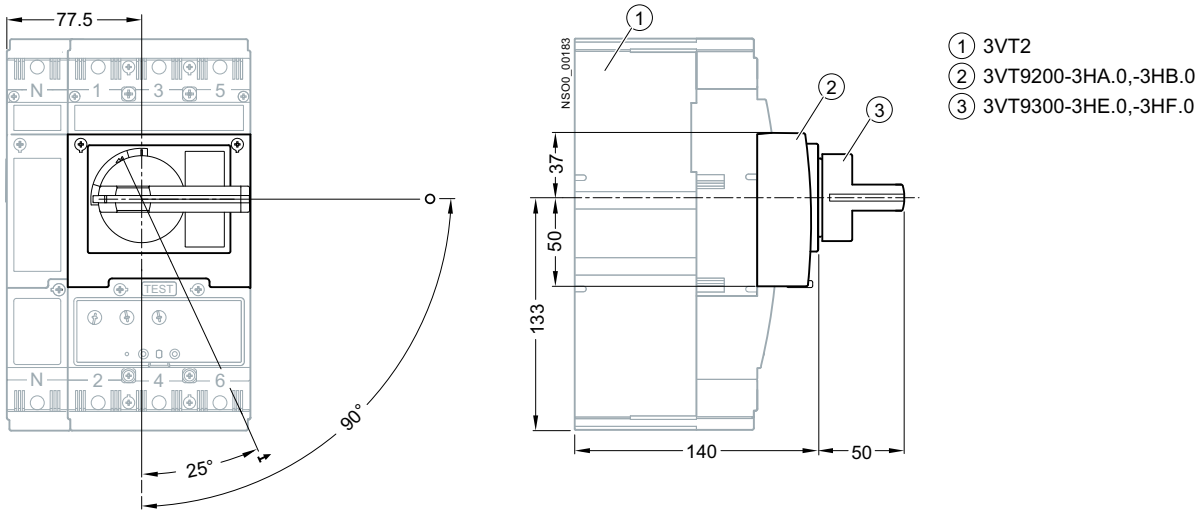


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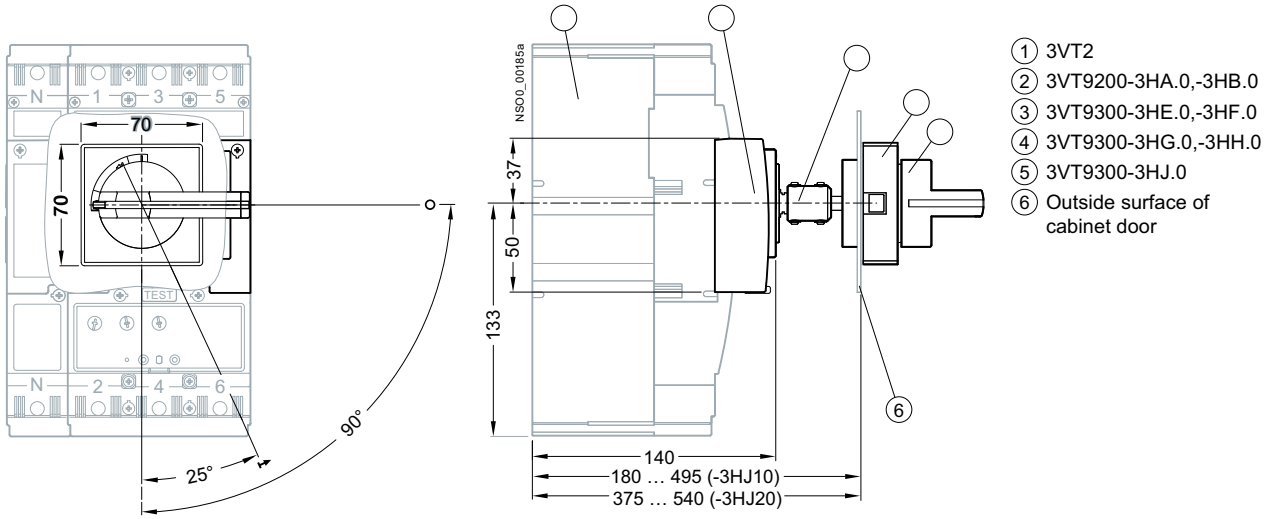
Fixed-mounted version, front connection (connecting set 3VT9215-4TF30 + 3VT9215-4TF00)



Fixed-mounted version, with rotary operating mechanism



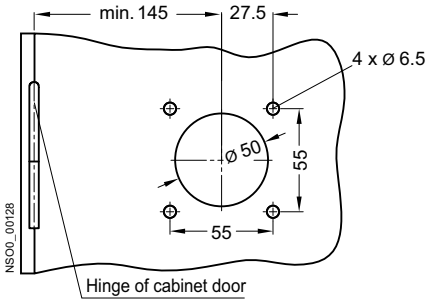
Fixed-mounted version, rotary operating mechanism with adjustable knob



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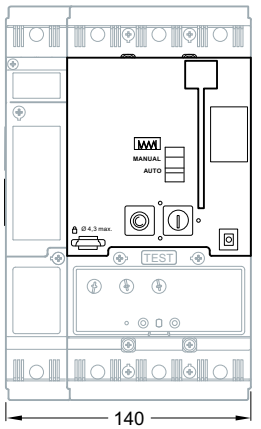
Dimensional drawings

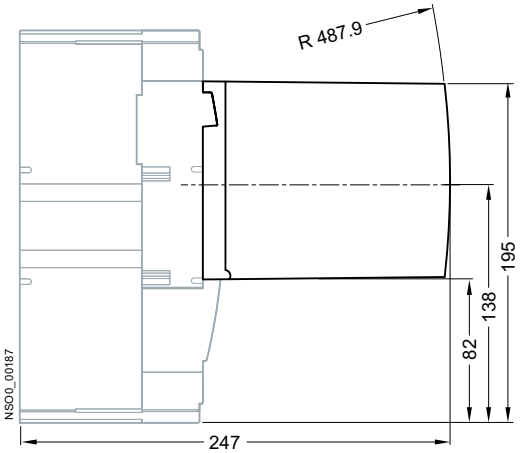
Cabinet door cut-out

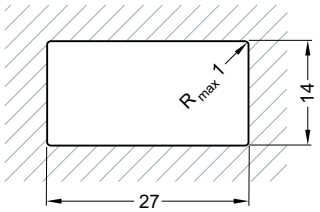


Fixed-mounted version, 3VT9200-3M..0 motorized operating mechanism

Opening dimensions in switchgear door for external operation cycle



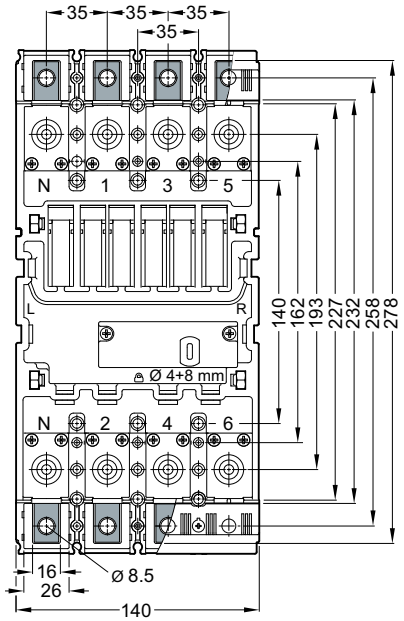


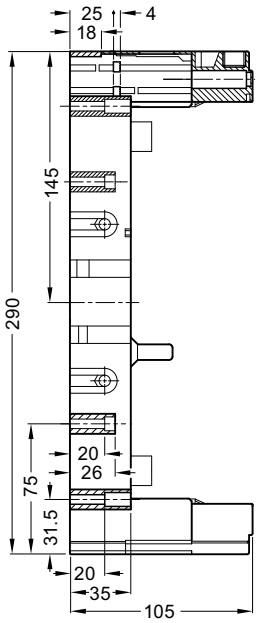


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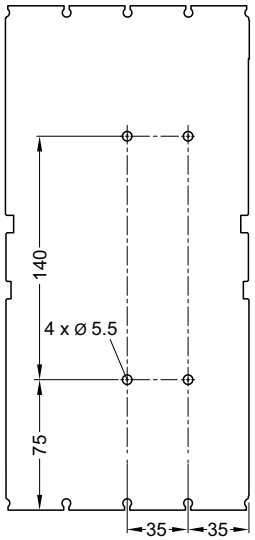
Dimensional drawings - 4-pole, plug-in version

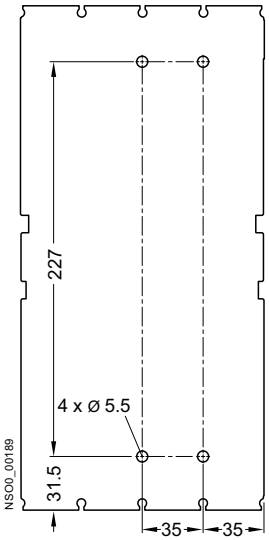
Plug-in base 3VT9200-4PA40



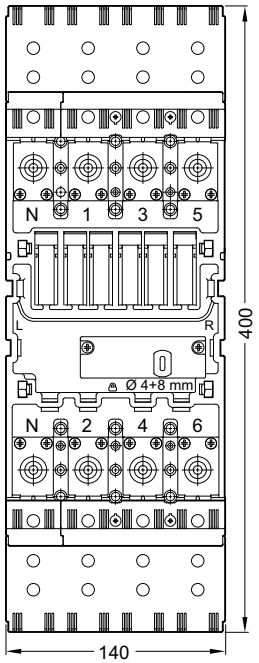


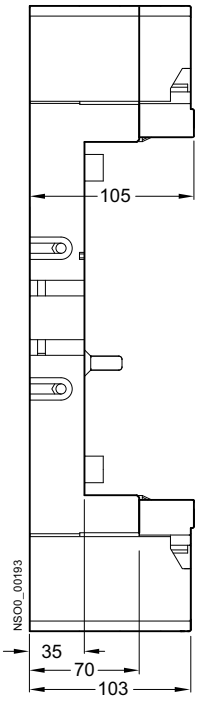
Drilling patterns





Plug-in base, 3VT9200-8CB40 terminal cover

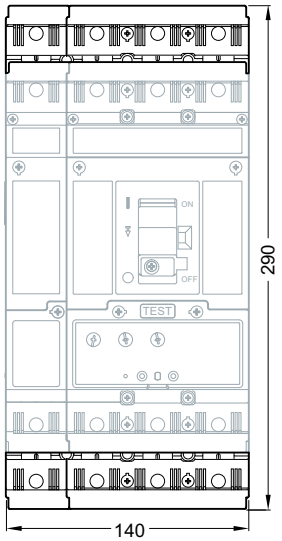


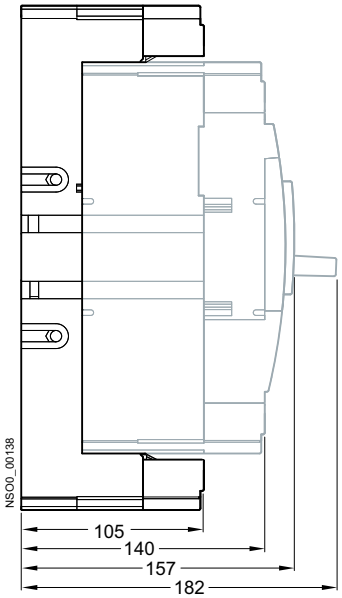


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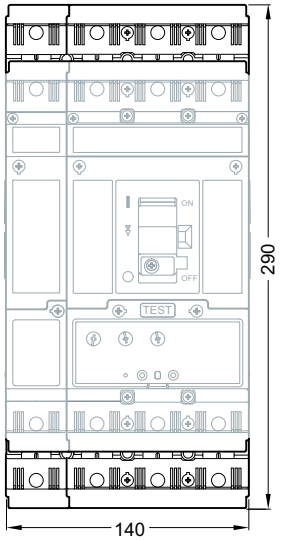
Dimensional drawings

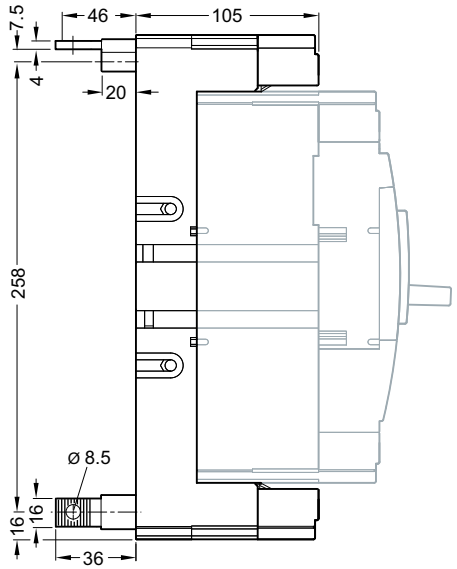
Plug-in version



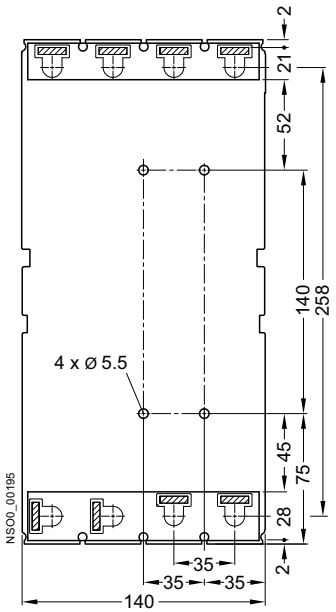


Plug-in version, rear connection
(connecting set 3VT9200-4RC30 + 3VT9200-4RC00)



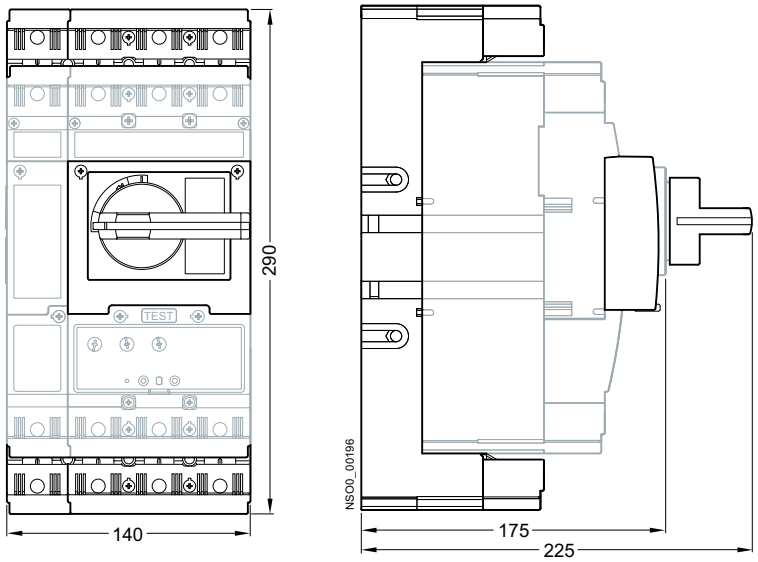


Drilling pattern

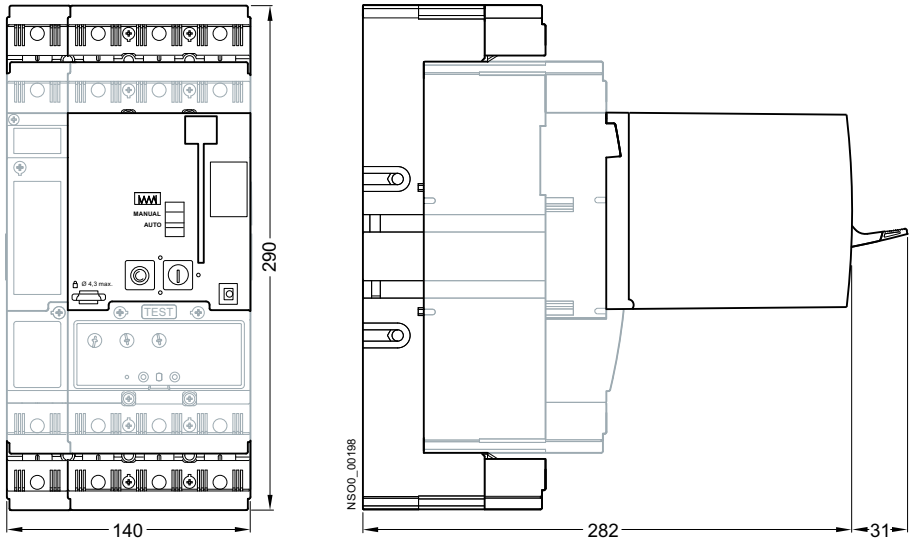


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Plug-in version, rotary operating mechanism



Plug-in version, 3VT9200-3M..0 motorized operating mechanism

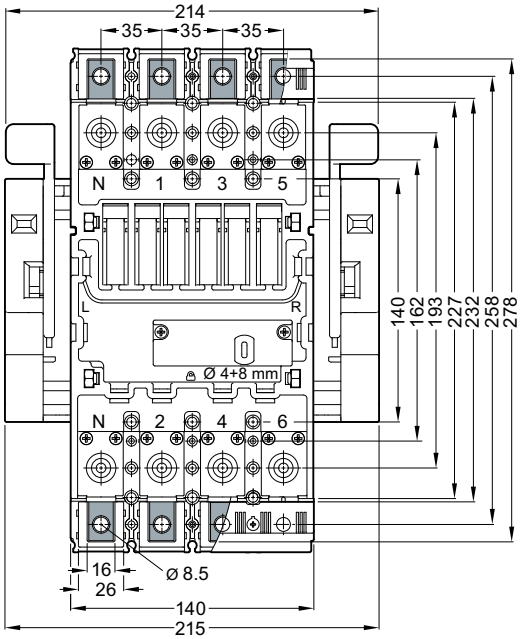


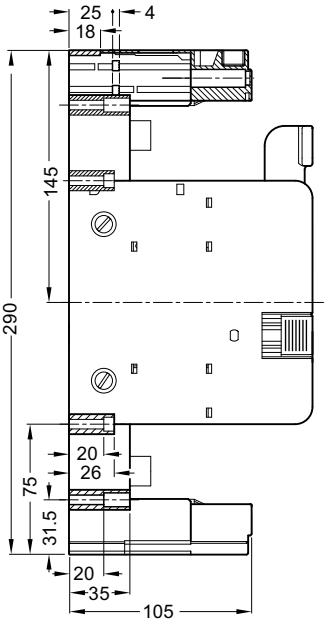
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Dimensional drawings

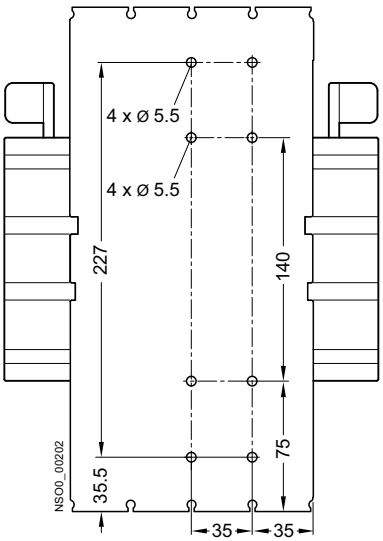
Dimensional drawings - 4-pole, withdrawable version

Withdrawable version, 3VT9200-4WA40

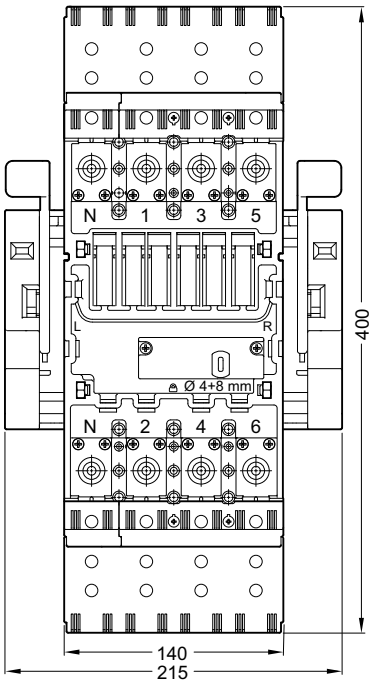


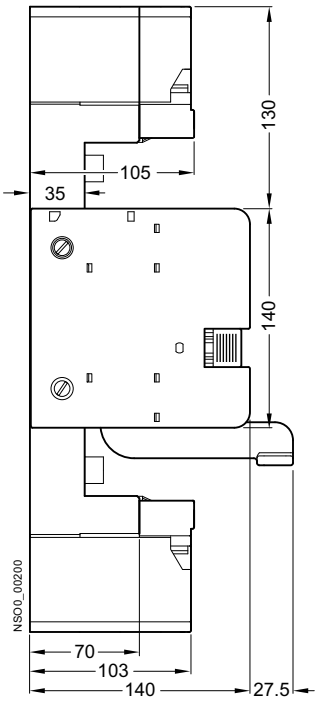


Drilling pattern



Withdrawable version, 3VT9200-8CB40 terminal cover

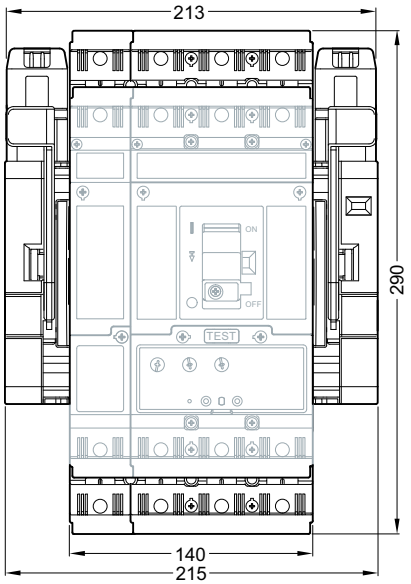




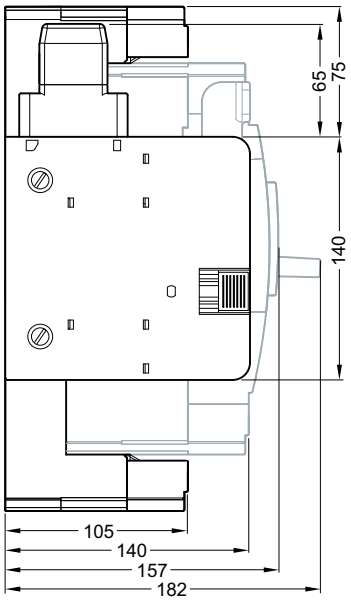
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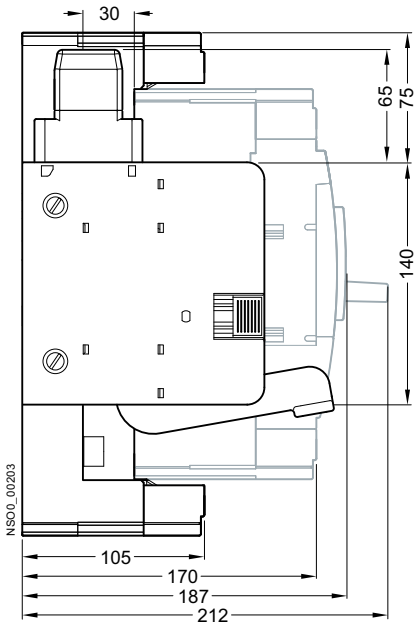
Withdrawable version

Operating position

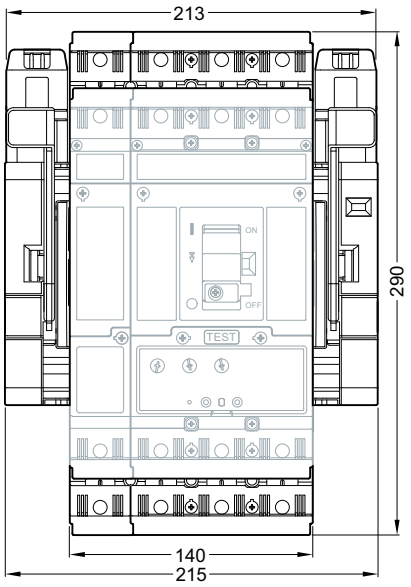


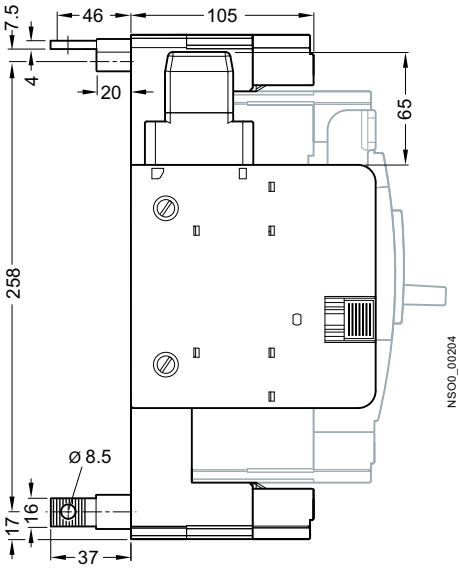
Maintenance position

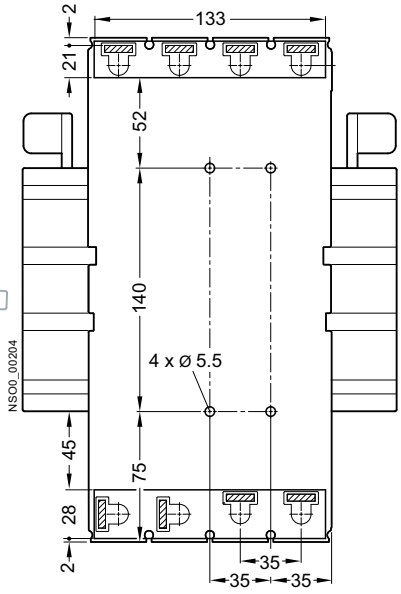




Withdrawable version, rear connection (connecting set 3VT9200-4RC30 + 3VT9200-4RC00)





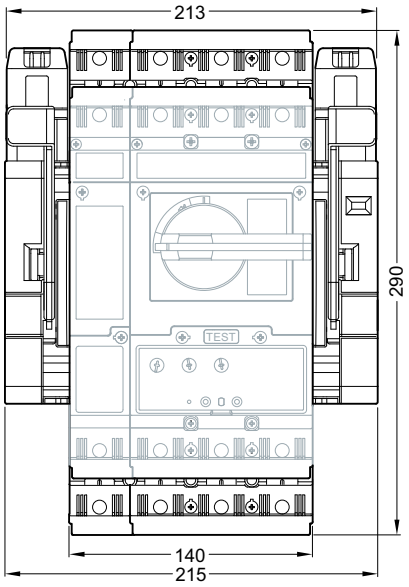


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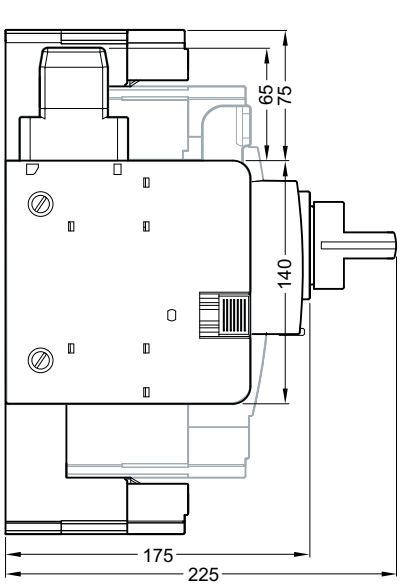
Dimensional drawings

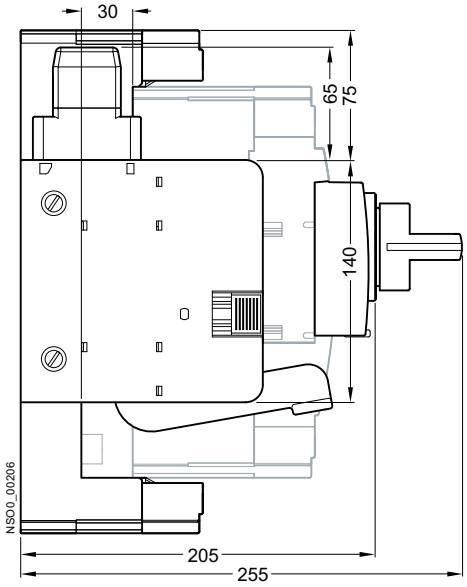
Withdrawable version, rotary operating mechanism

Operating position

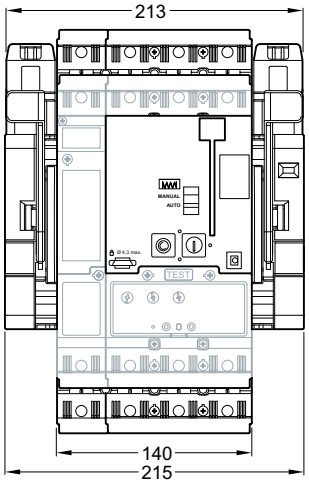


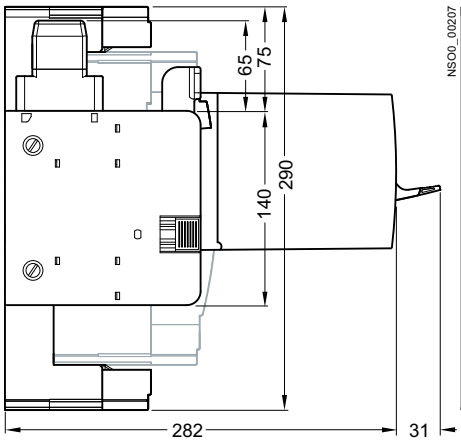
Maintenance position

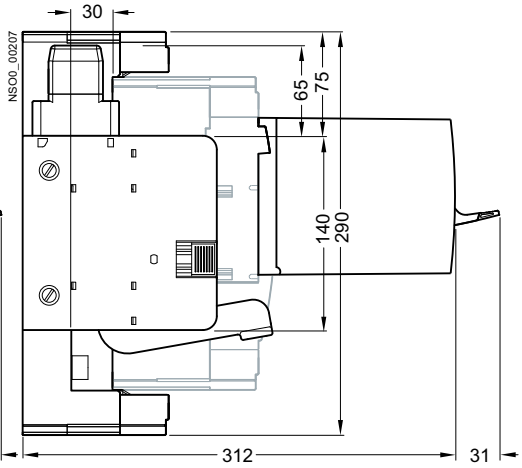




Withdrawable version, 3VT9200-3M..0 motorized operating mechanism







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3VT3 Molded Case Circuit Breakers up to 630 A

3



Catalog

3VT3 Molded Case Circuit Breakers up to 630 A

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Accessories and Components
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3/5 Auxiliary switches · Auxiliary trip units
3/6 Manual/motorized operating mechanism
3/8 Mounting accessories
3/9 Connecting accessories
3/10 Further accessories

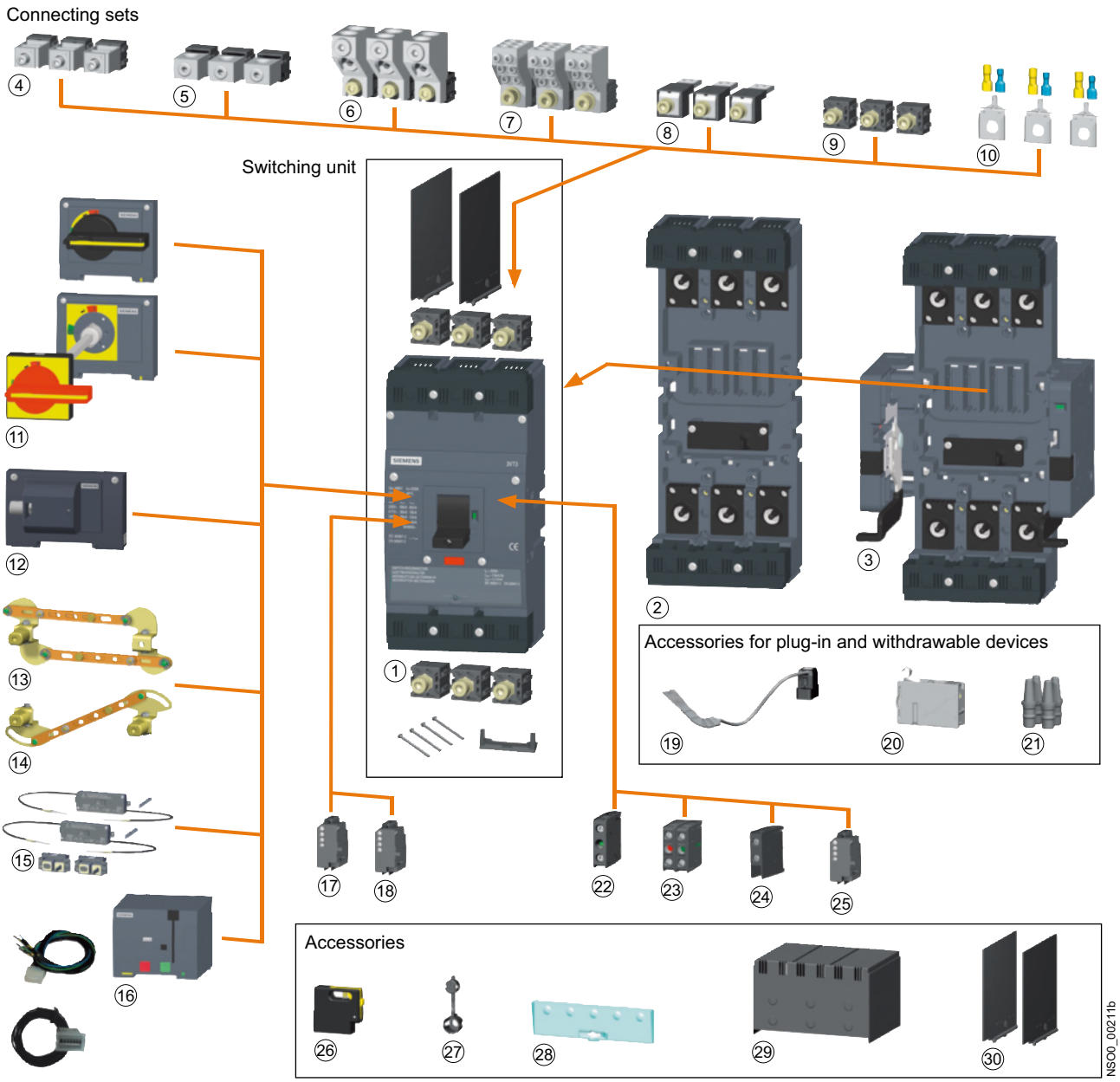
Technical Information

3VT3 Molded Case Circuit Breakers up to 630 A

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Overview



① Molded case circuit breaker
② Plug-in device
③ Withdrawable device
④ Box terminals
⑤ Circular conductor terminal
⑥ Multiple feed-in terminal
⑦ Multiple feed-in terminal
⑧ Rear connection
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⑩ Auxiliary conductor terminal
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⑫ Lateral rotary operating mechanism
⑬ Mechanical parallel switching
⑭ Mechanical interlocking
⑮ Mechanical interlocking by Bowden wire
⑯ Motor operating mechanism
⑰ Shunt trip unit
⑱ Undervoltage trip unit
⑲ Connecting cable
⑳ Position signalling
㉑ Coding Set
㉒ Auxiliary switch NC/NO
㉓ Auxiliary switch NC/NO
㉔ Auxiliary switch, change-over contact
㉕ Auxiliary switch, early
㉖ Lockingtype lever
㉗ Sealing inset
㉘ Additional cover for overcurrent releases
㉙ Terminal cover
㉚ Insulating barriers

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Overview

Switching unit

The switching unit includes:
- Two 3VT9300-4TA30 (front connection terminals), connecting sets – for connecting busbars or cable lugs
- 3VT9300-8CE30 insulating barriers
- A set of 4 installation bolts (M5 x 25)

The switching unit must be fitted with a trip unit (circuit breaker) or a 3VT9363-6DT00 switch disconnector unit (switch disconnector)

For maximum circuit breaker/switch disconnector loads in accordance with the ambient temperature, see page 3/11.

For recommended cross-sections of cables, busbars and flexibars for fixed-mounted, plug-in and withdrawable versions, see page 3/11.

Circuit breaker

The circuit breakers consist of a 3- or 4-pole switching unit and a trip unit which is available with a choice of different characteristics.

Switch disconnector

The switch disconnector consists of a switching unit and a switch disconnector unit.

Selection and ordering data



	Rated current I_n	Breaking capacity I_{cu} (AC 415 V)	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	kA				kg
Switching units						
	3-pole version					
	630	36		**3VT3763-2AA36-0AA0**	1 unit	5.986
	630	65		**3VT3763-3AA36-0AA0**	1 unit	5.970
	4-pole version, unprotected N					
	630	36		**3VT3763-2AA46-0AA0**	1 unit	7.400
	630	65		**3VT3763-3AA46-0AA0**	1 unit	7.400
	4-pole version, protected N					
	630	36		**3VT3763-2AA56-0AA0**	1 unit	5.970
	630	65		**3VT3763-3AA56-0AA0**	1 unit	7.400

* You can order this quantity or a multiple thereof.

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Selection and ordering data for accessories

	Rated current I_n	Current setting of the inverse- time delayed overcurrent releases "L" I_r	S function short-circuit protection (short-time delayed) "S" I_{sd}	Operating current of the instantaneous short-circuit releases "I" I_i	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	A						kg
ETU trip units								
	***Line protection, ETU LP, LI function*** [1]							
	• for protecting lines with low starting currents • without I_r regulation							
	250	250		1000 A		**3VT9325-6AB00**	1 unit	0.345
	315	315		1260 A		**3VT9331-6AB00**	1 unit	0.304
	400	400		1600 A		**3VT9340-6AB00**	1 unit	0.345
	500	500		2000 A		**3VT9350-6AB00**	1 unit	0.304
	630	630		2520 A		**3VT9363-6AB00**	1 unit	0.345
	***Distribution protection, ETU DP, LI function*** [1]							
	• for protecting lines and transformers							
	250	100 ... 250		4 x I_R / 12.5 x I_R		**3VT9325-6AC00**	1 unit	0.261
	400	160 ... 400		4 x I_R / 12.5 x I_R		**3VT9340-6AC00**	1 unit	0.300
	630	250 ... 630		4 x I_R / 12.5 x I_R		**3VT9363-6AC00**	1 unit	0.300
	***Distribution protection with N-pole protection, ETU DPN, LIN function*** [2]							
	• for protecting lines and transformers in TN-C-S and TN-S networks							
	250	100 ... 250		2 ... 9 x I_R		**3VT9325-6BC00**	1 unit	0.355
	400	160 ... 400		2 ... 9 x I_R		**3VT9340-6BC00**	1 unit	0.355
	630	250 ... 630		2 ... 9 x I_R		**3VT9363-6BC00**	1 unit	0.345
	***Motor/generator protection, ETU MP, LI function*** [1]							
	• for direct protection of motors and generators • suitable also for protecting lines and transformers							
	250	100 ... 250		320 ... 3750 A		**3VT9325-6AP00**	1 unit	0.261
	400	160 ... 400		500 ... 6000 A		**3VT9340-6AP00**	1 unit	0.321
	630	250 ... 630		800 ... 7000 A		**3VT9363-6AP00**	1 unit	0.323
	***Motor/generator protection, ETU MPS, LSI function*** [1]							
	• for direct protection of motors and generators. • suitable also for protecting lines and transformers • enables setting time delay of time-independent trip unit to 0, 100, 200 or 300 ms							
	250	100 ... 250	2 ... 10 x I_R	6500 A		**3VT9325-6AS00**	1 unit	0.260
	400	160 ... 400	2 ... 10 x I_R	6500 A		**3VT9340-6AS00**	1 unit	0.260
	630	250 ... 630	2 ... 10 x I_R	6500 A		**3VT9363-6AS00**	1 unit	0.323
Switch disconnector unit								
	630	**Switch disconnector unit** [1]				**3VT9363-6DT00**	1 unit	0.252

[1] Use only with switching unit 3VT3763-.AA36-0AA0 or 3VT3763-.AA46-0AA0.

[2] Use only with switching unit 3VT3763-.AA56-0AA0

* You can order this quantity or a multiple thereof.

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Overview

The circuit breakers can be equipped with

- auxiliary switches,
- alarm switches,
- shunt trip units,
- undervoltage trip units.

Shunt trip units can trip the circuit breaker from a remote location. A control supply voltage is required.

An undervoltage trip unit trips the circuit breaker automatically when the circuit voltage drops below 70 % U_e. The undervoltage trip unit protects motors and other equipment in case of undervoltage. A control supply voltage is required.

Selection and ordering data

	Rated control supply voltage U_s	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	AC 50/60 Hz, DC				kg
Auxiliary switches and alarm switches					
	**Single NO contacts**				
	AC/DC 60 ... 500 V		**3VT9300-2AC10**	1 unit	0.035
	AC/DC 5 ... 60 V		**3VT9300-2AC20**	1 unit	0.036
	**Single NC contacts**				
	AC/DC 60 ... 500 V		**3VT9300-2AD10**	1 unit	0.013
	AC/DC 5 ... 60 V		**3VT9300-2AD20**	1 unit	0.013
	**Double contacts (2 x NC)**				
	AC/DC 60 ... 500 V		**3VT9300-2AE10**	1 unit	0.038
	AC/DC 5 ... 60 V		**3VT9300-2AE20**	1 unit	0.038
	Double contacts (NO and NC)				
	AC/DC 60 ... 500 V		**3VT9300-2AF10**	1 unit	0.038
	AC/DC 5 ... 60 V		**3VT9300-2AF20**	1 unit	0.038
	Double contacts (2 x NO)				
	AC/DC 60 ... 500 V		**3VT9300-2AG10**	1 unit	0.038
	AC/DC 5 ... 60 V		**3VT9300-2AG20**	1 unit	0.038
	**Changeover contacts**				
	AC/DC 60 ... 250 V		**3VT9300-2AH10**	1 unit	0.013
	AC/DC 5 ... 60 V		**3VT9300-2AH20**	1 unit	0.013
	**Leading contacts**				
	AC/DC 60 ... 250 V		**3VT9300-2AJ00**	1 unit	0.040
Shunt trip units					
	AC/DC 24, 40, 48 V		**3VT9300-1SC00**	1 unit	0.140
	AC/DC 110 V		**3VT9300-1SD00**	1 unit	0.140
	AC 230, 400, 500 V/DC 220 V		**3VT9300-1SE00**	1 unit	0.154
Undervoltage trip units					
	AC/DC 24, 40, 48 V		**3VT9300-1UC00**	1 unit	0.151
	AC/DC 110 V		**3VT9300-1UD00**	1 unit	0.110
	AC 230, 400, 500 V/DC 220 V		**3VT9300-1UE00**	1 unit	0.110
	with leading contact[1)]				
	AC/DC 24, 40, 48 V		**3VT9300-1UC10**	1 unit	0.120
	AC/DC 110 V		**3VT9300-1UD10**	1 unit	0.140
	AC 230, 400, 500 V/DC 220 V		**3VT9300-1UE10**	1 unit	0.120

[1)] Not to be used with 3VT9300-3M..0 motorized operating mechanism.

* You can order this quantity or a multiple thereof.

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Manual/motorized operating mechanisms

Overview

Rotary operating mechanisms

The rotary operating mechanism must be combined from:

- For rotary operation of the circuit breaker:
  - 3VT9300-3HA.0 or 3VT9300-3HB.0 for frontside operation
  - 3VT9300-3HE10 or 3VT9300-3HE20 black knob or
  - 3VT9300-3HF20 red knob
- For operation through the switchgear cabinet door:
  - 3VT9300-3HA.0 or 3VT9300-3HB.0 for frontside operation
  - 3VT9300-3HJ.. extension shaft
  - 3VT9300-3HG/HH.. coupling driver
  - 3VT9300-3HE/HF.. knob.
- For operation through side wall of cabinet:
  - 3VT9300-3HC10 for left side operation OR
  - 3VT9300-3HD10 for right side operation
  - 3VT9300-3HJ..extension shaft
  - 3VT9300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9300-3HE/HF.. knob

Mechanical interlocking and interlocking for parallel switching

- Mechanical interlocking for fixed-mounted version must be combined from the following parts:
  - 2 x 3VT9300-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9300-3HE/HF.. knob
- Mechanical interlocking by Bowden wire is intended for fixed-mounted, plug-in and withdrawable versions
- Mechanical interlocking must be combined from the following parts:
  - 2 x 3VT9300-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9300-3HE/HF.. knob

Selection and ordering data

	Version	Color	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Rotary operating mechanisms						
	• not lockable	gray		**3VT9300-3HA10**	1 unit	0.243
	• lockable with padlock	gray		**3VT9300-3HA20**	1 unit	0.243
	• lockable with padlock	yellow label		**3VT9300-3HB20**	1 unit	0.243
	• for lateral operation, • mounted on the left side, • not lockable	gray		**3VT9300-3HC10**	1 unit	0.700
	• for lateral operation, • mounted on the right side, • not lockable	gray		**3VT9300-3HD10**	1 unit	0.700
	**Knobs for rotary operating mechanism**					
	• not lockable	black		**3VT9300-3HE10**	1 unit	0.075
	• lockable with padlock	black		**3VT9300-3HE20**	1 unit	0.075
	• lockable with padlock	red		**3VT9300-3HF20**	1 unit	0.075
	**Coupling driver for door-coupling operating mechanism** To be used with the 3VT9300-3HE10 or 3VT9300-3HE20 black knob					
	• degree of protection IP40	black		**3VT9300-3HG10**	1 unit	0.146
	• degree of protection IP66	black		**3VT9300-3HG20**	1 unit	0.146
	• degree of protection IP40 (switchboard door opening with the circuit breaker switched on)	black NEW		**3VT9300-3HG30**	1 unit	0.211
	Is used in combination with the 3VT9300-3HF20 red knob					
	• degree of protection IP40	yellow		**3VT9300-3HH10**	1 unit	0.140
	• degree of protection IP66	yellow		**3VT9300-3HH20**	1 unit	0.200
	• degree of protection IP40 (switchboard door opening with the circuit breaker switched on)	yellow NEW		**3VT9300-3HH30**	1 unit	0.209
	**Extension shaft** length 365 mm, may be shortened			**3VT9300-3HJ10**	1 unit	0.205
	**Extension shaft, telescopic**, length 245 ... 410 mm			**3VT9300-3HJ20**	1 unit	0.255

* You can order this quantity or a multiple thereof.

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	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Mechanical interlocking					
	**Mechanical interlocking** for fixed-mounted version only The mechanical interlocking additionally require the following parts: • 2 x 3VT9300-3HA../HB.. rotary operating mechanisms, • 2 x 3VT9300-3HE../HF.. knobs		**3VT9300-8LA00**	1 unit	0.136
	**Mechanical interlocking for parallel switching** for fixed-mounted version only The mechanical interlocking additionally require the following parts: • 2 x 3VT9300-3HA../HB.. rotary operating mechanisms, • 1 x 3VT9300-3HE../HF.. knobs		**3VT9300-8LB00**	1 unit	0.162
	**Mechanical interlocking** by Bowden wirer				
	• for two 3VT3 circuit breakers		**3VT9300-8LC10**	1 unit	0.393
	• for one 3VT2 and one 3VT3 circuit breaker		**3VT9300-8LC20**	1 unit	0.393
Motorized operating mechanisms with storage spring					
	Rated control supply voltage U_s				
	**Motorized operating mechanism**				
	AC/DC 24 V		**3VT9300-3MJ00**	1 unit	1.691
	AC/DC 48 V		**3VT9300-3ML00**	1 unit	1.691
	AC/DC 110 V		**3VT9300-3MN00**	1 unit	1.752
	AC 230 V/DC 220 V		**3VT9300-3MQ00**	1 unit	1.746
	Motorized operating mechanism with operations counter				
	AC/DC 24 V		**3VT9300-3MJ10**	1 unit	1.708
	AC/DC 48 V		**3VT9300-3ML10**	1 unit	1.708
	AC/DC 110 V		**3VT9300-3MN10**	1 unit	1.708
	AC 230 V/DC 220 V		**3VT9300-3MQ10**	1 unit	1.754
Accessories for motorized operating mechanisms					
	**Operations counter with cable,** length 110 cm		**3VT9300-3MF10**	1 unit	0.003
	**Extension cable** for motorized operating mechanism, 12 wires, length 60 cm		**3VT9300-3MF00**	1 unit	0.060

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Mounting accessories

Overview

Plug-in version

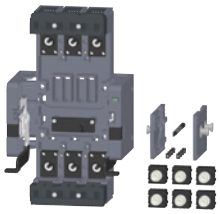
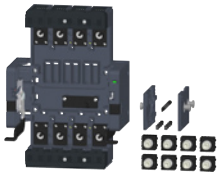
- The plug-in base includes:
  - complete accessories for assembling circuit breakers/ switch disconnectors in plug-in design
  - a set of four installation bolts (M5 x 30) for fixing the switching unit to the plug-in base
- The plug-in base must be outfitted with:
  - 3-pole version: 3VT3763-.AA36-0AA0 switching unit
  - 4-pole version: 3VT3763-.AA46-0AA0 or 3VT3763-.AA56-0AA0 switching unit

For mounting the plug-in version on busbars or cable lugs, 3VT9300-4TA30 connecting sets are available. These are included in the scope of supply of the 3VT3763-.AA36-0AA0 3-pole version ; 3VT3763-.AA46/56-0AA0... 4-pole version switching unit. For other types of connection, other connecting sets are available.

Withdrawable version

- The withdrawable version base includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable version.
- The circuit breaker inside the withdrawable version base can be moved between an operating position and a checking position (withdrawn).
- The withdrawable version base must be fitted with:
  - 3-pole version: 3VT3763-.AA36-0AA0 switching unit or
  - 4-pole version: 3VT3763-.AA46-0AA0 or 3VT3763-.AA56-0AA0 switching unit

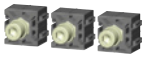
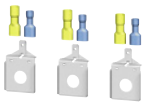
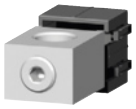
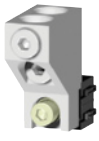
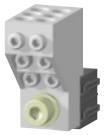
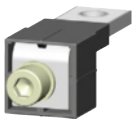
Selection and ordering data

	Version	Max. permissible cross-section *S*	DT	Article No.	PS*/ P. unit	Weight per PU approx.
		mm^2				kg
Plug-in bases						
	**3-pole version**			**3VT9300-4PA30**	1 unit	2.610
	**4-pole version**			**3VT9300-4PA40**	1 unit	3.400
Withdrawable version bases						
	**3-pole version**			**3VT9300-4WA30**	1 unit	4.986
	**4-pole version**			**3VT9300-4WA40**	1 unit	4.500

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Selection and ordering data

	Version	Max. permissible cross-section *S*	Type of connection	DT	Article No.	PS*/ P. unit	Weight per PU approx.
		mm²					kg
Connecting Sets							
	Connecting sets for 3-pole version						
	**Box terminals**	35 ... 240	Cu Cables, flexibars		**3VT9300-4TC30**	1 unit	0.440
	**Terminals for circular conductors**	25 ... 150	Cu/Al cables		**3VT9315-4TD30**	1 unit	0.302
		150 ... 240	Cu/Al cables		**3VT9324-4TD30**	1 unit	0.300
	For enhancing termination point protection to degree of protection IP20, use the 3VT9300-8CB30 terminal cover	2 x 25 ... 150	Cu/Al cables		**3VT9315-4TF30**	1 unit	0.900
		2 x 150 ... 240	Cu/Al cables		**3VT9324-4TF30**	1 unit	0.721
		6 x 6 ... 35	Cu/Al cables		**3VT9303-4TF30**	1 unit	0.300
	**Terminals for rear connection** **1 set = 3 units**		Cu/Al busbars cable lugs		**3VT9300-4RC30**	1 unit	0.558
	**Terminals for front connection** **1 set = 3 units**		Cu/Al busbars, cable lugs, flexibars		**3VT9300-4TA30**	1 unit	0.186
	**Auxiliary conductor terminals**	1.5 ... 2.5; 4 ... 6	Cu flexible conductors		**3VT9300-4TN30**	1 unit	0.021
	Front connection bars						
	**1 set = 3 units**	increases pole spacing	Cu/Al busbars cable lugs, flexibars		**3VT9300-4ED30**	1 unit	0.489
	**1 set = 3 units**	increases pole spacing	Cu/Al busbars cable lugs, flexibars		**3VT9300-4EE30**	1 unit	0.656
	Single terminals for 3- or 4-pole version						
	**Box terminal** **1 set = 1 unit**	35 ... 240	Cu Cables, flexibars		**3VT9300-4TC00**	1 unit	0.580
	**Terminals for circular conductors** **1 set = 1 unit**	25 ... 150	Cu/Al cables		**3VT9315-4TD00**	1 unit	0.126
		150 ... 240	Cu/Al cables		**3VT9324-4TD00**	1 unit	0.110
		2 x 25 ... 150	Cu/Al cables		**3VT9315-4TF00**	1 unit	0.285
		2 x 150 ... 240	Cu/Al cables		**3VT9324-4TF00**	1 unit	0.285
		6 x 6 ... 35	Cu/Al cables		**3VT9303-4TF00**	1 unit	0.100
	**Terminal for rear connection** **1 set = 1 unit**		Cu/Al busbars cable lugs		**3VT9300-4RC00**	1 unit	0.200

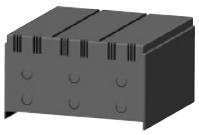
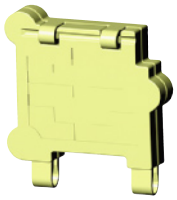
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Further accessories

Selection and ordering data

	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
	**Insulating barriers** Included in the scope of supply of the switching unit; in case the circuit breaker/switch disconnector is feed-in from below (power supply connected to terminals 2, 4, 6), it is necessary in most cases to install these barriers also on the bottom side				
	• set of two pieces, for 3-pole version		**3VT9300-8CE30**	1 unit	0.090
	• one piece, additionally needed for 4-pole version		**3VT9300-8CE00**	1 unit	0.040
	**Terminal cover, degree of protection IP20** Increases degree of protection of the connection point to IP20 when using 3VT9303-4TF30, 3VT9315-4TF30, 3VT9324-4TD30 or 3VT9324-4TF30 block type terminals, intended for fixed-mounted, plug-in and withdrawable versions.				
	• 3-pole version		**3VT9300-8CB30**	1 unit	0.217
	• 4-pole version		**3VT9300-8CB40**	1 unit	0.209
	**Locking device for knob** Enables locking the circuit breaker in "switched off manually" position. For locking the device, you can use up to three padlocks with a shank diameter of max. 6 mm		**3VT9300-3HL00**	1 unit	0.026
	**Bolt sealing insert** Provides sealing for: • trip unit • accessory compartment cover • terminal cover • rotary operating mechanism • operating mechanism		**3VT9200-8BN00**	1 unit	0.001
	**Additional cover for trip unit** Provides protection for trip units		**3VT9200-8BL00**	1 unit	0.080
	**Connecting cable** For connecting the circuit breaker/switch disconnector accessories in withdrawable version (can also be used for plug-in and fixed-mounted versions)		**3VT9300-4PL00**	1 unit	0.167
	**Position signalling switch** For indicating the position of the circuit breaker in the plug-in base or withdrawable version base		**3VT9300-4WL00**	1 unit	0.020
	**Coding set** Prevents insertion of the wrong switching unit into the plug-in base or withdrawable version base		**3VT9300-4WN00**	1 unit	0.005
	**Pushbutton cover** For motorized operating mechanism		**3VT9300-3MF20**	1 unit	0.054

* You can order this quantity or a multiple thereof.

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Design

Installation and connection

Main circuit

- Is connected using Cu or Al busbars or cables, and possibly cables with cable lugs
- For further connecting options, connecting sets are available (see page 3/9)
- Generally, conductors from the power supply are connected to input terminals 1, 3, 5, (N) and conductors from the load to terminals 2, 4, 6, (N). However, it is possible to reverse this connection (exchanging input and output terminals without limiting the rated short-circuit ultimate breaking capacity I_{cu})
- In case of feed-in from below, the circuit breakers/switch disconnectors must be fitted with 3VT9300-8CE30 insulating barriers on the bottom side of the circuit breaker/switch disconnector
- We recommend painting the connecting busbars in different colors
- Input and output conductors/busbars must be mechanically reinforced to avoid transmitting electrodynamic force to the circuit breaker/switch disconnector during short-circuiting
- The power circuit must be connected in such a way that the deionizing space of the circuit breaker/switch disconnector is not obstructed (see page 3/45).

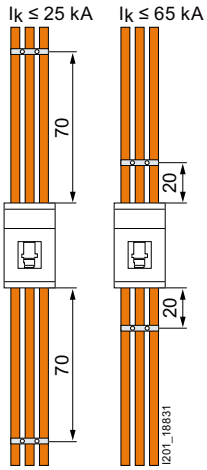
Auxiliary circuits

- Auxiliary switches, shunt trip units or undervoltage trip units are connected to terminals using flexible 0.5 ... 1 mm^2 Cu conductors.
- The motorized operating mechanism and auxiliary circuits of the plug-in base or withdrawable version base are connected with a connector.

Recommended cross-sections of cables, busbars and flexibars for fixed-mounted, plug-in and withdrawable versions

Rated current I_n	Permissible cross-section S		Dimensions of busbars W x H	
	Cu	Al	Cu	Al
A	mm^2	mm^2	mm	mm
100	35	50	20 x 2	25 x 2
125	50	70	25 x 2	25 x 3
160	70	95	25 x 3	32 x 3
200	95	120	25 x 4	25 x 5
250	120	150	25 x 5	32 x 5
315	150	185	32 x 5	32 x 6
400	185	240	32 x 6	32 x 8
500	2 x120	2 x185	32 x 8	32 x 12
630	2 x185	2 x240	32 x 12	32 x 16

Mechanical reinforcement of conductors for 3VT3



Maximum circuit breaker/switch disconnector loads in accordance with the ambient temperature

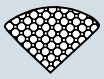
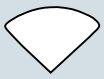
3VT3 circuit breaker/switch disconnector connection to pole by 1 x 185 mm^2 Cu cable

-15°C ... 50°C	55 °C	60 °C	65 °C	70 °C
630 A	620 A	580 A	540 A	500 A

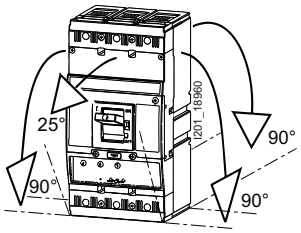
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Circuit breakers · Switch disconnectors

Conductor cross-sections of main terminals

Article No.	Maximum permitted current I_{max}	Maximum permissible conductor cross-section *S* Cable type				Busbars and cable lugs W x H	Flexibars W x H	Technical information
		Sector-shaped conductor, stranded 	Sector-shaped conductor, solid 	Round conductor, stranded 	Round conductor, solid 			
	A	mm²	mm²	mm²	mm²	mm (max.)	mm (max.)	See page
3VT9300-4TA30	630					32 x...	32 x...	
3VT9300-4TD00								
3VT9300-4RC30	630					32 x...	--	3/48, 3/59, 3/59, 3/59
3VT9300-4RC00								
3VT9300-4TC30	400	35 ... 240 Cu	35 ... 240 Cu	35 ... 240 Cu	35 ... 240 Cu	--	32 x...	
3VT9300-4TC00								
3VT9324-4TD30	400	150 ... 240 Cu/Al	120 ... 240 Cu/Al	150 ... 240 Cu/Al	120 ... 240 Cu/Al	--	--	
3VT9324-4TD00								
3VT9315-4TD30	315	25 ... 150 Cu/Al	16 ... 150 Cu/Al	25 ... 150 Cu/Al	16 ... 150 Cu/Al	--	--	
3VT9315-4TD00								
3VT9324-4TF30	630	2 x (150 ... 240) Cu/Al	2 x (120 ... 240) Cu/Al	2 x (150 ... 240) Cu/Al	2 x (120 ... 240) Cu/Al	--	--	3/47, 3/58
3VT9324-4TF00								
3VT9315-4TF30	500	2 x (25 ... 150) Cu/Al	2 x (16 ... 150) Cu/Al	2 x (25 ... 150) Cu/Al	2 x (16 ... 150) Cu/Al	--	--	3/48, 3/59
3VT9315-4TF00								
3VT9303-4TF30	250	6 x (6 ... 35) Cu/Al	6 x (6 ... 35) Cu/Al	6 x (6 ... 35) Cu/Al	6 x (6 ... 35) Cu/Al	--	--	3/48, 3/59
3VT9303-4TF00								
3VT9300-4ED30	400							3/49
3VT9300-4EE30	630							3/49
3VT9300-4TN30	10/16	1,5 ... 2,5/4 ... 6 flexible conductor				--		

Installation positions: fixed, plug-in and withdrawable design



Installation positions

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Technical specifications

Description		Circuit breakers			Switch disconnector unit
Article Number		**3VT3763-2AA36/46/56-0AA0, 3VT3763-3AA36/46/56-0AA0**			**3VT9363-6DT00**
Standards		EN 60 947-2, IEC 947-2			EN 60 947-3, IEC 947-3
Approval marks		CE			
Number of poles		3, 4			
Rated current I_n	A	250, 315, 400, 500, 630			--
Rated uninterrupted current I_u	A	630			
Rated operational current I_e	A	--			630
Rated operational voltage U_e	V	AC max. 690			AC max. 690, DC max. 440
Rated frequency f_n	Hz	50/60			
Rated impulse withstand voltage U_{imp}	kV	8			
Rated insulation voltage U_i	V	690			
Utilization category					
Selectivity AC 690 V		A			--
Switching mode AC 690 V DC 440 V		-- --			AC-23 B DC-23 B
Rated short-time withstand current U_e = AC 690 V I_{cw}/t		8 kA/50 ms, 7 kA/300 ms		6,5 kA/1 s	7.5 kA/5 s
Series U_e		3VT3 N	3VT3 H	U_e	--
Rated ultimate short-circuit breaking capacity (rms value)[1] I_{cu}		60 kA 36 kA 35 kA 20 kA 15 kA	100 kA 65 kA 35 kA 35 kA 20 kA	AC 230 V AC 415 V AC 440 V AC 500 V AC 690 V	--
Rated short-circuit breaking capacity (rms value) I_{cs}/U_e		40 kA 18 kA 18 kA 10 kA 8 kA	75 kA 36 kA 20 kA 20 kA 15 kA	AC 230 V AC 415 V AC 440 V AC 500 V AC 690 V	--
Rated short-ckt making capacity (peak value) I_{cm}/U_e		75 kA	140 kA	AC 415 V	14 kA/AC 415 V, 14 kA/DC 440 V
Off-time at I_{cu}	ms	10			--
Losses per pole at I_n = 630 A	W	75			
Mechanical endurance	cycles	20000			
Electrical endurance (U_e = AC 415 V)	cycles	5000			
Switching frequency	cycles/ hr	120			
Operating force	N	110			
Front-side device protection		IP40			
Terminal protection		IP20			
Operating conditions					
Reference ambient temperature	°C	40			
Ambient temperature range	°C	-40 ... +55			
Working environment		dry and tropical climate			
Degree of pollution		3			
Max. elevation	m	2000			
Seismic resistance	m/s^2	3 *g* at 8 ... 50 Hz			
Design modifications					
Front/rear connection		✓/✓			
Plug-in design		✓			
Withdrawable design		✓			
Accessories					
Switches-auxiliary/relative/signal/leading		✓/✓/✓/✓			
Shunt trip unit		✓			
Undervoltage trip unit/with leading switch, with alarm switch		✓/✓			
Front rotary oper. mechanism/lateral oper. mech. right/left		✓/✓			
Mechanical interlocking to the rotary oper. mechanism, by Bowden wire		✓			
Motorized oper. mechanism with operations counter		✓			
Locking-type lever		✓			
Bolt sealing insert/additional cover for trip unit		✓/✓			

✓ available,
-- unavailable

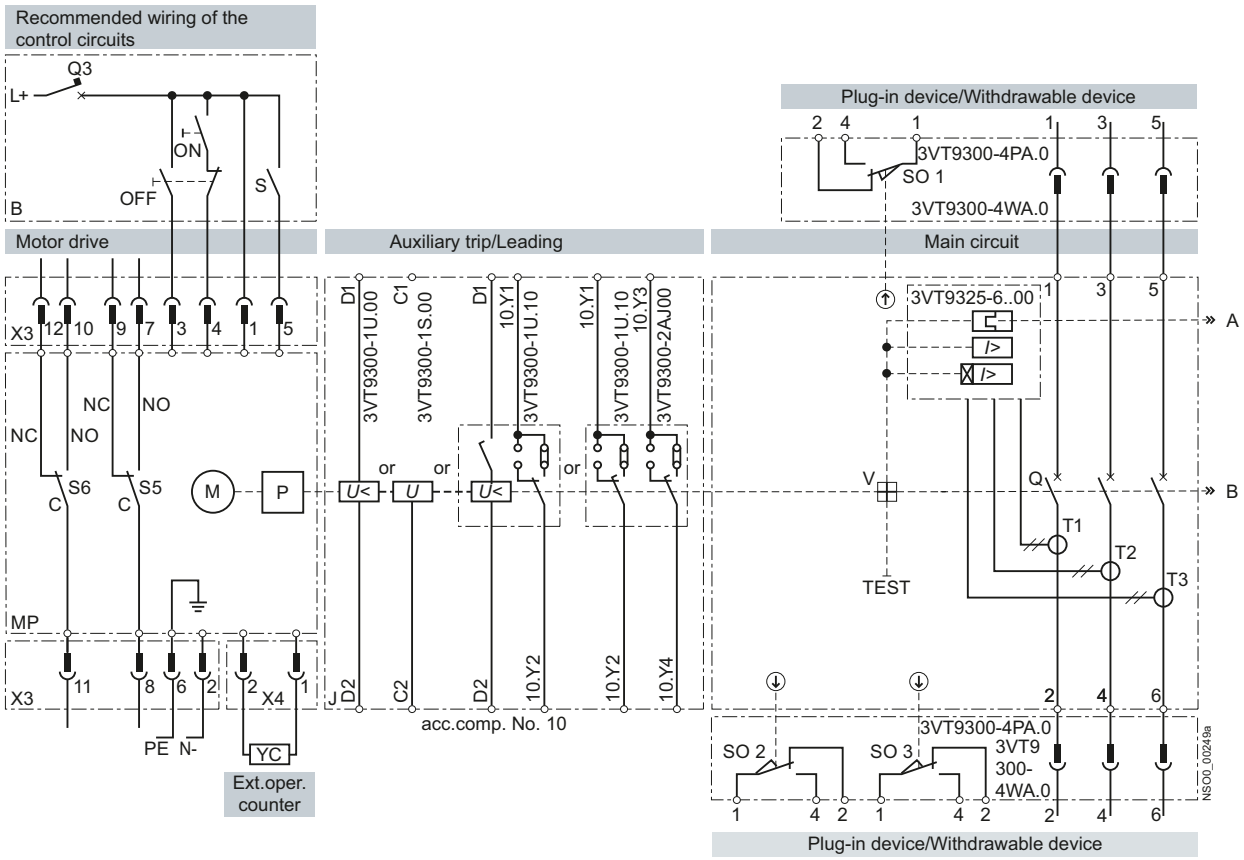
[1] If the circuit breaker connection is reversed (input terminals 2, 4, 6 , output terminals 1, 3, 5), I_{cu} does not change.

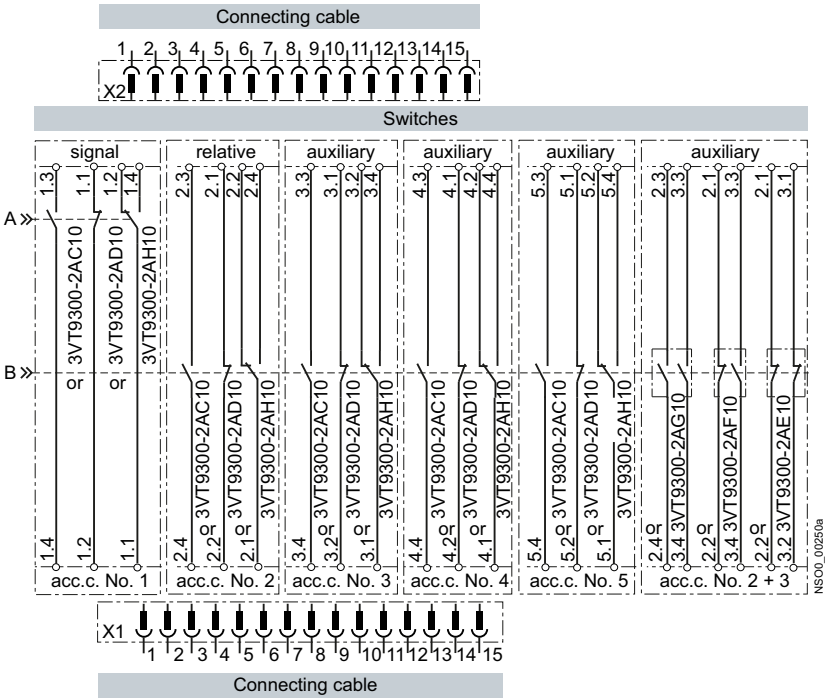
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Schematics

Circuit breakers with accessories

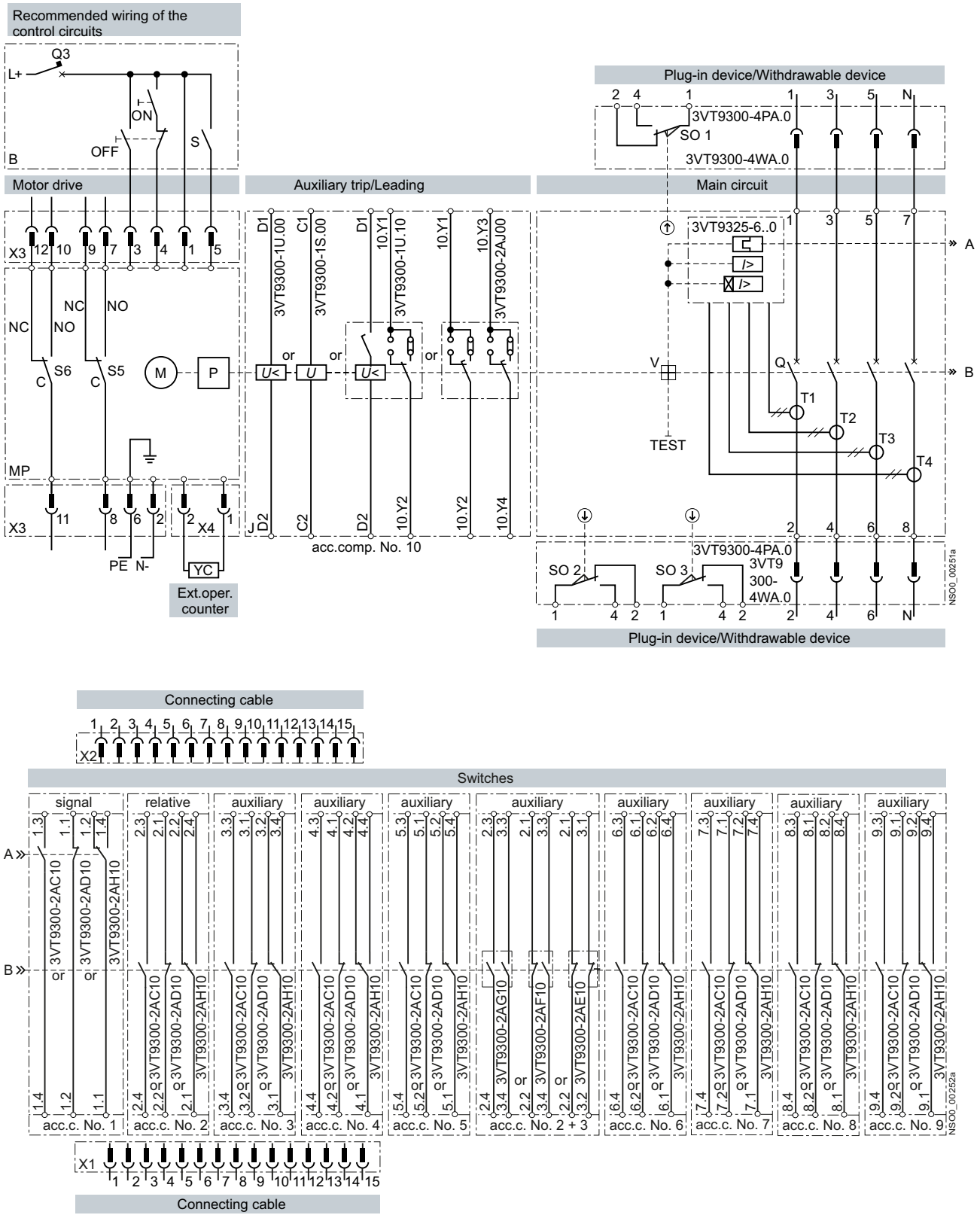
3-pole version





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4-pole version



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Circuit breakers · Switch disconnectors

MP	3VT9300-3M..0 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Connector to connect control circuits
X4	Connector for external operations counter
S5	Switch to signal AUTO (NO-C) / MANUAL (NC-C) modes
S6	Switch to signal full storage (ready to switch on: NO-C)
YC	External operations counter, 3VT9300-3MF10
B	Recommended wiring of the control circuits - not included with drive
ON, OFF	Pushbutton
S	Switch for energy storage (switched on = automatic storage, switch may be continuously switched on)
Q3	Circuit breaker for motorized operating mechanism
J	3VT3 switching unit
Q	Main contacts
T1, T2, T3, T4[1)]	Current transformers
V	Trip-free mechanism
3VT9325-6..00	3VT9363-6DT00 circuit breaker - trip unit - ETU LP, DP, MDP switch-disconnector - switch-disconnector unit
TEST	Pushbutton to test trip unit
3VT9300-4PA.0	3-pole/-4-pole plug-in base
3VT9300-4WA.0	3-pole/-4-pole withdrawable version base
X1, X2	3VT9300-4PL00 connecting cable
SO1, SO2, SO3	Contacts signalling position of circuit breaker/switch disconnector in plug-in base or withdrawable version base (Position signalling switch 3VT9300-4WL00)
3VT9300-1U.00	Undervoltage trip unit
3VT9300-1S.00	Shunt trip unit
3VT9300-1U.10	Undervoltage trip unit with leading contact
3VT9300-2AJ00	Leading contact
acc. c. No.	Accessory compartment number

[1)] Only for 4-pole version of the 3VT3763-.AA36-0AA0 switching unit.

Functions

States of auxiliary switches located in the switching unit accessory compartment

Circuit breaker state	Lever position of circuit breaker	State of the main contacts	Accessory compartment																			
			1		2		3, 4, 5 (6 ... 9)[1)]		10		2 and 3		2 and 3		2 and 3		1		2		3, 4, 5 (6 ... 9)[1)]	
			3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AJ00 or	3VT9300-1U.10	3VT9300-2AG10		3VT9300-2AF10		3VT9300-2AE10		3VT9300-2AH10		3VT9300-2AH10		3VT9300-2AH10	
Switched no		**1**	1	0	0	1	1	0	1	0	1	1	0	1	0	0	1	0	0	1	1	0
Switched off manually or electrically by operating mechanism		**0**	1	0	0	1	0	1	0	1	0	0	1	0	1	1	1	0	0	1	0	1
Switched off by trip unit		**0**	0	1	1	0	0	1	0	1	0	0	1	0	1	1	0	1	1	0	0	1
Switched off by auxiliary trip unit or by TEST button or the trip pushbutton on the motorized operating mechanism		**0**	1	0	1	0	0	1	0	1	0	0	1	0	1	1	1	0	1	0	0	1

0 = contact open, 1 = contact closed

[1)] Accessory compartment 6, 7, 8, 9 are only for 4.pole design.

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Overview

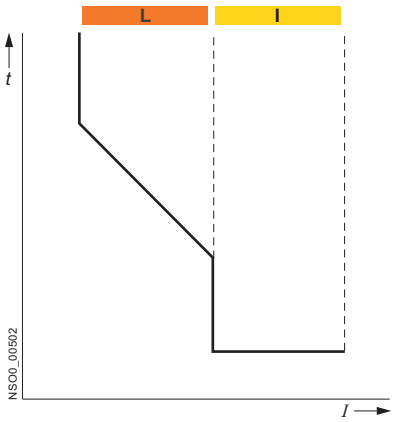
The electronic trip unit is a separate and interchangeable unit, which has to be ordered in addition to the 3VT3 switching unit. By exchanging the trip unit, the range of the circuit breaker's rated current can be easily changed.

Trip units for 3VT3 switching units are available for current values of I_n **= 250, 400 and 630 A**. The ETU LP trip units feature rated currents of 250, 315, 400, 500 and 630A. The trip units (including regulation of -60%) cover a current range from 100 to 630 A.

Tripping characteristics

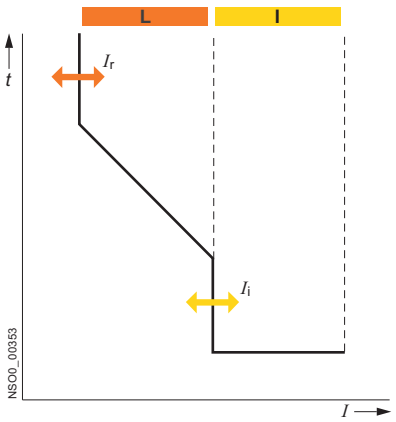
Several different trip units are available. Some have adjustable characteristics (in order to match the protected device and to achieve the required selectivity):

ETU LP trip units



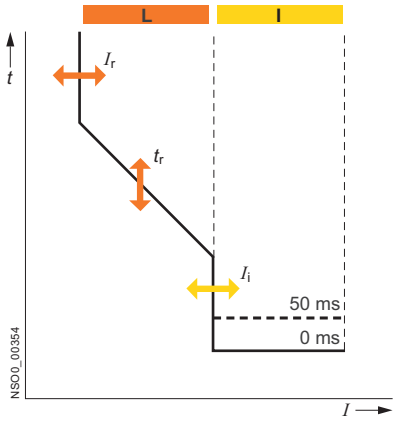
Electronic trip units ETU LP have one type of characteristic and fixed I_n and I_i settings.

ETU DP trip units



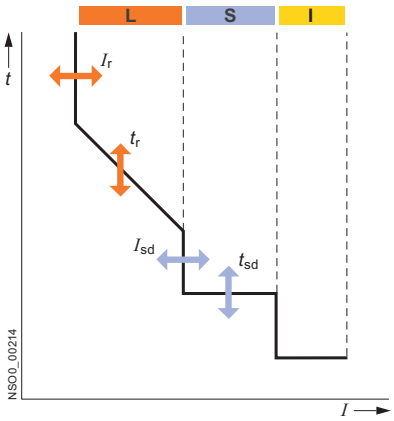
Electronic trip units ETU DP have one type of characteristic with adjustable I_r and I_i.

ETU MP trip units



Electronic trip units ETU LP have have more characteristics with adjustable I_r, t_r and I_i.

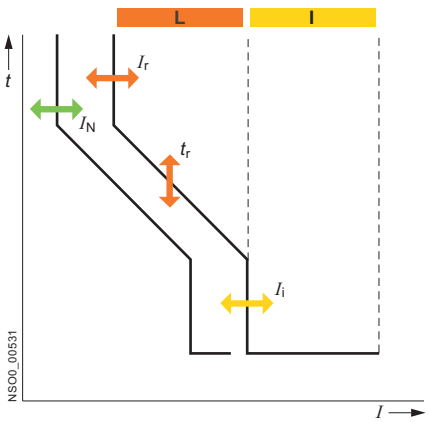
ETU MPS trip units



Electronic trip units ETU MPS have more characteristics with adjustable I_r, t_r, I_{sd} and t_{sd}.

ETU LP, DP, MP and MPS trip units are intended for 3-pole 3VT3763-.AA36-0AA0 switching units and 4-pole 3VT3763-.AA46-0AA0 switching units with disconnecting of the N pole.

ETU DPN trip units



ETU DPN trip units are intended for 4-pole 3VT3763-.AA56-0AA0 switching units with protected N pole. They have more characteristics with adjustable I_r, t_r, I_i and I_N.

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Trip units

Trip units ETU LP, DP, MP and MPS - description of function

Proper functioning of trip units does not depend on the current waveform in the main circuit. The function of the trip unit is supported by a microprocessor, which processes a sampled signal of the main circuit and recalculates it to obtain an rms value. Therefore, the trip units are suitable for protecting circuits where the sinusoidal current is distorted by high harmonics (e.g. circuits with controlled rectifiers, power factor compensators, pulse loading, and the like).

All the trip units protect a circuit against short-circuiting and overloading. Tripping characteristic of the trip units is independent of the ambient temperature. The trip unit is attached to the switching unit by two bolts. The translucent cover over the adjustment controls can be sealed (with sealing wire).

Setting the tripping characteristics

The tripping characteristic of the trip units is defined by standard EN 60947-2. For trip units ETU DP, MP, MPS and DPN, the characteristic is adjusted with latched switches located on the trip unit.

A visual demonstration on setting the tripping characteristic is available in the SIMARIS design software (Tool for Dimensioning Electrical Power Distribution).

L is a zone of low overcurrents and includes the area of thermal protection.

S is a zone of medium overcurrents and includes long-distance short-circuit protection for lines. Intentional delay in tripping of these low short-circuit currents can be used to achieve selectivity of protective devices. For ETU MPS trip units, the delay can be set at 0, 100, 200 or 300 ms.

I is a zone of high overcurrents and includes protection against ultimate short-circuit currents. For ETU MP trip units, the time delay can be set at 0 or 50 ms.

ETU MP and MPS

Tripping Adjust - Release Class	
M3	10 A
M8	10
M15	20
M25	30

1. Time-dependent trip unit (thermal) L

- The time-dependent trip unit **ETU DP** is adjusted using one I_r switch. The I_r switch adjusts the circuit breaker's rated current, with the characteristic shifting on the current axis. The trip unit is set to one type of characteristic.
- The time-dependent trip units **ETU MP, MPS and DPN** are adjusted with two switches, I_r and t_r. The first (I_r) switch adjusts the circuit breaker's rated current. The characteristic moves along the current axis.
  By turning the other switch (t_r), the time is adjusted after which the circuit breaker will trip while passing through 7.2 I_r. The tripping characteristic thus moves along the time axis. Using the t_r switch, it is possible to set a total of 8 characteristics.
  ETU MP and MPS trip units have 4 characteristics for motor protection and 4 characteristics for protecting lines.
  Breaking times correspond to trip unit classes 10 A, 10, 20, 30.
  By changing t_r, it is possible to select the trip unit characteristic according to the required motor starting characteristic (light, medium, heavy or very heavy starting).
  ETU DPN trip units have 8 characteristics for protecting lines or transformers. It is not possible to turn the circuit breaker back on immediately after the time-dependent trip unit has been actuated and the circuit breaker has tripped. The trip unit must be allowed to cool off (it has a thermal memory). The thermal memory can be disabled by turning the switch from the normal "T_t" position to the "T_0" position. In the "T_0" position the time-dependent trip unit remains active, and only its thermal memory is deactivated. Switching off the thermal memory should be used only in well-justified cases, and with the knowledge that there could be rising temperature in the protected device, causing repeated tripping.

2. Delayed time-independent trip unit S

This trip unit characteristic is available only in **ETU MPS** trip units. It is used to set up a selective cascade of circuit breakers. It is set up using parameters I_{sd} and t_{sd}. I_{sd} is an n-multiple of current I_r (I_{sd}= n × I_r). I_{sd} is a short-circuit current that, within the span of I_i to I_i, will trip the circuit breaker with delay t_{sd}, where t_{sd} is a delay set up for switching off the trip unit. The delayed time-independent trip unit actuates the circuit breaker if the current in the circuit reaches at least the preset n-multiple and lasts at least the preset delay time t_{sd}.

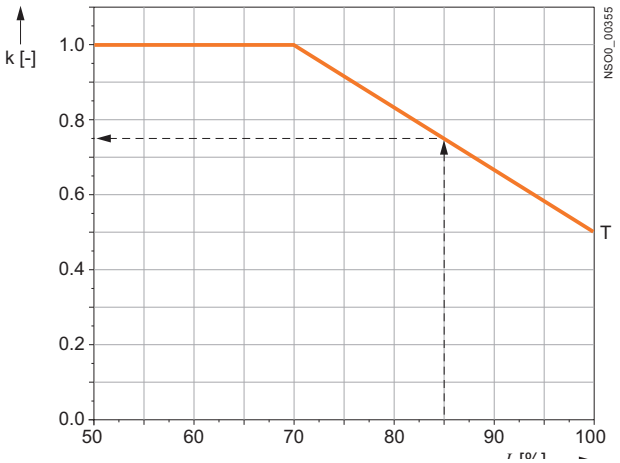
3. Time-independent instantaneous trip unit (short-circuit trip unit) I

- For trip units **ETU DP, MP and MPS**, the time-independent instantaneous trip unit is adjusted with the I_i switch. The I_i switch is used for setting up the short-circuit current that, when reached or exceeded, causes instantaneous tripping of the circuit breaker.

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Tripping characteristics of ETU LP, DP, MP, MPS and DPN trip units with load

The tripping characteristic from the cold state indicates the tripping times during which it is assumed that, up to the moment when an overcurrent develops, no current is flowing through the circuit breaker. The tripping characteristic tripped from warm state indicates the tripping times during which it is assumed that, before the moment when an overcurrent develops, current is flowing through the circuit breaker. Characteristics of electronic trip units are independent of the ambient temperature and are plotted in a cold state. Digital trip units enable simulation of tripping in warm state. The tripping times become shorter in a steady state, as shown in the following diagram. The steady state is a period during which the characteristic does not change. If the circuit breaker is loaded with a reduced current for at least 30 minutes, the tripping times will be cut by a half. If the load is less than 70% of I_r , the tripping time does not become shorter.



Decrease of tripping time with load

T - When tripping from the trip unit's "warm" state, the tripping time of the characteristic is cut short during the standstill time t_u by coefficient ***k***.

Thermal standstill time of the characteristics

For all trip units, the thermal standstill time is $t_u \geq 30$ min. During this time, the tripping time t_{sd} is cut short from the cold-state characteristic by the coefficient ***k***.

The real tripping time is $t_s = k \cdot t_{sd}$

Example

The shortening constant can be read from the diagram. With steady current 85% of I_r the real tripping time will be decreased to:

$t_s = 0.74 \cdot t_{sd}$

k [–] time shortening coefficient

I_r [A] adjusted rated current of the trip units

t_{sd} [s] tripping time of the trip unit, derived from the characteristic

t_s [s] real tripping time of the trip unit, tripped from warm state

t_u [s] standstill period for particular characteristics

Trip units are preset by the manufacturer

I_r = min

Restart = $T_{(t)}$

I_i = min, 0 ms

t_r = TV, $t_{(t)}$, min

I_{sd} = 0 ms, min

$I_N = 0.5\ I_r$

Trip units ETU LP - Lines protection

- Provides protection for lines with low starting currents

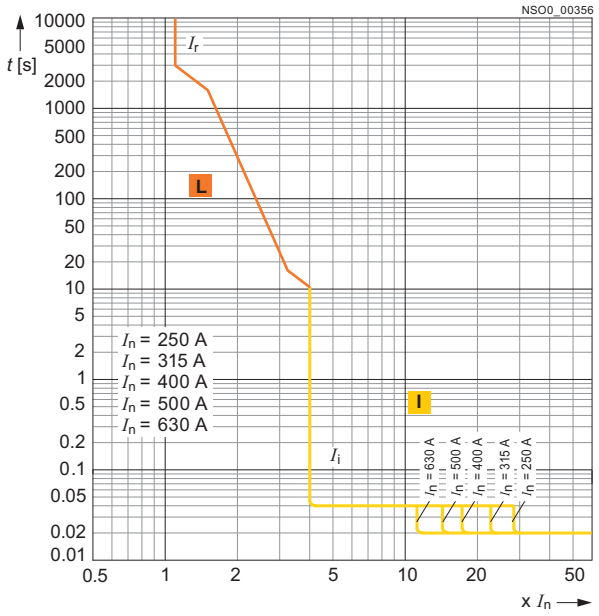
The 3VT93..-6AB00 trip unit is intended for the 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. The LP trip unit has a thermal memory that cannot be disabled. The rated currents of the trip units are given by their article numbers and correspond to a standardized series of currents (see specifications table). The short-circuit trip unit is fixed-set at 4 × I_n.

One of the advantages of the LP trip unit is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

Specifications

Article No.	Rated current I_n	Instantaneous short circuit protection I_i
	A	A
3VT9325-6AB00	250	1000
3VT9331-6AB00	315	1260
3VT9340-6AB00	400	1600
3VT9350-6AB00	500	2000
3VT9363-6AB00	630	2520

Tripping characteristics





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Trip units

Trip units ETU DP - Distribution protection

- Provides protection for lines and transformers

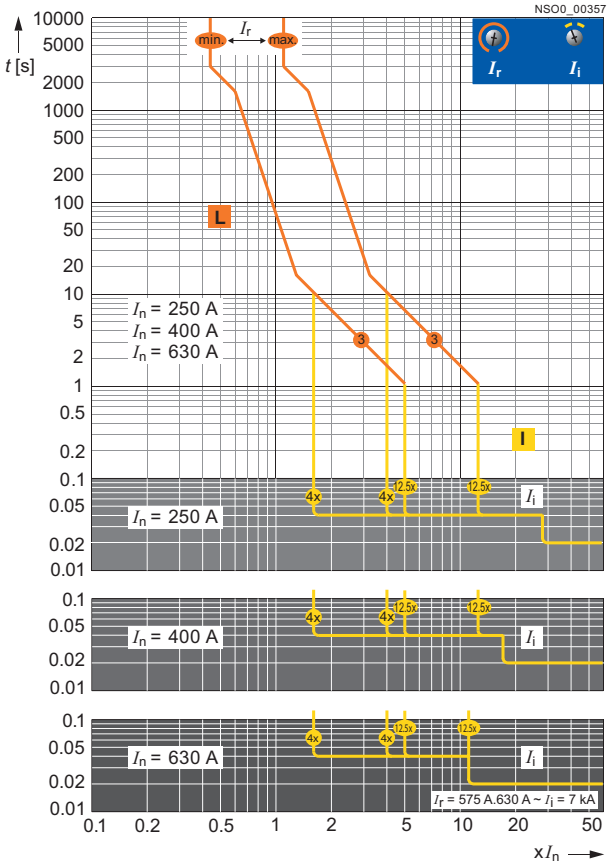
The 3VT93..-6AC00 trip unit is intended for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling the thermal memory, the thermal trip unit remains active. The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and just before tripping will begin to blink red.

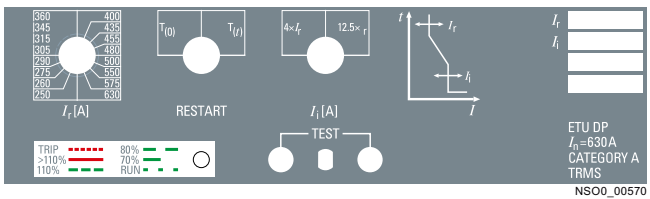
Located on the lower part of the trip unit cover are two photocells for communicating with the signalling unit.

The trip units have tripping characteristics especially designed for practical purposes, in order to provide optimal exploitation of transformers up to 1.5 I_r.

The trip units have simple adjustment of the tripping characteristic. Set-up includes only the rated current and the short-circuit tripping level at 4 I_r or 12.5 I_r.

Tripping characteristics





Adjustable specifications

Article No.	Rated current I_n A	Overload protection I_r A	Restart	Instantaneous short circuit protection I_i
3VT9325-6AC00	250	100 110 115 125 137 144 160 172 180 190 200 210 220 231 243 250	$T_{(0)}$ $T_{(t)}$	4 x I_r 12,5 x I_r
3VT9340-6AC00	400	160 172 180 190 200 210 220 231 243 250 275 290 315 345 360 400	$T_{(0)}$ $T_{(t)}$	4 x I_r 12,5 x I_r
3VT9363-6AC00	630	250 260 275 290 305 345 315 360 400 435 455 480 500 550 575 630	$T_{(0)}$ $T_{(t)}$	4 x I_r 12,5 x I_r

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Trip units ETU MP - Motor protection

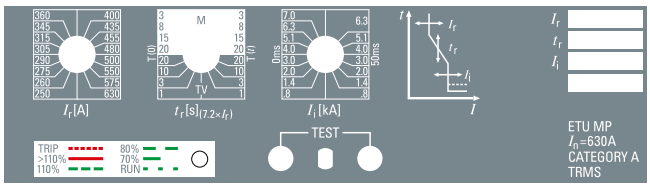
- Provides protection for motors and generators
- Can protect lines and transformers

The 3VT93..-6AP00 trip unit is intended for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. The operation of the MP trip unit is controlled by a microprocessor. The MP trip unit is equipped with a thermal memory that can be disabled by turning a switch located on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal trip unit remains active.

When one or two phases fail (due to current greater than I_r in the remaining phases), in the M-characteristic mode, the switch will open with a 4 s delay (so-called undercurrent trip unit).

Another parameter for adjusting the trip unit consists of the rated current and short-circuit tripping level. The time delay of the short-circuit trip unit can be set to 0 ms or 50 ms. The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and just before tripping will begin to blink red. Located on the lower part of the trip unit cover are two photocells for communicating with the signalling unit.

The trip units have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the trip unit. Mode "M" provides 4 characteristics suitable for protecting motors and in mode "TV" are 4 characteristics for protecting transformers and lines. The shape of each characteristic can be changed using a selector switch.



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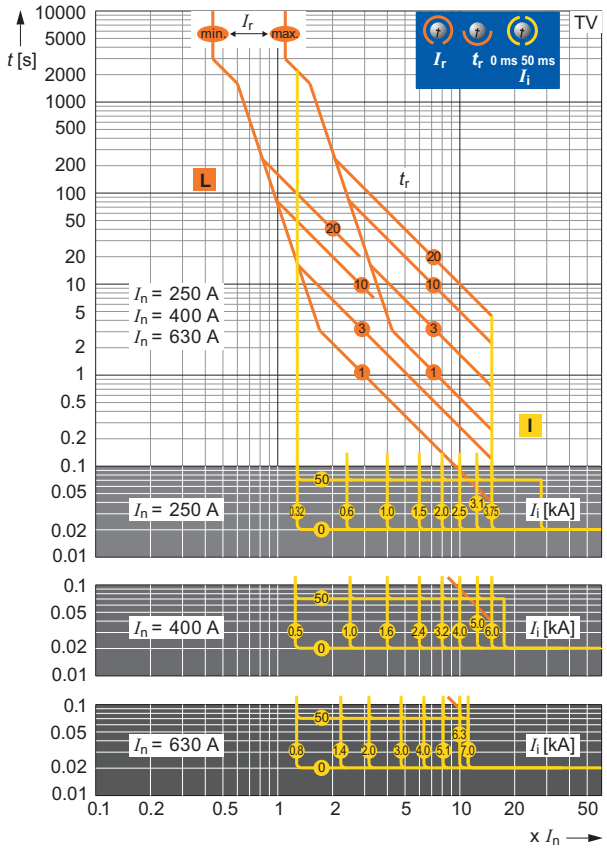
Adjustable specifications

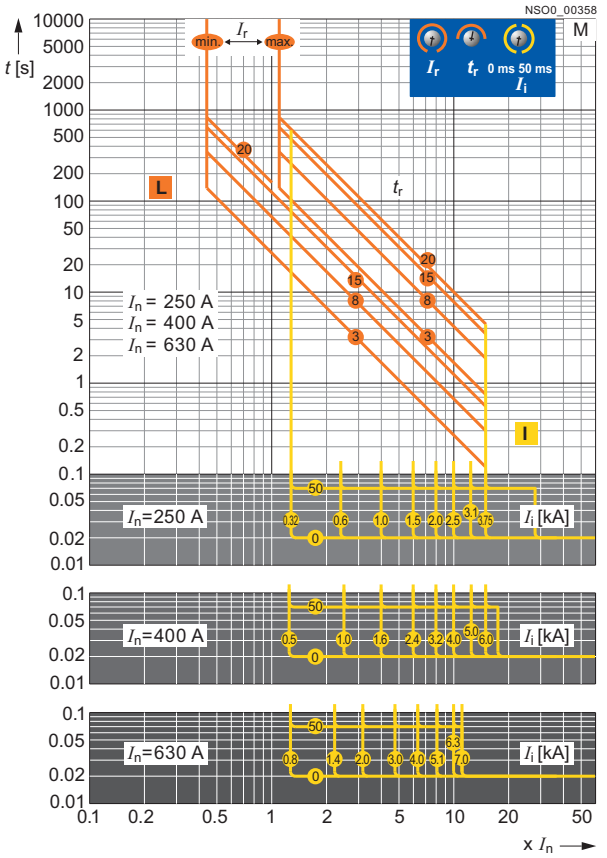
Article No.	Rated current I_n	Overload protection I_r	t_r (7.2 x I_r)	Restart	Instantaneous short circuit protection I_i	
	A	A	s		kA	ms
		100	1 (TV 1)	$T_{(0)}$	0,32	
		110	3 (TV 3)	$T_{(0)}$	0,6	
		115	10 (TV 10)	$T_{(0)}$	1,0	
		125	20 (TV 20)	$T_{(0)}$	1,5	0
		137	20 (M 20)	$T_{(0)}$	2,0	
		144	15 (M 15)	$T_{(0)}$	2,5	
		160	8 (M 8)	$T_{(0)}$	3,1	
3VT9325-6AP00	250	172	3 (M 3)	$T_{(0)}$	3,75	
		180	3 (M 3)	$T_{(t)}$	3,75	
		190	8 (M 8)	$T_{(t)}$	3,1	
		200	15 (M 15)	$T_{(t)}$	2.5	
		210	20 (M 20)	$T_{(t)}$	2,0	50
		220	20 (TV 20)	$T_{(t)}$	1,5	
		231	10 (TV 10)	$T_{(t)}$	1,0	
		243	3 (TV 3)	$T_{(t)}$	0,6	
		250	1 (TV 1)	$T_{(t)}$	0,32	
		160	1 (TV 1)	$T_{(0)}$	0,5	
		172	3 (TV 3)	$T_{(0)}$	1,0	
		180	10 (TV 10)	$T_{(0)}$	1,6	
		190	20 (TV 20)	$T_{(0)}$	2,4	
		200	20 (M 20)	$T_{(0)}$	3,2	0
		210	15 (M 15)	$T_{(0)}$	4,0	
		220	8 (M 8)	$T_{(0)}$	5,0	
3VT9340-6AP00	400	231	3 (M 3)	$T_{(0)}$	6,0	
		243	3 (M 3)	$T_{(t)}$	6,0	
		250	8 (M 8)	$T_{(t)}$	5,0	
		275	15 (M 15)	$T_{(t)}$	4,0	
		290	20 (M 20)	$T_{(t)}$	3,2	
		315	20 (TV 20)	$T_{(t)}$	2,4	50
		345	10 (TV 10)	$T_{(t)}$	1,6	
		360	3 (TV 3)	$T_{(t)}$	1	
		400	1 (TV 1)	$T_{(t)}$	0,5	
		250	1 (TV 1)	$T_{(0)}$	0,8	
		260	3 (TV 3)	$T_{(0)}$	1,4	
		275	10 (TV 10)	$T_{(0}$	2	
		290	20 (TV 20)	$T_{(0))}$	3	0
		305	20 (M 20)	$T_{(0)}$	4	
		315	15 (M 15)	$T_{(0)}$	5,1	
		345	8 (M 8)	$T_{(0)}$	6,3	
3VT9363-6AP00	630	360	3 (M 3)	$T_{(0)}$	7	
		400	3 (M 3)	$T_{(t)}$	6,3	
		435	8 (M 8)	$T_{(t)}$	6,3	
		455	15 (M 15)	$T_{(t)}$	5,1	
		480	20 (M 20)	$T_{(t)}$	4	
		500	20 (TV 20)	$T_{(t)}$	3	50
		550	10 (TV 10)	$T_{(t)}$	2	
		575	3 (TV 3)	$T_{(t)}$	1,4	
		630	1 (TV 1)	$T_{(t)}$	0,8	

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Trip units

Tripping characteristic 3VT9...-6AP00-ETU MP





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Trip units ETU MPS - Motor protection, setting timing selectivity

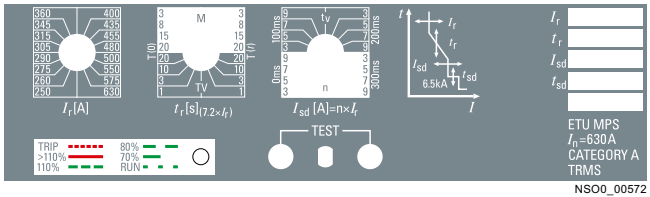
- Provides protection for motors and generators
- Can protect lines and transformers
- Enables adjusting time delay of time-independent trip units

The 3VT93..-6AS00 trip unit is designed for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal tipping function remains active.

When one or two phases fail (due to current greater than I_r in the remaining phases), in the M-characteristic mode, the switch will open with a 4 s delay (so-called undercurrent trip unit).

Another parameter for adjusting the trip unit consists of the rated current and tripping level of the delayed short-circuit trip unit. The time delay (t_{sd}) can be set on the delayed short-circuit trip unit at 0, 100, 200 or 300 ms. The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and just before tripping will begin to blink red. Located on the lower part of the trip unit cover are two photocells for communicating with the signalling unit.

The trip units have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the trip unit. Mode "M" provides 4 characteristics suitable for protecting motors, and mode "TV" incorporates 4 characteristics for protecting transformers and lines. The shape of each characteristic can be changed with a selector switch.



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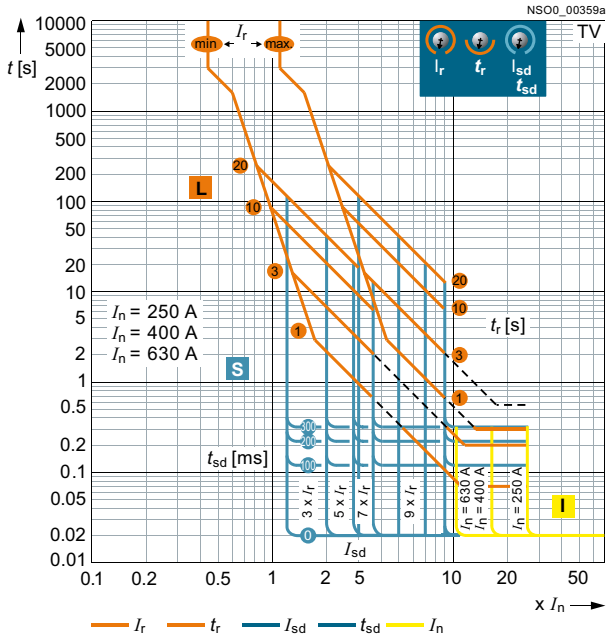
Adjustable specifications

Article No.	Rated current I_n	Overload protection I_r	t_r (7.2 x I_r)	Restart	Instantaneous short circuit protection I_i	
	A	A	S		x I_r	ms
3VT9325-6AS00	250	100	1 (TV 1)	$T_{(0)}$	3	
		110	3 (TV 3)	$T_{(0)}$	5	0
		115	10 (TV 10)	$T_{(0)}$	7	
		125	20 (TV 20)	$T_{(0)}$	9	
		137	20 (M 20)	$T_{(0)}$	3	
		144	15 (M 15)	$T_{(0)}$	5	100
		160	8 (M 8)	$T_{(0)}$	7	
		172	3 (M 3)	$T_{(0)}$	9	
		180	3 (M 3)	$T_{(t)}$	3	
		190	8 (M 8)	$T_{(t)}$	5	200
		200	15 (M 15)	$T_{(t)}$	7	
		210	20 (M 20)	$T_{(t)}$	9	
		220	20 (TV 20)	$T_{(t)}$	3	
		231	10 (TV 10)	$T_{(t)}$	5	300
		243	3 (TV 3)	$T_{(t)}$	7	
		250	1 (TV 1)	$T_{(t)}$	9	
3VT9340-6AS00	400	160	1 (TV 1)	$T_{(0)}$	3	
		172	3 (TV 3)	$T_{(0)}$	5	0
		180	10 (TV 10)	$T_{(0)}$	7	
		190	20 (TV 20)	$T_{(0)}$	9	
		200	20 (M 20)	$T_{(0)}$	3	
		210	15 (M 15)	$T_{(0)}$	5	100
		220	8 (M 8)	$T_{(0)}$	7	
		231	3 (M 3)	$T_{(0)}$	9	
		243	3 (M 3)	$T_{(t)}$	3	
		250	8 (M 8)	$T_{(t)}$	5	200
		275	15 (M 15)	$T_{(t)}$	7	
		290	20 (M 20)	$T_{(t)}$	9	
		315	20 (TV 20)	$T_{(t)}$	3	
		345	10 (TV 10)	$T_{(t)}$	5	300
		360	3 (TV 3)	$T_{(t)}$	7	
		400	1 (TV 1)	$T_{(t)}$	9	
3VT9363-6AS00	630	250	1 (TV 1)	$T_{(0)}$	3	
		260	3 (TV 3)	$T_{(0)}$	5	0
		275	10 (TV 10)	$T_{(0)}$	7	
		290	20 (TV 20)	$T_{(0)}$	9	
		305	20 (M 20)	$T_{(0)}$	3	
		315	15 (M 15)	$T_{(0)}$	5	100
		345	8 (M 8)	$T_{(0)}$	7	
		360	3 (M 3)	$T_{(0)}$	9	
		400	3 (M 3)	$T_{(t)}$	3	
		435	8 (M 8)	$T_{(t)}$	5	200
		455	15 (M 15)	$T_{(t)}$	7	
		480	20 (M 20)	$T_{(t)}$	9	
		500	20 (TV 20)	$T_{(t)}$	3	
		550	10 (TV 10)	$T_{(t)}$	5	300
		575	3 (TV 3)	$T_{(t)}$	7	
		630	1 (TV 1)	$T_{(t)}$	9	

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Trip units

3VT93..-6AS00 Tripping characteristics



Trip units ETU DPN-distribution protection with protected N pole

- For protecting lines and transformers in TN-C-S and TN-S networks

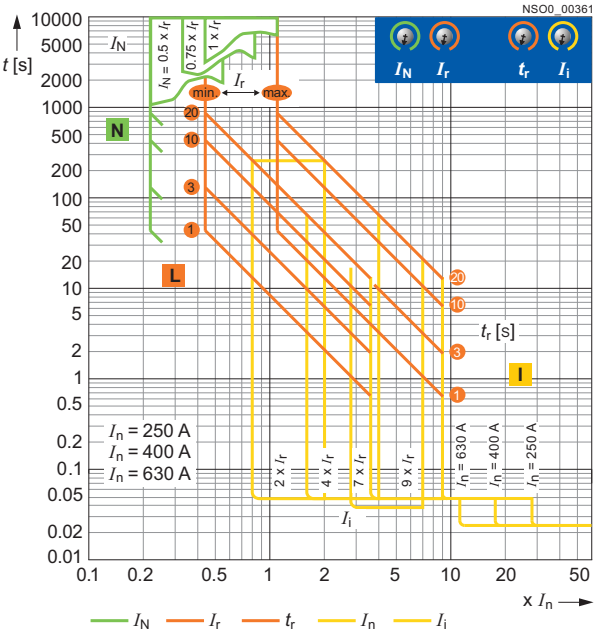
The 3VT93..-6BC00 trip unit is only intended for the 3VT3763-AA56-0AA0 switching unit. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal trip unit remains active.

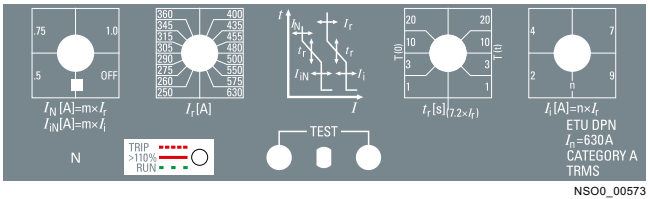
The rated current I_r, delay for switching off the trip unit at 7.2 I_r, and the tripping level of the short-circuit trip unit can be adjusted.

The operational state is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r this LED will turn red and will begin to blink red just before tripping. Located on the lower part of the trip unit cover are two photocells for communicating with the signalling unit.

The current of the fourth pole (N pole) is adjusted using the IN switch as a multiple of the I_r current. Measuring of current on the fourth pole can be disabled by turning the button to the "OFF" position.

Tripping characteristics





NSO0_00573

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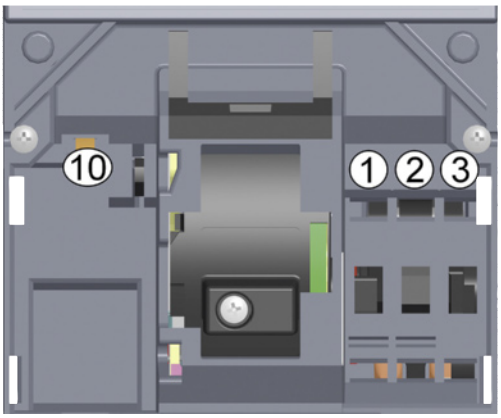
Adjustable specifications

Article No.	Rated current I_n	Overload protection I_r	t_r (7.2 x I_r)	Restart	Instantaneous short circuit protection I_i	
	A	A	S		x I_r	ms
3VT9325-6BC00	250	100	1	$T_{(0)}$	2	0,5
		110				
		115	3		4	0,75
		125				
		137	10		7	1
		144		$T_{(t)}$		
		160	20		9	OFF
		172				
		180	20			
		190				
		200	10			
		210				
		220	3			
		231				
		243	1			
		250				
3VT9340-6BC00	400	160	1	$T_{(0)}$	2	0,5
		172				
		180	3		4	0,75
		190				
		200	10		7	1
		210		$T_{(t)}$		
		220	20		9	OFF
		231				
		243	20			
		250				
		275	10			
		290				
		315	3			
		345				
		360	1			
		400				
3VT9363-6BC00	630	250	1	$T_{(0)}$	2	0,5
		260				
		275	3		4	0,75
		290				
		305	10		7	1
		315		$T_{(t)}$		
		345	20		9	OFF
		360				
		400	20			
		435				
		455	10			
		480				
		500	3			
		550				
		575	1			
		630				

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Auxiliary switches

Overview



Article number according to contact arrangement

Arrangement of contacts	Article No.	Number of contacts	Contact types
01	3VT9300-2AC10	1	NO
20	3VT9300-2AE10	2	NC
01	3VT9300-2AD10	1	NC
02	3VT9300-2AG10	2	NO
11	3VT9300-2AF10	1 + 1	NC + NO
001	3VT9300-2AH10	1	NC + NO

Functions and names of switches according to their location in accessory compartments

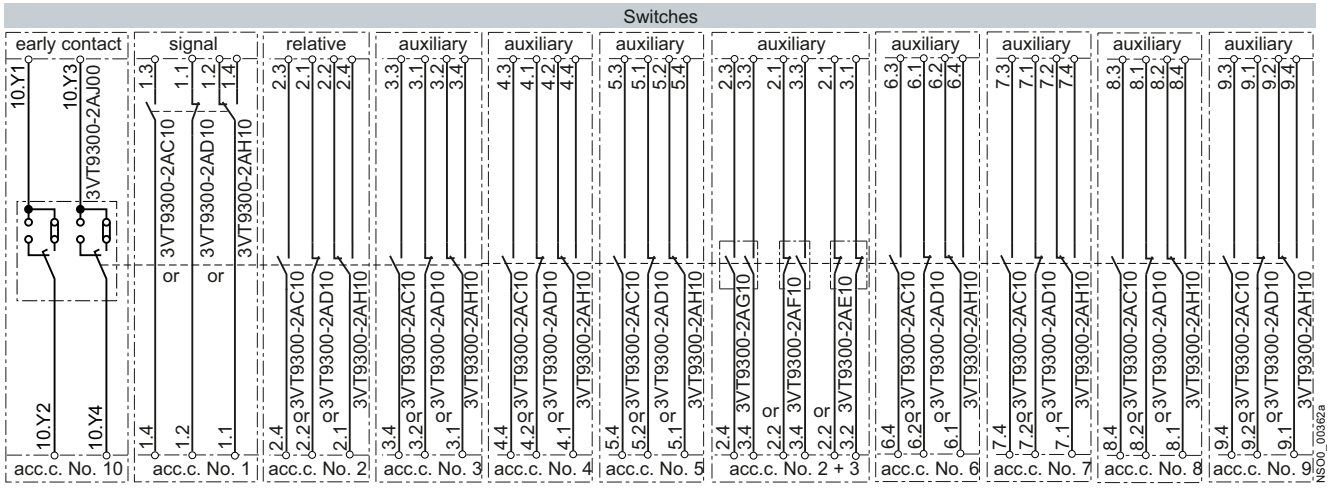
Accessory compartment	Switch name	Switch function
1	Signalling	Signal to indicate the state of the circuit breaker by the trip unit
2	Relative	Relative to indicate tripping of the circuit breaker by trip units, TEST pushbutton or by OFF pushbutton on the motorized operating mechanism
3, 4, 5, (6 ... 9)[1)]	Auxiliary	Auxiliary to indicate the position of the main contacts
10	Leading	Leading to make/break in advance of the main contacts

[1)] Accessory compartments 6 ... 9 for 4-pole version only.

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Function

State of switches located in the switching unit accessory compartment



Technical specifications

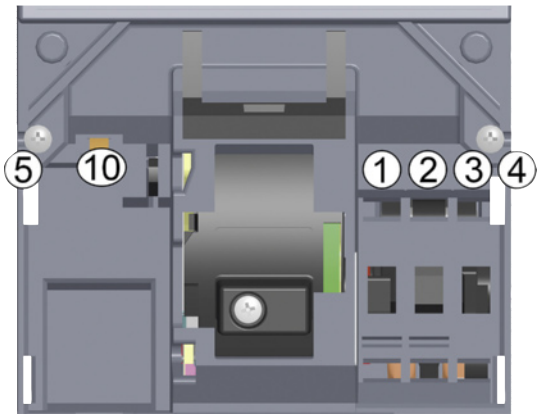
Article No.		3VT9300-2A.10	3VT9300-2A.20[1)]	3VT9300-2AJ00	3VT9300-2AH10	3VT9300-2AH20[1)]
Rated operational voltage U_e	V	AC 60 ... 500 DC 60 ... 500	AC 5 ... 60 DC 5 ... 60	AC 250	AC 24 ...250 DC 24 ...250	AC 5 ..60 DC 5 ...60
Rated isolation voltage U_i	V	500		250		
Rated frequency f_n	Hz	50/60				
Rated operational current I_e/U_e						
• AC-12		--	0.004 ... 0.5 A/5V	--	--	--
• AC-15		6 A/240 V,4 A/400 V, 2 A/500 V	--	1 A/AC 250 V	1.5 A/AC 250 V	--
• DC-12		--	0.004 ... 0.5 A/5V	--	--	0.01 A/DC 60 V
• DC-13		0.4 A/240 V, 0.3 A/400 V, 0.2 A/500 V	0.004 ... 0.01/60 V	--	0.2 A/DC 250 V	--
Thermal current I_{th}	A	10	0.5	--	6	0.5
Arrangement of contacts		01, 10, 02, 11, 20		02, 11, 20	001	
Connector cross-section S	mm^2	0.5 ... 1				
Terminal protection (connected switch)		IP20				

1) 3VT9300-2A.20 is not suitable for controlling electromagnetic loads.

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Auxiliary trip units

Overview



Article number of shunt trip units
according to the rated operating voltage

U_e	Article No.
AC/DC 24, 40, 48 V	3VT9300-1SC00
AC/DC 110 V	3VT9300-1SD00
AC 230, 400, 500 V/DC 220	3VT9300-1SE00

Article number of undervoltage trip units
according to the rated operating voltage

U_e	Article No.
AC 24,40 48 V	3VT9300-1UC00
AC/DC 110 V	3VT9300-1UD00
AC 230,400,500/DC 220 V	3VT9300-1UE00

The particular rated operating voltage of the trip unit is set up by jumpers located in the trip unit. Default setting is always the maximum value.

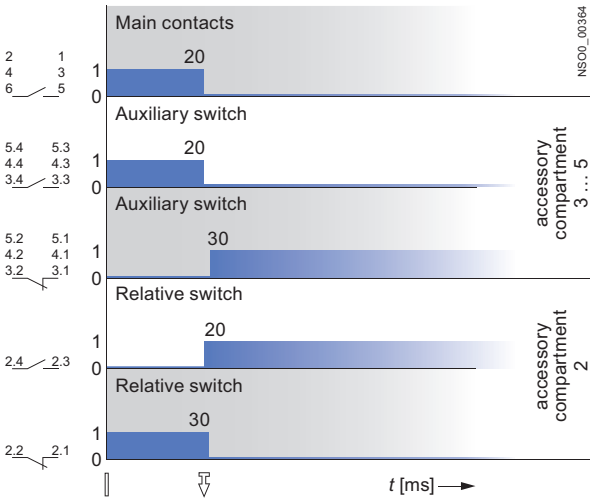




Function

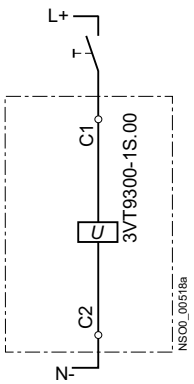
Shunt trip units

Circuit breaker switched off by the shunt trip unit

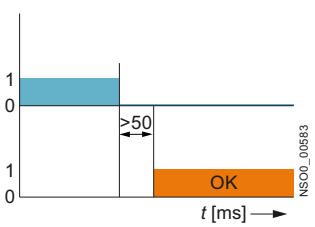


Circuit breaker states and lever positions of the circuit breaker

Circuit breaker state	Lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the tripping pushbutton located on the operating mechanism	
Switched off manually or electrically by operating mechanism	



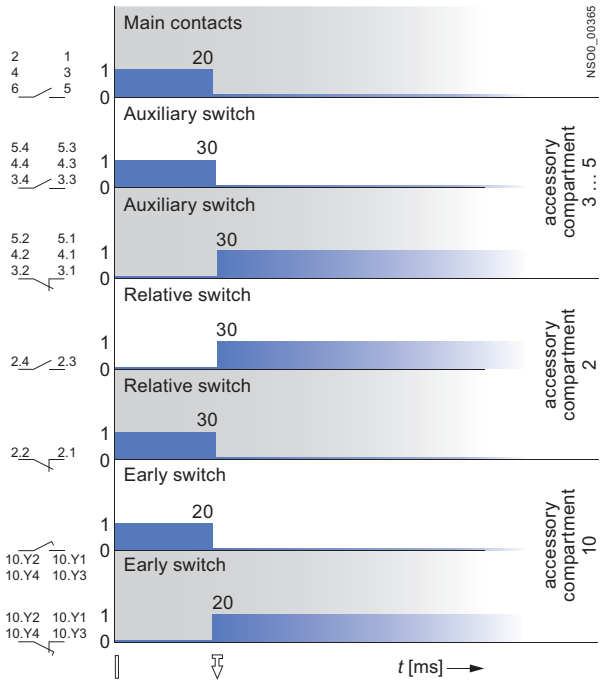
Reaction time of the shunt trip



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Undervoltage trip units

Circuit breaker switched off by the undervoltage trip unit



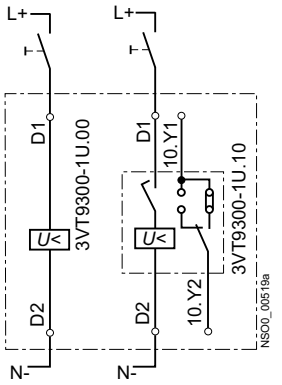
The 4th pole contact closes earlier than, and opens later than the main contacts

Circuit breaker states and lever positions of the circuit breaker

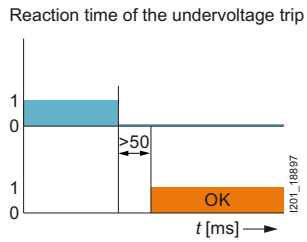
Circuit breaker state	Lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by operating mechanism	

Arrangement, number and type of contacts

Arrangement of contacts	Number of contacts	Contact types
2	2	NC
11	1 + 1	NC + NO
20	2	NO



Reaction time of the undervoltage trip unit



Technical specifications

Shunt trip units

Article No.		3VT9300-1S.00
Rated operating voltage U_e		AC 24, 40, 48, 110, 230, 400, 500 V DC 24, 40, 48, 110, 220 V
Rated frequency f_n	Hz	50/60
Input power at 1.1 U_e	AC DC	< 3 VA < 3 W
Functional description		$U \geq 0{,}7\ U_e$ the circuit breaker must trip
Time to switch-off	ms	20
Continuous load		Yes
Connector cross-section S	mm^2	0.5 ... 1
Terminal protection (connected trip unit)		IP20
Location in accessory compartment No.		10

Undervoltage trip units

Article No.		3VT9300-1U.00	3VT9300-1U.10[1]
Rated operating voltage U_e		AC 24, 40, 48, 110, 230, 400, 500 V DC 24, 40, 48, 110, 220 V	
Rated frequency f_n	Hz	50/60	
Input power at 1.1 U_e	AC DC	< 3 VA < 3 W	< 3 VA < 3 W
Functional description		U 0.85 U_e (circuit breaker can switch on) U 0.35 U_e (the circuit breaker must trip)	
Time to switched-off	ms	20	
Continuous load		Yes	
Connector cross-section S	mm^2	0.5 ... 1[1]	
Terminal protection (connected trip)		IP20	
Location in accessory compartment No.		10	
Earl switch		--	
Rated operating voltage U_e	V	--	AC 250
Rated frequency f_n	Hz	--	50/60
Rated operating current I_e/U_e	V	--	AC 1 A/AC 250
Arrangement of contacts		--	02, 11, 20
Connector cross-section S	mm^2	--	0.5 ... 1[1]
Terminal protection (connected trip unit)		--	IP20

[1] Cannot be used in combination with motorized operating mechanism 3VT9300-3M..0.

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Rotary operating mechanisms

Overview

Rotary operating mechanism

The following components of the rotary operating mechanisms are required:

- To switch the switching unit:
  - 3VT9300-3HE10 or 3VT9300-3HE20 black knob
  - 3VT9300-3HF20 red knob
- To switch the switching unit through the switchgear cabinet door:
  - 3VT9300-3HJ..extension shaft
  - 3VT9300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9300-3HE/HF.. knob

Mechanical interlocking and mechanical interlocking for parallel switching

- Mechanical interlocking for fixed-mounted versions require the following components:
  - 2 x 3VT9300-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9300-3HE/HF.. knob
- Mechanical interlocking with Bowden wire is intended for fixed-mounted, plug-in and withdrawable versions
- Mechanical interlocking with Bowden wire requires the following components:
  - 2 x 3VT9300-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9300-3HE/HF.. knob

Design



Fig. 1: Rotary operating mechanism with knob

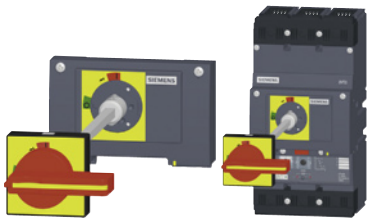


Fig. 2: Rotary operating mechanism with extension shaft, coupling driver and knob

The rotary operating mechanism makes it possible to actuate the circuit breaker by turning a knob, e.g. in order to switch machines on and off. The modular concept of the operating mechanisms makes allows simple mounting on the switching unit after the accessory compartment cover is removed. The operating mechanism and its accessories must be ordered separately (see page 3/6).

- The rotary operating mechanism is fixed right on the switching unit of the circuit breaker.
- The rotary operating mechanism coupling driver is fixed onto the switchgear door and it provides protection IP40 or IP66.
- The rotary operating mechanism knob is placed on the rotary operated mechanism unit or on the rotary operating mechanism coupling driver
- The extension shaft is available in two versions, standard (length 365 mm - can be shortened) and telescopic (adjustable length 245 ... 410 mm).

The rotary operating mechanism makes it possible to actuate the circuit breaker:

Operation from the front panel of the circuit breaker (Fig. 1)

3VT9300-3HA/HB.. rotary operating mechanism
+ 3VT9300-3HE/HF.. knob

Operation through the switchgear cabinet door (Fig. 2)

3VT9300-3HA/HB.. rotary operating mechanism
+ 3VT9300-3HJ.. extension shaft
+ 3VT9300-3HE/HF.. knob
+ 3VT9300-3HG/HH.. coupling driver

Operation through side wall of switchgear cabinet

3VT9300-3HC/HD10.. rotary operating mechanism
+ 3VT9300-3HJ.. extension shaft
+ 3VT9300-3HE/HF.. knob
+ 3VT9300-3HG/HH.. coupling driver

Enhanced safety for operator:

- The rotary operating mechanism and knob allow operators to lock the circuit breaker in position "switched off manually". The unit and knob of the rotary operating mechanism can be locked by three padlocks with a shank diameter up to 6 mm
- Each coupling driver for door-coupling operating mechanism prevents the cabinet door from being opened when the circuit breaker is in on-state or after tripping. Types 3VT9300-3HG10 and 3VT9300-3HG20 prevent the cabinet door from being opened when the circuit breaker is in the state "switched off manually" and when the rotary operating mechanism knob is locked out.
- Two circuit breakers with rotary operating mechanisms can be provided with mechanical interlocking or with parallel mechanical switching (see page 3/32).

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Features

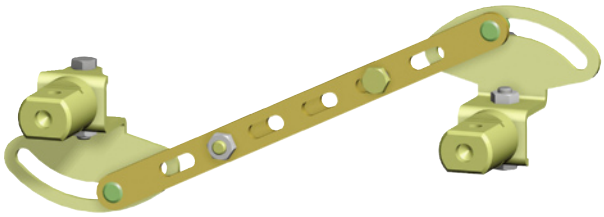
Article No.	Description	Color	Permits operator to lock the circuit breaker in OFF mode	Degree of protection	Switchgear cabinet door is locked when circuit breaker is		Length in mm
					switched on	switched off manually and locked	
3VT9300-3HA10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9300-3HA20	Rotary operating mechanism	gray	yes	--	--	--	--
3VT9300-3HB20	Rotary operating mechanism	yellow	yes	--	--	--	--
3VT9300-3HC10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9300-3HD10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9300-3HE10	Knob	black	no	--	--	--	--
3VT9300-3HE20	Knob	black	yes	--	--	--	--
3VT9300-3HF20	Knob	red	yes	--	--	--	--
3VT9300-3HG10	Coupling driver	black	--	IP40	yes	yes	--
3VT9300-3HG30	Coupling driver	black	--	IP40	yes	yes	--
3VT9300-3HG20	Coupling driver	black	--	IP66	yes	no	--
3VT9300-3HH10	Coupling driver	yellow	--	IP40	yes	yes	--
3VT9300-3HH30	Coupling driver	yellow		IP40	yes	yes	--
3VT9300-3HH20	Coupling driver	yellow	--	IP66	yes	no	--
3VT9300-3HJ10	Extension shaft, can be shortened	--	--	--	--	--	365
3VT9300-3HJ20	Extension shaft, telescopic	--	--	--	--	--	245 ... 410

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Mechanical interlocking and parallel switching

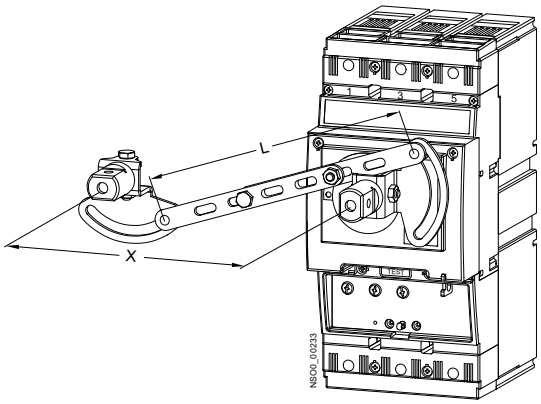
Function

3VT9300-8LA00 mechanical interlocking

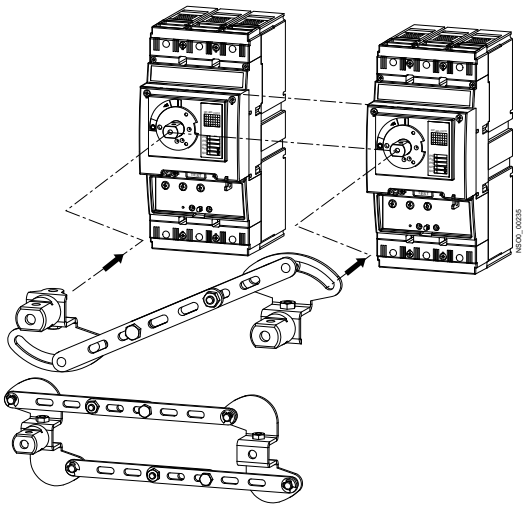


Mechanical interlocking make sure that two circuit breakers cannot trip simultaneously, but always just individually. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two 3VT3 circuit breakers or between one 3VT3 and one 3VT2 circuit breaker. Both circuit breakers must be furnished with rotary operating mechanisms (at least one of them with a rotary operating mechanism and knob).

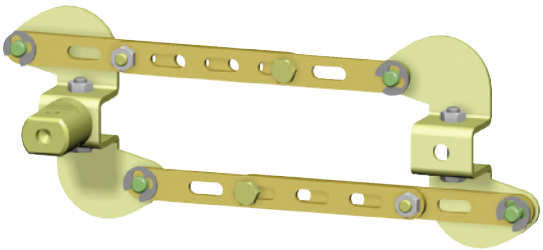
When using a mechanical interlocking it is required to comply with the dimensions shown in the figure and in the table.



Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2, 3P	105	112	140	145.5	122.5	128.5	181	185.5
3VT2, 4P	105	112	140	145.5	122.5	128.5	181	185.5
3VT3, 3P	122.5	128.5	157.5	145.5	140	145.5	185	189
3VT3, 4P	122.5	128.5	157.5	145.5	140	145.5	185	189

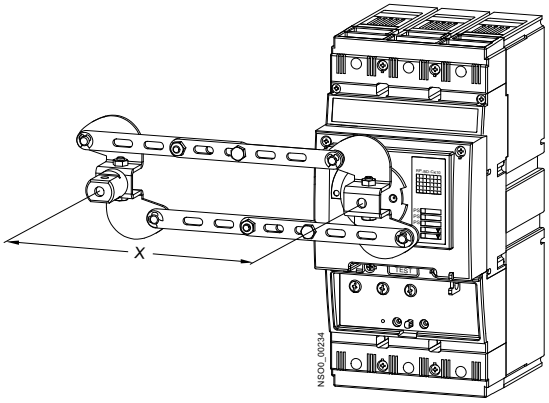


3VT9300-8LB00 mechanical parallel switching



Mechanical interlocking for parallel switching are for simultaneous switching of two circuit breakers. Parallel switching can be used between two 3VT3 circuit breakers or between 3VT3 and 3VT2 circuit breakers. Each circuit breaker must be furnished with a rotary operating mechanism and at least one of them with a knob.

When using a mechanical interlocking for parallel switching it is required to comply with the dimensions shown in the figure and in the table.



Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole[1]	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2, 3P	105^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	x	x
3VT2, 4P	105^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	x	x
3VT3, 3P	122.5^{+7}	164.5^{+7}	140^{+7}	164.5^{+7}	140^{+7}	164.5^{+7}	x	x
3VT3, 4P	122.5^{+7}	164.5^{+7}	140^{+7}	164.5^{+7}	140^{+7}	164.5^{+7}	x	x

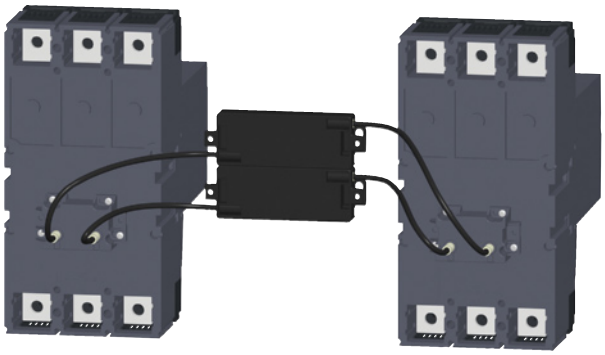
[1] Switching unit 3VT3, 4P (4-pole version) must be located on the right side.

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Mechanical interlocking and parallel switching

3VT9.00-8LC.0 Mechanical interlocking with bowden wire



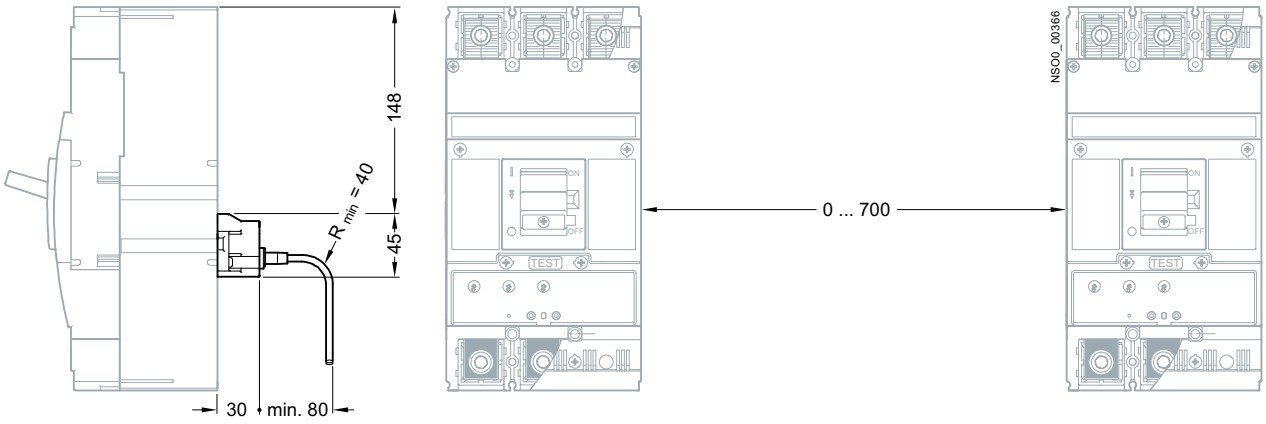


- Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both trip simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- 3VT9300-8LC10 mechanical interlocking is intended for two 3VT3 circuit breakers. 3VT9300-8LC20 interlocking is intended for one 3VT3 circuit breaker and one 3VT2.
- Circuit breakers may be in fixed, plug-in and withdrawable designs.

Article No. of mechanical interlocking	3VT9300-8LC10	3VT9300-8LC20
Circuit breaker types	3VT3	3VT2
	3VT3	3VT3

Circuit breaker installation in switchgear and controlgear assemblies

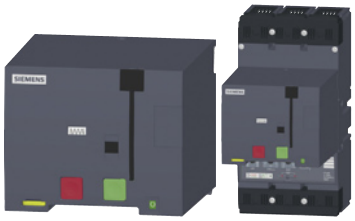
Detailed information is included in the "Instructions for use", which is available on our website:
www.siemens.com/lowvoltage/product-support.



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Motorized operating mechanism

Design



- It is used for remote control of the circuit breaker (switch off/on).
- Simple mounting on the circuit breaker after the circuit breaker cover of cavities is removed.
- Usage in industrial applications e.g. switching of stand by units etc. or wherever the automatic operation of electric devices is needed.
- In order to speed up the circuit breaker's switch off (e.g. safety STOP button) the undervoltage release or shunt trip can be used.
- On the motor drive front panel there is a change-over switch to select the drive modes AUTO/MANUAL:
  - AUTO mode - remote control. The circuit breaker is controlled by buttons for remote switch off/on, furthermore in this position mechanical control can be used on the front panel of the motor drive.
  - MANUAL mode - manual control. Control voltage is not needed. The circuit breaker can be switched on using the green switch on button and switched off using the red switch off button on the front part of the drive cover. Electric switch on is blocked. Electric switch off is functional. The accumulation of energy can be done by means of hinged lever.
- Possibility to indicate remotely the state of the AUTO/MANUAL switch.
- In MANUAL mode it is possible to switch on and off with the green and red pushbuttons located on the front panel of the motorized operating mechanism cover. The function of the remote control ON button in MANUAL mode is locked out, whereas the function of the remote control OFF button remains active for safety reasons.
- The motorized operating mechanism, as opposed to the circuit breaker, recognizes only two fixed positions. In the first position the circuit breaker is ON. When the circuit breaker is tripped in AUTO mode by the trip unit or shunt/undervoltage trip units, then because of mechanical link between the circuit breaker and the motor mechanism, a pulse will be generated to automatically wind up the spring of the storage unit. The motor mechanism can be wound up automatically by permanent closing switch S. In the second fixed position the circuit breaker is switched off and the loaded drive is ready to switch the breaker on after it has received the setting pulse.
- The motorized operating mechanism makes it possible to control the circuit breaker after the loss of control voltage. In MANUAL and AUTO modes, it is possible to wind up the storage unit by repeated rotation of the foldable handle. After charging the spring mechanism with spring energy, it is possible to switch the circuit breaker on and off with the control buttons located on the front panel of the motor mechanism.
- The front panel incorporates a storage unit status indicator to indicate what state the 3VT3 motor mechanism unit storage is in and whether it is possible to switch the circuit breaker on. The 3VT3 motor mechanism is also able to remotely indicate the storage status. A corresponding signal is issued to the terminal strip. 3VT motor mechanism have optional designs, alternatively with MANUAL/AUTO indication.
- The motorized operating mechanism can be furnished with an electromechanical operations counter that may be installed in the drive cover or outside of the circuit breaker (e.g. in the switchgear door). A metal holder included in the scope of supply of the external operations counter. Connecting is facilitated with connectors.
- The motorized operating mechanism can be locked in off position using as many as three padlocks with shank diameter max. 4.3 mm.
- A 3VT9300-3MF20 cover can be attached to the ON-OFF switch of the motorized operating mechanism, and then sealed with sealing wire. The cover prevents turning on the circuit breaker from the drive panel.
- Extension cable 3VT9300-3MF00 has a connector on one side that connects to the connector located on the motor mechanism and conductors on the other side that connect, for example, to a terminal block.
- Front panel state indicating device of the stored energy signals the state of motor drive storage devices. The state can be signalled from a distance.
- Motor drive can be sealed means of bolt sealing 3VT9200-8BN00

Article No.		3VT9300-3M.00
Operational voltage U_e	AC V DC V	24 ,48, 110, 230 24, 48, 110, 220
Rated frequency f_n	Hz	50/60
Control pulse length for storing	ms	400 ∞ [1]
Control pulse length		
for switching on	ms	20 ... 700 [1]
for switching off	ms	400 ...∞ [1]
Time before switching on	ms	< 60
Time before switching off	ms	900
Frequency of cycles ON/OFF		3 contact making/min
Frequency of cycles - instant successive ON/OFF cycles		10 contact making
Mechanical endurance		20000 contact making
Input power	AC VA DC W	100 100
Protection		
• AC 24, 48, 110 V; AC 230 V		5SX4104-7; 5SX4102-7
• DC 24, 48, 110 V; DC 220 V		5SX5104-7; 5SX5102-7
Rated operating current AUTO / MANUAL switches I_e/U_e	V	AC 5 A/250 DC 0.5 A/250

Article No.		3VT9300-3MF00
Number of conductors		12
Conductor cross sections S	mm^2	0.35
Conductor lengths	cm	60

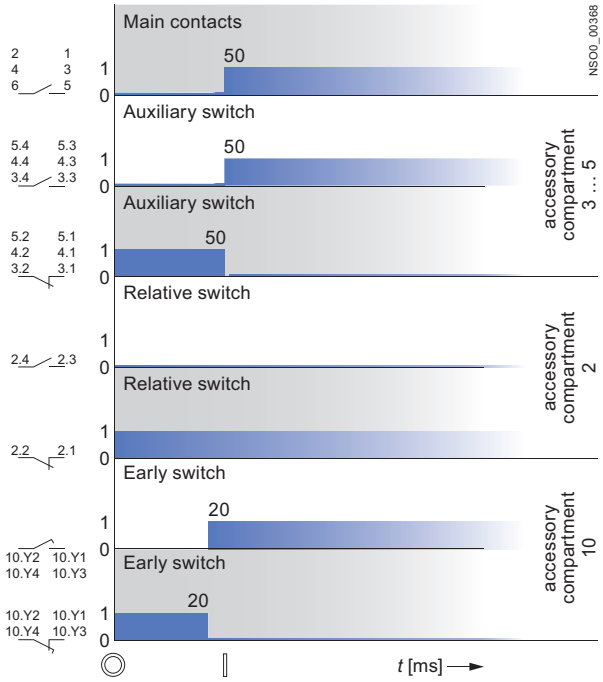
[1] For sequence of control pulses, see page 3/35.

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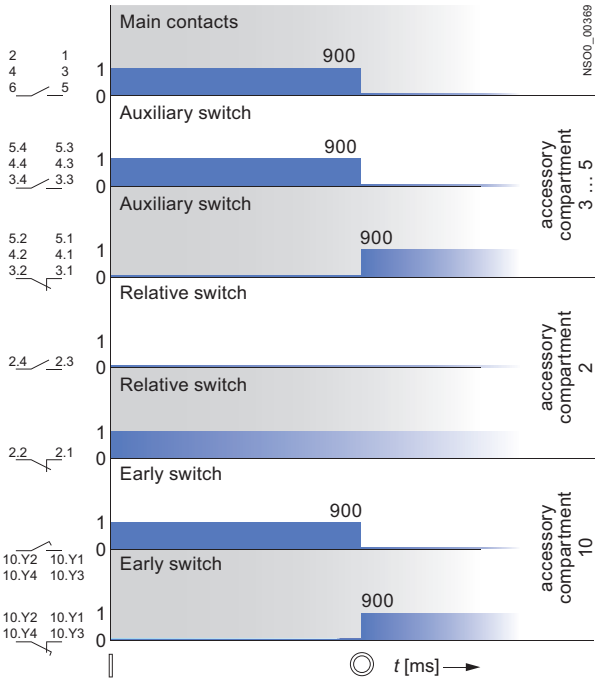
Function

Circuit breaker switched on/off by the motorized operating mechanism

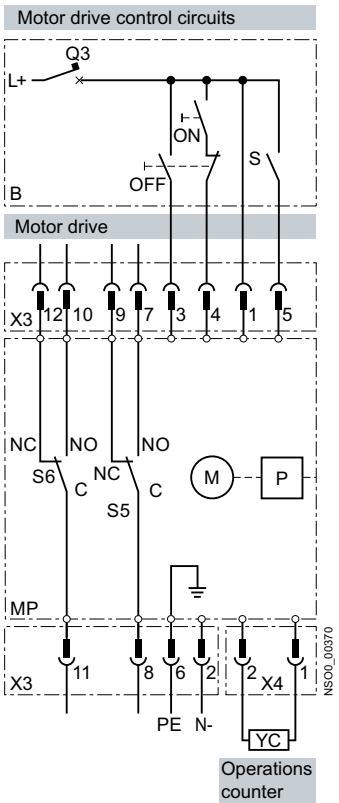
Circuit breaker switched on by the motorized operating mechanism – electricaly by pushbutton ON



Circuit breaker switched off by the motorized operating mechanism- electricaly by pushbutton OFF



Wiring diagram



Circuit breaker states and toggle positions of the circuit breaker

Circuit breaker state	Toggle positions of circuit breaker
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

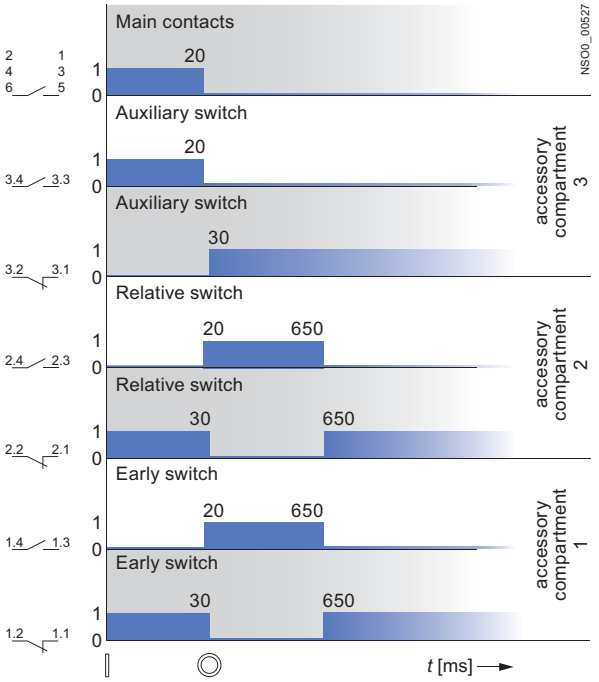
Wiring diagram description

Symbol	Description
MP	Motorized operating mechanism 3VT9300-3M..0
M	Motor
P	Energy storage device
X3	Connector to connect control circuits
X4	Connector for external operations counter
S5	Switch indicating AUTO/MANUAL modes
S6	Switching indicating energy storage (ready to on: NO-C)
YC	External operations counter 3VT9300-3MF10
B	recommended wiring of the control circuits (not included in delivery)
ON	Make pushbutton
OFF	Break pushbutton
S	Switch for energy storage (switched on = automatic storage, may be continuously switched on)
Q3	Circuit breaker for motorized operating mechanism

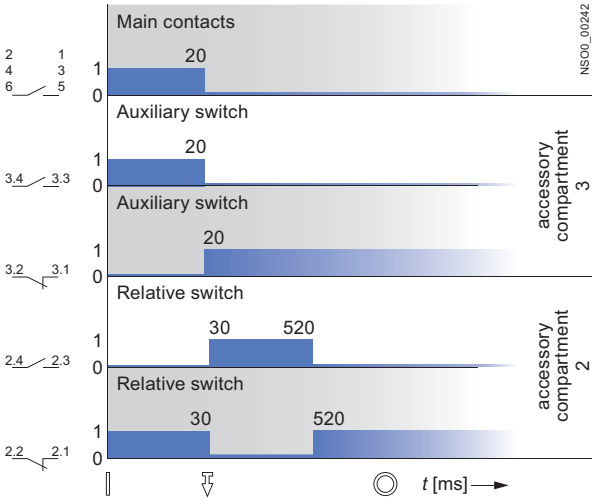
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Motorized operating mechanism

Tripping of the circuit breaker with a motorized operating mechanism by the trip unit (switch S – automatic spring charging)

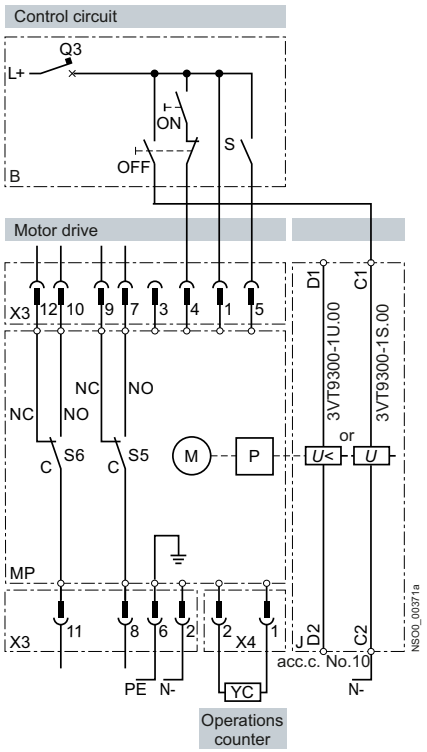


Tripping of the circuit breaker with motorized operating mechanism by a shunt trip unit or undercurrent trip unit (switch S – automatic spring charging)

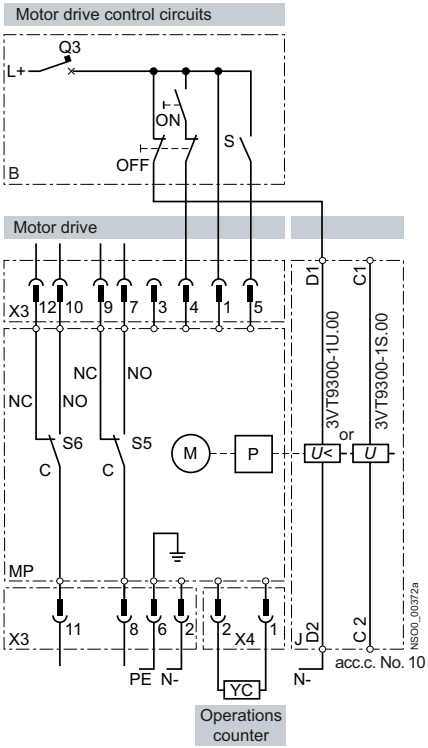


Wiring diagram

Circuit breaker switched on by motorized operating mechanism (electrical ON signal) and switched off by the shunt trip unit



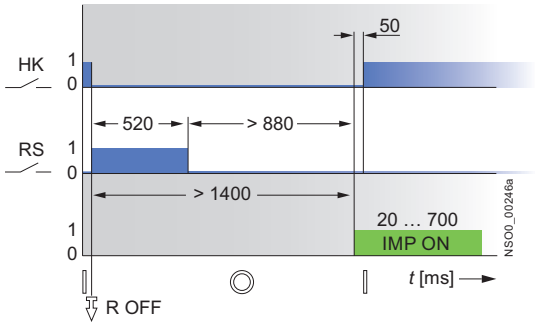
Circuit breaker switched on by motorized operating mechanism (electrical ON signal) and switched off by undervoltage trip unit



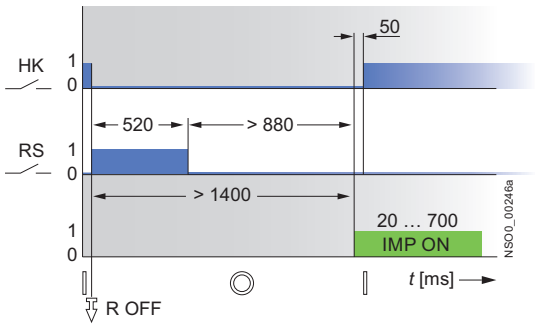
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Recommended actuating pulses

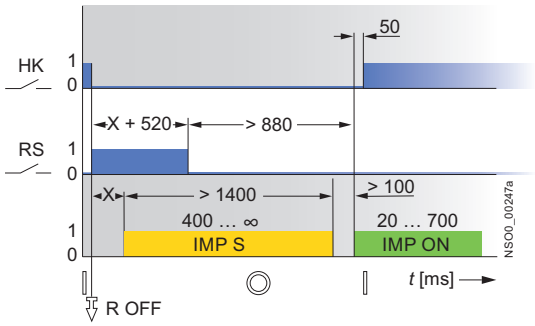
Circuit breaker switched on/off by motorized operating mechanism - switch S permanently closed (automatic spring charging) or open



Circuit breaker switched off by trip unit or shunt/undervoltage trip units and switched on by the motorized operating mechanism - switch S permanently closed (automatic spring charging)



Circuit breaker switched off by trip unit or shunt/undervoltage trip units and switched on by motorized operating mechanism - switch S closed only for storing



Description of charts

Symbol	Description
HK	Main contacts
PS	Auxiliary switch
RS	Relative switch
R OFF	Circuit breaker closes instantly, by trip unit
IMP S	Pulse to charge spring mechanism
IMP ON	Make pulse for motorized operating mechanism
IMP OFF	Break pulse for motorized operating mechanism
X	Random segment of time

Circuit breaker states and toggle positions of the circuit breakers

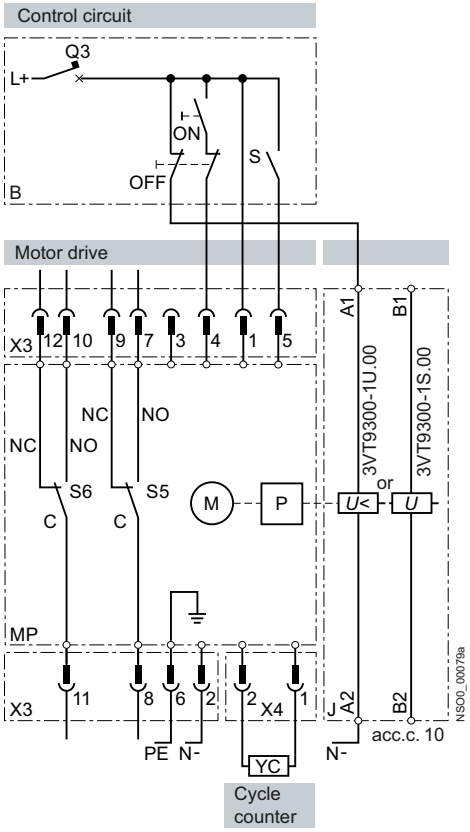
Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

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Motorized operating mechanism

Use of 3VT9200-3M..0 motorized operating mechanism in the automatic standby system

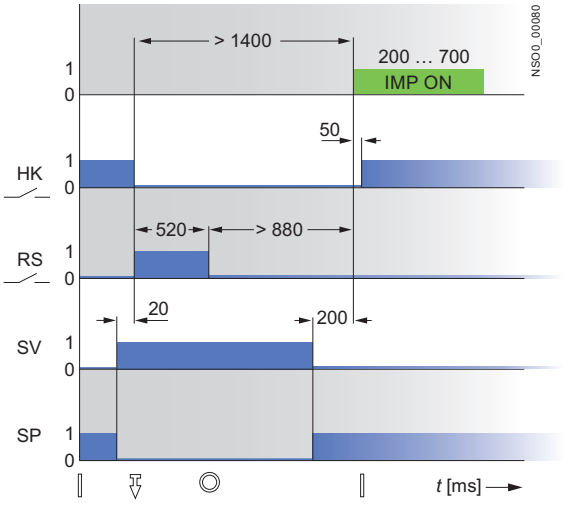
Wiring diagram of the motorized operating mechanism of the circuit breaker

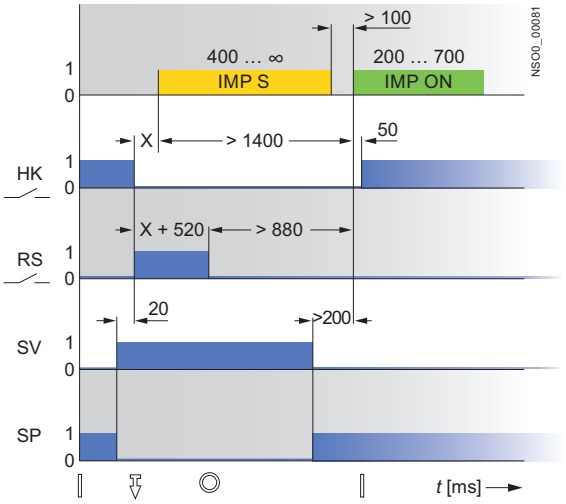


Symbol	Description
M	Motor
P	Energy storage device
X3	Connector for connection of control circuits
X4	Connector for external cycle counter
S5	Switch indicating AUTO (NO-C)/MANUAL (NC-C) mode
YC	External 3VT9300-3MF10 cycle counter
B	Recommended connection of control circuits (is not included in the motor drive supply)
ON	Pushbutton
OFF	Pushbutton
S	Switch for storage (closed = automatic storage; it can be closed permanently)
Q3	Circuit breaker for motorized operating mechanism

In a standby system, if a Bowden cable is used for mechanical interlocking, then an auxiliary trip unit should be used to switch the circuit breaker off. Otherwise, the first attempt of switching a standby circuit breaker may fail.

Recommended control pulses for switching the 3VT3 circuit breakers by the motorized operating mechanism after Circuit breaker was switched off by a shunt trip unit or by an undervoltage trip unit in the automatic standby system



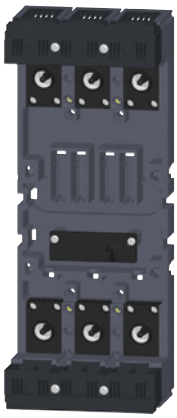


Symbol	Description
HK	Main contacts
RS	Relative switch
SV	Pulse for shunt trip unit
SP	Pulse for undervoltage trip unit
IMP ON	Motorized operating mechanism make pulse
IMP OFF	Motorized operating mechanism storage pulse (generated by S switch)
	Switched on
	Switched off by trip units, TEST or INSPECTION pushbutton
	Switched off manually or by motorized operating mechanism electrically (wound up state)

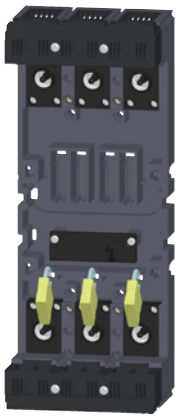
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Overview

Plug-in bases



3VT9200-4PA30
plug-in base



Locking plug-in base against
inserting the circuit breaker/disconnector

The plug-in version of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker is needed.

- The plug-in base includes complete accessories for assembling circuit breaker/switch-disconnector in plug-in design from the original fixed-mounted version
- The components of the plug-in base are:
  - supporting part of the plug-in base
  - 2 connection sets (total of 6 terminals) for fitting on to the switching unit
  - interlocking connecting rod (ensures automatic switching off of the circuit breaker for handling – inserting and removal)
  - set of mounting bolts for securing circuit breaker into plug-in base (to secure plug-in base into switchboard, a set of mounting bolts is used that is included in delivery of the 3VT3763-.AA36-0AA0 switching unit

Main circuit

- The 3VT9300-4TA30 connecting set is used for connecting with busbars or cable lugs and is included in the scope of supply of the 3VT3 of switching unit , 3 pole
- for connecting in another way, it is necessary to use connecting sets (see page 3/9)
- connections must comply with our recommendations (see page 3/45).

Auxiliary circuits



These are connected using a 15-wire 3VT9300-4PL00 cable.

Coding

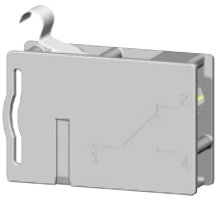
3VT9300-4WN00 coding set



The plug-in base and the circuit breaker can be provided with a coding set, which prevents inserting any other circuit breaker into the plug-in base.

Position signalling

3VT9300-4WL00 position signalling switch



The plug-in base may be provided with a maximum of four switches (for 4-pole version, max. 6 switches) for signalling the connected/removed position.

States of 3VT9300-4WL00 switches in plug-in base according to the circuit breaker position

Accessory compartment	11, 12, 13, 14 (19, 20)[1]	
Circuit breaker position		
Inserted	0	1
Removed	1	0

0 = contact open, 1 = contact closed

[1] Accessory compartments 19 and 20 are for 4-pole version only.

Technical specifications

Article No.		3VT9300-4WL00
Rated operational voltage U_e	V	AC 400 AC 250
Rated isolation voltage U_i	V	AC 500
Rated frequency f_n	Hz	50/60
Rated operational current I_e/U_e		
AC-13		3 A/AC 400 V
DC-15		0.15 A/250 V, 3 A/125 V, 4 A/30 V
Thermal current I_{th}	A	6
Arrangement of contacts		001
Connector cross-section S	mm^2	0.5 ... 1
Terminal protection (connected switch)		IP20

A wiring diagram showing the circuit breaker situated in a plug-in mounting base and outfitted with accessories, is shown on page 3/14.

Plug-in base with motorized operating mechanism

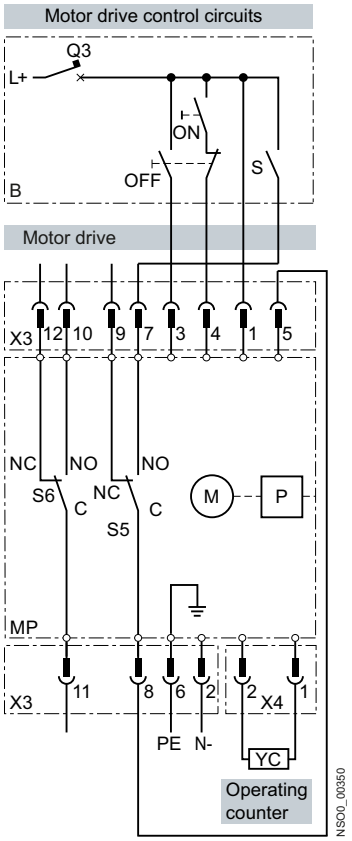


Circuit breaker in plug-in version with motorized operating mechanism

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Mounting accessories for plug-in version

Recommended wiring of the circuit breaker in plug-in design with motorized operating mechanism



Symbol	Description
MP	3VT9300-3M..0 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Terminal strip to connect control circuits
X4	Terminal strip for external operations counter
S5	Switch indicating AUTO (NO-C)/MANUAL (NC-C) modes
S6	Switch to indicate full storage (ready to switch on: NO-C)
YC	External operations counter 3VT9300-3MF10
B	Recommended wiring of the control circuits (control circuits not included in motorized operating mechanism delivery)
ON	Make pushbutton
OFF	Break pushbutton
S	Switch to store energy
Q3	Circuit breaker for motorized operating mechanism AC 24V 5SX4104-7 AC 48V 5SX4104-7 AC 110V 5SX4104-7 AC 230V 5SX4102-7 DC 24V 5SX5104-7 DC 48V 5SX5104-7 DC 110V 5SX5104-7 DC 220V 5SX5102-7

Recommended process of manipulation

After every manipulation with circuit breaker in plug-in design it is necessary to accomplish the operations in following sequence, after repeated insertation into the plug-in device:

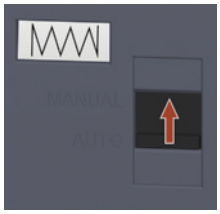


1 2

1) press the switch off button (red) on the motor operating mechanism
2) press the switch on button (green) on the motor operating mechanism

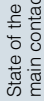
Unplugging the circuit breaker with motorized operating mechanism

- Each time before removing the circuit breaker, we recommend turning first of all the AUTO/MANUAL switch on the motorized operating mechanism to the MANUAL position
- More operating information is available in the operating instructions
- Not adhering to this procedure or failing to follow the recommended wiring, could mean that the circuit breaker will not successfully switch on at the first attempt.



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Changes in states of switches when inserting and withdrawing the circuit breaker

State of circuit breaker before removing			State of switches before removing inserted position →						State of switches after removing withdrawn position					
Accessory compartment			1		2		3, 4, 5 (6 ... 9)[1]		1		2		3, 4, 5 (6 ... 9)[1]	
	Lever position of the circuit breaker	State of the main contacts	3VT9300-2AC10	3VT9300-2AH10	3VT9300-2AC10	3VT9300-2AH10	3VT9300-2AC10	3VT9300-2AH10	3VT9300-2AC10	3VT9300-2AH10	3VT9300-2AC10	3VT9300-2AH10	3VT9300-2AC10	3VT9300-2AH10
														
Switched on		1	1	0	0	1	1	0	1	0	1	0	0	1
Manually switched off or switched off by motorized operating mechanism		0	1	0	0	1	0	1	1	0	1	0	0	1
Switched off by trip units		0	0	1	1	0	0	1	0	1	1	0	0	1
Switched off from switched-on state: by means of auxiliary trip unit, TEST pushbutton or by OFF pushbutton located on the motorized operating mechanism		0	1	0	1	0	0	1	1	0	1	0	0	1

0 = contact open, 1 = contact closed

[1] Accessory compartments 4, 5, 6 are for 4-pole version only.

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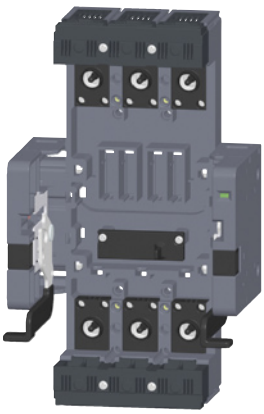
Mounting accessories for withdrawable version

Design

Withdrawable version mounting base



Circuit breaker installed in withdrawable version base



3VT9300-4WA30 withdrawable version base

The withdrawable version of the circuit breaker/switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker and frequent checking of the circuit are needed.

- The withdrawable version base includes all parts needed to convert a circuit breaker or switch disconnector from fixed-mounted version to withdrawable version.
- The components of the withdrawable version are:
  - withdrawable version base
  - 2 movable side plates
  - 2 connection sets (total of 6 terminals) for fitting onto the switching unit
  - interlocking connecting rod (ensures automatic switching off of the circuit breaker when handling, inserting and withdrawing)
  - a set of mounting bolts needed to fasten the withdrawable version mounting base into the switchboard

Main circuit

- The 3VT9300-4TA30 connecting set is used for connecting with busbars or cable lugs and is included in delivery of the 3VT3763-.AA36-0AA0 switching unit
- For connecting in another way, it is necessary to use connecting sets (see page 3/9)
- The type of connections must comply with our recommendations (see page 3/45).

Auxiliary circuits



These are connected using the 3VT9300-4PL00 15-wire cable.

Coding

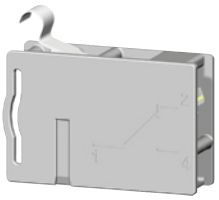
3VT9300-4WN00 coding set



The withdrawable version mounting base and the circuit breaker can be provided with coding set, which prevents inserting another circuit breaker into the withdrawable version mounting base.

Position signalling

3VT9300-4WL00 position signalling switch



The withdrawable version can be provided with switches for signalling the position of the circuit breaker, see table.

Technical specifications

Article No.		3VT9300-4WL00
Rated operational voltage U_e	V	AC 400 AC 250
Rated isolation voltage U_i	V	AC 500
Rated frequency f_n	Hz	50/60
Rated operational current I_e/U_e		
AC-13		3 A/AC 400 V
DC-15		0.15 A/DC 250 V, 3 A/DC 125 V, 4 A/DC 30 V
Thermal current I_{th}	A	6
Arrangement of contacts		001
Connector cross-section S	mm^2	0.5 ... 1
Terminal protection (connected switch)		IP20

For wiring diagram of the circuit breaker in withdrawable device with accessories, see page 3/14.

States of 3VT9300-4WL00 switches in withdrawable version according to circuit breaker and lockout positions

State of switch	Accessory compartment					
	11 ... 14 (19, 20)[1]		15,17 (19, 20)[1]		16, 18	
Circuit breaker and lockout position						
Inserted and unlocked	0	1	1	0	0	1
	0	1	1	0	1	0
Withdrawn and unlocked	1	0	0	1	0	1
	1	0	0	1	1	0
Removed and unlocked	1	0	1	0	0	1
	1	0	1	0	1	0

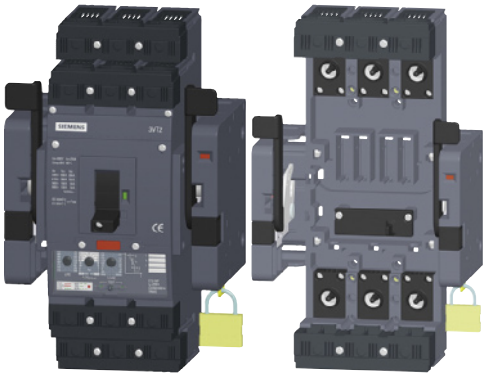
0 = contact open, 1 = contact closed

[1] Accessory compartments 19 and 20 are for 4-pole version only.

- Operating state is always in locked-out position
- In locked-out position, it is possible to lock the withdrawable device, so that the circuit breaker cannot be switched on (for more detailed information, see "Advantages and enhanced safety for operator").

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Locking



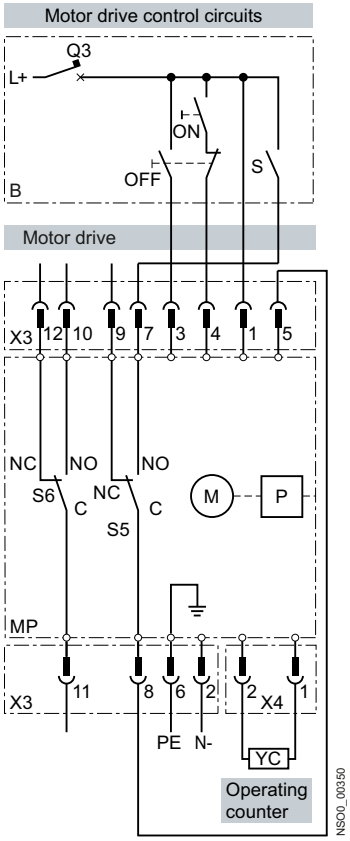
Locking the circuit breaker in withdrawable version base against tampering

Locking the withdrawable version base against inserting the circuit breaker

Withdrawable version with motorized operating mechanism



Recommended wiring of the circuit breaker in withdrawable version with motorized operating mechanism

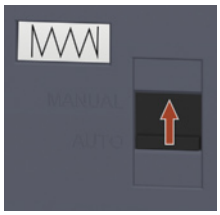


Wiring diagram description

Symbol	Description
MP	3VT9300-3M..0 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Terminal strip to connect control circuits
X4	Terminal strip for external operations counter
S5	Switch indicating AUTO (NO-C)/MANUAL (NC-C) modes
S6	Switch to indicate full storage (ready to switch on: NO-C)
YC	External operations counter 3VT9300-3MF10
B	Recommended wiring of the control circuits (control circuits not included in motorized operating mechanism delivery)
ON	Make pushbutton
OFF	Break pushbutton
S	Switch to charge spring mechanism
Q3	Circuit breaker for motorized operating mechanism AC 24V 5SX4104-7 AC 48V 5SX4104-7 AC 110V 5SX4104-7 AC 230V 5SX4102-7 DC 24V 5SX5104-7 DC 48V 5SX5104-7 DC 110V 5SX5104-7 DC 220V 5SX5102-7

Inserting and withdrawing the circuit breaker with motorized operating mechanism

- Each time before inserting or withdrawing the circuit breaker, we recommend placing the AUTO/MANUAL switch on the motorized operating mechanism to MANUAL position
- More operating information is available in the operating instructions
- Not adhering to this procedure or failing to follow the recommended wiring could mean that the circuit breaker will not successfully turn on at the first attempt.



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Mounting accessories for withdrawable version

Changes in states of switching unit when inserting and withdrawing circuit breaker

			State before inserted/withdrawn position							State after inserted/withdrawn position					
Circuit breaker before insertion			State of switches before insertion - withdrawn position →							State of switches after insertion - inserted position					
Circuit breaker before withdrawal			State of switches before withdrawal - inserted position →							State of switches after withdrawal - withdrawn position					
Accessory compartment			1			2		3, 4, 5 (6 ... 9)[1]		1		2		3,4,5 (6 ... 9)[1]	
	Lever position of circuit breaker	State of the main contacts	3VT9300-2AC10	3VT9300-2AD10		3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10	3VT9300-2AC10	3VT9300-2AD10
			4 2 3 1			4 2 3 1		4 2 3 1		4 2 3 1		4 2 3 1		4 2 3 1	
Switched on		1	1	0		0	1	1	0	1	0	1	0	0	1
Manually switched off or by operating mechanism		0	1	0		0	1	0	1	1	0	1	0	0	1
Switched off by trip units		0	0	1		1	0	0	1	0	1	1	0	0	1
Switched off from switched-on state: by means of auxiliary trip unit, TEST pushbutton or by OFF push-button on the motorized operating mechanism		0	1	0		1	0	0	1	1	0	1	0	0	1

0 = contact open, 1 = contact closed

[1] Accessory compartments 6 to 9 are for 4-pole version only.

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Overview

Use of insulating barriers and terminal covers for circuit breakers and switch disconnectors

Fixed-mounted version

Front connection

- Terminals 1, 3, 5
  - If U_e = AC 415 V, it is necessary to use 3VT9300-8CE30 insulating barriers or 3VT9300-8CB30 terminal covers.
  - For the connection of the main circuit to terminals 1, 3, 5, insulated conductors, flexibars or rear connection terminals are not used. It is necessary to use 3VT9300-8CE30 insulating barriers or 3VT9300-8CB30 terminal cover.
- Terminals 2, 4, 6
  - If the circuit breaker/switch disconnector is connected to the the power supply with terminals 2, 4, 6 and if *U*e = AC 415 V, it is necessary to use 3VT9300-8CE30 insulating barriers or a 3VT9300-8CB30 terminal cover.
  - If insulated conductors are not used for connecting the main circuit to terminals 2, 4, 6, and flexibars or rear connections are not used, then it is necessary to use 3VT9300-8CE30 insulating barriers or 3VT9300-8CB30 terminal covers.

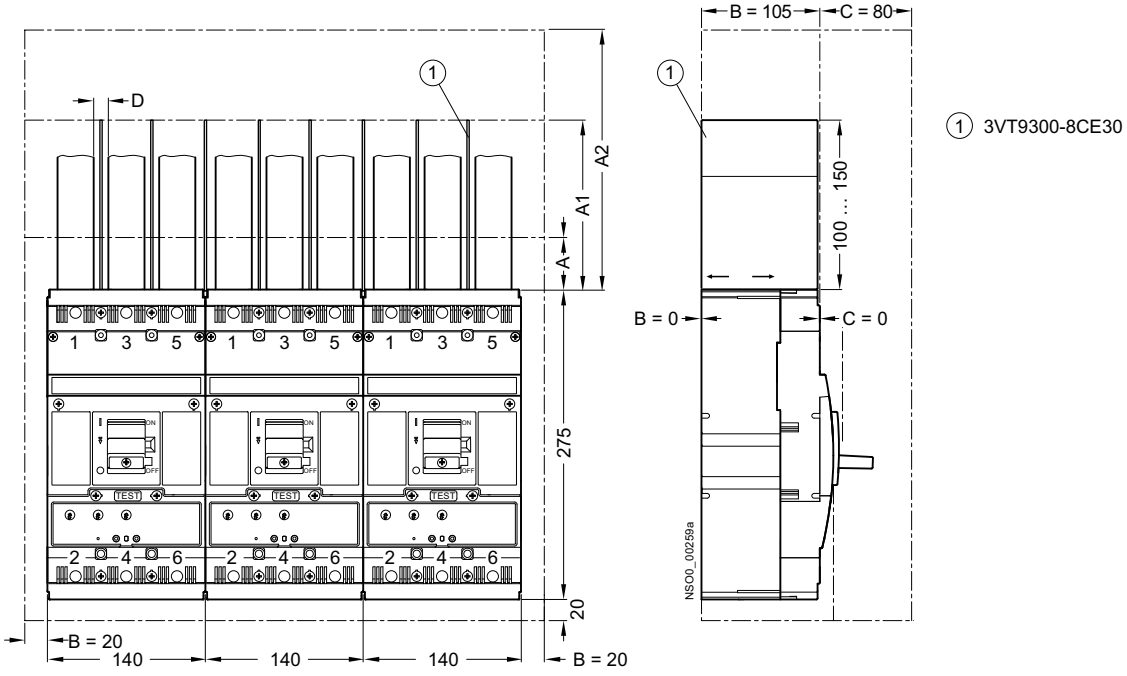
Rear connection

- Neither insulating barriers nor terminal covers have to be used.

Plug-in and withdrawable versions

Neither insulating barriers nor terminal covers have to be used.

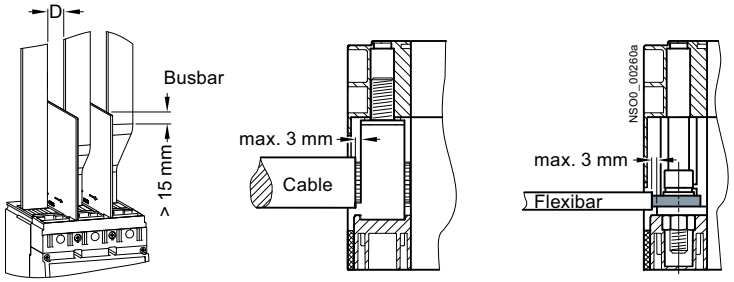
Deionization Spaces



A	Minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for connecting using insulated conductors, cables, flexibars or with rear connection)
A1	Minimum insulation length of bare conductors (using 3VT9300-8CE30 insulating barriers from 100 mm to max. 150 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)
A2	Minimum distance: • between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars) • between the circuit breaker/switch-disconnector and busbar • between two circuit breaker/switch-disconnectors situated vertically above one another • between uninsulated connections of two circuit breakers/ switch-disconnectors above one another
B, C	Minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall
D	Minimum distance between uninsulated conductors

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Insulating barriers and terminal covers



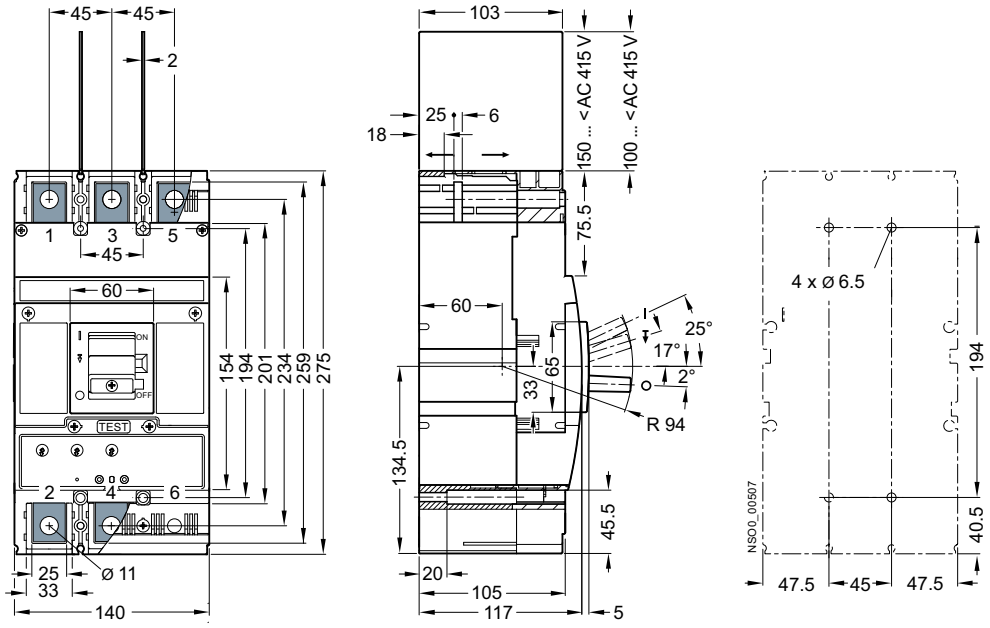
AC U_e			230 V	415 V		500 V		690 V	
3VT3 H wired with I_k [1]			≤ 100 kA	> 36 ... 65 kA	≤ 36 kA	> 20 ... 35 kA	≤ 20 kA	> 15 ... 20 kA	≤ 15 kA
3VT3 N wired with I_k			≤ 60 kA		≤ 36 kA		≤ 20 kA	≤ 10 kA	≤ 15 kA
C < 80 mm	D ≥ 10 mm	A (mm)	50	50	50	50	50	50	50
		A1 (mm)	150	200	100	200	150	150	150
		A2 (mm)	250	300	200	300	250	250	250
	D ≥ 30 mm	A (mm)	50	50	50	50	50	50	50
		A1 (mm)	100	150	100	150	150	150	150
		A2 (mm)	150	200	150	200	200	200	200
C ≥ 80 mm	D ≥ 10 mm	A (mm)	50	50	50	50	50	50	50
		A1 (mm)	100	150	100	150	150	150	150
		A2 (mm)	150	200	150	200	200	200	200

[1] I_k = max. short-circuit current in the protected circuit (rms).

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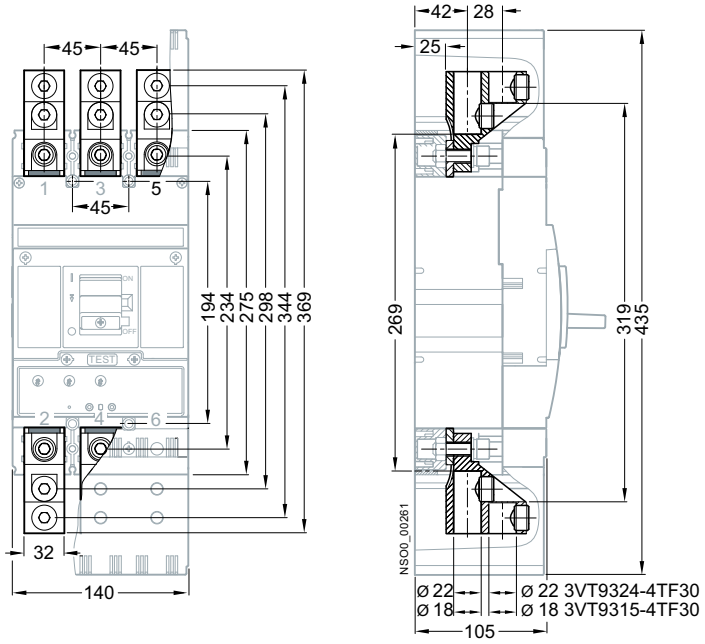
Dimensional drawings - 3-pole, fixed-mounted version

Fixed-mounted version, front connection



Drilling pattern

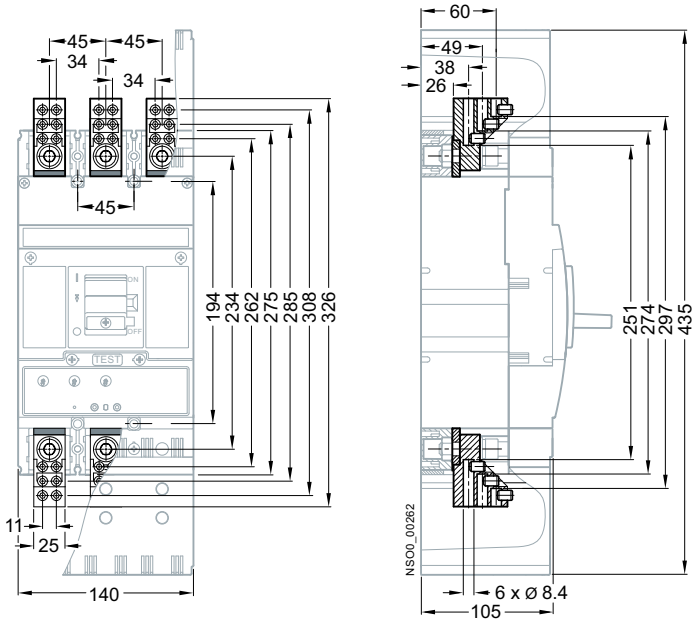
Fixed-mounted version, front connection with 3VT9324-4TF30, 3VT9315-4TF30 connecting set



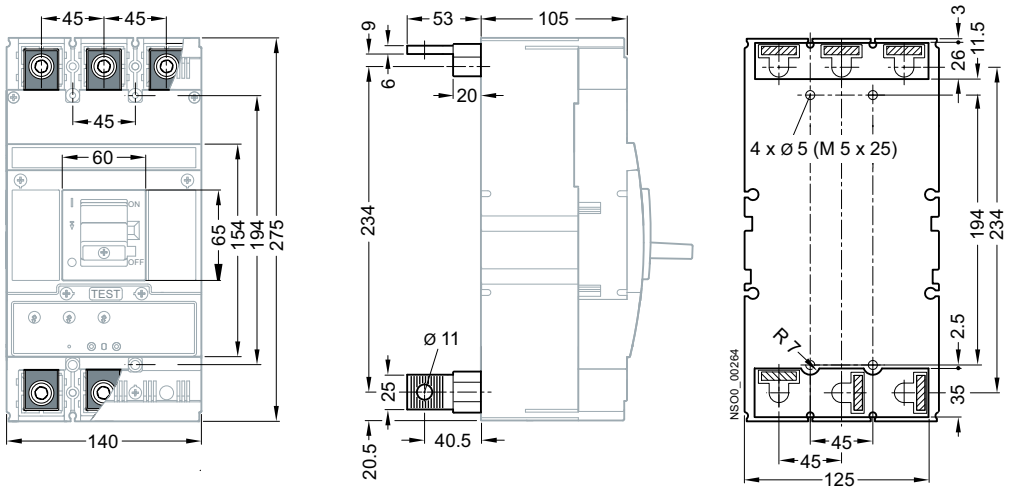
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Dimensional drawings

Fixed-mounted version, front connection (3VT9303-4TF30 connecting set)

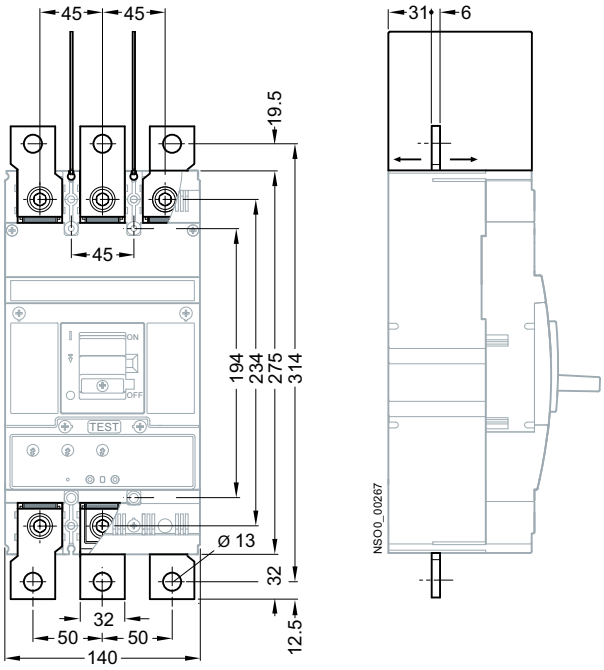


Fixed-mounted version, rear connection (3VT9300-4RC30 connecting set)

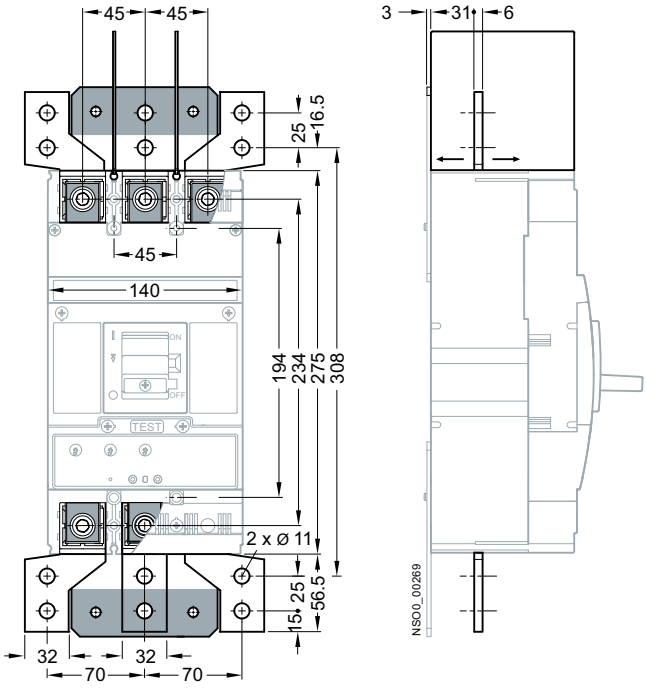


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Fixed-mounted version, front connection (3VT9300-4ED30 connecting set)



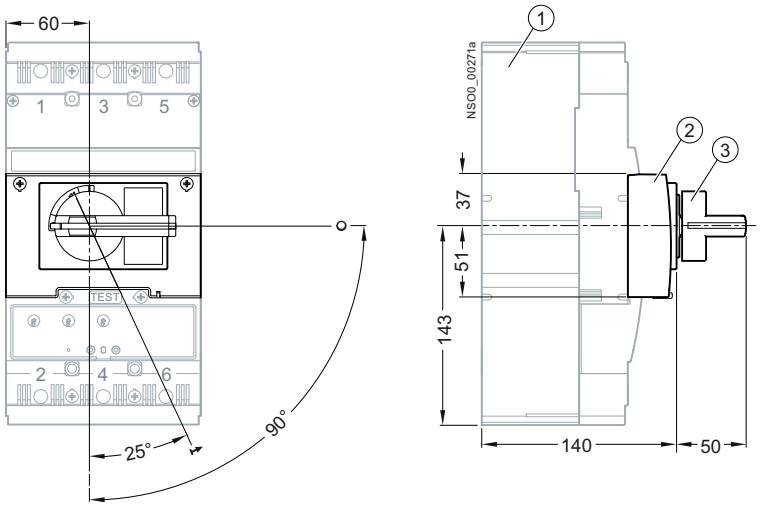
Fixed-mounted version, front connection (3VT9300-4EE30 connecting set)



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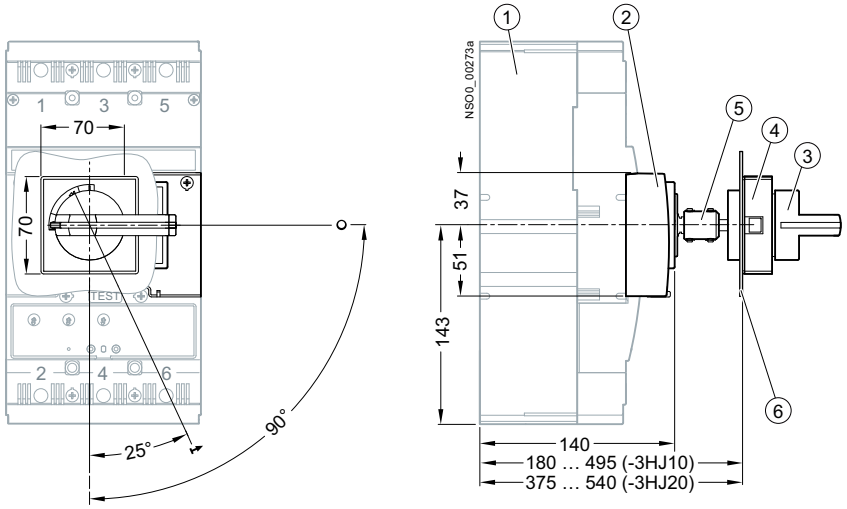
Dimensional drawings

Fixed-mounted version, rotary operating mechanism



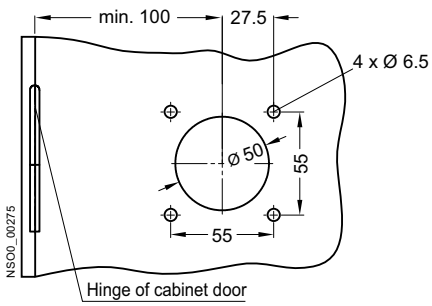
1 3VT3
2 3VT9300-3HA.0,-3HB.0
3 3VT9300-3HE.0,-3HF.0

Fixed-mounted version, rotary operating mechanism with adjustable knob



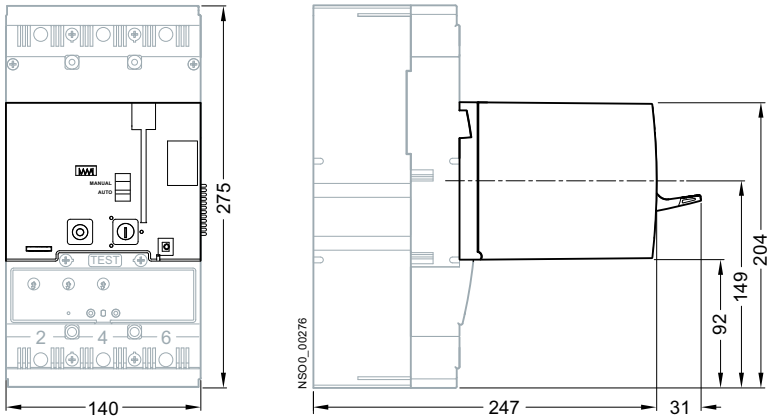
1 3VT3
2 3VT9300-3HA.0,-3HB.0
3 3VT9300-3HE.0,-3HF.0
4 3VT9300-3HG.0,-3HH.0
5 3VT9300-3HJ.0
6 Outside surface of cabinet door

Cabinet door cut-out

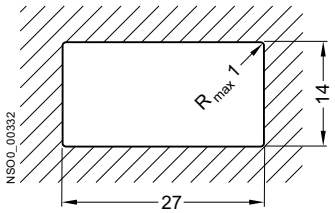


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Fixed-mounted version, with 3VT9300-3M..0 motorized operating mechanism



Opening dimensions in cabinet door for external operations counter

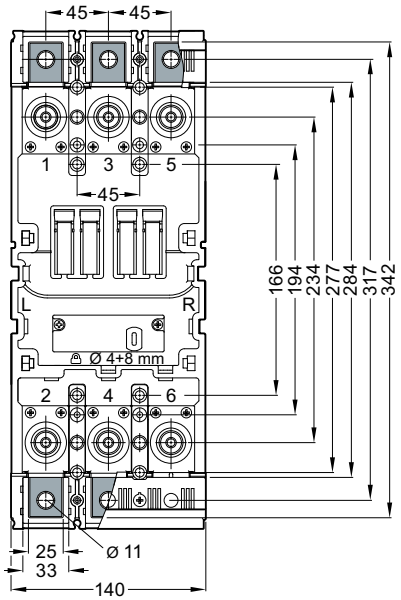


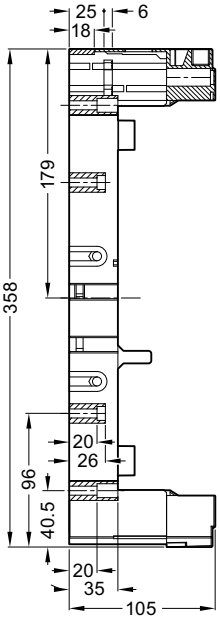
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Dimensional drawings

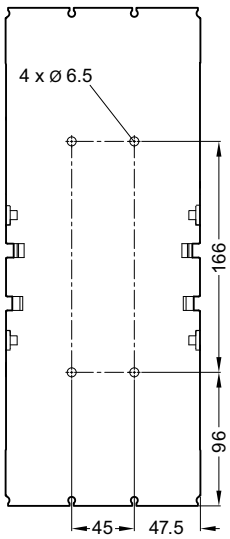
Dimensional drawings - 3-pole, plug-in version

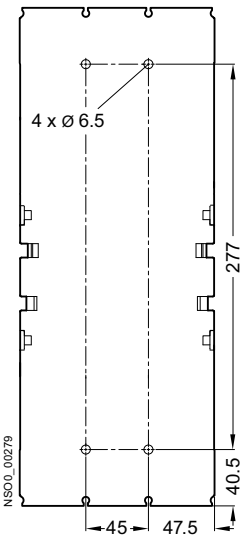
3VT9300-4PA30 plug-in base



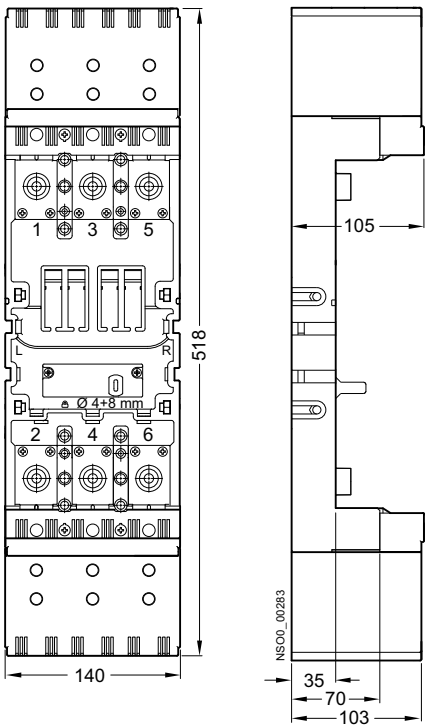


Drilling patterns



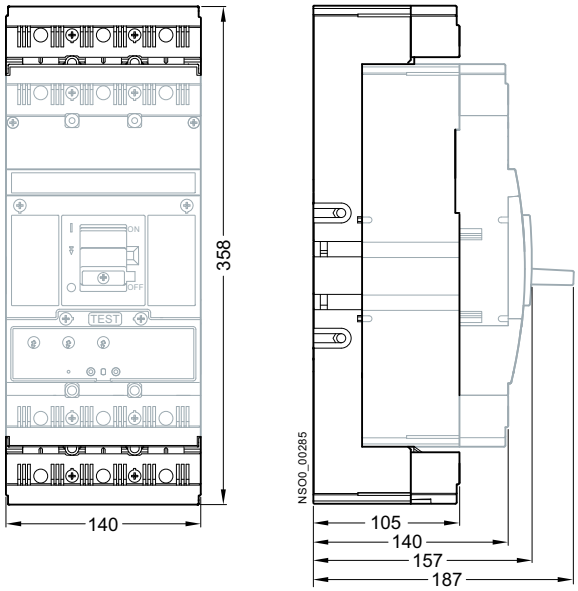


Plug-in version, 3VT9300-8CB30 motorized operating mechanism



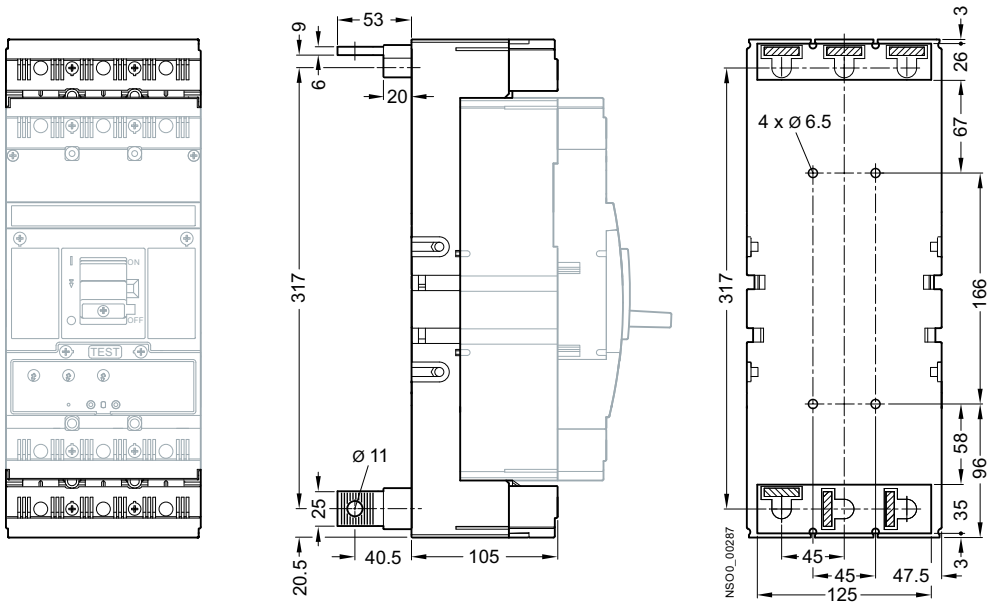
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Plug-in version



Plug-in version, rear connection with 3VT9300-4RC30 connecting set

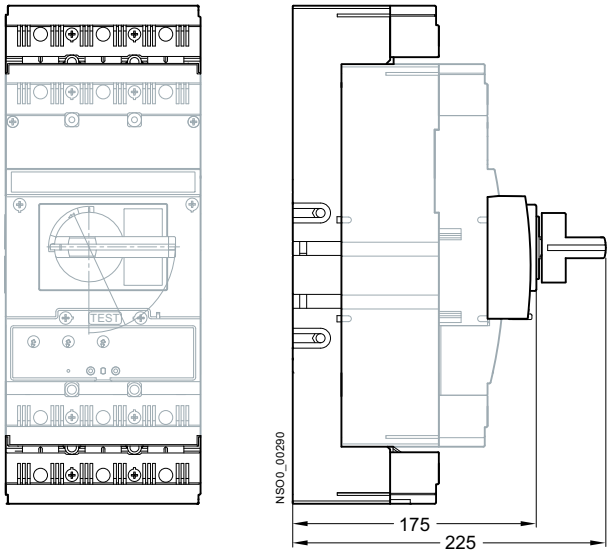
Drilling pattern



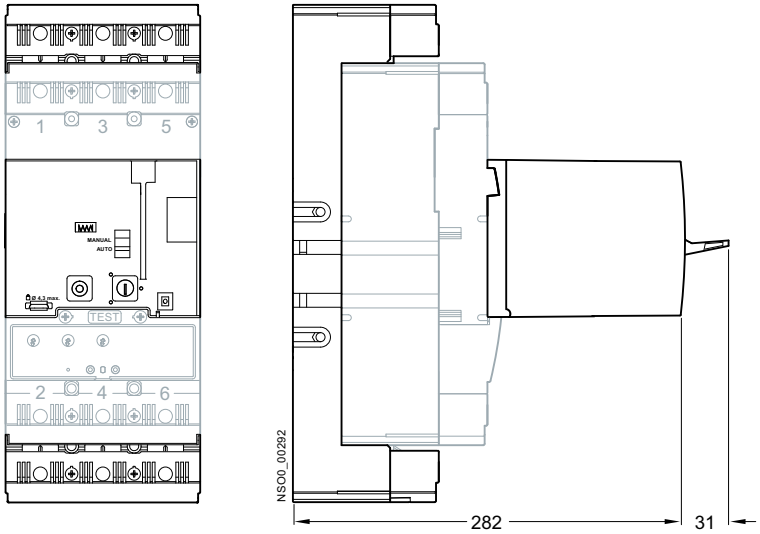
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Dimensional drawings

Plug-in version, with rotary operating mechanism



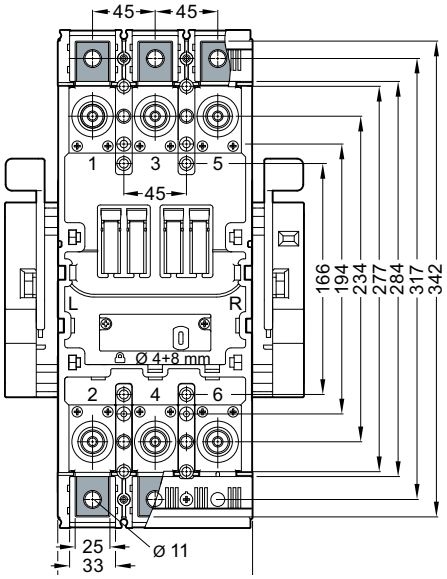
Plug-in version, with 3VT9300-3M..0 motorized operating mechanism

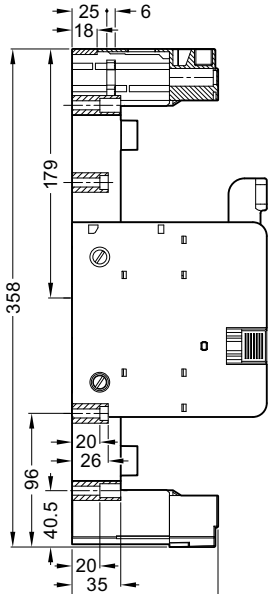


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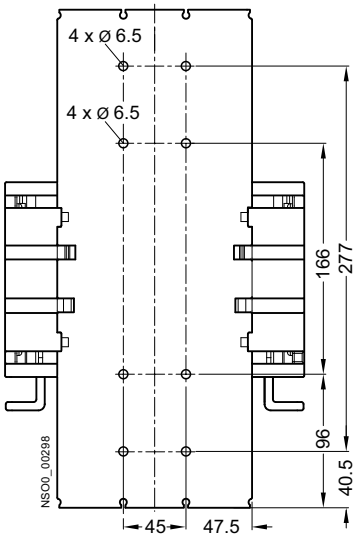
Dimensional drawings - 3-pole, withdrawable version

3VT9300-8CB30 withdrawable version base

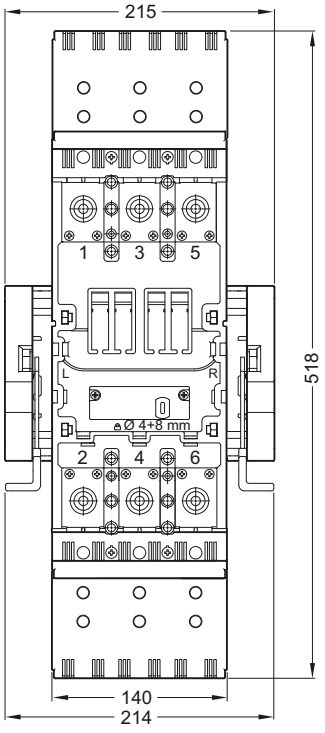


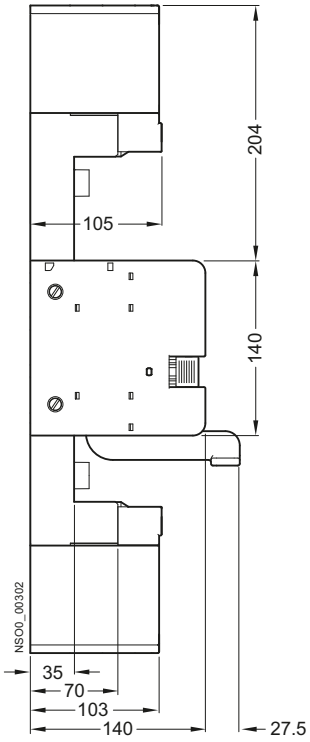


Drilling pattern



Withdrawable version base, with 3VT9300-8CB30 terminal cover

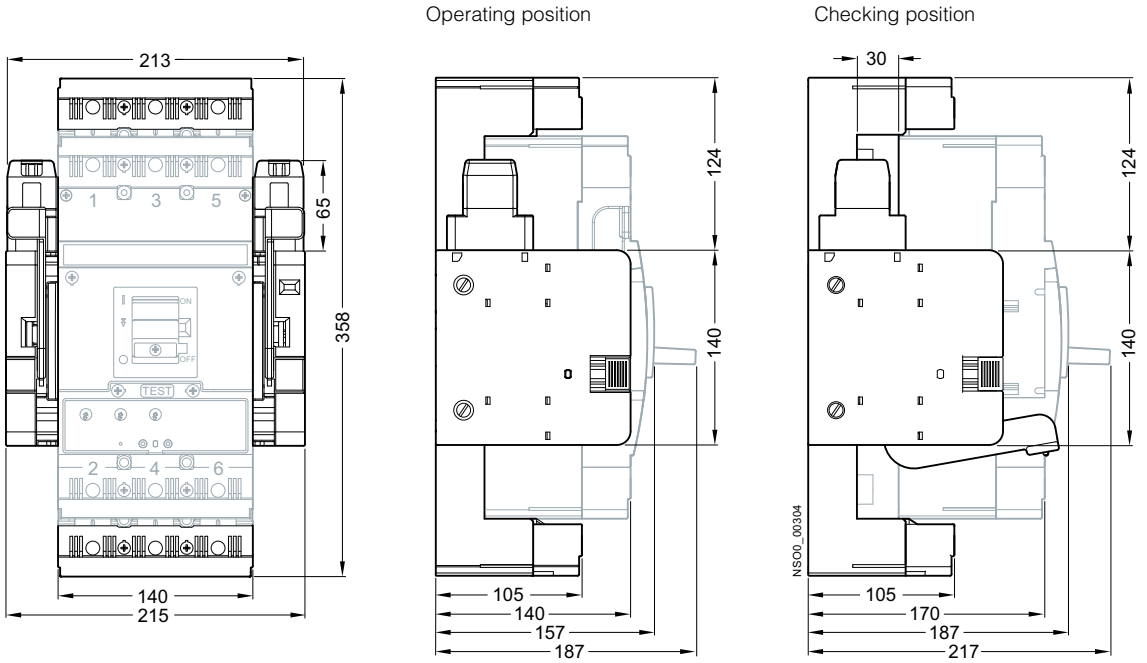




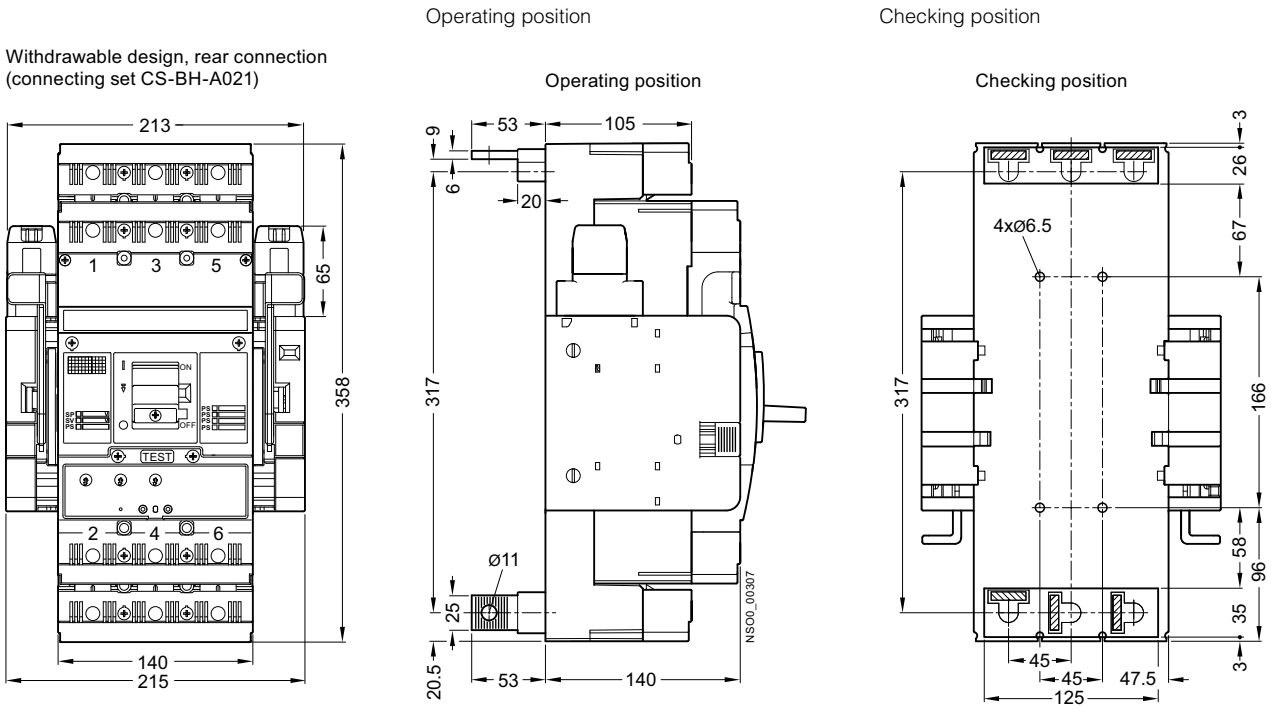
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Dimensional drawings

Withdrawable version

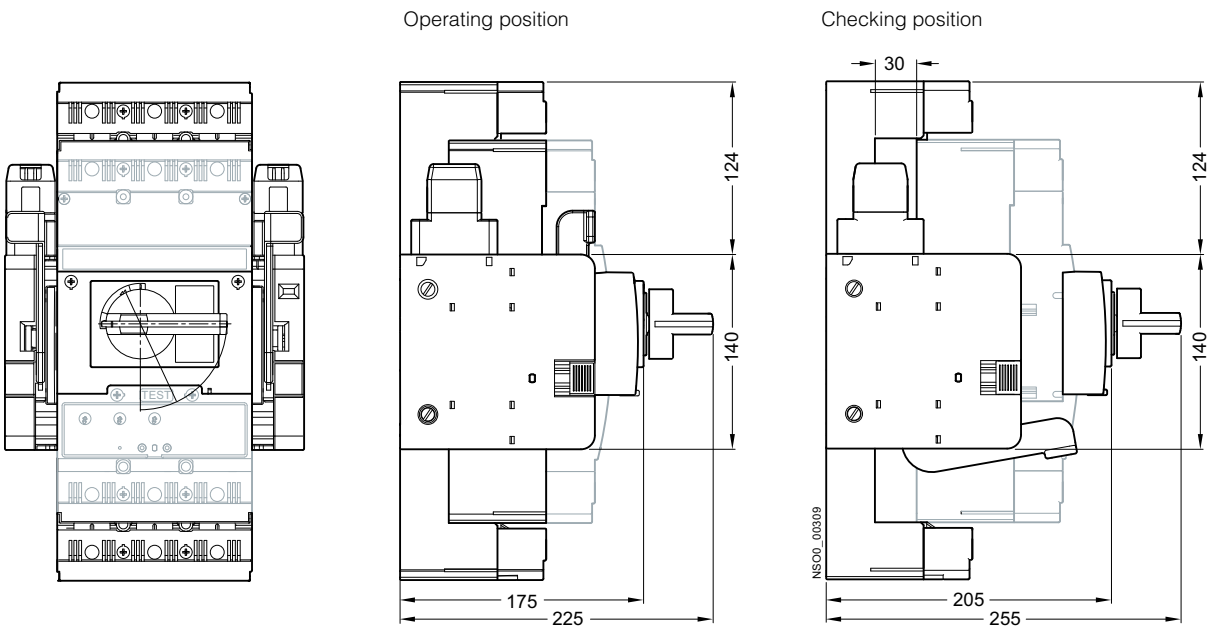


Withdrawable version, rear connection with 3VT9300-4RC30 connecting set

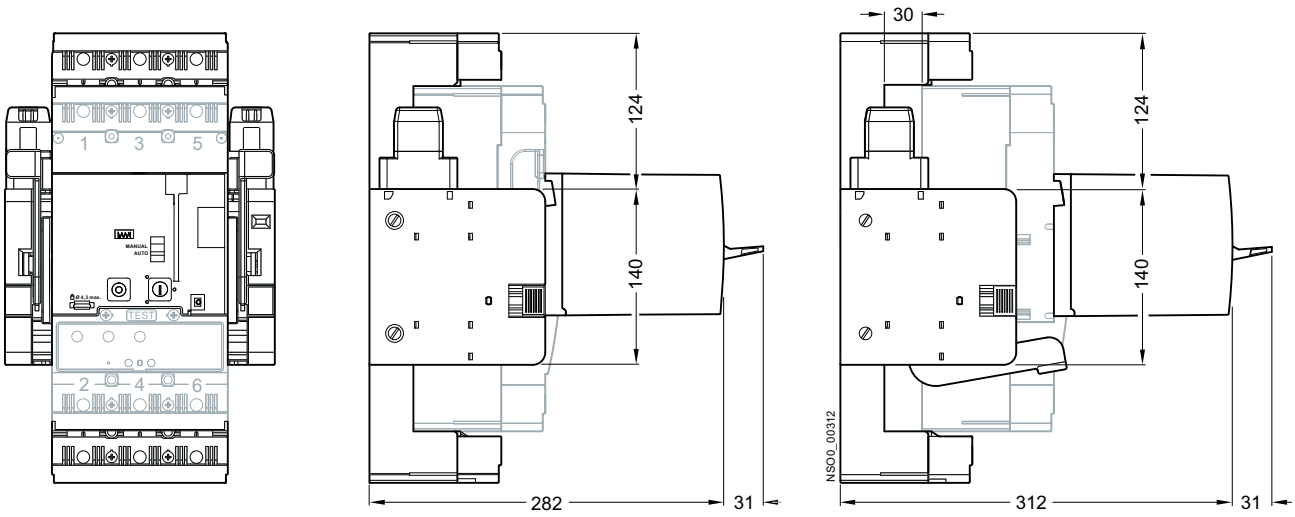


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Withdrawable version, with rotary operating mechanism



Withdrawable version, with motorized operating mechanism

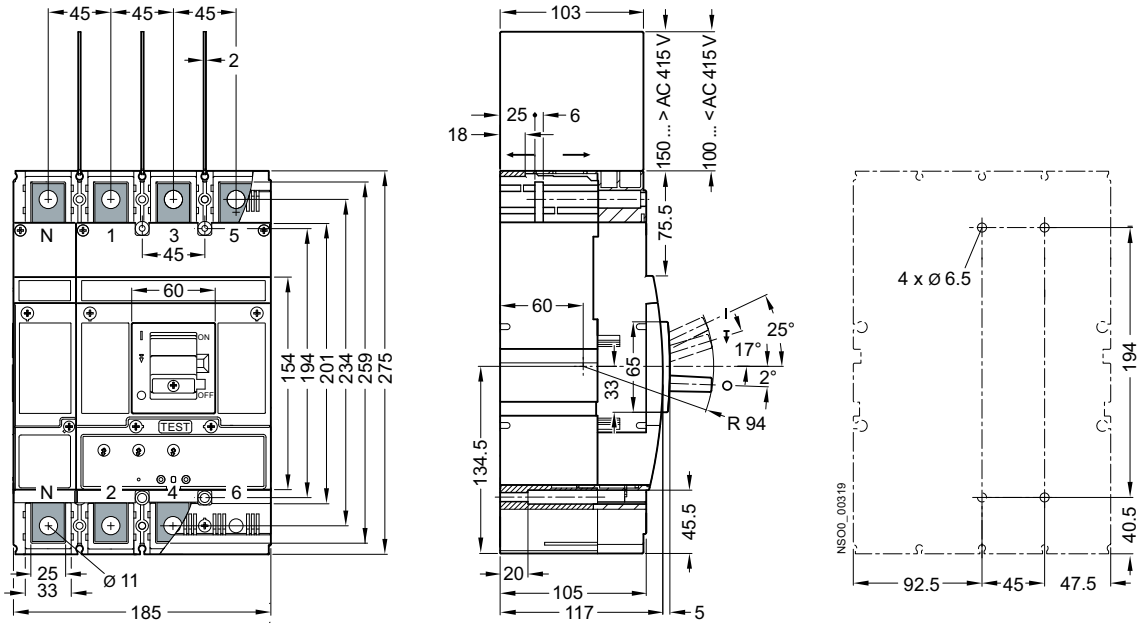


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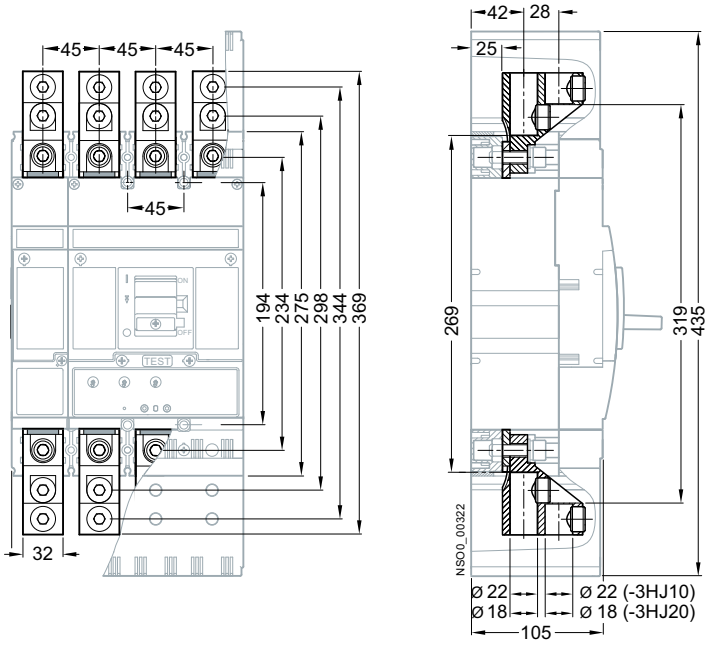
Dimensional drawings

Dimensional drawings - 4-pole, fixed-mounted version

Fixed-mounted version, front connection

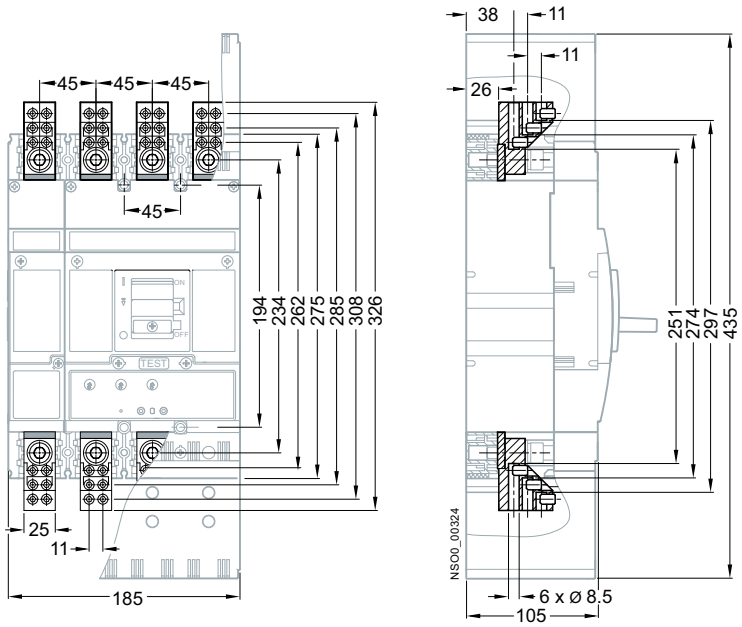


Fixed-mounted version, front connection
with 3VT9324-4TF30 + 3VT9324-4TF00, 3VT9315-4TF30 + 3VT9315-4TF00 connecting set

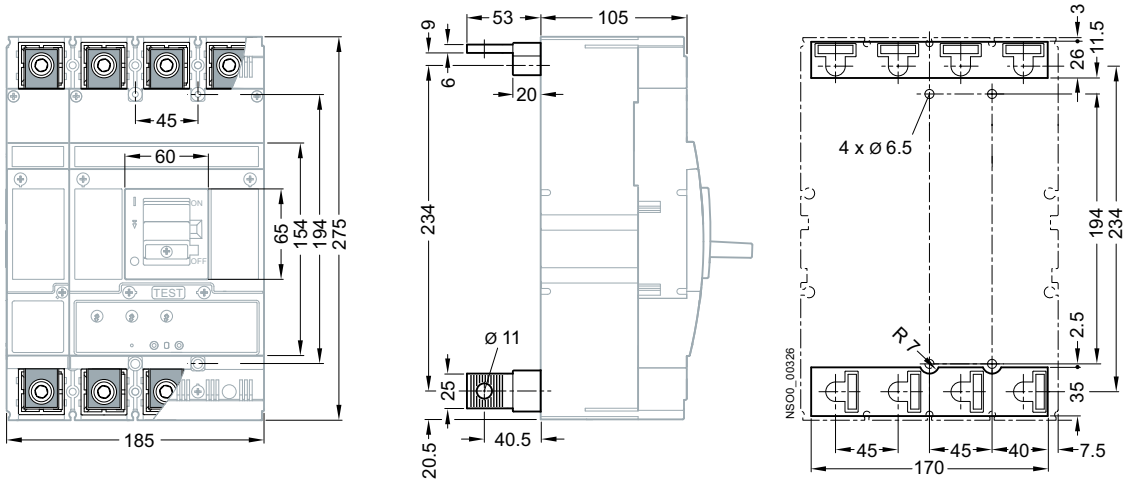


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Fixed-mounted version, front connection with 3VT9303-4TF30 + 3VT9303-4TF00 connecting set



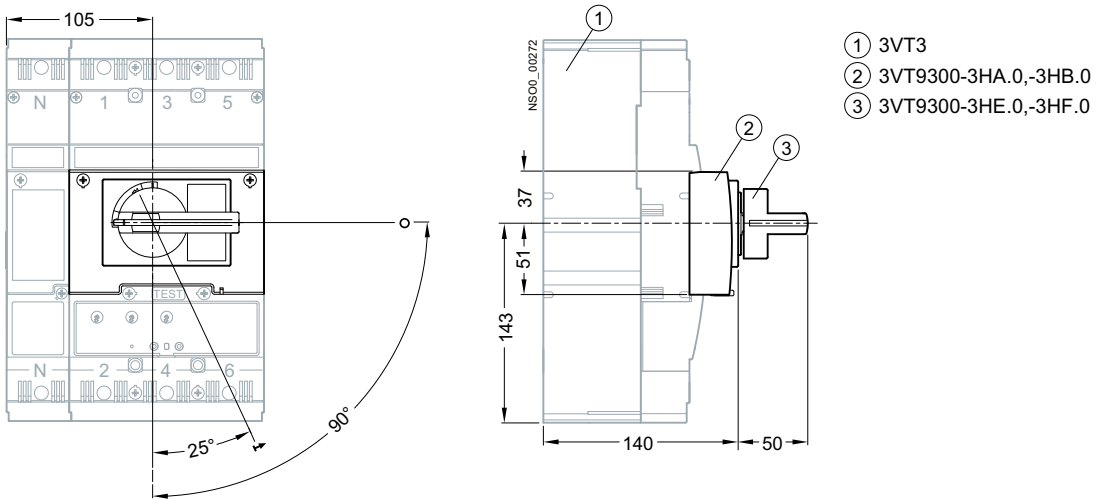
Fixed-mounted version, rear connection with 3VT9300-4RC30 + 3VT9300-4RC00 connecting set



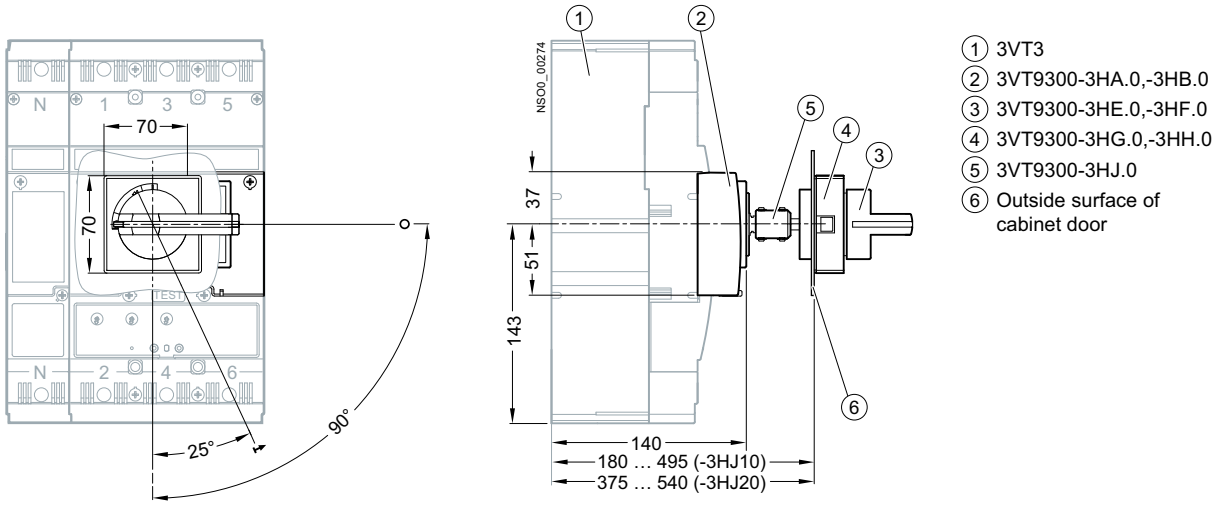
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Dimensional drawings

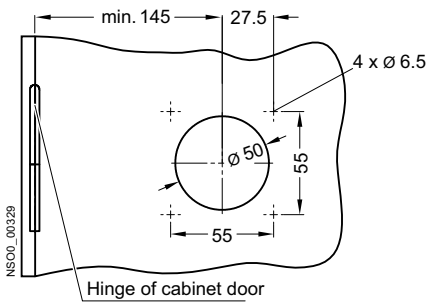
Fixed-mounted version, with rotary operating mechanism



Fixed-mounted version, with door-coupling operating mechanism

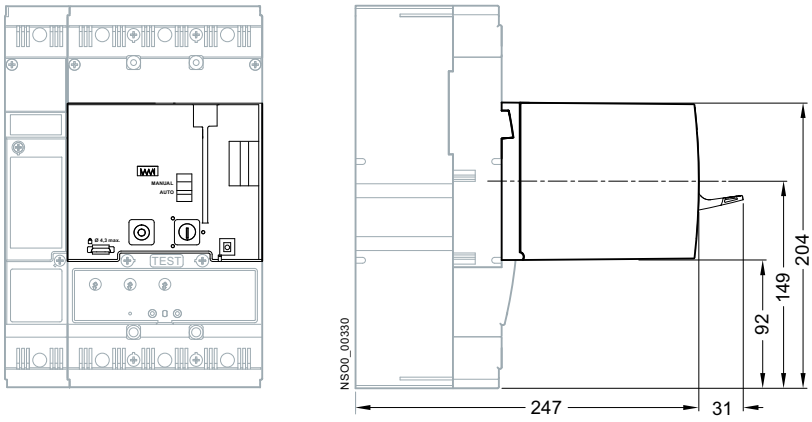


Cabinet door cut-out

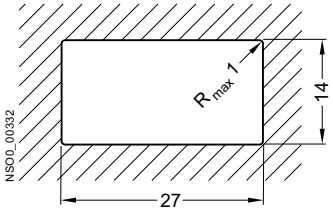


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Fixed-mounted version, 3VT9300-3M..0 motorized operating mechanism



Opening dimensions in cabinet door for external operations counter



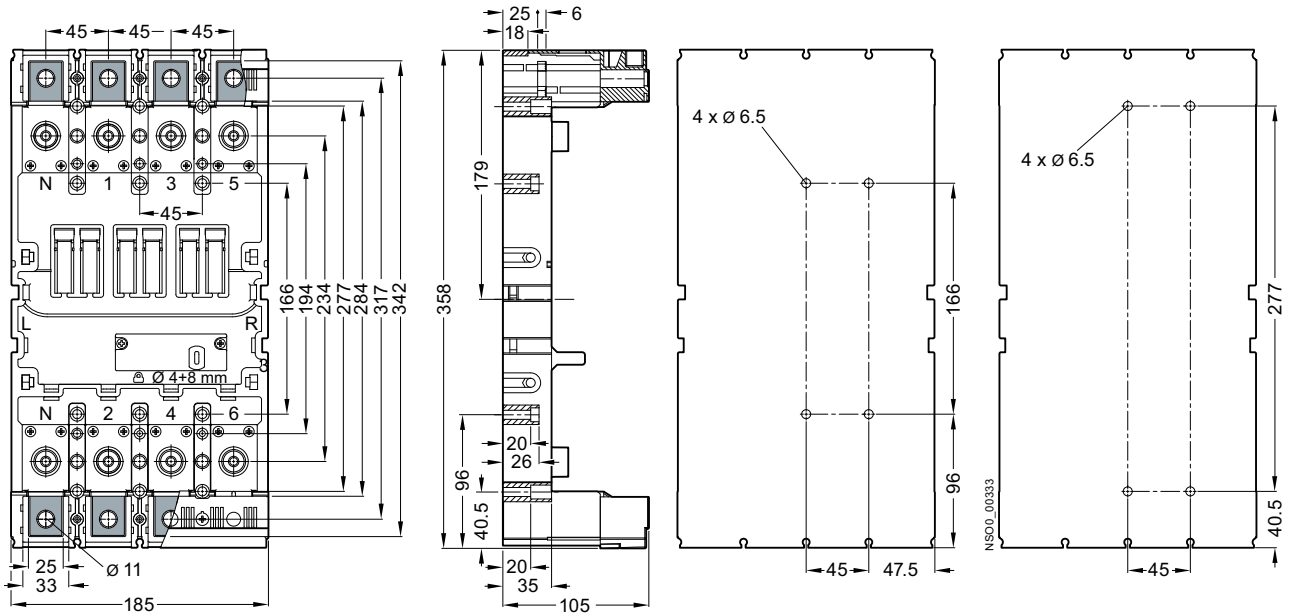
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Dimensional drawings

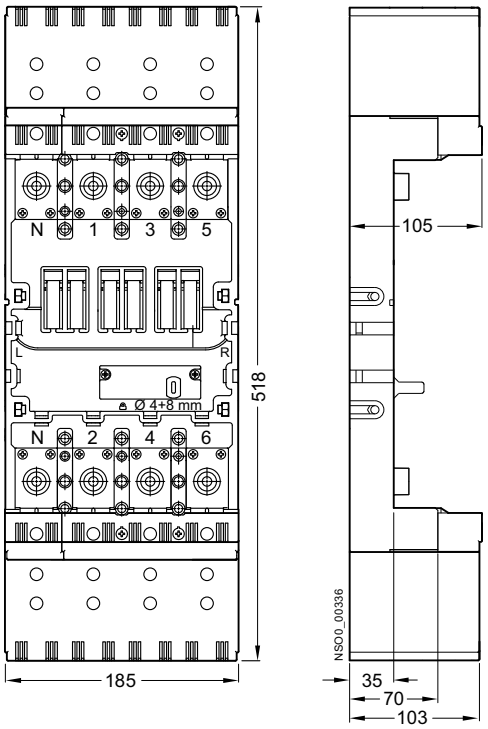
Dimensional drawings - 4-pole, plug-in version

3VT9300-4PA40 plug-in base

Drilling patterns

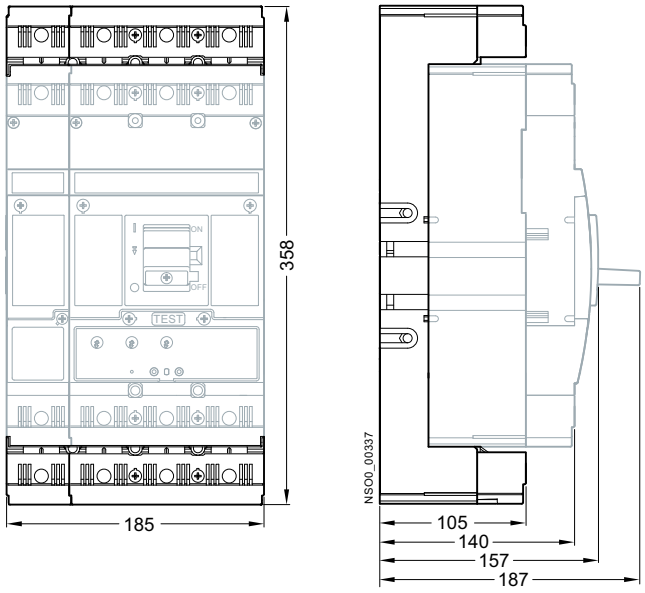


Plug-in base, with 3VT9300-8CB40 terminal cover



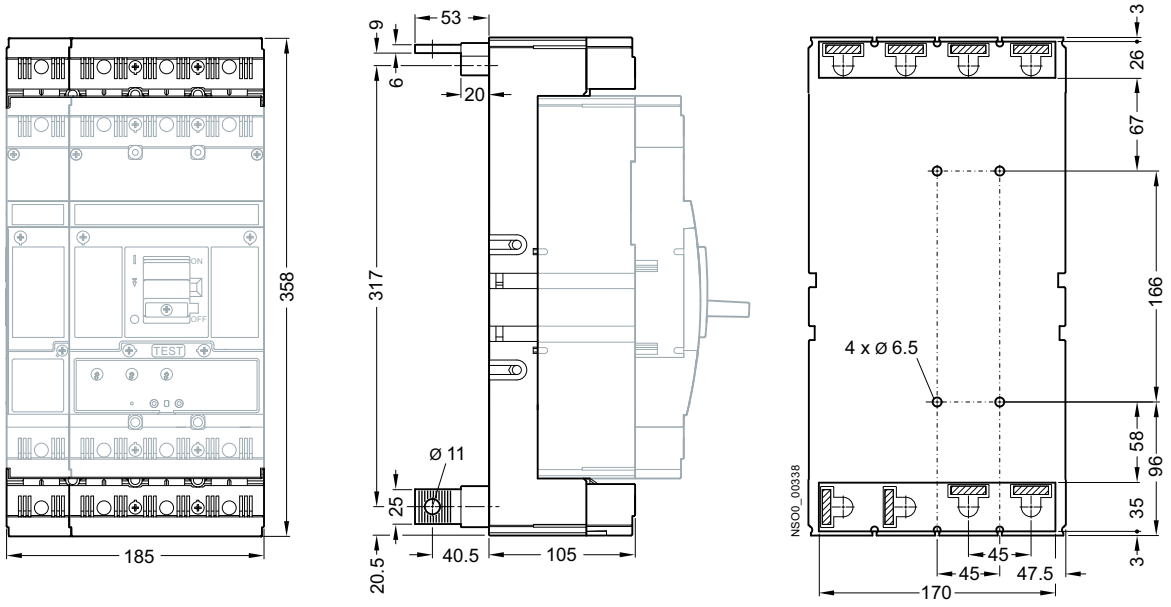
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Plug-in version



Plug-in version, rear connection with 3VT9300-4RC30 + 3VT9300-4RC00 connecting set

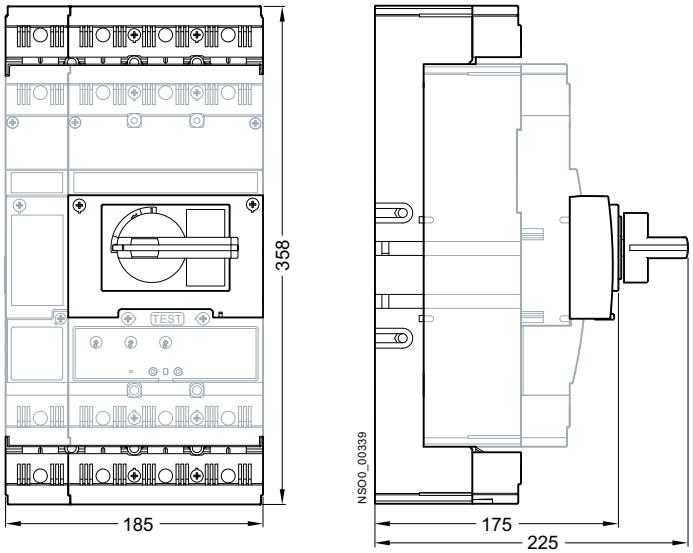
Drilling pattern



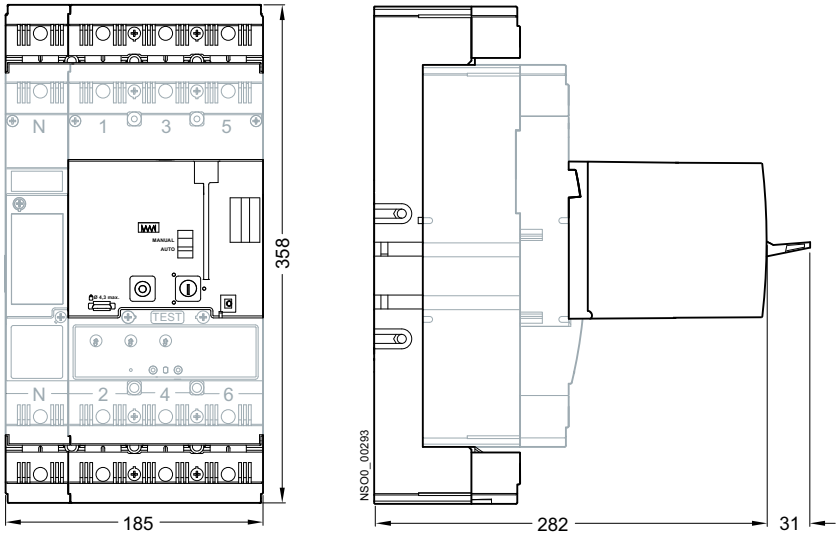
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Dimensional drawings

Plug-in version with rotary operating mechanism



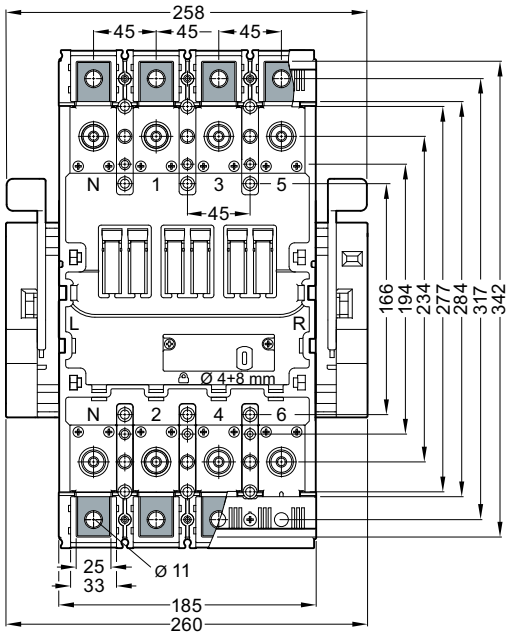
Plug-in version, with 3VT9300-3M..0 motorized operating mechanism

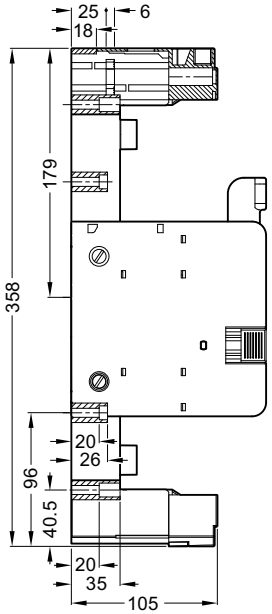


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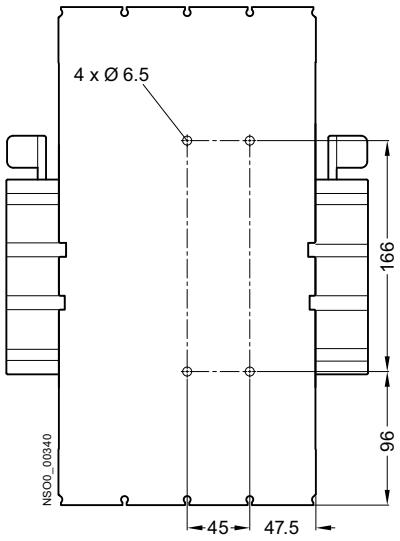
Dimensional drawings - 4-pole, withdrawable version

3VT9300-4WA40 withdrawable version base

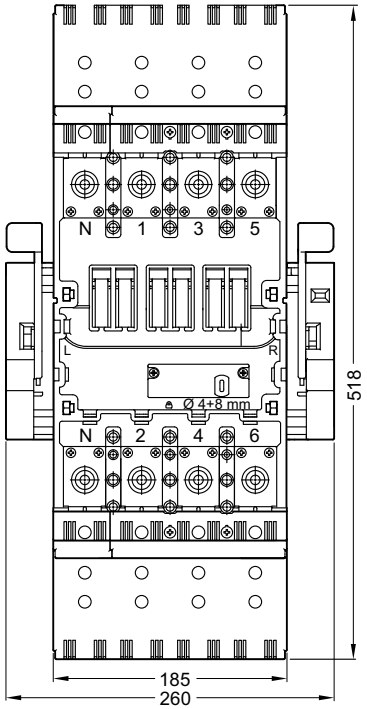


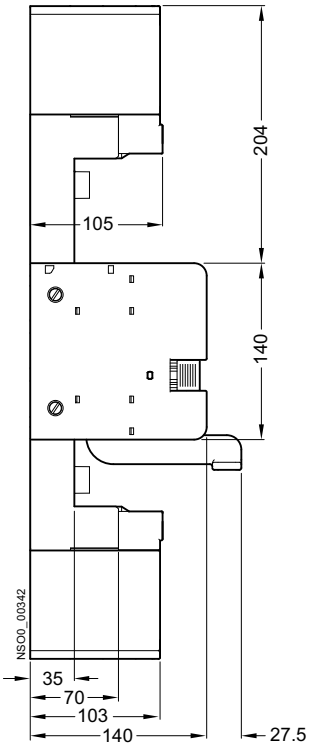


Drilling pattern



Withdrawable version with 3VT9300-8CB40 terminal cover



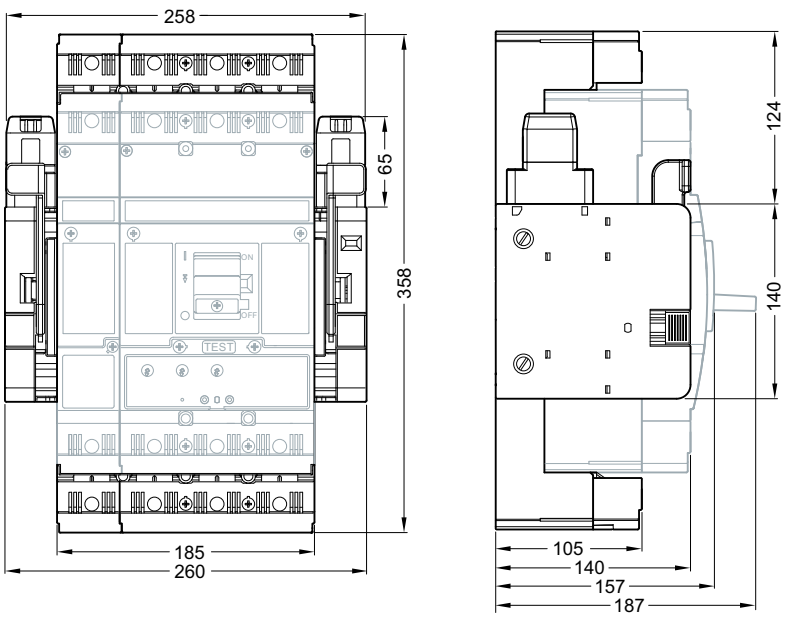


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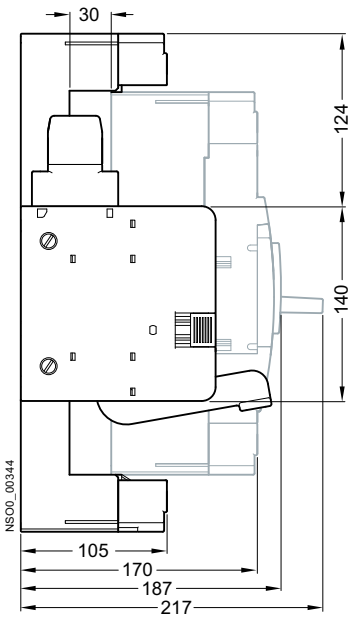
Dimensional drawings

Withdrawable version

Operating position

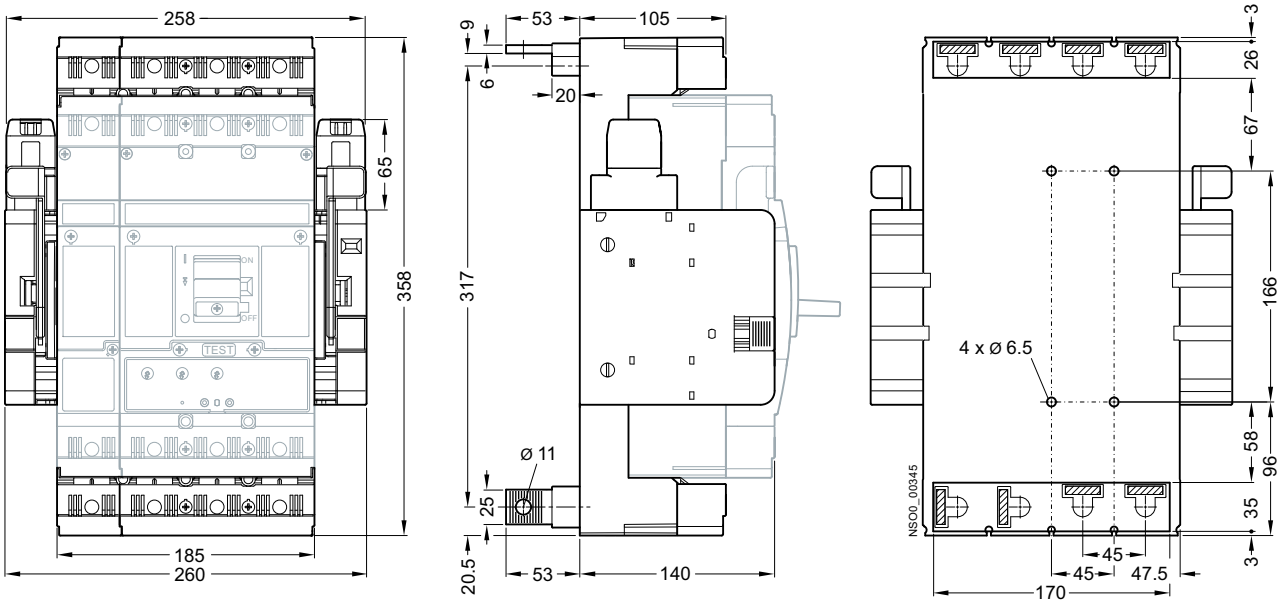


Checking position



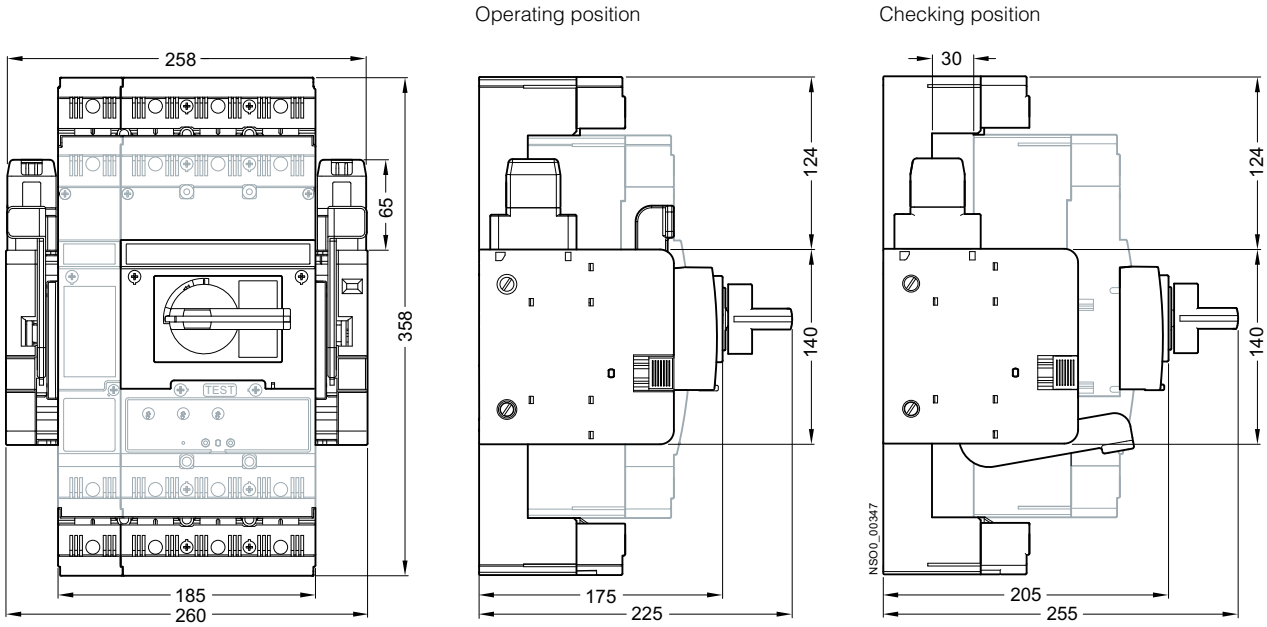
Withdrawable version, rear connection with 3VT9300-4RC30 + 3VT9300-4RC00 connecting set

Drilling pattern

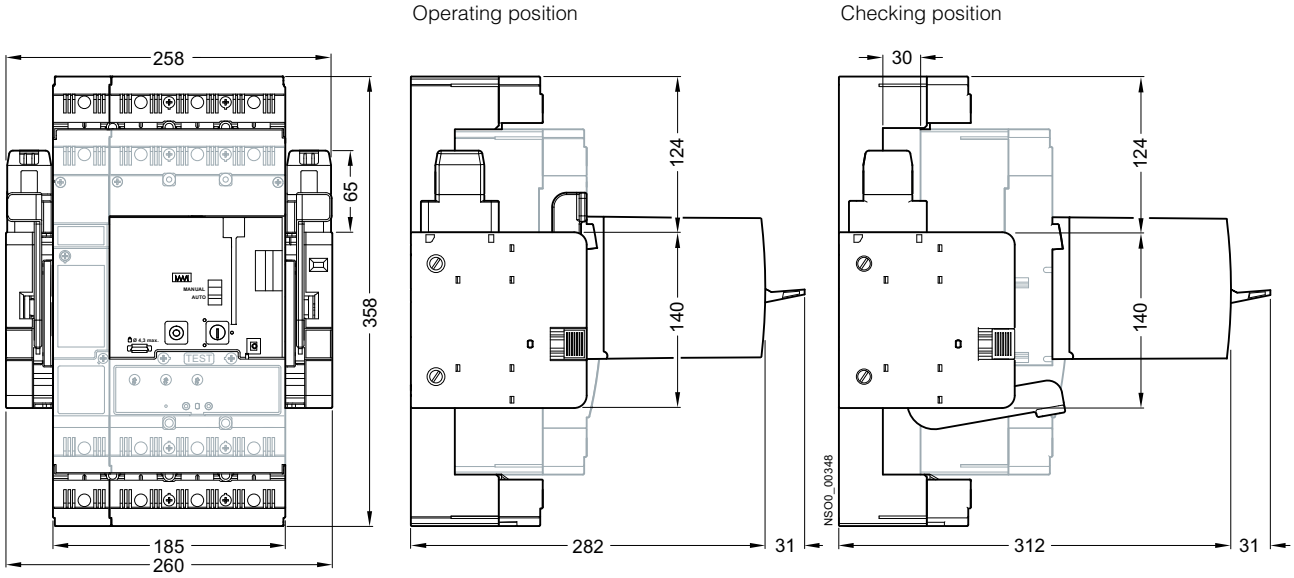


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Withdrawable version, with rotary operating mechanism



Withdrawable version, with 3VT9300-3M.. motorized operating mechanism



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Notes

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3VT4 Molded Case Circuit Breakers up to 1000 A

4



Catalog

3VT4 Molded Case Circuit Breakers up to 1000 A

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4/3 Circuit breakers · Switch disconnectors
Accessories and Components
4/4 Circuit breakers · Switch disconnectors
4/5 Manual/motorized operating mechanisms
4/6 Mounting accessories
4/7 Further accessories

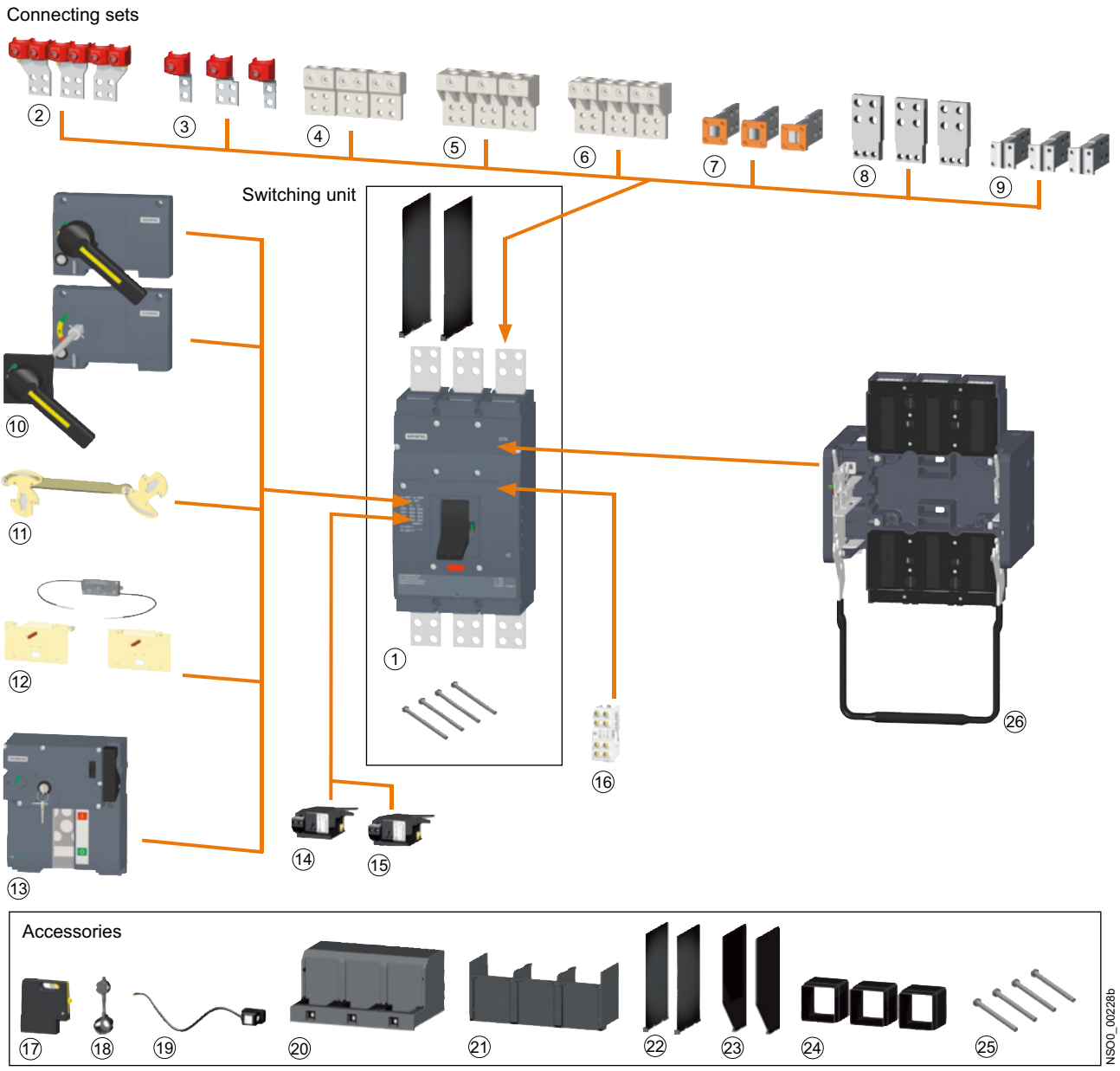
Technical Information

3VT4 Molded Case Circuit Breakers up to 1000 A

4/8 Circuit breakers · Switch disconnectors
Accessories and Components
4/9 Trip units
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Overview



① Molded case circuit breaker
② Multiple box terminals
③ Box terminals
④ Circular conductor terminal
⑤ Multiple feed-in terminal
⑥ Multiple feed-in terminal
⑦ Rear connection
⑧ Front connection
⑨ Rear connection
⑩ Rotary operating mechanism
⑪ Mechanical interlocking
⑫ Mechanical interlocking by Bowden wire
⑬ Motor operating mechanism
⑭ Shunt trip unit
⑮ Undervoltage trip unit
⑯ Auxiliary switch
⑰ Lockingtype lever
⑱ Sealing inset
⑲ Extension cable
⑳ Terminal cover
㉑ Terminal cover
㉒ Insulating barriers
㉓ Insulating barriers
㉔ Insulating grommets
㉕ Mounting bolts
㉖ Withdrawable version base

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Overview

Switching unit

The switching unit includes:

- 3VT9500-8CE30 insulating barriers
- connecting sets for front connection - busbars connection

The switching unit must be outfitted with:

- a trip unit ETU DP, MP or UP (circuit breaker) or
- 3VT9410-6DT00 switch disconnector unit

For the withdrawable version, the 3VT4710-3AA38-0AA0 switching unit requires

- 3VT9500-4WA30 withdrawable version base.
  The withdrawable version base must be fitted with:
  - 2 x 3VT9500-4EF30 connection set (front connection) or
  - 3VT9500-4RD30 (rear connection)
- We recommend fitting the switching unit with:
  - 3VT9500-4SA40 mounting bolts set (4 x M8 x 60)

Circuit breaker

The circuit breakers consist of a 3-pole switching unit (fixed-mounted or withdrawable version) and a trip unit, which is available with a choice of different characteristics.

Switch disconnector

The switch disconnector consists of a switching unit (fixed-mounted or withdrawable version) and a switch disconnector unit.

Selection and ordering data

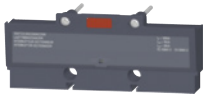
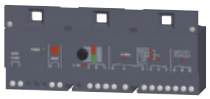
	Rated current I_n	Breaking capacity I_{cu} (AC 415 V)	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	kA				kg
Switching units						
	***Fixed-mounted version, 3-pole***					
	1000	55		**3VT4710-3AA30-0AA0**	1 unit	19.860
	***Withdrawable version, 3-pole***					
	1000	55		**3VT4710-3AA38-0AA0**	1 unit	23.000

4

* You can order this quantity or a multiple thereof.

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Selection and ordering data for accessories

	Rated current I_n	Set current of the inverse- time delayed overload trip units "L" I_r	S function short-circuit protection (short-time delayed) "S" I_{sd}	Operating current of the instantaneous short-curcuit releases "I" I_i	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	A		A				kg
Electronic trip units (ETU)								
	***Distribution protection, ETU DP, LI function***							
	• Provides protection for lines and transformers							
	315	125 ... 315		500 ... 5000		**3VT9431-6AC00**	1 unit	0.464
	630	250 ... 630		800 ... 10000		**3VT9463-6AC00**	1 unit	0.464
	800	315 ... 800		1000 ... 12000		**3VT9480-6AC00**	1 unit	0.530
	1000	400 ... 1000		1250 ... 14000		**3VT9410-6AC00**	1 unit	0.481
	***Motor/generator protection, ETU MP, LI function***							
	• Provides protection for motors and generators							
	• Suitable also for protecting lines and transformers							
	315	125 ... 315		500 ... 5000		**3VT9431-6AP00**	1 unit	0.500
	630	250 ... 630		800 ... 10000		**3VT9463-6AP00**	1 unit	0.500
	800	315 ... 800		1000 ... 12000		**3VT9480-6AP00**	1 unit	0.500
	1000	400 ... 1000		1250 ... 14000		**3VT9410-6AP00**	1 unit	0.483
	***Universal protection, ETU UP, LSI function***							
	• For protecting complicated loads or those not specified in advance							
	315	125 ... 315	3 ... 9 x I_R	500 ... 5000		**3VT9431-6AD00**	1 unit	0.500
	630	250 ... 630	3 ... 9 x I_R	800 ... 10000		**3VT9463-6AD00**	1 unit	0.500
	800	315 ... 800	3 ... 9 x I_R	1000 ... 12000		**3VT9480-6AD00**	1 unit	0.500
	1000	400 ... 1000	3 ... 9 x I_R	1250 ... 14000		**3VT9410-6AD00**	1 unit	0.590
Switch-disconnector unit								
	1000	Switch-disconnector unit				**3VT9410-6DT00**	1 unit	0.452
Signalling unit								
		Signalling unit for trip units ETU DP, ETU MP, ETU UP				**3VT9500-6AE00**	1 unit	0.670

	Rated control supply voltage U_s	DT	Article No.	PS*/ P. unit	Weight per PU approx.
					kg
Auxiliary switches					
	AC/DC 60 ... 500 V/DC 60 ... 240 V		**3VT9500-2AF10**	1 unit	0.041
	AC/DC 5 ... 60 V		**3VT9500-2AF20**	1 unit	0.041
Shunt trip units					
	AC/DC 24 V		**3VT9500-1SF00**	1 unit	0.199
	AC/DC 48 V		**3VT9500-1SG00**	1 unit	0.220
	AC/DC 110 V		**3VT9500-1SH00**	1 unit	0.220
	AC 230 V/DC 220 V		**3VT9500-1SJ00**	1 unit	0.237
	AC 400 V		**3VT9500-1SK00**	1 unit	0.220
	AC 500 V		**3VT9500-1SL00**	1 unit	0.220
Undervoltage trip units					
	AC/DC 24 V		**3VT9500-1UF00**	1 unit	0.220
	AC/DC 48 V		**3VT9500-1UG00**	1 unit	0.220
	AC/DC 110 V		**3VT9500-1UH00**	1 unit	0.220
	AC 230 V/DC 220 V		**3VT9500-1UJ00**	1 unit	0.220
	AC 400 V		**3VT9500-1UK00**	1 unit	0.220
	AC 500 V		**3VT9500-1UL00**	1 unit	0.220

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* You can order this quantity or a multiple thereof.

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Overview

Rotary operating mechanism

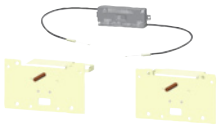
The rotary operating mechanism assembly consists of:

- 3VT9500-3HA10 rotary operating mechanism
- 3VT9500-3HE/HF10 hand drive lever

In order to operate the circuit breaker through the switchgear cabinet door the following components are additionally needed:

- 3VT9500-3HJ10 extension shaft
- 3VT9500-3HG10/HG20 coupling driver

Selection and ordering data

	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Rotary operating mechanism					
	**Rotary operating mechanism (hand drive unit)**				
	• lockable with padlock		**3VT9500-3HA10**	1 unit	0.230
	**Hand drive lever**				
	• lockable with padlock	black	**3VT9500-3HE10**	1 unit	0.261
	• lockable with padlock	red	**3VT9500-3HF10**	1 unit	0.261
	**Coupling driver**				
	• Degree of protection IP44		**3VT9500-3HG10**	1 unit	0.265
	• Degree of protection IP66		**3VT9500-3HG20**	1 unit	0.140
	**Extension shaft**				
	• length 365 mm (can be shortened)		**3VT9500-3HJ10**	1 unit	0.352
Mechanical Interlocking					
	**Mechanical interlocking** for the rotary operating mechanism for circuit breakers/switch disconnectors, fixed-mounted version Both circuit breakers must be equipped with a rotary operating mechanism and a knob.		**3VT9500-8LA00**	1 unit	0.120
	**Mechanical interlocking by Bowden wire** Mechanical interlocking by Bowden wire is intended for fixed-mounted and withdrawable versions.				
	• For circuit breakers/switch disconnectors, fixed-mounted version		**3VT9500-8LC10**	1 unit	0.400
	• For one fixed-mounted and one withdrawable circuit breaker/switch disconnector		**3VT9500-8LC30**	1 unit	0.400
	• For circuit breaker/switch disconnector, withdrawable version		**3VT9500-8LC40**	1 unit	0.400
Motorized operating mechanism					
	**Motorized operating mechanism; Rated control voltage**				
	AC/DC 110 V		**3VT9500-3MN00**	1 unit	4.350
	AC 230 V/DC 220 V		**3VT9500-3MQ00**	1 unit	4.454
	Motorized operating mechanism with operations counter; Rated control voltage				
	AC/DC 110 V		**3VT9500-3MN10**	1 unit	4.400
	AC 230 V/DC 220 V		**3VT9500-3MQ10**	1 unit	4.400

* You can order this quantity or a multiple thereof.

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Mounting accessories

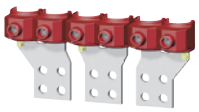
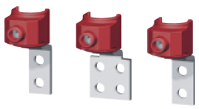
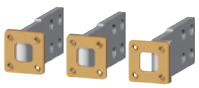
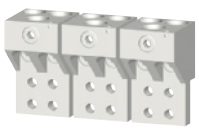
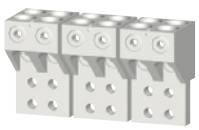
Overview

Withdrawable version

When connecting the main circuit, the recommendations on page 5/10 as well as the deionizing space (see page 5/34) must be observed

- The withdrawable version base must be fitted with:
  - 3VT4710-3AA38-0AA0 switching unit, 3-pole version;
  - 2 x 3VT9500-4EF30 connection set (front connection) or 3VT9500-4RD30 (rear connection)
- We recommend attaching the withdrawable version base to the switchboard with:
  - 3VT9500-4SA40 mounting bolt set (4 x M8 x60)

Selection and ordering data

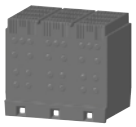
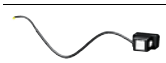
	Version	Max. permissible cross-section *S*	Type of cables	DT	Article No.	PS*/ P. unit	Weight per PU approx.
		mm²					kg
Withdrawable version base							
	**Withdrawable version base for 3-pole circuit breaker/switch disconnector**				**3VT9500-4WA30**	1 unit	13.888
Connecting sets							
	**Box terminals, double** For connecting four 70 ... 240 mm² cables, it is possible to use two 3VT9524-4TG30 connecting sets. Not for 3VT4710-3AA30-0AA0 switching unit.	2 x 70 ... 240	Cu/Al cables		**3VT9524-4TG30**	1 unit	1.475
	**Box terminals,** For connecting three 70 ... 240 mm² cables, it is possible to combine the 3VT9524-4TG30 connecting set with the 3VT9524-4TF30 connecting set. Not for 3VT4710-3AA30-0AA0 switching unit.	70 ... 240	Cu/Al cables		**3VT9524-4TF30**	1 unit	0.663
	Rear connection		Busbars				
	• Up to 1000 A				**3VT9400-4RC30**	1 unit	1.420
	• Up to 1600 A				**3VT9500-4RC30**	1 unit	2.678
	**Front connection** for withdrawable version		Busbars		**3VT9500-4EF30**	1 unit	2.730
	**Rear connection** for withdrawable version		Busbars		**3VT9500-4RD30**	1 unit	3.420
	Terminals for circular conductors	150 ... 300	Cu/Al cables				
	• for 2 cables				**3VT9532-4TF30**	1 unit	1.040
	• for 3 cables				**3VT9533-4TF30**	1 unit	1.948
	• for 4 cables				**3VT9534-4TF30**	1 unit	1.800

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* You can order this quantity or a multiple thereof.

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Selection and ordering data

	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Accessories					
	**Insulating barriers** In case of reversed connection (supply to terminals 2, 4, 6), the insulating barriers must also be installed on the bottom side. Not included in standard scope of delivery of switching units in fixed-mounted version. • For switching unit, fixed-mounted version		**3VT9500-8CE30**	1 unit	0.264
	• For withdrawable version		**3VT9500-8CF30**	1 unit	0.142
	**Terminal cover protection** Increases degree of protection of connection point to IP20. Intended for withdrawable version with front connection. We recommend installation of terminal cover protection on both sides of the withdrawable device for increasing safety when maintaining the electrical device. • For circuit breakers/switch disconnectors, fixed-mounted version with rear connection		**3VT9500-8CD30**	1 unit	0.287
	• For withdrawable version with front connection		**3VT9500-8CC30**	1 unit	0.168
	• For fixed design with block type terminals NEW		**3VT9500-8CH30**	1 unit	0.700
	**Insulating grommets** Intended for fixed-mounted version of switching unit and withdrawable version with rear connection. The insulating connecting sets insulate connecting sets of rear connection from switchgear structure. We recommend installation on all connecting sets with rear connection. • For rear connection		**3VT9500-8CG30**	1 unit	0.100
	**Locking device for knob** Enables locking circuit breaker in "switched off manually" position. For locking, up to three padlocks with a max. shank diameter of 6 mm may be used		**3VT9500-3HL00**	1 unit	0.041
	**Bolt sealing insert** Provides sealing for: • Accessory compartment cover		**3VT9500-8BN00**	1 unit	0.002
	**Connecting cable** • For connecting circuit breaker accessories to withdrawable version (15 wire)		**3VT9500-4PL00**	1 unit	0.120
	**Position indicator** Signals circuit breaker/switch disconnector position in withdrawable version		**3VT9500-4WL00**	1 unit	0.020
	**Mounting bolts** • For withdrawable version		**3VT9500-4SA40**	1 unit	0.144
	**ON button cover** • For motorized operating mechanism, cover can be sealed with sealing wire		**3VT9500-3MF20**	1 unit	0.190

* You can order this quantity or a multiple thereof.

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Technical specifications

Description		3VT4 Circuit breakers	Switch disconnector
Article number		**3VT4710-3AA30-0AA0 3VT4710-3AA38-0AA0**	**3VT9410-6DT00**
Standards		EN 60 947-2, IEC 947-2	EN 60 947-3, IEC 947-3
Approval marks		CE	
Number of poles		3	
Rated current I_n	A	315, 630, 800, 1000	--
Rated normal current I_u	A	1000	
Rated operational current I_e	A	--	1000
Rated operational voltage U_e	V	AC max. 690	AC max. 690, DC max. 440
Rated frequency f_n	Hz	50/60	
Rated impulse withstand voltage U_{imp}	kV	8	
Rated insulation voltage U_i	V	690	
Utilization category (selectivity) AC 690 V		A, B	AC-23 B
Utilization category (switching mode) AC 690 V DC 440 V		-- --	AC-23 B DC-23 B
Rated short-time withstand current U_e=*AC 690 V* I_{cw}/t	kA/1 s	15	15
Rated ultimate short-circuit breaking capacity (rms value)[1] I_{cu}/U_e		AC 85 kA/230V AC 55 kA/415V AC 45 kA/500V AC 20 kA/690V	--
Off-time at I_{cu}	ms	30	--
Rated short-circuit service breaking capacity (rms value) I_{cs}/U_e		AC 45 kA/230V AC 36 kA/415V AC 30 kA/500V AC 20 kA/690V	--
Rated short-circuit making capacity (peak value) I_{cm}/U_e		140 kA/AC 415 V	30 kA/AC 415 V, 30 kA/DC 440 V
Losses per pole at I_n = 1000 A	W	100	
Mechanical endurance	cycles	10000	
Electrical endurance (U_e = AC 415 V)	cycles	4000	
Switching frequency	cycles/hr	120	
Operating force	N	230	
Front-side device protection		IP40	
Terminal protection		IP20	
Operating conditions			
Reference ambient temperature	°C	40	
Ambient temperature range		-40 ... +55	
Working environment		dry and tropical climate	
Degree of pollution		3	
Max. elevation	m	2000	
Seismic resistance	m/s^2	3 *g* at 8 ... 50 Hz	
Design modifications			
Front/rear connection		✓/✓	
Plug-in design		--	
Withdrawable design		✓	
Accessories			
Switches-auxiliary/relative/signal/early		✓/✓/--/--	
Shunt trip unit		✓	
Undervoltage trip unit		✓	
Manual front operating mechanism		✓	
Mechanical interlocking to the rotary operating mechanism, by Bowden wire		✓	
Motorized operating mechanism/with operations counter		✓/✓	
Locking-type lever		✓	
Bolt sealing inset/additional cover for trip unit		✓/--	

✓ available,
-- unavailable

[1] If the circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5), I_{cu} does not change.

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Overview

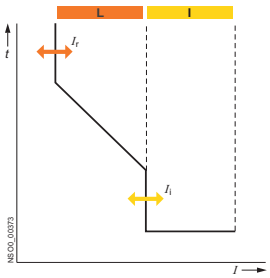
The electronic trip unit is a separate and interchangeable unit, which has to be ordered in addition to the 3VT4710-3AA..-0AA0 switching unit. By exchanging the trip unit, the range of the circuit breaker's rated current can be easily changed.

Trip units for the 3VT4710-3AA30-0AA0 switching unit are available in four current ranges I_n **= 315, 630, 800 and 1000 A**.
The trip units cover rated currents ranging from 125 to 1000 A.

Tripping characteristics

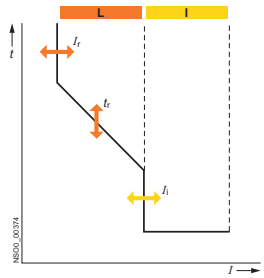
Several different trip units are available. Some have adjustable characteristics (in order to match the protected device and to achieve the required selectivity):

ETU DP trip units



ETU DP trip units have one type of characteristics with adjustable I_r and I_i.

ETU MP trip units



ETU MP trip units have more characteristics with adjustable I_r, t_r and I_i.

ETU UP trip units

ETU UP trip units have universal characteristics, with the greatest variability in adjustment: I_r, t_r, I_{sd}, t_{sd} and I_i.

ETU MP and MPS

Tripping Adjust - Release Class	
M3	10 A
M8	10
M15	20
M25	30

Trip units ETU DP, MP and UP - description of function

Proper functioning of trip units does not depend on the waveform of the current in the main circuit. The function of the trip unit is supported by a microprocessor, which processes a sampled signal of the power circuit and recalculates it to obtain an rms value. Therefore, digital trip units are suitable for protecting circuits where the sinusoidal current is distorted by high harmonics (e.g. circuits with controlled rectifiers, power factor compensators, pulse loading, and the like).

All the trip units protect a circuit against short-circuiting and overloading. Setting of selective cascading of circuit breakers is especially enabled by the ETU UP trip unit. Tripping characteristics of the trip units are independent of the ambient temperature. The trip unit is attached to the switching unit by two bolts. The translucent cover over the adjustment controls can be sealed (with sealing wire).

Adjustment of the tripping characteristics for ETU DP and MP trip units

The tripping characteristics of the trip units are defined by standard EN 60 947-2. The characteristics are adjusted in two zones, using latched switches located on the trip unit:

L is a zone of low overcurrents and includes the area of thermal protection.

I is a zone of high overcurrents and includes protection against ultimate short-circuit currents. For ETU MP trip units, the time delay can be set at 0 or 50 ms.

1. Time-dependent trip unit (thermal) L

- The time-dependent trip unit **ETU DP** is adjusted with one I_r switch. The I_r switch adjusts the circuit breaker's rated current. The characteristic moves along the current axis. The trip unit is set to one characteristic.
- The time-dependent trip unit **ETU MP** is adjusted with two switches, I_r and t_r. The first (I_r) switch adjusts the circuit breaker's rated current. The characteristic moves along the current axis.
  Turning the other switch (t_r) adjusts the time after which the circuit breaker will trip while passing through 7.2 I_r. The tripping characteristic thus moves along the time axis. With the t_r switch it is possible to set a total of 8 characteristics:
  - Four characteristics are available for motor protection. Breaking times correspond to trip unit classes 10 A, 10, 20, 30. By changing t_r, it is possible to select the characteristics according to the required motor starting (light, medium, heavy or very heavy starting).
  - Four characteristics are available for protecting transformers and lines.

  It is not possible to turn the device back on right after the time-dependent trip unit has been actuated and the circuit breaker has tripped. The trip unit must be allowed to cool off (it has a thermal memory). The memory can be disabled by turning the "restart" switch from the normal "T_t" position to the "T_0" position. The time-dependent trip unit remains active, and only its thermal memory is deactivated. The thermal memory should be switched off only in justified cases, and with the knowledge that the temperature could rise in the protected device, causing repeated tripping.

2. Time-independent instantaneous trip unit (short-circuit trip unit) *I*

The time-independent instantaneous **ETU DP** and **ETU MP** trip units are adjusted with one switch, I_i. The I_i switch sets the short-circuit current that, when reached or exceeded, causes instantaneous tripping of the circuit breaker.

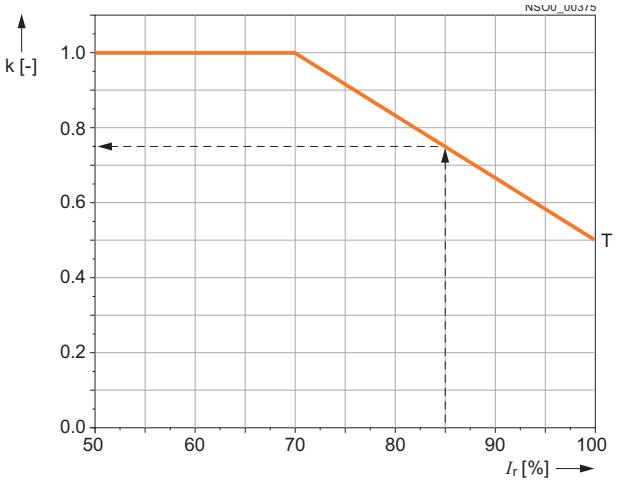
Regulation of the short-circuit trip unit provides settings for the characteristic appropriate for protecting lines and motors. The wave form of the tripping characteristic is adjusted with latched switches located on the trip unit's front panel according to the needs of the protected device. A visual demonstration on setting the tripping characteristics is available in the SIMARIS design software (Tool for Dimensioning Electrical Power Distribution).

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Trip units

Tripping characteristics of ETU DP and MP trip units with load

The tripping characteristics from the cold state indicate the tripping times during which it is assumed that, up to the moment when an overcurrent develops, no current is flowing through the circuit breaker. The tripping characteristics tripped from warm state, indicate the tripping times during which it is assumed that, before the moment when an overcurrent develops, current is flowing through the circuit breaker. Characteristics of electronic trip units are independent of the ambient temperature and are plotted in a cold state. Digital trip units enable simulation of a tripping in warm state. The tripping times become shorter in a steady state, as shown in the following graph. The steady state is a period during which the characteristics do not change. If the circuit breaker is loaded with a reduced current for at least 30 minutes, the tripping times will be cut by a half. If the load is less than 70% of I_r , the tripping time does not become shorter.



ETU DP and MP tripping times shortening with load

T - When tripping from the trip unit's "warm" state, the tripping time of the characteristic is cut short during the standstill time t_u by coefficient **k**.

Thermal standstill time of the characteristics

For all kinds of characteristics t_r, the thermal standstill time for ETU DP and MP trip units is $t_u \geq 30$ min.

During this time, the short-circuit tripping time t_{sd} is cut short from the cold-state characteristic by the coefficient **k**.

The real tripping time is $t_s = k \cdot t_{sd}$

Example

The shortening constant can be read from the diagram. With steady current 85% of I_r the real tripping time will be shortened to:

$t_s = 0.74 \cdot t_{sd}$

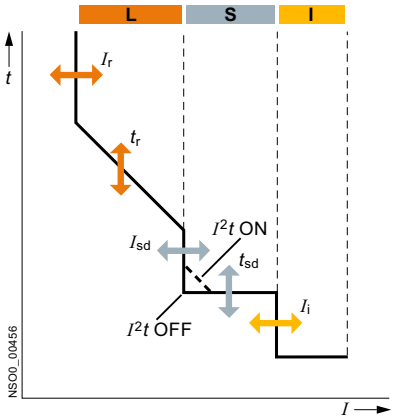
k [–] time shortening coefficient
I_r [A] adjusted rated current of the trip unit
t_{sd} [s] tripping time of the trip unit derived from the characteristic
t_s [s] real tripping time of the trip unit tripped from warm state
t_u [s] standstill period for particular characteristics

Trip units are set by the manufacturer

I_r = min
Restart = $T_{(t)}$
I_i = min, 0 ms
t_r = TV, min

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Adjustment of tripping characteristics, trip unit ETU UP



The tripping characteristics of trip units are defined by standard EN 60 947-2. The characteristics are adjusted in three zones using latched switches located on the trip unit:

L - is a zone of low overcurrents and includes the area of thermal protection.

S - is a zone of medium overcurrents and includes long-distance short-circuit protection for lines. Intentional delay in tripping of these low short-circuit currents can be used to achieve selectivity of protective devices. This type of delay can be set only in self-contained trip units (full version).

I - is a zone of high overcurrents and includes protection against ultimate short-circuiting without time delay.

I^2t - Characteristic setting in the ON position represents a constant value of energy passed through. If fuses are used as protective elements for outgoing branch feeders, it is possible to adjust the selective part of the characteristics to better suit the shape of the fuse characteristics.

1. Time-dependent trip unit (thermal) L

The time-dependent trip unit ETU UP is adjusted with two switches, I_r and t_r. The first switch, I_r, adjusts the circuit breaker's rated current. The characteristics move along the current axis.

Turning the second switch, t_r, adjusts the time after which the circuit breaker will trip while passing through 7.2 I_r. The tripping characteristics thus move on the time axis. A total of 8 characteristics can be set with the t_r switch. Breaking times correspond to tripping classes 10 A, 10, 20, 30.

It is not possible to turn the device back on right after the time-dependent trip unit has tripped the circuit breaker. The trip unit must be allowed to cool off (it has a thermal memory). The memory can be disabled by turning the "restart" switch from the normal "T_t" position to the "T_0" position. The time-dependent trip unit remains active, and only its thermal memory is inactivated. The thermal memory should be switched off only in justified cases, and with the knowledge that there could be rising temperature in the protected device, causing repeated tripping.

2. Delayed time-independent trip units S

It is used to set up a selective cascade of circuit breakers. It is set up using specifications I_{sd} and t_{sd}.

I_{sd} is an n-multiple of current I_r (I_{sd} = n × I_r). It is a short-circuit current that, within the span of I_{sd} to I_i, will trip the circuit breaker with delay t_{sd}, where t_{sd} is a delay set up for switching off the trip unit.

The delayed time-independent trip unit actuates the circuit breaker if the current in the circuit reaches at least the preset n-multiple and lasts at least the preset delay time t_{sd}. The trip unit can be disabled by setting the parameter n (I_{sd} = n × I_r) into the position. Parameter t_{sd} can be set to values with respect to the energy that passed through I^2t (switch position I^2t on). The preset time values are then applicable for currents higher than 10x current I_r. Tripping times of k-multiples of I_r for k < 10 are defined as follows:

$$t = t_{sd}\left(\frac{10}{k}\right)^2$$

3. Time-independent instantaneous trip unit I

It is set up with parameter I_i. I_i is a short-circuit current that, when reached or exceeded, causes the circuit breaker to switch off instantaneously. It is set up directly in kA on the trip unit. The wave form of the tripping characteristic is adjusted using latched switches located on the trip unit's front panel to match the needs of the protected device. A visual demonstration on setting the tripping characteristic is available in the SIMARIS design software (Tool for Dimensioning Electrical Power Distribution).

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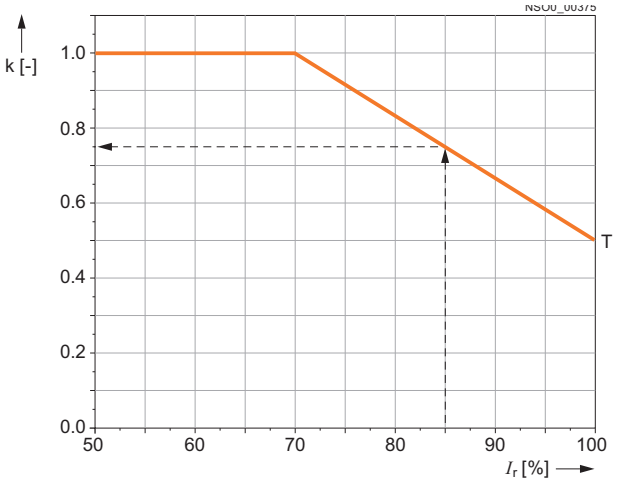
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Trip units

Tripping characteristics for ETU UP trip units with load

The tripping characteristics from the cold state indicate the tripping times during which it is assumed that, up to the moment when an overcurrent develops, no current is flowing through the circuit breaker. The tripping characteristics tripped from warm state indicate the tripping times during which it is assumed that, before the moment when an overcurrent develops, current is flowing through the circuit breaker. Characteristics of electronic trip units are independent of the ambient temperature and are plotted in a cold state. Digital trip units enable simulation of a tripping in warm state. The tripping times become shorter in a steady state, as shown in the following diagram. The steady state is a period during which the characteristics do not change.

If the circuit breaker is loaded with a reduced current for at least 30 minutes, the tripping times will be cut by half. If the load is less than 70% of I_r , the tripping time does not become shorter.



T - When tripping from the "warm" state, the tripping time of the characteristics are cut short during the standstill time t_u by coefficient k.

Thermal standstill time of the characteristics

For all kinds of characteristics t_r the thermal standstill period for ETU UP trip units is $t_u \geq 30$ min. During this time, the short-circuit tripping time t_{sd} is cut short from the cold-state characteristics by the coefficient k.

The real tripping time is $t_s = k \cdot t_{sd}$

Example

The shortening constant can be read from the diagram. With steady current 85% of I_r, the real tripping time will be shortened to:

$t_s = 0.74 \cdot t_{sd}$

k [–] time shortening coefficient
I_r [A] adjusted rated current of trip unit
t_{sd} [s] tripping time of the trip unit derived from the characteristics
t_s [s] real tripping time of the trip unit tripped from warm state
t_u [s] standstill period for particular characteristics

Trip units are set by the manufacturer
I_r = min
Restart = $T_{(t)}$
I_i = min
t_r = min
t_{sd} = min, I^2t - ON
I_{sd} = min

Trip units are set by the manufacturer

I_r = min

Restart = $T_{(t)}$

I_i = min, 0 ms

t_r = TV, $t_{(t)}$, min

I_{sd} = 0 ms, min

I = 0.5 I_r

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Trip units ETU DP - Distribution protection

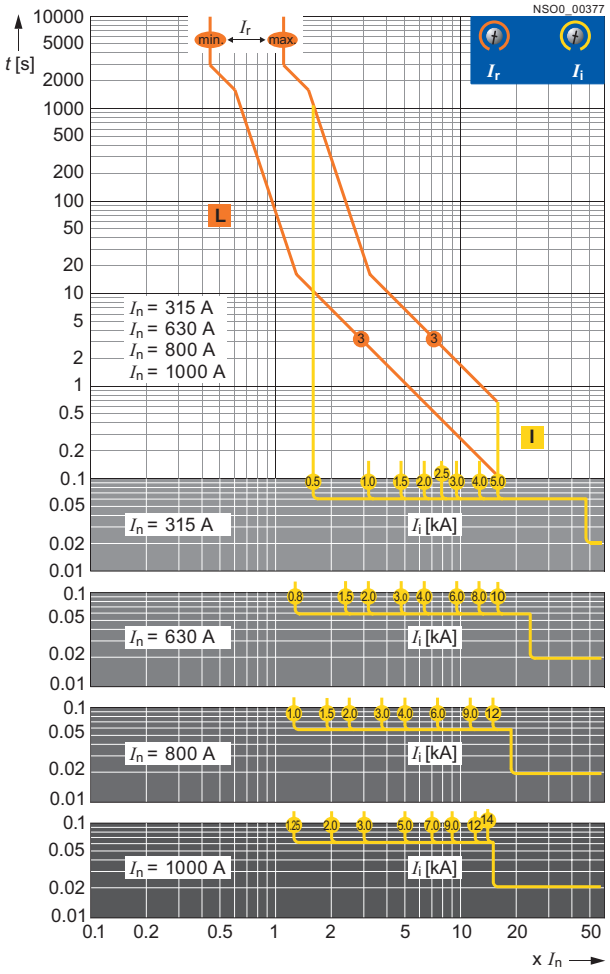
- Provides protection for lines and transformers

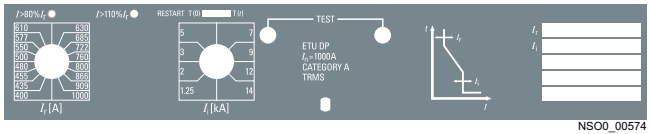
The 3VT94..-6AC00 trip unit is intended only for the 3VT4710-3AA..-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is fitted with a thermal memory that can be disabled by turning the switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After having disabled the thermal memory, the thermal tripping function remains active.

A practical advantage of the trip unit is special tripping characteristics that provide for optimized use of transformers up to 1.5 I_n.

Another advantage of this trip unit is the simple adjustment of the tripping characteristics. Set-up includes only the rated current in a range of 0.4 to 1.0 of I_n and the short-circuit tripping level. Reaching 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as $I > 80\%$ and $I > 110\%$ of I_r.
Located on the lower part of the trip unit cover are four photocells for communicating with the 3VT9500-6AE00 signalling unit.

Tripping characteristics





Specifications for adjustable trip units

Article No.	Rated current I_n A	Overload protection I_r A	Restart	Instantaneous short circuit protection I_i kA
3VT9431-6AC00	315	125, 137	$T_{(0)}$	0.5
		144, 160	$T_{(t)}$	1
		172, 180		1.5
		200, 220		2
		231, 243		2.5
		250, 260		3
		275, 290		4
		305, 315		5
3VT9463-6AC00	630	250, 260	$T_{(0)}$	0.8
		275, 290	$T_{(t)}$	1.5
		305, 315		2
		345, 360		3
		400, 435		4
		455, 480		6
		500, 550		8
		575, 630		10
3VT9480-6AC00	800	315, 345	$T_{(0)}$	1
		360, 400	$T_{(t)}$	1.5
		435, 455		2
		480, 500		3
		550, 575		4
		610, 630		6
		685, 720		9
		760, 800		12
3VT9410-6AC00	1000	400, 435	$T_{(0)}$	1.25
		455, 480	$T_{(t)}$	2
		500, 550		3
		575, 610		5
		630, 685		7
		720, 760		9
		800, 866		12
		909, 1000		14

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Trip units

Trip units ETU MP - Motor protection

- Direct protection of motors and generators
- Can protect lines and transformers

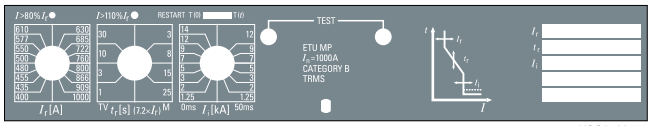
The 3VT94..-6AP00 trip unit is intended only for the 3VT4710-3AA..-0AA0 switching unit. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After having disabled the thermal memory, the thermal trip unit remains active.

A practical advantage of the trip unit are specially designed tripping characteristics that provide for optimal exploitation of transformers up to 1.5 I_n.

It is possible to set a total of 8 characteristics on the trip unit. From these, in mode "M", there are 4 characteristics for motor protection and another 4 characteristics in mode "TV" for protecting transformers and lines. The shape of each characteristic can be changed using a selector switch.

When one or two phases fail, in the M-characteristic mode, the switch will open with a 4 s delay (so called undercurrent tripping).

Another parameter for adjusting the trip unit is the rated current, which is adjusted in a range of 0.4 to 1.0 of I_n and the short-circuit tripping level, for which it is possible to set the delay at 0 or 50 ms. The reaching of 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as I > 80% of I_r and I > 110% of I_r. Located on the lower part of the trip unit cover are two photocells for communicating with the 3VT9500-6AE00 signalling unit.



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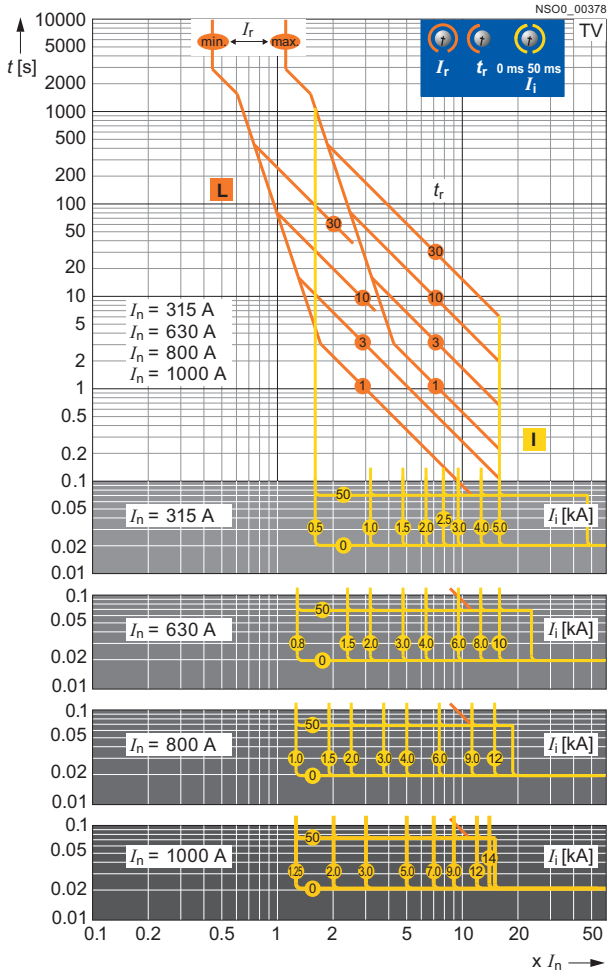
Specifications for adjustable trip units

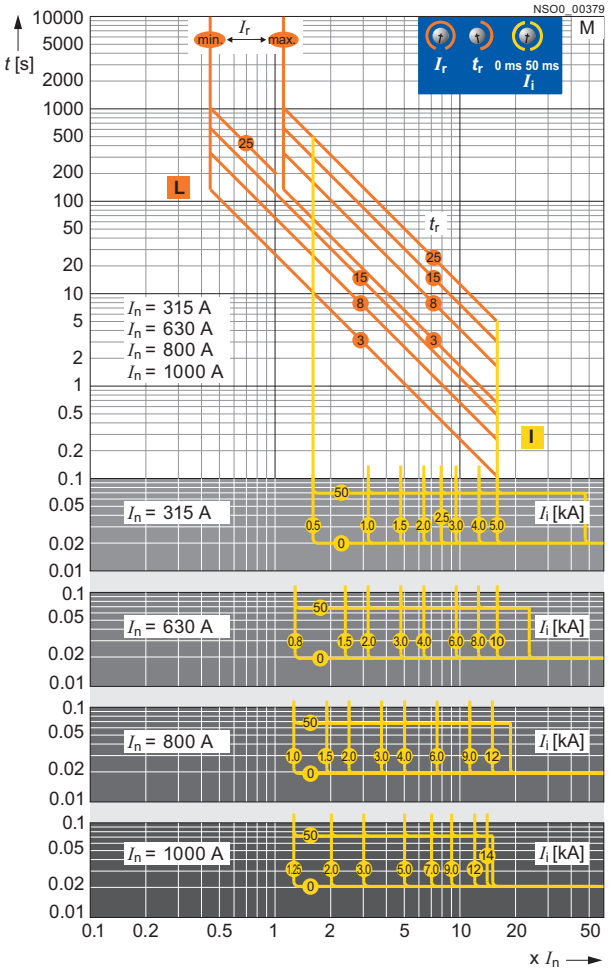
Article No.	Rated current In	Overload protection I_r	t_r (7.2 x I_r)	Restart	Instantaneous short circuit protection I_i	
	A	A	S		kA	ms
					0.5	
		125, 137	1 (TV 1)		1	
					1.5	
		144, 160	3 (TV 3)	$T_{(0)}$	2	0
					2.5	
		172, 180	10 (TV 10)		3	
					4	
3VT9431-6AP00	315	200, 220	30 (TV 30)		5	
					5	
		231, 243	3 (M 3)		4	
					3	
		250, 260	8 (M 8)	$T_{(t)}$	2.5	50
					2	
		275, 290	15 (M 15)		1.5	
					1	
		305, 315	25 (M 25)		0.5	

Article No.	Rated current In	Overload protection I_r	t_r (7.2 x I_r)	Restart	Instantaneous short circuit protection I_i	
	A	A	S		kA	ms
					0.8	
		250, 260	1 (TV 1)		1.5	
					2	
		275, 290	3 (TV 3)	$T_{(0)}$	3	
					4	0
		305, 315	10 (TV 10)		6	
					8	
3VT9463-6AP00	630	345, 360	30 (TV 30)		10	
					10	
		400, 435	3 (M 3)		8	
					6	
		455, 480	8 (M 8)	$T_{(t)}$	4	
					3	50
		500, 550	15 (M 15)		2	
					1.5	
		375, 630	25 (M 25)		0.8	
					1	
		315, 345	1 (TV 1)		1.5	
					2	
		455, 480	3 (TV 3)	$T_{(0)}$	3	0
					4	
		500, 550	10 (TV 10)		6	
					9	
3VT9480-6AP00	800	575, 610	30 (TV 30)		12	
					12	
		630, 685	3 (M 3)		9	
					6	
		722, 760	8 (M 8)	$T_{(t)}$	4	
					3	50
		800, 866	15 (M 15)		2	
					1.5	
		909, 1000	25 (M 25)		1	
					1.25	
		400, 435	1 (TV 1)		2	
					3	
		455, 480	3 (TV 3)	$T_{(0)}$	5	0
					7	
		500, 550	10 (TV 10)		9	
					12	
3VT9410-6AP00	1000	575, 610	30 (TV 30)		14	
					14	
		630, 685	3 (M 3)		12	
					9	
		722, 760	8 (M 8)		7	
				$T_{(t)}$	5	50
		800, 866	15 (M 15)		3	
					2	
		909, 1000	25 (M 25)		1.25	

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Tripping characteristic ETU MP





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Trip units

Trip units ETU UP - Universal protection

- For protecting complicated loads or those not specified in advance

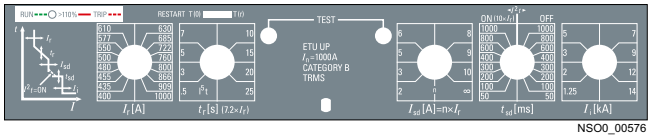
The 3VT94..-6AD00 trip unit is intended for the 3VT4710-3AA..-0AA0 switching unit only. The UP trip unit is equipped with a thermal memory that can be disabled by turning the "restart" switch on the front panel from the position $T_{(t)}$ to the position $T_{(0)}$. After the thermal memory has been disabled, the thermal trip unit remains active.

A practical advantage of the UP trip unit is its maximum flexibility for adjusting the tripping characteristics. With its possibility for setting I^2t = constant and I^5t = constant, it is optimal from the selectivity viewpoint for its interaction with fusing devices.

The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r this LED will turn red and just before tripping will begin to blink red. Located on the lower part of the trip unit cover are two photocells for communicating with the 3VT9500-6AE00 signalling unit.

Specifications for adjustable trip units

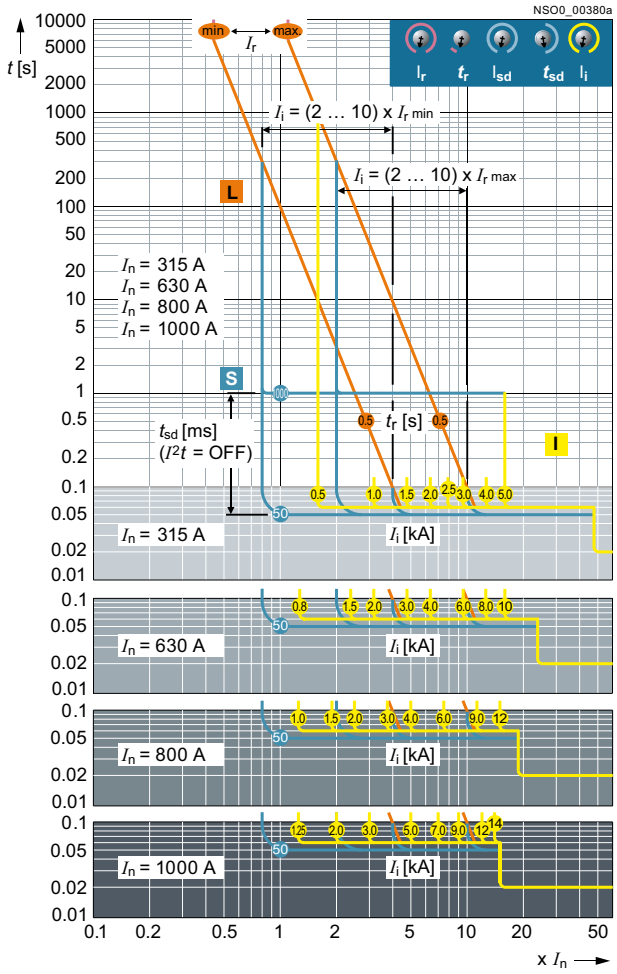
Article No.	Rated current I_n	Overload protection I_r	t_r (7.2 x I_r)	Short delayed short circuit protection I_{sd}=(n x I_r)	t_{sd}	I^2t	Restart	Instantaneous short circuit protection I_i
	A	A	S	n	ms			kA
3VT9431-6AD00	315	125, 137	0.5	2	50, 100			0.5
		144, 160	3	3	200, 300	on	$T_{(0)}$	1
		172, 180	5	5	400, 600			1.5
		200, 220	7	6	800, 1000			2
		231, 243	10	8	50, 100			2.5
		250, 260	15	9	200, 300	off	$T_{(t)}$	3
		275, 290	20	10	400, 600			4
		305, 315	25	∞	800, 1000			5
3VT9463-6AD00	630	250, 260	0.5	2	50, 100			0.8
		275, 290	3	3	200, 300	on	$T_{(0)}$	1.5
		305, 315	5	5	400, 600			2
		345, 360	7	6	800, 1000			3
		400, 435	10	8	50, 100			4
		455, 480	15	9	200, 300	off	$T_{(t)}$	6
		500, 550	20	10	400, 600			8
		575, 630	25	∞	800, 1000			10
3VT9480-6AD00	800	315, 345	0.5	2	50, 100			1
		360, 400	3	3	200, 300	on	$T_{(0)}$	1.5
		435, 455	5	5	400, 600			2
		480, 500	7	6	800, 1000			3
		550, 575	10	8	50, 100			4
		610, 630	15	9	200, 300	off	$T_{(t)}$	6
		685, 720	20	10	400, 600			9
		760, 800	25	∞	800, 1000			12
3VT9410-6AD00	1000	400, 435	0.5	2	50, 100			1.25
		455, 480	3	3	200, 300	on	$T_{(0)}$	2
		500, 550	5	5	400, 600			3
		575, 610	7	6	800, 1000			5
		630, 685	10	8	50, 100			7
		720, 760	15	9	200, 300	off	$T_{(t)}$	9
		800, 866	20	10	400, 600			12
		909, 1000	25	∞	800, 1000			14

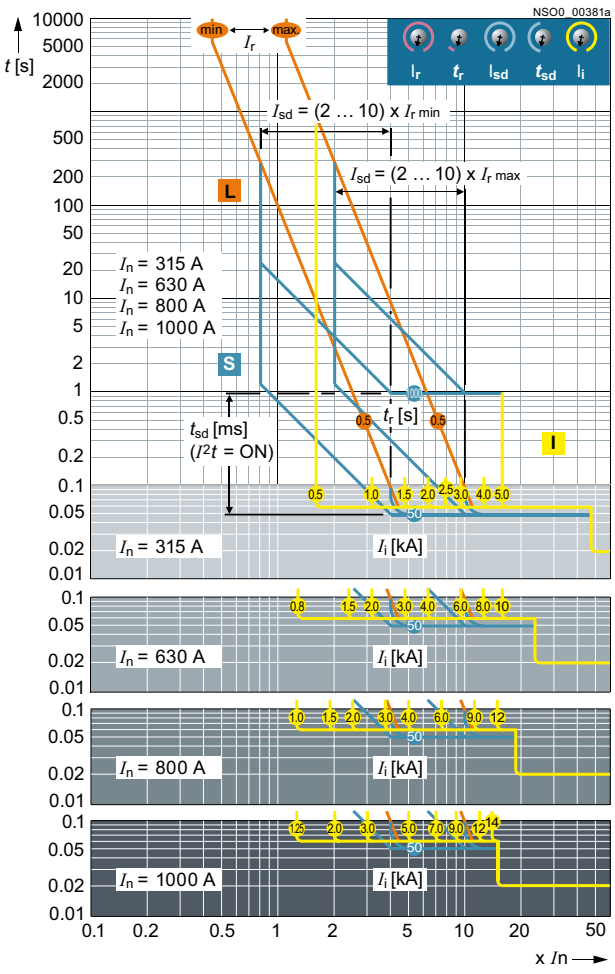


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Tripping characteristics ETU UP



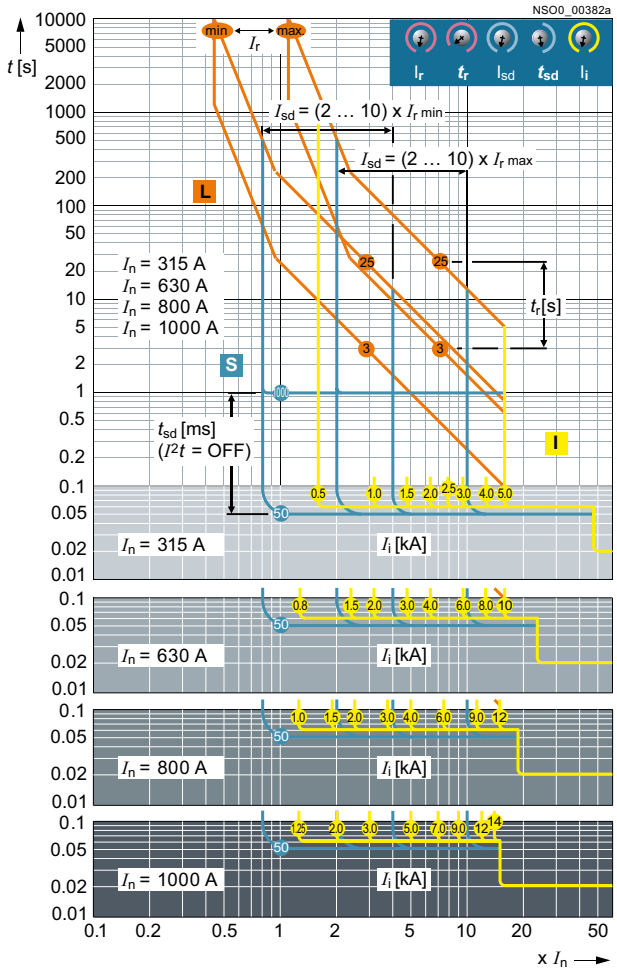


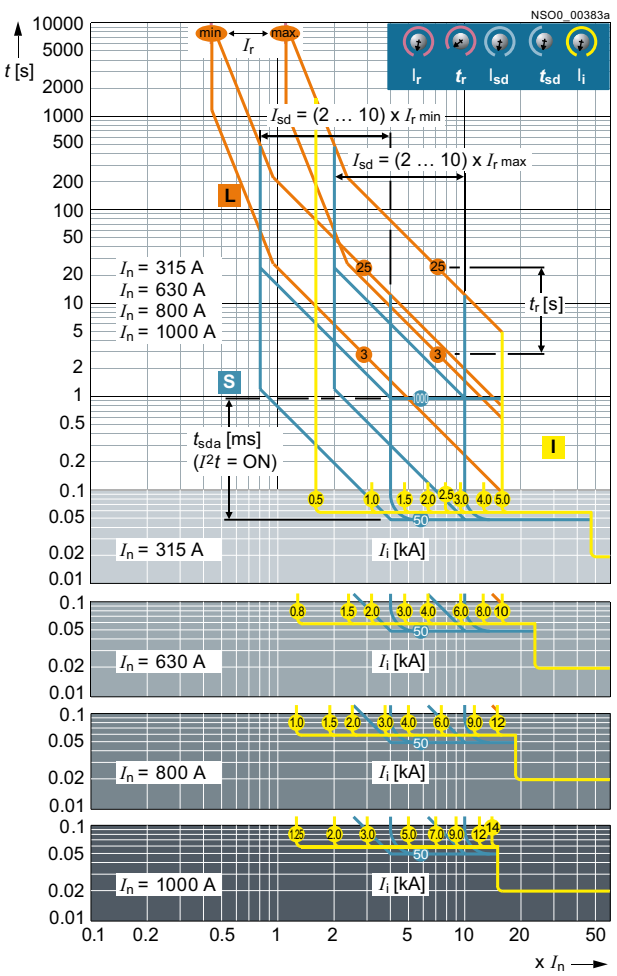
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Trip units

Tripping characteristics ETU UP





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3VT5 Molded Case Circuit Breakers up to 1600 A

5



Catalog

3VT5 Molded Case Circuit Breakers up to 1600 A

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Accessories and Components
5/4 Circuit breakers · Switch disconnectors
5/5 Manual/motorized operating mechanisms
5/6 Mounting accessories
5/7 Further accessories

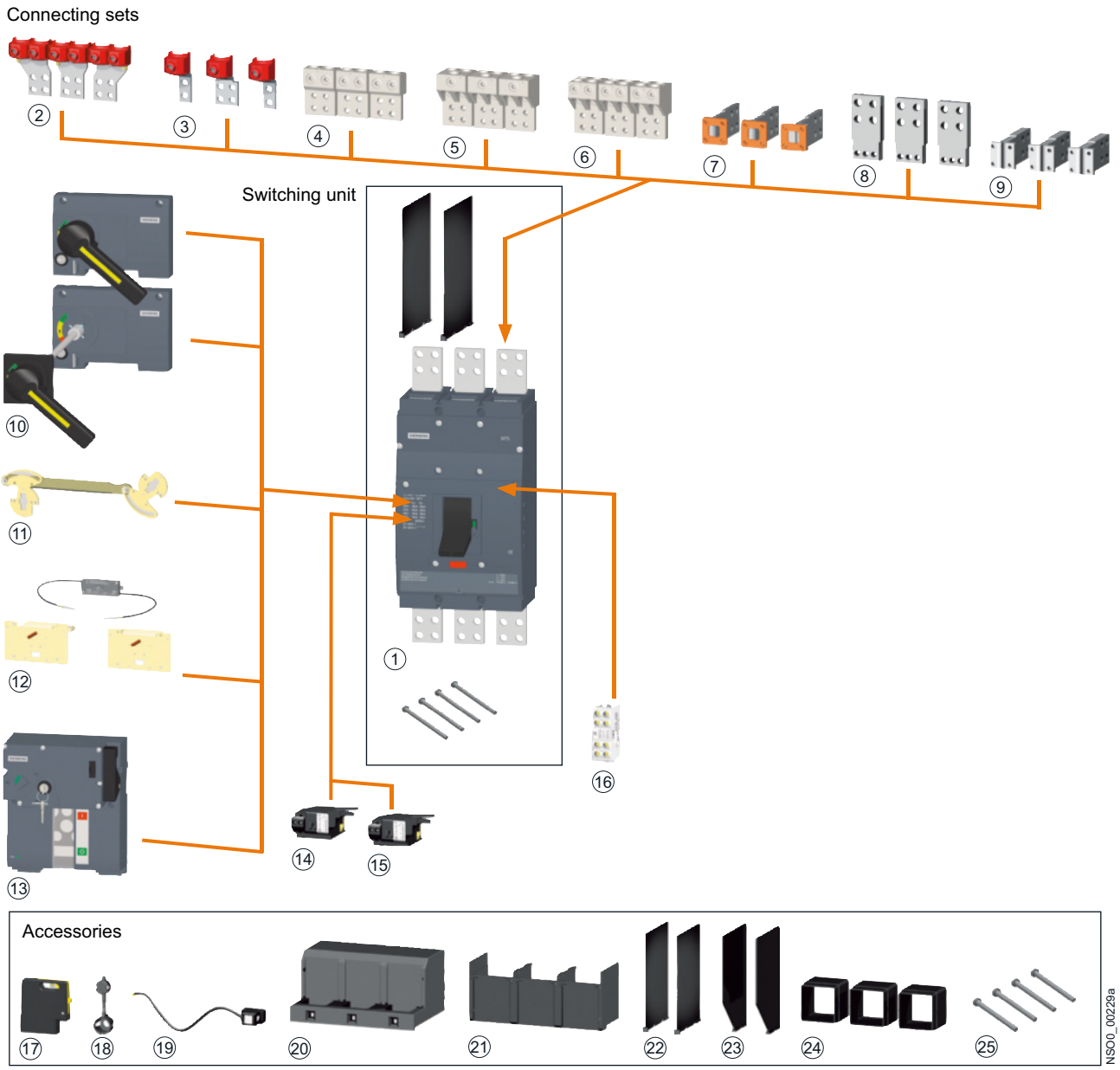
Technical Information

3VT5 Molded Case Circuit Breakers up to 1600 A

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Overview



1 Molded case circuit breaker
2 Multiple box terminals
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20 Terminal cover
21 Terminal cover
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23 Insulating barriers
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25 Mounting bolts

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Overview

Switching unit

The switching unit includes:

- 3VT9500-8CE30 insulating barriers
- Set of installation bolts (4x M8 x 80)
- Connecting sets for front connection - busbar connection

The switching unit must be outfitted with:

- Trip unit ETU DP, MP or UP (circuit breaker) or
- 3VT9516-6DT00 switch disconnector unit (switch disconnector)

For the withdrawable version, the 3VT5716-3AA38-0AA0 switching unit additionally requires

- 3VT9500-4WA40 withdrawable version base

Circuit breaker

The circuit breakers consist of a 3-pole switching unit (fixed-mounted or withdrawable version) and a trip unit, which is available with a choice of different characteristics.

Switch disconnector

The switch disconnector consists of a switching unit (fixed-mounted or withdrawable version) and a switch disconnector unit.

Selection and ordering data

	Rated Current I_n	Short-circuit breaking capacity $I_{cu\ at}$ AC 400 V	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	kA				kg
Switching units						
	***Fixed-mounted version, 3-pole***					
	1600	55		**3VT5716-3AA30-0AA0**	1 unit	23.000
	***Withdrawable version, 3-pole***					
	1600	55		**3VT5716-3AA38-0AA0**	1 unit	23.000

For different versions of connection, it is necessary to use connecting sets (see page 5/6).

* You can order this quantity or a multiple thereof.

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Selection and ordering data for accessories

	Rated current I_n	Set current of the inverse-time delayed overload trip units "L" I_r	S function short-circuit protection (short-time delayed) "S" I_{sd}	Operating current of the instantaneous short-circuit releases "I" I_i	DT	Article No.	PS*/ P. unit	Weight per PU approx.
	A	A		A				kg
Electronic trip units (ETU)								
Distribution protection, ETU DP, LI function								
	• For protecting lines and transformers							
	630	250 ... 630		800 ... 10000		**3VT9563-6AC00**	1 unit	0.670
	1000	400 ... 1000		1250 ... 15000		**3VT9510-6AC00**	1 unit	0.590
	1250	500 ... 1250		1500 ... 18000		**3VT9512-6AC00**	1 unit	0.529
	1600	630 ... 1600		2000 ... 20000		**3VT9516-6AC00**	1 unit	0.533
Motor/generator protection, ETU MP, LI function								
	• Provides protection for motors and generators • Suitable also for protecting lines and transformers							
	630	250 ... 630		800 ... 10000		**3VT9563-6AP00**	1 unit	0.500
	1000	400 ... 1000		1250 ... 15000		**3VT9510-6AP00**	1 unit	0.500
	1250	500 ... 1250		1500 ... 18000		**3VT9512-6AP00**	1 unit	0.530
	1600	630 ... 1600		2000 ... 20000		**3VT9516-6AP00**	1 unit	0.590
Universal protection, ETU UP LSI function								
	• Provides protection for complicated loads or loads not specified in advance							
	630	250 ... 630	2 ... 10 x I_R	800 ... 10000		**3VT9563-6AD00**	1 unit	0.500
	1000	400 ... 1000	2 ... 10 x I_R	1250 ... 15000		**3VT9510-6AD00**	1 unit	0.593
	1250	500 ... 1250	2 ... 10 x I_R	1500 ... 18000		**3VT9512-6AD00**	1 unit	0.500
	1600	630 ... 1600	2 ... 10 x I_R	2000 ... 20000		**3VT9516-6AD00**	1 unit	0.500
Switch disconnector unit								
	1600	Switch disconnector unit				**3VT9516-6DT00**	1 unit	0.400
Signalling unit								
		Signalling unit for trip units ETU DP, MP and UP				**3VT9500-6AE00**	1 unit	0.670

	Rated control supply voltage U_s	DT	Article No.	PS*/ P. unit	Weight per PU approx.
					kg
Auxiliary switches					
	AC 60 ... 500 V/DC60 ... 240 V		**3VT9500-2AF10**	1 unit	0.041
	AC/DC 5 ... 60 V		**3VT9500-2AF20**	1 unit	0.041
Shunt trip units					
	AC/DC 24 V		**3VT9500-1SF00**	1 unit	0.199
	AC/DC 48 V		**3VT9500-1SG00**	1 unit	0.220
	AC/DC 110 V		**3VT9500-1SH00**	1 unit	0.220
	AC 230 V/DC 220 V		**3VT9500-1SJ00**	1 unit	0.237
	AC 400 V		**3VT9500-1SK00**	1 unit	0.220
	AC 500 V		**3VT9500-1SL00**	1 unit	0.220
Undervoltage trip units					
	AC/DC 24 V		**3VT9500-1UF00**	1 unit	0.220
	AC/DC 48 V		**3VT9500-1UG00**	1 unit	0.220
	AC/DC 110 V		**3VT9500-1UH00**	1 unit	0.220
	AC 230 V/DC 220 V		**3VT9500-1UJ00**	1 unit	0.220
	AC 400 V		**3VT9500-1UK00**	1 unit	0.220
	AC 500 V		**3VT9500-1UL00**	1 unit	0.220

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Overview

Rotary operating mechanism

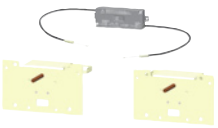
The rotary operating mechanism assembly consists of:

- 3VT9500-3HA10 rotary operating mechanism
- 3VT9500-3HE/HF10 hand drive lever

In order to operate the circuit breaker through the switchgear cabinet door the following components are additionally needed:

- 3VT9500-3HJ10 extension shaft
- 3VT9500-3HG10/HG20 coupling driver

Selection and ordering data

	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Rotary operating mechanism					
	**Rotary operating mechanism (hand drive unit)** • lockable with padlock		**3VT9500-3HA10**	1 unit	0.230
	**Hand drive lever** • lockable with padlock • lockable with padlock	black red	**3VT9500-3HE10** **3VT9500-3HF10**	1 unit 1 unit	0.261 0.261
	**Coupling driver** • Degree of protection IP44 • Degree of protection IP66		**3VT9500-3HG10** **3VT9500-3HG20**	1 unit 1 unit	0.265 0.140
	**Extension shaft** length 365 mm		**3VT9500-3HJ10**	1 unit	0.352
Mechanical interlocking					
	**Mechanical interlocking** for the rotary operating mechanism for circuit breakers/switch disconnectors, fixed-mounted version Both circuit breakers must be equipped with a rotary operating mechanism and a knob.		**3VT9500-8LA00**	1 unit	0.120
	**Mechanical interlocking by Bowden wire** Mechanical interlocking by Bowden wire is intended for fixed-mounted and withdrawable versions. • For circuit breakers/switch disconnectors, fixed-mounted version • For one fixed-mounted and one withdrawable circuit breaker/switch disconnector • For circuit breaker/switch disconnector, withdrawable version		 **3VT9500-8LC10** **3VT9500-8LC30** **3VT9500-8LC40**	 1 unit 1 unit 1 unit	 0.400 0.400 0.400
Motorized operating mechanism					
	**Motorized operating mechanism; Rated control voltage** AC/DC 110 V AC 230 V/DC 220 V		 **3VT9500-3MN00** **3VT9500-3MQ00**	 1 unit 1 unit	 4.350 4.454
	Motorized operating mechanism with operations counter; Rated control voltage AC/DC 110 V AC 230 V/DC 220 V		 **3VT9500-3MN10** **3VT9500-3MQ10**	 1 unit 1 unit	 4.400 4.400

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Mounting accessories

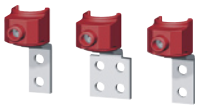
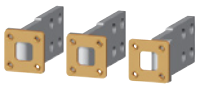
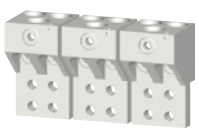
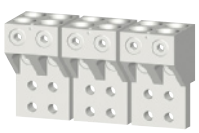
Overview

Withdrawable version

When connecting the main circuit, the recommendations on page 5/10 as well as the deionizing space (see page 5/34) must be observed

- The withdrawable version base must be fitted with:
  - 3VT5716-3AA38-0AA0 switching unit, 3-pole version;
  - 2 x 3VT9500-4EF30 connection set (front connection) or 3VT9500-4RD30 (rear connection)
- We recommend attaching the withdrawable version base to the switchboard with:
  - 3VT9500-4SA40 mounting bolt set (4 x M8 x 60)

Selection and ordering data

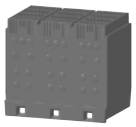
	Version	Max. permissible cross-section *S*	Type of cables	DT	Article No.	PS*/ P. unit	Weight per PU approx.
		mm²					kg
Withdrawable version base							
	**Withdrawable version base for 3-pole circuit breaker/switch disconnector**				**3VT9500-4WA30**	1 unit	13.888
Connecting sets							
	**Box terminals, double** For connecting four 70 ... 240 mm² cables, it is possible to use two 3VT9524-4TG30 connecting sets (see page 5/11). Not for 3VT4710-3AA30-0AA0 switching unit.	2 x 70 ... 240	Cu/Al cables		**3VT9524-4TG30**	1 unit	1.475
	**Box terminals,** For connecting three 70 ... 240 mm² cables, it is possible to combine the 3VT9524-4TG30 connecting set with the 3VT9524-4TF30 connecting set (see page 5/11). Not for 3VT4710-3AA30-0AA0 switching unit.	70 ... 240	Cu/Al cables		**3VT9524-4TF30**	1 unit	0.663
	Rear connection		Busbars				
	• Up to 1000 A				**3VT9400-4RC30**	1 unit	1.420
	• Up to 1600 A				**3VT9500-4RC30**	1 unit	2.678
	**Front connection** for withdrawable version		Busbars		**3VT9500-4EF30**	1 unit	2.730
	**Rear connection** for withdrawable version		Busbars		**3VT9500-4RD30**	1 unit	3.420
	Terminals for circular conductors	150 ... 300	Cu/Al cables				
	• for 2 cables				**3VT9532-4TF30**	1 unit	1.040
	• for 3 cables				**3VT9533-4TF30**	1 unit	1.948
	• for 4 cables				**3VT9534-4TF30**	1 unit	1.800

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Selection and ordering data

	Version	DT	Article No.	PS*/ P. unit	Weight per PU approx. kg
Accessories					
	**Insulating barriers** In case of reversed connection (supply to terminals 2, 4, 6), the insulating barriers must also be installed on the bottom side. Not included in standard scope of delivery of switching units in fixed-mounted version. • For switching unit, fixed-mounted version		**3VT9500-8CE30**	1 unit	0.264
	• For withdrawable version		**3VT9500-8CF30**	1 unit	0.142
	**Terminal cover protection** Increases degree of protection of connection point to IP20. Intended for withdrawable version with front connection. We recommend installation of terminal cover protection on both sides of the withdrawable device for increasing safety when maintaining the electrical device. • For circuit breakers/switch disconnectors, fixed-mounted version with rear connection		**3VT9500-8CD30**	1 unit	0.287
	• For withdrawable version with front connection		**3VT9500-8CC30**	1 unit	0.168
	• For fixed design with block type terminals NEW		**3VT9500-8CH30**	1 unit	0.700
	**Insulating grommets** Intended for fixed-mounted version of switching unit and withdrawable version with rear connection. The insulating connecting sets insulate connecting sets of rear connection from switchgear structure. We recommend installation on all connecting sets with rear connection. • For rear connection		**3VT9500-8CG30**	1 unit	0.100
	**Locking device for knob** Enables locking circuit breaker in "switched off manually" position. For locking, up to three padlocks with a max. shank diameter of 6 mm may be used		**3VT9500-3HL00**	1 unit	0.041
	**Bolt sealing insert** Provides sealing for: • Accessory compartment cover		**3VT9500-8BN00**	1 unit	0.002
	**Connecting cable** • For connecting circuit breaker accessories to withdrawable version (15 wire)		**3VT9500-4PL00**	1 unit	0.120
	**Position indicator** Signals circuit breaker/switch disconnector position in withdrawable version		**3VT9500-4WL00**	1 unit	0.020
	**Mounting bolts** • For withdrawable version		**3VT9500-4SA40**	1 unit	0.144
	**ON button cover** • For motorized operating mechanism, cover can be sealed with sealing wire		**3VT9500-3MF20**	1 unit	0.190

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Technical specifications

Type		3VT5 circuit breakers	Switch disconnector
Article number		**3VT5716-3AA30-0AA0 3VT5716-3AA38-0AA0**	**3VT9516-6DT00**
Standards		EN 60 947-2, IEC 947-2	EN 60 947-3, IEC 947-3
Approval marks		CE	
Number of poles		3	
Rated current I_n	A	630, 1000, 1250, 1600	--
Rated normal current I_u	A	1600	
Rated operational current I_e	A	--	1600
Rated operational voltage U_e	V	AC max. 690	AC max. 690 DC max. 440
Rated frequency f_n	Hz	50/60	
Rated impulse withstand voltage U_{imp}	kV	8	
Rated insulation voltage U_i	V	690	
Utilization category (selectivity) AC 690 V		A, B	--
Utilization category (switching mode) AC 690 V DC 440 V		-- --	AC-23 B DC-23 B
Rated short-time withstand current U_e = AC 690 V I_{cw}/t	kA/1 s	20	
Rated ultimate short-circuit breaking capacity (rms value)[1] I_{cu}		85 kA/AC 230 V 55 kA/AC 415 V 45 kA/AC 500 V 20 kA/AC 690 V	--
Off-time at I_{cu}	ms	30	--
Rated short-circuit service breaking capacity (rms value) I_{cs}/U_e		45 kA/AC 230 V 36 kA/AC 415 V 30 kA/AC 500 V 20 kA/AC 690 V	--
Rated short-circuit making capacity (peak value) I_{cm}/U_e		140 kA/AC 415 V	40 kA/AC 415 V 40 kA/AC 440 V
Losses per pole at I_n = 1600 A	W	120	
Mechanical endurance	cycles	10000	
Electrical endurance (U_e = AC 415 V)		4000	
Switching frequency	cycles/hr	120	
Operating force	N	230	
Front-side device protection		IP40	
Terminal protection		IP20	
Operating conditions			
Reference ambient temperature	°C	40	
Ambient temperature range		-40 ... +55	
Working environment		dry and tropical climate	
Degree of pollution		3	
Max. elevation	m	2000	
Seismic resistance	m/s^2	3 *g* at 8 ... 50 Hz	
Design modifications			
Front/rear connection		✓/✓	
Plug-in version		--	
Withdrawable version		✓	
Accessories			
Switches-auxiliary/relative/signal/leading		✓/✓/--/--	
Shunt trip unit		✓	
Undervoltage trip unit		✓	
Front rotary operating mechanism		✓	
Mechanical interlocking to the rotary operating mechanism by Bowden wire		✓	
Motorized operating mechanism/with operations counter		✓/✓	
Locking-type lever		✓	
Bolt sealing insert/additional cover for trip unit		✓/--	

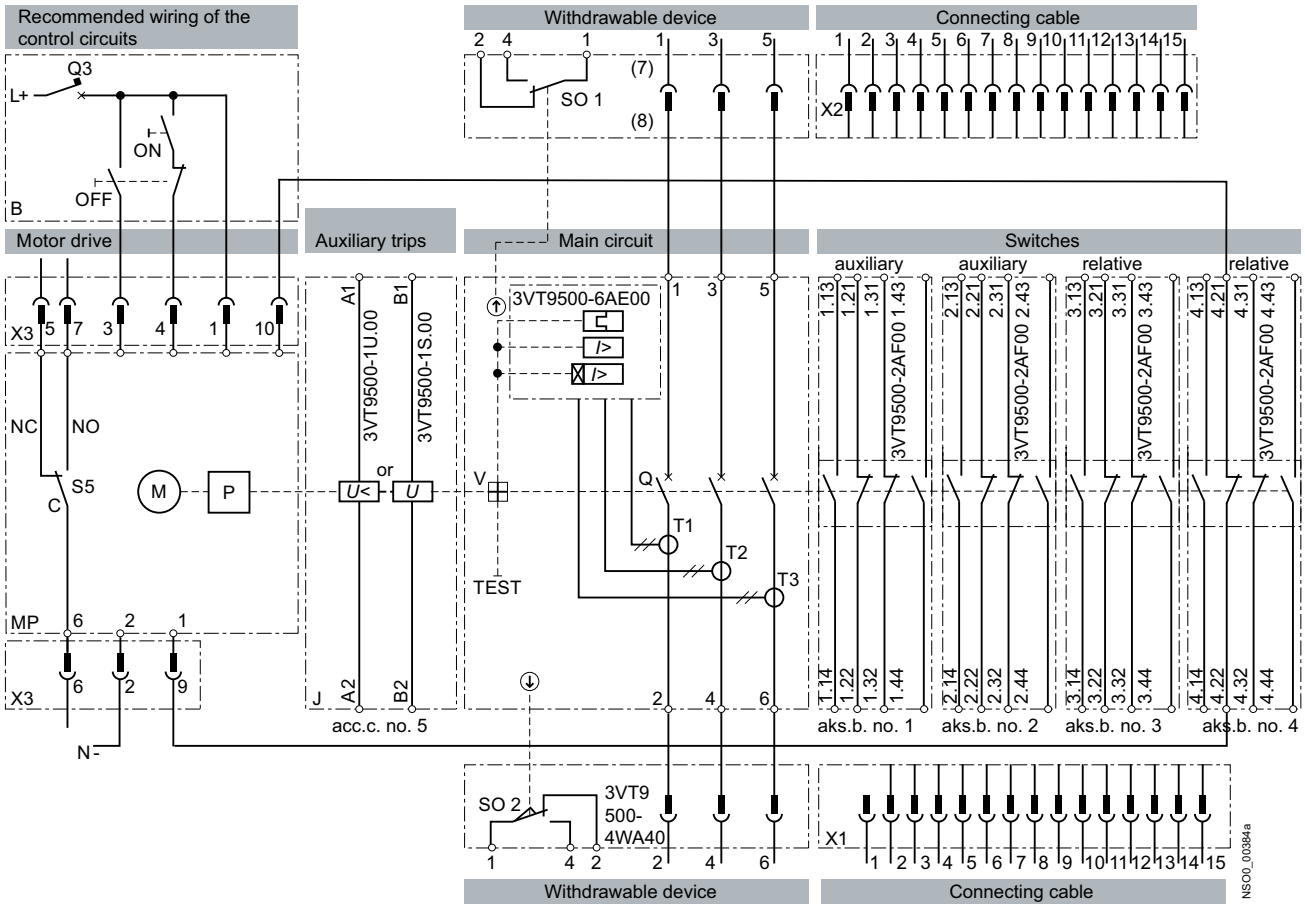
✓ available,
-- unavailable

0) If the circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5), I_{cu} does not change.

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Schematics

Circuit breaker with accessories

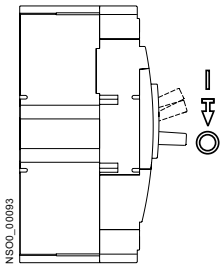


MP	3VT9500-3M..00 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Connector to connect control circuits
SSI	Switch signalling MANUAL (NO-C)/AUTO (NC-C) modes
B	Recommended wiring of the control circuits
ON	Pushbutton
OFF	Pushbutton
Q3	Circuit breaker for motorized operating mechanism
J	3VT4710-3AA30-0AA0, 3VT5716-3AA30-0AA0 switching unit
Q	Main contacts
T1, T2, T3,	Current transformers
V	Trip-free mechanism
ETU	Trip unit, ETU DP, MP and UP
TEST	Pushbutton to test tripping
ZV-BL	3VT9500-4WA40 withdrawable version
X1, X2	3VT9500-4PL00 connecting cable for withdrawable version
SO1, SO2	Contacts indicating positions of 3VT9500-4WL00 (see page 5/7) withdrawable versions, see page 5/24.
3VT9500-1U..0	Undervoltage trip units
3VT9500-1S..0	Shunt trip units

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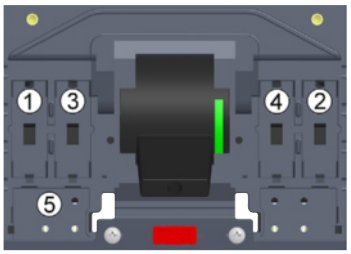
Functions

Switching states in the circuit breaker cavities

Accessory compartment			1, 2				3, 4			
Circuit breaker position 	Lever position of circuit breaker	State of the main contacts	3VT9500-2AF10				3VT9500-2AF10			
Switched on		**1**	1	0	0	1	1	0	0	1
Switched off manually or electrically by operating mechanism		**0**	0	1	1	0	1	0	0	1
Switched off by the trip unit, auxiliary trip unit or by TEST pushbutton		**0**	0	1	1	0	0	1	1	0

0 = contact open

1 = contact closed



Design

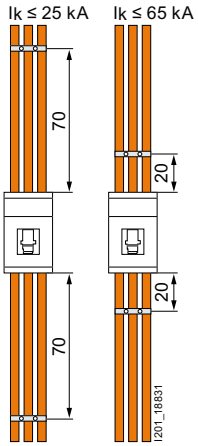
Main circuit

- Connected with Cu/Al busbars or cables, and possibly cables with cable lugs.
- Connecting sets are available for greater connecting options, (see page 5/6).
- Generally, conductors from the power supply are connected to input terminals 1, 3, 5, (N) and conductors from the load to terminals 2, 4, 6, (N). But it is possible to exchange this connection (switching of input and output terminals) without limiting rated short-circuit ultimate breaking capacity I_{cu}.
- In case of reversed connection, the circuit breaker/switch disconnector must be provided with 3VT9500-8CE30 insulating barriers also between terminals 2, 4, 6 (for detailed information, see page 5/34).
- We recommend painting the connecting busbars.
- Input and output conductors/busbars must be mechanically reinforced to avoid transmitting electrodynamic force to the circuit breaker/switch disconnector during short-circuiting.
- The power circuit must be connected in such a way that the deionizing space of the circuit breaker/switch disconnector is not obstructed (see page 5/34).

Auxiliary circuits

- Switches, shunt trip units or undervoltage trip units are connected using flexible 0.5 ... 1 mm^2 Cu conductors to the terminals on these devices.
- Auxiliary circuits of the withdrawable version are connected using a connector.

Mechanical reinforcement of conductors for 3VT4/5



Recommended cross-sections for cables, busbars and flexibars for fixed-mounted and withdrawable versions

Rated current I_n	Permissible cross-section S		Busbars W x H	
	Cu	Al	Cu	Al
A	mm^2	mm^2	mm	mm
250	120	150		
400	185	240		
500	2 x 150	2 x 185		
630	2 x 185	2 x 240		
800	2 x 240	3 x 240	50 x 10 2 x 50 x 5	2 x 50 x 8
1000	2 x 240	3 x 240	2 x 50 x 6	
1300	3 x 240	4 x 240		2 x 50 x 10
1500 (1450)[1)]	4 x 240		2 x 50 x 10	
1600 (1450)[1)]			2 x 50 x 10[1)]	

[1)] The withdrawable version connected by 2 x 50 x 12 mm Cu busbars can be loaded with max. 1420 A. For 1600 A loading, the withdrawable version must be connected by 2 x 50 x 12 mm busbars.

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Maximum circuit breaker/switch disconnector loads in accordance with ambient temperature

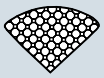
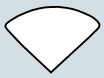
3VT4 circuit breaker/switch disconnector - connection of Cu busbars 2 x 50 x 6 mm to pole

50 °C	55 °C	60 °C	65 °C	70 °C
1000 A	1000 A	940 A	870 A	800 A

3VT5 circuit breaker/switch disconnector - connection of Cu busbars 2 x 50 x 10 mm to pole

50 °C	55 °C	60 °C	65 °C	70 °C
1400 A	1300 A	1200 A	1100 A	1000 A

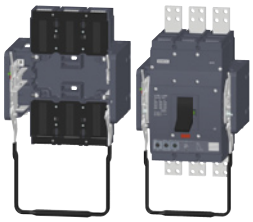
Specifications of cable shapes

Article No. of connecting set	Max. rated current *I*	**Maximum permissible conductor cross-section *S*** **Cable type**					
		Sector-shaped conductor, stranded 	Sector-shaped conductor, solid 	Round conductor, stranded 	Round conductor, solid 	Busbars and cable lugs W x H	Technical information
	A	mm^2				mm	
3VT9524-4TG30	800	2 x (70 ... 240) Cu/Al	2 x (95 ... 300) Cu/Al	2 x (50 ... 185) Cu/Al	2 x (70 ... 240) Cu/Al		5/36, 5/36
3VT9524-4TF30	500	70 ... 240 Cu/Al	95 ... 300 Cu/Al	50 ... 185 Cu/Al	70 ... 240 Cu/Al		5/36, 5/36
3VT9532-4TF30	1000	2 x (150 ... 300) Cu/Al	2 x (150 ... 300) Cu/Al	2 x (150 ... 300) Cu/Al	2 x (150 ... 300) Cu/Al		5/37, 5/37
3VT9533-4TF30	1500	3 x (150 ... 300) Cu/Al	3 x (150 ... 300) Cu/Al	3 x (150 ... 300) Cu/Al	3 x (150 ... 300) Cu/Al		5/37, 5/37
3VT9534-4TF30	1600	4 x (150 ... 300) Cu/Al	4 x (150 ... 300) Cu/Al	4 x (150 ... 300) Cu/Al	4 x (150 ... 300) Cu/Al		5/38, 5/38
3VT9400-4RC30	1000					50 x	5/35
3VT9500-4RC30	1600					50 x	5/35, 5/35
3VT9500-4EF30	1600					50 x	5/41
3VT9500-4RD30	1600					50 x	--

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Withdrawable version

Overview



The withdrawable version of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker and frequent checking of the circuit are needed.

- The withdrawable version base must be fitted with the following connecting sets:
  2 x 3VT9500-4EF30, for front connection or
  2 x 3VT9500-4RD30, for rear connection
- For mounting withdrawable device to switchgear, use 3VT9500-4SA40 installation bolts, see page 5/7.

Circuit breaker position

The withdrawable version of the circuit breaker has three positions:
1. inserted (connected position)
2. withdrawn (disconnected position)
3. removed

Main circuit

- To connect busbars and cable lugs, use 3VT9500-4EF30 connection set (front connection) or 3VT9500-4RD30 (rear connection).
- For connection using cables, it is necessary to additionally use 3VT9500-4EF30 or 3VT9500-4RD30 connection sets.
- The way of connecting the main circuit must observe recommendations (see page 5/10) as well as deionizing space (see page 5/34).

Auxiliary circuits

These are connected using 3VT9500-4PL00 15-wire cables.

Circuit breaker accessories for withdrawable version

The withdrawable version of the circuit breaker has the same accessories as the fixed-mounted version.

States of switches 3VT9500-4WL00 in withdrawable device according to circuit breaker and lockout positions

Circuit breaker position	State of switch	
		
Switched on (locked or not locked)	0	1
Other positions	1	0

0 = contact open
1 = contact closed

3VT9500-4WC00 specifications

Article number	3VT9500-4WL00
Rated operating voltage U_e	AC 230 V
Rated frequency f_n	50/60 Hz
Rated operating current I_e/U_e	6 A/AC 230 V
Arrangement of contacts	001
Connector cross-section S	0.5 ... 1 mm^2
Terminal protection (connected switch)	IP20

For the wiring diagram of the circuit breaker in withdrawable device with accessories, see page 5/9.

3VT9500-4WL00 position signalling

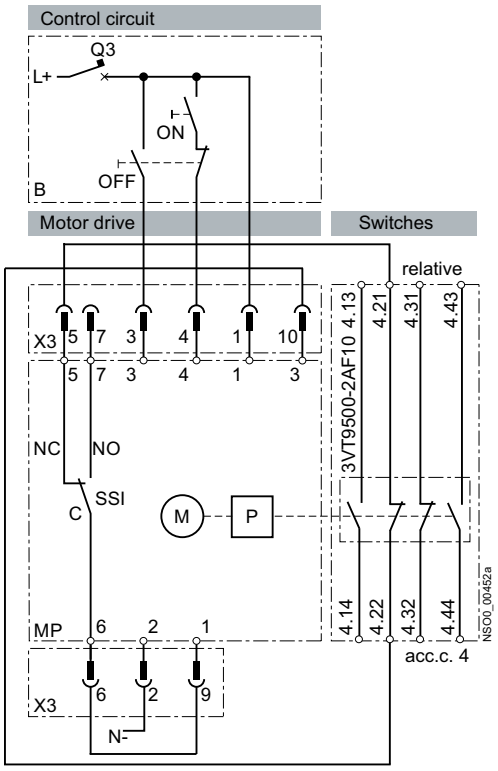
The withdrawable device can be provided with up to four switches for signalling the circuit breaker's switched-on position (see table).

Advantages and enhanced safety for operator:

- Remote signalling of circuit breaker's switched-on position (position of locking is not signalled)
- Checking of circuit breaker and accessories function in the checking position
- Locking of withdrawable device against inserting circuit breaker, locking of circuit breaker in withdrawn (checking) position - locking by means of padlocks.
- Visible and conductive disconnection of the power circuit
- Easy exchange of circuit breakers in case of failure

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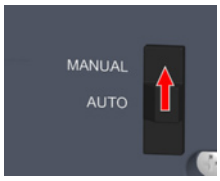
Recommended wiring of circuit breaker, withdrawable version with motorized operating mechanism



Symbol	Description
MP	3VT9500-3M..0 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Terminal strip to connect control circuits
X4	Terminal strip for external operations counter
SSI	Switch indicating AUTO (NO-C)/MANUAL (NC-C) modes
B	Recommended wiring of the control circuits (control circuits not included in motor driver delivery)
ON	Make pushbutton
OFF	Break pushbutton
Q3	Circuit breaker for motorized operating mechanism AC 110 V 5SX4104-7 AC 230 V 5SX4102-7 DC 110 V 5SX5104-7 DC 220 V 5SX5102-7

Inserting and withdrawing circuit breaker with motorized operating mechanism

- Each time before inserting or withdrawing the circuit breaker, we recommend first to turn the AUTO/MANUAL switch on the motor drive to the MANUAL position
- More information is available in the operating instructions
- Not adhering to this procedure or failing to follow the recommended wiring could mean that the circuit breaker will not successfully turn on at the first attempt





Changes in states of switches in compartments of switching unit when inserting and withdrawing circuit breaker

Circuit breaker state before insertion Circuit breaker state before withdrawal		State before insertion/withdrawal State of switches before insertion→ -withdrawn position State of switches before withdrawal→ inserted position accessory compartment				State after insertion/withdrawal State of switches after insertion inserted position State of switches after withdrawal withdrawn position accessory compartment			
	Lever position of circuit breaker	State of the main contacts	1,2 3VT9500-2AF10 4 2 3 1		3,4 3VT9500-2AF10 4 2 3 1		1,2 3VT9500-2AF10 4 2 3 1		3,4 3VT9500-2AF10 4 2 3 1	
Switched on		1	1	0	0	1	1	0	1	0
Switched off manually or by motor drive		0	1	0	0	1	1	0	1	0
Switched off from the switched-on state: by the trip unit or TEST button		0	1	0	1	0	1	0	1	0

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Trip units

Overview

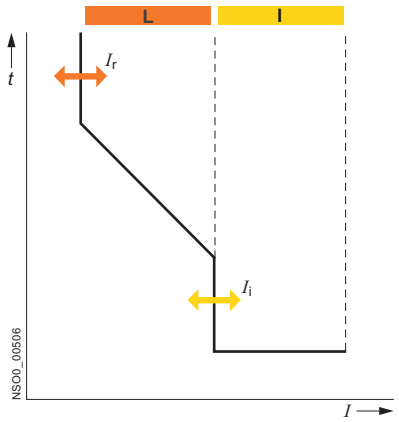
The electronic trip unit is a separate and interchangeable unit, which has to be ordered separately and in addition to the 3VT5716-3AA3.-0AA0 switching unit. By exchanging the trip unit, the range of the circuit breaker's rated current can be easily changed.

Trip units for the 3VT5716-3AA3.-0AA0 switching unit are available in four current values **I_n = 630, 1000, 1250 and 1600 A**. The trip units cover rated currents ranging from 250 to 1600 A.

Tripping characteristics

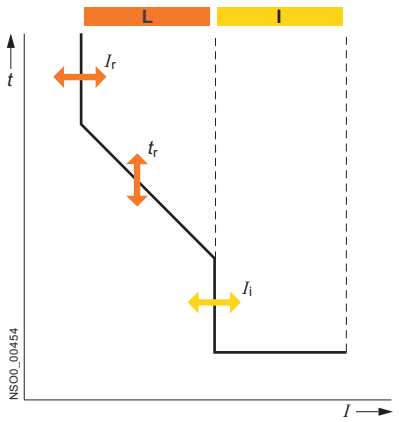
Several different trip units are available. Some have adjustable characteristics (in order to match the protected device and to achieve the required selectivity):

ETU DP trip units



ETU DP trip units have one type of characteristic with adjustable I_r and I_i.

ETU MP trip units



ETU MP trip units have more kinds of characteristics with adjustable I_r, t_r and I_i.

ETU UP trip units

They have universal characteristics, with the greatest variability in adjustment: I_r, t_r, I_{sdv}, t_{sd} and I_i.

Trip units ETU DP, MP and UP - description of function

Proper functioning of trip units does not depend on the waveform of the current in the main circuit. The function of the trip unit is supported by a microprocessor, which processes a sampled signal of the power circuit and recalculates it to obtain an rms value. Therefore, digital trip units are suitable for protecting circuits where the sinusoidal current is distorted by high harmonics (e.g. circuits with controlled rectifiers, power factor compensators, pulse loading, and the like).

All the trip units protect a circuit against short-circuiting and overloading. Setting of selective cascading of circuit breakers is especially enabled by the ETU UP trip unit. Tripping characteristics of the trip units are independent of the ambient temperature. The trip unit is attached to the switching unit by two bolts. The translucent cover over the adjustment controls can be sealed (with sealing wire).

Adjustment of the tripping characteristics for ETU DP and MP trip units

The tripping characteristics of the trip units are defined by standard EN 60 947-2. The characteristics are adjusted in two zones using latched switches located on the trip unit:

L -is a zone of low overcurrents and includes the area of thermal protection.

I is a zone of high overcurrents and includes protection against ultimate short-circuit currents.

1. Time-dependent trip unit (thermal) L

The time-dependent trip unit **ETU MP** is adjusted with two switches, I_r and t_r. The first (I_r) switch adjusts the circuit breaker's rated current. The characteristic moves along the current axis. Turning the other switch (t_r) adjusts the time after which the circuit breaker will trip while passing through 7.2 I_r. The tripping characteristic thus moves along the time axis. With the t_r switch it is possible to set a total of 8 characteristics:

- Four characteristics are available for motor protection. Breaking times correspond to trip unit classes 10 A, 10, 20, 30. By changing t_r, it is possible to select the characteristics according to the required motor starting (light, medium, heavy or very heavy starting).
- Four characteristics are available for protecting transformers and lines.

It is not possible to turn the device back on right after the time-dependent trip unit has been actuated and the circuit breaker has tripped. The trip unit must be allowed to cool off (it has a thermal memory). The memory can be disabled by turning the "restart" switch from the normal "T_t" position to the "T_0" position. The time-dependent trip unit remains active, and only its thermal memory is deactivated. The thermal memory should be switched off only in justified cases, and with the knowledge that the temperature could rise in the protected device, causing repeated tripping.

2. Time-independent instantaneous trip unit (short-circuit trip unit) I

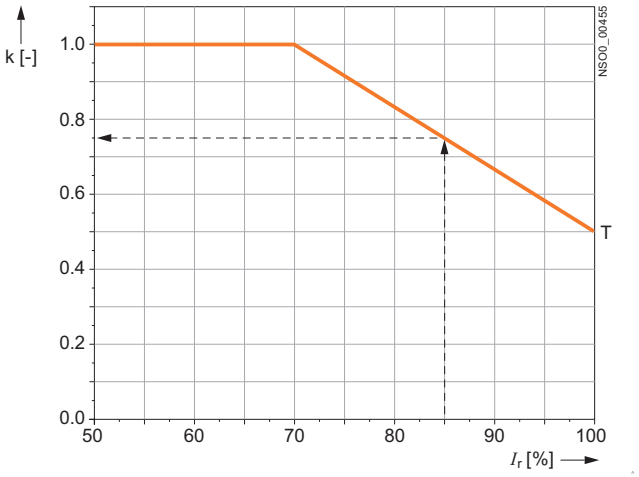
The time-independent instantaneous **ETU DP** and **ETU MP** trip units are adjusted with one switch, I_i. The I_i switch sets the short-circuit current that, when reached or exceeded, causes instantaneous tripping of the circuit breaker.

Regulation of the short-circuit trip unit provides settings for the characteristic appropriate for protecting lines and motors. The wave form of the tripping characteristic is adjusted with latched switches located on the trip unit's front panel according to the needs of the protected device. A visual demonstration on setting the tripping characteristics is available in the SIMARIS design software (Tool for Dimensioning Electrical Power Distribution).

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Tripping characteristics of ETU DP and MP trip units with load

The tripping characteristics from the cold state indicate the tripping times during which it is assumed that, up to the moment when an overcurrent develops, no current is flowing through the circuit breaker. The tripping characteristic tripped from warm state indicates the tripping times during which it is assumed that, before the moment when an overcurrent develops, current is flowing through the circuit breaker. Characteristics of electronic trip units are independent of the ambient temperature and are plotted in a cold state. Digital trip units enable simulation of tripping in warm state. The tripping times become shorter in a steady state, as shown in the following diagram. The steady state is a period during which the characteristic does not change. If the circuit breaker is loaded with a reduced current for at least 30 minutes, the tripping times will be cut by a half. If the load is less than 70% of I_r , the tripping time does not become shorter.



ETU DP and MP tripping times shortening with load

T - When tripping from the trip unit's "warm" state, the tripping time of the characteristic is cut short during the standstill time t_u by coefficient **k**.

Thermal standstill time of the characteristics

For all kinds of characteristics t_r the thermal standstill time for ETU DP and MP trip units is $t_u \geq 30$ min.

During this time, the short-circuit tripping time t_{sd} is cut short from the cold-state characteristic by the coefficient **k**.

The real tripping time is $t_s = k \cdot t_{sd}$

Example:

The shortening constant can be read from the graph. With steady current 85% of I_r the real tripping time will be shortened to:

$$\boldsymbol{t_s = 0.74 \cdot t_{sd}}$$

k [–] time shortening coefficient
I_r [A] adjusted rated current of the trip unit
t_{sd} [s] tripping time of the trip unit derived from the characteristic
t_s [s] real tripping time of the trip unit tripped from warm state
t_u [s] standstill period for particular characteristics

Trip units are set by the manufacturer

I_r = min
Restart = $T_{(t)}$
I_i = min
t_r = TV, min

ETU MP and MPS

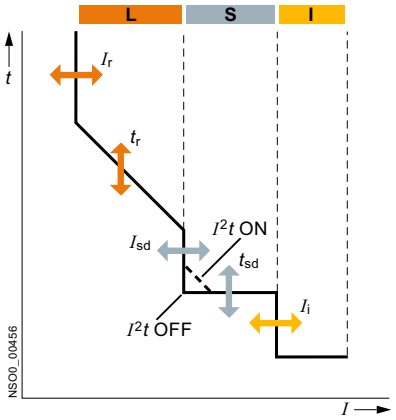
Tripping Adjust - Release Class	
M3	10 A
M8	10
M15	20
M25	30

5

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Trip units

Tripping characteristic adjustment, trip unit ETU UP



The tripping characteristic of trip unit is defined by standard EN 60 947-2. The characteristic is adjusted in three zones using latched switches located on the trip unit:

L - is a zone of low overcurrents and includes the area of thermal protection.

S - is a zone of medium overcurrents and includes long-distance short-circuit protection for lines. Intentional delay in tripping of these low short-circuit currents can be used to achieve selectivity of protective devices. This type of delay can be set only in self-contained trip units (full version).

I - is a zone of high overcurrents and includes protection against ultimate short-circuit currents without time delay.

I²t - Characteristic setting in ON position represents a constant value of energy passed through. If fuses are used as protective elements for outgoing branch feeders, it is possible to adjust the selective part of the characteristics to better suit the shape of the fuse characteristics.

1. Time-dependent trip unit (thermal) L

The time-dependent trip unit ETU UP is adjusted with two switches, I_r and t_r. The first switch, I_r, adjusts the circuit breaker's rated current. The characteristics move along the current axis.

Turning the second switch, t_r, adjusts the time after which the circuit breaker will trip while passing through 7.2 I_r. The tripping characteristics thus move on the time axis. A total of 8 characteristics can be set with the t_r switch. Breaking times correspond to tripping classes 10 A, 10, 20, 30.

It is not possible to turn the device back on right after the time-dependent trip unit has tripped the circuit breaker. The trip unit must be allowed to cool off (it has a thermal memory). The memory can be disabled by turning the "restart" switch from the normal "T_t" position to the "T_0" position. The time-dependent trip unit remains active, and only its thermal memory is inactivated. The thermal memory should be switched off only in justified cases, and with the knowledge that there could be rising temperature in the protected device, causing repeated tripping..

2. Delayed time-independent trip units S

It is used to set up a selective cascade of circuit breakers. It is set up using specifications I_{sd} and t_{sd}.

I_{sd} is an n-multiple of current I_r (I_{sd} = n × I_r). It is a short-circuit current that, within the span of I_{sd} to I_{rm}, will trip the circuit breaker with delay t_{sd}, where t_{sd} is a delay set up for switching off the trip unit.

The delayed time-independent trip unit actuates the circuit breaker if the current in the circuit reaches at least the preset n-multiple and lasts at least the preset delay time t_{sd}. The trip unit can be disabled by setting the parameter n (I_{sd} = n × I_r) into the position. Parameter t_{sd} can be set to values with respect to the energy that passed through I^2t (switch position I^2t on). The preset time values are then applicable for currents higher than 10x current I_r. Tripping times of k-multiples of I_r for k < 10 are defined as follows:

$$t = t_{sd}\left(\frac{10}{k}\right)^2$$

3. Time-independent instantaneous trip unit I

It is set up with parameter I_i. I_i is a short-circuit current that, when reached or exceeded, causes the circuit breaker to switch off instantaneously. It is set up directly in kA on the trip unit. The wave form of the tripping characteristic is adjusted using latched switches located on the trip unit's front panel to match the needs of the protected device. A visual demonstration on setting the tripping characteristic is available in the SIMARIS design software (Tool for Dimensioning Electrical Power Distribution).

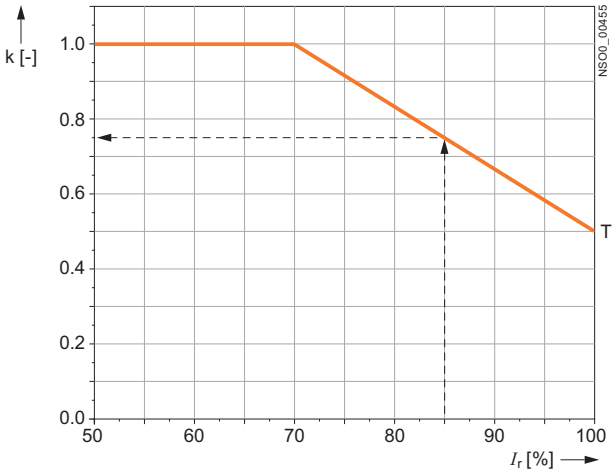
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Tripping characteristics of ETU UP trip units with load

The tripping characteristic from the cold state indicates the tripping times during which it is assumed that, up to the moment when an overcurrent develops, no current is flowing through the circuit breaker. The tripping characteristic tripped from warm state indicates the tripping times during which it is assumed that, before the moment when an overcurrent develops, current is flowing through the circuit breaker. Characteristics of electronic trip units are independent of the ambient temperature and are plotted in a cold state. Digital trip units enable simulation of a trip unit in warm state. The tripping times become shorter in a steady state, as shown in the following diagram. The steady state is a period during which the characteristic does not change.

If the circuit breaker is loaded with a reduced current for at least 30 minutes, the tripping times will be cut by a half. If the load is less than 70% of I_r, the tripping time does not become shorter.

Tripping time shortening with load



T - When tripping from the "warm" state, the tripping time of the characteristic is cut short during the standstill time t_u by coefficient k.

Thermal standstill time of the characteristics

For all kinds of characteristics t_r the thermal standstill period for ETU UP trip units is $t_u \geq 30$ min. During this time, the short-circuit tripping time t_{sd} is cut short from the cold-state characteristic by the coefficient k.

The real tripping time is $t_s = k \cdot t_{sd}$

Example

The shortening constant can be read from the graph. With steady current 85% of I_r the real tripping time will be shortened to:

$t_s = 0.74 \cdot t_{sd}$

k [-] time shortening coefficient
I_r [A] adjusted rated current of trip unit
t_{sd} [s] tripping time of the trip unit derived from the characteristic
t_s [s] real tripping time of the trip unit tripped from warm state
t_u [s] standstill period for particular characteristics

Trip units are set by the manufacturer

I_r = min
Restart = $T_{(t)}$
I_i = min
t_r = min
t_{sd} = min, I^2t - ON
I_{sd} = min

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Trip units

Trip units ETU DP - Distribution protection

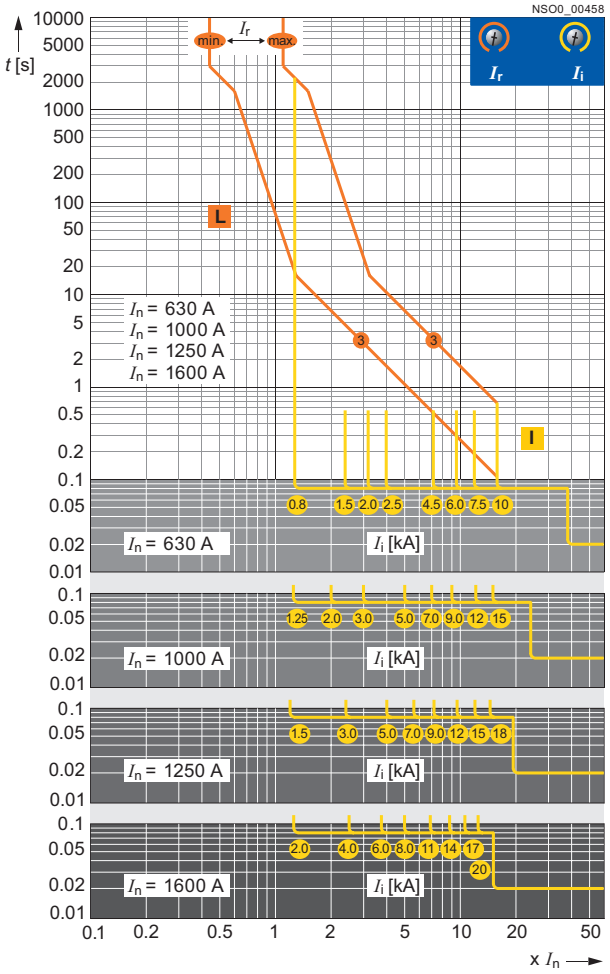
- Provides protection for lines and transformers

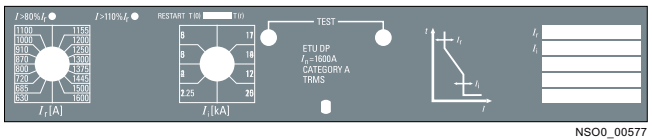
The 3VT95..-6AC00 trip unit is intended only for 3VT5716-3AA3.-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is fitted with a thermal memory that can be disabled by turning the switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After having disabled the thermal memory, the thermal tripping function remains active.

A practical advantage of the trip unit is a specially designed tripping characteristic that provides for optimal exploitation of transformers up to 1.5 I_n.

Another advantage of this trip unit is the simple adjustment of the tripping characteristic. Set-up includes only rated current and the tripping level of the short-circuit trip unit. Reaching 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as I > 80% of I_r and I > 110% of I_r. Located on the lower part of the trip unit cover are four photocells for communicating with the 3VT9500-6AE00 signalling unit.

Tripping characteristics





NSO0_00577

Adjustable specifications

Article No.	Rated current I_n	Overload protection I_r	Restart	Instantaneous short circuit protection I_i
	A	A		kA
3VT9563-6AC00	630	250, 260		0.8
		275, 290		1.5
		305, 315		2
		345, 360	$T_{(0)}$	2.5
		400, 435	$T_{(t)}$	4.5
		455, 480		6
		500, 550		7.5
		575, 630		10
3VT9510-6AC00	1000	400, 435		1.25
		455, 480		2
		500, 550		3
		575, 630	$T_{(0)}$	5
		630, 685	$T_{(t)}$	7
		720, 760		9
		800, 870		12
		910, 1000		15
3VT9512-6AC00	1250	500, 550		1.5
		577, 610		3
		630, 685		5
		722, 760	$T_{(0)}$	7
		800, 866	$T_{(t)}$	9
		909, 1000		12
		1100, 1155,		15
		1200, 1250		18
3VT9516-6AC00	1600	630, 685		2
		720, 800		4
		870, 910		6
		1000, 1100	$T_{(0)}$	8
		1155, 1200	$T_{(t)}$	11
		1250, 1300		14
		1375, 1445		17
		1500, 1600		20

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Trip units ETU MP - Motor protection

- Provides protection of motors and generators
- Can protect lines and transformers

The 3VT95..-6AP00 trip unit is intended only for 3VT5716-3AA3.-0AA0 switching unit. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After having disabled the thermal memory, the thermal trip unit remains active.

A practical advantage of the trip unit is a specially designed tripping characteristic that provides for optimal exploitation of transformers up to 1.5 I_n.

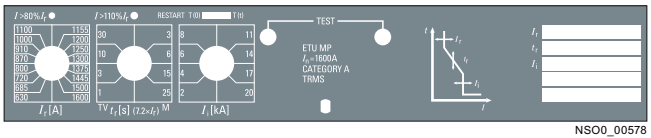
It is possible to set a total of 8 characteristics on the trip unit. From these, in mode "M", there are 4 characteristics for motor protection and another 4 characteristics in mode "TV" for protecting transformers and lines. The shape of each characteristic can be changed using a selector switch.

When one or two phases fail, in the M-characteristic mode, the switch will open with a 4 s delay (so-called undercurrent tripping).

Another parameter for adjusting the trip unit is the rated current, which is adjusted in a range of 0.4 to 1.0 of I_n and the short-circuit tripping level. Reaching 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as I > 80% of I_r and I > 110% of I_r. Located on the lower of the trip unit cover are four photocells for communicating with the 3VT9500-6AE00 signalling unit.

Adjustable specifications

Article No.	Rated current I_n	Overload protection I_r	t_t (7.2 x I_r)	Restart	Instantaneous short circuit protection I_i
	A	A	S		kA
3VT9563-6AP00	630	250, 260	1 (TV 1)	$T_{(0)}$	0.8
		275, 290	3 (TV 3)	$T_{(t)}$	1.5
		305, 315	10 (TV 10)		2
		345, 360	30 (TV 30)		2.5
		400, 435	3 (M 3)		4.5
		455, 480	8 (M 8)		6
		500, 550	15 (M 15)		7.5
		575, 630	25 (M 25)		10
3VT9510-6AP00	1000	400, 435	1 (TV 1)	$T_{(0)}$	1.25
		455, 480	3 (TV 3)	$T_{(t)}$	2
		500, 550	10 (TV 10)		3
		575, 630	30 (TV 30)		5
		630, 685	3 (M 3)		7
		720, 760	8 (M 8)		9
		800, 870	15 (M 15)		12
		910, 1000	25 (M 25)		15
3VT9512-6AP00	1250	500, 550	1 (TV 1)	$T_{(0)}$	1.5
		577, 610	3 (TV 3)	$T_{(t)}$	3
		630, 685	10 (TV 10)		5
		722, 760	30 (TV 30)		7
		800, 866	3 (M 3)		9
		909, 1000	8 (M 8)		12
		1100, 1155,	15 (M 15)		15
		1200, 1250	25 (M 25)		18
3VT9516-6AP00	1600	630, 685	1 (TV 1)	$T_{(0)}$	2
		720, 800	3 (TV 3)	$T_{(t)}$	4
		870, 910	10 (TV 10)		6
		1000, 1100	30 (TV 30)		8
		1155, 1200	3 (M 3)		11
		1250, 1300	8 (M 8)		14
		1375, 1445	15 (M 15)		17
		1500, 1600	25 (M 25)		20



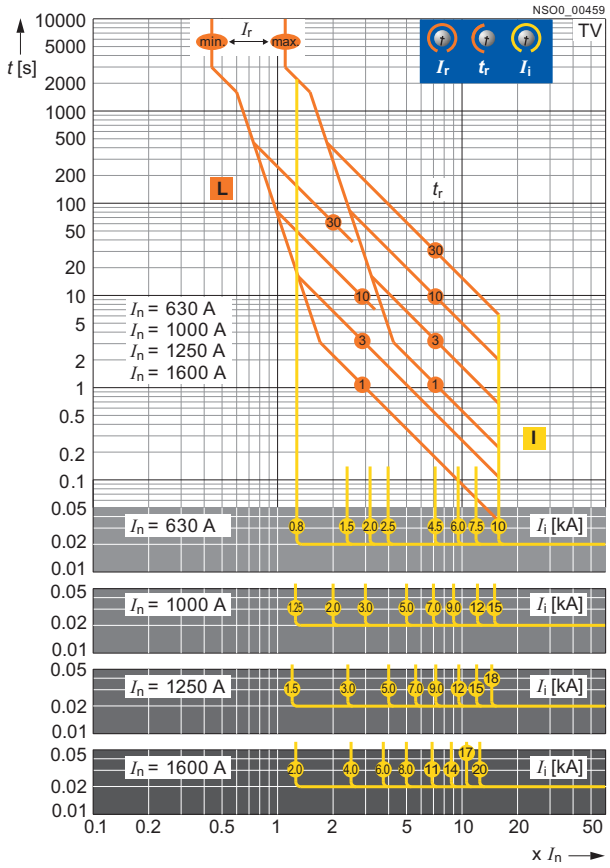
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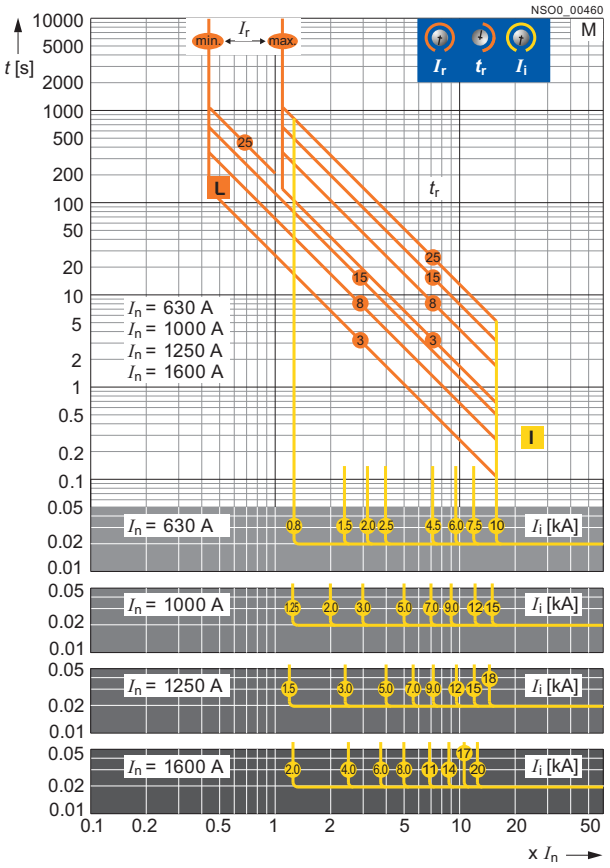
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Trip units

Tripping characteristic ETU MP





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Trip units ETU UP - Universal protection

- For protecting complicated loads or those not specified in advance.

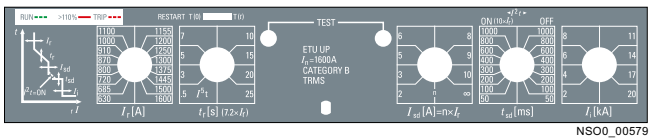
The 3VT95..-6AD00 trip unit is intended for the 3VT5716-3AA3.-0AA0 switching unit only. The trip unit is equipped with a thermal memory that can be disabled by turning a "restart" switch on the front panel from the position $T_{(t)}$ to position $T_{(0)}$. After disabling the thermal memory, the thermal trip unit remains active.

A practical advantage of the trip unit is its maximum flexibility for adjusting the tripping characteristic. With its possibility for setting I^2t = constant and I^5t = constant, it is optimal from the selectivity viewpoint for its interaction with fusing devices.

Reaching 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as I > 80% of I_r and I > 110% of I_r.
The bottom part of the trip unit cover contains photocells for communicating with the 3VT9500-6AE00 signalling unit.

Specifications for adjustable trip units

Article No.	Rated current I_n	Overload protection I_r	t_r (7.2 x I_r)	Short delayed short circuit protection I_{sd} A = (n x I_r)	t_{sd}	I^2t	Restart	Instantaneous short circuit protection I_i
	A	A	s	n	ms			kA
		250, 260	0.5	2	50, 100			0.8
		275, 290	3	3	200, 300	on	$T_{(0)}$	1.5
		305, 315	5	5	400, 600			2
3VT9563-6AD00	630	345, 360	7	7	800, 1000			2.5
		400, 435	10	8	50, 100			4.5
		455, 480	15	9	200, 300	off	$T_{(t)}$	6
		500, 550	20	10	400, 600			7.5
		575, 630	25	∞	800, 1000			10
		400, 435	0.5	2	50, 100			1.25
		455, 480	3	3	200, 300	on	$T_{(0)}$	2
		500, 550	5	5	400, 600			3
3VT9510-6AD00	1000	575, 630	7	7	800, 1000			5
		630, 685	10	8	50, 100			7
		720, 760	15	9	200, 300	off	$T_{(t)}$	9
		800, 870	20	10	400, 600			12
		910, 1000	25	∞	800, 1000			15
		500, 550	0.5	2	50,1 00			1.5
		577, 610	3	3	200, 300	on	$T_{(0)}$	3
		630, 685	5	5	400, 600			5
3VT9512-6AD00	1250	722, 760	7	7	800, 1000			7
		800, 866	10	8	50, 100			9
		909, 1000	15	9	200, 300	off	$T_{(t)}$	12
		1100, 1155,	20	10	400, 600			15
		1200, 1250	25	∞	800, 1000			18
		630, 685	0.5	2	50, 100			2
		720, 800	3	3	200, 300	on	$T_{(0)}$	4
		870, 910	5	5	400, 600			6
3VT9516-6AD00	1600	1000, 1100	7	7	800, 1000			8
		1155, 1200	10	8	50, 100			11
		1250, 1300	15	9	200, 300	off	$T_{(t)}$	14
		1375, 1445	20	10	400, 600			17
		1500, 1600	25	∞	800, 1000			20

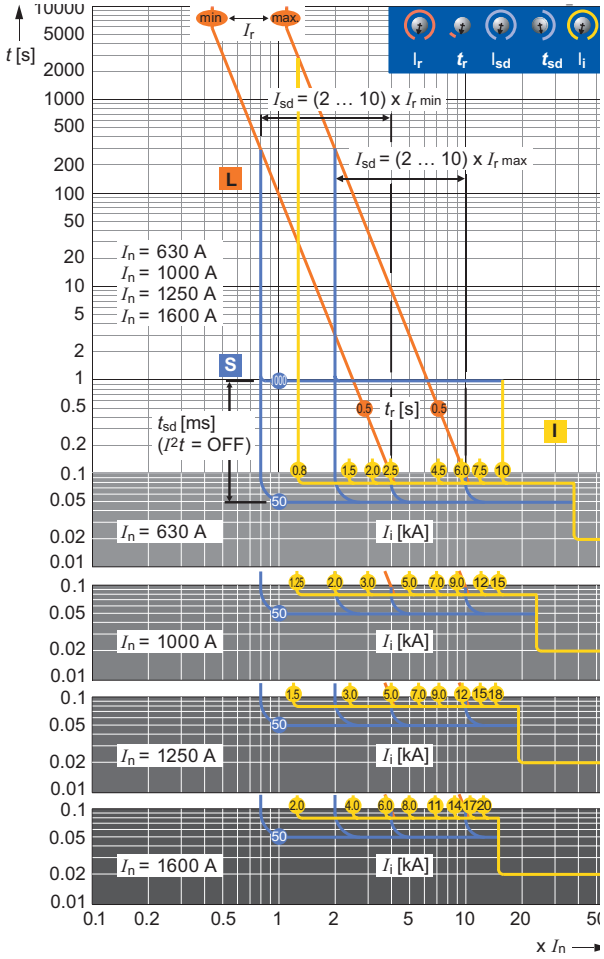


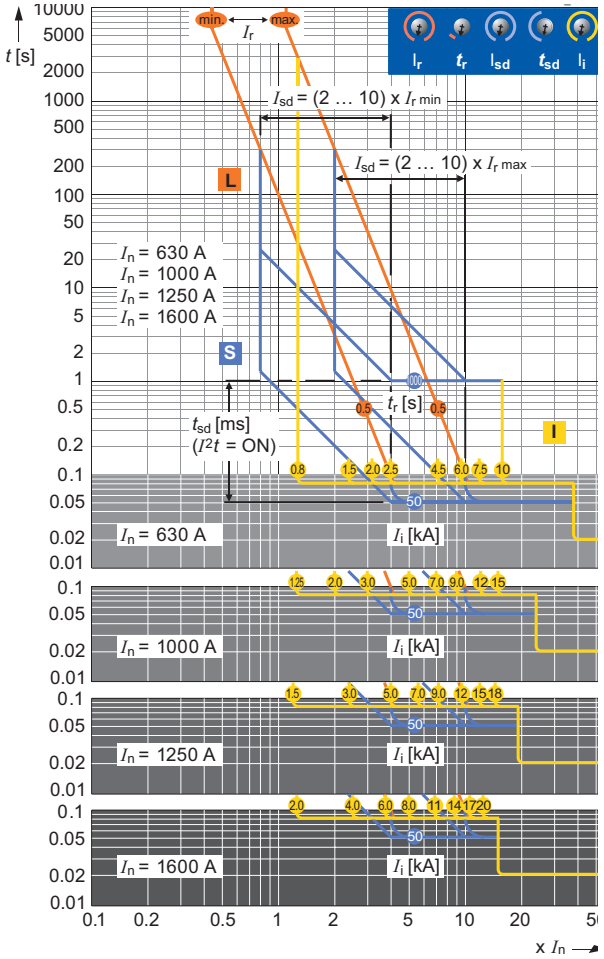
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Trip units

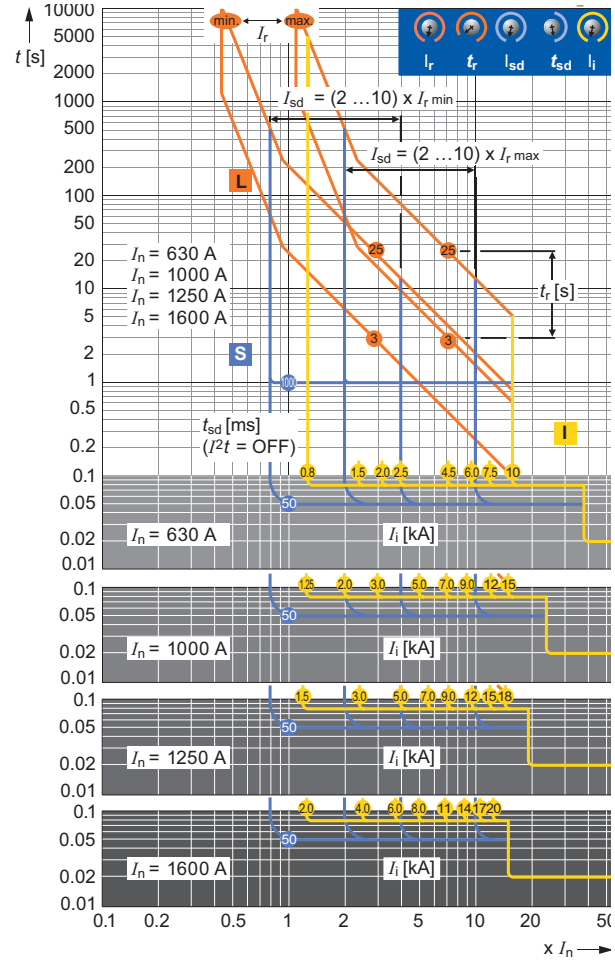
Tripping characteristic ETU UP

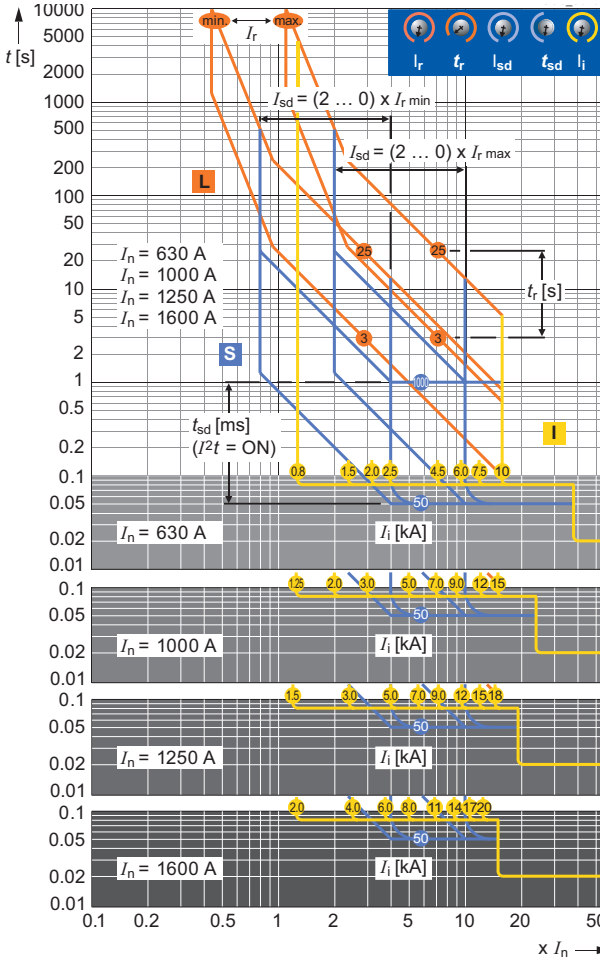




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Tripping characteristic ETU UP





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Signalling units

Overview

The 3VT9500-6AE00 signalling unit is a modular accessory for the 3VT4 and 3VT5 circuit breakers and operates in conjunction with 3VT95..-6AC00, 3VT95..-6AP00 and 3VT95..-6AD00 electronic trip units.

- It is intended for applications in automated control systems
- The signalling unit signals reaching a certain current value in a circuit and the tripping of the circuit breaker by trip units (time-dependent, time-independent, undercurrent)
  - The user has options to set up (by steps, using a rotary switch) a current value which will be indicated when reached
  - the options are 70; 80; 90; 100; 120; 140; 160 or 180% I_r (refer to the table below for more details).
- Local indication regarding the state of the circuit breaker and the protected circuit is signaled by LED indicators located on the front panel of the signalling unit
- The information on the state of the circuit breaker is transferred from the trip unit to the signalling unit by means of optical coupling
- Remote indication on the state of the circuit breaker and the protected circuit is ensured by a relay, the make and break contacts of which are pulled into the terminal strip on the unit
  - relays to indicate tripping of time-dependent or undercurrent and time-independent trip units have storage
  - after the storage relay is activated by tripping, it is necessary to reset the relay by actuating the front panel RESET switch, or to reset remotely by an external pushbutton.
- The supply voltages are presented in the table
- The main power supply circuit and the reset circuit are not safely separated
- The external RESET button must be connected with a screened cable or a twisted wire with maximum loop resistance of 100 Ohm.

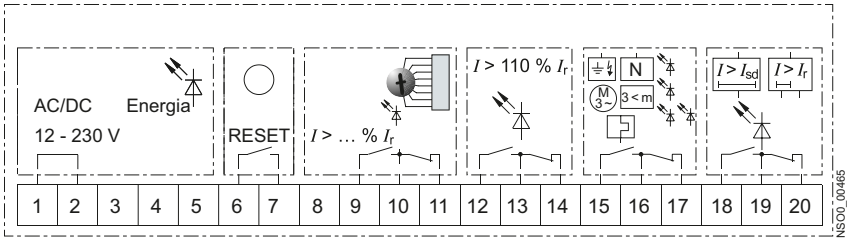
The signalling unit will not work without power supply!

Specifications

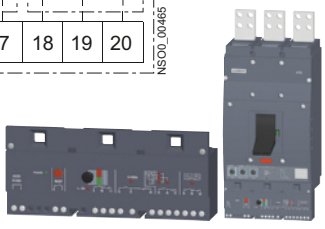
Article No.		3VT9500-6AE00
Rated operating voltage U_e		AC/DC 12 ... 230 V
Protection (tube fuse)		T1.5 A
Rated frequency f_n		50/60 Hz
Current draw (rms) max. at U_e AC-15 DC-13	 AC/DC 12 V AC/DC 24 V AC/DC 48 V AC/DC 110 V AC 230 V/DC 220 V	 370 mA 170 mA 100 mA 60 mA 50 mA
Rated operating current (of relay contacts) I_e/U_e	AC-1 DC-1	8 A/AC 230 V 0.25 A DC 250 V, 8 A/DC 30 V
Connection cross-section S		0.5 ... 1 mm^2

Main circuit status indication

		Signalling (relay contacts)	LED
Reaching	< 70% I_r	--	+
	110% I_r	+	+
	70; 80; 90; 100; 120; 140; 160; 180	--	+
	Settings	+	+
Tripping	By time-dependent/undercurrent trip unit	+	+/+
	By time-independent trip unit	+	+



1, 2	supply
6, 7	external RESET button
9, 10, 11	relay contacts indicating preset I_r
12, 13, 14	relay contacts indicating reaching 110% I_r
15, 16, 17	relay contacts indicating tripping by time-dependent or undercurrent trip units
18, 19, 20	relay contacts indicating tripping by independent trip unit (instantaneous or delayed tripping)

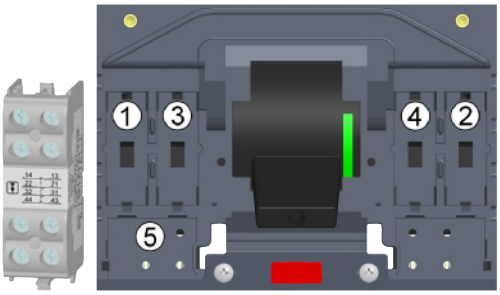


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Technical specifications

Article No.		3VT9500-2AF10	3VT9500-2AF20[1)]
Rated operating voltage U_e	V	AC 60 ...500 V DC 60 ...240 V	AC 5 ...60 V DC 5 ...60 V
Rated isolation voltage U_i	V	500	
Rated frequency f_n	Hz	50/60	
Rated operating current I_e/U_e AC-15 DC-13		 6 A/60 V ... 240 V, 3 A/400 V, 1.5 A/500 V 1 A/60 V, 0.7 A/110 V, 0.3 A/240 V	 AC-12, DC-12 0.004 ... 0.5 A/5V, 0.004 ...0.01/60V
Thermal current I_{th}	A	6 A	0.5 A
Arrangement of contacts		22	
Connection cross-section S	mm^2	0.5 ... 1	
Terminal protection (connected switch)		IP20	

1) 3VT9500-2AF20 is not suitable for controlling electromagnetic loads

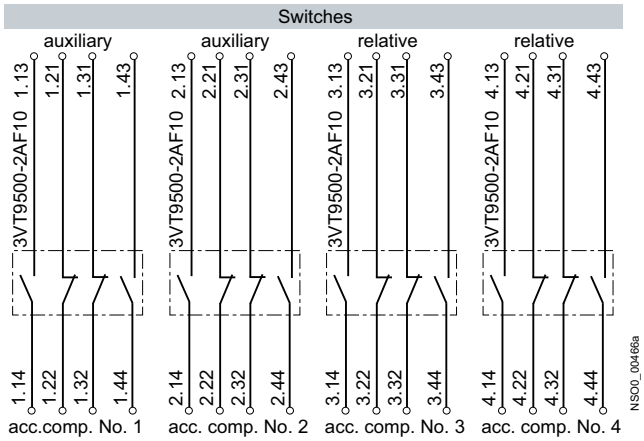


Arrangement of contacts	Number of contacts	Contact types
22	2 + 2	break + make

Functions and names of switches according to their location in cavities

Switch location	Switch name	Switch function
accessory compartment 1, 2	Auxiliary switch	to indicate the position of the main contacts
accessory compartment 3, 4	Relative switch	to indicate tripping of circuit breaker by trip unit, TEST pushbutton or by motor releases

Wiring diagram



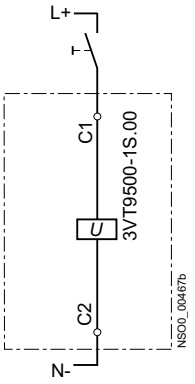
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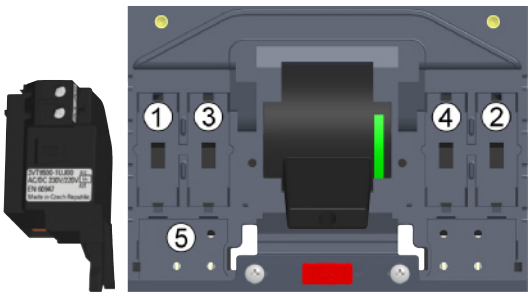
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Shunt trip units

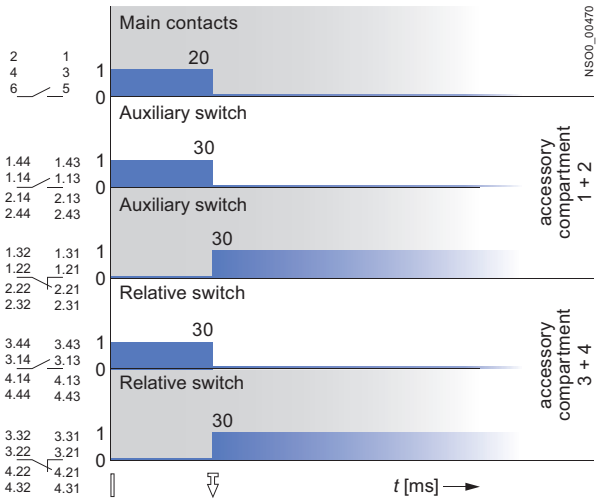
Technical specifications

Article No.		3VT9500-1S.00
Rated operating voltage U_e	V	AC 24, 48, 110, 230, 400, 500 DC 24, 48, 110, 220
Rated frequency f_n	Hz	50/60
Input power at 1.1 U_e AC DC		 < 2.5 VA < 2 W
Characteristic		U ≥ 0,7 U_e the circuit breaker must trip
Time to switch-off	ms	20
Continuous load		Yes
Connection cross-section S	mm^2	0.5 ... 1
Terminal protection (connected trip units)		IP20
Location in accessory compartment No.		5

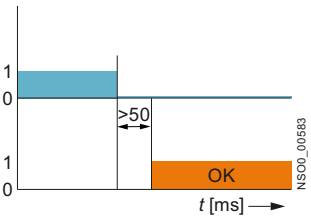




Circuit breaker switched off by shunt trip unit



Reaction time of the shunt trip



Circuit breaker states and lever positions of circuit breakers

Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motor drive	
Switched off manually or electrically by drive	

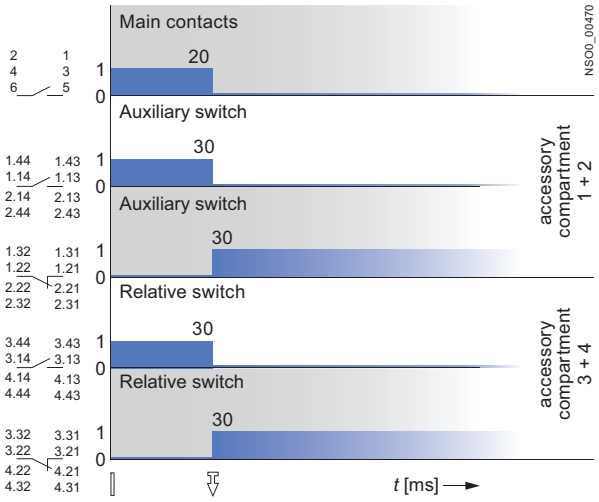
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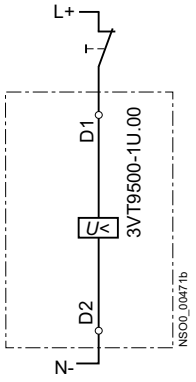
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Technical specifications

Article No.		3VT9500-1U.00
Rated operating voltage U_e	V	AC 24, 48, 110, 230, 400, 500 DC 24, 48, 110, 220
Rated frequency f_n	Hz	50/60
Input power at 1.1 U_e		< 2.5 VA < 2 W
Characteristic		$U \geq 0.85\ U_e$, circuit breaker can switch on $U \geq 0.35\ U_e$, the circuit breaker must trip
Time to switched-off	ms	20
Continuous load		Yes
Connection cross-section S	mm^2	0.5 ... 1
Terminal protection (connected trip unit)		IP20
Location in accessory compartment No.		5

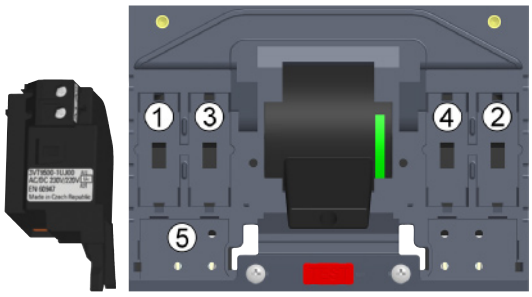
Circuit breaker switched off by undervoltage trip unit



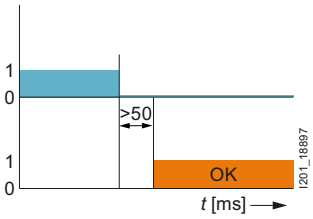


Circuit breaker switched off by undervoltage trip unit

Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motor drive	
Switched off manually or electrically by drive	



Reaction time of the undervoltage trip unit



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Rotary operating mechanism

Technical specifications

Rotating the hand drive lever located on the rotary operating mechanism switches circuit breakers 3VT4 to 3VT5 on and off, e.g. for switching electrical equipment on and off. Modular design of the drives enables easy installation on the circuit breaker after removing the accessory compartment cover from the circuit breaker. The rotary operating mechanism and its accessories must be ordered separately, see page 5/5.

- The coupling driver operates the circuit breaker through the front panel or through the cabinet door, the outlet for the operating shaft features protection class IP44 or IP66 (for bearings).
- The hand drive lever can be furnished with an extension shaft which makes it possible to control the circuit breaker in deeper cabinets.
- In order to enhance safety for the operator of the electrical equipment, the coupling driver is furnished with a locking feature which prevents the cabinet from being opened when the circuit breaker is in closed position.
- When the circuit breaker in position "manual open", the drive handle can be locked up using the built-in cylinder type lock (FAB) and as many as three padlocks with shank diameter up to 7 mm.
- When the drive lever is in position "manual open", it is possible to remove the hand drive lever.
- The circuit breakers with rotary operating mechanism can be equipped with a mechanical interlocking system, see next page.

Specifications

					Switchgear door locking in circuit breaker state	
Article number	Description	Color	Lockable with padlock when circuit breaker is in OFF state	Protection class	Switched on and off by trip unit	Length mm
3VT9500-3HA10	Rotary operating mechanism	--	yes	--	--	--
3VT9500-3HE10	Hand drive lever	black	yes	--	--	--
3VT9500-3HF10	Hand drive lever	red	yes	--	--	--
3VT9500-3HG10	Coupling driver	--	--	IP44	yes	--
3VT9500-3HG20	Coupling driver	--	--	IP66	yes	--
3VT9500-3HJ10	Extension shaft	--	--	--	--	365





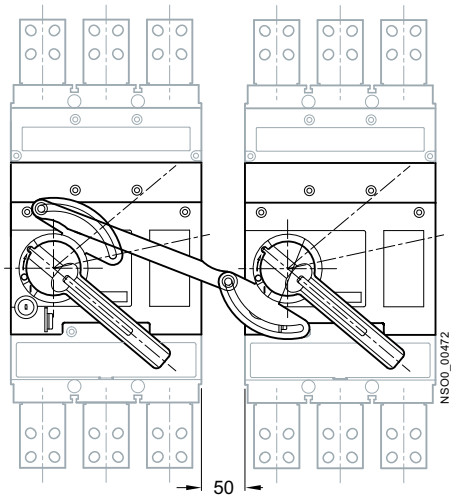
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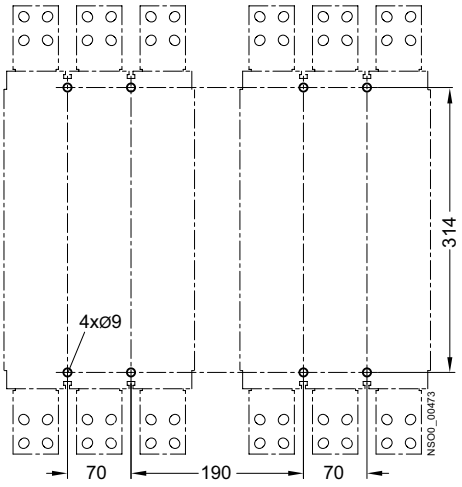
Technical specifications

3VT9500-8LA00 Mechanical interlocking



- It provides interlocking of two circuit breakers so that they cannot be switched on simultaneously, but always only one of them.
- It is possible to use the locking device between two 3VT4 or 3VT5 circuit breakers or between 3VT4 and 3VT5 circuit breakers. Both circuit breakers must be furnished with a rotary operating mechanism (at least with the hand drive unit and hand drive lever), see page 5/5. In order to use locking, it is necessary to adhere to the dimensions.

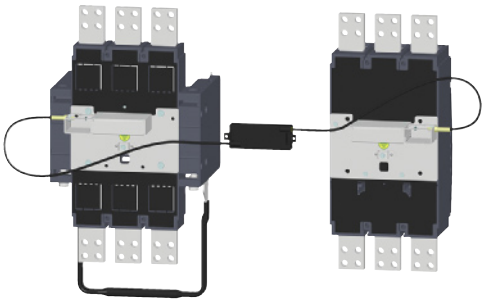




3VT9500-8LC10 Mechanical interlocking by Bowden

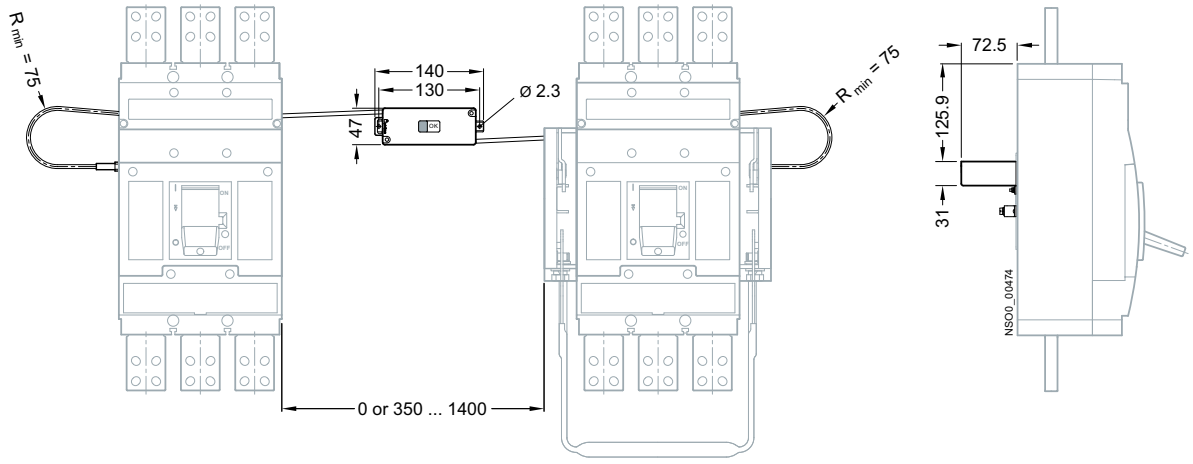
- Provides mechanical interlocking of two circuit breakers so that they cannot both be tripped simultaneously, but only one of them at a time.
- Interlocking can be used between two 3VT4 or 3VT5 circuit breakers or between a 3VT4 and a 3VT5 circuit breaker. For interlocking, circuit breakers can be outfitted with a rotary or motorized operating mechanism. To use interlocking, it is absolutely necessary to comply with the dimensions shown below.

Type of mechanical interlocking	Combination of circuit breaker/switch disconnector versions
3VT9500-8LC10	fixed-mounted - fixed-mounted
3VT9500-8LC30	fixed-mounted - withdrawable
3VT9500-8LC40	withdrawable - withdrawable



Mechanical interlocking by Bowden between fixed-mounted and withdrawable 3VT5 circuit breakers

Dimensions:



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Motorized operating mechanism

Technical specifications

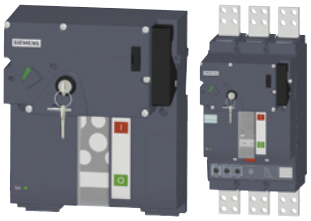
The motorized operating mechanism is equipped with spring storage units. The energy stored in the springs makes it possible to switch the circuit breaker on in less than 70 ms. Releasing the spring energy and turning on the circuit breaker is ensured by a closing coil. The motorized operating mechanism can trip the circuit breaker in approx. 10 s. This method of tripping is suitable for most technological applications. When faster circuit breaker tripping is required (e.g., because an emergency STOP button was pressed), it is possible to use the motorized mechanism in combination with an undervoltage trip unit or a shunt trip unit.

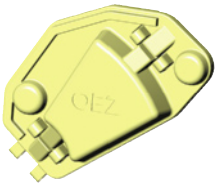
- The motorized operating mechanism front panel contains a selector switch for selecting the drive modes. There is also the possibility to remotely indicate the selector switch state.
  - The first mode is automatic remote control (selector switch in position AUTO). This is the standard position in automatic operation.
  - The second mode is manual control (selector switch position MANUAL). In manual mode the motorized operating mechanism does not need any voltage to perform perform opening/closing operations
- Remote switching on and off in position AUTO is carried out with pushbuttons that must be connected to the motorized operating mechanism connector. When the motorized operating mechanism is in MANUAL mode, the circuit breaker can be switched on using the green button on the front part of the motorized operating mechanism cover and to switch it off with the red TEST button on the trip unit. The function of the remote control ON button in MANUAL MODE is locked up, whereas the function of the remote control OFF button remains active for safety reasons.
- The motorized operating mechanism makes it simple to control the circuit breaker when there is a loss of control voltage. In MANUAL mode, it is possible to wind up the spring storage assembly by repeated rotation of the foldable handle. After the storage is wound up, the circuit breaker can be turned on using the green button on the front part of the insulation cover of the drive and it can be turned off using the red TEST button on the trip unit.
- The motorized operating mechanism, as opposed to the circuit breaker, recognizes only two fixed positions:
  - In the first position, the circuit breaker is ON. When the circuit breaker is tripped in AUTO mode by a trip unit, auxiliary trip devices or from a distance, the 3VT9500-2AF10 switch (included in motorized operating mechanism delivery) will generate a pulse to load the spring storage mechanism automatically. If the switch is placed in accessory compartment 3 or 4, automatic loading process will take place.
  - In the second fixed position the circuit breaker is switched off and the loaded motorized operating mechanism is ready to activate the circuit breaker after receiving the control pulse.
- The presence of the control voltage in the drive is indicated by a steadily lit green LED indicator below the drive plate. If the indicator is not lit, the position of the circuit breaker lever need not comply with the correct positions of the power contacts.
- The motorized operating mechanism may be furnished with an electromechanical operations counter.
- The motorized operating mechanism can be locked up in off-state position using the built-in cylinder type lock and using as many as three padlocks with the shank diameter max. 7 mm. Before the drive is locked up, it is necessary to turn the drive unit switch to MANUAL mode position, to withdraw the drive unit yellow lockup strip and to insert the padlock shank into the oval opening in the lockup strip. When a cylinder type lock is used, the lockup strip will stick out a little.
- An 3VT9500-3MF20 cover can be affixed to the motorized operating mechanism's turn-on switch and then sealed. The cover prevents turning on the circuit breaker from the motorized operating mechanism panel.

Specifications

Article number		3VT9500-3M...0
Operational voltage U_e	V	AC 110, 230 DC 110, 220
Rated frequency f_n	Hz	50/60
Control pulse length for switching on	ms	> 20 ... 1500 ∞[1]
Control pulse length for switching off	ms	> 20 ... ∞[1)]
Time to switching on	ms	< 70
Time to the accumulating of motor drive under voltage U_e		
• AC 230 V	s	14
• DC 220 V	s	18
Time to switch-off U_e		
• AC 230 V	s	10
• DC 220 V	s	12
Frequency of ON/OFF cycles	cycles/min	2
Frequency of cycles - immediately one after another ON/OFF	cycles	8
Mechanical endurance	cycles	10000
Input power		
• AC	VA	200
• DC	W	200
Protection		
• AC 110 V; AC 230 V		5SX4104-7; 5SX4102-7
• DC 110 V; DC 220 V		5SX5104-7; 5SX5102-7
Rated operating current of the switch selector AUTO / MANUAL I_e/U_e	V	6 A/AC 250

[1)] for sequence of control pulses, see page 5/33.





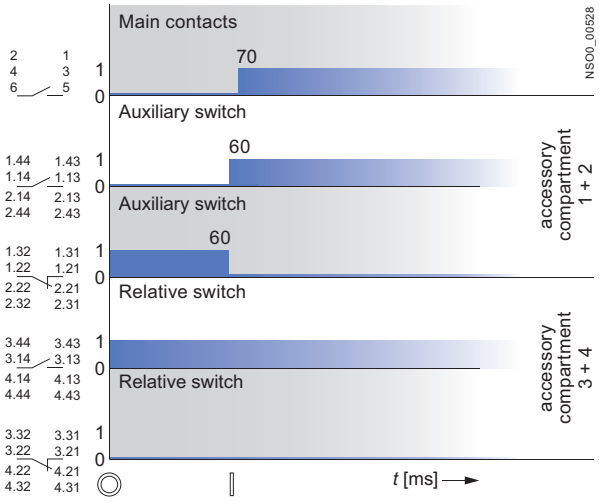
(Reset Red Led): If the circuit breaker is not stored by motor drive until 30 s., e.g. due to undervoltage, extremely low temperature, mechanical or electrical failure, the LED diode on the front panel is shining in red. During the lighting of the red LED, the mechanism is disconnected electronically, and cannot be remotly controlled. In order to restore remote control it is necessary to disconnected the motor operated mechanism for 30 s. At tripping of the circuit breaker by the overcurrent release, by auxiliary releases, or by TEST push button (in mode AUTO), the motorized operating mechanism automatically accumulates energy (circuit breaker loading), motorized operating mechanism is then ready to switch on the circuit breaker.

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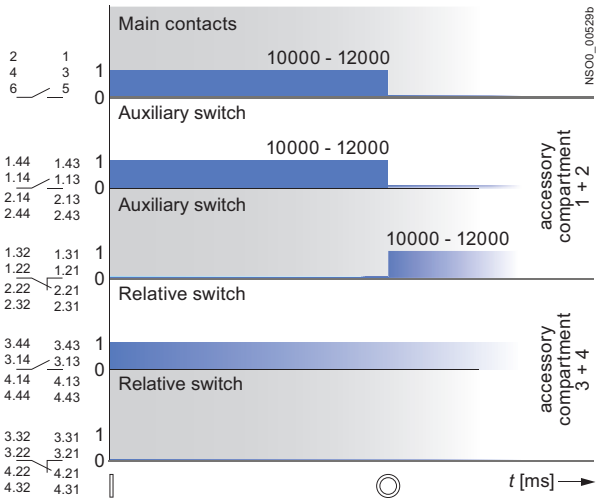
Motorized operating mechanism

Specifications

Circuit breaker switched on by motorized operating mechanism-electrically by pushbutton ON

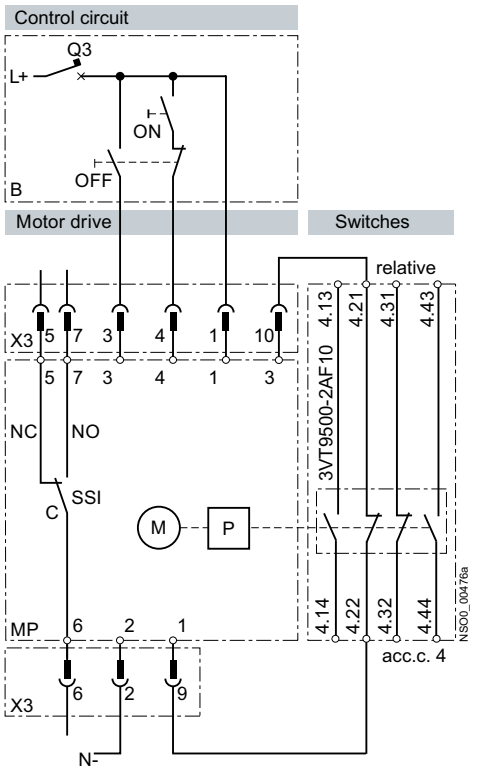


Circuit breaker switched off by motorized operating mechanism-electrically by pushbutton OFF



Wiring diagram

Circuit breaker switch on and switched off by motor driver - electrically by pushbutton ON and pushbutton OFF



Circuit breaker states and Lever positions of circuit breakers

Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by trip unit, or by TEST button	
Switched off manually or electrically by drive	

5

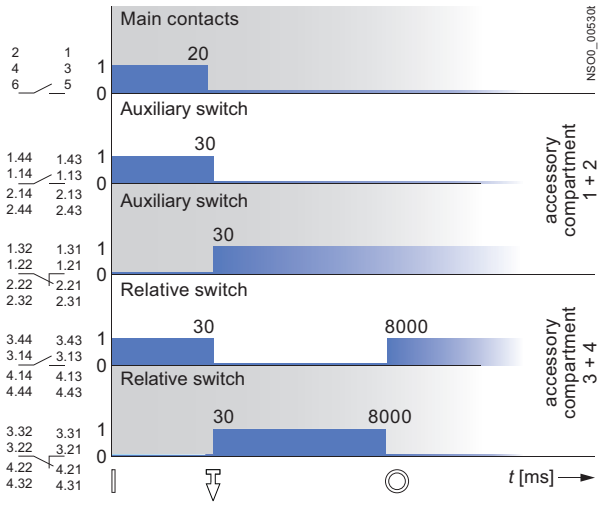
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Motorized operating mechanism

Symbol	Description
MP	3VT9500-3M...0 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Connector to connect auxiliary circuits
SSI	Switch indicating MANUAL(NO-C)/ AUTO(NC-C) modes
B	Recommended wiring of the control circuits (not included in delivery)
ON	Make pushbutton
OFF	Break pushbutton
S	Switch for energy storage (switched on = automatic storage, may be continuously switched on)
Q3	Circuit breaker for motorized operating mechanism

Specifications

Tripping of the circuit breaker with motorized operating mechanism by shunt trip unit or undervoltage trip unit



Circuit breaker states and lever positions of circuit breakers

Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off (TRIP) by trip unit, or by TEST button	
Switched off manually or electrically by drive	

Wiring diagram description

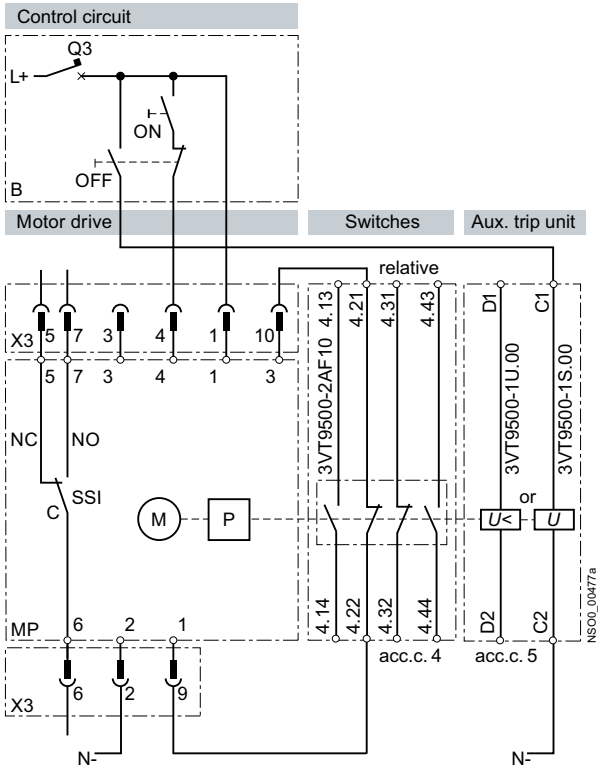
Symbol	Description
MP	Motorized operating mechanism 3VT9500-3M...0
M	Motor
P	Energy storage device
X3	Connector to connect auxiliary circuits
SSI	Switch indicating MANUAL(NO-C)/ AUTO(NC-C) modes
B	Recommended wiring of the control circuits (not included in delivery)
ON	Make pushbutton
OFF	Break pushbutton
Q3	Circuit breaker for motorized operating mechanism

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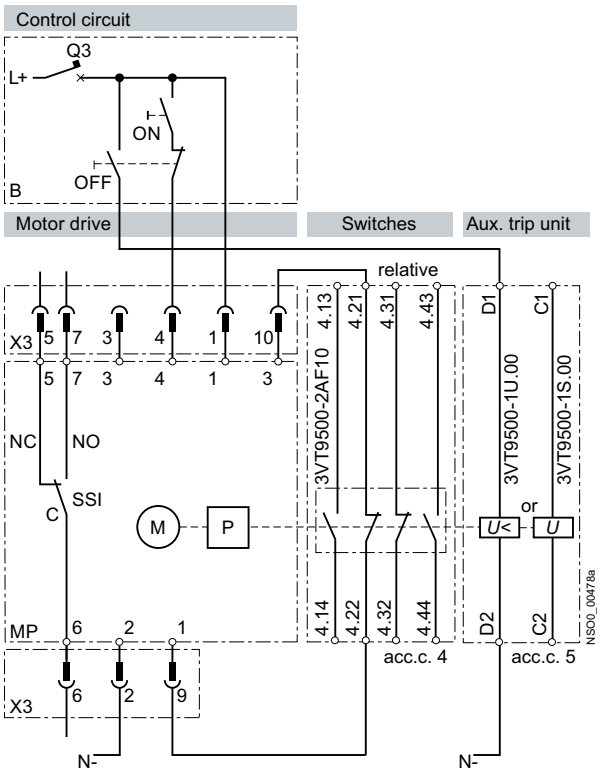
Motorized operating mechanism

Wiring diagram

Circuit breaker switched on by motorized operating mechanism (electrical pushbutton ON) and switched off by shunt trip unit



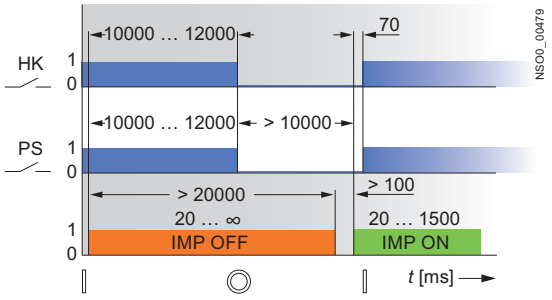
Circuit breaker switched on by motorized operating mechanism (electrical pushbutton ON) and switched off by undervoltage trip unit



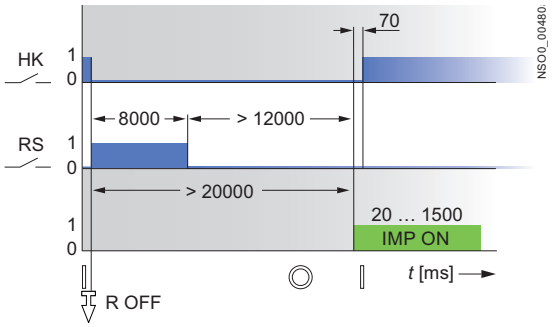
Specifications

Recommended actuating pulses

Circuit breaker switched on/off by motorized operating mechanism



Circuit breaker switched off by trip units or shunt/undervoltage trip units and switched on by motorized operating mechanism-S switch permanently closed



Circuit breaker states and lever positions of circuit breakers

Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by trip unit, or by TEST button or by the trip pushbutton on the motor drive	
Switched off manually or electrically by drive	

Description of charts

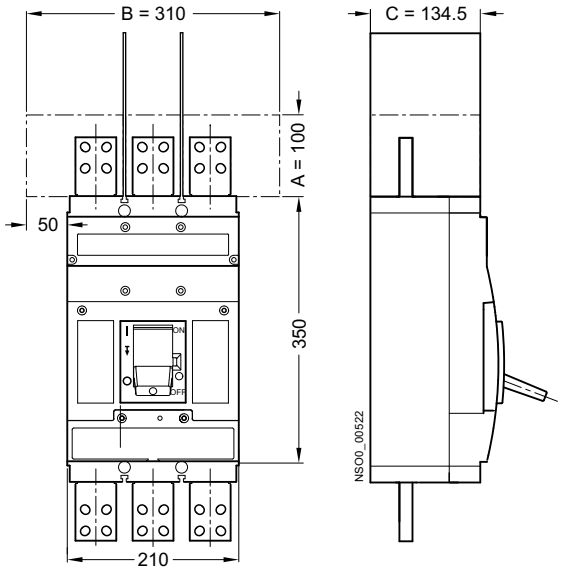
Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closed instantly by trip unit
IMP S	pulse to store up motor drive energy (generated by S switch)
IMP ON	make pulse for motor drive
IMP OFF	break pulse for motor drive
X	random segment of time

5

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Insulating barriers

Overview



A, B, C - minimum deionizing space, free of earthed metal parts

Use of insulating barriers and terminal covers with circuit breakers and switch disconnectors.

Fixed-mounted version

Front connection
- terminals 1, 3, 5 (upper side)

3VT9500-8CE30 insulating barriers must always be installed on circuit breakers/switch disconnectors.

- Terminals 2, 4, 6 (bottom side)
  - If circuit breakers/switch disconnectors are connected to the supply using terminals 2, 4, 6, 3VT9500-8CE30 insulating barriers must always be installed on it.
  - If circuit breakers/switch disconnectors are connected on the bottom side using clamp or block type terminals, 3VT9500-8CE30 insulating barriers must always be installed on it.

Rear connection
- terminals 1, 3, 5 (upper side)

3VT9500-8CD30 insulating covers or 3VT9500-8CE30 insulating barriers must always be installed on the circuit breaker/switch disconnector.

We recommend installing 3VT9500-8CG30 insulating grommets with all sets for rear connection.

- terminals 2, 4, 6 (bottom side)

If circuit breakers/switch disconnectors are connected to the bottom side using clamp or block type terminals, 3VT9500-8CD30 insulating barriers must always be installed on circuit breaker.

We recommend installing 3VT9500-8CG30 insulating grommets with all sets for rear connection.

Withdrawable version

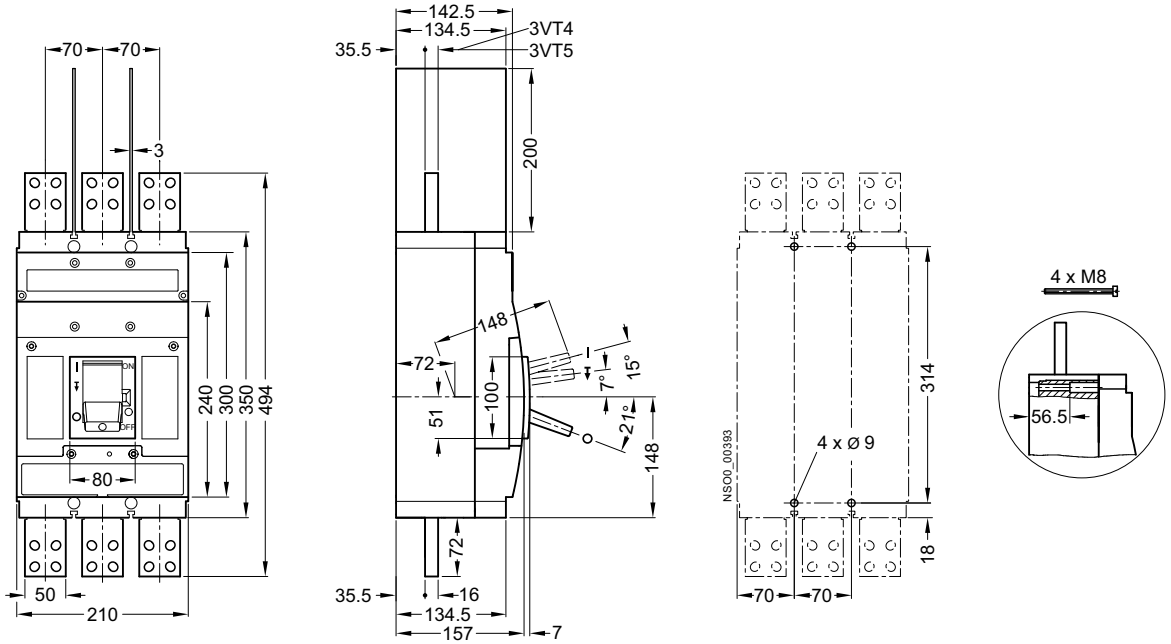
Front connection

- terminals 1, 3, 5 (upper side)
  If the mounting base for the withdrawable circuit breaker/switch disconnector is connected on the upper side, using clamp or block type terminals, 3VT9500-8CF30 insulating barriers must always be installed.
  In all other cases, we recommend installing 3VT9500-8CC30 insulating covers on the upper side of the circuit breaker.
- terminals 2, 4, 6 (bottom side)
  If the mounting base for the withdrawable circuit breaker/switch disconnector is connected to the bottom side of the circuit breaker using clamp or block type terminals, 3VT9500-8CF30 insulating barriers must always be installed.
  In all other cases, we recommend installing 3VT9500-8CC30 insulating covers on the bottom side of the withdrawable version base.

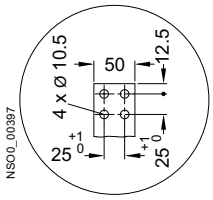
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3VT4/3VT5 Dimensional drawings - fixed-mounted version

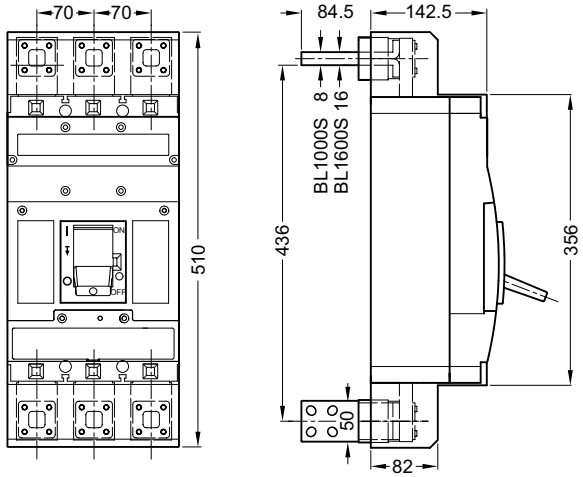
Fixed-mounted version, front connection



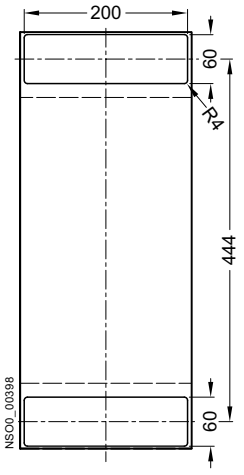
Drilling pattern



Fixed-mounted version, rear connection
(3VT9500-4RC30, 3VT9400-4RC30 connecting sets)



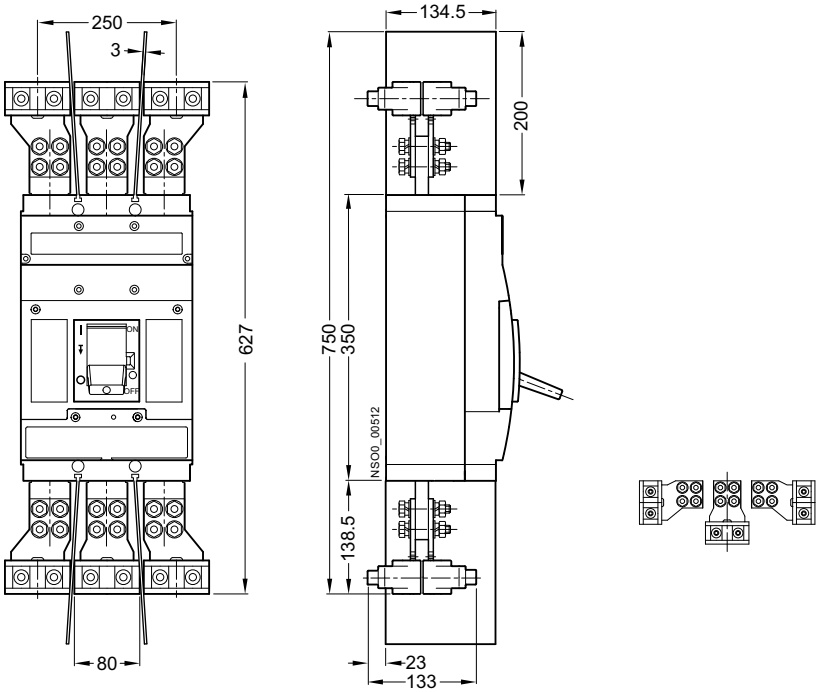
Openings for insulation grommets



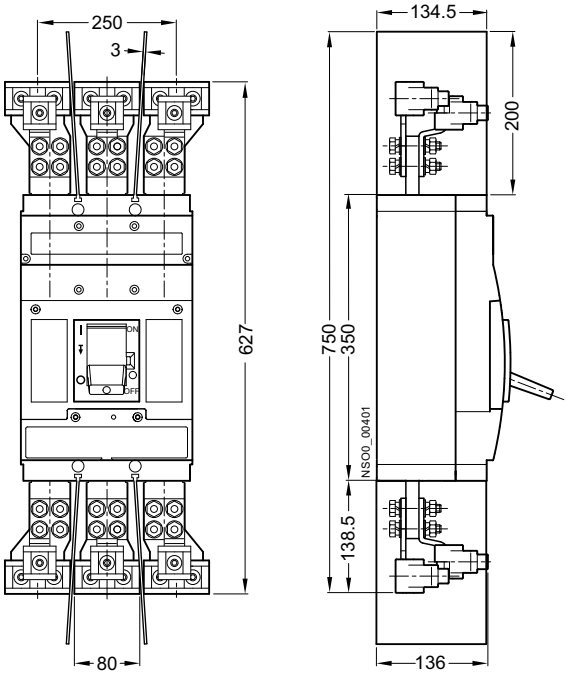
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Dimensional drawings

Fixed-mounted version, clamp type terminals (3VT9524-4TG30 connecting sets)
- not for 3VT4710-3AA30-0AA0 switching unit

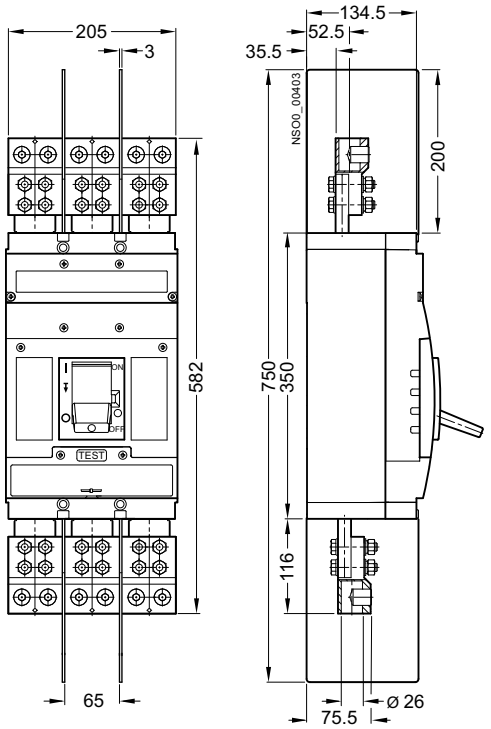


Fixed-mounted version, clamp type terminals (3VT9524-4TG30 and 3VT9524-4TF30 connecting sets)
- not for 3VT4710-3AA30-0AA0 switching units

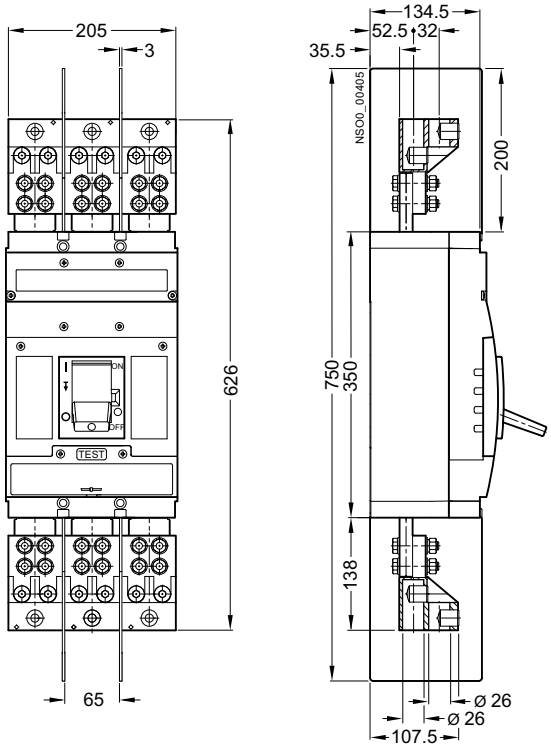


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Fixed-mounted version, block type terminals (3VT9532-4TF30)



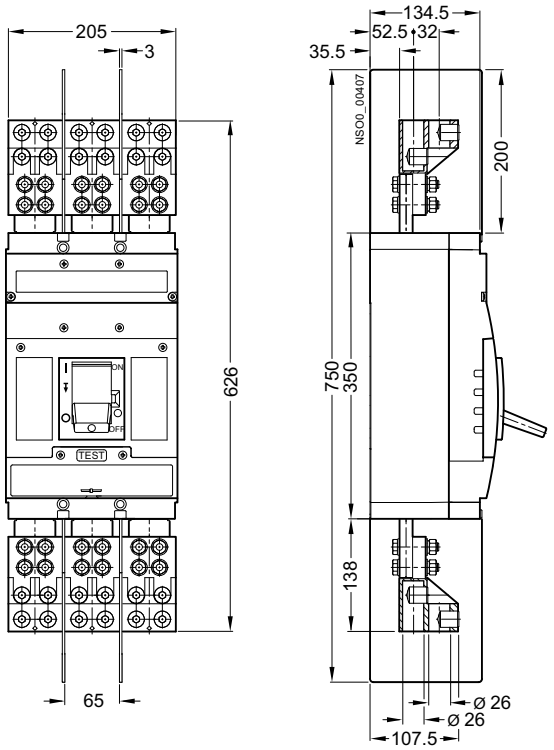
Fixed-mounted version, block type terminals (3VT9533-4TF30)



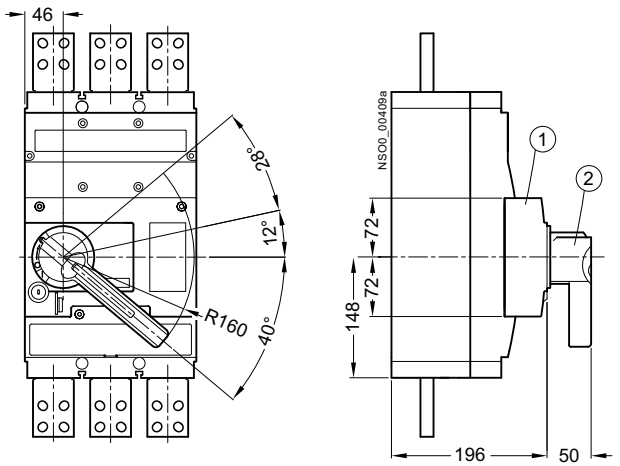
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Dimensional drawings

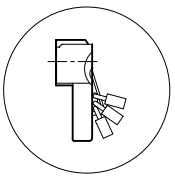
Fixed-mounted version, block type terminals (3VT9534-4TF30)



Fixed-mounted version, front rotary operating mechanism



Knob - lockable
(3VT9500-3HE10, 3VT9500-3HF10)

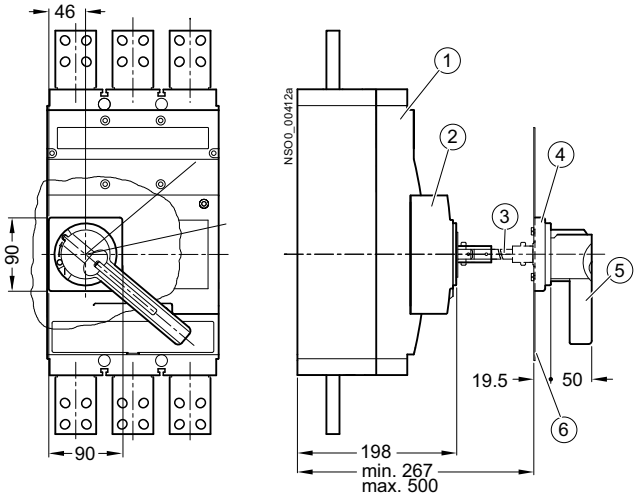


① 3VT9500-3HA10
② 3VT9500-3H.10

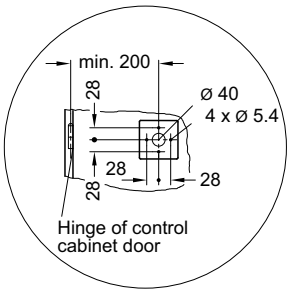
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Fixed-mounted version, front rotary operating mechanism

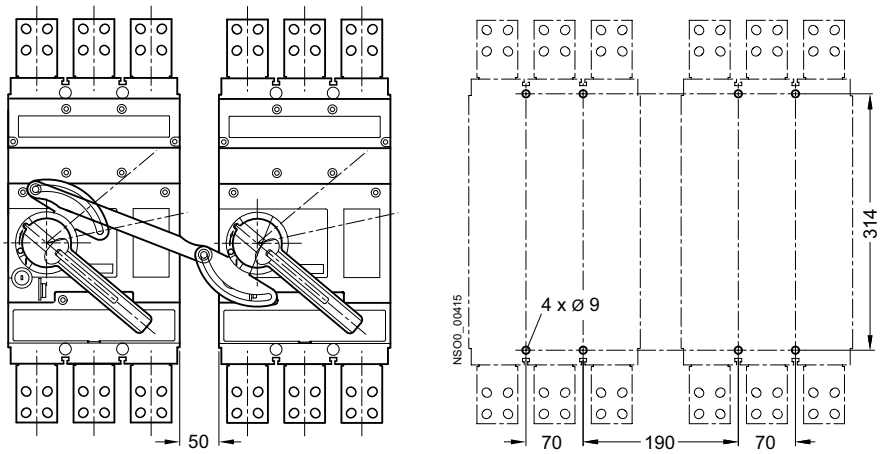


Cabinet door cut-out

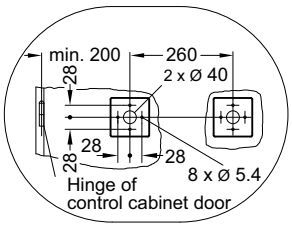


1. 3VT4/3VT5
2. 3VT9500-3HA10
3. 3VT9500-3HJ10
4. 3VT9500-3HG.0
5. 3VT9500-3H.10
6. Control cabinet door

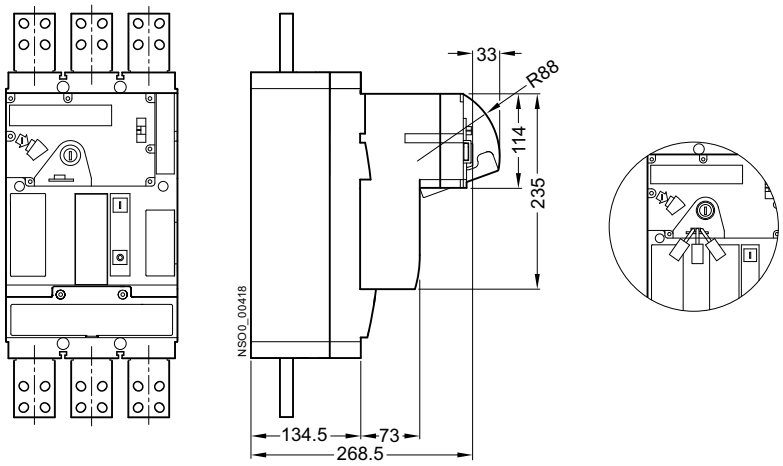
3VT9300-8LA00 mechanical interlocking



Cabinet door cut-out



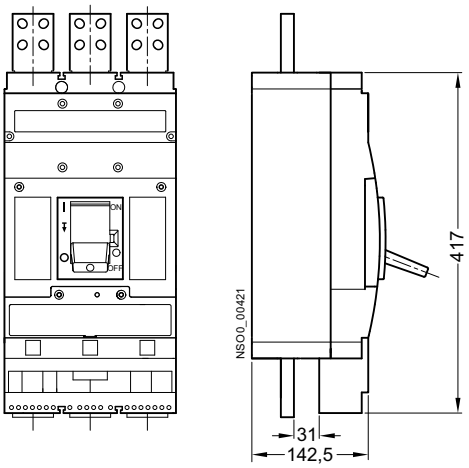
Fixed-mounted version, motorized operating mechanism 3VT9500-3M..0, lockable with up to three padlocks



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Dimensional drawings

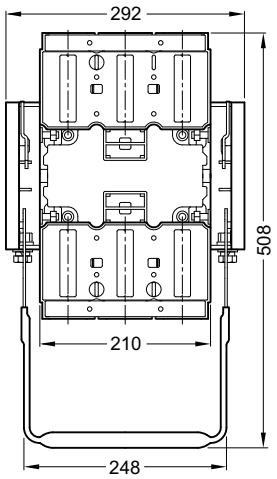
Fixed-mounted version, 3VT9500-6AE00 signalling unit
Description see page 5/24.

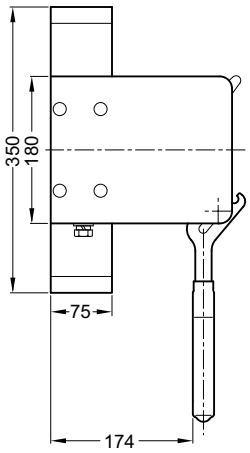


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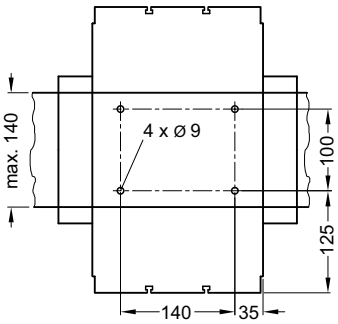
Dimensional drawings - withdrawable version

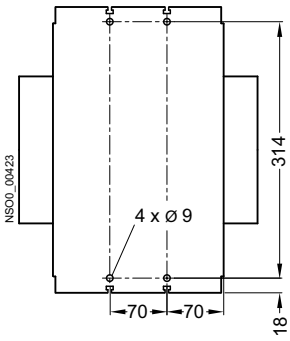
3VT9500-4WA40 withdrawable version base



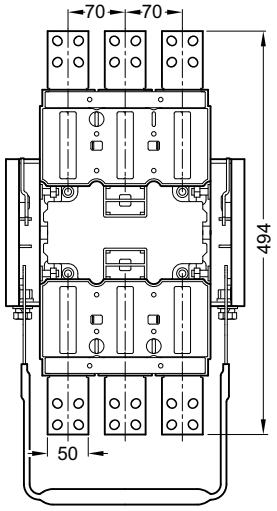


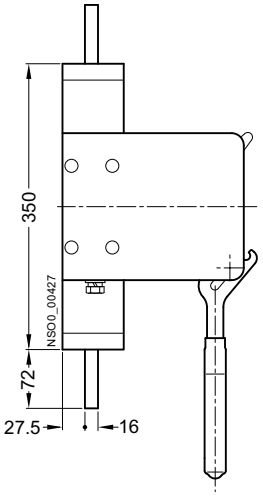
Drilling pattern

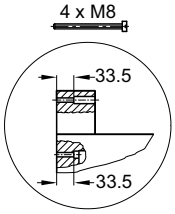




Withdrawable version, front connection (3VT9500-4EF30 connecting sets)





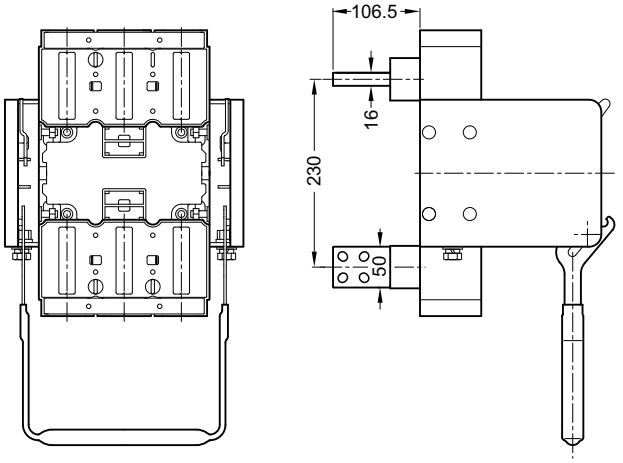


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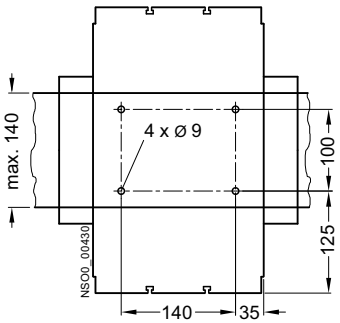
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Dimensional drawings

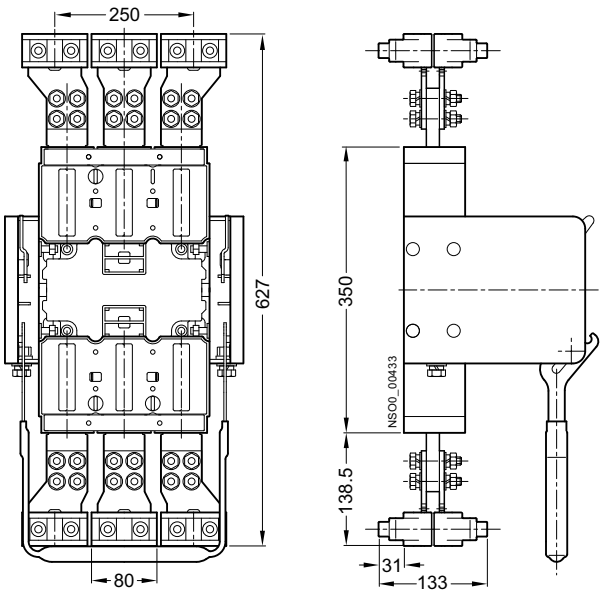
Withdrawable version, rear connection
(3VT9500-4RC30 connecting set)



Drilling pattern



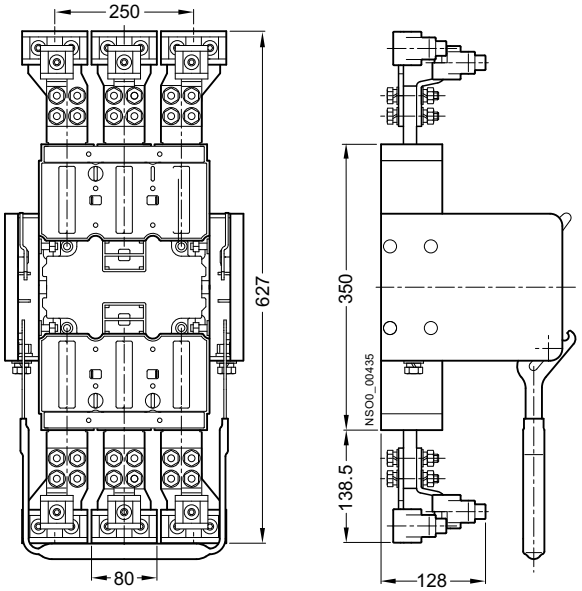
Withdrawable version, clamp type terminals (3VT9524-4TG30 connecting set)



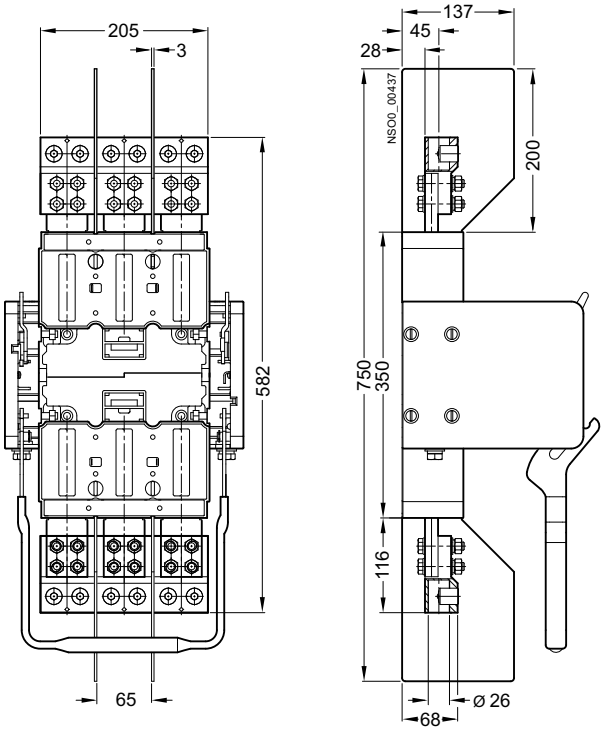
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Withdrawable version, clamp type terminals (3VT9524-4TG30 and 3VT9524-4TF30 connecting set)



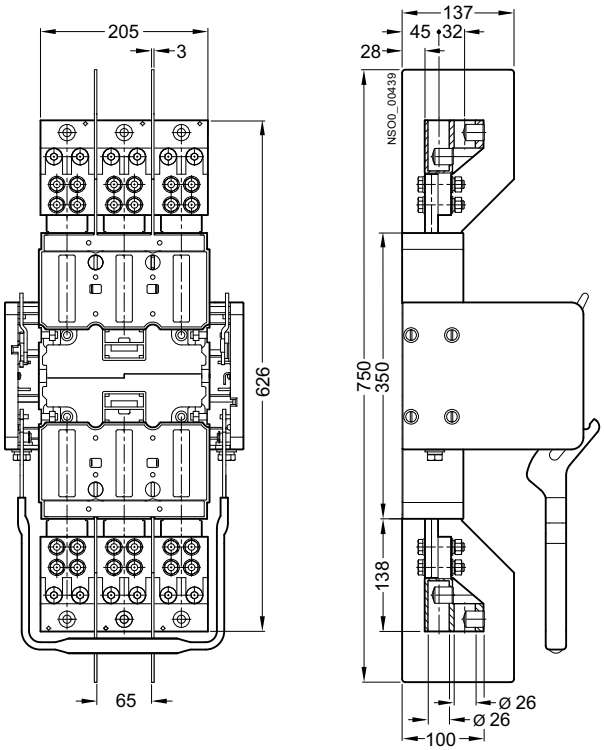
Withdrawable version, block type terminals (3VT9532-4TF30)



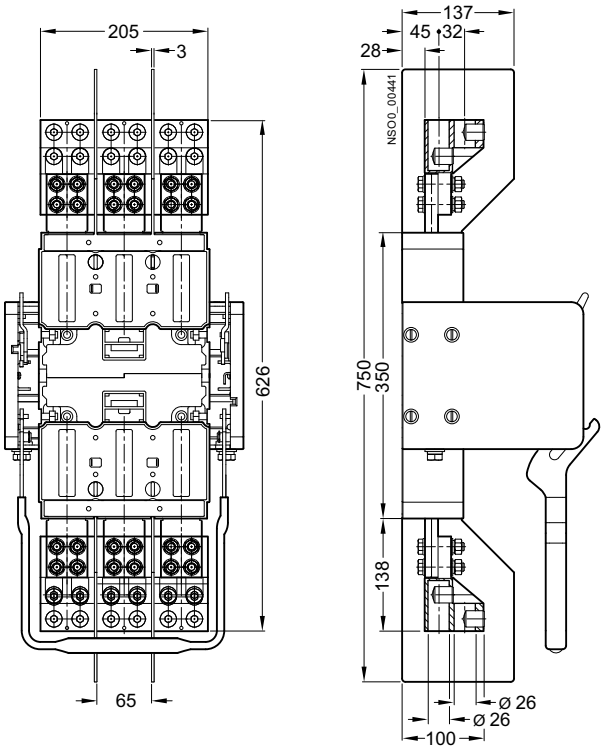
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Dimensional drawings

Withdrawable version, block type terminals (3VT9533-4TF30)



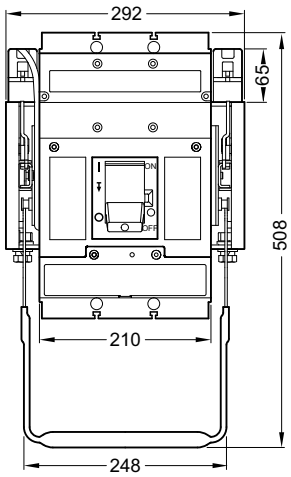
Withdrawable version, block type terminals (3VT9534-4TF30)



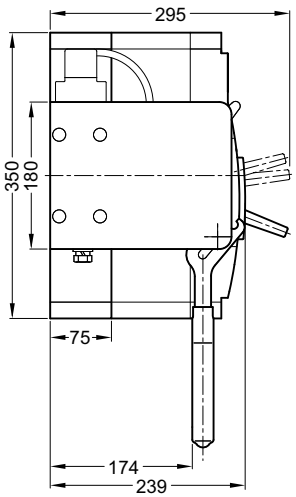
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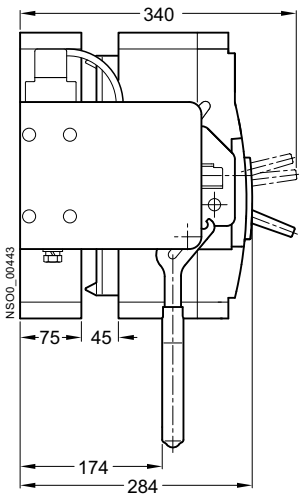
Withdrawable version



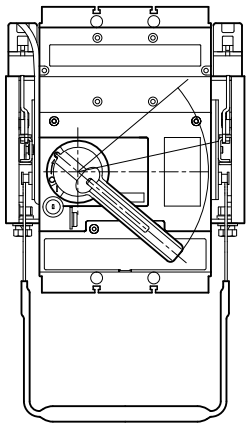
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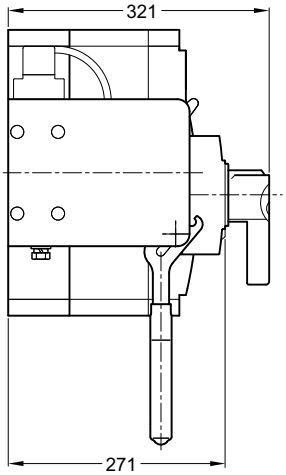
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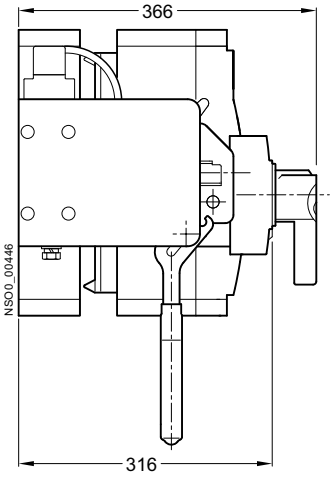
Withdrawable version, rotary operating mechanism



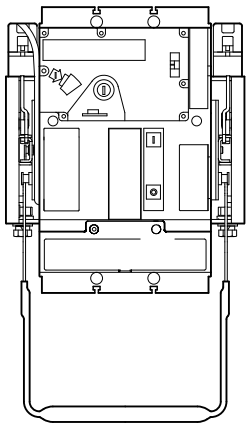
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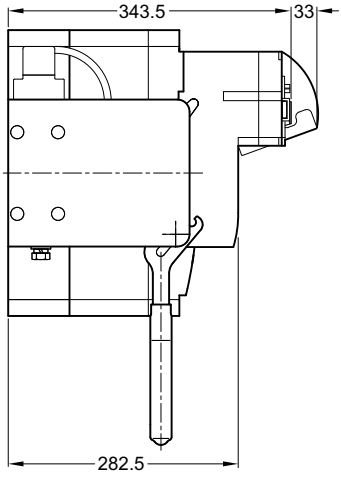
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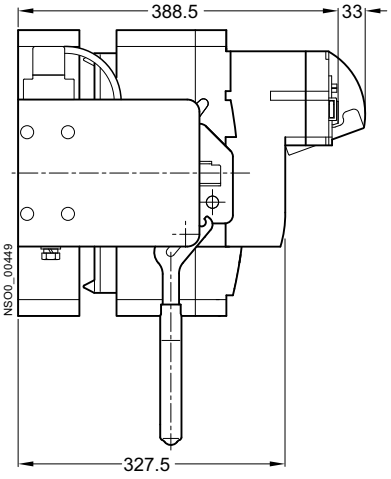
Withdrawable version, 3VT9500-3MQ00 motorized operating mechanism



Connected



Disconnected



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Notes

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6 Appendix



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Glossary

Rated operating voltage, (U_e)
EN 60947-1; 4.3.1.1

Voltage fixed by the manufacturer. Several pertinent tests relate to its determination, as may also the utilization category. Along with the rated (operating) current, it determines the device's utilization. The highest value of rated operating voltage may in no case be greater than the value of the rate insulation voltage U_i.

Rated insulation voltage, (U_i)
EN 60947-1; 4.3.1.2

Voltage measure to which are related tests of dielectric strength and creepage distance.

Rated current, (I_n)
EN 60947-2; 4.3.2.3

Current value of particular circuit breaker that can be handled uninterruptedly. The highest current valued tripping the circuit breaker in conformity with a specifically stated tripping characteristic.

Reduced rated current, (I_r)

Specifically established, reduced value of I_n current for a regulated time-dependent (thermal) trip unit and that the circuit breaker can handle continuously. Maximum setting is at value equal to I_n. Changing I_r shifts the trip unit's tripping characteristic along the current axis. ($I_r = k \times I_n$ holds where $k \leq 1$)

Tripping time at a given I_r multiple, (t_r)

Time after which circuit breaker will trip, if a current flows through it that is equal to the given multiple of I_r. Changing t_r shifts the tripping characteristic along the time axis.

Actuating current of (selective) release's time-independent delay, (I_{ds})

Minimum current value causing the release's time-independent delay to actuate.

Delay of time-independent delayed release, (t_v)

If a current flows through the circuit breaker equal to at least I_{sd} but not reaching I_{rm} the circuit breaker will trip with time delay t_v. Total shut-off time is influenced by the tripping of the circuit breaker itself and is about 10 ÷ 20 ms longer.

Actuating current of time-independent instantaneous, (I_{rm})

Minimum current value causing the time-independent instantaneous release to actuate.

Rated operating current, (I_e)
EN 60947-1; 4.3.2.3

Rated operating current of device (switch-disconnector) is fixed by the manufacturer with consideration for the rated operating voltage, rated frequency, rated operation, utilization category and type of protective cover, if that comes into consideration.

Rated normal current, (I_u)
EN 60947-1; 4.3.2.4

Current value set by the manufacturer and which the device can handle in continuous operation, i.e. during a period longer than 8 hours (weeks, months, or longer).

Rated ultimate short-circuit breaking capacity, (I_{cu})
EN 60947-2; 2.15.1; 4.3.5.2.1

Ultimate short-circuit breaking capacity value expressed as the rms value of the alternating component of the assumed short-circuit current that the circuit breaker must be able to manage in the mode: 1x switching off of the short circuit and a following 1x make-break sequence. After testing, the circuit breaker need not be able to conduct the rated current uninterruptedly. I_{cu} is set for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. Must fulfil the condition: $I_{cu} \geq I_k$"

Rated short-circuit service breaking capacity, (I_{cs})
EN 60947-2; 2.15.2; 4.3.5.2.2

Value of the operating short-circuit breaking capacity expressed as the rms value of the alternating component of the assumed short-circuit current that the circuit breaker must be able to manage in the mode: 1x switching off of the short circuit and a following 2x make-break sequence. May also be expressed as a percentage of I_{cu}. After testing, the circuit breaker must be able uninterruptedly to conduct the rated current and to switch off the overcurrent. Temperature increase of the main terminals may be greater. I_{cs} is set for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. Permitted: $I_{cs} \geq I_k$"

Rated short-time withstand current, (I_{cw})
EN 60947-1; 4.3.6.1
EN 60947-2; 4.3.5.4
EN 60947-3; 4.3.6.1

Value of short-time withstand current specified by the manufacturer that the device is able to handle without damage during a designated time period (short-time delay). In case of alternating current, it is the rms value of the alternating component of the assumed short-circuit current I_p.

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Overview

Trademarks

All product designations may be registered trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes may violate the rights of the owner.

Amendments

All technical data, dimensions and weights are subject to change without notice unless specified on the pages of this catalog.

Dimensions

All dimensions are in mm.

Images

The illustrations are not binding.

Technical data

The technical data in the catalog are for general information. The instruction manuals and the operating instructions on the products must be observed during assembly, operation and maintenance.

Further technical information is available at
www.siemens.com/lowvoltage/product-support

- under Product List:
  - Technical specifications
- under Entry List:
  - Updates
  - Downloads
  - FAQ
  - Manuals/operating instructions
  - Characteristic curves
  - Certificates

Configurators can be found under
www.siemens.com/lowvoltage/configurators

Assembly, operation and maintenance

The instruction manuals and the operating instructions on the products must be observed during assembly, operation and maintenance.

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Ordering notes

Logistics

General

With regard to delivery service, communications and environmental protection, our logistics service ensures "quality from the moment of ordering right through to delivery". By designing our infrastructure according to customer requirements and implementing electronic order processing, we have successfully optimized our logistics processes.

We are proud of our personal consulting service, on-time deliveries and 1-day transport within Germany.

To this end, we supply the preferred types marked with ► ex works.

We regard the DIN ISO 9001 certification and consistent quality checks as an integral part of our services.

Electronic order processing is fast, cost-effective and error-free. Please contact us if you want to benefit from these advantages.

Packaging, packing units

The packaging in which our devices are dispatched provides protection against dust and mechanical damage during transport, thus ensuring that you receive our products in perfect condition.

We select our packaging for maximum environmental compatibility and reusability (e.g. crumpled paper instead of polystyrene chips for protection during transport in packages up to 32 kg) and, in particular, with a view to reducing waste.

With our multi-unit packaging and reusable packaging, we offer you specific types of packaging that are both kind to the environment and tailored to your requirements:

Your advantages at a glance:

- Lower order costs.
- Cost savings through uniform-type packaging: low/no disposal costs.
- Reduced time and cost thanks to short unpacking times.
- "Just-in-time" delivery directly to the production line helps reduce stock: cost savings through reduction of storage area.
- Fast assembly thanks to supply in sets.
- Standard Euro boxes - corresponding to the Euro pallet modular system - suitable for most conveyor systems.
- Active contribution to environmental protection.

Unless stated otherwise in the "Selection and ordering data" of this catalog, our products are supplied individually packed.

> For small parts/accessories, we offer you economical packaging units as standard packs containing more than one item, e.g. 5, 10, 50 or 100 units. It is essential that whole number multiples of these quantities be ordered to ensure satisfactory quality of the products and problem-free order processing.

The products are delivered in a neutral carton. The label includes warning notices, the CE mark, the open arrow recycling symbol, and product description information in English and German. In addition to the Article No. (MLFB) and the number of items in the packaging, the Instr. Article No. is also specified for the operating instructions. It can be obtained from your local Siemens representative (you will find a list of your local Siemens representatives at www.siemens.com/automation/partner).

The device Article No. of most devices can also be acquired through the EAN barcode to simplify ordering and storage logistics.

The Article Nos. and EAN codes are assigned electronically in the master data of the products for low-voltage power distribution and electrical installation.

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Overview

Ordering special versions

When ordering products that differ from the standard versions listed in the catalog, **"–Z"** must be added to the Article No. indicated and the required features must be specified using alphanumeric order codes or plain text.

Ordering very small quantities

When small orders are placed, the costs associated with order processing are greater than the order value. We therefore recommend that you combine several small orders. Where this is not possible, we regret that we are obliged to make a small processing charge: for orders with a net goods value of less than € 250 we charge a € 20 supplement to cover our order processing and invoicing costs.

Explanations on the Selection and Ordering Data

Delivery time class (DT)

DT	Meaning
►	Preferred type
A	Two workdays
B	One week
C	Three weeks
D	Six weeks
X	On request

Preferred types are device types that can be delivered immediately ex works, i.e. they are dispatched within 24 hours.

If ordered in normal quantities, the products are usually delivered within the specified delivery times, calculated from the date we receive your order.

In exceptional cases, delivery times may vary from those specified.

The delivery times are valid ex works from Siemens AG (products ready for dispatch).

Shipping times depend on the destination and the method of shipping. The standard shipping time for Germany is one day.

The specified delivery times are correct at the time of going to print and are subject to constant optimization. Up-to-date information can be found at www.siemens.com/industrymall.

Price units (PU)

The price unit defines the number of units, sets or meters to which the specified price and weight apply.

PS/P. unit (packaging size/packaging unit)

The packaging size / packaging unit defines the number, e.g. of units, sets or meters, for outer packaging:

- The **first digit** in the PS/P. unit column (packaging size/packaging unit) indicates the minimum order quantity. You can only order this specified quantity or a multiple thereof.
- The **second digit** in the PS/P. unit column (packaging size/packaging unit) specifies the number of units contained in larger packaging (e.g. in a carton). You must order this quantity or a multiple thereof if you want the article to be delivered in a larger packaging quantity.

Examples:

PS/P. unit	Meaning
1 unit	You can order one article or a multiple thereof.
5 units	For example, five units are packed in a bag. Because the bags cannot be opened, you can only order a multiple of the quantity contained in the bag: 5, 10, 15, 20 etc.
5/100 units	One carton contains (for example) 20 bags, each containing 5 units, i.e. a total of 100 units. If only cartons are available for delivery, you need to order a multiple of the carton quantity: 100, 200, 300, etc. Ordering a quantity of 220 units would result in the following delivery: two cartons, each containing 100 units (= 200 units) and 4 bags, each containing 5 units (= 20 units).
1 set	A set comprises a defined number of different parts.

Price groups (PG)

Each product is allocated to a price group.

Weight

The defined weight is the net weight in kg and refers to the price unit (PU).

Example

DT	Article No.	Price per PU	PS*/ P. unit	Weight per PU approx.
	3VT2725-2AA36-0AA0		1 unit	3,314

PS*/ P. unit: 1 = minimum order quantity

Weight per PU approx.: The net weight in kg

DT	Article No.	Price per PU	PS*/ P. unit	Weight per PU approx.
	3VT2725-3AA36-0AA0		1 unit	3,330

PS*/ P. unit: 1 = minimum order quantity

Weight per PU approx.: The net weight in kg

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Further documentation

Low-Voltage Power Distribution and Electrical Installation Technology on the WWW



Siemens low-voltage power distribution and electrical installation technology offers switchboards, distribution boards, protection, switching, measuring and monitoring devices, switches and socket outlets. All over the world, the universality, modularity and intelligence of our components and systems give you innumerable benefits – for the entire duration of their service life. Developed according to the respective international standards, we offer forward-looking designs with innovative functions and ensure the highest quality standards around the globe.

We regard product support as just as important as the products and systems themselves.

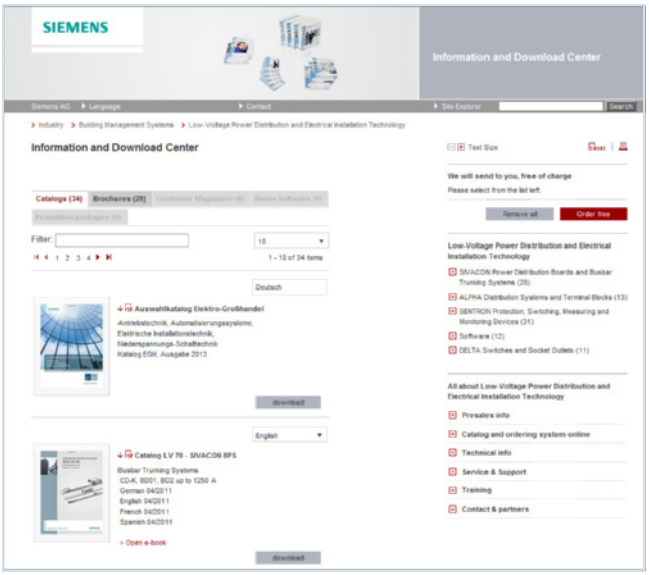
Visit our site on the Internet for a comprehensive offering of support for low-voltage power distribution and electrical installation products, such as

- Operating instructions and manuals for direct download
- Online registration for seminars and events
- Up-to-date answers to your queries and problems
- Software upgrades and updates for fast download
- Telephone assistance in more than 190 countries
- Photos and graphics for external use

and much more - all conveniently and easily accessible:

www.siemens.com/lowvoltage

Information and download center



You will find regularly updated information material such as catalogs, customer magazines, brochures and trial versions of software for low-voltage power distribution and electrical installation on the Internet at

www.siemens.com/lowvoltage/infomaterial

Here, you can order your copy of the available documentation or download it in common file formats (PDF, ZIP).

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Product selection using the interactive catalog CA 01



Detailed information together with user-friendly interactive functions:
The interactive catalog CA 01 with more than 80 000 products provides a comprehensive overview of the product range from Siemens Industry.

You can find everything you need here for solving automation, switching, installation and drive technology tasks. All information is offered over a user interface that is both user-friendly and intuitive.

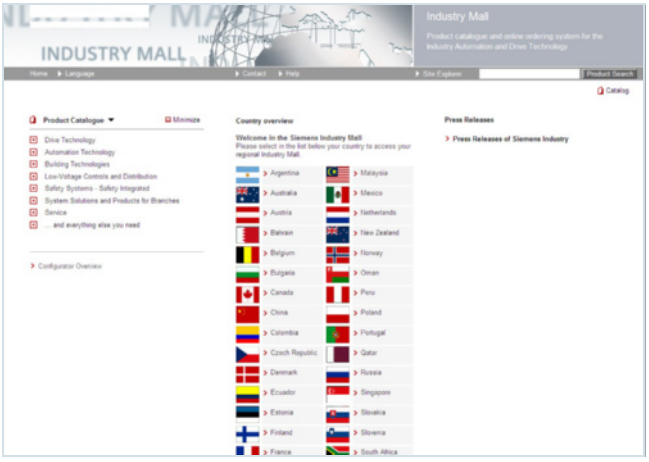
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information about the interactive catalog CA 01 can be found on the Internet at:

www.siemens.com/automation/ca01

or on DVD.

Industry Mall



The catalog and ordering system for Siemens automation and drive technology and low-voltage power distribution and electrical installation products. You can access this site round the clock to find out everything you need to know about our product portfolio – and much more besides. From intelligent tools designed to simplify the configuring of products and systems to software downloads and documentation.

By utilizing our personalized access service, you can make full use of all the Industry Mall functions. Once you are registered, our system provides you with a broad range of tools to help you conduct your business with Siemens efficiently:

The Industry Mall - for online information, product selection and ordering:

- Detailed information including product data, illustrations, certificates and dimensional drawings
- Simple configuring of systems
- Possibility to request individualized quotations
- Availability check
- Online ordering facility
- Order tracking/order overview
- Fast access to relevant training offers and services

You can find the Industry Mall on the Internet at

www.siemens.com/industrymall

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Further documentation

Industry Online Support



Whether you need help with implementing your project or you want to expand your plant or plan a new one: Siemens Industry Online Support will provide you with round-the-clock technical assistance and allow you to access all the product information and data that you need.

Your initial registration is free of charge. Once you are registered, you can utilize the full scope of functions provided and benefit from the useful online functions in mySupport.

You can also discuss any queries or requirements relating to planning and design with our experts in the online forum.

Comprehensive support – at any time whatever your location

- FAQs, sample applications, information about successor products and product news
- Prompt assistance with technical queries
- Discussions and exchange of experience with other users in the forum
- Provision of high-quality product data for your planning programs
- Faster access to information – with helpful filter and folder functions in mySupport
- Automatic notification service to keep you up to date with the latest information about topics of interest to you

To find the link to the Service & Support portal, go to

www.siemens.com/lowvoltage/technical-support

Siemens Industry Online Support App



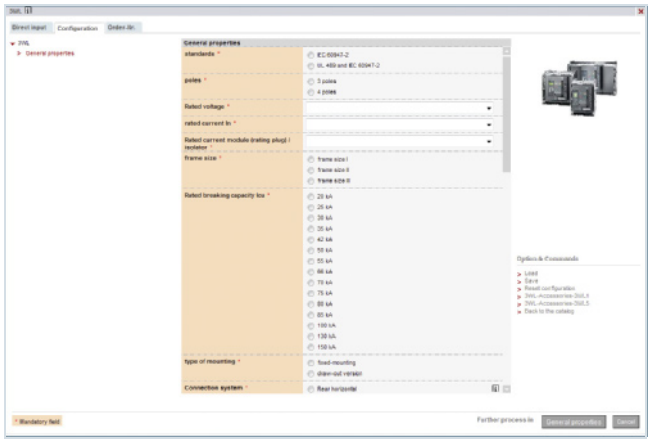
Whether you are out and about or standing right next to one of our installations or machines – if you need product information, you can access it at any time and from any location using the Siemens Industry Online Support App – quick, easy and well organized:

Scan in the product code, for example, and you will receive all the product information you need. You can send your search results conveniently by e-mail to your work place or store them in your Favorites folder for later offline retrieval.

The Siemens Industry Online Support App is available for Android and iOS.

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Product configurator



To help you find the right product for your application, Siemens displays an overview of key product highlights on its web pages. You can also call up detailed sample applications in the Siemens Industry Online Support. Another important tool to help you select the right components are the configurators for products and systems.

By clicking a few options with the mouse, you will find yourself guided by the configurator to a suitable product or system. Simply enter the relevant parameters and select your solution.

You will be supplied with useful product data, such as 3D models, circuit diagrams, certificates and operating instructions, to help you plan the mechanical and electrical systems of the configured solution. You can then export the generated product list to Excel or place it in the shopping cart of the Siemens Industry Mall ready for ordering.

The configurators are available online in the Siemens Industry Mall and offline in catalog CA01. A product selection process could hardly be made any faster or easier.

Find the right product faster using intuitive product selection

- Complete selection of products and systems based on technical characteristics or application requirements
- Simple, intuitive operation
- Option to save the configuration and order lists in a file format of your choice (txt, pdf, xls, csv)
- Direct transfer of the order list into the shopping cart of the Siemens Industry Mall
- Fast access to product data for the selected product and system configuration
- Available in multiple languages for use by customers anywhere in the world

You can find our configurators at the following website:

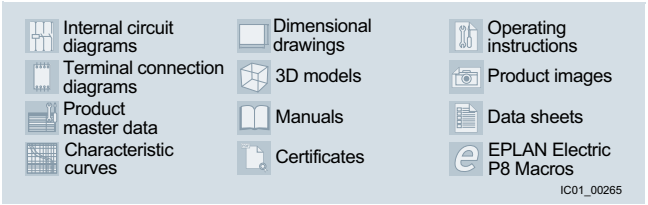
www.siemens.com/lowvoltage/configurators

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Further documentation

CAx Download Manager

The 12 CAx data types are listed below:



www.siemens.com/lowvoltage/cax

The CAx Download Manager can supply you with all the necessary CAx file types for the products of your choice for use in all common CAE and CAD systems. The data contained in the files is continuously updated. The whole process involves only four selection steps and is free of charge. All the files you select will then be compiled into a zip file and made available for you to download for further use.

This service will cut the time it takes you to integrate product data into your CAE and CAD system by up to 80 %.

Siemens makes available up to 12 file types to support your mechanical (CAD) and electrical (CAE) planning processes for you to download at any time of the day.

Universal product data for your CAE and CAD systems reduces data integration time by up to 80 %

- No manual data collection necessary
- Universal manufacturer data for all common CAE and CAD systems
- Standardized documentation is simple to generate
- Choice of different languages for system commissioning anywhere in the world

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Overview

The quality management system of our IC LMV LP Business Unit complies with the international standard EN ISO 9001.

The products and systems listed in this catalog are marketed using a VDE-approved quality management system according to ISO 9001.

VDE certificate

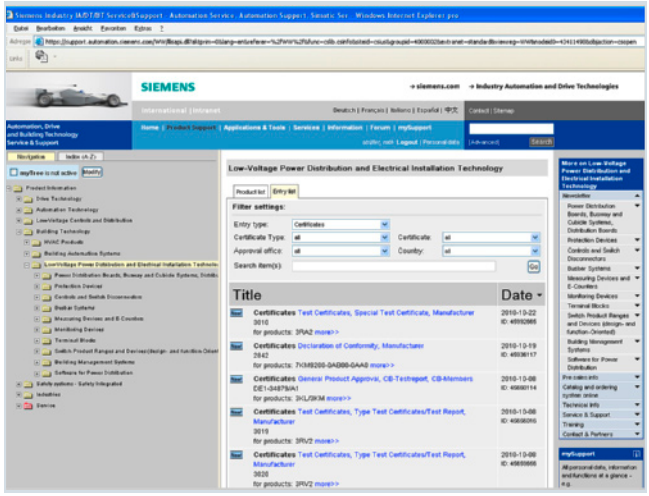
Siemens AG
Infrastructure & Cities Sector
Low and Medium Voltage Division
Low Voltage & Products
Reg. No.: 40017/QM/03.06

Certificates

Information on the certificates available (CE, UL, CSA, FM, shipping authorizations) for low-voltage power distribution and electrical installation products can be found on the Internet at

www.siemens.com/lowvoltage/product-support.

In the Entry List you can use the certificate type (general product approval, explosion protection, test certificates, shipbuilding,...) as a filter criterion.



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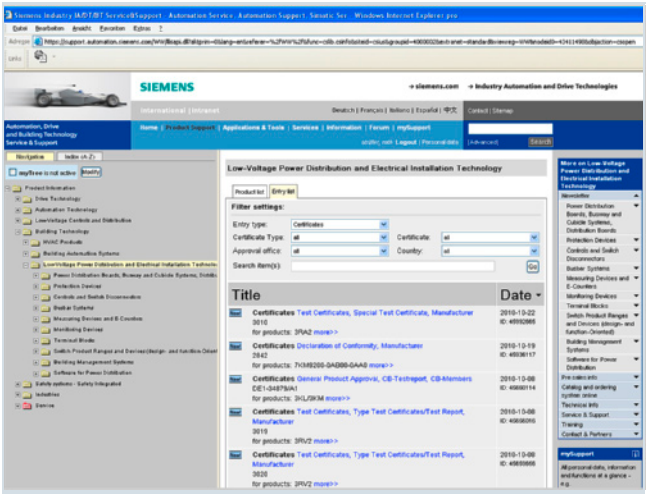
Standards and approvals

Overview

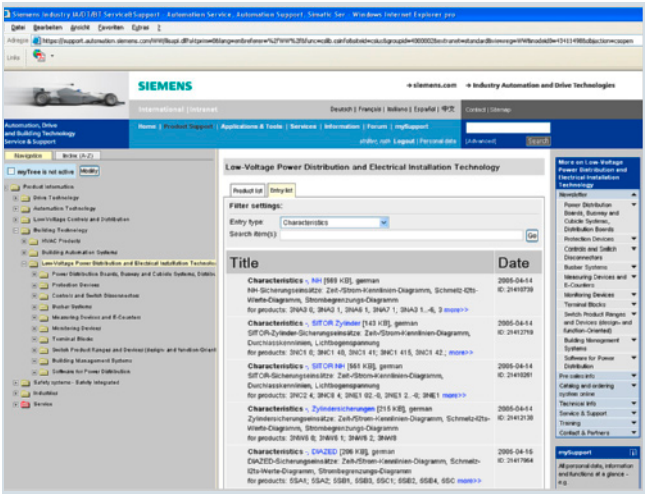
Approvals, test certificates, characteristic curves

An overview of the certificates available for low-voltage power distribution and electrical installation products along with more technical documentation can be consulted daily on the Internet at

www.siemens.com/lowvoltage/product-support



Product support: Approvals / Certificates



Product support: Characteristic curves

Product standards (excerpt)

IEC	EN	DIN VDE	Title
60947-1	60947-1	--	Low-voltage controlgear and switchgear: General rules
60947-2	60947-2	--	• Circuit breakers
60947-3	60947-3	--	• Switches, disconnectors, switch disconnectors and fuse-combination units
60947-4-1	60947-4-1	--	• Contactors and motor starters – Electromechanical contactors and motor starters
60947-4-2	60947-4-2	--	• Contactors and motor starters – Semiconductor motor controllers and starters, soft starters
60947-4-3	60947-4-3	--	• Contactors and motor starters – AC semiconductor controllers and contactors for non-motor loads
60947-5-1	60947-5-1	--	• Control circuit devices and switching elements – Electromechanical control circuit devices
60947-5-2	60947-5-2	--	• Control circuit devices and switching elements – Proximity switches
60947-5-3	60947-5-3	--	• Control circuit devices and switching elements – Requirements for proximity devices with defined behaviour under fault conditions
60947-5-5	60947-5-5	--	• Control circuit devices and switching elements – Electrical emergency stop device with mechanical latching function
60947-5-6	60947-5-6	--	• Control circuit devices and switching elements – DC interface for proximity sensors and switching amplifiers (NAMUR)
60947-5-7	60947-5-7	--	• Control circuit devices and switching elements – Requirements for proximity switches with analog output
60947-5-8	60947-5-8	--	• Control circuit devices and switching elements – Three-position enabling switches
60947-5-9	60947-5-9	--	• Control circuit devices and switching elements – Flow rate switches
60947-6-1	60947-6-1	--	• Multiple function equipment – Transfer switching equipment
60947-6-2	60947-6-2	--	• Multiple function equipment – Control and protective switching devices (or equipment) (CPS)
60947-7-1	60947-7-1	--	• Ancillary equipment – Terminal blocks for copper conductors
60947-7-2	60947-7-2	--	• Ancillary equipment – Protective conductor terminal blocks for copper conductors
60947-7-3	60947-7-3	--	• Ancillary equipment – Safety requirements for fuse terminal blocks
60947-8	60947-8	--	• Control units for built-in thermal protection (PTC) for rotating electrical machines
62026-2	50295	--	• Controller and device interface systems. Actuator-Sensor Interface (AS-i)
60269-1	60269-1	--	Low-voltage fuses – General requirements
60269-4	60269-4	--	Low-voltage fuses – Supplementary requirements for fuse-links for the protection of semiconductor devices
60050-441	--	--	International Electrotechnical Vocabulary. Switchgear, controlgear and fuses
60439-1	60439-1	--	Low-voltage switchgear and controlgear assemblies – Type-tested and partially type-tested assemblies
61439-1	--	--	Low-voltage switchgear and controlgear assemblies – General rules
61439-2	--	--	Low-voltage switchgear and controlgear assemblies – Particular requirements for busbar trunking systems (busways)
--	50274	--	Low-voltage switchgear and controlgear assemblies – Protection against electric shock - Protection against unintentional direct contact with hazardous live parts
61140	61140	--	Protection against electric shock - Common aspects for installation and equipment
60664-1	60664-1	--	Insulation coordination for electrical equipment within low-voltage systems – Principles, requirements and tests

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IEC	EN	DIN VDE	Title
60204-1	60204-1	--	Safety of machinery – Electrical equipment of machines – General requirements
--	50178	--	Electronic equipment for use in power installations
60079-14	60079-14	--	Explosive atmospheres – Part 14: Electrical installations design, selection and erection
60079-2	60079-2	--	Installing electrical apparatus in potentially explosive gas atmospheres (except mining) Explosive atmospheres – Part 2: Equipment protection by pressurized enclosures "p"
61810-1	61810-1	--	Electromechanical elementary relays – Part 1: General requirements
61812-1	61812-1	--	Specified time relays for industrial use – Part 1: Requirements and tests
60999-1	60999-1	--	Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0.2 mm^2 to 35 mm^2
61558-1	61558-1	0570-1[1)]	Safety of power transformers, power supplies, reactors and similar products – - Part 1: General requirements and tests
61558-2-1	61558-2-1	0570-2-1[1)]	- Part 2-1: Particular requirements and tests for separating transformers and power supplies incorporating separating transformers for general applications
61558-2-2	61558-2-2	0570-2-2[1)]	- Part 2-2: Particular requirements and tests for control transformers and power supplies incorporating control transformers
61558-2-4	61558-2-4	0570-2-4[1)]	- Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers
61558-2-6	61558-2-6	0570-2-6[1)]	- Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers
61558-2-9	61558-2-9	0570-2-9[1)]	- Part 2-9: Particular requirements and tests for transformers and power supply units for class III handlamps for tungsten filament lamps
61558-2-12	61558-2-12	0570-2-12[1)]	- Part 2-12: Particular requirements for constant voltage transformers
61558-2-13	61558-2-13	0570-2-13[1)]	- Part 2-13: Particular requirements and tests for auto transformers and power supply units incorporating auto transformers
61558-2-15	61558-2-15	0570-2-15[1)]	- Part 2-15: Particular requirements for isolating transformers for the supply of medical locations
61558-2-20	61558-2-20	0570-2-20[1)]	- Part 2-20: Particular requirements and tests for small reactors
62041	62041	0570-10[1)]	Power transformers, power supply units, reactors and similar products – EMC requirements
60076-11	60076-11	--	Power transformers – Part 11: Dry-type transformers
--	--	0552	Standards for variable-ratio transformers with moving contacts perpendicular to the coiling direction
61000-4-1	61000-4-1	--	Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – Overview of IEC 61000-4 series
61000-6-3	61000-6-3	--	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments
61000-6-4	61000-6-4	--	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
60044-1	60044-1	--	Instrument transformers – Part 1: Current transformers

[1)] VDE classification.

UL	CSA C22.2	ASME	JIS	Title
506	--	--	--	Specialty transformers
508	--	--	--	Industrial control equipment
489	--	--	--	Molded case circuit breakers, molded case switches and circuit breaker enclosures
1012	--	--	--	Power units other than CLASS 2
1561	--	--	--	Dry-type general purpose and power transformers
5085	--	--	--	Low-voltage transformers
60601-1	--	--	--	Medical electrical equipment, Part 1: General requirements for safety (IEC 60601, EN 60601, VDE 0750-1)
1604	--	--	--	Electrical equipment for use in CLASS I and II, Division 2 and CLASS III hazardous (Classified) locations
1059	--	--	--	Terminal blocks
486A-486B	--	--	--	Wire connectors
486E	--	--	--	Equipment wiring terminals for use with aluminum and/or copper conductors
50	--	--	--	Enclosures for electrical equipment. Non-environmental considerations
--	No. 66	--	--	Specialty transformers
--	No. 14	--	--	Industrial control equipment
--	No. 5	--	--	Molded case circuit breakers, molded case switches and circuit breaker enclosures
--	No. 107-1	--	--	General use power supplies
--	--	A17.5 / B 44.1	--	Elevator and escalator electrical equipment
--	--	--	C 8201-4-1	Low-voltage switchgear and controlgear; Contactors and motor-starters

Approval requirements valid in different countries

Siemens low-voltage switchgear and controlgear are designed, manufactured and tested according to the relevant German standards (DIN and VDE), IEC publications and European standards (EN) as well as CSA and UL standards. The standards assigned to the single devices are stated in the relevant parts of this catalog.

As far as is economically viable, the requirements of the various regulations valid in other countries are also taken into account in the design of the equipment.

In some countries (see table below), an approval is required for certain low-voltage switchgear and controlgear components. Depending on the market requirements, these components have been submitted for approval to the authorized testing institutes.

In some cases, CSA for Canada and UL for the USA only approve special switchgear versions. Such special versions are listed separately from the standard versions in the individual parts of this catalog.

For this equipment, partial limitations of the maximum permissible voltages, currents and ratings can be imposed, or special approval and, in some cases, special identification is required.

For use on board ship, the specifications of the marine classification societies must be observed (see table below). In some cases, they require type tests of the components to be approved.

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Standards and approvals

Testing bodies, approval identification and approval requirements

Country	Canada [1]	USA [1]	China
Government-appointed or private, officially recognized testing bodies	CSA UL (USA)	UL	CQC
Approval symbol	c UL c FM c FM US c UL US	UL FM c FM US c UL US	CCC
Approval requirements	+	+	+
Remarks	UL and CSA are authorized to grant approvals according to Canadian or US regulations. Please note: these approvals are frequently not recognized and additional approval often has to be obtained from the national testing authority.		CCC

For more information about UL and CSA on request.

[1] For guide numbers and file numbers for the approvals, visit our website at www.siemens.com/lowvoltage/product-support

CE marking

Manufacturers of products which fall within the scope of EC directives must identify their products, operating instructions or packaging with a CE marking of conformity.

The CE mark confirms that a product fulfills the appropriate basic requirements of all pertinent directives. The mark is a mandatory requirement for putting products into circulation throughout the EC.

All the products in this catalog are in conformance with the EC directives and bear the CE marking of conformity.

- Low-voltage directive
- EMC directive
- Machinery directive
- Ex protection directive

The CE mark of conformity: CE.

Special standards in different countries

CCC approval

A003617

Since August 1, 2003, CCC approval is required for many products that are marketed in China.

GOST approval for Russia

A GOST approval is required for all products that are to be sold in Russia. The GOST mark has been obligatory on the packaging of all devices since mid-1998.

All devices delivered to any part of the Russian Federation must have this customs certification.

Type overview of approved devices

	Approvals								
	Canada		USA			China	Australia	Russia	
	CSA	c FM US	UL	c UL US	FM	CCC	C-Tick	GOST	TR
3VT molded case circui breakers up to 1600 A (MCCB)									
IEC version									
3VT17..-.....-0AA0	--	--	--	--	--	+	--	+	+
3VT27..-.....-0AA0	--	--	--	--	--	+	--	+	+
3VT37..-.....-0AA0	--	--	--	--	--	+	--	+	+
3VT47..-.....-0AA0	--	--	--	--	--	+	--	+	+
3VT57..-.....-0AA0	--	--	--	--	--	+	--	+	+
3VT9100-.... (Switches)	--	--	--	--	--	+	--	+	+
3VT9300-.... (Switches)	--	--	--	--	--	--	--	+	+
3VT9500-.... (Switches)	--	--	--	--	--	--	--	+	+
3VT9...-.... (Other accessories)	--	--	--	--	--	--	--	+	+

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	Marine classifications							
	Germany	Great Britain	France	Norway	CIS	Italy	Poland	USA
	GL	LRS	BV	DNV	RMRS	RINA	PRS	ABS
3VT molded case circui breakers up to 1600 A (MCCB)								
IEC version								
3VT17..-.....-0AA0	--	--	--	--	--	--	--	--
3VT27..-.....-0AA0	--	--	--	--	--	--	--	--
3VT37..-.....-0AA0	--	--	--	--	--	--	--	--
3VT47..-.....-0AA0	--	--	--	--	--	--	--	--
3VT57..-.....-0AA0	--	--	--	--	--	--	--	--
3VT9100-.... (Switches)	--	--	--	--	--	--	--	--
3VT9300-.... (Switches)	--	--	--	--	--	--	--	--
3VT9500-.... (Switches)	--	--	--	--	--	--	--	--
3VT9...-.... (Other accessories)	--	--	--	--	--	--	--	--

+ Standard version approved.

-- Not yet submitted for approval.

More information

You can find more information about standards and approvals at www.siemens.com/lowvoltage/product-support

If you have any question concerning UL/CSA approvals, contact Technical Support.

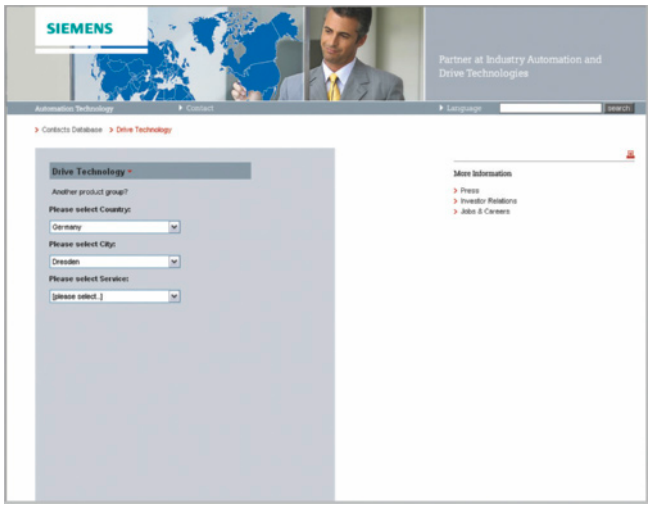
More detailed information is available at www.siemens.com/lowvoltage/technical-support

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Siemens contacts

Contact partners at Siemens Industry







At Siemens Industry, more than 85 000 people are resolutely pursuing the same goal:
long-term improvement of your competitive ability.
We are committed to this goal. Thanks to our dedication, we are continually setting new standards. In all industries – worldwide.

At your service, locally, around the globe: Partners for consulting, sales, training, service, support, spare parts ...
on the entire Siemens Industry range.

Your personal contact can be found in our Contact Database at

www.siemens.com/automation/partner.

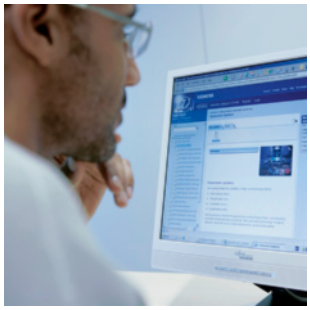
You start by selecting a

- Product group,
- Country,
- City,
- Service.

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The unmatched complete service for the entire life cycle

Online support



Our comprehensive online information platform covers every aspect of our Service & Support and is available whenever, wherever.

More detailed information is available at
www.siemens.com/lowvoltage/support

Technical support



The competent consulting service for technical issues with a broad range of customer-oriented services for all our products and systems.

More detailed information is available at
www.siemens.com/lowvoltage/technical-support

Training



Extend your lead – with practice-related know-how straight from the manufacturer.

More detailed information is available at
www.siemens.com/lowvoltage/training

Field Service



Siemens Field Service offers support with all aspects of commissioning and maintenance – so that the availability of your machines and plants is assured whatever the case.

More detailed information is available at
www.siemens.com/lowvoltage/technical-support

Spare parts



Plants and systems in all industries worldwide are expected to meet ever higher levels of availability. We can help you rule out unexpected stoppages: with a global network and optimum logistics chains.

More detailed information is available at
www.siemens.com/lowvoltage/technical-support

Specification texts

You can obtain qualified, free support to help you produce specifications for technically equipping non-residential and industrial buildings at
www.siemens.com/specifications

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Comprehensive support from A to Z

Overview

Product information	
Website	Fast and targeted information on low-voltage power distribution: www.siemens.com/lowvoltage
Newsletter	Always up to date about our trend-setting products and systems: www.siemens.com/lowvoltage/newsletter
Product information/product & system selection	
Information and Download Center	Current catalogs, customer magazines, brochures, demo software and promotion packages: www.siemens.com/lowvoltage/infomaterial
Industry Mall	Comprehensive information and order platform for the Siemens Industry Basket: www.siemens.com/lowvoltage/mall
Product & system engineering	
SIMARIS software tools	Support in planning and configuring the electrical power distribution: www.siemens.com/simaris
SIMARIS configuration planning and configuring software	Assists in generating offers and configuring ALPHA distribution boards up to the low-voltage SIVACON S4 switchboards www.siemens.com/scfb
Product documentation	
Service & Support portal	Comprehensive technical information - from planning to configuration and operation: www.siemens.com/lowvoltage/product-support
Product configurator	Complete selection of products and systems based on technical characteristics or application requirements www.siemens.com/lowvoltage/configurators
CAx Download Manager	Collation of CAx data types for standard CAE and CAD systems: www.siemens.com/lowvoltage/cax
My Documentation Manager	Compilation of project-specific documentation: www.siemens.com/lowvoltage/mdm
Image database	Collection of product photographs and graphics, such as dimensional drawings and internal circuit diagrams: www.siemens.com/lowvoltage/picturedb
Product training	
SITRAIN Portal	Comprehensive training program about our products, systems and engineering tools: www.siemens.com/lowvoltage/training
Product hotline	
Technical Support	Support in all technical queries about our products: E-mail: support.automation@siemens.com www.siemens.com/lowvoltage/technical-support

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Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of license (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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Software Licenses

Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

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3VT1701-2EC46-0AA0	1/4	N	N
3VT1701-2EJ46-0AA0	1/4	N	N
3VT1702-2DC36-0AA0	1/4	N	N
3VT1702-2DM36-0AA0	1/5	N	N
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3VT2725-3AA36-0AA0	2/3	N	N
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3VT3763-3AA36-0AA0	3/3	N	N
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3VT3763-3AA56-0AA0	3/3	N	N
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3VT4710-3AA30-0AA0	4/3	N	N
3VT4710-3AA38-0AA0	4/3	N	N
3VT5			
3VT5716-3AA30-0AA0	5/3	N	N

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3VT5716-3AA38-0AA0	5/3	N	N
3VT91			
3VT9100-1SB00	1/6	EAR99	N
3VT9100-1SC00	1/6	N	N
3VT9100-1SD00	1/6	N	N
3VT9100-1SE00	1/6	N	N
3VT9100-1UC00	1/6	N	N
3VT9100-1UD00	1/6	N	N
3VT9100-1UE00	1/6	N	N
3VT9100-1UU00	1/6	N	N
3VT9100-1UV00	1/6	N	N
3VT9100-2AB10	1/6	N	N
3VT9100-2AB20	1/6	N	N
3VT9100-2AH10	1/6	N	N
3VT9100-2AH20	1/6	N	N
3VT9100-3HA10	1/7	N	N
3VT9100-3HA20	1/7	N	N
3VT9100-3HB20	1/7	N	N
3VT9100-3HC10	1/7	N	N
3VT9100-3HD10	1/7	N	N
3VT9100-3HE10	1/7	N	N
3VT9100-3HE20	1/7	N	N
3VT9100-3HF20	1/7	N	N
3VT9100-3HG10	1/7	N	N
3VT9100-3HG20	1/7	N	N
3VT9100-3HH10	1/7	N	N
3VT9100-3HH20	1/7	N	N
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3VT9100-3HJ20	1/7	N	N
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3VT9100-3MA00	1/8	EAR99	N
3VT9100-3MB00	1/8	EAR99	N
3VT9100-3MD00	1/8	EAR99	N
3VT9100-3ME00	1/8	EAR99	N
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3VT9100-4PP30	1/11	N	N
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3VT9100-8LB00	1/8	N	N
3VT9115-5GY31	1/9	N	N
3VT9115-5GY41	1/9	N	N
3VT9116-5GA40	1/9	N	N
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3VT9200-3HB20	2/6	N	N
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3VT9200-3HD10	2/6	N	N
3VT9200-3HL00	2/10	N	N
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3VT9200-3MJ10	2/7	N	N
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3VT9210-6AS00	2/4	N	N
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3VT9225-6AB00	2/4	N	N
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3VT9225-6AS00	2/4	N	N
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3VT9225-6DT00	2/4	N	N
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3VT9300-1SB00	2/5	EAR99	N
3VT9300-1SC00	2/5, 3/5	N	N
3VT9300-1SD00	2/5, 3/5	N	N
3VT9300-1SE00	2/5, 3/5	N	N
3VT9300-1UC00	2/5, 3/5	N	N
3VT9300-1UC10	2/5, 3/5	N	N
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3VT9300-3HA20	3/6	N	N
3VT9300-3HB20	3/6	N	N
3VT9300-3HC10	3/6	N	N
3VT9300-3HD10	3/6	N	N
3VT9300-3HE10	2/6, 3/6	N	N
3VT9300-3HE20	2/6, 3/6	N	N
3VT9300-3HF20	2/6, 3/6	N	N
3VT9300-3HG10	2/6, 3/6	N	N
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3VT9300-3MF20	2/10, 3/10	N	N
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3VT9300-3MJ10	3/7	N	N
3VT9300-3ML00	3/7	N	N
3VT9300-3ML10	3/7	N	N
3VT9300-3MN00	3/7	N	N
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3VT9300-3MQ00	3/7	N	N
3VT9300-3MQ10	3/7	N	N

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3VT9300-4PA40	3/8	N	N
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3VT9300-4RC00	3/9	N	N
3VT9300-4RC30	3/9	N	N
3VT9300-4TA30	3/9	N	N
3VT9300-4TC00	3/9	N	N
3VT9300-4TC30	3/9	N	N
3VT9300-4TN30	3/9	N	N
3VT9300-4WA30	3/8	N	N
3VT9300-4WA40	3/8	N	N
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3VT9300-4WL00	3/10	N	N
3VT9300-4WN00	3/10	N	N
3VT9300-8CB30	3/10	N	N
3VT9300-8CB40	3/10	N	N
3VT9300-8CE00	2/10, 3/10	N	N
3VT9300-8CE30	2/10, 3/10	N	N
3VT9300-8LA00	2/7, 3/7	N	N
3VT9300-8LB00	2/7, 3/7	N	N
3VT9300-8LC10	3/7	N	N
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3VT9315-4TF00	3/9	N	N
3VT9315-4TF30	3/9	N	N
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3VT9340-6AS00	3/4	N	N
3VT9340-6BC00	3/4	N	N
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3VT9363-6AB00	3/4	N	N
3VT9363-6AC00	3/4	N	N
3VT9363-6AP00	3/4	N	N
3VT9363-6AS00	3/4	N	N
3VT9363-6BC00	3/4	N	N
3VT9363-6DT00	3/4	N	N
3VT94			
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3VT9431-6AC00	4/4	N	N
3VT9431-6AD00	4/4	N	N
3VT9431-6AP00	4/4	N	N
3VT9463-6AC00	4/4	N	N
3VT9463-6AD00	4/4	N	N
3VT9463-6AP00	4/4	N	N
3VT9480-6AC00	4/4	N	N
3VT9480-6AD00	4/4	N	N
3VT9480-6AP00	4/4	N	N
3VT95			
3VT9500-1SF00	4/4, 5/4	N	N
3VT9500-1SG00	4/4, 5/4	N	N
3VT9500-1SH00	4/4, 5/4	N	N
3VT9500-1SJ00	4/4, 5/4	N	N
3VT9500-1SK00	4/4, 5/4	N	N
3VT9500-1SL00	4/4, 5/4	N	N
3VT9500-1UF00	4/4, 5/4	N	N
3VT9500-1UG00	4/4, 5/4	N	N
3VT9500-1UH00	4/4, 5/4	N	N
3VT9500-1UJ00	4/4, 5/4	N	N
3VT9500-1UK00	4/4, 5/4	N	N
3VT9500-1UL00	4/4, 5/4	N	N
3VT9500-2AF10	4/4, 5/4	N	N
3VT9500-2AF20	4/4, 5/4	N	N
3VT9500-3HA10	4/5, 5/5	N	N
3VT9500-3HE10	4/5, 5/5	N	N
3VT9500-3HF10	4/5, 5/5	N	N
3VT9500-3HG10	4/5, 5/5	N	N
3VT9500-3HG20	4/5, 5/5	N	N
3VT9500-3HJ10	4/5, 5/5	N	N
3VT9500-3HL00	4/7, 5/7	N	N
3VT9500-3MF20	4/7, 5/7	N	N
3VT9500-3MN00	4/5, 5/5	N	N
3VT9500-3MN10	4/5, 5/5	N	N
3VT9500-3MQ00	4/5, 5/5	N	N
3VT9500-3MQ10	4/5, 5/5	N	N
3VT9500-4EF30	4/6, 5/6	N	N
3VT9500-4PL00	4/7, 5/7	N	N
3VT9500-4RC30	4/6, 5/6	N	N
3VT9500-4RD30	4/6, 5/6	N	N
3VT9500-4SA40	4/7, 5/7	N	N
3VT9500-4WA30	4/6, 5/6	N	N
3VT9500-4WL00	4/7, 5/7	N	N
3VT9500-6AE00	4/4, 5/4	N	N
3VT9500-8BN00	4/7, 5/7	N	N
3VT9500-8CC30	4/7, 5/7	N	N
3VT9500-8CD30	4/7, 5/7	N	N
3VT9500-8CE30	4/7, 5/7	N	N
3VT9500-8CF30	4/7, 5/7	N	N
3VT9500-8CG30	4/7, 5/7	N	N
3VT9500-8CH30	4/7, 5/7	a.Anfr.	a.Anfr.
3VT9500-8LA00	4/5, 5/5	N	N
3VT9500-8LC10	4/5, 5/5	N	N
3VT9500-8LC30	4/5, 5/5	N	N
3VT9500-8LC40	4/5, 5/5	N	N
3VT9510-6AC00	5/4	N	N
3VT9510-6AD00	5/4	N	N
3VT9510-6AP00	5/4	N	N
3VT9512-6AC00	5/4	N	N
3VT9512-6AD00	5/4	N	N
3VT9512-6AP00	5/4	N	N
3VT9516-6AC00	5/4	N	N
3VT9516-6AD00	5/4	N	N
3VT9516-6AP00	5/4	N	N
3VT9516-6DT00	5/4	N	N
3VT9524-4TF30	4/6, 5/6	N	N
3VT9524-4TG30	4/6, 5/6	N	N
3VT9532-4TF30	4/6, 5/6	N	N
3VT9533-4TF30	4/6, 5/6	N	N
3VT9534-4TF30	4/6, 5/6	N	N
3VT9563-6AC00	5/4	N	N
3VT9563-6AD00	5/4	N	N
3VT9563-6AP00	5/4	N	N

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GAMMA Building Control	ET G1
Drive Systems	
SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
ROBICON Perfect Harmony Medium-Voltage Air-Cooled Drives Germany Edition	D 15.1
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SINAMICS DCM Converter Units	D 23.1
SINAMICS DCM Cabinet	D 23.2
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Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
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