3VT Molded Case Circuit Breakers up to 1600 A

SENTRON Protection, Switching, Measuring and Monitoring Devices

Catalog LV 36 · 2011

Answers for infrastructure.

SIEMENS

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Contents

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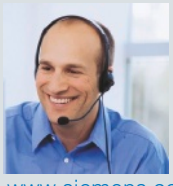

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3VT Molded Case Circuit Breakers up to 1600 A

SENTRON Protection, Switching, Measuring and Monitoring Devices

Catalog LV 36 · 2011

The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001. The certificate is recognized by all IQNet countries.

Supersedes:
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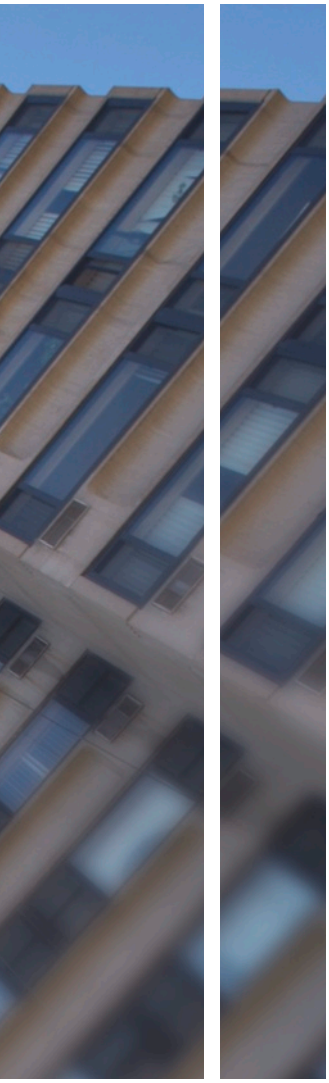

Answers for infrastructure

Siemens Industry meets the great challenges of our time head on. With solutions for technical infrastructure in industrial and non-residential buildings, residential buildings and public facilities, Siemens ensures enhanced comfort and energy efficiency in buildings, as well as the protection and safety of persons, property and business processes. As a longstanding and professional partner with all-round expertise in the industry sector, we offer tailored solutions that generate sustainable added value for our customers.

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with integrated building solutions

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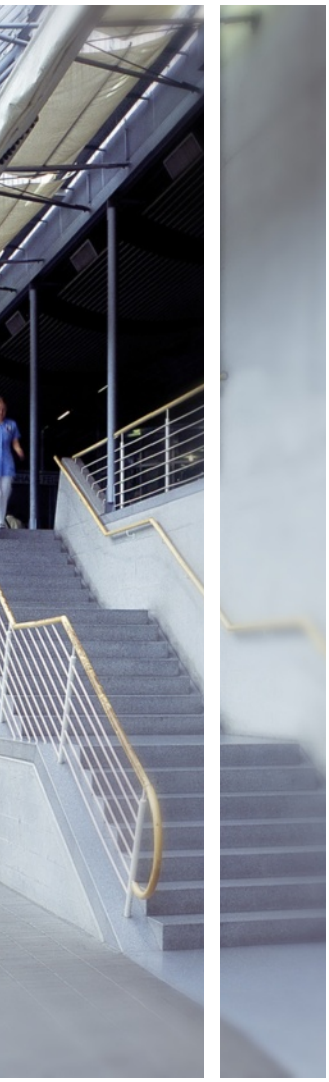
- *Low-voltage power distribution*
  Switchboards, busbar trunking systems, distribution boards, circuit breakers, switch disconnectors, low-voltage circuit protection, building management systems, switches and socket outlets
- *Building automation*
  Heating, ventilation and air-conditioning controls, overall energy solutions offering guaranteed savings
- *Safety solutions*
  Access control, video monitoring, burglar protection, alarm control centers, operation of alarm control centers
- *Fire protection*
  Fire alarms, alerting, evacuation, extinction and complete fire protection solutions

Take a closer look at all the options available from Siemens. Check out the opportunities our products provide and discover how we can help you to sustainably enhance your competitive edge.

The right product for every need

Our portfolio comprises switchboards, busbar trunking systems, distribution boards, measuring devices, circuit breakers and switch disconnectors, circuit protection devices, building management systems, switches and socket outlets. The consistency, modularity and intelligence of our components and systems offer you numerous advantages – throughout their service life and wherever you are in the world. We deliver trendsetting designs and innovative functions in unique quality, developed in accordance with the applicable international standards.



Consistent, safe and intelligent power distribution

Whether in industrial plants or in buildings: Every technical system depends on a reliable supply of electric power. Even a short power failure may have serious consequences. For this reason, you need products and systems which cope with every eventuality and always keep you on the safe side. Our portfolio is the broadest world-wide, covering everything from switchboards to socket outlets.

We will be glad to provide you with extensive support from the initial information to the operation. Convince yourself of the possibilities we offer you.

Making efficient use of energy

The consistent concept behind the communication-capable components of our low-voltage power distribution range forms a sound basis for the measurement, indication, evaluation and optimization of power flows, thus enabling professional energy management for more cost-effectiveness. At the same time our intelligent building management systems, e.g. for lighting and heating, help to remarkably reduce power consumption.

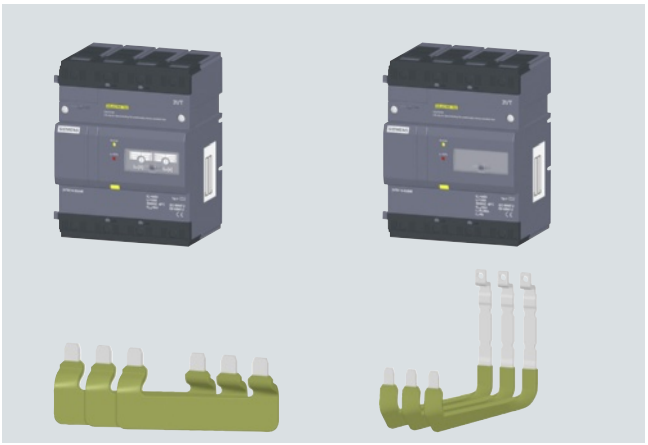
Excellent support

As a competent and reliable partner we offer you comprehensive support – from initial information, planning, configuration and ordering through to commissioning, operation and technical support. We know the requirements to be met in your area of work and day-to-day business. On this basis we provide you with the type of flexible and efficient help that allows you to concentrate fully on your customers and their needs.

Top quality standards world-wide

Opting for us puts you on the safe side: Whether it is our workmanship, the materials we use or the operability and functionality of our products – we guarantee top standards of quality world-wide.

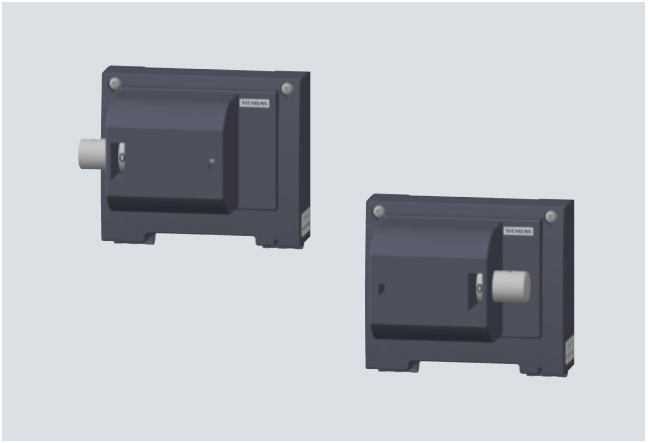
New developments



Residual current devices and accessories → See page 1/9

RCD modules

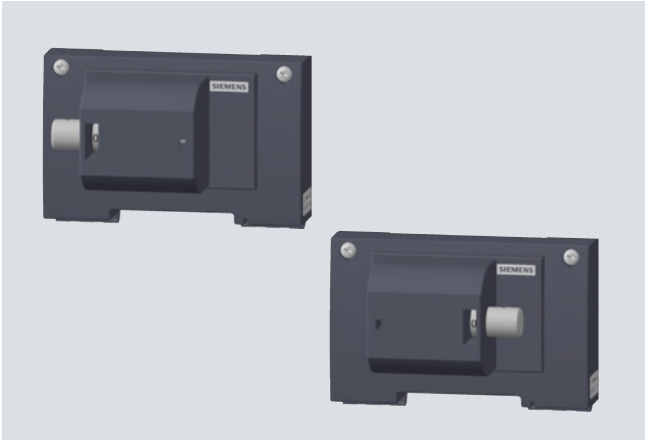
A residual current module (RCD module) disconnects a circuit whenever it detects that the electric current is not balanced between the energized conductor and the return neutral conductor.



Rotary operating mechanisms for 3VT2 → See page 2/6

Rotary operating mechanisms for operation through side wall of cabinet

For lateral operation of 3VT2 molded case circuit breakers up to 250 A. Available for right and left side mounting.



Rotary operating mechanisms for 3VT3 → See page 3/6

Rotary operating mechanisms for operation through side wall of cabinet

For lateral operation of 3VT3 molded case circuit breakers up to 630 A. Available for right and left side mounting.

Our added extra

Build on a sound basis

With our basic and advanced courses, you can lay the foundations for your business success. Expert lecturers provide you with the necessary theoretical and practical knowledge in our modern training center in Regensburg. Dynamic and easy-to-understand training with multimedia teaching equipment and many practical examples. Available in German and English. If required, we also provide training in-house or in one of our local Siemens branches.

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For details of our current range of courses, please visit our website at:
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We can help you with all your requirements: contact us if you have any queries regarding our products, the planning of your electrical installation or how to obtain technical documentation.

Just give us a call:
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- Fax: +49 (911) 895 7223

www.siemens.com/lowvoltage/technical-support

Tender specification texts

For your support, we offer you a comprehensive range of specification texts:
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Visit us on the Internet. You will find comprehensive information on our products – SIVACON switchboards, busbar trunking systems, ALPHA distribution boards, SENTRON circuit breakers and switch disconnectors, BETA low-voltage circuit protection, GAMMA building management systems and DELTA switches and socket outlets – at:
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BTLV Zusatzangebot En 11.11.2010

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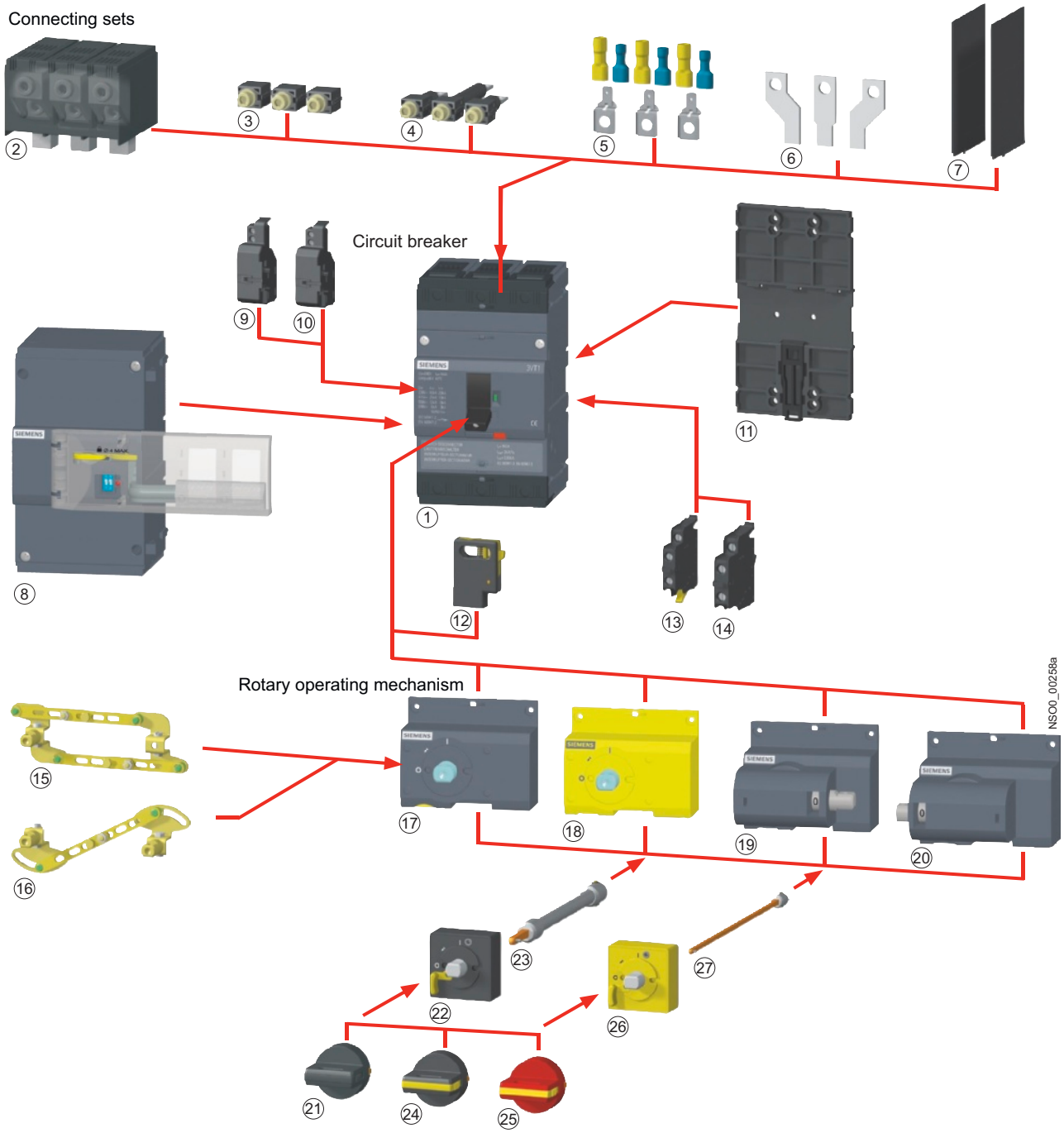
Also available are FAQs, software downloads, certificates and technical data sheets as well as our training programs. In the image database you will find, depending on the product, 2D/3D graphics, dimension drawings and exploded drawings, characteristic curves or circuit diagrams which you can download.

Convinced? We look forward to your visit!

3VT1 Molded Case Circuit Breakers up to 160 A

Overview

Versions and accessories



1 3VT circuit breaker
2 Circular conductor terminal
3 Front connection
4 Rear connection
5 Auxiliary conductor terminal
6 Front connecting bus with increased pole spacing
7 Insulating barriers
8 Lateral rotary operating mechanism
9 Shunt trip unit
10 Undervoltage trip unit
11 Adapter to install on 35 mm DIN rail
12 Lockingtype lever
13 Signal switch
14 Auxiliary switch
15 Mechanical parallel switching
16 Mechanical interlocking
17 Front manual operating mechanism
18 Front manual operating mechanism
19 Lateral manual operating mechanism (right)
20 Lateral manual operating mechanism (left)
21 Non lockable knob
22 Coupling driver
23 Telescopic extension shaft
24 Lockable knob
25 Lockable knob
26 Coupling driver
27 Extension shaft

Overview

Circuit breaker

Circuit breaker, 3-/4-pole versions

The 3- or 4-pole versions of the circuit breakers include:
- 2 connecting sets 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 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 overload trip unit „L“ I_r	DT	Order No.	PS*	Weight per PU approx.
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	160	B	**3VT1 704-2DA36-0AA0**	1 unit	1.043
50	200	B	**3VT1 705-2DA36-0AA0**	1 unit	1.043
63	252	B	**3VT1 706-2DA36-0AA0**	1 unit	1.062
80	320	B	**3VT1 708-2DA36-0AA0**	1 unit	1.062
100	400	B	**3VT1 710-2DA36-0AA0**	1 unit	1.047
125	500	B	**3VT1 712-2DA36-0AA0**	1 unit	1.047
160	640	B	**3VT1 716-2DA36-0AA0**	1 unit	1.074
TM, LI function, 3-pole + N, for unprotected N-conductor					
• with permanently fixed thermal overload trip unit, fixed short-circuit trip unit					
40	160	B	**3VT1 704-2EA46-0AA0**	1 unit	1.336
50	200	B	**3VT1 705-2EA46-0AA0**	1 unit	1.336
63	252	B	**3VT1 706-2EA46-0AA0**	1 unit	1.336
80	320	B	**3VT1 708-2EA46-0AA0**	1 unit	1.336
100	400	B	**3VT1 710-2EA46-0AA0**	1 unit	1.336
125	500	B	**3VT1 712-2EA46-0AA0**	1 unit	1.336
160	640	B	**3VT1 716-2EA46-0AA0**	1 unit	1.336
TM, LI function, 4-pole, for protected N-conductor					
• with permanently fixed overload trip unit, fixed short-circuit trip unit					
40	160	B	**3VT1 704-2EH46-0AA0**	1 unit	1.336
50	200	B	**3VT1 705-2EH46-0AA0**	1 unit	1.336
63	252	B	**3VT1 706-2EH46-0AA0**	1 unit	1.336
80	320	B	**3VT1 708-2EH46-0AA0**	1 unit	1.336
100	400	B	**3VT1 710-2EH46-0AA0**	1 unit	1.336
125	500	B	**3VT1 712-2EH46-0AA0**	1 unit	1.336
160	640	B	**3VT1 716-2EH46-0AA0**	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] Thermal-magnetic trip unit

* You can order this quantity or a multiple thereof.

Rated current I_n	Current setting of the inverse-time delayed overload trip unit „L“ I_r	DT	Order No.	PS*	Weight per PU approx.
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	160 ... 240	B	**3VT1 701-2DC36-0AA0**	1 unit	1.048
20	200 ... 300	B	**3VT1 702-2DC36-0AA0**	1 unit	1.048
25	250 ... 375	B	**3VT1 792-2DC36-0AA0**	1 unit	1.043
32	160 ... 320	B	**3VT1 703-2DC36-0AA0**	1 unit	1.047
40	200 ... 400	B	**3VT1 704-2DC36-0AA0**	1 unit	1.043
50	250 ... 500	B	**3VT1 705-2DC36-0AA0**	1 unit	1.043
63	315 ... 630	B	**3VT1 706-2DC36-0AA0**	1 unit	1.062
80	400 ... 800	B	**3VT1 708-2DC36-0AA0**	1 unit	1.062
100	500 ... 1000	B	**3VT1 710-2DC36-0AA0**	1 unit	1.047
125	625 ... 1250	B	**3VT1 712-2DC36-0AA0**	1 unit	1.047
160	800 ... 1600	B	**3VT1 716-2DC36-0AA0**	1 unit	1.074
TM, LI function 3-pole +N, for unprotected N-conductor					
• with adjustable thermal overload trip unit, adjustable short-circuit trip unit					
16	160 ... 240	B	**3VT1 701-2EC46-0AA0**	1 unit	1.336
20	200 ... 300	B	**3VT1 702-2EC46-0AA0**	1 unit	1.336
25	250 ... 375	B	**3VT1 792-2EC46-0AA0**	1 unit	1.336
32	160 ... 320	B	**3VT1 703-2EC46-0AA0**	1 unit	1.336
40	200 ... 400	B	**3VT1 704-2EC46-0AA0**	1 unit	1.336
50	250 ... 500	B	**3VT1 705-2EC46-0AA0**	1 unit	1.336
63	315 ... 630	B	**3VT1 706-2EC46-0AA0**	1 unit	1.336
80	400 ... 800	B	**3VT1 708-2EC46-0AA0**	1 unit	1.336
100	500 ... 1000	B	**3VT1 710-2EC46-0AA0**	1 unit	1.336
125	625 ... 1250	B	**3VT1 712-2EC46-0AA0**	1 unit	1.336
160	800 ... 1600	B	**3VT1 716-2EC46-0AA0**	1 unit	1.336
TM, LIN function 4 pole, for protected N-conductor					
• with adjustable thermal overload trip unit, adjustable short-circuit trip unit					
16	160 ... 240	B	**3VT1 701-2EJ46-0AA0**	1 unit	1.336
20	200 ... 300	B	**3VT1 702-2EJ46-0AA0**	1 unit	1.336
25	250 ... 375	B	**3VT1 792-2EJ46-0AA0**	1 unit	1.336
32	160 ... 320	B	**3VT1 703-2EJ46-0AA0**	1 unit	1.336
40	200 ... 400	B	**3VT1 704-2EJ46-0AA0**	1 unit	1.336
50	250 ... 500	B	**3VT1 705-2EJ46-0AA0**	1 unit	1.336
63	315 ... 630	B	**3VT1 706-2EJ46-0AA0**	1 unit	1.336
80	400 ... 800	B	**3VT1 708-2EJ46-0AA0**	1 unit	1.380
100	500 ... 1000	B	**3VT1 710-2EJ46-0AA0**	1 unit	1.336
125	625 ... 1250	B	**3VT1 712-2EJ46-0AA0**	1 unit	1.336
160	800 ... 1600	B	**3VT1 716-2EJ46-0AA0**	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.

	Rated current I_n	Current setting of the short-circuit trip unit „I“ I_i	DT	Order No.	PS*	Weight per PU approx.
	A	A				kg
Circuit breakers, for short-circuit protection only (tripping characteristic N [1],)						
	TM, I function, 3-pole					
	• without overload trip unit, with adjustable short-circuit trip unit					
	32	160 ... 320	B	**3VT1 703-2DB36-0AA0**	1 unit	1.043
	40	200 ... 400	B	**3VT1 704-2DB36-0AA0**	1 unit	1.043
	50	250 ... 500	B	**3VT1 705-2DB36-0AA0**	1 unit	1.048
	63	315 ... 630	B	**3VT1 706-2DB36-0AA0**	1 unit	1.048
	80	400 ... 800	B	**3VT1 708-2DB36-0AA0**	1 unit	1.048
	100	500 ... 1000	B	**3VT1 710-2DB36-0AA0**	1 unit	1.050
	125	625 ... 1250	B	**3VT1 712-2DB36-0AA0**	1 unit	1.059
	160	800 ... 1600	B	**3VT1 716-2DB36-0AA0**	1 unit	1.048
	TM, I function, 3-pole +N, for unprotected conductors					
	• without overload trip unit, with adjustable short-circuit trip unit					
	32	160 ... 320	B	**3VT1 703-2EB46-0AA0**	1 unit	1.336
	40	200 ... 400	B	**3VT1 704-2EB46-0AA0**	1 unit	1.336
	50	250 ... 500	B	**3VT1 705-2EB46-0AA0**	1 unit	1.336
	63	315 ... 630	B	**3VT1 706-2EB46-0AA0**	1 unit	1.336
	80	400 ... 800	B	**3VT1 708-2EB46-0AA0**	1 unit	1.336
	100	500 ... 1000	B	**3VT1 710-2EB46-0AA0**	1 unit	1.336
	125	625 ... 1250	B	**3VT1 712-2EB46-0AA0**	1 unit	1.336
	160	800 ... 1600	B	**3VT1 716-2EB46-0AA0**	1 unit	1.336
Circuit breakers with tripping characteristic M [2], for starter combinations						
	TM, LI function, 3-pole					
	• with adjustable thermal overload trip units, fixed short-circuit trip units					
	16	12.5 ... 16	B	**3VT1 701-2DM36-0AA0**	1 unit	1.048
	20	16 ... 20	B	**3VT1 702-2DM36-0AA0**	1 unit	1.048
	25	20 ... 25	B	**3VT1 792-2DM36-0AA0**	1 unit	1.043
	32	25 ... 32	B	**3VT1 703-2DM36-0AA0**	1 unit	1.043
	40	32 ... 40	B	**3VT1 704-2DM36-0AA0**	1 unit	1.043
	50	40 ... 50	B	**3VT1 705-2DM36-0AA0**	1 unit	1.043
	63	50 ... 63	B	**3VT1 706-2DM36-0AA0**	1 unit	1.062
	80	63 ... 80	B	**3VT1 708-2DM36-0AA0**	1 unit	1.059
	100	80 ... 100	B	**3VT1 710-2DM36-0AA0**	1 unit	1.047
Switch disconnectors						
	Switch disconnector, without overload protection, without short circuit protection					
	160	3-pole	B	**3VT1 716-2DE36-0AA0**	1 unit	1.043
	160	4-pole	B	**3VT1 716-2EE46-0AA0**	1 unit	1.336

[1] See page 1/16 (3-pole)
[2] See pages 1/16 and 1/20

* You can order this quantity or a multiple thereof.

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	Order No.	PS*	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	B	**3VT9 100-2AB10**	1 unit	0.010
	• AC/DC 5 ... 60 V	B	**3VT9 100-2AB20**	1 unit	0.010
	**Alarm switches for signalling the tripping of the circuit breaker by an trip unit**				
	• AC/DC 60 ... 250 V	B	**3VT9 100-2AH10**	1 unit	0.010
	• AC/DC 5 ... 60 V	B	**3VT9 100-2AH20**	1 unit	0.010
Shunt trip units					
	**Shunt trip units can trip the circuit breaker from a remote location.**				
	• AC/DC 24, 48 V	B	**3VT9 100-1SC00**	1 unit	0.050
	• AC 110, 230 V/DC 110, 220 V	B	**3VT9 100-1SD00**	1 unit	0.050
	• AC 230, 400 V/DC 220 V	B	**3VT9 100-1SE00**	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	B	**3VT9 100-1UC00**	1 unit	0.050
	• AC 110, 230 V	B	**3VT9 100-1UD00**	1 unit	0.050
	• AC 230, 400 V	B	**3VT9 100-1UE00**	1 unit	0.050
	• DC 24, 48 V	B	**3VT9 100-1UU00**	1 unit	0.050
	• DC 110, 220 V	B	**3VT9 100-1UV00**	1 unit	0.050

* You can order this quantity or a multiple thereof.

Overview

Rotary operating mechanisms

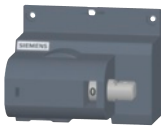
The rotary operating mechanism must be combined from the following parts:

- For rotary operation of the circuit breaker:
  - 3VT9 100-3HE../HF.. knob
- For operation through the switchgear cabinet door:
  - 3VT9 100-3HE../HF.. knob
  - 3VT9 100-3HG../HH.. coupling driver
  - 3VT9 100-3HJ.. extension shaft,
- For operating through side panel of switchgear cabinet (lateral operation):
  - 3VT9 100-3HE../HF.. knob
  - 3VT9 100-3HG../HH.. coupling driver
  - 3VT9 100-3HJ.. extension shaft

Mechanical interlocking and parallel switching

- The mechanical interlock must be combined from the following parts:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanisms (cannot be used with lateral operation)
  - 2 x 3VT9 200-3HE/HF.. knobs (standard) or 1 x 3VT9 200-3HE/HF.. knob (parallel switching)

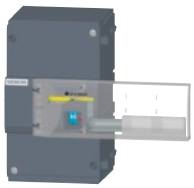
Selection and ordering data

	Version	Color	DT	Order No.	PS*	Weight per PU approx. kg
Rotary operating mechanisms						
	Rotary operating mechanism					
	• not lockable	gray	B	**3VT9 100-3HA10**	1 unit	0.079
	• lockable with padlock	gray	B	**3VT9 100-3HA20**	1 unit	0.079
	• lockable with padlock	yellow	B	**3VT9 100-3HB20**	1 unit	0.079
	• for lateral operation, mounted on the left side, not lockable	gray	B	**3VT9 100-3HC10**	1 unit	0.137
	• for lateral operation, mounted on the right side, not lockable	gray	B	**3VT9 100-3HD10**	1 unit	0.137
	Knob					
	• not lockable	black	B	**3VT9 100-3HE10**	1 unit	0.019
	• lockable with padlock	black	B	**3VT9 100-3HE20**	1 unit	0.019
	• lockable with padlock	red	B	**3VT9 100-3HF20**	1 unit	0.019
	Coupling driver for door-coupling operating mechanism					
	Additionally requires 3VT9 100-3HE10 or 3VT9 100-3HE20 black knob					
	• degree of protection IP40	black	B	**3VT9 100-3HG10**	1 unit	0.042
	• degree of protection IP66	black	B	**3VT9 100-3HG20**	1 unit	0.042
	Additionally requires 3VT9 100-3HF20 red knob					
	• degree of protection IP40	yellow	B	**3VT9 100-3HH10**	1 unit	0.042
	• degree of protection IP66	yellow	B	**3VT9 100-3HH20**	1 unit	0.042
	Extension shaft					
	• length 350 mm, can be shortened		B	**3VT9 100-3HJ10**	1 unit	0.113
	• length 199 ... 352 mm, telescopic		B	**3VT9 100-3HJ20**	1 unit	0.092

* You can order this quantity or a multiple thereof.

Manual/motorized operating mechanisms

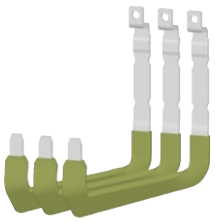
	Version	Color	DT	Order No.	PS*	Weight per PU approx. kg
Mechanical interlocks						
	The mechanical interlocks additionally require the following parts: • 2 x 3VT9 100-3HA../HB.. rotary operating mechanisms • 1 or 2 x 3VT9 100-3HE/HF.. knobs					
	**Mechanical interlock**		B	**3VT9 100-8LA00**	1 unit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

	Rated control supply voltage U_s	DT	Order No.	PS*	Weight per PU approx. kg
	AC 50/60 Hz or DC				
Motorized operating mechanism					
	**Laterally mounted motorized operating mechanism** For a detailed description see page 1/30.				
	• AC/DC 24 V	B	**3VT9 100-3MA00**	1 unit	0.900
	• AC/DC 48 V	B	**3VT9 100-3MB00**	1 unit	0.900
	• AC/DC 110 V	B	**3VT9 100-3MD00**	1 unit	0.900
	• AC 230 V/DC 220 V	B	**3VT9 100-3ME00**	1 unit	0.900

* You can order this quantity or a multiple thereof.

Selection and ordering data

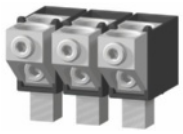
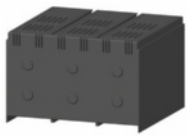
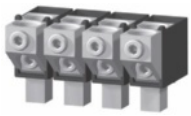
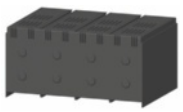
Circuit breakers for system protection, only for TM[1)], starters, disconnectors

	Rated current I_N	Residual currents I, adjustable	Delay time t_d, adjustable	Rated operational voltage U_e	DT	Order No.	PS*	Weight per PU approx.
	A	A	s	V				kg
RCD modules								
	**4-pole**							
	160	0.030	instantaneous	80 ... 440	C	**3VT9 116-5GA40**	1 unit	1.300
		0.100	0.1					
		0.300	0.2					
		0.500	0.3					
		1.000	0.5					
		3.000	1					
	**4-pole**							
	160	0.300	instantaneous	80 ... 440	C	**3VT9 116-5GB40**	1 unit	1.300
Accessories for RCD modules								
	**Connection set, short**							
	3-pole					**3VT9 115-5GY31**	1 unit	
	4-pole					**3VT9 115-5GY41**	1 unit	
	**Connection set, long**							
	3-pole					**3VT9 115-5GY32**	1 unit	
	4-pole					**3VT9 115-5GY42**	1 unit	

1) Thermal-magnetic

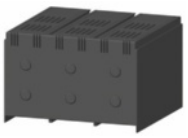
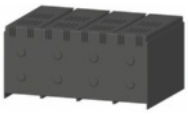
* You can order this quantity or a multiple thereof.

Selection and ordering data

	Version	Conductor cross-sections *S* mm²	Type of connection	DT	Order No.	PS*	Weight per PU approx. 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	B	**3VT9 100-4TA30**	1 unit	0.045
 	**Terminals for circular conductors** Set includes a terminal cover, degree of protection IP20	2 x 25 ... 120	Cu/Al cable	B	**3VT9 100-4TF30**	1 unit	0.180
	**Terminals for rear connection** 1 set = 3 units		Cu/Al busbars, cable lugs	B	**3VT9 100-4RC30**	1 unit	0.320
	**Auxiliary conductor terminals**	1.5 ... 2.5; 4 ... 6	Cu flexible conductors	B	**3VT9 100-4TN30**	1 unit	0.010
	**Front connection bars**	1.5 ... 2.5; 4 ... 6	Cu/Al busbars, cable lugs	B	**3VT9 100-4ED30**	1 unit	0.103
	Terminals for 4-pole version						
	**Terminal for front connection** 1 set = 1 unit For 4th pole (to be used with 3VT9 100-4TA30 connecting set)	--	Cu/Al busbars, cable lugs	B	**3VT9 100-4TA00**	1 unit	0.015
 	**Terminals for circular conductors** Set includes a terminal cover, degree of protection IP20	2 x 25 ... 120	Cu/Al cable	B	**3VT9 100-4TF40**	1 unit	0.250
	**Terminal for rear connection** 1 set = 1 unit For 4th pole (to be used with 3VT9 100-4RC30 connecting set)		Cu/Al-busbars, cable lugs	B	**3VT9 100-4RC00**	1 unit	0.080
	**Auxiliary conductor terminals** For 4th pole (to be used with 3VT9 100-4TN30 connecting set)	1,5 ... 2,5; 4 ... 6	Cu flexible conductor	B	**3VT9 100-4TN00**	1 unit	0.010

* You can order this quantity or a multiple thereof.

Selection and ordering data

	Version	Conductor cross-sections *S* mm²	Connection	DT	Order No.	PS*	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 1/36.			B	**3VT9 100-8CE30**	1 unit	0.030
	**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.			B	**3VT9 100-8CA30**	1 unit	0.050
	**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.			B	**3 VT9 100-3HL00**	1 unit	0.005
	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 1/37.			B	**3VT9 100-8CE00**	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			B	**3VT9 100-8CA40**	1 unit	0.080
	**Extension cable for motorized operating mechanism**			B	**3VT9 100-3MF00**	1 unit	0.100
	3-pole version						
	**For mounting on a 35 mm standard DIN mounting rail** For dimensions, see page 1/45.			B	**3VT9 100-4-poleP30**	1 unit	0.050

* You can order this quantity or a multiple thereof.

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 3VT9 100-8CE30 insulating barriers on the side of terminals 2, 4, 6 (see pages 1/36 and 1/37).
- 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 1/36 and 1/37).

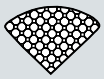
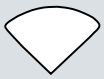
Recommended cross-section of cables, busbars and flexibars

Rated current I_n	Conductor cross-section S		Busbars W x H	
	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 4
125	50	95	16 x 4; 12 x 4	16 x 5; 12 x 6
160	70	120	16 x 5; 12 x 6	--

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.

Conductor cross-sections of main terminals

Order 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							
3VT9 100-4TF30	160	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120		1/38
3VT9 100-4TA30	160					16	
3VT9 100-4RC30	160					16	1/39
3VT9 100-4TN30	10/16	1,5 ... 2,5/4 ... 6				--	--
3VT9 100-4ED30	160					30	1/39
4-pole							
3VT9 100-4TF40	160	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120		1/43
3VT9 100-4TA00	160					16	
3VT9 100-4RC00	160					16	1/43
3VT9 100-4TN00	10/16	1,5 ... 2,5/4 ... 6					

Technical specifications

Order No.		3VT1 7..-2..36-0AA0	3VT1 716-2DE36-0AA0	3VT1 7..-2..46-0AA0	3VT1 716-2EE46-0AA0
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		A	--	A	--
• switching mode		AC-3 (16 ... 100 A) AC-2 (100 ... 160 A)	AC-23 A	AC-3 (16 ... 100 A) AC-2 (100 ... 160 A)	DC-22 A AC-23 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		6 kA/AC 690 V 12 kA/AC 500 V 25 kA/AC 415 V 40 kA/AC 230 V	--	13 kA/DC 440V (τ = max. 5 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		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. 5 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	2.8 kA/AC 415 V	52 kA/AC 415 V	2.8 kA/AC 415 V
Losses per pole at I_n = 160 A	W	see table page 1/14	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.

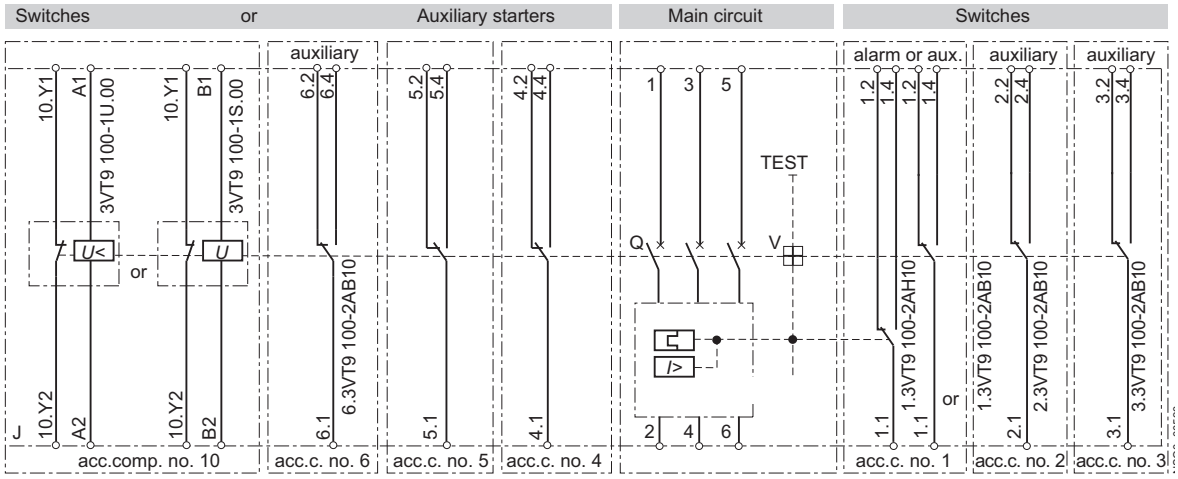
[2] Ranges of rated currents vary according to characteristics, see page 1/17.

[3] Permissible load of N pole is 100%.

Schematics

Circuit breakers with accessories

3-pole version



Explanations

J	3VT1 circuit breaker
Q	main contacts
V	trip-free mechanism
TEST	TEST pushbutton
3VT9 100-1U.00	undervoltage trip unit
3VT9 100-1S.00	shunt trip unit
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

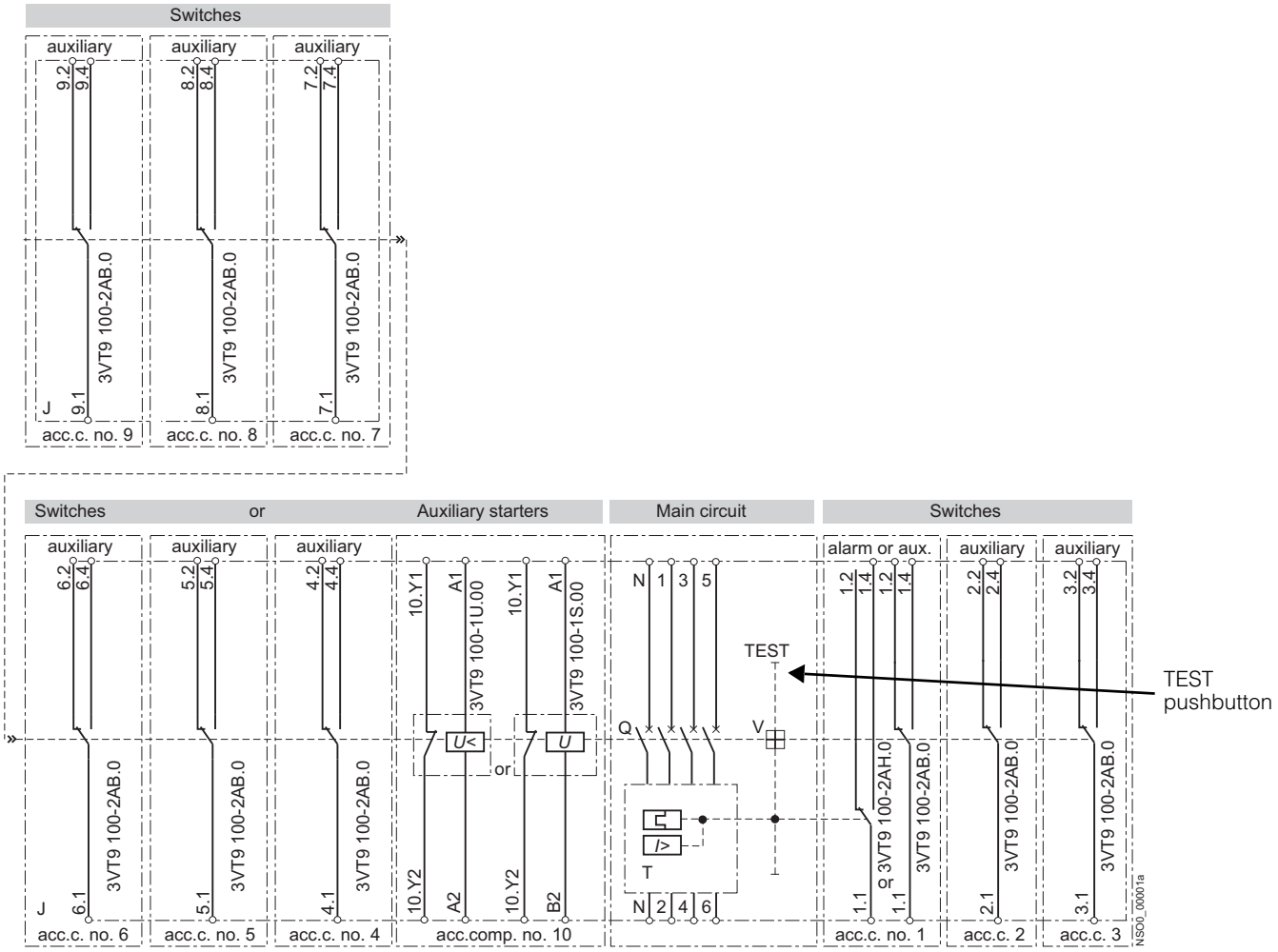
Pressing the TEST pushbutton switches the circuit breaker/switch disconnector off and actuates the auxiliary switches.

Operator panel

Indication of circuit breaker tripping

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

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
3VT9 100-1U.00	undervoltage trip unit
3VT9 100-1S.00	shunt trip unit
acc. c.	accessory compartment
acc. comp.	accessory compartment

Trip units

1

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.

Order numbers

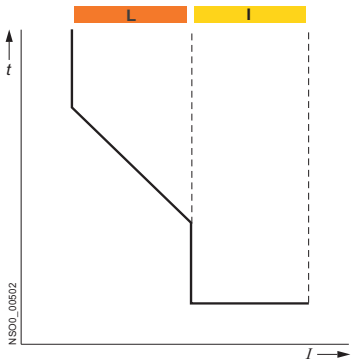
The order number of a circuit breaker depends on the rated current and on the tripping characteristics.
For example: Motor protection with I_n = 32 A.
The order number is: 3VT1 703-3DM36-0AA0.

Setting of tripping characteristics

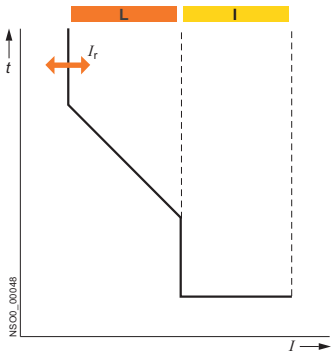
- **Time-dependent trip unit (thermal) L** (for circuit breakers with characteristics “D” and “M”). The time-dependent trip unit for overload protection I_r (instantaneous) is adjusted in a continuous range using the I_r adjustment dial on the overload trip unit. The I_r adjustment range is 0.75 ... 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

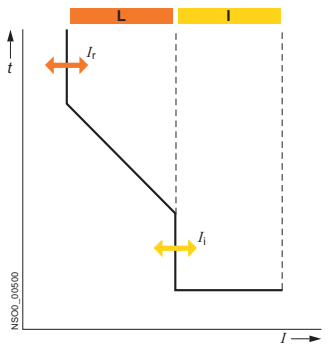
„L“:



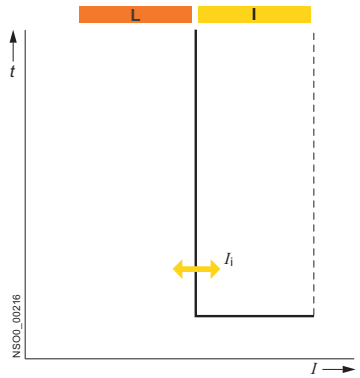
„M“:



„D“:

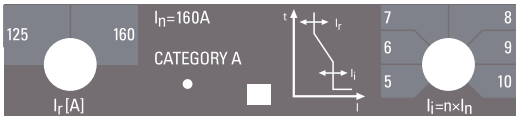


„N“:



Setting I_R and I_i for circuit breakers with characteristic „D“

Adjusting I_R Adjusting I_i



Derating in accordance with ambient temperature

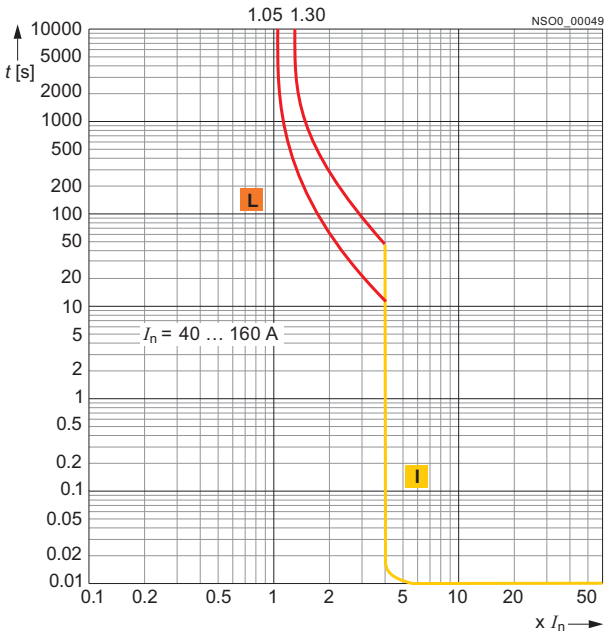
Rated current I_n	Permissible load at			
A	+ 55 °C	+ 40 °C	+20 °C	-15 °C
16	15	16	17	19
20	19	20	22	25
25	23	25	28	31
32	29	32	36	41
40	38	40	45	53
50	48	50	56	66
63	57	63	69	83
80	73	80	88	100
100	91	100	105	122
125	110	125	132	145
160	145	160	168	175

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

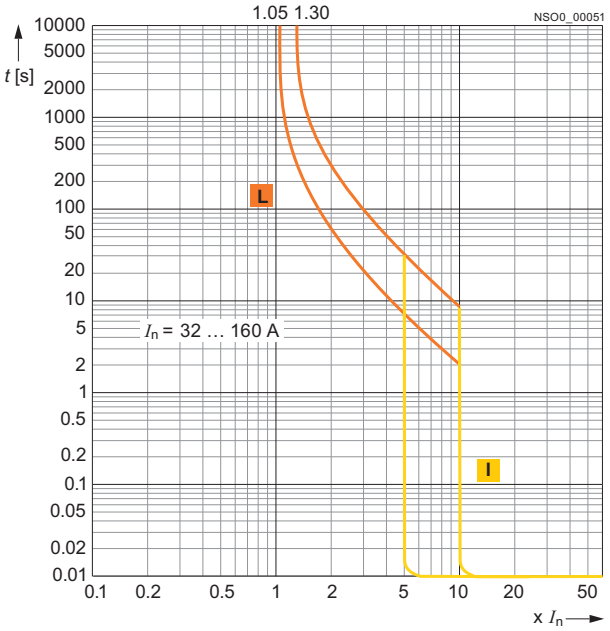
Rated current I_n	3VT1 7..-2DA36-0AA0		3VT1 7..-2DC36-0AA0		3VT1 7..-2DM36-0AA0		3VT1 7..-2DB36-0AA0	
	Overload protection I_r	Short circuit protection I_i (instantaneous)	Overload protection I_r	Short circuit protection I_i (instantaneous)	Overload protection I_r	Short circuit protection I_i (instantaneous)	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

Trip units

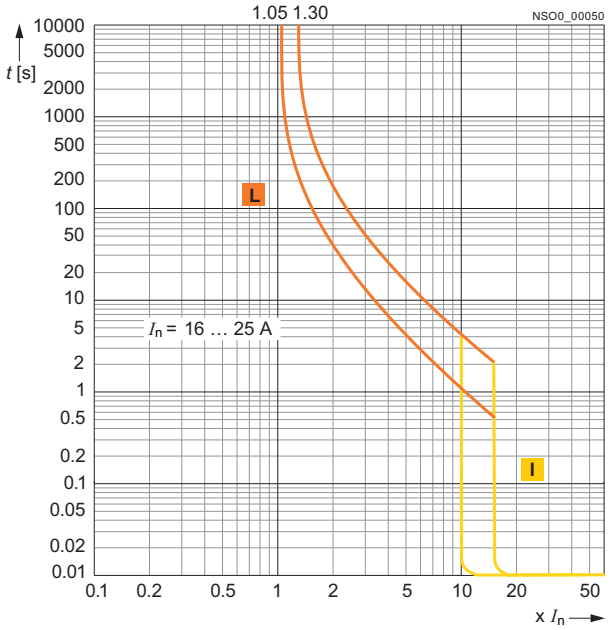
Characteristic „L“, I_n = 40, 50, 63, 80, 100, 125, 160 A



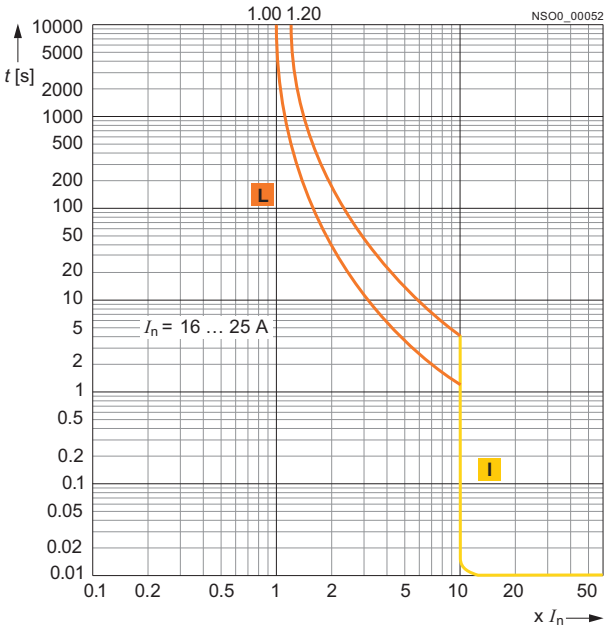
Characteristic „D“, I_n = 32, 40, 50, 63, 80, 100, 125, 160 A



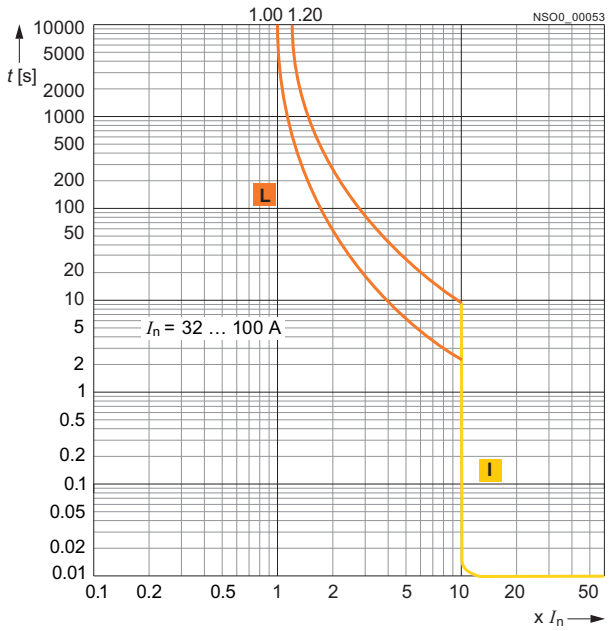
Characteristic „D“, I_n = 16, 20, 25 A



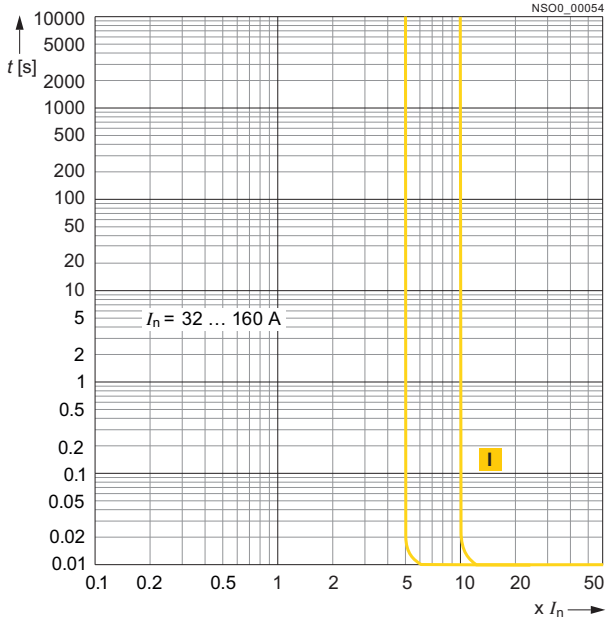
Characteristic „M“, I_n = 16, 20, 25 A



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



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



Trip units

Trip units, with tripping characteristics: class M

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.

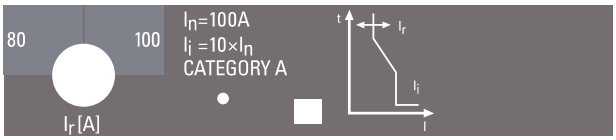


Plate of the trip units with characteristic M

Rated current I_n	Order No.	Class
16 A	3VT1 701-2DM36-0AA0	10A
20 A	3VT1 702-2DM36-0AA0	10A
25 A	3VT1 792-2DM36-0AA0	10A
32 A	3VT1 703-2DM36-0AA0	10
40 A	3VT1 704-2DM36-0AA0	10
50 A	3VT1 705-2DM36-0AA0	20
63 A	3VT1 706-2DM36-0AA0	20
80 A	3VT1 708-2DM36-0AA0	20
100 A	3VT1 710-2DM36-0AA0	20

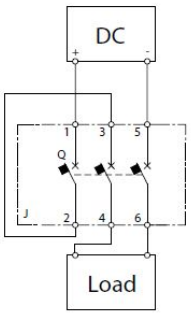
Rated short-circuit ultimate and service breaking capacity of 3-pole 3VT1 circuit breakers in DC circuits

Specifications

Order No.	3VT1 7..-2DM36-0AA0
Rated operational voltage U_e	DC 250 V
Rated ultimate short-circuit breaking capacity[1] (rms value) I_{cu}/U_e	25 kA/DC 250 V; τ = max. 5 ms
Rated service short-circuit breaking capacity (rms value) I_{cs}/U_e	13 kA/DC 250 V; τ = max. 5 ms
Utilization category (switching mode)	DC-22A

[1] in reverse connection of the circuit breaker (input terminals 2, 4, 6 and output terminals 1, 3, 5), I_{cu} does not change.

Circuit breaker connection for circuits DC 250 V:



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 1/22.

„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 1/22.

Order numbers

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

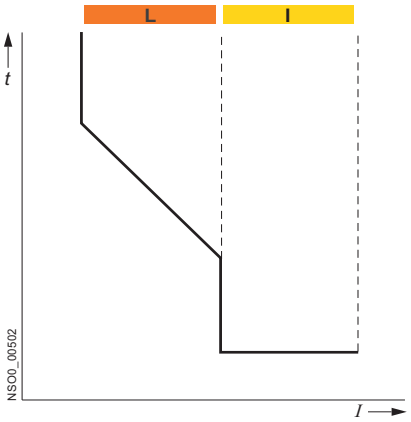
For example: Protection of a circuit with I_n = 40 A.
The order number is 3VT1 704-2EC46-0AA0.

Setting of tripping characteristics

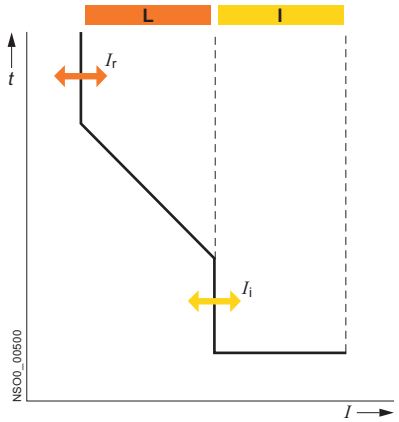
- **Time-dependent trip unit (thermal) L** (for circuit breakers with
characteristics “D” and “M”). The time-dependent trip unit for overload protection I_r (instantaneous), is adjusted in a continuous range using the I_r adjustment dial on the overload trip unit. The I_r adjustment range is 0.75 ... 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 1/22.

Circuit breakers with characteristic

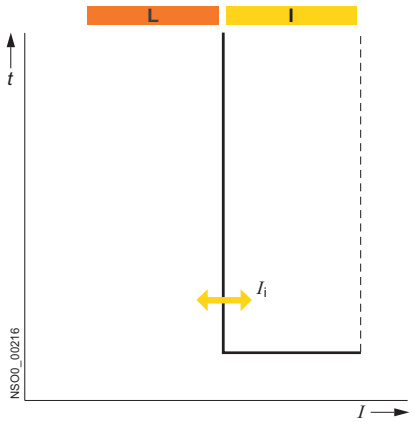
„L“



„D“



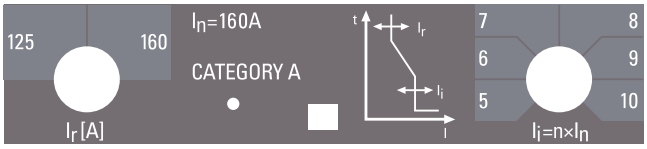
„N“



Trip units

Setting I_R and I_i for circuit breakers with characteristic „D“

Setting I_R Setting I_i



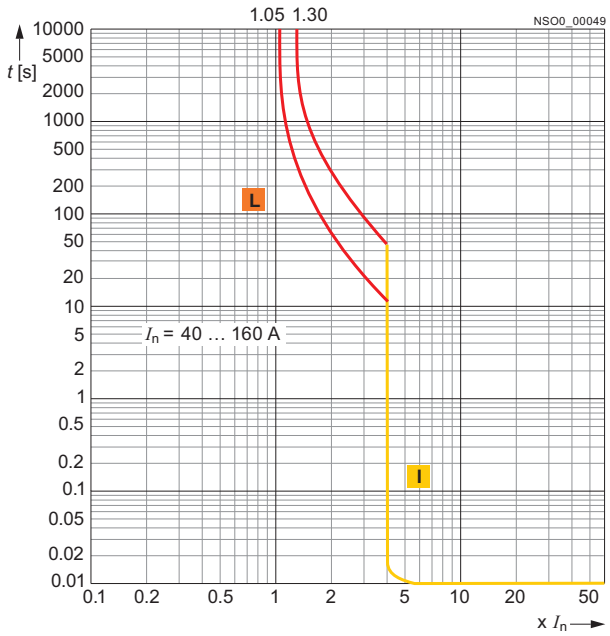
Derating in accordance with ambient temperature

Rated current I_n	Permissible load at			
A	+ 55 °C	+ 40 °C	+20 °C	-15 °C
16	15	16	17	19
20	19	20	22	25
25	23	25	28	31
32	29	32	36	41
40	38	40	45	53
50	48	50	56	66
63	57	63	69	83
80	73	80	88	100
100	91	100	105	122
125	110	125	132	145
160	145	160	168	175

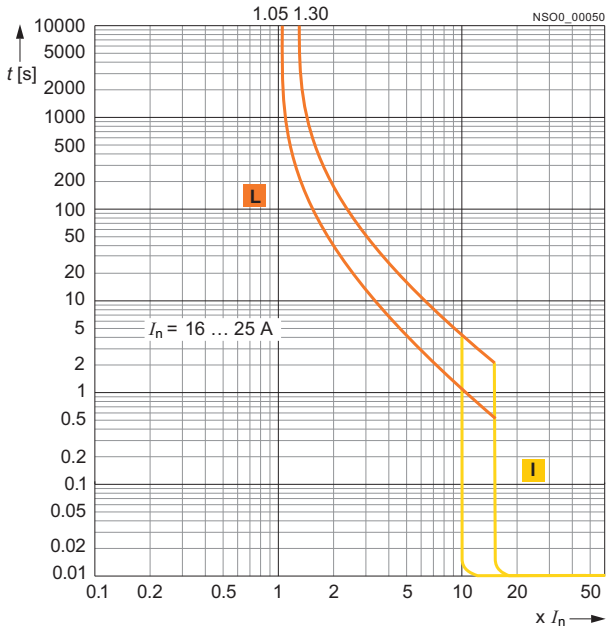
Current ranges of trip units and their possible settings at 40 °C

Rated current I_n	3VT1 7..-2EA46-0AA0		3VT1 7..-2EC46-0AA0		3VT1 7..-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

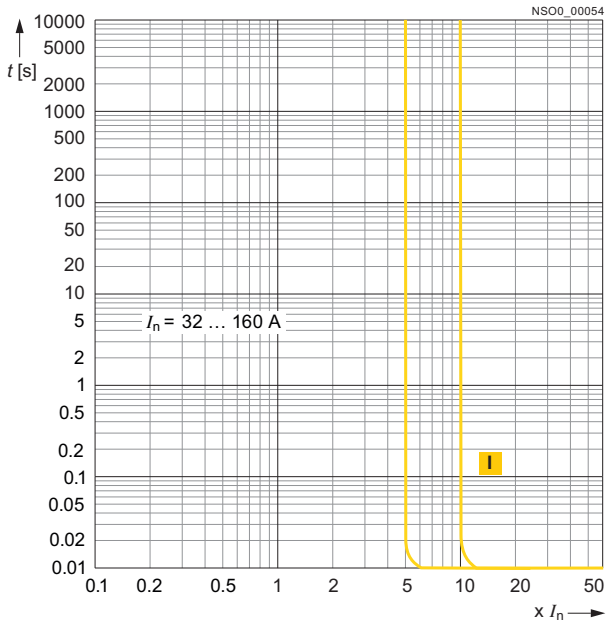
Characteristic „L“, I_n = 40, 50, 63, 80, 100, 125, 160 A



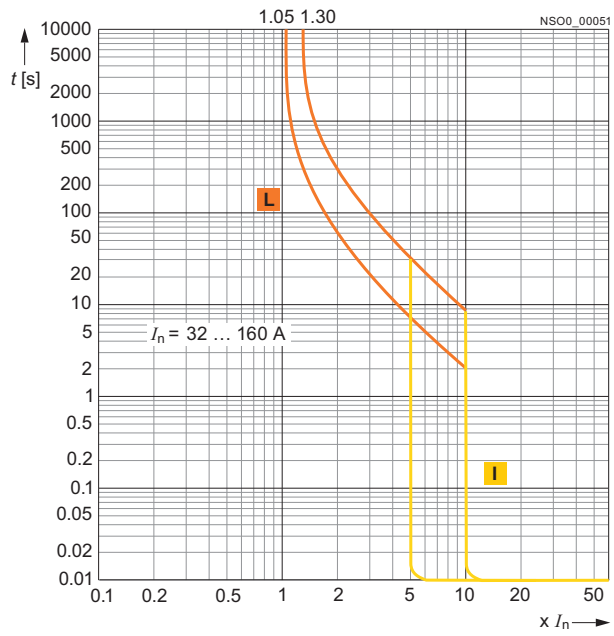
Characteristic „D“, I_n = 16, 20, 25 A



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



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



Auxiliary switches

Overview

Auxiliary switches

Auxiliary and alarm switches

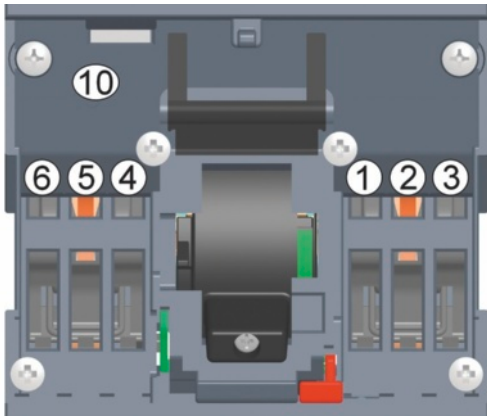
Function, name and location of switches

Order No.	Type	Switch location	Switch function
3VT9 100-2AB10 **3VT9 100-2AB20**	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
3VT9 100-2AH10 **3VT9 100-2AH20**	Alarm switch	Accessory compartment 1[1]	Signals whether the circuit breaker was tripped by the trip unit

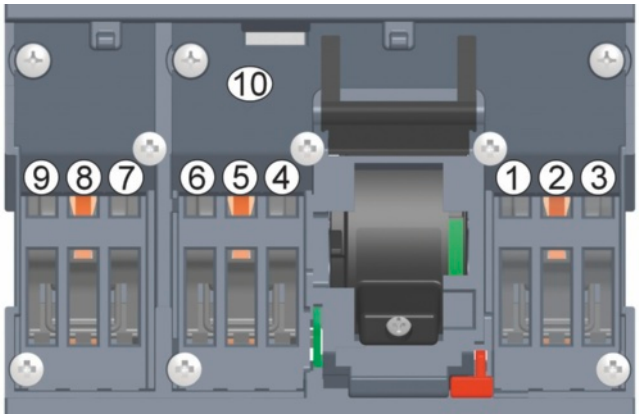
[1] In accessory compartment 1, a 3VT9 100-2AB10 auxiliary switch and 3VT9 100-2AH10 alarm switch cannot be used simultaneously.

[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.

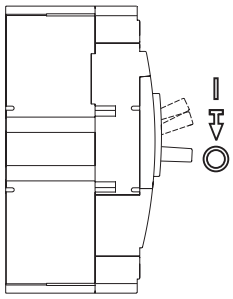


Location of accessory compartments in a 4-pole 3VT1 circuit breaker/switch disconnector.

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

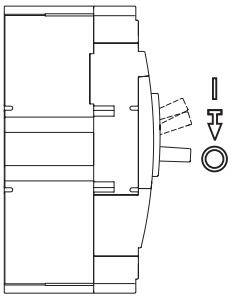
Function

Switching states (3-pole)

Accessory compartment			1 ... 9				1		10
Switching states of the circuit breaker 	Lever position	Position of the main contacts	3VT9 100-2AB10				3VT9 100-2AH10		3VT9 100-1UC/UD/UE.. 3VT9 100-1SC/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 (4-pole)

Accessory compartment			1 ... 6			1		10
Switching states of the circuit-breaker 	Lever position	Position of the main contacts	3VT9 100-2AB10			3VT9 100-2AH10		3VT9 100-1S... SP-BC-X...
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

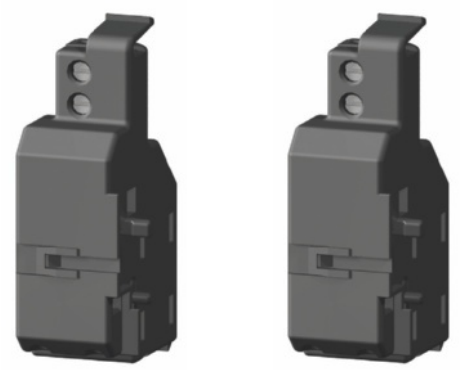
Technical specifications

Order No.		3VT9 100-2AB10, 3VT9 100-2AH10	3VT9 100-2AB20, 3VT9 100-2AH20
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	

Auxiliary trip units

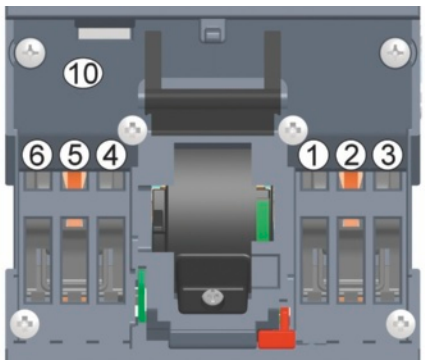
Design

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

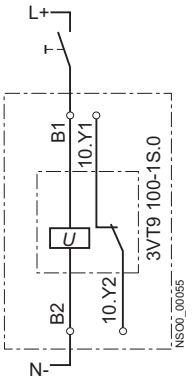
The order number of the auxiliary trip unit depends on the rated operational voltage

U_e	Order No.
AC/DC 24/48 V	3VT9 100-1SC00
AC 110/230 V, DC 110/220 V	3VT9 100-1SD00
AC 230/400 V, DC 220 V	3VT9 100-1SE00

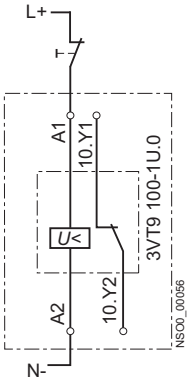
U_e	Order No.
AC/DC 24/48 V	3VT9 100-1UC00
AC 110/230 V, DC 110/220 V	3VT9 100-1UD00
AC 230/400 V, DC 220 V	3VT9 100-1UE00

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 order number.

Schematics



Shunt trip unit



Undervoltage trip unit

Technical specifications

Order No.	3VT9 100-1S.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	$U \geq 0.7\ U_e$: 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

Order No.	3VT9 100-1U.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 can be switched on $U \geq 0.85\ U_e$: circuit breaker must trip
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

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)
3VT9 100-3HA/HB.. rotary operating mechanism
+ 3VT9 100-3HE/HF.. knob

Fig. 1: Rotary operating mechanism with knob

Operation through the switchgear cabinet door (Fig. 2)
3VT9 100-3HA/HB.. rotary operating mechanism
+ 3VT9 100-3HJ.. extension shaft
+ 3VT9 100-3HG/HH.. coupling driver
+ 3VT9 100-3HE/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
3VT9 100-3HD10 (right) or 3VT9 100-3HC10 (left)
+ 3VT9 100-3HJ.. extension shaft
+ 3VT9 100-3HG/HH.. coupling driver
+ 3VT9 100-3HE/HF.. knob.

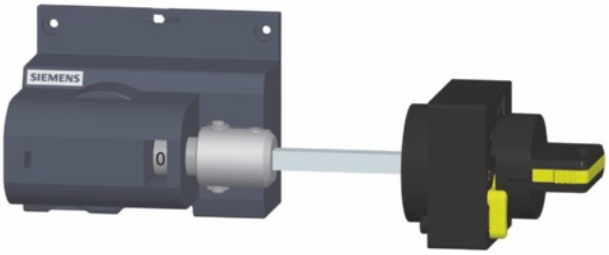


Fig. 3: Lateral rotary operating mechanism with extension shaft, coupling driver and knob

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 1/29).

Rotary operating mechanisms

Features

Order 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	
3VT9 100-3HA10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9 100-3HA20	Rotary operating mechanism	gray	yes	--	--	--	--
3VT9 100-3HB20	Rotary operating mechanism	yellow	yes	--	--	--	--
3VT9 100-3HC10	Rotary operating mechanism - lateral, left	grey	no	--	-	--	--
3VT9 100-3HD10	Rotary operating mechanism - lateral, right	grey	no	--	-	--	--
3VT9 100-3HE10	Knob	black	no	--	--	--	--
3VT9 100-3HE20	Knob, lockable with padlock	black	yes	--	--	--	--
3VT9 100-3HF20	Knob, lockable with padlock	red	yes	--	--	--	--
3VT9 100-3HG10	Coupling driver	black	--	IP40	yes	yes	--
3VT9 100-3HH10	Coupling driver	black	--	IP40	yes	yes	--
3VT9 100-3HG20	Coupling driver	yellow	--	IP66	yes	yes	--
3VT9 100-3HH20	Coupling driver	yellow	--	IP66	yes	yes	--
3VT9 100-3HJ10	Extension shaft (can be shortened)	--	--	--	--	--	350
3VT9 100-3HJ20	Extension shaft, telescopic	--	--	--	--	--	199 ... 352

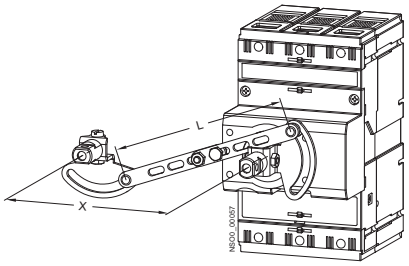
Mechanical interlock and mechanical interlock for parallel switching

3VT9 100-8LA00 mechanical interlock

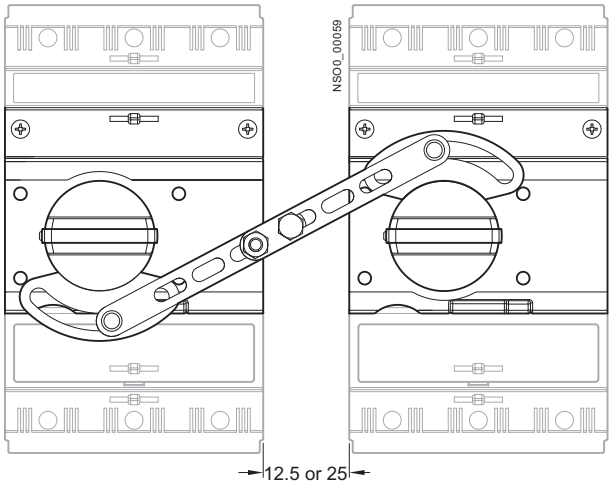
Mechanical interlocks make sure that two circuit breakers cannot trip simultaneously, but always just individually. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two 3VT1 circuit breakers. Each circuit breaker must be furnished with a rotary operating mechanism – at least one of them with a rotary operating mechanism and a knob (see page 1/27).

When using a mechanical interlock 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 3VT9 100-8LA00 mechanical interlock

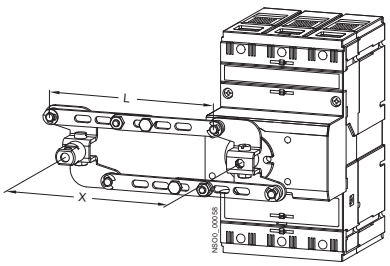


3VT9 100-8LB00 mechanical interlock for parallel switching

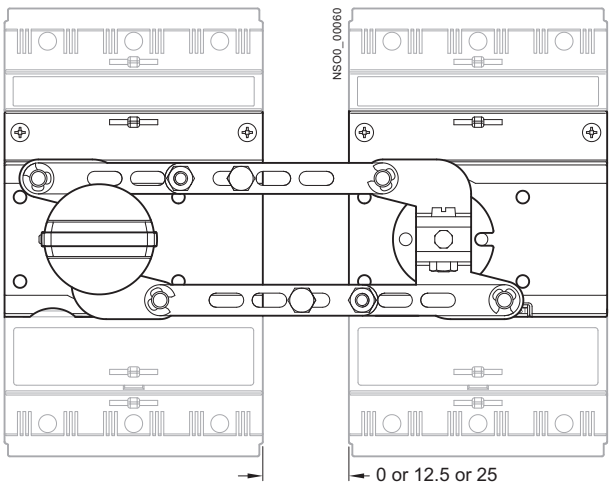
Mechanical interlocks for parallel switching are for simultaneous switching of two circuit breakers. Parallel switching can be used between two 3VT1 circuit breakers. Each circuit breaker must be furnished with a rotary operating mechanism and at least one of them with a knob (see page 1/27).

When using a mechanical interlock 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 3VT9 100-8LB00 mechanical interlock for parallel switching



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.

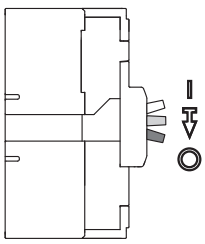
Lateral operating mechanisms can be locked in „off position“ of the circuit breaker by up to three padlocks with a shank diameter of max. 4 mm. The protective cover of the operating mechanisms can also be sealed.

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 3VT9 100-3MF00 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

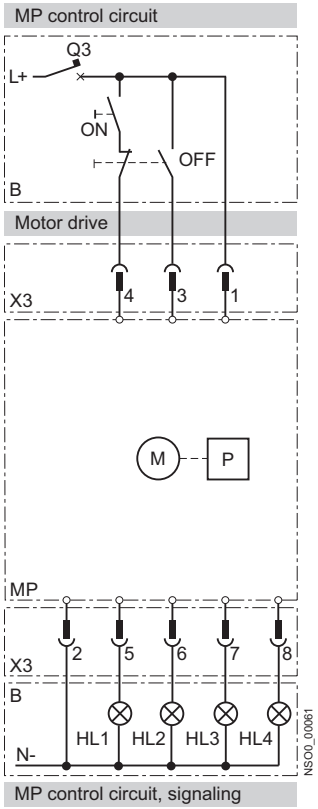


Switch position	Automatic operation preset	Preset description	Circuit breaker switching off to TRIP position	Circuit breaker will be switched to OFF position	Circuit breaker will be switched to ON position
0 N 1 2	1[1]	Automatic winding up is on	By trip unit By auxiliary trip unit By TEST pushbutton	The motorized operating mechanism switches the circuit breaker OFF automatically.	The motorized operating mechanism switches circuit breaker on when it receives an ON signal.
0 N 1 2	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.
0 N 1 2	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]	
0 N 1 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.

Schematics



Technical specifications

Order No.		3VT9 100-3M.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		 LSN 4C/1; LSN 2C/1 LSN-DC 4C/1; LSN-DC 2C/1
Order No.		3VT9 100-3MF00
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 1/32 ff.

Explanation of designations

MP	3VT9 100-3M.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[1)]
HL2	signalling of circuit breaker lever „wound up“ position, permissible load max. 10 W[1)]
HL3	signalling of opening of the front safety cover of the operating mechanism, permissible load max. 10 W[1)]
HL4	signalling of extension of the operating mechanism locking bar, permissible load max. 10 W[1)]

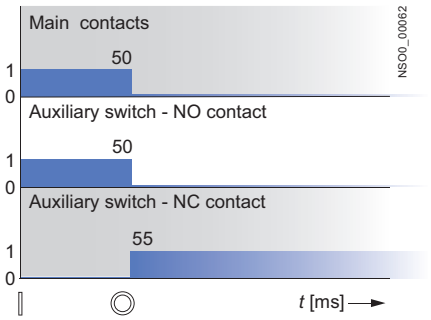
[1)] Voltage on terminals 5, 6, 7, 8 is the same as U_n of the motorized operating mechanism.

Motorized operating mechanism

3VT1 circuit breakers with motorized operating mechanism

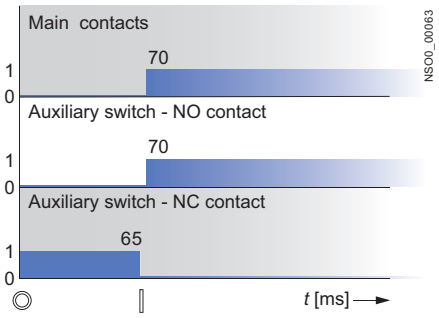
Circuit breaker switched off by motorized operating mechanism (OFF signal)

Automatic operation presets no. 1, 2, 3



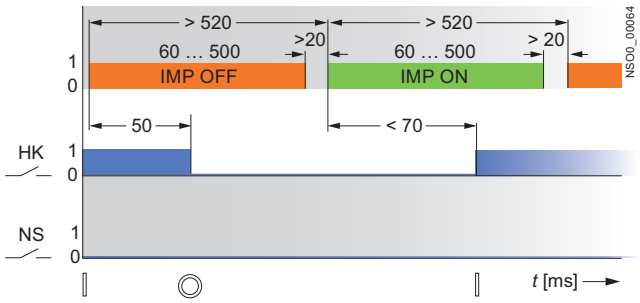
Circuit breaker switched on by motorized operating mechanism (ON signal).

Automatic operation presets no. 1, 2, 3

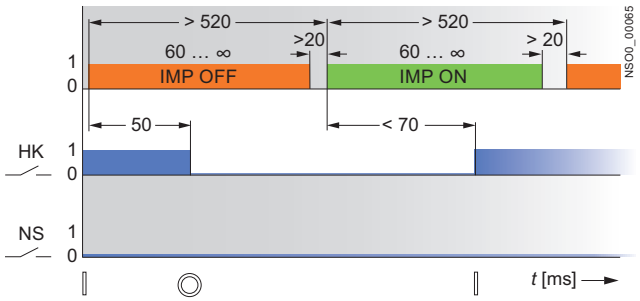


Recommended pulse durations for electrical switching

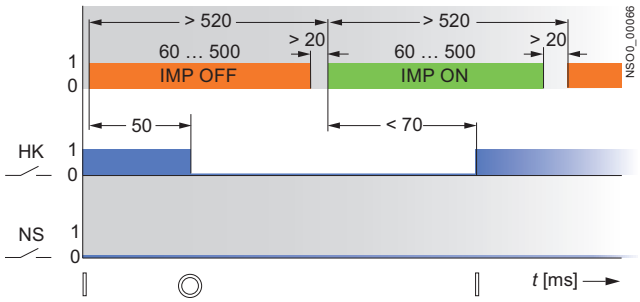
Automatic operation no. 1



Automatic operation no. 2



Automatic operation no. 3



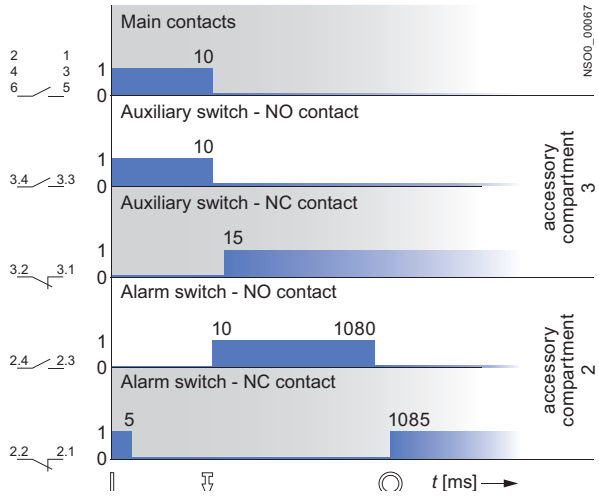
Graph description

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)

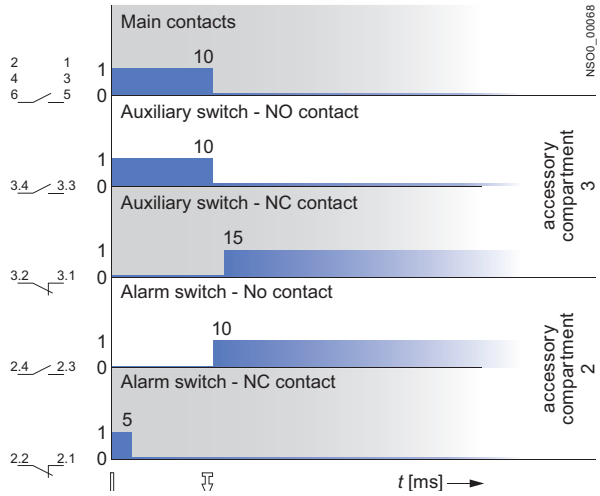
Motorized operating mechanism

Circuit breaker switches off by trip unit or INSPECTION pushbutton

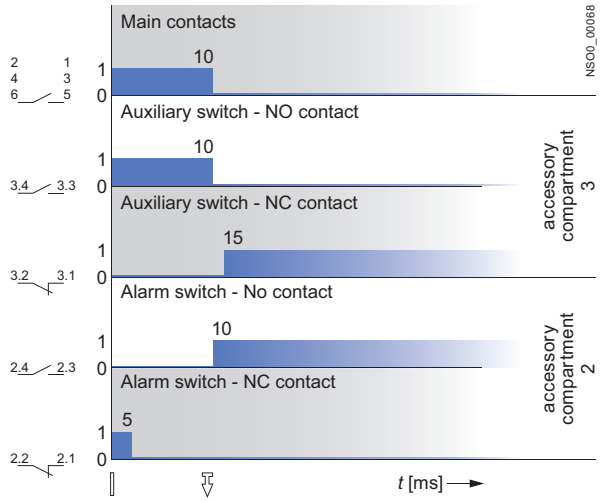
Automatic operation no. 1



Automatic operation no. 2

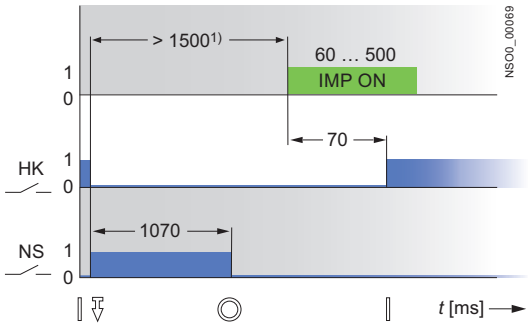


Automatic operation no. 3

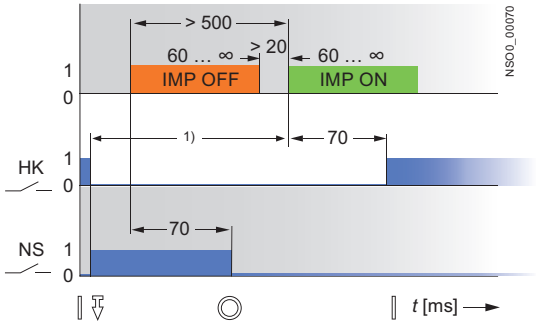


Recommended control pulses for switching the circuit breaker with motorized operating mechanism after it was switched off by trip unit or INSPECTION pushbutton

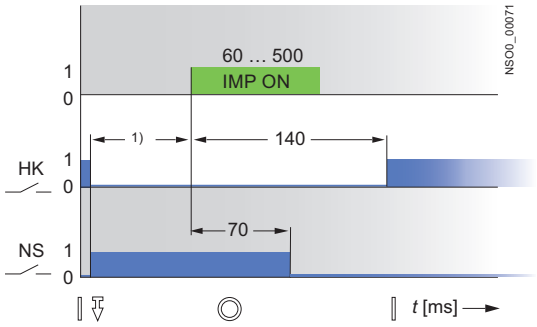
Automatic operation no. 1



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.

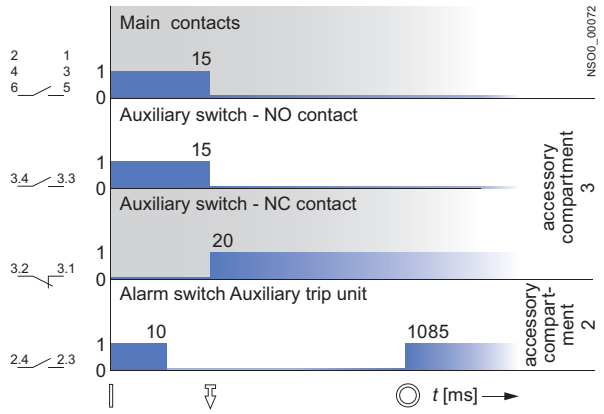
Graph description

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)

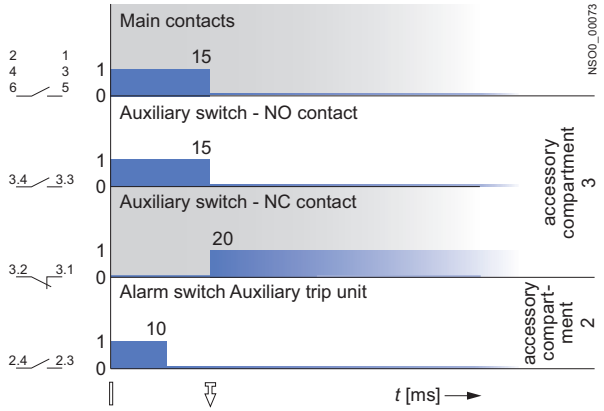
Motorized operating mechanism

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

Automatic operation no. 1



Automatic operation no. 2



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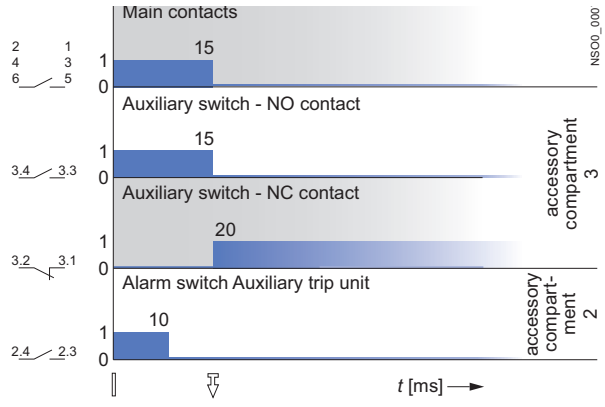
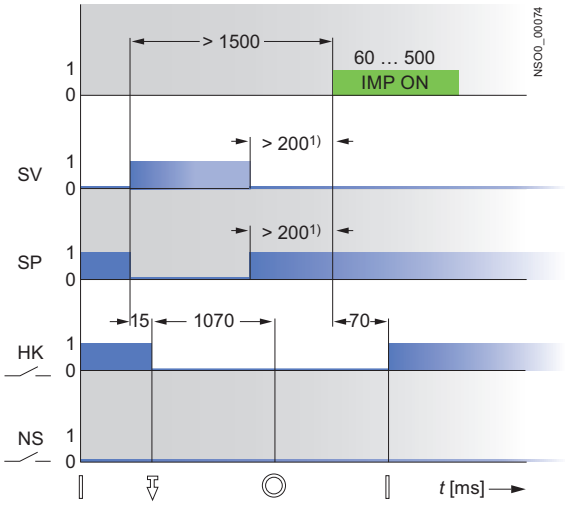


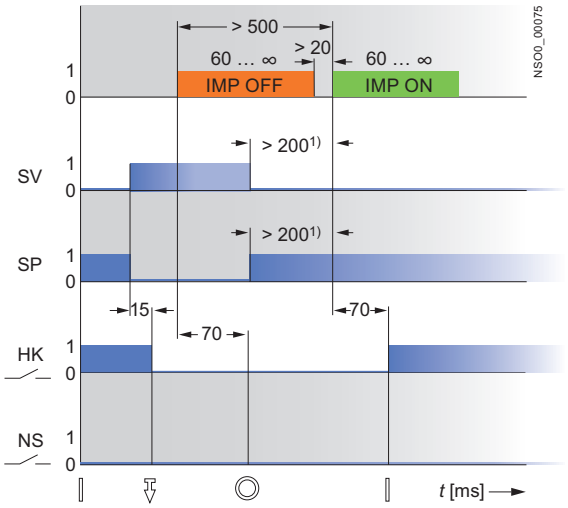
Motorized operating mechanism

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

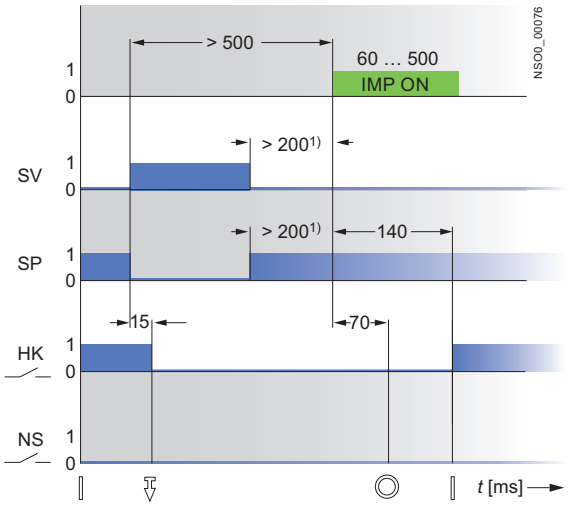
Automatic operation no. 1



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.

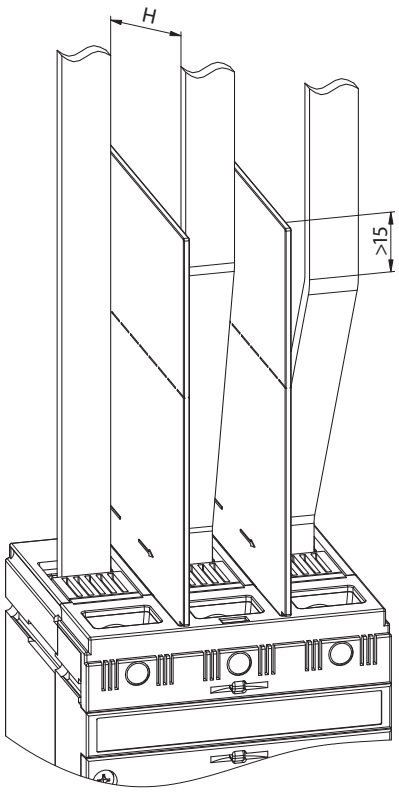
Graph description

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 REVISION pushbuttons
	Switched off manually or by electrically by motorized operating mechanism (wound up state)

Insulating barriers and terminal covers

Overview

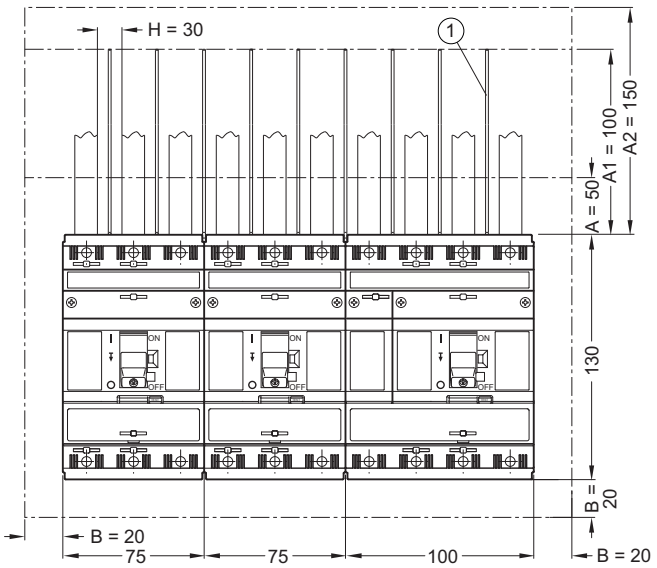
3-pole version

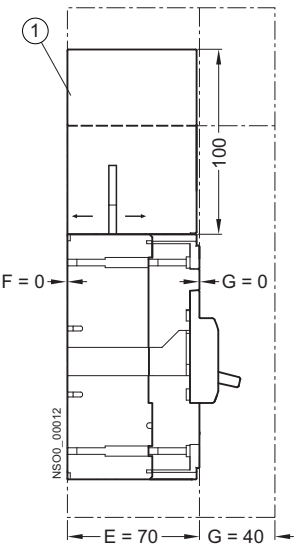


Fixed-mounted version

- Front connection
  - Terminals 1, 3, 5
    3VT9 100-8CE30 insulating barriers or 3VT9 100-8CA30 terminal covers have to be used (when using 3VT9 100-4TF30 connection sets for connecting circuit breakers/switch disconnectors, the terminal cover is included in the connecting set).
  - Terminals 2, 4, 6
    3VT9 100-8CE30 insulating barriers or 3VT9 100-8CA30 terminal covers have to be used (when using 3VT9 100-4TF30 connection sets for connecting circuit breaker/switch disconnector, the terminal cover is included in the connecting set).
- Rear connection
  - Insulating barriers and covers must 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	30	Minimum distance between the circuit breaker/switch disconnector and uninsulated earthed wall
H		Minimum distance between uninsulated conductors

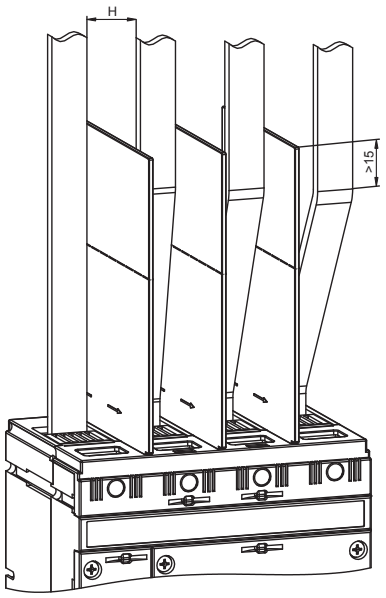




① 3VT9 100-8CE30

Insulating barriers and terminal covers

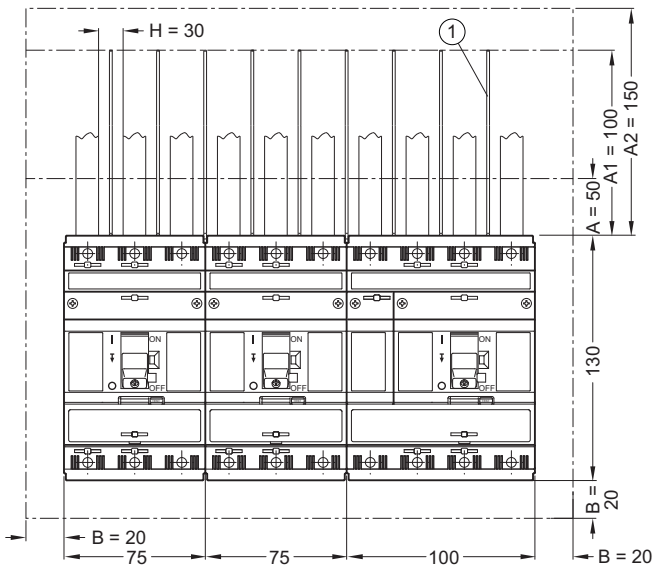
4-pole version

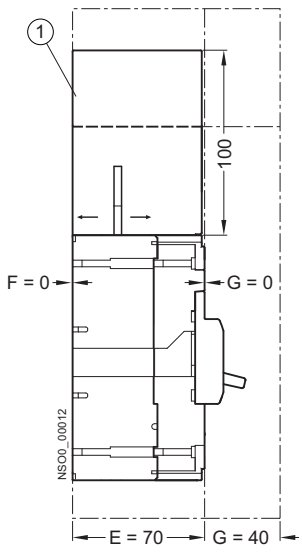


Fixed-mounted version

- Front connection
  - terminals N, 1, 3, 5
    3VT9 100-8CE30 and 3VT9 100-8CE00 insulating barriers or 3VT9 100-8CA40 terminal covers have to be used (if 3VT9 100-4TF40 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
    3VT9 100-8CE30 and 3VT9 100-8CE00 insulating barriers or 3VT9 100-8CA40 terminal covers have to be used (if 3VT9 100-4TF40 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 must 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 connection)
A1	100	Minimum insulation length of bare conductors (using 3VT9 100-8CE30 and 3VT9 100-8CE00 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	30	Minimum distance between circuit breaker/switch disconnector and uninsulated earthed wall
H		Minimum distance between uninsulated conductors



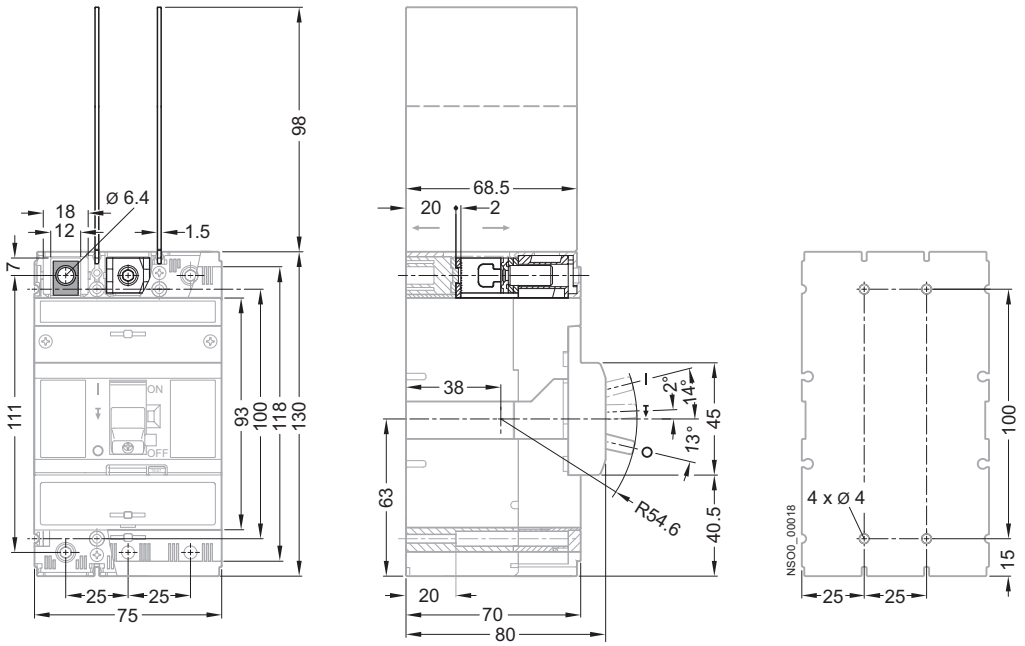


① 3VT9 100-8CE30

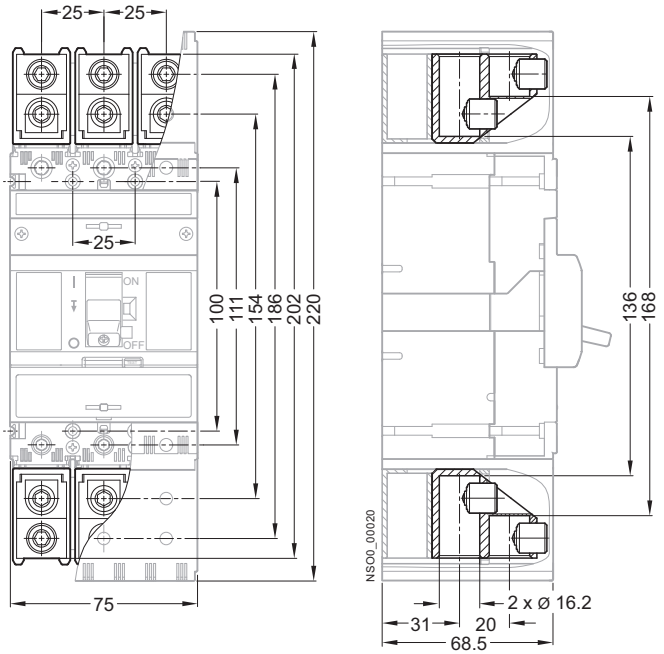
Dimensional drawings

Dimensional drawings - 3-pole, fixed-mounted version

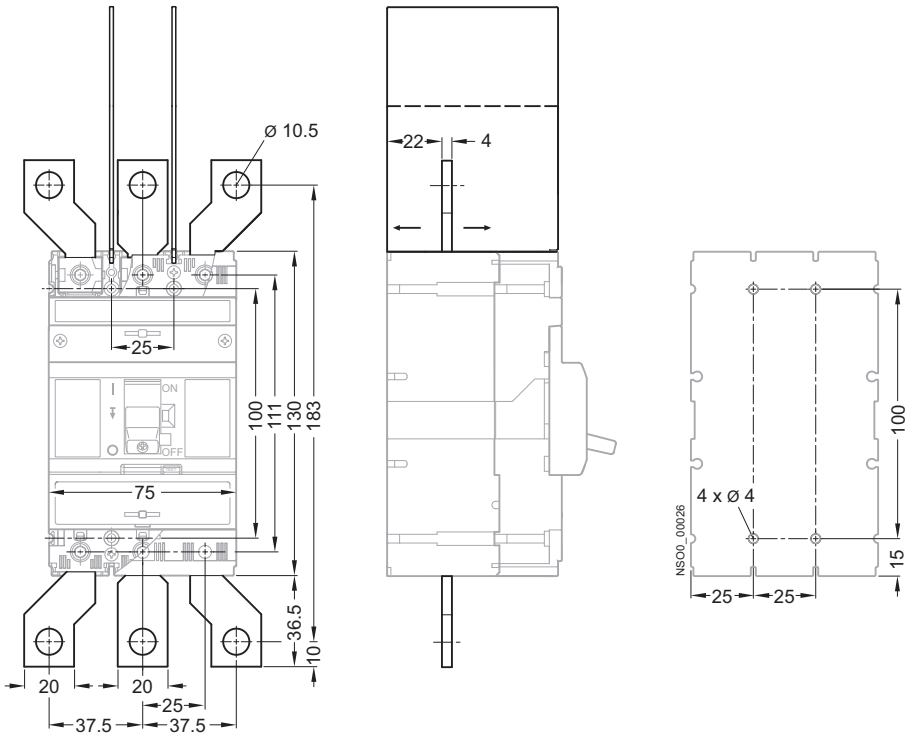
Fixed-mounted version, front connection



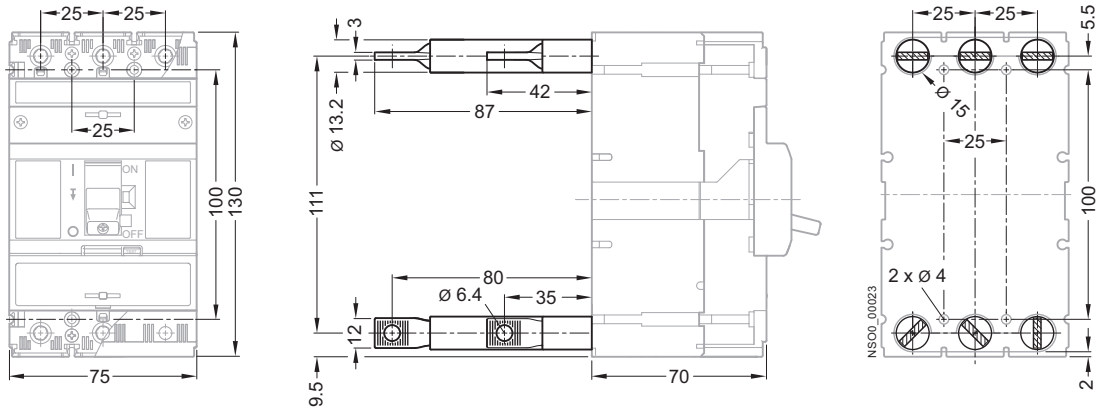
Fixed-mounted version, front connection (3VT9 100-4TF30 connecting set)



Fixed-mounted version, front connection (3VT9 100-4ED30 connecting set)

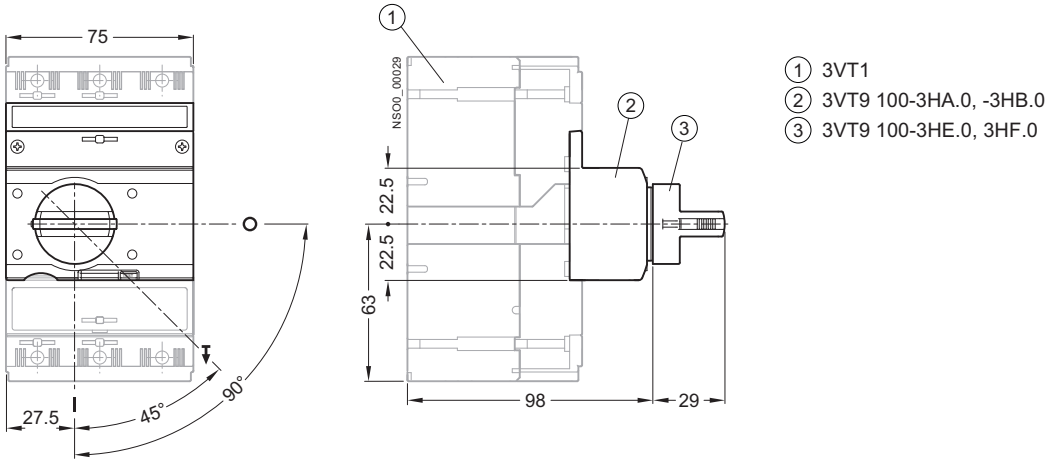


Fixed-mounted version, rear connection (3VT9 100-4RC30 connecting set)



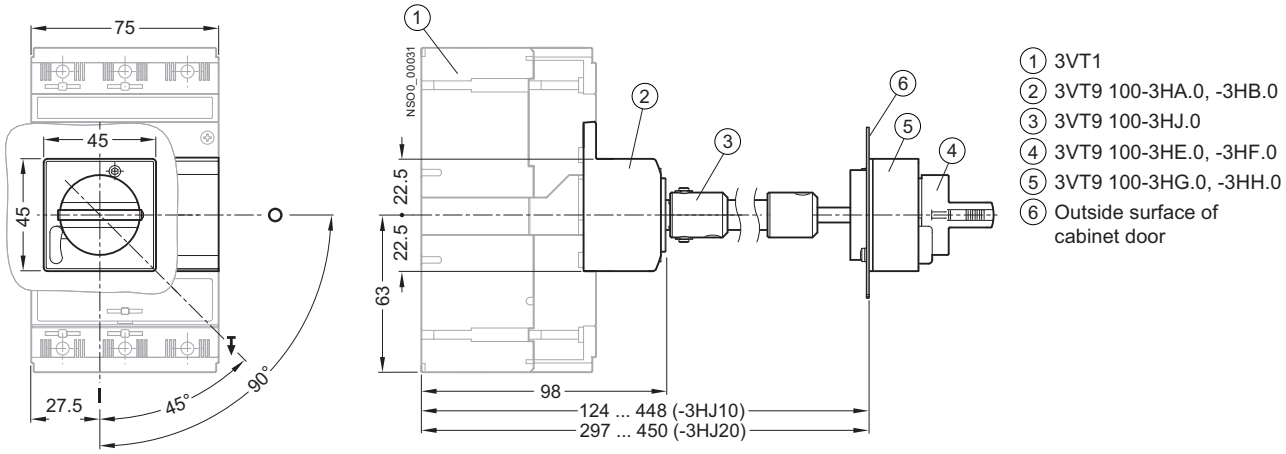
Dimensional drawings

Fixed-mounted version, rotary operating mechanism



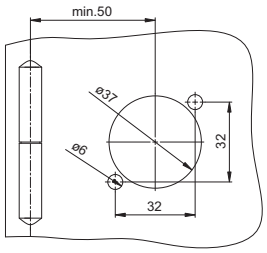
1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HE.0, 3HF.0

Fixed-mounted version, rotary operating mechanism with adjustable knob

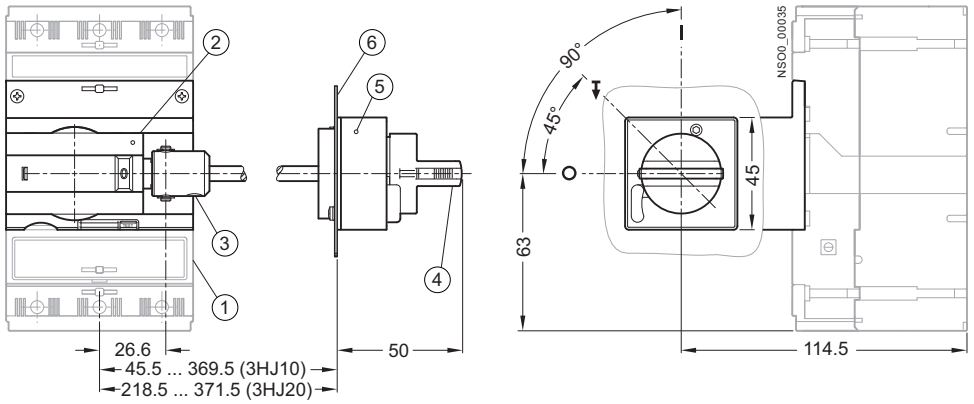


1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Dimensions of door cut-out

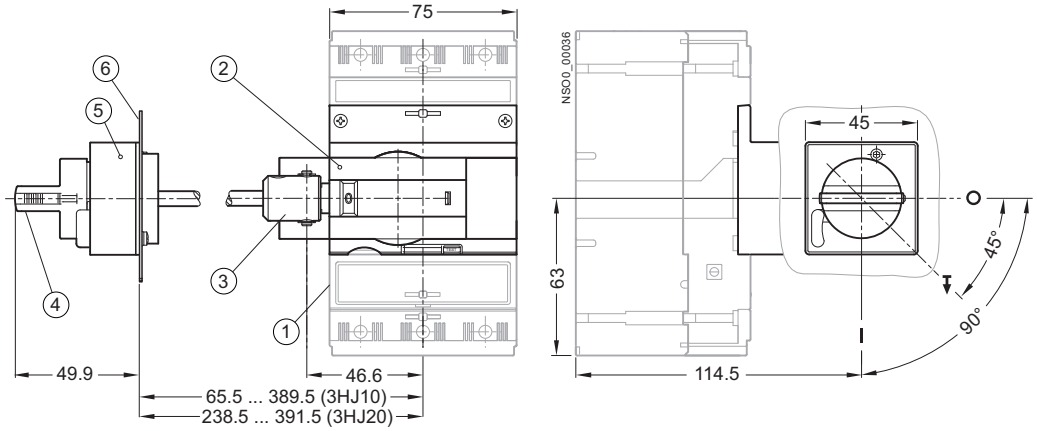


Fixed-mounted version, lateral rotary operating mechanism - right



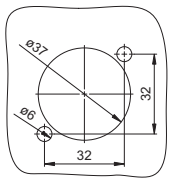
1 3VT1
2 3VT9 100-3HC10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Fixed-mounted version, lateral rotary operating mechanism - left

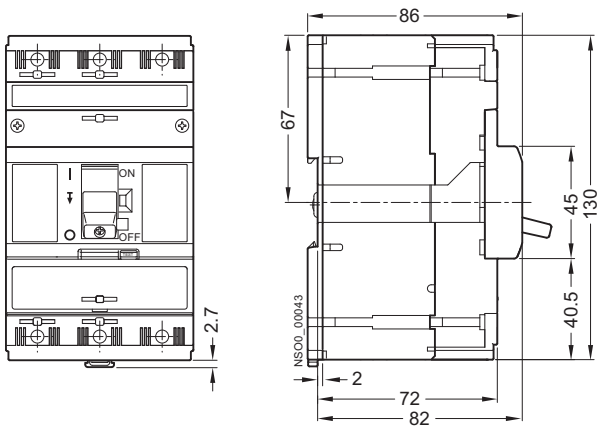


1 3VT1
2 3VT9 100-3HC10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Dimensions of door cut-out

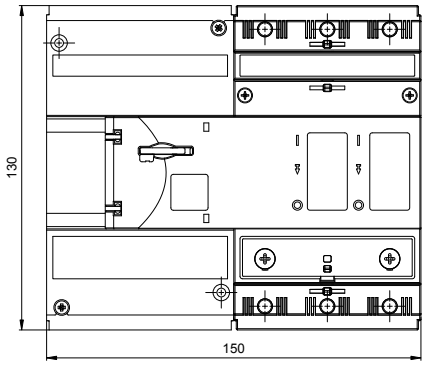


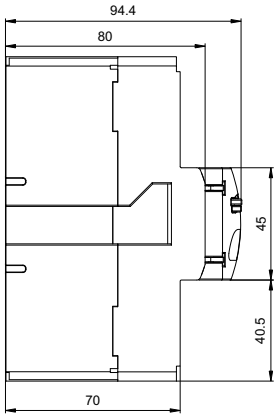
Fixed-mounted version, installation on standard DIN mounting rail (width 35 mm)



Dimensional drawings

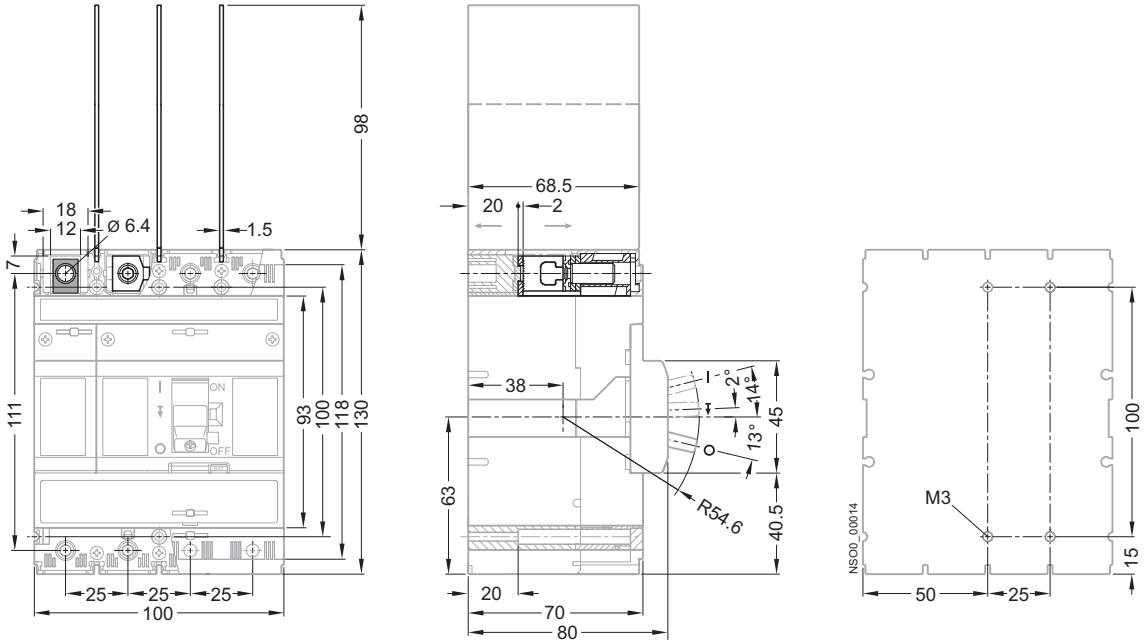
Fixed-mounted version and lateral motorized operating mechanism



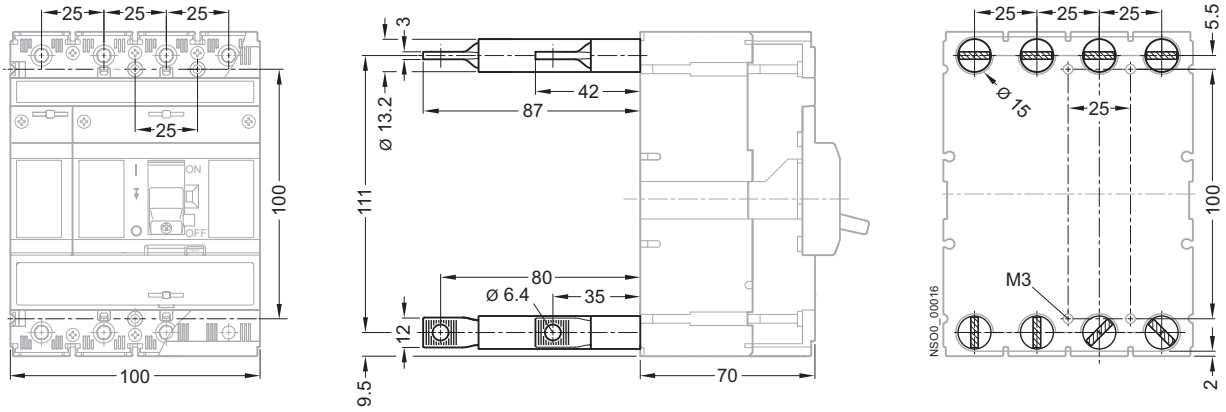


Dimensional drawings - 4-pole, fixed-mounted version

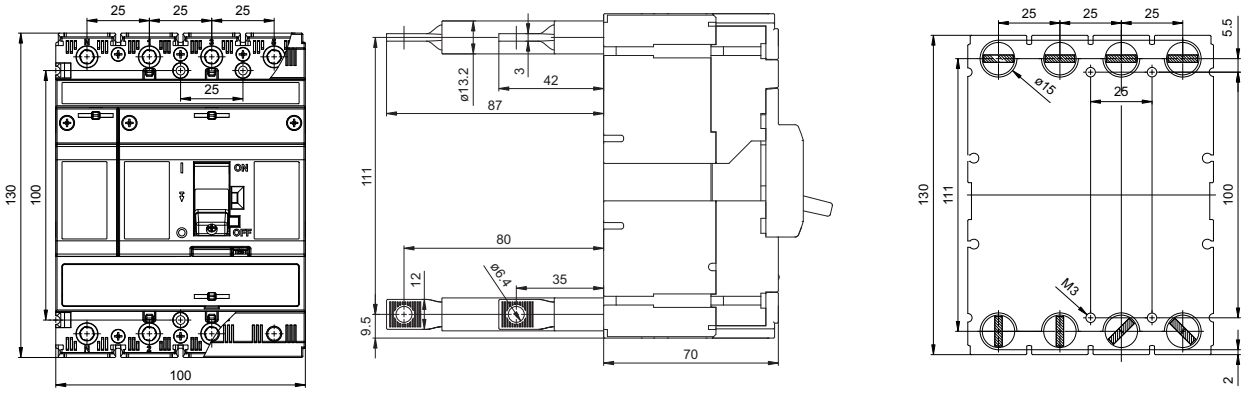
Fixed-mounted version, front connection



Fixed-mounted version, front connection (3VT9 100-4TF40 connecting set)

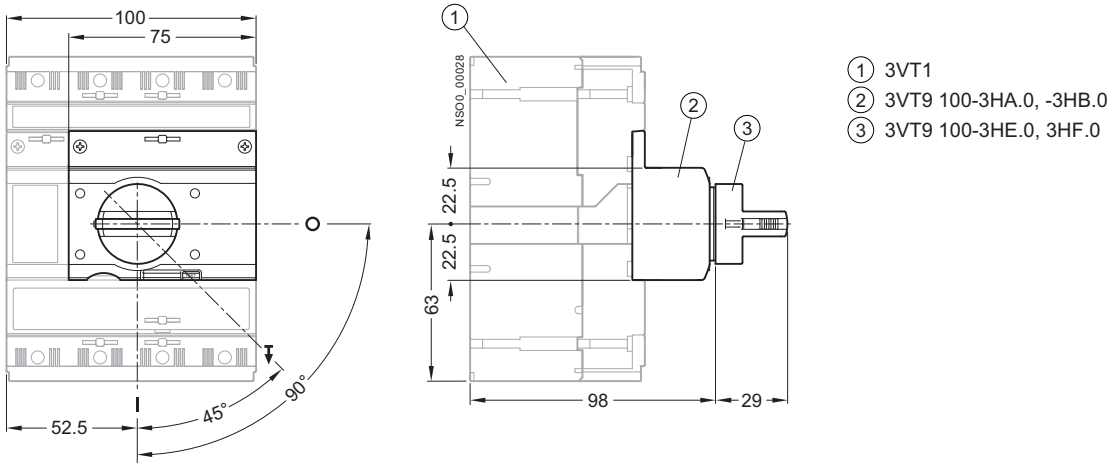


Fixed-mounted version, rear connection (3VT9 100-4RC00 connecting set)



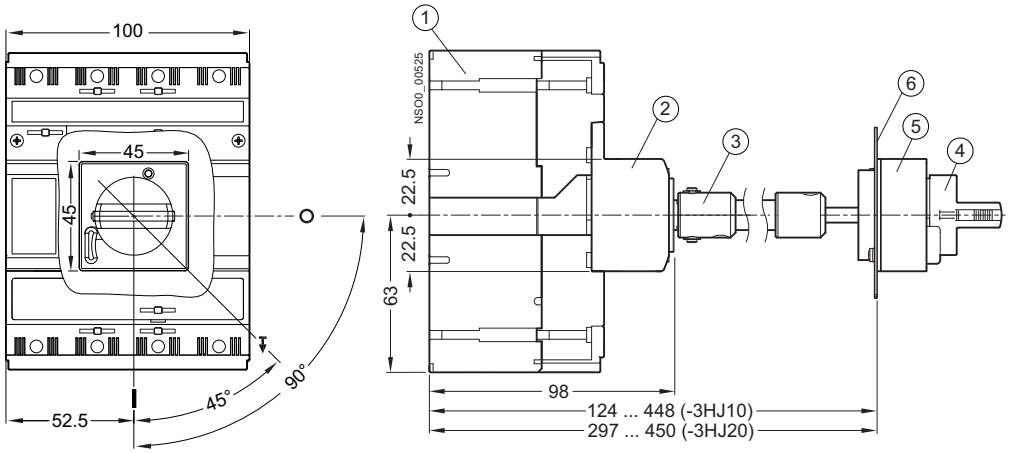
Dimensional drawings

Fixed-mounted version, front rotary operating mechanism



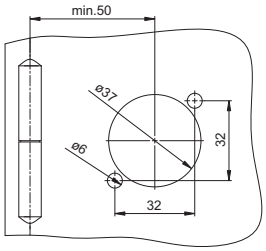
1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HE.0, 3HF.0

Fixed version, front rotary operating mechanism with adjustable knob

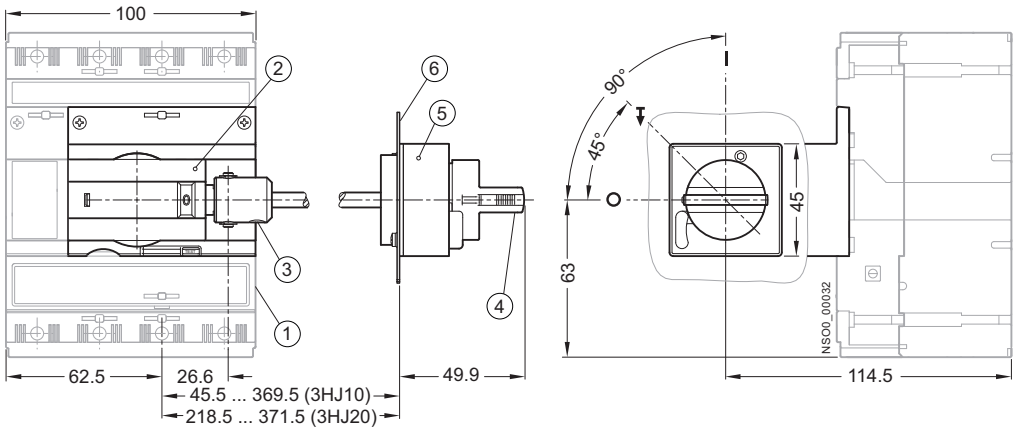


1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Dimensions of door cut-out

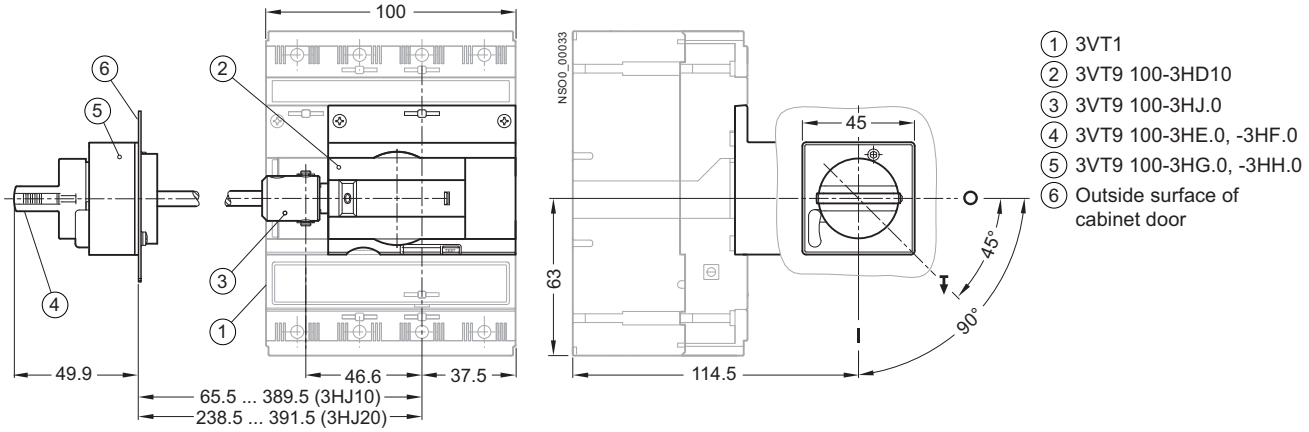


Fixed-mounted version, lateral rotary operating mechanism - right

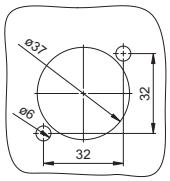


1 3VT1
2 3VT9 100-3HD10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

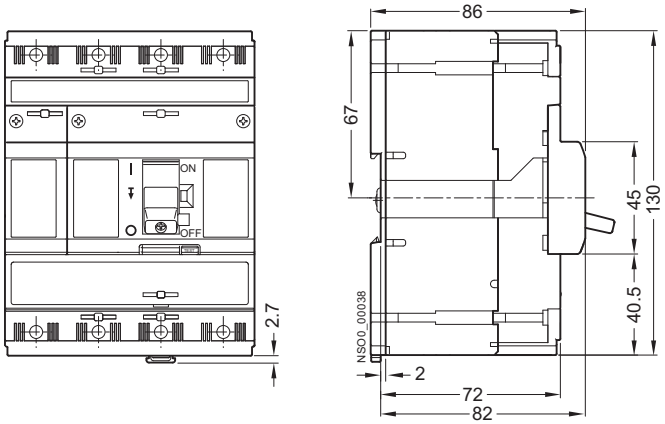
Fixed-mounted version, lateral rotary operating mechanism - left



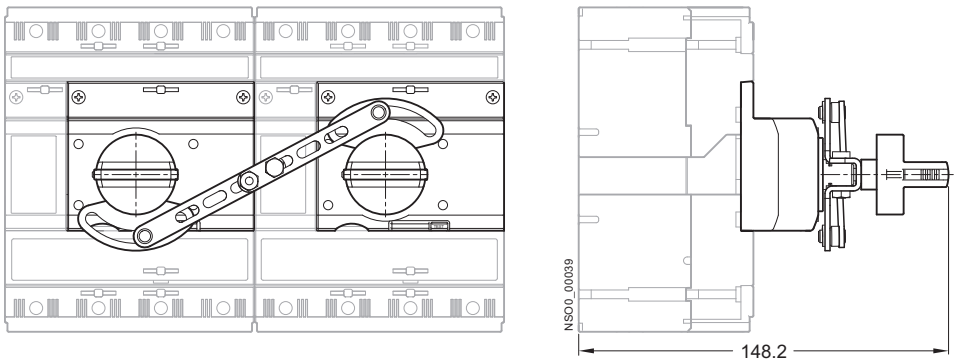
Dimensions of door cut-out



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

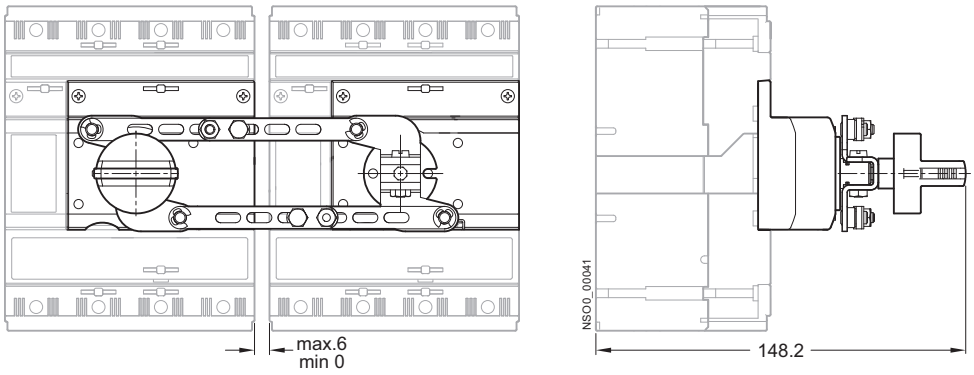


Arrangement of circuit breaker/switch disconnectors with 3VT9 100-8LA00 mechanical interlock

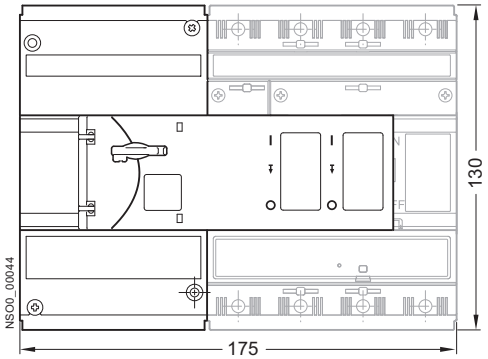


Dimensional drawings

Arrangement of circuit breaker/switch disconnectors with 3VT9 100-8LB00 mechanical interlock for parallel switching

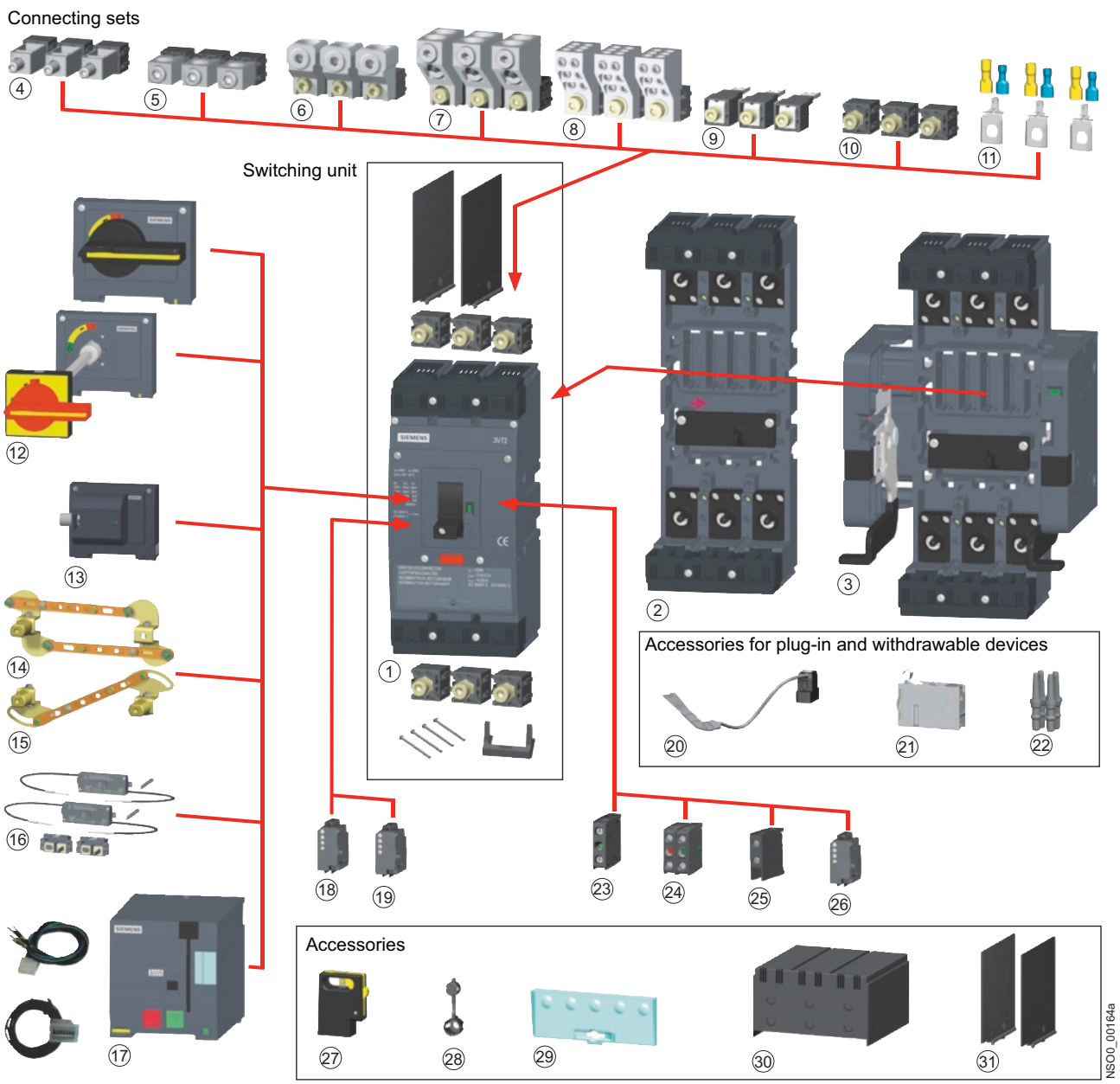


Fixed-mounted version and lateral motorized operating mechanism



3VT2 Molded Case Circuit Breakers up to 250 A

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
10 Front connection
11 Auxiliary conductor terminal
12 Rotary operating mechanism
13 Lateral rotary operating mechanism
14 Mechanical parallel switching
15 Mechanical interlocking
16 Mechanical interlocking by Bowden wire
17 Motor operating mechanism
18 Shunt trip unit
19 Undervoltage trip unit
20 Connecting cable
21 Position signalling
22 Keying pins
23 Auxiliary switch NC/NO
24 Auxiliary switch NC/NO
25 Auxiliary switch, change-over contact
26 Auxiliary switch, early
27 Lockingtype lever
28 Sealing inset
29 Additional cover for overcurrent releases
30 Terminal cover
31 Insulating barriers

Overview

Switching unit

The switching unit includes:
- Two connecting sets – 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}	DT	Order No.	PS*	Weight per PU approx.
	A	kA				kg
Switching units						
	***3-pole version***					
	250	36	B	**3VT2 725-2AA36-0AA0**	1 unit	2.840
	250	65	B	**3VT2 725-3AA36-0AA0**	1 unit	2.840
	4-pole version, unprotected N					
	250	36	B	**3VT2 725-2AA46-0AA0**	1 unit	2.840
	250	65	B	**3VT2 725-3AA46-0AA0**	1 unit	2.840
	4-pole version, protected N					
	250	36	B	**3VT2 725-2AA56-0AA0**	1 unit	2.840
	250	65	B	**3VT2 725-3AA56-0AA0**	1 unit	2.840

* You can order this quantity or a multiple thereof.

2

Selection and ordering data for accessories

	Rated current I_n	Current setting of the inverse- time delayed overcurrent trip units „L“ I_r	DT	Order No.	PS*	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	B	**3VT9 216-6AB00**	1 unit	0.317
	200	200	B	**3VT9 220-6AB00**	1 unit	0.317
	250	250	B	**3VT9 225-6AB00**	1 unit	0.317
	***Distribution protection, ETU DP, LI function*** [1]					
	with adjustable thermal overload trip unit, adjustable short-circuit trip unit					
	100	40 ... 100	B	**3VT9 210-6AC00**	1 unit	0.283
	160	63 ... 160	B	**3VT9 216-6AC00**	1 unit	0.284
	250	100 ... 250	B	**3VT9 225-6AC00**	1 unit	0.283
	***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	B	**3VT9 210-6BC00**	1 unit	0.327
	160	63 ... 160	B	**3VT9 216-6BC00**	1 unit	0.327
	250	100 ... 250	B	**3VT9 225-6BC00**	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	B	**3VT9 210-6AP00**	1 unit	0.285
	160	63 ... 160	B	**3VT9 216-6AP00**	1 unit	0.284
	250	100 ... 250	B	**3VT9 225-6AP00**	1 unit	0.285
	***Motor/generator protection, ETU MPS, LSI function*** [1]					
	with adjustable thermal overload trip unit, adjustable short-circuit trip unit					
	100	40 ... 100	B	**3VT9 210-6AS00**	1 unit	0.230
	160	63 ... 160	B	**3VT9 216-6AS00**	1 unit	0.230
	250	100 ... 250	B	**3VT9 225-6AS00**	1 unit	0.230
Switch disconnector unit						
	250	Switch disconnector unit [1]	B	**3VT9 225-6DT00**	1 unit	0.219

For a description of trip units, see page 2/15.

[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.

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	Order No.	PS*	Weight per PU approx.
	AC 50/60 Hz/DC				kg
Auxiliary switches					
	**with single NO contacts**				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AC10**	1 unit	0.020
	AC/DC 5 ... 60 V	B	**3VT9 300-2AC20**	1 unit	0.120
	**with single NC contacts**				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AD10**	1 unit	0.130
	AC/DC 5 ... 60 V	B	**3VT9 300-2AD20**	1 unit	0.130
	**with double contacts (2 x NO)**				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AE10**	1 unit	0.260
	AC/DC 5 ... 60 V	B	**3VT9 300-2AE20**	1 unit	0.260
	with double contacts (NO and NC)				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AF10**	1 unit	0.250
	AC/DC 5 ... 60 V	B	**3VT9 300-2AF20**	1 unit	0.250
	with double contacts (2 x NC)				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AG10**	1 unit	0.240
	AC/DC 5 ... 60 V	B	**3VT9 300-2AG20**	1 unit	0.240
	**with change-over contacts**				
	AC/DC 60 ... 250 V	B	**3VT9 300-2AH10**	1 unit	0.013
	AC/DC 5 ... 60 V	B	**3VT9 300-2AH20**	1 unit	0.013
	**with leading contacts**				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AJ00**	1 unit	0.040
Shunt trip units					
	AC/DC 24, 40, 48 V	B	**3VT9 300-1SC00**	1 unit	0.140
	AC/DC 110 V	B	**3VT9 300-1SD00**	1 unit	0.140
	AC 230, 400, 500 V/DC 220 V	B	**3VT9 300-1SE00**	1 unit	0.140
Undervoltage trip units					
	AC/DC 24, 40, 48 V	B	**3VT9 300-1UC00**	1 unit	0.110
	AC/DC 110 V	B	**3VT9 300-1UD00**	1 unit	0.110
	AC 230, 400, 500 V/DC 220 V	B	**3VT9 300-1UE00**	1 unit	0.110
	with leading contact[1)]				
	AC/DC 24, 40, 48 V	B	**3VT9 300-1UC10**	1 unit	0.120
	AC/DC 110 V	B	**3VT9 300-1UD10**	1 unit	0.120
	AC 230, 400, 500 V/DC 220 V	B	**3VT9 300-1UE10**	1 unit	0.120

1) Not to be used with 3VT9 200-3M..0 motorized operating mechanism.

* You can order this quantity or a multiple thereof.

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:
  - 3VT9 200-3HA.0 or 3VT9 200-3HB.0 for frontside operation
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob or
  - 3VT9 300-3HF20 red knob
- For operation through the switchgear cabinet door:
  - 3VT9 200-3HA.0 or 3VT9 200-3HB.0 for frontside operation
  - 3VT9 300-3HJ..extension shaft
  - 3VT9 300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9 300-3HE/HF.. knob
- For operation through side wall of cabinet:
  - 3VT9 200-3HC10 for right side operation OR
  - 3VT9 200-3HD10 for left side operation
  - 3VT9 300-3HJ..extension shaft
  - 3VT9 300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9 300-3HE/HF.. knob

Mechanical interlocking and parallel switching

- Mechanical interlocks for fixed-mounted version must be combined from the following parts:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9 200-3HE/HF.. knob or
  - 1 x 3VT9 200-3HE/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	Order No.	PS*	Weight kg
Rotary operating mechanisms						
	• not lockable	gray	B	**3VT9 200-3HA10**	1 unit	0.223
	• lockable with padlock	gray	B	**3VT9 200-3HA20**	1 unit	0.223
	• lockable with padlock	yellow label	B	**3VT9 200-3HB20**	1 unit	0.223
	• for lateral operation, • mounted on the right side, • not lockable	grey NEW	B	**3VT9 200-3HC10**	1 unit	0.300
	• for lateral operation, • mounted on the left side, • not lockable	grey NEW	B	**3VT9 200-3HD10**	1 unit	0.300
	Knobs for rotary operating mechanism					
	• not lockable	black	B	**3VT9 300-3HE10**	1 unit	0.075
	• lockable with padlock	black	B	**3VT9 300-3HE20**	1 unit	0.075
	• lockable with padlock	red	B	**3VT9 300-3HF20**	1 unit	0.075
	Coupling driver for door-coupling operating mechanism					
	To be used with the 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob					
	• degree of protection IP40	black	B	**3VT9 300-3HG10**	1 unit	0.140
	• degree of protection IP66	black	B	**3VT9 300-3HG20**	1 unit	0.140
	Additionally requires 3VT9 300-3HF20 red knob					
	• degree of protection IP40	yellow	B	**3VT9 300-3HH10**	1 unit	0.140
	• degree of protection IP66	yellow	B	**3VT9 300-3HH20**	1 unit	0.140
	**Extension shaft,** length 365 mm, may be shortened		B	**3VT9 300-3HJ10**	1 unit	0.205
	**Extension shaft, telescopic**, length 245 ... 410 mm		B	**3VT9 300-3HJ20**	1 unit	0.255

* You can order this quantity or a multiple thereof.

	Version	DT	Order No.	PS*	Weight per PU approx. kg
Mechanical interlocks					
	The mechanical interlock additionally requires the following parts: • 2 x 3VT9 300-3HA../HB.. rotary operating mechanisms, • 1 or 2 x 3VT9 300-3HE../HF.. knobs				
	**Mechanical interlock** for fixed-mounted version only	B	**3VT9 300-8LA00**	1 unit	0.136
	**Mechanical interlock for parallel switching** for fixed-mounted version only	B	**3VT9 300-8LB00**	1 unit	0.162
	**Mechanical interlocking** by Bowden wires				
	• for two 3VT2 circuit breakers	B	**3VT9 200-8LC10**	1 unit	0.393
	• for one 3VT2 and one 3VT3 circuit breaker	B	**3VT9 300-8LC20**	1 unit	0.393
Motorized operating mechanism with storage spring					
	**Degree of protection IP00, with locking device for 3 padlocks**				
	AC/DC 24 V	B	**3VT9 200-3MJ00**	1 unit	1.529
	AC/DC 48 V	B	**3VT9 200-3ML00**	1 unit	1.529
	AC/DC 110 V	B	**3VT9 200-3MN00**	1 unit	1.529
	AC 230 V/DC 220 V	B	**3VT9 200-3MQ00**	1 unit	1.564
	Motorized operating mechanism with operations counter				
	AC/DC 24 V	B	**3VT9 200-3MJ10**	1 unit	1.529
	AC/DC 48 V	B	**3VT9 200-3ML10**	1 unit	1.564
	AC/DC 110 V	B	**3VT9 200-3MN10**	1 unit	1.546
	AC 230 V/DC 220 V	B	**3VT9 200-3MQ10**	1 unit	1.546
Accessories for motorized operating mechanism					
	**Operations counter with cable,** length 110 cm	B	**3VT9 300-3MF10**	1 unit	0.003
	**Extension cable** for motorized operating mechanism, 12 wires, length 60 cm	B	**3VT9 300-3MF00**	1 unit	0.060

* You can order this quantity or a multiple thereof.

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.

3VT9 200-4TA30 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 3VT2 725-.AA36-0AA0 or 4-pole 3VT2 725-.AA46-0AA0 switching units.

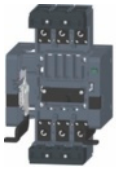
Other connecting sets are also available.

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.

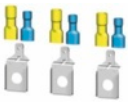
- The withdrawable version base includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable version.
- The circuit breaker located inside the withdrawable version base can be moved between an operating position (ON-OFF) and a checking position (withdrawn).

Selection and ordering data

	Version	DT	Order No.	PS*	Weight per PU approx. kg
Plug-in base					
	**3-pole version**	B	**3VT9 200-4PA30**	1 unit	1.766
	4-pole version	B	**3VT9 200-4PA40**	1 unit	2.100
Withdrawable version base					
	same as plug-in base, but with additional side panels and racks				
	**3-pole version**	B	**3VT9 200-4WA30**	1 unit	3.497
	4-pole version	B	**3VT9 200-4WA40**	1 unit	3.200

* You can order this quantity or a multiple thereof.

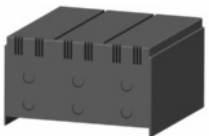
Selection and ordering data

	Version	Conductor cross-section S mm²	Type of connection	DT	Order No.	PS*	Weight per PU approx. kg
Terminals for fixed-mounted circuit breakers							
	Connecting sets for 3-pole version						
	**Box terminals** 1 set = 3 units	16 ... 150	Cu cables, flexibars	B	**3VT9 200-4TC30**	1 unit	0.240
	**Terminals for circular conductors**	25 ... 150	Cu/Al cables	B	**3VT9 215-4TD30**	1 unit	0.200
		150 ... 240	Cu/Al cables	B	**3VT9 224-4TD30**	1 unit	0.339
	**Terminals for circular conductors** for enhancing termination point protection to IP20 use the 3VT9 200-8CB30 terminal cover						
		2 x 25 ... 150	Cu/Al cables	B	**3VT9 215-4TF30**	1 unit	0.520
		2 x 150 ... 240	Cu/Al cables	B	**3VT9 224-4TF30**	1 unit	0.630
	**Terminals for circular conductors,** for 6 cables	6 x 6 ... 35	Cu/Al cables	B	**3VT9 203-4TF30**	1 unit	0.300
	**Terminals for rear connection** 1 set = 3 units		Cu/Al busbars cable lugs	B	**3VT9 200-4RC30**	1 unit	0.237
	**Terminals for front connection** 1 set = 3 units Included in every supply of switching units		Cu/Al busbars, cable lugs, flexibars	B	**3VT9 200-4TA30**	1 unit	0.120
	**Auxiliary conductor terminals**	1,5 ... 2,5; 4 ... 6	Cu flexible conductors	B	**3VT9 200-4TN30**	1 unit	0.017
	**Front connection bars** for increased pole spacing	--	Cu/Al busbars cable lugs, flexibars	B	**3VT9 200-4ED30**	1 unit	0.300
	for increased pole spacing	--	Cu/Al busbars cable lugs, flexibars	B	**3VT9 200-4EE30**	1 unit	0.447
	Single terminals for 3- or 4-pole versions						
	**Box terminal** 1 set = 1 unit	16 ... 150	Cu cables, flexibars	B	**3VT9 200-4TC00**	1 unit	0.320
	**Terminal for circular conductors** 1 set = 1 unit	25 ... 150	Cu/Al cables	B	**3VT9 215-4TD00**	1 unit	0.280
	1 set = 1 unit	150 ... 240	Cu/Al cables	B	**3VT9 224-4TD00**	1 unit	0.280
	1 set = 1 unit	2 x 25 ... 150	Cu/Al cables	B	**3VT9 215-4TF00**	1 unit	0.680
	1 set = 1 unit	2 x 150 ... 240	Cu/Al cables	B	**3VT9 224-4TF00**	1 unit	0.680
	**Terminals for circular conductors, for 6 cables**	6 x 6 ... 35	Cu/Al cables	B	**3VT9 203-4TF00**	1 unit	0.100
	**Terminal for rear connection** 1 set = 1 unit		Cu/Al busbars cable lugs	B	**3VT9 200-4RC00**	1 unit	0.320

* You can order this quantity or a multiple thereof.

Further accessories

Selection and ordering data

	Version	DT	Order No.	PS*	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	B	**3VT9 300-8CE30**	1 unit	0.077
	• one piece, additionally needed for 4-pole version	B	**3VT9 300-8CE00**	1 unit	0.050
	**Terminal cover, degree of protection IP20** Increases degree of protection of the connection point to IP20 when using 3VT9 224-4TD30, 3VT9 215-4TF30, 3VT9 224-4TF30 or 3VT9 203-4TF30 block type terminals, intended for fixed-mounted, plug-in and withdrawable versions.				
	• 3-pole version	B	**3VT9 200-8CB30**	1 unit	0.098
	• 4-pole version	B	**3VT9 200-8CB40**	1 unit	0.100
	**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	B	**3VT9 200-3HL00**	1 unit	0.013
	**Bolt sealing inset** Provides sealing for: • trip unit • accessory compartment cover • terminal cover • rotary operating mechanism • motorized operating mechanism	B	**3VT9 200-8BN00**	1 unit	0.001
	**Additional cover for trip units** Provides protection for trip units	B	**3VT9 200-8BL00**	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)	B	**3VT9 300-4PL00**	1 unit	0.020
	**Position signalling switch** For indicating the position of the circuit breaker located in the plug-in base or withdrawable version base	B	**3VT9 300-4WL00**	1 unit	0.020
	**Coding set** Prevents insertion of wrong switching unit into the plug-in base or withdrawable version base	B	**3VT9 200-4WN00**	1 unit	0.002
	**Pushbutton cover** For motorized operating mechanism	B	**3VT9 300-3MF20**	1 unit	0.054

* You can order this quantity or a multiple thereof.

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 3VT9 300-8CE30 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 2/43).

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

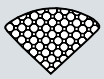
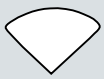
Rated current I_n	Permissible cross-section S		Busbars W x H	
	Cu	Al	Cu	Al
A	mm^2	mm^2	mm	mm
40	10	16		
50	10	16		
63	16	25		
80	25	35		
100	35	50	20 x 2	25 x 2
125	50	70	25 x 2	25 x 3
160	70	95	25 x 3	25 x 4
200	95	120	25 x 4	25 x 5
250	120	150	25 x 5	25 x 6

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

50 °C	55 °C	60 °C	65 °C	70 °C
250 A	250 A	250 A	250 A	250 A

Conductor cross-sections of main terminals

Order No.	Maximum permitted current I_{max}	Maximum permissible conductor cross-section Cable type				Busbars and cable lugs	Technical information
		Sector-shaped conductor, stranded 	Sector-shaped conductor, solid 	Round conductor, stranded 	Round conductor, solid 	W x H	
	A	mm^2	**mm^2**	**mm^2**	**mm^2**	mm	See page
3VT9 200-4TA30	250					25 x ...	
3VT9 200-4RC30	250					25 x ...	2/47, 2/58
3VT9 200-4TF00							
3VT9 200-4TC30	250	16 ... 150 Cu	10 ...150 Cu	16 ... 150	10 ...150 Cu		
3VT9 200-4TC00							
3VT9 215-4TD30	250	25 ... 150 Cu/Al	16 ...150 Cu/Al	25 ... 150 Cu/Al	16 ... 150 Cu/Al		
3VT9 215-4TD00							
3VT9 224-4TD30	250	150 ... 240 Cu/Al	120 ... 240 Cu/Al	150 ... 240 Cu/Al	120 ... 240 Cu/Al		2/45, 2/58
3VT9 224-4TD00							
3VT9 215-4TF30	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		2/46, 2/58
3VT9 215-4TF00							
3VT9 224-4TF30	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		2/45, 2/59
3VT9 224-4TF00							
3VT9 203-4TF30	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		2/46, 2/59
3VT9 203-4TF00							
3VT9 200-4ED30	250						2/47
3VT9 200-4EE30	250						2/48
3VT9 200-4TN30	10/16	1,5 ... 2,54 ... 6 Cu flexible conductor					

2

Technical specifications

Description		Circuit breakers			Switch disconnector
Order numbers		**3VT2 725-2AA36/46/56-0AA0, 3VT2 725-3AA36/46/56-0AA0**			**3VT9 225-6DT00**
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		--			AC-23 B
• DC 440 V		--			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 16 kA 10 kA	100 kA 65 kA 25 kA 13 kA	AC 230 V AC 415 V AC 500 V AC 690 V	--
Rated short-circuit service breaking capacity (rms value) I_{cs}/U_e		30 kA 18 kA 8 kA 5 kA	50 kA 36 kA 13 kA 8 kA	AC 230 V AC 415 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 15 V, 4 kA/AC 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		✓/✓/✓/✓			
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		✓/✓			

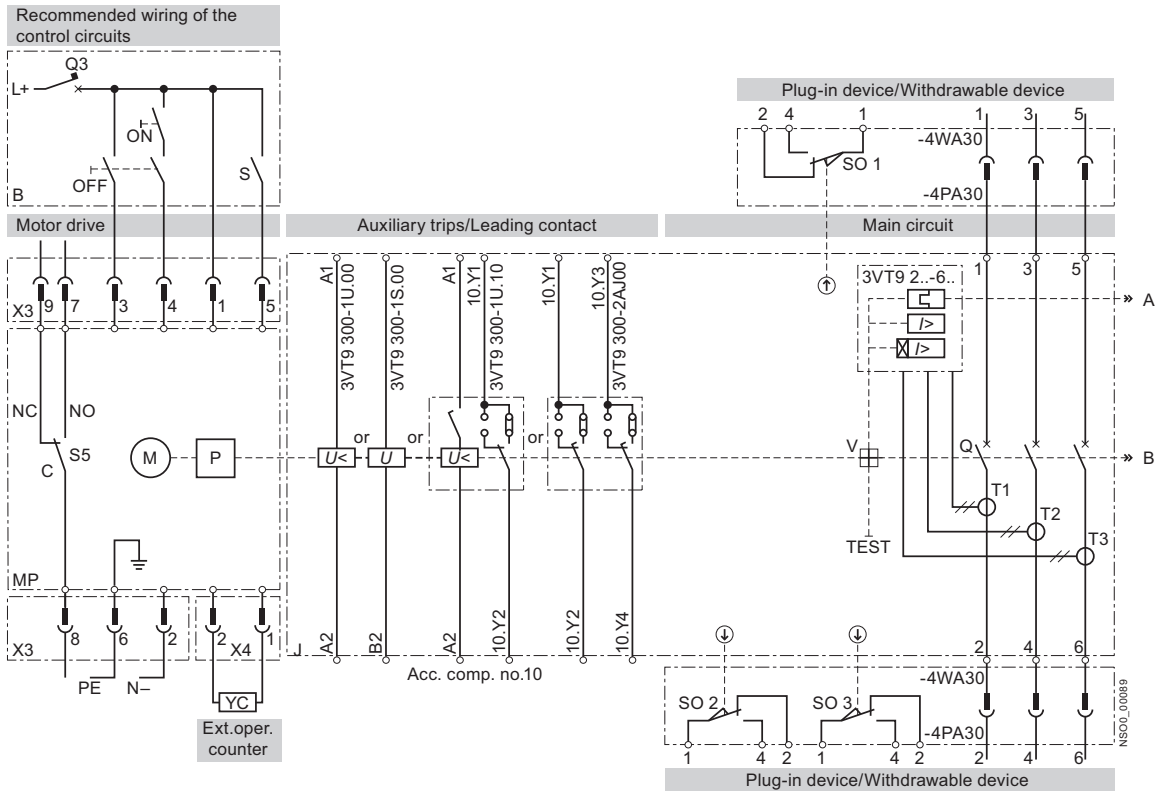
✓ available + in preparation

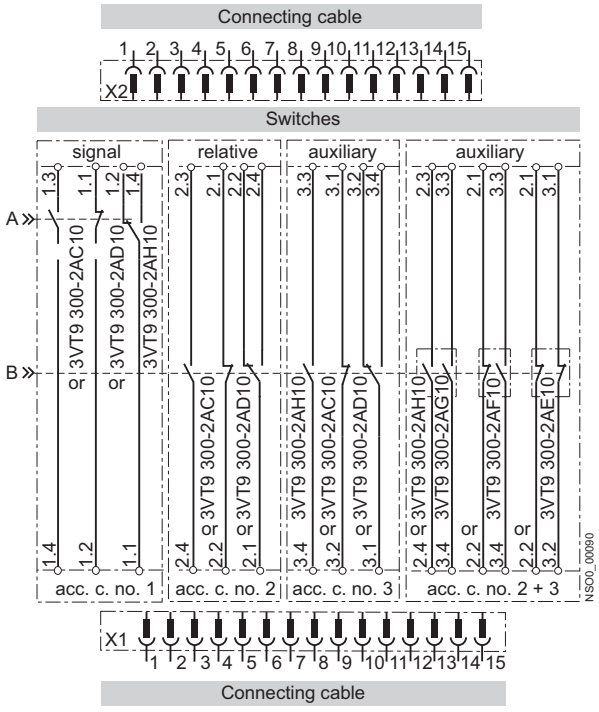
-- unavailable

Schematics

Circuit breakers with accessories

3-pole version

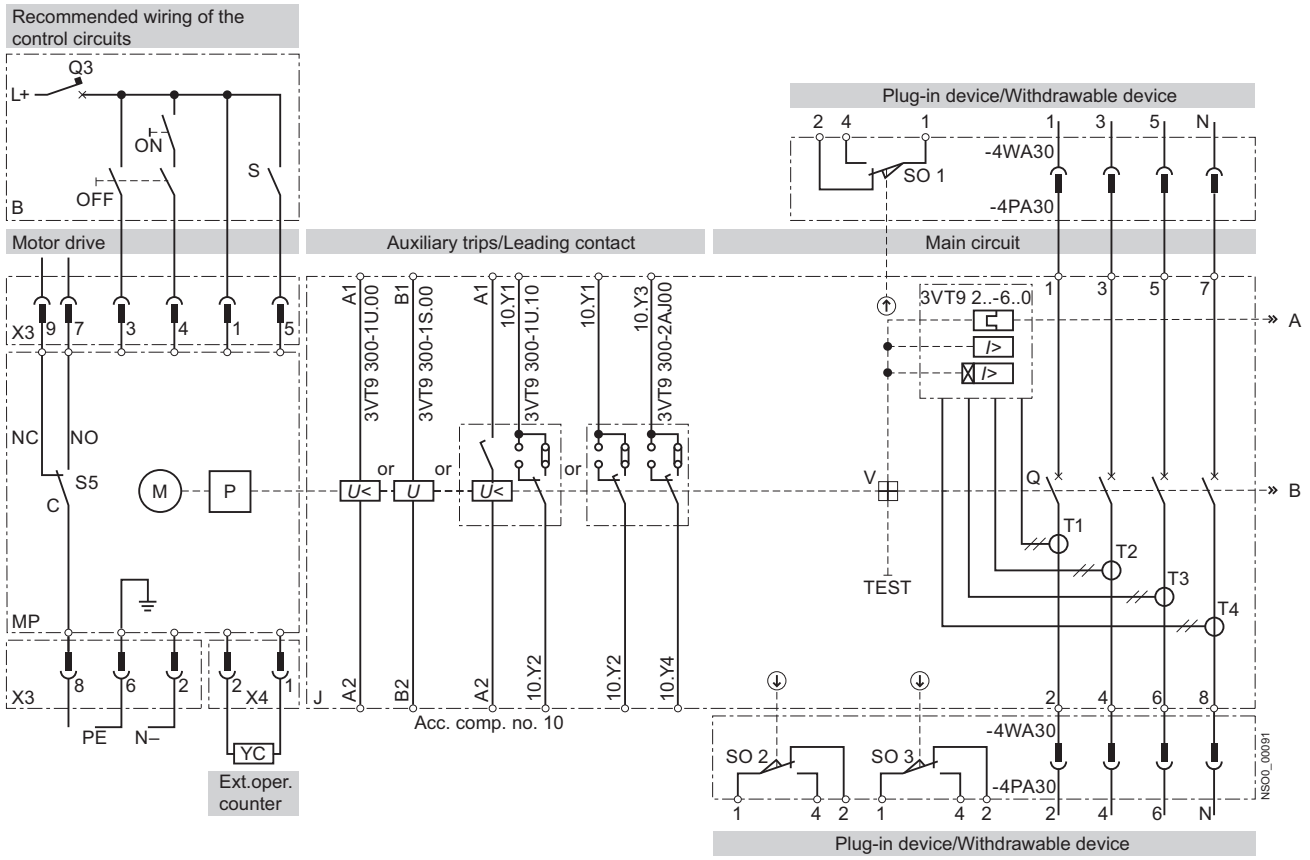


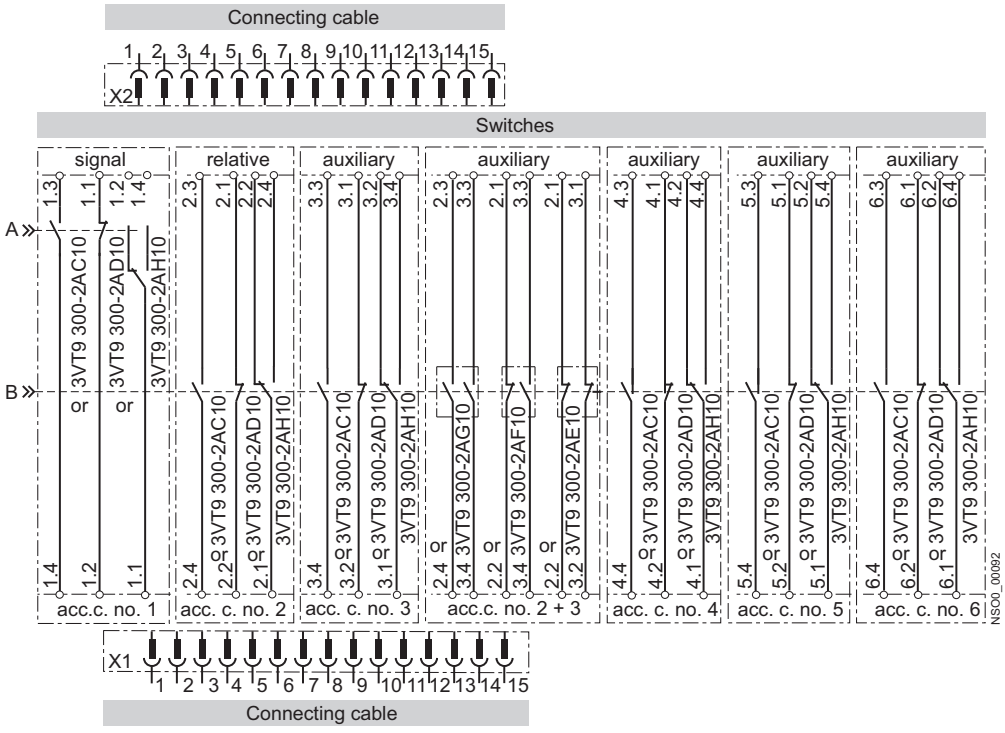


MP	3VT3 200-3M..0 motorized operating mechanism
M	Motor
P	Energy storage device
X3	Connector to connect control circuits
X4	Connector for external operations counter
S5	Switch to signal AUTO (NO-C) / MANUAL (NC-C) modes
YC	3VT9 300-3MF10 external operations counter
B	Recommended wiring of the control 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	3VT2 725-.AA36-0AA0 switching unit
Q	Main contacts
T1, T2, T3, T4[1)]	Current transformers
V	Trip-free mechanism
TEST	Pushbutton to test trip unit
3VT9 200-4PA30	3-pole plug-in base
3VT9 200-4WA30	3-pole withdrawable version base
X1, X2	3VT9 300-4PL00 connecting cable
SO1, SO2, SO3	Contacts signalling position of circuit breaker/switch disconnector in plug-in base or withdrawable version base (Position signalling switch 3VT9 300-4WL00)
3VT9 300-14.00	Undervoltage trip unit
3VT9 300-15.00	Shunt trip unit
3VT9 300-14.10	Undervoltage trip unit with leading contact
3VT9 300-2AJ00	Leading contact
acc. c. no.	Accessory compartment number

[1)] Only for 4-pole version of 3VT2 725-.AA46-0AA0 switching unit.

4-pole version





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.

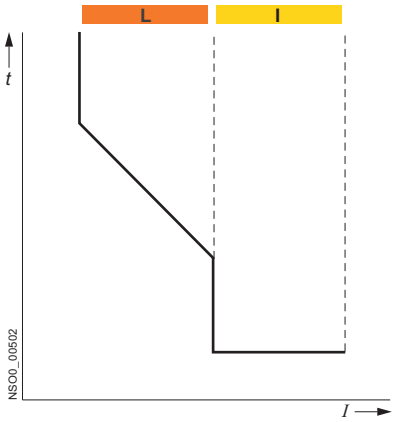
Trip units for 3VT2 switching units are available for current values of I_n = **100, 160 and 250 A**. The ETU LP feature rated currents of 160, 200 and 250 A. The trip units (including regulation of -60%) cover a current range **from 40 to 250 A**.

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).

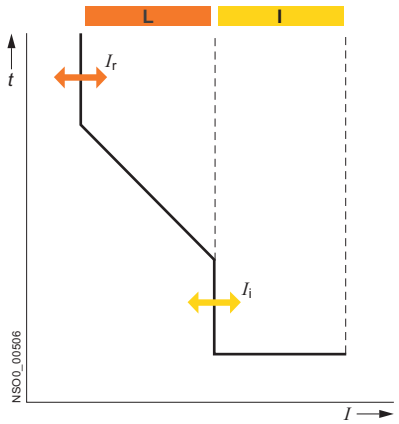
ETU LP, DP, MP and MPS trip units are intended for 3-pole 3VT2 725-.AA36-0AA0 switching units and 4-pole 3VT2 725-.AA46-0AA0 switching units with disconnecting of the N pole.

ETU LP trip units



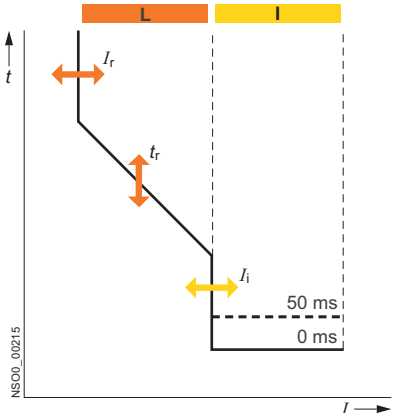
ETU LP trip units have one type of characteristic and fixed-set I_r and I_i settings.

ETU DP trip units



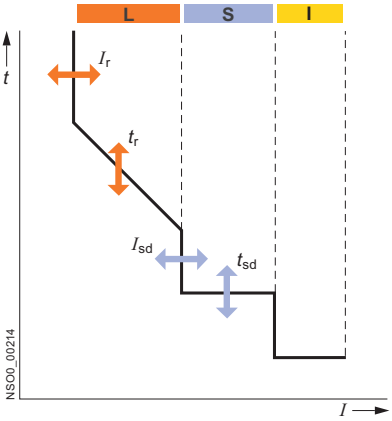
ETU DP trip units have one type of characteristic with adjustable I_r and I_i.

ETU MP trip units



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

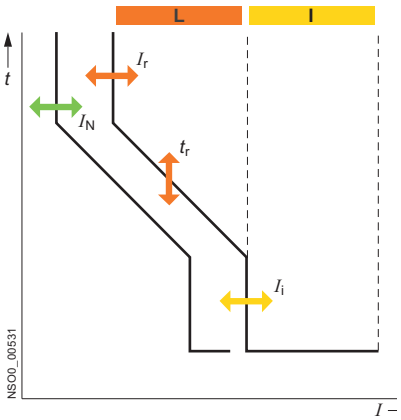
ETU MPS trip units



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 3VT2 725-AA56-0AA0 switching units with protected N pole. They have more characteristics with adjustable I_r , t_r , I_i and I_N.



Trip units

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_v. 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_v, where t_v 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_v.

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

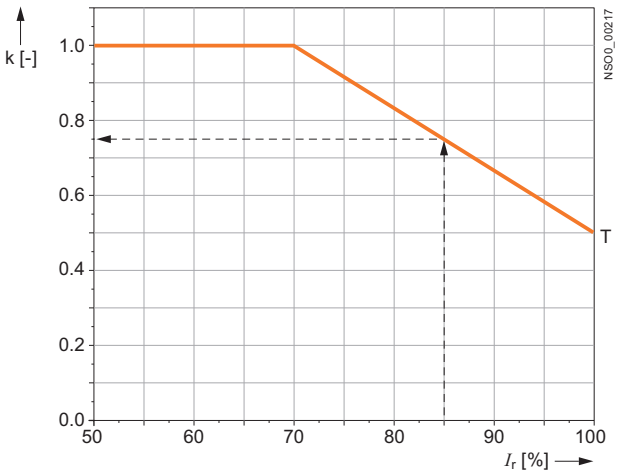
- For trip units **ETU DP, MP and DPN**, the time-independent instantaneous trip unit is adjusted with the I_{rm} switch. The I_{rm} switch is used for setting up the short-circuit current that, when reached or exceeded, causes instantaneous tripping of the circuit breaker.

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_v is cut short from the cold-state characteristic by the coefficient **k**.

The real tripping time is $t_s = k \times t_v$

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:

$t_s = 0.74 \times t_v$

k [–] time shortening coefficient

I_r [A] adjusted rated current of the trip unit

t_v [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

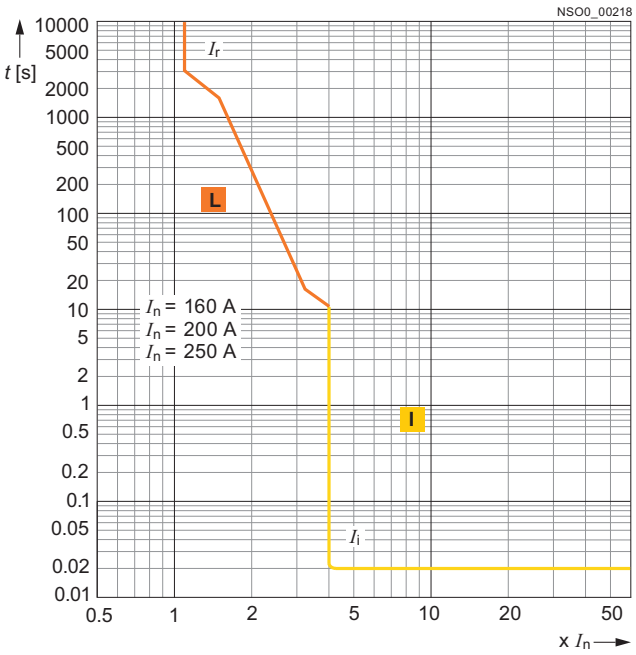
The 3VT9 2..-6AB00 trip unit is intended only for 3VT2725 -.AA36-0AA0 or 3VT2725 -.AA46-0AA0 switching unit. The LP trip unit has a thermal memory that cannot be disabled. The rated currents of the trip units are given by their order numbers and correspond to a standardized series of currents (see specifications table). The short-circuit trip unit is fixed-set at $4 \times I_n$.

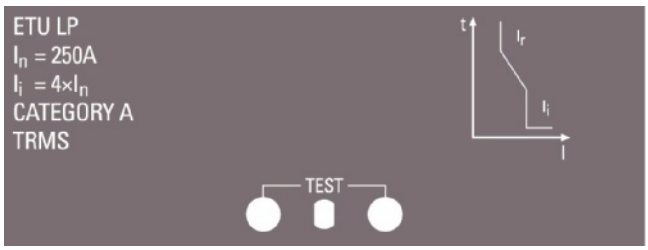
One of the advantages of the LP trip unit is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

Specifications

Order No.	Rated current I_n	Instantaneous short circuit protection I_r
	A	A
3VT9 216-6AB00	160	640
3VT9 200-6AB00	200	800
3VT9 250-6AB00	250	1000

Tripping characteristics





Trip units

Trip units ETU DP - Distribution protection

- Provides protection for lines and transformers

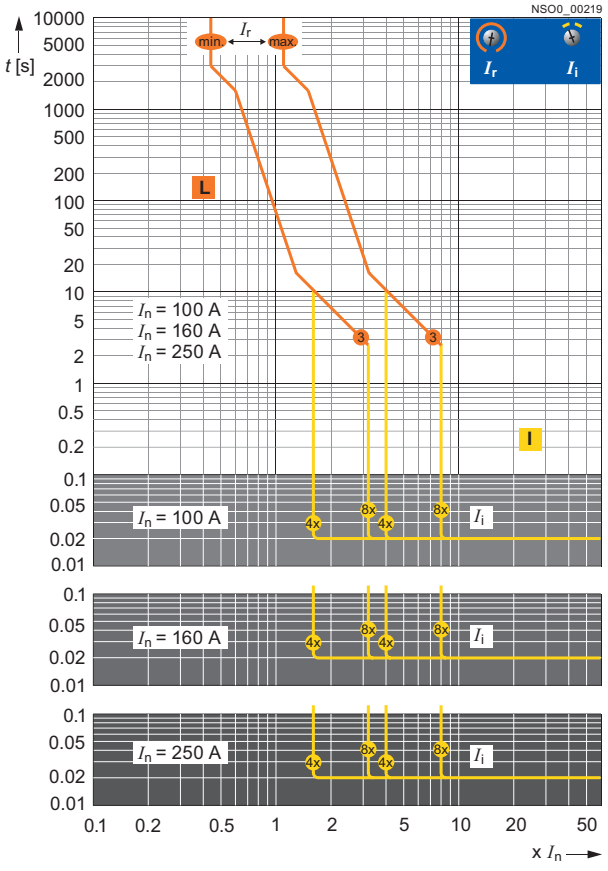
The 3VT9 2..-6AC00 trip unit is intended only for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ 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.

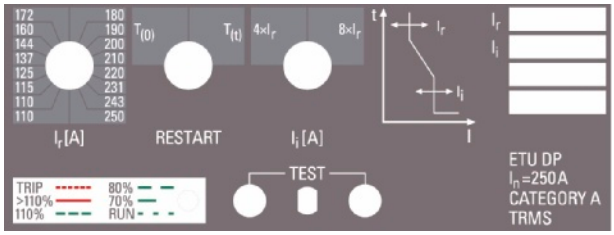
Located on the lower part of the DP trip unit cover are two photocells for communicating with the prospective signalling unit.

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

Order No.	Rated current I_n A	Overload protection I_r A	Restart	Instantaneous short circuit protection I_i
3VT9 210-6AC00	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
3VT9 216-6AC00	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
3VT9 225-6AC00	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

Trip units ETU MP - Motor protection

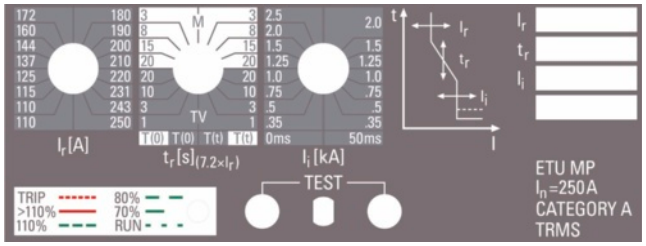
- Provides protection for motors and generators
- Can protect lines and transformers

The 3VT9 2..-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.

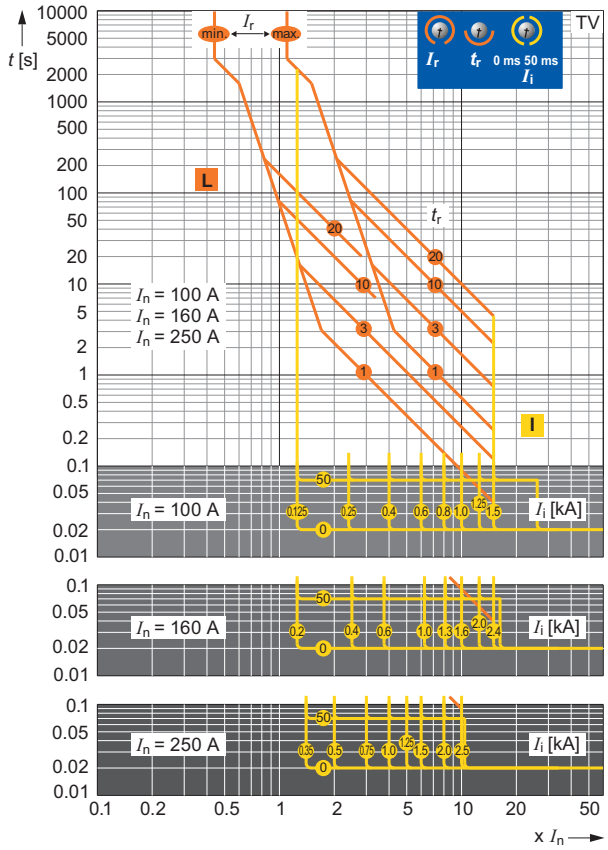


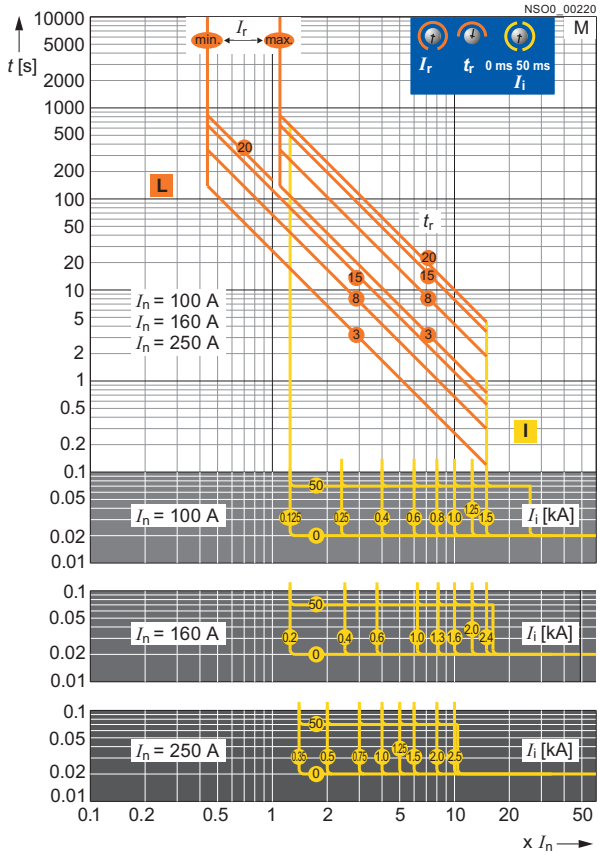
Adjustable specifications

Order 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	
3VT9 210-6AP00	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	
3VT9 216-6AP00	160	110	3 (M 3)	$T_{(0)}$	2,4	
		115	3 (M 3)	$T_{(t)}$	2,0	
		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	
3VT9 225-6AP00	250	172	3 (M 3)	$T_{(0)}$	2,5	
		180	3 (M 3)	$T_{(t)}$	2,0	
		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	

Trip units

Tripping characteristics





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

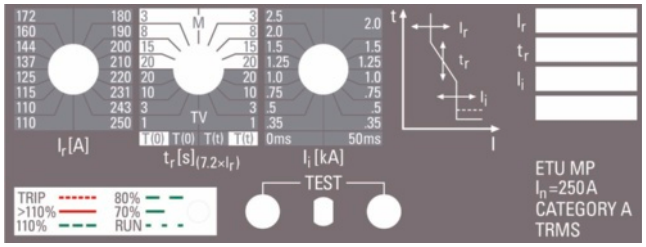
The 3VT9 2..-6AS00 trip unit is intended for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ 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.

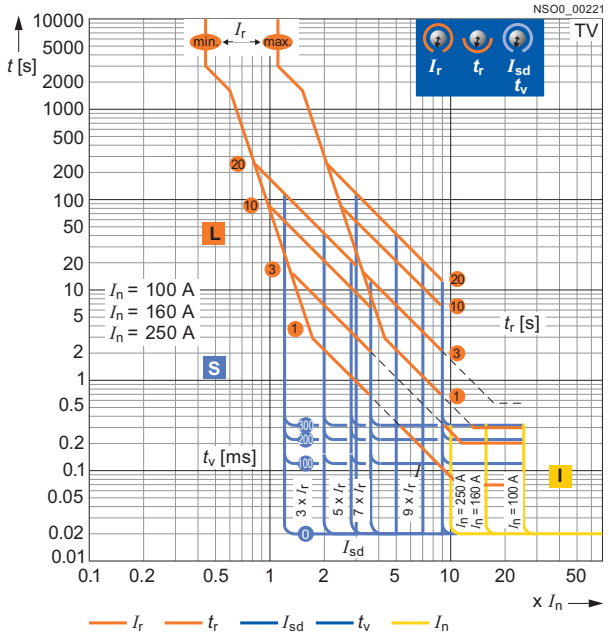


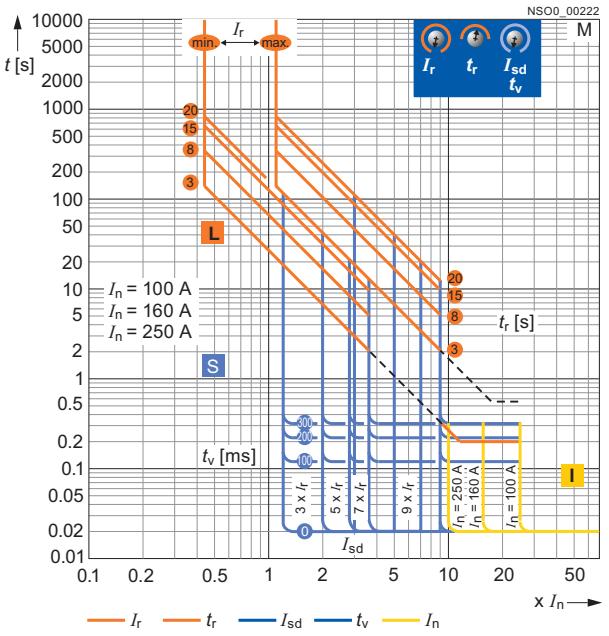
Adjustable specifications

Order 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		kA	ms
		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	
3VT9210-6AS00	100	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	
		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	
3VT9216-6AS00	160	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	
		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	
3VT9225-6AS00	250	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	

Trip units

Tripping characteristics





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 3VT9 2..-6BC00 trip unit is intended only for the 3VT2 725-.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.

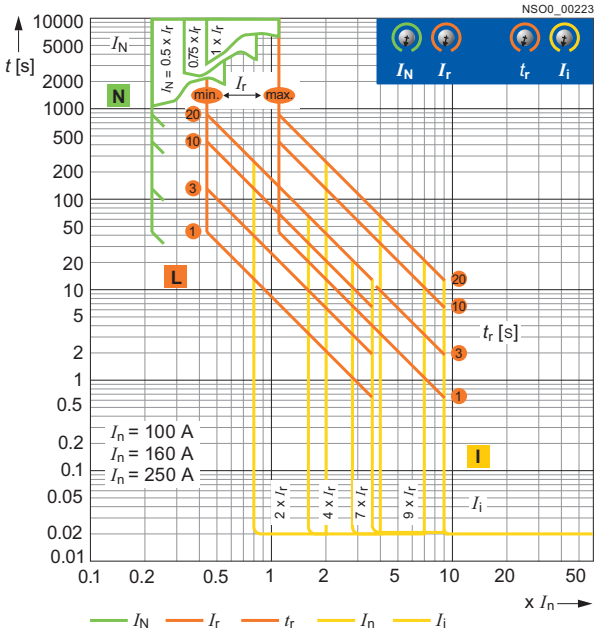
The rated current I_r, delay for switching off the trip unit at 7.2 I_r, and the tripping level of the short-circuit tripping can be adjusted.

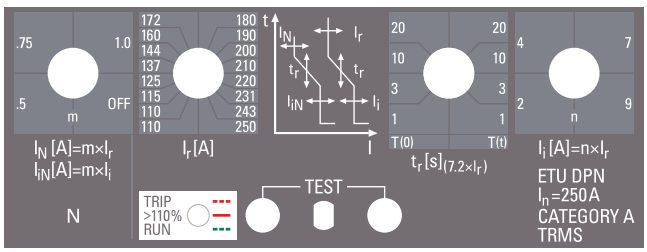
The operational state is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r, this LED will turn red and will begin to blink red just before tripping.

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



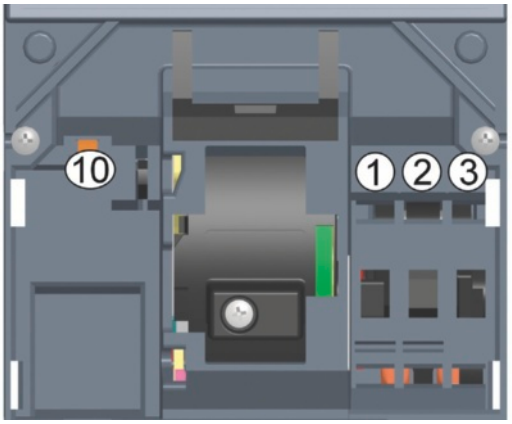


Adjustable specifications

Order 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	$T_{(0)}$	3	
		43		$T_{(0)}$	5	0
		46	3	$T_{(0)}$	7	
		48		$T_{(0)}$	9	
		50	10	$T_{(0)}$	3	
		55		$T_{(0)}$	5	100
		58	20	$T_{(0)}$	7	
3VT9 210-6BC00	100	61		$T_{(0}$	9	
		63	20	$T_{(t)}$	3	
		69		$T_{(t)}$	5	200
		72	10	$T_{(t)}$	7	
		76		$T_{(t)}$	9	
		80	3	$T_{(t)}$	3	
		87		$T_{(t)}$	5	300
		91	1	$T_{(t)}$	7	
		100		$T_{(t)}$	9	
		63	1	$T_{(0)}$	3	
		69		$T_{(0)}$	5	0
		72	3	$T_{(0)}$	7	
		80		$T_{(0)}$	9	
		87	10	$T_{(0)}$	3	
		91		$T_{(0)}$	5	100
		100	20	$T_{(0)}$	7	
3VT9 216-6BC00	160	110		$T_{(0)}$	9	
		115	20	$T_{(t)}$	3	
		120		$T_{(t)}$	5	200
		125	10	$T_{(t)}$	7	
		130		$T_{(t)}$	9	
		137	3	$T_{(t)}$	3	
		144		$T_{(t)}$	5	300
		150	1	$T_{(t)}$	7	
		160		$T_{(t)}$	9	
		100	1	$T_{(0)}$	3	
		110		$T_{(0)}$	5	0
		115	3	$T_{(0)}$	7	
		125		$T_{(0)}$	9	
		137	10	$T_{(0)}$	3	
		144		$T_{(0)}$	5	100
		160	20	$T_{(0)}$	7	
3VT9 225-6BC00	250	172		$T_{(0)}$	9	
		180	20	$T_{(t)}$	3	
		190		$T_{(t)}$	5	200
		200	10	$T_{(t)}$	7	
		210		$T_{(t)}$	9	
		220	3	$T_{(t)}$	3	
		231		$T_{(t)}$	5	300
		243	1	$T_{(t)}$	7	
		250		$T_{(t)}$	9	

Auxiliary switches

Overview



Location of accessory compartments in 3VT2 circuit breakers

Order number according to contact arrangement

Arrangement of contacts	Order No.	Number of contacts	Contact types
01	3VT9 300-2AC10 (20)	1	NO
20	3VT9 300-2AE10 (20)	2	NO
01	3VT9 300-2AD10 (20)	1	NC
02	3VT9 300-2AG10 (20)	2	NC
11	3VT9 300-2AF10 (20)	1 + 1	NC + NO
001	3VT9 300-2AH10 (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	Leading switch to make/break in advance of the main contacts

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

Function

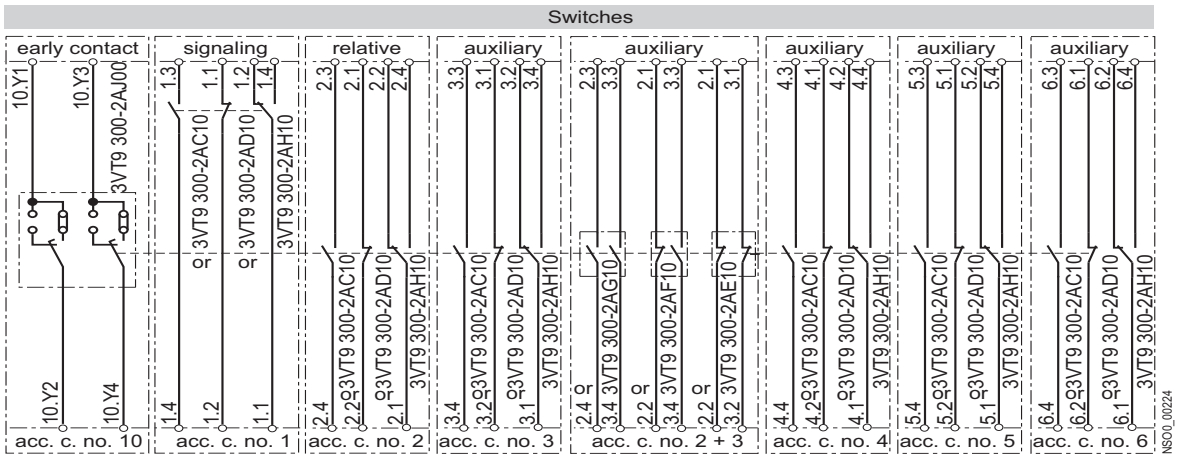
States of auxiliary switches located in the switching unit accessory compartments

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	
			3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AJ00	3VT9 300-1U.10	3VT9 300-2AG10		3VT9 300-2AF10		3VT9 300-2AE10		3VT9 300-2AH10		3VT9 300-2AH10		3VT9 300-2AH10	
Switched on	I	**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.

State of switches located in the switching unit accessory compartments



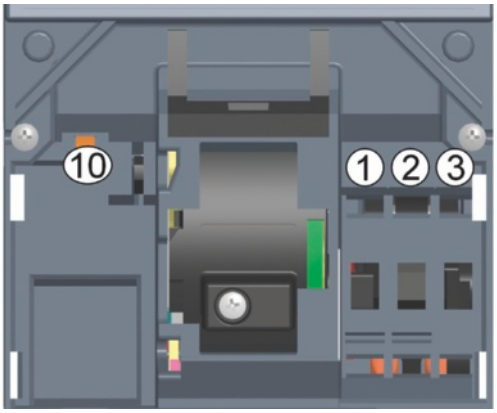
Technical specifications

Order No.		3VT9 300-2A.00	3VT9 300-2A.10[1)]	3VT9 300-2AJ00	3VT9 300-2AH10	3VT9 300-2AH20[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) 3VT9 300-2A.10 is not suitable for controlling electromagnetic loads

Auxiliary trip units

Overview



Location of accessory compartments 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.

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

Order No.	U_e
3VT9 300-1SC00	AC/DC 4, 40, 48 V
3VT9 300-1SD00	AC/DC 10 V
3VT9 300-1SE00	AC 230, 400, 500 V/DC 220 V

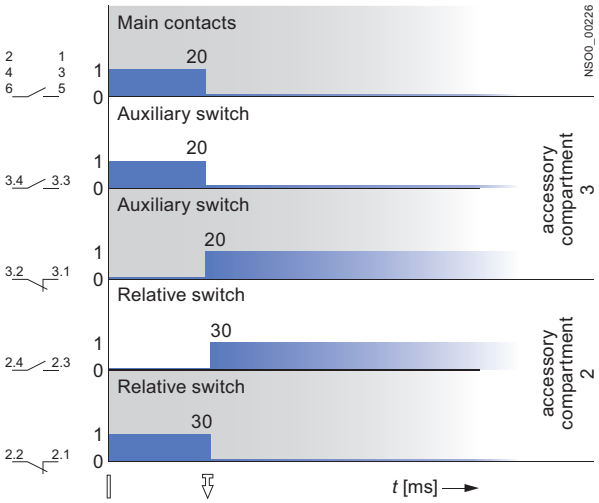
Order number of undervoltage trip units according to the rated operating voltage

Order No.	Rated operating voltage U_e
3VT9 300-1UC00	AC/DC 24, 40, 48 V
3VT9 300-1UD00	AC/DC 110 V
3VT9 300-1UE00	AC 230, 400, 500/DC 220 V

Function

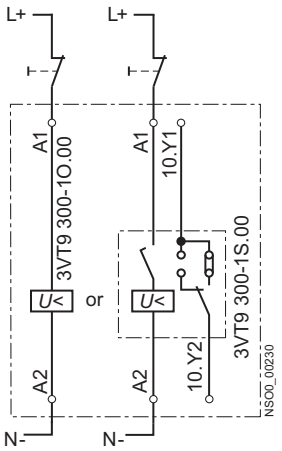
Shunt trip units

Circuit breaker switched off by the shunt trip unit



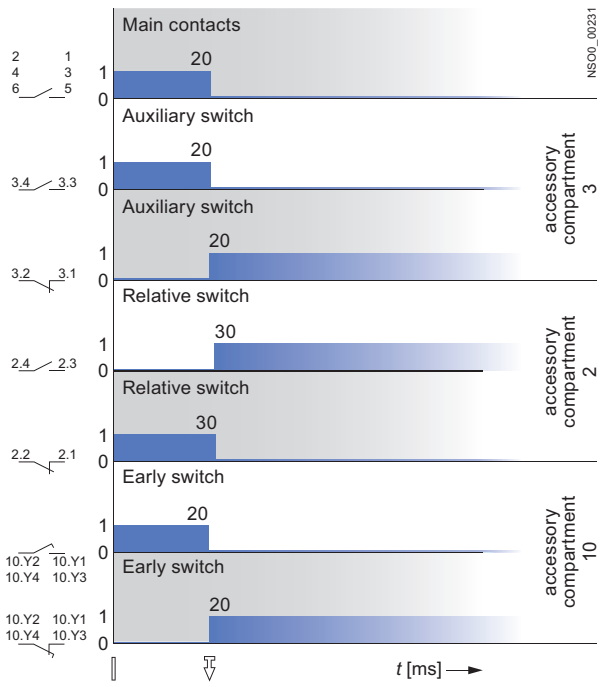
Circuit breaker states and toggle positions of the circuit breaker

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	



Undervoltage trip units

Circuit breaker switched off by the undervoltage trip unit

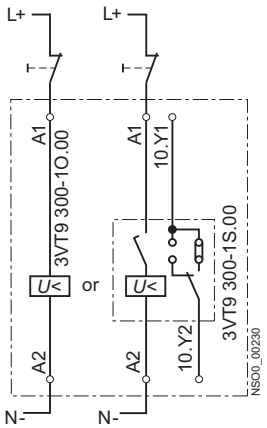


Circuit breaker states and toggle positions of the circuit breaker

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



Technical specifications

Shunt trip units

Order No.		3VT9 300-1S.00
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		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

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

Undervoltage trip units

Order No.		3VT9 300-1U.00	3VT9 300-1U.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

Rotary operating mechanisms

Overview

Rotary operating mechanism

The following components of the rotary operating mechanisms are required:

- To switch the switching unit:
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob
  - 3VT9 300-3HF20 red knob
- To switch the switching unit through the switchgear cabinet door:
  - 3VT9 300-3HJ..extension shaft
  - 3VT9 300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9 300-3HE/HF.. knob

Mechanical interlocks and mechanical interlock for parallel switching

- Mechanical interlocks for fixed-mounted versions require the following components:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9 200-3HE/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 3VT9 200-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9 200-3HE/HF.. knob

Design

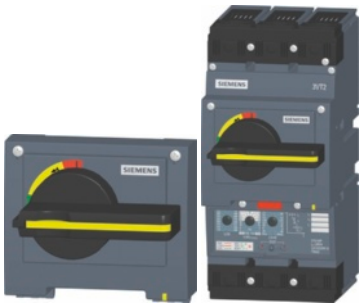


Fig. 1: Rotary operating mechanism with knob

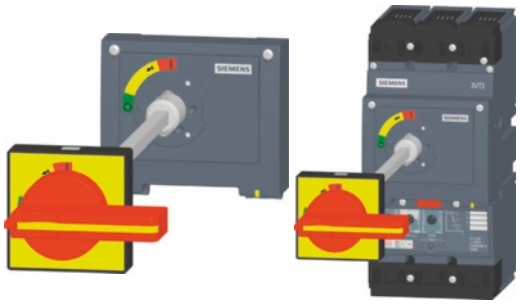


Fig. 2: Rotary operating mechanism with extension shaft, coupling driver and knob

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)

3VT9 200-3HA/HB.. rotary operating mechanism
+ 3VT9 300-3HE/HF.. knob

Operation through the switchgear cabinet door (Fig. 2)

3VT9 200-3HA/HB.. rotary operating mechanism
+ 3VT9 300-3HJ.. extension shaft
+ 3VT9 300-3HE/HF.. knob
+ 3VT9 300-3HG/HH.. coupling driver

Operation through side wall of switchgear cabinet

3VT9 200-3HC/HD10.. rotary operating mechanism
+ 3VT9 300-3HJ.. extension shaft
+ 3VT9 300-3HE/HF.. knob
+ 3VT9 300-3HG/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 2/30).

Features

Order 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	
3VT9 200-3HA10	Rotary operating mechanism	grey	no	--	--	--	--
3VT9 200-3HA20	Rotary operating mechanism	grey	yes	--	--	--	--
3VT9 200-3HB20	Rotary operating mechanism	yellow	yes	--	--	--	--
3VT9 200-3HC10	Rotary operating mechanism	grey	no	--	--	--	--
3VT9 200-3HD10	Rotary operating mechanism	grey	no	--	--	--	--
3VT9 300-3HE10	Knob	black	no	--	--	--	--
3VT9 300-3HE20	Knob, lockable with padlock	black	yes	--	--	--	--
3VT9 300-3HF20	Knob, lockable with padlock	red	yes	--	--	--	--
3VT9 300-3HG10	Coupling driver	black	--	IP40	yes	yes	--
3VT9 300-3HG20	Coupling driver	yellow	--	IP40	yes	yes	--
3VT9 300-3HH10	Coupling driver	black	--	IP66	yes	no	--
3VT9 300-3HH20	Coupling driver	yellow	--	IP66	yes	no	--
3VT9 300-3HJ10	Extension shaft, can be shortened	--	--	--	--	--	365
3VT9 300-3HJ20	Extension shaft, telescopic	--	--	--	--	--	245 ... 410

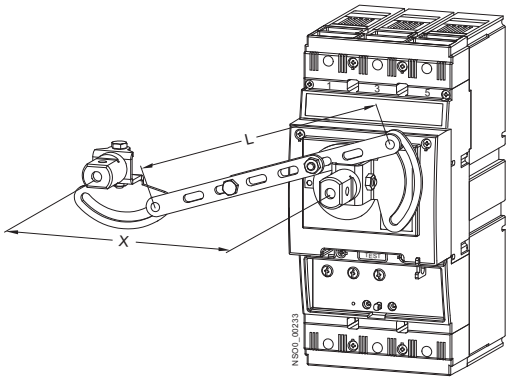
Mechanical interlocking and parallel switching

Function

3VT9 300-8LA00 Mechanical interlocking

Mechanical interlocks 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 interlock it is required to comply with the dimensions shown in the figure and in the table.

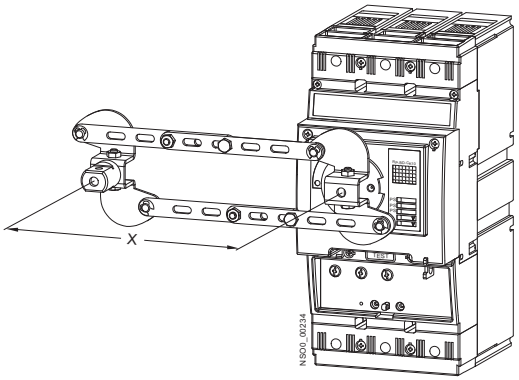


Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2 3P	105	112	140	145.5	122.5	128.5	181	185.5
3VT2 4P	105	112	140	145.5	122.5	128.5	181	185.5
3VT3 3P	122.5	128.5	157.5	145.5	140	145.5	185	189
3VT3 4P	122.5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

3VT9 300-8LB00 Mechanical parallel switching

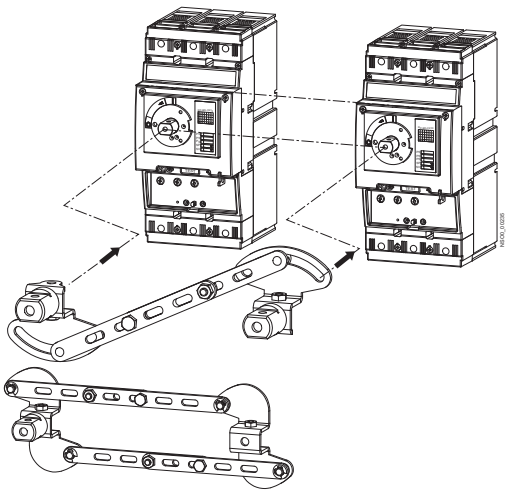
Mechanical interlocks for parallel switching are for simultaneous switching of two circuit breakers. Parallel switching can be used between two 3VT2 circuit breakers or between 3VT2 and 3VT3 circuit breakers. Each circuit breaker must be furnished with a rotary operating mechanism and at least one of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

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



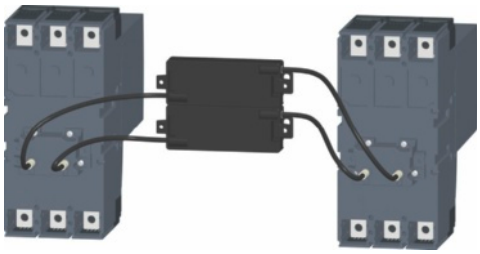
Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole[1]	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2 3P	105^{+7}	112^{+7}	140^{+7}	145.5^{+7}	122.5^{+7}	128.5^{+7}	x	x
3VT2 4P	105^{+7}	112^{+7}	140^{+7}	145.5^{+7}	122.5^{+7}	128.5^{+7}	x	x
3VT3 3P	122.5^{+7}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



Mechanical interlocking and parallel switching

3VT9 300-8LC.0 Mechanical interlocking

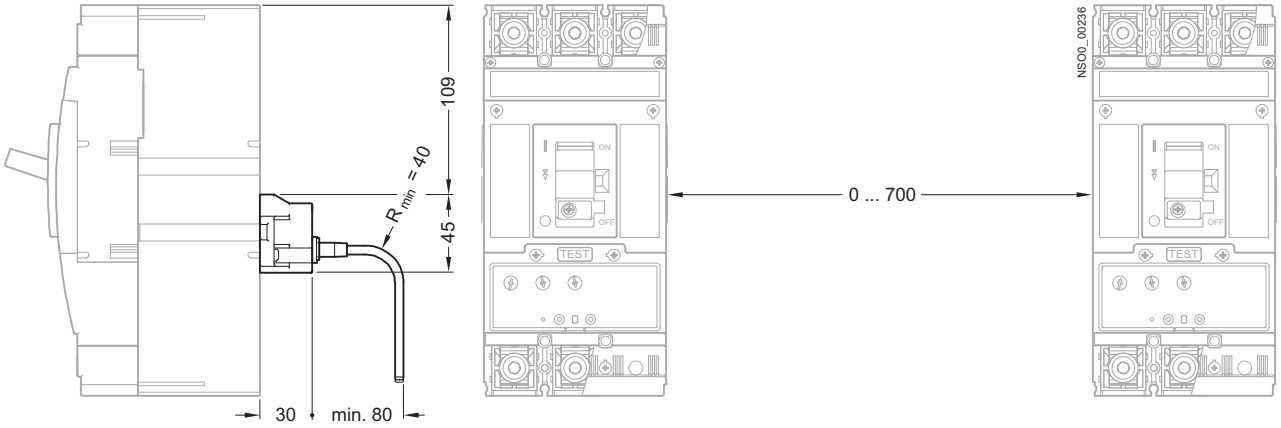


- Provides mechanical interlocking of two circuit breakers/ switch disconnectors, so that they cannot both trip simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- The 3VT9 200-8LC10 mechanical interlocking is intended for two 3VT2 circuit breakers. 3VT9 300-8LC20 interlocking is intended for one 3VT2 circuit breaker and one 3VT3.
- Circuit breakers can be delivered in fixed-mounted, plug-in and withdrawable versions.

Order No. of mechanical interlocking	3VT9 200-8LC10	3VT9 300-8LC20
Circuit breaker types	3VT2	3VT3
	3VT2	3VT2

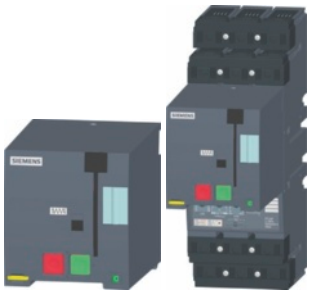
Circuit breaker installation in switchgear and controlgear assemblies

Detailed information is included in the "Instructions for use", which is available on our website:
www.siemens.com/technical assistance



Motorized operating mechanism

Design



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 50 ms. Releasing the spring energy storage unit and tripping the circuit breaker is ensured by a closing coil. The motorized operating mechanism can trip the circuit breaker in 800 ms. 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. Furthermore, this position makes it is possible to control the circuit breaker with the pushbuttons located on the motorized operating mechanism front panel.
- 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. 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 3VT9 300-3MF20 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 3VT9 300-3MF00 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.

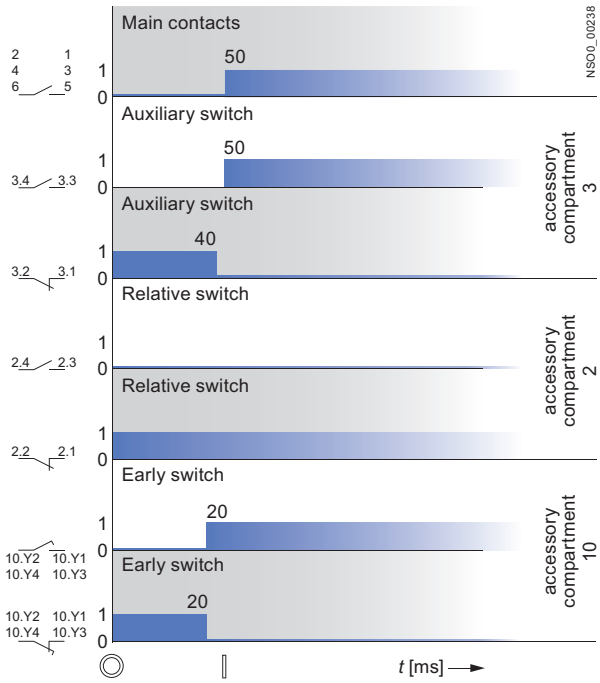
Order No.		3VT9 200-3M..0
Operational voltage U_e	V	AC 24, 48, 110, 230, 400, 500 DC 24, 48, 110, 220
Rated frequency f_n	Hz	50/60
Control pulse length for storing	ms	400 ... ∞[1)]
Control pulse length	ms	20 ... 700[1)], 400 ... ∞[1)]
Time before switching on	ms	< 50
Time before switching off	ms	800
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		LSN 4C/1; LSN 2C/1
• DC 24, 48, 110 V; DC 220 V		LSN-DC 4C/1; LSN-DC 2C/1
Rated operating current AUTO/MANUAL switches I_e/U_e	V	AC 5 A/250 DC 0.5A/250
Order No.		3VT9 300-3MF00
Number of conductors		12
Conductor cross sections S	mm^2	0.35
Conductor lengths	cm	60

[1)] For sequence of control pulses, see 2/36.

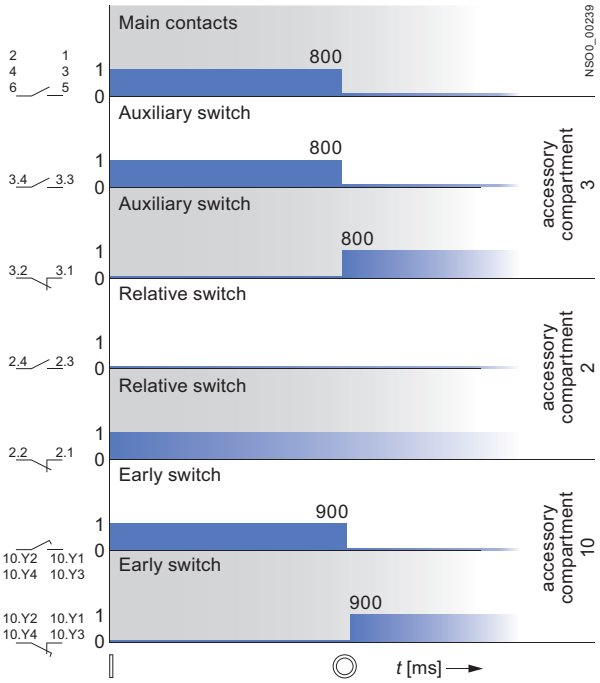
Function

Circuit breaker switched on/off by the motorized operating mechanism

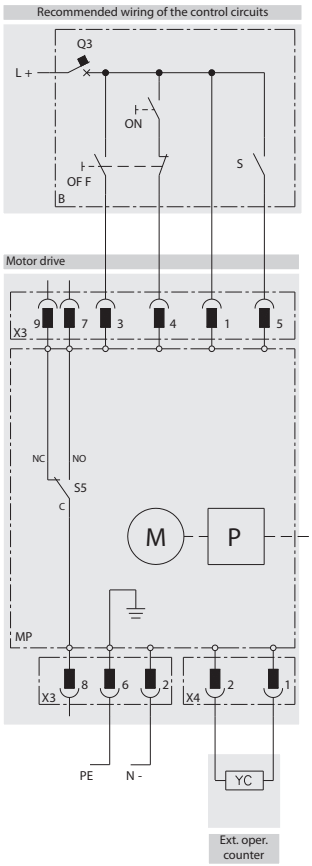
Circuit breaker switched on by the motorized operating mechanism – electrically by pushbutton ON



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

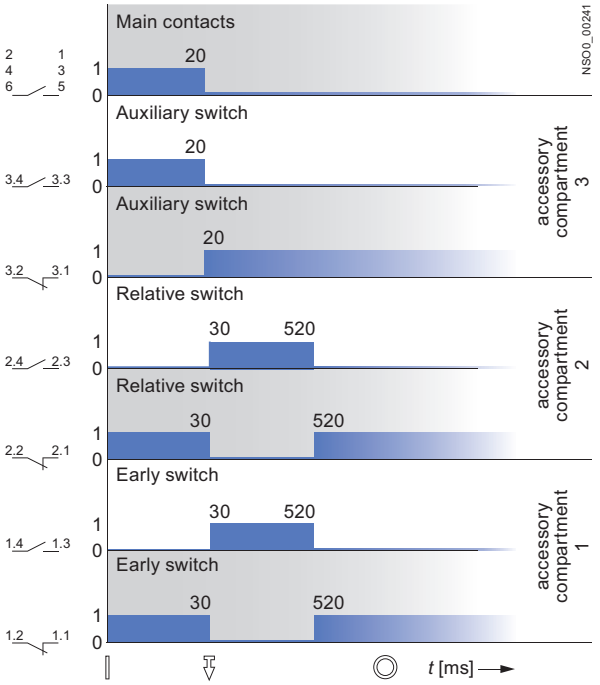
Circuit breaker state	Toggle positions of circuit breaker
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

Wiring diagram description

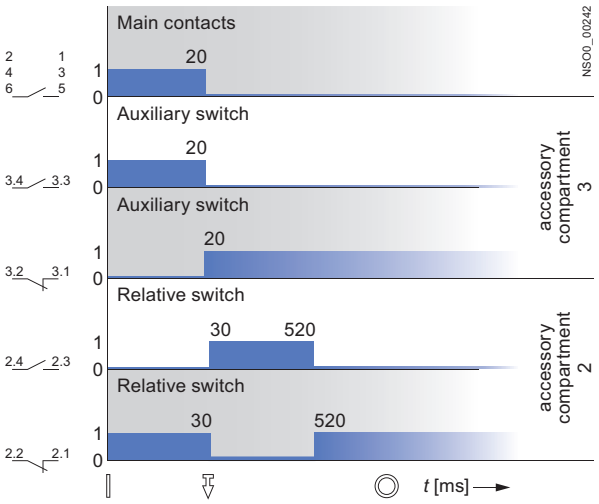
Symbol	Description
MP	3VT9 200-3M..0 motorized operating mechanism
M	Motor
P	storage mechanism
X3	Connector to connect control circuits
X4	Connector for external operations counter
S5	Switch indicating AUTO/MANUAL modes
YC	external 3VT9300-3MF10 operations counter
B	recommended wiring of the control 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

Motorized operating mechanism

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

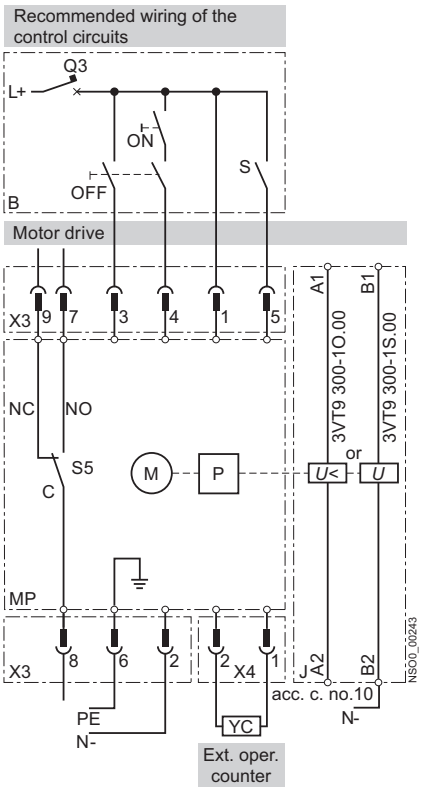


Tripping of the circuit breaker with motorized operating mechanism by a shunt trip unit or undercurrent trip unit (switch S – automatic spring charging)

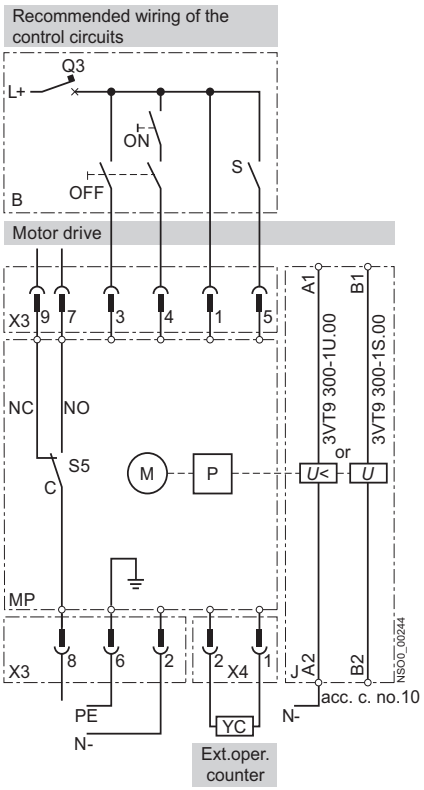


Wiring diagram

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

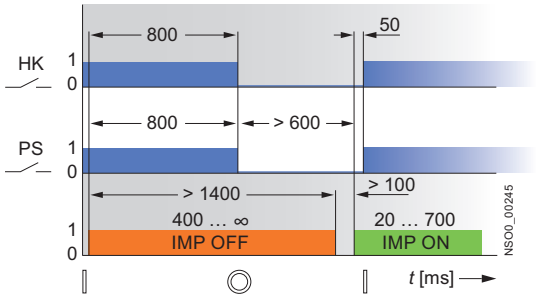


Circuit breaker switched on by motorized operating mechanism (electrical ON signal) and switched off by the undervoltage trip unit

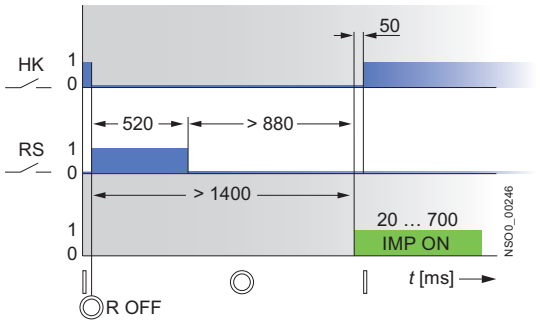


Recommended actuating pulses

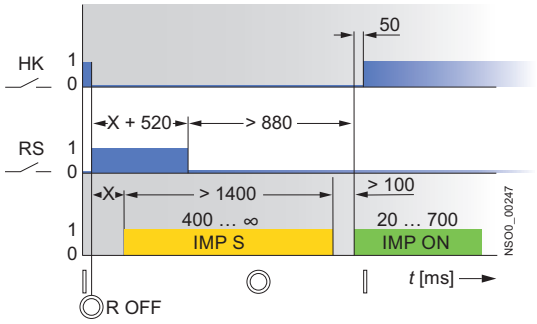
Circuit breaker switched on/off by motorized operating mechanism – switch S permanently closed (automatic spring charging) or open



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

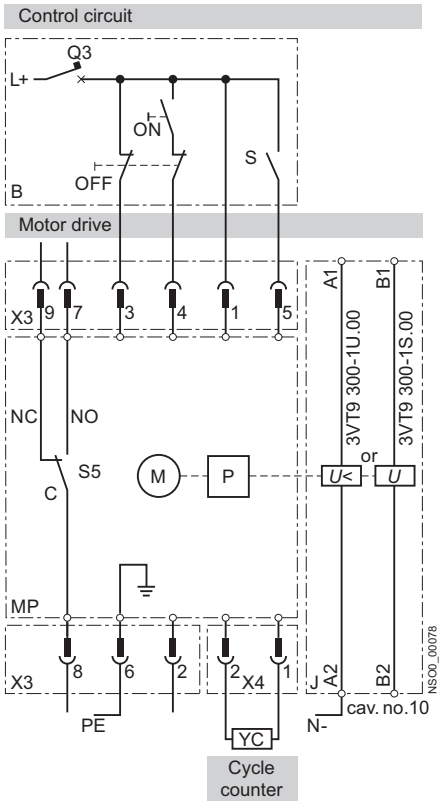
Circuit breaker states and toggle positions of the circuit breakers

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	

Motorized operating mechanism

Use of 3VT9 200-3M..0 motorized operating mechanism in the automatic standby system

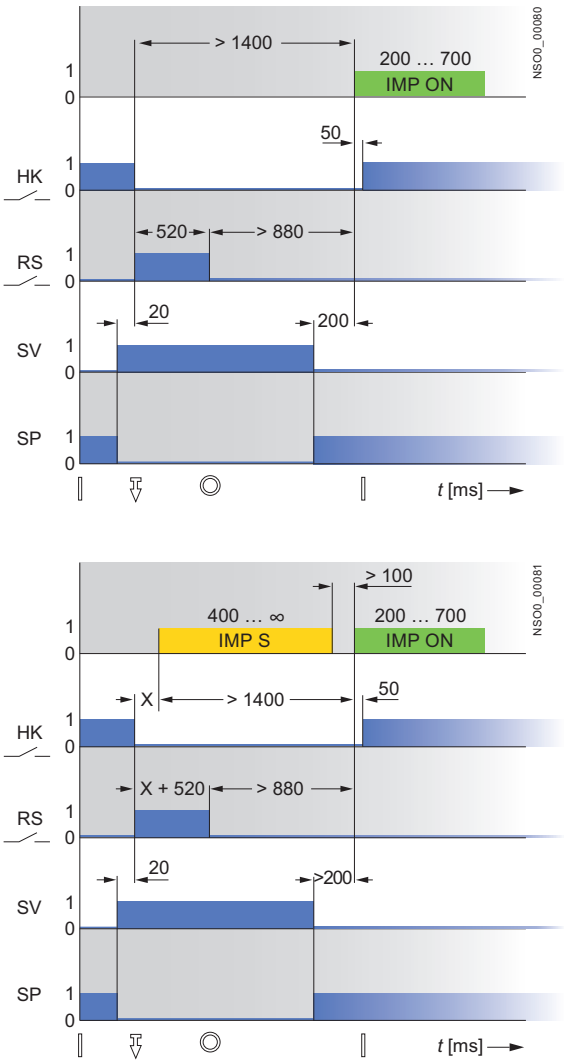
Wiring diagram of the motorized operating mechanism of the circuit breaker



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 3VT9 300-3MF10 cycle counter
B	Recommended connection of control circuits (is not included in the motorized operating mechanism supply)
ON	Pushbutton
OFF	Pushbutton
S	Switch for storage (closed = automatic storage; it can be closed permanently)
Q3	Motorized operating mechanism circuit breaker- see page 2/32

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 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

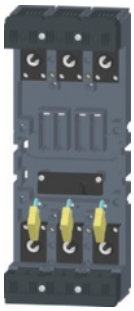


Symbol	Description
HK	Main contacts
RS	Relative switch
SV	Pulse for shunt trip unit
SP	Pulse for undervoltage trip unit
IMP ON	Motorized operating mechanism make pulse
IMP OFF	Motorized operating mechanism storage pulse (generated by S switch)
	Switched on
	Switched off by trip units, TEST or REVISION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

Overview

Plug-in bases

3VT9 200-4PA30
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 3VT2 725-.AA36-0AA0 switching unit.

Main circuit

- The 3VT9 200-4TA30 connecting set is used for connecting with busbars or cable lugs and is included in the scope of supply of the 3VT9 275-.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 3VT9 300-4PL00 15-wire cable.

Coding

3VT9 200-4WN00 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

3VT9 300-4WL00 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 3VT9 300-4WL00 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

Order No.		3VT9 300-4WL00
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

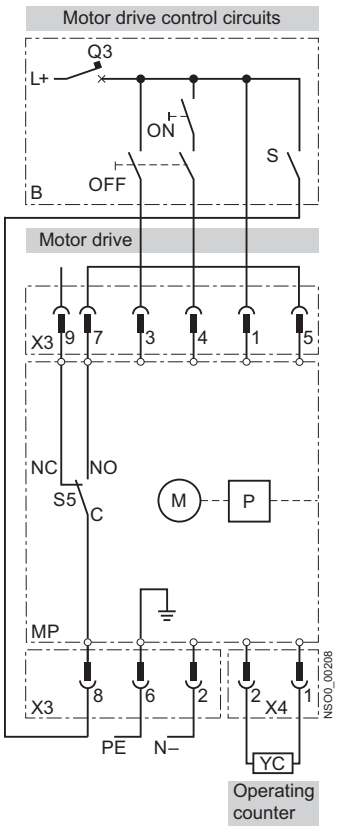
A wiring diagram showing the circuit breaker situated in a plug-in mounting base and outfitted with accessories, is shown on page 2/13.

Plug-in base with motorized operating mechanism

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

Mounting accessories for plug-in version

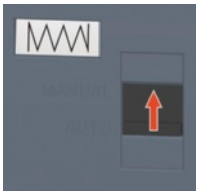
Recommended wiring of the circuit breaker in plug-in design with motorized operating mechanism



Symbol	Description
MP	3VT9 300-3M..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	3VT9 300-3MF10 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 LSN 4C/1 AC 48 V LSN 4C/1 AC 110 V LSN 4C/1 AC 230 V LSN 2C/1 DC 24 V LSN-DC 4C/1 DC 48 V LSN-DC 4C/1 DC 110 V LSN-DC 4C/1 DC 230 V LSN-DC 2C/1

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.



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	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10		3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT 9300-2AC10	3VT9 300-2AD10
															
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

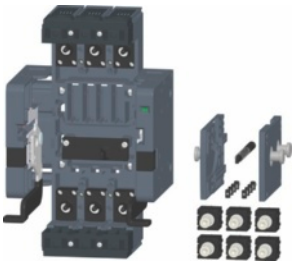
[1] Accessory compartments 4, 5, 6 are for 4-pole version only.

Mounting accessories for withdrawable version

Design

Withdrawable version mounting base

Circuit breaker installed in withdrawable version base



3VT9 200-4WA30 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 3VT9 200-4TA30 connecting set is used for connecting with busbars or cable lugs and is included in the scope of supply of the 3VT2 725-.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 3VT9 300-4PL00 15-wire cable.

Coding

3VT9 200-4WN00 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

3VT9 300-4WL00 position signalling switch

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

Technical specifications

Order No.		3VT9 300-4WL00
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 2/13.

States of 3VT9 300-4WL00 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

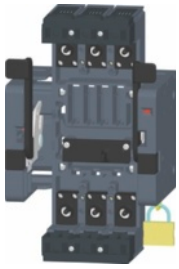
0 = contact open; 1 = contact closed

[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”)

Locking

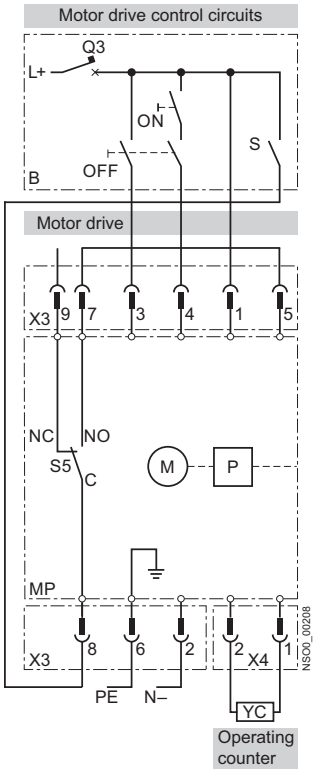
Locking the circuit breaker in withdrawable version base against tampering



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

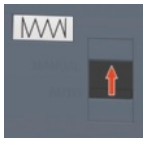


Description

Symbol	Description
MP	3VT9 300-3M..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	3VT9 300-3MF10 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 LSN 4C/1 AC 48 V LSN 4C/1 AC 110 V LSN 4C/1 AC 230 V LSN 2C/1 DC 24 V LSN-DC 4C/1 DC 48 V LSN-DC 4C/1 DC 110 V LSN-DC 4C/1 DC 230 V LSN-DC 2C/1

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.



Mounting accessories for withdrawable version

Switches in the accessory compartments of the switching unit

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

Circuit breaker before insertion		State before inserted/withdrawn position							State after inserted/withdrawn position					
Circuit breaker before withdrawal		State of switches before insertion - withdrawn position →							State of switches after insertion - connected position					
		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.

Overview

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

Fixed-mounted version

Front connection

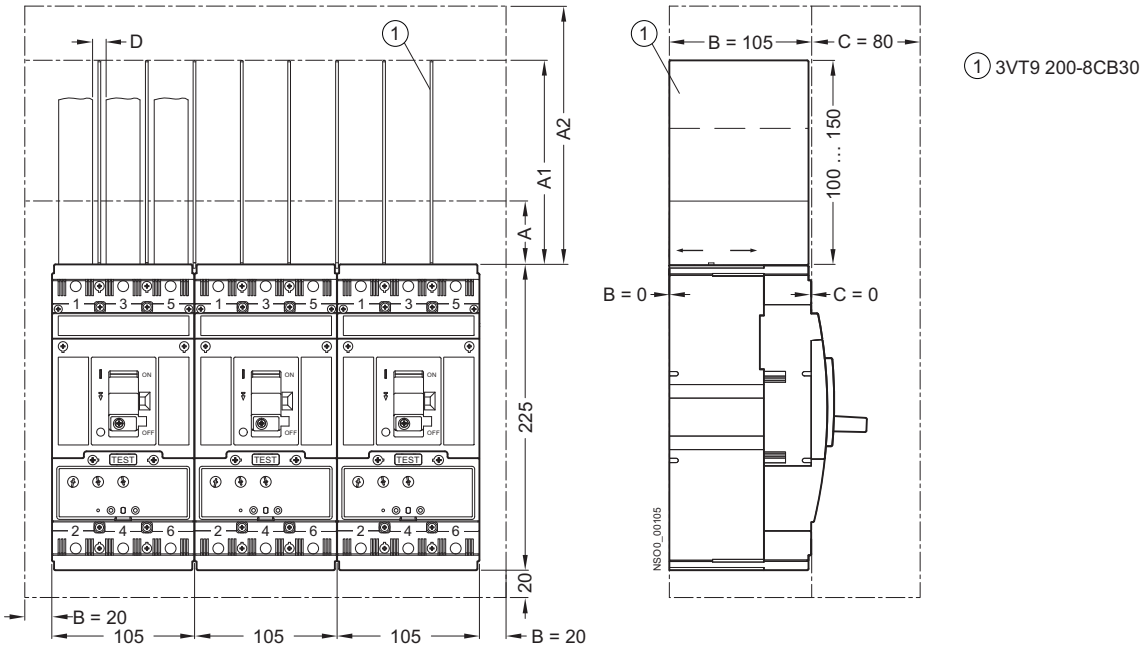
- Terminals 1, 3, 5
  - If U_e = AC 415 V, it is necessary to use 3VT9 300-8CE30 insulating barriers or 3VT9 200-8CB30 terminal covers.
  - If insulated conductors are not used for connecting the main circuit to terminals 1, 3, 5, flexibars or rear connection, it is necessary to use 3VT9 300-8CE30 insulating barriers or a 3VT9 200-8CB30 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 3VT9 300-8CE30 insulating barriers or a 3VT9 200-8CB30 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 3VT9 300-8CE30 insulating barriers or 3VT9 300-8CB30 terminal covers.

Rear connection

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

Plug-in and withdrawable versions

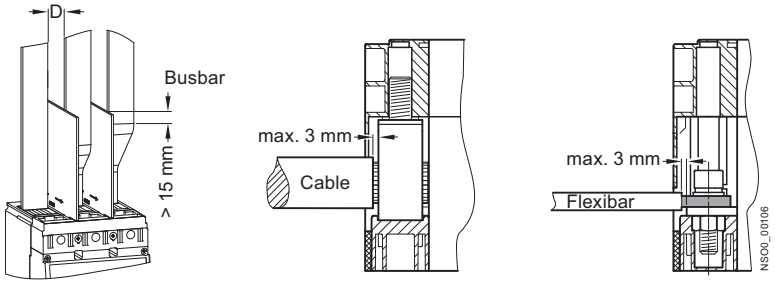
Neither insulating barriers nor terminal covers have to be used.



1 3VT9 200-8CB30

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 3VT9 300-8CE30 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

Insulating barriers and terminal covers

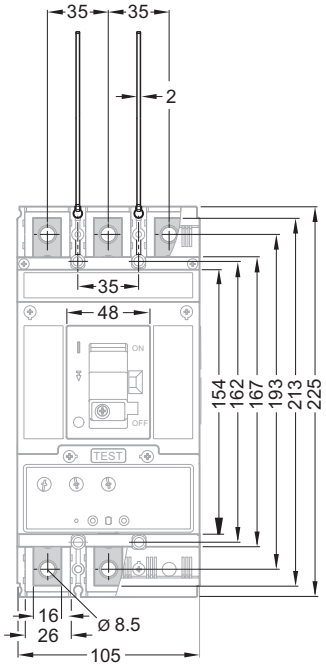


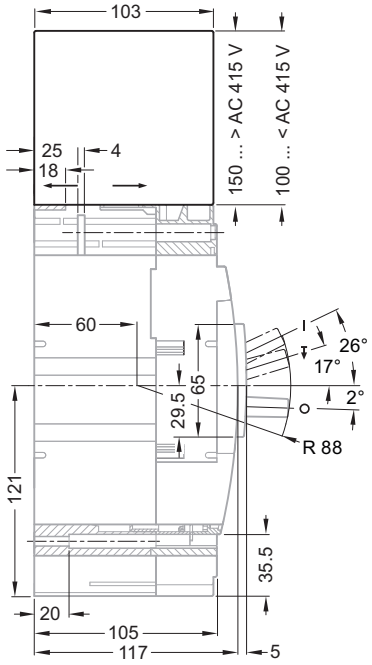
AC U_e			230 V	415 V		500 V	690 V
3VT2 H wired with I_k [1]			≤ 100 kA	> 36 ... 65 kA	≤ 36 kA	≤ 25 kA	≤ 13 kA
3VT2 N wired with I_k			≤ 60 kA		≤ 36 kA	≤ 16 kA	≤ 10 kA
C < 80 mm		A (mm)	50	50	50	50	50
	D ≥ 10 mm	A1 (mm)	100	150	100	150	150
		A2 (mm)	200	250	200	250	250
		A (mm)	50	50	50	50	50
	D ≥ 30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

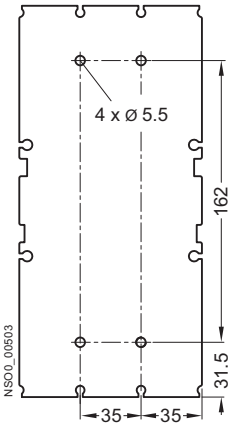
Dimensional drawings - 3-pole, fixed-mounted version

Fixed-mounted version, front connection

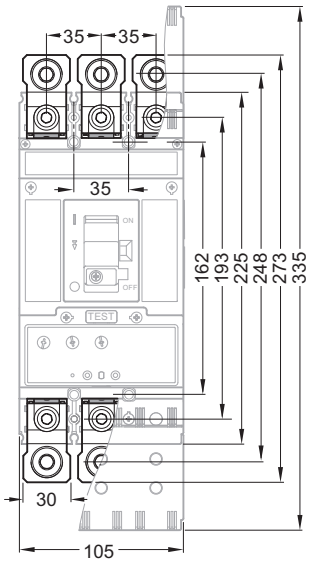


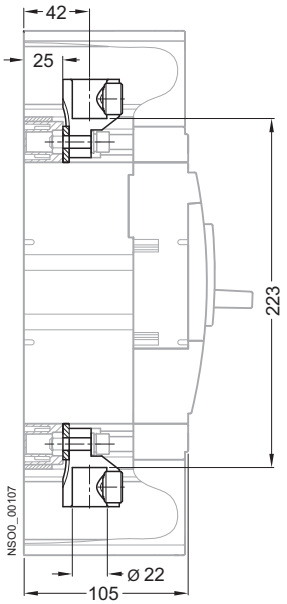


Drilling pattern



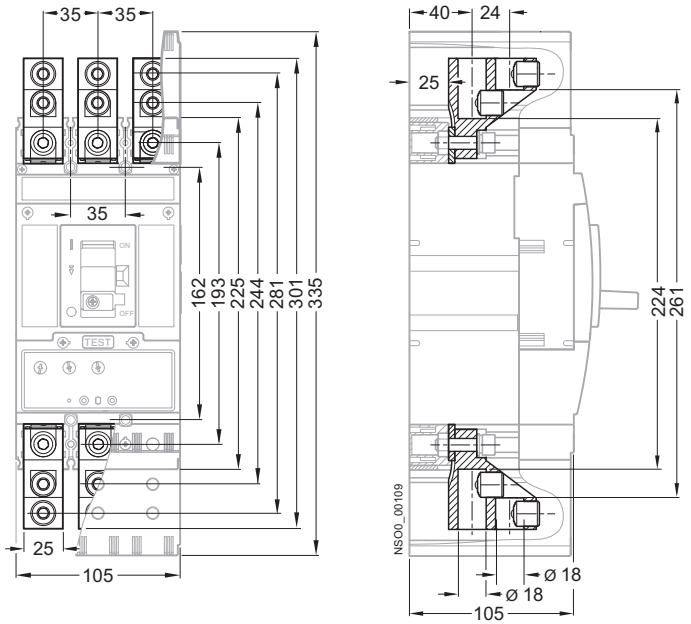
Fixed-mounted version, front connection (3VT9 224-4TD30 connecting set)



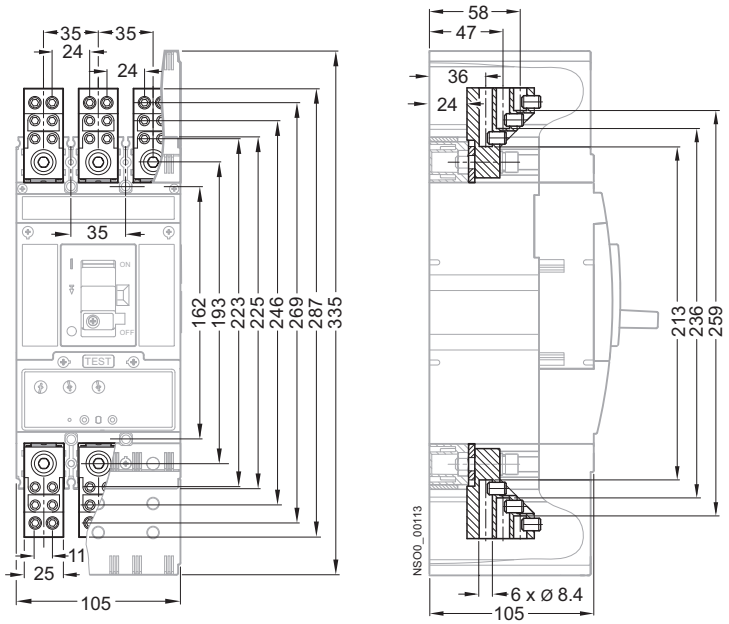


Dimensional drawings

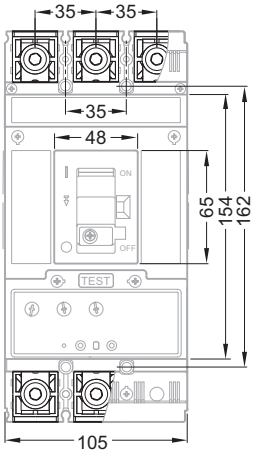
Fixed-mounted version, front connection (3VT9 215-4TF30 connecting set)

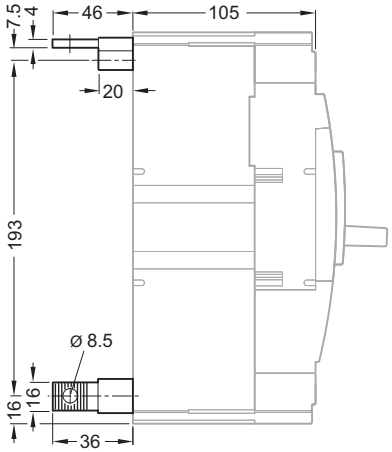


Fixed-mounted version, front connection (3VT9 203-4TF30 connecting set)

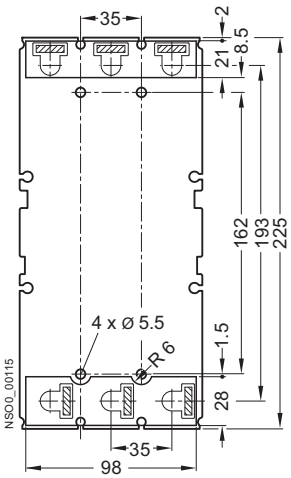


Fixed-mounted version, rear connection (3VT9 200-4RC30 connecting set)

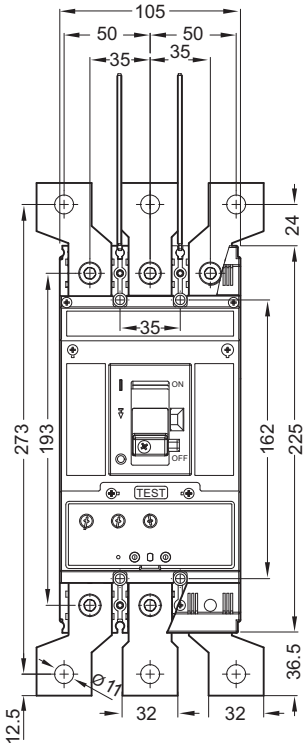


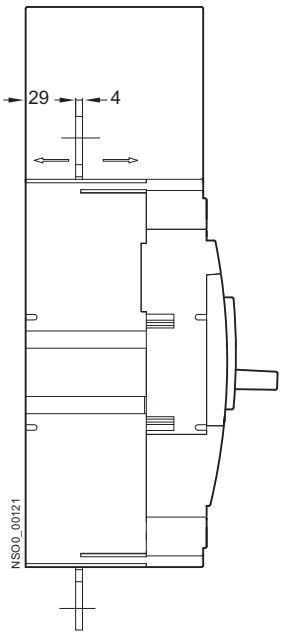


Drilling pattern



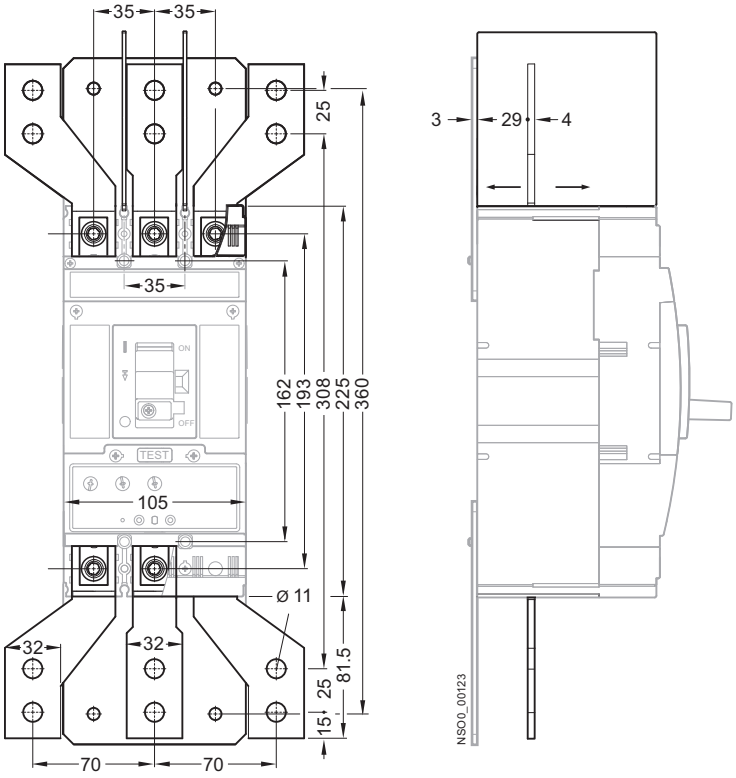
Fixed-mounted version, front connection (3VT9 200-4ED30 connecting set)



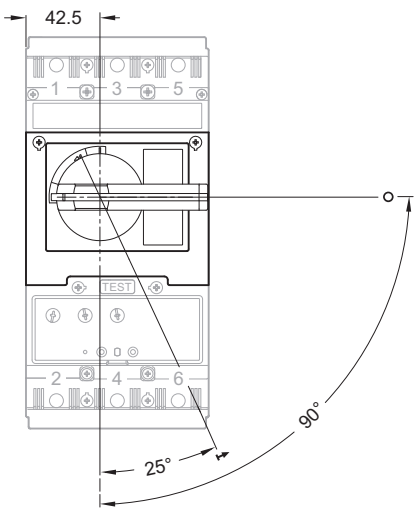


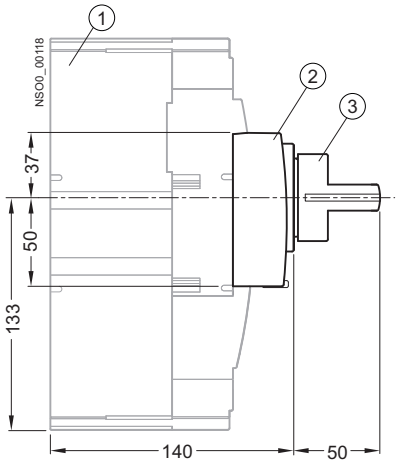
Dimensional drawings

Fixed-mounted version, front connection (3VT9 200-4EE30 connecting set)



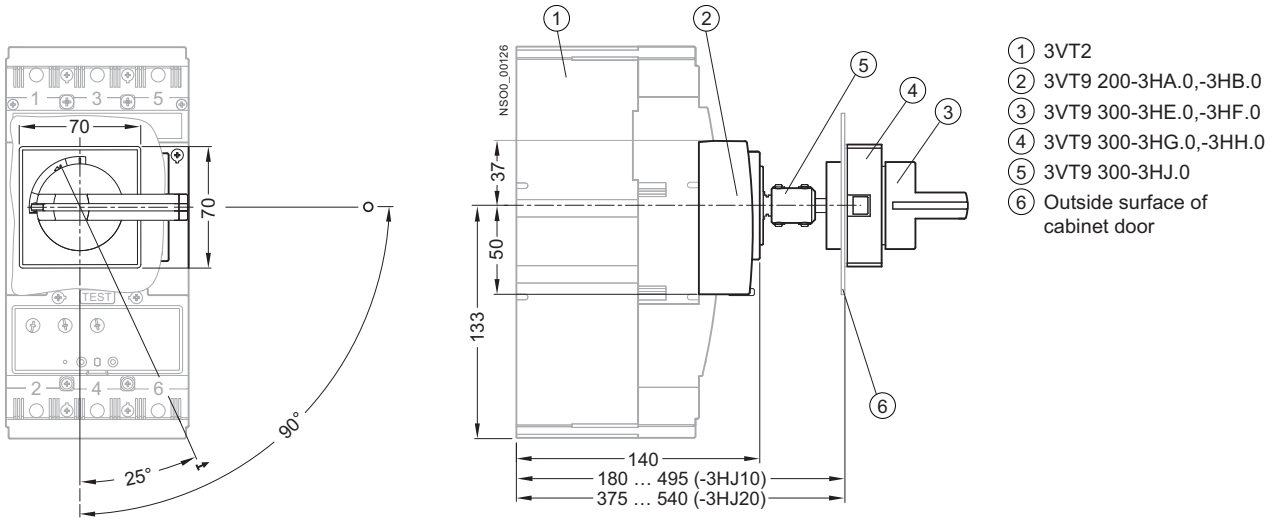
Fixed-mounted version, with rotary operating mechanism



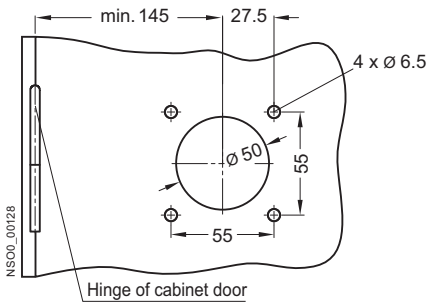


1 3VT2
2 3VT9 200-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0

Fixed-mounted version, rotary operating mechanism with adjustable knob

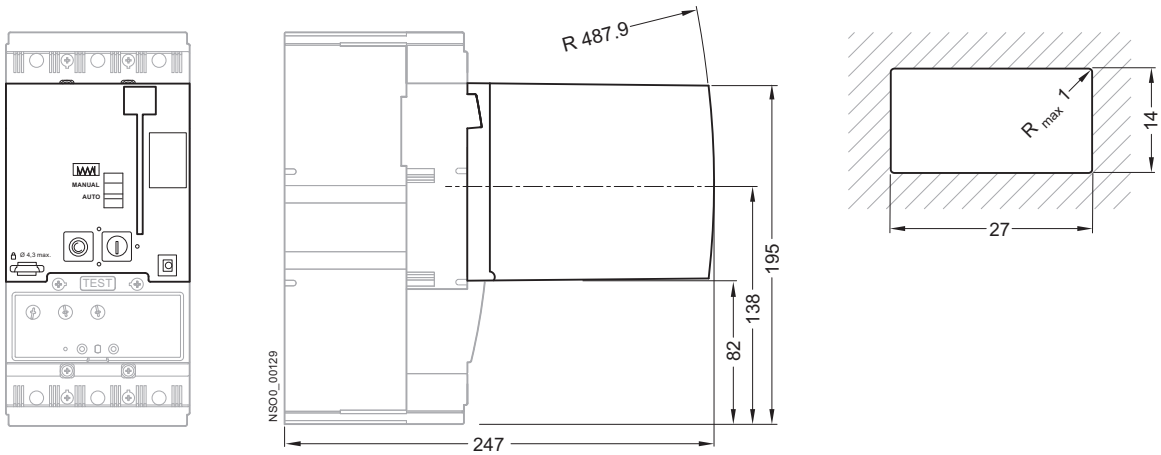


Cabinet door cut-out



Fixed-mounted version, 3VT9 200-3M..0 motorized operating mechanism

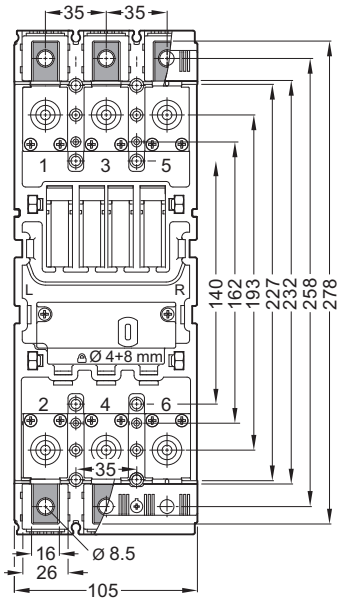
Opening dimensions in switchgear door for external operation cycle

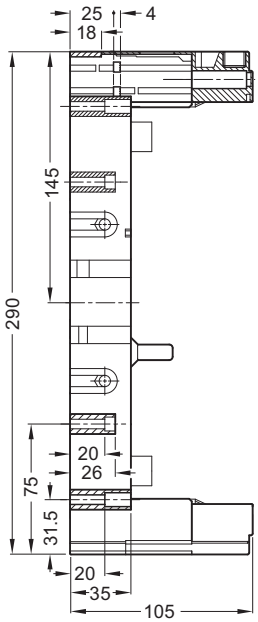


Dimensional drawings

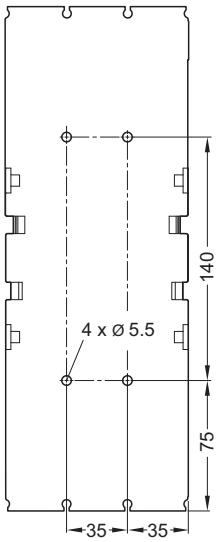
Dimensional drawings - 3-pole, plug-in version

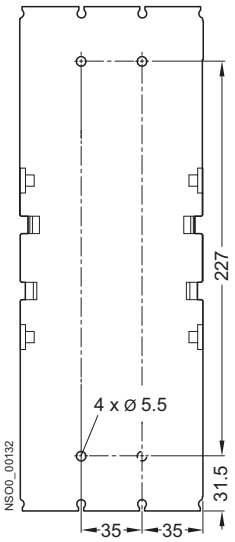
Plug-in base 3VT9 200-4PA30



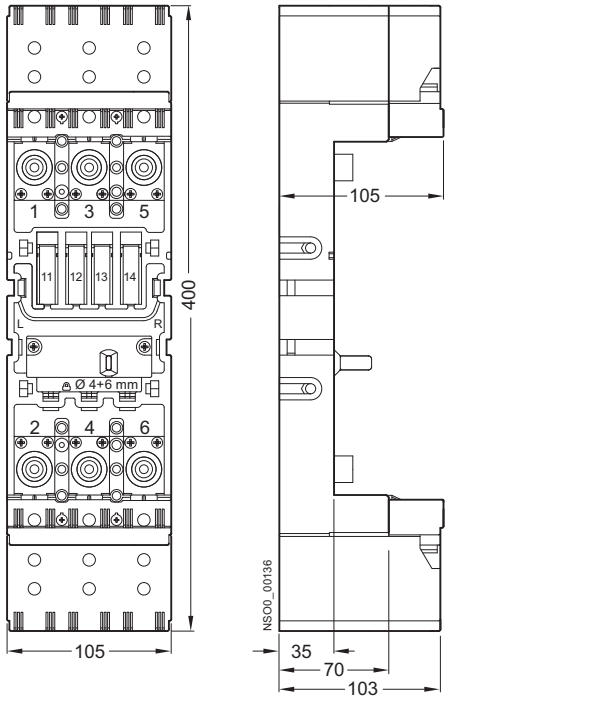


Drilling patterns

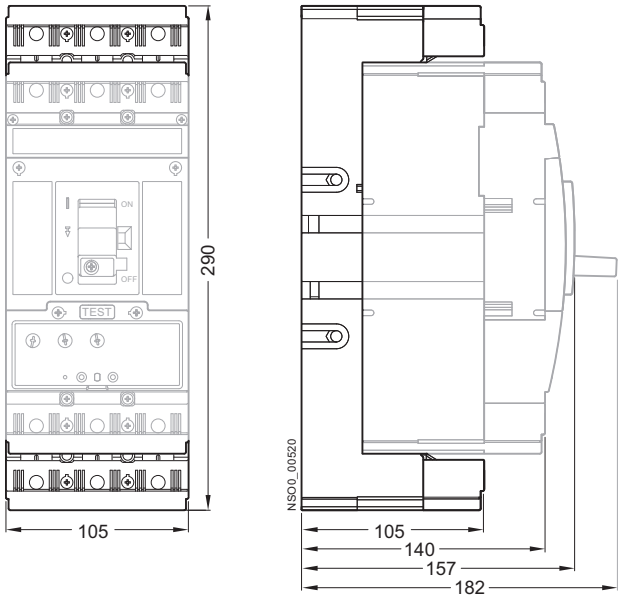




Plug-in base, 3VT9 200-8CB30 terminal cover

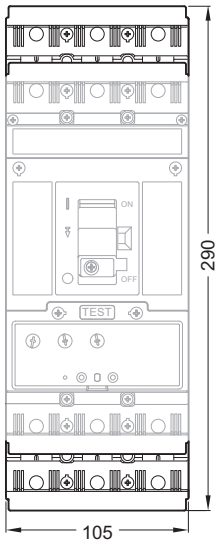


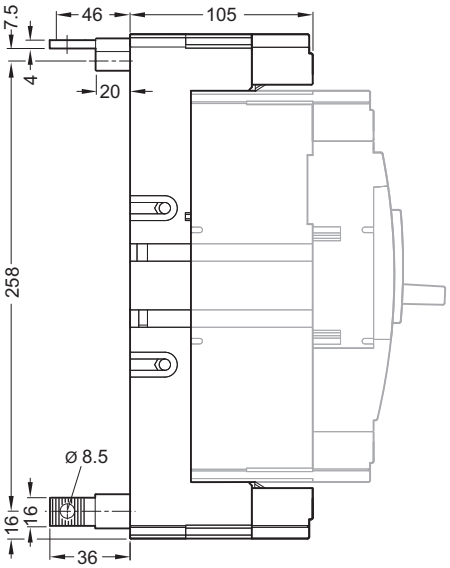
Plug-in version



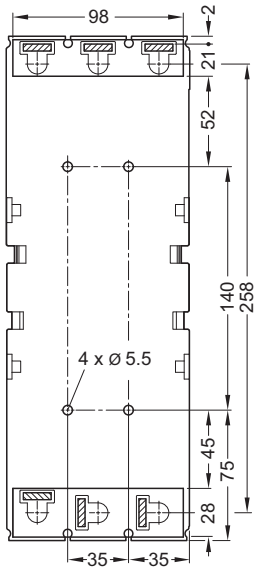
Dimensional drawings

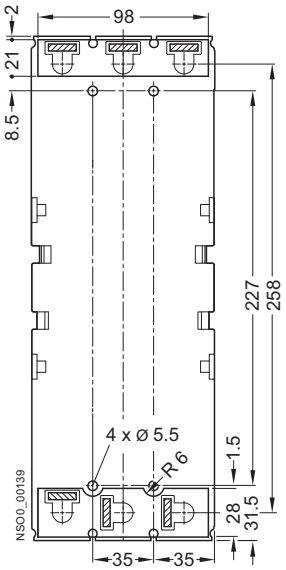
Plug-in version



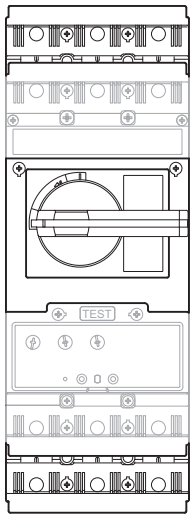


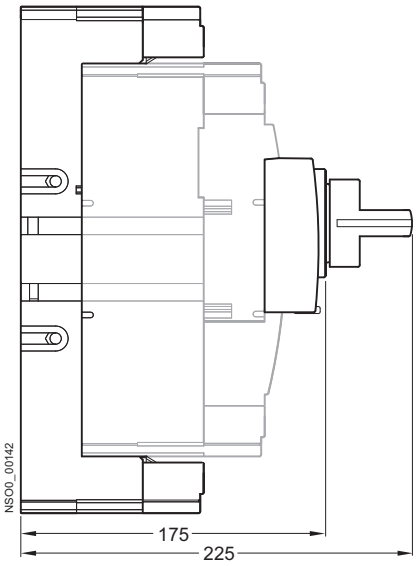
Drilling patterns



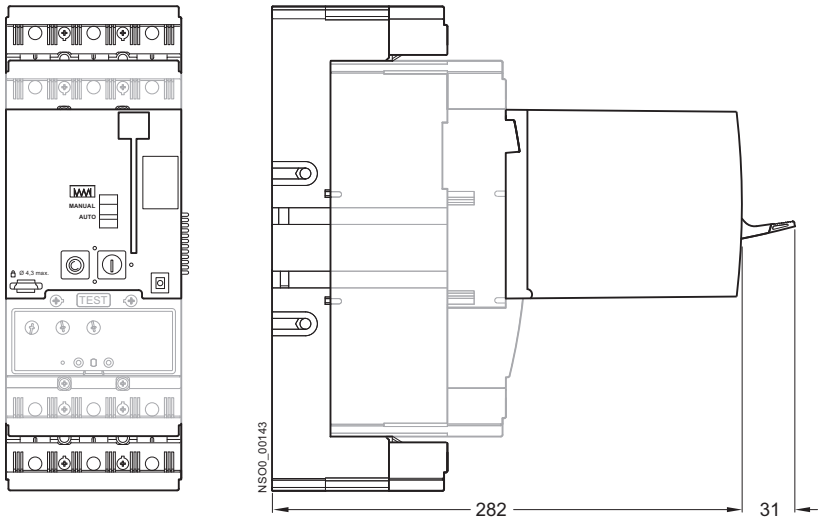


Plug-in version, rotary operating mechanism





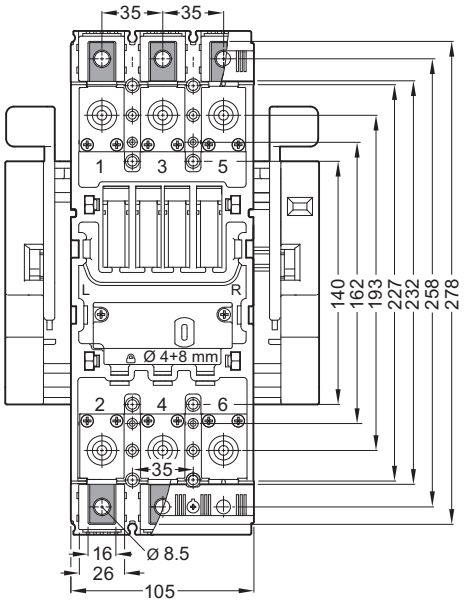
Plug-in version, 3VT9 200-3M..0 motorized operating mechanism

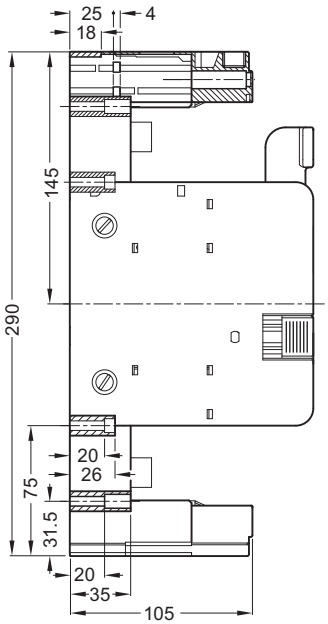


Dimensional drawings

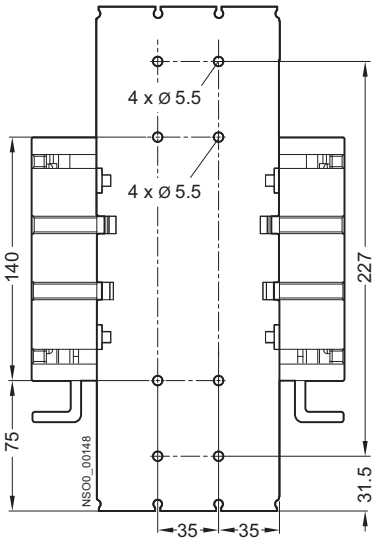
Dimensional drawings - 3-pole, withdrawable version

Withdrawable version 3VT9 200-4WA30

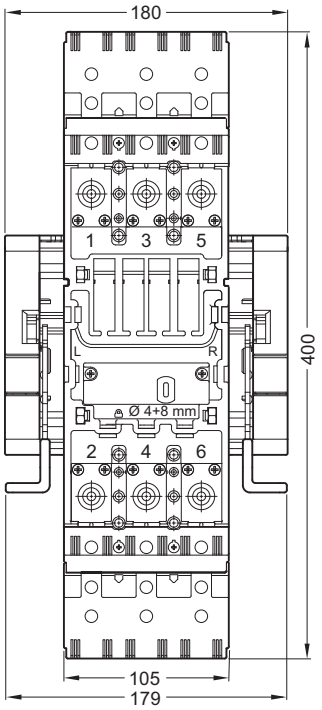


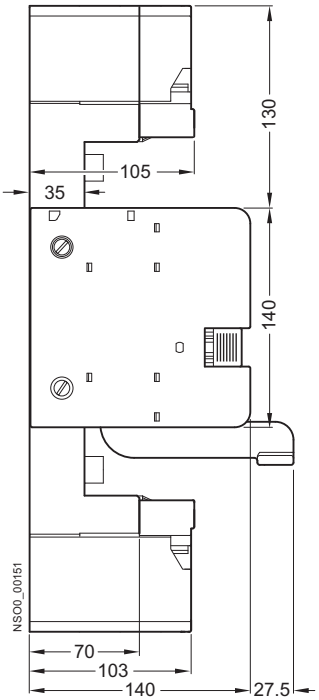


Drilling patterns



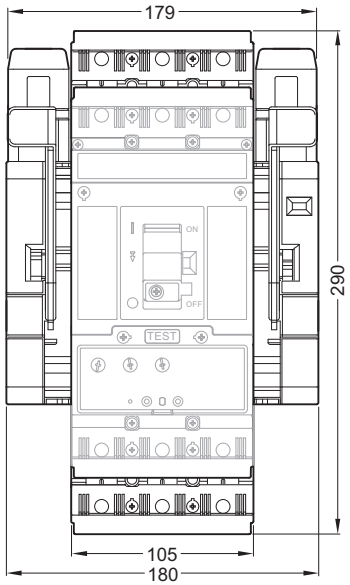
Withdrawable version, 3VT9 200-8CB30 terminal cover



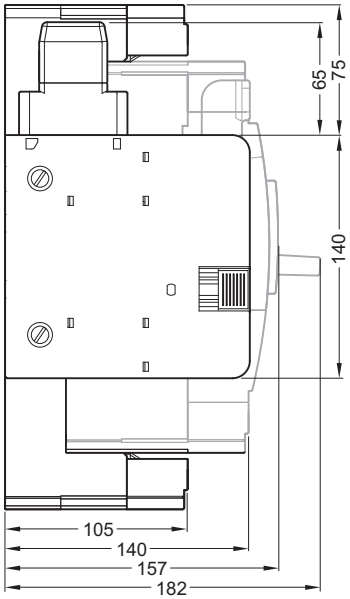


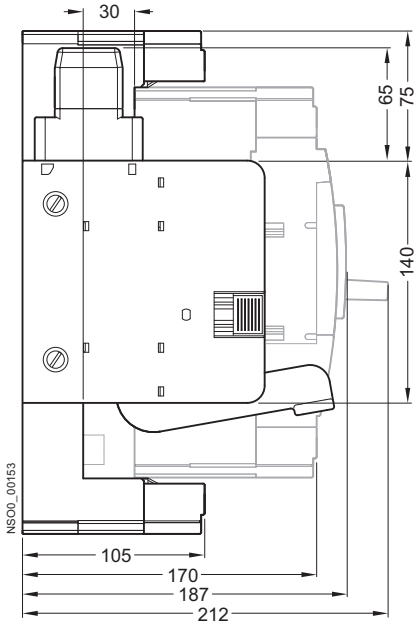
Withdrawable version

Operating position



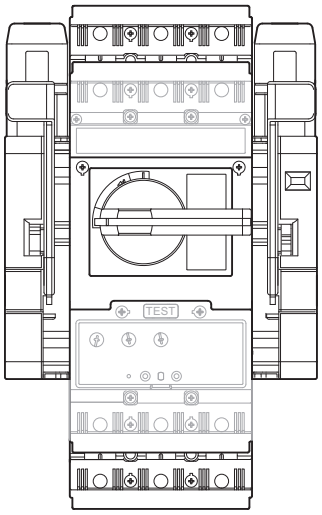
Maintenance position



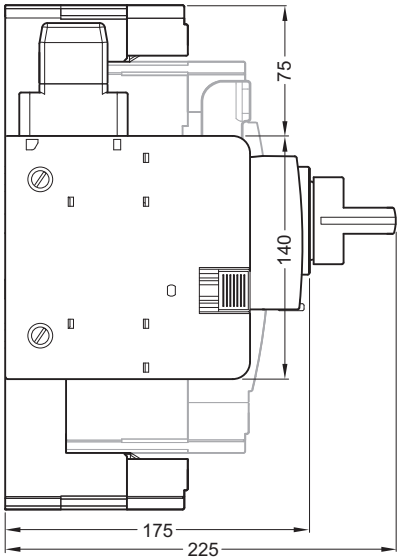


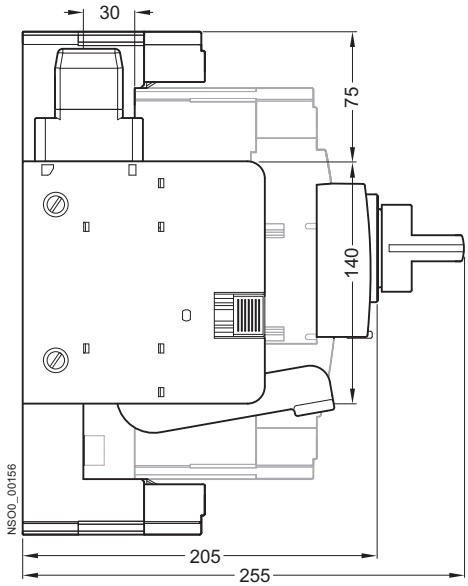
Withdrawable version, rotary operating mechanism

Operating position



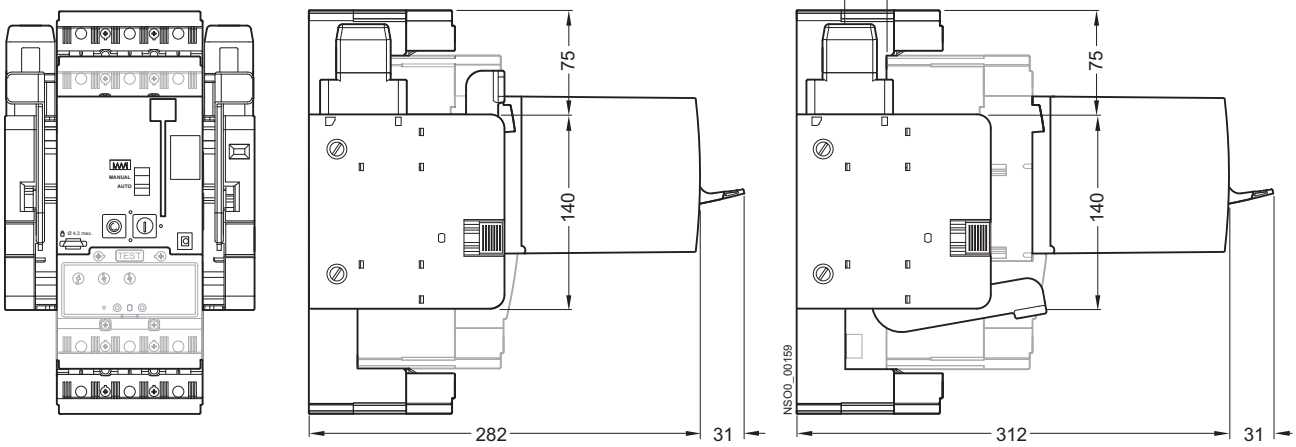
Maintenance position



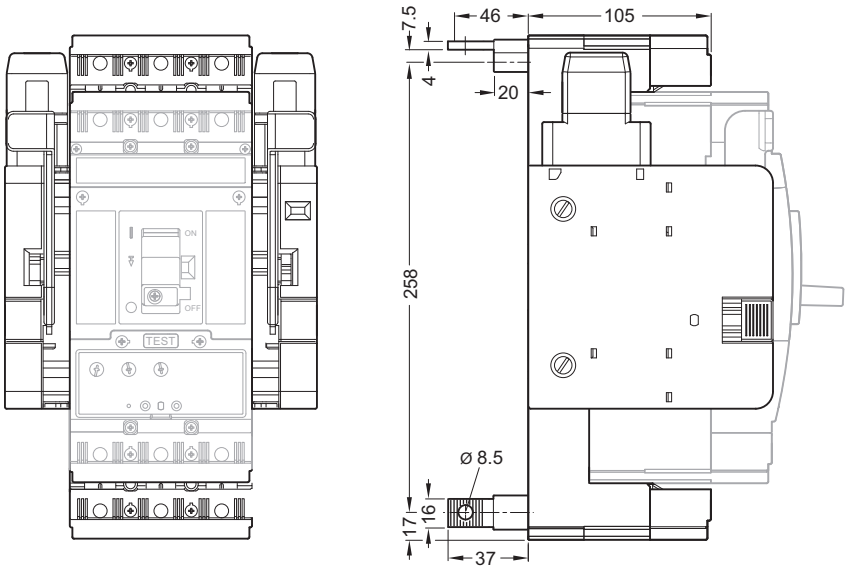


Dimensional drawings

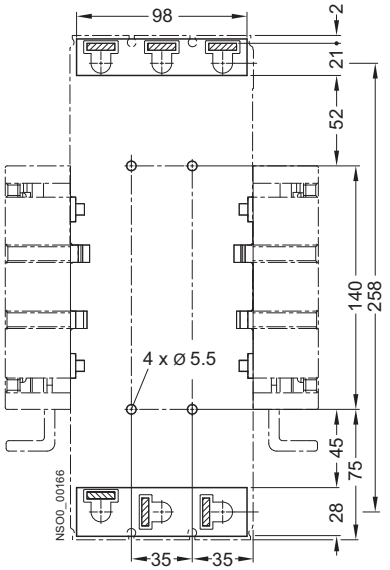
Withdrawable version, 3VT9 200-3M..0 motorized operating mechanism



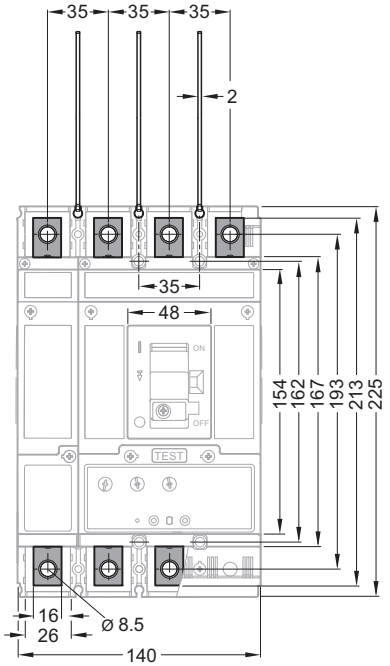
Withdrawable device, rear connection (3VT9 200-4RC00 connecting sets)

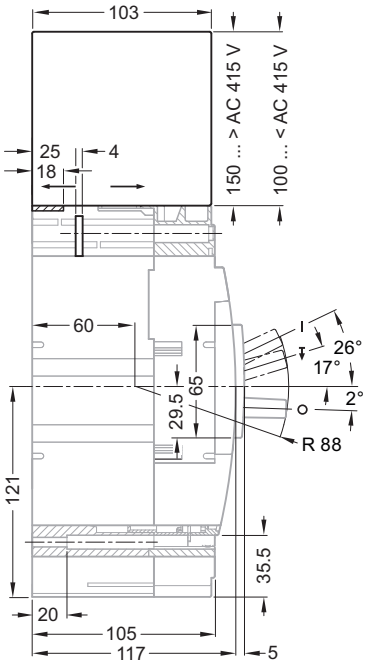


Drilling pattern

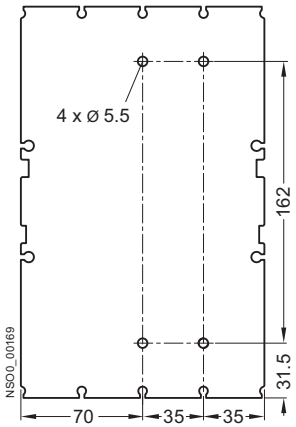


Withdrawable device, rear connection (3VT9 200-4RC00 connecting sets)





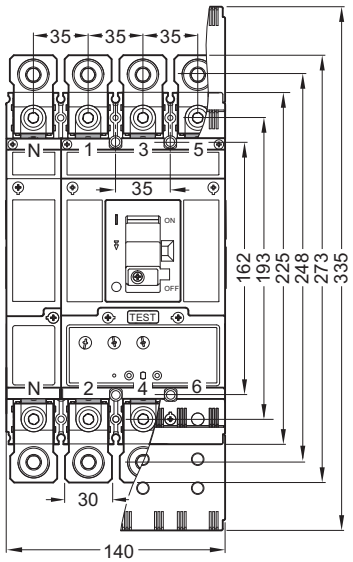
Drilling pattern



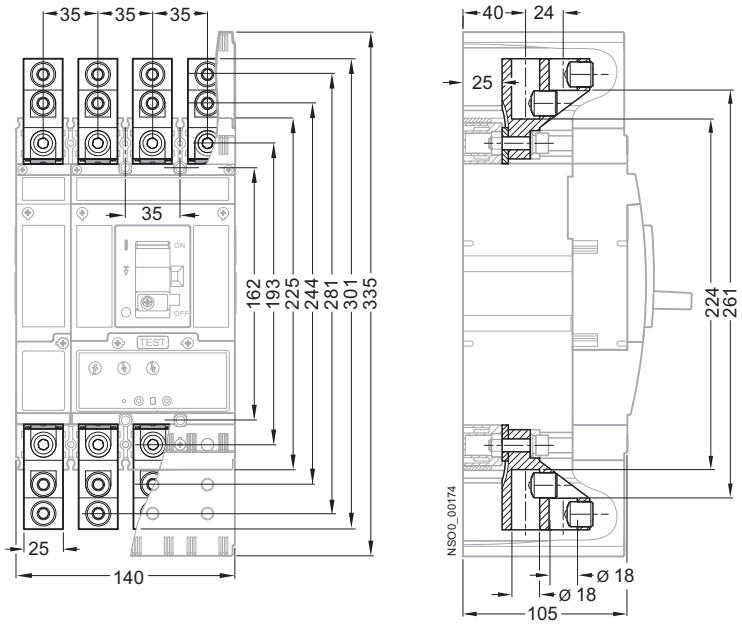
Dimensional drawings

Dimensional drawings - 4-pole, fixed-mounted version

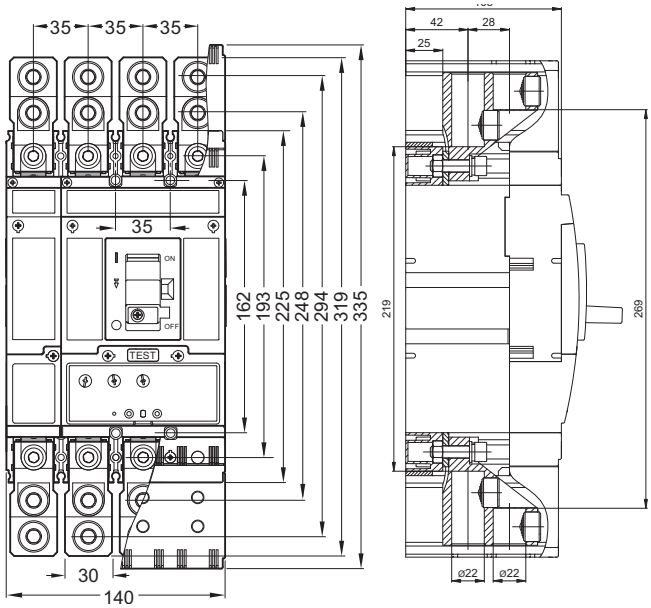
Fixed-mounted version, front connection (connecting set 3VT9 224-4TD30 + 3VT9 224-4TD00)



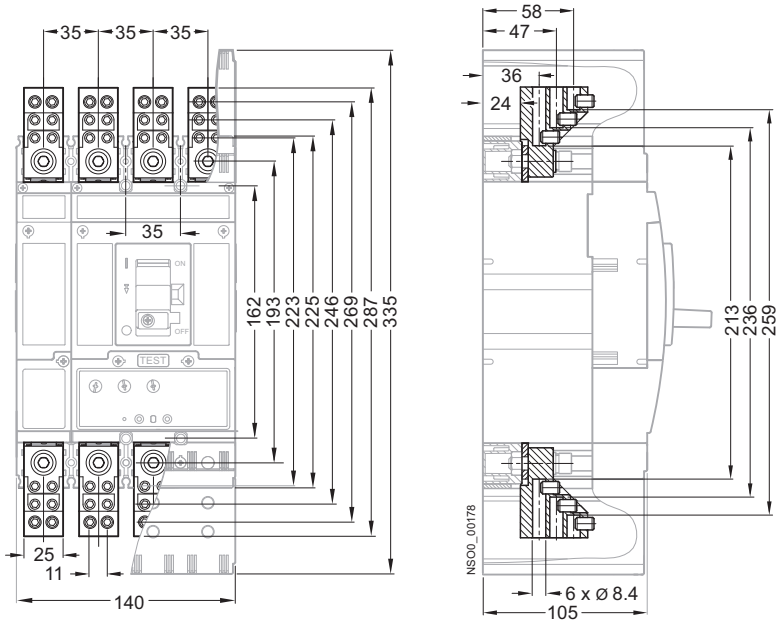
Fixed-mounted version, front connection (connecting set 3VT9 215-4TF30 + 3VT9 215-4TF00)



Fixed-mounted version, front connection (connecting set 3VT9 224-4TF30 + 3VT9 224-4TF00)

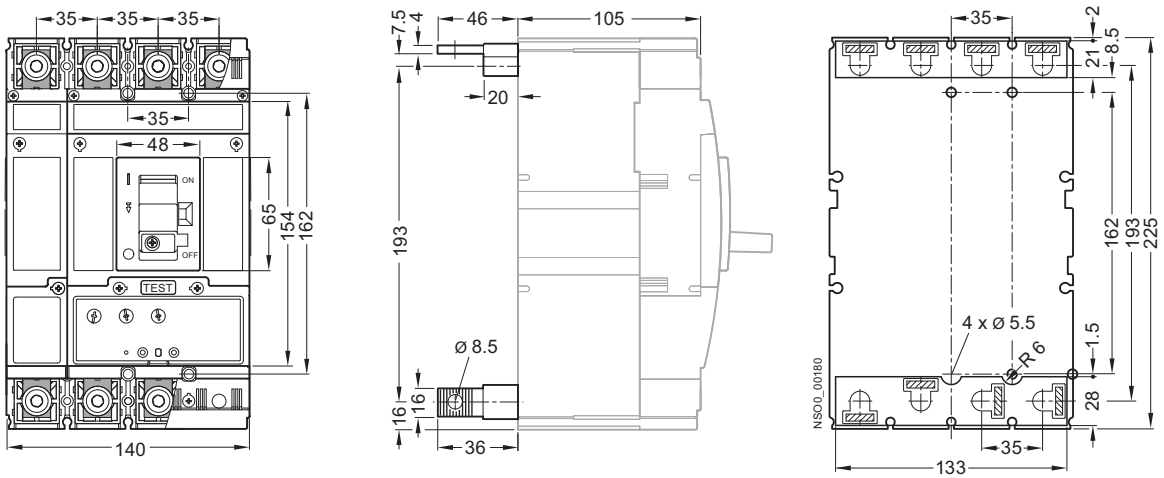


Fixed-mounted version, front connection (connecting set 3VT9 203-4TF30 + 3VT9 203-4TF00)

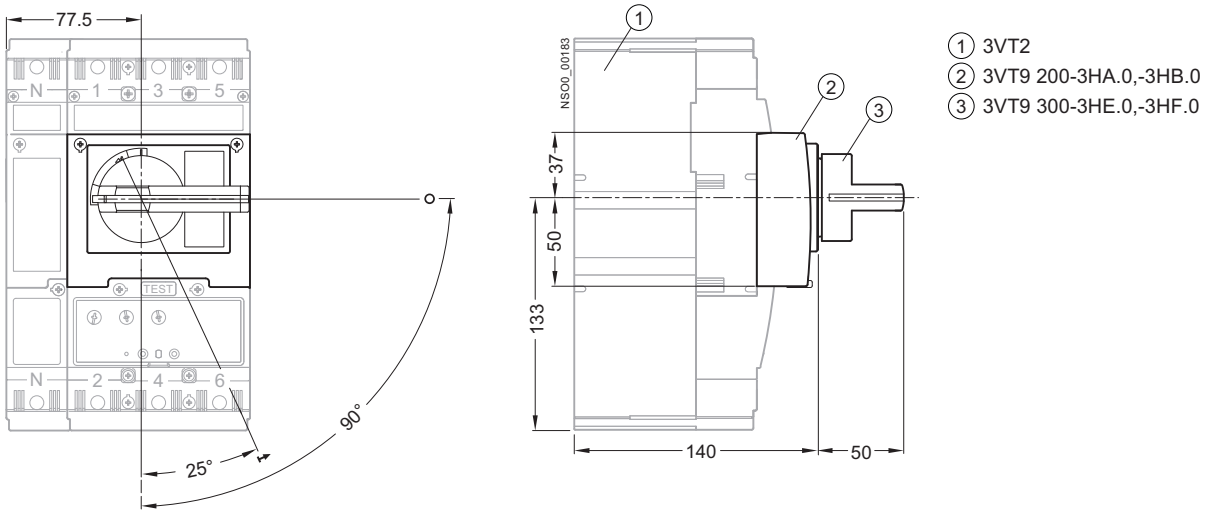


Dimensional drawings

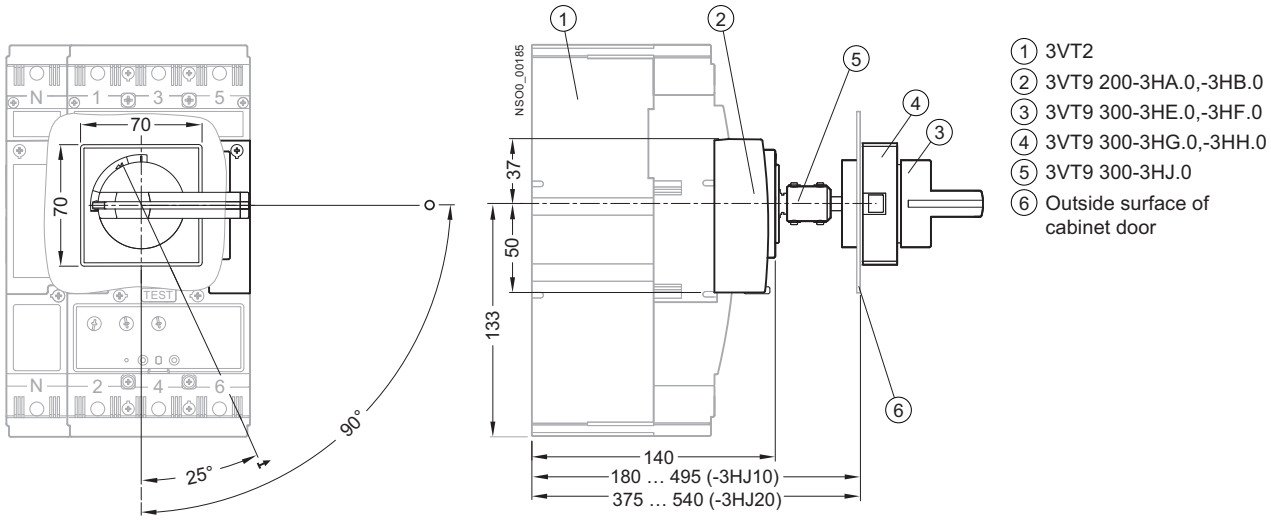
Fixed-mounted version, front connection (connecting set 3VT9 215-4TF30 + 3VT9 215-4TF00)



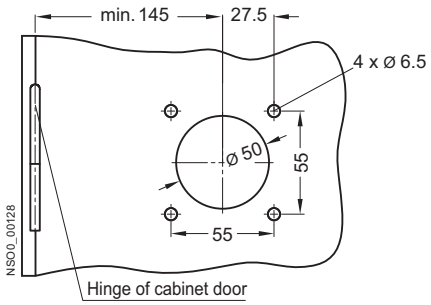
Fixed-mounted version, with rotary operating mechanism



Fixed-mounted version, rotary operating mechanism with adjustable knob

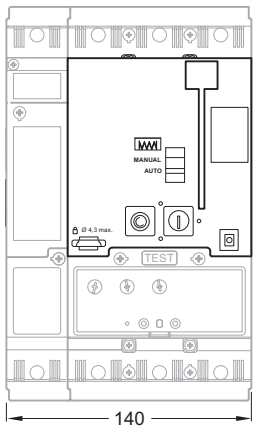


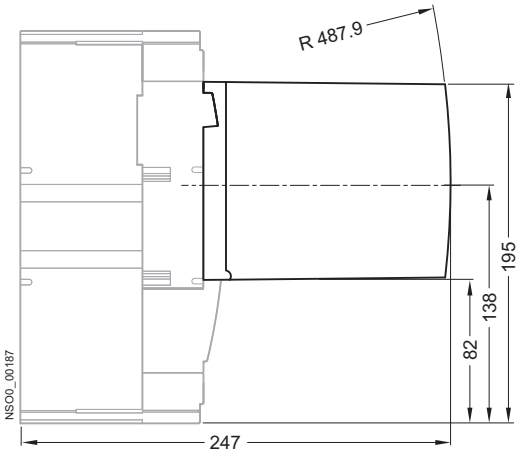
Cabinet door cut-out

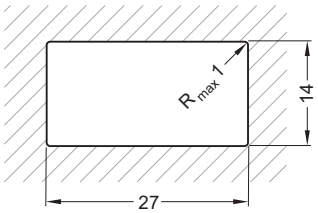


Fixed-mounted version, 3VT9 200-3M..0 motorized operating mechanism

Opening dimensions in switchgear door for external operation cycle



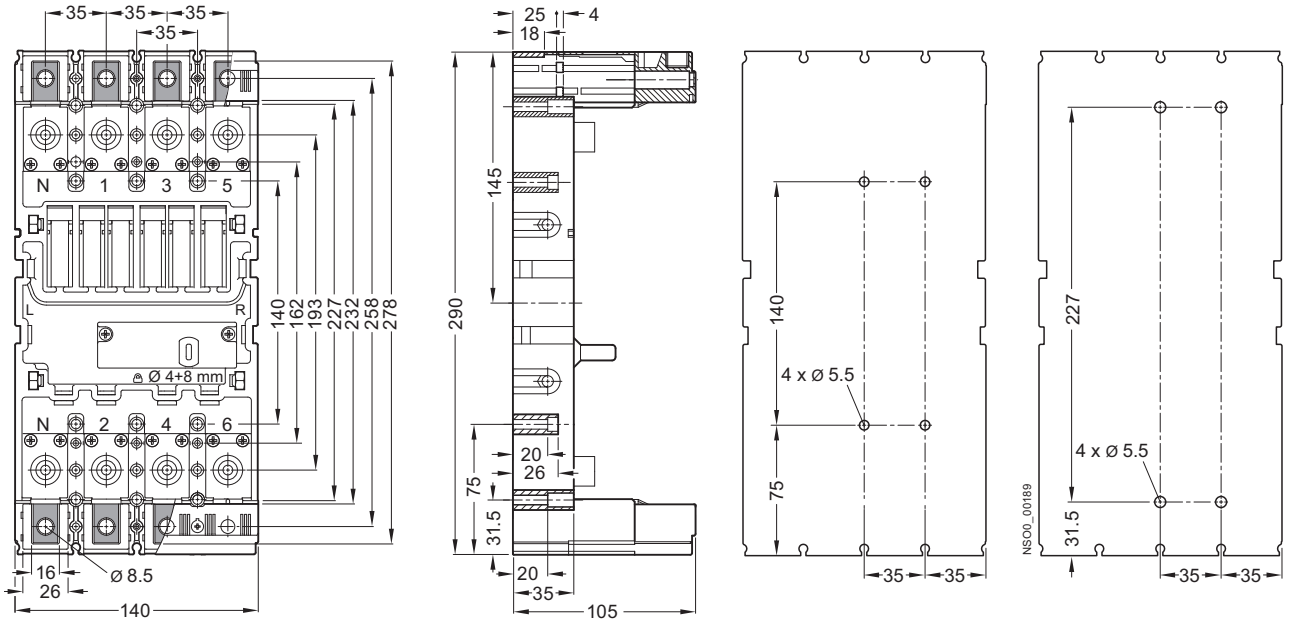




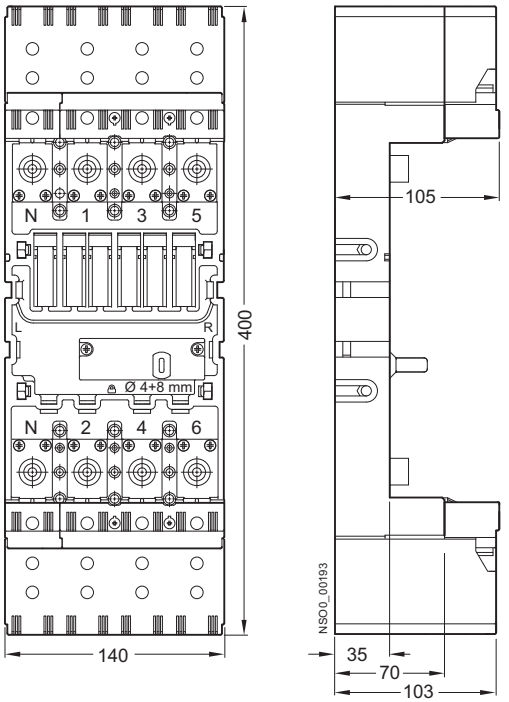
Dimensional drawings

Dimensional drawings - 4-pole, plug-in version

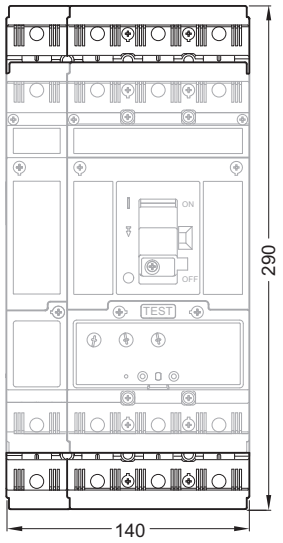
Plug-in base 3VT9 200-4PA40

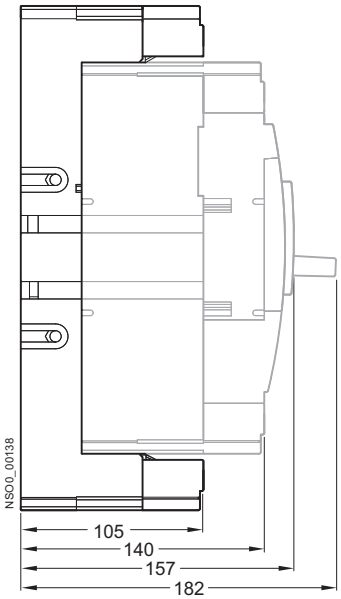


Plug-in base, 3VT9 200-8CB40 terminal cover

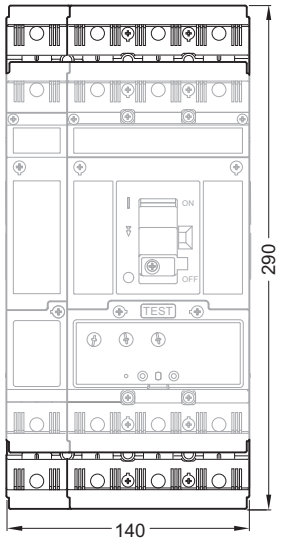


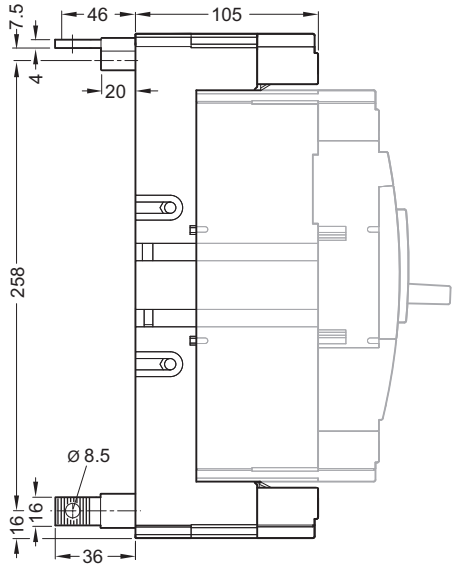
Plug-in version



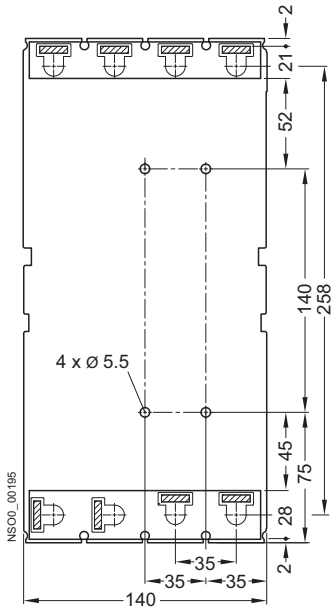


Plug-in version, rear connection
(connecting set 3VT9 200-4RC30 + 3VT9 200-4RC00)



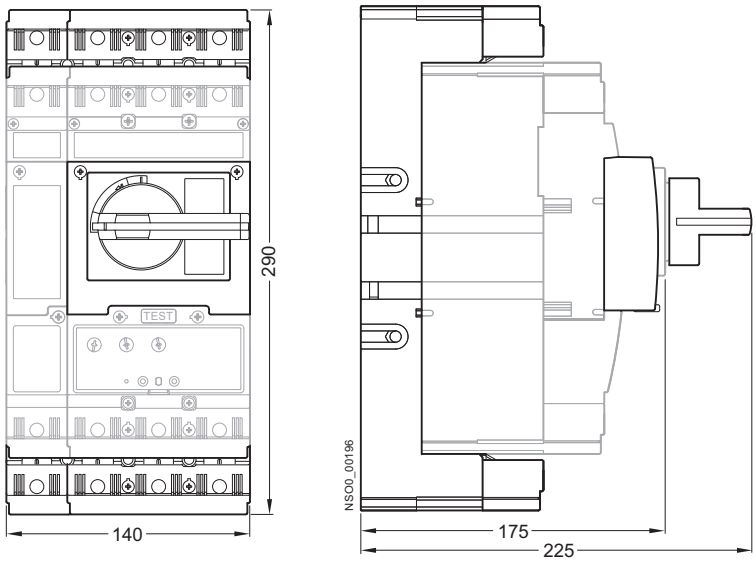


Drilling pattern

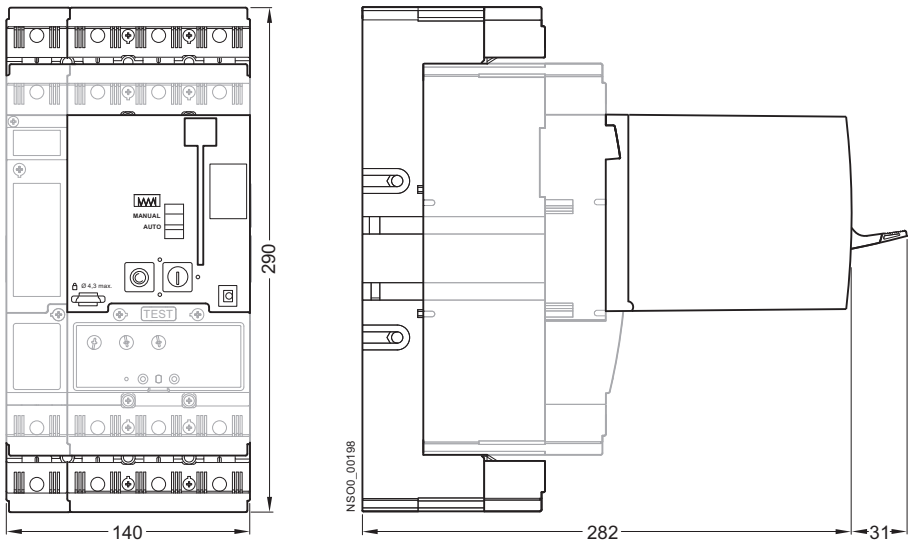


Dimensional drawings

Plug-in version, rotary operating mechanism

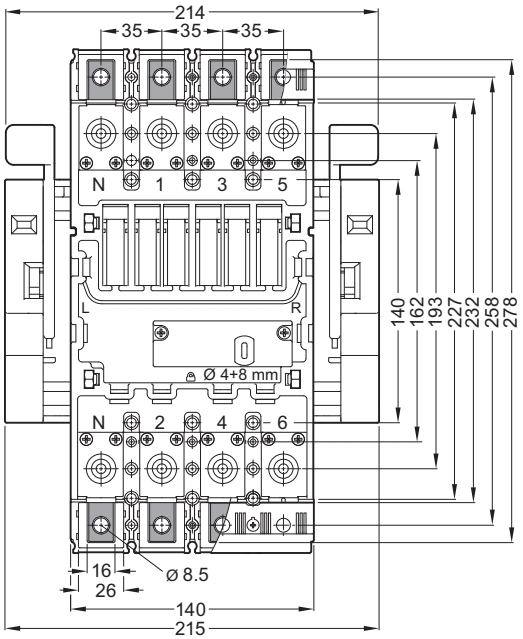


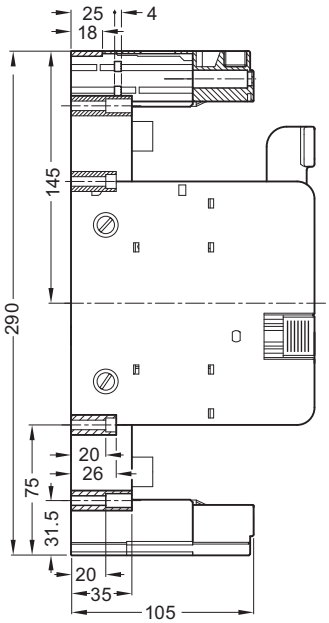
Plug-in version, 3VT9 200-3M..0 motorized operating mechanism



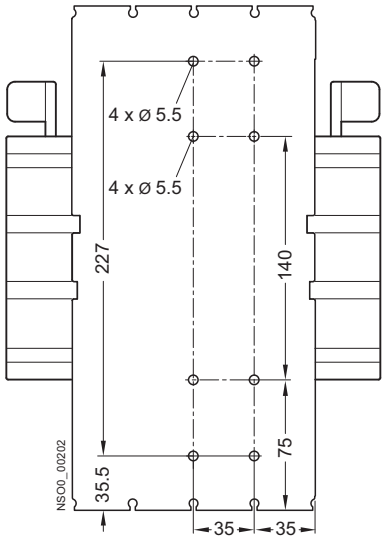
Dimensional drawings - 4-pole, withdrawable version

Withdrawable version, 3VT9 200-4WA40

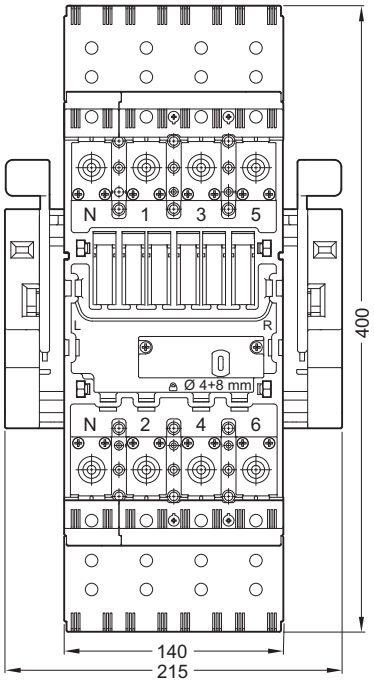


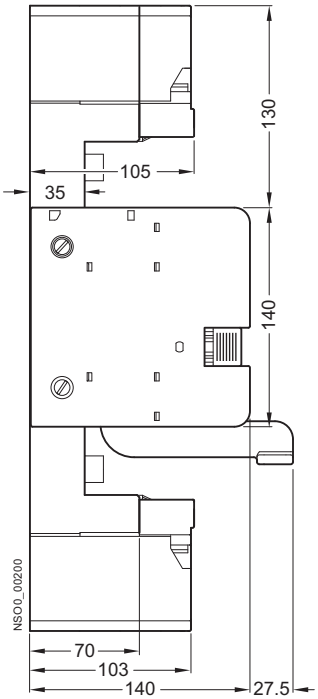


Drilling pattern



Withdrawable version, 3VT9 200-8CB40 terminal cover

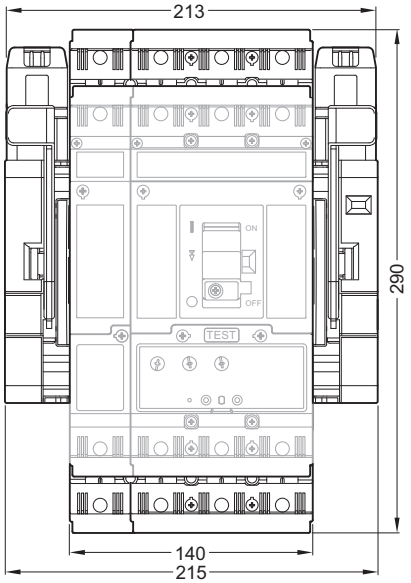




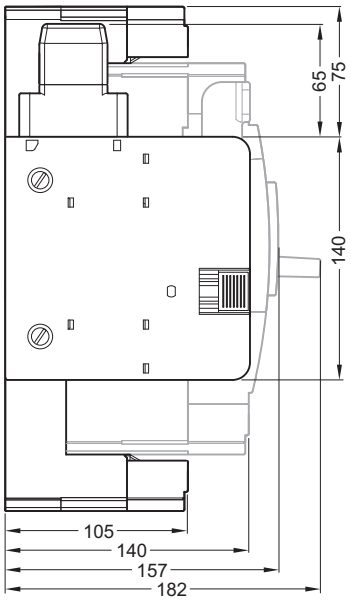
Dimensional drawings

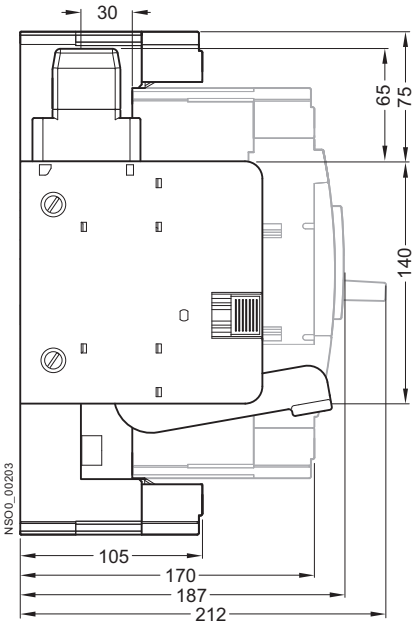
Withdrawable version

Operating position

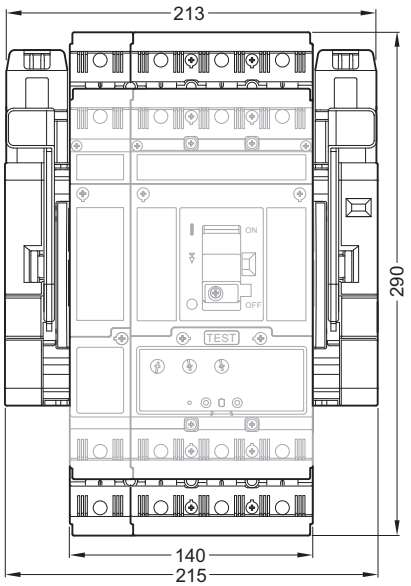


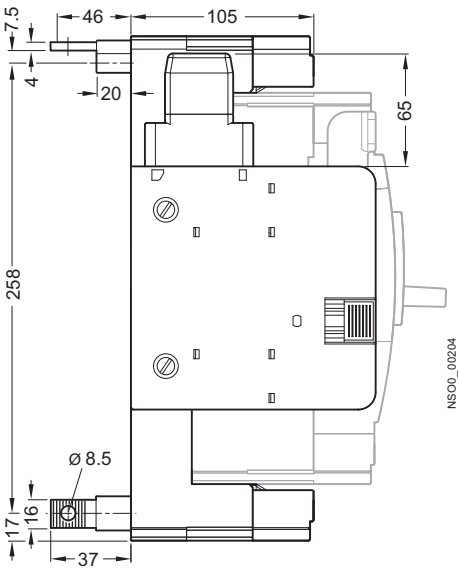
Maintenance position

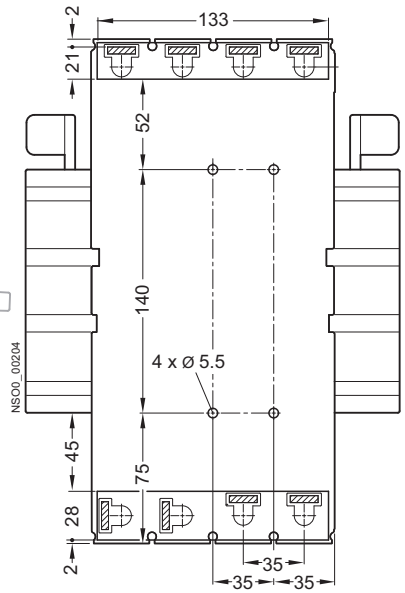




Withdrawable version, rear connection (connecting set 3VT9 200-4RC30 + 3VT9 200-4RC00)

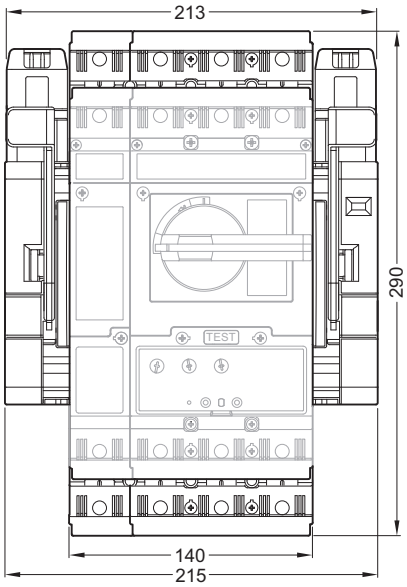




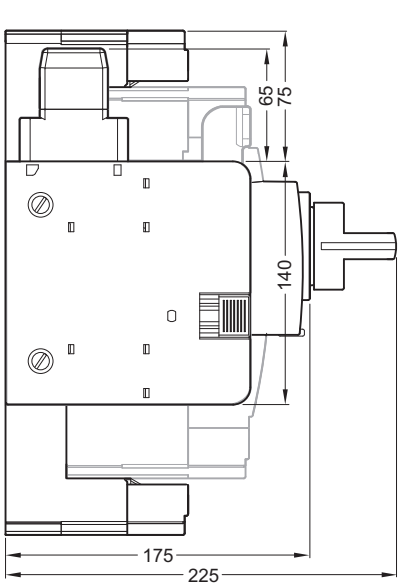


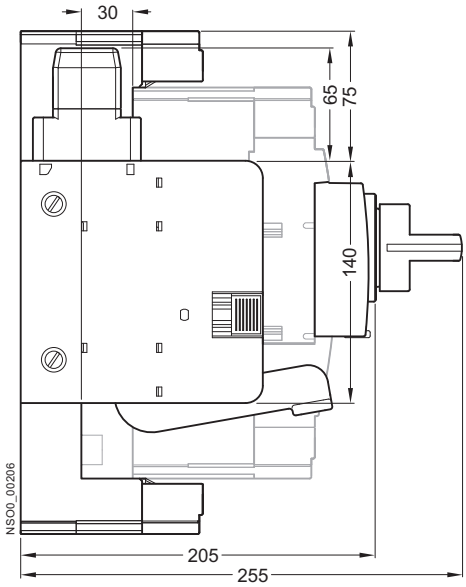
Withdrawable version, rotary operating mechanism

Operating position

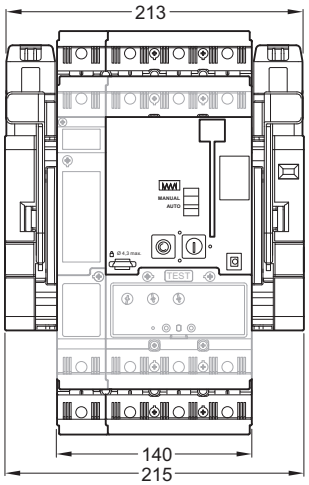


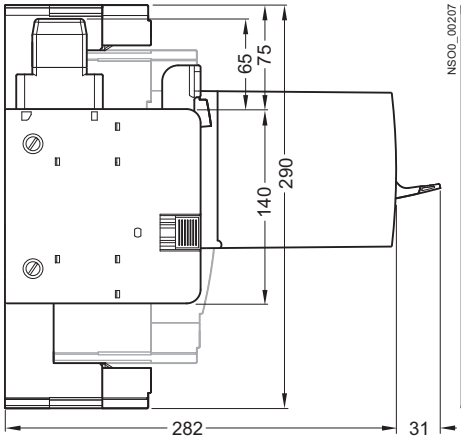
Maintenance position

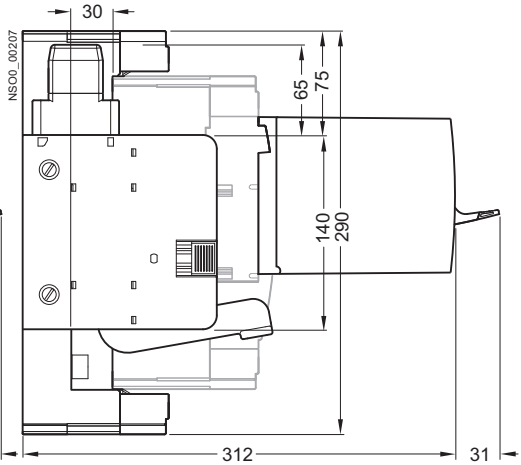




Withdrawable version, 3VT9 200-3M..0 motorized operating mechanism





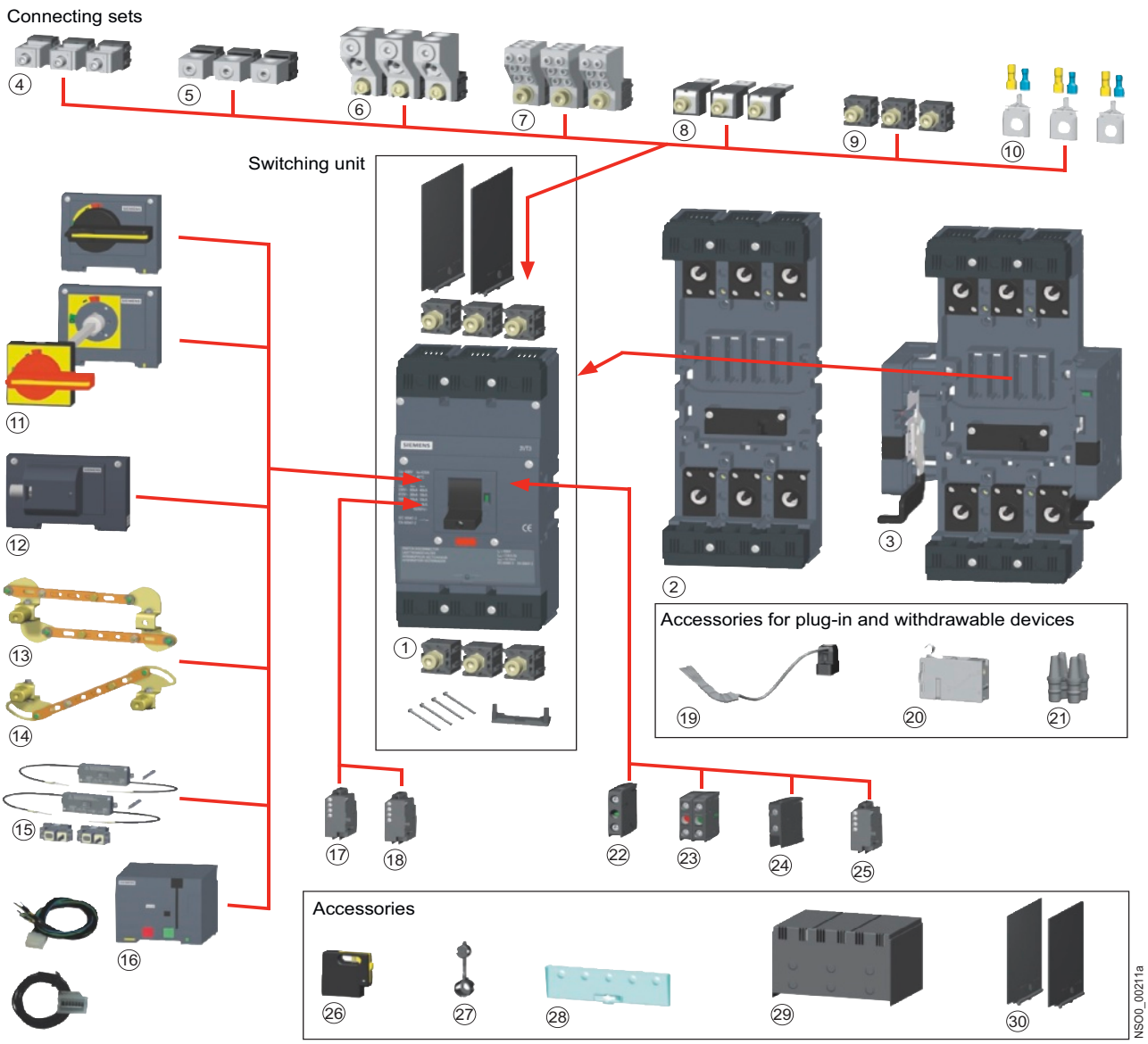


Notes

Notes

3VT3 Molded Case Circuit Breakers up to 630 A

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
9 Front connection
10 Auxiliary conductor terminal
11 Rotary operating mechanism
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 Keying pins
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

Overview

Switching unit

The switching unit includes:
- Two 3VT9 300-4TA30 connecting sets – for connecting busbars or cable lugs
- 3VT9 300-8CE30 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 3VT9 363-6DT00 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}	DT	Order No.	PS*	Weight per PU approx.
	A	kA				kg
Switching units						
	***3-pole version***					
	630	36	B	**3VT3 763-2AA36-0AA0**	1 unit	7.400
	630	65	B	**3VT3 763-3AA36-0AA0**	1 unit	7.400
	4-pole version, unprotected N					
	630	36	B	**3VT3 763-2AA46-0AA0**	1 unit	7.400
	630	65	B	**3VT3 763-3AA46-0AA0**	1 unit	7.400
	4-pole version, protected N					
	630	36	B	**3VT3 763-2AA56-0AA0**	1 unit	7.400
	630	65	B	**3VT3 763-3AA56-0AA0**	1 unit	7.400

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* You can order this quantity or a multiple thereof.

Selection and ordering data for accessories

	Rated current I_n	Current setting of the inverse- time delayed overload trip units „L“ I_r	DT	Order No.	PS*	Weight per PU approx.
	kW	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	B	**3VT9 325-6AB00**	1 unit	0.345
	315	315	B	**3VT9 331-6AB00**	1 unit	0.345
	400	400	B	**3VT9 340-6AB00**	1 unit	0.345
	500	500	B	**3VT9 350-6AB00**	1 unit	0.345
	630	630	B	**3VT9 363-6AB00**	1 unit	0.345
	***Distribution protection, ETU DP, LI function*** [1]					
	• for protecting lines and transformers					
	250	100 ... 250	B	**3VT9 325-6AC00**	1 unit	0.261
	400	160 ... 400	B	**3VT9 340-6AC00**	1 unit	0.318
	630	250 ... 630	B	**3VT9 363-6AC00**	1 unit	0.320
	***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	B	**3VT9 325-6BC00**	1 unit	0.355
	400	160 ... 400	B	**3VT9 340-6BC00**	1 unit	0.355
	630	250 ... 630	B	**3VT9 363-6BC00**	1 unit	0.355
	***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	B	**3VT9 325-6AP00**	1 unit	0.261
	400	160 ... 400	B	**3VT9 340-6AP00**	1 unit	0.321
	630	250 ... 630	B	**3VT9 363-6AP00**	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	B	**3VT9 325-6AS00**	1 unit	0.260
	400	160 ... 400	B	**3VT9 340-6AS00**	1 unit	0.260
	630	250 ... 630	B	**3VT9 363-6AS00**	1 unit	0.323
Switch disconnector unit						
	630	**Switch disconnector unit** [1]	B	**3VT9 363-6DT00**	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.

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	Order No.	PS*	Weight per PU approx.
	AC 50/60 Hz, DC				kg
Auxiliary switches and alarm switches					
	**Single NO contacts**				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AC10**	1 unit	0.020
	AC/DC 5 ... 60 V	B	**3VT9 300-2AC20**	1 unit	0.120
	**Single NC contacts**				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AD10**	1 unit	0.130
	AC/DC 5 ... 60 V	B	**3VT9 300-2AD20**	1 unit	0.130
	**Double contacts (2 x NO)**				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AE10**	1 unit	0.260
	AC/DC 5 ... 60 V	B	**3VT9 300-2AE20**	1 unit	0.260
	Double contacts (NO and NC)				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AF10**	1 unit	0.250
	AC/DC 5 ... 60 V	B	**3VT9 300-2AF20**	1 unit	0.250
	Double contacts (2 x NC)				
	AC/DC 60 ... 500 V	B	**3VT9 300-2AG10**	1 unit	0.240
	AC/DC 5 ... 60 V	B	**3VT9 300-2AG20**	1 unit	0.240
	**Changeover contacts**				
	AC/DC 60 ... 250 V	B	**3VT9 300-2AH10**	1 unit	0.013
	AC/DC 5 ... 60 V	B	**3VT9 300-2AH20**	1 unit	0.013
	**Leading contacts**				
	AC/DC 60 ... 250 V	B	**3VT9 300-2AJ00**	1 unit	0.040
Shunt trip units					
	AC/DC 24, 40, 48 V	B	**3VT9 300-1SC00**	1 unit	0.140
	AC/DC 110 V	B	**3VT9 300-1SD00**	1 unit	0.140
	AC 230, 400, 500 V/DC 220 V	B	**3VT9 300-1SE00**	1 unit	0.140
Undervoltage trip units					
	AC/DC 24, 40, 48 V	B	**3VT9 300-1UC00**	1 unit	0.110
	AC/DC 110 V	B	**3VT9 300-1UD00**	1 unit	0.110
	AC 230, 400, 500 V/DC 220 V	B	**3VT9 300-1UE00**	1 unit	0.110
	with leading contact[1)]				
	AC/DC 24, 40, 48 V	B	**3VT9 300-1UC10**	1 unit	0.120
	AC/DC 110 V	B	**3VT9 300-1UD10**	1 unit	0.120
	AC 230, 400, 500 V/DC 220 V	B	**3VT9 300-1UE10**	1 unit	0.120

1) Not to be used with 3VT9 300-3M..0 motorized operating mechanism.

* You can order this quantity or a multiple thereof.

Manual/motorized operating mechanisms

Overview

Rotary operating mechanisms

The rotary operating mechanism must be combined from:

- For rotary operation of the circuit breaker:
  - 3VT9 300-3HA.0 or 3VT9 300-3HB.0 for frontside operation
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob or
  - 3VT9 300-3HF20 red knob
- For operation through the switchgear cabinet door:
  - 3VT9 300-3HA.0 or 3VT9 300-3HB.0 for frontside operation
  - 3VT9 300-3HJ.. extension shaft
  - 3VT9 300-3HG/HH.. coupling driver
  - 3VT9 300-3HE/HF.. knob.
- For operation through side wall of cabinet:
  - 3VT9 300-3HC10 for right side operation OR
  - 3VT9 300-3HD10 for left side operation
  - 3VT9 300-3HJ..extension shaft
  - 3VT9 300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9 300-3HE/HF.. knob

Mechanical interlocks and interlock for parallel switching

- Mechanical interlocks for fixed-mounted version must be combined from the following parts:
  - 2 x 3VT9 300-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9 300-3HE/HF.. knob
- Mechanical interlocking by Bowden wire is intended for fixed-mounted, plug-in and withdrawable versions
- Mechanical interlocks must be combined from the following parts:
  - 2 x 3VT9 300-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9 300-3HE/HF.. knob

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Selection and ordering data

	Version	Color	DT	Order No.	PS*	Weight kg
	Rotary operating mechanisms					
	• not lockable	gray	B	**3VT9 300-3HA10**	1 unit	0.243
	• lockable with padlock	gray	B	**3VT9 300-3HA20**	1 unit	0.243
	• lockable with padlock	yellow label	B	**3VT9 300-3HB20**	1 unit	0.243
	• for lateral operation, • mounted on the right side, • not lockable	grey NEW	B	**3VT9 300-3HC10**	1 unit	0.300
	• for lateral operation, • mounted on the left side, • not lockable	grey NEW	B	**3VT9 300-3HD10**	1 unit	0.300
	Knobs for rotary operating mechanism					
	• not lockable	black	B	**3VT9 300-3HE10**	1 unit	0.075
	• lockable with padlock	black	B	**3VT9 300-3HE20**	1 unit	0.075
	• lockable with padlock	red	B	**3VT9 300-3HF20**	1 unit	0.075
	Coupling driver for door-coupling operating mechanism					
	To be used with the 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob					
	• degree of protection IP40	black	B	**3VT9 300-3HG10**	1 unit	0.140
	• degree of protection IP66	black	B	**3VT9 300-3HG20**	1 unit	0.140
	Is used in combination with the 3VT9 300-3HF20 red knob					
	• degree of protection IP40	yellow	B	**3VT9 300-3HH10**	1 unit	0.140
	• degree of protection IP66	yellow	B	**3VT9 300-3HH20**	1 unit	0.140
	**Extension shaft** length 365 mm, may be shortened		B	**3VT9 300-3HJ10**	1 unit	0.205
	**Extension shaft, telescopic**, length 245 ... 410 mm		B	**3VT9 300-3HJ20**	1 unit	0.255

* You can order this quantity or a multiple thereof.

	Version	DT	Order No.	PS*	Weight per PU approx. kg
Mechanical interlocks					
	The mechanical interlocks additionally require the following parts: • 2 x 3VT9 300-3HA../HB.. rotary operating mechanisms, • 2 x 3VT9 300-3HE../HF.. knobs				
	**Mechanical interlocks** for fixed-mounted version only	B	**3VT9 300-8LA00**	1 unit	0.136
	**Mechanical interlock for parallel switching** for fixed-mounted version only	B	**3VT9 300-8LB00**	1 unit	0.162
	**Mechanical interlocking** by Bowden wirer				
	• for two 3VT3 circuit breakers	B	**3VT9 300-8LC10**	1 unit	0.393
	• for one 3VT2 and one 3VT3 circuit breaker	B	**3VT9 300-8LC20**	1 unit	0.393
Motorized operating mechanisms with storage spring					
	Rated control supply voltage U_s				
	Motorized operating mechanism				
	AC/DC 24 V	B	**3VT9 300-3MJ00**	1 unit	1.691
	AC/DC 48 V	B	**3VT9 300-3ML00**	1 unit	1.750
	AC/DC 110 V	B	**3VT9 300-3MN00**	1 unit	1.752
	AC 230 V/DC 220 V	B	**3VT9 300-3MQ00**	1 unit	1.746
	Motorized operating mechanism with operations counter				
	AC/DC 24 V	B	**3VT9 300-3MJ10**	1 unit	1.750
	AC/DC 48 V	B	**3VT9 300-3ML10**	1 unit	1.750
	AC/DC 110 V	B	**3VT9 300-3MN10**	1 unit	1.708
	AC 230 V/DC 220 V	B	**3VT9 300-3MQ10**	1 unit	1.754
Accessories for motorized operating mechanisms					
	**Operations counter with cable,** length 110 cm	B	**3VT9 300-3MF10**	1 unit	0.003
	**Extension cable** for motorized operating mechanism**,** 12 wires, length 60 cm	B	**3VT9 300-3MF00**	1 unit	0.060

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* You can order this quantity or a multiple thereof.

Mounting accessories

Overview

Plug-in version

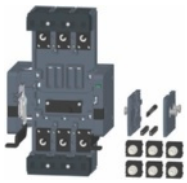
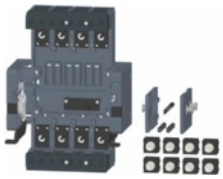
- The plug-in base includes:
  - complete accessories for assembling circuit breakers/ switch disconnectors in plug-in design
  - a set of four installation bolts (M5 x 30) for fixing the switching unit to the plug-in base
- The plug-in base must be outfitted with:
  - 3-pole version: 3VT3 763-.AA36-0AA0 switching unit
  - 4-pole version: 3VT3 763-.AA46-0AA0 or 3VT3 763-.AA56-0AA0 switching unit

For mounting the plug-in version on busbars or cable lugs, 3VT9 300-4TA30 connecting sets are available. These are included in the scope of supply of the 3VT3 763-.AA36-0AA0 3-pole version ; 3VT3 763-.AA46/56-0AA0... 4-pole version switching unit. For other types of connection, other connecting sets are available.

Withdrawable version

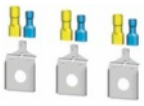
- The withdrawable version base includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable version.
- The circuit breaker inside the withdrawable version base can be moved between an operating position and a checking position (withdrawn).
- The withdrawable version base must be fitted with:
  - 3-pole version: 3VT3 763-.AA36-0AA0 switching unit or
  - 4-pole version: 3VT3 763-.AA46-0AA0 or 3VT3 763-.AA56-0AA0 switching unit

Selection and ordering data

	Version	Max. permissible cross-section *S*	DT	Order No.	PS*	Weight per PU approx.
		mm^2				kg
Plug-in bases						
	**3-pole version**		B	**3VT9 300-4PA30**	1 unit	2.610
	**4-pole version**		B	**3VT9 300-4PA40**	1 unit	3,400
Withdrawable version bases						
	**3-pole version**		B	**3VT9 300-4WA30**	1 unit	5,040
	**4-pole version**		B	**3VT9 300-4WA40**	1 unit	4,500

* You can order this quantity or a multiple thereof.

Selection and ordering data

	Version	Max. permissible cross-section *S*	Type of connection	DT	Order No.	PS*	Weight per PU approx.
		mm^2					kg
Connecting Sets							
	Connecting sets for 3-pole version						
	**Box terminals**	35 ... 240	Cu Cables, flexibars	B	**3VT9 300-4TC30**	1 unit	0.433
	**Terminals for circular conductors**	25 ... 150	Cu/Al cables	B	**3VT9 315-4TD30**	1 unit	0.302
		150 ... 240	Cu/Al cables	B	**3VT9 324-4TD30**	1 unit	0.279
	For enhancing termination point protection to degree of protection IP20, use the 3VT9 300-8CB30 terminal cover	2 x 25 ... 150	Cu/Al cables	B	**3VT9 315-4TF30**	1 unit	0.800
		2 x 150 ... 240	Cu/Al cables	B	**3VT9 324-4TF30**	1 unit	0.721
		6 x 6 ... 35	Cu/Al cables	B	**3VT9 303-4TF30**	1 unit	0.300
	**Terminals for rear connection** **1 set = 3 units**		Cu/Al busbars cable lugs	B	**3VT9 300-4RC30**	1 unit	0.567
	**Terminals for front connection** **1 set = 3 units**		Cu/Al busbars, cable lugs, flexibars	B	**3VT9 300-4TA30**	1 unit	0.186
	**Potential terminals**	1.5 ... 2.5; 4 ... 6	Cu flexible conductors	B	**3VT9 300-4TN30**	1 unit	0.021
	Front connection bars						
		for increased pole spacing	Cu/Al busbars cable lugs, flexibars	B	**3VT9 300-4ED30**	1 unit	0.490
		for increased pole spacing	Cu/Al busbars cable lugs, flexibars	B	**3VT9 300-4EE30**	1 unit	0.628
	Single terminals for 3- or 4-pole version						
	**Box terminal** **1 set = 1 unit**	35 ... 240	Cu Cables, flexibars	B	**3VT9 300-4TC00**	1 unit	0.580
	**Terminals for circular conductors** **1 set = 1 unit**	25 ... 150	Cu/Al cables	B	**3VT9 315-4TD00**	1 unit	0.400
		150 ... 240	Cu/Al cables	B	**3VT9 324-4TD00**	1 unit	0.370
		2 x 25 ... 150	Cu/Al cables	B	**3VT9 315-4TF00**	1 unit	0.500
		2 x 150 ... 240	Cu/Al cables	B	**3VT9 324-4TF00**	1 unit	0.960
		6 x 6 ... 35	Cu/Al cables	B	**3VT9 303-4TF00**	1 unit	0.500
	**Terminal for rear connection** **1 set = 1 unit**		Cu/Al busbars cable lugs	B	**3VT9 300-4RC00**	1 unit	0.500

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* You can order this quantity or a multiple thereof.

Further accessories

Selection and ordering data

	Version	DT	Order No.	PS*	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	B	**3TV9 300-8CE30**	1 unit	0.077
	• one piece, additionally needed for 4-pole version	B	**3VT9 300-8CE00**	1 unit	0.050
	Terminal cover, degree of protection IP20 Increases degree of protection of the connection point to IP20 when using 3VT9 224-4TD30, 3VT9 215-4TF30, 3VT9 224-4TF30 or 3VT9 203-4TF30 block type terminals, intended for fixed-mounted, plug-in and withdrawable versions.				
	• 3-pole version	B	**3VT9 300-8CB30**	1 unit	0.144
	• 4-pole version	B	**3VT9 300-8CB40**	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	B	**3VT9 300-3HL00**	1 unit	0.013
	**Bolt sealing insert** Provides sealing for: • trip unit • accessory compartment cover • terminal cover • rotary operating mechanism • operating mechanism	B	**3VT9 200-8BN00**	1 unit	0.001
	**Additional cover for trip unit** Provides protection for trip units	B	**3VT9 200-8BL00**	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)	B	**3VT9 300-4PL00**	1 unit	0.020
	**Position signalling switch** For indicating the position of the circuit breaker in the plug-in base or withdrawable version base	B	**3VT9 300-4WL00**	1 unit	0.020
	**Coding set** Prevents insertion of the wrong switching unit into the plug-in base or withdrawable version base	B	**3VT9 300-4WN00**	1 unit	0.002
	**Pushbutton cover** For motorized operating mechanism	B	**3VT9 300-3MF20**	1 unit	0.054

* You can order this quantity or a multiple thereof.

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 3VT9 300-8CE30 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 3/44).

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

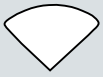
Rated current I_n	Permissible cross-section S		Dimensions of busbars W x H	
	Cu	Al	Cu	Al
A	mm^2	mm^2	mm	mm
100	35	50	20 x 2	25 x 2
125	50	70	25 x 2	25 x 3
160	70	95	25 x 3	32 x 3
200	95	120	25 x 4	25 x 5
250	120	150	25 x 5	32 x 5
315	150	185	32 x 5	32 x 6
400	185	240	32 x 6	32 x 8
500	2 x120	2 x185	32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

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

50°C	55 °C	60 °C	65 °C	70 °C
630 A	630 A	600 A	570 A	540 A

Conductor cross-sections of main terminals

Order No.	Maximum permitted current I_{max}	Maximum permissible conductor cross-section S Cable type				Busbars and cable lugs W x H	Technical information
		Sector-shaped conductor, stranded 	Sector-shaped conductor, solid 	Round conductor, stranded 	Round conductor, solid 		
	A	mm^2	mm^2	mm^2	mm^2	mm	See page
3VT9 300-4TA30	630					32 x...	
3VT9 300-4TD00							
3VT9 300-4RC30	630					32 x...	3/47, 3/58, 3/58, 3/58
3VT9 300-4RC00							
3VT9 300-4TC30	400	35 ... 240 Cu	35 ... 240 Cu	35 ... 240 Cu	35 ... 240 Cu	--	
3VT9 300-4TC00							
3VT9 324-4TD30	400	150 ... 240 Cu/Al	120 ... 240 Cu/Al	150 ... 240 Cu/Al	120 ... 240 Cu/Al		
3VT9 324-4TD00							
3VT9 315-4TD30	315	25 ... 150 Cu/Al	16 ... 150 Cu/Al	25 ... 150 Cu/Al	16 ... 150 Cu/Al		
3VT9 315-4TD00							
3VT9 324-4TF30	630	2 x (150 ... 240) Cu/Al	2 x (120 ... 240) Cu/Al	2 x (25 ... 150) Cu/Al	2 x (120 ... 240) Cu/Al		3/46, 3/57
3VT9 324-4TF00							
3VT9 315-4TF30	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		3/47, 3/58
3VT9 315-4TF00							
3VT9 303-4TF30	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		3/47, 3/58
3VT9 303-4TF00							
3VT9 300-4ED30	400						3/48
3VT9 300-4EE30	630						3/48
3VT9 300-4TN30	10/16	1.5 ... 2.54 ... 6 flexible conductor					

Technical specifications

Description		Circuit breakers			Switch disconnector unit
Order number		3VT3 763-2AA36/46/56-0AA0, 3VT3 763-3AA36/46/56-0AA0			3VT9 363-6DT00
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 20 kA 15 kA	100 kA 65 kA 35 kA 20 kA	AC 230 V AC 415 V AC 500 V AC 690 V	--
Rated short-circuit breaking capacity (rms value) I_{cs}/U_e		40 kA 18 kA 10 kA 8 kA	75 kA 36 kA 20 kA 15 kA	AC 230 V AC 415 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/AC 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		✓/✓			

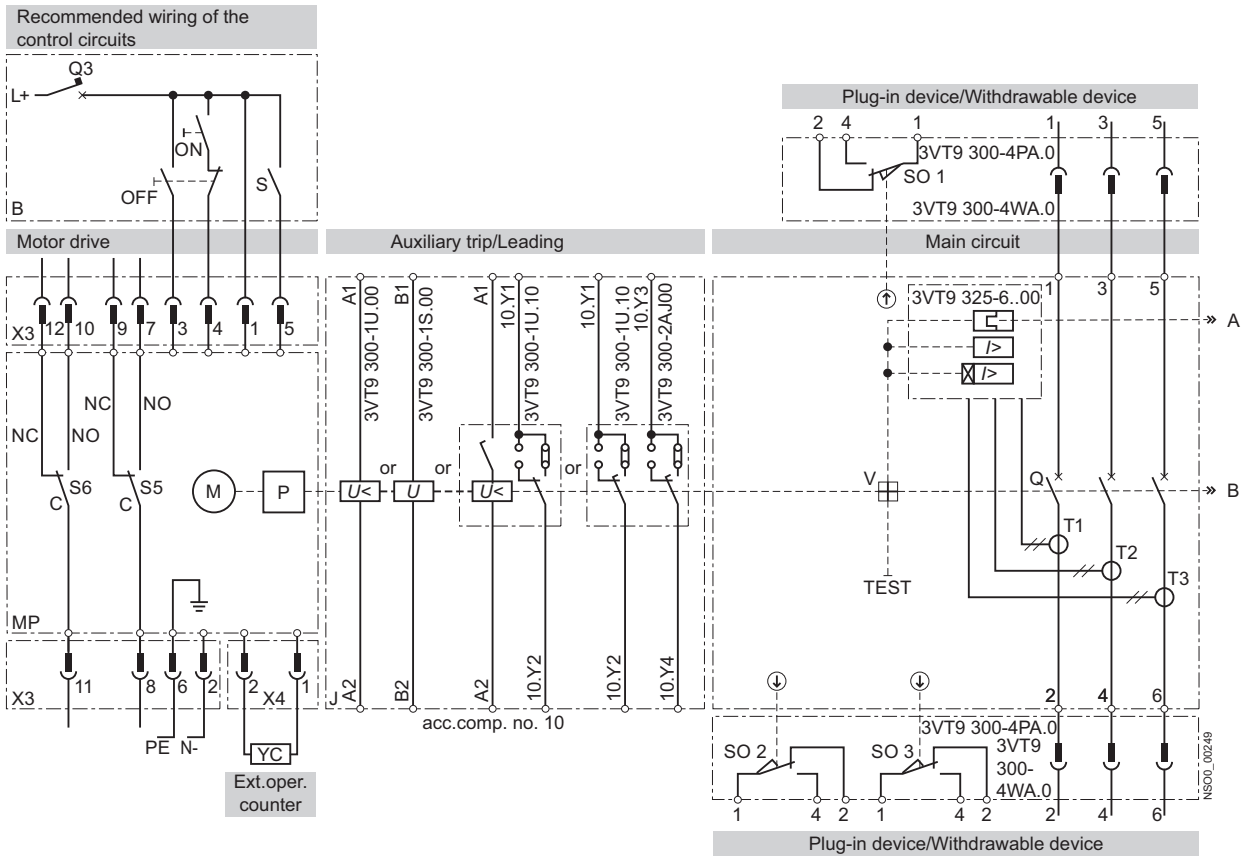
✓ available,
-- unavailable
+ in preparation

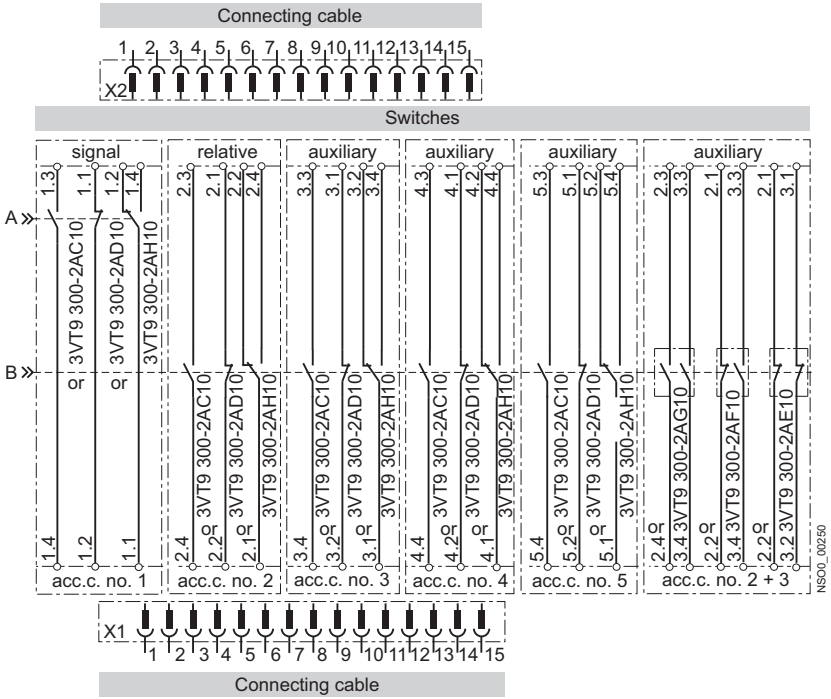
[1] If the circuit breaker connection is reversed (input terminals 2, 4, 6 , output terminals 1, 3, 5), I_{cu} does not change.

Schematics

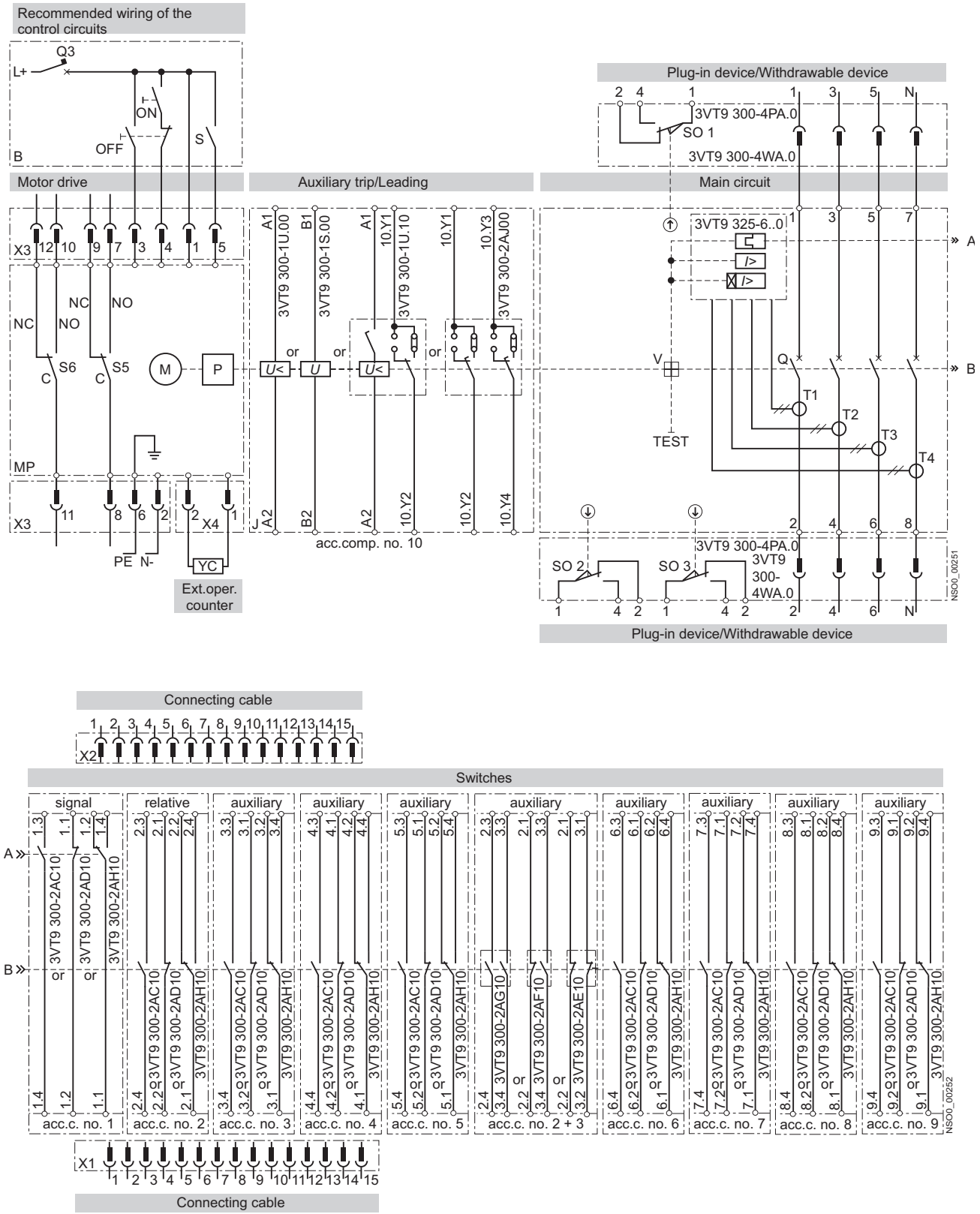
Circuit breakers with accessories

3-pole version





4-pole version



MP	3VT9 300-3M..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, 3VT9 300-3MF10
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
3VT9 325-6..00	3VT9 363-6DT00 circuit breaker - trip unit - ETU LP, DP, MDP switch-disconnector - switch-disconnector unit
TEST	Pushbutton to test trip unit
3VT9 300-4PA30	3-pole plug-in base
3VT9 300-4WA30	3-pole withdrawable version base
X1, X2	3VT9 300-4PL00 connecting cable
SO1, SO2, SO3	Contacts signalling position of circuit breaker/switch disconnector in plug-in base or withdrawable version base (Position signalling switch 3VT9 300-4WL00)
3VT9 300-1U.00	Undervoltage trip unit
3VT9 300-1S.00	Shunt trip unit
3VT9 300-1U.10	Undervoltage trip unit with leading contact
3VT9 300-2AJ00	Leading contact
acc. c. no.	Accessory compartment number

[1)] Only for 4-pole version of the 3VT3 763-.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)]	
			3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AJ00	3VT9 300-1U.10	3VT9 300-2AG10		3VT9 300-2AF10		3VT9 300-2AE10		3VT9 300-2AH10		3VT9 300-2AH10		3VT9 300-2AH10	
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.

Trip units

Overview

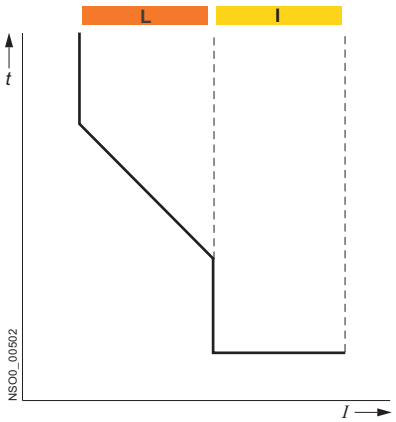
The electronic trip unit is a separate and interchangeable unit, which has to be ordered in addition to the 3VT3 switching unit. By exchanging the trip unit, the range of the circuit breaker's rated current can be easily changed.

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

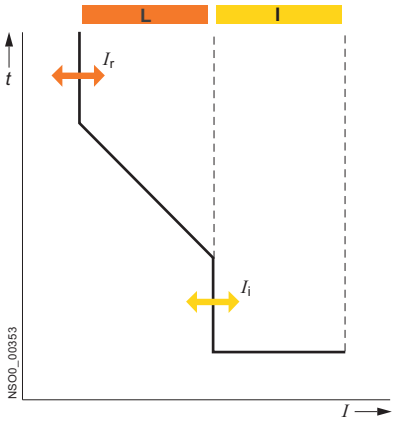
Several different trip units are available. Some have adjustable characteristics (in order to match the protected device and to achieve the required selectivity):

ETU LP trip units



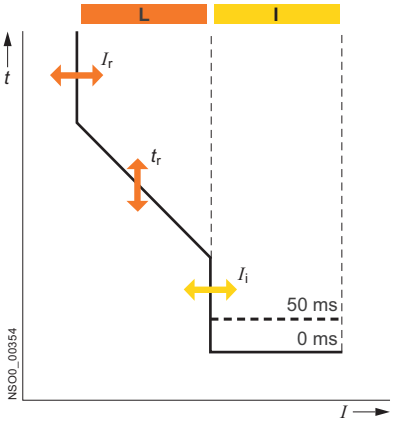
Electronic trip units ETU LP have one type of characteristic and fixed I_n and I_{rm} settings.

ETU DP trip units



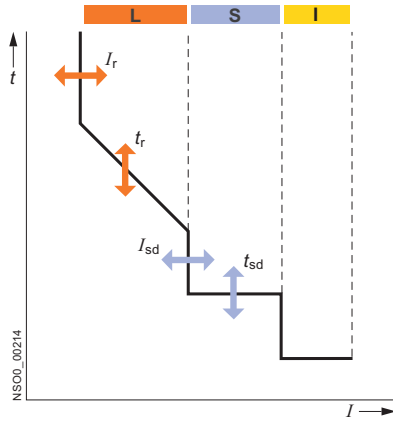
Electronic trip units ETU DP have one type of characteristic with adjustable I_r and I_{rm}.

ETU MP trip units



Electronic trip units ETU LP have have more characteristics with adjustable I_r, t_r and I_{rm}.

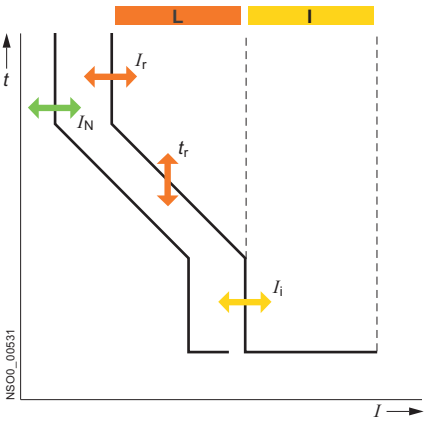
ETU MPS trip units



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 3VT3 763-.AA36-0AA0 switching units and 4-pole 3VT3 763-.AA46-0AA0 switching units with disconnecting of the N pole.

ETU DPN trip units



ETU DPN trip units are intended for 4-pole 3VT3 763-.AA56-0AA0 switching units with protected N pole. They have more characteristics with adjustable I_r, t_r, I_{rm} and I_N.

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.

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}.

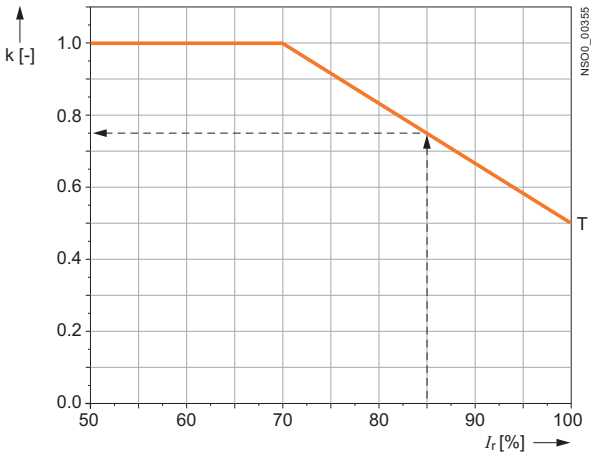
3. Time-independent instantaneous trip unit (short-circuit trip unit) I

- 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.

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 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

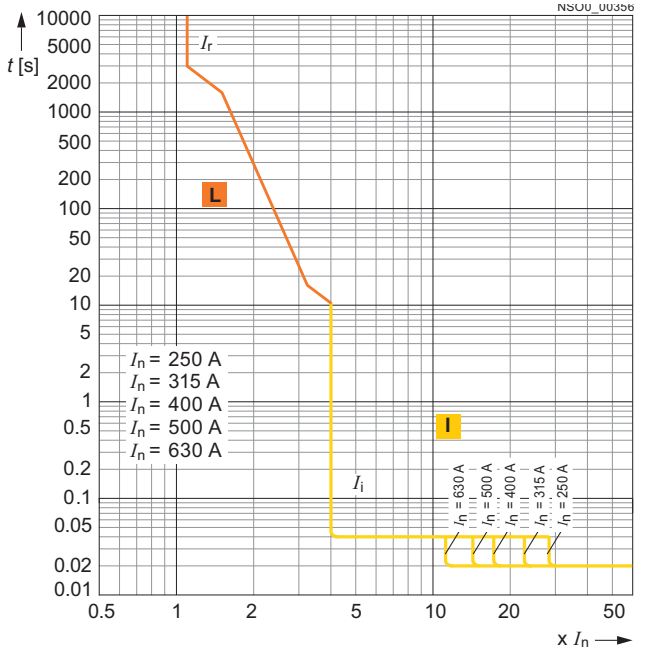
The 3VT9 3..-6AB00 trip unit is intended for the 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. The LP trip unit has a thermal memory that cannot be disabled. The rated currents of the trip units are given by their order numbers and correspond to a standardized series of currents (see specifications table). The short-circuit trip unit is fixed-set at $4 \times I_n$.

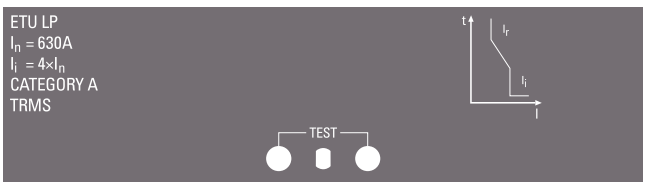
One of the advantages of the LP trip unit is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

Specifications

Order No.	Rated current I_n	Instantaneous short circuit protection I_{rm}
	A	A
3VT9 325-6AB00	250	1000
3VT9 331-6AB00	315	1260
3VT9 340-6AB00	400	1600
3VT9 350-6AB00	500	2000
3VT9 363-6AB00	630	2520

Tripping characteristics





Trip units ETU DP - Distribution protection

- Provides protection for lines and transformers

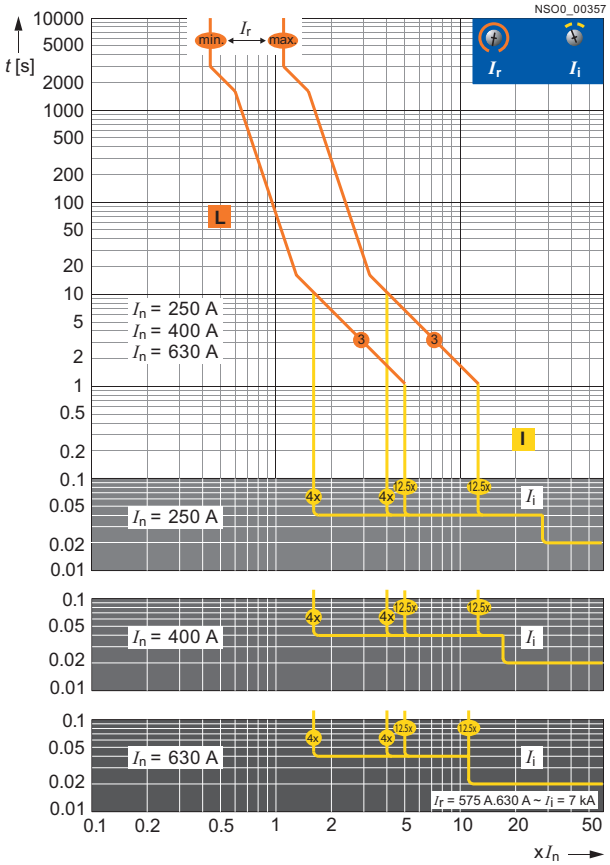
The 3VT9 3..-6AC00 trip unit is intended for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to 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.

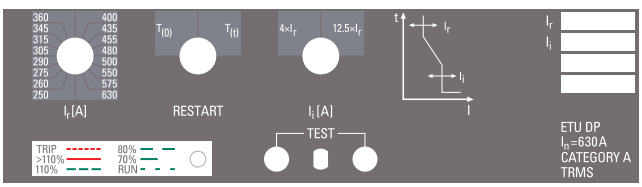
Located on the lower part of the trip unit cover are two photocells for communicating with the signalling unit.

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 8 I_r.

Tripping characteristics





Adjustable specifications

Order No.	Rated current I_n A	Overload protection I_r A	Restart	Instantaneous short circuit protection I_i
		100		
		110		
		115		
		125		
		137		
		144		
		160		
3VT9 325-6AC00	250	172	$T_{(0)}$	4 x I_r
		180	$T_{(t)}$	12,5 x I_r
		190		
		200		
		210		
		220		
		231		
		243		
		250		
		160		
		172		
		180		
		190		
		200		
		210		
		220		
3VT9 340-6AC00	400	231	$T_{(0)}$	4 x I_r
		243	$T_{(t)}$	12,5 x I_r
		250		
		275		
		290		
		315		
		345		
		360		
		400		
		250		
		260		
		275		
		290		
		305		
		345		
		315		
		360	$T_{(0)}$	4 x I_r
3VT9 363-6AC00	630	400	$T_{(t)}$	12,5 x I_r
		435		
		455		
		480		
		500		
		550		
		575		
		630		

3

Trip units

Trip units ETU MP - Motor protection

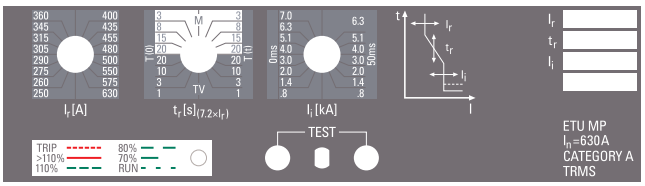
- Provides protection for motors and generators
- Can protect lines and transformers

The 3VT9 3..-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.

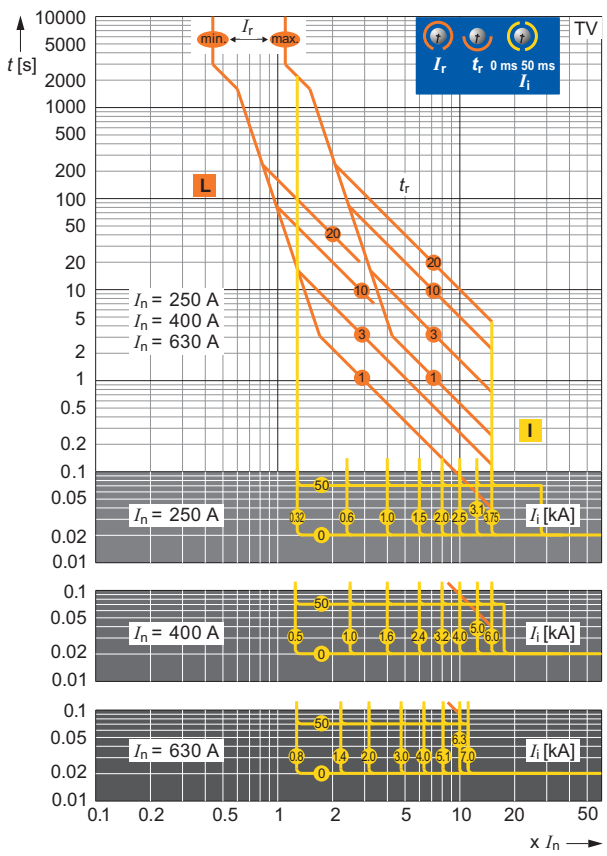
The trip units have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the trip unit. Mode “M” provides 4 characteristics suitable for protecting motors and in mode “TV” are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

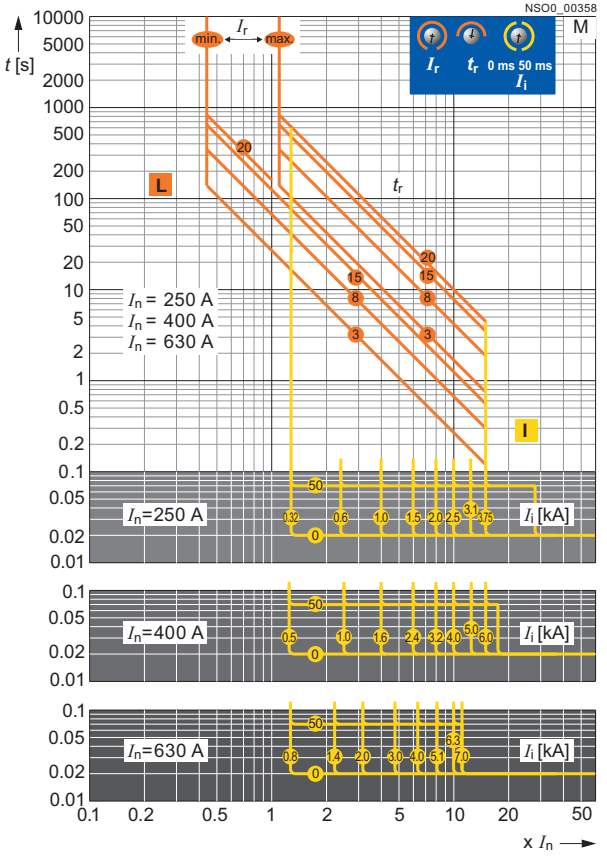


Adjustable specifications

Order 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	
3VT9 325-6AP00	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	
3VT9 340-6AP00	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	
3VT9 363-6AP00	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	

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





Trip units

Trip units ETU MPS - Motor protection, setting timing selectivity

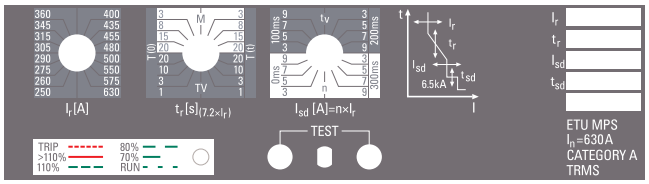
- Provides protection for motors and generators
- Can protect lines and transformers
- Enables adjusting time delay of time-independent trip units

The 3VT9 3..-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_v) 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.

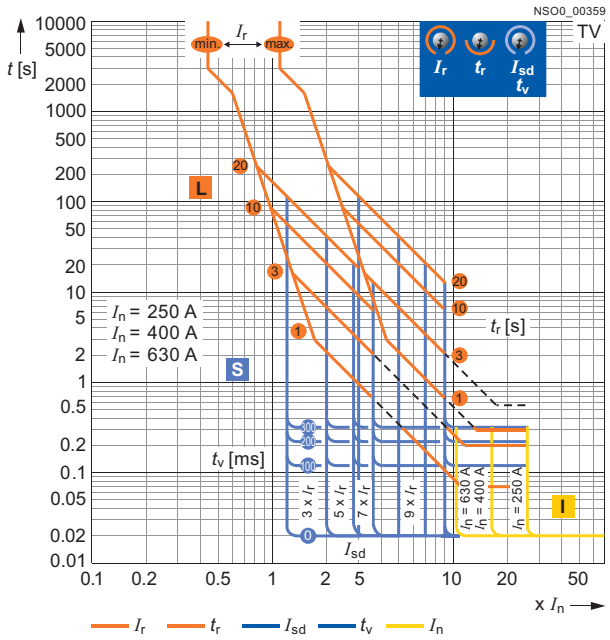
The trip units have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the trip unit. Mode “M” provides 4 characteristics suitable for protecting motors, and mode “TV” incorporates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



Adjustable specifications

Order 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
3VT9 325-6AS00	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	
3VT9 340-6AS00	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	
3VT9 363-6AS00	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	

3VT9 3..-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

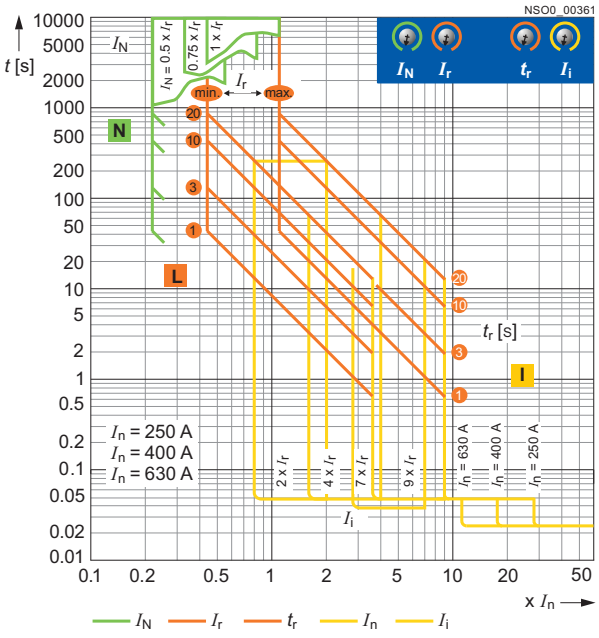
The 3VT9 3..-6BC00 trip unit is only intended for the 3VT3 763-AA56-0AA0 switching unit. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal trip unit remains active.

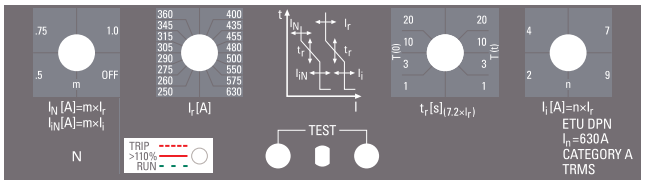
The rated current I_r, delay for switching off the trip unit at 7.2 I_r, and the tripping level of the short-circuit trip unit can be adjusted.

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



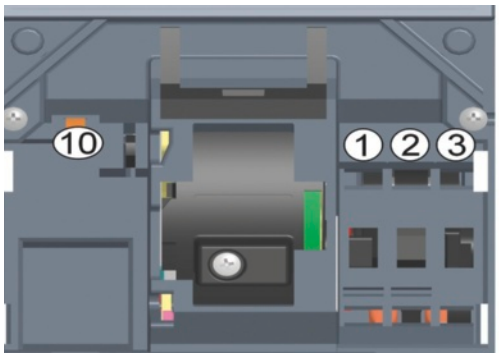


Trip units

Adjustable specifications

Order 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
3VT9 325-6BC00	250	100	1	$T_{(0)}$	2	0,5
		110				
		115	3		4	0,75
		125				
		137	10		7	1
		144				
		160	20	$T_{(t)}$	9	OFF
		172				
		180	20			
		190				
		200	10			
		210				
		220	3			
		231				
		243	1			
		250				
3VT9 340-6BC00	400	160	1	$T_{(0)}$	2	0,5
		172				
		180	3		4	0,75
		190				
		200	10		7	1
		210				
		220	20	$T_{(t)}$	9	OFF
		231				
		243	20			
		250				
		275	10			
		290				
		315	3			
		345				
		360	1			
		400				
3VT9 363-6BC00	630	250	1	$T_{(0)}$	2	0,5
		260				
		275	3		4	0,75
		290				
		305	10		7	1
		315				
		345	20	$T_{(t)}$	9	OFF
		360				
		400	20			
		435				
		455	10			
		480				
		500	3			
		550				
		575	1			
		630				

Overview



Order number according to contact arrangement

Arrangement of contacts	Order No.	Number of contacts	Contact types
01	3VT9 300-2AC10 (20)	1	NO
20	3VT9 300-2AE10 (20)	2	NO
01	3VT9 300-2AD10 (20)	1	NC
02	3VT9 300-2AG10 (20)	2	NC
11	3VT9 300-2AF10 (20)	1 + 1	NC + NO
001	3VT9 300-2AH10 (20)	1	NC + NO

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

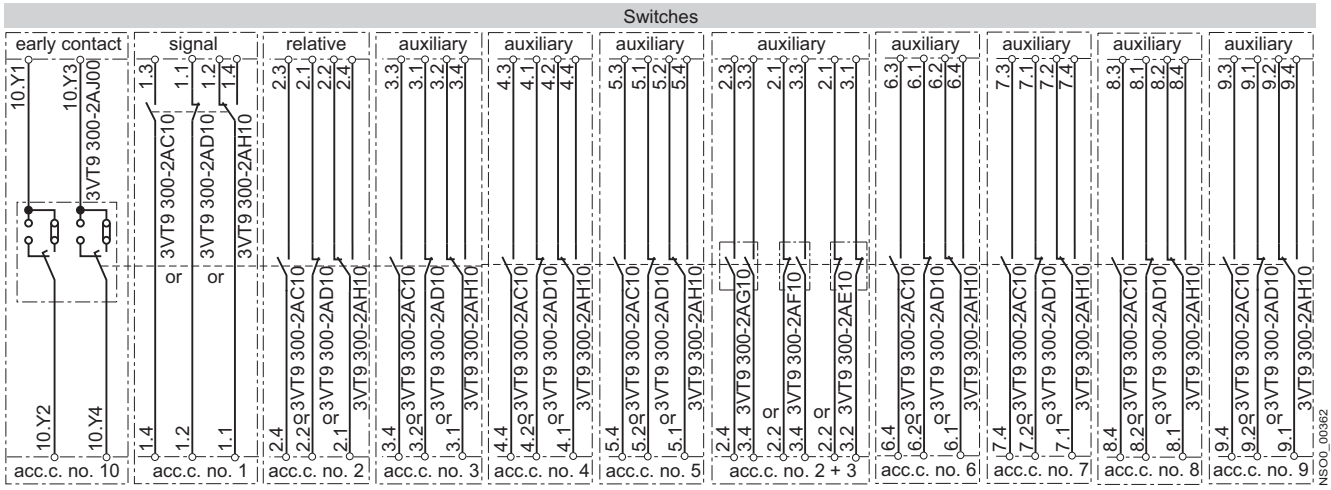
Accessory compartment	Switch name	Switch function
1	Signalling	Signal to indicate the state of the circuit breaker by the trip unit
2	Relative	Relative to indicate tripping of the circuit breaker by trip units, TEST pushbutton or by OFF pushbutton on the motorized operating mechanism
3, 4, 5, (6 ... 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.

Auxiliary switches

Function

State of switches located in the switching unit accessory compartment

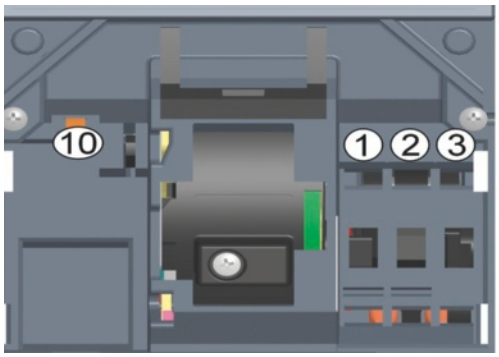


Technical specifications

Order No.		3VT9 300-2A.10	3VT9 300-2A.20[1]	3VT9 300-2AJ00	3VT9 300-2AH10	3VT9 300-2AH20[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] 3VT9 300-2A.20 is not suitable for controlling electromagnetic loads.

Overview



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

U_e	Order No.
AC/DC 24, 40, 48 V	3VT9 300-1SC00
1AC/DC 10 V	3VT9 300-1SD00
AC 230, 400, 500 V/DC 220	3VT9 300-1SE00

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

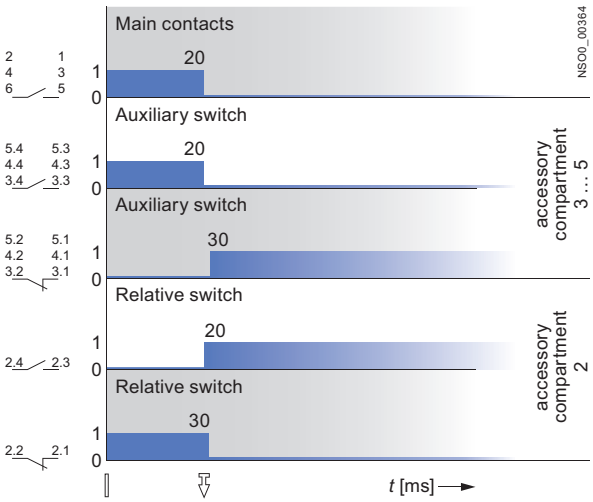
U_e	Order No.
AC 24,40 48 V	3VT9 300-1SC00
AC/DC 110 V	3VT9 300-1SD00
AC 230,400,500/DC 220 V	3VT9 300-1SE00

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

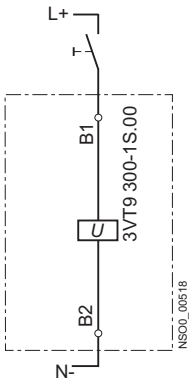
Shunt trip units

Circuit breaker switched off by the shunt trip unit



Circuit breaker states and lever positions of the circuit breaker

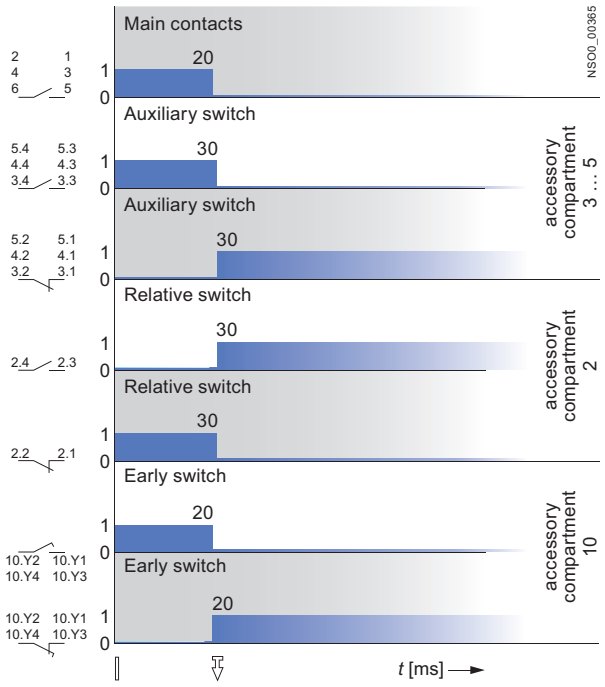
Circuit breaker state	Lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the tripping pushbutton located on the operating mechanism	
Switched off manually or electrically by operating mechanism	



Auxiliary trip units

Undervoltage trip units

Circuit breaker switched off by the undervoltage trip unit

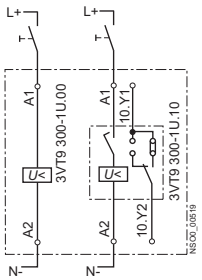


Circuit breaker states and lever positions of the circuit breaker

Circuit breaker state	Lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the 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	NONO



Technical specifications

Shunt trip units

Order No.		3VT9 300-1S.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

Order No.		3VT9 300-1U.00	3VT9 300-1U.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 3VT9 300-3M..0.

Overview

Rotary operating mechanism

The following components of the rotary operating mechanisms are required:

- To switch the switching unit:
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob
  - 3VT9 300-3HF20 red knob
- To switch the switching unit through the switchgear cabinet door:
  - 3VT9 300-3HJ..extension shaft
  - 3VT9 300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9 300-3HE/HF.. knob

Mechanical interlocks and mechanical interlock for parallel switching

- Mechanical interlocks for fixed-mounted versions require the following components:
  - 2 x 3VT9 300-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9 300-3HE/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 3VT9 300-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9 300-3HE/HF.. knob

Design

Fig. 1: Rotary operating mechanism with knob

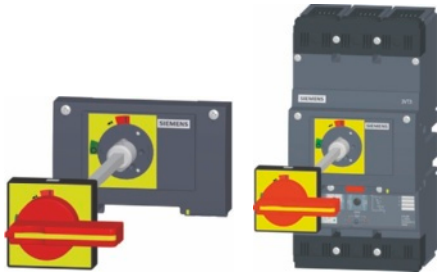


Fig. 2: Rotary operating mechanism with extension shaft, coupling driver and knob

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)

3VT9 300-3HA/HB.. rotary operating mechanism
+ 3VT9 300-3HE/HF.. knob

Operation through the switchgear cabinet door (Fig. 2)

3VT9 300-3HA/HB.. rotary operating mechanism
+ 3VT9 300-3HJ.. extension shaft
+ 3VT9 300-3HE/HF.. knob
+ 3VT9 300-3HG/HH.. coupling driver

Operation through side wall of switchgear cabinet

3VT9 300-3HC/HD10.. rotary operating mechanism
+ 3VT9 300-3HJ.. extension shaft
+ 3VT9 300-3HE/HF.. knob
+ 3VT9 300-3HG/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 3/31).

Rotary operating mechanisms

Features

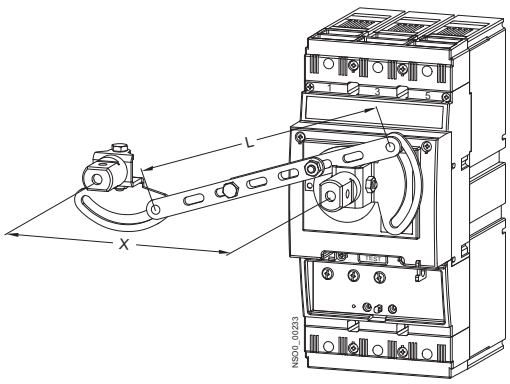
Order No.	Description	Color	Permits operator to lock the circuit breaker in OFF mode	Degree of protection	Switchgear cabinet door is locked when circuit breaker is		Length in mm
					switched on	switched off manually and locked	
3VT9 300-3HA10	Rotary operating mechanism	grey	no	--	--	--	--
3VT9 300-3HA20	Rotary operating mechanism	grey	yes	--	--	--	--
3VT9 300-3HB20	Rotary operating mechanism	yellow	yes	--	--	--	--
3VT9 300-3HC10	Rotary operating mechanism	grey	no	--	--	--	--
3VT9 300-3HD10	Rotary operating mechanism	grey	no	--	--	--	--
3VT9 300-3HE10	Knob	black	no	--	--	--	--
3VT9 300-3HE20	Knob	black	yes	--	--	--	--
3VT9 300-3HF20	Knob	red	yes	--	--	--	--
3VT9 300-3HG10	Coupling driver	black	--	IP40	yes	yes	--
3VT9 300-3HG20	Coupling driver	yellow	--	IP40	yes	yes	--
3VT9 300-3HH10	Coupling driver	black	--	IP66	yes	no	--
3VT9 300-3HH20	Coupling driver	yellow	--	IP66	yes	no	--
3VT9 300-3HJ10	Extension shaft, can be shortened	--	--	--	--	--	365
3VT9 300-3HJ20	Extension shaft, telescopic	--	--	--	--	--	245 ... 410

Function

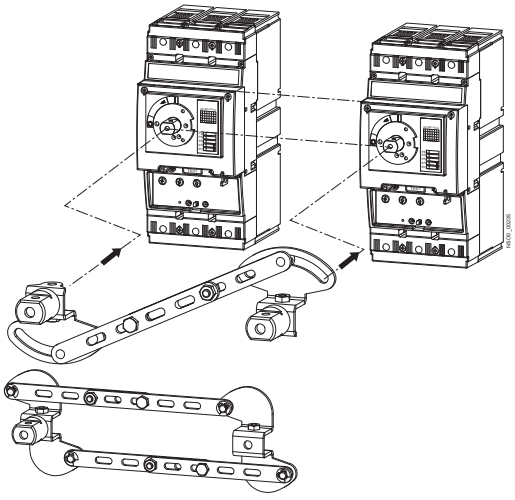
3VT9 300-8LA00 mechanical interlocking

Mechanical interlocks 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 interlock it is required to comply with the dimensions shown in the figure and in the table.



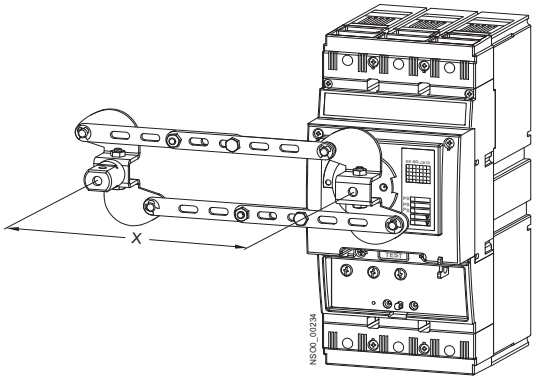
Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2, 3P	105	112	140	145.5	122.5	128.5	181	185.5
3VT2, 4P	105	112	140	145.5	122.5	128.5	181	185.5
3VT3, 3P	122.5	128.5	157.5	145.5	140	145.5	185	189
3VT3, 4P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



3VT9 300-8LB00 mechanical parallel switching

Mechanical interlocks 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 interlock for parallel switching it is required to comply with the dimensions shown in the figure and in the table.

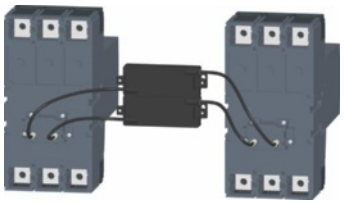


Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole[1]	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2, 3P	105^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	x	x
3VT2, 4P	105^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	x	x
3VT3,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

Mechanical interlocking and parallel switching

3VT9 300-8LC.0 Mechanical interlocking

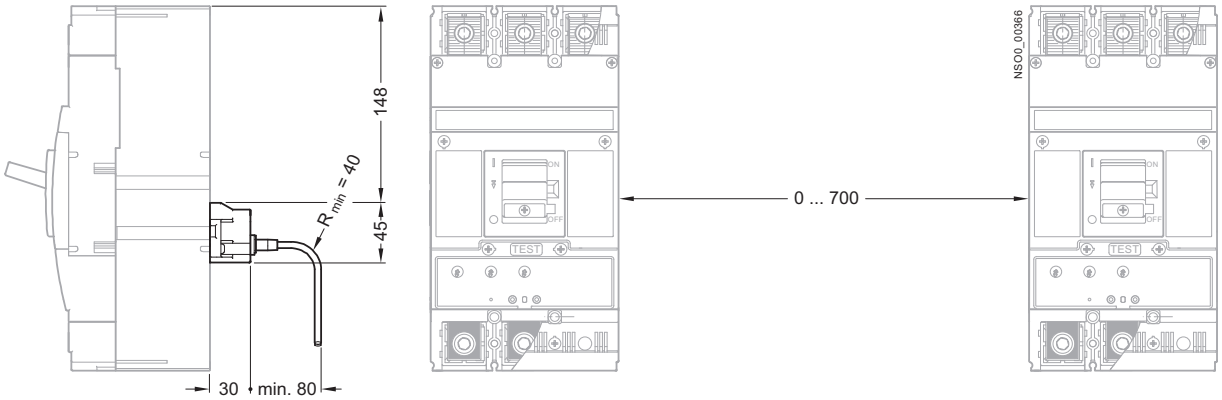


- Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both trip simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- 3VT9 300-8LC10 mechanical interlocking is intended for two 3VT3 circuit breakers. 3VT9 300-8LC20 interlocking is intended for one BH630 circuit breaker and one 3VT2.
- Circuit breakers may be in fixed, plug-in and withdrawable designs.

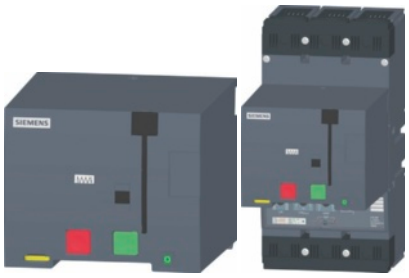
Order No. of mechanical interlocking	3VT9 300-8LC10	3VT9 300-8LC20
Circuit breaker types	3VT3	3VT2
	3VT3	3VT3

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/technical assistance.



Design



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 60 ms. Releasing the spring energy storage unit and tripping the circuit breaker is ensured by a closing coil. The motor mechanism can trip the circuit breaker in 900 ms. 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 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). The motorized operating mechanism does not need any voltage to perform its function.
- Remote switching on and off in position AUTO is carried out with pushbuttons that must be connected to the drive unit connector. Furthermore, this position makes it is possible to control the circuit breaker with the pushbuttons located on the drive unit front panel.
- 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. 3VT2 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 3VT9 300-3MF20 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 3VT9 300-3MF00 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.

Order No.		3VT9 300-1S.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		LSN 4C/1; LSN 2C/1
• DC 24, 48, 110 V; DC 220 V		LSN-DC 4C/1; LSN-DC 2C/1
Rated operating current AUTO / MANUAL switches I_e/U_e	V	AC 5 A/250 DC 0.5 A/250
Order No.		3VT9 300-3MF00
Number of conductors		12
Conductor cross sections S	mm^2	0.35
Conductor lengths	cm	60

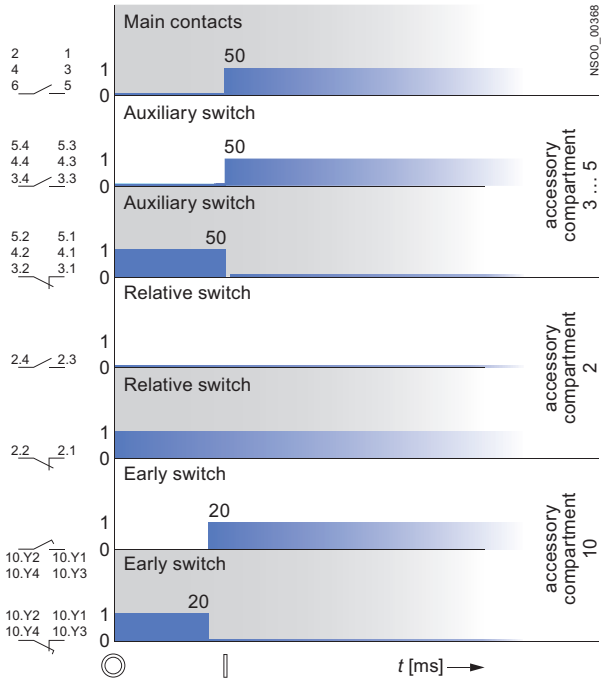
[1] For sequence of control pulses, see page 3/34.

Motorized operating mechanism

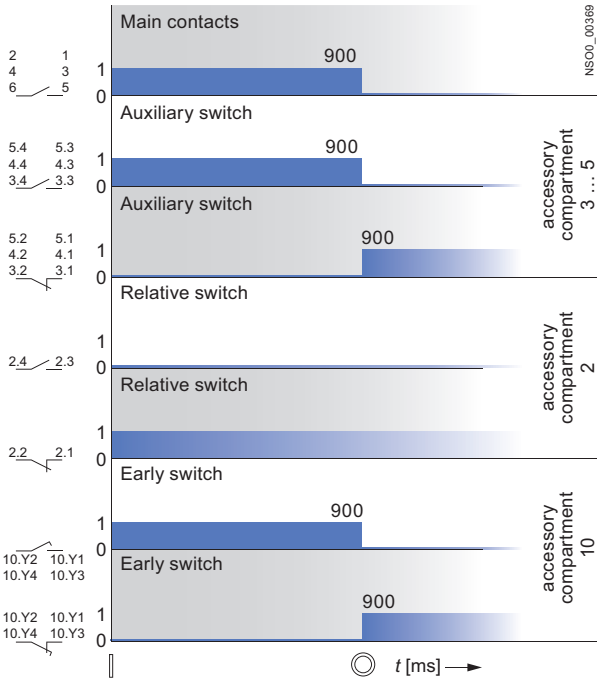
Function

Circuit breaker switched on/off by the motorized operating mechanism

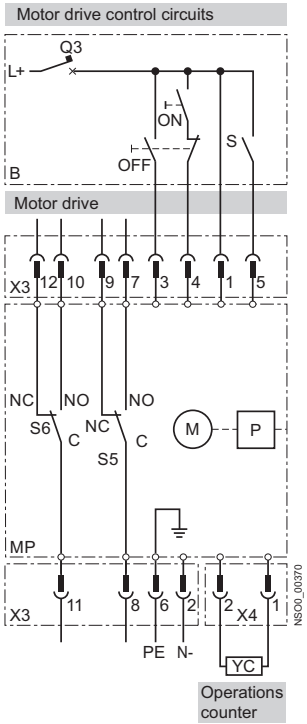
Circuit breaker switched on by the motorized operating mechanism – electrically by pushbutton ON



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



Wiring diagram



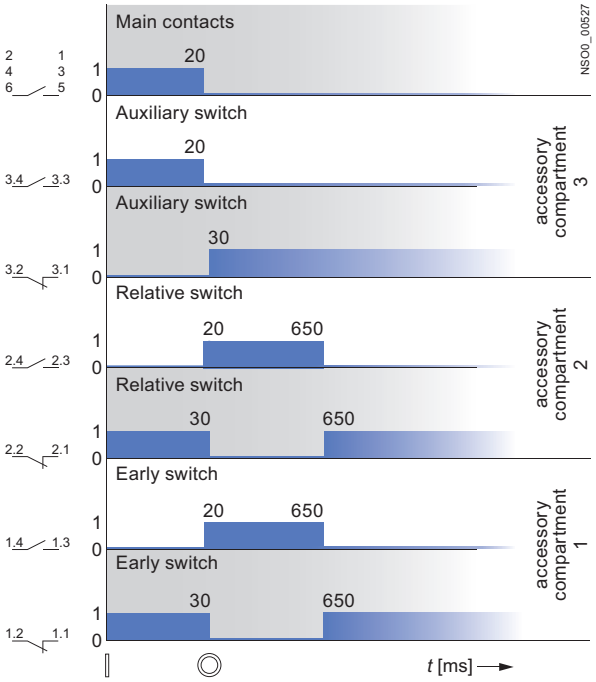
Circuit breaker states and toggle positions of the circuit breaker

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	

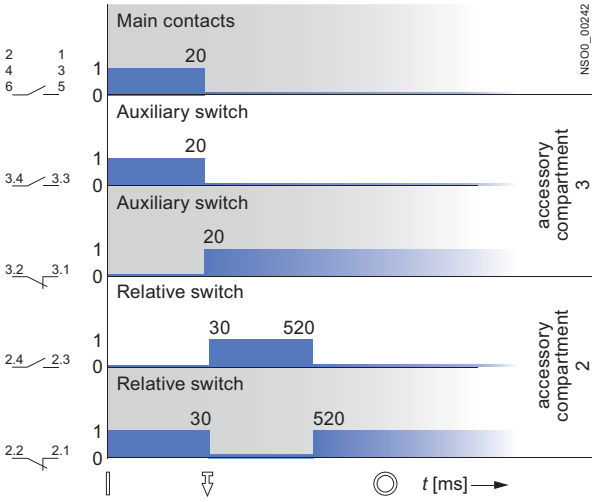
Wiring diagram description

Symbol	Description
MP	Motorized operating mechanism 3VT9 300-3M..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 3VT9 300-3MF10
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

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

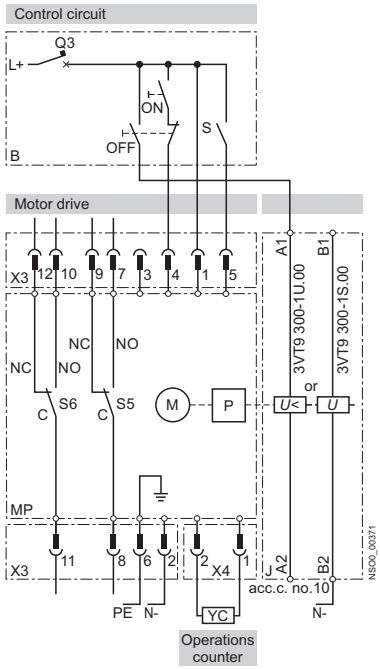


Tripping of the circuit breaker with motorized operating mechanism by a shunt trip unit or undercurrent trip unit (switch S – automatic spring charging)

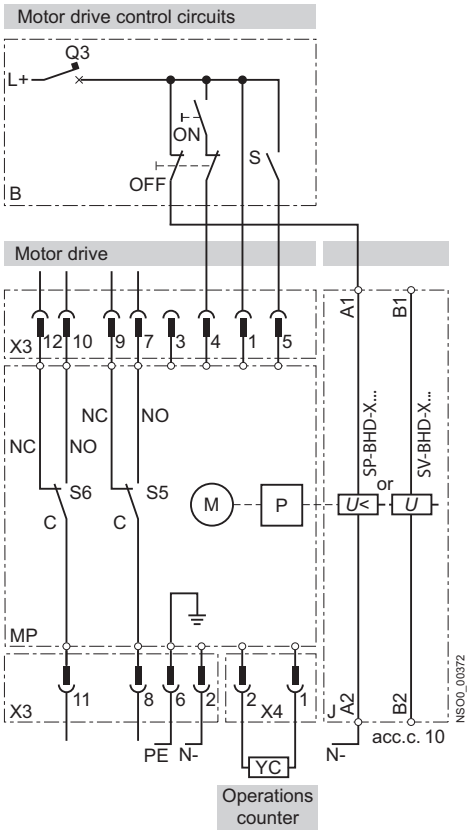


Wiring diagram

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



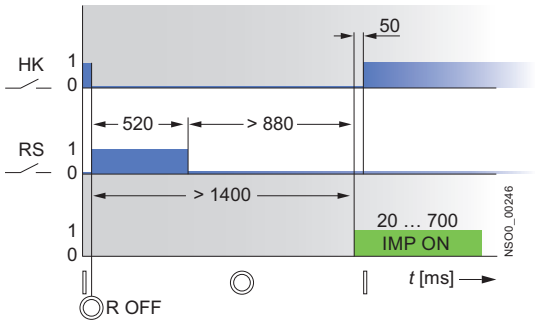
Circuit breaker switched on by motorized operating mechanism (electrical ON signal) and switched off by undervoltage trip unit



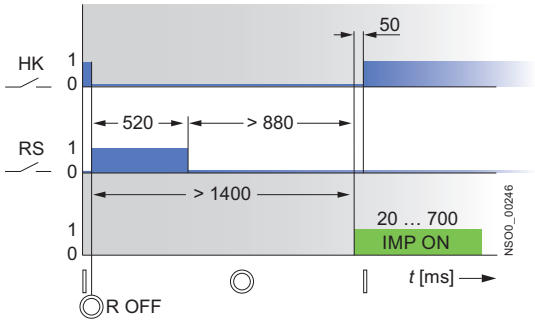
Motorized operating mechanism

Recommended actuating pulses

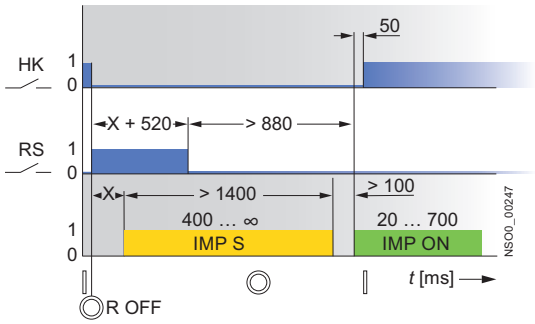
Circuit breaker switched on/off by motorized operating mechanism - switch S permanently closed (automatic spring charging) or open



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 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

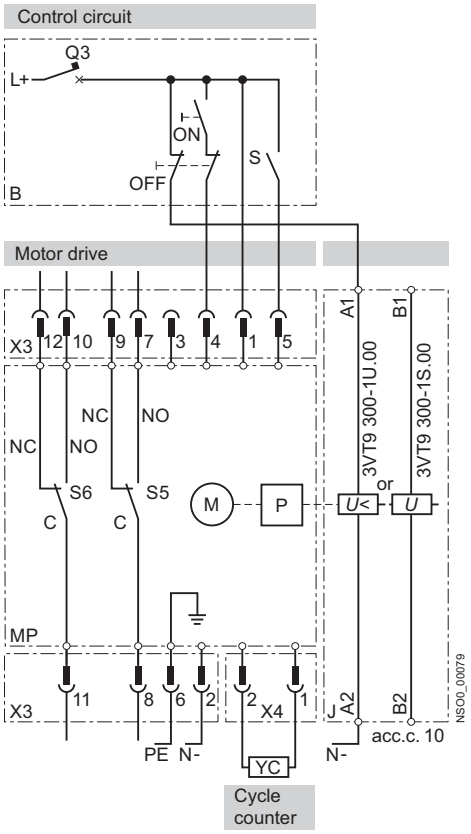
Circuit breaker states and toggle positions of the circuit breakers

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	

Motorized operating mechanism

Use of 3VT9 200-3M..0 motorized operating mechanism in the automatic standby system

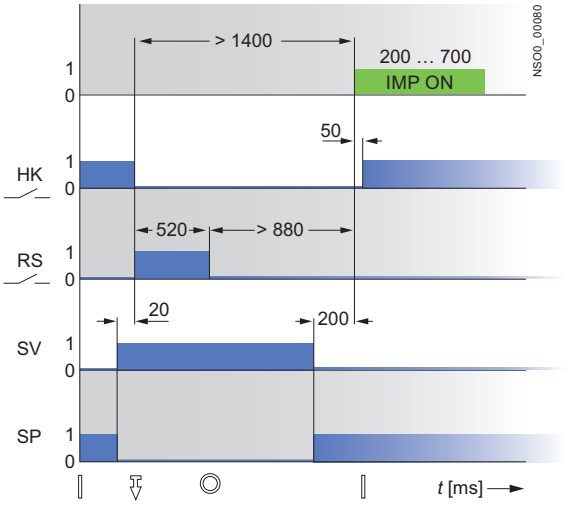
Wiring diagram of the motorized operating mechanism of the circuit breaker

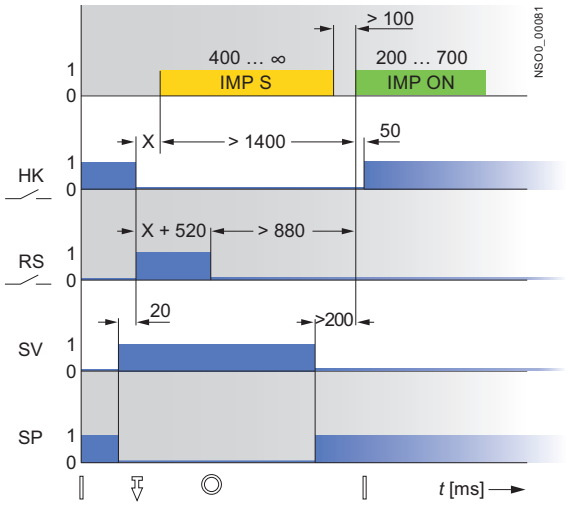


Symbol	Description
M	Motor
P	Energy storage device
X3	Connector for connection of control circuits
X4	Connector for external cycle counter
S5	Switch indicating AUTO (NO-C)/MANUAL (NC-C) mode
YC	External 3VT9 300-3MF10 cycle counter
B	Recommended connection of control circuits (is not included in the 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





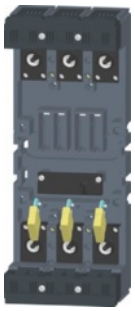
Symbol	Description
HK	Main contacts
RS	Relative switch
SV	Pulse for shunt trip unit
SP	Pulse for undervoltage trip unit
IMP ON	Motorized operating mechanism make pulse
IMP OFF	Motorized operating mechanism storage pulse (generated by S switch)
‖	Switched on
⊓	Switched off by trip units, TEST or REVISION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

Mounting accessories for plug-in version

Overview

Plug-in bases

3VT9 200-4PA30
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 3VT3 763-.AA36-0AA0 switching unit

Main circuit

- The 3VT9 300-4TA30 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 3/44).

Auxiliary circuits

These are connected using a 15-wire 3VT9 300-4PL00 cable.

Coding

3VT9 300-4WN00 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

3VT9 300-4WL00 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 3VT9 300-4WL00 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

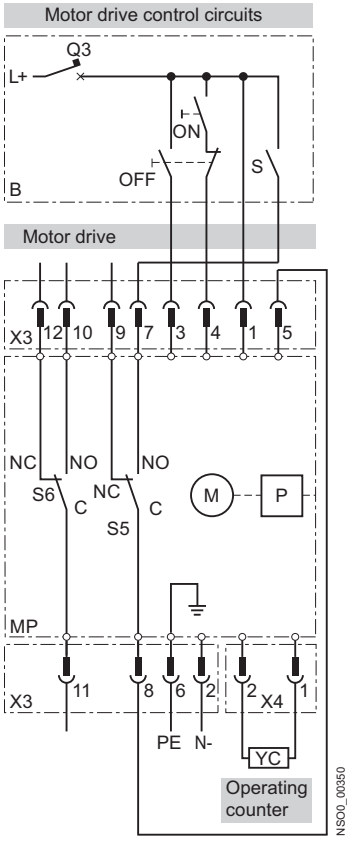
Order No.		3VT9 300-4WL00
Rated operational voltage U_e	V	AC 400 AC 250
Rated isolation voltage U_i	V	AC 500
Rated frequency f_n	Hz	50/60
Rated operational current I_e/U_e		
AC-13		3 A/AC 400 V
DC-15		0.15 A/250 V, 3 A/125 V, 4 A/30 V
Thermal current I_{th}	A	6
Arrangement of contacts		001
Connector 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 3/13.

Plug-in base with motorized operating mechanism

Circuit breaker in plug-in version with motorized operating mechanism

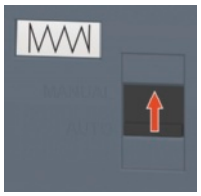
Recommended wiring of the circuit breaker in plug-in design with motorized operating mechanism



Symbol	Description
MP	3VT9 300-3M..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 3VT9 300-3MF10
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 LSN 4C/1 AC 48V LSN 4C/1 AC 110V LSN 4C/1 AC 230V LSN 2C/1 DC 24V LSN-DC 4C/1 DC 48V LSN-DC 4C/1 DC 110V LSN-DC 4C/1 DC 220V LSN-DC 2C/1

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.



Mounting accessories for plug-in version

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

State of circuit breaker before removing	Lever position of the circuit breaker	State of the main contacts	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]	
			3VT9 300-2AC10	3VT9 300-2AH10	3VT9 300-2AC10	3VT9 300-2AH10	3VT9 300-2AC10	3VT9 300-2AH10	3VT9 300-2AC10	3VT9 300-2AH10	3VT9 300-2AC10	3VT9 300-2AH10	3VT9 300-2AC10	3VT9 300-2AH10
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

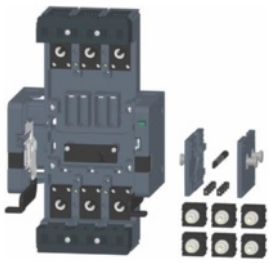
0 = contact open, 1 = contact closed

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

Design

Withdrawable version mounting base

Circuit breaker installed in withdrawable version base



3VT9 300-4WA30 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 3VT9 300-4TA30 connecting set is used for connecting with busbars or cable lugs and is included in delivery of the 3VT3 763-.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 3/44).

Auxiliary circuits

These are connected using the 3VT9 300-4PL00 15-wire cable.

Coding

3VT9 300-4WN00 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

3VT9 300-4WL00 position signalling switch

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

Technical specifications

Order No.		3VT9 300-4WL00
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 3/13.

States of 3VT9 300-4WL00 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

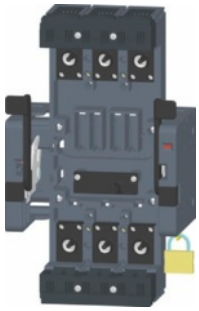
[1] Accessory compartments 19 and 20 are for 4-pole version only.

- 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”).

Mounting accessories for withdrawable version

Locking

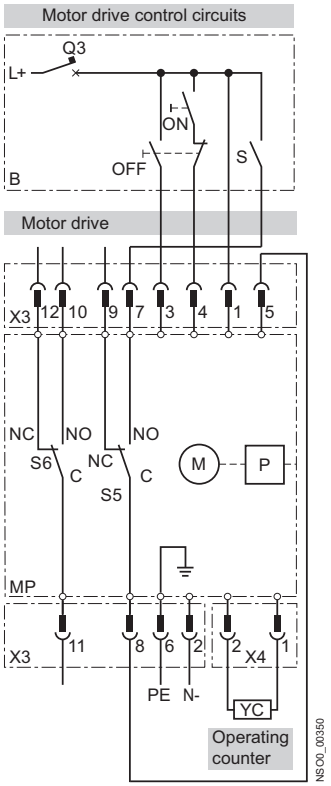
Locking the circuit breaker in withdrawable version base against tampering



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



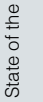
Wiring diagram description

Symbol	Description
MP	3VT9 300-3M..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 3VT9 300-3MF10
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 24 V LSN 4C/1 AC 48 V LSN 4C/1 AC 110 V LSN 4C/1 AC 230 V LSN 2C/1 DC 24 V LSN-DC 4C/1 DC 48 V LSN-DC 4C/1 DC 110 V LSN-DC 4C/1 DC 220 V LSN-DC 2C/1

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.

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	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10		3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10
															
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.

Insulating barriers and terminal covers

Overview

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

Fixed-mounted version

Front connection

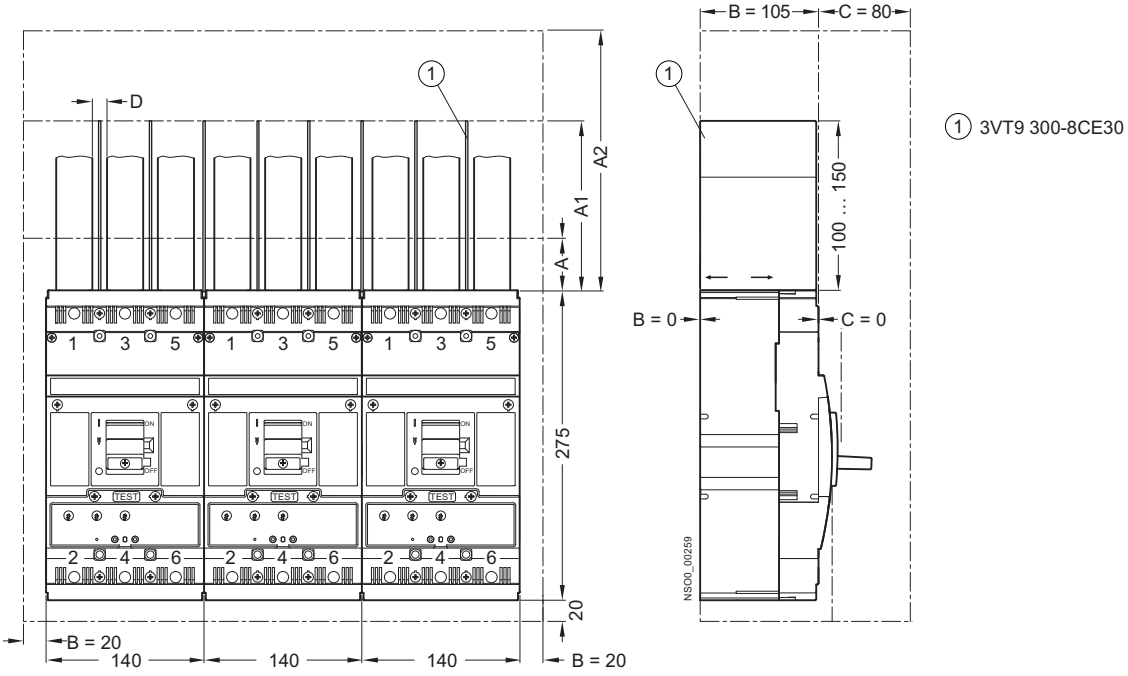
- Terminals 1, 3, 5
  - If U_e = AC 415 V, it is necessary to use 3VT9 300-8CE30 insulating barriers or 3VT9 300-8CB30 terminal covers.
  - For the connection of the main circuit to terminals 1, 3, 5, insulated conductors, flexibars or rear connection terminals are not used. It is necessary to use 3VT9 300-8CE30 insulating barriers or 3VT9 300-8CB30 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 3VT9 300-8CE30 insulating barriers or a 3VT9 300-8CB30 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 3VT9 300-8CE30 insulating barriers or 3VT9 300-8CB30 terminal covers.

Rear connection

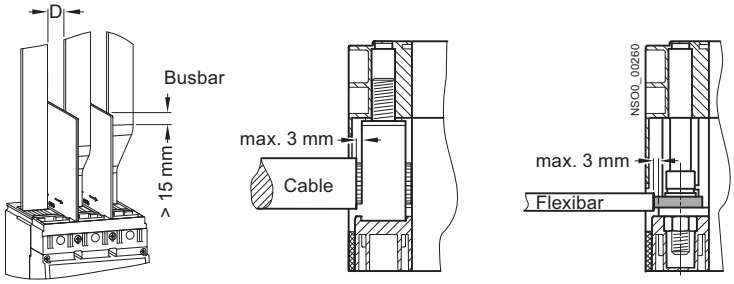
- Neither insulating barriers nor terminal covers have to be used.

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 connecting using insulated conductors, cables, flexibars or with rear connection)
A1	Minimum insulation length of bare conductors (using 3VT9 300-8CE30 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



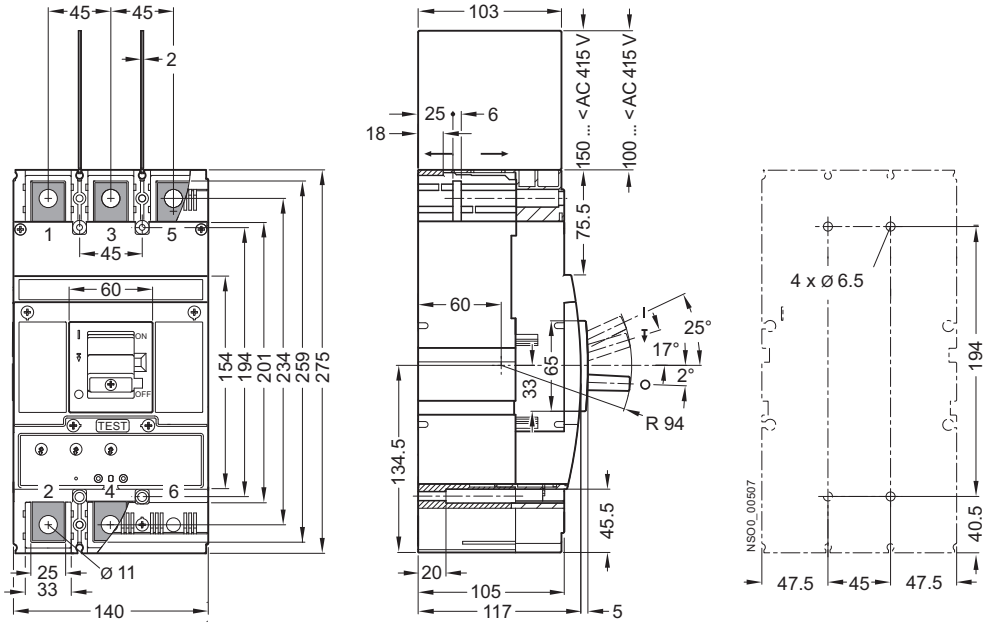
AC U_e			230 V	415 V		500 V		690 V	
3VT3 H wired with I_k [1]			≤ 100 kA	> 36 ... 65 kA	≤ 36 kA	> 20 ... 35 kA	≤ 20 kA	> 15 ... 20 kA	≤ 15 kA
3VT3 N wired with I_k			≤ 60 kA		≤ 36 kA		≤ 20 kA	≤ 10 kA	≤ 15 kA
C < 80 mm		A (mm)	50	50	50	50	50	50	50
	D ≥ 10 mm	A1 (mm)	150	200	100	200	150	150	150
		A2 (mm)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

Dimensional drawings

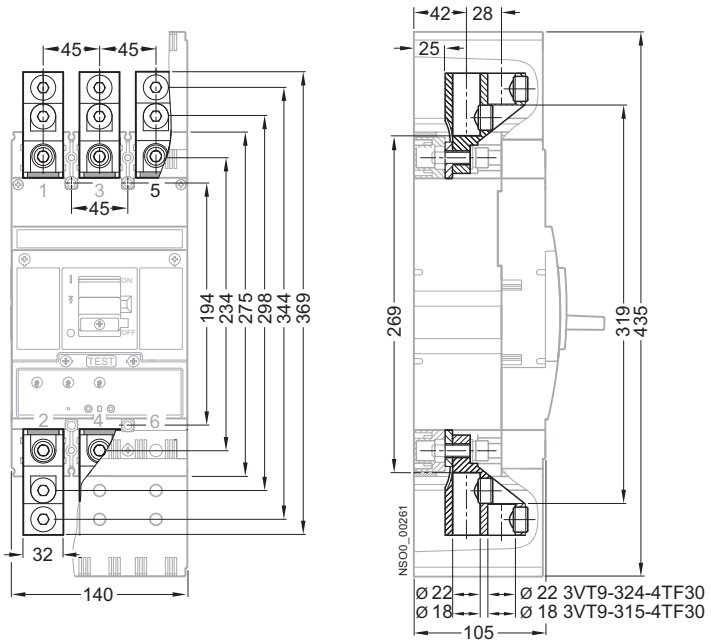
Dimensional drawings - 3-pole, fixed-mounted version

Fixed-mounted version, front connection

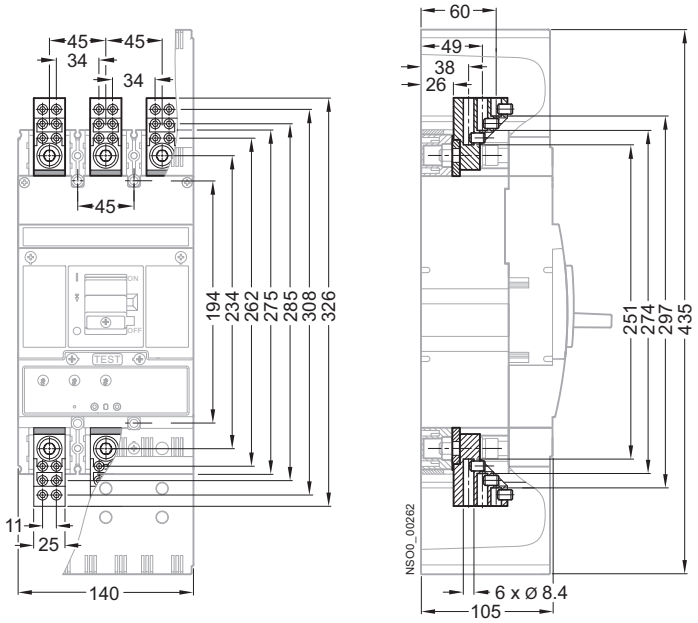


Drilling pattern

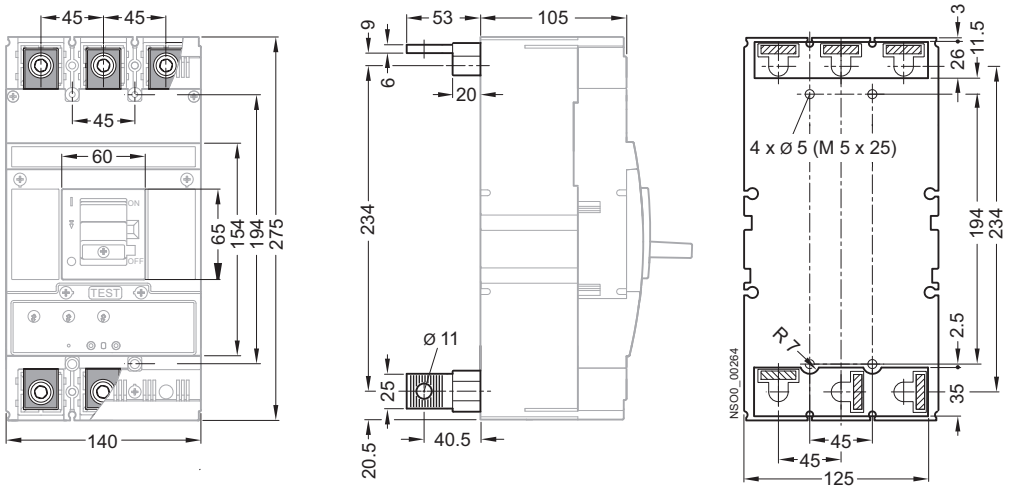
Fixed-mounted version, front connection with 3VT9 324-4TF30, 3VT9 315-4TF30 connecting set



Fixed-mounted version, front connection (3VT9 303-4TF30 connecting set)

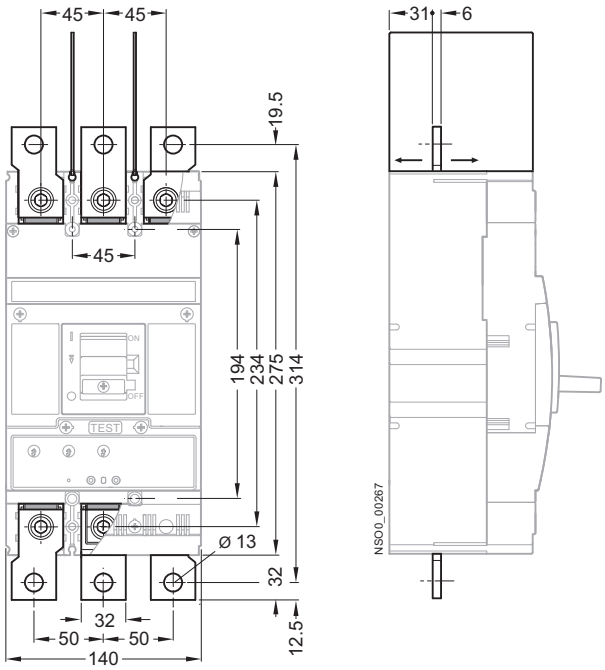


Fixed-mounted version, rear connection (3VT9 300-4RC30 connecting set)

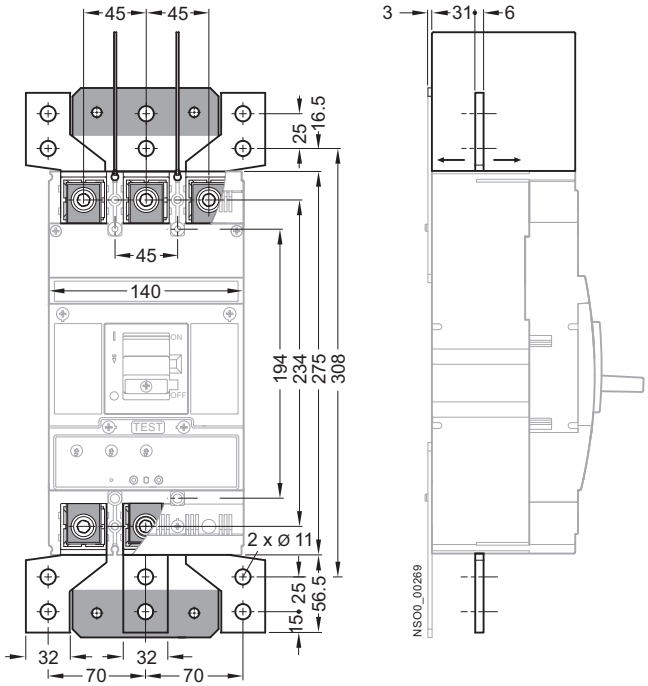


Dimensional drawings

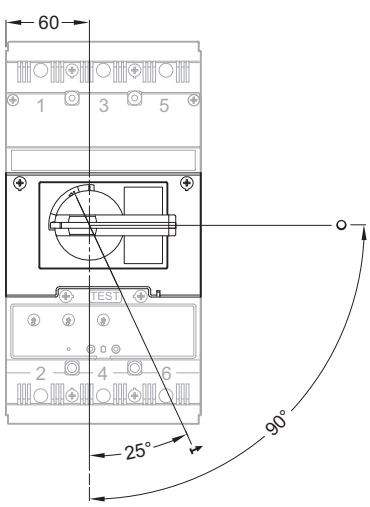
Fixed-mounted version, front connection (3VT9 300-4ED30 connecting set)

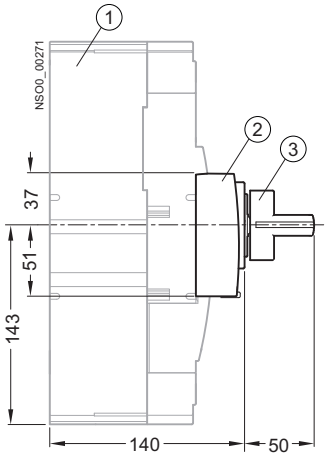


Fixed-mounted version, front connection (3VT9 300-4EE30 connecting set)



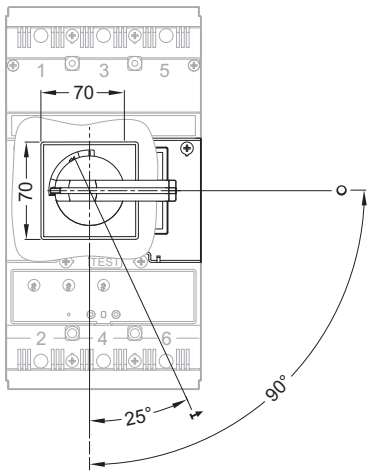
Fixed-mounted version, rotary operating mechanism

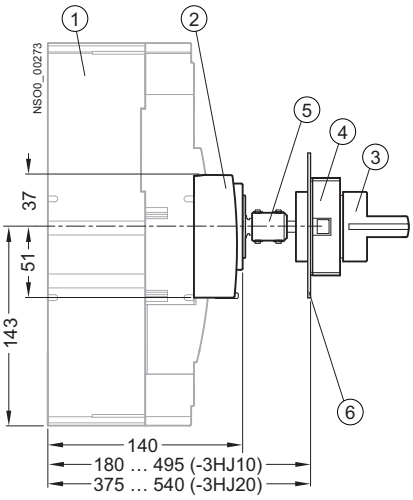




1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF-0

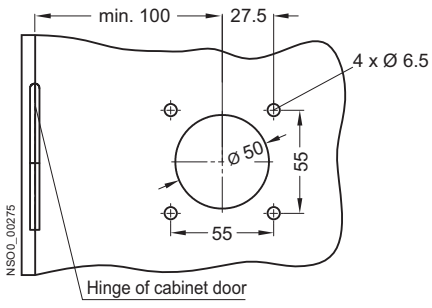
Fixed-mounted version, rotary operating mechanism with adjustable knob





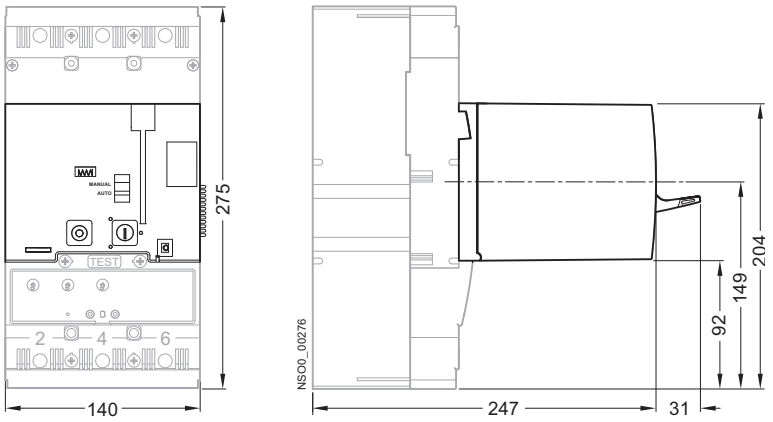
1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0
4 3VT9 300-3HG.0,-3HH.0
5 3VT9 300-3HJ.0
6 Outside surface of cabinet door

Cabinet door cut-out

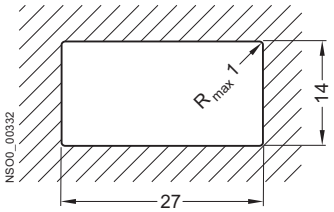


Dimensional drawings

Fixed-mounted version, with 3VT9 300-3M..0 motorized operating mechanism

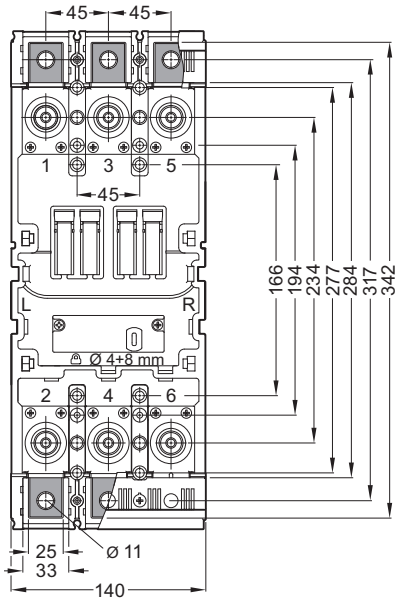


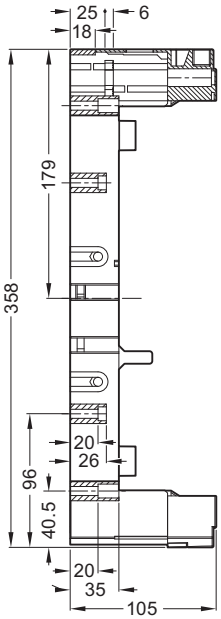
Opening dimensions in cabinet door for external operations counter



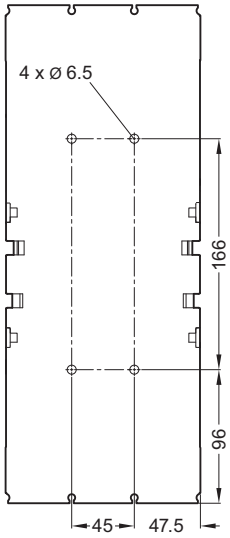
Dimensional drawings - 3-pole, plug-in version

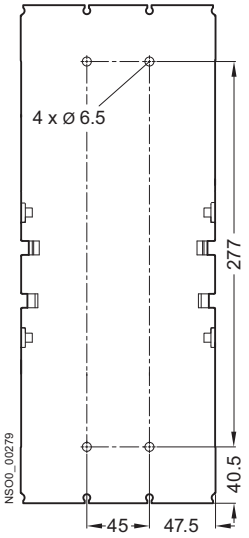
3VT9 300-4PA30 plug-in base



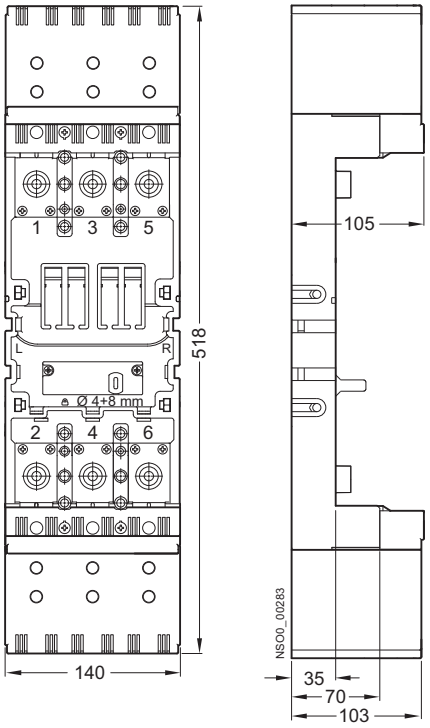


Drilling patterns



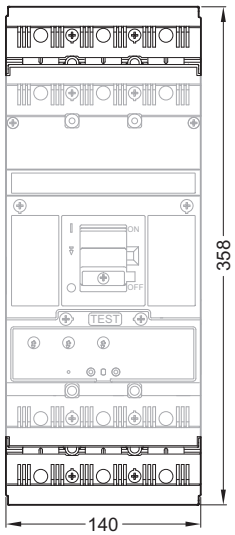


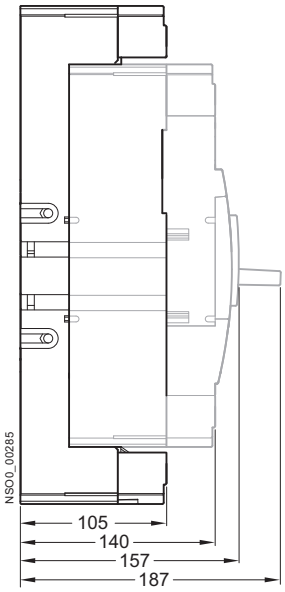
Plug-in version, 3VT9 300-8CB30 motorized operating mechanism



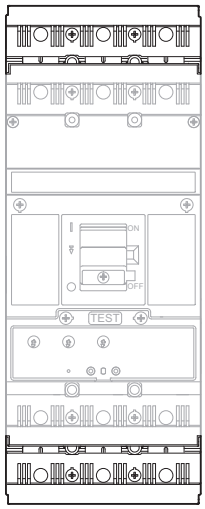
Dimensional drawings

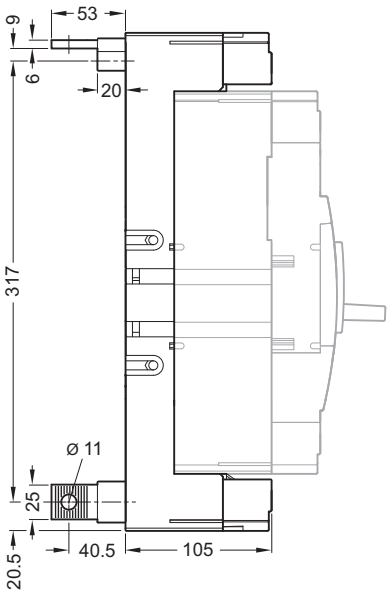
Plug-in version



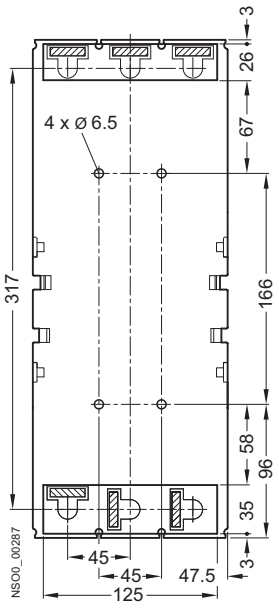


Plug-in version, rear connection with 3VT9 300-4RC30 connecting set

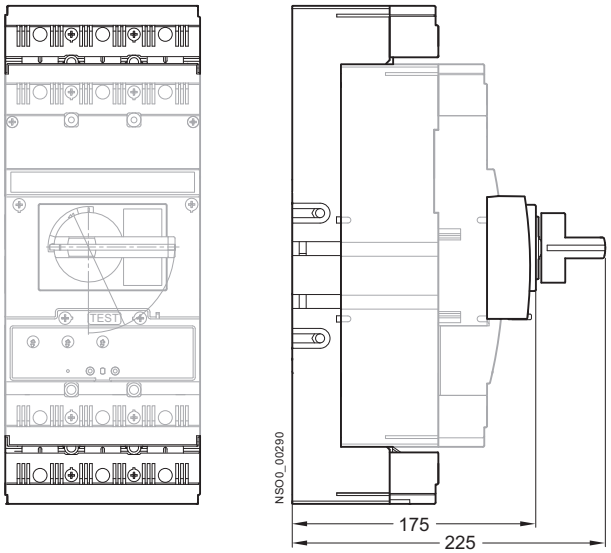




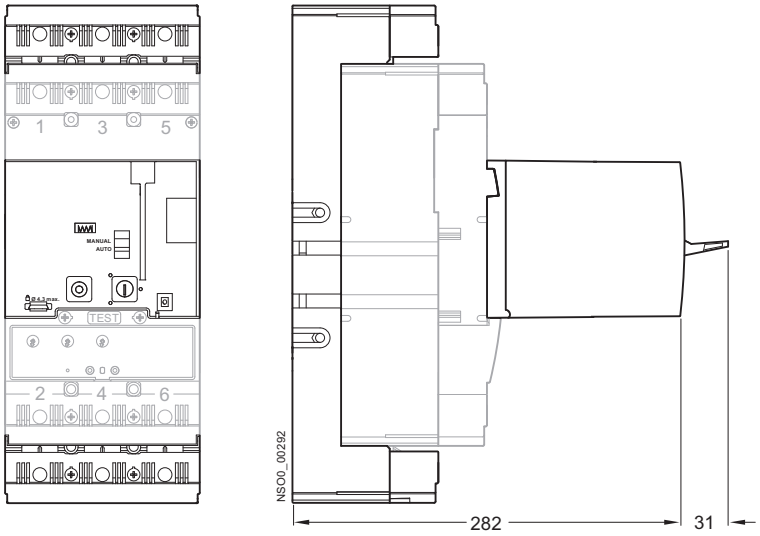
Drilling pattern



Plug-in version, with rotary operating mechanism



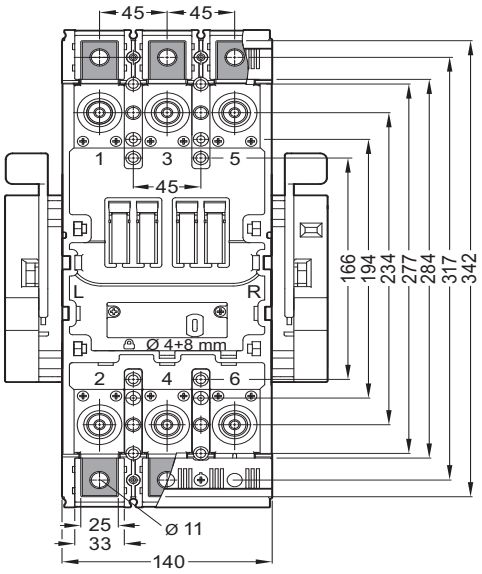
Plug-in version, with 3VT9 300-3M..0 motorized operating mechanism

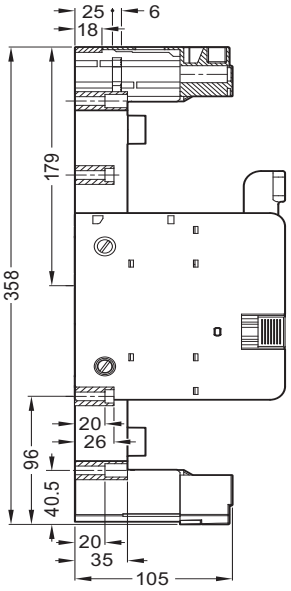


Dimensional drawings

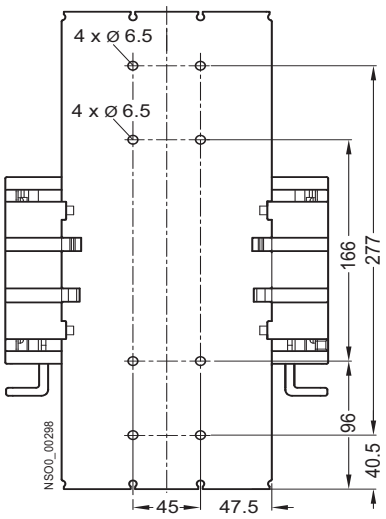
Dimensional drawings - 3-pole, withdrawable version

3VT9 300-8CB30 withdrawable version base

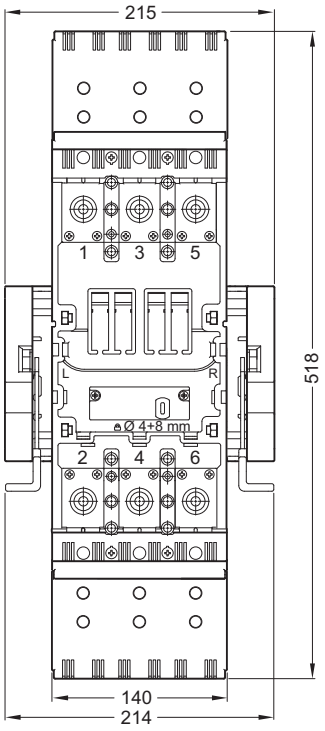


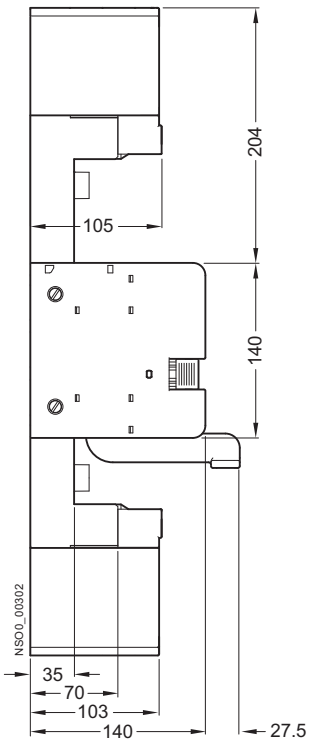


Drilling pattern

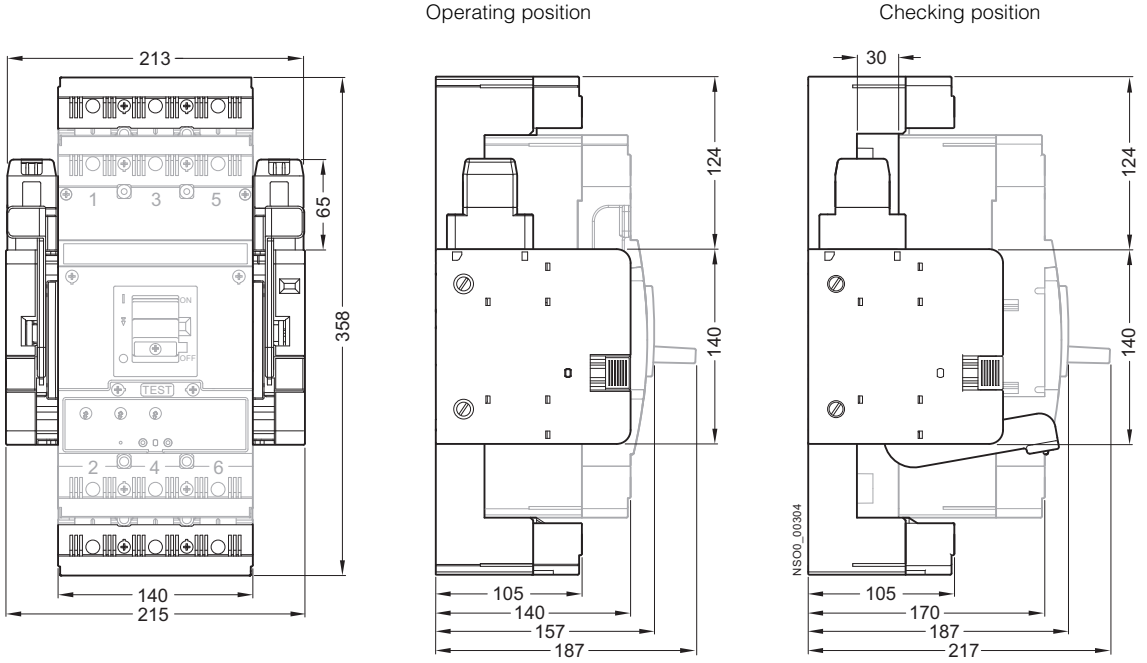


Withdrawable version base, with 3VT9 300-8CB30 terminal cover

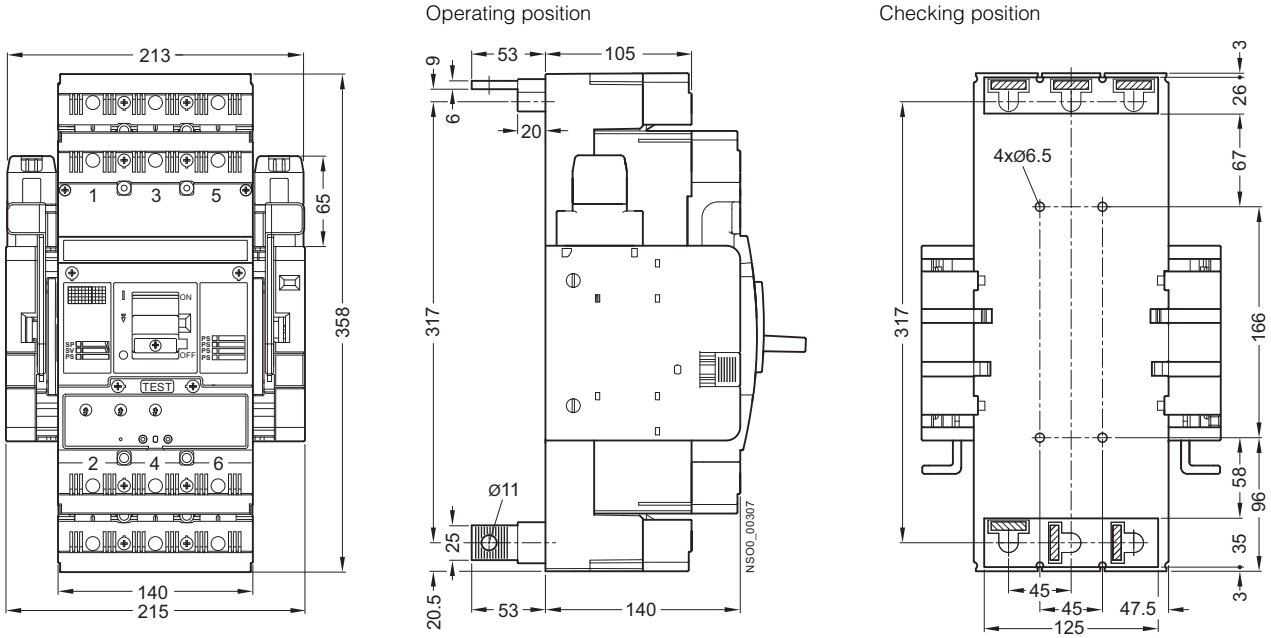




Withdrawable version



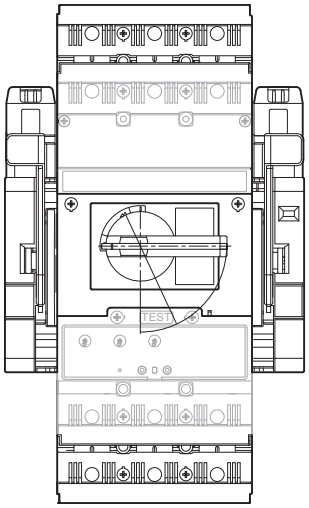
Withdrawable version, rear connection with 3VT9 300-4RC30 connecting set

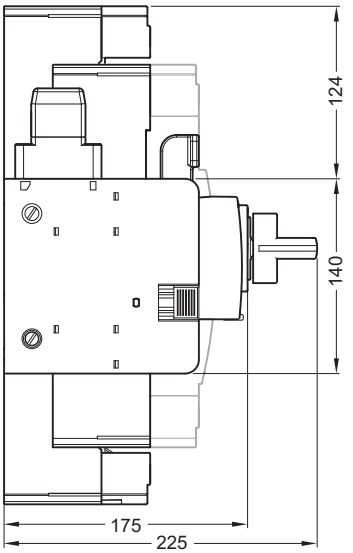


Dimensional drawings

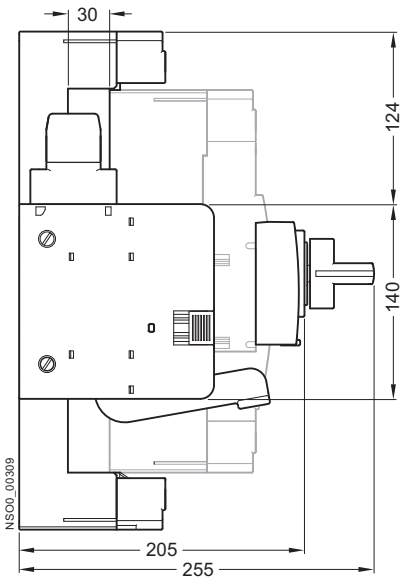
Withdrawable version, with rotary operating mechanism

Operating position



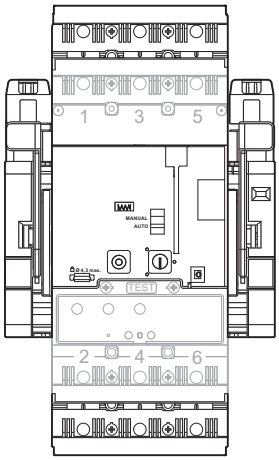


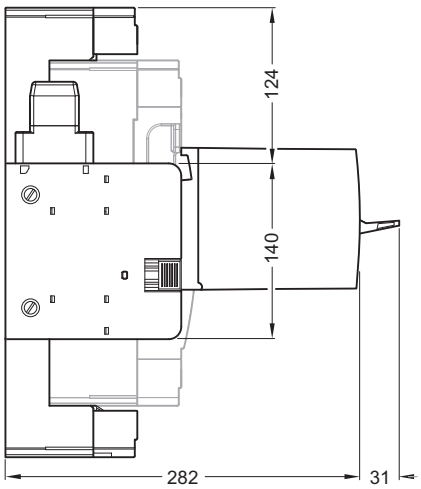
Checking position



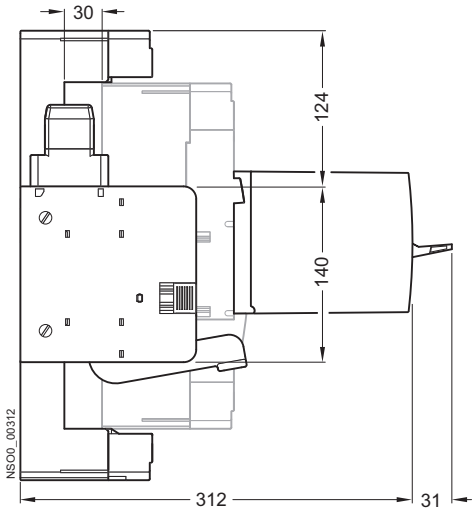
Withdrawable version, with motorized operating mechanism

Operating position



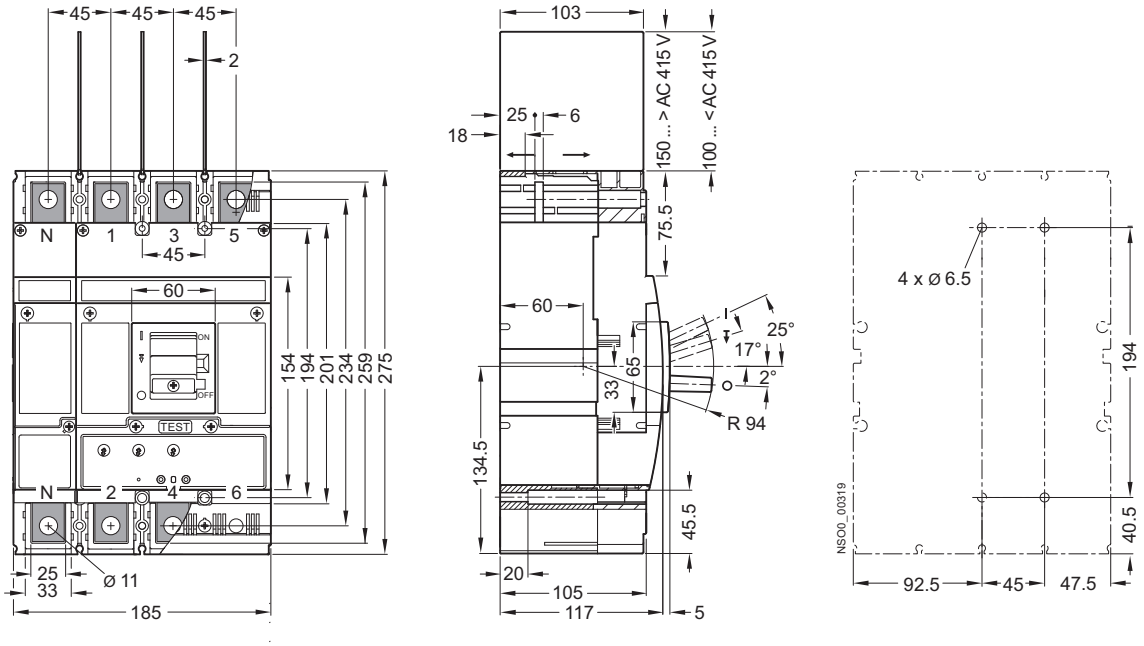


Checking position

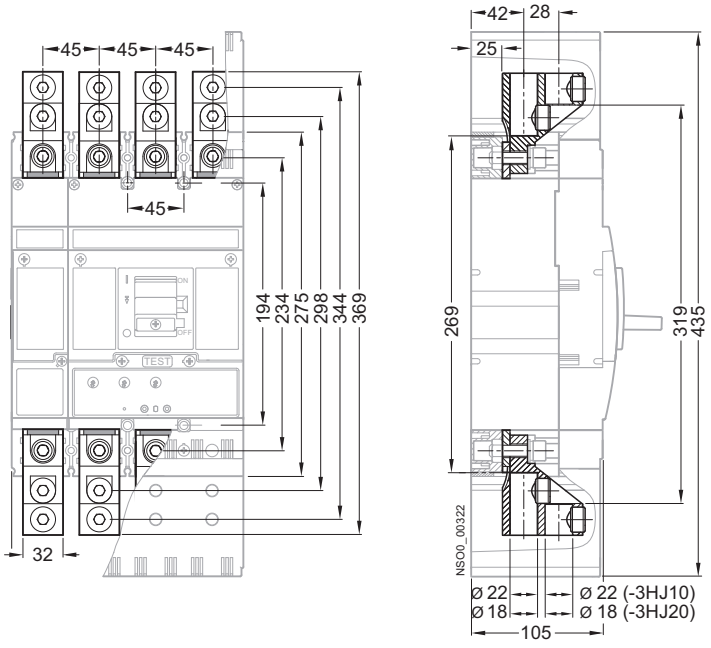


Dimensional drawings - 4-pole, fixed-mounted version

Fixed-mounted version, front connection

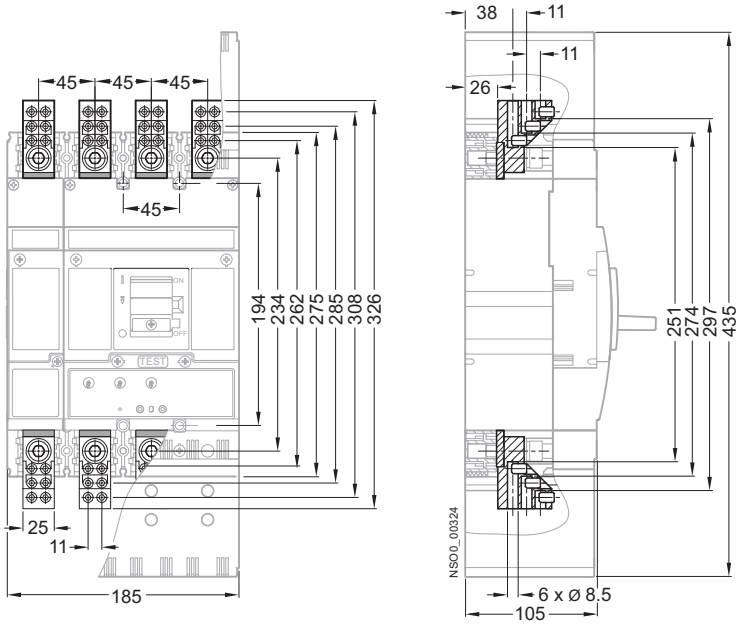


Fixed-mounted version, front connection
with 3VT9 324-4TF30 + 3VT9 324-4TF00, 3VT9 315-4TF30 + 3VT9 315-4TF00 connecting set

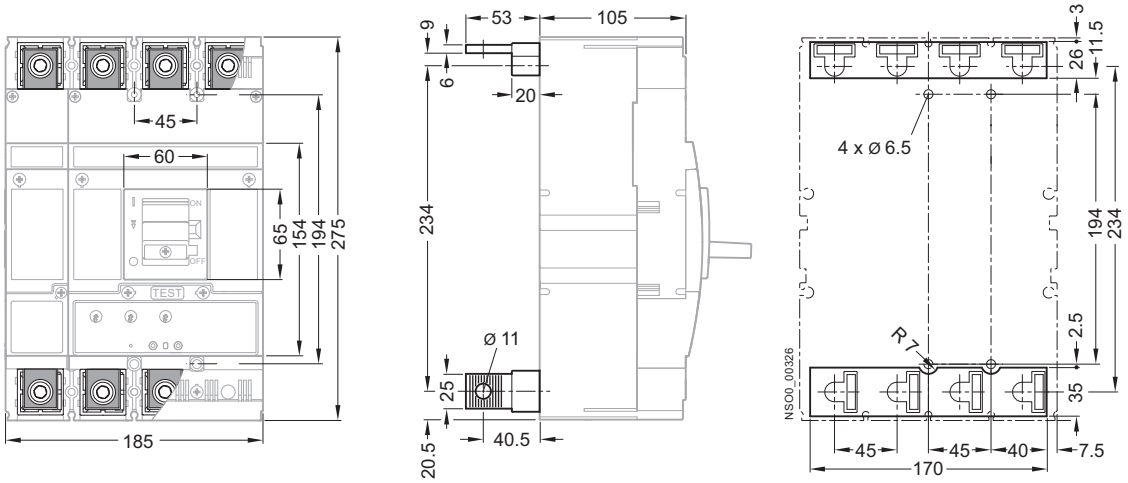


Dimensional drawings

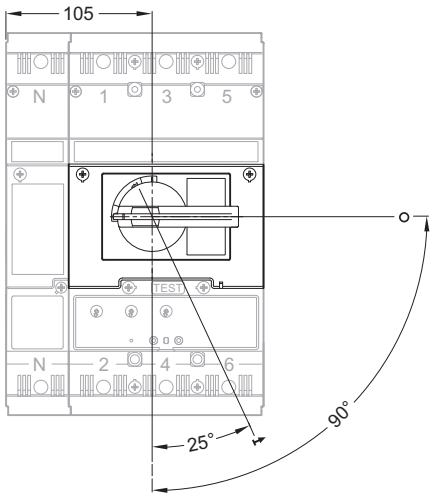
Fixed-mounted version, front connection with 3VT9 303-4TF30 + 3VT9 303-4TF00 connecting set

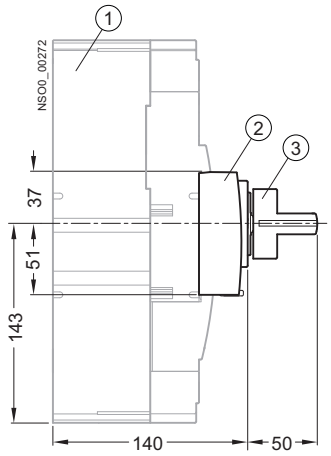


Fixed-mounted version, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set



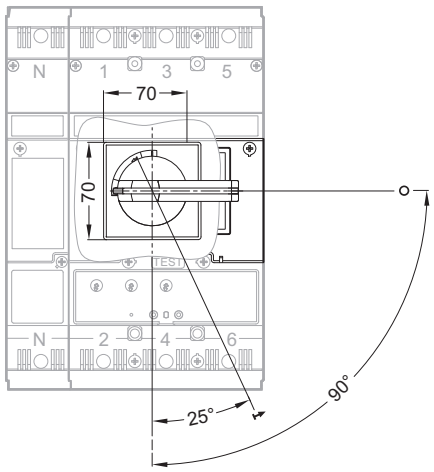
Fixed-mounted version, with rotary operating mechanism

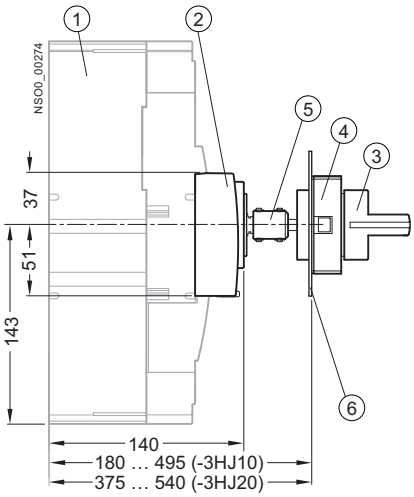




1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0

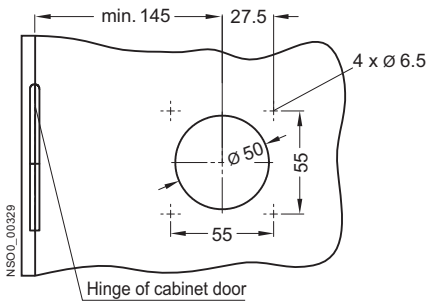
Fixed-mounted version, with door-coupling operating mechanism





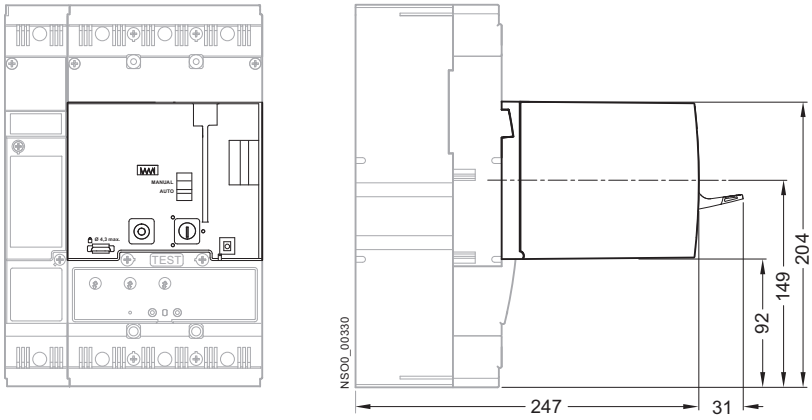
1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0
4 3VT9 300-3HG.0,-3HH.0
5 3VT9 300-3HJ.0
6 Outside surface of cabinet door

Cabinet door cut-out

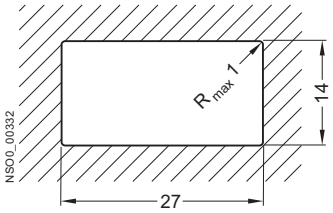


Dimensional drawings

Fixed-mounted version, 3VT9 300-3M..0 motorized operating mechanism



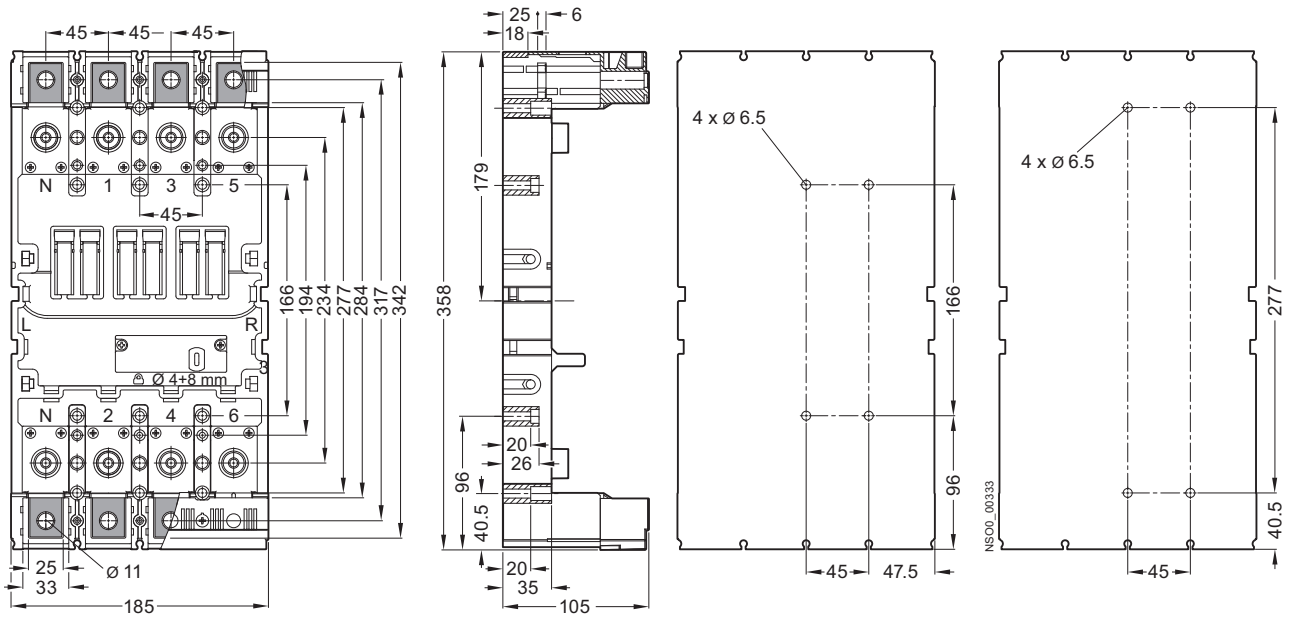
Opening dimensions in cabinet door for external operations counter



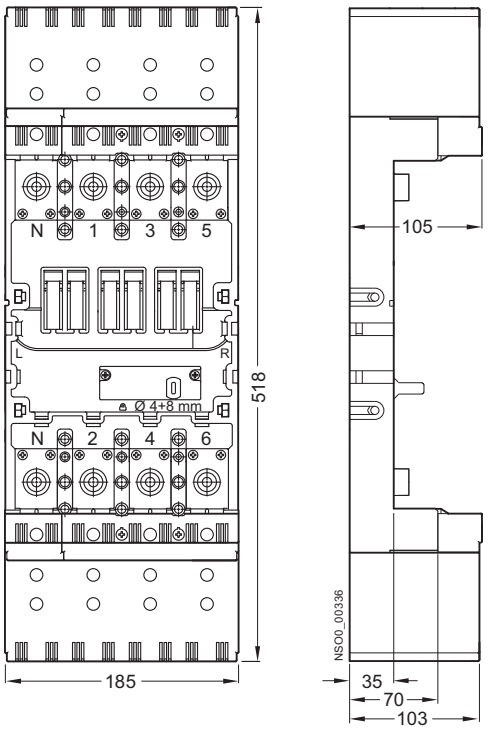
Dimensional drawings - 4-pole, plug-in version

3VT9 300-4PA40 plug-in base

Drilling patterns

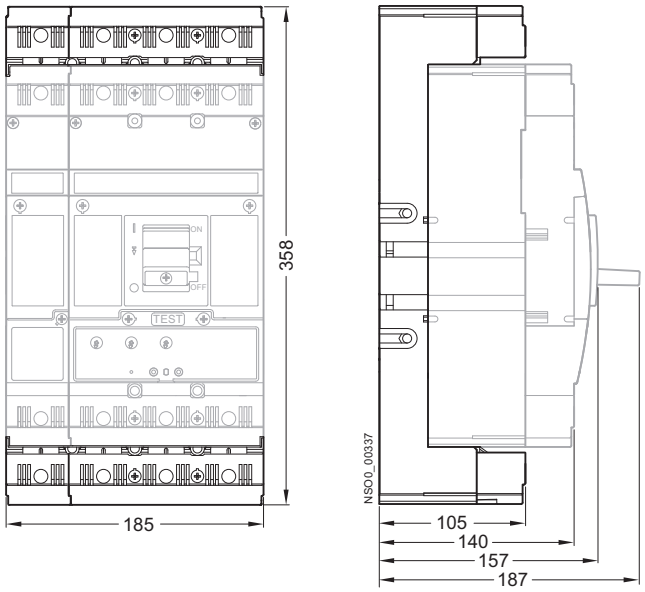


Plug-in base, with 3VT9 300-8CB40 terminal cover



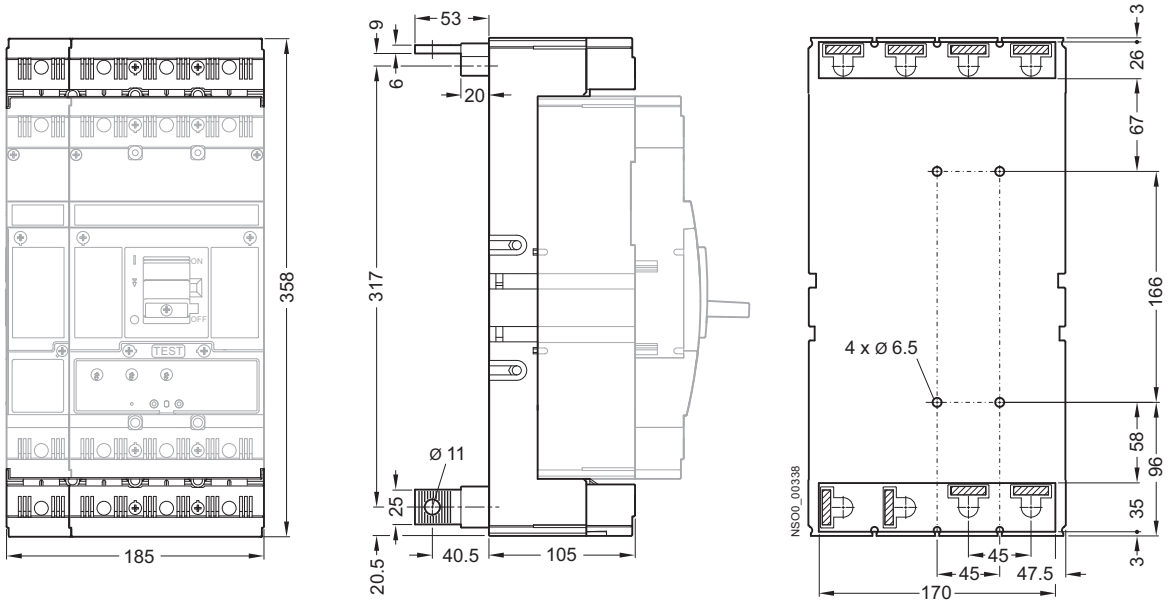
Dimensional drawings

Plug-in version

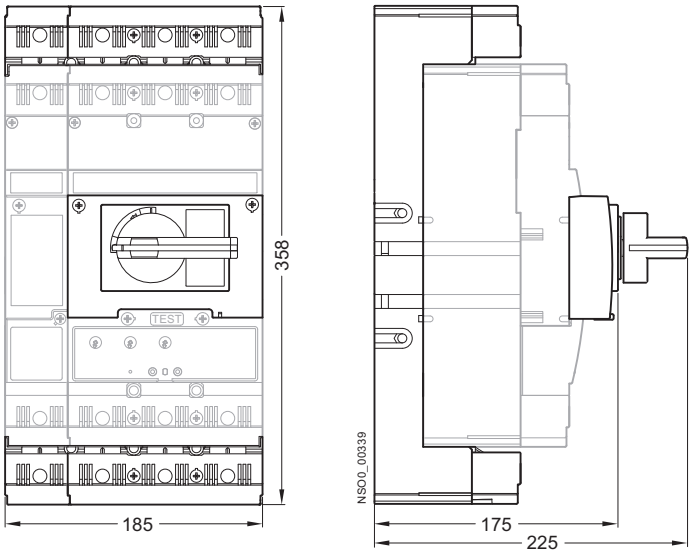


Plug-in version, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set

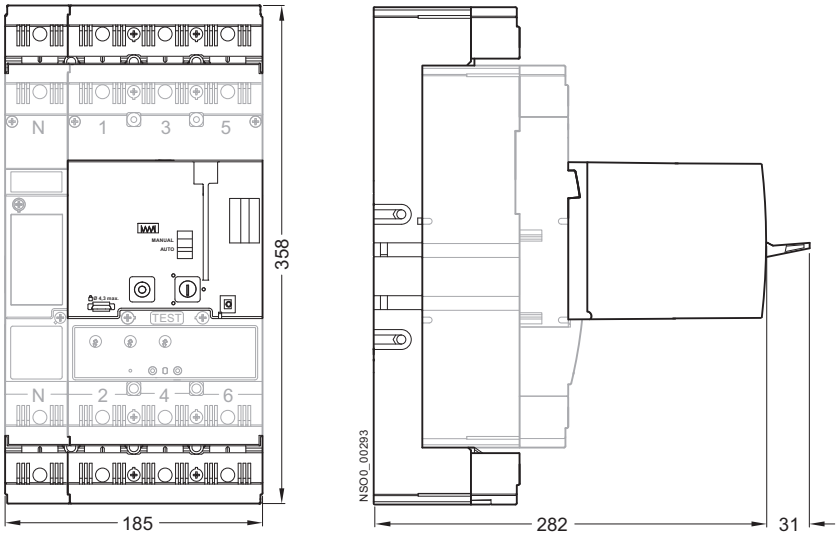
Drilling pattern



Plug-in version with rotary operating mechanism



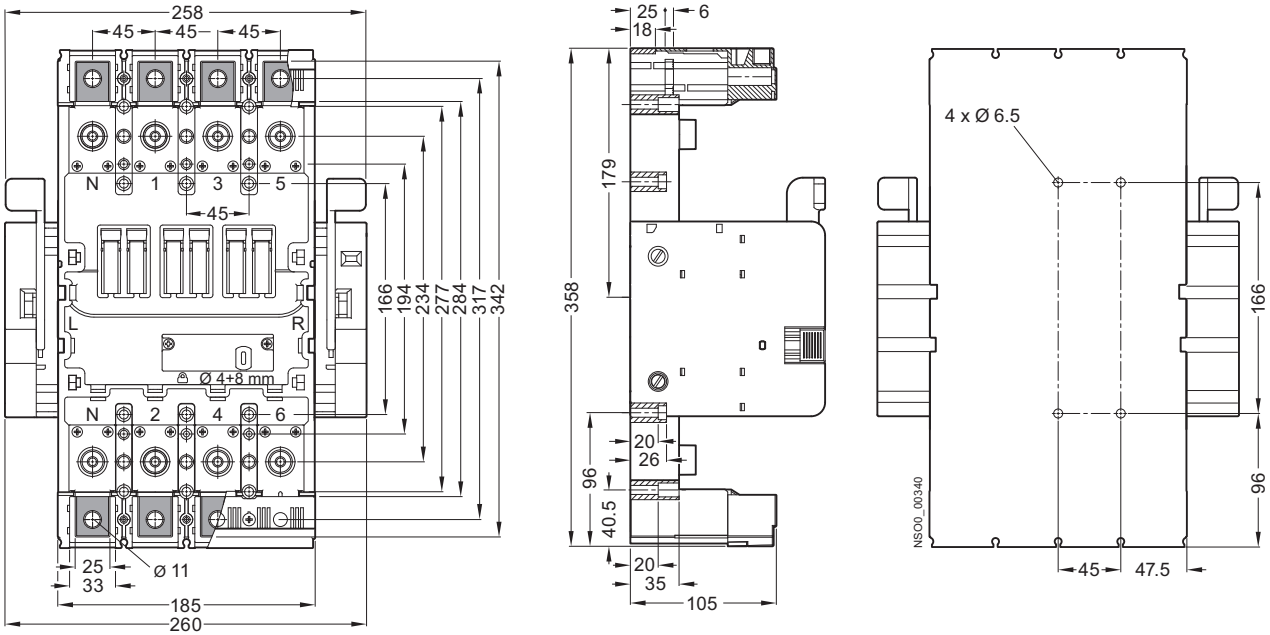
Plug-in version, with 3VT9 300-3M..0 motorized operating mechanism



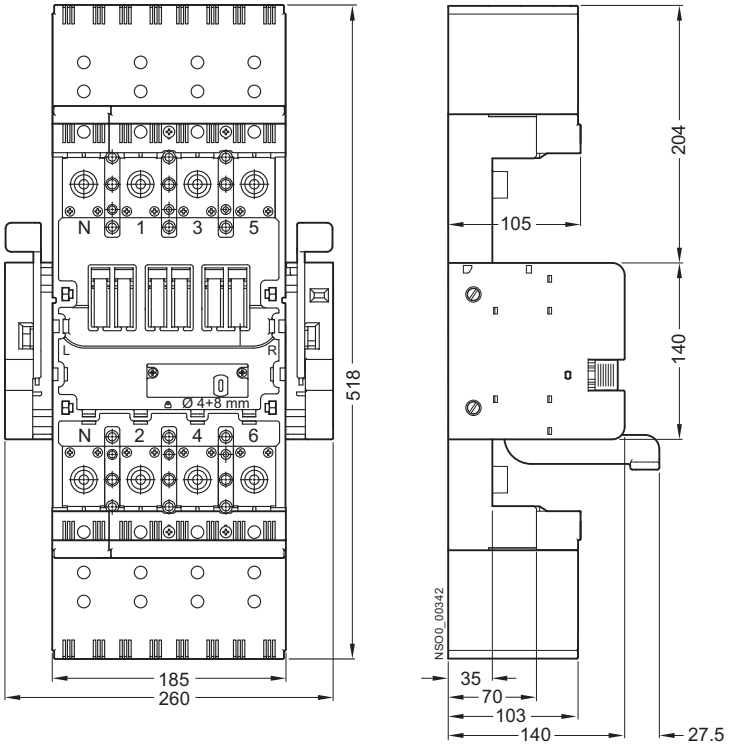
Dimensional drawings

Dimensional drawings - 4-pole, withdrawable version

3VT9 300-4WA40 withdrawable version base

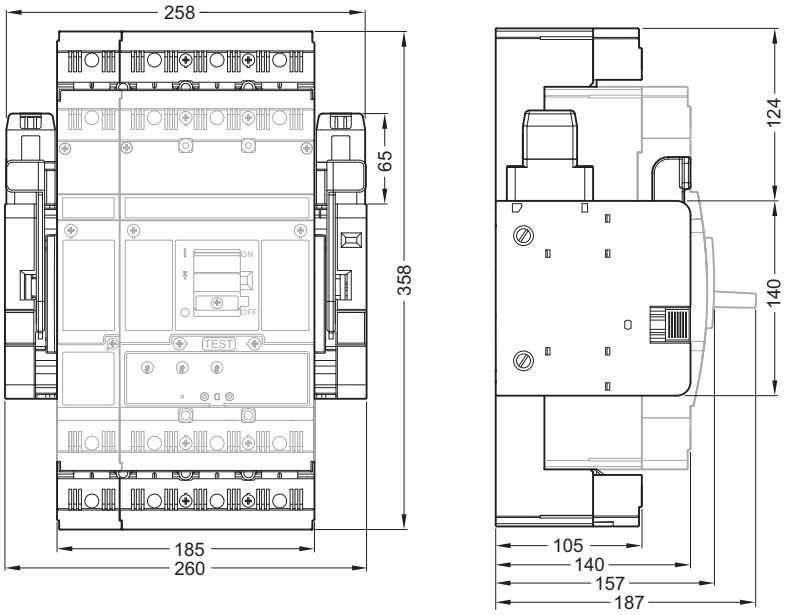


Withdrawable version with 3VT9 300-8CB40 terminal cover

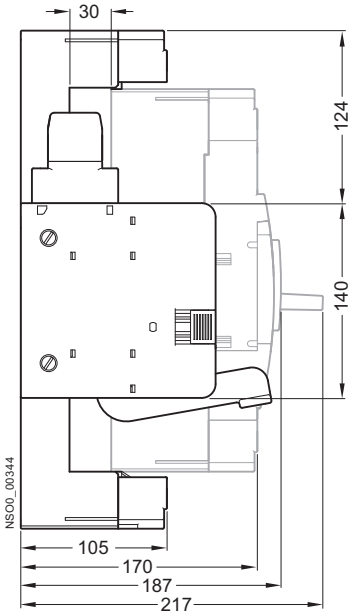


Withdrawable version

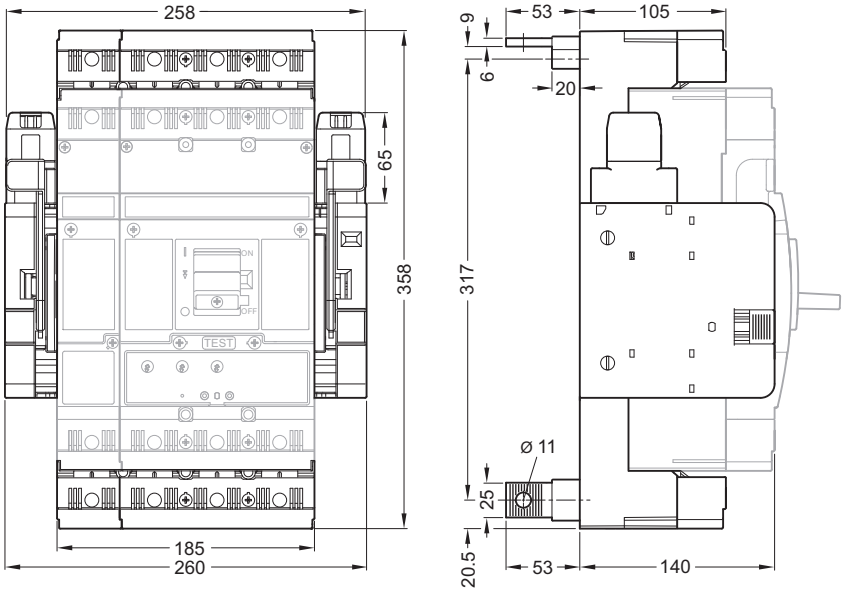
Operating position



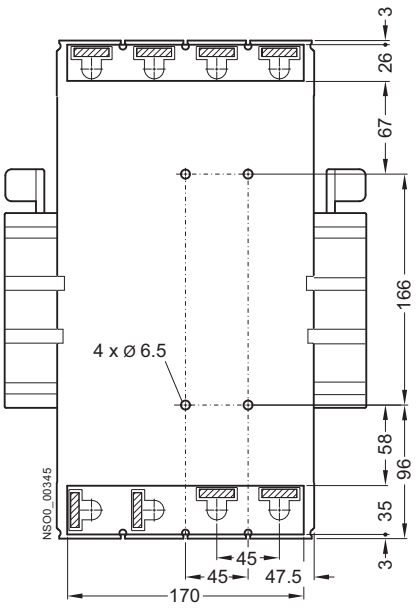
Checking position



Withdrawable version, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set



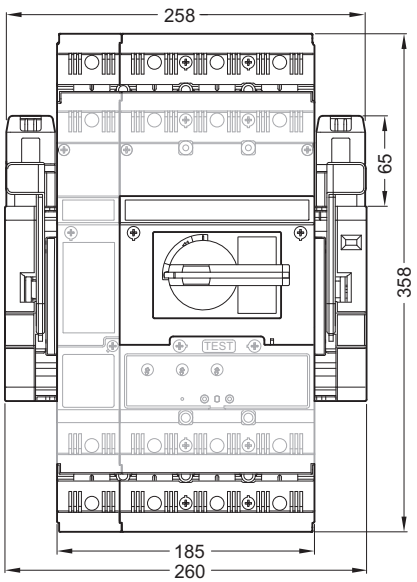
Drilling pattern

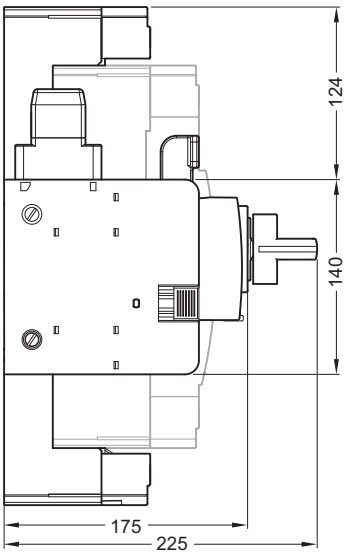


Dimensional drawings

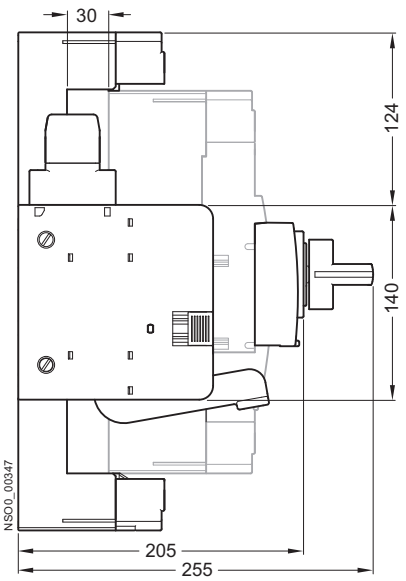
Withdrawable version, with rotary operating mechanism

Operating position



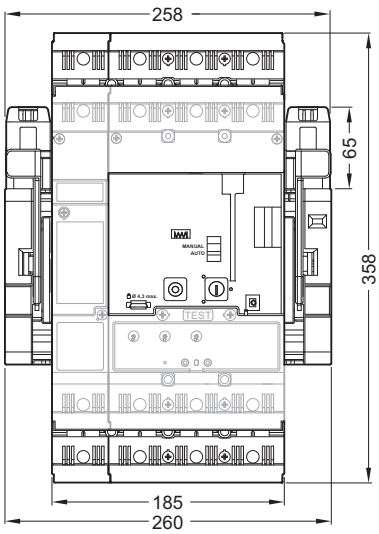


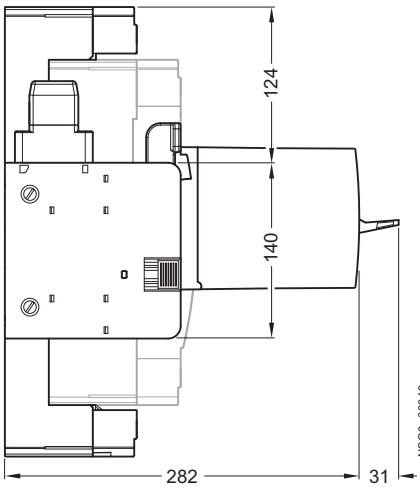
Checking position



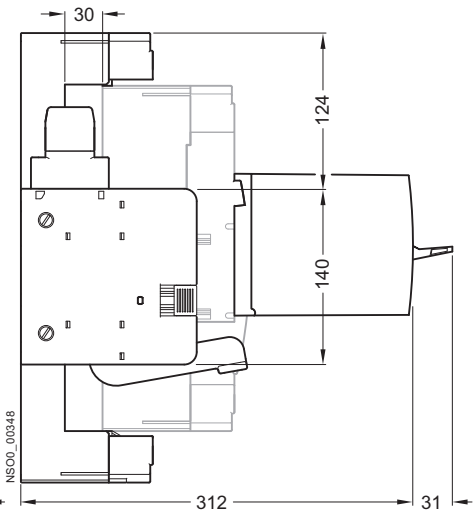
Withdrawable version, with 3VT9 300-3M.. motorized operating mechanism

Operating position





Checking position



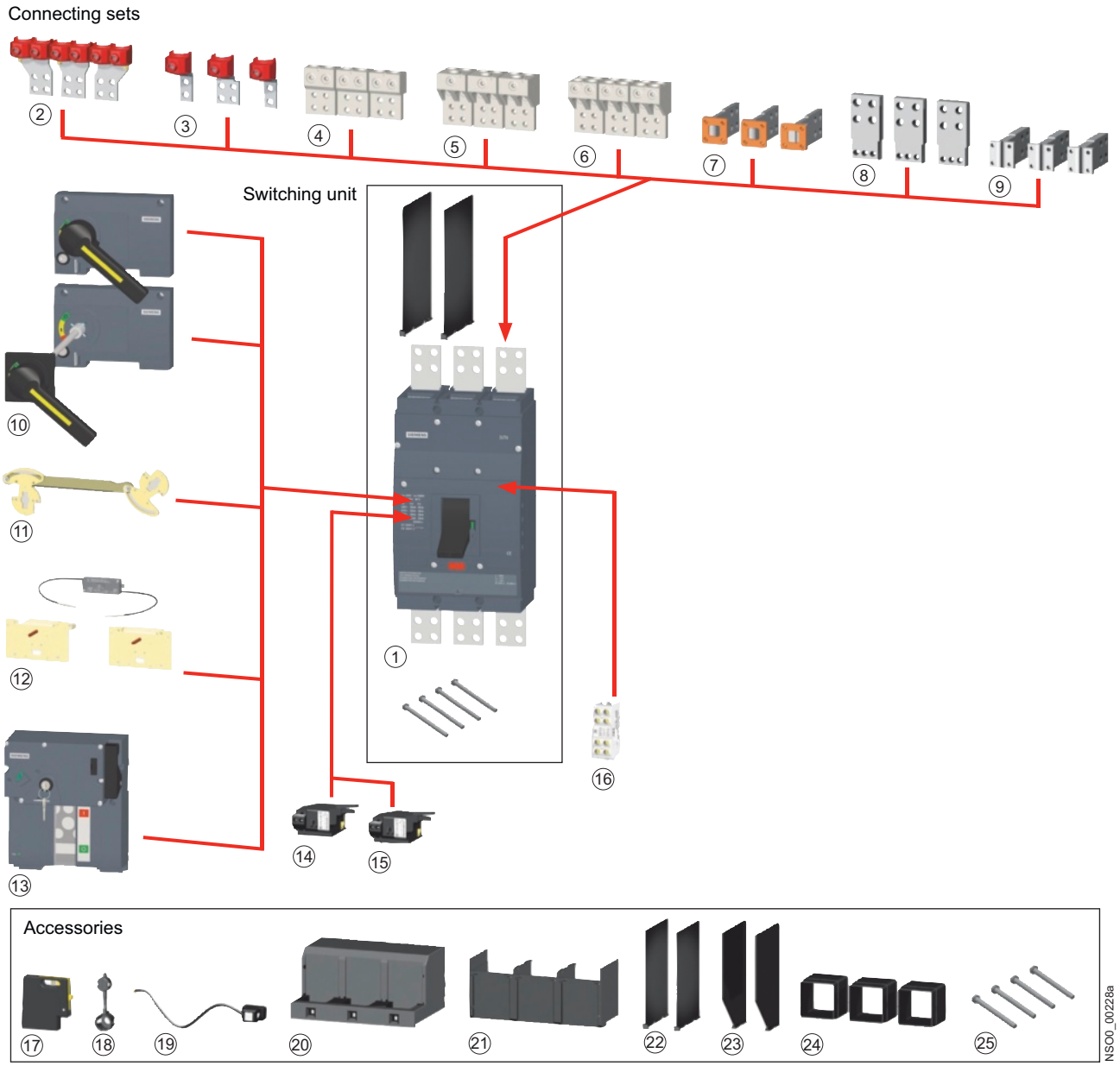
3VT4 Molded Case Circuit Breakers up to 1000 A

4

Catalog

Technical Information

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 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

Overview

Switching unit

The switching unit includes:

- 3VT9 500-8CE30 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
- 3VT9 410-6DT00 switch disconnector unit

For the withdrawable version, the 3VT4 710-3AA38-0AA0 switching unit requires

- 3VT9 500-4WA30 withdrawable version base.
  The withdrawable version base must be fitted with:
  - 2 x 3VT9 500-4EF30 connection set (front connection) or
  - 3VT9 500-4RD30 (rear connection)
- We recommend fitting the switching unit with:
  - 3VT9 500-4SA40 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

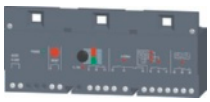
The switch disconnector consists of a switching unit (fixed-mounted or withdrawable version) and a switch disconnector unit.

Selection and ordering data

	Rated current I_n	Switching capacity I_{cu}	DT	Order No.	PS*	Weight per PU approx.
	A	kA				kg
Switching units						
	***Fixed-mounted version, 3-pole***					
	1000	65	B	**3VT4 710-3AA30-0AA0**	1 unit	23.000
	***Withdrawable version, 3-pole***					
	1000	65	B	**3VT4 710-3AA38-0AA0**	1 unit	23.000

* You can order this quantity or a multiple thereof.

Selection and ordering data for accessories

	Rated current I_n	Set current of the inverse-time delayed overload trip units „L“ I_r	DT	Order No.	PS*	Weight per PU approx.
	A	A				kg
Electronic trip units (ETU)						
	Distribution protection, ETU DP, LI function					
	• Provides protection for lines and transformers					
	315	125 ... 315	B	**3VT9 431-6AC00**	1 unit	0.500
	630	250 ... 630	B	**3VT9 463-6AC00**	1 unit	0.500
	800	315 ... 800	B	**3VT9 480-6AC00**	1 unit	0.500
	1000	400 ... 1000	B	**3VT9 410-6AC00**	1 unit	0.586
	Motor/generator protection, ETU MP, LI function					
	• Provides protection for motors and generators					
	• Suitable also for protecting lines and transformers					
	315	125 ... 315	B	**3VT9 431-6AP00**	1 unit	0.500
	630	250 ... 630	B	**3VT9 463-6AP00**	1 unit	0.500
	800	315 ... 800	B	**3VT9 480-6AP00**	1 unit	0.500
	1000	400 ... 1000	B	**3VT9 410-6AP00**	1 unit	0.590
	Universal protection, ETU UP, LSI function					
	• For protecting complicated loads or those not specified in advance					
	315	125 ... 315	B	**3VT9 431-6AD00**	1 unit	0.500
	630	250 ... 630	B	**3VT9 463-6AD00**	1 unit	0.500
	800	315 ... 800	B	**3VT9 480-6AD00**	1 unit	0.500
	1000	400 ... 1000	B	**3VT9 410-6AD00**	1 unit	0.500
Switch-disconnector unit						
	1000	Switch-disconnector unit	B	**3VT9 410-6DT00**	1 unit	0.474
Signalling unit						
		Signalling unit for trip units ETU, LP and UP	B	**3VT9 500-6AE00**	1 unit	0.670

	Rated control supply voltage U_s	DT	Order No.	PS*	Weight approx.
					kg
Auxiliary switches					
	AC/DC 60 ... 500 V/DC 60 ... 240 V	B	**3VT9 500-2AF10**	1 unit	0.041
	AC/DC 5 ... 60 V	B	**3VT9 500-2AF20**	1 unit	0.041
Shunt trip units					
	AC/DC 24 V	B	**3VT9 500-1SF00**	1 unit	0.199
	AC/DC 48 V	B	**3VT9 500-1SG00**	1 unit	0.220
	AC/DC 110 V	B	**3VT9 500-1SH00**	1 unit	0.220
	AC 230 V/DC 220 V	B	**3VT9 500-1SJ00**	1 unit	0.201
	AC/DC 400 V	B	**3VT9 500-1SK00**	1 unit	0.220
	AC/DC 500 V	B	**3VT9 500-1SL00**	1 unit	0.220
Undervoltage trip units					
	AC/DC 24 V	B	**3VT9 500-1UF00**	1 unit	0.220
	AC/DC 48 V	B	**3VT9 500-1UG00**	1 unit	0.220
	AC/DC 110 V	B	**3VT9 500-1UH00**	1 unit	0.220
	AC 230 V/DC 220 V	B	**3VT9 500-1UJ00**	1 unit	0.220
	AC/DC 400 V	B	**3VT9 500-1UK00**	1 unit	0.220
	AC/DC 500 V	B	**3VT9 500-1UL00**	1 unit	0.220

* You can order this quantity or a multiple thereof.

Overview

Rotary operating mechanism

The rotary operating mechanism assembly consists of:

- 3VT9 500-3HA10 rotary operating mechanism
- 3VT9 500-3HE/HF10 hand drive lever

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

- 3VT9 500-3HJ10 extension shaft
- 3VT9 500-3HG10/HG20 coupling driver

Selection and ordering data

	Version		DT	Order No.	PS*	Weight per PU approx. kg
Rotary operating mechanism						
	**Rotary operating mechanism (hand drive unit)**					
	• lockable with padlock		B	**3VT9 500-3HA10**	1 unit	0.230
	**Hand drive lever**					
	• lockable with padlock	black	B	**3VT9 500-3HE10**	1 unit	0.261
	• lockable with padlock	red	B	**3VT9 500-3HF10**	1 unit	0.261
	**Coupling driver**					
	• Degree of protection IP44		B	**3VT9 500-3HG10**	1 unit	0.265
	• Degree of protection IP66		B	**3VT9 500-3HG20**	1 unit	0.140
	**Extension shaft** length 365 mm		B	**3VT9 500-3HJ10**	1 unit	0.352
Mechanical Interlocks						
	**Mechanical interlocks** 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.		B	**3VT9 500-8LA00**	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		B	**3VT9 500-8LC10**	1 unit	0.400
	• For one fixed-mounted and one withdrawable circuit breaker/switch disconnector		B	**3VT9 500-8LC30**	1 unit	0.400
	• For circuit breaker/switch disconnector, withdrawable version		B	**3VT9 500-8LC40**	1 unit	0.500
Motorized operating mechanism						
	**Motorized operating mechanism; Rated control voltage**					
	AC/DC 110 V		B	**3VT9 500-3MN00**	1 unit	4,350
	AC 230 V/DC 220 V		B	**3VT9 500-3MQ00**	1 unit	4,454
	Motorized operating mechanism with operations counter; Rated control voltage					
	AC/DC 110 V		B	**3VT9 500-3MN10**	1 unit	4,400
	AC 230 V/DC 220 V		B	**3VT9 500-3MQ10**	1 unit	4,400

4

* You can order this quantity or a multiple thereof.

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:
  - 3VT4 710-3AA38-0AA0 switching unit, 3-pole version;
  - 2 x 3VT9 500-4EF30 connection set (front connection) or 3VT9 500-4RD30 (rear connection)
- We recommend attaching the withdrawable version base to the switchboard with:
  - 3VT9 500-4SA40 mounting bolt set (4 x M8 x60)

Selection and ordering data

	Version	Max. permissible cross-section *S*	Type of cables	DT	Order No.	PS*	Weight per PU approx.
		mm²					kg
Withdrawable version base							
	**Withdrawable version base for 3-pole circuit breaker/switch disconnector**			B	**3VT9 500-4WA30**	1 unit	13,000
Connecting sets							
	**Box terminals, double** For connecting four 70 ... 240 mm² cables, it is possible to use two 3VT9 524-4TG30 connecting sets. Not for 3VT4 710-3AA30-0AA0 switching unit.	2 x 70 ... 240	Cu/Al cables	B	**3VT9 524-4TG30**	1 unit	1.470
	**Box terminals,** For connecting three 70 ... 240 mm² cables, it is possible to combine the 3VT9 524-4TG30 connecting set with the 3VT9 524-4TF30 connecting set. Not for 3VT4 710-3AA30-0AA0 switching unit.	70 ... 240	Cu/Al cables	B	**3VT9 524-4TF30**	1 unit	0.663
	Rear connection		Busbars				
	• Up to 1000 A			B	**3VT9 400-4RC30**	1 unit	1.430
	• Up to 1600 A			B	**3VT9 500-4RC30**	1 unit	2.678
	**Front connection** for withdrawable version		Busbars	B	**3VT9 500-4EF30**	1 unit	2.730
	**Rear connection** for withdrawable version		Busbars	B	**3VT9 500-4RD30**	1 unit	3,420
	Terminals for circular conductors	150 ... 300	Cu/Al cables				
	• for 2 cables			B	**3VT9 532-4TF30**	1 unit	1.000
	• for 3 cables			B	**3VT9 533-4TF30**	1 unit	1.948
	• for 4 cables			B	**3VT9 534-4TF30**	1 unit	1.828

* You can order this quantity or a multiple thereof.

Selection and ordering data

	Version	DT	Order No.	PS*	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	B	**3VT9 500-8CE30**	1 unit	0.264
	• For withdrawable version	B	**3VT9 500-8CF30**	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	B	**3VT9 500-8CD30**	1 unit	0.287
	• For withdrawable version with front connection	B	**3VT9 500-8CC30**	1 unit	0.168
	**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	B	**3VT9 500-8CG30**	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	B	**3VT9 500-3HL00**	1 unit	0.041
	**Bolt sealing insert** Provides sealing for: • Accessory compartment cover	B	**3VT9 500-8BN00**	1 unit	0.002
	**Connecting cable** • For connecting circuit breaker accessories to withdrawable version (15 wire)	B	**3VT9 500-4PL00**	1 unit	0.120
	**Position indicator** Signals circuit breaker/switch disconnector position in withdrawable version	B	**3VT9 500-4WL00**	1 unit	0.020
	**Mounting bolts** • For withdrawable version	B	**3VT9 500-4SA40**	1 unit	0.144
	**ON button cover** • For motorized operating mechanism, cover can be sealed with sealing wire	B	**3VT9 500-3MF20**	1 unit	0.019

* You can order this quantity or a multiple thereof.

Technical specifications

Description		3VT4 Circuit breakers	Switch disconnector
Order number		**3VT4 710-3AA30-0AA0 3VT4 710-3AA38-0AA0**	**3VT9 410-6DT00**
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	--
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 65 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.

Overview

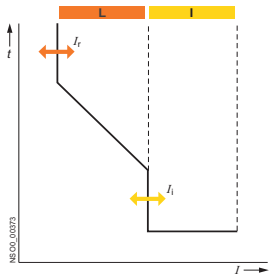
The electronic trip unit is a separate and interchangeable unit, which has to be ordered in addition to the 3VT4 710-3AA..-0AA0 switching unit. By exchanging the trip unit, the range of the circuit breaker's rated current can be easily changed.

Trip units for the 3VT4 710-3AA30-0AA0 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

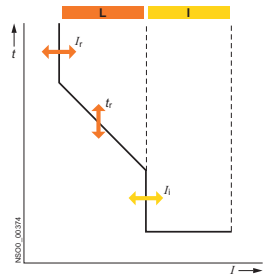
Several different trip units are available. Some have adjustable characteristics (in order to match the protected device and to achieve the required selectivity):

ETU DP trip units



ETU DP trip units have one type of characteristics with adjustable I_r and I_{rm}.

ETU MP trip units



ETU MP trip units have more characteristics with adjustable I_r, t_r and I_{rm}.

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.

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

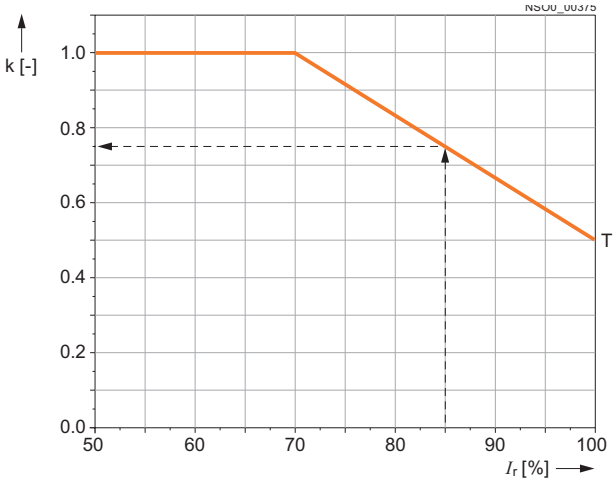
The time-independent instantaneous **ETU DP** and **ETU MP** trip units are adjusted with one switch, I_i. The I_i switch sets the short-circuit current that, when reached or exceeded, causes instantaneous tripping of the circuit breaker.

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).

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_v is cut short from the cold-state characteristic by the coefficient **k**.

The real tripping time is $t_s = k \cdot t_v$

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:

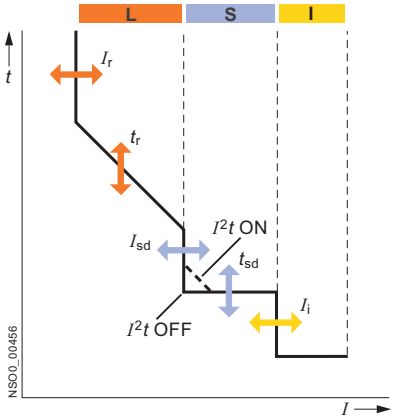
$$\boldsymbol{t_s = 0.74 \cdot t_v}$$

k [–] time shortening coefficient
I_r [A] adjusted rated current of the trip unit
t_v [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_{rm} = min, 0 ms
t_r = TV, min

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.

I2t - 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_{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:

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

3. Time-independent instantaneous trip unit I

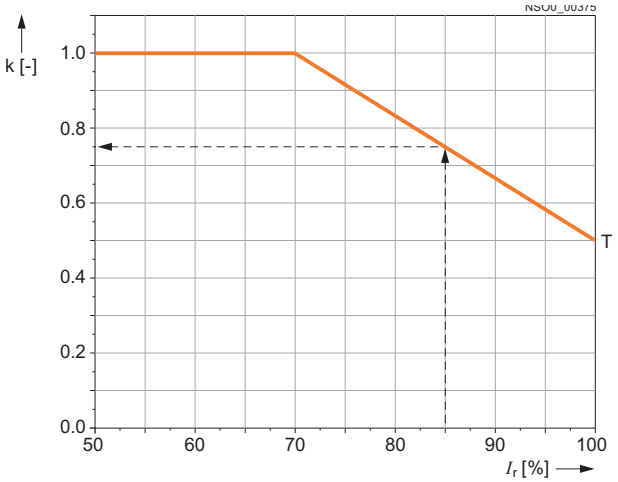
It is set up with parameter I_{rm}. I_{rm} is a short-circuit current that, when reached or exceeded, causes the circuit breaker to switch off instantaneously. It is set up directly in kA on the trip unit. The wave form of the tripping characteristic is adjusted using latched switches located on the 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).

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_v is cut short from the cold-state characteristics by the coefficient k.

The real tripping time is ts = k . t_v

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:

$t_s = 0.74 \cdot t_v$

k [–] time shortening coefficient
I_r [A] adjusted rated current of trip unit
t_v [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_{rm} = min
t_r = min
t_v = min, I^2t - ON
I_{sd} = min

Trip units are set by the manufacturer

I_r = min

Restart = $T_{(t)}$

I_{rm} = min, 0 ms

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

I_{sd} = 0 ms, min

I = 0.5 I_r

Trip units ETU DP - Distribution protection

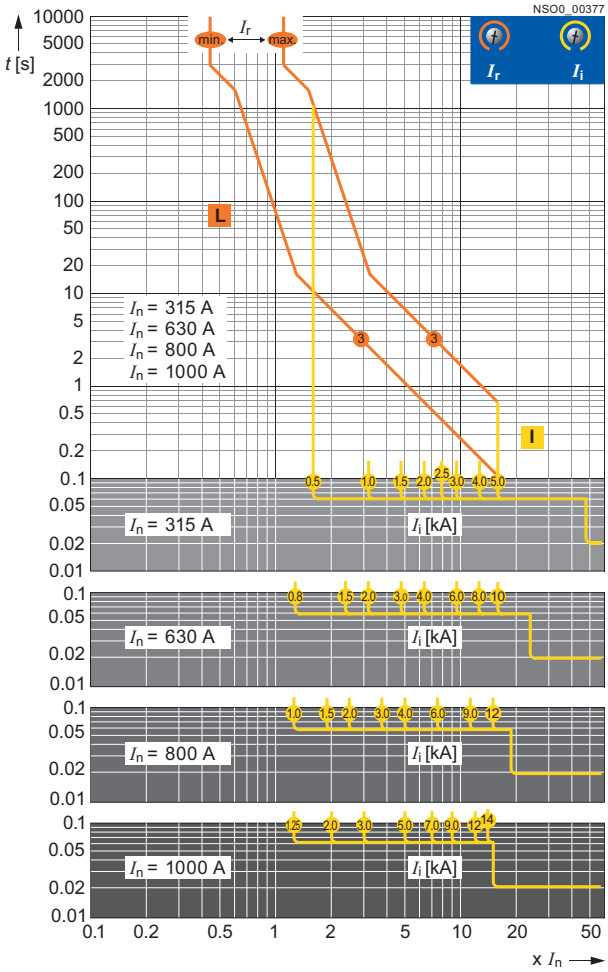
- Provides protection for lines and transformers

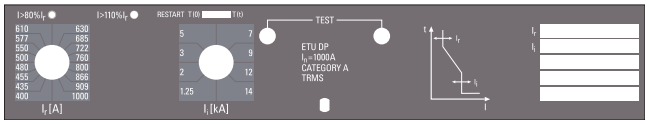
The 3VT9 4..-6AC00 trip unit is intended only for the 3VT4 710-3AA..-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is fitted with a thermal memory that can be disabled by turning the switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. 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 3VT9 500-6AE00 signalling unit.

Tripping characteristics





Specifications for adjustable trip units

Order No.	Rated current I_n A	Overload protection I_r A	Restart	Instantaneous short circuit protection I_i
3VT9 431-6AC00	315	125, 137	$T_{(0)}$	0.5
		144, 160		1
		172, 180		1.5
		200, 220		2
		231, 243	$T_{(t)}$	2.5
		250, 260		3
		275, 290		4
		305, 315		5
3VT9 463-6AC00	630	250, 260	$T_{(0)}$	0.8
		275, 290		1.5
		305, 315		2
		345, 360		3
		400, 435	$T_{(t)}$	4
		455, 480		6
		500, 550		8
		575, 630		10
3VT9 480-6AC00	800	315, 345	$T_{(0)}$	1
		360, 400		1.5
		435, 455		2
		480, 500		3
		550, 575		4
		610, 630		6
		685, 720		9
		760, 800		12
3VT9 410-6AC00	1000	400, 435	$T_{(0)}$	1.25
		455, 480		2
		500, 550		3
		575, 610		5
		630, 685		7
		720, 760		9
		800, 866		12
		909, 1000		14

4

Trip units

Trip units ETU MP - Motor protection

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

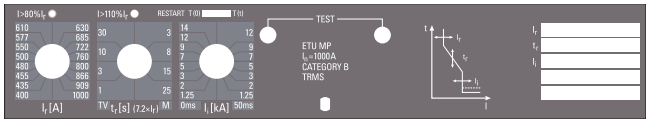
The 3VT9 4..-6AP00 trip unit is intended only for the 3VT4 710-3AA..-0AA0 switching unit. The operation of the trip unit is controlled by a microprocessor. The trip unit is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. 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 “T_V” 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).

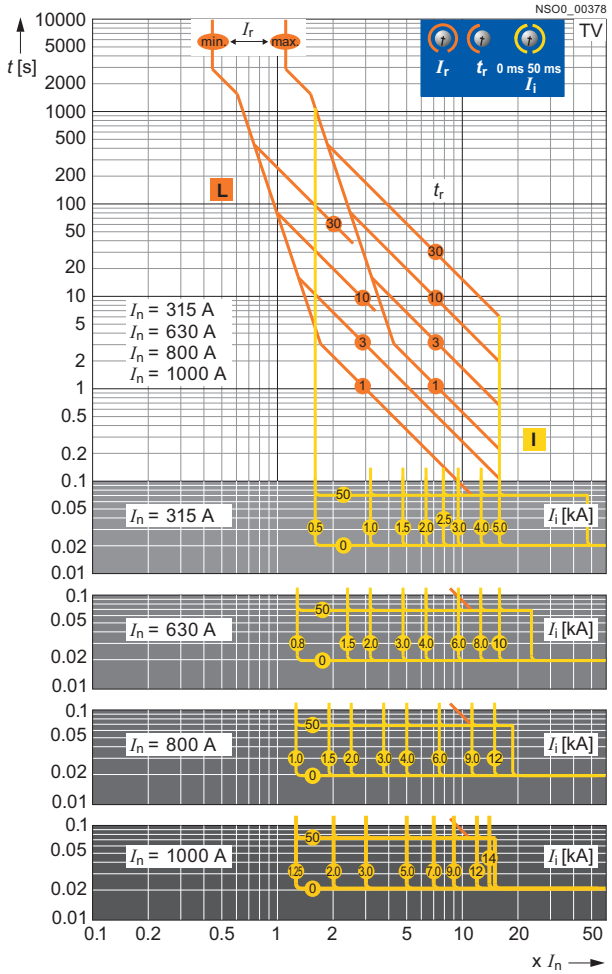
Another parameter for adjusting the trip unit is the rated current, which is adjusted in a range of 0.4 to 1.0 of I_n and the short-circuit tripping level, for which it is possible to set the delay at 0 or 50 ms. The reaching of 80% and 110% of I_r is indicated by LED diodes on the front panel denoted 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 3VT9 500-6AE00 signalling unit.

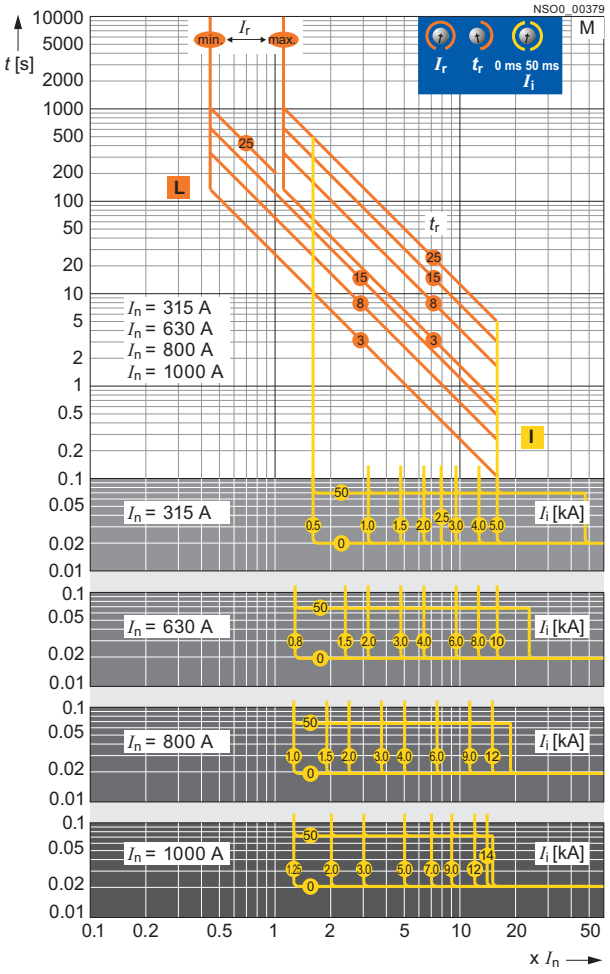


Specifications for adjustable trip units

Order No.	Rated current I_n	Overload protection I_r	t_r (7.2 x I_r)	Restart	Instantaneous short circuit protection I		
	A	A	S		kA	kA	ms
3VT9 431-6AP00	315	125, 137	1 (TV 1)		1	0.5	
		144, 160	3 (TV 3)	$T_{(0)}$	2	1.5	0
		172, 180	10 (TV 10)		3	2.5	
		200, 220	30 (TV 30)		5	4	
		231, 243	3 (TV 3)		4	5	
		250, 260	8 (TV 8)	$T_{(t)}$	2.5	3	50
		275, 290	15 (TV 15)		1.5	2	
		305, 315	25 (TV 25)		0.5	1	
3VT9 463-6AP00	630	250, 260	1 (TV 1)		1.5	0.8	
		275, 290	3 (TV 3)	$T_{(0)}$	3	2	
		305, 315	10 (TV 10)		6	4	0
		345, 360	30 (TV 30)		10	8	
		400, 435	3 (TV 3)		8	10	
		455, 480	8 (TV 8)	$T_{(t)}$	4	6	
		500, 550	15 (TV 15)		2	3	50
		375, 630	25 (TV 25)		0.8	1.5	
3VT9 480-6AP00	800	315, 345	1 (TV 1)		1.5	1	
		455, 480	3 (TV 3)	$T_{(0)}$	3	2	
		500, 550	10 (TV 10)		9	4	0
		575, 610	30 (TV 30)			6	
		630, 685	3 (TV 3)		9	12	
		722, 760	8 (TV 8)	$T_{(t)}$	4	12	
		800, 866	15 (TV 15)		2	6	
		909, 1000	25 (TV 25)		1	3	50
3VT9 410-6AP00	1000	400, 435	1 (TV 1)		2	1.5	
		455, 480	3 (TV 3)	$T_{(0)}$	5	3	0
		500, 550	10 (TV 10)		9	7	
		575, 610	30 (TV 30)		14	12	
		630, 685	3 (TV 3)		12	12	
		722, 760	8 (TV 8)		7	9	
		800, 866	15 (TV 15)	$T_{(t)}$	3	5	50
		909, 1000	25 (TV 25)		1.25	2	

Tripping characteristic ETU MP





4

Trip units

Trip units ETU UP - Universal protection

- For protecting complicated loads or those not specified in advance

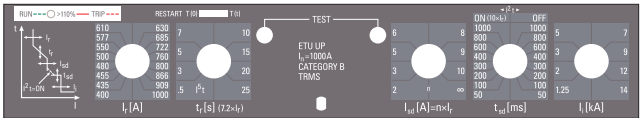
The 3VT9 4..-6AD00 trip unit is intended for the 3VT4 710-3AA..-0AA0 switching unit only. The UP trip unit is equipped with a thermal memory that can be disabled by turning the “restart” switch on the front panel from the position $T_{(t)}$ to the position $T_{(0)}$. After the thermal memory has been 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.

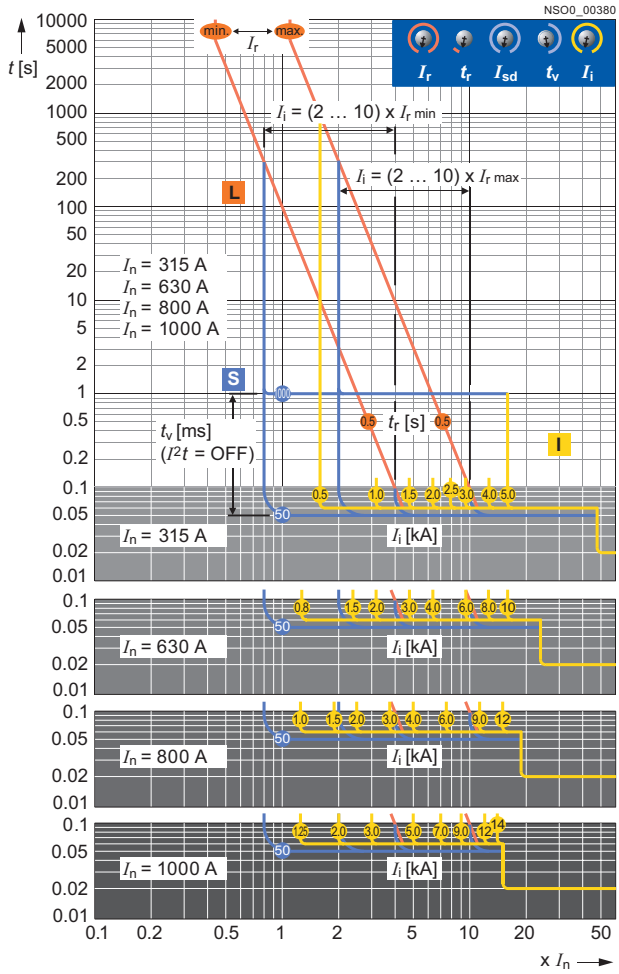
The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r this LED will turn red and just before tripping will begin to blink red. Located on the lower part of the trip unit cover are two photocells for communicating with the 3VT9 500-6AE00 signalling unit.

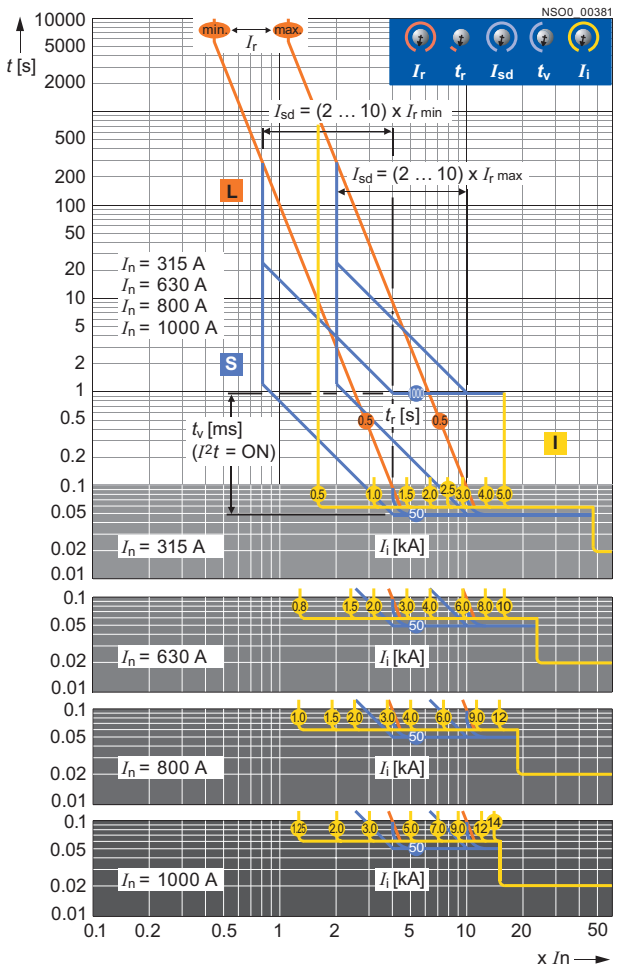
Specifications for adjustable trip units

Order 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
	A	A	S	n	ms			kA
3VT9 431-6AD00	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
3VT9 463-6AD00	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
3VT9 480-6AD00	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
3VT9 410-6AD00	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



Tripping characteristics ETU UP

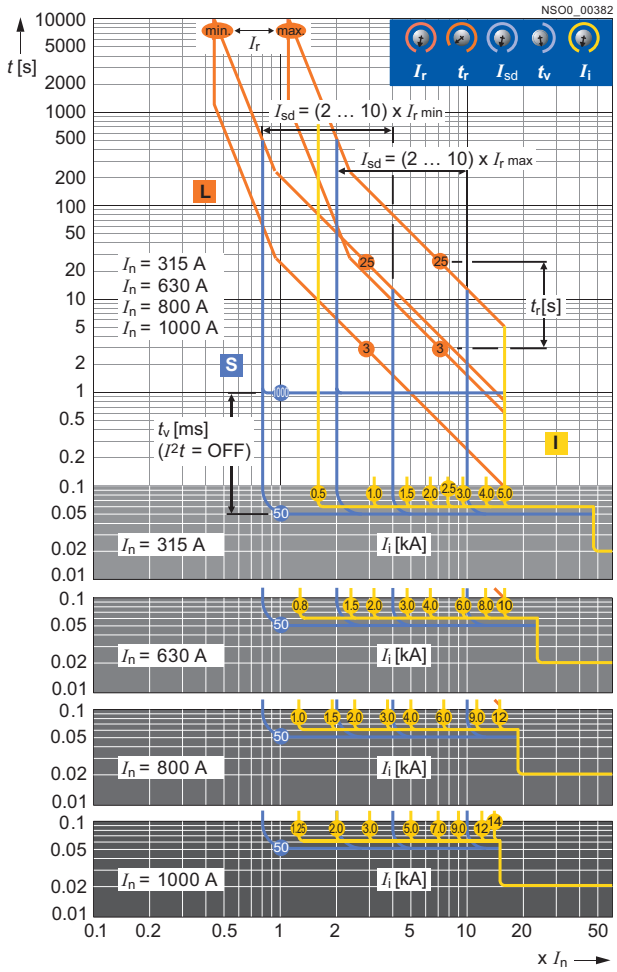


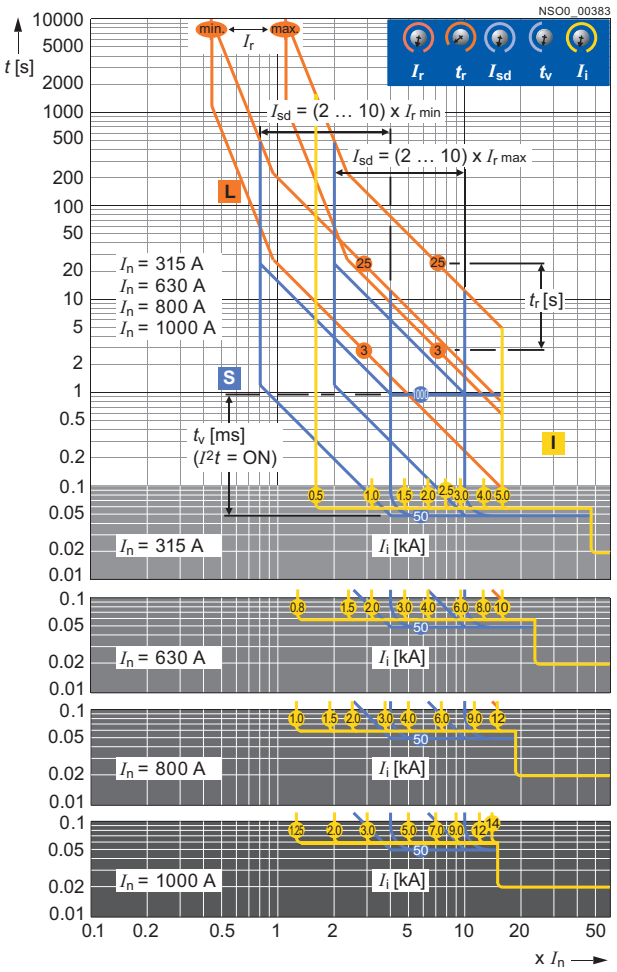


4

Trip units

Tripping characteristics ETU UP

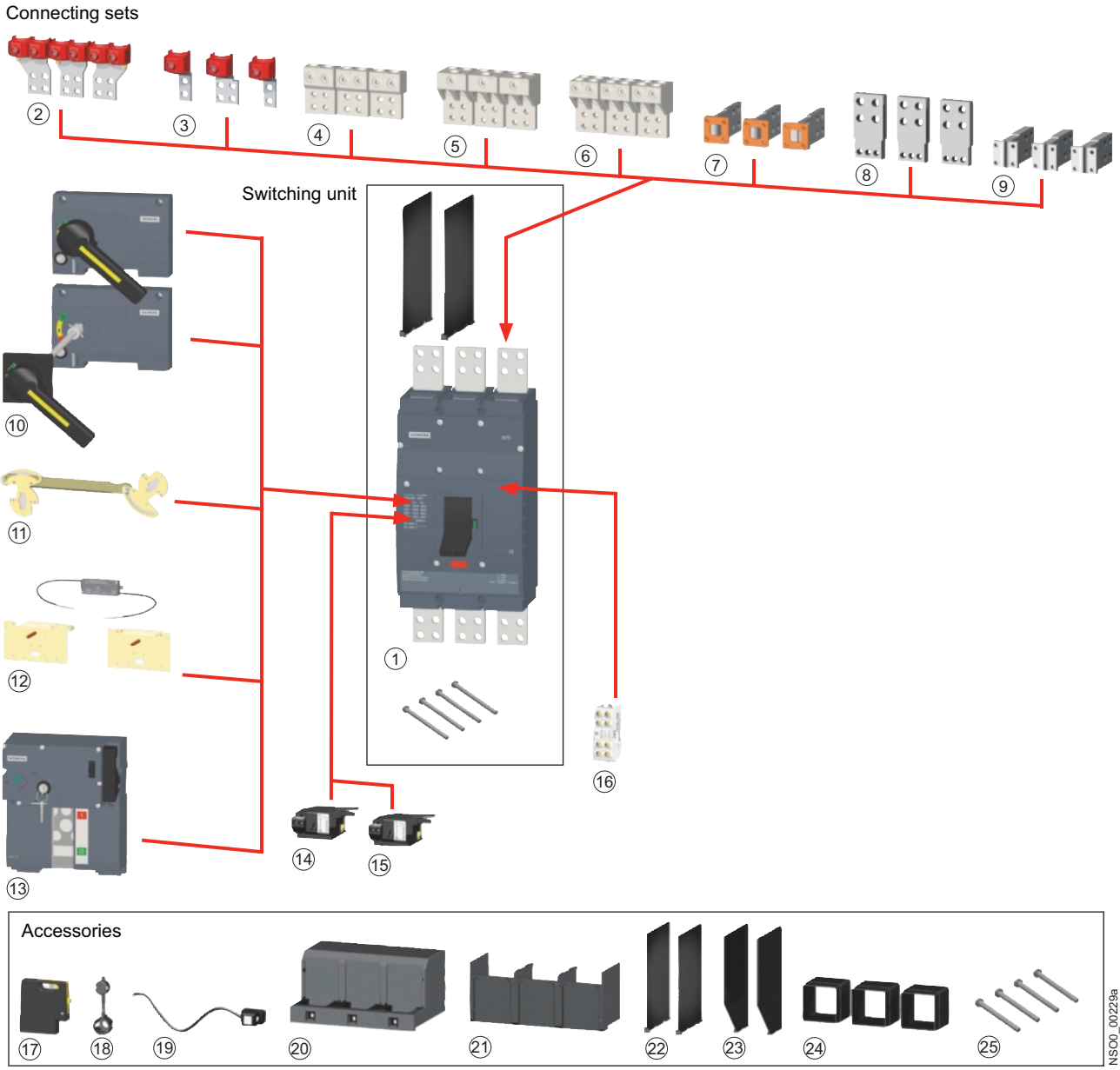




3VT5 Molded Case Circuit Breakers up to 1600 A

5

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 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

Overview

Switching unit

The switching unit includes:

- 3VT9 500-8CE30 insulating barriers
- Set of installation bolts (4x M8x80)
- Connecting sets for front connection - busbar connection

The switching unit must be outfitted with:

- Trip unit ETU DP, MP or UP (circuit breaker) or
- 3VT9 516-6DT00 switch disconnector unit (switch disconnector)

For the withdrawable version, the 3VT5 716-3AA38-0AA0 switching unit additionally requires

- 3VT9 500-4WA40 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.

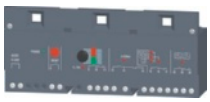
Selection and ordering data

	Rated Current I_n	Short-circuit breaking capacity $I_{cu\ at}$ AC 400 V	DT	Order No.	PS*	Weight approx.
	A	kA				kg
Switching units						
	***Fixed-mounted version, 3-pole***					
	1600	55	B	**3VT5 716-3AA30-0AA0**	1 unit	23.000
	***Withdrawable version, 3-pole***					
	1600	55	B	**3VT5 716-3AA38-0AA0**	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.

Selection and ordering data for accessories

	Rated current I_n	Overload protection	DT	Order No.	PS*	Weight approx.
	A					kg
Electronic trip units (ETU)						
Distribution protection, ETU DP, LI function						
	• For protecting lines and transformers					
	630	250 ... 630 A	B	**3VT9 563-6AC00**	1 unit	0.500
	1000	400 ... 1000 A	B	**3VT9 510-6AC00**	1 unit	0.500
	1250	500 ... 1250 A	B	**3VT9 512-6AC00**	1 unit	0.500
	1600	630 ... 1600 A	B	**3VT9 516-6AC00**	1 unit	0.590
Motor/generator protection, ETU MP, LI function						
	• Provides protection for motors and generators • Suitable also for protecting lines and transformers					
	630	250 ... 630 A	B	**3VT9 563-6AP00**	1 unit	0.500
	1000	400 ... 1000 A	B	**3VT9 510-6AP00**	1 unit	0.593
	1250	500 ... 1250 A	B	**3VT9 512-6AP00**	1 unit	0.500
	1600	630 ... 1600 A	B	**3VT9 516-6AP00**	1 unit	0.500
Universal protection, ETU UP LSI function						
	• Provides protection for complicated loads or loads not specified in advance					
	630	250 ... 630 A	B	**3VT9 563-6AD00**	1 unit	0.590
	1000	400 ... 1000 A	B	**3VT9 510-6AD00**	1 unit	0.590
	1250	500 ... 1250 A	B	**3VT9 512-6AD00**	1 unit	0.590
	1600	630 ... 1600 A	B	**3VT9 516-6AD00**	1 unit	0.590
Switch disconnector unit						
	1600	Switch disconnector unit	B	**3VT9 516-6DT00**	1 unit	0.400
Signalling unit						
		Signalling unit for trip units ETU DP, MP and UP	B	**3VT9 500-6AE00**	1 unit	0.670

	Rated control supply voltage U_s	DT	Order No.	PS*	Weight approx.
					kg
Auxiliary switches					
	AC/DC 60 ... 500 V/DC60 ... 240 V	B	**3VT9 500-2AF10**	1 unit	0.041
	AC/DC 5 ... 60 V	B	**3VT9 500-2AF20**	1 unit	0.041
Shunt trip units					
	AC/DC 24 V	B	**3VT9 500-1SF00**	1 unit	0.199
	AC/DC 48 V	B	**3VT9 500-1SG00**	1 unit	0.220
	AC/DC 110 V	B	**3VT9 500-1SH00**	1 unit	0.220
	AC 230 V/DC 220 V	B	**3VT9 500-1SJ00**	1 unit	0.201
	AC/DC 400 V	B	**3VT9 500-1SK00**	1 unit	0.220
	AC/DC 500 V	B	**3VT9 500-1SL00**	1 unit	0.220
Undervoltage trip units					
	AC/DC 24 V	B	**3VT9 500-1UF00**	1 unit	0.220
	AC/DC 48 V	B	**3VT9 500-1UG00**	1 unit	0.220
	AC/DC 110 V	B	**3VT9 500-1UH00**	1 unit	0.220
	AC 230 V/DC 220 V	B	**3VT9 500-1UJ00**	1 unit	0.220
	AC/DC 400 V	B	**3VT9 500-1UK00**	1 unit	0.220
	AC/DC 500 V	B	**3VT9 500-1UL00**	1 unit	0.220

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* You can order this quantity or a multiple thereof.

Overview

Rotary operating mechanism

The rotary operating mechanism assembly consists of:

- 3VT9 500-3HA10 rotary operating mechanism
- 3VT9 500-3HE/HF10 hand drive lever

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

- 3VT9 500-3HJ10 extension shaft
- 3VT9 500-3HG10/HG20 coupling driver

Selection and ordering data

	Version		DT	Order No.	PS*	Weight per PU approx. kg
Rotary operating mechanism						
	**Rotary operating mechanism (hand drive unit)**					
	• lockable with padlock		B	**3VT9 500-3HA10**	1 unit	0.230
	**Hand drive lever**					
	• lockable with padlock	black	B	**3VT9 500-3HE10**	1 unit	0.261
	• lockable with padlock	red	B	**3VT9 500-3HF10**	1 unit	0.261
	**Coupling driver**					
	• Degree of protection IP44		B	**3VT9 500-3HG10**	1 unit	0.265
	• Degree of protection IP66		B	**3VT9 500-3HG20**	1 unit	0.140
	**Extension shaft** length 365 mm		B	**3VT9 500-3HJ10**	1 unit	0.352
Mechanical Interlocks						
	**Mechanical interlocks** 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.		B	**3VT9 500-8LA00**	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		B	**3VT9 500-8LC10**	1 unit	0.400
	• For one fixed-mounted and one withdrawable circuit breaker/switch disconnector		B	**3VT9 500-8LC30**	1 unit	0.400
	• For circuit breaker/switch disconnector, withdrawable version		B	**3VT9 500-8LC40**	1 unit	0.500
Motorized operating mechanism						
	**Motorized operating mechanism; Rated control voltage**					
	AC/DC 110 V		B	**3VT9 500-3MN00**	1 unit	4,350
	AC 230 V/DC 220 V		B	**3VT9 500-3MQ00**	1 unit	4,454
	Motorized operating mechanism with operations counter; Rated control voltage					
	AC/DC 110 V		B	**3VT9 500-3MN10**	1 unit	4,400
	AC 230 V/DC 220 V		B	**3VT9 500-3MQ10**	1 unit	4,400

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* You can order this quantity or a multiple thereof.

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:
  - 3VT5 716-3AA38-0AA0 switching unit, 3-pole version;
  - 2 x 3VT9 500-4EF30 connection set (front connection) or 3VT9 500-4RD30 (rear connection)
- We recommend attaching the withdrawable version base to the switchboard with:
  - 3VT9 500-4SA40 mounting bolt set (4 x M8 x60)

Selection and ordering data

	Version	Max. permissible cross-section *S*	Type of cables	DT	Order No.	PS*	Weight per PU approx.
		mm^2					kg
Withdrawable version base							
	**Withdrawable version base for 3-pole circuit breaker/switch disconnector**			B	**3VT9 500-4WA30**	1 unit	13,000
Connecting sets							
	**Box terminals, double** For connecting four 70 ... 240 mm^2 cables, it is possible to use two 3VT9 524-4TG30 connecting sets (see page 5/11). Not for 3VT4 710-3AA30-0AA0 switching unit.	2 x 70 ... 240	Cu/Al cables	B	**3VT9 524-4TG30**	1 unit	1.470
	**Box terminals,** For connecting three 70 ... 240 mm^2 cables, it is possible to combine the 3VT9 524-4TG30 connecting set with the 3VT9 524-4TF30 connecting set (see page 5/11). Not for 3VT4 710-3AA30-0AA0 switching unit.	70 ... 240	Cu/Al cables	B	**3VT9 524-4TF30**	1 unit	0.663
	Rear connection		Busbars				
	• Up to 1000 A			B	**3VT9 400-4RC30**	1 unit	1.430
	• Up to 1600 A			B	**3VT9 500-4RC30**	1 unit	2.678
	**Front connection** for withdrawable version		Busbars	B	**3VT9 500-4EF30**	1 unit	2.730
	**Rear connection** for withdrawable version		Busbars	B	**3VT9 500-4RD30**	1 unit	3,420
	Terminals for circular conductors	150 ... 300	Cu/Al cables				
	• for 2 cables			B	**3VT9 532-4TF30**	1 unit	1.000
	• for 3 cables			B	**3VT9 533-4TF30**	1 unit	1.948
	• for 4 cables			B	**3VT9 534-4TF30**	1 unit	1.828

* You can order this quantity or a multiple thereof.

Selection and ordering data

	Version	DT	Order No.	PS*	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	B	**3VT9 500-8CE30**	1 unit	0.264
	• For withdrawable version	B	**3VT9 500-8CF30**	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	B	**3VT9 500-8CD30**	1 unit	0.287
	• For withdrawable version with front connection	B	**3VT9 500-8CC30**	1 unit	0.168
	**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	B	**3VT9 500-8CG30**	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	B	**3VT9 500-3HL00**	1 unit	0.041
	**Bolt sealing insert** Provides sealing for: • Accessory compartment cover	B	**3VT9 500-8BN00**	1 unit	0.002
	**Connecting cable** • For connecting circuit breaker accessories to withdrawable version (15 wire)	B	**3VT9 500-4PL00**	1 unit	0.120
	**Position indicator** Signals circuit breaker/switch disconnector position in withdrawable version	B	**3VT9 500-4WL00**	1 unit	0.020
	**Mounting bolts** • For withdrawable version	B	**3VT9 500-4SA40**	1 unit	0.144
	**ON button cover** • For motorized operating mechanism, cover can be sealed with sealing wire	B	**3VT9 500-3MF20**	1 unit	0.019

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* You can order this quantity or a multiple thereof.

Technical specifications

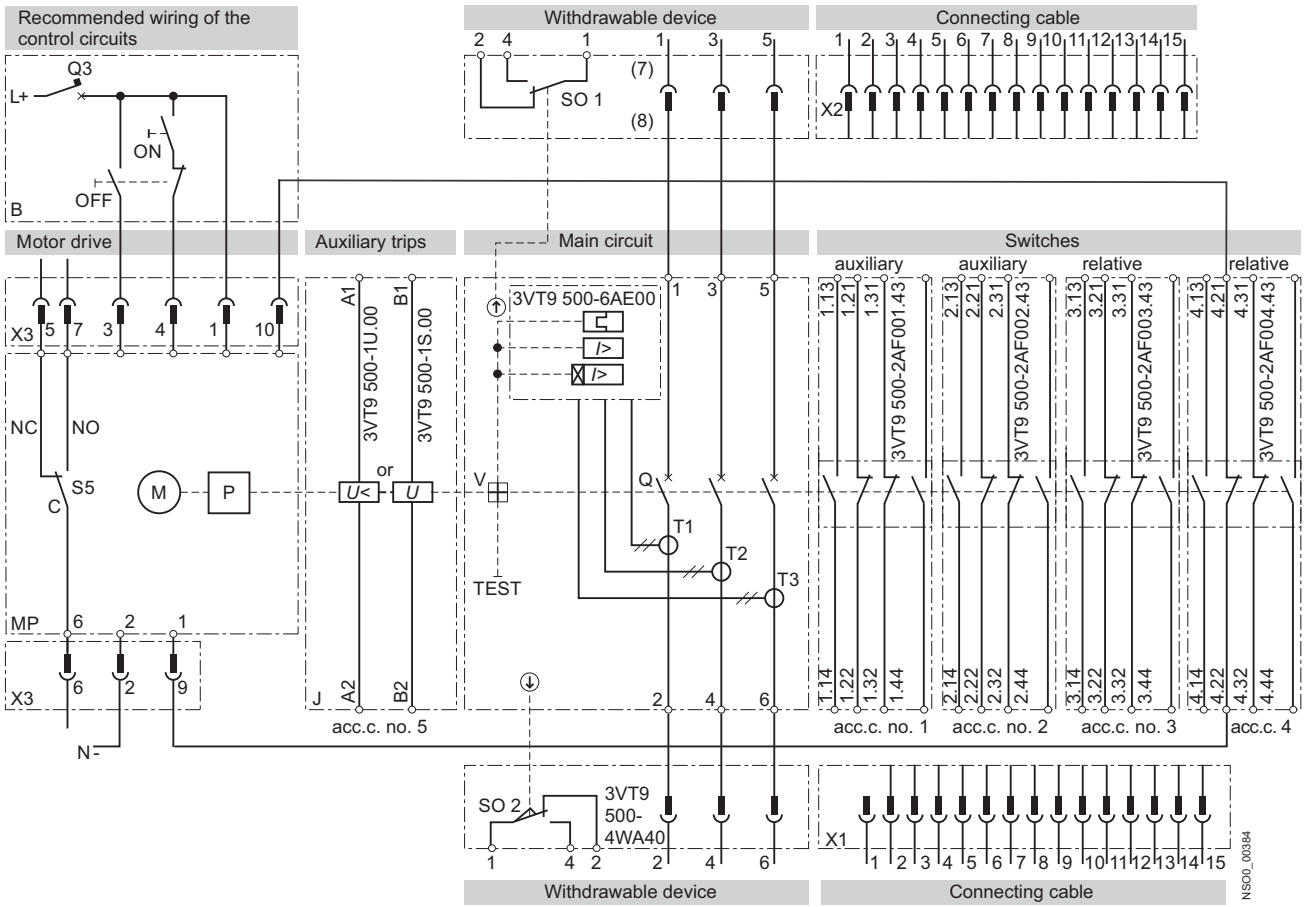
Type		3VT5 circuit breakers	Switch disconnector
Order number		**3VT5 716-3AA30-0AA0 3VT5 716-3AA38-0AA0**	**3VT9 516-6DT00**
Standards		EN 60 947-2, IEC 947-2	EN 60 947-3, IEC 947-3
Approval marks		CE	
Number of poles		3	
Rated current I_n	A	630, 1000, 1250, 1600	--
Rated normal current I_u	A	1600	
Rated 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 415 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.

Schematics

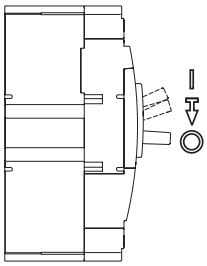
Circuit breaker with accessories



MP	3VT9 500-3M..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	3VT4 710-3AA30-0AA0, 3VT5 716-3AA30-0AA0 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	3VT9 500-4WA40 withdrawable version
X1, X2	3VT9 500-4PL00 connecting cable for withdrawable version
SO1, SO2	Contacts indicating positions of 3VT9 500-4WL00 (see page 5/7) withdrawable versions, see page 5/24.
3VT9 500-1U..0	Undervoltage trip units
3VT9 500-1S..0	Shunt trip units

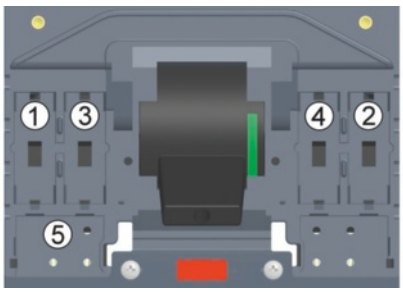
Functions

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	3VT9 500-2AF10				3VT9 500-2AF10			
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 3VT9 500-8CE30 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.

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.

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	1000 A	1000 A	980 A

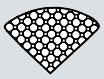
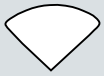
3VT5 circuit breaker/switch disconnector - connection of Cu busbars 2 x 50 x 6 mm to pole

50 °C	55 °C	60 °C	65 °C	70 °C
1400 A	1400 A	1340 A	1260 A	1200 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
1600 A	1540 A	1460 A	1400 A	1320 A

Specifications of cable shapes

Order 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	
3VT9 524-4TG30	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
3VT9 524-4TF30	500	70 ... 240 Cu/Al	95 ... 300 Cu/Al	50 ... 185 Cu/Al	70 ... 240 Cu/Al		5/36, 5/36
3VT9 532-4TF30	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
3VT9 533-4TF30	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
3VT9 534-4TF30	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
3VT9 400-4RC30	1000					50 x	5/35
3VT9 500-4RC30	1600					50 x	5/35, 5/35
3VT9 500-4EF30	1600					50 x	5/41
3VT9 500-4RD30	1600					50 x	--

5

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 3VT9 500-4EF30, for front connection or
  2 x 3VT9 500-4RD30, for rear connection
- For mounting withdrawable device to switchgear, use 3VT9 500-4SA40 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 3VT9 500-4EF30 connection set (front connection) or 3VT9 500-4RD30 (rear connection).
- For connection using cables, it is necessary to additionally use 3VT9 500-4EF30 or 3VT9 500-4RD30 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 3VT9 500-4PL00 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 3VT9 500-4WL00 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

3VT9 500-4WC00 specifications

Order Number	3VT9 500-4WL00
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.

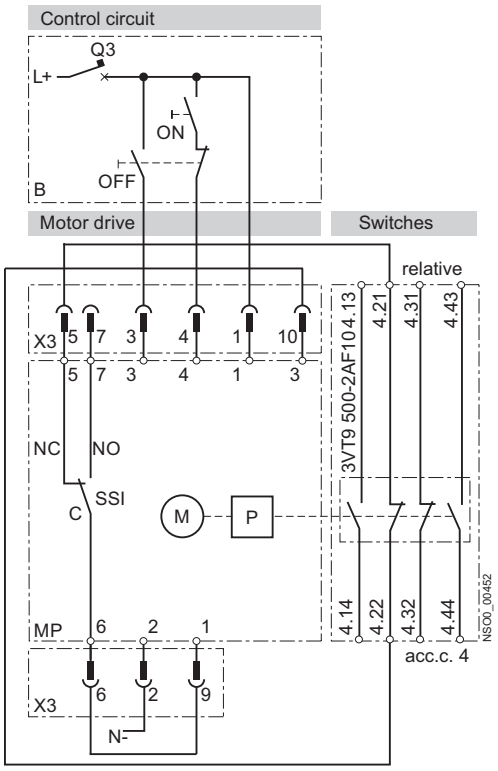
3VT9 500-4WL00 position signalling

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

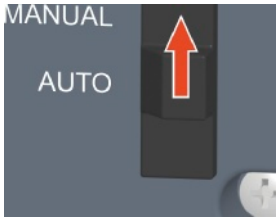
Recommended wiring of circuit breaker, withdrawable version with motorized operating mechanism



Symbol	Description
MP	3VT9 500-3M..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 LSN 4C/1 AC 230 V LSN 2C/1 DC 110 V LSN-DC 4C/1 DC 220 V LSN-DC 2C/1

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 3VT9 500-2AF10 4 3	1,2 3VT9 500-2AF10 2 1	3,4 3VT9 500-2AF10 4 3	3,4 3VT9 500-2AF10 2 1	1,2 3VT9 500-2AF10 4 3	1,2 3VT9 500-2AF10 2 1	3,4 3VT9 500-2AF10 4 3	3,4 3VT9 500-2AF10 2 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

Trip units

Overview

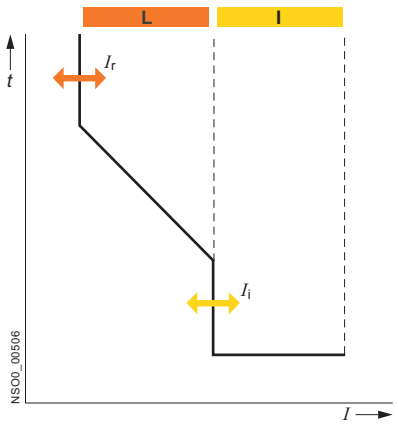
The electronic trip unit is a separate and interchangeable unit, which has to be ordered separately and in addition to the 3VT5 716-3AA3.-0AA0 switching unit. By exchanging the trip unit, the range of the circuit breaker's rated current can be easily changed.

Trip units for the 3VT5 716-3AA3.-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

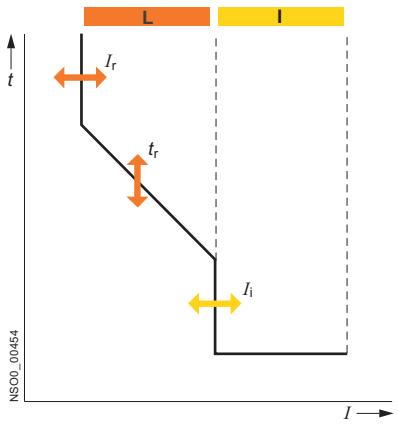
Several different trip units are available. Some have adjustable characteristics (in order to match the protected device and to achieve the required selectivity):

ETU DP trip units



ETU DP trip units have one type of characteristic with adjustable I_r and I_{rm}.

ETU MP trip units



ETU MP trip units have more kinds of characteristics with adjustable I_r, t_r and I_{rm}.

ETU UP trip units

They have universal characteristics, with the greatest variability in adjustment: I_r, t_r, I_{rmv}, t_v and I_{rm}.

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.

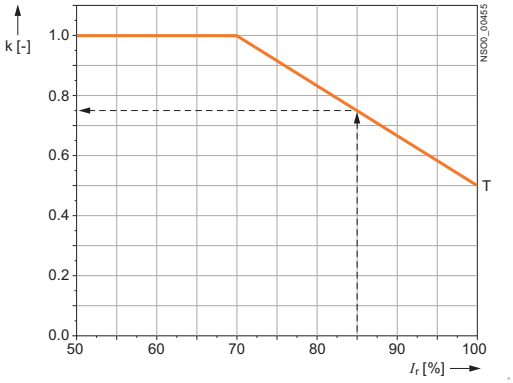
2. Time-independent instantaneous trip unit (short-circuit trip unit) I

The time-independent instantaneous **ETU DP** and **ETU MP** trip units are adjusted with one switch, I_{rm} . The I_{rm} 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).

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_v is cut short from the cold-state characteristic by the coefficient **k**.

The real tripping time is $t_s = k \cdot t_v$

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:

$$\boldsymbol{t_s = 0.74 \cdot t_v}$$

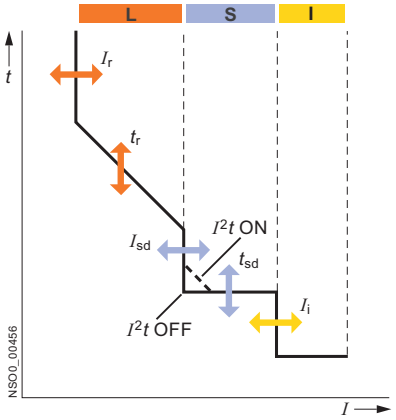
k [–] time shortening coefficient
I_r [A] adjusted rated current of the trip unit
t_v [s] tripping time of the trip unit derived from the characteristic
t_s [s] real tripping time of the trip unit tripped from warm state
t_u [s] standstill period for particular characteristics

Trip units are set by the manufacturer

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

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.

I^2t - 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:

$$t = t_V \cdot \left(\frac{10}{k}\right)^2$$

3. Time-independent instantaneous trip unit I

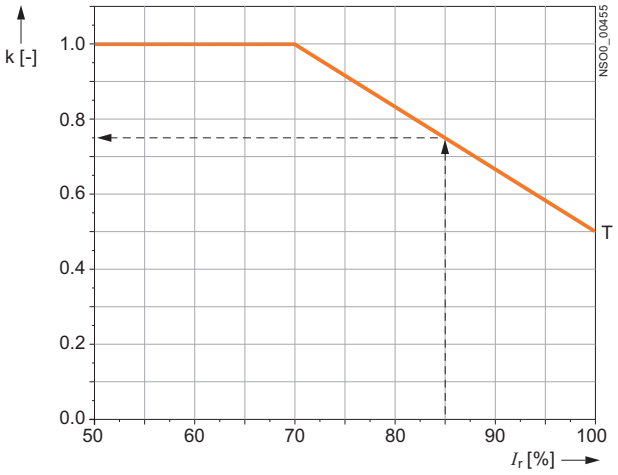
It is set up with parameter I_i. I_i is a short-circuit current that, when reached or exceeded, causes the circuit breaker to switch off instantaneously. It is set up directly in kA on the trip unit. The wave form of the tripping characteristic is adjusted using latched switches located on the trip unit's 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).

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_v is cut short from the cold-state characteristic by the coefficient k.

The real tripping time is $t_s = k \cdot t_v$

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:

$t_s = 0.74 \cdot t_v$

k [-] time shortening coefficient
I_r [A] adjusted rated current of trip unit
t_v [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
tr = min
t_{sd} = min, I^2t - ON
I_{sd} = min

Trip units

Trip units ETU DP - Distribution protection

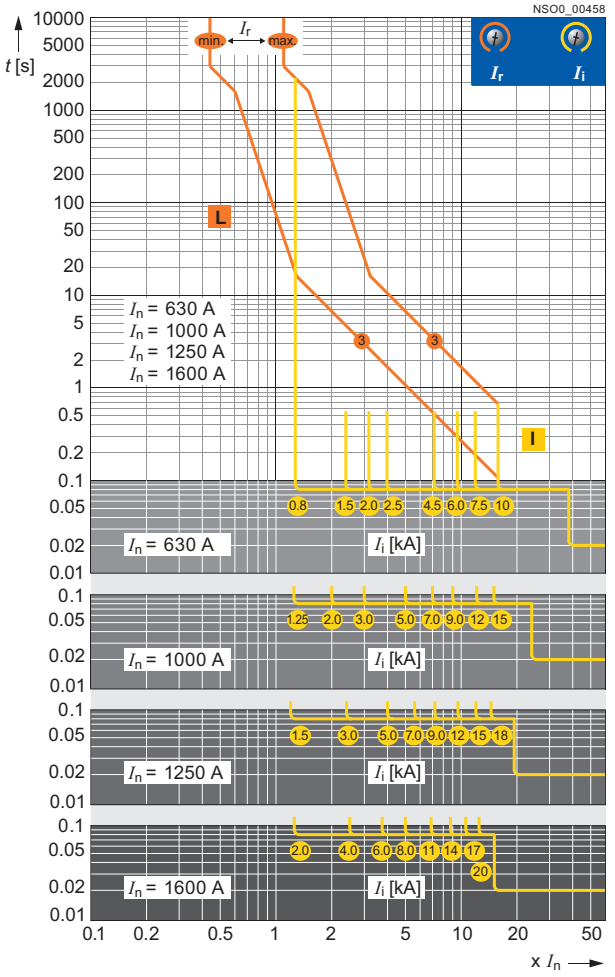
- Provides protection for lines and transformers

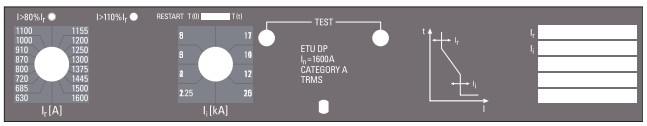
The 3VT9 5..-6AC00 trip unit is intended only for 3VT5 716-3AA3.-0AA0 switching units. Operation of the trip unit is controlled by a microprocessor. The trip unit is fitted with a thermal memory that can be disabled by turning the switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. 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 3VT9 500-6AE00 signalling unit.

Tripping characteristics





Adjustable specifications

Order No.	Rated current I_n A	Overload protection I_r A	Restart	Instantaneous short circuit protection I_i kA
3VT9 563-6AC00	630	250, 260	$T_{(0)}$	0.8
		275, 290		1.5
		305, 315		2
		345, 360		2.5
		400, 435	$T_{(t)}$	4.5
		455, 480		6
		500, 550		7.5
		575, 630		10
3VT9 510-6AC00	1000	400, 435	$T_{(0)}$	1.25
		455, 480		2
		500, 550		3
		575, 630		5
		630, 685	$T_{(t)}$	7
		720, 760		9
		800, 870		12
		910, 1000		15
3VT9 512-6AC00	1250	500, 550	$T_{(0)}$	1.5
		577, 610		3
		630, 685		5
		722, 760		7
		800, 866	$T_{(t)}$	9
		909, 1000		12
		1100, 1155,		15
		1200, 1250		18
3VT9 516-6AC00	1600	630, 685	$T_{(0)}$	2
		720, 800		4
		870, 910		6
		1000, 1100		8
		1155, 1200	$T_{(t)}$	11
		1250, 1300		14
		1375, 1445		17
		1500, 1600		20

* You can order this quantity or a multiple thereof.

Trip units ETU MP - Motor protection

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

The 3VT9 5..-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.

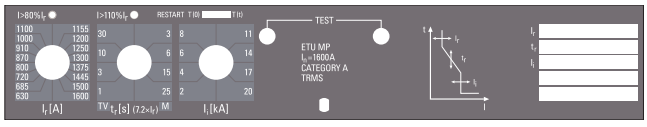
It is possible to set a total of 8 characteristics on the trip unit. From these, in mode “M”, there are 4 characteristics for motor protection and another 4 characteristics in mode “T_V” for protecting transformers and lines. The shape of each characteristic can be changed using a selector switch.

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 3VT9 500-6AE00 signalling unit.

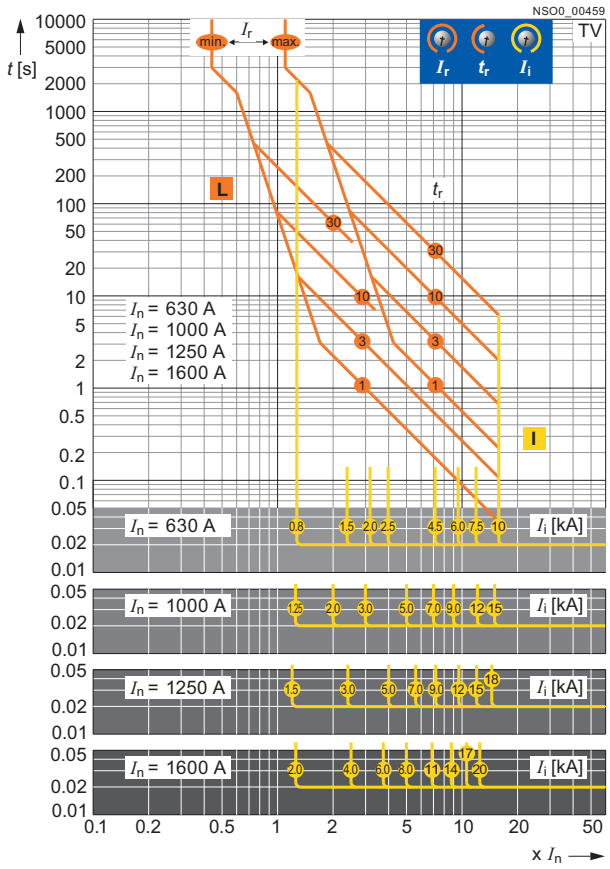
Adjustable specifications

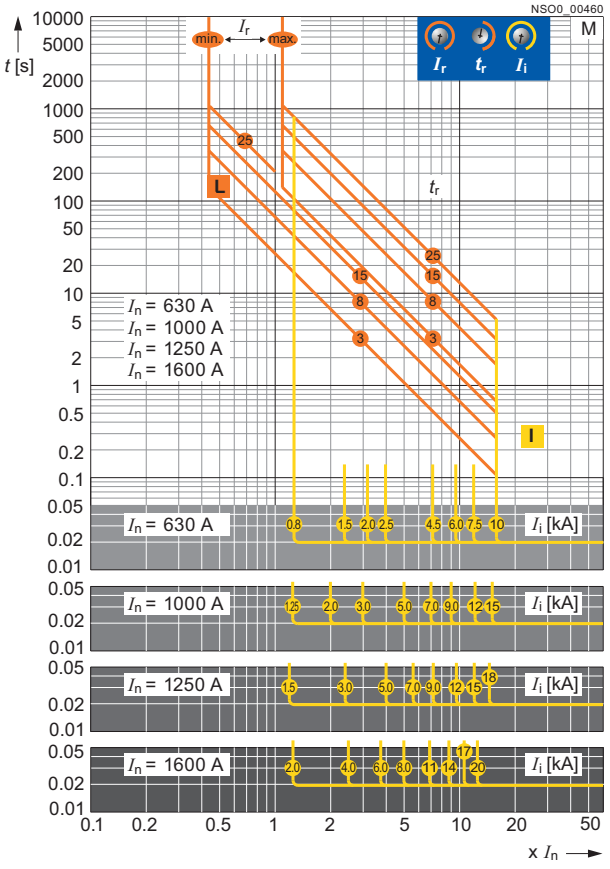
Order No.	Rated current I_n	Overload protection I_r	t_t (7.2 x I_r)	Restart	Instantaneous short circuit protection I_i
	A	A	S		kA
3VT9 563-6AP00	630	250, 260	1 (TV 1)	$T_{(0)}$	0.8
		275, 290	3 (TV 3)	$T_{(t)}$	1.5
		305, 315	10 (TV 10)		2
		345, 360	30 (TV 30)		2.5
		400, 435	3 (M 3)		4.5
		455, 480	8 (M 8)		6
		500, 550	15 (M 15)		7.5
		575, 630	25 (M 25)		10
3VT9 510-6AP00	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
3VT9 512-6AP00	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
3VT9 516-6AP00	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



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.

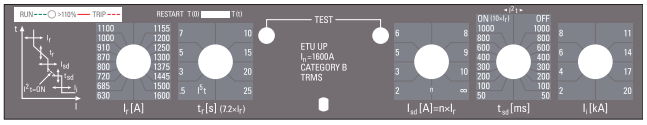
The 3VT9 5..-6AD00 trip unit is intended for the 3VT5 716-3AA3.-0AA0 switching unit only. The trip unit is equipped with a thermal memory that can be disabled by turning a "restart" switch on the front panel from the position $T_{(t)}$ to position $T_{(0)}$. After disabling the thermal memory, the thermal 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 3VT9 500-6AE00 signalling unit.

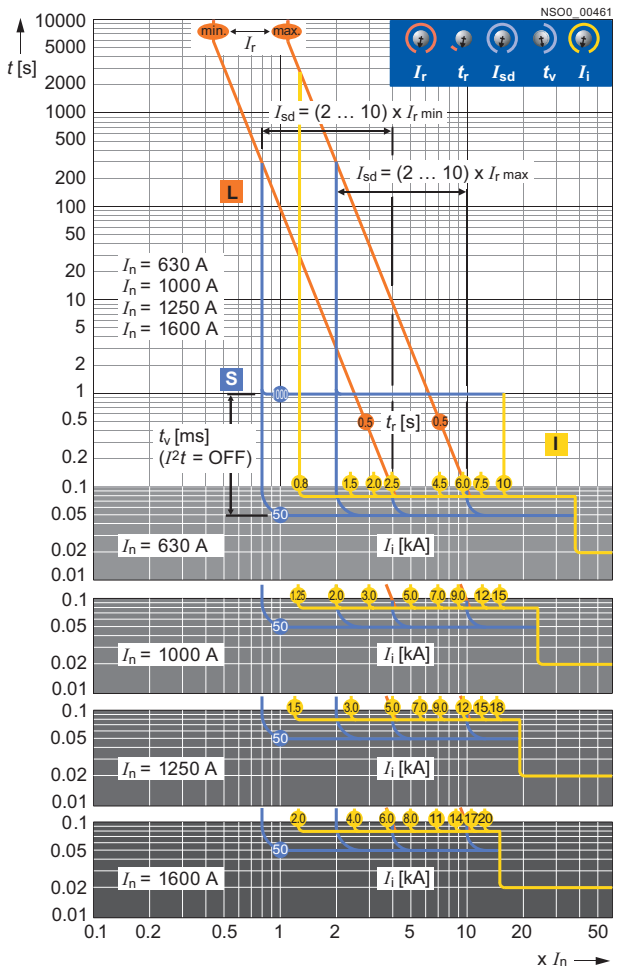
Specifications for adjustable trip units

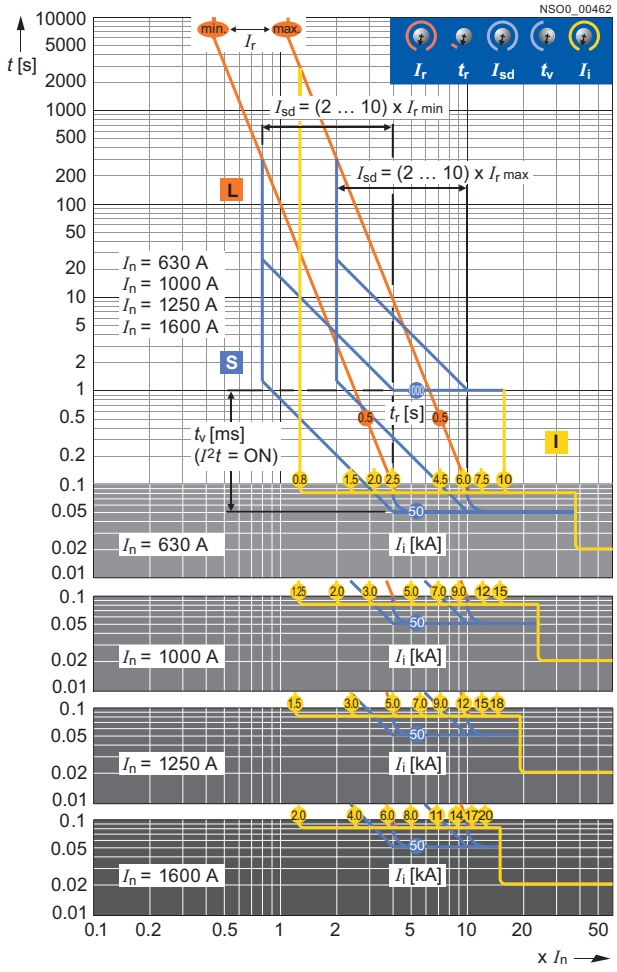
Order No.	Rated current I_n	Overload protection I_r	t_r (7.2 x I_r)	Short delayed short circuit protection I_{sd} A = (n x I_r)	t_{sd}	I^2t	Restart	Instantaneous short circuit protection I_i
	A	A	s	n	ms			kA
		250, 260	0.5	2	50, 100			0.8
		275, 290	3	3	200, 300	on	$T_{(0)}$	1.5
		305, 315	5	5	400, 600			2
3VT9 563-6AD00	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
3VT9 510-6AD00	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
3VT9 512-6AD00	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
3VT9 516-6AD00	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



Trip units

Tripping characteristic ETU UP





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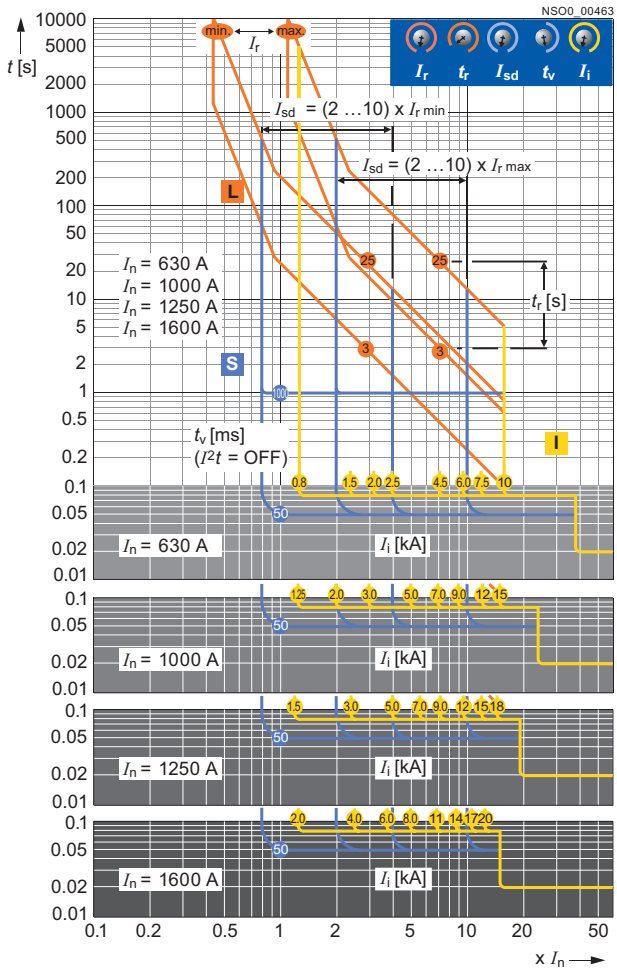
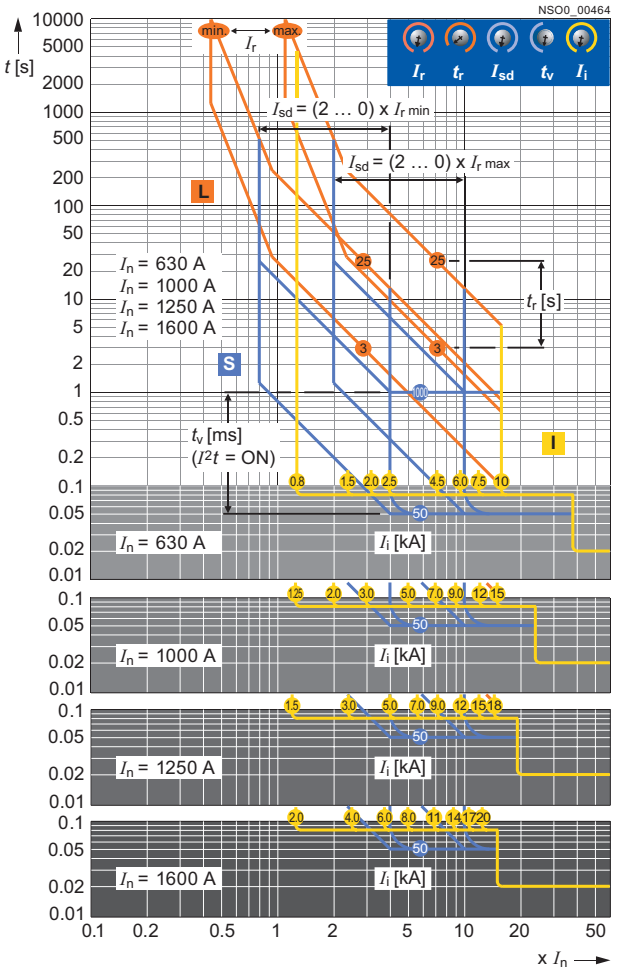
Tripping characteristic ETU UP





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Signalling units

Overview

The 3VT9 500-6AE00 signalling unit is a modular accessory for the 3VT4 and 3VT5 circuit breakers and operates in conjunction with 3VT9 5..-6AC00, 3VT9 5..-6AP00 and 3VT9 5..-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.

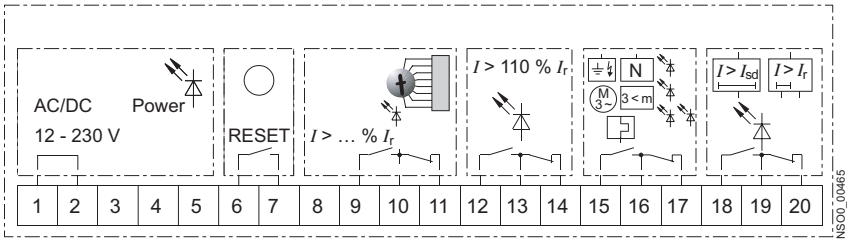
The signalling unit will not work without power supply!

Specifications

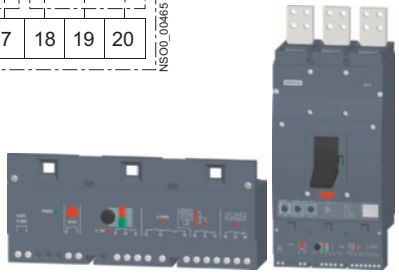
Order No.		3VT9 500-6AE00
Rated operating voltage U_e		AC/DC 12 ... 230 V
Protection (tube fuse)		T1.5 A
Rated frequency f_n		50/60 Hz
Current draw (rms) max. at U_e AC-15 DC-13	 AC/DC 12 V AC/DC 24 V AC/DC 48 V AC/DC 110 V AC 230 V/DC 220 V	 370 mA 170 mA 100 mA 60 mA 50 mA
Rated operating current (of 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	+	+



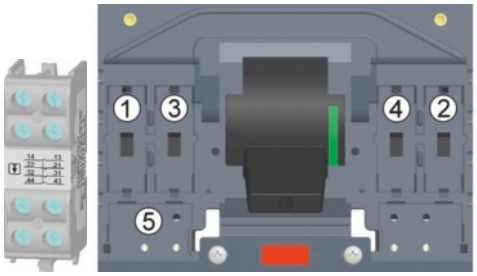
1, 2	supply
6, 7	external RESET button
9, 10, 11	relay contacts indicating preset I_r
12, 13, 14	relay contacts indicating reaching 110% I_r
15, 16, 17	relay contacts indicating tripping by time-dependent or undercurrent trip units
18, 19, 20	relay contacts indicating tripping by independent trip unit (instantaneous or delayed tripping)



Technical specifications

Order No.		3VT9 500-2AF10	3VT9 500-2AF20[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	
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) PS-BL-....-Au is not suitable for controlling electromagnetic loads

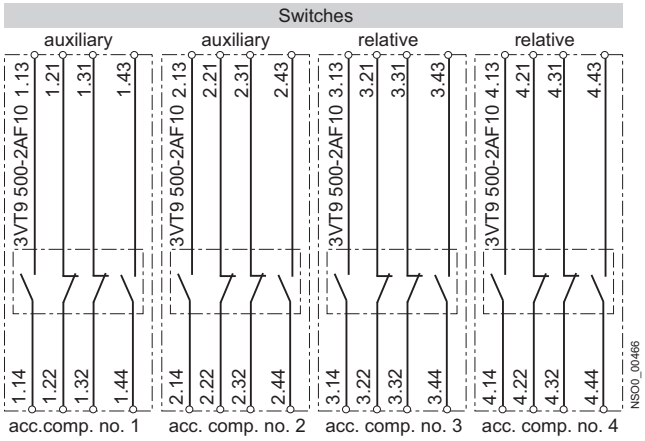


Arrangement of contacts	Number of contacts	Contact types
22	2 + 2	break + make

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

Wiring diagram



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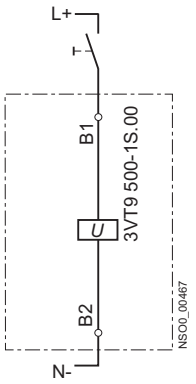
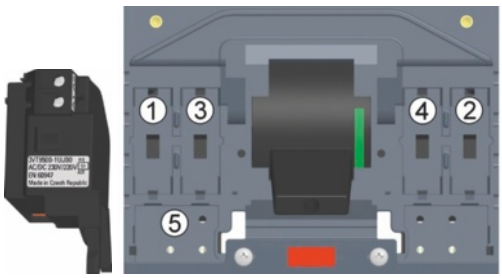
Shunt trip units

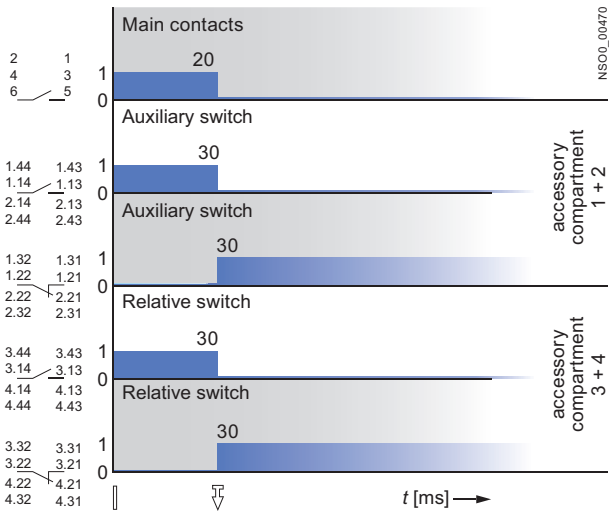
Technical specifications

Order No.		3VT9 500-1S.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



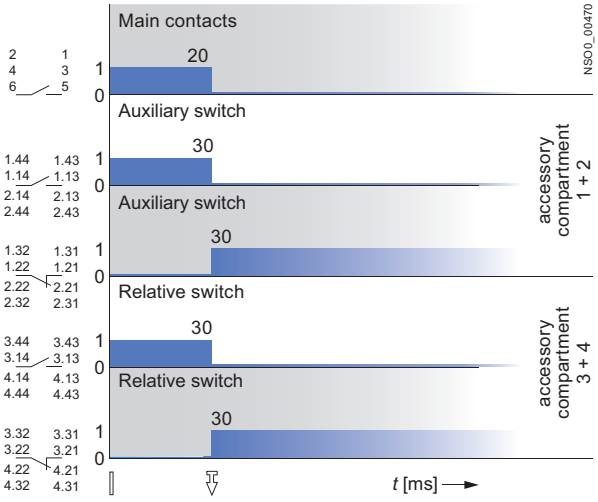
Circuit breaker states and lever positions of circuit breakers

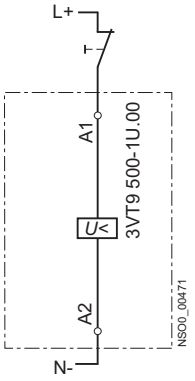
Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by trip units, or by TEST button or by the trip pushbutton on the motor drive	
Switched off manually or electrically by drive	

Technical specifications

Order No.		3VT9 500-1U.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

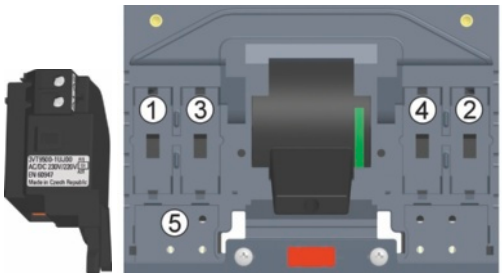
Circuit breaker switched off by undervoltage trip unit





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	



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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.

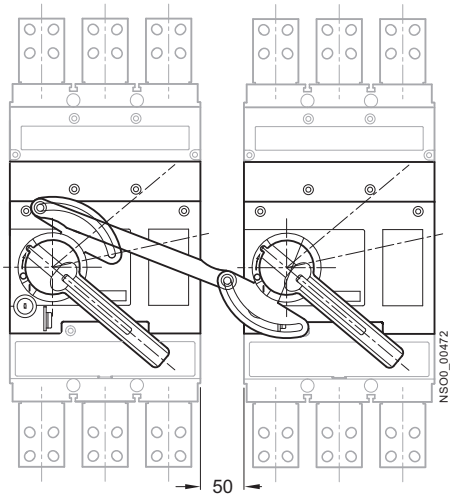
Specifications

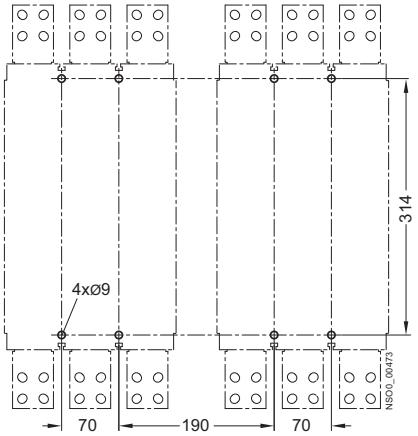
					Switchgear door locking in circuit breaker state	
Order Number	Description	Color	Lockable with padlock when circuit breaker is in OFF state	Protection class	Switched on and off by trip unit	Length mm
3VT9 500-3HA10	Rotary operating mechanism	--	yes	--	--	--
3VT9 500-3HE10	Hand drive lever	black	yes	--	--	--
3VT9 500-3HF10	Hand drive lever	red	yes	--	--	--
3VT9 500-3HG10	Coupling driver	--	--	IP44	yes	--
3VT9 500-3HG20	Coupling driver	--	--	IP66	yes	--
3VT9 500-3HJ10	Extension shaft	--	--	--	--	365

Technical specifications

3VT9 300-8LA00 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.

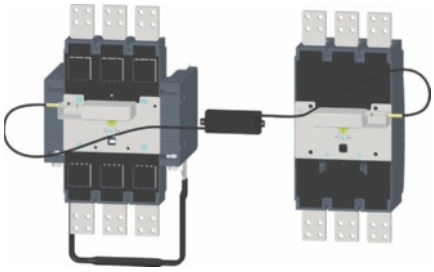




3VT9 500-8LC10 Mechanical interlocking by Bowden

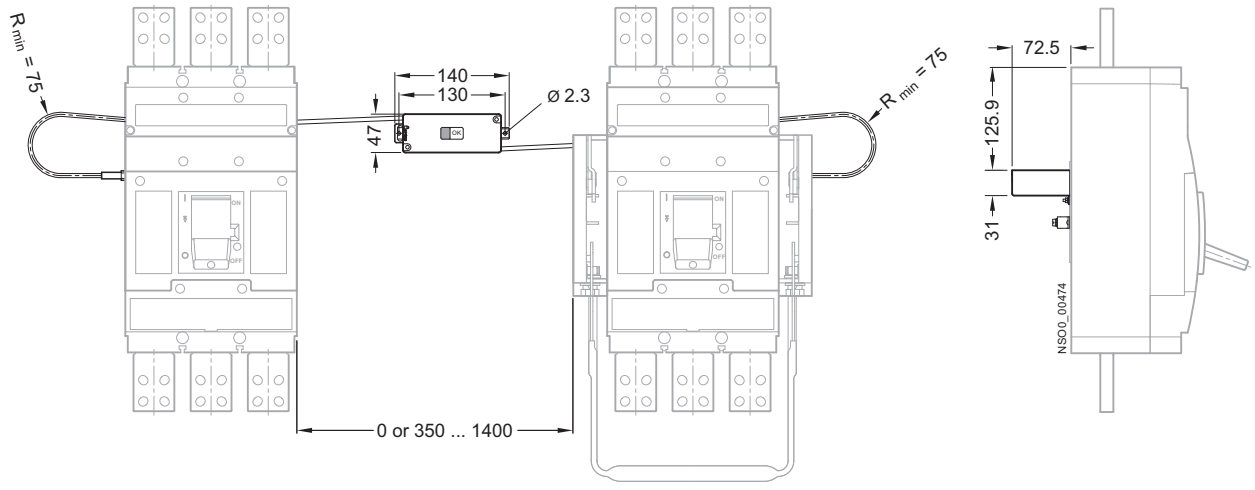
- Provides mechanical interlocking of two circuit breakers so that they cannot both be tripped simultaneously, but only one of them at a time.
- Interlocking can be used between two 3VT4 or 3VT5 circuit breakers or between a 3VT4 and a 3VT5 circuit breaker. For interlocking, circuit breakers can be outfitted with a hand or motor drive. 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
3VT9 500-8LC10	fixed-mounted - fixed-mounted
3VT9 500-8LC30	fixed-mounted - withdrawable
3VT9 500-8LC40	withdrawable - withdrawable



Mechanical interlocking by Bowden between fixed-mounted and withdrawable 3VT5 circuit breakers

Dimensions:



Motorized operating mechanism

Technical specifications

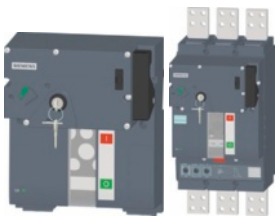
The motorized operating mechanism is equipped with spring storage units. The energy stored in the springs makes it possible to switch the circuit breaker on in less than 70 ms. Releasing the spring energy and turning on the circuit breaker is ensured by a closing coil. The motorized operating mechanism 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 3VT9 500-2AF10 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 3VT9 500-3MF20 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

Order Number		3VT9 500-3M...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	3
• DC 220 V	s	3
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		LSN 4C/1; LSN 2C/1
• DC 110 V; DC 220 V		LSN-DC 4C/1; LSN-DC 2C/1
Rated operating current of the switch selector AUTO / MANUAL I_e/U_e	V	6 A/AC 250

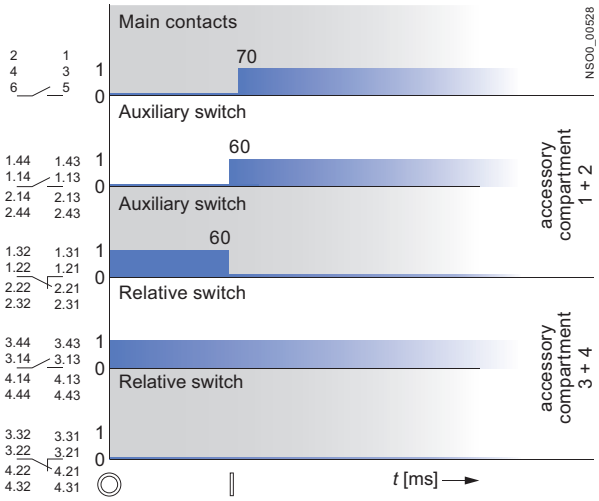
[1)] for sequence of control pulses, see page 5/33.



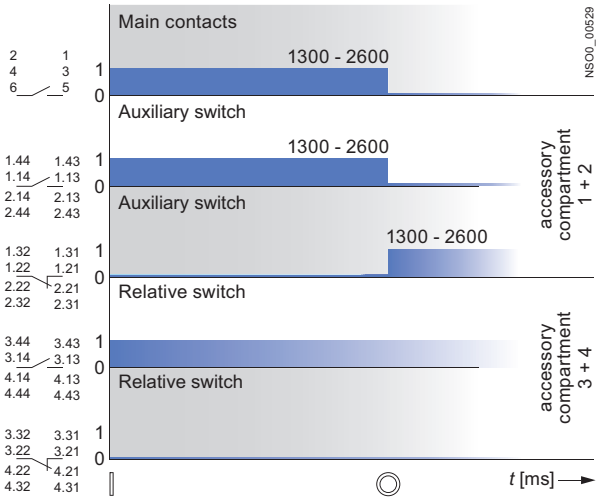
Motorized operating mechanism

Specifications

Circuit breaker switched on by motorized operating mechanism-electrically by pushbutton ON

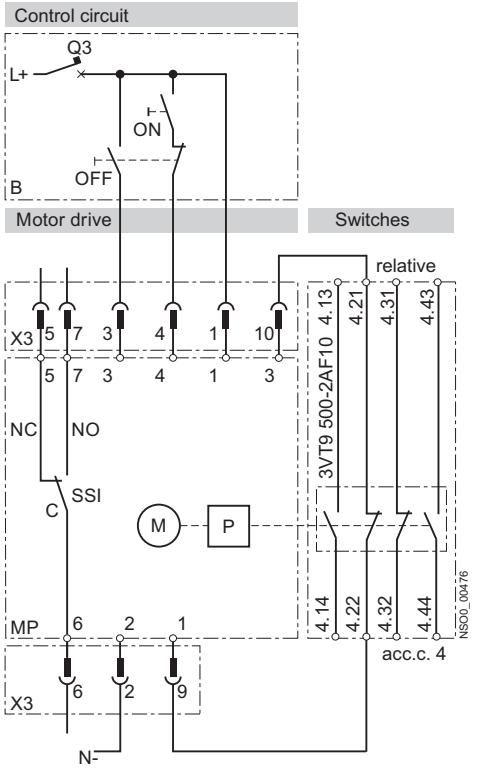


Circuit breaker switched off by motorized operating mechanism-electrically by pushbutton OFF



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

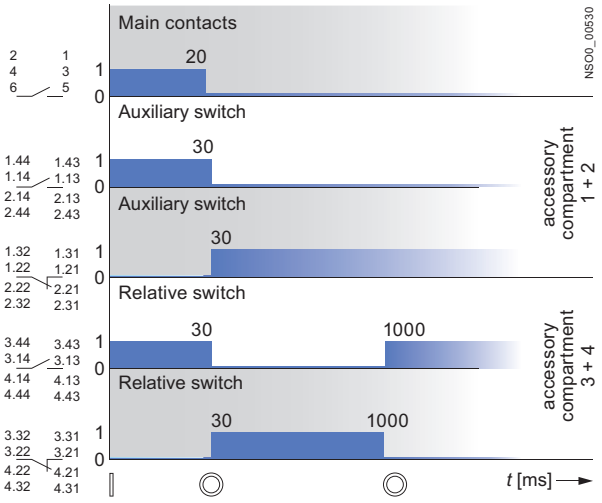
Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by trip unit, or by TEST button	
Switched off manually or electrically by drive	

Motorized operating mechanism

Symbol	Description
MP	3VT9 500-3M...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 by trip unit, or by TEST button	
Switched off manually or electrically by drive	

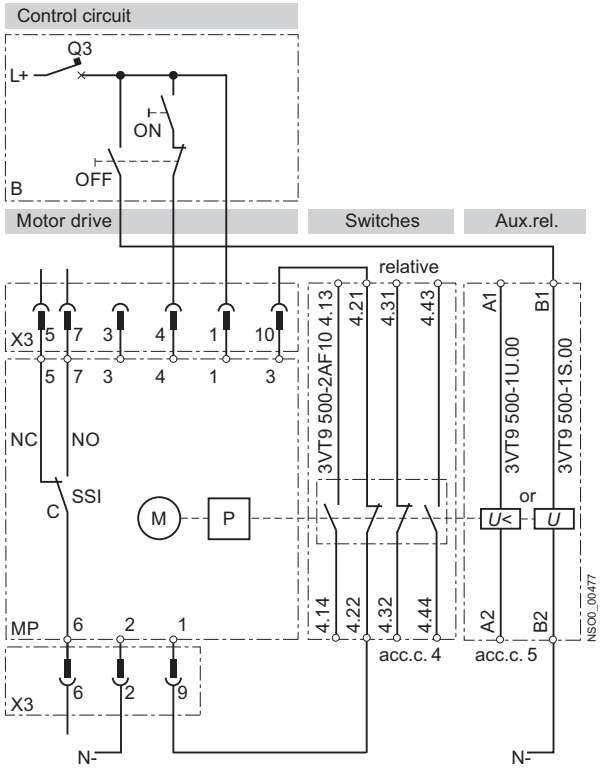
Wiring diagram description

Symbol	Description
MP	Motorized operating mechanism 3VT9 500-3M...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

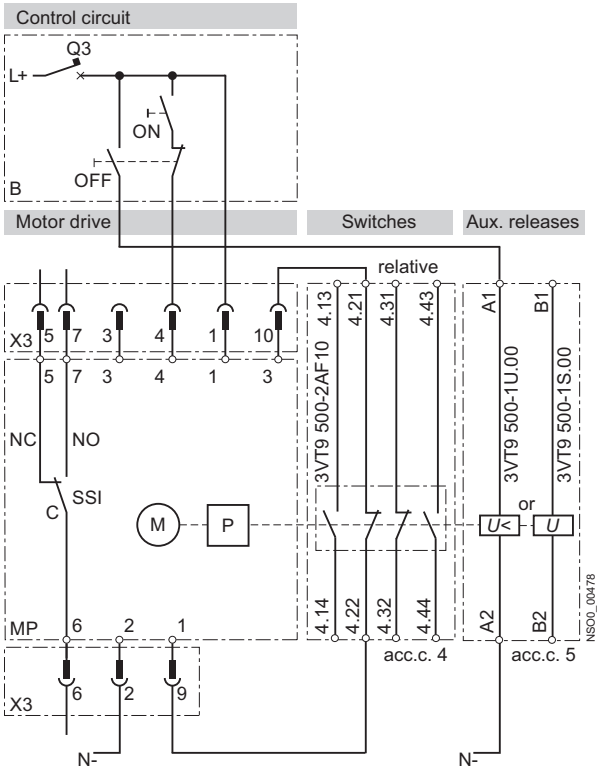
Motorized operating mechanism

Wiring diagram

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



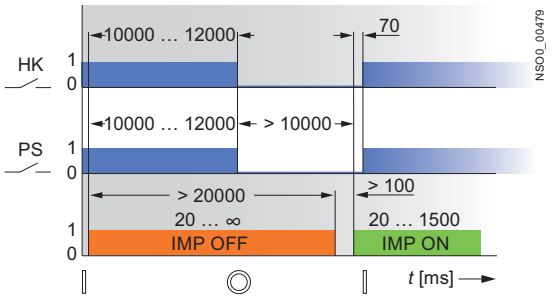
Circuit breaker switched on by motorized operating mechanism (electrical pushbutton ON) and switched off by undervoltage trip unit



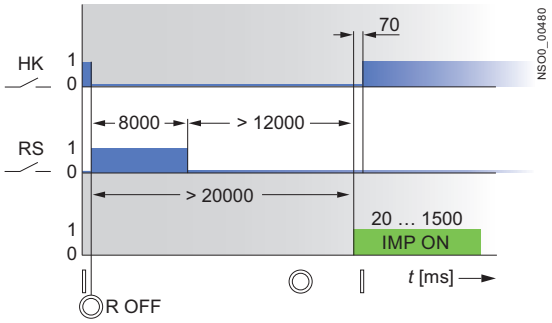
Specifications

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	

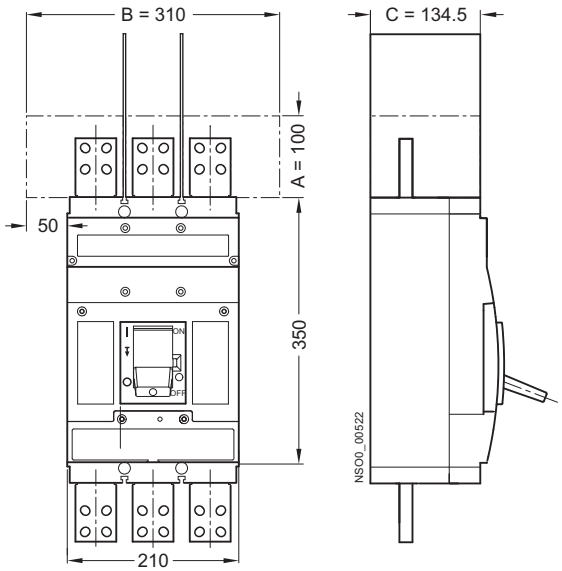
Description of charts

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

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)

3VT9 500-8CE30 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, 3VT9 500-8CE30 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, 3VT9 500-8CE30 insulating barriers must always be installed on it.

Rear connection
- terminals 1, 3, 5 (upper side)

3VT9 500-8CD30 insulating covers or 3VT9 500-8CE30 insulating barriers must always be installed on the circuit breaker/switch disconnector.

We recommend installing 3VT9 500-8CG30 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, 3VT9 500-8CD30 insulating barriers must always be installed on circuit breaker.

We recommend installing 3VT9 500-8CG30 insulating grommets with all sets for rear connection.

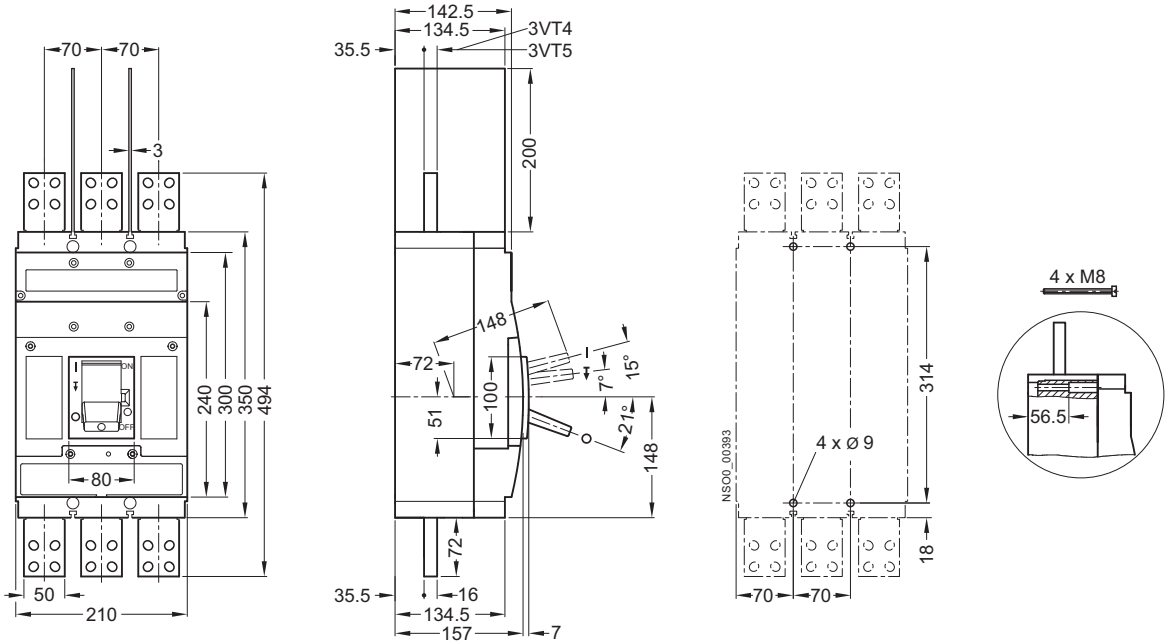
Withdrawable version

Front connection

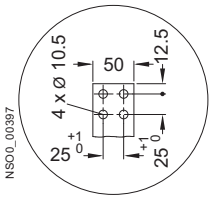
- terminals 1, 3, 5 (upper side)
  If the mounting base for the withdrawable circuit breaker/switch disconnector is connected on the upper side, using clamp or block type terminals, 3VT9 500-8CF30 insulating barriers must always be installed.
  In all other cases, we recommend installing 3VT9 500-8CC30 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, 3VT9 500-8CF30 insulating barriers must always be installed.
  In all other cases, we recommend installing 3VT9 500-8CC30 insulating covers on the bottom side of the withdrawable version base.

Dimensional drawings - fixed-mounted version

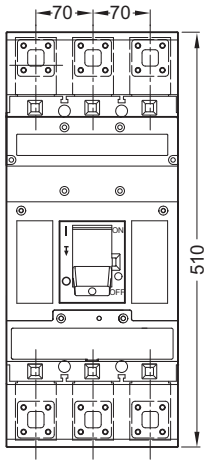
Fixed-mounted version, front connection

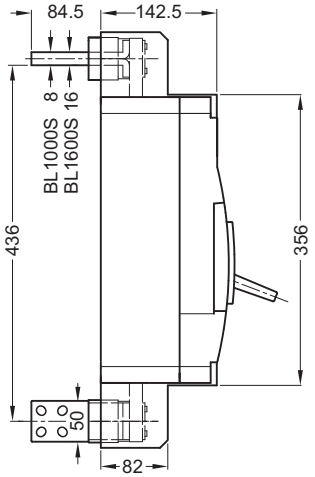


Drilling pattern

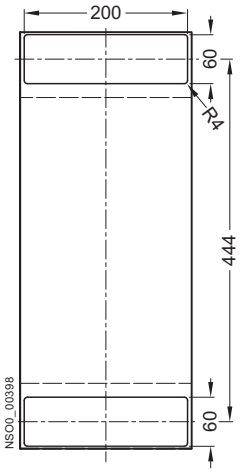


Fixed-mounted version, rear connection
(3VT9 500-4RC30, 3VT9 400-4RC30 connecting sets)





Openings for insulation grommets



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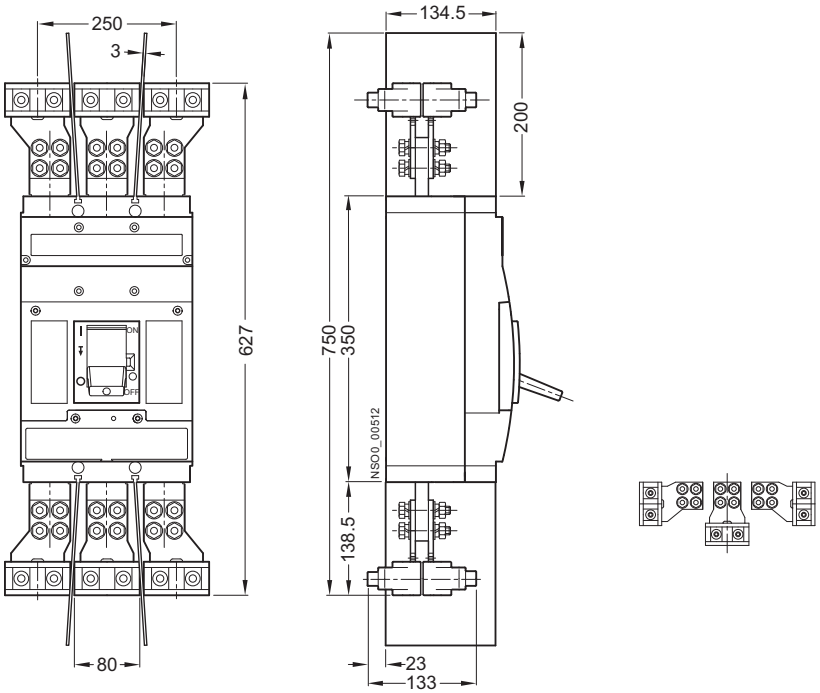
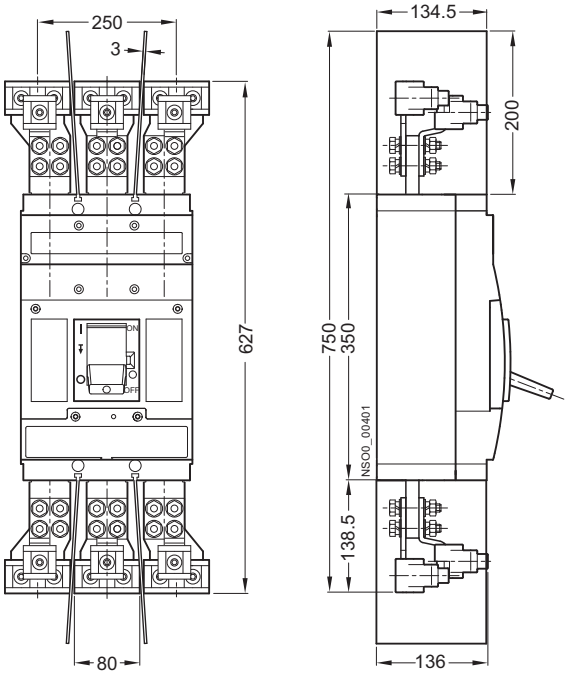
Dimensional drawings

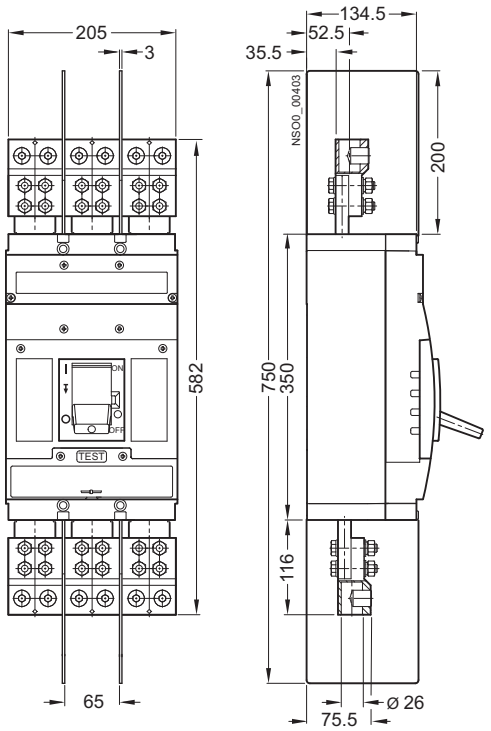
Fixed-mounted version, clamp type terminals (3VT9 524-4TG30 connecting sets)
- not for 3VT4 710-3AA30-0AA0 switching unit



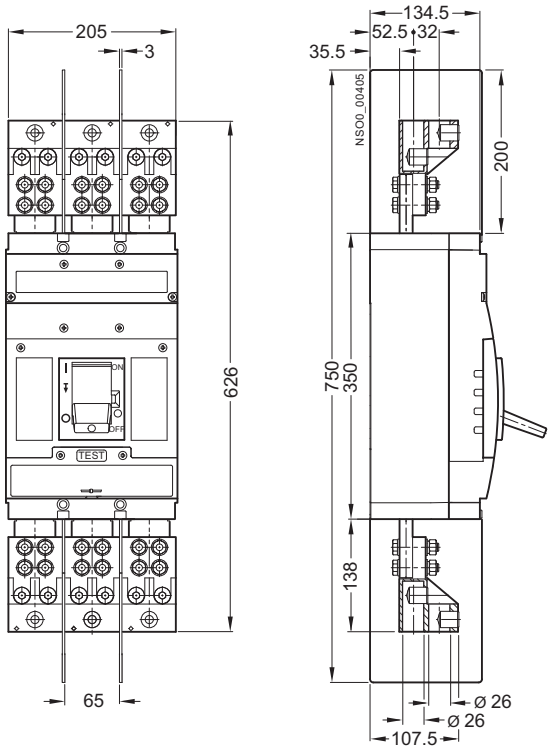
Fixed-mounted version, clamp type terminals (3VT9 524-4TG30 and 3VT9 524-4TF30 connecting sets)
- not for 3VT4 710-3AA30-0AA0 switching units



Fixed-mounted version, block type terminals (3VT9 532-4TF30)



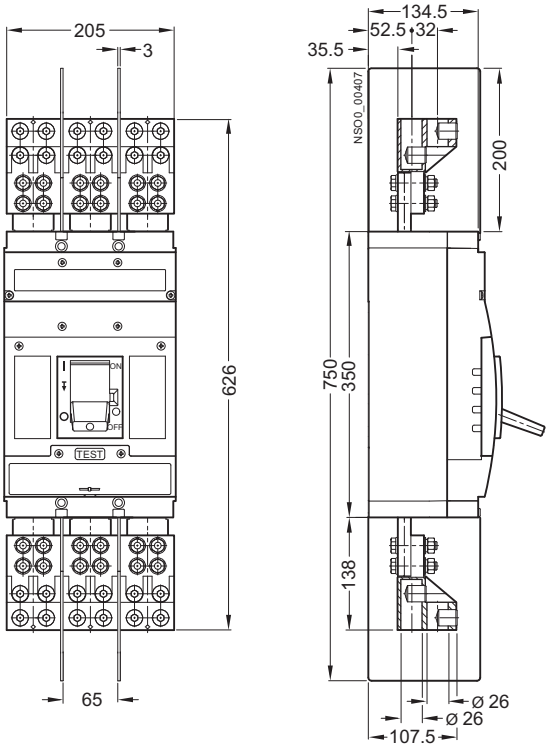
Fixed-mounted version, block type terminals (3VT9 533-4TF30)



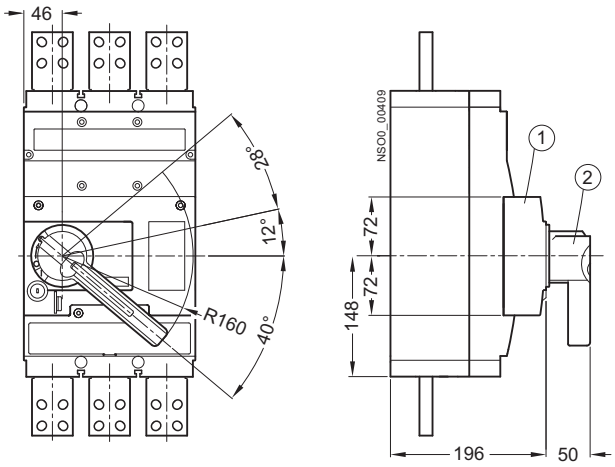
5

Dimensional drawings

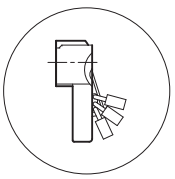
Fixed-mounted version, block type terminals (3VT9 534-4TF30)



Fixed-mounted version, front rotary operating mechanism



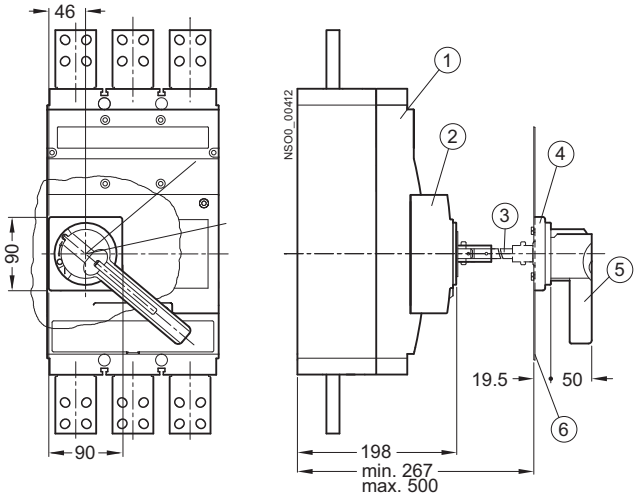
Knob - lockable
(3VT9 500-3HE10, 3VT9 500-3HF10)



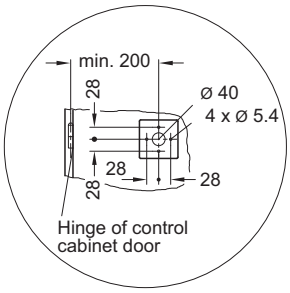
① 3VT9 500-3HA10
② 3VT9 500-3H.10

5

Fixed-mounted version, front rotary operating mechanism

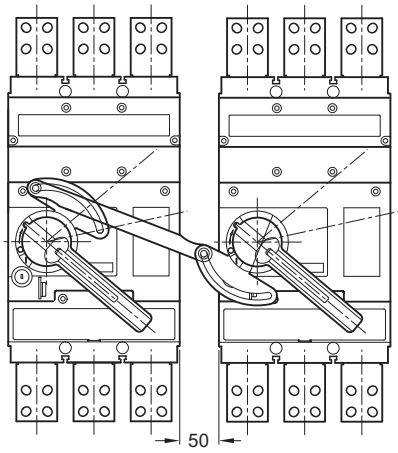


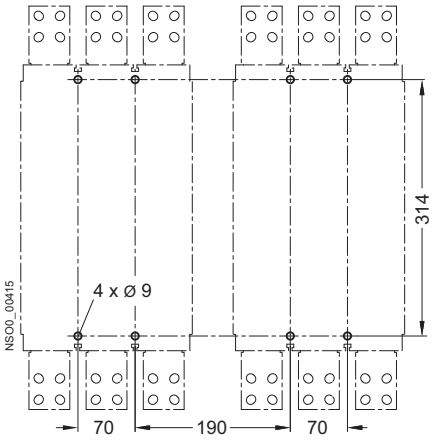
Cabinet door cut-out



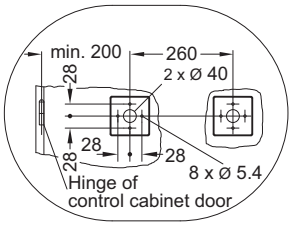
1. 3VT4/3VT5
2. 3VT9 500-3HA10
3. 3VT9 500-3HJ10
4. 3VT9 500-3HG.0
5. 3VT9 500-3H.10
6. Control cabinet door

3VT9 300-8LA00 mechanical interlock

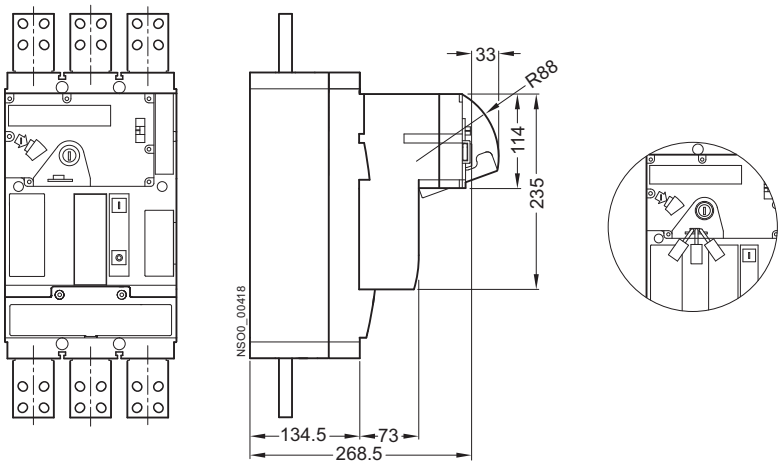




Cabinet door cut-out

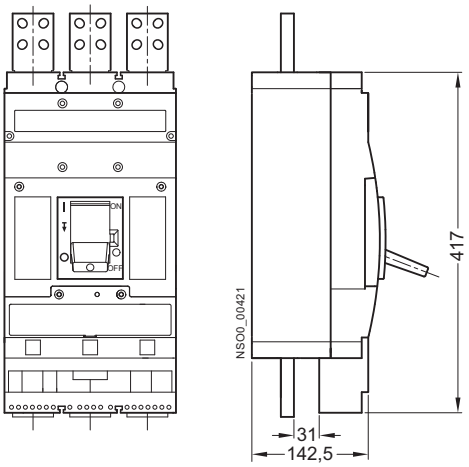


Fixed-mounted version, motorized operating mechanism 3VT9 500-3M..0, lockable with up to three padlocks



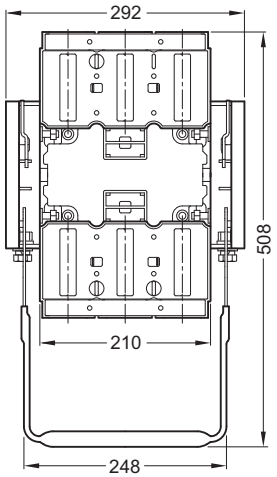
Dimensional drawings

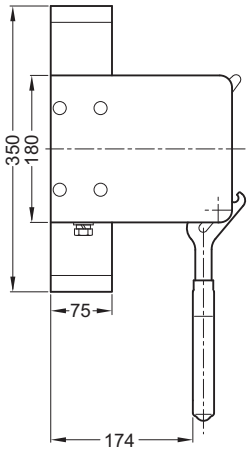
Fixed-mounted version, 3VT9 500-6AE00 signalling unit
Description see page 5/24.



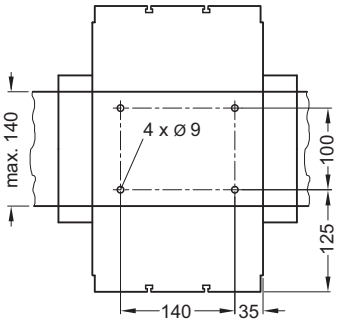
Dimensional drawings - withdrawable version

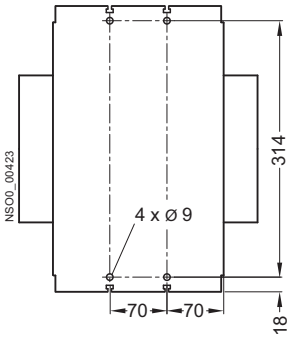
3VT9 500-4WA40 withdrawable version base



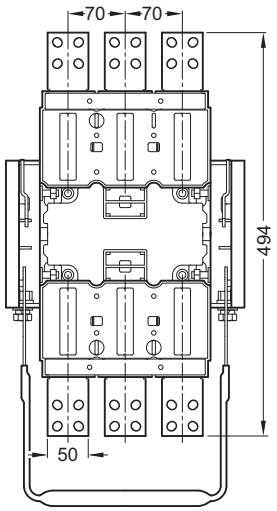


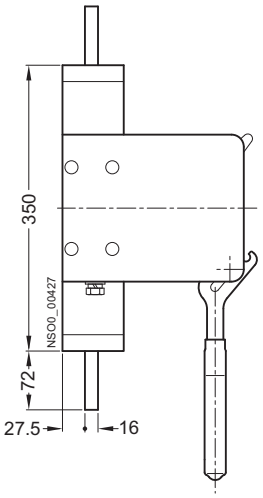
Drilling pattern

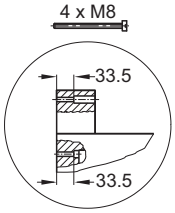




Withdrawable version, front connection (3VT9 500-4EF30 connecting sets)



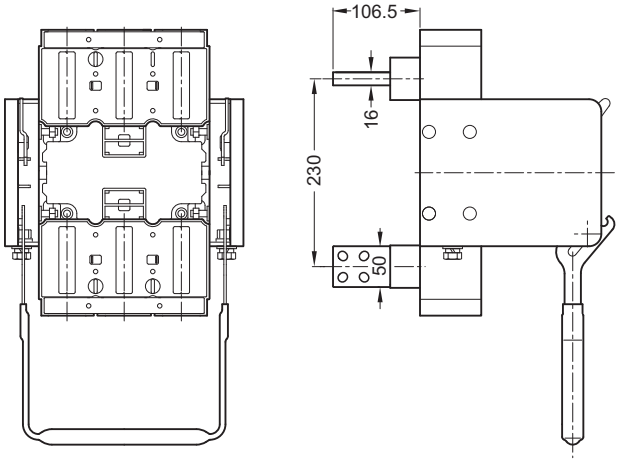




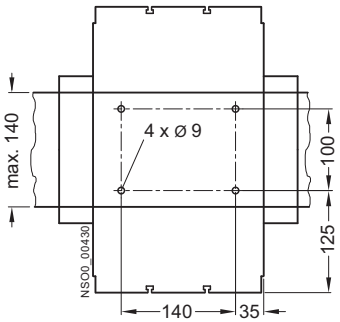
5

Dimensional drawings

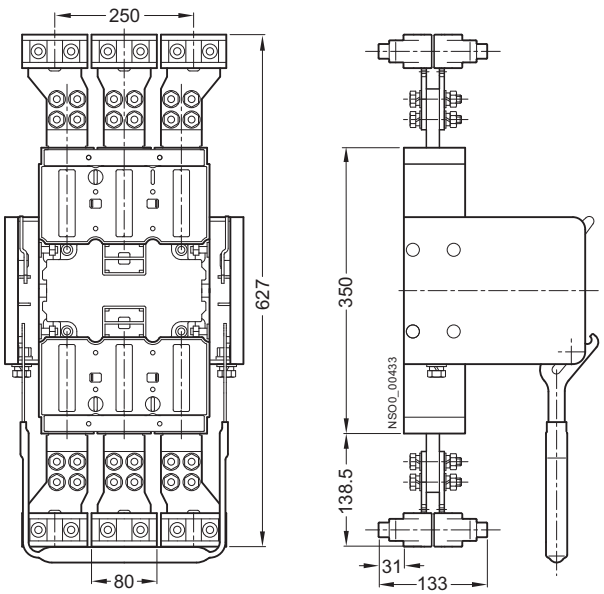
Withdrawable version, rear connection
(3VT9 500-4RC30 connecting set)



Drilling pattern



Withdrawable version, clamp type terminals (3VT9 524-4TG30 connecting set)



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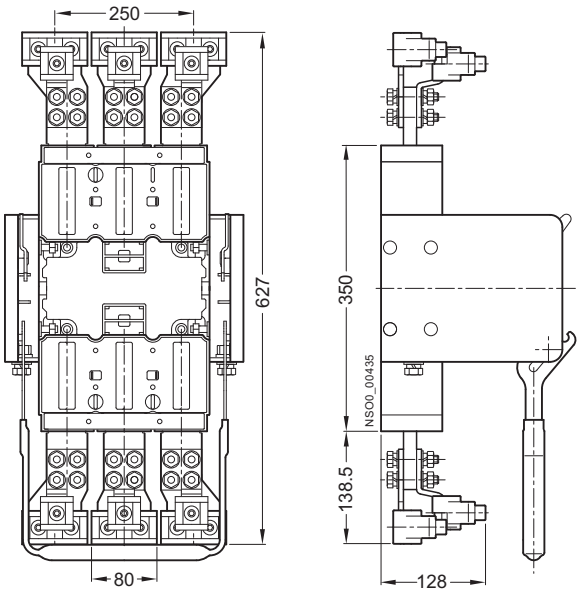
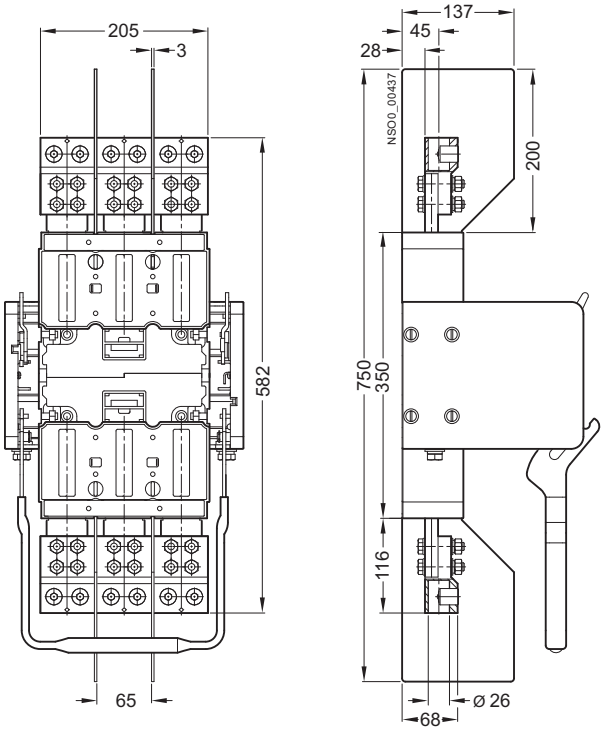
Withdrawable version, clamp type terminals (3VT9 524-4TG30 and 3VT9 524-4TF30 connecting set)

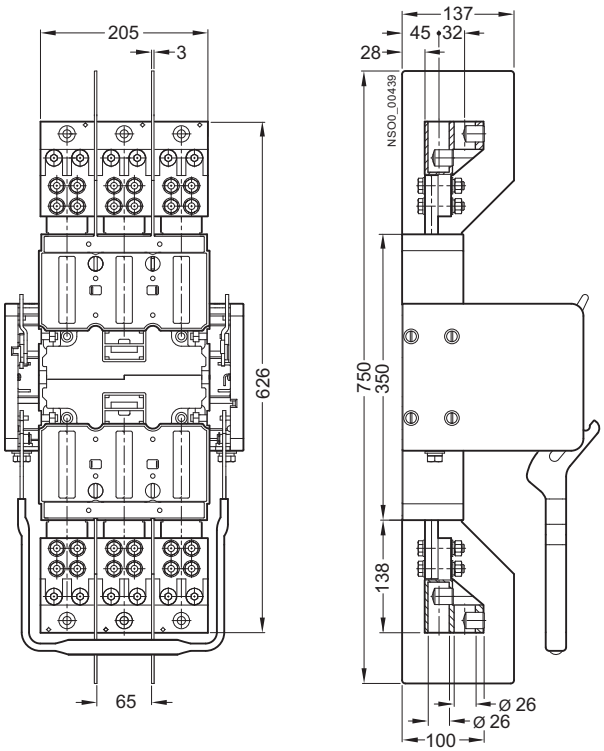


Withdrawable version, block type terminals (3VT9 532-4TF30)

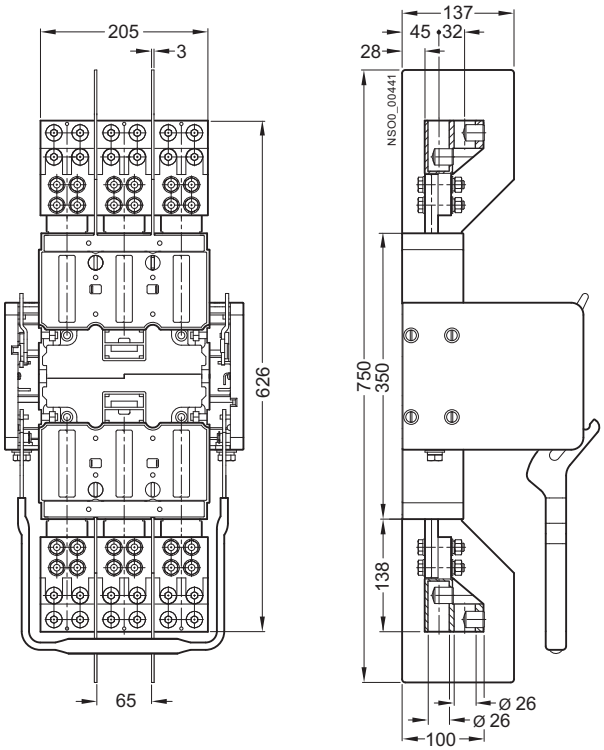


Dimensional drawings

Withdrawable version, block type terminals (3VT9 533-4TF30)



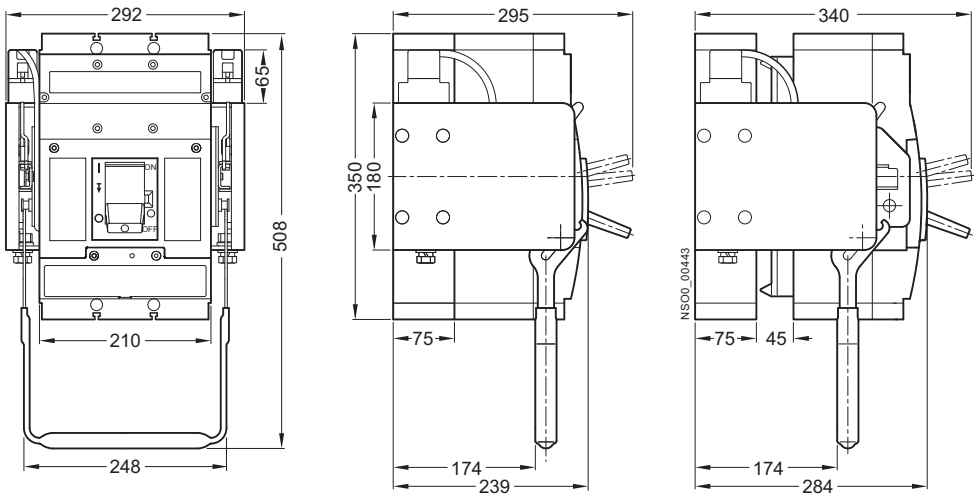
Withdrawable version, block type terminals (3VT9 534-4TF30)



Withdrawable version

Connected

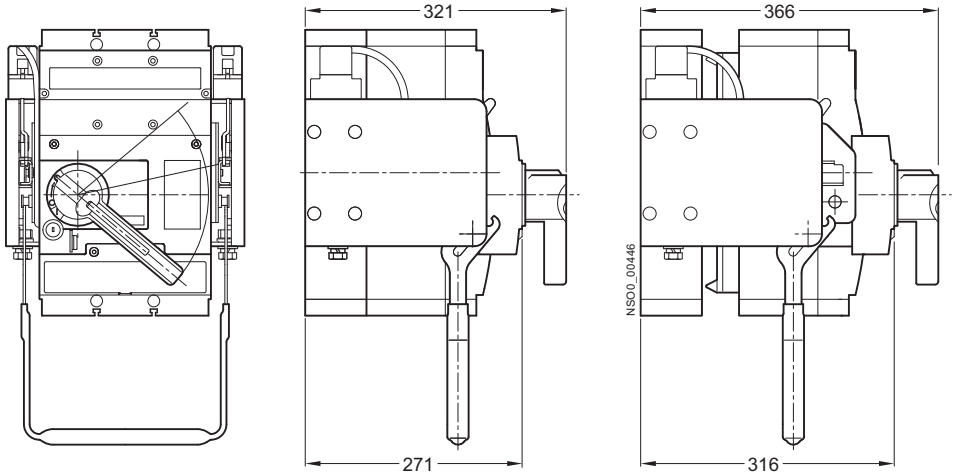
Disconnected



Withdrawable version, rotary operating mechanism

Connected

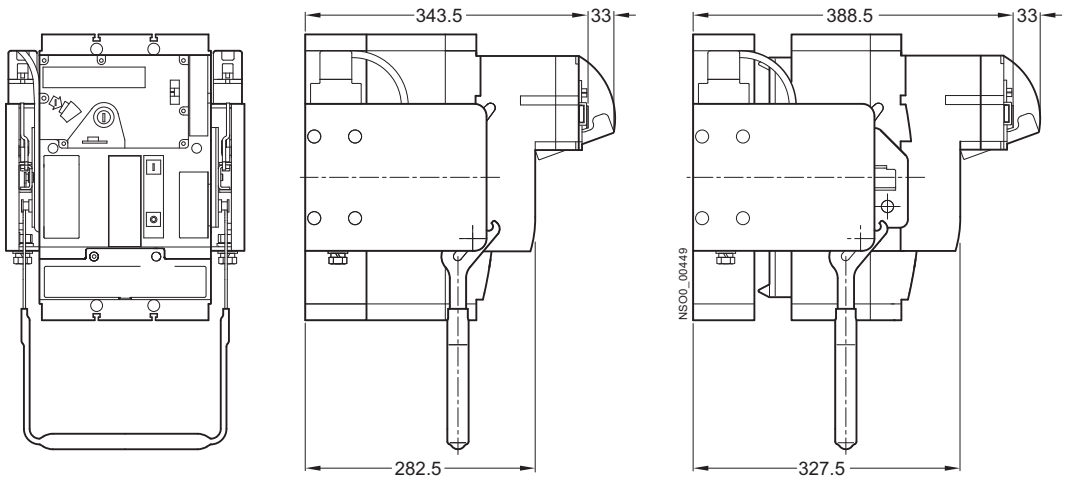
Disconnected



Withdrawable version, 3VT9 500-3MQ00 motorized operating mechanism

Connected

Disconnected



5

Notes

Notes

6 Appendix

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.

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 otherwise 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/support

- under Product List:
  - Technical specifications
- under Entry List:
  - Updates
  - Download
  - FAQ
  - Manuals
  - Characteristics
  - 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.

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-efficient and error-free. Please contact us if you want to benefit from these advantages.

Packaging, packing units

The packaging in which our equipment is dispatched provides protection against dust and mechanical damage during transport, thus ensuring that all our products arrive 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 Order No. (MLFB) and the number of items in the packaging, the Instr. Order 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 Order No. of most devices can also be acquired through the EAN barcode to simplify ordering and storage logistics.

The Order Nos. and EAN codes are assigned electronically in the master data of the products for low-voltage power distribution and electrical installation.

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 an € 20 supplement to cover our order processing and invoicing costs.

Overview

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.

Normal quantities of the products are usually delivered within the specified time following receipt of your order at our branch.

In exceptional cases, the actual delivery time may differ from that specified.

The delivery times apply up to the ramp at Siemens AG (products ready for dispatch).

The transport times depend on the destination and type of shipping. The standard shipping time for Germany is one day.

The delivery time classes specified here represent the state at 10/2010. They are permanently optimized. 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 (packaging size)

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 item to be delivered in a larger packaging quantity.

Examples:

PS/P. unit	Meaning
1 unit	You can order one item 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 produce the following delivery: two cartons, each containing 100 units (= 200 units) and 4 bags, each containing 5 units (= 20 units).

Weight

The defined weight is the net weight in kg and refers to the price unit (PU).

Examples

DT	Order No.	PS	Weight per PU approx.
			kg
B	**3VT2 725-2AA36-0AA0**	1 unit	2,840
B	**3VT2 725-3AA36-0AA0**	1 unit	2,840

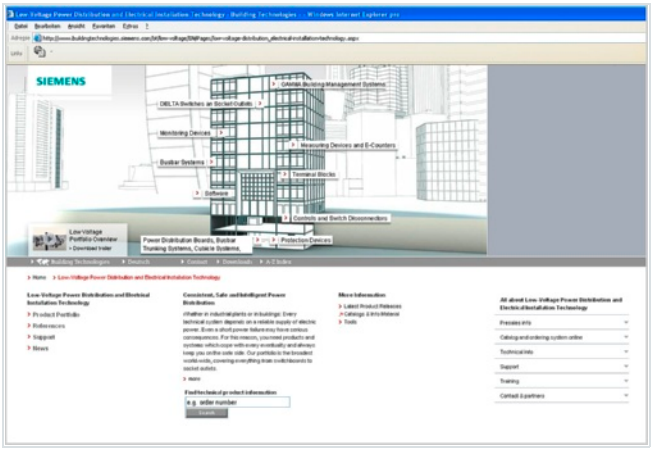
DT: B = one week
PS: The minimum order quantity is one unit

DT	Order No.	PS	Weight per PU approx.
			kg
B	**3VT9 300-8CE30**	1 unit	0,077
B	**3VT9 300-8CE00**	1 unit	0,050

DT: B = one week
PS: The minimum order quantity is one unit

Further documentation

Overview



We regard product support as just as important as the products and systems themselves.

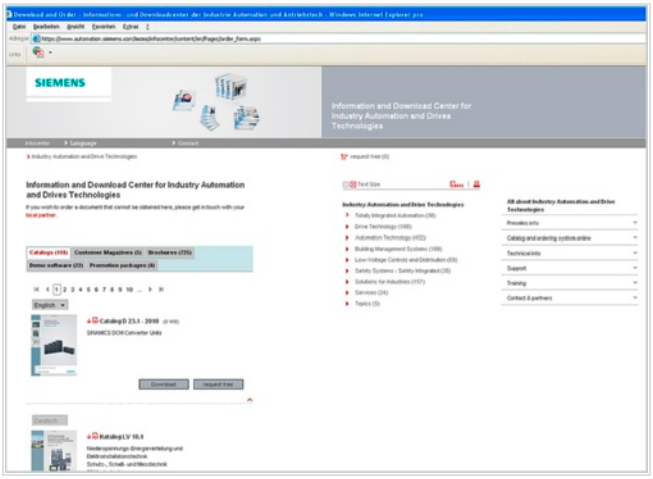
Visit our site on the Internet for a comprehensive offering of support for low-voltage power distribution and electrical installation products, such as

- 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, much more - all conveniently and easily accessible.

Address:

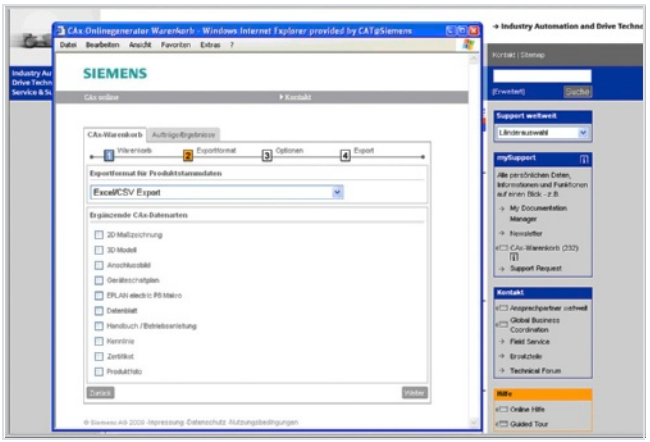
www.siemens.com/lowvoltage



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).



For your configuration systems we can provide technical and graphic data in electronic form for the range of low-voltage power distribution and electrical installation products:

CAx online generator

For the further processing of low-voltage power distribution and electrical installation products in CAE/CAD systems the online generator provides:

- Technical product master data in CSV and Excel format
- Graphic product data
  - 2D dimensional drawings in DXF format (other formats optional)
  - 3D models in STEP format
  - Internal circuit diagrams
  - EPLAN electric P 8 macros
- Documentation in the form of PDF files
  - Product data sheets
  - Manuals
  - Operating instructions
  - Characteristics
  - Certificates
- Product photos
- Texts for tenders in GAEB and Text format

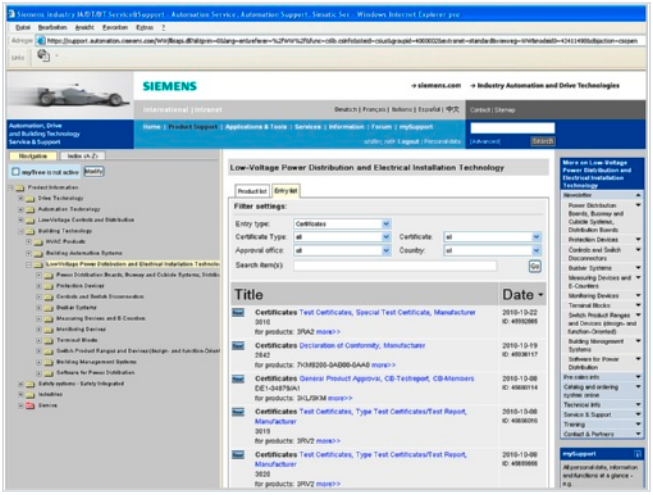
www.siemens.com/cax

Overview

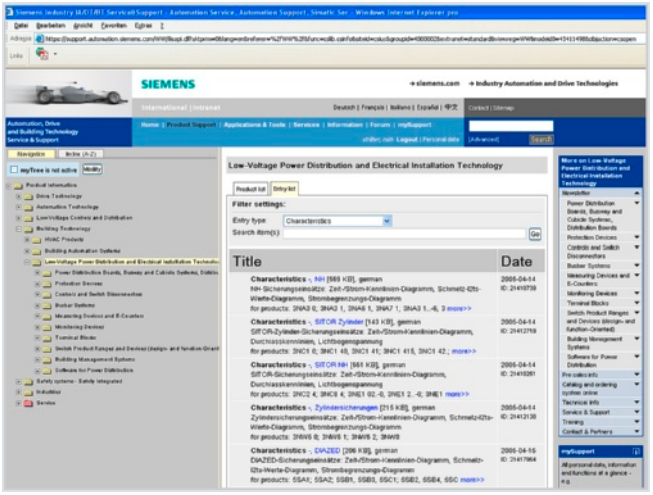
Approvals, test certificates, characteristic curves

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/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

Standards and approvals

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
			Installing electrical apparatus in potentially explosive gas atmospheres (except mining)
60079-2	60079-2	--	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

Quality management

The quality management system of our I BT LV 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
Industry Sector
Building Technologies Division

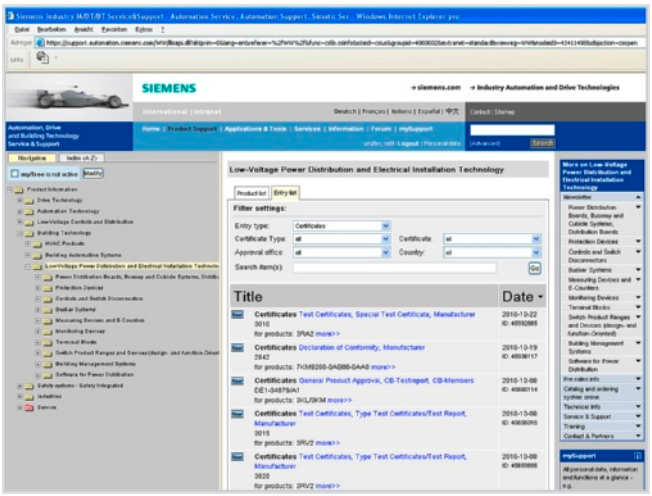
Low Voltage Distribution (I BT LV)
Reg. No.: 40017/QM/03.06

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/support

In the Entry List you can use the certificate type (general product approval, explosion protection, test certificates, shipbuilding,...) as a filter criterion.



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.

Testing bodies, approval identification and approval requirements

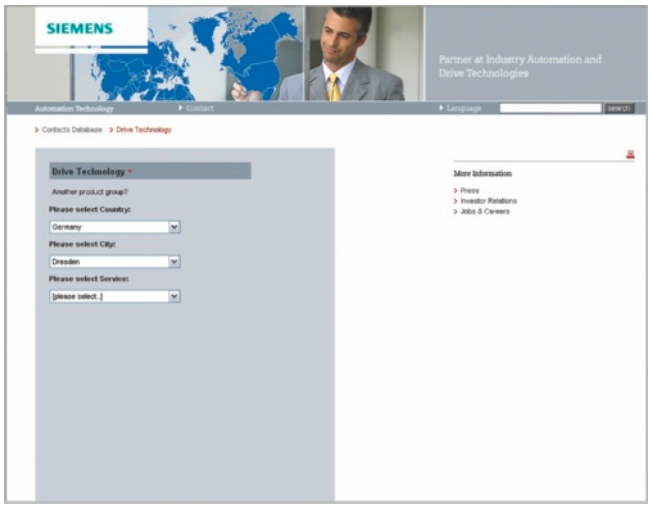
Country	Canada [1]	USA [1]	China
Government-appointed or private, officially recognized testing bodies	CSA UL (USA)	UL	CQC
Approval symbol	c UL c FM c FM US c UL US	UL FM c FM US c UL US	CCC
Approval requirements	+	+	+
Remarks	UL and CSA are authorized to grant approvals according to Canadian or US regulations. Please note: these approvals are frequently not recognized and additional approval often has to be obtained from the national testing authority.		CCC

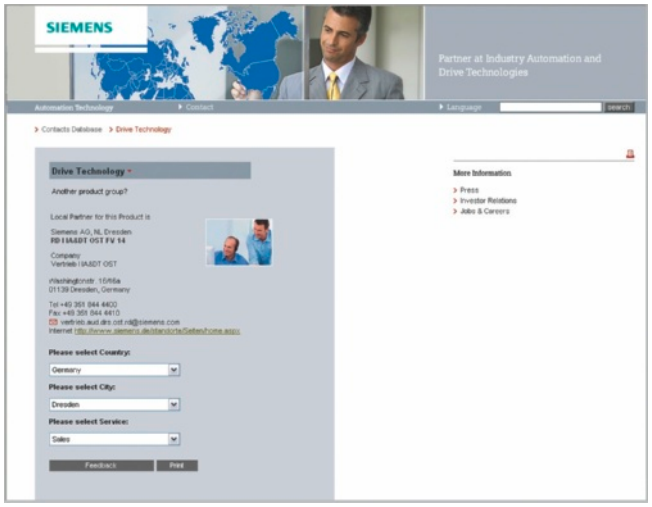
For more information about UL and CSA on request.

[1] For guide numbers and file numbers for the approvals, visit our website at www.siemens.com/lowvoltage/support

Siemens contacts

Contact partner 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 commitment, we continue to set new standards. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry range.

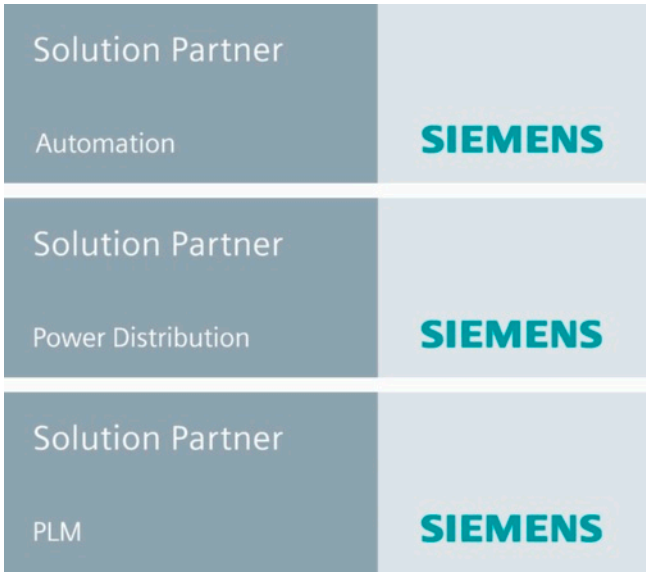
Your personal contact can be found in our Contacts Database at: www.siemens.com/automation/partner

You start by selecting a

- Product group,
- Country,
- City,
- Service.

6

Solution partners - Automation, Power Distribution and PLM



The products and systems from Siemens Industry Automation and Drive Technologies offer the ideal platform for all automation applications.

Under the name Siemens Solution Partner, selected system integrators operate around the world as uniformly qualified solution providers for the portfolio of Siemens automation, power distribution and product lifecycle management products. Day after day, they utilize their qualified product and system know-how as well as their excellent industry expertise to your advantage – for all requirements.

The Solution Partner emblem is a guarantee of quality.
The basis for this is to be found in four defined quality features:

- Solution quality:
  A good result in every case based on proven solution know-how.
- Expert quality:
  Certified technical competence guarantees maximum efficiency.
- Project quality:
  Straight to the goal with proven project experience.
- Product range quality:
  Comprehensive portfolio for state-of-the-art solutions from a single source.

Solution Partner Finder

The Siemens Solution Partner Program helps you to find the optimum partner for your specific requirements. Support is provided by the Solution Partner Finder, a comprehensive online database that showcases the profiles of all our solution partners. You can convince yourself of the competence of the respective Solution Partner by means of the references provided.

The following search criteria are possible:

- Country
- Technology
- Sector
- Company
- Zip code

Once you have located a partner, you are only one small step from contacting them.

You can locate the Solution Partner Finder as follows:

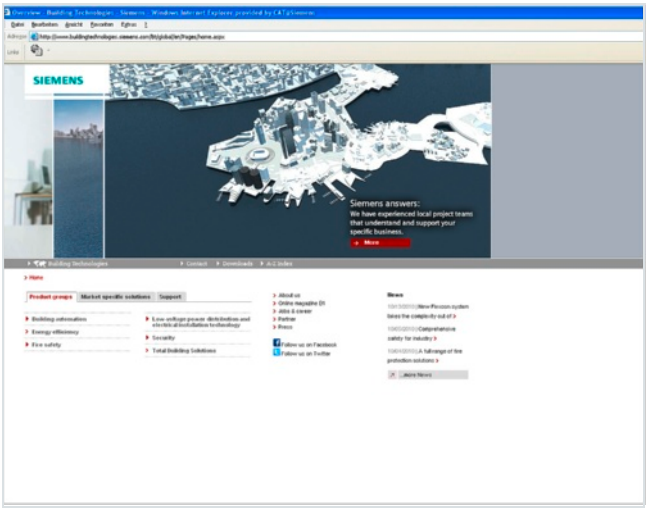
www.siemens.com/automation/partnerfinder

Additional information on the Siemens Solution Partner Program is available online at:

www.siemens.com/automation/solutionpartner

Information and ordering options available on the Internet and DVD

Siemens Building Technologies on the web



The Siemens Division Building Technologies offers the full range of products and solutions for secure and energy-efficient buildings and infrastructures – from building automation and heating, ventilation and air-conditioning systems (HLK) to fire protection, security, low-voltage power distribution and electrical installation technology.

Extensive information about all products, systems and services and support services is available in a compact and clear format on the Internet at:
www.siemens.com/buildingtechnologies

Product selection with the interactive catalog CA 01

Detailed information together with convenient interactive functions:

The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.

All information is linked into a user interface which is easy to work with and intuitive.

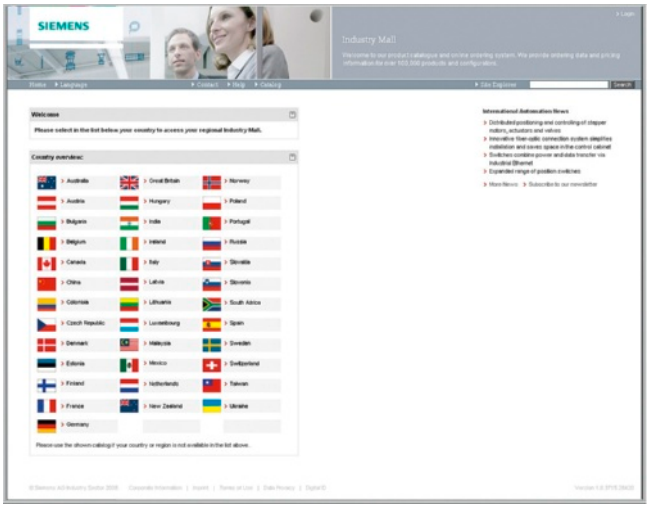
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under:

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the virtual department store of Siemens AG on the Internet. Here you have access to a huge range of products clearly and informatively presented in electronic catalogs.

Data transfer via EDIFACT allows the whole procedure, from selection over ordering through to order tracking, to be carried out online over the Internet.

A range of functions offer comprehensive support.

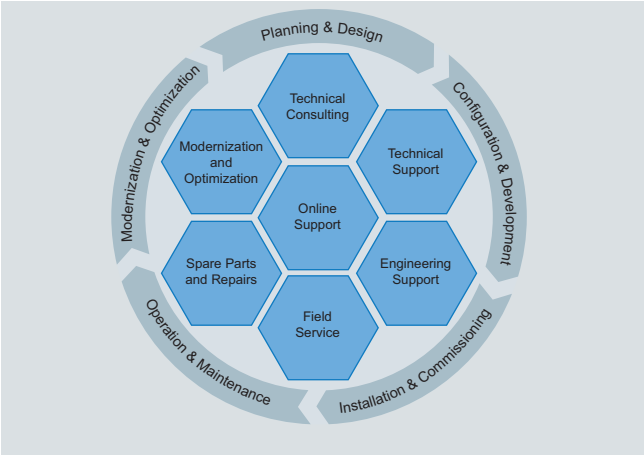
These include powerful search functions that make it easy to find the required products, which can then be immediately checked for availability. Customer-specific discounting and compilation of tenders are possible online, as is checking the status of your order (Tracking & Tracing).

You can find the Industry Mall on the Internet at:

www.siemens.com/industrymall

Service covering the entire life cycle

Overview



Our Service & Support are available worldwide to help you with every aspect of Siemens automation and drive technology. We offer on-site support for every phase of the life cycle of your machines and plants in more than 100 countries. Round the clock.

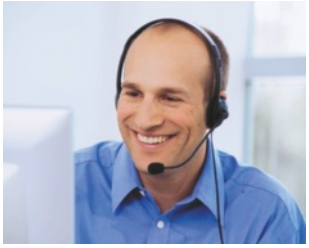
Every step of the way, you have access to an experienced team of specialists and their combined expertise. Thanks to regular training and the close cooperation of key employees around the globe, we are able to offer reliable services for a huge range of options.

Online Support

The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

www.siemens.com/lowvoltage/support

Technical Support



Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

www.siemens.com/lowvoltage/technical-support

Technical Consulting

Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.

Engineering Support

Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.

Field Service

With Field Service, we offer services for startup and maintenance essential for ensuring system availability.

Spare parts and Repais

In the operating phase of a machine or automation system, we offer comprehensive repair and spare parts services ensuring the highest degree of plant availability.

Modernization and Optimization

After startup or during the operating phase, additional potential for inceasing the productiviy or for reducing costs often arises. For this purpose, we offer you high-quality services in optimization and upgrading.

Contact information is available in the Internet at:
www.siemens.com/automation/partner

Comprehensive support from A to Z

Overview

In all issues for more efficiency - comprehensive support and access at any time to tried and tested tools, quickly and easily via the Internet.

Product information	
Website	Fast and targeted information about low-voltage power distribution: www.siemens.com/lowvoltage
Newsletter	Always up to date about our forward-looking 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/industrymall
Product- & System-Engineering	
SIMARIS Software tools	Support in planning and configuration the electrical power distribution: www.siemens.com/simaris
Engineering software ALPHA SELECT	Simple and fast configuration for distribution boards and meter cabinets with products from the Siemens Industry Basket: www.siemens.com/alpha-select
Product documentation	
Service & support portal	Comprehensive technical information - from planning to configuration and operation: www.siemens.com/lowvoltage/support
CAx Data	Collation of commercial and technical master product data: www.siemens.com/cax
Image database	Collection of product photographs and graphics, such as dimensional drawings and internal circuit diagrams: www.siemens.de/lowvoltage/bilddb
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

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
- Trial 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.

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 device, 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 number of hours (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

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.

Factory license

With the Factory License the user has the right to install and use the software at one permanent establishment only. The permanent establishment is defined by one address only.The number of hardware devices on which the software may be installed results from the order data or the Certificate of License (CoL).

Certificate of license

The Certificate of License (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.

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).

Detailed explanations concerning license conditions can be found in the "Terms and Conditions of Siemens AG" or under
http://www.siemens.com/industrymall
(Industry Mall Online-Help System)

Subject index

Order number index

Order number index

Order number index

Terms and conditions of sale and delivery

Overview

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity/regional having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The General Terms of Payment as well as the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry shall apply.

For software products, the General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany shall apply.

For customers with a seat or registered office outside of Germany

The General Terms of Payment as well as the General Conditions for Supplies of Siemens Automation and Drives for Customers with a Seat or registered Office outside of Germany shall apply.

For software products, the General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany shall apply.

General

All dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, excluding packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges are added to the price of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.
The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1
  (for customers based in Germany)
- 6ZB5310-0KS53-0BA1
  (for customers based outside Germany)

or download them from the Internet:
www.siemens.com/industrymall
(Germany: Industry Mall Online Help System)

Export regulations

Our obligation to fulfill this agreement is subject to the proviso that the fulfillment is not prevented by any impediments arising out of national and international foreign trade and customs requirements or any embargos and/or other sanctions.

If you transfer goods (hardware and/ or software and/ or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you shall comply with all applicable national and international (re-) export control regulations.

If required to conduct export control checks, you, upon request by us, shall promptly provide us with all information pertaining to particular end customer, destination and intended use of goods, works and services provided by us, as well as any export control restrictions existing.

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "AL" not equal to "N" are subject to a European or German export authorization when being exported out of the EU.
ECCN	Export Control Classification Number Products marked other than "N" are subject to a re-export license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with "ECCN" not equal to "N" are subject to a US re-export authorization.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

Catalogs

Industry Automation, Drive Technologies and Low Voltage Distribution

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

	Catalog
Interactive Catalog on DVD	
for Industry Automation, Drive Technologies and Low Voltage Distribution	**CA 01**
Drive Systems	
Variable-Speed Drives	
SINAMICS G110, SINAMICS G120 Standard Inverters SINAMICS G110D, SINAMICS G120D Distributed Inverters	D 11.1
SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S120 Chassis Format Units and Cabinet Modules SINAMICS S150 Converter Cabinet Units	D 21.3
SINAMICS DCM Converter Units	D 23.1
Three-phase Induction Motors • H-compact • H-compact PLUS	D 84.1
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
PDF: *SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units*	*DA 22*
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
MOTOX Geared Motors	D 87.1
Automation Systems for Machine Tools SIMODRIVE • Motors • Converter Systems SIMODRIVE 611/POSMO	NC 60
Automation Systems for Machine Tools SINAMICS • Motors • Drive System SINAMICS S120	NC 61
Drive and Control Components for Hoisting Equipment	HE 1
Mechanical Driving Machines	
FLENDER Standard Couplings	MD 10.1
Low-Voltage Power Distribution and Electrical Installation Technology	
Protection, Switching, Measuring & Monitoring Devices	LV 10.1
Switchboards and Distribution Systems	LV 10.2
GAMMA Building Management Systems	ET G1
PDF: *DELTA Switches and Socket Outlets*	*ET D1*
SICUBE System Cubicles and Cubicle Air-Conditioning	LV 50
SIVACON 8PS Busbar Trunking Systems	LV 70

	Catalog
Motion Control	
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61
SINUMERIK 828D BASIC T/BASIC M, SINAMICS S120 Combi and 1FK7/1PH8 motors	NC 82
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22
Power Supply and System Cabling	
Power supply SITOP	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2
Process Instrumentation and Analytics	
Field Instruments for Process Automation	FI 01
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
Products for Weighing Technology	WT 10
Process Analytical Instruments	PA 01
PDF: *Process Analytics, Components for the System Integration*	*PA 11*
Safety Integrated	
Safety Technology for Factory Automation	SI 10
SIMATIC HMI/PC-based Automation	
Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC
SIMATIC Industrial Automation Systems	
Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
PDF: *Migration solutions with the SIMATIC PCS 7 Process Control System*	*ST PCS 7.2*
SIMATIC NET	
Industrial Communication	IK PI
SIMATIC Sensors	
Sensor Technology for Factory Automation	FS 10
Industrial Identification Systems	ID 10
SINVERT Photovoltaics	
Inverters and Components for Photovoltaic Installations	RE 10
SIRIUS Industrial Controls	
SIRIUS Industrial Controls	IC 10
SIRIUS Industrial Controls (selected content from catalog IC 10)	IC 90
System Solutions	
Applications and Products for Industry are part of the interactive catalog CA 01	

PDF: *These catalogs are only available as pdf files.*

Download-Center

PDF versions of the catalogs are available on the Internet at:
www.siemens.com/buildingtechnologies/infocenter

Siemens AG
Industry Sector
Building Technologies Division
Low Voltage Distribution
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