3VT Molded Case Circuit Breakers up to 1600 A

Catalog LV 36 · 2008

Circuit Breakers

www.siemens.com/lowvoltage

SIEMENS

Related catalogs

Contents

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Order No.:
Catalog LV 1
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Systems • Controlgear: Contactors and contactor assemblies, solid-state switching devices • Protection equipment • Load feeders, motor starters and soft starters • Monitoring and control devices • Detecting devices • Commanding and signaling devices • Transformers • Power supplies • Planning and configuration with SIRIUS • Power Management System • SIVACON Power, distribution boards, busway and cubicle systems • SENTRON switching and protection devices for power distribution • Air circuit breakers, molded case circuit breakers, switch disconnectors • Software for power distribution• BETA low-voltage circuit protection

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Controls and Components
for Applications according to UL
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LV 16

SIRIUS 3RV17 and 3RV18 circuit breakers according to UL 489 • SIVACON Components for 8US Distribution Systems according to UL 508A • SENTRON 3WL5 air circuit breakers/non-automatic air circuit breakers according to UL 489/IEC • SENTRON 3VL Molded Case Circuit Breakers according to UL 489/IEC • ALPHA Devices according to UL Standard • BETA Devices according to UL standard

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LV 50

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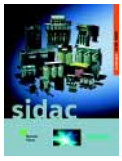
Cubicle solutions in applications • Cubicle air-conditioning • Special colors

SIDAC
Reactors and Filters
Order No.:
E86060-K2803-A101-A4-7600
LV 60



Commutating reactors for converters • Mains reactors for frequency converters • Iron-core output reactors • Ferrite output reactors • Iron-core smoothing reactors • Smoothing air-core reactors • Filter reactors • Application-specific reactors • Radio interference suppression filters • dv/dt filters • Sinewave filters

SIVACON 8PS
CD-K, BD01, BD2
Busbar Trunking Systems
up to 1250 A
Order No.:
E86060-K1870-A101-A3-7600
LV 70

Busbar trunking systems, overview • CD-K system (25 A to 40 A) • BD01 system (40 A to 160 A) • BD2 system (160 A to 1250 A)

Automation & Drives
The A&D Offline Mall
CD-ROM:
E86060-D4001-A110-C6-7600
DVD:
E86060-D4001-A510-C6-7600
CA 01

All Automation and Drives products, including those in the catalogs listed above.

A&D Mall
Internet:
http://www.siemens.com/automation/mall

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Catalog-PDF
Internet:
http://www.automation.siemens.com/cd

All catalogs for low-voltage controls and distribution can be downloaded as PDF files.

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Further information about low-voltage controls is available on the Internet at:
http://www.siemens.com/lowvoltage

Circuit Breakers

3VT Molded Case Circuit Breakers up to 1600 A

Catalog LV 36 · 2008

Contact your local Siemens representative for further information

Explanations

Delivery times (DT)

►	Preferred type
A	2 working days
B	1 week
C	3 weeks
D	6 weeks
X	on request

Preferred types are available immediately from stock, i.e. 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 period may differ from that specified.

The delivery periods apply up to the ramp at Siemens AG (products ready for dispatch). The transport times depend on the destination and type of shipping.

The delivery times specified here represent the state of 11/2007. They are permanently optimized. Up-to-date information can be found at http://www.siemens.com/automation/mall.

Price units (PU)

The price unit defines the number of units (U) or meters (M) to which the specified price and weight apply.

For price unit please refer to price list.

Packaging sizes (PS)

The packaging size defines the number, e.g. of units or meters, for outer packaging.

Only the quantity defined by the packaging size or a multiple thereof can be ordered!

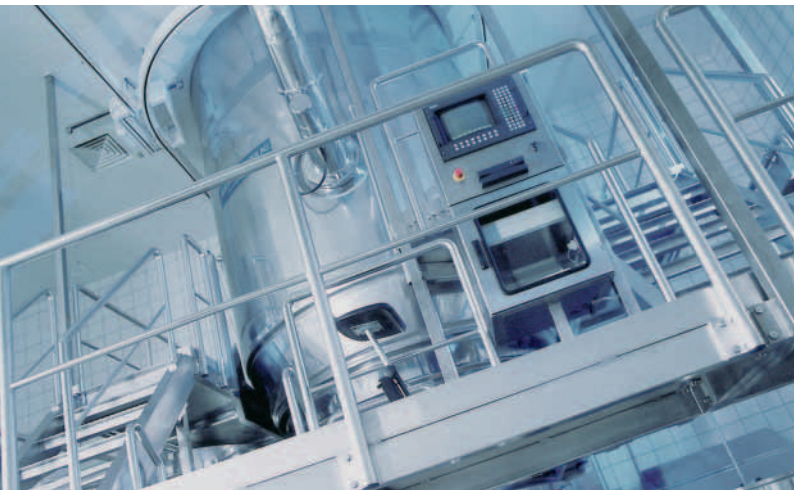
Weight

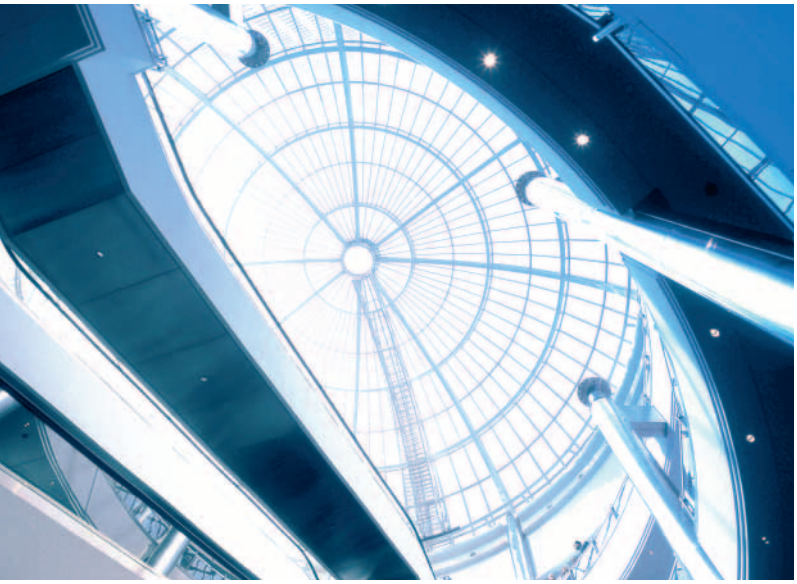
The defined weight in kg refers to the price unit (PU).

Dimensions

All dimensions in mm.

Introduction





Answers for Industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.

Low-Voltage Controls and Distribution. The basis for progressive solutions.

Extremely high demands are made on modern low-voltage controls and distribution: users want cost-effective solutions that are easy to integrate in control cabinets, distribution boards and distributed systems and can communicate perfectly with each other. Siemens has the answer: SIRIUS industrial controls and low-voltage power distribution with Power Management, SIVACON and SENTRON.

SIRIUS industrial controls

The SIRIUS range has everything you need for switching, protecting and starting loads. Products for monitoring, control, detection, commanding, signaling and power supply round off the spectrum of industrial controls.

Combined with Totally Integrated Automation, Safety Integrated and ECOFAST, our product portfolio can be bundled to create optimized systems. All in all, Siemens provides innovative controls with modern features, such as integrated communication and safety technology that work to your advantage: The basis for groundbreaking integrated solutions.

SIRIUS

SENTRON

SIVACON

Low-voltage power distribution with Power Management, SIVACON and SENTRON

Non-residental buildings and industrial plants have one thing in common: without electricity, everything comes to a halt. The availability, safety and cost effectiveness of the power distribution system is of utmost importance – from the medium voltage supply point through to the socket outlet. And only integrated solutions can ensure maximum efficiency for planning, configuration and operation.

The concept is called Totally Integrated Power from Siemens. Total integration in planning and configuration creates synergies and saves costs. Perfectly matched products and systems provide efficient engineering and reliable operation.

Notes

3VT1 Molded Case
Circuit Breakers up to 160 A

2

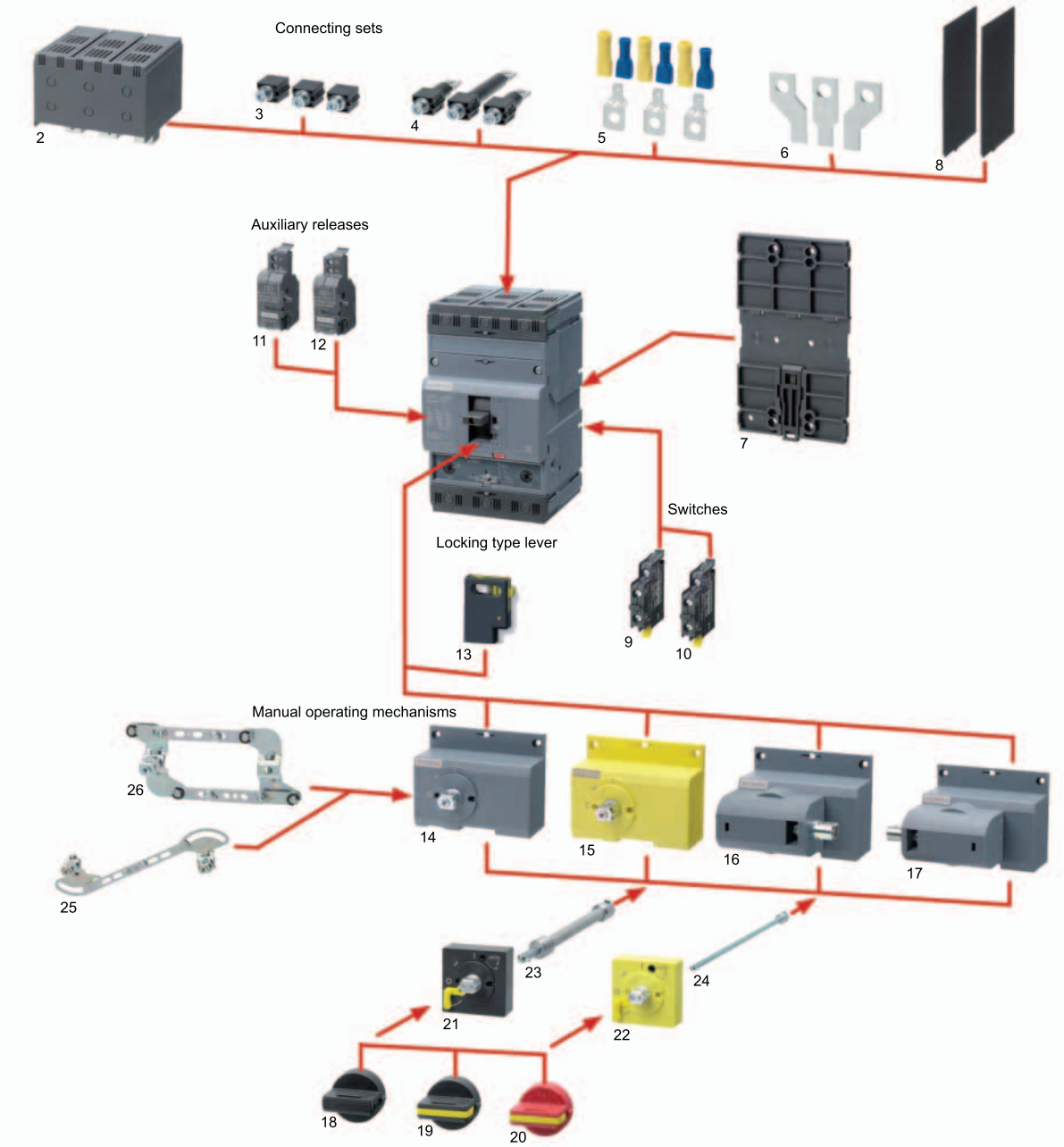
Catalog

Technical Information

General data

Overview

Versions and accessories



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

Overview

Circuit breakers

Circuit breakers, 3-pole version

The 3-pole version of the circuit breakers consits pf:
- 2 connecting sets for connecting Cu/Al cables[1] with cross-sections of 2.5 ... 95 mm^2
  (these terminals are fitted to the circuit breaker)
- 3VT9 100-8CE30 phase barriers
- A set of two mounting bolts (M3 x 30)
- A conductor holder

Characteristic M (motor): motor protection

Circuit breakers, 4-pole version

The 4-pole version of the circuit breakers consists of:
- 2 connecting sets for connecting Cu/Al cables[1] with cross-sections of 2.5 ... 95 mm^2
  (these terminals are fitted to the circuit breaker)
- 3VT9 100-8CE30 and 3VT9 100-8CE00 phase barriers
- 2 sets of two mounting bolts (M3 x 30)
- A conductor holder (installed in the circuit breaker)

Releases:

Characteristic L (line)
- Protecting lines with low starting currents
- Without I_r regulation

Characteristic D (distribution)
- Protecting lines and transformers

Characteristic N (only short-circuit release)
- Without I_r regulation

Switch disconnectors

Switch disconnectors, 3-pole version

The 3-pole version of the switch disconnectors consits of:
- 2 connecting sets for connecting Cu/Al cables[1] with cross-sections of 2.5 ... 95 mm^2
  (these terminals are fitted to the switch disconnector)
- 3VT9 100-8CE30 phase barriers
- A set of two mounting bolts (M3 x 30)
- A conductor holder

Switch disconnectors, 4-pole version

The 4-pole version of the switch disconnectors consits of:
- 2 connecting sets for connecting Cu/Al cables[1] with cross-sections of 2.5 ... 95 mm^2
  (these terminals are fitted to the switch disconnector)
- 3VT9 100-8CE30 and 3VT9 100-8CE00 phase barriers
- 2 sets of two mounting bolts (M3 x 30)
- Conductor holder (installed in the switch disconnector)

Connection

When connecting the main circuit, the dimensions of the deionization space of the circuit breaker must be observed, depending on the type of connection (see pages 2/35 and 2/36).

[1] For other connection methods, use connecting parts (see page 2/9).

Selection and ordering data

Rated current I_n	Current setting of the inverse-time delayed overload release „L“ I_r	DT	Order No.	PS*	Weight per PU approx.
A	A				kg
Circuit breakers for system protection characteristic L					
					
TM, LI function, 3P					
• with fixed thermal overload release, fixed short-circuit release					
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, 3P+N, for unprotected conductors					
• with fixed thermal overload release, fixed short-circuit release					
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, 4P					
• with fixed thermal overload release, fixed short-circuit release					
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

*** You can order this quantity or a multiple thereof.**

Circuit breakers · Switch disconnectors

Rated current I_n	Current setting of the inverse-time delayed overload release „L“ I_r	DT	Order No.	PS*	Weight per PU approx.
A	A				kg
Circuit breakers for system protection characteristic D					
TM, LI function 3P					
• with adjustable thermal overload release, adjustable short-circuit release					
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 3P+N, for unprotected N-conductor					
• with adjustable thermal overload release, adjustable short-circuit release					
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, LI function 4P					
• with adjustable thermal overload release, adjustable short-circuit release					
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

*** You can order this quantity or a multiple thereof.**

Rated current I_n	Current setting of the short-circuit release „I“ I_i	DT	Order No.	PS*	Weight per PU approx.
A	A				kg
Circuit breakers only for short-circuit protection					
TM, I function, 3P					
• without overload release, with adjustable short-circuit release					
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, 3P+N, for unprotected conductors					
• without overload release, with adjustable short-circuit release					
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
TM, LI function, 4P					
• without thermal overload releases, adjustable short-circuit releases					
32	160 ... 320	B	**3VT1 703-2EG46-0AA0**	1 unit	1.336
40	200 ... 400	B	**3VT1 704-2EG46-0AA0**	1 unit	1.336
50	250 ... 500	B	**3VT1 705-2EG46-0AA0**	1 unit	1.336
63	315 ... 630	B	**3VT1 706-2EG46-0AA0**	1 unit	1.336
80	400 ... 800	B	**3VT1 708-2EG46-0AA0**	1 unit	1.336
100	500 ... 1000	B	**3VT1 710-2EG46-0AA0**	1 unit	1.336
125	625 ... 1250	B	**3VT1 712-2EG46-0AA0**	1 unit	1.336
160	800 ... 1600	B	**3VT1 716-2EG46-0AA0**	1 unit	1.336
Circuit Breakers for starter combinations characteristic M					
TM, LI function, 3P					
• with adjustable thermal overload releases, fixed short-circuit releases					
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					
Non-automatic molded case circuit breakers without overload release, without short-circuit release					
160	3-pole	B	**3VT1 716-2DE36-0AA0**	1 unit	1.043
160	4-pole	B	**3VT1 716-2EE46-0AA0**	1 unit	1.336

* You can order this quantity or a multiple thereof.

2

Overview

The circuit breakers can be equipped with

- auxiliary switches and
- alarm switches.

For remote switching, shunt releases can be built in.

Undervoltage releases can be used to protect motors and other equipment against damage in case of undervoltage.

Selection and ordering data

Rated control supply voltage U_S/ Frequency	DT	Order No.	PS*	Weight per PU approx.
AC 50/60 Hz/DC				kg
Auxiliary switches and alarm switches				
 **Auxiliary switches for signaling 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 signaling the tripping of the circuit breaker by an overcurrent release**				
• 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 releases				
 • 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 releases				
 • 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** **on req.**		
• DC 110, 220 V	B	**3VT9 100-1UV00** **on req.**		
• DC 220 V	B	**3VT9 100-1UW00** **on req.**		

* You can order this quantity or a multiple thereof.

Selection and ordering data

Manual operating mechanisms

The rotary operating mechanism is to be completed:

- For simple rotary operation of the switch unit:
  - 3VT9 100-3HE../HF.. knob
- For operating through the switchgear cabinet door:
  - 3VT9 100-3HE../HF.. knob
  - 3VT9 100-3HG../HH.. coupling driver
  - 3VT9 100-3HJ.. extension shaft,
- For rotary operating mechanism for 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 is to be completed:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanisms (cannot be used with rotary operating mechanism for lateral operation)
  - 2 x 3VT9 200-3HE/HF.. knobs (standard) or 1 x 3VT9 200-3HE/HF.. knob (parallel switching)

	Version	Color	DT	Order No.	PS*	Weight per PU approx.
						kg
Manual operating mechanisms						
	Rotary operating mechanism					
	• locking not possible	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 left side, locking not possible	gray	B	**3VT9 100-3HC10**	1 unit	0.137
	• for lateral operation, mounted on right side, locking not possible	gray	B	**3VT9 100-3HD10**	1 unit	0.137
	Knob					
	• locking not possible	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					
	Is used with the 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
	Is used in with the 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, may be shortened		B	**3VT9 100-3HJ10**	1 unit	0.113
	• lenght 199 ... 352 mm, telescopic		B	**3VT9 100-3HJ20**	1 unit	0.092

* You can order this quantity or a multiple thereof.

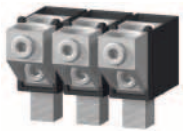
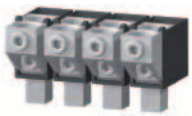
Manual/motorized operating mechanisms

	Version	Color	DT	Order No.	PS*	Weight per PU approx.
						kg
Mechanical interlocks						
	The mechanical interlocks have to be completed with: • 2 x 3VT9 100-3HA../HB.. rotary operating mechanisms • 1 or 2 x 3VT9 100-3HE/HF.. knobs					
	**Mechanical interlocking**		B	**3VT9 100-8LA00**	1 unit	0.089
	**Mechanical interlocks for parallel switching**		B	**3VT9 100-8LB00**	1 unit	0.109

	Rated control supply voltage U_s/ Frequency	DT	Order No.	PS*	Weight per PU approx.
	AC 50/60 Hz/DC				kg
Motorized operating mechanisms					
	**Lateral motorized operating mechanisms**				
	• 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

	Version	Conductor cross-sections S	Type of connection	DT	Order No.	PS*	Weight per PU approx.
		mm^2					kg
Terminals for fixed-mounted circuit breakers							
	Connecting set for 3-pole version						
	**Terminals for front connection**	--	Cu/Al busbars, cable lugs	B	**3VT9 100-4TA30**	1 unit	0.045
 	**Terminals for circular conductors** Terminal cover, degree of protection IP20, is Included in the scope of supply	2 x 25 ... 120	Cu/Al cable	B	**3VT9 100-4TF30**	1 unit	0.180
	**Terminals for rear connection**		Cu/Al busbars, cable lugs	B	**3VT9 100-4RC30**	1 unit	0.320
	**Isolating 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						
	**Terminals for front connection** 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** Terminal cover, degree of protection IP20, is included in the scope of supply	2 x 25 ... 120	Cu/Al cable	B	**3VT9 100-4TF40**	1 unit	0.250
	**Terminals for rear connection** 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
	**Isolating 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

2

* You can order this quantity or a multiple thereof.

Mounting accessories

Selection and ordering data

	Version	Conductor cross-sections *S*	Connection	DT	Order No.		PS*	Weight per PU approx.
		mm²						kg
Accessories								
	3-pole version							
	**Phase 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 2/35.			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 knob** • Enables locking of circuit breaker or switch disconnector in „switched off manually“ position • Locking is possible using padlock with a shank diameter of up to 3 ... 4 mm.				**3VT9 100-8HL00**	on req.		
	4-pole version							
	**Phase barriers 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 2/36.			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 cables for motorized operating mechanisms**			B	**3VT9 100-3MF00**		1 unit	0.100
Mounting adapters								
	3-pole version							
	**For mounting on a 35 mm standard mounting rails** For dimensions, see page 2/44.			B	**3VT9 100-4PP30**		1 unit	0.050

* You can order this quantity or a multiple thereof.

Design

Installation and connection

Main circuit

- Is connected, using Cu or Al busbars, cables, and possibly cables with cable lugs.
- For further connecting options, connecting sets can be used (see page 2/9).
- 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). 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 be fitted with 3VT9 100-8CE30 phase barriers also on the side of terminals 2, 4, 6 (see pages 2/35 and 2/36).
- 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 way of connecting the power circuit must observe the deionization space of the circuit breaker/switch disconnector (see pages 2/35 and 2/36).

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 releases or undervoltage releases are connected directly 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	Technical information
		Sector-shaped conductor, stranded	Sector-shaped conductor, solid	Round conductor, stranded	Round conductor, solid		
	A	mm²	mm²	mm²	mm²	mm	
3-pole							
3VT9 100-4TF30	160	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120		pg. D17
3VT9 100-4TA30	160					16	
3VT9 100-4RC30	160					16	pg. D18
3VT9 100-4TN30	10/16	1,5 ... 2,5/4 ... 6				--	--
3VT9 100-4ED30	160					30	pg. D18
4-pole							
3VT9 100-4TF40	160	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120	2 x 25 ... 120		pg. 12
3VT9 100-4TA00	160					16	
3VT9 100-4RC00	160					16	pg. 13
3VT9 100-4TN00	10/16	1,5 ... 2,5/4 ... 6					

Technical specifications

Specifications Order No. Number of poles		3VT1 7..-2..36-0AA0 Circuit Breakers 3	3VT1 716-2DE36-0AA0 Switch disconnectors	3VT1 7..-2..46-0AA0 Circuit Breakers [3] 4	3VT1 716-2EE46-0AA0 Switch Disconnectors
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. AC 690 max. AC 440	
Rated frequency f_n	Hz	50/60			
Rated impulse withstand voltage U_{imp}	kV	8			
Rated insulation voltage U_i	V	690			
Utilization category • selectivity AC 690 V • switching mode		 A AC-3 (16 ... 100 A) AC-2 (100 ... 160 A)	 -- AC-23 A	 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	--	13kA/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	--	13kA/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 2/14	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	Hz	3g (8 ... 50)			
Design modifications					
Front/rear connection		✔/✔			
Plug-in version		--			
Withdrawable version		--			
Accessories					
Switches - auxiliary/relative/signal/leading		✔/–/✔/–			
Shunt trip/with signal switch		✔/✔			
Undervoltage release/with leading switch/with signal 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.

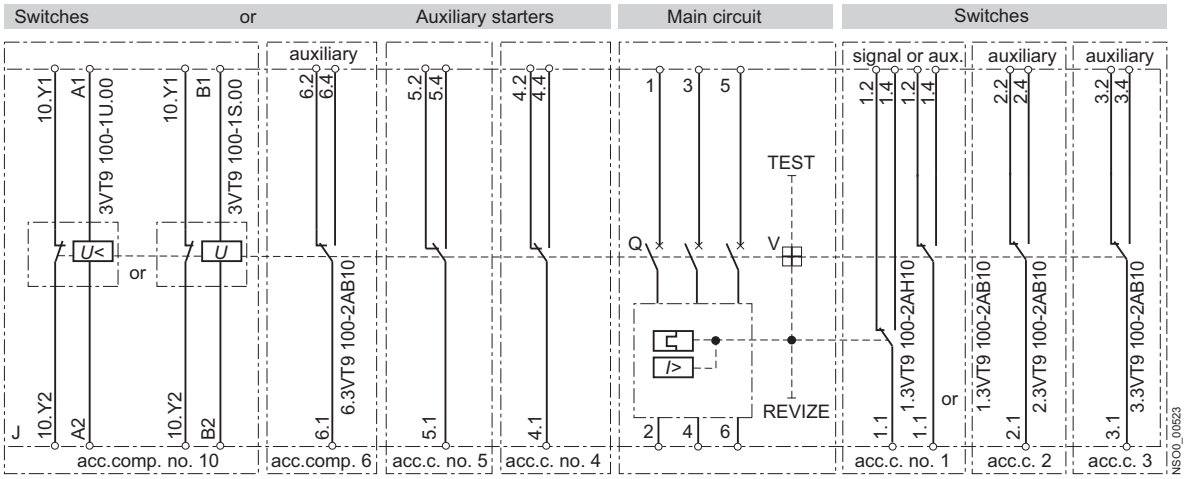
[2] Ranges of rated currents vary according to characteristics, see page 2/16.

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

Schematics

Circuit breakers with accessories

3-pole version



Explanations

J	circuit breaker
Q	main contacts
V	trip-free mechanism
N	overcurrent release
TEST	TEST push button
INSPECTION	INSPECTION push button
3VT9 100-1U.00	undervoltage release
3VT9 100-1S.00	shunt trip

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

Buttons

TEST pushbutton: By pressing this pushbutton, the circuit breaker/switch disconnector is switched off and the auxiliary switches are actuated.

REVISION pushbutton: By pressing this pushbutton, the tripping of the circuit breaker by an overcurrent release is simulated. This procedure also simulates the actuation of the auxiliary switches and signaling switches. For pressing the pushbutton, a suitable instrument – such as a wire with a diameter of about 1 mm – is needed.

Operator panel

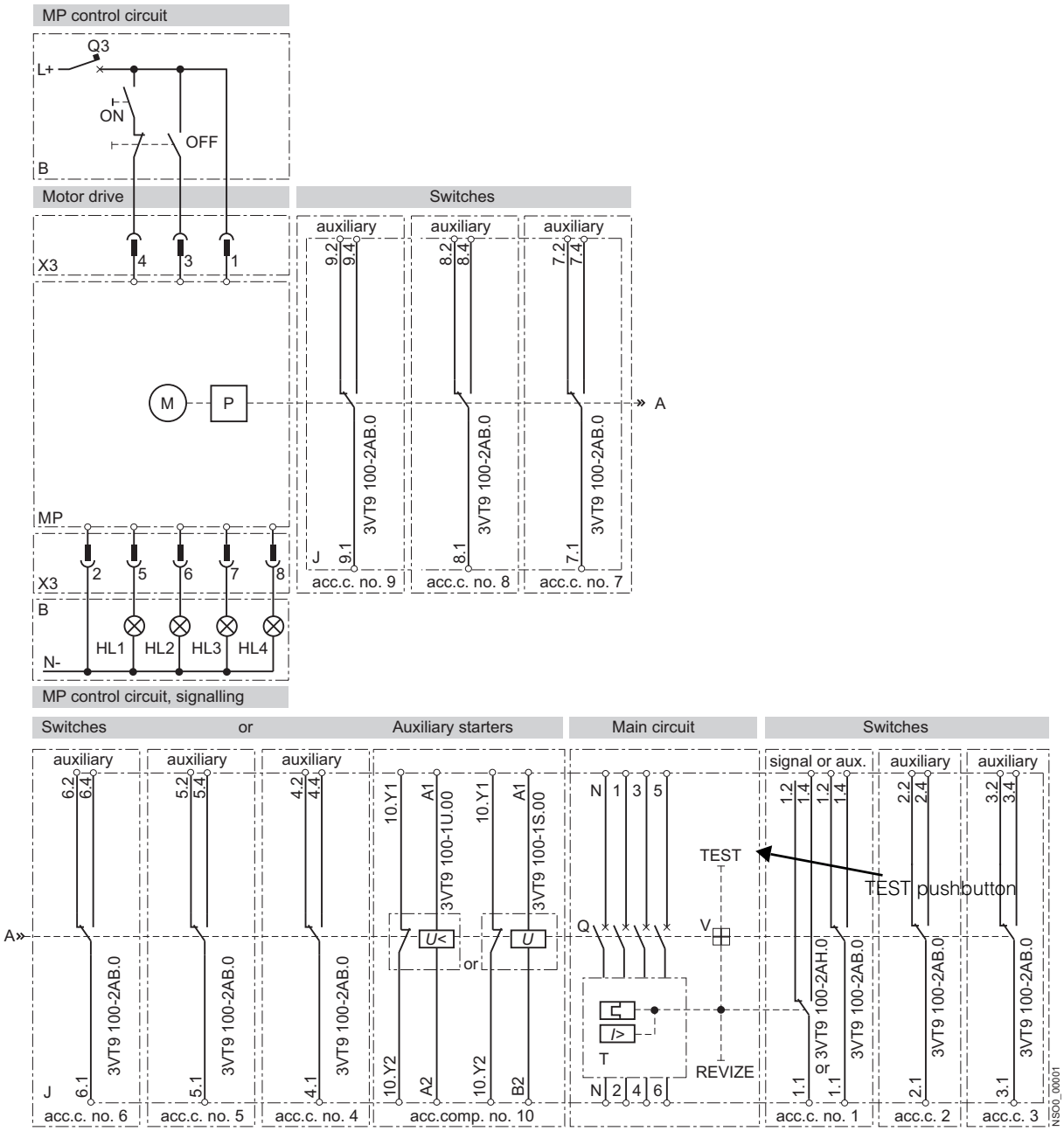
Indication of circuit breaker tripping

After the circuit breaker has been switched off by the overcurrent release, the following symbol will be displayed: „ “

Circuit breakers · Switch disconnectors

2

4-pole version



Explanations

MP	3VT9 100-3M.00 motorized operating mechanism
M	motor
P	gearbox
X3	connector for connection of control and signaling circuits
B	recommended connection of control circuits - is not part of MP
ON	pushbutton
OFF	pushbutton
Q3	motorized operating mechanism for the circuit breaker (see page 22)
J	3VT1 circuit breakers
Q	main contacts
T	thermomagnetic overcurrent release 3P+N (3 poles protected, N-pole unprotected) 4P (all four poles protected)
V	trip-free mechanism

TEST	release test pushbutton
REVIZE	release revision pushbutton
3VT9 100-1U.00	undervoltage release
3VT9 100-1S.00	shunt trip
HL1	remote failure signalling (unreliable making or breaking), max. permissible load10 W[1)]
HL2	signalling of circuit breaker lever „wound up“ position, max. permissible load 10 W[1)]
HL3	signalling of opening of the front safty cover of the drive, max. permissible load 10 W[1)]
HL4	signalling of extension of the drive locking bar, max. permissible load 10 W[1)]

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

Characteristics

Overcurrent releases, 3-pole version

Overcurrent releases are integrated in circuit breakers. Releases cannot be demounted and exchanged.

Tripping characteristics

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

„L“ - lines
Protecting lines with low starting currents

„D“ - distribution
Protecting lines and transformers

„M“ - motor
Motor protection

„N“ - short-circuit release only

- 3VT1 circuit breakers with characteristic **„L“** have a given and fixed rated current value. The circuit breakers are produced with I_n values in a standardized current range from 40 A to 160 A (see „Ranges of overcurrent releases and their possible settings“). Short-circuit releases are fixed at 4 x I_n.
- 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 are produced with I_n values in a standardized current range from 16 A to 160 A (see „Ranges of overcurrent releases and their possible settings“). The short-circuit release is adjustable.
  Setting values are given in the table on page 2/16.
- 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 are produced with I_n values in a standardized series of currents from 16 A to 100 A (see „Ranges of overcurrent release and their possible setting“). The short-circuit release is fixed at the value of 10 x I_n.
- 3VT1 circuit breakers with characteristic **„N“**only have a circuit release. They are produced with I_n values in a standardized series of currents ranging from 32 A to 160 A. The short-circuit release is adjustable.
  The values are given in the table on page 2/16.

The type designation for the circuit breakers is set according to the requested rated current and protection characteristics.
For example: Motor protection with I_n = 32 A.
The order No. designation will be 3VT1 703-3DM36-0AA0.

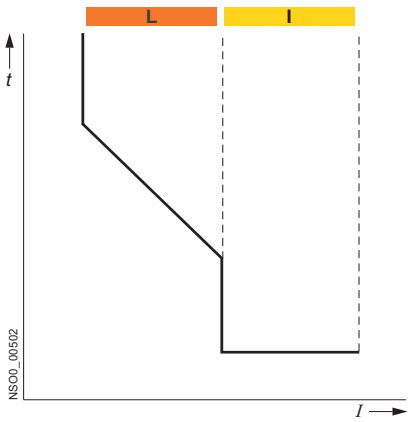
Setting of tripping characteristics:

- **Dependent release (thermal) L** (for circuit breakers with characteristics “D” and “M”). The dependent release for overload protection I_r (instantaneous) is adjusted in a continuous range using the I_r adjustment dial on the overload release. The I_r adjustment range is 0.75 ... 1 I_n.
- **Independent instantaneous release (short-circuit relase) I** (for circuit breakers with characteristics “D” and “N”). With an independent instantaneous release (value of the short circuit current I_i), adjustment is possible within a continuous range.
  All values are given in the table on page 2/16.

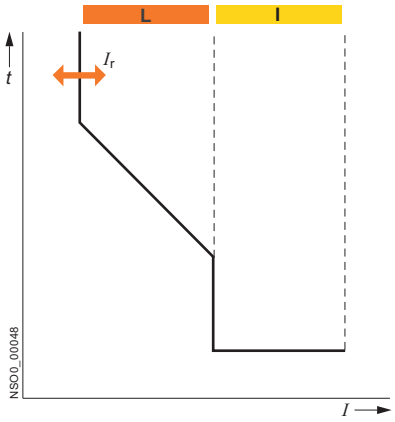
Setting of tripping characteristics

Circuit breakers with characteristic

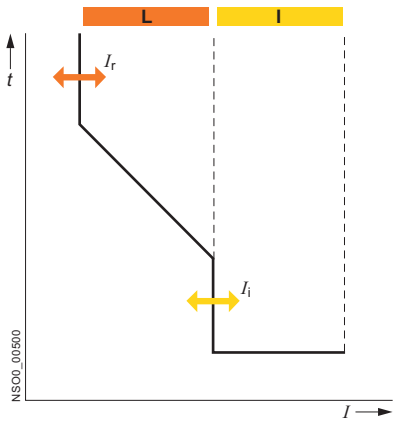
„L“



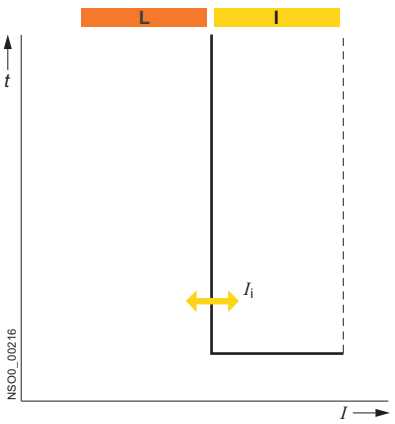
„M“



„D“

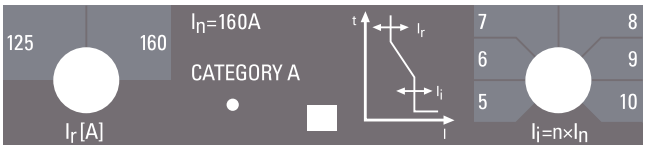


„N“



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

Adjusting I_R Adjusting I_i



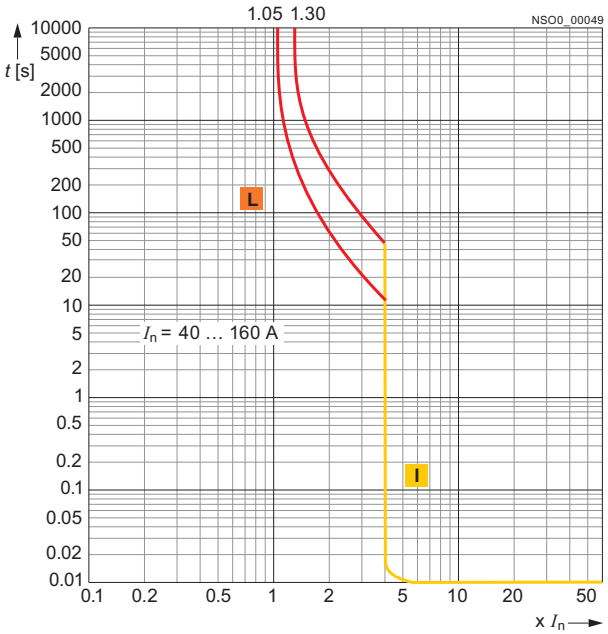
Derating in accordance with ambient temperature

Rated current I_n	Permissible load			
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

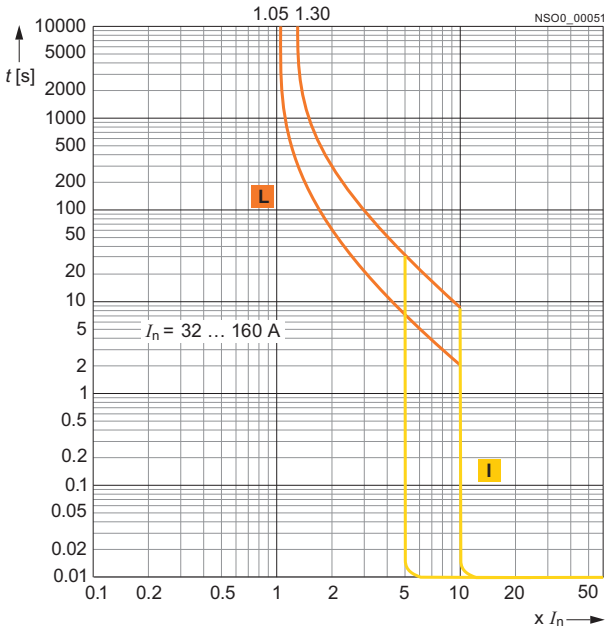
Current ranges of overcurrent releases and their possible setting at 40 °C

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

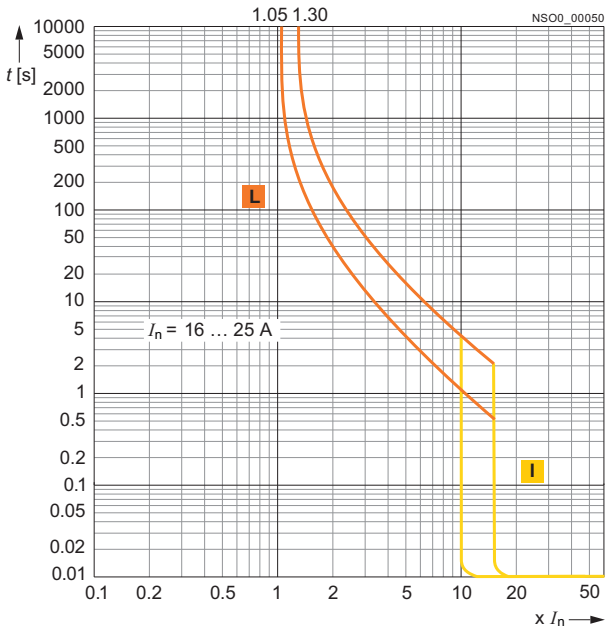
Characteristic „L“, I_n = 40, 50, 63, 80, 100, 125, 160 A



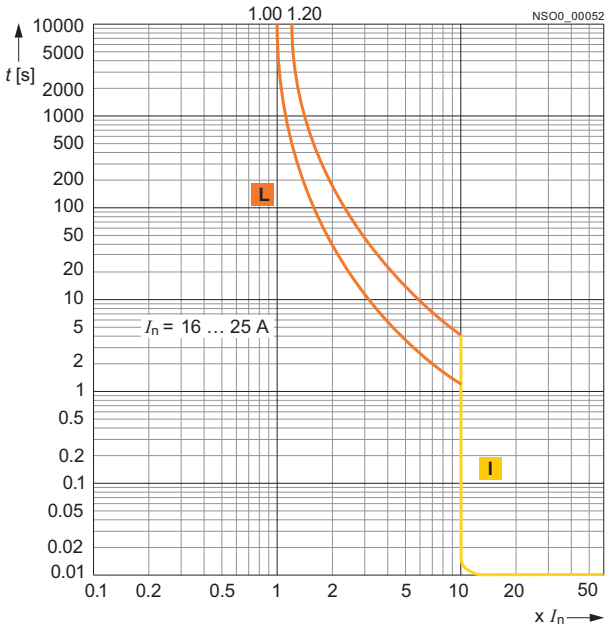
Characteristic „D“, I_n = 32, 40, 50, 63, 80, 100, 125, 160 A



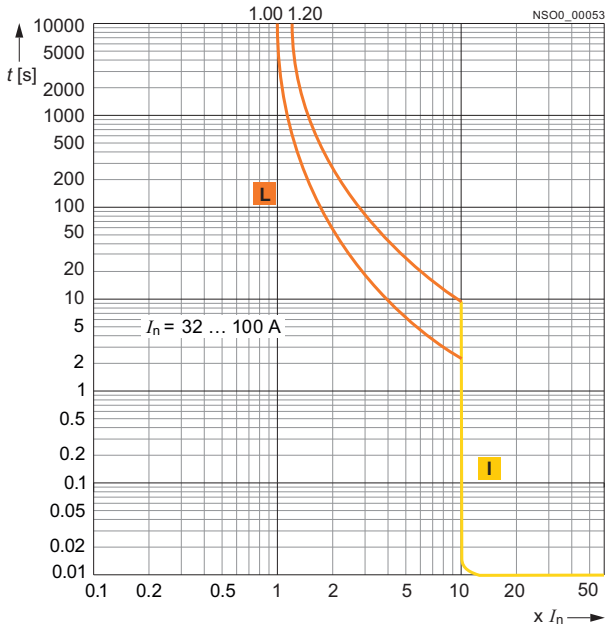
Characteristic „D“, I_n = 16, 20, 25 A



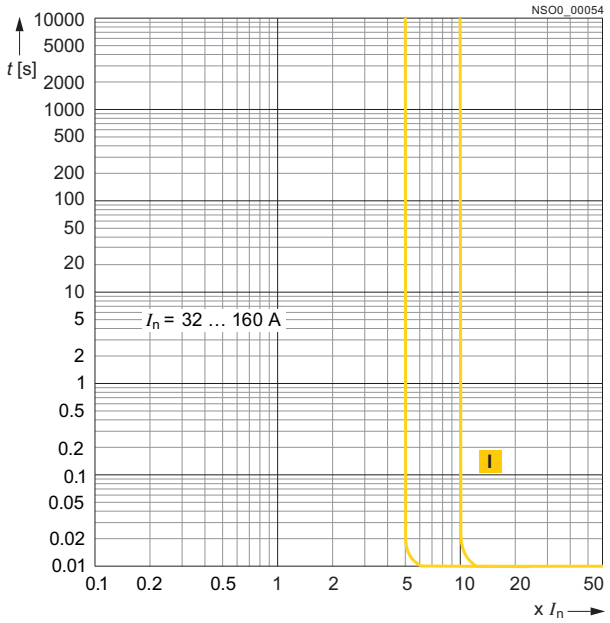
Characteristic „M“, I_n = 16, 20, 25 A



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



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



Overcurrent releases, 4-pole version

The overcurrent release is an integral part of the circuit breaker.

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

- 3P+N (three poles protected, N-pole unprotected)
- 4P (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
Protection of lines with low starting current

„D“ - distribution
Protection of lines and transformers

„N“ - short-circuit
Protection against short circuit only

- 3VT1 Circuit breakers with characteristic **„L“** have a fixed value of rated current I (without I_n control). The circuit breakers are manufactured with I_n values of standard current range 40 ... 160 A, see „Ranges of overcurrent release and their possible setting“. The Short-circuit release has a fixed setting to 4 x I_n.
- 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 are manufactured with I_n values within a standard current range of 16 ... 160 A.
  Setting values are given in the table on page 2/20.
- 3VT1 Circuit breakers with characteristic **„N“** have only a short circuit release. They are manufactured with circuit breaker values within a standard current range of 32 ... 160 A. The Short circuit release is adjustable.
  The values are given in the table on page 2/20.

The type designation for the circuit breakers is set according to the requested rated current and protection characteristics.

For example.: Protection of a circuit with I_n = 40 A.
The order No. designation will be 3VT1 704-2EC46-0AA0.

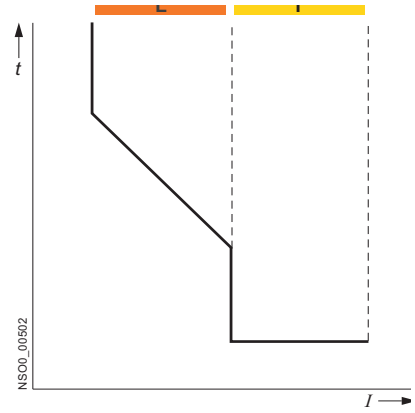
Setting of tripping characteristics

- **Dependent release (thermal) L** (for circuit breakers with characteristics “D” and “M”). The dependent release for overload protection I_r (instantaneous), is adjusted in a continuous range using the I_r adjustment dial on the overload release. The I_r adjustment range is 0.75 ... 1 I_n.
- **Independent instantaneous release (short-circuit relase) I** (for circuit breakers with characteristics “D” and “N”). With an independent instantaneous release (value of the short circuit current I_i), adjustment is possible within a continuous range.
  All values are given in the table on page 2/20.

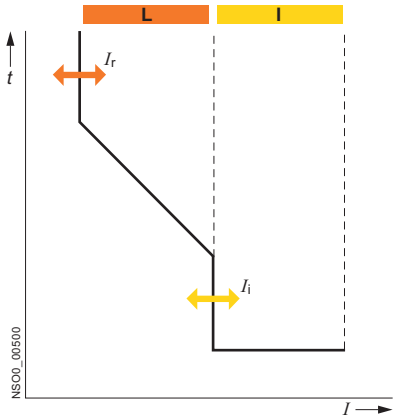
Setting of tripping characteristics

Circuit breakers with characteristic

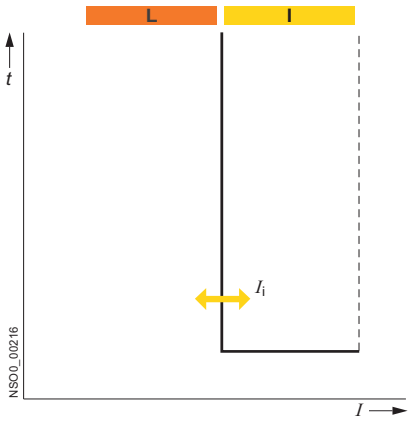
„L“



„D“



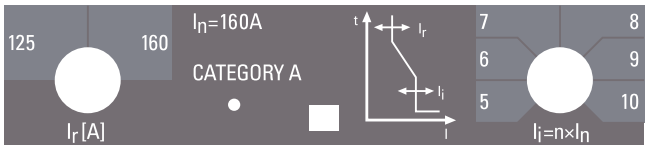
„N“



Circuit breakers · Switch disconnectors

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

Setting I_R Setting I_i



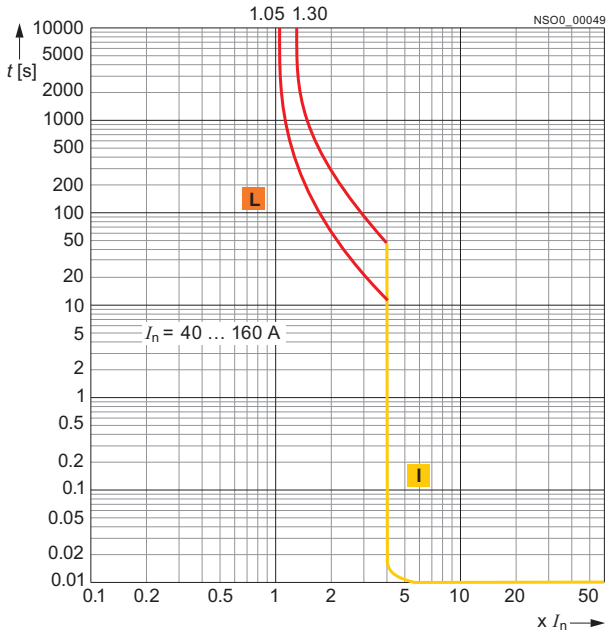
Derating in accordance with ambient temperature

Rated current I_n	Permissible load			
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

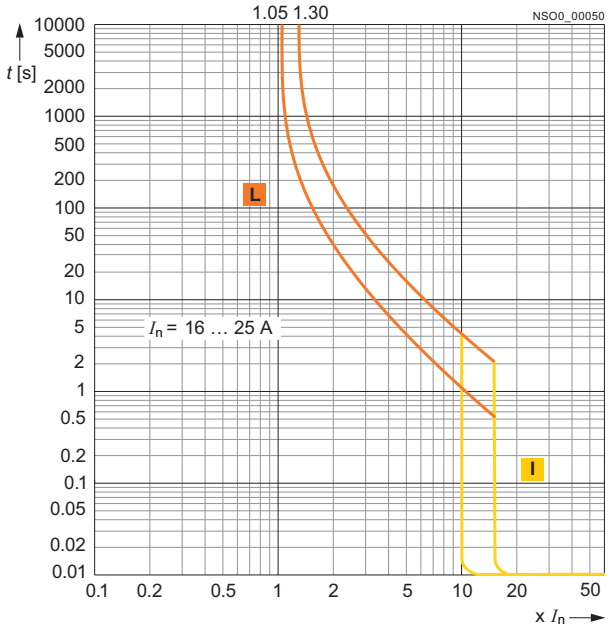
Current ranges of overcurrent releases and their possible setting at 40 °C

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

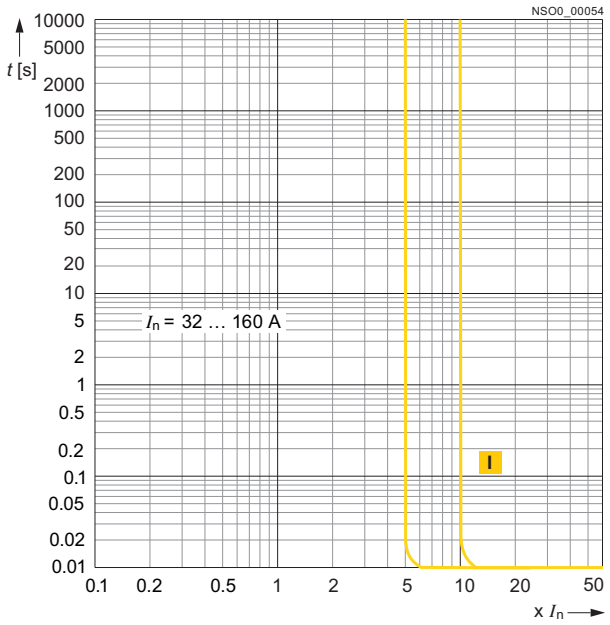
Characteristic „L“, I_n = 40, 50, 63, 80, 100, 125, 160 A



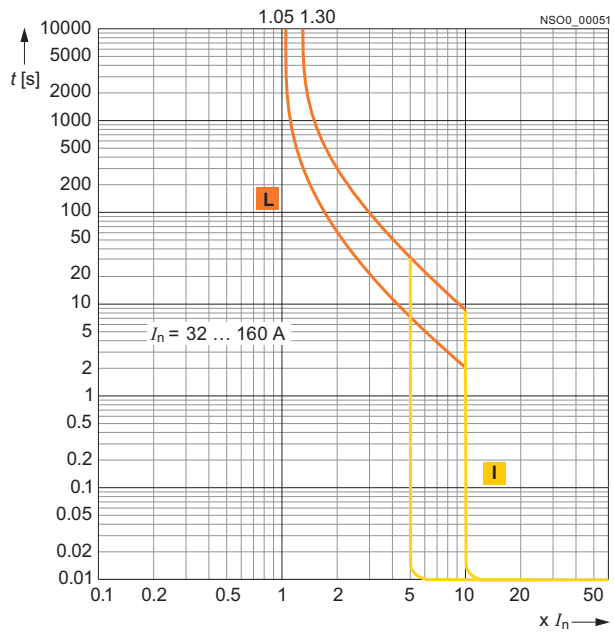
Characteristic „D“, I_n = 16, 20, 25 A



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



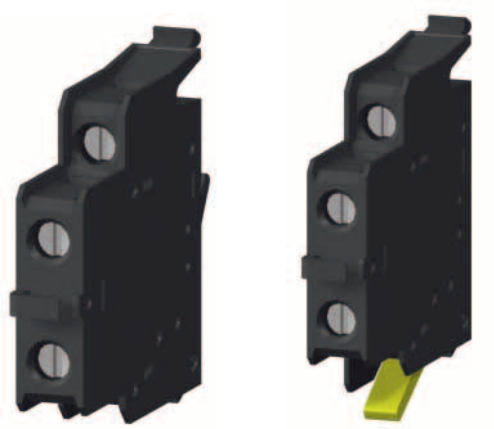
Characteristic „D“, I_n = 32,40, 50, 63, 80, 100, 125, 160 A



Auxiliary switches

Overview

Auxiliary switches



Auxiliary and alarm switches

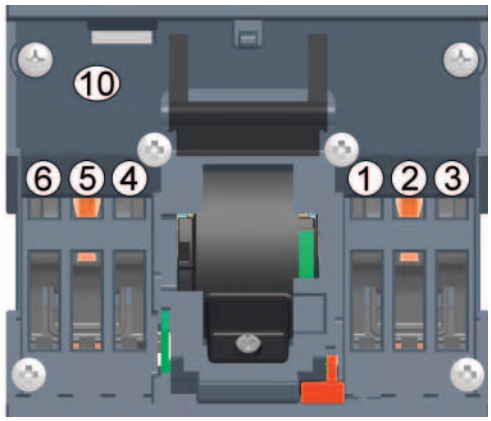
Function, name and location of switches according to type designation

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]	Signaling of the state of the main contact of the circuit breaker/ switch disconnector
3VT9 100-2AH10 **3VT9 100-2AH20**	Alarm switch	Accessory compartment 1[1]	Signal in the event of tripping of the circuit breaker by the overcurrent release

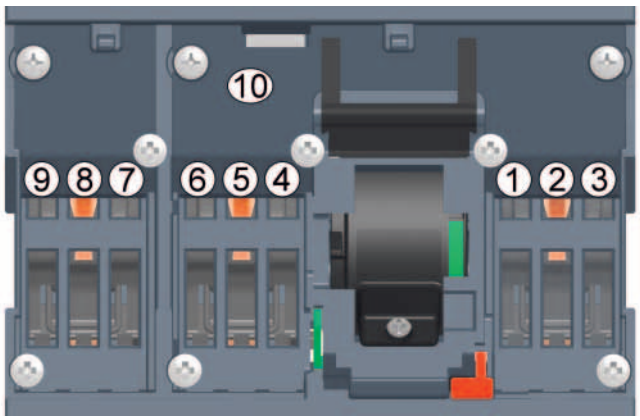
[1] In the accessory compartment 1, a 3VT9 100-2AB10 auxiliary switch and 3VT9 100-2AH10 signal switch cannot be used simultaneously.

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

Location of switches in accessory compartments



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

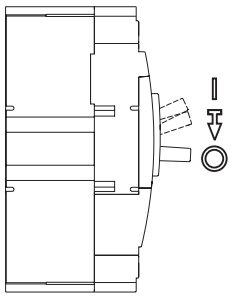


Location of accessory compartments in a 4-pole 3VT1 circuit breaker/switch disconnector.

When using one of the accessory compartments 4, 5 or 6, neither a shunt release nor an undervoltage release cannot be fitted.

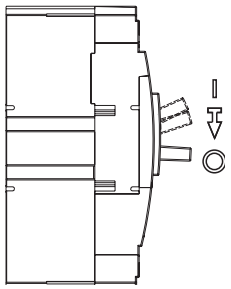
Function

Switching states (3-pole)

Accessory compartment			1 ... 9				1		10
Switching states of the circuit breaker 	Lever positon	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 overcurrent release or INSPECTION button		**0**	0	1	1	0	1		
Switched off by auxiliary release		**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 positon	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 overcurrent release or INSPECTION button		**0**	0	1	1	0	1		
Switched off by auxiliary release		**0**	0	1	0	1	0		
Switched off by TEST button		**0**	0	1	0	1	1		

0 = contact open, 1 = contact closed

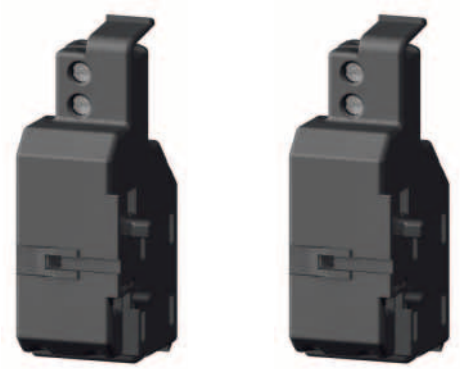
Technical specifications

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 whitstand 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 releases

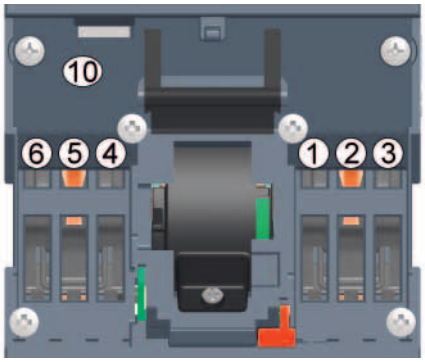
Design

Auxiliary releases



Shunt release Undervoltage release

Location of auxiliary releases



Auxiliary releases in compartment 10

Type designation according to the rated operational voltage

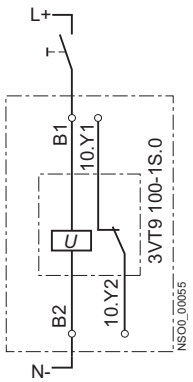
U_e	Order No.
AC/DC 24/48 V	3VT9 100-1SC00
AC 110/230 V, DC 110/220 V	3VT9 100-1SD00
AC 230/400 V, DC 220 V	3VT9 100-1SE00

Type designation according to the rated operational voltage

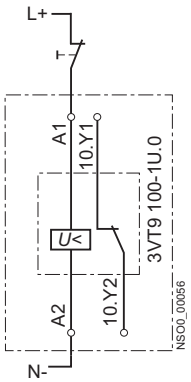
U_e	Order No.
AC/DC 24/48 V	3VT9 100-1UC00
AC 110/230 V /DC 110/220 V	3VT9 100-1UD00
AC 230/400 V /DC 220 V	3VT9 100-1UE00

The specific rated operational voltage of the shunt release is set by jumpers directly on the release. The standard setting by the manufacturer is always to the value corresponding to the type designation.

Schematics



Shunt release



Undervoltage release

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
Loading time	∞
Connection cross-section S	0,5 ... 1 mm^2
Terminal protection (connected release)	IP20
Location in accessory compartment no.	10
SIGNAL SWITCH - signals switching off by shunt trip	
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
Characteristic	$U \leq 0.35\ U_e$ circuit breaker can be switched on $U \geq 0.85\ U_e$ circuit breaker must trip
Time before switching off	15 ms
Loading time	∞
Connector cross-section S	0.5 ... 1 mm^2
Terminal protection (connected release)	IP20
Location in accessory compartment no.	10
SIGNAL SWITCH - signals switching off of the undervoltage	
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 manual operating mechanism permits the actuating of the circuit breakers/switch disconnectors by turning the knob, e.g. in order to switch machines on and off. The modular concept of the operating mechanism allows for simple mounting on the circuit breaker (even as an add-on). Mounting can be done after having removed the accessory compartment cover. An affixed drive may be sealed. The drive and its accessories are ordered separately according to your choice (see page 2/7).

The manual operating mechanism permits actuating the circuit breaker:

a) from the front panel (Fig. 1)
3VT9 100-3HA/HB/HC/HD.. rotary operating unit
+ 3VT9 100-3HE/HF.. knob

b) through the control cabinet door (Fig.2)
3VT9 100-3HA/HB/HC/HD.. rotary operating unit
+ 3VT9 100-3HJ.. extension shaft ..
+ 3VT9 100-3HG/HH.. coupling driver
+ 3VT9 100-3HE/HF.. knob

c) through the side wall of the control cabinet (Fig.3)
in left- or right-side designs of manual 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.

- The manual operating mechanism is mounted directly on the circuit breaker or switch disconnector.
- The coupling driver is fixed to the control cabinet door and provides for degree of protection IP40 or IP66.
- The knob is mounted onto the manual 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 manual operating unit.

Enhanced safety for operator

- The manual operating unit and knob are also supplied with the option to lock the circuit breaker into the “switched off manually” position. The manual operating unit and lever can be locked with up to three padlocks with a shaft diameter up to 3 ... 4 mm.
- Every coupling driver prevents the control cabinet door from opening when the circuit breaker is switched on or in a state of being switched off by releases. By means of this device, it is possible to switch off this locking and to open the door. Locking of the control cabinet door is also possible in the „switched off manually“state 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 manual operating mechanism can also be provided with reciprocal mechanical interlocking or mechanical parallel switching (see page 2/26).

Features

Order No.	Description	Color	Locking while the circuit breaker is in switched off state	Degree of Protection	Switchgear door locking in circuit breaker state		Length mm
					switched on	switched off manually and locked	
3VT9 100-3HA10	Rotary operating mechanism	gray	no	--	--	--	--
3VT9 100-3HA20		gray	yes	--	--	--	--
3VT9 100-3HB20		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		black	yes	--	--	--	--
3VT9 100-3HF20		red	yes	--	--	--	--
3VT9 100-3HG10	Coupling driver	black	--	IP40	yes	yes	--
3VT9 100-3HH10		black	--	IP40	yes	yes	--
3VT9 100-3HG20		yellow	--	IP66	yes	yes	--
3VT9 100-3HH20		yellow	--	IP66	yes	yes	--
3VT9 100-3HJ10	Extension shaft	--	--	--	--	--	350 (can be shorted)
3VT9 100-3HJ20		--	--	--	--	--	199 ... 352 telescopic

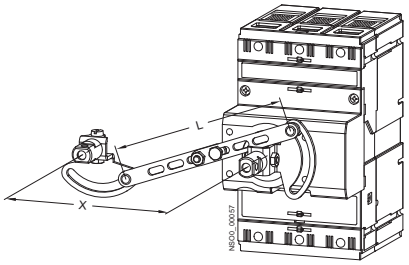
Manual operating mechanisms

Mechanical interlocks and mechanical interlocks for parallel switching

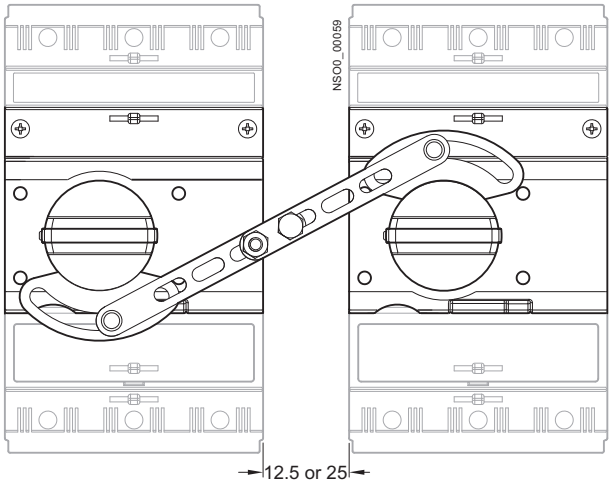
3VT9 100-8LA00 mechanical interlocking

The mechanical interlocks are for the mechanical interlocking of two circuit breakers so that they cannot be tripped 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 manual operating mechanism – at least one with a manual operaitng unit and a knob, (see page 2/25). In order to use the interlocking, it is absolutely necessary to comply with the dimensions shown in the figure and given in the table.

Dimensions	mm
X	87.5 or 100
L	94.5 or 106



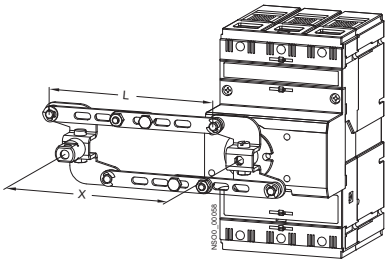
Arrangement of circuit breakers/switch disconnectors with 3VT9 100-8LA00 mechanical interlocks



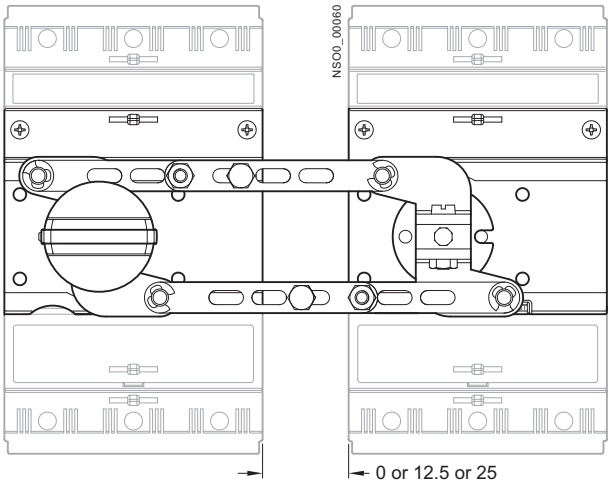
3VT9 100-8LB00 mechanical interlocks for parallel switching

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 manual operating unit and at least one with a knob (see page 2/25). In order to use parallel switching, it is absolutely necessary to comply with the dimensions shown in the figure and given in the table.

Dimensions	mm
X	75 or 87.5 or 100
L	L



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



Design

Motorized operating mechanisms

The motorized operating mechanism is an accessory of 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 operating mechanism enables its simple mounting on the circuit breaker (also additionaly). The operating mechanism is used for both remote and local control of 3VT1 3-pole and 4-pole circuit breakers. It is manufactured in the version for lateral mounting next to the circuit breaker on the switchboard or for mounting on standard mounting rails. The operating mechanism is fastened by means of a bayonet mechanism on the circuit breaker side. The installed operating mechanism can be sealed by means of the terminal cover seal.

3VT1 circuit breakers Modeion 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 the 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 automatically. The lifted position of the cover can be indicated remotely.

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

After having taken off the safety cover, 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 overcurrent or auxiliary release tripping.

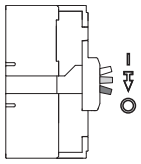
Lateral operating mechanisms can be locked in „off position“ of the circuit breaker by up to three padlocks with a shank diameter of max. 4 mm. It is possible to actuate the locking remotely. The protective cover of the operating mechanisms can also be sealed.

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 maually or by motorized operating mechanism electrically
⊓	Switched off by overcurrent releases, shunt release or undervoltage release, TEST or REVISION pushbutton
◎	Switched off maually or by motorized operating mechanism electrically, wound up state



Switch position	Automatic operation preset	Preset description	Circuit breaker switching off to postion[2] ⊓	Circuit breaker winding up to position	Circuit breaker switching on to position ▯
	1[1]	Automatic winding up is on	By overcurrent release By REVISION pushbutton By auxiliary release By TEST pushbutton	The motorized operating mechanism carries out automatically	By pressing the ON pushbutton
	2	Automatic winding up is off		The operator must press the OFF pushbutton	By pressing the ON push button
	3	Simultaeous winding up and switching on		By pressing the ON pushbutton, the motorized operating mechanism will wind up and switch on the circuit breaker[3]	
	The motorized operating mechanism is out of operation, the red LED is lighting.				

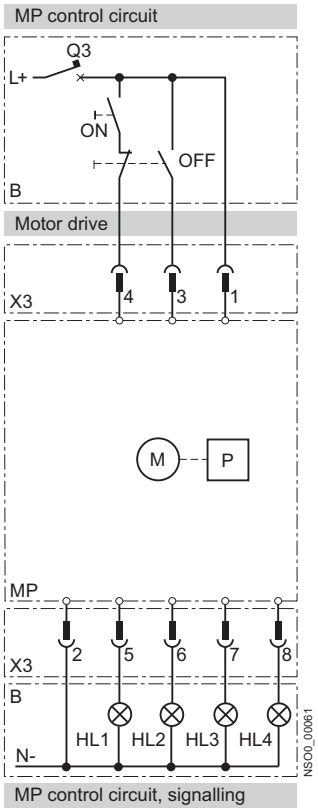
[1] Standard factory setting of the switch.

[2] When the circuit breaker is switched off by the motorized operating mechanism electrically with the use of the OFF push button, the circuit breaker control lever gets into the wound up position automatically, ◎ independently of the automatic operation preset.

[3] By pressing the OFF pushbutton, the motorized operaitng mechanism only winds the circuit breaker up to the position ◎.

Motorized operating mechanisms

Schematics



For a complete schematic of the 3VT1 circuit breaker with motorized operating mechanism, see page 2/14.

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/AC/DC 24 V 6 A/AC/DC 48 V 4 A/AC/DC 110 V 2 A/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 21, 23, 24, 25.

Explanation of designations

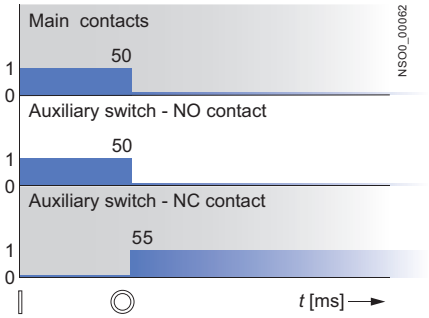
MP	3VT9 100-3M.00 motorized oeprating mechanism
M	motor
P	gearbox
X3	connector for connection of control and signaling circuits
B	recommended connection of control circuits-not part of MP
ON	pushbutton
OFF	pushbutton
Q3	motorized operating mechanism circuit breaker
HL1	remote failure signalling (unreliable 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.

3VT1 circuit breakers with motorized operating mechanism

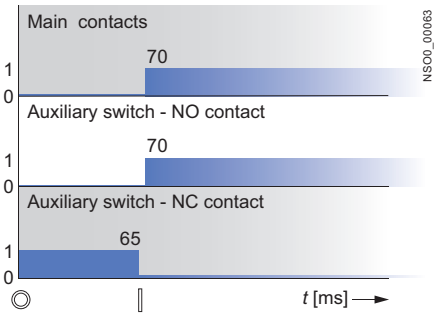
Electrical switching off of the circuit breaker by motorized operating mechanism (OFF pushbutton)

Automatic operation no. 1, 2, 3



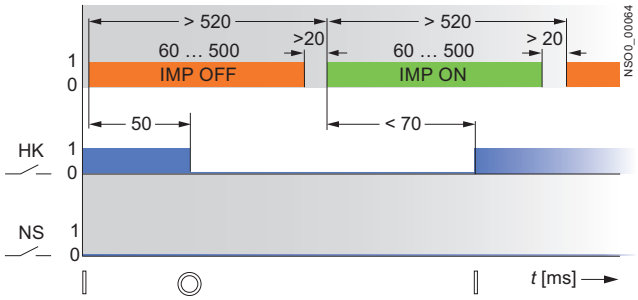
Electrical switching on of the circuit breaker by motorized operating mechanism (ON pushbutton).

Automatic operation no. 1, 2, 3



Recommended control pulses for electrically switching on and off the circuit breaker using the ON and OFF pushbuttons

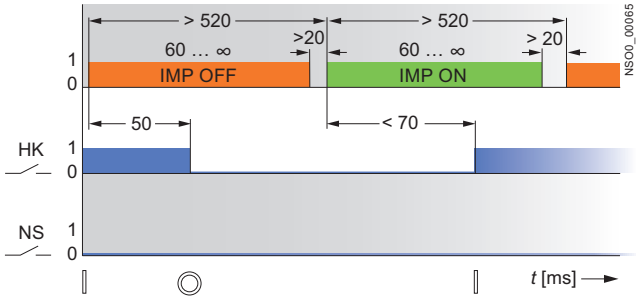
Automatic operation no. 1



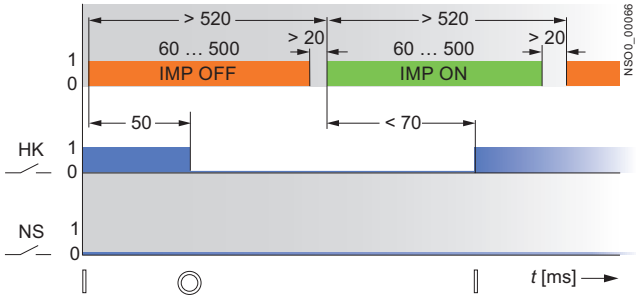
Graph description

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

Automatic operation no. 2



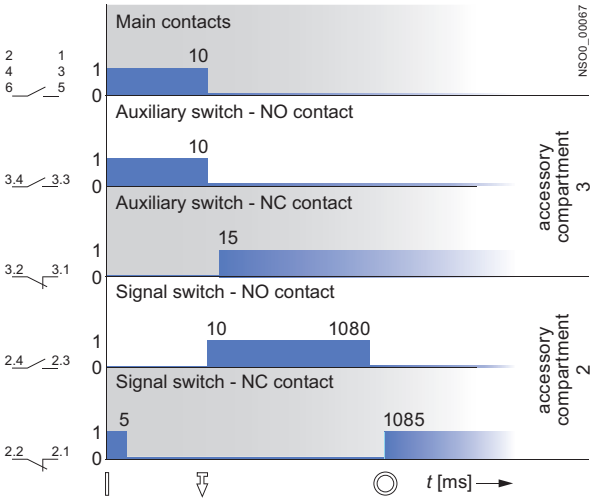
Automatic operation no. 3



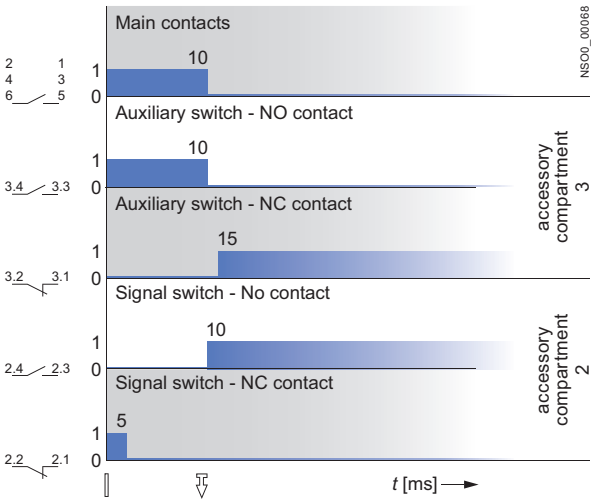
Motorized operating mechanisms

Circuit breaker switching off by overcurrent release or INSPECTION pushbutton

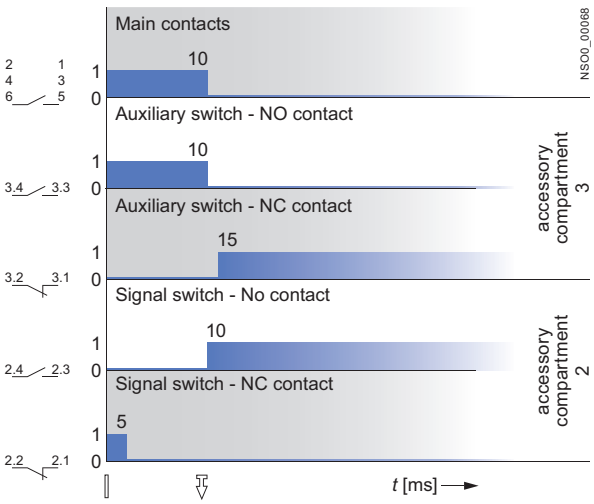
Automatic operation no. 1



Automatic operation no. 2

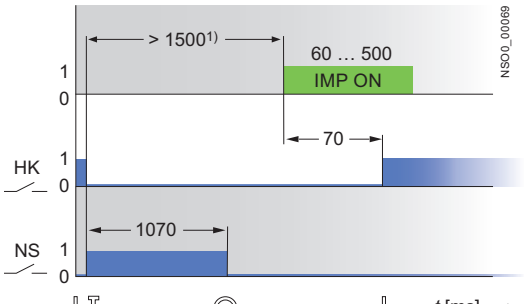


Automatic operation no. 3

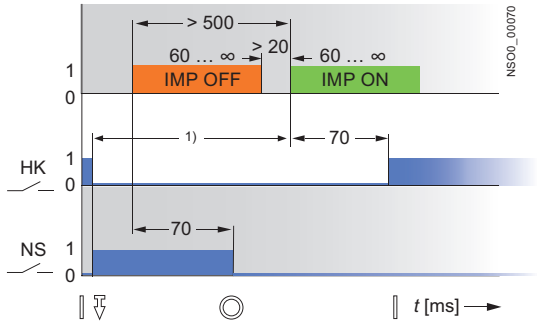


Recommended control pulses for switching the circuit breaker with motorized operating mechanism after its switching off by overcurrent release or INSPECTION pushbutton

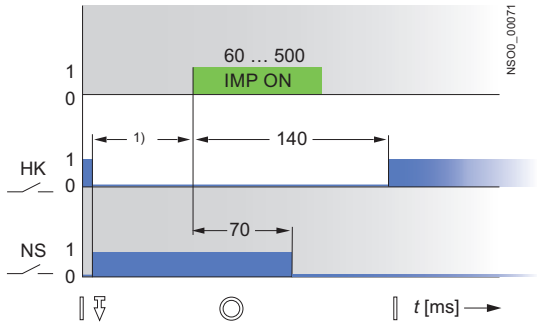
Automatic operation no. 1



Automatic operation no. 2



Automatic operation no. 3



* If the circuit breaker was switched off by an overcurrent release, it is necessary to remove the error before its switching on.

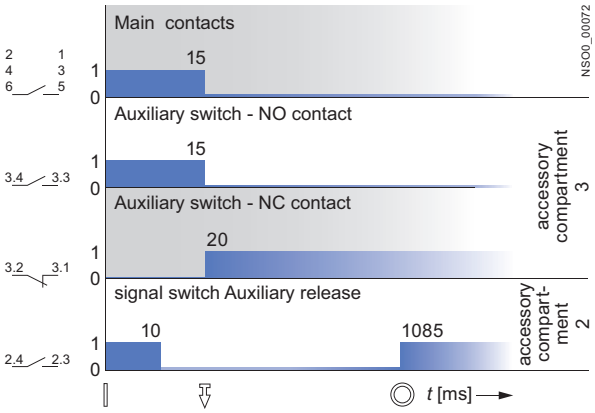
Graph description

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

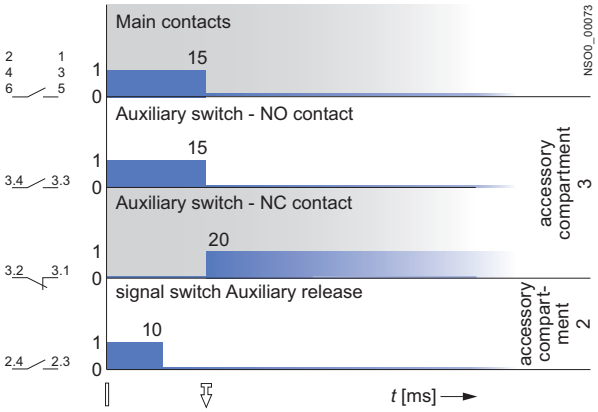
Motorized operating mechanisms

Circuit breaker switching off by
shunt release, undervoltage release or TEST pushbutton

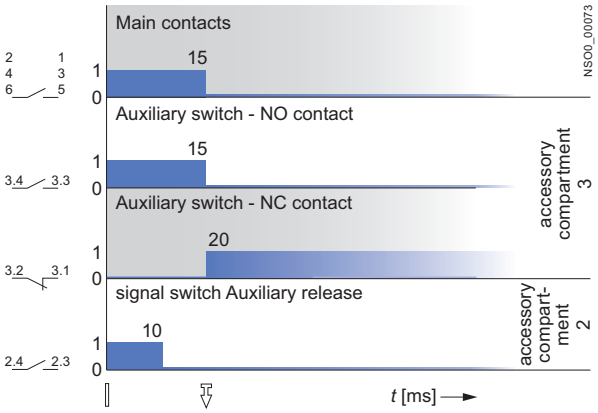
Automatic operation no. 1



Automatic operation no. 2

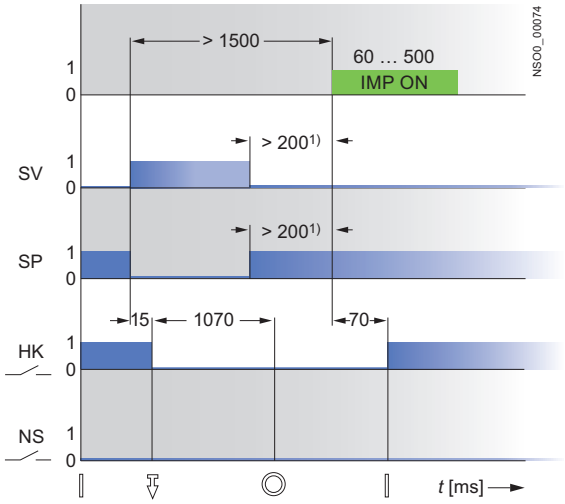


Automatic operation no. 3

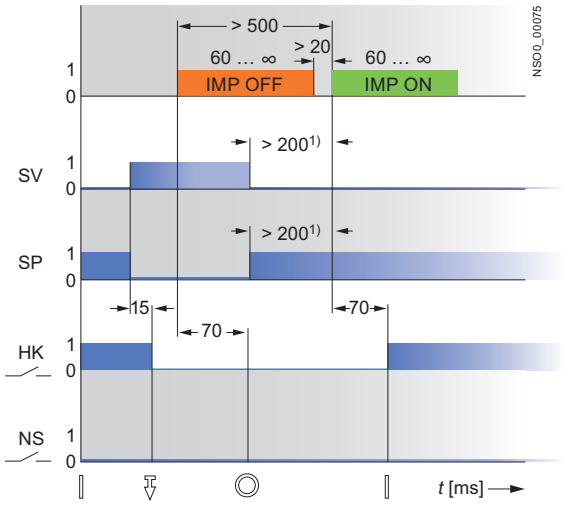


Recommended control pulses for switching the circuit breaker with motorized operating mechanism after its switching off by overcurrent release or INSPECTION pushbutton

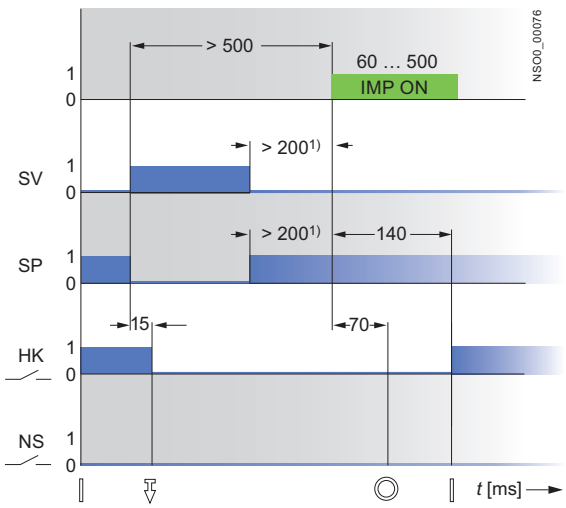
Automatic operation no. 1



Automatic operation no.2



Automatic operation no. 3



* Reswitching is only possible after deactivation of the shunt trip or undervoltage release.

Graph description

Symbol	Description
HK	Main contacts
NS	Signal switch
SV	Pulse for shunt trip
SP	Pulse for undervoltage release
IMP ON	Make pulse for motorized operating mechanism
IMP OFF	Break pulse for motorized operating mechanism
	Switched on
	Switched off by releases, TEST or REVISION pushbutton
	Switched off maually or by electrically by motorized operating mechanism (wound up state)

Motorized operating mechanisms

Overcurrent releases

Tripping characteristics: class M

The tripping time of the overcurrent release of 3VT1 circuit breakers with characteristic M at 7.2 I_n corresponds to the release class 10, 10 and 20 according to EN 60947-4-1.

Plate of the overcurrent releases with characteristic M

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

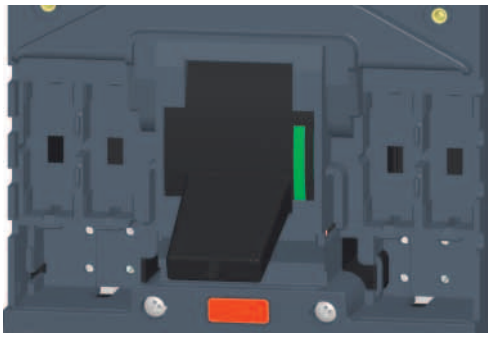
Rated short-circuit ultimate and service breaking capacity of 3-pole 3VT1 circuit breakers in DC circuits

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

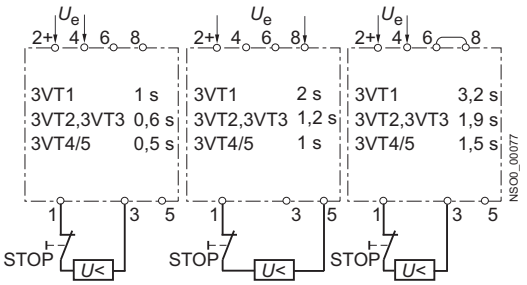


Delay device

Order No.	Description	Packing pc
3VT9 00-1UX00	Enables delayed tripping of undervoltage releases of 3VT circuit breakers	1

- The delay can be set at three levels (depending on connection)
- The 3VT9 00-1UX00 unit is inteded only for undervoltage releases with U_e = AC 230 V

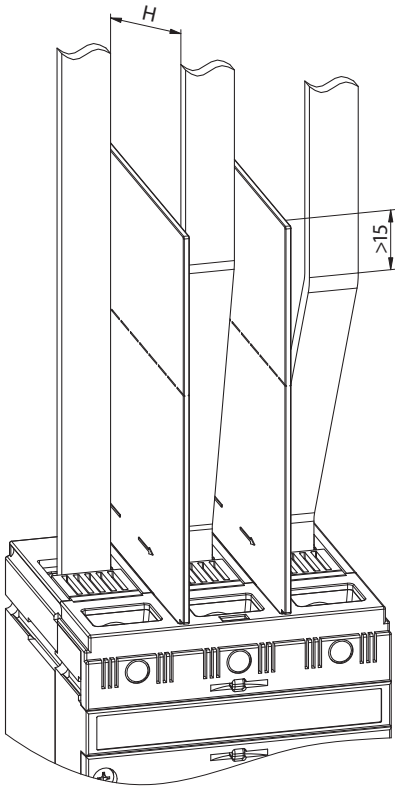
Circuit breakers	Delay		
	1st level	2nd level	3rd level
	s	s	s
3VT1	1	2	3.2
3VT2, 3VT3	0.6	1.2	1.9
3VT4, 3VT5	0.5	1	1.5



Dimensional drawings

Phase barriers and terminal covers

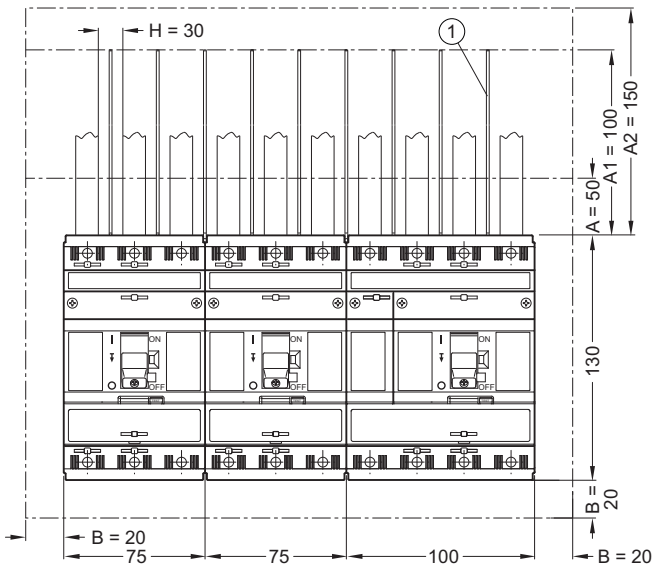
3-pole version

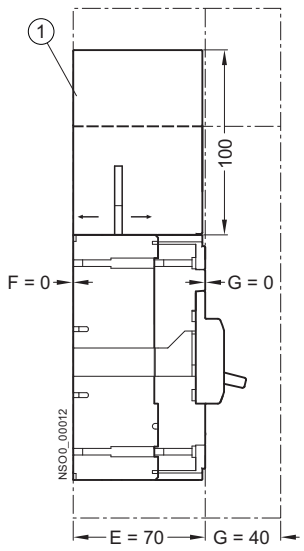


Fixed-mounted version

- Front connection
  - Terminals 1, 3, 5
    3VT9 100-8CE30 phase 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 phase barriers or 3VT9 100-8CA30 terminal covers have to be used if the circuit breaker/switch disconnector is connected to the power supply using terminals 2, 4, 6 (when using 3VT9 100-4TF30 connection sets for connecting circuit breaker/switch disconnector, the terminal cover is included in the connecting set).
- Rear connection
  - phase 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 phase 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

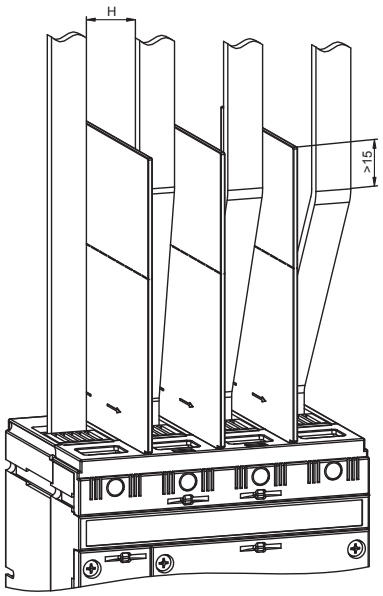




① 3VT9 100-8CE30

Project planning aids

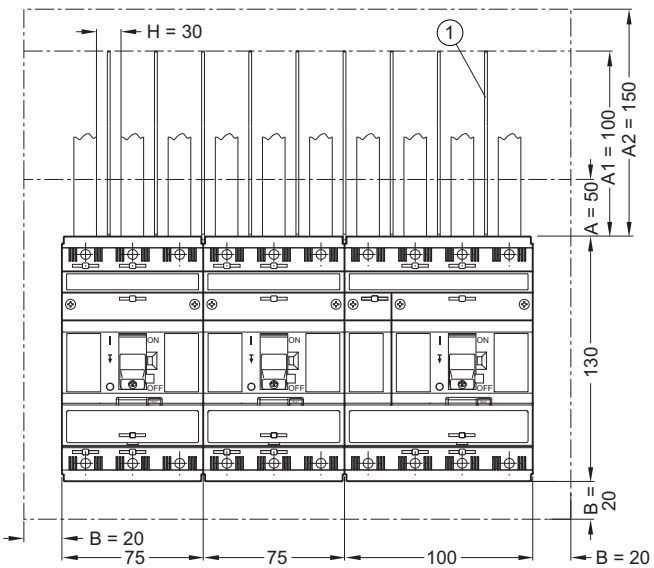
4-pole version

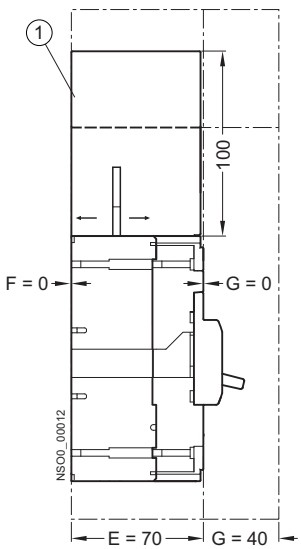


- Front connection
  - terminals N, 1, 3, 5
    3VT9 100-8CE30 and 3VT9 100-8CE00 phase barriers or 3VT9 100-8CA40 terminal covers always have to be used (if 3VT9 100-4TF40 connecting sets are used to connect the circuit breaker/switch disconnector, the terminal cover is included in the connecting set)
  - Terminals N, 2, 4, 6
    3VT9 100-8CE30 and 3VT9 100-8CE00 phase barriers or 3VT9 100-8CA40 terminal covers always have to be used, the circuit breaker/switch disconnector is connected to the power supply via terminals N, 2, 4, 6 (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
  - Phase barriers or covers must be used.

Reference	Size mm	
A	50	minimum distance between the circuit breaker/switch disconnctor 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 phase 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

Fixed-mounted version



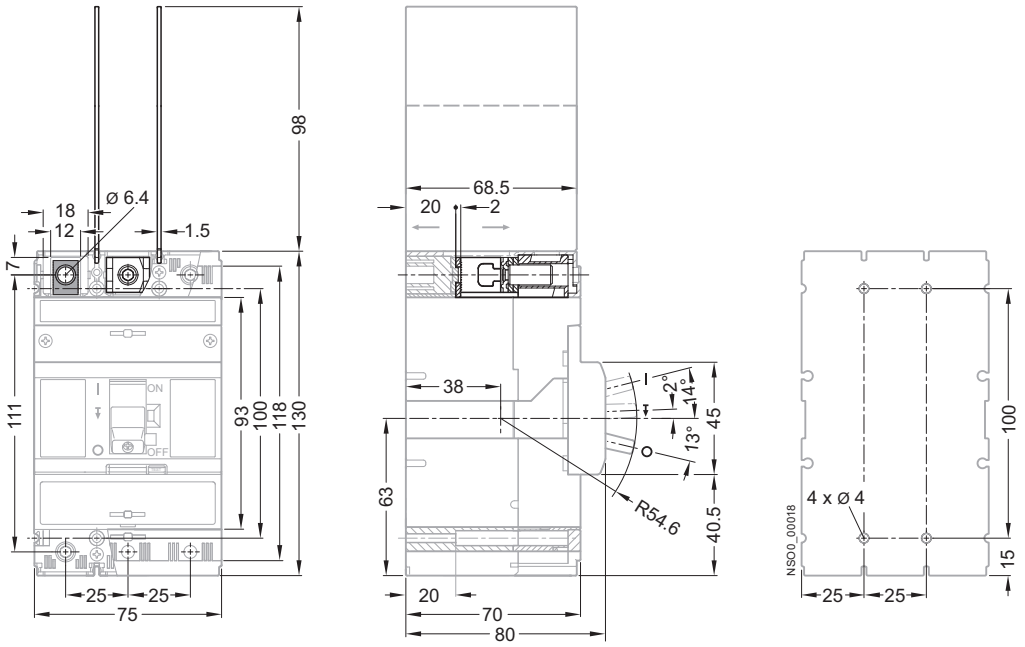


1 3VT9 100-8CE30

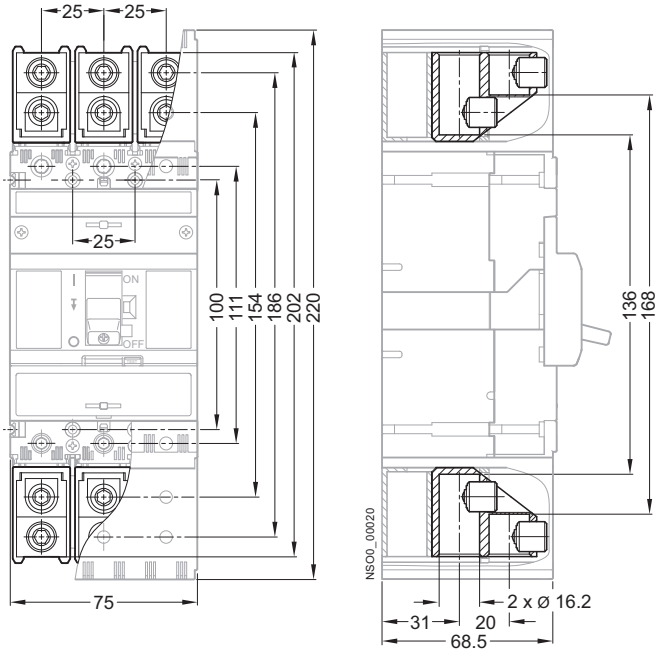
Fixed-mounted version

3-pole version

Fixed-mounted version, front connection

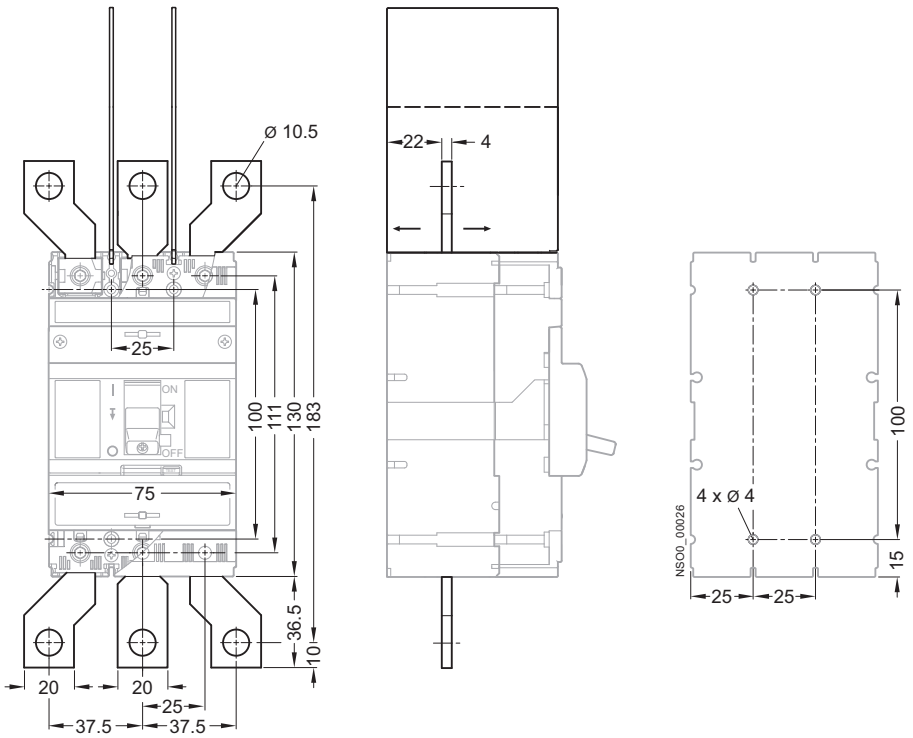


Fixed-mounted version, front connection (3VT9 100-4TF30 connecting set)

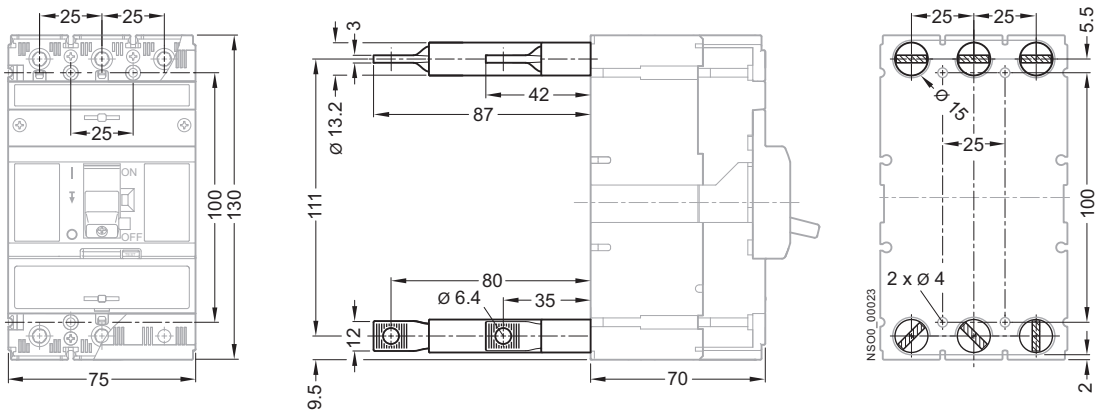


Project planning aids

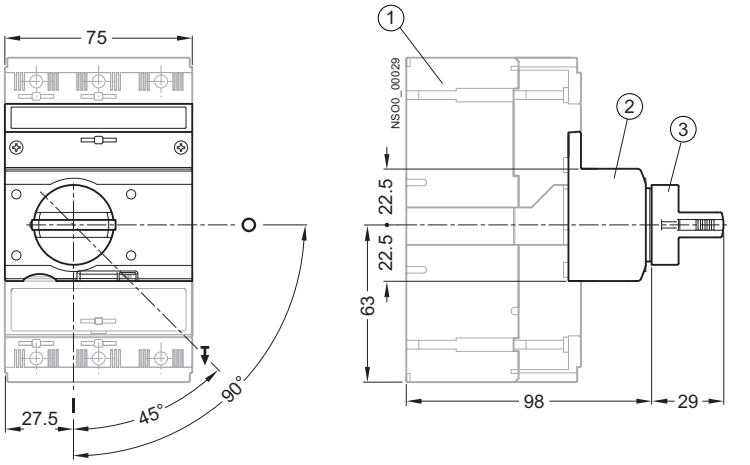
Fixed-mounted version, front connection (3VT9 100-4ED30 connecting set)



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

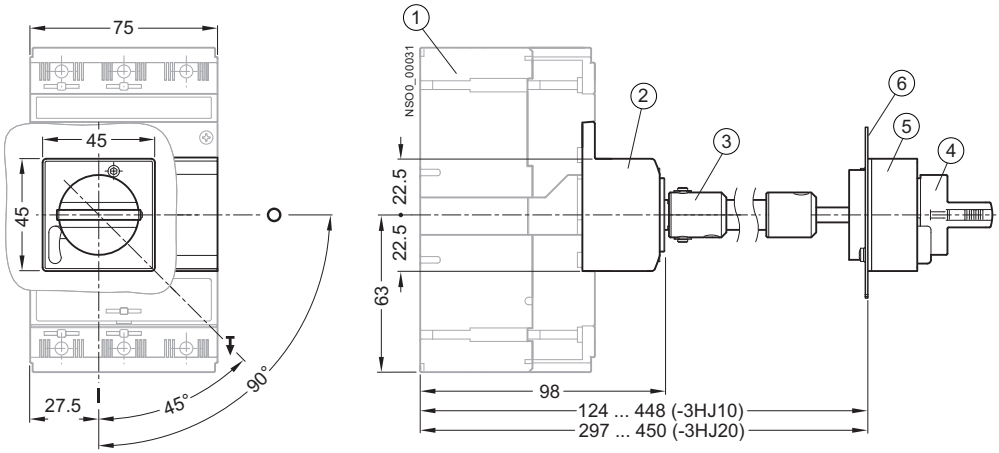


Fixed-mounted version, manual operating mechanism



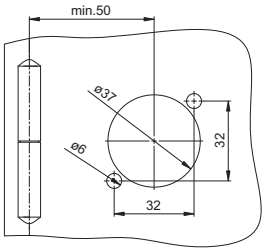
1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HE.0, 3HF.0

Fixed-mounted version, manual operating mechanism with adjustable knob



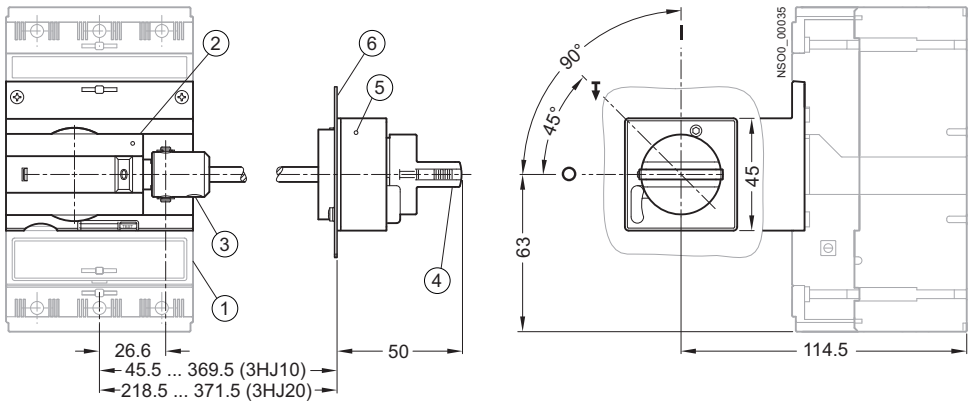
1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Adaptation of cabinet door dimensions



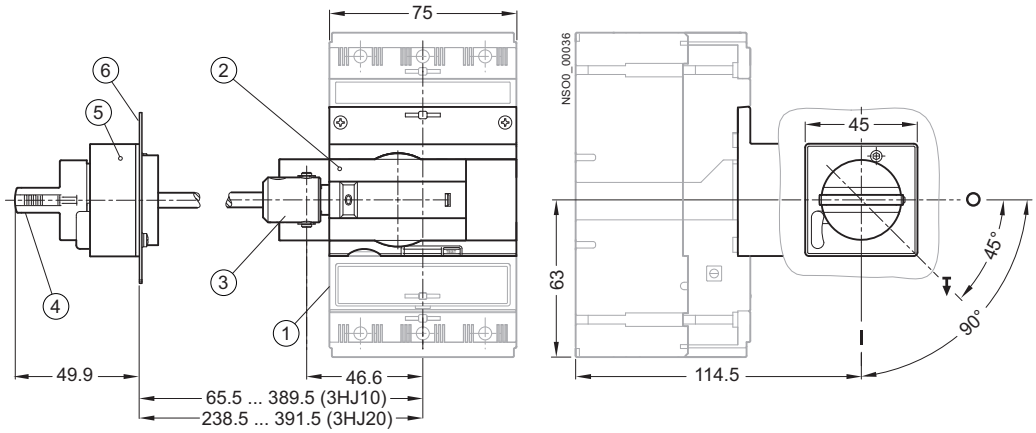
Project planning aids

Fixed-mounted version, lateral manual operating mechanism - right



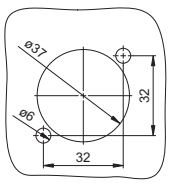
1 3VT1
2 3VT9 100-3HC10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Fixed-mounted version, lateral manual operating mechanism - left

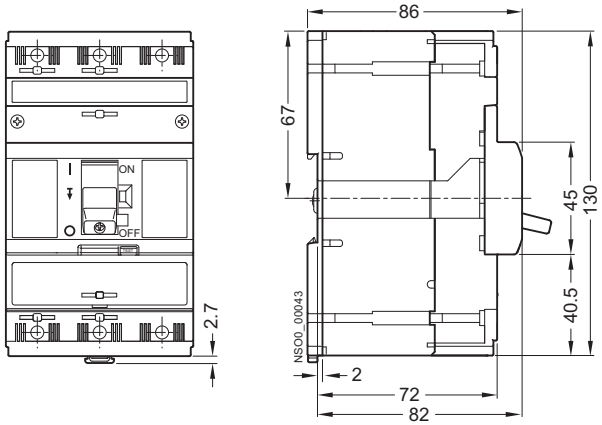


1 3VT1
2 3VT9 100-3HC10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

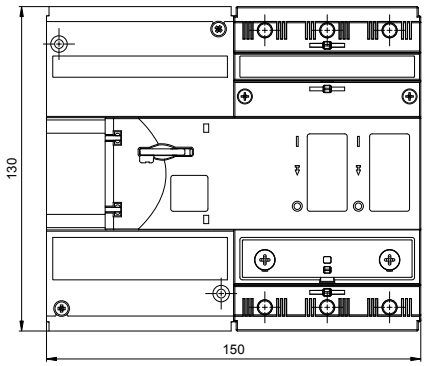
Adaptation of cabinet door dimensions

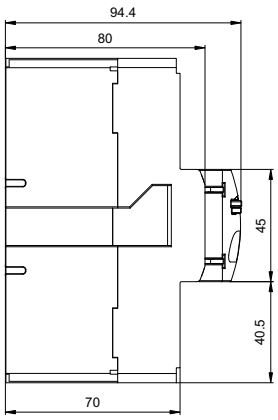


Fixed-mounted version, installation on standard mounting rail (width 35 mm)



Fixed-mounted version and lateral motorized operating mechanism

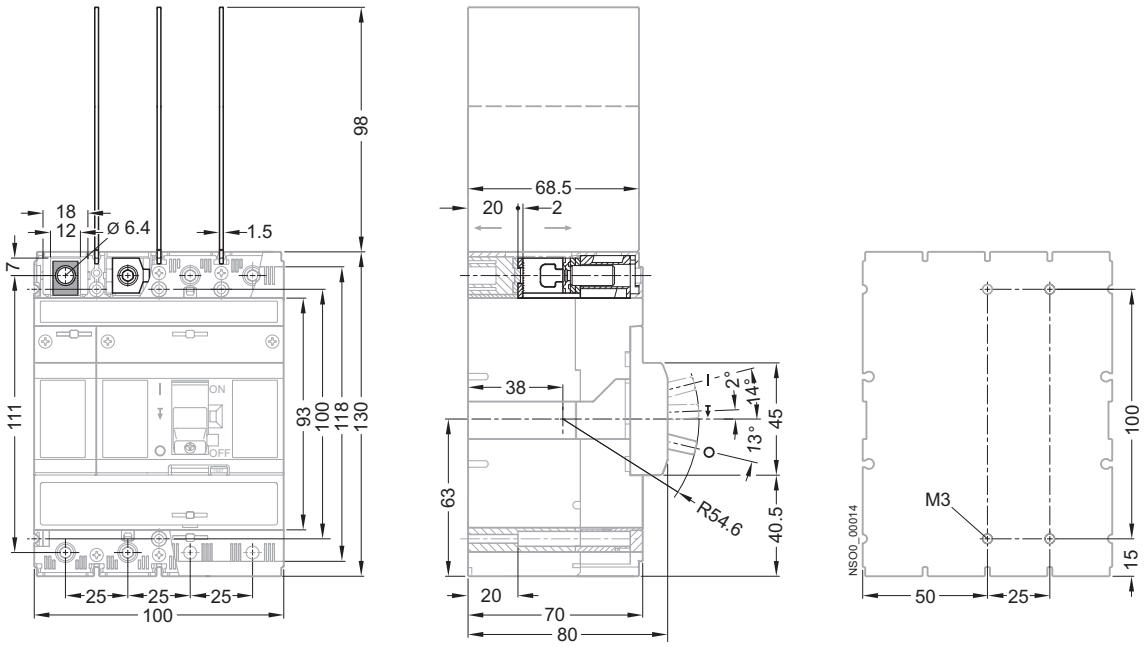




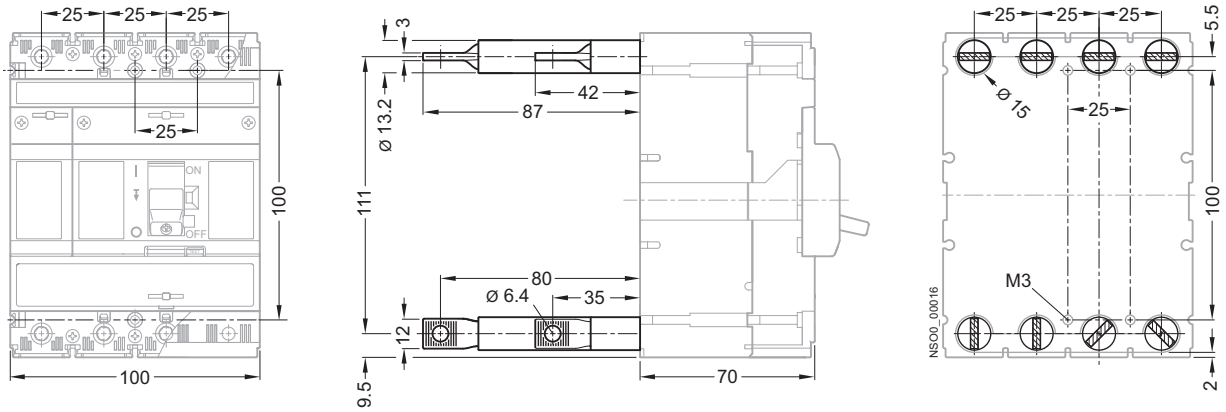
Project planning aids

4-pole version

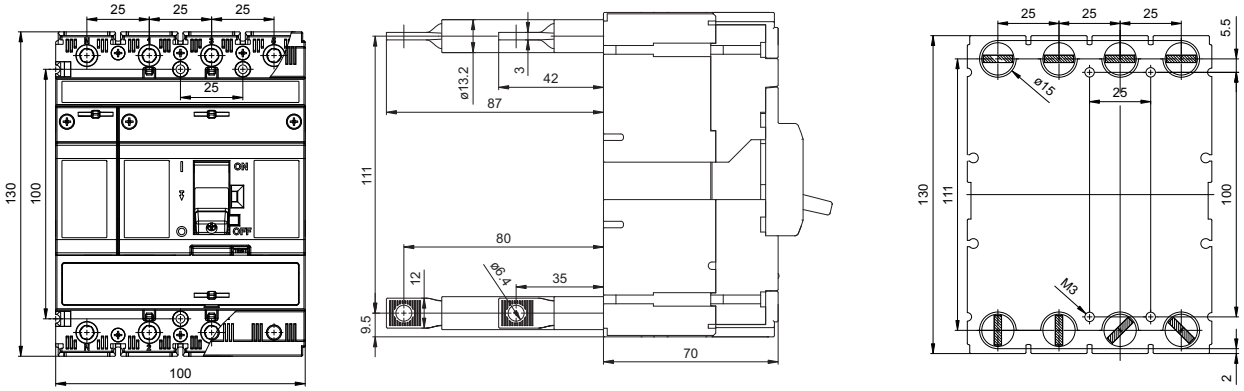
Fixed-mounted version, front connection



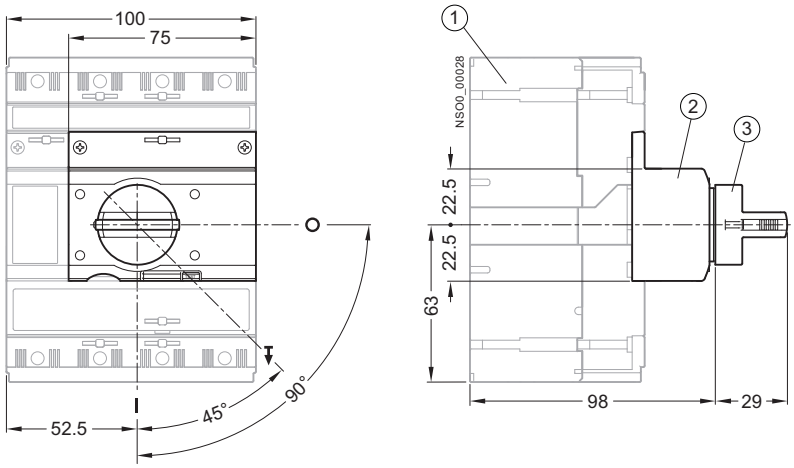
Fixed-mounted version, front connection (3VT9 100-4TF40 connecting set)



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

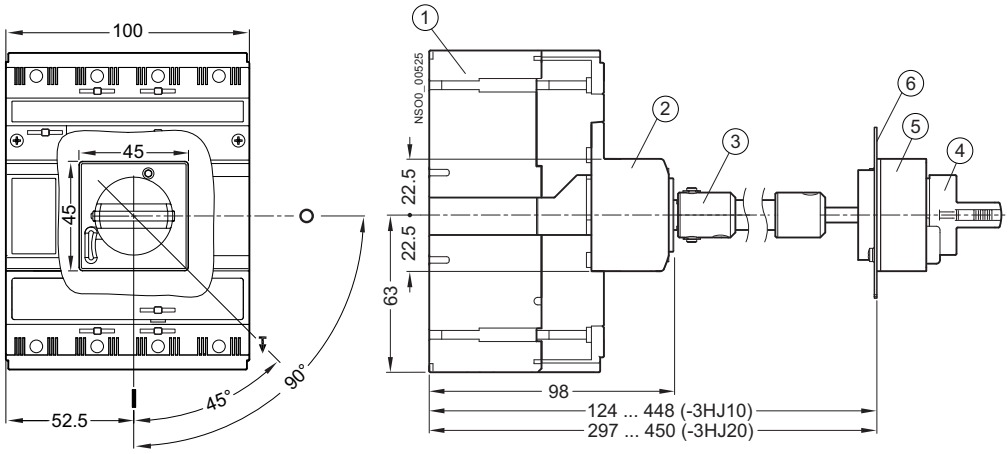


Fixed-mounted version, front manual operating mechanism



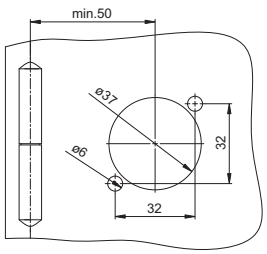
1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HE.0, 3HF.0

Fixed version, front manual operating mechanism with adjustable knob



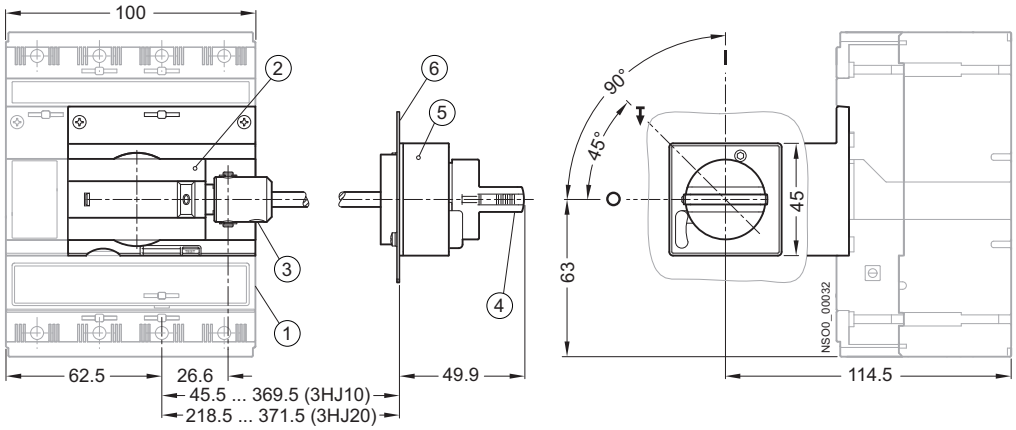
1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Adaptation of cabinet door dimensions



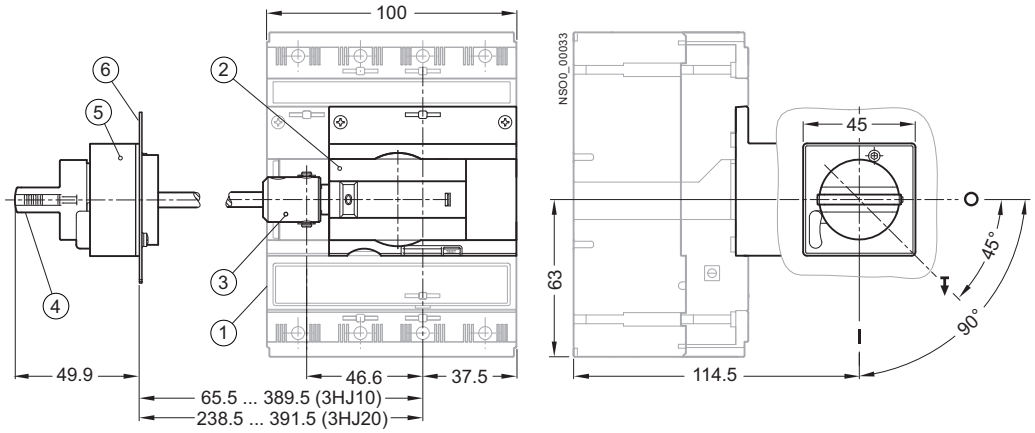
Project planning aids

Fixed-mounted version, lateral manual operating mechanism - right



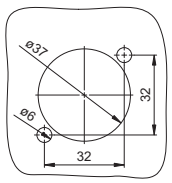
1 3VT1
2 3VT9 100-3HD10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Fixed-mounted version, lateral manual operating mechanism - left

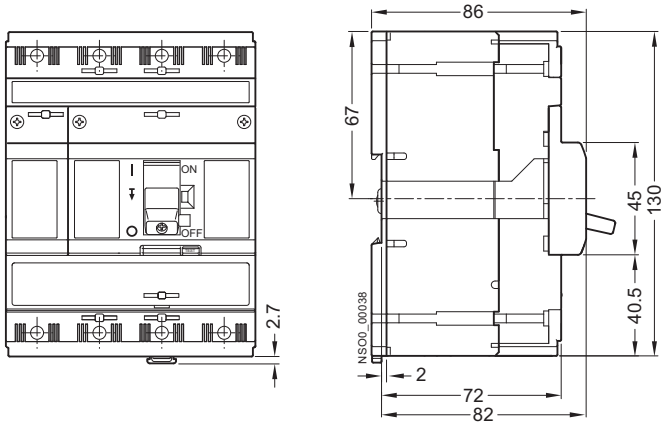


1 3VT1
2 3VT9 100-3HD10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

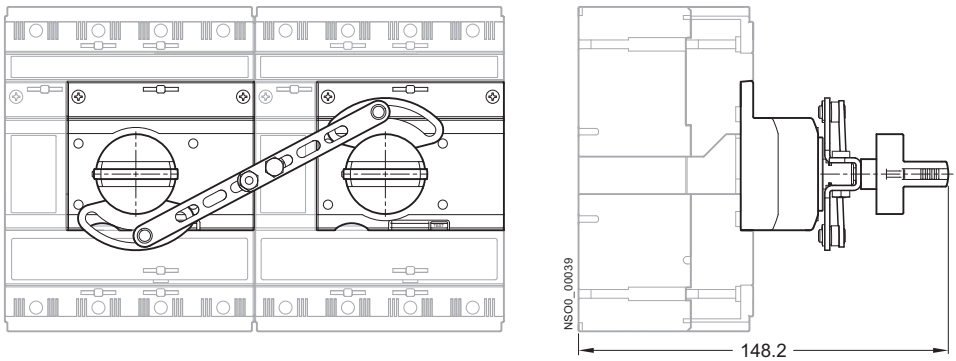
Adaptation of cabinet door dimensions



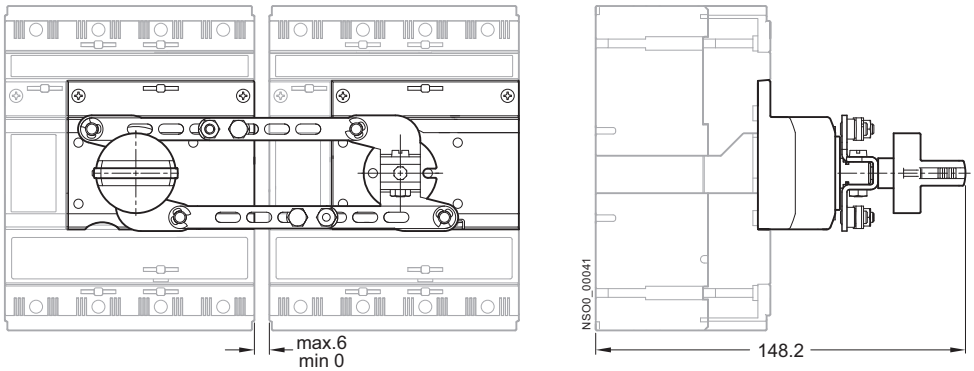
Fixed-mounted version, installation on a standard mounting rail (width 35 mm)



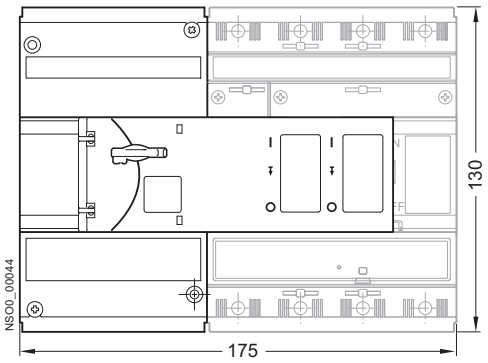
Arrangement of circuit breaker/switch disconnectors with 3VT9 100-8LA00 mechanical interlocks



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



Fixed-mounted version and lateral motorized operating mechanism



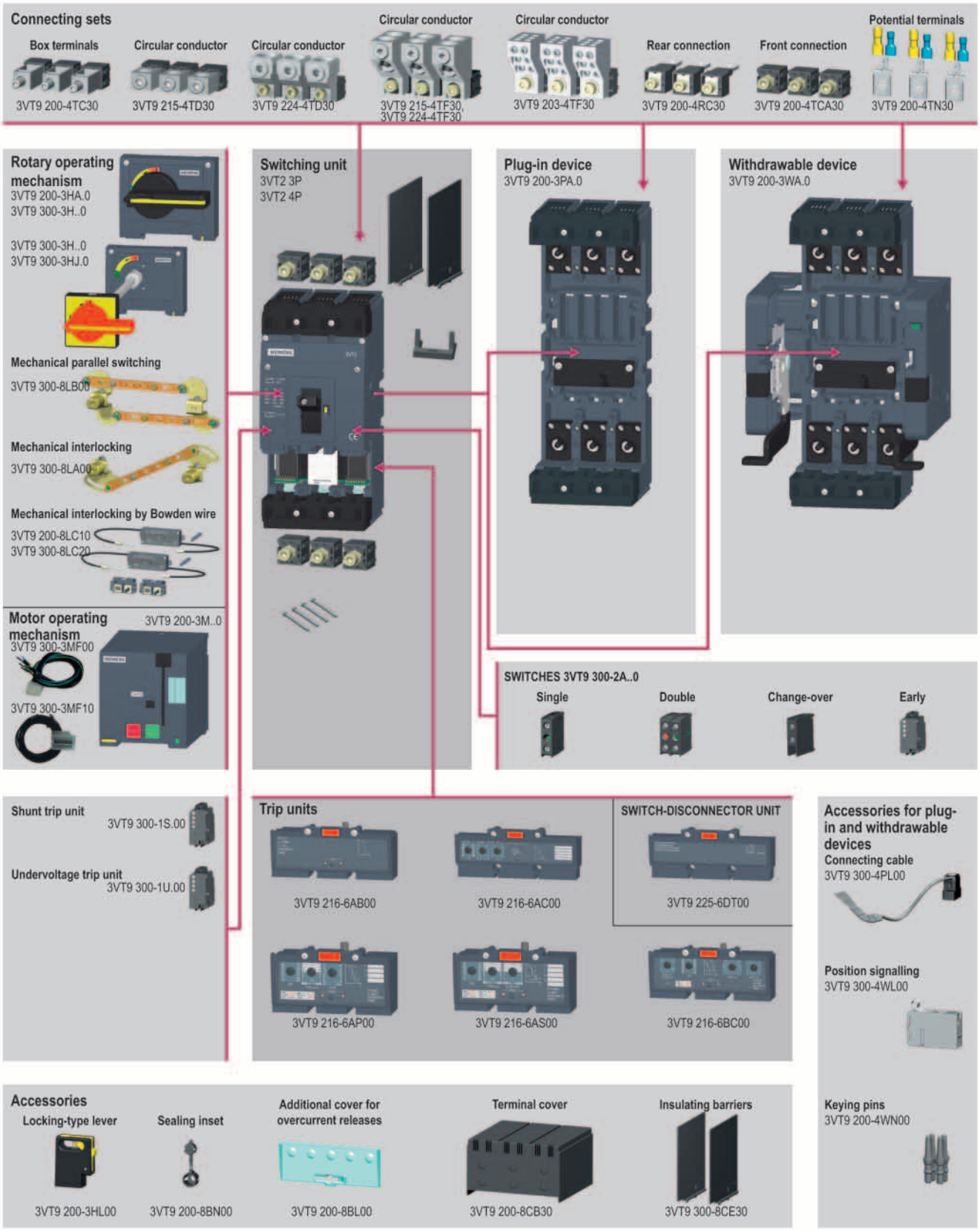
Notes

3VT2 Molded Case Circuit Breakers up to 250 A

3

General data

Overview



Overview

The circuit breakers consist of a 3- or 4-pole switching unit and an overcurrent release which is available with a choice of different characteristics. The switch disconnector is equipped with a switch disconnector module in place of the overcurrent release.

Switching units

The switching unit includes:
- Two 3VT9 200-4TA30 connecting sets – for connecting busbars or cable lugs
- 3VT9 300-8CE30 phase barriers
- A set of 4 installation bolts (M4 x 35)
- A conductor holder

The switching unit must be fitted with an overcurrent release (circuit breaker) or a 3VT9 225-6DT00 switch disconnector module (switch disconnector)

In case the circuit breaker is fed from below (input terminals 2, 4, 6; output terminals 1, 3, 5), I_{cu} does not change.

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

Overcurrent releases

ETU LP – characteristic L (lines)
- protecting lines with low starting currents
- without I_r regulation

ETU DP – characteristic D (distribution)
- protecting lines and transformers

ETU MP – characteristic M (motor)
- direct protection for motors and generators
- suitable also for protecting lines and transformers

ETU MPS – characteristic M (motor) with adjustable timing selectivity
- direct protection for motors and generators
- suitable also for protecting lines and transformers
- enables setting time delay of independent release to 0, 100, 200 or 300 ms

ETU DPN – characteristic D (distribution) with N-pole protection
- protecting lines and transformers in TN-C-S and TN-S network

For the description of releases see page 3/15.

Auxiliary switches and auxiliary releases

As an option, the circuit breakers can be equipped with
- Auxiliary switches
- Alarm switches
- Shunt release for remote tripping
- Undervoltage release for protecting motors and other equipment against damage in case of undervoltage.

Mounting

In the standard fixed-mounted design, the switching units can be mounted onto support plates. As an option, the units are available in plug-in or withdrawable versions (see page 3/8).

Connection

Main circuit
- Is connected, using Cu or Al busbars or cables, and possibly cables with cable lugs.
- For further connecting options, connecting sets can be used (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). 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 be fitted with 3VT9 300-8CE30 phase barriers also on the side of terminals 2, 4, 6.
- We recommend painting the connecting busbars.
- Input and output connectors/busbars must be mechanically reinforced to avoid transferring electrodynamic forces to the circuit breaker during short-circuiting.
- When connecting the main circuit, the dimensions of the deionization space of the circuit breaker must be observed, depending on the type of connection (see page 3/42).

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

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

Circuit breakers · Switch disconnectors

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	7.400
250	65	B	**3VT2 725-3AA36-0AA0**	1 unit	7.400
4-pole version, unprotected N					
250	36	B	**3VT2 725-2AA46-0AA0**	1 unit	7.400
250	65	B	**3VT2 725-3AA46-0AA0**	1 unit	7.400
4-pole version, protected N					
250	36	B	**3VT2 725-2AA56-0AA0**	1 unit	7.400
250	65	B	**3VT2 725-3AA56-0AA0**	1 unit	7.400

3

Accessories

Rated current I_n	Current setting of the inverse- time delayed overload releases „L“ I_r	DT	Order no.	PS*	Weight per PU approx.
A	A				kg
ETU overcurrent releases					
					
System protection, ETU LP, LI function [1]					
with fixed overload release, fixed short-circuit release					
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
					
System protection, ETU DP, LI function [1]					
with adjustable thermal overload release, adjustable short-circuit release					
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
					
System protection, ETU DPN, LIN function [2]					
with adjustable thermal overload release, adjustable short-circuit release					
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 and generator protection, ETU MP, LI function [1]					
with adjustable thermal overload release, adjustable short-circuit release					
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 and generator protection, ETU MPS, LSI function [1]					
with adjustable thermal overload release, adjustable short-circuit release					
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 module					
					
250	Switch disconnector [1]	B	**3VT9 225-6DT00**	1 unit	0,219

For the description of releases, see page 3/15.

[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 and
- alarm switches.

For remote switching, shunt releases can be built-in.

Undervoltage releases can be used to protect motors and other equipment against damage in case of undervoltage.

Selection and ordering data

	Rated control supply voltage U_s/ Frequency	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
	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
	Leading contacts					
	AC/DC 60 ... 500 V	B	**3VT9 300-2AJ00**		1 unit	0.040
Shunt releases						
	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 releases						
	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		**3VT9 300-1UC10**	on req.		
	AC/DC 110 V		**3VT9 300-1UD10**	on req.		
	AC 230, 400, 500 V/DC 220 V		**3VT9 300-1UE10**	on req.		

[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

Manual operating mechanisms

The rotary operating mechanism is to be completed:

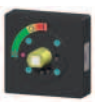
- For simple rotary operation of the switch unit:
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob or
  - 3VT9 300-3HF20 red knob
- For operating through the switchgear cabinet door:
  - 3VT9 300-3HJ..extension shaft
  - 3VT9 300-3HG/HH.. coupling driver for door-coupling operating mechanism
  - 3VT9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

Mechanical interlocking and parallel switching

- Mechanical interlocks for fixed-mounted design is to be completed:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanisms
  - 2 x 3VT9 200-3HE/HF.. knobs or
  - 1 x 3VT9 200-3HE/HF.. knob for parallel switching
- Mechanical interlocking by Bowden wire is intented for fixed-mounted, plug-in and withdrawable designs

Selection and ordering data

3

	Version	Color	DT	Order no.	PS*	Weight per PU approx.
						kg
Manual operating mechanisms						
	Rotary operating mechanisms					
	• locking not possible	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
	Knobs for manual operating mechanism					
	• locking not possible	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 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 have to be completed with: • 2 x 3VT9 300-3HA../HB.. rotary operating mechanisms, • 1 or 2 x 3VT9 300-3HE../HF.. knobs				
	**Mechanical interlock** for fixed-mounted design only	B	**3VT9 300-8LA00**	1 unit	0.136
	**Mechanical interlock for parallel switching** for fixed-mounted design 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 mechanisms 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		**3VT9 200-3MF00**		
	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		**3VT9 200-3MF10**		
	AC 230 V/DC 220 V	B	**3VT9 200-3MQ10**	1 unit	1.546
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

3

* You can order this quantity or a multiple thereof.

Mounting accessories

Overview

Plug-in version

- The plug-in device includes:
  - complete accessories for assembling circuit breakers/ switch disconnectors in plug-in design
  - a set of four installation bolts (M4 x 40) for fixing the switching unit to the plug-in device
- The device must be fitted with:
  - 3-pole version: 3VT2 725-.AA36-0AA0 switching unit
  - 4-pole version: 3VT2 725-.AA46-0AA0 or 3VT2 725-.AA56-0AA0 switching unit

For connecting the plug-in device with busbars or cable lugs, the 3VT9 200-4TA30 connecting sets can be used that are included in the scope of supply of the 3-pole 3VT2 725-.AA36-0AA0 or 4-pole 3VT2 725-.AA46-0AA0 switching unit. For connecting in another way, other connecting sets are available.

Withdrawable version

- The withdrawable device includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable design.
- The circuit breaker inside the withdrawable device can be moved between an operating position and a checking position (withdrawn).
- The device must be fitted with
  - 3-pole version: 3VT2 725-.AA36-0AA0 switching unit or
  - 4-pole version: 3VT2 725-.AA46-0AA0 or 3VT2 725-.AA56-0AA0 switching unit

3

Selection and ordering data

	Version	DT	Order no.	PS*	Weight per PU approx.
					kg
Plug-in devices					
	**3-pole version**	B	**3VT9 200-4PA30**	1 unit	1.766
	4-pole version	B	**3VT9 200-4PA40**	1 unit	2.100
Withdrawable devices					
	**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*	Type of connection	DT	Order no.	PS*	Weight per PU approx.
		mm²					kg
	Terminals for fixed-mounted circuit breakers						
	Connecting sets for 3-pole version						
	**Box terminals**	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**		Cu/Al busbars cable lugs	B	**3VT9 200-4RC30**	1 unit	0.237
	**Terminals for front connection** Included in every supply of switching units		Cu/Al busbars, cable lugs, flexibars	B	**3VT9 200-4TA30**	1 unit	0.120
	**Isolating 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	0.300
	for increased pole spacing	--	Cu/Al busbars cable lugs, flexibars	B	**3VT9 200-4EE30**	1	0.447
	Single terminals for 3- or 4-pole version						
	**Box terminal**	16 ... 150	Cu cables, flexibars	B	**3VT9 200-4TC00**	1 unit	0.320
	**Terminals for circular conductors**	25 ... 150	Cu/Al cables	B	**3VT9 215-4TD00**	1 unit	0.280
		150 ... 240	Cu/Al cables	B	**3VT9 224-4TD00**	1 unit	0.280
		2 x 25 ... 150	Cu/Al cables	B	**3VT9 215-4TF00**	1 unit	0.680
		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
	**Terminals for rear connection**		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
	**Phase 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 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: • overcurrent release • accessory compartment cover • terminal cover • manual operating mechanism • motorized operating mechanism	B	**3VT9 200-8BN00**	1 unit	0.001
	**Additional cover for overcurrent release** Provides protection for overcurrent releases	B	**3VT9 200-8BL00**	1 unit	0.080
	**Connecting cable** For connecting the circuit breaker/switch disconector accessories in withdrawable design (can also be used for plug-in and fixed-mounted design)	B	**3VT9 300-4PL00**	1 unit	0.020
	**Position signaling switch** For indicating the position of the circuit breaker in the plug-in or withdrawable device	B	**3VT9 300-4WL00**	1 unit	0.020
	**Coding set** Prevents inserting the wrong switching unit into the plug-in or withdrawable devices		**3VT9 200-4WN00**	1 unit	0.002
	**Pushbutton cover** For motorized operating mechanism; the cover may be provided with lead seals	B	**3VT9 300-3MF20**	1 unit	0.054

3

* 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 produced (see page 3/9).
- 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 phase barriers also on the side of 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 way of connecting the power circuit must observe the deionization space of the circuit breaker/switch disconnector (see page 3/42).

Auxiliary circuits

- Switches, shunt releases or undervoltage releases are connected using flexible 0.5 ... 1 mm^2 Cu conductors to terminals on these devices
- Motorized operating mechanism and auxiliary circuits of the plug-in or withdrawable design are connected using a connector.

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

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.	Rated current I_n	**Maximum permissible conductor cross-section** **Cable type** Sector-shaped conductor, stranded	Sector-shaped conductor, solid	Round conductor, stranded	Round conductor, solid	Busbars and cable lugs W x H	Technical information
	A	mm^2	mm^2	mm^2	mm^2	mm	Page
3VT9 200-4TA30	250					25 x ...	
3VT9 200-4RC30 **3VT9 215-4TF00**	250					25 x ...	3/45, 3/55
3VT9 200-4TC30 **3VT9 200-4TC00**	250	16 ... 150 Cu	10 ...150 Cu	16 ... 150	10 ...150 Cu		
3VT9 215-4TD30 **3VT9 215-4TD00**	250	25 ... 150 Cu/Al	16 ...150 Cu/Al	25 ... 150 Cu/Al	16 ... 150 Cu/Al		
3VT9 224-4TD30 **3VT9 224-4TD00**	250	150 ... 240 Cu/Al	120 ... 240 Cu/Al	150 ... 240 Cu/Al	120 ... 240 Cu/Al		3/44, 3/55
3VT9 215-4TF30 **3VT9 215-4TF00**	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		3/44, 3/55
3VT9 224-4TF30 **3VT9 224-4TF00**	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		3/44, 3/56
3VT9 203-4TF30 **3VT9 203-4TF00**	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		3/45, 3/56
3VT9 200-4ED30	250						3/46
3VT9 200-4EE30	250						3/46
3VT9 200-4TN30	10/16	1,5 ... 2,54 ... 6 Cu flexible conductor					

Technical specifications

Specifications		Circuit breakers			Switch disconnectors
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 690 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)[1] 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 18kA 8kA 5kA	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/AC440 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	Hz	3g (8 ... 50)			
Design modifications					
Front/rear connection		✔/✔			
Plug-in design		✔/+			
Withdrawable design		✔/+			
Accessories					
Switches – auxiliary/relative/signal/leading		✔/✔/✔/✔			
Shunt release/with signal switch		✔			
Undervoltage release/with leading switch/with signal switch		✔/✔			
Front manual operating mechanism/lateral operating mechanism at the right/left hand side		✔/✔			
Mechanical interlocking of manual operating mechanisms, by Bowden wire		✔/✔			
Motorized operating mechanism/with operations counter		✔/✔			
Locking-type knob		✔			
Bolt sealing inset/additional cover for overcurrent release		✔/✔			

✔ available

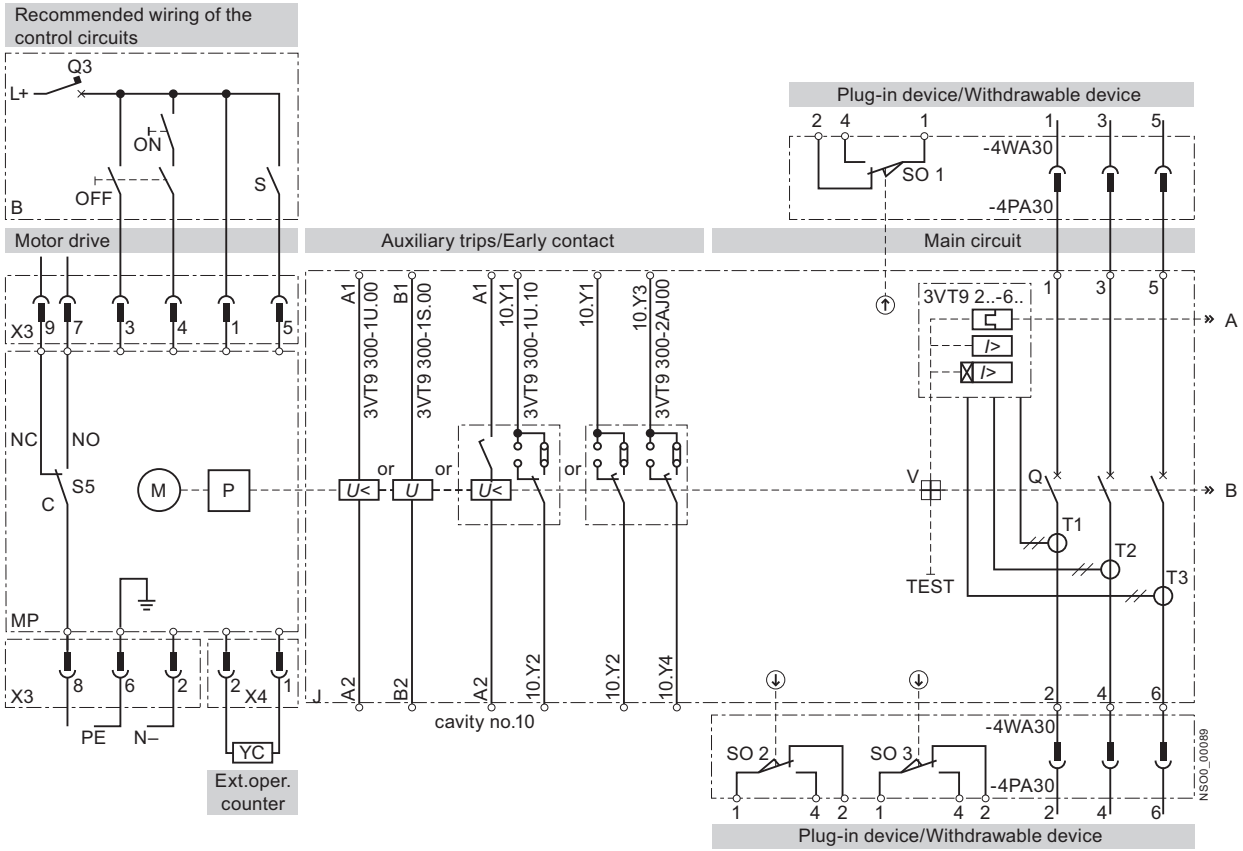
-- unavailable

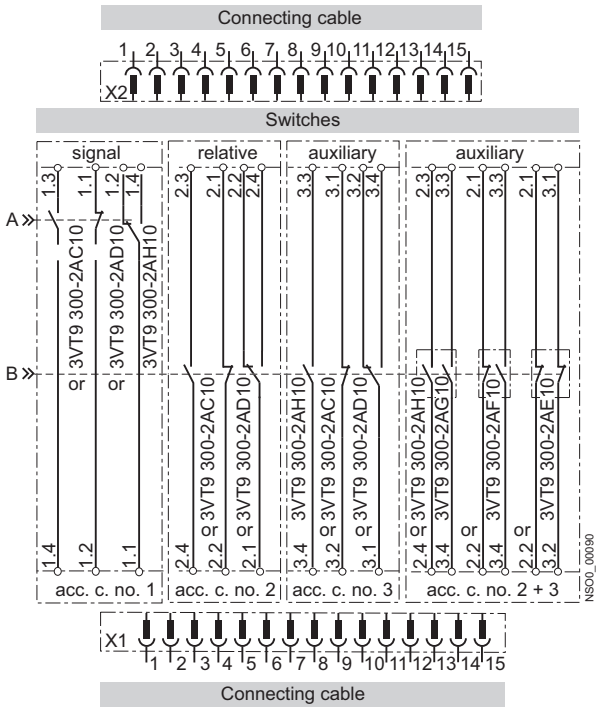
\+ in preparation

Schematics

Circuit breakers with accessories

3-pole version



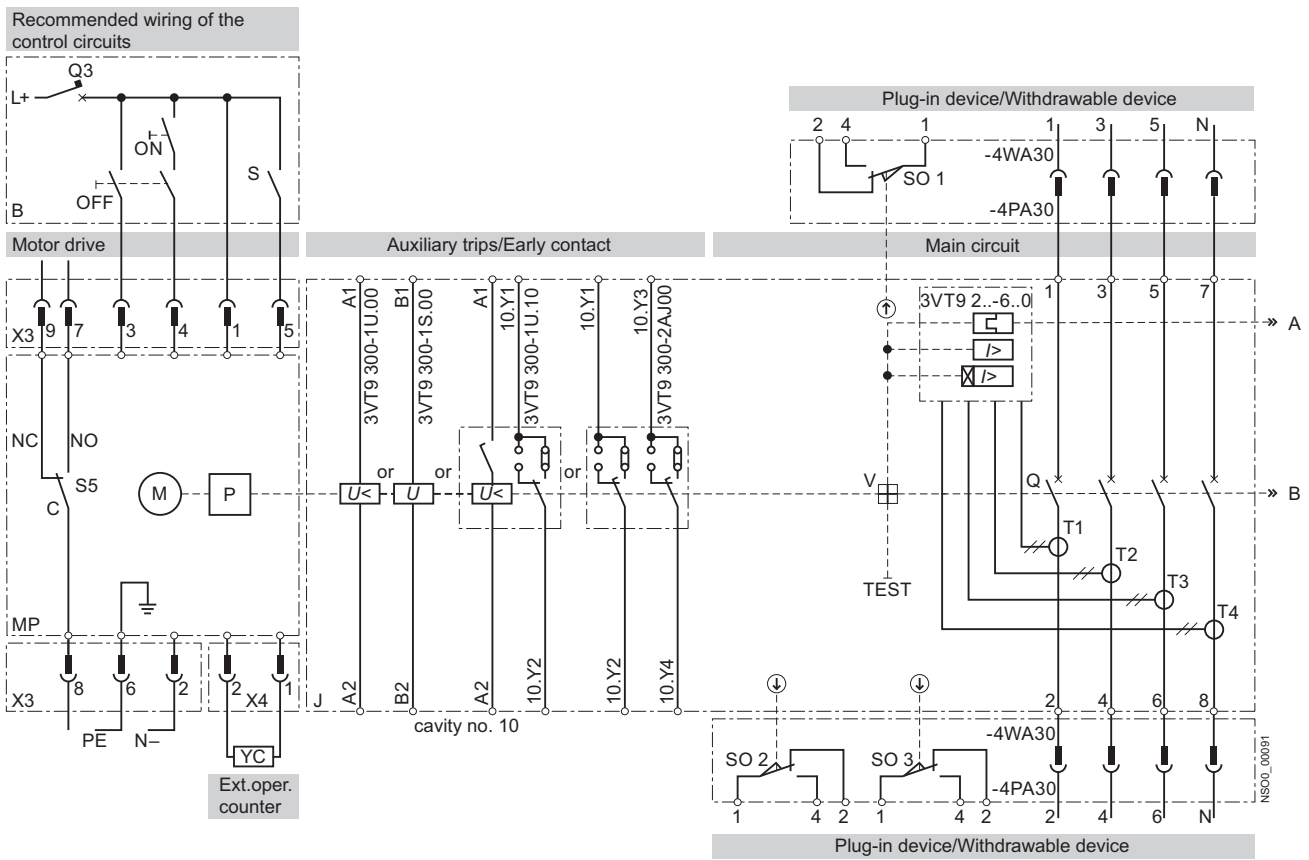


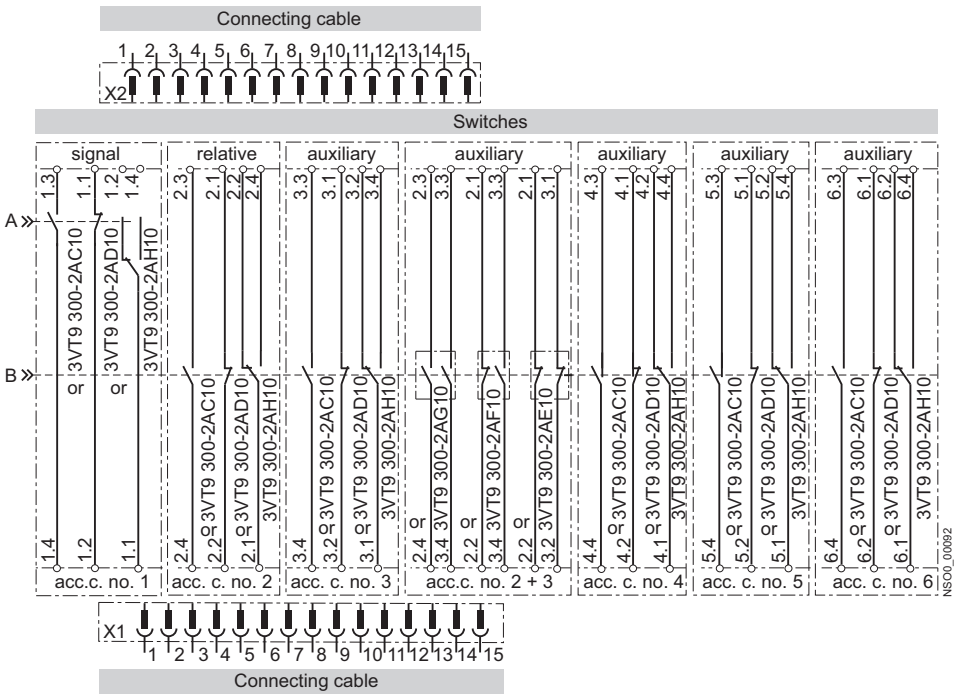
MP	3VT3 200-3M..0 motorized operating mechanism
M	motor
P	storage device
X3	connector to connect control circuits
X4	connector for external operations counter
S5	switch to signal AUTO (NO-C) / MANUAL (NC-C) modes
YC	3VT9 300-3MF10 external operations counter
B	recommended wiring of the control circuits (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
ETU LP/DP/MP/MPS	circuit breaker - overcurrent release / switch disconnector - 3VT9 225-6DT00 switch disconnector module
TEST	pushbutton to test release
3VT9 200-4PA30	plug-in device
3VT9 200-4WA30	withdrawable device
X1, X2	3VT9 300-4PL00 connecting cable
SO1, SO2, SO3	contacts signaling position of circuit breaker/switch disconnector in plug-in or 3VT9 300-4WL00 withdrawable device
3VT9 300-14.00	undervoltage release
3VT9 300-15.00	shunt release
3VT9 300-14.10	undervoltage release with leading contact
3VT9 300-2AJ00	leading contact

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

Circuit breakers · Switch disconnectors

4-pole version





Overview

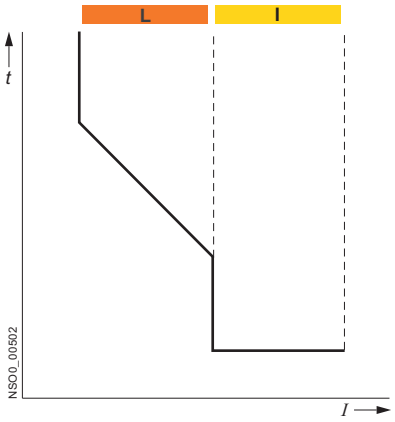
The electronic overcurrent release consists of a separate and interchangeable unit, which is supplied with the 3VT2 switching unit. By exchanging the overcurrent release, the range of the rated current of the circuit breaker can be easily changed.

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

Tripping characteristics

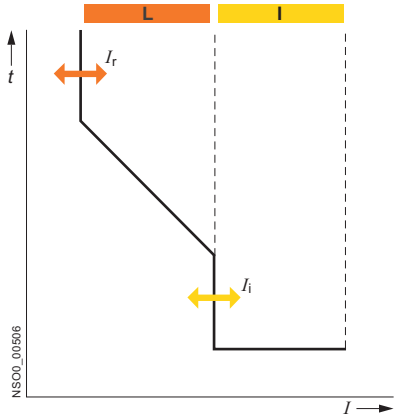
Depending upon the needs for adjusting the tripping characteristic to the protected device and to the variability of the characteristic with regard to selectivity, the following releases are available:

ETU LP



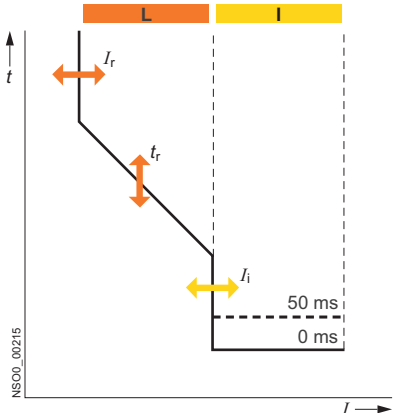
They have one type of characteristic and fixed-set I_r and I_i settings.

ETU DP



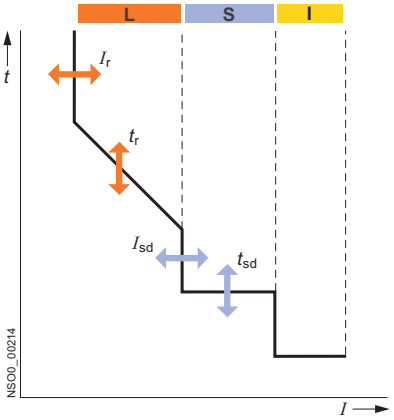
They have one type of characteristic with adjustable I_r and I_i.

ETU MP



They have more kinds of characteristics with adjustable I_r, t_r and I_i.

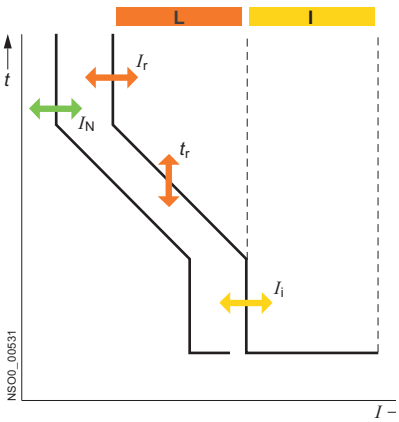
ETU MPS



They have more kinds of characteristics with adjustable I_r, t_r, I_i and t_v.

ETU LP, DP, MPand MPs overcurrent releases 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 DPN



They 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.

Overcurrent releases

Function

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

Proper functioning of releases does not depend on the form of current in the main circuit. The function of the release is supported by a microprocessor, which processes a sampled signal of the power circuit and recalculates it to obtain an rms value. Therefore, the releases 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 releases protect a circuit against short-circuiting and overloading. The tripping characteristics are independent of the ambient temperature. The release is fixed to the switching unit by two bolts. The transparent cover over the adjustment controls can be sealed.

Setting the tripping characteristic

The tripping characteristic of the overcurrent releases is defined by standard EN 60947-2. For releases ETU DP, MP, MPS and DPN, the characteristic is adjusted using latched switches on the overcurrent release.

A visual demonstration on setting the tripping characteristic can be found in the SIMARIS design program.

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 releases, 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 releases, the time delay can be set at 0 or 50 ms.

1. Dependent release (thermal) L

- The dependent release **ETU DP** is adjusted using one I_r switch. The I_r switch is used to adjust the rated current of the circuit breaker, with the characteristic shifting on the current axis. By means of its internal circuitry, the release is set to one type of characteristic.
- The dependent releases **ETU MP, MPS and DPN** are adjusted using two switches, I_r and t_r. The first (I_r) switch is used to adjust the circuit breaker's rated current. The characteristic is moved on 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. For ETU MP and MPS releases there are 4 characteristics for motor protection and 4 characteristics for protecting lines available. Breaking times correspond with the release classes 10, 20, 30. By changing t_r, it is possible to select the characteristic according to the required motor starting (light, medium, heavy or very heavy starting). For ETU DPN releases, there are available 8 characteristics for protecting lines or transformers. It is not possible to turn the device back on right after the dependent release has been actuated and circuit breaker tripped. The release must be allowed to cool off, because it has a thermal memory. The memory can be disabled by turning the switch from the normal "T_t" position to the "T_0" position. The dependent release remains active, and only its thermal memory is inactivated. 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 with repeated tripping.

2. Delayed independent release S

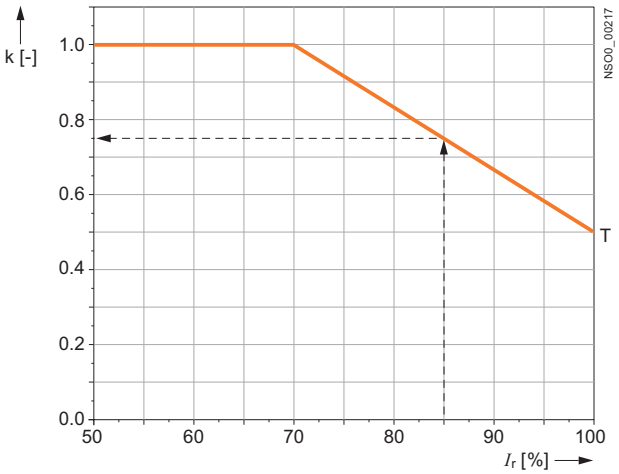
This release type is only in the ETU MPS overcurrent releases. The delayed independent release has the function of a delayed short-circuit release. It is used to set up a selective cascade of circuit breakers. It is set up using parameters I_{sd} and t_v. I_{sd} is an n-multiple of current I_r (I_{sd}= n × I_r). It 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 release. The delayed independent release 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. Independent instantaneous release (short-circuit release) **I**

- For releases **ETU DP, MP and DPN**, the independent instantaneous release is adjusted using one I_{rm} switch. The I_{rm} switch is used for setting up the short-circuit current that, upon being reached or exceeded, causes instantaneous tripping of the circuit breaker.

Tripping characteristics of ETU LP, DP, MP, MPS and DPN releases 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 releases are independent of the ambient temperature and are plotted in a cold state. Digital releases enable simulation of a release 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 overcurrent releases, 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 hortened to:

t_s **= 0.74 x** t_v

k [–] time shortening coefficient

I_r [A] adjusted rated current of the overcurrent release

t_v [s] tripping time of the release derived from the characteristic

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

t_u [s] standstill period for particular characteristics

Overcurrent releases 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

Overcurrent releases ETU LP - Lines

Protecting lines with low starting currents

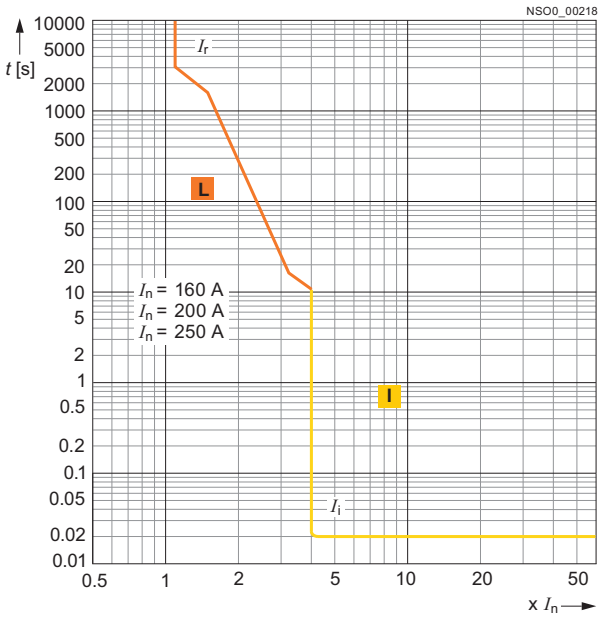
The 3VT9 2..-6AB00 release is intended only for 3VT2725 -.AA36-0AA0 or 3VT2725 -.AA46-0AA0 switching unit. The release has a thermal memory that cannot be disabled. The rated currents of the releases are given by their type designations and correspond to a standardized series of currents (see specifications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

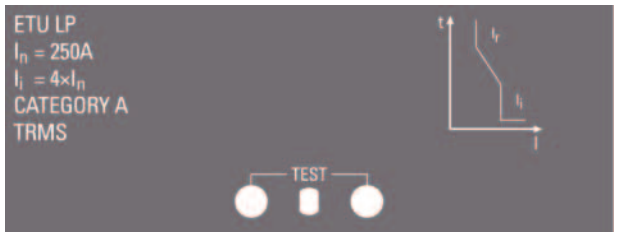
One of the advantages of the releases is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

Specifications

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

Tripping characteristics





Overcurrent releases

Overcurrent releases ETU DP - Distribution

Protecting lines and transformers

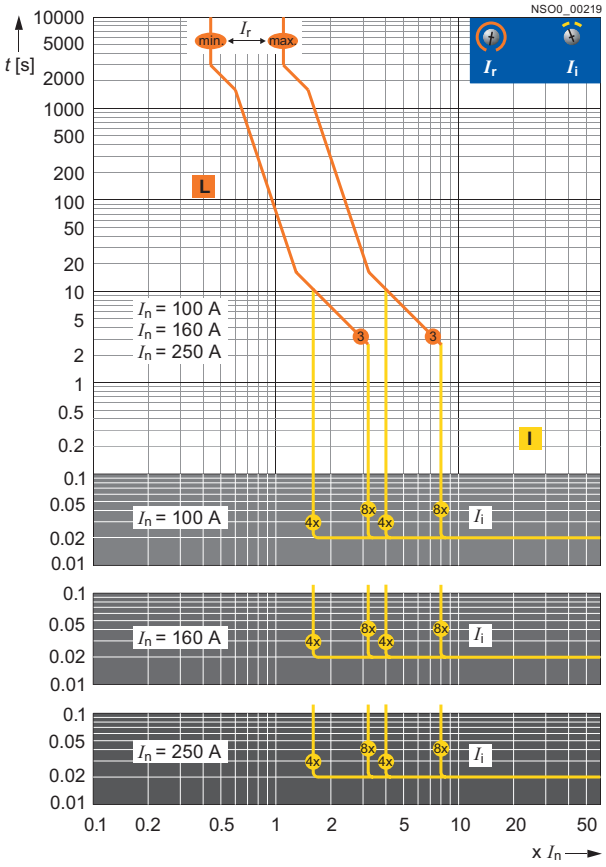
The 3VT9 2..-6AC00 release is intended only for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. Operation of the release is controlled by a microprocessor. The release is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position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

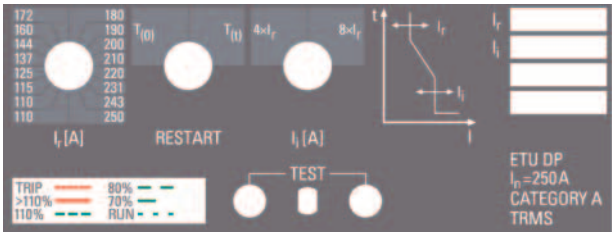
On the lower part of the release cover are two photocells for communicating with the prospective signaling unit.

The releases have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r.

The releases 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

Overcurrent releases ETU MP - Motors

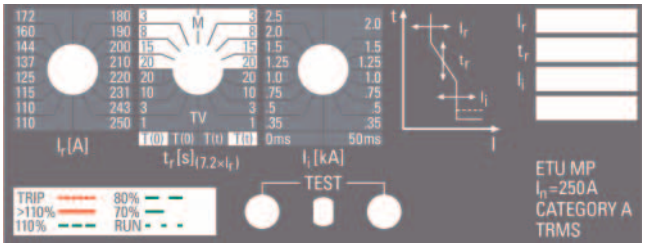
- Direct protection for motors and generators
- Possibility for protecting lines and transformers

The 3VT9 2..-6AP00 release is intended only for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. The operation of the release is controlled by a microprocessor. The release 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 release 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 release).

Another parameter for adjusting the release consists of the rated current and short-circuit tripping level. The time delay of the short-circuit release 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. On the lower part of the release cover are two photocells for communicating with the prospective signaling unit.

The releases 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 release. 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.

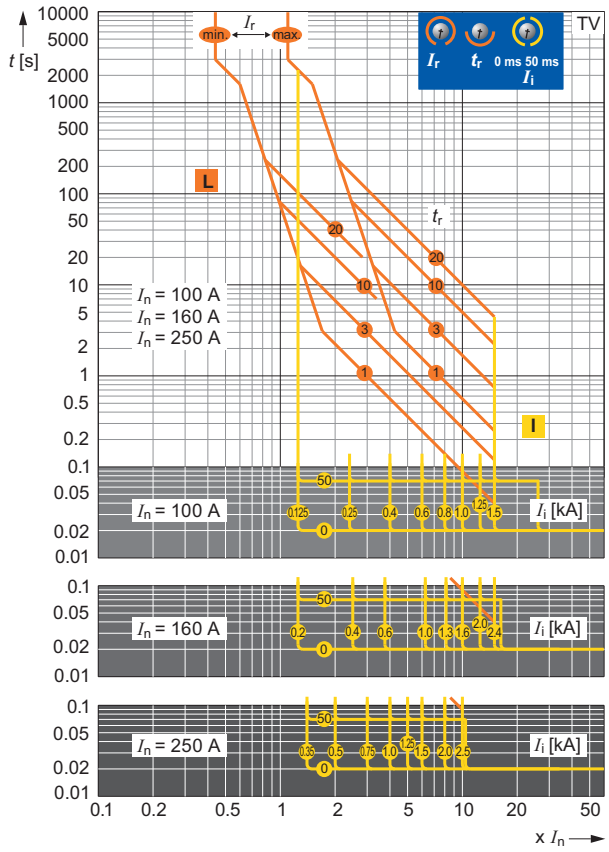


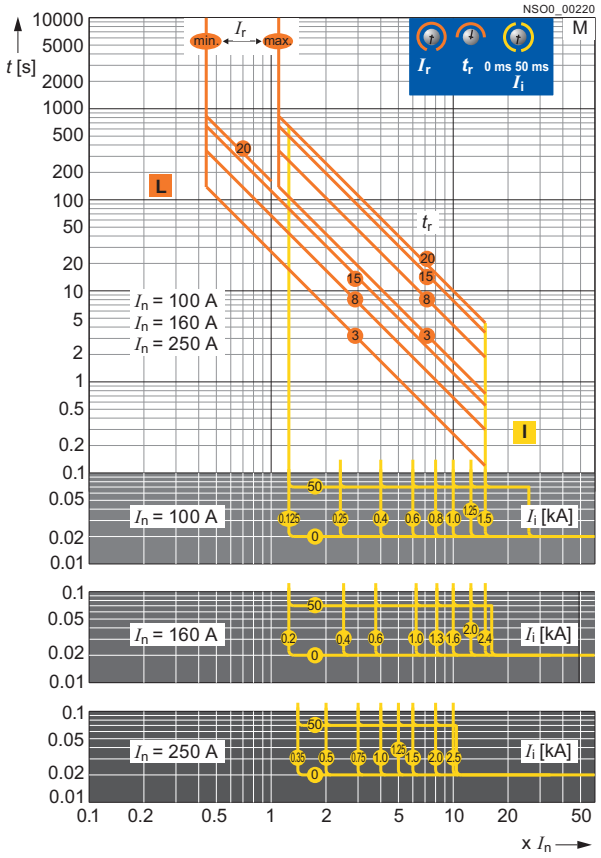
Adjustable specifications

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
		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	

Overcurrent releases

Tripping characteristics





Overcurrent releases ETU MPS - Motors with setting timing selectivity

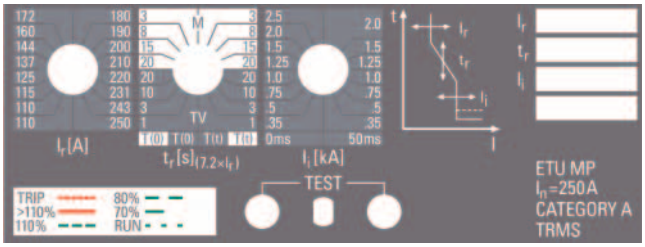
- Direct protection for motors and generators
- Possibility for protecting lines and transformers
- Enables adjusting time delay of independent release

The 3VT9 2..-6AS00 release is intended for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. The operation of the release is controlled by a microprocessor. The release 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 release 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 release).

Another parameter for adjusting the release is the rated current and tripping level of the delayed short-circuit release. The time delay (t_{sd}) can be set on the delayed short-circuit release 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. On the lower part of the release cover are two photocells for communicating with the prospective signaling unit.

The releases 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 release. 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.

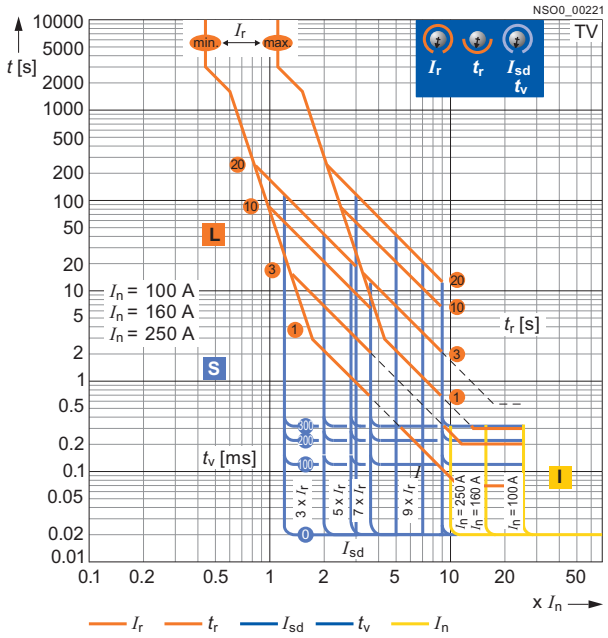


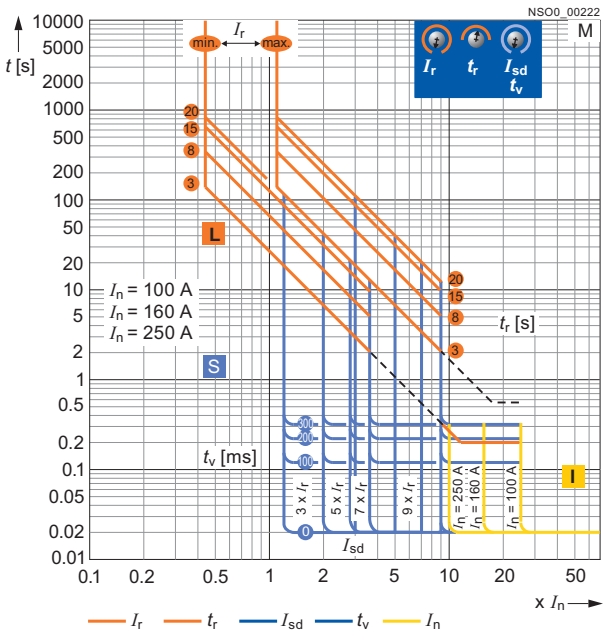
Adjustable specifications

Order No.	Rated current I_n	Overload protection I_r	t_{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	

Overcurrent releases

Tripping characteristics





Overcurrent releases ETU DPN - Distribution with protected N pole

- Protecting lines and transformers in TN-C-S and TN-S networks

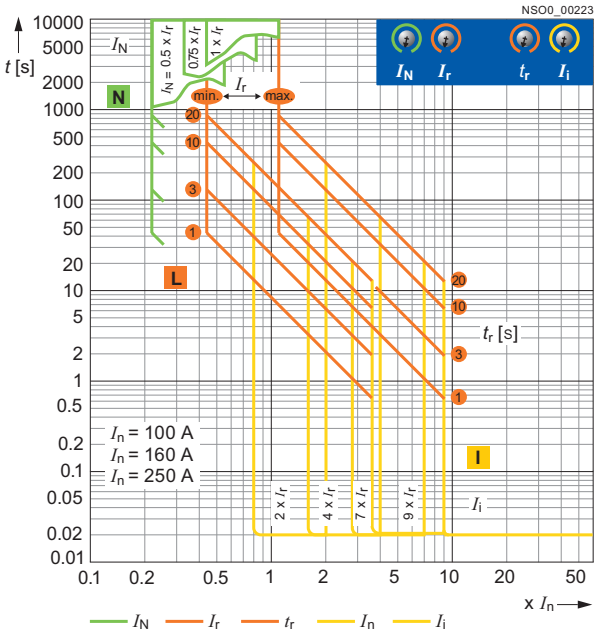
The 3VT9 2..-6BC00 release is intended only for the 3VT2 725-.AA56-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling of the thermal memory, the thermal release remains active.

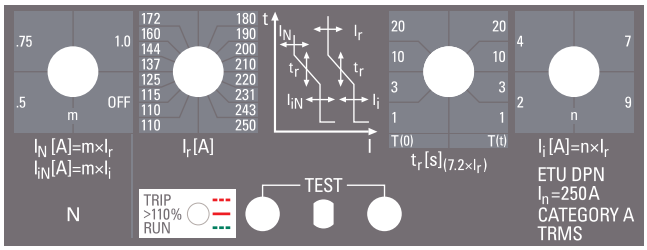
The rated current I_r, delay for switching off the release at 7.2 I_r, and the tripping level of the short-circuit release can be adjusted.

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. On the lower part of the release cover are two photocells for communicating with the prospective signaling 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



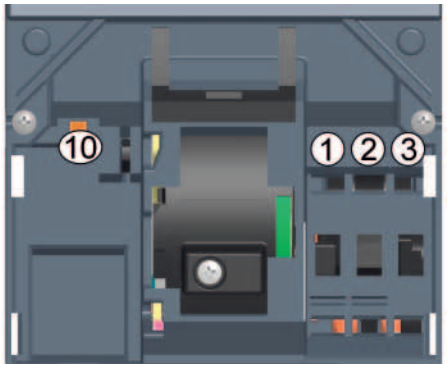


Adjustable specifications

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

Type designation according to contact arrangement

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

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

Accessory compartment	Switch name
1	Signaling
2	Relative
3 (4,5,6)[1]	Auxiliary
10	Leading

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

- Signaling switch: The switch is located in accessory compartment 1. Its function is to signal the state of the circuit breaker.
- Relative switch: The switch is located in accessory compartment 2. This switch indicates the tripping of the circuit breaker by releases, the TEST pushbutton or the OFF pushbutton on the motorized operating mechanism.
- Auxiliary switch: in compartement 3, an auxiliary switch is located. Its function is to indicate the switching position of the main contacts (in the 4-pole version, auxiliary switches can also be installed in accessory compartments 4,5 and 6). The leading switches are intended for the make/break function in advance of the main contacts.

Function

States of auxiliary switches in the switching unit accessory compartments

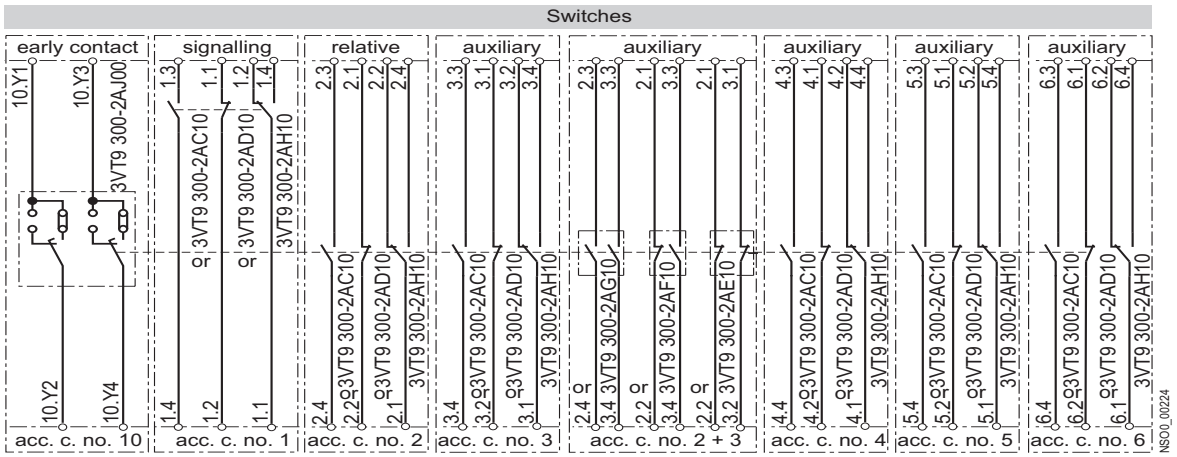
Circuit breaker state	Toggle positon of circuit breaker	State of the main contacts	Accessory compartment 1		2		3 (4 ... 6)[1]		10		2 and 3		2 and 3		2 and 3		1		2		3	
			3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AC10	3VT9 300-2AD10	3VT9 300-2AJ00	3VT9 300-1U.10	3VT9 300-2AG10		3VT9 300-2AF10		3VT9 300-2AE10		3VT9 300-2AH10		3VT9 300-2AH10		3VT9 300-2AH10	
Switched on		**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 over-current release		**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 release 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 4, 5, 6 are only for 4-pole version.

Location of switches in accessory compartments, see page 3/57.

State of switches in the switching unit accessory compartments



Technical specifications

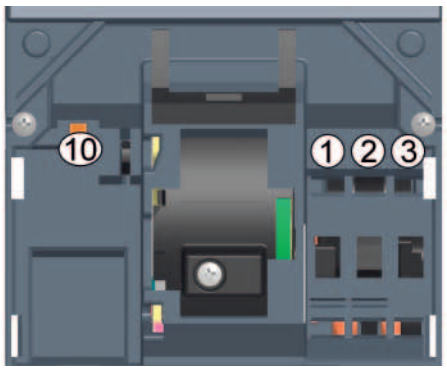
General data

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 to control electromagnetic loads

Auxiliary releases

Overview



Location of accsessory compartments in 3VT2

The particular rated operating voltage of the shunt release is set up by jumpers located on the right hand side in the release. It is always set to the maximum value by default.

Type designation of shunt releases 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

Type designation of undervoltage releases according to the rated operating voltage

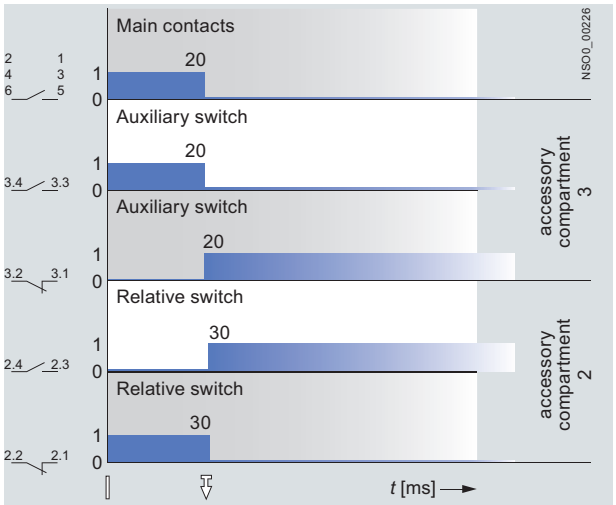
Order No.	Rated operating voltage U_e
3VT9 300-1UC00	AC/DC 24, 40, 48 V
3VT9 300-1UD00	AC/DC 110 V
3VT9 300-1UE00	AC 230, 400, 500/DC 220 V

- Signaling switch: The switch is located in accessory compartment 1. Its function is to signal the state of the circuit breaker.
- Relative switch: The switch is located in accessory compartment 2. This switch indicates the tripping of the circuit breaker by releases, the TEST pushbutton or the OFF pushbutton on the motorized operating mechanism.
- Auxiliary switch: in compartement 3, an auxiliary switch is located. Its function is to indicate the switching position of the main contacts (in the 4-pole version, auxiliary switches can also be installed in accessory compartments 4,5 and 6). The leading switches are intended for the make/break function in advance of the main contacts.

Function

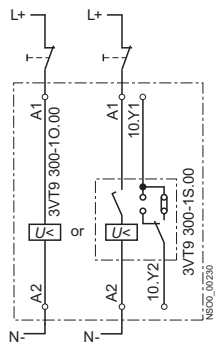
Shunt releases

Circuit breaker switched off by the shunt release



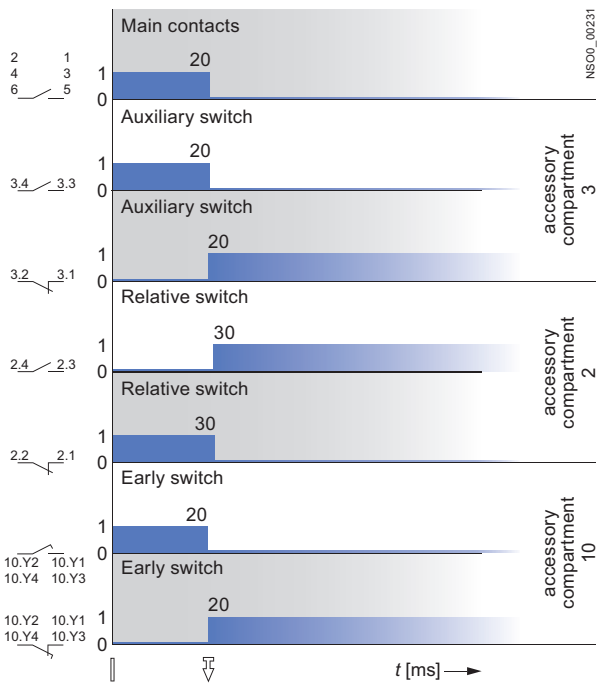
Circuit breaker states and toggle positions of the circuit breaker

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



Undervoltage releases

Circuit breaker switched off by the undervoltage release

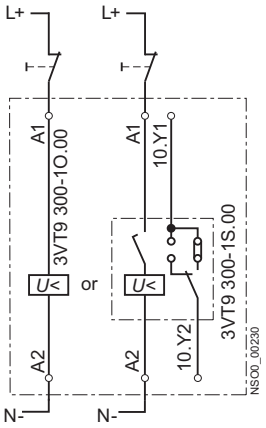


Circuit breaker states and toggle positions of the circuit breaker

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

Number and type of contacts by arrangement of contacts

Arrangement of contacts	Number of contacts	Contct types
02	2	break
11	1 + 1	break + make
20	2	make



Technical specifications

Shunt releases

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		50/60 Hz
Input power at 1.1 U_e		AC < 3 VA DC < 3 W
Functional description		U ≥ 0,7 U_e the circuit breaker must trip
Time to switch-off	ms	20
Loading time		∞
Connection cross-section S	mm^2	0.5 ... 1
Terminal protection (connected release)		IP20
Location in accessory compartment No.		10

Undervoltage releases

Order No.		3VT9 300-1U.00	3VT9 300-1U.10[2]
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[1]		U ≥ 0.85 U_e (circuit breaker is possible switch on) U ≤ 0.35 U_e (the circuit breaker must trip)	
Time to switch off	ms	20	
Loading time		∞	
Connector cross-section S	mm^2	0.5 ... 1	
Terminal protection (connected release)		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 release)		--	IP20

[1] Tripping of the undervoltage release can be delayed using the 3VT9 00-1UX00 delay unit, for more detailed information, see page P.

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

Manual operating mechanisms

Overview

Rotary operating mechanisms

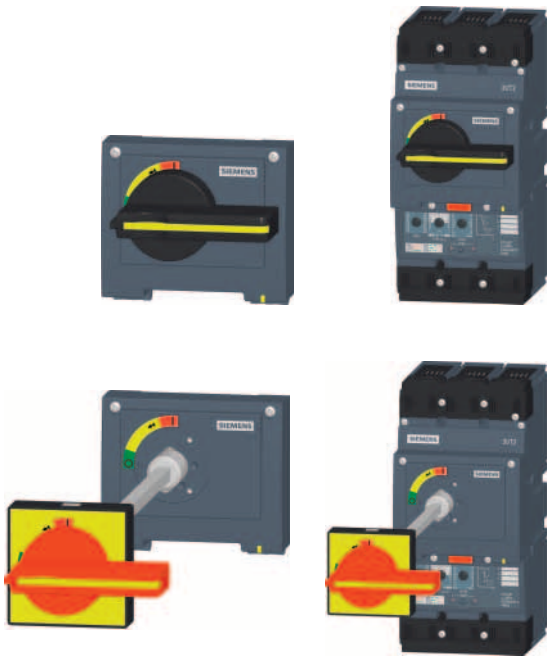
The following elements of the rotary operating mechanisms need to be used:

- for controled use of the switch unit with:
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob
  - 3VT9 300-3HF20 red knob
- for controlling through the switchgear cabinet door with:
  - 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 interlocks for parallel switching

- Mechanical interlocks for fixed-mounted versions are to be completed by:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9 200-3HE/HF.. knob
- Mechanical interlocking with Bowden wire is intented for fixed-mounted, plug-in and withdrawable designs
- Mechanical interlocking is to be completed with:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9 200-3HE/HF.. knob

Design



The rotary operating mechanism makes possible to govern the circuit breaker by pivoting knob, e.g. to switch machines on and off. Modular conception of operating mechanisms makes possible simple mounting on the switching unit (also additionally) after the accessory compartment cover is removed. A fixed motor is possible to seal. The operating mechanism and its accessories is ordered separately according to your choice (see page 3/6).

- The rotary operating mechanism makes possible to control the circuit breaker:
  a) from the front panel of the circuit breaker (Fig.1)
  3VT9 200-3HA/HB.. rotary operating mechanism
  + 3VT9 300-3HE/HF.. knob
  b) through the switchgear 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 for door-coupling operating mechanism
- The rotary operating mechanism is fixed right on the switching unit of the circuit breaker
- The coupling driver is fixed onto the switchgear door and 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 supplied in two options, standard (length 365 mm - can be cut short) and telescopic (adjustable length 245 ... 410 mm).

Enhanced safety for operator:

- The rotary operating mechanism and knob are also supplied with the possibility to lock the circuit breaker in position “switched off manually“. The unit and knob of the rotary operating mechanism can be locked using three padlocks with shank diameter max. 4 ... 6 mm
- Each coupling driver for door-coupling operating mechanism prevents the door from opening when the circuit breaker is on-state or off-state by releases and types 3VT9300-3HG10 and 3VT9300-3HG20 when the circuit breaker is in the state switched off manually and rotary operating mechanism knob is locked up
- Two circuit breakers with rotary operating mechanisms can be provided with mechanical interlock or with parallel mechanical switching (see page 3/62).

Features

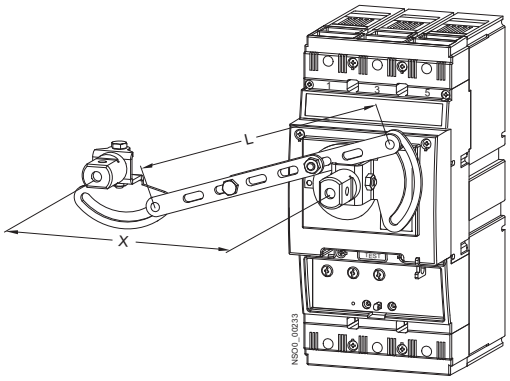
Order No.	Description	Colour	Locking while the circuit breaker is in OFF state	Degree of protection	Switchgear door locking in the circuit breaker state		
					switched on or off by release	switched off manually and locked	Length mm
3VT9 200-3HA10	Rotary operating mechanism	grey	no	--	--	--	--
3VT9 200-3HA20	Rotary operating mechanism	grey	yes	--	--	--	--
3VT9 200-3HB20	Rotary operating mechanism	yellow	yes	--	--	--	--
3VT9 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	--	--	--	--	--	365 (can be short)
3VT9 300-3HJ20	Extension shaft, telescopic	--	--	--	--	--	245 ... 410

Function

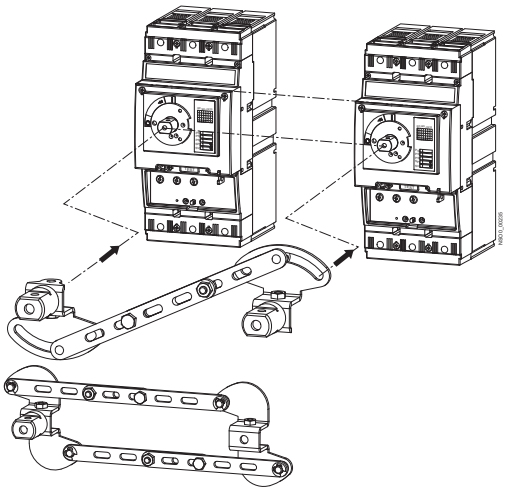
3VT9 300-8LA00 Mechanical interlocking

Provides mechanical interlocking of two circuit breakers/switch disconnectors so that they cannot both be tripped simultaneously, but only one of them at the same time. Both circuit breakers may be turned 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 a rotary operating mechanism (at least one with a rotary operating mechanism and knob).

In order to use the interlocking, it is absolutely necessary to comply with the dimensions shown in the figure and table.



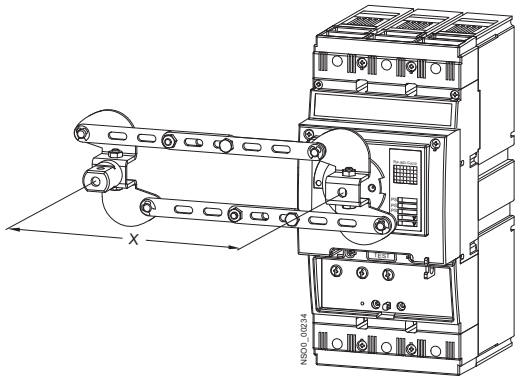
Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2 3P	105	112	140	145.5	122.5	128.5	181	185.5
3VT2 4P	105	112	140	145.5	122.5	128.5	181	185.5
3VT3 3P	122.5	128.5	157.5	145.5	140	145.5	185	189
3VT3 4P	122.5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



3VT9 300-8LB00 Mechanical parallel switching

Provides for simultaneous switching of two circuit breakers/switch disconnectors. Parallel switching can be used between two 3VT2 circuit breakers or between 3VT2 and 3VT3 circuit breakers. Each circuit breaker must be equipped with a rotary operating mechanism and at least one with a knob.

In order to use parallel switching, it is absolutely necessary to comply with the dimensions shown in the figure and table.

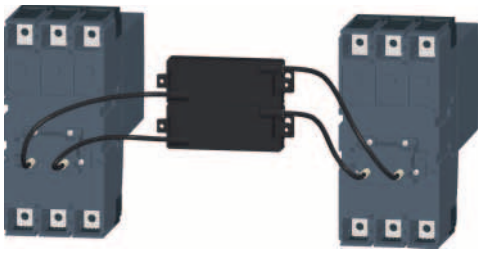


Left switching unit	Right switching unit							
	3VT2 3-pole		3VT2 4-pole		3VT3 3-pole		3VT3 4-pole[1]	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2 3P	105^{+7}	112^{+7}	140^{+7}	145.5^{+7}	122.5^{+7}	128.5^{+7}	x	x
3VT2 4P	105^{+7}	112^{+7}	140^{+7}	145.5^{+7}	122.5^{+7}	128.5^{+7}	x	x
3VT3 3P	122.5^{+7}	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) can only be on the right side.

Manual operating mechanisms

3VT9 300-8LC.0 Mechanical interlocking

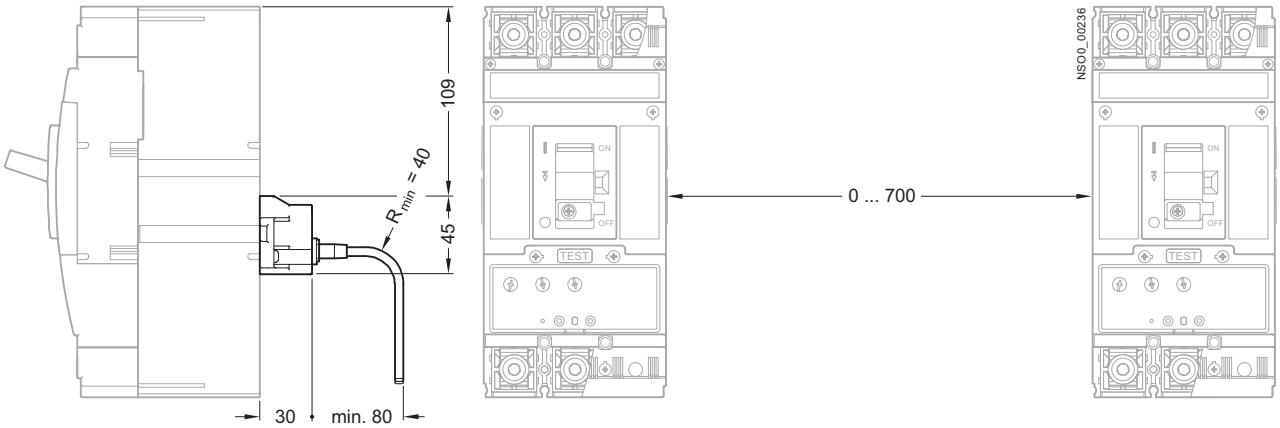


- Provides mechanical interlocking of two circuit breakers/ switch disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- The 3VT9 200-8LC10 mechanical interlocking is intended for two 3VT2 circuit breakers. 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 designs.

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

Circuit breaker installation in switchgear and controlgear assemblies

Detailed information can be found in the instructions for use, which you may download from our website www.siemens.com/technical assistance



Design

The motorized operating mechanism is part of circuit breaker accessories enabling you to switch the circuit breaker on and off remotely. Modular design of the operating mechanisms enables simple mounting on the circuit breaker (also additionally) after the circuit breaker accessory compartment cover is removed. The fixed operating mechanism can be sealed. 3VT circuit breakers with motorized operating mechanisms can be used in the most demanding industrial applications such as protection of standby sources, synchronization of two sources, etc. and for all applications for which it is necessary to ensure automated and unmanned operation of electrical equipment.

The motorized operating mechanisms are equipped with spring storage mechanisms and due to accumulated energy to trip the circuit breaker, it is no problem to trip the circuit breakers within times up to 50 ms. Releasing of the storage unit and tripping of the circuit breaker is ensured by a closing coil that belongs to standard equipment of every motorized operating mechanism. The time before the circuit breaker is tripped using the operating mechanism is 800 ms. This method of tripping is suitable for controlling technological entities. When faster circuit breaker tripping is required (e.g. emergency STOP button), it is possible to use the motorized operating mechanism in combination with undervoltage release or shunt release.

- On the front panel of the motorized operating mechanism, there is a selector switch to select the drive modes with a possibility to indicate remotely the selector switching position. The first mode is automatic remote control (selector switch in AUTO position). This is the standard position in automatic operation. The second mode is manual control (selector switch in MANUAL position), the motorized operating mechanism does not need any voltage to perform its function.
- Remote switching on and off in position AUTO is carried out using pushbuttons that must be connected to the operating mechanism connector. Furthermore, this position makes it is possible to control the circuit breaker with the pushbuttons on the operating mechanism front panel.
- In MANUAL mode it is possible to switch on and off using the green and red pushbuttons on the front panel of the motorized operating mechanism cover. 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, apart from 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 overcurrent releases or auxiliary trips. Then, because of the mechanical link between the circuit breaker and the operating mechanism, a pulse will be generated to wind up the spring of the storage unit automatically. The operating mechanism can be wound up automatically, depending on the demand by the operator, by permanent closing of switch S or after the circuit breaker is checked by switching S switch on. In the second fixed position the circuit breaker is switched off and the loaded operating mechanism 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 the storage unit is wound up, it is possible to switch the circuit breaker on and off using the control buttons on the front panel of the operating mechanism.
- On the front panel, there is a storage unit status indicator indicating locally what state the operating mechanism storage is in and whether it is possible to switch the circuit breaker on. 3VT3 motorized operating mechanisms enable to obtain a storage status signal from the terminal strip also remotely. 3VT2 operating mechanisms have optional designs, alternatively with MANUAL/AUTO indication.
- The operating mechanism can be furnished with an electromechanical operations counter that may be installed in the operating mechanism cover or fixed beyond the circuit breaker space (e.g. in the switchgear cabinet door) or in the switchgear space using a metal holder included in the supply of external operations counter and its connecting can be done using connectors.
- The operating mechanism can be locked in off position using as many as three padlocks with shank diameter of maximum 4.3 mm.
- An 3VT9 300-3MF20 cover can be fitted to the turn-on switch of the operating mechanism and then sealed. The cover prevents turning on the circuit breaker from the operating mechanism panel.
- The 3VT9 300-3MF00 extension cable has a connector on one side that connects to the connector on the motorized operating 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/hr
Frequency of cycles - instant successive ON/OFF cycles		10 contact making
Mechanical endurance		30000 contact making
Input power	AC DC	100 VA 100 W
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

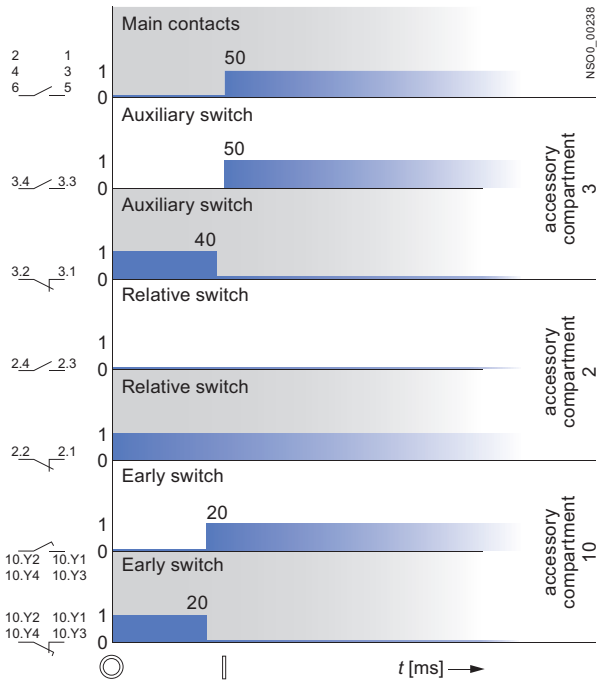
[1)] For sequence of control pulses, see page ...

Motorized operating mechanism

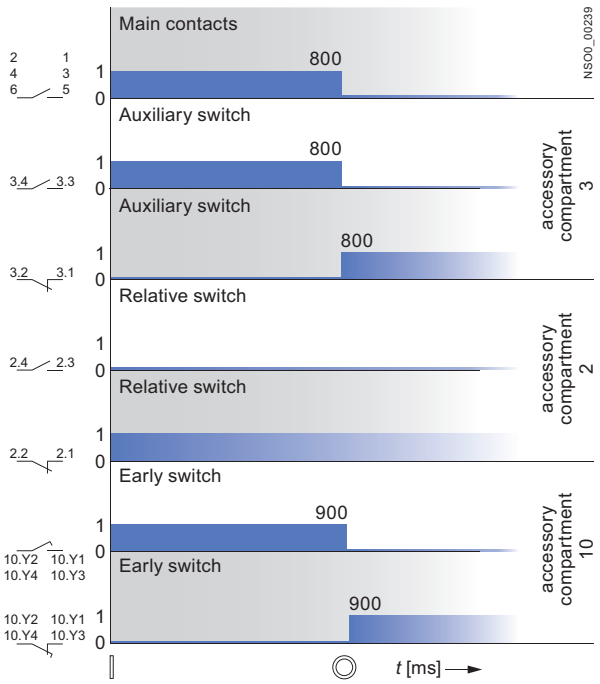
Function

Circuit breaker switched on/off by the motorized operating mechanism

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

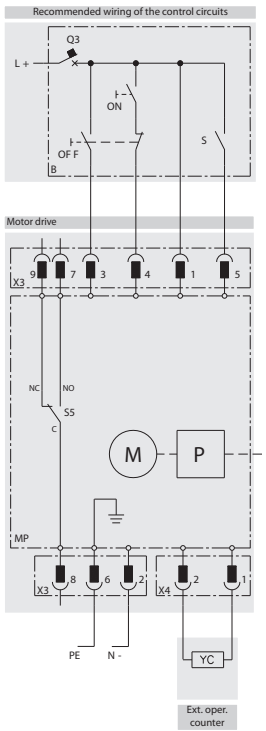


Circuit breaker switched off by the motorized operating mechanism – electrically by pushbutton OFF



Wiring diagram

Circuit breaker switch on and switched off by motorized operating mechanism, electrically by ON pushbutton and OFF pushbutton



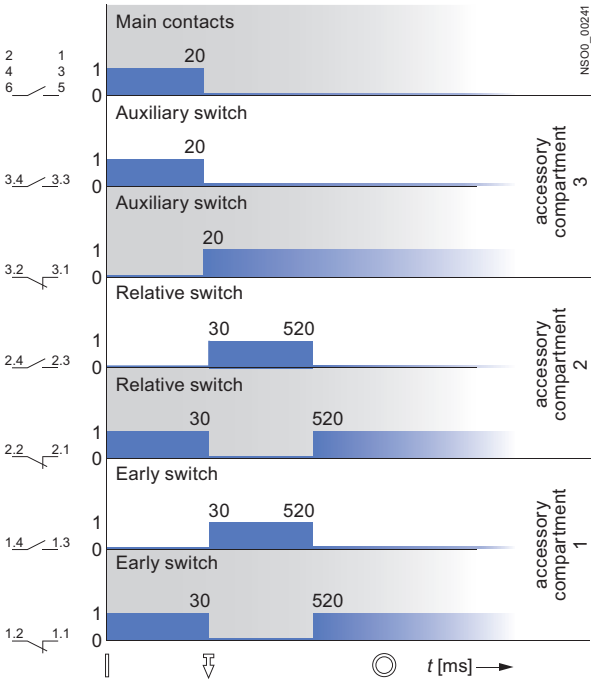
Circuit breaker states and toggle positions of the circuit breaker

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

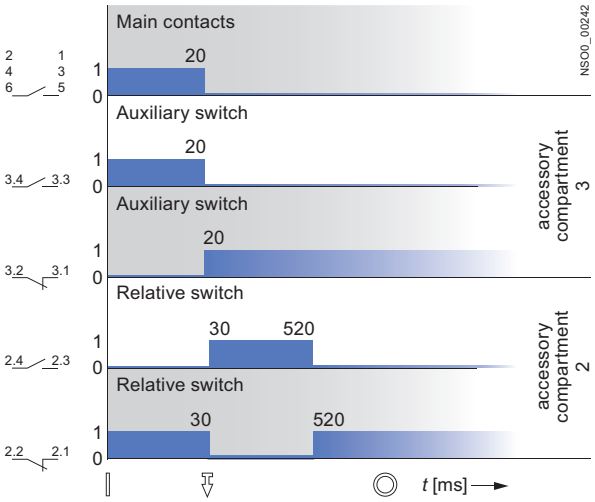
Wiring diagram description

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

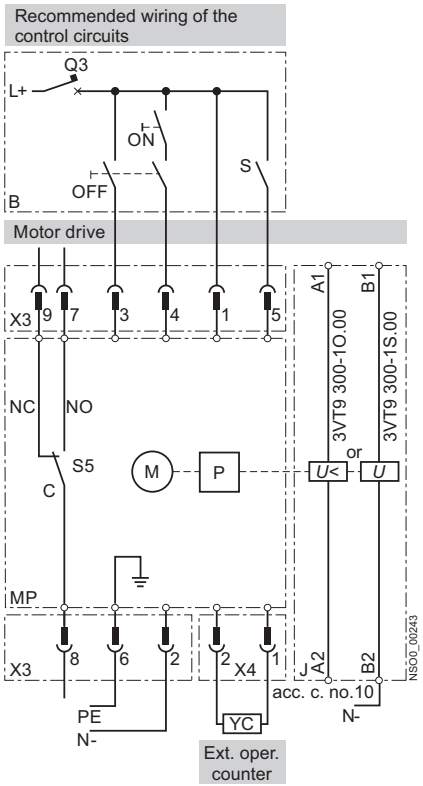
Tripping of the circuit breaker with motorized operating mechanism by the overcurrent release (switch S in switched-on state – automatic storage)



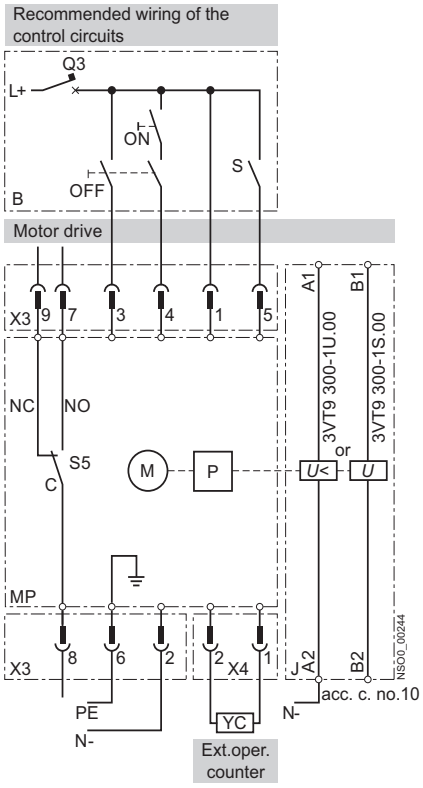
Tripping of the circuit breaker with motorized operating mechanism by a shunt release or undercurrent release (switch S in switched-on state – automatic storage)



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



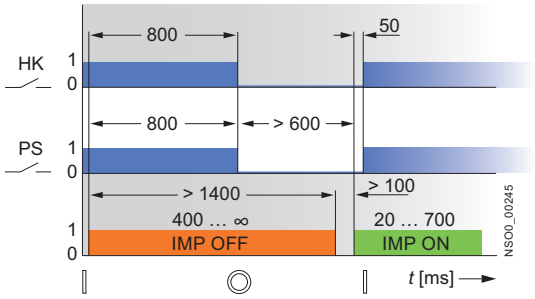
Circuit breaker switched on by the motorized operating mechanism (electrical pushbutton ON) and switched off by the undervoltage release



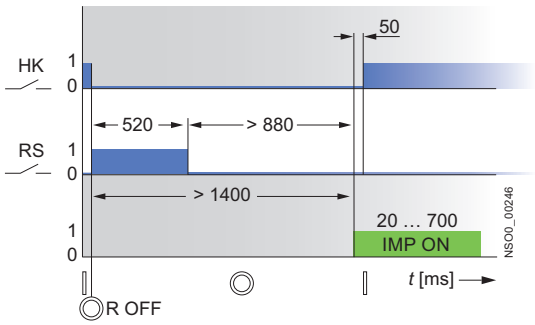
Motorized operating mechanism

Recommended actuating pulses

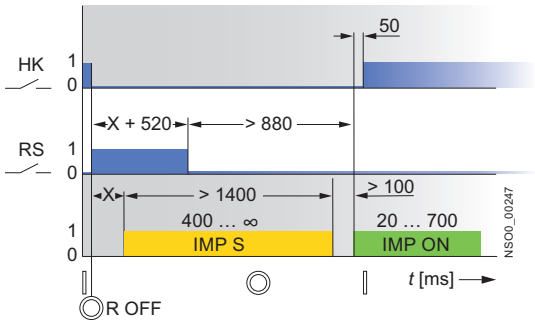
Circuit breaker switched on/off by the motorized operating mechanism – S switch permanently closed (automatic storage) or open



Circuit breaker switched off by the overcurrent or auxiliary releases and switched on by the motorized operating mechanism – S switch permanently closed (automatic storage)



Circuit breaker switched off by the overcurrent or auxiliary releases and switched on by the motorized operating mechanism – S switch closed only for storing up



Description of charts

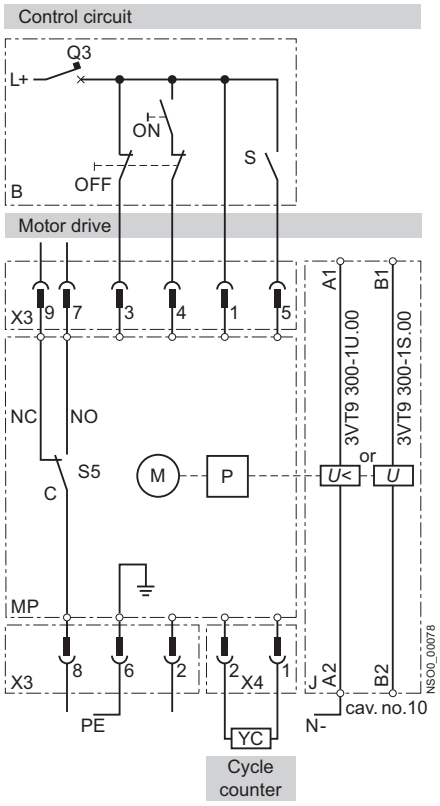
Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closing instant by release
IMP S	pulse to store up motorized operating mechanism energy (generated by S switch)
IMP ON	make pulse for motorized operating mechanism
IMP OFF	break pulse for motorized operating 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 releases, or by TEST button or by the trip pushbutton on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

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

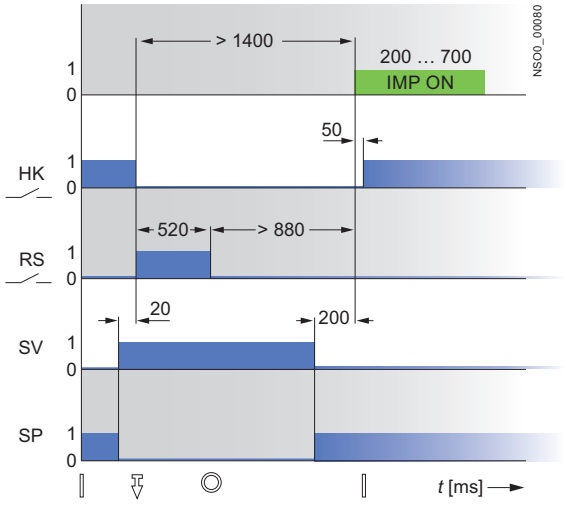
Wiring diagram of the motorized operating mechanism of the circuit breaker

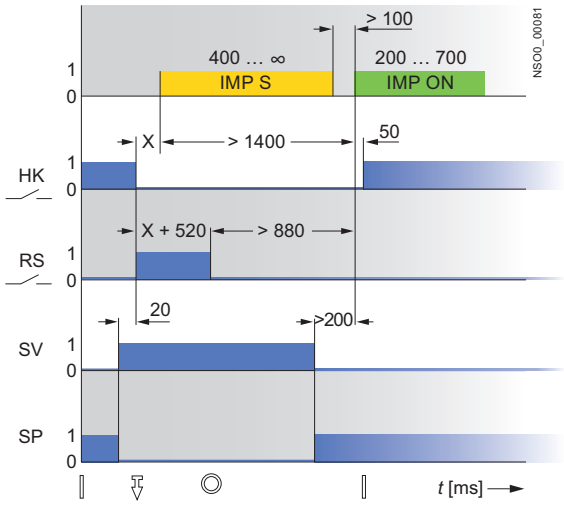


M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external cycle counter
S5	switch indicating AUTO (NO-C)/MANUAL (NC-C) mode
YC	external 3VT9 300-3MF10 cycle counter
B	recommended connection of control circuits (is not included in the motorized operating mechanism 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 E69

In use of 3VT2 circuit breakers with mechanical interlocking by Bowden cable in the automatic standby system, it is recommended to switch the circuit breaker off only by an auxiliary release. 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 release or undervoltage release in the automatic standby system





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

3

Mounting accessories

Overview

Plug-in devices

The plug-in design of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker along with both visual and conductive disconnection of the circuit is needed.

- The device includes:
  - complete accessories for assembling circuit breakers/ switch disconnectors in plug-in design
  - a set of four installation bolts (M4 x 40) for fixing the switching unit to the plug-in device
- The device must be fitted with:
  - a 3-pole 3VT2 725-.AA36-0AA0 switching unit or
  - a 4-pole 3VT2 725-.AA46-0AA0 or 3VT2 725-.AA56-0AA0 switching unit

3VT9 200-4PA30 plug-in device

Circuit breaker position

The circuit breaker in plug-in design has two positions:
1. connected (operating position)
2. removed

Circuit breaker accessories in plug-in design

The circuit breaker in plug-in design has the same accessories as the fixed-mounted circuit breaker.

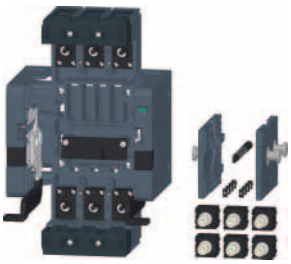
Advantages and enhanced safety for the operator

- Unambiguous remote signaling of the circuit breaker position in the plug-in device
- Option to lock the plug-in device with padlocks to prevent inserting of the circuit breaker
- Visible and conductive disconnection of the power circuit
- Easy exchange of the circuit breaker in case of a failure
- IP20 degree of protection of all termination points
- The plug-in device does not need earthing.

Withdrawable devices

The withdrawable design of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker, frequent checking and both visual and conductive disconnection of the circuit is needed.

- The device includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable design
- The device must be fitted with
  - a 3-pole 3VT2 725-.AA36-0AA0 switching unit or
  - a 4-pole 3VT2 725-.AA56-0AA0 or 3VT2 725-.AA56-0AA0 switching unit.



3VT9 200-4WA30 withdrawable device

Circuit breaker position

The circuit breaker in withdrawable design has three positions:
1. connected (operating position)
2. withdrawn (maintenance position)
3. removed

Circuit breaker accessories in withdrawable design

The circuit breaker in withdrawable design has the same accessories as the fixed-mounted circuit breaker.

Advantages and enhanced safety for the operator

- Unambiguous remote and local signaling of the circuit breaker and arrestment positions in the withdrawable device
- Checking of circuit breaker and accessories function in the maintenance position
- Locking of the withdrawable device with padlocks
  - prevents inserting of the circuit breaker
  - locking of circuit breaker in inserted (operating) position
  - locking of circuit breaker in withdrawn (maintenance) position
- Visible and conductive disconnection of the power circuit
- Easy exchange of circuit breakers in case of failure
- IP20 degree of protection of all termination points
- The withdrawable device does not need earthing.

Design

Plug-in devices

3VT9 200-4PA30 device

Locking plug-in device against plug-in inserting the circuit breaker

- The plug-in device includes complete accessories for assembling a circuit breaker/switch disconnector in plug-in design from the original fixed-mounted design
- The components of the plug-in device are:
  - supporting part of the plug-in device 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 device (to secure plug-in device 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 3/9)
- The type of connections must comply with our recommendations (see page 3/11).

Auxiliary circuits

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

Coding

3VT9 200-4WN00 coding set

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

Position signaling

3VT9 300-4WL00 position signaling switch

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

States of 3VT9 300-4WL00 switches in the plug-in device 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

For wiring diagram of the circuit breaker in plug-in device with accessories, see page 3/13.

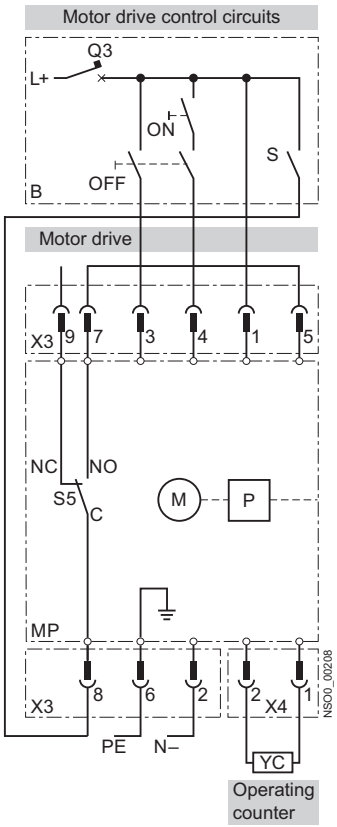
Plug-in device with motorized operating mechanism

Circuit breaker in plug-in design with motorized operating mechanism

Mounting accessories
Plug-in design

With motorized operating mechanism

Recommended wiring

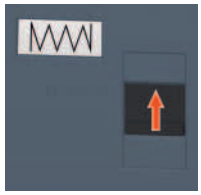


Description

Symbol	Description
M P	3VT9 300-3M.00 motorized operating mechanism
M	motor
P	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 up 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 can be found 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.



Switches in the accessory compartments of the switching unit

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

	Knob position of circuit breaker	State of the main contacts	State of switches before removing - connected position Accessory compartment 1		2		3 (4,5,6)[1]		State of switches after removing - withdrawn Accessory compartment 1		2		3 (4,5,6)[1]	
			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 by motorized operating mechanism		0	1	0	0	1	0	1	1	1	0	0	0	1
Switched off by releases		0	0	1	1	0	0	1	1	0	1	0	0	1
Switched off from switched-on state: by means of auxiliary release, TEST pushbutton or by OFF pushbutton 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.

Design

Withdrawable devices

Circuit breaker
in withdrawable design

3VT9 200-4WA30
withdrawable device

- The withdrawable device includes complete accessories for assembling circuit breaker/switch disconnector in withdrawable design from the originally fixed-mounted design
- The components of the withdrawable device are:
  - supporting part of the withdrawable device
  - 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 device into the switchboard, and these are include with 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 3VT2 725-.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 3/11).

Auxiliary circuits

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

Coding

3VT9 200-4WN00 coding set

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

Position signaling

3VT9 300-4WL00 position signaling switch

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

Technical specifications

Order No.		3VT9 300-4WL00
Rated operational voltage U_e	V	AC 400, 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 device with accessories, see page 3/13.

States of 3VT9 300-4WL00 switches in withdrawable device according to circuit breaker and arrestment positions

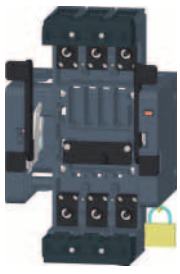
Circuit breaker and arrestment position	Accessory compartment 11,12,13,14 (19, 20)[1]		15,17 (19, 20)[1]		16,18	
Connected and unarrested	0 1	1 1	1 1	0 0	0 1	1 0
Withdrawn and unarrested	1 1	0 0	0 0	1 1	0 1	1 0
Removed and unarrested	1 1	0 0	1 1	0 0	0 1	1 0

0 = contact open; 1 = contact closed

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

- Operating state is always in arrested position
- In arrested position, it is possible to lock the withdrawable device (for more detailed information, see “Advantages and enhanced safety for operator”)

Locking the circuit breaker in withdrawable device against tampering

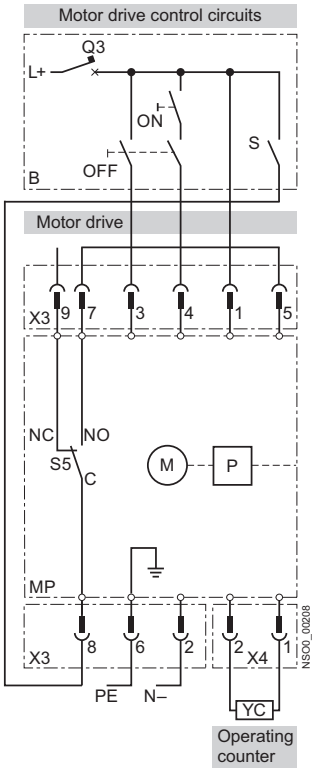


Locking the withdrawable device against inserting the circuit breaker

Mounting accessories Withdrawable design

With motorized operating mechanism

Recommended wiring



Description

Symbol	Description
MP	3VT9 300-3M..0 motorized operating mechanism
M	motor
P	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 up 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

Inserting and withdrawing the 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 motorized operating mechanism to the MANUAL position
- More operating information can be found 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.

Switches in the accessory compartments of the switching unit

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

			State before insertion/withdrawable						State after insertion/withdrawable					
Circuit breaker before insertion			State of switches before insertion - withdrawn position →						State of switches after insertion - connected position					
Circuit breaker before withdrawal			State of switches before withdrawal - connected position →						State of switches after withdrawal - withdrawn position					
Accessory compartment			1		2		3 (4,5,6)[1]		1		2		3 (4,5,6)[1]	
	Knob position of circuit breaker	State of the main contacts	3VT9300-2AC10 (4, 3)	3VT9300-2AD10 (2, 1)	3VT9300-2AC10 (4, 3)	3VT9300-2AD10 (2, 1)	3VT9300-2AC10 (4, 3)	3VT9300-2AD10 (2, 1)	3VT9300-2AC10 (4, 3)	3VT9300-2AD10 (2, 1)	3VT9300-2AC10 (4, 3)	3VT9300-2AD10 (2, 1)	3VT9300-2AC10 (4, 3)	3VT9300-2AD10 (2, 1)
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 releases		0	0	1	1	0	0	1	0	1	1	0	0	1
Switched off from switched-on state: by means of auxiliary release, 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.

3

Project planning aids

Dimensional drawings

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

Fixed-mounted design

Front connection

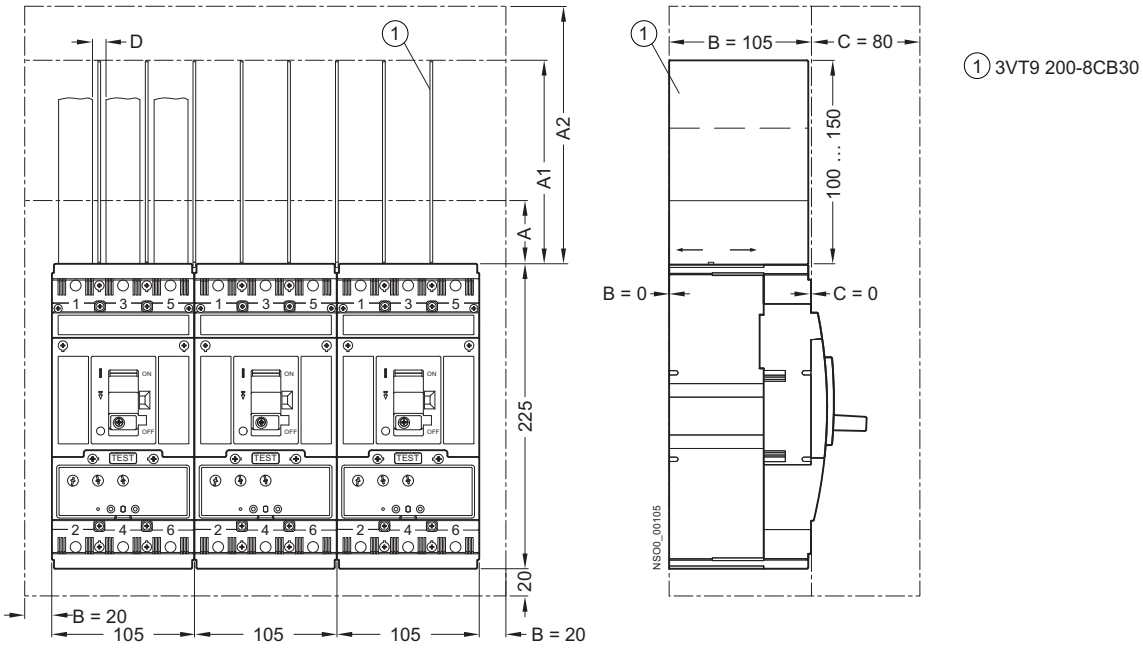
- terminals 1, 3, 5
  a) If U_e = AC 415 V, it is necessary to use 3VT9 300-8CE30 insulating barriers or a 3VT9 200-8CB30 terminal cover.
  b) If insulated conductors are not used for connecting main circuit to terminals 1, 3, 5, flexibars or rear connection, it is necessary to use 3VT9 300-8CE30 insulating barriers or a 3VT9 200-8CB30 terminal cover.
- terminals 2, 4, 6
  - Only in case that the circuit breaker/switch disconnector is connected to the source using terminals 2, 4, 6 and furthermore:
    a) If U_e AC 415 V, it is necessary to use 3VT9 300-8CE30 insulating barriers or a 3VT9 200-8CB30 terminal cover;
    b) If insulated conductors are not used for connecting main circuit to terminals 2, 4, 6, flexibars or rear connection, it is necessary to use 3VT9 300-8CE30 insulating barriers or a 3VT9 200-8CB30 terminal cover.

Rear connection

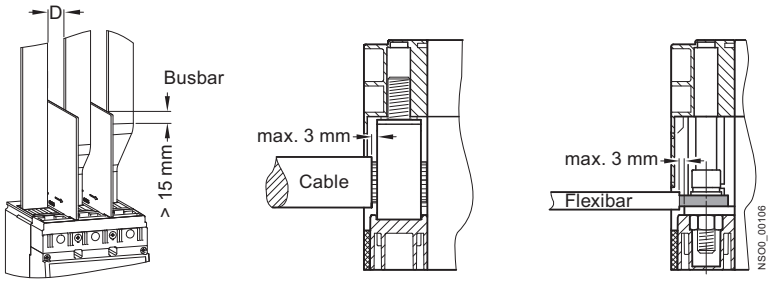
- Insulating barriers or terminal covers need not be used.

Plug-in and withdrawable devices

Insulating barriers or terminal covers need not be used.



A	minimum distance between the circuit breaker/switch-disconnctor 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

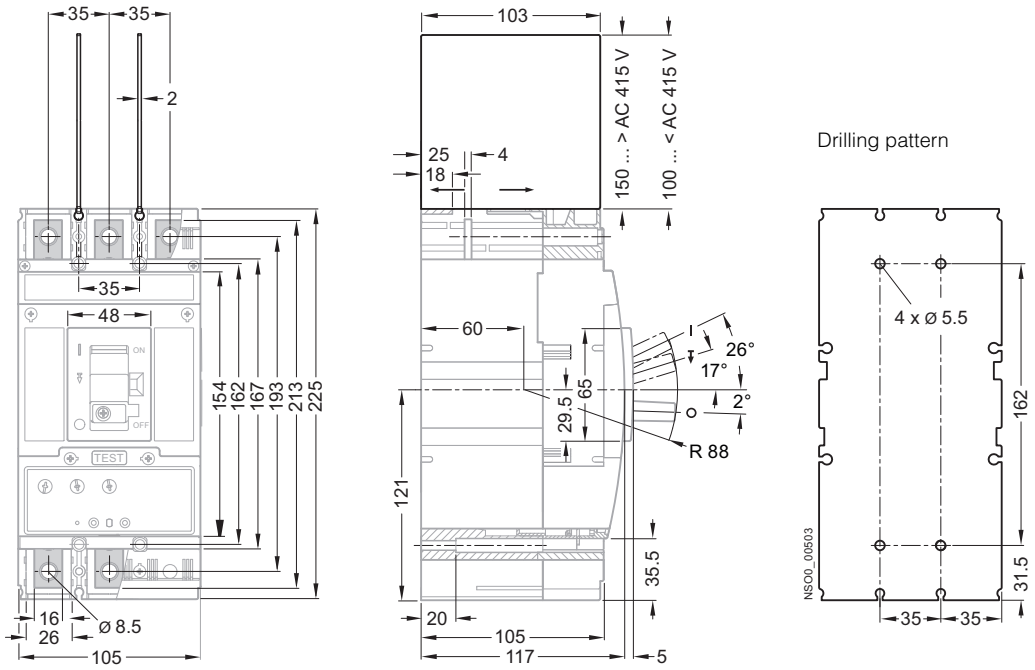


AC U_e			V	230	415		500	690
3VT2 H wired with I_k [1]			kA	≤ 100	> 36 ... 65	≤ 36	≤ 25	≤ 13
3VT2 N wired with I_k			kA	≤ 60		≤ 36	≤ 16	≤ 10
C mm	D mm							
< 80	≥ 10	A	mm	50	50	50	50	50
		A1	mm	100	150	100	150	150
		A2	mm	200	250	200	250	250
	≥ 30	A	mm	50	50	50	50	50
		A1	mm	100	150	100	150	150
		A2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

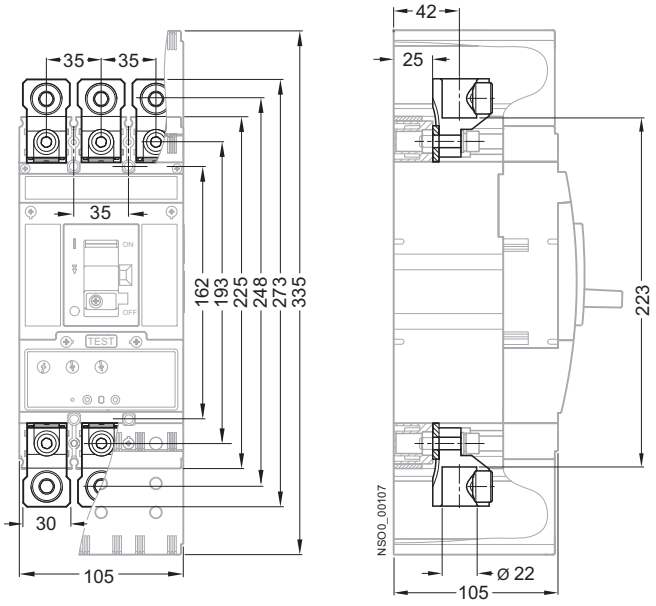
3-pole · Fixed-mounted design

Fixed-mounted design, front connection

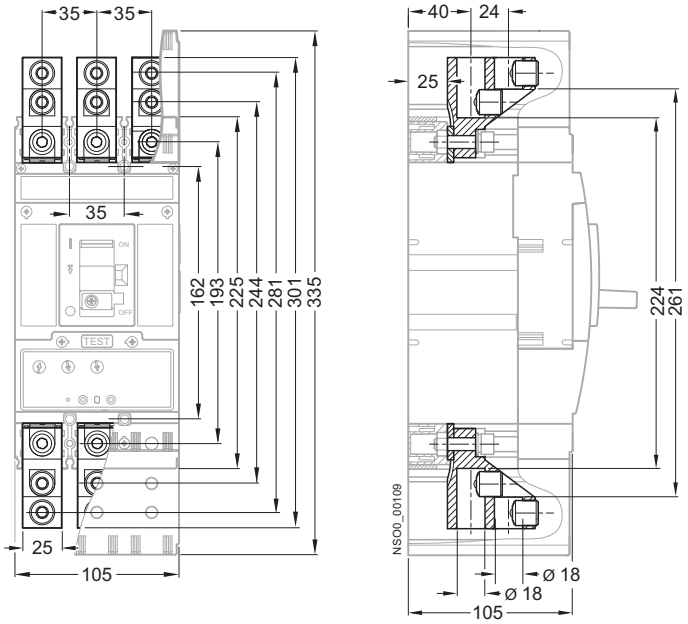


Project planning aids

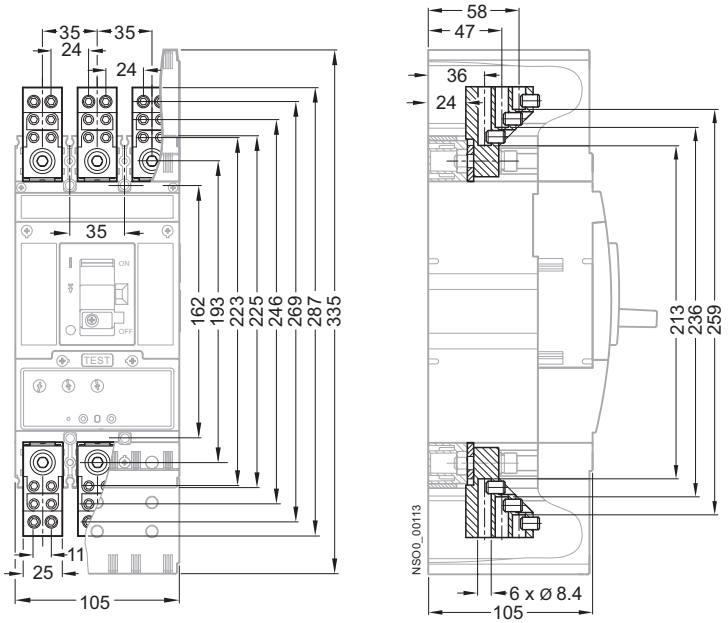
Fixed-mounted design, front connection (3VT9 224-4TD30 connecting set)



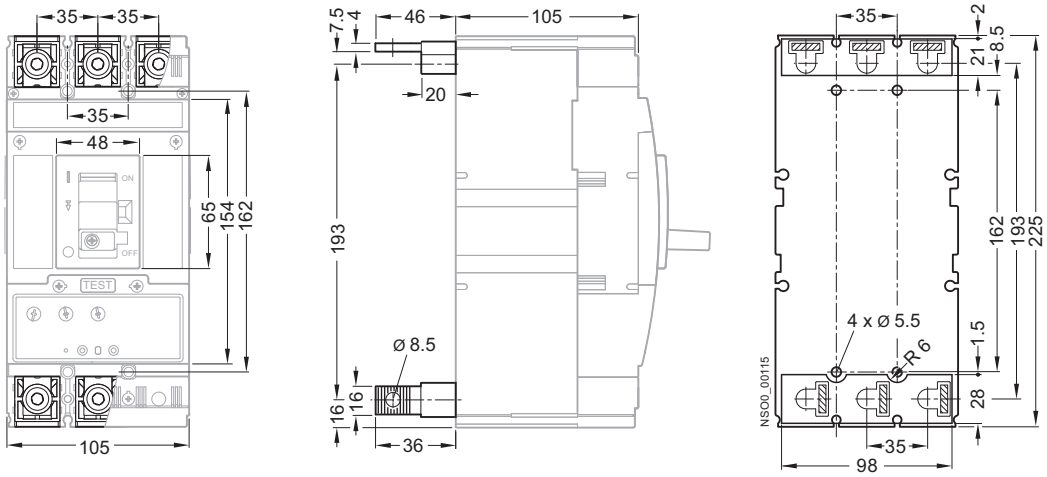
Fixed-mounted design, front connection (3VT9 215-4TF30 connecting set)



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

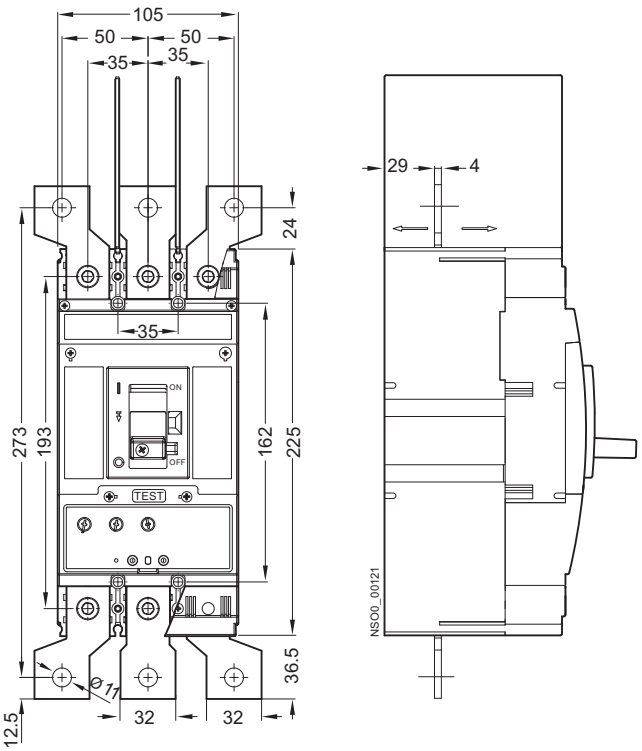


Fixed-mounted design, rear connection (3VT9 200-4RC30 connecting set)Drilling position

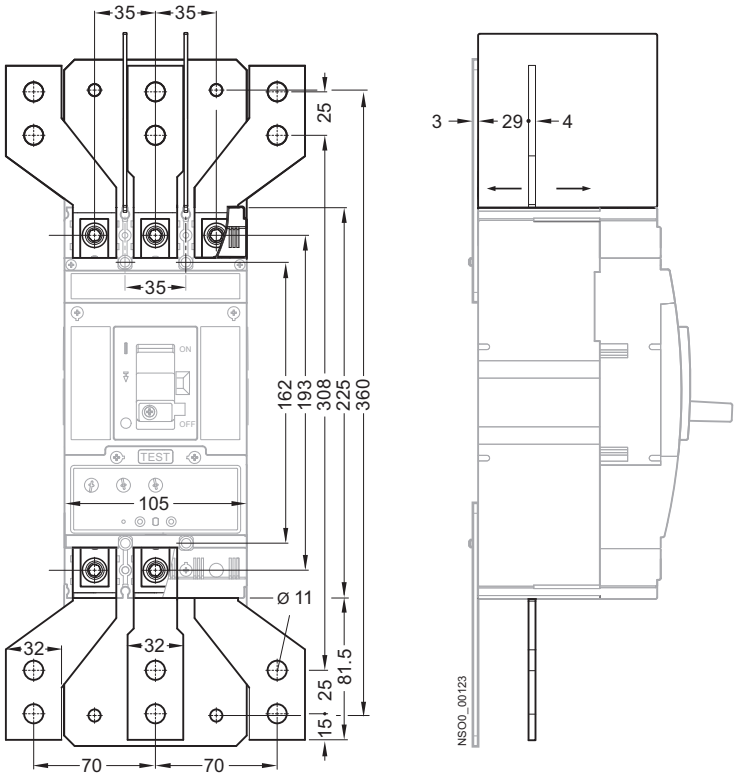


Project planning aids

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

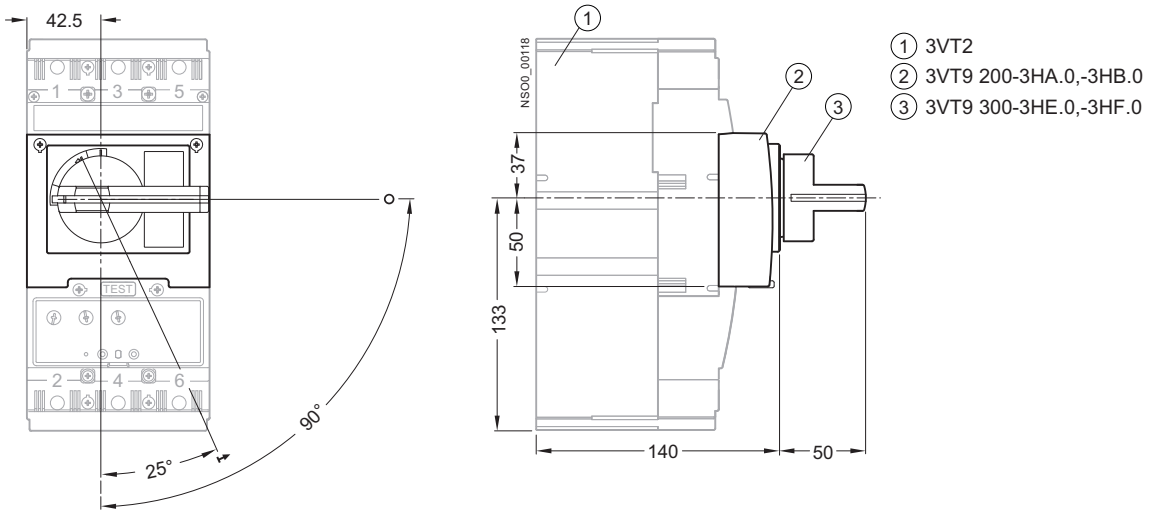


Fixed-mounted design, front connection (3VT9 200-4EE30 connecting set)



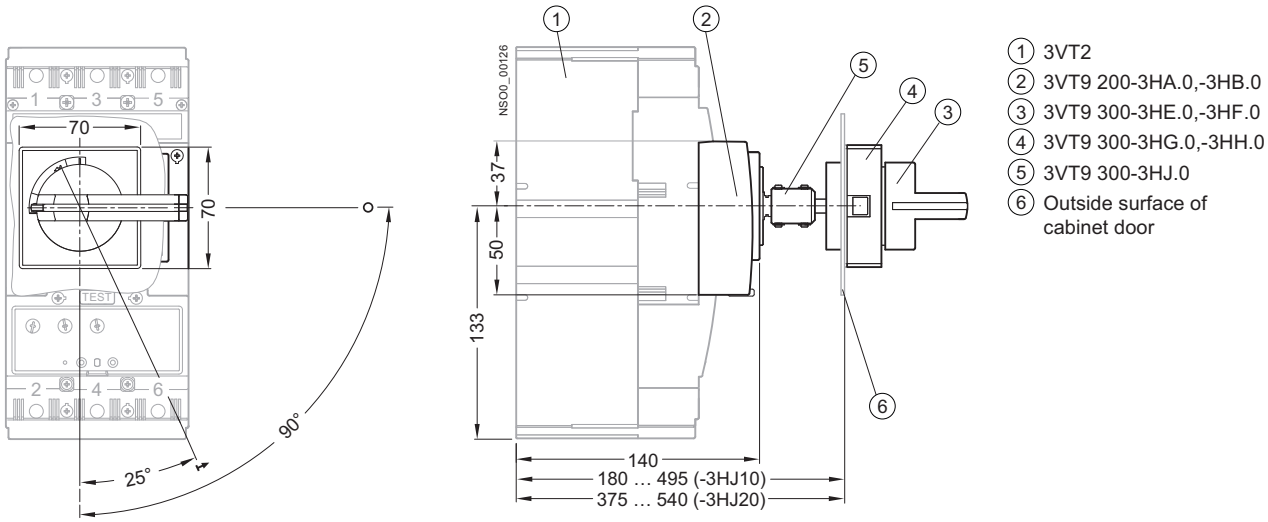
3-pole version· Fixed-mounted design · With operating mechanism

Fixed-mounted design, manual operating mechanism



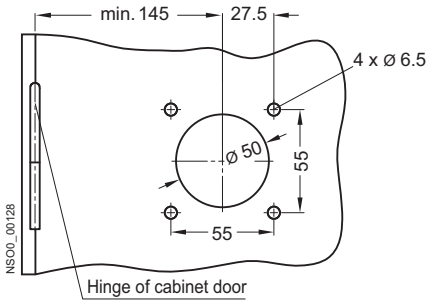
1 3VT2
2 3VT9 200-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0

Fixed-mounted design, manual operating mechanism with adjustable knob



1 3VT2
2 3VT9 200-3HA.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

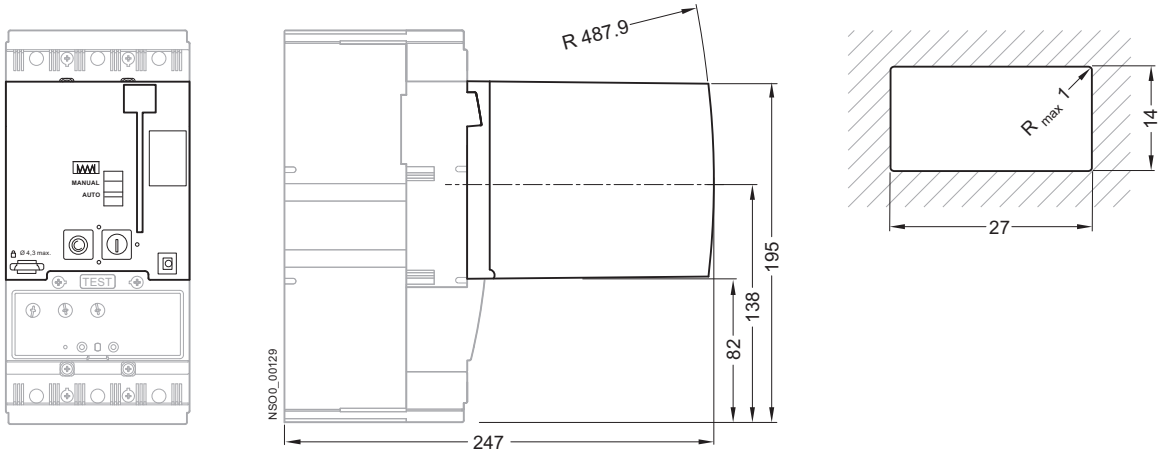
Adaption to cabinet door



Project planning aids

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

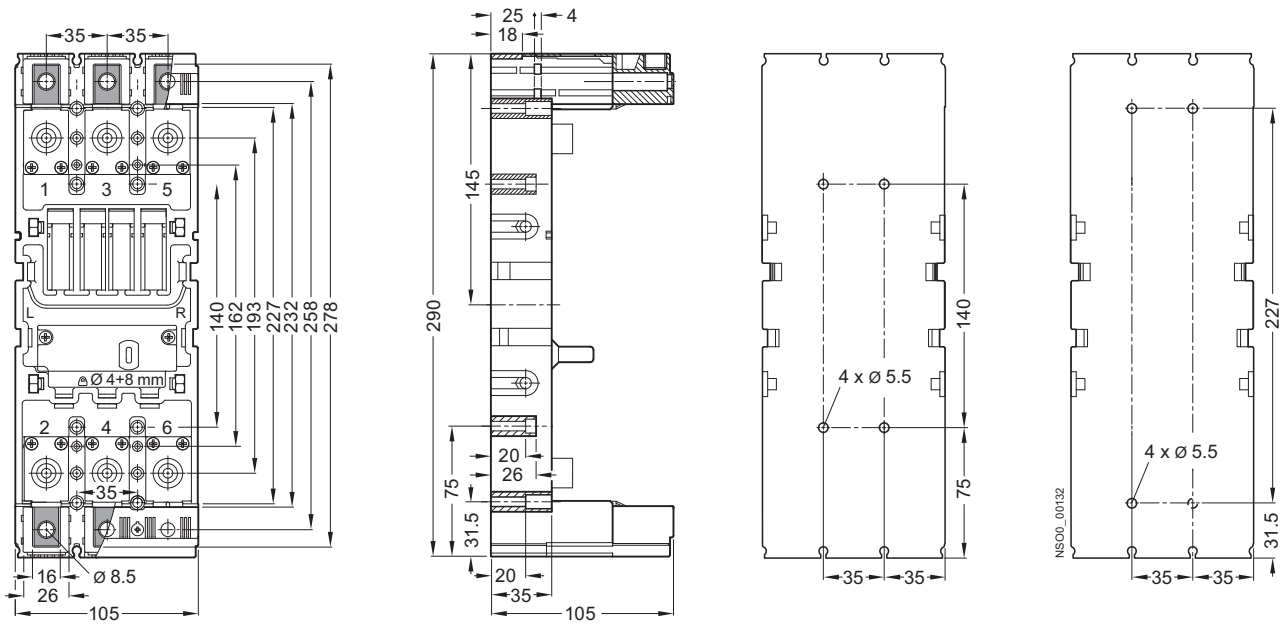
Opening dimensions in swtichgear door for external operation cycle



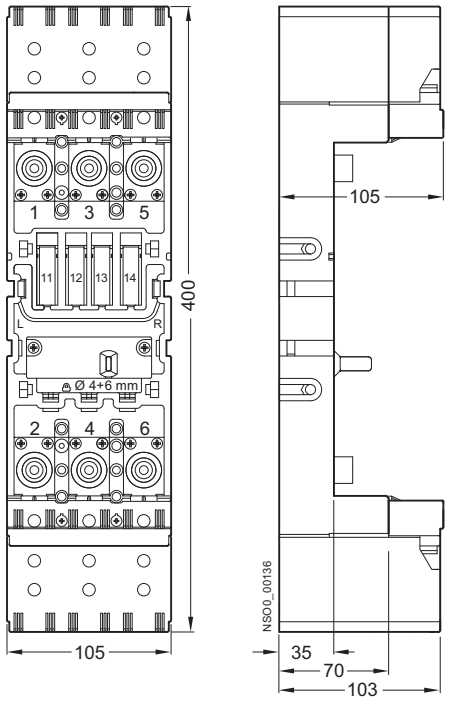
3

3-pole version · Plug-in design

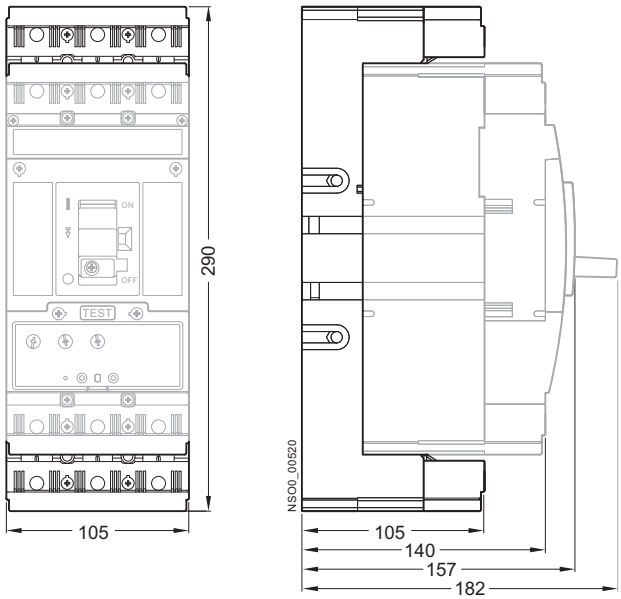
Plug-in device 3VT9 200-4PA30Drilling positions



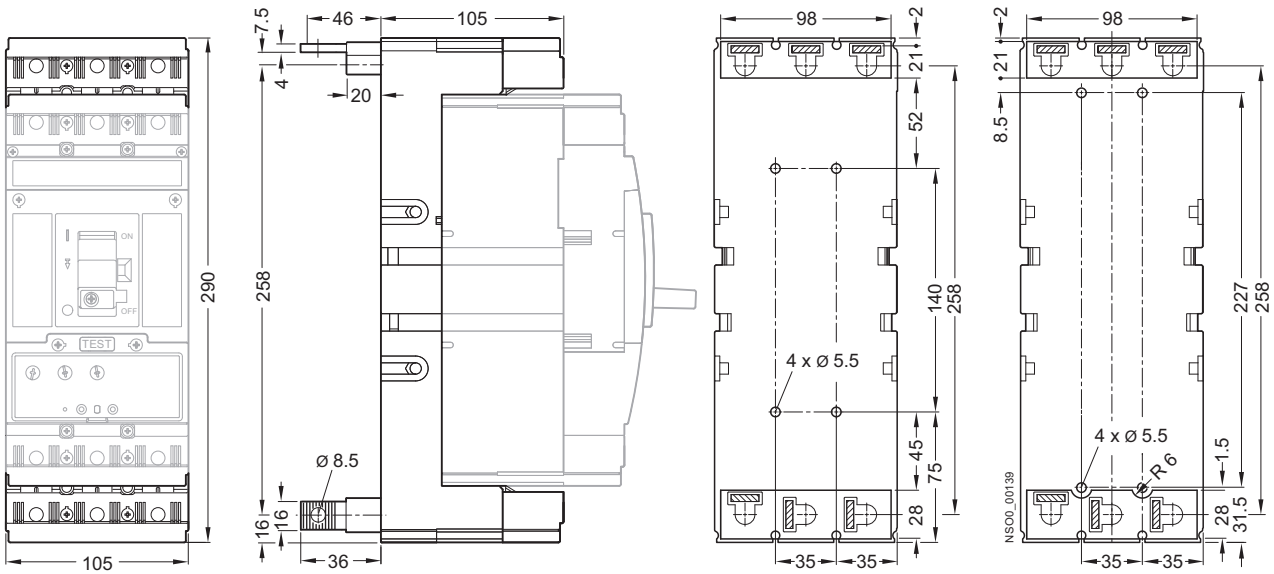
Plug-in device, 3VT9 200-8CB30 terminal cover



Plug-in design

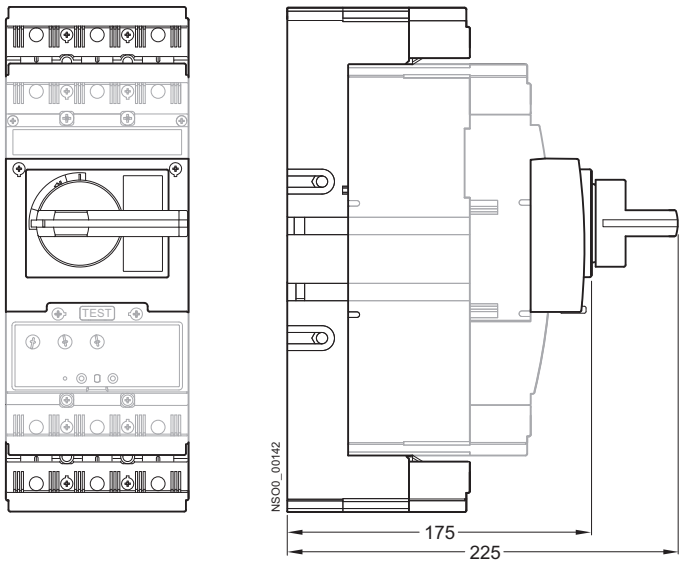


Plug-in designDrilling positions

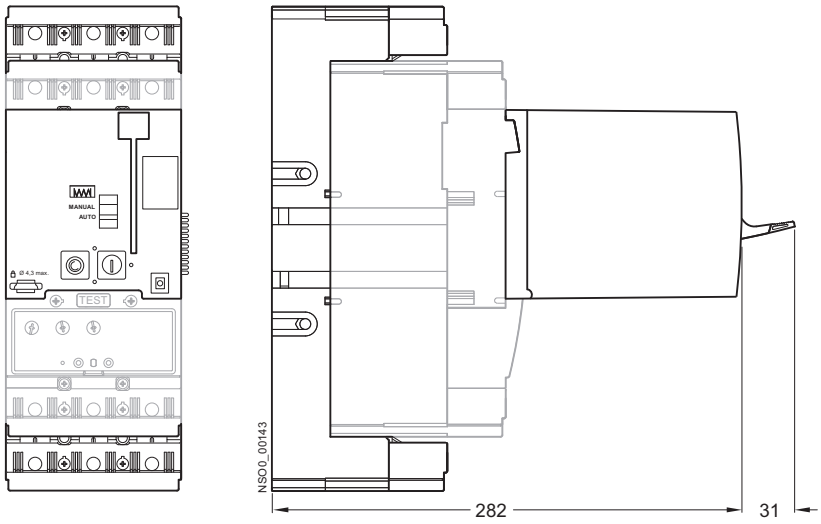


Project planning aids

Plug-in design, rotary operating mechanism

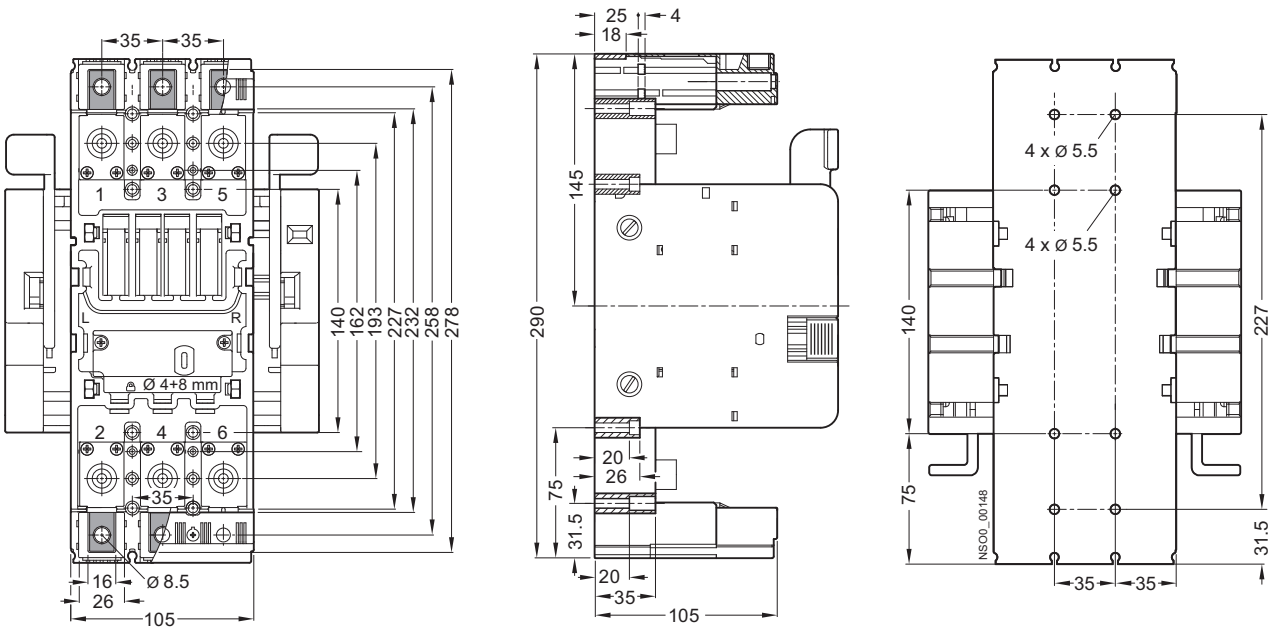


Plug-in design, 3VT9 200-3M..0 motorized operating mechanism

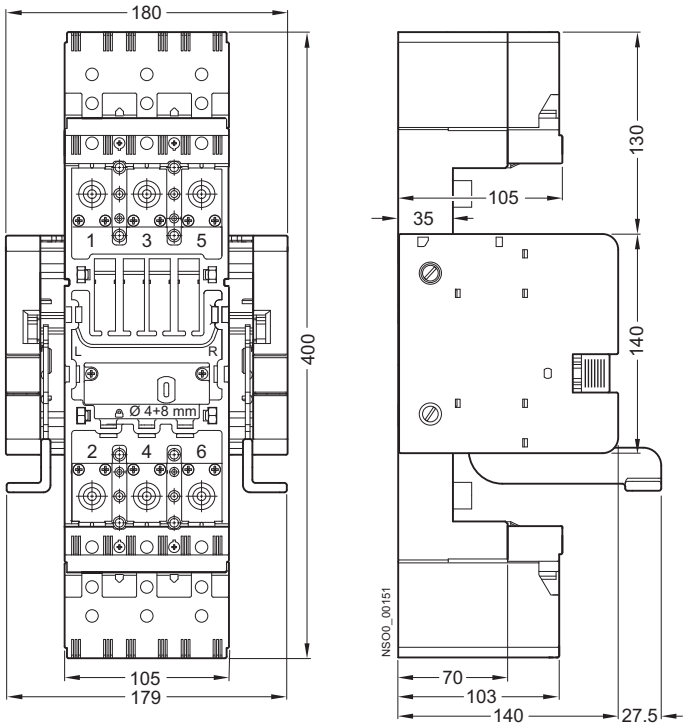


3-pole version · Withdrawable design

Withdrawable device 3VT9 200-4WA30Drilling positions



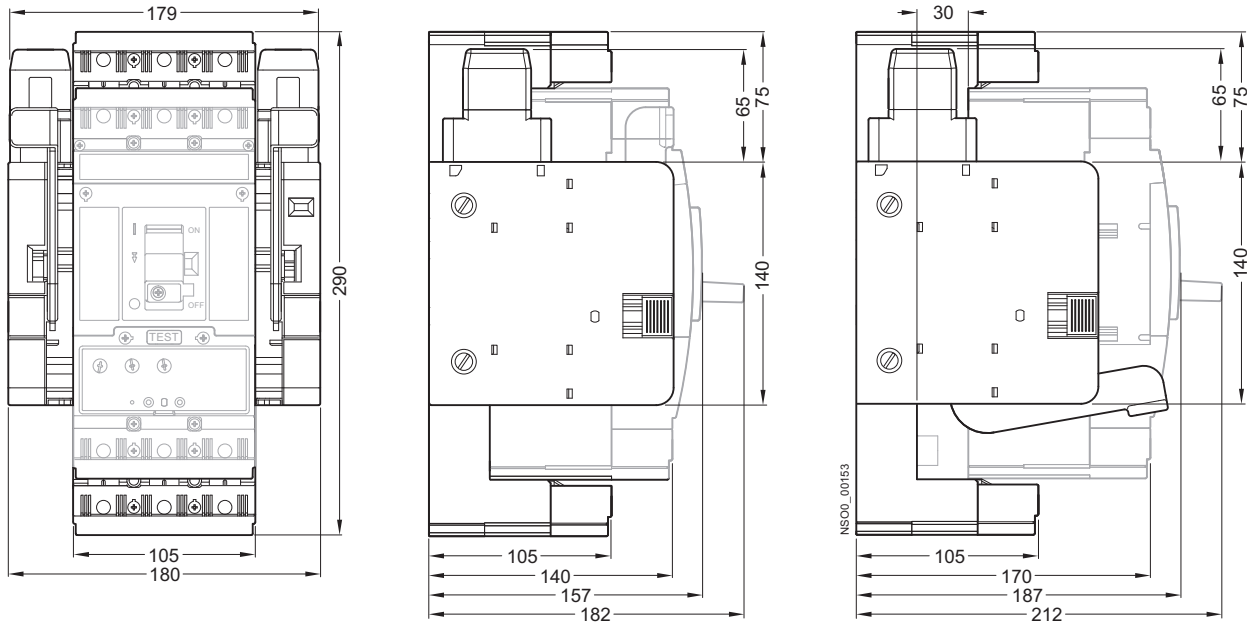
Withdrawable device, 3VT9 200-8CB30 terminal cover



Project planning aids

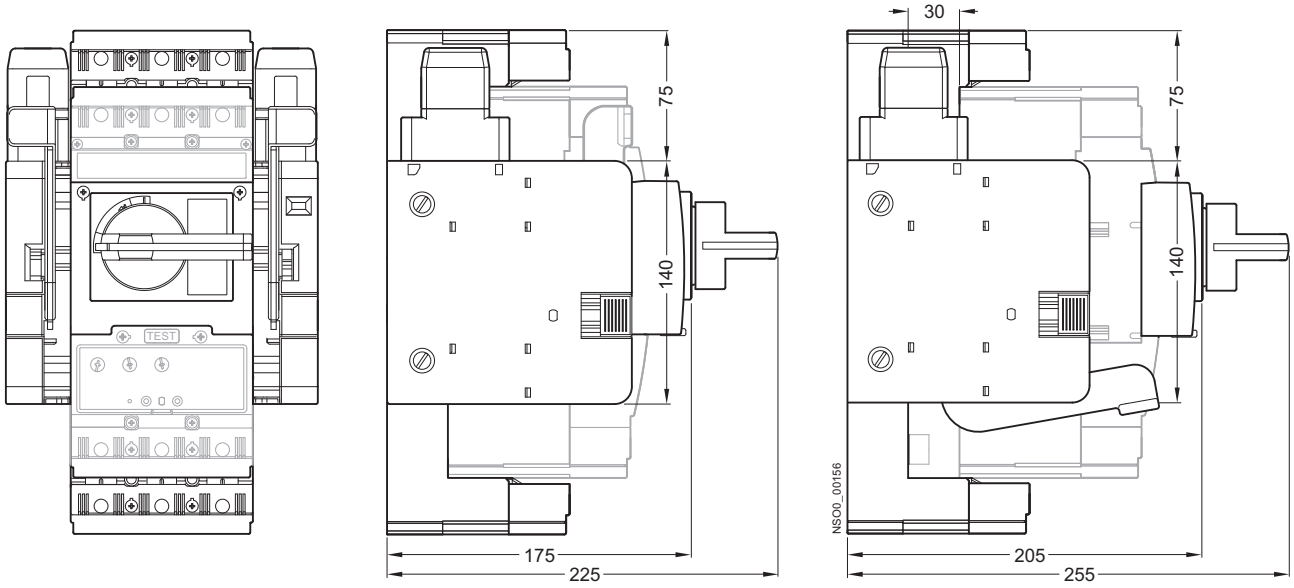
Withdrawable design

Operating position Maintenance position

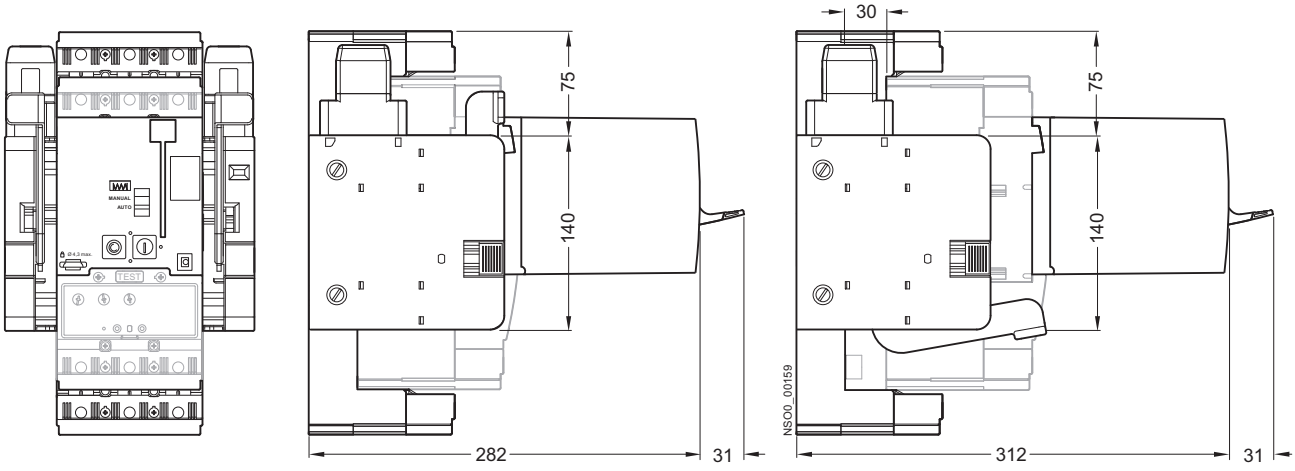


Withdrawable design, manual operating mechanism

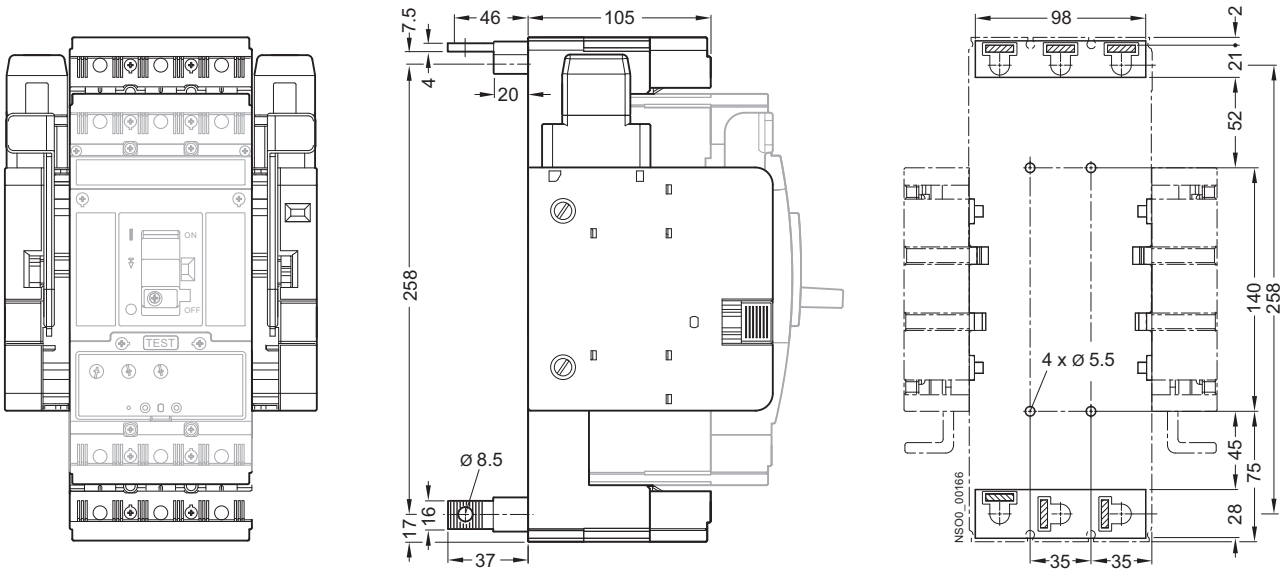
Operating position Maintenance position



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

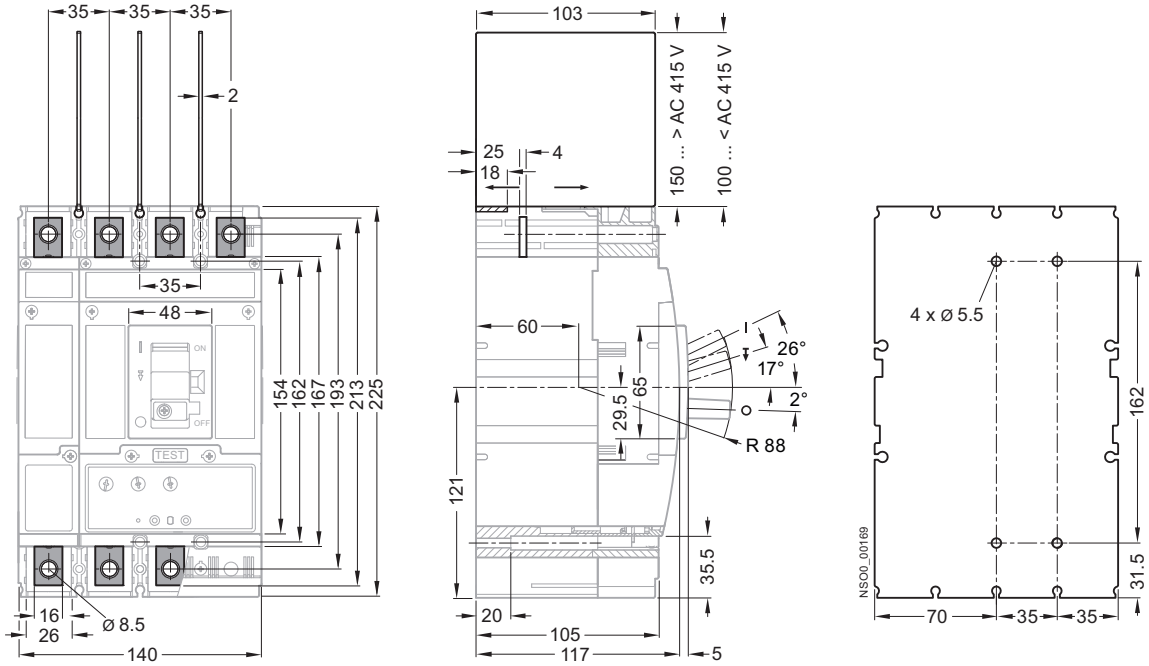


Withdrawable device, rear connection (3VT9 200-4RC00 connecting sets)Drilling position



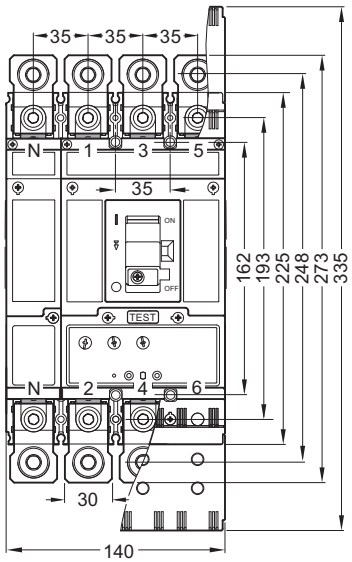
Project planning aids

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

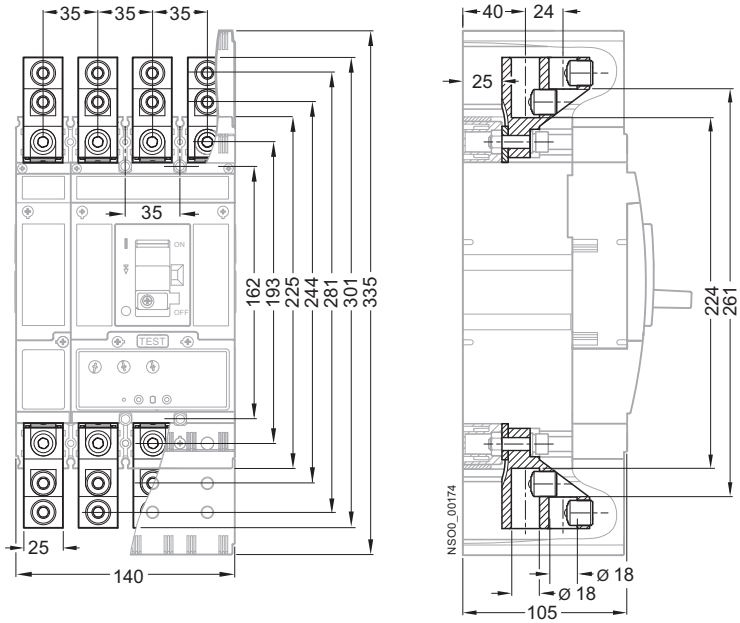


4-pole version · Fixed-mounted design

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

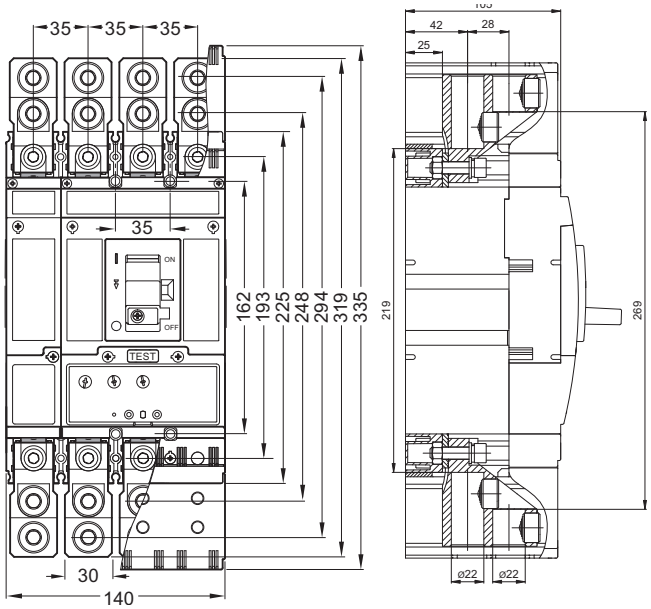


Fixed-mounted design, front connection (connecting set 3VT9 215-4TF30 + 3VT9 215-4TF00)

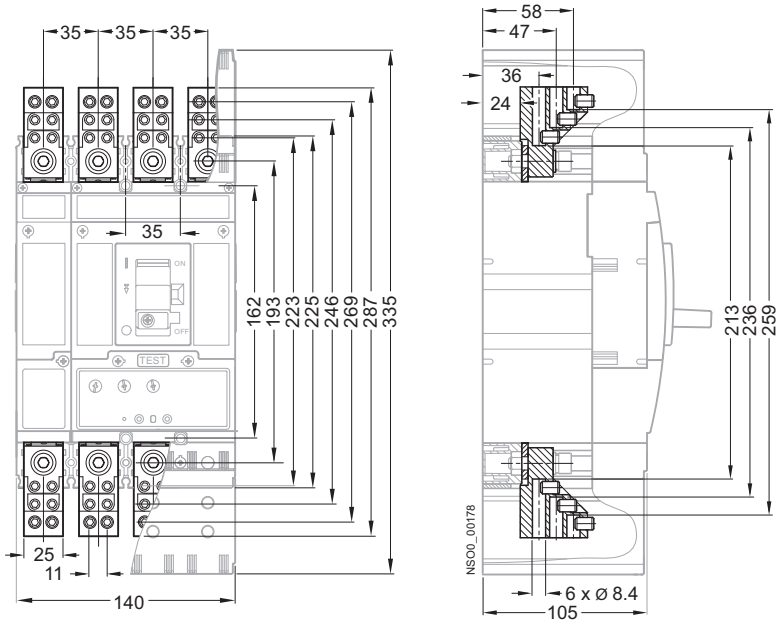


Project planning aids

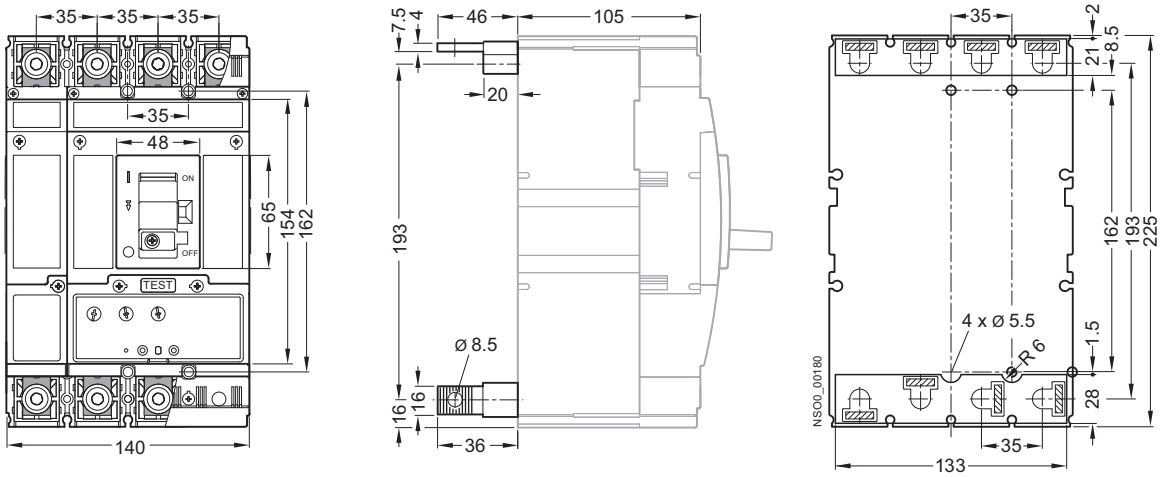
Fixed-mounted design, front connection (connecting set 3VT9 224-4TF30 + 3VT9 224-4TF00)



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

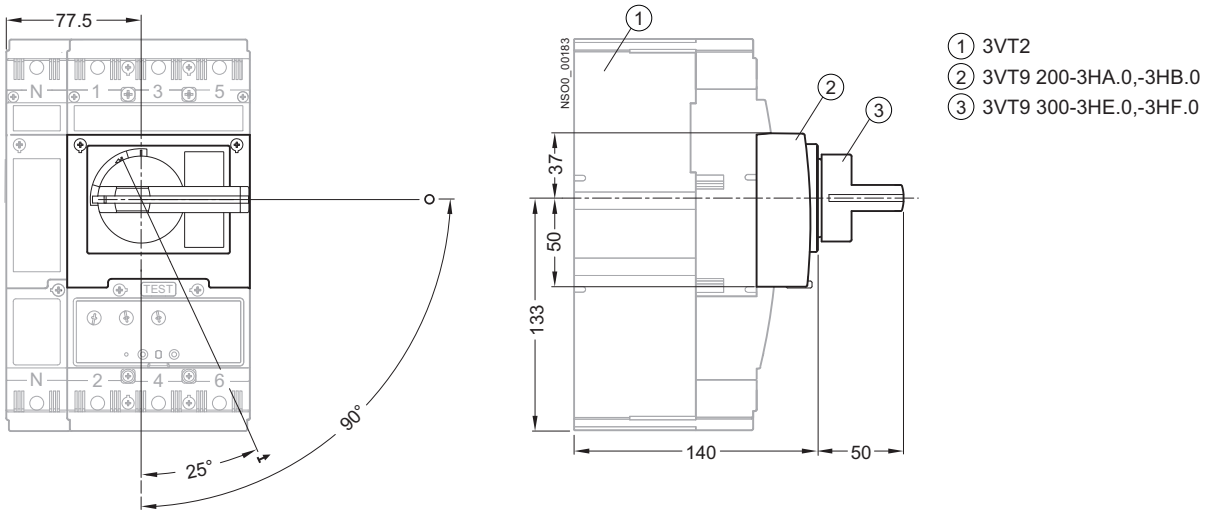


Fixed-mounted design, front connection (connecting set 3VT9 215-4TF30 + 3VT9 215-4TF00)



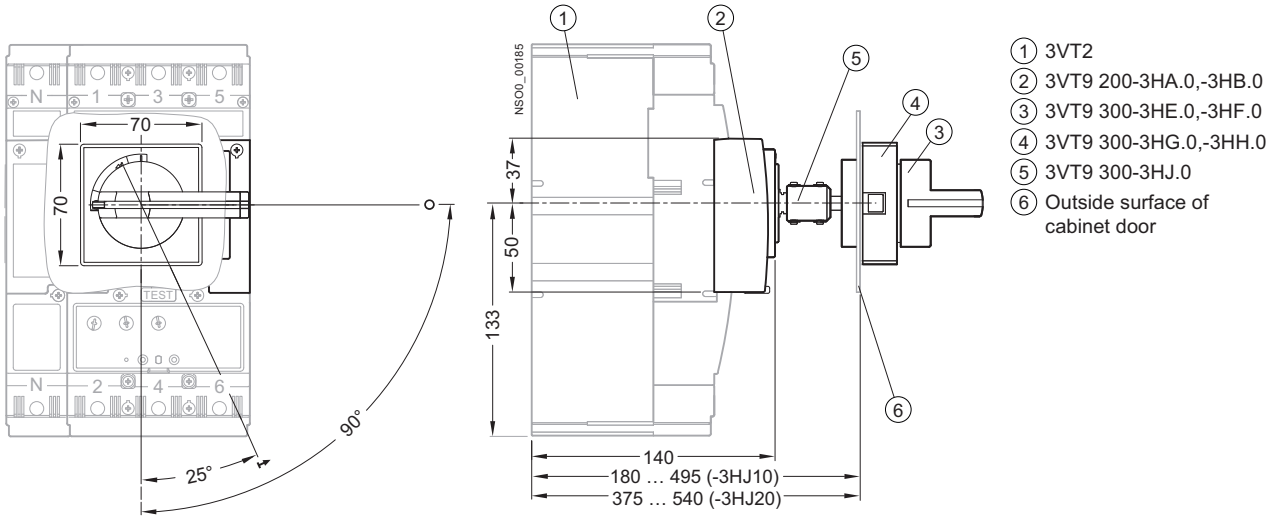
4-pole version · Fixed-mounted design · With operating mechanism

Fixed-mounted design, rotary operating mechanism



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

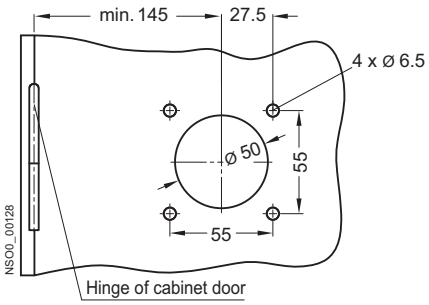
Fixed-mounted design, rotary operating mechanism with adjustable knob



1 3VT2
2 3VT9 200-3HA.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

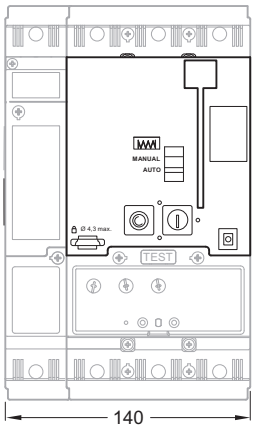
Cabinet door adaption

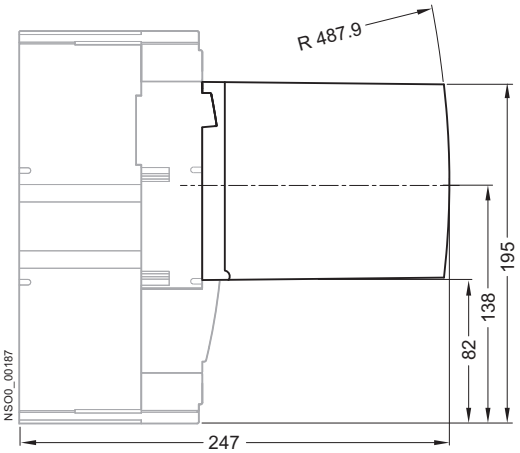
Project planning aids

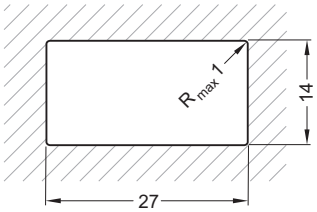


Fixed-mounted design, 3VT9 200-3M..0 motorized operating mechanism

Opening dimensions in switchgear door for external operation cycle

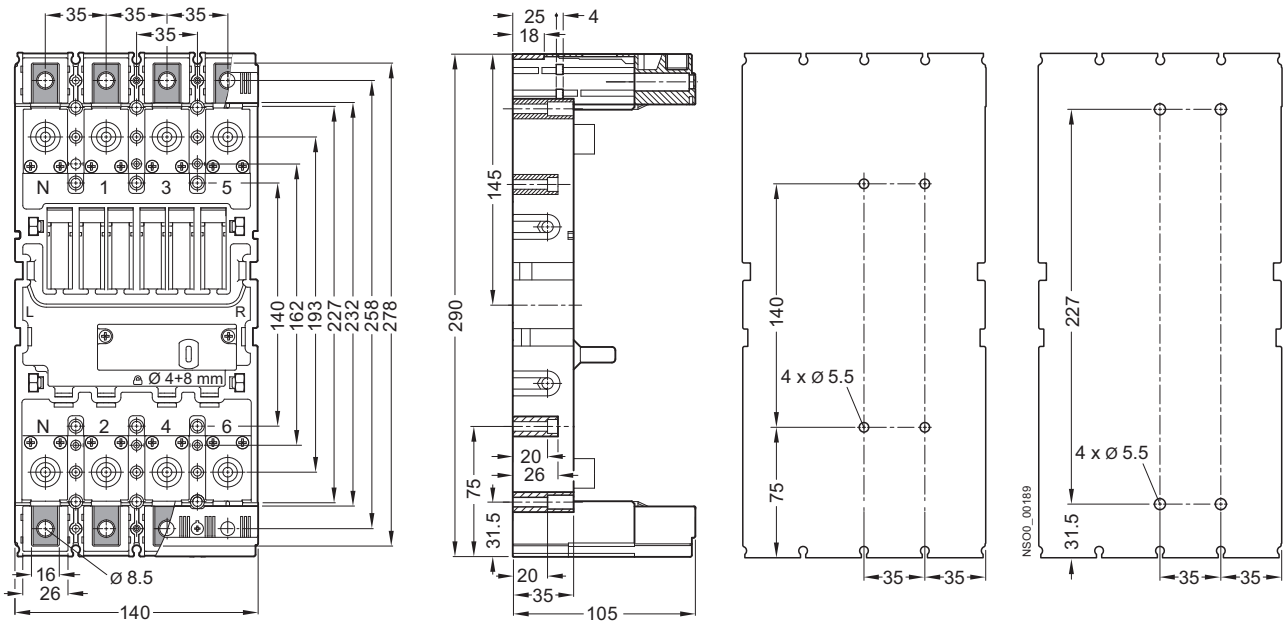




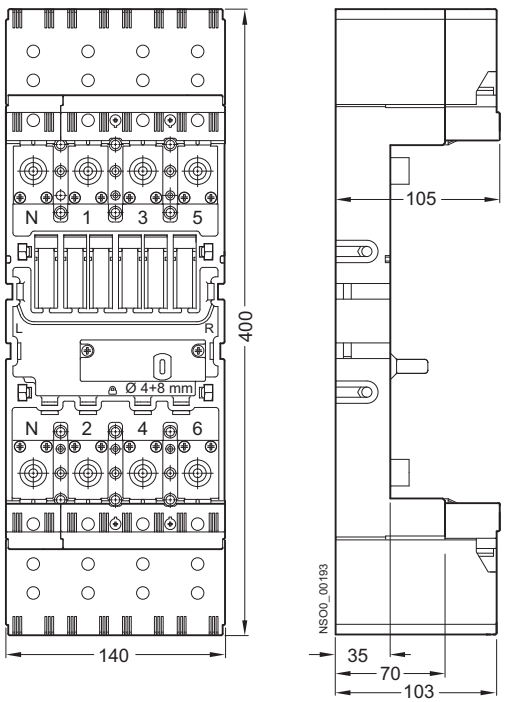


4-pole version · Plug-in design

Plug-in device 3VT9 200-4PA40Drilling positions

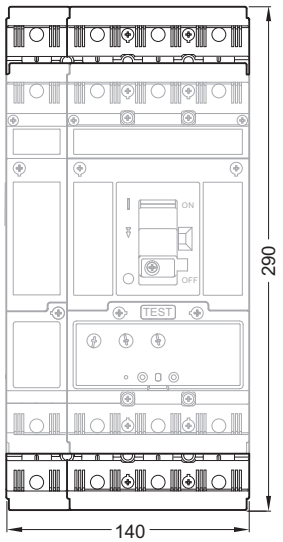


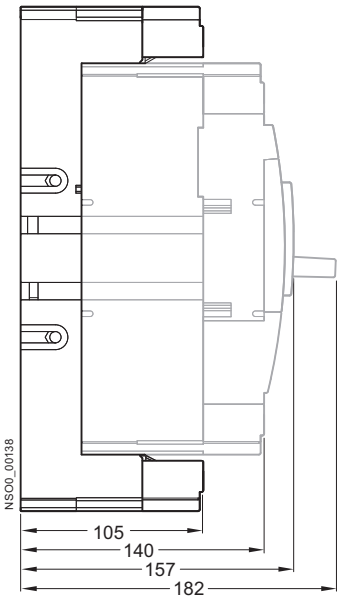
Plug-in device, 3VT9 200-8CB40 terminal cover



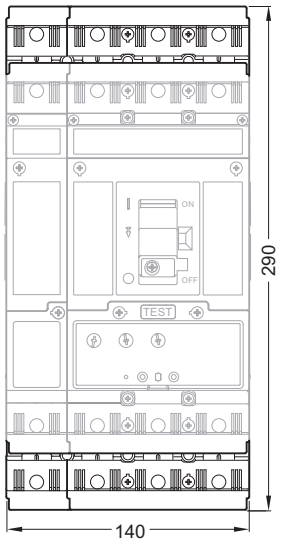
Project planning aids

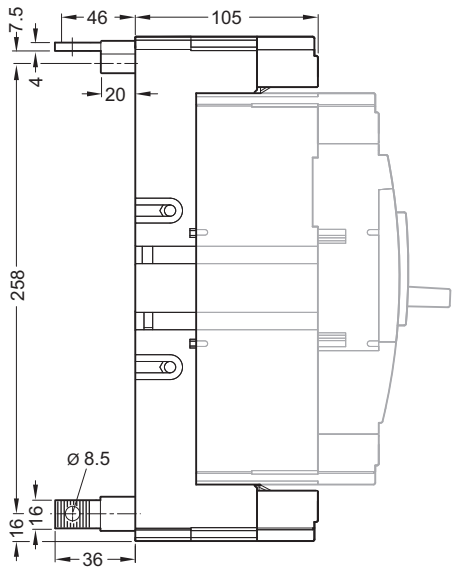
Plug-in design

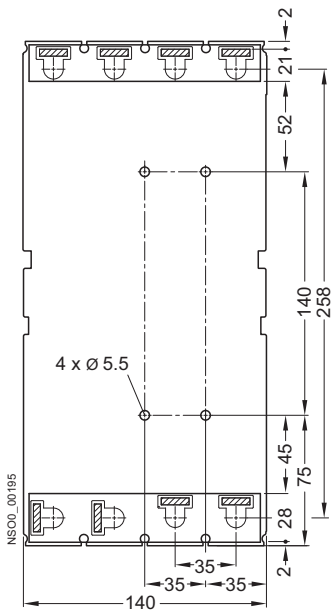




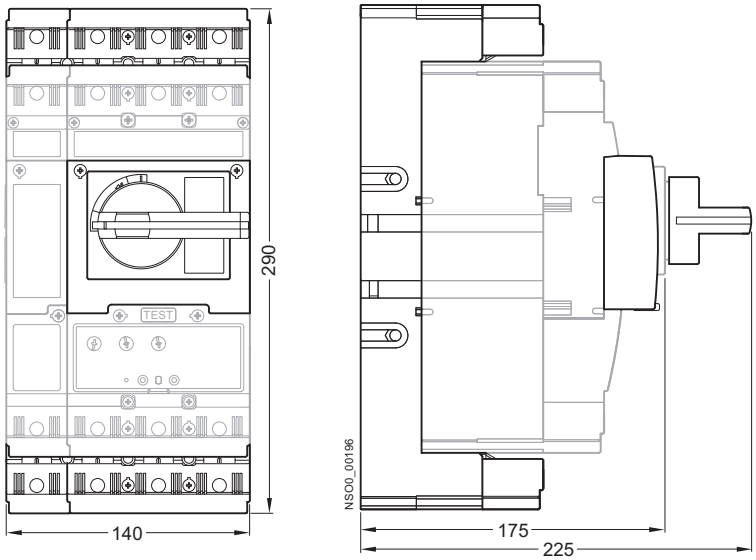
Plug-in design, rear connection
(connecting set 3VT9 200-4RC30 + 3VT9 200-4RC00)Drilling position



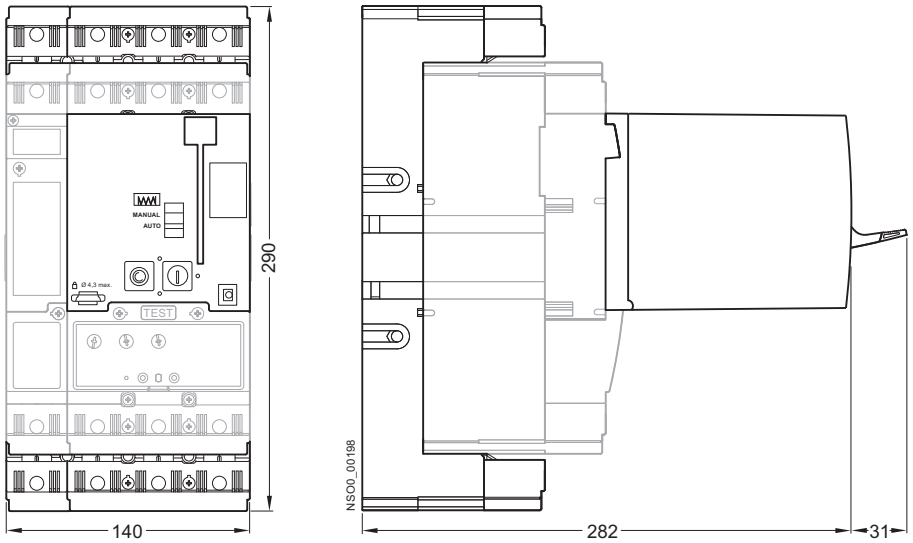




Plug-in design, rotary operating mechanism



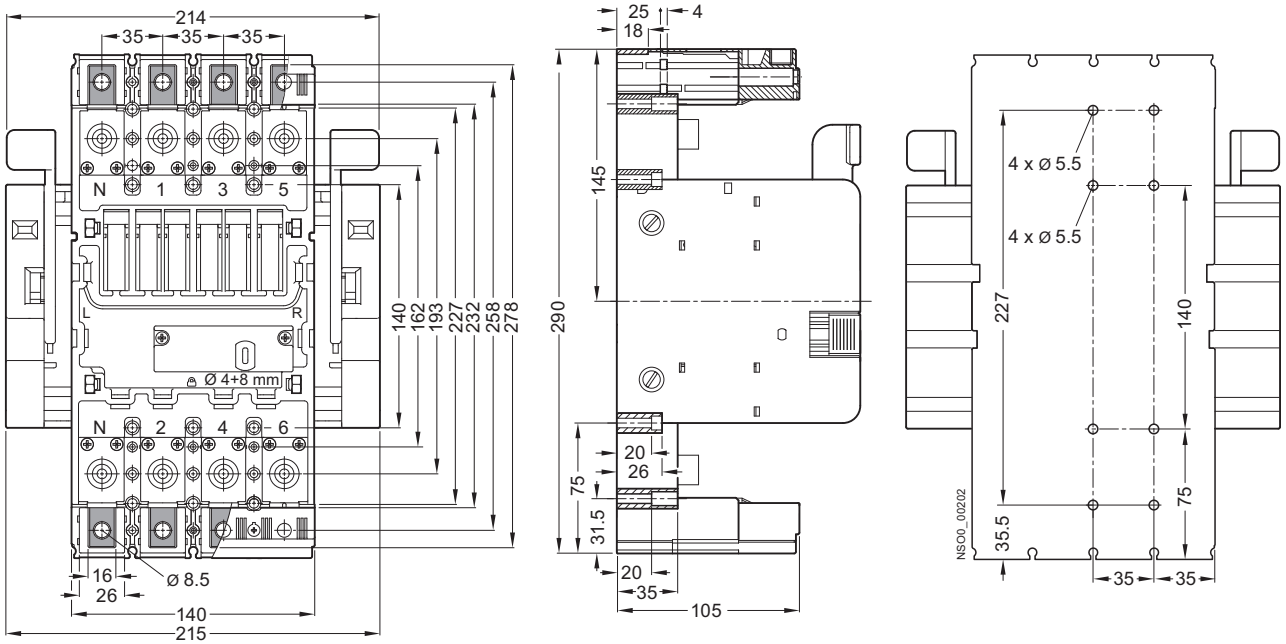
Plug-in design, 3VT9 200-3M..0 motorized operating mechanism



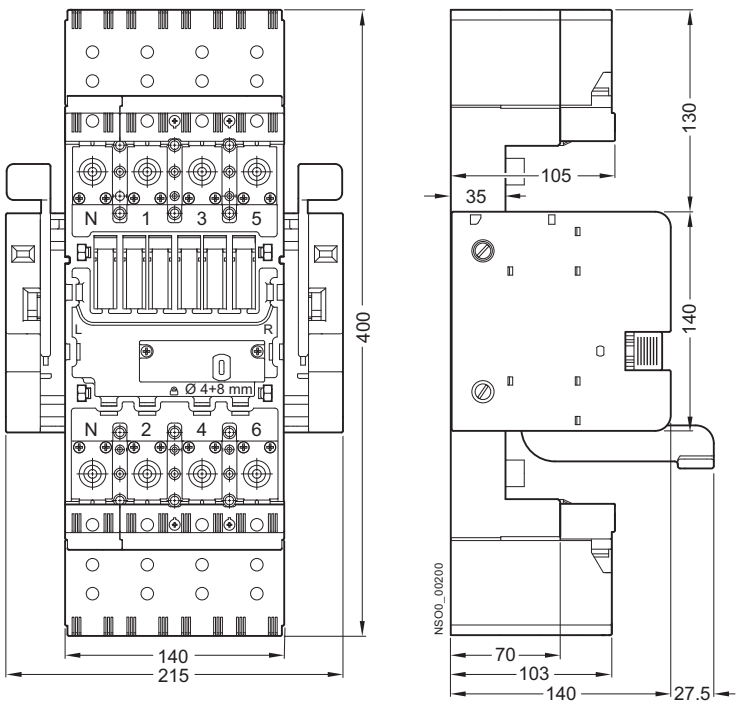
Project planning aids

4-pole version · Withdrawable design

Withdrawable device, 3VT9 200-4WA40Drilling position

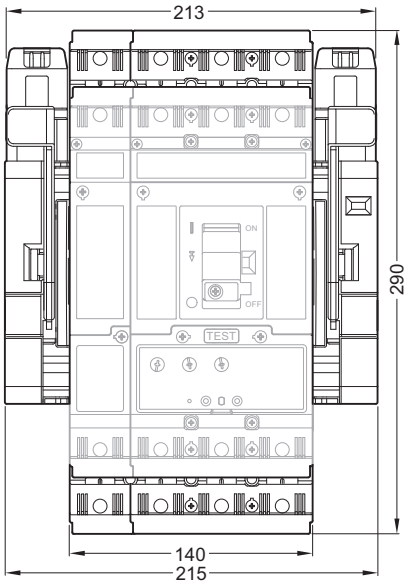


Withdrawable device, 3VT9 200-8CB40 terminal cover

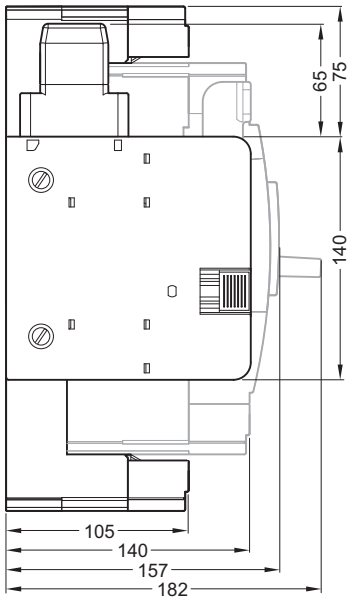


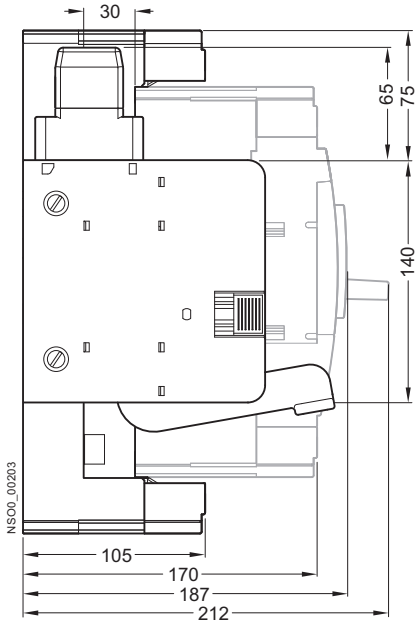
Withdrawable design

Operating position

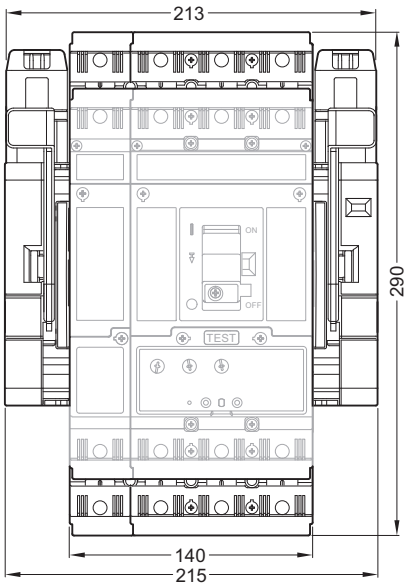


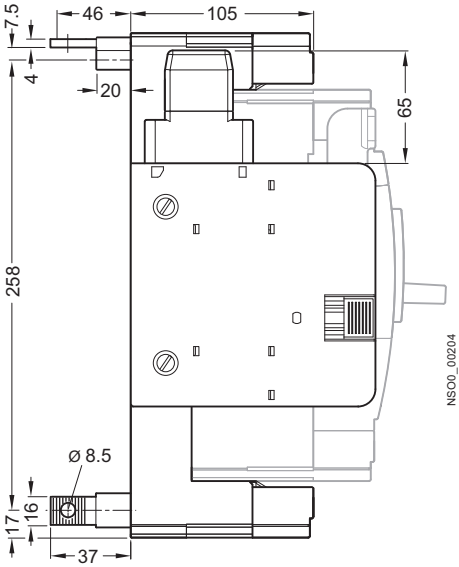
Maintenance position

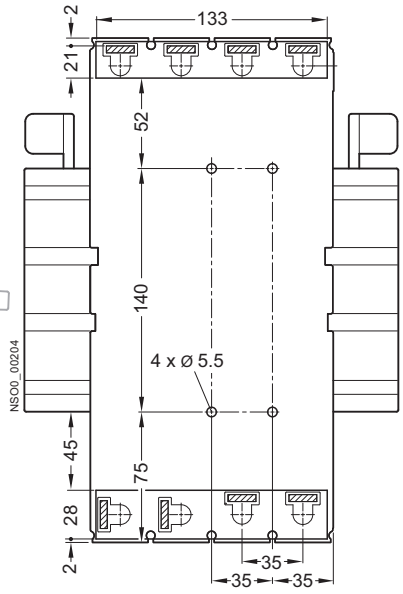




Withdrawable design, rear connection (connecting set 3VT9 200-4RC30 + 3VT9 200-4RC00)



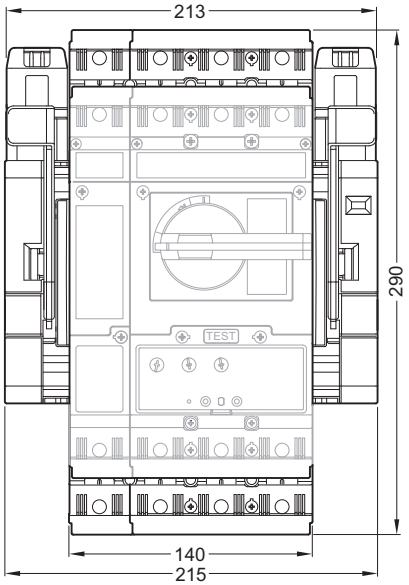




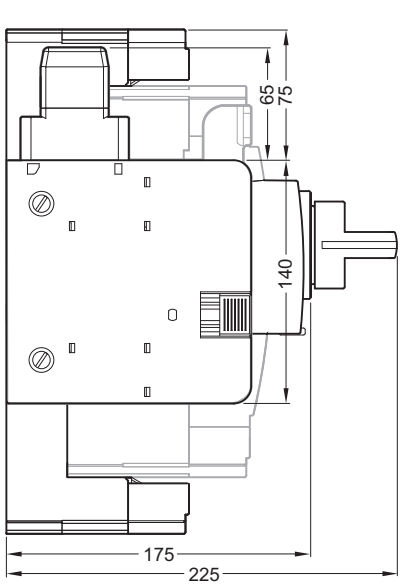
Project planning aids

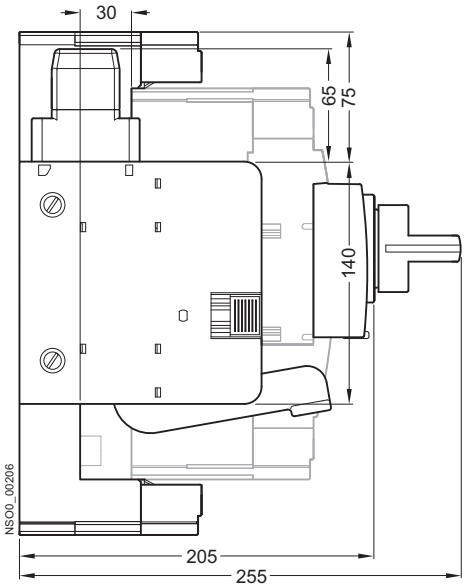
Withdrawable design, Manual operating mechanism

Operating position

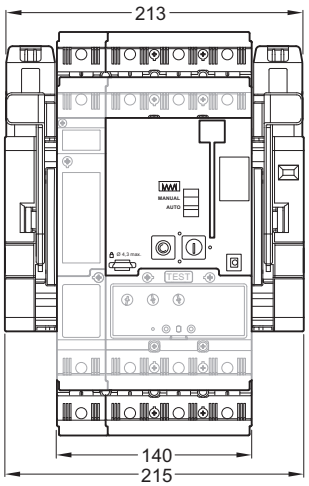


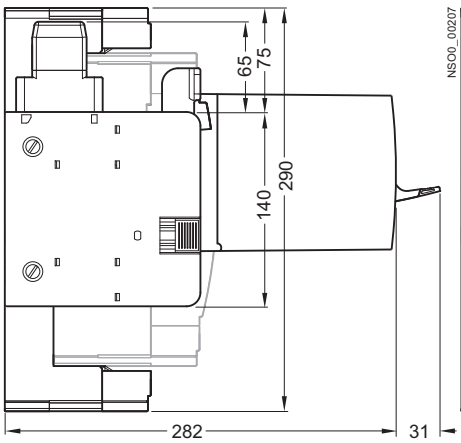
Maintenance position

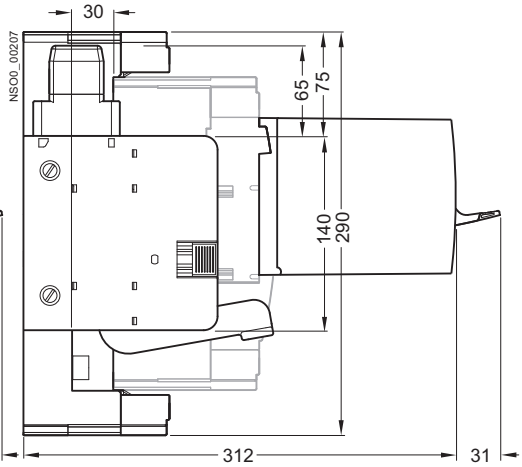




Withdrawable design, 3VT9 200-3M..0 motorized operating mechanism





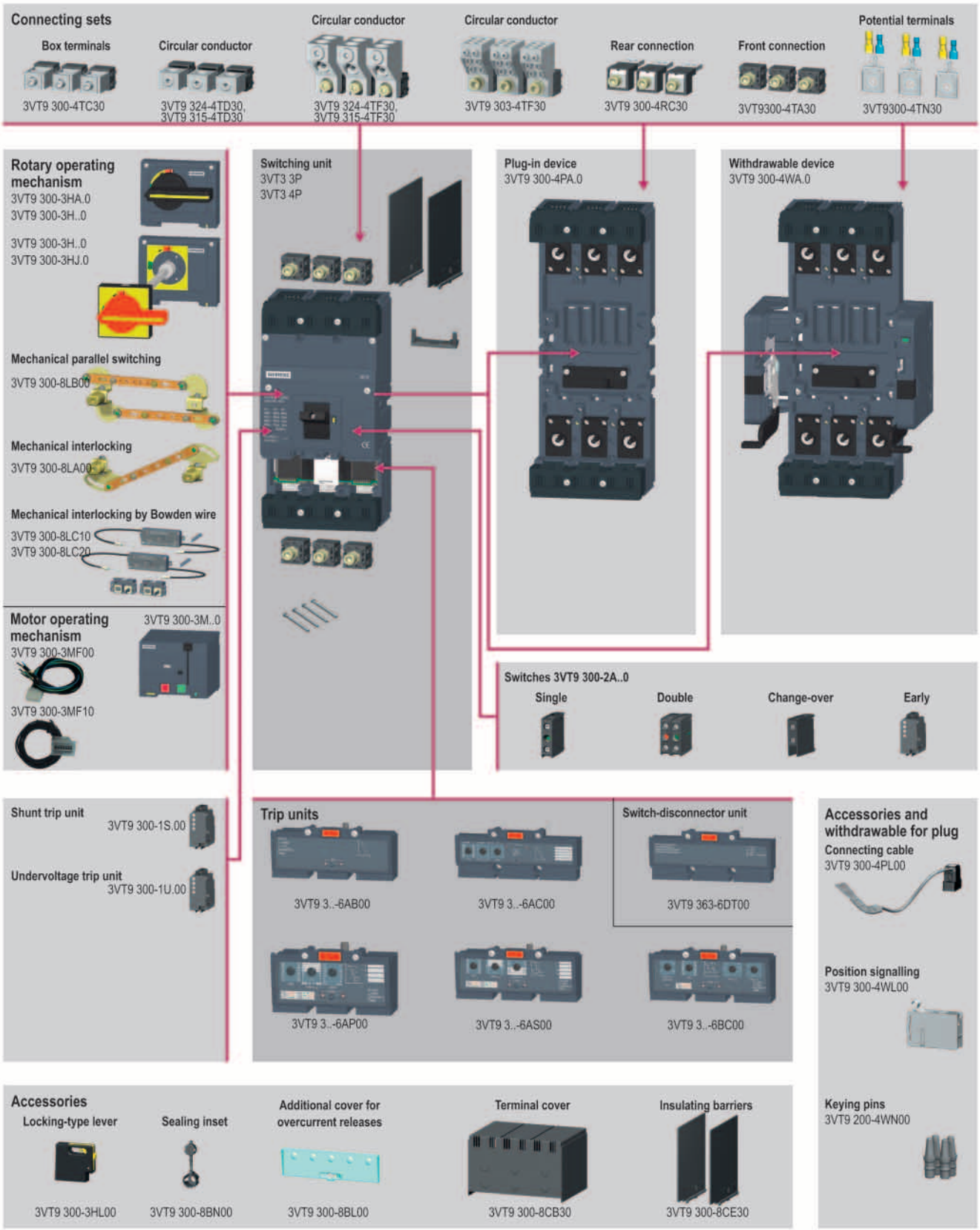


3VT3 Molded Case Circuit Breakers up to 630 A

4

General data

Overview



Overview

The circuit breakers consist of a 3- or 4-pole switching unit and an overcurrent release which is available with a choice of different characteristics. The switch disconnector is equipped with a switch disconnector module in place of the overcurrent release.

Switching units

The switching unit includes:
- Two 3VT9 300-4TA30 connecting sets – for connecting busbars or cable lugs
- 3VT9 300-8CE30 phase barriers
- A set of 4 installation bolts (M5 x 25)
- A conductor holder

The switching unit must be fitted with an overcurrent release (circuit breaker) or a 3VT9 363-6DT00 switch disconnector module (switch disconnector)

In case the circuit-breaker is fed from below (input terminals 2, 4, 6; output terminals 1, 3, 5), I_{cu} does not change.

For maximum circuit breaker/switch disconnector loads in accordance with the ambient temperature, see page 4/11.

Overcurrent releases

ETU LP – characteristic L (lines)
- protecting lines with low starting currents
- without I_r regulation

ETU DP – characteristic D (distribution)
- protecting lines and transformers

ETU MP – characteristic M (motor)
- direct protection for motors and generators
- suitable also for protecting lines and transformers

ETU MPS – characteristic M (motor) with adjustable timing selectivity
- direct protection for motors and generators
- suitable also for protecting lines and transformers
- enables setting time delay of independent release to 0, 100, 200 or 300 ms

ETU DPN – characteristic D (distribution) with N-pole protection
- protecting lines and transformers in TN-C-S and TN-S network

For the description of releases, see page 4/16.

Auxiliary switches and auxiliary releases

As an option, the circuit breakers can be equipped with
- Auxiliary switches
- Alarm switches
- Shunt release for remote tripping
- Undervoltage release for protecting motors and other equipment against damage in case of undervoltage.

Mounting

In the standard fixed-mounted design, the switching units can be mounted onto support plates. As an option, the units are available in plug-in or withdrawable versions (see page 4/8).

Connection

Main circuit
- Is connected using Cu or Al busbars or cables, and possibly cables with cable lugs
- For further connecting options, connecting sets can be used (see page 4/9)
- 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). 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 be fitted with 3VT9 300-8CE30 phase barriers also on the side of terminals 2, 4, 6.
- We recommend painting the connecting busbars.
- Input and output conductors/busbars must be mechanically reinforced to avoid transmitting electrodynamic forces to the circuit breaker/switch disconnector during short-circuiting
- When connecting the main circuit, the dimensions of the deionization space of the circuit breaker must be observed, depending on the type of connection (see page 4/43).

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

For recommended cross-sections of cables, busbars and flexibars for fixed-mounted, plug-in and withdrawable designs, see page 4/11.

Circuit breakers · Switch disconnectors

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

4

Accessories

	Rated current I_n	Current setting of the inverse- time delayed overload releases „L“ I_r	DT	Order no.	PS*	Weight per PU approx.
	kW	A				kg
ETU overcurrent releases						
	**System 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
	**System 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
	**System protection, ETU DPN, LIN function** [1]					
	• 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 and 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 and generator protection, ETU MPS, LSI function** [2]					
	• for direct protection of motors and generators. • suitable also for protecting lines and transformers • enables setting time delay of independent release 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 module						
	630	Switch disconnector [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 and
- Alarm switches.

For remote switching, shunt releases can be built-in.

Undervoltage releases can be used to protect motors and other equipment against damage in case of undervoltage.

Selection and ordering data

	Rated control supply voltage U_s/ Frequency	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 releases					
	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 releases					
	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

Manual operating mechanisms

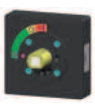
The rotary operating mechanism is necessary to be completed:

- For simple rotary operation of the switch unit:
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob or
  - 3VT9 300-3HF20 red knob
- For operating through the switchgear cabinet door:
  - 3VT9 300-3HJ.. extension shaft
  - 3VT9 300-3HG/HH.. coupling driver
  - 3VT9 300-3HE/HF.. knob.

Mechanical interlocks and mechanical interlocks for parallel switching

- Mechanical interlocks for fixed-mounted design have to be completed by:
  - 2 x 3VT9 300-3HA/HB.. rotary operating mechanisms
  - 2 x 3VT9 300-3HE/HF.. knobs
- Mechanical interlocking by Bowden wire is intended for fixed-mounted, plug-in and withdrawable designs
- Mechanical interlocks have to be completed by:
  - 2 x 3VT9 300-3HA/HB..manual operating mechanism
  - 1 x 3VT9 300-3HE/HF.. knob

Selection and ordering data

	Version	Color	DT	Order no.	PS*	Weight per PU approx.
						kg
Manual operating mechanisms						
	Rotary operating mechanism					
	• locking not possible	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
	Knobs for manual operating mechanism					
	• locking not possible	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
	• degree of protection IP40	black		**3VT9 300-3HG30**		
	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
	• degree of protection IP40	yellow		**3VT9 300-3HH30**		
	**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 have to be completed with: • 2 x 3VT9 300-3HA../HB.. rotary operating mechanisms, • 2 x 3VT9 300-3HE../HF.. knobs				
	**Mechanical interlocks** for fixed-mounted design only	B	**3VT9 300-8LA00**	1 unit	0.136
	**Mechanical interlocks for parallel switching** for fixed-mounted design 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[1)]	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[1)]	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 device 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 device
- The device must be fitted 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 can be used that 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 device includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable design.
- The circuit breaker inside the withdrawable device can be moved between an operating position and a checking position (withdrawn).
- The device 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

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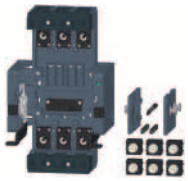
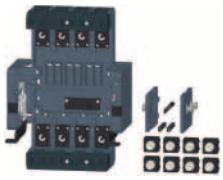
Selection and ordering data

	Version	Max. permissible cross-section *S*	DT	Order no.	PS*	Weight per PU approx.
		mm^2				kg
Plug-in devices						
	**3-pole version**		B	**3VT9 300-4PA30**	1 unit	2.610
	**4-pole version**		B	**3VT9 300-4PA40**	1 unit	3.400
Withdrawable devices						
	**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**		Cu/Al busbars cable lugs	B	**3VT9 300-4RC30**	1 unit	0.567
	**Terminals for front connection**		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**	35 ... 240	Cu Cables, flexibars	B	**3VT9 300-4TC00**	1 unit	0.580
	**Terminals for circular conductors**	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
	**Terminals for rear connection**		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
	**Phase 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 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		**3VT9 300-8CB00**	on req.		
	**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: • overcurrent release • accessory compartment cover • terminal cover • manual operating mechanism • motorized operating mechanism	B	**3VT9 200-8BN00**		1 unit	0.001
	**Additional cover for overcurrent release** Provides protection for overcurrent releases	B	**3VT9 200-8BL00**		1 unit	0.080
	**Connecting cable** For connecting the circuit breaker/switch disconector accessories in withdrawable design (can also be used for plug-in and fixed-mounted design)	B	**3VT9 300-4PL00**		1 unit	0.020
	**Position signaling switch** For indicating the position of the circuit breaker in the plug-in or withdrawable device	B	**3VT9 300-4WL00**		1 unit	0.020
	**Coding set** Prevents inserting the wrong switching unit into the plug-in or withdrawable devices		**3VT9 300-4WN00**		1 unit	0.002
	**Pushbutton cover** For motorized operating mechanism; the cover may be provided with lead seals	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 can be used (see page 4/9)
- 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 phase barriers also on the side of terminals 2, 4, 6
- 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 way of connecting the main circuit must observe the deionization space of the circuit breaker/switch disconnector (see page 4/43).

Auxiliary circuits

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

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

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.	Rated current I_n	**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^2	mm^2	mm^2	mm	Page
3VT9 300-4TA30 **3VT9 300-4TD00**	630					32 x...	
3VT9 300-4RC30 **3VT9 300-4RC00**	630					32 x...	4/46, 4/57, 4/57, 4/57
3VT9 300-4TC30 **3VT9 300-4TC00**	400	35 ... 240 Cu	35 ... 240 Cu	35 ... 240 Cu	35 ... 240 Cu	--	
3VT9 324-4TD30 **3VT9 324-4TD00**	400	150 ... 240 Cu/Al	120 ... 240 Cu/Al	150 ... 240 Cu/Al	120 ... 240 Cu/Al		
3VT9 315-4TD30 **3VT9 315-4TD00**	315	25 ... 150 Cu/Al	16 ... 150 Cu/Al	25 ... 150 Cu/Al	16 ... 150 Cu/Al		
3VT9 324-4TF30 **3VT9 324-4TF00**	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		4/45, 4/56
3VT9 315-4TF30 **3VT9 315-4TF00**	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		4/46, 4/57
3VT9 303-4TF30 **3VT9 303-4TF00**	250	6 x (6 ... 35) CuAl	6 x (6 ... 35) CuAl	6 x (6 ... 35) CuAl	6 x (6 ... 35) CuAl		4/46, 4/57
3VT9 300-4ED30	400						4/47
3VT9 300-4EE30	630						4/47
3VT9 300-4TN30	10/16	1.5 ... 2.54 ... 6 flexible conductor					

Technical specifications

Specifications Type		3VT3 763-2AA36/46/56-0AA0, 3VT3 763-3AA36/46/56-0AA0 Circuit breakers			Switch disconnectors
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 • switching mode AC 690 V DC 440 V		A -- --			-- 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-circuit 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 = 250 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	Hz	3g (8 ... 50)			
Design modifications					
Front/rear connection		✔/✔			
Plug-in design		✔/+			
Withdrawable design		✔/+			
Accessories					
Switches-auxiliary/relative/signal/leading		✔/✔/✔/✔			
Shunt trip/with signal switch		✔			
Undervoltage release/with leading switch, with signal switch		✔/✔			
Front man. oper. mechanism/ lateral oper. mech. ri./left		✔/✔			
Mechanical interlocking to the man.oper. mechanism, by Bowden wire		✔/✔			
Motorized oper. mechanism with operations counter		✔/✔			
Locking-type lever		✔			
Bolt sealing insert/additional cover for overcurrent release		✔/✔			

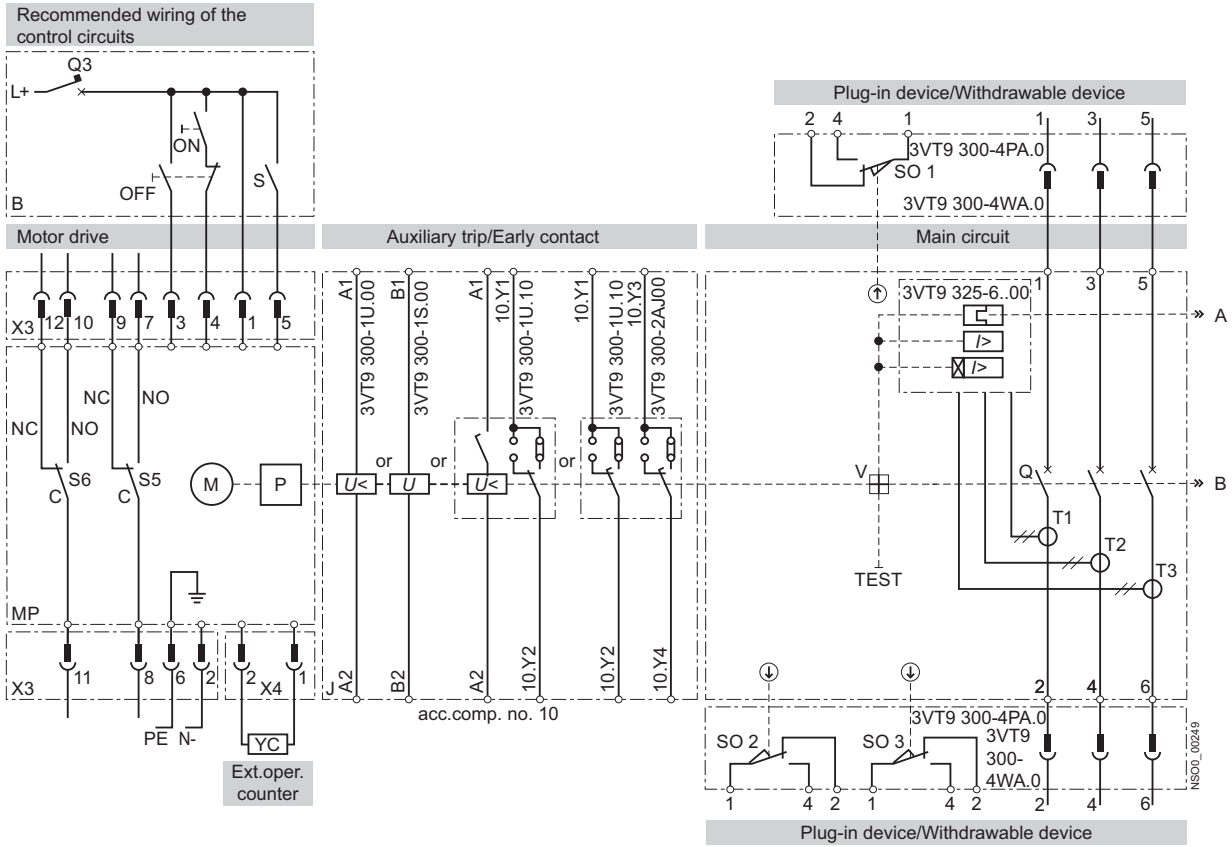
✔ available,
-- unavailable,
+ in preparation

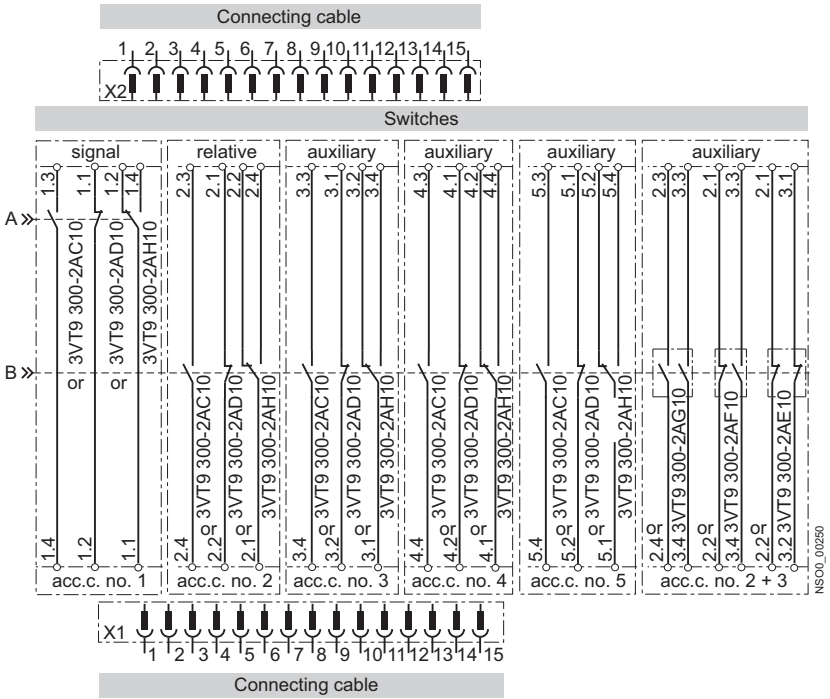
[1] In case circiut breaker connection is reversed (input terminals 2, 4, 6 output terminals 1, 3, 5), I_{cu} does not change.

Schematics

Cicuit breakers with accessories

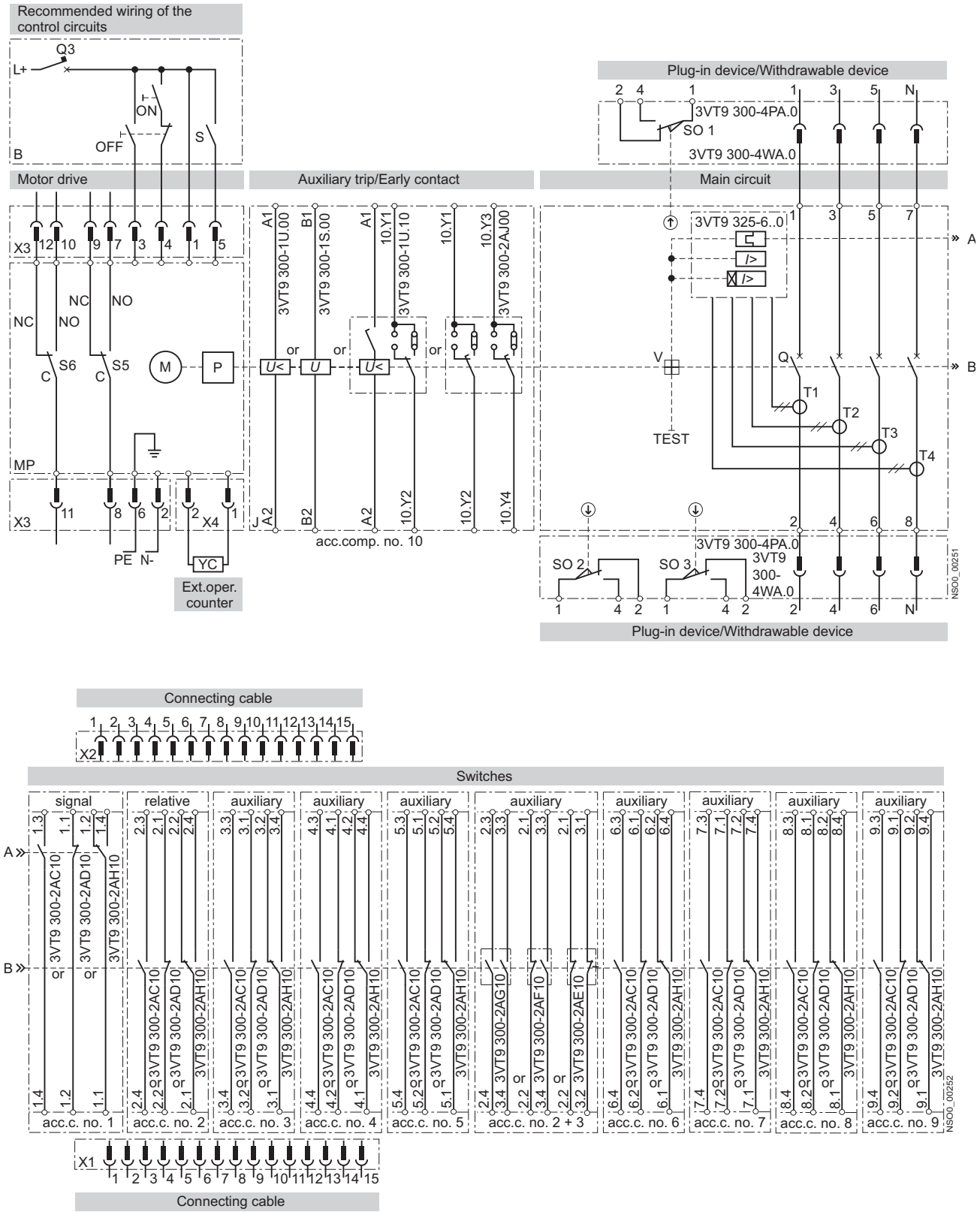
3-pole version





Circuit breakers · Switch disconnectors

4-pole version



MP	3VT9 300-3M..0 motorized operating mechanism
M	motor
P	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	motorized operating mech. circuit breaker, see page 4/64
J	3VT3 switching unit
Q	main contacts
T1, T2, T3, T4[1)]	current transformers
V	trip-free mechanism
3VT9 325-6..00[2)]	3VT9 363-6DT00circuit breaker - overcurrent release - ETU LP, DP, MDP switch-disconnector - switch-disconnector unit
TEST	pushbutton to test release
3VT9 300-4PA30	plug-in device
3VT9 300-4WA30	withdrawable device
X1, X2	3VT9 300-4PL001 connecting cable
SO1, SO2, SO3	contacts signalling position of circuit breaker/switch-disconnector in 3VT9 300-4WL00 plug-in or withdrawable device, see pages 4/44, 4/45
3VT9 300-1U.00	undervoltage release
3VT9 300-1S.00	shunt release
3VT9 300-1U.10	undervoltage release with leading contact
3VT9 300-2AJ00	leading contact

[1)] Only for 4-pole design of the 3VT3 763-.AA36-0AA0 switching unit.

4

Functions

States of auxiliary switches in the switching unit accessory compartment

Cicuit breaker state	Lever positon 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 on		**1**	1	0	0	1	1	0	1	0	1	1	0	1	0	0	1	0	0	1	1	0
Switched off manually or electrically by operating mechanism		**0**	1	0	0	1	0	1	0	1	0	0	1	0	1	1	1	0	0	1	0	1
Switched off by overcurrent release		**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 release 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
Location switches in accessory compartments, see page 4/54.

Overcurrent releases

Overview

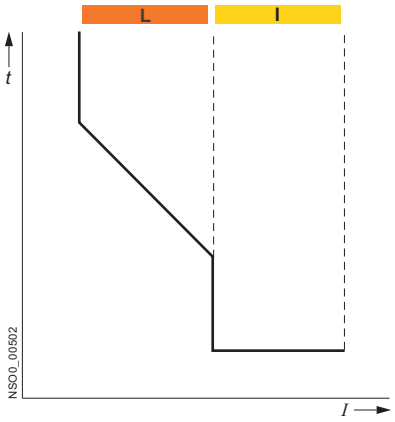
The electronic overcurrent release consists of a separate and interchangeable unit, which is supplied with the 3VT3 switching unit. By exchanging the overcurrent release, the range of the circuit breaker's rated current can be easily changed.

Overcurrent releases for 3VT3 switching units are produced in current values of I_n = 250, 400 and 630 A. The ETU LP releases are produced with rated currents of 250, 315, 400, 500 and 630A. The releases (including regulation of -60%) cover a current range from 100 to 630 A.

Tripping characteristics

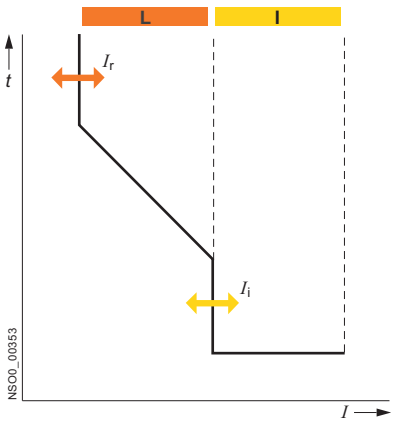
Depending upon the needs for adjusting the release's tripping characteristic to the protected device and to the variability of the characteristic with regard to selectivity, the following releases are available:

ETU LP



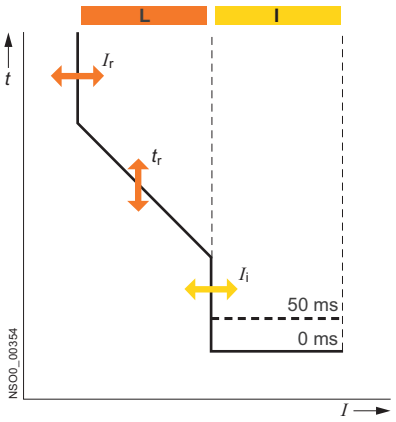
They have one type of characteristic and fixed I_n and I_{rm} settings.

ETU DP



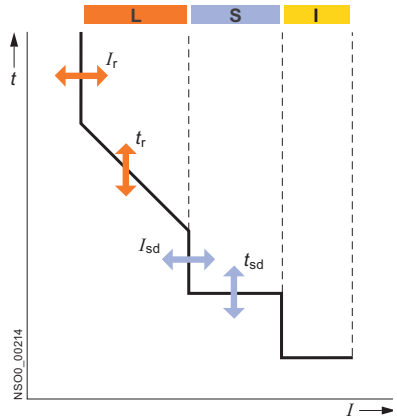
They have one type of characteristic with adjustable I_r and I_{rm}.

ETU MP



They have more kinds of characteristics with adjustable I_r, t_r and I_{rm}.

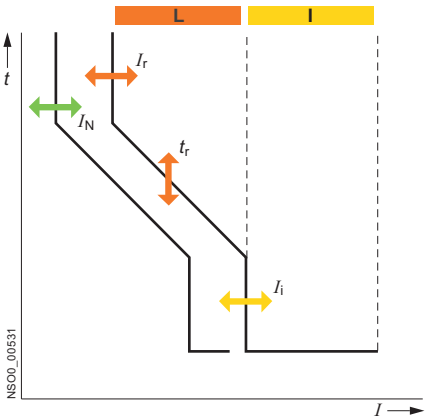
ETU MPS



They have more kinds of characteristics with adjustable I_r, t_r, I_{sd} and t_{sd}.

ETU LP, DP, MP and MPS overcurrent releases 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



They 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.

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

Proper functioning of releases does not depend on the type of current in the main circuit. The function of the release is supported by a microprocessor, which processes a sampled signal of the main circuit and recalculates it to obtain an rms value. Therefore, the releases 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 releases protect a circuit against short-circuiting and overloading. Tripping characteristic of the releases is independent of the ambient temperature. The release is affixed to the switching unit by two bolts. The translucent cover over the adjustment controls can be sealed.

Setting the tripping characteristics

The tripping characteristic of the overcurrent releases is defined by standard EN 60947-2. For releases ETU DP, MP, MPS and DPN, the characteristic is adjusted using latched switches on the overcurrent release unit.

A visual demonstration on setting the tripping characteristic can be found in the SIMARIS design program.

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 releases, 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 releases, the time delay can be set at 0 or 50 ms.

1. Dependent release (thermal) L

- The dependent release ETU DP is adjusted using one I_r switch. The I_r switch is used to adjust the circuit breaker's rated current, with the characteristic shifting on the current axis. By means of its internal circuitry, the release is set to one type of characteristic.
- The dependent releases ETU MP, MPS and DPN are adjusted using two switches, I_r and t_r. The first (I_r) switch is used to adjust the circuit breaker's rated current. The characteristic is moved on 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. For ETU MP amd MPS releases there are available 4 characteristics for motor protection and 4 characteristics for protecting lines. Breaking times correspond with the release classes 10 A, 10, 20, 30. By changing t_r, it is possible to select the characteristic according to the required motor starting (light, medium, heavy or very heavy starting). For ETU DPN releases, there are available 8 characteristics for protecting lines or transformers. It is not possible to turn the device back on right after the dependent release has been actuated and circuit breaker tripped. The release must be allowed to cool off, because it has a thermal memory. The memory can be disabled by turning the switch from the normal "T_t" position to the "T_0" position. The dependent release remains active, and only its thermal memory is inactivated. 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 with repeated tripping.

2. Delayed independent release S

This release type is only in the ETU MPS overcurrent releases. The delayed independent release has the function of a delayed short-circuit release. 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 ($I_{sd} = n \times I_r$). It is a short-circuit current that, within the span of I_{sd} to Irm, will trip the circuit breaker with delay t_{sd}, where t_{sd} is a delay set up for switching off the release. The delayed independent release 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}.

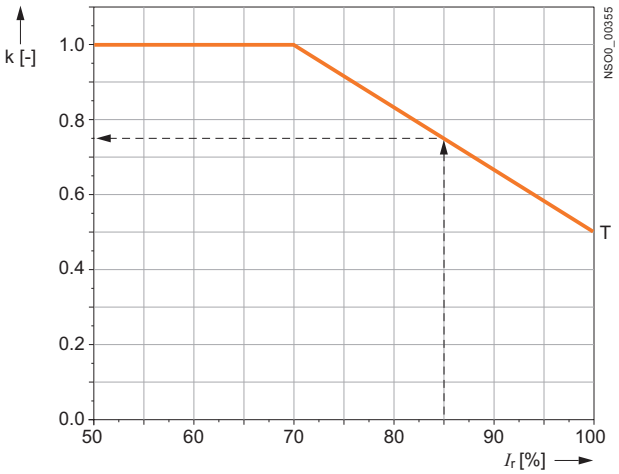
3. Independent instantaneous release (short-circuit release) I

- For releases ETU DP, MP and MPS, the independent instantaneous release is adjusted using one I_i switch. The I_i switch is used for setting up the short-circuit current that, upon its being reached or exceeded, causes instantaneous tripping of the circuit breaker.

Overcurrent releases

Tripping characteristics of ETU LP, DP, MP, MPS and DPN releases 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 releases are independent of the ambient temperature and are plotted in a cold state. Digital releases enable simulation of a release 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 release'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 overcurrent releases, 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 overcurrent release

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

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

t_u [s] standstill period for particular characteristics

Overcurrent releases 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
$I_N = 0.5\ I_r$

Protecting lines with low starting currents

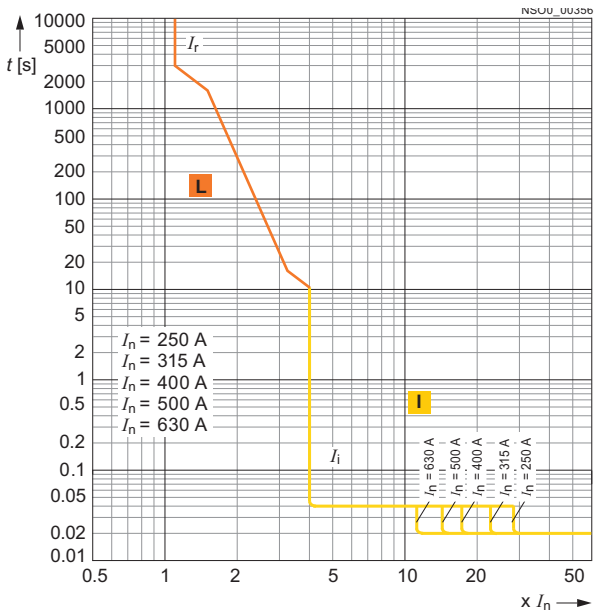
The 3VT9 3..-6AB00 release is intended for the 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching unit. The release has a thermal memory that cannot be disabled. Releases' rated currents are given by their type designations and correspond to a standardised series of currents (see specifications table). The short-circuit release is fixed-set at 4 I_n.

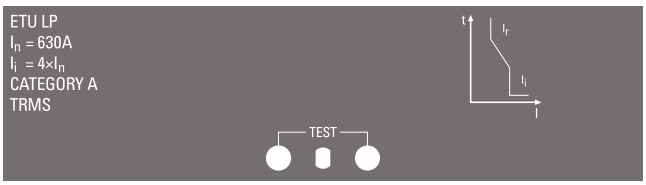
One of the release's advantages is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

Specifications

Type	Rated current I_n A	Overload protection I_{rm} 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





Overcurrent releases ETU DP-Distribution

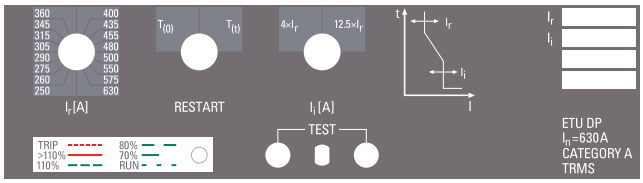
Protecting lines and transformers

The 3VT9 3..-6AC00 release is intended for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. Operation of the release is controlled by a microprocessor. The release 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 release 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.

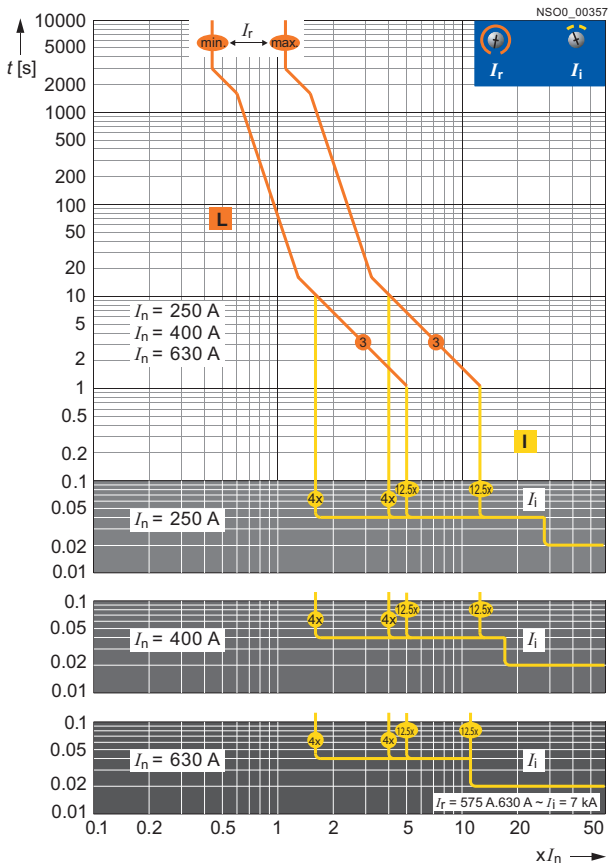
On the lower part of the release cover are two photocells for communicating with the prospective signalling unit.

The releases have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r.

The releases 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



Overcurrent releases

Adjustable specifications

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

Overcurrent releases ETU MP-Motors

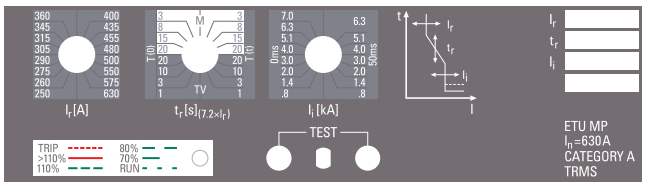
- Direct protection for motors and generators
- Possibility for protecting lines and transformers

The 3VT9 3..-6AP00 release is intended for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. The operation of the release is controlled by a microprocessor. The release 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 release 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 release).

Another parameter for adjusting the release consists of the rated current and short-circuit tripping level. The time delay of the short-circuit release 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 just before tripping will begin to blink red. On the lower part of the release cover are two photocells for communicating with the prospective signalling unit.

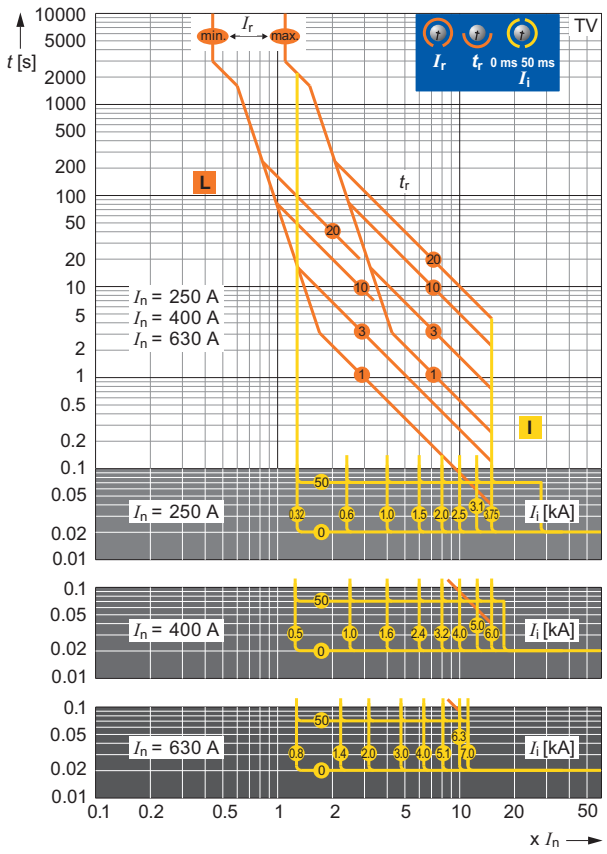
The releases have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the release. Mode “M” provides 4 characteristics suitable for protecting motors and in mode “TV” are 4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

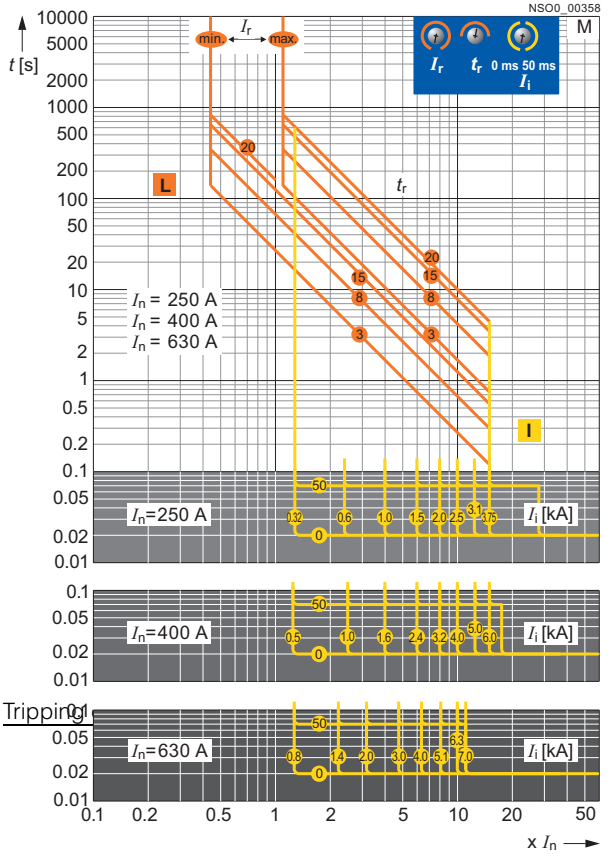


Overcurrent releases

Adjustable specifications

Order No.	Rated current I_n A	Overload protection I_r A	t_r (7.2 x I_r) s	Restart	Instantaneous short circuit protection I_i 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

Overcurrent releases

Overcurrent releases ETU MPS-Motors, setting timing selectivity

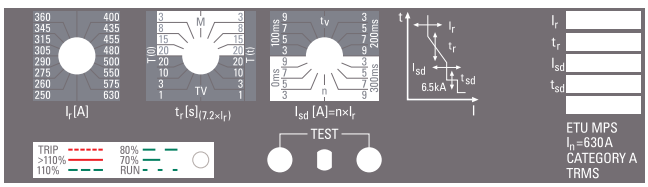
- Direct protection for motors and generators
- Possibility for protecting lines and transformers
- Enables adjusting time delay of independent release

The 3VT9 3..-6AS00 release is intended for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. The operation of the release is controlled by a microprocessor. The release 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 release 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 release).

Another parameter for adjusting the release consists of the rated current and tripping level of the delayed short-circuit release. The time delay (t_v) can be set on the delayed short-circuit release 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. On the lower part of the release cover are two photocells for communicating with the prospective signalling unit.

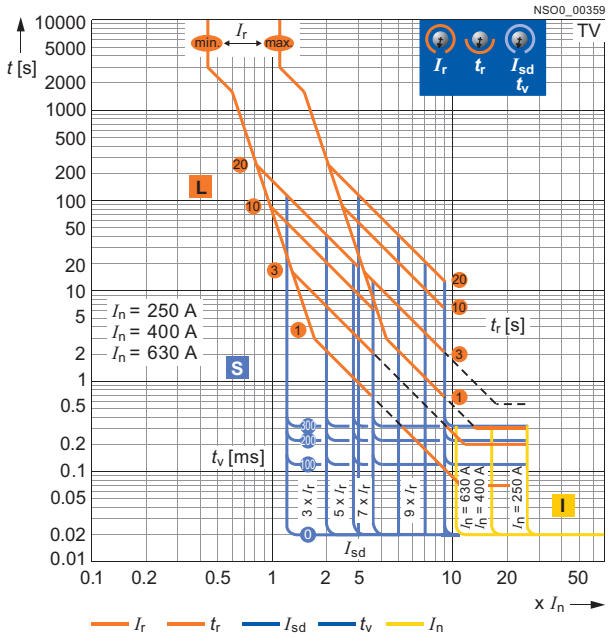
The releases have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 I_r. A total of 8 characteristics can be set on the release. Mode “M” provides 4 characteristics suitable for protecting motors, and in mode “TV” are 4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

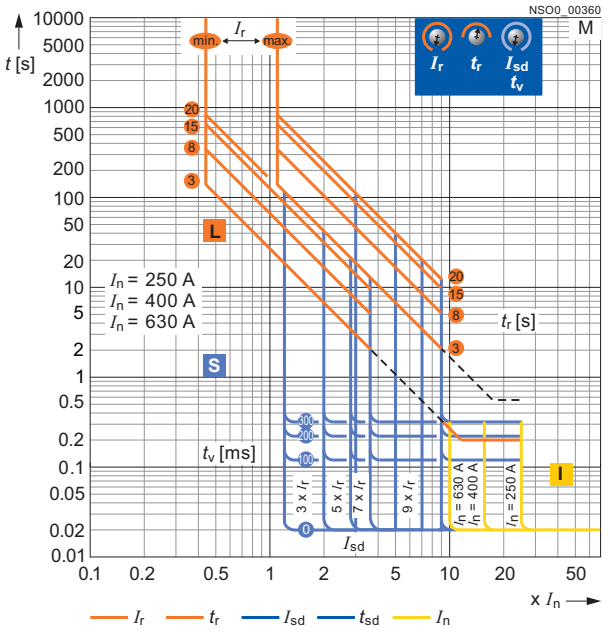


Adjustable specifications

Order No.	Rated current I_n A	Overload protection I_r A	t_r (7.2 x I_r) S	Restart	Instantaneous short circuit protection I_i kA	ms
		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	
3VT9 325-6AS00	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	
		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	
3VT9 340-6AS00	400	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	
		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	
3VT9 363-6AS00	630	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





Overcurrent releases

Overcurrent releases ETU DPN-Distribution with protected N pole

- Protecting lines and transformers in TN-C-S and TN-S networks

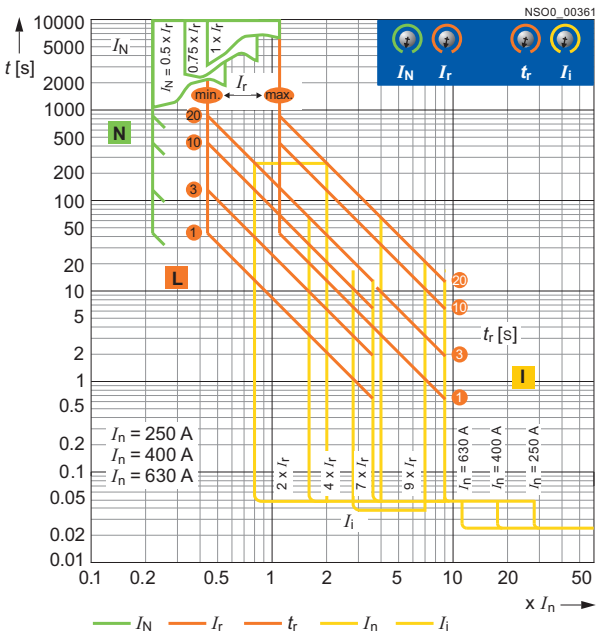
The 3VT9 3..-6BC00 release is only intended for the 3VT3 763-AA56-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$.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

The rated current I_r, delay for switching off the release at 7.2 I_r, and the tripping level of the short-circuit release 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. On the lower part of the release 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.

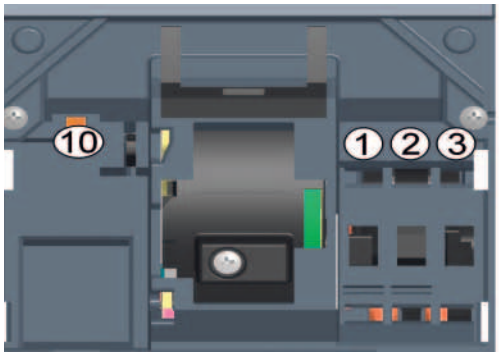
Tripping characteristics



Adjustable specifications

Order No.	Rated current I_n A	Overload protection I_r A	t_r (7.2 x I_r) S	Restart		ms
3VT9 325-6BC00	250	100 110 115 125 137 144 160 172 180 190 200 210 220 231 243 250	1 3 10 20 20 10 3 1	$T_{(0)}$ $T_{(t)}$	2 4 7 9	0,5 0,75 1 OFF
3VT9 340-6BC00	400	160 172 180 190 200 210 220 231 243 250 275 290 315 345 360 400	1 3 10 20 20 10 3 1	$T_{(0)}$ $T_{(t)}$	2 4 7 9	0,5 0,75 1 OFF
3VT9 363-6BC00	630	250 260 275 290 305 315 345 360 400 435 455 480 500 550 575 630	1 3 10 20 20 10 3 1	$T_{(0)}$ $T_{(t)}$	2 4 7 9	0,5 0,75 1 OFF

Overview



Type designation according to contact arrangement

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

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 overcurrent release
2	Relative	Relative to indicate tripping of the circuit breaker by releases, TEST push button or by OFF push button 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

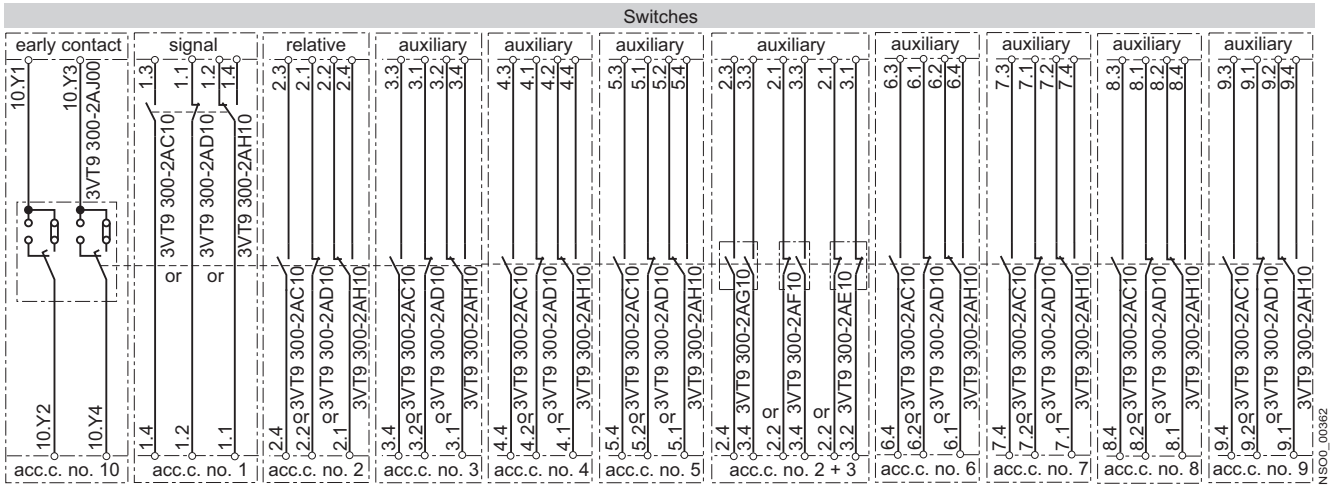
state of switches in the switching unit cavities

[1)] Accessory compartment 4, 5, 6 are only for 4-pole design.

Auxiliary switches

Function

State of switches in the switching unit accessory compartment



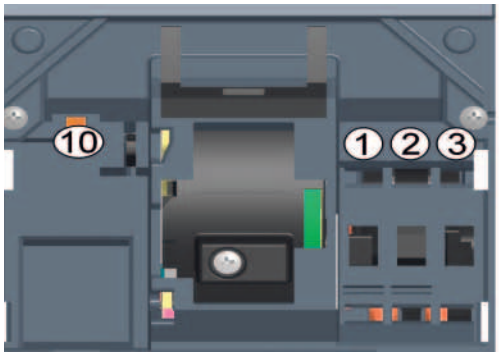
Technical specifications

General data

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 to control electromagnetic loads.

Overview



Type designation of shunt releases 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

Type designation of undervoltage releases according to the rated operating voltage

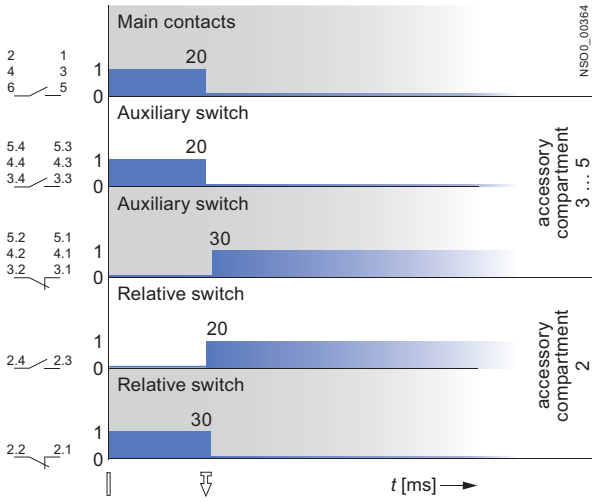
U_e	Order No.
AC 24,40 48 V	3VT9 300-1SC00
AC/DC 110 V	3VT9 300-1SD00
AC 230,400,500/DC 220 V	3VT9 300-1SE00

The particular rated operating voltage of the release is set up by jumpers located right in the release. It is always set to the maximum value by default.

Function

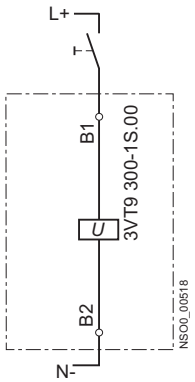
Shunt releases

Circuit breaker switched off by the shunt release



Circuit breaker states and toggle positions of the circuit breaker

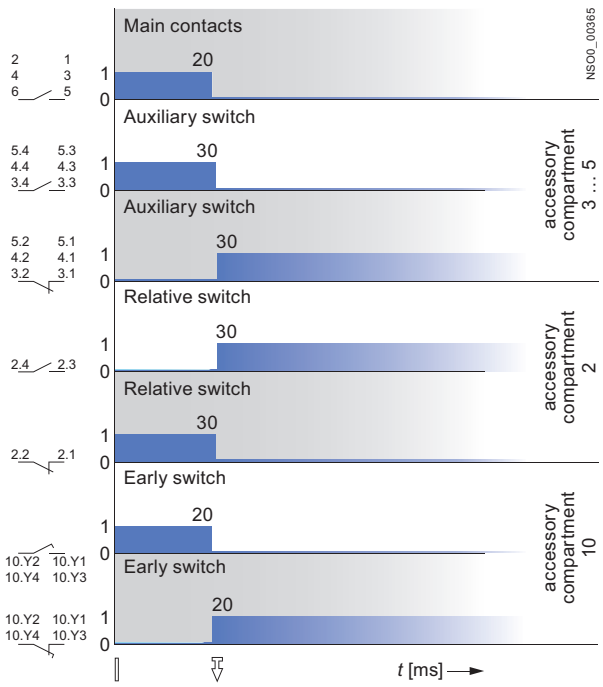
Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by releases, or by TEST button or by the release pushbutton on the motorized operating mechanism	
Switched off manually or electrically by operating mechanism	



Auxiliary releases

Undervoltage releases

Circuit breaker switched off by the undervoltage release

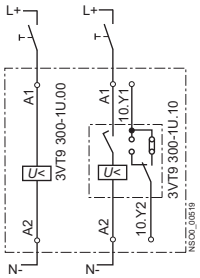


Circuit breaker states and lever positions of the circuit breaker

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

Number and type of contacts by arrangement of contacts

Arrangement of contacts	Number of contacts	Contact types
2	2	break
11	1 + 1	breake + make
20	2	make



Technical specifications

Shunt releases

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
Loading time		∞
Connector cross-section S	mm^2	0.5 ... 1
Terminal protection (connected release)		IP20
Location in accessory compartment No.		10

Undervoltage releases

Order No.		3VT9 300-1U.00	3VT9 300-1U.10[2]
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 is possible switch on) U 0.35 U_e (the circuit breaker must trip)	
Time to switched-off	ms	20	
Loading time		∞	
Connector cross-section S	mm^2	0.5 ... 1[2]	
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[2]
Terminal protection (connected release)		--	IP20

[1] Tripping of the undervoltage release can be delayed using the delay unit 3VT9 000-1UX00.

[2] Cannot be used in combination with motorized operating mechanism 3VT9 300-3M..0.

Overview

Rotary operating mechanisms

The following elements of the rotary operating mechanisms need to be used:

- for controled use of the switch unit with:
  - 3VT9 300-3HE10 or 3VT9 300-3HE20 black knob
- 3VT9 300-3HF20 red knob
  for controlling through the switchgear cabinet door with:
  - 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 interlocks for parallel switching

- Mechanical interlocks for fixed-mounted versions are to be completed by:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanism
  - 2 x 3VT9 200-3HE/HF.. knob
- Mechanical interlocking with Bowden wire is intented for fixed-mounted, plug-in and withdrawable designs
- Mechanical interlocking is to be completed with:
  - 2 x 3VT9 200-3HA/HB.. rotary operating mechanism
  - 1 x 3VT9 200-3HE/HF.. knob

Design

The rotary operating mechanism makes possible to govern the circuit breaker by pivoting lever, e.g. to switch machines on and off. Modular conception of drives makes possible simple mounting on the switching unit (also additionally) after the accessory compartment cover is removed. A fixed motor is possible to seal. The drive and its accessories is ordered separately according to your choice (see page 4/6).

- The rotary operating mechanism makes possible to control the circuit breaker:
  - from the front panel of the circuit breaker (Fig.1)
    3VT9 300-3HA/HB.. rotary operating mechanism
    + 3VT9 300-3HE/HF.. knob
  - through the switchgear door (Fig. 2)
    3VT9 300-3HA/HB.. rotary operating mechanism
    + 3VT9 300-3HJ.. extension shaft
    + 3VT9300-3HG/HH..couling driver
    + 3VT9 300-3HE/HF.. knob
- 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 supplied in two versions, standard (length 365 mm - can be cut short) and telescopic (adjustable length 245 ... 410 mm).

Enhanced safety for operator :

- The rotary operating mechanism unit and knob are also supplied with the possibility to lock the circuit breaker in position “switched off manually“. The unit and lever of the rotary operating mechanism can be locked using three padlocks with shank diameter max. 4 ... 6 mm.
- Each coupling driver prevents the door from opening when the circuit breaker is on-state or off-state by releases and types VT9300-3HG10 and VT9300-3HG20 when the circuit breaker is in the state switched off manually and the knob is locked up.
- Two circuit breakers with hand drives can be provided with mechanical interlocks or with mechanical interlocks for parallel switching (see page 4/30).

Features

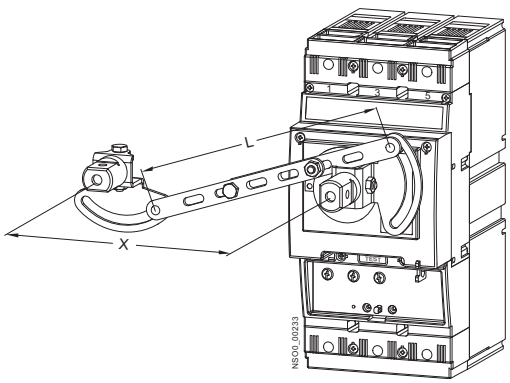
Order No.	Description	Color	Locking while the circuit breaker is in OFF state	Protection	Switchgear door locking in the circuit breaker state		Length mm
					switched on or off by release	switched off manually and locked	
3VT9 300-3HA10	Manual operating mechanism	blue	no	--	--	--	--
3VT9 300-3HA20	Manual operating mechanism	blue	yes	--	--	--	--
3VT9 300-3HB20	Manual operating mechanism	yellow	yes	--	--	--	--
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	--	--	--	--	--	365 (can be short)
3VT9 300-3HJ20	Extension shaft-telescopic	--	--	--	--	--	245 ... 410

Mechanical interlocking and parallel switching

Function

3VT9 300-8LA00 mechanical interlocking

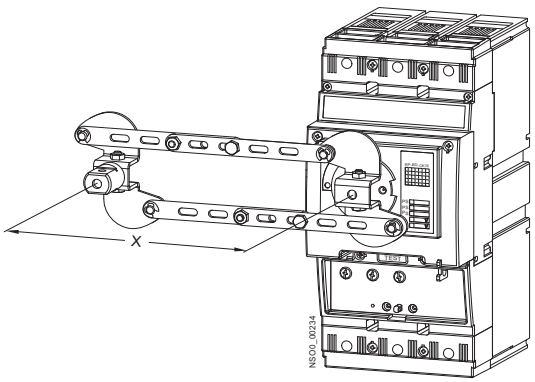
Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously. Interlocking can be used between two 3VT3 circuit breakers or between 3VT3 and 3VT2 circuit breakers. Both circuit breakers must be furnished with a hand drive (at least one with a manual operating mechanism and knob), see page 4/48.
In order to use the interlocking, it is absolutely necessary to comply with the dimensions shown in the figure and table.



Left switching unit	Right switching unit							
	3VT2, 3P		3VT2, 4P		3VT3, 3P		3VT3, 4P	
	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

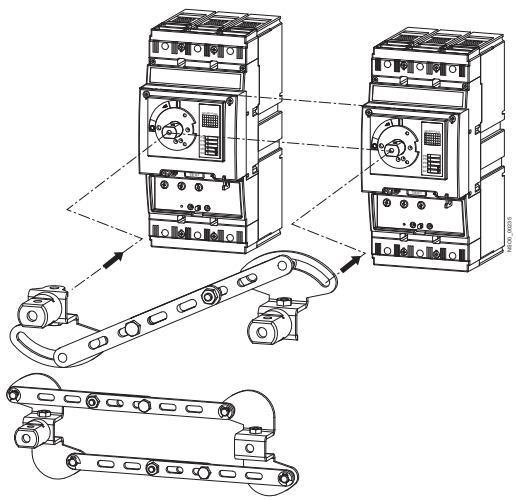
3VT9 300-8LB00 mechanical parallel switching

Provides for simultaneous switching of two circuit breakers/switch-disconnectors. Parallel switching can be used between two 3VT3[1] circuit breakers or between 3VT3 and 3VT2 circuit breakers. Each circuit breaker must be equipped with a manual operating mechanism and at least one with a knob, see page 4/48.
In order to use parallel switching it is absolutely necessary to comply with the dimensions shown in the figure and table.

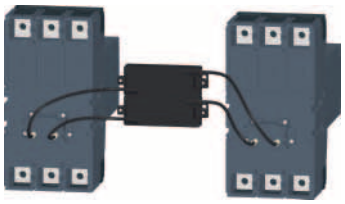


Left switching unit	Right switching unit							
	3VT2, 3P		3VT2, 4P		3VT3, 3P		3VT3, 4P[1]	
	X	L	X	L	X	L	X	L
	mm	mm	mm	mm	mm	mm	mm	mm
3VT2, 3P	105^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	x	x
3VT2, 4P	105^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	122.5^{+7}	164.5^{+7}	x	x
3VT3, 3P	122.5^{+7}	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 design) can only be on the right side.



3VT9 300-8LC.0 Mechanical interlocking

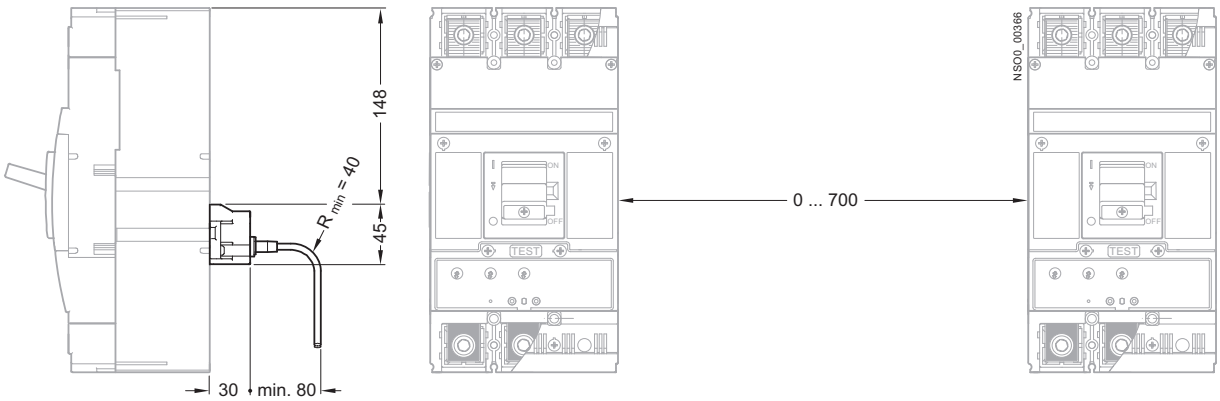


- Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- 3VT9 300-8LC10 mechanical interlocking is intended for two 3VT3 circuit breakers. 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 3VT3	3VT2 3VT3

Circuit breaker placement in switchgear

Detailed information can be found in the instructions for use, which you may download from our website www.siemens.com/technical assistance.



Motorized operating mechanisms

Design

The motorized operating mechanism is part of circuit breaker accessories enabling you to switch the circuit breaker on and off remotely. Modular conception of the motor mechanism enables simple mounting on the circuit breaker (also additionally) after the circuit breaker accessory compartment cover is removed. The fixed motor can be sealed. 3VT3 circuit breakers with motor mechanism can be used in the most demanding industrial applications such as protection of standby sources, synchronization of two sources, etc. and anywhere it is necessary to ensure automated and unmanned operation of electrical equipment.
The motor mechanism are equipped with spring storage units and due to accumulated energy to trip the circuit breaker, it is no problem to trip the circuit breakers within times up to 60 ms. Releasing of the storage unit and tripping of the circuit breaker is ensured by a closing coil that belongs to standard equipment of every motor mechanism. The time before the circuit breaker is tripped using the motor mechanism is 900 ms. This method of tripping is suitable for controlling technological entities. When faster circuit breaker tripping is required (e.g. emergency STOP button), it is possible to use the motor mechanism in combination with undervoltage release or shunt trip.

- On the motor mechanism front panel there is a selector switch to select the drive modes with a possibility to indicate remotely 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 motor mechanism does not need any voltage to perform its function.
- Remote switching on and off in position AUTO is carried out using push buttons that must be connected to the drive unit connector, furthermore, this position makes it is possible to control the circuit breaker with the push buttons on the drive unit front panel.
- In MANUAL mode it is possible to switch on and off using the green and red push buttons on the front panel of the motor mechanism cover. 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 motor mechanism, apart from 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 overcurrent releases or auxiliary trips, then because of mechanical link between the circuit breaker and the motor mechanism, a pulse will be generated to wind up the spring of the storage unit automatically. The motor mechanism can be wound up automatically, depending on operator's demand, by permanent closing of switch S or after the circuit breaker is checked by switching S switch on. 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 motor 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 the storage unit is wound up, it is possible to switch the circuit breaker on and off using the control buttons on the front panel of the motor mechanism.
- On the front panel there is a storage unit status indicator indicating locally what state the 3VT3 motor mechanism unit storage is in and whether it is possible to switch the circuit breaker on. 3VT3 motor mechanism enable to obtain a storage status signal from the terminal strip also remotely. 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 fixed beyond the circuit breaker space (e.g. in the switchgear door) or in the switchgear space using a metal holder included in the supply of external operations counter and its connecting can be done using connectors.
- The mechanism can be locked in off position using as many as three padlocks with shank diameter max. 4.3 mm.
- An 3VT9 300-3MF20 cover can be affixed to the drive's turn-on switch and then sealed. 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 on the motor mechanism and conductors on the other side that connect, for example, to a terminal block.

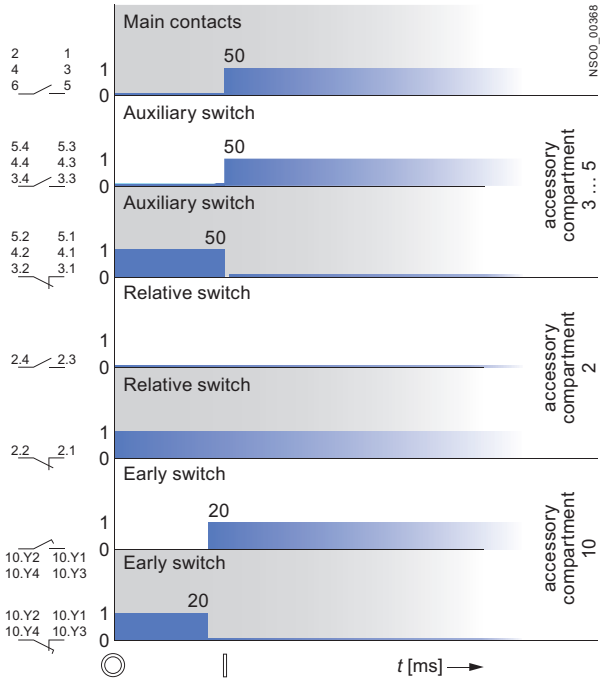
Order No.		3VT9 300-1S.00
Operational voltage U_e	V	AC 24 ,48, 110, 230 DC 24, 48, 110, 220
Rated frequency f_n	Hz	50/60
Control pulse length for storing		400 ms ∞[1]
Control pulse length for switching on for switching off		 20 ms ... 700 ms[1] 400 ms ...∞[1]
Time before switching on	ms	< 60
Time before switching off	ms	900
Frequency of cycles ON/OFF		3 contact making/hr
Frequency of cycles - instant successive ON/OFF cycles		10 contact making
Mechanical endurance		20000 contact making
Input power		AC 100 VA, DC 100 W
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
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 4/33.

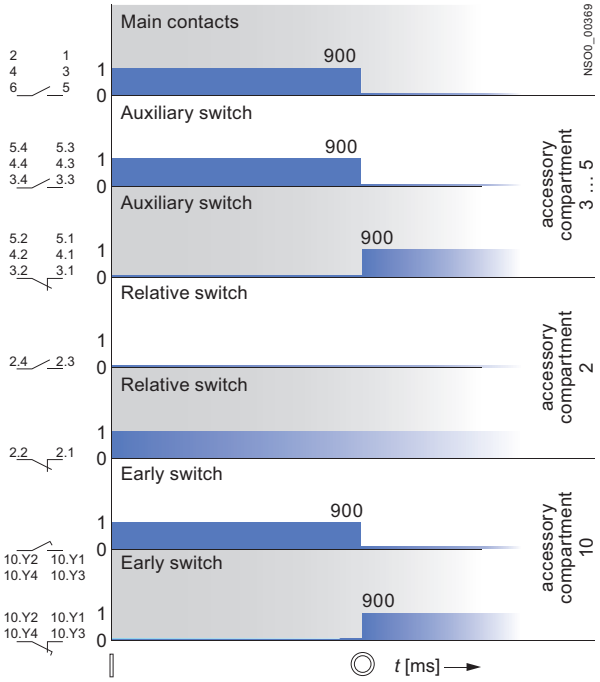
Function

Circuit breaker switched on/off by the motorized operating mechanism

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

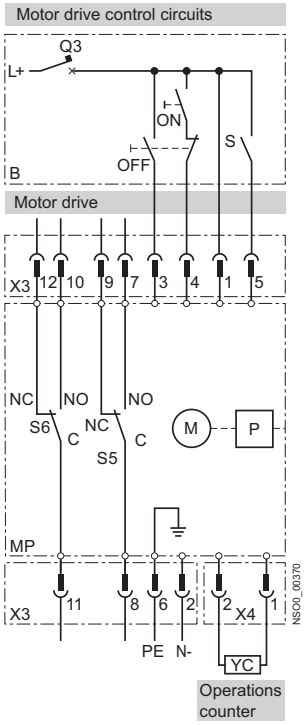


Circuit breaker switched off by the motorized operating mechanism- electrically by pushbutton OFF



Wiring diagram

Circuit breaker switched on and switched off by motorized operating mechanism, electrically by ON pushbutton and pushbutton



Circuit breaker states and toggle positions of the circuit breaker

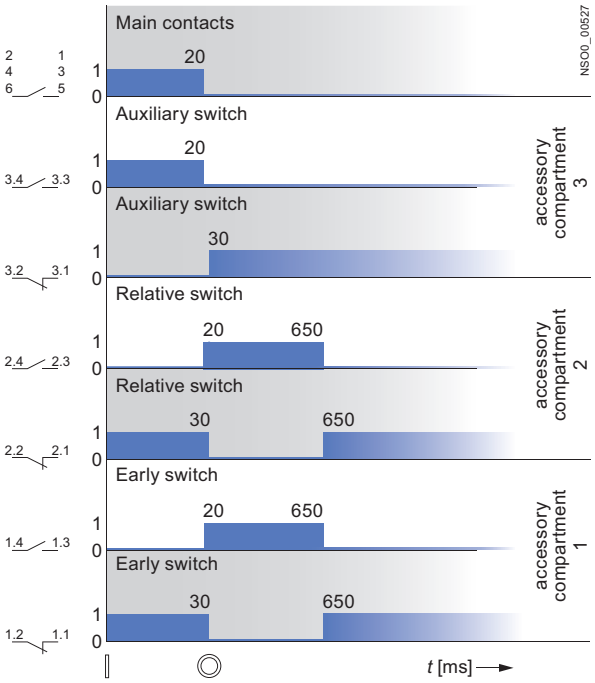
Circuit breaker state	Toggle positions of circuit breaker
Switched on	
Switched off by releases, or by TEST button or by the trip push button on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

Wiring diagram description

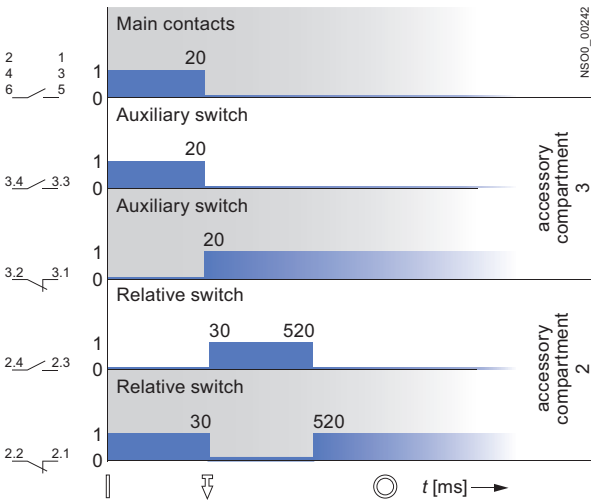
Symbol	Description
MP	motorized operating mechanism 3VT9 300-3M..0
M	motor
P	storage device
X3	connector to connect control circuits
X4	connector for external operations counter
S5	switch indicating AUTO/MANUAL modes
S6	Switching indicating energy storage (ready to on: NO-C)
YC	external operations counter 3VT9 300-3MF10
B	recommended wiring of the control circuits (not included in drive order)
ON	make push button
OFF	break push button
S	switch for energy storage (switched on = automatic storage, may be continuously switched on)
Q3	motorized operating mechanism circuit breaker, see page 4/64

Motorized operating mechanisms

Tripping of the circuit breaker with a motorized operating mechanism by the overcurrent release (switch S in switched-on state – automatic storage)

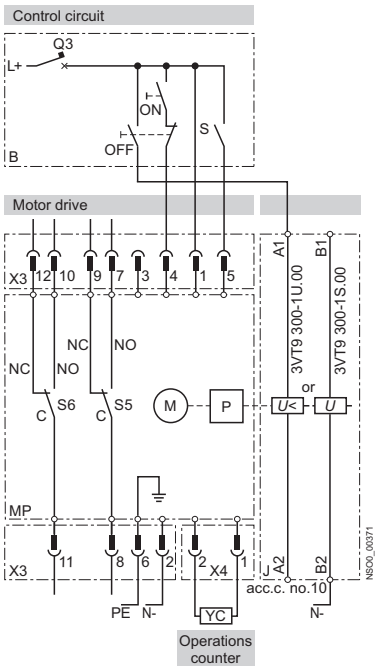


Tripping of the circuit breaker with motorized operating mechanism by a shunt release or undercurrent release (switch S in switched-on state – automatic storage)



Wiring diagram

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

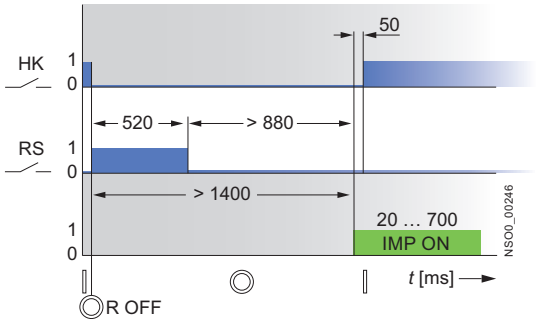


Circuit breaker switched on by motorized operating mechanism (electrical pushbutton ON) and switched off by undervoltage release

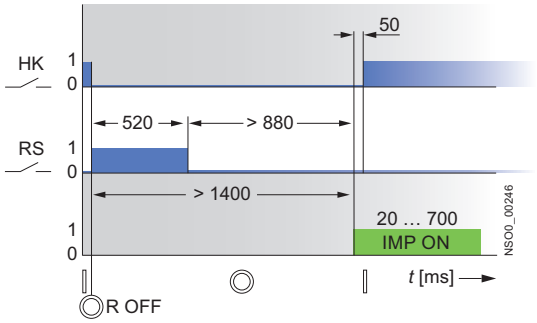
Recommended actuating pulses

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

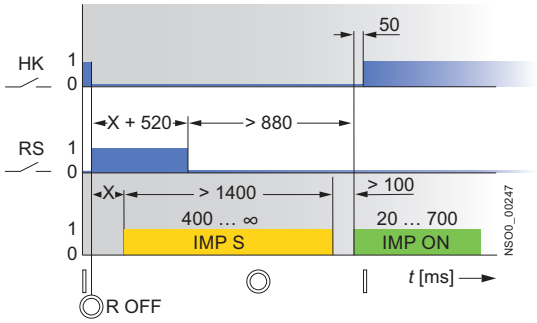
Motorized operating mechanisms



Circuit breaker switched off by overcurrent or auxiliary releases and switched on by the motorized operating mechanism - S-switch permanently closed (automatic storage)



Circuit breaker switched off by overcurrent or auxiliary releases and switched on by motorized operating mechanism - S-switch closed only for storing up



Description of charts

Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closing instant by release
IMP S	pulse to store up motorized operating mechanism energy (generated by S switch)
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

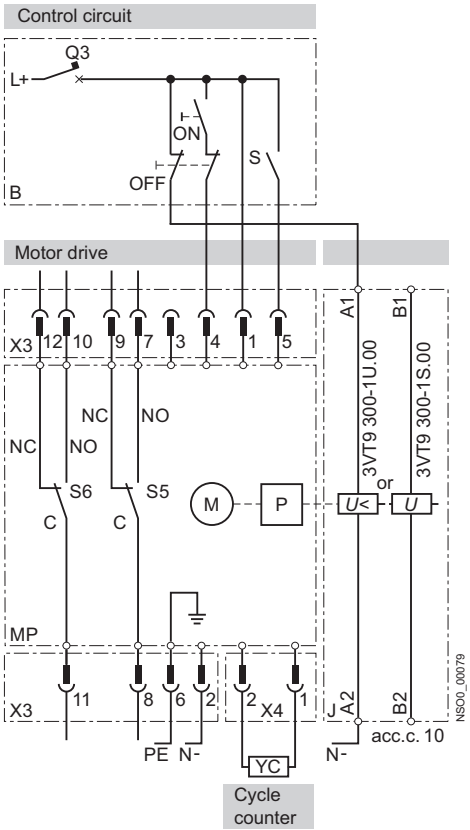
Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by releases, or by TEST button or by the trip push button on the motorized operating mechanism	
Switched off manually or electrically by the operating mechanism	

4

Motorized operating mechanisms

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

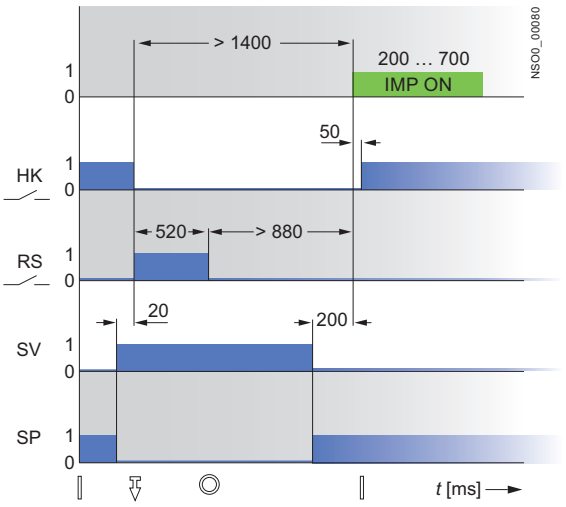
Wiring diagram of the motorized operating mechanism of the circuit breaker

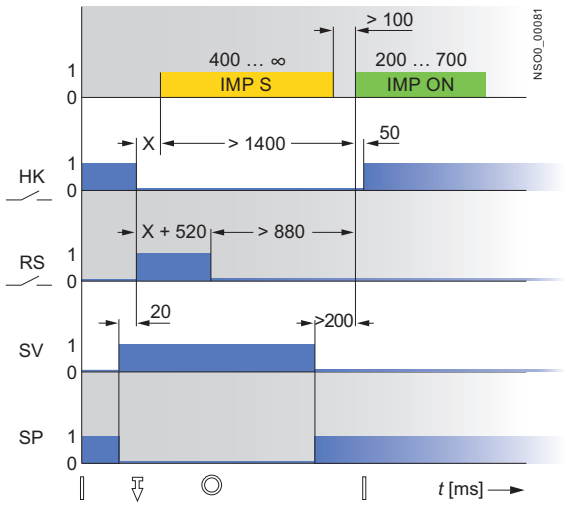


M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external cycle counter
S5	switch indicating AUTO (NO-C)/MANUAL (NC-C) mode
YC	external 3VT9 300-3MF10 cycle counter
B	recommended connection of control circuits (is not included in the motor drive supply)
ON	pushbutton
OFF	pushbutton
S	switch for storage (closed = automatic storage; it can be closed permanently)
Q3	motorized operating mechanism of circuit breaker, see page E69

In use of circuit breakers 3VT2 or 3VT3 with mechanical interlocking by Bowden cable in the automatic standby system, it is recommended to switch the circuit breaker off only by an auxiliary release. Otherwise, the first attempt of switching a standby circuit breaker may fail.

Recommended control pulses for switching of the 3VT3 circuit breakers by the motorized operating mechanism after their switching off by a shunt trip or undervoltage release in the automatic standby system





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

Overview

Plug-in devices

The plug-in design of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker along with both visual and conductive disconnection of the circuit is needed.

- The device includes:
  - complete accessories for assembling circuit breakers/ switch disconnectors in plug-in design
  - a set of four installation bolts (M4 x 40) for fixing the switching unit to the plug-in device
- The device must be fitted with:
  - a 3-pole 3VT2 725-.AA36-0AA0 switching unit or
  - a 4-pole 3VT2 725-.AA46-0AA0 or 3VT2 725-.AA56-0AA0 switching unit

3VT9 200-4PA30 plug-in device

Circuit breaker position

Circuit breaker in plug-in design has two positions:
1. inserted (operating position)
2. removed

Circuit breaker accessories in plug-in design

The circuit breaker in plug-in design has the same accessories as the fixed-mounted circuit breaker.

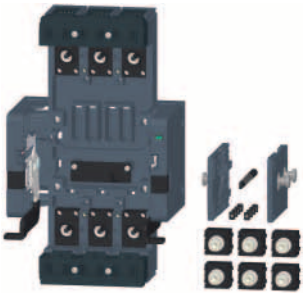
Advantages and enhanced safety for the operator

- Unambiguous remote signalling of the circuit breaker position
- Option to lock plug-in device with padlocks to prevent inserting of the circuit breaker
- Visible and conductive disconnection of the main circuit
- Easy exchange of circuit breakers in case of failure
- IP20 protection of all termination points
- Plug-in device does not need earthing

Withdrawable devices

The withdrawable design of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker, frequent checking and both visual and conductive disconnection of the circuit is needed.

- The device includes complete accessories for assembling circuit breakers/switch disconnectors in withdrawable design
- The device must be fitted with
  - a 3-pole 3VT2 725-.AA36-0AA0 switching unit or
  - a 4-pole 3VT2 725-.AA56-0AA0 or 3VT2 725-.AA56-0AA0 switching unit.



3VT9 300-4WA30 withdrawable device

Circuit breaker position

The circuit breaker in withdrawable design has three positions:
1. inserted (operating position)
2. withdrawn (checking position)
3. removed

Circuit breaker accessories in withdrawable design

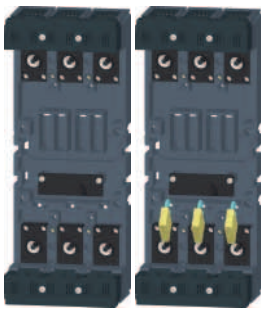
The circuit breaker in withdrawable design has the same accessories as the fixed-mounted circuit breaker.

Advantages and enhanced safety for the operator

- Unambiguous remote and local signalling of the circuit breaker and arrestment positions
- Checking of circuit breaker and accessories function in the checking position
- Locking of withdrawable device with padlocks prevents inserting of the circuit breaker
  - locking of circuit breaker in inserted (operating position)
  - locking of circuit breaker in withdrawn (checking position)
  - locking by means of padlocks
- Visible and conductive disconnection of the main circuit
- Easy exchange of circuit breakers in case of failure
- IP20 protection of all termination points
- Withdrawable device does not need earthing

Design

Plug-in devices



3VT9 200-4PA30 Locking plug-in device against plug-in device inserting the circuit breakers

The plug-in design of the circuit breaker/switch disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker along with both visual and conductive disconnection of the circuit are needed.

- The plug-in device includes complete accessories for assembling circuit breaker/switch-disconnector in plug-in design from the originally fixed-mounted design
- The components of the plug-in device are:
  - supporting part of the plug-in device 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 device (to secure plug-in device 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 4/9)
- connections must comply with our recommendations (see page 4/43).

Auxiliary circuits

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

Coding

3VT9 300-4WN00 coding set

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

Position signalling

3VT9 300-4WL00 position signalling switch

The plug-in device 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 device according to the circuit breaker position

Accessory compartment	11, 12, 13, 14 (19, 20)[1]	
Circiut 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

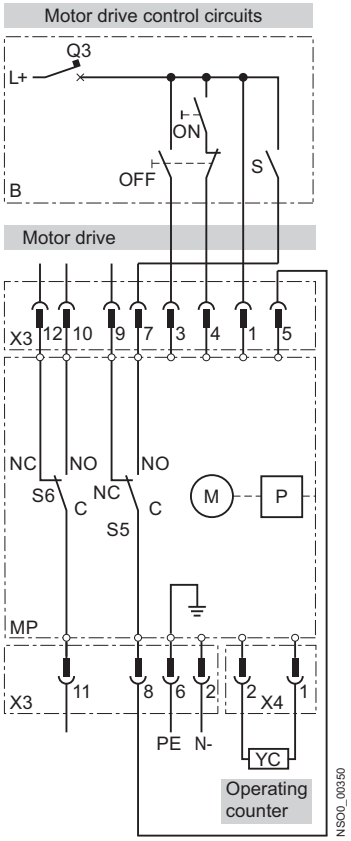
Order No.		3VT9 300-4WL00
Rated operational voltage U_e	V	AC 400 AC 250
Rated islation voltage U_i	V	AC 500
Rated frequency f_n	Hz	50/60
Rated operational current I_e/U_e		
AC-13		3 A/AC 400 V
DC-15		0.15 A/DC 250 V, 3 A/DC 125 V, 4 A/DC 30 V
Thermal current I_{th}	A	6
Arrangement of contacts		001
Connector cross-section S	mm^2	0.5 ... 1
Terminal protection (connected switch)		IP20

For wiring diagram of the circuit breaker in plug-in device with accessories, see page 4/13.

Plug-in device with motorized operating mechanism

Circuit breaker in plug-in design with motorized operating mechanism

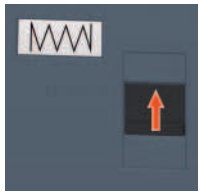
Recommended wiring of the circuit breaker in plug-in design with motorized operating mechanism



Symbol	Description
MP	3VT9 300-3M..0 motorized operating mechanism
M	motor
P	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 push button
OFF	break push button
S	switch to store up energy
Q3	motorized operating mechanism circuit breaker for 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 can be found 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 when inserting and withdrawing the circuit breaker

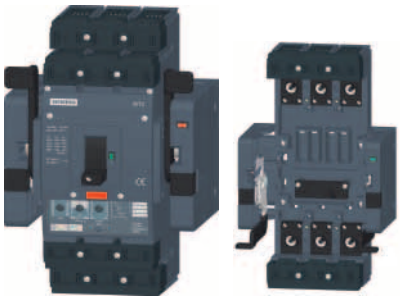
State of circuit breaker before removing			State of switches before removing - inserted position →						State of switches after removing - withdrawn					
Accessory compartment			1		2		3, 4, 5 (6 ... 9)[1]		1		2		3, 4, 5 (6 ... 9)[1]	
	Lever position of the circuit breaker	State of the main contacts	3VT9 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 by motorized operating mechanism		0	1	0	0	1	0	1	1	0	1	0	0	1
Switched off by releases		0	0	1	1	0	0	1	0	1	1	0	0	1
Switched off from switched-on state: by means of auxiliary release, TEST push button 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 compartment 4, 5, 6 are for 4-pole version only.

Design

Withdrawable device



Circuit breaker 3VT9-300-4WA30
in withdrawable design withdrawable device

The withdrawable device of the circuit breaker / switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker, frequent checking and both visual and conductive disconnection of the circuit are needed.

- The withdrawable device includes complete accessories for assembling circuit breaker/switch-disconnector in withdrawable design from the originally fixed-mounted design
- The components of the withdrawable device are:
  - supporting part of the withdrawable device
  - 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 device into the switchboard, and these are include with 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 delivery of the 3VT3 763-.AA36-0AA0 switching unit
- For connecting in another way, it is necessary to use connecting sets (see page 4/9)
- The type of connections must comply with our recommendations (see page 4/43).

Auxiliary circuits

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

Coding

3VT9 300-4WN00 coding set

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

Position signalling

3VT9 300-4WL00 position signalling switch

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

Technical specifications

Type		3VT9 300-4WL00
Rated operational voltage U_e	V	AC 400 AC 250
Rated islation 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 4/13.

States of 3VT9 300-4WL00 switches in withdrawable design according to circuit breaker and arrestment positions

	Accessory compartment					
	11 ... 14 (19, 20)[1]		15,17 (19, 20)[1]		16, 18	
Circiut breaker and arrestment position						
Inserted and unarrested	0 0	1 1	1 1	0 0	0 1	1 0
Withdrawn and unarrested	1 1	0 0	0 0	1 1	0 1	1 0
Removed and unarrested	1 1	0 0	1 1	0 0	0 1	1 0

0 = contact open, 1 = contact closed
Accessory compartments 19 and 20 are for 4-pole version only.

- Operating state is always in arrested position
- In arrested position, it is possible to lock the withdrawable device (for more detailed information, see “Advantages and enhanced safety for operator”)

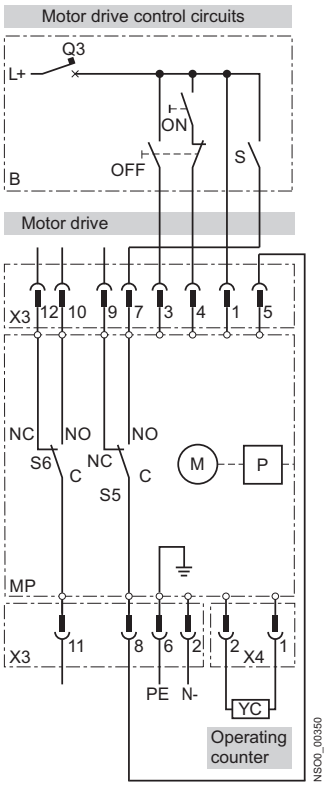
Locking

Locking the circuit breaker in withdrawable device against tampering

Locking the withdrawable device against inserting the circuit breaker

Withdrawable design with motorized operating mechanism

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



Wiring diagram description

Symbol	Description
MP	3VT9 300-3M..0 motorized operating mechanism
M	motor
P	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 up 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 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 first to turn the AUTO/MANUAL switch on the motorized operating mechanism to the MANUAL position
- More operating information can be found 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.

Mounting accessories Withdrawable design

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

Circuit breaker before insertion			State before insertion/withdrawal						State after insertion/withdrawal					
Circuit breaker before withdrawal			State of switches before insertion-withdrawn position →						State of switches after insertion-inserted position					
Accessory compartment			State of switches before withdrawal-inserted position →						State of switches after withdrawal-withdrawn position					
			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 motorized operating mechanism		0	1	0	0	1	0	1	1	0	1	0	0	1
Switched off by releases		0	0	1	1	0	0	1	0	1	1	0	0	1
Switched off from switched-on state: by means of auxiliary release, TEST push button 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.

Dimensional drawings

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

Fixed-mounted design

Front connection

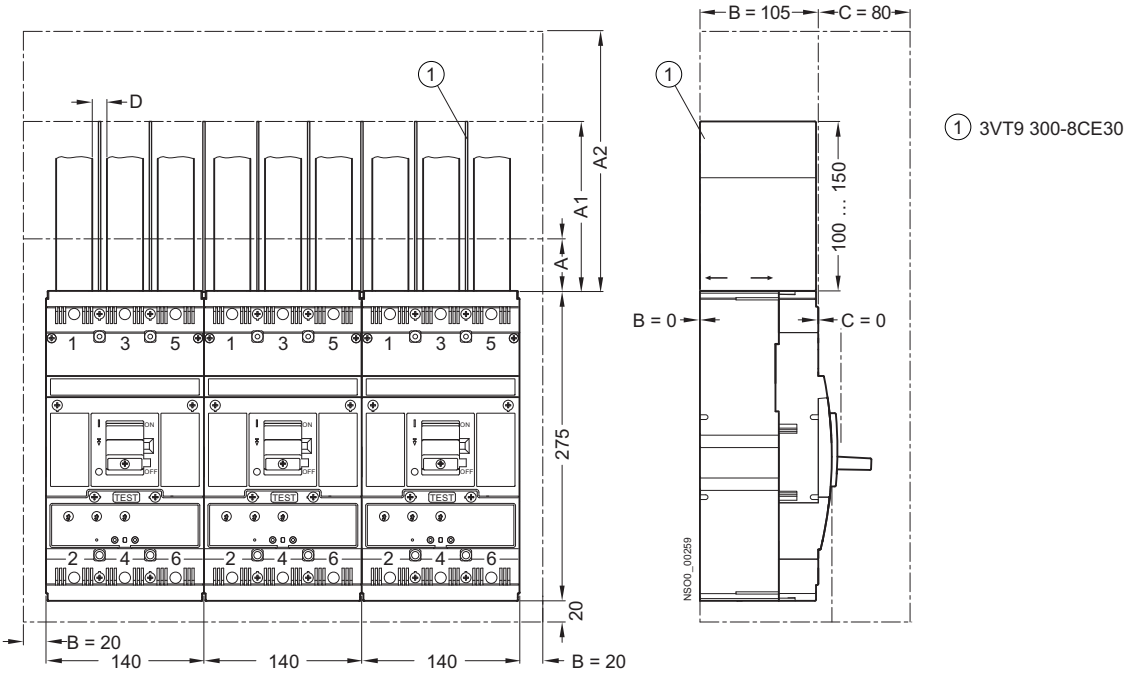
- Terminals 1, 3, 5
  - If U_e = AC 415 V, it is necessary to use 3VT9 300-8CE30 phase barriers or 3VT9 300-8CB30 terminal covers
  - For the connection of the main circuit to terminals 1, 3, 5, insulated conductors, flexibars or rear connection terminals are not used. It is necessary to use 3VT9 300-8CE30 phase barriers or 3VT9 300-8CB30 terminal cover.
- Terminals 2, 4, 6
  Only in case that the circuit breaker/switch disconnector is connected to the the power supply using terminals 2, 4, 6 and furthermore: if *Ue* AC 415 V, it is necessary to use 3VT9 300-8CE30 phase barriers or a 3VT9 300-8CB30 terminal cover
  - if insulated conductors are not used for connecting the main circuit to terminals 2, 4, 6 , flexibars or rear connection are not used, it is necessary to use 3VT9 300-8CE30 phase barriers or 3VT9 300-8CB30 terminal cover.

Rear connection

- Neither phase barriers nor terminal covers need not be used.

Plug-in and withdrawable design

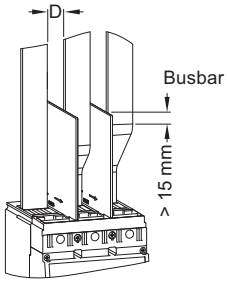
Neither phase barriers nor terminal covers need be used.

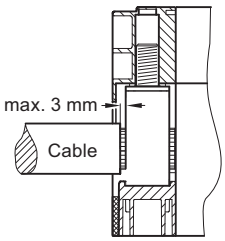


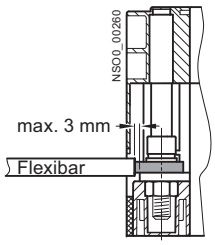
① 3VT9 300-8CE30

A	minimum distance between the circuit breaker/switch-disconnctor 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 phase 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

Project planning aids





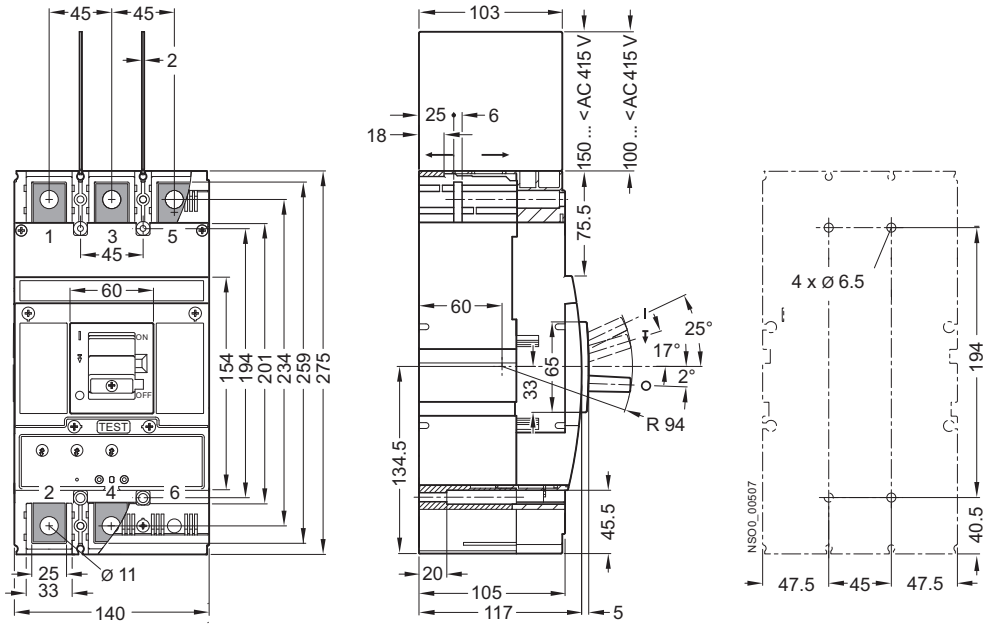


AC U_e		AC U_e	V	230	415		500		690	
3VT3 H wired with I_k [1]			kA	≤ 100	> 36 ... 65	≤ 36	> 20 ... 35	≤ 20	> 15 ... 20	≤ 15
3VT3 N wired with I_k			kA	≤ 60		≤ 36		≤ 20	≤ 10	≤ 15
C mm	D mm									
< 80	≥ 10	A	mm	50	50	50	50	50	50	50
		A1	mm	150	200	100	200	150	150	150
		A2	mm	250	300	200	300	250	250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

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

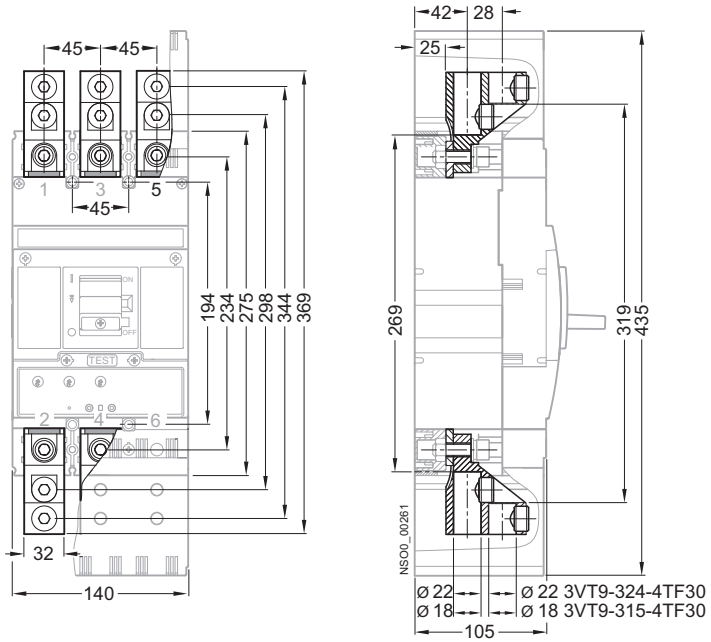
3-pole · Fixed-mounted design

Fixed-mounted design, front connection



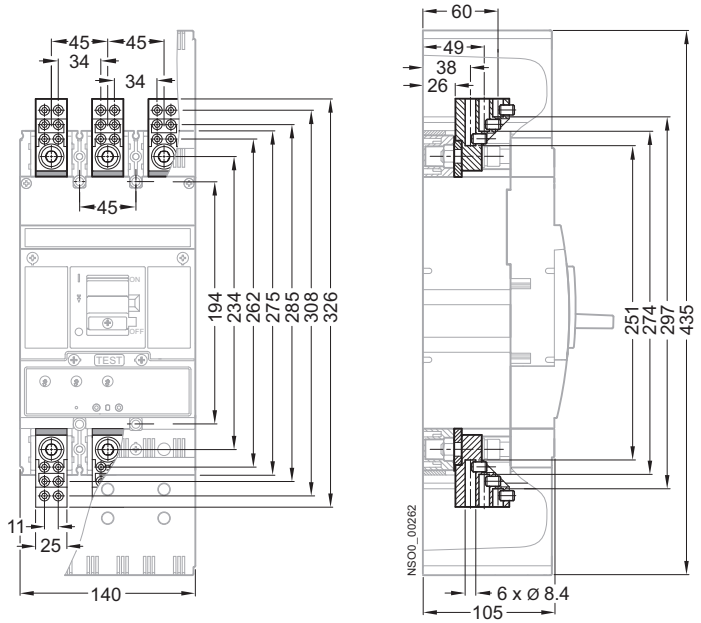
Drilling pattern

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

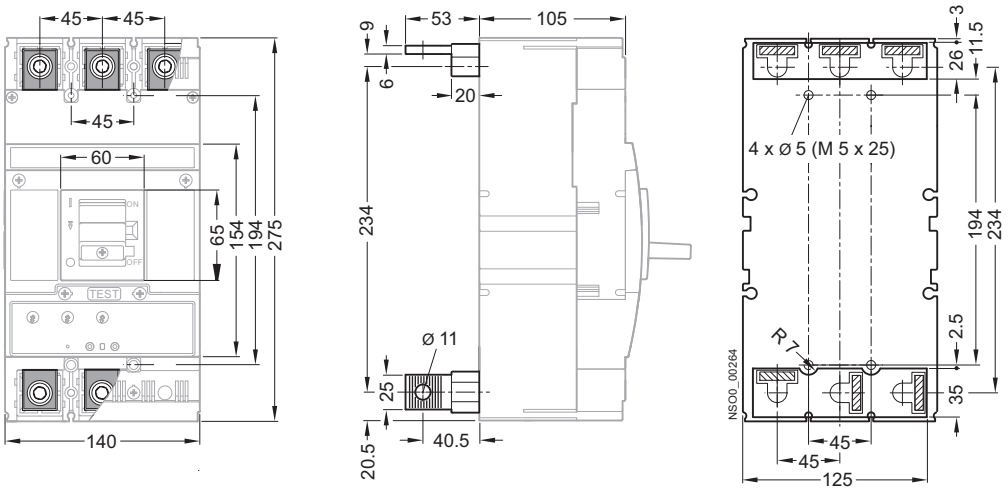


Project planning aids

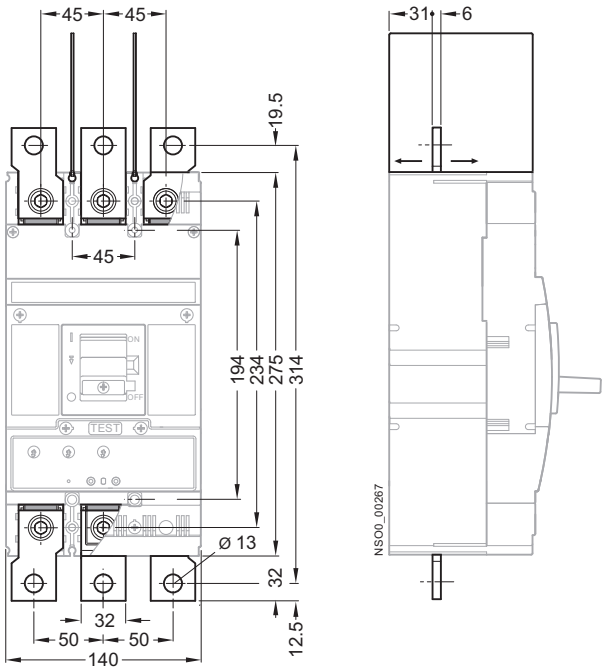
Fixed-mounted design, front connection (3VT9 303-4TF30 connecting set)



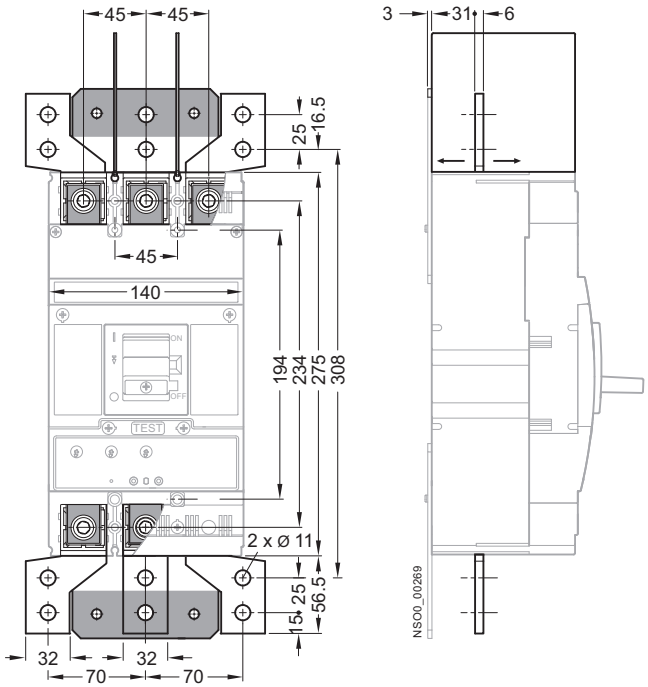
Fixed-mounted design, rear connection (3VT9 300-4RC30 connecting set)



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

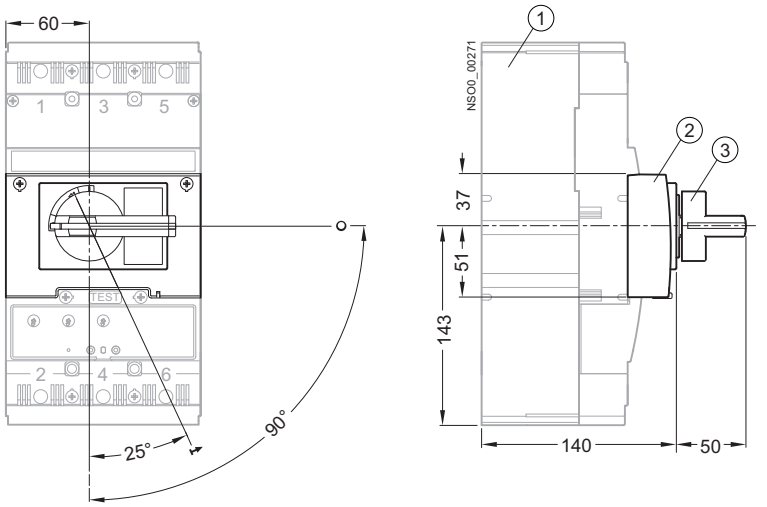


Fixed-mounted design, front connection (3VT9 300-4EE30 connecting set)



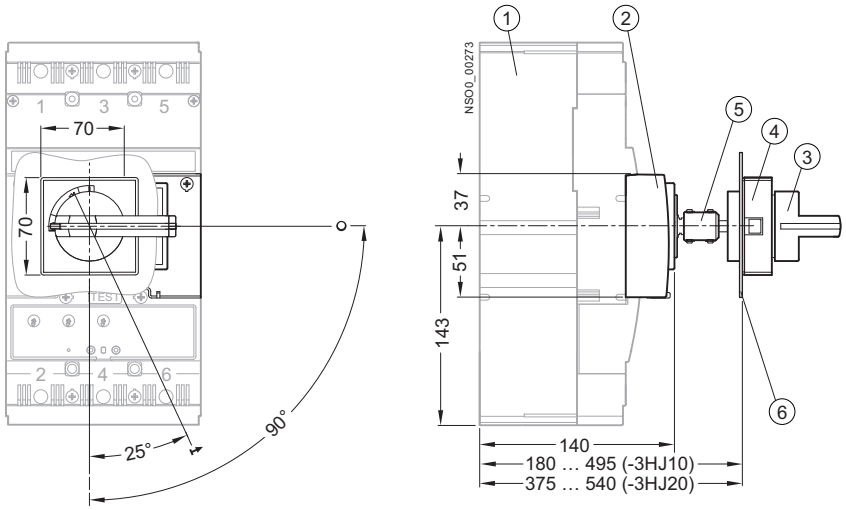
Project planning aids

Fixed-mounted design, manual operating mechanism



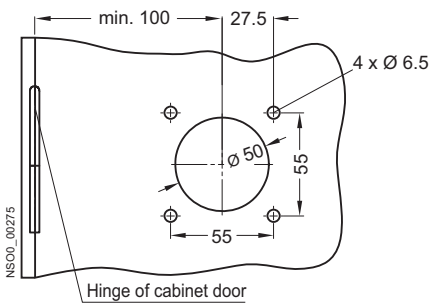
1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF-0

Fixed-mounted design, manual operating mechanism with adjustable knob

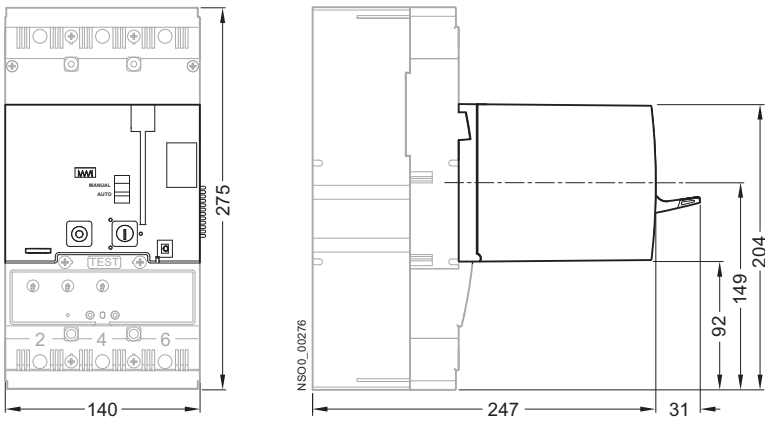


1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0
4 3VT9 300-3HG.0,-3HH.0
5 3VT9 300-3HJ.0
6 Outside surface of cabinet door

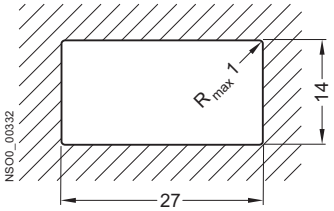
Adaptation of cabinet door



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



Opening dimensions in cabinet door for external operations counter

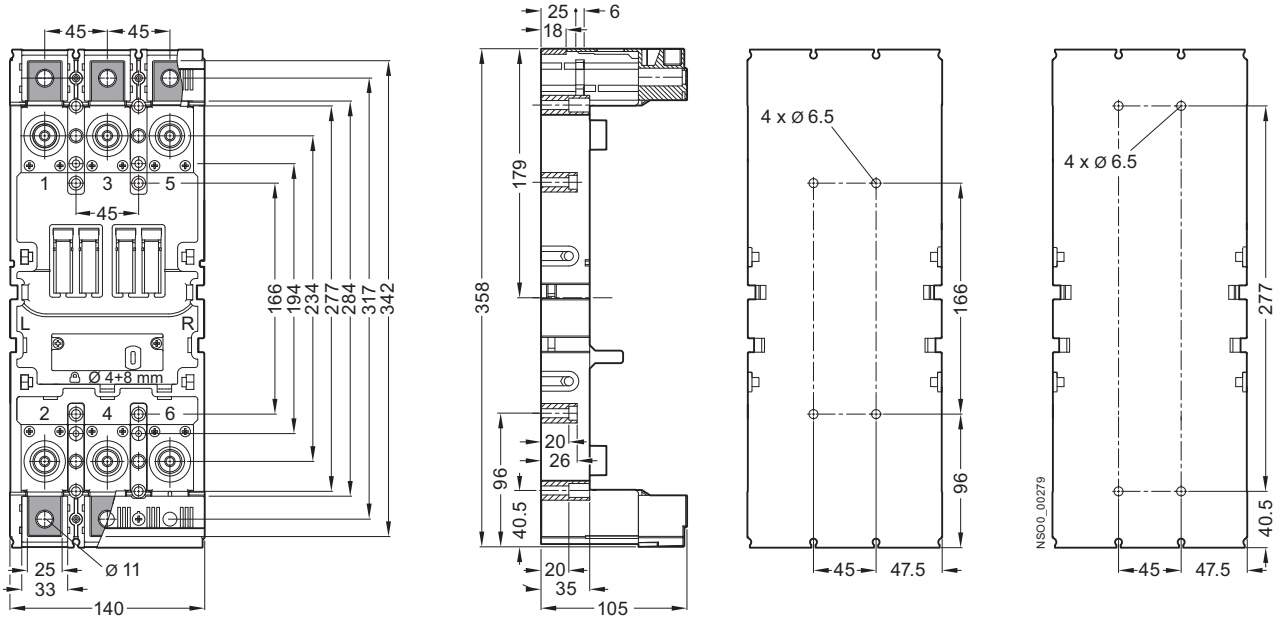


Project planning aids

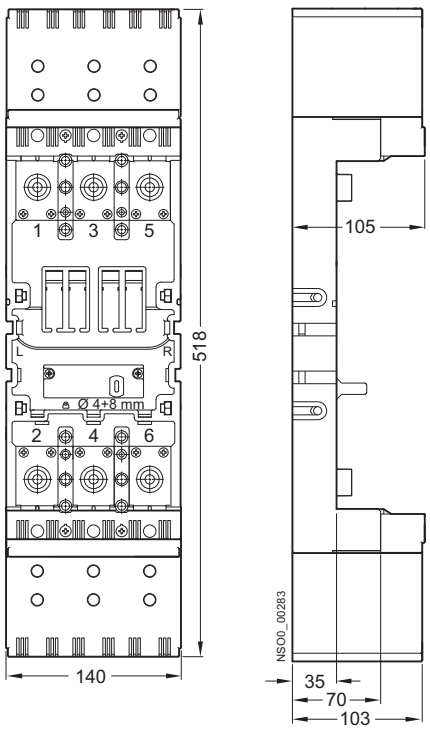
3-pole · Plug-in version

3VT9 300-4PA30 plug-in device

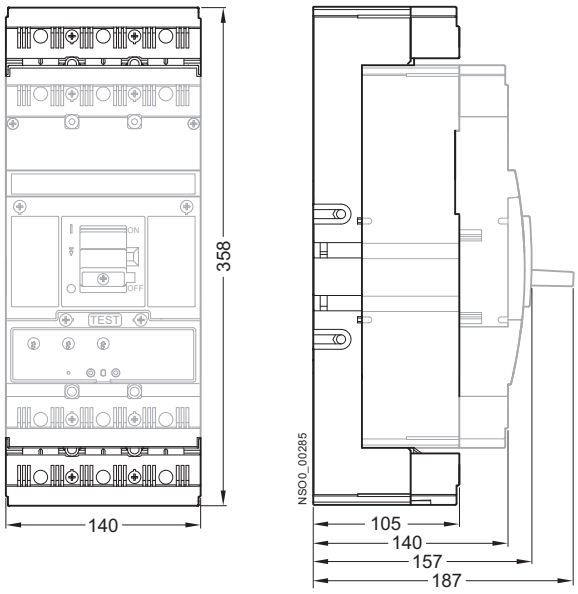
Drilling patterns



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

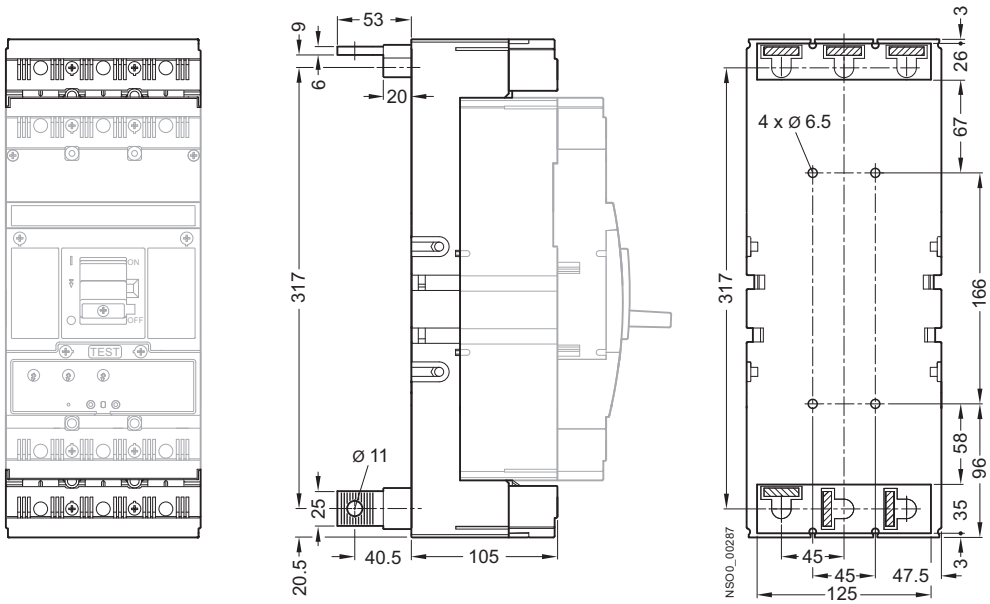


Plug-in design



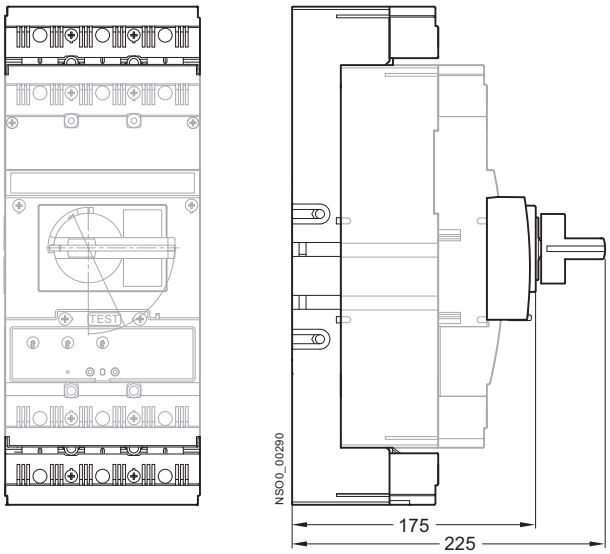
Plug-in design, rear connection with 3VT9 300-4RC30 connecting set

Drilling pattern

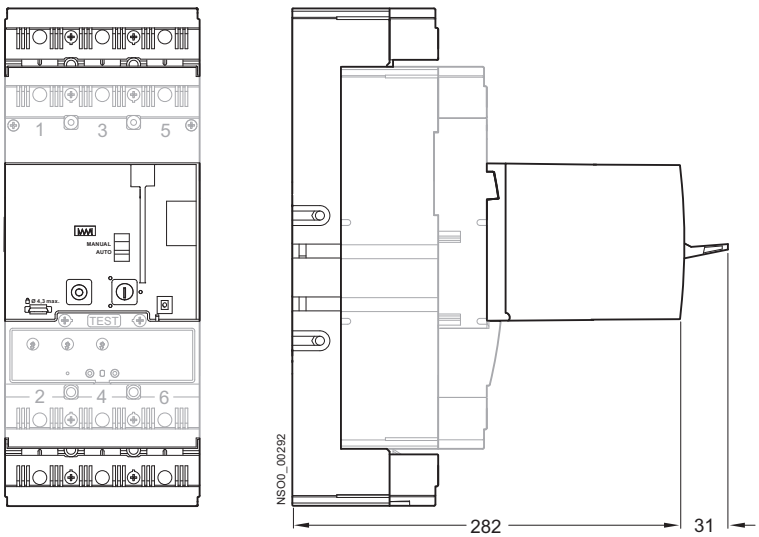


Project planning aids

Plug-in design, with rotary operating mechanism

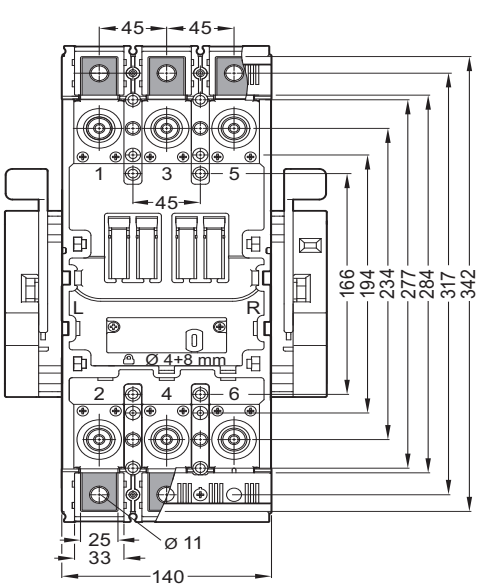


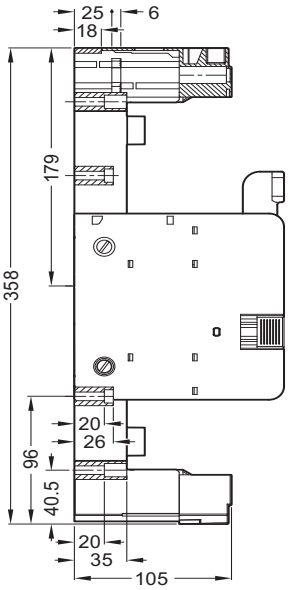
Plug-in design, with 3VT9 300-3M..0 motorized operating mechanism



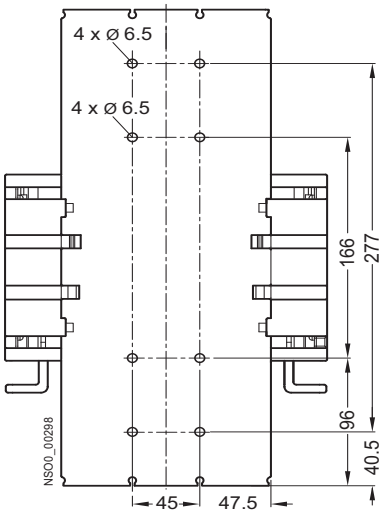
3-pole · Withdrawable version

3VT9 300-8CB30 withdrawable device

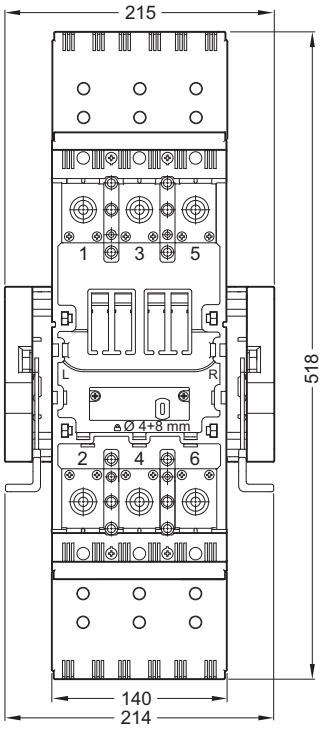


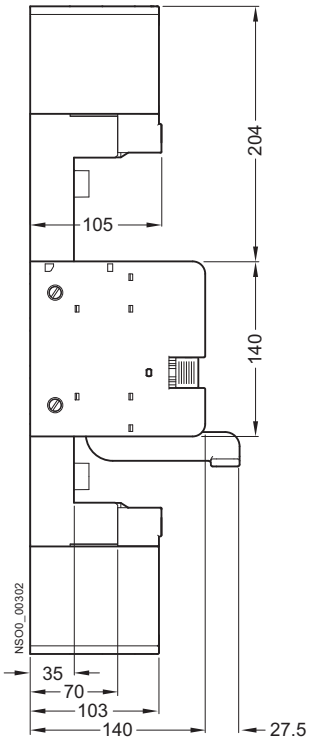


Drilling pattern



Withdrawable device, with 3VT9 300-8CB30 terminal cover

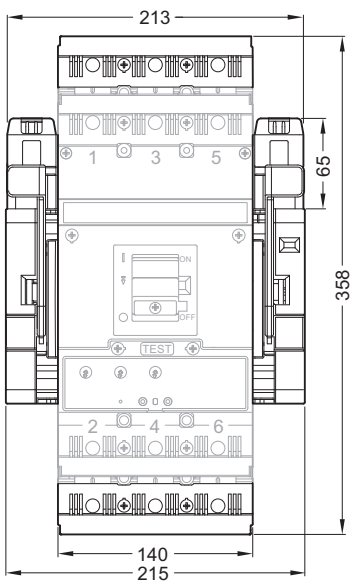


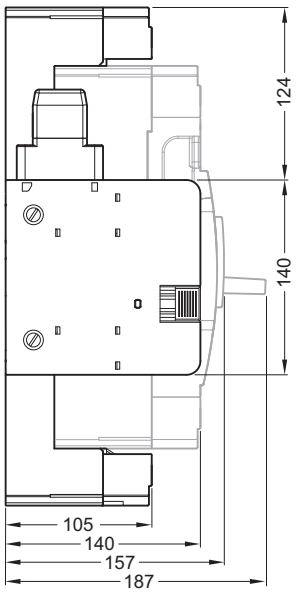


Project planning aids

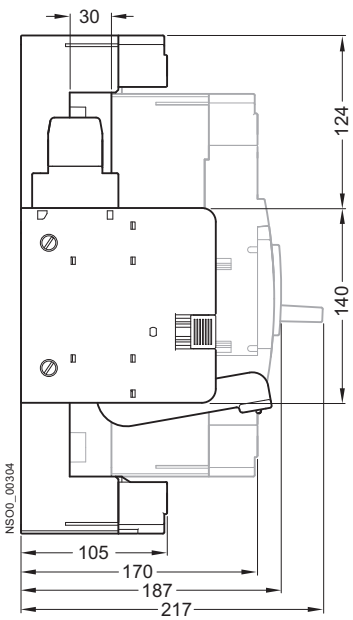
Withdrawable design

Operating position



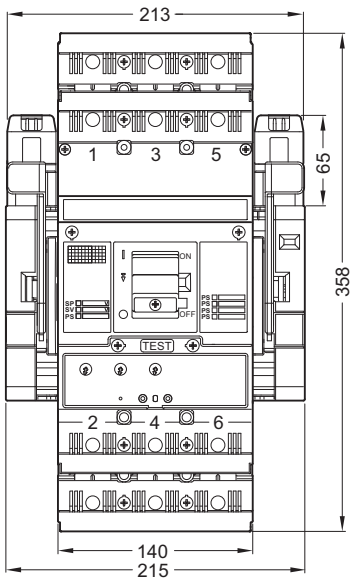


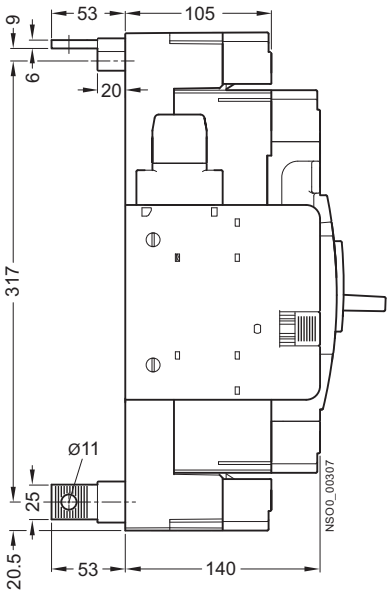
Checking position



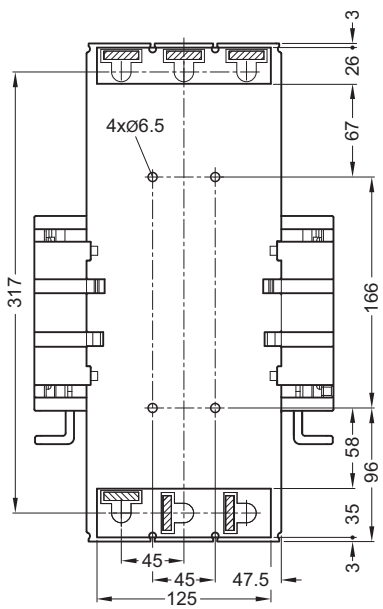
Withdrawable design, rear connection with 3VT9 300-4RC30 connecting set

Operating position

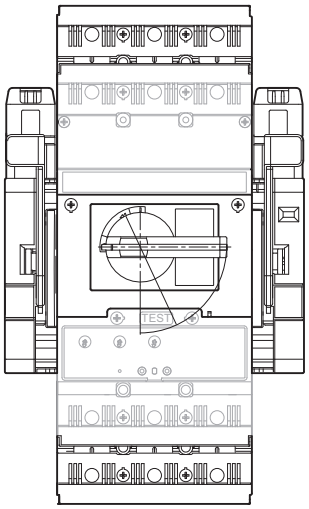




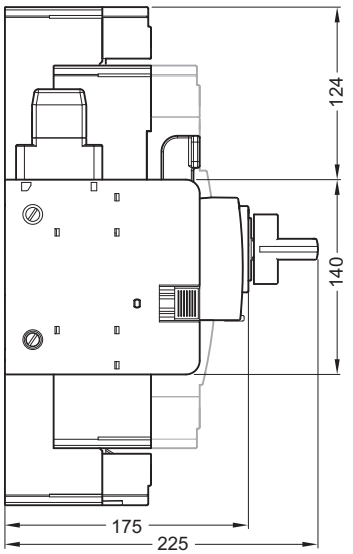
Checking position



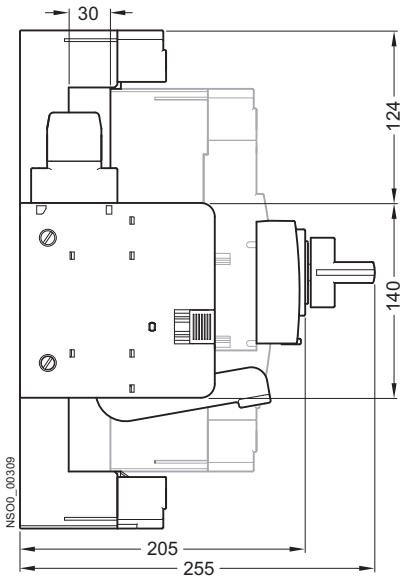
Withdrawable design, with manual operating mechanism



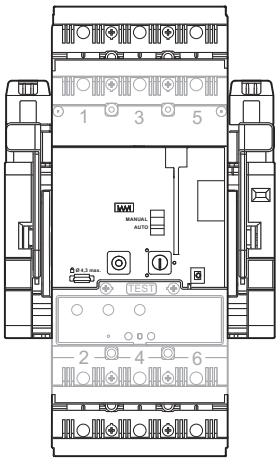
Operating position



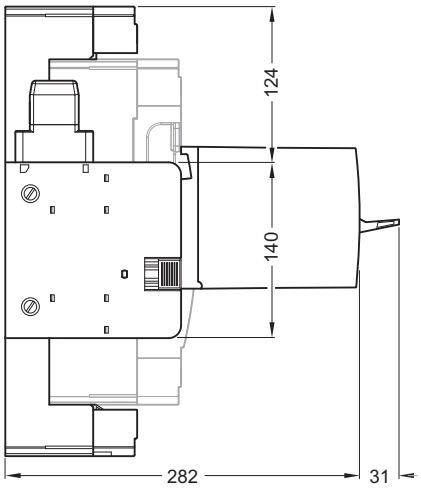
Checking position



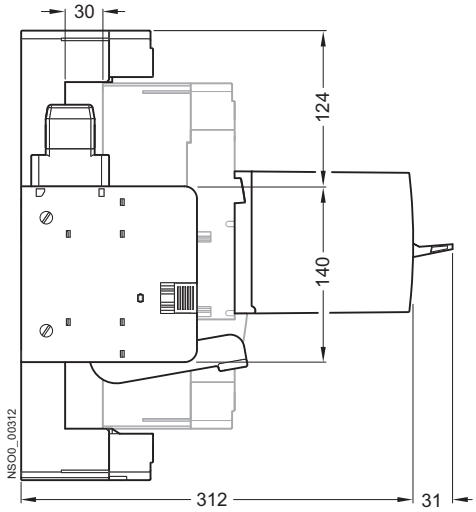
Withdrawable design, with motorized operating mechanism



Operating position



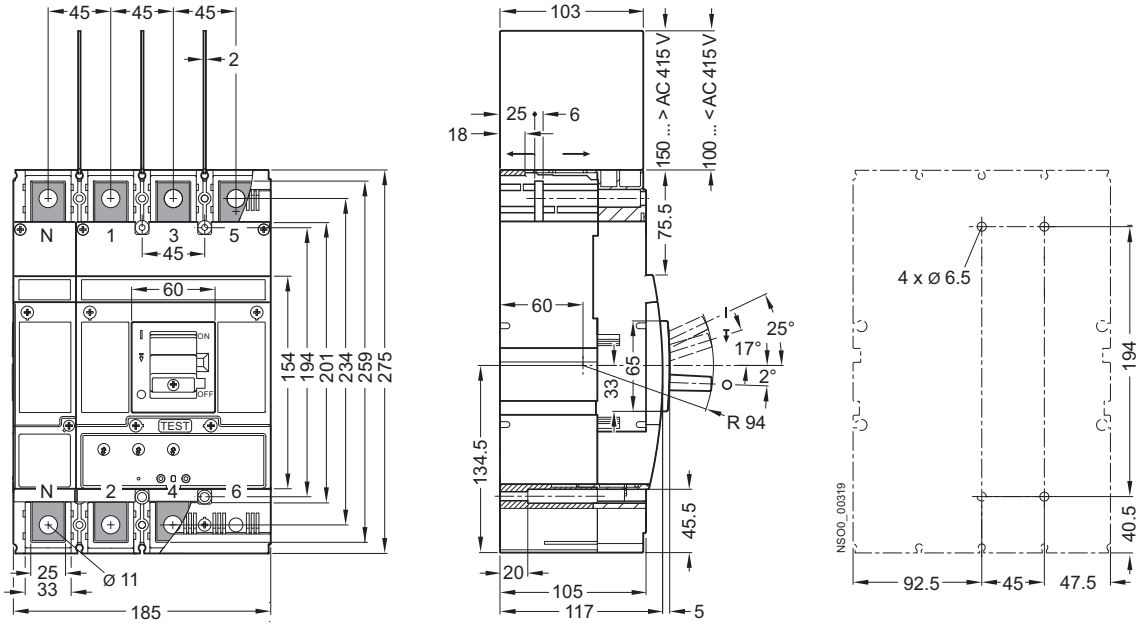
Checking position



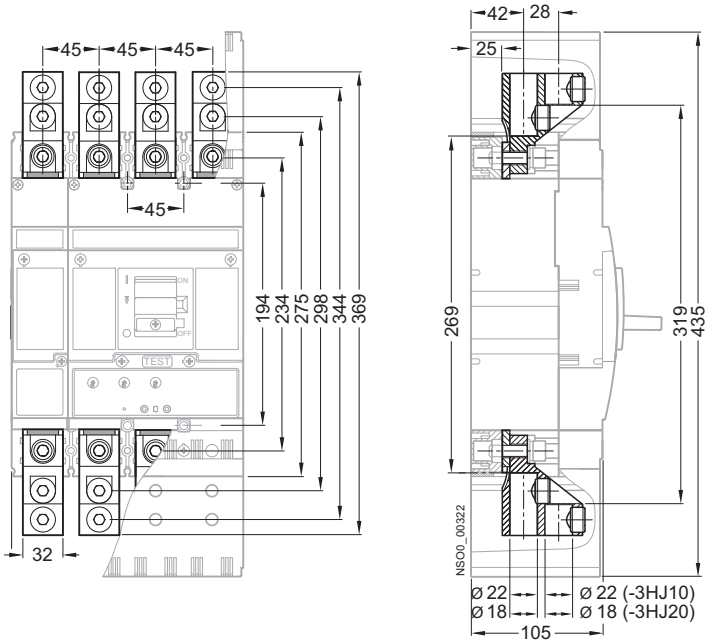
Project planning aids

4-pole · Fixed-mounted design

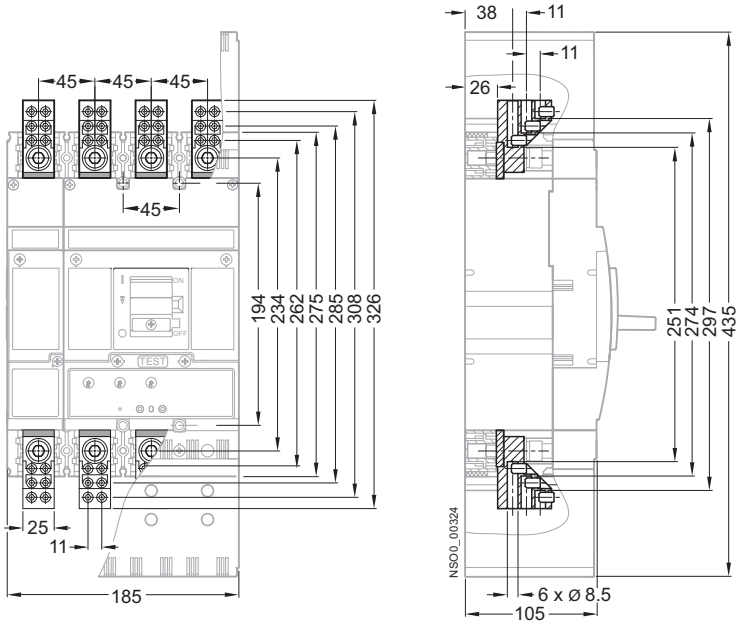
Fixed-mounted design, front connection



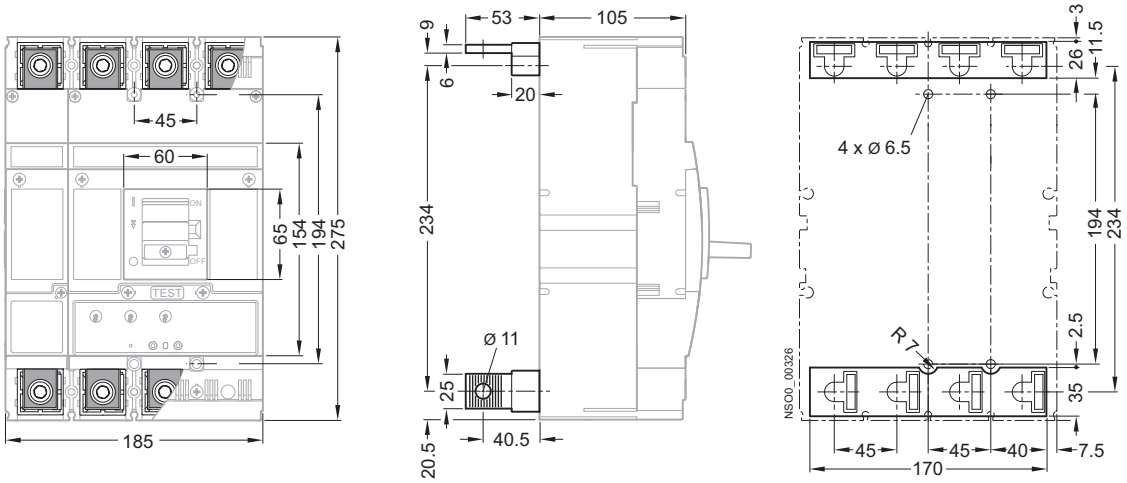
Fixed-mounted design, front connection
with 3VT9 324-4TF30 + 3VT9 324-4TF00, 3VT9 315-4TF30 + 3VT9 315-4TF00 connecting set



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

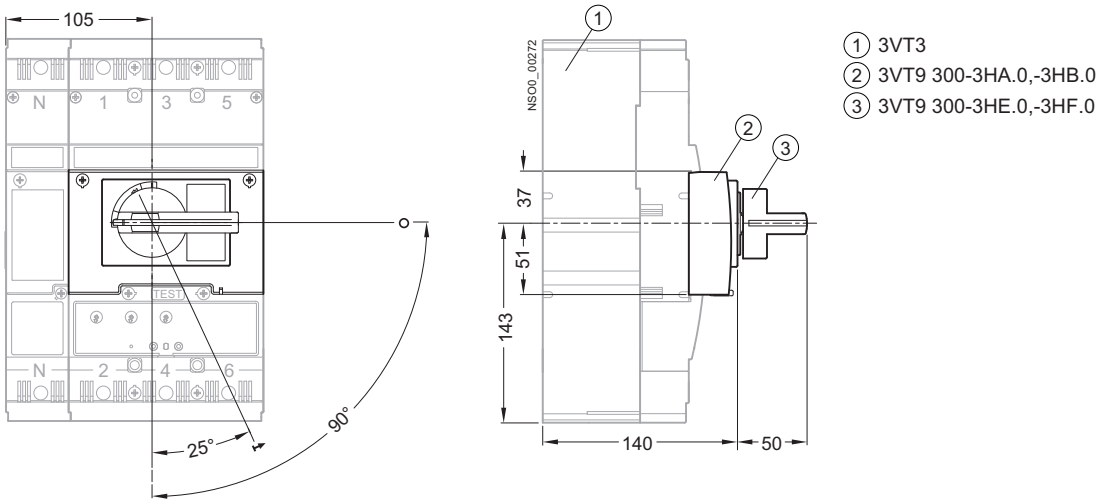


Fixed-mounted design, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set



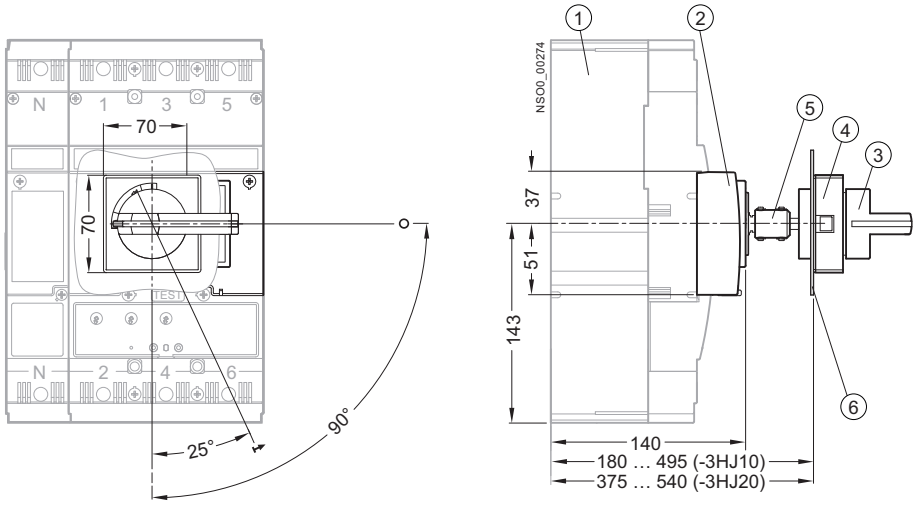
Project planning aids

Fixed-mounted design, with rotary operating mechanism



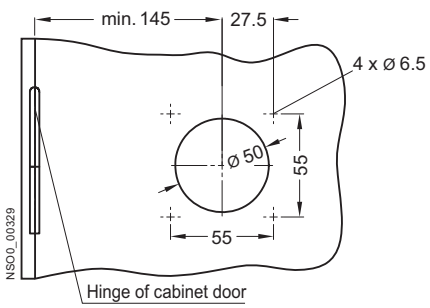
1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0

Fixed-mounted design, with door-coupling operating mechanism

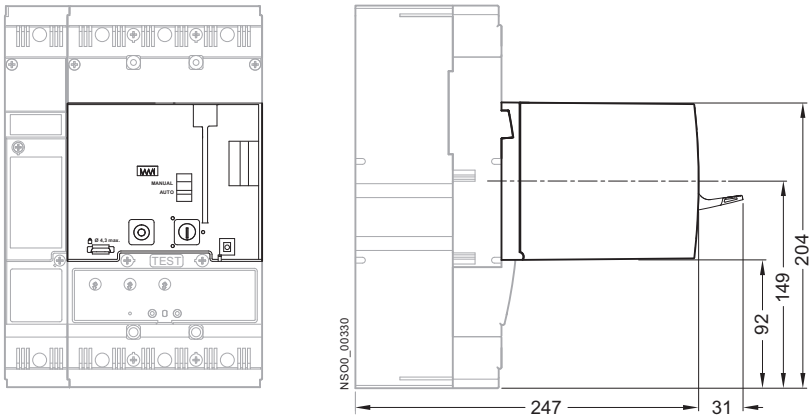


1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0
4 3VT9 300-3HG.0,-3HH.0
5 3VT9 300-3HJ.0
6 Outside surface of cabinet door

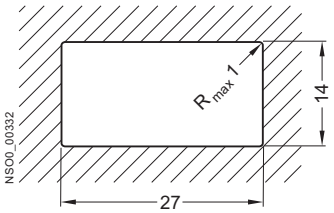
Adaptation of cabinet door



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



Opening dimensions in cabinet door for external operations counter

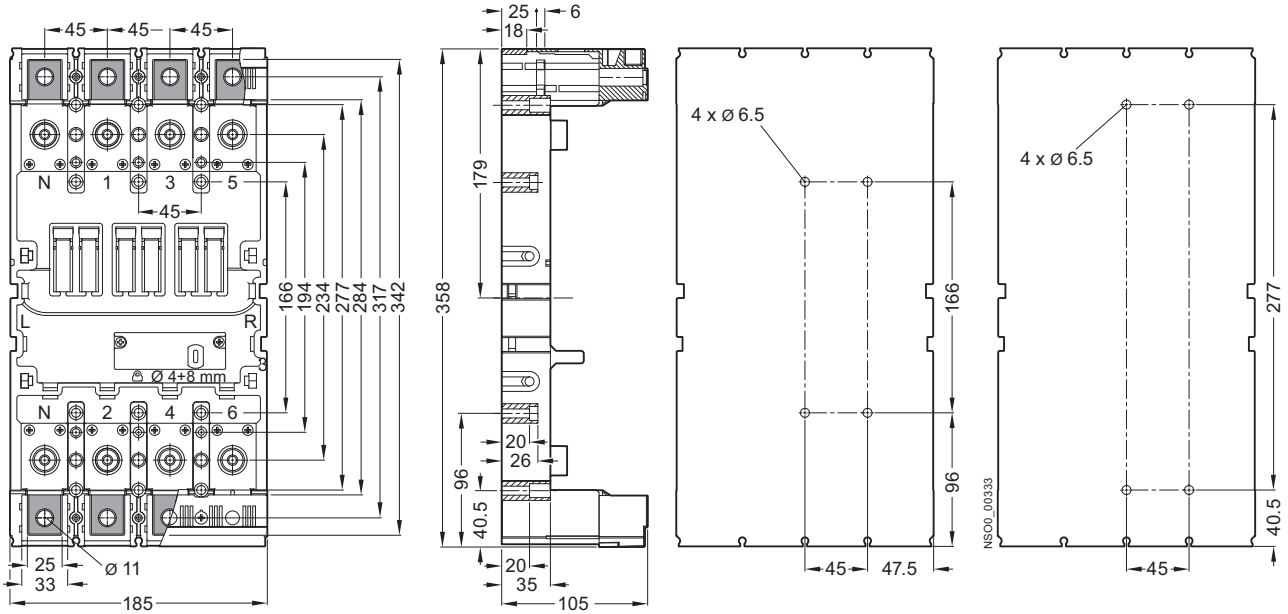


Project planning aids

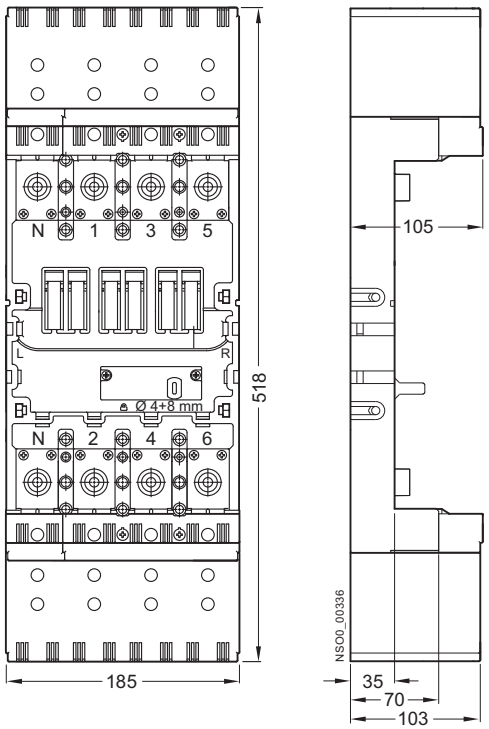
4-pole · Plug-in version

3VT9 300-4PA40 plug-in device

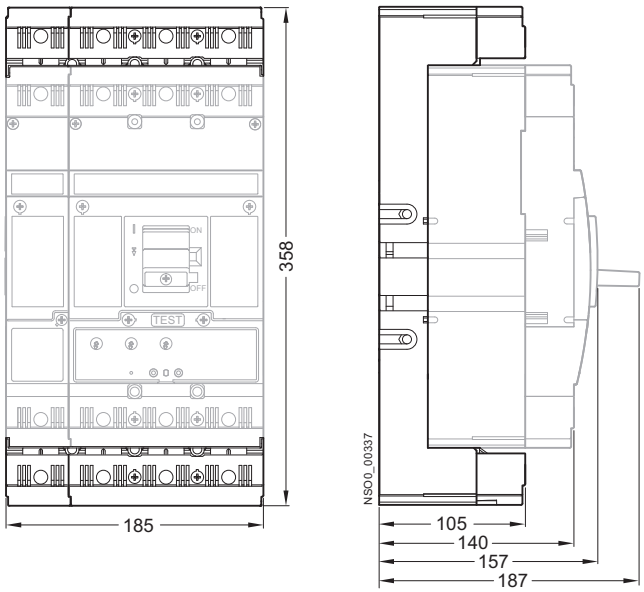
Drilling patterns



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

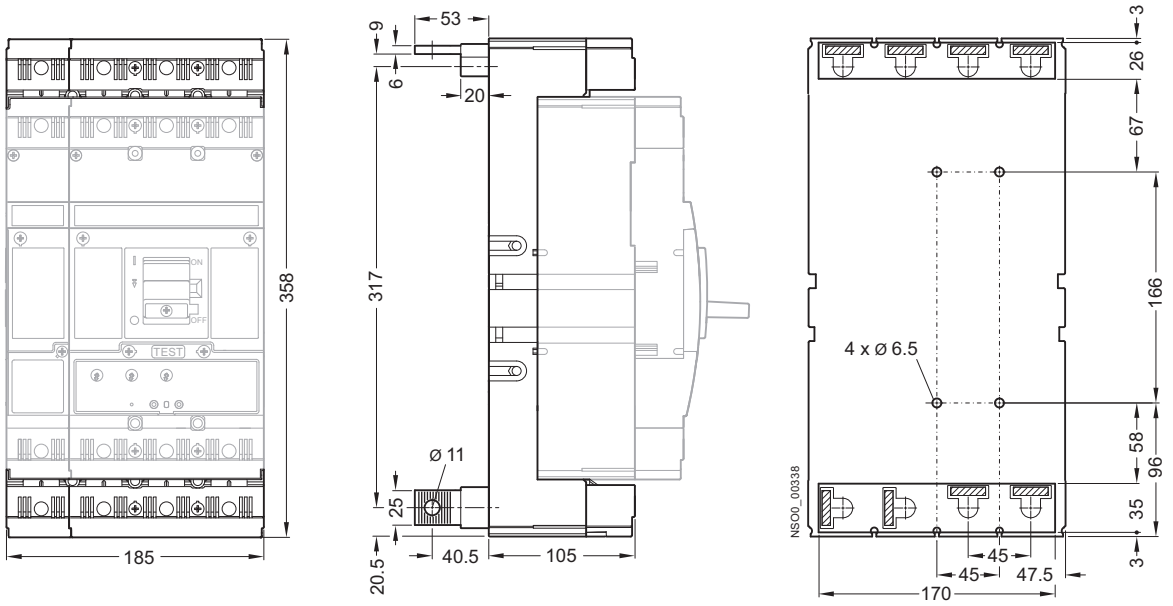


Plug-in design



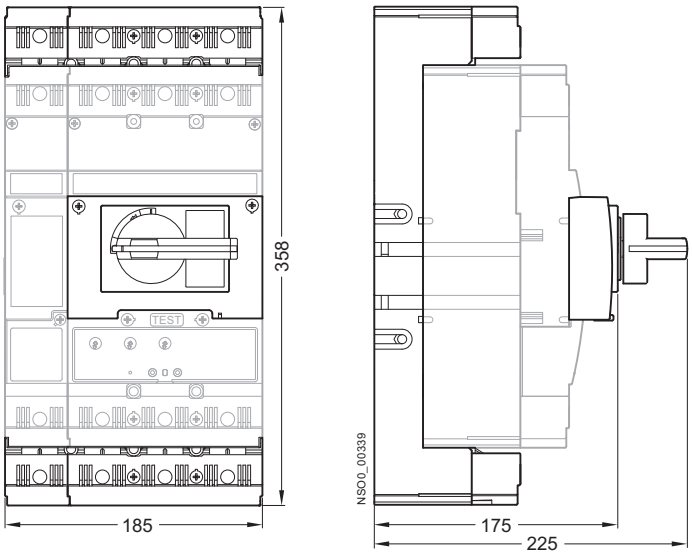
Plug-in design, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set

Drilling pattern

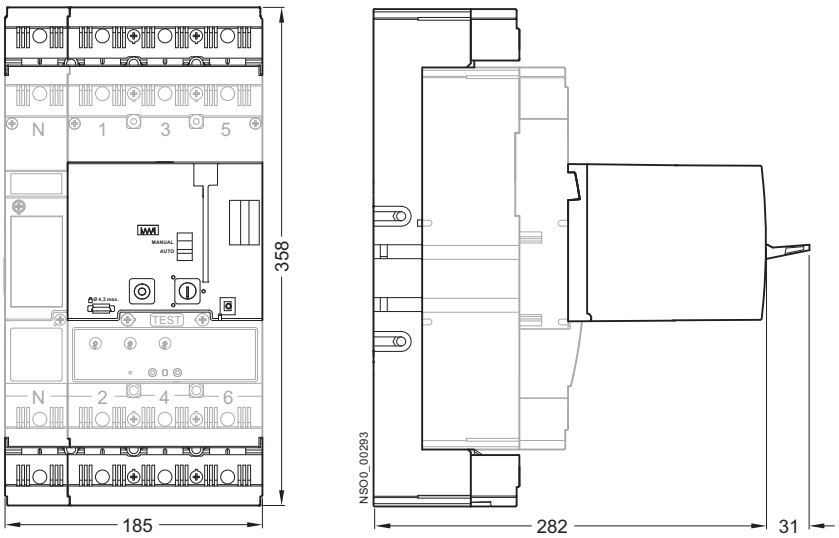


Project planning aids

Plug-in design with rotary operating mechanism

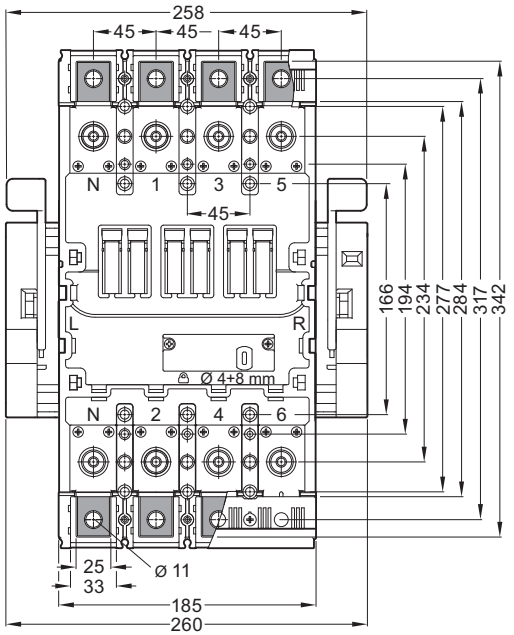


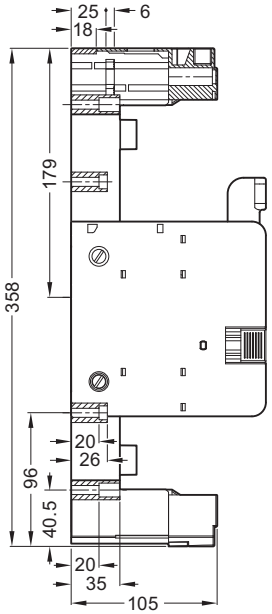
Plug-in design, with 3VT9 300-3M..0 motorized operating mechanism



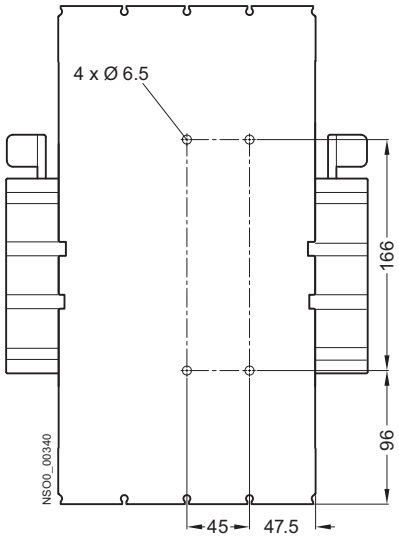
4-pole · Withdrawable version

3VT9 300-4WA40 withdrawable device

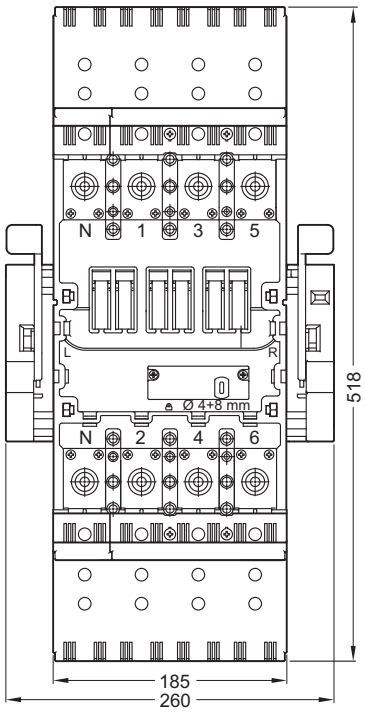


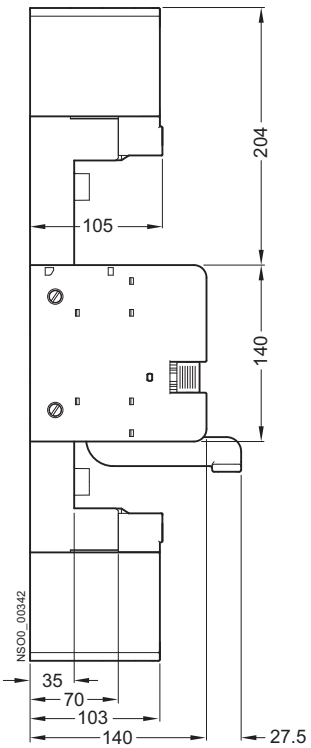


Drilling pattern



Withdrawable design with 3VT9 300-8CB40 terminal cover

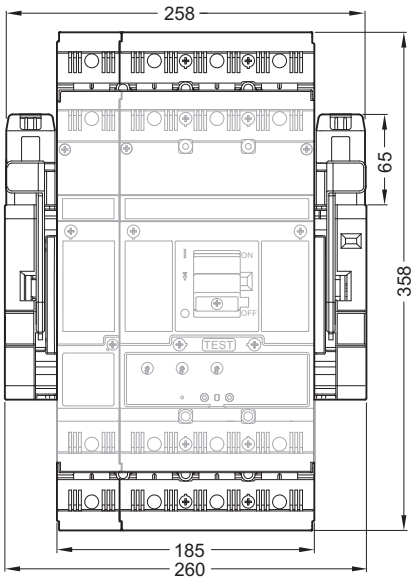


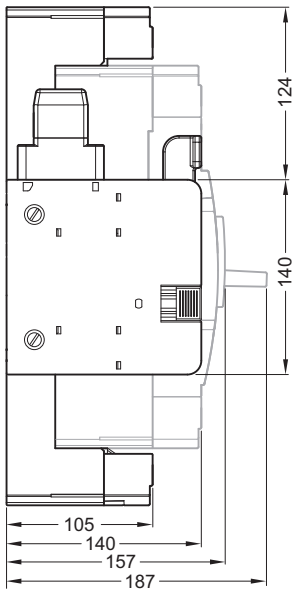


Project planning aids

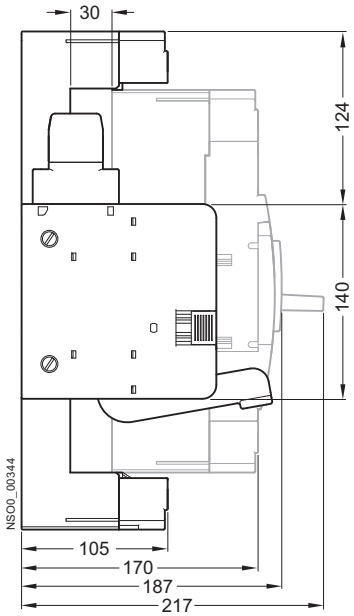
Withdrawable design

Operating position

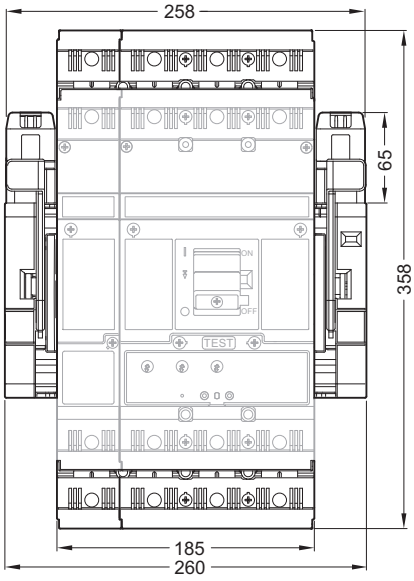


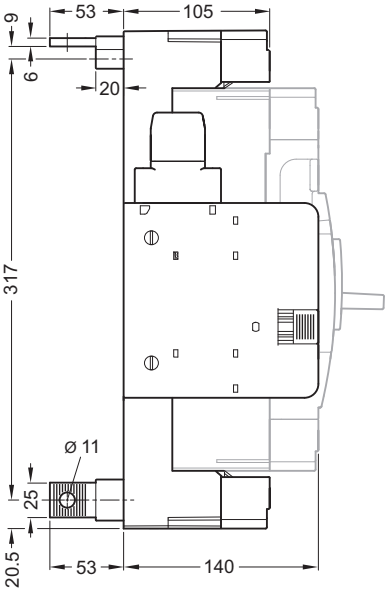


Checking position

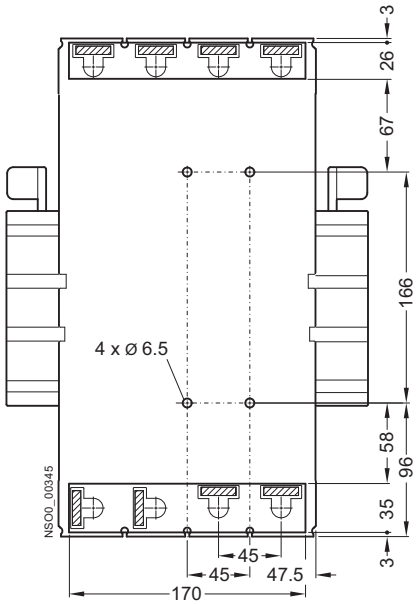


Withdrawable design, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set



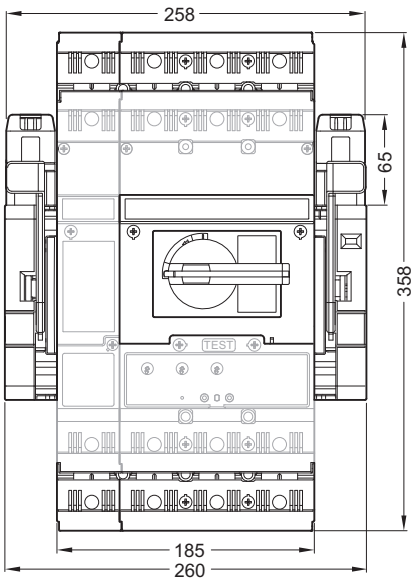


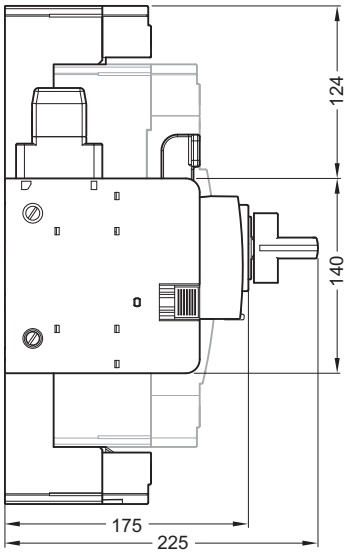
Drilling pattern



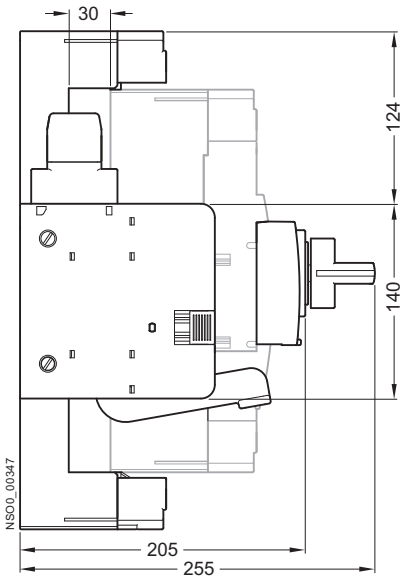
Withdrawable design, with rotary operating mechanism

Operating position



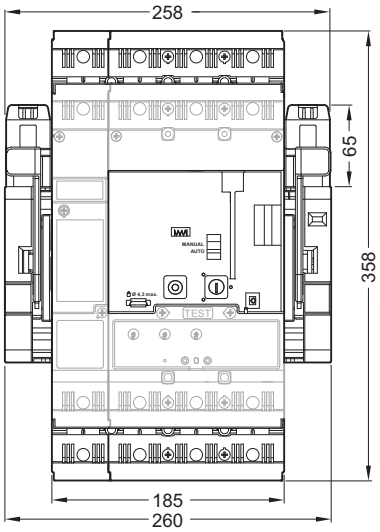


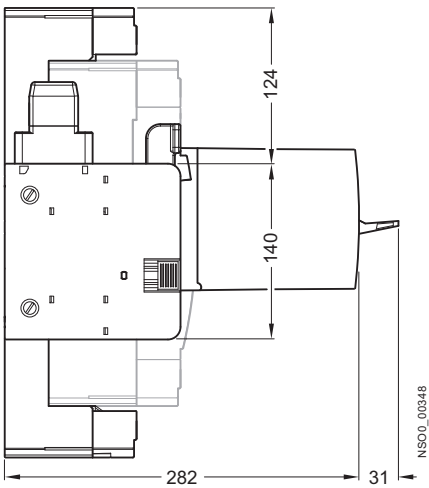
Checking position



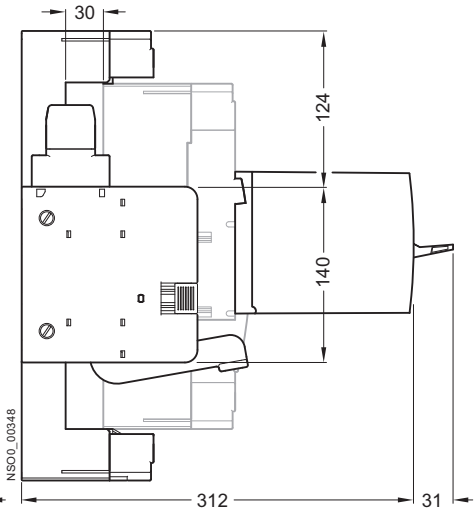
Withdrawable design, with 3VT9 300-3M.. motorized operating mechanism

Operating position





Checking position

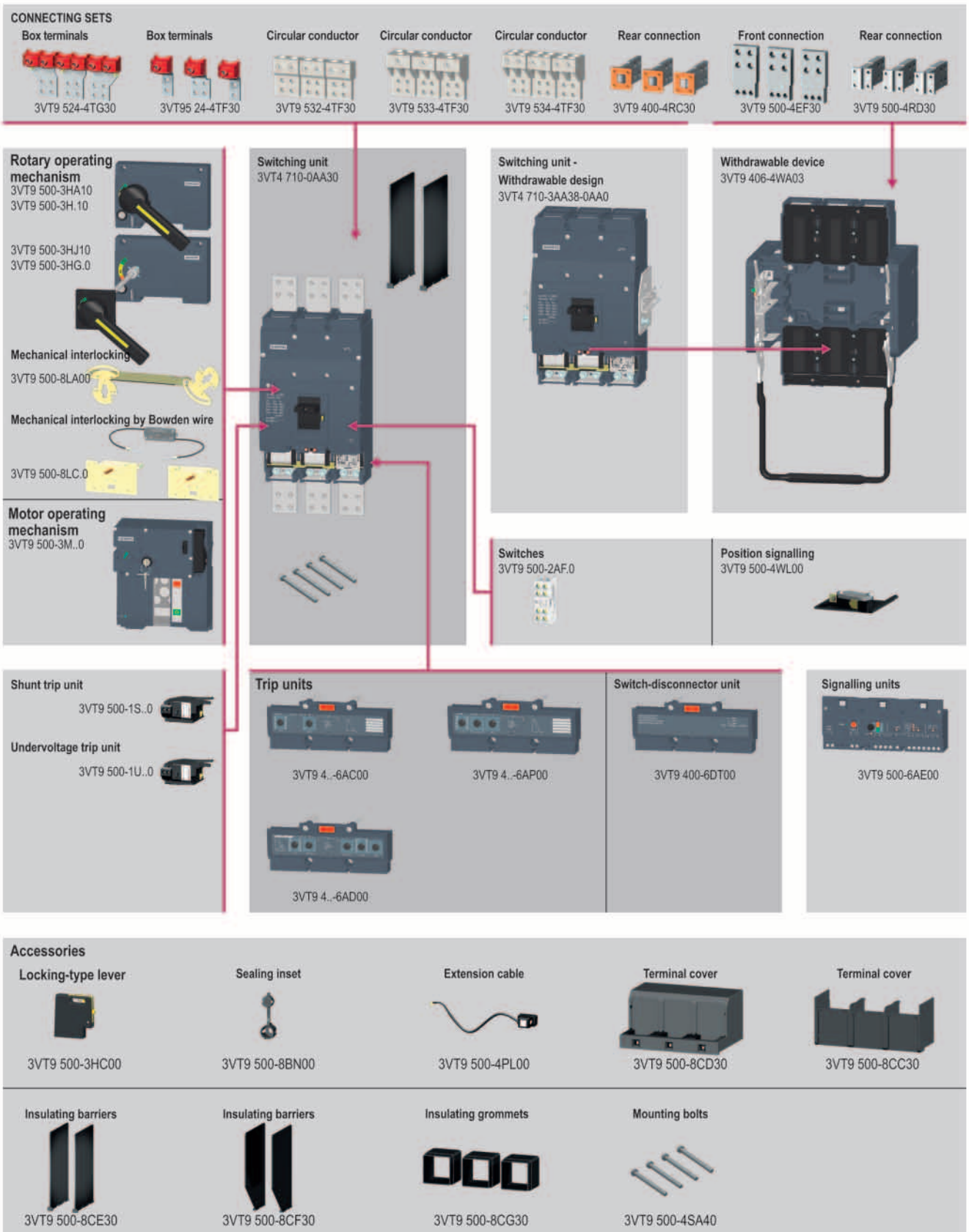


Notes

3VT4 Molded Case Circuit Breakers up to 1000 A

General data

Overview



Selection and ordering data

- The switching unit consits of:
  - 3VT9 500-8CE30 phase barriers
  - connecting sets for front connection - busbars connection
- The switching unit must be fitted with:
  - overcurrent release ETU DP, MP and UP (circuit breaker) or
  - 3VT9 410-6DT00 switch disconnector unit
  - 3VT9 500-4WA40 withdrawable device
- The withdrawable device 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)

	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 design, 3-pole*					
	1000	65	B	**3VT4 710-3AA38-0AA0**	1 unit	23.000
Withdrawable device						
	Withdrawbale device		B	**3VT9 500-4WA40**	1 unit	13.000

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
ETU trip unit						
	*System protection, ETU DP, LI function*					
	• For protecting 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 and generator protection, ETU MP, LI funktion*					
	• Direct 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

5

* You can order this quantity or a multiple thereof.

Circuit breakers, Switch disconnectors

	Rated current I_n	Set current of the inverse-time delayed overload trip units „L“/$_r$	DT	Order no.	PS*	Weight per PU approx.
	A	A				kg
Switch-disconnector unit						
	1000	Switch-disconnector unit	B	**3VT9 410-6DT00**	1 unit	0.474
Signalling unit						
		for overcurrent releases ETU, LP and UP	B	**3VT9 500-6AE00**	1 unit	0.670

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* You can order this quantity or a multiple thereof.

Technical specifications

Specifications Type		3VT4 circuit breakers	Switch disconnectors
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		15 kA/1 s	15 kA/1 s
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}		30 ms	--
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 = 250 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	Hz	3g (8 ... 50)	
Design modifications			
Front/rear connection		✔/✔	
Plug-in design		--	
Withdrawable design		✔	
Accessories			
Switches-auxiliary/relative/signal/early		✔/✔/--/--	
Shunt trip/with signal switch		✔	
Undervoltage release/with early switch with signal switch		✔/--	
Manual front operating mechanism/lateral operating mechanism right/left		✔/✔	
Mechanical interlocking to the manual operating mechanism, by Bowden wire		✔/✔	
Motorized operating mechanism/with operations counter		✔/✔	
Locking-type lever		✔	
Bolt sealing inset/additional cover for overcurrent release		✔/--	

✔ available,
-- unavailable

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

5

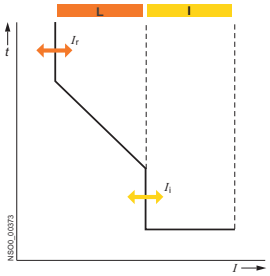
Overcurrent releases

Technical specifications

The electronic overcurrent release consists of a separate and interchangeable unit, which is supplied with the 3VT4 710-3AA..-0AA0 switching unit. By exchanging the overcurrent release, the range of the circuit breaker's rated current can be easily changed.
Releases for the 3VT4 710-3AA30-0AA0 switching unit are produced in four current ranges I_n = 315, 630, 800 and 1000 A. The releases, including their adjustment, cover rated currents ranging from 125 to 1000 A.

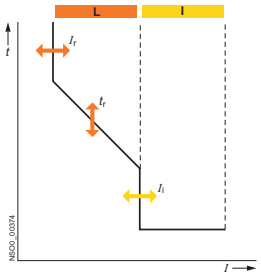
Depending on the needs for adjusting the release's tripping characteristics to the protected device and to the variability of the characteristics with regard to selectivity, the following release devices are available:

ETU DP



They have one type of characteristics with adjustable I_r and I_{rm}.

ETU MP



They have more kinds of characteristics with adjustable I_r, t_r and I_{rm}.

ETU UP

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

ETU DP, MP and UP

Proper functioning of releases does not depend on the form of current in the main circuit. The function of the release is supported by a microprocessor, which processes a sampled signal of the power circuit and recalculates it to obtain an rms value. Therefore, digital releases 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 releases protect a circuit against short-circuiting and overloading. Setting of selective cascading of circuit breakers is especially enabled by the ETU UP release. Tripping characteristics of the releases are independent of the ambient temperature. The release is affixed to the switching unit by two bolts. The translucent cover over the adjustment controls can be sealed.

Adjustment of the tripping characteristics for ETU DP and MP releases

The tripping characteristics of the overcurrent releases are defined by standard EN 60 947-2. The characteristics are adjusted in two zones using latched switches on the overcurrent release 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 releases, the time delay can be set at 0 or 50 ms.

1. Dependent release (thermal) L

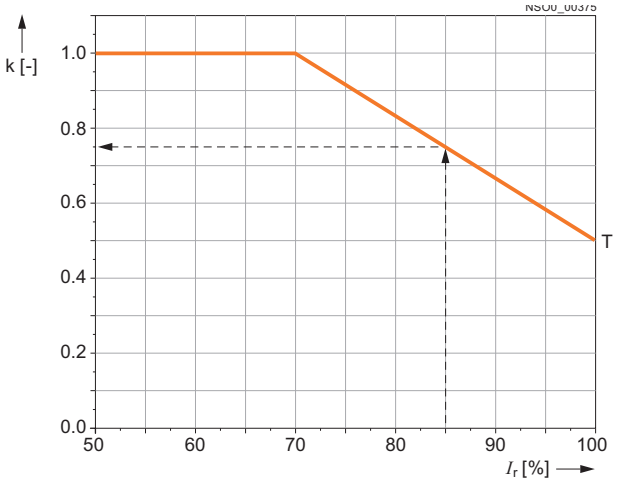
- The dependent release ETU DP is adjusted using one I_r switch. The I_r switch is used to adjust the circuit breaker's rated current. The characteristic is moved on the current axis. By means of its internal circuitry, the release is set to one type of characteristic.
- The dependent release ETU MP is adjusted using two switches, I_r and t_r. The first (I_r) switch is used to adjust the circuit breaker's rated current. The characteristics are moved on the current axis. By turning the other switch (t_r), the time 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 tr switch, it is possible to set a total of 8 characteristics. Four characteristics are available for motors protection. Breaking times correspond with the release class 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). For protecting transformers and lines, 4 characteristics can be set. It is not possible to turn the device back on right after the dependent release has been actuated and circuit breaker tripped. The release must be allowed to cool off, because 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 dependent release 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 the temperature could rise in the protected device with repeated tripping.

2. Independent instantaneous release (short-circuit release) I

The independent instantaneous release in designs ETU DP and ETU MP is adjusted using one switch, I_i. The I_i switch is used for setting up the short-circuit current that, upon its being reached or exceeded, causes instantaneous tripping of the circuit breaker. Regulation of the short-circuit release takes in settings for the characteristic appropriate for protecting lines and motors. The wave form of the tripping characteristic is adjusted using latched switches on the release's front panel according to the needs of the protected device. A visual demonstration on setting the tripping characteristics can be found in the SIMARIS design.

Tripping characteristics of ETU DP and MP releases 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 releases are independent of the ambient temperature and are plotted in a cold state. Digital releases enable simulation of a release 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.

Overcurrent releases

ETU DP and MP tripping times shortening with load

T - When tripping from the release'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 releases 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

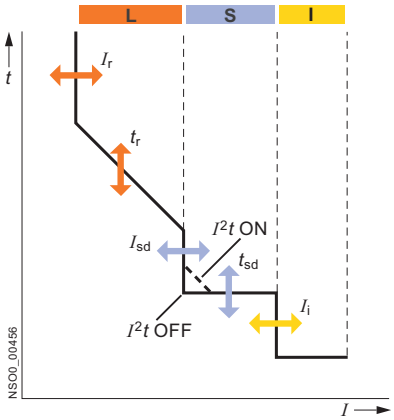
The shortening constant can be read from the diagram. With steady current 85% of I_r the real tripping time will be shortened to:
$t_s = 0.74 \cdot t_v$

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

Overcurrent releases 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 overcurrent releases are defined by standard EN 60 947-2. The characteristics are adjusted in three zones using latched switches on the overcurrent release 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 releases (full version).

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

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

1. Dependent release (thermal) L

The dependent release ETU UP is adjusted using two switches, I_r and t_r. Using the first switch, I_r, the circuit breaker's rated current is adjusted. The characteristics are moved on 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. Using the t_r switch, a total of 8 characteristics can be set. Breaking times correspond with the release class 10 A, 10, 20, 30. It is not possible to turn the device back on right after the dependent release has been actuated and circuit breaker tripped. The release must be allowed to cool off, because 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 dependent release 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 with repeated tripping.

2. Delayed independent releases S

The delayed independent release has the function of a delayed short-circuit release. 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 release.

The delayed independent release 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 independent release 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:

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

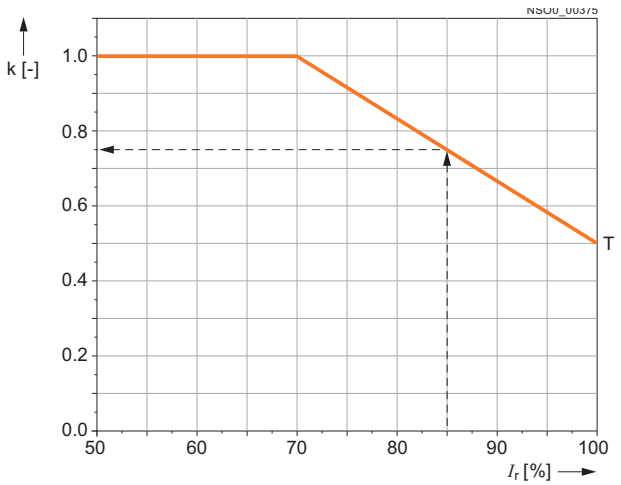
3. Independent instantaneous release I

The independent instantaneous release has the function of a short-circuit release. It is set up only on parameter Irm. Irm is a short-circuit current that, upon its being reached or exceeded, causes the circuit breaker to switch off instantaneously. It is set up directly in kA on the release. The wave form of the tripping characteristic is adjusted using latched switches on the release's front panel according to the needs of the protected device. A visual demonstration on setting the tripping characteristic can be found in the SIMARIS design.

Overcurrent releases

Tripping characteristics for ETU UP release 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 releases are independent of the ambient temperature and are plotted in a cold state. Digital releases enable simulation of a release 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 release's "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 releases 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 release
t_v [s] tripping time of the release derived from the characteristics
t_s [s] real tripping time of the release tripped from warm state
t_u [s] standstill period for particular characteristics

Overcurrent releases 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

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

Overcurrent releases ETU DP-Distribution

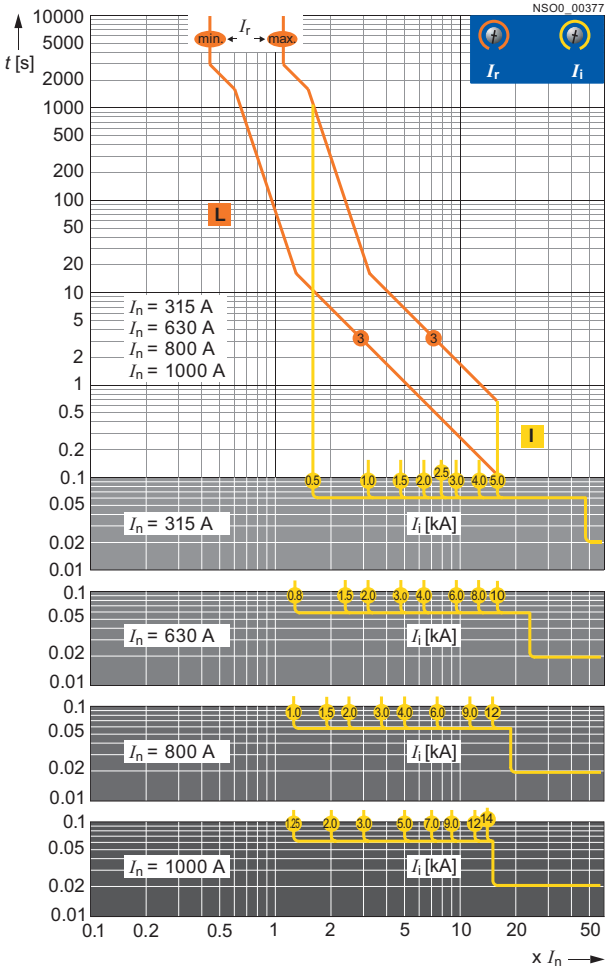
Protecting lines and transformers

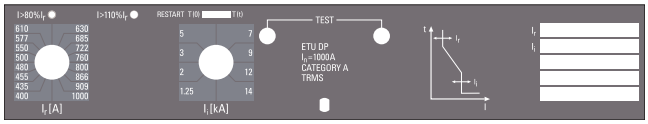
The 3VT9 4..-6AC00 release is intended only for the 3VT4 710-3AA..-0AA0 switching unit. Operation of the release is controlled by a microprocessor. The release is fitted with a thermal memory that can be disabled by turning the switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$.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

A practical advantage of the release are special tripping characteristics that provide for optimized use of transformers up to 1.5 I_n.

Another advantage of this release 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. The reaching of 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.
On the lower part of the release cover are four photocells for communicating with the 3VT9 500-6AE00 signalling unit are mounted.

Tripping characteristics





Specifications for adjustable releases

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

5

Overcurrent releases

Overcurrent releases ETU MP-Motors

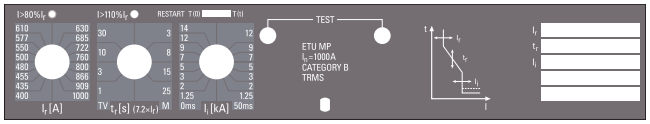
- Direct protection of motors and generators
- Possibility for protecting lines and transformers

The 3VT9 4..-6AP00 release is intended only for the 3VT4 710-3AA..-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release 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 release remains active.

A practical advantage of the release 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 release. 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 release).

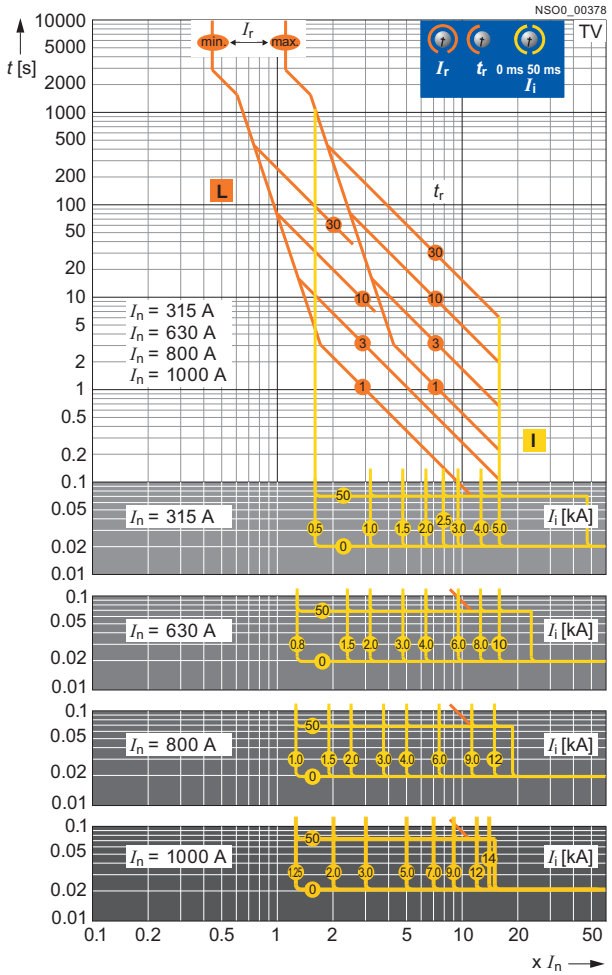
Another parameter for adjusting the release is the rated current, which is adjusted in a range of 0.4 to 1.0 of I_n and the short-circuit tripping level, for which it is possible to set the delay at 0 or 50 ms. The reaching of 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as I > 80% of I_r and I > 110% of I_r. On the lower part of the release cover four photocells are mounted for communicating with the 3VT9 500-6AE00 signalling unit.

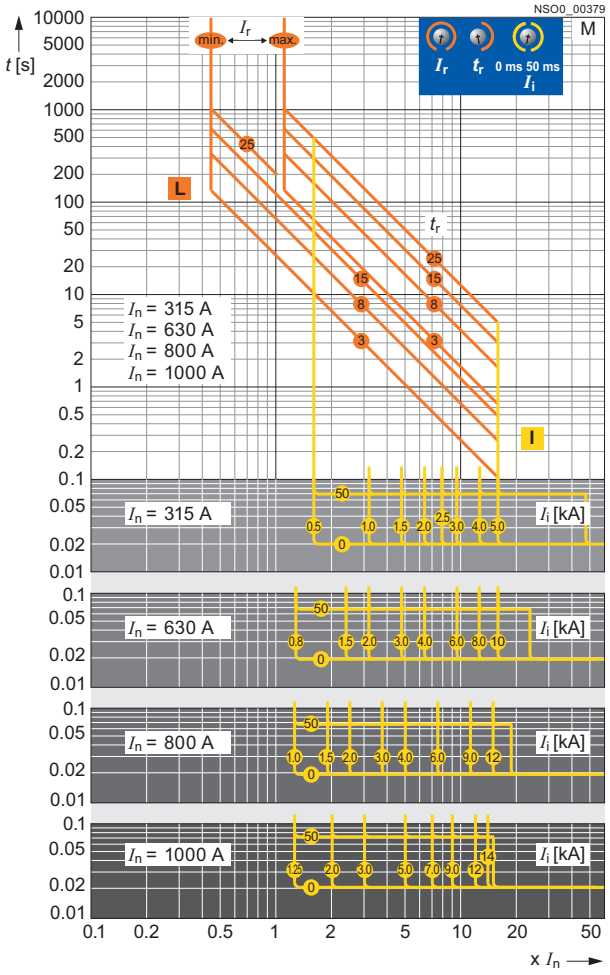


Specifications for adjustable releases

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		ms
3VT9 431-6AP00	315	125, 137	1 (TV 1)	$T_{(0)}$	1	0.5	0
		144, 160	3 (TV 3)		2	1.5	
		172, 180	10 (TV 10)		3	2.5	
		200, 220	30 (TV 30)		5	4	
		231, 243	3 (TV 3)	$T_{(t)}$	4	5	50
		250, 260	8 (TV 8)		2.5	3	
		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)	$T_{(0)}$	1.5	0.8	0
		275, 290	3 (TV 3)		3	2	
		305, 315	10 (TV 10)		6	4	
		345, 360	30 (TV 30)		10	8	
		400, 435	3 (TV 3)	$T_{(t)}$	8	10	50
		455, 480	8 (TV 8)		4	6	
		500, 550	15 (TV 15)		2	3	
		375, 630	25 (TV 25)		0.8	1.5	
3VT9 480-6AP00	800	400, 435	1 (TV 1)	$T_{(0)}$	1.5	1	0
		455, 480	3 (TV 3)		3	2	
		500, 550	10 (TV 10)		9	4 4	
		575, 610	30 (TV 30)			6 12	
		630, 685	3 (TV 3)	$T_{(t)}$	9	12	50
		722, 760	8 (TV 8)		4	6	
		800, 866	15 (TV 15)		2	3	
		909, 1000	25 (TV 25)		1	1.5	
3VT9 410-6AP00	1000	400, 435	1 (TV 1)	$T_{(0)}$	2	1.25	0
		455, 480	3 (TV 3)		5	3	
		500, 550	10 (TV 10)		9	7	
		575, 610	30 (TV 30)		14	12	
		630, 685	3 (TV 3)	$T_{(t)}$	12	12	50
		722, 760	8 (TV 8)		7	9	
		800, 866	15 (TV 15)		3	5	
		909, 1000	25 (TV 25)		1.25	2	

Tripping characteristic ETU MP





5

Overcurrent releases

Overcurrent trip unit-ETU UP

- For protecting complicated loads or those not specified in advance

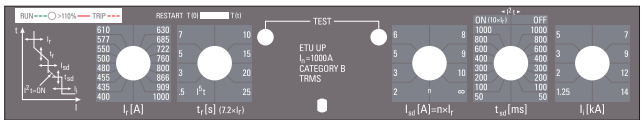
The 3VT9 4..-6AD00 release is intended only for the 3VT4 710-3AA..-0AA0 switching unit. The release is equipped with a thermal memory that can be disabled by turning the "restart" switch on the front panel from the position $T_{(t)}$ to the position $T_{(0)}$. After the thermal memory has been disabled,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

A practical advantage of the release 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.

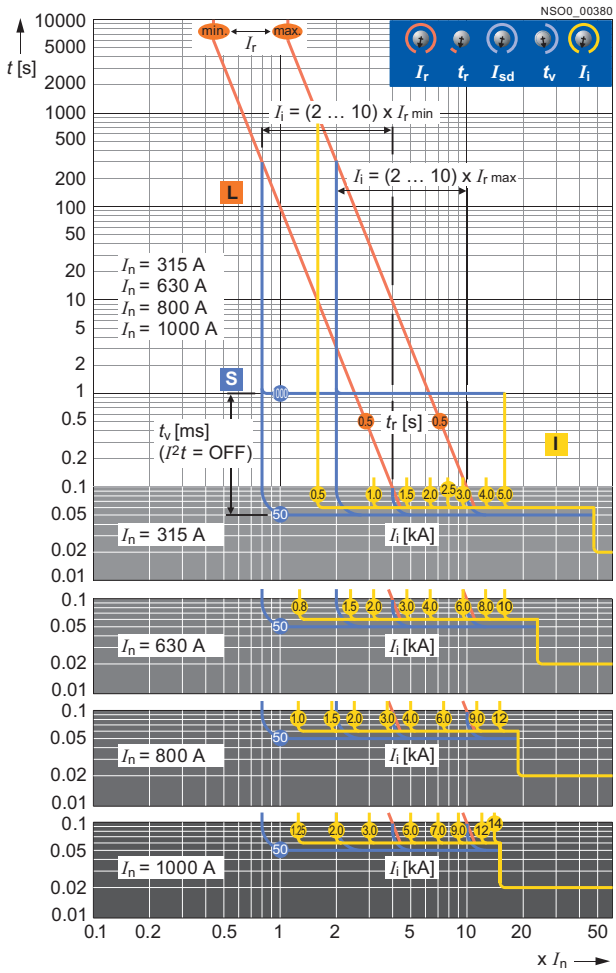
The operational state 70% of I_r is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of I_r this LED will turn red and just before tripping will begin to blink red. On the lower part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

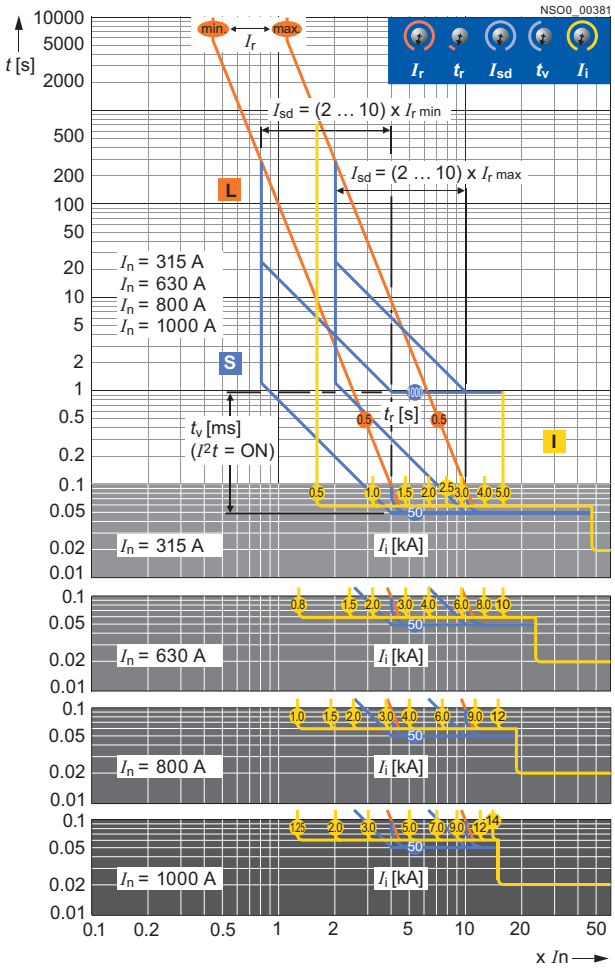
Specifications for adjustable releases

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	A	ms			kA
3VT9 431-6AD00	315	125, 137	0.5	2	50, 100	on	$T_{(0)}$	0.5
		144, 160	3	3	200, 300			1
		172, 180	5	5	400, 600			1.5
		200, 220	7	6	800, 1000			2
		231, 243	10	8	50, 100	off	$T_{(t)}$	2.5
		250, 260	15	9	200, 300			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	on	$T_{(0)}$	0.8
		275, 290	3	3	200, 300			1.5
		305, 315	5	5	400, 600			2
		345, 360	7	6	800, 1000			3
		400, 435	10	8	50, 100	off	$T_{(t)}$	4
		455, 480	15	9	200, 300			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	on	$T_{(0)}$	1
		360, 400	3	3	200, 300			1.5
		435, 455	5	5	400, 600			2
		480, 500	7	6	800, 1000			3
		550, 575	10	8	50, 100	off	$T_{(t)}$	4
		610, 630	15	9	200, 300			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	on	$T_{(0)}$	1.25
		455, 480	3	3	200, 300			2
		500, 550	5	5	400, 600			3
		575, 610	7	6	800, 1000			5
		630, 685	10	8	50, 100	off	$T_{(t)}$	7
		720, 760	15	9	200, 300			9
		800, 866	20	10	400, 600			12
		909, 1000	25	∞	800, 1000			14



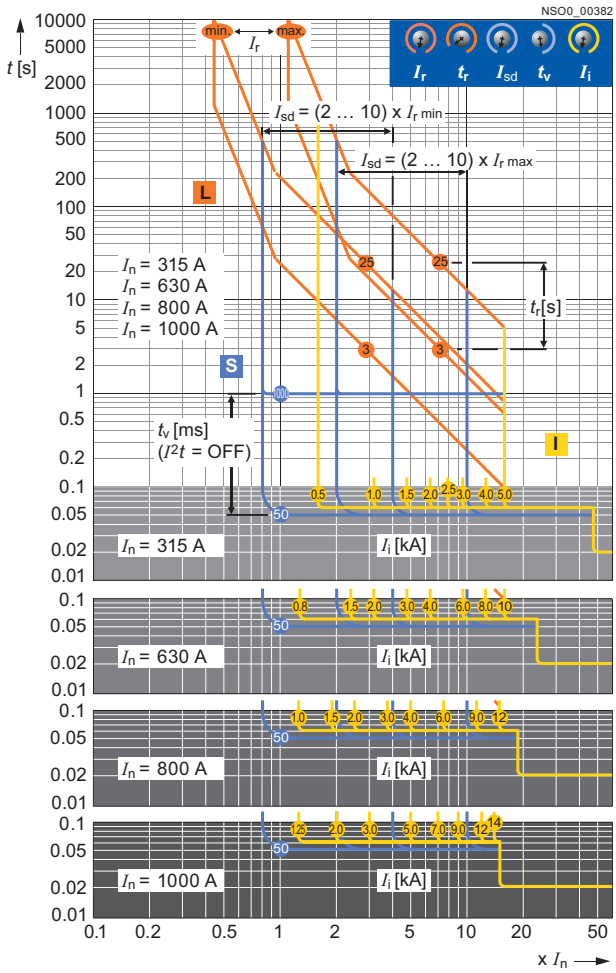
Tripping characteristics ETU UP

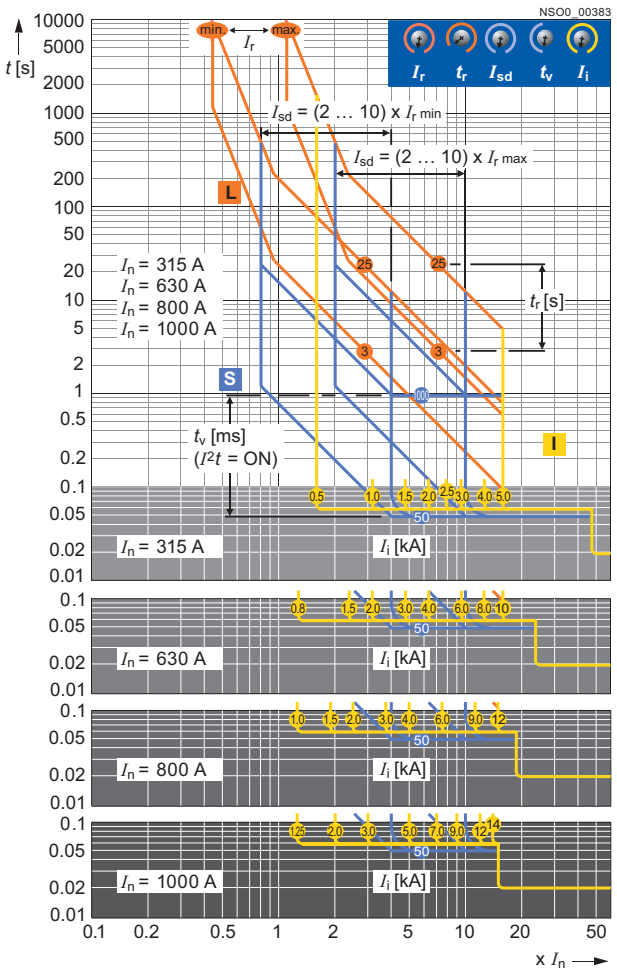




Overcurrent releases

Tripping characteristics ETU UP





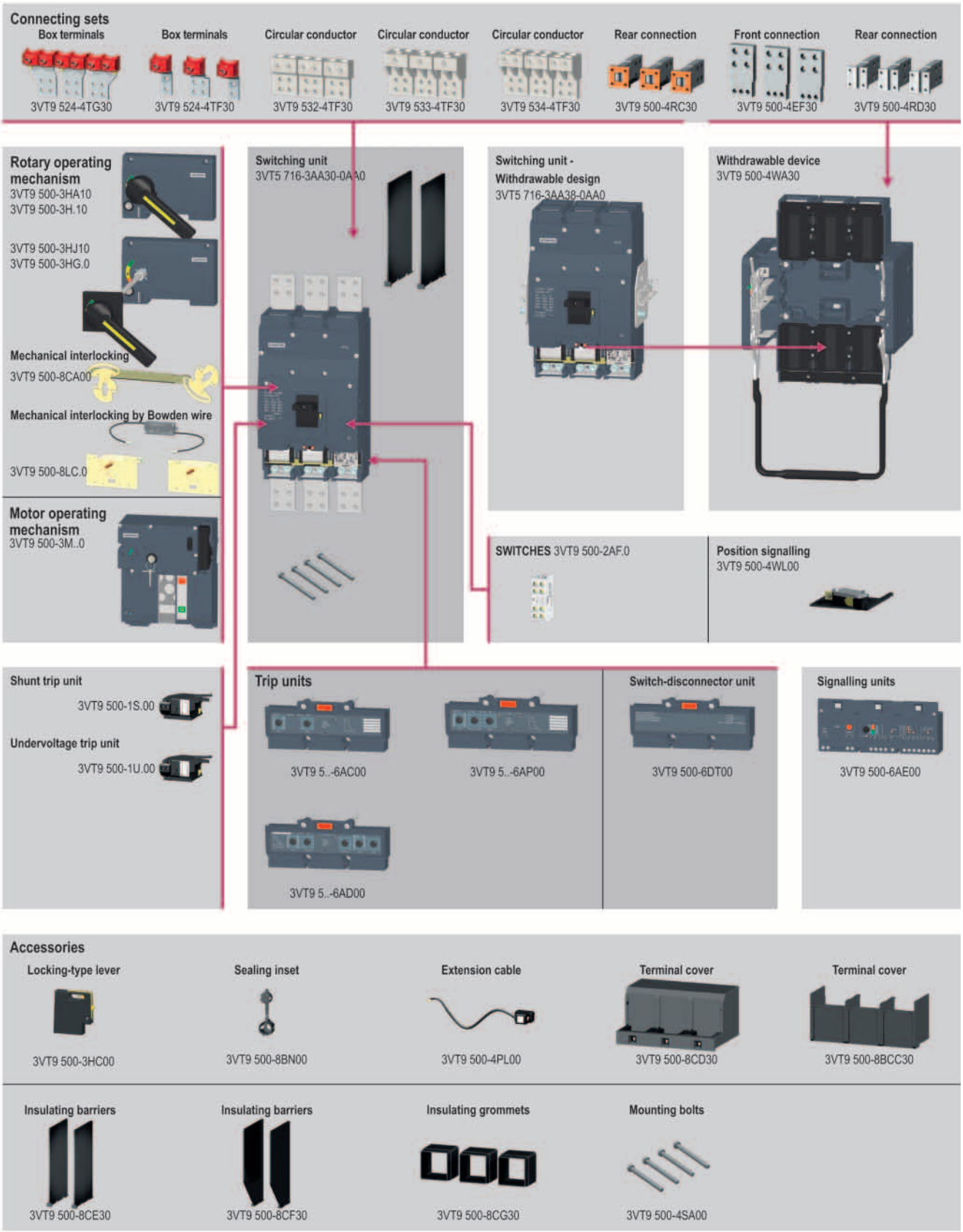
3VT5 Molded Case Circuit Breakers up to 1600 A

Catalog

Technical Information

General data

Overview



Selection and ordering data

- The switching unit consists of:
  - 3VT9 500-8CE30 phase barriers
  - Set of installation bolts (4x M8x80)
  - Connecting sets for front connection - busbar connection
- The switching unit must be fitted with:
  - Overcurrent release ETU DP, MP and UP (circuit breaker) or
  - 3VT9 516-6DT00 switch disconnector unit (switch disconnector)

Withdrawable version

- Must be fitted with:
  - Overcurrent release ETU DP, MP and UP (circuit breaker) or
  - 3VT9 516-6DT00 switch disconnector unit (switch disconnector)
  - 3VT9 500-4WA40 withdrawable device

	Rated Current I_n	Short-circuit breaking capacity $I_{cu\ at}$ AC 400 V	DT	Order no.	PS*	Weight per PU approx.
	A	kA				kg
Switching units						
	*Fixed-mounted design, 3-pole*					
	1600	65	B	**3VT5 716-3AA30-0AA0**	1 unit	23.000
	*Withdrawable version, 3-pole*					
	1600	65	B	**3VT5 716-3AA38-0AA0**	1 unit	23.000

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

Accessories

	Rated current I_n	Overload protection[1]	DT	Order no.	PS*	Weight per PU approx.
	A					kg
ETU releases						
	System 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, ETU MP, LI function					
	• For direct 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					
	• For protecting 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						
		For releases DP, MP and UP	B	**3VT9 500-6AE00**	1 unit	0.670

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* You can order this quantity or a multiple thereof.

Auxiliary switches and shunt releases

Selection and ordering data

	Rated control supply voltage U_s	DT	Order no.	PS*	Weight per PU approx.
					kg
Auxiliary switches					
	AC/DC 60 ... 500 V/DC60 ... 240 V	C	**3VT9 500-2AF10**	1 unit	0.100
	AC/DC 5 ... 60 V	B	**3VT9 500-2AF20**	1 unit	0.041
Shunt releases					
	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 releases					
	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 manual operating mechanism is to be fitted with:

- For controlling using the switch unit with the black 3VT9 500-3HE/HF10 hand drive lever
- For controlling through the control cabinet door
  - with the 3VT9 500-3HJ10 extension shaft
  - with the 3VT9 500-3HG.. coupling driver
  - 3VT9 500-3HE/HF10 hand drive lever

Selection and ordering data

	Version		DT	Order no.	PS*	Weight per PU approx.
						kg
Rotary operating mechanism						
	**Manual operating mechanism**					
	• 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 manual operating mechanism for circuit breakers/switch disconnectors, fixed-mounted design Both circuit breakers must be equipped at least with a manual operating mechanism and a knob.		B	**3VT9 300-8LA00**	1 unit	0.136
	**Mechanical interlocking by Bowden wire** Mechanical interlocking by Bowden wire is intented for fixed-mounted, plug-in and withdrawable versions.					
	• For circuit breakers/switch disconnectors, fixed-mounted design		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**					
	AC/DC 110 V AC 230 V/DC 220 V		B	**3VT9 500-3MF00** **3VT9 500-3MQ00**	1 unit	4.454
	Motorized operating mechanism with operations counter					
	AC/DC 110 V AC 230 V/DC 220 V		B	**3VT9 500-3MF10** **3VT9 500-3MQ10**	1 unit	4.400

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* You can order this quantity or a multiple thereof.

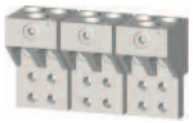
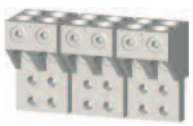
Mounting accesssories

Selection and ordering data

Withdrawable version

When connecting the main circuit, the recommendations on page 6/11 as well as the deionization space must be observed

- The device must be fitted with:
  - 3VT5 switching unit, 3-pole version;
- Must be fitted with
  - 2 x 3VT9 500-4EF30 connection set (front connection) or 3VT9 500-4RD30 (rear connection)
- We recommend fitting the device with:
  - 3VT9 500-4SA40 mounting bolt set (4 x M8 x60)

	Version	Max. permissible cross-section *S*	Type of cables	DT	Order no.	PS*	Weight per PU approx.
		mm^2					kg
Withdrawable device							
	**3-pole version**			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 6/14). 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 524-4TF30 connecting set with the 3VT9 524-4TF30 connecting set (see page 6/15). 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

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* You can order this quantity or a multiple thereof.

Selection and ordering data

	Version	DT	Order no.	PS*	Weight per PU approx.
					kg
Accessories					
	Phase barriers In case of reversed connection (supply to terminals 2, 4, 6), the phase barriers must also be installed on the bottom side. Not included in each order of switching units in fixed-mounted design.				
	• For switching unit, fixed-mounted design	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 design 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 design 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 cross-section of 4 ... 6 mm may be used		**3VT9 500-3HL00**		
	**Bolt sealing insert** Provides sealing for: • Overcurrent release • Accessory compartment cover		**3VT9 500-8BN00**	on req.	
	**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 on 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	B	**3VT9 500-3MF20**	1 unit	0.019

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* You can order this quantity or a multiple thereof.

Technical specifications

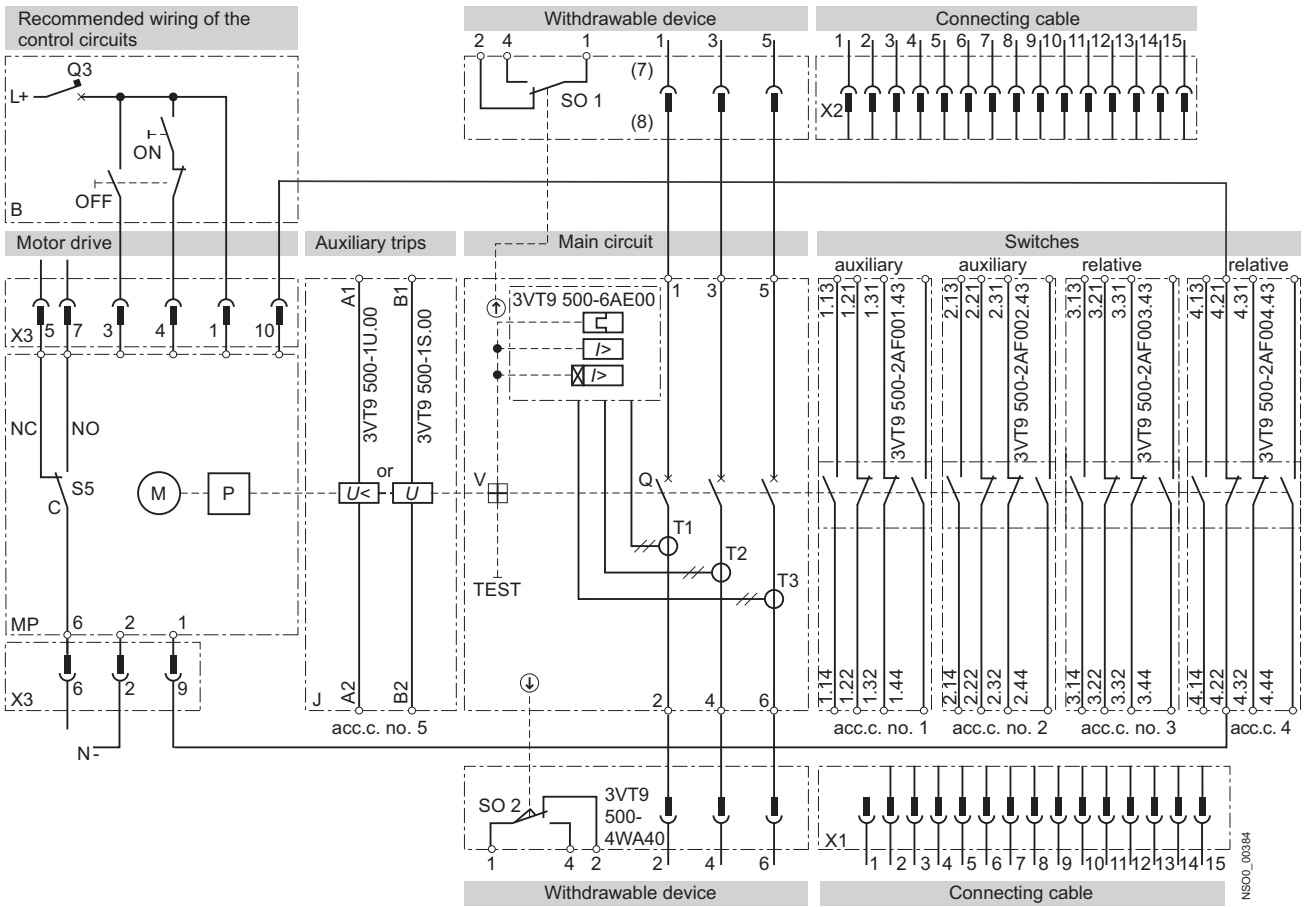
Specifications Type		3VT5 circuit breakers	Switch disconnectors
Standards		EN 60 947-2, IEC 947-2	EN 60 947-3, IEC 947-3
Approval marks		CE	
Number of poles		3	
Rated current I_n	A	630, 1000, 1250, 1600	--
Rated normal current I_u	A	1600	
Rated operational current I_e	A	--	1600
Rated operational voltage 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		20 kA/1 s	
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 = 250 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	Hz	3g (8 ... 50)	
Design modifications			
Front/rear connection		✔/✔	
Plug-in version		--	
Withdrawable version		✔	
Accessories			
Switches-auxiliary/relative/signal/leading		✔/✔/--/--	
Shunt release/with signal switch		✔	
Undervoltage release/with leading switch, with signal switch		✔/--	
Front manual operating mechanism/lateral operating mechanism right/left		✔/✔	
Mechanical interlocking to the manual operating mechanism by Bowden wire		✔/✔	
Motorized operating mechanism/with operations counter		✔/✔	
Locking-type lever		✔	
Bolt sealing insert/additional cover for overcurrent release		✔/--	

✔ available,
-- unavailable,
+ in preparation

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

Schematics

Cicuit breaker with accessories



MP	3VT9 500-3M..00 motorized operating mechanism
M	motor
P	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	motorized operating mechanism circuit breaker, see page 6/43
J	3VT4 710-3AA30-0AA0, 3VT5 716-3AA30-0AA0 switching unit
Q	main contacts
T1, T2, T3,	current transformers
V	trip-free mechanism
ETU	overcurrent release, ETU DP, MP and UP
TEST	pushbutton to test release
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 withdrawable versions, see page 6/25
3VT9 500-1U..0	undervoltage releases
3VT9 500-1S..0	shunt releases

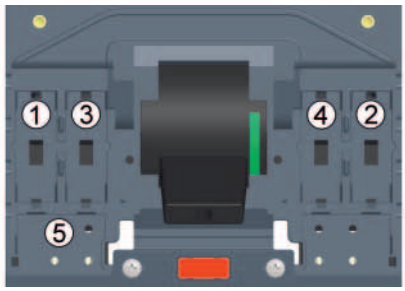
Functions

Switching states in the circuit breaker cavities

Accessory compartment			1, 2				3, 4			
Cicuit breaker position	Lever positon 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 overcurrent release, auxiliary release 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.
- For greater connecting options, connecting sets are produced (see page 6/6).
- 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). However, it is possible to reverse 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 phase barriers also on the side of terminals 2, 4, 6 (for detailed information, see page 6/12).
- 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 way of connecting the main circuit must observe the circuit breaker's deionization spaces (see page 6/12).

Auxiliary circuits

- Switches, shunt releases or undervoltage releases 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, 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
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 device 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

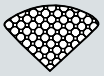
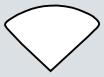
3VT5 circuit breaker/switch disconnector - connection of Cu busbars 2 x 50 x 6 mm to pole

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

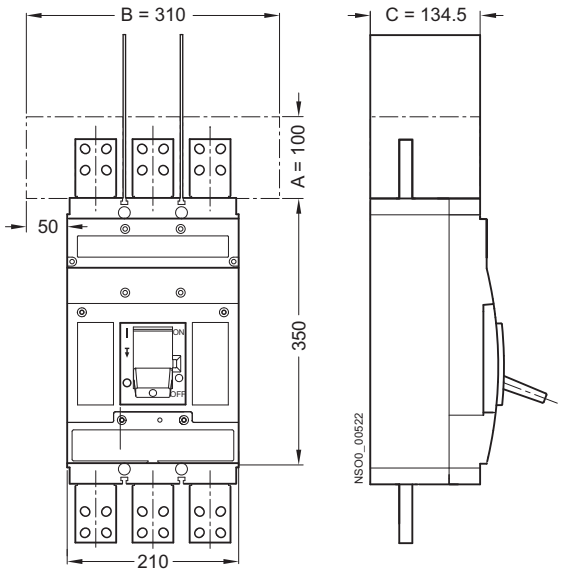
Specifications of cable shapes

Order No.	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	Page
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		6/14, 6/21, 6/20
3VT9 524-4TF30	500	70 ... 240 Cu/Al	95 ... 300 Cu/Al	50 ... 185 Cu/Al	70 ... 240 Cu/Al		6/15, 6/22, 6/23
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		6/15, 6/21
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		6/15, 6/21
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		6/16, 6/22
3VT9 400-4RC30	1000					50 x	6/13
3VT9 500-4RC30	1600					50 x	6/13
3VT9 500-4EF30	1600					50 x	6/19
3VT9 500-4RD30	1600					50 x	

6

Dimensional drawings

A, B, C - minimum deionization space, free of earthed metal parts



Use of phase barriers and terminal covers with circuit breakers and switch disconnectors.

Fixed-mounted design

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

3VT9 500-8CE30 phase barriers must always be installed on circuit breakers/switch disconnectors.

- Terminals 2, 4, 6 (bottom side)
  - a) If circuit breakers/switch disconnectors are connected to the supply using terminals 2, 4, 6, 3VT9 500-8CE30 phase barriers must always be installed on it.
  - b) If circuit breakers/switch disconnectors are connected on the bottom side using clamp or block type terminals, 3VT9 500-8CE30 phase barriers must always be installed on it.

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

3VT9 500-8CD30 insulating covers or 3VT9 500-8CE30 phase 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 phase barriers must always be installed on it.

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 withdrawable device is connected on the upper side using clamp or block type terminals, 3VT9 500-8CF30 phase barriers must always be installed.

In all other cases, we recommend installing 3VT9 500-8CC30 insulating covers on the upper side of the device.
- terminals 2, 4, 6 (bottom side)

If the withdrawable device is connected to the bottom side using clamp or block type terminals, 3VT9 500-8CF30 phase barriers must always be installed.

In all other cases, we recommend installing 3VT9 500-8CC30 insulating covers on the bottom side of the withdrawable device.

Technical specifications

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

- The withdrawable version must be fitted with the following connecting sets:
  2 x 3VT9 500-4EF30, for front connection or
  2 x 3VT9 500-4RD30, for rear connectionn
- For mounting withdrawable device to switchgear, use 3VT9 500-4SA40 installation bolts, see page 6/7.

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 use additionally 3VT9 500-4EF30 or 3VT9 500-4RD30 connection sets.
- The way of connecting the main circuit must observe recommendations (see page 6/11) as well as deionization space (see page 6/13).

Auxiliary circuits

These are connected using 3VT9 500-4PL00 15-wire cables.

Circuit breaker accessories in plug-in version

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

States of switches 3VT9 500-4WL00 in withdrawable device according to circuit breaker and arrestment 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

Type	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 6/9.

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).

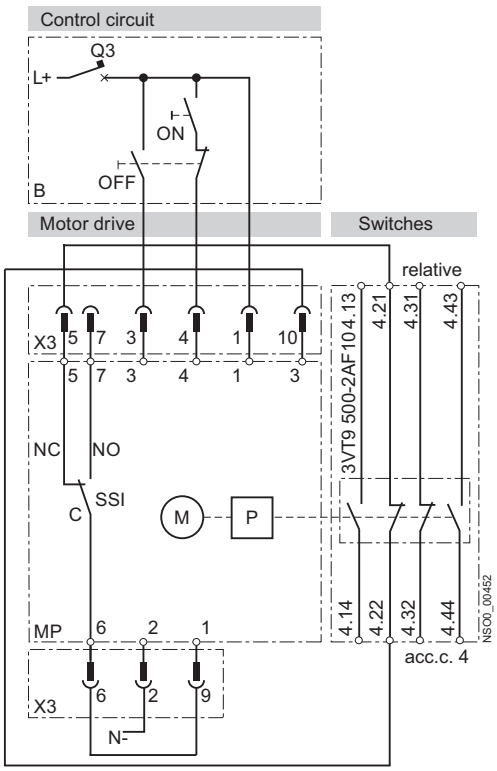
Advantages and enhanced safety for operator:

- 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

Accessories and Components

Withdrawable version

Recommended wiring of circuit breaker, plug-in version with motorized operating mechanism



Symbol	Description
MP	3VT9 500-3M..0 motorized operating mechanism
M	motor
P	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	Motorized operating mechanism circuit breaker for 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 can be found 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

6

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

Circuit breaker state before insertion			State before insertion/withdrawal State of switches before insertion→ -withdrawn position				State after insertion/withdrawal State of switches after insertion inserted position			
Circuit breaker state before withdrawal			State of switches before withdrawal→ inserted position				State of switches after withdrawal withdrawn position			
			accessory compartment				accessory compartment			
			1,2		3,4		1,2		3,4	
	Lever position of circuit breaker	State of the main contacts	3VT9 500-2AF10		3VT9 500-2AF10		3VT9 500-2AF10		3VT9 500-2AF10	
			4 2 3 1		4 2 3 1		4 2 3 1		4 2 3 1	
Switched on		1	1	0	0	1	1	0	1	0
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 release or TEST button		0	1	0	1	0	1	0	1	0

Technical specifications

The electronic overcurrent release consists of a separate and interchangeable unit, which is supplied with the 3VT5 716-3AA3.-0AA0 switching unit. By exchanging the overcurrent release, the range of the circuit breaker's rated current can be easily changed.
Releases for the 3VT5 716-3AA3.-0AA0 switching unit are produced in four current values I_n = 630, 1000, 1250 and 1600 A. Including their adjustment, the releases cover rated currents ranging from 250 to 1600 A.

Depending on the needs for adjusting the release's tripping characteristics to the protected device and to the variability of the characteristic with regard to selectivity, the following release devices are available:

ETU DP

They have one type of characteristic with adjustable I_r and I_{rm}.

ETU MP

They have more kinds of characteristics with adjustable I_r, t_r and I_{rm}.

ETU UP

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

ETU DP, MP and UP

Proper functioning of releases does not depend on the form of current in the main circuit. The function of the release is supported by a microprocessor, which processes a sampled signal of the power circuit and recalculates it to obtain an rms value. Therefore, the releases 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 releases protect a circuit against short-circuiting and overloading. Setting of selective cascading of circuit breakers is especially enabled by the ETU UP release. Tripping characteristics of the releases are independent of the ambient temperature. The releases are affixed to the switching unit by two bolts. The translucent cover over the adjustment controls can be sealed.

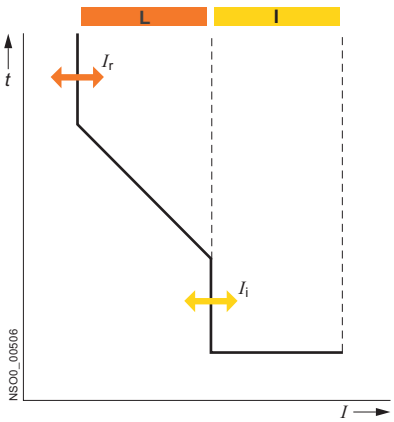
Adjustment of tripping characteristics for release ETU DP and MP

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

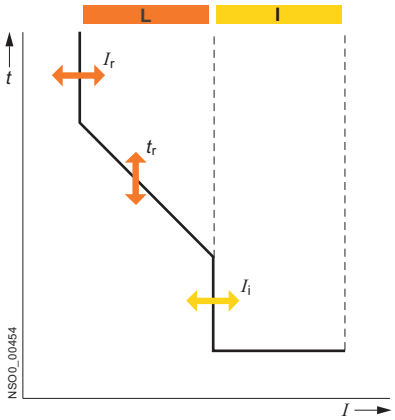
L - is a zone of low overcurrents and includes the area of thermal protection.

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

ETU DP



ETU MP



1.Independent release (thermal) L

- The dependent release ETU MP is adjusted using two switches, I_r and t_r. The first of these, the I_r switch, is used to adjust the circuit breaker's rated current. The characteristic moves on 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 characteristics thus move on the time axis. Using the tr switch, it is possible to set a total of 8 characteristics. Four characteristics are available for motor protection. Breaking times correspond with the release class 10 A, 10, 20, 30. By changing t_r it is possible to select the characteristic according to the required motor starting (light, medium, heavy or very heavy starting). For protecting transformers and lines, 4 characteristics can be set. It is not possible to turn the device back on right after the dependent release has been actuated and circuit breaker tripped. The release must be allowed to cool off, because 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 dependent release remains active, and only its thermal memory is inactivated. The thermal memory should be used only in justified cases, and with the knowledge that there could be rising temperature in the protected device with repeated tripping.
- The dependent release ETU DP is adjusted using one switch I_r. Using the I_r switch, the circuit breaker's rated current is adjusted, with the characteristic moving on the current axis. By means of its internal circuitry, the release is set to one type of characteristic, TV3.

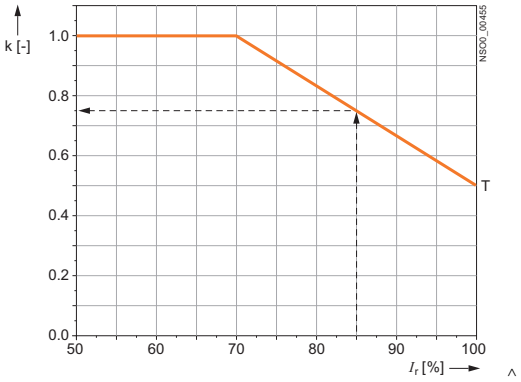
2. Independent instantaneous release (short-circuit trip) I

The independent instantaneous release in designs ETU DP and MP is adjusted using one I_{rm} switch. The I_{rm} switch is used for setting up the short-circuit current that, upon its being reached or exceeded, causes instantaneous tripping of the circuit breaker. Regulation of the short-circuit release takes in settings for the characteristic appropriate for protecting lines and motors. The wave form of the tripping characteristics is adjusted using latched switches on the release's front panel according to the needs of the protected device. A visual demonstration on setting the tripping characteristic can be found in the SIMARIS design.

Overcurrent releases

Tripping characteristics of ETU DP and MP releases 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 releases are independent of the ambient temperature and are plotted in a cold state. Digital releases enable simulation of a release 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 ETU DP, MP with load

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

Thermal standstill time of the characteristics

For all kinds of characteristics t_r the thermal standstill time for ETU DPand MP releases 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:

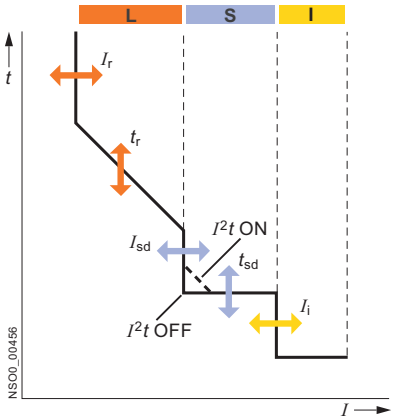
$$\boldsymbol{t_s = 0.74 \cdot t_v}$$

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

Overcurrent releases are set by the manufacturer

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

Tripping characteristic adjustment, trip unit ETU UP



The tripping characteristic of overcurrent releases is defined by standard EN 60 947-2. The characteristic is adjusted in three zones using latched switches on the overcurrent release 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 releases (full version).

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

I²t - Characteristic setting in ON position represents a constant value of energy passed through. If fuses are used as protective elements for outgoing branch feeders, it is possible to adjust the selective part of the characteristics to better suit the shape of the fuse characteristics.

1. Independent release (thermal) L

The dependent release ETU UP is adjusted using two switches, Ir and tr. Using the first switch, Ir, the circuit breaker's rated current is adjusted. The characteristic is moved on the current axis. Turning the second switch, tr, adjusts the time after which the circuit breaker will trip while passing through 7.2 Ir. The tripping characteristic thus moves on the time axis. Using the tr switch, a total of 8 characteristics can be set. Breaking times correspond with the release class 10 A, 10, 20, 30. It is not possible to turn the device back on right after the dependent release has been actuated and circuit breaker tripped. The release must be allowed to cool off, because it has a thermal memory.
The memory can be disabled by turning the "restart" switch from the normal "Tt" position to the "T0" position. The dependent release remains active, and only its thermal memory is inactivated. 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 with repeated tripping.

2. Delayed independent release S

The delayed independent release has the function of a delayed short-circuit release. 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 ($I_{sd} = n \times I_r$). It is a short-circuit current that, within the span of I_{sd} to I_i, will trip the circuit breaker with delay t_{sd}, where t_{sd} is a delay set up for switching off the release.
The delayed independent release 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 independent release can be disabled by setting the parameter n ($I_{sd} = n \times I_r$) 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 more than 10 x 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. Independent instantaneous release I

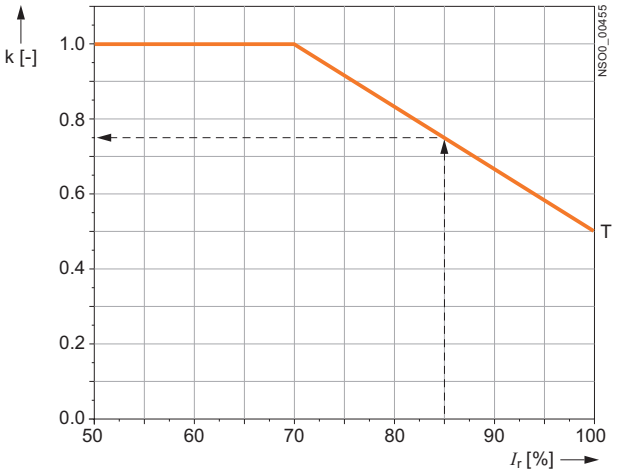
The independent instantaneous release has the function of a short-circuit release. It is set up only on parameter I_i. I_i is short-circuit current that, upon its being reached or exceeded, causes the circuit breaker instantaneously to switch off. It is set up directly in kA on the release. The wave form of the tripping characteristic is adjusted using latched switches on the release's front panel according to the needs of the protected device. A visual demonstration on setting the tripping characteristic can be found in the SIMARIS design.

Overcurrent releases

Tripping characteristics of ETU UP release 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 releases are independent of the ambient temperature and are plotted in a cold state. Digital releases enable simulation of a release 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 release's "warm" state, the tripping time of the characteristic is cut short during the standstill time t_u by coefficient k.

T standstill time of the characteristics

For all kinds of characteristics t_r the thermal standstill period for ETU UP releases 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 release
t_v [s] tripping time of the release derived from the characteristic
t_s [s] real tripping time of the release tripped from warm state
t_u [s] standstill period for particular characteristics

Overcurrent releases 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

Overcurrent releases ETU DP-Distribution

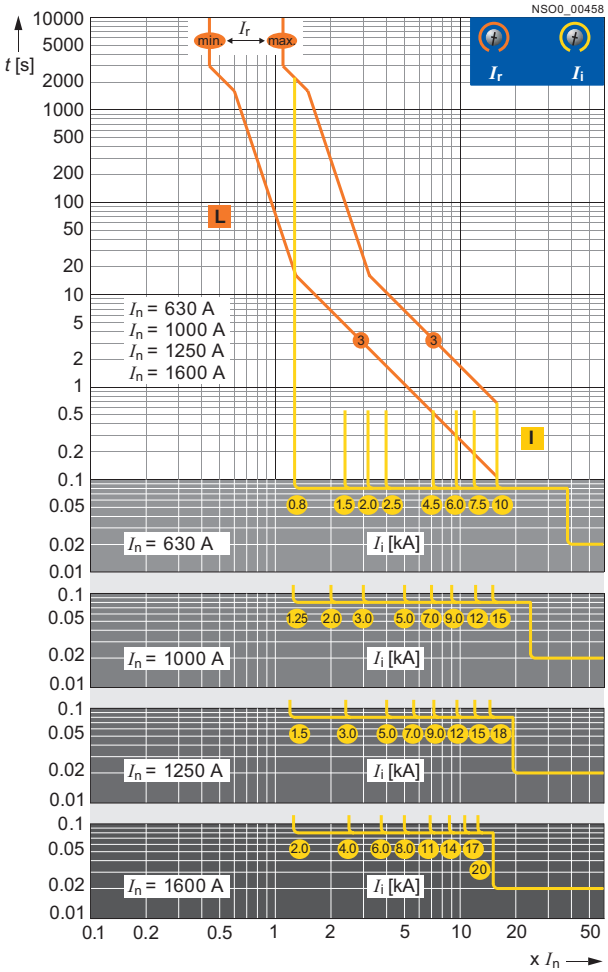
Protecting lines and transformers

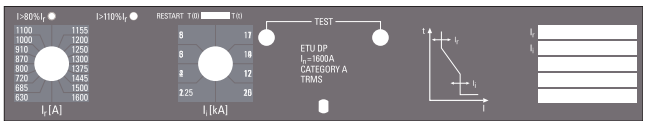
The 3VT9 5..-6AC00 release is intended for 3VT5 716-3AA3.-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release is outfitted with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After disabling the thermal memory, the thermal release remains active.

A practical advantage of the release is a specially designed tripping characteristic that provides for optimal exploitation of transformers up to 1.5 I_n.

Another advantage of this release is the simple adjustment of the tripping characteristic. Set-up includes only rated current and the tripping level of the short-circuit release. 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. On the bottom part of the release cover are 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 kA
3VT9 563-6AC00	630	250, 260	$T_{(0)}$ $T_{(t)}$	0.8
		275, 290		1.5
		305, 315		2
		345, 360		2.5
		400, 435		4.5
		455, 480		6
		500, 550		7.5
		575, 630		10
3VT9 510-6AC00	1000	400, 435	$T_{(0)}$ $T_{(t)}$	1.25
		455, 480		2
		500, 550		3
		575, 630		5
		630, 685		7
		720, 760		9
		800, 870		12
		910, 1000		15
3VT9 512-6AC00	1250	500, 550	$T_{(0)}$ $T_{(t)}$	1.5
		577, 610		3
		630, 685		5
		722, 760		7
		800, 866		9
		909, 1000		12
		1100, 1155, 1200, 1250		15 18
3VT9 516-6AC00	1600	630, 685	$T_{(0)}$ $T_{(t)}$	2
		720, 800		4
		870, 910		6
		1000, 1100		8
		1155, 1200		11
		1250, 1300		14
		1375, 1445		17
		1500, 1600		20

Overcurrent releases

Overcurrent releases ETU MP-Motors

- Direct protection for motors and generators
- Possibility for protecting lines and transformers

The 3VT9 5..-6AP00 release is intended only for 3VT5716-3AA3.-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release 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 release remains active.

A partical advantage of the release is a specially designed tripping characteristic that provides for optimal exploitation of transformers up to 1.5 I_n.

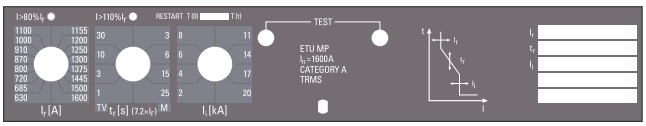
A of 8 characteristics can be set on the release. From these, in mode “M” there are 4 characteristics for motors protection and another 4 characteristics in mode “TV” for protecting transformers and lines. The shape of each characteristic can be changed using a selector switch.

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

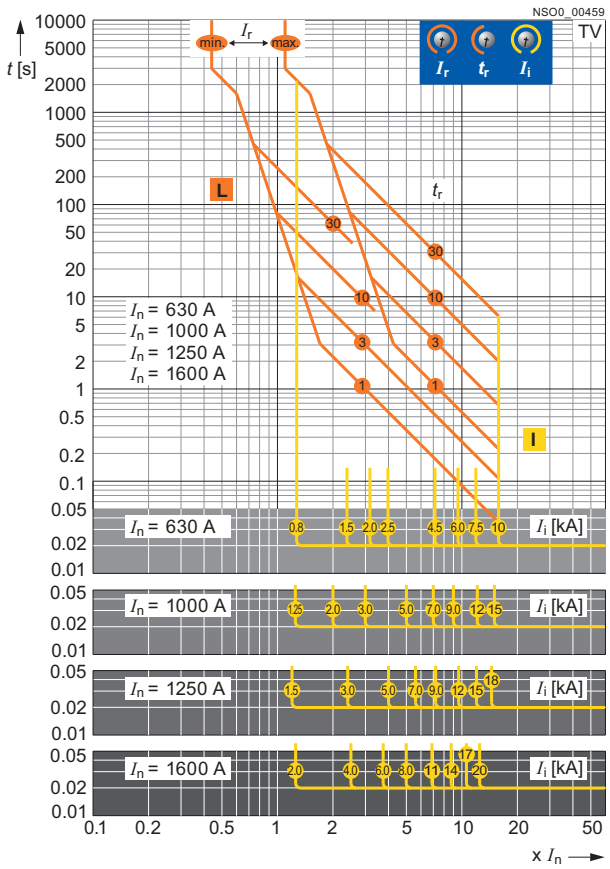
Another parameter for adjusting the release is rated current, which is adjusted in a range of 0.4 to 1.0 of I_n and the short-circuit tripping level. The reaching of 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as I > 80% of I_r and I > 110% of I_r. On the bottom part of the release cover are four photocells for communicating with the 3VT9 500-6AE00 signalling unit.

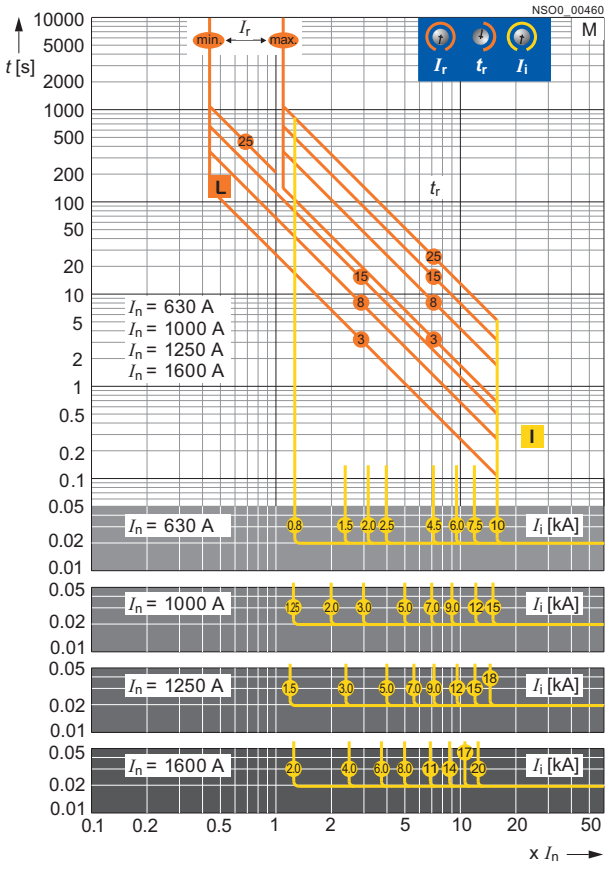
Adjustable specifications

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



Tripping characteristic ETU MP





Overcurrent releases

Overcurrent releases ETU UP-Universal

Protecting complicated loads or those not specified in advance

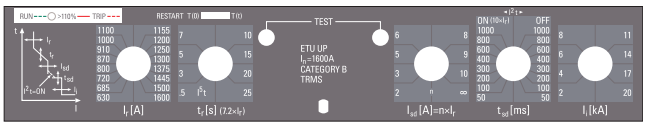
The 3VT9 5..-6AD00 release is intended only for the 3VT5 716-3AA3.-0AA0 switching unit. The release is equipped with a thermal memory that can be disabled by turning a "restart" switch on the front panel from the position $T_{(t)}$ to position $T_{(0)}$. After disabling the thermal memory, the thermal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

A practical advantage of the release 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.

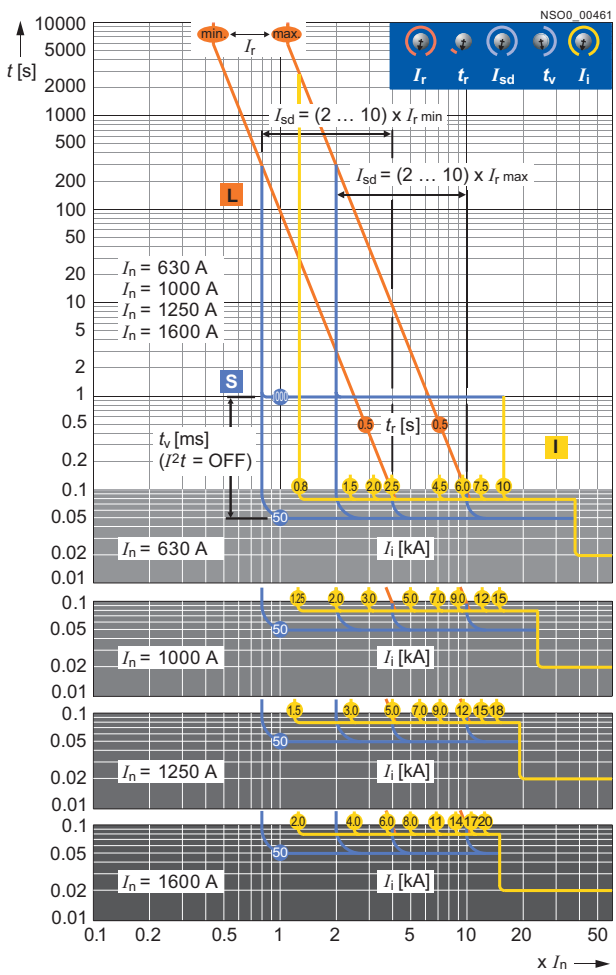
The reaching of 80% and 110% of I_r is indicated by LED diodes on the front panel denoted as I > 80% of I_r and I > 110% of I_r. On the bottom part of the release cover are photocells for communicating with the 3VT9 500-6AE00 signalling unit.

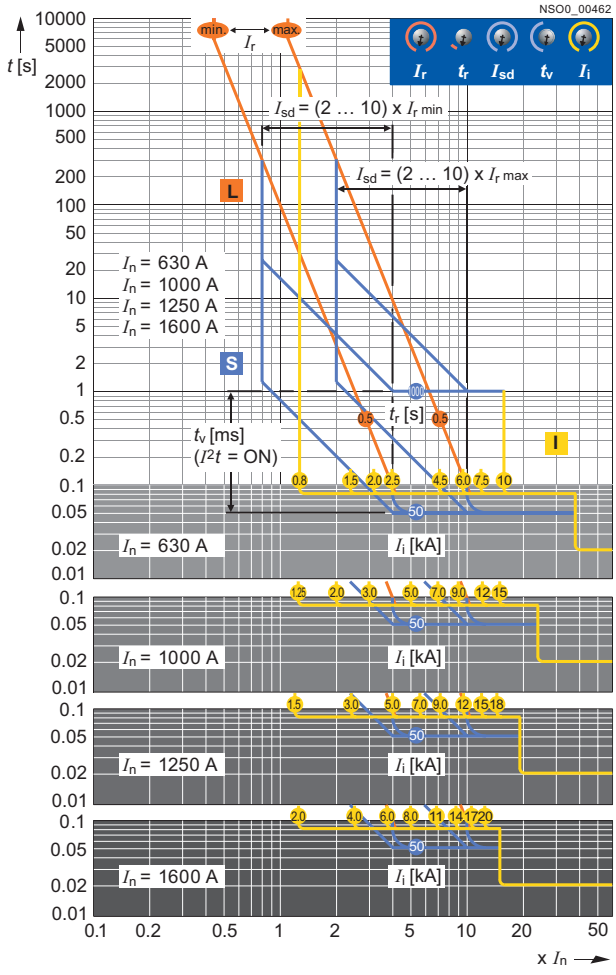
Adjustable specifications

Order No.	Rated current I_n A	Overload protection I_r	t_r (7.2 x I_r) s	short delayed short circuit protection I_{sd} A = (n x I_r) n	t_{sd} ms	I^2t	Restart	Instantaneous short circuit protection I 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



Tripping characteristic ETU UP





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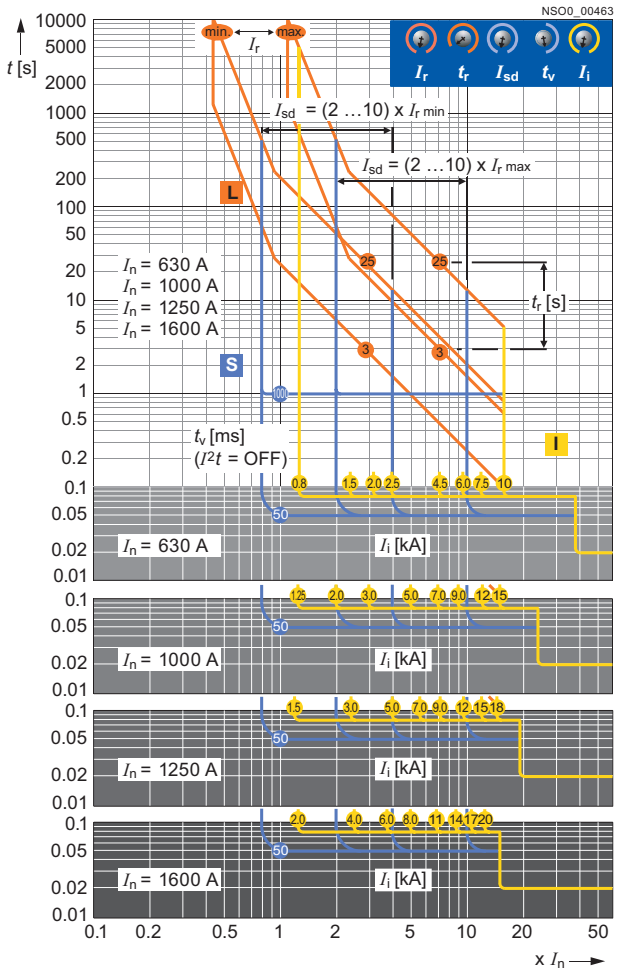
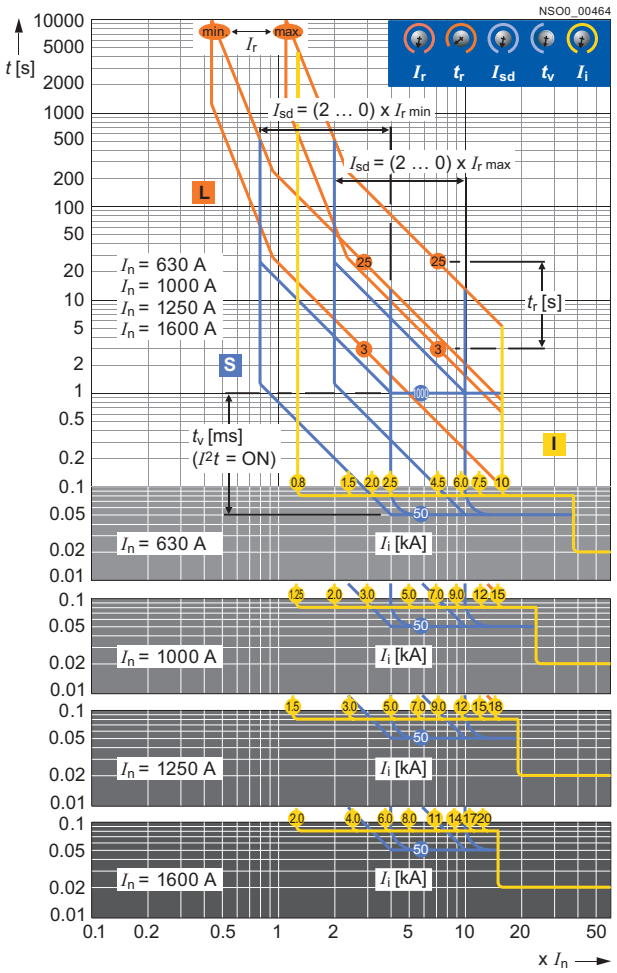
Overcurrent releases

Tripping characteristic ETU UP





Technical specifications

The 3VT9 5006AE00 signalling unit is a modular accessory for the 3VT4 and 3VT5 circuit breakers and collaborates with the electronic releases 3VT9 5..-6AC00, 3VT9 5..-6AP00 and 3VT9 5..-6AD00.

- It is intended for applications in automated-control systems
- The unit signals reaching a certain current value in a circuit and the tripping of the circuit breaker by releases (dependent, independent, undercurrent)
  - user has a options to set up (by steps, using a rotary switch) an amount of current he wishes to indicate if it has been 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 circuitry is carried out by LED indicators on the front panel of the unit
- The information on the state of the circuit breaker is transferred from the release to the signalling unit by means of optical coupling
- Remote indication on the state of the circuit breaker and the protected circuitry 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 dependent or undercurrent and independent releases have storage
  - after the storage relay is activated by tripping of a release, it is necessary to reset the relay using the front panel RESET switch or by an external push button remotely.
- The supply voltages are presented in the table
- The main power supply and the reset circuit are not concurrently conformable with conditions for safe separation of the circuits
- The external RESET button must be connected using a screened cable or a twisted wire with maximum resistance of the loop 100 Ohm.

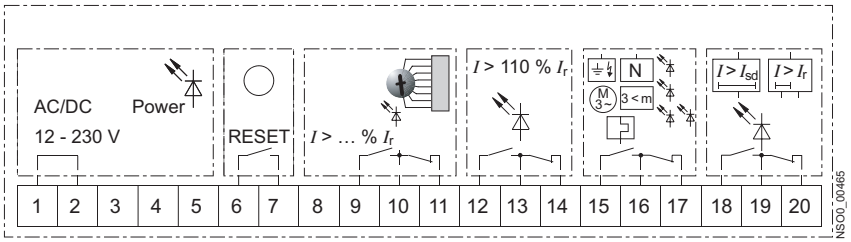
The signalling unit will not work without power supply!

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	+	+
Release tripping	By dependent/undercurrent	+	+/+
	Independent	+	+



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 dependent or undercurrent releases
18, 19, 20	relay contacts indicating tripping by independent release (instantaneous or delayed ones)

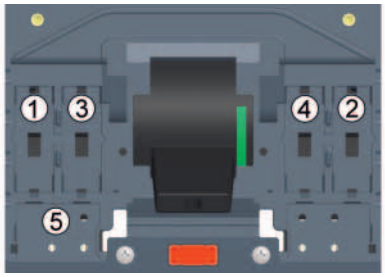
Auxiliary switches

Technical specifications

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 islation 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 to control electromagnetic loads

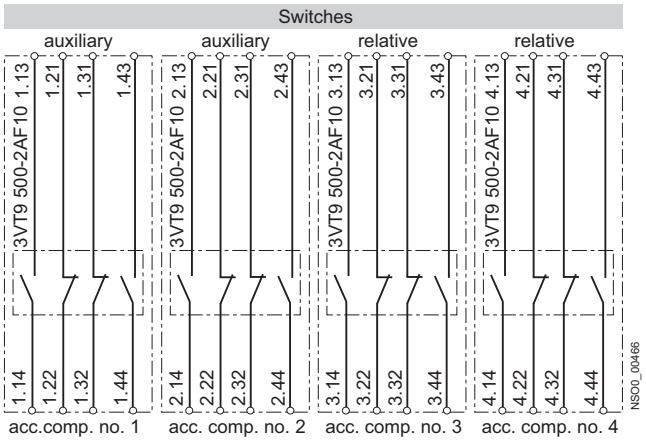


Arrangement of contacts	Number of contacts	Contact types
22	2 + 2	break + make

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 release, TEST push button or by motor

Wiring diagramm



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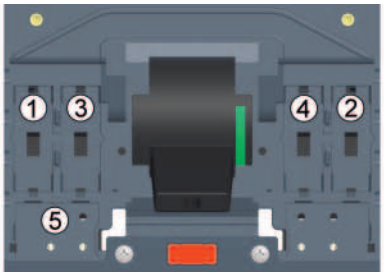
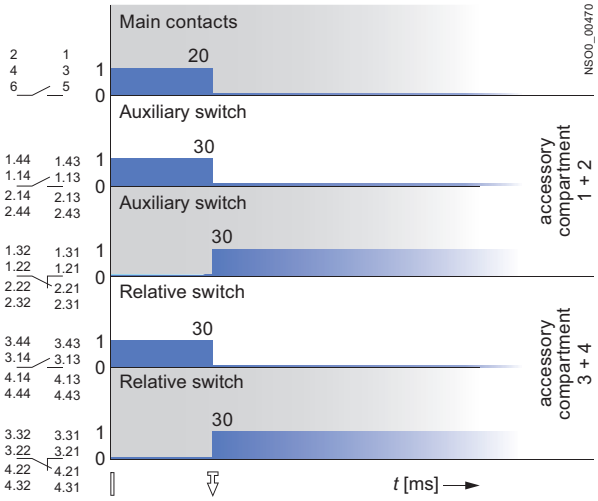
Technical specifications

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 ≥ 0,7U_e the circuit breaker must trip
Time to switch-off	ms	20
Loading time		∞
Connection cross-section S	mm^2	0.5 ... 1
Terminal protection (connected releases)		IP20
Location in accessory compartment No.		5

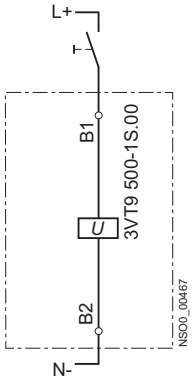


Circuit breaker switched off by shunt release



Circuit breaker states and lever positions of circuit breakers

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



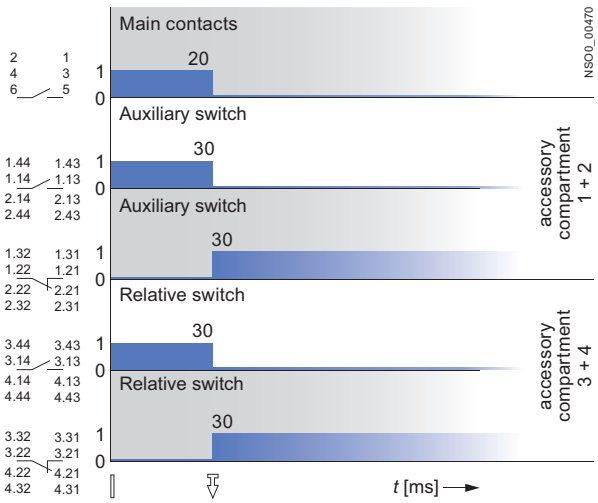
Undervoltage releases

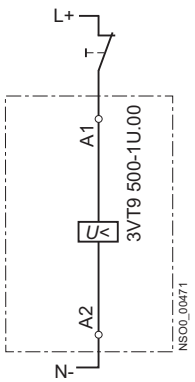
Technical specifications

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 is possible switch on $U \geq 0.35\ U_e$, the circuit breaker must trip
Time to switched-off	ms	20
Loading time		∞
Connection cross-section S	mm^2	0.5 ... 1 [1]
Terminal protection (connected releases)		IP20
Location in accessory compartment No.		5

[1] Tripping of the undervoltage release can be delayed using the delay unit 3VT9 000-1UX00, for more detailed information, see page P.

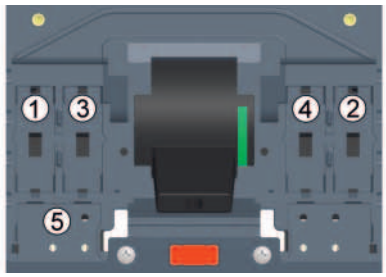
Circuit breaker switched off by undervoltage release





Circuit breaker switched off by undervoltage release

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



6

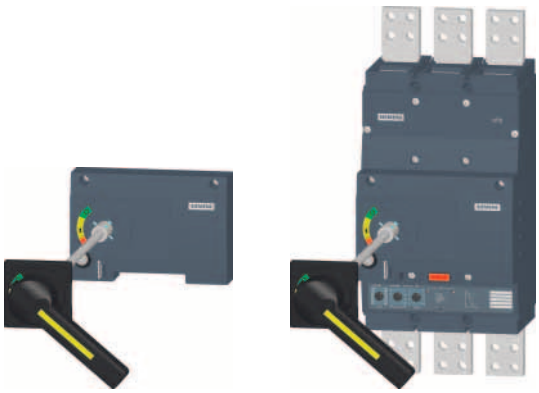
Technical specifications

The hand drive is the facility of the circuit breaker which enables circuit breakers 3VT4 to 3VT5 to be controlled locally by applying rotary movement on the lever, e.g. for switching electrical equipment on and off. Modular design of the drives enables easy installation on the circuit breaker after removing the cavity cover from the circuit breaker. The drive and its accessories is ordered separately according to your choice, see page 6/5.

- The hand drive enables to control the circuit breaker through the front panel or through the switchgear door, the outlet for the operating shaft is protected as has the protection code for bearings, IP44 or IP66.
- Hand drive operating lever can be furnished with an extension shaft which makes possible to control the circuit breaker also in deeper switchgears.
- In order to enhance safety for the operator of the electrical equipment, the mechanism of the drive is furnished with locking system preventing the switchgear door from opening 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 4 ... 7 mm.
- When the drive lever is in position manual open, it is possible to remove the handle.
- The circuit breakers with hand drives can be provided with mechanical interlocking system, see page 6/44.

Specifications

					Switchgear door locking in the circuit breaker state	
Type	Description	Color	Locking while the circuit breaker is in OFF state	Protection	switched on or off by release	Length mm
3VT9 500-3HA10	Manual 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

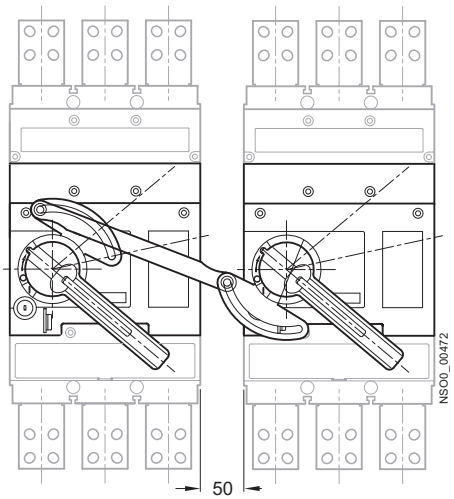


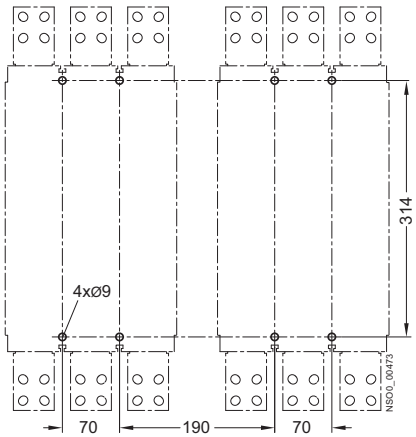
Mechanical interlocking and parallel switching

Technical specifications

3VT9 300-8LA00 Mechanical interlocking

- It provides interlocking of two circuit breakers so that they cannot be on-state simultaneously, but always only one of them.
- It is possible to use the locking device between two circuit breakers 3VT4 or 3VT5 or between circuit breakers 3VT4 and 3VT5. Both circuit breakers must be furnished with a hand drive (at least with the hand drive unit and hand drive lever), see page 6/6. In order to use locking, it is necessary to adhere to the dimensions.

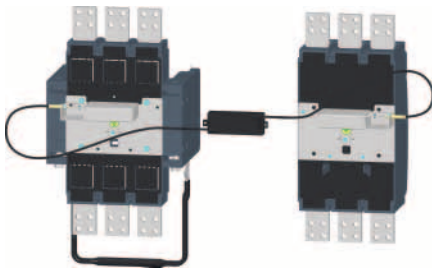




3VT9 500-8LC10 Mechanical interlocking by Bowden

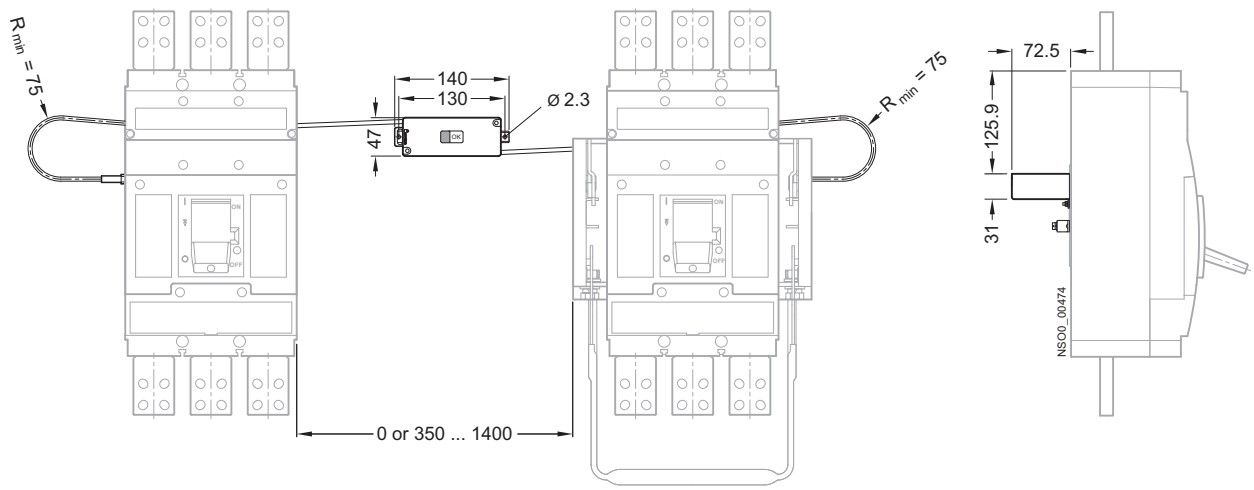
- Provides mechanical interlocking of two circuit breakers so that they cannot both be tripped simultaneously, but only one of them at a time.
- Interlocking can be used between two 3VT4 or 3VT5 circuit breakers or between a 3VT4 and a 3VT5 circuit breaker. For interlocking, circuit breakers can be outfitted with a hand or motor drive. To use interlocking, it is absolutely necessary to comply with the dimensions that are shown on pg. 6/45.

Type of mechanical interlocking	Combination of circuit breaker/switch disconnector designs
3VT9 500-8LC10	fixed-fixed
3VT9 500-8LC30	fixed-withdrawable
3VT9 500-8LC40	withdrawable-withdrawable



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

Option for locating circuit breakers/switch disconnectors



Technical specifications

The motor drive is part of circuit breaker accessories enabling you to switch the circuit breaker on and off remotely. Modular design of the drives enables easy installation on the circuit breaker after removing the cavity cover from the circuit breaker. 3VT circuit breakers with motor drives can be used in the most demanding industrial applications such as protection of standby sources, synchronization of two sources, etc. and anywhere it is necessary to ensure automated and unmanned operation of electrical equipment. As the motor drives are equipped with spring storage to accumulate energy necessary for activation, it is possible to turn on the circuit breaker in times up to 70 ms. Releasing of the storage device and turning on the circuit breaker is ensured by a closing coil included in standard equipment of every motor drive. The time before the circuit breaker breaks contact on account of a motor drive is approx. 10 s. This tripping method is applicable for controlling technological entities. When faster circuit breaker tripping is required (e.g. emergency STOP button), it is possible to use the motor drive combined with undervoltage release or shunt trip.

- On the motorized operating mechanism front panel there is a switch selector to select drive modes with a possibility to indicate remotely the state of this switch. The first mode is automatic remote control (position AUTO). This is the standard position in automatic operation. The other mode is manual control (selector position MANUAL), the motorized operating mechanism does not need any voltage to perform its operation.
- When the selector is in position AUTO, it is possible to switch on and off remotely with the push buttons that must be wired to the connector on the drive. When the drive is in MANUAL mode, the circuit breaker can be switched on using the green button on the front part of the drive cover and to switch it off with the red TEST button on the overcurrent release 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 motor drive 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 overcurrent release.
- The motorized operating mechanism, unlike the circuit breaker, recognizes only two fixed positions. In position one, the circuit breaker is in on-state. If the circuit breaker in AUTO mode is put in off-state by some overcurrent releases, 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 as a result of electrical linkage with the circuit breaker . If the switch is not placed in cavity 3 or 4, no automatic loading process will take place.
  In the second fixed position the circuit breaker is switched off and the loaded drive device 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 drive may be furnished with an electromechanical operations counter.
- The drive 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 run out a little.
- An 3VT9 500-3MF20 cover can be affixed to the drive's turn-on switch and then sealed. The cover prevents turning on the circuit breaker from the drive panel.

Specifications

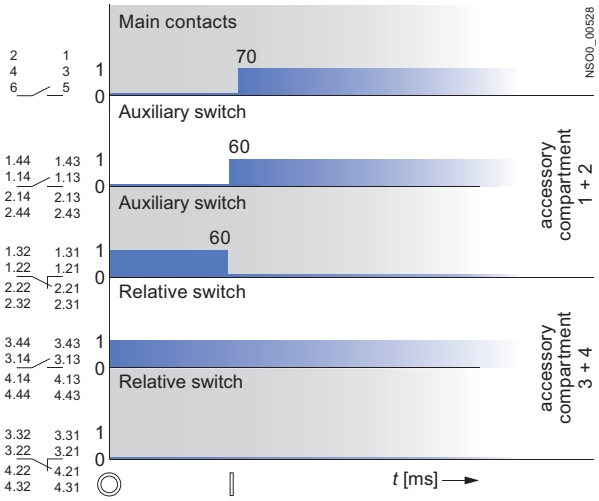
Type		3VT9 500-3M...0
Operational voltage U_e	V	AC 110, 230 DC 110, 220
Rated frequency f_n	Hz	50/60
Control pulse length for switching on	ms	> 20 ... 1500 ∞[1]
Control pulse length for switching off	ms	> 20 ... ∞[1)]
Time to switching on	ms	< 70
Time to the accumulating of motor drive under voltage U_e		
• AC 230 V	s	14
• DC 220 V	s	18
Time to switch-off U_e		
• AC 230 V		10
• DC 220 V		12
Frequency of ON/OFF cycles	cycles/ min	2
Frequency of cycles - immediatly 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 6/44.

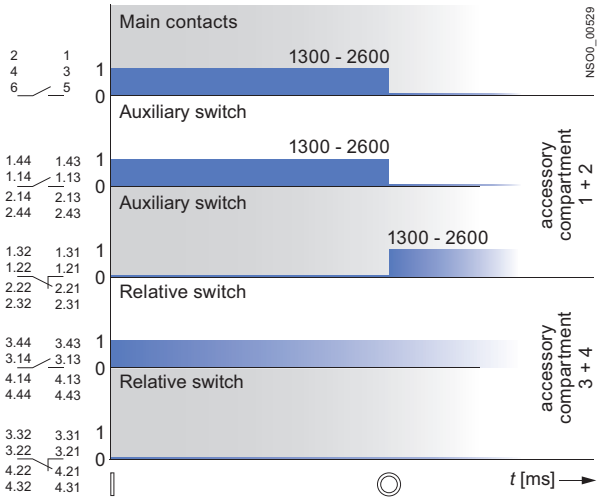
Motorized operating mechanism

Specifications

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

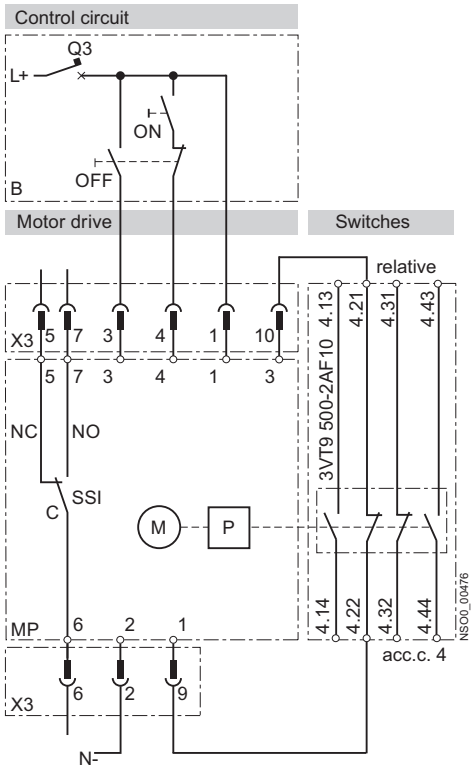


Circuit breaker switched off by motorized operating mechanism-electrically by pushbutton OFF



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 releases, or by TEST button	
Switched off manually or electrically by drive	

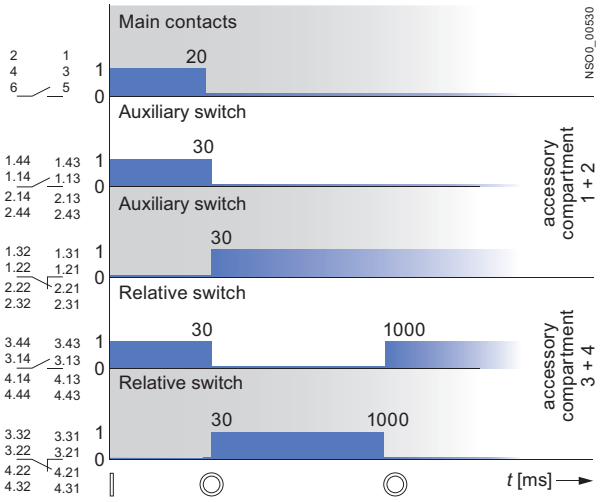
Symbol	Description
MP	3VT9 500-3M...0 motorized operatng mechanism
M	motor
P	storage device
X3	connector to connect auxiliary circuits
SSI	switch indicating MANUAL(NO-C)/ AUTO(NC-C) modes
B	recommended wiring of the control circuits (not included in drive order)
ON	make pushbutton
OFF	break pushbutton
S	switch for energy storage (switched on = automatic storage, may be continuously switched on)
Q3	motor drive circuit breaker - see page 6/45

6

Motorized operating mechanism

Specifications

Tripping of the circuit breaker with motorized operating mechanism by shunt trip or undervoltage release



Circuit breaker states and lever positions of circuit breakers

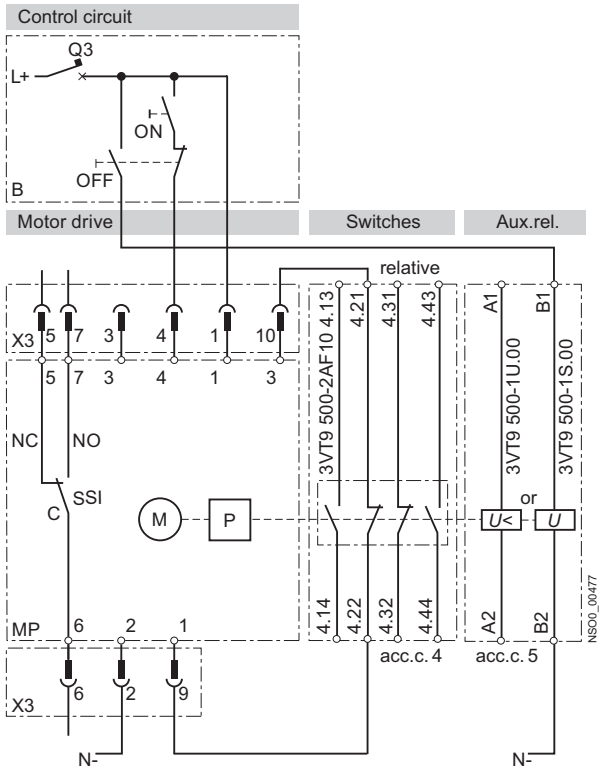
Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by releases, or by TEST button	
Switched off manually or electrically by drive	

Wiring diagram description

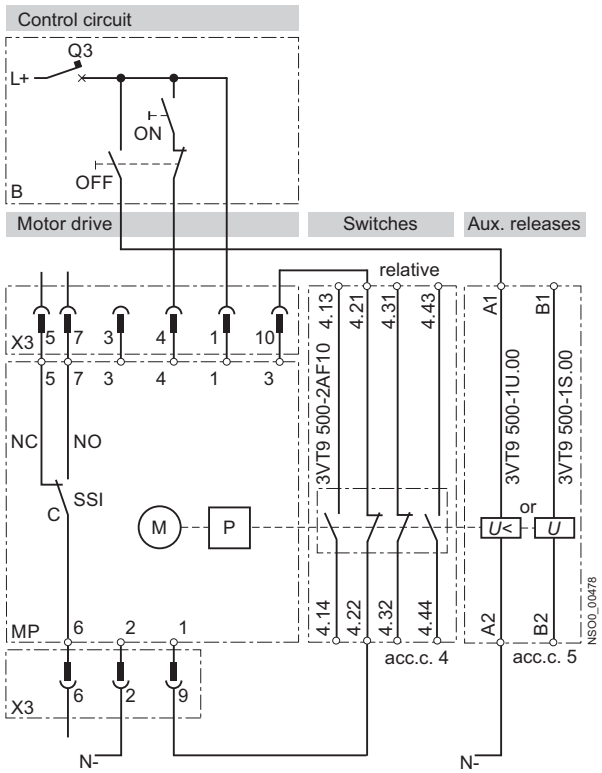
Symbol	Description
MP	motor drive 3VT9 500-3M...0
M	motor
P	storage device
X3	connector to connect auxiliary circuits
SSI	switch indicating MANUAL(NO-C)/ AUTO(NC-C) modes
B	recommended wiring of the control circuits (not included in drive order)
ON	make push button
OFF	break push button
Q3	motor drive circuit breaker-see page 6/45

Wiring diagram

Circuit breaker switched on by motorized operating mechanism (electrical push button ON) and switched off by shut trip



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

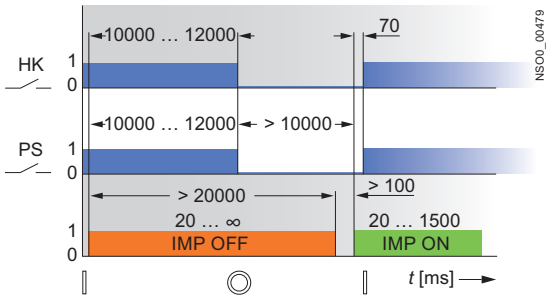


Motorized operating mechanism

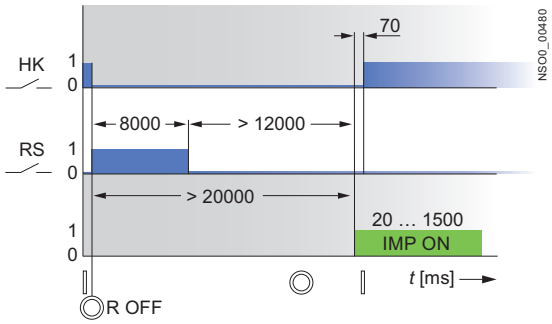
Specifications

Recommended actuating pulses

Circuit breaker switched on/off by motorized operating mechanism



Circuit breaker switched off by overcurrent or auxiliary releases and switched on by motorized operating mechanism-S switch permanently closed



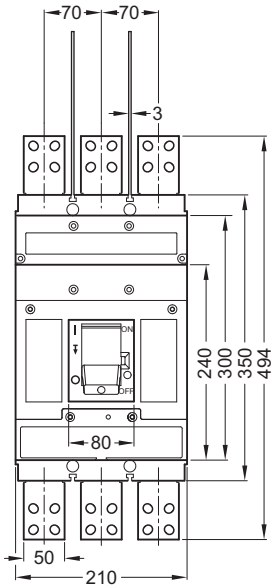
Circuit breaker states and lever positions of circuit breakers

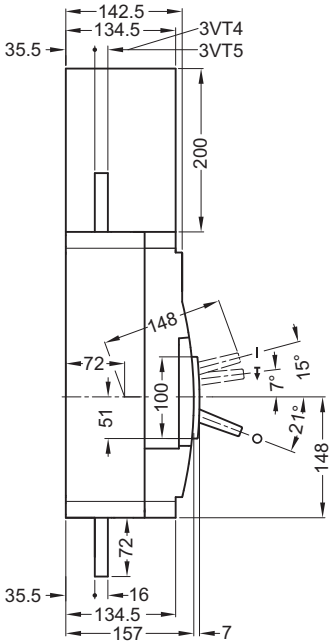
Circuit breaker state	lever positions of circuit breakers
Switched on	
Switched off by releases, or by TEST button or by the trip push button on the motor drive	
Switched off manually or electrically by drive	

Description of charts

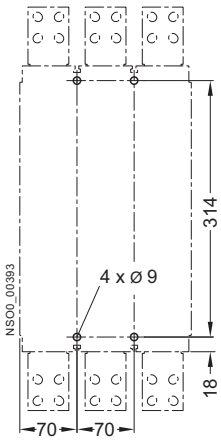
Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closing instant by release
IMP S	pulse to store up motor drive energy (generated by S switch)
IMP ON	make pulse for motor drive
IMP OFF	break pulse for motor drive
X	random segment of time

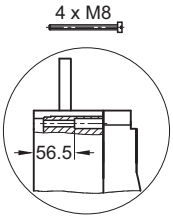
Fixed-mounted design, front connection

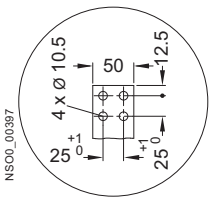




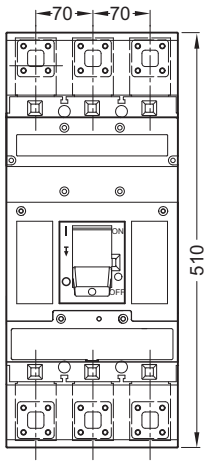
Drilling pattern

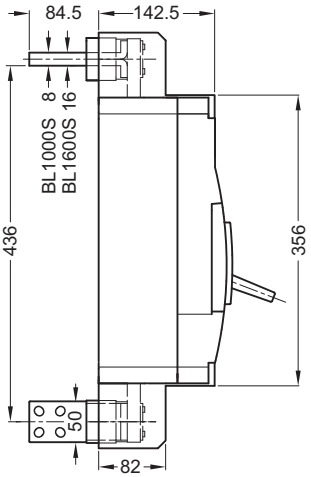




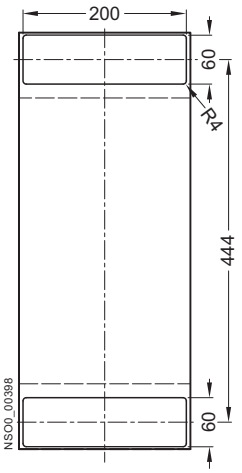


Fixed-mounted design, rear connection
(3VT9 500-4RC30, 3VT9 400-4RC30 connecting sets)





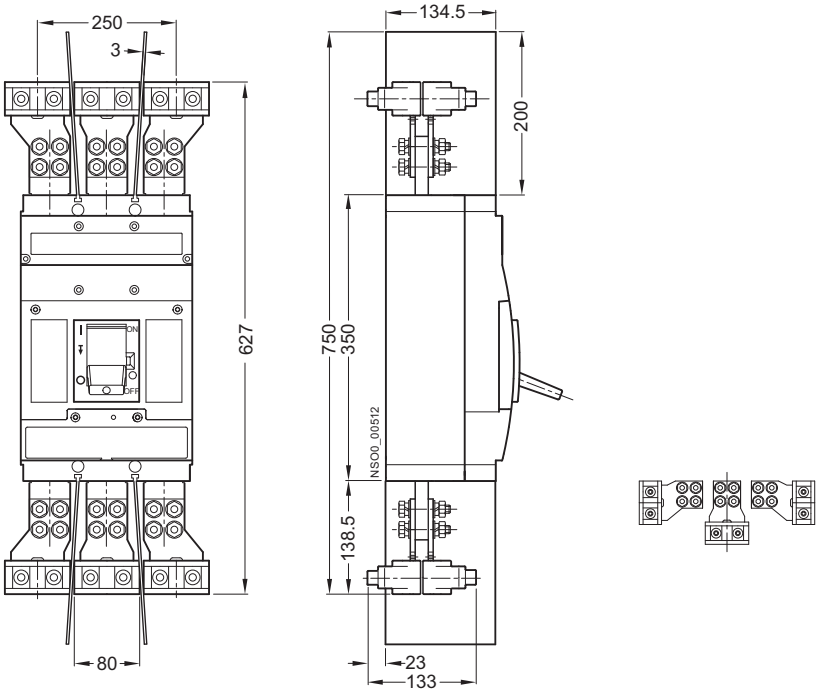
Openings for insulation grommets



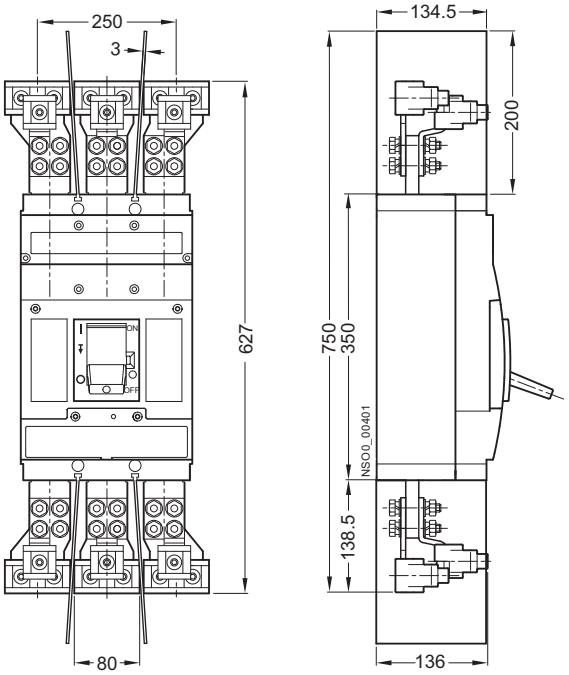
6

Motorized operating mechanism

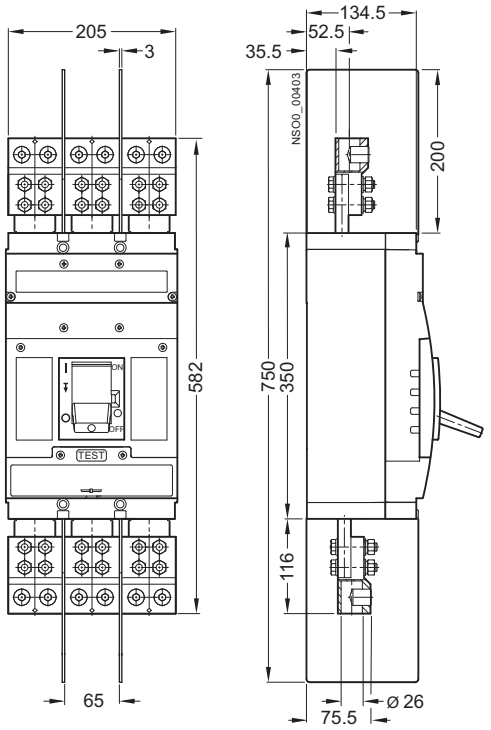
Fixed-mounted design, clamp type terminals (3VT9 524-4TG30 connecting sets) - not for 3VT4 710-3AA30-0AA0 switching unit



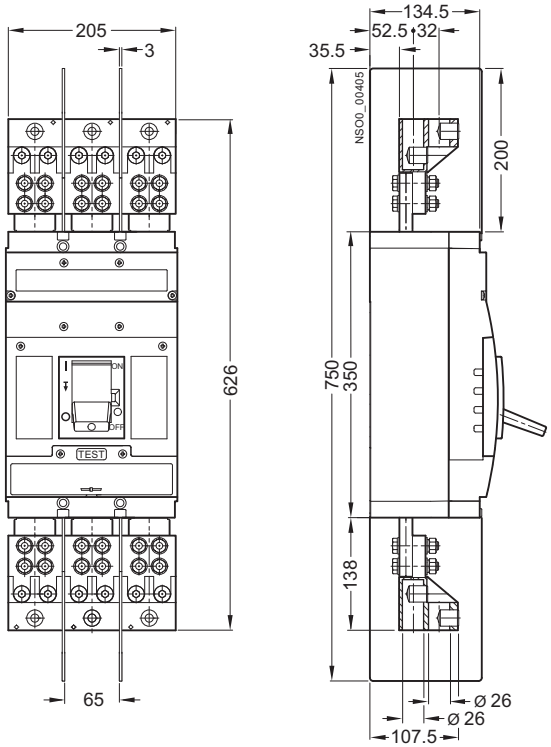
Fixed-mounted design, clamp type terminals (3VT9 524-4TG30 and 3VT9 524-4TF30 connecting sets)
- not for 3VT4 710-3AA30-0AA0 switching units



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



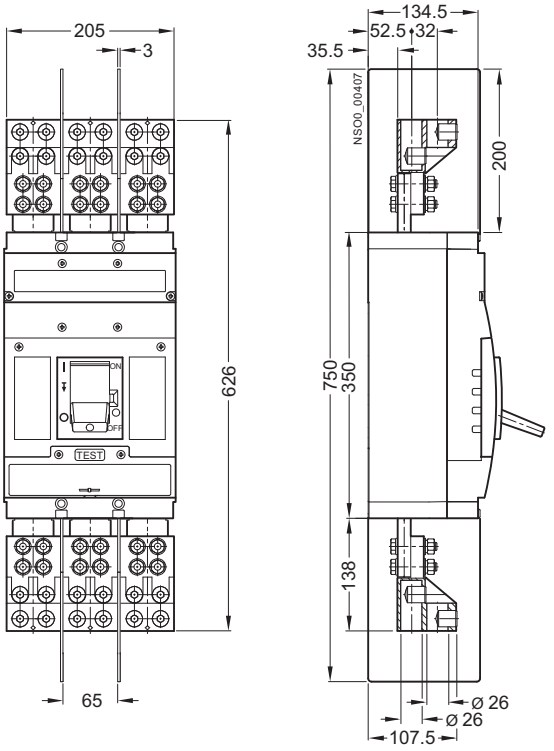
Fixed-mounted design, block type terminals (3VT9 533-4TF30)



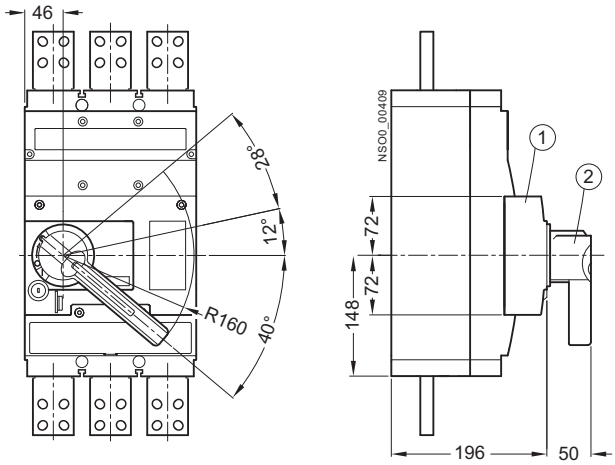
Accessories and Components

Motorized operating mechanism

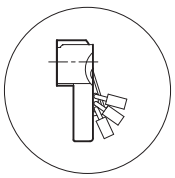
Fixed-mounted design, block type terminals (3VT9 534-4TF30)



Fixed-mounted design, front manual operating mechanism

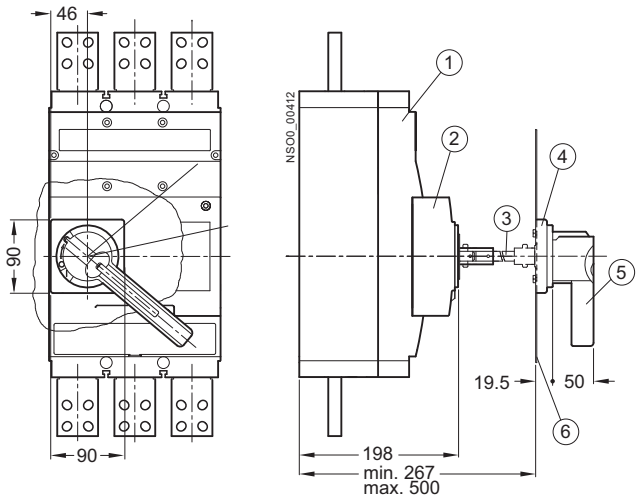


Knob - lockable
(3VT9 500-3HE10, 3VT9 500-3HF10)

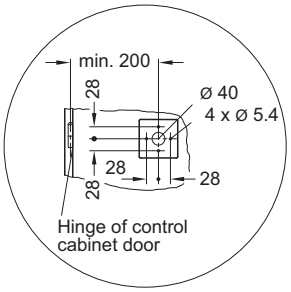


① 3VT9 500-3HA10
② 3VT9 500-3H.10

Fixed-mounted design, front manual operating mechanism

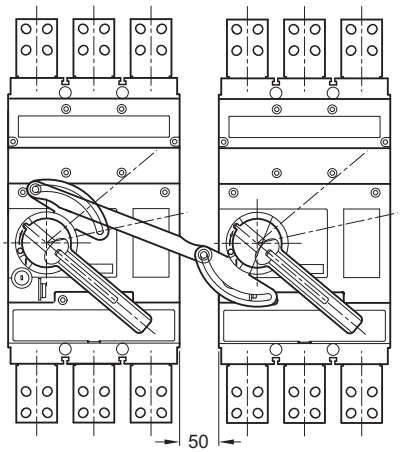


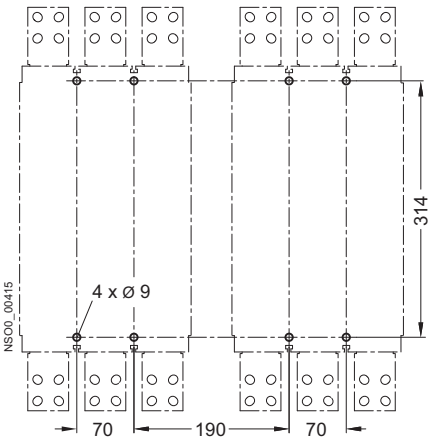
Adaptation of control cabinet door



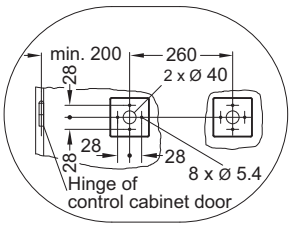
1. 3VT4/3VT5
2. 3VT9 500-3HA10
3. 3VT9 500-3HJ10
4. 3VT9 500-3HG.0
5. 3VT9 500-3H.10
6. Control cabinet door

3VT9 300-8LA00 mechanical interlocks





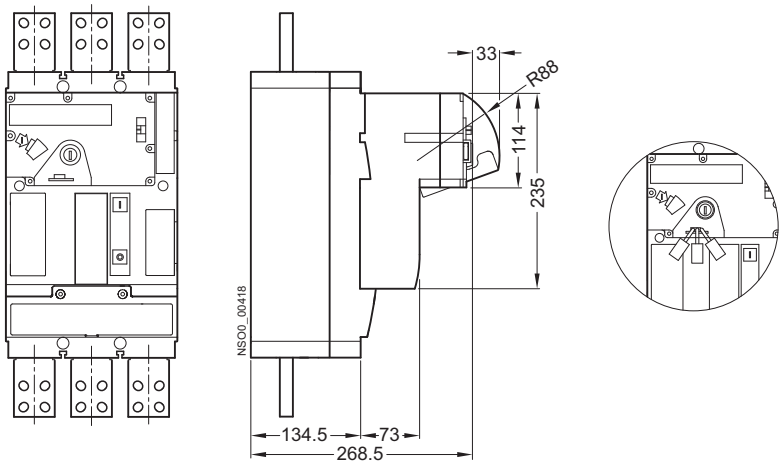
Adaptation of control cabinet door



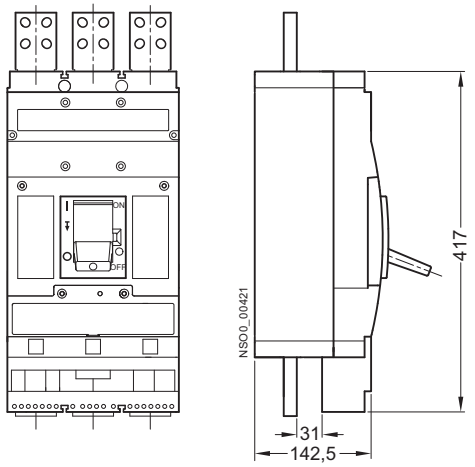
6

Motorized operating mechanism

Fixed-mounted design, motorized operating mechanism 3VT9 500-3M..0, lockable using three padlocks



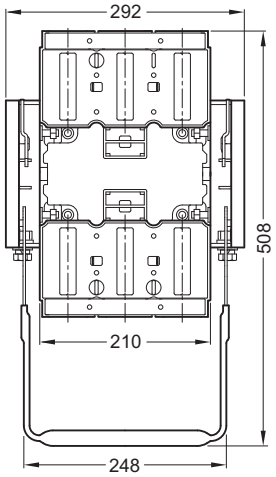
Fixed-mounted design, 3VT9 500-6AE00 signalling unit

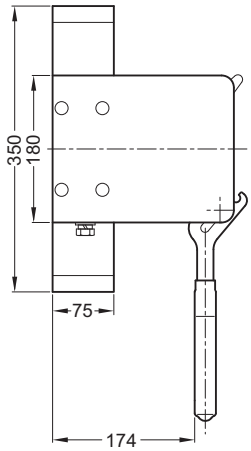


6

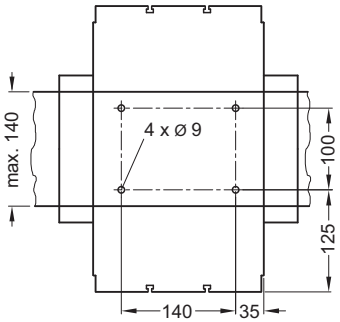
Withdrawable version

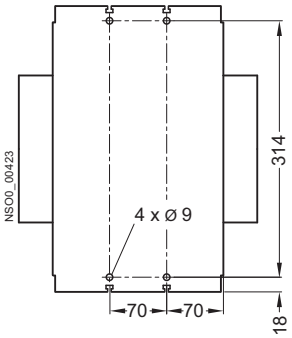
3VT9 500-4WA40 withdrawable version



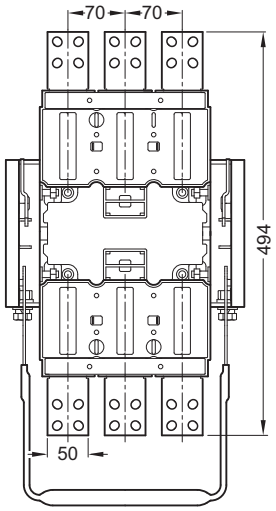


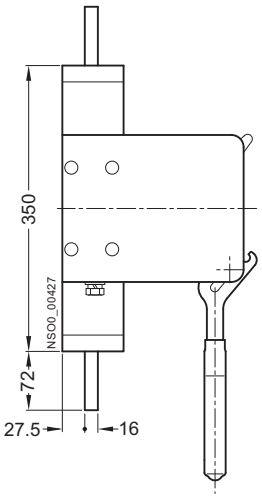
Drilling pattern

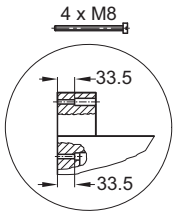




Withdrawable version, front connection (3VT9 500-4EF30 connecting sets)



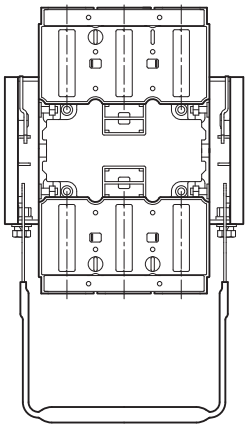


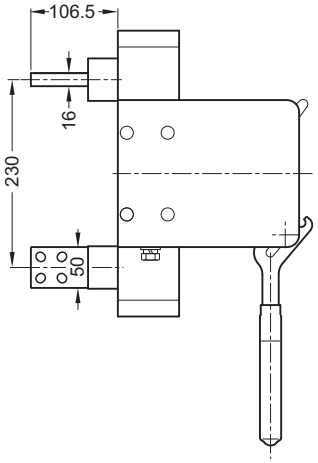


Accessories and Components

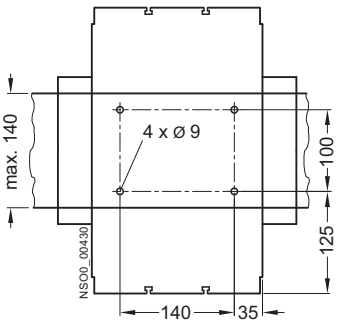
Motorized operating mechanism

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

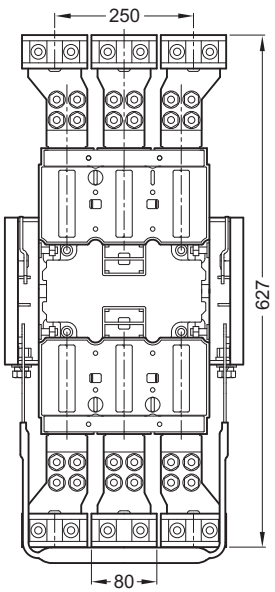


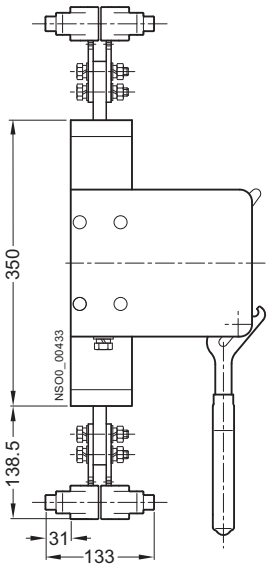


Drilling pattern

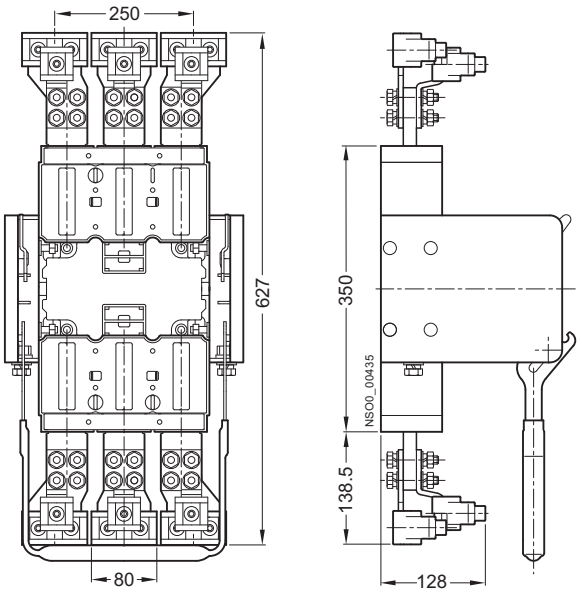


Withdrawable version, clamp type terminals (3VT9 524-4TG30 connecting set)

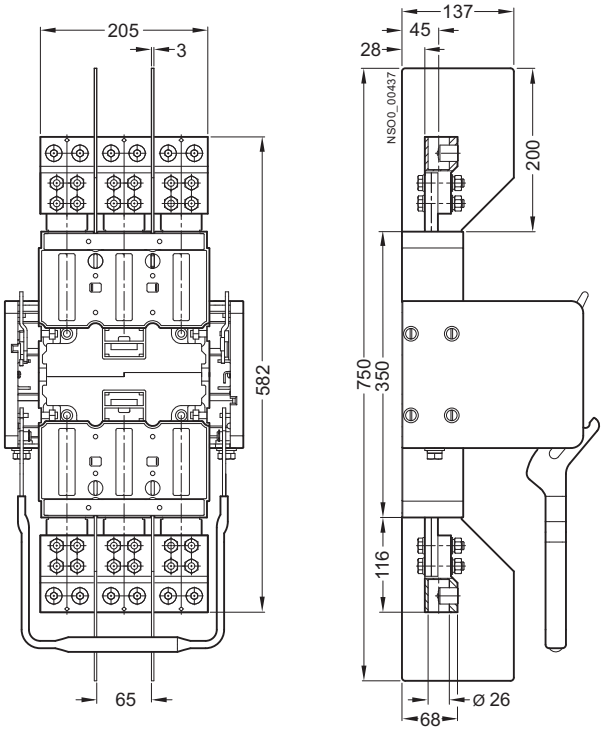




Withdrawable version, clamp type terminals (3VT9 524-4TG30 and 3VT9 524-4TF30 connecting set)

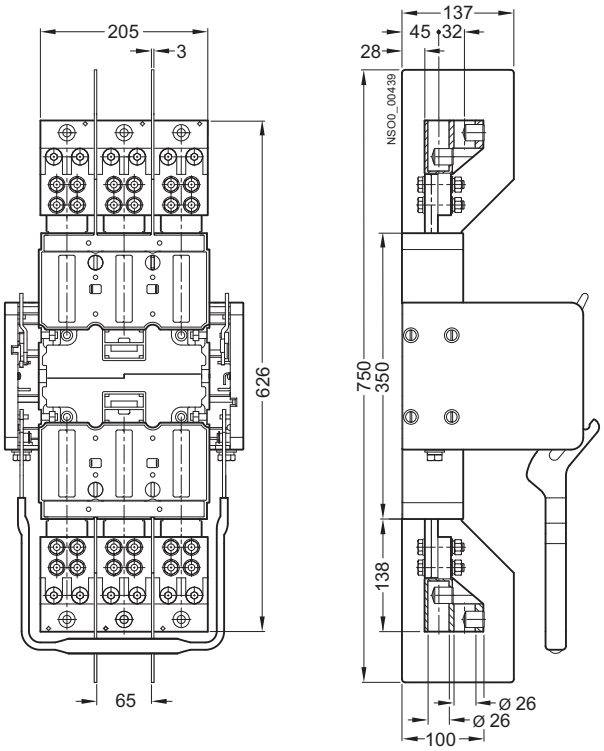


Withdrawable version, block type terminals (3VT9 532-4TF30)

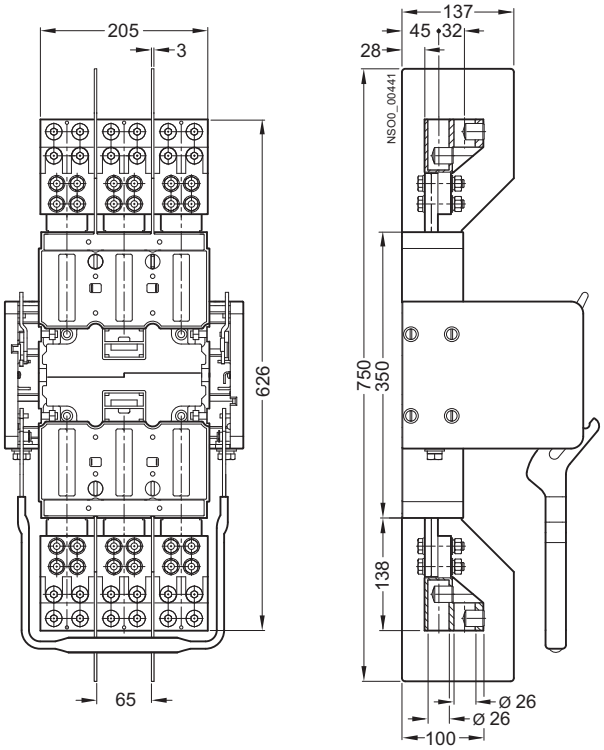


Motorized operating mechanism

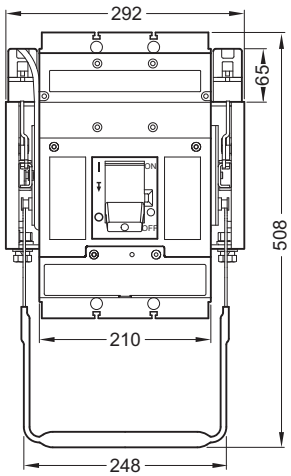
Withdrawable version, block type terminals (3VT9 533-4TF30)



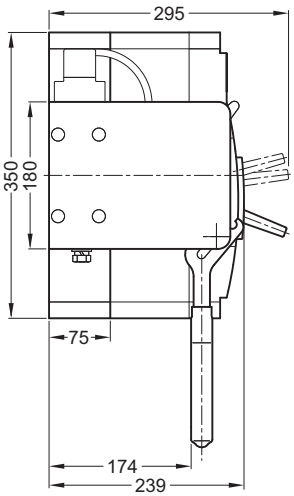
Withdrawable version, block type terminals (3VT9 534-4TF30)



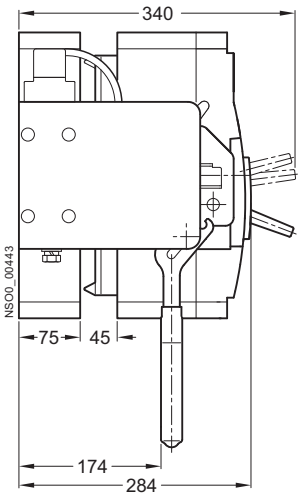
Withdrawable version



Connected



Disconnected

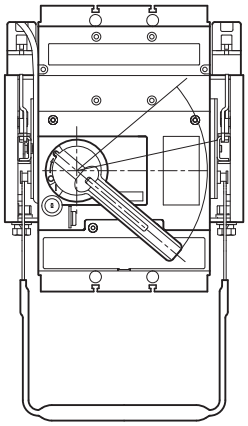


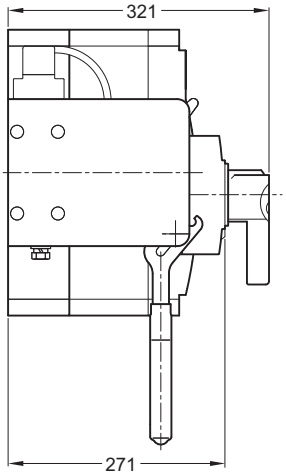
Accessories and Components

Motorized operating mechanism

Withdrawable version, manual operating mechanism

Connected





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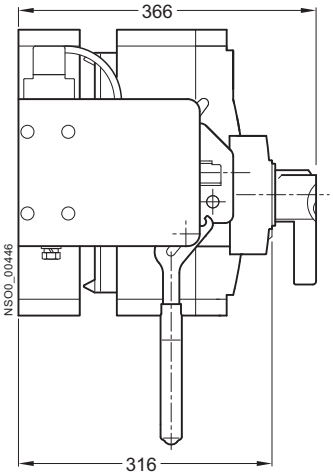
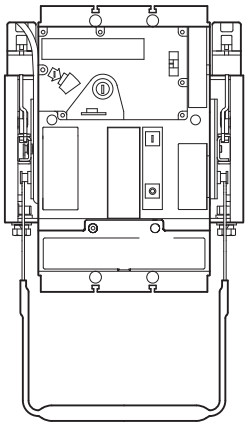
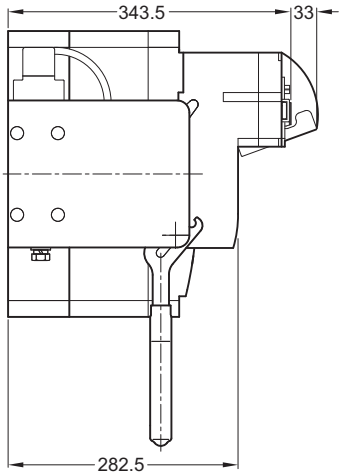


Withdrawable version, 3VT9 500-3MQ00 motorized operating mechanism

Connected





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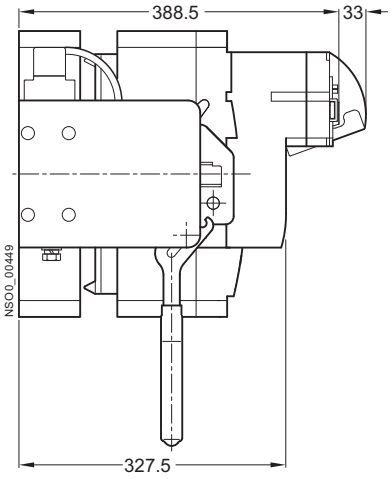

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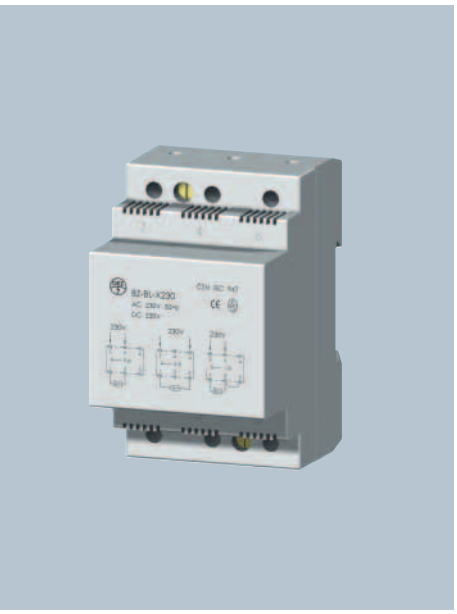

Catalog

Delay unit, Tester

Selection and ordering data

Tester of overcurrent releases for 3VT circuit breakers

Service device for checking the functionality of electronic overcurrent releases and switching units for Modeion circuit breakers.

Tests:

- ETU trip units
- Functionality of switching unit tripping mechanism
- Current transformers test overcurrent releases: ETU LP, DP, MP, MPS and UP

Tests switching units for circuit breakers:

- 3VT2N, 3VT2H
- 3VT3N, 3VT3H
- 3VT4H
- 3VT5H

Tester must be connected to an external power supply. Power supply voltage of tester is AC 230 V.

For detailed information and documentation, contact technical support http://www.siemens.com/automation/support-request.

	Rated current I_n	DT	Order no.	PS*	Weight per PU approx.
	A				kg
Delay unit					
	The delay may be set up at three levels (according to wiring). 3VT9 000-1UX00 delay unit is using only for the release with U_e = AC 230 V enables to delay the undervoltage trip unit opening of 3VT circuit breaker		**3VT9 000-1UX00**	on req.	
Tester of ETU trip units for circuit breakers					
	Tester to test ETU trip units for 3VT2, 3VT3, 3VT4 and 3VT5		**3VT9 000-1UX10**	on req.	

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* You can order this quantity or a multiple thereof.

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) release and that the circuit breaker can handle continuously. Maximum setting is at value equal to I_n. Changing I_r shifts the release'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.

Logistics

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.

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For ordering products that differ from the versions listed in the catalog, the order number specified in the catalog must be supplemented with **"–Z"**; the required features must be specified by means of the alphanumeric order codes or in plain text.

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When small orders are placed, the costs associated with order processing are greater than the order value. We recommend therefore that you combine several small orders. Where this is not possible, we unfortunately find it necessary to charge a processing supplement of € 20.-- to cover our costs for order processing and invoicing for all orders with a net goods value of less than € 250.--.

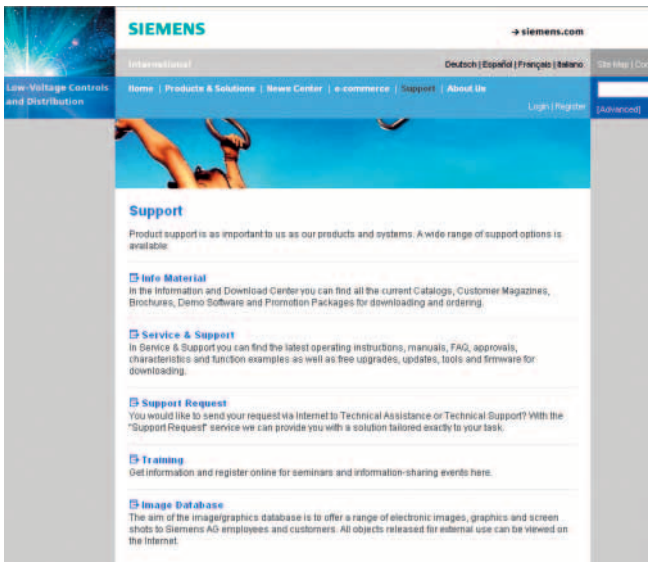
Further documentation

Overview

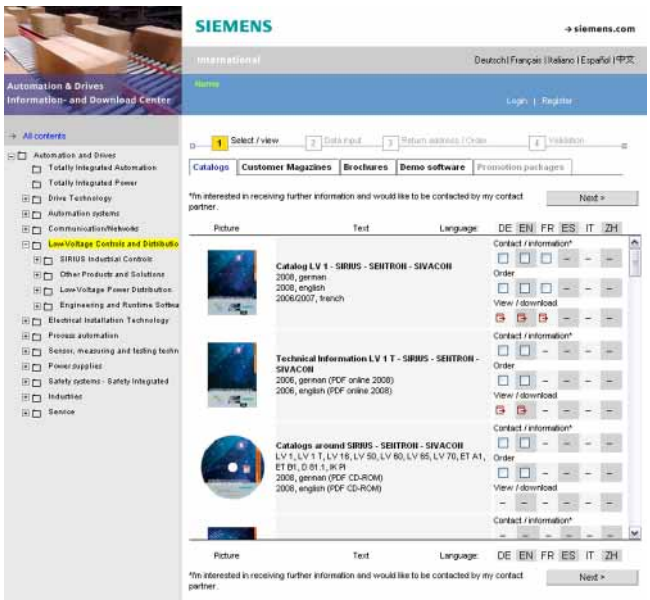
You will find all the latest information material, such as brochures, catalogs, manuals and operating instructions on low-voltage, controls and distribution on the Internet at:

http://www.siemens.com/lowvoltage/info

Here you can order your copy of the available documentation or download it in common file formats (PDF, ZIP).



We also provide further support for SIRIUS - SENTRON - SIVACON



Brochures, catalogs and CDs offer fast and more in-depth information

We regard product support as just as important as the products and systems themselves. Visit our Support site on the Internet for a comprehensive range of material on SIRIUS, SENTRON and SIVACON, such as

- Catalogs available to order free of charge
- 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.

Overview

Verification certificates and characteristic curves

To find the latest overview of the certificates available for our low-voltage controls and distribution products, as well as other technical documentation, please visit our Internet site at:

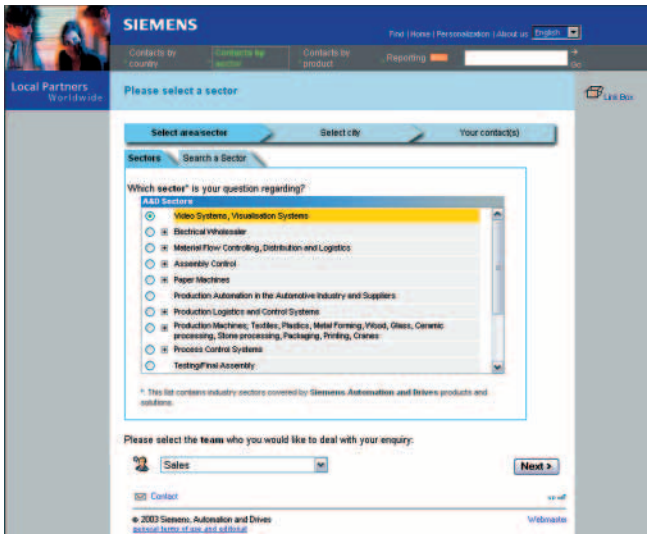
http://www.siemens.com/lowvoltage/support

Product support: Approvals / Certificates

Product support: Characteristic curves

Siemens contacts

Siemens contacts worldwide



At

http://www.siemens.com/automation/partner

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

A&D in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

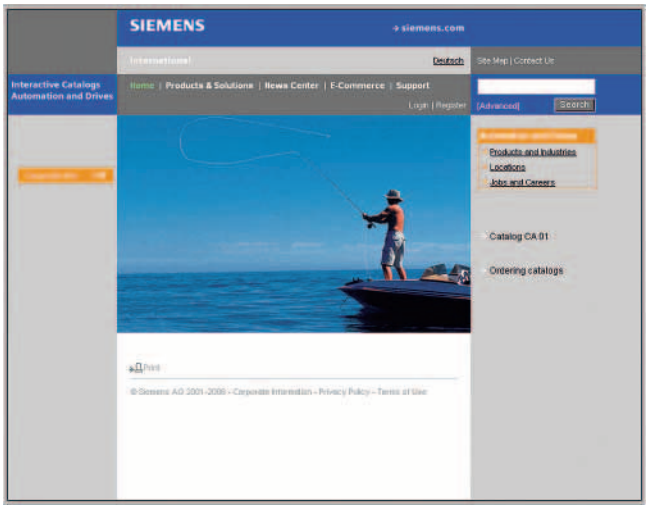
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product selection using the Offline Mall of Automation and Drives



Detailed information together with convenient interactive functions:
The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Automation and Drives 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 Offline Mall CA 01 can be found in the Internet under

http://www.siemens.com/automation/ca01

or on CD-ROM or DVD.

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The A&D Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

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

Numerous functions are available to support you.

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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.[1)]

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To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.[1)]

1) For country-specific telephone numbers go to our Internet site at: http://www.siemens.com/automation/service&support.

Order number index

Order number index

Conditions of sale and delivery
Export regulations

Terms and conditions of sale and delivery

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General

The 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, exclusive 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 will be added to the prices 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.

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Export regulations

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

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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.
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Notes

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Industry Automation, Drive Technologies and Electrical Installation Technology

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

	Catalog
Automation and Drives	
Interactive catalog on CD-ROM and on DVD	
• The Offline Mall of Automation and Drives	CA 01
Automation Systems for Machine Tools	
SINUMERIK & SIMODRIVE	NC 60
SINUMERIK & SINAMICS	NC 61
Drive Systems	
Variable-Speed Drives	
SINAMICS G110/SINAMICS G120 Inverter Chassis Units SINAMICS G120D Distributed Frequency 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 Drive Converter Systems	D 21.1
SINAMICS S150 Drive Converter Cabinet Units	D 21.3
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
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
IEC Squirrel-Cage Motors · New Generation 1LE1	D 81.1 N
MOTOX Geared Motors	D 87.1
Automation Systems for Machine Tools SIMODRIVE	NC 60
• Main Spindle/Feed Motors	
• Converter Systems SIMODRIVE 611/POSMO	
Automation Systems for Machine Tools SINAMICS	NC 61
• Main Spindle/Feed Motors	
• Drive System SINAMICS S120	
Drive and Control Components for Hoisting Equipment	HE 1
Mechanical Driving Machines	
Flender Standard Couplings	MD 10.1
Electrical Installation Technology	
PDF: *ALPHA Small Distribution Boards and Distribution Boards, Terminal Blocks*	*ET A1*
PDF: *ALPHA 8HP Molded-Plastic Distribution System*	*ET A3*
PDF: *BETA Low-Voltage Circuit Protection*	*ET B1*
PDF: *DELTA Switches and Socket Outlets*	*ET D1*
GAMMA Building Controls	ET G1
Human Machine Interface Systems SIMATIC HMI	ST 80

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

	Catalog
Industrial Communication for Automation and Drives	IK PI
Low-Voltage	
Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON	LV 1 T
SIDAC Reactors and Filters	LV 60
SIVENT Fans	LV 65
SIVACON 8PS Busbar Trunking Systems	LV 70
Motion Control System	
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
Process Instrumentation and Analytics	
Field Instruments for Process Automation Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters	FI 01
PDF: *Indicators for panel mounting*	*MP 12*
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
SIWAREX Weighing Systems	WT 01
Continuous Weighing and Process Protection	WT 02
Process Analytical Instruments	PA 01
PDF: *Process Analytics, Components for the System Integration*	*PA 11*
SIMATIC Industrial Automation Systems	
SIMATIC PCS Process Control System	ST 45
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
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pc-based Automation	ST PC
SIMATIC Control Systems	ST DA
SIMATIC Sensors	
Sensors for Factory Automation	FS 10
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Power supplies SITOP power	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2
System Solutions	
Applications and Products for Industry are part of the interactive catalog CA 01	
TELEPERM M Process Control System	
PDF: *AS 488/TM automation systems*	*PLT 112*

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90327 NÜRNBERG
GERMANY

Subject to change without prior notice
Order No. E86060-K1836-A101-A3-7600
Dispo 68201
KG 0308 10. AUM 268 En / 803030
Printed in Germany

www.siemens.com/automation

Token fee: 5,00 €

268 Seiten entspricht ca. 10,7 mm