# 3VT Molded Case Circuit Breakers up to 1600 A

## Catalog LV 36 · 2008


# Circuit Breakers

www.siemens.com/lowvoltage

SIEMENS

## Related catalogs

## Contents

**Low-Voltage Controls and Distribution**
SIRIUS · SENTRON · SIVACON
Order No.:
Catalog LV 1
E86060-K1002-A101-A7-7600
Technical Information incl. LV 1 T


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

**Low-Voltage**
Controls and Components
for Applications according to UL
Order no.:
E86060-K1816-A101-A1-7600
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

**Industrial Communication**
Industrial Communication
for Automation and Drives
Order No.:
E86060-K6710-A101-B6-7600 IK PI
E86060-K6710-A121-A2-7600 IK PI N


PROFINET/Industrial Ethernet • Industrial Mobile Communicaton • PROFIBUS to IEC 61158/EN 50170 • SIMATIC ET 200 distributed I/Os • AS-Interface to EN 50295/IEC 61158 • Remote operation with SINAUT Telecontrol • Routers • ECOFAST system

**SICUBE**
**System Cubicles and Cubicle Air-Conditioning**
Order No.:
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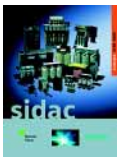
LV 50


System cubicles • Cubicle modifications • Cubicle expansion components • Accessories • Special cubicles
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:
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E86060-D4001-A510-C6-7600
CA 01


All Automation and Drives products,
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**A&D Mall**
**Internet:**
http://www.siemens.com/automation/mall

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

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


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

## Registered trademarks



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 | Preferred types are available immediately from stock, i.e. are dispatched within 24 hours. | 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. |
| A | 2 working days | Normal quantities of the products are usually delivered within the specified time following receipt of your order at our branch. | 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. |
| B | 1 week | | |
| C | 3 weeks | | |
| D | 6 weeks | | |
| X | on request | In exceptional cases, the actual delivery period may differ from that specified. | |

## 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!

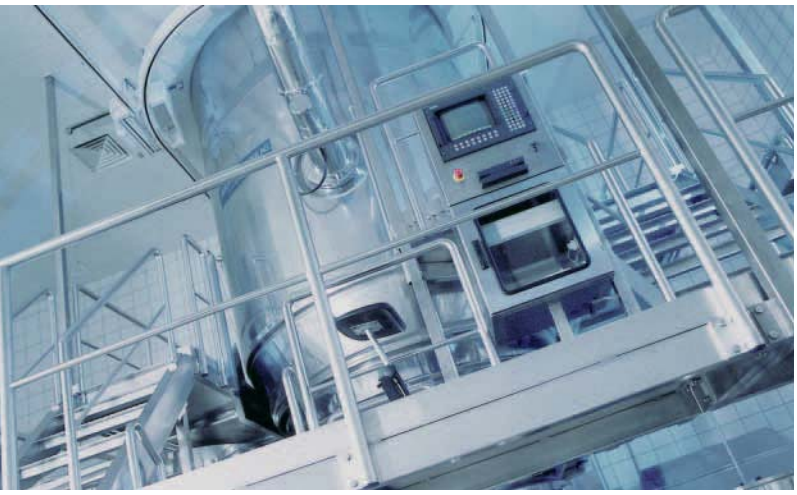
## Weight

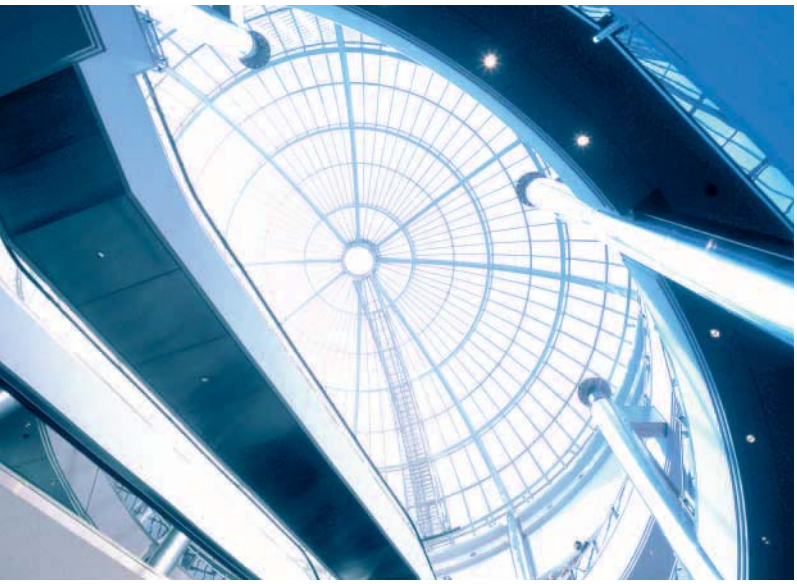
The defined weight in kg refers to the price unit (PU).

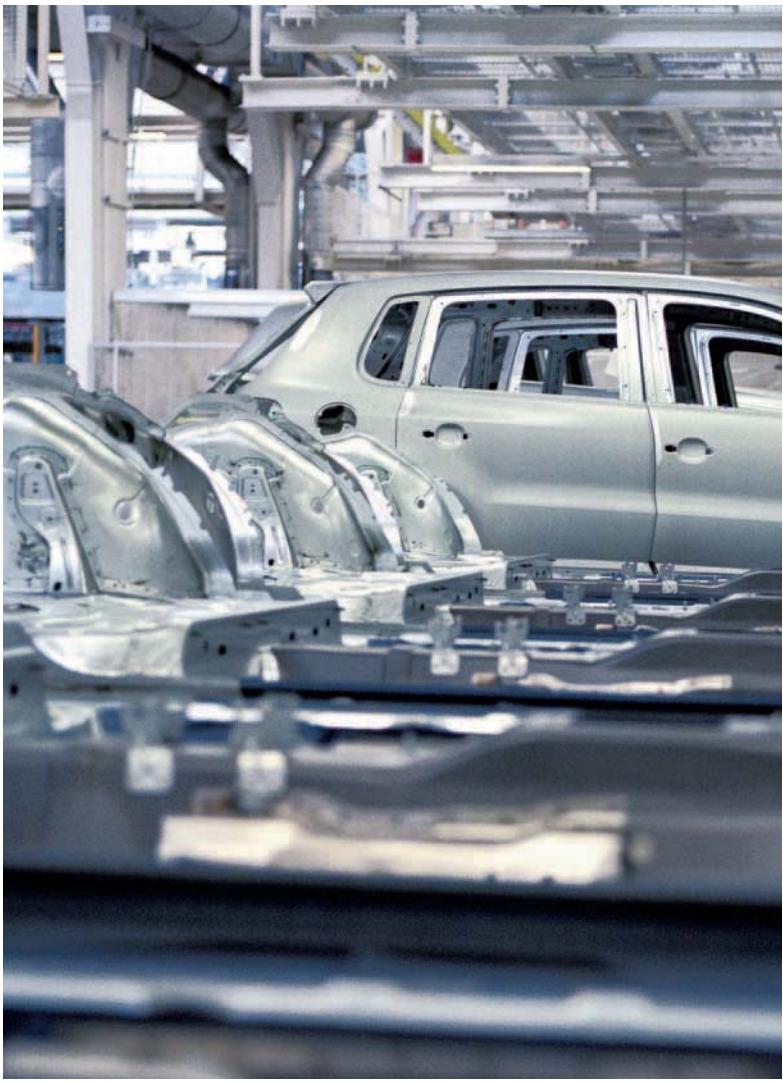
## Dimensions

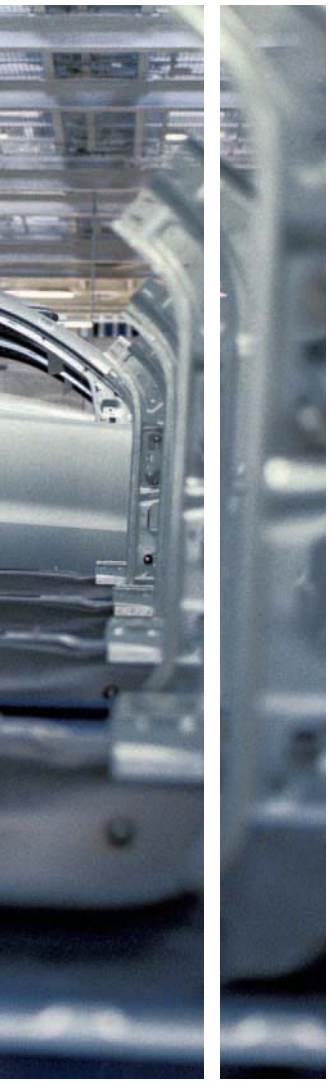
All dimensions in mm.

# 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.

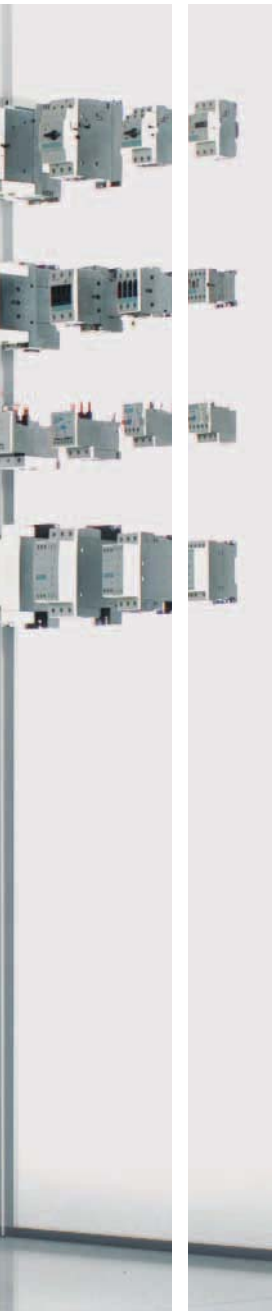
# Low-Voltage Controls and Distribution. The basis for progressive solutions.

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.

# 3VT1 Molded Case
# Circuit Breakers up to 160 A

2


**Catalog**

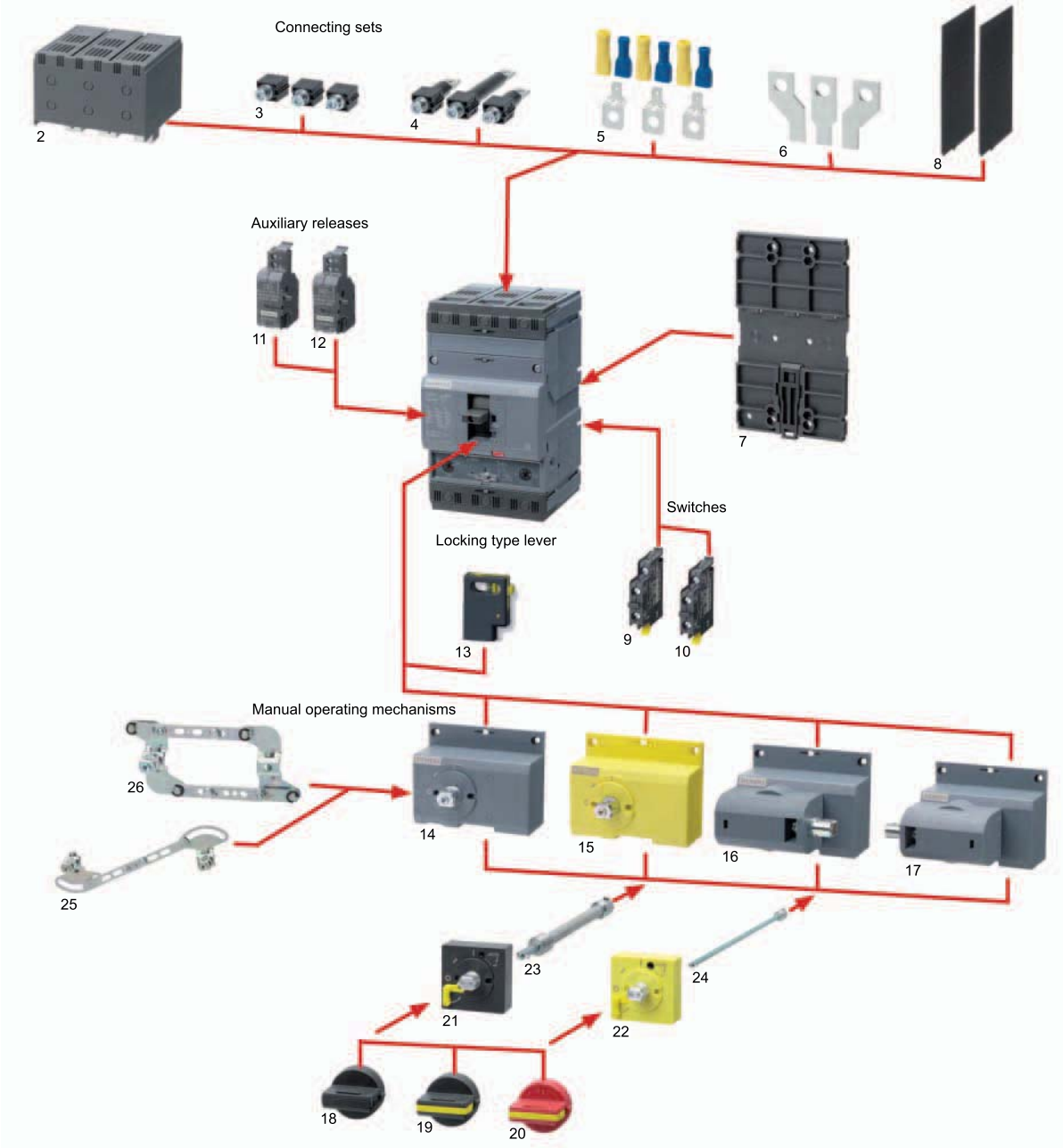


**Technical Information**

## 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.

## Auxiliary switches · Auxiliary releases

### Overview

The circuit breakers can be equipped with

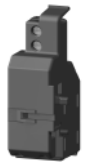
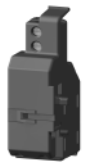
- auxiliary switches and
- alarm switches.

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.

# Accessories and Components

## Manual/motorized operating mechanisms

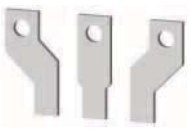


| | Version | Color | DT | Order No. | PS* | Weight per PU approx. |
|---|---|---|---|---|---|---|
| | | | | | | kg |
| **Mechanical interlocks** | | | | | | |
| | The mechanical interlocks have to be completed with:<br>• 2 x 3VT9 100-3HA../HB.. rotary operating mechanisms<br>• 1 or 2 x 3VT9 100-3HE/HF.. 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**<br>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;<br>4 ... 6 | Cu flexible conductors | B | **3VT9 100-4TN30** | 1 unit | 0.010 |
|  | **Front connection bars** | 1.5 ... 2.5;<br>4 ... 6 | Cu/Al busbars, cable lugs | B | **3VT9 100-4ED30** | 1 unit | 0.103 |
| | *Terminals for 4-pole version* | | | | | | |
|  | **Terminals for front connection**<br>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**<br>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**<br>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**<br>For 4th pole (to be used with 3VT9 100-4TN30 connecting set) | 1,5 ... 2,5;<br>4 ... 6 | Cu flexible conductor | B | **3VT9 100-4TN00** | 1 unit | 0.010 |

* 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**<br>Included in the scope of supply of the circuit breaker or switch disconnector<br>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<br>For more information, see page 2/35. | | | B | **3VT9 100-8CE30** | 1 unit | 0.030 |
|  | **Terminal protection cover, degree of protection IP20**<br>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**<br>• Enables locking of circuit breaker or switch disconnector in „switched off manually“ position<br>• 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**<br>• Included in the scope of supply of circuit breaker or switch disconnector<br>• 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<br>For more information, see page 2/36. | | | B | **3VT9 100-8CE00** | 1 unit | 0.020 |
|  | **Terminal cover, degree of protection IP20**<br>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**<br>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).

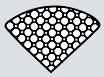
Recommended cross-section of cables, busbars and flexibars

| 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 | | 3VT1 7..-2..36-0AA0 | 3VT1 716-2DE36-0AA0 | 3VT1 7..-2..46-0AA0 | 3VT1 716-2EE46-0AA0 |
|---|---|---|---|---|---|
| **Order No.** | | **Circuit Breakers** | **Switch disconnectors** | **Circuit Breakers** [3] | **Switch Disconnectors** |
| **Number of poles** | | **3** | | **4** | |
| **Standards** | | EN 60 947-2, IEC 947-2 | EN 60 947-3,IEC 947-3 | EN 60 947-2, IEC 947-2 | EN 60 947-3,IEC 947-3 |
| **Approval marks** | | CE | | | |
| **Rated current $I_n$** | A | 16 ... 160 [2] | -- | 16 ... 160 [2] | -- |
| **Rated uninterrupted current $I_u$** | A | 16 ... 160 [2] | 160 | 16 ... 160 [2] | 160 |
| **Rated operational current $I_e$** | A | -- | 160 | -- | 160 |
| **Rated operational voltage $U_e$** | V | max. AC 690 | | max. AC 690<br>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**<br>• selectivity AC 690 V<br>• switching mode | | <br>A<br>AC-3 (16 ... 100 A)<br>AC-2 (100 ... 160 A) | <br>--<br>AC-23 A | <br>A<br>AC-3 (16 ... 100 A)<br>AC-2 (100 ... 160 A) | <br>--<br>DC-22 A<br>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<br>12 kA/AC 500 V<br>25 kA/AC 415 V<br>40 kA/AC 230 V | -- | 13kA/DC 440V<br>($\tau$ = max. 5 ms)<br>6 kA/AC 690 V<br>12 kA/AC 500 V<br>25 kA/AC 415 V<br>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<br>6 kA/AC 500 V<br>13 kA/AC 415 V<br>20 kA/AC 230 V | -- | 13kA/DC 440V<br>($\tau$ = max. 5 ms)<br>3 kA/AC 690 V<br>6 kA/AC 500 V<br>13 kA/AC 415 V<br>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.

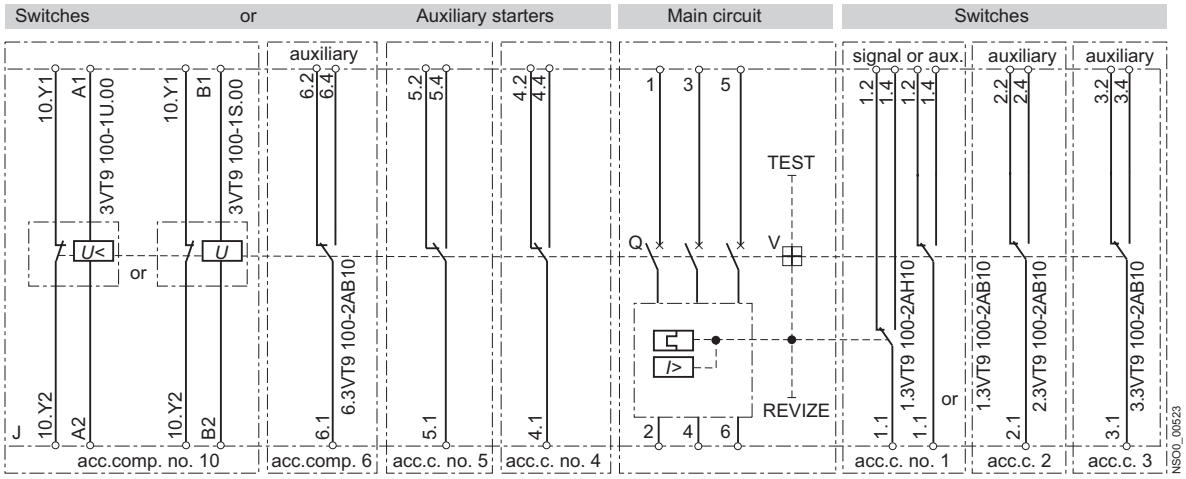
[2] Ranges of rated currents vary according to characteristics, see page 2/16.

[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

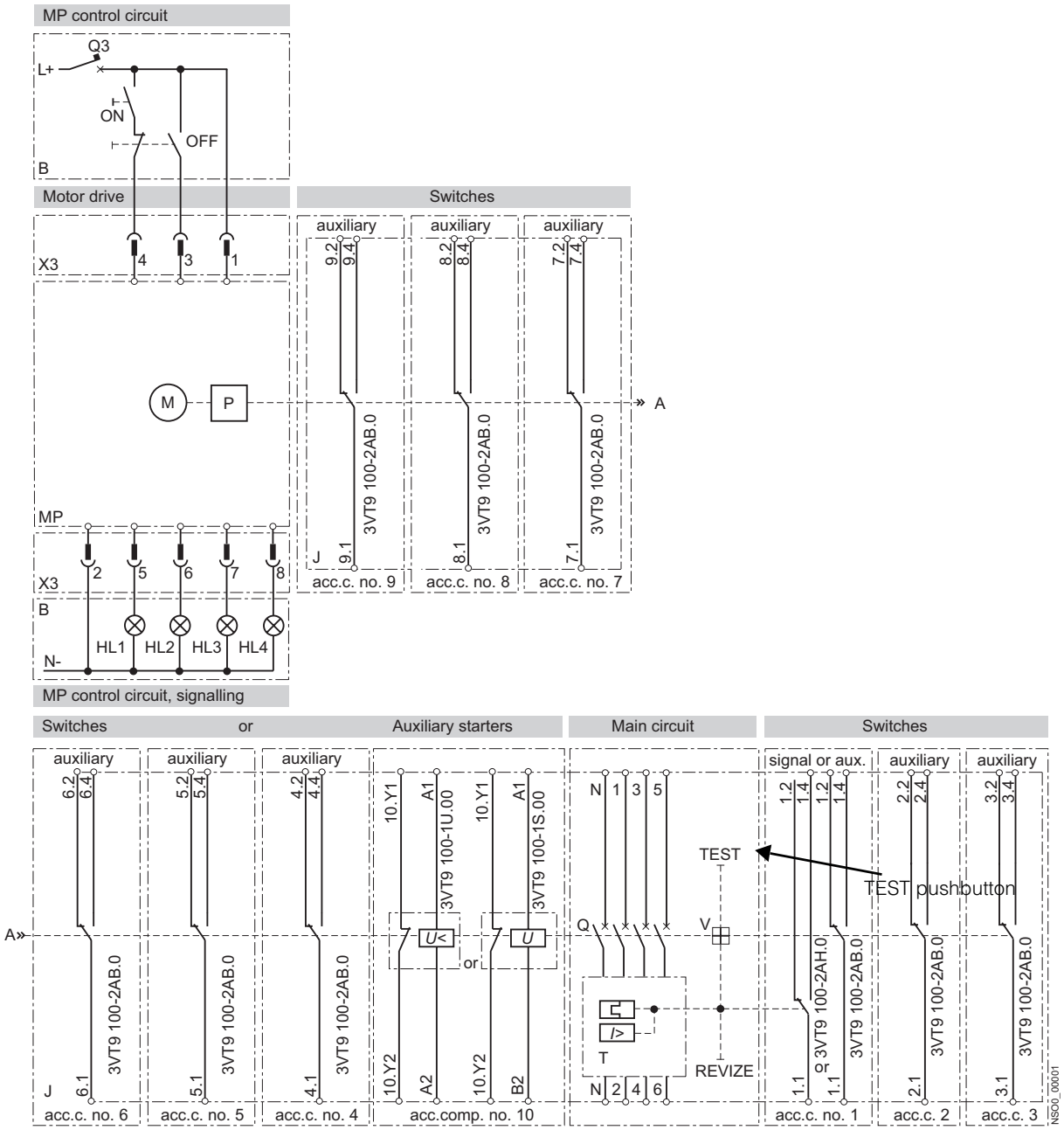
### Indication of circuit breaker tripping

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<br>3P+N (3 poles protected, N-pole unprotected)<br>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.

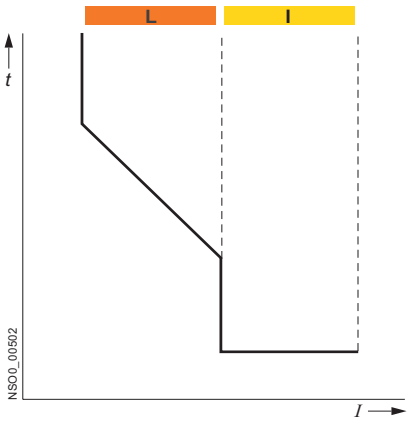
**Setting of tripping characteristics:**

- **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.

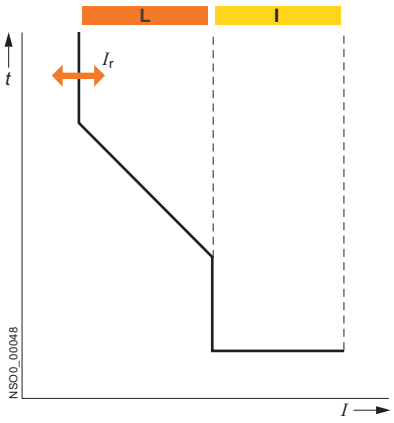
Setting of tripping characteristics

Circuit breakers with characteristic

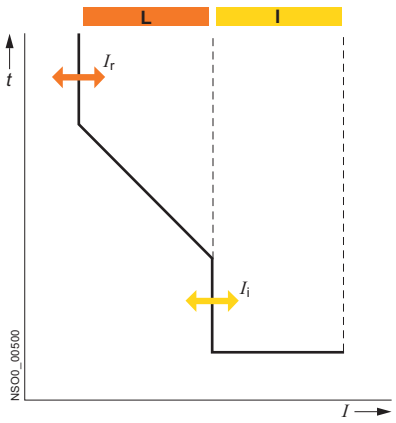
**„L“**



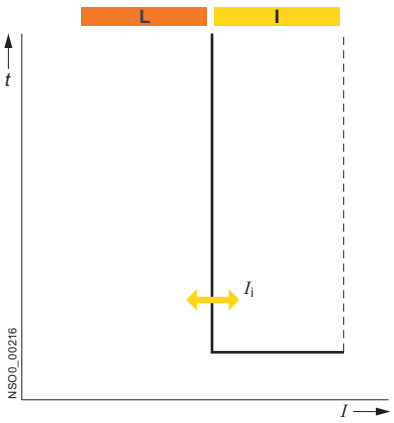

**„M“**




**„D“**

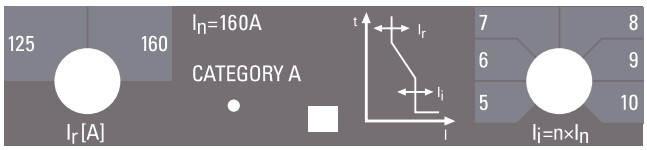


**„N“**




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

Adjusting $I_R$ Adjusting $I_i$



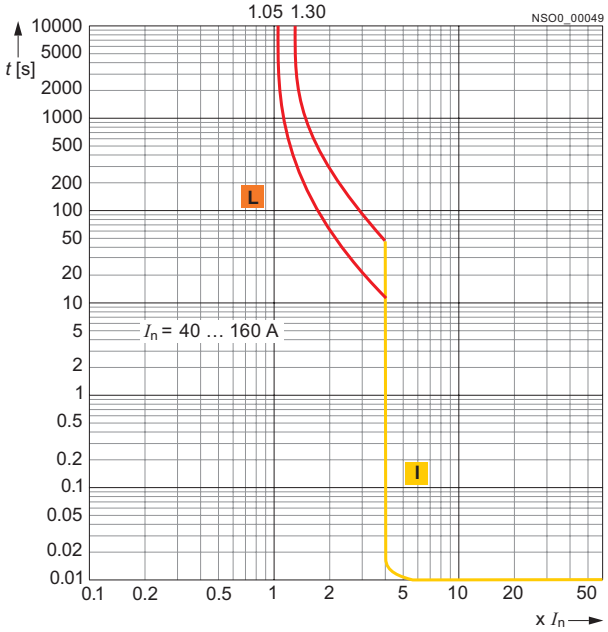

Derating in accordance with ambient temperature

| 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 |

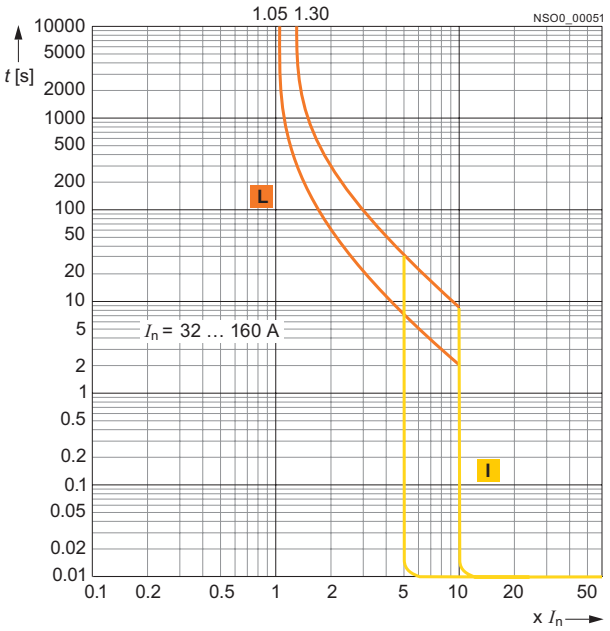
Current ranges of overcurrent releases and their possible setting at 40 °C

| 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 |

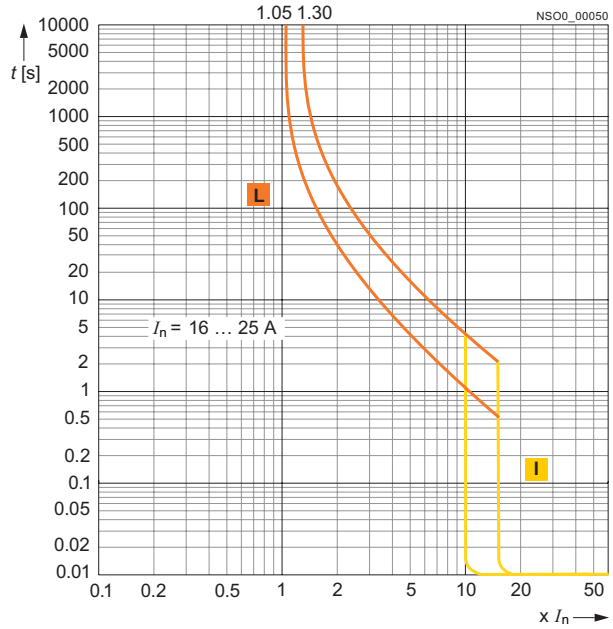
**Characteristic „L“, $I_n$ = 40, 50, 63, 80, 100, 125, 160 A**



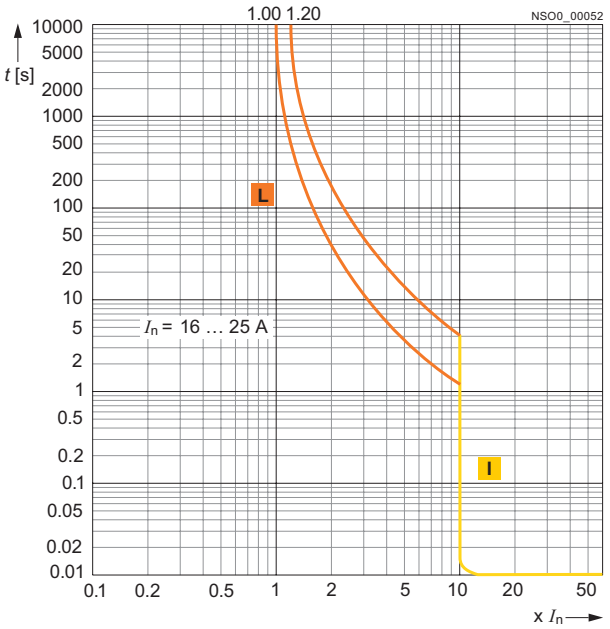

**Characteristic „D“, $I_n$ = 32, 40, 50, 63, 80, 100, 125, 160 A**



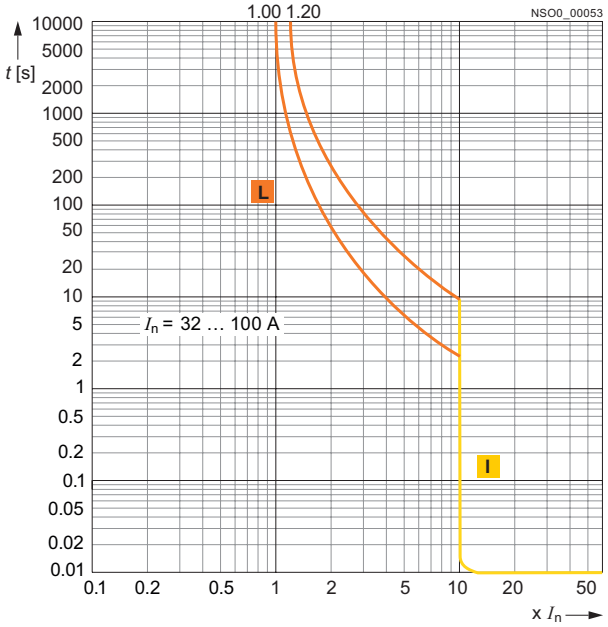

**Characteristic „D“, $I_n$ = 16, 20, 25 A**



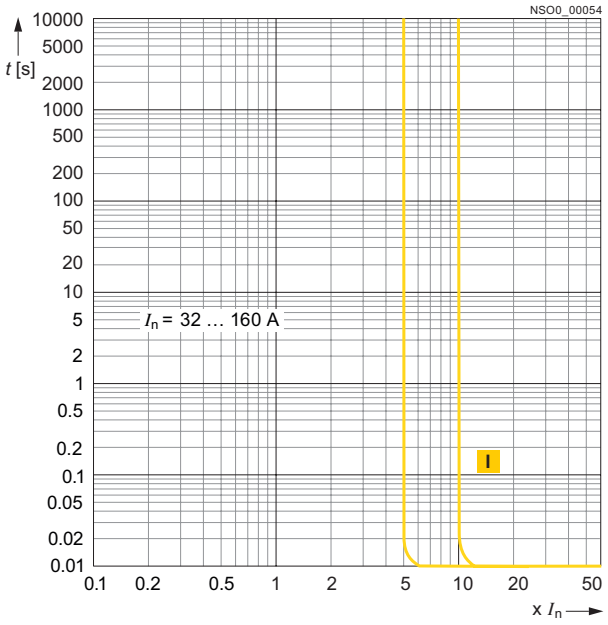

**Characteristic „M“, $I_n$ = 16, 20, 25 A**



**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.

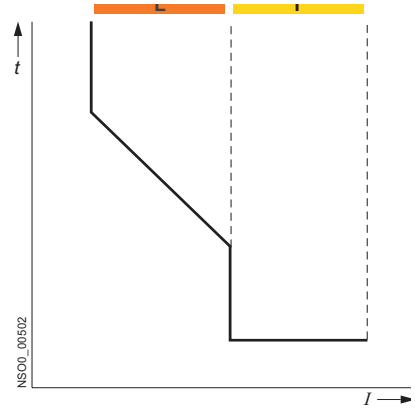
**Setting of tripping characteristics**

- **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.

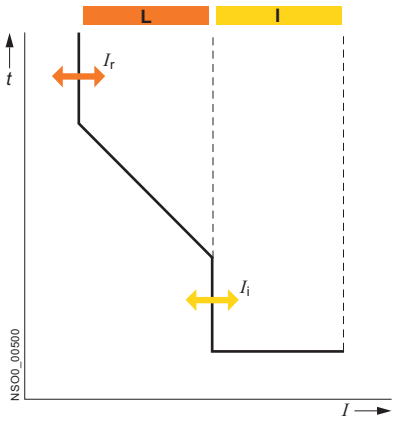
Setting of tripping characteristics

Circuit breakers with characteristic

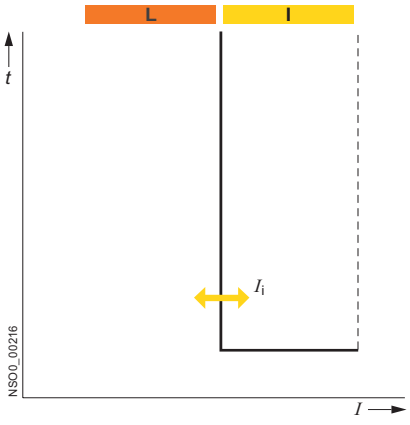
**„L“**




**„D“**



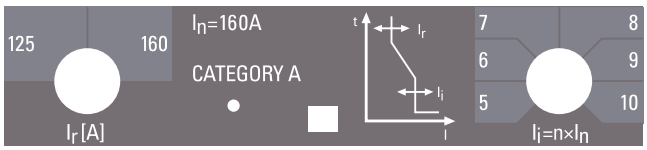

**„N“**



## Circuit breakers · Switch disconnectors

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

Setting $I_R$ Setting $I_i$




2

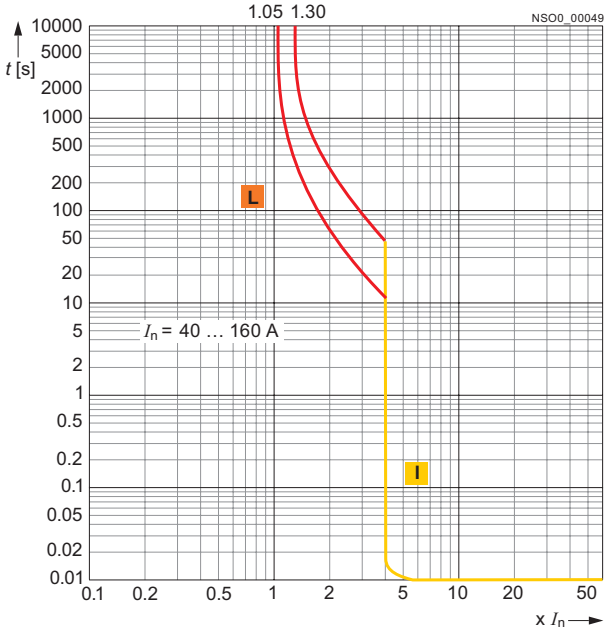
Derating in accordance with ambient temperature

| 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 |

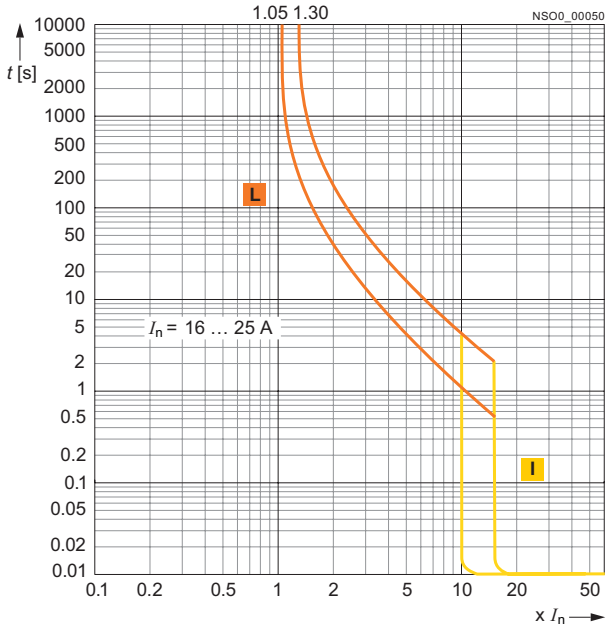
Current ranges of overcurrent releases and their possible setting at 40 °C

| 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 |

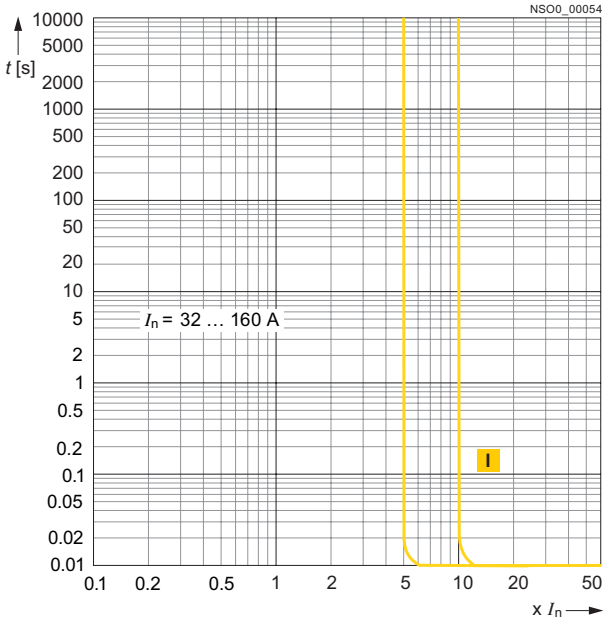
**Characteristic „L“, $I_n$ = 40, 50, 63, 80, 100, 125, 160 A**



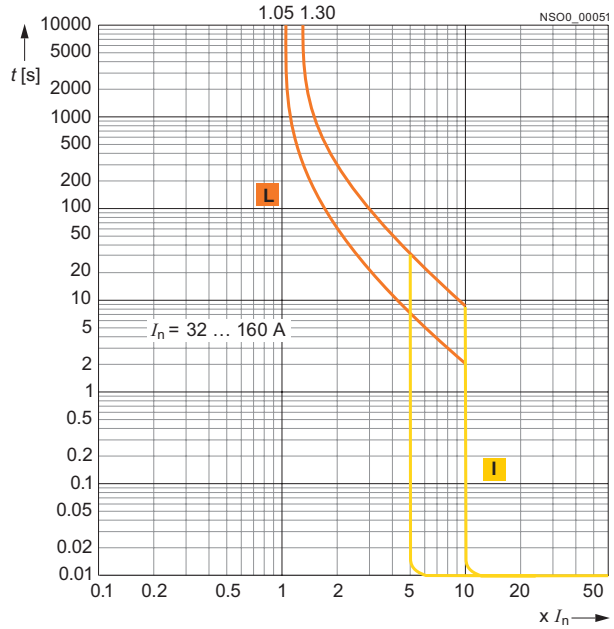

**Characteristic „D“, $I_n$ = 16, 20, 25 A**




**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

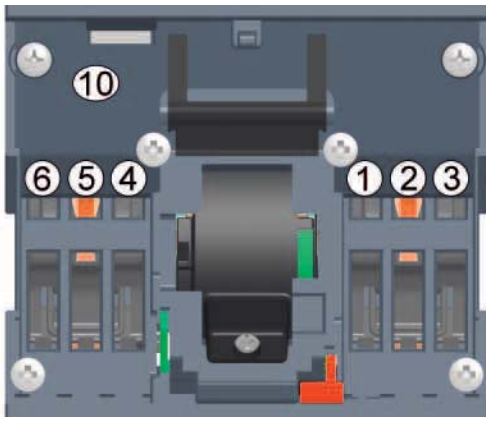
Function, name and location of switches according to type designation

| Order No. | Type | Switch location | Switch function |
|---|---|---|---|
| **3VT9 100-2AB10**<br>**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**<br>**3VT9 100-2AH20** | Alarm switch | Accessory compartment 1[1] | Signal in the event of tripping of the circuit breaker by the overcurrent release |

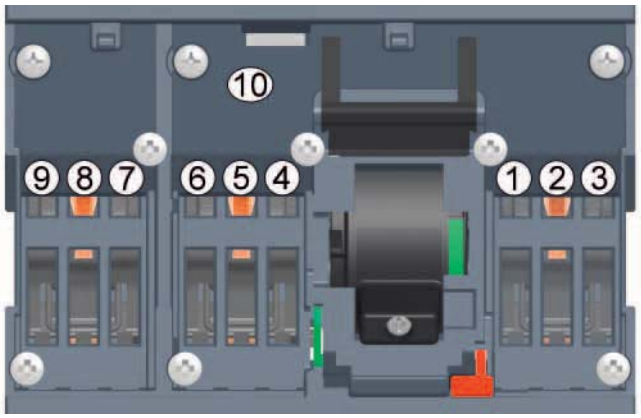
[1] In the accessory compartment 1, a 3VT9 100-2AB10 auxiliary switch and 3VT9 100-2AH10 signal switch cannot be used simultaneously.

[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.

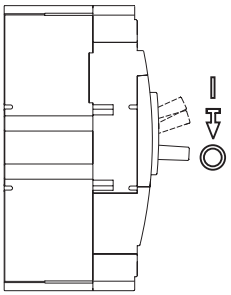



Location of accessory compartments in a 4-pole 3VT1 circuit breaker/switch disconnector.

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

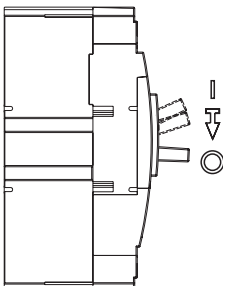
## Function

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<br>DC 60 ... 250 V | AC 5 ... 60 V<br>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

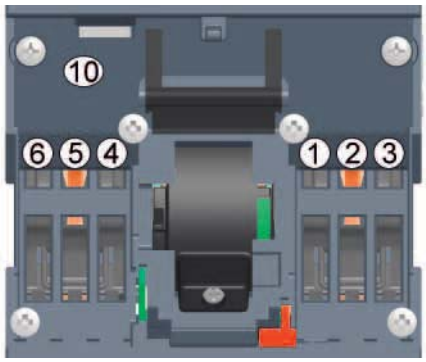
### Design

*Auxiliary releases*

Shunt release

Undervoltage release

Location of auxiliary releases




Auxiliary releases in compartment 10

Type designation according to the rated operational voltage

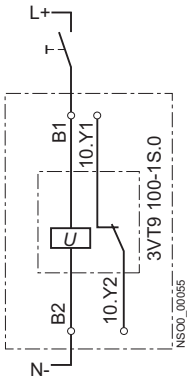
| $U_e$ | Order No. |
|---|---|
| AC/DC 24/48 V | 3VT9 100-1SC00 |
| AC 110/230 V, DC 110/220 V | 3VT9 100-1SD00 |
| AC 230/400 V, DC 220 V | 3VT9 100-1SE00 |

Type designation according to the rated operational voltage

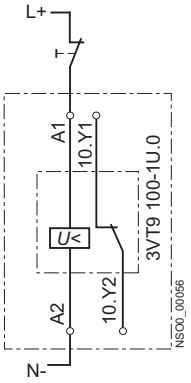
| $U_e$ | Order No. |
|---|---|
| AC/DC 24/48 V | 3VT9 100-1UC00 |
| AC 110/230 V /DC 110/220 V | 3VT9 100-1UD00 |
| AC 230/400 V /DC 220 V | 3VT9 100-1UE00 |

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<br>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<br>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<br>$U \geq 0.85\ U_e$ 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 |

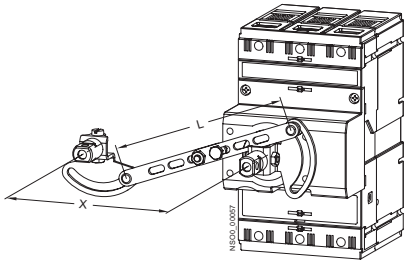
## Manual operating mechanisms

Mechanical interlocks and mechanical interlocks for parallel switching

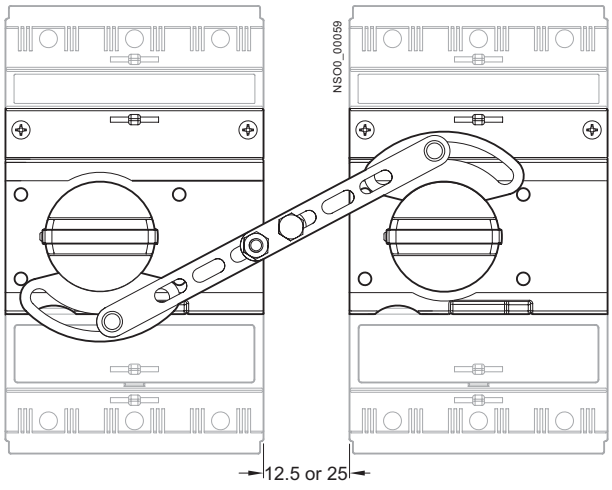
### 3VT9 100-8LA00 mechanical interlocking

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 |



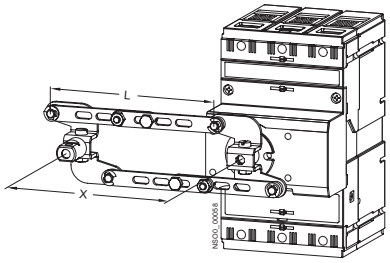

Arrangement of circuit breakers/switch disconnectors with 3VT9 100-8LA00 mechanical interlocks



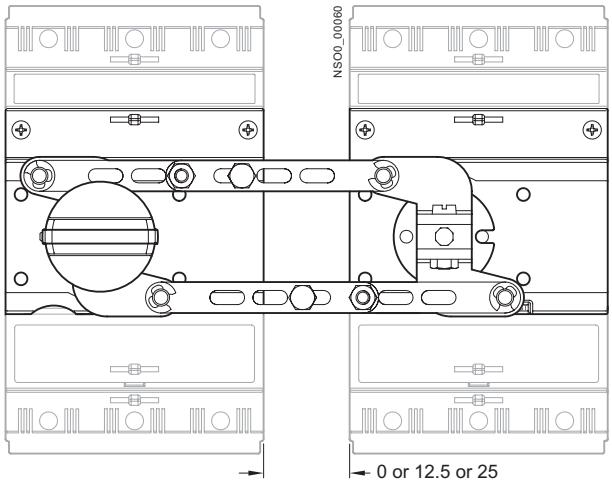

### 3VT9 100-8LB00 mechanical interlocks for parallel switching

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.

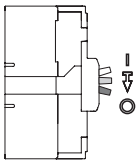
Lateral operating mechanisms can be locked in „off position“ of the circuit breaker by up to three padlocks with a shank diameter of max. 4 mm. It is possible to actuate the locking remotely. The protective cover of the operating mechanisms can also be sealed.

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<br>By REVISION pushbutton<br>By auxiliary release<br>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. | | | | |

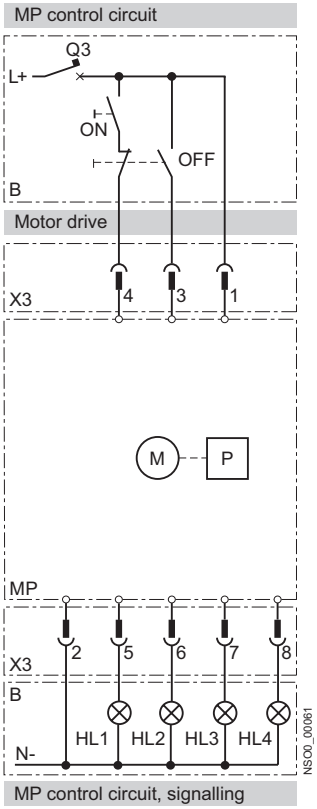
[1] Standard factory setting of the switch.

[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<br>DC 24/48/110/220 V |
| Rated frequency $f_n$ | | 50/60 Hz |
| Control pulse length<br>for switching on<br>for switching off | | 60 ms ... ∞[1)]<br>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<br>6 A/AC/DC 48 V<br>4 A/AC/DC 110 V<br>2 A/AC 230 V/DC 220 V |
| Protection<br>AC 24/48/110 V; AC 230 V<br>DC 24/48/110 V; DC 220 V | | <br>LSN 4C/1; LSN 2C/1<br>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

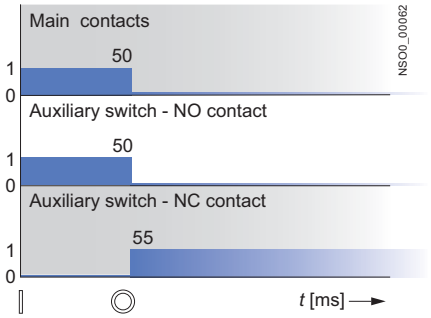
| | |
|---|---|
| MP | 3VT9 100-3M.00 motorized oeprating mechanism |
| M | motor |
| P | gearbox |
| X3 | connector for connection of control and signaling circuits |
| B | recommended connection of control circuits-not part of MP |
| ON | pushbutton |
| OFF | pushbutton |
| Q3 | motorized operating 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

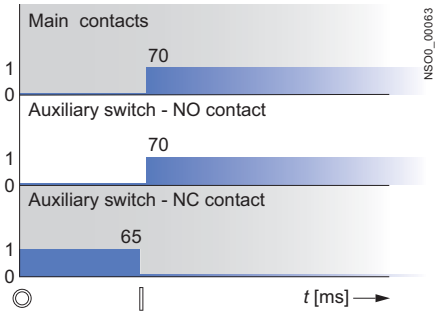
Electrical switching off of the circuit breaker by motorized operating mechanism (OFF pushbutton)

Automatic operation no. 1, 2, 3



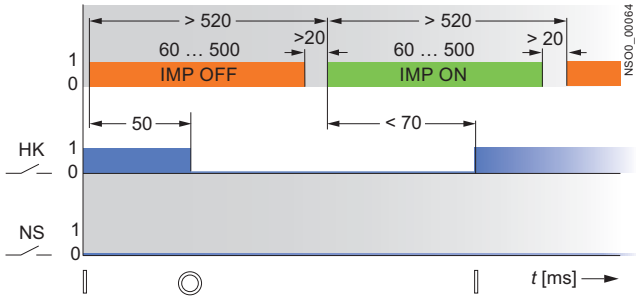

Electrical switching on of the circuit breaker by motorized operating mechanism (ON pushbutton).

Automatic operation no. 1, 2, 3

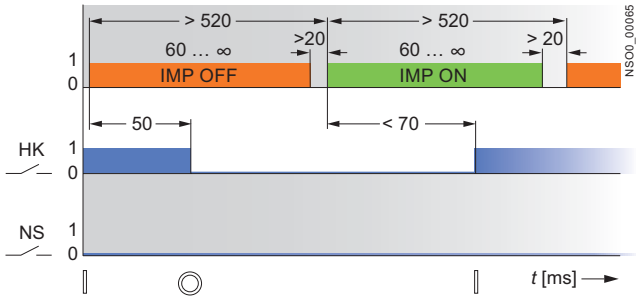



Recommended control pulses for electrically switching on and off the circuit breaker using the ON and OFF pushbuttons

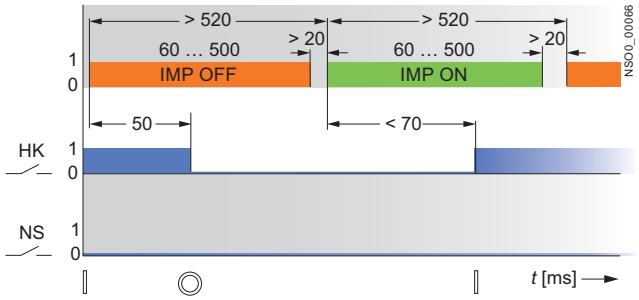
Automatic operation no. 1




Automatic operation no. 2




Automatic operation no. 3



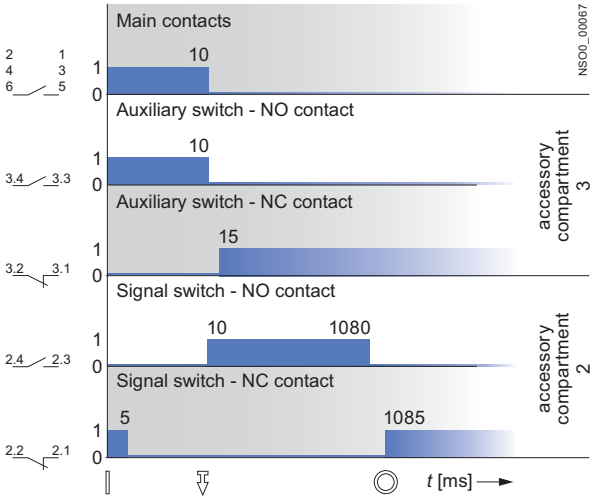

Graph description

| 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) |

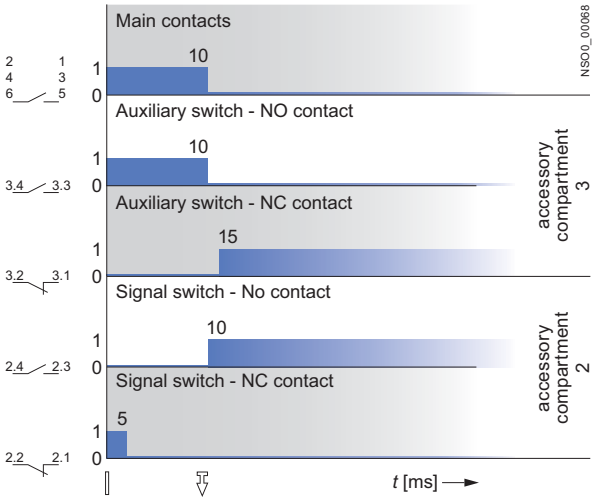
## Motorized operating mechanisms

Circuit breaker switching off by
overcurrent release or INSPECTION pushbutton

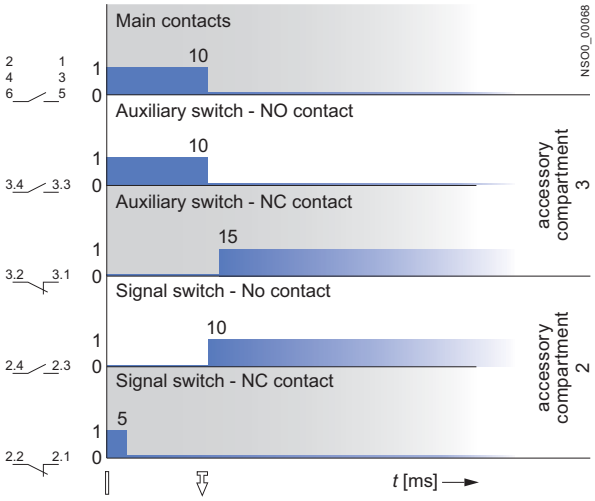
Automatic operation no. 1




Automatic operation no. 2

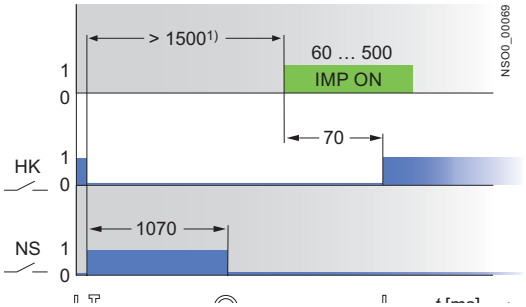



Automatic operation no. 3

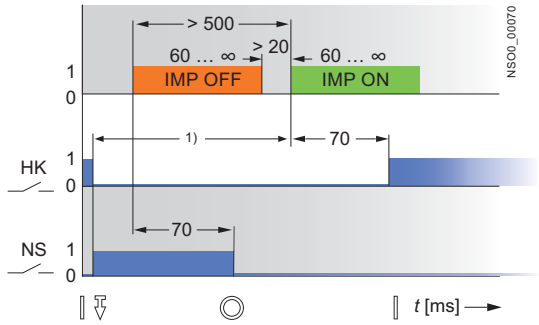


Recommended control pulses for switching the circuit breaker with motorized operating mechanism after its switching off by overcurrent release or INSPECTION pushbutton

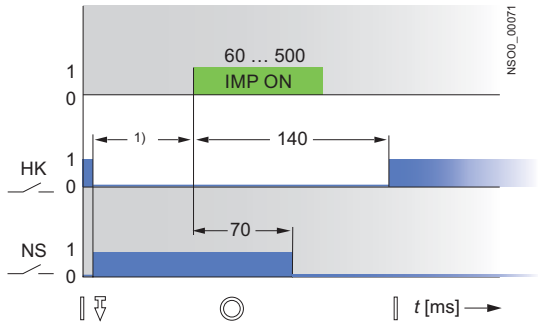
Automatic operation no. 1




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.

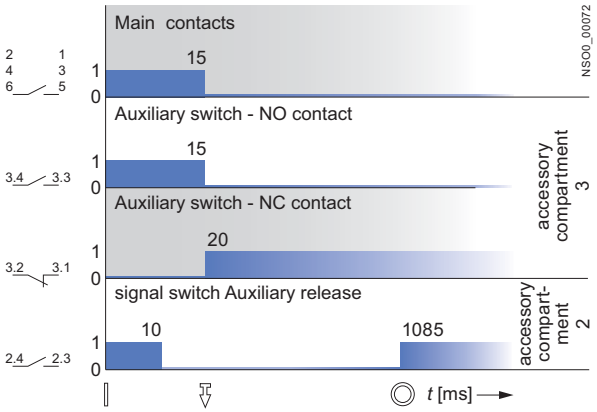
Graph description

| 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) |

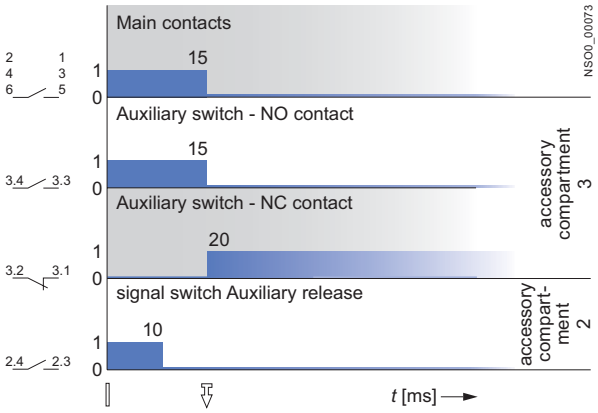
## Motorized operating mechanisms

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

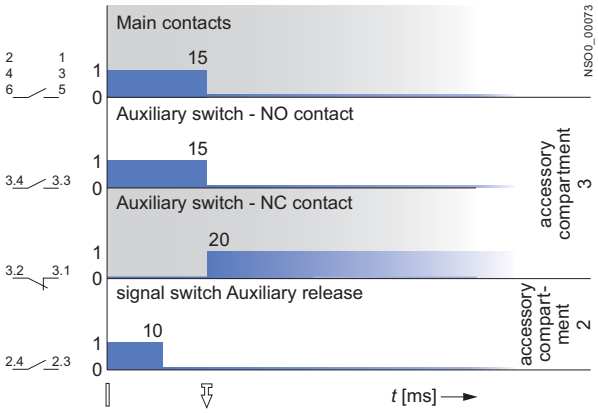
Automatic operation no. 1




Automatic operation no. 2

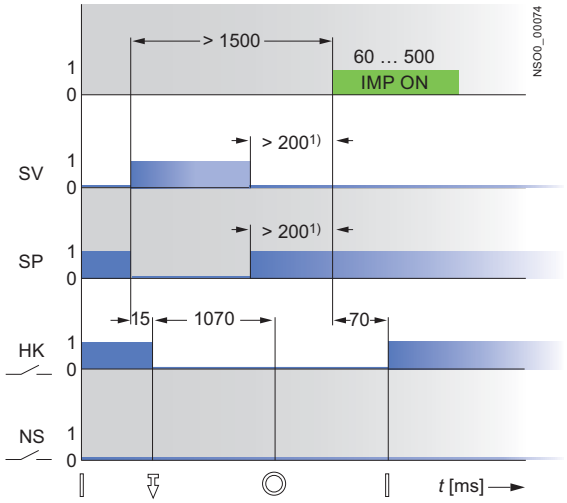



Automatic operation no. 3

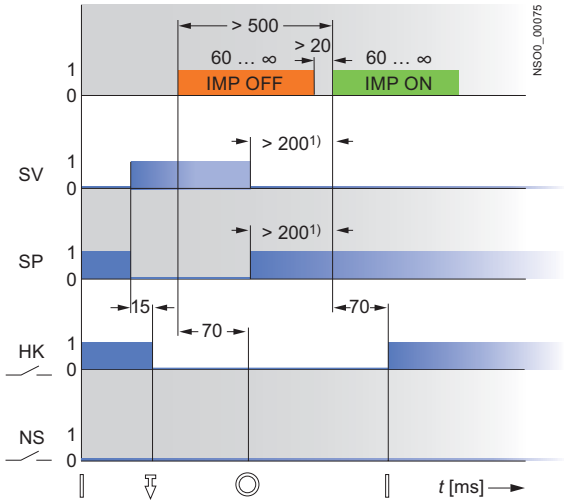


Recommended control pulses for switching the circuit breaker with motorized operating mechanism after its switching off by overcurrent release or INSPECTION pushbutton

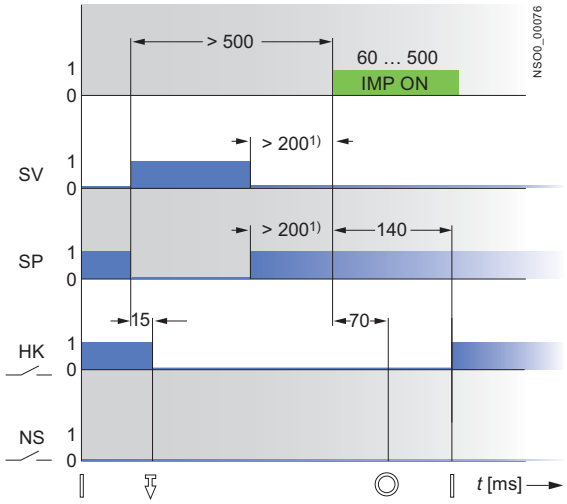
Automatic operation no. 1




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 |

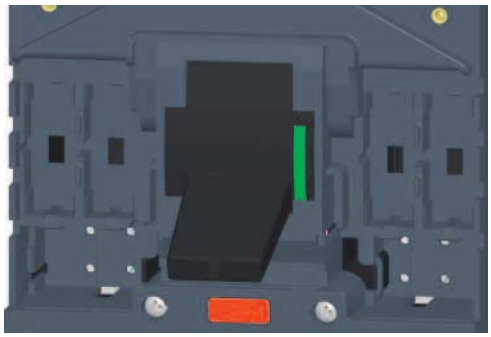
### *Rated short-circuit ultimate and service breaking capacity of 3-pole 3VT1 circuit breakers in DC circuits*

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

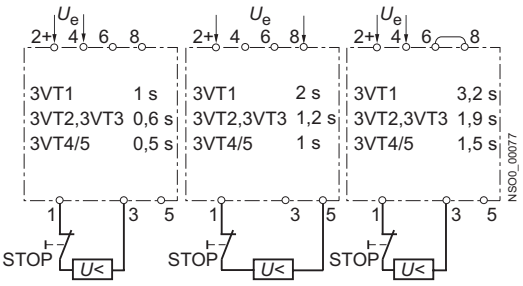


### *Delay device*

| 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

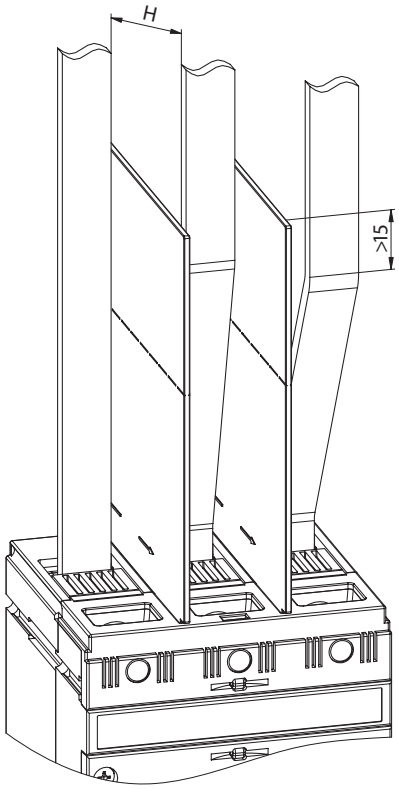
| Circuit breakers | Delay | | |
|---|---|---|---|
| | 1st level | 2nd level | 3rd level |
| | s | s | s |
| 3VT1 | 1 | 2 | 3.2 |
| 3VT2, 3VT3 | 0.6 | 1.2 | 1.9 |
| 3VT4, 3VT5 | 0.5 | 1 | 1.5 |



## Dimensional drawings

### *Phase barriers and terminal covers*

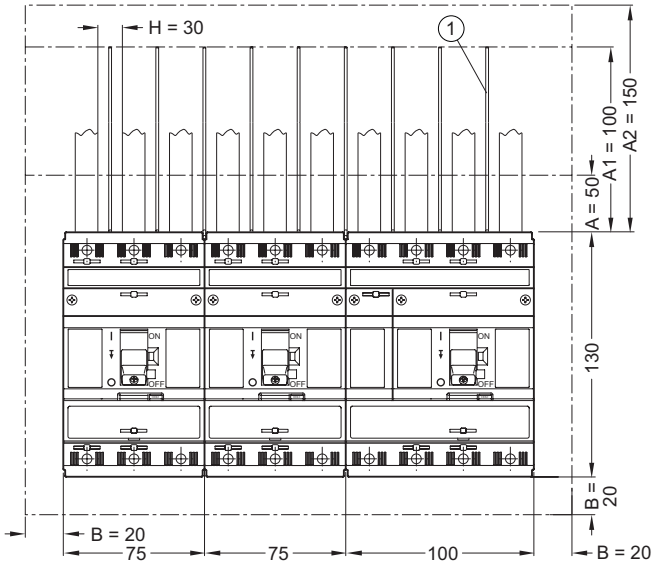
3-pole version

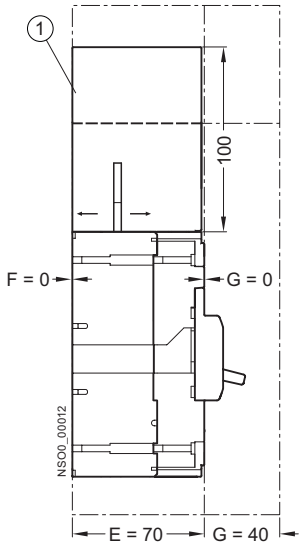



Fixed-mounted version

- 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:<br>• between circuit breaker/switch disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)<br>• between circuit breaker/switch disconnector and busbar<br>• between two circuit breakers/switch disconnectors situated vertically above one another<br>• 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 |

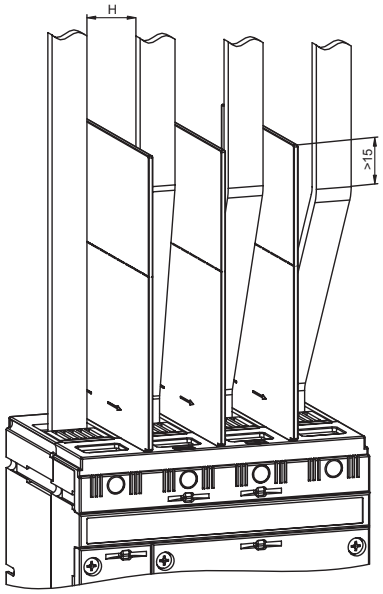



① 3VT9 100-8CE30

## Project planning aids

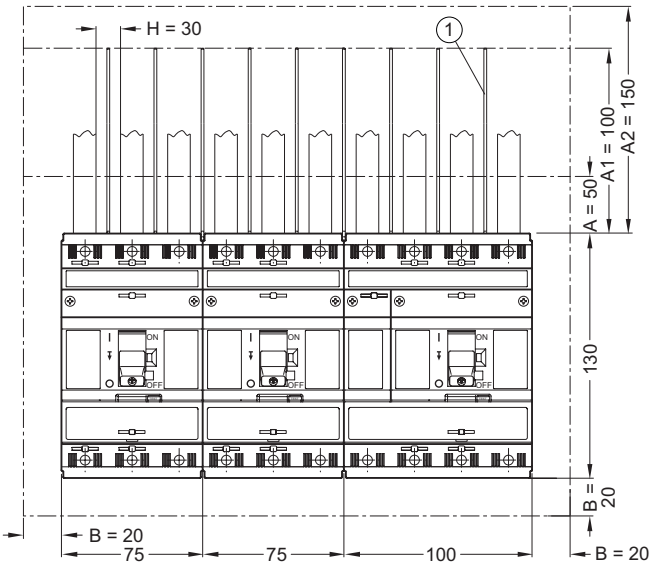
4-pole version

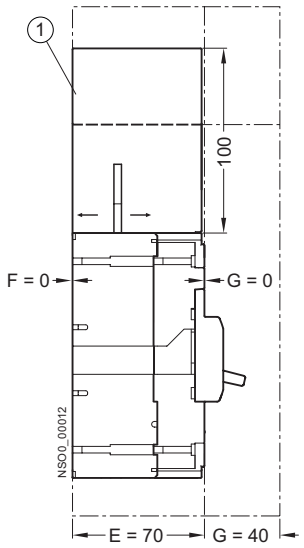



- Front connection
  - terminals N, 1, 3, 5
    3VT9 100-8CE30 and 3VT9 100-8CE00 phase barriers or 3VT9 100-8CA40 terminal covers always have to be used (if 3VT9 100-4TF40 connecting sets are used to connect the circuit breaker/switch disconnector, the terminal cover is included in the connecting set)
  - 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:<br>• between circuit breaker/switch disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)<br>• between circuit breaker/switch disconnector and a busbar<br>• between two circuit breakers/switch disconnectors installed vertically one above the other<br>• 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



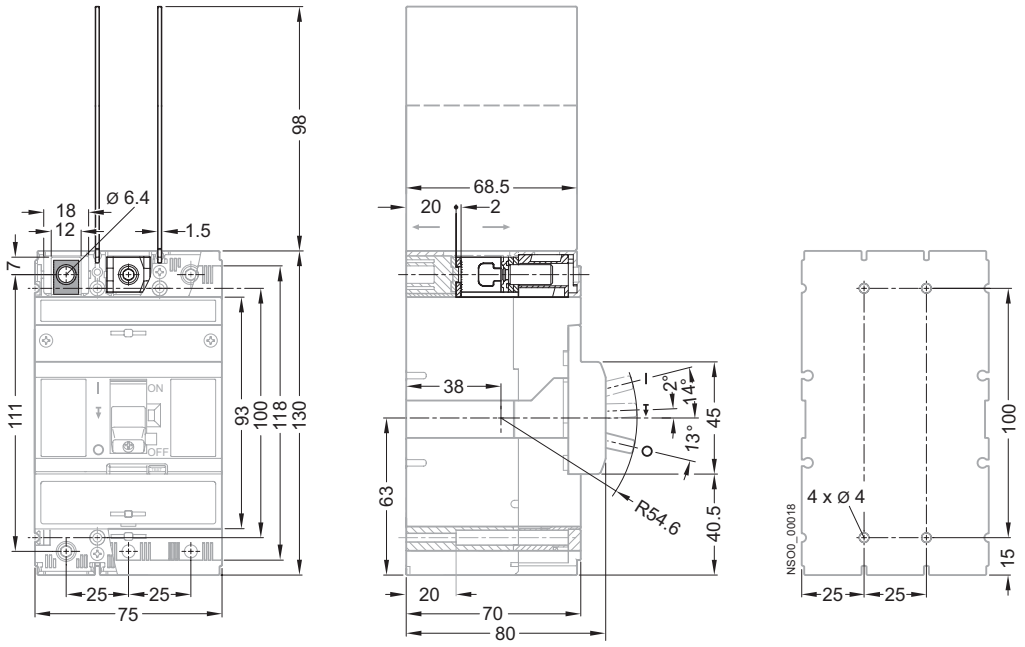




1 3VT9 100-8CE30

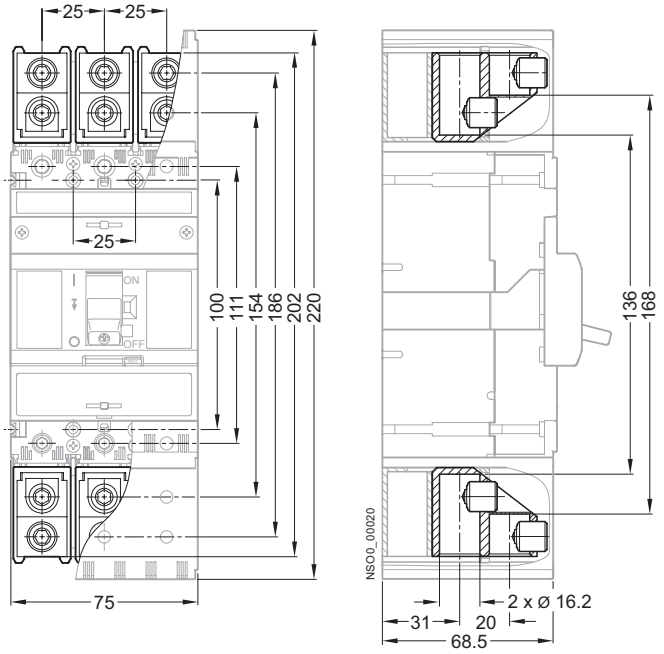
*Fixed-mounted version*

3-pole version

**Fixed-mounted version, front connection**

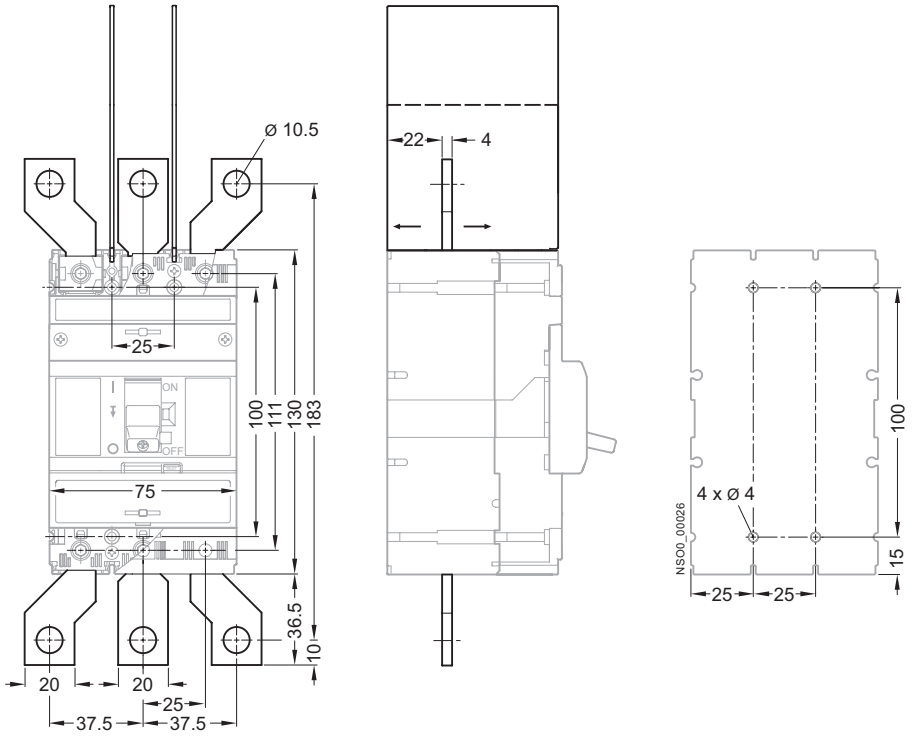



**Fixed-mounted version, front connection (3VT9 100-4TF30 connecting set)**

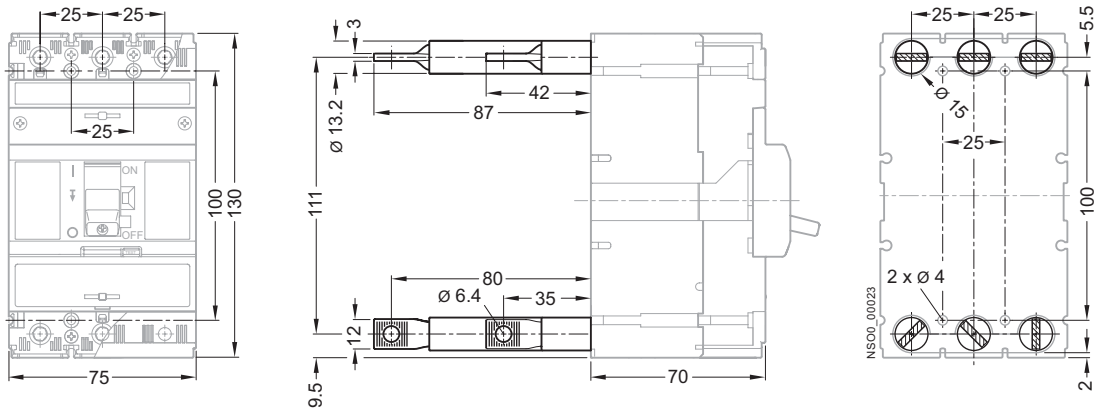


## Project planning aids

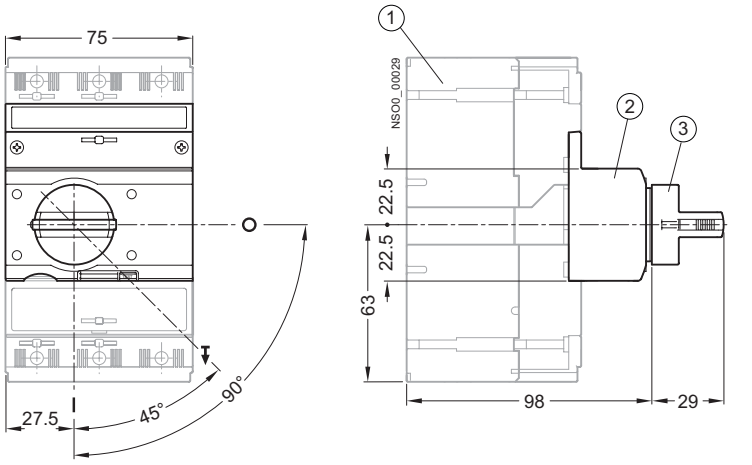
**Fixed-mounted version, front connection (3VT9 100-4ED30 connecting set)**




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

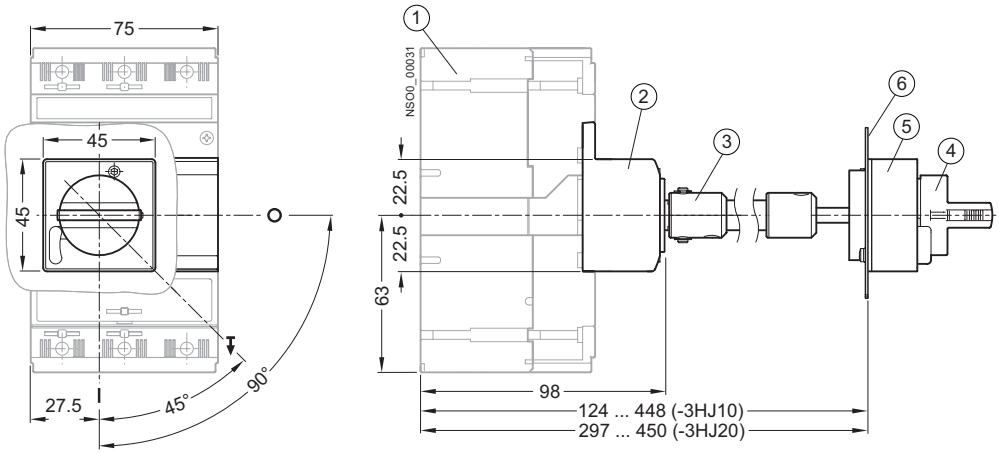


**Fixed-mounted version, manual operating mechanism**



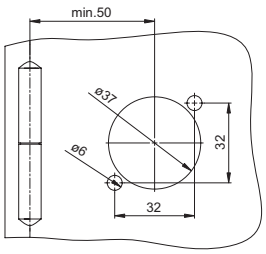

1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HE.0, 3HF.0

**Fixed-mounted version, manual operating mechanism with adjustable knob**



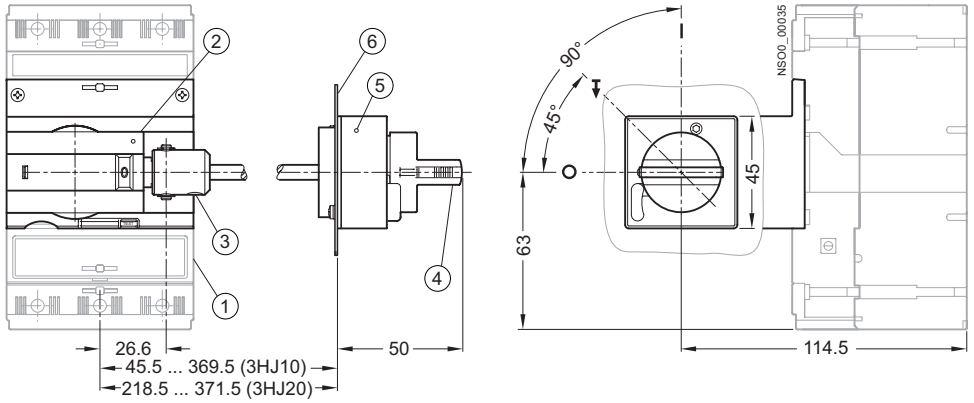

1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Adaptation of cabinet door dimensions



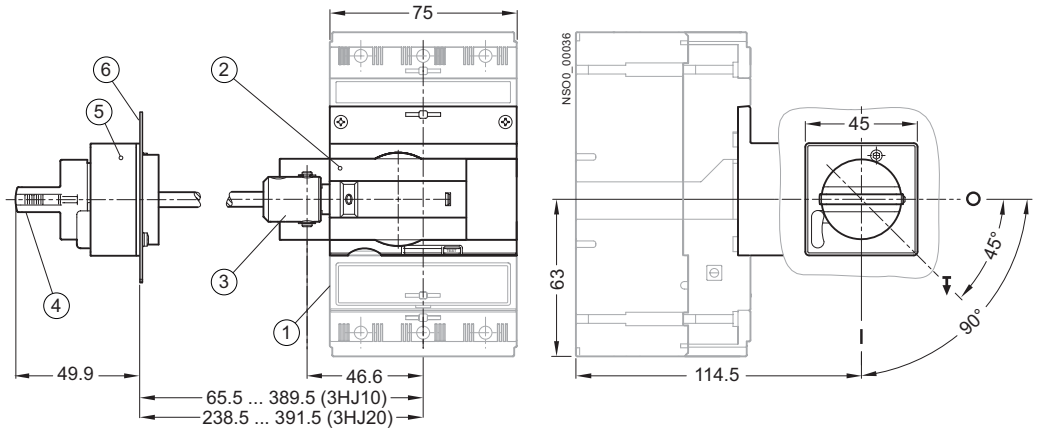
## Project planning aids

**Fixed-mounted version, lateral manual operating mechanism - right**



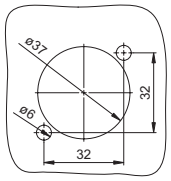

1 3VT1
2 3VT9 100-3HC10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

**Fixed-mounted version, lateral manual operating mechanism - left**

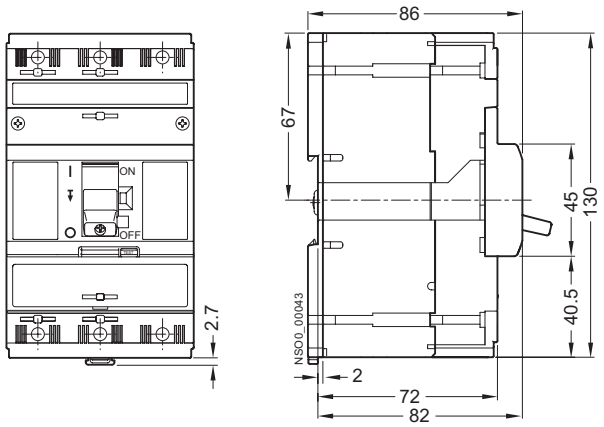



1 3VT1
2 3VT9 100-3HC10
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

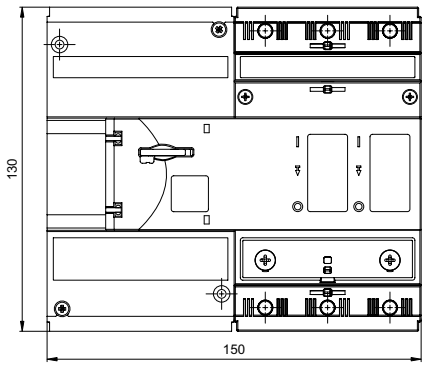
Adaptation of cabinet door dimensions

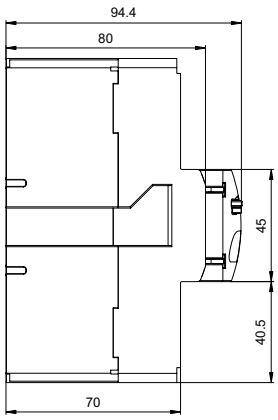


**Fixed-mounted version, installation on standard mounting rail (width 35 mm )**




**Fixed-mounted version and lateral motorized operating mechanism**



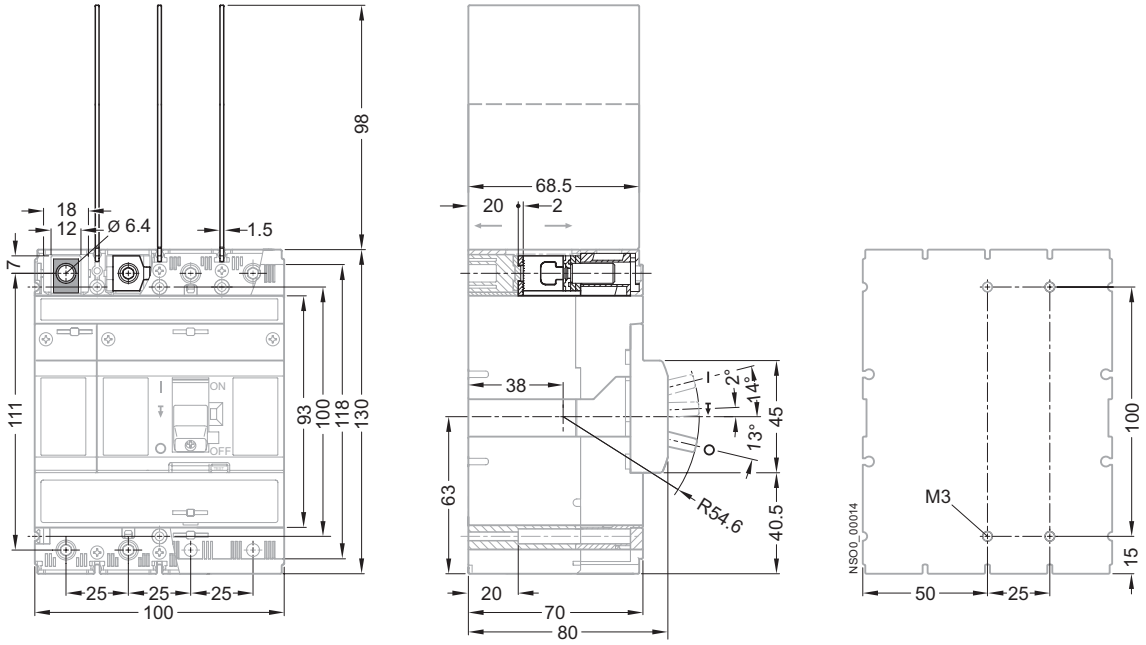



## Project planning aids

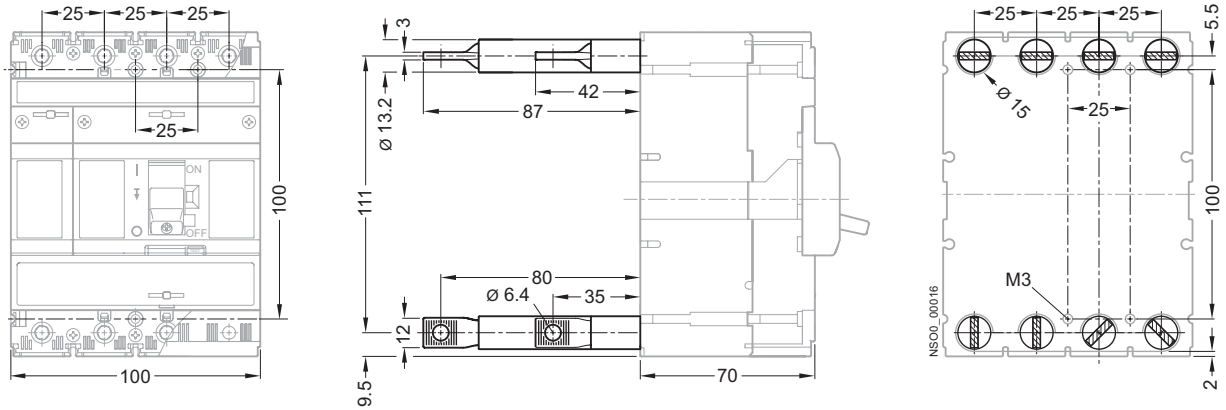


4-pole version

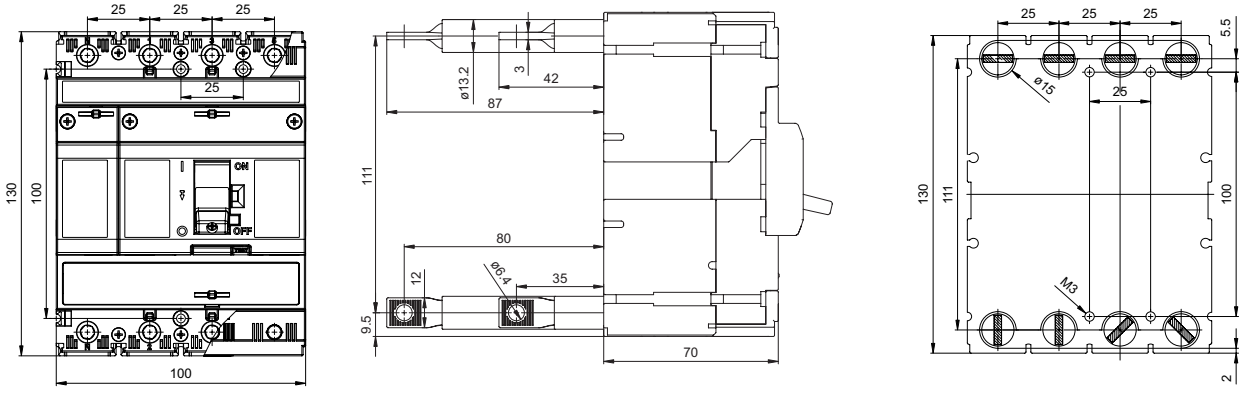
**Fixed-mounted version, front connection**



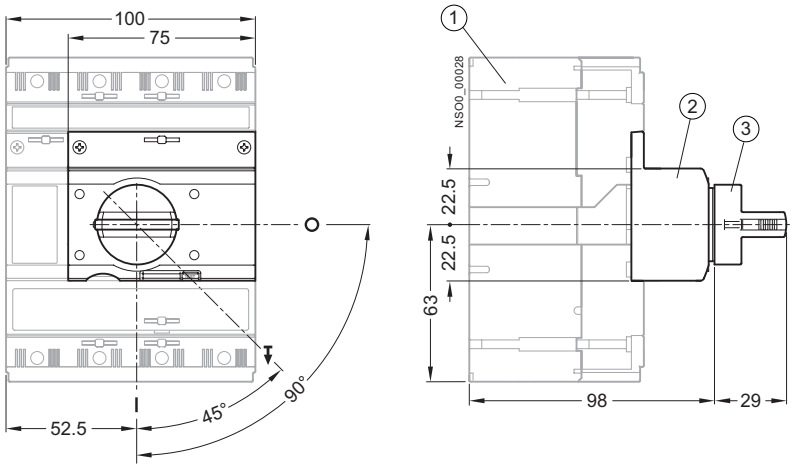

**Fixed-mounted version, front connection (3VT9 100-4TF40 connecting set )**




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

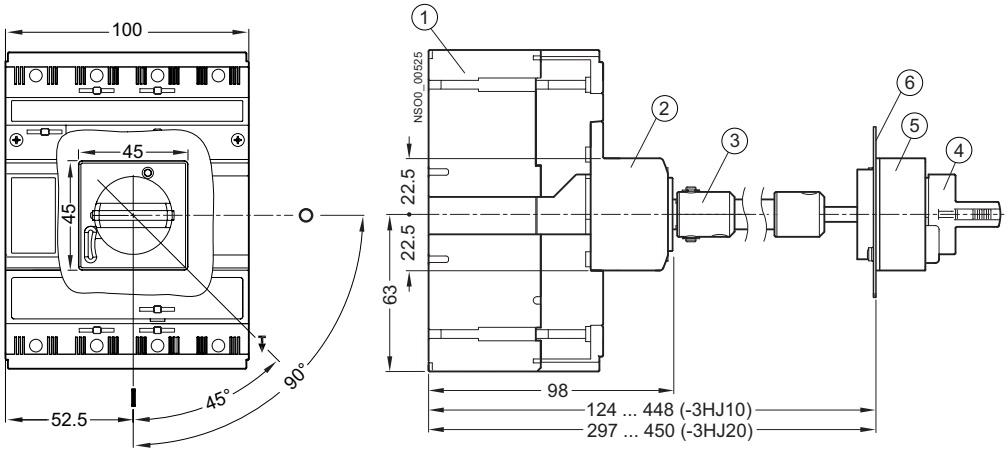


**Fixed-mounted version, front manual operating mechanism**



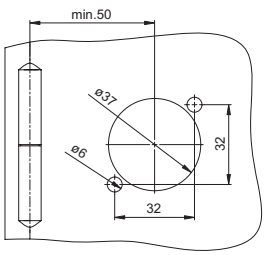

1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HE.0, 3HF.0

**Fixed version, front manual operating mechanism with adjustable knob**



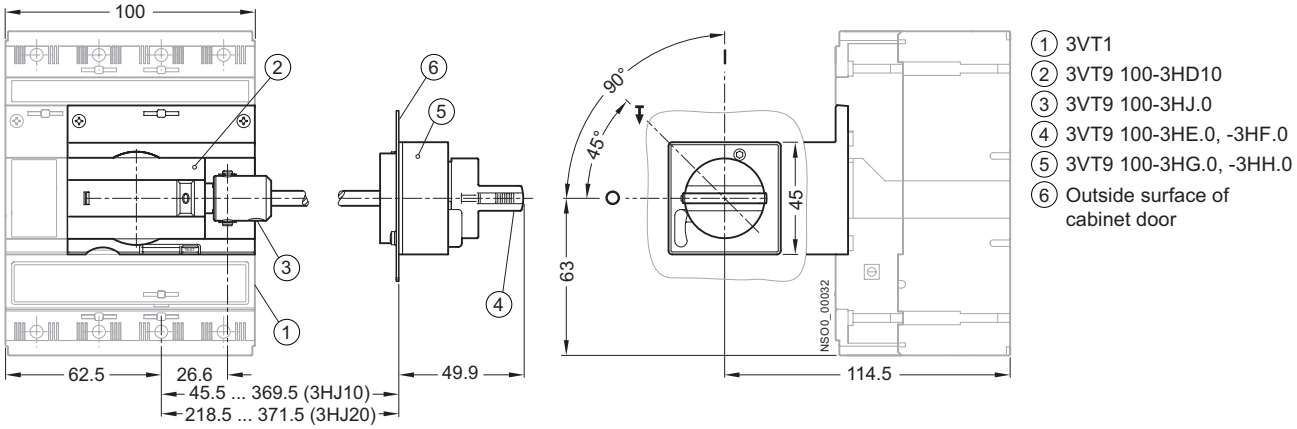

1 3VT1
2 3VT9 100-3HA.0, -3HB.0
3 3VT9 100-3HJ.0
4 3VT9 100-3HE.0, -3HF.0
5 3VT9 100-3HG.0, -3HH.0
6 Outside surface of cabinet door

Adaptation of cabinet door dimensions

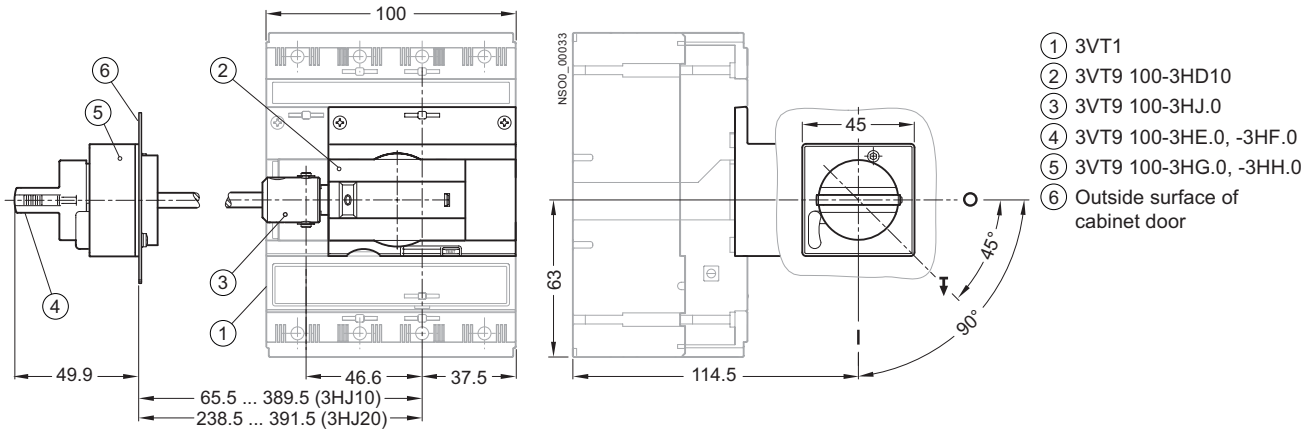


## Project planning aids

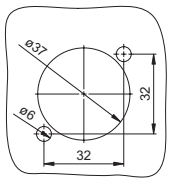
**Fixed-mounted version, lateral manual operating mechanism - right**



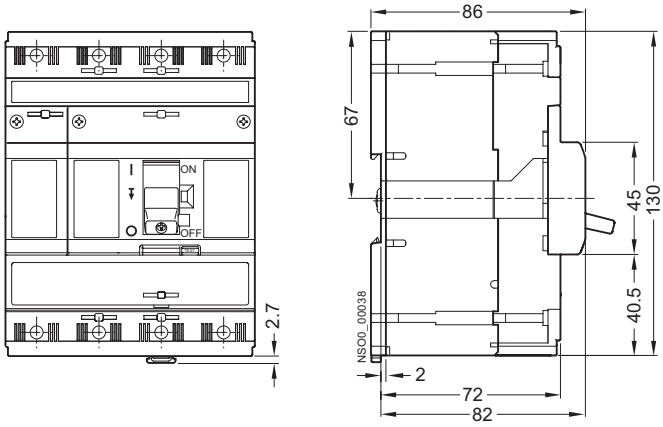

**Fixed-mounted version, lateral manual operating mechanism - left**



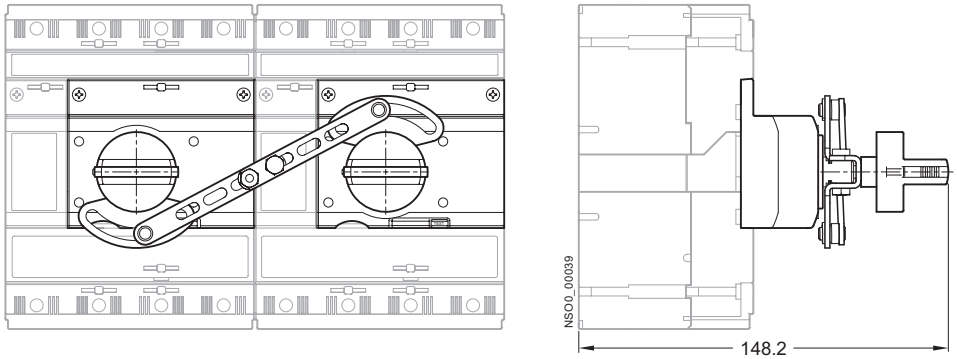

Adaptation of cabinet door dimensions



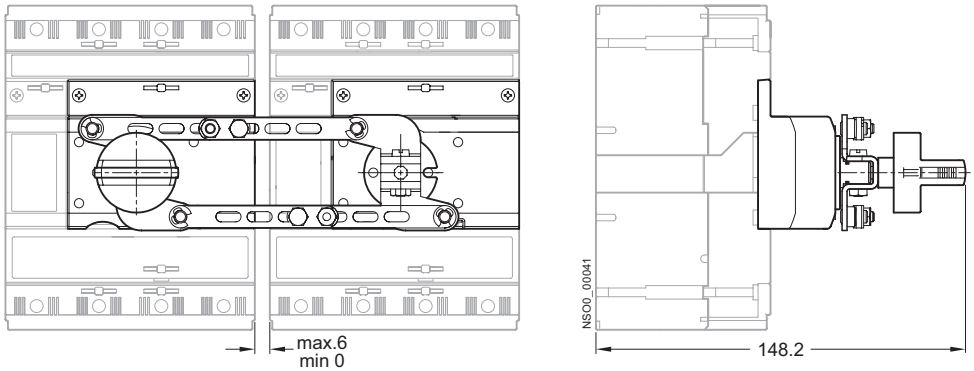

**Fixed-mounted version, installation on a standard mounting rail (width 35 mm )**



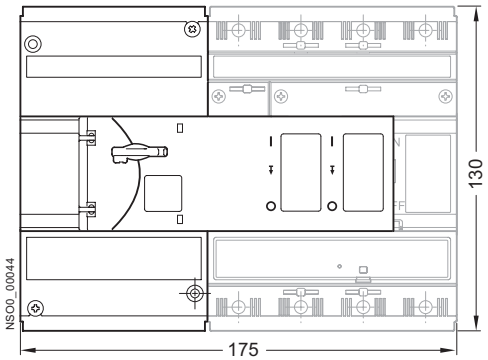
**Arrangement of circuit breaker/switch disconnectors with 3VT9 100-8LA00 mechanical interlocks**




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




**Fixed-mounted version and lateral motorized operating mechanism**

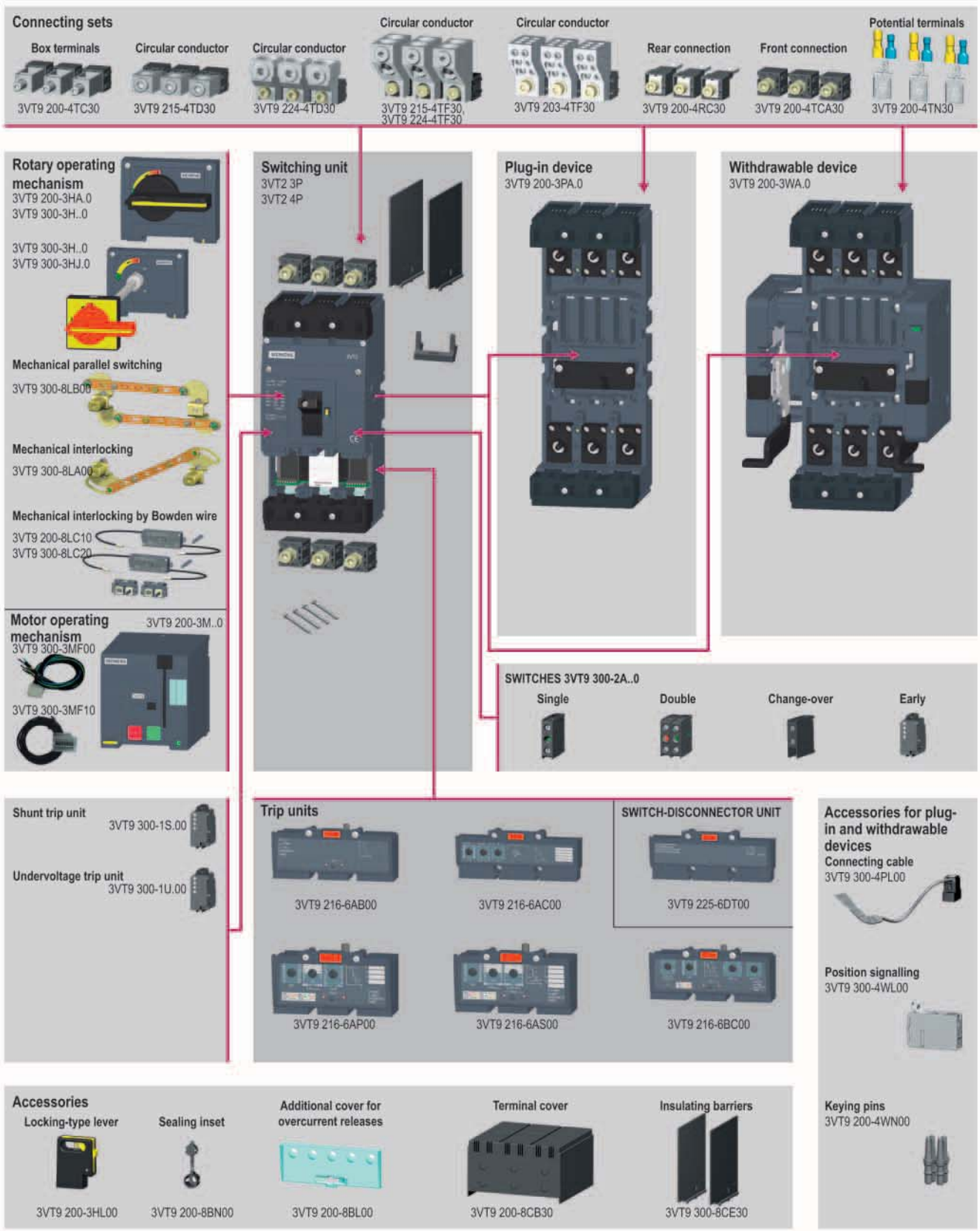


# 3VT2 Molded Case
# Circuit Breakers up to 250 A

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.

## Manual/motorized operating mechanisms

| | Version | DT | Order no. | PS* | Weight per PU approx. |
|---|---|---|---|---|---|
| | | | | | kg |
| **Mechanical interlocks** | | | | | |
| | The mechanical interlocks have to be completed with:<br>Ŕ 2 x 3VT9 300-3HA../HB.. rotary operating mechanisms,<br>Ŕ 1 or 2 x 3VT9 300-3HE../HF.. knobs | | | | |
|  | **Mechanical interlock**<br>for fixed-mounted design only | B | **3VT9 300-8LA00** | 1 unit | 0.136 |
|  | **Mechanical interlock for parallel switching**<br>for fixed-mounted design only | B | **3VT9 300-8LB00** | 1 unit | 0.162 |
|  | **Mechanical interlocking** by Bowden wires | | | | |
| | Ŕ for two 3VT2 circuit breakers | B | **3VT9 200-8LC10** | 1 unit | 0.393 |
| | Ŕ 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 200-3MN00** | | |
| | 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 200-3MN10** | | |
| | AC 230 V/DC 220 V | B | **3VT9 200-3MQ10** | 1 unit | 1.546 |
| **Accessories for motorized operating mechanisms** | | | | | |
|  | **Operations counter with cable,**<br>length 110 cm | B | **3VT9 300-3MF10** | 1 unit | 0.003 |
|  | **Extension cable** for motorized operating mechanism,<br>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

### 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. |
|---|---|---|---|---|---|---|---|
| | | $mm^2$ | | | | | 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**<br>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**<br>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**<br>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**<br>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**<br>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**<br>Provides sealing for:<br>• overcurrent release<br>• accessory compartment cover<br>• terminal cover<br>• manual operating mechanism<br>• motorized operating mechanism | B | **3VT9 200-8BN00** | 1 unit | 0.001 |
|  | **Additional cover for overcurrent release**<br>Provides protection for overcurrent releases | B | **3VT9 200-8BL00** | 1 unit | 0.080 |
|  | **Connecting cable**<br>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**<br>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**<br>Prevents inserting the wrong switching unit into the plug-in or withdrawable devices | | **3VT9 200-4WN00** | 1 unit | 0.002 |
|  | **Pushbutton cover**<br>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 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

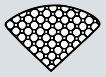
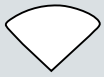
| Rated current $I_n$ | Permissible cross-section $S$ | | Busbars W x H | |
|---|---|---|---|---|
| | Cu | Al | Cu | Al |
| A | $mm^2$ | $mm^2$ | mm | mm |
| 40 | 10 | 16 | | |
| 50 | 10 | 16 | | |
| 63 | 16 | 25 | | |
| 80 | 25 | 35 | | |
| 100 | 35 | 50 | 20 x 2 | 25 x 2 |
| 125 | 50 | 70 | 25 x 2 | 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** | | | | Busbars and cable lugs | Technical information |
|---|---|---|---|---|---|---|---|
| | | Sector-shaped conductor, stranded  | Sector-shaped conductor, solid  | Round conductor, stranded  | Round conductor, solid  | W x H | |
| | A | $mm^2$ | $mm^2$ | $mm^2$ | $mm^2$ | mm | 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

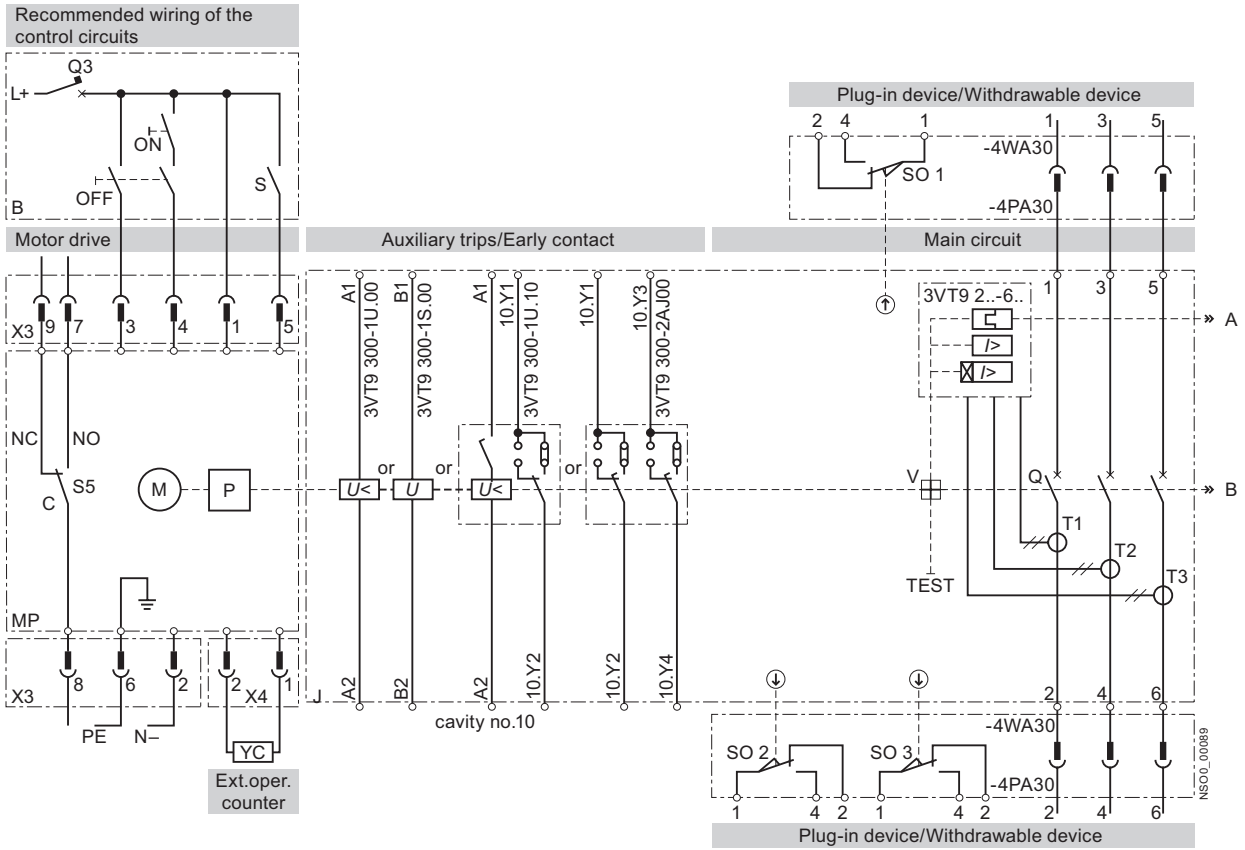
| Specifications | | Circuit breakers | | | Switch disconnectors |
|---|---|---|---|---|---|
| Standards | | EN 60947-2, IEC 60947-2 | | | EN 60947-3, IEC 60947-3 |
| Approval marks | | CE | | | |
| Number of poles | | 3, 4 | | | |
| Rated current $I_n$ | A | 100, 160, 200, 250 | | | -- |
| Rated uninterrupted current $I_u$ | A | 250 | | | |
| Rated operational current $I_e$ | A | -- | | | 250 |
| Rated operational voltage $U_e$ | V | AC max. 690 | | | AC max. 690<br>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<br>36 kA<br>16 kA<br>10 kA | 100 kA<br>65 kA<br>25 kA<br>13 kA | AC 230 V<br>AC 415 V<br>AC 500 V<br>AC 690 V | -- |
| Rated short-circuit service breaking capacity (rms value) $I_{cs}/U_e$ | | 30 kA<br>18kA<br>8kA<br>5kA | 50 kA<br>36 kA<br>13 kA<br>8 kA | AC 230 V<br>AC 415 V<br>AC 500 V<br>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<br>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 | | ✔/✔ | | | |

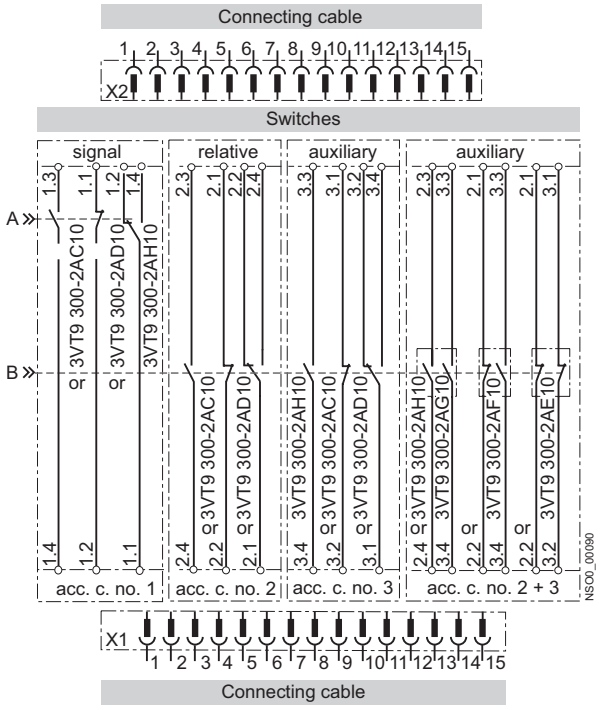
✔ available
-- unavailable
+ in preparation

## Schematics

### *Circuit breakers with accessories*

3-pole version



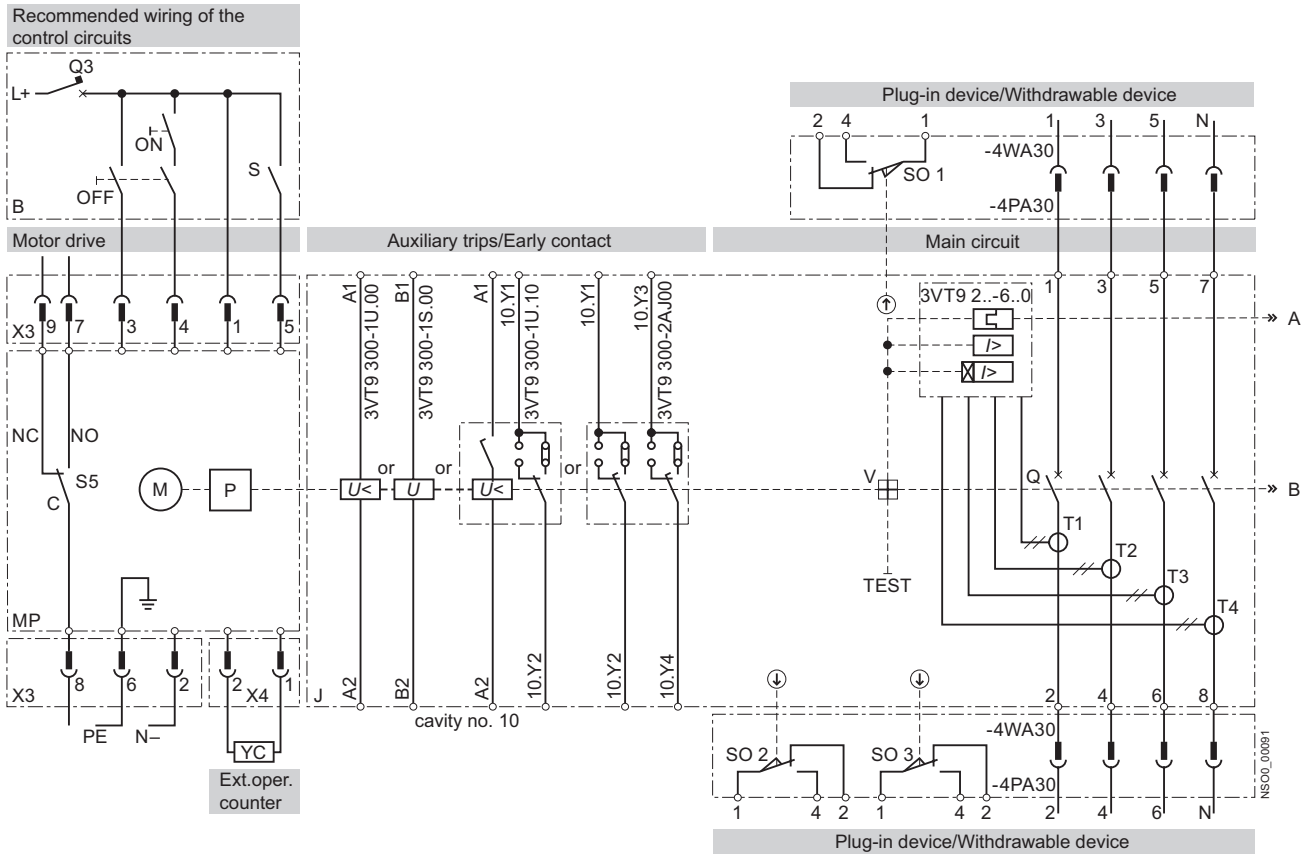



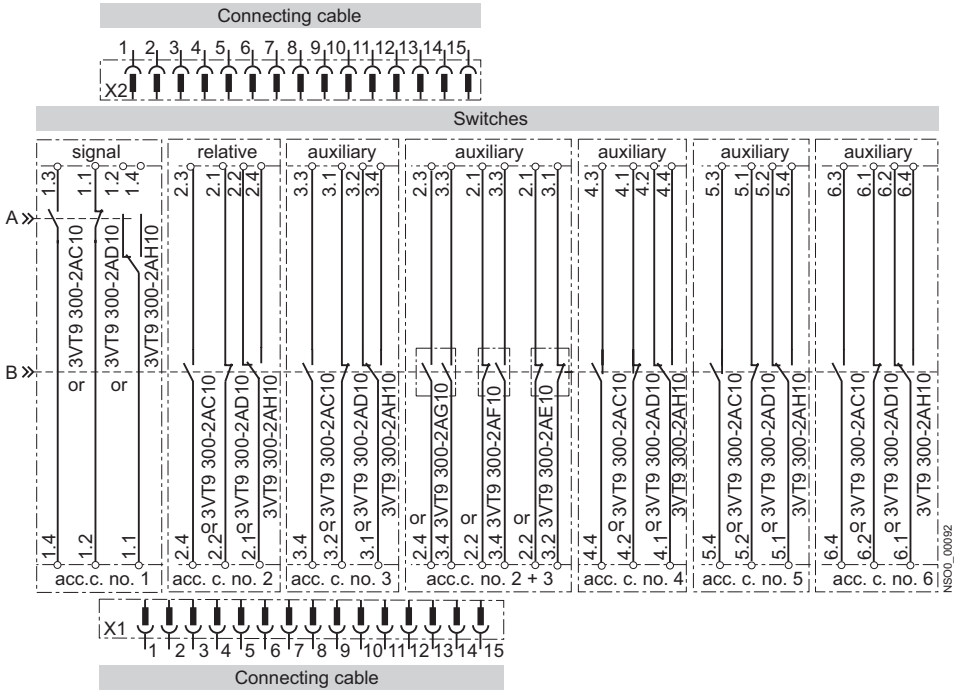

| | |
|---|---|
| MP | 3VT3 200-3M..0 motorized operating mechanism |
| M | motor |
| P | storage device |
| X3 | connector to connect control circuits |
| X4 | connector for external operations counter |
| S5 | switch to signal AUTO (NO-C) / MANUAL (NC-C) modes |
| YC | 3VT9 300-3MF10 external operations 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

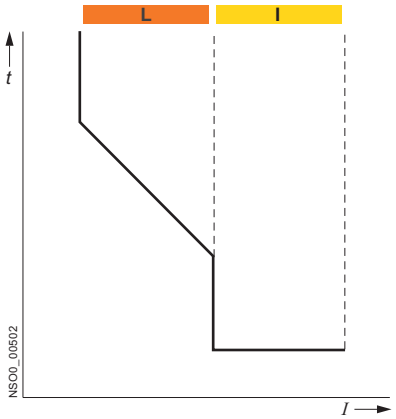
The electronic overcurrent release consists of a separate and interchangeable unit, which is supplied with the 3VT2 switching unit. By exchanging the overcurrent release, the range of the rated current of the circuit breaker can be easily changed.

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*

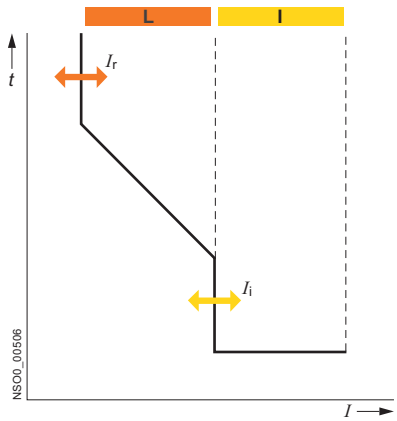
Depending upon the needs for adjusting the tripping characteristic to the protected device and to the variability of the characteristic with regard to selectivity, the following releases are available:

ETU LP



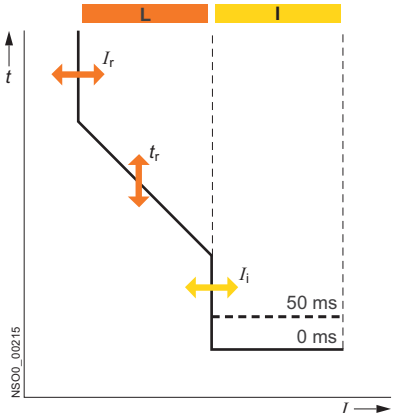

They have one type of characteristic and fixed-set $I_r$ and $I_i$ settings.

ETU DP



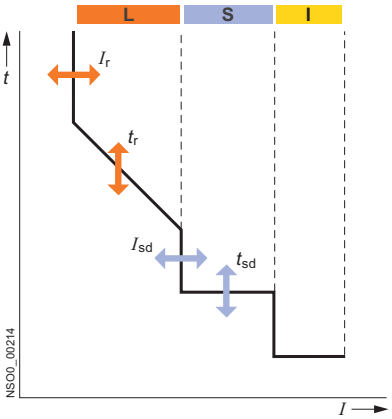

They have one type of characteristic with adjustable $I_r$ and $I_i$.

ETU MP




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

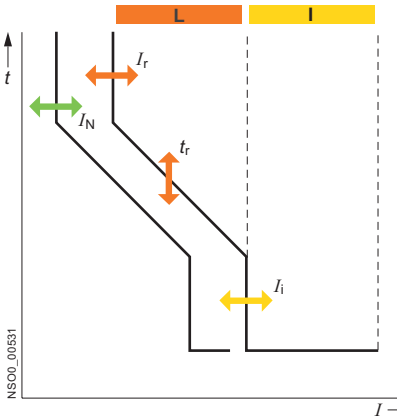
ETU MPS




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

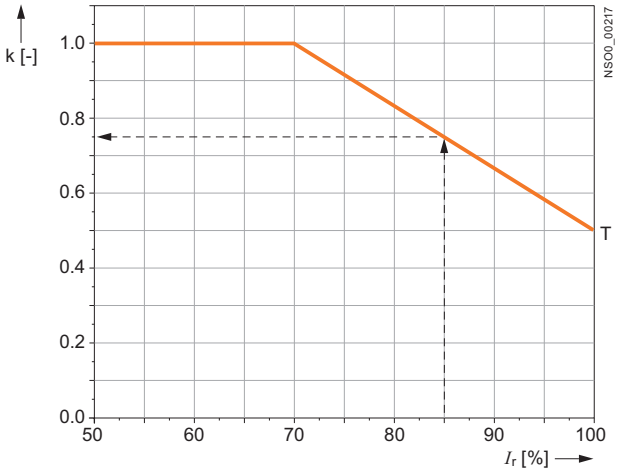
This release type is only in the ETU MPS overcurrent releases. The delayed independent release has the function of a delayed short-circuit release. It is used to set up a selective cascade of circuit breakers. It is set up using parameters $I_{sd}$ and $t_v$. $I_{sd}$ is an n-multiple of current $I_r$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

**$t_s = 0.74 \times t_v$**

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

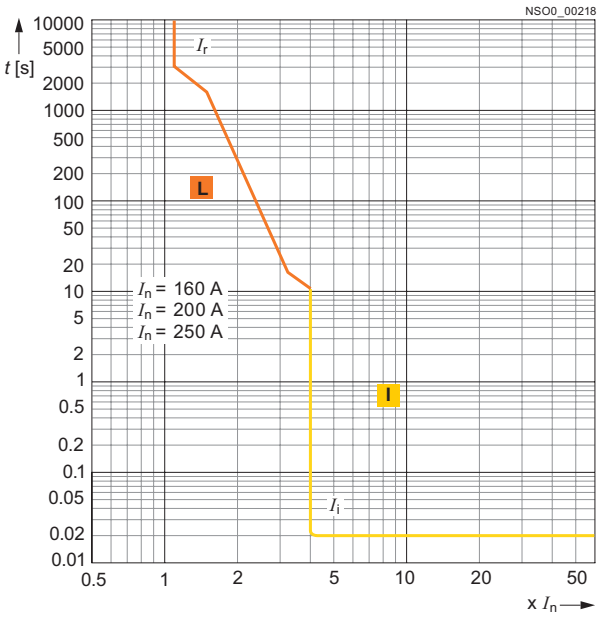
The 3VT9 2..-6AB00 release is intended only for 3VT2725 -.AA36-0AA0 or 3VT2725 -.AA46-0AA0 switching unit. The release has a thermal memory that cannot be disabled. The rated currents of the releases are given by their type designations and correspond to a standardized series of currents (see specifications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

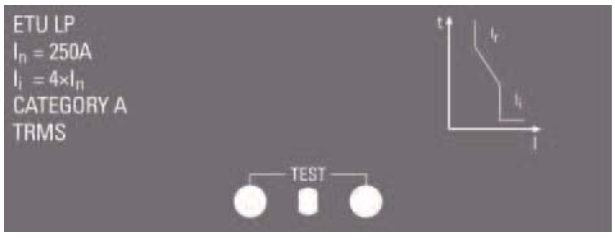
One of the advantages of the releases is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

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

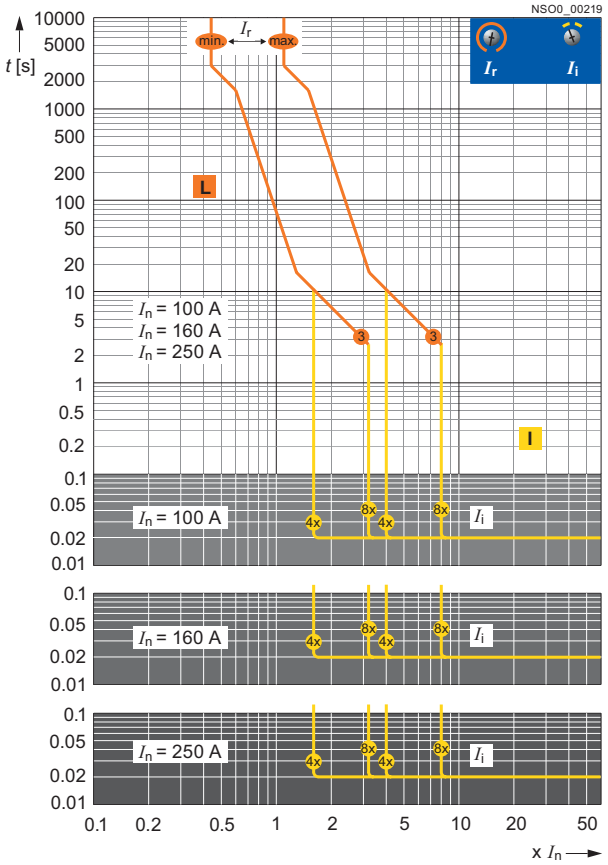
The 3VT9 2..-6AC00 release is intended only for 3VT2725-.AA36-0AA0 or 3VT2725-.AA46-0AA0 switching units. Operation of the release is controlled by a microprocessor. The release is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position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

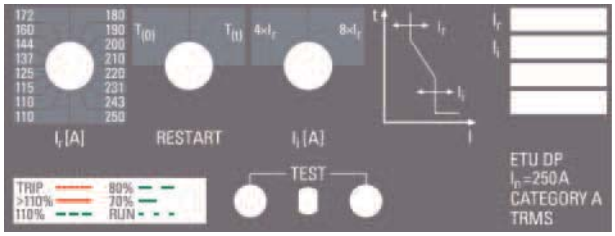
On the lower part of the release cover are two photocells for communicating with the prospective signaling unit.

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<br>43<br>46<br>48<br>50<br>55<br>58<br>61<br>63<br>69<br>72<br>76<br>80<br>87<br>91<br>100 | $T_{(0)}$<br>$T_{(t)}$ | 4 x $I_r$<br>8 x $I_r$ |
| 3VT9 216-6AC00 | 160 | 63<br>69<br>72<br>80<br>87<br>91<br>100<br>110<br>115<br>120<br>125<br>130<br>137<br>144<br>150<br>160 | $T_{(0)}$<br>$T_{(t)}$ | 4 x $I_r$<br>8 x $I_r$ |
| 3VT9 225-6AC00 | 250 | 100<br>110<br>115<br>125<br>137<br>144<br>160<br>172<br>180<br>190<br>200<br>210<br>220<br>231<br>243<br>250 | $T_{(0)}$<br>$T_{(t)}$ | 4 x $I_r$<br>8 x $I_r$ |

### *Overcurrent releases ETU MP - Motors*

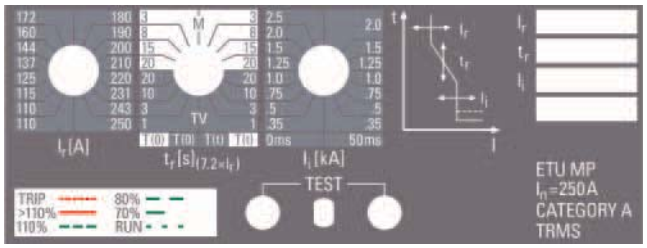
- Direct protection for motors and generators
- Possibility for protecting lines and transformers

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.

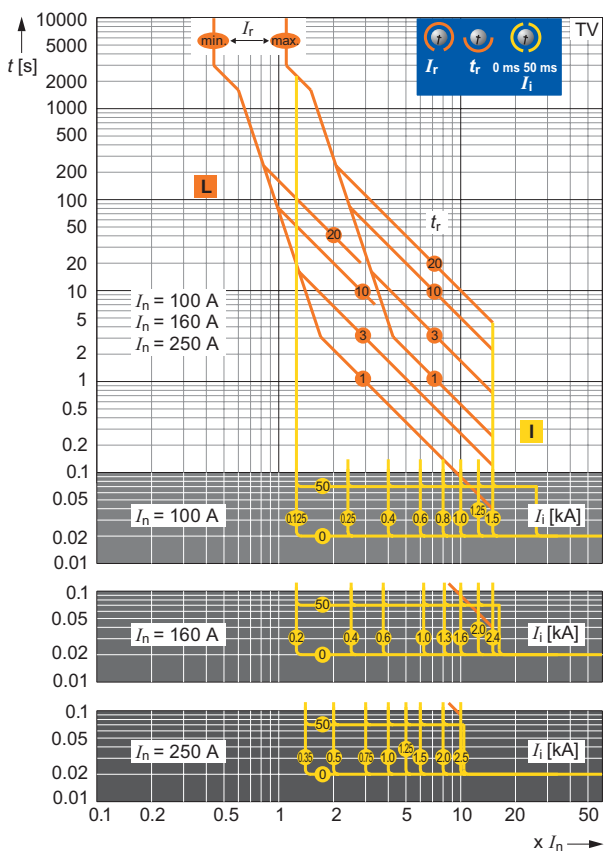


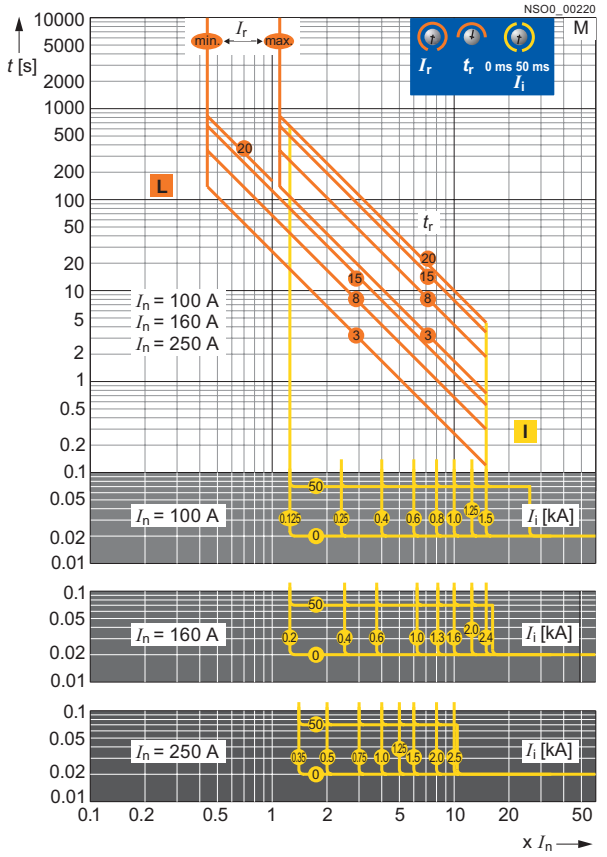

Adjustable specifications

| 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*

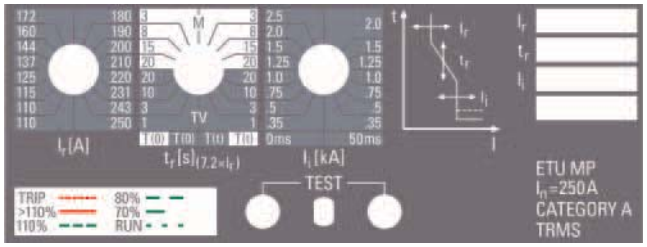
- Direct protection for motors and generators
- Possibility for protecting lines and transformers
- Enables adjusting time delay of independent release

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.

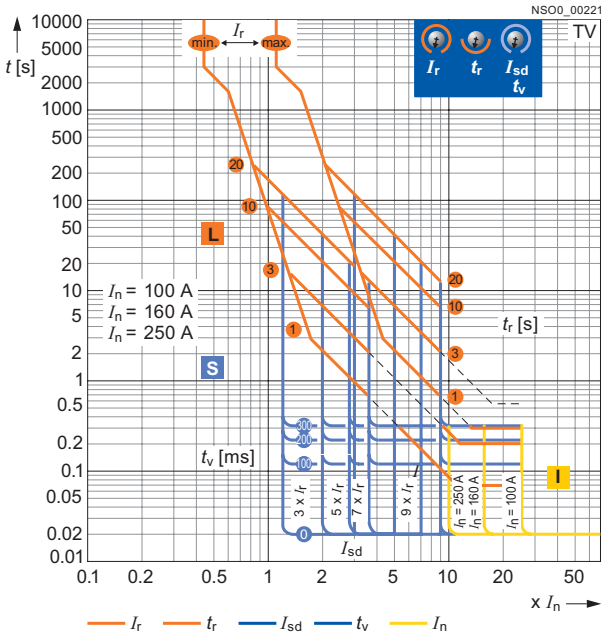


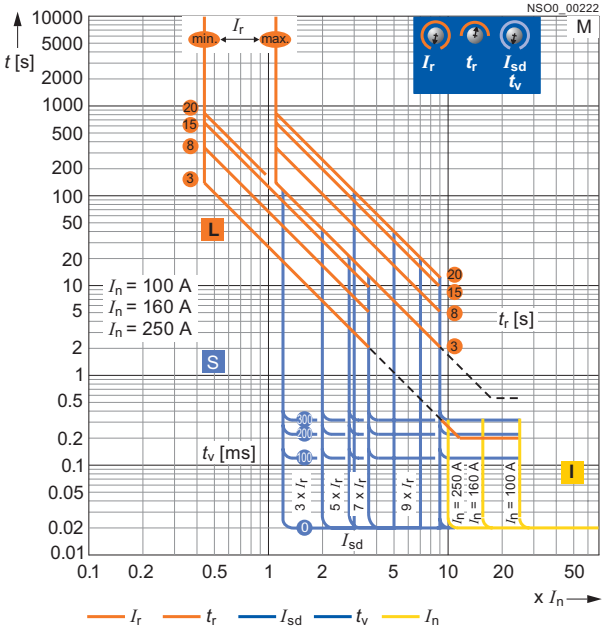

Adjustable specifications

| 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 |
| 3VT9210-6AS00 | 100 | 40 | 1 (TV 1) | $T_{(0)}$ | 3 | |
| | | 43 | 3 (TV 3) | $T_{(0)}$ | 5 | 0 |
| | | 46 | 10 (TV 10) | $T_{(0)}$ | 7 | |
| | | 48 | 20 (TV 20) | $T_{(0)}$ | 9 | |
| | | 50 | 20 (M 20) | $T_{(0)}$ | 3 | |
| | | 55 | 15 (M 15) | $T_{(0)}$ | 5 | 100 |
| | | 58 | 8 (M 8) | $T_{(0)}$ | 7 | |
| | | 61 | 3 (M 3) | $T_{(0)}$ | 9 | |
| | | 63 | 3 (M 3) | $T_{(t)}$ | 3 | |
| | | 69 | 8 (M 8) | $T_{(t)}$ | 5 | 200 |
| | | 72 | 15 (M 15) | $T_{(t)}$ | 7 | |
| | | 76 | 20 (M 20) | $T_{(t)}$ | 9 | |
| | | 80 | 20 (TV 20) | $T_{(t)}$ | 3 | |
| | | 87 | 10 (TV 10) | $T_{(t)}$ | 5 | 300 |
| | | 91 | 3 (TV 3) | $T_{(t)}$ | 7 | |
| | | 100 | 1 (TV 1) | $T_{(t)}$ | 9 | |
| 3VT9216-6AS00 | 160 | 63 | 1 (TV 1) | $T_{(0)}$ | 3 | |
| | | 69 | 3 (TV 3) | $T_{(0)}$ | 5 | 0 |
| | | 72 | 10 (TV 10) | $T_{(0)}$ | 7 | |
| | | 80 | 20 (TV 20) | $T_{(0)}$ | 9 | |
| | | 87 | 20 (M 20) | $T_{(0)}$ | 3 | |
| | | 91 | 15 (M 15) | $T_{(0)}$ | 5 | 100 |
| | | 100 | 8 (M 8) | $T_{(0)}$ | 7 | |
| | | 110 | 3 (M 3) | $T_{(0)}$ | 9 | |
| | | 115 | 3 (M 3) | $T_{(t)}$ | 3 | |
| | | 120 | 8 (M 8) | $T_{(t)}$ | 5 | 200 |
| | | 125 | 15 (M 15) | $T_{(t)}$ | 7 | |
| | | 130 | 20 (M 20) | $T_{(t)}$ | 9 | |
| | | 137 | 20 (TV 20) | $T_{(t)}$ | 3 | |
| | | 144 | 10 (TV 10) | $T_{(t)}$ | 5 | 300 |
| | | 150 | 3 (TV 3) | $T_{(t)}$ | 7 | |
| | | 160 | 1 (TV 1) | $T_{(t)}$ | 9 | |
| 3VT9225-6AS00 | 250 | 100 | 1 (TV 1) | $T_{(0)}$ | 3 | |
| | | 110 | 3 (TV 3) | $T_{(0)}$ | 5 | 0 |
| | | 115 | 10 (TV 10) | $T_{(0}$ | 7 | |
| | | 125 | 20 (TV 20) | $T_{(0))}$ | 9 | |
| | | 137 | 20 (M 20) | $T_{(0)}$ | 3 | |
| | | 144 | 15 (M 15) | $T_{(0)}$ | 5 | 100 |
| | | 160 | 8 (M 8) | $T_{(0)}$ | 7 | |
| | | 172 | 3 (M 3) | $T_{(0)}$ | 9 | |
| | | 180 | 3 (M 3) | $T_{(t)}$ | 3 | |
| | | 190 | 8 (M 8) | $T_{(t)}$ | 5 | 200 |
| | | 200 | 15 (M 15) | $T_{(t)}$ | 7 | |
| | | 210 | 20 (M 20) | $T_{(t)}$ | 9 | |
| | | 220 | 20 (TV 20) | $T_{(t)}$ | 3 | |
| | | 231 | 10 (TV 10) | $T_{(t)}$ | 5 | 300 |
| | | 243 | 3 (TV 3) | $T_{(t)}$ | 7 | |
| | | 250 | 1 (TV 1) | $T_{(t)}$ | 9 | |

## 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

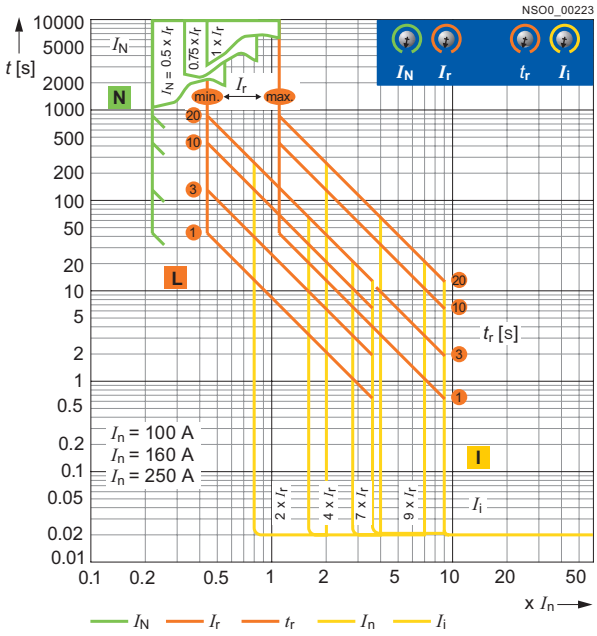
The 3VT9 2..-6BC00 release is intended only for the 3VT2 725-.AA56-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$.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

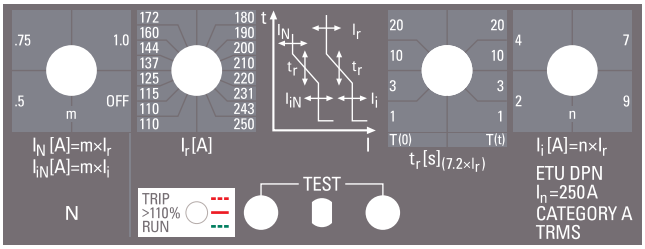
The rated current $I_r$, delay for switching off the release at 7.2 $I_r$, and the tripping level of the short-circuit release can be adjusted.

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



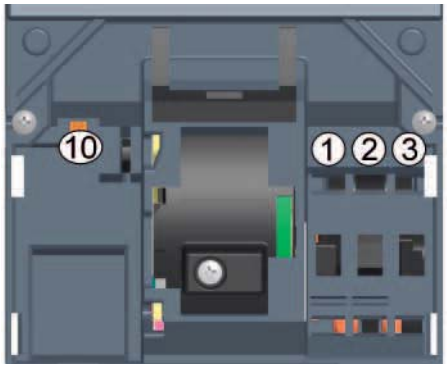




Adjustable specifications

| 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 |
| 3VT9 210-6BC00 | 100 | 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 | |
| | | 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 | |
| 3VT9 216-6BC00 | 160 | 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 | |
| | | 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 | |
| 3VT9 225-6BC00 | 250 | 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 | |
| | | 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

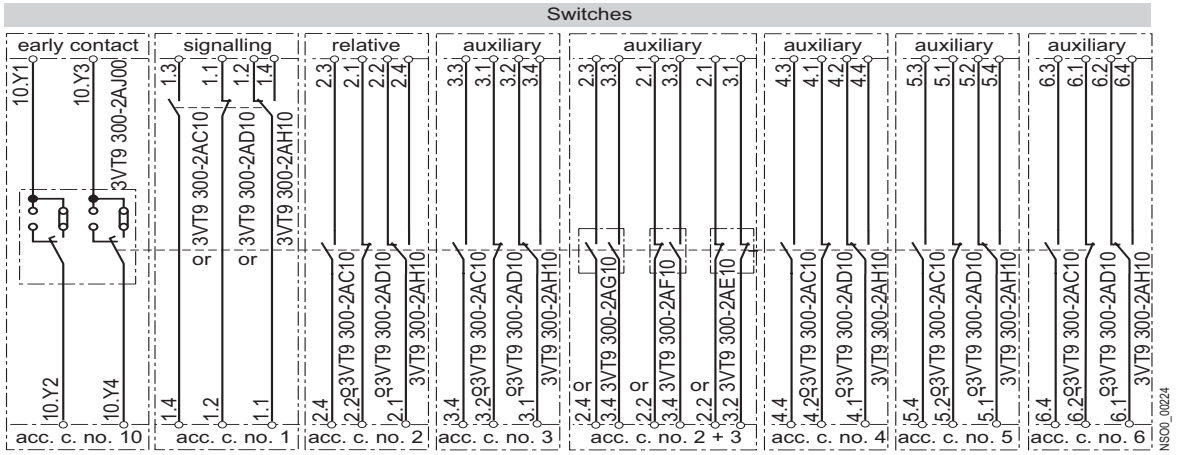
| Circuit breaker state | Toggle positon of circuit breaker | State of the main contacts | Accessory compartment | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | | 2 | | 3 (4 ... 6)[1] | | 10 | | 2 and 3 | | 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

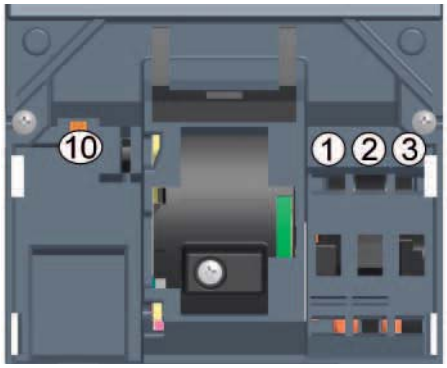
General data

| 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<br>DC 60 ... 500 | AC 5 ... 60<br>DC 5 ... 60 | AC 250 | AC 24 ...250<br>DC 24 ...250 | AC 5 ..60<br>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

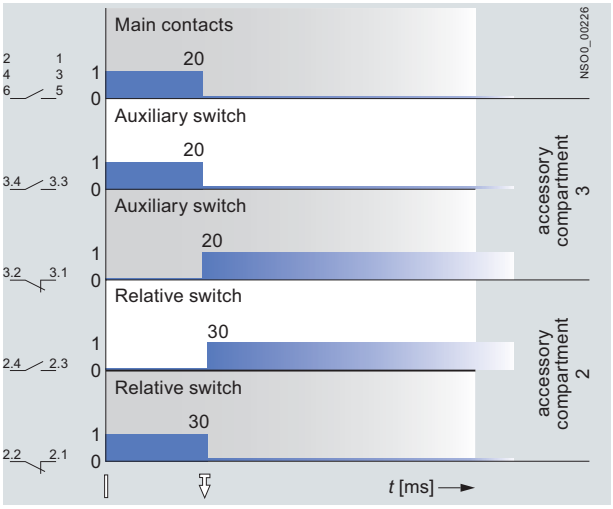
| Order No. | Rated operating voltage $U_e$ |
|---|---|
| 3VT9 300-1UC00 | AC/DC 24, 40, 48 V |
| 3VT9 300-1UD00 | AC/DC 110 V |
| 3VT9 300-1UE00 | AC 230, 400, 500/DC 220 V |

- 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

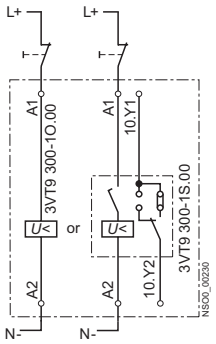
*Shunt releases*

Circuit breaker switched off by the shunt release



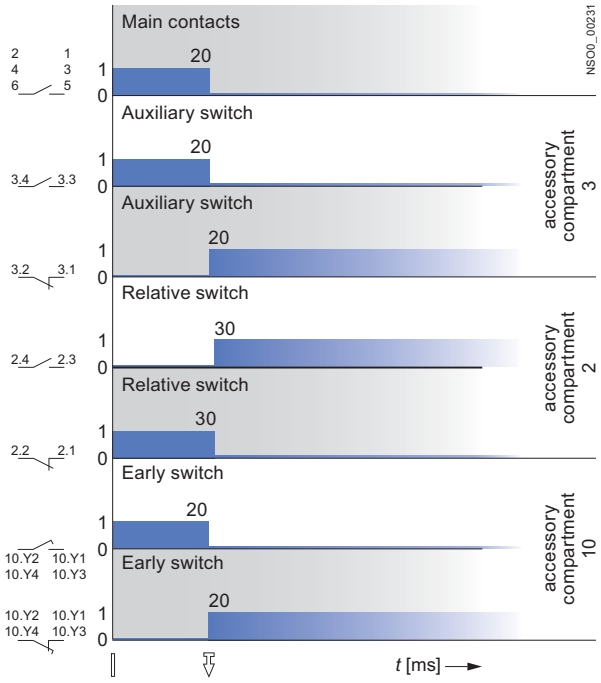

Circuit breaker states and toggle positions of the circuit breaker

| 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

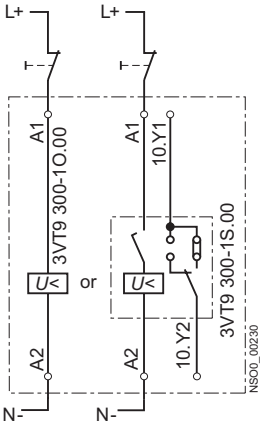



Circuit breaker states and toggle positions of the circuit breaker

| 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<br>DC 24, 40, 48, 110, 220 |
| Rated frequency $f_n$ | | 50/60 Hz |
| Input power at 1.1 $U_e$ | | AC < 3 VA<br>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<br>DC 24, 40, 48, 110, 220 | |
| Rated frequency $f_n$ | Hz | 50/60 | |
| Input power at 1.1 $U_e$ | | AC <3 VA<br>DC <3 W | |
| Functional description[1] | | U ≥ 0.85 $U_e$<br>(circuit breaker is possible switch on)<br>U ≤ 0.35 $U_e$<br>(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*

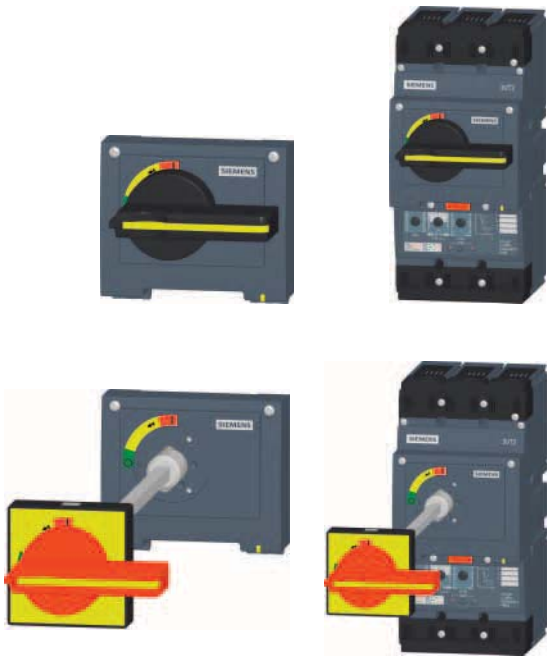
The following elements of the rotary operating mechanisms need to be used:

- 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

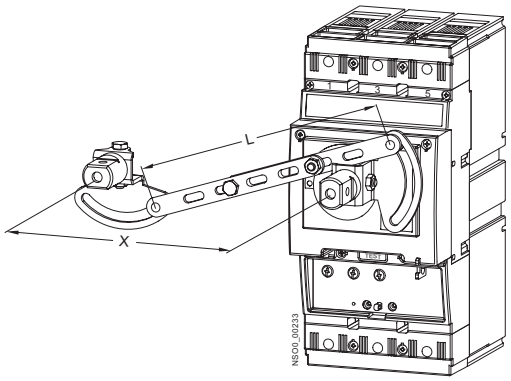
| Order No. | Description | Colour | Locking while the circuit breaker is in OFF state | Degree of protection | Switchgear door locking in the circuit breaker state | | |
|---|---|---|---|---|---|---|---|
| | | | | | switched on or off by release | switched off manually and locked | Length mm |
| 3VT9 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

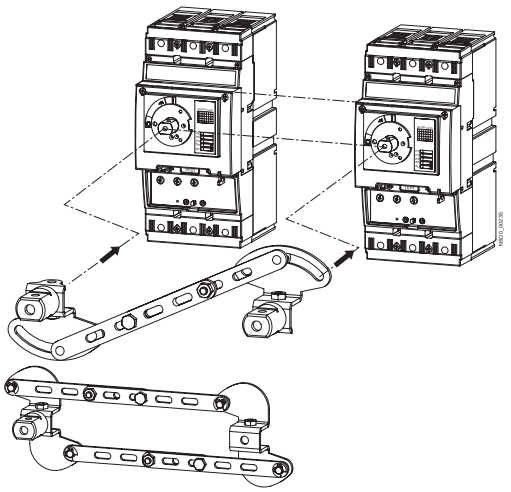
### *3VT9 300-8LA00 Mechanical interlocking*

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.



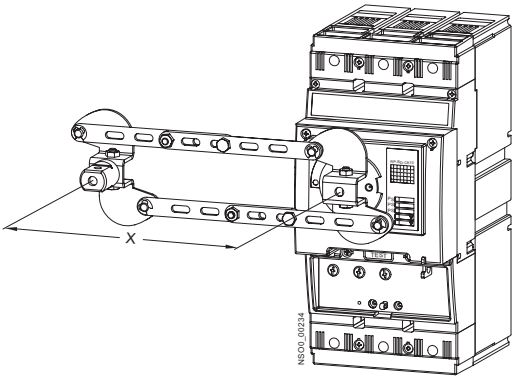

| Left switching unit | Right switching unit | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3VT2 3-pole | | 3VT2 4-pole | | 3VT3 3-pole | | 3VT3 4-pole | |
| | X | L | X | L | X | L | X | L |
| | mm | mm | mm | mm | mm | mm | mm | mm |
| 3VT2 3P | 105 | 112 | 140 | 145.5 | 122.5 | 128.5 | 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.

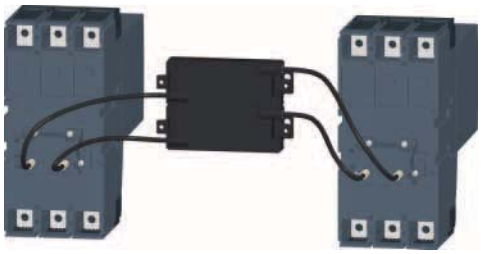



| Left switching unit | Right switching unit | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3VT2 3-pole | | 3VT2 4-pole | | 3VT3 3-pole | | 3VT3 4-pole[1] | |
| | X | L | X | L | X | L | X | L |
| | mm | mm | mm | mm | mm | mm | mm | mm |
| 3VT2 3P | $105^{+7}$ | $112^{+7}$ | $140^{+7}$ |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



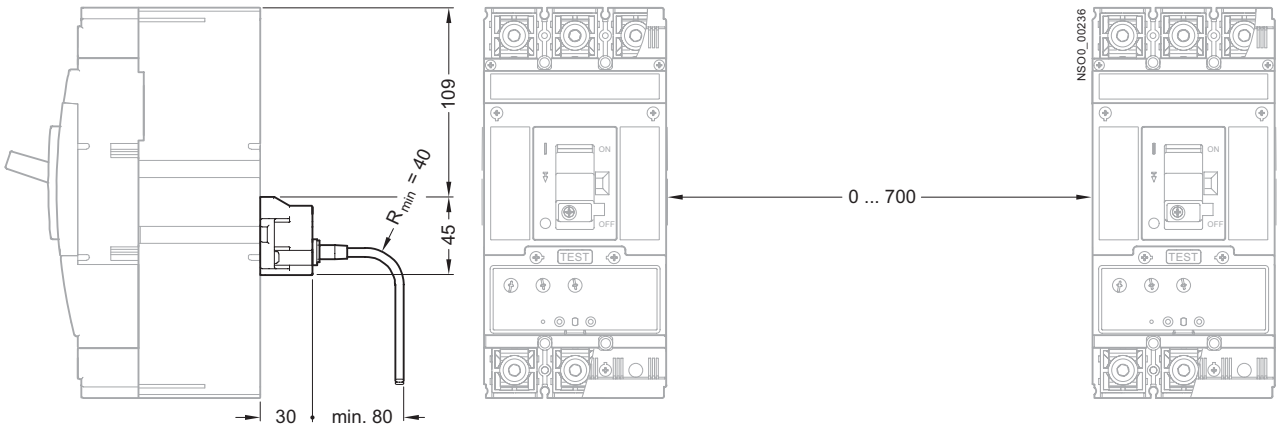


- Provides mechanical interlocking of two circuit breakers/ switch disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- The 3VT9 200-8LC10 mechanical interlocking is intended for two 3VT2 circuit breakers. 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<br>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<br>DC | 100 VA<br>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<br>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 |

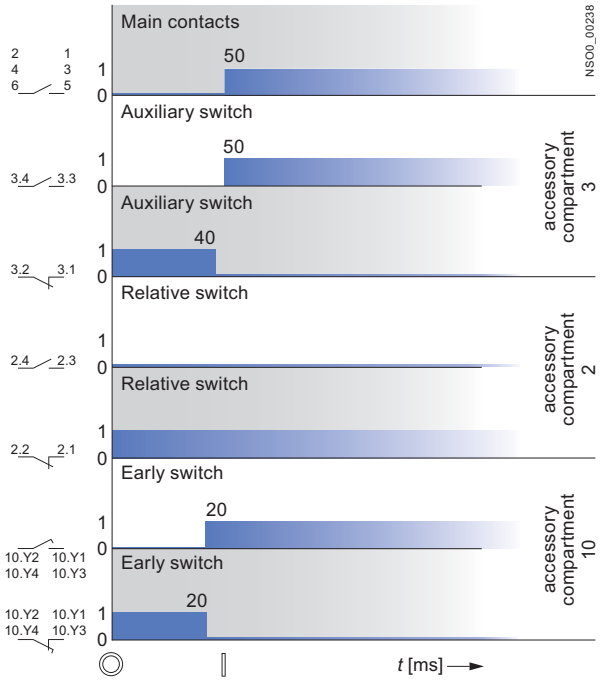
[1)] For sequence of control pulses, see page ...

## Motorized operating mechanism

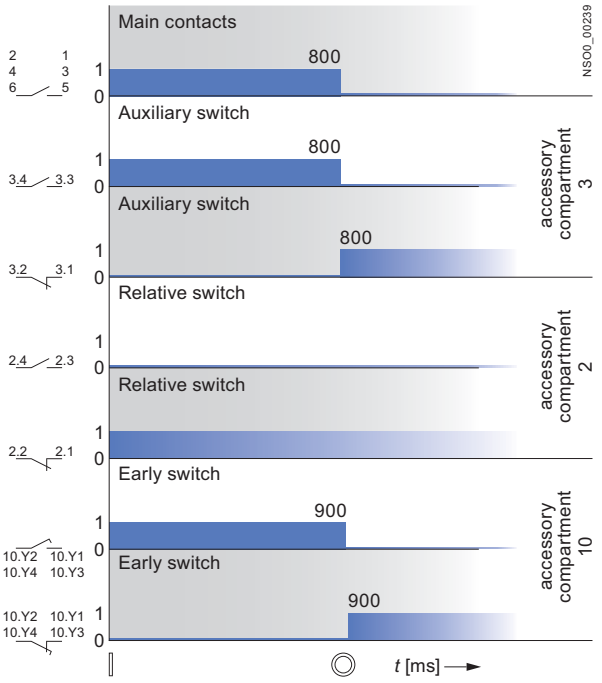
### Function

***Circuit breaker switched on/off by the motorized operating mechanism***

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

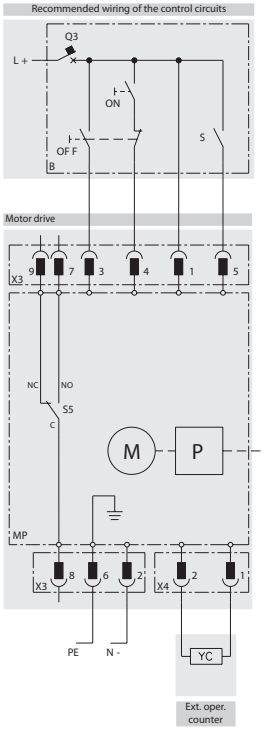



Circuit breaker switched off by the motorized operating mechanism – electrically by pushbutton OFF




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

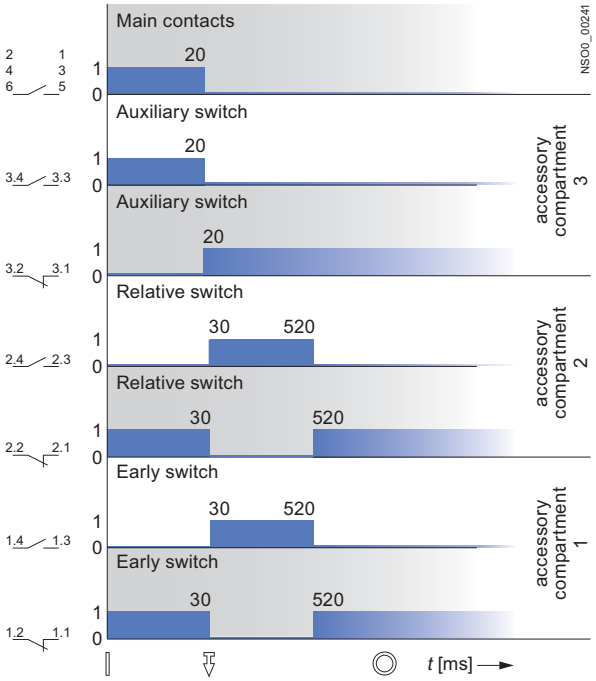
| Circuit breaker state | Toggle positions of circuit breaker |
|---|---|
| Switched on | |
| Switched off by releases, or by TEST button or by the trip pushbutton on the motorized operating mechanism | |
| Switched off manually or electrically by the operating mechanism | |

Wiring diagram description

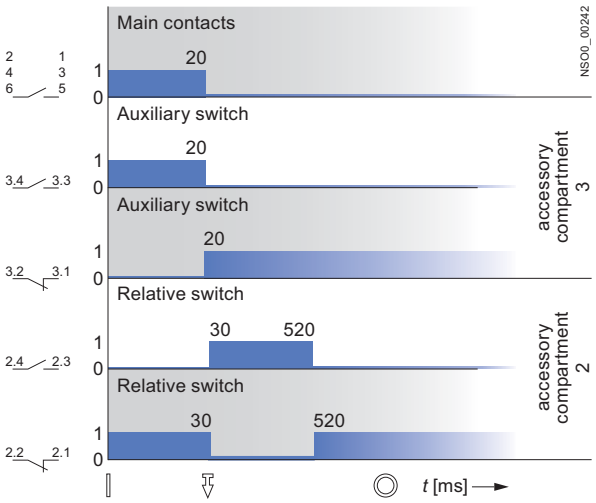
| Symbol | Description |
|---|---|
| MP | 3VT9 200-3M..0 motorized operating mechanism |
| M | motor |
| P | storage mechanism |
| X3 | connector to connect control circuits |
| X4 | connector for external operations counter |
| S5 | switch indicating AUTO/MANUAL modes |
| YC | external 3VT9300-3MF10 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 |

## Motorized operating mechanism

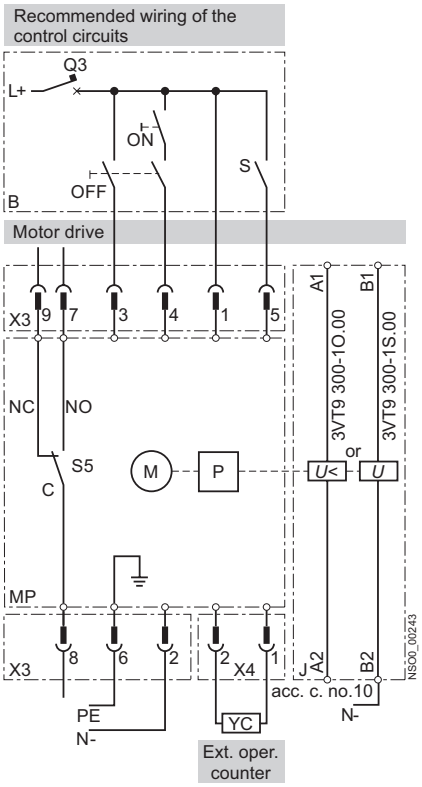
Tripping of the circuit breaker with motorized operating mechanism by the overcurrent release (switch S in switched-on state – automatic storage)



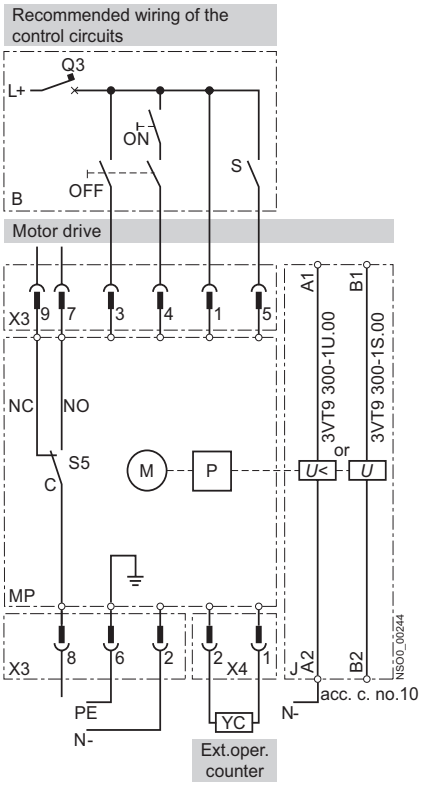

Tripping of the circuit breaker with motorized operating mechanism by a shunt release or undercurrent release (switch S in switched-on state – automatic storage)




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



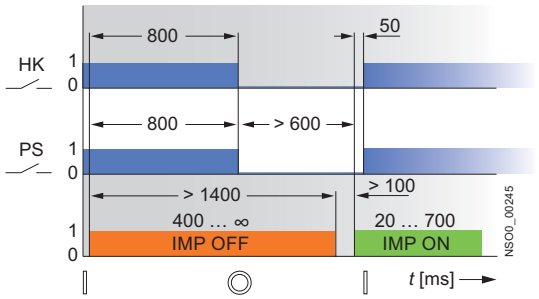

Circuit breaker switched on by the motorized operating mechanism (electrical pushbutton ON) and switched off by the undervoltage release



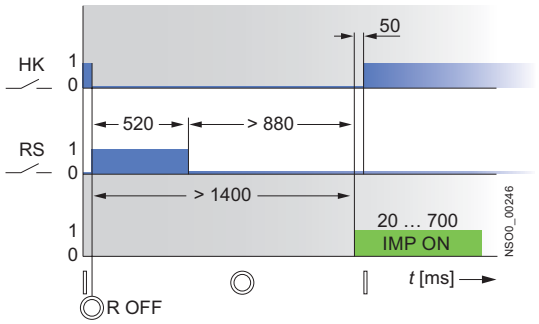
## Motorized operating mechanism

Recommended actuating pulses

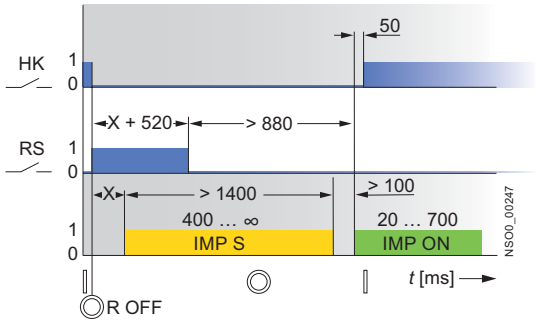
Circuit breaker switched on/off by the motorized operating mechanism – S switch permanently closed (automatic storage) or open




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 |

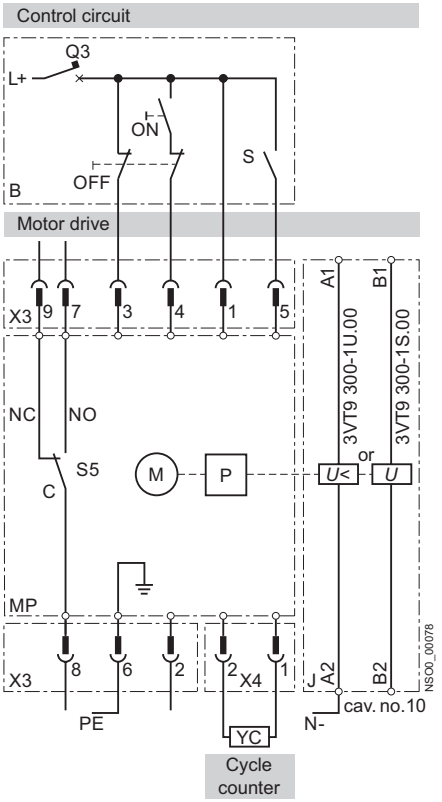
Circuit breaker states and toggle positions of the circuit breakers

| 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 | |

## Motorized operating mechanism

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

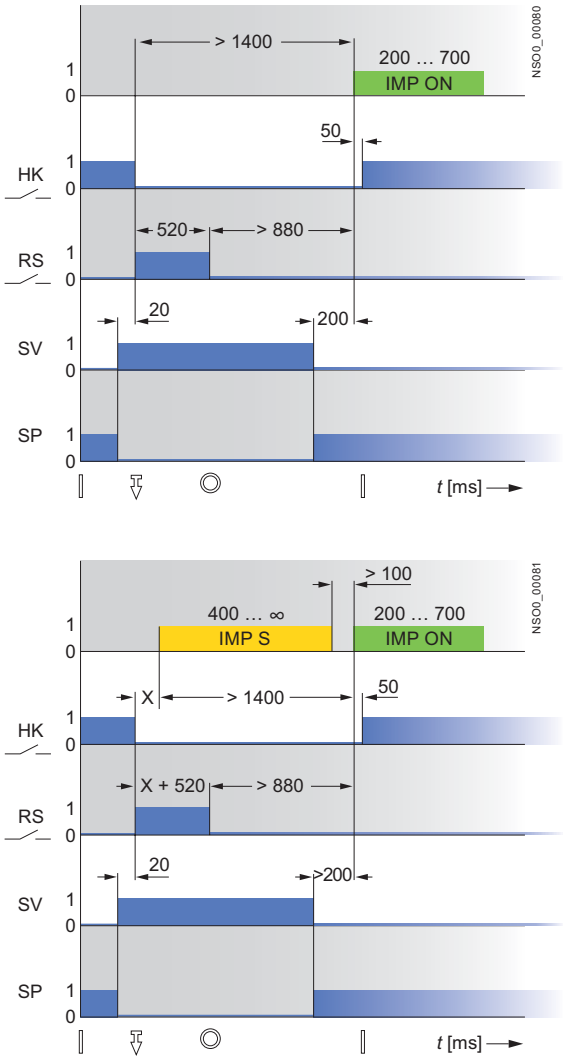
Wiring diagram of the motorized operating mechanism of the circuit breaker




| | |
|---|---|
| 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) |

## 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.

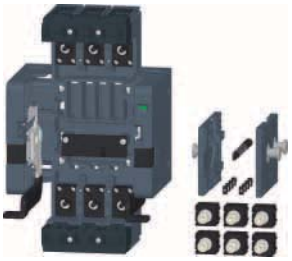
#### *Advantages and enhanced safety for the operator*

- 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<br>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.

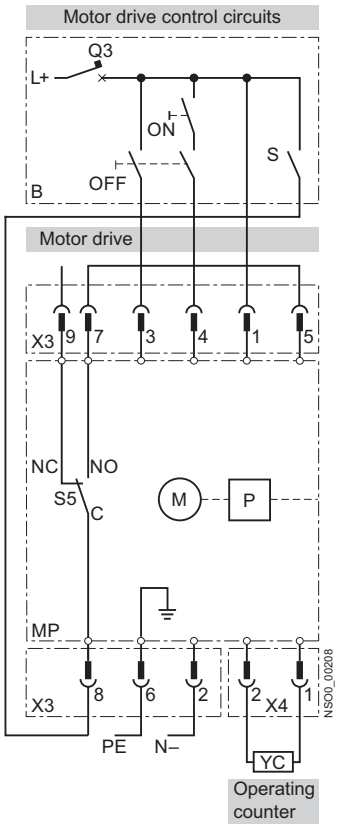
### *Plug-in device with motorized operating mechanism*

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<br>AC 24 V LSN 4C/1<br>AC 48 V LSN 4C/1<br>AC 110 V LSN 4C/1<br>AC 230 V LSN 2C/1<br>DC 24 V LSN-DC 4C/1<br>DC 48 V LSN-DC 4C/1<br>DC 110 V LSN-DC 4C/1<br>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<br>Accessory compartment<br>1 | | 2 | | 3 (4,5,6)[1] | | State of switches after removing - withdrawn<br>Accessory compartment<br>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<br>1 | 1<br>1 | 1<br>1 | 0<br>0 | 0<br>1 | 1<br>0 |
| Withdrawn and unarrested | 1<br>1 | 0<br>0 | 0<br>0 | 1<br>1 | 0<br>1 | 1<br>0 |
| Removed and unarrested | 1<br>1 | 0<br>0 | 1<br>1 | 0<br>0 | 0<br>1 | 1<br>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”)

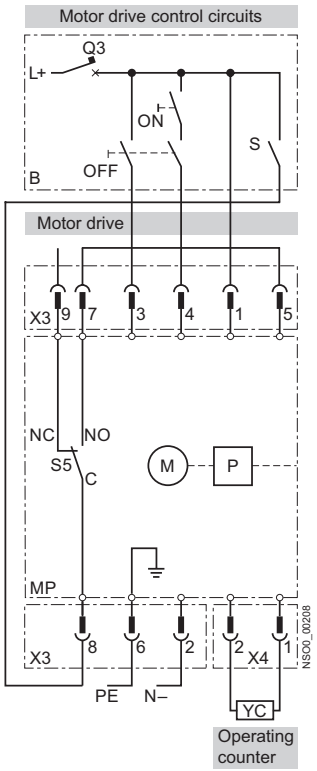
Locking the circuit breaker in withdrawable device against tampering

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<br>AC 24 V LSN 4C/1<br>AC 48 V LSN 4C/1<br>AC 110 V LSN 4C/1<br>AC 230 V LSN 2C/1<br>DC 24 V LSN-DC 4C/1<br>DC 48 V LSN-DC 4C/1<br>DC 110 V LSN-DC 4C/1<br>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

| Circuit breaker before insertion | | | State before insertion/withdrawable | | | | | | State after insertion/withdrawable | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | State of switches before insertion - withdrawn position → | | | | | | State of switches after insertion - connected position | | | | | |
| Circuit breaker before withdrawal | | | State of switches before withdrawal - connected position → | | | | | | State of switches after withdrawal - withdrawn position | | | | | |
| Accessory compartment | | | 1 | | 2 | | 3 (4,5,6)[1] | | 1 | | 2 | | 3 (4,5,6)[1] | |
| | Knob position of circuit breaker | State of the main contacts | 3VT9300-2AC10 | 3VT9300-2AD10 | 3VT9300-2AC10 | 3VT9300-2AD10 | 3VT9300-2AC10 | 3VT9300-2AD10 | 3VT9300-2AC10 | 3VT9300-2AD10 | 3VT9300-2AC10 | 3VT9300-2AD10 | 3VT9300-2AC10 | 3VT9300-2AD10 |
| Switched on | | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| Manually switched off or by motorized operating mechanism | | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| Switched off by 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.

## Project planning aids

### Dimensional drawings

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

Fixed-mounted design

Front connection

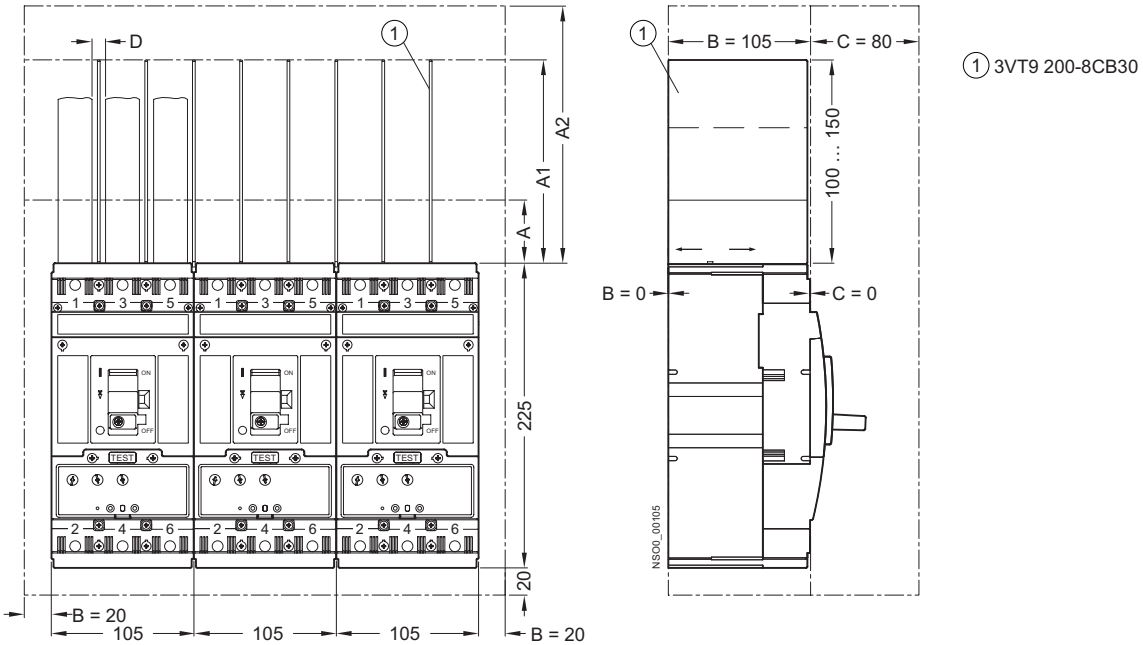
- terminals 1, 3, 5
  a) If $U_e$ = AC 415 V, it is necessary to use 3VT9 300-8CE30 insulating barriers or a 3VT9 200-8CB30 terminal cover.
  b) If insulated conductors are not used for connecting main circuit to terminals 1, 3, 5, flexibars or rear connection, it is necessary to use 3VT9 300-8CE30 insulating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

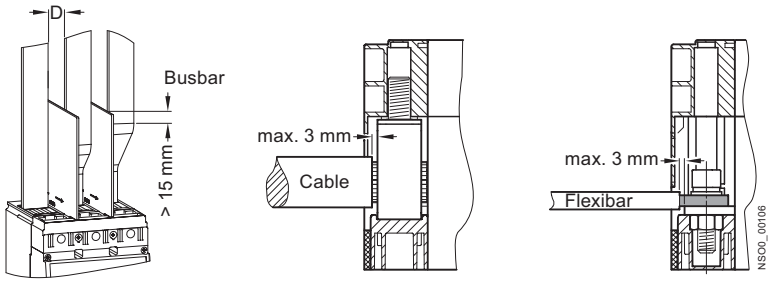
- Insulating barriers or terminal covers need not be used.

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:<br>• between circuit breaker/switch disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)<br>• between circuit breaker/switch disconnector and busbar<br>• between two circuit breaker/switch disconnectors situated vertically above one another<br>• 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 |

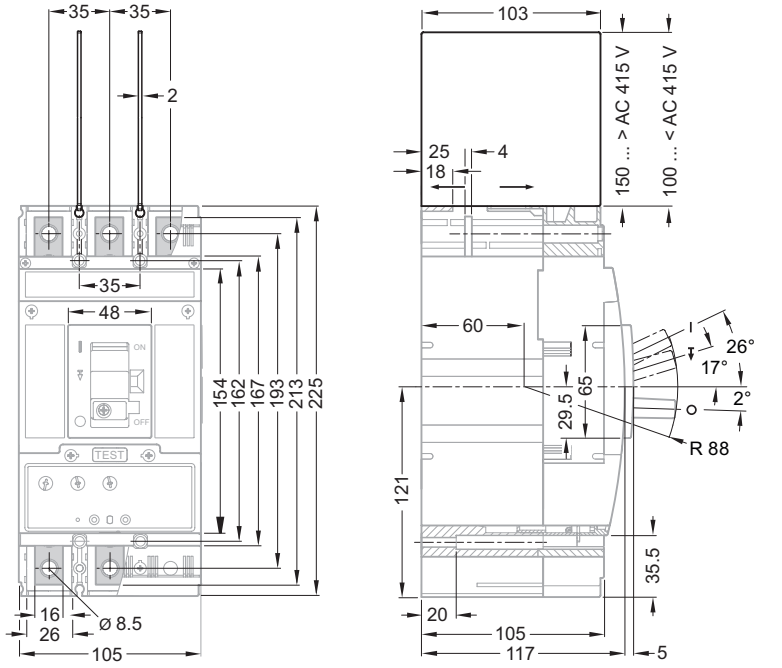



| AC $U_e$ | | | V | 230 | 415 | | 500 | 690 |
|---|---|---|---|---|---|---|---|---|
| 3VT2 H wired with $I_k$ [1] | | | kA | ≤ 100 | > 36 ... 65 | ≤ 36 | ≤ 25 | ≤ 13 |
| 3VT2 N wired with $I_k$ | | | kA | ≤ 60 | | ≤ 36 | ≤ 16 | ≤ 10 |
| C mm | D mm | | | | | | | |
| < 80 | ≥ 10 | A | mm | 50 | 50 | 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 |

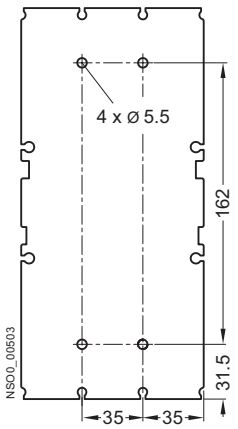
[1] $I_k$ - max. short-circuit current in the protected circuit (rms).

### *3-pole · Fixed-mounted design*

Fixed-mounted design, front connection

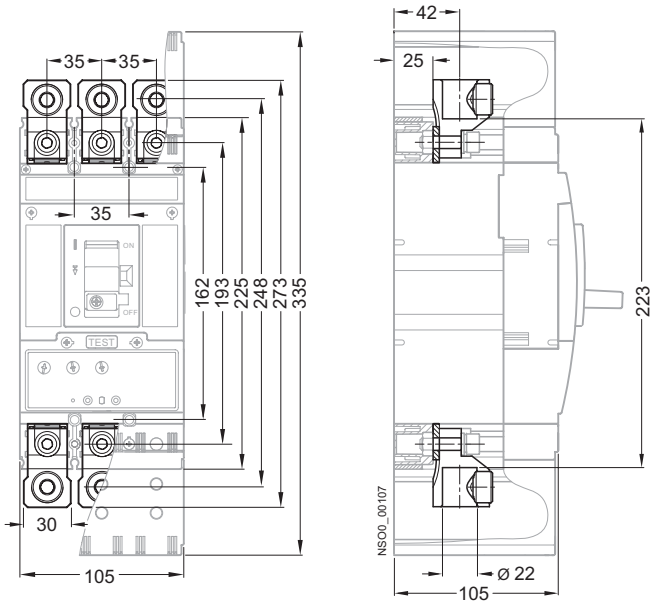



Drilling pattern

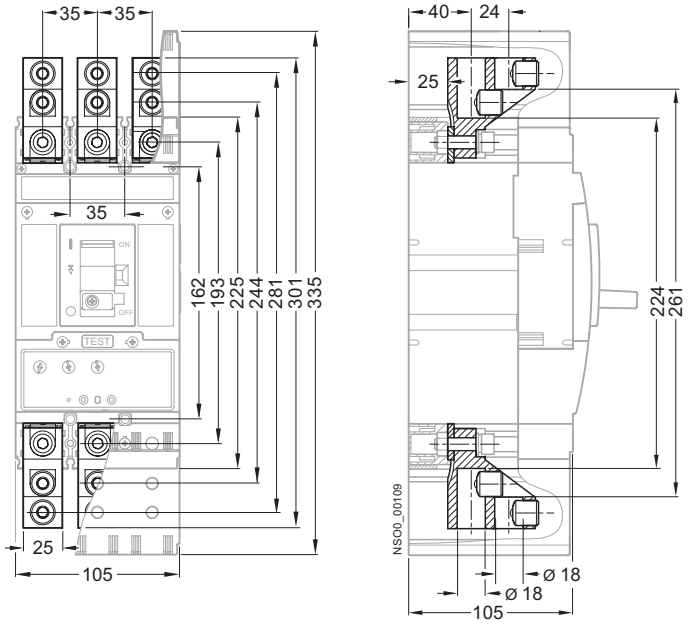


## Project planning aids

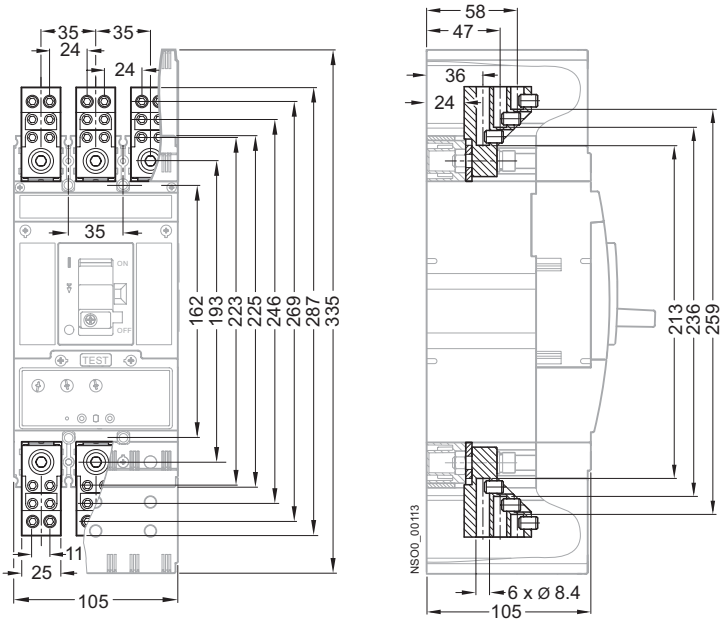
Fixed-mounted design, front connection (3VT9 224-4TD30 connecting set)



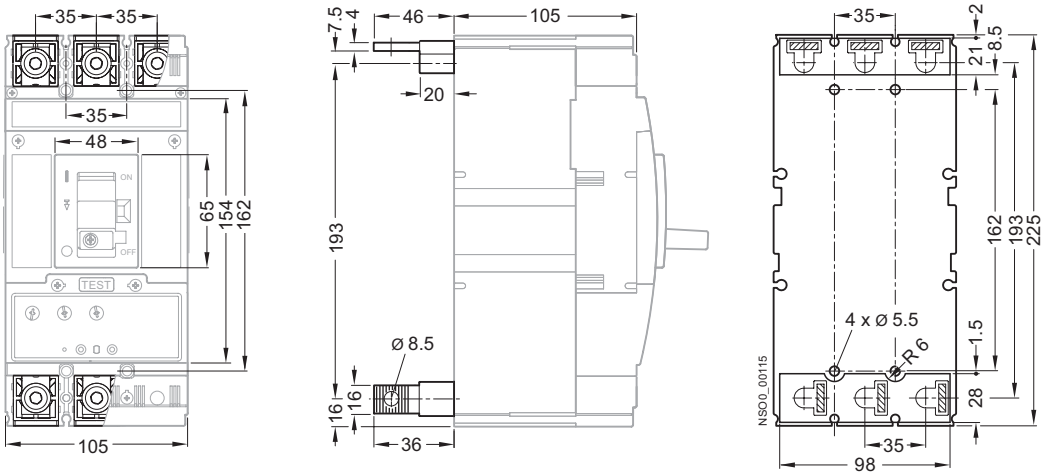

Fixed-mounted design, front connection (3VT9 215-4TF30 connecting set)



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

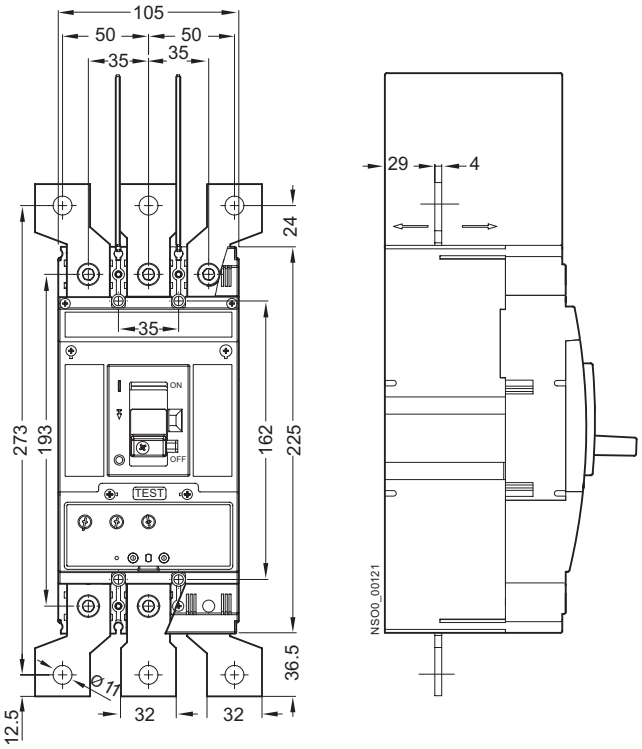



Fixed-mounted design, rear connection (3VT9 200-4RC30 connecting set)Drilling position

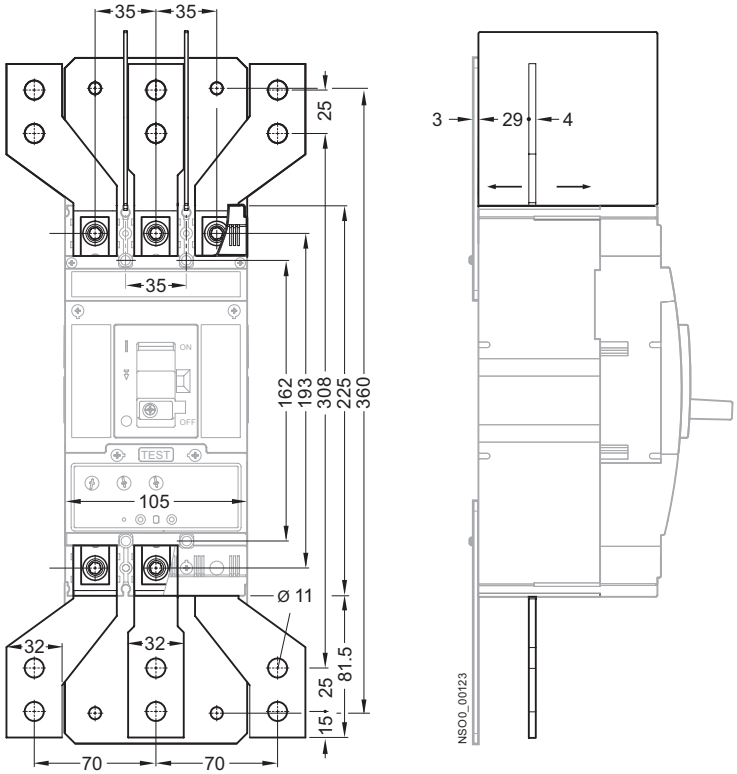


## Project planning aids

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

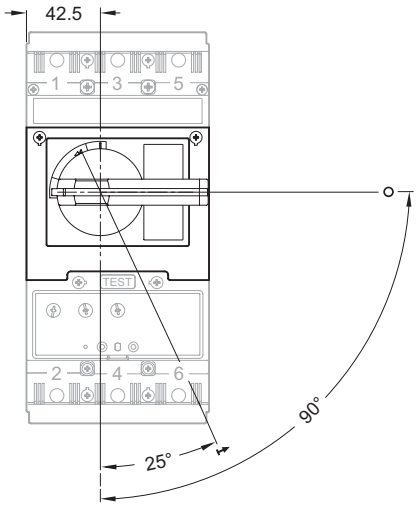


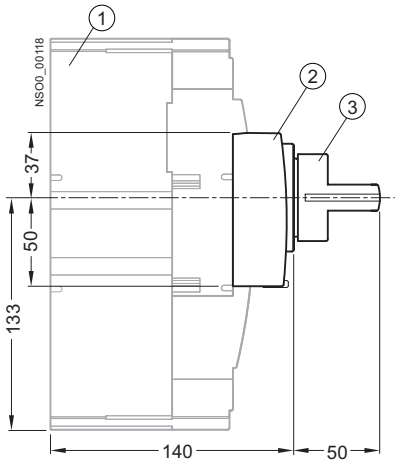

Fixed-mounted design, front connection (3VT9 200-4EE30 connecting set)



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

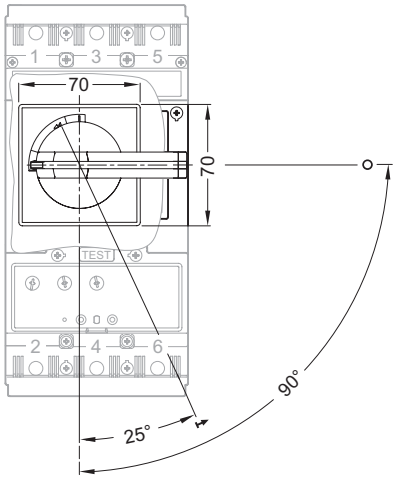
Fixed-mounted design, manual operating mechanism

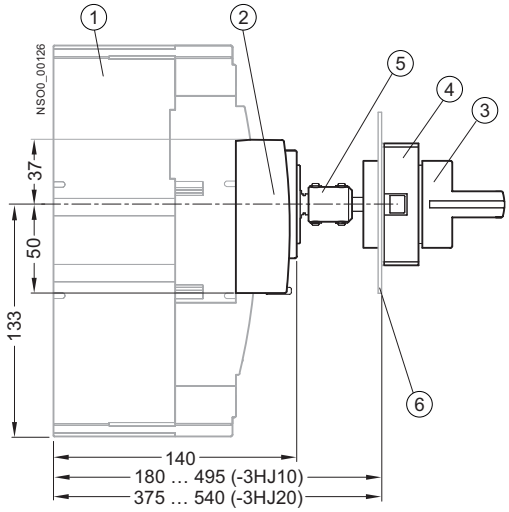



1 3VT2
2 3VT9 200-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0

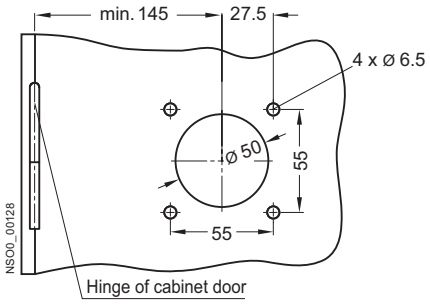
Fixed-mounted design, manual operating mechanism with adjustable knob




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

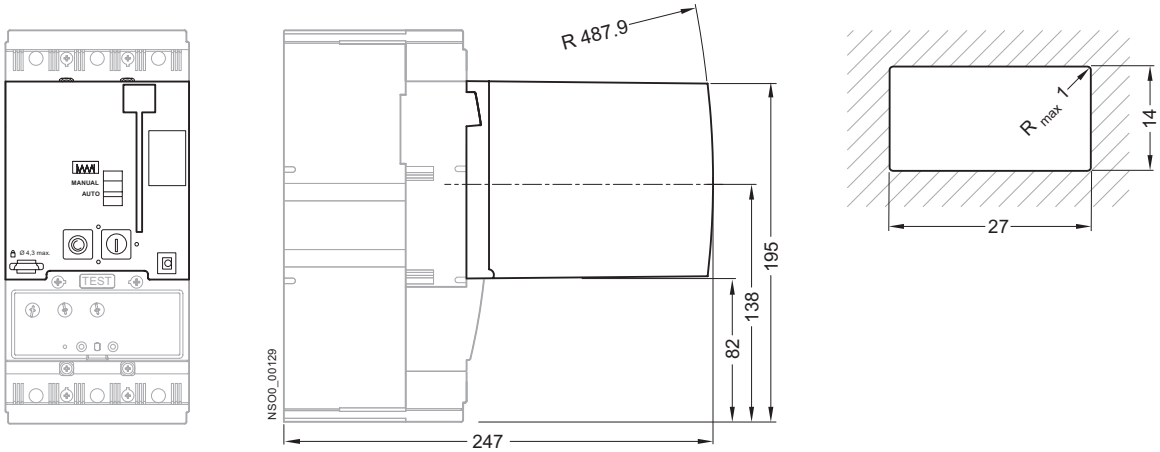
Adaption to cabinet door



## Project planning aids

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

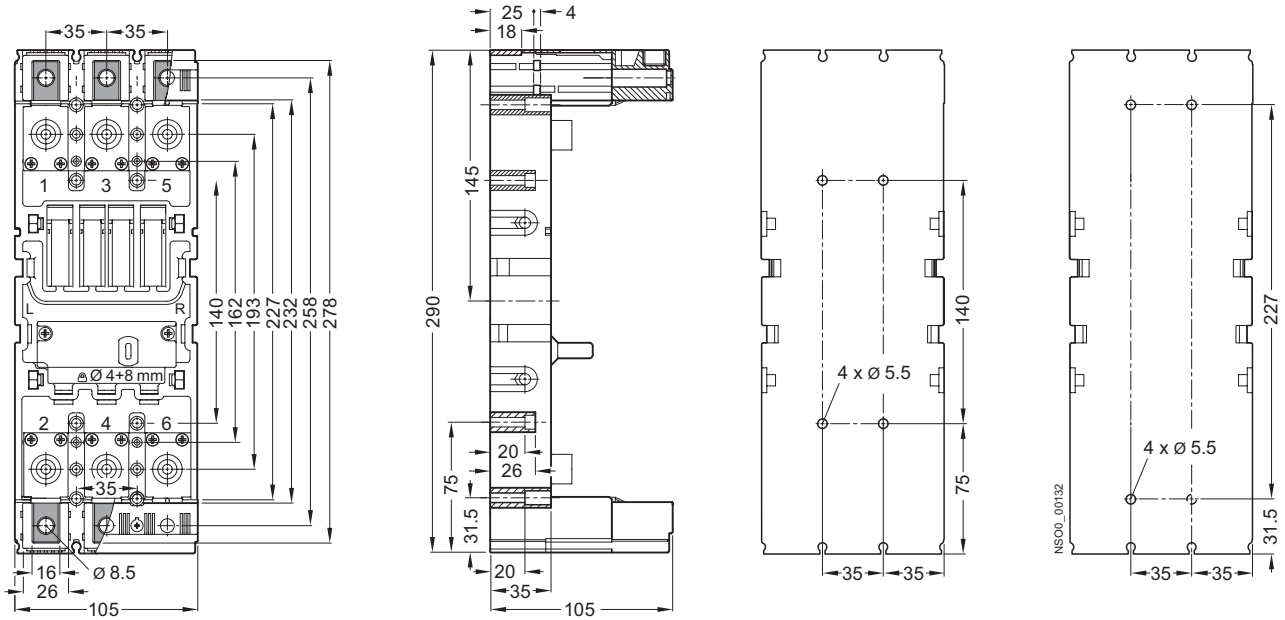
Opening dimensions in swtichgear door
for external operation cycle



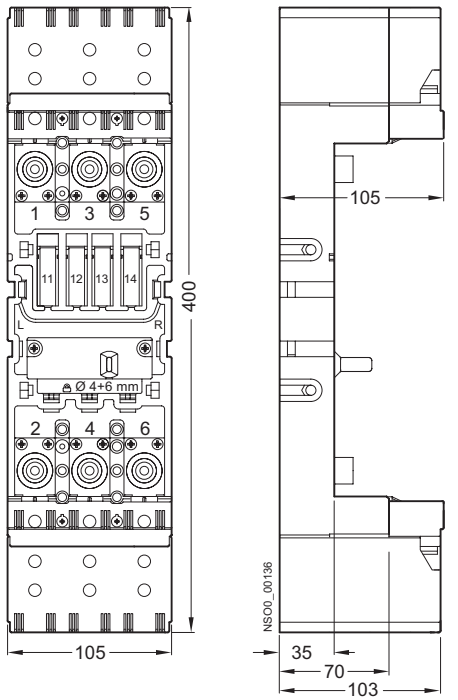



*3-pole version · Plug-in design*

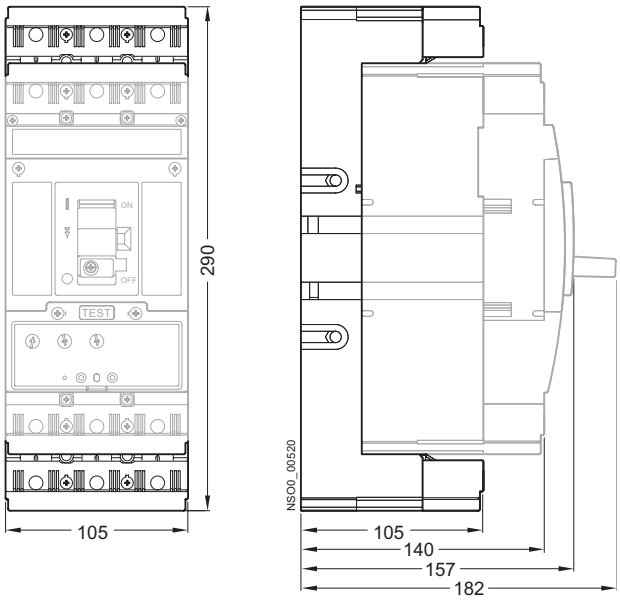
Plug-in device 3VT9 200-4PA30Drilling positions



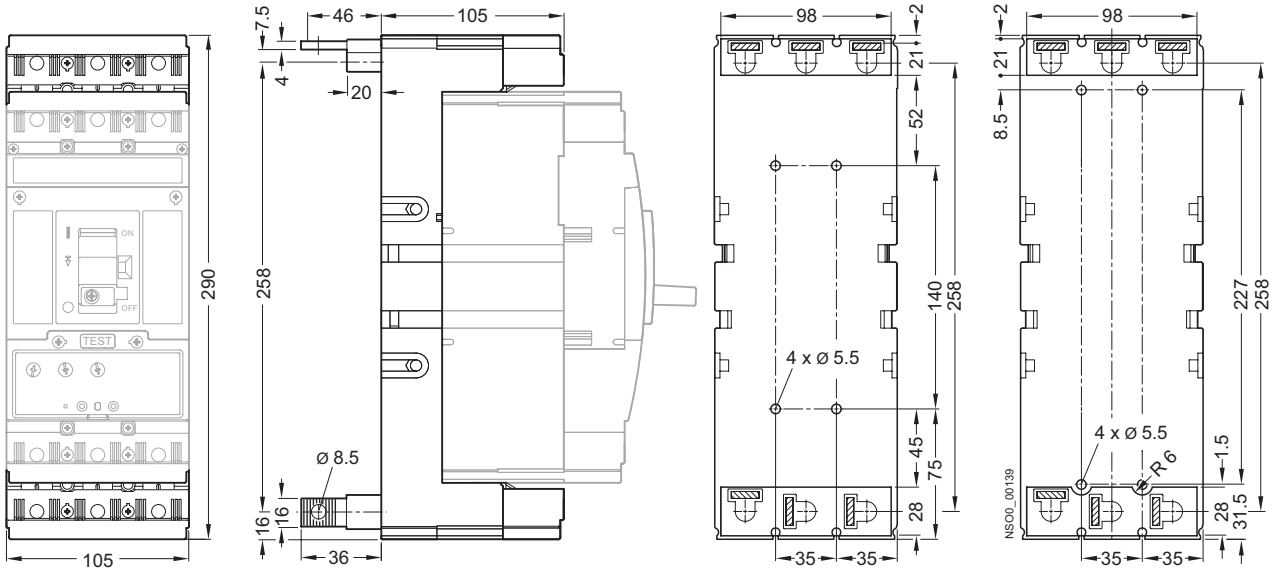
Plug-in device, 3VT9 200-8CB30 terminal cover




Plug-in design

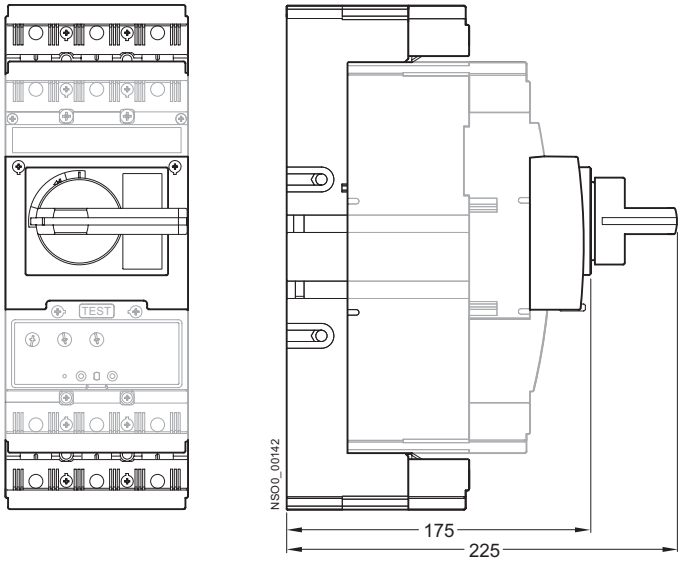



Plug-in designDrilling positions

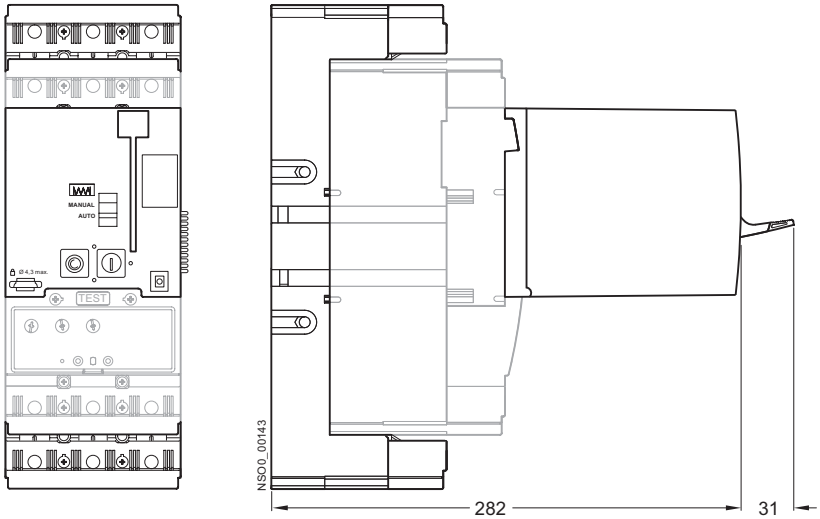


## Project planning aids

Plug-in design, rotary operating mechanism

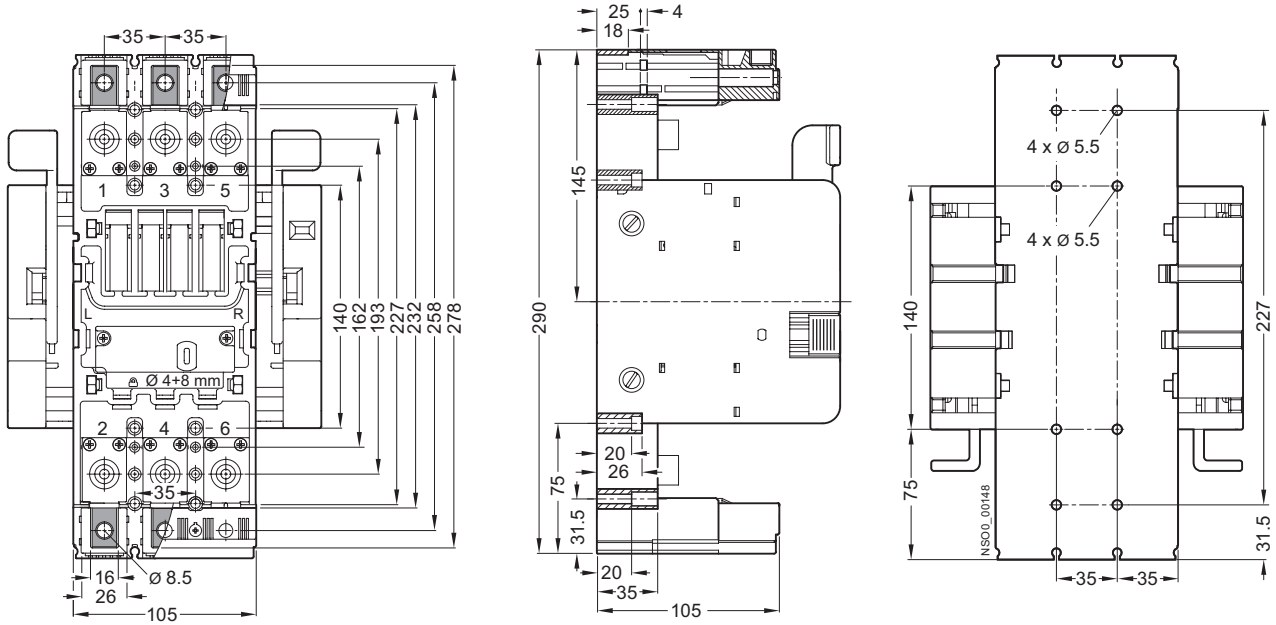



Plug-in design, 3VT9 200-3M..0 motorized operating mechanism

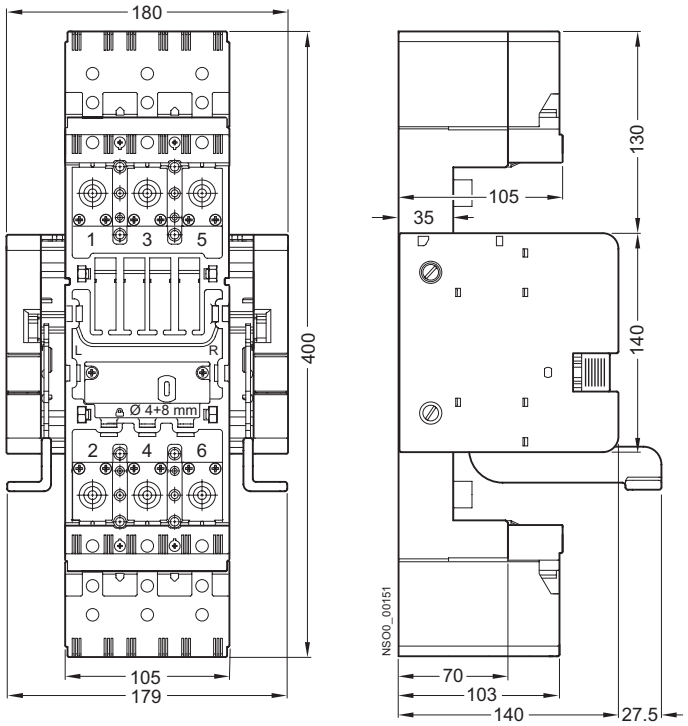


*3-pole version · Withdrawable design*

Withdrawable device 3VT9 200-4WA30Drilling positions



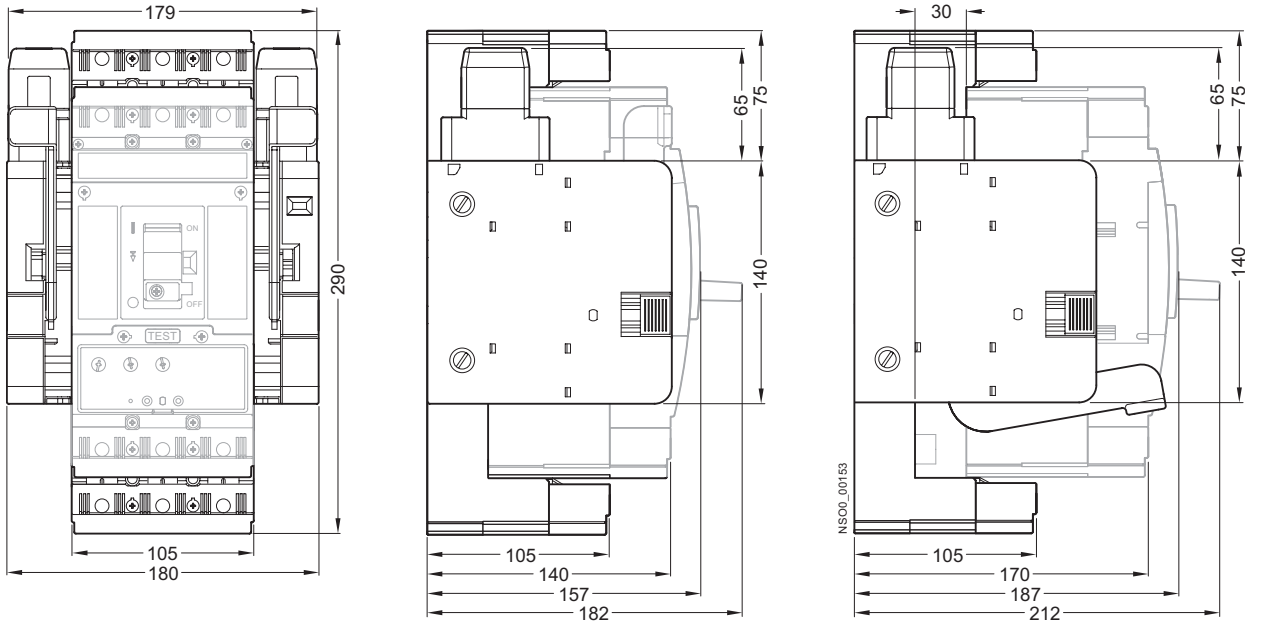

Withdrawable device, 3VT9 200-8CB30 terminal cover



## Project planning aids

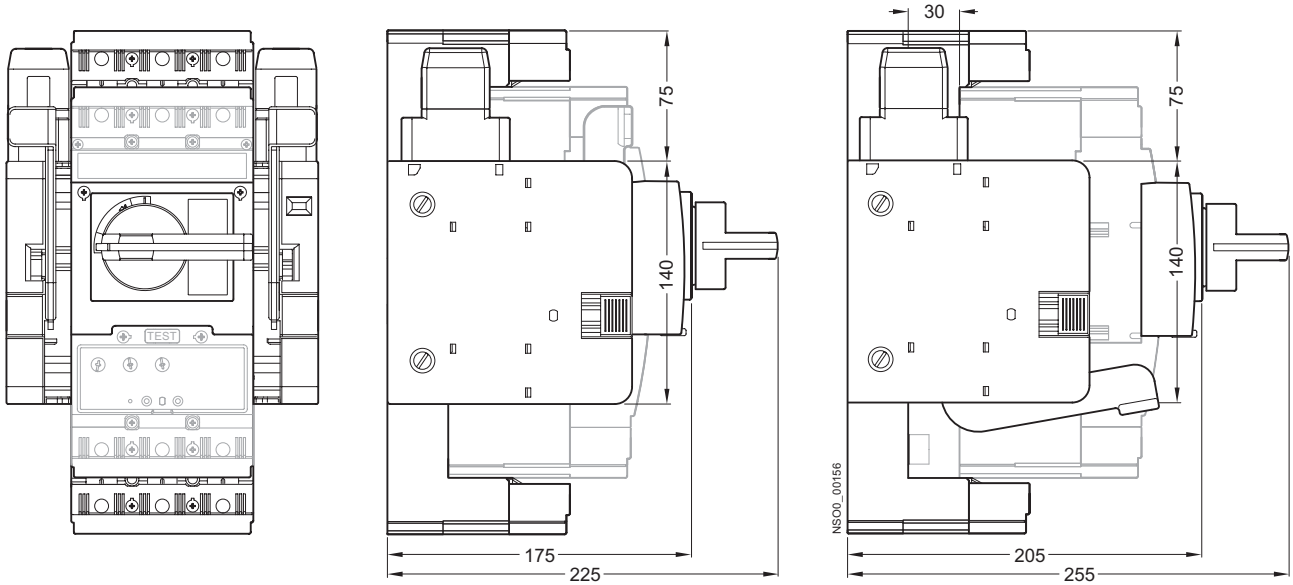
Withdrawable design

Operating position Maintenance position

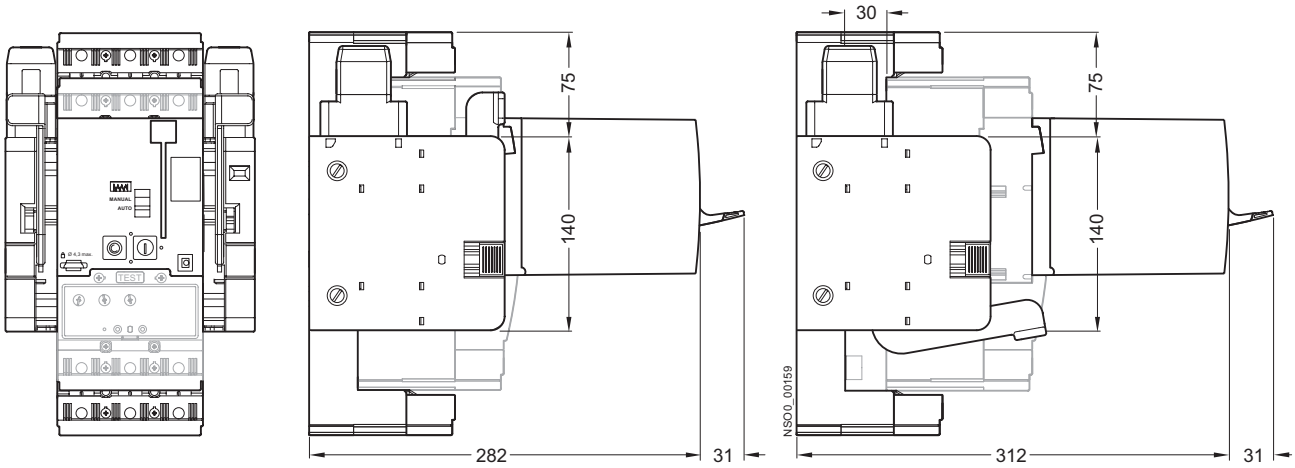



Withdrawable design, manual operating mechanism

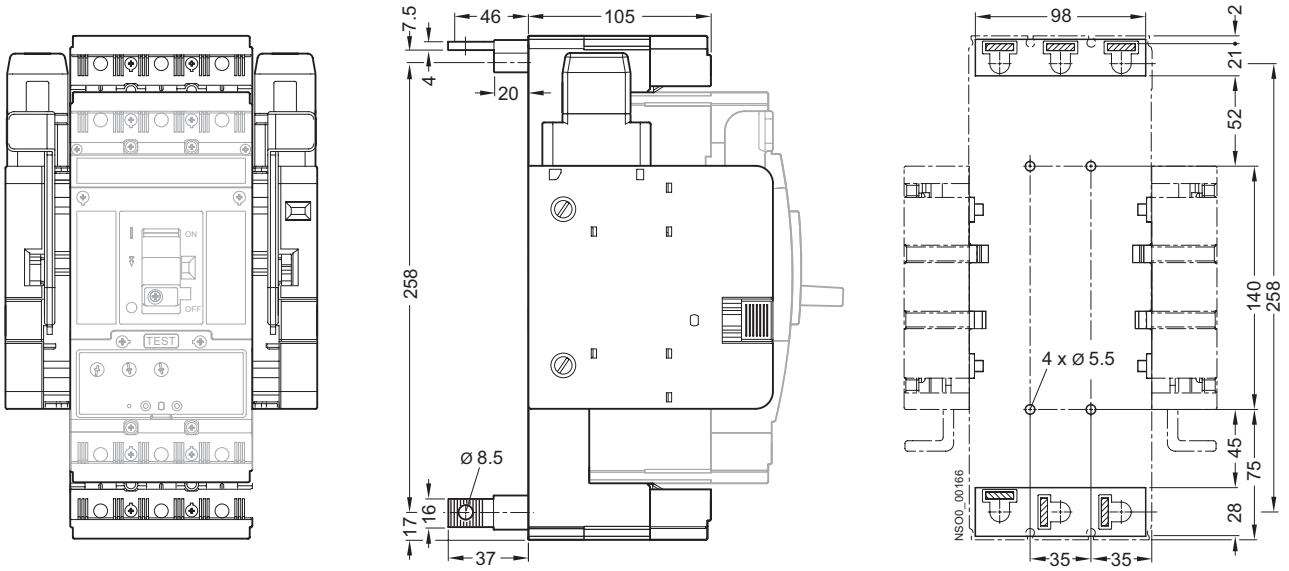
Operating position Maintenance position



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

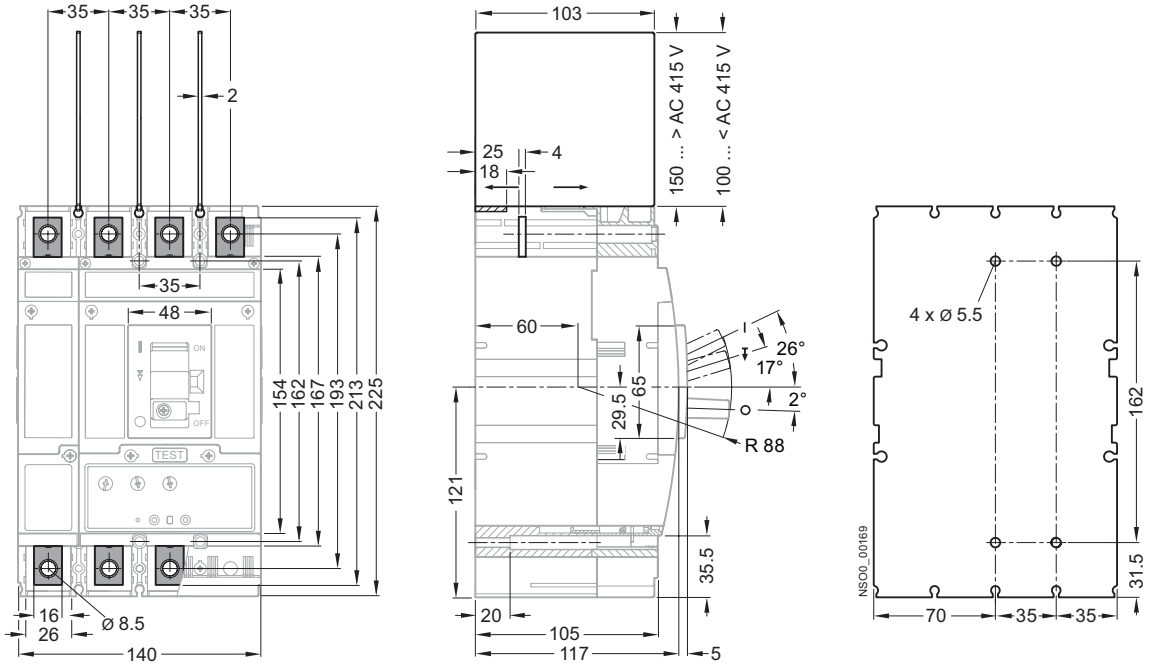



Withdrawable device, rear connection (3VT9 200-4RC00 connecting sets)Drilling position



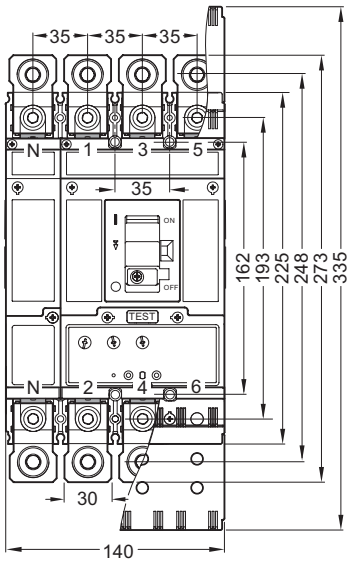
## Project planning aids

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

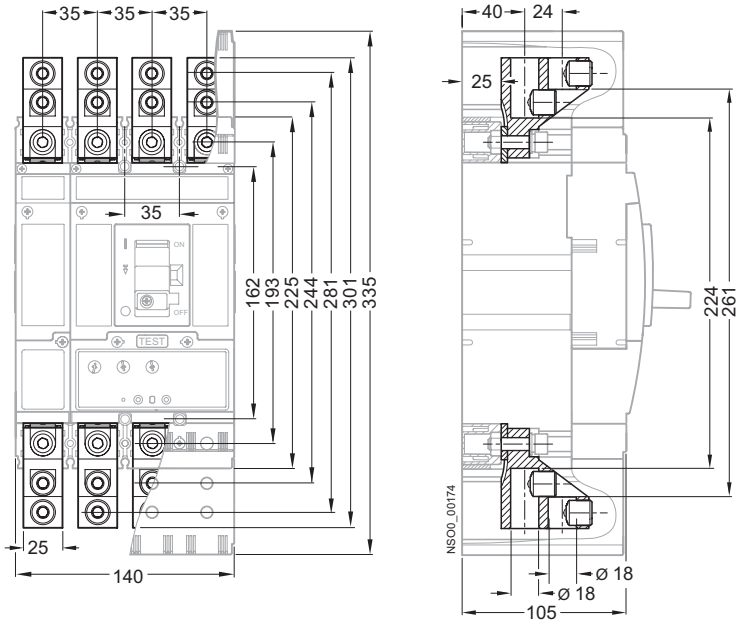


*4-pole version · Fixed-mounted design*

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

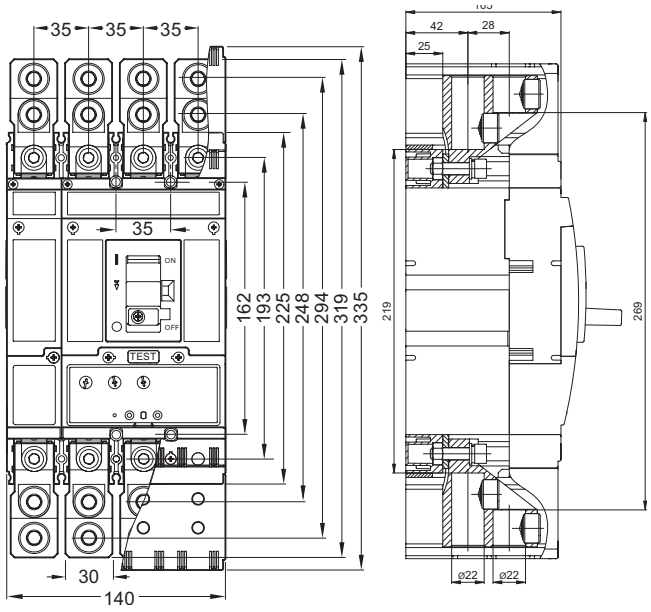



Fixed-mounted design, front connection (connecting set 3VT9 215-4TF30 + 3VT9 215-4TF00)

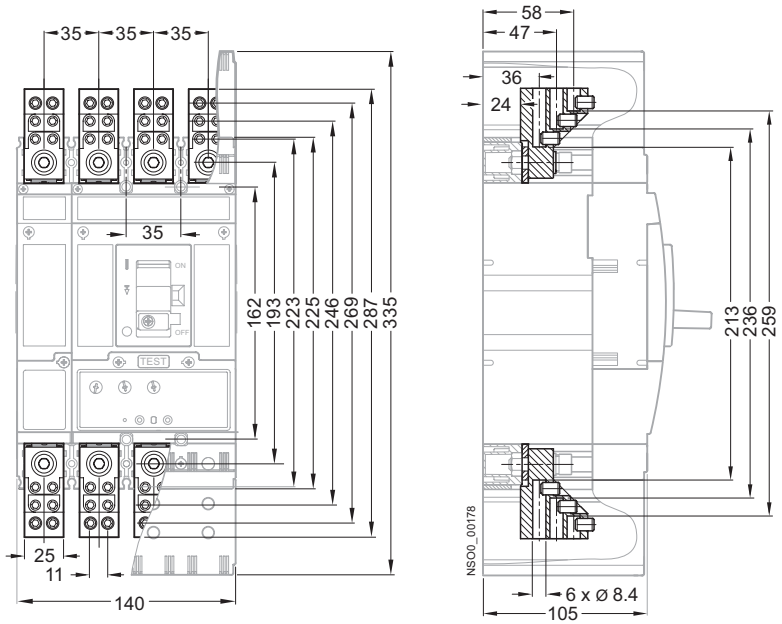


## Project planning aids

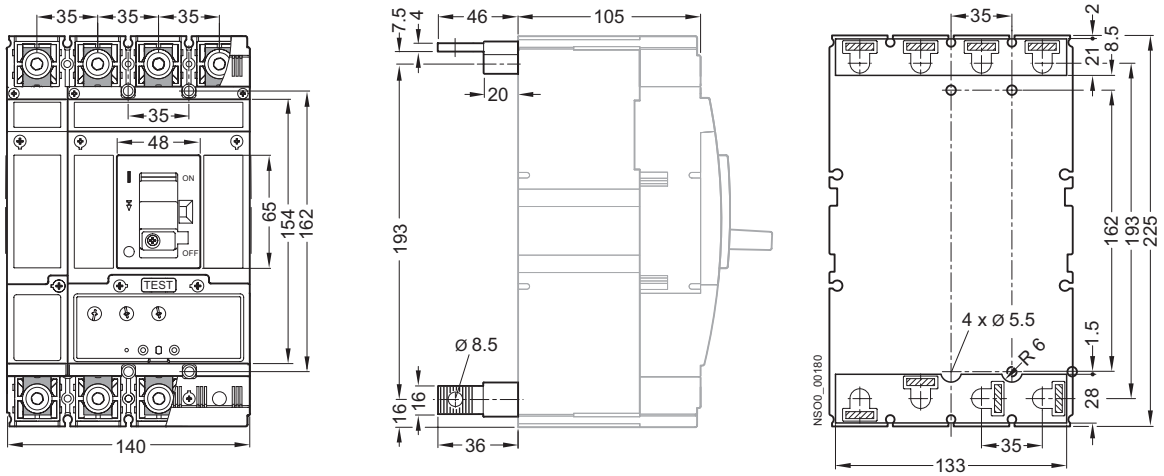
Fixed-mounted design, front connection (connecting set 3VT9 224-4TF30 + 3VT9 224-4TF00)




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

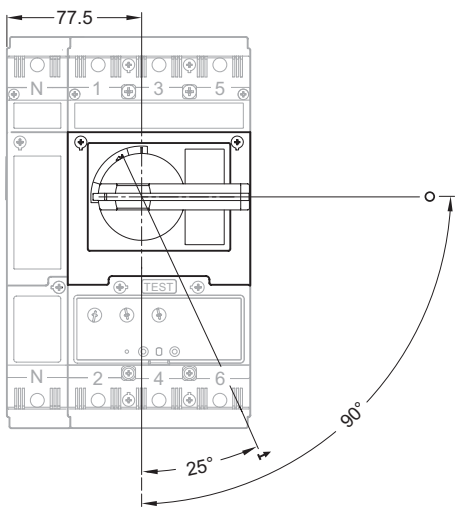


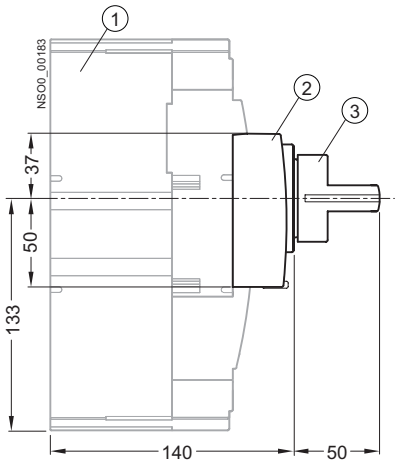
Fixed-mounted design, front connection (connecting set 3VT9 215-4TF30 + 3VT9 215-4TF00)




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

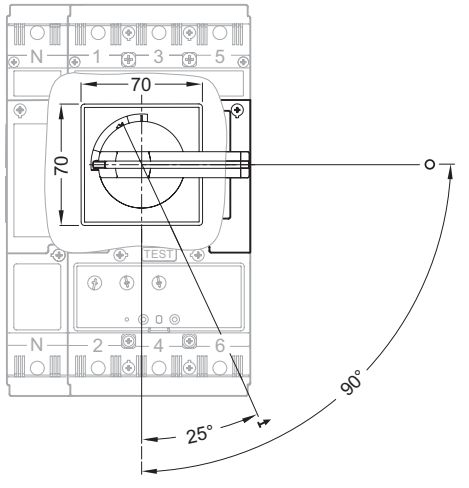
Fixed-mounted design, rotary operating mechanism

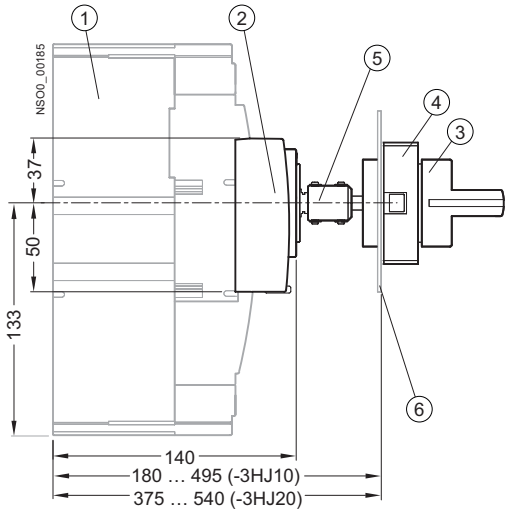



1 3VT2
2 3VT9 200-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0

Fixed-mounted design, rotary operating mechanism with adjustable knob

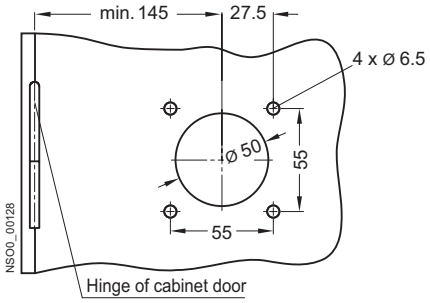



1 3VT2
2 3VT9 200-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0
4 3VT9 300-3HG.0,-3HH.0
5 3VT9 300-3HJ.0
6 Outside surface of cabinet door

Cabinet door adaption

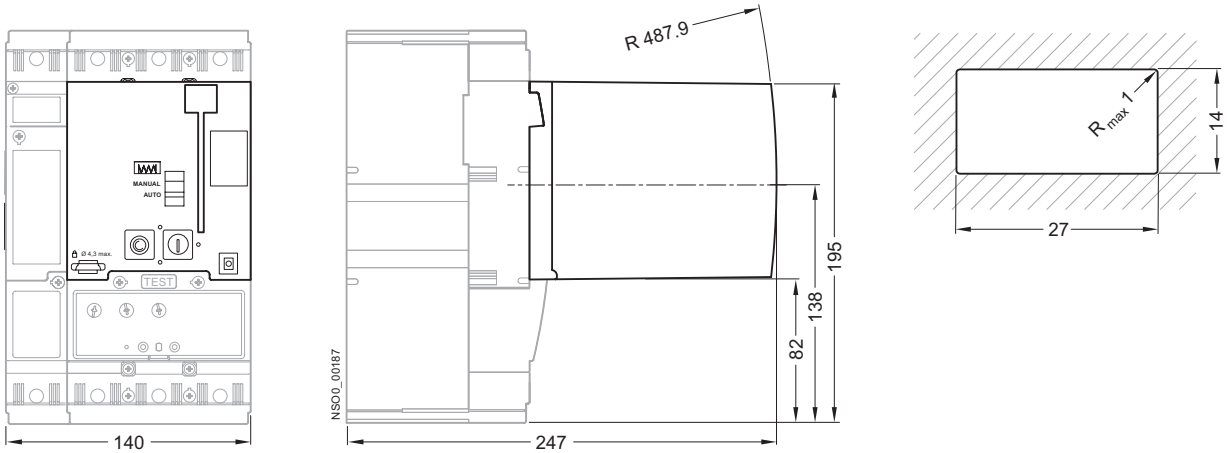
## Project planning aids




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

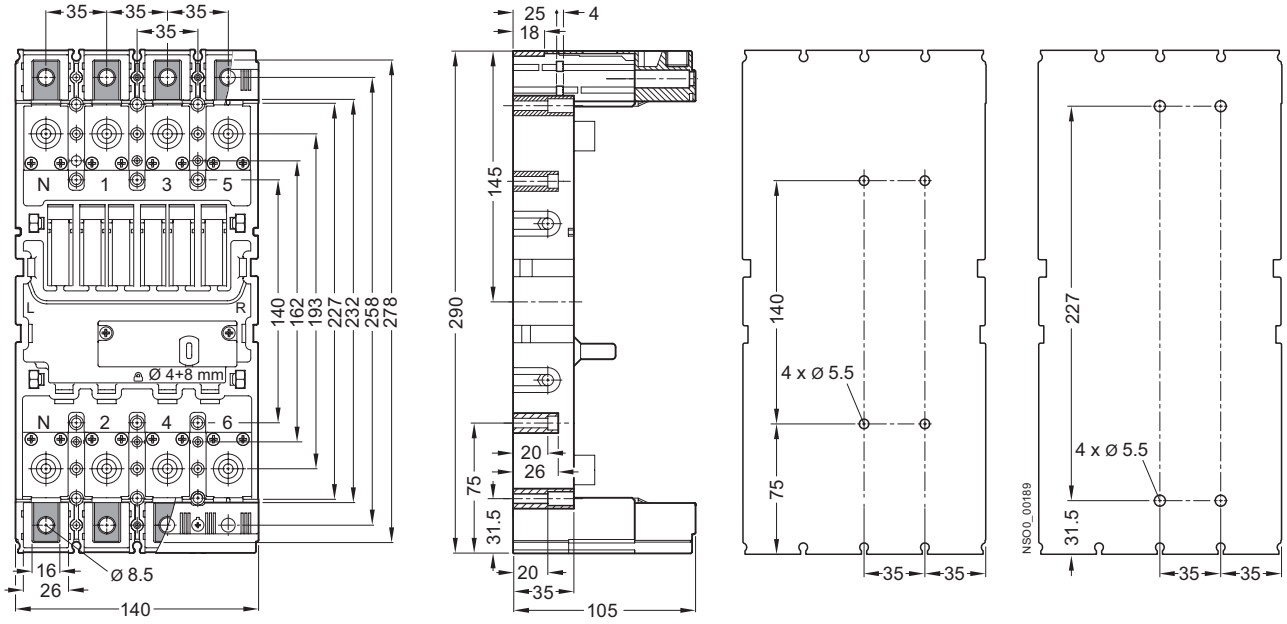
Opening dimensions in switchgear door for external operation cycle



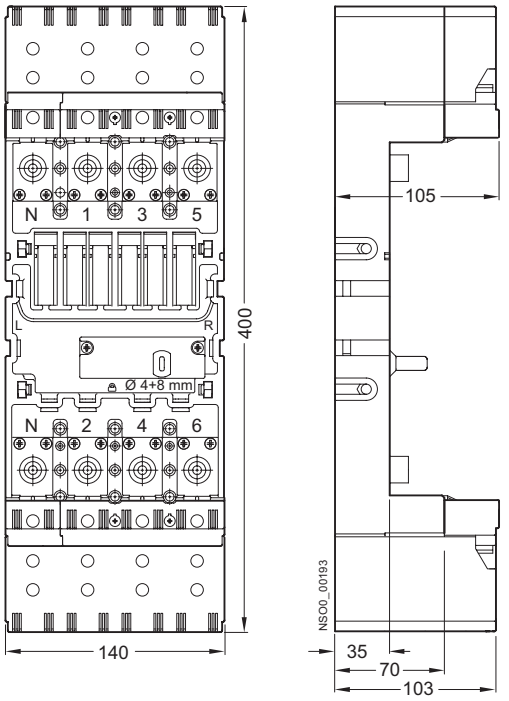


*4-pole version · Plug-in design*

Plug-in device 3VT9 200-4PA40Drilling positions

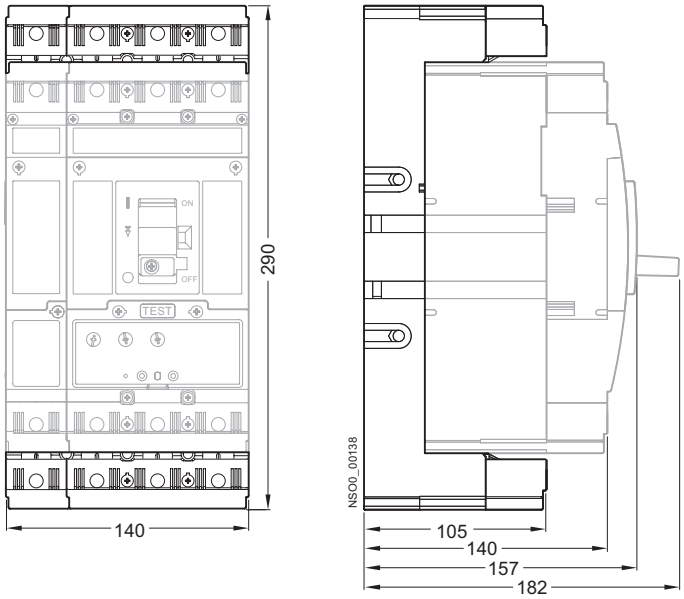



Plug-in device, 3VT9 200-8CB40 terminal cover

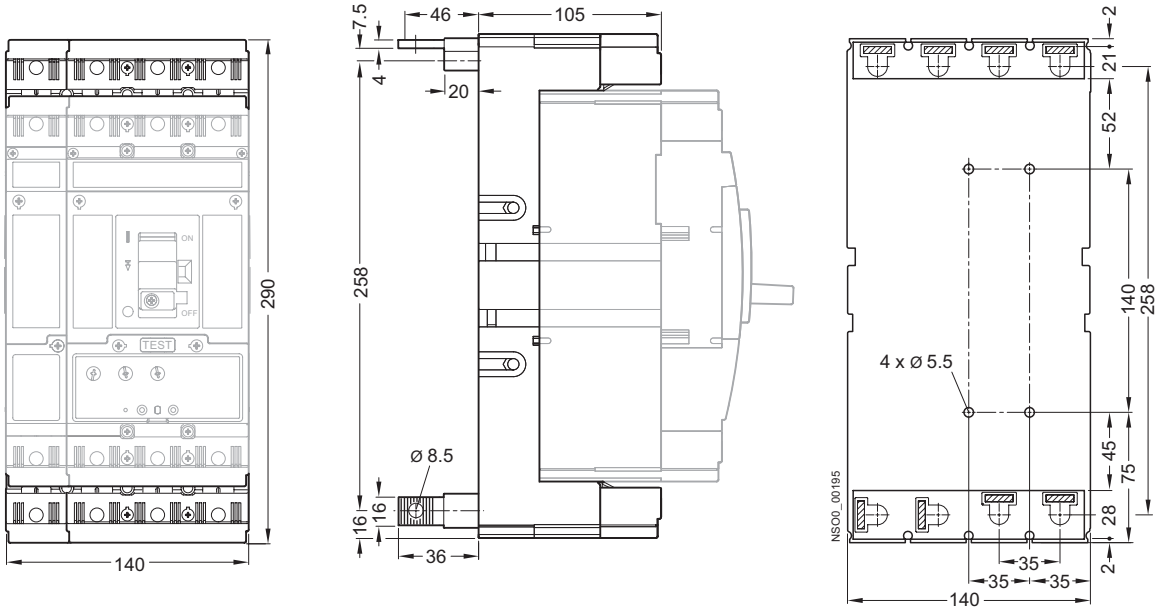


## Project planning aids

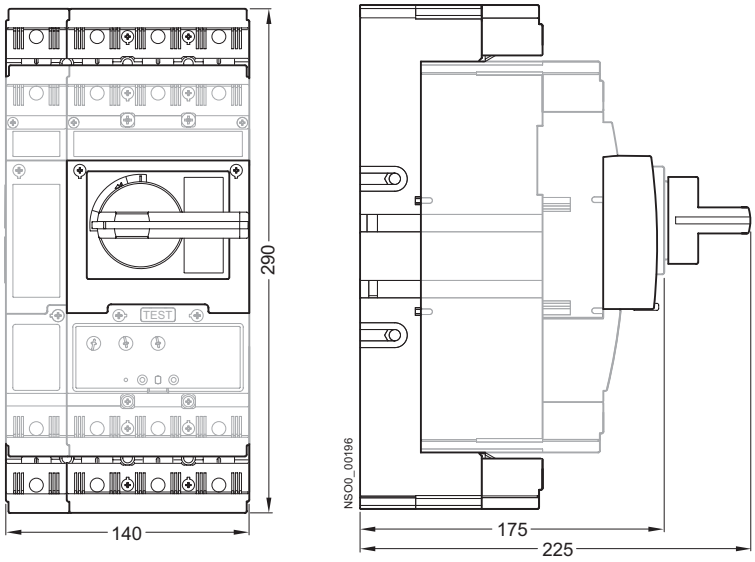
Plug-in design



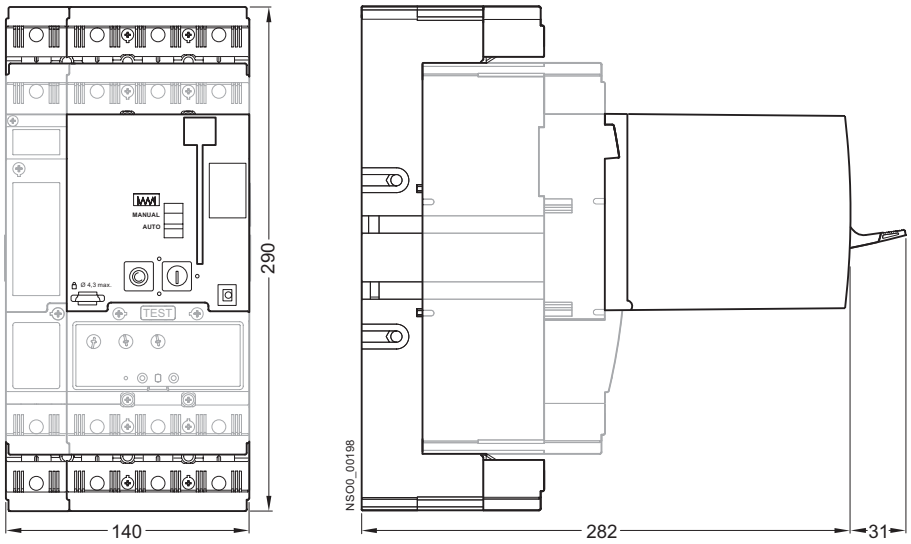

Plug-in design, rear connection
(connecting set 3VT9 200-4RC30 + 3VT9 200-4RC00)Drilling position



Plug-in design, rotary operating mechanism



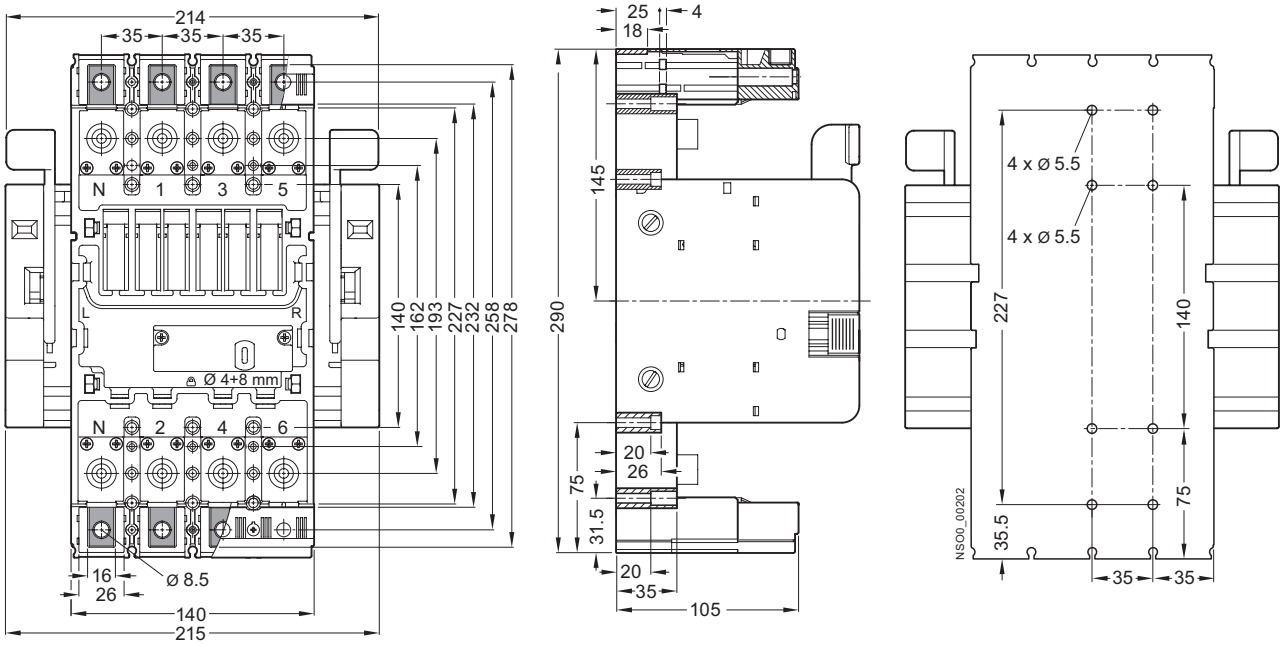

Plug-in design, 3VT9 200-3M..0 motorized operating mechanism



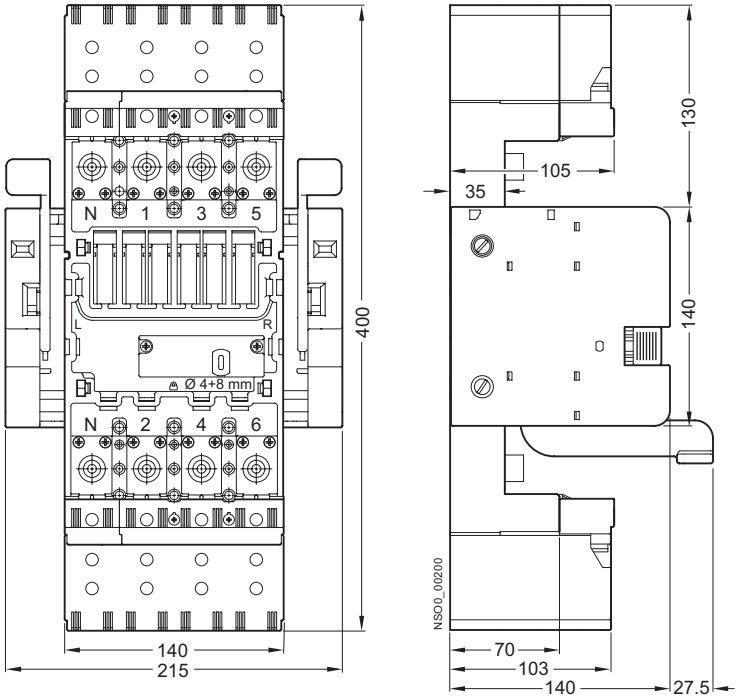
## Project planning aids

*4-pole version · Withdrawable design*

Withdrawable device, 3VT9 200-4WA40Drilling position

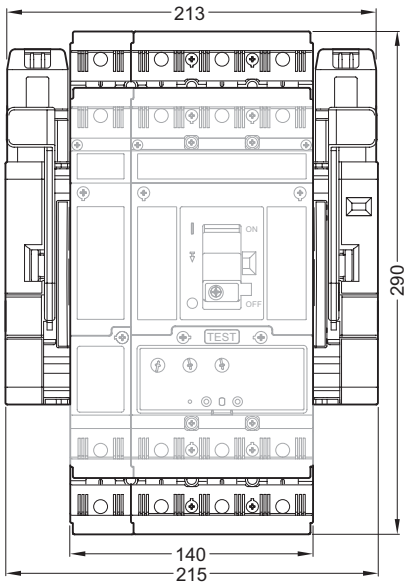



Withdrawable device, 3VT9 200-8CB40 terminal cover

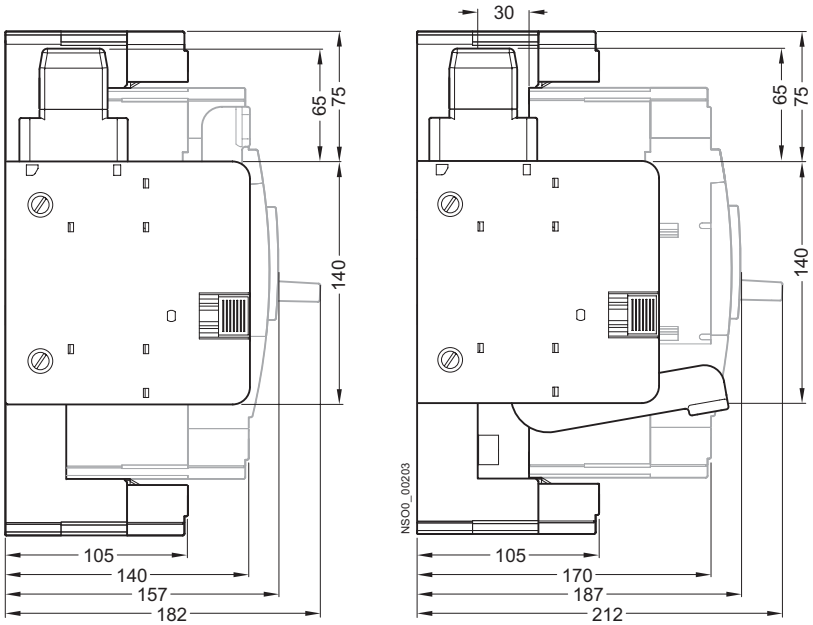


Withdrawable design

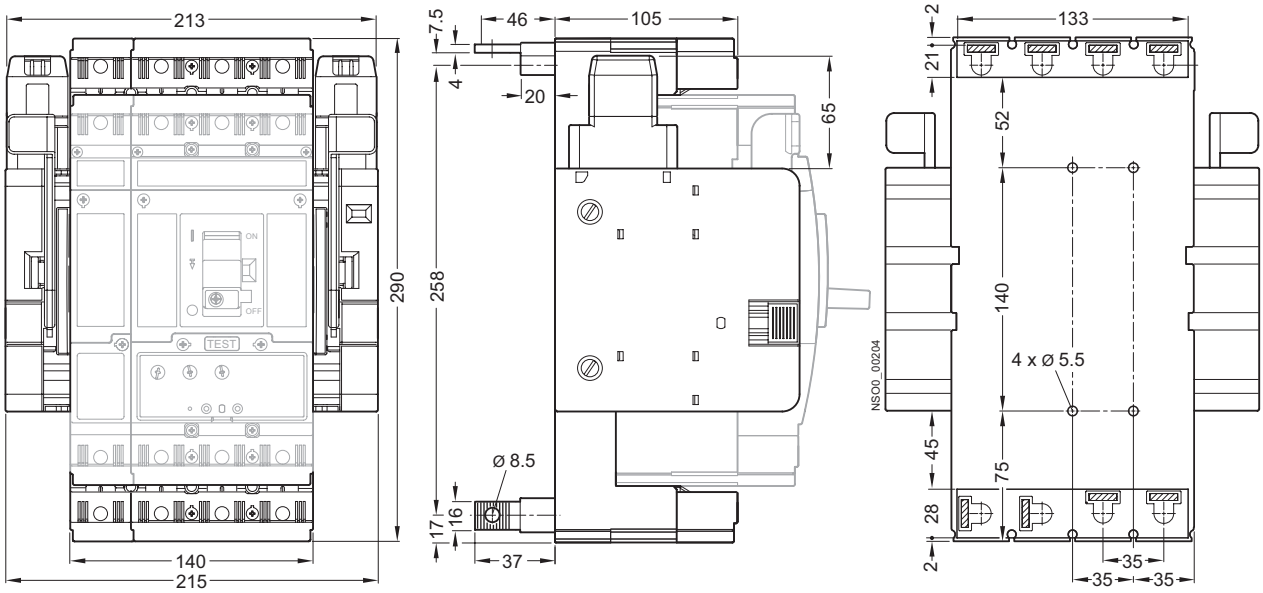
Operating position




Maintenance position



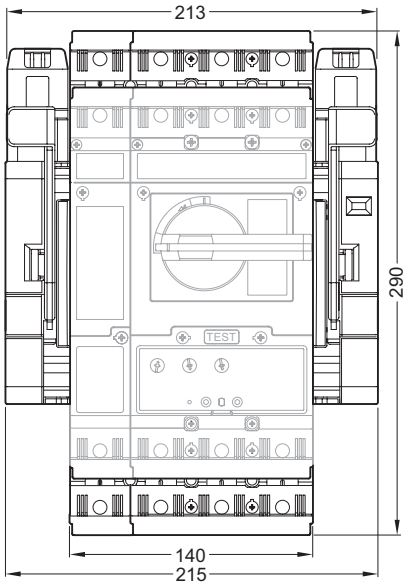

Withdrawable design, rear connection (connecting set 3VT9 200-4RC30 + 3VT9 200-4RC00)



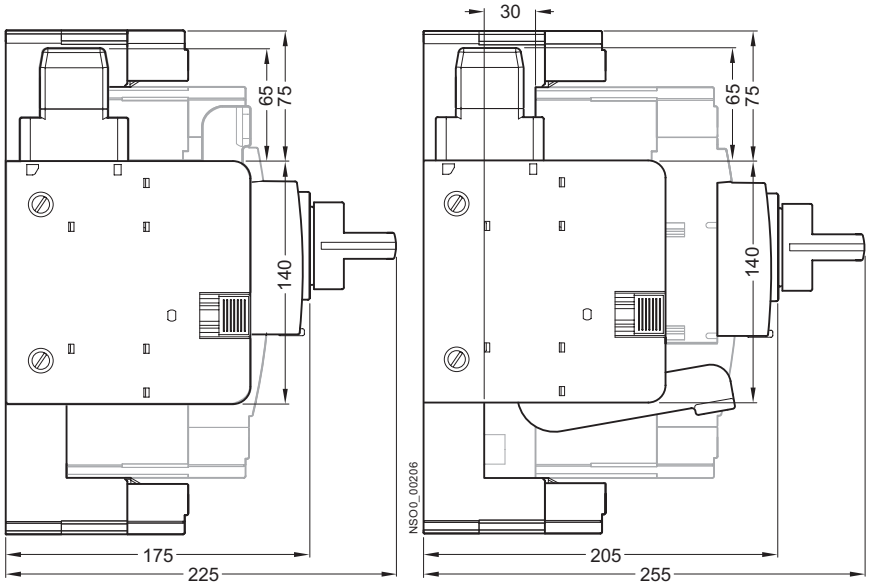
## Project planning aids

Withdrawable design, Manual operating mechanism

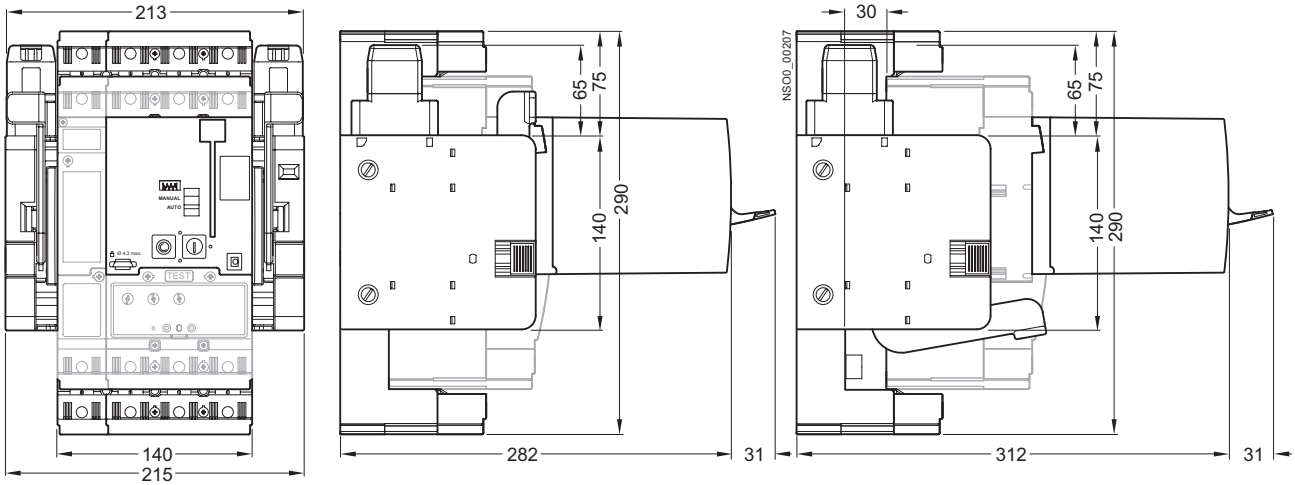
Operating position




Maintenance position




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

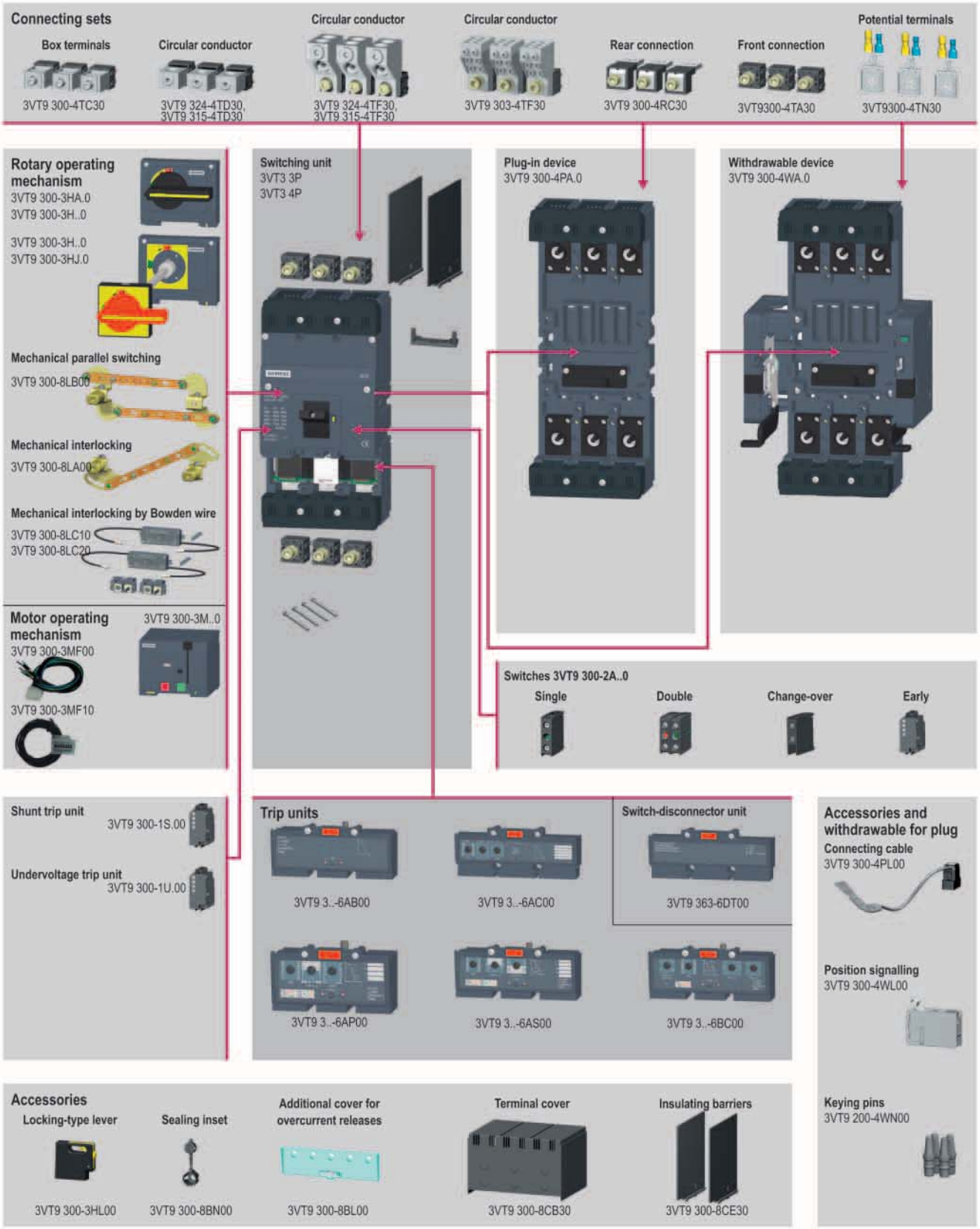


# 3VT3 Molded Case
# Circuit Breakers up to 630 A

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 |

### 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<br>• 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<br>• 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.<br>• suitable also for protecting lines and transformers<br>• 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

4

| | 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.

## Manual/motorized operating mechanisms

| | Version | DT | Order no. | PS* | Weight per PU approx. |
|---|---|---|---|---|---|
| | | | | | kg |
| **Mechanical interlocks** | | | | | |
| | The mechanical interlocks have to be completed with:<br>• 2 x 3VT9 300-3HA../HB.. rotary operating mechanisms,<br>• 2 x 3VT9 300-3HE../HF.. knobs | | | | |
|  | **Mechanical interlocks**<br>for fixed-mounted design only | B | **3VT9 300-8LA00** | 1 unit | 0.136 |
|  | **Mechanical interlocks for parallel switching**<br>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,**<br>length 110 cm | B | **3VT9 300-3MF10** | 1 unit | 0.003 |
|  | **Extension cable** for motorized operating mechanism,<br>12 wires, length 60 cm | B | **3VT9 300-3MF00** | 1 unit | 0.060 |

4

* 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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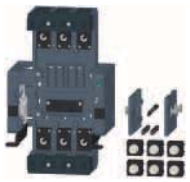
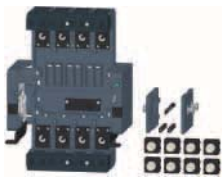
### Selection and ordering data

| | 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 |

4

* 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**<br>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**<br>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**<br>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**<br>Provides sealing for:<br>• overcurrent release<br>• accessory compartment cover<br>• terminal cover<br>• manual operating mechanism<br>• motorized operating mechanism | B | **3VT9 200-8BN00** | | 1 unit | 0.001 |
|  | **Additional cover for overcurrent release**<br>Provides protection for overcurrent releases | B | **3VT9 200-8BL00** | | 1 unit | 0.080 |
|  | **Connecting cable**<br>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**<br>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**<br>Prevents inserting the wrong switching unit into the plug-in or withdrawable devices | | **3VT9 300-4WN00** | | 1 unit | 0.002 |
|  | **Pushbutton cover**<br>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

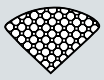
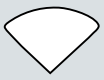
| Rated current $I_n$ | Permissible cross-section $S$ | | Dimensions of busbars W x H | |
|---|---|---|---|---|
| | Cu | Al | Cu | Al |
| A | mm$^2$ | mm$^2$ | mm | mm |
| 100 | 35 | 50 | 20 x 2 | 25 x 2 |
| 125 | 50 | 70 | 25 x 2 | 25 x 3 |
| 160 | 70 | 95 | 25 x 3 | 32 x 3 |
| 200 | 95 | 120 | 25 x 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** | | | | Busbars and cable lugs W x H | Technical information |
|---|---|---|---|---|---|---|---|
| | | Sector-shaped conductor, stranded  | Sector-shaped conductor, solid  | Round conductor, stranded  | Round conductor, solid  | | |
| | A | mm$^2$ | mm$^2$ | mm$^2$ | mm$^2$ | mm | 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<br>Type | | 3VT3 763-2AA36/46/56-0AA0,<br>3VT3 763-3AA36/46/56-0AA0<br>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<br>DC max. 440 |
| Rated frequency $f_n$ | Hz | 50/60 | | | |
| Rated impulse withstand voltage $U_{imp}$ | kV | 8 | | | |
| Rated insulation voltage $U_i$ | V | 690 | | | |
| Utilization category | | | | | |
| • selectivity AC 690 V | | A | | | -- |
| • switching mode AC 690 V | | -- | | | AC-23 B |
| DC 440 V | | -- | | | 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<br>36 kA<br>20 kA<br>15 kA | 100 kA<br>65 kA<br>35 kA<br>20 kA | AC 230 V<br>AC 415 V<br>AC 500 V<br>AC 690 V | -- |
| Rated short-circuit breaking capacity (rms value) $I_{cs}/U_e$ | | 40 kA<br>18 kA<br>10 kA<br>8 kA | 75 kA<br>36 kA<br>20 kA<br>15 kA | AC 230 V<br>AC 415 V<br>AC 500 V<br>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<br>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 | | ✔/✔ | | | |

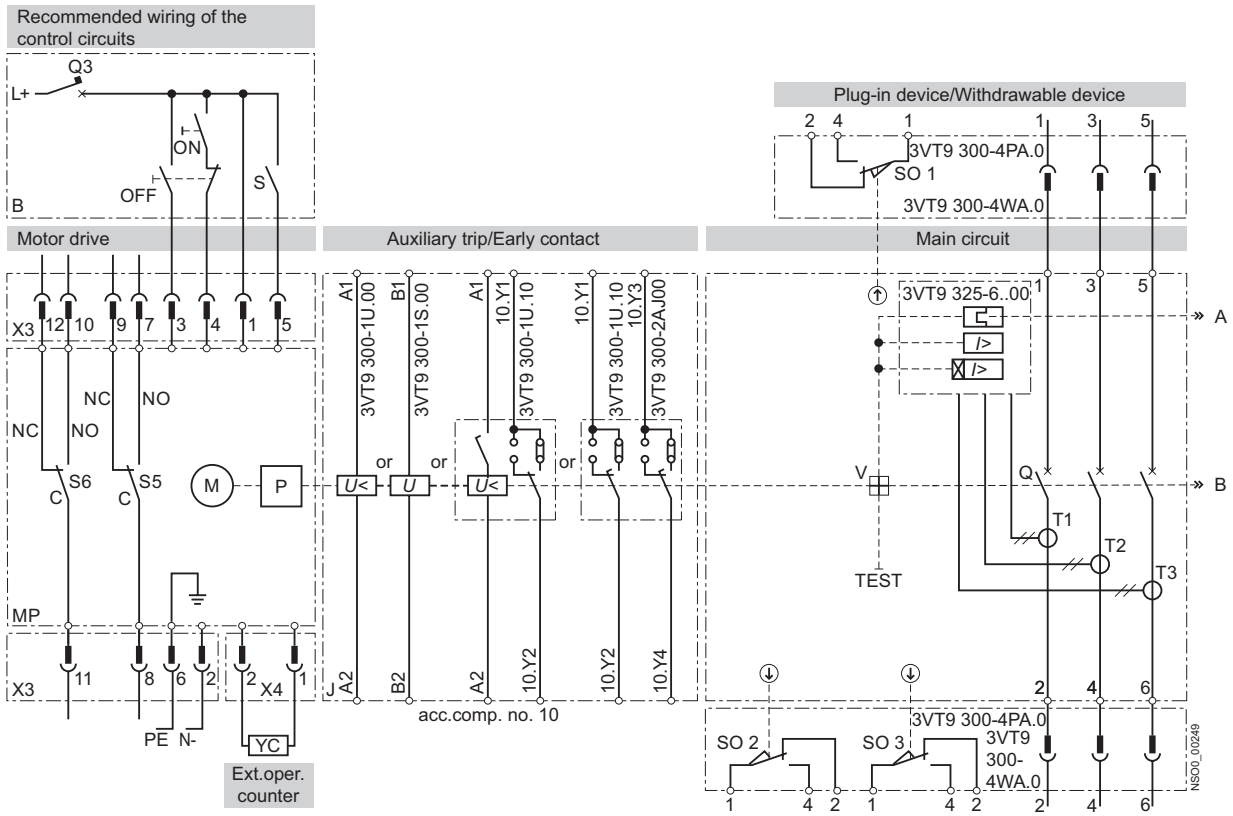
✔ available,
-- unavailable,
+ in preparation

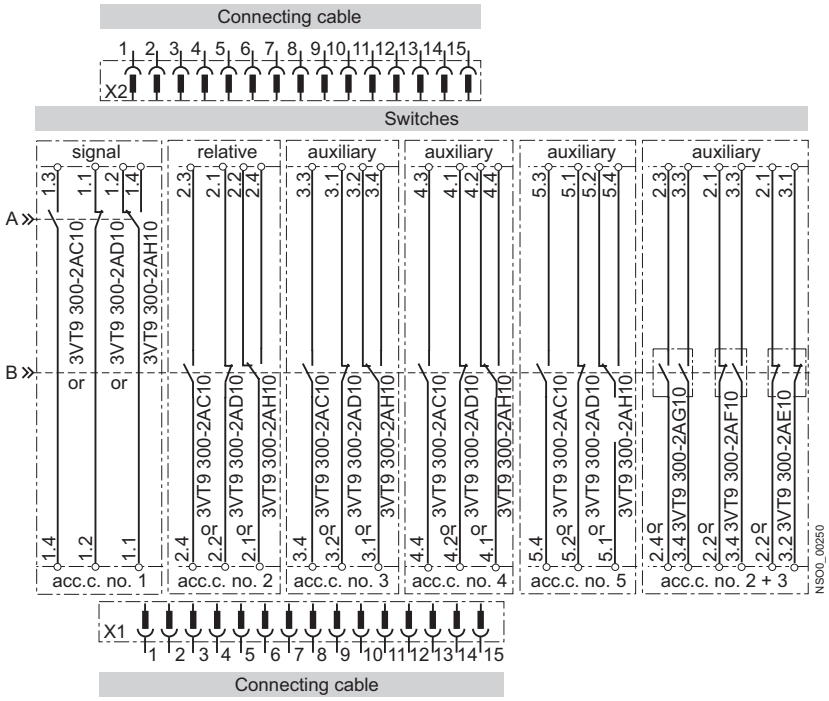
[1] In case circiut breaker connection is reversed (input terminals 2, 4, 6 output terminals 1, 3, 5), $I_{cu}$ does not change.

## Schematics

### *Cicuit breakers with accessories*

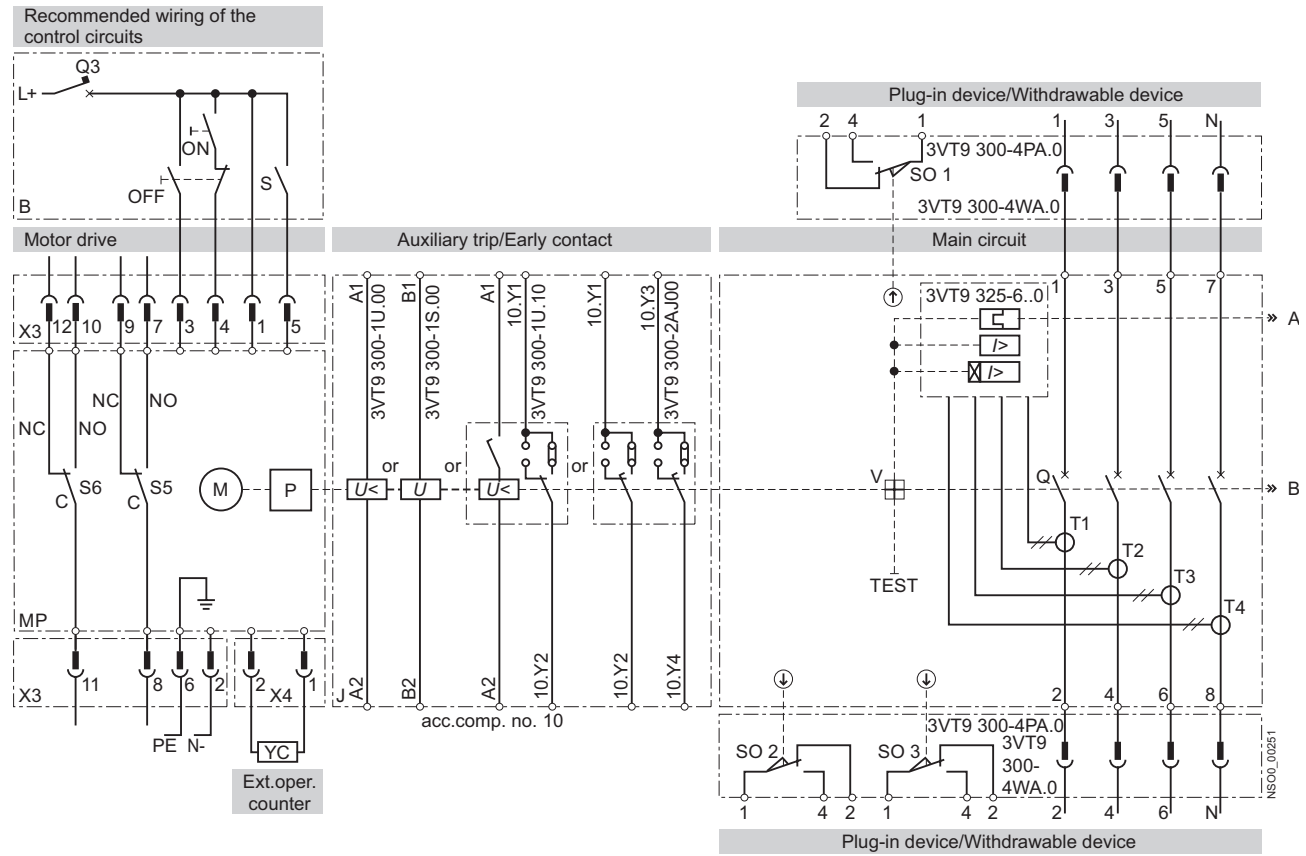
3-pole version

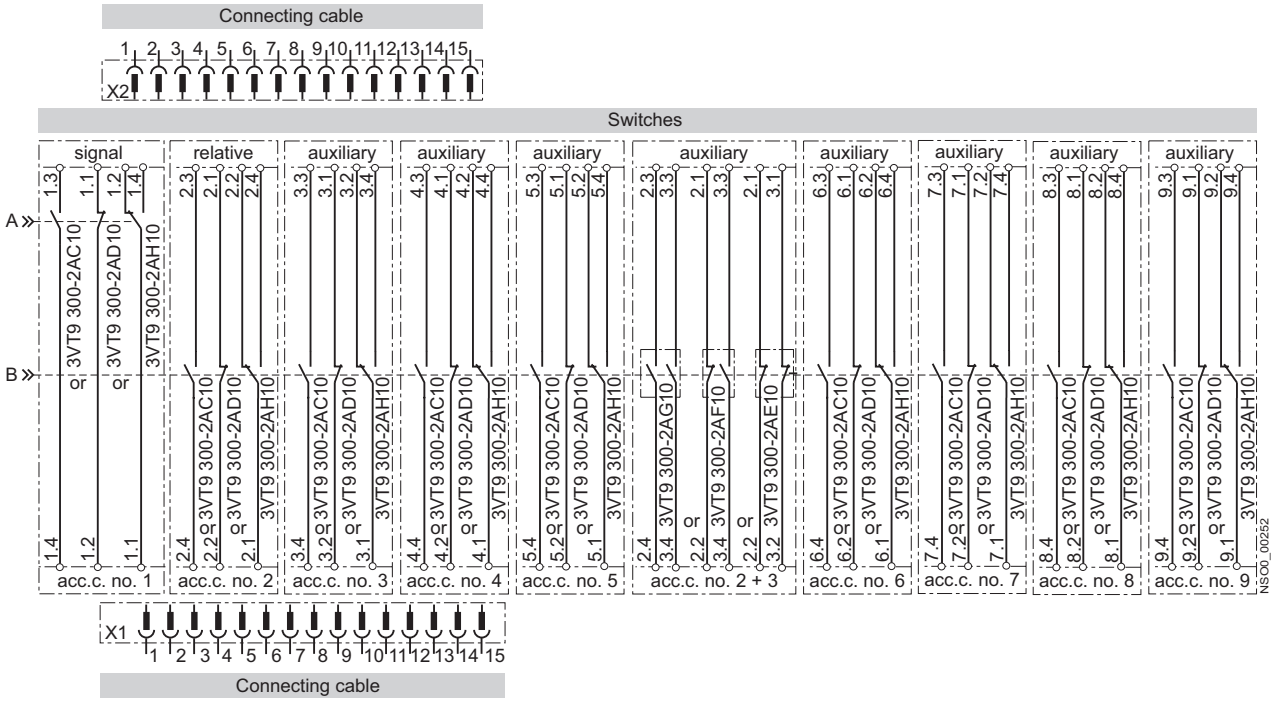


## Circuit breakers · Switch disconnectors

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 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 6, 7, 8, 9 are only for 4.pole design
Location switches in accessory compartments, see page 4/54.

## Overcurrent releases

### Overview

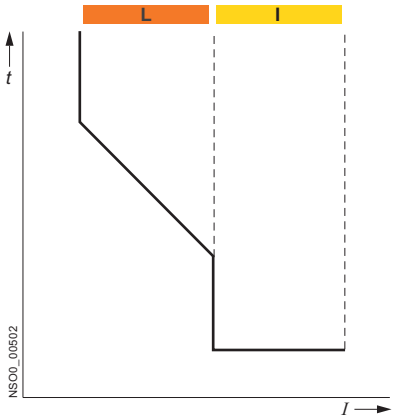
The electronic overcurrent release consists of a separate and interchangeable unit, which is supplied with the 3VT3 switching unit. By exchanging the overcurrent release, the range of the circuit breaker's rated current can be easily changed.

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*

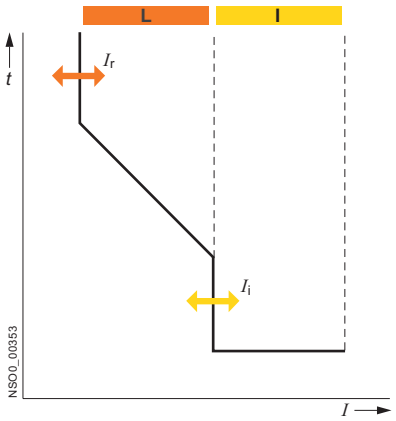
Depending upon the needs for adjusting the release's tripping characteristic to the protected device and to the variability of the characteristic with regard to selectivity, the following releases are available:

ETU LP



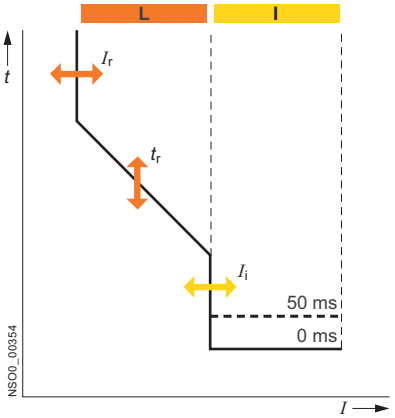

They have one type of characteristic and fixed $I_n$ and $I_{rm}$ settings.

ETU DP



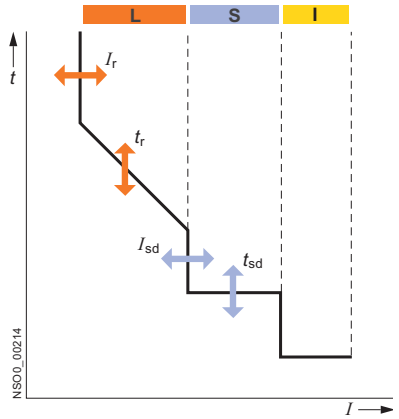

They have one type of characteristic with adjustable $I_r$ and $I_{rm}$.

ETU MP




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

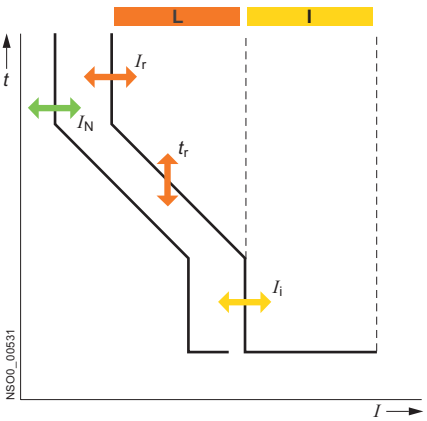
ETU MPS




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 $t_{sd}$.

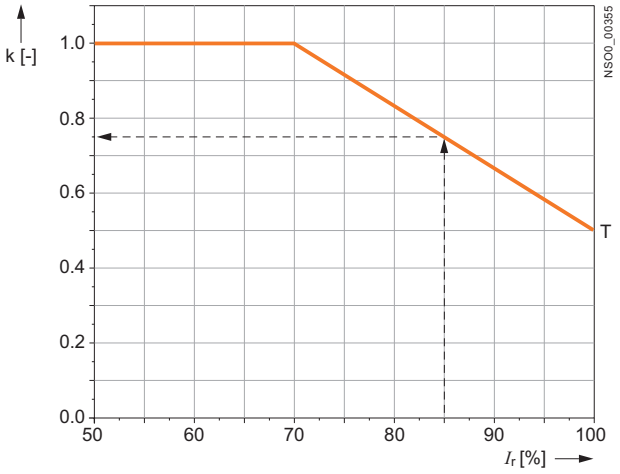
3. Independent instantaneous release (short-circuit release) I

- 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

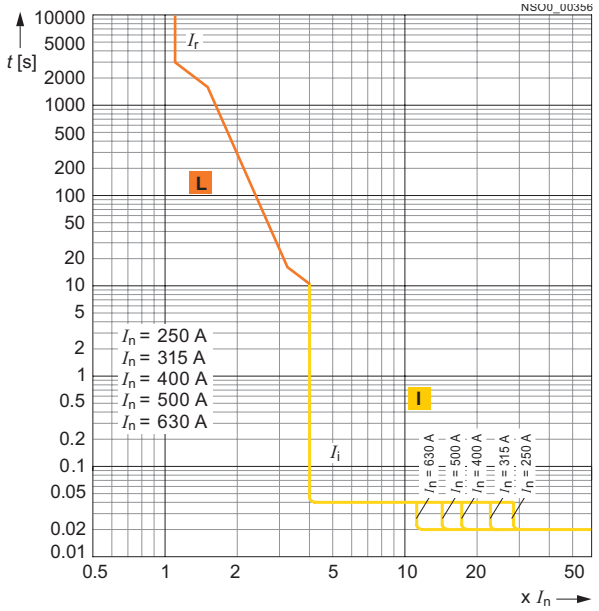
The 3VT9 3..-6AB00 release is intended for the 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching unit. The release has a thermal memory that cannot be disabled. Releases' rated currents are given by their type designations and correspond to a standardised series of currents (see specifications table).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

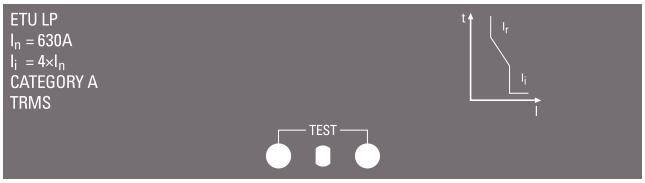
One of the release's advantages is its simplicity, because it does not require any adjustment. Therefore, it is intended for less complicated applications.

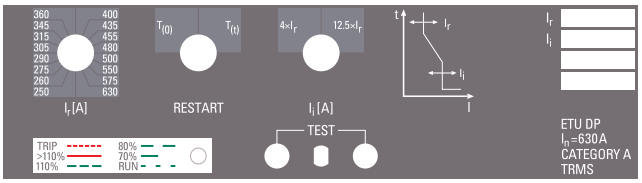
Specifications

| 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

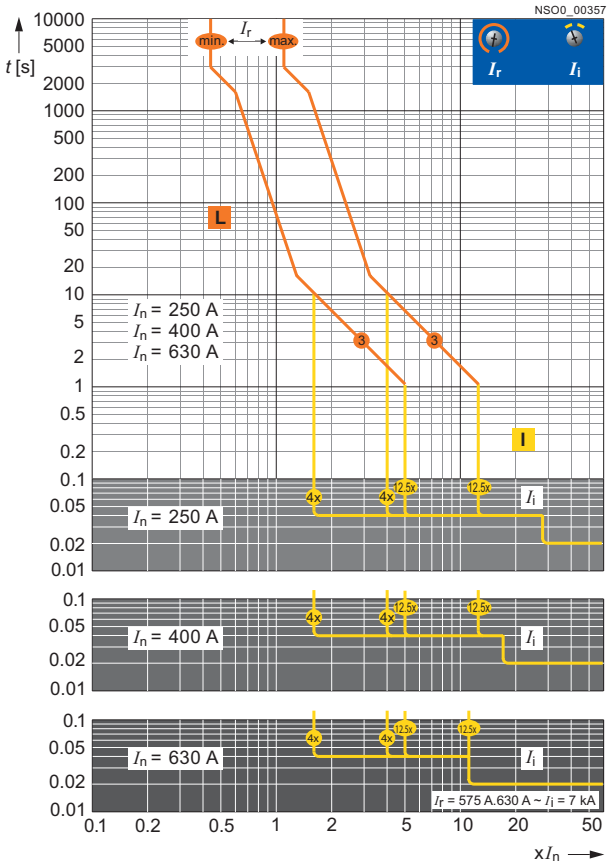
The 3VT9 3..-6AC00 release is intended for 3VT3763-.AA36-0AA0 and 3VT3763-.AA46-0AA0 switching units. Operation of the release is controlled by a microprocessor. The release is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. 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<br>110<br>115<br>125<br>137<br>144<br>160<br>172<br>180<br>190<br>200<br>210<br>220<br>231<br>243<br>250 | $T_{(0)}$<br>$T_{(t)}$ | 4 x $I_r$<br>12,5 x $I_r$ |
| 3VT9 340-6AC00 | 400 | 160<br>172<br>180<br>190<br>200<br>210<br>220<br>231<br>243<br>250<br>275<br>290<br>315<br>345<br>360<br>400 | $T_{(0)}$<br>$T_{(t)}$ | 4 x $I_r$<br>12,5 x $I_r$ |
| 3VT9 363-6AC00 | 630 | 250<br>260<br>275<br>290<br>305<br>345<br>315<br>360<br>400<br>435<br>455<br>480<br>500<br>550<br>575<br>630 | $T_{(0)}$<br>$T_{(t)}$ | 4 x $I_r$<br>12,5 x $I_r$ |

Overcurrent releases ETU MP-Motors

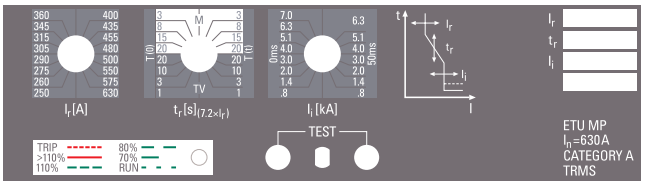
- Direct protection for motors and generators
- Possibility for protecting lines and transformers

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.

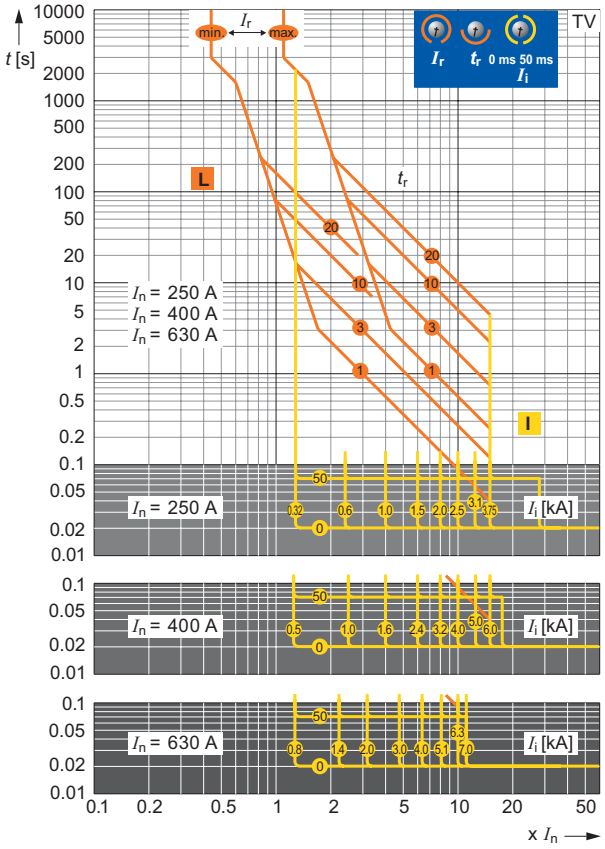


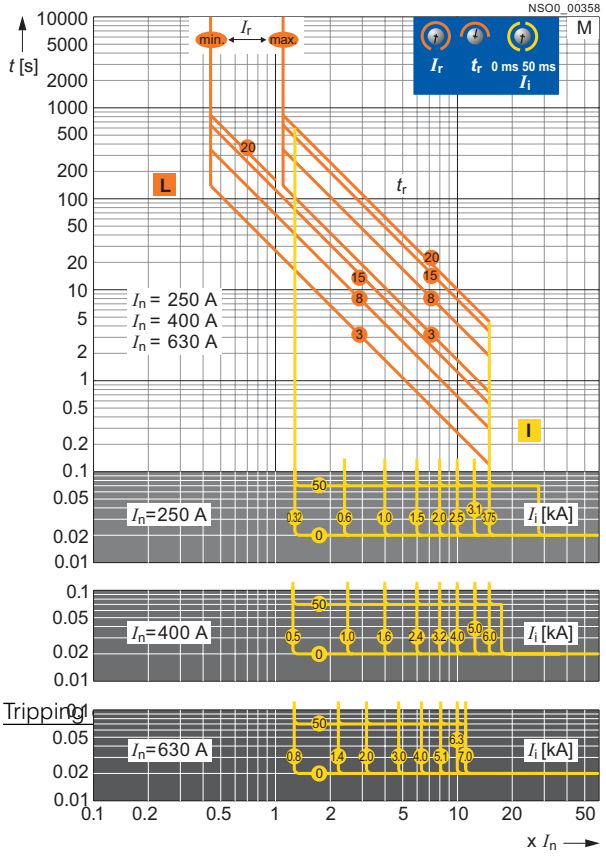
## Overcurrent releases

### 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 | |

| 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 |
|---|---|---|---|---|---|---|
| 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*

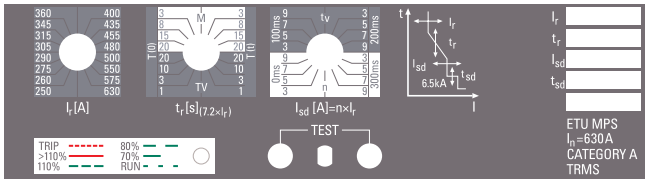
- Direct protection for motors and generators
- Possibility for protecting lines and transformers
- Enables adjusting time delay of independent release

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.

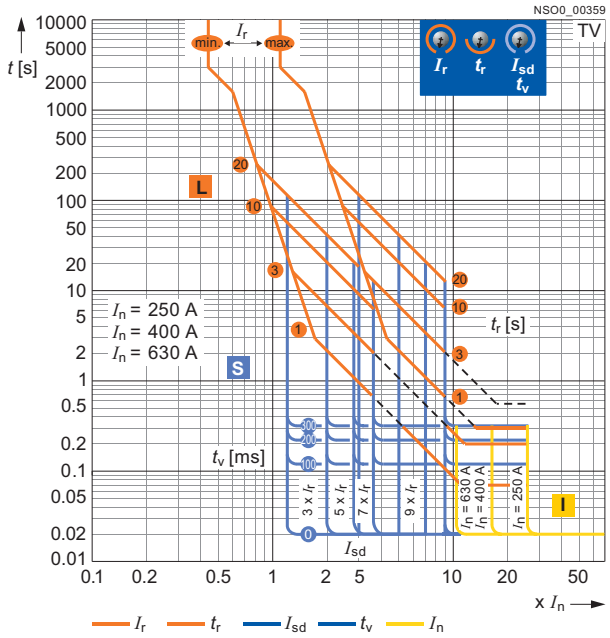
The releases have tripping characteristics especially designed for practical purposes that provide for optimal exploitation of transformers up to 1.5 $I_r$. A total of 8 characteristics can be set on the release. Mode “M” provides 4 characteristics suitable for protecting motors, and in mode “TV” are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

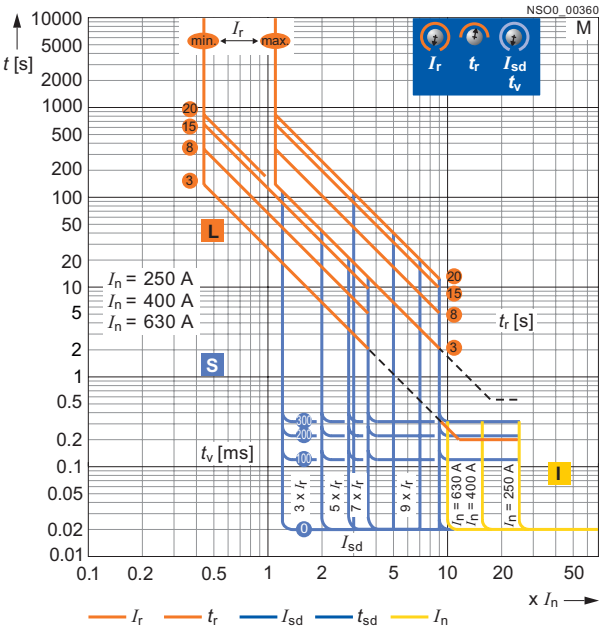



Adjustable specifications

| 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

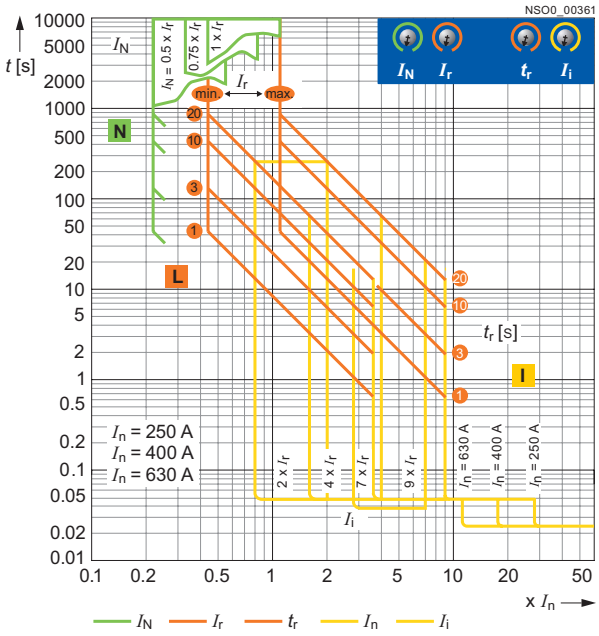
The 3VT9 3..-6BC00 release is only intended for the 3VT3 763-AA56-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release is equipped with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$.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

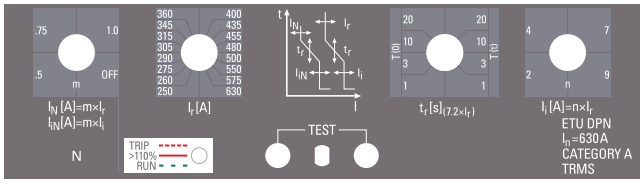
The rated current $I_r$, delay for switching off the release at 7.2 $I_r$, and the tripping level of the short-circuit release can be adjusted.

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

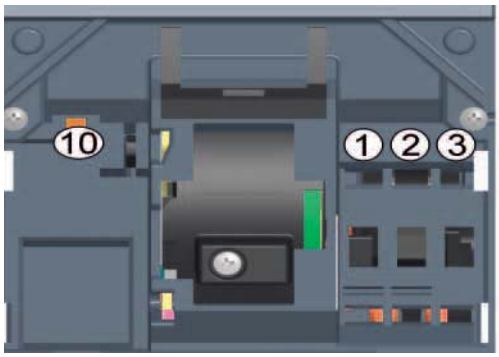



Adjustable specifications

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

## 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 |

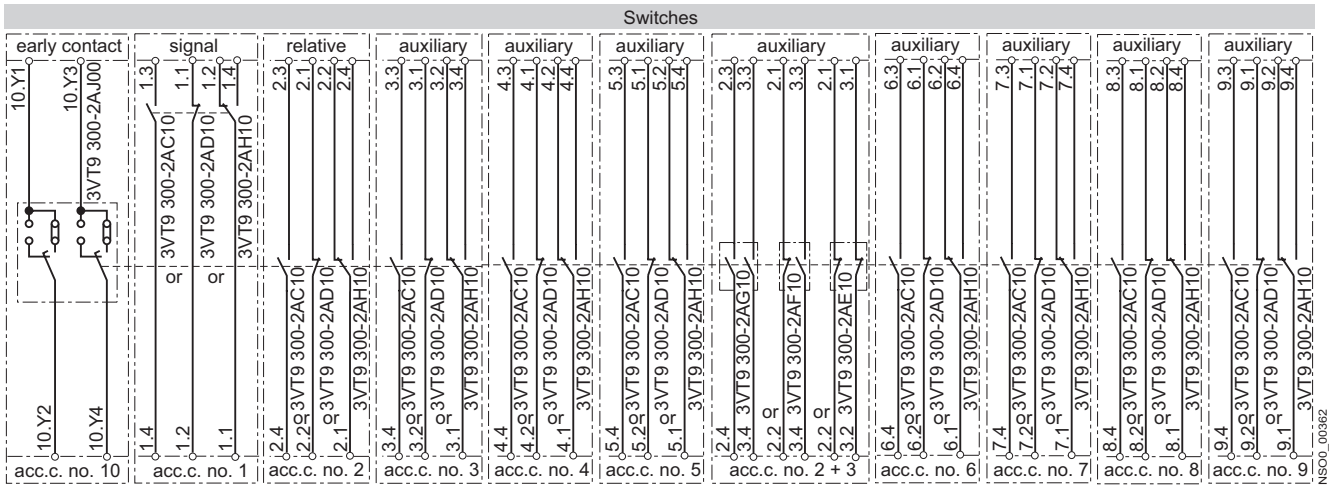
state of switches in the switching unit cavities

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

## Auxiliary switches

### Function

State of switches in the switching unit accessory compartment



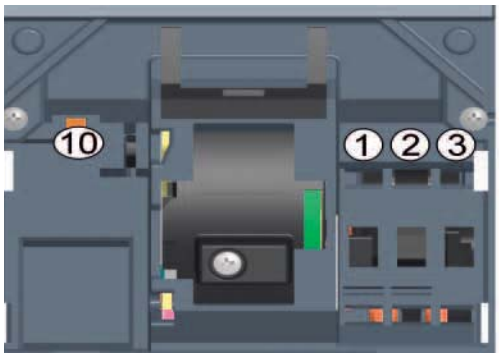

### Technical specifications

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<br>DC 60 ... 500 | AC 5 ... 60<br>DC 5 ... 60 | AC 250 | AC 24 ...250<br>DC 24 ...250 | AC 5 ..60<br>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,<br>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,<br>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<br>(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

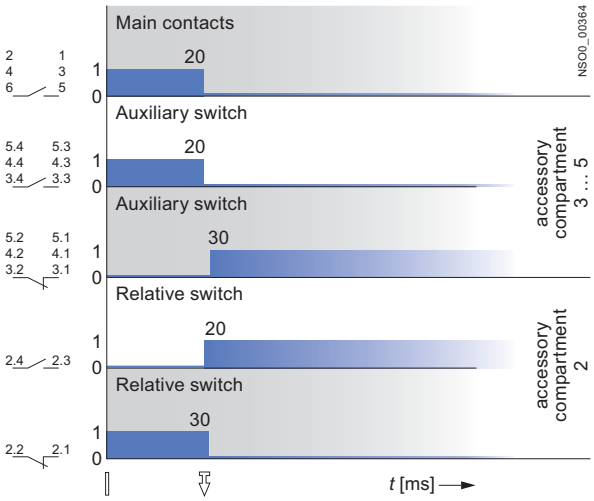
| $U_e$ | Order No. |
|---|---|
| AC 24,40 48 V | 3VT9 300-1SC00 |
| AC/DC 110 V | 3VT9 300-1SD00 |
| AC 230,400,500/DC 220 V | 3VT9 300-1SE00 |

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

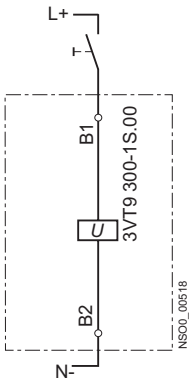
### *Shunt releases*

Circuit breaker switched off by the shunt release




Circuit breaker states and toggle positions of the circuit breaker

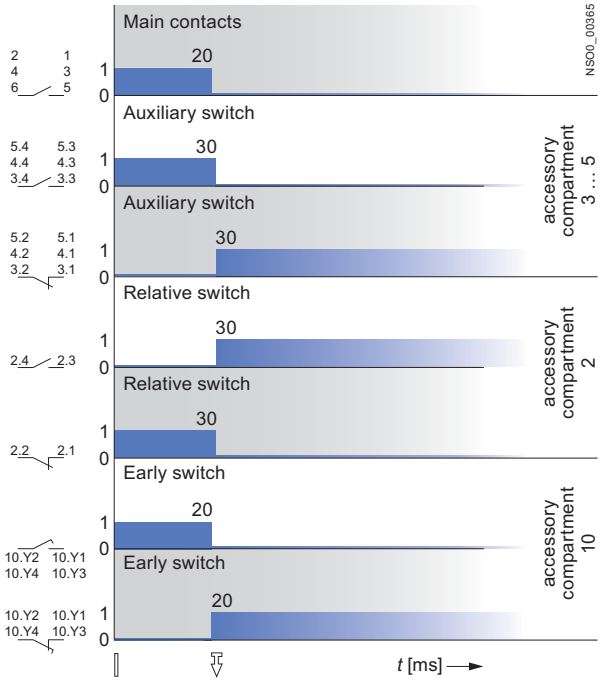
| Circuit breaker state | lever positions of circuit breakers |
|---|---|
| Switched on | |
| Switched off by releases, or by TEST button or by the release pushbutton on the motorized operating mechanism | |
| Switched off manually or electrically by operating mechanism | |



## Auxiliary releases

### *Undervoltage releases*

Circuit breaker switched off by the undervoltage release

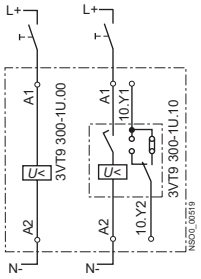



Circuit breaker states and lever positions of the circuit breaker

| 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<br>DC 24, 40, 48, 110, 220 V |
| Rated frequency $f_n$ | Hz | 50/60 |
| Input power at 1.1 $U_e$ | AC<br>DC | < 3 VA<br>< 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<br>DC 24, 40, 48, 110, 220 V | |
| Rated frequency $f_n$ | Hz | 50/60 | |
| Input power at 1.1 $U_e$ | AC<br>DC | < 3 VA<br>< 3 W | < 3 VA<br>< 3 W |
| Functional description | | $U$ 0.85 $U_e$<br>(circuit breaker is possible switch on)<br>$U$ 0.35 $U_e$<br>(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

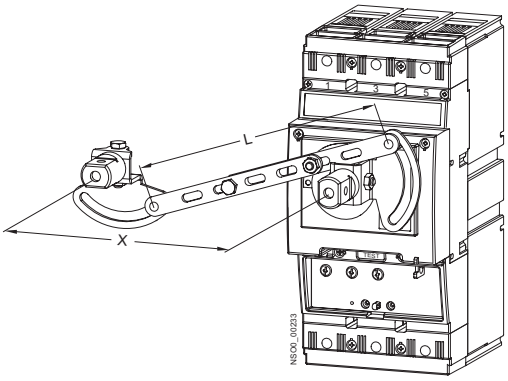
| Order No. | Description | Color | Locking while the circuit breaker is in OFF state | Protection | Switchgear door locking in the circuit breaker state | | Length mm |
|---|---|---|---|---|---|---|---|
| | | | | | switched on or off by release | switched off manually and locked | |
| 3VT9 300-3HA10 | 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*

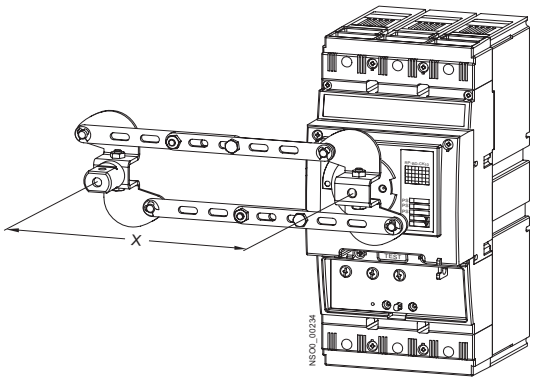
Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously. Interlocking can be used between two 3VT3 circuit breakers or between 3VT3 and 3VT2 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 |

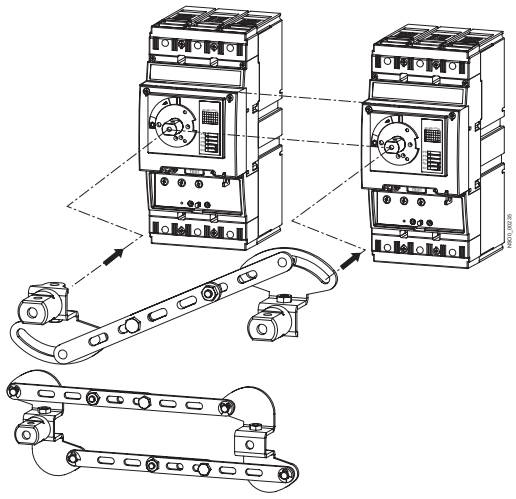
#### *3VT9 300-8LB00 mechanical parallel switching*

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.

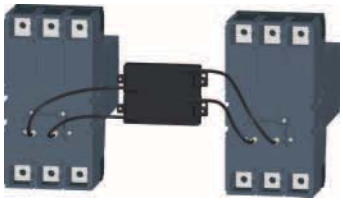



| Left switching unit | Right switching unit | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3VT2, 3P | | 3VT2, 4P | | 3VT3, 3P | | 3VT3, 4P[1)] | |
| | X | L | X | L | X | L | X | L |
| | mm | mm | mm | mm | mm | mm | mm | mm |
| 3VT2, 3P | $105^{+7}$ | $164.5^{+7}$ | $122.5^{+7}$ | $164.5^{+7}$ | $122.5^{+7}$ | $164.5^{+7}$ | 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*

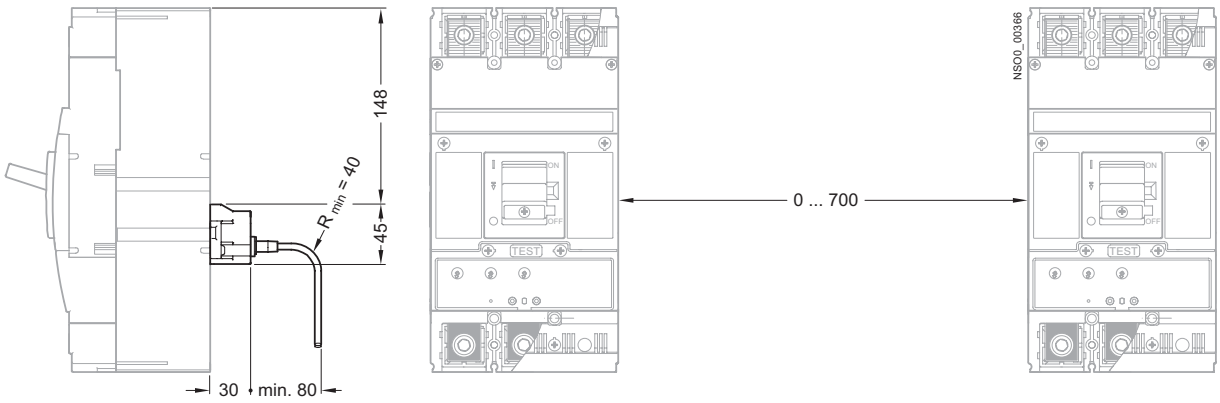


- Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be turned off simultaneously.
- 3VT9 300-8LC10 mechanical interlocking is intended for two 3VT3 circuit breakers.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

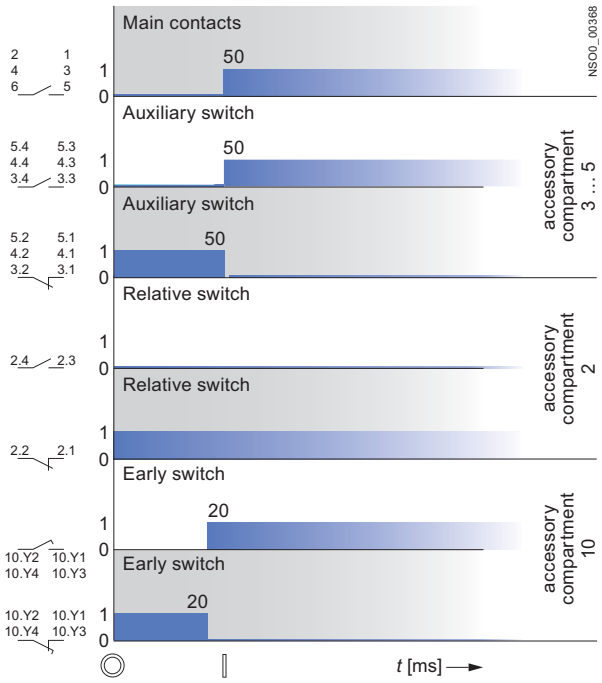
| | | |
|---|---|---|
| Order No. | | 3VT9 300-1S.00 |
| Operational voltage $U_e$ | V | AC 24 ,48, 110, 230<br>DC 24, 48, 110, 220 |
| Rated frequency $f_n$ | Hz | 50/60 |
| Control pulse length for storing | | 400 ms ∞[1)] |
| Control pulse length<br>for switching on<br>for switching off | | <br>20 ms ... 700 ms[1)]<br>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<br>• AC 24, 48, 110 V; AC 230 V<br>• DC 24, 48, 110 V; DC 220 V | | <br>LSN 4C/1; LSN 2C/1<br>LSN-DC 4C/1; LSN-DC 2C/1 |
| Rated operating current AUTO / MANUAL switches $I_e/U_e$ | V | AC 5 A/250<br>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.

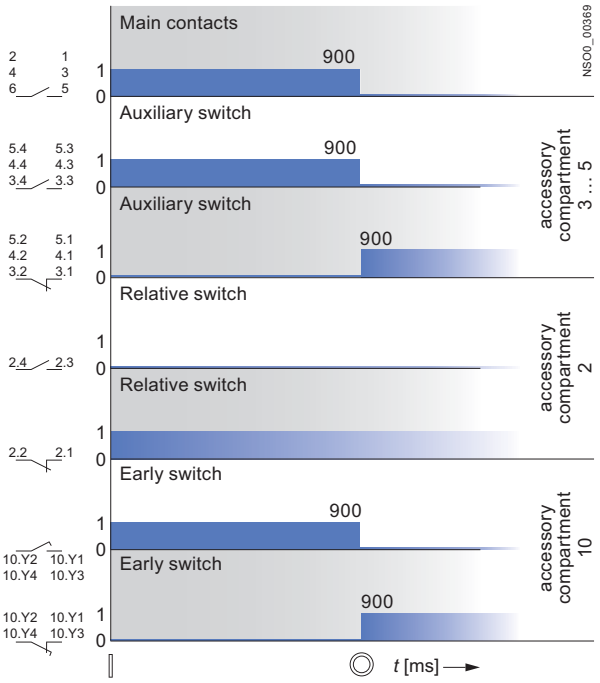
## Function

### *Circuit breaker switched on/off by the motorized operating mechanism*

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

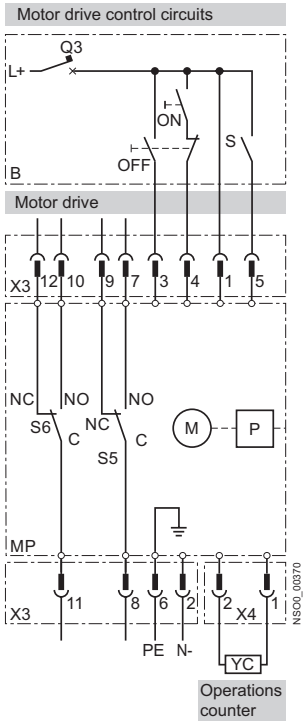



Circuit breaker switched off by the motorized operating mechanism- electrically by pushbutton OFF




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

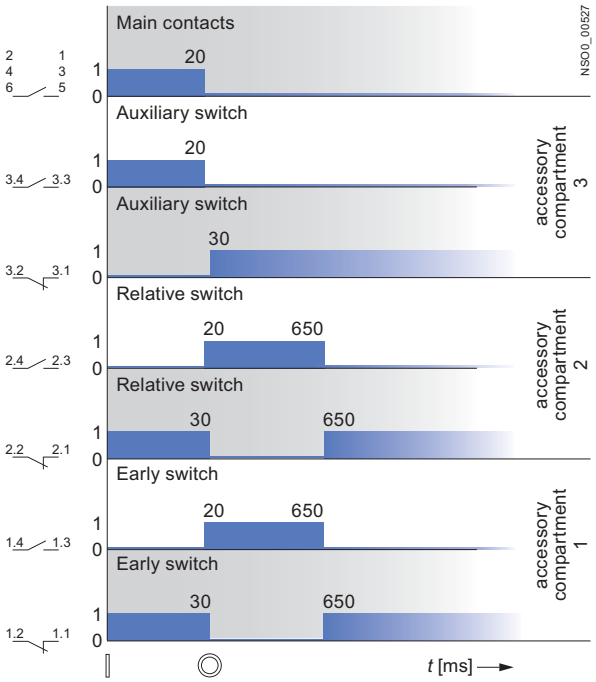
| Circuit breaker state | Toggle positions of circuit breaker |
|---|---|
| Switched on | |
| Switched off by releases, or by TEST button or by the trip push button on the motorized operating mechanism | |
| Switched off manually or electrically by the operating mechanism | |

Wiring diagram description

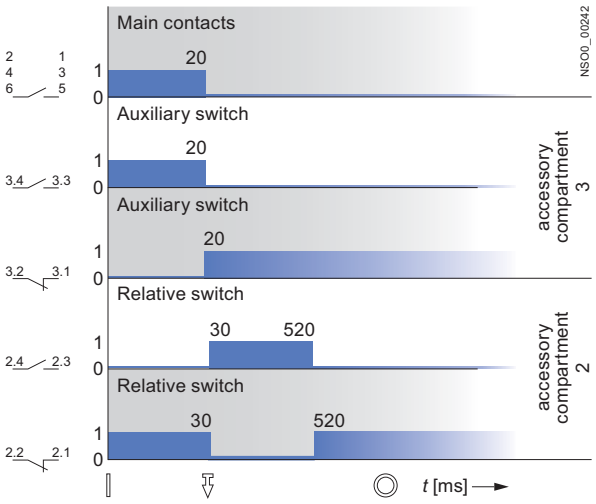
| Symbol | Description |
|---|---|
| MP | motorized operating mechanism 3VT9 300-3M..0 |
| M | motor |
| P | storage device |
| X3 | connector to connect control circuits |
| X4 | connector for external operations counter |
| S5 | switch indicating AUTO/MANUAL modes |
| S6 | Switching indicating energy 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)

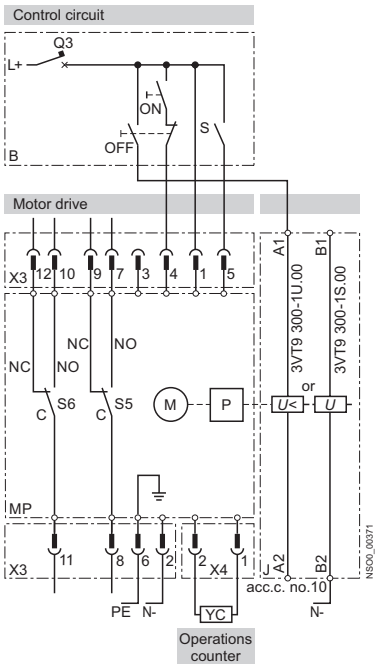



Tripping of the circuit breaker with motorized operating mechanism by a shunt release or undercurrent release (switch S in switched-on state – automatic storage)




Wiring diagram

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

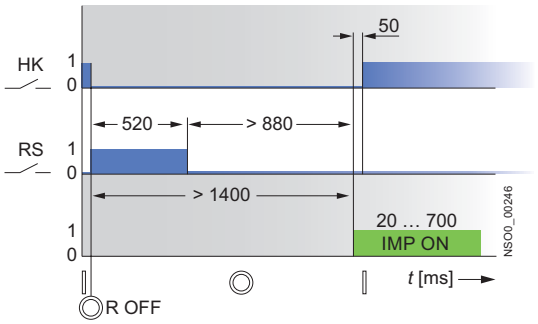



Circuit breaker switched on by motorized operating mechanism (electrical pushbutton ON) and switched off by undervoltage release

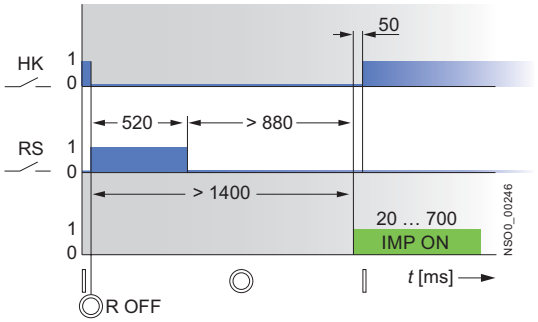
Recommended actuating pulses

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

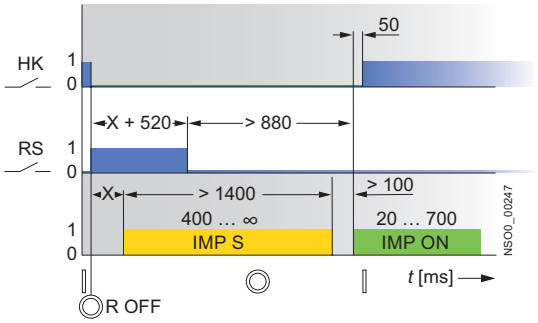
## Motorized operating mechanisms




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

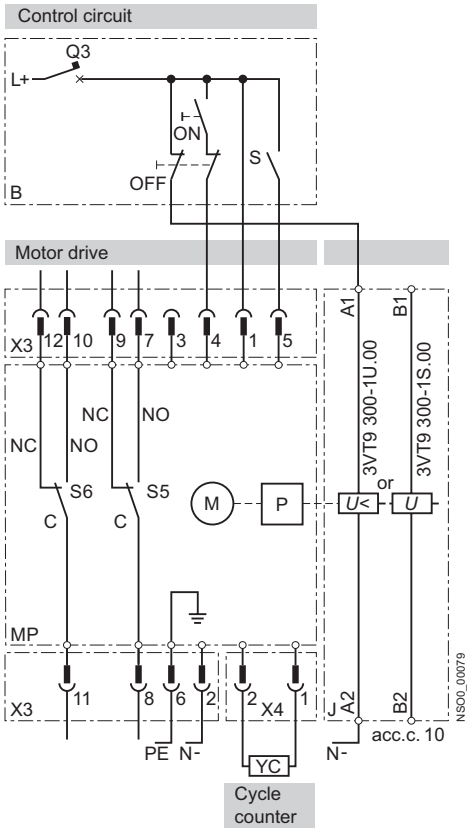
| Circuit breaker state | lever positions of circuit breakers |
|---|---|
| Switched on | |
| Switched off by releases, or by TEST button or by the trip push button on the motorized operating mechanism | |
| Switched off manually or electrically by the operating mechanism | |

4

## Motorized operating mechanisms

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

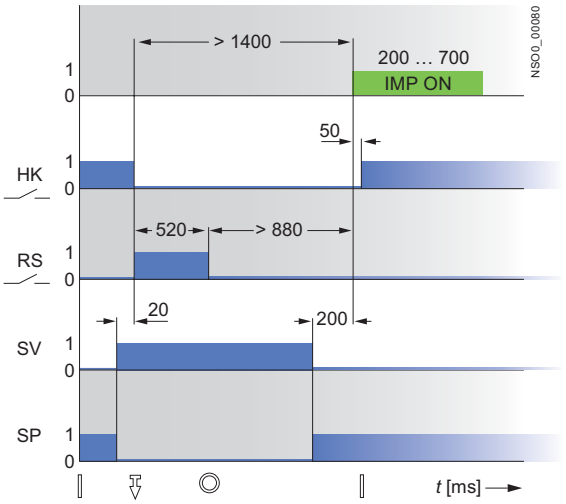
Wiring diagram of the motorized operating mechanism of the circuit breaker

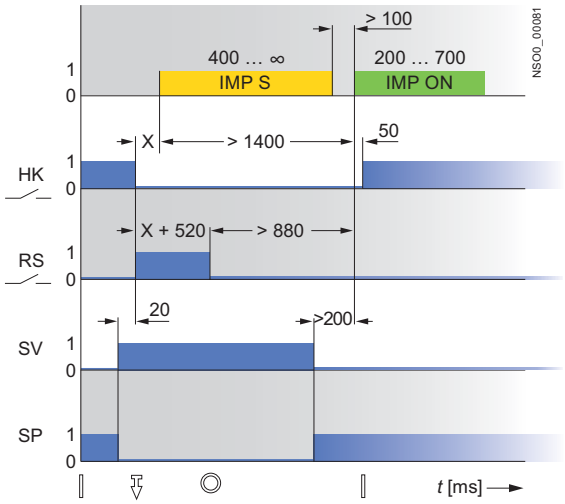



| | |
|---|---|
| M | motor |
| P | storage device |
| X3 | connector for connection of control circuits |
| X4 | connector for external cycle counter |
| S5 | switch indicating AUTO (NO-C)/MANUAL (NC-C) mode |
| YC | external 3VT9 300-3MF10 cycle counter |
| B | recommended connection of control circuits (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.

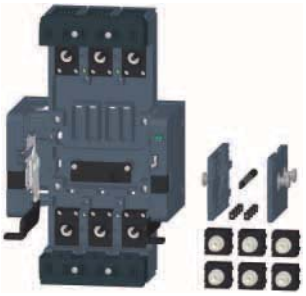
### *Advantages and enhanced safety for the operator*

- 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

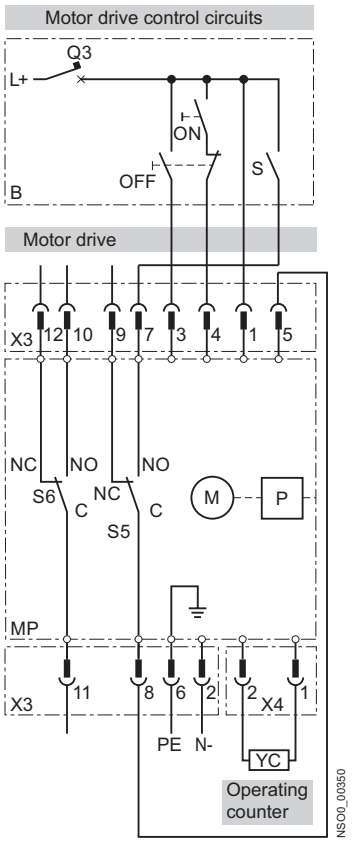
| Order No. | | 3VT9 300-4WL00 |
|---|---|---|
| Rated operational voltage $U_e$ | V | AC 400<br>AC 250 |
| Rated islation voltage $U_i$ | V | AC 500 |
| Rated frequency $f_n$ | Hz | 50/60 |
| Rated operational current $I_e/U_e$ | | |
| AC-13 | | 3 A/AC 400 V |
| DC-15 | | 0.15 A/DC 250 V, 3 A/DC 125 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

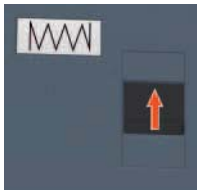
## Recommended wiring of the circuit breaker in plug-in design with motorized operating mechanism




| 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<br>AC 24V LSN 4C/1<br>AC 48V LSN 4C/1<br>AC 110V LSN 4C/1<br>AC 230V LSN 2C/1<br>DC 24V LSN-DC 4C/1<br>DC 48V LSN-DC 4C/1<br>DC 110V LSN-DC 4C/1<br>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<br>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<br>0 | 1<br>1 | 1<br>1 | 0<br>0 | 0<br>1 | 1<br>0 |
| Withdrawn and unarrested | 1<br>1 | 0<br>0 | 0<br>0 | 1<br>1 | 0<br>1 | 1<br>0 |
| Removed and unarrested | 1<br>1 | 0<br>0 | 1<br>1 | 0<br>0 | 0<br>1 | 1<br>0 |

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

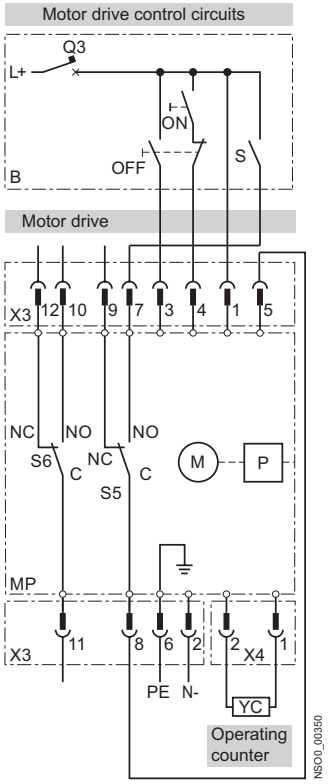
- Operating state is always in arrested position
- In arrested position, it is possible to lock the withdrawable device (for more detailed information, see “Advantages and enhanced safety for operator”)

### *Locking*

Locking the circuit breaker Locking the withdrawable device in withdrawable device against inserting the circuit breaker against tampering

### *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<br>AC 24 V LSN 4C/1<br>AC 48 V LSN 4C/1<br>AC 110 V LSN 4C/1<br>AC 230 V LSN 2C/1<br>DC 24 V LSN-DC 4C/1<br>DC 48 V LSN-DC 4C/1<br>DC 110 V LSN-DC 4C/1<br>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.

# Accessories and Components

## 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

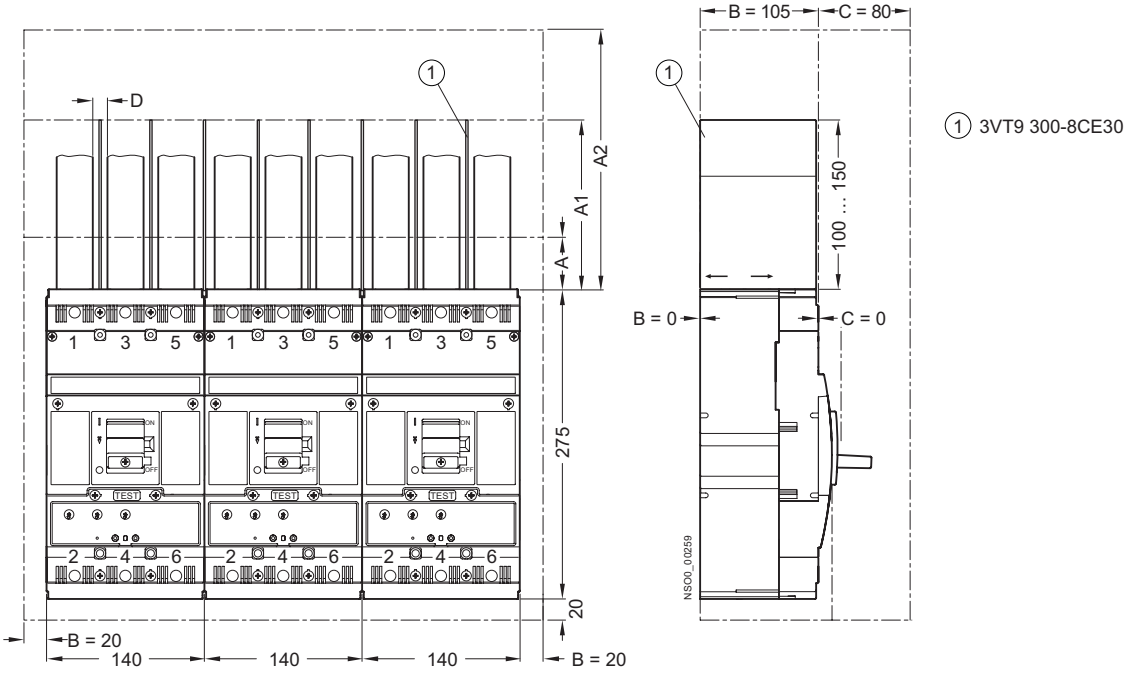
- Terminals 1, 3, 5
  - If $U_e$ = AC 415 V, it is necessary to use 3VT9 300-8CE30 phase barriers or 3VT9 300-8CB30 terminal covers
  - For the connection of the main circuit to terminals 1, 3, 5, insulated conductors, flexibars or rear connection terminals are not used. It is necessary to use 3VT9 300-8CE30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

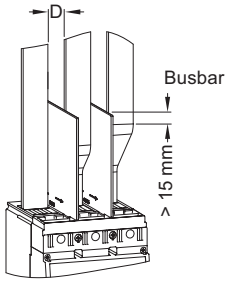
Plug-in and withdrawable design

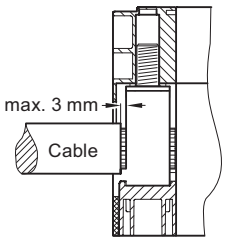
Neither phase barriers nor terminal covers need be used.

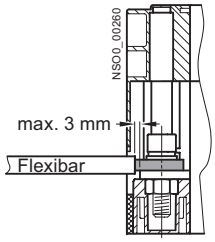



| | |
|---|---|
| A | minimum distance between the circuit breaker/switch-disconnctor and uninsulated earthed wall (applicable for connecting using insulated conductors, cables, flexibars or with rear connection) |
| A1 | minimum insulation length of bare conductors (using 3VT9 300-8CE30 phase barriers 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:<br>• between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)<br>• between the circuit breaker/switch-disconnector and busbar<br>• between two circuit breaker/switch-disconnectors situated vertically above one another<br>• 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



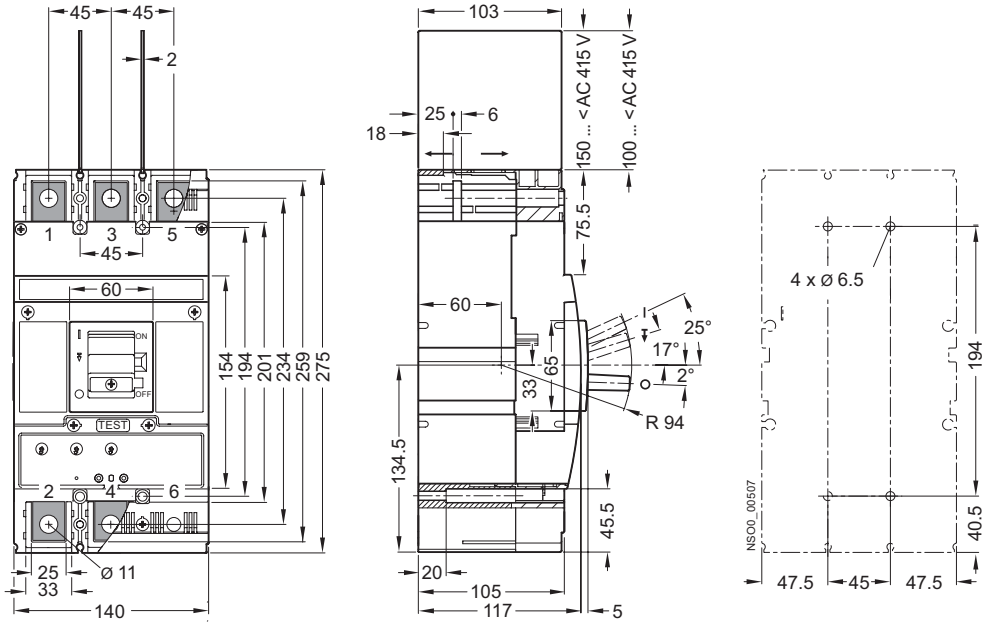




| AC $U_e$ | | AC $U_e$ | V | 230 | 415 | | 500 | | 690 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 3VT3 H wired with $I_k$ [1] | | | kA | ≤ 100 | > 36 ... 65 | ≤ 36 | > 20 ... 35 | ≤ 20 | > 15 ... 20 | ≤ 15 |
| 3VT3 N wired with $I_k$ | | | kA | ≤ 60 | | ≤ 36 | | ≤ 20 | ≤ 10 | ≤ 15 |
| C mm | 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).

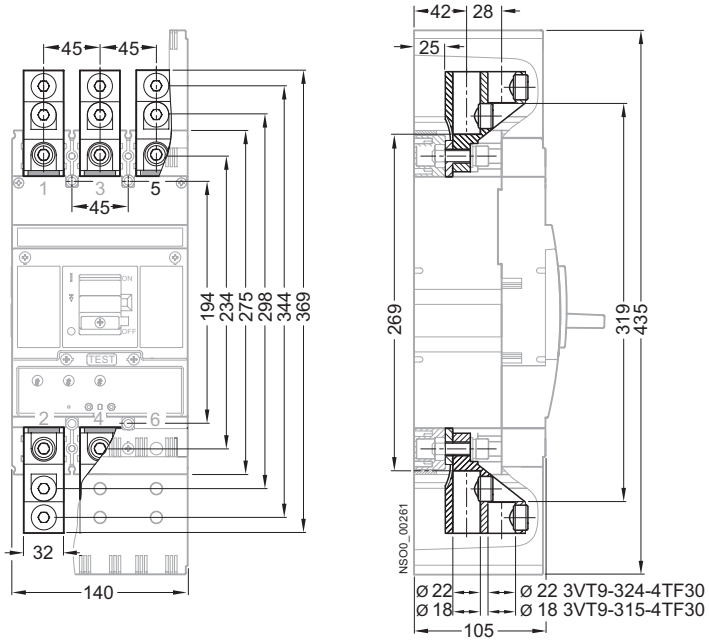
*3-pole · Fixed-mounted design*

Fixed-mounted design, front connection



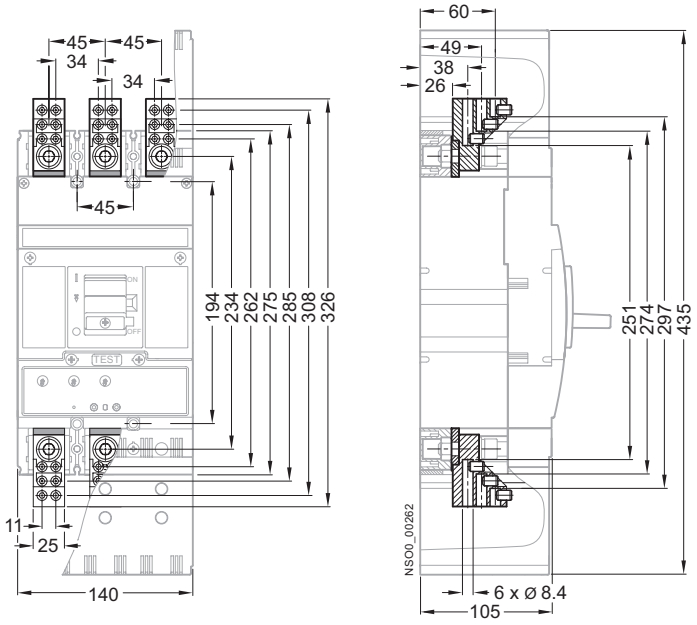

Drilling pattern

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

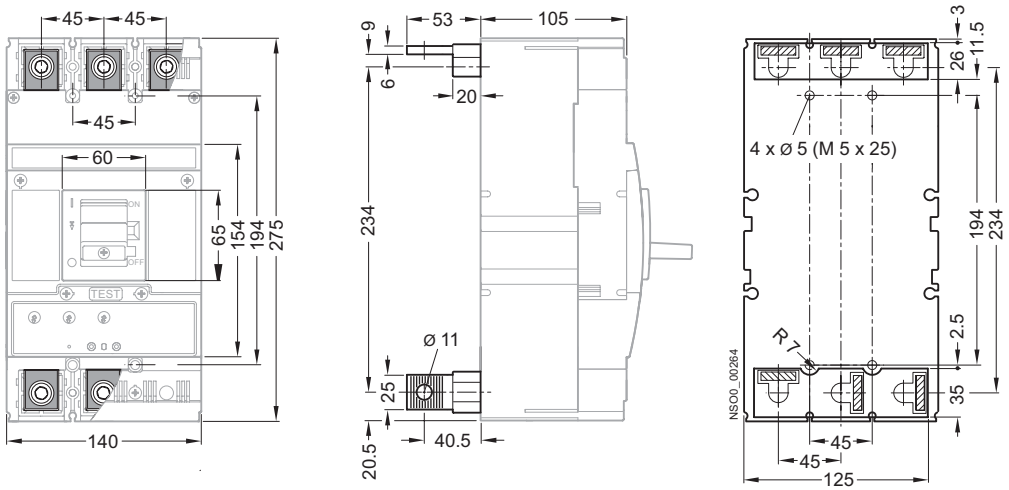


## Project planning aids

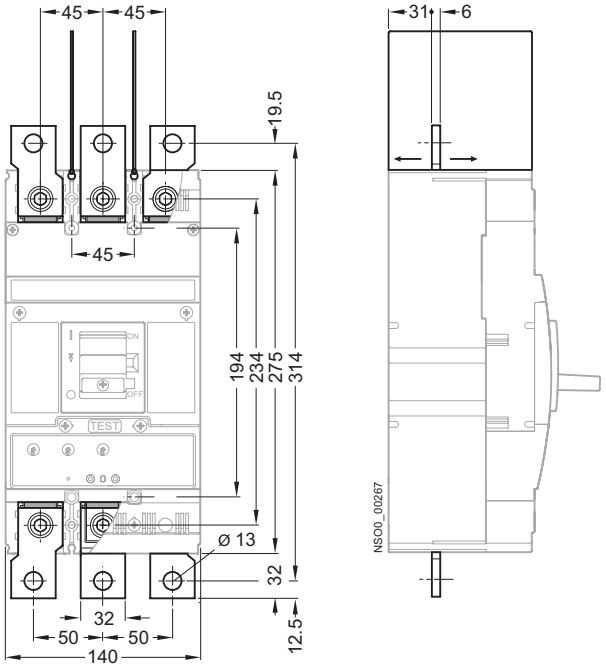
Fixed-mounted design, front connection (3VT9 303-4TF30 connecting set)



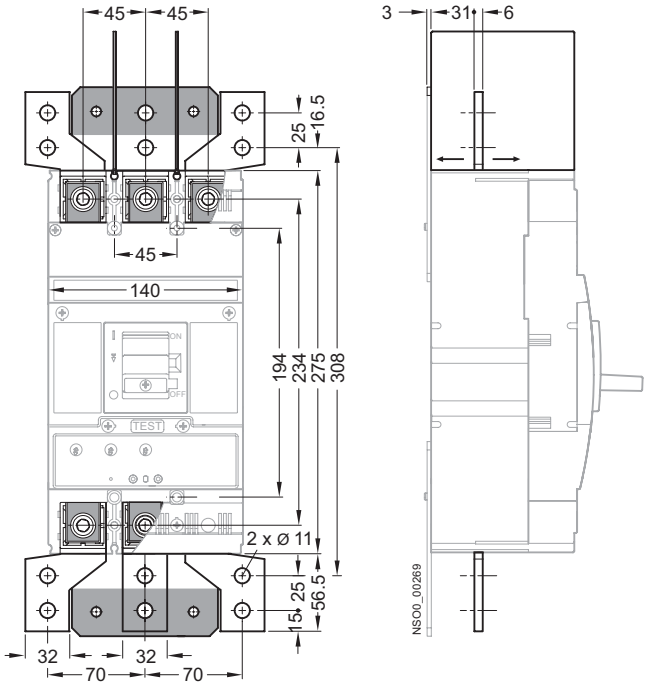

Fixed-mounted design, rear connection (3VT9 300-4RC30 connecting set)



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

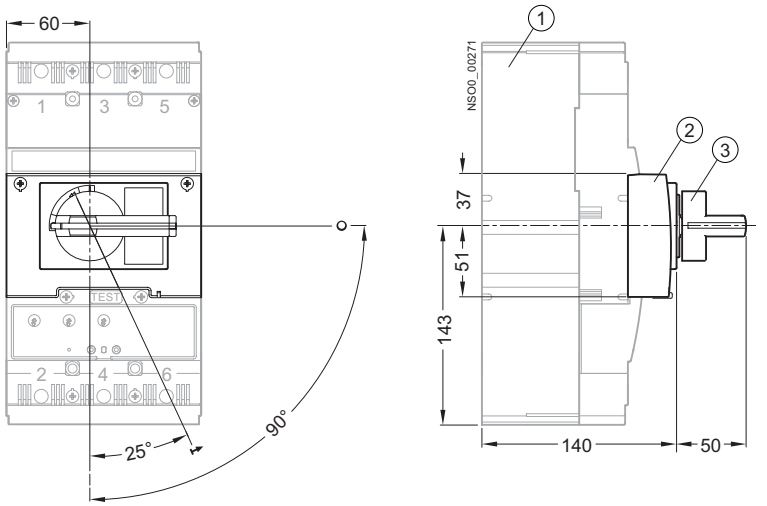



Fixed-mounted design, front connection (3VT9 300-4EE30 connecting set)



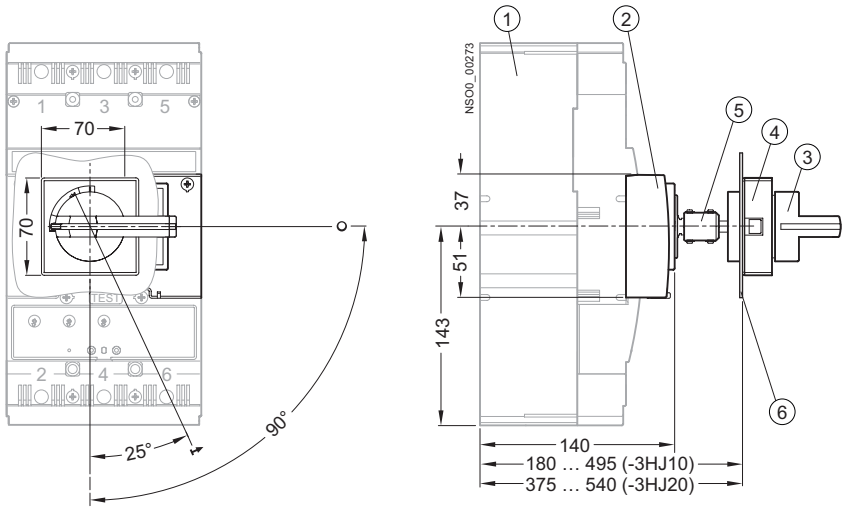
## Project planning aids

Fixed-mounted design, manual operating mechanism



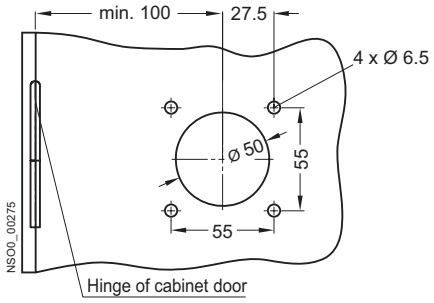

1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF-0

Fixed-mounted design, manual operating mechanism with adjustable knob

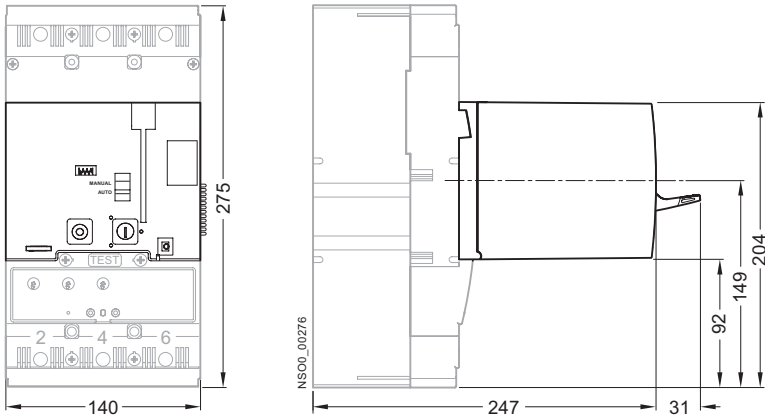



1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0
4 3VT9 300-3HG.0,-3HH.0
5 3VT9 300-3HJ.0
6 Outside surface of cabinet door

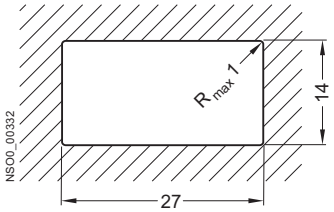
Adaptation of cabinet door



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




Opening dimensions in cabinet door for external operations counter

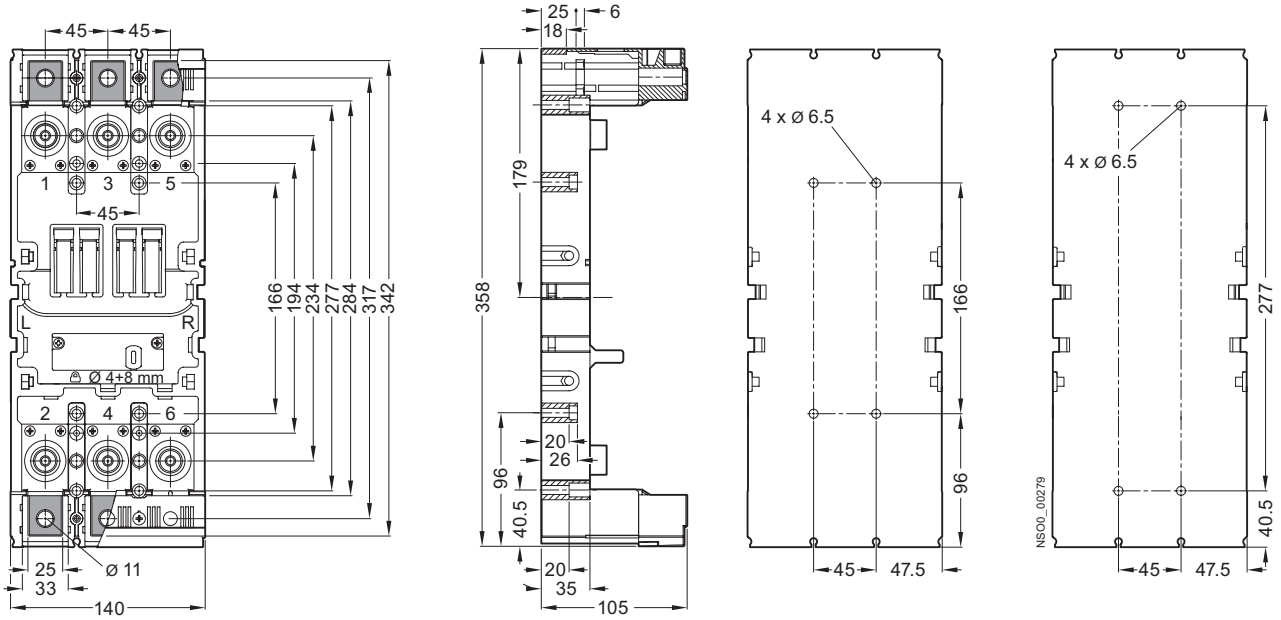


## Project planning aids

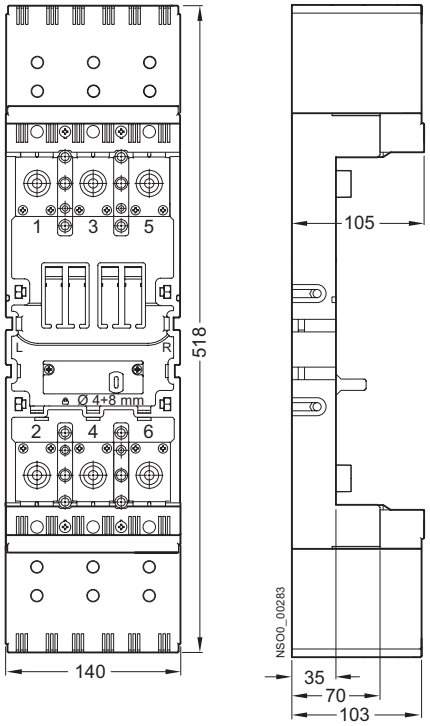
*3-pole · Plug-in version*

3VT9 300-4PA30 plug-in device

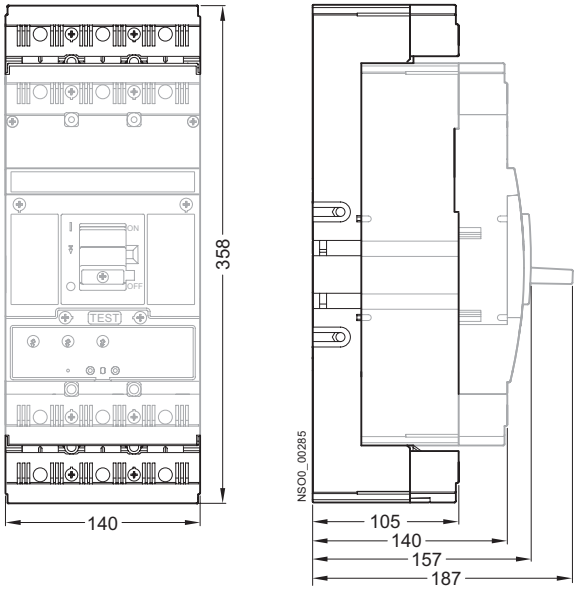
Drilling patterns




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

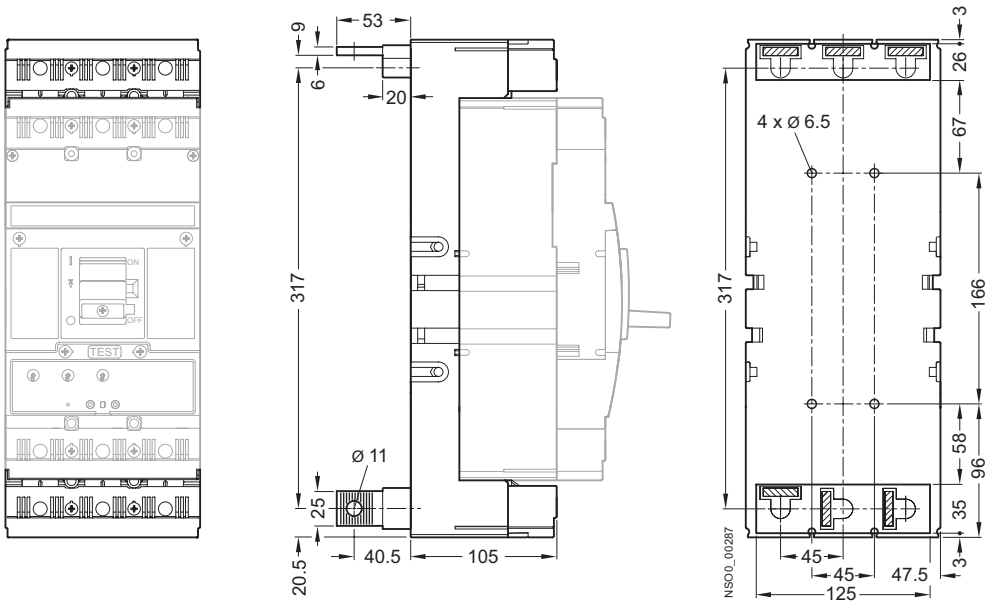


Plug-in design



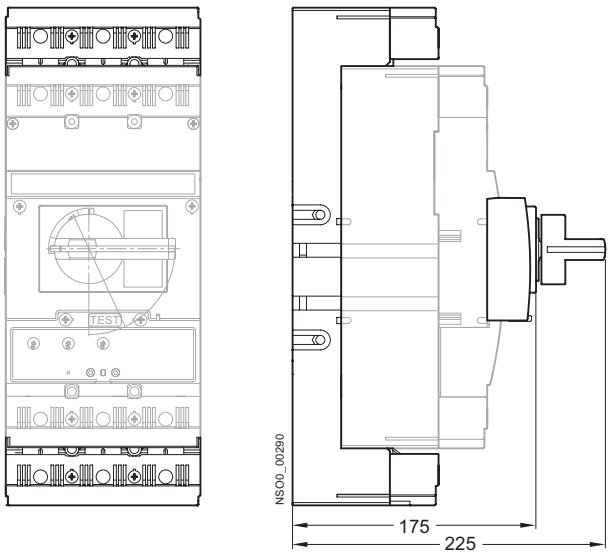

Plug-in design, rear connection with 3VT9 300-4RC30 connecting set

Drilling pattern

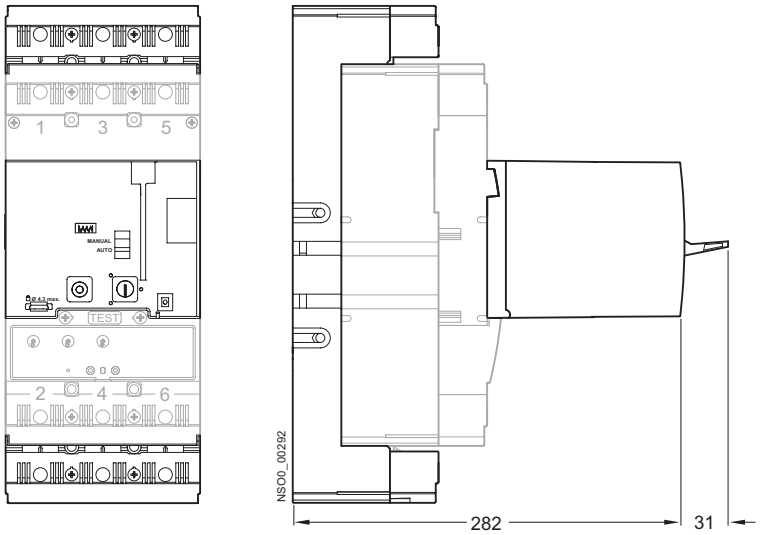


## Project planning aids

Plug-in design, with rotary operating mechanism

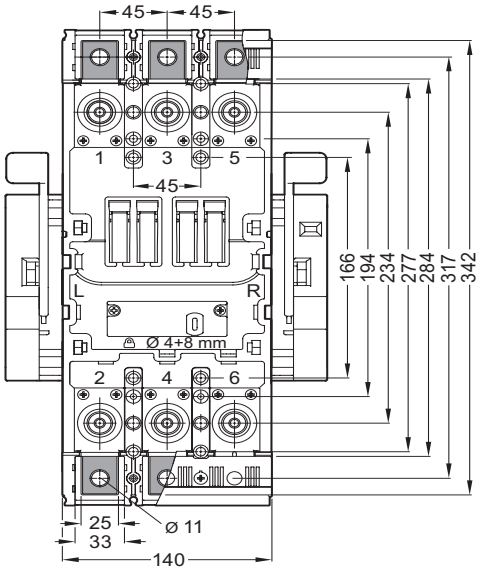


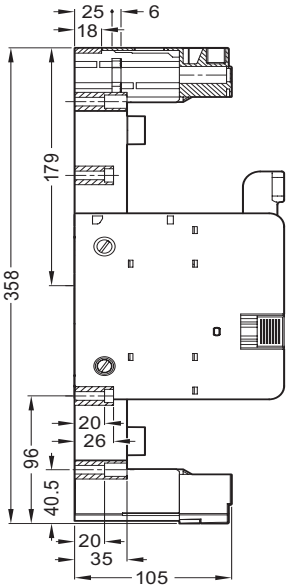

Plug-in design, with 3VT9 300-3M..0 motorized operating mechanism



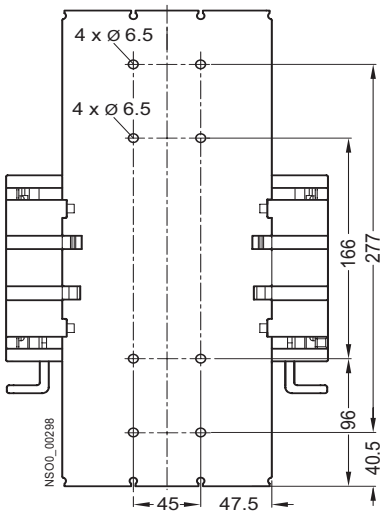
*3-pole · Withdrawable version*

3VT9 300-8CB30 withdrawable device

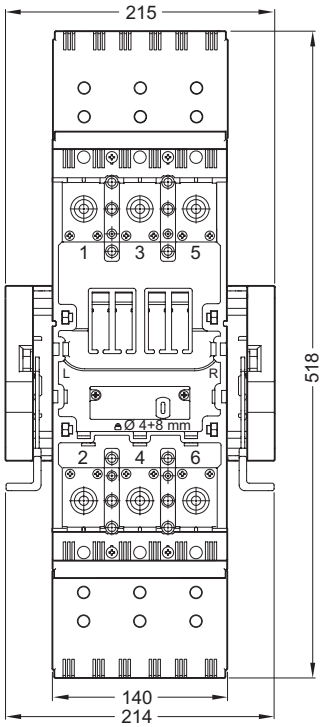


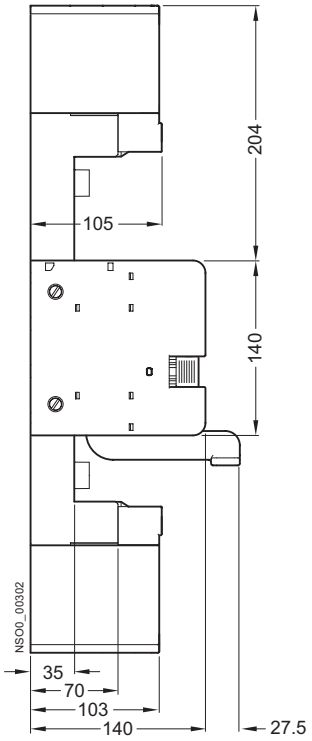




Drilling pattern



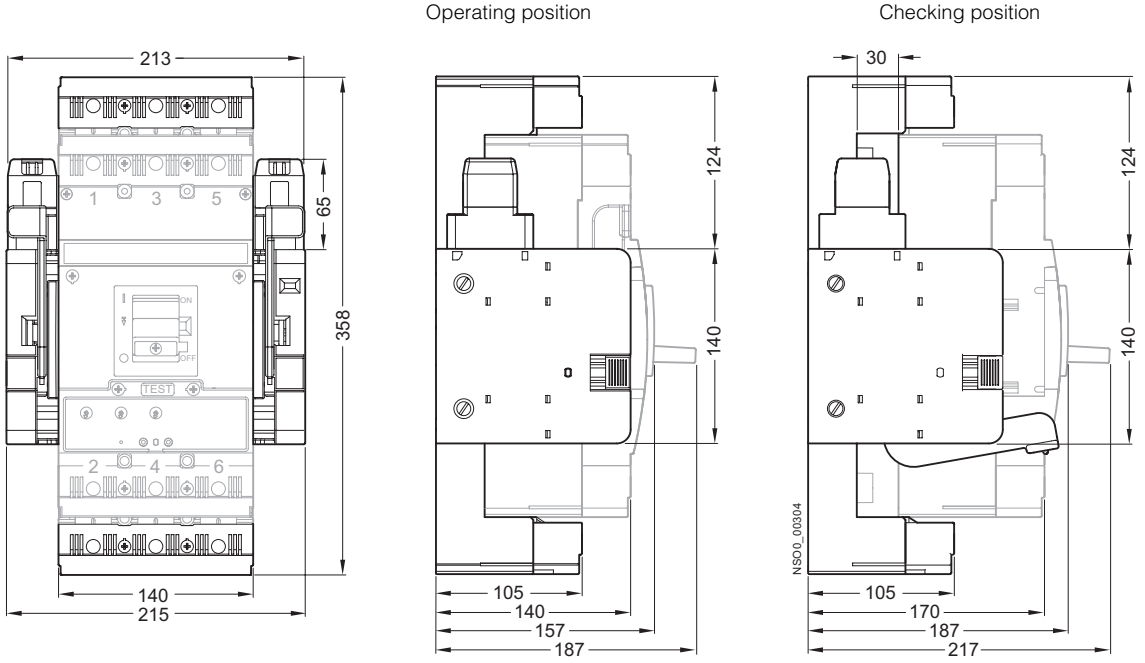

Withdrawable device, with 3VT9 300-8CB30 terminal cover



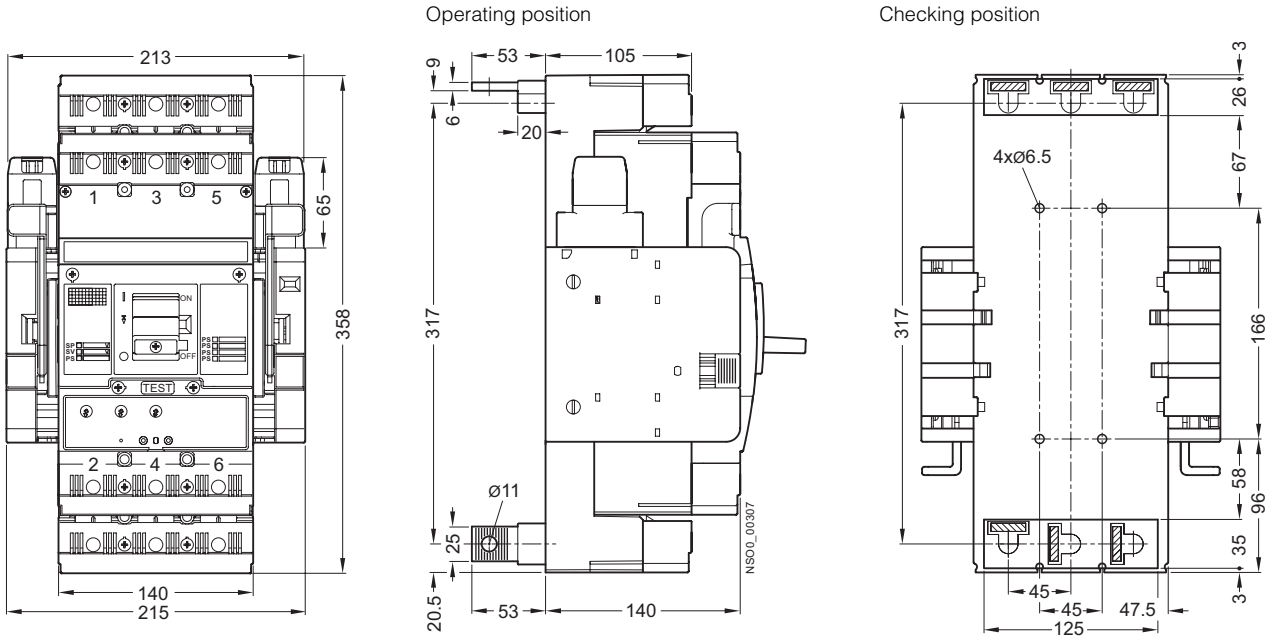



## Project planning aids

Withdrawable design

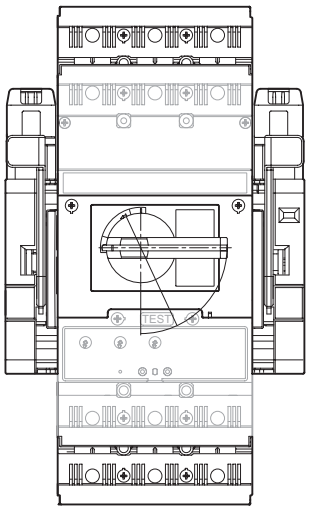


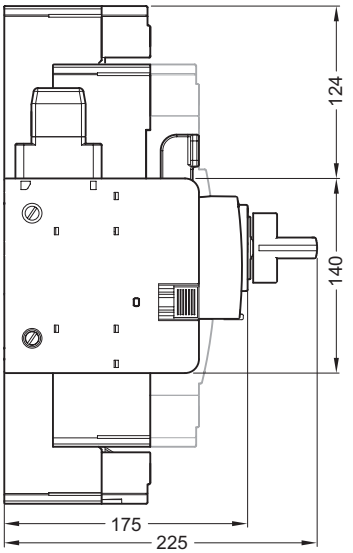

Withdrawable design, rear connection with 3VT9 300-4RC30 connecting set



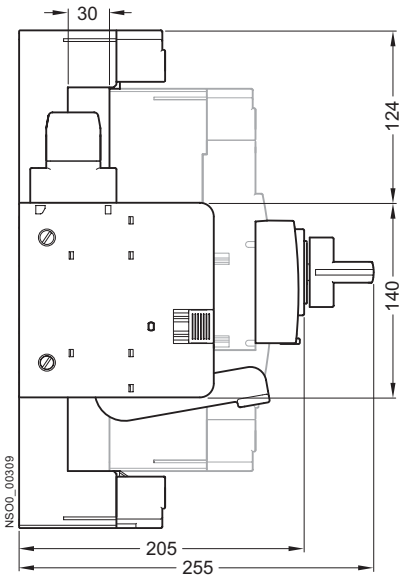
Withdrawable design, with manual operating mechanism

Operating position



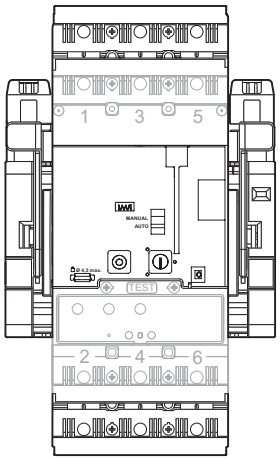



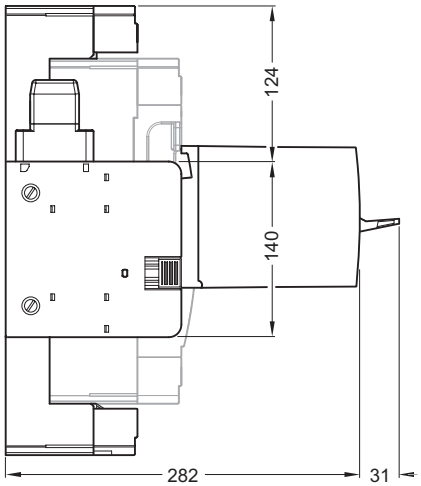

Checking position



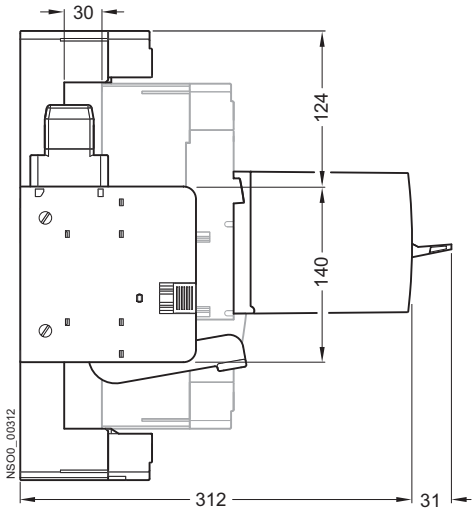

Withdrawable design, with motorized operating mechanism

Operating position



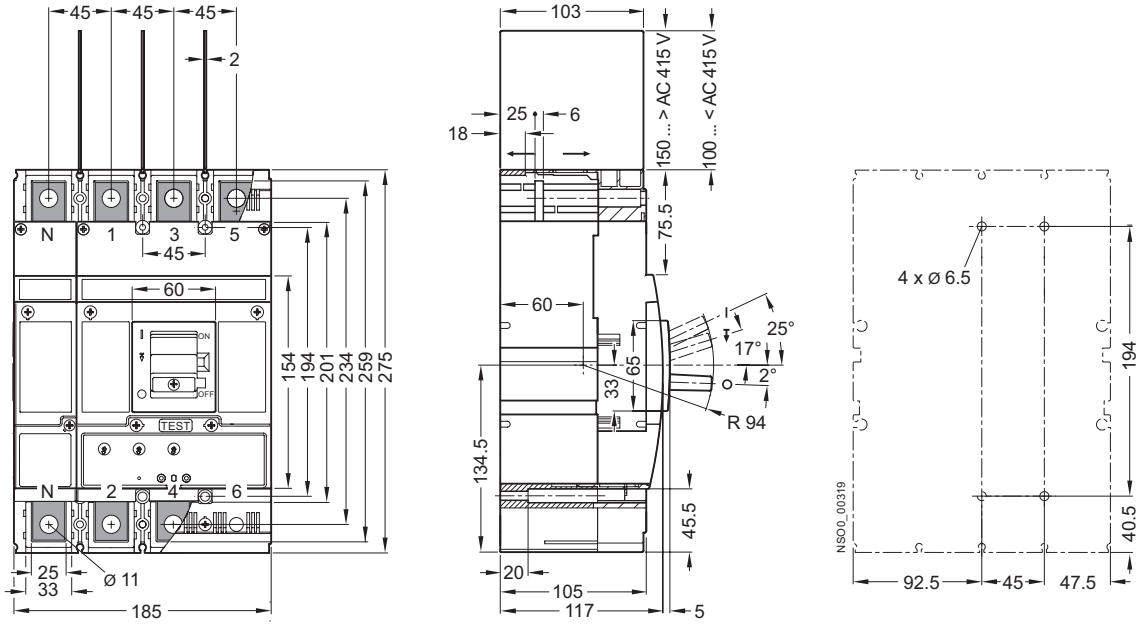

Checking position



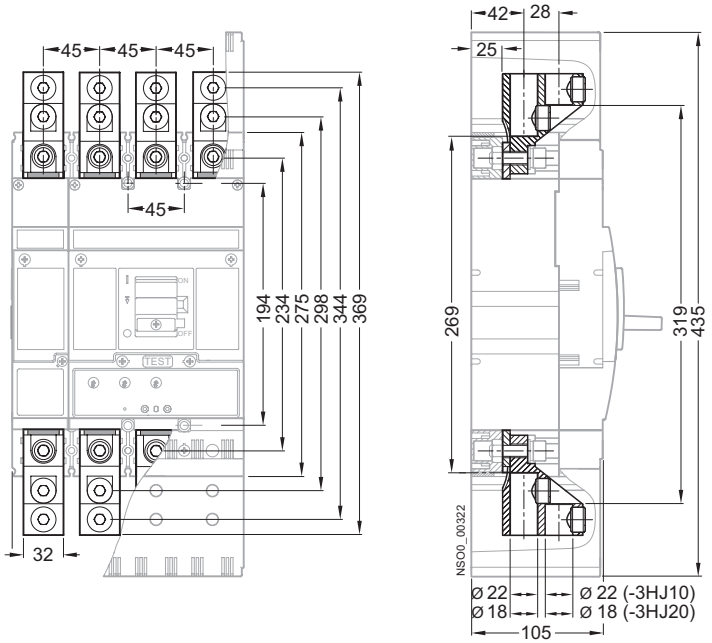
## Project planning aids

*4-pole · Fixed-mounted design*

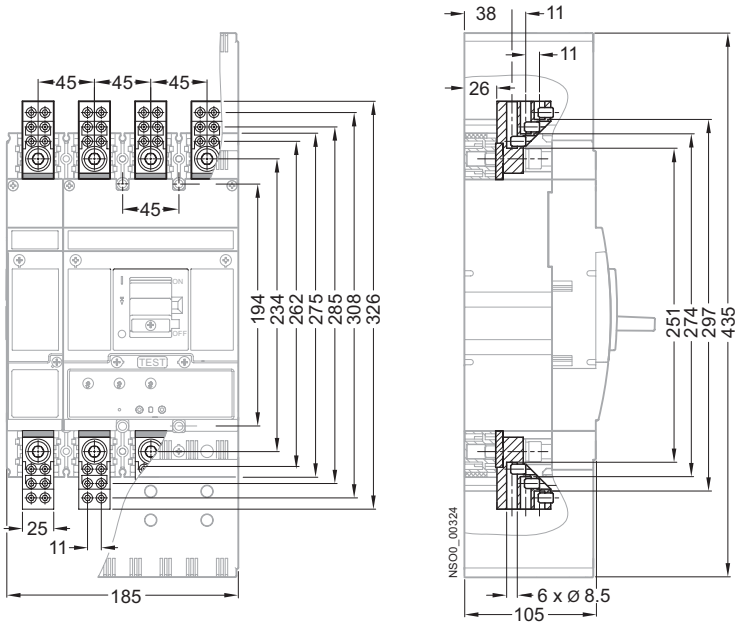
Fixed-mounted design, front connection



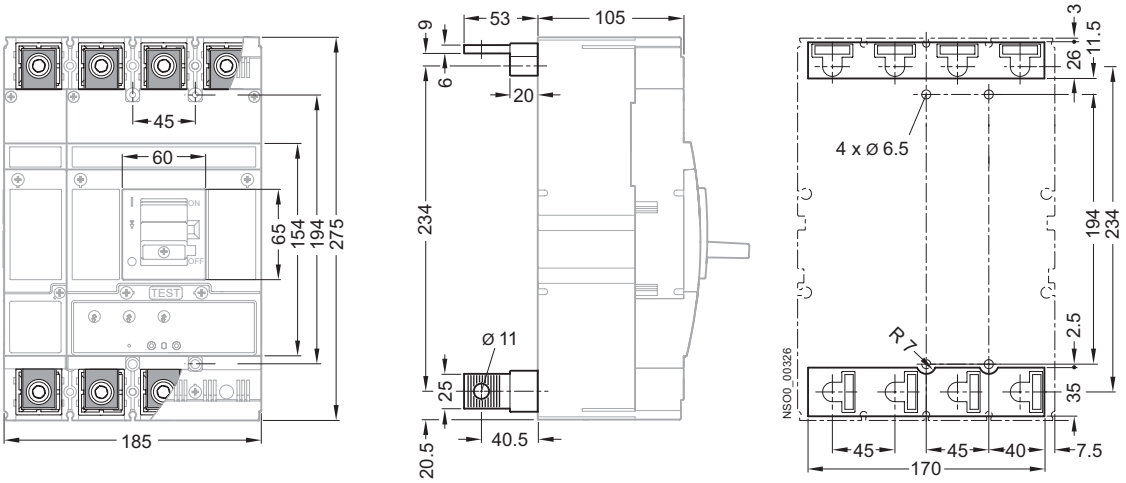

Fixed-mounted design, front connection
with 3VT9 324-4TF30 + 3VT9 324-4TF00, 3VT9 315-4TF30 + 3VT9 315-4TF00 connecting set



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

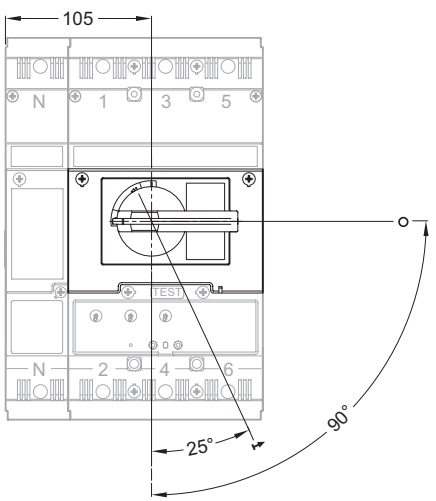


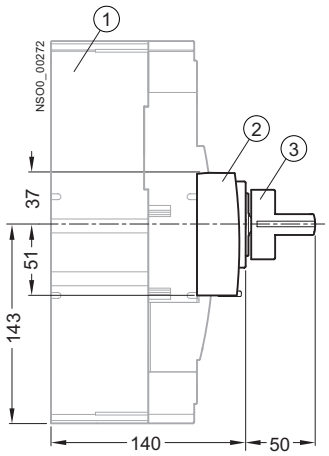

Fixed-mounted design, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set



## Project planning aids

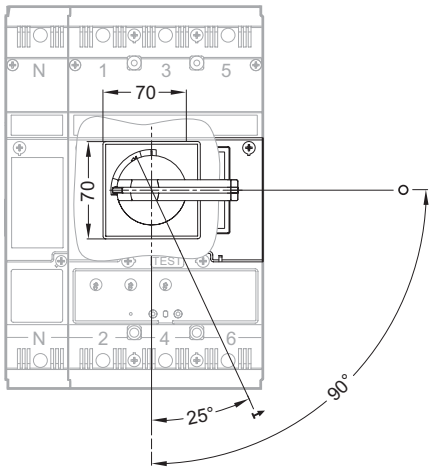
Fixed-mounted design, with rotary operating mechanism

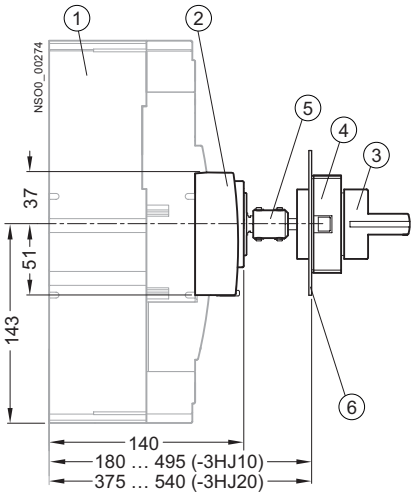



1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0

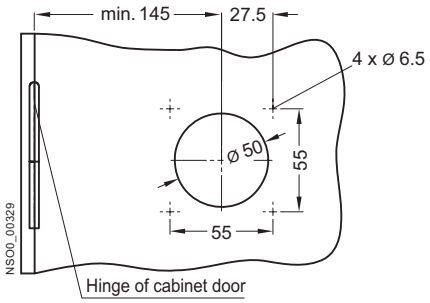
Fixed-mounted design, with door-coupling operating mechanism



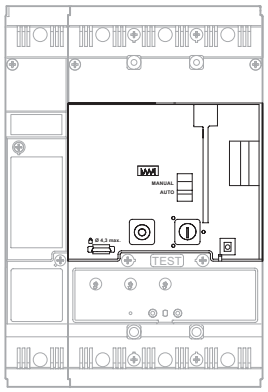



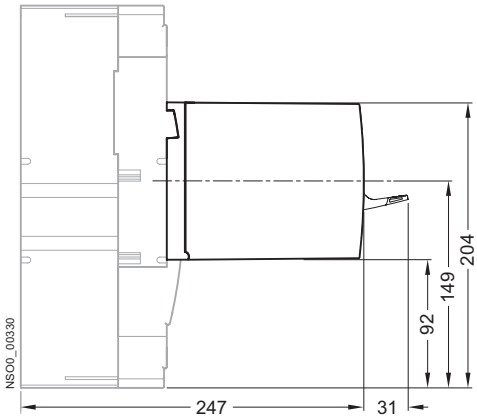

1 3VT3
2 3VT9 300-3HA.0,-3HB.0
3 3VT9 300-3HE.0,-3HF.0
4 3VT9 300-3HG.0,-3HH.0
5 3VT9 300-3HJ.0
6 Outside surface of cabinet door

Adaptation of cabinet door

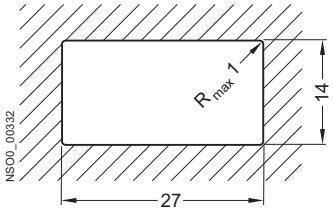


Fixed-mounted design, 3VT9 300-3M..0 motorized operating mechanism




Opening dimensions in cabinet door for external operations counter

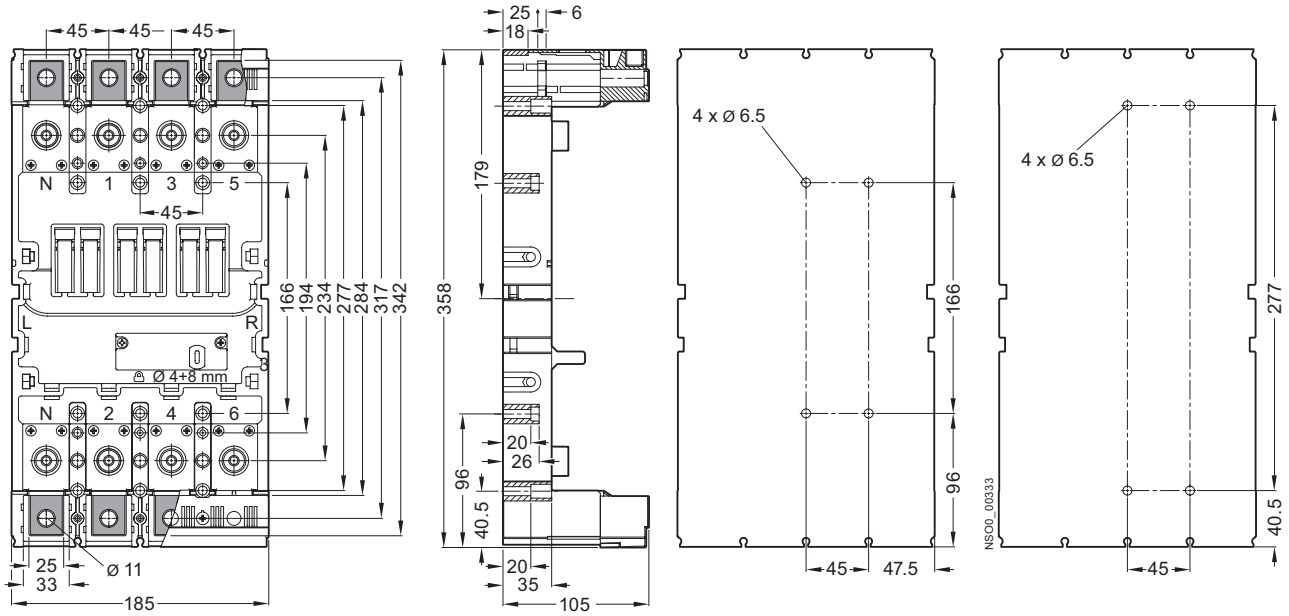


## Project planning aids

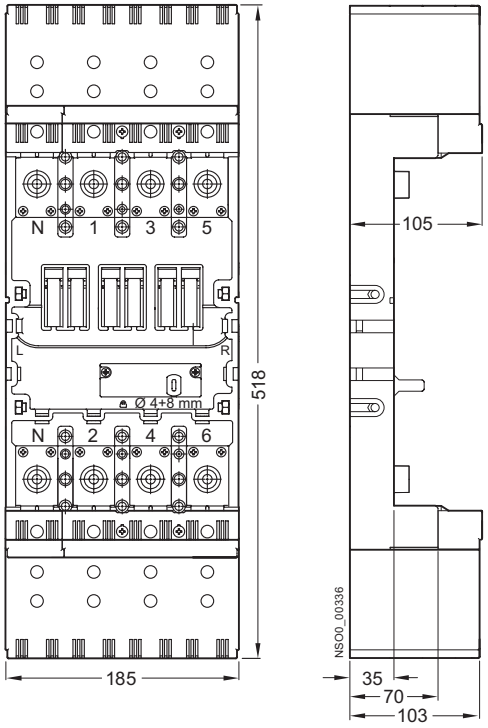
*4-pole · Plug-in version*

3VT9 300-4PA40 plug-in device

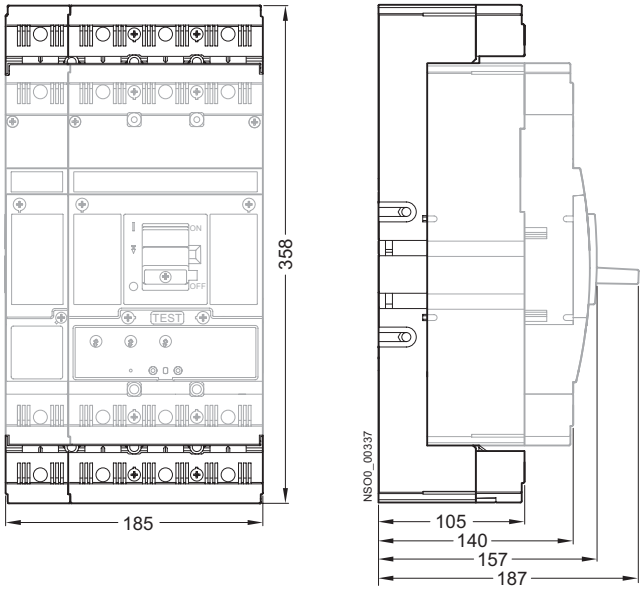
Drilling patterns




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

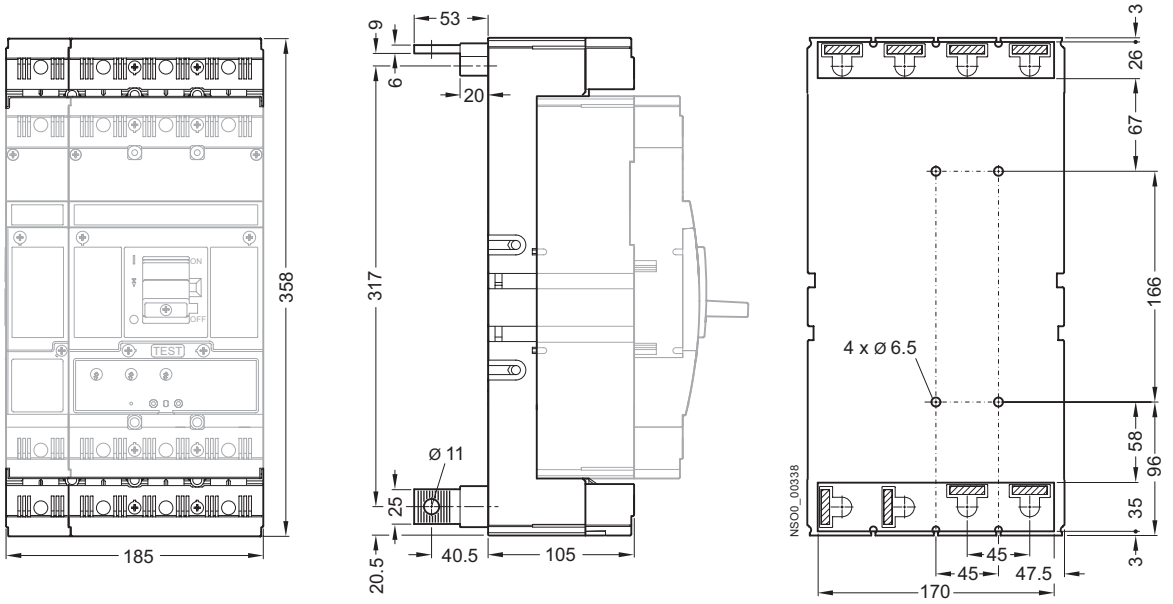


Plug-in design



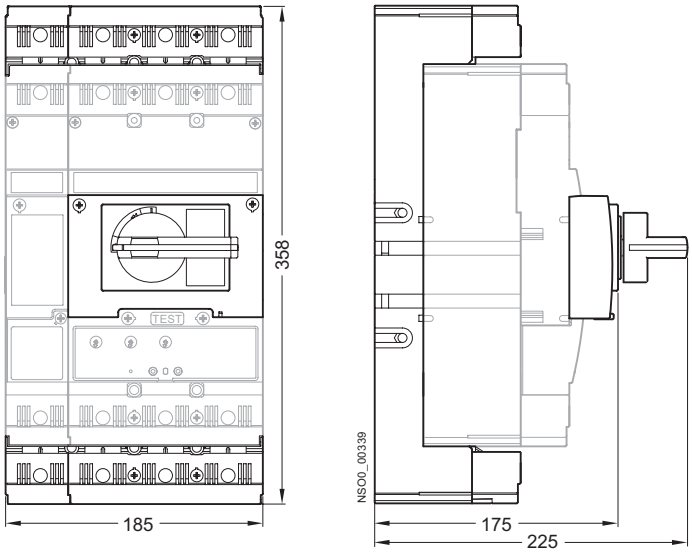

Plug-in design, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set

Drilling pattern

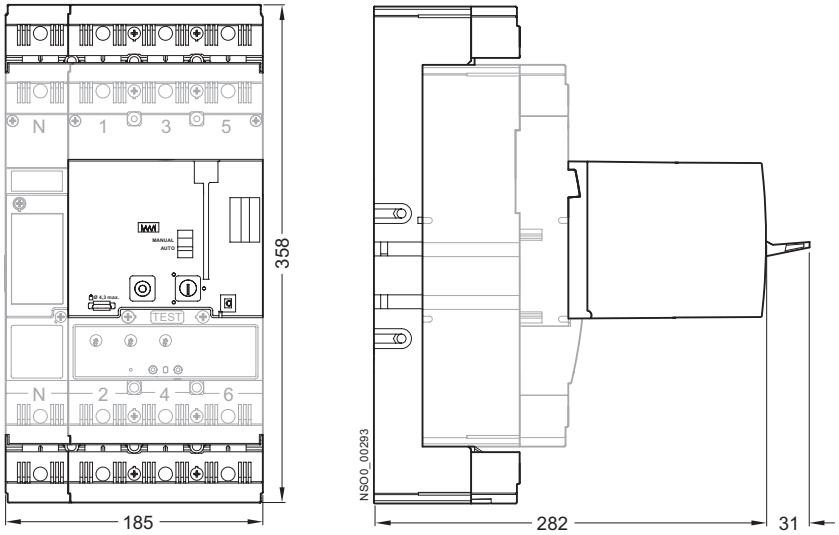


## Project planning aids

Plug-in design with rotary operating mechanism

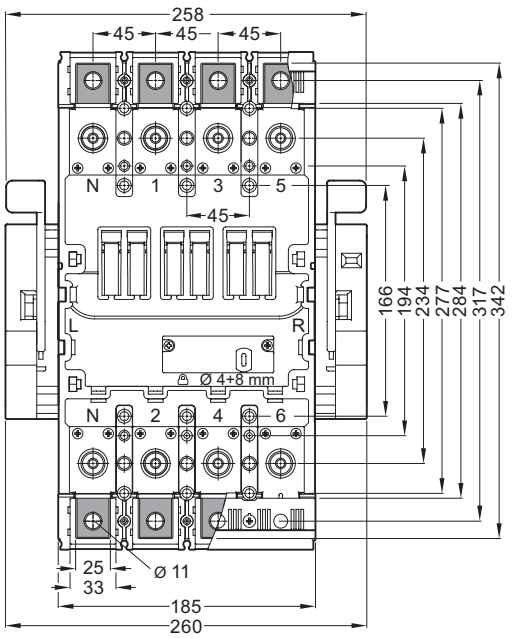


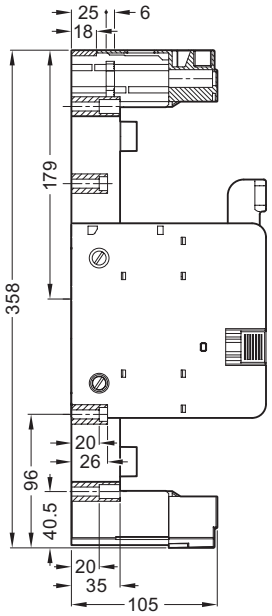

Plug-in design, with 3VT9 300-3M..0 motorized operating mechanism



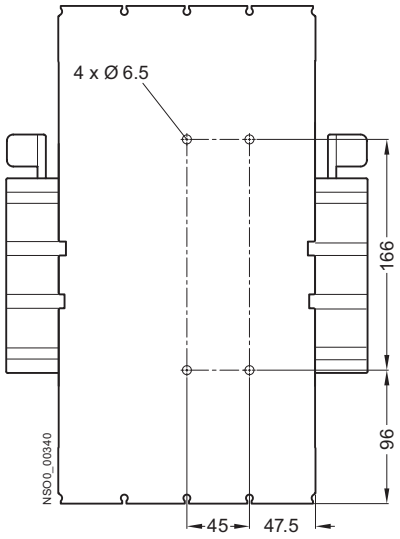
*4-pole · Withdrawable version*

3VT9 300-4WA40 withdrawable device

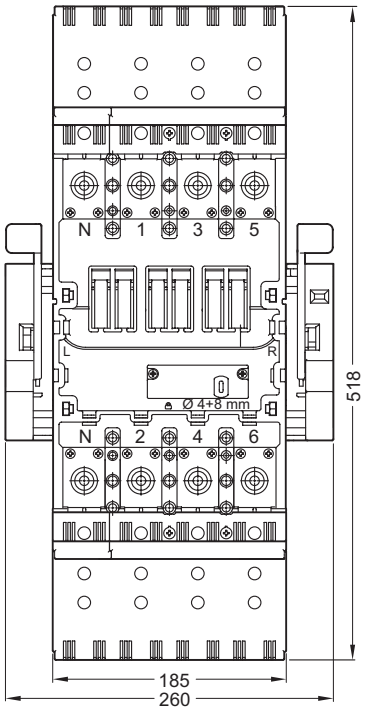


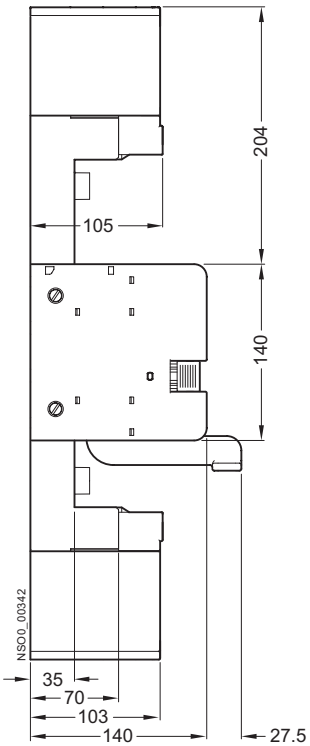




Drilling pattern




Withdrawable design with 3VT9 300-8CB40 terminal cover

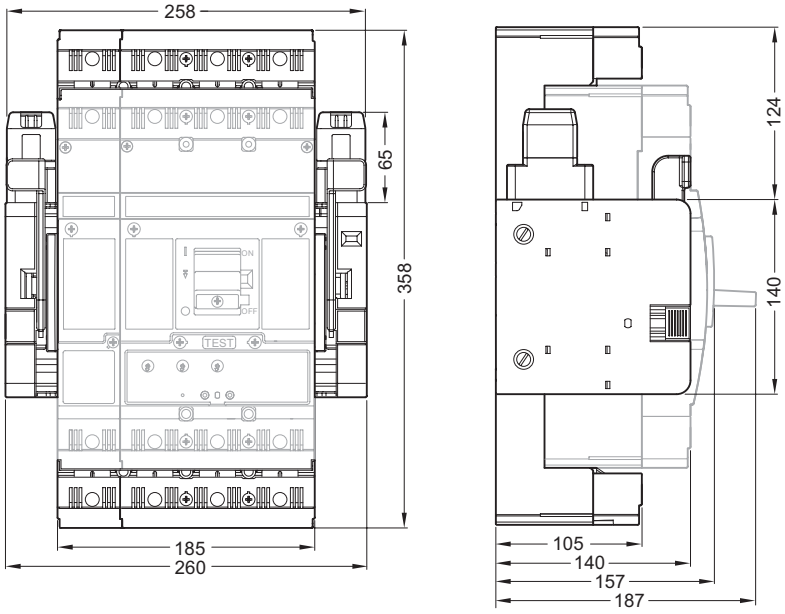


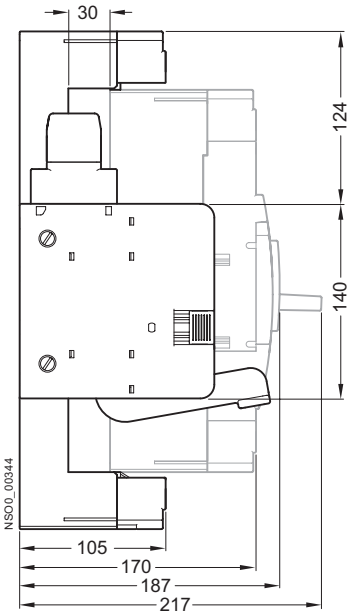
## Project planning aids

Withdrawable design

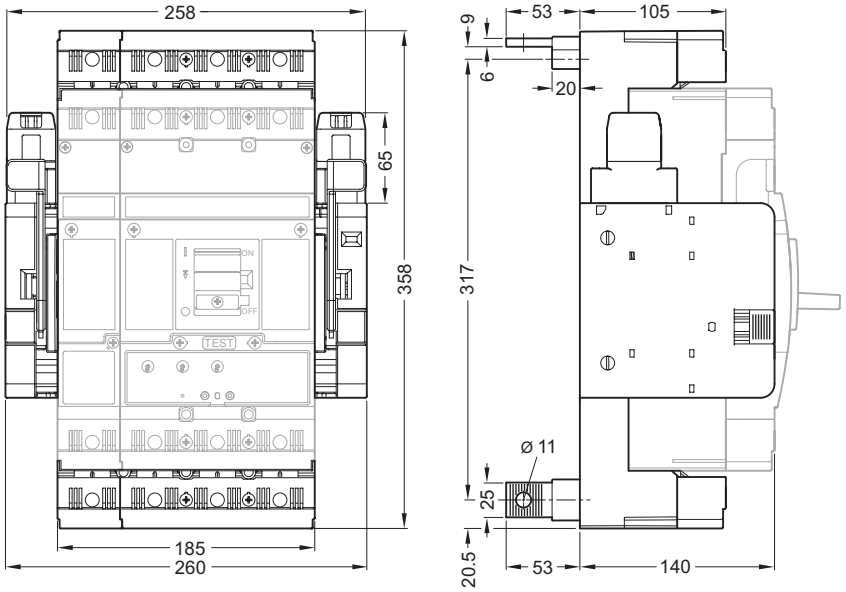
Operating position



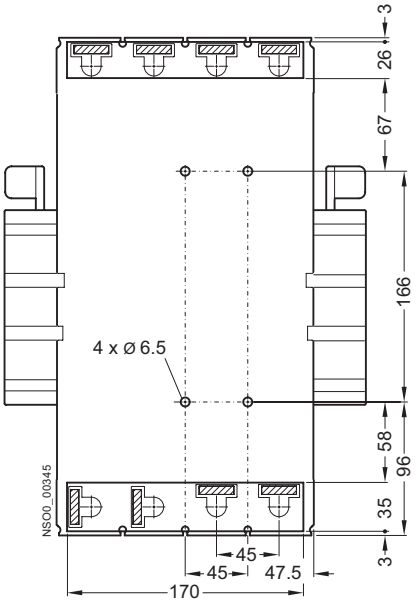

Checking position



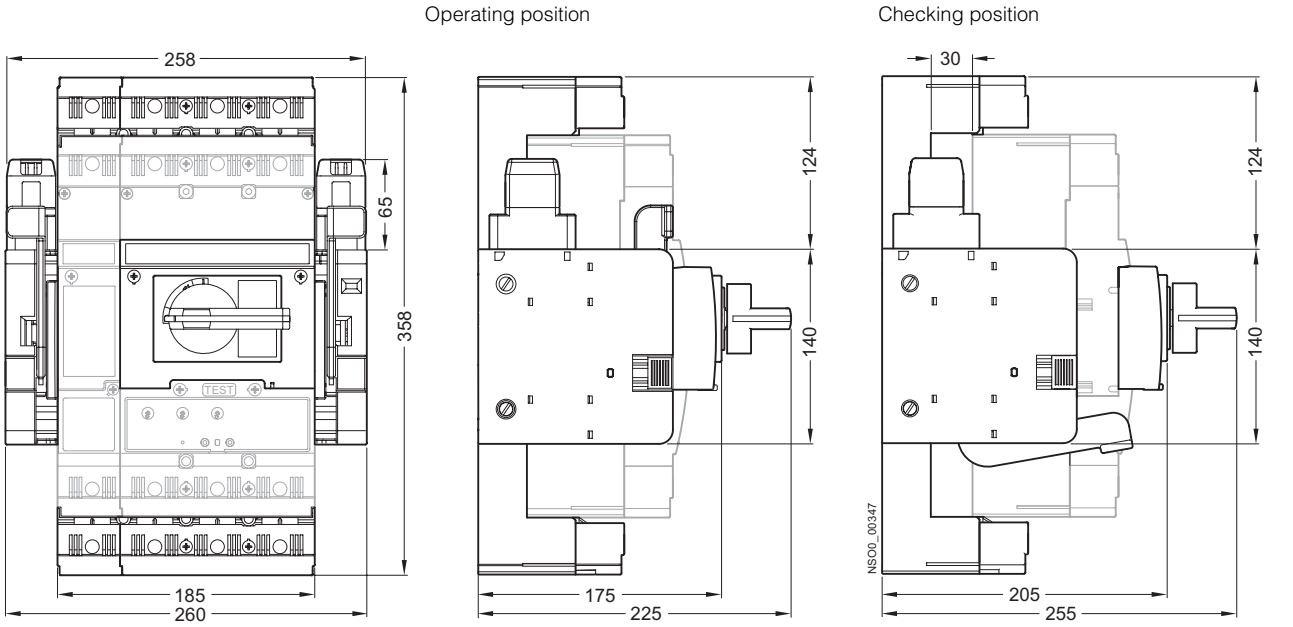

Withdrawable design, rear connection with 3VT9 300-4RC30 + 3VT9 300-4RC00 connecting set



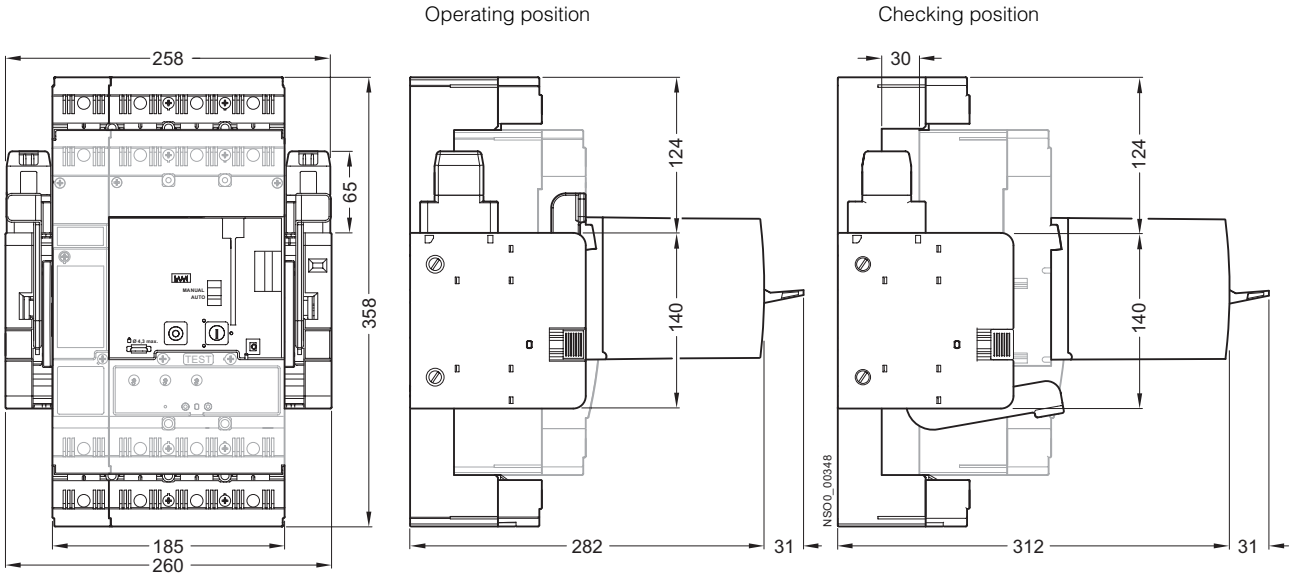

Drilling pattern



Withdrawable design, with rotary operating mechanism




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



## Notes

# 3VT4 Molded Case
# Circuit Breakers up to 1000 A

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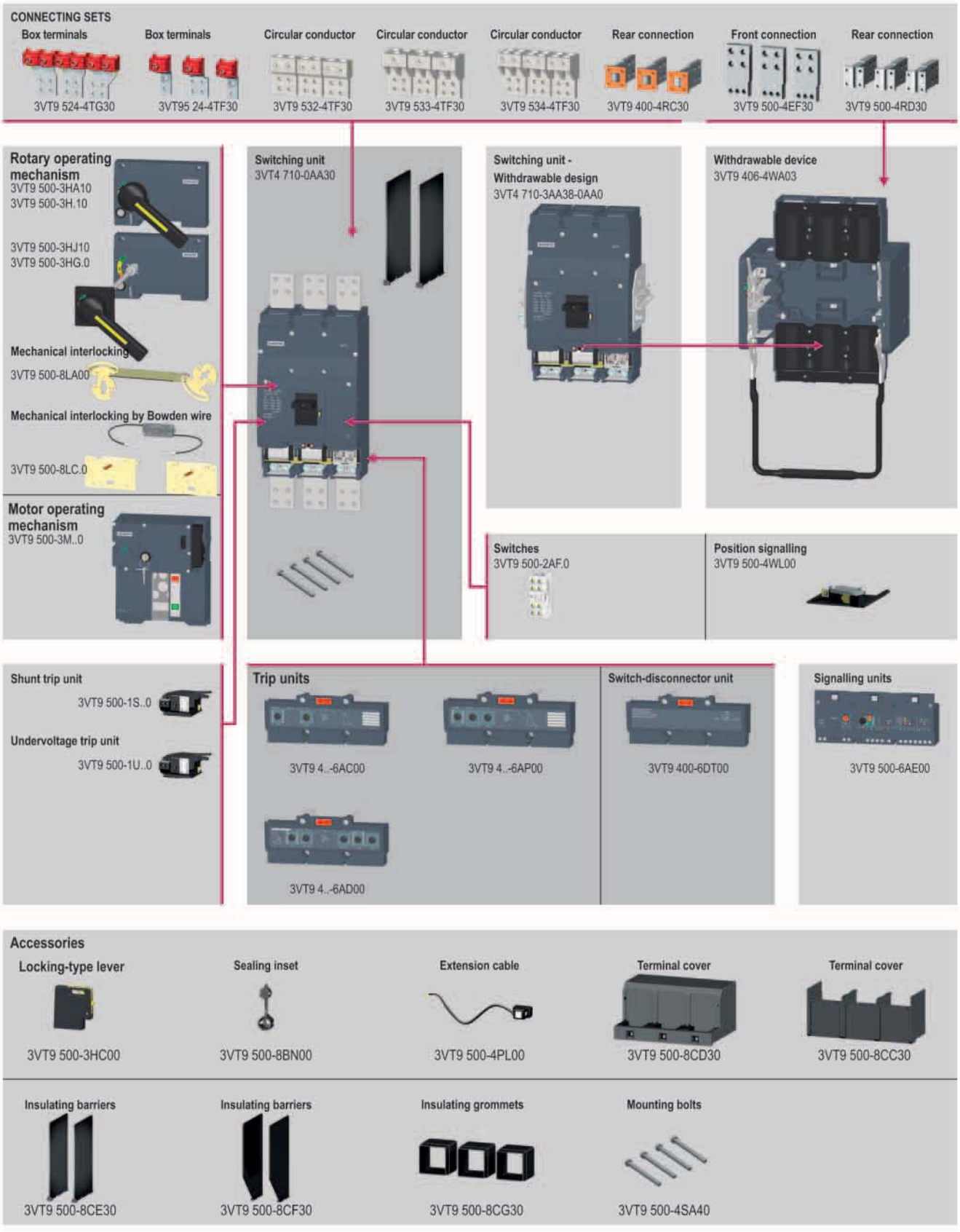
## General data

### 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<br>• 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 |

* 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“$I_r$ | 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<br>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<br>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<br>DC 440 V | | --<br>-- | AC-23 B<br>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<br>AC 65 kA/415V<br>AC 45 kA/500V<br>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<br>AC 36 kA/415V<br>AC 30 kA/500V<br>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<br>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.

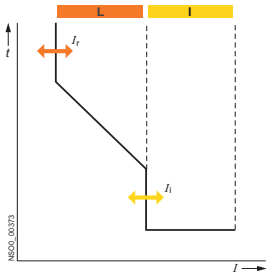
## Overcurrent releases

### 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.

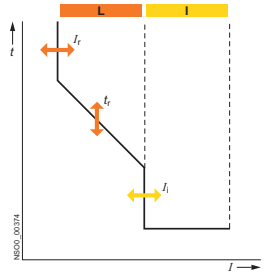
Depending on the needs for adjusting the release's tripping characteristics to the protected device and to the variability of the characteristics with regard to selectivity, the following release devices are available:

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

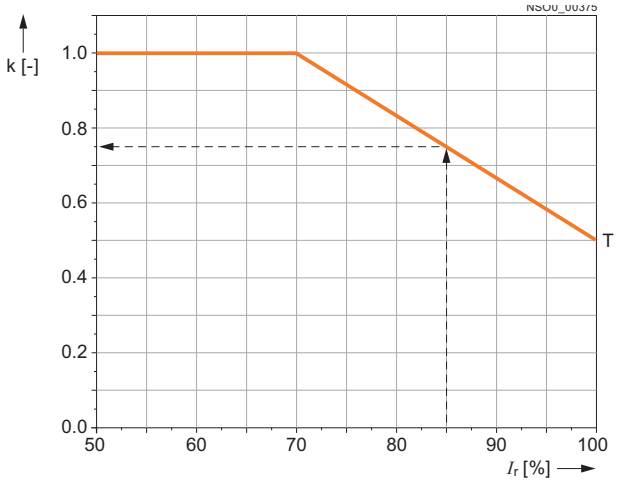
- The dependent release ETU DP is adjusted using one $I_r$ switch. The $I_r$ switch is used to adjust the circuit breaker's rated current. The characteristic is moved on the current axis. By means of its internal circuitry, the release is set to one type of characteristic.
- The dependent release ETU 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

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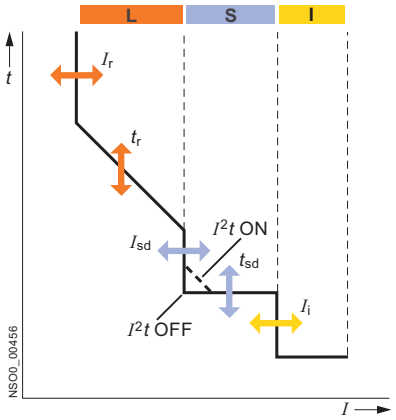
Adjustment of tripping characteristics, Trip unit ETU UP




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:

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

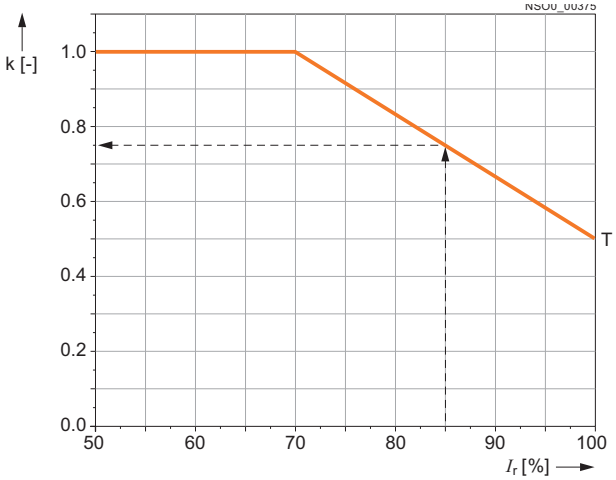
3. Independent instantaneous release I

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

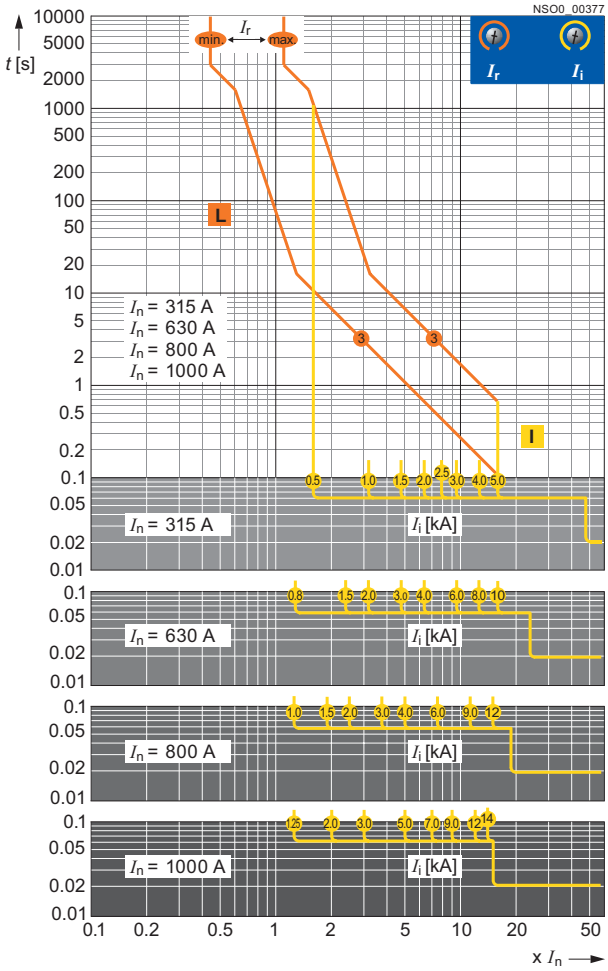
Protecting lines and transformers

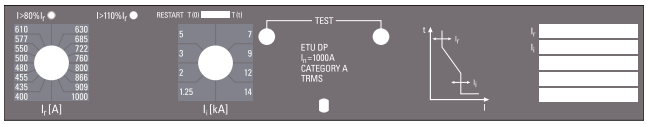
The 3VT9 4..-6AC00 release is intended only for the 3VT4 710-3AA..-0AA0 switching unit. Operation of the release is controlled by a microprocessor. The release is fitted with a thermal memory that can be disabled by turning the switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. 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<br>144, 160<br>172, 180<br>200, 220<br>231, 243<br>250, 260<br>275, 290<br>305, 315 | $T_{(0)}$<br>$T_{(t)}$ | 0.5<br>1<br>1.5<br>2<br>2.5<br>3<br>4<br>5 |
| 3VT9 463-6AC00 | 630 | 250, 260<br>275, 290<br>305, 315<br>345, 360<br>400, 435<br>455, 480<br>500, 550<br>575, 630 | $T_{(0)}$<br>$T_{(t)}$ | 0.8<br>1.5<br>2<br>3<br>4<br>6<br>8<br>10 |
| 3VT9 480-6AC00 | 800 | 315, 345<br>360, 400<br>435, 455<br>480, 500<br>550, 575<br>610, 630<br>685, 720<br>760, 800 | $T_{(0)}$<br>$T_{(0)}$ | 1<br>1.5<br>2<br>3<br>4<br>6<br>9<br>12 |
| 3VT9 410-6AC00 | 1000 | 400, 435<br>455, 480<br>500, 550<br>575, 610<br>630, 685<br>720, 760<br>800, 866<br>909, 1000 | $T_{(0)}$<br>$T_{(0)}$ | 1.25<br>2<br>3<br>5<br>7<br>9<br>12<br>14 |

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## Overcurrent releases

Overcurrent releases ETU MP-Motors

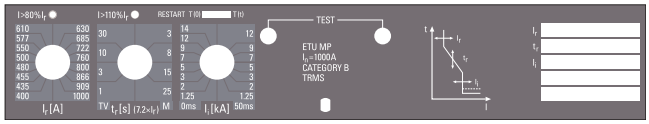
- Direct protection of motors and generators
- Possibility for protecting lines and transformers

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).

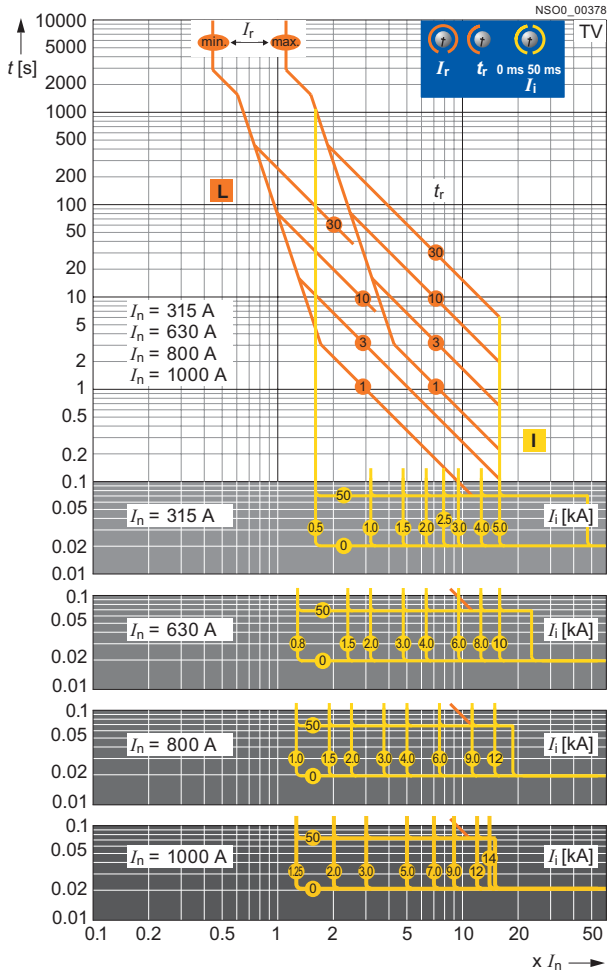
Another parameter for adjusting the release is the rated current, which is adjusted in a range of 0.4 to 1.0 of $I_n$ and the short-circuit tripping level, for which it is possible to set the delay at 0 or 50 ms. The reaching of 80% and 110% of $I_r$ is indicated by LED diodes on the front panel denoted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

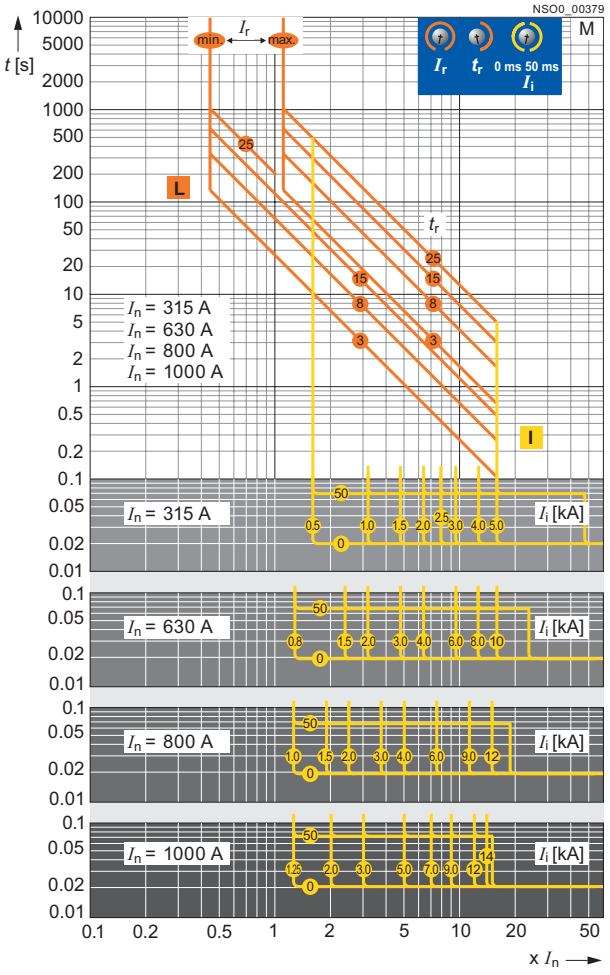



Specifications for adjustable releases

| 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 | |
| | | 575, 610 | 30 (TV 30) | | | 6 | |
| | | 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



## Overcurrent releases

Overcurrent trip unit-ETU UP

- For protecting complicated loads or those not specified in advance

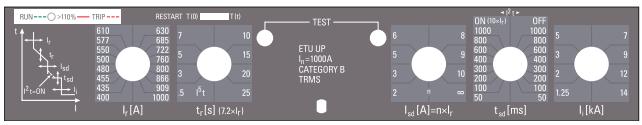
The 3VT9 4..-6AD00 release is intended only for the 3VT4 710-3AA..-0AA0 switching unit. The release is equipped with a thermal memory that can be disabled by turning the "restart" switch on the front panel from the position $T_{(t)}$ to the position $T_{(0)}$. After the thermal memory has been disabled,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

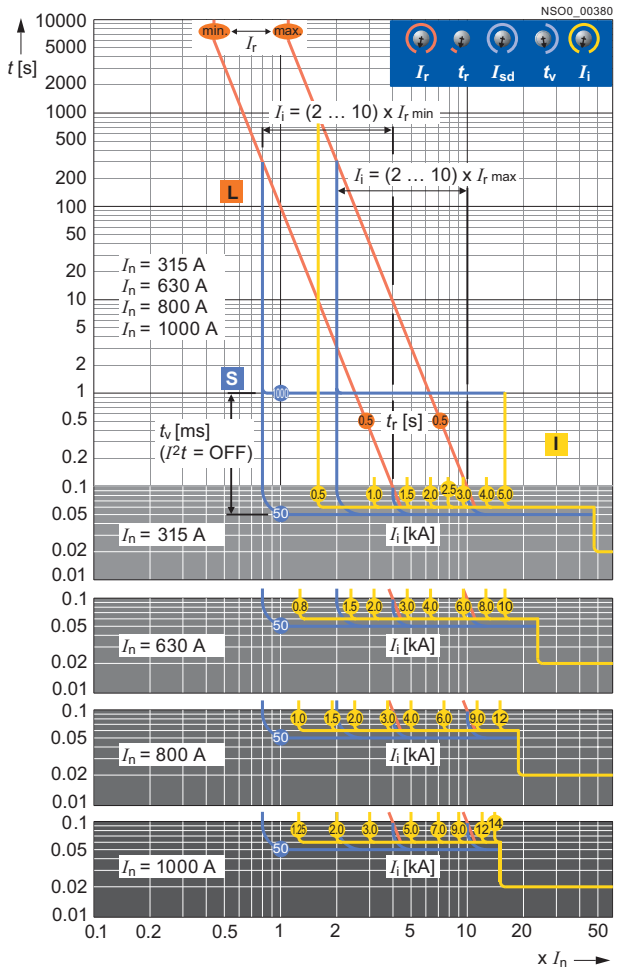
The operational state 70% of $I_r$ is signalled by an LED indicator that flashes green in a 1.5 s interval. As the load grows, the blinking frequency of the diode increases. In case of a load larger than 110% of $I_r$ this LED will turn red and just before tripping will begin to blink red. On the lower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

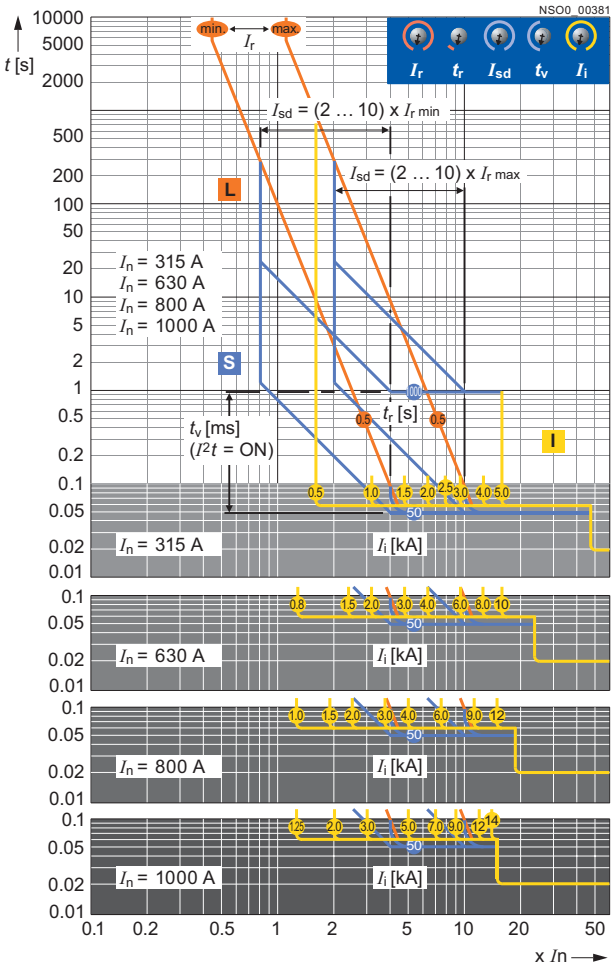
Specifications for adjustable releases

| 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 $I_r$) n | $t_{sd}$ | $I^2t$ | 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

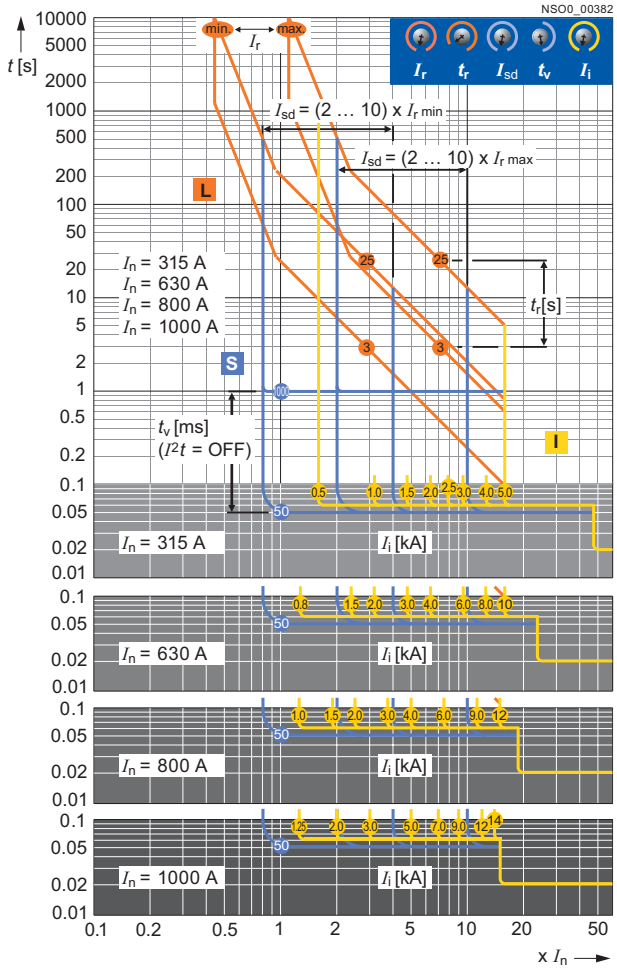


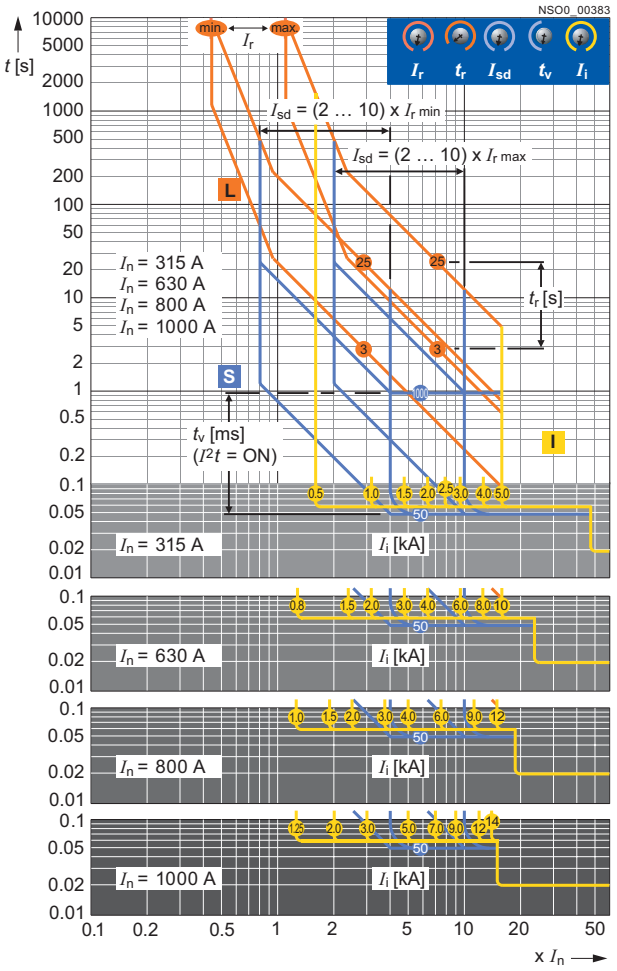




5

## Overcurrent releases

Tripping characteristics ETU UP



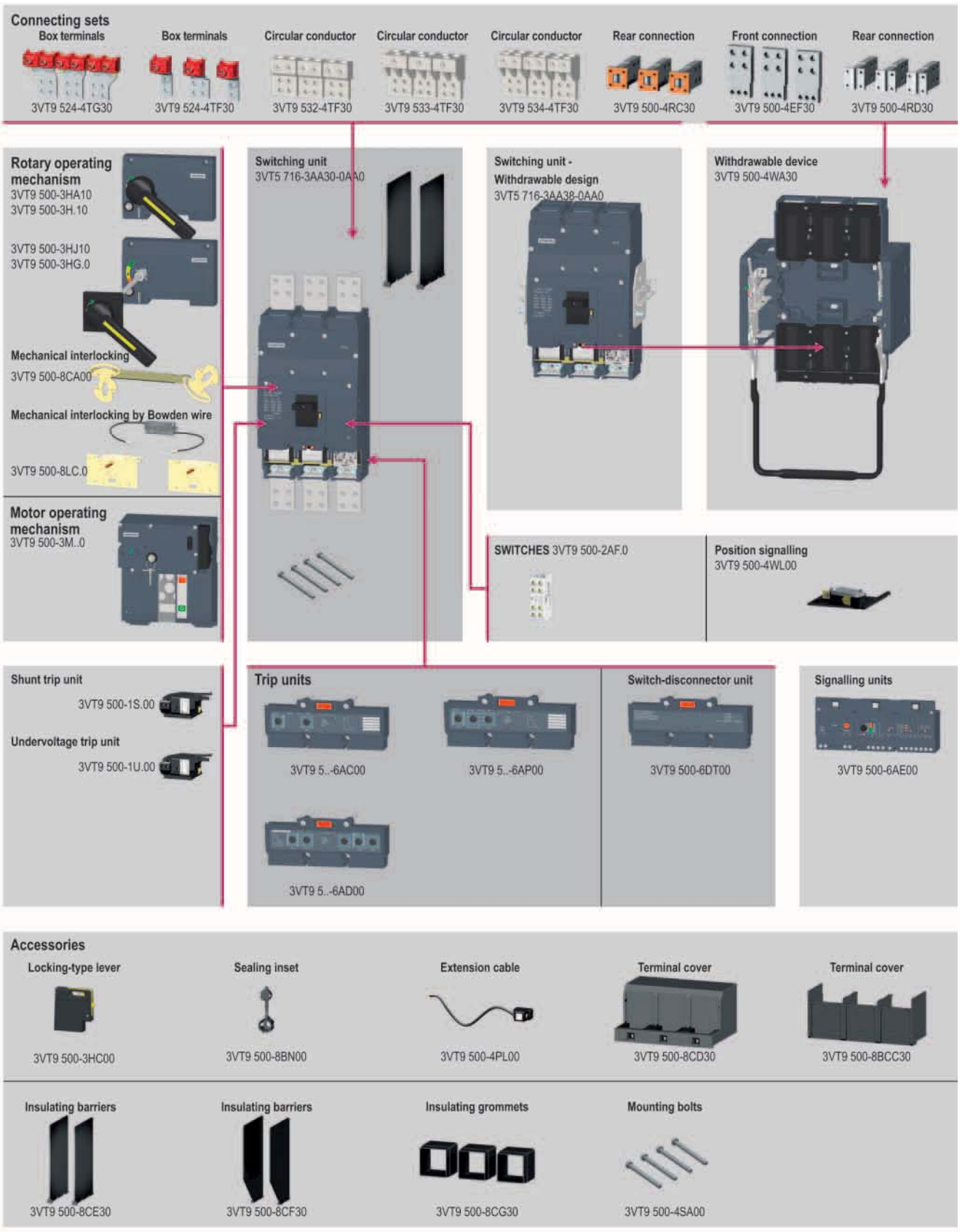



# 3VT5 Molded Case
# Circuit Breakers up to 1600 A

6

## 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<br>• 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 |

* 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**<br>length 365 mm | | B | **3VT9 500-3HJ10** | 1 unit | 0.352 |
| **Mechanical Interlocks** | | | | | | |
|  | **Mechanical interlocks** for the manual operating mechanism<br>for circuit breakers/switch disconnectors, fixed-mounted design<br>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**<br>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<br>AC 230 V/DC 220 V | | B | **3VT9 500-3MF00**<br>**3VT9 500-3MQ00** | 1 unit | 4.454 |
| | **Motorized operating mechanism with operations counter** | | | | | |
| | AC/DC 110 V<br>AC 230 V/DC 220 V | | B | **3VT9 500-3MF10**<br>**3VT9 500-3MQ10** | 1 unit | 4.400 |

* 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**<br>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,**<br>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**<br>for withdrawable version | | Busbars | B | **3VT9 500-4EF30** | 1 unit | 2.730 |
|  | **Rear connection**<br>for withdrawable version | | Busbars | B | **3VT9 500-4RD30** | 1 unit | 3.420 |
| | **Terminals for circular conductors** | 150 ... 300 | Cu/Al cables | | | | |
|  | • for 2 cables | | | B | **3VT9 532-4TF30** | 1 unit | 1.000 |
|  | • for 3 cables | | | B | **3VT9 533-4TF30** | 1 unit | 1.948 |
|  | • for 4 cables | | | B | **3VT9 534-4TF30** | 1 unit | 1.828 |

* You can order this quantity or a multiple thereof.

## Selection and ordering data

| | Version | DT | Order no. | PS* | Weight per PU approx. |
|---|---|---|---|---|---|
| | | | | | kg |
| **Accessories** | | | | | |
|  | **Phase barriers**<br>In case of reversed connection (supply to terminals 2, 4, 6), the phase barriers must also be installed on the bottom side.<br>Not included in each order of switching units in fixed-mounted design.<br>• 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**<br>Increases degree of protection of connection point to IP20.<br>Intended for withdrawable version with front connection.<br>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**<br>Intended for fixed-mounted design of switching unit and withdrawable version with rear connection.<br>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**<br>Enables locking circuit breaker in “switched off manually” position.<br>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**<br>Provides sealing for:<br>• Overcurrent release<br>• Accessory compartment cover | | **3VT9 500-8BN00** on req. | | |
|  | **Connecting cable**<br>• For connecting circuit breaker accessories to withdrawable version (15 wire) | B | **3VT9 500-4PL00** | 1 unit | 0.120 |
|  | **Position indicator**<br>Signals circuit breaker/switch disconnector position on withdrawable version | B | **3VT9 500-4WL00** | 1 unit | 0.020 |
|  | **Mounting bolts**<br>• For withdrawable version | B | **3VT9 500-4SA40** | 1 unit | 0.144 |
|  | **ON button cover**<br>• For motorized operating mechanism, cover can be sealed | B | **3VT9 500-3MF20** | 1 unit | 0.019 |

* You can order this quantity or a multiple thereof.

## Technical specifications

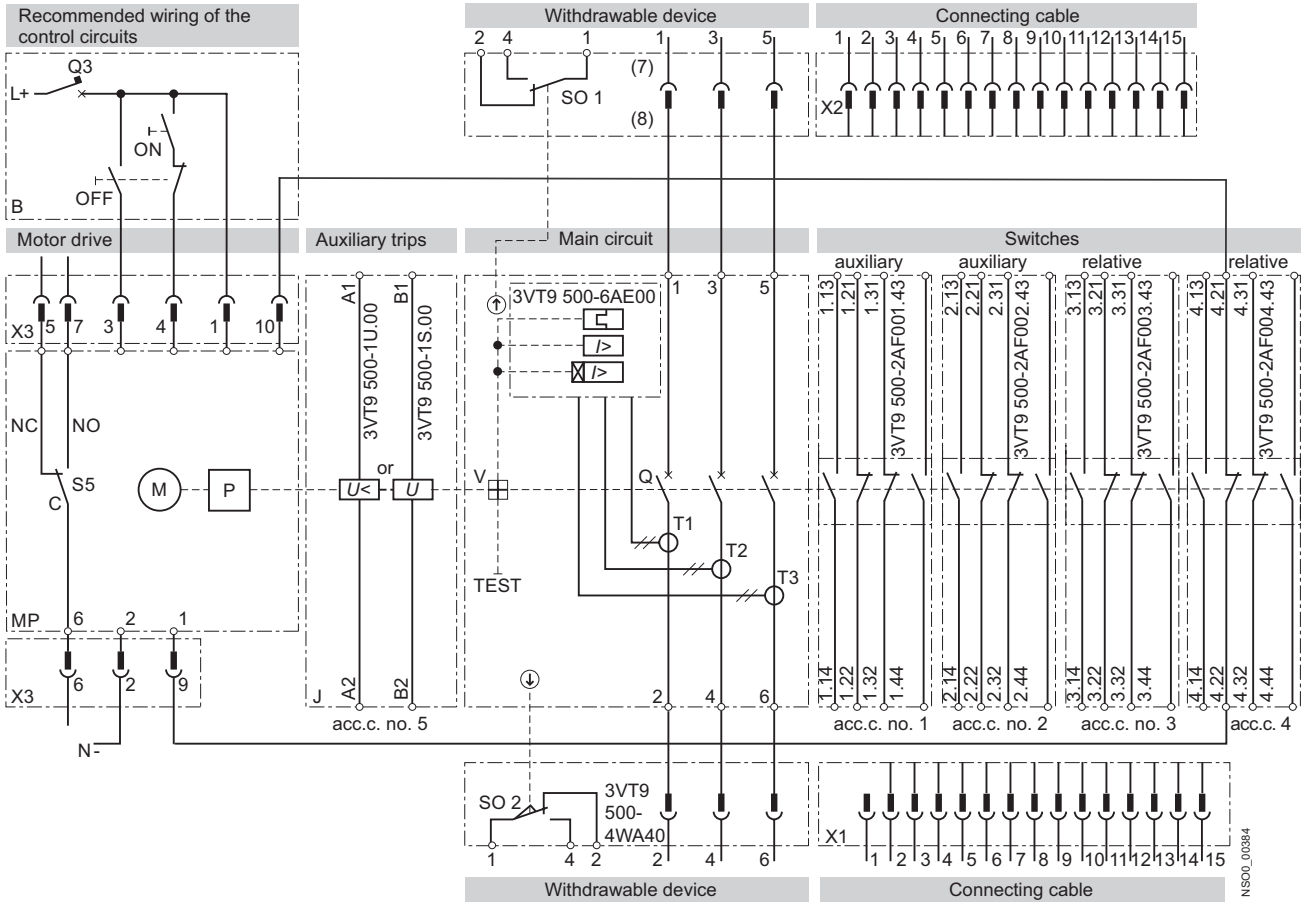
| Specifications<br>Type | | 3VT5 circuit breakers | Switch disconnectors |
|---|---|---|---|
| Standards | | EN 60 947-2, IEC 947-2 | EN 60 947-3, IEC 947-3 |
| Approval marks | | CE | |
| Number of poles | | 3 | |
| Rated current $I_n$ | A | 630, 1000, 1250, 1600 | -- |
| Rated normal current $I_u$ | A | 1600 | |
| Rated operational current $I_e$ | A | -- | 1600 |
| Rated operational voltage $U_e$ | V | AC max. 690 | AC max. 690<br>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)<br>AC 690 V<br>DC 440 V | | <br>--<br>-- | <br>AC-23 B<br>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<br>55 kA/AC 415 V<br>45 kA/AC 415 V<br>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<br>36 kA/AC 415 V<br>30 kA/AC 500 V<br>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<br>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 |

## Circuit breakers · Switch disconnectors

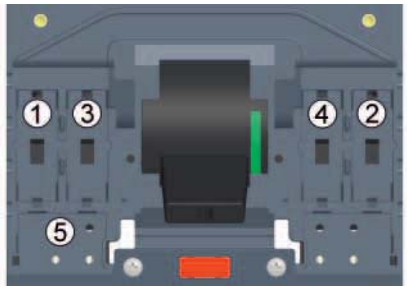
### Functions

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 |

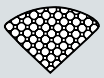
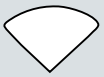
3VT5 circuit breaker/switch disconnector - connection of Cu busbars 2 x 50 x 6 mm to pole

| 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

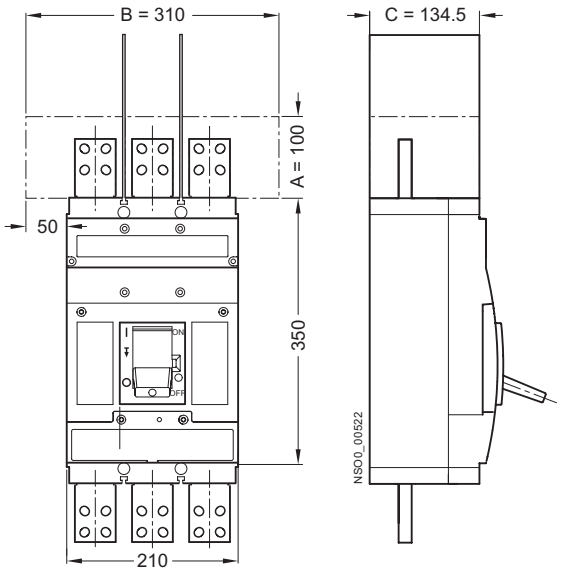
| 50 °C | 55 °C | 60 °C | 65 °C | 70 °C |
|---|---|---|---|---|
| 1600 A | 1540 A | 1460 A | 1400 A | 1320 A |

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 .... | |

## 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

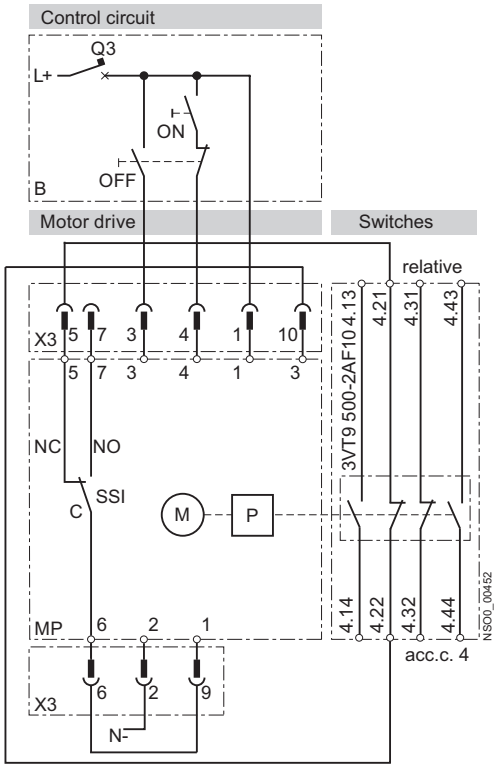
The withdrawable device can be provided with up to four switches for signalling the circuit breaker's switched-on position (see table).

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

## 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<br>AC 110 V LSN 4C/1<br>AC 230 V LSN 2C/1<br>DC 110 V LSN-DC 4C/1<br>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<br>State of switches before insertion→ -withdrawn position | | | | State after insertion/withdrawal<br>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<br>3 1 | | 4 2<br>3 1 | | 4 2<br>3 1 | | 4 2<br>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.

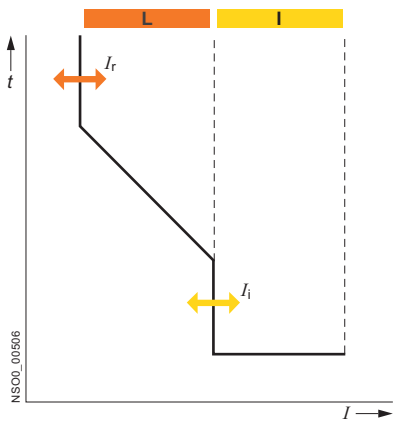
Adjustment of tripping characteristics for release ETU DP and MP

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:

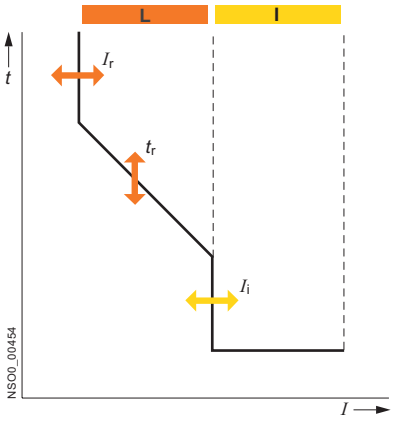
**L** - is a zone of low overcurrents and includes the area of thermal protection.

**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.

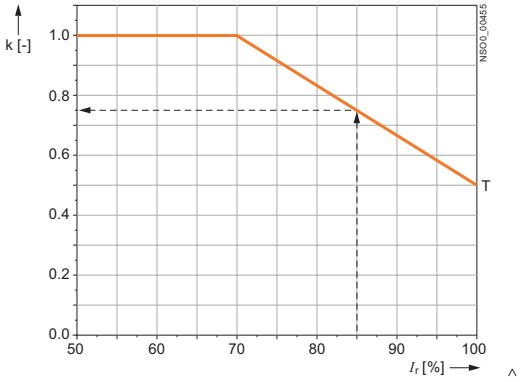
2. Independent instantaneous release (short-circuit trip) I

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:

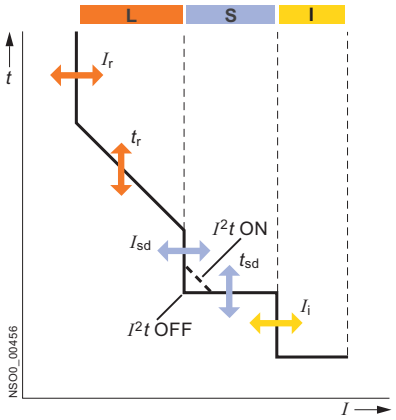
$$\boldsymbol{t_s = 0.74 \cdot t_v}$$

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 × $I_r$). 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 × $I_r$) 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

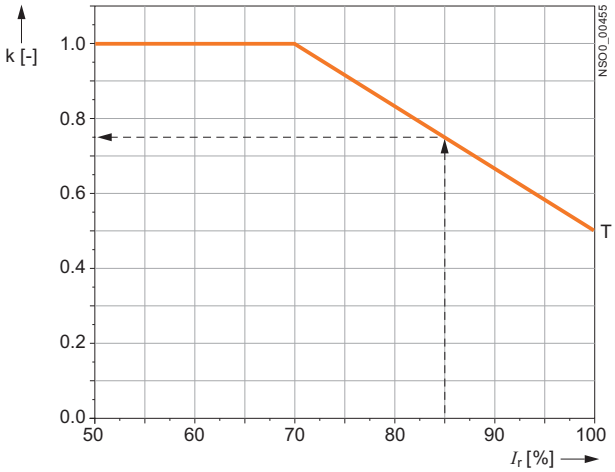
The independent instantaneous release has the function of a short-circuit release. It is set up only on parameter $I_i$. $I_i$ is short-circuit current that, upon its being reached or exceeded, causes the circuit breaker instantaneously to switch off. It is set up directly in kA on the release. The wave 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
$t_r$ = min
$t_{sd}$ = min, $I^2t$ - ON
$I_{sd}$ = min

## Overcurrent releases ETU DP-Distribution

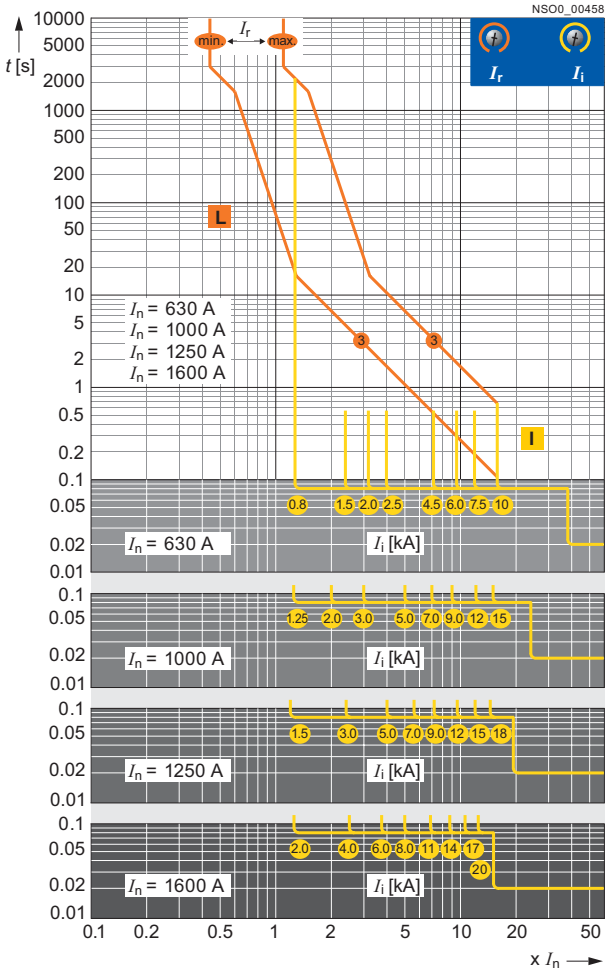
Protecting lines and transformers

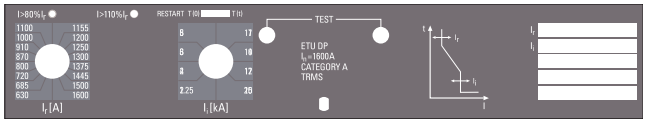
The 3VT9 5..-6AC00 release is intended for 3VT5 716-3AA3.-0AA0 switching unit. The operation of the release is controlled by a microprocessor. The release is outfitted with a thermal memory that can be disabled by turning a switch on the front panel from position $T_{(t)}$ to position $T_{(0)}$. After 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 | $T_{(0)}$ | 0.8 |
| | | 275, 290 | | 1.5 |
| | | 305, 315 | | 2 |
| | | 345, 360 | | 2.5 |
| | | 400, 435 | $T_{(t)}$ | 4.5 |
| | | 455, 480 | | 6 |
| | | 500, 550 | | 7.5 |
| | | 575, 630 | | 10 |
| 3VT9 510-6AC00 | 1000 | 400, 435 | $T_{(0)}$ | 1.25 |
| | | 455, 480 | | 2 |
| | | 500, 550 | | 3 |
| | | 575, 630 | | 5 |
| | | 630, 685 | $T_{(t)}$ | 7 |
| | | 720, 760 | | 9 |
| | | 800, 870 | | 12 |
| | | 910, 1000 | | 15 |
| 3VT9 512-6AC00 | 1250 | 500, 550 | $T_{(0)}$ | 1.5 |
| | | 577, 610 | | 3 |
| | | 630, 685 | | 5 |
| | | 722, 760 | | 7 |
| | | 800, 866 | $T_{(t)}$ | 9 |
| | | 909, 1000 | | 12 |
| | | 1100, 1155, | | 15 |
| | | 1200, 1250 | | 18 |
| 3VT9 516-6AC00 | 1600 | 630, 685 | $T_{(0)}$ | 2 |
| | | 720, 800 | | 4 |
| | | 870, 910 | | 6 |
| | | 1000, 1100 | | 8 |
| | | 1155, 1200 | $T_{(t)}$ | 11 |
| | | 1250, 1300 | | 14 |
| | | 1375, 1445 | | 17 |
| | | 1500, 1600 | | 20 |

6

## 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 $I_n$.

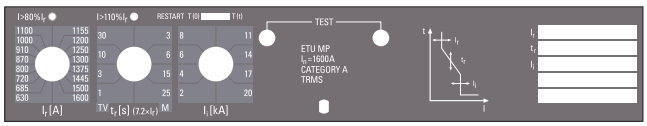
A of 8 characteristics can be set on the release. From these, in mode “M” there are 4 characteristics for motors protection and another 4 characteristics in mode “TV” for protecting transformers and lines. The shape of each characteristic can be changed using a selector switch.

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

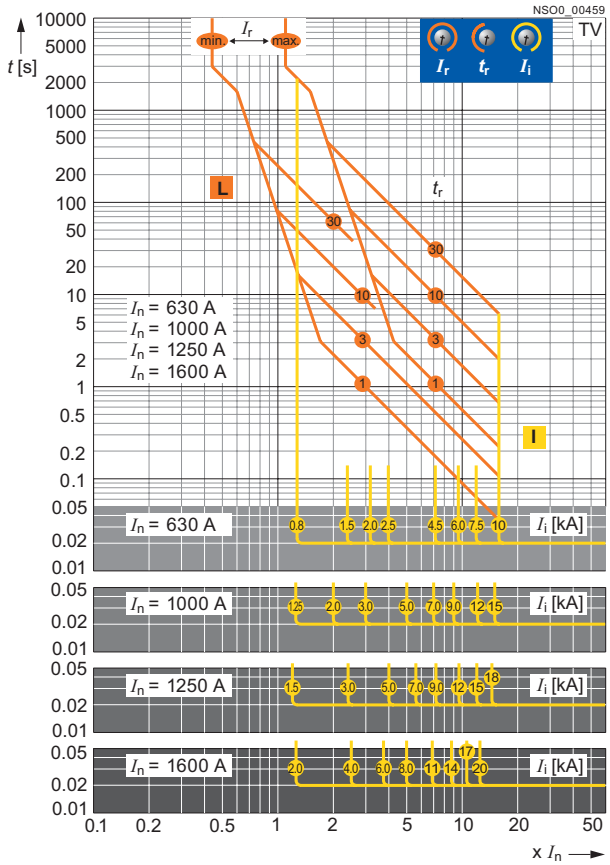
Another parameter for adjusting the release is rated current, which is adjusted in a range of 0.4 to 1.0 of $I_n$ and the short-circuit tripping level. The reaching of 80% and 110% of $I_r$ is indicated by LED diodes on the front panel denoted as $I$ > 80% of $I_r$ and $I$ > 110% of $I_r$. On the bottom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

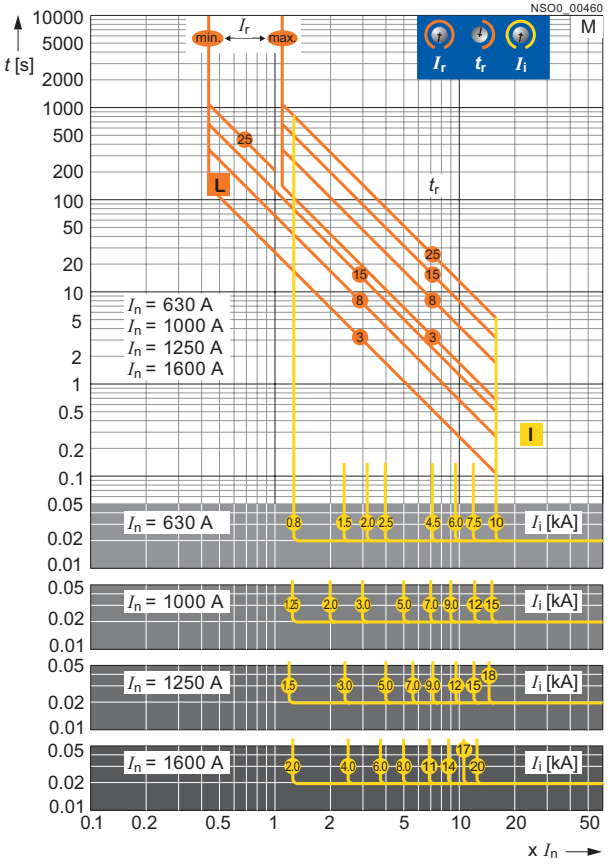
Adjustable specifications

| 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

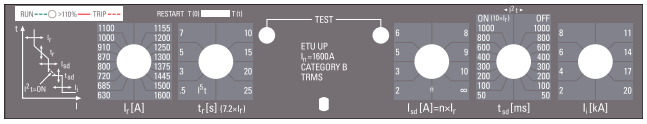
The 3VT9 5..-6AD00 release is intended only for the 3VT5 716-3AA3.-0AA0 switching unit. The release is equipped with a thermal memory that can be disabled by turning a "restart" switch on the front panel from the position $T_{(t)}$ to position $T_{(0)}$. After disabling the thermal memory, the thermal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

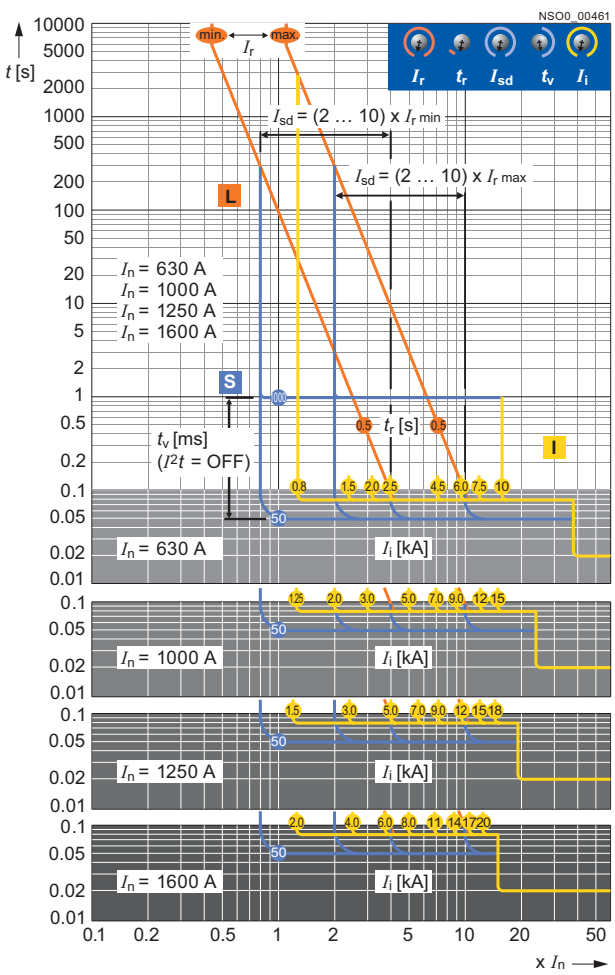
The reaching of 80% and 110% of $I_r$ is indicated by LED diodes on the front panel denoted as $I$ > 80% of $I_r$ and $I$ > 110% of $I_r$. On the bottom part of the release cover are photocells for communicating with the 3VT9 500-6AE00 signalling unit.

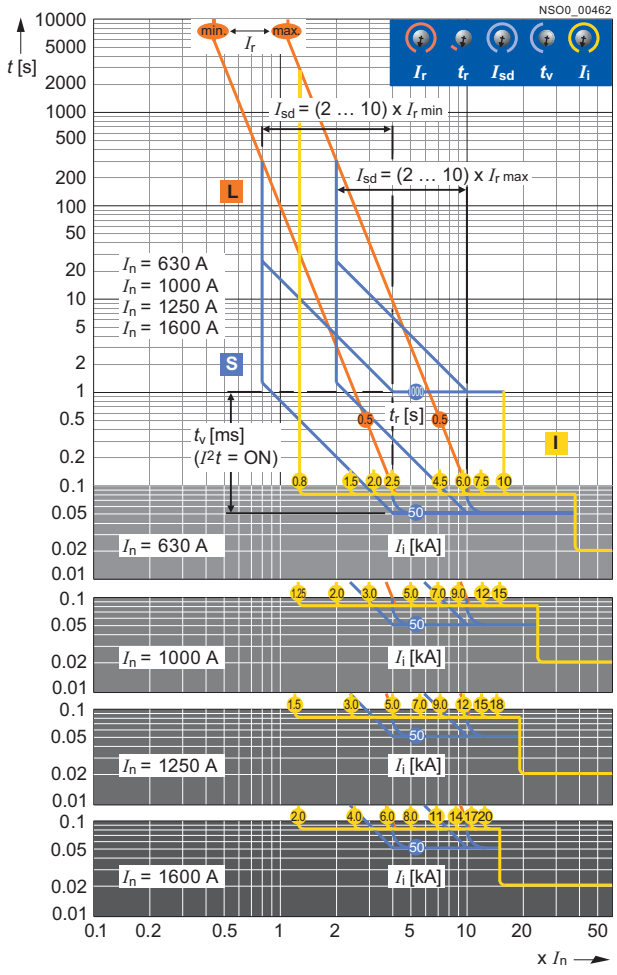
Adjustable specifications

| Order No. | Rated current $I_n$ | Overload protection $I_r$ | $t_r$ (7.2 x $I_r$) | short delayed short circuit protection $I_{sd}$ A = (n x $I_r$) | $t_{sd}$ | $I^2t$ | Restart | Instantaneous short circuit protection $I$ |
|---|---|---|---|---|---|---|---|---|
| | A | | s | n | ms | | | kA |
| | | 250, 260 | 0.5 | 2 | 50, 100 | | | 0.8 |
| | | 275, 290 | 3 | 3 | 200, 300 | on | $T_{(0)}$ | 1.5 |
| | | 305, 315 | 5 | 5 | 400, 600 | | | 2 |
| 3VT9 563-6AD00 | 630 | 345, 360 | 7 | 7 | 800, 1000 | | | 2.5 |
| | | 400, 435 | 10 | 8 | 50, 100 | | | 4.5 |
| | | 455, 480 | 15 | 9 | 200, 300 | off | $T_{(t)}$ | 6 |
| | | 500, 550 | 20 | 10 | 400, 600 | | | 7.5 |
| | | 575, 630 | 25 | ∞ | 800, 1000 | | | 10 |
| | | 400, 435 | 0.5 | 2 | 50, 100 | | | 1.25 |
| | | 455, 480 | 3 | 3 | 200, 300 | on | $T_{(0)}$ | 2 |
| | | 500, 550 | 5 | 5 | 400, 600 | | | 3 |
| 3VT9 510-6AD00 | 1000 | 575, 630 | 7 | 7 | 800, 1000 | | | 5 |
| | | 630, 685 | 10 | 8 | 50, 100 | | | 7 |
| | | 720, 760 | 15 | 9 | 200, 300 | off | $T_{(t)}$ | 9 |
| | | 800, 870 | 20 | 10 | 400, 600 | | | 12 |
| | | 910, 1000 | 25 | ∞ | 800, 1000 | | | 15 |
| | | 500, 550 | 0.5 | 2 | 50,1 00 | | | 1.5 |
| | | 577, 610 | 3 | 3 | 200, 300 | on | $T_{(0)}$ | 3 |
| | | 630, 685 | 5 | 5 | 400, 600 | | | 5 |
| 3VT9 512-6AD00 | 1250 | 722, 760 | 7 | 7 | 800, 1000 | | | 7 |
| | | 800, 866 | 10 | 8 | 50, 100 | | | 9 |
| | | 909, 1000 | 15 | 9 | 200, 300 | off | $T_{(t)}$ | 12 |
| | | 1100, 1155, | 20 | 10 | 400, 600 | | | 15 |
| | | 1200, 1250 | 25 | ∞ | 800, 1000 | | | 18 |
| | | 630, 685 | 0.5 | 2 | 50, 100 | | | 2 |
| | | 720, 800 | 3 | 3 | 200, 300 | on | $T_{(0)}$ | 4 |
| | | 870, 910 | 5 | 5 | 400, 600 | | | 6 |
| 3VT9 516-6AD00 | 1600 | 1000, 1100 | 7 | 7 | 800, 1000 | | | 8 |
| | | 1155, 1200 | 10 | 8 | 50, 100 | | | 11 |
| | | 1250, 1300 | 15 | 9 | 200, 300 | off | $T_{(t)}$ | 14 |
| | | 1375, 1445 | 20 | 10 | 400, 600 | | | 17 |
| | | 1500, 1600 | 25 | ∞ | 800, 1000 | | | 20 |



Tripping characteristic ETU UP

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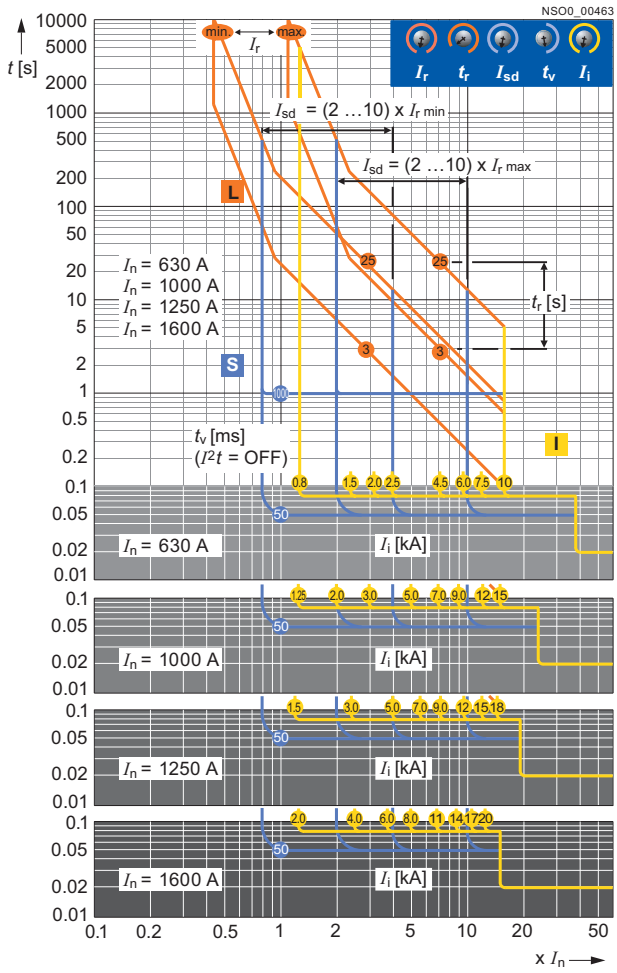
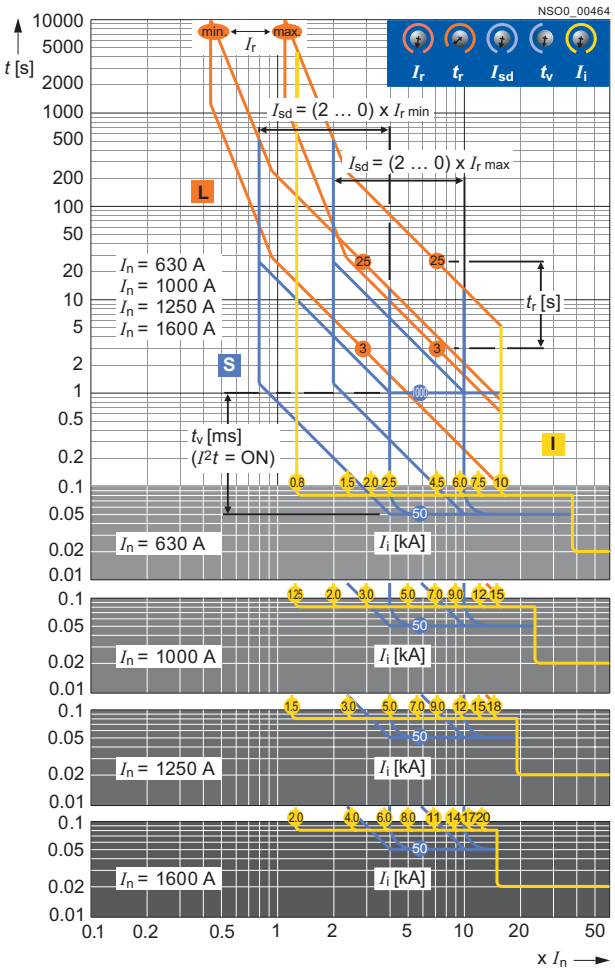
## Overcurrent releases

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.

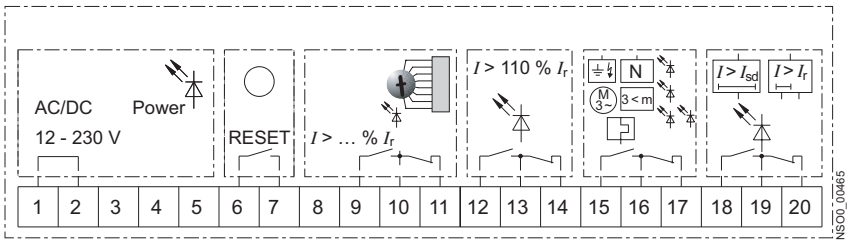
The signalling unit will not work without power supply!

### 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 $U_e$<br>AC-15<br>DC-13 | <br>AC/DC 12 V<br>AC/DC 24 V<br>AC/DC 48 V<br>AC/DC 110 V<br>AC 230 V/DC 220 V | <br>370 mA<br>170 mA<br>100 mA<br>60 mA<br>50 mA |
| Rated operating current (of relay contacts) $I_e/U_e$ | AC-1<br>DC-1 | 8 A/AC 230 V<br>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) |

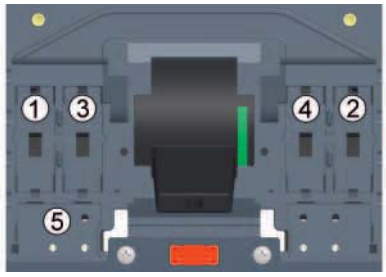
## Auxiliary switches

### Technical specifications

Technical specifications

| Order No. | | 3VT9 500-2AF10 | 3VT9 500-2AF20[1)] |
|---|---|---|---|
| Rated operating voltage $U_e$ | V | AC 60 ...500 V<br>DC 60 ...240 V | AC 5 ...60 V<br>DC 5 ...60 V |
| Rated islation voltage $U_i$ | V | 500 | |
| Rated frequency $f_n$ | Hz | 50/60 | |
| Rated operating current $I_e/U_e$<br>AC-15<br>DC-13 | | 6 A/60 V ... 240 V, 3 A/400 V,<br>1.5 A/500 V<br>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

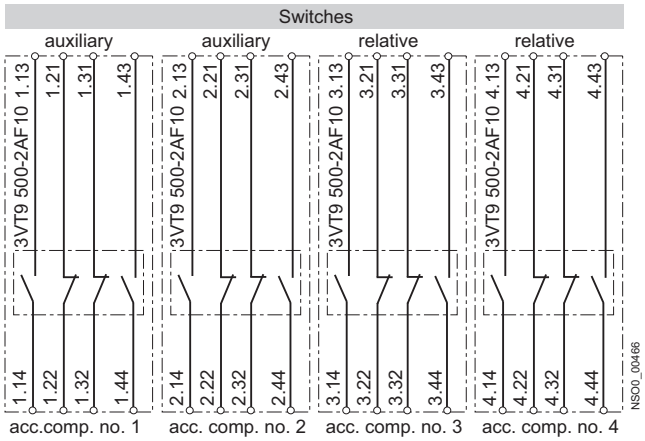



| Arrangement of contacts | Number of contacts | Contact types |
|---|---|---|
| 22 | 2 + 2 | break + make |

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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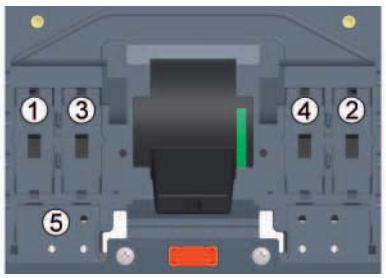
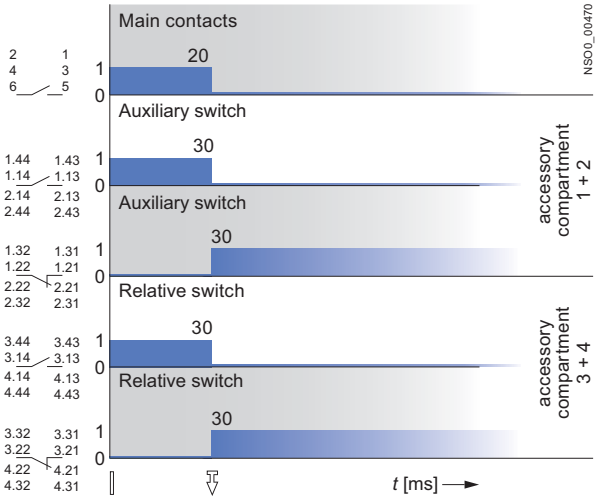
## Technical specifications

### Technical specifications

| Order No. | | 3VT9 500-1S.00 |
|---|---|---|
| Rated operating voltage $U_e$ | V | AC 24, 48, 110, 230, 400, 500<br>DC 24, 48, 110, 220 |
| Rated frequency $f_n$ | Hz | 50/60 |
| Input power at 1.1 $U_e$<br>AC<br>DC | | <br>< 2.5 VA<br>< 2 W |
| Characteristic | | 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 releases) | | IP20 |
| Location in accessory compartment No. | | 5 |

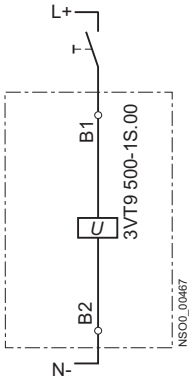



### Circuit breaker switched off by shunt release




### 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

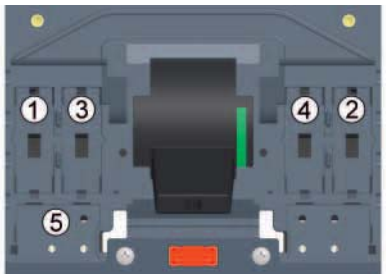
### Technical specifications

| | | |
|---|---|---|
| Order No. | | 3VT9 500-1U.00 |
| Rated operating voltage $U_e$ | V | AC 24, 48, 110, 230, 400, 500<br>DC 24, 48, 110, 220 |
| Rated frequency $f_n$ | Hz | 50/60 |
| Input power at 1.1 $U_e$ | | < 2.5 VA<br>< 2 W |
| Characteristic | | $U \geq 0.85\ U_e$,<br>circuit breaker is possible switch on<br>$U \geq 0.35\ U_e$,<br>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 |

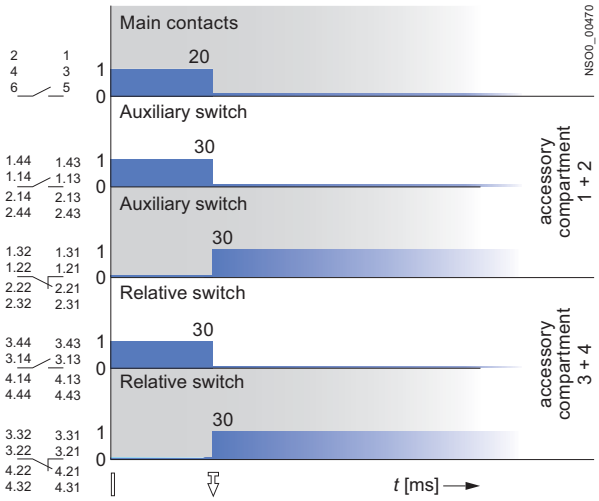
[1] Tripping of the undervoltage release can be delayed using the delay unit 3VT9 000-1UX00, for more detailed information, see page P.

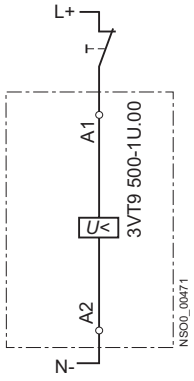
Circuit breaker switched off by undervoltage release

| Circuit breaker 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 | |




Circuit breaker switched off by undervoltage release



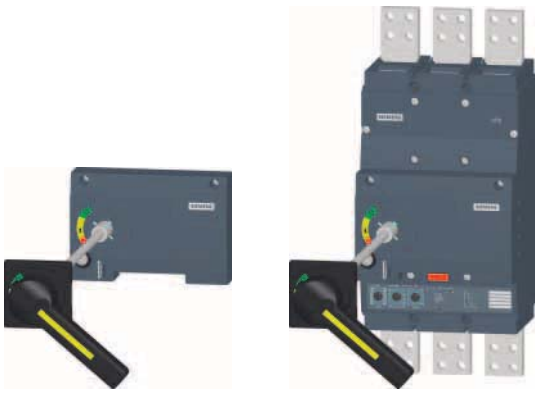
## Technical specifications

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 |

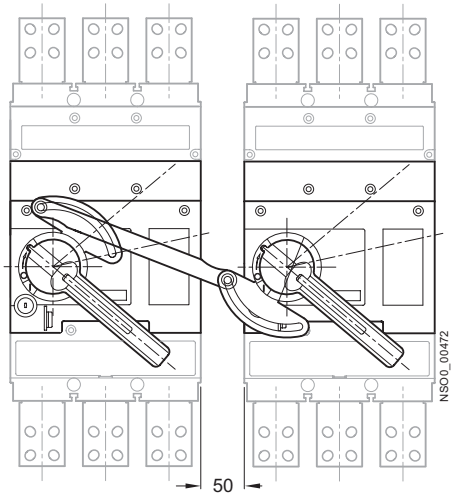


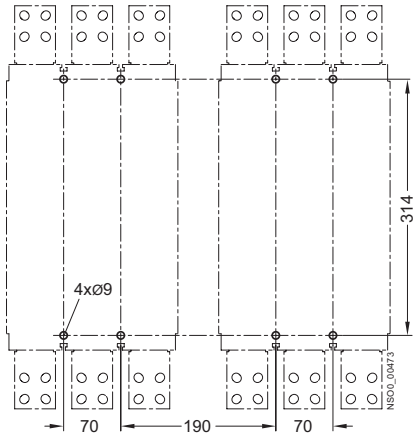
## Mechanical interlocking and parallel switching

### 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.

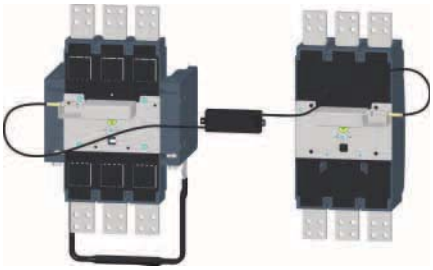



*3VT9 500-8LC10 Mechanical interlocking by Bowden*

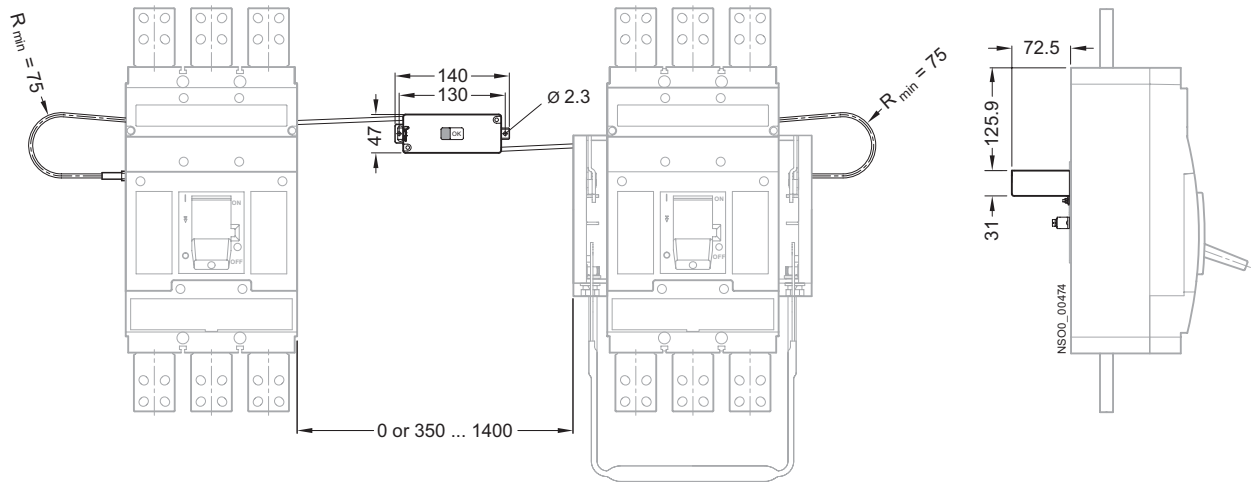
- Provides mechanical interlocking of two circuit breakers so that they cannot both be tripped simultaneously, but only one of them at a time.
- Interlocking can be used between two 3VT4 or 3VT5 circuit breakers or between a 3VT4 and a 3VT5 circuit breaker. For interlocking, circuit breakers can be outfitted 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

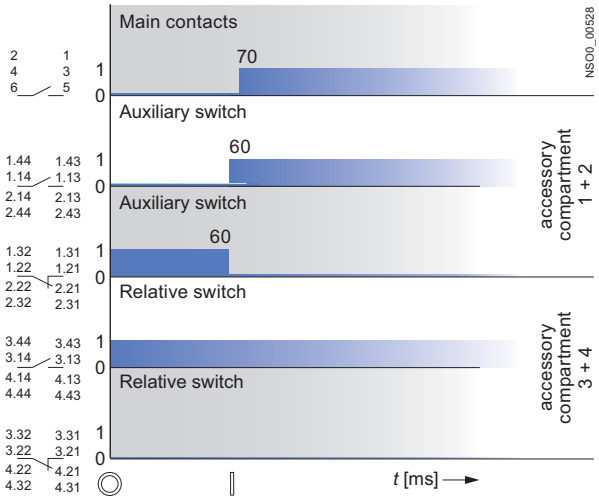
| Type | | 3VT9 500-3M...0 |
|---|---|---|
| Operational voltage $U_e$ | V | AC 110, 230<br>DC 110, 220 |
| Rated frequency $f_n$ | Hz | 50/60 |
| Control pulse length for switching on | ms | > 20 ... 1500 ∞[1] |
| Control pulse length for switching off | ms | > 20 ... ∞[1)] |
| Time to switching on | 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.

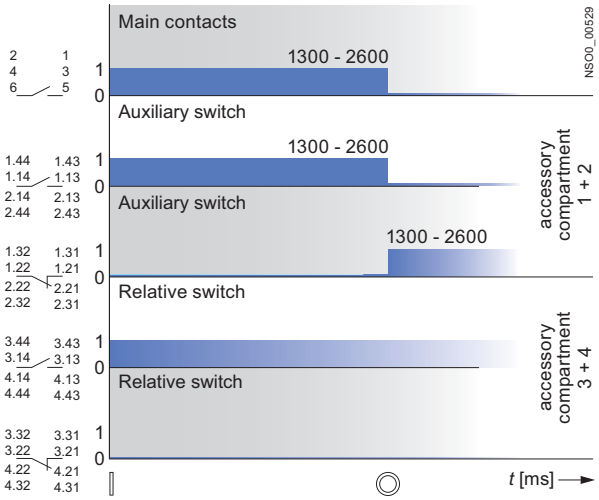
## Motorized operating mechanism

Specifications

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

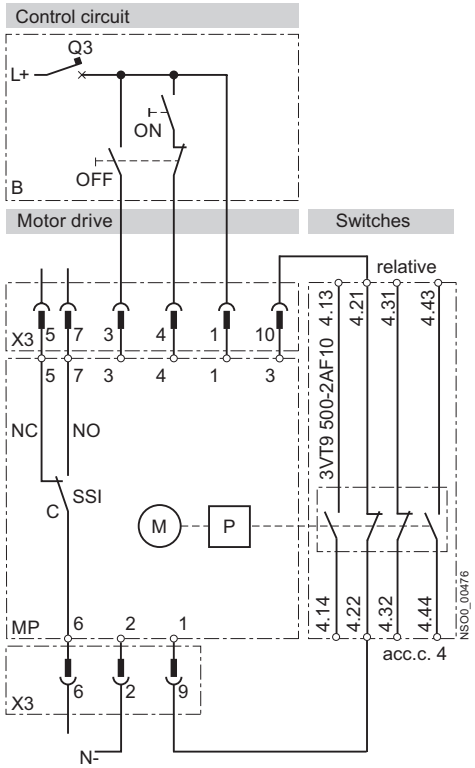



Circuit breaker switched off by motorized operating mechanism-electrically by pushbutton OFF




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

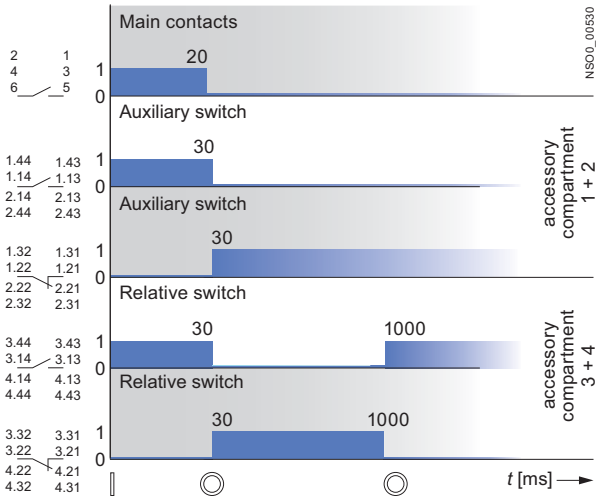
| Circuit breaker state | lever positions of circuit breakers |
|---|---|
| Switched on | |
| Switched off by releases, or by TEST button | |
| Switched off manually or electrically by drive | |

| 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 |

## 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

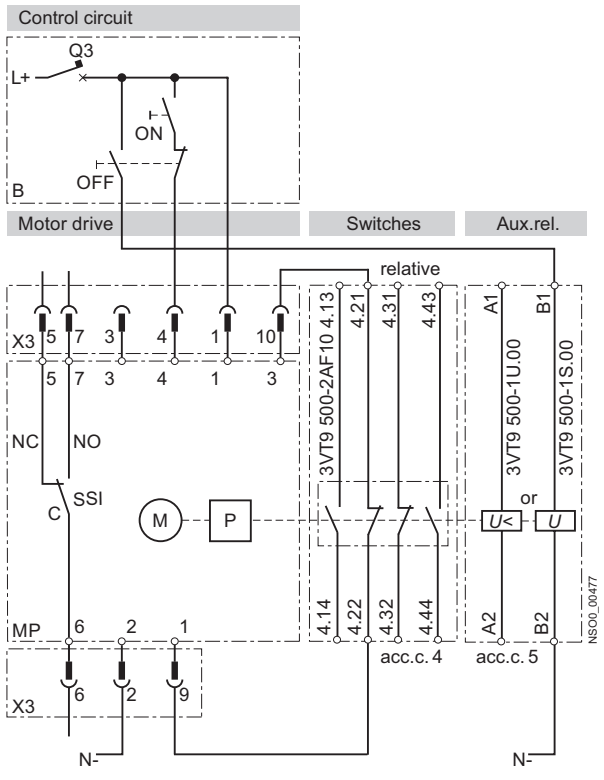
| Circuit breaker state | lever positions of circuit breakers |
|---|---|
| Switched on | |
| Switched off by releases, or by TEST button | |
| Switched off manually or electrically by drive | |

### Wiring diagram description

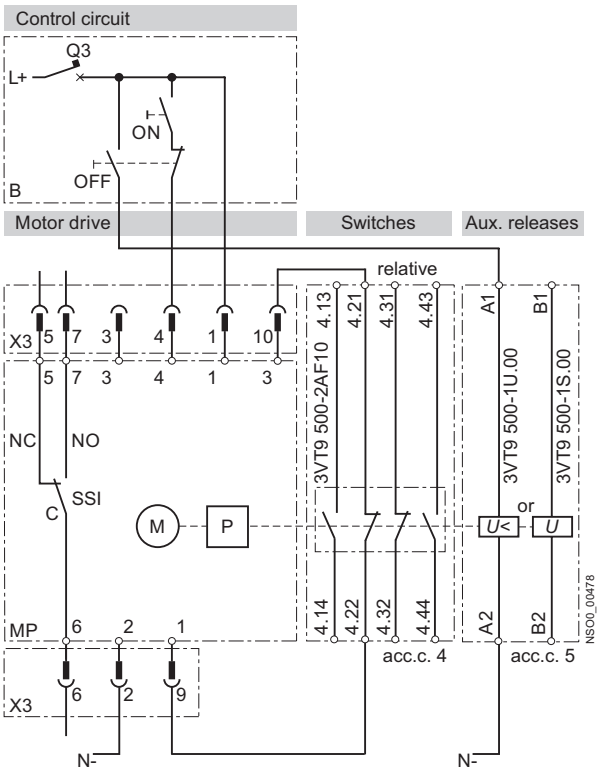
| Symbol | Description |
|---|---|
| MP | motor drive 3VT9 500-3M...0 |
| M | motor |
| P | storage device |
| X3 | connector to connect auxiliary circuits |
| SSI | switch indicating MANUAL(NO-C)/ AUTO(NC-C) modes |
| B | recommended wiring of the control circuits (not included in drive order) |
| ON | 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

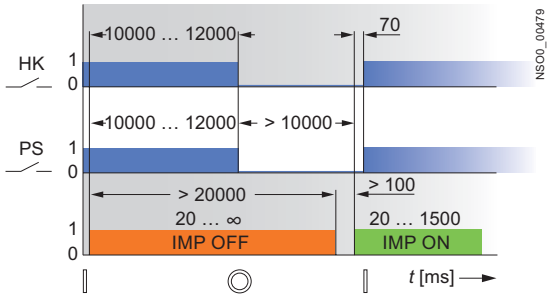


## Motorized operating mechanism

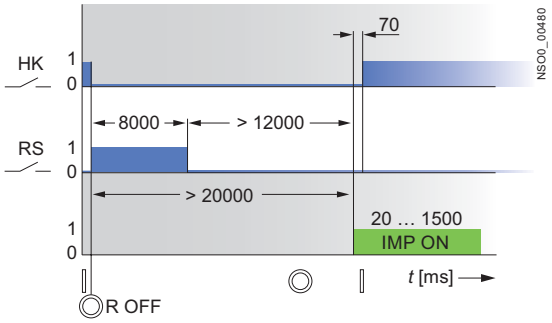
Specifications

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



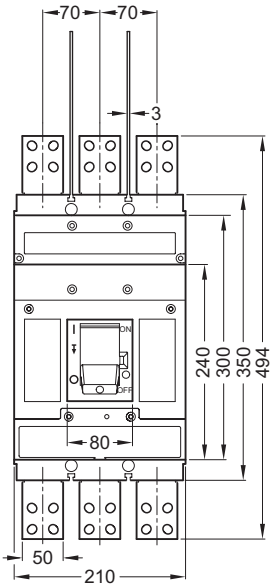

Circuit breaker states and lever positions of circuit breakers

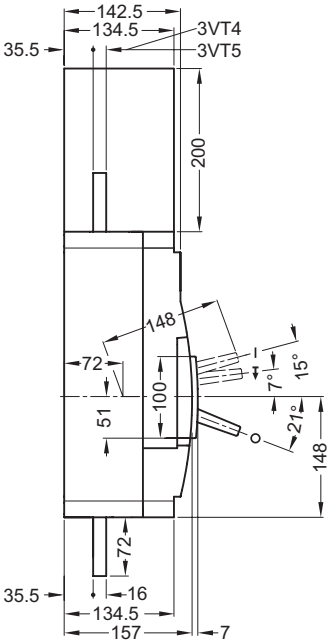
| Circuit breaker state | lever positions of circuit breakers |
|---|---|
| Switched on | |
| Switched off by releases, or by TEST button or by the trip push button on the motor drive | |
| Switched off manually or electrically by drive | |

Description of charts

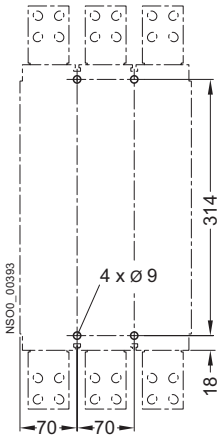
| Symbol | Description |
|---|---|
| HK | main contacts |
| PS | auxiliary switch |
| RS | relative switch |
| R OFF | circuit breaker closing instant by release |
| IMP S | pulse to store up motor drive energy (generated by S switch) |
| IMP ON | make pulse for motor drive |
| IMP OFF | break pulse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

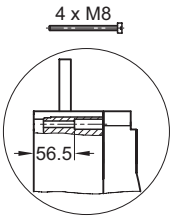
Fixed-mounted design, front connection

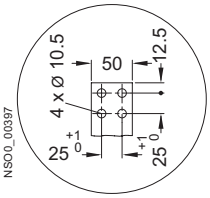


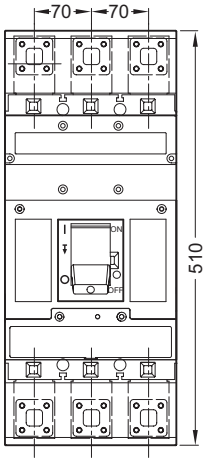

Drilling pattern

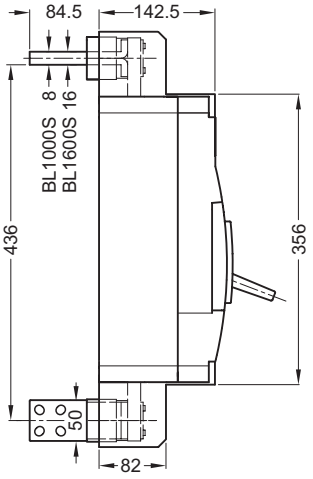


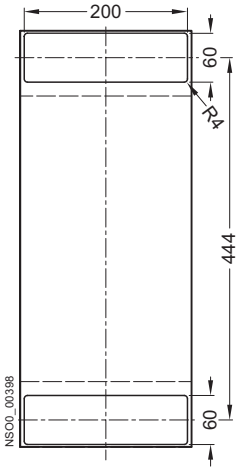




Fixed-mounted design, rear connection
(3VT9 500-4RC30, 3VT9 400-4RC30 connecting sets)



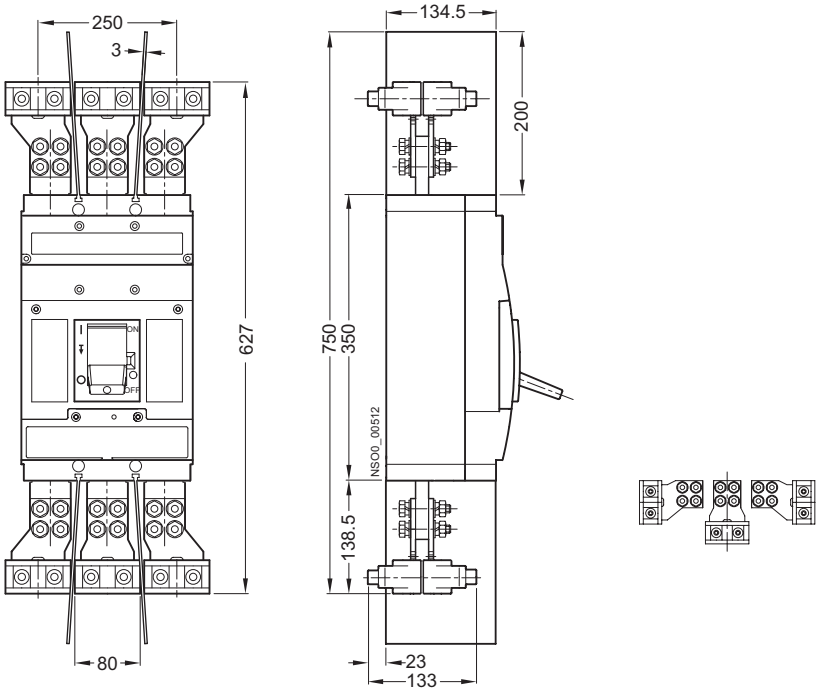

Openings for insulation grommets



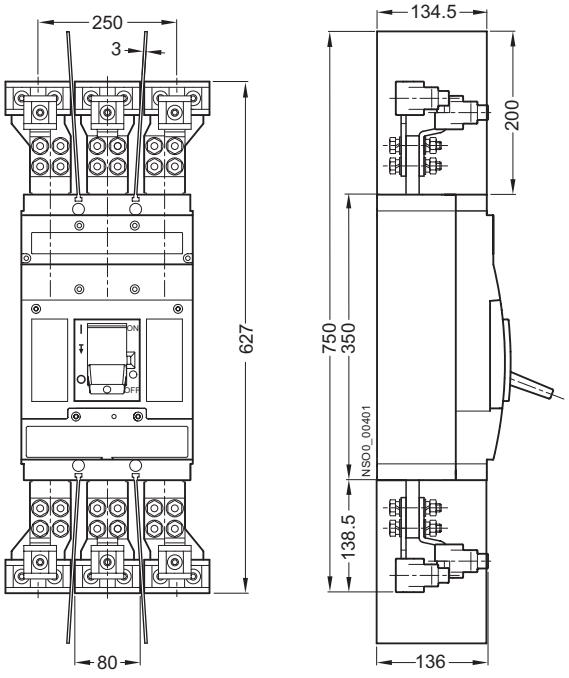

6

## Motorized operating mechanism

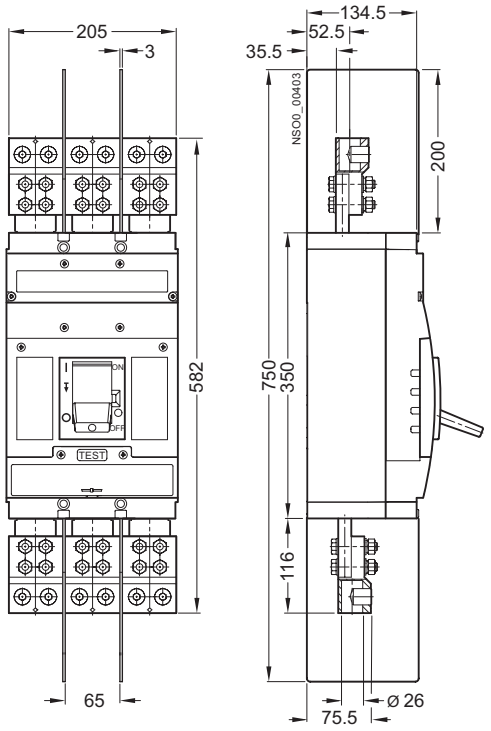
Fixed-mounted design, clamp type terminals (3VT9 524-4TG30 connecting sets) - not for 3VT4 710-3AA30-0AA0 switching unit



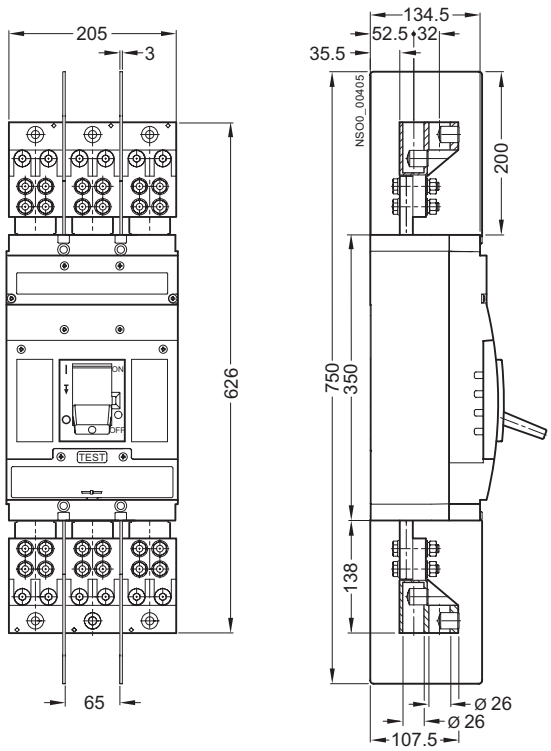

Fixed-mounted design, clamp type terminals (3VT9 524-4TG30 and 3VT9 524-4TF30 connecting sets) - not for 3VT4 710-3AA30-0AA0 switching units



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



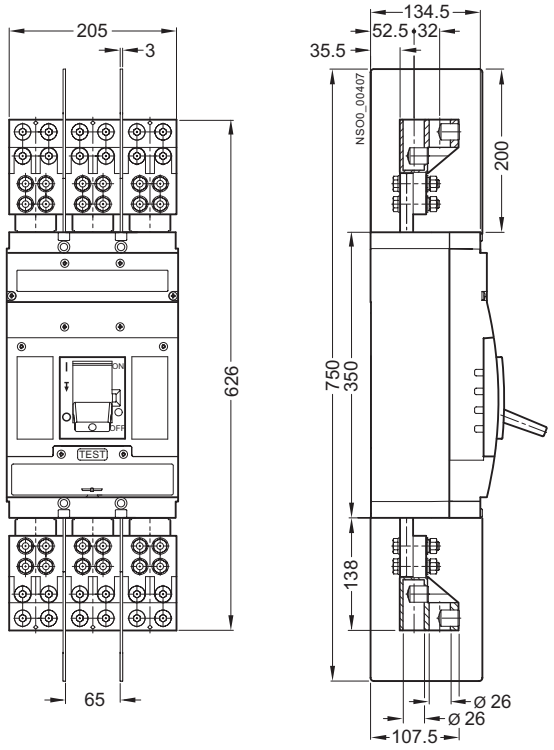

Fixed-mounted design, block type terminals (3VT9 533-4TF30)



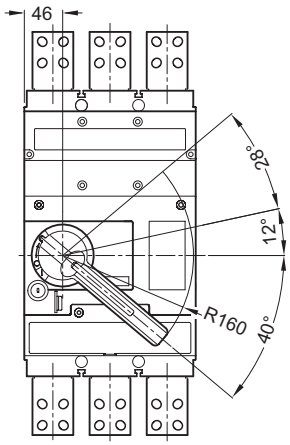

6

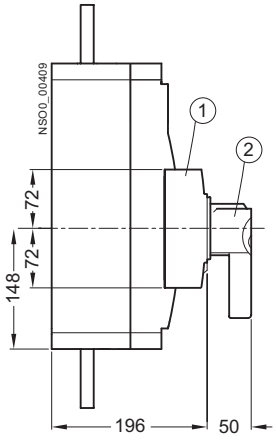
## Motorized operating mechanism

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

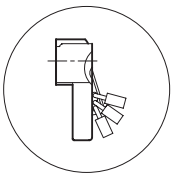



Fixed-mounted design, front manual operating mechanism



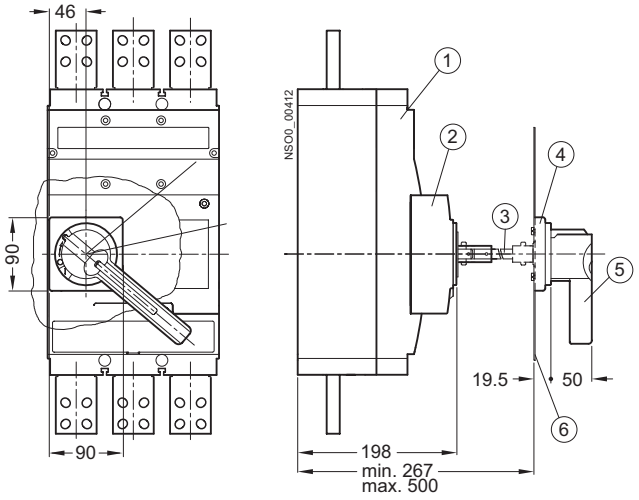




Knob - lockable
(3VT9 500-3HE10, 3VT9 500-3HF10)

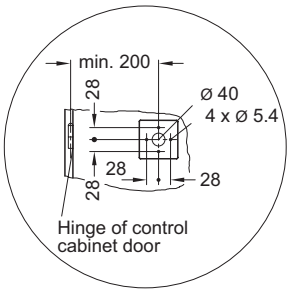


① 3VT9 500-3HA10
② 3VT9 500-3H.10

Fixed-mounted design, front manual operating mechanism

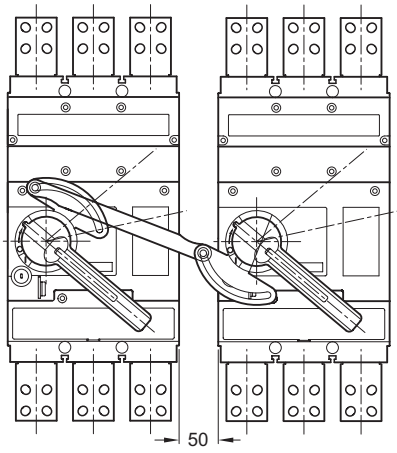



Adaptation of control cabinet door

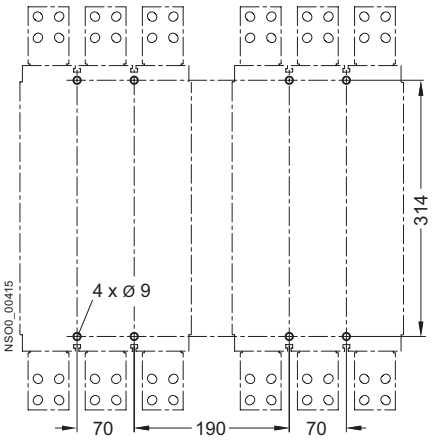


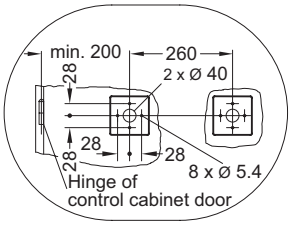

1. 3VT4/3VT5
2. 3VT9 500-3HA10
3. 3VT9 500-3HJ10
4. 3VT9 500-3HG.0
5. 3VT9 500-3H.10
6. Control cabinet door

3VT9 300-8LA00 mechanical interlocks



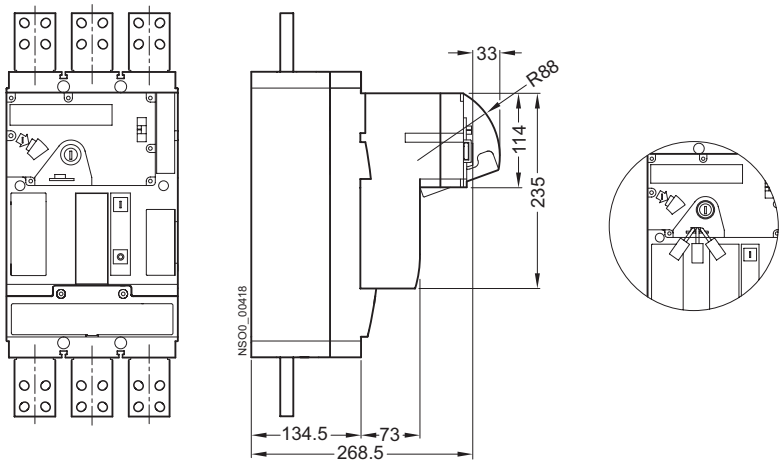

Adaptation of control cabinet door



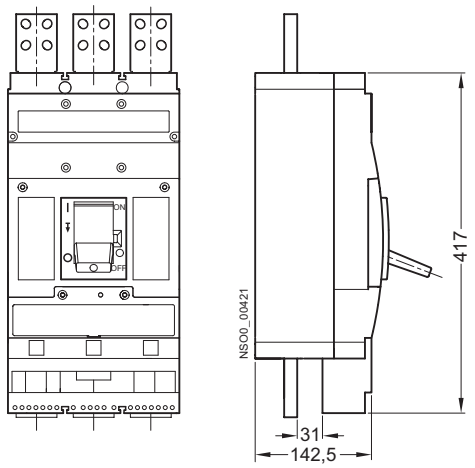



## Motorized operating mechanism

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

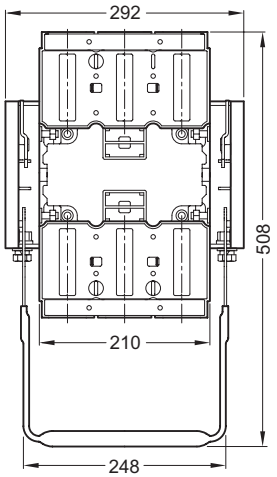


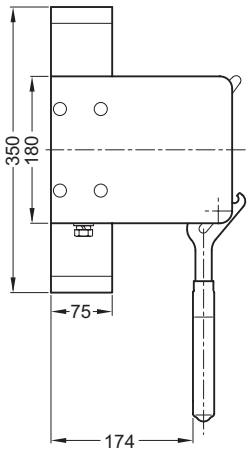

Fixed-mounted design, 3VT9 500-6AE00 signalling unit



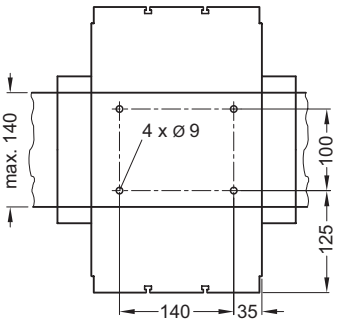
### *Withdrawable version*

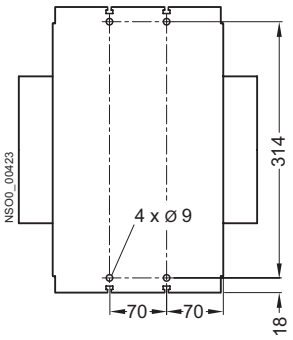
3VT9 500-4WA40 withdrawable version



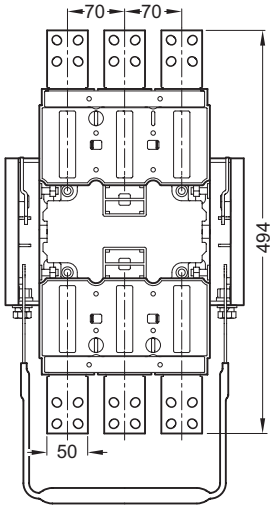



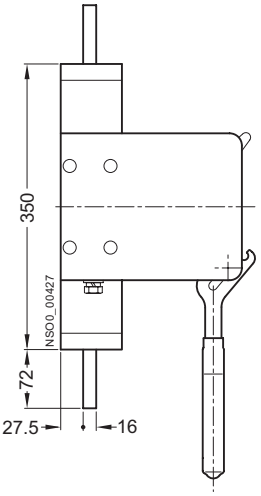

Drilling pattern

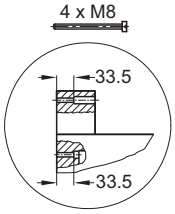



Withdrawable version, front connection (3VT9 500-4EF30 connecting sets)

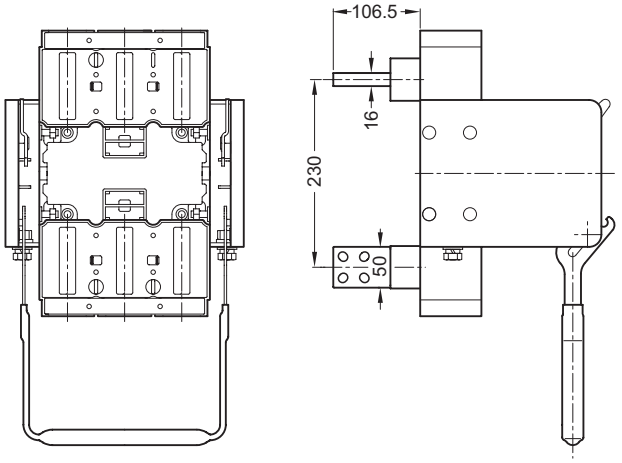


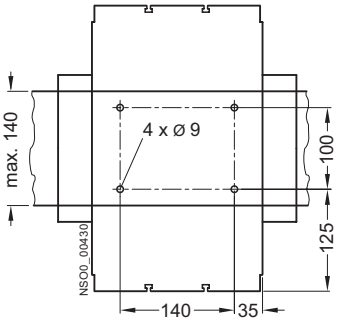



## Motorized operating mechanism

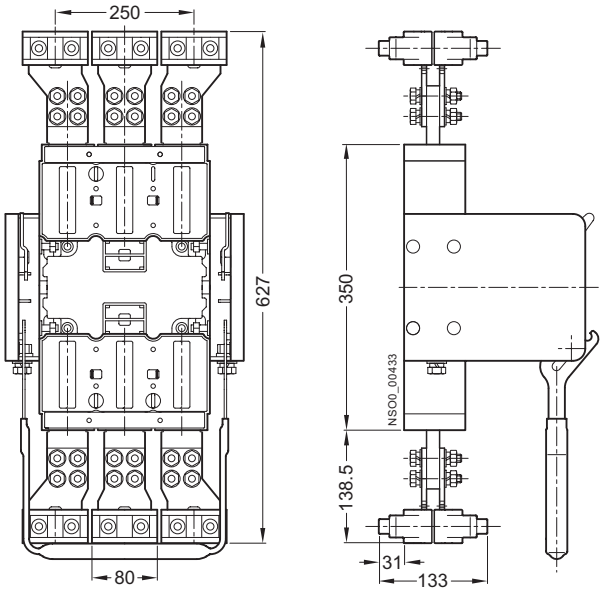
Withdrawable version, rear connection
(3VT9 500-4RC30 connecting set)



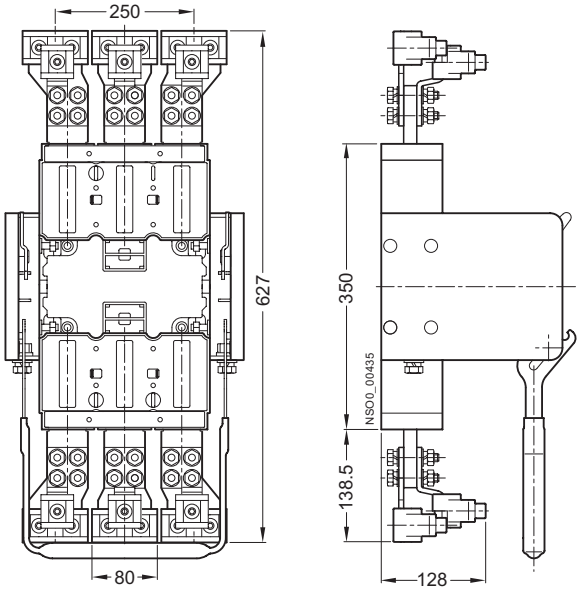

Drilling pattern



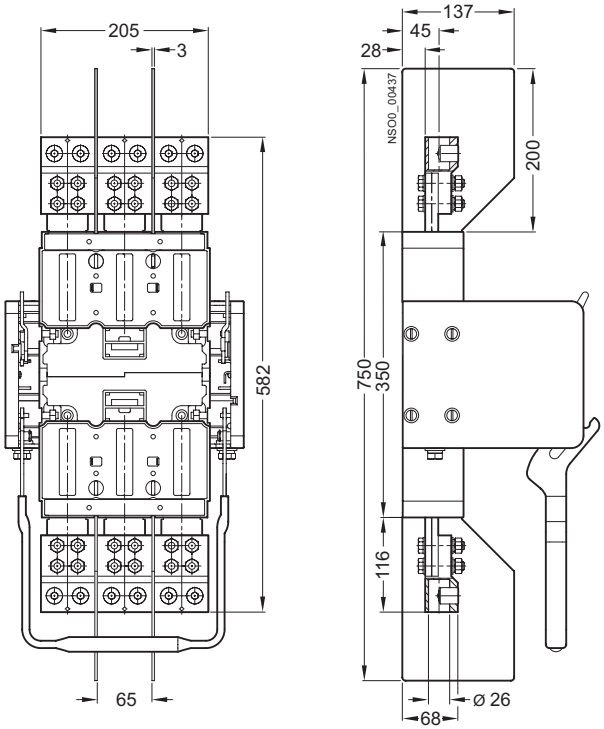

Withdrawable version, clamp type terminals (3VT9 524-4TG30 connecting set)



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

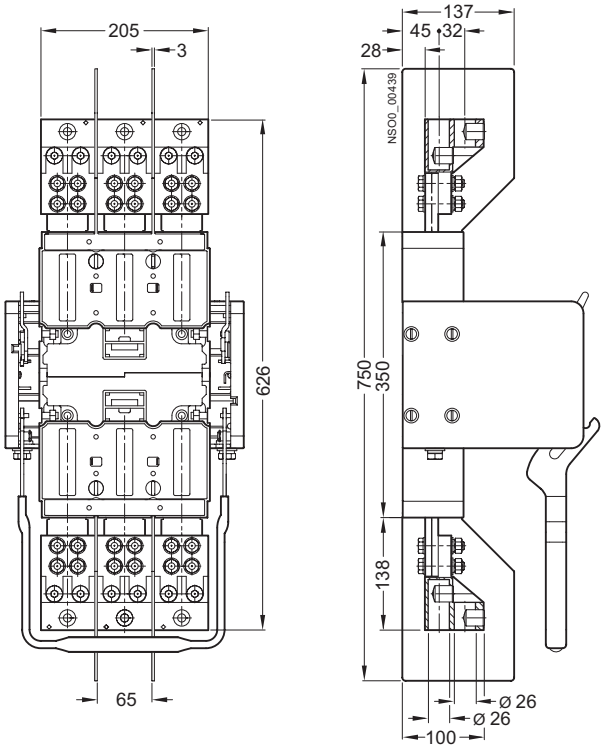



Withdrawable version, block type terminals (3VT9 532-4TF30)

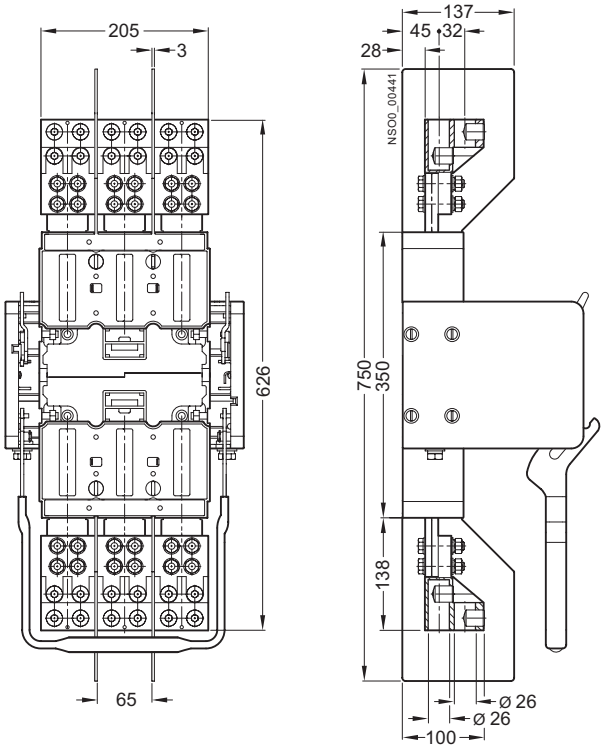


## Motorized operating mechanism

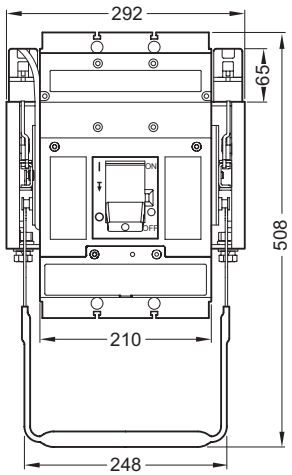
Withdrawable version, block type terminals (3VT9 533-4TF30)



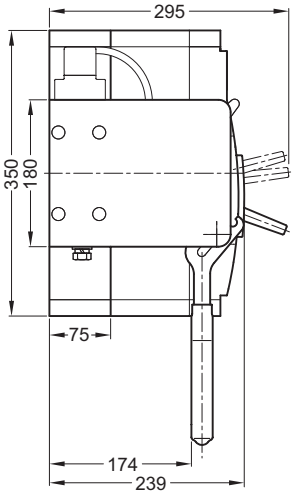

Withdrawable version, block type terminals (3VT9 534-4TF30)



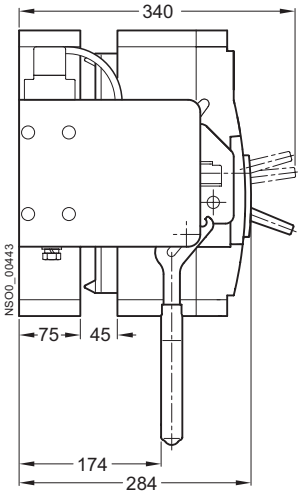
Withdrawable version




Connected



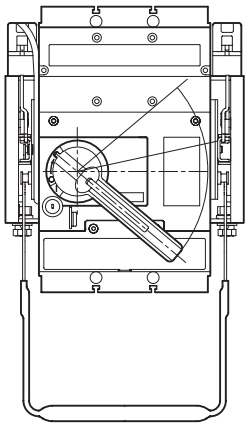

Disconnected

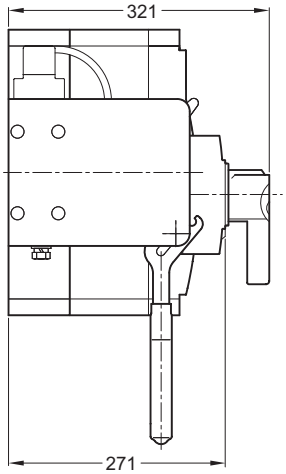


## Motorized operating mechanism

Withdrawable version, manual operating mechanism

Connected



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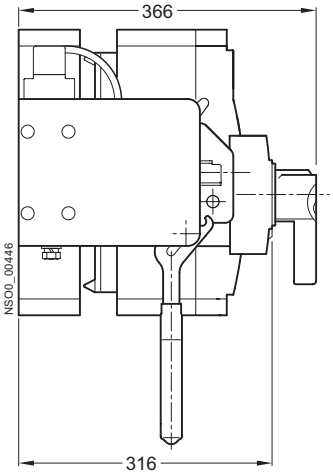
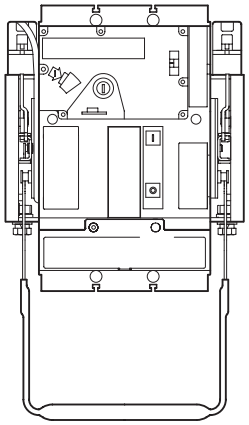
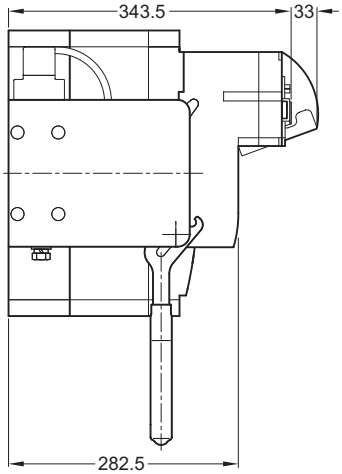



Withdrawable version, 3VT9 500-3MQ00 motorized operating mechanism

Connected



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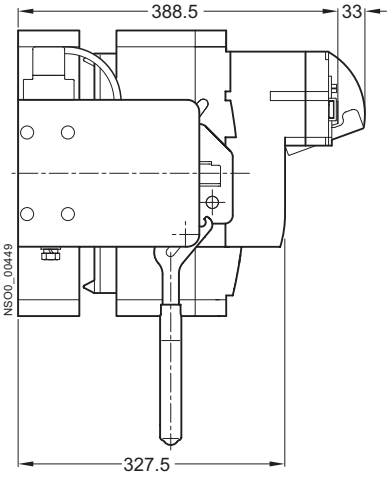


**Catalog**

## 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<br>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. | | |

7



* You can order this quantity or a multiple thereof.

# Appendix

8

# 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.

**To achieve this, we supply the preferred types marked with ► ex warehouse.**

Electronic order processing is fast, cost-efficient and error-free. Please contact us if you want to benefit from these advantages.

## Orders for special designs

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.

## Small orders

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.--.

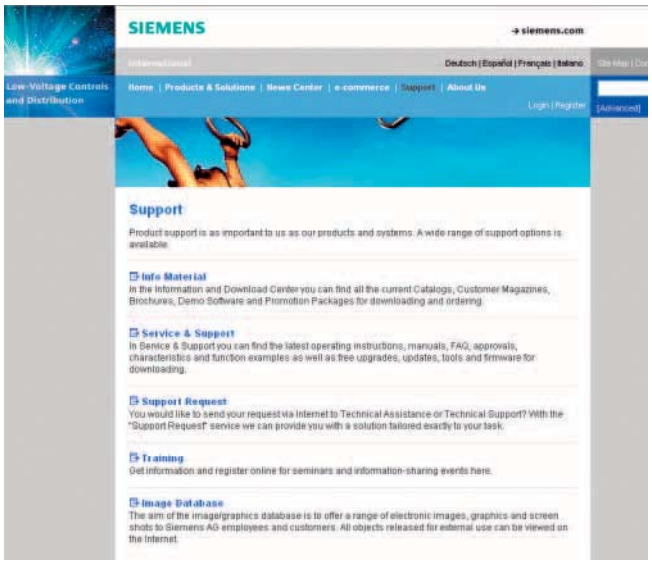
## Further documentation

### Overview

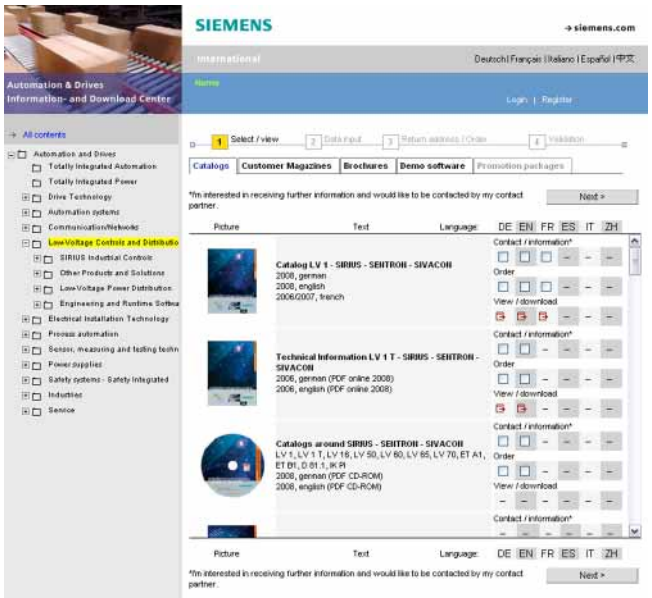
You will find all the latest information material, such as brochures, catalogs, manuals and operating instructions on low-voltage, controls and distribution on the Internet at:

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

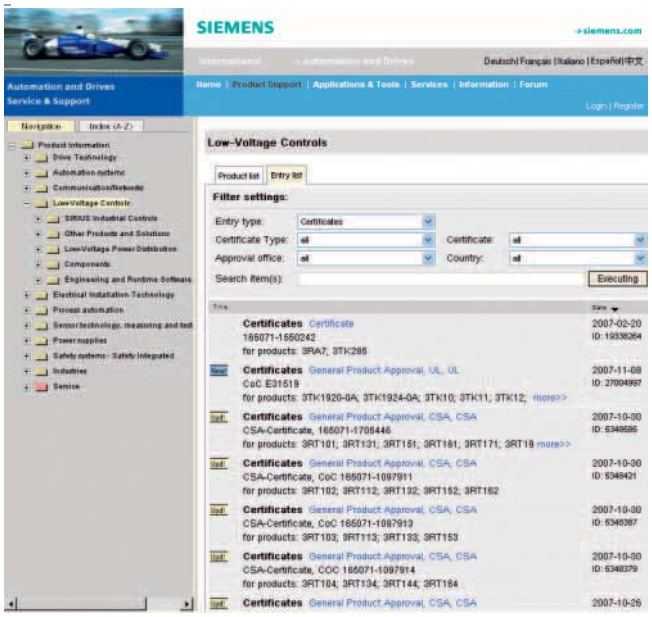
and much, much more - all conveniently and easily accessible.

## Overview

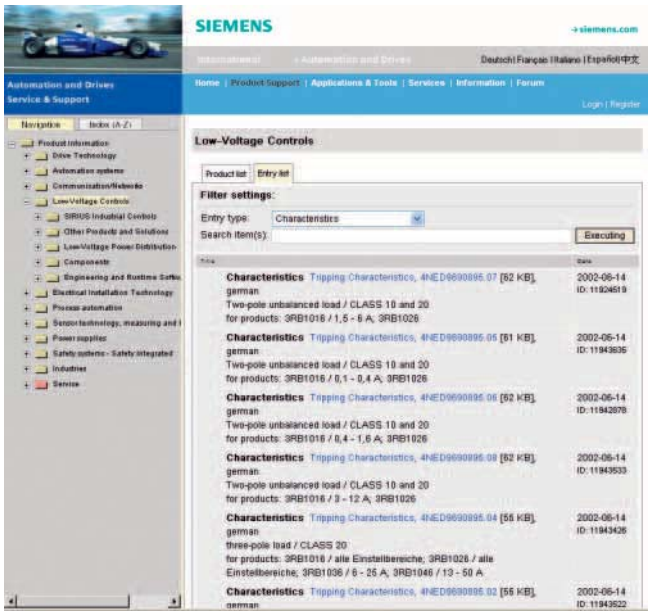
### *Verification certificates and characteristic curves*

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



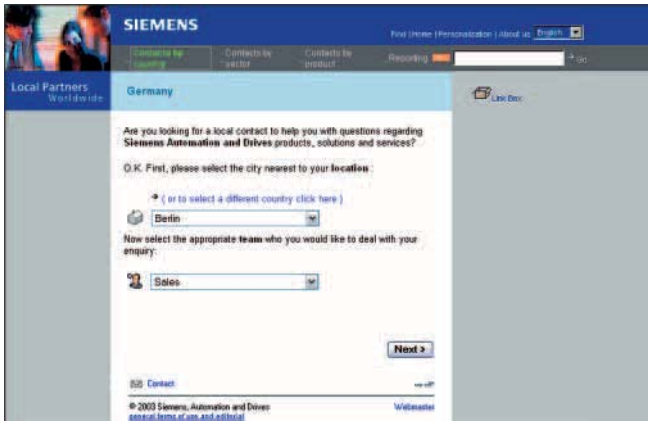

Product support: Approvals / Certificates

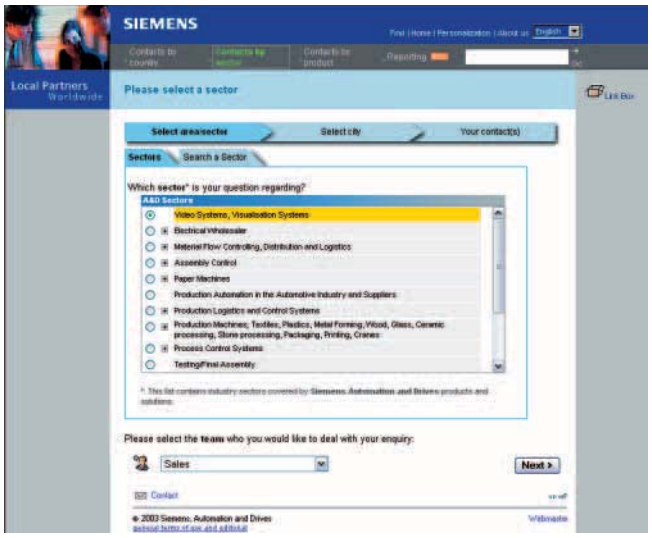


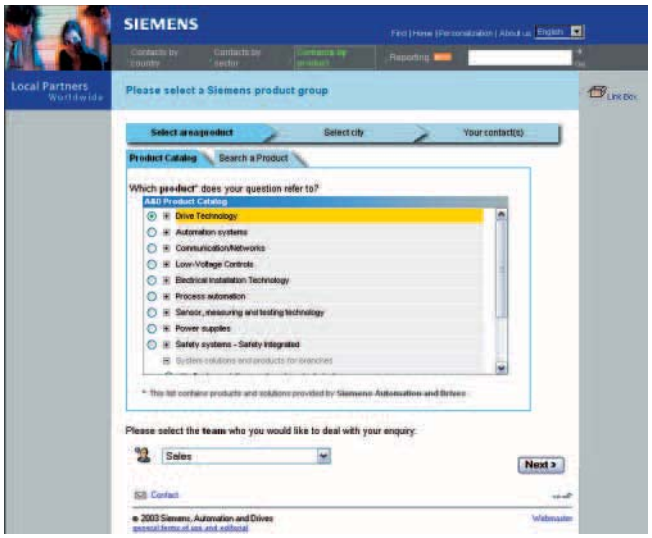

Product support: Characteristic curves

## 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.

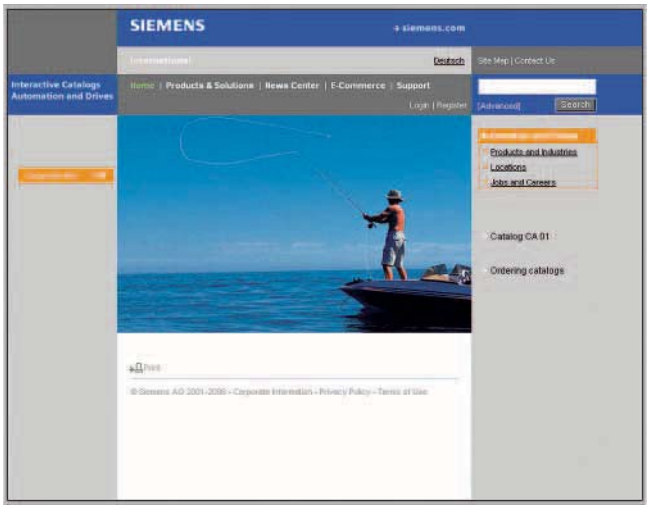
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

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.

## Easy shopping with the A&D Mall


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.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall on the Internet under:

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

# Appendix

## Customer support


In the face of harsh competition you need optimum conditions to keep ahead all the time:
A strong starting position. A sophisticated strategy and team for the necessary support - in every phase.
Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

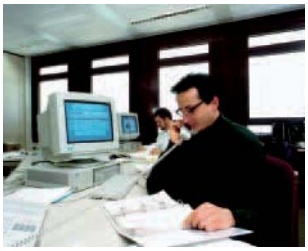
Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

### Online support

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

http://www.siemens.com/automation/service&support

### Technical support



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

**Tel.: +49 (0)180 50 50 222**
**Fax: +49 (0)180 50 50 223**
(0.14 €/min from the German fixed network)
http://www.siemens.com/automation/support-request

### Technical consulting

Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.[1)]

### Configuration and software engineering

Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.[1)]

### Service on site

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

In Germany
**0180 50 50 444**[1)]
(0.14 €/min from the German fixed network)

### Repairs and spare parts

In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.
In Germany
**0180 50 50 446**[1)]
(0.14 €/min from the German fixed network)

### Optimization and upgrading

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.

## Subject index

# Appendix

## Order number index

## Order number index

## Conditions of sale and delivery
## Export regulations

### Terms and conditions of sale and delivery

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

***For customers with a seat or registered office in Germany***

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

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

***For customers with a seat or registered office outside of Germany***

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

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

***General***

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.

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

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

or download them from the Internet
http://www.siemens.com/automation/mall
(Germany: A&D Mall Online-Help System)

### Export regulations

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

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

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

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

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

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

Errors excepted and subject to change without prior notice.

A&D/VuL_ohne MZ/En 05.09.06

# Catalogs

## 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** | |
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| SINAMICS G110/SINAMICS G120 Inverter Chassis Units<br>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 |

| | Catalog |
|---|---|
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| **Low-Voltage** | |
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| 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** | |
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| **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* |

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

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