Protective Devices: Circuit-Breakers[1])

4

1) The term "Circuit-Breaker" in this catalog does not imply UL489 approval. Please reference the individual technical specifications for confirmation.

Introduction

Overview






Type		3RV10	3RV11	3RV13	3RV14	3RV16	3RV16
SIRIUS circuit-breakers up to 100 A							
Applications							
Plant protection		✓[1]	✓[1]	–	–	–	–
Motor protection		✓	–	–	–	–	–
Motor protection with overload relay function		–	✓	–	–	–	–
Starter combinations		–	–	✓	–	–	–
Transformer protection		–	–	–	✓	–	–
Fuse monitoring		–	–	–	–	✓	–
Voltage transformer circuit-breakers for distance protection		–	–	–	–	–	✓
Size		S00, S0, S2, S3	S0, S2, S3	S0, S2, S3	S0, S2	S00	S00
Rated current I_n							
Size S00	A	up to 12	–	–	–	up to 0.2	up to 3
Size S0	A	up to 25	up to 25	up to 25	up to 20	–	–
Size S2	A	up to 50	up to 50	up to 50	up to 40	–	–
Size S3	A	up to 100	up to 100	up to 100	–	–	–
Rated operating voltage U_e	V	AC 690[2]	AC 690[2]	AC 690[2]	AC 690[2]	AC 690[2]	AC 400
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60	$16^2/_3$ ... 60
Trip class		CLASS 10 CLASS 20	CLASS 10	–	CLASS 10	–	–
Thermal overload release	A	0.11 ... 0.16 to	0.11 ... 0.16 to	none[3]	0.11 ... 0.16 to	0.2	1.4 ... 3
	A	80 ... 100	80 ... 100		28 ... 40		
Overcurrent release multiple of the rated current		13 times	13 times	13 times	20 times	6 times	4 to 7 times
Short-circuit switching capacity I_{cu} at AC 400 V	kA	50/100	50/100	50/100	50/100	100	50

Accessories													
For sizes	S00	S0	S2	S3	S0	S2	S3	S0	S2	S3	S0	S2	S00	S00
Auxiliary switch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm switch	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Undervoltage release	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shunt release	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Isolator module	–	✓	✓	–	✓	✓	–	✓	✓	–	✓	✓	–	–
Insulated 3-phase busbar system	✓	✓	✓	–	–	✓	–	✓	✓	–	✓	✓	✓	✓
Busbar adapters for circuit-breakers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Door-coupling rotary operating mechanism	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Remote motorized operating mechanisms	–	–	✓	✓	–	✓	✓	–	✓	✓	–	✓	–	–
Link modules	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Surface enclosure	✓	✓	✓	–	✓	✓	–	✓	✓	–	✓	✓	✓	✓
Bay enclosure	✓	✓	–	–	✓	–	–	✓	–	–	✓	–	✓	✓
Front plates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cage Clamp infeed system	✓[4]	✓	–	–	–	–	–	✓	–	–	✓	–	–	–

1) For symmetrical loading of the three phases.

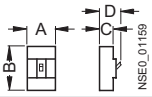
2) With molded-plastic enclosure AC 500 V.

3) For overload protection of the motors, appropriate overload relays must be used.

4) Only for circuit-breakers with Cage Clamp terminals.





Type		VL160	VL250	VL400	VL630	SENTRON WL
Circuit-breakers up to 500 A compact (MCCB) SENTRON VL						**SENTRON WL circuit-breakers in open design**
Applications						For further information about using the SENTRON WL circuit-breakers in open design for motor protection, see Catalog LV 30 "Products and Systems for Power Distribution"
Motor protection		✓	✓	✓	✓	
Starter combinations		✓	✓	✓	✓	
Rated current I_n at 50 °C ambient temperature	A	160	250	400	500	
Number of poles		3	3	3	3	
Rated operating voltage U_e						
AC 50 Hz/60 Hz	V	690	690	690	690	
Overcurrent releases						
Magnetic		✓	✓	✓	✓	
Solid-state ETU/LCD		✓	✓	✓	✓	
Replaceable		✓	✓	✓	✓	
PROFIBUS module COM10		✓	✓	✓	✓	
Dimensions						
 A	mm	105	105	139	190	
B	mm	175	175	280	280	
C	mm	82	82	102	102	
D	mm	107	107	139	139	
Switching capacity I_{cu}/I_{cs} RMS value, acc. to IEC 60947-2						
Standard switching capacity N						
up to AC 240 V	kA	65/65	65/65	65/65	65/65	
up to AC 415 V	kA	40/40	40/40	45/45	45/45	
up to AC 690 V	kA	12/6	12/6	20/10	20/10	
High switching capacity H						
up to AC 240 V	kA	100/75	100/75	100/75	100/75	
up to AC 415 V	kA	70/70	70/70	70/70	70/70	
up to AC 690 V	kA	12/6	12/6	22/10	30/15	
Very high switching capacity L						
up to AC 240 V	kA	150/150	200/150	200/150	200/150	
up to AC 415 V	kA	100/75	100/75	100/75	100/75	
up to AC 690 V	kA	12/6	12/6	25/12	35/17	

Note:

This catalog contains the SENTRON VL circuit-breakers up to 500 A for motor protection and for starter combinations.

The complete program of SENTRON VL circuit-breakers up to 1600 A for applications in plant/generator protection, motor protection, starter combinations and as non-automatic circuit-breakers as well as the complete range of accessories for the SENTRON VL circuit-breakers are listed in Catalog LV 30 "Products and Systems for Power Distribution".

General data

Overview

S0 circuit-breakers

3RV1 circuit-breakers are compact, current limiting circuit-breakers which are optimized for load feeders. The circuit-breakers are used for switching and protecting three-phase induction motors of up to 45 kW at AC 400 V and for other loads with rated currents of up to 100 A.

Construction

The circuit-breakers are available in four sizes:

- Size S00 - overall width 45 mm,
  max. rated current 12 A,
  at AC 400 V suitable for 3-phase induction motors up to 5.5 kW.
- Size S0 - overall width 45 mm,
  max. rated current 25 A,
  at AC 400 V suitable for 3-phase induction motors up to 11 kW.
- Size S2 - overall width 55 mm,
  max. rated current 50 A,
  at AC 400 V suitable for 3-phase induction motors up to 22 kW.
- Size S3 - overall width 70 mm,
  max. rated current 100 A,
  at AC 400 V suitable for 3-phase induction motors up to 45 kW.

Area of application

Operating conditions

3RV1 circuit-breakers are suitable for use in any climate. They are intended for use in enclosed areas where no severe operating conditions (e.g. dust, corrosive vapors, damaging gases) are present. When installed in dusty and damp areas, suitable enclosures must be provided.

3RV circuit-breakers can optionally be fed from the top or from below.

The permissible ambient temperatures, the maximum switching capacities, the tripping currents and other boundary conditions can be found in the technical specifications and tripping characteristics.

3RV1 circuit-breakers are suitable for use in IT systems (IT networks). In this case, the different short-circuit breaking capacity in the IT system must be taken into account.

Since operational currents, starting currents and current peaks are different even for motors with identical power ratings due to the inrush current, the motor ratings in the selection tables are only guide values. The specific rated and start-up data of the motor to be protected is always paramount to the choice of the most suitable circuit-breaker. This also applies to circuit-breakers for transformer protection.

In order to prevent premature tripping due to the integrated phase failure sensitivity, circuit-breakers should always be connected to ensure current flows through all three main conducting paths.

Short-circuit protection

If a short-circuit occurs, the short-circuit releases of 3RV1 circuit-breakers isolate the faulty load feeder from the mains supply and thus prevent further damage.

Circuit-breakers with a short-circuit breaking capacity of 50 kA or 100 kA are virtually short-circuit proof at a voltage of AC 400 V, since higher short-circuit currents are not to be expected in practice.

Motor protection

The tripping characteristics of 3RV10/3RV11 circuit-breakers are designed mainly to protect three-phase induction motors.

The circuit-breakers are therefore also referred to as motor circuit-breakers.

The rated current I_n of the motor to be protected is set on the setting scale. Factory setting of the short-circuit release is 13 times the rated current of the circuit-breaker. This permits trouble-free start-up and ensures that the motor is properly protected.

The phase failure sensitivity of the circuit-breaker ensures that it is tripped in time in the event of a phase failure and overcurrents that occur as a result in the other phases.

Circuit-breakers with thermal overload releases are normally designed in accordance with trip class 10 (CLASS 10). Circuit-breakers of sizes S2 and S3 are also available in class 20 (CLASS 20) and therefore allow motors to be started up under arduous conditions.

Motor protection with overload relay function (automatic reset)

Circuit-breakers for motor protection with overload relay function are designed for the protection of three-phase induction motors.

They are equipped with the same short-circuit release and overload release as circuit-breakers for motor protection without overload relay function.

The circuit-breaker always remains closed in the event of an overload. The overload release activates only two auxiliary contacts (1 NO + 1 NC). The overload trip can be signaled to a higher-level control with the help of these auxiliary contacts. Generally, it is also possible to open a downstream contactor directly.

The overload signal is reset automatically. The circuit-breaker itself only trips if a short-circuit occurs downstream.

Plant protection

The 3RV10/3RV11 circuit-breakers for motor protection are also suitable for plant protection.

In order to prevent premature tripping due to phase failure sensitivity, the three conducting paths must always be uniformly loaded. The conducting paths must be connected in series in the case of single-phase loads.

Short-circuit protection for starter combinations

The 3RV13 circuit-breakers for starter combinations in sizes S0, S2 and S3 provide short-circuit protection with the help of a contactor and overload relay combination.

Like the circuit-breakers for motor protection, they are equipped with short-circuit releases which are permanently set to a value equivalent to 13 times the rated current of the circuit-breakers. They are not equipped with overload releases.

On overload, the overload relay triggers the contactor, the circuit-breaker remains closed.

Only when a short-circuit occurs in the feeder does the circuit-breaker trip as well.

The circuit-breaker for starter combinations must always be used in combination with an overload relay because the circuit-breaker alone cannot protect the motor and itself against overload.

Transformer protection

When control-power transformers are protected on the line side, the high inrush currents generated at the time the transformers are switched on often cause spurious tripping in the protection mechanisms.

3RV14 circuit-breakers in sizes S0 and S2 for protecting transformers are therefore fitted with overcurrent releases which are permanently set in the factory to a value equivalent to 20 times the rated current.

Circuit-breakers can thus be used to provide line-side protection for transformers, the inrush peak currents of which are up to 30 times the rated current.

This type of circuit-breaker is not necessary in the case of control-power transformers with low inrush currents, such as control transformers from Siemens. 3RV1 circuit-breakers for motor protection can be used in this case.

Main and EMERGENCY-STOP switches

The circuit-breakers 3RV10, 3RV11, 3RV13, 3RV14 and 3RV16 comply with the isolating function to IEC 60947-2, therefore they can be used - taking IEC 60204-1 into account - as main and EMERGENCY-STOP switches.

3RV19.6-2. door-coupling rotary operating mechanisms for heavy duty also conform with the requirements for the isolating function.

Fuse monitoring

The 3RV16 11-0BD10 circuit-breaker size S00 is used for fuse monitoring.

A fuse is connected in parallel with each conducting path of the circuit-breaker. When a fuse blows, the current flows through the parallel conducting path and trips the circuit-breaker.

The 3RV16 11-0BD10 circuit-breaker must be equipped with a transverse or lateral auxiliary switch (accessories) that signals a tripping operation of the circuit-breaker and thus the tripping of the fuse, or switches off all poles of the disrupted electric circuit with the help of an appropriate switching device.

Notes on safety

When monitoring fuses with safety isolating functions, a warning sign must be affixed near the fuses indicating that voltage may still be present via the parallel circuit of the monitoring equipment assumed to be isolated after the fuse has been removed and if the monitoring equipment is not switched off.

We recommend the following text for this warning:

Important!
For safety isolation, also switch off fuse monitoring equipment with the item code ..... .

Circuit-breaker for fuse monitoring

The 3RV16 11-0BD10 circuit-breaker for fuse monitoring is suitable for the following voltages: 50Hz/60 Hz from AC 24 V to 690 V and up to DC 450 V. Fuse monitoring with 3RV16 11-0BD10 circuit-breakers is not permissible in feeders with power controllers that can induce DC feedback of higher values when an error occurs.

With parallel cables and meshed systems, the circuit-breaker will only trip, and a signal will be output to indicate this, if the voltage difference across the circuit-breaker is at least 24 V.

Use of IT systems (IT networks)

3RV1 circuit-breakers are suitable for use in IT systems acc. toIEC 60947-2. In the event of a 3-pole short-circuit, their response in this system is the same as in others:
Therefore, the same short-circuit breaking capacity applies, see technical specifications of I_{cu} and I_{cs}.

An initial fault (ground fault) does not necessarily force immediate shutdown of the network when operating IT systems. If a second independent error occurs (ground fault), the switching capacity of the circuit-breaker might be reduced.

This is the case if both ground faults occur in different phases and if one of the ground faults occurs on the line-side and the other on the secondary side of the circuit-breaker.

In order to maintain the short-circuit function of the circuit-breaker even with two independent ground faults (double ground faults), the reduced short-circuit breaking capacity with double ground faults must be taken into account in IT systems I_{cuIT} (see technical specifications). If a ground fault is instantaneously recognized and remedied (ground-fault monitoring), the risk of double ground fault and thus reduced short-circuit breaking capacity I_{cuIT} can be minimized.

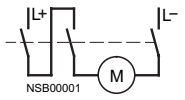
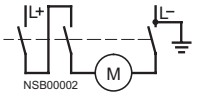
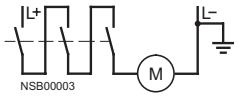
Switching of DC currents

3RV1 circuit-breakers for alternating currents are also suitable for DC switching.

The maximum permissible DC current per conducting path must, however, be adhered to. Higher voltages require a series circuit with 2 or 3 conducting paths.

The response values of the overload release remain unchanged; the response values of a short-circuit release increase by approximately 30 % for DC. The recommended circuits for DC switching can be seen in the table below.

General data

Recommended circuit for size S00 to S3 3RV1 circuit-breakers	Max. permissible DC voltage U_e	Note
	DC 150 V	**2-pole switching, non-grounded system** [1] If there is no possibility of a ground fault, or if every ground fault is rectified immediately (ground-fault monitoring), then the maximum permitted DC voltage can be tripled.
	DC 300 V	**2-pole switching, grounded system** The grounded pole is always assigned to the individual current path, so that there are always 2 current paths in series in the event of a ground fault.
	DC 450 V	**1-pole switching, grounded system** 3 current paths in series. The grounded pole is assigned to the unconnected current path.

1) It is assumed that this circuit always provides safe cut-out even in the event of a double ground fault that bridges two contacts.

3RV16 voltage transformer circuit-breakers up to 3 A

The voltage transformer circuit-breaker protects the secondary side of voltage transformers used to connect protective devices with voltage-dependent starting. The circuit-breaker is used for distance protection with low-impedance starting. Special auxiliary contacts reliably prevent low-impedance starting from triggering distance protection if only one fault has occurred in the transformer line.

The voltage transformer circuit-breaker can also be used to safely disconnect the distance protection device from the voltage transformer. In this case, the special auxiliary contacts also prevent erratic triggering of the distance protection.

Additional fuses are not required. A "Fuse Failure Monitor" (FFM) is also not required.

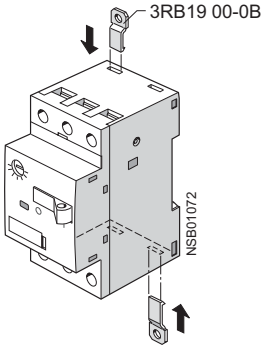
Design

Assembly

The circuit-breakers are snap-mounted on a 35 mm mounting rail to EN 50022. A mounting rail with a height of 15 mm is required for size S3 circuit-breakers. A 75 mm rail can be used as an alternative for size S3.

S2 and S3 circuit-breakers can also be screwed directly onto a baseplate.

The 3RB19 00-0B push-in lugs are available for screw mounting of S00 and S0 circuit-breakers.



Screw connection

3RV1 circuit-breakers of sizes S00 and S0 are fitted with terminals with captive screws and clamping pieces, allowing the connection of 2 conductors with different cross-sections.

The box terminals of the S2 and S3 circuit-breakers also enable 2 conductors with different cross-sections to be connected. With the exception of S3 circuit-breakers which are equipped with 4 mm hexagon socket screws, all terminal screws are tightened with a Pozidriv screwdriver size 2.

The box terminals of the S3 circuit-breakers can be removed in order to connect conductors with cable lugs or connecting bars. A terminal cover is available as shock protection and to ensure that the required clearances and creepage distances are maintained if the box terminals are removed.

Cage Clamp connection

As an alternative to screw terminals, S00 circuit-breakers are also available with Cage Clamp connection.

This screwless connection technique, already familiar from terminal blocks, clamps the conductors using a cage tension spring and is shock-proof and vibration-proof.

Circuit-breakers with Cage Clamp connection allow independent connection of two conductors per terminal.

Circuit-breakers with Cage Clamp connection.

3RV16 voltage transformer circuit-breakers up to 3 A

The voltage transformer circuit-breaker widely corresponds with the SIRIUS 3RV1 circuit-breaker, size S00. Two special features are taken into account for safe prevention of false tripping of the distance protection device.

Auxiliary switch for blocking the distance protection

The main contacts of the circuit-breaker are opened if the voltage transformer circuit-breaker is tripped or switched off. The distance protection would falsely interpret low impedance as a fault, which results in immediate power cut-out within only a few milliseconds.

To prevent this fault response, special auxiliary contacts with a time-dependent assignment to the circuit-breaker's main contacts (see timing diagram) must be provided. The distance protection is blocked with the help of these auxiliary contacts and thus prevents false tripping.

An auxiliary switch for blocking the distance protection device is available as 1 changeover contact fitted permanently in the voltage transformer circuit-breaker. This changeover contact can be used as 1 NO (11-14) or 1 NC (11-12). Thanks to the high contact stability of these auxiliary contacts at the lowest possible rated operational currents, they are also suitable for modern solid-state distance protection devices.

The laterally mounted auxiliary switches of the SIRIUS range can be used for signaling functions. They cannot be used for blocking the distance protection device.

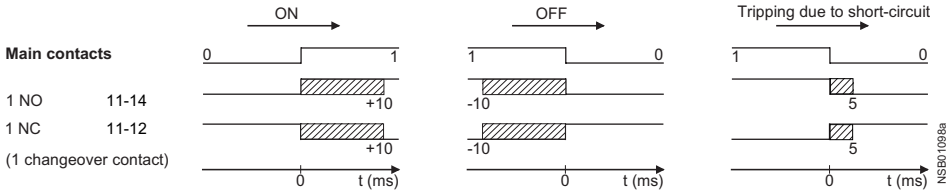
Impedance across the main contacts

There is only minor current flow across the main contacts of the voltage transformer circuit-breaker. To ensure reliable functioning of the distance protection, transfer resistance of the main contacts must be minimal and nearly constant throughout the service life of the circuit-breaker.

This is implemented with suitable contacts and contact materials for the 3RV16 voltage transformer circuit-breaker.

Mounting

The circuit-breakers are snap-mounted on a 35 mm mounting rail to EN 50022. Push-in lugs are available for screw connection of the circuit-breakers (see Accessories for SIRIUS 3RV1 circuit-breakers).



Timing diagram of auxiliary switches for blocking distance protection

Functions

Releases

3RV1 circuit-breakers are equipped with inverse-time delayed overload releases based on the bimetal principle and with instantaneous overcurrent releases (electromagnetic short-circuit releases).

The overload releases can be set in accordance with the load current. The overcurrent releases are permanently set to a value 13 times the rated current and thus enable trouble-free start-up of motors.

Circuit-breakers for line-side transformer protection are set to 20 times the rated current to prevent tripping as a result of high transformer inrush current.

The scale cover can be sealed to prevent unauthorized adjustments to the set current.

Trip classes

The trip classes of thermally delayed releases are based on the tripping time (t_A) at 7.2 times the operational current in cold state (excerpt from IEC 60947-4):

- CLASS 10A 2 s < t_A < 10 s
- CLASS 10 4 s < t_A < 10 s
- CLASS 20 6 s < t_A < 20 s
- CLASS 30 9 s < t_A < 30 s

The circuit-breaker must trip within this time!

Operating mechanisms

S00 circuit-breakers are activated by a rocker operating mechanism and S0, S2 and S3 circuit-breakers by a rotary operating mechanism. If the circuit-breaker trips, the rotary operating mechanism switches to the tripped position to indicate this. Before the circuit-breaker is reclosed, the rotary operating mechanism must be reset manually to the 0 position to prevent the breaker from closing by mistake before the fault has been cleared. The circuit-breaker can then only be set to the I position afterwards.

In the case of circuit-breakers with rotary operating mechanisms, an electrical signal can be output by an alarm switch to indicate that the circuit-breaker has tripped.

All operating mechanisms can be locked in the 0 position with a padlock (shackle diameter 3.5 mm to 4.5 mm).

The circuit-breaker isolating function conforms to IEC 60947-2.

General data

Technical specifications

Rated short-circuit breaking capacity I_{cn} to IEC 60947-2

This table shows the rated ultimate short-circuit breaking capacity I_{cu} and the rated service short-circuit breaking capacity I_{cs} of the 3RV1 circuit-breakers with different inception voltages dependent of the rated current I_n of the circuit-breakers.

Circuit-breaker infeed is permissible at the upper or lower terminals without restricting the rated data. If the short-circuit current at the installation point exceeds that rated short-circuit breaking capacity of the circuit-breaker as specified in the table, a back-up fuse is required. Alternatively, a circuit-breaker with a limiter function can be connected upstream.

The maximum rated current for the back-up fuse is specified in the tables. The rated ultimate short-circuit breaking capacity then applies as specified on the fuse.

Fuseless construction

Circuit-breaker contactor combinations for short-circuit currents up to 50 kA can be ordered in the form of fuseless load feeders in accordance with Part 6.

Circuit-breaker	Rated current I_n	up to AC 240 V[1]			up to AC 400 V[1]/415 V[2]			up to AC 440 V[1]/460 V[2]			up to AC 500 V[1]/525 V[2]			up to AC 690 V[1]		
		I_{cu}	I_{cs}	max. fuse (gL/gG)	I_{cu}	I_{cs}	max. fuse (gL/gG)[3]	I_{cu}	I_{cs}	max. fuse (gL/gG)[3]	I_{cu}	I_{cs}	max. fuse (gL/gG)[3]	I_{cu}	I_{cs}	max. fuse (gL/gG)[3][4]
Type	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
3RV10 1, 3RV16 11-0BD10 Size S00	0.16 ... 0.8	100	100	°	100	100	°	100	100	°	100	100	°	100	100	°
	1	100	100	°	100	100	°	100	100	°	100	100	°	100	100	°
	1.25	100	100	°	100	100	°	100	100	°	100	100	°	2	2	20
	1.6	100	100	°	100	100	°	100	100	°	100	100	°	2	2	20
	2	100	100	°	100	100	°	100	100	°	10	10	35	2	2	35
	2.5	100	100	°	100	100	°	100	100	°	10	10	35	2	2	35
	3.2	100	100	°	100	100	°	50	10	40	3	3	40	2	2	40
	4	100	100	°	100	100	°	50	10	40	3	3	40	2	2	40
	5	100	100	°	100	100	°	50	10	50	3	3	50	2	2	50
	6.3	100	100	°	100	100	°	50	10	50	3	3	50	2	2	50
	8	100	100	°	50	12.5	80	50	10	63	3	3	63	2	2	63
	10	100	100	°	50	12.5	80	10	10	63	3	3	63	2	2	63
	12	100	100	°	50	12.5	80	10	10	80	3	3	80	2	2	80
3RV1. 2 Size S0	0.16 ... 1.25	100	100	°	100	100	°	100	100	°	100	100	°	100	100	°
	1.6	100	100	°	100	100	°	100	100	°	100	100	°	100	100	°
	2	100	100	°	100	100	°	100	100	°	100	100	°	8	8	25
	2.5	100	100	°	100	100	°	100	100	°	100	100	°	8	8	25
	3.2	100	100	°	100	100	°	100	100	°	100	100	°	8	8	32
	4	100	100	°	100	100	°	100	100	°	100	100	°	6	3	32
	5	100	100	°	100	100	°	100	100	°	100	100	°	6	3	32
	6.3	100	100	°	100	100	°	100	100	°	100	100	°	6	3	50
	8	100	100	°	100	100	°	50	25	63	42	21	63	6	3	50
	10	100	100	°	100	100	°	50	25	80	42	21	63	6	3	50
	12.5	100	100	°	100	100	°	50	25	80	42	21	80	6	3	63
	16	100	100	°	50	25	100	50	10	80	10	5	80	4	2	63
	20	100	100	°	50	25	125	50	10	80	10	5	80	4	2	63
	22	100	100	°	50	25	125	50	10	100	10	5	80	4	2	63
	25	100	100	°	50	25	125	50	10	100	10	5	80	4	2	63
3RV1. 3 Size S2	16	100	100	°	50	25	100	50	25	100	12	6	63	5	3	63
	20	100	100	°	50	25	100	50	25	100	12	6	80	5	3	63
	25	100	100	°	50	25	100	50	15	100	12	6	80	5	3	63
	32	100	100	°	50	25	125	50	15	125	10	5	100	4	2	63
	40	100	100	°	50	25	160	50	15	125	10	5	100	4	2	63
	45	100	100	°	50	25	160	50	15	125	10	5	100	4	2	63
	50	100	100	°	50	25	160	50	15	125	10	5	100	4	2	80
3RV1. 41 Size S3	40	100	100	°	50	25	125	50	20	125	12	6	100	6	3	63
	50	100	100	°	50	25	125	50	20	125	12	6	100	6	3	80
	63	100	100	°	50	25	160	50	20	160	12	6	100	6	3	80
	75	100	100	°	50	25	160	50	20	160	8	4	125	5	3	100
	90	100	100	°	50	25	160	50	20	160	8	4	125	5	3	125
	100	100	100	°	50	25	160	50	20	160	8	4	125	5	3	125
3RV1. 42 Size S3 with increased switching capacity	16	100	100	°	100	50	°	100	50	°	30	15	80	12	7	63
	20	100	100	°	100	50	°	100	50	°	30	15	80	12	7	63
	25	100	100	°	100	50	°	100	50	°	30	15	80	12	7	63
	32	100	100	°	100	50	°	100	50	°	22	11	100	12	7	63
	40	100	100	°	100	50	°	100	50	°	18	9	160	12	6	80
	50	100	100	°	100	50	°	100	50	°	15	7.5	160	10	5	100
	63	100	100	°	100	50	°	70	50	200	15	7.5	160	7.5	4	100
	75	100	100	°	100	50	°	70	50	200	10	5	160	6	3	125
	90	100	100	°	100	50	°	70	50	200	10	5	160	6	3	160
	100	100	100	°	100	50	°	70	50	200	10	5	160	6	3	160

Short-circuit proof up to at 50 kA.

° No back-up fuse required, since short-circuit proof up to 100 kA.

1) 10% overvoltage.

2) 5% overvoltage.

3) Back-up fuse only required if the short-circuit current at the installation point > I_{cu}.

4) Alternatively, fuseless limiter combinations for AC 690 V can also be used (see page 4/10).

Short-circuit breaking capacity I_{cuIT} in the IT system (IT network) to IEC 60947-2

3RV1 circuit-breakers are suitable for use in IT systems. Values valid for triple-pole short-circuit are I_{cu} and I_{cs}. In case of double ground fault on different phases at the input and output side of a circuit-breaker, the special short-circuit breaking capacity I_{cuIT} applies. The specifications in the table below apply to 3RV1 circuit-breakers.

In the colored areas, I_{cuIT} is 100 kA, or in some ranges it is 50 kA. Therefore the circuit-breakers are short-circuit proof in these ranges.

If the short-circuit current at the installation point exceeds that rated short-circuit breaking capacity of the circuit-breaker as specified in the table, a back-up fuse is required.

The maximum rated current for the back-up fuse is specified in the tables. The rated short-circuit breaking capacity then applies as specified on the fuse.

Circuit-breaker	Rated current I_n	up to AC 240 V[1]		up to AC 400 V[1] / 415 V[2]		up to AC 500 V[1] / 525 V[2]		up to AC 690 V[1]	
		I_{cuIT}	max. fuse (gL/gG)[3]	I_{cuIT}	max. fuse (gL/gG)[3][4]	I_{cuIT}	max. fuse (gL/gG)[3]	I_{cuIT}	max. fuse (gL/gG)[3]
Type	A	kA	A	kA	A	kA	A	kA	A
3RV10 1	0.16 ... 0.63	100	°	100	°	100	°	100	°
3RV16 11-0BD10	0.8	100	°	100	°	100	°	2	16
Size S00	1	100	°	100	°	100	°	2	16
	1.25	100	°	2	20	2	20	2	20
	1.6	100	°	2	20	2	20	2	20
	2	100	°	2	35	2	35	2	35
	2.5	100	°	2	35	2	35	2	35
	3.2	100	°	2	40	2	40	2	40
	4	100	°	2	40	2	40	2	40
	5	100	°	2	50	2	50	2	50
	6.3	100	°	2	50	2	50	2	50
	8	50	80	2	63	2	63	2	63
	10	50	80	2	63	2	63	2	63
	12	50	80	2	80	2	80	2	80
3RV1. 2	0.16 ... 0.63	100	°	100	°	100	°	100	°
Size S0	0.8	100	°	100	°	100	°	6	16
	1	100	°	100	°	100	°	6	16
	1.25	100	°	100	°	8	20	6	20
	1.6	100	°	100	°	8	20	6	20
	2	100	°	8	25	8	25	6	25
	2.5	100	°	8	25	8	25	6	25
	3.2	100	°	8	32	8	32	6	32
	4	100	°	6	32	4	32	3	32
	5	100	°	6	32	4	32	3	32
	6.3	100	°	6	50	4	50	3	50
	8	100	°	6	50	4	50	3	50
	10	100	°	6	50	4	50	3	50
	12.5	100	°	6	63	4	63	3	63
	16	50	80	4	63	3	63	2	63
	20	50	80	4	63	3	63	2	63
	22	50	80	4	63	3	63	2	63
	25	50	80	4	63	3	63	2	63
3RV1. 3	16	50	100	8	100	6	80	5	63
Size S2	20	50	125	8	100	6	80	5	63
	25	50	125	8	100	6	80	5	63
	32	50	125	6	125	4	100	3	80
	40	50	160	6	125	4	100	3	80
	45	50	160	6	125	4	100	3	80
	50	50	160	6	125	4	100	3	80
3RV1. 41	40	50	125	10	63	5	50	5	50
Size S3	50	50	125	8	80	3	63	3	63
	63	50	160	6	80	3	63	3	63
	75	50	160	5	100	2	80	2	80
	90	50	160	5	125	2	100	2	100
	100	50	160	5	125	2	100	2	100
3RV1. 42	16	100	°	12	63	6	50	6	50
Size S3	20	100	°	12	63	6	50	6	50
with increased	25	100	°	12	63	6	50	6	50
switching	32	100	°	12	63	6	50	6	50
capacity	40	100	°	12	80	6	63	6	63
	50	100	°	10	100	4	80	4	80
	63	100	°	7.5	100	4	80	4	80
	75	100	°	6	125	3	100	3	100
	90	100	°	6	160	3	125	3	125
	100	100	°	6	160	3	125	3	125

Short-circuit proof down to min. 50 kA.

° No back-up fuse required, since short-circuit proof up to 100 kA.

1) 10% overvoltage.

2) 5% overvoltage.

3) Back-up fuse only required, if short-circuit current at the installation point > I_{cuIT}.

4) Alternatively, fuseless limiter combinations for AC 690 V can also be used (see page 4/10).

General data

Limiter function with standard devices for AC 500 V and AC 690 V to IEC 60947-2

The table shows the rated ultimate short-circuit breaking capacity I_{cu} and the rated service short-circuit breaking capacity I_{cs} with an upstream standard circuit-breaker that fulfils the limiter function at AC 500 V and AC 690 V. The short-circuit breaking capacity can be increased significantly with an upstream standard circuit-breaker.

The circuit-breaker which is connected downstream must be set to the rated current of the load.

With circuit-breaker combination assemblies, note the clearance to grounded parts and between the circuit-breakers. Short-circuit proof wiring between the circuit-breakers must be ensured. The circuit-breakers can be mounted side-by-side in a modular arrangement.

Standard circuit-breaker	Standard circuit-breaker with limiter function	Rated current I_n	**up to AC 500 V[1] / 525 V[2]**		**up to AC 690 V[1]**	
			I_{cu}	I_{cs}	I_{cu}	I_{cs}
Type	Type Rated current I_n	A	kA	kA	kA	kA
3RV10 2 Size S0	**3RV13 21-4DC10** Size S0 I_n = 25 A	up to 1	°	°	°	°
		1.25	°	°	°	°
		1.6	°	°	°	°
		2	°	°	50	25
		2.5	°	°	50	25
		3.2	°	°	50	25
		4	°	°	50	25
		5	°	°	50	25
		6.3	°	°	50	25
		8	100	50	20	10
		10	100	50	20	10
		12.5	100	50	20	10
		16	100	50	20	10
		20	100	50	20	10
		22	100	50	20	10
		25	100	50	20	10
3RV10 3 Size S2	**3RV13 31-4HC10** Size S2 I_n = 50 A	16	100	50	50	25
		20	100	50	50	25
		25	100	50	50	25
		32	100	50	50	25
		40	100	50	50	25
		50	100	50	50	25
3RV10 4 Size S3	**3RV13 41-4HC10** Size S3 I_n = 50 A	32	100	50	50	25
		40	100	50	50	25
		50	100	50	50	25
3RV10 4 Size S3	**3RV13 41-4MC10** Size S3 I_n = 100 A	50	100	50	50	25
		63	100	50	50	25
		75	100	50	50	25
		90	100	50	50	25
		100	100	50	50	25

Short-circuit proof up to at least 100 kA.

° No upstream circuit-breaker required since short-circuit proof up to 100 kA.

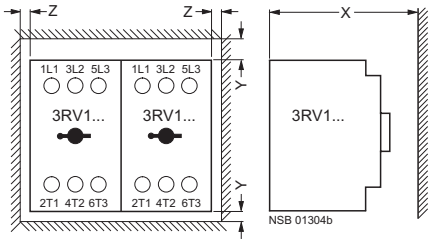
1) 10% overvoltage.

2) 5% overvoltage.

Rules for mounting circuit-breakers

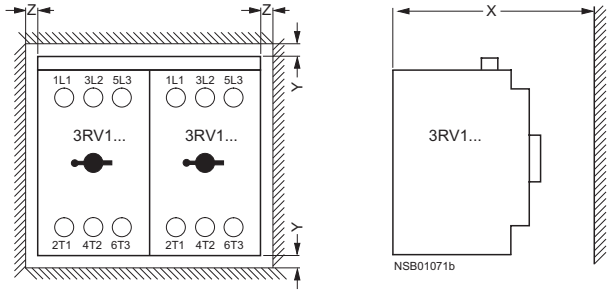
When mounting circuit-breakers, the following clearances must be maintained to grounded or live parts.

Circuit-breaker			Clearances to grounded or live parts acc. to IEC 60947-2		
Type	Size	U_e	Y	X	Z
		V	mm	mm	mm
3RV1. 1	S00	up to 690	20	70	9
3RV1. 2	S0	up to 500	30	90	9
		up to 690	50	90	30
3RV1. 3	S2	up to 690	50	140	30
3RV1. 4	S3	up to 240	50	167	10
		up to 440	70	167	10
		up to 500	110	167	10
		up to 690	150	167	30

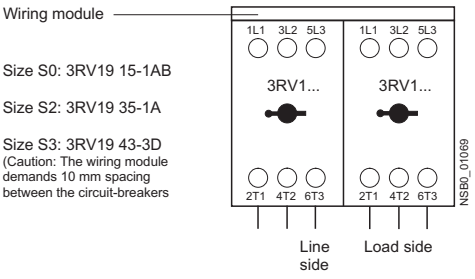


Rules for mounting circuit-breakers with limiter function

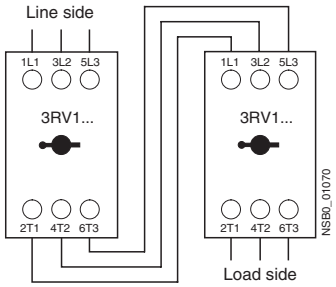
Circuit-breaker			Clearances to grounded or live parts acc. to IEC 60947-2		
Type	Size	U_e	Y	X	Z
		V	mm	mm	mm
3RV1. 2	S0	up to 500	40	90	10
		up to 690	50	90	30
3RV1. 3	S2	up to 690	50	140	10
3RV1. 4	S3	up to 500	110	167	10
		up to 690	150	167	30



Standard mounting for S0, S2 and S3



Structure for S0 for the setting ranges 5.5 A ... 8 A to 20 A ... 25 A at 690 V



General data

General technical specifications

Type			3RV1.1[1]	3RV1.2	3RV1.3	3RV1.4
Standards						
• IEC 60947-1, EN 60947-1 (VDE 0660 Part 100)			yes			
• IEC 60947-2, EN 60947-2 (VDE 0660 Part 101)			yes			
• IEC 60947-4-1, EN 60947-4-1 (VDE 0660 Part 102)			yes			
Size			S00	S0	S2	S3
Number of poles			3			
Max. rated current I_{nmax} (= max. rated operating current I_e)		A	12	25	50	100
Permissible ambient temperature						
• Storage/transport		°C	-50 ... + 80			
• Operation		°C	-20 ... + 70[2]			
Permissible rated current at inside temperature of cubicle:						
• +60 °C		%	100			
• +70 °C		%	87			
Circuit-breaker inside enclosure						
Permissible rated current at inside temperature of enclosure						
• +35 °C		%	100			
• +60 °C		%	87			
Rated operating voltage U_e		V	690[3]			
Rated frequency		Hz	50/60			
Rated insulation voltage U_i		V	690			
Rated impulse withstand voltage U_{imp}		kV	6			
Utilization category						
• IEC 60947-2 (circuit-breaker)			A			
• IEC 60947-4-1 (motor starter)			AC-3			
Trip CLASS	acc. to IEC 60947-4-1		10		10/20	
DC short-circuit breaking capacity (time constant τ = 5 ms)						
• 1 conducting path DC 150 V		kA	10			
• 2 conducting paths in series DC 300 V		kA	10			
• 3 conducting paths in series DC 450 V		kA	10			
Power loss P_v per circuit-breaker dependent on rated current I_n (upper setting range)	I_n: up to 1.25 A	W	5	-	-	-
	I_n: 1.6 ... 6.3 A	W	6	-	-	-
	I_n: 8 ... 12 A	W	7	-	-	-
$R_{\text{per conducting path}} = P/I^2 \times 3$	I_n: up to 0.63 A	W	-	5	-	-
	I_n: 0.8 ... 6.3 A	W	-	6	-	
	I_n: 8 ... 16 A	W	-	7	-	-
	I_n: 20 ... 25 A	W	-	8	-	-
	I_n: up to 25 A	W	-	-	12	-
	I_n: 32 A	W	-	-	15	-
	I_n: 40 ... 50 A	W	-	-	20	-
	I_n: up to 63 A	W	-	-	-	20
	I_n: 75 and 90 A	W	-	-	-	30
	I_n: up to 100 A	W	-	-	-	38
Shock resistance	acc. to IEC 60068-2-27	g/ms	25/11 (square and sinusoidal pulse)			
Degree of protection	acc. to IEC 60529		IP20		IP20[4]	
Touch protection	acc. to DIN VDE 0106-100		Finger-safe			
Temperature compensation	acc. to IEC 60947-4-1	°C	-20 ... +60			
Phase-failure sensitivity	acc. to IEC 60947-4-1		yes			
Explosion protection	ATEX license to EU guideline 94/9/EG		yes, for 3RV10 (CLASS 10), 3RV11 (CLASS 10)			
Isolating function	acc. to IEC 60947-2		yes			
Main and EMERGENCY-STOP switch characteristics [5]	acc. to IEC 60204-1 (VDE 0113)		yes			
Safe isolation between main and auxiliary circuits, required for PELV applications	acc. to DIN VDE 0106-101					
• up to 400 V + 10 %			yes			
• up to 415 V + 5 % (higher voltages on request)			yes			
Mechanical endurance		Operating cycles	100000		50000	
Electrical endurance		Operating cycles	100000		25000	
Max. operating frequency per hour (motor starts)		1/h	15			

1) Technical specifications on 3RV16 voltage transformer circuit-breaker is given on page 4/17.

2) Over +60 °C current reduction.

3) 500 V with molded-plastic enclosure.

4) Terminal compartment IP00.

5) With appropriate accessories.

Rated short-circuit breaking capacity I_{cn} see table on page 4/8.

Conductor cross-sections for main circuit

Type		3RV1.	3RV1. 2	3RV1. 3	3RV1. 4
Type of connection		Screw connection		Screw connection with box terminal	
Terminal screw		Pozidriv size 2		Pozidriv size 2	Hexagon socket screw 4 mm
Prescribed tightening torque	Nm	0.8 ... 1.2	2 ... 2.5	3 ... 4.5	4 ... 6
Conductor cross-sections, 1 or 2 conductors					
Solid	mm^2	2 x (0.5 ... 1.5), 2 x (0.75 ... 2.5)	2 x (1 ... 2.5), 2 x (2.5 ... 6)	2 x (0.75 ... 16)	2 x (2.5 ... 16)
Finely stranded with end sleeve	mm^2	2 x (0.5 ... 1.5), 2 x (0.75 ... 2.5)	2 x (1 ... 2.5), 2 x (2.5 ... 6)	2 x (0.75 ... 16), 1 x (0.75 ... 25)	2 x (2.5 ... 35), 1 x (2.5 ... 50)
Stranded	mm^2	2 x (0.5 ... 1.5), 2 x (0.75 ... 2.5)	2 x (1 ... 2.5), 2 x (2.5 ... 6)	2 x (0.75 ... 25), 1 x (0.75 ... 35)	2 x (10 ... 50), 1 x (10 ... 70)
AWG cables, solid or stranded	AWG	2 x (18 ... 14)	2 x (14 ... 10)	2 x (18 ... 3), 1 x (18 ... 2)	2 x (10 ... 1/0), 2 x (10 ... 2/0)
Ribbon cable conductors (number x width x circumference)	mm	-	-	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)
Removable box terminal [1]					
With copper bars		-	-	-	18 x 10
With cable lug		-	-	-	up to 2 x 70
Cage Clamp connections [2] [3] (1 or 2 conductors connectable)					
Solid	mm^2	2 x (0.25 ... 2.5)	-		
Finely stranded with end sleeve	mm^2	2 x (0.25 ... 1.5)	-		
Finely stranded without end sleeve	mm^2	2 x (0.25 ... 2.5)	-		
AWG cables, solid or stranded	AWG	2 x (24 ... 14)	-		
Max. external diameter of the cable insulation: 3.6 mm.					
Permissible mounting position		any, acc. to IEC 60447 start command "I" right-hand side or top			

1) Cable lug and bar connection is also possible, after removal of the box terminals.

2) With conductor cross-sections of ≤ 1 mm^2 an "insulation stopper" must be used (see accessories for "Contactors and contactor combinations").

3) Corresponding opening tool 8WA2803/8WA2804, see accessories.

General data

Permissible ratings of devices approved for North America (UL/CSA)

Circuit-breakers of the 3RV1 series are approved for UL/CSA and according to UL 508 and CSA 22.2 No. 14 they can also be used as a load feeder in combination with a contactor.

These circuit-breakers can be used as "Manual Motor Controllers" for "Group Installations", as "Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations" and as "Self-Protected Combination Motor Controller" (Type E).

3RV1 circuit-breaker as "Manual Motor Controller"

If used as a "Manual Motor Controller", the circuit-breaker is always operated in combination with an upstream short-circuit protection device. As short-circuit-protection device, approved fuses or a circuit-breaker compliant with UL489/CSA 22.2 No.5 can be used. These devices must be dimensioned in accordance with the National Electrical Code (UL) or Canadian Electrical Code (CSA). Approval of the 3RV as a Manual Motor Controller can be found under the following file numbers: UL File No. 47705, CSA Master Contract 165071, Product Class 3211 05.

Circuit-breaker		hp rating[1] for FLA[2] max.		Rated current I_n	**AC 240 V**		**AC 480 Y/277 V**		**AC 600 Y/347 V**	
					UL	CSA	UL	CSA	UL	CSA
					I_{cc}[3]	I_{cc}[3]	I_{cc}[3]	I_{cc}[3]	I_{cc}[3]	I_{cc}[3]
Type	V	single-phase	three-phase	A	kA	kA	kA	kA	kA	kA
3RV10 11				0.16 ... 2	65	50	65	50	30	10
3RV16 11-0BD10				2.5	65	50	65	50	30	10
	115	1/2	-	3.2	65	50	65	50	30	10
Size S00	200	1 1/2	3	4	65	50	65	50	30	10
	230	2	3	5	65	50	65	50	30	10
FLA[2] max. 12 A, 600 V	460	-	7 1/2	6.3	65	50	65	50	30	10
	575/600	-	10	8	65	50	65	50	30	10
NEMA Size 00				10	65	50	65	50	30	10
				12	65	50	65	50	30	10
3RV10 21 / 3RV11 21				0.16 ... 3.2	65	50	65	50	30	30
3RV13 21				4	65	50	65	50	30	30
				5	65	50	65	50	30	30
Size S0	115	2	-	6.3	65	50	65	50	30	30
	200	3	7 1/2	8	65	50	65	50	30	30
FLA[2] max. 25 A, 600 V	230	5	7 1/2	10	65	50	65	50	30	30
	460	-	15	12.5	65	50	65	50	30	30
NEMA Size 1	575/600	-	20	16	65	50	65	50	30	30
				20	65	50	65	50	30	30
				22	65	50	65	50	30	30
				25	65	50	65	50	30	30
3RV10 31 / 3RV11 31				16	65	50	65	50	25	25
3RV13 31				20	65	50	65	50	25	25
	115	3	-	25	65	50	65	50	25	25
Size S2	200	7 1/2	15	32	65	50	65	50	25	25
	230	10	20	40	65	50	65	50	25	25
FLA[2] max. 50 A,600 V	460	-	40	45	65	50	65	50	25	25
NEMA Size 2	575/600	-	50	50	65	50	65	50	25	25
3RV10 41 / 3RV10 42				16	65	50	65	50	30	30
3RV11 42				20	65	50	65	50	30	30
3RV13 41 / 3RV13 42	115	10	-	25	65	50	65	50	30	30
	200	20	30	32	65	50	65	50	30	30
Size S3	230	20	40	40	65	50	65	50	30	30
	460	-	75	50	65	50	65	50	30	30
FLA[2] max. 100 A, 600 V	575/600	-	100	63	65	50	65	50	30	30
				75	65	50	65	50	30	30
NEMA Size 3				90	65	50	65	50	30	30
				100	65	50	65	50	30	30

1) hp rating = power rating in horse power (maximum motor rating).

2) FLA = Full Load Amps/Motor full load current.

3) Complies with "short-circuit breaking capacity" to UL/CSA.

3RV10 circuit-breaker as "Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations"

The application as "Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations" is only available from UL. CSA does not recognize this approval! When the circuit-breaker is used as a "Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations", it must always be combined with upstream short-circuit protection. As short-circuit-protection device, approved fuses or a circuit-breaker compliant with UL489 can be used.

These devices must be dimensioned in accordance with the National Electrical Code. The 3RV10 motor protection circuit-breakers are approved as "Manual Motor Controller Suitable for Tap Conductor Protection in Group Installations" under the following file number: UL File No. 47705.

Circuit-breaker		hp rating[1] for FLA[2] max.		Rated current I_n	**AC 240 V** UL I_{cc}[3]	**AC 480 Y/277 V** UL I_{cc}[3]	**AC 600 Y/347 V** UL I_{cc}[3]
Type	V	single-phase	three-phase	A	kA	kA	kA
3RV10 11				0.16 ... 0.8	65	65	-
				1	65	65	-
	115	1/3	-	1.25	65	65	-
Size S00	200	3/4	2	2	65	65	-
	230	1	2	2.5	65	65	-
FLA[2] max. 8A, 480 V	460	-	5	3.2	65	65	-
	575/600	-	-	4	65	65	-
NEMA Size 00				5	65	65	-
				6.3	65	65	-
				8	65	65	-
3RV10 21				0.16 ... 1.6	65	65	30
				2	65	65	30
				2.5	65	65	30
Size S0	115	2	-	3.2	65	65	30
	200	3	7 1/2	4	65	65	30
FLA[2] max. 22 A, 480 V	230	3	7 1/2	5	65	65	30
12.5 A, 600 V	460	-	15	6.3	65	65	30
	575/600	-	10	8	65	65	30
NEMA Size 1				10	65	65	30
				12.5	65	65	30
				16	65	65	-
				20	65	65	-
				22	65	65	-
3RV10 31				16	65	65	25
				20	65	65	25
Size S2	115	3	-	25	65	65	25
	200	7 1/2	15	32	65	65	25
FLA[2] max. 50 A,600 V	230	10	20	40	65	65	25
NEMA Size 2	460	-	40	45	65	65	25
	575/600	-	50	50	65	65	25
3RV10 4.				16	65	65	30
				20	65	65	30
Size S3	115	10	-	25	65	65	30
	200	20	30	32	65	65	30
FLA[2] max. 100 A, 480 V	230	20	40	40	65	65	30
75 A, 600 V	460	-	75	50	65	65	30
NEMA Size 3	575/600	-	75	63	65	65	30
				75	65	65	30
				90	65	65	-
				100	65	65	-

1) hp rating = Power rating in horse power (maximum motor rating).

2) FLA = Full Load Amps/Motor full load current.

3) Complies with "short-circuit breaking capacity" to UL.

General data

3RV10 circuit-breaker as "Self-Protected Combination Motor Controller (Type E)"

As of 16 July 2001, UL 508 demands a line-side 1-inch air distance and 2-inch creepage distance for "Self-Protected Combination Motor Controller".

Therefore, 3RV10 circuit-breakers of size S0 and S3 are approved to UL 508 in combination with the terminal blocks listed below.

The basic unit of 3RV10 circuit-breaker in size S2 conforms with the required air/creepage distances.

CSA does not demand these extended air/creepage distances. According to CSA, these terminal blocks can be omitted when the device is used as "Self-Protected Combination Motor Controller".

The 3RV10 motor protection circuit-breakers are approved as "Self-Protected Combination Motor Controller" under the following file numbers:
UL File No. E156943, Product Class NKJH,
CSA Master Contract 165071, Product Class 3211 08.

Circuit-breaker		hp rating[1] for FLA[2] max.		Rated current I_n	up to AC 240 V		up to AC 480 Y/277 V		up to AC 600 Y/347 V	
					UL I_{cc}[3]	CSA I_{cc}[3]	UL I_{cc}[3]	CSA I_{cc}[3]	UL I_{cc}[3]	CSA I_{cc}[3]
Type	V	single-phase	three-phase	A	kA	kA	kA	kA	kA	kA
3RV10 21				0.16 ... 1.6	65	50	65	50	30	30
+ 3RV19 28-1H[4]				2	65	50	65	50	30	30
	115	2	-	2.5	65	50	65	50	30	30
Size S0	200	3	7 1/2	3.2	65	50	65	50	30	30
	230	3	7 1/2	4	65	50	65	50	30	30
FLA[2] max. 22 A, 480 V	460	-	15	5	65	50	65	50	30	30
12.5 A, 600 V	575/600	-	10	6.3	65	50	65	50	30	30
				8	65	50	65	50	30	30
NEMA Size 1				10	65	50	65	50	30	30
				12.5	65	50	65	50	30	30
				16	65	50	65	50	-	-
				20	65	50	65	50	-	-
				22	65	50	65	50	-	-
3RV10 31				16	65	50	65	50	25	25
				20	65	50	65	50	25	25
Size S2	115	3	-	25	65	50	65	50	25	25
	200	7 1/2	15	32	65	50	65	50	25	25
FLA[2] max. 50 A,600 V	230	10	20	40	65	50	65	50	25	25
	460	-	40	45	65	50	65	50	25	25
NEMA Size 2	575/600	-	50	50	65	50	65	50	25	25
3RV10 4.				16	65	50	65	50	30	30
+ 3RT19 46-4GA07[4]				20	65	50	65	50	30	30
	115	10	-	25	65	50	65	50	30	30
Size S3	200	20	30	32	65	50	65	50	30	30
FLA[2] max. 100 A, 480 V	230	20	40	40	65	50	65	50	30	30
75 A, 600 V	460	-	75	50	65	50	65	50	30	30
	575/600	-	75	63	65	50	65	50	30	30
NEMA Size 3				75	65	50	65	50	30	30
				90	65	50	65	50	-	-
				100	65	50	65	50	-	-

1) hp rating = Power rating in horse power (maximum motor rating).
2) FLA = Full Load Amps/Motor full load current.
3) Complies with "short-circuit breaking capacity" to UL/CSA.
4) Not required for CSA.

Ratings of the auxiliary switches and alarm switches

Type		Lateral auxiliary switch with 1 NO + 1 NC, 2 NO, 2 NC, 2 NO + 2 NC and alarm switch	Transverse auxiliary switch with 1 changeover contact	Transverse auxiliary switch with 1 NO + 1 NC, 2 NC
Max. rated voltage				
• to NEMA (UL)	AC V	600		250
• to NEMA (CSA)	AC V	600		250
Continuous current	A	10	5	2.5
Switching capacity		A600	B600	C300
		Q300	R300	R300

Voltage converter circuit-breakers

General technical specifications

Type		3RV16 11-1AG14	3RV16 11-1CG14	3RV16 11-1DG14
Rated current I_n	A	1.4	2.5	3
Ambient temperature				
• Storage/transport	°C	-50 ... + 80		
• Operation	°C	-20 ... + 60 (up to + 70 °C is possible with derating)		
Rated operating voltage U_e	V	400		
Rated frequency	Hz	16 $^2/_3$ ... 60		
Rated insulation voltage U_i	V	690		
Short-circuit breaking capacity I_{cu} at AC 400 V	kA	50		
Set value of the thermal overload release	A	1.4	2.5	3
Operating value of the instantaneous overcurrent release	A	6 ± 20%	10.5 ± 20%	20 ± 20%
Tripping time of the instantaneous overcurrent release	ms	approx. 6 at 12 A	approx. 6 at 20 A	approx. 6 at 40 A
Internal resistance				
• in cold state	Ω	> 0.25 ± 6.5 %		
• in heated state	Ω	> 0.30 ± 6.5 %		
Shock resistance acc. to IEC 60068 Part 2-27	g	15		
Degree of protection acc. to IEC 60529		IP20		
Touch protection acc. to DIN VDE 0106-100		Finger-safe		
Endurance				
• mechanical	Operating cycles	10 000		
• electrical	Operating cycles	10 000		
Permissible mounting position		any		

Conductor cross-sections, main circuit, 1 or 2 conductors

Type		3RV16 11-1AG14	3RV16 11-1CG14	3RV16 11-1DG14
Terminal type		Screw connection		
Terminal screw		Pozidriv size 2		
Solid	mm^2	2 x (0.5 ... 1.5), 2 x (0.75 ... 2.5), max. 4		
Finely stranded with end sleeve	mm^2	2 x (0.5 ... 1.5), 2 x (0.75 ... 2.5)		
Stranded	mm^2	2 x (0.5 ... 1.5), 2 x (0.75 ... 2.5), max. 4		

Auxiliary switches for blocking the distance protection

• with defined lateral assignment for blocking distance protection		1 changeover contact (for use as 1 NO or 1 NC), solid-state compatible		
• Rated operating voltage U_e Alternating voltage	V	250		
• Rated operating current I_e / AC-14 at U_e = 250 V	A	0.5		
• Rated operating current I_e / AC-14 at U_e = 125 V	A	1		
• Rated operating voltage U_e Direct voltage *L/R* 200 ms	V	250		
• Rated operating current I_e / DC-13 at U_e = 250 V	A	0.27		
• Rated operating current I_e / DC-13 at U_e = 125 V	A	0.44		

Short-circuit protection for auxiliary circuit

• Fuse gL/gG	A	10
• Miniature circuit-breaker, C characteristic	A	6 (prospective short-circuit current < 0.4 kA)

Auxiliary switches for other signaling functions

For technical specifications, see "Mountable accessories"

General data

4

Characteristics

The time/current characteristic, the current limiting characteristics and the I^2t characteristics were determined according to IEC 60947.

The tripping characteristic of the inverse-time delayed overload release (thermal overload releases, 'a' releases) for DC and AC with a frequency of 0 Hz to 400 Hz.

The characteristics apply to the cold state; at operating temperature, the tripping times of the thermal releases are reduced to approximately 25 %.

Under normal operating conditions, all three poles of the device must be loaded. The three main conducting paths must be connected in series in order to protect single-phase or DC loads.

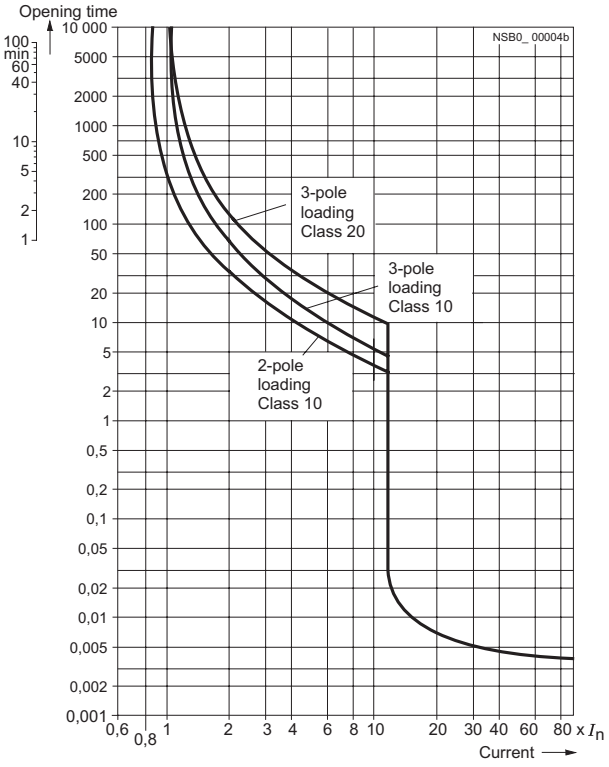
With 2-pole and 3-pole loading, the maximum deviation in the tripping time of 3 times the setting current and upwards is ± 20 % and thus in accordance with VDE 0165.

The tripping characteristics for the instantaneous, electromagnetic overcurrent releases (short-circuit releases, 'n' releases) are based on the rated current I_n that also represents the maximum value of the setting range for circuit-breakers with adjustable overload releases. If the current is set to a lower value, the tripping current of the 'n' release is increased by a corresponding factor.

The characteristics of the electromagnetic overcurrent releases apply to frequencies of 50 Hz/60 Hz. Appropriate correction factors must be used for lower frequencies down to 16 2/3 Hz, for higher frequencies up to 400 Hz and for DC.

The shown characteristic curve for the circuit-breaker relates to a specific setting range. It is, however, also valid as a schematic representation of circuit-breakers with other current ranges.

Time/current characteristics, current limiting characteristics and I^2t curves can be ordered from "Technical Assistance" (e-mail: nst.technical-assistance@siemens.com).

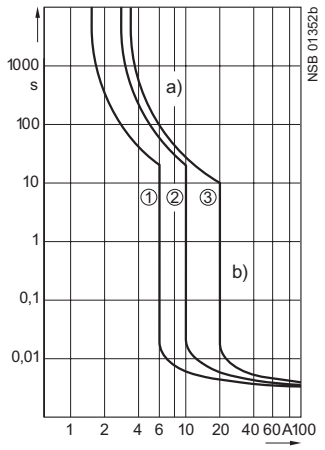


Schematic representation of typical time/current characteristic of 3RV10

3RV16 voltage transformer circuit-breakers up to 3 A

The specified tripping characteristics of the thermal overload release (a) correspond to the mean value of the scatter band in the cold state. At operating temperature, these times are reduced to approximately 25 % of the specified values.

The characteristic curves below are schematic representations. Precise characteristic curves are available from "Technical Assistance" (e-mail: nst.technical-assistance@siemens.com).



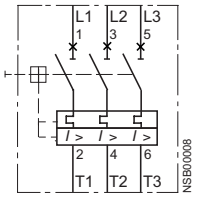
① 1.4 A / 6 A
② 2.5 A / 10.5 A
③ 3 A / 20 A
a) Thermal overload release
b) Instantaneous electromagnetic overcurrent release

Circuit diagrams

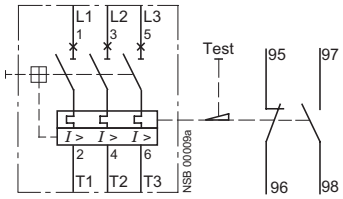
Internal circuit diagrams

Circuit-breakers

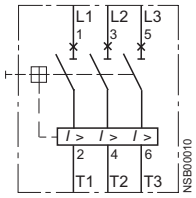
3RV10 ..
3RV14 ..
3RV16 11-0BD10



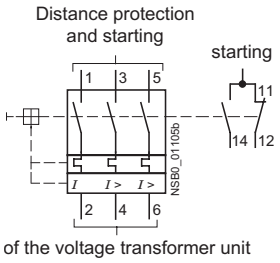
3RV11 ..



3RV13 ..



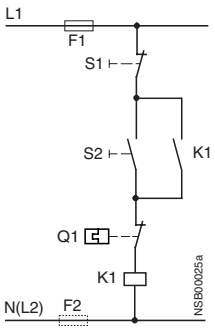
3RV16 voltage transformer circuit-breakers up to 3 A



of the voltage transformer unit

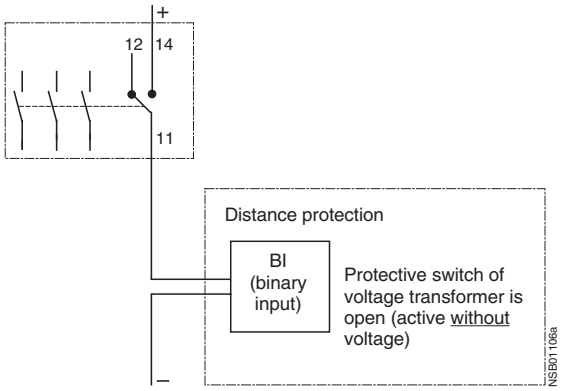
Typical circuits

3RV11 circuit-breaker with overload relay function



S1 OFF pushbutton
S2 ON pushbutton
K1 Latching contact
F1; F2 Fuses gL/gG 6A
Q1 3RV11 circuit-breaker

3RV16 voltage transformer circuit-breakers up to 3 A



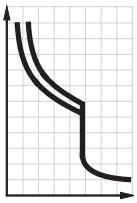
Note:

When using the NC contact to connect the voltage transformer circuit-breaker, the binary input of the distance protection device (Siemens 7 SA xxx) should be set to "active without voltage". This type of connection is used for additional monitoring of correct wiring.

For motor protection

Selection and ordering data

Class 10, without/with auxiliary switch



Rated current	Suitable for three-phase induction motors[1] with P	Current setting range for thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at AC 400 V	DT	**Screw connection**	PS*	Weight per PU approx.[2]	DT	**Cage Clamp connection**	PS*	Weight per PU approx.[2]
I_n		⊏	I >	I_{cu}		Order No.				Order No.		
A	kW	A	A	kA				kg				kg
Size S00												
0.16	0.04	0.11 ... 0.16	2.1	100	▶	**3RV10 11-0AA1☐**	1 unit	0.245	▶	**3RV10 11-0AA2☐**	1 unit	0.253
0.2	0.06	0.14 ... 0.2	2.6	100	▶	**3RV10 11-0BA1☐**	1 unit	0.246	▶	**3RV10 11-0BA2☐**	1 unit	0.254
0.25	0.06	0.18 ... 0.25	3.3	100	▶	**3RV10 11-0CA1☐**	1 unit	0.246	▶	**3RV10 11-0CA2☐**	1 unit	0.254
0.32	0.09	0.22 ... 0.32	4.2	100	▶	**3RV10 11-0DA1☐**	1 unit	0.247	▶	**3RV10 11-0DA2☐**	1 unit	0.254
0.4	0.09	0.28 ... 0.4	5.2	100	▶	**3RV10 11-0EA1☐**	1 unit	0.250	▶	**3RV10 11-0EA2☐**	1 unit	0.256
0.5	0.12	0.35 .. .0.5	6.5	100	▶	**3RV10 11-0FA1☐**	1 unit	0.247	▶	**3RV10 11-0FA2☐**	1 unit	0.252
0.63	0.18	0.45 ... 0.63	8.2	100	▶	**3RV10 11-0GA1☐**	1 unit	0.249	▶	**3RV10 11-0GA2☐**	1 unit	0.254
0.8	0.18	0.5 5... 0.8	10	100	▶	**3RV10 11-0HA1☐**	1 unit	0.250	▶	**3RV10 11-0HA2☐**	1 unit	0.257
1	0.25	0.7 ... 1	13	100	▶	**3RV10 11-0JA1☐**	1 unit	0.249	▶	**3RV10 11-0JA2☐**	1 unit	0.255
1.25	0.37	0.9 ... 1.25	16	100	▶	**3RV10 11-0KA1☐**	1 unit	0.297	▶	**3RV10 11-0KA2☐**	1 unit	0.301
1.6	0.55	1.1 ... 1.6	21	100	▶	**3RV10 11-1AA1☐**	1 unit	0.298	▶	**3RV10 11-1AA2☐**	1 unit	0.303
2	0.75	1.4 ... 2	26	100	▶	**3RV10 11-1BA1☐**	1 unit	0.297	▶	**3RV10 11-1BA2☐**	1 unit	0.302
2.5	0.75	1.8 ... 2.5	33	100	▶	**3RV10 11-1CA1☐**	1 unit	0.298	▶	**3RV10 11-1CA2☐**	1 unit	0.304
3.2	1.1	2.2 ... 3.2	42	100	▶	**3RV10 11-1DA1☐**	1 unit	0.299	▶	**3RV10 11-1DA2☐**	1 unit	0.305
4	1.5	2.8 ... 4	52	100	▶	**3RV10 11-1EA1☐**	1 unit	0.296	▶	**3RV10 11-1EA2☐**	1 unit	0.304
5	1.5	3.5 ... 5	65	100	▶	**3RV10 11-1FA1☐**	1 unit	0.301	▶	**3RV10 11-1FA2☐**	1 unit	0.306
6.3	2.2	4.5 ... 6.3	82	100	▶	**3RV10 11-1GA1☐**	1 unit	0.303	▶	**3RV10 11-1GA2☐**	1 unit	0.308
8	3	5.5 ... 8	104	50	▶	**3RV10 11-1HA1☐**	1 unit	0.304	▶	**3RV10 11-1HA2☐**	1 unit	0.310
10	4	7 ... 10	130	50	▶	**3RV10 11-1JA1☐**	1 unit	0.300	▶	**3RV10 11-1JA2☐**	1 unit	0.306
12	5.5	9 ... 12	156	50	▶	**3RV10 11-1KA1☐**	1 unit	0.297	▶	**3RV10 11-1KA2☐**	1 unit	0.302
Size S0												
0.16	0.04	0.11 ... 0.16	2.1	100	▶	**3RV10 21-0AA1☐**	1 unit	0.300		-		
0.2	0.06	0.14 ... 0.2	2.6	100	▶	**3RV10 21-0BA1☐**	1 unit	0.304		-		
0.25	0.06	0.18 ... 0.25	3.3	100	▶	**3RV10 21-0CA1☐**	1 unit	0.302		-		
0.32	0.09	0.22 ... 0.32	4.2	100	▶	**3RV10 21-0DA1☐**	1 unit	0.303		-		
0.4	0.09	0.28 ... 0.4	5.2	100	▶	**3RV10 21-0EA1☐**	1 unit	0.303		-		
0.5	0.12	0.35 ... 0.5	6.5	100	▶	**3RV10 21-0FA1☐**	1 unit	0.304		-		
0.63	0.18	0.45 ... 0.63	8.2	100	▶	**3RV10 21-0GA1☐**	1 unit	0.366		-		
0.8	0.18	0.55 ... 0.8	10	100	▶	**3RV10 21-0HA1☐**	1 unit	0.367		-		
1	0.25	0.7 ... 1	13	100	▶	**3RV10 21-0JA1☐**	1 unit	0.368		-		
1.25	0.37	0.9 ... 1.25	16	100	▶	**3RV10 21-0KA1☐**	1 unit	0.369		-		
1.6	0.55	1.1 ... 1.6	21	100	▶	**3RV10 21-1AA1☐**	1 unit	0.371		-		
2	0.75	1.4 ... 2	26	100	▶	**3RV10 21-1BA1☐**	1 unit	0.371		-		
2.5	0.75	1.8 ... 2.5	33	100	▶	**3RV10 21-1CA1☐**	1 unit	0.372		-		
3.2	1.1	2.2 ... 3.2	42	100	▶	**3RV10 21-1DA1☐**	1 unit	0.375		-		
4	1.5	2.8 ... 4	52	100	▶	**3RV10 21-1EA1☐**	1 unit	0.370		-		
5	1.5	3.5 ... 5	65	100	▶	**3RV10 21-1FA1☐**	1 unit	0.376		-		
6.3	2.2	4.5 ... 6.3	82	100	▶	**3RV10 21-1GA1☐**	1 unit	0.374		-		
8	3	5.5 ... 8	104	100	▶	**3RV10 21-1HA1☐**	1 unit	0.374		-		
10	4	7 ... 10	130	100	▶	**3RV10 21-1JA1☐**	1 unit	0.375		-		
12.5	5.5	9 ... 12.5	163	100	▶	**3RV10 21-1KA1☐**	1 unit	0.374		-		
16	7.5	11 ... 16	208	50	▶	**3RV10 21-4AA1☐**	1 unit	0.382		-		
20	7.5	14 ... 20	260	50	▶	**3RV10 21-4BA1☐**	1 unit	0.376		-		
22	11	17...22	286	50	▶	**3RV10 21-4CA1☐**	1 unit	0.378		-		
25	11	20...25	325	50	▶	**3RV10 21-4DA1☐**	1 unit	0.382		-		
Order No. supplement for transverse auxiliary switch												
without					▶	**0**			▶	**0**		
1 NO + 1 NC					▶	**5**			B	**5**		

1) Recommended values for standard 4-pole motors at AC 50 Hz 400 V. The actual start-up data and ratings for the motor to be protected are relevant.

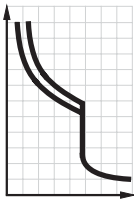
2) Weights are specified for the variant with auxiliary switch.

Auxiliary switches can also be ordered separately (see "Mountable accessories").

For multi-unit packing and reusable packaging, see "Appendix".

*** This quantity or a multiple thereof can be ordered.**

Class 10, without auxiliary switch



Rated current	Suitable for three-phase induction motors[1] with P	Current setting range Thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at AC 400 V	DT	Screw connection	PS*	Weight per PU approx.
I_n		⊏	I >	I_{cu}		Order No.		
A	kW	A	A	kA				kg
Size S2								
16	7.5	11 ... 16	208	50	▶	**3RV10 31-4AA10**	1 unit	1.040
20	7.5	14 ... 20	260	50	▶	**3RV10 31-4BA10**	1 unit	1.040
25	11	18 ... 25	325	50	▶	**3RV10 31-4DA10**	1 unit	1.030
32	15	22 ... 32	416	50	▶	**3RV10 31-4EA10**	1 unit	1.020
40	18.5	28 ... 40	520	50	▶	**3RV10 31-4FA10**	1 unit	1.040
45	22	36 ... 45	585	50	▶	**3RV10 31-4GA10**	1 unit	1.030
50	22	40 ... 50	650	50	▶	**3RV10 31-4HA10**	1 unit	1.020
Size S3								
40	18.5	28 ... 40	520	50	▶	**3RV10 41-4FA10**	1 unit	2.210
50	22	36 ... 50	650	50	▶	**3RV10 41-4HA10**	1 unit	2.240
63	30	45 ... 63	819	50	▶	**3RV10 41-4JA10**	1 unit	2.240
75	37	57 ... 75	975	50	▶	**3RV10 41-4KA10**	1 unit	2.250
90	45	70 ... 90	1170	50	▶	**3RV10 41-4LA10**	1 unit	2.280
100	45	80 ... 100	1235	50	▶	**3RV10 41-4MA10**	1 unit	2.290
Size S3, with increased switching capacity								
16	7.5	11 ... 16	208	100	▶	**3RV10 42-4AA10**	1 unit	2.170
20	7.5	14 ... 20	260	100	▶	**3RV10 42-4BA10**	1 unit	2.180
25	11	18 ... 25	325	100	▶	**3RV10 42-4DA10**	1 unit	2.210
32	15	22 ... 32	416	100	▶	**3RV10 42-4EA10**	1 unit	2.210
40	18.5	28 ... 40	520	100	▶	**3RV10 42-4FA10**	1 unit	2.200
50	22	36 ... 50	650	100	▶	**3RV10 42-4HA10**	1 unit	2.230
63	30	45 ... 63	819	100	▶	**3RV10 42-4JA10**	1 unit	2.250
75	37	57 ... 75	975	100	▶	**3RV10 42-4KA10**	1 unit	2.260
90	45	70 ... 90	1170	100	▶	**3RV10 42-4LA10**	1 unit	2.280
100	45	80 ... 100	1235	100	▶	**3RV10 42-4MA10**	1 unit	2.270

Class 20, without auxiliary switch

Size S2								
16	7.5	11 ... 16	208	50	A	**3RV10 31-4AB10**	1 unit	1.060
20	7.5	14 ... 20	260	50	A	**3RV10 31-4BB10**	1 unit	1.070
25	11	18 ... 25	325	50	A	**3RV10 31-4DB10**	1 unit	1.050
32	15	22 ... 32	416	50	A	**3RV10 31-4EB10**	1 unit	1.060
40	18.5	28 ... 40	520	50	A	**3RV10 31-4FB10**	1 unit	1.070
45	22	36 ... 45	585	50	A	**3RV10 31-4GB10**	1 unit	1.070
50	22	40 ... 50	650	50	A	**3RV10 31-4HB10**	1 unit	1.070
Size S3, with increased switching capacity								
40	18.5	28 ... 40	520	100	A	**3RV10 42-4FB10**	1 unit	2.220
50	22	36 ... 50	650	100	A	**3RV10 42-4HB10**	1 unit	2.260
63	30	45 ... 63	819	100	A	**3RV10 42-4JB10**	1 unit	2.270
75	37	57 ... 75	975	100	A	**3RV10 42-4KB10**	1 unit	2.260
90	45	70 ... 90	1170	100	A	**3RV10 42-4LB10**	1 unit	2.310
100	45	80 ... 100	1235	100	A	**3RV10 42-4MB10**	1 unit	2.320

1) Recommended values for standard 4-pole motors at AC 50 Hz 400 V. The actual start-up data and ratings for the motor to be protected are relevant.

Auxiliary switches can be ordered separately (see "Mountable accessories").

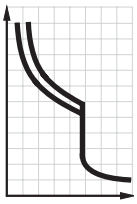
Multi-unit/reusable packaging, see "Appendix".

*** This quantity or a multiple thereof can be ordered.**

For motor protection with overload relay function

Selection and ordering data

CLASS 10, with overload relay function (automatic reset), without auxiliary switch



Rated current	Suitable for three-phase induction motors[1] with P	Current setting range Thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at AC 400 V	DT	Screw connection	PS*	Weight per PU approx.
I_n		⊏	I >	I_{cu}		Order No.		
A	kW	A	A	kA				kg
Size S0[2]								
0.16	0.04	0.11 ... 0.16	2.1	100	A	**3RV11 21-0AA10**	1 unit	0.354
0.2	0.06	0.14 ... 0.2	2.6	100	A	**3RV11 21-0BA10**	1 unit	0.358
0.25	0.06	0.18 ... 0.25	3.3	100	A	**3RV11 21-0CA10**	1 unit	0.352
0.32	0.09	0.22 ... 0.32	4.2	100	A	**3RV11 21-0DA10**	1 unit	0.352
0.4	0.09	0.28 ... 0.4	5.2	100	A	**3RV11 21-0EA10**	1 unit	0.355
0.5	0.12	0.35 ... 0.5	6.5	100	A	**3RV11 21-0FA10**	1 unit	0.356
0.63	0.18	0.45 ... 0.63	8.2	100	A	**3RV11 21-0GA10**	1 unit	0.423
0.8	0.18	0.55 ... 0.8	10	100	A	**3RV11 21-0HA10**	1 unit	0.421
1	0.25	0.7 ... 1	13	100	A	**3RV11 21-0JA10**	1 unit	0.416
1.25	0.37	0.9 ... 1.25	16	100	A	**3RV11 21-0KA10**	1 unit	0.426
1.6	0.55	1.1 ... 1.6	21	100	A	**3RV11 21-1AA10**	1 unit	0.422
2	0.75	1.4 ... 2	26	100	A	**3RV11 21-1BA10**	1 unit	0.427
2.5	0.75	1.8 ... 2.5	33	100	A	**3RV11 21-1CA10**	1 unit	0.422
3.2	1.1	2.2 ... 3.2	42	100	A	**3RV11 21-1DA10**	1 unit	0.428
4	1.5	2.8 ... 4	52	100	A	**3RV11 21-1EA10**	1 unit	0.420
5	1.5	3.5 ... 5	65	100	A	**3RV11 21-1FA10**	1 unit	0.429
6.3	2.2	4.5 ... 6.3	82	100	A	**3RV11 21-1GA10**	1 unit	0.426
8	3	5.5 ... 8	104	100	A	**3RV11 21-1HA10**	1 unit	0.425
10	4	7 ... 10	130	100	A	**3RV11 21-1JA10**	1 unit	0.428
12.5	5.5	9 ... 12.5	163	100	A	**3RV11 21-1KA10**	1 unit	0.426
16	7.5	11 ... 16	208	50	A	**3RV11 21-4AA10**	1 unit	0.436
20	7.5	14 ... 20	260	50	A	**3RV11 21-4BA10**	1 unit	0.430
22	11	17 ... 22	286	50	A	**3RV11 21-4CA10**	1 unit	0.427
25	11	20 ... 25	325	50	A	**3RV11 21-4DA10**	1 unit	0.432
Size S2[2]								
16	7.5	11 ... 16	208	50	A	**3RV11 31-4AA10**	1 unit	1.120
20	7.5	14 ... 20	260	50	A	**3RV11 31-4BA10**	1 unit	1.130
25	11	18 ... 25	325	50	A	**3RV11 31-4DA10**	1 unit	1.110
32	15	22 ... 32	416	50	A	**3RV11 31-4EA10**	1 unit	1.110
40	18.5	28 ... 40	520	50	A	**3RV11 31-4FA10**	1 unit	1.120
45	22	36 ... 45	585	50	A	**3RV11 31-4GA10**	1 unit	1.130
50	22	40 ... 50	650	50	A	**3RV11 31-4HA10**	1 unit	1.100
Size S3, with increased switching capacity[2]								
16	7.5	11 ... 16	208	100	A	**3RV11 42-4AA10**	1 unit	2.240
20	7.5	14 ... 20	260	100	A	**3RV11 42-4BA10**	1 unit	2.250
25	11	18 ... 25	325	100	A	**3RV11 42-4DA10**	1 unit	2.280
32	15	22 ... 32	416	100	A	**3RV11 42-4EA10**	1 unit	2.290
40	18.5	28 ... 40	520	100	A	**3RV11 42-4FA10**	1 unit	2.280
50	22	36 ... 50	650	100	A	**3RV11 42-4HA10**	1 unit	2.320
63	30	45 ... 63	819	100	A	**3RV11 42-4JA10**	1 unit	2.330
75	37	57 ... 75	975	100	A	**3RV11 42-4KA10**	1 unit	2.360
90	45	70 ... 90	1170	100	A	**3RV11 42-4LA10**	1 unit	2.350
100	45	80 ... 100	1235	100	A	**3RV11 42-4MA10**	1 unit	2.340

1) Recommended values for standard 4-pole motors at AC 50 Hz 400 V. The actual start-up data and ratings for the motor to be protected are relevant.

2) Accessories for mounting on the right (for series S0 to S3) and 3RV19 15 three-phase busbars (for size S0) cannot be used.

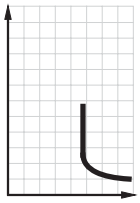
Auxiliary switches can be ordered separately (see "Mountable accessories").

Multi-unit/reusable packaging, see "Appendix".

*** This quantity or a multiple thereof can be ordered.**

Selection and ordering data

Without auxiliary switch



Rated current	Suitable for three-phase induction motors[1] with P	Current setting range Thermal overload release[2]	Instantaneous overcurrent release	Short-circuit breaking capacity at AC 400 V	DT	Screw connection	PS*	Weight per PU approx.
I_n			$I >$	I_{cu}		Order No.		
A	kW	A	A	kA				kg
Size S0								
0.16	0.04	without	2.1	100	A	**3RV13 21-0AC10**	1 unit	0.282
0.2	0.06	without	2.6	100	A	**3RV13 21-0BC10**	1 unit	0.284
0.25	0.06	without	3.3	100	A	**3RV13 21-0CC10**	1 unit	0.285
0.32	0.09	without	4.2	100	A	**3RV13 21-0DC10**	1 unit	0.282
0.4	0.09	without	5.2	100	A	**3RV13 21-0EC10**	1 unit	0.286
0.5	0.12	without	6.5	100	A	**3RV13 21-0FC10**	1 unit	0.283
0.63	0.18	without	8.2	100	A	**3RV13 21-0GC10**	1 unit	0.348
0.8	0.18	without	10	100	A	**3RV13 21-0HC10**	1 unit	0.347
1	0.25	without	13	100	A	**3RV13 21-0JC10**	1 unit	0.345
1.25	0.37	without	16	100	A	**3RV13 21-0KC10**	1 unit	0.351
1.6	0.55	without	21	100	A	**3RV13 21-1AC10**	1 unit	0.352
2	0.75	without	26	100	A	**3RV13 21-1BC10**	1 unit	0.352
2.5	0.75	without	33	100	A	**3RV13 21-1CC10**	1 unit	0.352
3.2	1.1	without	42	100	A	**3RV13 21-1DC10**	1 unit	0.353
4	1.5	without	52	100	A	**3RV13 21-1EC10**	1 unit	0.349
5	1.5	without	65	100	A	**3RV13 21-1FC10**	1 unit	0.354
6.3	2.2	without	82	100	A	**3RV13 21-1GC10**	1 unit	0.355
8	3	without	104	100	A	**3RV13 21-1HC10**	1 unit	0.354
10	4	without	130	100	A	**3RV13 21-1JC10**	1 unit	0.357
12.5	5.5	without	163	100	A	**3RV13 21-1KC10**	1 unit	0.354
16	7.5	without	208	50	A	**3RV13 21-4AC10**	1 unit	0.362
20	7.5	without	260	50	A	**3RV13 21-4BC10**	1 unit	0.357
22	11	without	286	50	A	**3RV13 21-4CC10**	1 unit	0.358
25	11	without	325	50	A	**3RV13 21-4DC10**	1 unit	0.359
Size S2								
16	7.5	without	208	50	A	**3RV13 31-4AC10**	1 unit	1.030
20	7.5	without	260	50	A	**3RV13 31-4BC10**	1 unit	1.030
25	11	without	325	50	A	**3RV13 31-4DC10**	1 unit	1.010
32	15	without	416	50	A	**3RV13 31-4EC10**	1 unit	1.010
40	18.5	without	520	50	A	**3RV13 31-4FC10**	1 unit	1.030
45	22	without	585	50	A	**3RV13 31-4GC10**	1 unit	1.040
50	22	without	650	50	A	**3RV13 31-4HC10**	1 unit	1.010
Size S3								
40	18.5	without	520	50	A	**3RV13 41-4FC10**	1 unit	2.190
50	22	without	650	50	A	**3RV13 41-4HC10**	1 unit	2.220
63	30	without	819	50	A	**3RV13 41-4JC10**	1 unit	2.240
75	37	without	975	50	A	**3RV13 41-4KC10**	1 unit	2.240
90	45	without	1170	50	A	**3RV13 41-4LC10**	1 unit	2.260
100	45	without	1235	50	A	**3RV13 41-4MC10**	1 unit	2.290
Size S3, with increased switching capacity								
16	7.5	without	208	100	A	**3RV13 42-4AC10**	1 unit	2.170
20	7.5	without	260	100	A	**3RV13 42-4BC10**	1 unit	2.180
25	11	without	325	100	A	**3RV13 42-4DC10**	1 unit	2.210
32	15	without	416	100	A	**3RV13 42-4EC10**	1 unit	2.200
40	18.5	without	520	100	A	**3RV13 42-4FC10**	1 unit	2.210
50	22	without	650	100	A	**3RV13 42-4HC10**	1 unit	2.210
63	30	without	819	100	A	**3RV13 42-4JC10**	1 unit	2.240
75	37	without	975	100	A	**3RV13 42-4KC10**	1 unit	2.270
90	45	without	1170	100	A	**3RV13 42-4LC10**	1 unit	2.260
100	45	without	1235	100	A	**3RV13 42-4MC10**	1 unit	2.290

1) Recommended values for standard 4-pole motors at AC 50 Hz 400 V. The actual start-up data and ratings for the motor to be protected are relevant.

2) For overload protection of the motors, appropriate overload relays must be used.

Auxiliary switches can be ordered separately (see "Mountable accessories").

Multi-unit/reusable packaging, see "Appendix".

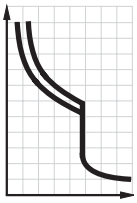
*** This quantity or a multiple thereof can be ordered.**

For protection of transformers

Selection and ordering data

Class 10, without auxiliary switch

Circuit-breakers for the protection of transformers with high in-rush current.



Rated current	Current setting range Thermal overload release	Instanta-neous over-current release	Short-circuit breaking capacity at AC 400 V	DT	**Screw connection**	PS*	Weight per PU approx.
I_n	⊏	$I >$	I_{cu}		Order No.		
A	A	A	kA				kg
Size S0							
0.16	0.11 ... 0.16	3.3	100	▶	**3RV14 21-0AA10**	1 unit	0.286
0.2	0.14 ... 0.2	4.2	100	▶	**3RV14 21-0BA10**	1 unit	0.287
0.25	0.18 ... 0.25	5.2	100	▶	**3RV14 21-0CA10**	1 unit	0.286
0.32	0.22 ... 0.32	6.5	100	▶	**3RV14 21-0DA10**	1 unit	0.288
0.4	0.28 ... 0.4	8.2	100	▶	**3RV14 21-0EA10**	1 unit	0.287
0.5	0.35 ... 0.5	10	100	▶	**3RV14 21-0FA10**	1 unit	0.286
0.63	0.45 ... 0.63	13	100	▶	**3RV14 21-0GA10**	1 unit	0.348
0.8	0.55 ... 0.8	16	100	▶	**3RV14 21-0HA10**	1 unit	0.352
1	0.7 ... 1	21	100	▶	**3RV14 21-0JA10**	1 unit	0.353
1.25	0.9 ... 1.25	26	100	▶	**3RV14 21-0KA10**	1 unit	0.354
1.6	1.1 ... 1.6	33	100	▶	**3RV14 21-1AA10**	1 unit	0.353
2	1.4 ... 2	42	100	▶	**3RV14 21-1BA10**	1 unit	0.358
2.5	1.8 ... 2.5	52	100	▶	**3RV14 21-1CA10**	1 unit	0.354
3.2	2.2 ... 3.2	65	100	▶	**3RV14 21-1DA10**	1 unit	0.358
4	2.8 ... 4	82	100	▶	**3RV14 21-1EA10**	1 unit	0.354
5	3.5 ... 5	104	100	▶	**3RV14 21-1FA10**	1 unit	0.357
6.3	4.5 ... 6.3	130	100	▶	**3RV14 21-1GA10**	1 unit	0.356
8	5.5 ... 8	163	100	▶	**3RV14 21-1HA10**	1 unit	0.358
10	7 ... 10	208	100	▶	**3RV14 21-1JA10**	1 unit	0.362
12.5	9 ... 12.5	260	100	▶	**3RV14 21-1KA10**	1 unit	0.360
16	11 ... 16	286	50	▶	**3RV14 21-4AA10**	1 unit	0.365
20	14 ... 20	325	50	▶	**3RV14 21-4BA10**	1 unit	0.365
Size S2							
16	11 ... 16	325	50	▶	**3RV14 31-4AA10**	1 unit	1.020
20	14 ... 20	416	50	▶	**3RV14 31-4BA10**	1 unit	1.030
25	18 ... 25	520	50	▶	**3RV14 31-4DA10**	1 unit	1.030
32	22 ... 32	660	50	▶	**3RV14 31-4EA10**	1 unit	1.020
40	28 ... 40	836	50	▶	**3RV14 31-4FA10**	1 unit	1.030

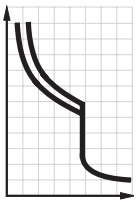
Auxiliary switches can be ordered separately (see "Mountable accessories").

Multi-unit/reusable packaging, see "Appendix".

*** This quantity or a multiple thereof can be ordered.**

Selection and ordering data

Without auxiliary switch



	Rated current	Thermal overload release	Instantaneous overload release	Short-circuit breaking capacity at AC 400 V	DT	Screw connection	PS*	Weight per PU approx.
	I_n		I >	I_{cu}		Order No.		
	A	A	A	kA				kg
Size S00								
	0.2	0.2	1.2	100	▶	**3RV16 11-0BD10**	1 unit	0.289

Multi-unit/reusable packaging, see "Appendix".

The auxiliary release required for signaling can be ordered separately.

	Type	Version	DT	Order No.	PS*	Weight per PU approx.
						kg
Mountable auxiliary switches						
 3RV19 01-1E	**Transverse auxiliary switch** with screw connection	1 NO + 1 NC	▶	**3RV19 01-1E**	1 unit	0.018
 3RV19 01-1A	**Lateral auxiliary switch** with screw connection	1 NO + 1 NC	▶	**3RV19 01-1A**	1 unit	0.045

For further auxiliary switches, see "Mountable accessories".

*** This quantity or a multiple thereof can be ordered.**

For distance protection

Selection and ordering data

Voltage transformer circuit-breaker with auxiliary switch

Rated current	Thermal overload release	Instantaneous overcurrent release	Auxiliary switch integrated in the switch, transverse	Short-circuit breaking capacity at AC 400 V	DT	Screw connection	PS*	Weight per PU approx.
I_n	⊏	$I >$		I_{cu}		Order No.		
A	A	A		kA				kg
Size S00								
1.4	1.4	6	1 CO	50	B	**3RV16 11-1AG14**	1 unit	0.314
2.5	2.5	10.5	1 CO	50	B	**3RV16 11-1CG14**	1 unit	0.318
3	3	20	1 CO	50	B	**3RV16 11-1DG14**	1 unit	0.315

Type	Version	DT	Order No.	PS*	Weight per PU approx.
					kg
Laterally mountable auxiliary switches for other signaling purposes					
Lateral auxiliary switch[1)]	1 NO + 1 NC	►	**3RV19 01-1A**	1 unit	0.045

3RV19 01-1A

1) For further lateral auxiliary switches, see "Mountable accessories".

Further information

Conversion of voltage transformer circuit-breakers 3VU13 to 3RV1

The previous version of the 3VU13 voltage circuit-breakers are no longer available.

The 3RV1 voltage transformer circuit-breakers will be offered as replacement types.

Previous type	Replacement type
3VU13 11-6HR00 ➔	3RV16 11-1CG14
3VU13 21-6HR00 ➔	3RV16 11-1CG14 + 3RV19 01-1A
3VU13 11-6JR00 ➔	3RV16 11-1DG14

*** This quantity or a multiple thereof can be ordered.**

Overview

Mounting location and function

The 3RV1 circuit-breakers have three main contact elements. In order to achieve maximum flexibility, auxiliary switches, alarm switches, auxiliary releases and isolator modules can be supplied separately.

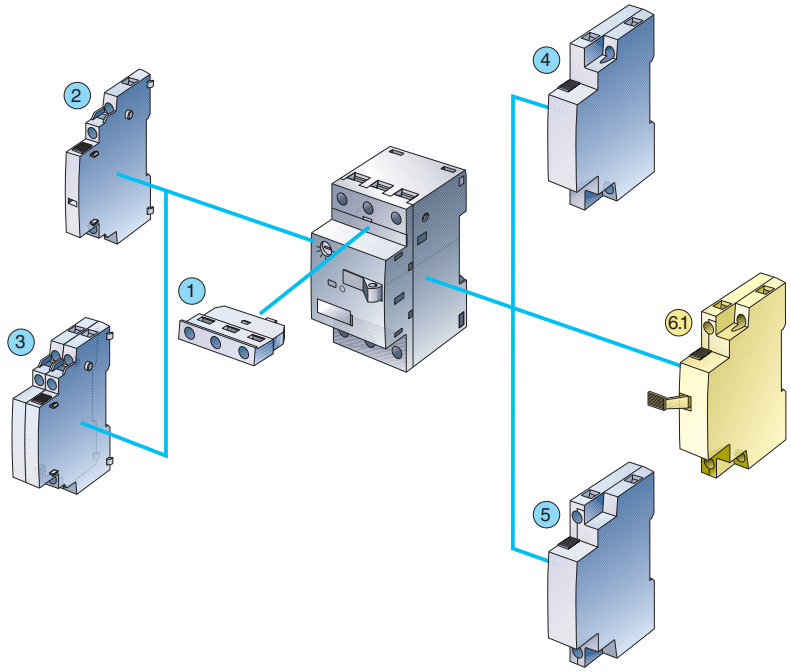
These components can be fitted as required on the switches without using tools.

Front *Note:* *A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each circuit-breaker.*	**Transverse auxiliary switch** 1 NO + 1 NC or 2 NO or 1 changeover contact	An auxiliary contact block can be inserted transversely on the front. The overall width of the circuit-breakers remains unchanged.29
Left-hand side	**Lateral auxiliary switch (2 contacts)** 1 NO + 1 NC or 2 NO or 2 NC	One of the three auxiliary switches can be mounted laterally for each circuit-breaker. The contacts of the auxiliary switch close and open together with the main contacts of the circuit-breaker. The overall width of the lateral auxiliary switch with 2 contacts is 9 mm.
	Lateral auxiliary switch (4 contacts) 2 NO + 2 NC	One auxiliary switch can be mounted laterally for each circuit-breaker. The contacts of the auxiliary switch close and open together with the main contacts of the circuit-breaker. The overall width of the lateral auxiliary switch with 4 contacts is 18 mm.
Notes: • *Auxiliary switches (2 contacts) and alarm switches can be mounted separately or together.* • *A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each circuit-breaker.*	**Alarm switch for sizes S0, S2 and S3** Trip 1 NO + 1 NC Short-circuit 1 NO + 1 NC	One alarm switch can be mounted at the side of each circuit-breaker with a rotary operating mechanism. The alarm switch has two contact systems. One contact system always signals tripping irrespective of whether this was caused by a short-circuit, an overload or an auxiliary release. The other contact system only switches in the event of a short circuit. There is no signaling as a result of switching off with the handle. In order to be able to switch on the circuit-breaker again after a short-circuit, the alarm switch must be reset manually after the error cause has been eliminated. The overall width of the alarm switch is 18 mm.
Right-hand side	**Shunt release**	For remote-controlled tripping of the circuit-breaker. The release coil should only be energized for short periods (see circuit diagrams).
	or	
	Undervoltage release	Trips the circuit-breaker when the voltage is interrupted and prevents the motor from being restarted accidentally when the voltage is restored. Used for remote-controlled tripping of the circuit-breaker. Particularly suitable for EMERGENCY-STOP disconnection via the appropriate EMERGENCY-STOP button in accordance with IEC 60204-1.
	or	
Notes: • *One auxiliary release can be mounted per circuit-breaker.* • *Accessories cannot be mounted at the right-hand side of the 3RV11 circuit-breakers with overload relay function.*	**Undervoltage release with leading auxiliary contacts** (2 NO)	Function and use as for the undervoltage release without leading auxiliary contacts, but with the following additional function: The auxiliary contacts will open in switch position OFF to deenergize the coil of the undervoltage release, thus interrupting power consumption. In the "tripped" position of the breaker, these auxiliary contacts are not guaranteed to open. The leading contacts permit the circuit-breaker to reclose. The overall width of the auxiliary release is 18 mm.
Top *Note:* *The isolator module covers the terminal screws of the transverse auxiliary switch. If the isolator module is used, we therefore recommend that either the lateral auxiliary switches be fitted or that the isolator module not be mounted until the auxiliary switch has been wired.*	**Isolator modules for circuit-breakers** Size S0 and S2	Isolator modules can be mounted to the upper terminal end of circuit-breakers of sizes S0 and S2. The supply cable is connected to the circuit-breaker via the isolator module. The plug can only be unplugged when the circuit-breaker is open and isolates all 3 poles of the circuit-breaker from the network. The shock-protected isolation point is clearly visible and secured with a padlock to prevent reinsertion of the plug.

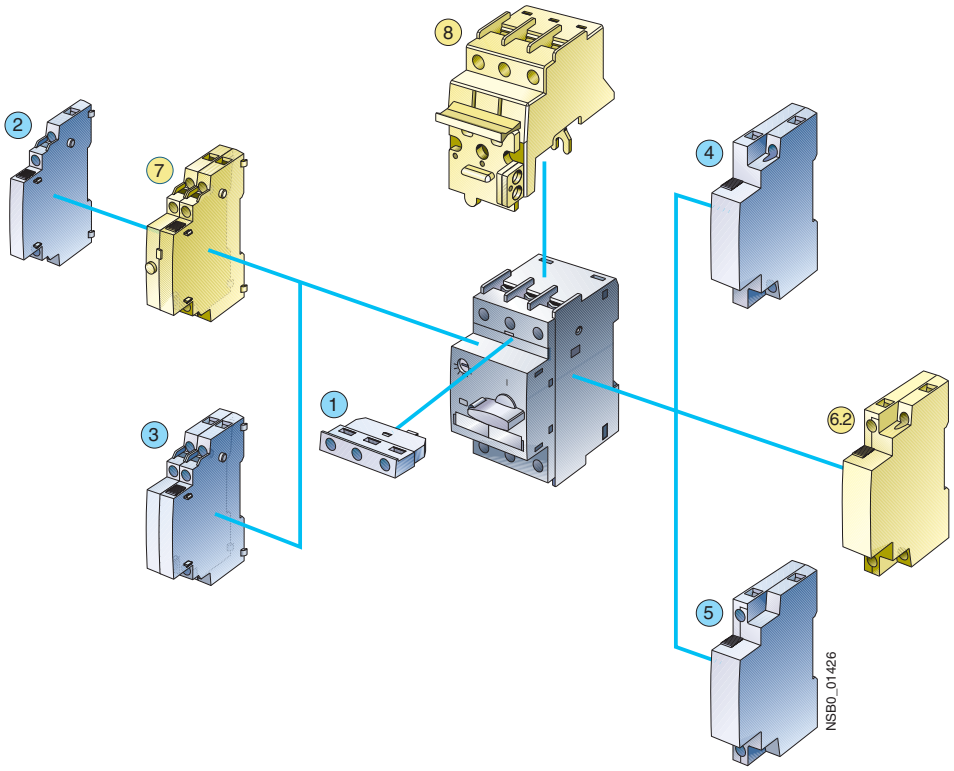
Accessories

Mountable accessories

S00 circuit-breakers with mountable accessories



Circuit-breakers, sizes S0, S2 or S3, with mountable accessories



Mountable accessories for all sizes S00 ... S3

- (1) Transverse auxiliary switch
- (2) Lateral auxiliary switch with 2 contacts
- (3) Lateral auxiliary switch with 4 contacts
- (4) Shunt release
- (5) Undervoltage release

Mountable accessories	for sizes
(6.1) Undervoltage release with leading auxiliary contacts	S00
(6.2) Undervoltage release with leading auxiliary contacts	S0 ... S3

Mountable accessories	for sizes
(7) Signalling switch	S0 ... S3
(8) Isolator module	S0 and S2

Technical specifications

Front transverse auxiliary switches

		Switching capacity for different voltages	
		1 changeover contact	1 NO + 1 NC, 2 NO
Rated operating voltage I_e			
• at AC-15, alternating voltage			
- 24 V	A	4	2
- 230 V	A	3	0.5
- 400 V	A	1.5	-
- 690 V	A	0.5	-
• at AC-12 = I_{th}, alternating voltage			
- 24 V	A	10	2.5
- 230 V	A	10	2.5
- 400 V	A	10	-
- 690 V	A	10	-
• at DC-13, direct voltage L/R 200 ms			
- 24 V	A	1	1
- 48 V	A	-	0.3
- 60 V	A	-	0.15
- 110 V	A	0.22	-
- 220 V	A	0.1	-

Front transverse solid-state compatible auxiliary switches

			1 changeover contact
Rated operating voltage U_e	Alternating voltage	V	250
Rated operating current I_e / AC-14 at U_e = 250 V		A	0.5
Rated operating current I_e / AC-14 at U_e = 125 V		A	1
Rated operating voltage U_e	Direct voltage L/R 200 ms	V	250
Rated operating current I_e / DC-13 at U_e = 250 V		A	0.27
Rated operating current I_e / DC-13 at U_e = 125 V		A	0.44

Lateral auxiliary switches

		Switching capacity for different voltages 1 NO+1 NC, 2 NO, 2 NC, 2 NO + 2 NC and alarm switch
Rated operating voltage I_e		
• at AC-15, alternating voltage		
- 24 V	A	6
- 230 V	A	4
- 400 V	A	3
- 690 V	A	1
• at AC-12 = I_{th}, alternating voltage		
- 24 V	A	10
- 230 V	A	10
- 400 V	A	10
- 690 V	A	10
• at DC, direct voltage L/R 200 ms		
- 24 V	A	2
- 110 V	A	0.5
- 220 V	A	0.25
- 440 V	A	0.1

Auxiliary releases

		Undervoltage release	Shunt release
Power consumption			
• during pick-up			
- AC voltages	VA / W	20.2 / 13	20.2 / 13
- DC voltages	W	20	13 ... 80
• with continuous operation			
- AC voltages	VA / W	7.2 / 2.4	-
- DC voltages	W	2.1	-
Response voltage			
• Trip	V	0.35 ... 0.7 x U_s	0.7 ... 1.1 x U_s
• Pick-up	V	0.85 ... 1.1 x U_s	-
Max. opening time	ms	20	20

Short-circuit protection for auxiliary and control circuits

• Fuses gL/gG	A	10
• Miniature circuit-breaker, C characteristic	A	6[1)]

1) Prospective short-circuit current < 0.4 kA

Accessories

Mountable accessories

Conductor cross-sections for auxiliary and control circuits

Type of connection **Terminal screw**		**Screw connection** Pozidriv size 2
Conductor cross-sections 1 or 2 conductors		
• Solid	mm^2	2 x (0.5 ... 1.5) / 2 x (0.75 ... 2.5)
• Finely stranded with end sleeve	mm^2	2 x (0.5 ... 1.5) / 2 x (0.75 ... 2.5)
• Stranded	mm^2	2 x (0.5 ... 1.5) / 2 x (0.75 ... 2.5)
• AWG cables	AWG	2 x (18 ... 14)
Terminal type		**Cage Clamp terminals** 1) 2)
Conductor cross-sections (1 or 2 conductors connectable)		
• Solid	mm^2	2 x (0.25 ... 2.5)
• Finely stranded with end sleeve	mm^2	2 x (0.25 ... 1.5)
• Finely stranded without end sleeve	mm^2	2 x (0.25 ... 2.5)
• AWG cables, solid and stranded	AWG	2 x (24 ... 14)
Max. external diameter of the cable insulation: 3.6 mm.		

1) With conductor cross-sections of ≤ 1 mm^2 an "insulation stopper" must be used, see accessories for "Contactors and contactor combinations".

2) Corresponding opening tool 8WA2803/8WA2804, see accessories.

Selection and ordering data

Type	Version	For circuit-breakers Size	DT	Screw connection Order No.	PS*	Weight per PU approx. kg
Auxiliary switches[1]						
 3RV19 01-1E **Transverse auxiliary switch** with screw connection	1 CO 1 NO + 1 NC 2 NO[2]	S00, S0, S2, S3	▶ ▶ ▶	**3RV19 01-1D** **3RV19 01-1E** **3RV19 01-1F**	1 unit 1 unit 1 unit	0.015 0.018 0.018
 3RV19 01-1G **Transverse solid-state compatible auxiliary switch** with screw connection for use in dusty environments and in solid-state circuits with low operating currents	1 CO	S00, S0, S2, S3	A	**3RV19 01-1G**	1 unit	0.016
 3RV19 01-0H **Covering caps for transverse auxiliary switches**		S00, S0, S2, S3	▶	**3RV19 01-0H**	10 units	0.006
  3RV19 01-1A 3RV19 01-1J **Lateral auxiliary switch** with screw connection	1 NO + 1 NC 2 NO 2 NC 2 NO + 2 NC	S00, S0, S2, S3	▶ ▶ ▶ A	**3RV19 01-1A** **3RV19 01-1B** **3RV19 01-1C** **3RV19 01-1J**	1 unit 1 unit 1 unit 1 unit	0.045 0.045 0.045 0.083

1) Each circuit-breaker can be fitted with one transverse and one lateral auxiliary switch. The lateral auxiliary switch with 2 NO + 2 NC is used without transverse auxiliary switch.

2) Compatible with the following circuit-breakers:
3RV1.1 (size S00) as of version E01
3RV1.2 (size S0) as of version E04
3RV1.3 (size S2) as of version E04
3RV1.4 (size S3) as of version E04.

*** This quantity or a multiple thereof can be ordered.**

Alarm switch[1)]


3RV19 21-1M

Type	Version	For circuit-breakers Size	DT	Screw connection Order No.	PS*	Weight per PU approx. kg
Alarm switch	Separate tripped and short-circuit alarms, 1 NO + 1 NC.	S0, S2, S3	▶	**3RV19 21-1M**	1 unit	0.094

Isolator module


3RV19 38-1A with padlock

Type	Version	For circuit-breakers Size	DT	Screw connection Order No.	PS*	Weight per PU approx. kg
Isolator module	Visible isolating distance for isolating individual circuit-breakers from the network, lockable in isolating position.	S0	▶	**3RV19 28-1A**	1 unit	0.157
		S2		**3RV19 38-1A**	1 unit	0.324

1) One alarm switch can be mounted to the left of each circuit-breaker.

Auxiliary releases[3)]


3RV19 02-1DP0


3RV19 12-1CP0

Rated control supply voltage U_s AC 50 Hz	AC 60 Hz	AC 50/60 Hz 100 % ON [1)]	AC 50/60 Hz, DC 5 s ON [2)]	DC	For circuit-breakers Size	DT	Screw connection Order No.	PS*	Weight per PU approx. kg
V	V	V	V	V					
Undervoltage releases									
-	-	-	-	24	S00, S0, S2, S3	A	**3RV19 02-1AB4**	1 unit	0.138
24	-[4)]	-	-	-		A	**3RV19 02-1AB0**	1 unit	0.134
110	120	-	-	-		A	**3RV19 02-1AF0**	1 unit	0.134
-[4)]	208	-	-	-		A	**3RV19 02-1AM1**	1 unit	0.128
230	240	-	-	-		▶	**3RV19 02-1AP0**	1 unit	0.131
400	-[4)]	-	-	-		▶	**3RV19 02-1AV0**	1 unit	0.127
415	480	-	-	-		A	**3RV19 02-1AV1**	1 unit	0.129
500	575	-	-	-		A	**3RV19 02-1AS0**	1 unit	0.128
Undervoltage release with early-make auxiliary contacts 2 NO									
230	240	-	-	-	S00	A	**3RV19 12-1CP0**	1 unit	0.140
400	-[4)]	-	-	-		A	**3RV19 12-1CV0**	1 unit	0.137
415	480	-	-	-		A	**3RV19 12-1CV1**	1 unit	0.139
230	240	-	-	-	S0, S2, S3	A	**3RV19 22-1CP0**	1 unit	0.139
400	-[4)]	-	-	-		A	**3RV19 22-1CV0**	1 unit	0.136
415	480	-	-	-		A	**3RV19 22-1CV1**	1 unit	0.138
Shunt releases									
-	-	20 ... 24	20 ... 70	-	S00, S0, S2, S3	▶	**3RV19 02-1DB0**	1 unit	0.133
-	-	90 ... 110	70 ... 190	-		A	**3RV19 02-1DF0**	1 unit	0.135
-	-	210 ... 240	190 ... 330	-		▶	**3RV19 02-1DP0**	1 unit	0.130
-	-	350... 415	330 ... 500	-		A	**3RV19 02-1DV0**	1 unit	0.126
-	-	500	500	-		A	**3RV19 02-1DS0**	1 unit	0.126

1) The voltage range is valid for 100 % (infinite) duty cycle.
The response voltage is at 0.9 the lower limit of the voltage range.

2) The voltage range is valid for 5 s duty cycle at AC 50 Hz/60 Hz and DC.
The response voltage is at 0.85 the lower limit of the voltage range.

3) One auxiliary release can be mounted to the right of each circuit-breaker.

4) Not a usual mains voltage.

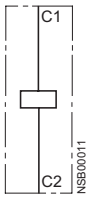
Mountable accessories

Circuit diagrams

Internal connections

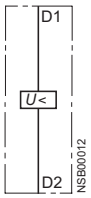
Shunt release

3RV19 02-1D



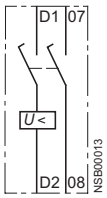
Undervoltage release

3RV19 02-1A



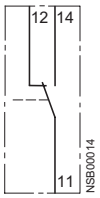
Undervoltage release with leading auxiliary contacts

3RV19 12-1C
3RV19 22-1C

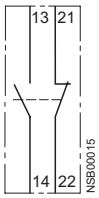


Transverse auxiliary switches

3RV19 01-1D
3RV19 01-1G



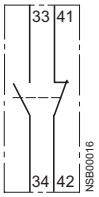
3RV19 01-1E
3RV19 01-2E



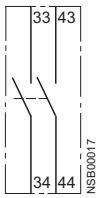
3RV19 01-1F

Lateral auxiliary switches with 2 contacts

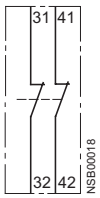
3RV19 01-1A
3RV19 01-2A



3RV19 01-1B
3RV19 01-2B

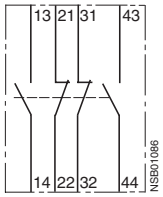


3RV19 01-1C
3RV19 01-2C



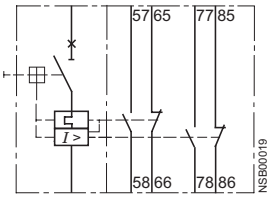
Lateral auxiliary switch with 4 contacts

3RV19 01-1J



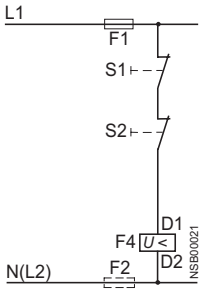
Alarm switch

3RV19 21-1M



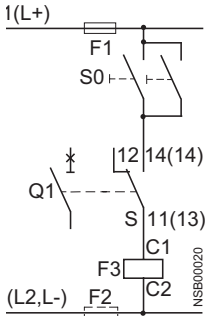
Circuit diagrams

Undervoltage release



S0; S1; S2	OFF button in the plant
F1; F2	Fuse (gL/gG) max. 10 A
F4	Undervoltage trip unit

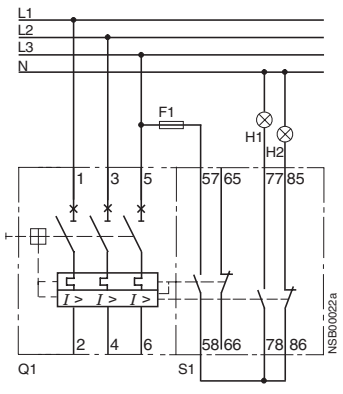
Shunt release



S0; S1; S2	OFF button in the plant
Q1	Circuit-breaker
S	Auxiliary switch of the circuit-breaker Q1 (transverse or lateral)
F1; F2	Fuse (gL/gG) max. 10 A
F3	Voltage trip unit

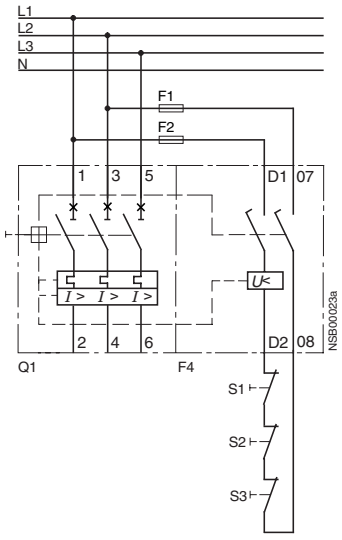
Typical circuits

3RV1 circuit-breaker with 3RV19 21-1M alarm switch



Separate "tripped" and "short-circuit" signals.

Circuit-breakers tripped by means of pushbutton or EMERGENCY-STOP button in the system



The early-make auxiliary contacts will open in switch position "OFF" to deenergize the coil of the under-voltage release, thus avoiding power consumption in the switched off state. In the "tripped" position of the circuit-breaker, these contacts are not guaranteed to open.

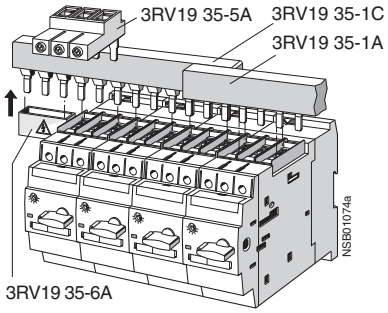
Overview

Insulated three-phase busbar system

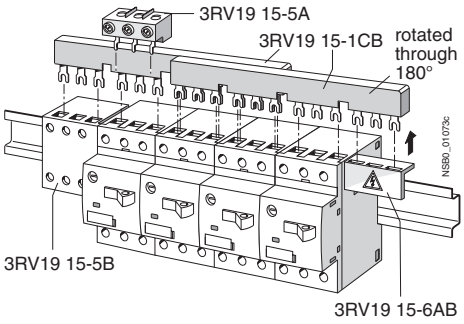
Three-phase busbar systems provide an easy and time-saving means of feeding 3RV1 circuit-breakers with screw-type terminals. Different designs are available for sizes S00, S0 and S2 and can be used for the various different types of circuit-breakers. The only exceptions are the 3RV19 15 three-phase busbar systems, which are not suitable for the 3RV11 circuit-breakers with overload relay function.

The busbars are suitable for between 2 and 5 circuit-breakers. However, any kind of extension is possible by clamping the tags of an additional busbar (rotated by 180°) underneath the terminals of the respective last circuit-breaker. Different sized circuit-breakers cannot be clamped together due to the different dimensions. Special connectors are available for connecting three-phase busbars for S0 circuit-breakers to busbars for S00 circuit-breakers.

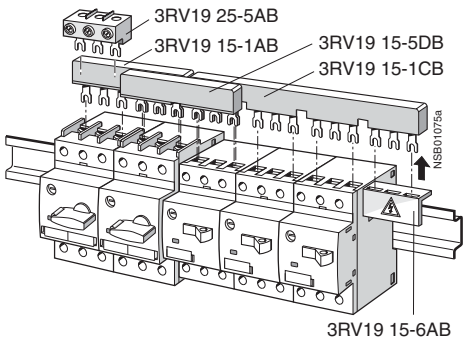
Busbars with larger modular spacing can be used for circuit-breakers with laterally mounted accessories. The circuit-breakers are supplied by appropriate line-side terminals.



3-phase busbar system, size S2



3-phase busbar system, size S00



3-phase busbar system, with example for combining sizes S00 and S0

The three-phase busbar systems are finger-safe. They are designed for any short-circuit stress which can occur at the load side of connected circuit-breakers.

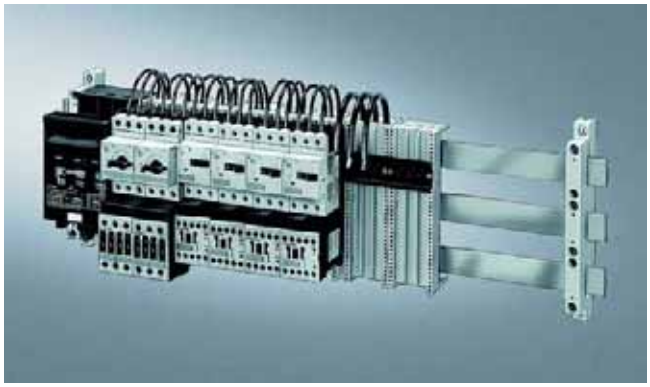
For 3-phase busbar systems for Cage Clamp connection, see "Cage Clamp infeed system".

Busbar adapters

The circuit-breakers are mounted directly with the aid of busbar adapters on busbar systems with 40 mm and 60 mm center-line spacing in order to save space and to reduce infeed times and costs.

Busbar adapters for busbar systems with 40 mm center-line spacing are suitable for copper busbars with a width of 12 mm to 15 mm, while those with 60 mm center-line spacing are suitable for copper busbars with a width of 12 mm to 30 mm. The busbars can be 4 to 5 mm or 10 mm thick. The circuit-breakers are snapped onto the adapter and connected on the line side. This prepared unit is then plugged directly onto the busbar system, and is thus connected both mechanically and electrically at the same time.

Further busbar adapters for snap-mounting direct-on-line starters and reversing starters as well as additional accessories such as line terminals and outgoing terminals, busbar copper, etc., can be found under "Distribution/busbar systems and controlgear".



SIRIUS circuit-breakers and load feeders with busbar adapters snapped onto busbars

4

Busbar accessories

Selection and ordering data

Insulated three-phase busbar system

Modular spacing	Number of circuit-breakers that can be connected: Without lateral accessories	With lateral auxiliary switch	With auxiliary release	Rated current I_n at 690 V	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx.
mm				A					kg
3-phase busbar systems									
	For feeding several circuit-breakers with screw-type connection, mounted side-by-side on standard mounting rails, insulated, with touch protection.								
45	2	-	-	63	S00, S0[1]	▶	**3RV19 15-1AB**	1 unit	0.044
	3					▶	**3RV19 15-1BB**	1 unit	0.071
	4					▶	**3RV19 15-1CB**	1 unit	0.099
	5					▶	**3RV19 15-1DB**	1 unit	0.124
55	-	2	-	63	S00, S0[1]	▶	**3RV19 15-2AB**	1 unit	0.048
		3				▶	**3RV19 15-2BB**	1 unit	0.079
		4				▶	**3RV19 15-2CB**	1 unit	0.111
		5				▶	**3RV19 15-2DB**	1 unit	0.140
63	-	-	2	63	S00, S0[1]	▶	**3RV19 15-3AB**	1 unit	0.052
			4			▶	**3RV19 15-3CB**	1 unit	0.120
55	2	-	-	108	S2	▶	**3RV19 35-1A**	1 unit	0.137
	3					▶	**3RV19 35-1B**	1 unit	0.214
	4					▶	**3RV19 35-1C**	1 unit	0.295
75	-	2	2	108	S2[2]	A	**3RV19 35-3A**	1 unit	0.161
		3	3			A	**3RV19 35-3B**	1 unit	0.262
		4	4			A	**3RV19 35-3C**	1 unit	0.369


3RV19 15-1AB


3RV19 15-1BB


3RV19 15-1CB


3RV19 15-1DB

1) Not suitable for 3RV11 circuit-breakers with overload relay function. Common clamping of S00 and S0 circuit-breakers is not possible, due to the different modular spacings and terminal heights. The 3RV19 15-5DB connector is available for connecting busbars from size S0 to size S00.

2) Auxiliary releases and lateral auxiliary switches cannot be used in combination.

Version	Modular spacing	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx.
	mm					kg
Connector for 3-phase busbars						
For connecting three-phase busbars for circuit-breakers of size S0 (left) to size S00 (right)	45	S00, S0	▶	**3RV19 15-5DB**	1 unit	0.045


3RV19 15-5DB

Conductor cross-section: Solid or stranded	Finely stranded with end sleeve	AWG cables, solid and stranded	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx.
mm²	mm²	AWG					kg
3-phase line-side terminals							
Connection from above							
2.5 ... 25	4 ... 16	12-4	S00	▶	**3RV19 15-5A**	1 unit	0.042
			S0	▶	**3RV19 25-5AB**	1 unit	0.041
Connection from below[1]							
2.5 ... 25	4 ... 16	12-4	S00, S0	▶	**3RV19 15-5B**	1 unit	0.110
Connection from above							
2.5 ... 50	1.5 ... 35	14-0	S2	▶	**3RV19 35-5A**	1 unit	0.115


3RV19 25-5AB


3RV19 15-5B

1) This terminal is connected in place of a switch, please take the spacing into account.

Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx.
					kg
Covers for connection tags					
Touch protection for empty positions	S00, S0	▶	**3RV19 15-6AB**	10 units	0.003
	S2	▶	**3RV19 35-6A**	5 units	0.006


3RV19 15-6AB

* This quantity or a multiple thereof can be ordered.

4

Busbar adapters

	For circuit-breakers Size	Rated current	Connec-tion cable	Adapter length	Adapter width	Rated voltage	DT	Order No.	PS*	Weight per PU approx.
		A	AWG	mm	mm	V				kg
Busbar adapters for 40 mm systems										
	For copper busbars to DIN 46433 Width: 12 mm and 15 mm Thickness: 5 mm and 10 mm									
	S00, S0	25	12	121	45	690	▶	**8US10 51-5DJ07**	1 unit	0.106
	S00, S0 + lateral auxiliary switch	25	12	121	55	690	▶	**8US10 61-5DJ07**	1 unit	0.119
	S2	56	8	139	55	690	▶	**8US10 61-5FK08**	1 unit	0.231
	S3	100	4	182	70	400[1]	▶	**8US11 11-4SM00**	1 unit	0.541
	S3	100	4	182	72	480...690[2]	▶	**8US10 11-4TM00**	1 unit	0.478

8US10 61-5DJ07

1) Up to AC 460 V with max. short-circuit breaking capacity 25 kA.

2) Cannot be used for voltages < AC 480 V
Short-circuit breaking capacity AC 480 V/ 500 V/ 525 V:
- up to I_n = 25 A: max. 30 kA
- up to I_n = 90 A: max. 16 kA
- up to I_n = 100 A: max. 6 kA

Short-circuit breaking capacity AC 690 V:
- max. 12 kA.

	For circuit-breakers Size	Rated current	Connec-tion cable	Adapter length	Adapter width	Rated voltage	DT	Order No.	PS*	Weight per PU approx.
		A	AWG	mm	mm	V				kg
Busbar adapters for 60 mm systems										
	For copper busbars to DIN 46433 Width: 12 mm to 30 mm Thickness: 5 mm and 10 mm as well as for T and double-T special profiles									
	S00, S0	25	12	182	45	690	▶	**8US12 51-5DM07**	1 unit	0.183
	S2	56	8		55	690	▶	**8US12 61-5FM08**	1 unit	0.263
	S3	100	4		70	400[1]	▶	**8US11 11-4SM00**	1 unit	0.541
	S3	100	4		72	480...690[2]	A	**8US12 11-4TM00**	1 unit	0.498

8US12 51-5MD07

1) Up to AC 460 V with max. short-circuit breaking capacity 25 kA.

2) Cannot be used for voltages < AC 480 V
Short-circuit breaking capacity AC 480 V/ 500 V/ 525 V:
- up to I_n = 25 A: max. 30 kA
- up to I_n = 90 A: max. 16 kA
- up to I_n = 100 A: max. 6 kA

Short-circuit breaking capacity AC 690 V:
- max. 12 kA.

For further busbar adapters, accessories, technical specifications and dimension drawings, see Section 6 "Load feeders".

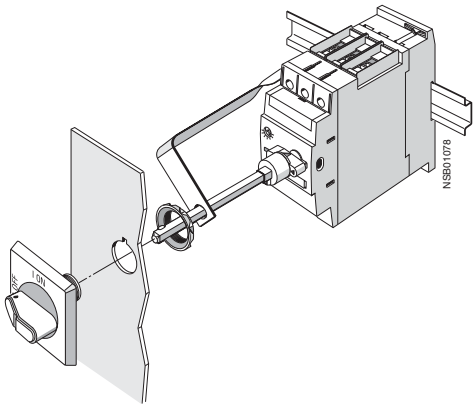
*** This quantity or a multiple thereof can be ordered.**

Rotary operating mechanisms

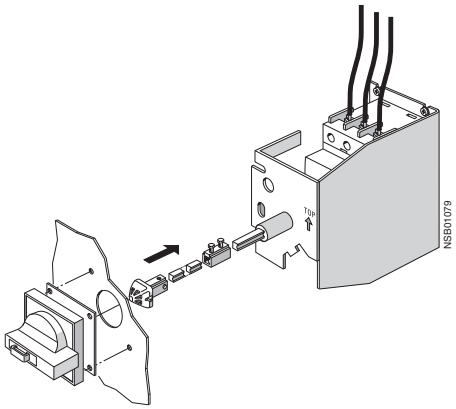
Overview

Door-coupling rotary operating mechanisms

Circuit-breakers with a rotary operating mechanism can be mounted in a control cabinet and operated externally by means of a door-coupling rotary operating mechanism. When the circuit-breaker cabinet door is closed, the operating mechanism is coupled. When the circuit-breaker closes, the coupling is locked which prevents the door from being opened unintentionally. This lock can be defeated by the maintenance personnel. In the Open position, the rotary operating mechanism can be secured against reclosing with up to 3 padlocks. Inadvertent opening of the door is also not possible here.



3RV19 26-0K door-coupling rotary operating mechanism



3RV19 26-2B door-coupling rotary operating mechanism for harsh environments

Remote motorized operating mechanisms

3RV1 circuit-breakers are manually operated switching devices. They automatically trip in case of an overload or short-circuit. Intentional remote-controlled tripping is possible by means of a shunt release or an undervoltage release. Reclosing is only possible directly at the circuit-breaker.

The motorized remote-controlled operating mechanism allows the circuit-breakers to be opened and closed by electrical commands. This enables a load or an installation to be isolated from the power system or reconnected to it from an operator panel.

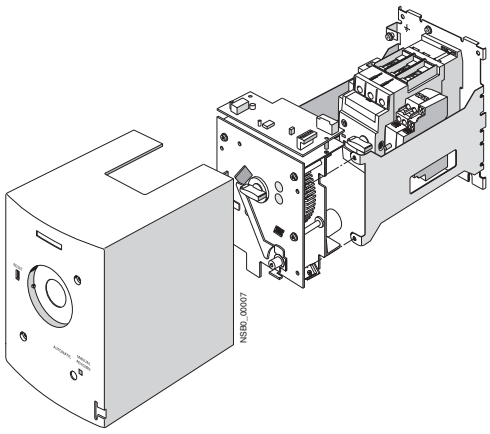
If the circuit-breaker is tripped as a result of overload or short-circuit, it will be in tripped position. For reclosing, the motorized remote-controlled operating mechanism must first be set manually or electrically to the 0 position (electrically by means of the Open command). Then it can be reclosed.

The remote-controlled motorized operating mechanism is available for circuit-breakers of size S2 (I_{nmax} = 50 A) and S3 (I_{nmax} = 100 A) that are designed for control voltages of AC 230 V and DC 24 V. The circuit-breaker is fitted into the remote-controlled motorized operating mechanism as shown in the drawing.

In the "MANUAL" position, the circuit-breaker in the remote-controlled motorized operating mechanism can continue to be switched manually on site. In the "AUTOMATIC" position, the circuit-breaker is switched by means of electrical commands. The switching command must be applied for a minimum of 100 ms. The motorized remote-controlled operating mechanism closes the circuit-breaker after a maximum of 1 second. On voltage failure during the switching operation it is ensured that the circuit-breaker remains in the Open or Closed position.

Reset function

The RESET button on the motorized operating mechanism serves to reset any 3RV19 21-1M alarm switch that might be installed.



Technical specifications

Remote motorized operating mechanisms		
• Max. power consumption at U_s = DC 24 V	W	48
• Max. power consumption at U_s = AC 230 V	VA	170
• Operating range		0.85 ... 1.1 x U_s
• Min. command duration at U_s	S	0.1
• Max. command duration		unlimited (uninterrupted operation)
• Max. total break time, remote-controlled	S	2
• Ready to reclose after approx.	S	2.5
• Number of switching operations	1/h	25
• Internal back-up fuse		
- AC 230 V	A	0.8
- DC 24 V	A	1.6
Connection type of control leads		Connector with screw connection
Shock resistance to IEC 60068-2-27	g/ms	25 /11 (square and sinusoidal pulse)

4

Selection and ordering data

Door-coupling rotary operating mechanisms

3RV19 26-0B

The door-coupling rotary operating mechanisms consist of a knob, a coupling driver and an extension shaft of 130/330 mm in length (5 x 5 mm). The door-coupling rotary operating mechanisms are designed to the IP65 degree of protection. The door locking device prevents accidental opening of the control cabinet door in the ON position of the circuit-breaker. The OFF position can be locked with up to 3 padlocks.

Type	Color of knob	Version of extension shaft mm	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Door-coupling rotary operating mechanism	Black	130	S0, S2, S3	▶	**3RV19 26-0B**	1 unit	0.109
		330		▶	**3RV19 26-0K**	1 unit	0.324
EMERGENCY-STOP door-coupling rotary operating mechanism	Red/yellow	130	S0, S2, S3	▶	**3RV19 26-0C**	1 unit	0.109
		330		▶	**3RV19 26-0L**	1 unit	0.316

Door-coupling rotary operating mechanisms, for arduous conditions

3RV19 26-2C

The door-coupling rotary operating mechanisms consist of a knob, a coupling driver, an extension shaft of 300 mm in length (8 x 8 mm), a spacer and two metal brackets, into which the circuit-breaker is inserted. The door-coupling rotary operating mechanisms are designed to the IP65 degree of protection. The door locking device reliably prevents opening of the control cabinet door in the ON position of the circuit-breaker. The OFF position can be locked with up to 3 padlocks. Laterally mountable auxiliary releases and two-pole auxiliary switches can be used. The door-coupling rotary operating mechanism thus meets the requirements for isolating functions to IEC 60947-2.

Type	Color of knob	Version of extension shaft mm	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Door-coupling rotary operating mechanism	Grey	300	S0	▶	**3RV19 26-2B**	1 unit	1.180
			S2	▶	**3RV19 36-2B**	1 unit	1.570
			S3	▶	**3RV19 46-2B**	1 unit	1.720
EMERGENCY-STOP door-coupling rotary operating mechanism	Red/yellow	300	S0	▶	**3RV19 26-2C**	1 unit	1.180
			S2	▶	**3RV19 36-2C**	1 unit	1.480
			S3	▶	**3RV19 46-2C**	1 unit	1.730

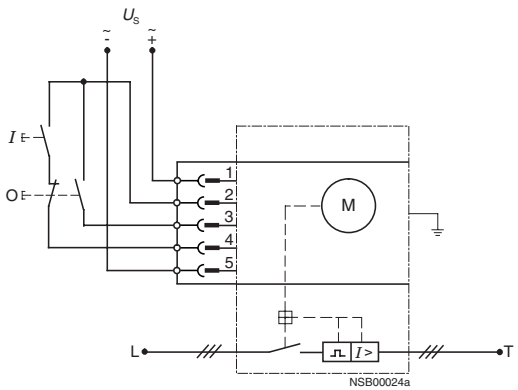
Remote motorized operating mechanisms

Type	Rated control supply voltage U_s	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Remote-controlled motorized operating mechanisms	AC 50/60 Hz, 230 V	S2	B	**3RV19 36-3AP0**	1 unit	3.520
	DC 24 V	S2	B	**3RV19 36-3AB4**	1 unit	3.420
	AC 50/60 Hz, 230 V	S3	B	**3RV19 46-3AP0**	1 unit	3.440
	DC 24 V	S3	B	**3RV19 46-3AB4**	1 unit	3.350

Circuit diagrams

Typical circuits

3RV1 circuit-breakers with 3RV19 36/3RV19 46 remote-controlled motorized operating mechanisms



*** This quantity or a multiple thereof can be ordered.**

Mounting accessories

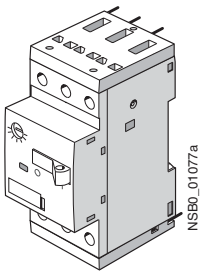
Overview

Soldering terminal

Solder pin adapters are available for the main contacts and transverse auxiliary switches of S00 circuit-breakers.

The prepared terminal parts are clamped to the upper and lower screw terminals of the circuit-breakers which allows them to be soldered into printed circuit boards.

3RV19 18-5A



Terminals for "Self-Protected Combination Motor Controller (Type E)" to UL508

The 3RV10 circuit-breaker for motor protection is approved according to UL508 as "Combination Motor Controller Type E".

As of 16 July 2001, for this application, UL 508 demands increased clearance and creepage distances (1 inch and 2 inches respectively) at the line side of the device.

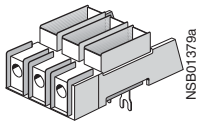
The 3RV19 28-1H terminal block must be used here for size S0; it is simply screwed onto the basic unit.

Basic units of size S2 are already compliant with the new clearance and creepage distance requirements.

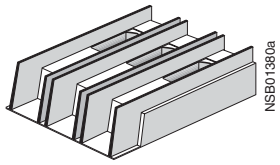
The 3RT19 46-4GA07 terminal block must be used for size S3. The standard box terminal is to be replaced by this terminal block.

According to CSA, these terminal blocks can be omitted when the device is used as "Self-Protected Combination Motor Controller" (Type E).

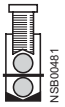
3RV19 28-1H



3RT19 46-4GA07



Technical specifications

Type			3RV19 28-1H	3RT19 46-4GA07
Terminals for "Self-Protected Combination Motor Controller (Type E)" to UL508				
Conductor cross-sections				
• Front clamping point connected				
 NSB00479	- Solid	mm²	1 ...10	See data for 3RV1.4 circuit-breakers
	- Finely stranded with end sleeve	mm²	1 ... 16	
	- Stranded	mm²	2.5 ... 25	
	- AWG cables, solid and stranded	AWG	14 ... 3	
	- Terminal screw		M4	
• Rear clamping point connected				
 NSB00480	- Solid	mm²	1 ...10	
	- Finely stranded with end sleeve	mm²	1 ... 16	
	- Stranded	mm²	1.5 ... 25	
	- AWG cables, solid and stranded	AWG	16 ... 3	
	- Terminal screw		M4	
• Both clamping points connected				
 NSB00481	- **Front clamping point**			
	- Solid	mm²	1 ...10	
	- Finely stranded with end sleeve	mm²	1 ...10	
	- Stranded	mm²	2.5 ... 10	
	- AWG cables, solid and stranded	AWG	14 ... 6	
	- Terminal screw		M4	
	- **Rear clamping point**			
	- Solid	mm²	1 ...10	
	- Finely stranded with end sleeve	mm²	1 ...10	
	- Stranded	mm²	5 ... 25	
	- AWG cables, solid and stranded	AWG	16 ... 3	
	- Terminal screw		M4	

Selection and ordering data

Covers

3RV1 (size S3) with
3RT19 46-4EA1 (left)
3RV19 08-0P (right)

Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Terminal cover for box terminals additional touch protection to be fitted at the box terminals (2 units can be mounted per circuit-breaker)	S2 S3	▶ ▶	**3RT19 36-4EA2** **3RT19 46-4EA2**	1 unit 1 unit	0.020 0.017
Terminal cover for cable lug and bar connection for maintaining the required voltage clearance and as touch protection if box terminal is used (2 units can be mounted per circuit-breaker)	S3	▶	**3RT19 46-4EA1**	1 unit	0.037
Scale cover sealable, for covering the current setting scale.	S00, S0, S2, S3	▶	**3RV19 08-0P**	10 units	0.060

Fixing accessories

3RB19 00-0B

Type	Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Push-in lugs	For screwing the circuit-breaker onto mounting plates. For each circuit-breaker, 2 units are required.	S00, S0	▶	**3RB19 00-0B**	10 units	2.000

Soldering terminal

3RV19 18-5B with
circuit-breaker

Type	Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
For main contacts	For soldering the main conductor cross-sections of a circuit-breaker to a printed circuit board (1 set = 2 parts for 1 circuit-breaker).	S00	B	**3RV19 18-5A**	4 sets	0.030
For main and auxiliary contacts	For soldering the main conductor connections and the auxiliary conductor connections of the transverse auxiliary switch 1NO + 1NC of a circuit-breaker to a printed circuit board (1 set = 3 parts for 1 circuit-breaker).	S00	B	**3RV19 18-5B**	4 sets	0.044

Terminals for "Self-Protected Combination Motor Controller (Type E)" to UL508

Note: As of 16 July 2001, UL508 demands for "Combination Motor Controller Type E" 1-inch clearance and 2-inch creepage distance at line side. The following terminal blocks must be used in 3RV10 circuit-breakers of sizes S0 and S3. The circuit-breaker 3RV10 in size S2 conforms with the required clearance and creepage distances without a terminal block. Terminal blocks are not required for use according to CSA. With size S0, these terminal blocks cannot be used in combination with 3RV19.5 three-phase busbars and with size S3, they cannot be used with a transverse auxiliary switch.

3RV19 28-1H

3RT19 46-4GA07

Type	Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Terminal block type E	For extended clearance and creepage distances (1-inch and 2-inch respectively)	S0 S3	A A	**3RV19 28-1H** **3RT19 46-4GA07**	1 unit 1 unit	0.083 0.155

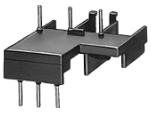
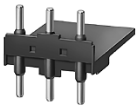
*** This quantity or a multiple thereof can be ordered.**

Accessories

Mounting accessories

Auxiliary terminals, 3-pole

	Type	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
 3RT19 46-4F	For connection of auxiliary and control cables to the main conductor connections (for one side)	S3	B	**3RT19 46-4F**	1 unit	0.033

	Version	Method of operation	Size Contactor	Size Circuit-breaker	DT	Order No.	PS*	Weight per PU approx. kg
Link modules, single unit packaging								
 3RA19 11-1AA00	For mechanical and electrical connection between contactor and circuit-breaker with screw connection.	AC/DC	S00	S00	▶	**3RA19 11-1AA00**	1 unit	0.027
			S00	S0	▶	**3RA19 21-1DA00**	1 unit	0.028
		AC	S0	S0	▶	**3RA19 21-1AA00**	1 unit	0.037
			S2	S2	▶	**3RA19 31-1AA00**	1 unit	0.042
			S3	S3	▶	**3RA19 41-1AA00**	1 unit	0.090
		DC	S0	S0	▶	**3RA19 21-1BA00**	1 unit	0.039
			S2	S2	▶	**3RA19 31-1BA00**	1 unit	0.043
			S3	S3	▶	**3RA19 41-1BA00**	1 unit	0.089
Link modules, multi-unit packaging								
 3RA19 31-1A	For mechanical and electrical connection between contactor and circuit-breaker with screw connection.	AC/DC	S00	S00	▶	**3RA19 11-1A**	10 units	0.193
			S00	S0	▶	**3RA19 21-1D**	10 units	0.206
		AC	S0	S0	▶	**3RA19 21-1A**	10 units	0.276
			S2	S2	▶	**3RA19 31-1A**	5 units	0.163
			S3	S3	▶	**3RA19 41-1A**	5 units	0.366
		DC	S0	S0	▶	**3RA19 21-1B**	10 units	0.299
			S2	S2	▶	**3RA19 31-1B**	5 units	0.168
			S3	S3	▶	**3RA19 41-1B**	5 units	0.376
Hybrid link modules, single-unit packaging								
3RA19 11-2FA00 	Electrical and mechanical connection between circuit-breakers with screw connection and contactors with Cage Clamp connection	AC/DC	S00	S00	▶	**3RA19 11-2FA00**	1 unit	0.038
			S00	S0	▶	**3RA19 21-2FA00**	1 unit	0.028
Hybrid link modules, multi-unit packaging								
3RA19 11-2F 	Electrical and mechanical connection between circuit-breakers with screw connection and contactors with Cage Clamp connection	AC/DC	S00	S00	▶	**3RA19 11-2F**	10 units	0.315
			S00	S0	▶	**3RA19 21-2F**	10 units	0.304

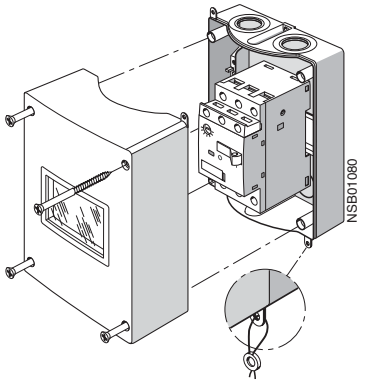
* This quantity or a multiple thereof can be ordered.

Overview

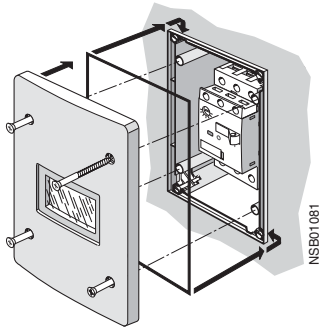
Enclosures

For installing circuit-breakers of sizes S00 (I_{nmax} = 12 A) S0 (I_{nmax} = 25 A) and S2 (I_{nmax} = 50 A) as a single unit, molded-plastic enclosures for surface mounting and molded-plastic enclosures for flush mounting are available in various dimensions.

The enclosures for surface mounting have the IP55 degree of protection; the enclosures for flush mounting also conform with the IP55 degree of protection at the front (the flush-mounted section complies with IP20).



Enclosure for surface mounting



Enclosure for flush mounting

All enclosures are equipped with N and PE/ground terminals. There are two knock-out cable entries for cable glands at the top and two at the bottom; also on the rear corresponding cable entries are scored. There is a knock-out on the top of the enclosure for indicator lamps that are available as accessories.

The narrow enclosure can accommodate a circuit-breaker without accessories, with transverse and lateral auxiliary switch, whereas wide enclosures and enclosures for S2 circuit-breakers also provide space for a laterally mounted auxiliary release. There is no provision for installing a circuit-breaker with an alarm switch.

With S00 circuit-breakers, the switch rocker is operated by means of the actuator diaphragm of the enclosure. A locking device, capable of holding up to three padlocks, can be fitted onto the actuator diaphragm to prevent the circuit-breaker from closing during maintenance work, for example.

A mushroom-shaped EMERGENCY-STOP knob can be fitted in place of the locking device. If it is actuated abruptly, the circuit-breaker opens and the mushroom-shaped knob latches. The knob can be unlatched again either by turning it or by using a special key. The circuit-breaker can subsequently be switched on again.

The molded-plastic enclosures of S0 and S2 circuit-breakers with rotary operating mechanism are fitted with a rotary operating mechanism as well.

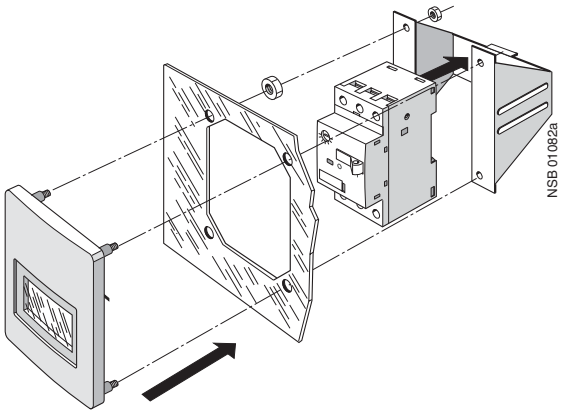
The enclosures can be supplied with a black rotary operating mechanism or with an EMERGENCY-STOP rotary operating mechanism with a red/yellow knob.

All rotary operating mechanisms can be locked in the Open position with up to 3 padlocks.

Front plates

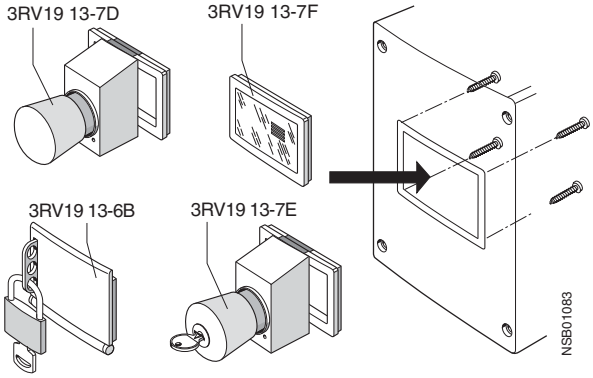
Circuit-breakers are frequently required to be actuated in any enclosure. Front plates equipped with an actuating diaphragm for size S00 circuit-breakers, or rotary operating mechanism for S0 to S3 circuit-breakers are available for this purpose.

The front plates for size S00 have a retaining frame into which the circuit-breakers can be snapped. A retaining frame for size S0 circuit-breakers is available for front plate sizes S0 to S3.



Front plate for size S00

Accessories for enclosures and front plates



Accessories

Enclosures and front plates

Selection and ordering data

	Type	Degree of protection	Inte-grated terminals	Overall width	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx.
									kg
Molded-plastic enclosures for surface mounting									
 3RV19 13-1DA00	**With actuator diaphragm**	IP55	N and PE/ground	54 mm (for circuit-breaker + lateral auxiliary switch)	S00	►	**3RV19 13-1CA00**	1 unit	0.296
				72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)		►	**3RV19 13-1DA00**	1 unit	0.355
 3RV19 23-1CA00	**With rotary operating mechanism**, lockable in 0 position	IP55	N and PE/ground	54 mm (for circuit-breaker + lateral auxiliary switch)	S0	►	**3RV19 23-1CA00**	1 unit	0.332
				72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)		►	**3RV19 23-1DA00**	1 unit	0.399
				82 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)	S2	A	**3RV19 33-1DA00**	1 unit	1.130
	With EMERGENCY-STOP rotary operating mechanism, lockable in 0 position	IP55	N and PE/ground	54 mm (for circuit-breaker + lateral auxiliary switch)	S0	A	**3RV19 23-1FA00**	1 unit	0.329
				72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)		A	**3RV19 23-1GA00**	1 unit	0.388
				82 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)	S2	A	**3RV19 33-1GA00**	1 unit	1.130
Cast aluminum enclosures for surface mounting									
 3RV19 23-1DA01	**With rotary operating mechanism**, lockable in 0 position	IP65	PE[1)]	72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)	S0	A	**3RV19 23-1DA01**	1 unit	1.010
	With EMERGENCY-STOP rotary operating mechanism, lockable in 0 position	IP65	PE[1)]	72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)	S0	A	**3RV19 23-1GA01**	1 unit	1.000
Molded-plastic enclosures for flush mounting									
 3RV19 13-2DA00	**With actuator diaphragm**	IP55 (front side)	N and PE/ground	72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)	S00	A	**3RV19 13-2DA00**	1 unit	0.416
 3RV19 23-2DA00	**With rotary operating mechanism**, lockable in 0 position	IP55 (front side)	N and PE/ground	72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)	S0	A	**3RV19 23-2DA00**	1 unit	0.426
	With EMERGENCY-STOP rotary operating mechanism, lockable in 0 position	IP55 (front side)	N and PE/ground	72 mm (for circuit-breaker + lateral auxiliary switch + auxiliary release)	S0	A	**3RV19 23-2GA00**	1 unit	0.430

1) If required, an additional N terminal can be mounted (e.g. 8WA10 11-1BG11).

* This quantity or a multiple thereof can be ordered.

4

Front plates

3RV19 13-4C

3RV19 23-4B + 3RV19 23-4G

Type	Degree of protection	Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Molded-plastic front plate with actuator diaphragm	IP55 (front side)	For actuating circuit-breakers in any enclosures, includes holder for circuit-breaker.	S00	A	**3RV19 13-4C**	1 unit	0.216
Molded plastic front plate with rotary operating mechanism, lockable in 0 position	IP55 (front side)	For actuating 3RV1 circuit-breakers in any enclosure.	S0, S2, S3	A	**3RV19 23-4B**	1 unit	0.124
Molded-plastic front plate with EMERGENCY-STOP rotary operating mechanism red/yellow, lockable in 0 position	IP55 (front side)	EMERGENCY-STOP actuation of 3RV1 circuit-breakers in any enclosure.	S0, S2, S3	A	**3RV19 23-4E**	1 unit	0.124
Holder for front plate for circuit-breaker size S0	-	Holder is mounted on front plate, circuit-breaker with and without accessories is snapped in.	S0	A	**3RV19 23-4G**	1 unit	0.188

Accessories for enclosures

Molded plastic enclosure for surface mounting with 3RV19 13-7D

Type	Degree of protection	Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
EMERGENCY-STOP mushroom button red/yellow for enclosure and front plates 3RV19 13-..., cannot be used in combination with locking device	IP55	Latching mushroom button, unlatch by turning	S00	►	**3RV19 13-7D**	1 unit	0.108
EMERGENCY-STOP mushroom button red/yellow with safety lock for enclosure and front plates 3RV19 13-..., cannot be used in combination with locking device	IP55	Latching mushroom button, unlatch with key, Ronis safety lock, lock number SB 30, supplied with 2 keys.	S00	A	**3RV19 13-7E**	1 unit	0.126
Locking device for enclosure and front plates 3RV19 13-..., cannot be used in combination with EMERGENCY-STOP mushroom button	IP55	For 3 padlocks with max. 8 mm shackle diameter.	S00	►	**3RV19 13-6B**	1 unit	0.074
Spare actuator diaphragm	IP55	Diaphragm, includes holder frame and screws	S00	A	**3RV19 13-7F**	1 unit	0.029

Indicator lights

3RV19 03-5B

Type	Version	Rated control supply voltage U_s V	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx. kg
Indicator light for all enclosures and front plates	With glow lamp and colored lenses red, green, yellow, orange and clear	110 ... 120	S00, S0, S2	B	**3RV19 03-5B**	1 set	0.027
		220 ... 240		B	**3RV19 03-5C**	1 set	0.026
		380 ... 415		B	**3RV19 03-5E**	1 set	0.026
		480 ... 500		B	**3RV19 03-5G**	1 set	0.027

*** This quantity or a multiple thereof can be ordered.**

Accessories

Accessories for circuit-breakers with Cage Clamp connection

Selection and ordering data

Type	Version	DT	Order No.	PS*	Weight per PU approx. kg
Transverse auxiliary switches with Cage Clamp connection					
 1 transverse auxiliary switch can be mounted on each circuit-breaker	1 NO + 1 NC	▶	**3RV19 01-2E**	1 unit	0.017
Laterally mountable auxiliary switches with Cage Clamp connection					
 1 lateral auxiliary switch can be mounted on the left for each circuit-breaker	1 NO + 1 NC	▶	**3RV19 01-2A**	1 unit	0.040
	2 NO	▶	**3RV19 01-2B**	1 unit	0.040
	2 NC	▶	**3RV19 01-2C**	1 unit	0.040

Type	Version	DT	Order No.	PS*	Weight per PU approx. kg
Adapter and link module for Cage Clamp connection					
 3RA19 11-2A + 8US10 51-5CM47  3RA19 11-2E	**Link module, Cage Clamp** electrical connection between circuit-breaker and contactor (busbar adapter not included in the scope of supply)	Size S00	▶	**3RA19 11-2A**	10 units	0.160
	Link module, Cage Clamp with mechanical connection mechanical and electrical connection between circuit-breaker and contactor	Size S00	▶	**3RA19 11-2E**	10 units	0.283
	Adapter for rail mounting with 2 mounting rails, one adjustable	45 mm wide	▶	**3RA19 22-1L**	1 unit	0.413
	Busbar adapter 45 mm wide, 182 mm long, adapted for Cage Clamp circuit-breakers. An additional mounting rail must be mounted for an additional contactor.	40 mm wide	▶	**8US10 51-5CM47**	1 unit	0.193
		60 mm wide	▶	**8US12 51-5CM47**	1 unit	0.190
	35 mm standard mounting rail plastic, including fixing screws		A	**8US19 98-7CA15**	10 units	0.009

Type	Version	DT	Order No.	PS*	Weight per PU approx. kg
3-phase busbars for Cage Clamp connection					
 3RV19 15-1BA	**3-phase busbar for Cage Clamp** incl. 2 holders, modular spacing 45 mm or more. Terminal blocks can be used for the incoming supply. Max. rated current 16 A.	For three S00 circuit-breakers	▶	**3RV19 15-1BA**	1 unit	0.122
		For four S00 circuit-breakers	▶	**3RV19 15-1CA**	1 unit	0.155

Type	Version	DT	Order No.	PS*	Weight per PU approx. kg
Tools for opening Cage Clamp connection					
 For all SIRIUS devices with Cage Clamp connection, up to max. 2.5 mm² conductor cross-section	Length approx. 100 mm		**8WA2 804**	1 unit	0.012
	Length approx. 175 mm		**8WA2 803**	1 unit	0.024

* This quantity or a multiple thereof can be ordered.

Cage Clamp infeed system

Overview

The Cage Clamp infeed system is a convenient means of power supply and distribution for a group of several circuit-breakers or complete load feeders with a Cage Clamp connection system.

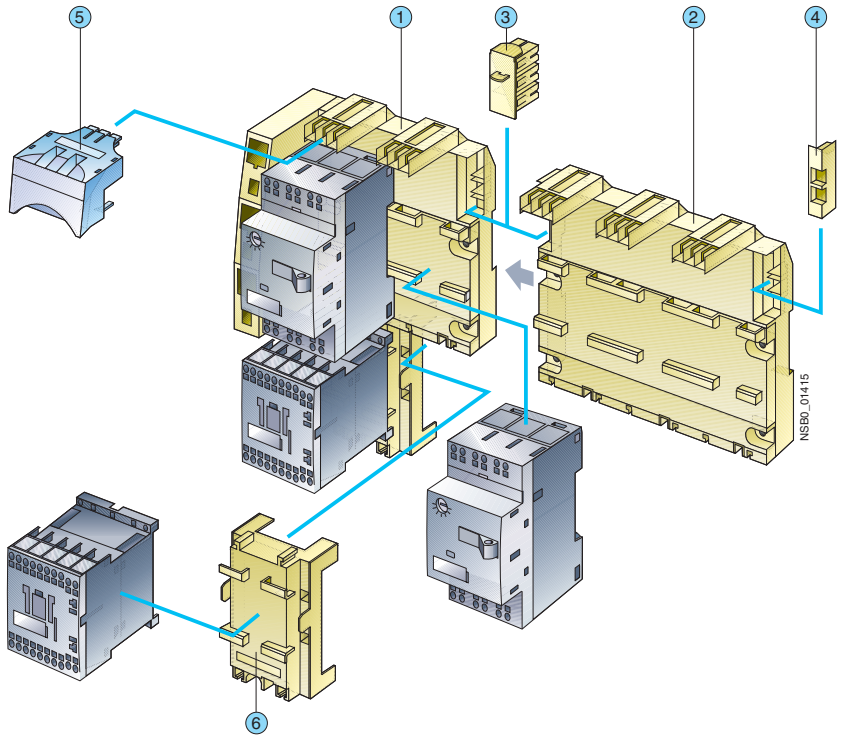
These devices are available in the SIRIUS modular system up to 5.5 kW at AC 400 V. For higher power ratings, circuit-breakers of size S0 with screw connection (up to 11 kW at AC 400 V) can be integrated into the system.

Design

The system is based on a basic module complete with a lateral incoming unit (3-phase busbar with infeed). This incoming unit with Cage Clamp terminals is mounted on the right or left depending on the design and can be supplied with a maximum conductor cross-section of 25 mm^2 (with end sleeve). A basic module has two sockets onto each of which a circuit-breaker can be snapped. Expansion modules are available for extending the system (3-phase busbars for system expansion). The individual modules are connected through an expansion plug.

Electrical connection between the 3-phase busbars and the circuit-breakers is implemented through plug-in connectors. The complete system can be mounted on a 35 mm standard rail to EN 50022 and can be expanded as required up to a maximum current carrying capacity of 63 A.

The system is mounted extremely quickly and easily thanks to the simple plug-in technique. Thanks to the lateral infeed, the system also saves space in the control cabinet. The additional overall height required for the infeed unit is only 30 mm. The alternative infeed possibilities on each side offer a high degree of flexibility for configuring the control cabinet: infeed on left-hand or right-hand side, ring infeed or infeed on one side and loop-through from the other side to supply further loads are all possible.



1. 3-phase busbar with infeed
2. 3-phase busbar for system extension
3. Extension connector
4. End cover
5. Cable connector
6. Contactor base

① *3-phase busbars with infeed*

A 3-phase busbar with infeed unit is required for connecting the incoming supply. This module comprises one infeed module and 2 sockets which each accept one circuit-breaker. A choice of two designs with infeed on the left or right is available. The incoming supply is connected via Cage Clamp terminals. The Cage Clamp springs permit conductor cross-sections of up to 25 mm^2 with end sleeves. An end cover is supplied with each module.

② *3-phase busbars for system expansion*

The 3-phase busbars for system expansion support expansion of the system. There is a choice of modules with 2 or 3 sockets. The system can be expanded as required up to a maximum current carrying capacity of 63 A. An expansion plug is supplied with each module.

Cage Clamp infeed system

③ *Expansion plug*

The expansion plug is used for electrical connection of adjacent 3-phase busbars. One expansion plug is supplied with each 3-phase busbar for system expansion. Further expansion plugs are therefore only required as spare parts.

④ *End cover*

The end cover is used to cover the 3-phase busbar at the open end of the system. This cover is therefore only required once for each system. An end cover is supplied with each 3-phase busbar system with infeed. Further end covers are therefore only required as spare parts.

⑤ *Plug-in connector*

The plug-in connectors are used for the electrical connection between the 3-phase busbar and the circuit-breaker. There are two different designs. One design is for S00 circuit-breakers with Cage Clamp connection and one is for S0 circuit-breakers with screw-type connection.

⑥ *Contactor base*

Load feeders can be assembled in the system using the contactor base. The contactor bases are suitable for contactors of size S00 with Cage Clamp connection and are simply snapped onto the 3-phase busbar. Direct-on-line starters and reversing starters are possible. One contactor base is required for direct-on-line starters and two are required for reversing starters. To assemble load feeders for reversing starters, the contactor bases can be arranged either below each other (45 mm overall width) or alongside each other (90 mm overall width). It is important to note that mechanical interlocking of the contactors is only possible when they are arranged vertically.

The infeed system is designed for mounting on a 35 mm standard rail with 7.5 mm overall depth. This standard rail gives the contactor base a stable mounting surface to sit on. If standard rails with a depth of 15 mm are used, the spacer connected to the bottom of the contactor base must be knocked out and plugged into the mating piece that is also on the underside. Then the contactor base also has a stable mounting surface. When standard rails with a depth of 7.5 mm are used, the spacer has no function and can be removed.

As an alternative to using a contactor base, for load feeders for direct-on-line starters of size S00, the 3RA19 11-2E electrical link module can also be used. Circuit-breaker and contactor assemblies can then be directly snapped into the sockets of the 3-phase busbars. For feeders of size S0, the corresponding 3RA19 21-1.... link modules should generally be used. For this size, it is only possible integrate load feeders for direct-on-line starters and they must be integrated in the system as complete assemblies.

Technical specifications

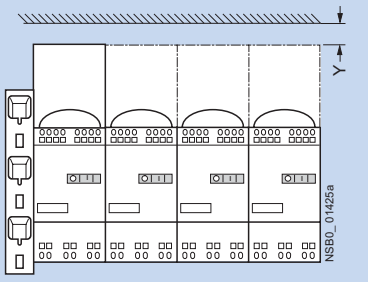
Type		3RV19 .7
Rated operating voltage U_e		
• IEC		
- 10% overvoltage	V	500
- 5% overvoltage	V	525
• UL/CSA	V	600
Rated frequency	Hz	50/60
Rated current I_n	A	63
Permissible ambient temperature		
• Storage/transport	°C	-50 ... +80
• Operation	°C	-20 ... +60[1)]
Permissible rated current for 3RV10 11 circuit-breakers (size S00) at control cabinet internal temperature		
• +60 °C	%	100
Permissible rated current for 3RV1. 21 circuit-breakers (size S0) at control cabinet internal temperature		
• +40 °C	%	100
• +60 °C	%	87
Degree of protection acc. to IEC 60529		IP20[2)]
Touch protection acc. to DIN VDE 0106-100		Finger-safe
Conductor cross-sections for main circuit infeed		
Solid	mm^2	4 ... 25
Finely stranded with end sleeve	mm^2	4 ... 25
Finely stranded without end sleeve	mm^2	6 ... 25
AWG conductors, solid or stranded	AWG	10 ... 3

1) Above +40 °C, for 3RV1. 21 circuit-breaker (size S0) derating is necessary.

2) In infeed terminal compartment without a conductor connected: IP00.

Installation guidelines

Clearance in Y direction from live, earthed or insulated parts according to IEC 60947-4. In addition, the installation guidelines for circuit-breakers or fuseless load-feeders including the clearances must be complied with.	mm	10



4

Selection and ordering data

Type	Version	For circuit-breakers Size	DT	Order No.	PS*	Weight per PU approx.
						kg
3-phase busbars with infeed						
 3RV19 17-1A	**3-phase busbars with infeed** incl. end cover 3RV19 17-6A	For 2 circuit-breakers with infeed from the left	S00 (Cage Clamp)[1], S0 (screw)	A	**3RV19 17-1A**	1 unit	0.380
		For 2 circuit-breakers with infeed from the right	S00 (Cage Clamp)[1], S0 (screw)	A	**3RV19 17-1E**	1 unit	0.380
3-phase busbars for system expansion						
 3RV19 17-4B	**3-phase busbars for system expansion** incl. 3RV19 17-5BA00 expansion connector	For 2 circuit-breakers	S00 (Cage Clamp)[1], S0 (screw)	A	**3RV19 17-4A**	1 unit	0.200
		For 3 circuit-breakers	S00 (Cage Clamp)[1], S0 (screw)	A	**3RV19 17-4B**	1 unit	0.300
Plug-in connector						
 3RV19 17-5AA00	**Plug-in connector** to make contact with the circuit-breakers	Single unit packaging	S00 (Cage Clamp)[1]	A	**3RV19 17-5AA00**	1 unit	0.041
			S0 (screw)	A	**3RV19 27-5AA00**	1 unit	0.028
		Multi-unit packaging	S00 (Cage Clamp)[1]	A	**3RV19 17-5A**	10 units	0.041
			S0 (screw)	A	**3RV19 27-5A**	10 units	0.028

1) Compatible with the following circuit-breakers: 3RV10 11-...2. (size S00, Cage Clamp) product version E03 and upwards.

Type	Version	For contactor Size	DT	Order No.	PS*	Weight per PU approx.
						kg
Contactor base						
 3RV19 17-7A	**Contactor base** for mounting direct-on-line or reversing starters	Single unit packaging	S00 (Cage Clamp)	A	**3RV19 17-7AA00**	1 unit	0.031
		Multi-unit packaging	S00 (Cage Clamp)	A	**3RV19 17-7A**	10 units	0.031

* This quantity or a multiple thereof can be ordered.

Accessories

Cage Clamp infeed system

	Type	Version	DT	Order No.	PS*	Weight per PU approx.
						kg
Expansion plugs						
	**Expansion plug**[1] as spare part	Single unit packaging	A	**3RV19 17-5BA00**	1 unit	0.026
End covers						
	**End cover**[2] as spare part	Multi-unit packaging	A	**3RV19 17-6A**	10 units	0.050
Tools						
	**For opening the 3RV19 17-1. Cage Clamp line-side terminal**	Length: approx. 175 mm, Blade dimensions: 5.5 x 0.8 mm		**8WA2 806**	1 unit	0.063

1) The expansion plug is included in the scope of supply of the 3-phase busbars for system expansion 3RV19 17-4..

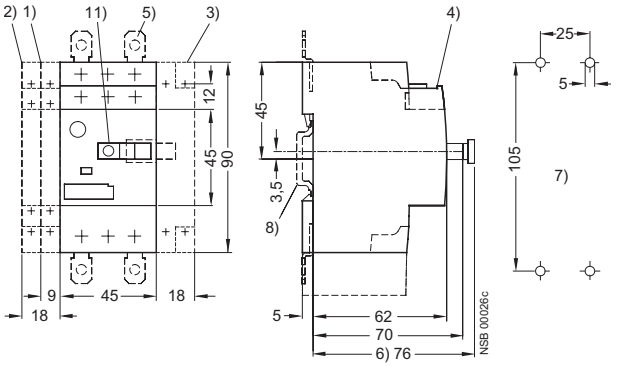
2) The end cover is included in the scope of supply of the 3-phase busbars with line-side terminal 3RV19 17-1..

*** This quantity or a multiple thereof can be ordered.**

Dimension drawings

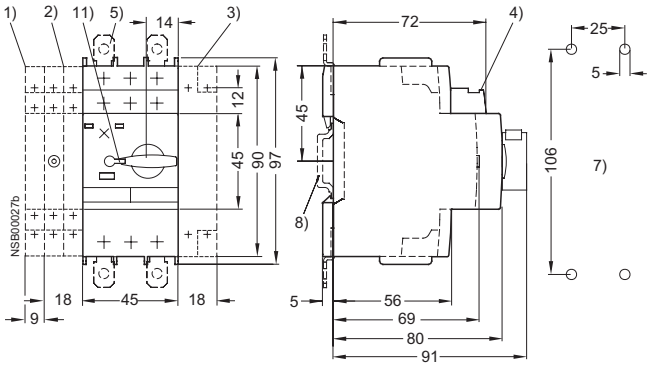
3RV1 circuit-breaker, size S00

3RV10 11, 3RV16



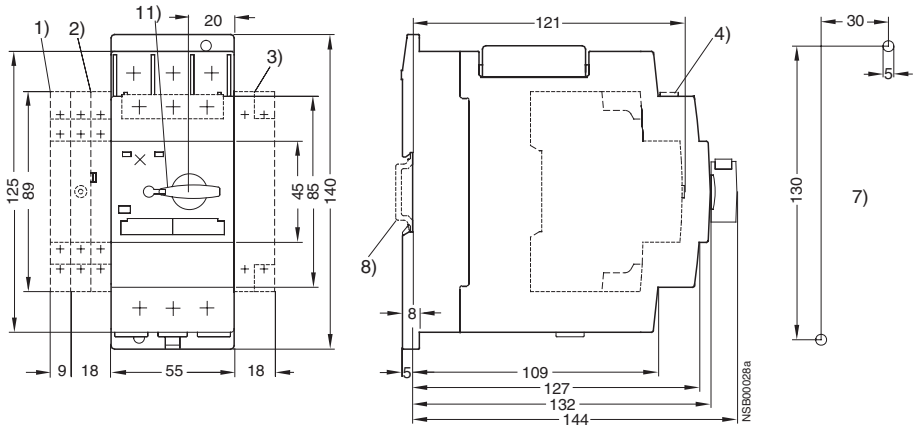
3RV1 circuit-breaker, size S0

3RV10 21, 3RV13 21, 3RV14 21



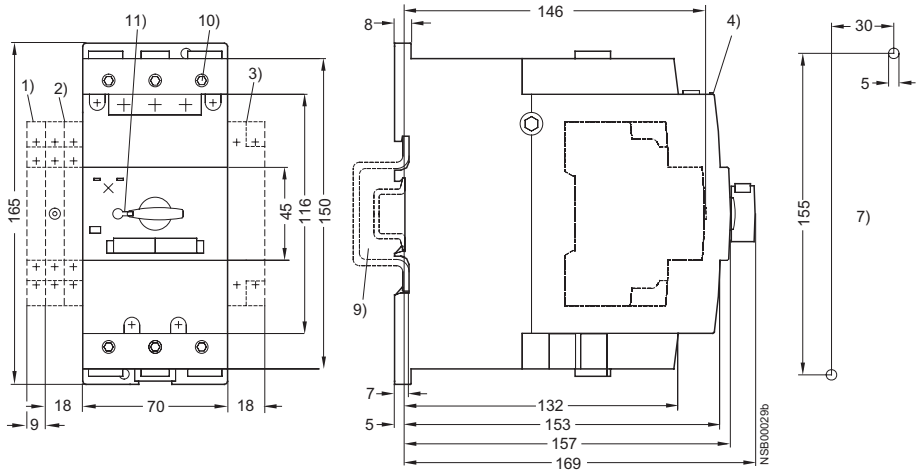
3RV1 circuit-breaker, size S2

3RV10 31, 3RV13 31, 3RV14 31



3RV1 circuit-breaker, size S3

3RV10 4, 3RV13 4

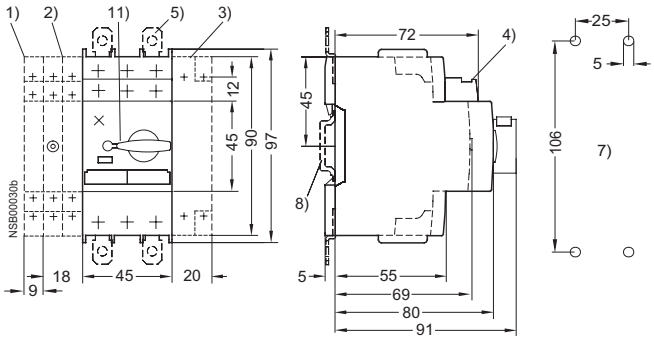


1) Lateral auxiliary switch, 2-pole.
2) Alarm switch (S0-S3) or lateral auxiliary switch, 4-pole (S00-S3).
3) Auxiliary release
4) Transverse auxiliary switch
5) Push-in lugs for screw fixing
6) For undervoltage release with leading auxiliary switch only.
7) Drilling diagram
8) 35 mm standard rail acc. to EN 50022
9) Mounting onto 35 mm standard rail, 15 mm high, acc. to EN 50022 or 75 mm standard rail acc. to EN 50023
10) Hexagon socket screw 4 mm
11) Lockable in neutral position With shackle diameter 3.5 mm to 4.5 mm.

Project planning aids

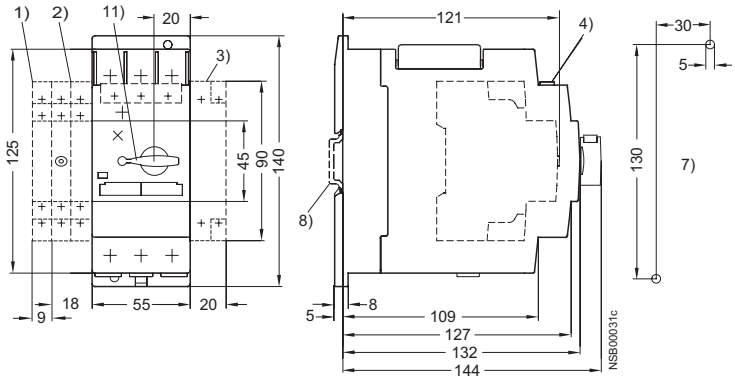
3RV11 circuit-breaker, size S0

3RV11 21



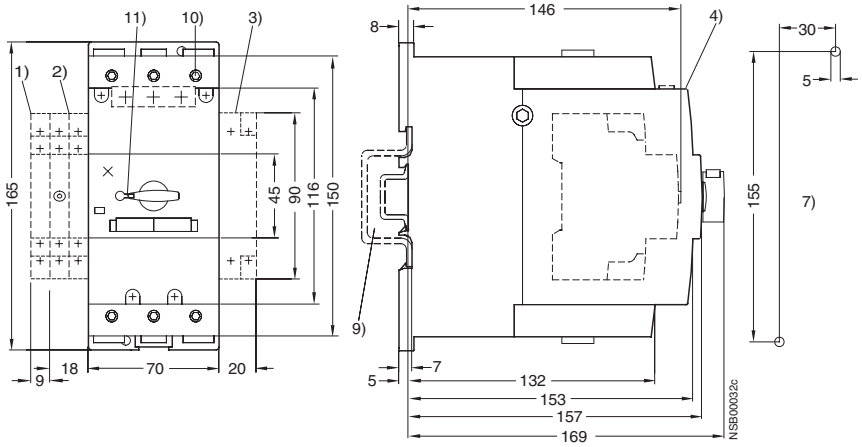
3RV11 circuit-breaker, size S2

3RV11 31



3RV11 circuit-breaker, size S3

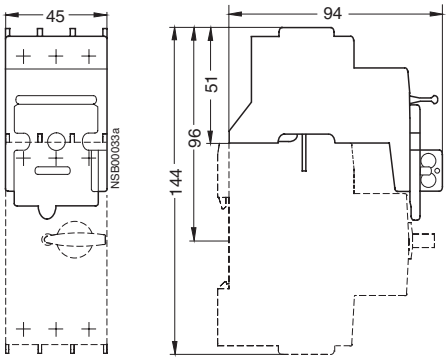
3RV11 42



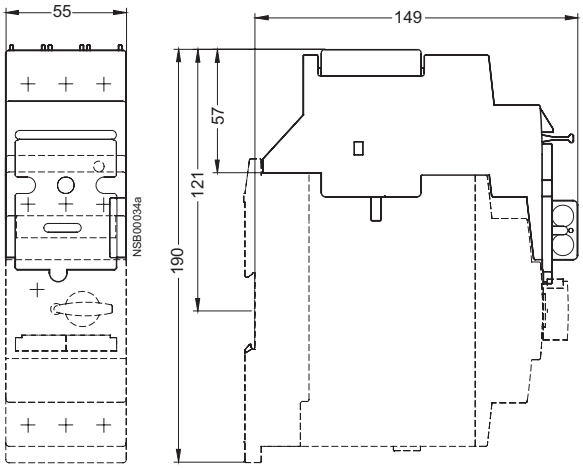
1) Lateral auxiliary switch, 2-pole.
2) Alarm switch or lateral auxiliary switch, 4-pole
3) Block for overload relay function
4) Transverse auxiliary switch
5) Push-in lugs for screw fixing
7) Drilling diagram
8) 35 mm standard rail acc. to EN 50022
9) Mounting onto 35 mm standard rail, 15 mm high, acc. to EN 50022 or 75 mm standard rail acc. to EN 50023
10) Hexagon socket screw 4 mm
11) Lockable in neutral position with 3.5 mm to 4.5 mm shackle diameter

Disconnector modules

3RV19 28-1A
for circuit-breaker size S0

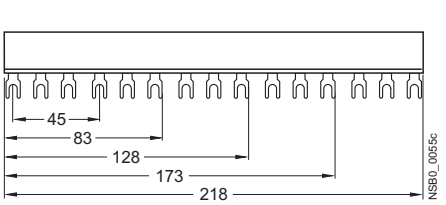


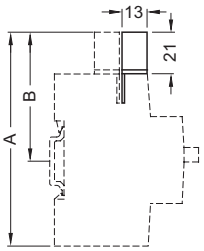
3RV19 38-1A
for circuit-breaker size S2



Busbars

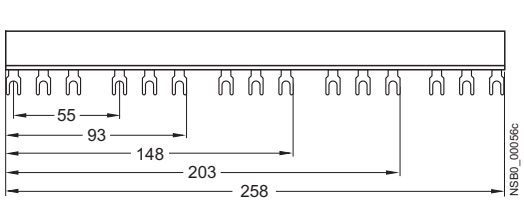
3RV19 15-1. 3-phase busbars
for circuit-breakers with frame sizes S00 and S0, modular spacing 45 mm
for 2 3RV19 15-1AB circuit-breakers
for 3 3RV19 15-1BB circuit-breakers
for 4 3RV19 15-1CB circuit-breakers
for 5 3RV19 15-1DB circuit-breakers

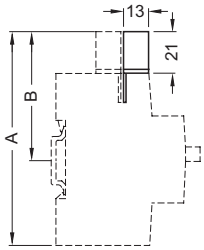




	S00	S0
A	111	119
B	67	70

3RV19 15-2.. 3-phase busbars
for circuit-breakers with frame sizes S00 and S0, modular spacing 55 mm
for 2 3RV19 15-2AB circuit-breakers
for 3 3RV19 15-2BB circuit-breakers
for 4 3RV19 15-2CB circuit-breakers
for 5 3RV19 15-2DB circuit-breakers

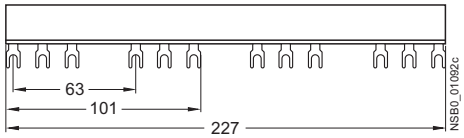


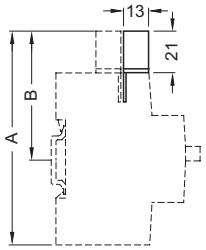


	S00	S0
A	111	119
B	67	70

Project planning aids

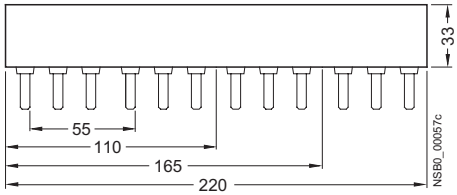
3RV19 15-3.. 3-phase busbars
for circuit-breakers with frame sizes S00 and S0, modular spacing 63 mm
for 2 3RV19 15-3AB circuit-breakers
for 4 3RV19 15-3CB circuit-breakers

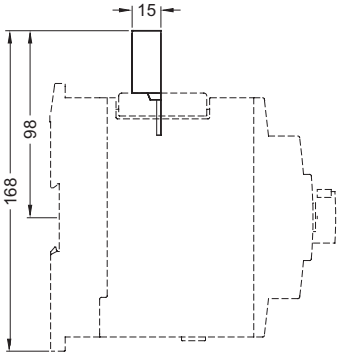




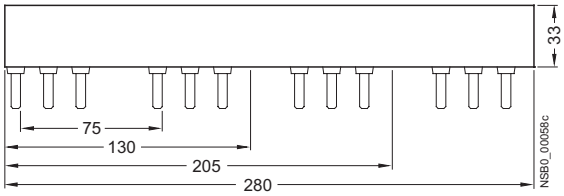
	S00	S0
A	111	119
B	67	70

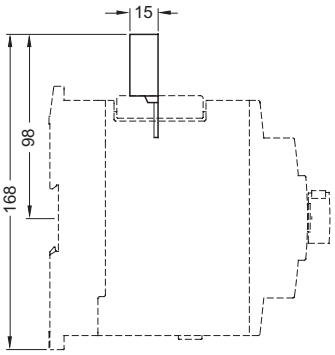
3RV19 35-1. 3-phase busbars
for circuit-breakers with frame size S2, modular spacing 55 mm
for 2 3RV19 35-1A circuit-breakers
for 3 3RV19 35-1B circuit-breakers
for 4 3RV19 35-1C circuit-breakers





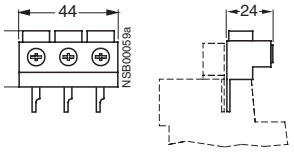
3RV19 35-3.. 3-phase busbars
for circuit-breakers with frame size S2, modular spacing 75 mm
for 2 3RV19 35-3A circuit-breakers with accessory
for 3 3RV19 35-3B circuit-breakers with accessory
for 4 3RV19 35-3C circuit-breakers with accessory



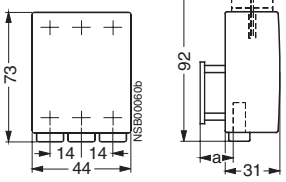


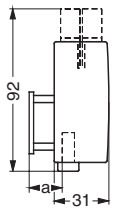
3RV19 15-5. 3-phase line-side terminals

3RV19 15-5A
connected from top,
size S00



3RV19 15-5B
connected from below,
size S00 and S0

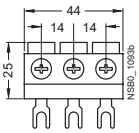


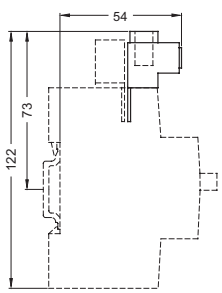


a) 3RV1. 1 19 mm
3RV1. 2 23 mm

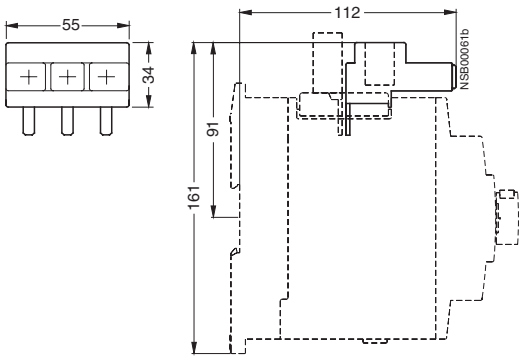
3RV19 25-5AB 3-phase line-side terminals

Connected from top
size S0

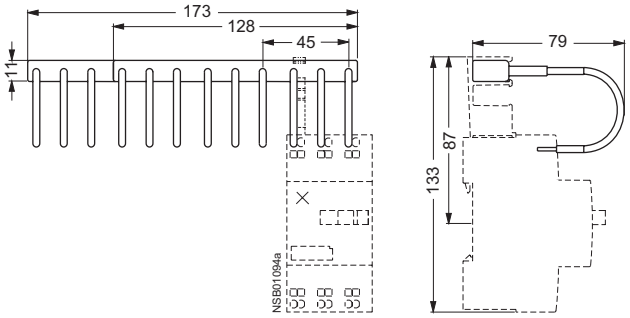




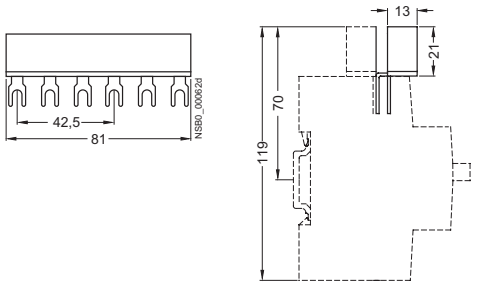
3RV19 35-5A 3-phase supply terminals
for circuit-breakers of size S2



3RV19 15-1.. 3-phase busbars for Cage Clamp connection
3RV19 15-1BA, 3RV19 15-1CA



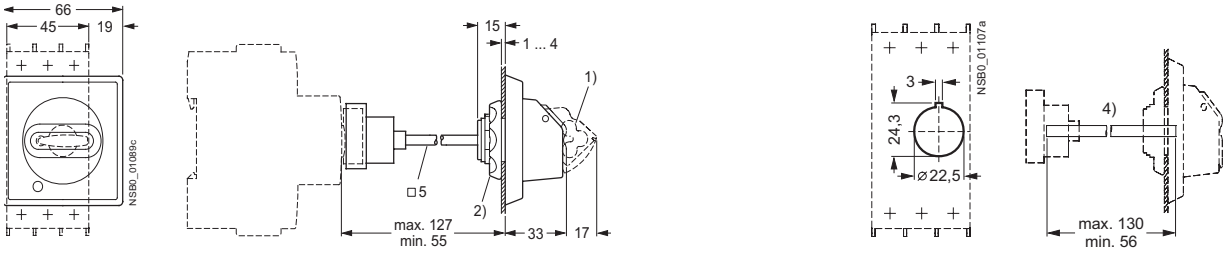
3RV19 15-5DB connecting piece
for connection of the three-phase busbar for circuit-breakers of size S0 (connected on the left)
to frame size S00 (connected on the right)



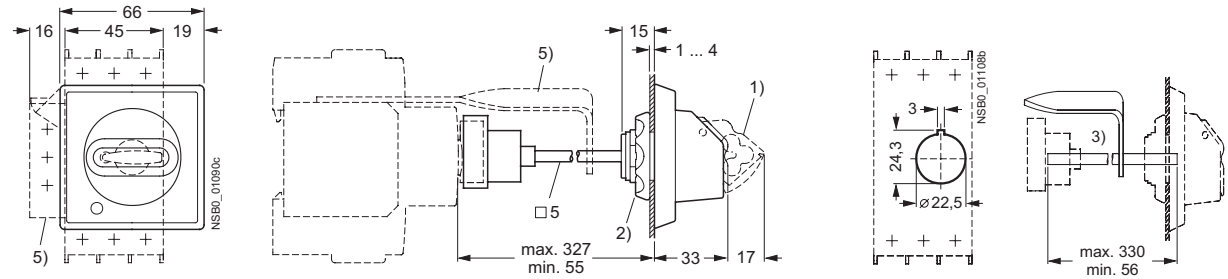
Project planning aids

3RV19 26-0. door-coupling rotary operating mechanisms

3RV19 26-0B
3RV19 26-0C
short shaft[4], for circuit-breakers of sizes S0, S2, S3



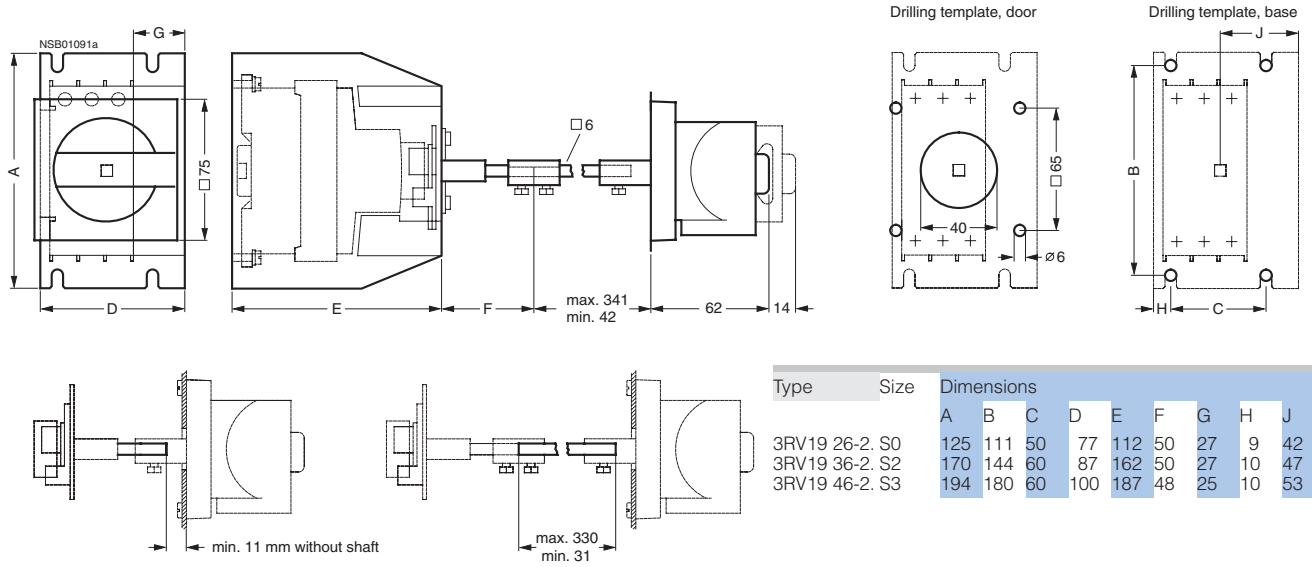
3RV19 26-0K
3RV19 26-0L
long shaft (with bracket)[3], for circuit-breakers of sizes S0, S2, S3



1) Lockable in neutral position with max. 8 mm shackle diameter.
2) Mounted with screw cap.
3) Supplied with a shaft length of 330 mm; can be adjusted by shortening the shaft.
4) Supplied with a shaft length of 130 mm; can be adjusted by shortening the shaft.
5) 35 mm^2 ground terminal and fixing bracket for 330 mm shaft.

3RV19 . 6-2. door-coupling rotary operating mechanisms for arduous conditions

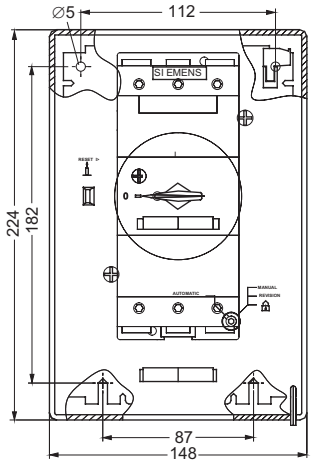
3RV19 26-2., 3RV19 36-2., 3R19 46-2.
for sizes S0, S2, and S3

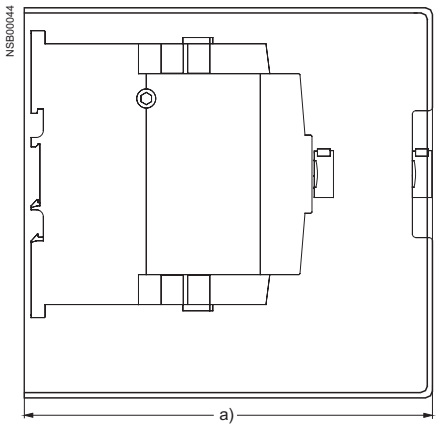


Type	Size	Dimensions								
		A	B	C	D	E	F	G	H	J
3RV19 26-2.	S0	125	111	50	77	112	50	27	9	42
3RV19 36-2.	S2	170	144	60	87	162	50	27	10	47
3RV19 46-2.	S3	194	180	60	100	187	48	25	10	53

Remote motorized operating mechanisms

3RV19. 6-3AP0
for frame sizes S2 and S3

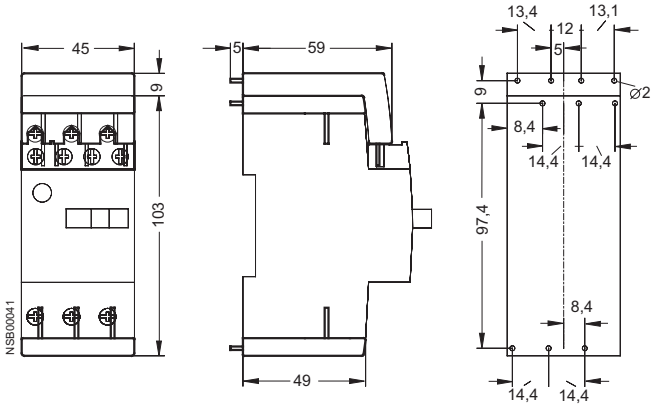




a) 3RV19 36-3AP0 211 mm
3RV19 46-3AP0 236 mm

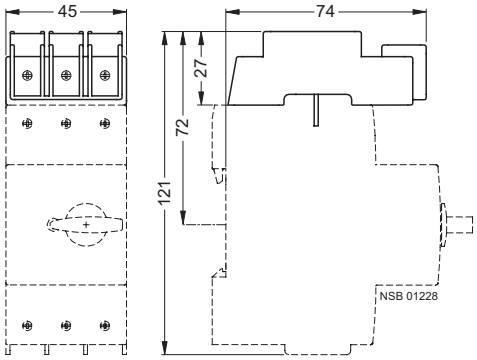
3RV19 18-5. solder pin adapter

3RV19 18-5A
3RV19 18-5B

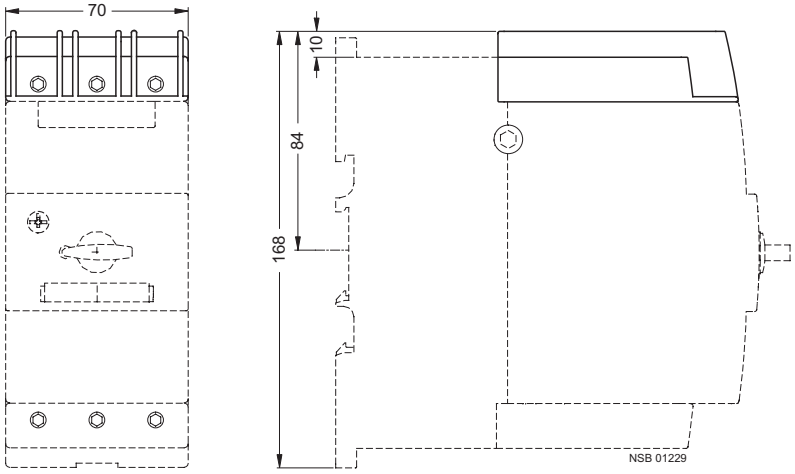


Terminals for "Self-Protected Combination Motor Controller (Type E)" to UL508

3RV19 28-1H



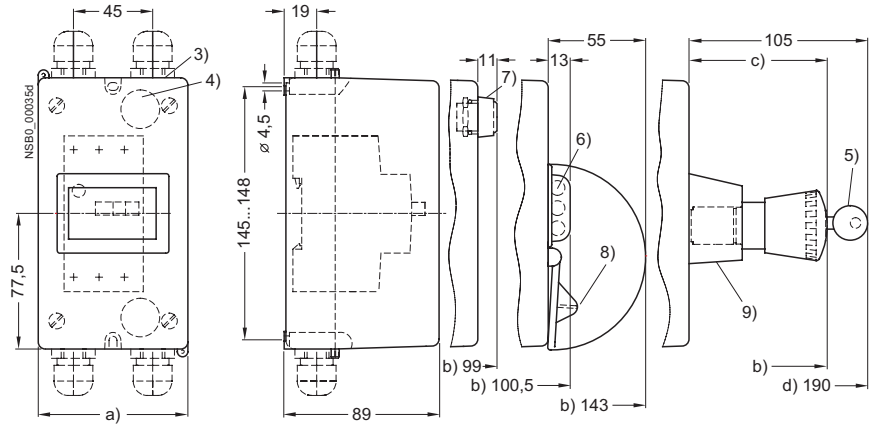
3RT19 46-4GA07



Project planning aids

3RV19 . 3-1. . . . molded-plastic surface-mounted enclosure

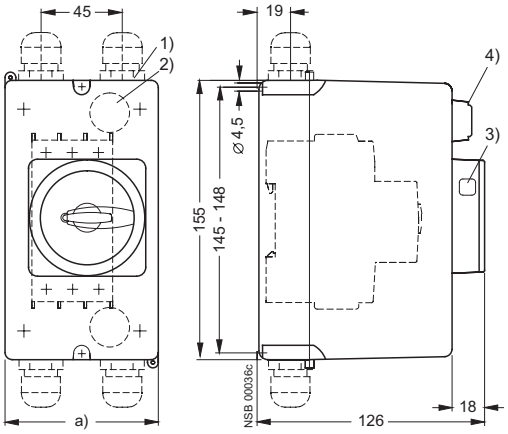
For circuit-breaker size S00
3RV19 13-1. . . .



a) 3RV19 13-1CA00 85 mm
b) With 3RV19 13-7D: 154 mm
with 3RV19 13-7E: 174 mm
Dimensions refer to mounting surface.
c) With 3RV19 13-7D: 64 mm
with 3RV19 13-7E: 84 mm.
d) Dimensions refer to mounting surface.

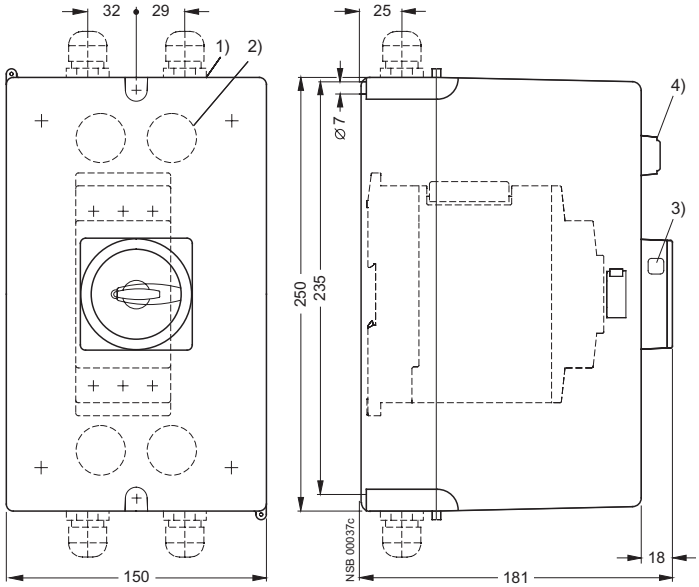
3) Knock-outs for M25.
4) Knock-outs for rear main conductor connection M20.
5) With safety lock.
6) Max. shackle diameter for padlock 8 mm.
7) 3RV19 03-5 indicator light.
8) 3RV19 13-6B locking device.
9) 3RV19 13-7 EMERGENCY-STOP mushroom button.

For circuit-breakers size S0
3RV19 23-1. . . .



a) 3RV19 23-1CA00 85 mm
3RV19 23-1DA00 105 mm.
1) Knock-outs for M25.
2) Knock-outs for rear main conductor connection M20.
3) Opening for padlock with shackle diameter of 6 mm to 8 mm.
4) 3RV19 03-5 indicator light.

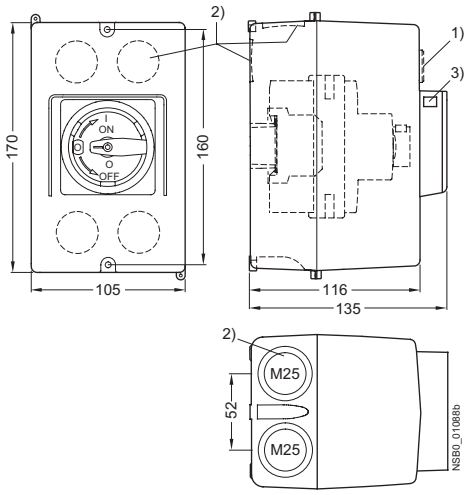
For circuit-breakers size S2
3RV19 33-1. . . .



1) Knock-outs for M32 (left) and M40 (right).
2) Knock-outs for rear main conductor connection M32.
3) Opening for padlock with shackle diameter of 6 mm to 8 mm.
4) 3RV19 03-5 indicator light.

3RV19 23-1. . . . cast aluminum surface-mounted enclosure

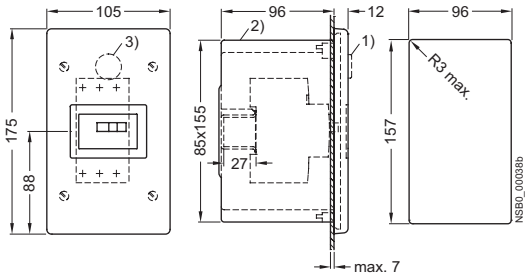
For circuit-breakers of size S0
3RV19 23-1DA01
3RV19 23-1G



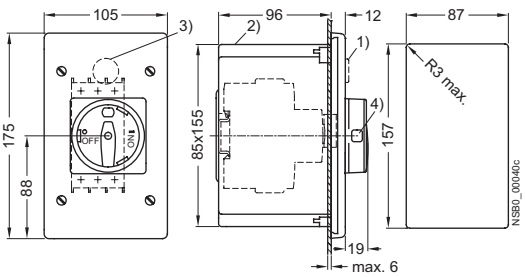
1) 3RV19 03-5 indicator light.
2) Knock-outs for M25 cable glands.
3) Opening for padlock with shackle diameter of 6 mm to 8 mm.

3RV19 .3-2. . . . molded-plastic surface-mounted enclosure

For circuit-breakers of size S00
3RV19 13-2DA00



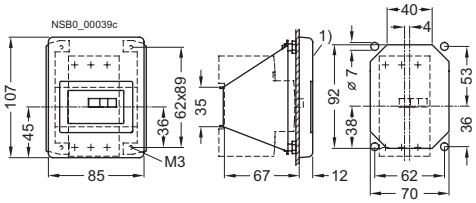
For circuit-breakers of size S0
3RV19 23-2DA00
3RV19 23-2GA00



1) 3RV19 03-5 indicator light.
2) Knock-outs for M25.
3) Knock-outs for M20.
4) Opening for padlock with shackle diameter of 6 mm to 8 mm.

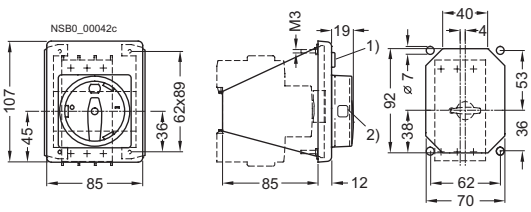
3RV19 13-4C molded-plastic front plate

For circuit-breakers of size S00
3RV19 13-4C



3RV19 23-4. molded-plastic front plate

For circuit-breakers of size S0, S2, S3
3RV19 23-4B
3RV19 23-4E
3RV19 23-4G (for size S0 only)

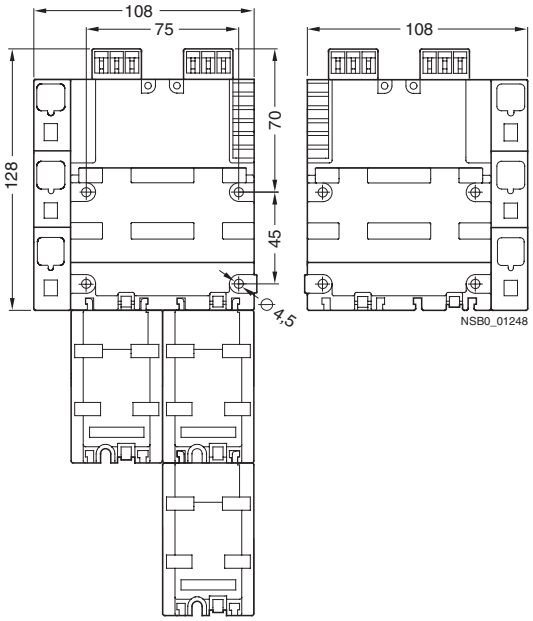


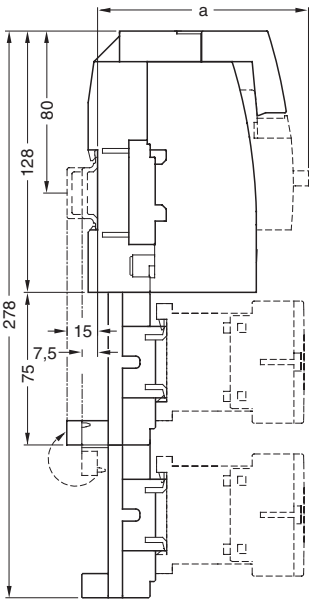
1) 3RV19 03-5 indicator light.
2) Opening for padlock with shackle diameter of 6 mm to 8 mm.

Project planning aids

Cage Clamp infeed system

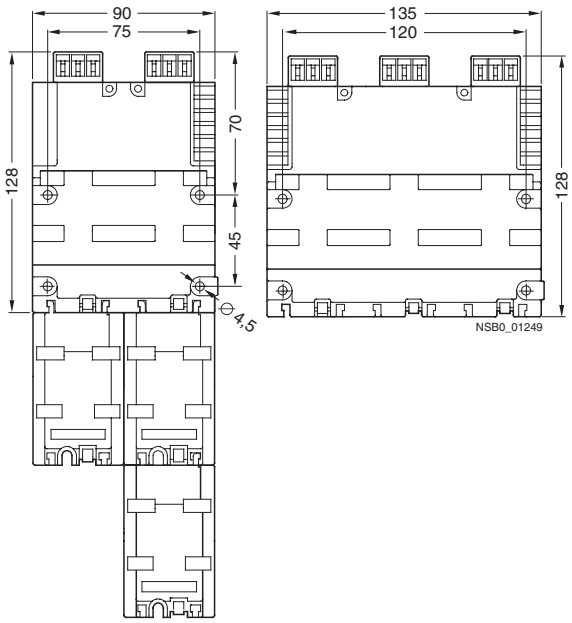
3-phase busbars with line-side terminals
for 2 circuit-breakers of sizes S00 and S0
3RV19 17-1.

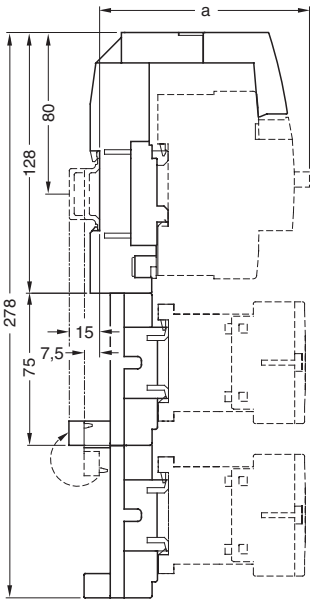




	S00	S0
a	104	125

3-phase busbars for system expansion
for 2 and 3 circuit-breakers of sizes S00 and S0
3RV19 17-4.





	S00	S0
a	104	125

Area of application

The compact design of the SENTRON VL circuit-breakers with excellent characteristics fulfils the high demands of today's electrical distribution systems.

These circuit-breakers offer a broad product range, improved technology, space savings and simple operation.

They are available both in thermal/magnetic design (16 A to 630 A) and in solid-state design (63 A to 1600 A).

Catalog LV 10 lists circuit-breakers for motor protection and for starter combinations with magnetic and solid-state overcurrent releases and rated currents from 63 A to 500 A.

For further SENTRON VL circuit-breakers, see Catalog LV 30.

The different designs of SENTRON VL circuit-breakers are suitable for the following applications:

- Incoming and outgoing circuit-breakers in distribution systems
- Switching and protection devices for motors, transformers and capacitors
- Main control switches and EMERGENCY-STOP switches in conjunction with lockable rotary operating mechanisms and terminal covers.

Design

Overview

- Rated current range from 16 A to 1600 A
- Different switching capacities for each size
  N Standard (40 to 50 kA/AC 415 V)
  H High (70 kA/AC 415 V)
  L Very high (100 kA/AC 415 V)
- No derating or loss of performance up to 50 °C
- Electronic overcurrent releases from size 160 A (VL160), particularly for time-based discrimination and ground-fault protection
- Only two ranges of internal accessories
- Full range of external accessories e.g. terminals for aluminim cables.

Functions

For motor protection

(in 3-pole design)
The overload and short-circuit releases are designed for optimized protection and direct starting of three-phase squirrel-cage motors. The circuit-breakers for motor protection are susceptible to phase failure and feature an adjustable trip class. The overcurrent releases operate with a microprocessor.

For starter combinations

(in 3-pole design)
These circuit-breakers are used both for short-circuit protection as well as for isolating functions, which may be required in starter combinations consisting of circuit-breakers, overload relays and motor contactors. These circuit-breakers exclusively feature adjustable, instantaneous short-circuit releases.

Current limitation

The SENTRON VL circuit-breakers utilize the design principle of magnetic repulsion of the contacts. The contacts open before the anticipated peak value of the short-circuit current is achieved. The current-limiting effects of the SENTRON VL circuit-breakers provide effective protection for system components against the thermal and dynamic effects of the short-circuit current in the event of an electrical fault.

Electronic overcurrent releases ETU

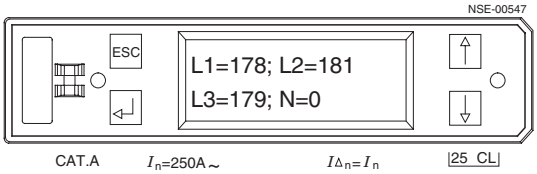
Application: Motor protection – ETU10M, LI function

Overload protection, finely adjustable I_R = 0.41; 0.42 to 0.98; 0.99; 1 × I_n, time-lag class t_R = 10 (fixed)

Thermal image

Short-circuit protection (instantaneous) I_i = 1.25 to 11 × I_n

with phase-failure sensitivity



Application: Motor protection – ETU30M, LI function

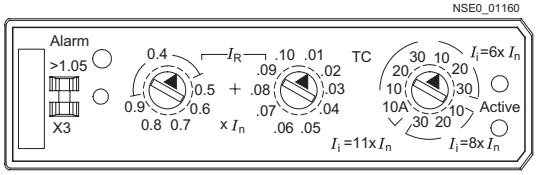
Overload protection, finely adjustable I_R = 0.41; 0.42 to 0.98; 0.99; 1 × I_n,

Trip class T_c = 10 A, 10, 20, 30

Thermal image

Short-circuit protection (instantaneous)
I_i = 6, 8, 11 × I_n

with phase-failure sensitivity



Electronic overcurrent releases LCD ETU

General

- Indication of the current values on the LCD
- User-friendly, menu-driven setting of protection parameters in absolute ampere values via keys
- Integrated self-test function
- Female connector for test/programming device
- For communication link to PROFIBUS DP see Catalog LV 30, Part 3.

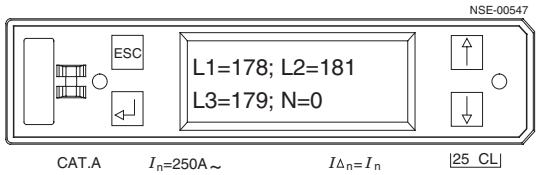
Motor/generator protection – ETU40M, LSI function

Overload protection I_R = 0.4 to 1 × I_n, trip class T_c = 2.5 to 30

On/off selectable thermal image

Short-circuit protection (short-time delayed)
I_{sd} = 1.5 to 10 × I_R, t_{sd} = 0 to 0.5 s, I^2t selectable on/off

Short-circuit protection (instantaneous) I_i = 1.25 to 11 × I_n



For motor/generator protection ETU

Selection and ordering data

3-pole fixed-mounted circuit-breakers, VL160 to VL630, solid-state overload releases

Type	Rated current I_n	Setting current of inverse-time delayed overload releases "L" I_R	Operating current of instantaneous short-circuit release "I" I_i	DT	**Standard switching capacity N 40/45/50 kA at AC 380/415 V** Order No. Order No. supplement required, see page 4/61.	Weight per PU approx.	DT	**High switching capacity H 70 kA at AC 380/415 V** Order No. Order No. supplement required, see page 4/61.	Weight per PU approx.	DT	**Very high switching capacity L 100 kA at AC 380/415 V** Order No. Order No. supplement required, see page 4/61.	Weight per PU approx.
	A	A	X I_n			kg			kg			kg
		Circuit-breakers for motor/generator protection, ETU10M, LI function with permanently fixed trip class T_c = 10, with phase-failure sensitivity										
VL160	63	25...63	1.25...11	B	**3VL27 06-1AP33-....**	2.400	B	**3VL27 06-2AP33-....**	2.400	B	**3VL27 06-3AP33-....**	2.400
	100	40...100	1.25...11	B	**3VL27 10-1AP33-....**	2.400	B	**3VL27 10-2AP33-....**	2.400	B	**3VL27 10-3AP33-....**	2.400
	160	64...160	1.25...11	B	**3VL27 16-1AP33-....**	2.400	B	**3VL27 16-2AP33-....**	2.400	B	**3VL27 16-3AP33-....**	2.400
VL250	200	80...200	1.25...11	B	**3VL37 20-1AP36-....**	2.500	B	**3VL37 20-2AP36-....**	2.500	B	**3VL37 20-3AP36-....**	2.500
	250	100...250	1.25...11	B	**3VL37 25-1AP36-....**	2.500	B	**3VL37 25-2AP36-....**	2.500	B	**3VL37 25-3AP36-....**	2.500
VL400	315	125...315	1.25...11	B	**3VL47 31-1AP36-....**	5.900	B	**3VL47 31-2AP36-....**	5.900	B	**3VL47 31-3AP36-....**	5.900
	400	160...400	1.25...11	B	**3VL47 40-1AP36-....**	5.900	B	**3VL47 40-2AP36-....**	5.900	B	**3VL47 40-3AP36-....**	5.900
VL630	500	200...500	1.25...12.5	B	**3VL57 50-1AP36-....**	9.300	B	**3VL57 50-2AP36-....**	9.300	B	**3VL57 50-3AP36-....**	9.300
		Circuit-breakers for motor/generator protection, ETU30M, LI function with adjustable trip class T_c (10A, 10, 20, 30) with phase-failure sensitivity										
VL160	63	25...63	1.25...11	B	**3VL27 06-1AS33-....**	2.400	B	**3VL27 06-2AS33-....**	2.400	B	**3VL27 06-3AS33-....**	2.400
	100	40...100	1.25...11	B	**3VL27 10-1AS33-....**	2.400	B	**3VL27 10-2AS33-....**	2.400	B	**3VL27 10-3AS33-....**	2.400
	160	64...160	1.25...11	B	**3VL27 16-1AS33-....**	2.400	B	**3VL27 16-2AS33-....**	2.400	B	**3VL27 16-3AS33-....**	2.400
VL250	200	80...200	1.25...11	B	**3VL37 20-1AS36-....**	2.500	B	**3VL37 20-2AS36-....**	2.500	B	**3VL37 20-3AS36-....**	2.500
	250	100...250	1.25...11	B	**3VL37 25-1AS36-....**	2.500	B	**3VL37 25-2AS36-....**	2.500	B	**3VL37 25-3AS36-....**	2.500
VL400	315	125...315	1.25...11	B	**3VL47 31-1AS36-....**	5.900	B	**3VL47 31-2AS36-....**	5.900	B	**3VL47 31-3AS36-....**	5.900
	400	160...400	1.25...11	B	**3VL47 40-1AS36-....**	5.900	B	**3VL47 40-2AS36-....**	5.900	B	**3VL47 40-3AS36-....**	5.900
VL630	500	200...500	1.25...12.5	B	**3VL57 50-1AS36-....**	9.300	B	**3VL57 50-2AS36-....**	9.300	B	**3VL57 50-3AS36-....**	9.300
		Circuit-breakers for motor/generator protection, ETU40M, LSI function with adjustable trip class T_c (5, 10, 15, 20, 30), with phase-failure sensitivity										
VL160	63	25...63	1.25...11	B	**3VL27 06-1CP33-....**	2.400	B	**3VL27 06-2CP33-....**	2.400	B	**3VL27 06-3CP33-....**	2.400
	100	40...100	1.25...11	B	**3VL27 10-1CP33-....**	2.400	B	**3VL27 10-2CP33-....**	2.400	B	**3VL27 10-3CP33-....**	2.400
	160	63...160	1.25...11	B	**3VL27 16-1CP33-....**	2.400	B	**3VL27 16-2CP33-....**	2.400	B	**3VL27 16-3CP33-....**	2.400
VL250	200	80...200	1.25...11	B	**3VL37 20-1CP36-....**	2.500	B	**3VL37 20-2CP36-....**	2.500	B	**3VL37 20-3CP36-....**	2.500
	250	100...250	1.25...11	B	**3VL37 25-1CP36-....**	2.500	B	**3VL37 25-2CP36-....**	2.500	B	**3VL37 25-3CP36-....**	2.500
VL400	315	125...315	1.25...11	B	**3VL47 31-1CP36-....**	5.900	B	**3VL47 31-2CP36-....**	5.900	B	**3VL47 31-3CP36-....**	5.900
	400	160...400	1.25...11	B	**3VL47 40-1CP36-....**	5.900	B	**3VL47 40-2CP36-....**	5.900	B	**3VL47 40-3CP36-....**	5.900
VL630	500	200...500	1.25...12.5	B	**3VL57 50-1CP36-....**	9.300	B	**3VL57 50-2CP36-....**	9.300	B	**3VL57 50-3CP36-....**	9.300


NSE0_00705

NSE0_00691


NSE0_00706

Package size for SENTRON VL circuit-breakers is 1 unit, i.e. 1 unit or a multiple thereof can be ordered.

For the complete range of SENTRON VL circuit-breakers see Catalog LV 30 "Products and Systems for Power Distribution".

3-pole fixed-mounted circuit-breakers, VL160 to VL630
Magnetic overcurrent releases

Type	Rated current I_n	Setting current of inverse-time delayed overload release "L" I_R	Operating current of instanta-neous short-circuit release "I" I_i	DT	**Standard switching capacity N 40/45/50 kA at AC 380/415 V** Order No. Order No. supplement required, see below.	Weight per PU approx.	DT	**High switching capacity H 70 kA at AC 380/415 V** Order No. Order No. supplement required, see below.	Weight per PU approx.	DT	**Very high switching capacity L 100 kA at AC 380/415 V** Order No. Order No. supplement required, see below.	Weight per PU approx.
	A	A	A			kg			kg			kg
		Circuit-breakers for starter combinations, I function without overload release, with adjustable short-circuit release										
 NSE0_00707												
VL160	63	–	450-900	B	**3VL27 06-1DK33-....**	2.200	B	**3VL27 06-2DK33-....**	2.200	B	**3VL27 06-3DK33-....**	2.200
	100	–	750-1500	B	**3VL27 10-1DK33-....**	2.200	B	**3VL27 10-2DK33-....**	2.200	B	**3VL27 10-3DK33-....**	2.200
	160	–	1250-2500	B	**3VL27 16-1DK33-....**	2.200	B	**3VL27 16-2DK33-....**	2.200	B	**3VL27 16-3DK33-....**	2.200
VL250	250	–	2000-4000	B	**3VL37 25-1DK36-....**	2.300	B	**3VL37 25-2DK36-....**	2.300	B	**3VL37 25-3DK36-....**	2.300
VL400	200	–	1250-2500	B	**3VL47 20-1DK36-....**	5.700	B	**3VL47 20-2DK36-....**	5.700	B	**3VL47 20-3DK36-....**	5.700
	250	–	2000-4000	B	**3VL47 25-1DK36-....**	5.700	B	**3VL47 25-2DK36-....**	5.700	B	**3VL47 25-3DK36-....**	5.700
	400	–	3000-6000	B	**3VL47 40-1DK36-....**	5.700	B	**3VL47 40-2DK36-....**	5.700	B	**3VL47 40-3DK36-....**	5.700
VL630	315	–	2000-4000	B	**3VL57 31-1DK36-....**	9.000	B	**3VL57 31-2DK36-....**	9.000	B	**3VL57 31-3DK36-....**	9.000
	500	–	3250-6300	B	**3VL57 50-1DK36-....**	9.000	B	**3VL57 50-2DK36-....**	9.000	B	**3VL57 50-3DK36-....**	9.000

Package size for SENTRON VL circuit-breakers is 1 unit, i.e. 1 unit or a multiple thereof can be ordered.

For the complete range of SENTRON VL circuit-breakers
see Catalog LV 30 "Products and Systems for Power Distribution".

Order No. supplements

1. Order No. supplement: Undervoltage or shunt release, directly wired to accessories

Rated control supply voltage U_s/frequency		Order No. supplement
AC 50/60 Hz DC		**3VL**. . . .-. . . . .-□□. .
Without auxiliary release		**0 A**
With undervoltage release	Right pole only	
AC V	DC V	
–	24	**2 P**[1]
110-127	–	**2 G**[1]
–	110-127	**2 R**[1]
220-250	–	**2 H**[1]
–	220-250	**2 S**[1]
With shunt release	Right pole only	
AC V	DC V	
–	24	**8 C**[1]
110-127	–	**8 R**[1]
–	110-127	**8 K**[1]
208-277	–	**8 T**[1]
–	220-250	**8 Q**[1]

2. Order No. supplement: Auxiliary switch (HS) and alarm switch (AS), left/right pole, directly wired to accessories

Complement	Order No. supplement	Circuit-breaker Type		
HS = contact block 1 NO or 1 NC AS = contact block 1 NO	3VL. . . .-. . . . .-. . □□	**VL160/ VL250**	**VL400**	**VL630**
Without auxiliary switch/alarm switch	**A 0**	x	x	x
With auxiliary switch/alarm switch				
2 HS (1 NO/1 NC)	**B 1**	x[2]	x	–
4 HS (2 NO/2 NC)	**C 1**	–	–	x
1 AS (1 NO)	**G 1**	x[2]	x	–
2 HS (1 NO/1 NC) + 1 AS (1 NO)	**D 1**	x[2]	x	–
2 HS (1 NO/1 NC) + 1 AS (1 NO)	**E 1**	–	–	x

x = available

– = not available

1) For VL160/VL250 circuit-breakers with solid-state tripping units, only one undervoltage release or shunt release or one auxiliary/alarm switch combination is possible.

2) Excluding installation in the left accessory compartment of the SENTRON VL 160X circuit-breaker with RCD module and SENTRON VL160 and VL250 circuit-breakers with solid-state release units, because this compartment contains the tripping solenoid. On the right, only one auxiliary release or one auxiliary/alarm switch combination can be installed. A 3SB adapter can be installed in the N pole (4-pole circuit-breaker only) for this application only.

Accessories/Spare parts

Selection and ordering data

	DT	For VL160 to VL250 Order No.	PS*	Weight per PU approx. kg	DT	For VL400 Order No.	PS*	Weight per PU approx. kg	DT	For VL630 Order No.	PS*	Weight per PU approx. kg
Front-operated rotary operating mechanism[1] for direct mounting on the circuit-breaker, without a early-make auxiliary switch, IP30 degree of protection [2], black, max. 3 padlocks												
	B	**3VL9 300-3HA00**	1 unit	0.618	B	**3VL9 400-3HA00**	1 unit	0.618	B	**3VL9 600-3HA00**	1 unit	1.370
EMERGENCY-STOP design, red knob, yellow indicator plate	B	**3VL9 300-3HC00**	1 unit	0.618	B	**3VL9 400-3HC00**	1 unit	0.618	B	**3VL9 600-3HC00**	1 unit	1.360
Door-coupling rotary operating mechanism, complete[1]**, installation in doors and covers**												
IP65 degree of protection, incl. black knob with masking frame, indicator plate, removable door coupling, 300 mm extension shaft and front-operated rotary operating mechanism for the respective circuit-breaker, lockable with up to 3 padlocks, with door interlocking												
	B	**3VL9 300-3HF04**	1 unit	0.965	B	**3VL9 400-3HF04**	1 unit	0.965	B	**3VL9 600-3HF04**	1 unit	2.465
EMERGENCY-STOP design, red knob, yellow indicator plate, without leading auxiliary switch	B	**3VL9 300-3HG04**	1 unit	0.980	B	**3VL9 400-3HG04**	1 unit	1.100	B	**3VL9 600-3HG04**	1 unit	2.460
Auxiliary switches (HS) and alarm switches (AS) for retrofitting												
Assembly kits / **Mounting side**												
2 HS (1 NO + 1 NC) / N, left[3], right	B	**3VL9 400-2AB00**	1 unit	0.073	B	**3VL9 400-2AB00**	1 unit	0.073		–		
4 HS (2 NO + 2 NC) / N, left, right		–				–			B	**3VL9 800-2AC00**	1 unit	0.094
Undervoltage release for retrofitting												
AC 220-250 V / Right pole only	B	**3VL9 400-1UH00**	1 unit	0.121	B	**3VL9 400-1UH00**	1 unit	0.121	B	**3VL9 800-1UH00**	1 unit	0.132
Shunt release[4] for retrofitting												
AC 208-277 V / Right pole only	B	**3VL9 400-1ST00**	1 unit	0.140	B	**3VL9 400-1ST00**	1 unit	0.140	B	**3VL9 800-1ST00**	1 unit	0.183
Motorized operating mechanism[5]												
IP30 degree of protection, with locking device for 3 padlocks												
AC 50/60 Hz V / DC V												
220-250 / 220-250	B	**3VL9 300-3MQ00**	1 unit	2.530	B	**3VL9 400-3MQ00**	1 unit	2.510	B	**3VL9 600-3MQ00**	1 unit	5.460

1) Not possible on VL160X with RCD module.

2) IP40 with additional masking frame mounted on door cut-out.

3) Excluding installation in the left accessory compartment of the SENTRON VL160X circuit-breaker with RCD module and SENTRON VL160 and VL250 circuit-breakers with solid-state overload releases, because this compartment contains the tripping solenoid. A 3SB adapter can be installed in the N pole (4-pole circuit-breaker only) for this application only.

4) For VL160X to VL400: Shunt release with disconnection contact (3SB3 for ON/OFF position) not floating.

5) For VL 400: Not suitable for mounting in the right-hand compartment. The installation kit 3VL9 400-2AB00 with auxiliary switches only is recommended.

Further information

Manual for the SENTRON VL circuit-breakers

This manual contains additional technical information, covering a product description, mode of operation, electrical wiring system and retrofitting. The manual and the operating instructions can be found in PDF format at:
www.siemens.de/energieverteilung

*** This quantity or a multiple thereof can be ordered.**