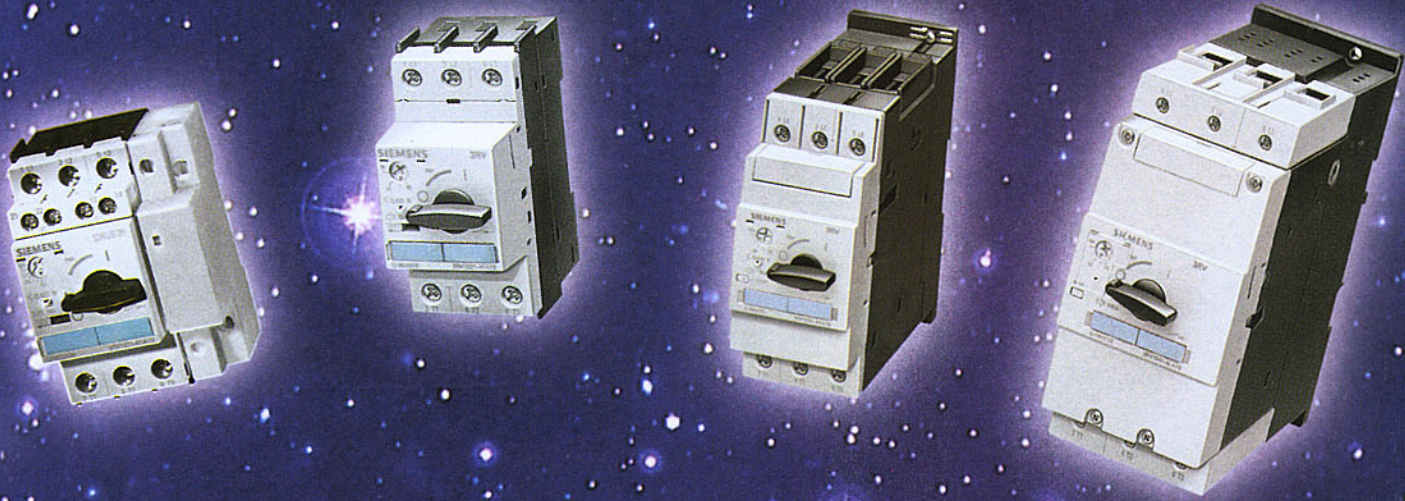


SIEMENS

New Generation Motor Protection Circuit Breakers Type 3RV



- **Designed for fuseless motor feeders in MCC's.**
- **Short circuit breaking capacity of 50 kA.**
- **MPCB with 'relay function'.**
- **Rotary handle with trip position.**

Introduction

3RV circuit-breakers are compact, current-limiting circuit-breakers designed for fuseless motor feeders of the 21st century. The circuit-breakers are therefore referred to as **"Motor Protection Circuit Breakers"** (MPCB).

The circuit-breaker fulfils the isolation conditions as per IEC 947-3 and the additional test conditions for circuit breakers with isolation characteristics as per IEC 947-2. The MPCBs can be deployed as **mains and emergency stop** circuit breakers with appropriate accessories.

Protection options

The MPCBs are supplied with factory-fitted over current release. There are four possible options for the over current release. These are:

- MPCBs with standard release.
The MPCB trips on thermal overload and also on short circuit.
- MPCB with relay function.
MPCB senses overload & signals the contactor to trip on overloads. The MPCB trips on short circuit.
- MPCB with "MAG only" release.
The MPCB trips on short circuit only. Separate overload protection device e.g. bimetal relay is required.
- MPCBs with Class 20 release (upon request).
For heavy starting motors.

Applications for each type are given below.

Features - 3RV

- MPCB / contactor combination for fuseless motor feeder (type-2 coordinated).
- Rotary operating mechanism.
- MPCB with "relay function". A totally new concept.
- Suitable for service temperatures upto 70°C
- Current limiting type. Tripping time < 5 msec.
- Wide range of site fittable accessories, common for complete range.
- Trip free mechanism

Recommended applications

- For motors, with normal DOL starting.
This is an economy driven starter feeder comprising of contactor and MPCB. However, this arrangement compromises the life of the MPCB.
- For motors with normal DOL starting.
This option ensures:-
 - High life of MPCB because overload faults are interrupted by the contactor which has a higher electrical life
 - Very compact feeder (no birelay)

- For motors with Star delta starting.
Because birelay is required to be connected in delta circuit, for accurate overload protection.
- For motors with longer starting times upto 20 sec.

Operating mechanism on the MPCB

Size S0, S2, and S3 MPCBs are operated by means of a rotary handle. When the MPCB trips, the handle moves to the trip position to indicate this. Before the MPCB is reclosed, the rotary handle must be reset to the '0' position. This prevents the MPCB from closing on to a fault by mistake.

Operating Mechanism on the Panel door

A rotary door operating mechanism with door interlock, defeat facility, padlocking facility for switching MPCBs mounted in panel is available. It comprises

- the 8UC61 front drive and
- the breaker operator kit.

The operating mechanism can be locked in the '0' position with a padlock (shackle dia. 3.5 to 4.5 mm).

Advantages

- Short circuit proof for faults upto 50 KA - high system uptime.
- Visual On / Off / Trip indication, reset function, padlock feature.
- "Relay function" – results in longer life of the system because the contactor interrupts overload faults, instead of the MPCB.
- Reliability of protection is ensured.
- Faster fault clearing for enhanced life of installations.
- Flexibility in designing the system with minimum inventory.
- Positive opening in the event of faults.

Short-circuit protection

3RV MPCBs have a standard short-circuit breaking capacity of 50 kA or 100 kA at a voltage of 415 V AC. They are practically short-circuit-proof at this voltage as higher short-circuit currents are not usually encountered at the installation point.












Installation

The MPCBs size 0 and size 2 are suitable for snap mounting onto 35 mm standard DIN rails.

S2 and S3 MPCBs can be also screwed directly onto a baseplate.

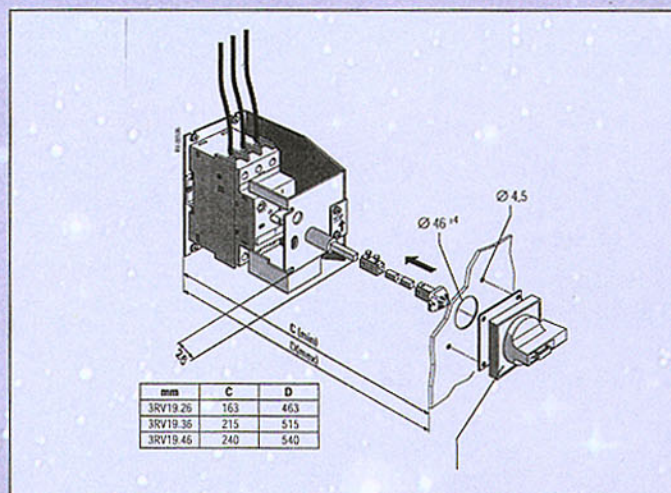
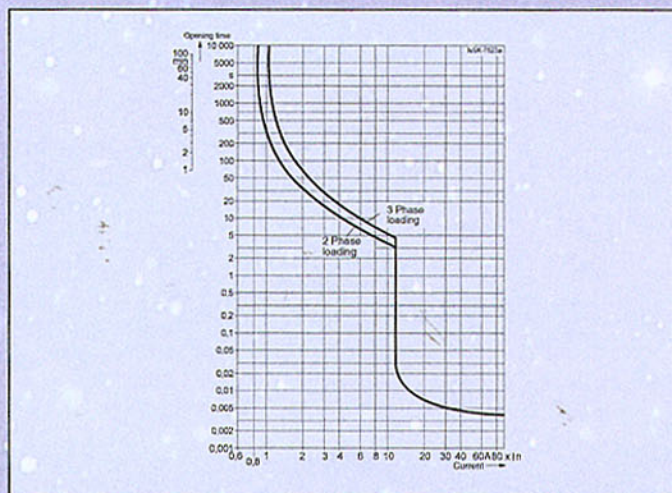
Selection Table

To order auxiliary contact, pls. refer table for accessories

	MPCB Rated current I_n	Suitable for 3-phase motors ¹⁾ P_n	Short-circuit breaking capacity at AC 415V I_{cs}	MPCB with Standard release			MPCB with 'MAG only' function			MPCB with 'Relay function'		
				Overload setting range 	Short-circuit release setting 	Type	Overload setting range 	Short-circuit release setting 	Type	Overload setting range 	Short-circuit release setting 	Type
	A	kW	kA	A	A		A	A		A	A	
Size S0												
 	0.16		100	0.11-0.16	1.9	3RV10 21-0AA10	None	1.9	3RV13 21-0AC10	0.11-0.16	1.9	3RV11 21-0AA10
	0.2		100	0.14-0.2	2.4	3RV10 21-0BA10	None	2.4	3RV13 21-0BC10	0.14-0.2	2.4	3RV11 21-0BA10
	0.25	0.06	100	0.18-0.25	3	3RV10 21-0CA10	None	3	3RV13 21-0CC10	0.18-0.25	3	3RV11 21-0CA10
	0.32	0.09	100	0.22-0.32	3.8	3RV10 21-0DA10	None	3.8	3RV13 21-0DC10	0.22-0.32	3.8	3RV11 21-0DA10
	0.4		100	0.28-0.4	4.8	3RV10 21-0EA10	None	4.8	3RV13 21-0EC10	0.28-0.4	4.8	3RV11 21-0EA10
	0.5	0.12	100	0.35-0.5	6	3RV10 21-0FA10	None	6	3RV13 21-0FC10	0.35-0.5	6	3RV11 21-0FA10
	0.63	0.18	100	0.45-0.63	7.6	3RV10 21-0GA10	None	7.6	3RV13 21-0GC10	0.45-0.63	7.6	3RV11 21-0GA10
	0.8		100	0.55-0.8	9.6	3RV10 21-0HA10	None	9.6	3RV13 21-0HC10	0.55-0.8	9.6	3RV11 21-0HA10
	1	0.25	100	0.7-1	12	3RV10 21-0JA10	None	12	3RV13 21-0JC10	0.7-1	12	3RV11 21-0JA10
	1.25	0.37	100	0.9-1.25	15	3RV10 21-0KA10	None	15	3RV13 21-0KC10	0.9-1.25	15	3RV11 21-0KA10
	1.6	0.55	100	1.1-1.6	19	3RV10 21-1AA10	None	19	3RV13 21-1AC10	1.1-1.6	19	3RV11 21-1AA10
	2	0.75	100	1.4-2	24	3RV10 21-1BA10	None	24	3RV13 21-1BC10	1.4-2	24	3RV11 21-1BA10
	2.5		100	1.8-2.5	30	3RV10 21-1CA10	None	30	3RV13 21-1CC10	1.8-2.5	30	3RV11 21-1CA10
	3.2	1.1	100	2.2-3.2	38	3RV10 21-1DA10	None	38	3RV13 21-1DC10	2.2-3.2	38	3RV11 21-1DA10
	4	1.5	100	2.8-4	48	3RV10 21-1EA10	None	48	3RV13 21-1EC10	2.8-4	48	3RV11 21-1EA10
	5	2.2	100	3.5-5	60	3RV10 21-1FA10	None	60	3RV13 21-1FC10	3.5-5	60	3RV11 21-1FA10
6.3		100	4.5-6.3	76	3RV10 21-1GA10	None	76	3RV13 21-1GC10	4.5-6.3	76	3RV11 21-1GA10	
8	3.7	100	5.5-8	96	3RV10 21-1HA10	None	96	3RV13 21-1HC10	5.5-8	96	3RV11 21-1HA10	
10		100	7-10	120	3RV10 21-1JA10	None	120	3RV13 21-1JC10	7-10	120	3RV11 21-1JA10	
12.5	5.5	100	9-12.5	150	3RV10 21-1KA10	None	150	3RV13 21-1KC10	9-12.5	150	3RV11 21-1KA10	
16	7.5	50	11-16	192	3RV10 21-4AA10	None	192	3RV13 21-4AC10	11-16	192	3RV11 21-4AA10	
20	9.3	50	14-20	240	3RV10 21-4BA10	None	240	3RV13 21-4BC10	14-20	240	3RV11 21-4BA10	
22	11	50	17-22	264	3RV10 21-4CA10	None	264	3RV13 21-4CC10	17-22	264	3RV11 21-4CA10	
25		50	20-25	300	3RV10 21-4DA10	None	300	3RV13 21-4DC10	20-25	300	3RV11 21-4DA10	
Size S2												
	25	11	50	18-25	300	3RV10 31-4DA10	None	300	3RV13 31-4DC10	18-25	300	3RV11 31-4DA10
	32	15	50	22-32	384	3RV10 31-4EA10	None	384	3RV13 31-4EC10	22-32	384	3RV11 31-4EA10
	40	18.5	50	28-40	480	3RV10 31-4FA10	None	480	3RV13 31-4FC10	28-40	480	3RV11 31-4FA10
	45	22	50	36-45	540	3RV10 31-4GA10	None	540	3RV13 31-4GC10	36-45	540	3RV11 31-4GA10
	50		50	40-50	600	3RV10 31-4HA10	None	600	3RV13 31-4HC10	40-50	600	3RV11 31-4HA10
Size S3												
	50	22	50	36-50	600	3RV10 41-4HA10	None	600	3RV13 41-4HC10	36-50	600	3RV11 42-4HA10
	63	30	50	45-63	756	3RV10 41-4JA10	None	756	3RV13 41-4JC10	45-63	756	3RV11 42-4JA10
	75	37	50	57-75	900	3RV10 41-4KA10	None	900	3RV13 41-4KC10	57-75	900	3RV11 42-4KA10
	90	45	50	70-90	1080	3RV10 41-4LA10	None	1080	3RV13 41-4LC10	70-90	1080	3RV11 42-4LA10
	100		50	80-100 ²⁾	1140	3RV10 41-4MA10	None	1140	3RV13 41-4MC10	80-100 ²⁾	1140	3RV11 42-4MA10




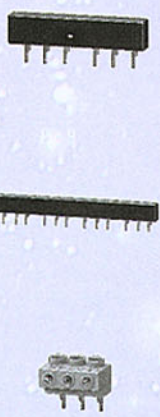
¹⁾ Indicative value for standard 4-pole motors at AC 50 Hz 415V.

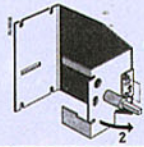
²⁾ Maximum motor current 95A.



Typical tripping characteristic of 3RV1 MPCB

Accessories

	Description	Version	For MPCB size	Type	Weight approx. kg	
Front						
	Front auxiliary contact One per MPCB	1 Changeover 1NO + 1NC	S0, S2, S3 S0, S2,S3	3RV19 01-1D 3RV19 01-1E	0.02	
LHS						
	Side auxiliary contact with screw connection One per MPCB	1NO + 1NC 2NO 2NC	S0,S2,S3	3RV19 01-1A 3RV19 01-1B 3RV19 01-1C		
	Alarm contact One per MPCB Can also be fitted in addition to auxiliary contact.	1NO + 1NC each for trip and S/C trip	S0,S2,S3	3RV19 21-1M		
RHS						
	Either under voltage or shunt release only.					
	Undervoltage release One per MPCB	AC 50 Hz 110V 230V 400V	S0,S2,S3	3RV19 02-1AF0 3RV19 02-1AP0 3RV19 02-1AV0	0.11	
	Shunt trip One per MPCB	24V AC/DC 110V AC/DC 230V AC/220V DC 415V AC/440V DC	S0,S2,S3	3RV19 02-1DB0 3RV19 02-1DF0 3RV19 02-1DP0 3RV19 02-1DB0	0.11	
Top						
	Isolator modules					
	Isolator module (to ensure visible isolation)	for MPCB size S0 for MPCB size S2	S0 S2	3RV19 28-1A 3RV19 38-1A		
	Insulated 3-phase busbar system					
	3-phase busbars modular spacing 45 mm	for 2 MPCB w/o side accessories for 3 MPCB w/o side accessories for 4 MPCB w/o side accessories for 5 MPCB w/o side accessories	S0 S0 S0 S0	3RV19 15-1A 3RV19 15-1B 3RV19 15-1C 3RV19 15-1D		
	3-phase busbars modular spacing 63 mm	for 2 MPCB with side accessories for 4 MPCB with side accessories	S0 S0	3RV19 15-3A 3RV19 15-3C		
	3-phase busbars modular spacing 55 mm	for 2 MPCB w/o side accessories for 4 MPCB w/o side accessories	S2 S2	3RV19 35-1A 3RV19 35-1C		
	3-phase busbars modular spacing 75 mm	for 2 MPCB with side accessories for 4 MPCB with side accessories	S2 S2	3RV19 35-3A 3RV19 35-3C		
	3-phase in feed terminal connection from above	Conductor cross-section solid: 25 mm ² Conductor cross-section linely stranded: 16 mm ²	S0	3RV19 15-5A		
3-phase in feed terminal connection from above	Conductor cross-section: 1 cond. 2.5..50 mm ² 2 cond. 35 mm ²	S2	3RV19 35-5A			

	Description	Version	For MPCB size	Type	Weight approx. kg
	Door operating – Mechanism with door interlock defeat facility, padlocking facility extension shaft 300mm	Front drive	S0, S2, S3	8UC61	
		Breaker Operator Kit ¹⁾	S0 S2 S3	3RV1926-1B 3RV1936-1B 3RV1946-1B	

¹⁾ For complete set of door operating mechanism, order one front drive and one breaker operator kit.

Technical data							
Standards	IEC 947-1, IEC 947-2, IEC 947-4-1						
Type	3RV1.2		3RV1.3		3RV1.4		
Size	S0		S2		S3		
Max. rated operational current I_n	A	25	50	100			
Permissible temperature	storage / transport	°C -50 to +80					
	service	°C -20 to +70 (No derating upto +60°C)					
Rated operational voltage U_n	V	690					
Rated frequency	Hz	50/60					
Rated insulation voltage U_i	V	690					
Rated impulse withstand voltage U_{imp}	kV	6					
Rated short-circuit breaking capacity I_{cn}	Refer page 3						
DC short-circuit breaking capacity time constant $\tau = 5$ ms							
1 Pole	2 Pole in series	3 Pole in series					
DC 150 V	DC 300 V	DC 450 V	kA on request				
Power loss P_v per circuit-breaker depending on rated current I_n (upper setting range)		I_n (A)	P_v (W)	I_n (A)	P_v (W)	I_n (A)	P_v (W)
		up to 0.63	5	up to 25	12	up to 63	20
		0.8 to 6.3	6	32	15	75 and 90	30
		8 to 16	7	40 to 50	20	100	38
		20 to 25	8				
Shock resistance acc. to IEC 68 Part 2-27	g	25					
Degree of protection	acc. to IEC 529	IP 20					
Shock-hazard protection	acc. to DIN VDE 0106 Part 100	safe from finger touch					
Temperature compensation ¹⁾	acc. to IEC 947-4-1	°C -20 to +60					
Phase failure sensitivity	acc. to IEC 947-4-1	yes					
Isolator characteristics	acc. to IEC 947-3	yes					
Main and EMERGENCY-STOP switch characteristics ²⁾	acc. to IEC (VDE 0113)	yes					
Mechanical endurance	operating cycles	100 000	50 000	50 000			
Electrical endurance	operating cycles	100 000	50 000	50 000			
Max. switching frequency per hour (motor starts)	1/h	15	15	15			
Conductor cross-sections for main circuit							
Terminal type	Screw-type		Box terminal				
Terminal screw	Pozidrive size 2		Pozidrive size 2		Allen screw		
Minimum/maximum conductor cross-sections finely stranded with end sleeve							
1 conductor	mm ²	1/6	0.75/25	2.5/50			
2 conductors	mm ²	1/2.5 or 2.5/6	0.75/16	2.5/35			
solid or stranded							
1 conductors	mm ²	1/6 (max. 10)	0.75/35	2.5/70			
2 conductors	mm ²	1/2.5 or 2.5/6	0.75/25	2.5/50			

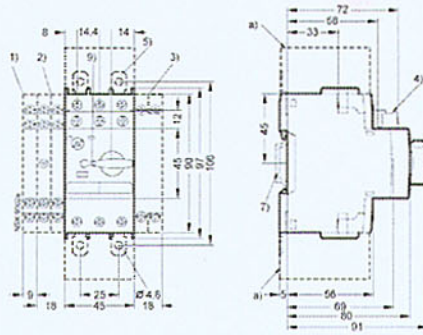
¹⁾ Only for circuit-breakers for motor protection.²⁾ With appropriate accessories.

Auxiliary contact						
Front auxiliary contact 1 changeover						
Rated operational voltage U_o	AC	AC V	24	230	415	
Rated operational current I_o	AC-15	A	4	3	1.5	
Conventional thermal current I_{th}		A	10			
Rated operational voltage U_o	DC L/R 200 ms	DC	V	24	110	220
Rated operational current I_o	DC-13	A	1	0.22	0.1	
Front auxiliary contact 1 NO + 1 NC						
Rated operational voltage U_o	AC	AC V	24	230		
Rated operation current I_o	AC-15	A	2	0.5		
Conventional thermal current I_{th}		A	2.5			
Rated operational voltage U_o	DC L/R 200 ms	DC	V	24	48	60
Rated operational current I_o	DC-13	A	1	0.3	0.15	
Side auxiliary contact 1 NO + 1 NC, 2 NO, 2 NC and alarm contact						
Rated operational voltage U_o	AC	AC V	24	230	415	
Rated operational current I_o	AC-15	A	6	6	3	
Conventional thermal current I_{th}		A	10			
Rated operational voltage U_o	DC L/R 200 ms	DC	V	24	110	220
Rated operational current I_o	DC-13	A	2	0.5	0.25	
Auxiliary releases						
Undervoltage release						
Power consumption	during pick-up	V A W	20.2/13			
	uninterrupted duty	V A W	7.2/2.4			
Response voltage	trip	V	0.7 to 0.35 x U_n			
	pick-up	V	0.85 to 1.1 x U_n			
Max. opening time		ms	20			
Shunt trip						
Power consumption	during pick-up	AC / DC	V A W	20.2/13		
Response voltage	trip	V	0.7 to 1.1 x U_n			
Permissible command duration		s	5			
Max. opening time		ms	20			
Short-circuit protection for auxiliary and control circuits						
Fuses	utilization category gL/gG	A	10			
Miniature circuit-breakers	C characteristic	A	6 ¹⁾			

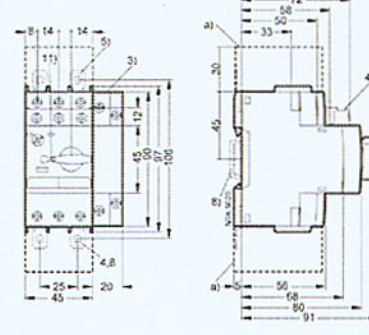
¹⁾ Prospective short-circuit current < 0.4 kA.

Dimensions in mm

Size S0

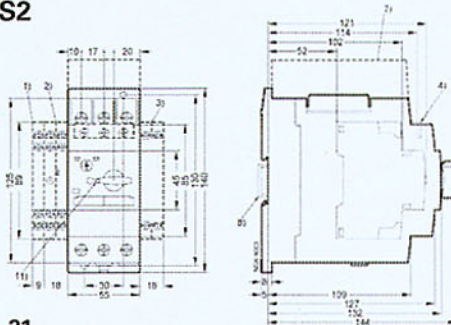


3RV1, 21

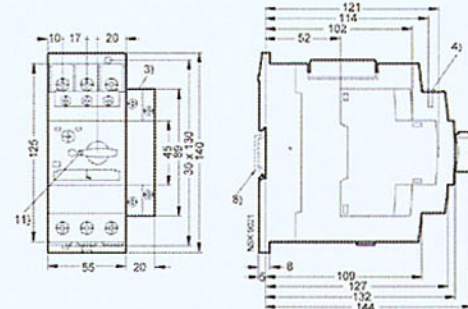


3RV11 21

Size S2

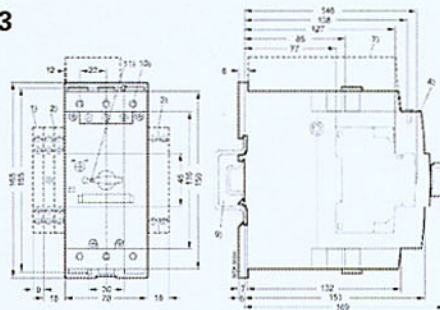


3RV1, 31

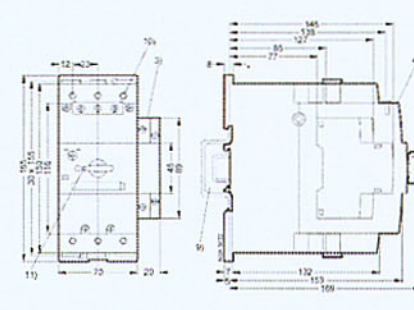


3RV11 31

Size S3

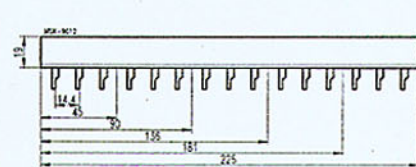


3RV1, 41

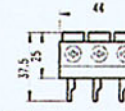


3RV11 42

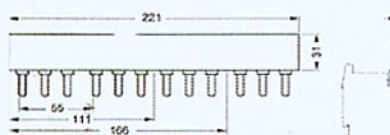
- | | | |
|---------------------------------------|--|---|
| 1) Side mountable auxiliary contact. | 6) For undervoltage release with leading auxiliary contact only. | 9) Mounting on 35 mm standard mounting rail, 15 mm high, acc. to EN 50 022 or 75 mm standard mounting rail acc. to EN 50 023. |
| 2) Alarm contact. | 7) Arcing space | 10) 4 mm Allen screw. |
| 3) Auxiliary release. | 8) 35 mm acc. to EN 50 022 | 11) Lockable in O position, shackle diameter 5 mm. |
| 4) Front mountable auxiliary contact. | | |
| 5) Push-in lugs for screw fitting. | | |



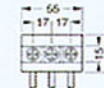
3-phase busbars - size S0
 for 2 MPCB's 3RV19 15-1A
 for 3 MPCB's 3RV19 15-1B
 for 4 MPCB's 3RV19 15-1C
 for 5 MPCB's 3RV19 15-1D



3RV19 15-5A
 3-phase in feed terminal
 for MPCB size S0



3-phase busbars - size S2
 for 2 MPCB's 3RV19 35-1A
 for 4 MPCB's 3RV19 35-1C



3RV19 35-5A
 3-phase in feed terminal for
 MPCB size S2

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